THE REPUBLIC OF KENYA

AFRICAN DEVELOPMENT BANK

TANA WATER SERVICES BOARD

KENYA TOWNS SUSTAINABLE WATER SUPPLY AND SANITATION PROGRAM

LOT 1: Review of Designs and Construction Supervision of Chuka and Chogoria Water Supply and Sewerage Project

Contract No. TWSB/ADB/001/2016-2017

CHUKA WATER SUPPLY INFRASTRUCTURE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT

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Disclaimer:
This Environmental Impact Assessment Project Report is based on literature review, preliminary feasibility and design reports and findings from field assessment. It is strictly confidential and any materials thereof should strictly be used in accordance with agreement from the management of Tana Water Services Board (TWSB). It is however, subject to conditions in the Environmental Management and Coordination Act 2015, Environmental (Impact Assessment and Audit) Regulations, 2003 reviewed in 2009 and African Development Bank Operation Safeguards Policies 1,2,3,4 & 5.

LIST OF ACRONYMS

AfDB	African Development Bank
BOD	Biological Oxygen Demand
CG	County Government
GHG	Green House Gases
ECD	Early Childhood Development
EA	Environmental Assessment
EHS	Environment Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environment and Social Management & Monitoring Plan
EMSF	Environmental and Social Management Framework
EMCA	Environmental Management and Coordination Act
ESA	Environmental and Social Assessment
EA	Environmental Assessment
EHS	Environmental, Health and Safety Guidelines
IFC	International Finance Cooperation
ILO	International Labour Organization
IBRD	International Bank for Reconstruction Development
IDA	International Development Agencies
KFS	Kenya Forest Service
KNBS	Kenya National Bureau of Statistics
KWS	Kenya Wildlife Services
HASP	Health and Safety Plan
MTP	Medium Term Plan
MDG	Millennium Development Goal
MAS	Modified Activated Sludge
MSF	Multi-stakeholder Forum
NIWASCO	Nithi-Water and Sanitation Company
NEC	National Environment Council
NEP	National Environment Policy
NEMA	National Environment Management Authority
OS	Operation Safeguards
OP	Operations Policy
PAD	Project Appraisal Document
PCR	Physical Cultural Resources
PPP	Private Public Participation
RAP	Resettlement Action Plan
SDG	Sustainable Development Goals
SUP	Socially Uplifting Project
TWSB	Tana Water Services Board
TPT	Town Planning Team
WB	World Bank
WRMA	Water Resources Management Authority
WWTP	Waste Water Treatment Plant

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ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT STUDY REPORT

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E. EXECUTIVE SUMMARY

E.1 Project Information

This Report is an Environmental and Social Impact Assessment (ESIA) Study Report for the proposed Water Supply Infrastructure for Chuka to be financed under the Kenya Towns Sustainable Water Supply and Sanitation Program of the African Development Bank (AfDB). The overall goal of the project is to improve the health and quality of life and reduce poverty levels of the population of Kenya through provision of safe water in a sustainable manner.

The Project Report for the Project was submitted to the National Environment Management Authority (NEMA) for review on 6th September 2016 under NEMA/EIA/PSR/6511. Upon review of the Report, NEMA advised that the Project should be subjected to a Full Study as required by Environment Impact Assessment and Audit Regulations 2003 for Projects of similar nature.

The proposed Project shall involve construction of Water Supply for Chuka Town and its environs. Specific components under the Water Supply System are provided in **Table E-1 below.**

Table E-1: Water Supply Scope

Item	Final Scope of Works
Intake Works	• New Reinforced Concrete Run-of-river Ogee Weir Intake on the confluence of Ruguti/Manyara Rivers for New Kirege Treatment Works • Rehabilitation of existing Intake on Tungu River for Existing Kiang'ondu Treatment Works
Raw Water Mains	• New ND 450mm, 7 Km long Ferrous Raw Water Gravity Main to New Kirege Treatment Works • Rehabilitation Existing Twin ND 250mm, 3 Km length uPVC mains to Existing Kiang'ondu Treatment Works
Treatment Works	• New Kirege Water Treatment Works, Full Conventional Treatment Works of gross capacity 15,000m^3/d. • Rehabilitation/ Completion of Existing Kiang'ondu Treatment Works estimated gross capacity 3,500m^3/d to provide Full Conventional Treatment system.
Transmission Mains	• DN 150 - 400mm Ferrous mains, Total Length 29 Km
Storage Tanks	• Total 5 Nr Reinforced Concrete Tanks- 3 Nr. 500m^3capacity tanks at Nthirani, Kibugua and Ikuu 2 Nr. 100m^3 capacity tanks at Kaanwa and Rubate.
Distribution Network	• Rehabilitation/ Augmentation Works on existing water supply system

The Engineer's Estimate of the Project Cost is Kshs. 1,435,053,176.

E.2 Legal and Regulatory Instruments

The Report has presented the relevant policies, legislation and institutional frameworks that guide preparation of ESIA at both National and AfDB Safeguard Standards levels.

Policy provisions included; Constitution of Kenya 2010, Kenya Vision 2030, National Environment Policy (NEP) 2013, HIV and AIDS Policy 2009, National Land Policy of 2009, Gender Policy 2011, Kenya National Youth Policy 2006, the Sustainable Development Goals (SDGs)

Acts of Parliament applicable included; EMCA 2015, Land Act 2012, Water Act 2016, Physical Planning Act 1996 (286), The Urban Areas and Cities Act 2011, Occupational Health and Safety Act (OSHA 2007), The Public Health Act (Cap.242), HIV and AIDS Prevention and Control Act 2011, Sexual Offences Act 2006, Child Rights Act (Amendment Bill) 2014, Labour Relations Act 2012, National Gender and Equality Commission Act 2011, and The Wildlife Conservation and Management Act CAP 376, 2013

The assessment has also made reference to African Development Banks (AfDB) Operational Safeguards (OS) Policies. These Policies include; OS 1: Environmental and Social Assessment; OS 2: Involuntary Resettlement, Land Acquisition, Population Displacement and Compensation; OS 3: Biodiversity and Ecosystem Services; OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency and OS 5: Labour Conditions, Health and Safety.

E.3 Highlights of Stakeholder Consultations

The African Development Bank Operation Safeguard (OS 1) Environmental and Social Assessment and Kenya's Environmental Impact Assessment / Audit Regulations of 2003 require that in the process of conducting Scoping, Environmental Impact Assessment, the proponent shall in consultation with the Authority herein referred to as the National Environment Management Authority (NEMA); seek the views of persons who may be affected by the Project.

The aim of stakeholder consultations was to disseminate information on project details impacts, mitigation measures and outline benefits to be gained, provide a platform for information sharing and opinion gathering in relation to the proposed project. Consultations were done in form of public meetings/ barazas and key informant interviews. The issues were than analyzed and presented to form this ESIA Report and discussed with design team for finalization of Project designs and planning on how best to implement the Project.

To comply with the above discussed statues, preliminary consultation at Project Report Stage of the ESIA involved consultations with key stakeholders in Chuka Town in the year 2016. At full Study Stage of the ESIA in March 2018, detailed workshops and public meetings at the local level were held from 12th to 19th March 2018 in 10 different sub-locations in accordance with the constitutional right (Article 10) of public participation where it's the democratic right of every Kenyan to participate in public decisions and collaborate in public projects.

The workshops involved EIA experts, TWSB team, local administration, village leaders, business community, local church leaders, WRUA members, community water group members and local residents of various sub locations who form the main beneficiaries of the project. **Table E-2** below presents a summary of Consultative meetings held within the Project area.

Table E-2: Schedule of Stakeholder Meetings in Chuka

Date	Venue of Workshop	Participants Involved	Gender Representation
15th April 2016	NIWASCO	County Government Officials NIWASCO staff, WRMA, Local Administration Officials	Government Officials
15th April 2016	Chuka Town	County Government Officials NIWASCO staff, WRMA, Local Administration officials, open public	Total 25 15 men 10 women
20th March 2018	Office of the Chief Mariani Location	**Marian Location:** A Chief Mariani Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 149 Male 87 Female 62
22nd March 2018	Office of Chief Mugwe Location	**Chief Mugwe Location,** Assistant Chief Kirege Sub Location, Assistant Chief Mugirirwa Sub Location, E.I.A Expert, TWSB Engineer, and members of the public.	Total 26 Male 24 Female 2
21st March 2018	Office of Chief Rubate Location	**Chief Rubate Location,** Assistant Chief Rubate Sub-Location, Assistant Chief Kanthiiri Sub Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 398 Male 277 Female 121
21st March 2018	Office of Chief Thoita Location	**Chief Thoita Location**, Assistant Chief Thoita Sub-Location, Assistant Chief Kathatwa Sub Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 15 Male 13 Female 2

In Summary, issues discussed included; Project benefits, fate of existing communal water supply projects, timeframe of implementation of the project, operation and maintenance of the project, water tariff, modalities of getting water connections, scope and coverage of the project, priority between water and sanitation component and displacement of activities along the riparian reserves and compensation issues.

E.4 Project Impacts

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

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

Sections E.4.1 to E.4.4 below provides a summary of the Project impacts both positive and negative discussed in this Report.

E.4.1 Positive Impacts During Construction Phase

The Project is a Socially Uplifting Project (SUP) and it's envisaged to have more positive impacts after completion of the civil works and commissioning. A summary of anticipated positive impacts of the Project include:

- Employment opportunities during construction, the design report has provided for 90% unskilled labour and 60% skilled labourers to be sourced from the local market.
- Provision of ready market for construction materials such as sand, ballast and cement that will be sourced from local market, this will lead to injection of money into the local economy
- Technological and knowledge transfer to the local sector, this will be through the artisan who will be employed and trained by the Project.

E.4.2 Positive Impacts during Operation Phase

The Project shall result to both direct and indirect benefits to the residents of Chuka Project Area as summarized below:

(i) Improve affordable, clean, reliable water supply within Project area leading to improved health and hygiene.
(ii) Reduce exposure to health risks posed by consumption of untreated water from existing community water schemes.
(iii) Improve health and nutrition of Chuka people through consumption of treated safe water.
(iv) Provision of clean reliable safe water supply will eliminate water burden to women and girl child, this will allow women to engage in other economic activities while girl child concentrate on education.
(v) Provision of affordable water to residents because the water will be billed at Water Services Regulatory Authority recommended tariffs as opposed to the current exorbitant tariffs posed by local community water schemes.

E.4.3 Negative Impacts and Mitigation Measures during Project Construction Phase

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

i) delivery of construction of pipes, and associated fittings, culverts and manhole cover to the Project sites,
ii) Manual excavation of trenches,
iii) Temporary stockpiling of soils, sub-soils and rock along the trenches,
iv) Importing material for bedding of concrete joints of the water lines and sewer lines (e.g. sand, cement, and concrete)

The activities above have the potential to trigger negative environment and social impacts during Project Construction Phase, **Table E-3** on **Page E-5** gives a summary of potential negative impacts and proposed mitigation measures.

Table E-3: Negative Impacts and Proposed Mitigation Measures During Construction

Impact	Summary of Mitigations
Bio-Physical Impacts	
Loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits along River Ruguti within Mt Kenya (Chuka)	• The Contractor will ensure proper demarcation of the Project area to be affected by the construction works; • Strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works; • Retention of trees and shrubs, where possible on the potential sites for screening of the visual impact; • Where the proposed route requires the removal of any vegetation, care will be taken to minimize the destruction or damage of trees; • Work in collaboration with KFS to ensure replanting of destroyed trees in cleared areas where works are complete; • Ensure a permit to work within the forest is obtained from KFS as per the Forest Act, 2016.
Disruption of wildlife movement corridors at the weir site and raw water corridor along Ruguti River within Mt Kenya (Chuka)	• KWS to be involved in monitoring existing and new species and other negative impacts accompanying the project; • Clearance of vegetation should be done in necessary areas only; • Off-road driving will be discouraged; • Maximizing hiring local workforce for the project and sensitization programs for contractors on laws against poaching and safety measures to reduce Human Wildlife Conflict (HWC); • Presence of KWS staff on site for monitoring throughout construction period; • Provide a watering point for animals at the intake site as proposed by KWS; • Regular monitoring of construction materials to avoid introduction of invasive plant species.
Vegetation clearing, soil erosion and siltation	• Contain excavated soils so that they will not find their way into nearby water sources; • Spilled cement or concrete should be collected and disposed away from natural water ways or storm water drainage; • Sensitise workers and enable them to properly handle concrete spillages or waste cement; • Re-vegetation of exposed areas around the site should be carried out rapidly in order to mitigate against erosion of soil through surface water runoff and wind erosion.
Water quality pollution from construction activities which include solid and effluents waste	• Isolate solid wastes disrupted from the works during excavations for safe disposal. The wastes should be collected and disposed in approved sites. • Earth moving and excavations for the construction are carried out considering safety of the river and surface drainage. Control siltation of rivers and other surface drains • Ensure spilt oil does not discharge into water sources Provide oil spill containment including concrete platform for servicing of construction equipment and holding of scrap oil drums.
Interference with drainage and hydrology within Project site	• Excavated channels to follow natural water course to avoid interference with surface drains; • Whenever necessary, drains along the construction line are directed towards existing drainage systems to cater for storm water during the rains. However, construction should be carried out during a dry season and should take the shortest period possible; • Utilise excavated soil to level excavated ground where necessary and cover the water and sewer lines that will have been laid in the ground.

Impact	Summary of Mitigations
Interruption of existing infrastructure such as roads, community waterlines and power lines	• Formal request for permission to cross, break in and lay the pipelines should be sought from affected property owners; and • A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction.
Solid waste generation from construction activities	• A site waste management plan should be prepared by the Contractor prior to commencement of construction works. This should include designation of appropriate waste storage areas, collection and removal schedule and identification of approved disposal site; • Ensure that the solid waste collection, segregation, and disposal system is functioning properly at all times during the construction phase; • Recycle and re-use wastes where possible such as scraps metal.
Health and safety Impacts	
Air quality pollution caused by emissions from construction plant and equipment which include dust and gaseous emissions.	• The contractor will comply to the provisions of EMCA 2015 (Air Quality Regulations 2014). • Workers shall be trained on management of air pollution from vehicles and machinery. All construction machinery shall be maintained and serviced in accordance with the contractor's specifications. • Water sprays shall be used on all earthworks areas within 200 metres of human settlement especially during the dry season. • Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air.
Noise and excessive vibration from construction equipment and vehicles	• Contractor will comply with provisions of EMCA 2015 (Noise and Excessive Vibrations Regulations of 2009). • The Contractor will keep noise level within acceptable limits (60 Decibels during the day and 35 Decibels during the night) and construction activities shall, where possible, be confined to normal working hours in the residential areas. • Sensitive receptors, for example Schools including Chuka University, Chuka Boys shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity.
Occupational health and safety risks associated with the Project	• Establish a Health and Safety Plan (HASP) for civil works areas ensuring the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit for purposes of gaining extra pay; • Provide workers with gloves, ear gears, sturdy rubber boots and overalls to protect their skin from the effects of cement; • Provide workers training on safety procedures and emergency response such as fire
Social Impacts	
Project impact to private property and sources of livelihood	Prepare a Resettlement Action Plan (RAP) for purposes of compensation of likely assets and sources of livelihood for Project affected persons.

Impact	Summary of Mitigations
Spread of communicable diseases and HIV/AIDS infection	• Develop appropriate training and awareness materials for Information, Education • Develop an intervention strategy compatible with the construction programme to address success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders; • Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs
Labour Influx to the Project area.	• Effective community engagement and strong grievance mechanisms on matters related to labour. • Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx • Proper records of labour force on site while avoiding child and forced labour • Fair treatment, non-discrimination and equal opportunity of workers. • Comply to provisions of Labour Relations Act 2012 and Work Place Injuries and Benefits Act (WIBA 2007) • The Contractor shall require his employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct.
Violation of Human Rights, and gender requirement by Contractors	• Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule and National Gender and Equality Commission Act 2011 • Protecting human risk areas associated with, disadvantaged groups, interfering with Participation Rights and Labour Rights • The contract will provide provisions that ensures that gender based violence and abuse are not triggered by the Project as provided for by Sexual Offences Act 2006
Violation of children right by contractor and labour force on site.	• Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project. • All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour • Children under the age of 18years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014

E.4.4 Project Negative Impacts and Proposed Mitigation Measures During Operation Phase

The Project once commissioned has the potential of triggering negative impacts associated with operation and maintenance as summarized in **Table E-4** on **Page E-8.**

Table E-4: Negative Impacts and Mitigation Measures During Project Operation

Issue	Summary of Mitigation
Risk of encroachment and construction of structures on the water easement	• Mapping and installation of beacons to which illustrate the width of the pipeline reserve • Regular patrol of the pipeline corridor for encroachment. • Prosecution of encroachers as required by County By Laws on way leaves and road reserves maintenance. • Conduct public sensitization programs on importance not interfere with way leaves and public reserve land
Risk of water pipeline bursts leading water wastages (Non-Revenue Water percentages increase)	• Regular check, repair and maintenance of the water pipeline • Activate a community watch group for information sharing on the status of the water line • Implement a leak detection and repair program (includingrecords of past leaks and unaccounted- for water to identify potential problem areas)
Risk of illegal connection to the water pipeline	• This will require constant inspection by NIWASCO officials and installation of leak and burst detectors at designated areas along the pipeline. • Conduct public sensitization programs on importance not interfere with the water pipeline and the need to seek official water connection from NIWASCO
Water Discharges during flushing/cleaning of pipes to remove sediments. The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids, residual chlorine, and other contaminants that can harm surface waterbodies.	• Identify environmental issues that need mitigation during operation of the Project component. • Develop management plans and procedures needed to address the environmental concerns • Monitor and evaluate the performance against set targets • Set a budget for environmental management; and restorations • Schedule for revising and updating the ESMMP. • Initiate sensitization programmes on best practices on solid waste management right from the source, sorting, transportation and disposal • Conducting an initial audit in the first year of operation of the projects and subsequent annual audits of the operational activities.

E.5 Assessment Findings

The Environmental and Social Impact Assessment undertaken for the Project indicates that the Project will have the following impacts.

(i) The Project is listed under Schedule Two of EMCA 2015 for Projects which require to be subjected to ESIA, such project requires that site characteristics are identified early including likely social and environmental impacts. The schedule categorizes Water Supply Projects as medium risk, while AfDB Operation Safeguard (1) on Environment and Social Assessment categorizes Water Supply Projects as Category B. This implies that the Project has less significant impacts to the environment and can be easily mitigated

(ii) The assessment identified that there will be limited direct interaction of the Project activities at the time of construction with the natural sensitive ecosystems at the proposed weir sites and raw water pipelines within Mt Kenya forest along river

Ruguti in Chuka. Therefore, associated impacts of such works would include;

- Minor loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits along River Ruguti within Mt. Kenya. The ESIA has provided for an "offset" which includes replanting of indigenous trees ten times the number of the trees to be cleared along the raw water pipeline 7km in the forest.
- Disruption of wildlife movement corridors at the weir site and raw water corridor along Ruguti River within Mt. Kenya. The ESIA provides for collaboration with KWS in establishment of appropriate mitigation measures throughout construction period.

E.6 Recommendations

In order to alleviate the expected negative impacts and to make the Project environmentally sound, an ESMMP has been prepared, and it includes: the mitigation plan; the monitoring and enforcement requirements; and the responsible persons/organizations. All the recommendations / mitigations mentioned in the assessment should be financed and incorporated in the construction and supervision stages and also during operation and maintenance stage of the Project.

This assessment recommends the following provisions:

(i) The Bid Documents prepared for the Project incorporates the Environment, Social Health and Safety Provisions discussed under Chapter 7 (Environment and Social Impact Assessment and Mitigation Measures).

(ii) Contractor to commit to implementing the Environment, Social Health and Safety (ESHS) Provisions by developing site specific (ESHS) plans.

(iii) At Project implementation stage, the Contractor to report to the Project management team comprising of the Consultant and the Project proponent on a monthly basis on how ESHS provision detailed in this ESIA are addressed at each Project Site.

(iv) On completion of the Civil Works, NIWASCO to commission an independent Consultant to undertake an initial Environment, Social, Health and Safety Audit as required by Environment Impact Assessment and Audit Regulations of 2003. The audit will identify nonconformities which the Contractor together with NIWASCO will address through the defects liability period of the Project. This audit will also form basis of annual Project self audits by NIWASCO.

CHAPTER 1: BACKGROUND INFORMATION

1.1 General

1.1.1 Background Information

The Government of the Republic of Kenya (GoK) has mainstreamed its National Water Policy to envisage 100% access to safe water and sanitation facilities for the Country's population by year 2030. To achieve this target, the GoK has been implementing a far-reaching sector reform program since 2002 aimed at harmonizing the Management of Water Resources and Water Supply and Sanitation (WSS) throughout the Country. This reform has been propelled by the Water Act (2002), which aims at harmonizing the Management of Water Resources and Water Supply and Sanitation Services.

In August 2010, Kenya enacted a New Constitution. A key benchmark of the New Constitution is stipulated under Chapter IV-BILL OF RIGHTS, paragraph 43(1)(b) and (d) which stipulates: "Every person has the right to (b)..... reasonable standards of sanitation and (d) clean and safe water in adequate quantities."

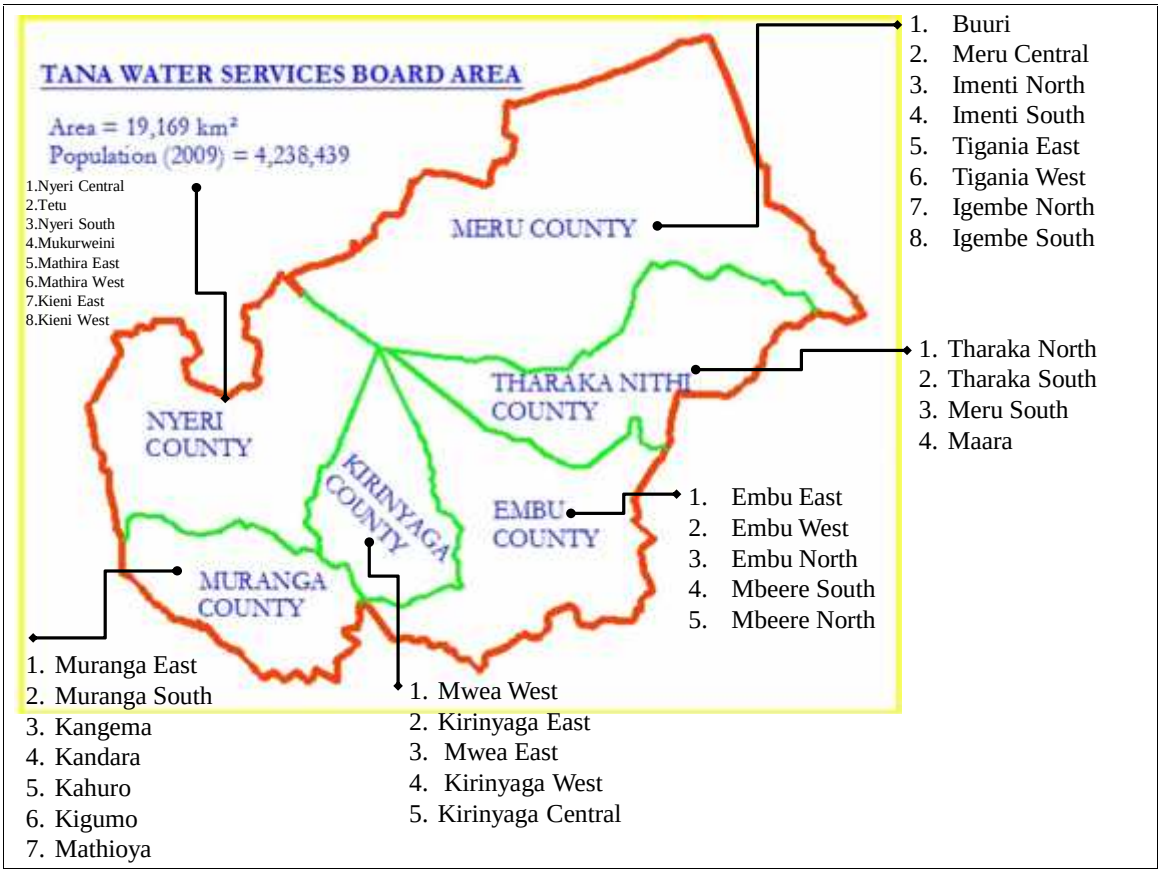
The Africa Development Bank has been supporting the GoK in its Water Sector Reforms through financing of Programmes towards improvement of Water and Sanitation Services in the Country. The Government of Kenya has received funding from African Development Bank through the 'Kenya Towns Sustainable Water Supply and Sanitation Program'. The overall goal is to improve the health and quality of life and reduce poverty levels of the population of Kenya through provision of water and sanitation services in a sustainable manner.

The Project specific purpose was to improve the access, quality, availability and sustainability of water supply and wastewater services in the Chuka and Chogoria Towns located in Tharaka Nithi County. Other projects planned to be funded include Kerugoya Kutus in Kirinyaga County and Meru Sanitation Project located in Meru County.

Mangat, I.B. Patel (MIBP) Limited has been appointed as the Consultant for preparation of Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP), Design Review, Procurement of the Services of Contractor(s) for executing these Works and Construction Supervision.

1.2 Project Implementing Authority

The Project is planned to be implemented by Tana Water Services Board (TWSB), the Board is among the eight Water Services Boards created under the Water Act, 2002. The Board's mandate is to ensure efficient and economical provision of water and sanitation services in its area of jurisdiction in line with the Water Act, 2002.The Board is responsible for the provision of Water Services in six Counties; namely Nyeri, Embu, Kirinyaga, Meru, Murang'a and Tharaka-Nithi covering an area approximated to be 19,169 km^2 with a population of 4,238,469 as per the 2009 Kenya National Bureau of Statistics (KNBS) population and housing census. A layout plan showing the locations of Counties under TWSB is given in **Figure 1-1** on **Page 1-2.**



Source: Detailed Design Report Bulk Water Supply and Sanitation Project for Chuka Town

Figure 1-1: Tana Water Services Board Coverage

1.3 Project Justification and Benefits

TWSB has developed a strategic plan for the period 2013 – 2017 with the aim of improving access to water and sanitation services by increasing the proportion of urban population accessing safe water from 73% to 90%, rural population accessing safe water from 46% to 70% over the planning period. The Project is among the initiatives of the Board towards achieving the strategic goal above.

The Project addresses improved water supply and sanitation, in small towns and surrounding rural areas, as well as water storage that underpins the Kenyan economic and social developments (Vision 2030) and its associated five years Medium Term Plan (MTP) for 2012 – 2017.

Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal (MDG) as guided by resolutions of Rio+20 conference. The goal focuses more on investment in adequate infrastructure in Water, Sanitation, Hygiene, Water Quality, Waste Water Management, Water Scarcity and use Efficiency, Integrated Water Resource Management and Protection of Water related Ecosystems.

1.4 Objectives and Scope of the ESIA

This ESIA assessment has been conducted in compliance with the Environmental Impact Assessment Regulations as outlined under the Gazette Notice No. 56 of 2003 reviewed in 2009, established under the Environmental Management and Coordination Act (EMCA), 2015 of Kenya. The Environmental & Social Impact Assessment (ESIA) is expected to achieve the following objectives:

- To identify all potential significant environmental and Social impacts of the proposed Project and recommend measures for mitigation.
- To assess and predict the potential impacts during site preparation, construction and operational phases of the Project.
- To verify compliance with environmental regulations.
- To generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the Project cycle.
- To allow for public participation.
- To give an Environmental and Social Management Plan to mitigate the identified impacts to ensure sustainability of the proposed Project.
- To recommend cost effective measures to be implemented to mitigate against the expected impacts.

1.5 Assessment Methodology

The approach to this exercise was structured to cover the requirements under the EMCA, 1999, as well as the EIA regulations as stipulated under the Gazette Notice No. 56 of 13th June 2003 and African Development Bank (AfDB) Operational Safeguards Policies.

The assessment involved an understanding of the Project background, Review of the Project Report which was submitted to NEMA in June 2016, the final designs and the implementation plan as well as Project commissioning. In addition, the baseline information was obtained through physical investigation of the site and the surrounding areas, interviews with a sample of surrounding community, Stakeholder benchmarking photography and most important discussions with the Client and the Design Team.

1.5.1 Environment and Social Scoping

The scoping study covered physical, biological and socio economic and cultural environment within the Project proposed areas in Chuka Town and identified significant environmental and social issues associated with the proposed Works.

Interviews and discussions with stakeholders and Project beneficiaries were applied in determining the aspects such as adequacy of the supply, awareness ownership, willingness to pay for water and general opinions of the people. Significant issues identified through this process have been applied in drawing up the impacts as well as the management plan under this Report.

Through the scoping assessment, the following activities were undertaken:

1. Field visit to the Project Sites
2. Literature review of Technical Reports

3. Initial and broad assessment of the Project
4. Review of policies, regulations and baseline data
5. Determination of geographical coverage
6. Identification of relevant Stakeholders (interested and affected parties),
7. Significant impacts (areas of study) and the levels of detail in each impact study.

1.5.2 Desk Review

A desktop review was conducted prior to site visit. Documents reviewed include:

- Detailed Designs of the Proposed Project Components
- National Environmental Acts and Regulations (EMCA 2015 and EIA/EA Regulations 2003)
- African Development Bank (AfDB) Operational Safeguards Policies
- Project Report for Chuka Water Supply Project submitted to NEMA in June 2016.

1.5.3 Field Assessment

The physical evaluation of the Project area was carried out with specific focus on the environmental and social issues. The environmental issues assessed include, water sources and water quality, drainage and hydrology, air quality, sanitation and hygiene, biodiversity and sources of environmental pollution. The social issues include; settlement patterns, socio economic activities, land use, presence of traditional/cultural sites in the area. On the social economic front, structured stakeholder consultation meetings were held in some specific areas in addition to rapid interactions with the stakeholders to capture the views of all the parties affected.

1.5.4 Public Participation

The assessment involved public and stakeholder consultations with relevant stakeholders in Chuka Town concerning the Project. The aim of stakeholder consultations was to give communities the required Project information, collect their concerns regarding the Project and also to discuss relevant issues raised that concerns the Project. The issues were then analyzed and used in finalization of the Project designs and planning on how best to implement the Project for Chuka Town. Public participation was held on 21st April 2016 at the County hall in Chuka Town, attendance of the meeting represented various interested groups in the Town.

1.5.5 Key Informants

During the scoping stage, several consultations were conducted including Key Informant Interviews/ meetings held with various Tharaka-Nithi County Government Officers, Town Planning Team (TPT) representatives as well as the Multi-stakeholder Forum (MSF) representatives between 21st and 23rd April, 2016. During this stage of the study, Key informant interviews were conducted with Specific County, Sub- County Government representatives of Central Line Ministries and Multi Stakeholder Forum members from different villages and estates in Chuka Town.

1.6 Socio Economic Survey Methodology

1.6.1 Socio Economic Survey

The survey was conducted within Chuka Town with target respondents being the anticipated Project beneficiaries. The information gathered was based on (a) review of secondary data and (b) collection of primary data, both qualitative and quantitative. The qualitative data was gathered through administration of questionnaires and public consultative meetings organized by the area local administration and community members and other stakeholders in the locations.

1.6.2 Household Surveys

The objectives of the household survey was to; understand demographic and economic profile of households within the project locations, know status of and issues related to ownership and tenancy structure, assess resident's access to infrastructure, social amenities, understand environmental conditions, health and various social issues. This information is important as it helps in establishing baseline data required during Project impact evaluation after commissioning.

1.6.3 Social Infrastructure Mapping

Social mapping was undertaken while doing the community survey using full participation from the Local Administration and Community. The focus of the process was to help in the depiction of location boundaries, roads, drainage systems, schools, drinking water facilities, source of drinking water, community infrastructure, etc. It focused on the spatial dimension of the people's realities as expressed in their background information. This process was done to help in charting the various aspects related to land use, water bodies, rivers and drainage channels.

1.6.4 Sampling Design

The sampling design relied on probabilistic sample design for selection of households to ensure that every single household in the settlement area has a known and non-zero chance being selected into the survey sample. For the household survey, it is quite common to use circular systematic sampling (Systematic sampling is a probability sample selection method in which the sample is obtained by selecting every kth element of the population, where k=N/n, N is population and n is the sample size). The first sampling unit is selected randomly within the first k units of the list. This method for selection of households and the same has been followed in the present study.

1.6.5 Sample Size

For each of the locations, the sample size was determined at 5% level of precision (also called desired margin of error), 95% confidence level and 50% population proportion of response to key study indicators. The choice of population response proportion is arbitrary; but this is what is assumed to generate the largest possible sample in the absence of a prior knowledge about population response to key study indicators. The sample size was not adjusted for non-response factor. Like in many surveys, non-response of the sampling unit (here household) has been tackled by substituting original sample unit by another.

1.6.6 Survey Questionnaire

The survey questionnaire was designed after reviewing the instruments used in similar kind of household studies in Kenya and prototype survey instruments available from the user guide of the World Bank Group (Preparing Surveys for Urban Upgrading Interventions – Prototype Survey Instrument and User Guide, March 2008). The questionnaire used contains six modules, namely: demographics and household composition; security of housing, land and tenure; settlement profile; economic and employment profile; infrastructure services; and health

1.6.7 Secondary Socio Economic Data

This information was largely drawn from the Kenya National Bureau of Statistics. The Kenya Population and Housing Census VII on Population and Household Distribution by Socio Economic Characteristic, August 2010 and findings from household survey undertaken during Environmental and Social Impact Assessment (ESIA) process within the month of April 2016 and March 2018, during preparation of Project Report.

CHAPTER 2: BASELINE INFORMATION

2.1 Location of the Project

The Project Area is located approximately 180km north of Nairobi, the Capital City of Kenya, in Tharaka Nithi County. Chuka Town is on the Western slopes of Mt. Kenya which is the highest Mountain in Kenya with the highest peak at 5199m amsl. The Project area covers 380 km^2 which is in Meru South sub-County and borders Mt. Kenya Forest to the West, Tharaka Sub-County to the East, Maara sub-County to the North and Embu County on the Southern border.

Chuka Town is the biggest Town in the County and its environs are largely rural in nature. The location of Chuka in the Country is shown on **Figure 2-1** below, while the Project Area is delineated as shown in **Figure 2-2** on **Page 2-2.**

Figure 2-1: Location map of the Project Area

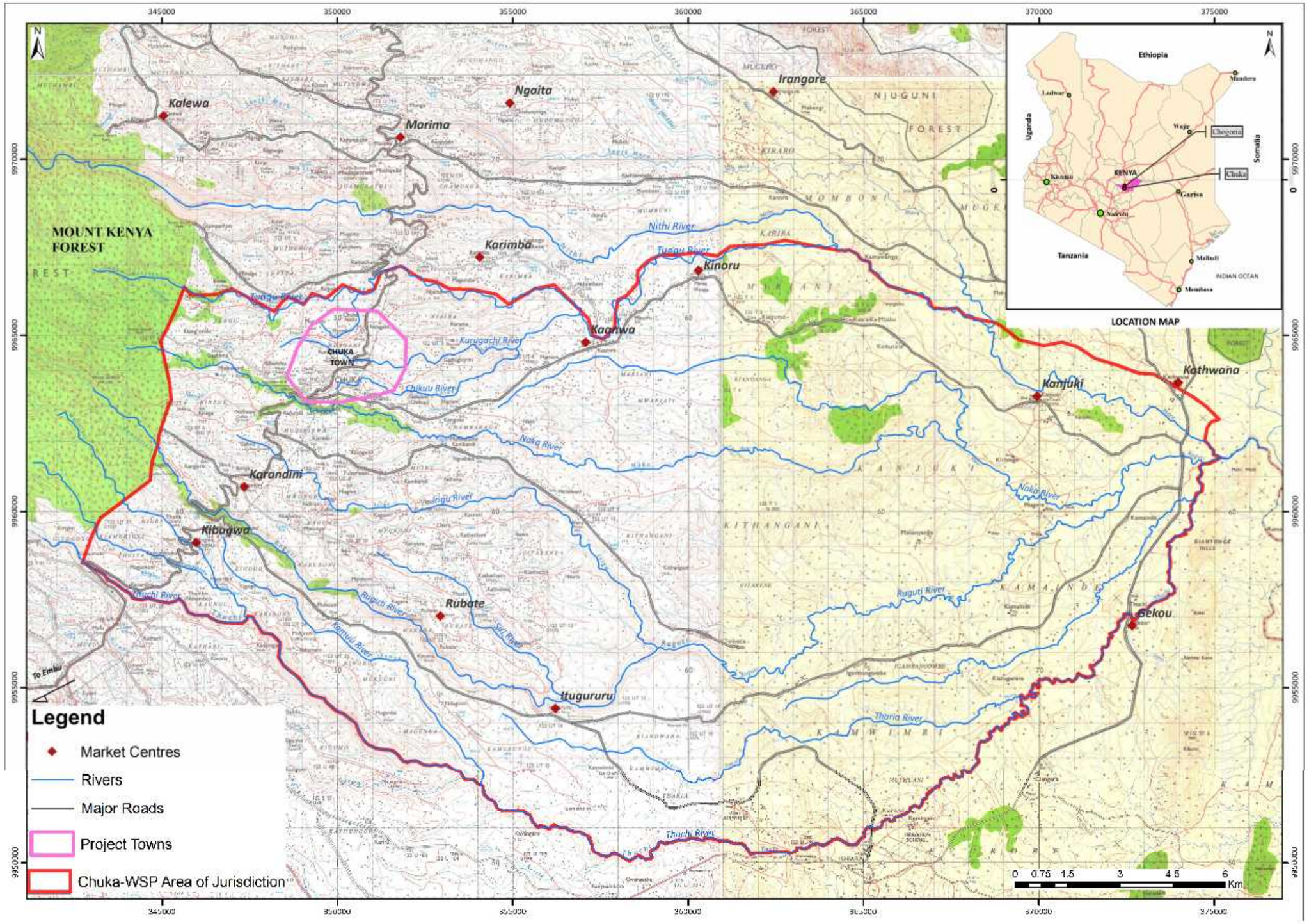


Figure 2-2: Location Plan of Chuka Project Area

2.1.1 Administrative Structure

Tharaka Nithi County is divided into four (4) Administrative Sub Counties namely; Tharaka North, Tharaka South, Chuka/Igamba ngombe and Maara sub-Counties. Tharaka North Sub County is the largest covering an area of 803.4 Km^2, followed by Tharaka South with 766.1 Km^2. Chuka/Igamba ngombe is third in size with an area of 624.4 Km^2 and Maara is the smallest Sub County covering an area of 468.2 Km^2. There are fifteen (15) Wards, sixty-three (63) Locations and one hundred and sixty-four (164) Sub-Locations in the County. **Table 2-1** shows the total area by sub counties, wards, locations and sub-locations in Tharaka Nithi County and the County's Administrative Units.

Table 2-1: Administrative Units of Tharaka-Nithi County

Sub County	Area (km^2)	No. of Wards	No. of Locations	No. of Sub-Locations
Tharaka North	803.4	2	7	18
Tharaka South	766.1	3	31	70
Chuka/Igamba ngombe	624.4	5	17	45
Maara	468.2	5	8	31
	2,662.1	**15**	**63**	**164**

Source: KNBS 2013

2.2 Physical Environment

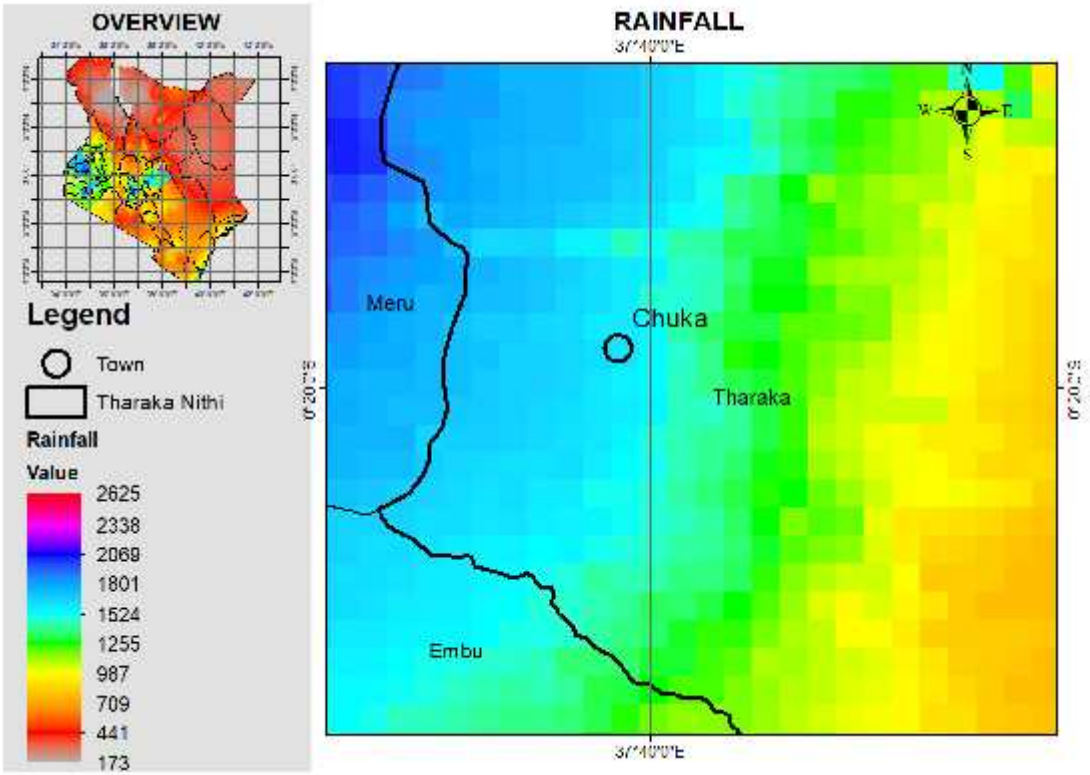
This section analyzes the environmental characteristic surrounding the areas proposed for the project. The sub-sections below describe the physical, biophysical, social and cultural environment of the Project area.

2.2.1 Climate

The climate of the study area is influenced by its geographical location and altitude relative to Mt. Kenya Forest Ecosystem and the equator. The equator and the mountain influence the climate of the Project area which is on the slopes of Mt. Kenya. Climate of the Project area changes with altitude, areas around the forest exhibit characteristic of a high rainfall region while areas located towards the lower parts of Tharaka Nithi County exhibit semi-arid characteristics. **Figure 2-3 on Page 2-4** illustrates the rainfall pattern of Tharaka Nithi County.

Rainfall is bi-modal with the long rains occurring from March to May, with a maximum in April, and the short rains from October to December. Depending on the altitude, the annual rainfall ranges from between 1,250-2,500mm in the eastern slope of Mt. Kenya and Nyambene Hills from where the rivers in the lower region of the Project originates to between 400-1,000 mm with an average of 700 mm in the lower reaches of the Project area.

The climate of the Project area can be divided into two major zones namely, the highlands which borders Mt. Kenya Forest, these areas have a temperature range of 14°C to 30°C and the marginal areas (lowlands) have a temperature range of between 22°C and 36°C. Overall, the Project area has a favorable climate for cultivation of tea, coffee, maize, cowpeas, pigeon peas, tobacco, beans and bananas among others.

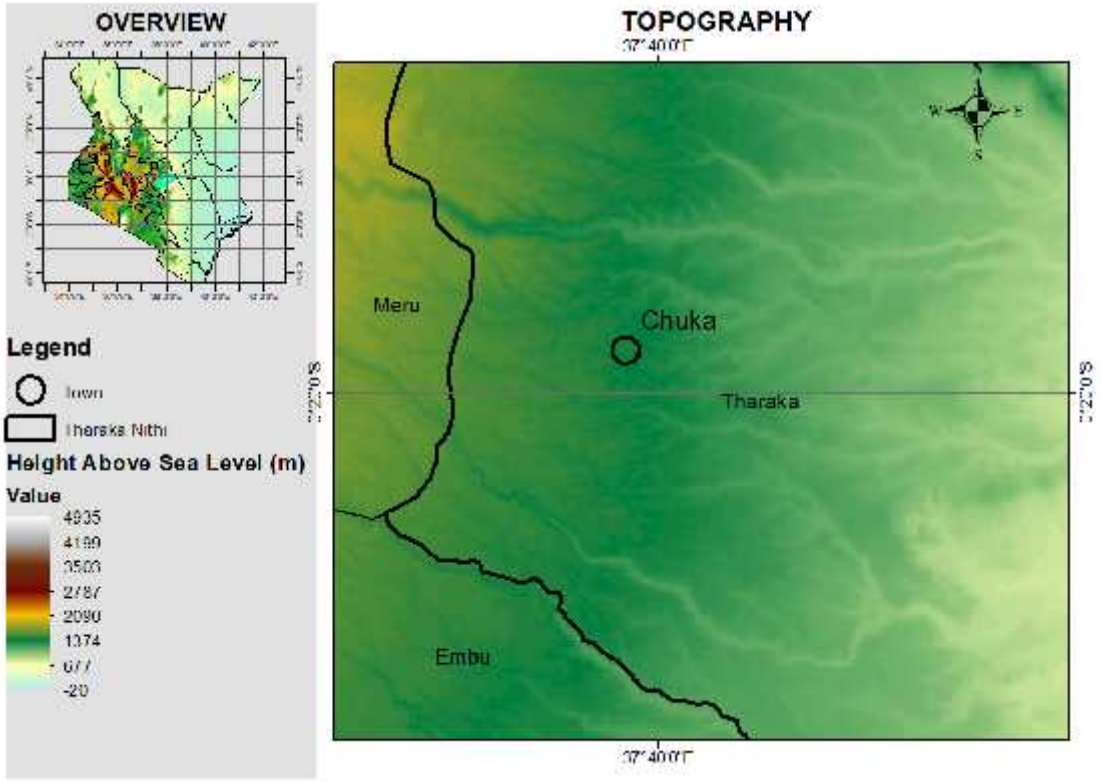


Source: Field Data ESIA May 2018

Figure 2-3: Rainfall Patterns

2.2.2 Topography

The topography of Chuka/Igambangombe Constituency is greatly influenced by the Mt Kenya volcanic activity creating 'V' shaped valleys within which the main tributaries of Tana River flow originating from Mt Kenya forest. The highest altitude of the County is 5200m a.s.l within the forest in Chuka/Igambangombe and Maara while the lowest is 600m a.s.l Eastwards in Tharaka. Major hills found within the area include Kiera, Munuguni and Njoguini in Mara constituency and Kijeje and Ntugi in Tharaka Constituency. Other physical feature of the County is the 360km^2 of Mt. Kenya Forest which serves as a tourist attraction, is also a catchment area for Tana River, the ecosystem is also a source of ecosystem services which include provision of fuel, wood, fodder and honey for the communities living around. The topography of Tharaka-Nithi County is illustrated in **Figure 2-4** on **Page 2-5**.



Source: Field Data ESIA (May 2018)

Figure 2-4: Topography

2.2.3 Geology and Soils

Geology of the Project area is characterized by the volcanic eruption of Mt. Kenya; the Project area is generally underlain by the Precambrian Basement System which is covered by volcanic rocks and sediments from the eruption of Mt. Kenya. There is apparent water erosion during or after the ice age. The sediments from this erosion form a well-drained soil blanket along the "V" shaped valleys of the rivers. The geology is composed to a large extent of quaternary volcanic rocks, which are overlain by deep soils comprising of dark brown to grayish brown within the area as illustrated in photographs below.

Alluvial Soils Within the Project area

Red volcanic soils within the Project area

2.3 Hydrology

2.3.1 Groundwater Resources

Largely due to the proximity of the region to Mt. Kenya, the source of all surface water draining the catchment, groundwater sources have not been extensively exploited. Shallow wells are the most prevalent category of ground water sources. They are found in homesteads in areas where the water table is high. Community water schemes in the area which provide raw water are the main source of water in areas not covered by the water service providers. They draw the water upstream ensuring that the systems are gravity fed. This negates the need to exploit ground water sources which could prove to be more expensive to initiate and operate.

2.3.2 Surface Water Resource

The area's hydrology is highly influenced by the Mt. Kenya ecosystem. Rivers flowing Eastwards through the County include Rivers Thuci, Mara, Nithi, Mutonga, Naka and Ruguti Tharaka Sub County on the other hand is traversed by several rivers which originate from both the Mt. Kenya and Nyambere Hills, flowing Eastwards as tributaries of Tana River. These rivers include; Mutonga, Thingithu, Kathita, Thanantu, Thangatha, Kithinu and Ura River which provide water for Irrigation in the densely populated locations in parts of Tharaka. Photographs below illustrate rivers within the Project area.

Figure 2-5: Hydrology

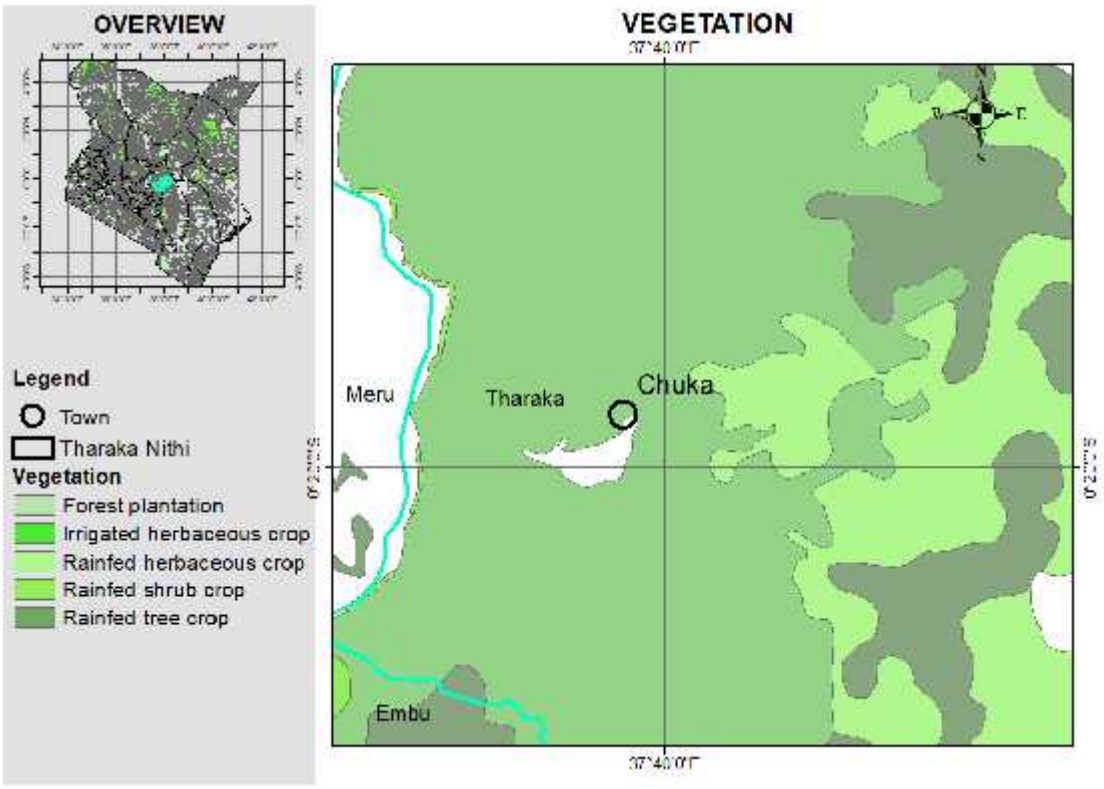
River Manyaga - upstream of proposed Intake Works for the Water Supply Project

River Tungu proposed to receive treated effluent from the WWTP

2.4 Biological Environment

2.4.1 Vegetation and Flora

Biodiversity of the Project location is highly influenced by the Mt. Kenya Forest Ecosystem with respect to indigenous plant cover species. However, due to human activities, the indigenous plant species have been displaced by exotic species that have also acquired economic values among the communities. Such plant species include tea, coffee, Eucalyptus spp, Cypress ssp., Caussurina spp. and Graveria SSP and wattle trees species. Other plant features include grass species, ferns, nippier grass, avocado, banana, yams (mainly in the river flood plains), cassava, sugar cane, pineapple, arrowroots, and coffee). **Figure 2-6** and photographs **on Page 2-8** shows vegetation cover outlook of the Project area.



Source: Field Data ESIA (May 2018)

Figure 2-6: Vegetation

Standard home within the area

Tea farming within the area

2.4.2 Fauna

Human habitation and agricultural activities have significantly interfered with both terrestrial and aquatic habitats in the Project area. There is no terrestrial wildlife observed in the Project area since most land is under agricultural use for many years pushing the animals into the Mt. Kenya Forest. However, limited rodents like squirrels, moles and different bird species among others are found in the area. Among the aquatic species present include frogs, fresh water fishes found naturally in the rivers. Livestock keeping is significant with dairy cows, sheep, goats, poultry and house pets (dogs and cats) also constituting part of the wider biodiversity.

2.5 Social Setup

2.5.1 Population

The Project Design report analyzed demographic data of Chuka from Central Bureau of Statistics (CBS), for the intercensal periods between 1979 to 2009 has been analyzed to establish trends in terms of population size and intercensal growth rates, to develop future population projection patterns.

From the analysis of the previous Kenya Population and Housing Census data, it was established that between intercensal periods, existing sub-locations were split or combined to form new sub-locations and the areas covered by the sub-locations, in such cases, vary between the intercensal period.

A summary of inter-censal population data for Chuka Sub-County is given in **Table 2-2** below detailed population projection is presented in the Chuka Water Supply Infrastructure Design Report 2018 prepared as a separate report under this consultancy.

Table 2-2: Historical Population in Chuka Service Area

	Census Population Data			
Year	**1979**	**1989**	**1999**	**2009**
Total Population	67,828	88,793	102,076	118,557

Source: Chuka Water Supply Design Report (MIBP 2018)

2.5.2 Education

The County's Educational Institutions consist of Nursery schools, Early Childhood Development Education (ECDE), Primary Schools, Secondary Schools and Tertiary Institutions such as Youth Polytechnics, other Training Institutions and Universities. From the Kenya National Bureau of statistics, it is estimated that there will be 43,000 pupils in primary school 21,000 students in secondary school.

The Education Institutions enroll children from ECDE centers at an average age of four years. The transition from primary to secondary school is 70%. Some of the leading Secondary Schools include Chuka Boys High, Chuka Girls High School, Ikuu Boys High School and Ikuu Girls High School. Institutions of higher learning include Rubate Teachers Training College and Chuka University. Photographs below shows some of the learning institutions present in the area.

Chuka High School


Chuka University

2.5.3 Health Facilities

The County has a significant health facilities network run by Government, Religious Organizations, Community Based Organizations and Private Individuals. The health facilities include District Hospitals, Sub-District Hospitals and Health Centres, Dispensaries, Medical Clinics and other private facilities. Among the big hospitals include the Chuka District Hospital and Chuka Cottage Hospital.

2.5.4 Transport and Communication

Chuka/Igambangombe Sub County is accessed by the Nairobi - Meru Highway (B6). This highway is the main access route for the County and the lager Meru region. There are other gravel roads that form the bulk of accessibility in the County. The roads are Chuka to Kaanwa to Kathwana which is a gravel road, Kibugua - Itugururu - gravel and B6-Rubate gravel road. There are minor earth /gravel access roads within the region. Bitumen roads are limited to 32km of B6 along Meru-Nairobi highway from Katheri- Chuka Chogoria to Keria, 18km along Ishiara, Kathwana-Chiakariga Road (mate road) and (D471)1.2km to Kibugua. The road in which the proposed water infrastructure is to be constructed include: Nairobi- Meru Highway (B6), D471-Kibugua, part bitumen 1.2km (gravel), Kanwa (gravel), Rubate (gravel).

Photographs below give an overview in Chuka Town.


Images of Developments in Chuka Town


Common modes of transport within Chuka Town

2.5.5 Economic Activities

Chuka urban center is the largest town in Tharaka-Nithi County. The road network is well developed within the town center and its environs. The Ndagani area in the outskirts of Chuka Town is also fast urbanizing catalyzed by the growth of Chuka University with numerous commercial and residential developments. Chuka Town has several banks namely Co-operative Bank, Post Bank, Equity Bank, Kenya Commercial Bank, K-Rep Bank and Barclays Bank and other microfinance institutions.

Chuka is a predominantly agricultural area with approximately 80% of the population engaged in agricultural activities in growing of tea, coffee, maize, beans, bananas, sukuma wiki under micro irrigation, cowpeas, cabbages, etc. There are several tea and coffee factories in the area.

Figure 2-7 on **Page 2-11** illustrates the general land use characterization of Chuka Town.

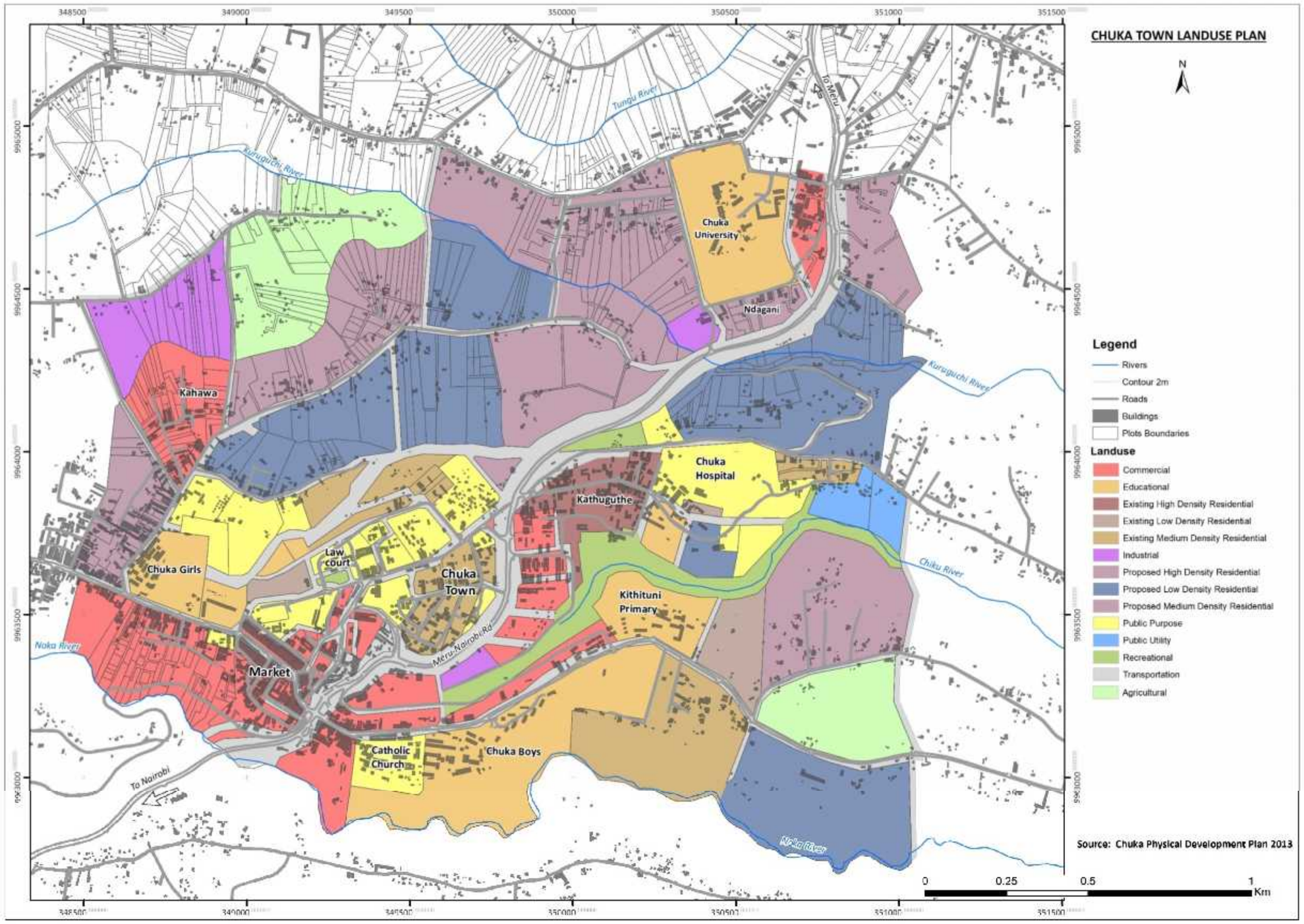


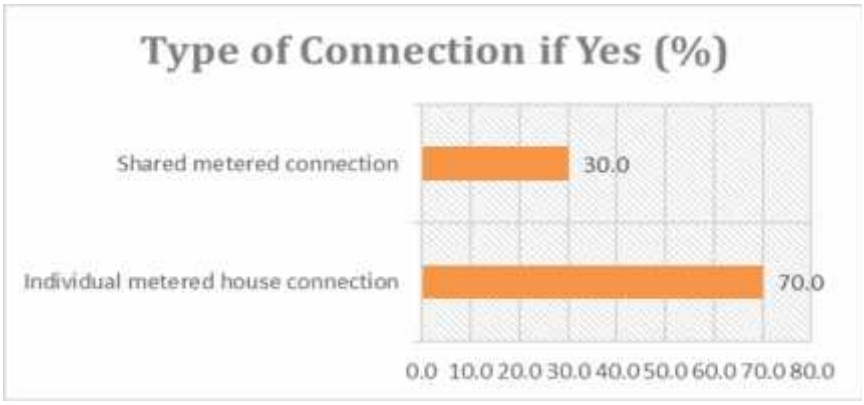
Figure 2-7: Land use Map

2.6 House Survey Findings

The ESIA field assessment randomly administered socio-economic questionnaires within the target supply areas of Chuka. The aim of this exercise was to understand water supply characteristics of households within the Project area. Specifically, the assessment targeted respondents were from: Thoita, Rubate, Marian and Mugwe Locations. Sub sections below provide a summary of the findings from the assessment.

2.6.1 Connection to a Water Supply Provider

The question sought to find out whether respondents within the Project locations are currently connected to any water supply provider. The target respondents were Project beneficiaries ranging from individual households, institutions and business units within Chuka Town. **Figure 2-8** below represents a summary of the response from the survey. 70% of respondents are connected to a water services provider and have their own individual metered house connection while 30% have shared metered connections. Most residents are supplied with water by the Community Water Service Providers who supply untreated water to the customers. The residents who are connected to Nithi Water and Sanitation Company (NIWASCO) network complain of water rationing with majority only receiving water once or twice in a week.

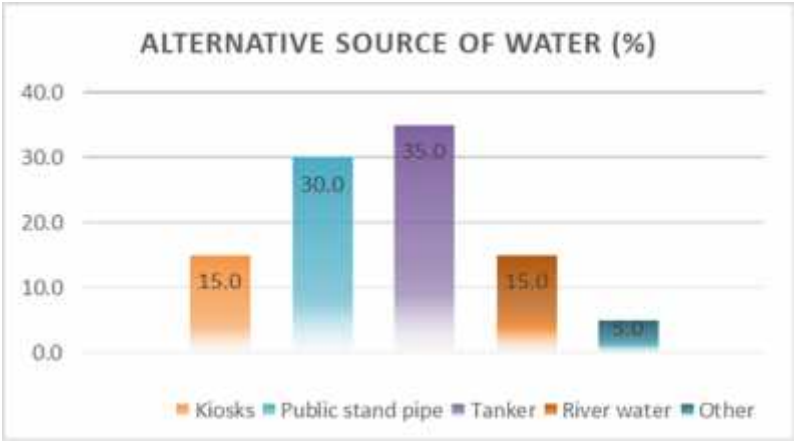


Source: Field Survey ESIA (May 2018)

Figure 2-8: Water Connection Available

2.6.2 Alternative Sources of Water Supply

The respondents who are connected to the Water Service Provider (NIWASCO) in Chuka address unreliable water supply problems by getting water from kiosks and rivers (15%) and Tankers (35%) as seen in **Figure 2-9** on **Page 2-13.**

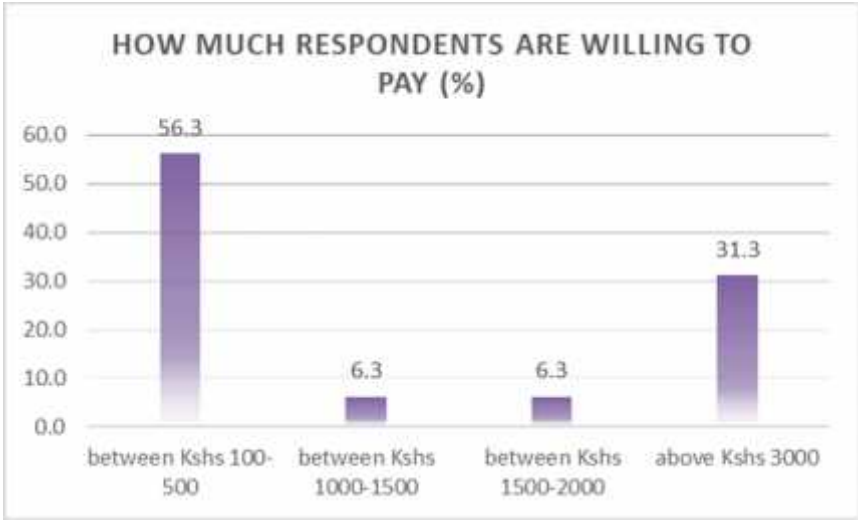


Source: Field Survey ESIA (May 2018)

Figure 2-9: Alternative Water Supply

2.6.3 Willingness to Pay for Improved Water Supply

Question was sought to understand whether the community is willing to embrace the proposed Chuka Water Supply Infrastructure and whether the community will welcome tariff review initiatives due to improved water supply both in terms of quantity and quality from NIWASCO. 56.3% of the respondents are willing to pay between Kshs 100-500 and 31.3% of the respondents were willing to pay over Kshs 3000 for improved services as seen in **Figure 2-10** below.



Source: Field Survey ESIA (May 2018)

Figure 2-10: Willingness to Pay for Water Services

CHAPTER 3: PROJECT DESCRIPTION

3.1 Existing Intake Works for Chuka Town

Water Supply Services in Chuka Town is managed by Nithi Water and Sanitation Company (NIWASCO) who is the licensed Water Service Provider (WSP).

3.1.1 Existing Intake Works for Chuka Town

Existing Intake Works on Tungu River is a reinforced concrete weir intake constructed in 1977 at elevation 1661.40m amsl. The Intake structure has a primary weir and secondary weir opening into diversion channel directing water to an inlet chamber through coarse and fine screens.

3.1.2 Existing Twin Raw Water Gravity Mains

There are 2 Nr. OD 250mm uPVC Raw Water Gravity Mains, one constructed in 1977 and the other in 2001. The pipelines are 3 Km long traversing the dense Mt. Kenya Forest.

3.1.3 Existing Kiang'ondu Water Treatment Works

The existing treatment works at elevation 1620.90m amsl comprises of two independent water treatment systems i.e.

- Inlet Works, Plain Sedimentation, capacity 3,500m^3/day and chlorination. The existing Sedimentation Tanks are not connected to the existing filters.
- Direct filtration of raw water with rapid gravity sand filters and chlorination. In normal operations, the filters are by-passed, and water is only chlorinated before distribution. The filters are prone to constant overflows because the capacity of the raw water gravity main (6,500m^3/day) is much higher than the capacity of the filters (750m^3/day).

3.1.4 Existing Water Distribution System

The location of Storage Tanks and pipeline routing ensures a gravity distribution system. The water distribution network was first constructed in 1977 in Kiang'ondu area and Chuka Town with subsequent expansion works over the years. The approximate total length of transmission mains is 60Km with diameters ranging from 50mm – 250mm uPVC and HDPE Pipes. There are 15 Nr. Tanks in the distribution network with capacities ranging from 50m^3 - 1,000m^3.

3.1.5 Existing Community Water Schemes

In addition to the NIWASCO Water Supply System, there are several Community Water Supply Schemes which supply raw water for domestic consumption and irrigation. Some of the Community Schemes in Chuka include Magumoni, Mwonge Range, Mbogoni, Kibiga, Nthambo, Ndigia, Mugirirwa, Gitareni, Manyanga, Chuka University, Nkombore, Ndagani KK, etc.

Community Water Supply Schemes are funded and built by community groups assisted by NGOs and County Government. The Community Schemes have distribution networks that run parallel to the NIWASCO networks in the urban areas and extend to rural areas beyond the NIWASCO current network.

A summary of the Existing Water Supply System in Chuka is given in **Table 3-1** below.

Table 3-1: Details of Existing Water Supply Systems

Description	Chuka Area of Supply
General Details	
Area of Supply (Current area of supply as per NIWASCO's Service Provision Agreement)	Current supply area - 115Km^2 Total supply area - 380Km^2 i.e. 30% coverage in Chuka Town and its environs.
Community Water Supply Schemes	More than 20 Nr. Community Water Schemes Local Community Projects construct run-of-the-river intakes on rivers from Mt. Kenya Forest. The raw water is supplied to domestic and institutional customers for domestic consumption and irrigation. The Community Projects are characterized by gravity transmission systems parallel to NIWASCO's supply network in the urban areas and extend to rural areas not served by NIWASCO.
Existing Water Supply Network	
Intake Works	Reinforced Concrete run-of-the-river Intake on Tungu River
Twin Raw Water Mains	250mm and 275mm dia uPVC mains, pipe length 3 km
Water Abstracted	10,800 m^3/day reported by NIWASCO
Water Treatment	Kiang'ondu Water Treatment Works operates two separate treatment systems; Sedimentation + Chlorination - 3,500m^3/day Chlorination only - 6,500m^3/day
Water Supply Volumes	Average 10,000 m^3/day reported by NIWASCO as recorded by Bulk Meters at the Treatment Works
Non-Revenue Water, NRW	74% - Estimated by NIWASCO
Water Supply Pipe Network	Approximate total length of transmission mains 60.0Km Diameters ranging from 50mm to 250mm uPVC
Water Storage	15 Nr. Storage Tanks, sizes ranging from 50m^3 - 1,000m^3

Photographs of various components of Existing Chuka Water Supply are given on **Page 3-3.** A Layout Plan showing the existing Water Supply System for Chuka is given in **Figure 3-1** on **Page 3-4.**

Chuka Water Supply System - Photos of Existing Infrastructure

Intake Works on Tungu River for Kiang'ondu Treatment Works

Operator's Office, Laboratory and Chlorine Store at Kiang'ondu Treatment Works.

Sedimentation Tank, Filters and Chlorination units at Kiang'ondu Treatment Works.

Stilling Well and 2 Nr. Sedimentation Tanks capacity 3,500m^3/d at Kiang'ondu Treatment Works.

Water Kiosk at Weru Market

Existing NIWASCO 100m^3 capacity Storage Tank adjacent to a local Community Scheme & 100m^3 capacity Storage Tank at Makawani School

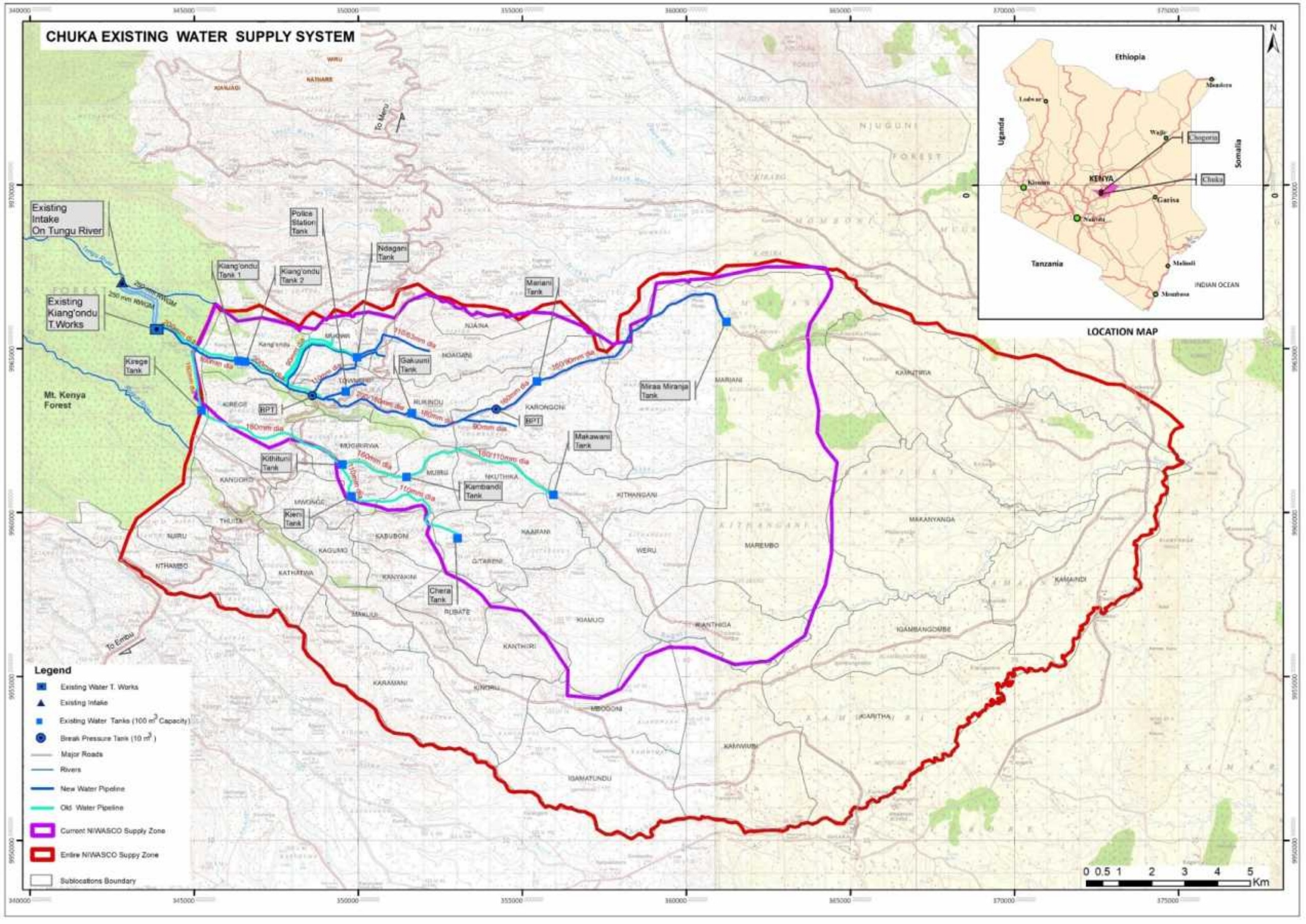


Figure 3-1: Layout Plan of Existing Water Supply System in Chuka

3.2 Hydrological Analysis

3.2.1 General

The Proposed Intake Works is located at the Confluence of Manyara and Ruguti Rivers at an elevation of 1596m, at UTM Co-ordinates 339468m E and 9965460m S. The Intake Works is sited approximately 7 Km within the Mt. Kenya Forest and is accessible from the Nyayo Tea Zone Plantations along Kangoro - Kianjeru Road.

A layout plan showing the location of the Proposed Intake and adjacent River Gauging Station is given in **Figure 3-2** below.

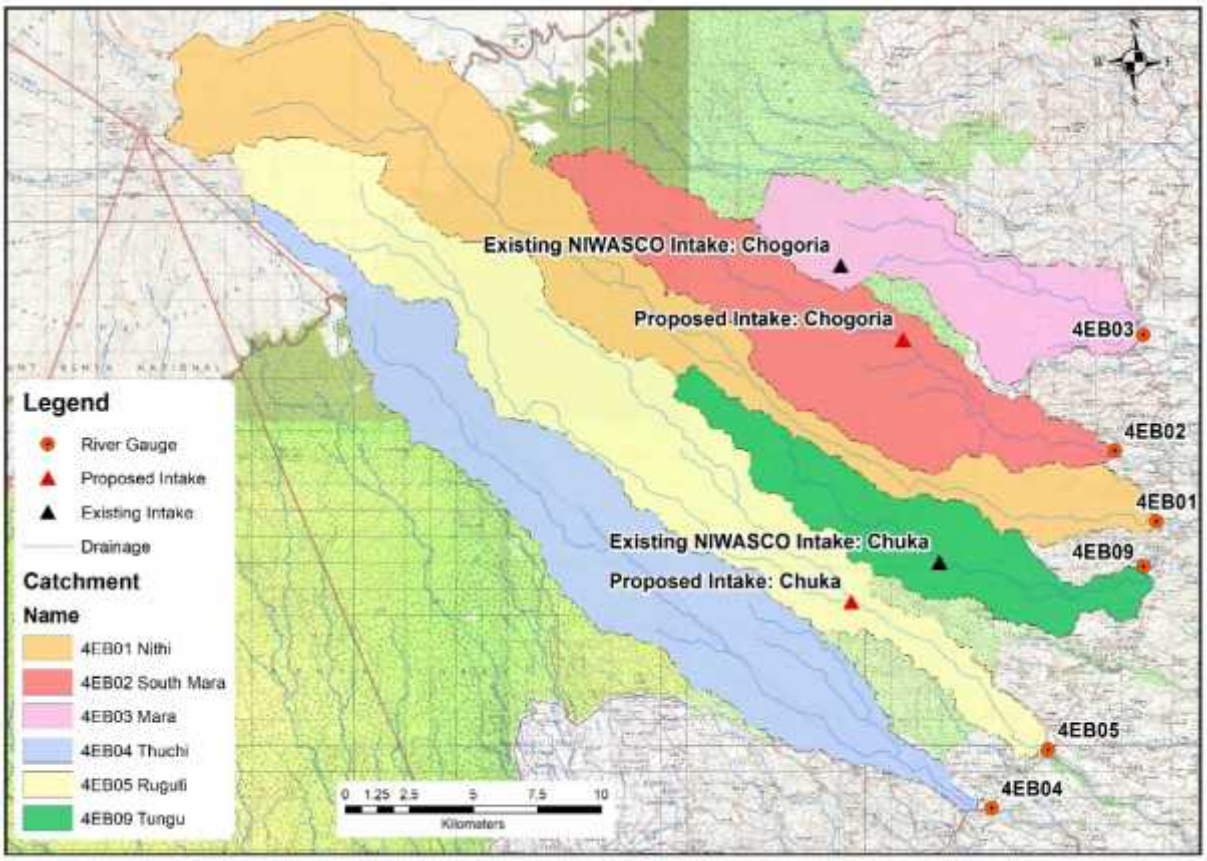


Figure 3-2: Locations of River Gauging Stations and their Catchments

3.2.2 Detailed Hydrological Analysis

Climatological data i.e. mean daily rainfall, temperature, relative humidity and wind speed was obtained from Kenya Meteorological Department.

Hydrological data i.e. stream flow data was obtained from WRMA for six River Gauging Stations (RGS) located in the vicinity of the proposed abstraction points. Further analysis was carried out using the data to understand the characteristics of the catchments. Normalized mean flows were calculated for each RGS to determine the average runoff and for comparison of flow between catchments.

Scarcity in hydrological data presents the greatest challenge to hydrological assessment of water resources. Stream flow data obtained from WRMA for 1953 to 2003 had 23% data gaps while data from 1981 to 2003 had 40% of the data missing.

The Water Evaluation and Planning (WEAP) Model was set up for the 37-year period spanning year 1981 - 2017 to carry out the Hydrological Analysis of the Project catchments. The rainfall-runoff model used was successful in simulating observed flow, infilling data gaps and subsequently extending the stream flow data to year 2017.

A summary of the results from the Hydrological Model is given in **Table 3-2** below.

The available water for abstraction from the entire RGS catchment area using observed and simulated series data was determined. A catchment reduction factor of 0.83 was applied i.e. a ratio of the proposed catchment area to the total RGS catchment area to obtain the gross water available from the proposed catchment area. The existing abstractions i.e. 4,950m^3/day was subtracted from the gross available water to obtain the net available water for allocation.

Table 3-2: Flows at RGS 4EB05 and Proposed Intake Location

	Flows at RGS m^3/day		Available Water for Allocation (m^3/day)	Gross Available Water for Allocation (m^3/day)	Net Available Water for Allocation (m^3/day)
	Q_{80}	Q_{95}	Q_{80}-Q_{95}	0.83 x (Q_{80}-Q_{95})	(Q_{80}-Q_{95})– 4,950
Observed (1981-1988)	130,464	101,952	28,512	23,665	18,715
Simulated (1981-1988)	132,192	92,448	39,744	32,988	28,038
Simulated (1981-2017)	117,504	80,352	37,325	30,980	26,030

3.2.3 Conclusion

Taking into consideration the stringent WRMA Allocation Rules of (Q_{80} – Q_{95}) – (Sum of Existing Water Abstractions), 26,030m^3/day is available for abstraction at the proposed Intake Works.

The Ministry of Water and Irrigation Design Manual indicates that the Q_{96} i.e. 96% probability daily low flow should be regarded as safe yield of a river available for abstraction. In this analysis, Q_{95} is 101,952m^3/day for the RGS 4EB05 and 84,620m^3/day for the proposed Intake Works.

From the analysis, it can be concluded that the requirement of 15,000m^3/day for the proposed Chuka Water Supply can be met at the proposed run-of-river Intake location.

3.3 Proposed Water Supply Systems

The Ultimate Year 2037 water demand and available water sources were considered. During discussions held in Technical Meeting No. 2 on 21st August 2017 in the TWSB Board Room attended by MIBP, TWSB, NIWASCO and Tharaka Nithi County Water Officer, it was agreed to adopt the following water supply system;

The Project Area will be divided into two Water Supply Zones;

- Low Level Zone, gross capacity 15,000m^3/day
  This system covers part of Chuka Town and the largest part of the Chuka Project Area. This zone will be served by the proposed Kirege Water Treatment Works, capacity 15,000m^3/day.

- High Level Zone, gross capacity 3,500m^3/day
  This area is adjacent to Nyayo Tea Zone, Kirege, Kiang'ondu, Chuka University and part of Chuka Town. This zone will be served from the Existing Kiang'ondu Water Treatment Works system. The Existing Treatment Works will be rehabilitated, and missing treatment units constructed to ensure water quality and quantity (3,500m^3/day) is acceptable to WHO and MWI Standards.

A layout plan of Proposed Water Supply System is given in **Table 3-3** on **Page 3-7.**

The Final Project Scope of Works is given in **Table 3-3** below.

Table 3-3: Details of Proposed Water Supply Systems

Item	Final Scope of Works
Intake Works	• New Reinforced Concrete Run-of-river Ogee Weir Intake on the confluence of Ruguti/Manyara Rivers for New Kirege Treatment Works • Rehabilitation of existing Intake on Tungu River for Existing Kiang'ondu Treatment Works
Raw Water Mains	• New ND 450mm, 7 Km long Ferrous Raw Water Gravity Main to New Kirege Treatment Works • Rehabilitation Existing Twin ND 250mm, 3 Km length uPVC mains to Existing Kiang'ondu Treatment Works
Treatment Works	• New Kirege Water Treatment Works, Full Conventional Treatment Works of gross capacity 15,000m^3/d. • Rehabilitation/ Completion of Existing Kiang'ondu Treatment Works estimated gross capacity 3,500m^3/d to provide Full Conventional Treatment system.
Transmission Mains	• DN 150 - 400mm Ferrous mains, Total Length 29 Km
Storage Tanks	• 5 Nr Reinforced Concrete Water Storage Tanks- 500m^3capacity tanks at Nthirani, Kibugua and Ikuu 100m^3 capacity tanks at Kaanwa and Rubate.
Distribution Network	• Rehabilitation/ Augmentation Works on existing water supply system to be provided

A Layout Plan showing the Proposed Works on the Water Supply System is given in **Figure 3-3** on **Page 3-8.**

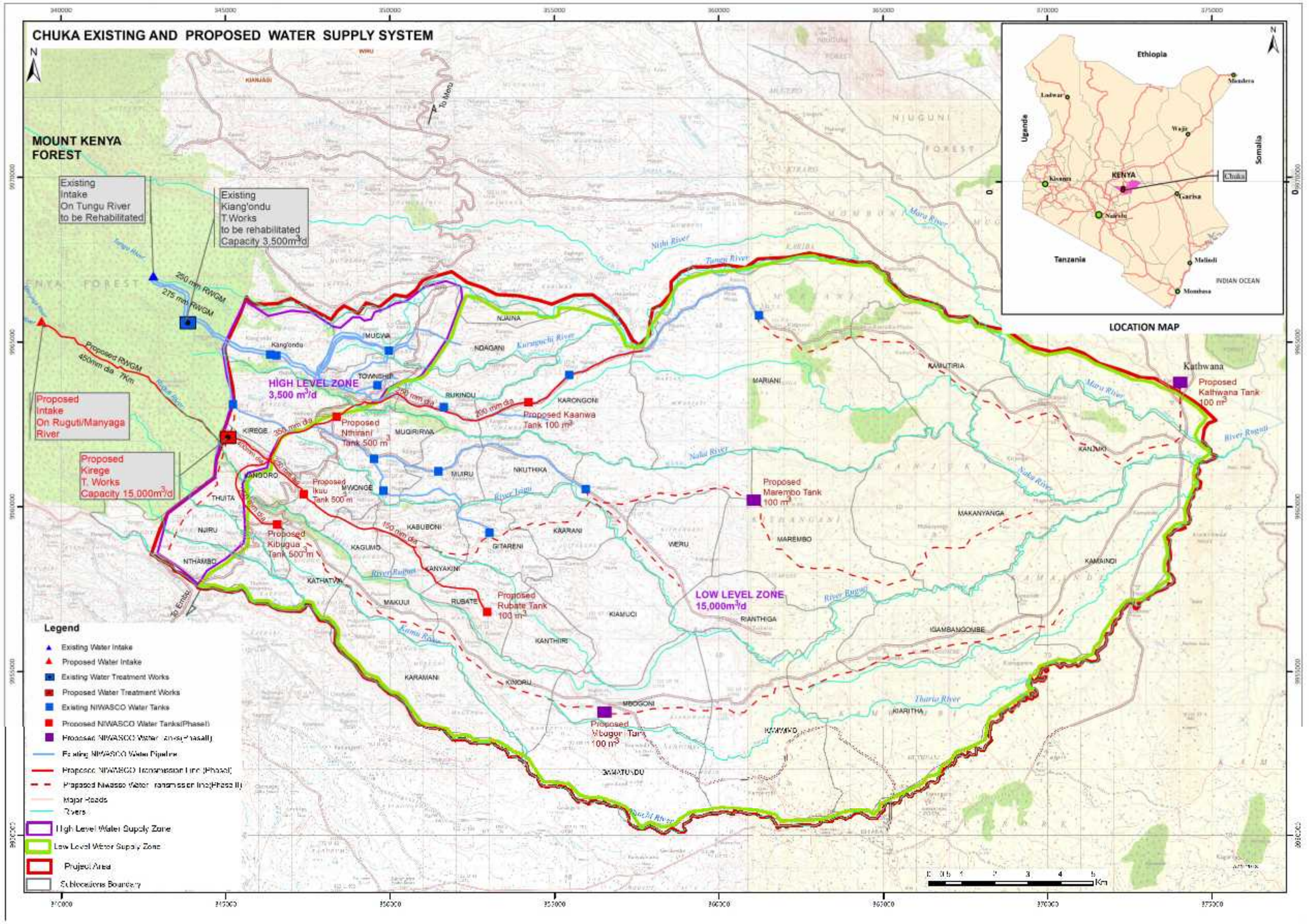


Figure 3-3: Layout Plan of Proposed Works on Water Supply System in Chuka

3.3.1 New Intake Works

The Intake Works are located at the confluence of Ruguti and Manyara Rivers at an elevation of 1596m, at UTM Co-ordinates 339468m E and 9965460m S. The Intake Works is sited approximately 7 Km within the Mt. Kenya Forest and is accessible from the Nyayo Tea Zone Plantations along Kangoro - Kianjeru Road.

The Intake comprises of a Reinforced Concrete Weir, length 9.9m constructed across the Ruguti River. The weir is divided into primary and secondary weirs separated by a reinforced concrete separating wall. The secondary weir crest (EL 1596.40) is 0.4m lower than the primary weir to concentrate the river flow toward the intake chamber during low flows.

The weir has been provided with a scouring arrangement consisting of 2Nr. 200mm dia. pipes with control penstocks. An 800mm wide metal girder bridge has been provided over the weir to enable operation of the penstocks and maintenance of the riverbank protection.

Abstraction of water is by a rectangular side entry, size 1.0m x 1.0m into the Intake Chamber. The Intake Chamber comprises of a fixed coarse screen at the side inlet entry point of raw water from the weir. 3Nr. removable fine screens are provided in the Intake Chamber. The 450mm diameter outlet for the raw water gravity main is located with the Intake Chamber and controlled with a circulation penstock. A 150mm diameter scour pipe with a circular penstock control is provided in the Intake Chamber to allow for periodic scouring of the chamber.

Requisite Ancillary Works at the Intake Include the following:

- Provision of reinforced Concrete Apron, up to 8m downstream and 3m upstream of Weir.
- Provision of gabion protection on river bed and river banks, upstream and downstream of Weir.
- Intake Chamber, size 4.1m x 2.7m, for security of metal screens, penstocks, etc.
- Site and Ancillary Works including access road to Intake Site, fencing, landscaping, etc.

3.3.2 New Raw Water Gravity Main

The Raw Water Gravity Main from New Intake Works on the confluence of Ruguti/ Manyaga rivers traverses the dense indigenous Mt. Kenya Forest to New Kirege Water Treatment Works.

The alignment follows the Ruguti river up to Ch 0+300 then follows the gentle slope avoiding steep embankments and deep excavations. From Ch 3+405, the pipeline route is parallel to existing community water pipelines up Ch 6+953 i.e. New Kirege Water Treatment Works.

3.3.3 New Kirege Water Treatment Works

New Kirege Treatment Works is located at the edge of the Mt. Kenya Forest within the Nyayo Tea Plantations at UTM Co-ordinates 344915m E and 9962387m S along Kangoro - Kianjeru Road. The capacity of the Treatment Works is 15,000m^3/d and will cater for Year 2037 demand for Chuka Service area.

The Treatment Works will include the following components;

i) Inlet Structure with robust flow measurement devices,
ii) Stilling Well
iii) 2 Nr. Flocculation Basins
iv) 4 Nr. Horizontal Flow Sedimentation Tanks
v) 8 Nr. Rapid Sand Filters
vi) Chemical Storage and Dosing Building
vii) Administration Building
viii) 1,000m^3 capacity clear water tank
ix) Chlorine Storage and Dosing Building
x) 150m^3 Elevated Backwash Tank
xi) Staff Houses
xii) Onsite Ancillary Works

3.3.4 Water Distribution System and Storage

The Storage Tanks are required to provide balancing storage to cater for diurnal variations in water demands i.e. high water demands during peak times of early morning, midday and early evenings. It is also recommended to have storage capacity equivalent to half-day water demand in the supply zone.

Water from the New Kirege Water Treatment Works will be transmitted through New Water Transmission Lines which will terminate at the Storage Tanks strategically located within each zone. The new Transmission Mains will augment the existing water supply and increase the NIWASCO area of supply.

Pipeline	Pipeline Description/ Water Tanks	Pipe Dia, mm	Length, m	Pipe Material	Break Pressure Tanks
Kangoro Pipeline	Main transmission from Kirege Treatment Works	400	1,752	Ferrous	-
Kaanwa Pipeline	Transmission to New Nthirani Tank, capacity 500m^3	350	1,900	Ferrous	-
	Transmission to Chuka Town	250	1,557	Ferrous	-
	Transmission to Kaanwa Tank, capacity 100m^3	200	9,488	Ferrous	1 Nr, capacity 5m^3
Rubate Pipeline	Transmission to New Ikuu Tank, capacity 500m^3	250	626	Ferrous	-
	Transmission to Rubate Tank, capacity 100m^3	150	7,772	Ferrous	1 Nr, capacity 5m^3
Kibugua Pipeline	Transmission to New Kibugua Tank, capacity 500m^3	250	3,635	Ferrous	-
Total Pipeline Length			**26,730**		**2 Nr.**

3.3.5 Rehabilitation of Existing Water Supply Systems

3.3.5.1 Rehabilitation of Existing Intake Works

Existing Intake Works on Mara Manyi River is a reinforced concrete weir intake constructed in 1977 at elevation 1661.40m amsl. The Intake structure has a primary weir and secondary weir opening into a diversion channel directing water to an inlet chamber through Coarse and Fine screen.

Rehabilitation Works required at the Intake Works include;

- Desilting upstream and downstream of intake weir
- Embankment Protection Works using Gabions
- Replacement of Coarse and Fine Screens at Intake Chamber
- Repair work on chambers and replacement of missing covers
- Replacement of leaking/ faulty outlet and scour valves
- Construction of scour valve chamber

3.3.5.2 Existing Twin Raw Water Gravity Mains

There are 2 Nr. OD 250mm uPVC Raw Water Gravity Mains, one constructed in 1977 and the other in 2001. The pipelines are 3 Km long traversing the dense Mt. Kenya Forest.

The rehabilitation works required on the raw water gravity mains are;

- Provision of missing air valves and washouts
- Protection Works of exposed pipework especially on steep slopes
- Replacement of leaking/ faulty outlet and scour valves
- Repair work and cleaning of chambers and replacement of missing covers

3.3.5.3 Existing Kiang'ondu Water Treatment Works

The existing treatment works at elevation 1620.90m amsl is comprised of two independent water treatment systems i.e.

- Inlet Works, Plain sedimentation, capacity 3,500m^3/day and chlorination. The existing sedimentation tanks are not connected to the existing filters.
- Direct filtration of raw water with rapid gravity sand filters, capacity 750m^3/day and chlorination. In normal operations, the filters are bypassed and water is only chlorinated before distribution. The filters are prone to constant overflows because the capacity of the raw water gravity main i.e. 4,000m^3/day is much higher than the capacity of the filters 750m^3/day.

For compatibility of the quality of treated water from the Existing and New Treatment Works, it is essential the existing treatment system is upgraded to ensure the water quality is to acceptable WHO and MWI Standards.

Discussions on the treatment system to be adopted were held during Technical Meeting No. 2 held on 1st February 2018 in the TWSB Board Room attended by MIBP and TWSB.
It was agreed to adopt the following;

1. Construct the following missing components:
   - Stilling Well and Chemical Dosing Channel
   - Flocculation Basin, capacity 3,500m^3/day
   - Chemical Mixing and Dosing Building
   - Rapid Gravity Sand Filters, capacity 3,500m^3/day;
   - Elevated Backwash Tank, 100m^3 capacity

2. Modification/ Rehabilitation Works on Existing components;
   - Sedimentation Tanks, capacity 3,500m^3/day
   - Backwash Pump House
   - 2 Nr. Storage Tanks, total capacity 1,050m^3/day
   - Operator's Office, Laboratory and Store
   - Staff Houses
   - Ancillary Works
   - KPLC power to replace the existing Solar-powered lighting system

3.3.5.4 Rehabilitation on Existing Distribution System

Condition Survey of the existing Reticulation System was carried out and the status of pipes and appurtenances recorded. Most of the pipelines surveyed had the requisite hydraulic appurtenances not working or vandalized needing replacement. Several pipelines did not have the requisite appurtenances installed at required locations especially air valves and section valves. The requisite appurtenances and chambers will be provided as required.

The rehabilitation works recommended are as follows:

- Replacement of Distribution Lines where buildings are constructed on top of them
- Cleaning of existing chambers where necessary
- Exposing of buried existing chambers
- Construction of new chambers where necessary
- Provision of covers, step irons etc. in existing chambers as necessary
- Placement of marker posts along the alignment of the mains
- Replacement of air valves and scour valves along the alignment
- Repair of any leaking sections
- Repair of sections of pipe exposed due to erosion
- Replace anchor blocks provided on sections in steep slopes as necessary
- Slope protection using gabions on areas prone to landslides

3.3.6 Water Supply Infrastructure Cost Estimates

The estimated cost of the Project is approximately **Kshs.1,435,053,176.**

CHAPTER 4: PROJECT ALTERNATIVES

4.1 Project Design Consideration

This Chapter analyses the design process used to arrive at the proposed project capacity, technology used and location of project components. The 'No Project' alternative was also considered. The design considerations analyzed were as follows;

- Project Location
- Water Treatment Technology
- Land Acquisitions and Resettlement Impacts
- Material sourcing sites and disposal of spoil
- Proposed Project Option
- No Project Alternative.

4.2 Location of Project Components

The following factors were considered during the selection of the sites for the project components:

Selection of Intake Works site;

- The intake will be constructed 7kmfrom the edge of Mt. Kenya Forest at the confluence of Ruguti and Manyaga rivers.
- From hydrological studies carried out, the river has adequate flows to provide the required water demand over the design horizon
- Availability of raw water by inclusion major tributary catchments
- Availability of rock foundation for the intake structure
- Gravity flow to proposed Water Treatment Works and Water Storage Tank Site

Selection of Water Treatment Works

- Suitable topography ensuring proper drainage and ease of construction
- Public land was selected where possible resulting in limited land acquisition
- Ease of access from the existing roads
- Good soil for strong foundations without excessive stabilization procedures
- Gravity flow of water to consumers from the Treatment Works Site

4.3 Project Capacity

To determine the capacity of the water treatment system, the design team followed the following steps;

- Defined the project area
- Determine the population from the 2009 Population census and project to the year 2017, 2027 and 2037 design horizons
- Determine the required water consumption using consumption rates from the 'Practice Manual for Water Supply Services in Kenya' for all consumer categories.

4.4 Selection of Water Treatment System

Quality tests were carried out on raw water samples from the proposed intakes. Conventional Water Treatment Systems have been selected to treat water to the required WHO standards for potable water.

The Low-Level Zone will be served by Kirege Water Treatment Works, capacity 15,000m^3/day comprising of the following components;

- Stilling Well and Flow Measuring Channel
- Flocculation Basins
- Horizontal Flow Sedimentation Tanks
- Rapid Gravity Sand Filters
- Chemical Storage and Dosing Building
- Administration Building
- Chlorine Storage and Dosing Building
- Backwash Pumps and Air Blower Building
- Clear Water Tank, 500m^3 capacity
- Elevated Steel Backwash Tank, 150m^3 capacity
- Sludge and Backwash Water Lagoon
- Sludge Drying Beds
- Staff houses and guard house

The High-Level Zone will be served by Kiang'ondu Water Treatment Works, capacity 3,500m^3/day comprising of the following components;

- Stilling Well and Flow Measuring Channel
- Flocculation Basins
- Horizontal Flow Sedimentation Tanks
- Rapid Gravity Sand Filters
- Chemical Storage and Dosing Building
- Administration Building
- Chlorine Storage and Dosing Building
- Backwash Pump Room
- Clear Water Tank, 1,000m^3 capacity
- Elevated Steel Backwash Tank, 100m^3 capacity
- Sludge and Backwash Water Lagoon
- Sludge Drying Beds
- Staff houses and guard house

4.5 Project Resettlement Issues

Acquisition of land for the Water Treatment Plant, Water Storage Tanks and easement for pipe laying has been considered during the design stage. The Project shall be constructed within available public land existing wayleaves and river riparian land except for water storage tanks which are in public land. Specifically, the sites are as described below;

- Intake Works – Located within Mt. Kenya
- Water Treatment Plant – Located within Nyayo Tea Zone Land
- Water Tanks – Land to be acquired at current market rates from willing residents
- Water Transmission Mains – within Road Reserves

4.6 Material Sourcing Sites and Disposal of Spoil

Material for fill shall be preferably red soil which is available on site. Other materials such as rock and clay are also readily available within many small quarries a few kilometers from the project area. The Project shall have limited spoil material which will be used to bury open and degraded sites within the Project corridor; excess material will be disposed off appropriately as required by the County Government of Tharaka-Nithi.

4.7 Project Benefits

The Project will directly result to realization of social and economic benefits described in section 1.3 of this assessment and summarized below:

- The Project shall lead to realization of TWSB strategic goals of improving safe water supply from 73% to 90% rural population accessing safe water from 46% to 70% of the urban population accessing safe water over the planning period year 2037.
- The Project addresses improved water supply in Chuka Town and surrounding rural areas, that underpins the Kenyan economic and social developments (Vision 2030) and its associated five-year medium Term Plan (MTP) for 2012 - 2017
- Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal as guided by resolutions of Rio+20 conference. The goal focuses more on investment in adequate infrastructure in water sanitation, Hygiene, water quality/quantity, waste water management, water scarcity and use efficiency, integrated water resource management and protection of water related ecosystems

4.8 No Project Alternative

The No Project Option in respect to the proposed Project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions.

However, if the Project is not implemented, the following issues will continue affecting residents of Chuka Town and surrounding Rural areas.

- Poor accessibility to portable and reliable water supply to Chuka residents
- High non-revenue water losses of abstracted water
- No improvements in living standard/well-being, employment and local economy in the target beneficiaries
- Limited opportunities for future growth of the Town
- No creation of employment during both construction and operation phases of the Project
- Uncontrolled tariff charges by the Community Water Supply Schemes
- Unplanned & uneconomical water Network System as a result of many parallel water pipes by different community Water Supply Schemes
- High risk of residents contracting water borne diseases.

The expected environmental impacts are not extreme and can be managed to reduce negative impacts on the environment. Therefore, the 'No Project' option is not a suitable alternative for the community.

CHAPTER 5: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Introduction

Development of infrastructure projects is dealt with under several Laws, By-laws, Regulations and Acts of Parliament, as well as policy documents and it is not possible to bring all those statutes under one heading. This Chapter is therefore aimed at assessing the existing policies and legislative framework, economic tools and enforcement mechanisms for the management of infrastructure projects at different stages. In so doing, the discussion will be based on the following legislations and policy provision.

5.2 Policy Provision

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

Table 5-1: Policy Framework

No	Policy	Applicability
1	Constitution of Kenya 2010	The CoK at Article 43 (1) provides that every person has the right – (b) to accessible and adequate housing, to reasonable standards or sanitation; and, (d) to clean and safe water in adequate quantities. These provisions cover oblige state organs and bind them to provide not just high quality or clean and safe water but also adequate quantities to all people that they will serve. Also, the Constitution of Kenya provides for sound management and sustainable development of all of Kenya's Projects, both public and private investments. It also calls for the duty given to the Project proponent to cooperate with State organs and other persons to protect and conserve the environment as mentioned in Part II.
2	Kenya Vision 2030	Kenya Vision 2030 is the current national development blueprint for period 2008 to 2030. The vision has three pillars – economic, social and political. It is recognized that Kenya is a water scarce Country but stated (Kenya, 2007: 115) that the Vision for the water and sanitation sector is "to ensure water and improved sanitation services availability. The Project will directly contribute towards achievement of objectives of vision under the environment and social pillar through provision of the planned sanitation investments under the Master Plan.
3	National Climate Change Response Strategy, 2010	The strategy paper recognizes that Kenya is a water scarce Country and offers a variety of strategies for ensuring that the resource is utilized in ways that recognize that it is a finite resource. The paper also argues that interventions in the water sector should take a participatory approach involving different water users including gender groups, socioeconomic groups, planners and policy makers in water resource management (Kenya, 2010: 53). These principles will also apply to the sanitation initiatives discussed in this ESIA.
4	National Environment Policy (NEP)	The revised draft of the National Environmental Policy, dated April 2012, sets out important provisions relating to the management of ecosystems and the sustainable use of natural resources. The project area is in ecological zone V and VI. Ecosystems under these zones are sensitive to any activity out of character with the ecosystem. Therefore, during construction and operation phases of the Project the ESMMP provided in chapter 8 of this assessment be implemented, in order to ensure that the ecosystems are not destabilized by the subsequent Project activities.

No	Policy	Applicability
5	HIV and AIDS Policy 2009	Chuka Project area is a among regions in Kenya with high HIV prevalence levels, this implies that people in this area are vulnerable to abuse during implementation of the Project. The HIV Policy therefore will be complied with during implementation of the Project; the Contract will incorporate in Bid Document and implement HIV awareness initiatives during construction of the Project.
6	Gender Policy 2011	This Policy will be referred to during Project implementation especially during hiring of staff to be involved in the Project, procuring of suppliers, sub consultants and sub-contractors to the Project
7	The Sustainable Development Goals (SDGs)	The concept of the SDGs was born at the United Nations Conference on Sustainable Development, Rio+20, in 2012. The objective was to produce a set of universally applicable goals that balances the three dimensions of sustainable development: environmental, social and economic. The Investments will therefore contribute towards achieving this goal through the proposed sanitation Projects.
8	Kenya National Youth Policy 2006	This Policy aims at ensuring that the youth play their role, alongside adults in the development of the Country. The National Youth Policy visualizes a society where youth have an equal opportunity as other citizens to realize their fullest potential. Proposed Sanitation Projects will provide direct employment to the youth as required by the Policy.
9	The National Environmental Sanitation and Hygiene Policy-July 2007	The Policy is devoted to environmental sanitation and hygiene in Kenya as a major contribution to the dignity, health, welfare, social well-being and prosperity of all Kenyan residents. The Policy recognizes that healthy and hygienic behaviour and practices begin with the individual. The implementation of the Policy will greatly increase the demand for sanitation, hygiene, food safety, improved housing, use of safe drinking water, waste management, and vector control at the household level and encourage communities to take responsibility for improving the sanitary conditions of their immediate environment. Implementing the Project will directly contribute to achievement of the Policy

5.3 Kenyan Legislations

The proposed investments will be implemented within provisions of various Acts of Parliament and Local Legislations as summarized in **Table 5-2** below:

Table 5-2: Acts of Parliament

No	Policy	Applicability
1	EMCA 2015	The Act provides for the establishment of a legal and institutional framework for the management of the environment. This is achieved through various regulations. For Water Supply Projects proposed in Chuka, the following EMCA Regulations will be applicable: (i) EMCA (Waste Management) Regulations, 2006 Legal Notice No. 121; (ii) EMCA (Water Quality) Regulations, 2006 Legal Notice No. 120; (iii) EMCA (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61; (iv) EMCA (Air Quality Regulations 2014)

No	Policy	Applicability
2	The Environmental Impact Assessment and Audit) Regulations, 2003	The regulation provides a framework under which Environment and Social Impact Assessment for the Project will be prepared, Regulation 4(1) further states that: (a)''…no Proponent shall implement a project: likely to have a negative environmental impact. (b) for which an environmental impact assessment is required under the Act or these Regulations, unless an environmental impact assessment has been concluded and approved in accordance with these Regulations…''
3	Environmental Management & Coordination (Water Quality) Regulations, 2006	Regulation 9 provides for water quality monitoring. It states that the "Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year and such monitoring records shall be in the prescribed form as set out in the second schedule to these regulations".
4	(Waste Management Regulations, 2006	Regulation 4 (1) states that "no person shall dispose of any waste on a public highway, street, road, recreational area or in any place except in a designated receptacle". Regulation 4 (2) further states that "a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations". The proponent will use provisions of this regulation to ensure that waste is handled, stored, transported and disposed as per this regulation.
5	Noise and Excessive Vibration Pollution (Control) Regulations, 2009	The Contractor will be required to ensure compliance with the above regulations in order to promote a healthy and safe working environment throughout the Construction Phase. This shall include regular inspection and maintenance of equipment and prohibition of unnecessary hooting by vehicles. The regulations provide for a maximum of 60 dcl during the day and 35 dcl during the night for a construction site.
6	The Environmental Management and Coordination (Air Quality Regulations 2014)	These regulations provide a framework for management of plant and equipment emissions of hydrocarbons on site. The regulations require that all plant and equipment on site should be well serviced to manufacturers specifications to avoid air pollution, the regulation also require monitoring of baseline air quality within construction site and implementation of correction action where the standards are not complied to. Water spray will be used at all times when working in dry areas to avoid risks associated with dust menace.
8	Land Act 2012	It is the substantive law governing land in Kenya and provides legal regime over administration of public and private lands. It also provides for the acquisition of land for public benefit. The government has the powers under this Act to acquire land for projects, which are intended to benefit the general public. The Project proposed will be implemented within government land and along road reserves. However, sites for WWTP will be acquired through willing buyer willing seller arrangement.
9	Water Act 2016	The Water Act 2002 was amended in the year 2016 to align to the Kenyan Constitution 2010. The Act vest the responsibility of developing water and sanitation infrastructure (sewerage and water supply) in Chuka Town to Nithi Water and Sanitation Company (NIWASCO). The Design and ESIA Teams have adequately involved NIWASCO in the preparation the Project.
10	County Government Act No. 17 of 2012	The proposed Projects will be implemented within Chuka Town Project area. Part II of the Act empowers the county government to be in charge of function described in Article 186 of the constitution, (county roads, water and Sanitation, Health). The Projects once complete will be handed over to NIWASCO County Government for operation and maintenance.

No	Policy	Applicability
11	Physical Planning Act 1996 (286)	Section 29 of the said Act empowers the local Authorities (now county governments) to reserve and maintain all land planned for open spaces, parks, urban forests and green belts as well as land assigned for public social amenities. The Projects identified will be implemented with the Spatial Plan developed by the Tharaka Nithi County Government.
12	The Urban Areas and Cities Act 2011	This Law passed in 2011 provides legal basis for classification of urban areas (City) when the population exceeds 500,000; a municipality when it exceeds 250,000; and a town when it exceeds 10,000) and requires the city and municipality to formulate County Integrated Development Plan (Article 36 of the Act). The Projects described in this assessment are within Tharaka Nithi County CIDP 2013-2017.
13	Occupational Health and Safety Act (OSHA 2007)	The Act provides EHS Guidelines which shall be followed by both the Contractor and Supervising Consultant during implementation of the Project to avoid injuries and even loss of life to workers and neighbouring community.
14	The Public Health Act (Cap.242)	The Act provides Guidelines to the Contractor on how he shall manage all wastes (Liquid and Solid Wastes) emanating from the Project in a way not to cause nuisance to the community. This Act, during construction shall be read alongside the waste management regulations of EMCA 2015 for utmost compliance.
15	HIV and AIDS Prevention and Control Act 2011	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. The Act provisions will be applied during Project implementation phase where the contractor will be required to create awareness among workers and community at large
16	Sexual Offences Act 2006	An Act of Parliament that makes provision about sexual offences aims at prevention and the protection of all persons from harm from unlawful sexual acts, and for connected purposes. Section 15, 17 and 18 focuses mainly focused on sexual offenses on minor (children).
17	Child Rights Act (Amendment Bill) 2014	This Act of Parliament makes provision for parental responsibility, fostering, adoption, custody, maintenance, guardianship, care and protection of children. It also makes provision for the administration of children's institutions, gives effect to the principles of the Convention on the Rights of the Child and the African Charter on the Rights and Welfare of the Child. The contractor under this Project will be required to comply to provisions of the Act during Project implementation
18	Labour Relations Act 2012	An Act of Parliament to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations or federations, to promote sound labour relations through the protection and promotion of freedom of association. This act will be applied by labour force on site in addressing disputes related to working conditions.
19	National Gender and Equality Commission Act 2011	The over-arching goal for NGEC is to contribute to the reduction of gender inequalities and the discrimination against all; women, men, persons with disabilities, the youth, children, the elderly, minorities and marginalized communities. This Act will be applied during hiring of

No	Policy	Applicability
		workforce on site
20	Public participation bill of 2016	The Bill is an ACT of Parliament that provides a general framework for effective public participation and to give effect for the constitutional principles of democracy. The purpose of the act includes promotion of democracy and public participation of the people according to article 10 of the constitution, promote community ownership for public decisions and promote public participation and collaboration in governance processes. In adherence to the bill two main stakeholder workshops and 5nr public meetings were carried out during Project EISIA study and in the full ESIA study. The purpose of the stakeholder workshops included informing the community on the project, incorporating the views of the people into the project design, enhancing the sustainability of the project by allowing feedback of major concerns in the project life.
21	The Wildlife Conservation and Management Act CAP 376, 2013	This Act provides for the protection, conservation and management of wildlife in Kenya. The Act deals with areas declared as National Parks, under the Act. The Act controls activities within the park, which may lead to the disturbance of wild animals. Further the Act protects wildlife outside the parks. The Act prohibits killing of wildlife for any purpose whatsoever unless authorized by the KWS. *There are a wide variety of wildlife within the Mt Kenya Forest, Proposed Weir and raw water main will be constructed with the protected forest hence compliance to provisions of the Act will be required.*
22	Permits and Licenses	The Proponent should demonstrate compliance to the legislation through acquisition of the appropriate licenses and permits. Furthermore, all contractors and consultants who will be engaged during the planning and design, construction, operation and maintenance and decommissioning should demonstrate compliance to the necessary pieces of legislation. These includes: NEMA registration certificates, collection of Waste by a NEMA licensed handler. NIWASCO will before project operation apply for license to discharge into the environment. Other permits will include leases from Kenya Forest Services (KFS) and Water Resources management Authority (WRMA) for the Water Supply Component.

5.4 African Development Bank Policy Provisions

The Project is being financed by AfDB, was therefore checked against the above listed Operation Safeguards and appropriate mitigation measures likely to be triggered under each policy were summarized in the EMSP and presented in **Table 5-3** on **Page 5-6.**

Table 5-3: Project Activities Triggering AfDB Operational Safeguards

Policy	Criteria in The Project	Discussions
OS 1: Environmental and Social Assessment.	Yes	The Project components will trigger OS 1, the assessment identified that According to OS 1 screening provisions, Chuka Water Supply Infrastructure is a Category 2, the project is likely to have detrimental site-specific environmental and/or social impacts that are less adverse and largely reversible,and readily minimized by applying appropriate management and mitigation measures. Mitigation measures for impacts identified are detailed in chapter 7 of this report.
OS 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation.	Yes	The policy aims to avoid involuntary resettlement where feasible, or minimise resettlement impacts where involuntary resettlement is deemed unavoidable after all alternative project designs have been explored. For Chuka Water Supply Infrastructure, displacement not triggered as pipelines are designed to follow road Right of Way (RoW) and River Riparian - However, impact crops/trees / structures/fences. (i) Karongoni and Rukindu Sub Locations, 81PAPs were identified along the easement to be used by both water and sewer pipelines. (ii) Chuka, Ndagani, Rukindu Sub Locations, 88PAPs were identified along the easement to be used by both water and sewer pipelines. (iii) Ndagani Locations 107PAPs were identified along the easement proposed for sewer pipelines. Land for establishment of the water treatment works in will be acquired through a willing seller willing buyer arrangement.
OS 3: Biodiversity, Renewable Resources and Ecosystem Services.	Yes	The safe guard aims to conserve biological diversity and ecosystem integrity by avoiding or, if avoidance is not possible, reducing and mitigating any adverse environment and social risks. , For Proposed Chuka Water Supply Infrastructure Project. The proposed weir and 7km raw water pipeline will be constructed on River Manyaga at the confluence with River Ruguti within Mt. Kenya (Chuka) such works might result in loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits. Also, there might be slight disruption of wildlife movement corridors within the same section. However, the impacts to biodiversity by the above described works will be less significant as detailed in Chapter 7 of this report. Hydrological Assessment undertaken based on WRMA Allocation Rules of (Q80 – Q95), 26,030m^3/day is available for abstraction at the proposed Intake Works, this implies that environmental flows required for sustaining downstream users and aquatic ecosystems will be sustained.

Policy	Criteria in The Project	Discussions
OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency.	Yes	The Project shall utilize raw materials both during construction and operation phase that could result to pollution of biophysical environment if not handled appropriately. Appropriate mitigation measures for likely waste to be generated by the Project are detailed in Chapter 7 of this report. Project activities shall not result to significant amount of greenhouse gases, EMSP prepared for operation phase provides for measures to be adopted to ensure efficient function of the Plant consequently reducing emission of methane and hydrogen sulphide gases. Also, the Project design has ensured that sewer flows through by gravity hence reducing the need for pumping.
OS 5: Labour Conditions, Health and Safety.	yes	The Project shall involve workers both during construction and operation phases of the project. This policy read together with OSHA 2007 shall form integral instruments to be used in ensuring that health, safety and working conditions of both works and community is safeguards. The Labour Relations Act 201 will be applied by labour force on site in addressing disputes related to working conditions.

CHAPTER 6: STAKEHOLDER CONSULTATION

6.1 Stakeholder Consultations

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

Stakeholder consultation in the EIA process is undertaken during the design, implementation and initial operation stages of the Project. The aim is to disseminate information to interested and affected parties (stakeholders), solicit their views and consult on sensitive issues.

Inadequate public consultation can result in significant information gaps, which could mislead environmental planners undertaking an environmental assessment. Lack of attention to communication and consultation processes can generate individual, community or regional opposition to a Project. This can ultimately be a cause of substantial delays, increased costs, and unsatisfactory compromise solutions, which could have been avoided through earlier consultations. Participation is therefore a process through which different stakeholders influence and share their views regarding development initiatives and the decisions and resources that affect them.

6.1.1 Stakeholder Mapping

This was done to ensure that all the stakeholders likely to be affected or influenced by the Project were identified and involved in ESIA detailed study. The following stakeholders are necessary and were engaged in the ESIA Study;-

- County Government in Project Area e.g. County Executive, Members of County Assembly (MCAs), Community Members in County traversed by Project for social, environmental and land affairs
- Project Affected Persons
- Kenya Forest Services (KFS)
- Kenya Wildlife Services (KWS)
- Business Community
- Water Resources Users Association (WRUAs) members or representatives
- Community Water Group Representatives
- Ministry of Lands and National Land Commission
- County Administration-County Commissioners, Deputy County Commissioners, Assistant County Commissioners, Chiefs and Assistant Chiefs, Village elders etc.
- Water Service Provider.

Table 6-1 on **Page 6-2** gives detailed stakeholders identified and consulted during the assessment.

Table 6-1: Relevant Stakeholders

No	Name	Category
Primary Stakeholders		
1.	Tana Water Services Board (TWSB)	Project Proponent
2.	Population at Water Treatment Works Sites, along pipeline routes and at storage reservoirs	Project Beneficiaries and Affected Persons
3.	Tharaka Nithi County Officials	County Government
4.	Members of County Assembly	
5.	County Commissioner Representatives	National Government Administration
6.	Deputy County Commissioners Representative	
7.	Representative of the legislature	National Legislature
8.	Water Resources Management Authority (WRMA)	Water Regulatory Body
9.	Tharaka Nithi Water and Sanitation Company	Project Beneficiaries
10.	Water Users Association	Water Users of Associations of effluent receiving rives
11.	Water Resource Users Association Representatives	Water Resource Users Associations of abstraction points
Secondary Stakeholders		
1.	Coffee and Tea Factories using rivers downstream	Large Water Consumers
2.	Kenya Tea Development Authority (KTDA)	
3.	Sub-County Water Officer	National Government Line Ministries
4.	Physical Planning Office	
5.	Public Health Officers	
6.	NEMA County Officer in Tharaka County	
7.	Department of Gender and Social Development	
8.	Agriculture Officers – District Agriculture Officer and District Livestock Development Officer	
9.	Sub-County Lands Officer	
10.	Sub-County Development Officer (DDO)	
Tertiary		
1.	Non-Governmental Organizations operating in the Project site	In the following sectors: • Environmental Management • Water • Rural and Community Development • Vulnerable Groups

6.1.2 Legal and Policy Provisions for Public Consultation

Stakeholder and public consultations are guided by various legal and policy framework documents. For Chuka Water Supply Infrastructure, Public consultation activities conform to both National and International Legal Instruments as described in **Table 6.2** below.

Table 6-2: Legal and Policy Provisions for Public Consultations

Level	Statutes
National (Kenya)	Kenya Constitution 2010 Articles 10(2), 35, 69(1), 118, 174(c), 184(1)(c), 196, 201(a), 232(1)d
	Public Participation Bill 2016
	The Environmental Management and Coordination Act (EMCA), 2015 and subsequent regulations of Environment Impact Assessment and Audit Regulation of 2003
International	African Development Bank OS 1 on Environment Assessment

Table 6-3 below provides in detail, Sections of the Kenya Constitution which require public participation in governance.

(a) Kenyan Constitution 2010

Table 6-3: Kenya Constitution Provision for Public Participation

Article	Public Participation Provision
Article 10(2)	Article 10(2) of the Constitution Provides **national values and principles of governance** in this Article bind all State organs, State officers, public officers and all persons whenever any of them whenever they (c) makes or implements public policy decisions. The national values and principles of governance as provided in the constitution include; patriotism, national unity, sharing and devolution of power, the rule of law, democracy and **participation of the people** and **sustainable development**.
Article (35)	Article (35) of the same constitution provides for **Access to information**, the articles indicates that every citizen has the right of access to information held by the State; an information held by another person and required for the exercise or protection of any right or fundamental freedom. The same article provides that The State shall **publish and publicize** any important information affecting the nation.
Articles 174(c)	Articles 174(c) state objectives of devolutions, among them is that devolution give powers of self-governance to the people and enhance the participation of the people in the exercise of the powers of the State and in making decisions affecting them and to recognize the right of communities to manage their own affairs and to further their development
Article 184	Article 184 is exclusive on **urban areas and Cities**, the article provides that National legislation shall provide for the governance and management of urban areas and cities and shall, among other provision provide for **participation by residents in the governance** of urban areas and cities.
Article 201(a)	Article 201(a) provides Principles of public finance which require openness and accountability, including public participation in financial matters;
Article 232(1)	Article 232(1) provides values and principles of public service include among others involvement of the people in the process of policy making;

(b) The Public Participation Bill 2016

The Bill, when enacted by parliament, will be referred to as "Public Participation Act". The Bill provides general guidelines of ensuring public participation in nation governance. The Bill will give effect to Articles of the Constitution referred to above namely Articles 10(2), 35, 69(1), 118, 174(c), 184(1)(c), 196, 201(a), 232(1)d.

The Bill provides that public participation shall be guided by the following:

- The public, communities and organizations to be affected by a decision shall have a right to be consulted and involved in the decision making process
- Provision of effective mechanisms for the involvement of the public, communities, organizations and citizens that would be affected by or that would be interested in a decision
- Participants' equitable access to the information they need to participate in a meaningful manner

- That public views shall be taken into consideration in decision making
- Development of appropriate feedback mechanisms
- Adherence to the national values under Article 10 of the Constitution
- Adherence to the principles of leadership and integrity set out in Chapter Six of the Constitution;
- Adherence to the principles of public participation as may be prescribed by any written law
- Promotion of sustainable decisions recognizing the needs and interests of all participants, including decision makers

6.1.3 Stakeholder Consultation Methods

The assessment involved public and stakeholder consultations with relevant stakeholders in Chuka Project area. The aim was to disseminate to communities the required Project information, address their concerns and perceptions regarding the Project and discuss relevant issues raised on the Project. The issues as presented in **Table 6-5**, were analyzed and used in finalization of the Project designs and planning on how best to implement the Project for Chogoria Project Area.

The ESIA Consultation process has involved two main stakeholder consultation workshops. The first workshop was held during the preliminary design period and the latter during the Project design finalization. The first public participation involved two meetings one held on 15th April 2016 in Chuka Town. Subsequent detailed stakeholder workshops were held from 12th to 19th March 2018.

The workshops involved local administration, business community members, local leaders, WRUA representatives, institution leaders, village elders, residents of various sub-locations all who are beneficiaries of the Project. The aim of this second stakeholder consultation was to give a wider platform for information dissemination on Project impacts, benefits and at the same time for information sharing and opinion gathering in relation to the proposed Project.

The consultations were in public barazas and forums. The issues raised were discussed openly and feedback provided by the ESIA and TWSB team to the attendants. The meetings ended in satisfactory manner with the community giving full support to the Project. The schedule for the meetings held is given in **Table 6-4** on **Page 6-5.**

Table 6-4: Schedule of Stakeholder Meetings in Chuka

Date	Venue of Workshop	Participants Involved	Gender Representation
15th April 2016	NIWASCO	County Government Officials, NIWASCO staff, WRMA, Local Administration Officials	Government Officials
15th April 2016	Chuka Town	County Government Officials, NIWASCO staff, WRMA, Local Administration Officials, members of the public.	Total 22 15 men 7momen
20th March 2018	Office of the Chief Mariani Location	**Marian Location:** A Chief Mariani Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 149 Male 87 Female 62
22nd March 2018	Office of Chief Mugwe Location	**Chief Mugwe Location,** Assistant Chief Kirege Sub Location, Assistant Chief Mugirirwa Sub Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 26 Male 24 Female 2
21st March 2018	Office of Chief Rubate Location	**Chief Rubate Location,** Assistant Chief Rubate Sub-Location, Assistant Chief Kanthiiri Sub Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 398 Male 277 Female 121
21st March 2018	Office of Chief Thoita Location	**Chief Thoita Location**, Assistant Chief Thoita Sub-Location, Assistant Chief Kathatwa Sub Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 15 Male 13 Female 2
25th April 2018	Stakeholder Consultative Forum Held at Hotel Godka in Chuka	Stakeholders at the forum were drawn from Tharaka Nithi County Representatives, Tana Water Services Board Representatives, Engineering Consultants and general stakeholder from Chuka Project Area	Total rep 64 Male 41 Female 23

Some of the specific outcomes of the workshops are discussed below in tabular form while detailed minutes of the meetings are outlined in **Annex 1**.

6.1.4 Outcome of Stakeholder Consultations

The stakeholder engagement outcome is presented in **Table 6-5** below and photographs that follow:

Table 6-5: Summary of Issues Discussed in Public Meetings

Area of Concern	Issue Raised by Stakeholder Attendants	Issue Addressed by EIA and TWSB Teams
Mariani Location Meeting		
The Project Scope	• Residents were interested in understanding the scope of the Project	• New Reinforced Concrete Run-of-river Ogee Weir Intake on the confluence of Ruguti/Manyaga Rivers for New Kirege Treatment Works • Rehabilitation of existing Intake on Tungu River for Existing Kiang'ondu Treatment Works • Detailed scope of the Project is discussed in the Design Report

Area of Concern	Issue Raised by Stakeholder Attendants	Issue Addressed by EIA and TWSB Teams
Project Implementation Period	When will the Project be implemented	• This will be as soon as the necessary documentation has been completed.
Project Benefits	• Residents noted that the Project shall benefit their community.	• The Water Project is aimed at providing clean and safe drinking water for both human and domestic animals thus saving costs of boiling or buying treated bottled water • Reduction of water borne diseases like typhoid, diarrhoea as a result of clean and affordable drinking water • Sourcing of building materials from the local hardware and other businesses thus providing income to the locals who own such businesses
Water Charges	• Residents sought to know how much they shall be charged for the water.	• The Water Service Provider shall come up with favourable rates for the water after the Project implementation.
Compensation	• Residents sought to know how crops and land shall be compensated or any other property that shall be affected by the Project.	• Valuation shall be made by the proponent and compensation made accordingly.
Water Charges	• Residents sought to know how much they shall be charged for the water.	• The water service provider shall come up with favourable rates for the water after the Project implementation.
	• Project benefits:	• Savings on exhausters expenses • Ability to build high density houses. • Increase in property value in the area.
Mugwe-Location		
• **Compensation of PAPs**	• Concerns with under valuation of crops and property	• certified government value to be contacted
• **Water**	• High water rates of community water proposed cheaper rates • Need for repair of damaged water pipelines during construction	• Rates reviewed by water company are expected to be reasonable • Water lines damaged during construction will be restored as immediate as possible.
Water	• Need for treatment of community water to reduce incidences of water borne diseases • Water connections to the residents to be increased once the project is complete	• Coordination will be done with water company for water treatment • No conflicts with water user associations • Water connections will be done by water company after completion of project
Compensation	• Area will not require installation of water pipelines.	• No need for compensation as water lines are already existing

Area of Concern	Issue Raised by Stakeholder Attendants	Issue Addressed by EIA and TWSB Teams
Employment	• Need for employment during the Project	• Contractor will hire a certain percentage of persons from the areas required by law
Rubate-Location		
Compensation	• Fear of lack of compensation due to lack of titles	• A certified valuer will be contracted for valuation. • PAPs owning lands without land ownership documents will use affidavits for verification
Water	• Many water Projects in the area yet high water cases of water related diseases. • Low water levels in river Manyaga and Tungu limiting project sustainability	• Increased access to clean water and sanitation systems. • Water currently available is for irrigation yet not treated
Water	• Low reliability on current water supply • Project could cause destruction of community water pipelines	▪ Water in the Project will be treated, installation of meters will be mandatory to reduce wastage to be done by water company ▪ Community pipes destroyed will be reinstated as soon as its practicable ▪ Project team will work with locals to minimize conflicts.
Compensation	• Change of sewer line route • Need for full compensation due to previous undervaluing	• Design was done using the most optimal route, connections to the location considered during design • Certified government valuer will be available for valuation and full replacement cost to be carried out.
Thoita-Location		
Compensation	• Compensation of late land owners • Need to avoid double compensation	• All land ownership will be compensated along with beneficiaries of late persons/the process will be assisted by local administration
Employment	• Need to hire local and source materials from them	• Persons will be hired in accordance with law and materials will be sourced locally if available
Water	• Current water supply is unsafe due to high water related diseases • Need to repair broken pipes during the works	• Water will be treated • All affected infrastructure will be restored by contractor
Stakeholder Consultative Forum Held at Hotel Godka in Chuka		
Public consultation	• Residents applauded the openness of the Project before its commencement	• Part of their constitutional right to participate in the Project • More Sectorial Consultations will be done with KWS, WRUA and KFS during the ESIA review

Area of Concern	Issue Raised by Stakeholder Attendants	Issue Addressed by EIA and TWSB Teams
Downstream ecological flows	• Residents wanted a confirmation that downstream flows were not compromised by the proposed Project	• Hydrological assessment have been done, the assessments indicate that the rivers have sufficient flows for abstraction without interfering with ecological flows.
Compensation	• All and affected	• All property affected would be compensated accordingly according to AfDB OS 2.
Benefits of Project to employment	• What are the main benefits considering there are other water projects?	• Provision of clean (treated) water to the residents • Provision of employment opportunities will be 60% skilled and 90% casual • Reduced waterborne diseases
Water	• Water payments • Activities that can be done on the reserve after project completion	• WSPs will be responsible for setting water tariffs money collection which is necessary for sustainability of project and employment creation • Farmers can plant items on the reserve but not trees nor deep rooted plants

Chuka Town Stakeholders Meeting held on 21st April 2016

Public Consultation in Rubate Location 21st March 2018

Area Chiefs addressing the residents

Residents during the meeting session

TWSB Design Engineer explaining the project scope to the residents

Residents signing the attendance list

Public Consultation in Thoita Location on 21st March 2018

TWSB Engineer explaining the project scope to residents

A resident raising concern during the meeting session

A Resident signing the attendance list form

Residents during the meeting session

Public Consultation in Mugwe Location on 22nd March 2018

A resident raising concern during the meeting

Residents during the meeting session

TWSB Engineer explaining the project scope to residents

A resident signing the attendance list

Public Consultation in Mariani Location on 20th March 2018

Residents during the meeting session

TWSB Design engineer explaining the project scope to residents

CHAPTER 7: ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT & MITIGATION

7.1 Introduction

This ESIA assessment has been systematically conducted to determine whether the proposed Project will have a diverse impact on the environment. The Environmental Management and Co- ordination Act (EMCA) No.8 of 2015 provides the legal and statutory guidelines for the Environment and Social Impact Assessment process in Kenya.

The impacts in this Chapter have been generated based on the analysis of the proposed environment in relation to the proposed project. The impacts arising during each of the phases of the proposed development namely construction, operation and decommissioning can be categorized into:

- Impacts on Biophysical Environment
- Health and safety Impacts
- Social-economic Impacts

7.2 Definition and Classification of Environment Impact

An Environmental Impact is any change to the existing condition of the environment caused by human activity or an external influence, the impact may be:

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

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

7.2.1 Impact Significance

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

- Are subject to legislative control;
- Relate to protected areas or to historically and culturally important areas;
- Are of public concern and importance;
- Are determined as such by technically competent specialists;
- Trigger subsequent secondary impacts;
- Elevate the risk to life threatening circumstances; and
- Affect sensitive environmental factors and parameters

7.2.2 Impact Assessment and Scoring

The impact analysis were done using the Leopold Matrix which is a grid that is used to identify the interaction between project activities, which are displayed along one axis, and environmental characteristics, which are displayed along the other axis. For the identification of impacts a breakdown of the environment into elements or factors that may be affected and a breakdown of the various actions or activities of the project under study were done.

The potential impacts associated with the proposed development have been assessed as presented in **Table 7-1** on **Page 7-2.** Precautionary principle was used to establish the significance of impacts and their management and mitigation i.e. information, the Environmentalist erred on the side of caution.

Table 7-1: Impact Rating Criteria for Environment and Social Risks

Extent		Duration		Intensity		Probability		Weighting Factor (WF)		Significance Rating (SR)		Mitigation Efficiency		Significance Following Mitigation (SFM)	
Foot print	1	Short term	1	Low	1	Probable	1	Low	1	Low	0-19	High	0,2	High	0-19
Site (1km radius)	2	Short to medium	2			Possible	2	Low to Medium	2	Low to Medium	20-30	Medium to High	0,4	Medium to High	20-30
Location	3	Medium term	3	Medium	3	Likely	3	medium	3	medium	40-59	medium	0,6	medium	40-59
Sub County	4	Long term	4			Highly likely	4	Medium to high	4	Medium to high	60-79	Low to medium	0,8	Low to medium	60-79
County	5	Permanent	5	High	5	High	5	High	5	High	80-100	low	1,0	low	80-100

Definition of Terms

Extent: An area of influence covered by the impact. In this sense, if the action produces a much-localized effect within the space, it is considered that the impact is low (1). If, however, the effect does not support a precise location within the project environment, having a pervasive influence beyond the project footprint, the impact will be at location level (3) or could be County (5)

Timing: Refers to the moment of occurrence, the time lag between the onset of action and effect on the appearance of the corresponding factor. We consider five categories according to this time period is zero, up to 1 year (short term), or more than two years, which are called respectively medium term (3), long-term (4), and permanent (5).

Intensity: refers to the degree of impact on the factor, in the specific area in which it operates, ranked from low (1) to high (5).

Probability: Refers to the likelihood of the impact occurring during the project implementation, this is also ranked as Probable (1) to highly probable.

7.3 Positive Impacts During Construction Phase

The Project construction phase includes Pre-Construction and Construction Phases. The construction phase depends on the nature of the project activities and normally vary from one year to three years. Direct project positive impacts are:

- Employment opportunities during construction, the design report has provided for 90% unskilled labour and 60% skilled labourers to be sourced from the local market.
- Provision of ready market for construction materials such as sand, ballast and cement that will be sourced from local market, this will lead to injection of money into the local economy
- Technological and knowledge transfer to the local sector, this will be through the artisan who will be employed and trained by the Project.

7.4 Negative Impacts During Construction Phase

The following negative impacts are associated with the Construction Phase of the Project:

7.4.1 Biodiversity

The proposed weir and raw water pipeline will be constructed along River Ruguti within Mt. Kenya (Chuka), such works might result in loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits. Also, there might be slight disruption of wildlife movement corridors within the same section.

The rating for Project Impacts on Biodiversity is as shown in **Table 7-2** below.

Table 7-2: Impact Scoring for Project Impact on Biodiversity

Impact Sources	**Alterations of the vegetation cover and interference with wildlife movement corridor and habitat by site clearance and excavation activities**		**Mitigation Efficiency**
Nature of impact	✓ Loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits ✓ Disruption of wildlife movement corridors at the weir site and raw water corridor. ✓ Could lead to human wildlife conflict during operation of the plant especially to workers maintaining the system ✓ Sensitive receptors will be the forest section of along Ruguti river within Mt Kenya Forest in Chuka.		High
Reversibility of impact	Yes		
Mitigation Measures	Yes as provide below		
Affected Areas	Terrestrial ecosystem		
Monitoring Indicators	✓ Square feet of area reinstated ✓ Number of trees planted ✓ State of the Project site after Project completion ✓ Number of Human Wildlife conflicts recorded.		
Magnitude	*Extent*	Site – 2	
	Intensity	Low - 1	
	Duration	Short term-1	
	Probability	Probable – 2	
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability) x WF(2+1+1+1) x1=5 (Low)	Low

Mitigation Measures for Loss of Vegetation Cover

- The Contractor will ensure proper demarcation of the Project area to be affected by the construction works
- Strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works
- Retention of trees and shrubs, where possible on the potential sites for screening of the visual impact
- Where the proposed route requires the removal of any vegetation, care will be taken to minimize the destruction or damage of trees
- Work in collaboration with KFS to ensure replanting of destroyed trees in cleared areas where works are complete
- Ensure a permit to work within the forest is obtained from KFS as per the Forest Act, 2005

Mitigation Measures for Interference with Wildlife Corridor

- KWS to be involved in monitoring existing and new species and other negative impacts accompanying the project
- Clearance of vegetation should be done in necessary areas only
- Off-road driving will be discouraged
- Maximizing hiring local workforce for the project and sensitization programs for contractors on laws against poaching and safety measures to reduce Human Wildlife Conflicts
- Presence of KWS staff on site for monitoring throughout construction period
- Provide a watering point for animals at the intake site as proposed by KWS
- Regular monitoring of construction materials to avoid introduction of invasive

7.4.2 Vegetation Clearing, Soil Erosion and Siltation

Construction activities have the potential to clear vegetation and loosen soils particularly on slopes which can then be washed down into the lower areas (streams and valleys). Soil quality degradation is also likely to occur during construction as a result of disposal of construction materials on the adjacent lands especially near the base of the valleys and ultimately into the rivers as indicated in **Table 7-3** on **Page 7-6.**

Table 7-3: Project Impacts on Vegetation Cover.

Impact Sources	**Clearing of vegetation cover along the pipeline identified for the Project**		**Mitigation Efficiency**	**High**
Nature of impact	• Loss of soil cover along the pipelines corridor within the forest and outside the forest • Clearing of vegetation cover exposes soils to agents of soil erosion such as wind and runoff, this could lead to soil degradation. • Soil structure disruption along the excavated areas, could result to mud flow and land slides • Triggers sedimentation in nearby Ruguti river, this increases river turbidity, could also lead to flooding.			
Reversibility of impact	yes			
Affected stakeholders /areas	Fauna and flora, business persons Farmers			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-3		
	Duration	Short to medium-2		
	Probability	Likely-3		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability) x WF (2+3+2+3) x3= 30 (Low-Medium)		Low to Medium

Mitigation Measures

The following measures are proposed to mitigate against soil erosion and measures to enhance vegetation cover.

- Re-plant the indigenous vegetation as much as practical once work is completed.
- Limit vegetation clearance unless where unavoidable circumstances appear;
- Contain excavated soils so that they will not find their way into nearby water sources;
- Cement mixing should be done in a designated area away at a safe distance from storm water drains;
- Spilled cement or concrete should be collected and disposed away from natural water ways or storm water drainage;
- Sensitise workers and enable them to properly handle concrete spillages or waste cement;
- Re-vegetation of exposed areas around the site should be carried out rapidly in order to mitigate against erosion of soil through surface water runoff and wind erosion.

7.4.3 Air Pollution Impacts

Potential air pollution caused by emissions from construction equipment (Carbon, Hydrocarbons, Particulate Matter) – earth movers and excavators, vehicles, concrete and cement batching plants and trucks, emission of dust from trucks and vehicles accessing the construction areas and camp sites as well as material piling (sand and aggregate). Such impacts may affect the immediate residential houses and commercial premises as illustrated in **Table 7-4** below.

Table 7-4: Air Quality Impacts Rating

Impact Sources	Impact trigger		Mitigation Efficiency	High
Nature of impact	• Removal of top soils during excavation • High traffic flows the project alignment • Traffic diversions to dusty roads • Emissions During off loading and on-loading of materials including sand, concrete. • Hydro carbons exhausts from plant and equipment on site. • Sensitive receptors that might be impacted by poor air quality include: Chuka Market, Chuka Boys secondary, Chuka University and Chuka Hospital within the Project area.			
Reversibility of impact	Yes			
Affected parties	Community, workers			
Magnitude	*Extent*	Site-2		
	Intensity	High-5		
	Duration	Medium-4		
	Probability	High-5		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability) x WF (2+5+4+5) x 3= 48 (high)		medium

Mitigation Measures

- Maintain construction equipment at high operational conditions such as to control emissions into the air.
- Earth moving be done under dump conditions as much as possible to prevent emission of dust into the air,
- Similarly, piled materials (sand and aggregate) should be maintained dump to prevent dust emissions,
- It will be necessary to notify the immediate neighbourhoods on the potential odours during the excavations. The period should, however, be kept as short as possible (odour generation may not be fully eliminated during the period)
- Use of sprinklers to regularly water construction site, this suppresses the dust menace at construction sites
- People working in the sites with dust emissions to use dust masks to prevent respiratory infections.

7.4.4 Noise Pollution

Construction Phase for the proposed Project will most likely result in noise emissions and excessive vibrations as a result of the machines that will be used (excavation equipment among others) and construction vehicles delivering materials to site. Noise can be a nuisance to the local community if construction works begin too early in the day and continues into the night as indicated in **Table 7-6** on **Page 7-8.**

Noise generating activities such as equipment operations and the workers themselves could be a public nuisance to nearby settlements and commercial centres, health centres and schools especially those within 200m of the Project site. As required, OSHA 2007 and EMCA 2015 Noise and Excessive Vibration 2009 should be adhered to. **Table 7-5** below provides permissible noise levels for a residential and construction sites

Table 7-5-: Permissible Noise levels

MAXIMUM PERMISSIBLE NOISE LEVELS FOR CONSTRUCTIONS SITES

(Measurement taken within the facility)

Facility		*Maximum Noise Level Permitted (Leq) in dB(A)*	
		Day	Night
(i)	Health facilities, educational institutions, homes for disabled etc.	60	35
(ii)	Residential	60	35
(iii)	Areas other than those prescribed in (i) and (ii)	75	65

Table 7-6: Impacts Associated with Noise and Vibrations

Impact Sources	**Construction activities that may cause excessive vibration and noise pollution**		**Mitigation Efficiency**	**Medium**
Nature of impact	• Hearing impairments to construction workers, neighbouring communities and institutions including schools near project working areas. • Sensitive receptors likely to be impacted by noise and excessive vibrations include chuka Market, Chuka Boys secondary, Chuka University and chuka hospital within the Project area.			
Reversibility of impact	No			
Affected stakeholders / areas	Workers, persons living or working near project site			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-3		
	Duration	Short to medium-2		
	Probability	Likely-3		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability)x WF(2+3+2+3) x3= 30 (Low-Medium)		Low to Medium

Mitigation Measures

To control noise pollution:

- Avoid night time construction when noise is loudest;
- Conduct periodic noise measuring and monitoring to determine levels and extent of harmful noise;
- Clearly label the high noise areas;
- Provide PPE personal protective equipment (PPE) including masks, goggles, scarfs, boots and overalls among other protective clothing to persons operating within or visit identified high noise areas.
- In order to meet noise level requirements, the equipment should be equipped with standard noise attenuation features. Machines that exceed acceptable noise limits should be equipped with silencers or lagging materials or specially designed acoustic enclosures;
- Inform local residents when construction activities are likely to generate excessive noise in order to minimize disruption to local residents;
- Sensitize truck drivers to avoid hooting especially when passing through sensitive areas such as churches, residential areas and hospitals

7.4.5 Water Resources Pollution

Limited discharge of silt into rivers and other local drainage system from earth moving during construction, potential discharge of oil residuals into the same rivers and open drains from the construction equipment and disruption of accumulated solid wastes from work areas and washed down into the river and other drains as indicated in **Table 7-6** below.

Table 7-7: Water Pollution Impacts Rating

Impact Sources	**Discharge of silt and oils into rivers and water bodies leading to pollution**		**Mitigation Efficiency**	**Medium**
Nature of impact	• Erosion of soils that are washed off into water sources • Discharge of oil spills into water bodies • Washing off of solid wastes from project sites into drains and water sources • Could lead to contamination of aquifers and underground water sources			
Reversibility of impact	Yes			
Affected stakeholders /areas	Fauna and flora, rivers and streams			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-3		
	Duration	Medium-3		
	Probability	Likely-3		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability) x WF (2+3+3+3) x3= (Low to Medium)		Low to Medium

Mitigation Measures

- Isolate solid wastes disrupted from the works during excavations for safe disposal. The wastes should be collected and disposed in approved sites.
- Earth moving and excavations for the construction are carried out considering safety of the river and surface drainage. Control siltation of rivers and other surface drains
- Ensure spilt oil does not discharge into water sources. Provide oil spill containment including concrete platform for servicing of construction equipment and holding of scrap oil drums.

7.4.6 Drainage and Hydrology Disruptions

Project construction will involve earthworks and excavation that could interfere with local drainage in Chuka Town with a potential to divert the normal surface drains towards homes and private plots. No significant implications are expected in the general hydrology of the larger Project area.

Earthwork activities will result in the generation of some spoil materials. When not handled properly the soils could lead to sedimentation of the nearby water sources which will interfere with the habitats and hence flora and fauna downstream of such rivers within the Project area as indicated in **Table 7-8** below.

Table 7-8: Drainage and Hydrology Impact Scoring

Impact Sources	**Project excavation and earthworks that interfere with the drainage and hydrology of the area**		**Mitigation Efficiency**	**Medium**
Nature of impact	• Interference with surface drainage • Soil erosion which is washed off to rivers and streams that are the main sources of water for the rural people • Blockage of existing drains and pollution of rivers by sediments			
Reversibility of impact	Yes			
Affected stakeholders /areas	Fauna and flora			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-3		
	Duration	Medium-2		
	Probability	Likely-3		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability) x WF (2+3+2+3) x3= 30 (Low-Medium)		Low to Medium

Mitigation Measures

- Excavated channels to follow contours to avoid interference with surface drains;
- Whenever necessary, drains along the construction line are directed towards existing drainage systems to cater for storm water during the rains. However, construction should be carried out during a dry season and should take the shortest period possible;
- Utilise excavated soil to level excavated ground where necessary and cover the water and sewer lines that will have been laid in the ground;
- Construction materials and other debris (lime, cement and fresh concrete.) should be handled carefully to prevent them from finding their way into the nearby water sources
- Ensure compliance with environmental laws.

7.4.7 Interruption of Existing Infrastructure

There are various installations that will be crossed, move in or move along installations among them:

- Roads both main roads and feeder roads in the towns and estates
- Underground utilities e.g. electricity and water lines with the estates
- Fences and temporal structures along the main roads

These services are critical and have implications with spillover effects on the social and economic performance as indicated in **Table 7-9** below.

Table 7-9: Impact to Public Utilities

Impact Sources	**Project excavation and earthworks that interfere with the public utilities and services in the area.**		**Mitigation Efficiency**	**High**
Nature of impact	• Interference with surface and underground service utilities. • These services include; power cables, existing community waterlines, and access culverts and data cables.			
Reversibility of impact	Yes			
Affected stakeholders /areas	Fauna and flora			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-3		
	Duration	Medium-2		
	Probability	Likely-3		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability) x WF (2+3+2+3) x3= 30 (Low-Medium)		Low to Medium

Mitigation Measures

- Formal request for permission to cross, break in and lay the pipelines should be sought from affected property owners; and
- A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction.

7.4.8 Waste Generation Impacts (Liquid and Solid)

During construction, solid waste will be generated from a wide range of project activities. Some of the waste includes earth spoils, wrapping materials discarded by the workers on site, food waste from kitchens, waste from the workshops and offices consisting of waste papers, toners and cartridges, broken equipment and containers, steel, timber, etc.

Also, during construction various types of liquid waste will be produced such as concrete washings, runoff from workshops and grey water from contractor's camp. Just as with solid waste, liquid waste can attract wildlife especially for meeting their drinking water needs. This can affect wildlife especially primates.

To minimize pollution and visual intrusion, the waste will have to be managed appropriately as provided by Waste Management Regulation of 2006. **Table 7-10 on page 7-11** provides impact scoring for waste generation on site.

Table 7-10: Waste Generation Impacts

Impact Sources	**Adverse Impact associated with Health and Safety**		**Mitigation Efficiency**	**High**
Nature of impact	- Impact involves pollution of the environment caused by construction generated solid and liquid waste which include waste water, fuels, oils, hazardous substances and other liquid pollutants. - These wastes could pose health and sanitation risks when washed away into water bodies			
Reversibility of impact	Yes			
Affected stakeholders /areas	Workers and Community			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-5		
	Duration	Medium term-4		
	Probability	Likely – 4		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability)x WF(2+5+4+4) x4=60 (Medium to High)		Medium to high

Waste Management Mitigation measures are summarized below.

Solid Wastes Impacts Mitigation Measures

(i) The contractor shall develop a comprehensive waste management plan prior to commencement of works
(ii) Properly labelled and strategically placed waste disposal containers shall be provided at all places of work
(iii) Litter bins should have secured lids to prevent animals and birds from scavenging
(iv) All personnel shall be instructed to dispose of all waste in a proper manner
(v) Recycling of construction material shall be practiced where feasible e.g. containers and cartons
(vi) Earth spoils shall be disposed of in pre-identified sites
(vii) The construction camps should be situated away from the primate reserve and wildlife corridors to prevent wildlife from scavenging polluted waste.

Liquids Wastes Impacts Mitigation Measures

(i) Water containing pollutants such as concrete or chemicals should be directed to a conservancy tank for removal from the site where applicable
(ii) Potential pollutants of any kind and form shall be kept, stored and used in such a manner that any escape can be contained
(iii) In case of any form of pollution the contractor should notify the RE
(iv) Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas including groundwater are not polluted
(v) No grey water runoff or uncontrolled discharges from the site or working areas to any

Hazardous Wastes Impacts Mitigation Measures

(i) The contractor shall ensure that the machines and equipment are in good condition
(ii) Ensure proper handling of lubricants, fuels and solvents while maintaining the equipment
(iii) Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean-up material shall be removed, treated and transported to an appropriate site licensed for its disposal.
(iv) A safety and emergency response plan will need to be developed for all operations with emphasis on the protection of the environment prior to start up.
(v) Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean-up material shall be removed, treated and transported to an appropriate site licensed for its disposal;
(vi) Storm water shall be diverted away from the fuel handling and storage areas. An oil water interceptor shall be provided to treat any rainwater from fuel storage and handling areas;
(vii) Measures should be taken to ensure proper storage of fuel, oil and bitumen. Oil-water interceptors or sumps should be constructed to capture discharge of oils, fats and other polluting liquids from maintenance workshops, vehicle and equipment washing bays and kitchen drains;
(viii) At the work sites the contractor will be expected to maintain strict surveillance particularly when working within the vicinity of water supply points and the rivers within the project area;

(ix) Tank equipment such as dispensing hoses, valves, meters, pumps, and gauges shall be located within the containment or provided with own containment

7.4.9 Resettlement Impacts

The Project design has ensured that the Project components will be implemented within existing public land, road reserves, wayleaves and river riparian.

Displacement not triggered as pipelines are designed to follow road Right of Way (RoW) and River Riparian, however, there will be impact on crops / trees / structures / fences as detailed in RAP report prepared for the Project.

A summary of RAP impacts is presented in **Table 7-11** below.

Table 7-11: Project Impacts to Assets and Sources of Livelihood

Sub Location	Number of PAPs	Assets Affected	Quantity
Chuka Town	26	trees/crops	83
		fence	3
		goat shed	1
		house	1
Sub Location	**Number of PAPs**	**Assets Affected**	**Quantity**
Karongoni	26	trees/crops	104
		store	0
		live fence	0
		main house	0
		gate	0
		main house	0
Sub Location	**Number of PAPs**	**Assets Affected**	**Quantity**
Ndagani	122	trees/crops	432
		latrine	1
		live fence	0
		main house	0
		gate	0
		main house	0
Sub Location	**Number of PAPs**	**Assets Affected**	**Quantity**
Rukindu	83	trees/crops	465
		fence	3
		live fence	0
		main house	0
		gate	0
		main house	0

Land for establishment of the Kirege Water Treatment Scheme will be acquired from the Kenya Forest Service (Nyayo Tea Zone area).

Therefore, referring to African Development Bank (AfDB) Operational Safeguards Policy on land acquisition and involuntary resettlement, a Resettlement Action Plan (RAP) for affected persons and their assets shall be prepared as illustrated in the **Table 7-12** on **Page 7-15.**

Table 7-12: Ressettlement Impacts Rating

Impact Sources	**Resettlement Impacts**		**Mitigation Efficiency**	**Medium**
Nature of impact	• Displacement of activities including livelihoods located along reserves • Uprooting of crops and trees • Interference with aesthetics • Destruction of perimeter walls and buildings along the reserve			
Reversibility of impact	yes			
Affected stakeholders /areas	Fauna and flora, business persons Farmers			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-3		
	Duration	Permanent-4		
	Probability	High-5		
Significance	**Weighting**	(Extent + Intensity + Duration + Probability) x WF (2+3+4+5) x 3 = 42 (Medium)		Medium

Mitigation Measures

- Prepare a Resettlement Action Plan (RAP) for purposes of compensation of likely assets and sources of livelihood for Project Affected Persons.

7.4.10 Project Social Risks

The Project activities as described in the report have the potential of triggering various social risks both at Project Construction Phase and Operation Phase. These risks are likely to be significant in Market centres and towns along the proposed Project route, significant impact could be in Chuka Town and Chuka University as an institution.

This assessment has identified potential social risks associated with the Project as listed below and analyzed in **Table 7-13** below.

(i) Project Impacts to Vulnerable and Marginalized Groups (VMGs)
(ii) Labour Influx Impacts
(iii) Human Rights and gender inclusivity
(iv) Increased Transmission of communicable diseases including HIV/AIDS

Table 7-13: Impacts on Social Setting

Impact Sources	**Project Impacts to social setting of the Project area**		**Mitigation Efficiency**	**High**
Nature of impact	(i) Labour Influx Impacts (ii) Human Rights and gender inclusivity (iii) Child protection (iv) Increased Transmission of communicable diseases including HIV/AIDS			
Reversibility of impact	Yes			
Mitigation Measures	As detailed below			
Affected stakeholders	Workers and Community			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium-5		
	Duration	Medium term-4		
	Probability	Likely – 4		
Significance	**Weighting**	(Extent+ Intensity +Duration + Probability)x WF(2+3+3+3) x1=11 (Low)		Low

Labour Influx Effects

This impact is triggered during Project Construction Phase due to the Project attracting various categories of workers from local, national and international markets. This therefore leads to concentration of people in one area drawn from diverse social and cultural backgrounds often resulting to a number of issues as listed below;

(i) Strain on various resources especially water resources for road works
(ii) Grievances from local community members over job opportunities.
(iii) Sexual Offences
(iv) Teenage Pregnancies

Mitigation Measures to Labour Influx Impacts

(i) Effective community engagement and strong grievance mechanisms on matters related to labour
(ii) Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx, the contractor should engage a local community liaison person as provided for in Chapter 6
(iii) Proper records of labour force on site while avoiding child and forced labour
(iv) Comply to provisions of WIBA 2007
(v) Develop and implement a children Protection Strategy, this strategy will ensure that no child under the legal age of 18 years in employed to the Project.

Human Right and Gender Inclusivity

This impact is triggered during Project Construction Phase due to the potential of the Contractor's failure to comply with the following provisions;

(i) Gender Inclusivity requirements in hiring of workers and entire Project Management as

required by Gender Policy 2011 and 2/3 gender rule.

(ii) failure to protect Human Risk areas Associated with, Disadvantaged Groups, Interfering with Participation Rights, and interfering with Labour Rights

Mitigation Measures of Human Rights and Gender Requirements

(i) Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 Gender Rule.
(ii) The existing community structures headed by location chiefs should be involved in local labour hire, emphasize the requirement of hiring women, youth and people with disability.
(iii) Protecting Human Risk areas Associated with, Disadvantaged Groups, Interfering with Participation Rights and interfering with Labour Rights

Child Protection

The possibility of contractor children abuse is through hiring of child labour, also labour force on site might abuse children within the Project area through sexual advance that could lead to early pregnancies and school dropout including exposure to communicable diseases such as HIV and AIDS. The contractor will undertake the below listed mitigation measures.

Mitigation Measures to child protection

(i) Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project.
(ii) All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour
(iii) Children under the age of 18years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014

Increase in Prevalence of Communicable Diseases

This impact is triggered during Project Construction Phase due to the Project attracting various categories of workers from local, national and international markets. This therefore leads to concentration of people in one area drawn from diverse social and cultural backgrounds often resulting to people engaging in risky sexual activities.

Mitigation Measures to Risk of Communicable Diseases

(i) HIV/AIDS Awareness Program and other communicable diseases to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the Supervising Engineer.
(ii) This will involve periodic HIV/AIDS and other communicable diseases Awareness Workshops for Contractor's Staff
(iii) Access to Contractor's Workforce Camps by outsiders to be controlled
(iv) Contractor to provide standard quality condoms to personnel on site

7.5 Positive Impacts During Operational Phase

The project's main objective is to improve the quality of life of people within Chuka Town and environs through provision of improved Water Services.

Specific benefits are listed below;

(i) Improved affordable, clean, reliable water supply within Project area leading to improved health and hygiene.
(ii) Reduced exposure to health risks posed by consumption of untreated water from existing community water schemes.
(iii) Improved health and nutrition of Chuka people through provision of treated safe water.
(iv) Provision of clean reliable safe water supply will eliminate water burden to women and girl child, this will allow women to engage in other economic activities while girl child concentrate on education.
(v) The Project once operational will save community members money, this is because the water will be billed at recommended tariff by Water Services Regulatory Authority as opposed to the current exorbitant tariffs posed by local community water schemes.

7.6 Negative Impacts During Operation Phase

The operation phase will have potential negative impacts; these impacts are less significant and can be easily mitigated as described in **Table 7-14** below.

Table 7-14: Negative Impacts during Project Operation Phase

Issue	Proposed Mitigation
Risk of encroachment and construction of structures on the water easement	• Mapping and installation of beacons to which illustrate the width of the pipeline reserve • Regular patrol of the pipeline corridor for encroachment. • Prosecution of encroachers as required by County By-Laws on way leaves and road reserves maintenance. • Conduct public sensitization programs on importance not interfere with way leaves and public reserve land
Risk of water pipeline bursts leading water wastages (Non-Revenue Water percentages increase)	• Regular check, repair and maintenance of the water pipeline • Activate a community watch group for information sharing on the status of the water line • Implement a leak detection and repair program (including records of past leaks and unaccounted for water to identify potential problem areas
Risk of illegal connection to the water pipeline	• This will require constant inspection by NIWASCO officials and installation of leak and burst detectors at designated areas along the pipeline. • Conduct public sensitization programs on importance not interfere with the water pipeline and the need to seek official water connection from NIWASCO

Issue	Proposed Mitigation
Water Discharges during flushing/cleaning of pipes to remove sediments. The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids, residual chlorine, and other contaminants that can harm surface waterbodies.	• Identify environmental issues that need mitigation during operation of the Project component. • Develop management plans and procedures needed to address the environmental concerns • Monitor and evaluate the performance against set targets • Set a budget for environmental management and restorations • Schedule for revising and updating the ESMMP • Initiate sensitization programmes on best practices on solid waste management right from the source, sorting, transportation and disposal • Conducting an initial audit in the first year of operation of the projects and subsequent annual audits of the operational activities.

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

8.1 Purpose and Objectives of ESMMP

The specific objectives of the ESMMP are to:

- Serve as a commitment and reference for the contractor to implement the ESMMP including conditions of approval from NEMA.
- Serve as a guiding document for the environmental and social monitoring activities for the supervising consultant, contractor and the client management including requisite progress reports.
- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment.
- Provide instructions to relevant Project personnel regarding procedures for protecting the environment and minimizing environmental effects, thereby supporting the Project goal of minimal or zero incidents.
- Document environmental concerns and appropriate protection measures; while ensuring that corrective actions are completed in a timely manner.

8.2 Auditing of ESMMP

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

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

8.3 Management Responsibility of ESMMP

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

- TWSB/NIWASCO
- NEMA
- Contractor
- Design Consultant
- County Government of Tharaka Nithi

8.3.1 Tana Water Services Board / Nithi Water and Sanitation Company (TWSB/ NIWASCO)

TWSB in conjunction with NIWASCO the proponent, will be charged with the responsibility of ensuring that the proposed development has been put up in an environmentally sound manner. This can be achieved by inclusion of environmental specifications in the tender documents, selection of renowned environmentally conscious contractors and supervision to ensure that the objectives of this ESMMP are met.

8.3.2 National Environment Management Authority (NEMA)

The responsibility of NEMA is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government of Kenya in the implementation of all policies relating to the environment.

8.3.3 The Contractor

The persons/firms contracted to put up the proposed water and sanitation projects plant will be required to comply with the requirements of the ESMMP within this Report. To ensure strict compliance environmental specifications of this ESMMP should form part of the contract documents.

8.3.4 Consultant

The sourced consultant will have to ensure that the proposed ESMMP is up to date and is being used by the contractor. Periodic audits of the ESMMP will have to be done to ensure that its performance is as expected.

8.3.5 County Government of Tharaka Nithi

The relevant departmental officers in the above local authorities should be called upon where necessary during Project implementation to provide the necessary permits and advisory services to the Project implementers.

Tables 8-1 and **8-2** on **Pages 8-3** to **8-10** present the ESMMP for the proposed Water Supply Infrastructure during the construction, operation and decommissioning phases respectively. Wastes and debris holding sites will be cleared with maximum re-use of the debris either on surfacing the passageways or other grounds such as schools and church compounds.

Table 8-1: Construction Phase: Environmental and Social Management and Monitoring Plan

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
Seeking approvals from NEMA for ESIA and Approval of plans from County and National Government, KERRA, KURA and KeNHA Approvals on usage of Right of Way	Delay in implementation of the Project due to objections and stop orders	Low	▪ The Contractor shall ensure that all pertinent permits, certificates and licences have been obtained prior to any activities commencing on site and are strictly enforced/ adhered to; ▪ The Contractor shall maintain a database of all pertinent permits and licences required for the contract as a whole and for pertinent activities for the duration of the contract	All the Project Lots Responsibility TWSB & Contractor	• Number of approvals / permits issued	~KShs.2M
Construction campsites	Environmental degradation risks	Medium	▪ Isolate through fencing the camp sites from access by the public for their safety ▪ Preferably to be located on land already cleared land wherever possible ▪ The Contractor's Camp layout shall take into account availability of access for deliveries and services and any future works	Campsites Responsibility Contractor(s)	• Number of public outcry due to accidents	~KShs. 0.5M
Access to campsites and construction sites	Environmental degradation risks	Medium	▪ Utilize to the extent possible the existing public roads to avoid social and economic disruption ▪ Ensure road safety measures for the construction vehicles to the extent possible by observing all traffic regulations	Access Roads Responsibility Contractor(s)	• Cases of private land required • Accidents occurrence incidences	No direct cost associated
Environmental and Social Training and Awareness	Risks of Environmental and Social degradation risks and occupational health and safety related accidents	High	▪ The Contractor and sub-contractors shall be aware of the environmental requirements and constraints on construction activities contained in the provisions of the ESMMP ▪ The Contractor will be required to provide for the appropriate Environmental Training and Awareness as described in this ESMMP in his costs and programming ▪ An initial environmental awareness training session shall be held prior to any work commencing on site, with the target audience being all project	All Workers Responsibility Contractor(s)	• Number of Trainings Held • Availability of Training reports • Attendance list of participants during the trainings sessions	KShs. 0.5M

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
HIV/AIDS awareness and prevention campaign	Risks of Increased HIV and Aids transmission in the area	Medium	▪ The Contractor shall institute HIV/AIDS awareness and prevention campaign amongst his workers for the duration of the contract, contracting an implementing organisation with preference for an organisation already working on this issue in the Project area; ▪ The campaign shall include training of facilitators, information posters in more frequented areas in the campsite and public areas, availability of promotional material (T-shirts and caps), availability of condoms (free) and theatre groups	All Workers <u>Responsibility</u> Contractor(s)	• Number of Trainings Held • Availability of Training reports • Attendance list of participants during the training sessions	KShs. 0.5M
Setting out and clearance of Project routes and site	Delay in Project implementation due to opposition from PAPs	Medium	▪ Ensure that land acquisition is done within the provision of Land Act, 2012 ▪ Prepare and Implement RAP recommendations before commencement of civil works	All the Project Lots <u>Responsibility</u> Contractor & TWSB	• Numbers of satisfied PAPS • Extend of route opened to the contractor	To be provided by rap
Local Labour / Employment	Delay in Project implementation due to opposition from aggrieved community members	Medium	▪ Wherever possible, the Contractor shall use local labour, women must be encouraged to be involved in construction work ▪ The contractor shall ensure compliance to the gender balance as required by the 2/3 gender rule	All the Project Lots <u>Responsibility</u> Contractor	• Number of workforce employed from the local community • Number of female employed	No direct costs associated
EMP management records	Risks of non-conforming to ISO 9001 on QMS and ISO 14001 on EMS	Medium	▪ The updated version of the EMP should be kept on site ▪ Copies of all necessary permits and licences should be kept on site ▪ All site specific plans prepared as part of the updated ESMMP ▪ All related environmental, social, health and safety management registers and correspondence, including any complaints ▪ A register of audit non-conformance reports and corrective actions	All the Project Lots <u>Responsibility</u> Contractor	• Number of available permits on site • ISO audit report on non-conformities • Number of corrective measure adopted	No direct associated costs

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
Earth moving and excavations (Vegetation clearance, channeling and site preparations)	▪ Health and Safety risks ▪ Air pollution ▪ Social nuisance	Medium	▪ Provide notices, signage & information to the public for their safety at all locations ▪ Install barriers along walkways, crossings and public places affected by the works for public safety ▪ Where there are potential for nuisance from dust generation, ensure earth moving is under dump conditions (consider watering where necessary) ▪ Inform immediate communities or stakeholders of the activities.	All work areas Responsibility Contractor(s)	• Accidents occurrence incidences • Cases of respiratory complication at nearby health centre	~KShs. 0.5M
	▪ Vegetation Cover destruction ▪ Loss of biodiversity	Low	▪ Construction activities will be limited to Project sites/routes which already exist therefore no destruction to vegetation cover	All work areas Responsibility Contractor(s)	• Soil erosion extend and intensity on site	No direct cost
	▪ Loss of top soil	Low	▪ Stock piling of top soil, construction material and wastes should be done only at designated sites approved by the supervising engineer, erosion prevention through berming of loose soil sites should be done in all areas susceptible to agents of erosion	All work areas Responsibility Contractor(s)	• Soil erosion extend and intensity on site	No direct cost
	▪ Public Health and safety risks ▪ Worker Occupational safety risks	Medium	▪ Notify public the intent to cut sections of the road for safety precautions ▪ Provide signage and safety information in all work areas ▪ Ensure compliance by workers with safety safeguards including the OHS, provision of safety gear and enforcement of application	Civil works areas Responsibility Contractor(s) Supervision	• Accidents occurrence incidences	
	Disruption of amenities (access roads, services lines and driveways) causing inconveniences to the community	Medium	▪ Notify other services providers and ▪ Open small sections that can be reinstated within the shortest period to avoid public disruption ▪ Mark the lines to avoid conflicts with other activities	Civil works areas Responsibility Contractor(s) Supervision	• Number of complaints from community due to lack of certain services	No direct costs

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
Materials sourcing, from burrow pits and quarries delivery and storage	Environmental and Safety risks associated with burrowing and opening up of new quarry sites	High	▪ The Contractor will be responsible for ensuring that appropriate authorisation to use the proposed borrows pits and quarries have been obtained before commencing activities ▪ Topsoil shall be stripped prior to removal of borrow and stockpiled onsite. This soil shall be replaced on the disturbed once the operation of the borrow site or quarry is complete ▪ Construction material sources should be environmentally sustainable (approved) ▪ Delivery routes and modes of transport should be approved ▪ Material storage on site not to be internal or external nuisance	Burrow Pits and Quarry Site <u>Responsibility</u> Contractor(s) Supervision	• Environmental status of reinstated burrow pits • Complains from the community on burrow pits and material transportation	KShs. 0.5M
Concrete / cement batching plant	Risks associated with water resource pollution, noise and vibration and air pollution from dust this could lead to respiratory problems	High	▪ Where required, a Concrete batching plant shall be located more than 20m from the nearest stream/river channel; ▪ Top soil removed from the batching plant site and stockpiled ▪ Contaminated storm water and wastewater runoff from the batching area and aggregate stock piles shall not be permitted to enter streams but shall directed to a pit where the water can soak away ▪ Suitable screening and containment shall be in place to prevent windblown contamination associated with any bulk cement silos, loading and batching ▪ Cleaning of equipment and flushing of mixers shall not resulting pollution of the surrounding environment	Concrete / cement batching plant <u>Responsibility</u> Contractor(s) Supervision	• Number of incidence of Environment pollution around the plant	KShs. 0.5M

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
Waste generation and disposal	Risks of contaminating surface and underground water resources	High	▪ Construction wastes (residual earth, debris and scrap materials) to be removed for safe disposal ▪ Encourage recycling where possible (concrete debris for access road surfacing), ▪ Contaminated organic matter in the work areas to be isolated for safe disposal ▪ Material residuals to be disposed off in accordance with established regulations	Construction areas Responsibility Contractor(s) Supervision	• Number of complaints from community not happy with waste management of the contractor	KShs. 0.5M
Spoil Storage site	Risks of solid waste mismanagement leading to pollution	Medium	▪ Preferably to be located on land already cleared wherever possible. Communities shall be involved in the site location to avoid conflict ▪ The need to be more than 20 meters from water courses and in a position that will facilitate the prevention of storm-water runoff from the site from entering the watercourse ▪ Contouring of spoil site to approximate natural topography and drainage and/or reduce erosion impacts on the site ▪ The Contractor shall ensure that the placement of spoil is done in such a manner to minimise the spread of materials and the impact on surrounding vegetation and that no materials 'creep' into 'no-go 'areas	Construction areas Responsibility Contractor(s) Supervision	• Number of complaints from community not happy with waste management of spoil material	Contractor best management practice
Occupational Health and Safety	Risks of Accidents, Injuries or death of workers or community member	High	▪ Provide construction workers with personal protective gear (gloves, gum boots, overalls and helmets), ▪ Provide temporary toilets and bathrooms for the construction workers at the work sites ▪ Provide onsite first aid kit accessible by the workers on need, ▪ Isolate the site for access by the local communities during the construction for	All work areas Responsibility Contractor(s) Supervision	• Accidents occurrence incidences	KShs. 0.5M

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
			their safety and health ▪ Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the resident engineer.			
Storage of fuel oils, lubricants, chemicals and flammable materials	Hazards of fire outbreak, oil and chemical spills.	High	▪ Follow specifications of the Occupational Health and Safety Act, EMCA1999 and others in the development and operation of stores.	All work areas Responsibility Contractor(s) Supervision	• Incidence of reported cases of fuel leaks and fire incidences	No direct cost associated
Sanitation issues resulting from both solid and liquid wastes on site.	Risks associated with waterborne diseases exposed to community and workforce	Medium	▪ The Contractor shall adhere to laws relating to public health and sanitation ▪ All temporary/ portable toilets or pit latrines shall be secured to the ground to the satisfaction of the RE to prevent them from toppling over ▪ A wash basin with adequate clean water and soap shall be provided alongside each toilet, Staff shall be encouraged to wash their hands after use of the toilet, in order to minimise the spread of possible disease	All work areas Responsibility Contractor(s) Supervision	• Incidence of reported cases of water related diseases among the workforce and neighbor community	No direct cost associated
Noise and Vibration control from plant and equipment	Risk to health and safety of community and workers	Medium	▪ The Contractor shall keep noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours in the residential areas ▪ hospitals and other noise sensitive areas shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity ▪ Any complaints received by the Contractor regarding noise will be recorded and communicated to the RE ▪ The Contractor must adhere to Noise Prevention and Control Rules of April 2005	civil works areas and access roads Responsibility Contractor(s) Supervision engineer	• Reported complaints from neighbor community and institutions	No direct cost associated
Traffic management on site	Risks of Accidents, Injuries or death of workers or community member	High	▪ Strict use of warning signage and tapes where the trenches are open & active sites ▪ Employ and train road safety Marshalls who will be responsible for management of	civil works areas and access roads Responsibility	• Accidents occurrence incidences	KShs. 0.5M

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
			traffic on site ▪ Contractor to provide a traffic management plan during construction to be approved by the resident engineer	Contractor(s) Supervision engineer		
Air Quality Control	Air pollution causing respiratory disorders to human	High	▪ Workers shall be trained on management of air pollution from vehicles and machinery. All construction machinery shall be maintained and serviced in accordance with the contractor's specifications ▪ The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilised as soon as practically possible ▪ The contractor shall not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds ▪ Vehicles delivering soil materials shall be covered to reduce spills and windblown dust ▪ Water sprays shall be used on all earthworks areas within 200metres of human settlement.	All work areas <u>Responsibility</u> Contractor(s) Supervision	• Cases of respiratory complication at nearby health centre	No direct costs (integrated in the works costs)
Contractor de-mobilization and site reinstatement	Associated risks of environmental degradation	High	▪ The site is to be cleared of all construction materials, including litter prior to hand over ▪ Fences, barriers and demarcations associated with the construction phase must be removed from the site ▪ Fences, barriers and demarcations associated with the construction phase must be removed from the site ▪ Rehabilitation Activities of Environmental Cases identified must continue throughout the defect liability period	All work areas <u>Responsibility</u> Contractor(s) Supervision	Closeout audit report findings	No direct anticipated
Total Estimated Cost for EMP and RAP implementation					**EMP**	**KES 6.5M**

Table 8-2: Operational Phase: Environmental and Social Management and Monitoring Plan

No.	Issue	Action required	Responsibility	Provisional Budget
1	Risk of encroachment and construction of structures on the water easement corridor	• Mapping and installation of beacons to which illustrate the width of the pipeline reserve • Regular inspection of the pipeline corridor for encroachment. • Prosecution of encroachers as required by City County By laws on way leaves and road reserves maintenance. • Conduct public sensitization programs on importance not interfering with way leaves and public reserve land	NIWASCO Tharaka Nithi County Government	To be established at operation phase and included in the operation of the projects
2	Risk of water pipeline bursts leading water wastages (Non-Revenue Water percentages increase) Water system leaks can reduce the pressure compromising its integrity and ability to protect waterquality (by allowing contaminated water to leak into the system)	• Regular check, repair and maintenance of the water pipeline • Activate a community watch group for information sharing on the status of the water line • Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas)	NIWASCO	To be established at operation phase and included in the operation of the projects
3	Risk of illegal connection to the water pipeline	• This is common in the informal settlements where residents illegally tap the water pipeline • This will require constant inspection by NIWASCO officials and installation of leak and burst detectors at designated areas along the pipeline. • Conduct public sensitization programs on importance not interfering with the water pipeline and the need to seek official water connection from NIWASCO	NIWASCO	To be established at operation phase and included in the operation of the projects
4	Water Discharges during flushing/cleaning of pipes to remove sediments The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids, residual chlorine, and other contaminants that can harm surface waterbodies.	• Identify environmental issues that need mitigation during Project operation. • Develop management plans and procedures needed to address the environmental concerns • Monitor and evaluate the performance against set targets • Set a budget for environmental management; and restorations • Schedule for revising and updating the ESMMP. • Initiate sensitization programmes on best practices on solid waste management right from the source, sorting, transportation & disposal • Conducting an initial audit in the first year of operation of the projects and subsequent annual audits of the operational activities.	NIWASCO	To be established at operation phase and included in the operation of the projects

8.4 Decommissioning Flow Chart

The Project has been designed to operate effectively for over 20years. If the infrastructure will be required to be overhauled, then the following steps should be considered in order to undertake the procedure in a structured manner with minimum impact to both human and natural environment as illustrated in **Table 8-3** below.

Table 8-3:: Decommissioning Flow Chart

	Action	Actor
Step 1	**Initiation** Development of an Objective Worksheet and checklist incorporating references, legal and policies Undertake decommissioning audit	**Proponent then**
Step 2	**Prepare Road Map for Decommissioning Design** Conduct design review to validate elements of the design and ensure design features are incorporated in the decommissioning design. Public consultations	**Proponent then**
Step 3	**Prepare and Award Contract** Prepare a contract that incorporates validated Project information and award to a Contractor as per the Procurement rules.	**Proponent then**
Step 4	**Execute Decommission Works** Implement design elements and criteria on the Project in accordance with specifications and drawings. Inspect during decommissioning and at Project completion to ensure that all design elements are implemented according to design specifications.	**Contractor**
Step 5	**Commissioning Environmental Management Plan**	**Contractor**
Step 6	**Non-Conformance, Corrective/Preventive Action** Determine root cause Propose corrective measures Propose future preventive measures.	**Contractor**

CHAPTER 9: CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

The Environmental and Social Impact Assessment undertaken for the Project indicates that the Project will have the following impacts:

(i) The Project is listed under Schedule Two of EMCA 2015 for Projects which require to be subjected to ESIA, such Projects require that site characteristics are identified early including likely social and environmental impacts. The schedule categorizes water supply Projects as medium risk, while AfDB Operation Safeguard (1) on Environment and Social Assessment categorizes Water Supply Projects as Category B. This implies that the Project has less significant impacts to the environment and can be easily mitigated.

(ii) The assessment identified that there will be limited direct interaction of the Project activities at the time of construction with the natural sensitive ecosystems at the proposed Intake Sites and Raw Water Pipelines within Mt. Kenya Forest along River Ruguti in Chuka. Therefore, associated impacts of such works would include;

- Minor loss of vegetation diversity which provide habitat to wildlife and other related ecosystems benefits along River Ruguti within Mt. Kenya. The ESIA has provided for an "offset" which includes replanting of indigenous trees ten times the number of the trees to be cleared along the raw water pipeline 7km in the forest.
- Disruption of wildlife movement corridors at the Intake Site and Raw Water corridor along Ruguti River within Mt. Kenya. The ESIA provides for collaboration with KWS in establishment of appropriate mitigation measures throughout construction period.

9.2 Recommendations

This assessment recommends the following provisions:

i) The Bid Documents prepared for the Project incorporates the Environment, Social Health and Safety Provisions discussed under Chapter 7 (Environment and Social Impact Assessment and Mitigation Measures).
ii) Contractor be required to commit to implementing the Environment, Social, Health and Safety (ESHS) Provisions by developing site specific (ESHS) plans.
iii) At Project implementation stage, the Contractor to report to the Project Management Team comprising of the Consultant and the Project proponent monthly on how ESHS provision detailed in this ESIA are addressed at each Project Site.
iv) On completion of the Civil Works, NIWASCO to commission an Independent Consultant to undertake an initial Environment, Social, Health and Safety Audit as required by Environment Impact Assessment and Audit Regulations of 2003. The audit will identify non-conformities which the Contractor together with NIWASCO will address through the defects liability period of the Project. This audit will also form basis of annual Project self audits by NIWASCO.

ANNEXES

Annex 1 - Public Participation Minutes and List of Participants
Annex 2 - Chance Find Procedures
Annex 3 - Lead Expert License 2018

Annex 1

Public Participation Minutes and List of Participants

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

Public Consultation Held on 20/4/2016

PRESENT:

1. Stanley Njagi - Host and Area chief
2. David Mutembei Ithara - Chief, Kabuboni
3. Samuel Mucheni Munyanja - Senior Chief, Rubate
4. Leticia K Kanga - Chief, Karingani
5. Lawrence Mwai Ndegwa - TWSB
6. Arthur Mumo - TWSB
7. Beatrice Githinji - Sociologist, Mangat I B Patel (MIBP) Ltd.

See attached stakeholder's attendance sheet.

AGENDA:

- Preliminaries
- The proposed project.
- Potential impacts of the proposed project.
- Community concerns
- AOB

Item No	Agenda
1	**Prayer and Introduction** • The meeting was called to order at 10.30 am by Mr Njagi (Area Chief). After prayers, he briefed those present on various issues affecting the area. • He then handed to the Consultants to proceed with the days agenda.
2.	**Introduction of the Project and its impacts:** • Lawrence Mwai from Tana water services board gave an overview and scope of the proposed Project including the Project proponent. • He briefed those present on the two proposed projects and the importance of having the sewer in Chuka and also the water project. • Beatrice Githinji took over and explained the role of public consultation in the proposed project. • She pointed out on the benefits of the proposed Project to the area residents. • She briefed the stakeholders on the importance of carrying EIA activity for the Project as a requirement by NEMA and the Bank. • The stakeholders were also briefed on the potential significant negative impacts along mitigation measures to be implemented. • Members present were requested to make submissions in light of the information given with reference to the proposed project.

3	**Public Submissions**	**Deliberations**
	The Publics stated some of the following as their concerns: • Management of the sewer after construction • Connection to the sewer. • Who will pay, and is there a monthly charge?	• Jackson Muthuri, a resident sought to know what will happen to the trunk and the sewer after construction and who shall be in charge of maintenance. • He was informed that Nithi Water and Sewerage Company shall be handed over the Project after its completion. • Magret Karimi, a resident of Ndagani wanted to know how the residents in Ndagani shall be connected to the main trunk sewer considering Ndagani area host the Chuka University and there are many hostels within the area • She was informed that all the residents within the Project area will be beneficiaries of the project. Upon completion, the Project will be handed over to the Water Service Provider (NIWASCO). At this point, reticulation will be done. • Connections will be at a fee and there is charge every month which is incorporated in the water bills. • The members present welcomed the Project and agreed that it was viable for their Community. • Fatuma Njeru, a resident sought to know what will happen if the trunk happens to pass through someone' land which is not part of the riparian. • She was informed that in such cases, easement rights will be acquired and the Project affected person will be compensated.
	Time frame: When is the Project expected to start?	• This will be as soon as the necessary documentation has been completed.
	Sewer bursts: We have seen sewer flowing on streets in Embu and Meru. Will it also happen here?	• The Operator will maintain the system properly. • Once connected, residents must desist from dumping solids into the sewers system.
	Benefits: Several participants noted that the Project is welcome on the basis of the following benefits:	• Savings on exhausters. • The area is rocky and digging pit latrines is difficult. • Increase in property value in the area.
4	**Employment**	Casual workers must be sourced from the area
5	**Adjournment**	The meeting was adjourned at 1.00Pm with a word of prayer by Chief David.

Minutes Signed

SECRETARY

List of Participates

KENYA SMALL TOWNS AND RURAL WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED PROJECTS – STAKEHOLDER PARTICIPATION

Town CHUKA

Date 21/4/2016

No	Name	Orgunization	Telephone	Signature
1.	[illegible] MUTUKU [illegible]	FAMILY [illegible]	0725682091	
2.	[illegible]	[illegible]	[illegible]	
3.	[illegible]	FAMILY [illegible]	[illegible]	
4.	[illegible]	[illegible]	[illegible]	
5.	[illegible]	[illegible]	[illegible]	
6.	[illegible]	[illegible]	[illegible]	
7.	[illegible]	[illegible]	[illegible]	
8.	[illegible]	[illegible]	[illegible]	
9.	[illegible]	[illegible]	[illegible]	
10.	[illegible]	[illegible]	[illegible]	
11.	[illegible]	[illegible]	[illegible]	
12.	[illegible]	[illegible]	[illegible]	
13.	[illegible]	[illegible]	[illegible]	
14.	[illegible]	[illegible]	[illegible]	
15.	[illegible]	[illegible]	[illegible]	
16.	[illegible]	[illegible]	[illegible]	
17.	[illegible]	[illegible]	[illegible]	
18.	[illegible]	[illegible]	[illegible]	
19.	[illegible]	[illegible]	[illegible]	
20.	[illegible]	[illegible]	[illegible]	
21.	[illegible]	[illegible]	[illegible]	
22.	[illegible]	[illegible]	[illegible]	

KENYA SMALL TOWNS AND RURAL WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED PROJECTS – STAKEHOLDER PARTICIPATION

Town CHUKA

Date 21/4/2016

No	Name	Organization	Telephone	Signature
	ISAAC MUIGO KUBANE	RTA CENTRE	0726936536	
	ALEXIUS NJAGI MUNGE	BUSINESS MAN	0720676680	
	HENRIS KAROGO KARIUKI	UPARENTA (RUBATE)	0723083754	

MINUTES OF MARIANI LOCATION PUBLIC CONSULTATION MEETING HELD ON 20th MARCH 2018 AT 10:00AM

Meeting Session	Date of the Meeting	Participants	Number of participants
Public Consultative meeting with residents of Mariani Location held at office of Chief Mariani Location	**20th March 2018**	Village Chairman, Ward Administrator, E.I.A Expert, TWSB Engineer, and members of the public.	Total 149 Male 87 Female 62

Theme	Issues Discussed
Water Pipelines	The stakeholders in the meeting highlighted the following issues: • Residents complained that the current water lines in the area are always not clean thus having several cases of water borne diseases in the area. • Residents inquired how the water project was going to be different with the current water projects in the area. • Residents complained of constant water shortage in the area. • Stakeholders urged residents to avoid water wastage which is the main cause of water shortage. • Water meters will be used by the managing company to control water usage and avoid wastage. • After completion of the project it will be handed to Tharaka Nithi County Government to manage and maintain through its water companies i.e. NIWASCO who will offer connection to residents after application and paying a fee. • The project's main aim is to provide fully treated water for domestic use for both human and domestic that is not currently in the area. • The area population was put into consideration thus the water will be enough to serve the area population if used by the residents without wastage without wastage. • The Contractor will reinstate any water project line currently in the area if it will be interfered with during the construction time. • Connection to the water line will be voluntary by the residents as they will choose which water to consume at their own convenience. • The Design Engineer insisted that the project will not conflict with the current water projects as it is only aimed at providing another better option for the residents. • Because the water project will undergo full treatment it will not be advisable to be used for irrigation as it will contain chemicals that can affect the crops

Theme	Issues Discussed
Sewer Line	The stakeholders in the meeting highlighted the following issues: • The sewer line project is aimed at improving sanitation in the area as the region currently lacks a proper sewer system due to the high population in Chuka Town that is just nearby and also due to blockage of the current sewer lines.
Benefits of the Project	The stakeholders in the meeting highlighted the following issues: • The water project will provide clean and safe drinking water for both human and domestic animals that will need no treatment or boiling as it will be treated already thus saving on costs of boiling or buying treated bottled water. • Reduction of water borne diseases like typhoid, diarrhoea because of clean and affordable drinking water • The contractor might source some of the building materials from the local hard wares and other businesses thus providing income to the locals who own such businesses. • Some locals will be employed by the contractor during the contract period.
Employment of the Locals	The stakeholders in the meeting highlighted the following issues: • Residents complained that the previous contractors didn't hire the locals during the project period thus suggested the project contractor should hire some of the locals during the project period. • The contractor will contract some of the local youths as it as a requirement in the law for a certain percentage of the locals to be recruited during the project.
Compensation of PAPs	The stakeholders in the meeting highlighted the following issues: • Because the proposed project line will pass along the resident's lands thus crops and trees will be affected. Compensation will be provided to all types affected persons and no one will not be compensated. • Residents complained of undervaluation of the previous contracts. • Residents suggested they be present during valuation time to ensure no asset is left unrecorded to avoid undervaluation. • A certified valuer will be contracted by the consulting company to conduct the valuation of the affected crops, structures, trees and lands for compensation purposes. Thus valuation will be accurate. • The residents were urged to be present during valuation as it was their right and also ensure every asset is captured. • The area chief will conduct the verification of land ownership documents assisted by the relevant authorities for compensation purpose to ensure no double compensation or compensation of

Theme	Issues Discussed
	wrong persons happens. • Residents along the project proposed line were urged to start organising for land ownership documents for compensation purposes as the project was soon commencing.
AOB	The residents thanked GoK for the project as it would really benefit them as they currently lacked clean and safe drinking water. The village chairman urged the residents to start planting as the rains could be unpredictable.
There being no business the meeting adjourned at 1250Hrs with a word of prayer.	

PHOTO PLATE OF THE MEETING SESSION

Residents during the meeting session.

TWSB Design Engineer explaining the project scope to residents

A resident raising concern during the meeting session

Residents signing the attendance list

MINUTES AUTHENTICATION

CHIEF/ASSISTANT CHIEF

NAME……

Signature……

Date……

TWSBREPRESENTATIVE

NAME……

Signature……

Date……

CONSULTANT REPRESENTATIVE

NAME……

Signature……

Date……

MINUTES OF MUGWE LOCATION PUBLIC CONSULTATION MEETING HELD ON 22th MARCH 2018 AT 10:00AM

Meeting Session	Date of the Meeting	Participants	Number of participants
Public Consultative meeting with residents of Mugwe Location held at Office of Chief Mugwe Location	**22th March 2018**	Chief Mugwe Location, Assistant Chief Kirege Sub Location, Assistant Chief Mugirirwa Sub Location, E.I.A Expert, TWSB Engineer, and members of the public.	Total 26 Male 24 Female 2

Theme	Issues Discussed
Benefits of the Project	The stakeholders in the meeting highlighted the following issues: • The sewer line project is aimed at improving the sanitation in the area as the region currently lacks a proper sewer system due to the high population in the region. • The water project will provide clean and safe drinking water for both human and domestic animals that will need no treatment or boiling as it will be treated already thus saving on costs of boiling or buying treated bottled water. • Reduction of water borne diseases like typhoid, diarrhoea as a result of clean and safe drinking water. • The contractor might source some of the building materials from the local hard wares and other businesses thus providing income to the locals who own such businesses.
Water Line	The stakeholders in the meeting highlighted the following issues: • Residents suggested the water rates be cheaper as the current water projects are a bit expensive. • Residents complained of poor maintenance of the current water lines mostly of breakage of water pipes that takes too long before repair which causes water shortage. • Stakeholders urged residents to always pay the monthly fee for the current water lines to enable maintenance of the lines. • Residents complained of increased cases of water borne diseases in the area because of using the current water projects. • The design engineer assured the residents that the water rates will be affordable as the rates are always reviewed by all stakeholders and is always standard across the region.as set by TWSB • Because the water project will undergo full treatment it will not be advisable to be used for irrigation as it will contain chemicals

Theme	Issues Discussed
	that can affect the crops thus was only meant for Human and domestic use. • Because the water project will undergo full treatment, this will greatly reduce cases of water borne diseases in the area. • The water projects in the area gets their water from Mt Kenya Forest. The water gets polluted by wild animal's waste that flows through to the rivers where the projects has their intakes. This water appears clean to the eye but contains bacteria that can cause water borne diseases. • After completion of the project it will be handed to Tharaka Nithi County Government to manage and maintain through its water companies i.e. NIWASCO who will offer connection to residents after application and paying a fee. • The project will be voluntary as residents will choose which water project to use at their own convenience.
Sewer Line	The stakeholders in the meeting highlighted the following issues: • The sewer line project is aimed at improving sanitation in the area as the region currently lacks a proper sewer system due to the high population in Chuka town that is just nearby and also due to blockage of the current sewer lines. • Most of the sewage in the area comes from the Chuka Town mostly from Chuka University. • The sewer line will start from Chuka Town and Chuka University to Mariani then to Kaano.
Reinstatement of current water lines	The stakeholders in the meeting highlighted the following issues: • Because the proposed project lines will interfere with the current lines the contractor will reinstate any water project line currently in the area if it will be interfered with during the construction time.
Compensation of PAPs	The stakeholders in the meeting highlighted the following issues: • Because the proposed project line will pass along the resident's lands thus crops and trees will be affected. Compensation will be provided to all types affected persons and no one will not be compensated. • A certified valuer will be contracted by the consulting company to conduct the valuation of the affected crops, structures, trees and lands for compensation purposes. Thus valuation will be accurate. • Residents complained of undervaluation in the previous projects. • The residents were urged to be present during valuation as it was their right and also ensure every asset is captured.

Theme	Issues Discussed
	• The area chief will conduct the verification of land ownership documents assisted by the relevant authorities for compensation purpose to ensure no double compensation or compensation of wrong persons happens. • Residents along the project proposed line were urged to start organising for land ownership documents for compensation purposes as the project was soon commencing.
Employment of the locals	The stakeholders in the meeting highlighted the following issues: • Residents urged that the contractor should hire some of the local during the project period. • The contractor will contract some of the local youths as it as a requirement in the law for a certain percentage of the locals to be recruited during the project
AOB	Residents welcomed the project as it would greatly benefit and even added they were ready to offer land for the project if need could be.
There being no business the meeting adjourned at 1220Hrs with a word of prayer.	

PHOTO PLATE OF THE MEETING SESSION

A resident raising concern during the meeting.

Residents during the meeting session.

TWSB Engineer explaining the project scope to residents.

A resident signing the attendance list

MINUTES AUTHENTICATION

CHIEF/ASSISTANT CHIEF

NAME……

Signature……

Date……

TWSBREPRESENTATIVE

NAME……

Signature……

Date……

CONSULTANT REPRESENTATIVE

NAME……

Signature……

Date……

MINUTES OF RUBATE LOCATION PUBLIC CONSULTATION MEETING HELD ON 21th MARCH 2018 AT 10:00AM

Meeting Session	Date of the Meeting	Participants	Number of participants
Public Consultative meeting with residents of Rubate Location held at Office of Chief Rubate Location	**21th March 2018**	Chief Rubate Location, Assistant Chief Rubate Sub-Location, Assistant Chief Kanthiiri Sub Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 398 Male 277 Female 121

Theme	Issues Discussed
Sewer Pipelines	The stakeholders in the meeting highlighted the following issues: • The design engineer explained that because the land where the sewer treatment plant was going to be constructed was acquired in another area thus the sewer line will not be passing along the area as it will be passing along Mariani from Chuka University to Kaanwa but would be considered in the future if need arises. • Stakeholders suggested because the area was having a rising population growth sewer line would be needed in the future because the current one will be insufficient.
Water Pipelines	The stakeholders in the meeting highlighted the following issues: • Residents inquired how they will access the water line after completion of the project. • A resident inquired if the water project will be free or would be paid. • A resident explained how they had been using the current water projects for so many years without getting sick. • Stakeholders inquired how the contractor will deal with the existing local community water lines if the proposed project lines passes along the current lines. • After completion of the project it will be handed to Tharaka Nithi County Government to manage and maintain through its water companies i.e. NIWASCO who will offer connection to residents after application and paying a fee. • The selected managing company will use water meters to control water usage that users will be paying also a monthly fee for maintenance of the lines. • The design engineer explained that the contractor will reinstate the current lines to their original conditions or even a better condition in case of interference. • The water projects in the area gets their water from Mt Kenya Forest. The water gets polluted by wild animal's waste that flows through to the rivers where the projects has their intakes. This

Theme	Issues Discussed
	water appears clean to the eye but contains bacteria that can cause water borne diseases. • The project will not conflict with the existing local community water projects in the area as is it will be voluntary in connection thus residents will choose which project water to use.at their will. • The project's main aim is to provide fully treated water at affordable costs to residents that currently lacks in the area.
Benefits of the water Project	The stakeholders in the meeting highlighted the following issues: • A resident inquired how the project will benefit them. • The water project is aimed at providing clean and safe drinking water for both human and domestic animals that will need no treatment or boiling as it will be treated already thus saving on costs of boiling or buying treated bottled water. • Reduction of water borne diseases like typhoid, diarrhoea because of clean and affordable drinking water • The contractor will source labour and building materials from local businesses which will increase income to the locals.
Employment of the Locals	The stakeholders in the meeting highlighted the following issues: • Residents insisted the contractor should hire some of the locals during the project period. • The residents were assured the contractor will hire some of the locals during the project period as it was a requirement by the law now that during a certain percentage from the workforce should be the local persons.
Compensation of PAPs	The stakeholders in the meeting highlighted the following issues: • Residents suggested compensation of their assets should come before the project starts. • Residents complained of undervaluation in the previous projects. • A certified valuer will be contracted by the consulting company to conduct the valuation of the affected crops, structures, trees and lands for compensation purposes thus valuation will be accurate. • The area chief will conduct the verification of land ownership documents assisted by the relevant authorities for compensation purpose to ensure no double compensation or compensation of wrong persons happens. • The residents were assured that even that if compensation could it will surely come because it was a GOK project and the funds has been already secured from African Development Bank. • Residents along the project proposed line were urged to start organising for land ownership documents for compensation purposes as the project was soon commencing.
AOB	• The residents were urged to corporate with the project contractor

Theme	Issues Discussed
	whoever will be contracted for the project to be a success. • The residents anonymously agreed the water project would greatly benefit them as the area currently lacked clean drinking water.
There being no business the meeting adjourned at 1230Hrs with a word of prayer.	

PHOTO PLATE OF THE MEETING SESSION

Area Chiefs addressing the residents

Residents during the meeting session

TWSB Design Engineer explaining the project scope to the residents.

Residents signing the attendance list

MINUTES AUTHENTICATION

CHIEF/ASSISTANT CHIEF

NAME……

Signature……

Date……

TWSBREPRESENTATIVE

NAME……

Signature……

Date……

CONSULTANT REPRESENTATIVE

NAME……

Signature……

Date……

MINUTES OF THOITA LOCATION PUBLIC CONSULTATION MEETING HELD ON 21st MARCH 2018 AT 2:00PM

Meeting Session	Date of the Meeting	Participants	Number of participants
Public Consultative meeting with residents of Thoita Location held at Office of Chief Thoita Location	**21th March 2018**	Chief Thoita Location, Assistant Chief Thoita Sub-Location, Assistant Chief Kathatwa Sub Location, E.I.A Expert, TWSB Engineer and members of the public.	Total 15 Male 13 Female 2

Theme	Issues Discussed
Sewer Line	The stakeholders in the meeting highlighted the following issues: • The design engineer explained that because the land where the sewer treatment plant was going to be constructed was acquired in another area thus the sewer line will not be passing along the area as it will be passing along Mariani from Chuka University to Kaanobut would be considered in the future if need of a sewer line arises. • Stakeholders complained that the sewer line will not be passing along the area and insisted it should be considered in the near future.
Benefits of the Water Project	The stakeholders in the meeting highlighted the following issues: • The water project main aim is to provide clean and safe drinking water for both human and domestic animals that will need no treatment or boiling as it will be treated already thus saving on costs of boiling or buying treated bottled water. • Reduction of water borne diseases like typhoid, diarrhoea as a result of clean and affordable drinking water • The contractor might source some of the building materials from the local hard wares and other businesses thus providing income to the locals who own such businesses.
Water Line	The stakeholders in the meeting highlighted the following issues: • A resident inquired if the water line could be extended so as to reach residents far from the line. • Residents complained of the current water projects in the area sighting lack of water safety and cases of water borne diseases as a result of consuming the water. • Residents suggested the water rates be a bit cheaper sighting high rates on the current projects. • The Design Engineer assured the residents that the water tariffs will be affordable as the rates are always reviewed by all

Theme	Issues Discussed
	stakeholders and is always standard across the region.as set by WASREB. • Water meters will be used by to control water wastage in the area. • Because the water project will undergo full treatment it will not be advisable to be used for irrigation as it will contain chemicals that can affect the crops. • After completion of the project it will be handed to Tharaka Nithi County Government to manage and maintain through its water companies i.e. NIWASCO who will offer connection to residents along the line and also to residents a bit far from the line as long as the line can be tapped after application and paying a fee. • The water projects in the area gets their water from Mt Kenya Forest. The water gets polluted by wild animal's waste that flows through to the rivers where the projects has their intakes. This water contains bacteria that can cause water borne diseases experienced in the area.
Reinstatement of Existing Projects	The stakeholders in the meeting highlighted the following issues: • Stakeholders inquired if the contractor will reinstate the current water lines in the area as there are several lines along the proposed Project line. • The contractor will reinstate any water Project line currently in the area if it will be interfered with during the construction time. • Stakeholders insisted the contractor should reinstate the lines in time as previous contractor delayed in reinstating the affected projects thus causing water shortages in the area.
Compensation of PAPs	The stakeholders in the meeting highlighted the following issues: • Residents inquired how the valuation of their affected assets will be done. • Residents complained of undervaluation in previous Projects. • A certified valuer will be contracted by the consulting company to conduct the valuation of the affected crops, structures, trees and lands for compensation purposes. This will also ensure accurate valuations. • The area chief will conduct the verification of land ownership documents assisted by the relevant authorities for compensation purpose to ensure no double compensation or compensation of wrong persons happens. • All land owners and asset owners will be compensated if their assets will be affected thus no affected person will be left uncompensated.

Theme	Issues Discussed
	• Residents along the project proposed line were urged to start organising for land ownership documents for compensation purposes as the project was soon commencing.
AOB	• Residents acknowledged that the water project will greatly benefit the area as the area currently lacked clean safe drinking water. • Residents anonymously welcomed the project and even pledged to offer any assistance if need be during the project period.
There being no business the meeting adjourned at 1700Hrs	

PHOTO PLATE OF THE MEETING SESSION

TWSB Engineer explaining the project scope to residents.

A resident raising concern during the meeting session,

A Resident signing the attendance list form.

Residents during the meeting session.

MINUTES AUTHENTICATION

CHIEF/ASSISTANT CHIEF

NAME……

Signature……

Date……

TWSBREPRESENTATIVE

NAME……

Signature……

Date……

CONSULTANT REPRESENTATIVE

NAME……

Signature……

Date……

AFRICAN DEVELOPMENT BANK GROUP

MIBP CONSULTING ENGINEERS

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Marani Location Date 20/03/2018

Date ..... Venue 8/7/18 at Girl Marani Local

No	Name	Region / Area / Village	Telephone	Sign
	STELLAH SACHERI	NTIRINGI	0727228[illegible]	
	CASTY MWENDE	NTIRINGI	0791326[illegible]	
	Rollena kanyu	KAANWA	0717055241	
	Jane gakii	Kaanwa	0794328[illegible]	
	Rolena gaceri	Mwanjati	0705520973	R. G
	Esther Muranie	mwanjati	0724467518	
	Mavis Mukiithi	Mariani	0726388344	Mavis
	Dorothy Kagendo	Kaanwa	0714823[illegible]	
	M'Ritthi njeru	Ntiringi	0[illegible]68886	
	david kinyua	mwanjati	0721606246	
	Catherien kaji	mwanjati	0	
	moses muriithi	mbuiru	0725078742	
	Alice kagendo	mwanjati		
	Ruth ciamboka	mwanjati		
	Alibina mwinshi	Mwanjati	0714512[illegible]79	
	Fedis kambura	kiegomo	0710109316	
	Lenad gikundi	Karingani	0702[illegible]883	
	Lycyline karimi	kiegomo		
	florence thigaca	mbuiru		
	Fridah muriuki	mwanjati	0791[illegible]1946355	
	Judah mateji	Kaanwa	0713838309	
	Felista gatura	mbuiru		

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue...Marani Location.......Date ...20/03/2018......

Date........Venue...Office of chief Marani Loc.

No	Name	Region / Area / Village	Telephone	Sign
	Delavina mutiria	mbwiru		
	Eric mutwiri	kaanwa		
	Costy karanu	ntiringi		
	mirim gakii	ntiringi		
	Aliat mbati	mwanjati		
	Laulensia Ciambaka	mwanjati		
	Virenna kanyua	mbiru		
	Lucyline mukwairu	marani		
	margelet mukwairu	Kagati		
	david mbubai muthiora	mwanjati		
	wanja John	kaanwa		
	ERIC MWIRIGI	Mbwiru	0711967333	
	Muriithi dia	mwanjati	0710550906	
	NGaramara muteg.	Kiguswmbura	0718432920	
	Phares mbesa	mirma		
	Cereen Kawira	mbwiru	0705889814	
	Cicilia Kagendo	Kavongoni		
	Justa Kagendo	mwanjati	0718420780	
	Bredahu Karini	Ntiringi		
	Francis Njeru	Mbwiru		
	Caroline Mumbi	Kaanwa		
	Emily mwende	Ntiringi		

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Mariani Location Date 20/03/2018

Date ..... Venue Office of Chief Mariani Location

No	Name	Region / Area / Village	Telephone	Sign
23	M'MBIUKI MUKABWA	MWANJATI		
24	Simon Njagi Muchai	Kiathanga	0728928336	
25	Moses Mutwiri Nyaga	Mariani	0702651109	
26	Doline Kendi Njagi	Mariani	0704065516	
27	Virginia M. Rimita	Mariani	0708167299	
28	Gervasio Rarang'ira	Mariani	0716390285	
29	Serefina Njagi-K	Mariani	0703496115	
30	Tim Kariuga	Mariani	0721792288	
31	[illegible]	Mwanjati	0716145307	
32	Josic Muende	Nkabore	0791222619	
33	[illegible]	Mwanjati	0707606626	
34	MARTIN MUTONDEI	MAKUTANO	0765657264	
35	TRISILIA MAITHA	MAKUTANO		
36	PETER MUYUA/GA	MAKUTANO		
37	[illegible]	MAKUTANO		
38	KARIUKI KAHURO	MWANJATI		
39	SA[illegible] IGOKA	MWANJATI		
40	JUSTUS KASUNTU	MWANJATI		
41	JULIUS MUNYOKE	MWANJATI		
42	SOLOMON IKUME	KAMWA		
43	ESTERIA KAMAU	MAKUTANO		
44	MGORE MUYUA	MBIRU		

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Marori Location Date 20/03/2018

Date Venue Office of Chief - Marori Location

No	Name	Region / Area / Village	Telephone	Sign
1	Lukas mugendi	Kaanwa	0729990120	
2	GERMANO KABA	KAANWA	0728254076	
3	TABATISIO MBAKA	KAANEWA		MBAKA
4	Ephantus Muridi	KAANWA	0707975746	
5	PATRICK BAUNI	Kaanwa Urban	0727117807	
6	JUSTUS MIRITI	Mirua Miraja	0727644189	
7	Joseph Njagi	Karaingoni	0716550154	
8	ROBINSON NJERU	Karungoni	0701561340	
9	JOSEPH TABIA MUKIAMBU	KAANWA	0700[illegible]28	
10	ALBERT MITHIRI	Karangoni	0715 [illegible] 733	
11	[illegible]	[illegible]	[illegible]	
12	JAMES MUKENDI	KAANWA	0702[illegible]	
13	Edwin muchiri nduriri	Mibaamiraja	0742008378	
14	Jerald N Jagi	Kaanwa		
15	Kenneth M Shujizi	Kaanwa	0795792857	
16	Gilbert Mwenda	Mirua Miraja		
17	Titus Mbaka	Mwanjati		
18	Frednick Mutegi	Kamaindi	0719521731	
19	M'Mutegi Mukandia	Mirua Miraja		
20	GENESIOS KABURU	MWANJATI	0711450764	KABURU
21	Beatrice Nyeri	Kiegunio	0740[illegible]824	
22	Johnson Gakono	Mwanjati	0701[illegible]96	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Mariani Loc f... Date: 2/8/2018

Date........ Venue: ... Mariani Loc f.

No	Name	Region / Area / Village	Telephone	Sign
	ROSEMARY ZAKAYO	KAANWA	0714905579	[signature]
	VERAZIA MUTHONI	KAANWA	0727555746	Muthoni
	JUSTA GACERI	KAANWA	0792945732	Gaceri
	PULAVIA KANGAI	KAANWA	0705921303	KANGAI
	FELISTA M. KANGAI	MWAJATI	0713223964	Kangai
	ALICE THIGAA	MWAJATI	0715198816	Thigaa
	NYAGA M'THAKA	MARIANI		Nyaga
	JAMES MICHENI	MBWIRU	0716700249	[signature]
	MIKE NTHUKU	KUBOKO	0700295388	[signature]
	MARY NCIADETE	MUWATI		[signature]
	PURITY KANINI	KIEGUMO	0792105929	[signature]
	David MBITHIA	KUBOKO	0798893914	David
	LINUS Mbaabu	KAANWA	0705443191	[signature]
	SAMSON Mutembei	KAANWA	0728220847	[signature]
	Doris MUKOYAGI	RURA	0729157256	[signature]
	LUCY CIAKATHIA	KAANWA		LUCY
	VIRGINIA Ciatergra	NKIO	0704043757	[signature]
	Purity Ciamati	Kathagani	0719545001	GAMATI
	Purity Kagendo	KAANWA	0703492966	Kagendo
	Yarivo Mwenda	MWAJATI	0737755038	[signature]
	Ringa rwingu NJERU	MWAJATI	0704342727	[signature]
	Uba MUNYUA	MBWIRU	0754062992	[signature]

MAINA MWOWE MWANJATI

DAVID GITONGA NKABO 0717394426 [signature]

Ireri Sanderson Ngeru Mwoni 0729605850 [signature]

KILLIAN MUKWANDIKUA

Jane Njeri Muriithi 0792105983

ANITA MUCHIRI 0716045227 [signature]

M. MERI NJUE M. AKUNJUKIA

LENAN WANJA NTHURI 0711959137

STANLEY KABURU KANGORI

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Marimi and Karingani Chief Date: 20/23/2018

Date.............................Venue: Office of Chief - Marimi Location

No	Name	Region / Area / Village	Telephone	Sign
	BENSON MBAE	KAANWA	0705703366	
	Samson Murenda	KAANWA	0704357786	
	MARIAM NCUUATI	KAANWA	0716619028	
	JANET KARIMI	Kiwabura	0799253425	
	RUTINA MUTHONI	MBWIRU		Muthoni
	LUCY CIAMWARI	Mwanjat		Lucy
	ANCIETA Kabii	Mwanjati		
	Cathrine Mugore	Mwanjati	0796908641	
	Lucy Kegeni	Mwanjati	071641356	Luci
	Pamela Kirote	Kwabura	0704170041	
	LETICIA KAGII	MBWIRU	0713270123	
	KOMEME KIUTA	Mbwiru	0725685027	
	Rosemary Kaari	Mbwiri	0719874096	
	Elliot Kainuri	Nkombore	0712645766	
	Stanley M. Mugo	Kiangongo	07177510	
	Mugo Murage	"	—	—
	Joseph Nyaga	Mwanjati		JN
	LILIAN WARIN'ARINGU	MWANJATI	0713270512	
	KIRIMI	JOHN		
	[illegible]	Nkabore	0712226919	
	Solomoni Gataka	Kaa Nkabore	0712241324	
	Dinnesa Ugendo	Mwanjati	0708163665	

DOUGLAS MAINA 0718430820

WILFRED KIMATHI MWANJATI

AMBROSE MUTEMBEI MWANJATI 0712656165

JENIFER KARIMI 0718053252

M'NANU M'MUGWIRA

MUKWARIA M'KOINJANI

BASILIO NDEKE 0705046048

CATHRINE MURAGI

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Mugae Loc. Fom. Date 22/02/2016

Date..... Venue Office of Chief Mugae Loc. Fom.

No	Name	Region / Area / Village	Telephone	Sign
1	BEDFORD K. MUKEIR	MUGAMIRWA	0711681990	
2	PETER M. NKANABO	KIREGE SUB/LOC.	0721880583	
3	JOSEPH NYAGA	MUBUKURO Village	0789865877	
4	JAPHET KARIUKI	KINGOMI VILLAGE	0721824453	
5	STEPHEN M. RITHAA	MURAGORI VILLAGE	0705991089	
6	JOHN KINYUA	KABUTIINI VILLAGE	0716626377	
7	PA-N-MBOMNI	KIREGE ARTI	0708-426117	
8	VEDIEN NGAI	KIENI/MARIANI	0718113882	
9	MARIA JOHN KIAIMI	IRAMBA	0722160781	
10	JAPHET MBIRIA	MUTHAUNI	0242769033	
11	FRASE-MAUNJI	MUGANANI	0247104463	
12	JAPHET NYAGA	KAMURU	0791678803	
13	JAPHET KIOKA N	MUTHEGE	0701022259	
14	PATRICK J. RERI	KATHIMANI	0725555967	
15	JAMES MUGO	NKAIDE	0790733326	
16	-PHER Kinegeri	Gakangoni	0723666921	
17	JOSEPHINE GITONGA	MUGI KIUNGUNI	0713269801	
18	Isaiah Mutwiri	KIRIGUNI	0703533824	
19	PATRICK M. MWAMBA	IRUGA EAST	0712333524	
20	Michael Mugambi	Kinguru	0704509855	
21	MARGARET KARIUKI			
22	MARTIN GITONGA NJAGI	MUGAIRWA	0716949023	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Mugae Location Date 22/12/2016

Date Venue Office of Chief Mugae Location

No	Name	Region / Area / Village	Telephone	Sign
23	B. JOHN KABURI	MUKIRIRIRA		
24	JOSEPH MUNJIRA	KIAMUNIGU	0719[illegible]05	
25	ANTONY GITONGA	KAMUTUBU	0727627675	
26	Kenneth Gitonga	Gitwaka	0701602355	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Thuita Loc Tal .... Date: 21/03/2018

Date: .... Venue: Office of Chief Thuita Loc Tal

No	Name	Region / Area / Village	Telephone	Sign
1	John Mugo Murathi	Kigogo	0727521753	
2	James N. Mwiricha	Thuita	0715257659	
3.	Jenifer W. Thaara	Kathatuia	0718239342	
4	Minyua Mugo	Kigogo	0703666590	
5	Boore Njeka	Thuita	0700464843	
6	John Micheni Boore	Thuita	0725663946	
7	Justin Mugendi	Thuita	0739378153	
8	George Gitari	Thuita	0790134342	
9	Nicholas Riungu	Thuita		
10	Johnson Kariuki	Thuita	0711284606	
11	Fredrick Murela	Thuita	0715574557	
12	M. Kihara Njagi	Thuita	0713559466	
13	Floras Gitonga Mbaka	Thuita	0714 8949	
14	Douglas K. Aniedimo	Thuita	0720363440	
15	Henry N. Rugamba	Thuita	0708402628	

Rubate Location Attendance List

AFRICAN DEVELOPMENT BANK GROUP

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue....Rubate Location.......Date ....21/02/2016....

Date.............................Venue....[illegible]....

No	Name	Region / Area / Village	Telephone	Sign
1	Maurice Njiru	Rubate	0728 072752	[illegible]
2.	Gregory Kithinji	Rubate	0706695183	Gregory
3.	Ngai Mutwiri	"	0715510148	Ngai
4	Peter Muriuki	"	0720262974	[illegible]
5	Isabella Mbuba	"	0725161870	[illegible]
6	Gilbert Ngai	"	0721268155	[illegible]
7	[illegible] Murenki	"	[illegible]908896	[illegible]
8	Florida Njeri	"	[illegible]9234787	Njeri
9	Joseph Ngai	"	0718 480458	[illegible]
10	Stella Karimi	"	[illegible]4958	[illegible]
11	Mary Njoki Kiriatok	"	[illegible]	
12	Elosy Kiriethi	"	0718480259	Elosy
13	Karri Kaye	"	0726557616	Karri
14	Mary Mutiani	"	727489838	[illegible]
15	Elosy Kauni	"	0736670595	Elosy
16	Stephen Kaari	"	0709718 40	S. Kaari
17	Daniel Njage	"	0710107878	[illegible]
18	Japhet Karimi	"	0711682140	Karimi
19	Esther Karwitha	"	0725650970	[illegible]
20	James Muranda	"	0702876700	[illegible]
21	Emily Kagwi	"	[illegible]	[illegible]
22.	Martin Kirangi		7229660 51	[illegible]

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MIBP CONSULTING ENGINEERS

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Rubate [illegible] Date: 21/02/2016

Date: .... Venue: [illegible]

No	Name	Region / Area / Village	Telephone	Sign
	Alfred Midem	KANTHIRI	0726557545	[illegible]
	Florence Njeri	"	0711348055	[illegible]
	Willie Ciakuthi	"	0741121574	[illegible]
	Kanini Muso	"	0701443213 4	[illegible]
	Purity Wanjiru	"	0729168070	[illegible]
	Lucy Mullioni	"	0704432104	[illegible]
	Rose Murugi	"	0719370407	[illegible]
	Eva Gakii	"	0796672296	[illegible]
	Joy Karimi	"	0790069870	Joy
	John Mugendi N	"	0729576708	[illegible]
	Gitonga	"	0723406149	[illegible]
	[illegible]	"	0717525742	[illegible]
	[illegible] Mwenda	"	0728991807	[illegible]
	John Gitari Njagi	"	0721933105	[illegible]
	Denton Mati	"	0712241305	[illegible]
	John Mutani	Kafoa	[illegible]	
	Lucy Kabora	Gatange	[illegible]3769	[illegible]
	Jackline Nyaga	[illegible]	[illegible]	[illegible]
	Geoffrey Mbaka	Ngaa Kairu	[illegible]	[illegible]
	Geoffrey Mutegi	[illegible]	705096173	[illegible]
	Karimi [illegible]	Githambi	0742259024	CARAMEZA
	Albert Kinyua Nyamu	Ngigamaua	0729339763	[illegible]

AFRICAN DEVELOPMENT BANK GROUP

MIBP CONSULTING ENGINEERS

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue RUBATE Date 21-3-2018

Date Venue

No	Name	Region / Area / Village	Telephone	Sign
1	ROYFORA MUGENDI	GATURI	0724609541	
2	ALFRED GITARI	GATURI	0716126719	
3	EVANGELINE MIKUI	GATURI	0712113985	E. Mikui
4	FERONICA MBUBA	GATURI		
5	GEOFFREY MUGAMBI	GATURI	0706143780	
6	~~ALEXANDER MBUBA~~	GATURI		
7	LAWRENCIA MUTHONI	GATURI	0702017259	
8	EVAGILINE MAITHA	GATURI	0723071877	
9	TABITHA MUIKALI	GATURI	07019754490	
10	ESTHER MUTHONI	GATURI	0712-793454	
11	GETRUDE MUTUGI	GATURI	0704561090	Getrude
12	CASTY GACHUNKU	GATURI	0703755517	Casty
13	GLADYS MAITHERA	GATURI	0716165295	
14	~~MR~~ KAARI RUGANE	GATURI	0717611088	
15	STELLA KAGENDI	GATURI	0795793664	
16	Emily MURIGI	GATURI	0707107137	
17	FRANKLIN MUCIOKA	GATURI		
18	Eunice CIANKUI	GATURI	0704774713	Eunice
19	JOYCE WANJIKU	GATURI	0729502585	
20	CHRISTOPHER MUCHIRI	GATURI	0	
21	CASTY WANJA	GATURI	0729964886	
22	FAITH NJERI	GATURI	0716299887	
23	JULIET CIAMATI	GATURI	0719386601	
24	FINAAA KINYUA	GATURI		

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MIBP CONSULTING ENGINEERS

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Ruboto [illegible] Date: 2/02/2016

Date: .... Venue: Gaarti [illegible]

No	Name	Region / Area / Village	Telephone	Sign
	Susan nyaga	Rwegamugwe	2563943	
	Nancy karimi	Rwegamugwe	34990328	
	Christine marangu	Rwegamugwe	0798317932	
	Dorcas mukami	Gagigango	27457009	
	Denis kimotho	Konyo	22772742	
	Evaglin wanjui	Gaturi	4320258	
	Juliet karitu	Gaturi	2382044	
	Mercy wanja	konyo	23340619	
	Jane mwende	Gitumbi	13873627	
	Allicent muthoni	Rwegamugwe	1729072	
	Joy kendi	Gaturi	25507485	
	Mercy kaumbi	Gaturi	25449288	
	Gladys wanjiru	Gaturi	31927298	
	Martha muthoni	Ithia	8074740	
	Paskwalina mutegi	kangombi	4452316	
	Christine gacheri	Rwegamugwe	12614037	
	Catherine gataka	Rwegamugwe	0715742470	
	wanja mathu	kiriathi	0701447105[illegible]	
	Lucy karugi	Ithia	5686691	
	Beata njuki	karamani	1798089	
	Idah njeri	karamani	14408910	
	James mugambi	Gatanga	12614418	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Roboto Centre........ Date: 21/10/2016

Date................ Venue: Chief's Office

No	Name	Region / Area / Village	Telephone	Sign
	Carolina muthoni	Ithio	10347931	
	Harriet mika	Ithio		
	Anita muthoni	Ithio	0729754145	
	Edinarath muchiri	Gaumbi	10640164	
	Jamuce Nkune	Ithio	9702464	
	Florence manga	Ithio	32233249	
	Harriet Gitari	Ithio	9086097	
	Grace Rita	Gaumbi	4452906	
	Dolly mugendi	Ithio	27497483	
	Veronica Henry	Rwegamugwe	4323556	
	Karimi murraki	Karia	0103959360	
	Wanja murithi	Kariani	23607498	
	Lydia murugi	Ithio	4452393	
	Monica kangai	Kagera	21872244	
	Stephannia Wawira	Ithio	24689436	
	Annrose wairimu	Kithitu	3518779	
	Justin mbuba	Gatua	26495419	
	Esther wanja	Gatua	27020658	
	Frankline Gitari	Rwegamugwe	23561187	
	Flomina kawira	Rwegamugwe	2386177	
	Sabella muthoni	Rwegamugwe	9250854	
	Bedford mugendi	Gitumbi	25631654	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Rubate Lec Hall Date 21/02/2016

Date Venue Office of Trust

No	Name	Region / Area / Village	Telephone	Sign
1	Alex Muriithi	Mio	0723941466	
2	Julian Kaveji	Ithio	0723390010	
3	Joanja Njoka	Ithio	0713327223	
4	Justa Kangai	Kithitu	0790039707	
5	Kelvin Muthoni	Kagera	2	
6	Stella Gaitari	Ithio	26309077	
7	Purity Kagwira	Bwegamiguo	0713367093	
8	Agnes Kiamwari	"	23851258	
9	Agusta Kangai	Kithitu	0713790222	
10	Daniel Igoki	Kithitu	0710198181	
11	Jackson Mugendi	Nkwego	0725545333	
12	Purity Mwende	Kariani	0790094871	
13	Mary Kagendi	Kanthiri	0725172043	
14	Doreen Kajnomi	Kariani	0715502775	
15	Dulodyine Nkunu	Ngatua	0712781845	
16	Ann Gakaaga	Kagera	0713021612	
17	Agnes Kathia	Kagera	4452277	
18	Esther Kaura	Mio	4526634	
19	Berister Ngaine	Gitumbi	2382128	
20	Doreen Wairimu	Kirii	0729920136	
21	Kanini Joel	Kagwi	16380680	
22	Janet Kathure	Kagwi	27456958	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Roberto LGA Date 21/03/2018

Date Venue Chief's Office

No	Name	Region / Area / Village	Telephone	Sign
23	Doreen ncege	Kaviani	78944931	
24	christine Gatiria	Kagera	23577777	
25	Charity Nkeri	Kanyo	10617423	
26	Lenity kaumbi	Rwegamugwe	302796724	
27	Josphine kanari	Kithitu	4323363	
28	Lucy Rimunya	Gitumbi	21698614	
29	Bridget mukiya	Gatua	1725839	
30	Lilian Gitari	Kavia	7284704	
31	Eva Gaki	Kanthiari	34999578	
32	Ann kanugi	Rwegamugwe	36646055	
33	Patricia Ciaetia	Gatua	4452510	
12	Sarah Cianati	kanii	2384991	
13	Stephana nkoya	Kaviani	2384859	
14	Leonard njeka	Kaviani	21901382	
15	Julieslan ciamuti	Ithio	2840727	
16	Greeta mwende	Kania	33755547	
17	Florence munyi	Rwegamugwe	31242763	
18	Doreen mumgi	Rwegamugwe	36845741	
19	Florence gachuri	Rwegamugwe	74298411	
20	Helen nyambura	Mcaego	701889000	
	Nkeri Rwanda	Ithio	5086664	
	Fenster kagendo	Rwegamugwe	2439899	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Rubate [illegible] Date: 21/03/2016

Date: .... Venue: Chiefs Office

No	Name	Region / Area / Village	Telephone	Sign
	Doreen Kaunda	Konyo	0707678774	
	Jacquine Muriga	Kariani	3489463	
	Janice Noka	Rwegamugwe	25530725	
	Bancy Kawira	Kagera	0727971626	
	Joyce Wanjika	Mbabi	24301541	
	Lucy Nkere	Konyo	12613865	
	Emithe Kiraku	Kagani	7392875	
	Damaris Mate	Kithiru	24358457	
	Casty Kawira	Kithiru	13871665	
	Aniceta Gitari	Kithiru	7453934	
	Aniceta Karimi	Kithiru	7457934	
	Damaris Nkane	Kithiru	9574042	
	Stephene Gitonga		32995093	
	Jane Karimi	Huid	7016772	
	Nancy Ngai	Gatua	30515692	
	Mercy Muthoni	Kariani	21829071	
	Julia Karimi	Karamani	9214444	
	Jane Mbogo	Huid	5086442	
	Morris Sebastian	Rwegamugwe	22838057	
	Nancy Muthoni			
	Grace Murunga	Kanji	11096615	
	Lilian Muthoni	Kithiru	9594306	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Ribarta Hotel Date 21/03/2018

Date Venue Chuka Office

No	Name	Region / Area / Village	Telephone	Sign
	Zipporah Oivere	Kavia	32768213	
	Joy Keeru	Ethaeu	302107.50	
	Asunta Nkuri	Ithio	3046/702	Asunta
	Helen Muthoni	Ithio	13677 69	
	Siphila Kanin	Kangombe	25618945	
	Lucy Kendi	Nyagatalu	25629346	
	Asukiah Isanya	Kamani	2384699	
	Cianbuba Mbuba	Kalamani	5087634	
	Lilah Kawira	Mwenge	132[illegible]583	
	Lucyline Kaari	Kamani	1273755	
	Jackline Murugi	Kagera	11056927	
	Evageline Nyaga	Kangombe	25259906	
	Sabella Kankini	Ithio	7757620	
	Purity Njoka	Rwegamuguo	5087596	
	Onesmus Nyaga	Rwegamuguo	5086705	
	Josphine Kafuthi	Rwegamuguo	5087628	
	Ghan Mwala	Rwegamuguo	2385029	
	Doreen Elias	Rwegamuguo	30841148	
	Florence Mwima	Rwegamuguo	7381672	
	Kellen Kathoni		70[illegible]2929	
	Karen Karimi	Kariti	0714903[illegible]	
	Susan Gachen	Kariti	0703938697	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Rubate Loc. Tr. Date 21/03/2015

Date.......... Venue Ofiza A Chief

No	Name	Region / Area / Village	Telephone	Sign
1	James Mbaka Iringo	Kithunty		[illegible]
2	Jane Ciamwari	Rugemwe		Jane
3	Kagendo Mbungu	Kangombe	0724996[illegible]	Kabado
4	Juliet Kanyua	Ithio	07005246	[illegible]
5	Nancy Wanja	Kangombe	0704422134	Mang
6	Agnes Bore	Kagera		Agnes
7	Kirimi Bore	Kagera		Bore
8	Mathoni Dugan	Kangombe		Mathoni
9	Mary Kageni	Nkwego		Kageni
10	Catherine Wanjiku	Karini		Cwan
11	Teresia Wanjiru	Gitumbi	0792014978	[illegible]
12	Virinia Mukui	Rugambuwe		Mukui
13	Ciakamba Nyumu	Njagatiiru		Nyumu
14	Rebecca Rigiri	Kagumbi	0716059100	[illegible]
15	Doreen Gatwiri	Gaciongo		Doreen
16	Lucy Karimi	Karii	0705473760	K
17	Cristine Kathomi	Karii	0713373637	Kathomi
18	Joy Kagwiria Gunbi	Kakiriguni	0717618533	Kawira
17	Joy Gacheri	Ropayo	0719550890	[illegible]
18	Lizebeth Kirambi	Karii	0791642468	[illegible]
19	Francis Njoka Kiriku	Kagwi		Njoka
20	Jenifer Ciamugwe Mbaka	Kithitu		Ciamugwe

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Rubate Location Date 21/03/2018

Date Venue Chief's Office

No	Name	Region / Area / Village	Telephone	Sign
	EZEKIEL M MARIKA	KAGWA	0727272066	
	FAITH NJERI	KAITHIRI	0716289887	
	PAUL CHAMOTEGI	GAIOA	0	
	JOSYLIN KARIMI	GAIVA		
	GITONGA B BOORE	KAGERA		
	SULEMAN M BOORE	KAGERA		
	James Mwangi	Rugamuga	12/12/19	
	BEATA CHANGI	KAGWI		
	Ronald Kinyua	Kagwi	0708705857	
	NICHOLAS ISARIAH	Kithechu	0712530832	
	John Micheni	Kithechu	0716148443	
	LAWRENCE MUGAMBI	Karamani	0716[illegible]80	
	Stella NJOKI	Karamani	0795[illegible]	
	Kamiliini JOSE	Kanyo	0720[illegible]82	
	BEATA WANGAI	Karamani	0716128875	
	Lucy Cianjai Karugi	Karamani	0727972973	
	SAMUEL KAHINDI NJOKE	Karamani	0710572361	
	NAH NJERI	KARAMANI	0722965288	
	Beatrice Wanjiku	Karamani	0711961622	
	Florence Kageado	Karamani	0729990256	
	Jackline Kageni	Karamani	0724126375	
	ROSEMARY KAGENDO	Karamani	0717916642	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Rubate Location Date: 21/03/2018

Date: ………… Venue: Office of Chief.

No	Name	Region / Area / Village	Telephone	Sign
1.	Rose Mutindi	Kavugwi	0710715761	[illegible]
2.	Kaari Rugano	Gaturi	437098	Kar.
3.	Fridah Kaari	Nkwego	0727892707	[illegible]
4.	Harriet Muthoni	Kavugwi	0716962225	He.
	Justus Mate	Karamani	0727951456	[illegible]
	Casty Wanja	Gaturi	0729964886	[illegible]
	Genesio Mbuba	Rwambgwe	0710105892	Gm
	Jeremy Kimanju	Kairi	0796511736	
	Boniface Mutani	Kairi	0701892447	[illegible]
	Alex Mwendwa	Nyagakaini	0727930859	[illegible]
	Stevanina Njeri	Karamani	0727792842	[illegible]
	Lucy Kangai Jackn	Ithio	0713892793	Lucy
	Jedlinecambeka	Kithaeru		
	Emilly Rwanda	Kang'ombe	0718769364	Emilly
	Nancy Kawira	Kajui	0726323071	NK
	Riungu Mutegi	Kajui	1	
	Lucia Mbuba	Kathy	0711 33861	
	Kanini Kamb.	Gatua	0918834R	
	Kalinga Kanin	Rutia	4554325	
	Gudiana Mbaka	4	440359 16	

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Rubate Location Date 21/02/2018

Date Venue Gwafi Office

No	Name	Region / Area / Village	Telephone	Sign
21	Judith Ciankui Mutua	Kithitu		Ciankui
22	Dorothy Ciambuba Mutegi	Kithecu	0707995583	Ciambuba
23	Juliste Ciangai Nthigai	Gatua		Ciangai
24	Aileen Kahubia Kathuni	Kithecu	0716246183	Aileen
25	Mary Muthoni Ngai	Gacigongo	0700784179	Muthoni
26	Margrate Ciambindu Nkoroi	Kagwi		Ciambindu
27	Felis Kanini Michen	Kaiem	0714635711	Koriri
28	Loyd Mwiathi Nkengu	Kagera	0710840459	Mwiathi
29	Kariba Mugambi Kithinji	Maabi	0734361513	Kariba
30	Daniel Mugambi Mutunga	Kanyo	0704963493	Mugambi
31	Peter Mugendi Josphino	Rwegamugwe	0716879690	mugendi
32	Festus Kinyua Mbuba	Ethio	0701080990	Kinyua
33	Jane Kaimenti Mitu	Kariani	0798581686	Kaimenti
34	Kinyua Ayubu	Kagera	0749597644	Kinyua
35	Elosy Nkoroi	Gacigongo	0796807619	Elosy
36	Alexanda Nyeru	Nkegera	0723853088	Nyeru
37	Penlisty Kagendo	Mbae	0714936778	Kagendo
38	Linus Mutwiri Mal	ITHO	0790853224	Eval
39	Peter Mungai	Rwegamugwe	0723066068	Peter
40	Reuben Gitonga	Karamani	0716021065	Gitonga
41	Idah Nduati Mutegi	Kariii		Idah
42	Dorothy Kagai Mutegi	Kinyo		Kagai

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue [illegible] Date 21/03/2016

Date .... Venue [illegible] office

No	Name	Region / Area / Village	Telephone	Sign
	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]

AFRICAN DEVELOPMENT BANK GROUP

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CONSULTING ENGINEERS

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Ndubai Location Date: 21/03/2018

Date: .... Venue: Chiefs Office

No	Name	Region / Area / Village	Telephone	Sign
1	HAMSON GITONGA	KANTHIRI	0778397464	[illegible]
2	PARICIA NAIRONI	KANTHIRI	0718770222	[illegible]
3	MARKO MATUMO	//	0711981122	[illegible]
	Melvin Gitonga N	//	0702787583	[illegible]
	JOSEPH MBUKO M	//	0732700493	[illegible]
	Phenics Gundi	//	0705977284	[illegible]
	~~[illegible]~~	Kithiker	0707605159	[illegible]
	[illegible] Mbug	//	0799231690	[illegible]
	Rwanda Mbugu	//		[illegible]
	Muraga Ntuka	//	07 —	[illegible]
	Tyson Kinyua		0711201585	[illegible]
	Nkai		0714550797	[illegible]
	Nkore Rumukia	//	—	[illegible]
	Jamlick Nkury	//	0718146765	[illegible]
	Njeri Kiombaka	//	—	[illegible]
	Timothy Ntaga	//	0729542589	[illegible]
	David Nyaga	//	0717735417	[illegible]
	Douglas Nkanga	//	0736122224	[illegible]
	JASPHER MBUBA		0717972858	[illegible]
	JOSEPH MUTEGI	//	0724092537	[illegible]
	JAPHET Mugambi	//	0729173791	[illegible]
	Lilia Kathuni	//	07 —	[illegible]

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Roboto Location Date 21/03/2018

Date........ Venue Chief's Office

No	Name	Region / Area / Village	Telephone	Sign
	Calister Gatumi	Kanthiine	07[illegible]	[signature]
	Christine Wanja	"	07206297	[signature]
	Evelyn Kanotho	"	0700170326	[signature]
	Mercy Wanja	"	0712[illegible]3226	[signature]
	Fredrick Mwaniki	Kathiiri		[signature]
	Ezekiel Kiriumi	"	0715300[illegible]	[signature]
	Samuel Njagi	"	0700925[illegible]	[signature]
	Murithi Mbuba	"	0729467954	[signature]
	Crafford Mugambi	"		[signature]
	Rugendo Njeru	"		[signature]
	John Njeru	"		[signature]
	Erard Mutegi		0770[illegible]	[signature]
	Armstrong Mbae	"	0720380[illegible]	[signature]
	Ashford Mwiti	"	0721867245	[signature]
	Macknon Imugambi	- - -		- -
	Charles Njeru Ndaba		072[illegible]	[signature]
	James Mutuma Jeri	Gatuki	0729473579	[signature]
	Dunglas Mbumbo	"	0703464[illegible]	[signature]
	Elick Nyaga	"	0724173384	[signature]
	M. Muchiri Thomas	"	072003[illegible]	[signature]
	Jasper Gitari	"	07284433[illegible]	[signature]
	Juliet Gitobu	"	0736175164	Juliet

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CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue: Rubate [illegible] Date: 21/03/2015

Date: .... Venue: [illegible]

No	Name	Region / Area / Village	Telephone	Sign
	Priscella Njoki	Kanthuni	–	[signature]
	Priscella Manyaga	"	–	[signature]
	Apollo Ngai	"	–	[signature]
	[illegible] Nkanga	"	0710943685	Nkinga
	Purity Muthoni	"	072959504	[signature]
	Agnese Ciandeke	"	0713679494	AG
	Lydia Ciamati	"	–	Lydia
	Lucy Gatari	"	0722899916	LG
	Agnes Gatune	"	072550409	[signature]
	Ester Wanjo	"	0711125537	Wanja
	Tabitha Mukari	"	072983[illegible]	[signature]
	Hadija Rasoya	"		
	Rose Kambura	"	–	[signature]
	Ciakuthii Nkeo	"	–	[signature]
	Stella Wanja	"	–	[signature]
	Caroline Kaari	"	0718829816	[signature]
	Katirea Gitari	"	071389[illegible]8	Gatirice
	Margaret Rugendi		[illegible]	[signature]
	Iiganie David	"	0715461712	[signature]
	Evangeline Maitha		0723071[illegible]	Maitha
	Jesca Kanini	"	071611797[illegible]	[signature]
	Jamleck Nyaga Ndwiga	Rubate	0716127953	[signature]

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MIBP CONSULTING ENGINEERS

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Rubate Location Date 21/03/2015

Date Venue Chiefs office

No	Name	Region / Area / Village	Telephone	Sign
43	LYDIA KAGENDA MUTEGI	KIOJE		MUTEGI
44	ANIEL MURITHARA	KATHIRI	0710769389	ANIEL
45	ALIPION KIONI	KIMI	0701402712	KIONI
46	DANISH MUCHIRU	KITHECU	0704230993	DANISH
47	RUNGU MUGERA	KAVIA	0	MUGERA
48	KANGANGA RUGARE	KARIA		KANGANGA
49	SAMUEL GITARI	NJOKA KARII	0719973726	NJOKA
50	EUNICE KAARI	RWENGWOMUGWA	0705164388	KAARI
51	FREDRICK MUTEMBEI	MUKUMARI ITHIO	0711666771	MUTEMBEI
52	HADIET CIAMATI	ITHIO	0711860284	HARIET
53	TERESIA MUTHONI	MICHENI ITHIO	0707200574	MICHENI
54	SUSAN CIAMBUA	KABUTHIA KAGO	07	SUSAN
55	GEOFFREY MUNENE	KAURIA ETHIO	0705366	MUNENE
56	BENTACE MUTEMI	NJOKA KARII	0701893411	NJOKA
57	PHILIPHEY MUTEGI	KATHIRI	0719640382	MUTEGI
58	[illegible]	MKOBE GO	0720312821	KIRIMI
59	STELLA GACERI	MWEGO	0706611915	GACERI
60	DOROTHY KARIMI	KAARI	0713136695	KARIMI
61	NICHOLAS MUIRI	KATUCA	0700442269	NICHOLAS
62	EDWIN MURIUKI	KAARIE	0705191436	KINYUA
63	MERCY KINYUA			
64	JULIA NDUBA	KAARI		NDUBA

AFRICAN DEVELOPMENT BANK GROUP

MIBP CONSULTING ENGINEERS

CHUKA BULK WATER SUPPLY AND SANITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND RESETTLEMENT ACTION PLAN (RAP)

PUBLIC CONSULTATIONS

Venue Rubate Location Date 21/03/2015

Date Venue Chiefs Office - Rubate

No	Name	Region / Area / Village	Telephone	Sign
	Pauline Kawira	Kariani	0722978404	
	Jane Kgondi Njagi	Nthwego		
	Beatrice Mbogo	Kithuthu		
	Eunice Karimi	Kithuthu	0720173062	
	Margaret Rundi	Kirigini	0717683879	
	Beth Mbundi	Kariri		
	Bilisila Ciamwaki	Githumbi		
	James Ser Mbaka	Githumbi		
	Teresia Wairi	Githumbi		
	Retford Mutambeu	Karamani	0711922590	
	Harriet Ciakiondi	Kariri		
	Edith Ciakuthi	Kadiaki		
	Polycarp Karimi	Ithiu	0796807643	
	Mary Kawira	Kinguru	0727558085	
	Fredrick Ithumbi	Kagwii	0728089342	
	Sophiana Wanjiku	Kirigini		
	Jane Kanyai			
	Bridget Ciamwaki	Konyu		
	Joyce Nzisa	Kithekiu		
	Geoffrey Mavura	Ithiu		
	Mbaga Thuga	Kaera	0723458985	
	Joyce Wanjiku	Kathiiri		

Annex 2

Chance Find Procedures

CHANCE FIND PROCEDURES

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT – CHUKA WATER SUPPLY INFRASTRUCTURE

CHUKA TOWN

Policy and Legal Provision

World Bank OP 4.11 on Physical Cultural Resource and National Museums and Heritage Act 2006 laws of Kenya provides for; *'if you believe that you may have encountered any archaeological materials or any material national importance stop work in the area and follow the procedure box below'*

Chance Find Procedures

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

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

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

Annex 3

Lead Expert License 2018

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/7161

Application Reference No: NEMA/EIA/EL/10134

M/S **GODWIN LIDAHULI SAKWA**
(individual or firm) of address

P.O. Box 18075-00500, Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **2492**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **2/12/2018**

Expiry Date: **12/31/2018**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2008 Certified