

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT

FOR THE PROPOSED KAPSASURA DAM SOTIK TEA ESTATE IN BOMET COUNTY



(Ref: NEMA/TOR/5/2/491)

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EXECUTIVE SUMMARY

Introduction

Sotik Tea Company Ltd is proposing to develop a water storage structure along the Kapsasura Stream in Bomet County to provide water for irrigation. The proponent intends to diversify agricultural products with the introduction of avocados and blueberries under irrigation. This is expected to increase the water demand within the estate. The company seeks to comply with all necessary statutory and regulatory requirements for such development, including the requirement for an environmental impact assessment (EIA).

EIA Study and Methodology

In seeking to comply with the requirement for an EIA Study prior to commencement of the proposed project, the project proponent engaged Rural Focus Ltd., to conduct the EIA Study and Engineering Design for the proposed dam. Licensed NEMA Expert, Eng. Mike Thomas (EIA/EA Lead Expert Reg. No. 0129) has undertaken the EIA supported by a team of experts with necessary skills on environmental management and water resources planning, engineering and development.

The study methodology involved desk study, stakeholder consultation and field investigations. The EIA process included: Desk Review of Engineering Design/Project Proposal and existing policy documents; Project Scoping and Development of Terms of Reference; Consultations with the Project Proponent; Mapping of Key Stakeholders; Field Assessment to establish the baseline conditions; Consultations with key stakeholders including the general public; Analysis of stakeholder feedback; and Compilation of the EIA Study Report encompassing the details specified in the Environmental Impact Assessment/Audit Regulations (2003) revised in 2015.

Public participation was mainly conducted through Key Informant Interviews (KII) using structured questionnaires that were administered face to face and some through e-mail; Focus Group Discussions (FGD) and a public baraza. Those consulted included representatives from neighbouring farms, institutions, community/settlements, institutions, national and county government departments as well as Water Resources Users' Association (WRUA).

Policy, Legal and Regulatory Frameworks

EIA is a legal requirement under the Environmental Management and Co-ordination Act, 1999, the Environmental Management and Co-ordination Amendment Act, 2015 and the Environmental (Impact Assessment and Audit) Regulations, 2003. This study report has also been prepared in accordance with Legal Notice 31 of 2019, which amended the Second Schedule of the Environmental Management and Co-ordination Act (EMCA). According to the amended schedule, water resources and related infrastructure including storage dams and barrages are classified as High-Risk projects. The proposed Kapsasura Dam thus falls under the classification of a High-Risk project where the project proponent is required through an EIA Expert to prepare and submit an Environmental Impact Assessment Study Report to the National Environmental Management Authority (NEMA) for approval. Other key national laws that govern the management of environmental resources in the country have been discussed in this report.

Additionally, the design of the dam has been undertaken by a consultant engineering firm and a water permit application for authorization of construction of works has been prepared for WRA in compliance with the Water Act 2016 and the Water Resource Management 2021 regulations. Finally, the public consultations for this EIA have been conducted with due observance of the Ministry of Health directives and protocols on COVID 19.

Project Background and Justification

Sotik Tea Company Ltd (STC) is mainly involved in commercial agriculture, primarily tea, and commercial forestry. The company has two estates namely Arroket, and Monieri, traversing Bomet and Nyamira Counties. The proposed project site is situated within Monieri Estate near the boundary with Arroket Estate. Collectively the two estates cover 2,265 ha of which 1327 ha is under tea, 714.6 ha under plantation forestry, 19.9 ha under indigenous forestry and 6.9 ha under buildings/settlements. Tea farming and processing remains the main activity.

The proposed project is in response to the company's intentions of diversifying its products by introducing commercial avocado and blueberry farming. STC ran successful trials with about 8ha of avocado and 2ha of blueberries in a greenhouse. In the long run, STC intends to introduce 200ha of avocados and 20ha of blueberries under irrigation. This is expected to increase the water demand.

Project Description

Dam Specifications

The project design has endeavoured to put into consideration the physical features of the site, intended use, safety, and cost-effective measures for construction and maintenance. The design recommends a wall of 11m maximum height thus allowing a normal water depth of 9.0m. The wall will extend over a distance of 78m across the site. This will provide approximately 135,421m³ of storage capacity covering about 4.293ha at normal water level. The storage volumes are based on the original ground topography of the impoundment area.

Dam Catchment

The catchment area of Kapsasura is estimated to be about 19.72Km². The stream supports about three dams, one for Sasini Tea Estate and two for Sotik Tea Estate (Arroket and Kapkoya). Water from Kapkoya dam is not abstracted for any purpose. The Kapsasura stream is estimated to have a mean annual flow of 0.31m³/s or 9.7MCM/yr.

Dam Site

The proposed dam site is entirely within the boundaries of STC's estate. It is located on the Kapsasura stream approximately 150m upstream of the Arroket dam. The site, presently, hosts a low weir that creates a sediment trap for Arroket dam, which was reportedly built in the 1960s. The weir is made of natural stone with a 2m wide channel to the west and provisions for compensation flow and offtake. The site is approximately 2.7km from the confluence of the Kapsasura stream and Kipsonoi River. This section hosts significantly lesser natural vegetation compared to the section downstream of Arroket dam.

Project Cost

The total cost of the project **Kshs 42,625,311**. This covers EIA, geotechnical investigations, engineering design, tendering, construction supervision and actual construction of the dam components. The amount payable to NEMA is **Kshs 42,625**, which is 0.1% of the total project cost.

Project Activities

The construction of the Kapsasura Dam shall involve civil and engineering works as outlined below:

- (1). Site preparation (mobilize labour, plant, and materials);
- (2). Design and construction of temporary works, flow diversion, etc,
- (3). Site clearing,
- (4). Excavation works,
- (5). Construction of the main works including the main earth embankment dam wall, spillway, aprons and wing walls;
- (6). Construction of ancillary works;
- (7). Site reinstatement.
- (8). Handover/commissioning

Potential Environmental Impacts and Mitigation Measures

Positive Impacts

- Increased labour for skilled and unskilled workers. It is estimated that 15-25 people will obtain employment for the duration of the project.
- Enhanced agricultural production and multiplier benefits such as employment, increased incomes, and livelihood diversification.
- Flood regulation.
- Semi-permanent flow immediately downstream of the dam due to seepage and/or compensation flow which can result in an increased density of riparian vegetation which in turn can support an increase in biodiversity.
- Increase in fish population and other aquatic animals;

Negative Impacts

- Increased traffic, noise and dust pollution that may affect estate residents and along other routes associated with the project;
- Soil erosion from unprotected spoil heaps. This can be minimized by careful attention to the spoil heaps;
- Temporary human habitation in the labour camp which can cause pollution if not well managed;
- Loss of biodiversity within the impoundment and infrastructure area;
- A body of deep water increases the risk of drowning. This can be minimized through controlled access, proper supervision of visitors, provision of life jackets and proper recreational equipment;
- Increase in water-dependent insect population.

Proposed Mitigation Measures

- Revegetation after completion of the construction;
- Well supervised construction and proper attention to occupational safety practices
- Proper disposal of wastes generated;
- Having in place complaints handling mechanisms to address any arising concerns throughout the lifespan of the project;
- Pest and disease vector monitoring and control;
- Dam monitoring and risk reduction activities.
- Preparation of Dam Emergency Action Plan.

Environmental Management Plan

An environmental management and monitoring plan (EMMP) has been developed for the project which will be implemented and monitored from time to time via Annual Environmental Audits to be submitted to NEMA by Sotik Tea Company.

Conclusion and Recommendations

Summary of the EIA Findings:

- The impoundment and borrow areas are dominated by grass, aquatic reeds, commercial forestry and perennial vegetation.
- Plantation (exotic) trees within the proposed impoundment area have already been cleared.
- There is no human settlement in the immediate downstream of the impoundment and embankment area;
- The area that will be inundated by water upon completion of the dam is entirely contained within the Sotik tea estates (Monieri and Arroket);
- Key stakeholders who have been consulted support the proposed projects and their concerns and recommendations have been addressed during the process of this EIA Study and been factored in on the EMMP as well as the design of the dam.

From the environmental impact assessment conducted and findings further detailed in this report, the benefits/positive impacts of the Kapsasura Dam outweigh the risk of negative impacts. The risks of negative project impacts are minimal and the project proponent has duly planned to address the proposed mitigation measures.

The communities neighbouring the estate as well as other stakeholders consulted during the EIA Study expressed utmost acceptability and goodwill for the proposed project. This report therefore recommends that the project be accorded NEMA approval subject to the mitigation measures highlighted in the EMMP being implemented by the concerned parties as the project does not pose serious environmental concerns.

Further recommendations for the proposed project include:

- Continued stakeholder consultation throughout the dam life cycle;
- First priority for employment opportunities for unskilled labour be given to locals from settlements immediately neighbouring the estate as a way of uplifting their livelihoods especially during the construction stages;

- Social and environmental impacts to be addressed by ensuring appropriate tools such as Health Safety and Dam Safety Plan have been developed and adopted during the construction and operational phases of the dam project;
- The mitigation measures proposed in this EIA Study report should be followed by the proponent and the proponent should ensure to undertake and submit to NEMA environmental audits every year after the commissioning of the project to ensure that all the proposed mitigation measures are being complied with;
- The design, construction and operation should be carried out in accordance with the specific design report for this proposed project.

KAPSASURA DAM

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT

This Environmental Impact Assessment Study report was prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental Impact Assessment and Audit Regulations 2003 and within the terms and conditions of the National Environment Management Authority, in order to meet the statutory requirements for implementation of projects under Schedule II.

Lead Expert

I, **MICHAEL KARIUKI THOMAS**, of **Rural Focus Ltd, P.O. Box 1011, Nanyuki**, confirm that the EIA Study Report for **Kapsasura Dam** has been developed under my supervision and that I am a licensed Lead Expert with the National Environmental Management Authority (No. 0129). I further confirm that this report was prepared based on the data collected from primary and secondary sources during the course of the EIA Study and the contents of this report are a true representation of the EIA Study process for the proposed construction of Kapsasura Dam within the Sotik Tea Estates (Monieri Estate) in Monire sub-location, Manaret Location, Sotik Sub-county of Bomet County.

Signature: _____

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Proponent Approval

I, **Guilliam Chambers**, have legal authority to sign on behalf of **Sotik Tea Estates Company Ltd.** and have read the EIA Study Report and accept the findings and recommendations of the report. I accept the Environmental Management and Monitoring Plan and will strive to fulfil its obligations.

Signature: _____

Guilliam Chambers

Position: _____

General Manager

Date: _____

5/11/22



TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Background.....	1
1.2	Objective of the Project	1
1.3	Project Justification.....	1
1.4	Project Proponent.....	2
1.5	Objectives of the EIA Study	2
1.6	Purpose and Outline of this Study Report.....	3
2	EIA STUDY METHODOLOGY AND PUBLIC CONSULTATIONS	5
2.1	Desk Study	5
2.2	Field/Site Assessment	5
2.3	Public Consultations and Disclosure	6
2.3.1	Methodology for Public Consultations for this EIA Study.....	6
2.3.2	Analysis of Questionnaires & Feedback from the KIIs and Public Baraza	9
2.4	EIA Team composition.....	11
3	RELEVANT POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORKS	12
4	BASELINE ENVIRONMENTAL CONDITIONS	26
4.1	Project Location.....	26
4.2	Biophysical Baseline Conditions	27
4.2.1	Climate.....	27
4.2.2	Topography.....	29
4.2.3	Catchment Area	29
4.2.4	Stream Flow	30
4.2.5	Slope Characteristics.....	31
4.2.6	Geology.....	31
4.2.7	Soils	31
4.2.8	Hydrogeology	32
4.2.9	Flora.....	33
4.2.10	Fauna.....	34
4.3	Social Economic Setting	35
4.3.1	Land tenure and use	35
4.3.2	Transport Network.....	36
4.3.3	Information Communication Technology (ICT), Telecommunications and Energy.....	36
4.3.4	Demographics	36
4.3.5	Sanitation and Solid Waste Management	37
4.3.6	Social amenities	37
4.3.7	Water Supply	37
5	ACTIVITIES DURING THE IMPLEMENTATION AND COST.....	40
5.1	Site Description.....	40
5.2	STC's Water Demand	41
5.3	Proposed Dam Design.....	42
5.3.1	Dam wall.....	42
5.3.2	Spillway Design.....	42
5.3.3	Compensation Flow	43
5.3.4	Sediment management.....	43
5.3.5	Draw-off mechanisms.....	43
5.3.6	Staff gauges and monitoring posts.....	43
5.4	Project Implementation Activities During Construction Phase	44
5.4.1	Mobilization.....	44
5.4.2	Site Clearing and Top Soil Stripping	44

5.4.3	Excavation and Construction of Main Works.....	44
5.4.4	Restoration Activities & Commissioning	44
5.5	Activities during the Operations Phase.....	45
5.6	Project Ownership and Management	45
5.7	Project Implementation Schedule, Cost and Financing	45
6	MATERIALS AND EQUIPMENT TO BE USED, PRODUCTS, BY-PRODUCTS, WASTES AND METHODS OF DISPOSAL	46
6.1	Materials to be used	46
6.2	Equipment to be used.....	46
6.3	Personal Protective Equipment (PPE).....	46
6.4	Products, By-products, Wastes Generated and Waste Disposal Methods	46
7	DECOMMISSIONING PLAN	48
7.1	Overview.....	48
7.2	Rationale for decommissioning	48
7.2.1	Transfer of Management or Donation of the Project as a Going Concern.....	48
7.2.2	Transfer or Donation of the Project for a Different Use	48
7.2.3	Abandonment of the project.....	48
7.3	Activities in decommissioning.....	49
8	POTENTIAL ENVIRONMENTAL IMPACTS, MITIGATION MEASURES REQUIRED DURING AND AFTER IMPLEMENTATION OF THE PROJECT	50
8.1	Positive Impacts.....	50
8.1.1	Planning and Design Phase.....	50
8.1.2	Construction Phase	50
8.1.3	During the operational phase	50
8.1.4	During decommissioning after construction.....	51
8.2	Potential Negative Environmental Impacts and Mitigation Measures.....	51
8.2.1	Design and Planning	51
8.2.2	During Construction	51
8.2.3	During Operations Phase	54
8.3	Demobilization after Construction.....	55
8.4	Health and Safety Plan for Personnel	55
8.5	Dam Safety Plan	56
8.6	Sustainability and Future Plans.....	57
9	ANALYSIS OF ALTERNATIVES	58
9.1	Overview.....	58
9.2	Project Alternatives.....	58
9.2.1	No project Alternative	58
9.2.2	Ground water development and utilization.....	58
9.2.3	Alternative surface water sources	59
9.2.4	Alternative Methods for Sediment Management.....	59
9.3	Results of the Analysis.....	60
10	ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN.....	61
11	CONCLUSIONS AND RECOMMENDATIONS.....	73
11.1	Conclusion	73
11.2	Recommendations.....	73
12	REFERENCES	74

APPENDICES

- APPENDIX A : Proponent's Documents**
- APPENDIX B : Public Consultation Documents**
- APPENDIX C : Lead Expert EIA License**
- APPENDIX D : Land Documents**
- APPENDIX E : Preliminary Dam Design Report**
- APPENDIX F: Bill of Quantities**

ANNEXURES

ANNEXURE 1: Kapsasura Dam EIA Study TOR

LIST OF TABLES

Table 2-1: Stakeholder Consultations Summary	8
Table 2-2: Questionnaires Analysis	9
Table 4-1: Mean annual rainfall from three stations at Sotik Tea Estates	27
Table 4-2: Details of the catchment area	30
Table 4-3: Slope characteristics	31
Table 4-4: Tree stock in areas earmarked for avocado farming.....	34
Table 4-5: Land use of Kapsasura dam catchment area.....	35
Table 4-6: Population of the Project Area	36
Table 4-7: Abstractors within the catchment	38
Table 5-1: Surface water sources at STC's estates.....	41
Table 5-2: Estimated future water demand.....	41
Table 5-3: Dam classification in Kenya.....	42
Table 5-4: Summary of the dam design	43
Table 8-1: Possible Adverse Impacts During the Construction Phase.....	52
Table 8-2: Possible Adverse Impacts During the Operational and Maintenance Phase	54
Table 10-1: Environmental Management and Monitoring Plan for the proposed Kapsasura Dam	61

LIST OF FIGURES

Figure 1-1: Avocado farming site with tea and forestry plantations in the background.....	2
Figure 4-1: Project Location Map (<i>Source Google Earth</i>)	26
Figure 4-2: Mean annual rainfall for Arroket	28
Figure 4-3: Mean monthly rainfall for Arroket.....	28
Figure 4-4: Temperature data for the project area	29
Figure 4-5: 1JF07 Mean Monthly Discharge	30
Figure 4-6: Soil map of the project area	33
Figure 4-7: Staff quarters within Monieri tea estate	36
Figure 5-1: Current state of the project site	40
Figure 8-1: Kapsasura Dam EAP overview.....	56
Figure 8-2: A barrier and warning sign to limit access at Kapkoya dam.....	57

ACRONYMS

amsl	above mean sea level
asl	above sea level
BD	Biological Diversity
CAP	Chapter
CIDP	County Integrated Development Plan
CM	Cubic metres
DOHSS	Directorate of Occupational Health and Safety Services
EA	Environmental Audit
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act, 1999
EMMP	Environmental Management & Monitoring Plan
FGD	Focus Group Discussion
GI	Galvanised Iron
GoK	Government of Kenya
GPS	Global Positioning System
HDPE	High Density Polyethylene
ITCZ	Inter-Tropical Convergence Zone
KII	Key Informant Interview
KRA	Kenya Revenue Authority
LR	Land Reference
PIN	Personal Identification Number
MWI	Ministry of Water and Irrigation
NEMA	National Environment Management Authority
O & M	Operation and Maintenance
PPE	Personal Protective Equipment
<i>spp.</i>	Species
RFL	Rural Focus Ltd
STHE	Sotik Tea Highlands Estate
STC	Sotik Tea Company
WRA	Water Resources Authority
WRUA	Water Resource Users Association

1 INTRODUCTION

The following is a brief description of the project background, objectives and project identification/justification.

1.1 Background

Sotik Tea Company Ltd (STC) is mainly involved in commercial agriculture. The company has two estates namely Arroket, and Monieri traversing Bomet and Nyamira Counties.

The proposed project site is situated within Monieri Estate near the boundary with Arroket Estate. Collectively, the two estates cover 2,265 ha of which 1327 ha is under tea, 714.6 ha under plantation forestry, 19.9 ha under indigenous forestry and 6.9 ha under buildings/settlements. Tea farming and processing remains the main activity. The plantation forest is harvested for timber and wood fuel mainly for the tea factory. However, the use of fuel wood is expected to reduce in the future considering that STC set up a solar power system to augment the existing supply. The pockets of indigenous forestry around the estate are left intact with minimal disturbance.

The Sotik Tea Highlands Estate (STHE) is a different company from STC but managed collectively with STC. Sotik Highlands has an area 1027 ha of which 597.8 ha is under tea, 316.7 ha is under plantation forestry, 9.7 ha is under indigenous forestry and 4.4 ha is under buildings/settlements.

The proposed project is in response to STC's intention to diversify its products by introducing commercial avocado and blueberry farming. STC ran successful trials with about 8ha of avocado and 2ha of blueberries in a greenhouse. In the long run, STC intends to introduce 200ha of avocados and 20ha of blueberries under irrigation. This is expected to increase the water demand and the company will need between 200,000 and 400,000 cubic metres of storage¹.

1.2 Objective of the Project

The objective of the proposed dam project is to provide water for irrigation to meet the demand arising from the introduction of commercial avocado and blueberry farming. The proposed dam is expected to provide approximately 135,421m³ of water for irrigation.

1.3 Project Justification

The amount of rainfall received in the area adequately caters for agricultural water covering tea farming and forestry. Therefore, the two Sotik Tea Estates have had minimal demand for water for irrigation purposes. The main water uses within the estates are domestic and industrial water supply. This demand is adequately met by two dams, Arroket (on Kapsasura) and Mettarora (on Mettarora stream). The product diversification plans have necessitated the need for sustainable water sources to meet the anticipated demand. The Water Storage Development Plan for Avocado & Blueberry Projects (Feasibility Study Report) prepared by Rural Focus Ltd evaluated an array of options including rehabilitation and expansion of

¹ STC Water Storage Development Plan – Feasibility Report, 2022.

existing dams and identification of suitable sites for development of water storage infrastructure.

The expansion of existing dams namely Kapkoya, Mettarora, and Arroket was limited by their initial designs that rendered them unsuitable for significant increases in height to meet the intended storage requirements. Thus, construction of a new water storage structure across Kapsasura Stream, specifically at the Kapsasura Weir, was deemed the most viable option. The proposed dam site is strategically located near areas earmarked for avocado and blue berry farming, particularly within Monieri Estate.

Additionally, the Hydrological Assessment Report for the Kapsasura Dam indicates that Kapsasura Stream has adequate stream flow to support a new dam. The stream, which is a tributary of Kipsonoi river, also supports Kapkoya dam and Sasini Dam upstream of the proposed dam site. However, there is no abstraction from Kapkoya dam, which is heavily silted and vegetated by aquatic reeds. Therefore, the proposed dam will compensate for the abstraction missed from Kapkoya.



Figure 1-1: Avocado farming site with tea and forestry plantations in the background

1.4 Project Proponent

Sotik Tea Company Ltd is a duly registered company in Kenya as per the Companies Act, 2015. The proponent owns three parcels of land registered as LR No. 8270, 8283& 8420. The certificate of incorporation and the KRA PIN Certificate for the company have been provided in **Appendix A** while the Land ownership documents are contained in **Appendix D**.

1.5 Objectives of the EIA Study

Under Part VI Section 58 of the Environmental Management and Coordination Act 1999 No. 8, any person, being a proponent of a project is required to apply for and obtain an Environmental Impact Assessment (EIA) license from National Environment Management Authority (NEMA) before he/she can finance, commence, proceed with, carry out, execute, or conduct any undertaking specified in the 2nd Schedule of the Act. The objective of this study is to carry out an Environmental and Social Impact Assessment for the Kapsasura Dam

in line with the Environmental Impact Assessment and Audit Regulations of June 2003 established under Environmental Management and Coordination Act (EMCA), 1999. According to the terms of reference for this EIA Study (**Annexure:1**) the scope of the EIA study was to address the following:

- i. Study the baseline environmental conditions in the project area, such as the physical, biological and socio-economic environment;
- ii. Study the project conditions and requirements in terms of location, construction and operational requirements;
- iii. Study the positive and negative impacts of the dam project on the physical, biological and socio-economic environment;
- iv. Assess environmental and social impacts of the project and suggest suitable mitigation measures for adverse impacts;
- v. Prepare an environmental management and monitoring plan (EMMP) for implementation and monitoring of mitigation measures along with budgetary estimates, institutional and reporting requirements.

1.6 Purpose and Outline of this Study Report

The purpose of this EIA Report is to highlight the significance of the project's potential environmental impacts in order to predict, mitigate, compensate for negative impacts, enhance positive impacts and develop an Environmental and Social Management Plan for the dam project. This report therefore covers the Environmental Impact Assessment (EIA) Study for the proposed Kapsasura Dam within Sotik Tea Estates located in Bomet County, Sotik Sub-county, Manaret Location, Monire Sub-location. Additionally, the report has been prepared based on the data collected from primary and secondary sources during the course of the EIA Study and including as much information as possible in order to make environmental self-audits easier.

In the introduction (**Chapter One**), the report highlights a brief description of the project background, objectives, project justification, objectives of the EIA Study and the EIA Terms of Reference.

The methodology used in conducting this EIA study and the views and recommendations from the area residents and other stakeholders have been highlighted in **Chapter Two**. The proposed project has been well received as it will bring about some benefits to the community such as creating jobs.

The legal framework against which the project must comply has been reviewed in **Chapter Three**. The pertinent statutes which have been reviewed include the EMCA, EIA/Audit Regulations, Water Act, Water Resources Regulations, Water Harvesting & Storage Regulations, and Public Health Act among others.

The Project area baseline characteristics have been documented in **Chapter Four** for the purpose of providing data against which the project monitoring may be carried out in the future. Information in this chapter describes the project location, existing water sources, biophysical characteristics such as climate, geology, soil and flora and fauna as well as the social economic setting of the project area.

Chapter Five and Six describe the activities to be encountered during the project construction phase with a view of to create better understanding of how such activities may

cause environmental changes and impacts. The Chapters also highlights the expected by-products and the method of waste disposal.

Chapter Seven details anticipated activities and the actual process to guide the decommissioning process. The decommissioning plan covers aspects relating to ceasing of operations, transfer of ownership, land use changes, or changes in the use of the dam.

The possible Environmental Impacts and their mitigation have been highlighted in **Chapter Eight**.

Chapter Nine of the report highlights the project alternatives. The idea is to compare the proposed dam with other project alternatives such as alternative sites, ground water development, direct abstraction from the stream, and expansion of the existing infrastructure. These options were subjected to a multi-criteria analysis taking into consideration economic, environmental, and safety considerations.

To assist in the implementation of identified mitigation and monitoring strategies, an Environmental Management and Monitoring Plan (EMMP) has been developed and is presented in **Chapter Ten**. It dwells on the various environmental management strategies and procedures and identifies the institutional management roles and responsibilities. It ensures that monitoring is undertaken and that the results are analysed during all phases of the project.

Finally, **Chapter Eleven** covers the conclusion and recommendations of this EIA Study report.

2 EIA STUDY METHODOLOGY AND PUBLIC CONSULTATIONS

This chapter summarizes the EIA Study approach that was applied to gather data and information for this EIA Study report. It further details the methodology and outcomes of the public consultations.

The data that has informed the development of this EIA Study report was collected through three key stages:

- Literature review of relevant documents;
- Site reconnaissance and visit of the proposed Kapsasura Dam Project;
- Consultations with relevant stakeholders.

Data collection was carried out using checklists, questionnaires, individual and group interviews, observations and photography. Further description of the data collection procedures is detailed below.

2.1 Desk Study

This involved the documentary review of various materials relevant to the Kapsasura Dam including:

- Project feasibility and preliminary design documents including engineering drawings;
- Available reports that highlight characteristics of the area, in terms of climate, vegetation, population etc. This included the Feasibility Study (RFL 2022) for storage development at STC;
- Policy and legislative documents;
- Existing documents on previous studies, proposals, among others.

The desk study aided the understanding of the background and context of the project and provided some necessary information for this EIA Study. The review of relevant policy and legislation frameworks further provided guidance on requirements that must be followed in the EIA study, project design, construction and operation. The information was also used to inform and advise the proponent accordingly on the compliance of the project to the various policies, legislation and regulations.

A detailed description of the various policy, legislative and institutional framework relevant to the proposed project have been summarized and presented in **Chapter 3** of this EIA Study Report.

2.2 Field/Site Assessment

Field visits were carried out specifically for physical inspection and assessment of the proposed catchment area and the proposed dam, spill way, offtake and compensation flow design and the actual environmental status in order to determine the anticipated impacts. It also included taking photographs of the proposed dam site and other important features within the site and the surrounding areas, noting features at the site, inspection of the area, documentation of vegetation and any wildlife sightings. Among the tools and materials used for this exercise were; a topographical map of the area, a notebook and pen, a camera, and GPS.

The field assessment was conducted prior to the stakeholder consultations to enable gathering of information necessary to provide details of the existing situation on the ground to the stakeholders as well as ensure that the EIA team was able to offer clarifications to their questions/concerns.

2.3 Public Consultations and Disclosure

EMCA 1999 states that the EIA study should be participatory and therefore consultation with key stakeholders is mandatory. It is incumbent on the project proponent to disclose the nature and scope of the project so that the public can be fully informed and provided with an opportunity to consider the potential impacts of the projects. The public disclosure and consultation process has been designed to help the public and interested stakeholders to understand the project and document their concerns. These concerns can then be addressed through the design of the project's environmental management and monitoring plan.

The public's interest in the Kapsasura Dam project is foreseen to arise as a result of the possibility of unknown or unforeseen effects being occasioned by the project along with the risk of dam breaching leading to loss of life and property and water use conflicts, particularly in the downstream section.

Taking cognisance of the fact that public participation is a right enshrined in the Kenyan Constitution and the important role that public consultations and disclosure plays in promoting acceptability of a project, identifying possible effects of the project as well as availing critical information for the design of the project to mitigate any possible effects, the project proponent has undertaken public and stakeholder consultations through a team of EIA Experts. The Consultant's EIA field team carried out stakeholder consultations in order to offer full disclosure on the proposed dam project to the farms, institutions, and communities surrounding STC and other interested parties and to gather their views and feedback.

2.3.1 Methodology for Public Consultations for this EIA Study

The methodology for consultations used was preceded by making preliminary site visits on the proposed dam site within the Sotik Tea Estate and discussions with the proponents by the EIA Lead Expert so as to aid in the structuring of the questionnaires and confirm/identify the major stakeholders. These site visits were made between June 2022 and October 2022.

After this, questionnaires and checklists were designed to capture both the affected and interested parties who included commercial farms, institutions and the general public on the upstream and downstream sections as well as relevant government departments and political offices.

The questionnaires were designed to capture information on whether the proposed development will have significant impacts on the following:

- Local residents/neighbours;
- Natural ecology of the area both within and outside of the estate;
- Recreation and aesthetic values;
- Public health and safety;
- Effect on water resources and quality;
- Effect on soils;

- Effect on infrastructural facilities;
- Effect on socio-economic aspects;
- Effects on agricultural activities; and
- Effects on security.

The EIA consultations were conducted between 11th and 14th October 2022. These covered Key Informant Interviews and a Public Consultative meeting. In other instances, phone interviews were conducted and followed up by sending of consultation forms to stakeholders via emails for filling. The consultative meeting was held on 12th October 2022 at Arroket Recreation Centre within Sotik Tea Estate. This was followed by a visit to the Kapsasura Weir, the proposed project site, to allow the participants get a better understanding of the proposed project components. The main challenge encountered in the consultation process was mobilizing women to attend the consultative meeting. Therefore, the EIA field team used questionnaires to consult a number of women from the communities around Sotik Tea Estate.

Representatives of the WRUA had been engaged earlier on 7th October 2022 owing to their role in water resources management as stipulated in the Water Act, 2016.

The discussions on the proposed project during these consultations focused on, but was not limited to:

- Background of the proposed project and what exactly the project will entail;
- Potential positive and negative impacts of the project;
- Stakeholders views and feedback on the proposed project;
- Stakeholders support to the proposed project;

During these consultations, the stakeholders got a clear understanding of the proposed project following necessary briefing by the EIA field team. This information helped in assessing the impact of the project on the environment as well as on the social economic status of the project area.

Table 2-1 below provides a summary of the various consultations that were held including the persons consulted and how and when they were consulted. The filled questionnaires for the key informant interviews, the minutes for the public baraza, the comment form by the relevant WRUA and some photos of the public consultation have been provided in **Appendix B**.

Table 2-1: Stakeholder Consultations Summary

	Stakeholder Consulted	Method of Consultation	Date Consulted
1.	County Government <ul style="list-style-type: none"> - Fredrick Ruto – County Directorate of Water/ Ag. MD-Bomet Water & Sewerage Company - Nelly Chepwogon – County Directorate of Environment. - Denis- Sub-County Agricultural Officer - Eunice C Bett – Community Development Officer (Gender & Youth) 	KII & Phone	11 th -14 th October 2022
2.	National Government Administration <ul style="list-style-type: none"> - Edna Sigei – Chief Manaret Location - Jared Kalamu Ongaga – Ag. Chief Ketaru Location (Nyamira County) - John Maritim – Ag. Chief - Zacchaeus Rotich – Ass. Chief - Baratiet Geoffery – Ass. Chief 	KII	Wednesday 12 th October 2022
3.	Political Leaders <ul style="list-style-type: none"> - Alfred Bett – Administrator Rongena/Manaret Ward - Emmy Suiyon – Sotik Sub-County Administrator. 	KII & Phone	11 th -14 th October 2022
4.	Neighbouring Institutions <ul style="list-style-type: none"> - Cecilliah K Gwaro – Deputy Head Teacher Monire Primary School. - Ibrahim Sakawa – Registered Nurse, Arroket Health Centre 	KII	Thursday 13 th October 2022
5.	Neighbouring Farms <ul style="list-style-type: none"> - Dipporah Bwari – EHS Officer, Kipkebe Tea Estate - Beatrice Chepkirui– Field Coordinator Kipkebe Tea Estate 	KII	Thursday 13 th October 2022
6.	Gender Balance <ul style="list-style-type: none"> - Christine Chepkemioi - Ruth Yegon - Hellen Rutoh - Nancy Kwamboka 	KII	12 th & 13 th October 2022
8	Public/Area Residents	Public Baraza	Wednesday 12 th October 2022
9.	WRUA Representatives <ul style="list-style-type: none"> - Willy Cheruiyot - John Bett 	WRUA Comment Form	7 th October 2022

2.3.2 Analysis of Questionnaires & Feedback from the KIIs and Public Baraza

Table 2-2 below summarises the response from the questionnaires.

Table 2-2: Questionnaires Analysis

No. of questionnaires Issued	Filled and Returned	Filled and not collected	Not Returned	Those rejecting the project	Those approving the project
20	18	0	2	None	18

The following issues emerged from the KIIs and Public Baraza:

Positive Impacts

- Water storage and flood control – The proposed dam is expected to harness a considerable volume of the runoff available during the rainy season and also play a critical role in flood control within Kapsasura stream.
- Reliable water storage; The proposed Kapsasura dam is expected to provide a more reliable water source for irrigation.
- Direct and indirect employment; Employment opportunities will arise throughout the lifecycle of the project. Direct employment opportunities will involve hiring of workers involved in the construction activities. On the other hand, indirect opportunities include suppliers and workers involved in the production of the new crops.
- The introduction of new crops will spur interest in the neighbouring community who may also be engaged as out-growers, thus diversified products and increased incomes.
- Increased revenue for STC may translate to CSR activities for the community.
- The dam may be used for other uses including recreational activities, fish farming, and possibly hydro-power production.
- The dam is expected to enhance the micro-climate around the area and spur conservation activities along within the catchment.

Concerns and proposed mitigation measures

- Poor construction works; Stakeholders raised concerns of the possibility of poor construction standards thus resulting to a weak/unstable embankment.
The stakeholders proposed that proper construction standards be adhered to during the implementation phase.
- Possible breaching of the dam leading to loss of life and property downstream.
The stakeholders proposed that the dam wall be built to the right standards as per the proposed design with provisions for regular monitoring and maintenance.

- The dam poses a risk of loss of life; People and livestock may drown if they stray to the dam area.
Stakeholders proposed that a fence should be erected around the dam to deter people and animals from accessing the dam.
- The dam may become a breeding ground for disease vectors such as mosquitoes leading to high prevalence of malaria.
The proponent was urged to explore effective measures to prevent disease vectors from using the dam as a breeding ground. Consultations with the personnel at Arroket Health Centre revealed that Malaria is not a major disease in the area.
- Development of the dam may lead to reduced stream flow within Kapsasura stream.
The proponent was encouraged to adhere to the design and relevant regulations to ensure that abstraction through the dam allows for environmental flow.
- The use of the dam for irrigation activities may also result to presence of agro-chemicals and fertilizers in the stream leading to poor water quality.
Proper measures such as drip irrigation and proper design of the fertigation system are put in place to ensure that agro-chemicals do not pollute the water or cause eutrophication.

Other Considerations

- The stakeholders urged STC to support catchment conservation in the upstream through supply of trees for planting along the riparian area. This could preferably be done in collaboration with the WRUA and Sasini Tea as the headwaters of Kapsasura Stream is within its Kipkebe and Mugura Tea Estates. *Equally, the community was encouraged to actively engage in WRUA activities for successful catchment and water resources management.*
- STC could assist the local community in enhancing avocado and blue berry farming at the household level through farmer field days. Diversification of crops for better returns will indeed be an indirect benefit for the community arising from the proposed dam project.
- Members of the neighbouring communities should be given priority in employment opportunities arising from the proposed project.
- STC should consider providing piped water to the surrounding settlements as part of its CSR program.

Clarifications offered by STC and EIA team:

Both STC representatives and the EIA Team provided immediate feedback to stakeholders, particularly the public consultative meeting. The main clarifications offered are highlighted below;

- **Use of the dam:** Presently, the dam is mainly intended for irrigation thus there are no plans to supply domestic water in the short and medium term. However, STC will continue supplying water to the neighbouring institutions from existing arrangements.
- **Employment of locals:** It was clarified that the proponent was committed to ensuring that the locals were offered jobs especially during the construction period.
- **Water Quality:** It is not anticipated that the proponent will use agrochemicals around the dam. In fact, the main water treatment unit for the tea estate is located downstream of

proposed Kapsasura dam, hence the proponent is committed to ensuring that water quality is not compromised.

The clarifications and immediate feedback was complemented by a visit to the proposed project site. This allowed for a practical understanding on the siting and operation of the various projects components.

2.4 EIA Team composition

The EIA Team composed of the following experts:

- | | |
|-------------------------|---|
| 1. Engineer Mike Thomas | Lead Expert/ Water Development Specialist |
| 2. Nick Mwaniki | Environmental Specialist/ Associate EIA/EA Expert |
| 3. Jackson Kibet | Environmental Specialist/ Associate EIA/EA Expert |
| 4. Caroline Macharia | Sociologist/ Associate EIA/EA Expert |

The EIA License for the Lead Expert is provided in **Appendix C**.

3 RELEVANT POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORKS

This chapter reviews and analyses the relevant policies, laws, regulations and institutions that have a bearing on the implementation of the proposed Kapsasura Dam and that the proponent must comply with.

3.1 Environmental Management Principles and Guidelines

The project proponent is expected under law and set practice to consider and exercise the principles and guidelines of environmental management as follows:

3.1.1 Sustainability

In the course of implementing the proposed project, the project proponent is expected to use resources sustainably and source materials from suppliers that have been identified as practicing sustainable resources use, thereby maintaining the potential of the natural resources to meet the needs and aspirations of present and future generations.

3.1.2 Intergenerational Equity

Operations and activities undertaken at all the stages of the proposed project ought to be designed to comply with the principle of intergeneration equity in resources use of both natural and man-made resources. Additionally, various resource users in the current generation should not have their resource use ability compromised by the proposed project.

3.1.3 Prevention

The project proponent should undertake all the preventive and viable measures to protect the environment in the first place, throughout all the phases of the project (Construction, Operation and Decommissioning) rather than allow damage to take place then take remedial action. Prevention is far less costly than mitigating environmental damage.

3.1.4 Precaution

The project proponent should undertake all the necessary precaution in the making of environmental decisions where there is scientific uncertainty and such uncertainty should not be used as a reason for not taking cost effective measures to prevent environmental harm.

3.1.5 Polluter pays principle

Polluters of natural resources are required to bear the full environmental and social costs of their activities. Therefore, should the project proponent cause damage to private properties or public utilities such as roads or public goods such as water bodies, measures to compensate the affected should be instituted immediately.

3.1.6 Public Participation

The project proponent will ensure environmental democracy and involvement of the public, especially local communities in environmental and developmental decisions that it seeks to

make, which affect their lives. The public participation process shall be open and transparent, provide valuable information on key impacts, potential mitigation measures and possible alternatives as well as enlightens the community on the opportunities and benefits that could arise from the project.

3.1.7 Cultural & Social Principal

Due consideration shall be made of the local environment management systems in the course of implementing the project and due care shall thus be exercised while introducing technologies that may conflict with the existing environmental management systems.

3.2 Policy Framework

The following are some of the policies that are relevant to the Kapsasura Dam Project:

3.2.1 National Environment Action Plan (NEAP) 1994 (Revised 2007)

NEAP was a deliberate policy effort to integrate environmental considerations into the country's economic and social development, informed by the premise that economic and social development programmes that disregard environmental sustainability have negative impacts on ecosystems. This integration process was to be achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources are an integral part of societal decision-making.

The project proponent has undertaken this EIA Study with a view to ensure that the proposed Kapsasura Dam Project has made due regard to relevant environmental management issues. Further in recognizing that a multi-sectoral approach is desired in identifying and solving environmental problems, the proponent has endeavoured to engage stakeholders in identifying and recommending mitigation measure for potential environmental concerns arising from the project. Various relevant stakeholders were consulted during the preparation of this study report and close engagement is encouraged during the project implementation and operational phases of the project.

3.2.2 National Environmental Policy (2013)

The National Environmental Policy acknowledges that natural resources are under immense pressure from human activities particularly for critical ecosystems including forest, grasslands and arid and semi-arid lands and sets out important provisions on the management of ecosystems and the sustainable use of natural resources. The policy seeks to develop an integrated approach to environmental management, strengthening the legal and institutional framework for effective coordination and promoting environmental management tools. The broad objectives of policy include:

- Optimal use of natural land and water resources in improving the quality of human environment;
- Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of future generations;
- Integration of environmental conservation and economic activities into the process of sustainable development; and

- Meet national goals and international obligations by conserving bio-diversity, arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

The various Acts and Regulations addressing environmental management seek to make provisions that enable the achievement of the National Environmental Policy objectives. *The project proponent will thus endeavor to observe the provisions of the various statutes that are aimed at maintaining a clean and healthy environment.*

This EIA study has additionally developed an environmental management and monitoring plan to mitigate the impacts that may result during the construction and operation phases of the proposed Kapsasura Dam project. This tool is aimed at promoting coordination of environmental management of the project such that sensitive ecosystems are not destabilized by the project activities.

3.2.3 National Water Policy, 2021

The goal of this Sessional Paper is to guide the achievement of sustainable management, development and use of water resources in Kenya. It provides a framework for sustainable management and financing of water resources; water harvesting and storage; and for equitable, efficient, and universal access to water supply and reasonable standards of sanitation, for domestic, economic use and ecosystem sustenance.

The Sessional Paper provides guidance for aligning the water sector to the Constitution of Kenya especially with respect to the establishment of mechanisms to guide intergovernmental and, institutional coordination for better delivery of respective functions.

With respect to water harvesting and storage, the National Water Policy, 2021, underpins the needs to expand the availability of renewable water, mitigate the conflict, and promote climate proofing of water harvesting and storage infrastructure. The ministry in charge of water affairs will be expected to implement measures to develop an efficient water harvesting and storage capacity in order to meet the rising demand for water and towards realization of water security in the country, in order to promote various water uses and sustainable development.

The design of the proposed Kapsasura dam takes into account the goals and objectives of this sessional paper, particularly in regard to compliance to relevant regulatory framework, enhancing water security for agricultural production, sustainable water resources use, catchment protection and conservation, and climate change mitigation.

3.2.4 National Water Resources Management Strategy (2020 – 2025)

The formulation of a new strategy was necessitated by the expiry of the National Water Resources Management Strategy (2010 – 2016) and in accordance with requirements of the Water Act, 2016. The purpose of the new strategy is to provide the Government's plans and programmes for the regulation, monitoring, protection, conservation, and management of

The main thrust of the strategy is to guide the public and private sector and civil society's efforts in addressing emerging issues and challenges facing the Kenya's water sector. The challenges include: lack of universal access to safe water, water scarcity, catchment degradation, encroachment of riparian land and wetlands, pollution, uncontrolled and

unregulated use of water resources, flooding, management of transboundary resources, limited technical and enforcement capacities, rising water demand, climate variability and climate change.

The project design takes into cognizance the objectives, achievements, challenges identified in the current and previous strategy documents.

3.2.5 National Water Master Plan, 2030

The development of NWMP 2030 has taken into account and has highlighted key area of concern. These include the per capita water which is estimated to be 1985m³ up from 647m³ in 1992. The former included flood water which can be harnessed through storage which would therefore make per capita water above the global benchmark of 1000m³ per capita. The MWI has emphasized on storage development through which the National Water Harvesting and Storage Policy which provides a framework for water harvesting including mandatory requirement to provide buildings with rainwater harvesting systems, has been developed.

The NWMP 2030 aims at progressively increasing availability of water resources through accurate assessment, optimal management and development of existing potentials. This entails enhancing water storage through designing additional large/medium and small-scale storage facilities as envisaged in Vision 2030. It also entails promoting rainwater harvesting and storage systems, re-establishing green water storage area such as wetlands and forests, water saving technologies, ground aquifer re-charging, among others.

3.2.6 National Land Policy (2009)

The National Land Policy address the critical issues of land administration, access to land, land use planning and environmental degradation. The policy recognizes the need for security of tenure for all and secures the rights over land as well as provides for sustainable growth, investment and the reduction of poverty. Additionally, the policy designates all land in Kenya as public, community or private land. As such, the policy ensures that all land is put into productive use on a sustainable basis by facilitating the implementation of key principles on land use, productivity targets and guidelines as well as conservation.

As relates to environmental conservation, the policy provides actions for addressing the environmental problems such as the degradation of natural resources, soil erosion, and pollution and recommends for appropriate waste management systems and procedures. The policy goes further to advocate for environmental assessment and audit as a land management tool to ensure environmental impact assessments and audits are carried out on all land developments that may degrade the environment and take appropriate actions to correct the situation. Additionally, the policy advocates for the implementation of the polluter pays principle which ensures that polluters meet the cost of cleaning up the pollution they cause.

During project implementation, the proponent will ensure environmental protection of the subject land the project is being developed as well as ensure the proposed project aligns to key principles and guidelines on land use and environmental conservation.

3.2.7 National Water Harvesting and Storage Strategy (2020 – 2025)

This strategy has been prepared to provide medium term (5year period) strategic roadmap and coordinated mechanism for the progressive realization of water resources storage development in line with the devolved governance structure. It is expected that the strategy paper will provide mechanisms to increase water storage to match the increasing demand for water. This requires participation of key stakeholders in planning, financing and investments in infrastructure development for water harvesting and storage. This will ensure that the storage capacity is increased from 124 MCM (Million Cubic Metres) to 4.5 BCM (Billion Cubic Metres) by 2030.

The strategy also recognizes that it is essential for the storage infrastructure to be safe and effective in usage and is developed in consideration of other storage infrastructure taking into account the principles of integrated water resources management.

3.2.8 Kenya Vision 2030

The Kenya Vision 2030 is Kenya's long term development blueprint, that aims to create a globally competitive and prosperous country providing high quality of life for all its citizens by the year 2030. The Kenya Vision 2030 identifies Kenya as a water scarce country and the economic and social developments anticipated by vision 2030 require more high-quality water supplies than at present. The country therefore aims to conserve sources and start new ways of harvesting and using rain and underground water.

The 2030 vision for water and sanitation is to ensure that improved water and sanitation are available and accessible to all. It identifies water among the focal sectors to achieving development. The Social Pillar which aims to build a just and cohesive society enjoying equitable social development in a clean and secure environment identifies water and sanitation, the environment, equity and poverty eradication among the key sectors to achievement of desired transformation of society. Under the economic pillar which aims to maintain a sustained economic growth of 10% per annum over the next 25 years, increasing value in agriculture, livestock and fisheries is identified as a key strategy to contribute to the aspired economic growth. Specific strategies are to transform key institutions in agriculture and livestock to promote household and private sector agricultural growth and increase productivity of crops and livestock.

The proposed project is expected to contribute towards the achievement of various aspects of the Vision 2030 blue print. These include employment creation, enhanced agricultural production and diversification, and potentially processing and manufacturing in the long run. Indeed, these outcomes are expected to have an immense contribution to poverty reduction and economic growth.

3.3 Legal and Regulatory Frameworks

3.3.1 The Constitution of Kenya (2010)

Article 42 of the bill of rights provides that 'Every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures' Article 43(d) further confers to every person the right to clean and safe water in adequate quantities.

The COK [Section 62. (1) (g) and (i)] classifies among other issues that government forests, water catchment areas, especially protected areas and all rivers, lakes and other water bodies as defined by an Act of Parliament as public land, vest in and are held in trust for the people of Kenya by the national government [Section 62 (3)].

COK goes further ahead and stipulates under article 69 in chapter 5 on Environmental and Natural Resources Part II, that the State shall;

- Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
 - Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;
 - Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;
 - Encourage public participation in the management, protection and conservation of the environment;
 - Protect genetic resources and biological diversity;
 - Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
 - Eliminate processes and activities that are likely to endanger the environment; and
- Moreover, every person has been mandated to cooperate with the State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources

In line with these provisions of COK 2010, the project proponent has by this EIA Study report and the EMMP, taken advance measures to make sure that the proposed project does not cause harm to the environment. The proponent will additionally comply with all the obligations relating to the environmental conservation and protection through the implementation of the EMMP through-out the life cycle of the proposed project.

3.3.2 The Environmental Management and Co-ordination Act EMCA, 1999 and the Environmental Management and Coordination Amendment Act, 2015

The Environmental Management and Co-ordination Act, 1999 (Principal Act) and the Environmental Management and Co-ordination Amendment Act, 2015 aim to ensure successful environmental management in Kenya using four main principles:

- The sustainability of the environment and natural resources;
- The precautionary principle;
- The integration of environmental considerations into development planning and management; and
- The encouragement of public participation in any environmental decision-making.

Part VII on Environmental Audit and Monitoring section 68 and 69 specifically details the need to undertake Environmental Impact Assessments of all projects likely to cause negative impacts to the environment. Further, activities identified in the Second Schedule of EMCA require an EIA license. Legal Notice 31 of 2019, which amended the Second Schedule of EMCA, classifies water resources and related infrastructures including storage dams and barrages as High-Risk projects.

The proposed project constitutes several activities, that could generate considerable changes and significant effects to the environment including on land, water, atmospheric resources and biological diversity, therefore requiring an EIA before implementation of the project. The Kapsasura Dam falls under the classification of a High-Risk project where the project proponent is required through an EIA Expert to prepare and submit an Environmental Impact Assessment Study Report to the National Environmental Management Authority (NEMA) for approval.

The project proponent has therefore undertaken this Environmental Impact Assessment Study to ensure that the activities of the proposed project comply with all the legal and institutional frameworks that are in place to safeguard and protect the environment. Further, this EIA has been carried out by experts registered by NEMA.

3.3.3 Environmental Impact Assessments and Audit Regulations, 2003 and Environmental Impact Assessments and Audit (Amendment) Regulations, 2019

Part III of the Environmental (Impact Assessment and Audit) Regulations 2003 details the guidelines for Environmental Impact Assessment. The regulations require that EIA and EA be conducted in accordance with the issues and general guidelines spelled out in the second and third schedules of the regulations. These include considerations of the issues on the second schedule which include ecological, social, landscape, land use and water. The general guidelines on the third schedule are on impacts and their sources, project details, national legislation, impacts and their mitigation measures, management plan and environmental auditing schedules and procedures. Section 17 of part III details the need for public consultation to seek the views of persons who may be affected by the project.

Part IV Section 18(1) of the Environmental (Impact Assessment and Audit) Regulations 2003 details the contents of the Environmental Impact assessment report to be submitted to NEMA.

The environmental impact assessment process and compilation of this EIA Study Report were done in accordance with the issues and general guidelines provided in the EIA and EA Regulations. Persons affected or with an interest in the proposed project were also consulted and their views and recommendations sought and used to inform the development of EMMP as well as improve on the project design and implementation plan.

3.3.4 The Environmental Management and Coordination (Water Quality) Regulations, 2006

These Regulations apply to drinking water, water used for agricultural purposes, recreational purposes, fisheries and wildlife and water used for any other purposes.

The project will also be required to comply with the conditions set in the Environmental Management and Coordination (Water Quality) Regulations of 2006 (Legal Notice No. 120), among them the domestic water quality standards as stipulated in the First Schedule. The proposed dam use is for irrigation and may also be used for domestic water supply thus making some of the provisions of these regulations applicable.

Part II of the regulation provides for Protection of Sources of Water for Domestic Use. Regulation 4 (2) states that no person shall throw or cause to flow into or near a water

resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

Part III provides for water for industrial use and effluent discharge. Regulation 11 states that no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit any person to dump or discharge such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards set out in the Third Schedule to these regulations.

The project proponent shall adhere to the provisions of these regulations and shall ensure pollution prevention and control to the Kapsasura Stream during the construction and operation phase of the proposed dam project.

3.3.5 Environmental Management and Coordination (Waste Management) Regulations, 2006

These regulations outline requirements for handling, storing, transporting, and treatment /disposal of all waste categories including: Industrial wastes; Hazardous and toxic wastes; Pesticides and toxic substances; Biomedical wastes; and Radio-active substances.

The project proponent shall ensure compliance with the Environmental Management and Coordination (Waste Management) Regulations of 2006 (Legal Notice No. 121) particularly with dealing with waste generated during the construction and operational phases of the dam.

3.3.6 Environmental Management and Coordination (Wetlands, River Banks, Lakes Shores and Sea Shore Management) Regulations, 2009

The project shall ensure compliance with the Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations of 2009 (Legal Notice No. 19).

Part II section 12 and 13(1) highlights the need for a water abstraction permit from WRMA (now WRA) and an EIA licence from NEMA.

This report has been prepared as part of the requirements to obtain the EIA license, while the application for the WRA authorization is also underway. During the operational phase of the project, the proponent shall endeavour to conserve the dam catchment area.

3.3.7 Environmental Management and Coordination, Conservation of Biological Diversity (BD) Regulations 2006

These Regulations apply to conservation of biodiversity which includes: Conservation of threatened species, Inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources and benefit sharing.

Although the tea estate does not host any endangered or endemic flora and fauna species, appropriate measures have been put in place to protect indigenous tree species. The EMMP has also provided a monitoring system to help identify arising problems during the

implementation of the proposed project and inform conservation of the biodiversity in the catchment area.

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

These Regulations prohibit making or causing any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. It also prohibits the Contractor from excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment or excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source.

Under the regulation the Contractor will be required to undertake daily monitoring of the noise levels within the project area during construction period to maintain compliance.

3.3.9 The Water Act 2016

The Water Act 2016 provides for the management, conservation, use and control of water resource, providing regulatory and management measures for the supply of water services as well as for water resource management. The Act also has strict guidelines on water abstraction from rivers or watercourses and groundwater and stipulates that a permit is required in all cases of proposed diversion, abstraction, obstruction, storage or use of water. This dam project is therefore bound by this Act.

The Water Act 2016 has made provisions for the formation of Water Resources Authority (WRA) described in section 3.4.2. In order to complete water permit application process to WRA, the project will be required to submit an EIA Project Report, among other requirements.

This EIA Study report has been prepared in compliance with provisions of the Water Act including consulting the Water Resources Users Association.

3.3.10 Water Resources Regulations, 2021

The regulations were enacted to align with the Water Act, 2016 and the wider reforms in the water sector. Part VIII of the regulations provides for conditions of authorisation, permits, and approved water uses. Specifically, section 75 requires an applicant of a water resources use permit to show compliance with the provisions of the Environmental Management and Coordination Act, 1999 as well as membership to a water resources user's association.

Section 84. (1) stipulates that a person in possession of a valid water use permit or who is required to have a valid permit for water use, shall pay to the Authority water use charges on the basis of the water abstracted, diverted, obstructed or used including energy derived from a water resource at the appropriate rate as set out in the Second Schedule.

Section 87 states the need for controlling and measuring devices for accurate measurement of the water abstracted.

On pollution, Part VI, Section 61. (1) states that no person shall discharge or apply any poisonous, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit any person to dump or discharge such matter into a water resource unless the discharge of such poisonous, toxic, noxious or obstructing matter, radioactive waste or pollutant is authorised by the Authority and treated to permissible standards.

Part XIII Section 105 of the regulations states that the Reserve in all instances shall comprise of one element related to the quantity of the resource and the respective probability associated with that quantity and a second element related to the quality of the resource.

Section 106 subsection 3 states that establishing reserve shall be guided by:

- a) Ecological vulnerability;
- b) Vulnerability of population dependent on the water resource;
- c) Local observations with respect to the naturalized flows or water levels of the minimum values observed during periods of prolonged drought;
- d) Where water flow is known to be normally perennial, then the reserve quantity shall be sufficient to ensure perennial flow; and
- e) Consultations with the water resources users' association if they exist.

Section 107 (2) states that any person may complain to the Authority if:

- a) He/she is unable to obtain sufficient water from the water resource for basic human needs as a result of the reserve being violated; or
- b) As a result of the person's observations, the person considers the ecology is threatened as a result of the reserve being violated.

Environmental flow is an issue of great interest for both the proponent, the public and various stakeholders, not only as an issue of compliance but also as an issue that has great potential to cause or exacerbate water resource use conflicts.

Through the team of EIA Experts involved in the EIA Study, the proponent duly consulted the Water Resources Users Association (WRUA) and neighbouring community with a view to gain better understanding of water resource use on the Kapsasura Stream. The consultations also sought to unearth any existing water resources use conflicts within the catchment of the proposed dam. The WRUA issued a duly signed comment form and did not indicate any reservations for the proposed project. The design of the proposed Kapsasura Dam has also provided for the release of environmental flow and the project EMMP has addressed the issue of sustaining stream flow.

3.3.11 Water Harvesting and Storage Regulations, 2021

These regulations apply to the policies, plans, programmes, and activities of the national and county governments and their entities as well as public and private water works for water harvesting and storage, reservoirs for impounding surface run-off and for regulating streamflows and devices for flood control.

Part 1 Section 4 provides a detailed classification of dams based on a criteria set out in the second schedule of the regulations. The second schedule also provides for the minimum spillway designs.

Section 9 (1) states that, prior to constructing waterworks, the applicant shall apply for and obtain;

- a) A water use permit issued the authority under the act and the regulations.
- b) An environmental impact assessment license in accordance with the environmental management and coordination act
- c) Authorization from the mandated lead agency where the proposed water works is to be located inside a protected area or catchment area.

Part V on maintenance and management of water works states that the owner or operator of waterworks shall be responsible for the safety of the storage dam and shall directly or through an agent undertake maintenance and management of the waterworks in accordance with the third schedule.

Further, Section 21 subsection 4 requires the owner or operator of the water works to;

- a) Create a monitoring and evaluation system for optimal use of the works.
- b) Implement any other measures necessary for the safe operation and management of the storage dam or water works and
- c) Undertake annual environmental audit on the compliance of the dam or waterworks with the environmental impact assessment license and environmental management plan issued for the dam under the environmental management and coordination act.

3.3.12 Crops Act, 2013

The objective of this Act is to accelerate the growth and development of agriculture in general, enhance productivity and incomes of farmers and the rural population, improve investment climate and efficiency of agribusiness and develop agricultural crops as export crops that will augment the foreign exchange earnings of the country, through promotion of the production, processing, marketing, and distribution of crops in suitable areas of the country.

The proposed project aims to meet key objectives of this act through enhancing productivity and farming of crops for export, which will earn foreign exchange for the country.

3.3.13 Agriculture Act, Cap 318

The Agriculture Act is the principal land use statute covering, inter-alia, soil conservation and agricultural land use in general. The Agricultural Land-Use Rules under Cap 318 are clear on activities proscribed in riparian areas and it's essential that the proposed construction of the dam does not contradict requirements of this Act, but provides opportunities to expand irrigable land in the country. Afforestation and catchment restoration activities up and down stream will ensure reduced soil erosion.

The proposed project is intended for supplying water for irrigation purposes. The proponent is committed to ensuring proper soil and catchment conservation for long term agricultural productivity.

3.3.14 Factories and Other Places of Work Act, Cap 514

The Factories and Other Places of Work Act (Cap 514) provides for standards related to the infrastructure and working conditions in workplaces. An abstract of the Act is supposed to be displayed in the workplaces.

The act applies to all workplaces where any person is at work, whether temporarily or permanently and therefore will apply to the proposed project both during construction and operation phases.

3.3.15 Public Health Act, Cap 242

This is an Act of Parliament which makes provision for good public sanitation and maintenance of health. This Act provides the impetus for a healthy environment and gives regulations to waste management, pollution and human health. Part III section 17-18 highlights on what the proponent should do in case of an outbreak of infectious diseases within the project site. The infectious diseases apply to plague, cholera, typhus fever, acute poliomyelitis, rabies and many others.

3.3.16 Climate Change Act, 2016

This act provides that actions by government of Kenya must aim to realisation of low carbon climate resilient development. The law further provides for development of a five-year National Climate Change Action Plan (NCCAP), which identifies priority sectorial actions economy-wide and sets out the necessary inputs to mainstream both mitigation and adaptation actions.

3.3.17 Physical and Land Use Planning Act, 2019

This act makes provisions for the planning, use, regulation, and development of land in Kenya. The Act also promotes public participation in the preparation of plans and requires that in preparation of plans, proper consideration be given to the potential for economic development, socio-economic development needs of the population, the existing planning and future transport needs, the physical factors which may influence orderly development in general and the possible influence of future development upon natural environment. The act makes provisions for the requirement for EIA and EA in various land use activities.

3.3.18 Forest Conservation and Management Act, 2016

This Act makes provision for the conservation and management of public, community and private forests and areas of forest land that require special protection, defines the rights in forests and prescribes rules for the use of forest land. It also makes provision for community participation of forest lands by community forest association, the trade in forest products, the protection of indigenous forests and the protection of water resources.

The proponent will adhere to the provisions of the act including, actively, engaging KFS, where appropriate, from project inception to completion and monitoring.

3.3.19 Other Legislation

Other legislation pertinent to the operation of the proposed project are listed below. However, these other acts relate to employment and contractual conditions, rather than to the environmental dimension of the work operations.

- The Employment Act Cap 226
- The Workmen's Compensation Act Cap 236

- The Trade Union Act Cap 223
- The Trade Dispute Act Cap 234
- The National Hospital Insurance Act Cap 255
- The National Social Security Fund Act Cap 258

3.4 Institutional Framework

Several institutions are involved in water resource and environment management in Kenya. These organizations include the Ministry of Water, Sanitation, and Irrigation, Ministry of Environment and Natural Resources, National Environment and Management Authority, Water Resources Authority and the County Governments. The entity charged with overall responsibility in environmental management in Kenya is the NEMA.

3.4.1 National Environment Management Authority

NEMA was founded and mandated under EMCA to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment.

3.4.2 The Water Resources Authority (WRA)

The Water Act, 2016 allows for the establishment of the Water Resources Authority (WRA) whose functions, among others are to:

- formulate and enforce standards, procedures and Regulations for the management and use of water resources and flood mitigation;
- regulate the management and use of water resources as well as enforce the regulations;
- Issue water permits for water abstraction, water use and recharge, enforce the conditions of those permits;
- determine and set permit and water use fees and collect water permit fees and water use charges;
- provide information and advice for formulation of policy on national water resource management, water storage and flood control strategies

3.4.3 Other Governing Bodies

The Directorate of Occupational Health and Safety Services (DOHSS), Ministry of Labour, is mandated to inspect work places and occupational health and Safety issues. The DOHSS also requires that they approve building plans for the workplaces before they are built.

3.5 International Conventions and Treaties

Some of the international resolutions relating to the general adequacy and conditions of water resources include:

- 1) UNCED, Rio de Janeiro Earth Summit, 1992 Agenda 21- deals with the protection of quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources
- 2) World summit on sustainable development
- 3) 3rd World Water Forum held in Kyoto, Japan in 2003 which resolved to:

- a. Reduce by half the proportion of people without access to hygienic sanitation facilities by 2015
- b. Reduce by half the people without sustainable access to adequate quantities of affordable and Clean water
- c. Provide water, sanitation and hygiene for all by 2025; and
- d. Ensure environmental sustainability during the same period

3.6 Awareness of Governing Legislation

Sotik Tea Company Ltd. has demonstrated awareness regarding legislation relevant to the project operations and acknowledges the importance and need for the EIA Study and subsequently, environmental audits. STC has further put in place structures and mechanisms and is working towards compliance to all the relevant legislation.

4 BASELINE ENVIRONMENTAL CONDITIONS

This chapter outlines the location and biophysical and social-economic environment of the proposed project area.

4.1 Project Location

The proposed project site is situated entirely within Sotik Tea Estate, which comprises of two estates namely, Arroket, and Monieri. The proposed Kapsasura Dam will be located along the boundary of Arroket and Monieri estates with the larger part of the impoundment being in the latter. The two estates straddle the counties of Bomet and Nyamira along the boundary of the two counties with Kericho.

The proposed project site is situated along the Sotik – Ikonge road approximately 8km from Chepilat shopping centre. The site is at grid reference Lat -0.63211109, Long 35.06764691 (730113701E 9930086.882N UTM Zone36N). It is found on Survey of Kenya Reference maps sheet, Sheet 130/2 and 131/1- Chemagel (Scale 1: 50,000).

The location map is presented in **Figure 4-1**.

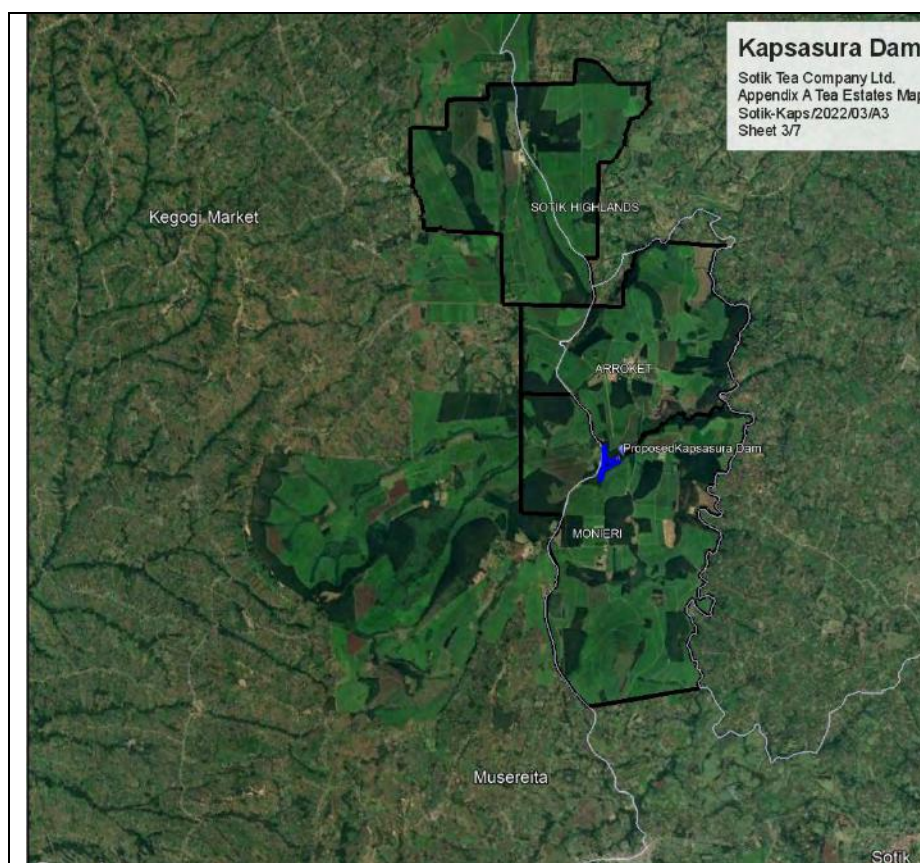


Figure 4-1: Project Location Map (Source Google Earth)

Sotik Tea Estates borders community settlements to the north, east and south and Kipkebe and Mugura tea estates owned by Sasini Tea to the west. Administratively, the project site falls within Bomet County. It thus, falls under the following administration units;

Sub-county: Sotik
Ward: Rongena/Manaret
Location: Manaret
Sub-location: Monire

4.2 Biophysical Baseline Conditions

4.2.1 Climate

Rainfall

The *Köppen and Geiger* climate classification system categorizes the project area as a subtropical highland climate receiving an average of 1400mm per annum. The rainfall is evenly distributed except for the short dry season in January and February. The wettest months are April and May. There is a little break between short and long rains in most parts of Bomet County.

This is corroborated by rainfall data from rainfall stations within Sotik Tea Estates. The data, which is for the period between 1974 and 2020, shows a reasonably consistent rainfall pattern.

Table 4-1 below presents data for three stations for the period 2001 to 2020. The mean annual rainfall is about 1625mm.

Table 4-1: Mean annual rainfall from three stations at Sotik Tea Estates

Station	Start	End	Mean Annual Rainfall (mm)	Standard Deviation (mm)
Arrocket	01/2001	12/2020	1636	241
Monieri	01/2001	12/2020	1627	206
SHTE	01/2001	12/2020	1612	231

The Kapsasura Dam design report relied on data from Arroket rainfall station. This EIA Study Report will also use the same data for purposes of consistency in illustrating rainfall patterns in the project area.

The annual rainfall pattern presented in **Figure 4-2** shows a low of 1,041mm/year in 2008 and a high of 2,113mm/year in 2013, with a mean of 1,538mm/yr. for the period 1974 – 2020. The slightly lower mean annual rainfall value reflects the below average rainfall during the 1980's.

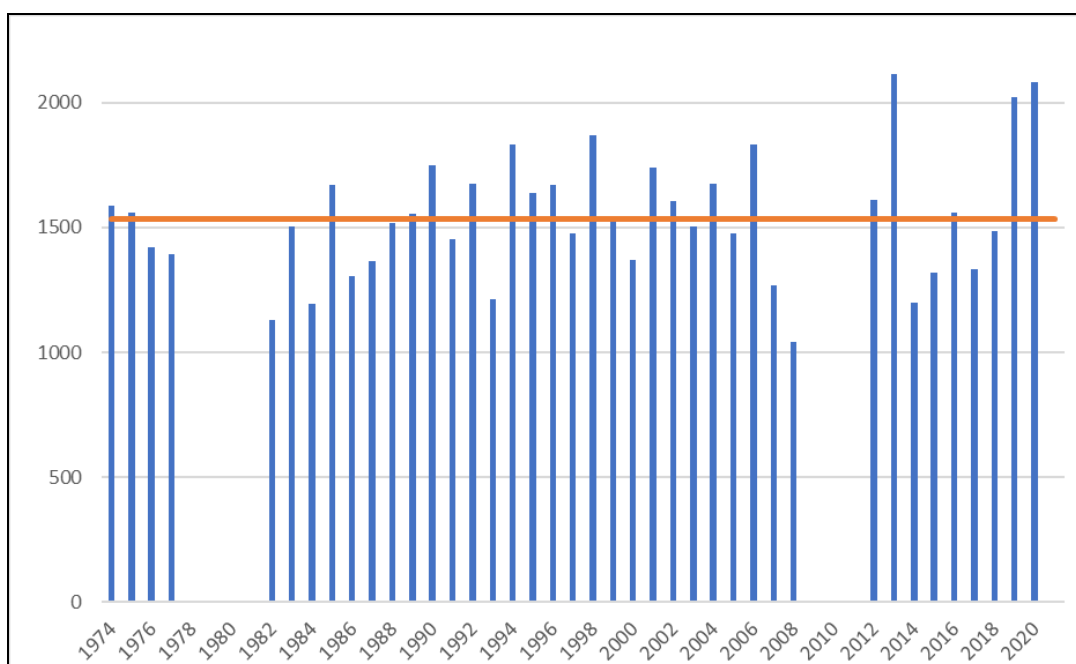


Figure 4-2: Mean annual rainfall for Arroket

The monthly rainfall pattern presented in **Figure 4-3** shows a bimodal pattern with a high in April (194 mm) and March (148mm), and lows in February (84mm) and January (86mm). This pattern is consistent with the movement of the intertropical convergence zone (ITCZ) across the equator modified by inter-seasonal rainfall from the Lake Victoria basin giving more rainfall in August.

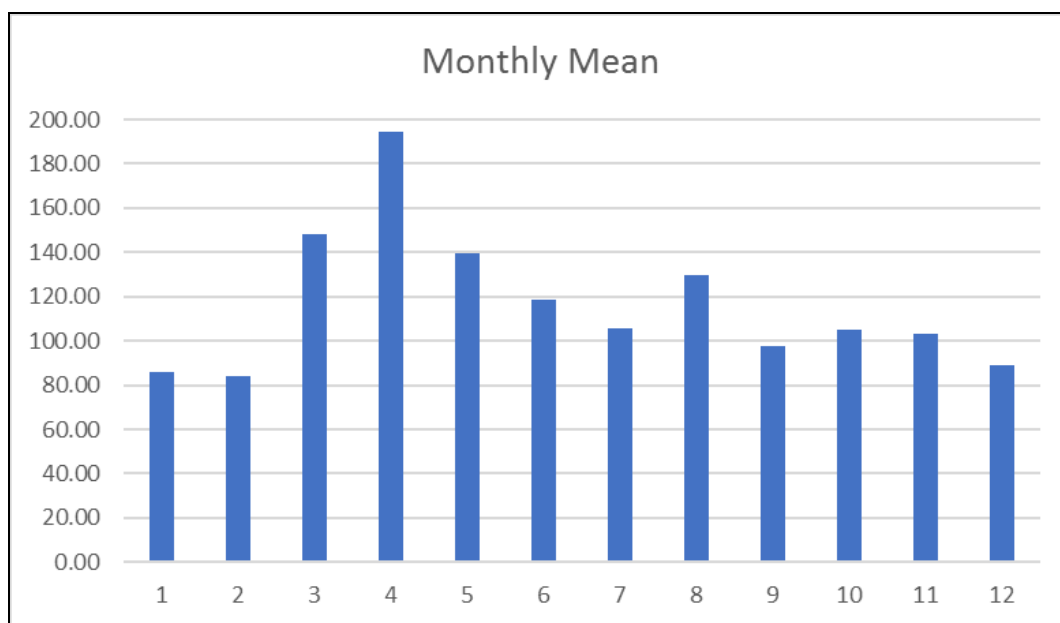


Figure 4-3: Mean monthly rainfall for Arroket

The considerably high amount of rainfall means that there are abundant surface water sources and steady flows in streams and rivers. Additionally, rain-fed agriculture remains the main economic activity in Bomet County.

Temperature and Evapotranspiration

Monthly temperature data taken within Sotik Tea Estates for the period October 2017 - November 2021 is shown on **Figure 4-4**. It shows a mean daily temperature of 19.6°C with an average maximum value of 27.8°C and an average minimum temperature of 11.4°C. The highest temperature on record is 31.1°C and the lowest is 8.8°C.

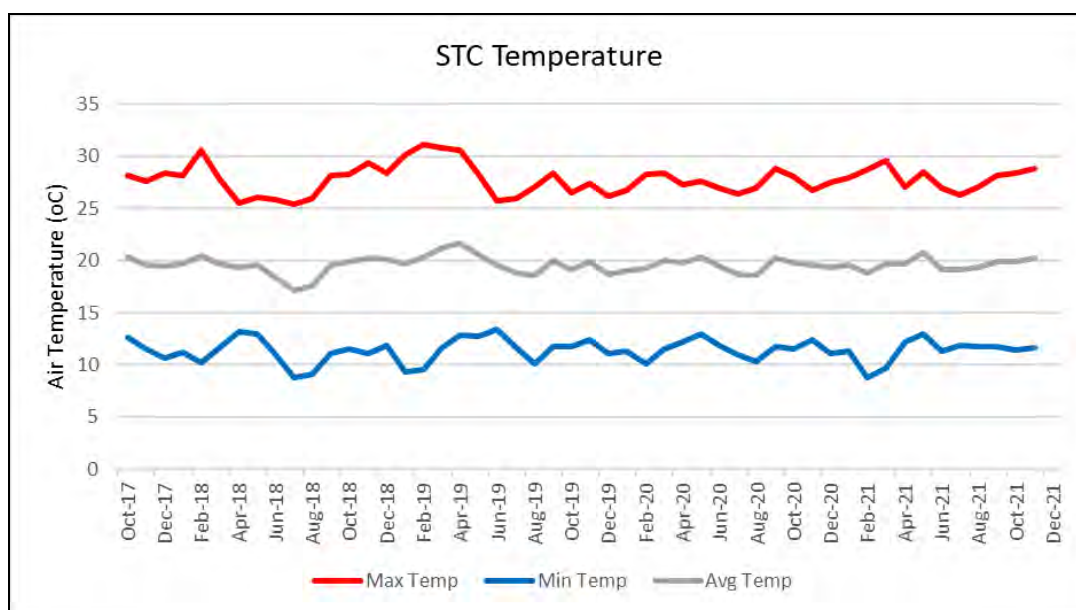


Figure 4-4: Temperature data for the project area

4.2.2 Topography

Bomet County is characterized by undulating topography that gives way to flatter terrain in the south. The overall slope of the land is towards the south, except the north eastern part which rises eastwards towards the 3,000 m high Mau Ridges. The project area rises to an altitude of about 1800m with the proposed project site being about 1773masl.

4.2.3 Catchment Area

The general drainage of the project area is dominated by Kipsonoi river. The river joins Chemosit river to form Sondu river drains into Lake Victoria. Kipsonoi river rises from the south eastern part of Bomet County and flows in a north westerly direction. The river forms the eastern boundary of the tea estate and the neighbouring community settlements. The Kipsonoi river has a catchment area of 1410 km². It is fed by numerous tributaries including Kapsasura, Mettarora, and Kroiseet, which are important drainage features in the immediate vicinity.

The catchment area of Kapsasura is estimated to be about 19.72Km². The stream supports about three dams, one for Sasini Tea Estate and two for Sotik Tea Estate (Arroket and Kapkoya). Water from Kapkoya dam is not abstracted for any purpose.

The basic details of the Kapsasura dam catchment are provided in **Table 4-2**.

Table 4-2: Details of the catchment area

Item	Value
Catchment area (km ²)	1.4720
Longest path (km)	7.534
Maximum width (km)	4.352
Maximum elevation (m.a.s.l)	2140
Minimum elevation (m.a.s.l)	1770
Dam elevation (m.a.s.l)	1770
Average slope (%)	4.9
Catchment Conditions:	
Cover condition	Cropland with some forest
Soils	Red soils
Land use	Tea plantations and forestry

4.2.4 Stream Flow

The Kapsasura catchment is ungauged and therefore stream flow data for the same is not available. In such a case, the hydrology of the river is modelled based on available data for a catchment with similar characteristics. Stream flow data for Kipsonoi River measured at river gauging station (RGS) 1JF07 obtained from WRA Kericho Sub-region office was used to determine the stream flow for Kapsasura Stream.

The Hydrological Assessment Report (RFL,2022) estimated that Kipsonoi River has a mean annual flow (MAF) of 20.60 m³/s. The lowest mean monthly flow (15.0m³/s) occurs in February while the highest (32.4 m³/s) occurs in May.

Figure 4-5 below shows the mean monthly discharge for Kipsonoi River as measured at RGS 1JF07.

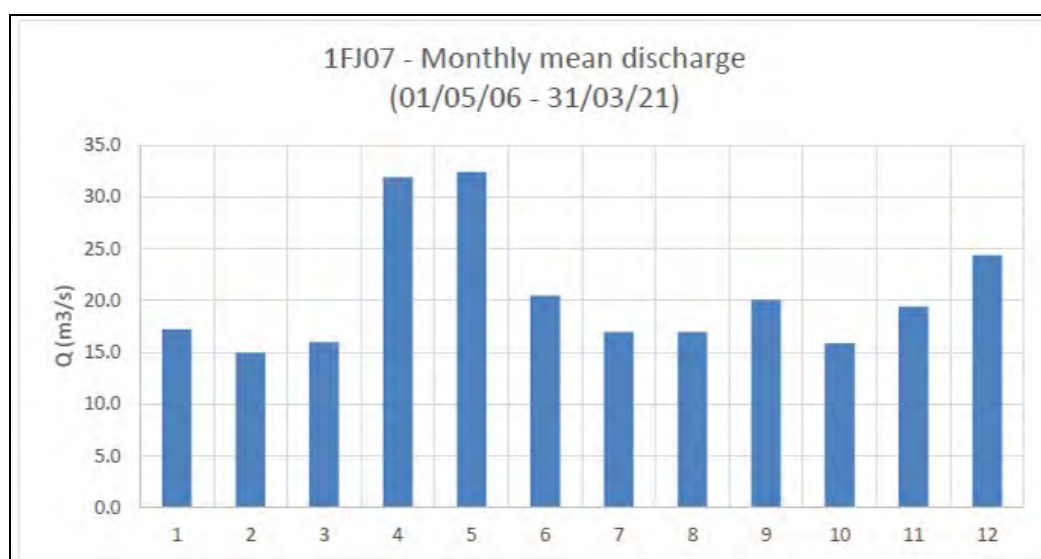


Figure 4-5: 1JF07 Mean Monthly Discharge

The Kapsasura stream is about 1.49% (approx..20Km²) of the total catchment area (1410Km²) measured at RGS 1JF07. This translates to a mean annual flow of 0.31m³/s or 9.7MCM/yr. The proposed dam and the abstraction from the dam about 0.135MCM is unlikely to have any significant impact on the downstream. Additionally, there are no other abstractors on the Kapsasura stream downstream of the Kapsasura and Arroket Dams up to the confluence with Kipsonoi River.

4.2.5 Slope Characteristics

The slope characteristics of the sub-catchments under RGS 1JF07 and the proposed Kapsasura Dam are presented in **Table 4-3**. This reveals that 1JF07 has a lower proportion of steeper sloped land (12%) against 23% for Kapsasura Dam sub-catchment. It also has a higher proportion of gently sloping land (48%) against 29% for Kapsasura Dam sub-catchment.

The moderately sloping land is of approximately the same proportion. The implication of this on the hydrological performance is that 1JF07 is likely to have lower runoff than the small sub-catchments that have a greater proportion of steeper sloped land. This makes the 1JF07 hydrological record a conservative estimate for the hydrology of the sub-catchments.

Table 4-3: Slope characteristics

River		Kipsonoi	Kapsasura
Dam Site		RGS 1JF07	KapsasuraDam
Area (km ²)		1410.26	19.72
Slope	Low < 5%	48%	29%
	Moderate 5 – 12%	40%	48%
	High 12 – 40%	12%	23%

4.2.6 Geology

Bomet County is made up of volcanic as well as igneous and metamorphic rocks. In addition to tertiary lava (phonolites) and intermediate igneous rocks, there are basement systems (granite), volcanic ash mixtures and other pyroclastic rocks. Also present are quaternary volcanoes to the south west parts and faults along the Mau escarpment bordering Narok County.

According to *Dijkshoorn et al (2012)*, the geology of the project area is mainly characterized by early Precambrian rocks. The area is dominated by biotite migmatites composite rocks found in medium – high grade metamorphic environment the dominant type of rocks underlying the area, these are compact rocks medium grained without exfoliation these rocks are largely reconstituted by partial melting with alternate layer being pegmatitic, aplitic, granitic or generally plutonic in appearance. There are a few faults around the north eastern area about 8Km from the proposed dam site within crystalline limestone.

4.2.7 Soils

The soils in the project area reflect to a certain extent the nature of the underlying formations. A soil map for the immediate vicinity derived from *Dijkshoorn et al (2012)*² is presented in **Figure 4-6**. The predominant soils in the area are well drained Ferrallo-humic nitosols (red soils).

4.2.8 Hydrogeology

In general, the hydrogeology of the area is influenced by the geology and the significant gradient change. The drop from 2000m to approximately 1800m around the project area suggests a potential hydraulic gradient within the steeply dipping geological formations. Presence of faults may facilitate flow by providing channels of high permeability or may be barriers by offsetting zones of high permeability.

Higher borehole yields are, generally, associated with volcanic aquifers whereas the low yields are related to the Basement System rocks. Sotik Tea Estates has three boreholes with a groundwater abstraction permits for a total of 117 m³/day. This water is used for domestic purposes. Other permitted boreholes in the area are generally used for domestic or industrial purposes. The average yields may depend on aquifer type, penetration through the aquifers, depth, and drilling and construction precision.

² Dijkshoorn, J.A., Macharia, P.N., 2012. Soil and terrain database for Kenya (KENSOTER), version 2.0 [WWW Document]. WUR. URL <https://www.wur.nl/en/Publication-details.htm?publicationId=publication-way-343532323134> (accessed 7.6.20)

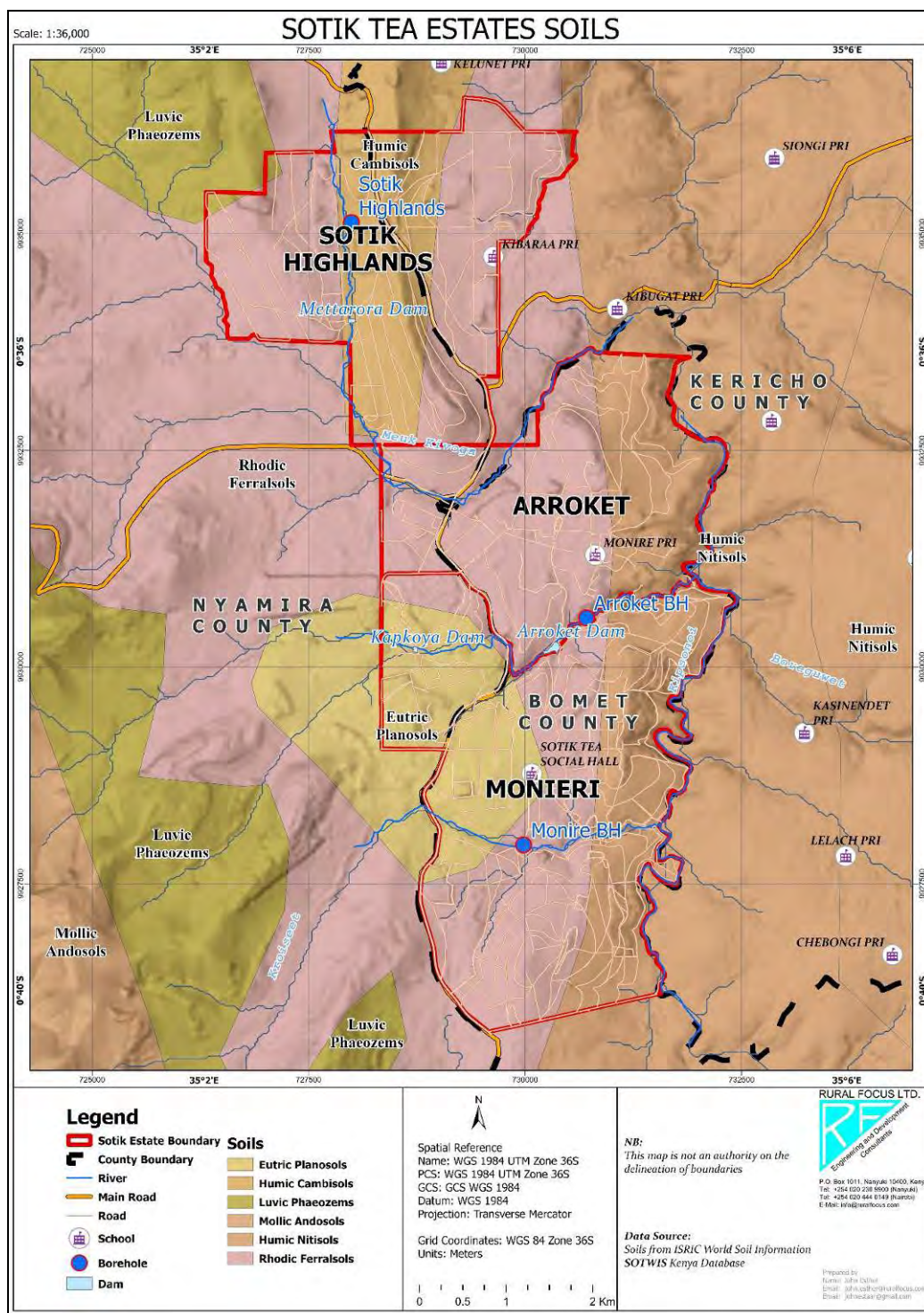


Figure 4-6: Soil map of the project area

4.2.9 Flora

The project area is dominated by cropland and pockets of indigenous and plantation forests. Indigenous and plantation forests are mainly found within the large scale tea estates. The small holder community lands also host both indigenous and exotic tree species. The most common indigenous tree species include Meru Oak, Podo, African cherry, Elgon Teak, and assorted Acacia species while Pine, Eucalyptus, and Grevillia dominate the plantation forests. A huge part of Sotik Tea Estates is under tea plantations.

The development of the proposed Kapsasura Dam and establishment of avocado and blueberry farming areas will involve clearing of trees and vegetation. The STC Forestry Department has put in place measures to ensure only the required area under exotic tree species, which would still be felled for timber and fuel wood, are cleared. New plantations will be established elsewhere in addition to the avocado trees that will be introduced in the cleared sites. Indigenous vegetation within these areas will not be removed. In fact, the identification of suitable sites for farming and the proposed dam also considered abundance and diversity of indigenous trees and shrubs.

Table 4-4: Tree stock in areas earmarked for avocado farming

Name	No.	Name	No.
Cypress	785	Yellow magnolia	0
Grivellia	0	Elgon Teak	1003
Kei apple	1632	Albizzia	0
Cape chestnut	0	Moreton Bay Chestnut	0
Australian flame tree	0	Sotik tea Avocados	1594
Flamboyant	8	Porini Hass Avocado	476
Jacaranda	0	Meru Oak	1004
<i>Araucaria cunninghamii</i>	10	Hedge Bamboo	0
Podo	0	Macadamia	3
Thika palm	0	Loquat	0
<i>Acacia tortilis</i>	76	<i>Polyscias fulva</i>	0
Naivasha Thorn	0	<i>Cordia abyssinica</i>	52
<i>Bischofia javanica</i>	0	<i>Zanthoxylum gillettii</i>	708
<i>Prunus Africana</i>	267	Chinese Lantern	1
Giant bamboo	2	<i>Croton megalocarpus</i>	0
Golden bamboo	248	Royal Palm Tree	0
Solid bamboo	0	Markhamia	0
Bottle brush	0	Mexican Ash	0
Paper Bark Tree	0	Nandi Flame	0
Brush Cherry Tree	27	<i>Ficus benjamina</i>	0
<i>Dombeya burgessiae</i>	0	<i>Syzygium cumini</i>	0
Mutaranganga (<i>Bridelia micrantha</i>)	0	Mutere (<i>Maesopsis eminii</i>)	27
<i>Juniperus procera</i>	0	<i>Ziziphus mucronata</i>	0
<i>Pinus patula</i>	500	<i>Acacia polyacantha</i>	18
<i>Casimiroa edulis</i> (White sapote)	8	<i>Dalbergia melanoxylon</i>	33
<i>Acacia persiciflora</i>	498		

Source: STC Forestry Department

The section of the stream around the proposed impoundment area comprises of aquatic reeds with no endemic or indigenous vegetation species. The proposed project will thus have minimal adverse impact of the vegetation cover. The proponent is also encouraged to maintain a healthy vegetation cover around the dam comprising of appropriate tree species and bamboo for enhanced soil conservation and biodiversity.

4.2.10 Fauna

The general land use patterns in the area do not allow for existence of wildlife species except for varied insect, rodent, reptile, and avian species. Sotik Tea Estate also hosts a considerable

number of monkeys inhabiting both plantation and indigenous forests. During the EIA process stakeholders who have lived and worked in the area indicated that the monkeys are not native to the area. The population of the monkeys has increased over the decades since their introduction.

4.3 Social Economic Setting

4.3.1 Land tenure and use

Land use tenure and ownership tends to influence land use in a locality. Land ownership in the project area can broadly be categorized as private and public. Public land is mostly under the national and county governments while private land under individual entities can either be freehold or leasehold. STC owns the land under a leasehold.

Most of the land in the project area including Sotik tea estates is zoned for agricultural use. The main crops cultivated in the area are tea and maize while the most common livestock breeds are sheep, poultry, and dairy cattle. The production system is, essentially, subsistence with commercial farming being practiced by a few estates including the project proponent. Avocado farming is also gaining precedence among the commercial farms as well as the local community. The closest urban areas are Chepilat shopping centre and Sotik Town.

Analysis of land use categories in the vicinity of the proposed project site based on land cover map from the European Space Agency (2016) ³ indicates that cropland covers 79% of the catchment. The other significant land use type is forestry, both plantation and natural with the latter being mainly along the river valleys. **Table 4-5** details the land use categories in the catchment.

Table 4-5: Land use of Kapsasura dam catchment area

Kapsasura Stream	%
Area	19.72
Forest (%)	20.12
Shrub land (%)	0.17
Grassland (%)	0.59
Cropland (%)	78.96
Aquatic Vegetation (%)	0.01
Bare Ground (%)	0.02
Built up Areas (%)	0.10
Water (%)	0.04
Total	100.00

The proposed project is not expected to have adverse impacts on the land use or economic activities within and around the area. Instead, it is anticipated that it will enhance agricultural production, employment opportunities, and income levels in the long term.

³ European Space Agency Climate Change Initiative - S2 prototype Land Cover 20m map of Africa 2016. <http://2016africallandcover20m.esrin.esa.int/>.

4.3.2 Transport Network

STC main offices are situated within the tea estate. The estate is about 8kms and 14kms from Chepilat and Sotik urban centres and can be accessed through the Sotik – Ikonge Road. The proponent maintains the roads within the estate through regular gravelling for efficient movement by vehicles and machinery.

4.3.3 Information Communication Technology (ICT), Telecommunications and Energy

A large part of the project area has a good network coverage of mobile telephone and internet services. The entire estate is served by the national grid. STC has also installed a solar power system to supplement the existing energy supply of the tea factory. Households and institutions in the estate are also connected to the national grid. Other energy sources used for lighting, cooking and heating include firewood, charcoal, paraffin, and to an extent LPG.

4.3.4 Demographics

Census data from KNBS shows that the population of Bomet County increased by 21% from 723,813 in 2009 to 875,689 2019. According to the 2019 census data, Sotik Sub-county had the highest population in the county at 227,855 while Bomet Central sub-county had the highest population density at 613 against the county average of 349.



Figure 4-7: Staff quarters within Monieri tea estate

The project site falls within Monire sub-location of Manaret Location. The sub-location covers one part of the estate thus explaining the low population density of 67 people per square kilometre. The population of the project area are shown on **Table 4-6**.

Table 4-6: Population of the Project Area

	Total	Male	Female	Household s	Land Size Sq. Km	Persons per Sq. Km
Manaret Location	12,045	6,153	5,891	3,174	52.8	228
Manaret	2,771	1,378	1,393	559	8.9	312
Chepilat/Manaret	5,356	2,711	2,644	1,510	12.9	416
Mabwaita	2,615	1,324	1,291	575	11.6	226
Monire	1,303	740	563	530	19.5	67

Source: 2019 Kenya Population and Housing Census: Volume II

4.3.5 Sanitation and Solid Waste Management

The project area is not served by a sewer line or a designated dump site for solid wastes. The estate has, therefore, adopted appropriate waste management techniques for both solid and liquid wastes. Liquid wastes are managed using septic tanks, soakaway pits, wetland system, and water reuse practices such as watering lawns. Solid wastes comprising of biodegradable and non-degradable are managed through composting, burning, reuse, and recycling. These approaches are adequate as the amount of wastes produced is relatively minimal. These will also be adopted once the construction activities commence. These are not expected to have an impact on surface water sources including the proposed dam.

4.3.6 Social amenities

The immediate vicinity is served by two primary schools, Monire and Kipkebe. Monire serves households living within STC's estate while the latter is owned by the neighbouring Kipkebe tea estate. STC also runs a health centre situated within Arroket tea estate. Other amenities and services including schools, market, and administration offices are found in Chepilat and Sotik town.

4.3.7 Water Supply

The rainfall patterns in the area are indicative of a reasonably good water supply, particularly for surface water. There are numerous streams and springs in the area that are important water sources for the community. Shallow wells and rooftop rainwater harvesting are also considerable water sources for various households. The main challenge remains the relatively low coverage of piped water in the rural areas. Sotik town and its immediate environs is served by piped water managed by Bomet Water and Sewerage Company (BOMWASCO).

It is worth noting that the most common water uses in the area are domestic and industrial purposes. This is validated by the relatively low number of abstractors within the catchment area. There are only 14 surface water permits (including storage permits) with a total allocation of 3,144.17 m³/day in the sub-catchment and 13 groundwater permits with a total allocation of 410 m³/day. The details of abstractors including STC (highlighted) are provided in **Table 4-7** below.

Table 4-7: Abstractors within the catchment

Type	Ref No.	Name	Category	Allocation (m³/d)	Water use
Ground Water	WRMA/12/KCO/1JF/10148/G	Sotik Tea Co. Ltd	B	39	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10149/G	Sotik Tea Co. Ltd	B	39	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10150/G	Sotik Tea Co. Ltd	B	39	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10152/G	Kipkebe Ltd	B	39	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10153/G	Kipkebe Ltd	B	39	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10172/G	Evergreen Tea Factory Ltd	B	15	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10293/G	New K.C.C. Sotik	B	20	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10387/G	Korara Highlands Tea Factory Limited	B	20	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10393/G	Akshar Kibori Secondary School	C	50	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10394/G	Kipngosos Primary School	C	50	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10395/G	Sotik Business Services Limited	B	20	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10396/G	Manaret Estates Limited	B	20	Domestic Use
Ground Water	WRMA/12/KCO/1JF/10430/G	Kipkebe Ltd	B	20	Domestic Use
Surface Water	WRMA/12/KCO/1JF/1/S	Keritor Limited	C	120.6	Domestic and commercial Irrigation
Surface Water	WRMA/12/KCO/1JF/7/S	Kipkebe Ltd	B	102.27	Domestic Use Only

Surface Water	WRMA/12/KCO/1JF/8/S	Kipkebe Ltd	C	381.81	
Surface Water	WRMA/12/KCO/1JF/55/S	New K.C.C Sotik	C	327.2	Water is for Domestic and Steam Rising
Surface Water	WRMA/12/KCO/1JF/56/S	Sotik Tea Company Limited	C	848.62	Domestic, irrigation,
Surface Water	WRMA/12/KCO/1JF/57/S	Sotik Tea Company Limited	B	56.1	Water is for domestic industrial
Surface Water		Sotik Tea Company Limited	C	963.54	Water is for domestic and Power to drive the hydram
Surface Water	WRMA/12/KCO/1JF/59/S	Kipkebe Ltd	B	62.72	Water is for domestic use
Surface Water	WRMA/12/KCO/1JF/10276/S	Evergreen Tea Factory Ltd	B	70	Abstract water using a truck bowser for Industry use
Surface Water	WRMA/12/KCO/1JF/10370/S	Sotik Tea Company Limited	D	0	Water for Storage/Conservation
Surface Water	WRMA/12/KCO/1JF/10373/S	Sotik Tea Company Limited	D	0	Water for storage
Surface Water	WRMA/12/KCO/1JF/10374/S	Sotik Highlands Tea Estate Limited	D	0	Water for storage
Surface Water	WRMA/12/KCO/1JF/10429/S	Highland Creamers And Foods Limited	B	40	Water for domestic and Milk processing
Surface Water	WRMA/12/KCO/1JF/10446/S	Matunwa Dam Water Project Self Help Group	B	171.31	Water for storage, Domestic and livestock

5 ACTIVITIES DURING THE IMPLEMENTATION AND COST

This section describes the project design and activities that will be undertaken during the development and operation of the dam including the project implementation schedule and estimated project costs, governance issues and dam safety plan.

5.1 Site Description

The proposed dam site is entirely within the boundaries of STC's estate. It is located on the Kapsasura stream approximately 150m upstream of the Arroket dam. The site, presently, hosts a low weir that creates a sediment trap for Arroket dam, which was reportedly built in the 1960s. The weir is made of natural stone with a 2m wide channel to the west and provisions for compensation flow and offtake provisions. The offtake provision is not used as water is not abstracted at this point. The design of the proposed dam has retained the weir.

The site is approximately 2.7km from the confluence of the Kapsasura stream and Kipsonoi River. This section hosts significantly lesser natural vegetation compared to the downstream of Arroket dam. The riparian is dominated by plantation forest although some sections have been harvested for different uses and to, a lesser extent, in anticipation of development of the proposed Kapsasura dam.



Figure 5-1: Current state of the project site

The stream valley takes a gentle U-shape, which portrays a stream with a relatively low flow. The main infrastructure in the vicinity of the proposed project site is the weir, Arroket water treatment works, and the main highway. The highest water level of the dam will be about 200m from the road reserve and water treatment works in the upstream and downstream sections respectively.

The Kapsasura Dam Design Report in **Appendix D** shows that the dam would not have a significant adverse impact in the *worst case scenario* of a dam breach as there are no settlements in the downstream area. Additionally, the presence of two valleys in the upstream, stream width, and the width of Kipsonoi river in the downstream area would adequately manage the flood water.

5.2 STC's Water Demand

Presently, STC relies on both surface and ground water sources for domestic and industrial purposes. Ground water use is limited as there are adequate surface water sources, that provide adequate and clean water at a relatively lower cost. Data obtained from STC, shows that the mean monthly abstraction from Arroket and Mettarora dams is 11,519m³ and 6,356m³ respectively, for domestic and industrial use. This is equivalent to about 384m³/day for Arroket dam and 212m³/day for Mettarora dam. Details of the surface water sources are provided in **Table 5-1**.

Table 5-1: Surface water sources at STC's estates

	Estimated Size (m3)	Allocation (m³/day)	Abstraction (m³/day)
Arroket	38,000	848.62	384
Mettarora	4,896	56.1	212
Kapkoya	2,400	963.54	0

The proposed project is a result of an increase in water demand for irrigation within the estate. The demand aspect and irrigation reliability were key considerations in the final design of the dam. Water demand analysis and modelling undertaken during the Feasibility Study mainly considered water for irrigation purposes, specifically for avocados and blue berries. This EIA study acknowledges the importance of futuristic planning, particularly with respect to finite resources such as water

The water demand analysis based on the FAO CropWAT software indicates that there is a maximum crop water requirement of approximately 2.5 mm/day for avocados and 0.9 mm/day for Blueberries. This implies that for planning purposes, the irrigation water requirement for avocados and blueberries should be 30 and 10 m³/ha/day, given 90% irrigation efficiency. **Table 5-2** highlights the estimated irrigation water demand within the three estates.

Table 5-2: Estimated future water demand

	Avocado				Blueberry			
	Area (ha)	Irrigation Water Demand (m³/ha/day)	Total Irrigation Water Demand (m³/day)	90 Day storage requirement (m³)	Area (ha)	Irrigation Water Demand (m³/ha/day)	Total Irrigation Water Demand (m³/day)	90 Day storage requirement (m³)
Sotik Highlands	91.81	30	2,754	247,879	0		-	-
Arroket	71.80	30	2,154	193,865	0		-	-
Monieri	282.87	30	8,486	763,744	22.052	10	221	19,847
Total	446.48		13,394	1,205,488	22.052		221	19,847

Source: Adapted from STC Feasibility Study, RFL, 2022

Based on the above future water demand analysis, water demand for avocado would reduce by 50% as only 200ha will be introduced. This may translate to a total irrigation water demand of 6,000m³/day for avocados and 200m³/day for blueberries.

5.3 Proposed Dam Design

The project design has endeavoured to put into consideration the physical features of the site, intended use, safety, and cost-effective measures for construction and maintenance. The design recommends a wall of 11m maximum height thus allowing a normal depth of 9.0m. The wall will extend over a distance of 78m across the site. This will provide approximately 135,421m³ of storage capacity covering about 4.293ha at normal water level. The storage volumes are based on the original ground topography of the impoundment area.

The proposed Kapsasura Dam is classified as a Medium Risk Dam under the Water Resource Regulations, 2021 and Water Harvesting and Storage Regulations, 2021. Adequate measures have been proposed to manage or alleviate any risks associated with the proposed dam.

Table 5-3: Dam classification in Kenya

<i>Class of Dam</i>	<i>Maximum Depth of Water at NWL (m)</i>	<i>Impoundment at NWL (m3)</i>	<i>Catchment Area (km2)</i>
SD1 – Low Risk	0 — 4.99	< 100,000	< 100
SD2 – Medium Risk	5.00— 14.99	100,000 to 1,000,000	100 to 1,000
SD3 – High Risk	> 15.00	> 1,000,000	> 1,000

The specific components and their designs are briefly described below and further summarized on **Table 5-4**. Detailed information on the dam design is contained in the Dam Design Report presented in **Appendix E**:

5.3.1 Dam wall

The designed dam wall is a homogenous earth embankment with a cut-off core trench and filter blanket. Material for the embankment will be from the impoundment area. The borrow material will be graded so that grade 1 material is used in the core and grade 2 material is used on the embankment shells. Proper compaction and construction supervision is a requirement to ensure that compaction efforts produce the required material density.

The crest of the dam, the upstream face, embankment gutters, and rock toe can make use of locally available stone which can be harvested from the surrounding land surface and from the spillway excavations. All available stone will be used. It is unlikely that stone will need to be brought from off site.

5.3.2 Spillway Design

The spillway crest will be a 20m side reinforced concrete sill. This will allow a 1 in 100 year flood flow to flow over the spillway once the water flow approach height exceeds 1.500m above the sill, with a flow depth of 1.00m. Slope protection at each end of the weir is recommended. Slope protection should extend 1.0m above the weir crest.

Spillway excavation is expected to be in natural soil with weathered rock. A 0.2 m wide by 0.3m tall concrete sill is provided as a control weir. It will have a key 0.5m deep from original ground, but may be extended to 1m depending on site conditions. The sill will be protected from erosion by two 2.0 m long grouted rubble stone aprons immediately upstream and downstream of it.

River protection works will be included where the spillway meets the natural river course. These will consist of placed stone or stone gabions. As the spillway channel meets the river at a favourable angle, minimal protection work will be required.

5.3.3 Compensation Flow

The possibility for compensation flow is dependent on the catchment rainfall, reservoir performance and extent of seepage from the dam. The area has a reliable rainfall pattern thus the stream flow is expected to be stable. The design has provided for release options to ensure continued flow of water downstream. Compensation flows will be released through a 250mm diameter (10") uPVC ClasE/PN16. The pipe will also be used to release water for purposes of reducing water during maintenance.

5.3.4 Sediment management

The sediment trap efficiency is a function of the ratio of the reservoir to the total annual streamflow. There are different options of minimizing sediment inflow into the dam including construction of sediment traps rubble stone masonry walls upstream. However, the sediment load is expected to be low owing to the catchment condition and slope. The proponent will have to maintain a healthy vegetation cover upstream and around the dam. This will offer an effective sediment load management mechanism in the long-term.

We also recognise that the Kapkoya dam on STC and the dam on Sasini estate upstream will act as sediment traps for the proposed Kapsasura Dam.

5.3.5 Draw-off mechanisms

Water from the dam will be abstracted using a 250mm (10") Class E uPVC pipe in mass concrete surround with anti-seep collars with perforated GI upstand protected by stone surround. The water will flow to a pump house located below dam for supply to the intended sections. The supply from the dam will rely on gravity. Appropriate control valves and flow meters will be installed

5.3.6 Staff gauges and monitoring posts

A total of four staff gauges will be constructed consisting of 2.0m GI pipes with welded D8 steel or offcuts at 0.5m intervals. The gauges will be positioned to allow constant monitoring of the stored volume of water.

Monitoring posts will be constructed to facilitate long term monitoring of embankment settlement and/or movement monitoring. The posts should be installed in straight lines, longitudinally across the embankment wall. Two lines of monitoring posts should be positioned along the downstream edge of the crest and along downstream embankment face to provide a visual indication of any crest movement

Table 5-4: Summary of the dam design

Part	Description
Dam wall	Crest Elevation: 1770.00m (relative to local BM datum approx. mASL) Maximum Height: 11m from Original Ground Depth of water 9.0m Length: 78m

	Fetch: 320m Crest Width: 5.0m Material Volume: 23,318m ³ U/S Slope Protection: Rip-rap placed below high flood water level D/S Slope Protection Topsoil and grass Crest Protection: 150mm murram
Spillway	1no. side spillway along right river bank Inflow Design Flood: 61.723m ³ /s Return Period: 1 in 100 years
Compensation flow	1 No.250mm Class E uPVC pipe Compensation requirement: 0.116m ³ /s
Offtake	1 No.250mm Class E uPVC pipe

5.4 Project Implementation Activities During Construction Phase

The dam construction phase is a notable phase of the project due to the involved activities. These activities will mainly cover the 4 Ha of the area to be inundated, setting up of the Contractor's Site and labour camp, diversion of the stream, and opening up an access road. The need to consider diverting the stream during construction activities was informed by the frequent rains in the area and the need to ensure constant water supply downstream, especially for Arroket dam.

The significant activities in this phase are briefly discussed below:

5.4.1 Mobilization

This will involve activities such as development of an access road, setting up a construction site camp and material sourcing and haulage to the construction camp. These activities will require clearing of vegetation, removing of stumps and levelling. The estate already has roads skirting through the various sections thus only a small section will be cleared for the access road. Haulage of the construction materials will require control of traffic and appropriate storage of the materials. This EIA Study report encourages the proponent and contractor to use existing facilities where appropriate to minimize on environmental disturbances.

5.4.2 Site Clearing and Top Soil Stripping

This activity will involve setting out of works, marking and pegging for particular activities which will be carried out concurrently with the clearing of vegetation on the dam site, excavation and earth moving as per the design, the removal of the cleared vegetation to suitable utilization or disposal area and moving of spoils to designated dumping location. This step will also involve felling of plantation trees around the proposed impoundment area.

5.4.3 Excavation and Construction of Main Works

This will involve excavation works around the impoundment area. The excavated material will be used in development of the embankment. Other construction works will involve development of the stream diversion, spill way, compensation and offtake provisions, and ancillary works as per the dam design.

5.4.4 Restoration Activities & Commissioning

Upon completion of dam construction, all sections damaged by the construction activities including deep excavations and materials sources and spoil disposal sites, access roads and the stream banks will be restored. The dam surroundings will also be re-vegetation with indigenous trees by STC Forestry Department for conservation of the dam catchment. All structures and equipment not required for the operation and maintenance dam will also be removed from the site and the construction camp site restored.

The restoration activities will then be followed by a formal hand-over by the contractor to the project proponent. During the handover, the contractor and the client will ensure there are no unresolved social concerns, that the dam has been completed to the design details, affected sites have been well rehabilitated and that all components are operational.

5.5 Activities during the Operations Phase

The initial stage of the operation phase will involve the filling of the reservoir, which could take a period of four months. This will require observance of the regulated filling process as well as regulated release of compensation flow. Thereafter, major activities will include monitoring and inspection of various components of the dam, implementation of dam safety plan, maintenance works such as sediment control activities and ensuring the project remains compliant to the various regulatory requirements including environmental audits and water permit requirements.

5.6 Project Ownership and Management

The proponent STC will finance the project from inception to completion. All approvals and permits will be obtained under STC. The proponent is also required to ensure adequate resources are availed for the management and maintenance and efforts will also be put towards averting water resource conflicts in the long run.

5.7 Project Implementation Schedule, Cost and Financing

Construction of the proposed Kapsasura Dam is expected to take about 4.5 months from the date of commencement of construction activities. The total cost of the project **Kshs 42,625,311**. This covers EIA, geotechnical investigations, engineering design, tendering, construction supervision and actual construction of the dam components. The amount payable to NEMA is **Kshs 42,625**, which is 0.1% of the total project cost. The Bill of Quantities (BoQ) for the project is provided in **Appendix F**.

6 MATERIALS AND EQUIPMENT TO BE USED, PRODUCTS, BY-PRODUCTS, WASTES AND METHODS OF DISPOSAL

The construction phase will involve acquisition of materials as well as generation of wastes. This section briefly discusses the materials to be used, wastes that will be generated and the method of disposal.

6.1 Materials to be used

Various materials will be used in most of the project activities. These materials will basically be used in building the embankment, spillway and to provide reinforcement where necessary. The materials will be transported to site using motorised vehicles. Some of the materials to be used in the construction works will include soil borrow material, cement, ballast, pipes, water and stones. Some of these, particularly stones and borrow material, are locally available and can be sourced from within the estate.

Other materials will be procured from licensed dealers and especially those who have complied with the environmental management guideline policies and conform to NEMA standards.

Re-usable materials that remain upon completion will be kept and used to repair the system.

6.2 Equipment to be used

These include trucks, loaders, excavators and rollers amongst other construction tools and equipment. Most of the machinery that use petroleum products to operate should be in good condition to avoid excessive emissions and oil leakages thereby degrading the environment.

6.3 Personal Protective Equipment (PPE)

Occupational Safety and Health Act, Cap 514 provides for safety, health and welfare of workers and all persons lawfully present at workplaces, which includes construction sites. The Act also requires that in workplaces where employees are exposed to wet or to any injurious or offensive substances, the employers must provide and maintain clothing and appliances that are adequate, effective and suitably protective.

The workers will be provided with PPEs like helmets, reflector jackets, dust covers, sound mufflers, overalls, goggles, hard-nosed boots and gloves.

6.4 Products, By-products, Wastes Generated and Waste Disposal Methods

It is anticipated that the project will generate wastes from earth moving equipment including earth spoil heaps, cuttings from reinforcement, spillage and waste from concrete batch mixing plant, waste oil and lubricants, human waste from construction camp including sewage and solid waste.

The possible wastes during and after construction, and their disposal methods include:

- Remains of materials supplied, which include sand, ballast, and cement. These materials can be used on other construction activities by the client. It is however expected that the remains will be minimal as the design only allows for up to 10% variation.

- Packaging materials for cement: These will be collected and stored for reuse.
- Containers such as lubricants and petroleum jerricans should be collected, cleaned for reuse or given to container dealers.
- Sanitation facilities and solid waste bins will be provided for adequate management of wastes at the construction camp.

On completion of the construction activities, the sites will be cleared and left clean and free from debris, hydrocarbons and waste, and all pits and trenches will be filled up. Spoil heaps will be spread or used in backfilling where appropriate.

7 DECOMMISSIONING PLAN

7.1 Overview

Decommissioning of the project may involve abandonment of the project and transfer of management or donation of the project as a going concern. The main objective of the decommissioning phase will be to maintain or enhance project benefits or ensure the conditions at the site are equivalent or better than its original state. The proponent has no plans to decommission the project in the long run.

Any decision to decommission the project will be informed by regular review of its performance during the operations and maintenance phase. Environmental Audits will be relied upon to provide information on the impacts of the project during the decision-making process.

7.2 Rationale for decommissioning

Decommissioning of the project can occur due to any one of the following reasons:

7.2.1 Transfer of Management or Donation of the Project as a Going Concern

In the event that the management of project is transferred or the project is donated as a going concern, the new owner/management will assume all responsibilities associated with the project operations. Copies of all environmental reports, audits and NEMA correspondence will be made available to the transferee/recipient. The transferee/recipient will be expected to adhere to the environmental management plans and any other issues appended in the documentation. Such a scenario could for example arise in the event of transfer of ownership of the estate to a new owner.

7.2.2 Transfer or Donation of the Project for a Different Use

The proponent may use the project other than supply of water for irrigation. This may include fish farming or recreational activities. Although, the location of the project may currently limit alternative uses, this may not be the case in future. Therefore, appropriate designs and technology will be incorporated to enhance compliance and environmental performance in the event the project is assigned a different use. Removal and disposal of any equipment or structure shall be done in accordance with relevant legal and regulatory provisions. The new owner will ensure proper maintenance of the project components and documentation of compliance reports/ certification.

7.2.3 Abandonment of the project

This alternative would involve complete abandonment of the project or cease the use of the reservoir. This may occur due to the following factors;

- a) The dam is no longer operational due to extremely high levels of siltation. This scenario will be avoided by instituting effective sediment management, periodic silting, and instituting soil conservation measures within the catchment area that falls within the estate.

- b) The proponent is not in a position to adequately manage the project and the alternative of transferring to another owner is not feasible. STC will ensure that adequate resources are available for maintenance activities.
- c) The reservoir is deemed to pose significant risks owing to structural/ design defects. This will be avoided by ensuring the construction works are as per the design and required standards. Periodic inspections will also be undertaken to assess the condition of the reservoir and maintenance needs/requirements. Under this scenario, the proponent will ensure that all the water in the reservoir is released and the site restored to its original or better conditions. Other activities such as establishment of vegetation and removal of ancillary structure would be undertaken to improve the state of site.

7.3 Activities in decommissioning

In most cases, this phase is associated with the following activities;

- Notification of intent to cease operations the relevant regulatory agencies;
- Liaise with project consultants including engineers, and environmentalists to ascertain guidelines,
- anticipated de-commissioning impacts and mitigation measures.
- Inform NEMA, WRA, County Government and any other relevant agency on any planned demolition activities.

The proponent has committed to institute short, medium, and long-term measures that ensure the dam maintains the required standards and thus operates at an optimal level.

8 POTENTIAL ENVIRONMENTAL IMPACTS, MITIGATION MEASURES REQUIRED DURING AND AFTER IMPLEMENTATION OF THE PROJECT

The construction of the Kapsasura dam is anticipated to impose various changes on the nearby environment. The project will therefore have some environmental and socio-economic impacts and this section details the anticipated potential positive and negative impacts associated with the proposed project. It also outlines appropriate mitigation measures for the possible negative impacts.

8.1 Positive Impacts

The positive environmental, social and economic impacts associated with the various phases of the proposed project are outlined below.

8.1.1 Planning and Design Phase

The following are some of the positive impacts anticipated during the planning and design phase of the project:

- Creation of awareness on the proposed project through public consultation approaches used in the EIA process aimed at creating awareness about the proposed project and collating stakeholder views and concerns. These informed the project designing process to enhance the proposed project's overall environmental sustainability. In the long run, the consultations also provided a platform to enhance stakeholder's awareness on the prevailing legal and regulatory framework governing environmental matters in Kenya;
- The phase provided an opportunity to protect the environment through recommendation of adequate mitigation measures to respond to possible adverse impacts and to enhance the anticipated positive impacts;
- Professional employment opportunities particularly for Hydrologists, Hydrogeologists, Environmentalist, Sociologists, among others, providing a gain of fees for services rendered which has some positive impact on the economy in general;
- Sourcing of relevant legal documentation thus ensuring compliance, and alleviating the risks of the project being stopped by relevant authorities due to non-compliance.

8.1.2 Construction Phase

The immediate benefits or positive impacts associated with the project during construction include:

- Provision of employment opportunities for both skilled and semi-skilled workers;
- Transfer of knowledge and skills, building of on-the-job skills for the locals since the artisans and casual workers will remain behind after the project construction, they will use some of the skills so acquired during similar projects and could also be engaged during maintenance such as desilting of the sediment traps;
- Revenue to the government through payment of fees during the approval processes;
- Boost to local businesses as some of the materials/services may be sourced from local service providers.

8.1.3 During the operational phase

The project is likely to have the following positive impacts;

- The reservoir will supplement current sources of water within STC and provide water security for enhanced agricultural production.
- Enrich the biodiversity of STC through the introduction of aquatic fauna and increased riparian vegetation thus attracting wildlife. An increase in trees and hydro-morphic plants along the water edge, will increase habitat that may encourage an increase in fauna populations that enjoy this type of habitat for wading, roosting, shelter, and nesting.
- The reservoir will act as a flood control measure by harnessing flood water, which the flows into Kipsonoi river.
- The proposed project will lead to increased employment opportunities as a result of enhanced agricultural production at STC.

8.1.4 During decommissioning after construction

The following are possible positive impacts of the project in the event of decommissioning after construction:

- The site will become available for alternative uses;
- Any potential hazards associated with the reservoir would be forestalled;
- The reservoir maybe used for alternative activities such as fishing, and other recreation activity which will be subjected to future designs to meet the standards.

8.2 Potential Negative Environmental Impacts and Mitigation Measures

The following sub-sections summarise the possible negative impacts during and after completion of the project. Practical and appropriate mitigation measures have also been recommended for each adverse impact identified.

8.2.1 Design and Planning

The identified adverse impacts include;

- Possibility of heightened expectations and speculation amongst stakeholders. Stakeholder consultations during the EIA process could result into misunderstandings about the project and possible impacts.
To mitigate this, the EIA process is expected to provide all socio-economic and technical facts about the proposed project. The proponent will also be encouraged to provide avenues for interaction with stakeholders and complaints handling mechanisms to respond to arising concerns and help alleviate dissemination of inaccurate information about the project.
- Conflicts with relevant authorities due to failure to comply with pertinent legal and regulatory provisions.
To mitigate this, the proponent will obtain all the necessary certifications and permits.

8.2.2 During Construction

Most adverse impacts are expected to occur during the construction phase. However, most of these impacts will be temporary, and are expected to adequately resolved as soon as the

construction is completed. The possible negative impacts and their mitigation measures are presented in **Table 8-1**.

Table 8-1: Possible Adverse Impacts During the Construction Phase

Possible adverse impacts	Mitigation measures
Loss of biodiversity, alteration of landscape quality and soil erosion during site clearing, sourcing of borrow material, movement of vehicles/ heavy machinery, and development of the impoundment.	<ul style="list-style-type: none"> • Proper delineation of the project site to avoid indiscriminate clearing of vegetation. • Ensure traffic follows designated access routes or reroute access road to a less vegetated area. • Establish the construction/site camp within a less vegetated area. • Rehabilitate any borrow pit within the estate by replacing the top soil and re-establishing indigenous vegetation. • Source borrow material from other areas to avoid degradation within the estate. • Revegetate as much as possible upon completion of construction. • Replace any vegetation damaged accidentally. • Consider using suitable tree species around the dam area to increase the vegetation cover and embankment affirmation.
Generation of wastes/debris/litter from off-cuts of pipes and metal, cement bags, containers etc.	<ul style="list-style-type: none"> • Non-biodegradable wastes that cannot be reused or recycled will be disposed of at a designated waste dumpsite off the estate. • Metallic pieces will be stored for reuse/ fabrication in various estate activities. • The off-cuts may also be sold to recyclers/fabricators or donated to institutions. • Contractor/proponent to take preventative measures though use of BoQ and purchase only what is needed to minimize possibility of waste.
Pollution as a result of poor handling chemicals, lubricants, and fuel at the site.	<ul style="list-style-type: none"> • Ensure proper measures of storing and handling chemicals and other potentially hazardous fluids/substances, and keeping data in MSDS. • Ensure prompt cleaning/ management of such spills. • Provide containers to store used oil and grease to avoid contamination at the site. • Ensure any maintenance works on the equipment is undertaken away from the site and proper conditions are maintained such as use of spill trays.
Poor sanitation at the construction camp	<ul style="list-style-type: none"> • Provide a pit latrine for use by personnel at the site. • Provide covered solid waste bins at the construction site and ensure they are emptied regularly. • Maintain a lean population at the construction site to minimize amount of waste generated.
Noise pollution	<ul style="list-style-type: none"> • Limit noisy activities to daytime only to avoid causing nuisance at night • The Contractor will keep noise level within acceptable limits as stipulated in EMCA, Noise Regulations. • Workers on site during use of machinery that

	<p>generate noise should be provided with appropriate PPE.</p> <ul style="list-style-type: none"> • Limit equipment and vehicle idling time as much as possible to prevent unnecessary noise. • Proper scheduling of materials delivery to minimize noise pollution.
Air pollution from dust and emissions during movement of vehicles and machinery	<ul style="list-style-type: none"> • Apply dust suppression measures along access roads. • Provide appropriate PPE such masks where necessary. • Maintain equipment fleet in good working condition to reduce emissions.
Possible accidents owing to the slight increase in traffic along the road to Kapsasura dam site during delivery of materials and damage to the existing road network.	<ul style="list-style-type: none"> • Sensitize drivers to observe traffic rules and speed limits, particularly near the shopping centre and primary school. • Erection of speed bumps to control traffic flow near schools and centres. • Loading on traffic to be controlled to comply with government regulations. • Contractor to repair and maintain road condition to fair condition. • Vehicles to have operational horns. • Drivers to be properly vetted before engagement.
Health and safety issues such injuries to the workers resulting from use of hand-held tools or machinery.	<ul style="list-style-type: none"> • Contractor vetting to ensure compliance with legal requirements governing suitability for the specific job. • Proponent will develop and commit the contractor to site occupational health and safety rules. OSHA/DOSH. • Work permit issuance to ensure work progresses only if safety and other standards are observed. • The contractor to provide workers with PPEs, which include gloves, boots, goggles, aprons, ear protection, etc. • Health and safety awareness creation on ESH hazard and near miss reporting, accident prevention, control and reporting. This should be done before and continuously on the job • Conduct basic first aid training and provide first aid kits • Ensure vehicles have functioning reversing alarm
Increased water demand for the construction site	<ul style="list-style-type: none"> • The contractor will ensure efficient water use to prevent wastage. • Explore reliable water supply alternatives to enhance sanitation. • Workers will be provided with clean drinking water to avoid dehydration and drinking of water from contaminated sources.
Spread of communicable diseases and other infections	<ul style="list-style-type: none"> • Provide appropriate/adequate facilities to maintain proper sanitation and personal hygiene facilities • Sensitize personnel on proper sanitation and hygiene • Adequate ventilation and spacing of

	accommodation <ul style="list-style-type: none"> • Observance of protocols for COVID 19 prevention
Sub-standard construction activities	<ul style="list-style-type: none"> • Ensure merit is major consideration in selection of contractors, suppliers, and personnel. • Ensure stringent monitoring system is put in place to inform the engineering team on the conformance to the specifications recommended in the design report.

8.2.3 During Operations Phase

Potential adverse impacts during the operations and maintenance phase and their mitigations measures are outlined in **Table 8-2** below:

Table 8-2: Possible Adverse Impacts During the Operational and Maintenance Phase

Possible adverse impacts	Mitigation measures
Reduced flood flow downstream during initial dam filling	<ul style="list-style-type: none"> • Ensure the dam design provides for regulated filling process. • Ensure continuous regulated release through compensation flow pipe
Possible increase of nuisance species	<ul style="list-style-type: none"> • Careful monitoring of condition and diversity of flora and fauna with particular emphasis on nuisance species.
Possible occurrence of breeding ground for disease vectors such as mosquitoes.	<ul style="list-style-type: none"> • Utilize biological vector-control methods such as introduction of fish species to feed on the mosquitoes.
Possible contamination of water and spread of water-borne diseases	<ul style="list-style-type: none"> • Regular monitoring of water quality. • Encourage STC estate personnel to avoid drinking untreated water
Sedimentation and proliferation of aquatic weeds reducing the capacity of the dam	<ul style="list-style-type: none"> • Develop appropriate sediment traps upstream of the reservoir. • Ensure periodic desilting of the sediment traps and upstream sections of the reservoir. • Prompt removal of aquatic weeds • Allow discharge to prevent weed growth • Initiate soil conservation measures such as trees and vegetation around the dam.
Possible breaching of the dam leading to ecological and property damage.	<ul style="list-style-type: none"> • Appropriate design for the dam to deal with incidences of flooding and spill over. • Carryout regular inspections on the health of the dam and undertake appropriate maintenance works.
Possible drowning of people and livestock	<ul style="list-style-type: none"> • Provide safety measures to enhance the recreational use of the dam such as guard rails, supervision by skilled personnel, life safety equipment near dam. • Install necessary safety signage.
Loss of capacity of dam due to siltation	<ul style="list-style-type: none"> • Maintain well vegetated catchment. • Desilt check dams upstream.
Risk to people, dwellings, infrastructure,	<ul style="list-style-type: none"> • Spillway built to design standard.

Possible adverse impacts	Mitigation measures
livestock & livelihood downstream due to dam failure	<ul style="list-style-type: none"> • Regular dam safety inspections. • Develop and implement a dam safety plan.
Possible conflicts with downstream users	<ul style="list-style-type: none"> • Ensure compensation/ environmental flows are continuously and consistently released. • Ensure the local water users are aware of the dam design and functionality.

8.3 Demobilization after Construction

Decommissioning of the construction camp and associated activities during construction will be critical in ensuring short-term adverse impacts are adequately handled. It will involve demolition of all structures, removal of soil spoils and debris, remaining materials and off-cuts among other objects.

The proponent and the contractor will ensure all wastes in form of steel/metal, stone, plastics, and pipes are properly disposed in accordance to NEMA regulations and guidelines. Remains of the excess construction material will not be left or dispersed on the project site but will be removed from the site and stored in an environmentally friendly manner for future use. The same will apply to the tools and machines.

8.4 Health and Safety Plan for Personnel

Construction works relating to the proposed project may pose various health and safety risks to the personnel. However, the risks are not expected to be significant. The proponent and the contractor will take precautions to avoid or alleviate risks on those working at the site. The following activities should be undertaken;

- Properly demarcate the construction site.
- Provide his workers (and visitors) with protective gear such as safety reflective jackets and hard hats etc. These should have been taken care of in the project budget/cost;
- Engage competent and experienced staff to minimize chances of an accident;
- Ensure the machinery and equipment are well serviced and in good working condition;
- Ensure there is a properly equipped first aid kit at the site and a person trained on the same;
- Cordon off trenches and any pits around the construction site.

In addition, the contractor must ensure all employees are inducted on health and safety to avoid accidents, staff members will be required to be in good health free from illness before allowed to work. The contractor shall also ensure alcohol and drugs are not on site and all employees work without the influence of such substances. Employees must be provided with personal protective equipment and their supervisor(s) to ensure they use the same throughout the working hours.

8.5 Dam Safety Plan

Impounding of water by a dam forms a hazard and it is therefore necessary that possible associated risks of harm and or damage are analysed and an Emergency Action Plan (EAP) for the dam is developed to guide emergency response. The EAP should address the following:

- Brief description of the project providing critical details such as the location of the dam including a detailed map indicating the access routes to the site;
- A notification flow chart that provides details and priority order for those to be notified and on what particular emergency situations;
- Description of inspection and monitoring systems needed to ensure timely detection of potential emergency. This should also include specification of preparedness activities that are planned and implemented under normal operating conditions;
- Elaboration of how detected potential emergencies will be evaluated to establish level of threat and necessary response including an emergency classification system to aid the evaluation and guide decision making;
- Outline the persons responsible for maintenance and operation of the dam and for the implementation of the various components of the EAP.

The project proponent who will be the owner/operator of the proposed project will develop and periodically review and update the EAP for the Kapsasura Dam. **Figure 8-1** outlines the proposed EAP for the dam. More details on some of the aspects of dam safety plan have been addressed in the final Dam Design Report in **Appendix E**.

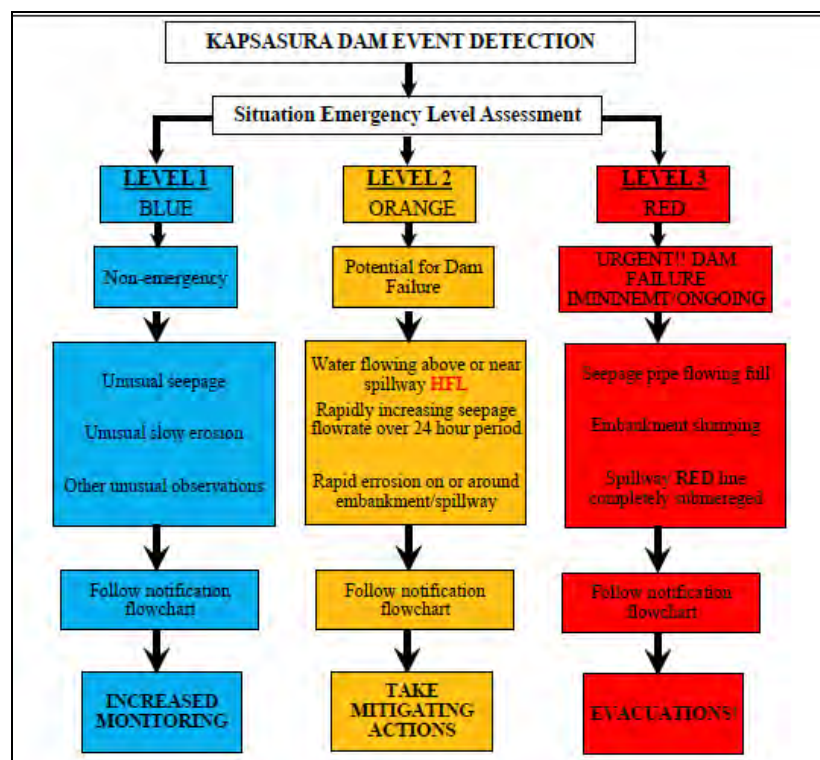


Figure 8-1: Kapsasura Dam EAP overview

8.6 Sustainability and Future Plans

The project design is such that if all factors remain constant, then the project should be able to operate and support proposed irrigation scheme within STC, and its environs. To an extent, the design and implementation of associated project components is dependent on hydrology of the catchment. The proponent will ensure adequate resources are available for the operations and maintenance phase for long term benefits.



Figure 8-2: A barrier and warning sign to limit access at Kapkoya dam.
(Note the vegetation cover maintained around the impoundment)

9 ANALYSIS OF ALTERNATIVES

9.1 Overview

This chapter analyses the possible alternatives to the proposed project. Analysis of alternative is an important aspect of environmental assessment since it enhances the project design through examining optimum options that are economically feasible and have minimal adverse environmental impacts. It involves the comparison of feasible alternatives to the proposed project as well as feasible alternatives to specific aspects of the proposed project.

An array of options was explored in the Feasibility Study, Design formulation, Hydrological Assessment as well as during the EIA process. These options were evaluated on the basis of a multi criteria encompassing different aspects such as environmental impact, health and safety, impact of existing infrastructure, baseline conditions, and economic viability.

9.2 Project Alternatives

The following alternatives were considered:

9.2.1 No project Alternative

This alternative implies that the status quo is maintained and the proposed project would not be implemented. It would be the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. The project proposal would not seek approvals from relevant authorities such as NEMA and WRA. However, this would mean the benefits associated with the proposed project would be foregone.

The No Project Alternative goes against the rationale of strategic and long-term planning, especially in water resource use and development. The proposed project is expected to adequately support the key projects in the estate, that is, avocado and blue-berries irrigation scheme which will be important income generating activities to the company besides the tea. Therefore, presence of a reliable water supply is key to the realization of employment creation and wealth generation locally and at the national level. As such, the *No Project Option* is the least preferred alternative from the socio-economic and partly environmental perspective.

9.2.2 Ground water development and utilization

STC has two functional boreholes that is used for domestic water supply. In this scenario, the proponent would utilize the boreholes for irrigation and seek approval for an extra borehole and associated storage infrastructure. The area has moderate ground water potential, thus, this alternative would adequately support the irrigation activities.

However, increased ground water utilization would have relatively more drawbacks than abstraction and storage of flood flow. The estimated water demand would mean significant abstraction from the local aquifer, which would likely deplete the aquifer (in the long run) if subjected to intense use while the proposed dam is expected to contribute to ground water recharge. In addition, quality of ground water may require further treatment for irrigation requirements.

Selection of this alternative would mean that the anticipated benefits such as harnessing of flood flow that usually goes to waste, improvement of the biological diversity, micro climate, and soil erosion control will be foregone. Therefore, this alternative would not meet the intended use and benefits of the proposed project alternative.

9.2.3 Alternative surface water sources

Alternative surface water sources would involve the following;

(a) Expansion of existing dams

This scenario would involve rehabilitation and expansion of the existing dams within the estate. The three dams, Arroket, Kapkoya, and Mettarora, would be expanded to provide more water for irrigation purposes. This represents the most basic option with the view of reducing costs and environmental risks associated with development of a new site. However, this alternative was avoided owing to the absence of concrete designs for the existing structures. The proponent is thus expected to undertake normal maintenance activities to enhance operations of the dams.

(b) Alternative sites

A total of seven (7) sites on three streams traversing the estate were considered as alternatives for the development of a dam (RFL 2022). Among these, Police Station and Meuk sites both on Meuk stream were considered reliable based on the multi-criteria analysis. However, would not be developed as the Police station site is along the boundary of the farm while Meuk site is near the main road. The Kapsasura Weir site (project site) was deemed to have significantly better Height-Volume-Area (HVA) characteristics compared to the remaining five sites.

Preliminary assessment indicated that a 5m reservoir depth at Kapsasura weir site could support up to 100 hectares of avocado with 100% reliability and up to 350 hectares with 82% reliability. Increasing the reservoir depth to 10m, would adequately support up to 140 hectares of avocado, irrigated at over 86% reliability.

9.2.4 Alternative Methods for Sediment Management

Presence of an appropriate sediment management mechanism is critical to the life of the dam. Unabated sediment accumulation will have the effect of reducing the storage capacity of the dam and therefore, successful control of sedimentation will safeguard its durability and intended purpose. The most practical alternatives explored include maintaining a healthy vegetation cover around the catchment area and construction of sediment traps along the upstream sections should be considered. Both alternatives would readily be compatible or used in combination.

Although sediment retention in the catchment area would be an ideal option, its implementation would be a challenge as the proponent does not have control over soil and water conservation strategies outside its boundaries. This means that there is little that the proponent can do to influence sediment retention in the catchment area. Therefore, both alternatives should be considered. Additionally, periodic sediment removal will complement

these options. It is also encouraged that the proponent continuously explores other efficient, sustainable and cost-effective sediment removal mechanisms.

It is also noted that there are two existing dams upstream, which will act as sediment traps.

9.3 Results of the Analysis

Analysis of alternatives determined that the proposed project remains the most suitable alternative. Essentially, it is more compatible with the prevailing ecological conditions, enhance ecotourism, as well as provide direct and indirect socio-economic benefits. Under the proposed development alternative, the proponent would be issued with an EIA license upon approval of the Study Report by NEMA.

This EIA Study report has appraised the project to ascertain its potential impacts and practical mitigation measures. Therefore, if all measures provided are implemented, the proposed project will not have significant adverse impacts.

10 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Table 10-1 presents the Environmental Management and Monitoring Plan, which summarises the main contents of the report highlighting measures required to reduce the negative risks or impacts associated with the project activities. The mitigation measures elaborated in this EMMP are achievable and should be implemented in totality. The EMMP forms the basis for the formulation and implementation of an integrated approach to management of the dam, which will be geared towards minimizing risks to the environment and human health and safety.

Table 10-1: Environmental Management and Monitoring Plan for the proposed Kapsasura Dam

POSSIBLE ADVERSE IMPACTS	OBJECTIVE	MITIGATION MEASURES	VERIFIABLE INDICATOR	BY WHO	APROX. COST (KSHS. *000)	MONITORING PERIOD
Loss of biodiversity Alteration of landscape quality and Soil erosion.	Prevent degradation of vegetation and soil	<ul style="list-style-type: none"> • Proper delineation of the project site to avoid indiscriminate clearing of vegetation. • Ensure traffic follows designated access routes or reroute access road to a less vegetated area. • Establish the construction/site camp within a less vegetated area. • Rehabilitate any borrow pit within the estate by replacing the top soil and re-establishing 	<ul style="list-style-type: none"> • Vegetation density and diversity • Location of site camp • Soil conservation measures. 	<ul style="list-style-type: none"> • Contractor • STC • RFL/Consultants • WRA • WRUA • NEMA 	300	<ul style="list-style-type: none"> • Throughout construction phase

		indigenous vegetation. <ul style="list-style-type: none"> • Source burrow material from other areas to avoid degradation within the estate. • Revegetate as much as possible upon completion of construction • Replace any vegetation damaged accidentally • Consider using suitable tree species around the dam area to increase the vegetation cover and embankment affirmation. • Monitoring the terrestrial and aquatic habitats with emphasize on the habitats in downstream of dam as well as irrigation area. 				
Waste management	To ensure proper management of waste at the site.	<ul style="list-style-type: none"> • Segregate organic and inorganic wastes. 	<ul style="list-style-type: none"> • Number and type of waste receptacles. 	<ul style="list-style-type: none"> • Contractor • STC 	150	<ul style="list-style-type: none"> • Regularly throughout the

		<ul style="list-style-type: none"> • Non-biodegradable wastes that cannot be reused or recycled will be disposed of at a designated waste dumpsite off the estate. • Metallic pieces will be stored for reuse/fabrication in various estate activities. • The off-cuts may also be sold to recyclers/fabricators or donated to institutions. • Contractor/proponent to take preventative measures though use of BoQ and purchase of only what is needed to minimize possibility of waste. 	<ul style="list-style-type: none"> • Reuse/ Recycling activities adopted/ 5R principle. • General housekeeping of the construction camp. • Documentation on orders/purchase of materials 			Construction Phase
Chemical and oil spills	To prevent soil, air, water pollution at the site.	<ul style="list-style-type: none"> • Ensure proper measures of storing and handling chemicals and other potentially hazardous fluids/substances. • Ensure prompt cleaning/management of such 	<ul style="list-style-type: none"> • Designated store and storage containers • Frequency and location of vehicle and machinery servicing. 	<ul style="list-style-type: none"> • Contractor • STC 	50	<ul style="list-style-type: none"> • Regularly throughout the Construction Phase

		spills. <ul style="list-style-type: none"> • Provide containers to store used oil and grease to avoid contamination at the site. • Ensure any maintenance works on the equipment is undertaken away from the site and proper conditions are maintained e.g., use of spill trays. 	<ul style="list-style-type: none"> • Number and extent of spills 			
Poor sanitation at the construction camp	To enhance health and safety at the construction camp	<ul style="list-style-type: none"> • Provide a pit latrine/mobile toilet for use by personnel at the site. • Provide covered solid waste bins at the construction site and ensure they are emptied regularly. • Maintain a lean population at the construction site to minimize amount of waste generated. 	<ul style="list-style-type: none"> • Sanitation facilities on site • Number and type of waste bins/receptacles • Number of staff living in the construction camp 	<ul style="list-style-type: none"> • Contractor • STC 	30	<ul style="list-style-type: none"> • Throughout Construction Phase
Noise pollution	To keep noise levels at minimum/acceptable levels	<ul style="list-style-type: none"> • Limit noisy activities to daytime only to avoid causing nuisance at night 	<ul style="list-style-type: none"> • Work schedule • PPEs available • Noise levels 	<ul style="list-style-type: none"> • Contractor • STC 	45	<ul style="list-style-type: none"> • Throughout Construction Phase

		<ul style="list-style-type: none"> • The Contractor will keep noise level within acceptable limits as stipulated in EMCA, Noise Regulations. • Workers on site during use of machinery that generate noise should be provided with appropriate PPE. • Limit equipment and vehicle idling time as much as possible to prevent unnecessary noise. 				
Air pollution	To maintain low levels of air pollution during construction	<ul style="list-style-type: none"> • Pave the main access road to the project area. • Sprinkle water on exposed dusty surfaces to reduce dust generation. • Trucks hauling soil should be covered with tarpaulins. - Checking, repairing and fixing the engines of vehicles and heavy 	<ul style="list-style-type: none"> • Dust suppression measures and frequency of application. • Visual levels of vehicle/machinery and dust emissions 	<ul style="list-style-type: none"> • Contractor • STC 	20	<ul style="list-style-type: none"> • Throughout Construction Phase

		<p>machineries. All machineries and equipment should be maintained in good working order to ensure minimum emissions including carbon monoxide, oxides of nitrogen and sulphur, as well as suspended particles.</p> <ul style="list-style-type: none"> • Affixing filters on the exhausts. • Utilizing masks for workers who are directly in the location where dust is dispersed. • Creating an alarm system for cases the air pollution exceeds the standard limits. • Supervision by a representative from NEMA on the implementation of the above-mentioned mitigation measures. • Staff training before the commencement of construction 				
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		activities				
Increased traffic	To promote road safety	<ul style="list-style-type: none"> • Sensitize drivers to observe traffic rules and speed limits. • Notify the school administration of the anticipated increase in traffic and identify best strategies to protect pupils • Erect speed bumps near schools and shopping centres 	<ul style="list-style-type: none"> • Road safety sensitization measures. • No. of accidents/traffic issues reported. • Speed limit mechanisms in place • Code of conduct for drivers 	<ul style="list-style-type: none"> • Contractor • STC • Suppliers 	10	<ul style="list-style-type: none"> • Throughout Construction Phase
Health and safety issues.	To reduce risk of occupational injury	<ul style="list-style-type: none"> • Contractor vetting to ensure compliance with legal requirements governing suitability for the specific job. • Proponent will develop and commit the contractor to site occupational health and safety rules, • Work permit issuance to ensure work progresses only if safety and other 	<ul style="list-style-type: none"> • PPEs availability • Availability of First Aid kits • EHS sensitization measures • Code of conduct for personnel • Competency of the contractor 	<ul style="list-style-type: none"> • Contractor • STC • Suppliers 	100	<ul style="list-style-type: none"> • Throughout Construction Phase

		<p>standards are observed.</p> <ul style="list-style-type: none"> • The contractor to provide workers with PPEs, which include gloves, boots, goggles, aprons, ear protection, etc. • Health and safety awareness creation on ESH hazard and near miss reporting, accident prevention, control and reporting. This should be done before and continuously on the job • Conduct basic first aid training and provide first aid kits 				
Increased water demand for the construction site	To promote prudent use of water during construction phase	<ul style="list-style-type: none"> • The contractor will ensure efficient water use to prevent wastage. • Explore reliable water supply alternatives to enhance sanitation. • Workers will be provided with clean drinking water to 	<ul style="list-style-type: none"> • Water conservation measures • Rate of water use • Source of water 	<ul style="list-style-type: none"> • Contractor • STC • Suppliers 	90	<ul style="list-style-type: none"> • Throughout Construction Phase

		avoid dehydration and drinking of water from contaminated sources				
Spread of communicable diseases and other infections	To prevent occurrence and spread of diseases	<ul style="list-style-type: none"> • Provide appropriate/adequate facilities to maintain proper sanitation and personal hygiene facilities • Sensitize personnel on proper sanitation and hygiene • Adequate ventilation and spacing of accommodation • Observance of protocols for COVID 19 prevention 	<ul style="list-style-type: none"> • Sanitation facilities • Health and safety protocols • General housekeeping • No. of personnel on site • Design of accommodation facilities 	<ul style="list-style-type: none"> • Contractor • STC 	5	<ul style="list-style-type: none"> • Throughout Construction Phase
Sub-standard construction activities	To promote quality and standard construction works	<ul style="list-style-type: none"> • Ensure merit is major consideration in selection of contractors, suppliers, and personnel. • Ensure stringent monitoring system is put in place to inform the engineering team on the conformance to 	<ul style="list-style-type: none"> • Competence and experience of contractor(s) • Monitoring system/ Quality control measures 	<ul style="list-style-type: none"> • Contractor • STC 	120	<ul style="list-style-type: none"> • Throughout Construction Phase

		the specifications recommended in the design report.				
Reduced flood flow downstream during initial dam filling	To sustain normal stream flow	<ul style="list-style-type: none"> • Ensure the dam design provides for regulated filling process; • Ensure continuous regulated release of through compensation flow pipe 	<ul style="list-style-type: none"> • Dam design • Quantity of stream flow 	<ul style="list-style-type: none"> • STC 	-	<ul style="list-style-type: none"> • Throughout Operations Phase
Breeding of disease vectors e.g., mosquitoes.	To promote health and safety	<ul style="list-style-type: none"> • Utilize biological vector-control methods e.g., introduction of fish species to feed on the mosquitoes. • Sensitizing community members to use mosquito nets. 	<ul style="list-style-type: none"> • Biological control methods used 	<ul style="list-style-type: none"> • STC 	60	<ul style="list-style-type: none"> • Throughout Operations Phase
Contamination and spread of water-borne diseases	To maintain good water quality	<ul style="list-style-type: none"> • Regular monitoring of water quality. • Encourage estate personnel to avoid drinking untreated water, and encourage boiling drinking water. 	<ul style="list-style-type: none"> • Frequency of monitoring • Water quality analysis reports • Draw-off mechanisms 	<ul style="list-style-type: none"> • STC • WRA • NEMA 	-	<ul style="list-style-type: none"> • Throughout Operations Phase

Sedimentation and proliferation of aquatic weeds reducing the capacity of the dam	To maintain the capacity of the dam	<ul style="list-style-type: none"> • Develop appropriate sediment traps upstream of the reservoir. • Ensure periodic desilting of the sediment traps and upstream sections of the reservoir. • Prompt removal of aquatic weeds • Allow discharge to prevent weed growth • Initiate soil conservation measures e.g., trees and vegetation around the dam. 	<ul style="list-style-type: none"> • Siting of sediment traps • Frequency of desilting • Vegetation density along the upstream sections 	• STC	300	<ul style="list-style-type: none"> • Periodically during Operations Phase
Possible breaching of the dam leading to ecological and property damage.	To maintain dam safety and alleviate risks	<ul style="list-style-type: none"> • Appropriate design for the dam to deal with incidences of flooding and spill-over • Carry out regular inspections on the health of the dam and undertake appropriate maintenance works. 	<ul style="list-style-type: none"> • design • Frequency of inspections 	• STC	80	<ul style="list-style-type: none"> • Periodically during Operations Phase
Possible drowning of people and	To maintain dam safety and alleviate risks	<ul style="list-style-type: none"> • Provide safety measures to enhance the recreational use 	<ul style="list-style-type: none"> • Dam design • Draw-off 	• STC	200	<ul style="list-style-type: none"> • Throughout Operations Phase

livestock		of the dam e.g., guard rails, supervision by skilled personnel, and provide lifesaving jackets.	mechanisms <ul style="list-style-type: none"> • Safety measures to support recreational use 			
Possible conflicts with downstream users	To sustain normal stream flow	<ul style="list-style-type: none"> • Ensure compensation/ environmental flows are continuously and consistently released. • Ensure the downstream water users are aware of the dam design and functionality. 	<ul style="list-style-type: none"> • Stream flow downstream • Dam design 	<ul style="list-style-type: none"> • STC 	-	<ul style="list-style-type: none"> • Throughout Operations Phase

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 Conclusion

The result of this Environmental Impact Assessment has indicated that there are no major or persistent negative impacts likely to be generated by the activities of the proposed project. The results of the EIA Study indicate that adoption and implementation of the EMMP will adequately manage the potential adverse impacts. The positive impacts associated with the project outweigh the risks and negative impacts associated with the proposed project.

The proposed project is not expected to compromise the wellbeing of the local hydrology, people or the project area's ecological conditions. Although it is located within the estate, the development will have some direct and indirect benefits to the community. Therefore, the proposed development should be approved by NEMA to facilitate its implementation.

11.2 Recommendations

Most of the environmental and socio-economic impacts that will arise from the proposed project were found to be positive. Feasible mitigation measures were established to offset the negative impacts. The following recommendations should be adhered to ensure smooth implementation of the project:

- i) Proper waste management strategies including provision of waste receptacles and sanitation facilities. Waste will be disposed of in an environmentally friendly manner in accordance to EMCA, Cap 387 and subsidiary regulations;
- ii) The proponent will ensure continuous release of environmental flows;
- iii) Decommissioning should be undertaken with due regard to relevant legal and institutional framework as well as concerns of stakeholders;
- iv) Personnel at the construction site will be provided with the right working tools and safety gears to prevent accidents;
- v) Personnel will be sensitized on wildlife behaviour (monkeys) to avoid conflicts.
- vi) Construction activities will be undertaken by qualified personnel while semi-skilled personnel will be supervised to ensure quality and standard works;
- vii) Consistent implementation of the proposed mitigation measures and compliance with EMMP be sustained.

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APPENDIX A:

PROPONENT LEGAL DOCUMENTS

Certificate of Incorporation

KRA Pin Certificate



No.
C. 1135

CERTIFICATE OF INCORPORATION

I hereby Certify, that

I certify that this is a true copy
Date 21-08-02

Registrar of Companies

SOTIK TEA COMPANY LIMITED.....

is this day Incorporated under the Companies Act (Cap. 486) and that the Company is LIMITED.

Given under my hand at Nairobi this SIXTH day

of SEPTEMBER ~~XXXXXXX~~ One Thousand Nine Hundred and FORTY FIVE

SCD. ? ? ?

Registrar of Companies

INCOME TAX DEPARTMENT
PERSONAL IDENTIFICATION NUMBER CERTIFICATE



PIN:

P000591288T

NAME:

SOTIK TEA CO. LTD

DATE OF BIRTH:

*

PLACE OF BIRTH:

*

Date: 29.10.92

FORM PIN 1



APPENDIX B:

PUBLIC CONSULTATION DOCUMENTS

AB1: Minutes of the Public Baraza

AB2: Attendance Lists

AB3: Public Baraza Invitation Notice

AB4: Filled KII Forms

AB5: WRUA Comment Form

AB6: Photos of Public Meetings

AB1: Minutes of the Public Baraza

**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED KAPSASURA
DAM AT SOTIK TEA ESTATES, BOMET COUNTY**

Minutes for the Community Consultative Meeting (Baraza) at STC

Location: Arroket Recreational Center Facilitator (s): <ol style="list-style-type: none"> 1. N M Nguru - EIA Expert 2. Jackson Kibet- EIA Expert 3. Joe Otieno - Engineer 		Minute Taker(s): Nguru/Kibet
Date of Meeting: 12 th October 2022		Start Time: 10: 45am Finish time 1.00pm
Purpose of Meeting	Environmental Impact Assessment Study- Stakeholder Consultations for the Proposed Kapsasura Dam	
Attendance	Vide Appended List	
Agendas	Matters Discussed <ol style="list-style-type: none"> 1. Introductions (and purpose of the meeting) 2. Brief description of the EIA process and the progress made in the planning and design phase 3. Detailed description of the proposed Kapsasura Dam 4. Description of the apparent positive and negative impacts of the project 5. Discussions on the anticipated community benefits, negative impacts and concerns. 6. A.O.B 	Action by: Japheth Rotich (STC) N M Nguru (RFL) J Kibet (RFL)
Min 1 Introductions	<p>Mr. Japheth Rotich, STC's EHS Officer, welcomed the stakeholders to the meeting and invited Mr. Philip Nyakwama to lead in a word of prayer.</p> <p>Japheth thanked the community for heeding the invitation to the meeting and for their punctuality. He informed the stakeholders that the session/meeting would be facilitated by Rural Focus Limited as part of the EIA Stakeholder consultation for the proposed Kapsasura Dam.</p> <p>He led the participants through the introduction section for purposes of understanding the audience and breaking the ice.</p> <p>Japheth informed the stakeholders about the proposed Kapsasura Dam, which will mainly be used for irrigation. He urged the community to listen carefully and objectively engage the facilitators in order to obtain all the facts about the proposed project. This would be vital in understanding the impacts of the project.</p>	Japheth Rotich (STC)

Min 2 The EIA process and Progress made	<p>Mr Nguru (RFL) took the community through the EIA process and the legal basis for undertaking EIA studies. This was done in simple but logical manner to ensure the stakeholders understood the importance of the process. Specifically, he described the approaches used in stakeholder consultations and the importance of feedback in informing the final design of the project.</p> <p>In regard to the proposed project planning and design, he explained that STC, contracted RFL to undertake a feasibility study, hydrological assessment, prepare preliminary designs, and environmental impact assessment for the dam. RFL has already submitted a Terms of Reference to NEMA.</p> <p>He emphasized that the consultation process is essential in collating their opinions on addressing the adverse impacts, but also in prescribing and understanding the roles of proponent and different stakeholders. This is vital in attaining long-term benefits from the project. Mr Nguru informed the community that stakeholder consultations have been ongoing and will involve both county and national government representatives, community members, public institutions and commercial estates.</p>	N M Nguru (RFL)
Min 3 Detailed description of the proposed Kapsasura Dam	<p>Mr. Nguru provided a detailed background on the project covering the key features of the dam e.g. wall, capacity, water source, environmental flows, and auxiliary works. To assist in the description, he endeavored to describe these features by contextualizing the dimensions at the site of the meeting or locally understood metrics.</p> <p>He explained that the source of the water will be Kapsasura stream, which drains into Kipsonoi river. The illustration was supported by use of photos/ map of the proposed project site.</p> <p>Mr. Nguru noted that the present members should aim to understand key technical facts about the project as they would also be involved in disseminating correct information to other stakeholders and community members not present.</p> <p>Mr. Joe further provided clarifications on the dam design to the stakeholders. He alleviated fears expressed including the capacity of the stream to continuously provide water for the dam and complete blocking of the stream by the proposed dam wall.</p>	N. Nguru (RFL) J. Otieno (RFL)
Min 4	Mr. Kibet provided a description of the apparent positive	J. Kibet (RFL)

<p>Apparent/ Obvious positive and negative impacts of the project</p>	<p>and negative impacts arising from the project. He explained that these impacts were as a result of preliminary assessment of the project activities against the baseline conditions of the project site/area.</p> <p>Some of the positive impacts will include;</p> <ul style="list-style-type: none"> • Direct and indirect employment opportunities from planning and design to project completion. • Indirect opportunities arising from increased demand for labour around the avocado and blue berry farming areas. <p>Mr Kibet urged the stakeholders to express their opinions objectively and without any reservations as the meeting provided the best platform to get a better understanding on the project design and potential impacts. This opened the next phase of discussions.</p>	
<p>Min 5 Discussions on the anticipated community benefits, negative impacts and concerns.</p>	<p>The EIA team invited the stakeholders to express their opinions and seek further clarification on the proposed project. The team explained that some of the issues would be clarified or responded to immediately while others would be incorporated in the EIA report.</p> <p>In addition, each issue was discussed in plenary by the Stakeholders, STC Staff and RFL's EIA team. This was to ensure each issue was handled in an objective and conclusive manner.</p> <p>The following main issues were discussed;</p> <p>i.) Dam safety</p> <p>The main questions regarding the reservoir's safety revolved around the possibility of breaching of the dam and causing havoc both upstream and downstream.</p> <p>The EIA team provided further explanations to community on the design of the dam. The stakeholders acknowledged that if proper construction works are carried out, the risk of breaching would be alleviated. Some of the members also highlighted that presence of the Kipsonoi river, which would handle any excessive amount of water as experienced during heavy rainfall.</p> <p>Joe Otieno (RFL) provided a description of the modelling results on the worst case scenario incase of flooding. The design would adequately cater for such incidents.</p> <p>Additionally, it was noted that there are no human settlements within the vicinity that would be affected by such incidents.</p>	<p>J. Kibet (RFL) NM Nguru (RFL) J Otieno (RFL)</p>

	<p>One of the community members concluded that the in case there was an accident or breaching the dam, the community would engage with the proponent to address the issues.</p> <p>ii.) How will the project benefit the local communities?</p> <p>The issue of direct and indirect benefits featured prominently in the discussions. Interestingly, most of the community members were aware that most benefits were indirect owing to the main purpose of the project as well as its location. Some of the key benefits identified were employment opportunities and benefits through experiences on growing avocados for local and export markets.</p> <p>The stakeholders urged the company to organize field days to enhance the community's knowledge on avocado and blueberry farming, which would significantly increase their returns.</p> <p>However, Japheth (STC) cautioned the community from over expecting from the proposed project. He reminded them that some aspects of employment are subject to academic and professional qualifications.</p> <p>iii.) Water quality</p> <p>The stakeholders expressed concerns on the possibility of proposed farming activities posing a risk to water quality. This would mainly through the offtake mechanisms used, which may lead to fertilizers and other agro chemicals reaching the stream.</p> <p>Japheth (STC) assured the stakeholders that proper measures are already in place to ensure that the water quality of the stream is not affected. He noted that the company has a water treatment site for domestic water supply, in the downstream part of the proposed dam. Therefore, STC would be greatly affected if this occurs. The company undertakes regular water quality tests at Arroket dam thus any changes in water quality will be detected early enough.</p> <p>iv.) Over abstraction</p> <p>The stakeholders were concerned that the proposed dam would significantly reduce the stream flow as the dam wall would block the stream.</p> <p>The EIA team informed the stakeholders that only a small amount of water will be impounded considering</p>	
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	<p>the mean monthly and annual flows revealed by the hydrological survey/ assessment.</p> <p>Further, they were concerned that STC would potentially abstract more water as the irrigation needs increase.</p> <p>The EIA team clarified that the offtake mechanisms will have a meter to monitor amount of water abstracted and pay for the same to WRA. The STC team committed that the proponent will adhere to the conditions of the permits and licenses for the project.</p> <p>v.) Catchment conservation</p> <p>The stakeholders urged the proponent to support catchment protection in the upstream sections. It was agreed by all participants that this was critical to the existence of the dam and general well-being of the local environment.</p> <p>The community was also urged to be active in catchment protection through joining the WRUA and taking part in its activities.</p>	
Min 7 A.O.B	<p>The community requested the company to intensify its CSR program.</p> <p>Mr Ondari (STC) urged the community to consistently aim to foster a better relationship with the company for long term mutual benefits. He noted that the public participation meeting was not a mere legal process but an indication of the STC's regard to the community.</p> <p>These remarks were reiterated by Madam Edna, Chief Manaret Location who affirmed their support to the project, which will have benefits in the long run. She urged the proponent to significantly consider helping local farmers in establishing avocado and blue berry farming.</p> <p>The meeting was closed with a word of prayer by Mr. Philip Nyakwama.</p>	All

EIA Field Team:

J. Kibet

Sign



NM Nguru

Sign:



J. Otieno

Sign



AB2: Attendance List

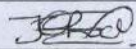
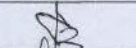
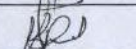
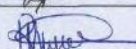
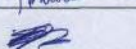
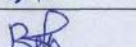
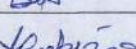
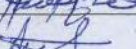
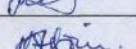
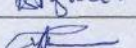
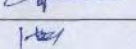
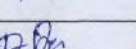
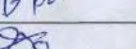
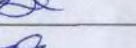
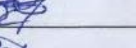
KAPSASURA DAM PROJECT EIA

EIA PUBLIC CONSULTATION MEETING (COMMUNITY BARAZA)


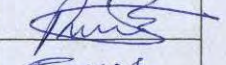
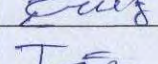



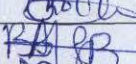
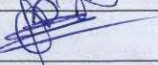
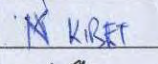


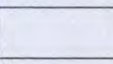
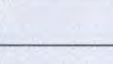
VENUE: ARROKET RECREATION CENTRE

DATE: 12th October 2022

TIME: 10:45am - 1:00pm

NO.	NAME	ORGANIZATION	DESIGNATION	PHONE NO.	ID NO	SIGN
1.	JAPHETH ROTICH	SOTIK TEA CO.	EHS Manager	0721771376	22964693	
2.	TOM ONDARI	SOTIK TEA CO.	EM-SEC	0788853109	11552326	
3.	PHILIP K. SAMBU	KIMUNJI Villages	FARMER	0722891578	3870176	
4.	Robert Mufai	STC & SATC	PA-Forestry	0720962994	20993376	
5.	JOHANA KIRUI	STC	CONTRACTOR	0721139206	5226451	
6.	BETI VINCENT	COUNTY GOVT OF BURETI	SUB-WARD ADMIN	0704512669	29178646	
7.	NELSON MUGIRE	NYAMIRA COUNTY	ELDER-KITARA	0724885292	0946167	
8.	SAMUEL ONDARI	NYAMIRA COUNTY	ELDER-KITARA	0705171489	16034816	
9.	AMBROSE K. KORIR	BURETI SUB-COUNTY	V. ELDER	0759385081	0736447	
10.	PHILIP C. KOSKEI	BURETI-SUB-COUNTY	V-ELDER	07959119	5226732	
11.	KIPRONO A. KOECH	BURETI-SUB-COUNTY	V. ELDER	0701894323	5226751	
12.	DANIEL ROTICH	BURETI-SUB-COUNTY	V. ELDER	072526765	6944844	
13.	JONATHAN CHERUYO	R RCI SD V	V ELER	0712588142	2435800	
14.	JOSECK MATORE	KAPSASURA	V ELER	0713921450	914957	
15.	ELIAH C. ROP	BURETI-SUB-COUNTY	CONTRACTOR	0714862769	5226388	

KAPSASURA DAM PROJECT EIA

NO.	NAME	ORGANIZATION	DESIGNATION	PHONE NO.	ID NO	SIGN
16.	PHILIP NYAKAMA	CLAN ELDER	SIC	0719582586	7405716	
17.	ROBERT MUSOTA	V. ELDER	S.I.C.	0736970658	11700305	
18.	ELIJAH KOECH	V. Manager	TEGAT	0721980115	B021322	
19.	JOHN RONOH	V. Manager	TIRITAP m.c.a	070044573	6244666	
20.	JARED W ONGAGA	INTERIOR	PG Chief Ketau	0706293322	23637051	
21.	ADOLAH SILEI	INTERIOR	PROG CHIEF	0727010929	22535015	
22.	JOHN MARITIM	INTERIOR	ARCHITECT	0723075169	8454937	
23.	ZACCHAEUS K. ROTICH	INTERIOR	ARCHITECT	0710229024	12914794	
24.	ALFRED BETT	INTERIOR	ARCHITECT	0713117309	10771347	
25.	COIMAS BI	INTERIOR	SNR ARCHITECT	0722261475	10886585	
26.	JACKSON KIBET	RFL	EIA TEAM	0704922379		
27.	Nic M. NGURU	Rumuh focus Ltd.	EIA TEAM	0712541895	28016649	
28.	JOE OTIENO	RFL	Engineer	0719779570	32424588	
29.						
30.						
31.						
32.						

AB3: Public Baraza Invitation Notice

SOTIK TEA COMPANY LIMITED

8th October 2022

Dear.....

RE: PUBLIC PARTICIPATION ON PROPOSED KAPSASURA DAM PROJECT

Sotik Tea Company intends to diversify its products from Made Tea production and introduce blueberries and avocados under irrigation. The company plans to develop a dam along Kapsasura Stream to meet water demand for the new crops.

Before such a project commences, the Environmental Management and Coordination Act, CAP 387 requires that the proponent undertakes an Environmental and Social Impact Assessment and obtains a License/Approval from National Environment Management Authority (NEMA). The Sotik Tea Company has engaged Registered ESIA Experts to undertake the study. Public Participation is one of the key requirements in the Environmental and Social Impact Assessment process.

You are kindly invited for a consultation and public participation meeting.

Date: **12th October 2022;**

Time: **10.00 – 11.00 am**

Venue: **Arrocket Recreation Centre.**

Please attend without fail.

Yours Sincerely,

Tom Ondari

Estate Manager

AB4: Filled KII Forms

Filed

Environmental Impact Assessment (EIA) Study Report

PUBLIC CONSULTATION FORM (KEY STAKEHOLDERS)

Every person in Kenya is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment.

The Environmental Management and Co-ordination Act, 1999 (EMCA) aims to ensure sustainable environmental management in Kenya using among others the following principles:

- The sustainability of the environment and natural resources;
- The precautionary principle (*the principle that where there are threats of damage to the environment, whether serious or irreversible, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation*);
- The intergenerational equity;
- The public participation in any environmental decision-making.

The National Environment Management Authority (NEMA) is the governing body that oversees the application of these principles. EMCA makes provision for an Environmental Impact Assessment (EIA) to be carried out before permission for any development out of character with its surroundings is granted. In addition, Audits must be carried out as per the Environmental (Impact Assessment and Audit) Regulations, 2003, developed to support EMCA. All ongoing projects, which should have undergone an EIA as per the provisions of EMCA, must be subjected to an audit as per the Regulations. It is in this perspective that the Sotik Tea Company seeks public consultation in regard to the proposed Kapsasura Dam project.

Background of Kapsasura Dam Project.

The Sotik Tea Company (STC) intends to diversify its products from black tea, eucalyptus and timber products and proposes, after successful trials, to introduce 20ha of blueberries and 200ha of avocados under irrigation. To meet the water demand for the new crops, it is estimated that the estate will need an additional 200,000 to 400,000 cubic meters of reliable storage. Ideally the storage should be situated close to the proposed new crops.

A feasibility study conducted by Rural Focus Ltd proposed development of a new storage structure instead of improving the existing storage due to uncertainty over original designs and construction techniques. Additionally, it is unlikely that any of the existing dams on the estate will be suitable for significant increases in height that would fully meet the increased storage requirements.

The proposed dam will be developed on Kapsasura Stream with a 78m long embankment wall and 11m crest elevation above the natural ground. This will create a reservoir with 135,421 m³ live storage capacity. The reservoir will cover an area of 4.293 hectares at normal water level with a maximum water depth of 9.00m at normal water level and 10.00m at flood level. The design further anticipates one 20m wide side spillway near the North-East end of the wall.

According to the Water Harvesting and Storage Regulations 2021 classification of dams, the proposed Kapsasura dam is a class SD2 dam meaning it is a Medium Risk Infrastructure. However, NEMA as per the Special Issue in Kenya Gazette Supplement No. 137 classifies all dams as "high risk" projects and requires a full EIA study to be conducted for any proposed dam.

Please fill in your comments on the proposed Kapsasura Dam on the attached consultation form. It is important that you provide your personal contacts. This form will be collected by Rural Focus Ltd.

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

→ This Project will help in diversification which will entirely benefit both the company and the Members of the surrounding community.

→ Employment of the youths from far and the neighborhood.

→ Blue berries are so beneficial to the health since it has alot of nutrients which are so beneficial.

→ It will Market the name of some Tea Company as one of best companies which support the CSR programmes.

RESPONDENT'S DETAILS

Name: BARETJET GEDFFEY

Organisation: INTERIOR & CITIZEN SERVICES

Designation: DEPT. CHIEF

Signature: [Signature]

ID Number: 22890149

Address (postal, telephone/mobile phone, email): Barettergeff HA@gmail.com

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

- ① The dam will provide a reliable water source for the company's agricultural activities.
- ② The dam will facilitate creation of new job opportunities for the people in the surrounding and beyond.
- ③ The dam will help in reducing and controlling floods hence people and property will be safe.
- ④ It can be used as a tourist attraction.
- ⑤ Hydroelectric power can also be introduced for use within the farm.

mitigations to be done:-

- ① Control the spread of snails and other organisms that may cause diseases.
- ② The earthquakes caused by the weight of dams may pose risks of damage hence must be controlled.

RESPONDENT'S DETAILS

Name: Hellen Ruth
 Organisation: Manaret resident Location
 Designation: Resident Resident
 Signature: [Signature]
 ID Number: 25544141
 Address (postal, telephone/mobile phone, email): 0710895212

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

positive effects

1. The dam will be necessary in order to provide water for irrigation to sustain crop production
2. Source of employment for farmers to work for the case of plumbing and necessary operations
3. water conservation very necessary.
4. It helps to modify the environment through evaporation hence attraction of rainfall. That is climatic condition
5. It can be used for fish farming hence increase food production

Negative

1. When full it can call floods
2. If not well secured it can collapse such as (Solai dam) causing havoc.
3. It can displace people living near the dam.
4. Water borne diseases and even malaria due to breeding of mosquitoes.

RESPONDENT'S DETAILS

Name: CECILIAH K. GWARO
 Organisation: MONIRE PRIMARY
 Designation: DHIT
 Signature: KQ
 ID Number: 14431130
 Address (postal, telephone/mobile phone, email): 339, SOTIK
0720014452

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

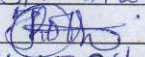
- ①- CREATE EMPLOYMENT.
- ②- WATER RESERVOIR.
- ③- TOUR CENTRE.
- ④- EDUCATION CENTRE.

RESPONDENT'S DETAILS

Name: ZACCHAEUS ROTICH

Organisation: INTERIOR

Designation: ASS. CHIEF

Signature: 

ID Number: 12914794

Address (postal, telephone/mobile phone, email): Zacchaeusrotich 2018@gmail.com

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

Yes, I strongly support the programme, optimize harvesting of surface run off during heavy rains with base flow. It's good project to provide an horticultural farming which also going to improve farming in the neighbouring areas to boost livelihood of the community.

- It's my proposal that the company should provide water to the upstream users as well as well down stream users.

- Bearing in mind the volume of the reservoir proper consideration must be put in place to ensure the safety of the reservoir and downstream environment flow must be follow to the later and check must be put in place to ensure compliance.

RESPONDENT'S DETAILS

Name: FREDERICK RIND
 Organisation: CHS-WATER
 Designation: MD
 Signature: [Signature]
 ID Number: 12345678
 Address (postal, telephone/mobile phone, email): fredrick@chswater

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

The project will assist many of my neighbors in employment and also adding value to the community. As the community will benefit direct or indirect from the company as it is a good relationship of neighbor. For the community will be benefited by getting education and also they will be getting also job opportunities. We thank the company for the good neighborhood.

RESPONDENT'S DETAILS

Name: Jared Kalamu ngaga
 Organisation: Ministry of Interior
 Designation: Acting Chief Kalamu location
 Signature: [Signature]
 ID Number: 23637051
 Address (postal, telephone/mobile phone, email): P.O. Box 11, Ntawungu
jaredngaga@yahoo.com

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

The Project will create employment within the region thus promoting the economy. It will also raise the living standards of the people around the region. Availability of blueberries and avocados also will benefit the society since it boosts farming. There will be market, since the Project will create them hence enabling farmers around the region have ready market. Water is a problem here, building of the dam will benefit farmers and people living around it as well. People will learn more about benefits of planting blueberries and avocados hence encouraging them to do the same especially that ready market will be available. Trees are water catchment areas, this also promotes conservation and preservation of environment. Therefore, the Project is of great importance to the people living around the region and the environment itself.

RESPONDENT'S DETAILS

Name: EUNICE-C. BETH

Organisation: COUNTY GOVERNMENT OF BONERI-MINOR GENDER SOCIAL SERVICES SETIK SUB-C.

Designation: COMMUNITY DEV. OFFICER

Signature: EUNICE

ID Number: 10887493

Address (postal, telephone/mobile phone, email): 0757080021, 0703821842 / eunicebeth67@gmail.com

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

- I will be a tourist attraction site
 - Greater employment to the neighbourhood
 - Environmental friendly project
 - Consistent presence of water in the area

RESPONDENT'S DETAILS

Name: EDIRAIT SUREI
 Organisation: MINISTRY OF INTERIOR
 Designation: SECRET
 Signature: [Signature]
 ID Number: 22535015
 Address (postal, telephone/mobile phone, email): 828, SOTTO
0727010929 Chelangatelnaht@gmail.com

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

Benefits arising from the project include:

- Job creation and income for residents.
- Productivity of the land for the company through new crops with better returns
- Provide alternatives for the community in case of drought.
- Provide lessons for the local community for new farming techniques.

Potential impacts and mitigation measures include:

- Dam collapse - Ensure proper construction and maintenance.
- Drowning of people - Fence off the dam.

RESPONDENT'S DETAILS

Name: Nancy Kwamboka
 Organisation: Mananet
 Designation: President
 Signature: NK
 ID Number: 10012984
 Address (postal, telephone/mobile phone, email): 0726216440

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

Reasons

- ✓ Provision of enough water for farming especially during dry season.
- ✓ Job creation in the farms thus raising living standards through incomes
- ✓ Will lead to improvement of infrastructure

Mitigation for possible impacts.

- ✓ Should be well secured to minimize accidents.
- ✓ Measures to be taken against spread of malaria since it may become a breeding place for mosquitoes
- ✓ Should be well constructed in order to sustain the impact of water in case of floods.

RESPONDENT'S DETAILS

Name: Ruth Tegon
 Organisation: Manaret Location
 Designation: Resident
 Signature: [Signature]
 ID Number: 24983653
 Address (postal, telephone/mobile phone, email): 0723682817

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

The proposed project will have a number of positive impacts for the company and neighboring community. These include;

- 1) Employment creation
- 2) Increase in revenue for the company.
- 3) Increase in C&A activities including teaching local community on farming of new crops

The only potential adverse impact posed by the dam is drowning of people and livestock if they access the dam.

The area is not a malaria hotspot thus the dam may not increase prevalence of malaria in the area. The health centre will monitor any health issues arising from the proposed project.

RESPONDENT'S DETAILS

Name: Ibrahim Garawa
 Organisation: STCs
 Designation: Registered Nurse
 Signature: [Signature]
 ID Number: 30250314
 Address (postal, telephone/mobile phone, email): 0719469101



EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

- ① Create employment
- ② - Consistent water reservoir.
- ③ - Education centre.
- ④ - Tourist centre.
- ⑤ - Conserve environment.

RESPONDENT'S DETAILS

Name: JOHN MARITIM
 Organisation: MINISTRY OF INTERIOR
 Designation: Asst. Chief
 Signature: [Signature]
 ID Number: 8548937.
 Address (postal, telephone/mobile phone, email): P.O. BOX 79, SOTIK.
0723075169 - kipygonmaritim7@gmail.com.

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

KAPSASURA DAM PROJECT SHOULD BE IMPLEMENTED BECAUSE:

1. It provides constant water supply for irrigation.
 2. It will create employment, this will raise population of area in its vicinity.
 3. A dam is the best method of water conservation.
 4. Dam helps modify the environment.
 5. It can promote fish farming hence there will be food supply.
 6. Crops intended to irrigate are good for our health.
- THE NEGATIVE IMPACTS CAN BE:

1. Can cause floods if not well designed and constructed.
2. If control measures are not adhered to it can cause accidents like drowning.
3. If not treated it can cause water borne diseases and breeding place for ^{Mosquitoes} ~~Malaria~~ and this will cause Malaria.

RESPONDENT'S DETAILS

Name: CHRISTINE CHEPKEMOT

Organisation: MONIRE

Designation: TEACHER

Signature: [Signature]

ID Number: 2903526

Address (postal, telephone/mobile phone, email): _____

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

I don't have any reasons to discourage the project from taking off.

But it's very important that the community living around the proposed project benefit from the same.

The supply of water for various means including domestic use, irrigation purposes and also for industrial use if that will be possible.

The proposed project too should avoid:

- Displacement of people.
- Disruption of local ecosystems.
- To mention but a few.

NB: local communities should be engaged.



RESPONDENT'S DETAILS

Name: Nelly Chepwogen
Organisation: County Government of Bomet
Designation: Environmentalist
Signature: [Signature]
ID Number: 28212830
Address (postal, telephone/mobile phone, email): Nelly.Chepwogen@gmail.com
0720403723

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☐ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

1. Yes

2. Below are impacts of setting up Kapsasura Dam project for irrigation and appropriate mitigation measures.

Socio-environmental & Economical Factors

- **Water related disease; the dam may turn into a breeding site for mosquitoes causing malaria posing health issue-** Ensure the dam site is located away from residence to protect them from diseases.
- **Loss of jobs-** Provide support and skills for an alternative livelihood if irrigation replaces jobs for the surrounding communities also ensure the irrigation does not alter other agricultural activity, such as household vegetables.
- **Damage to downstream ecosystems due to reduced water quantity and quality-** ensure there is frequent water disposal this will make the running water conducive for ecosystem.
- **Dry drinking wells-**Keep monitoring ground water levels to ensure it doesn't cause drying up of wells and any other water sources. Monitor ground water levels.
- **Health and safety-** ensure the dam site is well fenced to avoid drowning of workers and put up signages.

RESPONDENT'S DETAILS

Name: BEATRICE CHEPKIRUI

Organisation: KIPKEBE LIMITED

Designation: FIELD CO-ORDINATOR

Signature: _____

ID Number: 28645183

Address (postal, telephone/mobile phone, email): bcchepkirui@saini.co.ke

EIA CONSULTATION FORM FOR THE PROPOSED KAPSASURA DAM PROJECT

1. Should the project be implemented? (tick whichever is appropriate) YES ☒ NO ☐
2. Do you have any reasons for your answer above? (Please state & propose mitigation measures where appropriate)

- ① Improve water availability and reliability within the estate
- ② For proposed new crops irrigation purposes and improved crop production
- ③ The storage dam would ensure downstream water users would not be affected
- ④ Introduction of blueberries and establishment of avocados with increase farm forest cover. It is environmental friendly.
- ⑤ Ecologically will boost natural wildlife habitat.

RESPONDENT'S DETAILS

Name: DENNIS MURIEL MUYIA

Organisation: COUNTY LAND OFFICE OF EMBU - DEPARTMENT OF AGRICULTURE

Designation: AGRICULTURAL OFFICER

Signature: [Signature]

ID Number: 28192459

Address (postal, telephone/mobile phone, email): P.O BOX 933 - EMBU.

AB5: WRUA Comment Form



Water Resources Authority

The Chief Executive Officer, Water Resources Authority, P.O. Box 45250 – 00100 NAIROBI	Grid Reference for Works (UTM Arc 1960)		Form:	WRA 003
	Easting:	730099.93	Catchment:	
	Northing:	9930034.353	WRA ID:	
	Zone:	36S, WGS84	File No:	

COMMENTS BY WRUA ON APPLICATION FOR WATER PERMIT

(To be submitted in triplicate)

(Rule 19)

NAME OF WRUA			
PARTICULARS OF PERMIT APPLICANT			
1. Full name of applicant(s) (In Block Letters)	SOTIK TEA COMPANY		
2. WRA ID Number of Applicant			
3. Box Number	PRIVATE BAG		
4. Town	SOTIK		
5. Telephone Contact (Landline)	0709450200		
6. Telephone Contact (Mobile)	0780550944		
7. Email Contact	info@sotiktea.co.ke		

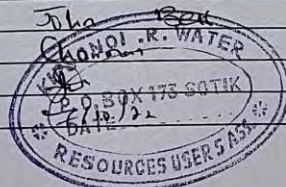
WATER RESOURCE DETAILS

Name of Body of Water or Aquifer where water is to be diverted, abstracted or stored								
Type of Water Use	Surface Water				Groundwater		Effluent Discharge	Swamp Drainage
	Diversion	Abstraction	In-stream Works	Storage	Shallow well	Borehole		
Tick Box		✓		✓				

WRUA COMMENTS	ANSWER / COMMENTS
1. Application was discussed by WRUA on (date)	5/10/22
2. Is proposed application for water use likely to severely impact dry season flows?	NO
3. Is proposed application for water use likely to severely impact water quality?	NO
4. Is proposed application for water use likely to put public at risk?	NO
5. Is proposed application likely to increase the risk of water use conflicts?	NO
6. Is proposed application for water use considered beneficial to the public?	YES
7. Is there an alternative water source for the applicant that should be considered? (provide details)	BOREHOLE
8. WRUA Conclusion (Objection, No objection, or Conditional No-Objection, or unable to make a conclusion due to lack of information)	NO OBJECTION
9. Reasons for Objection or Conditions for No-Objection	
(1)	
(2)	
(3)	

SIGNATURE BY TWO WRUA OFFICIALS

	(1)	(2)
Name of WRUA Official	John R. Water	Caroline W. W. W.
Position	SECRETARY	SECRETARY
Signature of WRUA Official	[Signature]	[Signature]
Date of Signature	7/10/22	7/10/22



AB6: Photos of Public Meetings



A stakeholder presents his views during the consultative meeting



Consultations with medical personnel at Arroket Health Centre



A member of the EIA team responds to issues raised during the meeting



Visit to the proposed project site with stakeholders



Member of the local administration during the consultative meeting



Consultations with the Headteacher at Monire Primary School

APPENDIX C:

LEAD EXPERT EIA LICENSE



nema
mazingira yetu | uhai wetu | wajibu wetu

FORM 7

(r.15(2))

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/16474

Application Reference No: NEMA/EIA/EL/21474

M/S **Michael Kariuki Thomas**
(individual or firm) of address

P.O. Box 1011 - 10400, Nanyuki

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **0129**

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

Issued Date: **2/7/2022**

Expiry Date: **12/31/2022**

Signature.....

(Seal)

Director-General
The National Environment Management
Authority

P.T.O.



ISO 9001:2015 Certified

APPENDIX D:

LAND DOCUMENTS

34505



Stamp Duty .. 44/-
 do. Counterpart .. Sh.....
 Penalty
 Registration Fee .. 2/-
 Copying Fees .. 10/-

138

L.R.
 8270

COLONY AND PROTECTORATE OF KENYA

THE REGISTRATION OF TITLES ORDINANCE
(CHAPTER 160)

GRANT: Number I.R.9528

ANNUAL RENT: Shillings 325/60

TERM: 957 years from 1.5.1953

2765

*This L.R. Certificate
 has been submitted
 L.R. 942/8
 75/11
 3724/4*

KNOW ALL MEN BY THESE PRESENTS that in pursuance of a Surrender registered in the Crown Lands Registry at Nairobi in Volume H.22 Folio 392/3 and as Numbers I.R.6024/4 and 6705/3 the GOVERNOR AND COMMANDER-IN-CHIEF OF THE COLONY AND PROTECTORATE OF KENYA on behalf of HER MOST GRACIOUS MAJESTY QUEEN ELIZABETH THE SECOND under and by virtue of the powers vested in him hereby GRANTS unto SOTIK TEA COMPANY LIMITED having its registered office at Nairobi in the said Colony (hereinafter called "the Grantee") ALL that piece of land situate south west of Kericho Township in the Kericho District of the said Colony containing by measurement one thousand six hundred and twenty-eight acres or thereabouts that is to say Land Reference Number 8270 which said piece of land with the dimensions abutments and boundaries thereof is delineated on the plan annexed hereto and more particularly on Land Survey Plan Number 51997 deposited in the Survey Records Office at Nairobi TO HOLD for the term of nine hundred and fifty-seven years from the first day of May One thousand nine hundred and fifty-three SUBJECT to (a) the payment in advance on the first day of January in each year of the rents hereinafter prescribed (namely) :-

- (i) from the first day of May One thousand nine hundred and fifty-three until the thirty-first day of December One thousand nine hundred and sixty an annual rent of Shillings three hundred and twenty-five and Cents sixty;
- (ii) from the first day of January One thousand nine hundred and sixty-one until the thirty-first day of December One thousand nine hundred and seventy-five an annual rent

calculated at the rate of one per centum on the unimproved value of the land in the year One thousand nine hundred and sixty;

- (iii) from the first day of January One thousand nine hundred and seventy-six until the thirty-first day of December Two thousand and five an annual rent calculated at the rate of two per centum on the unimproved value of the land in the year One thousand nine hundred and seventy-five;
- (iv) for every subsequent period of thirty years an annual rent calculated at the rate of three per centum on the unimproved value of the land in the last year of the preceding period of thirty years;
- (b) the provisions of the Crown Lands Ordinance (Chapter 155)
- (c) all such easements quasi-easements rights acquired or in course of being acquired under the Limitation Ordinance (Chapter 11) restrictions leases licences and other liabilities (in particular the easement created by a transfer registered in the Registry of Titles at Nairobi as Number I.R.550/12) as affected the land immediately prior to the said Surrender and as are valid and subsisting and capable of taking effect and (d) the following Special Conditions (namely) :-

SPECIAL CONDITIONS

1. The land shall be used for agricultural purposes only.
2. The value of the developments required by Section 58 of the said Crown Lands Ordinance to be effected on the land within the first three years and the first five years respectively of the term shall be Shillings eleven thousand three hundred and twelve (Shs.11,312/-) and Shillings sixteen thousand nine hundred and sixty-eight (Shs.16,968/-) of which sums Shillings six thousand (Shs.6,000/-) and Shillings nine thousand (Shs.9,000/-) shall be in respect of permanent developments.

IN WITNESS WHEREOF I, JOHN STEVENTON
BALLETINE, C.B., C.I.E., the Acting
Commissioner of Lands have by Order
of the Governor hereunto set my hand
this eight day of May
One thousand nine hundred and fifty-
three in the presence of :-

H. J. Starn
REGISTRAR OF TITLES

John Stevenston

NEW GRANT (CONVERSION)

COLONY & PROTECTORATE OF KENYA

DISTRICT OF KERicho

Locality S.W. of Kericho Township

Meridional District South. A. 36
F. III. A.

Land Reference No. 8270

(Orig. No. _____)

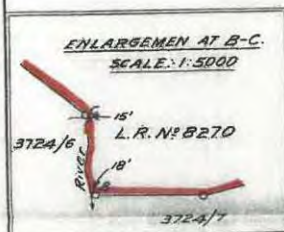
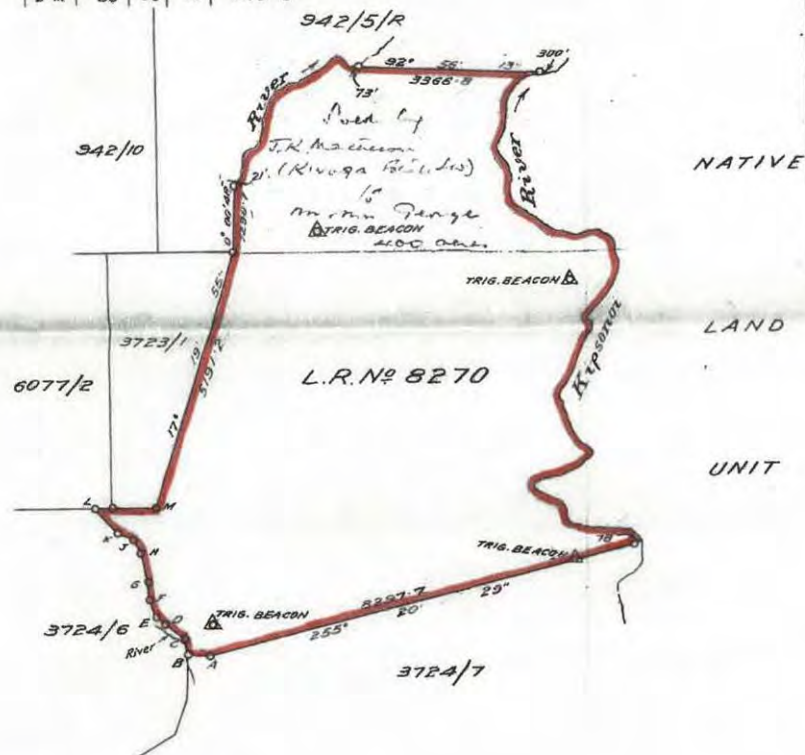
Subdivision No. _____ (Orig. No. _____)

of Section No. _____

Scale: 1 in. 25,000 or 2063.3 Feet to 1 inch

Area = 1628 Acres (Approx)

Bearings	°	'	''	Distances
				Feet
A-B	271	16	39	408.2 (G.M.V. = 10)
B-C	303	04	45	472.9 (C-R.V. = 15)
C-D	305	04	10	216.1
D-E	340	05	17	364.4
E-F	355	32	38	365.8
F-G	348	02	28	309.3
G-H	325	40	47	338.5
H-I	296	34	21	338.5
I-J	318	20	08	620.3
J-K	30	00	00	1170.6



Note:-
Land within a radius of 20 feet
from centre of Trig. Beacon
is reserved to Government.

(Sgd.) W. ROLLAND

for Director of Surveys.

Nairobi 18 FEB 1953

Please quote this PLAN No. 51997

Traced by *Elmes*
Compared by *W.H.*

LAND OFFICE COLONY OF KENYA

ENLAND 11-5-53

Presented No. I.R. 9528/1

Presented 11-5-53
Date 10-52-9

J. J. Stamm
REGISTRAR OF TITLES

95

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED IN THIS TITLE,
EIGHTH 1 by the Crown dated 18th September 1961
declaring the annual rent payable for the land comprised in the within-written
GRANT CERTIFICATE OF TITLE to be Sh. 24/84.
with effect from 1st January, 1961.
Presentation No. 918 Date of Registration 23/9/1961
Registrar of Titles

2307

L.R.
8283

Stamp Duty .. 5/-
 do. Conveyance .. Sh/-
 Duty .. 1/-
 Registration Fee .. 1/-
 Copying Fees .. 1/-



COLONY AND PROTECTORATE OF KENYA
THE REGISTRATION OF TITLES ORDINANCE
(CHAPTER 180)

GRANT: Number I.R.9875

ANNUAL RENT: Shs:118/40 (revisable)

TERM: 957 years from 1.4.1953

KNOW ALL MEN BY THESE PRESENTS that in pursuance of a Surrender registered in the Crown Lands Registry at Nairobi in Volume H.13 Folio 135/18 the GOVERNOR AND COMMANDER-IN-CHIEF OF THE COLONY AND PROTECTORATE OF KENYA on behalf of HER MOST GRACIOUS MAJESTY QUEEN ELIZABETH THE SECOND under and by virtue of the powers vested in him hereby GRANTS unto JESSIE RUDD MISKIN of Sotik in the said Colony (hereinafter called "the Grantee") ALL that piece of land situate South West of Kericho Township in the Kericho District of the said Colony containing by measurement five hundred and ninety-two acres or thereabouts that is to say Land Reference Number 8283 which said piece of land with the dimensions abuttals and boundaries thereof is delineated on the plan annexed hereto and more particularly on Land Survey Plan Number 52535 deposited in the Survey Records Office at Nairobi TO HOLD for the term of nine hundred and fifty-seven years from the first day of April One thousand nine hundred and fifty-three SUBJECT to (a) the payment in advance on the first day of January in each year of the rents hereinafter prescribed (namely):-

Page Two.

- (i) from the first day of April One thousand nine hundred and fifty-three until the thirty-first day of December One thousand nine hundred and sixty an annual rent of Shillings one hundred and eighteen and Cents forty (revisable);
- (ii) from the first day of January One thousand nine hundred and sixty-one until the thirty-first day of December One thousand nine hundred and seventy-five an annual rent calculated at the rate of one per centum on the unimproved value of the land in the year One thousand nine hundred and sixty;
- (iii) from the first day of January One thousand nine hundred and seventy-six until the thirty-first day of December Two thousand and five an annual rent calculated at the rate of two per centum on the unimproved value of the land in the year One thousand nine hundred and seventy-five;
- (iv) for every subsequent period of thirty years an annual rent calculated at the rate of three per centum on the unimproved value of the land in the last year of the preceding period of thirty years;
- (b) the provisions of the Crown Lands Ordinance (Chapter 155) and
- (c) the following Special Conditions (namely):-

SPECIAL CONDITIONS

1. The land shall be used for agricultural purposes only.

2. The value of the developments required by Section 38 of the said Crown Lands Ordinance to be effected on the land within the first three years and the first five years respectively of the term shall be Shillings seven thousand one hundred and sixty-eight (Shs:7168/-) and Shillings ten thousand seven hundred and fifty-two (Shs:10,752/-) of which sums Shillings six thousand (Shs:6000/-) and Shillings nine thousand (Shs:9000/-) shall be in respect of permanent developments.

IN WITNESS WHEREOF I,
JOHN STEVENTON BALLENTINE,
C.B., C.I.E., the Acting
Commissioner of Lands have
by Order of the Governor
hereunto set my hand this
fourteenth day
of September One thousand
nine hundred and fifty-three
in the presence of:-

H. J. Skem
REGISTRAR OF TITLES

W. A. Allen

LAND TITLES REGISTRY - COLONY OF KENYA

ENLAND DISTRICT No. 111 REGISTERED No. L.R. 9875/11

Presented 7/9/53 7. J. Skem
Time 9.45 a.m. REGISTRAR OF TITLES

2. THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THIS TITLE
CHARGE to LESLIE LANGMEAD AND FRANK
CHANDLER

3. THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THIS TITLE
Lease to Mrs. Christian Rodson
Term: 4 years from 1st February, 1954
yearly Rent Shs. 12,000/-

Registration No. 5948 Date of Registration 8/10/53 Registrar of Titles

Registration No. 2260 Date of Registration 14/4/54 Registrar of Titles

(NOT REVERSED) TRANS. 1951

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THIS TITLE
Certificate of Marriage of George Arnold
Lord Kenward with Jessica Rudd Jackson

Registration No. 1465 Date of Registration 11/2/62 Registrar of Titles

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THIS TITLE
Discharge of No 2 above

Registration No. 3814 (Date of Registration) 14.4.65 Registrar of Titles

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THIS TITLE
Transfer to Solih Sea Company Limited

Registration No. 3815 (Date of Registration) 14.4.65 Registrar of Titles

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THIS TITLE:
DECLARATION by the Crown dated 19th September 1951

declaring the annual rent payable for the land comprised in the within-written
Grant/Certificate of Title to be Sh. 770/-

with effect from 1st January, 1961.

Registration No. 917 Date of Registration 23/9/61 Registrar of Titles

COLONY & PROTECTORATE OF KENYA

DISTRICT OF KERICHO

Locality S. W. of Kericho Township

Meridional District $\frac{\text{South. A. } 36}{\text{F. III. } 2} 4$

Scale: 1 in. 10000 or 833.33 Feet to 1 Inch

Land Reference No. 8283 ✓

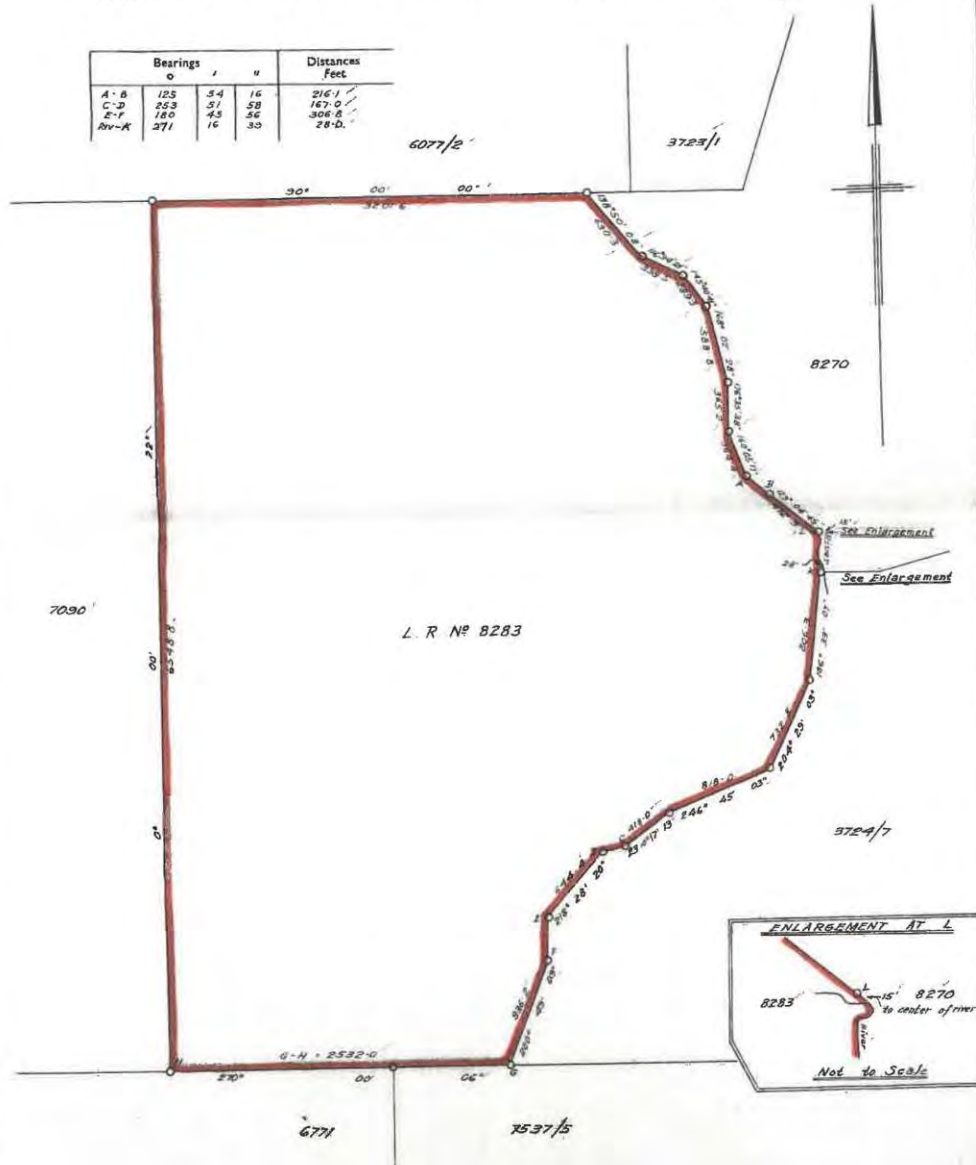
(Orig. No. _____)

Subdivision No. _____ (Orig. No. _____)

of Section No. _____

Area - 592 Acres (Approx)

Bearings				Distances
	\circ	\angle	u	Feet
A-B	125	34	16	216.1
C-D	253	51	58	167.0
E-F	180	43	56	306.8
Rev-K	271	16	33	28.0



(Sgd.) W. ROLLAND

for Director of Surveys.

Nairobi 3 MAR 1953

Please quote this PLAN No. 52535

Traced by Leath
 Compared by Web

45449



L.R. 8420

40.24.
SL 2/-
£1/-
1/2

COLONY AND PROTECTORATE OF KENYA
THE REGISTRATION OF TITLES ORDINANCE
(CHAPTER 180)

GRANT: Number I.R.10160
ANNUAL RENT: SHS:164/80 (revisable)
TERM: 957 years from 1.12.1953

KNOW ALL MEN BY THESE PRESENTS that in pursuance of a Surrender registered in the Crown Lands Registry at Nairobi in Volume H.24 Folio 100/3 the GOVERNOR AND COMMANDER-IN-CHIEF OF THE COLONY AND PROTECTORATE OF KENYA on behalf of HER MOST GRACIOUS MAJESTY QUEEN ELIZABETH THE SECOND under and by virtue of the powers vested in him hereby GRANTS unto THE SOTIK TEA COMPANY LIMITED having its registered Office at Nairobi in the said Colony (hereinafter called "the Grantee") ALL that piece of land situate North West of Sotik Township in the Kericho District of the said Colony containing by measurement eight hundred and twenty-four acres or thereabouts that is to say Land Reference Number 8420 which said piece of land with the dimensions abutments and boundaries thereof is delineated on the plan annexed hereto and more particularly on Land Survey Plan Number 54563 deposited in the Survey Records Office at Nairobi TO HOLD for the term of nine hundred and fifty-seven years from the first day of December One thousand nine hundred and fifty-three SUBJECT to (a) the payment in advance on the first day of January in each year of the rents hereinafter prescribed (namely):-

1399

Page Two.

- (i) from the first day of December One thousand nine hundred and fifty-three until the thirty-first day of December One thousand nine hundred and sixty an annual rent of Shillings one hundred and sixty-four and Cents eighty (revisable);
 - (ii) from the first day of January One thousand nine hundred and sixty-one until the thirty-first day of December One thousand nine hundred and seventy-five an annual rent calculated at the rate of one per centum on the unimproved value of the land in the year One thousand nine hundred and sixty;
 - (iii) from the first day of January One thousand nine hundred and seventy-six until the thirty-first day of December Two thousand and five an annual rent calculated at the rate of two per centum on the unimproved value of the land in the year One thousand nine hundred and seventy-five;
 - (iv) for every subsequent period of thirty years an annual rent calculated at the rate of three per centum on the unimproved value of the land in the last year of the preceding period of thirty years;
- (b) the provisions of the Crown Lands Ordinance (Chapter 155)
- (c) the easement reserved by an Assignment registered as aforesaid in Volume H.24 Folio 100/1 and (d) the following Special Conditions (namely):-

Page Three.

SPECIAL CONDITIONS

1. The land shall be used for agricultural purposes only.
2. The value of the developments required by Section 38 of the said Crown Lands Ordinance to be effected on the land within the first three years and the first five years respectively of the term shall be Shillings eight thousand and ninety-six (Shs:8096/-) and Shillings twelve thousand one hundred and forty-four (Shs:12,144/-) of which sums Shillings six thousand (Shs:6,000/-) and Shillings nine thousand (Shs:9,000/-) shall be in respect of permanent developments.

IN WITNESS WHEREOF I,
JOHN STEVENTON BALLENTINE,
C.B., C.I.E., the Acting
Commissioner of Lands have
by Order of the Governor
hereunto set my hand this
second day
of December One thousand
nine hundred and fifty-three
in the presence of:-

A. J. Steven

REGISTRAR OF TITLES

Car Allen

LAND TITLES DEPARTMENT - COLONY OF KENYA

DECLARATION BY THE CROWN - REGISTERED NO. LR 10/60/
Presentation No. 3/12/53
Date 8.31.53
A. J. Steven
Registrar of Titles

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THIS TITLE:
DECLARATION by the Crown dated 20th September 1961
declaring the annual rent payable for the land comprised in the within-written
GRANT/ORDINANCE OF TITLE to be Sh. 1961/-
with effect from 1st January, 1961.
Presentation No. 916 Date of Registration 23/9/1961
Allen
Registrar of Titles

New Grant
(Conversion)

COLONY & PROTECTORATE OF KENYA

DISTRICT OF KERicho

Locality N.W. of Sotik Township

Meridional District South A. 36 4
F. B. 3

Land Reference No. 8420

(Orig. No. _____)

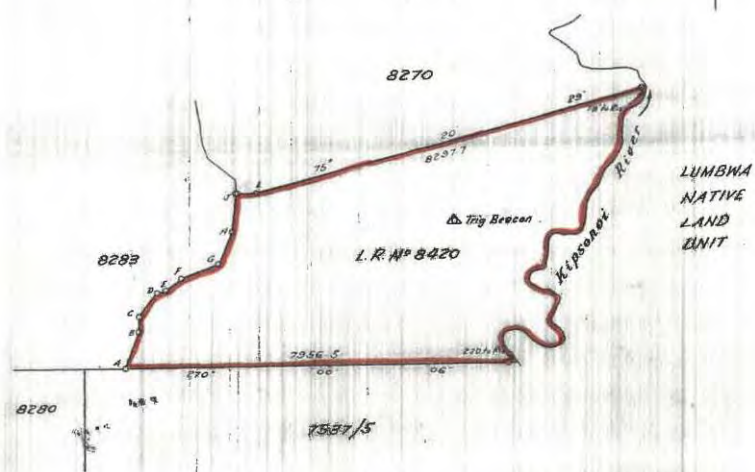
Subdivision No. _____ (Orig. No. _____)

of Section No. _____

Scale: 1 in. 25000 or 2083.33 Feet to 1 Inch

Area - 820 Acres (Approx) ✓

Bearings	1	2	Distances
0			Feet
A-B	20	40	806.0
B-C	60	45	306.0
C-D	30	50	606.0
D-E	75	51	107.0
E-F	54	75	418.0
F-G	66	60	218.0
G-H	29	29	782.8
H-I	08	33	806.0
I-J	31	16	960.0



Note:-
Land within a radius of 20 feet
from centre of Trig Beacon
is reserved to Government

(Sgt.) E. M. USHER

for Director of Surveys.

Nairobi

OCT 28 1953

Traced by CHOL
Compared by CHOL

Please quote this PLAN No. 54563

APPENDIX E:

PRELIMINARY DESIGN REPORT