REPUBLIC OF KENYA

Ministry of Lands, Public Works, Housing and Urban Development.

State Department for Housing and Urban Development.

SECOND KENYA INFORMAL SETTLEMENTS IMPROVEMENT PROJECT (KISIP 2)

CONSULTANCY SERVICES FOR INFRASTRUCTURE UPGRADING PLANS, DETAILED ENGINEERING DESIGNS AND PREPARATION OF PROCUREMENT DOCUMENTS AND CONSTRUCTION SUPERVISION OF INFRASTRUCTURE IMPROVEMENT WORKS IN TRANS NZOIA INFORMAL SETTLEMENTS.

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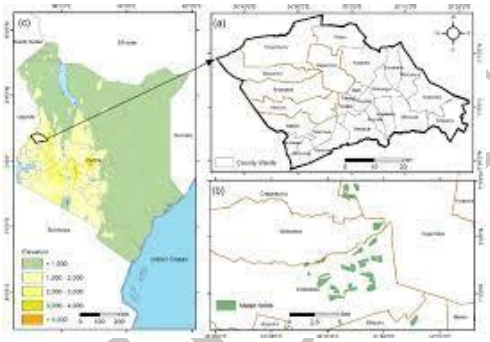

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

COMPREHESIVE PROJECT REPORT FOR FIVE SETTLEMENTS IN TRANS NZOIA COUNTY

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ACRONYMS

AFD	Agence Française de Développement
AIDS	Acquired immunodeficiency virus
ADR	Alternative Dispute Resolution
AQM	Air Quality Monitor
ARAP	Abridged Resettlement Action Plan
CBD	Convention on Biological Diversity
CEC	County Executive Committee
Cfb	Temperate oceanic climate
CIDP	County Integrated Development Plan
CRICs	County Resettlement Implementation Committees
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CoG	Council of Governors
CPR	Comprehensive Project Report
E	East
E&S	Environmental and Social
EA	Environmental Assessment
EIA	Environmental Impact Assessment
ESIA	Environment and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMMP	Environment and Social Management and Monitoring Plan
ESMP	Environment and Social Management Plan
ESS	Environmental and Social Standard
GBV	Gender Based Violence
GHG	Greenhouse gases
GoK	Government of Kenya

GRM	Grievance Redress Mechanisms
HH	Household
HIV	Human Immunodeficiency Virus
IDA	International Development Association
IFC	International Finance Corporation
ISO	International Organization for Standardization
KERRA	Kenya Rural Roads Authority
KFS	Kenya forestry Service
KIHBS	Kenya Integrated Household Budget Survey
KISIP	Kenya Informal Settlement Improvement Plan
LVNWSB	Lake Victoria North Water Services Board
N	North
NEMA	National Environmental Management Authority
NGOs	Non-Governmental Organizations
NO_2	Nitrogen Oxides
NZOWASCO	Nzoia Water and Sewerage Company
ODF	Open Defecation Free zones
PAD	Project Appraisal Documents
PAPs	Project affected persons
PCT	Project Coordinating Team
PLWD	Persons Living with Disabilities
PM_{10}	Inhalable Particulate Matter
$PM_{2.5}$	Respirable Particulate Matter
PPE	Personal Protective Equipment
PPP	Public Private Partnership
RAP	Resettlement Action Plan
RE	Resident Engineer

RIC	Resettlement Implementation Committee
RoW	Right of Way
RPF	Resettlement Policy Framework
SDG	Sustainable Development Goals
SEA	Sexual Exploitation Abuse
SEC	Social Executive Team
SEF	Stakeholder Engagement Framework
SGRC	Settlement Grievance Redress Committee
SH	Sexual Harassment
SPR	Summary Project Report
TOLs	Temporary Occupation Licenses
TSP	Total Suspended Particulates
UNFCC	United Nations Framework Convention on Climate Change
VOCs	Volatile Organic Compounds
VTMP	Vehicle & Traffic Management Plan
WASREB	Water Services Regulatory Board
WB	World Bank
WRA	Water Resource Authority
WSP	Water Services Provider

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EXECUTIVE SUMMARY

E-1 Introduction and Project Background

The Government of Kenya has received Credit facility from the International Development Association (IDA) and Agence Française de Développement (AFD) towards the cost of the Second Kenya Informal Settlements Improvement Project (KISIP II) which entails Construction of Infrastructure Works in Selected Informal Settlements in the Counties of Bungoma, Elgeyo Marakwet and Trans Nzoia.

KISIP II will build on the successes and lessons learned from KISIP1, but also introduce new interventions to deepen its overall impact. It will support the interventions that have been successful under KISIP I: tenure regularization, infrastructure upgrading, and institutional strengthening. In addition, the project will include activities to link vulnerable people (elderly, orphans, disabled, and others) of informal settlements to government programs aimed at reducing poverty and vulnerability, and to link at-risk youth to programs focused on building skills and creating opportunities for employment and self-employment. KISIP II will include activities to prevent crime and violence. This Project, while concentrating on informal settlements, complements existing and past urban operations in Kenya which address the urban infrastructure deficit and urban socio-economic and institutional challenges.

E-2 Project Components

The project has the following four components:

Component 1: Integrated Settlement Upgrading. This component supports settlement upgrading through two main interventions classified under two sub-components:

Sub-component 1.1: Tenure regularization

Coordinates regularization of tenure for people living on uncontested public lands whose process includes;

(i) Development of a local physical plan for the settlement which lays out land parcels and infrastructure (roads, drainage, walkways, etc.);

(ii) Surveying with physical placement of beacons (pegging) to demarcate the parcels as per the plan;

(iii) Preparation and issuance of letters of allotment based on the survey plan

(iv) Issuance of titles.

Sub-component 1.2: Infrastructure Upgrading

Coordinates infrastructure investment portfolio whose menu includes roads, bicycle paths, pedestrian walkways, street and security lighting, vending platforms, solid waste collection and settlement sorting, storm water drainage, water and sanitation systems, public parks, and green spaces. It further includes investments related to prevention of crime and violence, including but not limited to community centers.

Component 2: Socio-Economic Inclusion Planning

This component supports community development plans to enhance social and economic inclusion, identifies beneficiaries who fit the eligibility criteria of government programs but are excluded and connects them appropriately, supports participatory crime and violence mapping, monitors the employment of local labor, carries out community capacity building and awareness raising for various project interventions including community-based solid waste management.

Component 3: Institutional Capacity Development for Slum Upgrading

This component supports institutional and policy development at national and county levels; develops a capacity building plan for national and county levels to implement the Strategy and to develop understanding of slum upgrading processes; also supports technical assistance, training, workshops and learning events, experience sharing and peer-learning activities with other counties, and other capacity building activities.

Component 4: Program Management and Coordination

This component supports activities of the National Project Coordination Team (NPCT) and the County Project Coordination Teams (CPCTs) related to national and county-level project management and coordination, including planning, surveying, engineering, fiduciary (financial management and procurement), safeguards compliance and monitoring, monitoring and evaluation (M&E), communication and community development.

E-3 Scope of the ESIA Assessment

The government of Kenya through its laws (Environmental Management and Coordination Act 1999) requires all projects to undergo Environmental Impact Assessment. To commence the ESIA process, Environmental and social screening must be undertaken in line with the provisions of

the Environmental Management and Coordination Act CAP 387 (amended 2019) and the World Bank Operating Policies since the project is undertaken in collaboration with World Bank. The NEMA regulations requires that all new projects, programs or activities be subjected to an Environmental and Social Impact Assessment at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning of the Project.

E-4 Objectives of the ESIA study

The main objective of this study is to objectively assess and evaluate environmental and social impacts that may arise because of implementing the project based on the engineering design. The specific objectives are to:

i. To fulfill the legal requirements as outlined in Environmental Management and Coordination Act, EMCA 1999 (Amended 2015) and the Integrated Environmental (Impact Assessment and Audit) EIA/EA Regulations 2019;
ii. To obtain background biophysical information of the site and legal and regulatory issues associated with the Project;
iii. To assess and predict the potential environmental and social impacts during site preparation, construction and operational phases of the Project;
iv. To make suggestions of possible alterations to the proposed design, based on the assessment findings;
v. To propose mitigation measures for the potential significant adverse environmental impacts and safety risks;
vi. To prepare an Environmental and Social Management Plan (ESMP);
vii. Submit the EIA report to NEMA for licensing.
viii. Conduct public participation/sensitization about the project.

E-5 Project relevance and justification

The decision to improve the infrastructures within Trans Nzoia Informal Settlements under the scope of KISIP II was informed by the settlement's unique challenges, social and environmental considerations need to create meaningful impacts on the livelihoods of the residents and also to contribute to the realization of national development objectives including vision 2030. The ESIA process is important as it will highlight specific challenges and guide the formulation of mitigation measures for negative impacts associated with the settlement improvement project. The construction project proposed within the informal settlements seek to address critical infrastructural needs while adhering to the Environmental Management and Coordination

(Environmental Impact Assessment and Audits) Regulations 2003 and their amendment regulations in 2019. Specifically, the project will:

i. Promote Equity and Social Justice by addressing disparities within the settlement. KISIP II's aspiration to uplift marginalized communities is consistent with broader aspirations of social justice and inclusivity.
ii. Provide avenue for Community Engagement and Involvement and enable them influence the decision-making process. Collaborating with the community has the potential of unveiling settlement-specific needs and help tailor interventions to align with community priorities.
iii. Address the challenges faced by the vulnerable groups within the selected five informal settlements in Kitale town in line with KISIP II's social objectives. Informal settlements frequently house marginalized and economically disadvantaged populations.
iv. The settlement's existing infrastructure and its potential for improvement likely shaped the decision to improve the infrastructure and promote service accessibility within the project area.
v. Improve aesthetic view of the settlement emanating from the road project

E-6 Project location

The proposed five projects are all located within an urban set up to the Northwestern side of Trans-Nzoia County and are all easily accessible from the Kitale Town Center.

Trans Nzoia County covers an area of 2,495 Km^2 and is located in the Rift Valley region of Kenya. It borders the Republic of Uganda to the North - West, Bungoma to the West and South - West, Kakamega and Uasin Gishu to the South - East, Elgeyo Markwet to the East and West Pokot to the North. Its geographical coordinates are 1.0567° N, 34.9507° E and located at an altitude of 1864.59m above sea level, experiencing annual mean temperatures of between 12.33º C to 25.38º C (Trans Nzoia County Integrated Development Plan, 2018-2022).

Trans Nzoia County comprises of five administrative sub counties namely Kiminini, Saboti, Cherang'any, Endebess and Kwanza. The sub counties are further sub-divided into twenty-five administrative wards. Under the national government, the county comprises of five administrative sub counties namely; Kiminini, Trans Nzoia West, Trans Nzoia East, Endebess and Kwanza. The sub counties are further sub divided into 39 locations, 63 sub locations and 1,610 Villages (Trans Nzoia County Integrated Development Plan, 2018-2022).

The population is projected to increase to 1,265,797. The highest proportion of the population in Trans Nzoia is Children of Age 0-14 which accounts for over 43 percent of the projected county population. The county has generally a youthful population with 876,813 of her population below 35 years of age, representing 78.9 per cent of the total projected population and only 4,853 persons in the age cohort, 80+. On the other hand, the labour force mainly of ages 15-64 years has a projected population of 600,191 persons representing 54 percent of the total county population (Trans Nzoia County Integrated Development Plan, 2018-2022).

In line with the Urban Areas and Cities Act, 2011 Trans Nzoia County has two main urban centres namely Kitale and Kiminini towns. The total projected population for these towns is 182,186. Trans Nzoia County is among top fifteen densely populated counties in the country. The population density is projected to 507.2 people per square kilometer (Trans Nzoia County Integrated Development Plan, 2018-2022).

Figure i: Map of Trans-Nzoia County

Project Scope

The proposed projects include:

Table 1a: Lot 1 Trans-Nzoia Project scope

Matisi Settlement	
Roads /footpath	*Construction of 2523m of roads*
Stormwater Drainage	*Construction of 2523m of Storm Water Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network (2998m)and household connections*
Public lighting	*Construction of 20Nr Street light and 1Nr. High mast flood light*
Tuwani Settlement	
Roads /footpath	*Construction of 1720m of roads*
Storm water Drainage	*Construction of 1720m of Storm water Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network (1760m) and household connections*
Public lighting	*Construction of 20Nr Street light*
Shanti Settlement	
Roads /footpath	*Construction of 2023m of roads*
Stormwater Drainage	*Construction of 2023m of Storm water Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network(1962m) and household connections*
Public lighting	*Construction of 20Nr Street light and 1Nr. High mast flood light*
Kipsongo A Settlement	
Water supply	*Construction of 1no. water kiosk*
sanitation	*Construction of 1no. ablution block and a biodigester*
Mitume Settlement	
Roads /footpath	*Construction of 2761m of roads*
Stormwater Drainage	*Construction of 2761m of stormwater Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network(2332m) and household connections*
Public lighting	*Construction of 25Nr Street light and 1Nr. High mast flood light*

The proposed projects were identified in consultation with the community of their main priority areas and in line with the Trans-Nzoia County Integrated Development Plan of 2023-2027. The project is also a fulfilment of the constitutional requirement by the GoK in providing healthy and clean environment to its citizen.

E-7 Design Alternatives

The engineering design has followed the recommendations of the design manuals referenced in the design review report. However due to the uniqueness of the sites, some design Alternatives were incorporated in the project as briefly explained in the sections below:

a. The streetlights were designed to accommodate both solar energy and national grid.

b. Due to varied widths of the road alignments for the settlements, specific cross sections were proposed for each alignment fitting the necessary services within the available space

c. The topography of the settlements brings out unique surface runoff drainage challenges. There are a number of localized drainage problems where natural drainage system to the existing waterways lacks. In such cases, vertical drains were proposed to address such challenges

E-8 Design approach

The approaches to the detailed engineering solutions that has been taken into account are:

i. Optimized the use of materials for construction;
ii. Improved geometric deficiencies;
iii. Improved the junctions;
iv. Provided access culverts and improved access roads for public convenience to major buildings;
v. Provided cross-drainage structures with adequate opening size and proper protection work;
vi. Providing roadside drainage with adequate capacity;
vii. Proper outfall connectivity of the longitudinal drains/ ditches, has been proposed;
viii. Proper outfall of culverts has been designed;

E-9 Impact Identification and Analysis

The identification and assessment of environmental and social impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of

environmental impacts associated with a proposed project[1]. Other potentially significant impacts or those of stakeholder concern, the impact identification and evaluation process.

The identified Impacts were categorized as negative and positive. Further, negative impacts were analyzed based on impacts consequence and impacts likelihood as shown on Table 2a and Table 3a below. Similarly, impacts rating was determined based on impacts consequence and impacts likelihood as shown in Table 2a and 3a. Impacts prediction was then made during the construction and the operation phases of the proposed projects. Mitigation measures were then proposed with the hierarchy of avoidance, minimization, mitigation and offsetting the impacts.

Table 2a: Impacts Consequences

Severity / Magnitude of Impact	Rating	Spatial Scope / Geographic Extent of Impact	Rating	Duration of Impact	Rating
Insignificant / non-harmful	1	Activity specific	1	One day to one month	1
Small / potentially harmful	2	Area Specific	2	One month to one year	2
Significant / slightly harmful	3	Whole Site	3	One year to ten years	3
Great / harmful	4	Regional/Neighbouring areas	4	Life of operation	4
Disastrous / Extremely harmful	5	National	5	Post closure / permanent	5

Note:

Total Rating of Impact Consequence = Rating of Severity/Magnitude + Rating of Spatial Scope of Impact + Rating of Impact Duration

Table 3a : Impacts Likelihood

Frequency / duration of activity	Rating	Frequency of impact	Rating
Annually or less	1	Almost never / Impossible	1
6 monthly / temporary	2	Very seldom / highly unlikely	2
Monthly / infrequent	3	Infrequent / unlikely / seldom	3
Weekly / life of operation	4	Often / regularly / likely / possible	4
Post closure	5	Daily / highly likely / definitely	5

[1] https://cdn.slrconsulting.com/uploads/2020-10/TEPNA_Seismic_DEIR_App4_IA_Method.pdf

Note:

Total Rating of Impact Likelihood = Rating of Frequency/Duration of Activity + Rating of Impact Frequency**.** The definitions used in the impact assessment are given below:

- **Frequency** of activity refers to how often the proposed activity will take place.
- **Frequency** of impact refers to the frequency with which a stressor (aspect) will impact on the receptor.
- **Severity** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
- **Spatial** scope refers to the geographical scale of the impact.
- **Duration** refers to the length of time over which the stressor will cause a change in the resource or receptor.

Table 4a : Significance Rating Matrix

Consequence (Magnitude+ Geographic extent + Duration of the Impact)															
Likelihood (Frequency of Activity + Frequency of Impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Note:

Rating of Impact Significance = Rating of Likelihood x Rating of Consequence

Table 5a: Negative Impacts ratings and associated colour codes

Significance rating	**Value**	**Colour Code**	**Negative Impact Management Recommendation**
Very high	121-150		Propose mitigation measures
High	100-120		Propose mitigation measures

Medium high	77-99		Propose mitigation measures
Low medium	51-76		Maintain current management
Low	25-50		Maintain current management
Very low	4-24		Maintain current management

E- 10 Secondary data

Secondary data entailed the review of literature to obtain all relevant information pertaining to the project. The documents that were reviewed include the following:

(i) The project Environmental and Social Management Framework (ESMF)

(ii) Grievance Redress Mechanism (GRM)

(iii) Stakeholder Engagement Framework (SEF)

(iv) Vulnerable and Marginalized Groups Framework

(v) All relevant policies, regulations and guidelines

(vi) Relevant and related EIA project and monitoring reports

(vii) World Bank OP 4.12 and 4.01.

E-11 Primary data collection

The physical evaluation of the Project area was carried from 13th to 18th November 2023 with specific focus on the environmental and social issues.

E-12 Physical Environment

The County has a cool and temperate climate with mean maximum (day time) temperatures ranging between 23.4°C and 29.2°C and mean minimum (night time) temperatures ranging between 11.0°C and 13.5°C. The maximum and minimum extreme temperature are recorded in February (about 34.2°C) and January (about 6.5°C) respectively. The mean monthly relative humidity is 67%, ranging from a maximum of 97% in July and a minimum of 35% in January. The mean wind speed within the county is 66.79 km/h or 36.06 knots (Trans Nzoia County Integrated Development Plan, 2018-2022).

The County receives annual rainfall ranging from 1000mm to 1700mm. Western parts of Endebess, Saboti and Kiminini Sub Counties, and North Western parts of Cherangany Sub County receive the highest rainfall ranging between 1,300mm and 1,700mm per year. The eastern parts of Saboti and Kiminini Sub Counties, southern parts of Kwanza Sub County, western and central parts of Cherang'any Sub County receive moderate rainfall ranging from 1,200 to 1,300mm. The parts of the County that receive the lowest rainfall (1,000mm -1,200mm) are Northern parts of Kwanza Sub County, Eastern parts of Endebess Sub County, South Eastern parts of Cherangany Sub County (Tuigoin) and South Eastern parts of Kiminini Sub County (Waitaluk). Map 2 shows the distribution of annual mean rainfall by Sub County. The annual rainfall is distributed into three major seasons namely; Long rainfall season- March, April, May

(MAM), Intermediate Season- June-July-August (JJA); and short rainfall season- October-November-December (OND). The long and intermediate seasons are more reliable for agricultural production as compared to the short rainfall season. In the recent past, drought, dry spells and floods hazards have increased in frequency and complexity, probably exacerbated by climate change. Uncertainty about the growing season, including about the onset and end of the rainy season, moisture stress, and excess rainfall are the main climatic hazards that affect productivity, thus compromising food security in the County.

E-13 Socio-Economic Baseline

The baseline socio-economic survey was conducted from 13th to 18th November, 2023. The data was collected using socio-economic survey tool provided in annex: VII. Survey was conducted using a sample size of 60 households picked randomly from the settlement.

E-14 Policy, Legal and Institutional Frameworks

National Laws

i. Kenyan Constitution 2010
ii. Environmental Management and Coordination Act (EMCA),2015 and subsequent regulations
iii. Water Act 2016 and subsequent regulations.
iv. County Government Act no 17 of 2012
v. Urban Cities Act of 2011
vi. Physical and Land Use Planning Act, 2019
vii. Occupational Health and Safety Act (OSHA 2007)
viii. The Public Health Act (Cap.242)
ix. Workplace Injuries and Benefits Act 2007

Policy frameworks

i. Kenya Vision 2030
ii. HIV and AIDS policy 2009
iii. Kenya National Youth Policy 2006
iv. Gender Policy 2011

WB Policies and guidelines

i. World Bank OP 4.12 on Involuntary Resettlement
ii. World Bank OP 4.11 on Physical Cultural Resources

iii. World Bank Access to Information Policy 2015
iv. World Bank Group Environment Health and Safety Guidelines on Water and Sanitation
v. World Bank OP 4.01 on Environment Assessment

KISIP Instruments

i. Environmental Management and Social Framework (EMSF) revised October 2014
ii. Resettlement Policy Framework (RPF) revised October 2014

E-16 Public and Stakeholder Consultations

The main objective of the community and stakeholder consultation was to disseminate project information and to incorporate the views of the Project Affected Persons (PAPs) in the design of the mitigation measures and preparation of environmental and social management plans.

The specific objectives of the stakeholder and public consultation process included:

i. Introduction of the proposed project to stakeholders;
ii. Allow the stakeholders to provide comments and raise issues and concerns regarding the project;
iii. Gather and document communities' concerns about the project and the EIA process;
iv. Obtain opinions and suggestions directly from the stakeholders on their preferred mitigation measures;
v. Assist in building and strengthening relationships with the community and stakeholders;
vi. Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.

The public baraza for the five settlements in Kitale were conducted as follows:

Table 6a : Schedule of public baraza

Settlement	Date	Venue	Male	Female	PWDs	Total
Tuwan	15/11/23	Mitume Bible Baptist Church	22	29	0	51
Shanti	17/11/23	Children's home compound	32	25	2	57
Mitume	15/11/23	Church of God Mitume	37	15	3	52
Matisi	17/11/23	Abundant Church	20	14	2	34
Kipsongo	18/11/23	Kipsongo Hall	26	24	3	50

Table 7a: Issues arising from public Baraza

No.	Questions	Answers
	Tuwan	
1	Will the equipment used during construction not affect the sewerage and water pipes?	Environmental monitoring before and during construction will be done. This will enable the engineers to know the equipment's rating to avoid much vibration.
2	What precaution will be put in place to control dust during the construction of the roads?	The equipment to be used will have low rating to avoid a lot of dust. Also there will be sprinkling of water during construction to minimize the dust.
3	Will the labour force come from the settlement during the project implementation?	The contractor will be unveiled to the community members before commencement of works and the youth have been assured of employment especially the unskilled labor depending on the availability of the human resources in the area.
4	In case of conflict among community members, who should bring peace?	The SEC and GRC members will work hand in hand to make sure each and every member understands the importance of the project. The GRC chairman to accommodate all the complains and handle them amicably.
6	Need for Cooperation with the Consultant	The chief urged the residents to cooperate with the consultant so as to ensure smooth running of the project
7	Will the SEC and GRC members trained on their roles?	The consultant will organize for SEC and GRC training. They will be communicated on when the training will be effected.
	Mitume	
1	Will the local youth be employed during the project implementation?	The contractor will be unveiled to the community members before commencement of works and the youth have been assured of employment especially the unskilled labor depending on the availability of the human resources in the area.
2	Some engineers never want to be guided in the project, if they refuse to listen to the community members, where will they take their complains?	If there will be any complain, the SEC and GRC will tackle it.
3	Will the community members involved to give opinions on where the ablution block will be constructed?	The community members will be allowed to air their views on where the ablution block will be constructed. The engineers will guide on the same.
4.	The town planner starts well by calling public participation for projects and later on bring contaminated water to the members, construct substandard sewerage which lead to manhole lids being stolen and this exposes health issues to the community members.	The meeting is for awareness on the priorities of Kisip$_2$ project. The project will be done according to the World bank standards.
5	Some Water pipes are passing through culverts. Some of the water pipes might get destroyed during construction. How will the engineers know?	The community members to advise where the water pipes could pass. This is to avoid contamination and interference of the water pipes. Piping will be done before road construction
6	Need for Cooperation with the Consultant	The MCA urged the residents to cooperate with the consultant so as to ensure smooth running of the project

7	Will the SEC and GRC members trained on their roles?	The consultant will organize for SEC and GRC training. They will be communicated on when the training will be effected.
	Matisi	
1	Will the streets lights be of high quality? The ones put before have not functioning and most of them can't be repaired.	The street lights will be of very high standards. The ones put before were for solar and the batteries were stolen and also sensors were interfered with thus are not functioning.
2	Can the road to Mosque included in the priorities?	The county government and MCA will work on the remaining roads which were not marked.
3	What precaution will be put in place to control dust during the construction of the roads?	The equipment to be used will have low rating to avoid a lot of dust. Also there will be sprinkling of water during construction to minimize the dust.
4	How will you deal with noise pollution?	The engineers will look at the equipment which are not producing a lot of noise.
5	Can we be provided with a dumping site?	The county government can assist in providing dumping bins to the settlement.
6	How soon is the project commencing?	The construction works will start immediately once all the initial processes have been finalized including but not limited to NEMA license, RAP, final engineering designs and a suitable contractor appointed
7	Who will be responsible for the electrical posts along the roads during the construction?	The county government will liaise with the Kenya power company on the same.
8	Sometimes contractors leave roads unfinished. Is this project different?	World bank works in a professional way. All roads marked as priorities will be completed.
	Shanti	
1	Can other feeder roads constructed apart from the ones given priorities?	The ones identified as priorities are the ones to be constructed first. The county government can consider other roads which are not marked.
2	Dumping is a major issue in our settlement, can it be considered?	The county government to be informed about dumping bins. This will limit pollution.
3	Sewer line was done upto the stream. Can it be extended to the other side of the stream ?	There is a possibility of the engineers extending the sewer line to the other side of the stream. This can be done in a certain angle but not 90 degrees
4	What quality will be the drainage?	The drainage will be of good quality according to the standards of the World bank.
5	Where will we get enumerators who will assist in filling in questionnaires?	The enumerators will come from the settlement.
6	We are in need of a sport field. How can we be assisted?	The world bank doesn't buy lands for sports. The SEC members to liaise with the ward administrator of the same
7	Is there compensation to the PAPs?	The consultant team is going round and will take any photos of the structures constructed on the marked roads and also take details of the PAPs for documentation.
8	How soon is the project commencing?	The construction works will start immediately once all the initial processes have been finalized including but not limited to NEMA license, RAP, final engineering designs and a suitable contractor appointed.
	Kipsongo	

1	Which type of Ablution block will be built for the community because the community members aren't exposed and don't know how to use modern convenient washrooms?	The ablution block supposed to be built is modern and it will be built according to World Bank Standards. The County government together with SEC leaders will also do the necessary induction and trainings on how to use modern toilets.
2	How will $KISIP_2$ priority projects for the community implemented without affecting their current existing settlement	The SEC members to actively engage with the community to help them identify specific perfect places of installing and building the $KISIP_2$ projects for the benefit of the community
3	Where ablution block will be built , will the affected families be compensated?	The SEC members in consultation with the community members to look for a perfect place of building ablution block without any displacement of people.
4	Need for Cooperation with the Consultant	The Ward Administrator urged the residents to cooperate with the consultant so as to ensure smooth running of the project

E-17 Grievance Resolution Mechanism

This grievance redress mechanism presents the structured process for addressing and resolving complaints or grievances from individuals or communities affected by the proposed projects. The mechanism is designed to provide an avenue for affected parties to voice their concerns, seek resolution, and ensure that their grievances are addressed appropriately.

E-18 Grievance Tiers

Tier 1: Settlement Grievance Redress Committee (SGRC)

The first level in addressing grievances will be at the settlement. The settlement will form a Settlement Grievance Redress Committee comprising of two members from SEC, and three other respected community members who are not PAPs. The community should elect the committee in a transparent manner and after sensitization by KISIP PCT.

Tier 2: County Resettlement Implementation Committee (CRICs)

The second level of grievance mechanism will involve the County Resettlement Implementation Committee (CRICs). The CRICs will consider grievance reports forwarded to it from the community grievance committee and make a determination. The CRIC will comprise of the County Coordinator, Environment Officer, Social/Community Officer and Component Heads for Infrastructure, and Land tenure, Assistant Deputy County Commissioners, and Ward Administrator.

Tier 3: National PCT, (NRIC)

The third level of grievance mechanism will involve the National PCT, (NRIC) which will comprise of the National Project Coordinator, Heads of Components, Environment and Social Safeguard heads, and a designated Grievance Redress Officer who will be the Secretary. It will handle grievances referred to it by the CGRCs and monitor the performance of the whole GRM for the project.

Tier 4: Court of Law/ Alternative Dispute Resolution (ADR).

If complainants are not satisfied by the decisions of the grievance's committees, they can seek redress from a court of law or resort to Alternative Dispute Resolution (ADR).

World Bank GRS

The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are promptly reviewed and addressed[2].

E-19 Environmental and Social Impact Assessment and Analysis

Whilst the KISIP II project is aimed at development and improving people's lives, it can also lead to adverse impacts to both the physical and social environment. ESIA is thus a formal process to predict the environmental consequences of the proposed developments and to plan appropriate measures to eliminate or reduce adverse effects and to augment positive impacts.

Impacts can be classified as follows:

- Positive (beneficial) or negative (adverse);
- Direct or indirect, long-term or short-term in duration, and wide-spread or local in the extent of their effect;
- Cumulative Impacts –Impacts that build up over time.

The impacts are presented in the tables below:

[2] https://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service

Table 8a: Positive Impacts Construction phase

Positive Impact	Impact Category	Impact Effects
Employment Opportunities	Direct Impact	job opportunities, providing employment for local residents and contributing to economic development in the community during construction
Business opportunity	Direct Impact	Sourcing of construction material from the local community

Table 9a: Positive impacts operations

Positive Impact	Impact category	Impact Effects
Improved Accessibility	Direct Impact	Settlement road projects enhance the connectivity of remote or underserved areas, improving accessibility for residents and facilitating the movement of goods and services
Economic Development	Direct Impact	Construction activities and the enhanced connectivity will lead to increased economic activities as it becomes easier for businesses to transport goods, reach markets, and engage in trade, ultimately boosting local economies
Increased Property Values	Direct Impact	The proposed roads is likely to positively impact property values in the surrounding areas, attracting investment and improving the overall real estate market
Job Creation	Direct Impact	The construction and maintenance the roads create employment opportunities, supporting local communities and contributing to poverty reduction
Social Integration	Indirect Impact	Improved accessibility fosters social integration by connecting previously isolated settlements, allowing residents to interact more easily and participate in community activities
Education and Healthcare Access	Direct Impact	Settlement roads facilitate better access to education and healthcare facilities, as students, healthcare workers, and patients can travel more efficiently
Enhanced Emergency Response	Direct Impact	The roads improve access for emergency services, reducing response times and increasing the effectiveness of disaster management and healthcare delivery
Quality of Life Improvement	Direct Impact	Improved roads contribute to a better quality of life for residents, making it easier to access essential services, reducing travel times, and enhancing overall well-being

Positive Impact	Impact category	Impact Effects
Infrastructure Development	Direct Impact	Settlement roads often pave the way for additional infrastructure development, such as water supply, sanitation, and electricity, contributing to a more developed and resilient community
Community Empowerment	Direct Impact	Improved infrastructure empowers communities by providing them with the means to actively participate in economic, social, and political activities.
Reduced Isolation	Direct Impact	Settlement roads reduce the isolation of remote communities, allowing the connection with urban centers and access a broader range of services and opportunities
Positive Impact	**Impact Category**	**Impact Effects**
Employment Opportunities	Direct Impact	job opportunities, providing employment for local residents and contributing to economic development in the community in terms of maintenance and operation workers
Improved Public Health	Indirect Impact	Access to clean and safe water sources, along with proper sanitation facilities, reduces the risk of waterborne diseases and contributes to overall public health.
Disease Prevention	Direct Impact	Adequate sanitation facilities, such as latrines and sewage systems, prevent the contamination of water sources and the spread of waterborne diseases like cholera and dysentery.
Reduced Mortality Rates	Direct Impact	Access to safe water and sanitation facilities is linked to lower mortality rates, particularly among children, as it helps prevent water-related illnesses.
Enhanced Hygiene Practices	Direct Impact	Provision of handwashing facilities and hygiene education encourages better hygiene practices, leading to improved personal and community health
Increased Productivity	Direct Impact	Access to reliable water sources saves time spent on water collection, particularly for women and children, allowing for increased productivity and educational opportunities
Food Security	Direct Impact	Reliable water sources contribute to improved agricultural practices for those practicing agriculture, leading to increased food security and livelihoods for communities
Gender Empowerment	Direct Impact	Provision of water and sanitation facilities can empower women and girls by reducing the time and effort spent on water-related activities, allowing for more educational and economic opportunities
Community Resilience	Direct Impact	Water projects that focus on sustainable water management contribute to community resilience in the face of climate change and water scarcity
Reduced Water-Borne Pollution	Direct Impact	Proper sanitation facilities prevent the contamination of water sources, reducing waterborne pollution and protecting aquatic ecosystems.
Social Equity	Direct Impact	Equitable access to water and sanitation facilities promotes social inclusion and reduces disparities, fostering a sense of community well-being.
Community Gathering Spaces	Direct Impacts	Ablution blocks can serve as community gathering spaces, fostering social interaction and cohesion within the community
Improved Hygiene Practices	Direct Impacts	Provision of handwashing facilities in ablution blocks promotes good hygiene practices among the community members

Positive Impact	Impact Category	Impact Effects
Enhanced Dignity and Privacy	Direct Impacts	Adequate ablution facilities contribute to the dignity and privacy of individuals, particularly in crowded or public spaces
Community Education	Indirect Impacts	Ablution blocks can serve as platforms for hygiene and sanitation education, raising awareness about the importance of cleanliness and health
Reduction of Open Defecation	Direct Impacts	Adequate sanitation facilities, including ablution blocks, contribute to the reduction of open defecation, improving community health and sanitation
Local Economic Opportunities	Indirect Impacts	Construction and maintenance of ablution blocks can create local job opportunities, contributing to the economic well-being of the community
Emergency Preparedness	Direct Impacts	Ablution blocks can serve as essential facilities during emergencies, providing access to clean water and sanitation services in times of need
Improved Accessibility	Direct Impact	Settlement road projects enhance the connectivity of remote or underserved areas, improving accessibility for residents and facilitating the movement of goods and services
Economic Development	Direct Impact	Construction activities and the enhanced connectivity will lead to increased economic activities as it becomes easier for businesses to transport goods, reach markets, and engage in trade, ultimately boosting local economies
Increased Property Values	Direct Impact	The proposed roads is likely to positively impact property values in the surrounding areas, attracting investment and improving the overall real estate market
Job Creation	Direct Impact	The construction and maintenance the roads create employment opportunities, supporting local communities and contributing to poverty reduction
Social Integration	Indirect Impact	Improved accessibility fosters social integration by connecting previously isolated settlements, allowing residents to interact more easily and participate in community activities
Education and Healthcare Access	Direct Impact	Settlement roads facilitate better access to education and healthcare facilities, as students, healthcare workers, and patients can travel more efficiently
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Quality of Life Improvement	Direct Impact	Improved roads contribute to a better quality of life for residents, making it easier to access essential services, reducing travel times, and enhancing overall well-being
Infrastructure Development	Direct Impact	Settlement roads often pave the way for additional infrastructure development, such as water supply, sanitation, and electricity, contributing to a more developed and resilient community
Community Empowerment	Direct Impact	Improved infrastructure empowers communities by providing them with the means to actively participate in economic, social, and political activities.
Reduced Isolation	Direct Impact	Settlement roads reduce the isolation of remote communities, allowing the connection with urban centers and access a broader range of services and opportunities
Positive Impact	**Impact category**	**Impact Effects**
Reduced Crime and Increased Safety	Direct Impacts	Well-lit streets and public spaces contribute to increased safety, potentially reducing criminal activity and enhancing public security

Positive Impact	Impact Category	Impact Effects
Enhanced Visibility and Reduced Accidents	Direct Impacts	Adequate lighting improves visibility, reducing the likelihood of accidents and improving overall road safety for pedestrians and motorists
Increased Sense of Community	Direct Impacts	Well-lit public spaces foster a sense of community by providing a safe and welcoming environment for residents to gather, socialize, and participate in community events
Support for Nighttime Economy	Indirect Impacts	Street lights contribute to a vibrant nighttime economy by extending business hours and supporting nighttime activities in commercial areas
Emergency Response Improvement	Direct Impacts	Adequate lighting facilitates emergency response efforts by providing clear visibility during nighttime incidents or emergencies
Improved Public Health	Direct Impacts	Well-lit streets and public spaces contribute to community well-being by promoting mental health, reducing fear of crime, and enhancing overall feelings of safety
Enhanced Aesthetics	Indirect Impacts	lighting installations contribute to the visual appeal of public spaces, making the lit areas more attractive and creating a positive ambiance
Increased Property Values	Indirect Impacts	Well-lit neighborhoods and commercial areas can contribute to increased property values, attracting investment and promoting economic growth

Table 10a: Positive impacts decommissioning phase

Positive Impact	Impact Category	Impact Effects
Employment Opportunities	Direct Impact	job opportunities, providing employment for local residents and contributing to economic development in the community during decommissioning
Business opportunity	Direct Impact	The camp sites can be converted to community social amenities such has dispensary, school or police station

E-20 Negative Environmental and Social Impacts

Table 11a : Potential negative impacts during construction

Anticipated Negative Impact	Impact description
a) Air Pollution from dust	Emissions to air during construction and operation have the potential to impact sensitive receptors (residents), both within the immediate vicinity and the project area of influence. Construction activities such as utility diversions, road excavation and road resurfacing works will result in dust and particulate emissions which may be exacerbated by winds and dry weather. Dust emissions have the potential for temporary significant negative effects, particularly on road users and sensitive receptors adjacent to construction sites and compounds.
b) Noise and vibration	Noise and vibration can be a source of disturbance at sensitive receptors. Given the urban context of the proposed project, sensitive noise and vibration receptors include buildings (residential, places of worship and educational dwellings) and road users in the immediate vicinity of the existing settlements.
c) Flooding of storm water due to blocked drainage channels	Flooding could occur mainly due to alternation or blockage of existing drainage channels during construction. This with the changing weather patterns could lead to flooding that may lead to loss of property and life.
d) Water Quality	Construction activities such as diversion of utilities, road excavation and road widening have the potential to create pathways for pollutants to enter watercourses and indirectly impact on water quality. Soil compaction during construction has the potential to increase the rate of surface water runoff.
e) Displacement Impacts	This could happen when people have settled along the project reserve areas or during compulsory acquisition of land for development projects. There will be no compulsory acquisition for KISIP 2 projects.
f) Destruction of water pipes or disruption of water supply, sewer and power lines	Construction activities may disrupt the daily lives of community members, affecting routines and causing inconvenience
g) Incidence of HIV/AIDS	Migration of people from different regions with diverse moral backgrounds through various workforce may lead to behavioral influences which may increase the spread of diseases such as Human Immuno-Deficiency Virus (HIV),

h) Vegetation loss	Clearing the vegetation would lead to soil erosion
i) Soil loss and soil pollution	Construction activities will require the excavation of existing made ground and the existing roadbed. Construction activities may create pathways between contaminants from the existing made ground and the local environment and groundwater resources which has the potential to result in significant negative effects (both temporary and permanent). In addition, construction activities may result in generation and removal of materials and solid waste generation.
j) Solid waste generation	Solid wastes will mainly emanate from the construction activities and will include excavated soil, cement storage bags and other packaging materials used during construction, spillage of oil and grease from machines used in excavation, waste from repair and maintenance of construction equipment, part demolition waste among others
k) Visual impacts	Temporary structures, construction debris, and equipment may create visual eyesores during the construction phase while Dust generated from construction activities can contribute to reduced air quality, affecting the clarity of views among other impacts
l) Potential impact on traffic/ obstruction of temporary access	Construction of the proposed infrastructure projects has the potential to impact people's day-to-day travel activities. Temporary traffic diversions, and in some instances temporary lane or road closures, may be required to undertake construction activities. Temporary traffic diversions and road closures may also reduce traffic capacity.
m) Accidental spills & leakages	Accidental spills from the construction vehicles and construction materials could occur during construction. This would lead to soil, surface and subsurface water pollution
n) Occupational Health and Safety Risks	During construction, workers would be exposed to various health and safety risks that would require control measures be taken. Opportunities for employment will also be created/available during the construction of the projects that would require hiring policies and employ management plans.
o) Building materials	Sourcing the building materials could lead to resource depletion and could sourcing from far areas could also lead to high costs and high carbon footprints
p) River water contamination	This could occur once vegetation is cleared and the soils are exposed to erosion factors. Material piles also if not properly secured would lead to downstream contamination of existing nearby springs and rivers

q) Sustainability and Climate Change Impacts	The potential impacts include greenhouse gas emissions, resource depletion, air and water pollution etc.

Table 12a : Negative Impacts during Operations Phase

Anticipated Negative Impact	Impact description
a) Air Pollution	Emissions from vehicles and motorbikes using the roads on a daily basis will contribute to air pollution during operation phase of the project. The impact on air quality during repairs and maintenance (operation phase) is expected to occur
b) Noise Pollution	Noise emission and associated impacts during repairs and maintenance is expected to be low and will emanate from motorized equipment as well as noise from the motor vehicles used on the roads.
c) Possible vandalism and theft of accessories	Installed roads, lights infrastructure could be targeted for theft
d) Grievances	Grievance on the use of the infrastructure and employment
e) Incidence of HIV/AIDS	Multiple sexual interactions by employees could lead to spread of HIV/Aids
f) GBV-Sexual Exploitation and Abuse (SEA) of communities by project workers and Sexual Harassment (SH) amongst employees	This could unfold when operators ask for favors from job seekers for an employment chance. This could also unfold when employees are exploited by their leadership to retain their jobs among other reasons
g) Child Exploitation and Abuse	Employment of underaged individuals during operation stages of the project
h) Exclusion of disadvantaged and vulnerable groups e.g., PWDs, elderly, youth, the sick, the poor, single-women, OVC etc.	Unequal employment opportunities denied to the vulnerable persons
i) Inadequate stakeholder engagement	Numerous grievances from the public regarding ownership and operations of the projects

E-21 Environmental Management and Monitoring Plan

This ESMMP has been developed as a tool to guide the proponent and the contractor during the project implementation since it captures the anticipated impacts and therefore acts as a preventive measure towards possible social and economic disruptions that may arise during project implementation. It provides the indicative mitigation measures, the monitoring indicators,

responsibilities for mitigation and monitoring and the anticipated costs. The EMPs summarizes the environment and social impacts identified and their proposed mitigation measures, the actions to be taken by various parties and the monitoring indicators. An indication of the implementation and monitoring timelines is also provided.

E-22 Conclusion

Trans Nzoia KISIP 2 projects, identified in collaboration with the community, prioritize essential elements such as roads, drainage systems, water supply, sanitation and street lighting. Following a thorough screening, these projects have been categorized as having a medium risk level, prompting the need for an Environmental and Social Impact Assessment Study.

Considering factors like project location, design, available alternatives, regulatory compliance, and community feedback, both positive and negative impacts have been discerned. Each negative impact has accompanying recommended mitigation measures, and the implementation of these measures is anticipated to result in minimal and negligible consequences.

A pivotal aspect of these proposed projects is their location on government land, significantly reducing the risk of displacement. Twenty- three Project Affected Persons (PAPs) are slated for displacement during the implementation phase, streamlining the acceptance and execution process.

While the execution of the proposed projects is anticipated to yield both positive and negative impacts, this report outlines mitigation measures based on key stakeholder opinions and community feedback gathered during engagements. Chapter Nine (9) presents a comprehensive environmental management plan aimed at further diminishing identified potential adverse impacts, demonstrating a commitment to minimizing negative consequences. The study ultimately concludes that the project will greatly benefit the community as a whole.

E-23 Recommendations

Based on the assessment and findings presented in this Environmental and Social Assessment report, the following recommendations are proposed:

i. Develop an ESMMP implementation action plan
ii. Develop the traffic management plans that will be used during the construction phase
iii. Obtain all the required construction and operational permits before commencement
iv. Develop the Health and Safety management plans

v. The contractor should comply with the approved designs and implement ESMP developed by the consultant

vi. Include the proposed mitigations in the tender contract and tender documents so that the contractor who will be selected for the project will be bound to implement them.

CHAPTER ONE

1. INTRODUCTION AND BACKGROUND

1.1. Project Overview

The Government of Kenya has received Credit facility from the International Development Association (IDA) and Agence Française de Développement (AFD) towards the cost of the Second Kenya Informal Settlements Improvement Project (KISIP II) which entails Construction of Infrastructure Works in Selected Informal Settlements in the Counties of Bungoma, Elgeyo Marakwet and Trans-Nzoia (9No. Settlements).

The Second Kenya Informal Settlements Project (KISIP II) will build on the successes and lessons learned from KISIP1, but also introduce new interventions to deepen its overall impact. It will support the interventions that have been successful under KISIP I: tenure regularization, infrastructure upgrading, and institutional strengthening. In addition, the project will include activities to link vulnerable people (elderly, orphans, disabled, and others) of informal settlements to government programs aimed at reducing poverty and vulnerability, and to link at-risk youth to programs focused on building skills and creating opportunities for employment and self-employment. KISIP II will include activities to prevent crime and violence. This Project, while concentrating on informal settlements, complements existing and past Urban operations in Kenya which address the Urban infrastructure deficit and Urban socio-economic and institutional challenges.

1.2. KISIP II Project Components

The project has the following four components:

Component 1: Integrated Settlement Upgrading. This component supports settlement upgrading through two main interventions classified under two sub-components:

Sub-component 1.1: Infrastructure Upgrading

Coordinates infrastructure investment portfolio whose menu includes roads, bicycle paths, pedestrian walkways, street and security lighting, vending platforms, solid waste collection and settlement sorting, storm water drainage, water and sanitation systems, public parks, and green spaces. It further includes investments related to the prevention of crime and violence, including but not limited to community centers.

Component 2: Socio-Economic Inclusion Planning

This component supports community development plans to enhance social and economic inclusion, identifies beneficiaries who fit the eligibility criteria of government programs but are excluded and connects them appropriately, supports participatory crime and violence mapping, monitors the employment of local labor, carries out community capacity building and awareness raising for various project interventions including community-based solid waste management.

Component 3: Institutional Capacity Development for Slum Upgrading

This component supports institutional and policy development at national and county levels; develops a capacity building plan for national and county levels to implement the Strategy and to develop understanding of slum upgrading processes; also supports technical assistance, training, workshops and learning events, experience sharing and peer-learning activities with other counties, and other capacity building activities**.**

Component 4: Program Management and Coordination

This component supports activities of the National Project Coordination Team (NPCT) and the County Project Coordination Teams (CPCTs) related to national and county-level project management and coordination, including planning, surveying, engineering, fiduciary (financial management and procurement), safeguards compliance and monitoring, monitoring and evaluation (M&E), communication and community development.

1.3. Scope of the ESIA Assessment

The government of Kenya through its laws (Environmental Management and Coordination Act 1999) requires all projects to undergo Environmental Impact Assessment. To commence the ESIA process, Environmental and social screening must be undertaken in line with the provisions of the Environmental Management and Coordination Act CAP 387 (amended 2019) and the World Bank Operating Policies since the project is undertaken in collaboration with World Bank. The NEMA regulations requires that all new projects, programs or activities be subjected to an Environmental and Social Impact Assessment at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning of the Project.

1.4. Objectives of the CPR/ESIA study

The main objective of this study is to objectively assess and evaluate environmental and social impacts that may arise because of implementing the project based on the engineering design. The specific objectives are to:

i. To fulfill the legal requirements as outlined in Environmental Management and Coordination Act, EMCA 1999 (Amended 2015) and the Integrated Environmental (Impact Assessment and Audit) EIA/EA Regulations 2019;
ii. To obtain background biophysical information of the site and legal and regulatory issues associated with the Project;
iii. To assess and predict the potential environmental and social impacts during site preparation, construction and operational phases of the Project;
iv. To make suggestions of possible alterations to the proposed design, based on the assessment findings;
v. To propose mitigation measures for the potential significant adverse environmental impacts and safety risks;
vi. To prepare an Environmental and Social Management Plan (ESMP);
vii. Submit the EIA report to NEMA for licensing.
viii. Conduct public participation/sensitization about the project.

1.5. Project relevance and justification

The decision to improve the infrastructures within Trans-Nzoia Informal Settlements under the scope of KISIP II was informed by the settlement's unique challenges, social and environmental considerations need to create meaningful impacts on the livelihoods of the residents and also to contribute the realization of national development objectives including vison 2030. The ESIA process is important as it will highlight specific challenges and guide the formulation of mitigation measures for negative impacts associated with the settlement improvement project. The construction project proposed within the informal settlement seeks to address critical infrastructural needs while adhering to the Environmental Management and Coordination (Environmental Impact Assessment and Audits) Regulations 2003 and their amendment regulations in 2019. Specifically, the project will:

i. Promote Equity and Social Justice by addressing disparities within the settlement. KISIP II's aspiration to uplift marginalized communities is consistent with broader aspirations of social justice and inclusivity.

ii. Provide avenue for Community Engagement and Involvement and enable them influence the decision-making process. Collaborating with the community has the potential of unveiling settlement-specific needs and help tailor interventions to align with community priorities.

iii. Address the challenges faced by the vulnerable groups within Trans Nzoia Informal Settlement in line with KISIP II's social objectives. Informal settlements frequently house marginalized and economically disadvantaged populations.

iv. The settlement's existing infrastructure and its potential for improvement likely shaped the decision to improve the infrastructure and promote service accessibility within the project area.

v. Improve aesthetic view of the settlement emanating from the road project

1.6 CPR/ESIA Screening

The consultant carried out environmental screening which was informed by the Second Schedule of the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 and the World Bank guidelines. As per this Schedule, the issues considered by the team of experts included ecological, socio-economic, landscape use and changes and water demand. The detailed screening checklist is presented in Annex IV and V of this report.

1.7 Environment and Social Scoping

This process-involved identification of significant environmental and social impacts associated with the proposed projects that need to be considered. Scoping was done to define the extent of the study through reviews of the secondary Documents and available data supported with field evaluations. The process enabled the consultant to determine the Project potential social, environmental, biophysical and Health and Safety risks.

1.8 CPR/ESIA Project Scope

Scoping was undertaken and established that the ESIA study would the following:

1. Baseline Environmental Assessment
   a. Air quality assessment (PM_{10}, $PM_{2.5}$, SO_2, NO_2)
   b. Environmental noise assessment
   c. Water quality assessment
2. Literature Review
3. Site visit/inspection

4. Environmental and Social Impacts identification and analysis
5. Public and Stakeholder consultations
    a. Key Stakeholders consultations
    b. Public Consultations

1.9 Environmental and Social Impact Assessment Methodology

Environmental and Social Impact Assessment (ESIA) is a comprehensive process employed to evaluate the potential environmental and social consequences of proposed projects, plans, or policies before they are implemented. The primary goal of ESIA is to identify, predict, and assess the potential impacts of these initiatives to ensure that they are undertaken in a sustainable and responsible manner. The ESIA process employed for the study included the following:

1.10 Field Assessment

Field assessments were conducted by visiting the project areas to gather firsthand information, evaluate potential impacts, and engage with stakeholders regarding the proposed project. Observations of the physical environment, including surrounding land uses, ecosystems, and existing infrastructure, were crucial for contextualizing the potential project impacts. Baseline data collection was then carried out using diverse methodologies deemed fit for the study as discussed in the subsequent sections.

1.11 Baseline data collection

1.11.1 Primary Data Collection

Primary data collection was undertaken to determine the baseline conditions of the proposed project areas and assessing potential environmental and social impacts. The primary data collected included field survey, baseline ambient air and noise measurements public and stakeholder consultations.

a) Baseline air quality monitoring

Air quality monitors were employed at different locations to assess the air quality levels of inhalable and respirable Particulate Matter ($PM_{2.5}$ and PM_{10}) respectively as well as for the collection of gaseous pollutants including Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2). The findings are presented in Chapter Four of this report.

b) Water Quality monitoring

Water samples from surface and subsurface water sources were collected and sent to designated laboratory for analysis. ISO 1996-2(1996) was used as the best practice guidelines on the assessment of noise Guidelines.

c) Noise levels monitoring

ISO 1996-2(1996) was used as the best practice guidelines on the assessment of noise Guidelines. Spot check noise of 15 minutes were conducted at each monitoring locations described where information on daily variability in noise levels, as well as an expected typical or average daily condition of the noise is provided.

1.12 Literature Review

A literature review was undertaken to understand existing knowledge, methodologies, and best practices related to environmental and social impact assessment, and to identify relevant legislation, regulations, and guidelines governing such assessments in the project area. This ensures that the assessment process aligns with legal requirements and international standards. The review aids in the identification of key environmental and social issues specific to the proposed project.

By reviewing existing studies, reports, and academic papers, potential impacts on ecosystems, biodiversity, water resources, air quality, cultural heritage, and local communities can be better understood and anticipated. It enables the identification and evaluation of different methodologies and tools used in previous ESIA studies, including techniques for impact prediction, mitigation, monitoring, and evaluation. Additionally, the literature review helps to identify gaps in existing knowledge and areas where further research or data collection may be required. This allows for a more targeted and rigorous assessment of potential impacts, ensuring that no important issues are overlooked.

1.12.1 Secondary Data Collection

Secondary data was also assessed to establish the existing data that would help in providing context, background, and additional insights into the environmental, social, and economic aspects of the project area. Secondary data was collected through literature reviews, review of previous reports, use of published information from reputable websites. Some of the documents that were reviewed included the following:

1. The project Environmental and Social Management Framework (ESMF)
2. Grievance Redress Mechanism (GRM)
3. Stakeholder Engagement Framework (SEF)
4. Resettlement Plan Framework (RPF)
5. Vulnerable and Marginalized Groups Framework
6. All relevant policies, regulations and guidelines
7. Relevant and related EIA project and monitoring reports
8. World Bank's Operational Policy (OP) 4.01 on Environmental Assessment
9. World Bank's Operational Policy (OP) 4.12 on Involuntary Resettlement
10. County Integrated Development Plans
11. Project design report
12. World Bank OP 4.11 on Physical Cultural Resources
13. World Bank Access to Information Policy 2015
14. World Bank Group Environment Health and Safety Guidelines on Water and Sanitation

1.13 Stakeholder consultations

Engagement of stakeholders is crucial because it helps a project achieve transparent decision-making and overall sustainability. The key stakeholders were identified and mapped based on influence and interest on an ordinal scale of 0-5 (for either interest or influence from low (0) to high (5)).

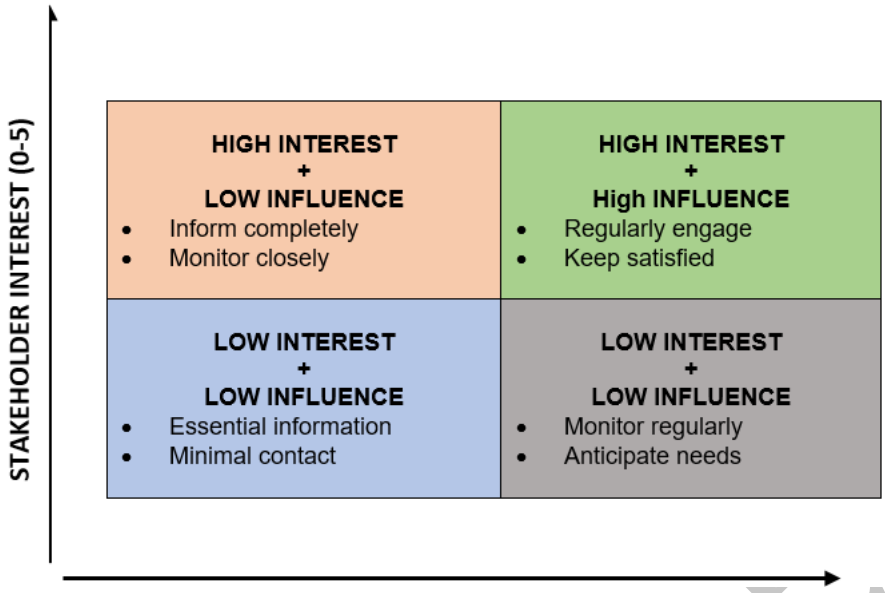


Figure 1: Stakeholder Influence (0 5)

Key stakeholder's consultations

One on one interviews with key stakeholders within the project area was undertaken from 20th to 23rd November 2023 to obtain and document comments of the affected and or interested persons to the proposed projects. The identified and consulted key stakeholders included the following:

1. National Environmental Management Authority (NEMA)
2. Ministry of Environment and Natural Resources
3. Ministry of Lands, Public works, Housing and Urban Development
4. Kenya forestry Service (KFS)
5. Ministry of Water and Sanitation
6. Settlement Committee Members (SEC)

d) Public Meetings/ Barazas

Community consultations and sensitization were undertaken to provide the project area community and key stakeholders with an opportunity to directly interact with the project proponent through the ESIA Consultants and ask questions, raise issues and concerns pertaining to the proposed project and contribute to the identification of project impacts, mitigation measures and project alternatives.

1.14 Socio-Economic Survey

Socio-economic survey was carried out between 11th to 18th November 2023 to identify and understand the various social groups and stakeholders potentially impacted by the project and understanding their demographics, livelihoods, socio-cultural practices to help in assessing potential social impacts and designing appropriate mitigation measures. These socio economic data establishes a baseline which future changes and impacts can be measured. The baseline conditions include information on income levels, employment patterns, access to services (such as healthcare and education), land tenure systems, and other socio-economic indicators.

The socio-economic survey conducted for KISIP II aimed to identify both the potential positive and negative impacts of the project on local communities and individuals. This survey utilized a pre-designed Socio-economic survey tool provided in Annex VII administered by trained enumerators across all settlements.

1.15 Abbreviated Resettlement Action Plan (A-RAP)

In compliance with the Government's National Policy on Involuntary Resettlement and the World Bank's Operational Policy (OP) 4.12 on Involuntary Resettlement, an abbreviated Resettlement Action Plan (A-RAP) has been prepared. This was necessitated by the identification of Project Affected Persons (PAPs) in settlements including Shanti, Matisi, Mitume, and Tuwani. The complete A-RAP report is available in Annex III of this document.

1.16 Environmental and Social Impact Identification and Analysis

The identification and assessment of environmental and social impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with a proposed project[3]. Other potentially significant impacts or those of stakeholder concern, the impact identification and evaluation process.

The identified Impacts were categorized as negative and positive. Further, negative impacts were analyzed based on impacts consequence and impacts likelihood as shown on Table 1 and Table 2 below. Similarly, impacts rating was determined based on impacts consequence and impacts likelihood as shown in Table 3 and Table 4. Impacts prediction was then made during the

[3] https://cdn.slrconsulting.com/uploads/2020-10/TEPNA_Seismic_DEIR_App4_IA_Method.pdf

construction and the operation phases of the proposed projects. Mitigation measures were then proposed with the hierarchy of avoidance, minimization, mitigation and offsetting the impacts.

Table 1: Impacts Consequences

Severity / Magnitude of Impact	Rating	Spatial Scope / Geographic Extent of Impact	Rating	Duration of Impact	Rating
Insignificant / non-harmful	1	Activity specific	1	One day to one month	1
Small / potentially harmful	2	Area Specific	2	One month to one year	2
Significant / slightly harmful	3	Whole Site	3	One year to ten years	3
Great / harmful	4	Regional/Neighbouring areas	4	Life of operation	4
Disastrous / Extremely harmful	5	National	5	Post closure / permanent	5

Note:

Total Rating of Impact Consequence = Rating of Severity/Magnitude + Rating of Spatial Scope of Impact + Rating of Impact Duration

Table 2: Impacts Likelihood

Frequency / duration of activity	Rating	Frequency of impact	Rating
Annually or less	1	Almost never / Impossible	1
6 monthly / temporary	2	Very seldom / highly unlikely	2
Monthly / infrequent	3	Infrequent / unlikely / seldom	3
Weekly / life of operation	4	Often / regularly / likely / possible	4
Post closure	5	Daily / highly likely / definitely	5

Total Rating of Impact Likelihood = Rating of Frequency/Duration of Activity + Rating of Impact Frequency

The definitions used in the impact assessment are as given below:

- **Frequency** of activity refers to how often the proposed activity will take place.
- **Frequency** of impact refers to the frequency with which a stressor (aspect) will impact on the receptor.
- **Severity** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.

- **Spatial** scope refers to the geographical scale of the impact.
- **Duration** refers to the length of time over which the stressor will cause a change in the resource or receptor.

Table 3: Significance Rating Matrix

Consequence (Magnitude+ Geographic extent + Duration of the Impact)															
Likelihood (Frequency of Activity + Frequency of Impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Note:

Rating of Impact Significance = Rating of Likelihood x Rating of Consequence

Table 4: Negative Impacts ratings and associated colour codes

Significance rating	Value	Colour Code	Negative Impact Management Recommendation
Very high	121-150		Propose mitigation measures
High	100-120		Propose mitigation measures
Medium high	77-99		Propose mitigation measures
Low medium	51-76		Maintain current management
Low	25-50		Maintain current management
Very low	4-24		Maintain current management

CHAPTER TWO

2. PROJECT DESCRIPTION AND DESIGN

2.1. General Description of the Project Environment

The proposed project areas selected within Trans-Nzoia County include Matisi, Tuwani Shanti, Kipsongo, and Mitume Settlements all within Saboti Constituency and therefore the scope of works for this assignment is limited to the selected informal settlements. The County CIDP report indicates that Matisi, Shanti and Kipsongo are within Matisi Ward whereas Tuwani Mitume are within Tuwani Ward. Tuwani, kipsongo and Mitume are among the mushrooming informal settlements in the County due to rapid urbanization. The proposes projects in the selected settlements are as presented below:

Table 5: Proposed projects within the Selected Informal Settlements

Matisi Settlement	
Roads /footpath	*Construction of 2523m of roads*
Stormwater Drainage	*Construction of 2523m of Storm Water Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network (2998m)and household connections*
Public lighting	*Construction of 20Nr Street light and 1Nr. High mast flood light*
Tuwani Settlement	
Roads /footpath	*Construction of 1720m of roads*
Storm water Drainage	*Construction of 1720m of Storm water Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network (1760m) and household connections*
Public lighting	*Construction of 20Nr Street light*
Shanti Settlement	
Roads /footpath	*Construction of 2023m of roads*
Stormwater Drainage	*Construction of 2023m of Storm water Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network(1962m) and household connections*
Public lighting	*Construction of 20Nr Street light and 1Nr. High mast flood light*
Kipsongo A Settlement	
Water supply	*Construction of 1no. water kiosk*
sanitation	*Construction of 1no. ablution block and a biodigester*
Mitume Settlement	
Roads /footpath	*Construction of 2761m of roads*
Stormwater Drainage	*Construction of 2761m of stormwater Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network(2332m) and household connections*
Public lighting	*Construction of 25Nr Street light and 1Nr. High mast flood light*

Baseline assessments indicated that most of the settlements are covered with non-exotic vegetation which have mushroomed in unsettled areas. Most vegetation are found along the streams and rivers or along the storm water drainages along the roads especially during the rainy seasons.

Plates 1: Vegetation cover along one of the river tributary locally known as Mtoni Nyangau

The County has numerous rivers that act as tributaries to Nzoia River. These rivers originate from Mt.Elgon and Cherangany hills. The presence of these rivers has ensured adequate supply of water in the County thus the promotion of agriculture, recreation and tourism (CICDP 2027-2027). Apart from rivers, other sources of water include: - springs, wells, boreholes, ponds, dams, pans and rain water harvesting. Observed during eh site visit were springs used by residents to access water. The CIDP report County fact sheet indicates that the County has 544 protected and 25 unprotected springs.

Plates 2: View of residents sourcing spring water in Matisi

Plates 3: Spring Water source in Matisi

Plates 4: A nearby river tributary known to the locals as Exodus River

The largest natural forest cover in the County is found in Mt. Elgon and the Cherang'any Hills, however, continued pressure from human activities significantly affects negatively the forest cover which continued to reduce from 17% in 2013 to the current 15.1%. No forests were observed along the proposed project areas.

2.2. Project Location

The proposed five settlements are all located within an urban set up to the Northwestern side of Trans-Nzoia County and are all easily accessible from the Kitale Town Center.

Trans Nzoia County covers an area of 2,495 Km^2 and is located in the Rift Valley region of Kenya. It borders the Republic of Uganda to the North - West, Bungoma to the West and South - West, Kakamega and Uasin Gishu to the South - East, Elgeyo Markwet to the East and West Pokot to the North. Its geographical coordinates are 1.0567° N, 34.9507° E and located at an altitude of 1864.59m above sea level, experiencing annual mean temperatures of between 12.33º C to 25.38º C. (Trans Nzoia County Integrated Development Plan, 2018-2022).

Trans Nzoia County comprises of five administrative sub counties namely Kiminini, Saboti, Cherang'any, Endebess and Kwanza. The sub counties are further sub-divided into twenty-five administrative wards. Under the national government, the county comprises of five administrative sub counties namely; Kiminini, Trans Nzoia West, Trans Nzoia East, Endebess and Kwanza. The sub counties are further sub divided into 39 locations, 63 sub locations and 1,610 Villages.
The population is projected to increase to 1,265,797. The highest proportion of the population in Trans Nzoia is Children of Age 0-14 which accounts for over 43 percent of the projected county population. The county has generally a youthful population with 876,813 of her population below 35 years of age, representing 78.9 per cent of the total projected population and only 4,853 persons in the age cohort, 80+. On the other hand, the labour force mainly of ages 15-64 years has a projected population of 600,191 persons representing 54 percent of the total county population. In line with the Urban Areas and Cities Act, 2011 Trans Nzoia County has two main urban centres namely Kitale and Kiminini towns. The total projected population for these towns is 182,186. Trans Nzoia County is among top fifteen densely populated counties in the country. The population density is projected to 507.2 people per square kilometer (Trans Nzoia County Integrated Development Plan, 2018-2022).

Figure 2: Map of Trans-Nzoia County

2.2.1. Location Coordinates

Table 6: Tran-Nzoia Settlements Location Co-ordinates

Settlement	Co-ordinates	Altitude (m)
Mitume Settlement	1°01'44"N 34°59'08"E	1,858.2
Matisi Settlement	1°02'14"N 34°58'19"E	1,847.3
Tuwani Settlement	1°02'04"N 34°59'27"E	1,858.2
Shanti Settlement	1°00'48"N 34°58'51"E	1,837.4
Kipsongo Settlement	1°00'50"N 34°59'15"E	1,847.7

Figure 3 below indicates the settlement location map.

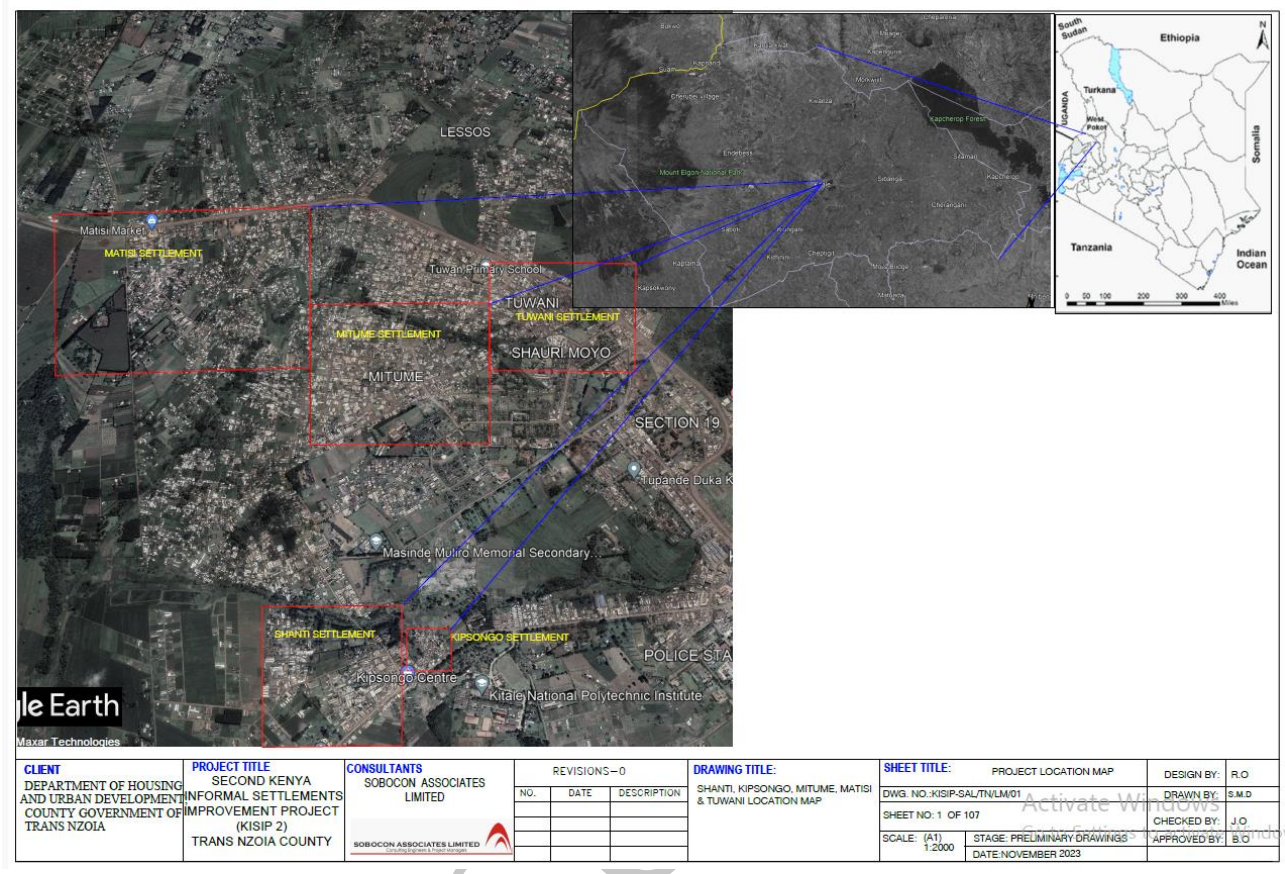


Figure 3: Settlement location Map

2.3. Project scope and details

The proposed projects in Trans-Nzoia County are within five informal settlements namely, Tuwani, Matisi, Mitume, Shanti and Kipsongo. These settlements are proposed to host the following project details:

2.3.1. Shanti Informal Settlement

2.3.1.1 Location of Shanti

Shanti Settlement is located within Matisi Ward (Trans-Nzoia CIDP 2023) and is part of the settlements earmarked for improvement on road, drainage, water supply and lighting projects.

2.3.1.2 Shanti Population

The current population in Shanti settlement is 1,794. The design population was based on a design base year of 2025 and 2045 as the ultimate year. Table 7 below shows the projected population for Shanti Settlement. Trans Nzoia County Integrated Development Plan, 2018-2022).

Table 7: Projected Population of Shanti

Surface	Population	Density	Pop. 20-year Projection (4.2%)
[km^2]	[hab]	[hab/ km^2]	[hab20]
0.18 km^2	1,794	9,966	4,085

Hence, the following scenarios were prepared:

- Design to consultants figures as detailed above
- Design to estimated population numbers based on the consultant's figures.
- Design to a 20-year projection based on the consultants figures with a growth rate of 4.2%[4].
- The design population is 4,085 inhabitants.

2.3.1.3 Project components

The proposed project and its components comprise of construction of 2023m internal roads with 4-15m reserve width and 2023m storm drainage network. The other project components involve construction of tertiary service lines of Water Supply Reticulation Network (1962m) and household connections and Construction of 20Nr Street light and 1Nr. High mast flood light. The settlement

[4] Source World bank open source data 2008

has an estimated area of 18 Ha with a population about 1,794 people. Table 8 below summarizes the proposed project details in Shanti settlement.

Table 8: Shanti project details

Shanti Settlement		**Length**	**Width**
Roads /footpath	*Construction of 2023m of roads* *i. Shanti- Kipsongo-1150m*	*1150m*	*14m*
	ii. Magoha Lane-70m	*70m*	
	iii. Mama Kethi Lane-100m	*100m*	
	iv. PAG-Makarani Road-350m	*350m*	
	v. Kitale Kisewe Road-353m	*353m*	
Storm Water Drainage	*Construction of 2023m of Storm water Drainage Network*	*2023*	
Water Supply	*Construction of Tertiary service lines of Water Supply Reticulation Network(1962m) and household connections*	*1962m*	
Public Lighting	*Construction of 20Nr Street light*	*30m high*	
	1Nr. High mast flood light		

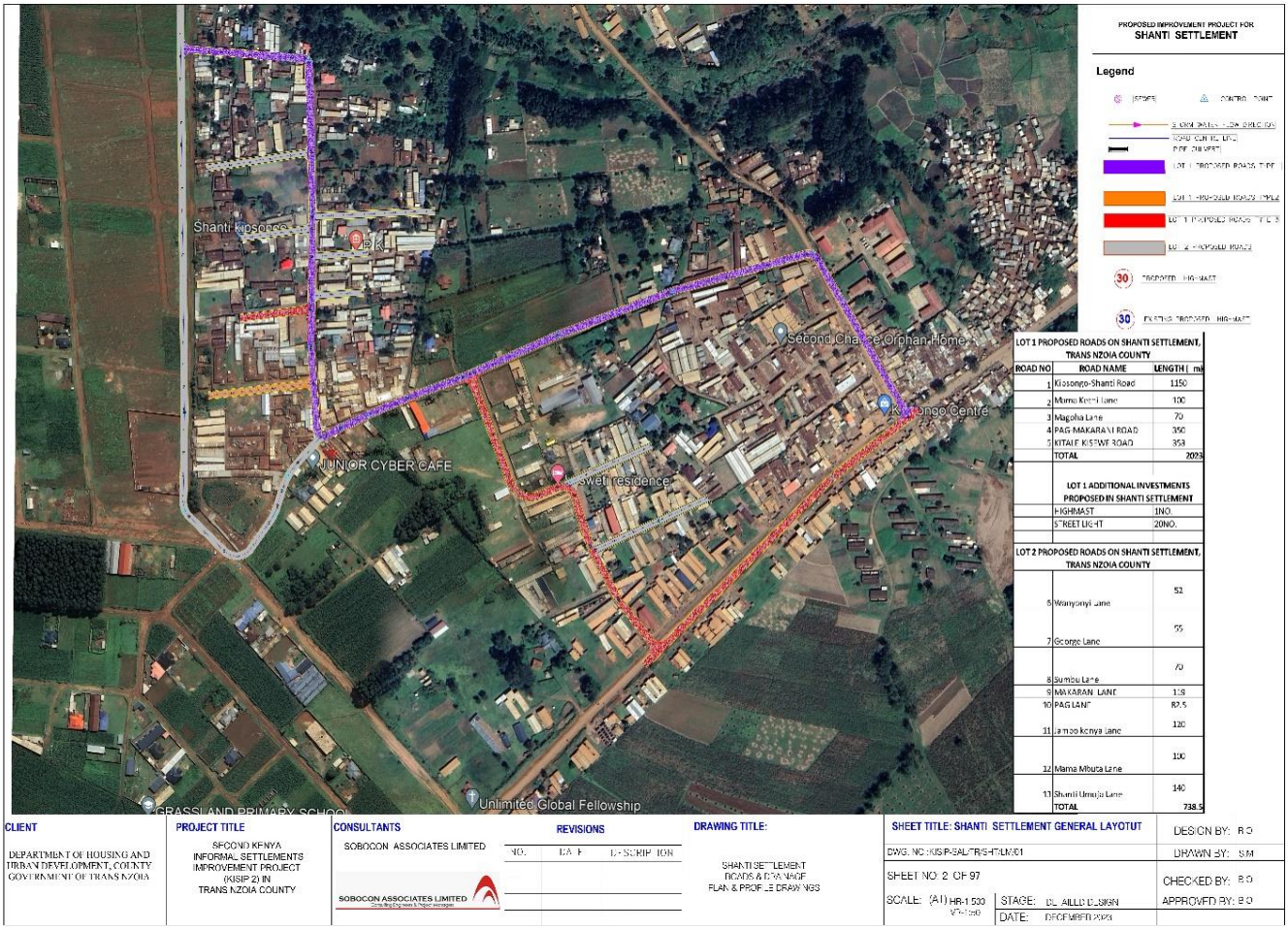


Figure 4: Shanti Project Area Map

2.3.1.4 Shanti Proposed Project Designs

2.3.1.4.1 Shanti Roads and Footpath

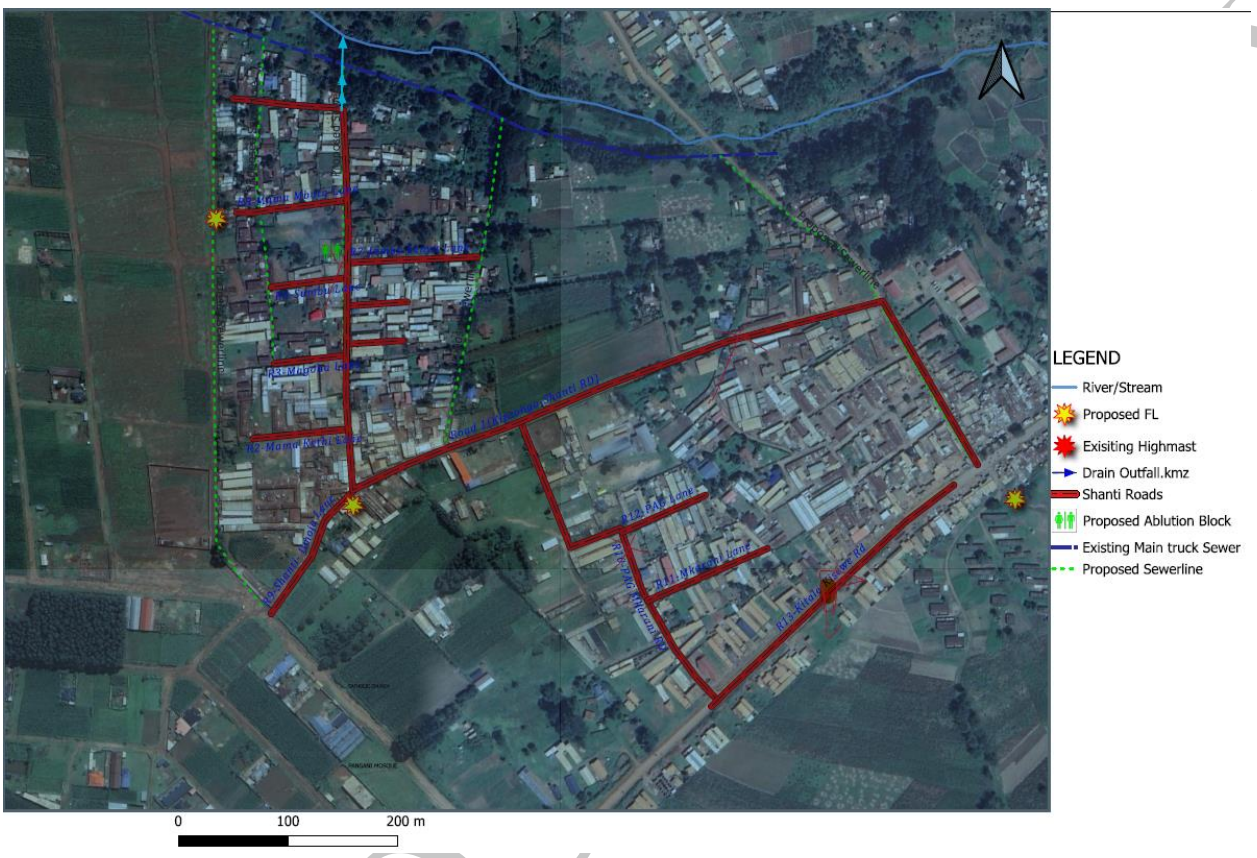


Figure 5: Shanti proposed Project Roads

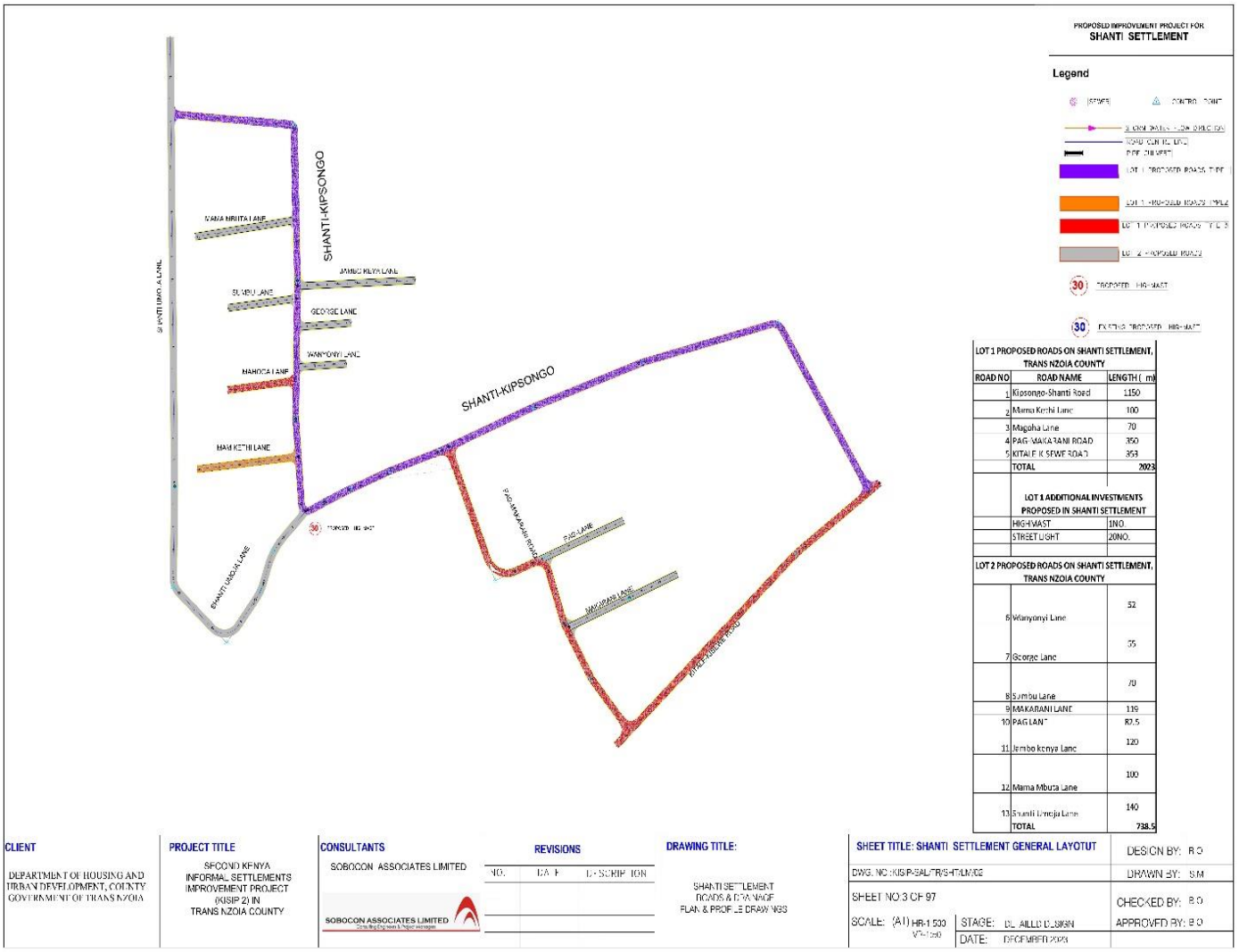


Figure 6: Roads and footpath layouts

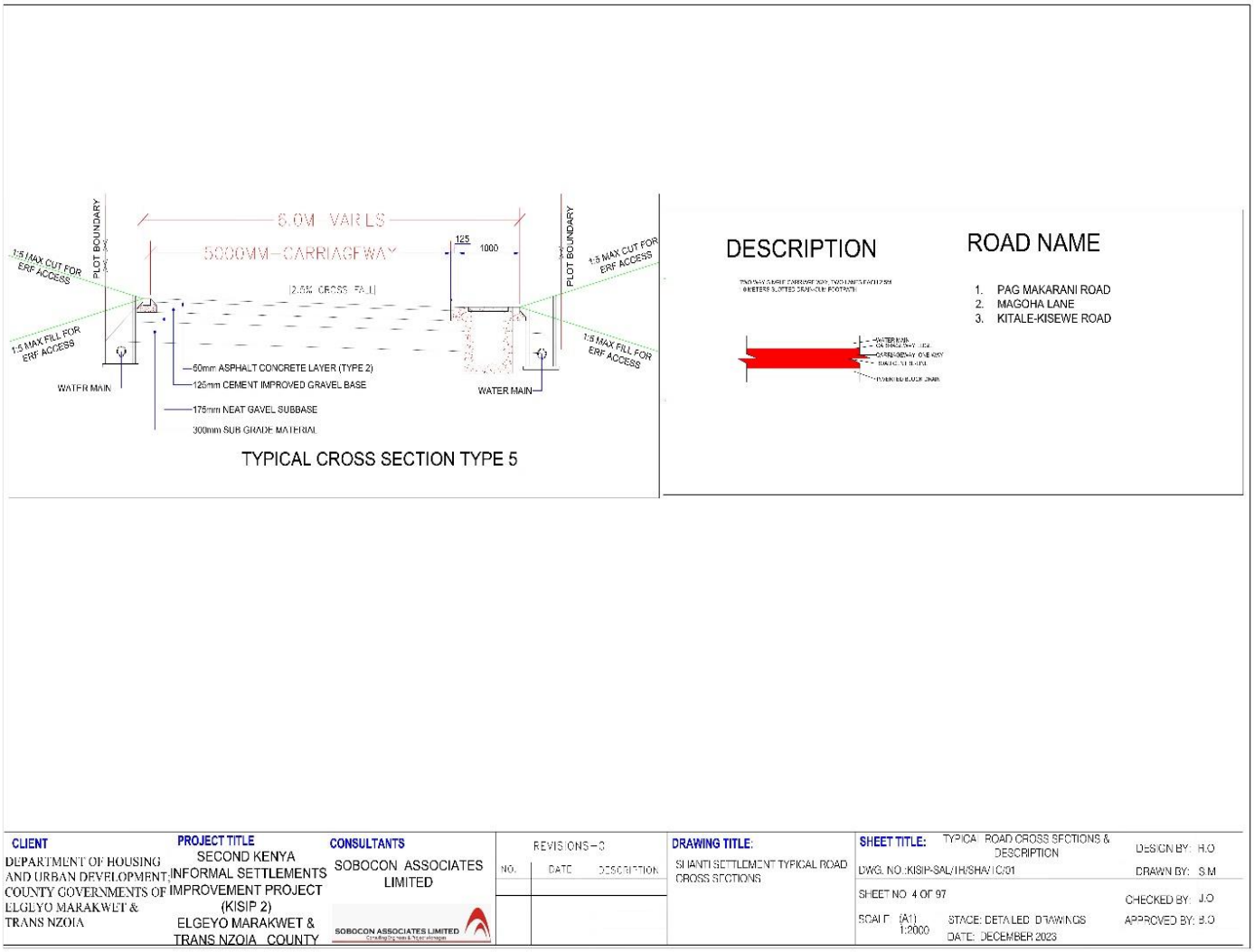


Figure 7: Road Cross section

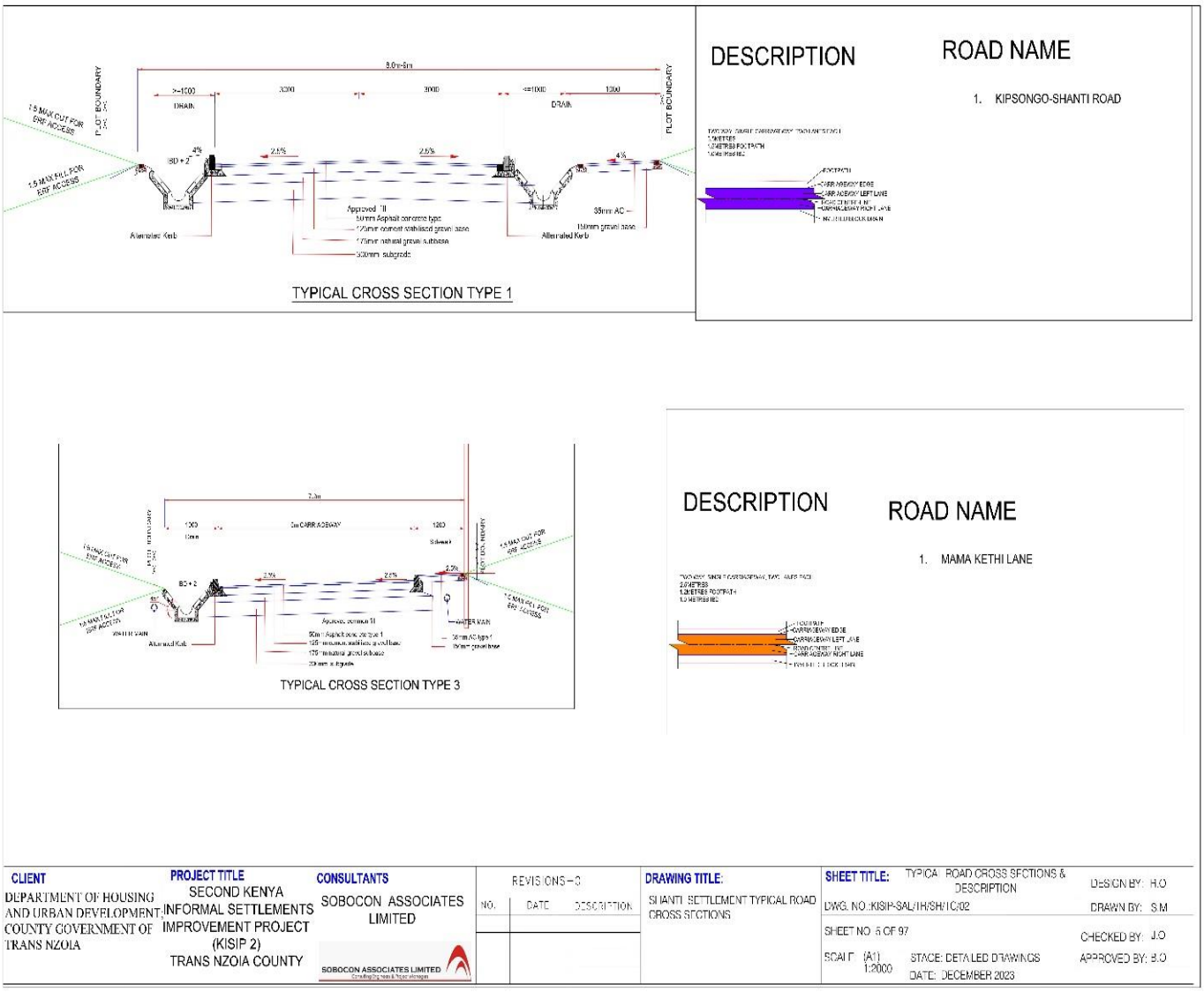
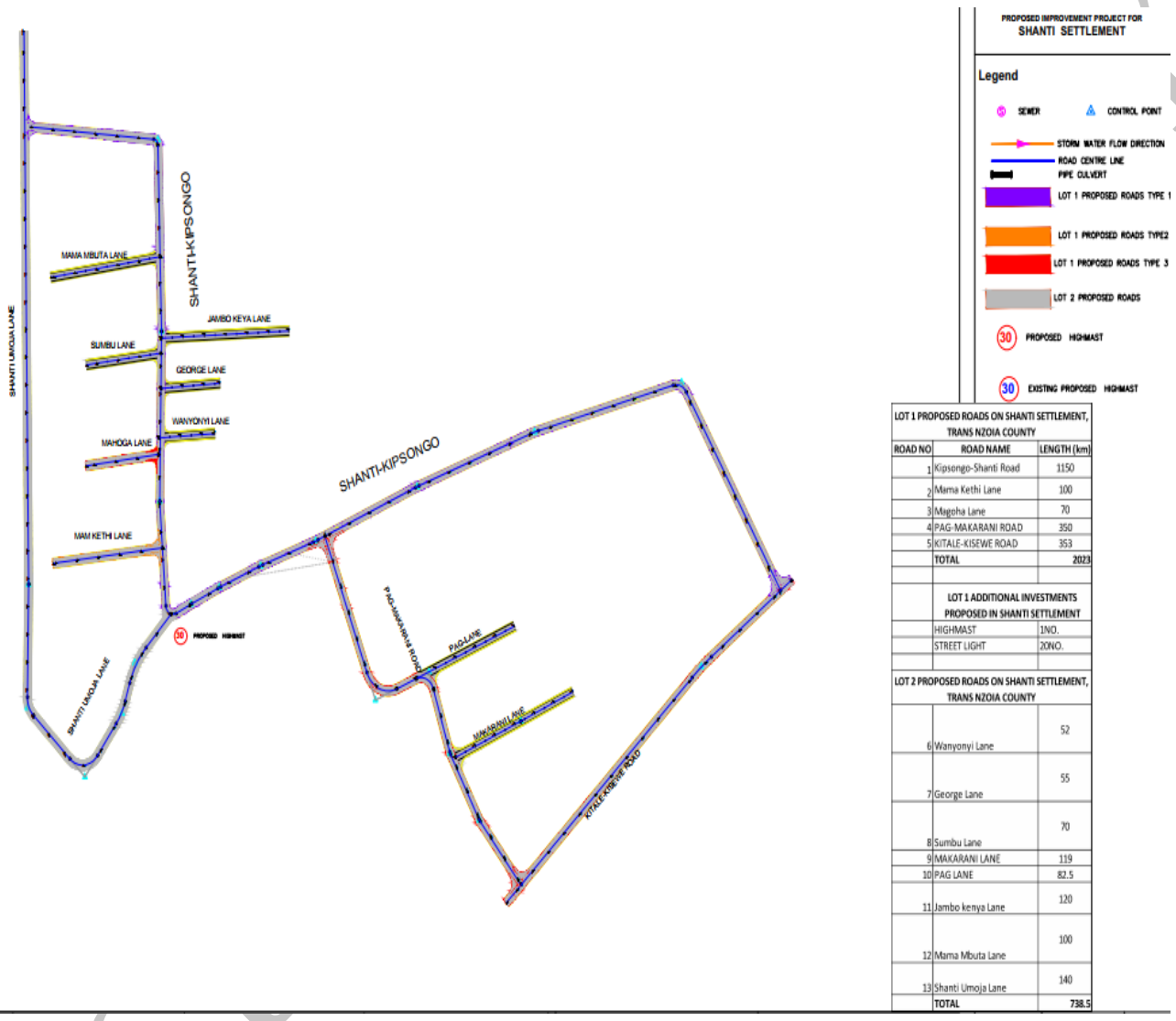


Figure 8: Roads Cross Section

2.3.1.4.2 Shanti Water Supply



LOT 1 PROPOSED ROADS ON SHANTI SETTLEMENT, TRANS NZOIA COUNTY		
ROAD NO	ROAD NAME	LENGTH (km)
1	Kipsongo-Shanti Road	1150
2	Mama Kethi Lane	100
3	Magoha Lane	70
4	PAG-MAKARANI ROAD	350
5	KITALE-KISEWE ROAD	353
	TOTAL	2023

LOT 1 ADDITIONAL INVESTMENTS PROPOSED IN SHANTI SETTLEMENT		
	HIGHMAST	1NO.
	STREET LIGHT	20NO.

LOT 2 PROPOSED ROADS ON SHANTI SETTLEMENT, TRANS NZOIA COUNTY		
6	Wanyonyi Lane	52
7	George Lane	55
8	Sumbu Lane	70
9	MAKARANI LANE	119
10	PAG LANE	82.5
11	Jambo kenya Lane	120
12	Mama Mbuta Lane	100
13	Shanti Umoja Lane	140
	TOTAL	738.5

Figure 9: Shanti Water Supply Network

2.3.1.4.3 Shanti Public Light Design

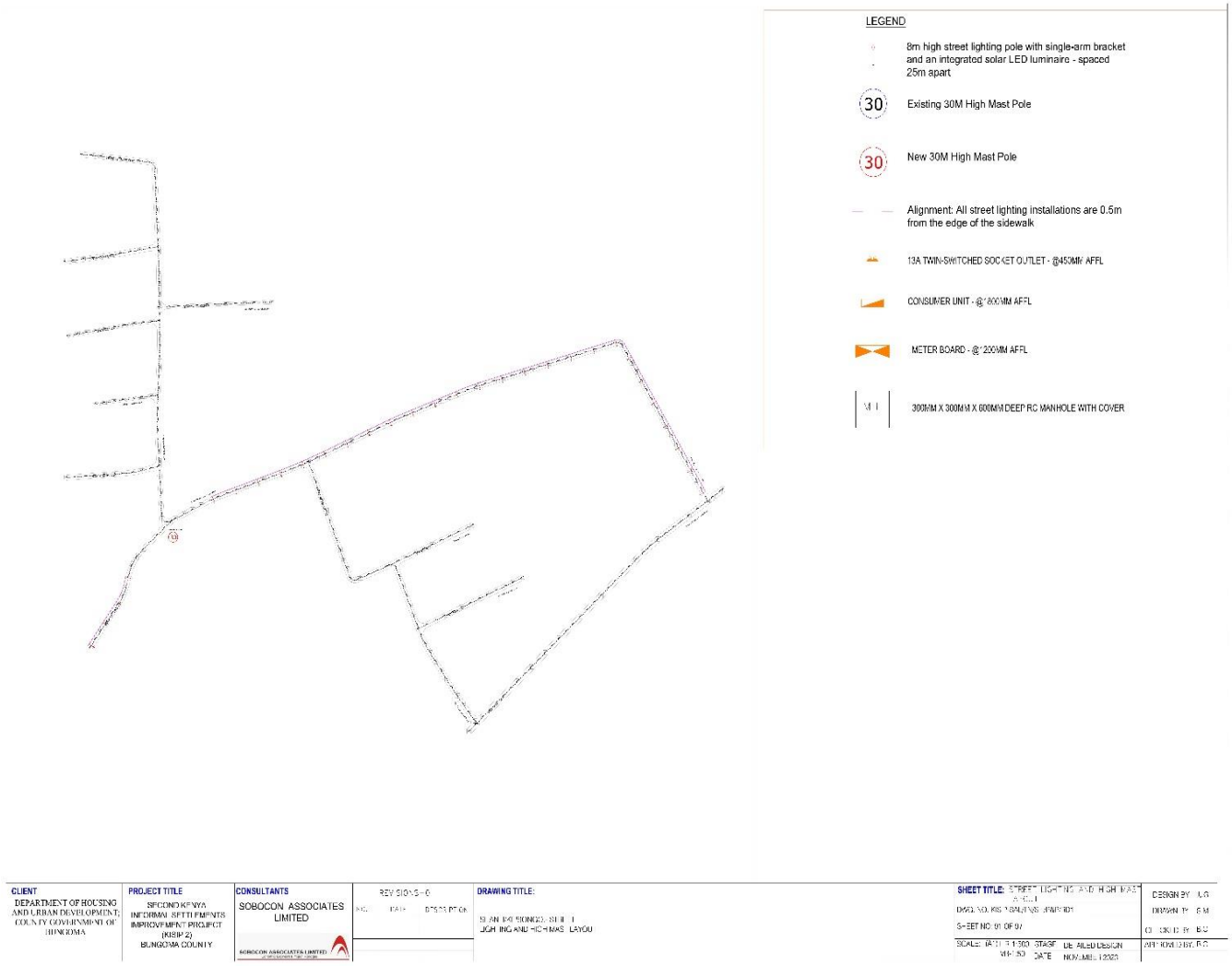


Figure 10: Street and High Mast layouts

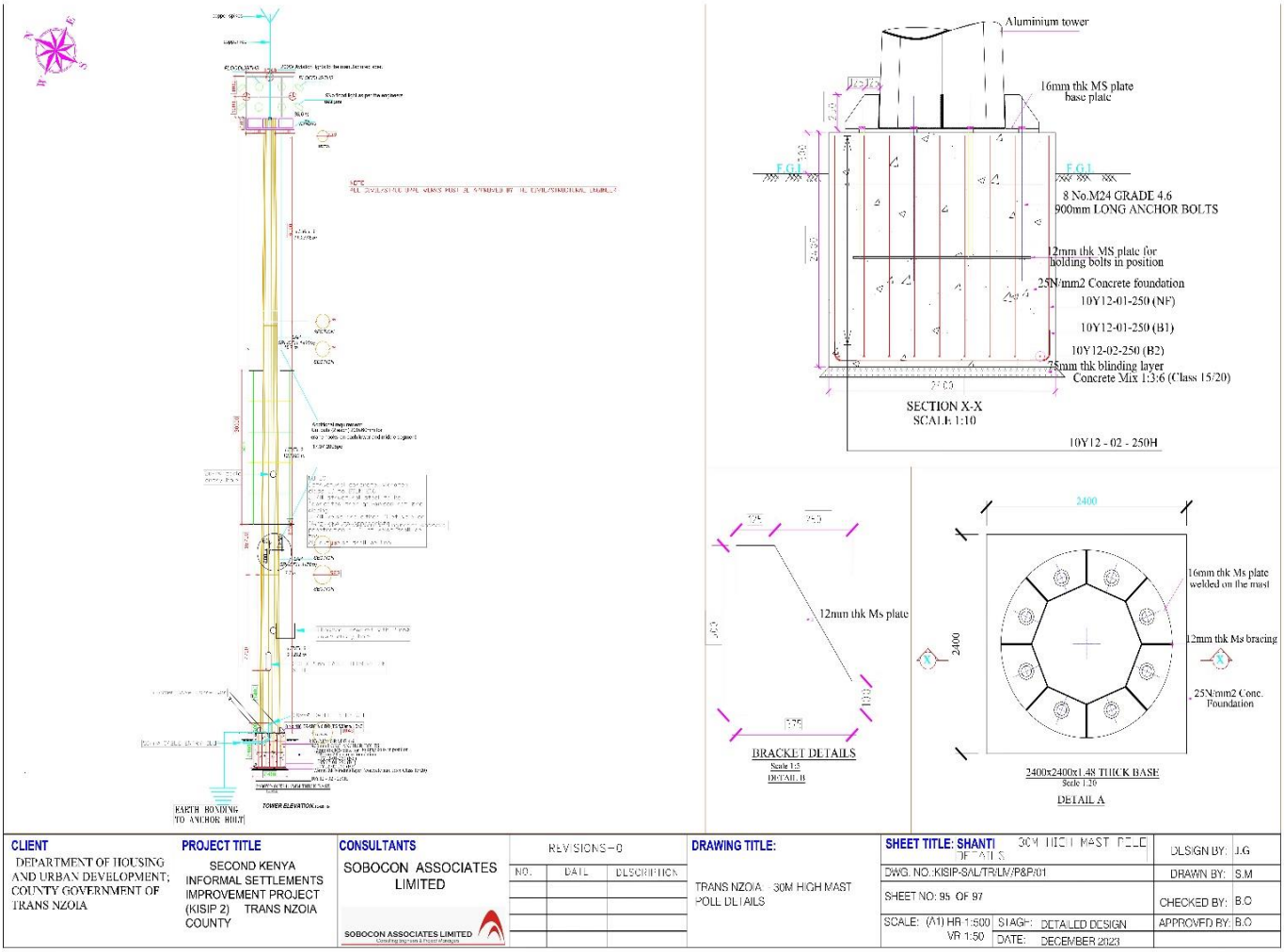


Figure 11: Mast poles details

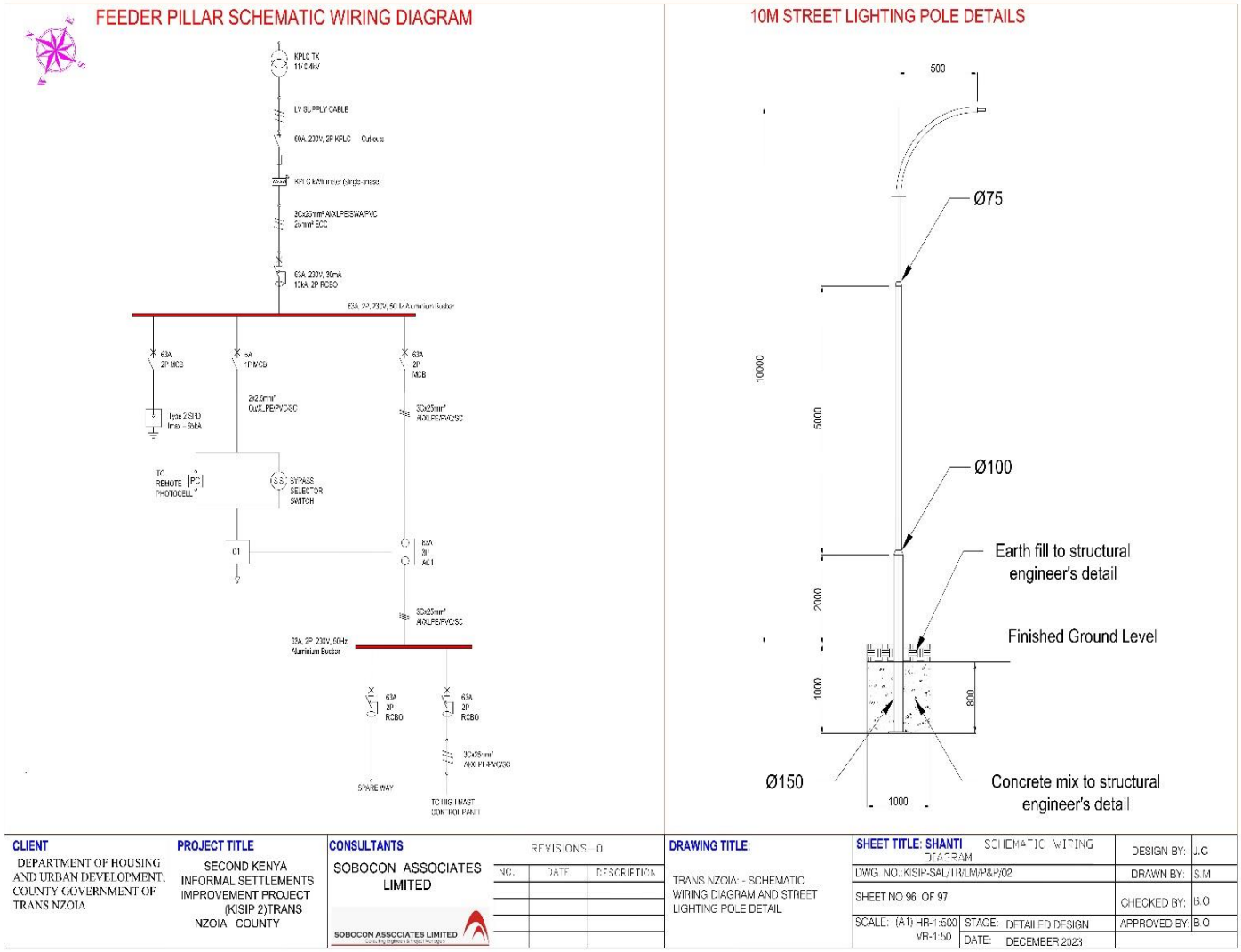


Figure 12: Street lights pole details

2.3.2 Kipsongo A Informal Settlement

2.3.2.1 Location of Kipsongo

Kipsongo Settlement is located within Matisi Ward and is part of the settlements earmarked for water supply and sanitaion projects.

2.3.2.2 Population

The current population in Kipsongo A settlement is 2,098. The design population was based on a design base year of 2025 and 2045 as the ultimate year. Table 9 below shows the projected population for Kipsongo A Settlement (Trans Nzoia County Integrated Development Plan, 2018-2022).

Table 9: Projected Population of Kipsongo A

Surface	Population	Density	Pop. 20-year Projection (4.2%)
[km^2]	[hab]	[hab/ km^2]	[hab20]
0.27 km^2	2,098	7,770	4,777

Hence, the following scenarios were prepared:

- Design to consultants figures as detailed above
- Design to estimated population numbers based on the consultants figures.
- Design to a 20-year projection based on the consultants figures with a growth rate of 4.2%[5].
- The design population is 4,777 inhabitants.

2.3.2.3 Project Components

The project will include construction of 1 water kiosk and Construction of 1no. ablution block and a bio digester. The settlement has an estimated area of 27 Ha with a population about 2,098 people. Table 10 below summarizes the proposed project details in Kipsongo Settlement.

Table 10: Kipsongo A Project Details

Kipsongo A Settlement	
Water supply	*Construction of 1no. water kiosk*
Sanitation	*Construction of 1no. ablution block and a bio digester*

[5] Source World bank open source data 2008

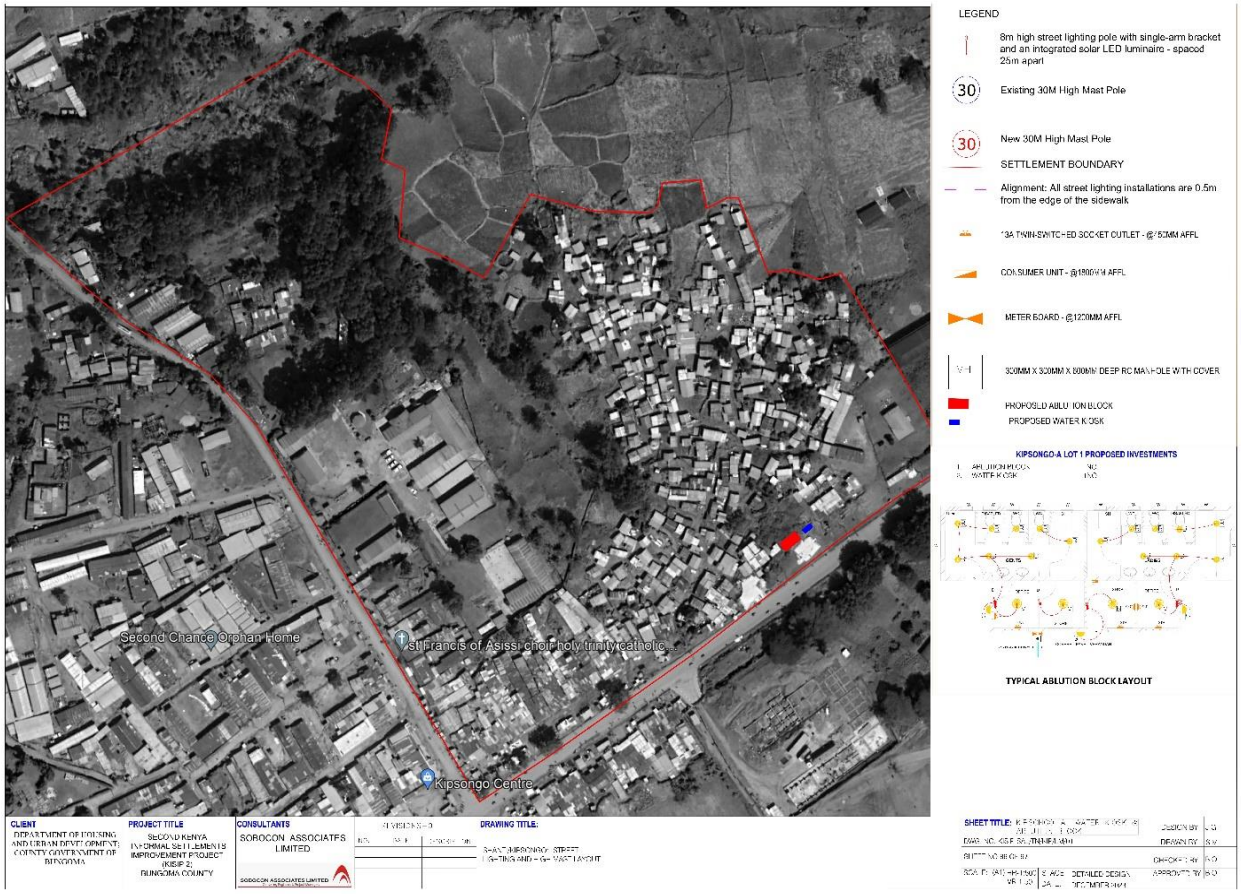


Figure 13: Kipsongo Project Area Map

Plates 5: Proposed Ablution Block Location

The above mentioned projects will upgrade the infrastructure and sanitation situation in the informal settlements, hence helping the County Government in the fulfilment of the constitutional

requirements of providing healthy and clean environment to the residence. During the initial construction phases, the project is likely to cause limited negative environmental and social impacts that are more localized in the project area with the implementation within the scope of planning/and can be mitigated.

2.3.2.4 Project Designs

The proposed project details are presented in 13 below:

2.3.2.4.1 Kipsongo Proposed Ablution Block

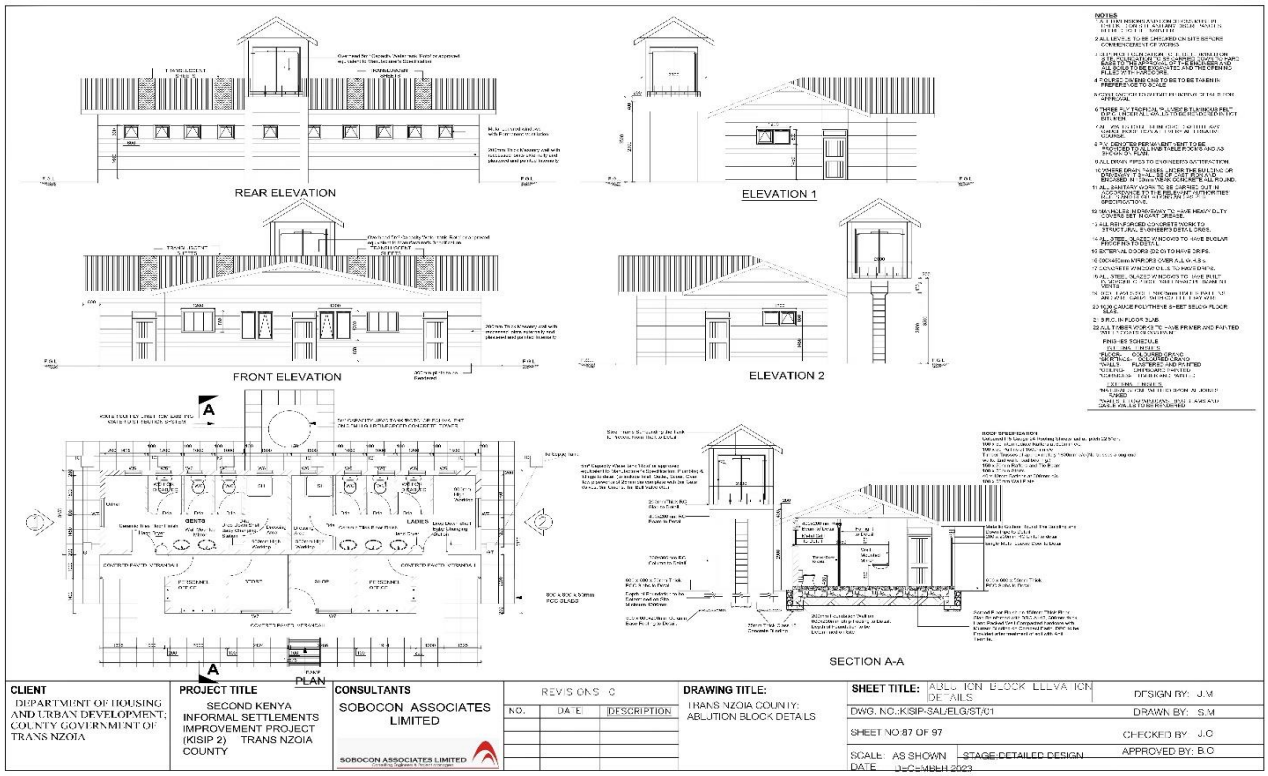


Figure 14: Ablution Block project details

2.3.3 Matisi Informal Settlement

2.3.3.1 Location of Matisi

Matisi Settlement is located within Saboti Ward as indicated in figure 15 below:

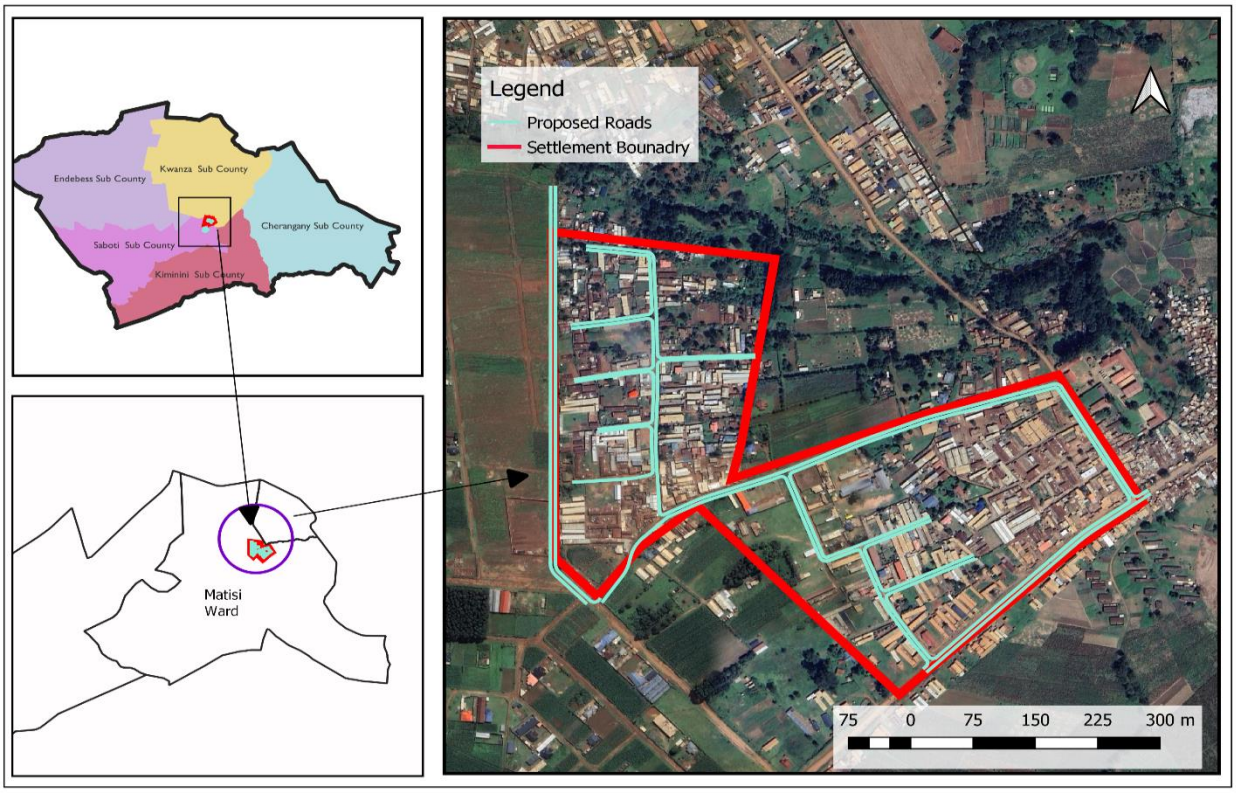


Figure 15: Matisi Ward Area Map

2.3.3.2 Matisi Population

The current population in Matisi settlement is 9,882. The design population was based on a design base year of 2025 and 2045 as the ultimate year. The Table 11 below shows the projected population for Matisi Settlement (Trans Nzoia County Integrated Development Plan, 2018-2022).

Table 11: Projected Population of Matisi

Surface	Population	Density	Pop. 20-Year Projection (4.2%)
[km^2]	[hab]	[hab/ km^2]	[hab20]
0.28	9,882	35,292	22,501

Hence the following scenarios were prepared:

- Design to consultants figures as detailed above
- Design to estimated population numbers based on the consultant's primary data.

- Design to a 20 year projection based on the consultants figures with a growth rate of 4.2%[6].
- The design population is 22,501 inhabitants.

2.3.3.3 Project Components

The proposed project in Matisi comprise of construction of 2523m internal roads with 9-15m reserve width and 2523m storm drainage network. The other project components involve Construction of Tertiary service lines of Water Supply Reticulation Network (2998m) and household connections and Construction of 20Nr Streetlight and 1Nr. High mast flood light. The settlement has an estimated area of 28 Ha with a population about 9,882 people. Table 12 below summarizes the proposed project details in Matisi settlement.

Table 12: Matisi project details

Matisi Settlement	
Roads /Footpath	*Construction of 2523m of roads* *i. Kiberenge St.John RD-913m* *ii. Sokomoko RD-450m* *iii. KERRA Link RD-1160m*
Storm Water Drainage	*Construction of 2523m of Storm Water Drainage Network*
Water Supply	*Construction of Tertiary service lines of Water Supply Reticulation Network (2998m)and household connections*
Public Lighting	*Construction of 20Nr Street light and 1Nr. High mast flood light*

[6] Source World bank open source data 2008

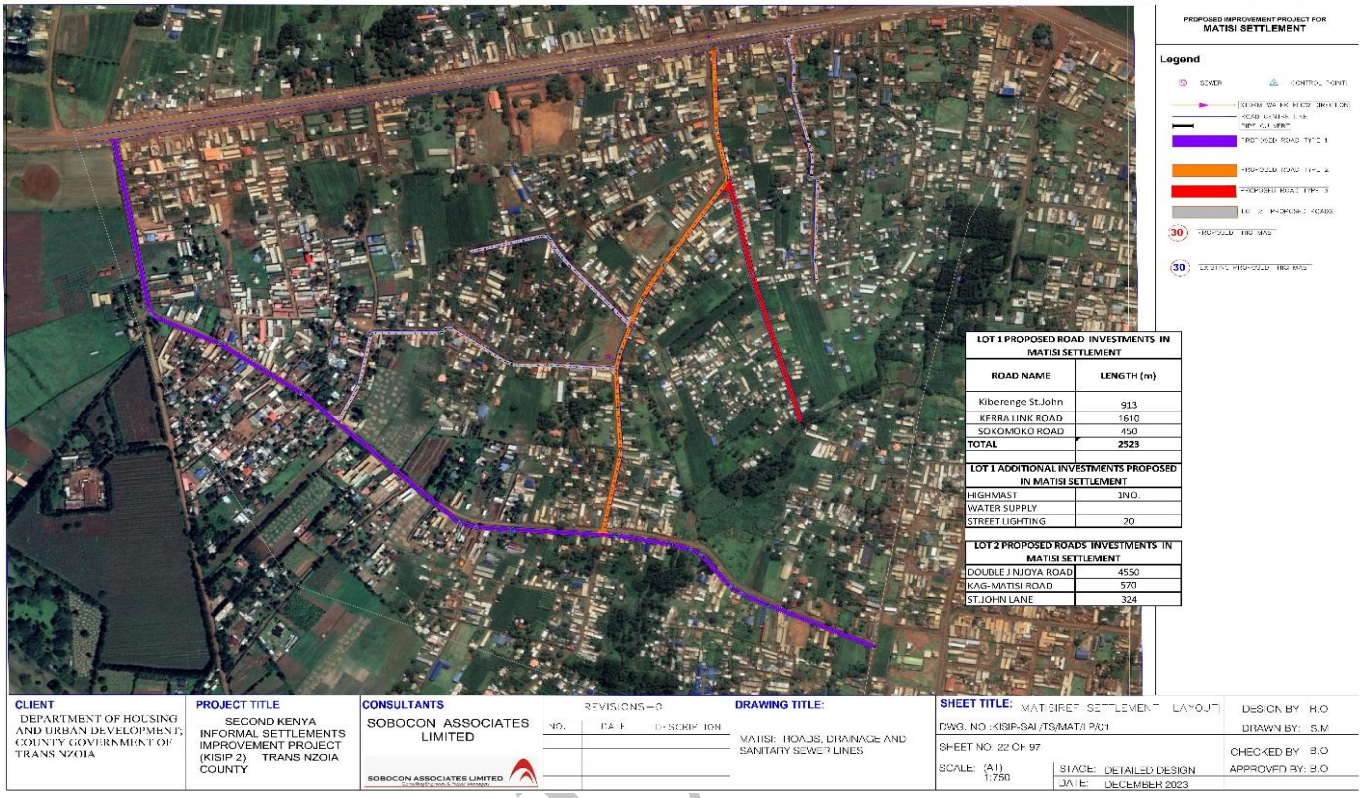


Figure 16: Matisi project area map

2.3.3.4 Project Designs

2.3.3.4.1 Matisi Road and Drainage Project Design

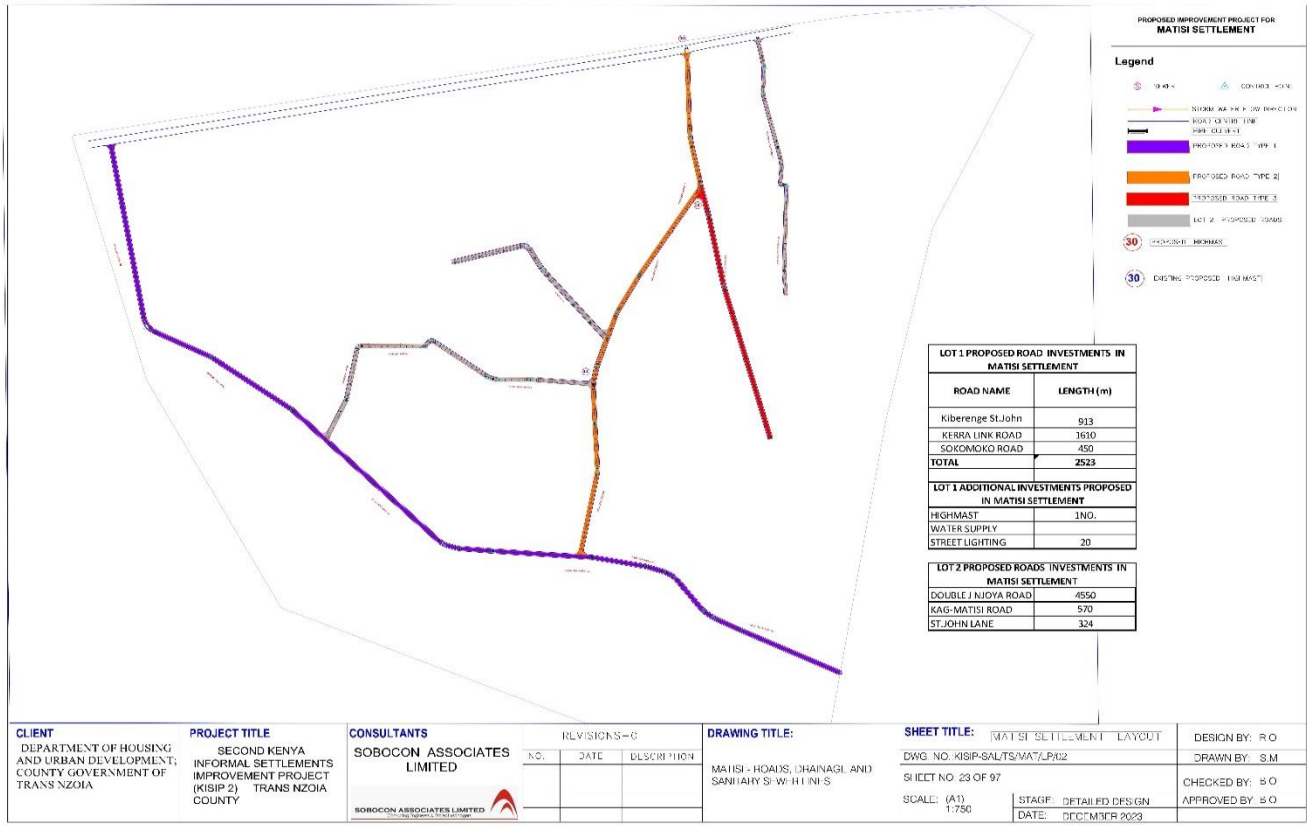


Figure 17: Matisi Roads and Drainage Network

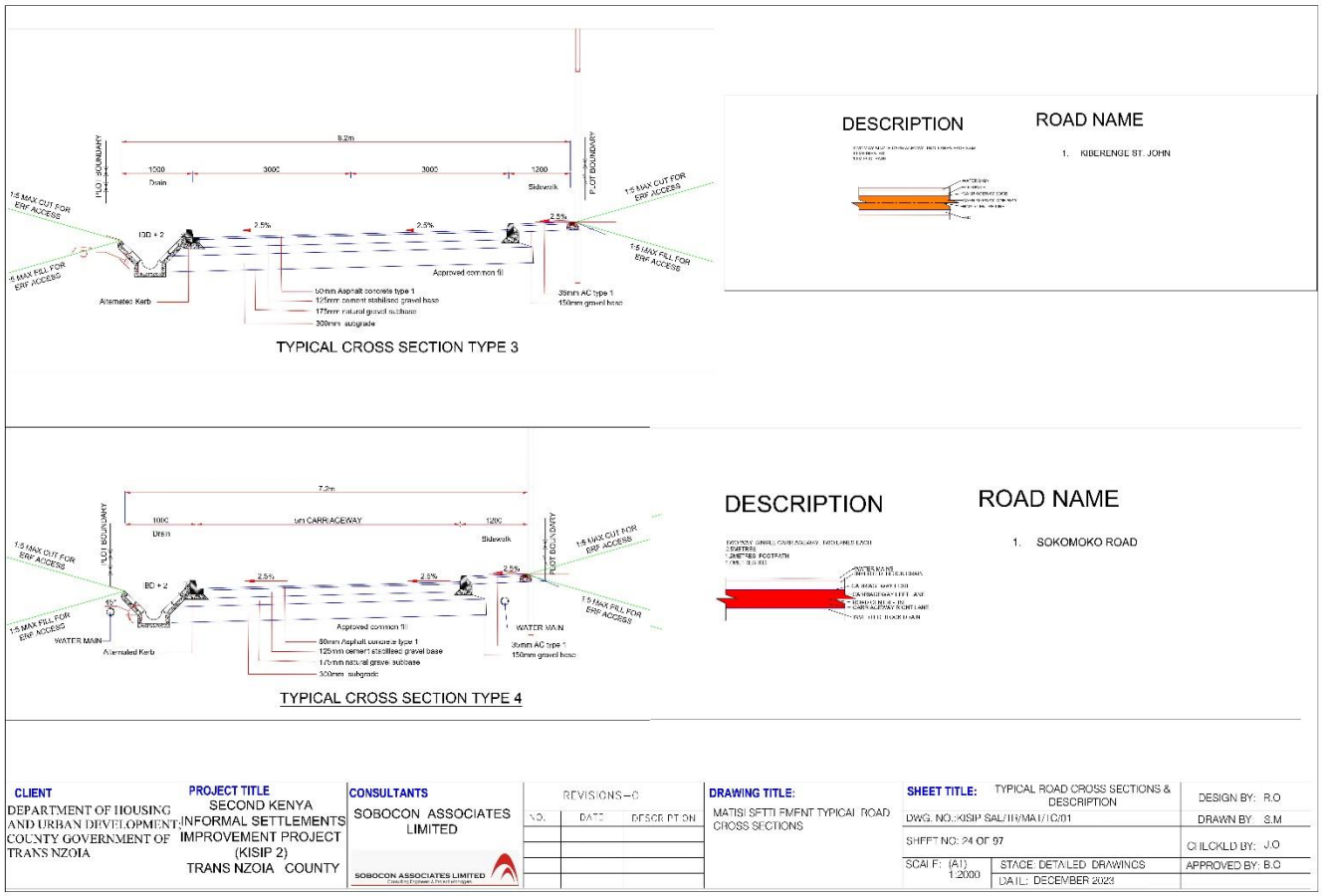


Figure 18: Roads Cross Section

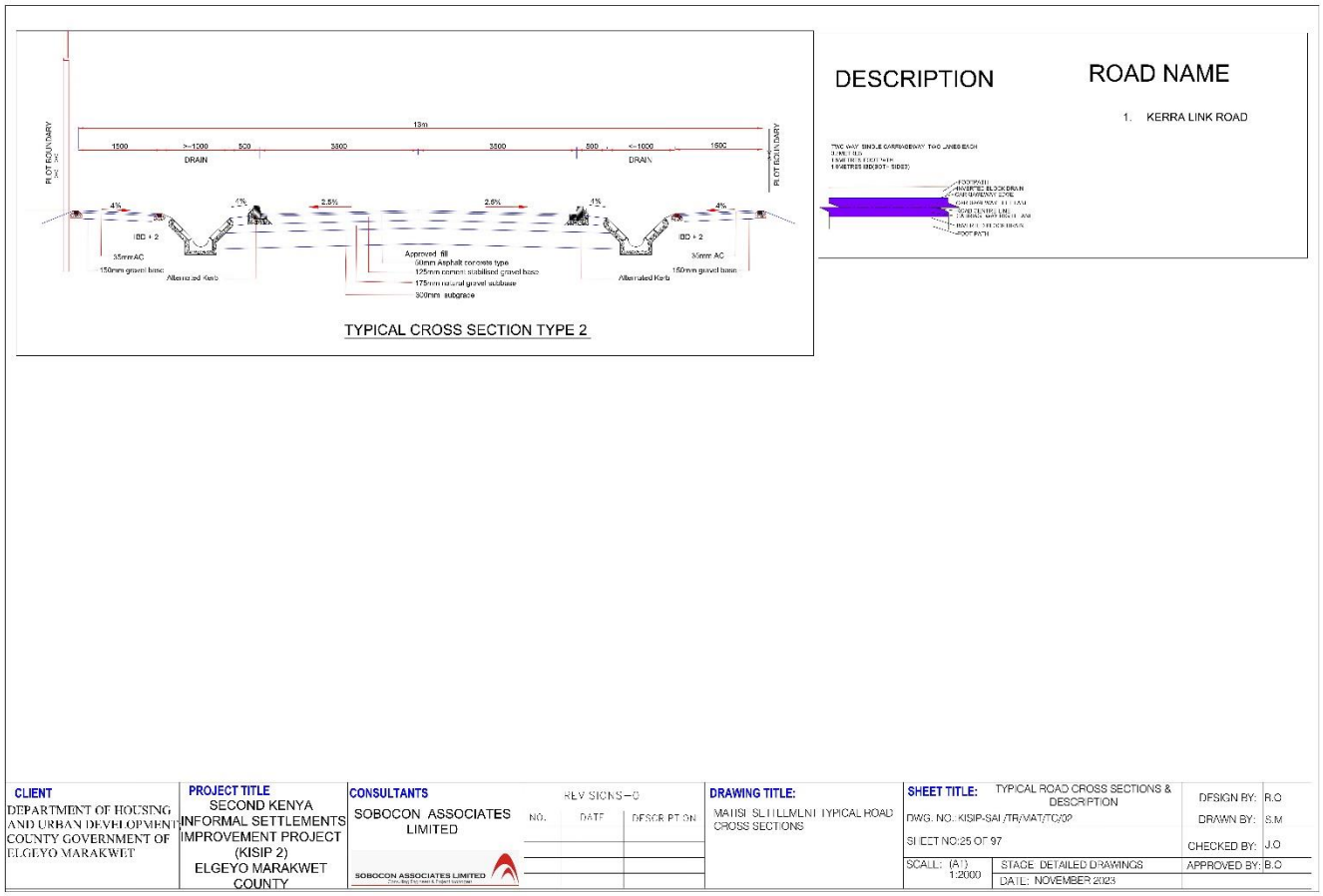


Figure 19: Roads Cross Section

2.3.3.4.2 Matisi Water Supply Project Design

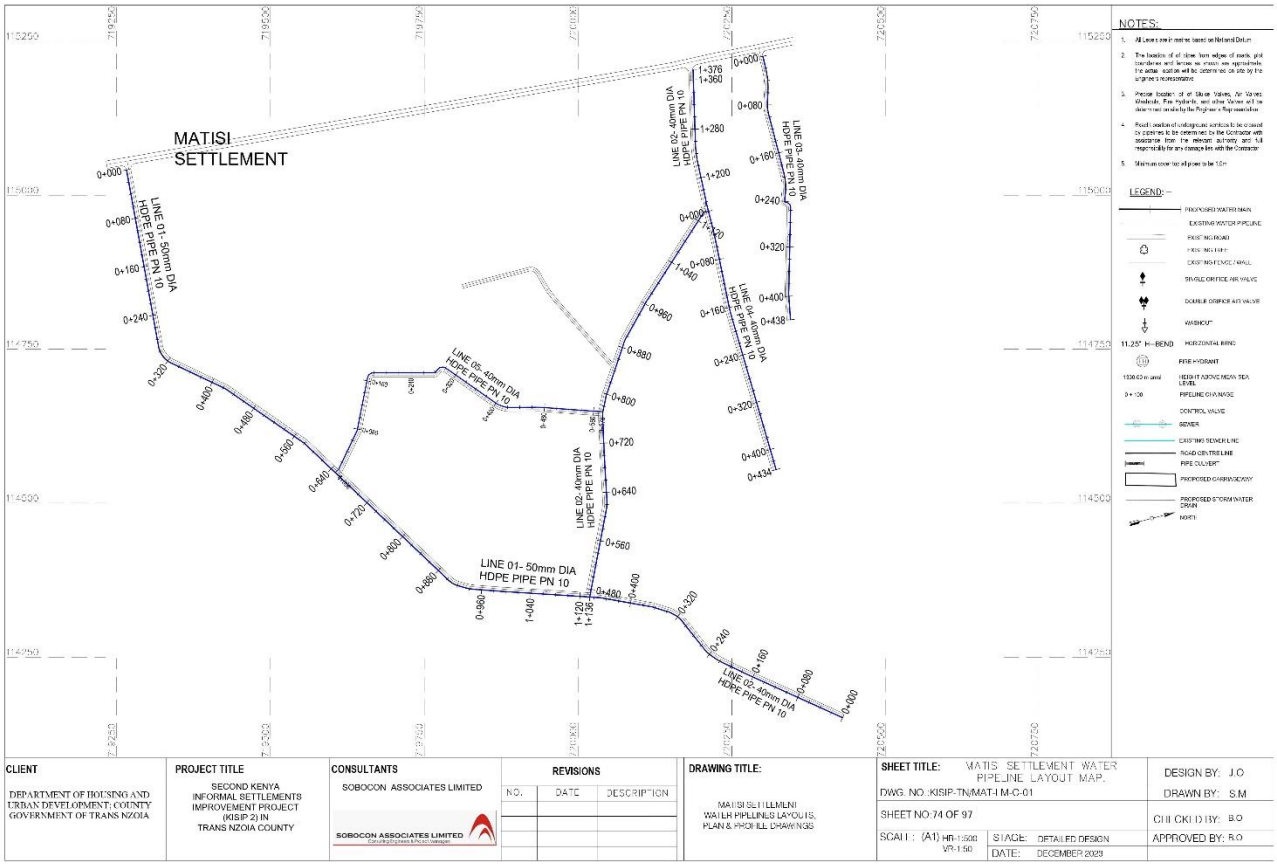


Figure 20: Matisi Water Supply Layout

2.3.3.4.3 Matisi Public Light Design

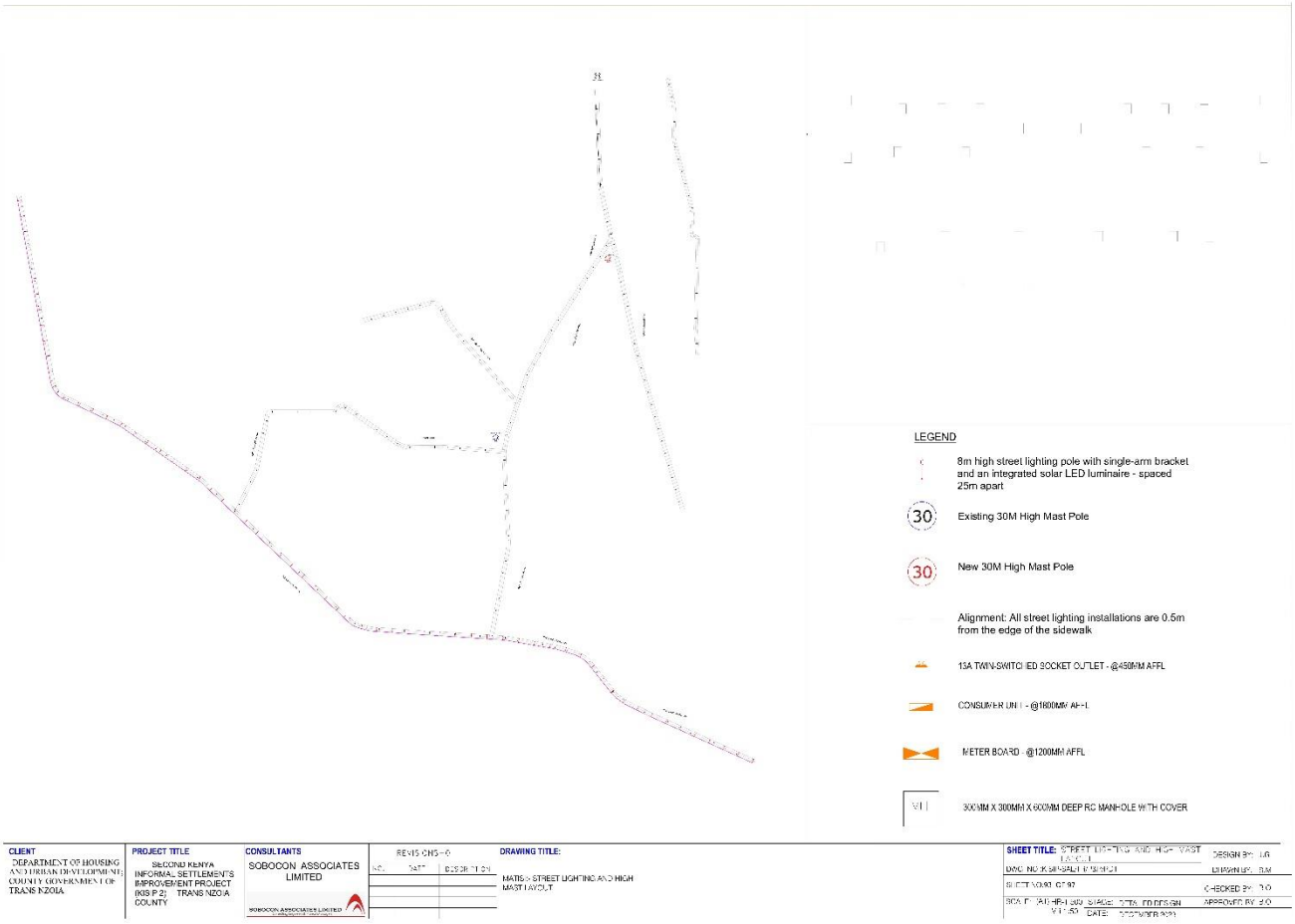


Figure 21: Matisi Lights Layout Map

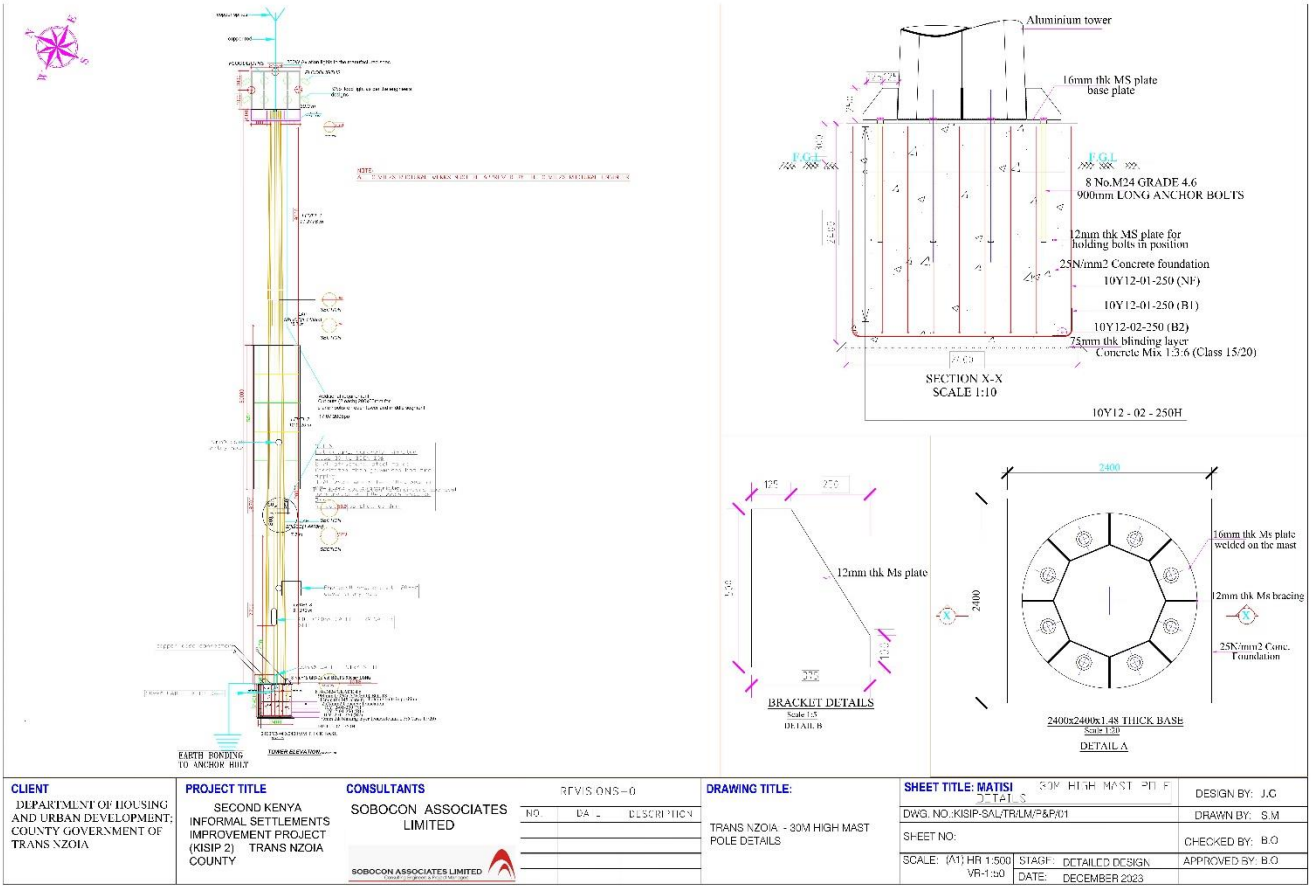


Figure 22: High Mast Pole Details

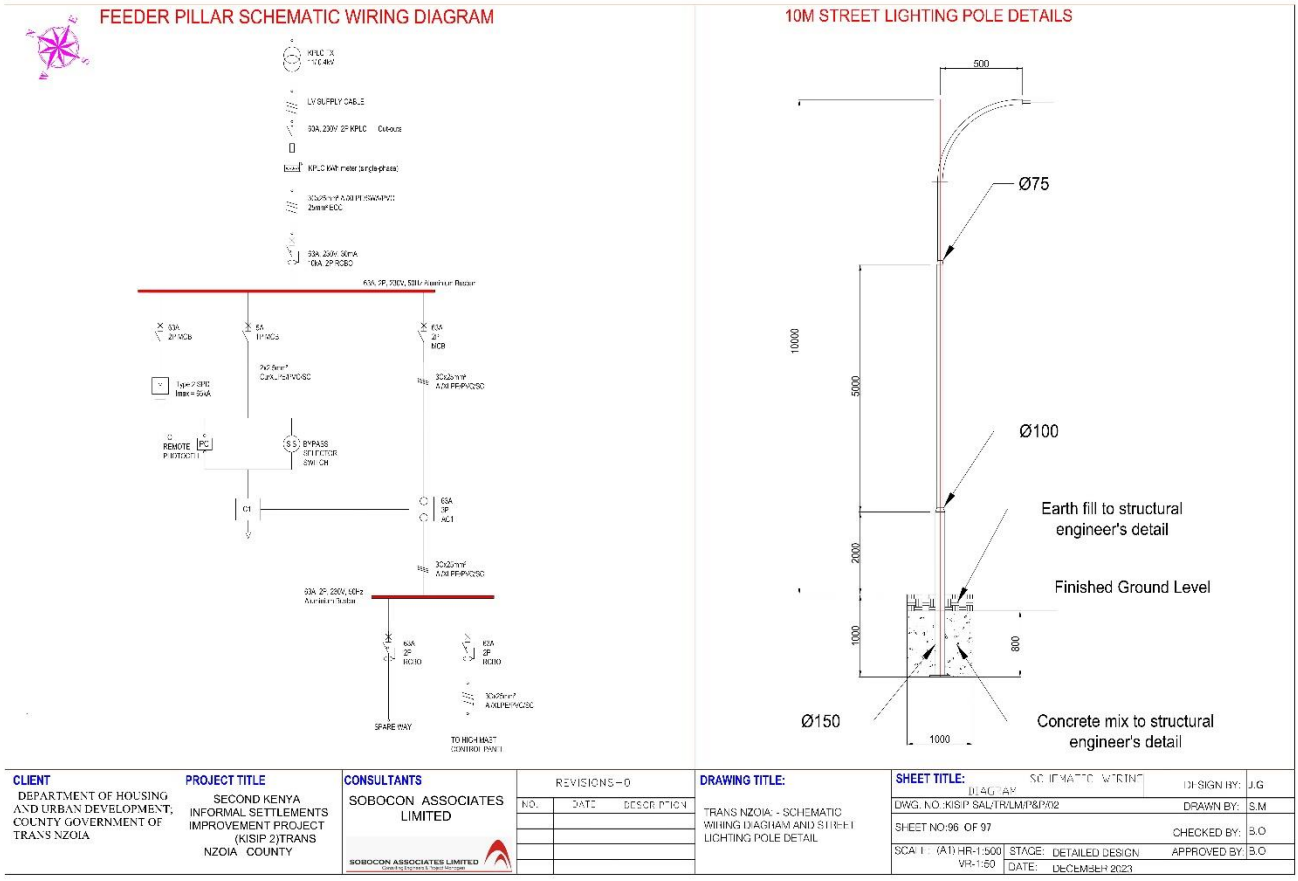


Figure 23: Street Lights Pole Details

2.3.4 Mitume (Mau Mau) Informal Settlement

2.3.4.1 Location of Mitume

Mitume Informal Settlement is located in Tuwani Ward and is one of the mushrooming settlements in Kitale Town (Trans-Nzoia CIDP 2023).

2.3.4.2 Population

The current population in Mitume settlement is 16,043. The design population was based on a design base year of 2025 and 2045 as the ultimate year. Table 13 below shows the projected population for Mitume Settlement (Trans Nzoia County Integrated Development Plan, 2018-2022).

Table 13: Projected Population of Mitume

Surface	Population	Density	Pop. 20-year Projection (4.2%)
[km^2]	[hab]	[hab/ km^2]	[hab20]
0.2 km^2	22,888	114,440	52,115

Hence, the following scenarios were prepared:

- Design to consultants figures as detailed above
- Design to estimated population numbers based on the consultants figures.
- Design to a 20 year projection based on the consultants figures with a growth rate of 4.2%[7]
- The design population is 52,115 inhabitants.

2.3.4.3 Project Components

The proposed project and its components comprise of construction of 2761m internal roads with 4-15m reserve width and 2761m storm drainage network. The other project components involve construction Tertiary service lines of Water Supply Reticulation Network (2332m) and household connections and Construction of 25Nr Streetlight and 1Nr. High mast flood light. Table 14 below summarizes the proposed project details in Mitume Settlement.

Table 14: Mitume project details

MITUME SETTLEMENT		Length	Width
Roads /footpath	Construction of 2761m of roads		
	Usafi Road	1841m	14m
	Mitume Hosital Road	576m	14m
	Umoja Link Road	140m	8m

[7] Source World bank open source data 2008

	Mitume Apostolic	204m	8m
Storm water Drainage	Construction of 2761m of storm water Drainage Network		
Water supply	Construction of Tertiary service lines of Water Supply Reticulation Network(2332m) and household connections		
Public lighting	Construction of 25No. Street light and 1Nr. High mast flood light.		

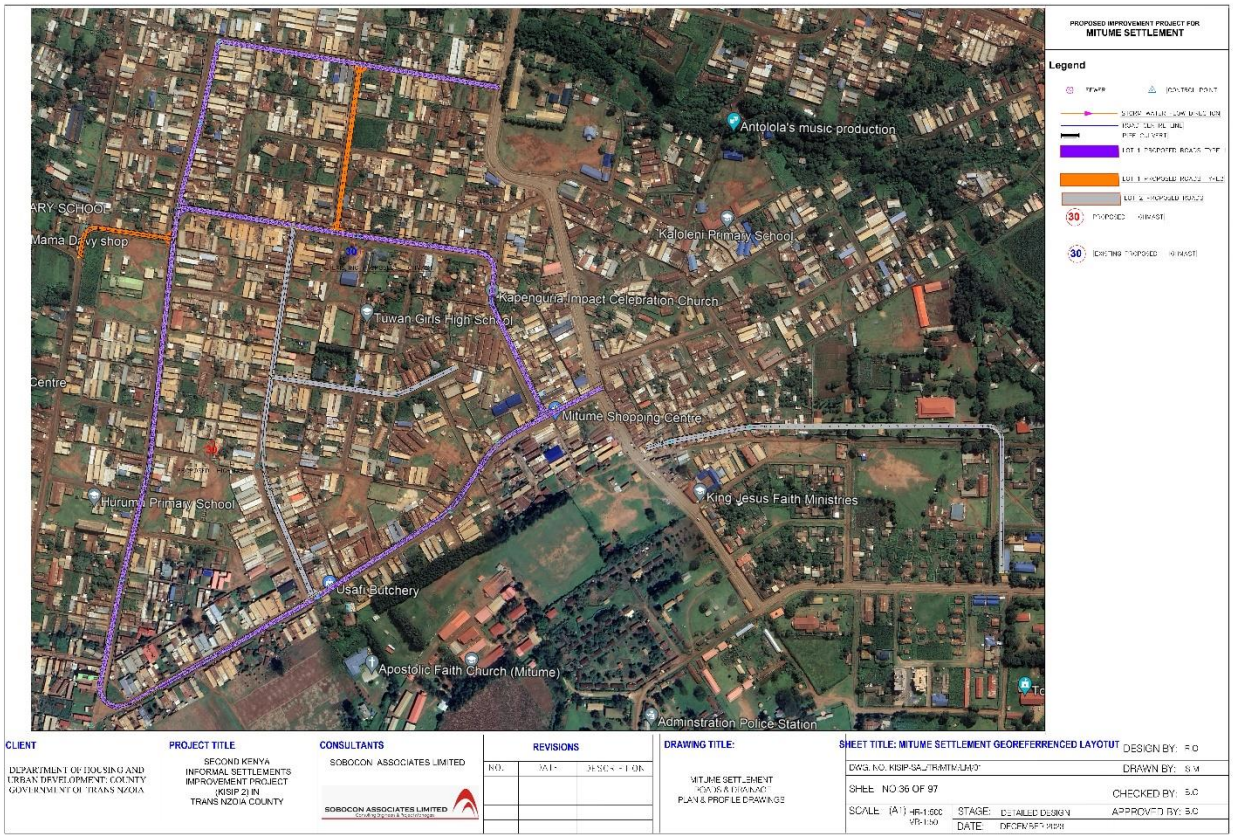


Figure 24: Mitume project area map

Plates 6: Part of Mitume Usafi Road

Plates 7: Part of Mitume Hospital Road

Plates 8: Part of the Mitume Apostolic Road

Plates 9: Part of the Umoja Link Road

Plates 10: Affected PAP wall

Plates 11: Affected PAP Kiosk

Plates 12:Affected PAP wall

2.3.4.4 Mitume Proposed Project Design

2.3.4.4.1 Mitume Roads and Footpath

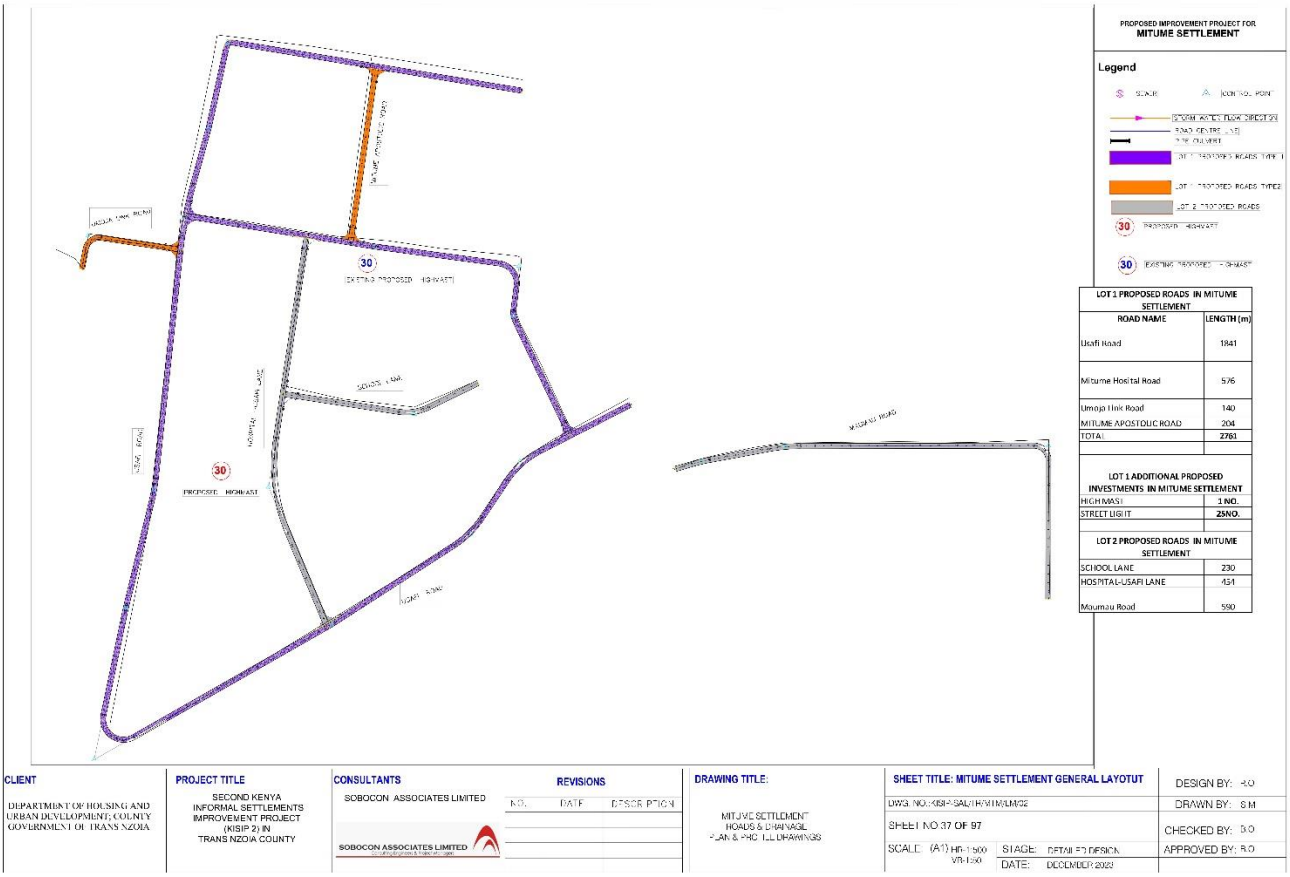


Figure 25: Mitume Roads and Drainage Network

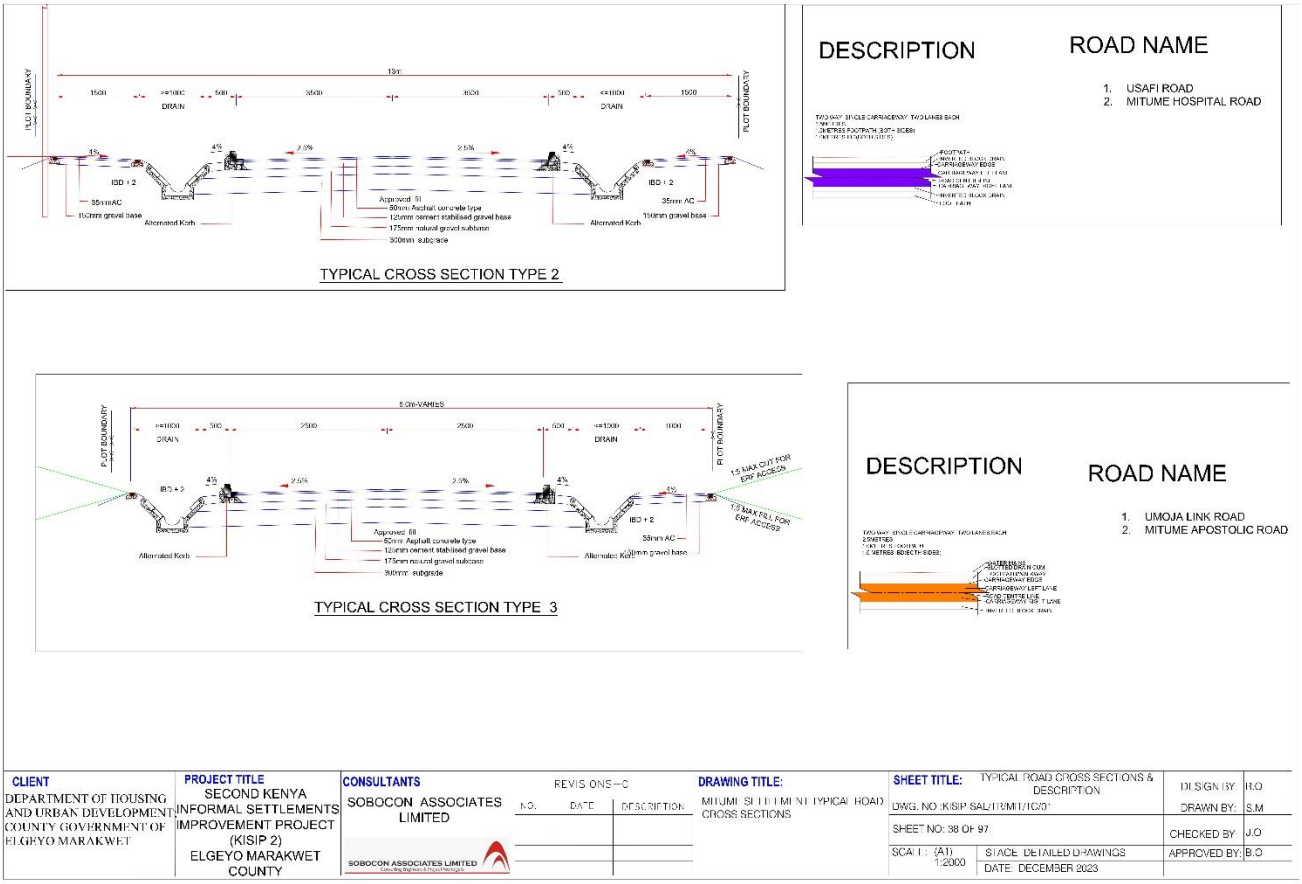


Figure 26: Mitume Roads Cross Section

2.3.4.4.2 Mitume Water Supply

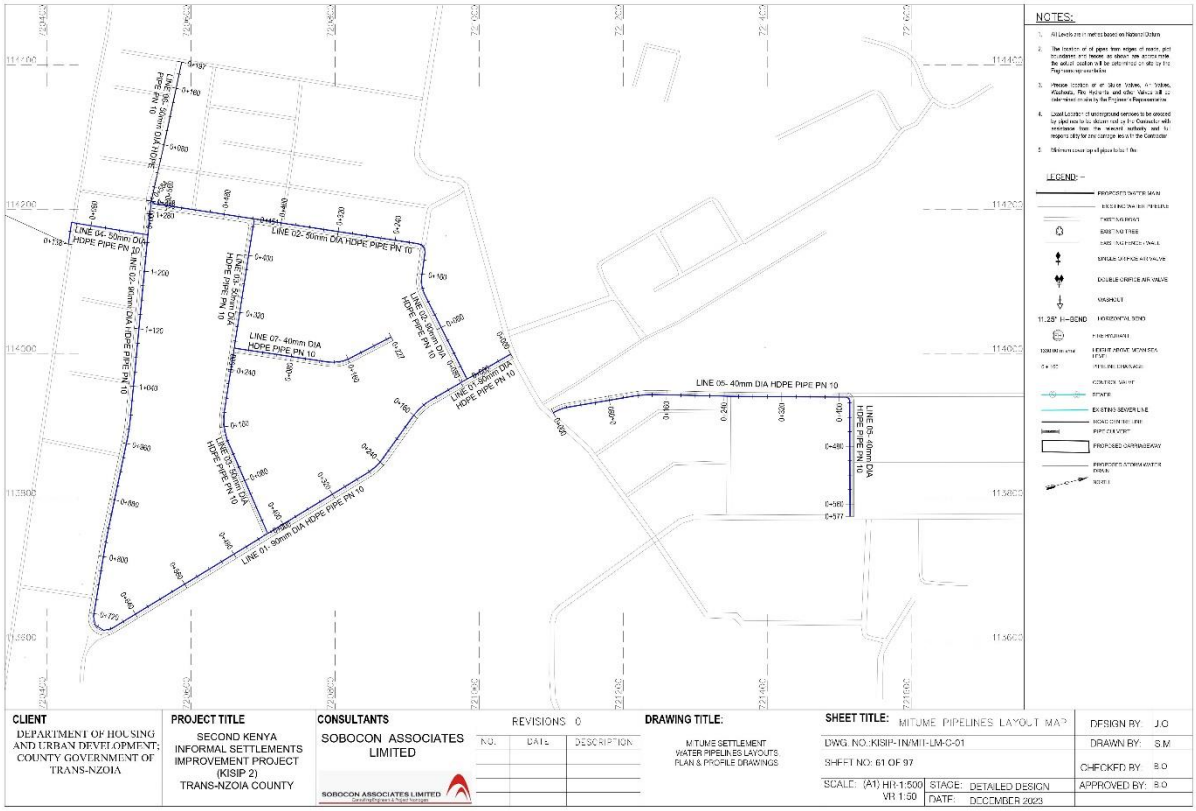


Figure 27: Mitume Water Supply Layout

2.3.4.4.3 Mitume Public Light Design

Figure 28: Mitume Lights Layout Map

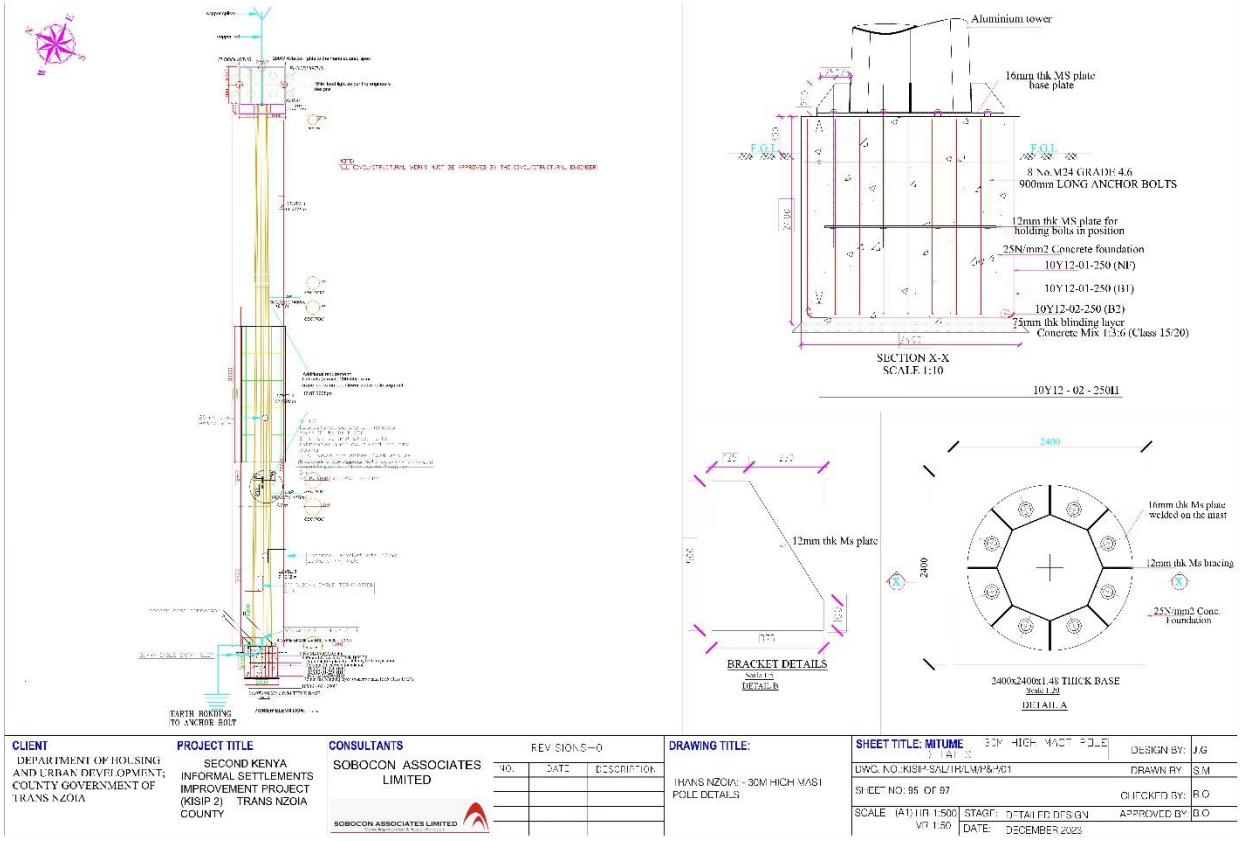


Figure 29: High Mast Pole Details

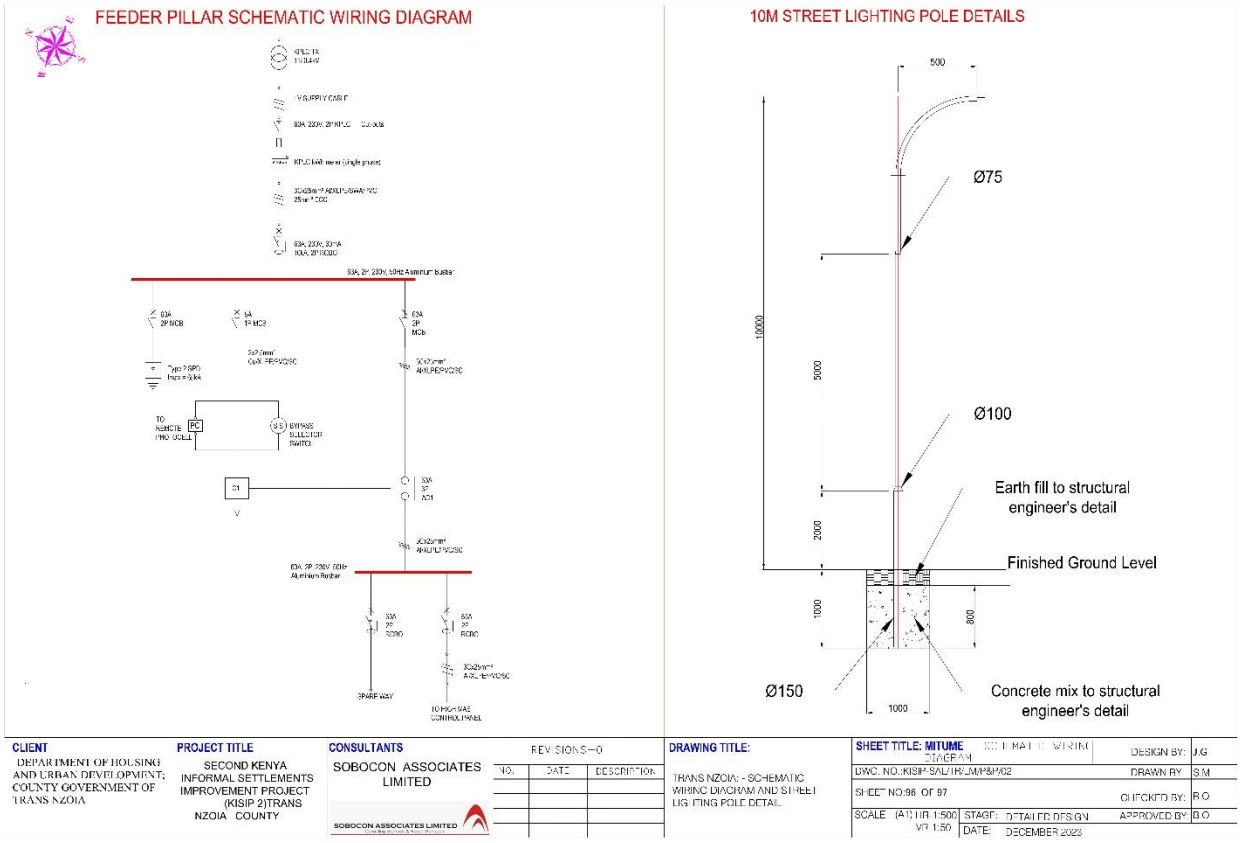


Figure 30: Street Lights Pole Details

2.3.5 Tuwani Informal Settlement

2.3.5.1 Location on Tuwani

Tuwani Settlement is located within Tuwani Ward as indicated in the figure 31 below:

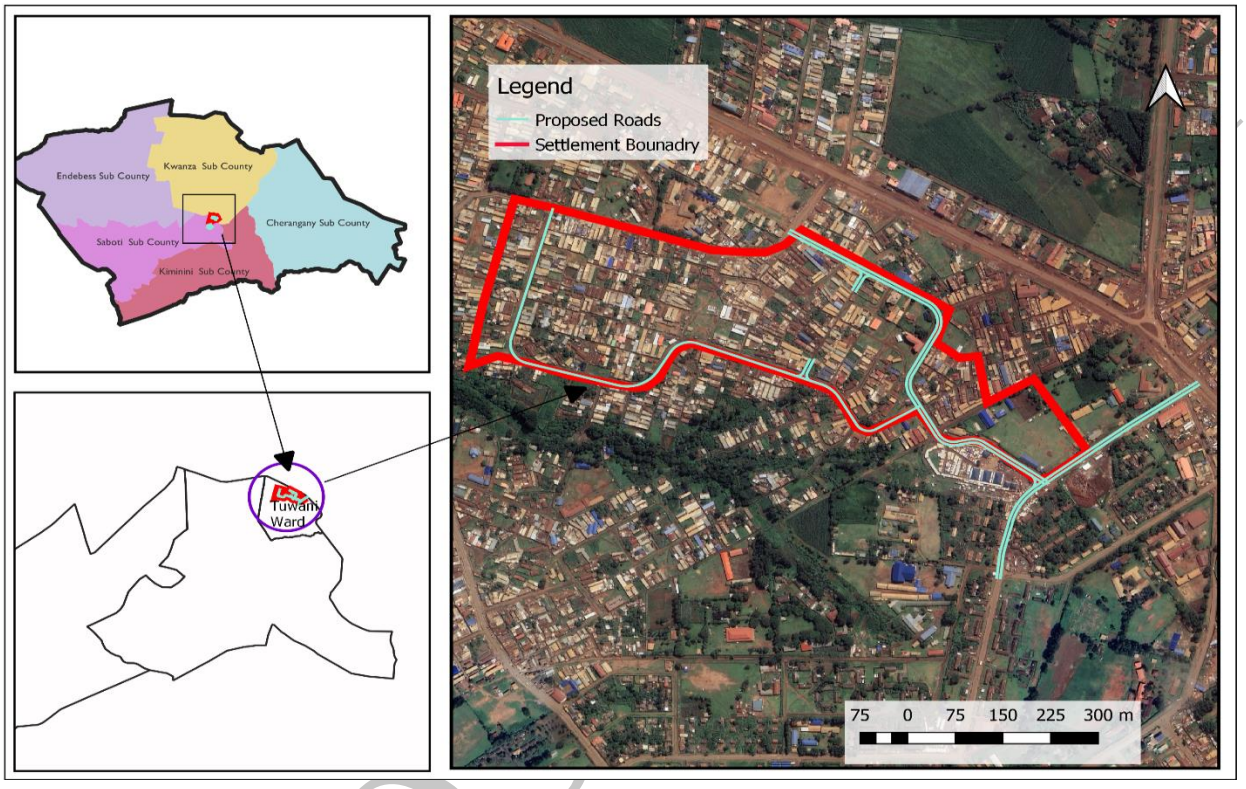


Figure 31: Tuwani Location

2.3.5.2 5.4.4.2 Tuwani Population

The current population in Tuwani settlement is 16,043. The design population was based on a design base year of 2025 and 2045 as the ultimate year Table 15 below shows the projected population for Tuwani Settlement (Trans Nzoia County Integrated Development Plan, 2018-2022).

Table 15: Projected Population of Tuwani

Surface	Population	Density	Pop. 20-year Projection (4.2%)
[km^2]	[hab]	[hab/ km^2]	[hab20]
0.22 km^2	16,043	72,922	36,529

Hence, the following scenarios were prepared:

- Design to consultants figures as detailed above
- Design to estimated population numbers based on the consultants figures.

- Design to a 20-year projection based on the consultants figures with a growth rate of 4.2%[8].
- The design population is 36,529 inhabitants.

2.3.5.3 Project Details and components

The proposed project and its components comprise of construction of 1720m internal roads with 4-15m reserve width and storm drainage network. The other project components involve construction of tertiary service lines of Water Supply Reticulation Network (1760m) and household connections and Construction of 20Nr Street light. The settlement has an estimated area of 20 Ha with a population about 22,888 people. Table 16 below summarizes the proposed project details in Tuwani Settlement.

Table 16: Tuwani Project details

Tuwani Settlement	
Roads /footpath	*Construction of 1720m of roads* *i. Kitale East Road-1015m* *ii. Tudadi Road-705m*
Storm water Drainage	*Construction of 1720m of Storm water Drainage Network*
Water supply	*Construction of Tertiary service lines of Water Supply Reticulation Network (1760m)and household connections*
Public lighting	*Construction of 20Nr Street light*

[8] Source World bank open source data 2008

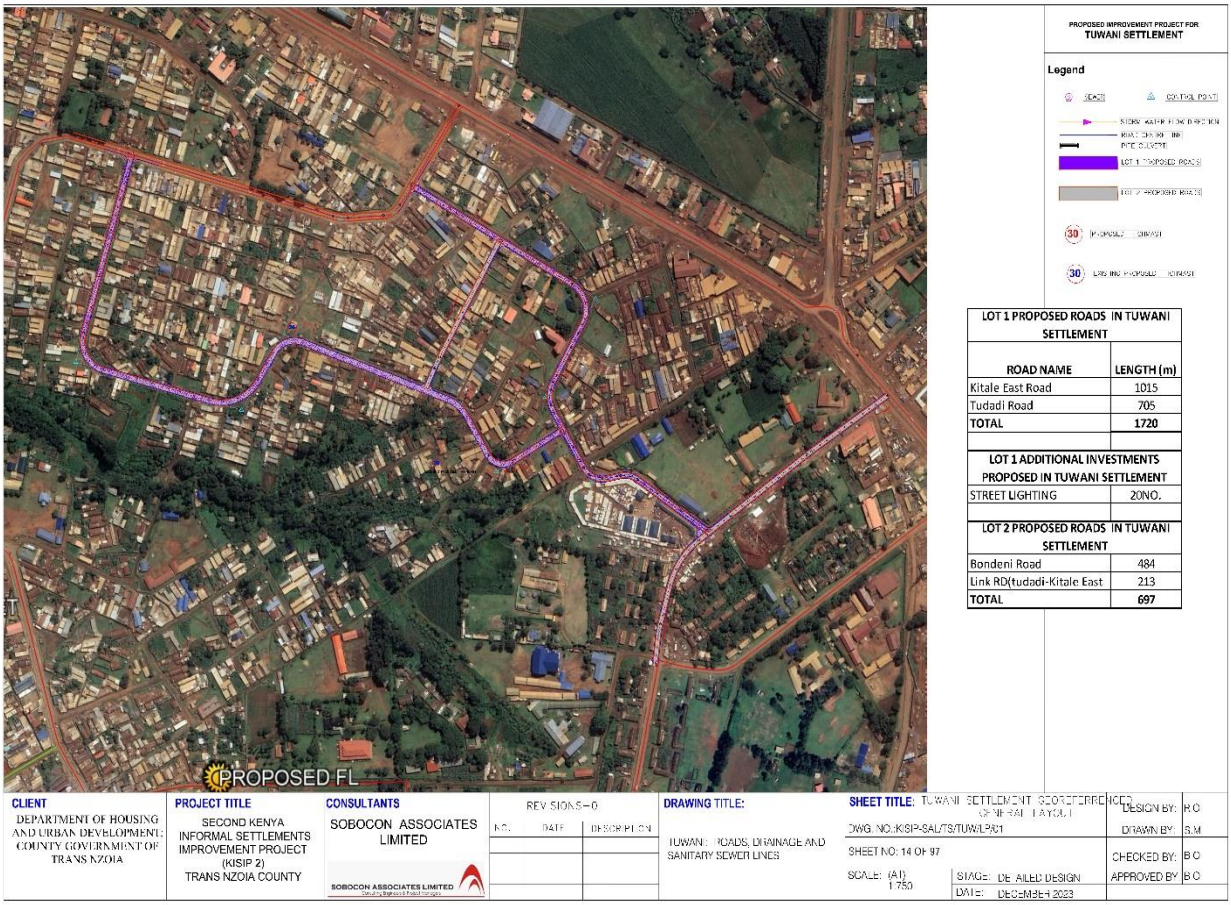


Figure 32: Tuwani Project Area Map

2.3.5.4 Tuwani Proposed Project Design

2.3.5.4.1 Tuwani Roads and Footpath

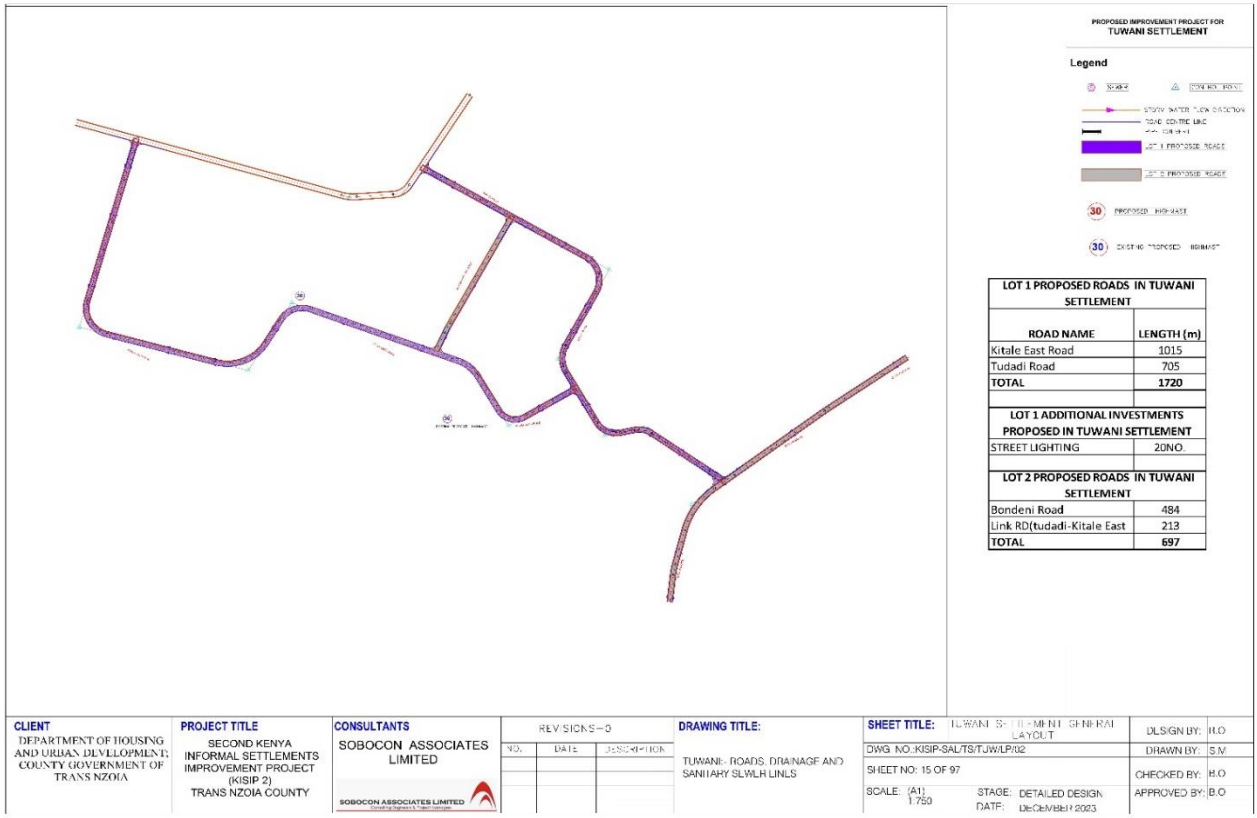


Figure 33: Tuwani Roads and Drainage Network

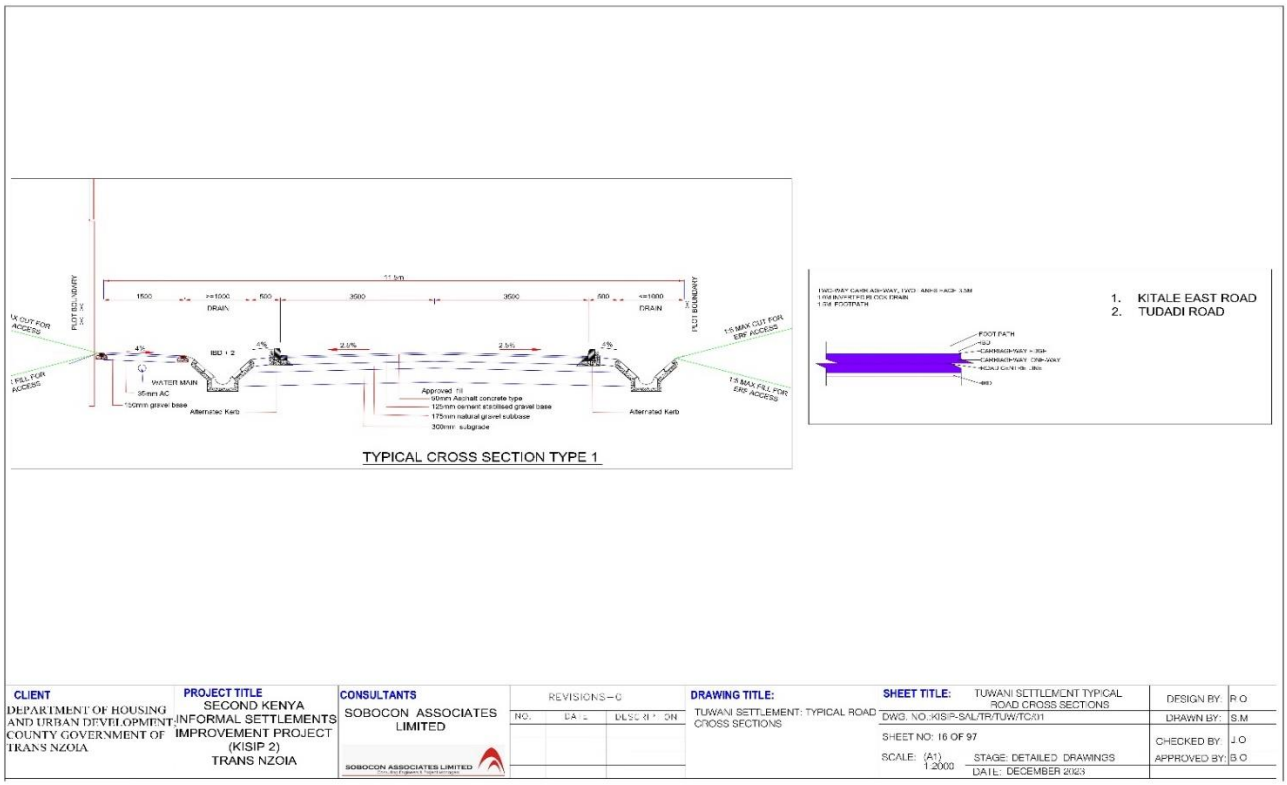


Figure 34: Tuwani Roads Cross Section

2.3.5.4.2 Tuwani Water Supply

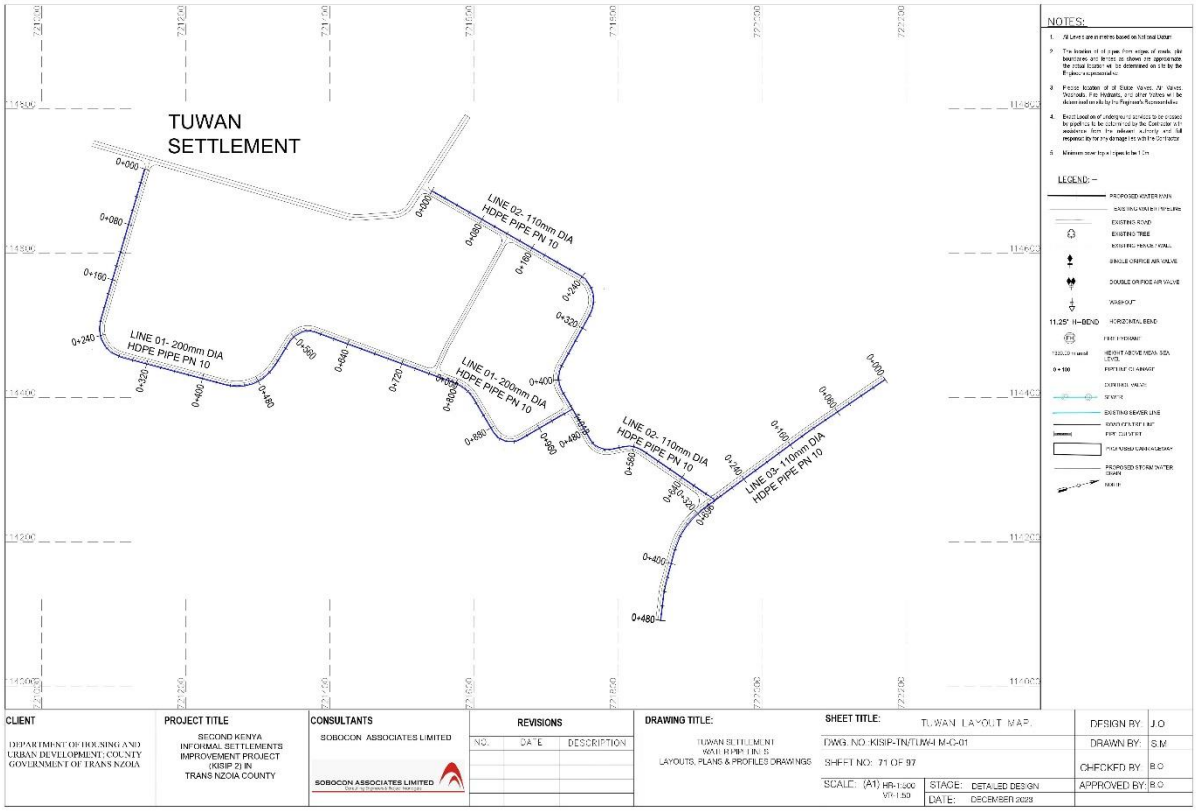


Figure 35: Tuwani Water Supply Layout

2.3.5.4.3 Tuwani Public Light Design

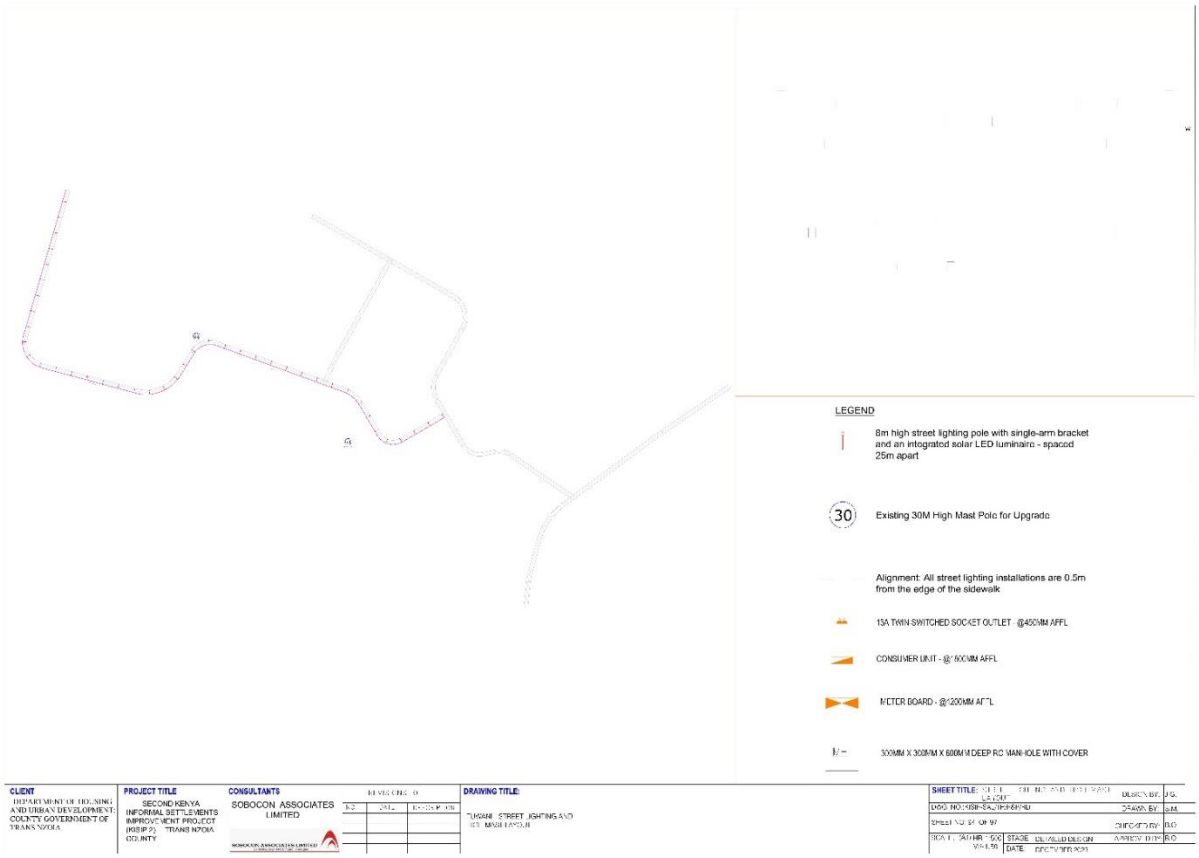


Figure 36: Tuwani Lights Layout Map

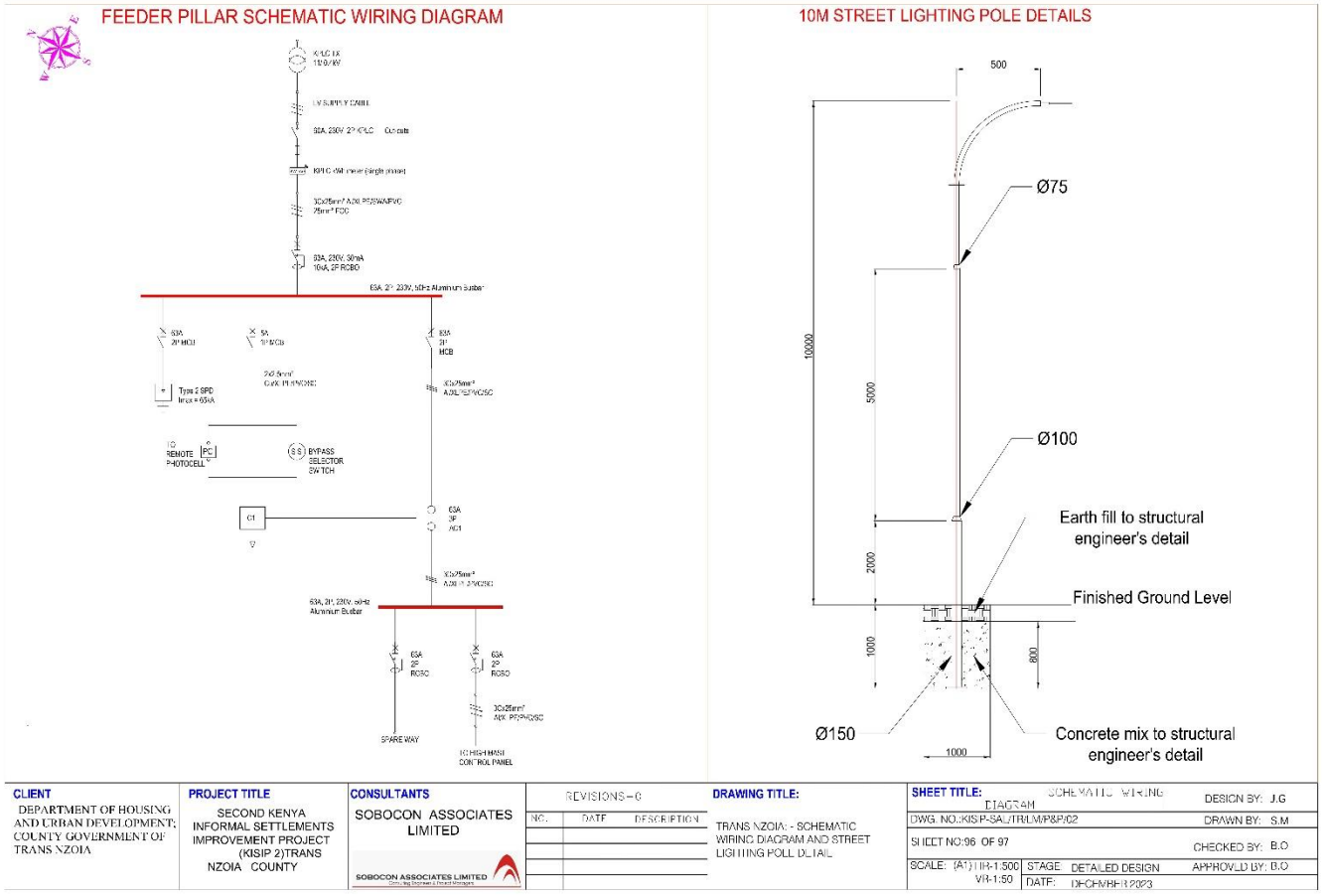


Figure 37: Street Lights Pole Details

2.4 Project Design

The concepts that guided the designs were derived from direct community and county government engagements. The designs were based on sound value engineering principles and feasible on the ground guided by the existing national standards/laws and county technical by-laws.

Certain infrastructure elements are interdependent and function in tandem. For instance, the construction of a road necessitates the incorporation of proper drainage, as a road lacking adequate drainage is prone to a shortened lifespan. In settlements, solid waste poses a significant challenge by obstructing already strained waste and storm water drainage systems. Therefore, addressing solid waste management must go hand in hand with drainage considerations. Public lighting, encompassing floodlights and streetlights, is closely tied to the level of electrification in an area. Additionally, it directly impacts the security and safety of residents.

All the project designs and proposed features are shown in the detailed drawings, which are submitted as the Book of Drawings contained in the project design report. This report however captures the project design preview relevant to the study.

2.4.1 Roads and footpath designs

The geometric design of the proposed access roads has been done to follow closely the existing alignment and offer a combination of uninterrupted traffic flow sections and junctions. The aspects considered in the geometric design include but limited to: -

- Horizontal alignment,
- Vertical alignment,
- Road cross section
- Super elevation of curves,
- Road widening,
- Junctions and
- Bus bays

The geometric design sought to identify the economic, safe and practical horizontal and vertical alignments such that; the desired roads can physically be realized and the total performance of the constructed road is adequate. The design is to offer a combination of uninterrupted traffic flow sections and junctions. The un-interrupted traffic flow section is the road link, the right of way reserved for unhindered vehicular travel between two locations along a route while an intersection space is the entire area shared by the joining or crossing of a number of basic road spaces.

The overarching goal of the geometric design is to identify the most economical, safe, and practical horizontal and vertical alignments. This ensures that the desired roads can be physically realized, and the overall performance of the constructed road is deemed adequate. The design aims to create a balance between providing uninterrupted traffic flow sections and efficient junctions.

Additionally, the road design contributes to low carbon emissions by potentially optimizing traffic flow, reducing congestion, and enhancing overall road efficiency. This can result in smoother traffic patterns, minimizing idling time for vehicles and subsequently reducing carbon emissions associated with transportation.

2.4.2 Drainage Design

The drainage system has been accurately designed to accommodate the natural peak run-off without causing erosion to embankments or any part of the road. Various geographical factors, such as soil condition and rainfall intensity should be considered too clearly define the shape, location, and capacity of these drains.

In settlements, the primary drains are designed as covered rectangular channels, with their dimensions, determined based on runoff volumes estimated using Lloyd Davis' Rational formula. The actual size of the drainage structure section is calculated using Manning's formula for hydraulic considerations. This comprehensive approach ensures that the drainage system can effectively manage climate resilience during flood seasons. The proposed project and its designs have incorporated the following:

Preventing Erosion: By efficiently managing natural peak run-off and preventing erosion to embankments or road structures, the drainage system helps maintain the integrity of the road infrastructure. This reduces the need for frequent repairs and reconstruction, which, in turn, minimizes the carbon footprint associated with construction materials, machinery, and transportation.

Optimizing Road Longevity: The prevention of erosion and proper water drainage preserves the road surface, leading to a longer lifespan for the infrastructure. A longer-lasting road requires less frequent maintenance and reconstruction, resulting in reduced carbon emissions associated with construction activities over time.

Efficient Runoff Collection: The drainage system collects runoff from road surfaces, side slopes, and neighboring areas, preventing the accumulation of water that could lead to soil erosion and related carbon-intensive processes. This efficient runoff collection contributes to the overall health of the ecosystem and minimizes the environmental impact associated with sediment transport.

Climate-Resilient Design: The drainage system is designed to handle climate variability, particularly during flood seasons. This climate-resilient approach reduces the likelihood of extreme weather events causing damage to the road infrastructure, which would necessitate extensive repairs and contribute to increased carbon emissions associated with reconstruction efforts.

Smart Sizing of Drainage Structures: The dimensions of the primary drains, determined using Lloyd Davis' Rational formula for runoff volumes and Manning's formula for hydraulic considerations, ensure that the drainage system is appropriately sized. This smart sizing minimizes excess construction materials and resources, optimizing the efficiency of the drainage system and reducing associated carbon emissions.

Well-designed drainage system not only enhances the sustainability and resilience of the road infrastructure but also contributes to a reduction in carbon emissions by minimizing the environmental impact of construction, maintenance, and reconstruction activities.

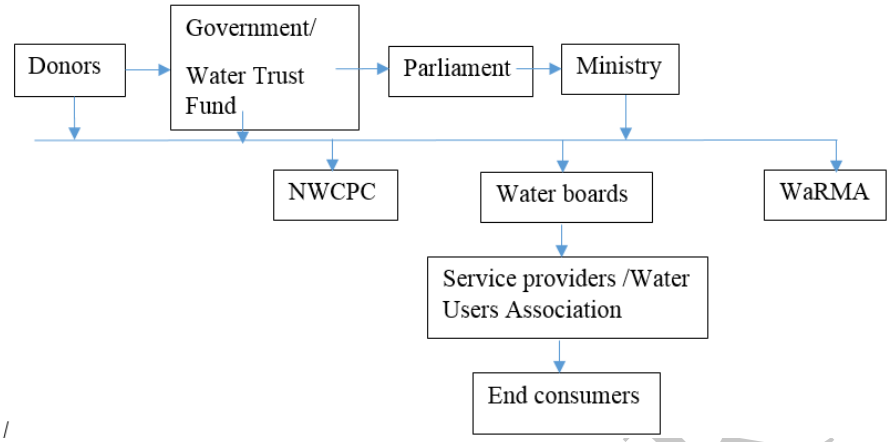
2.4.3 Water Supply

The Design Criteria was based on the guidelines for design parameters as laid down by the Ministry of Water & Irrigation of the Republic of Kenya in the Practice Manual for Water Supply Services in Kenya, Published in October 2005 (MoWI, 2005). Where the design guideline is silent, other design standards, guidelines or previous experience of project specialists have been used in consultation with appropriate stakeholders. Where appropriate, adjustments to these other guidelines have been made to consider conditions in the project area. For other criteria relevant to detailed design (e.g. structural criteria) the designs will conform to British Standards and other stated standards.

The chosen criteria emphasize functionality, cost effectiveness, environmental compatibility and long-term flexible operation and ease of construction bidding process with reduced maintenance

costs. The objectives of this section are to establish the criteria necessary for a realistic engineering design of the water supply system to present reasons behind their selection.

The water supply institutional framework is as illustrated in the **Error! Reference source not found.** below.



/

Figure 38: Water supply institutional framework in Kenya

2.4.3.1 Water Design Calculations

2.4.3.1.1 Projections

The year 2025 was considered as the 'initial year'; and 2045 as the 'ultimate design year', these time spans were then used in establishing the water demand.

The geometric progression formula below was then used to project population in the different design time spans while compounding the results at each stage;

$$M = P\left(1 + \frac{r}{100}\right)^{t}$$

Where; M = Ultimate year's demand

P = Initial year's demand

r = Population growth rate for the Settlement Area

t = Time period

The projections were therefore as calculated in the attached calculations in the appendices

2.4.3.1.2 Service Level

Based on the ***Ministry of Water, Water Design Manual, 2005, Chapter 2, Table 2.1, pg. A26***, from the service level distribution over the design years, the service level table was generated for the study areas, based on the assumption that the settlements are low class housing urban areas.

Table 17: Service Levels

	IC %			NC %		
	Initial	**Future**	**Ultimate**	**Initial**	**Future**	**Ultimate**
Urban Areas						
High and Medium Class Housing	100	100	100	0	0	0
Low class Housing	10	30	50	90	70	50
Rural Areas						
High potential	20	40	80	80	60	20
Medium potential	10	20	40	90	80	60
Low potential	5	10	20	95	90	80

(Source: Sobocon Design report, December 2023)

2.4.3.1.3 Consumption rates

The water demand for the settlements were computed based on the guidelines provided in the ***Ministry of Water, Water Design Manual, 2005, Chapter 2, Table 2.2, pg. A30 (Appendix iii),*** considering the settlements as low class housing urban areas.

Table 18: Consumption rates

CONSUMER	UNIT	RURAL AREAS			URBAN AREAS		
		High potential	Medium potential	Low potential	High Class Housing	Medium Class Housing	Low Class Housing
People with individual connections	l/head/ day	60	50	40	250	150	75
People without connections	l/head/ day	20	15	10	-	-	20
Livestock unit	l/head/ day	50			-		
Boarding schools	l/head/ day	50					
Day schools with WC without WC	l/head/ day	25 5					
Hospitals Regional District other	l/bed/ day	400 200 100			+ 20 l per outpatient and day (minimum 5000 l/day)		
Dispensary and Health Centre	l/day	5000					
Hotels High Class Medium Class Low Class	l/bed/ day	600 300 50					
Administrative offices	l/head/ day	25					
Bars	l/day	500					
Shops	l/day	100					
Unspecified industry	l/ha/day				20,000		
Coffee pulping factories	l/kg coffee	25 (when re-circulation of water is used).					

(Source: Sobocon KISIP II Design report, December 2023)

The detailed design drawings can be found in Appendix 12 of this report

2.4.4 Sanitation

2.4.5 Septic Tanks and Soak Pits Designs

Septic tanks are rectangular chambers, usually sited just below ground level; they receive both excreta and flush water from flush toilets and all other household wastewater. The mean

hydraulic retention time in the tank is usually 1 to 3 days. During this time the solids settle to the bottom of the tank where they are digested anaerobically, and a thick layer of scum is formed at the surface. Although digestion of the settled solids is reasonably effective, some sludge accumulates and the tank must be desludged at regular intervals, usually once every 1 to 5 years.

A two-compartment septic tank is preferred to one with only a single compartment because the suspended solids concentration in its effluent is considered lower.

Figure 39 below shows a variety of alternate designs, including an experimental septic tank in which an anaerobic up flow filter is substituted for subsurface systems for effluent disposal.

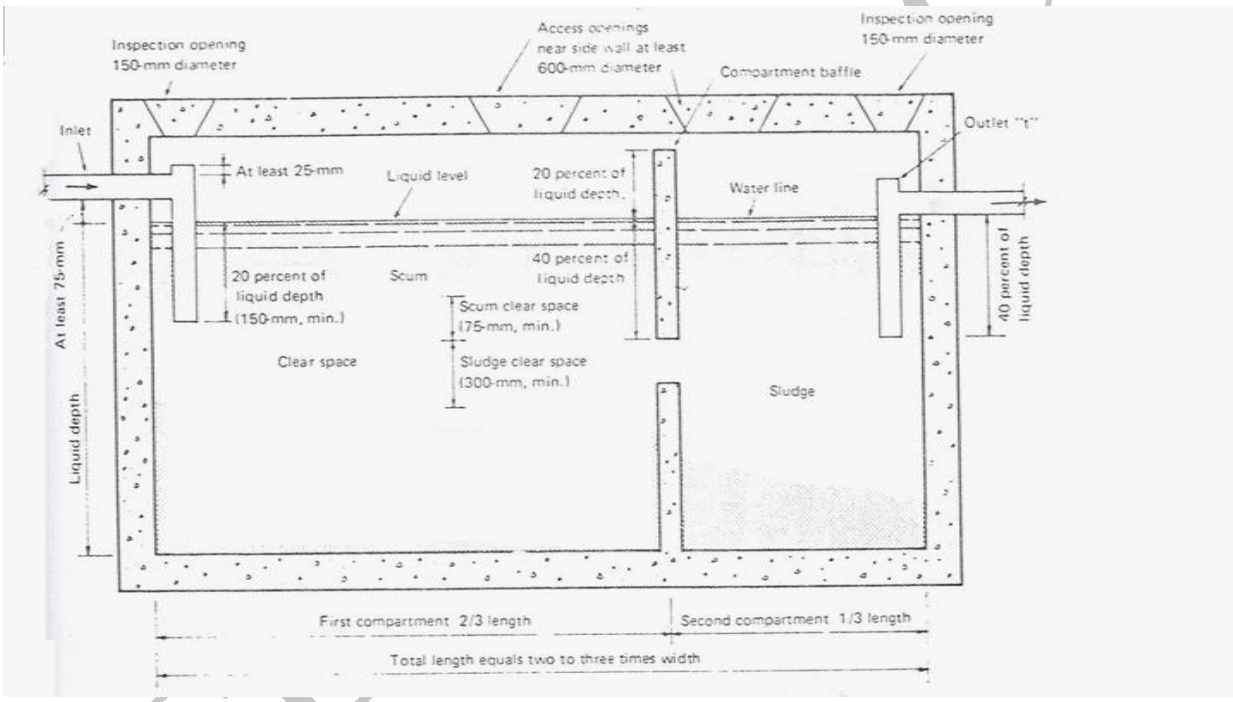


Figure 39: Schematic drawing for typical septic tank
(Source: Sobocon KISIP II Design report, December 2023)

2.4.5.1 Soak pit

Pits used to dispose of effluent from septic tanks are commonly 2-5 m deep with a diameter of 1.0-2.5 m. The capacity should not be less than that of the septic tank.

Depending on the nature of the soil and the local cost of stone and other building material, soak pits may either be lined or filled with stones or broken bricks. Linings are generally made of bricks, blocks or masonry with honeycomb construction or open joints as for the linings of pit latrines. The infiltration capacity of the soil may be increased by filling any space behind the lining with sand or gravel hard

material such as broken rock or broken kiln-dried bricks not less than 50 mm in diameter may be used to fill an unlined pit

Whether the main part of the pit is lined or filled, the top 500 mm should have a ring of blocks, bricks or masonry with full mortar joints to provide a firm support for the cover. The ring may be corbelled to reduce the size of the cover. Covers are usually made of reinforced concrete and may be buried by 200-300 mm of soil to keep out insects.

Increasing the diameter of the pit results in a disproportionate increase in the volume of excavation and in the cost of the cover slab compared with the increase of wall area. Therefore, if the required infiltration area is large, it may be more economical to provide drainage trenches.

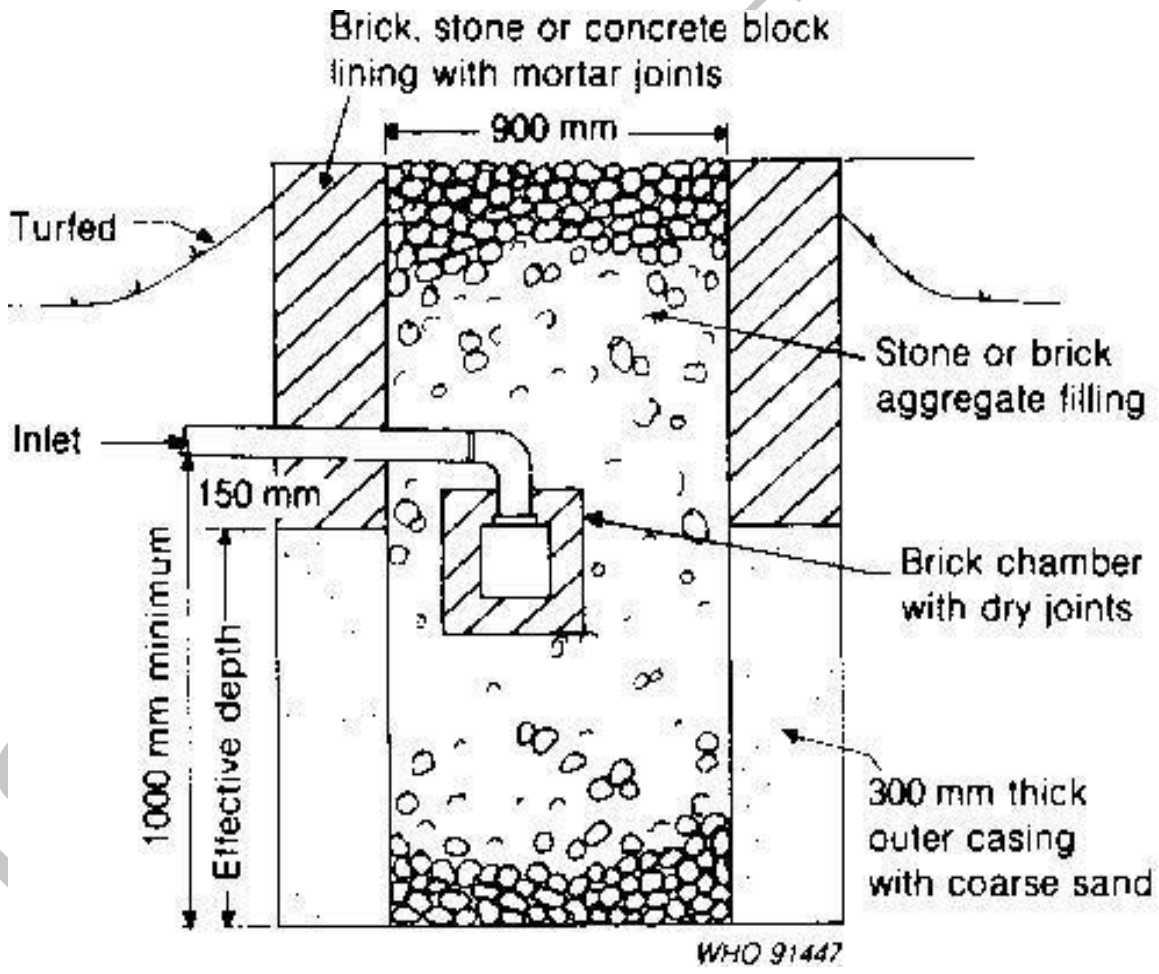


Figure 40: Lined soak pit
(Source: Sobocon KISIP II Design report, December 2023)

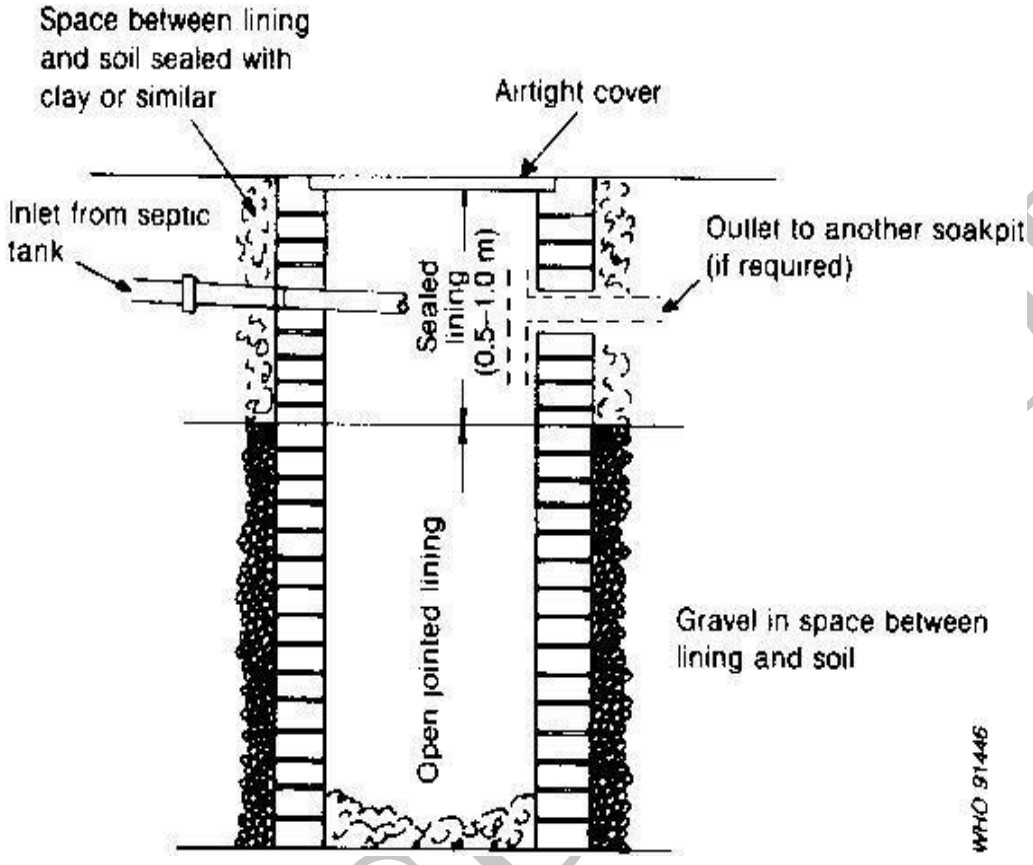


Figure 41: Unlined soak pit
(Source: Sobocon KISIP II Design report, December 2023)

2.4.6 Public Lighting

The structure of the pole is designed to- ASCE Manual 72:1990 Guide for Design of Steel Pole Structures, BS 3692: ISO Metric Precision Hexagon Bolts, Screws and Nuts, BS 4360: Weldable Structural Steel and BS8100:Part1 & 2 Lattice Towers and Mast – Part 1: Code of Practice for Loading.

Basic Design Wind Speeds

The monopole is designed, for the purpose of assessing its structural strength to a Basic Design Wind Speed of 33.33m/s (120 km/hr) 3-second gust speed or 22.22m/s mean hourly wind speed for all sites. This corresponds to a return period of 1 in 50 years. For the purpose of compliance check for maximum deflection (sway) of the monopole, a 1 in 20 years return period wind speed of 30.0m/s (3 second gust) or 20.0m/s mean hourly wind speed shall be used.

Basic Design Electrical Component

It was first sought to establish an appropriate arrangement of light fittings on a 30m High Mast Floodlight that would spread light so that the regions farthest served by it would have at the worst case the minimum lighting level of 5 lux recommended for light traffic areas (BS 5489-1:2003). The light fitting chosen is of 250W 33,000 lumens as Nikkon S2266 LEDXION K10119 and 12No. of them were arranged equispaced on a luminaire carriage as shown in the **Error! Reference source not found.** below (Luminaire Carriage). For this configuration, using the Illumination Software Dialux 7.1, a light distribution was designed as depicted in **Error! Reference source not found.**: Dialux G enerated Lighting Coverage for One Mast. The 5-lux target occurred at a distance 64.49m from the foot of the mast.

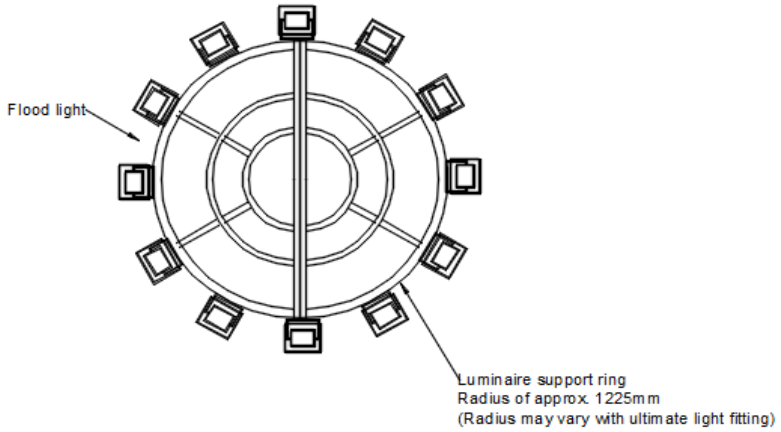


Figure 42: Luminaire Carriage
(Source: Sobocon KISIP II Design report, December 2023)

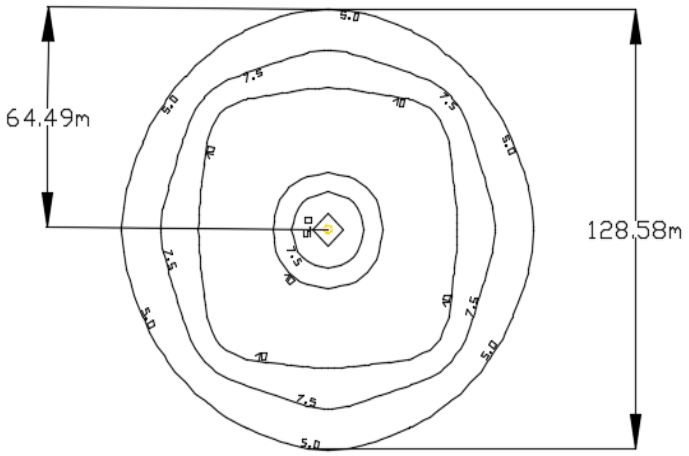


Figure 43: Dialux Generated Lighting Coverage for one Mast
(Source: Sobocon KISIP II Design report, December 2023)

2.5 Project Cost

The estimated project cost for Trans-Nzoia County KISIP 2 projects is a total of Kenya shillings Nine Hundred and Twelve Million, Two Hundred and Nine Thousand and Seven Hundred and Six Shillings Only (KES. **912,209,706**). The statutory charge of 0.1% payable to NEMA is therefore Kenyan Shillings Nine Hundred and Twelve Thousand, Two Hundred and ten Shilling and Only (KES **912,210**) pursuant to Gazette Notice No. 13211 of Regulation 48 of the Environmental (Impact Assessment and Audit) Regulations, 2003. The payment is done on the e-citizen platform after receipt of an invoice from NEMA.

CHAPTER THREE

3 ANALYSIS OF PROJECT ALTERNATIVES

This chapter presents the different alternative considerations in terms of design, site location, technology used to ensure that environmental considerations are taken into account for the proposed developments KISIP II project selection was done through consultations with the communities through the elected Settlement Executive Committee team to ensure a holistic and community-centered approach. This was done to ensure viable project selections that minimize negative impacts while aligning with the settlement's unique characteristics and needs. Considerations that were evaluated include:

3.1. Settlement selection

Environment and social impacts are minimized as a direct consequence of the settlement selection in that the proposed projects location must not have adverse impacts to the identified location. The following considerations were made:

Land Requirements: The proposed project areas within the settlement are located on land that is owned by Trans-Nzoia County Government. The projects have been designed to only utilize the road reserves as designated on the Physical Development Plans (PDPs) developed by KISIP 2 component for the targeted settlements. No private land will be acquired for the project. This has significantly minimized displacement of populations and livelihoods because of the Project and the need to carry out resettlement. A separate Abbreviated RAP was prepared for the Project components that have an impact to people's assets and sources of livelihood along the proposed project corridors.

Location: The proposed project sites are located within the urban areas of the settlement with no sensitive environmental features.

Scale of potential displacement of residents: The proposed developments are situated in areas with minimal displacements especially along the wayleaves.

Proximity to trunk infrastructure: The proposed projects are implemented in settlements areas with close proximity to core trunk infrastructure (such as roads and trunk lines for water, sewage or electricity) and these are the ones in the priority list.

Need to eliminate economic differentials: KISIP 2 is by design biased towards support to informal settlements. The motivating criteria is to improve quality of life in informal settlements towards building equality and attaining both local and globally accepted standards for quality of life. The Settlements in Trans-Nzoia are fast growing and in turn require faster connectivity and infrastructure.

Compliance with Kenyan law: The Settlements within Trans-Nzoia County are located within an urbanized area, away from riparian areas. The proposed developments including Roads and footpaths, Storm water Drainage and Public lighting will be located within the government planning area and will not involve any relocation.

3.2. Construction of Proposed infrastructure projects

The project components comprise roads & drainage and security lighting. Project alternatives was majorly analyzed for roads, drainages and street lighting proposed for unserved and underserved areas.

3.3. Design Alternatives

The engineering design has followed the recommendations of the design manuals referenced in the design review report. However due to the uniqueness of the site, some design Alternatives were incorporated in the project as briefly explained in the sections below:

i. The streetlights were designed to accommodate both solar energy and national grid.

ii. Due to varied widths of the road alignments for the settlements, specific cross sections were proposed for each alignment fitting the necessary services within the available space

iii. The topography of the settlements brings out unique surface runoff drainage challenges. There are a number of localized drainage problems where natural drainage system to the existing waterways lacks. In such cases, vertical drains were proposed to address such challenges

3.4. Design Standards

3.4.1. Design approach

The approaches to the detailed engineering solutions that has been taken into account are:

i. Optimized the use of materials for construction;

ii. Improved geometric deficiencies;
iii. Improved the junctions;
iv. Provided access culverts and improved access roads for public convenience to major buildings;
v. Provided cross-drainage structures with adequate opening size and proper protection work;
vi. Providing roadside drainage with adequate capacity;
vii. Proper outfall connectivity of the longitudinal drains/ ditches, has been proposed;
viii. Proper outfall of culverts has been designed;

The main outcomes of the design approach adopted are explained below.

3.4.2. Drainage Systems:

i. **Permeable Pavement:** Use of Permeable surfaces such as permeable concrete or interlocking permeable pavers allow water to infiltrate and contributes to reduction of runoff and erosion.

ii. **Bio retention Cells/ rain gardens**: These are landscaped areas, which collect and treat storm water naturally hence promoting filtration and reducing the burden on traditional drainage systems.

3.4.3. Roads Alternatives

The available alternative technologies considered include the prefabricated concrete panels, tarmacked roads and conventional concrete roads. The roads will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The technology to be adopted for example-tarmacked roads will be the most economically viable and sensitive to the environment.

3.4.4. Lighting and electric Alternatives

i. Solar powered alternative

The option of solar power uses batteries to store power during the day for use at night. This option has high initial cost but it is sustainable in the long run as it utilizes renewable energy.

ii. Electricity Grid alternative

The electricity grid is available within the settlement and will only require connecting the street lighting to electricity from the grid.

3.4.5. Evaluation criteria

The evaluation criteria for choosing the best design alternatives is provided in Table 19 below.

Table 19: Design evaluation criteria

Sr. No	Criteria and weighting	Description
1	Technical Assessment **(30%)**	The technical criterion assesses route options in terms of geometry, degree of curvature, length of the road, drainage systems.
3	Social, political & Resettlement Assessment **(30%)**	This criterion assesses road options in relation to parameters such as population, number of encroachments.
4	Road Safety **(20%)**	The following design criteria which are linked to road safety were used to assess the suitability of the alternative roads: a) Stopping and passing sight distances; b) Coordination of horizontal and vertical curves; c) Cross-sections; and, d) Carriageway and roadside safety treatments.
5	Cost **(20%)**	The aim is to select the roads with the least lifetime construction and maintenance cost per unit of investment. In other words, the alternative that give the highest Net Present Value per Unit Cost of Investment. The economic evaluation was undertaken using the internationally recognized HDM-4, and will incorporate environmental and road safety costs and savings in the analysis.

3.5. The 'Yes' Project Alternative

This option envisages that the proposal will be implemented. It was considered as the most viable because of the following reasons; Employment creation, enhanced visibility and security, reduced storm water flooding and promotion of businesses either directly or indirectly, improved sanitation and environmental conditions in the selected Trans-Nzoia Settlement.

3.6. No project alternative

This alternative maintains the status quo. It is the most environmentally friendly alternative. However, it also means that all the socio-economic benefits that are envisioned to accrue from implementation of the project shall be foregone. The most important one being improving the living standards of the inhabitants of the selected Trans-Nzoia settlements. The benefits, of this alternative is that the biophysical condition of the project area will remain intact and any of the negative impacts anticipated from the development would not occur.

CHAPTER FOUR

4 ENVIRONMENTAL AND SOCIAL BASELINE INFORMATION

4.1 Environmental Baseline Conditions

The Baseline conditions of the project site were assessed and documented for the purposes of determining the future impacts of the proposed project on the environment and social aspects of the local community. This section details on the findings of the survey, which will form a basis for impact monitoring plans and improvement of the environmental and social performance of the project during implementation. The baseline environment (physical, biological and socio-cultural) for the proposed project locations are presented below:

4.1.1 Physical Environment

4.1.1.1 Climate

Trans Nzoia County has a cool and temperate climate with mean maximum (day time) temperatures ranging between 23.4°C and 29.2°C and mean minimum (night time) temperatures ranging between 11.0°C and 13.5°C. The maximum and minimum extreme temperature are recorded in February (about 34.2°C) and January (about 6.5°C) respectively. The mean monthly relative humidity is 67%, ranging from a maximum of 97% in July and a minimum of 35% in January. The mean wind speed within the county is 66.79 km/h or 36.06 knots (Trans Nzoia County Integrated Development Plan, 2018-2022).

The County receives annual rainfall ranging from 1000mm to 1700mm. Western parts of Endebess, Saboti and Kiminini Sub Counties, and North Western parts of Cherang'any Sub County receive the highest rainfall ranging between 1,300mm and 1,700mm per year. The eastern parts of Saboti and Kiminini Sub Counties, southern parts of Kwanza Sub County, western and central parts of Cherang'any Sub County receive moderate rainfall ranging from 1,200 to 1,300mm. The parts of the County that receive the lowest rainfall (1,000mm -1,200mm) are Northern parts of Kwanza Sub County, Eastern parts of Endebess Sub County, South Eastern parts of Cherangany Sub County (Tuigoin) and South Eastern parts of Kiminini Sub County (Waitaluk). Map 2 shows the distribution of annual mean rainfall by Sub County. The annual rainfall is distributed into three major seasons namely; Long rainfall season- March, April, May (MAM), Intermediate Season- June-July-August (JJA); and short rainfall season- October-November-December (OND). The long and intermediate seasons are more reliable for agricultural production as compared to the short rainfall season. In the recent past, drought, dry spells and

floods hazards have increased in frequency and complexity, probably exacerbated by climate change. Uncertainty about the growing season, including about the onset and end of the rainy season, moisture stress, and excess rainfall are the main climatic hazards that affect productivity, thus compromising food security in the County **(**Trans Nzoia County Integrated Development Plan, 2018-2022).

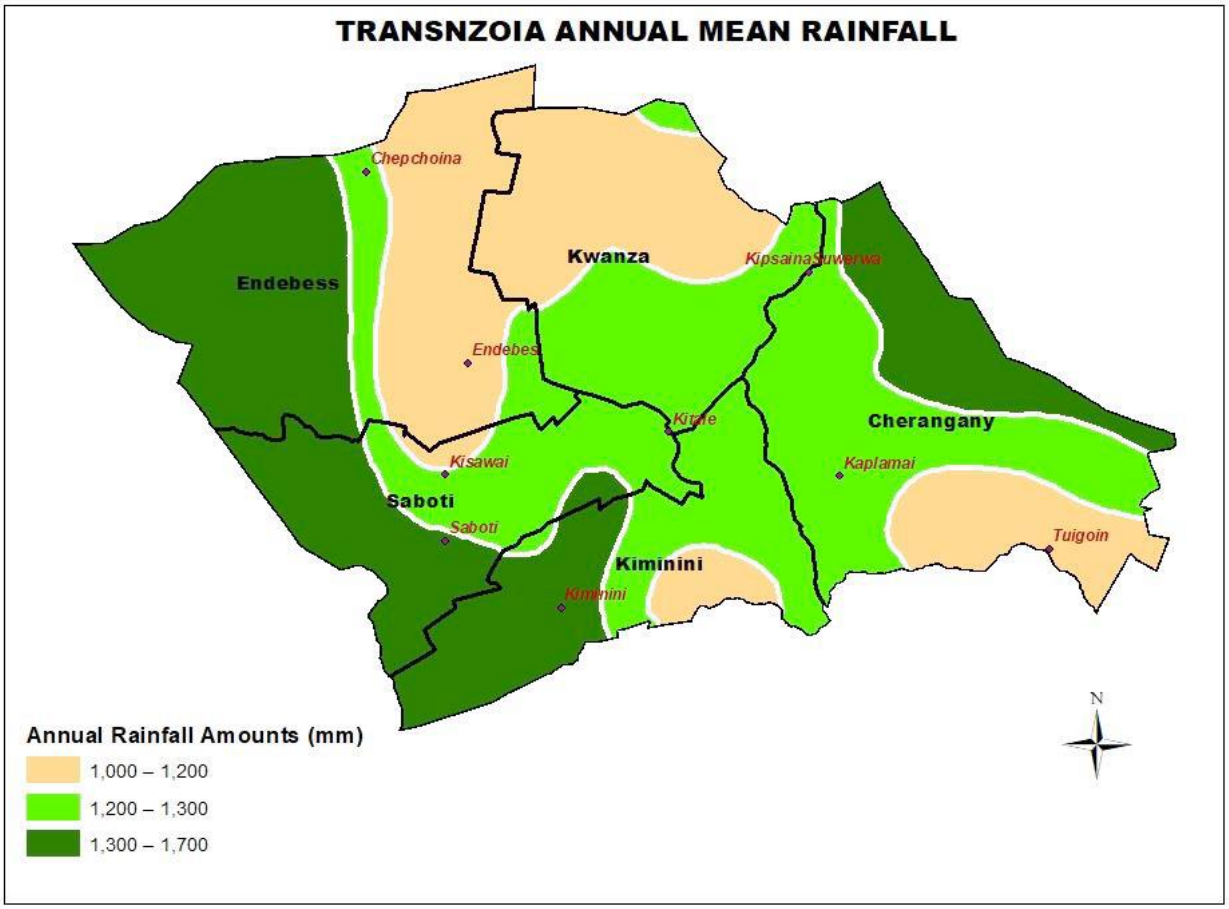


Figure 44: Trans-Nzoia Annual mean Rainfall

During January, the amount of precipitation is at its lowest, with only 53 mm | 2.1 inch recorded. The maximum quantity of rainfall is observed during the month of August, exhibiting an average value of 232 mm | 9.1 inch.

4.1.1.2 Average Temperature by Month Kitale

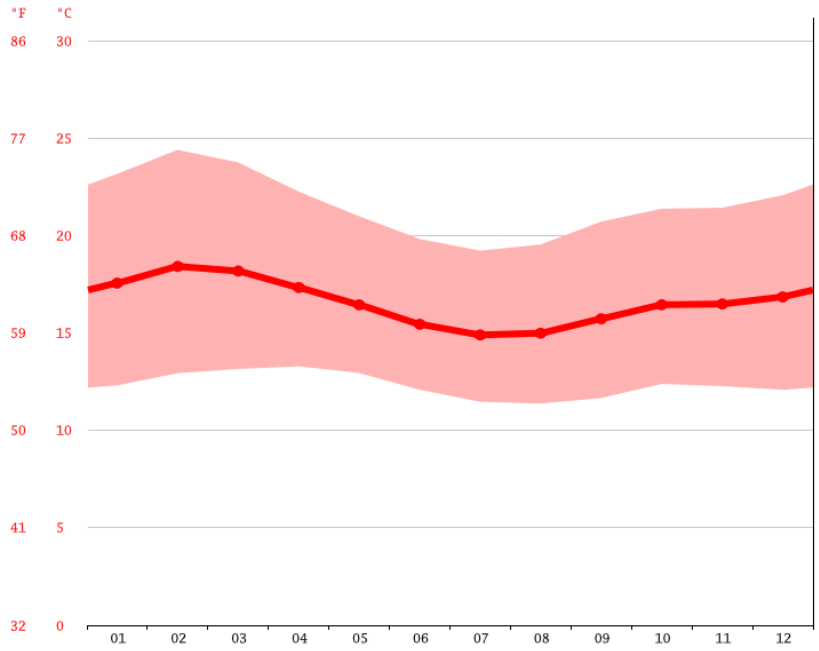


Figure 45: Kitale monthly temperature data

The month of maximum warmth in a year is February. The average temperature during this period reaches up to 18.4 °C | 65.1 °F, making it the hottest time of the year. During the month of July, there is a notable drop in temperature, with an average low of approximately 14.9 °C | 58.8 °F.

4.1.1.3 Weather by Month // Weather Averages Kitale

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	17.6 °C (63.6) °F	18.4 °C (65.1) °F	18.2 °C (64.7) °F	17.3 °C (63.2) °F	16.4 °C (61.6) °F	15.4 °C (59.8) °F	14.9 °C (58.8) °F	15 °C (59) °F	15.7 °C (60.3) °F	16.4 °C (61.6) °F	16.5 °C (61.7) °F	16.8 °C (62.3) °F
Min. Temperature °C (°F)	12.3 °C (54.2) °F	12.9 °C (55.3) °F	13.2 °C (55.7) °F	13.3 °C (55.9) °F	12.9 °C (55.3) °F	12.1 °C (53.7) °F	11.5 °C (52.6) °F	11.4 °C (52.5) °F	11.7 °C (53) °F	12.4 °C (54.3) °F	12.3 °C (54.1) °F	12.1 °C (53.7) °F
Max. Temperature °C (°F)	23.2 °C (73.7) °F	24.4 °C (75.9) °F	23.8 °C (74.8) °F	22.3 °C (72.1) °F	21 °C (69.8) °F	19.8 °C (67.7) °F	19.2 °C (66.6) °F	19.5 °C (67.2) °F	20.7 °C (69.3) °F	21.4 °C (70.5) °F	21.4 °C (70.6) °F	22.1 °C (71.7) °F
Precipitation / Rainfall mm (in)	53 (2)	53 (2)	100 (3)	196 (7)	231 (9)	201 (7)	176 (6)	232 (9)	176 (6)	166 (6)	147 (5)	77 (3)
Humidity(%)	56%	50%	58%	72%	77%	79%	78%	78%	74%	73%	72%	64%
Rainy days (d)	5	5	9	15	17	16	16	17	13	15	14	8
avg. Sun hours (hours)	10.4	10.6	10.3	9.7	9.4	9.0	8.8	9.0	9.8	9.8	9.7	10.1

Data: 1991 - 2021 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2019: avg. Sun hours

Figure 46: Kitale rainfall data

The variation in precipitation between the months with the lowest and highest levels of rainfall is 179 mm | 7 inch, as observed. The degree of fluctuation in the yearly temperature is approximately 3.5 °C | 6.3 °F.

In terms of relative humidity, the month that exhibits the highest level is June with a percentage of 50.02. Conversely, February has been recorded as having the lowest amount of relative humidity at only 50.02. It is noteworthy that May has the highest number of rainy days, amounting to 23.27, whereas the month with the least rainfall is February, experiencing only 7.03 wet days.[9]

4.1.1.4 Topography

Trans Nzoia County is generally flat with gentle undulations rising steadily towards Cherang'any Hills to the east and Mt. Elgon in the northwest (CIDP 2023-2027). The altitude ranges from the lowest point 1660 in Sikhendu ward at 34.811877°E and 0.812766°N at to 4299 metres above sea level at the peak of Mt. Elgon in the Kenya with undulating terrain across the County. The topographic features of the proposed project sites are presented in Table 20 below:

Table 20: Settlement Altitude levels

Settlement	Lowest point (m)	Highest point (m)
Mitume	1835	1875
Tuwani	1840	1885
Matisi	1824	1859

[9] Kitale climate: Weather Kitale & temperature by month (climate-data.org)

Shanti	1817	1852
Kipsongo	1817	1852

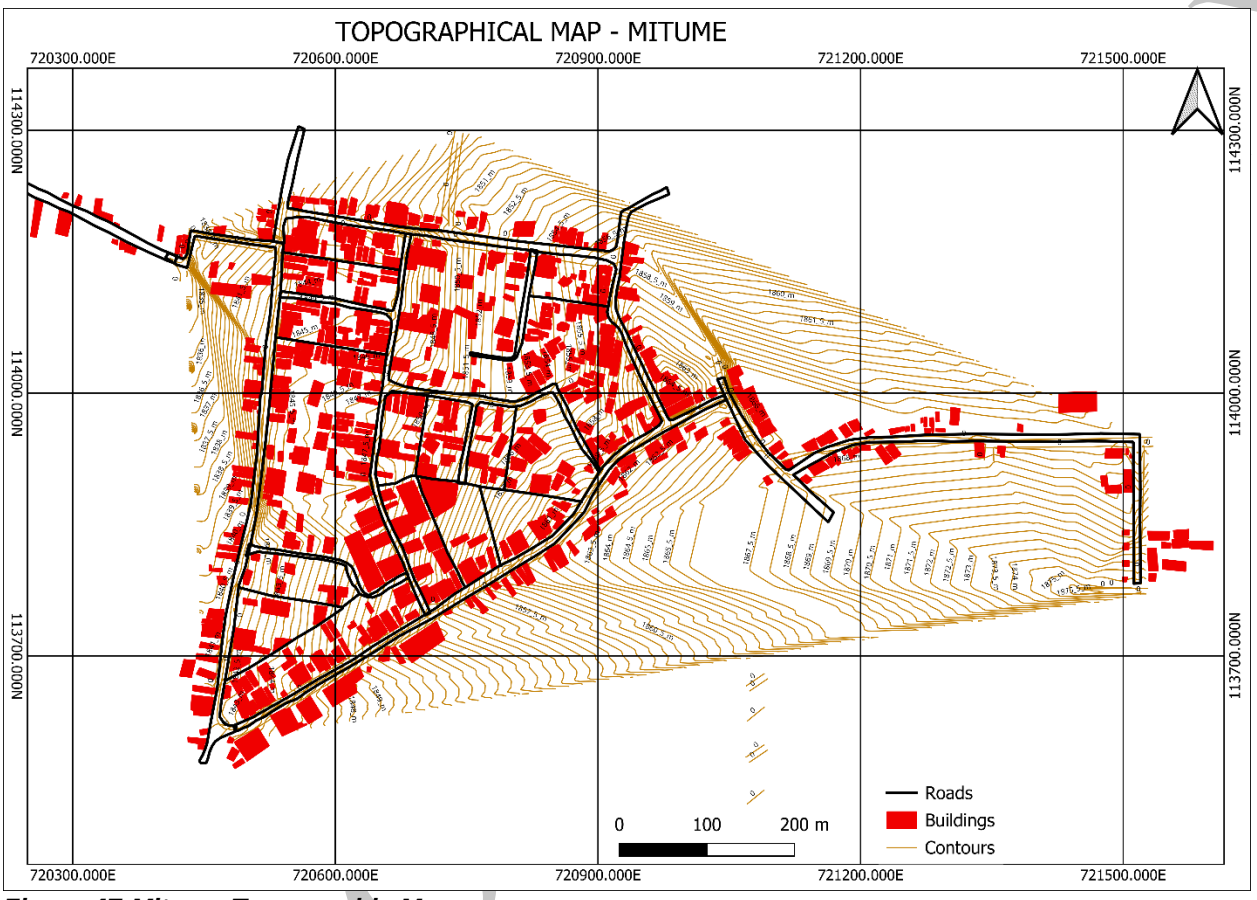


Figure 47:Mitume Topographic Map

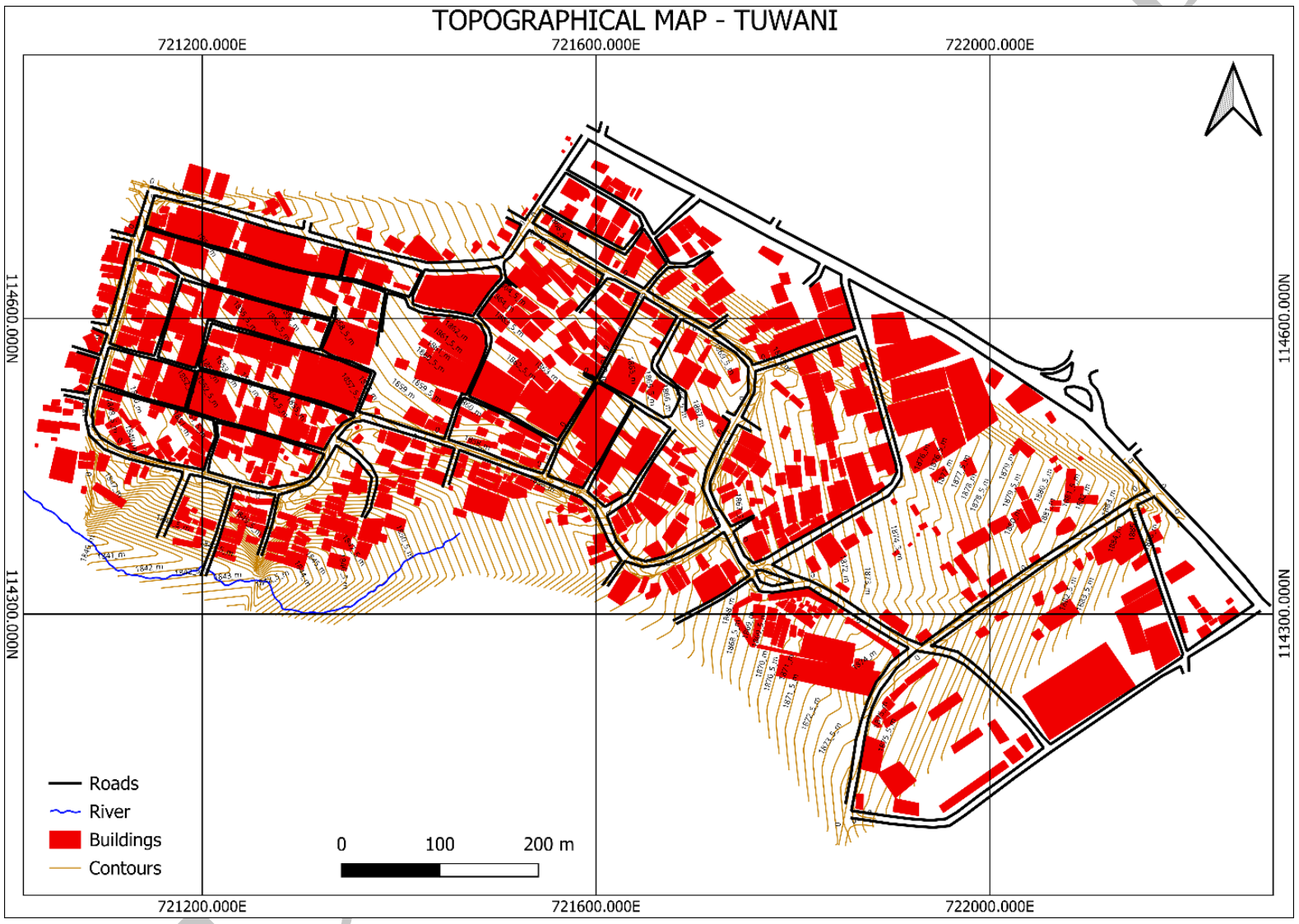


Figure 48:Tuwani Topographic Map

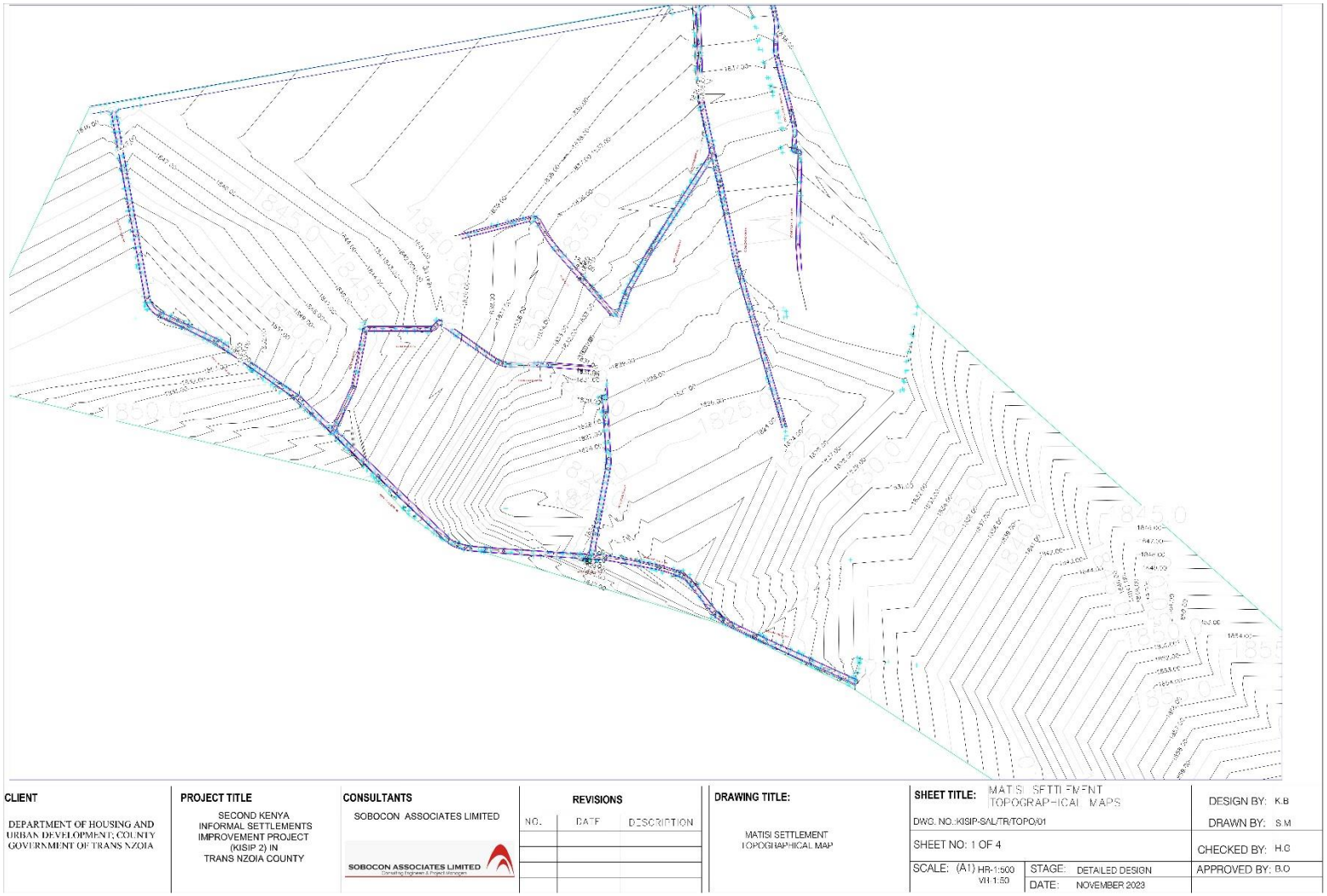


Figure 49:Matisi Topographic Map

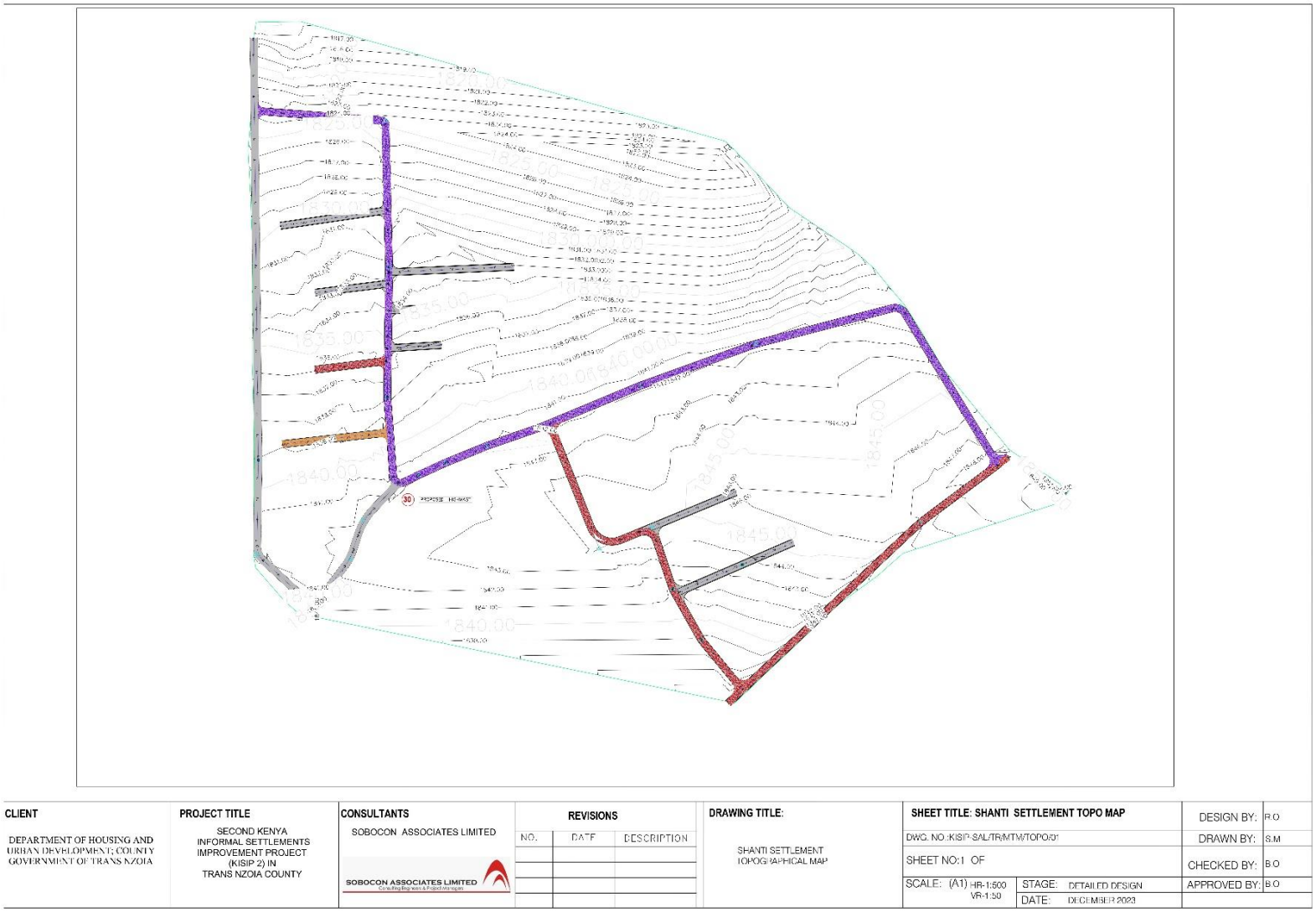


Figure 50:Shanti Topographic Map

4.1.1.5 Hydrology

The County receives annual rainfall ranging from 1000mm to 1700mm. Western parts of Endebess, Saboti and Kiminini Sub Counties, and North Western parts of Cherang'any Sub County receive the highest rainfall ranging between 1,300mm and 1,700mm per year. The eastern parts of Saboti and Kiminini Sub Counties, southern parts of Kwanza Sub County, western and central parts of Cherang'any Sub County receive moderate rainfall ranging from 1,200 to 1,300mm. The parts of the County that receive the lowest rainfall (1,000mm -1,200mm) are Northern parts of Kwanza Sub County, Eastern parts of Endebess Sub County, South Eastern parts of Cherangany Sub County (Tuigoin) and South Eastern parts of Kiminini Sub County (Waitaluk). The annual rainfall is distributed into three major seasons namely; Long rainfall season- March, April, May (MAM), Intermediate Season- June-July-August (JJA); and short rainfall season- October- November-December (OND). The long and intermediate seasons are more reliable for agricultural production as compared to the short rainfall season. In the recent past, drought, dry spells and floods hazards have increased in frequency and complexity, probably exacerbated by climate change. Uncertainty about the growing season, including about the onset and end of the rainy season, moisture stress, and excess rainfall are the main climatic hazards that affect productivity, thus compromising food security in the County **(**Trans Nzoia County Integrated Development Plan, 2018-2022).

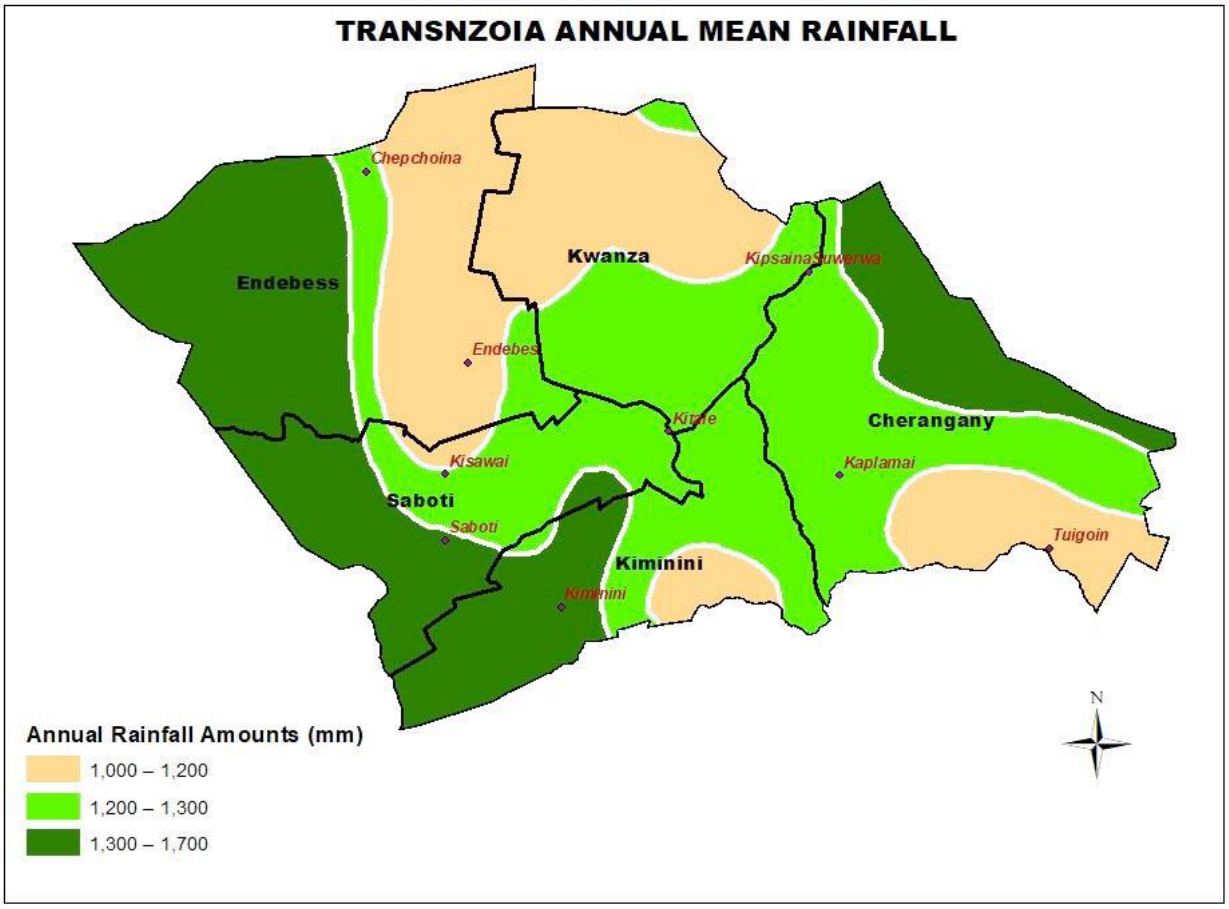


Figure 51: Trans-Nzoia Annual mean Rainfall

During January, the amount of precipitation is at its lowest, with only 53 mm | 2.1 inch recorded. The maximum quantity of rainfall is observed during the month of August, exhibiting an average value of 232 mm | 9.1 inch.

Average Temperature by Month Kitale

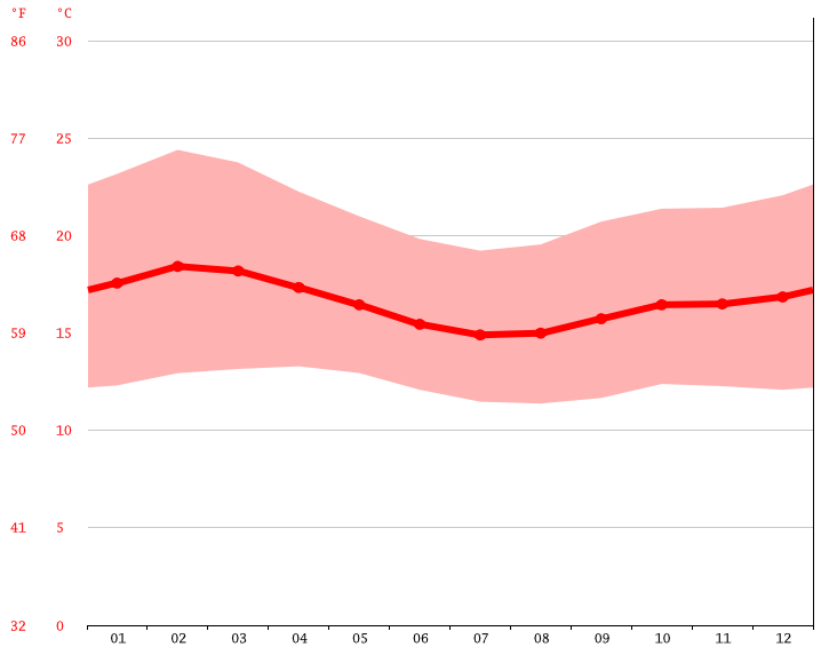


Figure 52: Kitale monthly temperature data

The month of maximum warmth in a year is February. The average temperature during this period reaches up to 18.4 °C | 65.1 °F, making it the hottest time of the year. During the month of July, there is a notable drop in temperature, with an average low of approximately 14.9 °C | 58.8 °F.

Weather by Month // Weather Averages Kitale

	January	February	March	April	May	June	July	August	September	October	November	December
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Max. Temperature °C (°F)	23.2 °C (73.7) °F	24.4 °C (75.9) °F	23.8 °C (74.8) °F	22.3 °C (72.1) °F	21 °C (69.8) °F	19.8 °C (67.7) °F	19.2 °C (66.6) °F	19.5 °C (67.2) °F	20.7 °C (69.3) °F	21.4 °C (70.5) °F	21.4 °C (70.6) °F	22.1 °C (71.7) °F
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Humidity(%)	56%	50%	58%	72%	77%	79%	78%	78%	74%	73%	72%	64%
Rainy days (d)	5	5	9	15	17	16	16	17	13	15	14	8
avg. Sun hours (hours)	10.4	10.6	10.3	9.7	9.4	9.0	8.8	9.0	9.8	9.8	9.7	10.1

Data: 1991 - 2021 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2019: avg. Sun hours

Figure 53: Kitale rainfall data

The variation in precipitation between the months with the lowest and highest levels of rainfall is 179 mm | 7 inch, as observed. The degree of fluctuation in the yearly temperature is approximately 3.5 °C | 6.3 °F.

In terms of relative humidity, the month that exhibits the highest level is June with a percentage of 50.02. Conversely, February has been recorded as having the lowest amount of relative humidity at only 50.02. It is noteworthy that May has the highest number of rainy days, amounting to 23.27, whereas the month with the least rainfall is February, experiencing only 7.03 wet days.[10]

4.1.2 Drainage

The county boasts rivers such as Nzoia, Ewaso-Rongai, Noigamaget River, and Sabwani River. In the study area, Nzoia catchment forms the dominant drainage system in the Lake Victoria North Drainage Basin. The river drains the region with its major tributaries Ewaso, Rongai, Koitobos and Ainomaget rivers. These rivers flow into Lake Victoria through River Nzoia while Suam River drains into Lake Turkana. The existing of these rivers possess significant groundwater potential, making the area suitable for boreholes, shallow wells, and springs, alongside various surface water sources like water pans and dams. Notably, the region is dotted with 65 dams, numerous water springs, shallow wells, and wetlands.

No hydrological study has been undertaken within the project areas to establish the drainage systems however the it was established that some of the river tributaries observed are known by their local names including Mtoni Nyangau in Mitume and Tuwani border and Exodus River in Matisi area.

[10] Kitale climate: Weather Kitale & temperature by month (climate-data.org)

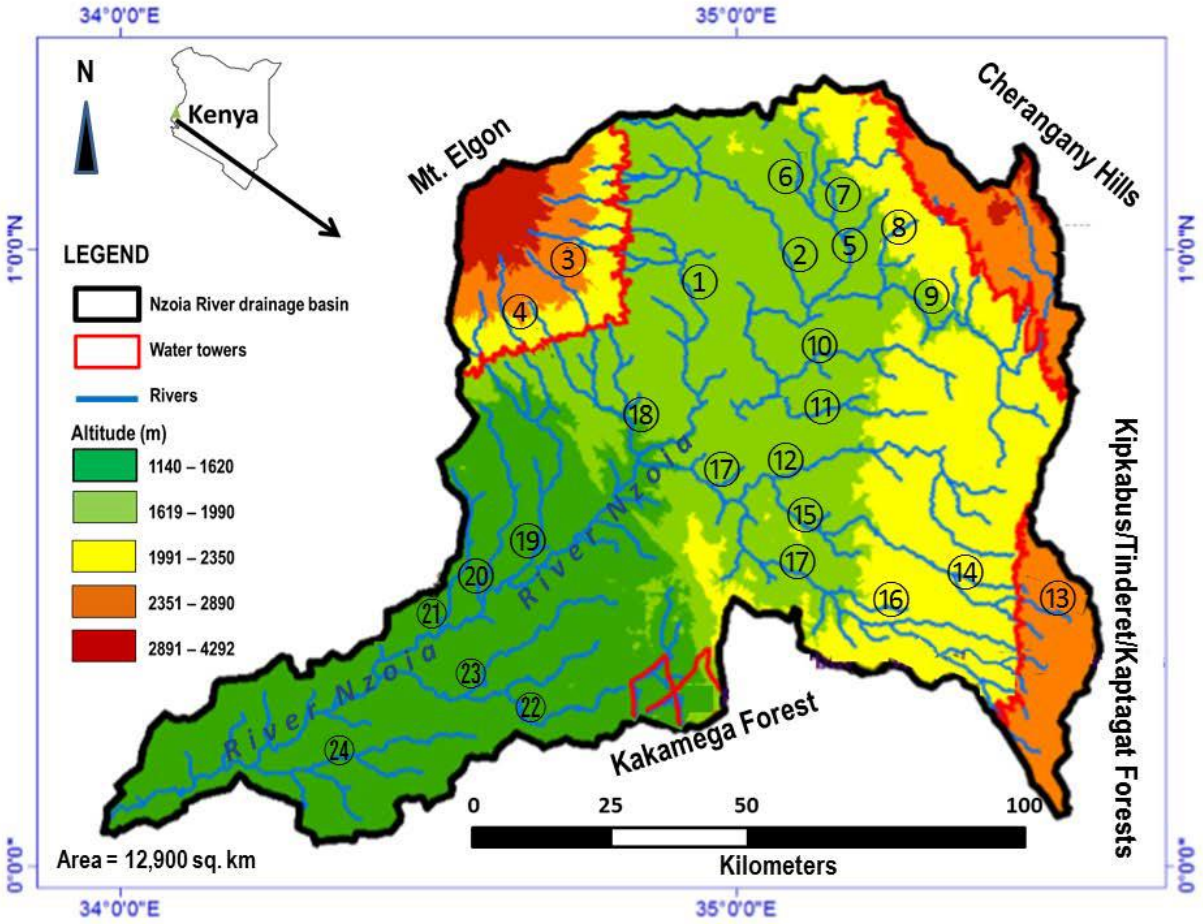
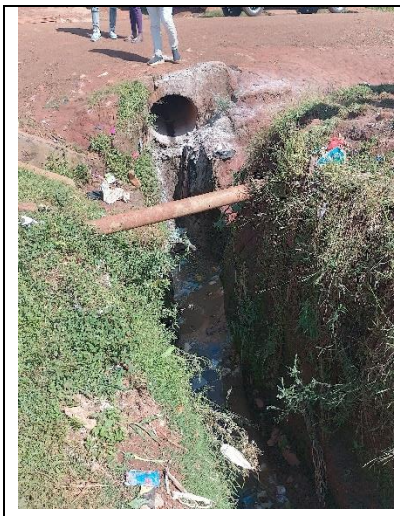


Figure 54: elevations and river system of the Nzoia River drainage basin
Source: Journal of East African Natural History (Nasirwaetal.2021)

Key

Encircled numbers are the tributaries of the River Nzoia with names as follows: ①Ewaso Rongai; ②Koitobos; ③Sosio; ④Kabingei; ⑤Noigamneget; ⑥Saiwa; ⑦Kapolet; ⑧Losorua; ⑨Moiben; ⑩Little Nzoia; ⑪Kipsangwa; ⑫Sergoit; ⑬Kisinandi; ⑭Ellegerini; ⑮Sosiani; ⑯Nureri; ⑰Kipkaren; ⑱Kabisi; ⑲Kuywa; ⑳Chwele; ㉑Khalaba; ㉒Isiukhu; ㉓Lusumu; ㉔Wuoroya. Adapted from source map: (GOK, 2016).

In urban areas of Trans-Nzoia, where the proposed settlements are located, drainage systems have been established to manage the removal of surface water. These systems comprise open channels, ditches, and culverts designed to redirect rainwater away from populated areas. However, these channels often face challenges such as blockages caused by solid waste and erosion. Despite these challenges, the water is eventually directed into nearby river tributaries, eventually flowing into the Nzoia River. The enhancement of these drainage systems through the KISIP project aims to ensure more effective drainage within the settlements.

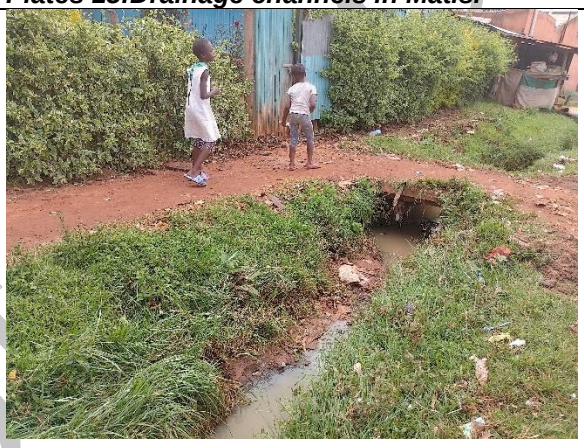


Plates 13: Drainage Culvert in Mitume

Plates 14: Eroded drainage in Tuwani

Plates 15:Drainage channels in Matisi

Plates 16:Drainage in Tuwani area



Plates 17:Drainage system along the proposed road in Tuwani

Plates 18:Drainage in Mitume

4.1.3 Solid waste baseline

Approximately 120 tonnes of waste is generated daily from domestic, industrial, commercial and agricultural activities. Most of this waste comes from the urban areas. In spite of the efforts made by the County in waste management, it still lacks the capacity to collect and effectively dispose of this waste[11]. This was also observed the proposed project areas as seen below:

Plates 19: Others dispose of their waste in open public areas

Plates 20: Waste management by burning at home

Plates 21:The County Government waste skips

Plates 22: Waste dumped along River Nyang'au

[11] Trans-Nzoia CIDP 2023-2027

Plates 23: Waste deposited along the drainage

In light of this baseline waste management situation, it is imperative that the road construction project incorporates robust waste management practices. Contractors must adhere to strict guidelines to minimize environmental impact and ensure compliance with local regulations. Given the informal nature of waste handling in the project area, it is essential that contractors collaborate closely with the County government to establish proper waste disposal procedures. Waste generated during construction activities should be properly segregated, with recyclable materials separated for recycling and non-recyclable waste disposed of in designated areas identified in coordination with the County authorities.

4.1.4 Liquid waste baseline

Plates 23: Pit latrine located next to the river banks In Mitume

Plates 24: Waste deposited along the drainage in Mitume

Plates 25: Existing storm water drainage in Mitume the settlements

Plates 26: Drainage from households into the storm water drainage systemin in Mitume

Given the absence of a sewer system in most project areas and the prevalent use of pit latrines for liquid waste disposal in the settlements of Trans-Nzoia, it is imperative for a contractor to devise a comprehensive strategy for managing liquid waste generated during construction activities. This plan should entail the provision of on-site facilities such as portable toilets and handwashing stations to meet the needs of construction workers while minimizing liquid waste generation through the use of water-efficient equipment and spillage prevention measures. Furthermore, the contractor must ensure proper handling and disposal of liquid waste by adhering to designated disposal areas or facilities that comply with local regulations and environmental standards.

4.1.5 Water resources

The portable water sources in the County are by gravity and pumping, boreholes, developed shallow wells, protected springs and rainwater harvesting. The average walking distance to the nearest potable water source is about 1.5km.

Water Sources

Plates 27: Mtoni Nyang'au water sources from a stream

Plates 28: Tuwani-Mitume River

Since the water sources within the settlements are primarily from rivers, streams, and piped NZOWASCO water, the contractor must assess the reliability of these sources. In planning for water use and sourcing in the project area, the contractor should consider their water source, storage capabilities, and water conservation measures to minimize water consumption during construction activities.

Should the water from these sources be inadequate, the contractor could explore alternative water sources, such as rainwater harvesting or utilizing water from nearby rivers or streams (while ensuring proper permits and environmental considerations). This can help reduce reliance on municipal water sources and minimize the impact on local water resources.

While obtaining water from different sources, water quality monitoring should be undertaken to ensure that water used for construction activities meets safety and regulatory standards. Regular testing and analysis should be conducted to detect any contaminants or pollutants that may pose risks to human health or the environment

4.1.6 Access Roads

The roads within settlements like Mitume have undergone paving through past funded projects. While the main access roads within Mitume are in good condition, the feeder roads leading to the settlement areas are part of ongoing project interventions. However, in areas like Shanti, Matisi, Tuwani, and Kipsongo, the roads mainly consist of unpaved earth surfaces. These roads become dusty during dry weather and experience excessive mud and erosion during the wet seasons, as highlighted in the Trans-Nzoia CIDP report.

The implementation of KISIP II road construction and drainage projects is essential to address these pressing issues. Improving the road network will enhance transportation connectivity, allowing residents to travel more efficiently and access essential services such as schools, hospitals, and markets. Additionally, a well-designed drainage system will mitigate the impacts of erosion, reducing the risk of flooding and safeguarding infrastructure and livelihoods.

Below are examples of roads within these settlements:

4.1.6.1 Matisi

Plates 29: Part of KERRA Link Road

Plates 30: Part of Sokomoko Road

Plates 30: A section of Kiberenge St John Road

Plates 31: A section of St.John Road

4.1.6.2 Mitume

Plates 32: Part of Umoja Link Road

Plates 33: Part of the Umoja Link Road

Plates 34: Part of Mitume Usafi Road

Plates 35: Part of the Mitume Apostolic Road

Plates 36: Part of Mitume Hospital Road

4.1.6.3 Tuwani

Plates 37: A section of Tudadi Road

Plates 38: A section of Kitale East Road

4.1.6.4 Shanti

Plates 39: Kipsongo Shanti Road

Plates 40: Kipsongo Shanti Main Road

Plates 41: Keremi Road

Plates 42: PAG Mkarani Raod

Plates 43: Kitale Kisewe Road

Plates 44: Mkarani Lane

4.1.7 Vegetation Cover

Baseline assessments indicated that most of the settlements are covered with non-exotic vegetation which have mushroomed in unsettled areas. Most vegetation are found along the streams and rivers or along the storm water drainages along the roads especially during the rainy seasons

Plates 45: Numerous shrubs within settlements mainly along spririver tributeries and drainage systems

4.1.8 Biophysical Environment

4.1.8.1 Baseline Air Quality

Air quality monitoring was undertaken to establish the baseline levels before implementation of the project. The obtained results for SO_X, NO_X, VOCs, and PM are presented in Table 21 and 22 below:

Table 21: Baseline Particulate Matter results -Shanti

Description	**TSP**	**PM $_{2.5}$**	**PM $_{10}$**
	Average (µg/m^3)	**Average (µg/m^3)**	**Average (µg/m^3)**
Kipsongo/Shanti	8.7	7.3	9.25
Masjid Tawahiid Shanti Child care unit	8.0	12.75	11.15
PAG Church Shanti	5.8	5.8	6.5
EMCA Guidelines	**500µg/m^3**	**75µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**75µg/m^3**	**150µg/m^3**

Table 22: Baseline gaseous air quality results – Shanti

Description	**VOCs Average (µg/m^3)**	**SO_X Average (µg/m^3)**	**NO_X Average (µg/m^3)**
Kipsongo/Shanti	29.4	64.0	7.05
Masjid Tawahiid Shanti Child care unit	26.6	61.25	4.15
PAG Church Shanti	46.4	61.5	4.80
EMCA Guidelines	**600µg/m^3**	**125µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**125µg/m^3**	**150µg/m^3**

Plates 46: Air & Noise Measurement at Kipsongoo/Shanti

Plates 47: AQ Measurement at Masjid Tawahiid Shanti

Plates 48: AQ Measurement at PAG Church

Table 23: Baseline Particulate Matter results - Kipsongo

Description	**TSP**	**PM $_{2.5}$**	**PM $_{10}$**
	Average (µg/m^3)	**Average (µg/m^3)**	**Average (µg/m^3)**
Kipsongo Community Centre	7.0	5.88	6.1
EMCA Guidelines	**500µg/m^3**	**75µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**75µg/m^3**	**150µg/m^3**

Table 24: Baseline gaseous air quality results – Kipsongo

Description	**VOCs Average (µg/m^3)**	**SO$_X$ Average (µg/m^3)**	**NO$_X$ Average (µg/m^3)**
Kipsongo Community Centre	63.5	19.72	4.0
EMCA Guidelines	**600µg/m^3**	**125µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**125µg/m^3**	**150µg/m^3**

Plates 49: AQ Measurements at Kipsongo Primary School

Table 25: Baseline Particulate Matter results - Matisi

Description	**TSP**	**PM $_{2.5}$**	**PM $_{10}$**
	Average (µg/m^3)	**Average (µg/m^3)**	**Average (µg/m^3)**
Exodus Academy Matisi	11.0	6.8	35.5
St John Education Centre Matisi	7.7	6.6	5.6
Residential Area Matisi	7.1	5.7	10.4
EMCA Guidelines	**500µg/m^3**	**75µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**75µg/m^3**	**150µg/m^3**

Table 26: Baseline Air quality results – Matisi

Descriptio	**VOCs Average (µg/m^3)**	**SO$_X$ Average (µg/m^3)**	**NO$_X$ Average (µg/m^3)**
Exodus Academy Matisi	56.7	2.00	6.3
St John Education Centre Matisi	67.4	21.32	5.5
Residential Area Matisi	34.2	117.2	5.1
EMCA Guidelines	**600µg/m^3**	**125µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**125µg/m^3**	**150µg/m^3**

Plates 50: AQ Measurement at Exodus Academy

Plates 51: AQ Measurement at St John Education Centre

Table 27: Baseline Particulate Matter results - Mitume

Description	**TSP**	**PM $_{2.5}$**	**PM $_{10}$**
	Average (µg/m^3)	**Average (µg/m^3)**	**Average (µg/m^3)**
Mitume Dispensary	7.6	6.3	7.4
Lyn Star Faith Academy Mitume	7.7	6.1	7.1
EMCA Guidelines	**500µg/m^3**	**75µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**75µg/m^3**	**150µg/m^3**

Table 28: Baseline Air quality results – Mitume

Description	**VOCs Average (µg/m^3)**	**SO_X Average (µg/m^3)**	**NO_X Average (µg/m^3)**
Mitume Dispensary	21.9	84.71	6.0
Lyn Star Faith Academy Mitume	35.7	105.30	7.0
EMCA Guidelines	**600µg/m^3**	**125µg/m^3**	**150µg/m^3**
WHO Guidelines	**-**	**125µg/m^3**	**150µg/m^3**

Plates 52: AQ Measurement at Mitume Dispensary

Plates 53: AQ Measurement at Lyn Star Faith Academy Mitume

Table 29: Tuwani Baseline Particulate Matter results

Description	**TSP**	**PM 2.5**	**PM 10**
	Average (µg/m³)	**Average (µg/m³)**	**Average (µg/m³)**
Angels of Hope Evangelism Centre Tuwani	8.2	5.8	6.4
Tuwani Near Beba Beba Guest House	7.5	6.0	5.6
EMCA Guidelines	**500µg/m³**	**75µg/m³**	**150µg/m³**
WHO Guidelines	**-**	**75µg/m³**	**150µg/m³**

Table 30: Baseline Air quality results – Tuwani

Description	**VOCs Average (µg/m³)**	**SO_X Average (µg/m³)**	**NO_X Average (µg/m³)**
Angels of Hope Evangelism Centre Tuwani	49.7	74.35	5.1
Tuwani Near Beba Beba Guest House	56.8	**158.36**	4.8
EMCA Guidelines	**600µg/m³**	**125µg/m³**	**150µg/m³**
WHO Guidelines	**-**	**125µg/m³**	**150µg/m³**

Plates 54: AQ Measurement at Angels of Hope Evangelism Centre

Plates 50: AQ Measurement at Tuwani Near Beba Beba Guest House

4.1.8.2 Baseline Noise

Baseline Noise measurements was carried out along the project areas to establish the baseline status before commencement of the project. The scope of work was assessing the noise exposure levels of environmental noise along the proposed project corridors.

Table 31: Shanti Noise Results

Monitoring Location	LAMax(dBA)	LAMin(dBA)	LAeq(dBA)	Noise Environment Components
Kipsongoo/Shanti	64.6	43.0	49.07	Vehicular Movement
Masjid Tawahiid Shanti Child care unit	68.2	47.1	52.76	Vehicular Movement, Human Noise
PAG Church Shanti	66.0	51.2	56.35	Vehicular Movement, Human Noise
EMCA Standards			**60**	
WB/IFC			**70**	

Plates 55: Noise Measurement at PAG Church

Plates 56: Noise Measurement at Masjid Tawahiid Shanti settlement

Table 32: Kipsongo Noise Results

Monitoring Location	LAMax(dBA)	LAMin(dBA)	LAeq(dBA)	Noise Environment Components
Kipsongo Community Centre	65.0	48.9	57.96	Vehicular Movement , Human Noise
EMCA Standards			**60**	
WB/IFC			**70**	

Plates 57: Noise Measurement at Kipsongo Primary School

Plates 58: Noise Measurement at Kipsongo/Shanti

Table 33: Matisi Noise Results

Monitoring Location	LAMax(dBA)	LAMin(dBA)	LAeq(dBA)	Noise Environment Components
Exodus Academy Matisi	72.2	42.5	50.71	Vehicular Movement, Human Noise
St John Education Centre Matisi	64.3	42.5	50.57	Vehicular Movement, Human Noise
Residential Area Matisi	59.6	43.4	51.3	Vehicular Movement, Human Noise
EMCA Standards			**60**	
WB/IFC			**70**	

Plates 59: Noise Measurement at St. John Education Centre Matisi

Plates 60: Noise Measurement at Exodus Academy Matisi

Plates 61: Noise Measurement at a play ground near residential area in Matisi

Table 34: Mitume Noise Results

Monitoring Location	LAMax(dBA)	LAMin(dBA)	LAeq(dBA)	Noise Environment Components
Mitume Dispensary	76.6	45.8	51.67	Vehicular Movement, Human Noise
Lyn Star Faith Academy Mitume	78.5	45.1	56.68	Vehicular Movement, Human Noise
EMCA Standards			**60**	
WB/IFC			**70**	

Plates 62: Noise Measurement at Lyn Star Faith Academy Mitume

Table 35: Tuwani Noise Results

Monitoring Location	LAMax (dBA)	LAMin(dBA)	LAeq(dBA)	Noise Environment Components
Evangelism Centre Tuwani	56.7	44.1	48.71	Vehicular Movement, Human Noise
Tuwani Near Beba Beba Guest House	60.0	48.8	53.49	Vehicular Movement, Human Noise
EMCA Standards			**60**	
WB/IFC			**70**	

Plates 63: Noise Measurement at Angel of Hope Evangelism Centre Tuwami

Plates 60: Noise Measurement at Tuwani near Beba Beba Guest House

IFC Noise Management Guidelines propose that where predicted or measured noise impacts from a project exceed the applicable noise level guideline at the most sensitive point of reception, noise prevention, and mitigation measures be put in place.

The guidelines indicate that for industrial and commercial areas, noise levels should not exceed 70 dB (A). In residential, institutional, and educational areas, noise levels should not exceed 55 dB (A) during the day (07:00 to 22: 00 Hrs.) and 45 dB (A) during the night (22:00 to 07:00 Hrs.). In both cases, a maximum increase of 3 dB (A) is allowed where background noise already exceeds the guideline value. See Table 36 below;

Table 36: IFC/World Bank Noise Management Guidelines

Receptor	**Maximum allowable LAeq (hourly) in dBA**	
Time Frame	Day: 07:00 – 22:00hrs	Night: 22:00 -07:00
Residential; institutional; Educational	55	45
Commercial	70	70

During site visits, it was noted that sensitive receptors, including schools, hospitals, and residential areas, are located in close proximity to the road construction site.

Given the presence of these sensitive receptors, the contractor is required to exercises heightened caution and implements appropriate measures to minimize disruption and ensure the safety and well-being of the surrounding community.

To address these concerns, the contractor must implement effective traffic management measures to minimize congestion and ensure the smooth flow of traffic, especially during peak hours. Temporary traffic diversions and signage should be utilized to safely guide vehicles and pedestrians around the construction site, particularly near the hospital.

Additionally, measures to mitigate noise and dust generated by construction activities are essential, particularly in residential areas and near healthcare facilities and schools. This may include the use of dust suppression techniques and scheduling noisy activities during off-peak hours to minimize disturbances to nearby sensitive receptors.

Maintaining open communication with stakeholders, including local authorities and the hospital, and residents, is also crucial to keep them informed about construction activities, schedules, and any potential disruptions. Addressing concerns and feedback in a timely and transparent manner to foster positive community relations and minimize the impact on sensitive receptors.

4.1.8.3 Baseline Water Quality

Water sample was collected at the River Matisi, Kipsongo Stream and at a borehole in Shanti. The results of the water samples are as indicated below:

LABORATORY TEST REPORT

Date Received : 17/11/2023 **Batch No :** 23/0277 **Sampled By:** Client
Date Started : 17/11/2023 **Sample Ref:** LW2678 **Sampling Method:** N/A
Date Completed : 21/11/2023 **Sampling Date:** 17/11/2023
External Sample ID : River Matisi Water **Report Date:** 21/11/2023

Chemical Analysis

PARAMETER	Method	Results	Guide L & H			Ref. Std Limits (Max)
			Low	Opt.	High	
pH*	ISO 10523	6.98				6.5-8.5
Total Suspended Solids (TSS), mg/L	APHA 2540	3.67				30
Nitrate as NO_3, mg/l	ISO 7890	3.40				10
Ammonia Nitrogen, mg/L	ISO 11732	0.21				0.5
Nitrite as NO_2 , mg/L	ISO 6777	0.38				3
Total Dissolved Solids (TDS), mg/l	APHA 2540 C	33.15				1200
Phenol, mg/L	APHA 5530	2.34				Nil
Fluoride as F, mg/L	APHA 4500 F	1.09				1.5
E.coli cfu per 100ml	ISO 9308-1	Nil				Nil
Lead as Pb, in mg/L	ISO 8288	0.04				0.05
Arsenic as As, mg/L	ISO 8288	<0.001				0.01
Cadmium as Cd^{2+}, mg/L	ISO 8288	<0.001				0.01
Selenium as Se, mg/L	ISO 17379	<0.001				0.01
Copper as Cu, in mg/L	ISO 8288	0.02				1
Zinc as Zn, in mg/L	ISO 8288	<0.001				5
Permanganate Value (PV) mg/L	ISO 8467	<0.001				1
Alkyl Benzyl Sulphonates mg/L	ASTM D4711	<0.001				0.5
Total coliform, cfu/100ml	ISO 9308-1	Nil				X^2
Free Residual Chlorine	LWTP 012	0.02				X^2
Chloroform	LWTP 037	Not Detectable				X^2

********End of test results********

Figure 55: River Matisi Water Quality Results

LABORATORY TEST REPORT

Date Received : 17/11/2023 **Batch No :** 23/0277 **Sampled By:** Client
Date Started : 17/11/2023 **Sample Ref:** LW2680 **Sampling Method:** N/A
Date Completed : 21/11/2023 **Sampling Date:** 17/11/2023
External Sample ID : Kipsongoo Spring Water **Report Date:** 21/11/2023

Chemical Analysis

PARAMETER	Method	Results	Guide L & H			Ref. Std Limits (Max)
			Low	Opt.	High	
pH*	ISO 10523	5.41				6.5-8.5
Total Suspended Solids (TSS), mg/L	APHA 2540	Nil				30
Nitrate as NO_3, mg/l	ISO 7890	107.30				10
Ammonia Nitrogen, mg/L	ISO 11732	0.62				0.5
Nitrite as NO_2 , mg/L	ISO 6777	0.01				3
Total Dissolved Solids (TDS), mg/l	APHA 2540 C	199.70				1200
Phenol, mg/L	APHA 5530	0.47				Nil
Fluoride as F, mg/L	APHA 4500 F	0.94				1.5
E.coli cfu per 100ml	ISO 9308-1	Nil				Nil
Lead as Pb, in mg/L	ISO 8288	<0.001				0.05
Arsenic as As, mg/L	ISO 8288	<0.001				0.01
Cadmium as Cd^{2+}, mg/L	ISO 8288	<0.001				0.01
Selenium as Se, mg/L	ISO 17379	<0.001				0.01
Copper as Cu, in mg/L	ISO 8288	0.022				1
Zinc as Zn, in mg/L	ISO 8288	<0.001				5
Permanganate Value (PV) mg/L	ISO 8467	<0.001				1
Alkyl Benzyl Sulphonates mg/L	ASTM D4711	<0.001				0.5
Total coliform, cfu/100ml	ISO 9308-1	Nil				X^2
Free Residual Chlorine	LWTP 012	0.03				X^2
Chloroform	LWTP 037	Not Detectable				X^2

********End of test results********

Figure 56: Kipsongo Spring Water Quality Results

LABORATORY TEST REPORT

Date Received : 17/11/2023 **Batch No :** 23/0277 **Sampled By:** Client
Date Started : 17/11/2023 **Sample Ref:** LW2681 **Sampling Method:** N/A
Date Completed : 21/11/2023 **Sampling Date:** 17/11/2023
External Sample ID : Shaliti Borehole Water **Report Date:** 21/11/2023

Chemical Analysis

PARAMETER	Method	Results	Guide L & H			Ref. Std Limits (Max)
			Low	Opt.	High	
pH*	ISO 10523	5.43				6.5-8.5
Total Suspended Solids (TSS), mg/L	APHA 2540	Nil				30
Nitrate as NO_3, mg/l	ISO 7890	112.30				10
Ammonia Nitrogen, mg/L	ISO 11732	0.47				0.5
Nitrite as NO_2 , mg/L	ISO 6777	0.01				3
Total Dissolved Solids (TDS), mg/l	APHA 2540 C	550.90				1200
Phenol, mg/L	APHA 5530	Nil				Nil
Fluoride as F, mg/L	APHA 4500 F	1.11				1.5
E.coli cfu per 100ml	ISO 9308-1	Nil				Nil
Lead as Pb, in mg/L	ISO 8288	<0.001				0.05
Arsenic as As, mg/L	ISO 8288	<0.001				0.01
Cadmium as Cd^{2+}, mg/L	ISO 8288	<0.001				0.01
Selenium as Se, mg/L	ISO 17379	<0.001				0.01
Copper as Cu, in mg/L	ISO 8288	0.038				1
Zinc as Zn, in mg/L	ISO 8288	<0.001				5
Permanganate Value (PV) mg/L	ISO 8467	<0.001				1
Alkyl Benzyl Sulphonates mg/L	ASTM D4711	<0.001				0.5
Total coliform, cfu/100ml	ISO 9308-1	Nil				X^2
Free Residual Chlorine	LWTP 012	0.01				X^2
Chloroform	LWTP 037	Not Detectable				X^2

********End of test results********

Figure 57: Shanti Borehole Water Quality Results

The water monitoring results in the figures above indicate that most parameters are within regulatory limits, except for elevated levels of Phenols, Nitrates, and Ammonia. The presence of high nitrate levels suggests potential contamination sources, such as agricultural runoff, wastewater discharges, or septic system leachate, which require further investigation. Additionally, the reported ammonia level in the Kipsongo River of 0.62 mg/L exceeds the recommended limit of 0.5 mg/L, albeit to a lesser extent compared to nitrate levels.

The reported phenol levels in Matisi are 2.34 mg/L, and in Kipsongo, 0.47 mg/L, both above acceptable limits. Potential sources of phenols in water include industrial discharges, chemical manufacturing wastewater, agricultural runoff with pesticides or herbicides, and natural sources like decaying organic matter.

The project team should take note of the baseline levels of contaminants, such as Phenols, Nitrates, and Ammonia, and ensure that these levels are not further elevated by the implementation of the project. It is essential to prioritize the protection of water quality and prevent any exacerbation of existing contamination issues during project activities.

4.2 Social Baseline Information

Social baseline information was undertaken to aid the understanding of the social context and conditions prevailing in a project area prior to project implementation. It was conducted from 13th to 18th November, 2023. The data was collected using socio-economic survey tool provided in annex: VII. Survey was conducted using a sample size of 60 households picked randomly from each settlement.

In this baseline, the demographics including population size, age structure, gender distribution, ethnic composition, and household characteristics;

4.2.1. Sanitation

The sanitation management services are under water service providers. For effective provision of these services, the County department has embraced both sewerage and non-water conservancies systems especially in water scarce areas. The department of public health promotes sanitation and hygiene with a view to achieving Open Defecation Free zones (ODF) in the rural set ups.

The socio-economic survey indicated that a large percentage (79%) of the respondents have access to toilet facilities while 21% do not have access as shown in Figure 58 below. The project will aim to improve the sanitation coverage for the settlements.

Figure 58: Toilet Facilities

4.2.2. Access to clean drinking Water

The portable water sources in the County are by gravity and pumping, boreholes, developed shallow wells, protected springs and rainwater harvesting. The average walking distance to the nearest portable water source is about 1.5km (Trans Nzoia County Integrated Development Plan, 2018-2022). Almost half (49%) of the respondents have access to tapped water for drinking. The County water company NZOWASCO either connects the water to the households. Those without direct connections to their households buy tapped water from the nearby water kiosks. More than half (51%) of the respondents get water from the wells as shown in Figure 59 below.

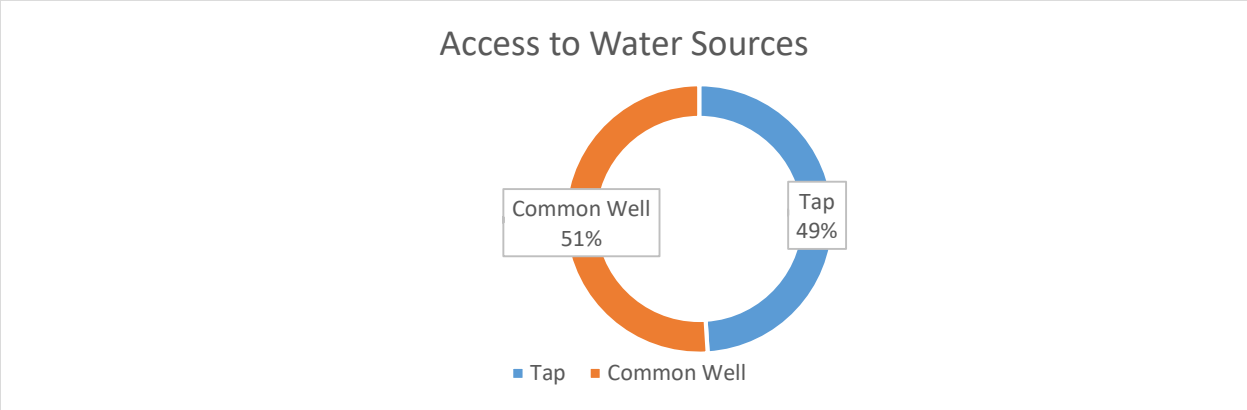


Figure 59: Access to water

4.2.3. Population of persons with disabilities

The 2019 census enumerated 26,789 Persons living with Disabilities (PWDs), out of these, 13,461 were male and 13,328 were female. Visual impairment constituted 28.1% and 27.4% female and male respectively (Trans Nzoia County Integrated Development Plan, 2018-2022).

4.2.4. Access to electricity

According to the 2015/2016 KIHBS report, in Trans Nzoia County, electricity is the main source of lighting fuel at 30.7 percent for 210,000 households surveyed and this can be attributed to the scale up in the rural electrification program. On the other hand, 29.1 percent of the households use paraffin tin lamps for lighting while 19.3 percent of the households use paraffin lanterns and 0.5 percent use pressure lamps. Similarly, other sources of lighting fuel used are generator, candle and battery lamp/torch at 0.1 percent, 0.2 percent and 1.1 percent respectively. 6 percent of the county households use other energy sources for lighting. (Trans Nzoia County Integrated Development Plan, 2018-2022).

The results from socio-economic survey indicated that majority (81%) of the respondents have access to electric connectivity while 19% do not have access as shown in Figure 60 below.

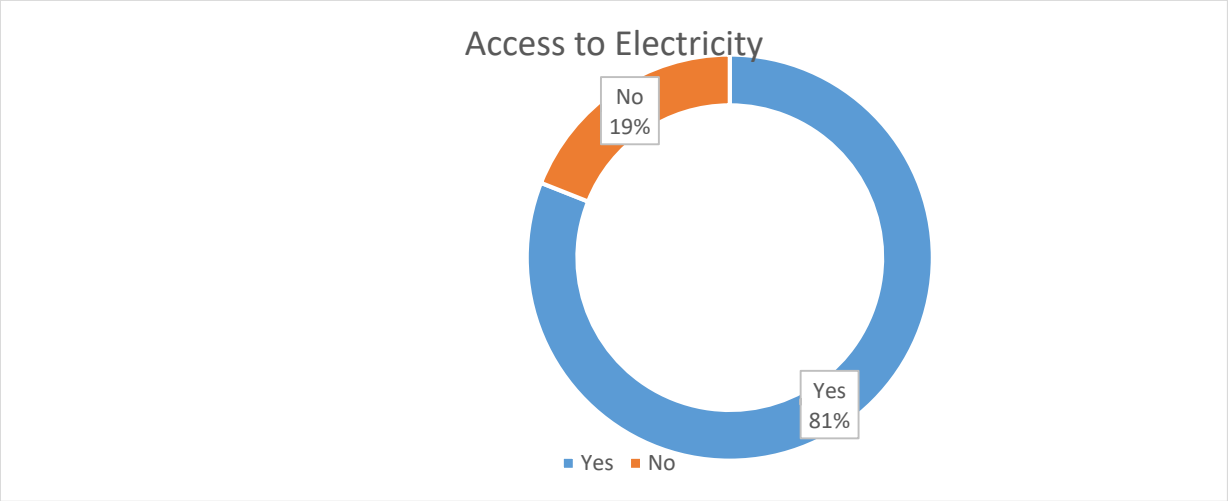


Figure 60: Access to Electricity and Connectivity

4.2.5. Access to Cooking Energy

According to the KIHBS 2015/2016, 65.8 percent of the households interviewed use firewood for cooking, 17.7 percent use charcoal, 4.9 percent use kerosene, 0.5 percent use biogas, 6.4 percent (Trans Nzoia County Integrated Development Plan, 2018-2022).

Access to different sources of cooking energy vary across household. Majority (44%) of the respondents use charcoal, while 32% use gas. Those who use kerosine and firewood each account for 12% respectively as presented in the Figure 61 below.

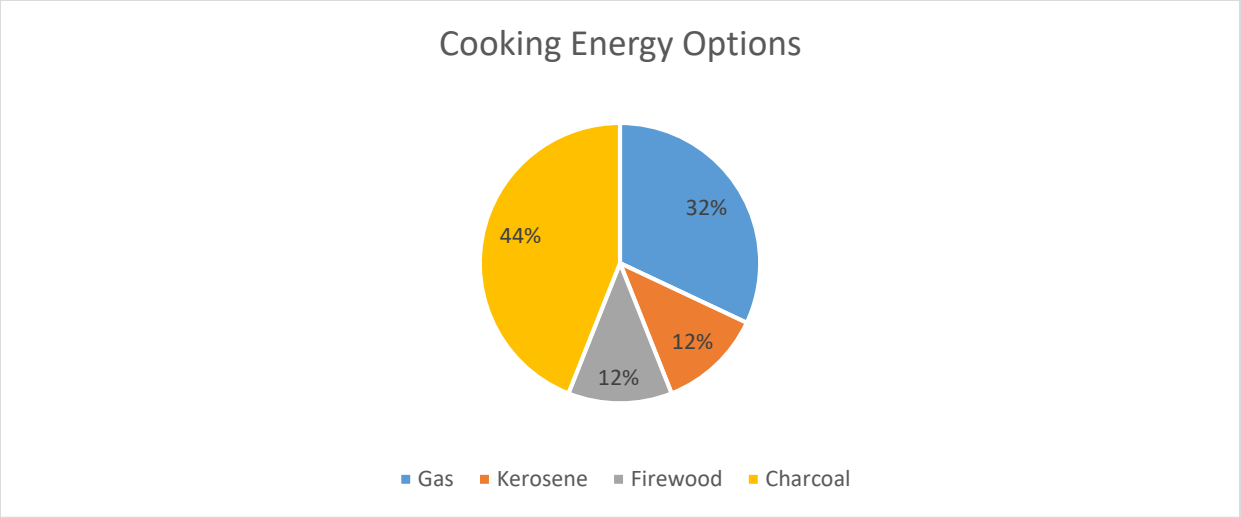


Figure 61: Cooking Energy

4.2.6. Housing Ownership

Housing is one of the basic requirements for growth and development of the economy. Majority (63%) of the respondents live in rented houses while 37% own their houses as shown in figure 62 below.

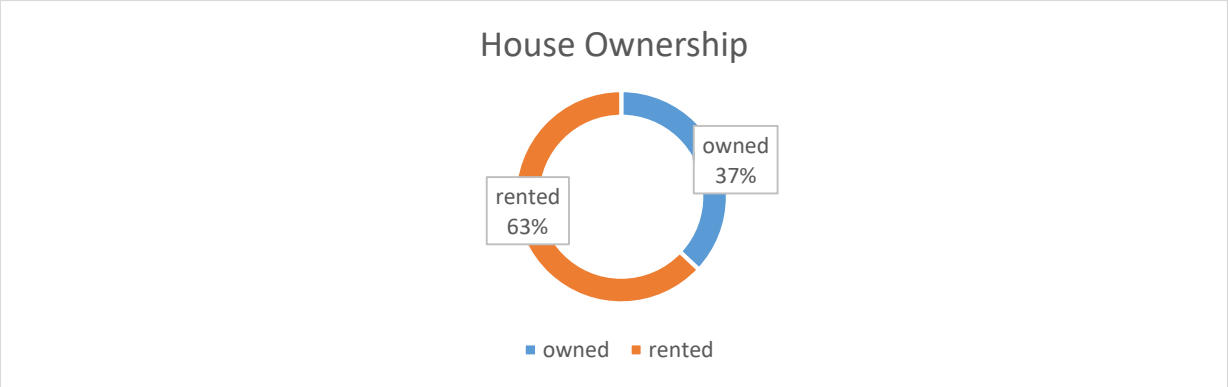


Figure 62: Housing Ownership

4.2.6.1. Types of building materials

In Kenya, housing is classified in terms of roofing, walling and flooring materials. In the settlements, the main materials used for roofing are corrugated iron sheets. In the County, the main materials used for roofing are corrugated iron sheets and grass. Corrugated iron sheet is the leading roofing material at 83 per cent of the houses while the grass thatched or makuti roof houses constitute 14 per cent and tile roofed houses being less than 1 per cent. The main types of walling material include mud and wood accounting for 81 percent, brick or block accounting for

17 percent, mud and cement accounting for 2 percent and stone accounting for 1.4 percent of the dwelling units in the County. Other types of walling material used in the County include wood only, corrugated iron sheet, grass straw, tin and others (Trans Nzoia County Integrated Development Plan, 2018-2022).

The preferred wall type is bricks used by 69 % of the respondents. The respondents with mud walled houses accounted for 31%. Majority (96%) of the respondents use corrugated iron sheet for roofing. Small number (3%) use grass while 1% use concrete as shown in Figure 63 below.

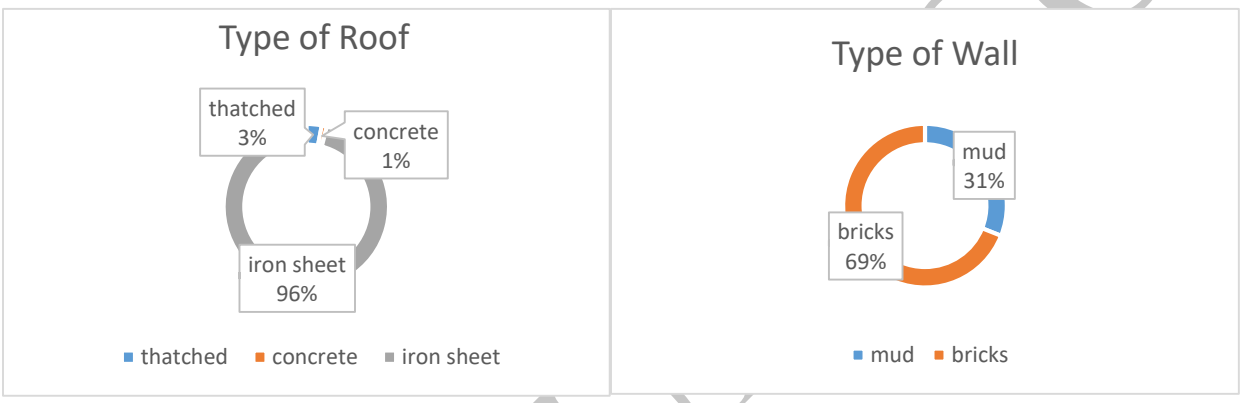


Figure 63: Wall and Roof Type

4.2.7. Ownership of household assets

Almost quarter (22%) of the respondents own mobile phones while (20%) own radio. Cooking gas is owned by 17% same as television at 17%. Bicycle (7%), music system (7%), refrigerator (4%) car (3%), oven (2%), tractor, and washing machine 1% as shown in figure 64 below.

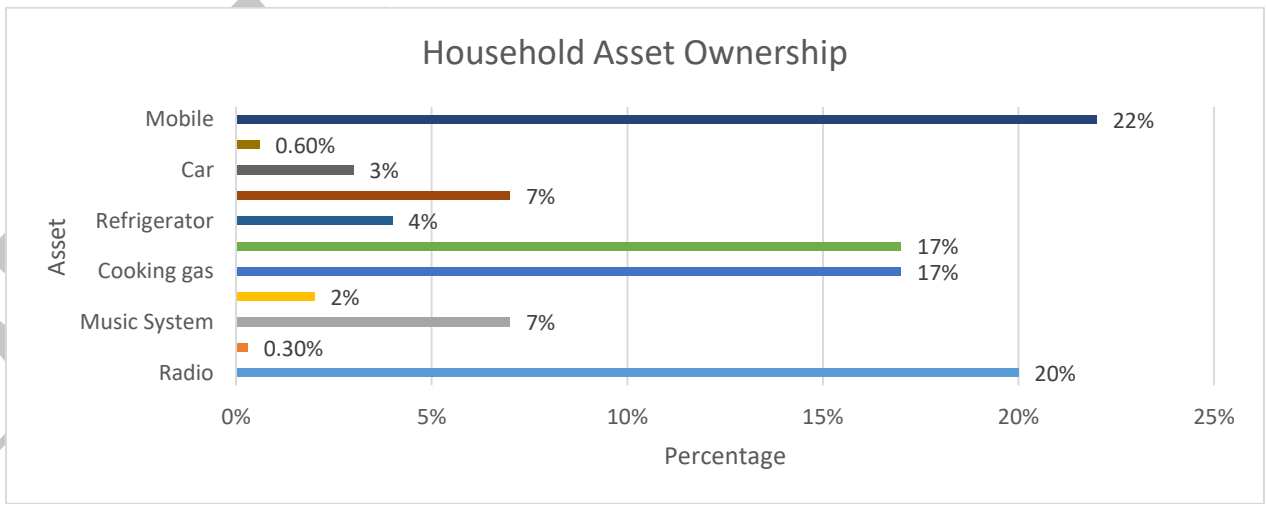


Figure 64: Household asset Ownership

4.2.7.1. Access to essential services

Less than half (37%) of the respondents have Access to education institutions. At the same time, 30% have access to hospitals. Trans Nzoia County has eight (8) functional tier-3 public hospitals. The number of tier-2 and tier-1 public health facilities is 73 and 87 respectively. The average distance to the nearest health facility within urban centres is 1 kilometre; while for rural areas it is 5 kilometres. There is a general need for additional wards, beds and hospital equipment across all the county facilities. The county has a total of 43 registered private facilities distributed across the sub counties as follows: Kiminini (20), Cherang'any (6), Endebess (1), Kwanza (4) and Saboti (12). Based on tiers, there are 38 and 5 tier-2 and tier-3 private facilities respectively (Trans Nzoia County Integrated Development Plan, 2018-2022).

Less than half (47%) of the respondents have access to hospitals and police station (25%). The average distance to the nearest health facility within urban centres is 1 kilometre; while for rural areas it is 5 kilometres. Access to market and police station accounted for 28% and 25% as shown in figure 65.

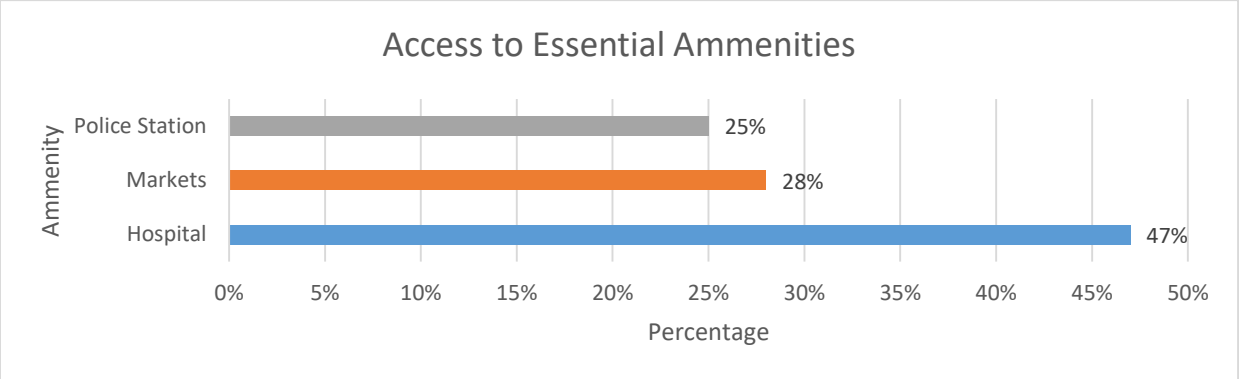


Figure 65: Access to essential amenities

Less than half (47%) of the respondents have access to hospitals and police station (25%). The average distance to the nearest health facility within urban centres is 1 kilometre; while for rural areas it is 5 kilometres. Access to market and police station accounted for 28% and 25% as shown in figure 66.

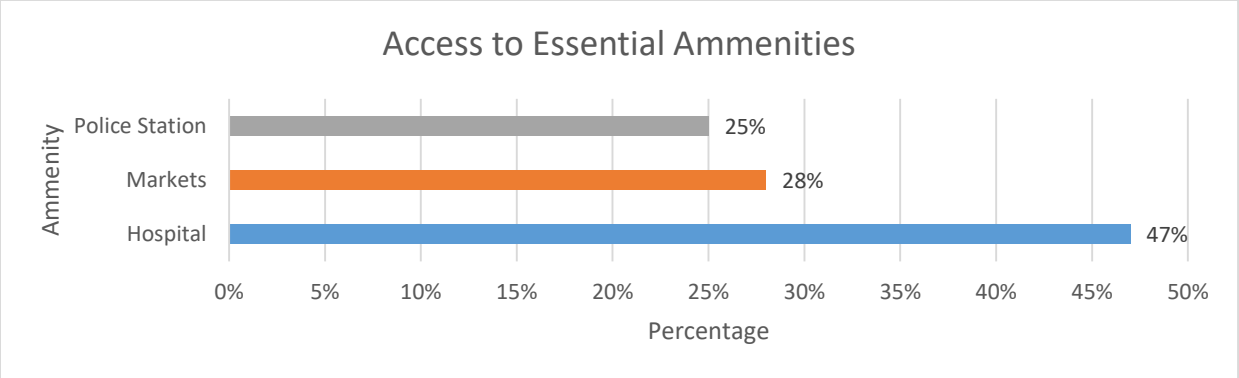


Figure 66: Access to essential amenities

4.2.8. Household Expenditures

Less than half (42%) of the respondents spend less than kshs. 20,000 on basic needs such as food and clothing while 28% of the respondents spend between 20,001 to 40,000 on education. At the same time 15% spend 40,001 to 60,000 on health. Expenditure on farm inputs ranges from 60,001 to 80,000 and accounts for 3%. Entertainment expenditures ranged from 80,001 to 100,000 and accounts for 3%. General expenditures of above kshs. 100,000 accounted for 9% as shown in the Figure 67 below.

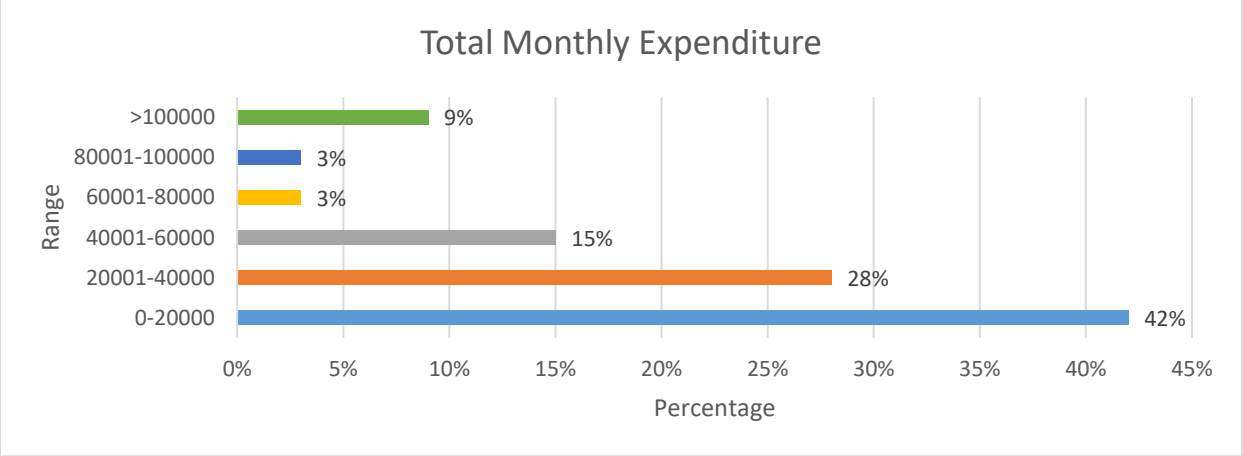


Figure 67: Household expenditure

4.2.9. Land ownership categories/ classification

Majority of land in the County is under private ownership as either leasehold or freehold. In addition, some land in urban areas is also held on temporary basis under Temporary Occupation Licenses.

4.2.10. Water management

Currently, the water management institutions are under the LVNWSB and WASREB. As a measure for sustainability, the County has initiated the process of having its Water Services Provider (WSP) as well as building Public Private Partnership (PPP) for the development and management of urban, rural and community water supplies. Some of the community water resources and supplies are managed by the Water Services and Resource Users Associations.

4.2.11. Morbidity

Malaria remains the leading cause of morbidity in the adult population (20%); followed by upper respiratory tract infections (13%), diseases of the skin (6%), urinary tract infections (3%) and diarrhoea (3%). The disease prevalence burden in paediatric patients is in the following order: upper respiratory tract infections (23%), malaria (16%), diarrhoea (13%), diseases of the skin (6%) and pneumonia (3%). Notably, the most prevalent diseases in the county are malaria, upper respiratory tract infections, diseases of the skin and diarrhoea. The high prevalence of malaria could be due to non-use of mosquito nets (Trans Nzoia County Integrated Development Plan, 2018-2022).

During the socio-economic survey, very few (9%) of the respondents reported having suffered serious illness in the last one year and the morbidity is reported as very low. Malaria is the leading disease within the project area accounting for 26% followed by tuberculosis (22%), pneumonia (13%), cholera (10%), blood pressure (7%), HIV, Diabetes, Kidney failure and asthma each accounted for 3% respectively of the disease prevalence as reported by the respondents in figure 68 below.

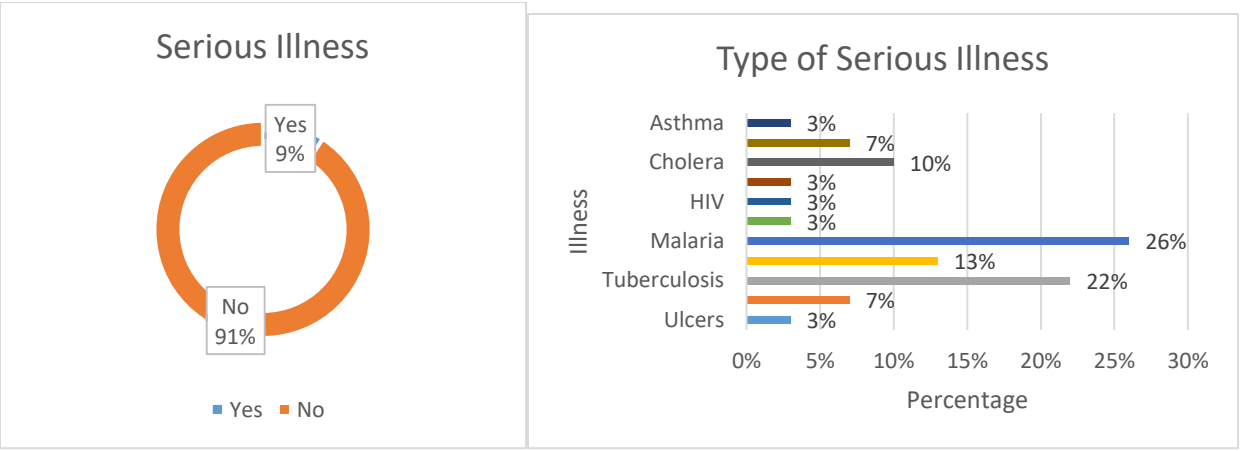


Figure 68: Serious Illness

4.2.12. Land Use

The study areas are majorly residential with a small mix of commercial use. The structures in the settlement are diverse ranging from mud housing to masonry permanent housing. The settlements have been adjudicated, and land ownership is not an issue. Small and medium-sized businesses are located throughout the settlements, with residents providing labour for both formal and informal businesses such as industries, small medium enterprises, agricultural activities, and Jua kali sector activities.

4.2.13. Land tenure

Leasehold is most predominant land tenure system within the project area accounting for 63 % of the respondents while freehold accounts for 37% as shown in figure 69 below. The land within the settlement is privately owned. The land where the project will be implanted is public land set aside by the county government of Trans Nzoia.

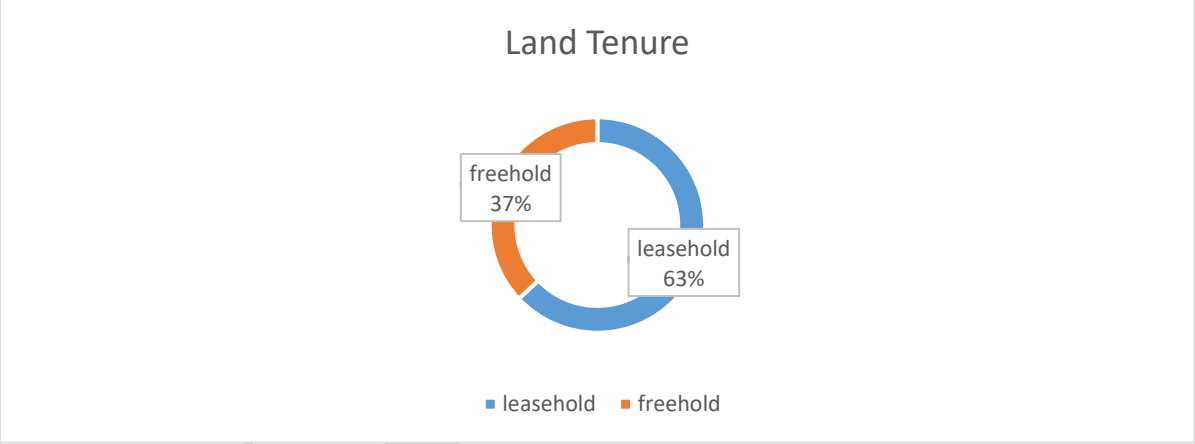


Figure 69: Land tenure

4.2.14. Age distribution

Youthful population are the majority of the household members accounting for 39%. This is followed by children and teenagers aged between 0-17years accounting for 31%. Those aged between 36-60 years accounted for 25%. Adults aged 61-70 were 4% while the elderly were 1%. The age distribution of the respondents is presented in the figure 70 below. The youthful population shall provide labour during the construction phase of the project.

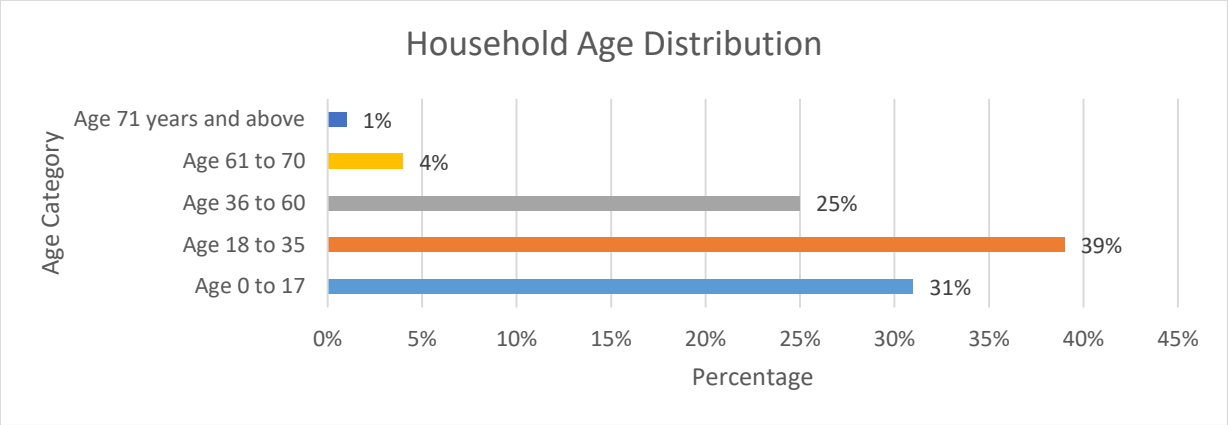


Figure 70: Age Distribution

4.2.15. Gender Issues

The main gender issues are contained under the customary practices where the male vests ownership and control of productive assets. Women in the settlements are faced with a number of challenges including inadequate access to credit, lack of technical skills, multiplicity of roles for women and inadequate access to education and training. The traditional delineation of labour persists with women assuming the entire responsibility for childcare, provision of food, water and firewood collection and the general maintenance of the homestead among others. A small number of respondents said that women own land (4%). Those who said that women own Houses were (5%). In terms of Decision making women have a say on Financial Matters (16%), education of children (12%), Healthcare (12%), Assets Purchase (12%), daily activities (16%), Social Functions (15%) and Governance 8%. KISIP-2 should ensure that women also benefit from the opportunities presented by the projects to be implemented. Gender analysis is provided in figure 71 below.

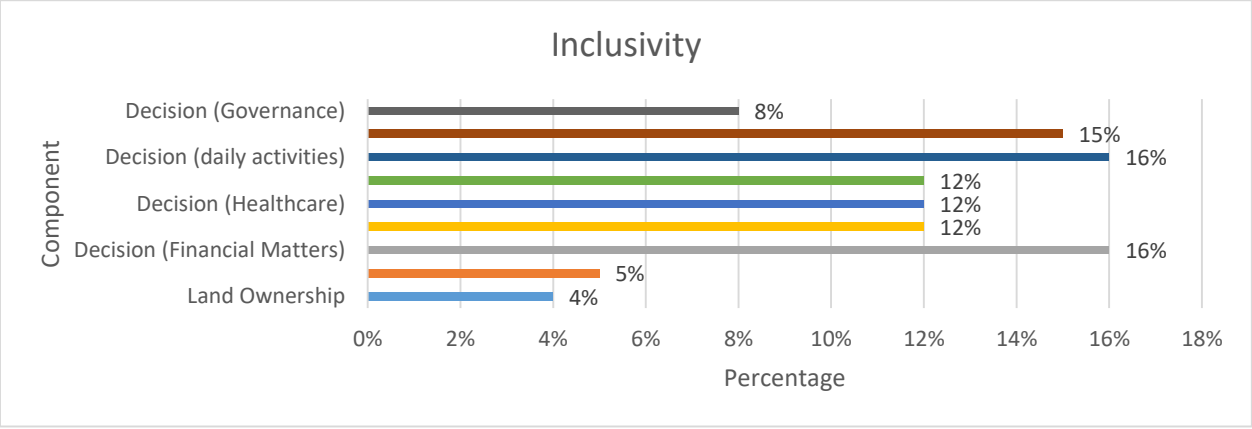


Figure 71: Gender Issues

4.2.16. Gender Distribution of the Respondents

The survey data from the respondents indicates that 66% of household heads were males while 34 % were female. The data suggests that males head most of the surveyed households. Nuclear family is the most preferred family type by most of the respondents interviewed within the project area. The changing cultural and social norms and the high cost of living are driving most people to coalesce around nuclear family setup. The gender distribution is presented in figure 72 below.

Information on gender will also enhance gender mainstreaming into the project activities as per the legal, policy and guiding world best practices i.e. vision 2030 policy.

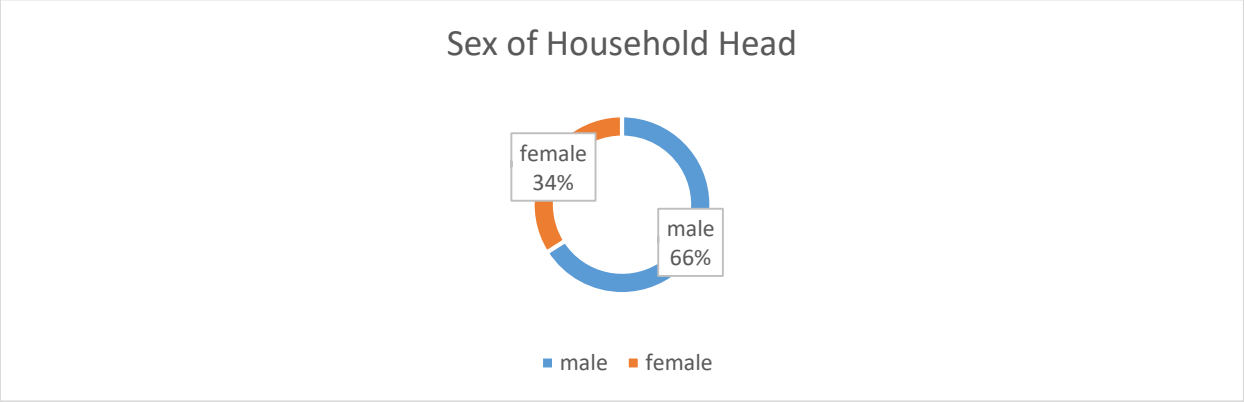


Figure 72: Gender Distribution of Household Heads

4.2.17. Marital status

Majority (44%) of the respondents are married followed by widow (23%), widower (19%). Single and divorced accounted for 7% each respectively as shown in 73 below.

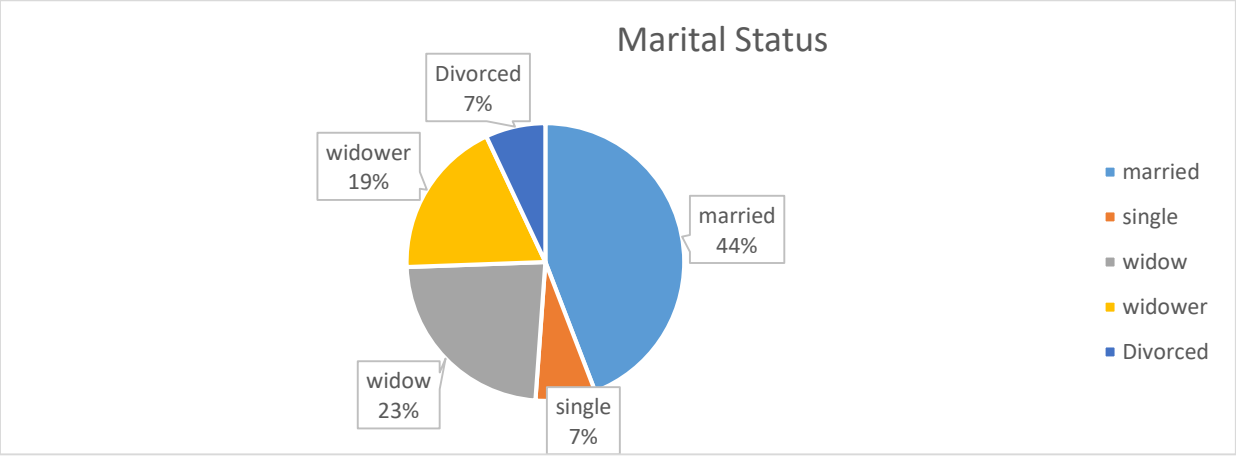


Figure 73: Marital Status

4.2.18. Educational Level

Male education level was reported as secondary (28%), primary (27%), middle level college (19%), illiterate (15%), graduate (8%) and above graduate (3%). Female education has primary level leading at (25%) followed by secondary (24%). Illiterate, middle level college and above graduate each accounted for 15% each respectively. Graduate accounted for 6%. The few illiterate respondents may require assistance during the implementation of the road project. The analysis and the findings of the socio-economic survey should inform the involvement of the PAPs in the project execution/ works i.e. the skilled PAPs can be involved/ prioritised during construction workers' recruitment while unskilled PAPs can also be involved in construction works that conform with their abilities. Distribution of educational level is provided in figure 74 below.

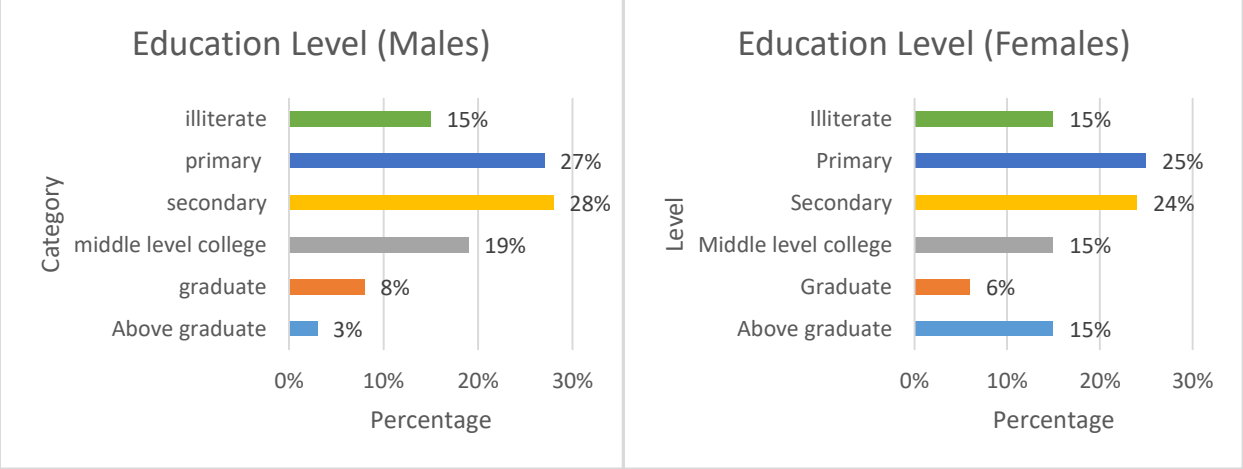


Figure 74: Education Status

4.2.19. Source of monthly income and Wage Earners

Based on the population projection data, the number of wage earners in the County is estimated at 450,952 workers. Male workers are estimated to be 236,650 while the female workers are 214,302. Most of the wage earners in the County are employed in rural areas (Trans Nzoia County Integrated Development Plan, 2018-2022).

Majority (81%) of the respondents are self-employed and involved in small trades while 19% are salaried as shown in figure 75 below. Those who are self-employed can get an opportunity to work in the project as semi-skilled laborers during construction. The residents will get additional job opportunities during project construction phase.

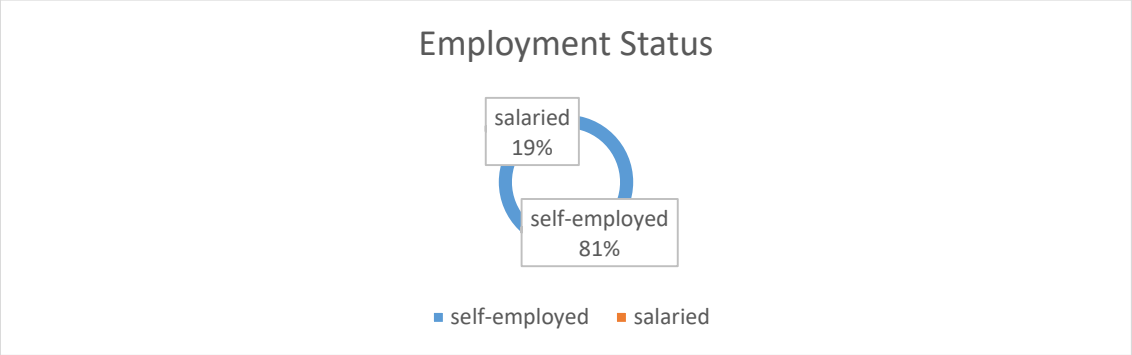


Figure 75: Occupation

4.2.20. HIV Awareness

Most of the respondents (96%) reported that they have knowledge of HIV while 4% said that they were not aware as shown in figure 76 below.

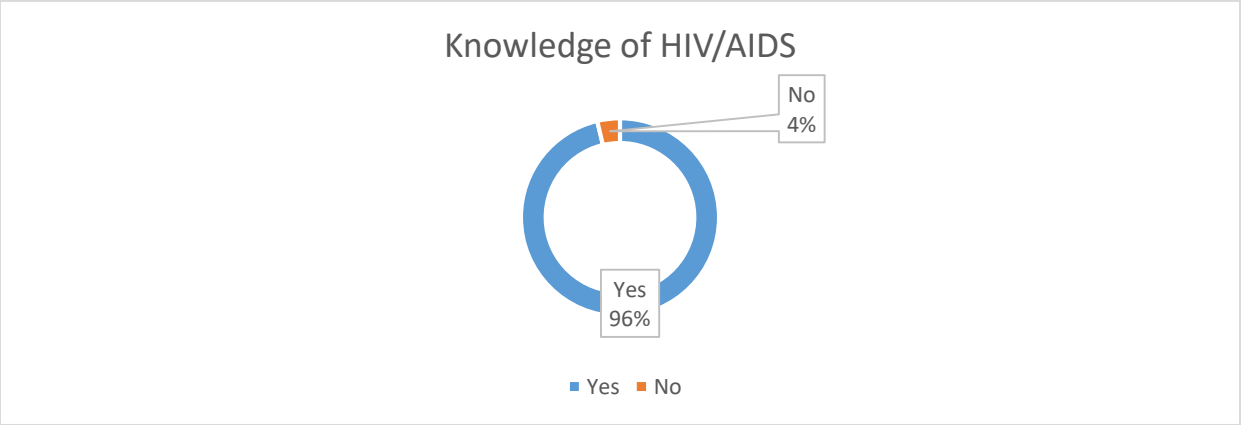


Figure 76: Knowledge of causes of HIV/AIDS

The respondents also said that they know how it spreads through Unprotected sex (82%), Blood transfusion (13%), contaminated syringe (4%) and infected mother(1%). They also reported a number of prevention strategies such as use of Condom (71%), Not sharing contaminated syringe (1%), HIV test before pregnancy (1%), Abstinence (25%) and Testing of blood before transfusion (2%) as shown in figure 77.

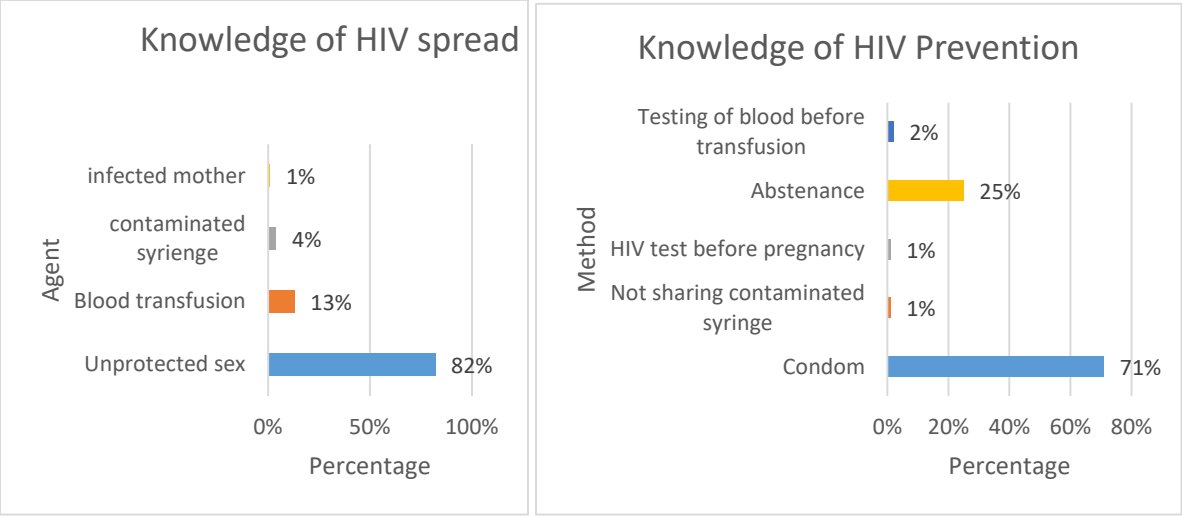


Figure 77: Awareness of HIV/AIDS prevention methods

4.2.21. Vulnerable Groups

The elderly accounts for 27% of vulnerability while orphans and chronically ill accounts 18% and 8% respectively. Other vulnerabilities accounts for 47% as presented in the Figure 78 below.

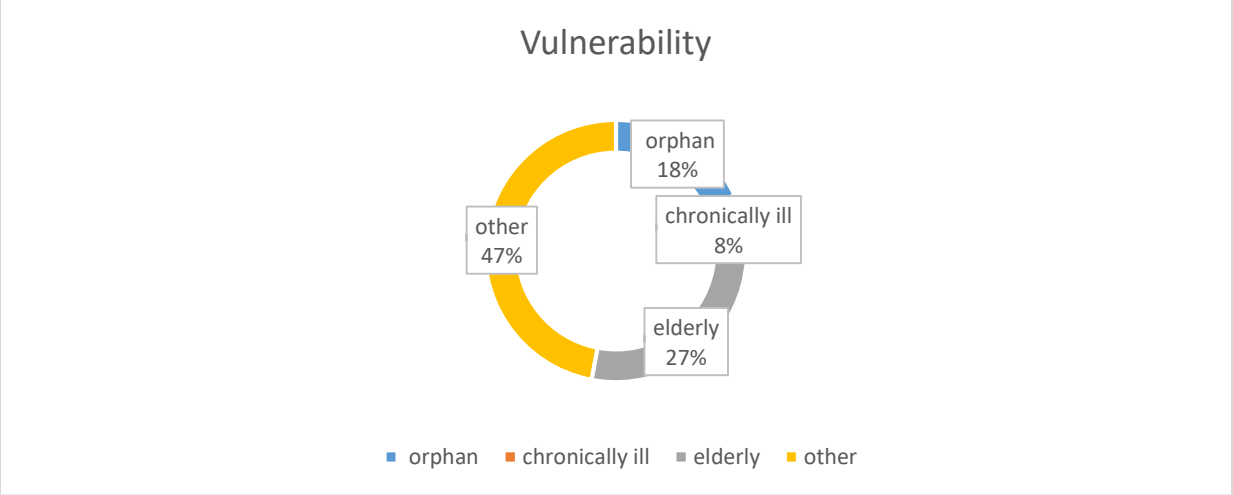


Figure 78: Vulnerability

CHAPTER FIVE

5. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS

5.1 Overview

This section provides details of the policy, legal and institutional frameworks relevant to the proposed project. Other relevant regulatory and legal framework specific to each Physical, Biodiversity or Social discipline is provided within each section of the ESIA.

5.2. The Policy Framework

5.2.1. The Kenya Vision 2030

The objective of the Vision 2030 is to transform Kenya into a middle-income country with a consistent annual growth of 10 % by the year 2030. Chapter 5 of the Vision 2030 blueprint focuses on education, health, water, environment, housing and urbanization amongst other sectors. The 2030 goal for urban areas is to achieve "a well-housed population living in an environmentally-secure urban environment." This is to be achieved by bringing basic infrastructure and services—roads, streetlights, water and sanitation facilities, storm water drains, footpaths, and others—to informal settlements.

Relevance: *KISIP 2 implementation directly contributes to achieving this goal of the Vision 2030 by the provision of basic infrastructure to the informal settlement.*

5.2.2. Sessional Paper No. 3 of 2009 on National Land Policy

This policy was formulated with the aim of securing rights over land and provision for sustainable growth, investment and reduction of poverty in line with Government overall development objectives. The policy offers a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide:

a) All citizens with opportunity to access and beneficially occupy and use land;
b) Economically viable, socially equitable and environmentally sustainable allocation and use of land;
c) Efficient, effective and economical operation of land markets;
d) Efficient and effective utilization of land and land-based resources; and
e) Efficient and transparent land dispute resolution mechanisms.

5.2.3. Sessional Paper No. 6 of 1999 on Environment and Development

Following the first National Environment Action Plan (NEAP) in 1996, Sessional Paper No. 6 on environment and development was developed in 1999 to harmonize environmental and developmental goals to achieve sustainable development. It contained comprehensive strategies and appropriate guidelines for the government to act.

The key objectives of the Policy include -

- To ensure that from the onset, all development policies, programmes and projects take environmental considerations into account,
- To ensure that an independent environmental impact assessment (EIA) report is prepared for any industrial venture or other development before implementation,
- To come up with effluent treatment standards that will conform to acceptable health guidelines.

Under this paper, broad categories of development issues have been covered that require a "sustainable development" approach. These issues relate to waste management and human settlement. The policy recommends the need for enhanced reuse/recycling of residues including wastewater, use of low or non-waste technologies, increased public awareness and appreciation of a clean environment. It also encourages participation of stakeholders in the management of wastes within their localities.

Relevance: *KISIP 2 projects are aiming at improving the environment by enabling proper sanitation trough roads and drainages and the provision of ablution blocks for use by families in the informal settlement areas.*

5.2.4. National Water Policy 2021

The overall goal of the policy is to guide the achievement of sustainable management, development, and use of water resources in the country. The overall objective of the policy is to provide a framework that is dynamic, innovative, and effective for re-engineering the water sector.

Relevance: *The project design should take into account all environmental components and water resource conservation.*

5.2.5. Gender Policy

This policy spells out an approach of Gender mainstreaming and empowerment of women and clearly states that it is the right of women, men, girls and boys to participate in and benefit equally from the development process. It provides a framework for mainstreaming gender in all policies, planning and programming in Kenya and puts in place institutional mechanisms to ensure effective implementation. The need for a national policy arose from the government's realization that without a coherent and comprehensive overall framework for guiding gender mainstreaming within the different sectors and line ministries involved in development, enormous resources may continue to be misplaced.

Relevance: *In implementing KISIP II, The Client is hereby mandated to ensure compliance to the requirements of this policy during labour force mobilization*.

5.3. Regulatory Framework for Environmental and Social Management in Kenya

5.3.1. The Constitution of Kenya, 2010

The Constitution of Kenya 2010 is the supreme law of the land. It lays the foundation on which the wellbeing of Kenya is founded. The constitution's provisions are specific to ensuring sustainable and productive management of land resources. Article 43 (1) states that;

Every person has the right—

(a) to the highest attainable standard of health, which includes the right to health care services, including reproductive health care;
(b) to accessible and adequate housing, and to reasonable standards of sanitation;
(c) to be free from hunger, and to have adequate food of acceptable quality;
(d) to clean and safe water in adequate quantities;
(e) to social security; and
(f) to education.

In Sections 69 and 70, the Constitution has inter alia identified National Obligations in respect of the environment and Enforcement of Environmental Rights respectively as follows: -

Section 69 (1): The State shall—

a) ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;

c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;
d) encourage public participation in the management, protection and conservation of the environment;
e) protect genetic resources and biological diversity;
f) establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
g) eliminate processes and activities that are likely to endanger the environment; and
h) Utilize the environment and natural resources for the benefit of the people of Kenya.

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

Section 70 provides for enforcement of environmental rights thus: -

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

(2) On application under clause (1), the court may make any order, or give any directions, it considers appropriate—

(a) to prevent, stop or discontinue any act or omission that is harmful to the environment;
(b) to compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or
(c) to provide compensation for any victim of a violation of the right to a clean and healthy environment.

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

Essentially, the New Constitution has embraced and provided further anchorage to the spirit and letter of EMCA 1999 whose requirements for environmental protection and management.

***Relevance**: The proposed project is geared towards ensuring that people living within densely populated settlements are able to access infrastructure and eventually quality services for the improvement of their living standards.*

5.3.2. The Environment Management and Co-ordination (Amendment) Act, 2015 and its sub regulations

EMCA Cap 387 is the principal law that governs the use, management and regulation of environmental resources in Kenya. Section 7 of the Act, establishes NEMA as the authority to coordinate all environmental related activities in Kenya. The Act provides guidelines and recommendations in carrying out environmental assessment. In order to mitigate and control environmental damage from ongoing projects, Sections 68 and 69 of the Act require that all ongoing projects be subjected to annual environmental audits as further expounded in Regulation 35 (1) and (2) of Legal Notice 101 of June 2003. To operationalize EMCA 1999, a number of subsidiary legislation (Regulations) have been developed, key among them:

5.3.2.1. Environmental Management and Coordination (Water Quality) Regulations, 2006

The Regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams, springs, wells and other water sources). It is an offense under Regulation No. 4 (2), for any person to 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.

Regulation No. 11 further makes it an offense for any person to discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit the dumping or discharge of such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards for effluent discharge into the environment. Regulation No. 14 (1) requires every licensed person generating and discharging effluent into the environment to carry out daily effluent discharge quality and quantity monitoring and to submit quarterly records of such monitoring to the Authority or its designated representatives.

The regulations provide details on management (handling, storage, transportation, treatment and disposal) of various waste streams including: domestic, hazardous and toxic, pesticides, biomedical, and radioactive wastes.

Regulation No. 4 (1) makes it an offense for any person to dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle.

Regulation 5 (1) provides categories of cleaner production methods that should be adopted by waste generators in order to minimize the amount of waste generated and they include: improvement of the production processes, monitoring the product cycle from beginning to end, and incorporating environmental concerns in the product design and disposal.

Relevance: *The construction and operational phases could impact on the surface water and thus will be guided by these regulations.*

5.3.2.2. Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control (Regulations) 2009

The Regulations control pollution from excessive noise and vibrations to protect human health. Part II section 3(I) of these Regulations states that: no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Part II Section 4 also states that: except as otherwise provided in these Regulations, no person shall (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or (b) cause to be made excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source.

Part III, Section 11(1) states that any person wishing to (a) operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or (b) engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to the Regulations. Any person who contravenes this Regulation commits an offense. Section 13(1) states that no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to these Regulations. These purposes include emergencies, those of a domestic nature and /or public utility construction.

Relevance: *Implementation of KISIP 2 project should adhere to these requirements especially during the construction phase of the project.*

5.3.2.3. Environmental Management and Coordination (Air Quality) Regulations, 2014

Part II of the regulation prohibits any person through their activities to directly or indirectly cause immediate or subsequent air pollution by emitting any liquid, solid or gaseous substance in levels exceeding those set out in the First Schedule of the regulation.

Relevance: *Implementation of KISIP 2 project should adhere to these requirements especially during the construction phase of the project.*

5.3.2.4. Environmental Management and Co-ordination (Waste Management) Regulations, 2006

These Regulations were formulated to provide guidelines, procedures and standards for the environmental governance to ensure compliance. The Legal Notice No. 121, 2006 was enacted to regulate waste disposal activities within the country, Kenya. These Regulations define rules for the management of waste in general and for the management of solid waste, industrial waste, hazardous waste, pesticides and toxic substances, biomedical waste and radioactive substances.

Relevance: *Implementation of KISIP 2 project should adhere to the requirements prescribed in the regulations regarding waste management especially during the construction phase of the project.*

5.3.3. The Occupational Safety and Healthy Act, No. 15 of 2007 (Revised 2010)

This Act of Parliament was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith. At every workplace where chemicals or other toxic substances are manipulated, the employer shall develop a suitable system for the safe collection, recycling and disposal of chemical wastes, obsolete chemicals and empty containers of chemicals to avoid the risks to safety, health of

Employees and to the environment. Under the Act, the employer as per section 6 has responsibilities among others to:

- Provide and maintain plant and systems and procedures of work that are safe and without risks to health
- Ensure safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances
- Provide information and training on safety and health
- Carry out appropriate risk assessments

- Take immediate steps to stop any operation or activity where there is an imminent and serious danger to safety and health

Relevance: *Implementation of KISIP 2 project should adhere to these requirements and ensure that all workers are protected in all phases of the project.*

5.3.4. Public Health Act Cap 242

This Act aims at achieving a clean environment free of any nuisance to promote public health and safety. This is applicable in this project, as a number of the proposed projects will directly and/or indirectly improve the health of the residents.

For the interpretation of the Act, Section 15 (IX) indicates that any noxious matter or wastewater discharged from any premises, such as a building constitutes a nuisance. The act also stresses that no person shall cause a nuisance to exist on any land or premise occupied by him. Because of the above, the Act acknowledges that it shall be the duty of all local authorities (County Governments) to take all lawful measures for always maintaining their district in a clean and sanitary condition for remedy of any nuisance or condition liable to be injurious to health.

5.3.5. The Water Regulations, 2021

This Regulation implements the provisions of the Water Act, 2016 2016 concerning networks, facilities, equipment, applications and assets of all water resources. Part V and VI of the Act makes provisions for authorization of groundwater development and water quality, monitoring, waste disposal and effluent discharge data respectively.

Relevance: *Underground water sources are likely to be polluted by seepage of construction waste contaminants and drains-water from the building. Construction work also potentially uses a lot of water.*

5.3.6. Physical and Land Use Planning Act, 2019

The objects of the Act are to provide:

a) The principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level;
b) The administration and management of physical and land use planning in Kenya;

c) The procedures and standards for development control and the regulation of physical planning and land use;
d) A framework for the co-ordination of physical and land use planning by county governments;
e) A mechanism for dispute resolution with respect to physical and land use planning;
f) A framework for equitable and sustainable use, planning and management of land;
g) The functions of and the relationship between planning authorities;
h) A robust, comprehensive and responsive system of physical and land use planning and regulation; and
    a. a framework to ensure that investments in property benefit local communities and their economies.

The main principle among others to note for this project is that:

Relevance: *Development activities including the KISIP II projects will be planned in a manner that integrates economic, social and environmental needs of present and future generations.*

5.3.7. Kenya Roads Board (General) Rules 2022

The Kenya Roads Board was established in July, 2000 by the Kenya Roads Board Act, Act No. 7 of 1999 with the mandate to oversee, co-ordinate its development, rehabilitate and maintain the road networks in Kenya. The Board has the responsibility of managing revenues arising from the Roads Maintenance Levy Fund (RMLF).

The legal and institutional aspects of the new road sub-sector policy were subsequently incorporated in the Kenya Roads Act 2007, which provides for the establishment of three independent Road Authorities namely:

i). Kenya National Highways Authority (KeNHA) responsible for the administration, control, development and maintenance of all class A, B and C roads in Kenya.
ii). Kenya Rural Roads Authority (KeRRA) responsible for rural and small town roads including class D, E roads and Special Purpose Roads.
iii). Kenya Urban Roads Authority (KURA) is significant to KISIP 2 as it takes charge of all City and Municipal Roads. This is the Authority that LAs will coordinate with in the design and implementation of investments targeting improvement of roads.

Legislations pertaining to land reservation and Ownership: The entire regime of laws relating to land has been explored under the Resettlement Policy Framework.

5.3.8. National Gender and Equality Commission Act 2011

The overarching goal for NGEC is to contribute to the reduction of gender inequalities and the discrimination against all; women, men, persons with disabilities, the youth, children, the elderly, minorities and marginalized communities.

Relevance: *This Act will be applicable for beneficiary groups and in workforce-related activities in the KISIP 2 sites.*

5.3.9. Public Procurement and Disposal Act 2022

An ACT of Parliament to give effect to Article 227 of The Constitution; to provide procedures for efficient public procurement and for assets disposal by public entities; and for connected purposes ENACTED by Parliament of Kenya. The objectives of public procurement include improving efficiency, competition, and accountability. There are six main types of objectives: price, quality, timeliness, sustainability, proportionality, and neutrality.

Relevance: *All procurement under KISIP 2 will be subject to this statute.*

5.3.10. Land Act, 2012

It is the substantive law governing land in Kenya and provides legal regime over administration of public and private lands. It also provides for the acquisition of land for public benefit. The government has the powers under this Act to acquire land for projects, which are intended to benefit the public.

This Act provides for the procedure to be followed during compulsory acquisition of land by the Government and the just compensation, which should be paid promptly, and in full to all persons whose interest in land has been affected.

An abbreviated Resettlement Action Plan was undertaken to establish whether there are any displacements along the proposed project locations and the findings captured in the ARAP report on Annex III of this report.

5.3.11. HIV and AIDS Prevention and Control Act 2006 (Revised 2012)

The object and purpose of this Act is to (a) promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS; (b) extend to every person suspected or known to be infected with HIV and AIDS full protection of his human rights and civil liberties. The Act provisions will be applied during the Project implementation phase where the contractor will be required to create awareness on prevention and management among workers and community at large.

5.3.12. The Urban Areas and Cities (Amendment) Act 2019

In classifying an area as a city, municipality or town, regard shall be had to the ability to provide the following services and the existence of the services required to be provided by the National Government.

legal basis for classification of urban areas (City) when the population is at least 250,000; a municipality when it is at least 50,000; and a town when the population is at least 10,000 and a market center when the population is at least 2,000.

Relevance: *With the growing population, there will be need for more resources and infrastructure in line with the population of the area. This act will guide future KISIP projects in terms of prioritization.*

5.3.13. Physical Planning Act 1996 (286) (Revised) in 2012

Section 33 of the Act states that no person shall carry out development within the area of a local authority without a development permission granted by the local authority under section 33.

Section 36 also states that if in connection with a development application a local authority is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report

Relevance*: Relevant approvals and permits should be obtained within the relevant County Government jurisdictions to ensure that the project implementation is flawless. This Environmental Impact Assessment report is also undertaken to satisfy this requirement especially for material sites for the road construction project.*

5.3.14. Data Protection Act, 2019

An Act of Parliament to give effect to Article 31(c) and (d) of the Constitution; to establish the Office of the Data Protection Commissioner; to make provision for the regulation of the processing of personal data; to provide for the rights of data subjects and obligations of data controllers and processors; and for connected purposes.

The Act expressly prohibits the processing of personal data of a data subject where their consent has not been obtained. It is upon the data controller and/or data processor to prove that they obtained the consent of the data subject before processing their personal data.

All information obtained from the KISIP II consulted parties is confidential and only used for the purposes of this report. Consent will be obtained to process al the required data from them.

5.3.15. Sexual Offences Act, 2006

An Act of Parliament that makes provision about sexual offences aims at prevention and the protection of all persons from harm from unlawful sexual acts and for connected purposes. Section 15, 17 and 18 focuses mainly on sexual offenses on minors (children).

Relevance: *Protection of vulnerable individuals including children by providing confidentiality and Privacy of reported cases of Sexual Harassment (SH) and Sexual Assault (SA) in the project's duration.*

5.3.16. Labour Relations Act, 2007 (Revised) 2012

An Act of Parliament to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations or federations, to promote sound labour relations through the protection and promotion of freedom of association. This act will be applied by the labour force on site in addressing disputes related to working conditions.

5.3.17. The Children Act, 2022

Part II Section 18 of the Act indicates that (1) No person shall subject a child-to-child labour, domestic servitude, economic exploitation or any work or employment which is hazardous, interferes with the child's education or is likely to be harmful to the child's health or physical, mental, moral or social development where a child is any individual who has not attained the age of eighteen years.

Relevance: *This Act prohibits child labour, sexual harassment among other vices during construction and all other phases of the project.*

5.3.18. County Government Act No. 17 of 2012

The preamble to the Act gives an overriding object and purpose of the Act. It states that, 'An Act of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Part II elaborate on the functions and powers of the county government, emphasizing its constitutional authority to enter into contracts, acquire and hold and dispose of assets, and delegate functions, such as through sub-contracts and partnerships. Part VI considers the focus and administration of decentralization to the sub-county level, including to urban areas and cities.

Part VIII focuses on Citizen Participation stating that "citizen participation in county governments shall be based upon reasonable access to the process of formulating and implementing policies, laws, and regulations, including the approval of development proposals, projects and budgets, the granting of permits and the establishment of specific performance standards" (87(b)); and "promotion of public private partnerships, such as joint committees, technical teams, and citizen commissions, to encourage direct dialogue and concerted action on sustainable development" (87(f)).

On the aspect of public communication and access to information, the county governments are vested to "undertake advocacy on core development issues such as agriculture, education, health, security, economics, and sustainable environment among others" (94(c)).

The County Government Act, 2012, provides the basis for spatial plans as statutory requirements in the county. The Act stipulates a 10-year spatial plan be developed by each county to provide for:-

(a) Spatial depiction of the social and economic development programme of the county as articulated in the integrated county development plan;

(b) A clear statement of how the spatial plan is linked to the regional, national and other county plans; and

(c) A clear clarification on the anticipated sustainable development outcomes of the spatial plan.

Relevance: *The KISIP 2 project should adhere to the requirements of this Act in ensuring that the proposed project is in line with the current county government spatial plans.*

5.3.19. Legislations Relating to Physical Cultural Property

The administration of Kenya's cultural heritage is informed by the Kenya National Policy on Culture and Heritage (NPCH) and by the provisions of articles 11, 40, and 69 of the Kenya Constitution (Republic of Kenya 2010). At the practical level, the National Museums and Heritage Act, Cap 216 and less importantly both the Environmental Management and Co-ordination Act, Cap 387 and the Land Act 2012 operationalize the management of Kenya's cultural heritage. Others include Cap 19 (the Public Archives and Documentation Service Act of 1991) and Cap 509 (Kenya's Industrial Property Act of 2001).

The National Museums and Heritage Act, (Cap 216), mandates the National Museums of Kenya as the institution to protect, preserve, and control the use of Cultural Heritage in the country. The Act repealed the then Antiquities and Monuments Act cap 215. The Act provides for the control, establishment, development and management of national museums and the protection, identification, transmission and conservation of the natural and cultural heritage of Kenya.

Under the Act, an object or area of cultural, historical, or scientific significance, can be declared as protected. In accordance with Cap 216, archaeological sites may not be destroyed, excavated or altered without an exploration/excavation permit issued by the cabinet secretary or designate.

A chance find of previously unknown heritage resources e.g. graves, shrines, archaeological sites, etc. encountered during project construction or operation will be managed according to a Chance Find Procedure. The Chance Find Procedure is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented. This procedure will be applicable to all activities conducted by project personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken, the roles and responsibilities, and the response times required from both project staff, and any relevant heritage authority.

The Environmental Management and Coordination Act, requires project proponents to undertake Environmental Impact Assessment (EIAs) for proposed projects. For projects, with potential impact on cultural and heritage sites, a cultural and heritage impact assessment is required as part of the ESIA.

Relevance: *KISIP 2 projects must take history and cultural heritage into consideration while locating and implementing projects. Upon screening, no cultural heritage site was identified along the project areas. See screening checklist on Annex IV and V of this report.*

5.3.20. Climate Change (Amendment) Act, 2023

The Acts provides for development, management, implementation and regulation. of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya. All projects are required to mainstream climate change responses into development planning, decision making and implementation among others.

Relevance: *The release of greenhouse gases from construction vehicles during construction and material sourcing may impact the microclimate along the construction area. The design of the roads, drainages and lights should be climate resilient*

5.3.21. Trans Nzoia County Climate Change Act 2021

The act requires climate resilient projects to be undertaken

5.4. Relevant International & Regional Conventions

Kenya is a signatory to several international instruments on environmental management. These are summarized in Table 37 below:

Table 37: Relevant International and Regional Conventions

Convention	Objective	Relevance to KISIP
Sustainable Development Goals	The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.	**SDG 1**: No Poverty: The construction project can create job opportunities for residents, helping to alleviate poverty and improve livelihoods within the informal settlement **SDG 6:** Clean Water and Sanitation: The project can provide access to clean and safe water sources, as well as upgraded sanitation facilities, thereby improving hygiene and reducing waterborne diseases **SDG 11:** Sustainable Cities and Communities: By improving infrastructure and housing, the project can contribute to the development of

	Relevant SDGs: SDG 1: No poverty SDG 6: Clean water and sanitation SDG 11: Sustainable cities and communities SDG 13: Climate action	more sustainable and resilient communities within the informal settlement **SDG 13:** Climate Action: The construction project can incorporate climate-resilient design elements and technologies that mitigate the impact of climate change on the informal settlement
The African Convention on the Conservation of Nature (1968)	To encourage individual and joint action for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.	KISIP II environmental assessments will assess the development with regards to utilization of natural resources and environmental conservations
The Ramsar Convention (1971) on wetlands of International Importance	To stop the progressive encroachment on and loss of wetland now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational values.	KISIP II environmental assessments will assess the development with regards nearby ecological functions. Including rivers and streams among others
The Protection of World and Cultural Heritage convention (1972)	To establish an effective system of collective protection of the cultural and natural heritage of outstanding universal values.	KISIP II environmental assessments will assess the development with regards the existing cultural heritage sites. The screening exercise noted that there were no cultural sites along the proposed project corridors
The Vienna Convention for the protection of the Ozone Layer (1985)	To protect human health and the environment against adverse effects resulting from modification of the ozone layer	KISIP II environmental assessments will assess the development with regards to climate change factors
Montreal Protocol on Substances that deplete the Ozone layer (1987)	To protect the ozone layer by taking precautionary measures to control global emissions of substances that depletes it.	KISIP II environmental assessments will assess the development with regards to assessment of air pollution by undertaking baseline screening measurements
The Basel Convention on the trans-boundary Movement of Hazardous	To reduce trans-boundary movements of waste subject to a minimum consistent to the environmentally sound and different effects of such wastes and to minimizing the amount and toxicity of hazardous wastes generated and	KISIP II environmental assessments will assess the development with regards types of wastes that are likely to be generated and their mitigation measures

Wastes and their disposal	ensuring their environmentally sound management	
Convention on Biological Diversity- (CBD 1992)	To promote diversity and sustainable use and encourage equitable sharing of benefits arising out of the utilization of genetic resources	KISIP II environmental assessments will assess the development with regards to biodiversity and sustainability
United Nations Framework Convention on Climate Change (UNFCCC, 1992) and the Paris Climate Agreement 2016	An international Treaty adopted in 1992 that came into force in 1994. The objective of UNFCCC is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Paris Climate Agreement 2016, operationalizes UNFCCC whose long term goal is to keep the increase in global temperatures to well below 2 degrees above pre-industrial levels, and to pursue efforts to limit the increase to 1.5 degrees, to substantially reduce impacts of climate change.	KISIP II environmental assessments will assess the development with regards to climate change

5.5. World Bank's Safeguard Policies

The World Bank's Safeguard policies are designed to help ensure that projects proposed for Bank financing are environmentally and socially sustainable. These operational policies are as shown in Table 38 below:

Table 38: Applicable of World Bank Safeguard Policies Policies

Operational Policy	Relevance
OP 4.01: Environmental Assessment	The project is assigned Category B, based on the results of the screening of the potential project activities. The projects interaction with natural and human environment qualifies the applicability of the policy and the reason for undertaking this Environmental and Social Impact. Assessment.
OP 4.12: Involuntary Resettlement	The proposed KISIP II project will have impact on people's property. The identified project affected persons were twenty-three PAPs; some operating Kiosks along the project corridors. Other PAPs who will be affected are residents whose perimeter walls are along the project corridors.
OP 4.11 on physical and cultural resources	This policy is captured to cater for the possibility/chance finding of significant cultural assets should they be found in the course of the project phases
World Bank World Bank Access to Information Policy 2015	The ESIA will be prepared with meaningful stakeholder engagement with the aim of complying with the provision of the policy which requires; Maximizing access to information, setting out a clear list of exceptions,

	Safeguarding the deliberative process and Providing clear procedures for making information available.
World Bank Group Environment, General Health and Safety Guidelines	The ESIA will be prepared within provisions of general Health and Safety Guidelines

(i) Environmental Assessment (OP 4.01)

OP 4.01 requires Environmental Assessment (EA) for projects proposed for Bank financing to ensure that they are environmentally sound and sustainable, and as a basis for decision making. Under OP 4.01 projects are screened and assigned either of four categories each of which requires different levels of environmental assessment as follows: -

- Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.

- Category B: A proposed project is classified as Category B if it's potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.

- Category C: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

- Category FI: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary in subprojects that may result in adverse environmental impacts.

The KISIP 2 has been classified as environmental category B and under an Environmental and this Environmental Impact Assessment; report has been prepared in compliance with OP 4.01.

(ii)Involuntary Resettlement (OP 4.12)

OP 4.12 requires that a Resettlement Action Plan (RAP) be prepared for all projects that anticipate displacement of both settlements and livelihoods. Though minimal if any displacement is anticipated from KISIP activities, an RPF has nonetheless been prepared and issued as Volume Two to the ESMF with the following objectives: -

(i) To provide a policy, legal and institutional framework for responding to all displacement impacts occasioned by activities undertaken under KISIP. This policy covers direct economic and social impacts that both result from Bank assisted investment projects, and are caused by either (a) the involuntary taking of land resulting in relocation or loss of shelter; loss of assets or access to assets; or loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or (b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

(ii) To offer choices among, and identify technically and economically feasible resettlement alternatives; and,

(iii) To put in place modalities for providing prompt and effective compensation at full replacement cost for loss of assets attributable directly to the project and provide support during the transitional period to enable the affected people to improve or at least restore their pre-impact living standards.

5.5.1. World Bank Environmental and Social Policy for Investment Project Financing

The Bank classifies project into one of four classifications: High Risk, Substantial Risk, Moderate Risk or Low Risk and thus will be done in accordance with the national law. (World Bank ESF 2018) Screening for KISIP 2 project was undertaken and the checklist presented in Annex IV and V for the social and environmental screening respectively. The screening undertaken indicates that the proposed projects are likely to have minimal or no adverse environmental or social risks and impacts and do not require further environmental and social assessment following the initial screening and therefore classified as moderate risk.

5.6. Project Governance and Administrative Structure

The following Table 39 below presents a list of administrative agencies and government institutions that regulate the development of the project.

Table 39: Project Governance and Administrative Structure

Institution	Description
Donor	Responsible in financing the project and technical assistance
National Level	
Project Steering Committee:	Responsible for Strategic guidance and in consultation with World Bank, provides approval of Annual Work Plans and Budgets
National Project Coordination Team	Responsible for the overall coordination of Project activities. NPCT is in charge of Project design, financial management, and procurement, M&E, reporting, capacity building and communication. Further, it supports the participating counties to ensure adherence to IDA's applicable policies and guidelines. The national level works in liaison with the Council of Governors (CoG) to ensure effective coordination and communication with the participating County Governments.
County Level	
County Project Coordination Team	Responsible for implementing Project activities within respective counties and supervising the day-to-day project activities.
Community Level	
Settlement Executive Committee (SEC)	Established in each participating settlement. Responsible for community mobilization, awareness creation and ensuring community participation on Project activities.
Grievance Redress Committee (GRC)	Responsible for receiving and registering grievances/ complaints, investigating and giving resolutions. Cases that are not resolved are escalated to CPCT, then to NPCT and WB GRS. Complainants are also at liberty to seek redress at the court of law.

5.7. Public institutional arrangement

The proposed investments will be implemented in liaison with various government institutions mandated to provide various services to the public under various Acts of parliament. Relevant government institutions and their role is presented in Table 40 below**.**

Table 40: Institutional Arrangement

MLPWHUD	Ministry of Lands, Public Works, Housing and Urban Development (MLPWHUD), is the government ministry responsible for policy formations and implementation in matters related to Land, Public Works, Housing and Urban development. The ministry has established KISIP implementing unit which is responsible for planning and implementing KISIP Projects across the county. KISIP is headed by a National Coordinator who is support by various team of experts in the field of Engineering, Procurement, Sociology, Environment, Monitoring and Evaluation.
County Government of Trans-Nzoia	The County Government assists KISIP implementing unit to implement the Project, County Governments has also established a County Government KISIP implementation unit. The role of developing and approving of the Physical Development Plans (PDPs) is the function of the County Government through the assistance of KISIP component 2 which deals with planning and land tenure. In KISIP II, the county government is the proponent and the contractor procuring entity. The county government is also responsible Resettlement Action Plans implementation.
NZOWASCO	Nzoia Water and Sanitation Service Company (NZOWASCO) is as Water Service Provider (WSP) is a private company that assists in developing water and sewerage designs as well as operating water and sewerage infrastructure after Project completion.
Kenya Power	This is a government company charged with responsibility of destruction and managing electric power with the city. During implementation of the Project Kenya Power will be consulted regularly in areas where power installations require relocation.
WRA	Water Resource Authority (WRA) is a government parastatal under the Ministry of Water mandated to manage water resources including rivers. WRA will be consulted regularly in situations where river crossing will be required
KERRA	Kenya Rural Roads Authority (KERRA) will be consulted regularly where KISIP II projects will require crossing, maintaining and road works within the informal settlement areas
NEMA	National Environment Management Authority (NEMA) is a government parastatal under Ministry of Environment mandated to Manage Environment. NEMA will be

	responsible to approve and license the projects and conduct inspections during project implementation to ensure compliance to provisions of Environment license

5.8. List of required permits

Table 41: List of permits

Permit/License requirement	Issuing Body	Legal requirement
Construction permit	County Government	Physical Planning Act 1996 (286) (Revised) in 2012
Effluent discharge license	NEMA	Environmental Management and Co-ordination Amendment Act (2015
EIA license	NEMA	Environmental Management and Co-ordination Amendment Act (2015
Waste handlers license/permits	NEMA/ County government	Environmental Management and Co-ordination Amendment Act (2015
Water abstraction permit	WRA	Environmental Management and Co-ordination Amendment Act (2015 and Water Act, 2016.
Noise permit	County Government	Environmental Management and Co-ordination Amendment Act (2015
Development plan permits	County Government	Physical land use planning Act (2019)
Workplace registration permit	County Government	DOSHS draws its functions from the Occupational Safety and Health Act (OSHA), 2007 and the Work Injury Benefit Act, 2007
Material transportation permit	County Government	Traffic Act Cap 403 part (V) and (VI); Kenya Roads Act No.2 of 2007

CHAPTER SIX

6. PUBLIC AND STAKEHOLDER CONSULTATIONS

The main objective of the community and stakeholder consultation is to disseminate project information and to incorporate the views of the Project Affected Persons (PAPs) in the design of the mitigation measures and preparation of environmental and social management plans.

The specific objectives of the stakeholder and public consultation process include:

- Introduce the proposed project to stakeholders;
- Allow the stakeholders to provide comments and raise issues and concerns regarding the project;
- Gather and document communities' concerns about the project and the screening process;
- Obtain opinions and suggestions directly from the stakeholders on their preferred mitigation measures;
- Assist in building and strengthening relationships with the community and stakeholders;
- Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.

6.1 Identification and analysis of stakeholders

The various local and international standards being applied to this Project define two main categories of stakeholders; differentiating, for example, between "those who will be or are likely to be directly or indirectly affected, positively or negatively, by a project (commonly referred to as project affected people, households or communities)" and "those who might have an interest in, or may influence the project" Following these definitions, the two principal groups of stakeholders in the Project are broadly categorized as follows.

***Affected Parties*:** People/entities directly affected by the Project and/or have been identified as potentially vulnerable to change and who need to be engaged in identifying impacts and their significance, as well as in decision-making on mitigation and management measures. Affected parties are those generally located within the Project's defined area of influence.

***Directly affected*:** Communities, groups and individuals displaced physically and/or economically by the Project, including any vulnerable or marginalized persons; and

***Indirectly Affected**:* Residents, businesses, officials and administrators in the project area who may be indirectly affected by employment opportunities, influx and the related pressure on resources and services; local community-based groups who represent affected groups and/or other affected parties; and employees, their representatives and contractors.

***Interested Parties*:** These are people/entities interested in the Project and/or could affect the Project in some way. Interested parties include National and international CSOs, non-governmental organizations (NGOs), community-based organizations (CBOs) and faith-based Organizations.

The various stakeholders in the project are analyzed in the table 42 below.

Table 42: Stakeholder identification and analysis

Stakeholder groups	Key stakeholders	Current engagement How they are involved in the project activities	How could the stakeholder contribute to the project?	Level of Influence	Level of Interest	Engagement Technique
National government agencies (Lead agencies mandated to review and advise on the project's development, including)	Ministry of roads, transport infrastructure	Coordinate the project at national level	Coordinates project funds with the donor and treasury	High	High	Collaborate
	National Environment Management Authority (NEMA)	Ensure that the project is in compliance with National Environmental laws	Approval of project environmental related documents	High	Low	Consult
	Kenya Rural Roads Authority (KERRA)	Deals with Rural roads	Road improvement in project area	Low	High	Involve
	Kenya Urban Roads Authority (KURA)	Deals with urban Roads	Improvement of roads in urban area	Low	High	Involve
	Water Resource Management Authority (WRM)	Deals with water resources management	Protection of water catchment areas and wetlands within the project area	Low	High	Involve
	Kenya Power and Lighting company (KPLC)	Deals with electric power transmission	Deals with electric power transmission	Low	High	Involve
	ICT- Authority			Low	High	Involve
	Ministry of Interior and coordination of national government functions	Provide security and shall also coordinate and supervise the project on behalf of the National government	Provide security Provide security to project team and support project implementation through local administrators such as chiefs	High	High	Collaborate
	Social, Gender, and Youth Development	support the different groups which shall be formed during the various phases of the project.	Support the different groups which shall be formed during the various phases of the project.	Low	High	Involve
	Ministry of Agriculture	Advise on to compensate crops which shall be affected by the project	Advise on to compensate crops which shall be affected by the project	Low	High	Involve
Local County Government Of Trans Nzoia	Governors, CEC roads Environment, agriculture and lands	Support Counties to mobilize people and share project information with the members of the public	Support Counties to mobilize people and share project information with the members of the public	Low	High	Involve

Leaders	MCAs Members of the National assembly			High	Low	Consult
Affected communities	Local populations	Affected communities: settlements affected by both Project impacts and benefits.	Can be mobilized to support the project	Low	High	Involve
	Youths			Low	High	Involve
	Vulnerable groups	Affected communities: settlements affected by both Project impacts and benefits.	Can be mobilized to support the project	Low	Low	Inform
	Bodaboda associations			Low	High	Involve
	Businesses, utilities and other infrastructure Owners Affected businesses, Chamber of commerce Bodaboda groups with Shades on road reserve	Businesses that will experience both Project impacts and benefits. Impacts include loss of land, assets or revenue, including roadside market stall owners, and formal and informal businesses affected by land acquisition. Benefits include reduced travel time, increased economic opportunities and easier access to customers and markets	Can be mobilized to support the project	Low	High	Involve
Civil Society Organizations	NGOs and local associations, religious organizations	Keen on defending the rights of the local communities but may also help the PEA to mobilize local support for the project	Keen on defending the rights of the local communities but may also help the PEA to mobilize local support for the project	Low	High	Involve
International	Project financiers World Bank	Organizations providing finance for the development of the project	Organizations providing finance for the development of the project	High	High	Collaborate
Press and media	Local and national press and media	Press and general media groups have the role of informing the general public about the Project's impacts and benefits	Press and general media groups have the role of informing the general public about the Project's impacts and benefits	Low	Low	Informed

6.2 Consultation Methods

The consultation methods used to engage the stakeholders in the specific projects included:

6.2.1 One- to-one meetings with Key Informants

The team of experts who visited the key informants in their respective offices undertook this. Their comments were captured in questionnaires and other taken note of inclusion in the report. All information was obtained and presented with consent of the stakeholders.

6.2.2 Key stakeholder consultations outcomes

Key informant interviews were held within the month of November 2023 between 20th and 23rd. The relevant government officers were visited in their offices and comments were noted with several Sub-county water officers and heads within Trans-Nzoia County. Table 43 below presents the feedback of the key stakeholders consulted.

Table 43: Key Stakeholders feedback

Environmental Aspect	**Comment**
Ward Admin Shanti and Kipsongo	
Solid waste	• Very poor solid waste management • No adequate collection bins are available for all the residence • Dumping of waste is done anywhere • There are no regulations or guidelines being adhered to in the settlements regarding waste management • The waste collection vehicles in that disposes waste offsite are very few and take time to come and collect the accumulated waste leading to overflow and foul smell • A few residents are connected to the piped water. Most people used the river water which is contaminated from al surface runoff
Drainage	There is an experience of busting of both water and sewer lines. The sewer water would mix with the clean water causing contamination.
River conservation	There are no conservation measures undertaken along the river banks and thus people have greatly encroached and contributed to their pollution.
Water contamination	Some people use waste from the hand dug wells. These wells could be contaminated since the pit latrines are also sunk next to the wells in most settlements
Director Environment Trans-Nzoia County	
Environmental Aspect	**Comment**
Waste (Solid and Liquid)	• The County has distributed a total of 28 kip bins across the informal settlements for waste management though these are inadequate given the population • The siting of the skips will be looked at since some of them are placed at inaccessible areas and some are next to the storm water drainages • The County has encountered challenges in collection and has led to delay and thus accumulation of waste for a longer time leading to odour, littering and water contamination

Sensitive areas	• There is a lot of encroachment on the riparian and people have planted blue gum tree species which is invasive and destructive to the rivers • Rivers have become waste disposal sites leading to chocking and flooding during heavy rains. • Sand harvesting has been practiced along the rivers causing siltation
Structural Engineer Trans-Nzoia County	
Environmental Aspect	**Comment**
Project Design	The designs that will be drawn must be approved by the County before implementation. The designs should take into considerations future population projections
Waste management	• Connections within the sewerage manholes was poor and could be the reason for frequent bursting of the sewer lines. • NZOWASCO are in charge of maintenance the sewer lines and are also in charge unblocking • Green water being channeled to the storm water drains since there is no space for people to put a soak pit in place. Feasibility can be done to assess whether bio digesters and French drains can be sustainable in such areas
Water	The community connection to the water supply system is not very good since most of them fear water bills
Sustainability of projects	• Embracing public participation • Public education on projects. Scenarios like burning tryes on the roads cause destruction to the roads. • Once complete, the projects should be handed over to the respective departments for maintenance and a maintenance plan developed
Other desired projects	The MCA should identify their people's needs and priorities and submit to the ministry of public works for consideration

Chief Shanti	
Environmental Aspect	**Comment**
Waste management	• Waste skips have been provided for solid waste disposal however they are very few • Waste collection is done at a fee and thus those who do not afford are the ones disposing wastes haphazardly in the wee hours • Most residence are not connected to the sewer lines and thus channel their waste water into the storm water drains which flow to the rivers and thus leads to contamination.
Water contamination	Chetoto stream is contaminated with waste since the residents dispose their wastes therein
Sand harvesting	Uncontrolled Sand harvesting is done at Chetoto bridge leading to riverbank degradation
River conservation	There is need to plant trees along the streams for their protection
Environmental management	At the community level, the Environmental Ward Committee is in charge of environmental issues within the ward
Director NEMA Trans Nzoia County	
Challenges	**Comment/Recommendations**
• Poor accessibility when responding to emergencies	• Develop action plans to address issues raised

• Lack of settlement planning. • Noncompliance with EMP • Failure to undertake Environmental Audits	• Ensure that physical plans are used to guide developments • Obtain all relevant approvals for the proposed developments before commencement • Ensure that once in progress, Environmental audits are undertaken to assess compliance • Provide waste skips with compartments to enable sorting of waste from the source • Collaborate with NEMA on awareness creation, sensitization and Education on environment matters • Review the existing physical plans and ensure that the projects are in line with the same.
Administrative Officer Water, Environment, Natural Resources and Climate Change	
Environmental Aspect	**Comment/Recommendations**
Water sources within the project areas	NZOWASCO piped water Streams and Rivers Shallow wells Boreholes
Water Quality of the sources of water	NZOWASCO undertakes water quality assessments only for the piped water. Other sources are not determined
Waste water disposal	• Open waste water disposal majorly practiced. Existing drainage system are chocked with solid waste • Locals have devised makeshift drainages which drain into the storm water drain and eventually into the rivers and streams
Solid waste management	Skip bins are provided by the County Government. No waste segregation is done
Positive impacts	• Improved infrastructure and accessibility • Accessibility of water and other emergency services • Improved security • General improvement of peoples living standards • Improved economics by attracting investors/businessmen
Negative Impacts	• Interference with land owners and squatters • Pollution during road construction (dust, smoke, Noise) • Waste generated from construction activities • Possible soil contamination (fuel,oil spillage) • Vandalism • Wastage of resources during operational stage • Overstretching of the facilities due to high population • Social vices i.e prostitution could come up
Management of Impacts	• Community policing to avoid/prevent vandalism • Use appropriate materials and design that do not attract thieves. Avoid the use of metals • Sensitize the community on prudent and wise utilization of resources • Assess the population size and projections and plan for the accordingly in the design • Public participation and education to be done on a regular basis

		• Consultants to use appropriate pollution control mechanisms • Set and communicate specific construction time • Contractor to ensure proper disposal of construction waste • Undertake a comprehensive EIA and cost benefit analysis to ensure the maintenance of the ecological diversity by having artificial stability pillars • Avoid interference with the natural stream, rivers • Prioritize community needs for sustainability • Encourage community sense of ownership • Undertake CSR to the community	
Key Stakeholder (Name)	**Environmental Aspect**	**Comment**	**Recommendation**
Assistant Chief, Bondeni sub location	Sanitary waste management	Increased population has strained the existing infrastructure and need urgent interventions. The main sewer lines are overburdened with the situation becoming worse during the rainy season.	Design systems that will take future growth into considerations
	Solid waste management	The county Government has placed a few disposal bins around however not strategically placed since some are next to the storm water drainage system and delay in collection would cause overflow and littering	Strategic collection areas should be increased and frequent emptying should be done
	Storm water	The storm water drainage only exists along the main roads with built infrastructure. No storm water drainage system at the residential areas	The intervention should have storm water drainage systems
	Vegetation	Some trees planted along the river banks are not appropriate since they cause river dry up during dry seasons	If –revegetating the area, use appropriate tree species favorable to the river banks and the environment in totality

	Asbestos	Some settlements including Matano and Munobi within Bondeni sub-location have houses roofed with Asbestos	Avoid disturbance of these structures during construction. The County Government should liaison with the National Housing Cooperation on their removal.
	Lessons learnt from other projects	• Use materials that cannot attract vandalism in construction • Prepare designs that takes future growth and technology into considerations • Give provisions for power and other future projects • Periodic updates of physical plans should be done to cater for dynamics over the years	
	Future project considerations	Consider including the road crossing the dumpsite to Kitale National Polytechnic into your next priority list as well as sewerline within Bondeni sub-county.	
SEC Team Members			
Mitume- Usafi	Relocation	Shifting stress for those encroaching	Ensure early preparation before the project commences
Youth Representative SEC member representing Structure owners SEC Chair SEC representing landlords SEC Religious representative Structure Owners representative Structure Owners representative	Waste management Water pollution • Noise • Water pollution from poor waste management, livestock farming, Industries and deforestation • Air Pollution • Poor drainage • Squatters issues • Noise	• Environmental Challenge faced poor waste management. All waste is channeled to the streams when it rains • The dumping skips provided are few and take long before they are emptied causing air pollution from the smell • Water Pollution since there are no sewer systems. No storm water drainages are available and thus a lot of stagnant water covers the residential areas • Main noise source is from motorbikes and churches, • Water pollution from blocked sewer lines • Air pollution from garbage • Leaking drainage systems enabling water to flow into residential areas • Resistance will be experienced from those squatting on public land.	• Prepare the residents to move early before the project commences • Ensure quality work is undertaken • Grievances should be addressed through the GRM team selected by the community • Introduce more waste disposal containers in the area • Place water pipes where there are no

		• Lack of adequate land space • Overcrowding • Lack of water when the pipes will be relocated	any interference • Early communication should be done to the people who will be displaced early enough • Project to commence almost during the rainy season

6.2.3 Public Meetings

Community meetings organized by the County Project Coordination team together with the SEC members' leadership and the local leadership were undertaken at agreed venues and all community members were invited. Both stakeholders and public consultations were held during the ESIA studies and comments, concerns and recommendations have been considered in the development of this ESIA report. The minutes and the list of participants for the public baraza are provided in the Annex VIII and IX of this report. The baraza was attended by both men and women as well as persons with disability as in the table 44 below. The persons with disability were given an opportunity to participate in the public baraza. They were aided by their relatives.

Table 44: Schedule of public barazas

Settlement	Date	Venue	Male	Female	PWDs	Total
Tuwani	15/11/23	Mitume Bible Baptist Church	22	29	0	51
Shanti	17/11/23	Children's home compound	32	25	2	57
Mitume	15/11/23	Church of God Mitume	37	15	3	52
Matisi	17/11/23	Abundant Church	20	14	2	34
Kipsongo	18/11/23	Kipsongo Hall	26	24	3	50

Table 45: Issues raised in public barazas

No.	Questions	Answers
	Tuwani	
1	Will the equipment used during construction not affect the sewerage and water pipes?	Environmental monitoring before and during construction will be done. This will enable the engineers to know the equipment is rating to avoid much vibration.
2	What precaution will be put in place to control dust during the construction of the roads?	The equipment to be used will have low rating to avoid a lot of dust. Also there will be sprinkling of water during construction to minimize the dust.
3	Will the labour force come from the settlement during the project implementation?	The contractor will be unveiled to the community members before commencement of works and the youth have been assured of employment especially the unskilled labor depending on the availability of the human resources in the area.

4	In case of conflict among community members, who should bring peace?	The SEC and GRC members will work hand in hand to make sure each and every member understands the importance of the project. The GRC chairman to accommodate all the complains and handle them amicably.
6	Need for Cooperation with the Consultant	The chief urged the residents to cooperate with the consultant so as to ensure smooth running of the project
7	Will the SEC and GRC members trained on their roles?	The consultant will organize for SEC and GRC training. They will be communicated on when the training will be effected.
	Mitume	
1	Will the local youth be employed during the project implementation?	The contractor will be unveiled to the community members before commencement of works and the youth have been assured of employment especially the unskilled labor depending on the availability of the human resources in the area.
2	Some engineers never want to be guided in the project, if they refuse to listen to the community members, where will they take their complains?	If there will be any complain, the SEC and GRC will tackle it.
3	Will the community members involved to give opinions on where the ablution block will be constructed?	The community members will be allowed to air their views on where the ablution block will be constructed. The engineers will guide on the same.
4.	The town planner starts well by calling public participation for projects and later on bring contaminated water to the members, construct substandard sewerage which lead to manhole lids being stolen and this exposes health issues to the community members.	The meeting is for awareness on the priorities of Kisip$_2$ project. The project will be done according to the World bank standards.
5	Some Water pipes are passing through caravats. Some of the water pipes might get destroyed during construction. How will the engineers know?	The community members to advise where the water pipes could pass. This is to avoid contamination and interference of the water pipes. Piping will be done before road construction
6	Need for Cooperation with the Consultant	The MCA urged the residents to cooperate with the consultant so as to ensure smooth running of the project
7	Will the SEC and GRC members trained on their roles?	The consultant will organize for SEC and GRC training. They will be communicated on when the training will be effected.
	Matisi	
1	Will the streets lights be of high quality? The ones put before have not functioning and most of them can't be repaired.	The street lights will be of very high standards. The ones put before were for solar and the batteries were stolen and also sensors were interfered with thus are not functioning.
2	Can the road to Mosque included in the priorities?	The county government and MCA will work on the remaining roads which were not marked.

3	What precaution will be put in place to control dust during the construction of the roads?	The equipment to be used will have low rating to avoid a lot of dust. Also there will be sprinkling of water during construction to minimize the dust.
4	How will you deal with noise pollution?	The engineers will look at the equipment which are not producing a lot of noise.
5	Can we be provided with a dumping site?	The county government can assist in providing dumping bins to the settlement.
6	How soon is the project commencing?	The construction works will start immediately once all the initial processes have been finalized including but not limited to NEMA license, RAP, final engineering designs and a suitable contractor appointed
7	Who will be responsible for the electrical posts along the roads during the construction?	The county government will liaise with the Kenya power company on the same.
8	Sometimes contractors leave roads unfinished. Is this project different?	World bank works in a professional way. All roads marked as priorities will be completed.
	Shanti	
1	Can other feeder roads constructed apart from the ones given priorities?	The ones identified as priorities are the ones to be constructed first. The county government can consider other roads which are not marked.
2	Dumping is a major issue in our settlement, can it be considered?	The county government to be informed about dumping bins. This will limit pollution.
3	Sewer line was done upto the stream. Can it be extended to the other side of the stream ?	There is a possibility of the engineers extending the sewer line to the other side of the stream. This can be done in a certain angle but not 90 degrees
4	What quality will be the drainage?	The drainage will be of good quality according to the standards of the World bank.
5	Where will we get enumerators who will assist in filling in questionnaires?	The enumerators will come from the settlement.
6	We are in need of a sport field. How can we be assisted?	The world bank doesn't buy lands for sports. The SEC members to liaise with the ward administrator of the same
7	Is there compensation to the PAPs?	The consultant team is going round and will take any photos of the structures constructed on the marked roads and also take details of the PAPs for documentation.
8	How soon is the project commencing?	The construction works will start immediately once all the initial processes have been finalized including but not limited to NEMA license, RAP, final engineering designs and a suitable contractor appointed
	Kipsongo	
1	Which type of Ablution block will be built for the community because the community members aren't exposed and don't know how to use modern convenient washrooms?	The ablution block supposed to be built is modern and it will be built according to World Bank Standards. The County government together with SEC leaders will also do the necessary induction and trainings on how to use modern toilets.
2	How will $KISIP_2$ priority projects for the community implemented without affecting their current existing settlement	The SEC members to actively engage with the community to help them identify specific perfect places of installing and building the $KISIP_2$ projects for the benefit of the community

3	Where ablution block will be built , will the affected families be compensated?	The SEC members in consultation with the community members to look for a perfect place of building ablution block without any displacement of people.
4	Need for Cooperation with the Consultant	The Ward Administrator urged the residents to cooperate with the consultant so as to ensure smooth running of the project

Plate 61:Tuwani public baraza at Mitume Bible Baptist Church

Plate 62: Mitume public baraza at Church of God Mitume

Plate 63: Matisi Public Baraza at Abundant Church

Plate 64: Shanti public baraza at Children's home compound

Plate 65: Kipsongo public baraza at Kipsongo Hall

CHAPTER SEVEN

7. GRIEVANCE REDRESS MECHANISM

This grievance redress mechanism presents the structured process for addressing and resolving complaints or grievances from individuals or communities affected by the proposed projects. The mechanism is designed to provide an avenue for affected parties to voice their concerns, seek resolution, and ensure that their grievances are addressed appropriately. KISIP 2 project has established Grievance Redress Committee whose roles are to:

a) Conduct extensive public awareness and consultations with the affected people.
b) Help ensure that local concerns raised by PAPs as regards resettlement and compensation are promptly addressed.
c) Resolve manageable disputes that may arise relating to resettlement and compensation process. If it is unable to resolve, help refer such grievances to the SCRCC.
d) Ensure that the concerns of vulnerable persons such as the disabled, widowed women affected by the project are addressed.
e) Ensure that all the PAPs in their locality are informed about the content of the RAP.
f) Validate inventories of PAPs and affected assets;
g) Facilitate conflict resolution and addressing grievances; and
h) Participate in compensation ward sign-off

7.1 Grievance Tiers

There are four-tier grievance mechanism at the community, County, national and resolution through courts of law. It is desirable to resolve all the grievances at the community level to the greatest extent possible. To achieve the community or settlement level, grievance mechanism must be credible and generally acceptable. The grievance redress mechanisms will aim to solve disputes at the earliest possible time in the interest of all parties concerned. Grievance procedures may be invoked at any time, depending on the complaint. No person or community from whom land or other productive assets are to be taken will be required to surrender those assets until any complaints he/she has about the method or value of the assets or proposed measures are satisfactorily resolved.

Tier 1: Settlement Grievance Redress Committee (SGRC)

The first level in addressing grievances will be at the settlement. The settlement will form a Settlement Grievance Redress Committee comprising of two members from SEC, and three other respected community members who are not PAPs. The committee should be elected by the community in a transparent manner and after sensitization by KISIP PCT.

Tier 2: County Resettlement Implementation Committee (CRICs)

The second level of grievance mechanism will involve the County Resettlement Implementation Committee (CRICs). The CRICs will consider grievance reports forwarded to it from the community grievance committee and make a determination. The CRIC will comprise of the County Coordinator, Environment Officer, Social/Community Officer, and Component Heads for Infrastructure, and Land tenure, Assistant Deputy County Commissioners, and Ward Administrator.

Tier 3: National PCT, (NRIC)

The third level of grievance mechanism will involve the National PCT, (NRIC) which will comprise of the National Project Coordinator, Heads of Components, Environment and Social Safeguard heads, and a designated Grievance Redress Officer who will be the Secretary. It will handle grievances referred to it by the CGRCs and monitor the performance of the whole GRM for the project.

Tier 4: Court of Law/ Alternative Dispute Resolution (ADR).

If complainants are not satisfied by the decisions of the grievance's committees, they can seek redress from a court of law or resort to Alternative Dispute Resolution (ADR).

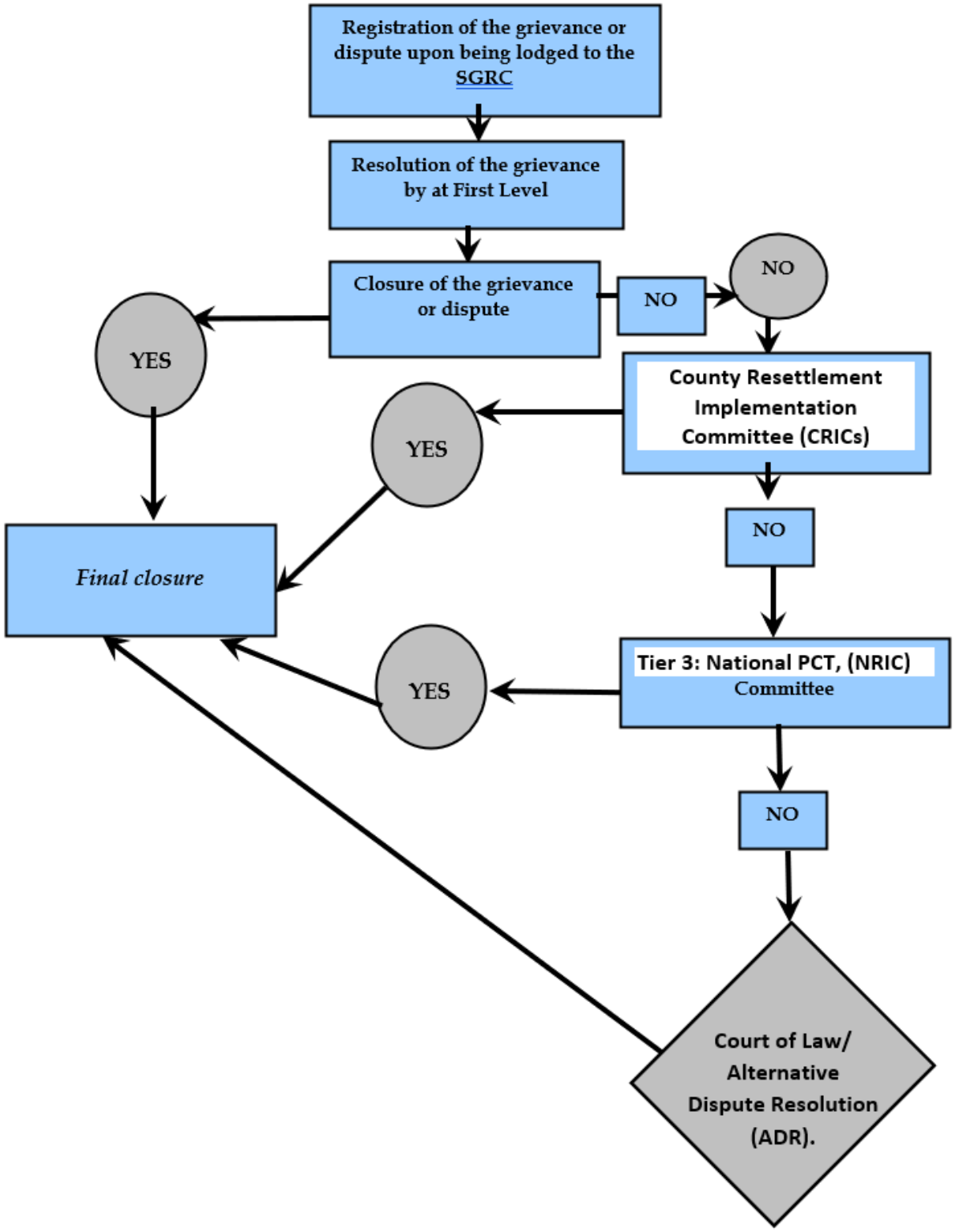


Figure 79: Grievance Redress Flow Chart

7.2 World Bank Grievance Redress System (GRS)

The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are promptly reviewed and addressed.

The GRS considers a complaint admissible when:
- The complaint relates to a World Bank-supported project that is under preparation, active, or has been closed for less than 15 months
- The complaint is submitted by individuals or communities affected by a World Bank-supported project, or by their authorized representative; and
- The complainant(s) allege that they have been or will be affected by the World Bank-supported project.

Complaints must be in writing and addressed to the GRS. They can be sent by the following methods:
- Online, access the online form
- By email to grievances@worldbank.org
- By letter or by hand delivery to the World Bank Headquarters in Washington D.C., United States or any World Bank Country Office – print and use this form (DOCX)

Information to include in a complaint
Complaints must:

- Identify the project subject of the complaint
- Clearly state the project's adverse impact(s)
- Identify the individual(s) submitting the complaint
- Specify if the complaint is submitted by a representative of the person(s) or community affected by the project
- If the complaint is submitted by a representative, include the name, signature, contact details, and written proof of authority of the representative.

Supporting evidence is not necessary but may be helpful in reviewing and resolving the complaint. The complaint may also include suggestions on how the individuals believe the complaint could be resolved. All complaints will be treated as confidential. The GRS will not disclose any personal data that may reveal the identity of complainants without their consent.

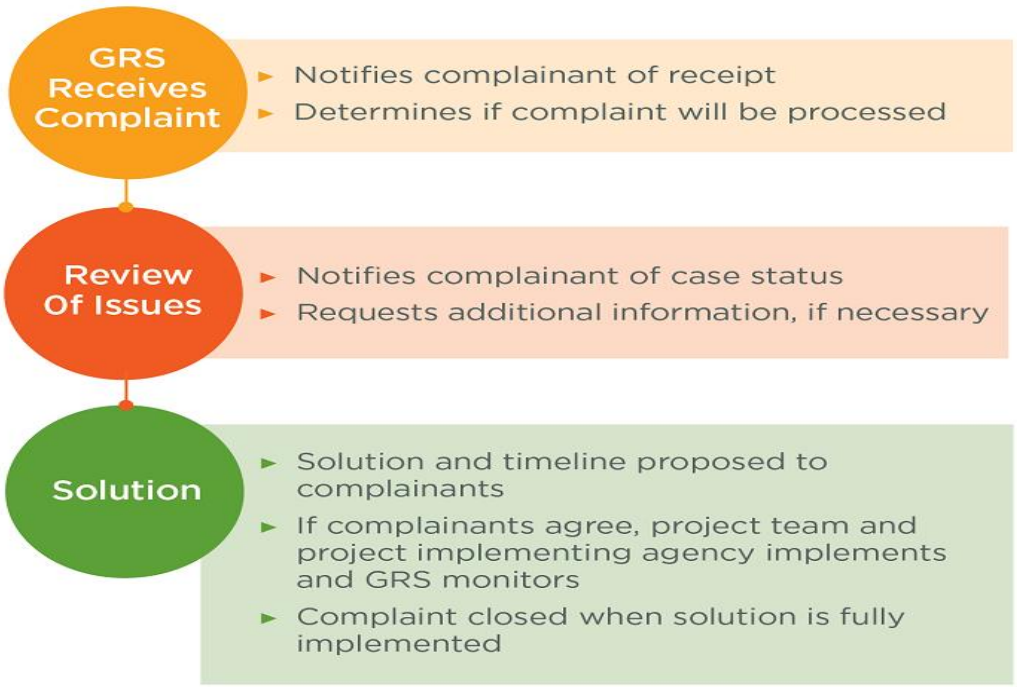


Figure 80: World Bank Grievance Redress System (GRS) Process

CHAPTER EIGHT

8. ENVIRONMENTAL AND SOCIAL IMPACT ANALYSIS

This section presents the proposed projects identified possible environmental, social and economic impacts. Whilst the KISIP II project is aimed at development and improving people's lives, it can also lead to adverse impacts to both the physical and social environment. ESIA is thus a formal process to predict the environmental consequences of the proposed developments and to plan appropriate measures to eliminate or reduce adverse effects and to augment positive impacts.

Impacts can be classified as follows:

- Positive (beneficial) or negative (adverse);
- Direct or indirect, long-term or short-term in duration, and wide-spread or local in the extent of their effect;
- Cumulative Impacts –Impacts that build up over time

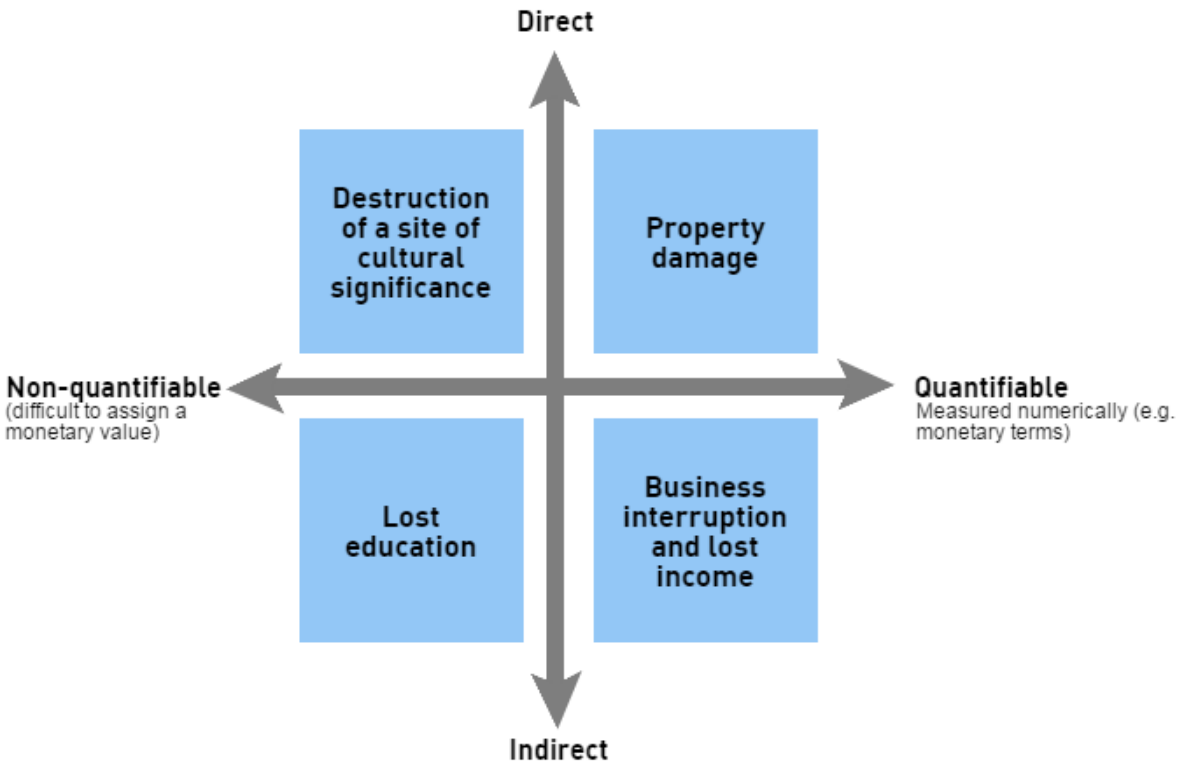


Figure 81: Classification of Impacts

8.1. Impact identification and analysis Methodology

The identification and assessment of environmental and social impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with a proposed project[12]. Other potentially significant impacts or those of stakeholder concern, the impact identification and evaluation process.

The identified Impacts were categorized as negative and positive. Further, negative impacts were analyzed based on impacts consequence and impacts likelihood as shown on **Table 46 and 47** below. Similarly, impacts rating was determined based on impacts consequence and impacts likelihood as shown in **Table 48 and Table 49 below**. Impacts prediction was then made during the construction and the operation phases of the proposed projects. Mitigation measures were then proposed with the hierarchy of avoidance, minimization, mitigation and offsetting the impacts.

Table 46: Impacts Consequences

Severity / Magnitude of Impact	Rating	Spatial Scope / Geographic Extent of Impact	Rating	Duration of Impact	Rating
Insignificant / non-harmful	1	Activity specific	1	One day to one month	1
Small / potentially harmful	2	Area Specific	2	One month to one year	2
Significant / slightly harmful	3	Whole Site	3	One year to ten years	3
Great / harmful	4	Regional/Neighbouring areas	4	Life of operation	4
Disastrous / Extremely harmful	5	National	5	Post closure / permanent	5

Note:
Total Rating of Impact Consequence = Rating of Severity/Magnitude + Rating of Spatial Scope of Impact + Rating of Impact Duration

Table 47: Impacts Likelihood

Frequency / duration of activity	Rating	Frequency of impact	Rating
Annually or less	1	Almost never / Impossible	1
6 monthly / temporary	2	Very seldom / highly unlikely	2
Monthly / infrequent	3	Infrequent / unlikely / seldom	3
Weekly / life of operation	4	Often / regularly / likely / possible	4
Post closure	5	Daily / highly likely / definitely	5

Note:
Total Rating of Impact Likelihood = Rating of Frequency/Duration of Activity + Rating of Impact

[12] https://cdn.slrconsulting.com/uploads/2020-10/TEPNA_Seismic_DEIR_App4_IA_Method.pdf

Frequency

The definitions used in the impact assessment are given below:

- **Frequency** of activity refers to how often the proposed activity will take place.
- **Frequency** of impact refers to the frequency with which a stressor (aspect) will impact on the receptor.
- **Severity** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
- **Spatial** scope refers to the geographical scale of the impact.
- **Duration** refers to the length of time over which the stressor will cause a change in the resource or receptor.

Table 48: Significance Rating Matrix

Consequence (Magnitude+ Geographic extent + Duration of the Impact)															
Likelihood (Frequency of Activity + Frequency of Impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Note:
Rating of Impact Significance = Rating of Likelihood x Rating of Consequence

Table 49: Negative Impacts ratings and associated colour codes

Significance rating	**Value**	**Colour Code**	**Negative Impact Management Recommendation**
Very high	121-150		Propose mitigation measures
High	100-120		Propose mitigation measures
Medium high	77-99		Propose mitigation measures
Low medium	51-76		Maintain current management
Low	25-50		Maintain current management
Very low	4-24		Maintain current management

8.2. Positive Environmental and Social Impacts

8.2.1 Positive Impacts pre-construction phase

Positive Impact	Impact Category	Impact Effects
Employment Opportunities	Direct Impact	job opportunities, providing employment for local residents and contributing to economic development in the community during design study and social and environmental studies
Community Engagement	Direct Impact	The design phase often involves community engagement, consultation, and participation, fostering a sense of ownership and collaboration
Local sourcing	Direct Impact	Local employment will be provided to community members thus earning a living.

8.2.2 Positive Impacts Construction phase

Positive Impact	Impact Category	Impact Effects
Employment Opportunities	Direct Impact	job opportunities, providing employment for local residents and contributing to economic development in the community during construction
Business opportunity	Direct Impact	Sourcing of construction material from the local community

8.2.3 Positive Impacts Operations phase

Positive Impact	Impact category	Impact Effects
Improved Accessibility	Direct Impact	Settlement road projects enhance the connectivity of remote or underserved areas, improving accessibility for residents and facilitating the movement of goods and services
Economic Development	Direct Impact	Construction activities and the enhanced connectivity will lead to increased economic activities as it becomes easier for businesses to transport goods, reach markets, and engage in trade, ultimately boosting local economies
Increased Property Values	Direct Impact	The proposed roads is likely to positively impact property values in the surrounding areas, attracting investment and improving the overall real estate market
Job Creation	Direct Impact	The construction and maintenance the roads create employment opportunities, supporting local communities and contributing to poverty reduction
Social Integration	Indirect Impact	Improved accessibility fosters social integration by connecting previously isolated settlements, allowing residents to interact more easily and participate in community activities

Positive Impact	Impact category	Impact Effects
Education and Healthcare Access	Direct Impact	Settlement roads facilitate better access to education and healthcare facilities, as students, healthcare workers, and patients can travel more efficiently
Enhanced Emergency Response	Direct Impact	The roads improve access for emergency services, reducing response times and increasing the effectiveness of disaster management and healthcare delivery
Quality of Life Improvement	Direct Impact	Improved roads contribute to a better quality of life for residents, making it easier to access essential services, reducing travel times, and enhancing overall well-being
Infrastructure Development	Direct Impact	Settlement roads often pave the way for additional infrastructure development, such as water supply, sanitation, and electricity, contributing to a more developed and resilient community
Community Empowerment	Direct Impact	Improved infrastructure empowers communities by providing them with the means to actively participate in economic, social, and political activities.
Reduced Isolation	Direct Impact	Settlement roads reduce the isolation of remote communities, allowing the connection with urban centers and access a broader range of services and opportunities

Positive Impact	Impact Category	Impact Effects
Employment Opportunities	Direct Impact	job opportunities, providing employment for local residents and contributing to economic development in the community in terms of maintenance and operation workers
Improved Public Health	Indirect Impact	Access to clean and safe water sources, along with proper sanitation facilities, reduces the risk of waterborne diseases and contributes to overall public health.
Disease Prevention	Direct Impact	Adequate sanitation facilities, such as latrines and sewage systems, prevent the contamination of water sources and the spread of waterborne diseases like cholera and dysentery.
Reduced Mortality Rates	Direct Impact	Access to safe water and sanitation facilities is linked to lower mortality rates, particularly among children, as it helps prevent water-related illnesses.
Enhanced Hygiene Practices	Direct Impact	Provision of handwashing facilities and hygiene education encourages better hygiene practices, leading to improved personal and community health
Increased Productivity	Direct Impact	Access to reliable water sources saves time spent on water collection, particularly for women and children, allowing for increased productivity and educational opportunities
Food Security	Direct Impact	Reliable water sources contribute to improved agricultural practices for those practicing agriculture, leading to increased food security and livelihoods for communities

Positive Impact	Impact Category	Impact Effects
Gender Empowerment	Direct Impact	Provision of water and sanitation facilities can empower women and girls by reducing the time and effort spent on water-related activities, allowing for more educational and economic opportunities
Community Resilience	Direct Impact	Water projects that focus on sustainable water management contribute to community resilience in the face of climate change and water scarcity
Reduced Water-Borne Pollution	Direct Impact	Proper sanitation facilities prevent the contamination of water sources, reducing waterborne pollution and protecting aquatic ecosystems.
Social Equity	Direct Impact	Equitable access to water and sanitation facilities promotes social inclusion and reduces disparities, fostering a sense of community well-being.
Community Gathering Spaces	Direct Impacts	Ablution blocks can serve as community gathering spaces, fostering social interaction and cohesion within the community
Improved Hygiene Practices	Direct Impacts	Provision of handwashing facilities in ablution blocks promotes good hygiene practices among the community members
Enhanced Dignity and Privacy	Direct Impacts	Adequate ablution facilities contribute to the dignity and privacy of individuals, particularly in crowded or public spaces
Community Education	Indirect Impacts	Ablution blocks can serve as platforms for hygiene and sanitation education, raising awareness about the importance of cleanliness and health
Reduction of Open Defecation	Direct Impacts	Adequate sanitation facilities, including ablution blocks, contribute to the reduction of open defecation, improving community health and sanitation
Local Economic Opportunities	Indirect Impacts	Construction and maintenance of ablution blocks can create local job opportunities, contributing to the economic well-being of the community
Emergency Preparedness	Direct Impacts	Ablution blocks can serve as essential facilities during emergencies, providing access to clean water and sanitation services in times of need
Improved Accessibility	Direct Impact	Settlement road projects enhance the connectivity of remote or underserved areas, improving accessibility for residents and facilitating the movement of goods and services
Economic Development	Direct Impact	Construction activities and the enhanced connectivity will lead to increased economic activities as it becomes easier for businesses to transport goods, reach markets, and engage in trade, ultimately boosting local economies
Increased Property Values	Direct Impact	The proposed roads is likely to positively impact property values in the surrounding areas, attracting investment and improving the overall real estate market
Job Creation	Direct Impact	The construction and maintenance the roads create employment opportunities, supporting local communities and contributing to poverty reduction
Social Integration	Indirect Impact	Improved accessibility fosters social integration by connecting previously isolated settlements, allowing residents to interact more easily and participate in community activities
Education and Healthcare Access	Direct Impact	Settlement roads facilitate better access to education and healthcare facilities, as students, healthcare workers, and patients can travel more efficiently

Positive Impact	Impact Category	Impact Effects
Enhanced Emergency Response	Direct Impact	The roads improve access for emergency services, reducing response times and increasing the effectiveness of disaster management and healthcare delivery
Quality of Life Improvement	Direct Impact	Improved roads contribute to a better quality of life for residents, making it easier to access essential services, reducing travel times, and enhancing overall well-being
Infrastructure Development	Direct Impact	Settlement roads often pave the way for additional infrastructure development, such as water supply, sanitation, and electricity, contributing to a more developed and resilient community
Community Empowerment	Direct Impact	Improved infrastructure empowers communities by providing them with the means to actively participate in economic, social, and political activities.
Reduced Isolation	Direct Impact	Settlement roads reduce the isolation of remote communities, allowing the connection with urban centers and access a broader range of services and opportunities
Positive Impact	**Impact category**	**Impact Effects**
Reduced Crime and Increased Safety	Direct Impacts	Well-lit streets and public spaces contribute to increased safety, potentially reducing criminal activity and enhancing public security
Enhanced Visibility and Reduced Accidents	Direct Impacts	Adequate lighting improves visibility, reducing the likelihood of accidents and improving overall road safety for pedestrians and motorists
Increased Sense of Community	Direct Impacts	Well-lit public spaces foster a sense of community by providing a safe and welcoming environment for residents to gather, socialize, and participate in community events
Support for Nighttime Economy	Indirect Impacts	Street lights contribute to a vibrant nighttime economy by extending business hours and supporting nighttime activities in commercial areas
Emergency Response Improvement	Direct Impacts	Adequate lighting facilitates emergency response efforts by providing clear visibility during nighttime incidents or emergencies
Improved Public Health	Direct Impacts	Well-lit streets and public spaces contribute to community well-being by promoting mental health, reducing fear of crime, and enhancing overall feelings of safety
Enhanced Aesthetics	Indirect Impacts	lighting installations contribute to the visual appeal of public spaces, making the lit areas more attractive and creating a positive ambiance
Increased Property Values	Indirect Impacts	Well-lit neighborhoods and commercial areas can contribute to increased property values, attracting investment and promoting economic growth

8.2.4 Positive impacts decommissioning phase

Positive Impact	Impact Category	Impact Effects
Employment Opportunities	Direct Impact	job opportunities, providing employment for local residents and contributing to economic development in the community during decommissioning
Business opportunity	Direct Impact	The camp sites can be converted to community social amenities such has dispensary, school or police station

8.3. Possible General Negative Impacts

The generic impacts that would cut across all the proposed projects includes and is not limited to the impacts outlined in Table 50-53 below. The mitigation plan for the se impacts are presented in section 5 of this report. The construction phase would have the following impacts:

Table 50: Pre- Construction Phase General Impacts

Anticipated Negative Impact	Impact description
Displacement	The project will lead to the displacement of 23 PAPs

Table 51: Potential negative impacts during construction

Anticipated Negative Impact	Impact description
Air Pollution from dust	Emissions to air during construction and operation have the potential to impact sensitive receptors (residents), both within the immediate vicinity and the project area of influence. Construction activities such as utility diversions, road excavation and road resurfacing works will result in dust and particulate emissions which may be exacerbated by winds and dry weather. Dust emissions have the potential for temporary significant negative effects, particularly on road users and sensitive receptors adjacent to construction sites and compounds.
Noise and vibration	Noise and vibration can be a source of disturbance at sensitive receptors. Given the urban context of the proposed project, sensitive noise and vibration receptors include buildings (residential, places of worship and educational dwellings) and road users in the immediate vicinity of the existing settlements.
Flooding of storm water due to blocked drainage channels	Flooding could occur mainly due to alternation or blockage of existing drainage channels during construction. This with the changing weather patterns could lead to flooding that may lead to loss of property and life.
Water Quality	Construction activities such as diversion of utilities, road excavation and road widening have the potential to create pathways for pollutants to enter watercourses and indirectly impact on water quality. Soil compaction during construction has the potential to increase the rate of surface water runoff.

Anticipated Negative Impact	Impact description
Displacement Impacts	This could happen when people have settled along the project reserve areas or during compulsory acquisition of land for development projects. There will be no compulsory acquisition for KISIP projects.
Destruction of water pipes or disruption of water supply, sewer and power lines	Construction activities may disrupt the daily lives of community members, affecting routines and causing inconvenience
Incidence of HIV/AIDS	Migration of people from different regions with diverse moral backgrounds through various workforce may lead to behavioral influences which may increase the spread of diseases such as Human Immuno-Deficiency Virus (HIV),
Vegetation loss	Clearing the vegetation would lead to soil erosion
Soil loss and soil pollution	Construction activities will require the excavation of existing made ground and the existing roadbed. Construction activities may create pathways between contaminants from the existing made ground and the local environment and groundwater resources which has the potential to result in significant negative effects (both temporary and permanent). In addition, construction activities may result in generation and removal of materials and solid waste generation.
Solid waste generation	Solid wastes will mainly emanate from the construction activities and will include excavated soil, cement storage bags and other packaging materials used during construction, spillage of oil and grease from machines used in excavation, waste from repair and maintenance of construction equipment, part demolition waste among others
Visual impacts	Temporary structures, construction debris, and equipment may create visual eyesores during the construction phase while Dust generated from construction activities can contribute to reduced air quality, affecting the clarity of views among other impacts
Potential impact on traffic/ obstruction of temporary access	Construction of the proposed infrastructure projects has the potential to impact people's day-to-day travel activities. Temporary traffic diversions, and in some instances temporary lane or road closures, may be required to undertake construction activities. Temporary traffic diversions and road closures may also reduce traffic capacity.
Accidental spills & leakages	Accidental spills from the construction vehicles and construction materials could occur during construction. This would lead to soil, surface and subsurface water pollution
Occupational Health and Safety Risks	During construction, workers would be exposed to various health and safety risks that would require control measures be taken. Opportunities for employment will also be created/available during the construction of the projects that would require hiring policies and employ management plans.
Building materials	Sourcing the building materials could lead to resource depletion and could sourcing from far areas could also lead to high costs and high carbon footprints

Anticipated Negative Impact	Impact description
River water contamination	This could occur once vegetation is cleared and the soils are exposed to erosion factors. Material piles also if not properly secured would lead to downstream contamination of existing nearby springs and rivers
Sustainability and Climate Change Impacts	The potential impacts include greenhouse gas emissions, resource depletion, air and water pollution etc.
Inadequate stakeholder Engagement.	Conflicts and delay in project due inadequate stakeholder engagement
Exclusion of disadvantaged and vulnerable groups	Project benefit may not reach the vulnerable population hence subjecting to increased poverty
Ineffective Grievance Management	Grievances may derail the project if not resolved in a timely manner
Gender-Based Violence Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH	Women and the adolescent girls may be exposed to SEAH from workers employed during the construction of the project
Child Exploitation and Abuse	Employment of children to work in the project may expose them to abuse to and injury

Table 52: Negative Impacts during Operations Phase

Anticipated Negative Impact	Impact description
Air Pollution	Emissions from vehicles and motorbikes using the roads on a daily basis will contribute to air pollution during operation phase of the project. The impact on air quality during repairs and maintenance (operation phase) is expected to occur
Noise Pollution	Noise emission and associated impacts during repairs and maintenance is expected to be low and will emanate from motorized equipment as well as noise from the motor vehicles used on the roads.
Possible vandalism and theft of accessories	Installed roads, lights infrastructure could be targeted for theft
In effective Grievances Management	Grievance on the use of the infrastructure and employment
Incidence of HIV/AIDS	Multiple sexual interactions by employees could lead to spread of HIV/Aids
GBV-Sexual Exploitation and Abuse (SEA) of communities by project workers and Sexual Harassment (SH) amongst employees	This could unfold when operators ask for favors from job seekers for an employment chance. This could also unfold when employees are exploited by their leadership to retain their jobs among other reasons
Child Exploitation and Abuse	Employment of under aged individuals during operation stages of the project
Exclusion of disadvantaged and vulnerable groups e.g PWDs, elderly, youth, the sick, the poor, single-women, OVC etc.	Unequal employment opportunities denied to the vulnerable persons

Inadequate stakeholder engagement	Numerous grievances from the public regarding ownership and operations of the projects

Table 53: Decommissioning Phase Negative Impacts

Anticipated Negative Impact	Impact description
Waste Generation	The decommissioning of infrastructure projects inevitably generates various types of waste, presenting both environmental and logistical challenges. Construction and demolition activities result in the production of significant quantities of waste materials, including concrete, asphalt, metals, wood, plastics, and other construction debris. This waste poses several impacts on the environment, public health, and resource utilization
Child exploitation	Child exploitation may manifest in various forms, including child labor, trafficking, and sexual exploitation. Children may be forced or coerced into hazardous work environments, such as scavenging through construction debris or engaging in manual labor, to supplement family income or as a result of displacement from their homes. Additionally, the breakdown of social structures and protective mechanisms during decommissioning may expose children to increased risks of abduction, trafficking, and sexual exploitation by opportunistic individuals or criminal networks.
GBV-Sexual exploitation	gender-based violence (GBV) can escalate during decommissioning, with women and girls facing heightened risks of physical, sexual, and psychological abuse. Displacement, overcrowded living conditions, and disruption of community support networks can exacerbate existing vulnerabilities and create environments conducive to GBV. Women may face increased risks of domestic violence, sexual harassment, and exploitation, both within their homes and in public spaces, as social norms and power dynamics shift during decommissioning activities.

8.4. Negative Environmental and Social Impact Ratings

The section below discusses the adverse impacts anticipated from implementation of the proposed projects. Common impacts such as those from construction activity have been lumped together so that only those specific to sub-projects are discussed separately. All civil works as proposed under KISIP investment has potential to generate impacts as listed below: -

8.4.1. Pre - Construction Phase

8.4.1.1. Inadequate planning and engagements

Table 54: Inadequate planning Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	2
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	4
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4

Impact Significance Rating (Consequence × likelihood)	**Medium High**	80

Proposed Mitigation Measures

- *Review and develop of all environmental and social Management plans*
- *Communicate with the occupiers of land, stakeholders, and all relevant authorities*

8.4.1.2. Lack of public notification of commencement of work

Table 55: Lack of public notification Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	4
Likelihood	Frequency/duration of activity	5
	Frequency of impact	5
Impact Significance Rating (Consequence × likelihood)	**High**	110

Proposed Mitigation Measures

Notify the public especially the residents on the commencement giving all relevant details

8.4.1.3. Losses or damages related to the clearance of corridors.

Table 56: Damages related to clearance of corridor Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	90

Proposed Mitigation Measures

- *In line with the provisions of the RPF, prepare and effectively implement a plan for managing the land-related impacts.*
- *Facilitate all affected persons and address all grievances prior to commencing works.*
- *Notify the public on the areas to be cleared*
- *Restrict clearance to the marked areas*
- *Facilitate all affected persons and address all grievances prior to commencing works.*

8.4.1.4. Leasing/allocation of land for Contractor facilities and workers' camp.

Table 57: Leasing of land Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	1
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	3
Likelihood	Frequency/duration of activity	1
	Frequency of impact	2

Impact Significance Rating	**Very Low**	15

Impact Mitigation

- *Facilitate all affected persons and address all grievances prior to commencing works.*
- *Notify the public on the areas to be cleared*
- *Restrict clearance to the marked areas*

8.4.1.5. Displacement Impacts

The Kenya integrated Slum improvement project in Trans Nzoia will affect structures belonging to 23 PAPs. The asset inventory of the PAPs is provided in Annex: X of this report.

Table 58: Displacement Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	5
Impact Significance Rating (Consequence × likelihood)	**High**	100

Proposed Mitigation Measures

- *Adequate notice period to relocate business wares and structures,*
- *Minimize damages and compensate the trader (1kiosk), owners of the 2 perimeter walls,*
- *Hasten the construction process to reduce period of inconvenience/length of impacts*
- *Develop comprehensive resettlement plans that outline procedures for compensation, alternative housing, and livelihood restoration*

8.4.2. Construction Phase

8.4.2.1. Air Pollution from dust

Earth moving activities will result to dust generation during clearance and construction at the identified locations. This is in addition to various concrete mixing and painting activities. This will affect the construction workforce, the neighboring households and community in general, flora and fauna in the area.

Table 59: Air Pollution Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	4
Likelihood	Frequency/duration of activity	3
	Frequency of impact	5
Impact Significance Rating (Consequence × likelihood)	**High**	104

Proposed Mitigation:

- *Use water spray systems to control dust and the active construction sites;*
- *Schedule high-dust activities during low-wind periods;*
- *Provide workers with personal protective equipment (PPE) like dust masks;*
- *Display warning signs and implement traffic control measures;*
- *Inform nearby residents and businesses about construction activities and potential dust impacts;*
- *Train construction workers on dust control measures and the use of personal protective equipment;*
- *Engage with the local community to provide information on the air quality impact challenges they are encountering and establish their mitigation measures.*

Air pollution from source emissions

Source emissions pollution during construction refers to the release of pollutants directly from construction activities and equipment. These emissions can have adverse effects on air quality, human health, and the environment. Common sources of emissions during construction include construction equipment, machinery, and materials.

Proposed Mitigation:

- *Use fuel efficient construction equipment;*
- *Install emission control technologies such as diesel particulate filters and selective catalytic reduction systems on construction equipment;*
- *Train operators on best practices for equipment operation to optimize fuel efficiency and reduce emissions;*
- *Implement regular maintenance schedules to ensure equipment operates efficiently and meets emission standards;*
- *Undertakes baseline air quality to assess particulates and gases before start of construction and;*
- *Ensure continuous air quality monitoring throughout the entire construction period.*

8.4.2.2. Noise and vibration

Noise pollution will mainly result from construction vehicles movement as well as from various machinery operations used in construction including metal grinding and welding works, excavations, blasting among other machinery operations. Excessive noise will impact on the community residing within near and along the project areas, as well as the construction workforce.

Vibrations on the other hand would be caused by grading activities, drilling as well as blasting activities. Excessive vibration has the potential to affect the existing infrastructure (people's homes, roads, bridges), destabilize the area geological formation and structural integrity of community houses.

Table 60: Noise Pollution Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	3

	Duration of Impact	4
Likelihood	Frequency/duration of activity	3
	Frequency of impact	5
Impact Significance Rating (Consequence × likelihood)	**Medium High**	88

Proposed Mitigation

- *Use equipment that is properly fitted with noise reduction devices such as mufflers;*
- *Use equipment that have low noise emissions as stated by the manufacturers;*
- *Standard restrictions to hours of site woks;*
- *Workers should be provided with personal protective equipment;*
- *The residents will be informed ahead of the commencement of works.*
- *Encourage the adoption of low noise technology and practice for machines during construction.*
- *Construction activities should be limited to daylight hours although scheduling may require overnight operations on specific occasions;*
- *Limit operation for specific loud pieces of equipment or operations to day-time;*
- *Require contractors to prepare and implement a Vehicle & Traffic Management Plan (VTMP);*
- *Ensure continuous noise level monitoring throughout the entire construction period.*

8.4.2.3. Soil and Water Pollution

Use of construction chemicals, adhesives, sealants, additives and other construction-related chemicals could introduce contaminants into the soil, affecting its composition and quality. Additionally, accidental spills or leaks of construction chemicals, fuels, and lubricants. Dumping or improper disposal of construction debris, concrete waste, and hazardous materials on the other hand can lead to soil pollution. Improper disposal of concrete washout water, which contains alkaline substances and may be contaminated with cementitious materials, can harm aquatic environments like rivers present at the project areas.

Table 61: Surface and ground water pollution Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	3
Likelihood	Frequency/duration of activity	2
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Low**	40

Proposed Mitigation Measures

- *Store construction chemicals in designated areas with proper containment measures;*
- *Develop a spill prevention and response plan to address accidental releases of hazardous materials;*

- *Conduct soil and water sampling and testing before, during, and after construction to monitor soil quality especially at the operating sites;*
- *Conduct educational programs for construction crews on proper soil management practices and the importance of preventing soil pollution;*
- *Use designated areas for concrete washout, and provide proper containment and disposal methods. Consider using environmentally friendly concrete additives*.

8.4.2.4. Surface Water Runoff

Soil exposed from site clearance and de-vegetation, Improper location of stockpiles of sand, gravel, cement, etc., at the construction site could cause fine materials to be washed away during heavy rainfall events.

Table 62: Water runoff Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	3
	Spatial Scope/Geographic Extent of Impact	2
	Duration of Impact	2
Likelihood	Frequency/duration of activity	2
	Frequency of impact	2
Impact Significance Rating (Consequence × likelihood)	**Low**	28

Proposed Mitigation measures

- *Schedule construction activities to avoid periods of heavy rainfall when the risk of runoff is higher;*
- *Develop and implement comprehensive storm water management plans that include erosion control measures*.

8.4.2.5. Solid Waste Generation

Solid wastes will mainly emanate from the construction activities and will include excavated soil, cement storage bags and other packaging materials used during construction, spillage of oil and grease from machines used in excavation, waste from repair and maintenance of construction equipment, part demolition waste among others.

Table 63: Solid water Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	3
	Spatial Scope/Geographic Extent of Impact	2
	Duration of Impact	2
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	Low Medium	56

Proposed Mitigation Measures

- *Provide clearly labeled bins for source separation of different types of waste (e.g., metal, wood, concrete) to encourage recycling;*
- *Train construction workers on the importance of source separation and proper disposal practices to minimize contamination;*
- *Develop and implement a comprehensive program for the reuse and recycling of construction waste materials, including concrete, wood, metal, and other recyclables*
- *Prioritize material efficiency and waste reduction by planning construction activities to minimize excess materials and packaging;*
- *Provision of toilet facilities for use by the contractor staff and other workers during construction and operation phases respectively. Provide portable sanitary conveniences for the construction workers for control of sewage waste. A ratio of approximately 25 workers per chemical toilet should be used;*
- *Develop strategies (waste management plan) for management of specific waste streams prior to construction phase;*
- *Store hazardous wastes such as used oils and other chemicals in bunded areas away from watercourses.*

8.4.2.6. Potential Impact on Traffic/ Obstruction of Temporary Access

The potential impact on traffic and obstruction of temporary access during construction is a significant consideration. Construction activities can disrupt normal traffic flow and access routes, leading to safety concerns and inconvenience for the locals. The potential impacts include traffic congestion, obstruction of access routes, pedestrian safety risks, emergency vehicle access etc.

Table 64: Traffic Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	2
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	1
Likelihood	Frequency/duration of activity	2
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Very Low**	24

Proposed Mitigation Measures

- *Develop a comprehensive traffic management plan that includes measures to minimize congestion, regulate traffic flow, and ensure safe pedestrian movement;*
- *se clear and visible signage to inform the public about construction activities, detours, and expected delays. Communicate construction schedules in advance;*
- *Schedule construction activities during off-peak hours to minimize disruption to normal commuting times;*
- *Identify and promote alternative routes for motorists to bypass construction zones, reducing congestion on primary routes;*
- *Provide safe and well-marked pedestrian walkways, ensuring that pedestrians can navigate around construction zones without compromising their safety;*
- *Engage with the local community through the SEC committee to inform them about construction plans, potential traffic impacts, and mitigation measures. Solicit feedback and address concerns;*
- *Plan construction activities in phases to minimize the extent of road closures and traffic disruptions at any given time;*
- *Coordinate with emergency services to establish clear emergency access routes and ensure that construction activities do not impede their response.*

8.4.2.7. Occupational Health and Safety Risks

Occupational health and safety impacts during construction are of paramount concern, as construction sites involve various hazards that can pose risks to workers. Addressing these impacts is crucial to ensure the well-being of construction workers and prevent accidents and injuries. These hazards include falls, struck-by hazards, caught between hazards, electrical hazards, ergonomic hazards, chemical and biological hazards, psychosocial hazards, noise and vibration etc.

Table 65: Occupational Safety Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	3
Likelihood	Frequency/duration of activity	4
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Medium High**	77

Proposed Mitigation Measures

- *Provide comprehensive safety training for all workers, emphasizing hazard awareness, safe work practices, and emergency procedures.*
- *Ensure the use of appropriate PPE, such as hard hats, safety glasses, gloves, and respiratory protection.*
- *Conduct regular inspections and audits to identify and address potential hazards on the construction site.*
- *Develop and communicate emergency response plans to address potential accidents or incidents promptly.*
- *Implement health monitoring programs to track workers' exposure to hazardous substances and identify potential health issues.*
- *Design workstations and processes with ergonomic principles to minimize strain and prevent musculoskeletal disorders.*
- *Promote overall worker well-being through wellness programs and initiatives addressing both physical and mental health.*

8.4.2.8. Soil Erosion and Loss

There is a risk of soil erosion during excavation/ construction works, or if inadequate measures for storm water management is not put in place. The natural drains around the project area are expected to receive eroded soil.

Table 66: Soil erosion Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	3
Likelihood	Frequency/duration of activity	2
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Low**	40

Proposed Mitigation measures

- *Practice selective vegetation clearing where necessary;*
- *Schedule construction activities to avoid periods of heavy rainfall when the risk of runoff is higher;*
- *Cover soil stockpiles and construction materials on site and on transit to prevent wind and water erosion;*
- *Minimize the extent of grading and disturbance to natural terrain, preserving existing vegetation and soil structure.*
- *Use excavated soils for backfilling while carry away excess soil for appropriate disposal.*
- *Carry out slope protection along the steep slopes to rehabilitate areas where excavation has taken place to prevent future collapse and erosion;*
- *Re-vegetating disturbed areas once construction and demolition works are completed during construction and decommissioning phases, respectively.*

8.4.2.9. Drainage Impacts - Flooding of storm water due to blocked drainage channels

Flooding could occur mainly due to alternation or blockage of existing drainage channels during construction. This with the changing weather patterns could lead to flooding that may lead to loss of property and life.

Table 67: Flooding Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	4
Likelihood	Frequency/duration of activity	3
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium - High**	77

Proposed Mitigation Measures

- *Designate emergency overflow routes or areas where excess water can be safely directed during heavy rainfall that will help to prevent flooding in critical areas by providing an alternative path for excess water;*
- *Develop and implement comprehensive storm water management plans that address the entire watershed;*
- *Assess and Implement early warning systems to provide timely alerts about potential flooding that could guide on construction timings;*
- *Develop and enforce construction waste management practices to prevent improper disposal of construction debris and materials into drainage channels;*
- *Rationale: Strict enforcement discourages practices that contribute to blockages in the drainage system.*

8.4.2.10. Destruction of the physical Environment

The requirement and use of local building materials during construction can have various implications for sustainability, cost-effectiveness, and community development. Some materials may be abundant and others need to be sourced from outside the area. Locally available materials could be easy to source and thus reduce environmental footprint, more cost effective however, quality may need to be assessed.

Table 68: Construction Materials Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	3
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	88

Potential Mitigation Measures

- *The construction contract should stipulate that the Contractor sources materials from an approved site;*
- *The tender documents should specify required standards and certification for procurement of all materials and appliances;*
- *The sources of all required materials should be inspected prior to acquisition to confirm that they are legitimate operations;*
- *The contractor should ensure that he sources construction materials sustainably;*
- *The contractor should ensure that the storage area for materials is good so as to avoid spoils and waste;*
- *Possibly invest in local capacity building to enhance the skills and capabilities of local craftsmen and suppliers, ensuring that they can meet project requirements;*
- *Collaborate with local industries to develop and supply materials that meet project specifications, fostering a sustainable supply chain.*

8.4.2.11. Sustainability and Climate Change Impacts

Sustainability and climate change impacts during construction are critical considerations as the construction industry significantly influences environmental and social aspects. Addressing these impacts is essential for creating resilient, eco-friendly, and socially responsible built environments. The potential impacts include greenhouse gas emissions, resource depletion, air and water pollution etc.

Table 69: Climate Change Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	3
Likelihood	Frequency/duration of activity	3
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Low Medium**	66

Proposed Mitigation measures

- *Use of low emission vehicles for mobilization activities;*
- *Use generators with low emissions;*
- *Switch-off engines when not in use;*
- *Conduct regular maintenance of vehicles and equipment to minimize emissions;*
- *Disturbed areas that will no longer be developed can be revegetated with local vegetation to serve as buffer for future activities and operation and to increase local sequestering capacity for greenhouse gases;*
- *Ensure regular monitoring of possible GHGs emissions.*

8.4.2.12. Vegetation loss

A number of ornamental plants and exotic trees were identified along the project areas. Site preparation by vegetation clearance and excavations exposes soils leaving them vulnerable to erosion by heavy rainfall and surface run-off.

Table 70: Vegetation loss Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	2
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	2
Likelihood	Frequency/duration of activity	4
	Frequency of impact	5
Impact Significance Rating (Consequence × likelihood)	**Low**	45

Proposed Mitigation Measures

- *Conduct a comprehensive assessment of the existing vegetation, including species diversity, ecological value, and health to assist in developing targeted mitigation strategies;*
- *Establish a monitoring program to track vegetation recovery and adjust mitigation strategies based on ongoing assessments.*

8.4.2.13. Immorality and Increase in Sexually Transmitted Diseases

Migration of people from different regions with diverse moral backgrounds through various workforce may lead to behavioral influences, which may increase the spread of diseases such as Human Immuno-Deficiency Virus (HIV), Acquired Immune Deficiency Syndrome (AIDS) and other Sexually Transmitted Infections (STIs).

Table 71: STI diseases Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	5
Likelihood	Frequency/duration of activity	4
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Medium High**	98

Proposed Mitigation Measures

- *Implement comprehensive sexual education programs that cover safe sex practices, STD prevention, and the importance of consensual relationships. This will promote awareness and equips individuals with the knowledge to make informed decisions about their sexual health;*
- *Ensure easy access to condoms and other forms of contraception to encourage safe sexual practices;*

- *Establish feedback mechanisms to receive input from the community about the effectiveness of prevention and education programs.*

8.4.2.14. Possibility of encroachment along the access road

Table 72: Encroachment Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	1
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	Low Medium	63

Mitigation Measures

- *Sensitize locals on penalties associated with encroachment to road reserves*

8.4.2.15. Inadequate stakeholder Engagement

Table 73: Inadequate Stakeholder Consultations Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	4
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**High**	104

Mitigation Measures

- *Engage stakeholders and share project information widely and in a timely manner through diverse, feasible and accessible channels of communication e.g., public forums.*

8.4.2.16. High Project Maintenance Cost

Table 74: High project Maintenance Cost Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	4
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	99

Mitigation Measures

- *Use quality material during the construction phase to reduce cost of maintenance*
- *Engage local communities in road maintenance efforts to foster a sense of ownership and responsibility*
- *Train and sensitize maintenance staff on effective technologies*
- *Conduct regular maintenance and inspection of the road*

8.4.2.17. Ineffective Grievance Management

Table 75: Ineffective Grievance Management Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**High**	117

Mitigation Measures

- Constitute a Local Grievances Committee in consultation with all community segments and incorporate the existing local dispute resolution mechanisms.
- Implement a workers grievances mechanism.
- Create awareness on the culturally appropriate and accessible GRM to all community segments including vulnerable individuals and households and CSOs.
- Log, date, process, resolve, and close-out all reported grievances in a timely manner.
- Ensure proportionate representation of disadvantaged persons in the local grievances committee.
- Enable the GRM to provide for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity.

8.4.2.18. GBV-Sexual Exploitation

Table 76: GBV during Construction Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	5
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	80

Mitigation Measures

- *Conduct comprehensive training sessions for all construction workers, supervisors, and contractors on recognizing, preventing, and responding to GBV and SEA. Raise awareness about the impact of these issues and emphasize the importance of respectful behavior and gender equality on construction sites;*

- *Establish clear codes of conduct and policies that explicitly prohibit GBV and SEA, including harassment, exploitation, and discrimination*
- *Create a safe and secure working environment on construction sites through adequate lighting, secure facilities, and effective security measures*
- *Assign dedicated personnel to monitor construction sites regularly for any signs of GBV or SEA*
- *Engage with local communities to raise awareness about GBV and SEA, as well as available support services*
- *Design construction projects with gender considerations in mind, including the provision of separate and secure facilities for men and women, such as restrooms and changing areas*
- *Establish accessible and confidential reporting mechanisms for workers to report incidents of GBV or SEA*
- *Hold contractors, supervisors, and project managers accountable for preventing and addressing GBV and SEA on construction sites*

8.4.2.19. Child Exploitation and Abuse

Table 77: Child Abuse Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	4
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Low Medium**	72

Mitigation Measures

- *Ensure each employee signs a code of conduct that covers child protection ensuring no children are employed on site in accordance with national labour laws.*
- *Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.*
- *Employ workers who are 18 years and above, and with a valid national ID at the time of hire.*
- *Implement and monitor the employment register regularly.*
- *Comply with the national labor laws and labour management practices. Put visible signage on site "No Jobs for children.*

8.4.3. Project Operations Phase Impacts

8.4.3.1. Air pollution

Emissions from vehicles and motorbikes using the roads on a daily basis will contribute to air pollution during operation phase of the project. The impact on air quality during repairs and maintenance (operation phase) is expected to occur.

Table 78: Air Pollution Impacts Rating during Operations

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	5
	Duration of Impact	2
Likelihood	Frequency/duration of activity	3
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Low Medium**	66

Mitigation

- *Promote the use of cleaner vehicles, enforce emission standards, and implement dust control measures.*
- *Use of manual equipment to minimize the air quality impacts from motorized machinery.*

8.4.3.2. Noise pollution

Noise emission and associated impacts during repairs and maintenance is expected to be low and will emanate from motorized equipment as well as noise from the motor vehicles on the roads.

Table 79: Noise Pollution Impacts Rating during Operations

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	5
	Duration of Impact	2
Likelihood	Frequency/duration of activity	3
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Low Medium**	66

Mitigation: *use of manual equipment to minimize the noise levels impacts from motorized machinery Provide speed limits.*

8.4.3.3. Possibility of flooding due to blocked drainage systems

Flooding could occur mainly due to blockage of the drainage systems by solid waste.

Table 80: Flooding Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	4
Likelihood	Frequency/duration of activity	3
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Low**	50

Proposed Mitigation Measures

- *Designate emergency overflow routes or areas where excess water can be safely directed during heavy rainfall that will help to prevent flooding in critical areas by providing an alternative path for excess water;*
- *Develop and implement comprehensive storm water management plans that address the entire watershed;*
- *Assess and Implement early warning systems to provide timely alerts about potential flooding that could guide on construction timings;*
- *Develop and enforce construction waste management practices to prevent improper disposal of construction debris and materials into drainage channels;*
- *Rationale: Strict enforcement discourages practices that contribute to blockages in the drainage system.*

8.4.3.4. Possible Vandalism and Theft of Accessories

Table 81: Vandalism Impacts Rating during Operations

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	5
	Duration of Impact	2
Likelihood	Frequency/duration of activity	3
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Low Medium**	66

Proposed Mitigation Measures

- *Employ security personnel or community watch programs;*
- *Use tamper-resistant accessories or materials;*
- *Educate the community on the importance of infrastructure protection.*
- *Engage local authorities and law enforcement in monitoring and preventing vandalism.*

8.4.3.5. Accidents from Speeding Vehicles

Table 82: Accidents Impacts Rating during Operations

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	2
	Duration of Impact	5
Likelihood	Frequency/duration of activity	4
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Medium High**	77

Proposed Mitigation measures

- *Implement speed limits and enforce traffic regulations.*
- *Install speed bumps or rumble strips.*
- *Display prominent road signs indicating speed limits.*

8.4.3.6. Trips and fall into uncovered drainages

Table 83: Trip and fall Impacts Rating during Operations

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	2
	Duration of Impact	5
Likelihood	Frequency/duration of activity	4
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Medium High**	77

Proposed Mitigation measures

- *Ensure the drainage system is covered especially near the pedestrian access areas*
- *Ensure clear warning signage are displayed*

8.4.3.7. Possibility of Spread of Waterborne Diseases from Contaminated Piped Water

Table 84: Water Borne Diseases Impact Rating during Operations

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	4
Likelihood	Frequency/duration of activity	3
	Frequency of impact	2
Impact Significance Rating (Consequence × likelihood)	**Low Medium**	60

Proposed Mitigation Measures

- *Regularly test and monitor water quality from public watering points;*
- *Install water treatment facilities if necessary;*

- *Educate the public on safe water practices.*

8.4.3.8. Destruction of roads and amenities from riots and demonstrations

Table 85: Riots Impacts Rating during Operations

Criteria		Rating
Consequences	Severity/Magnitude of Impact	1
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	4
Likelihood	Frequency/duration of activity	3
	Frequency of impact	3
Impact Significance Rating (Consequence × likelihood)	**Low**	48

Proposed Mitigation Measures

- *Conduct awareness campaigns on the importance of the infrastructure and its impact on the community.*
- *Communicate the potential consequences of destructive actions during riots and demonstrations;*
- *Familiarize project stakeholders with legal consequences for engaging in destructive actions;*
- *Collaborate with local authorities to enforce legal measures against those involved in vandalism.*

8.4.3.9. Possibility of encroachment along the access road

Table 86: Encroachment Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	1
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Low Medium**	63

Mitigation Measures

- *Sensitize locals on penalties associated with encroachment to road reserves*

8.4.3.10. Inadequate stakeholder Engagement

Table 87: Inadequate Stakeholder Engagement Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	4
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**High**	104

Mitigation Measures

- *Engage stakeholders and share project information widely and in a timely manner through diverse, feasible and accessible channels of communication e.g., public forums.*

8.4.3.11. Maintenance Cost

Table 88: High Maintenance Cost Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	4
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	99

Mitigation Measures

- *Use quality material during the construction phase to reduce cost of maintenance*
- *Engage local communities in road maintenance efforts to foster a sense of ownership and responsibility*
- *Train and sensitize maintenance staff on effective technologies*
- *Conduct regular maintenance and inspection of the road*

8.4.3.12. Ineffective Grievance Management

Table 89: Ineffective Grievance Management Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	3
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**High**	117

Mitigation Measures

- *Log, date, process, resolve, and close out all reported grievances are in a timely manner.*

8.4.3.13. GBV-Sexual Exploitation

Table 90: Gender based violence Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	5
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	80

Mitigation Measures

- *Undertake sensitization and training on gender-based violence*
- *Develop clear policies that explicitly condemn Gender based Violence(GBV) and Sexual Exploitation and Abuse (SEA)*
- *Engage with local communities to raise awareness about GBV and SEA, their impact, and available support services*
- *Establish confidential and accessible reporting mechanisms for survivors or witnesses of GBV and SEA.*
- *Develop protocols for responding to reports of GBV and SEA promptly and effectively*
- *Conduct regular risk assessments to identify potential vulnerabilities and risks related to GBV and SEA within project operations*
- *Integrate gender considerations into all aspects of project design, implementation, monitoring, and evaluation*
- *Hold staff and partners accountable for their behavior and adherence to GBV and SEA policies through monitoring, supervision, and performance evaluation*
- *Work closely with government agencies, local authorities, NGOs, and other stakeholders to coordinate efforts and share resources in addressing GBV and SEA*
- *Collect disaggregated data on GBV and SEA incidents to better understand patterns, trends, and underlying factors*

8.4.3.14. Child Exploitation and Abuse

Table 91: Child Exploitation Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	126

Mitigation Measures

- *Ensure each employee signs a code of conduct that covers child protection ensuring no children are employed on site in accordance with national labour laws.*
- *Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.*
- *Employ workers who are 18 years and above, and with a valid national ID at the time of hire.*
- *Implement and monitor the employment register regularly.*
- *Comply with the national labor laws and labour management practices. Put visible signage on site "No Jobs for children.*

8.4.4 Project decommissioning phase impacts

8.4.4.1 Solid Waste Generation

Solid wastes will mainly emanate from the decommissioning activities and will include excavated soil, Unused or Surplus Materials, electronic waste, packaging materials, spillage of oil and grease from machines and general wastes among others.

Table 92: Solid water Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	3
	Spatial Scope/Geographic Extent of Impact	2
	Duration of Impact	2
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	Low Medium	56

Proposed Mitigation Measures

- *Re-use and recycling of materials whenever possible. Salvage and repurpose materials such as bricks, concrete, wood, and metal for future projects. Establish recycling programs for materials such as metals, plastics, glass, and electronic waste;*
- *Ensure that waste is transported and disposed of by licensed and reputable waste management companies following proper procedures. Maintain records of waste disposal activities to track waste volumes and ensure compliance with regulations*

8.4.4.2 Child Exploitation and Abuse

Table 93: Child Exploitation Impacts Rating

Criteria		Rating
Consequences	Severity/Magnitude of Impact	5
	Spatial Scope/Geographic Extent of Impact	4
	Duration of Impact	5
Likelihood	Frequency/duration of activity	5
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	126

Mitigation Measures

- *Ensure each employee signs a code of conduct that covers child protection ensuring no children are employed on site in accordance with national labour laws.*
- *Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.*
- *Employ workers who are 18 years and above, and with a valid national ID at the time of hire.*
- *Implement and monitor the employment register regularly.*
- *Comply with the national labor laws and labour management practices. Put visible signage on site "No Jobs for children.*

8.4.4.3 GBV-Sexual Exploitation

Table 94: Gender based violence Impacts Rating

Criteria		**Rating**
Consequences	Severity/Magnitude of Impact	4
	Spatial Scope/Geographic Extent of Impact	1
	Duration of Impact	5
Likelihood	Frequency/duration of activity	4
	Frequency of impact	4
Impact Significance Rating (Consequence × likelihood)	**Medium High**	80

Mitigation Measures

- *Undertake sensitization and training on gender-based violence*
- *Develop clear policies that explicitly condemn Gender based Violence(GBV) and Sexual Exploitation and Abuse (SEA)*
- *Engage with local communities to raise awareness about GBV and SEA, their impact, and available support services*
- *Establish confidential and accessible reporting mechanisms for survivors or witnesses of GBV and SEA.*
- *Develop protocols for responding to reports of GBV and SEA promptly and effectively*
- *Conduct regular risk assessments to identify potential vulnerabilities and risks related to GBV and SEA within project operations*
- *Integrate gender considerations into all aspects of project design, implementation, monitoring, and evaluation*
- *Hold staff and partners accountable for their behavior and adherence to GBV and SEA policies through monitoring, supervision, and performance evaluation*
- *Work closely with government agencies, local authorities, NGOs, and other stakeholders to coordinate efforts and share resources in addressing GBV and SEA*
- *Collect disaggregated data on GBV and SEA incidents to better understand patterns, trends, and underlying factors*

CHAPTER NINE

9. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

9.1. Overview

This chapter outlines the environmental management plan for the impacts mentioned in the preceding chapter (8) summarizes the key identified elements and their mitigation measures, the actions to be taken by various parties and the monitoring activities. The EMMP has been presented in line with the project phases including the construction phase, the operations phase and decommissioning phase.

9.2. Objectives of this ESMMP

This ESMMP has been developed as a tool to guide the proponent and the contractor during the project implementation since it captures the anticipated impacts and therefore acts as a preventive measure towards possible social and economic disruptions that may arise during project implementation. It provides the indicative mitigation measures, the monitoring indicators, responsibilities for mitigation and monitoring and the anticipated costs.

The EMPs presented in this Chapter therefore summarizes the environment and social impacts identified and their proposed mitigation measures, the actions to be taken by various parties and the monitoring indicators. An indication of the implementation and monitoring timelines is also provided. Tables 95 – 98 below present the Environmental Management and Monitoring Plans during pre-construction, construction, operation and decommissioning phases of the project.

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9.3. Pre-Construction Phase

Table 95: Pre-construction phase Impacts

Project	Potential Environmental and Social Impacts	Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
Roads, Footpath and Storm water drainage Projects Water supply projects Lighting project	Inadequate planning and engagements	• Review and develop of all environmental and social Management plans • Communicate with the occupiers of land, stakeholders, and all relevant authorities	• Availability of environmental, social, safety and security management plans • Aligned communication with the project affected persons along the construction corridors	Contractor Proponent	Before construction	No additional cost
Roads, Footpath and Storm water drainage Projects Water supply projects Lighting project	Lack of public notification of commencement of work	Notify the public especially the residents on the commencement giving all relevant details	• Notifications sent to the public especially the project affected persons along and around the construction corridors	Contractor Proponent	Before construction	No additional cost
Roads, Footpath and Storm water drainage Projects Water supply projects Lighting project	Losses or damages related to the clearance of corridors.	In line with the provisions of the RPF, prepare and effectively implement a plan for managing the land-related impacts. Facilitate all affected persons and address all grievances prior to commencing works. Notify the public on the areas to be cleared	• Consultation minutes and signed lists of participants. • Type and amount of facilitation/compensation provided to affected persons. • Number of Project affected Persons facilitated/compensated.	Contractor Proponent	Before construction	No additional cost

Project	Potential Environmental and Social Impacts	Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		Restrict clearance to the marked areas	• Number and type of Grievances reported. • Number of Grievances resolved/not resolved.			
Roads, Footpath and Storm water drainage Projects Water supply projects Lighting project	Leasing/allocation of land for Contractor facilities and workers' camp. (Implement agreements for use of land and restoration).	Evidence of leased space/land	• Lease agreements	Contractor Proponent	Before construction	No additional cost
Road, drainage and water supply Projects	Displacement Impacts of 23 PAPs.	• Adequate notice period to relocate business wares and structures, • Minimize damages and Compensate traders for damages, time and income lost • Hasten the construction process to reduce period of inconvenience/length of impacts Develop comprehensive resettlement plans that outline procedures for compensation, alternative housing,	• Documentation of notice periods provided to affected residents and businesses; • Compensation records for traders affected by construction; • Progress tracking of construction activities against the planned schedule; • Implementation of the Resettlement Action Plan.	Contractor Proponent	Before construction	Kshs. 2,639,500.

Project	Potential Environmental and Social Impacts	Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		and livelihood restoration				

9.4. Construction Phase Environmental and Social Impacts Management and Monitoring Plan

Table 96: Construction Phase ESMP Matrix

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
ENVIRONMENTAL IMPACTS					
Water Resource Impacts	**Surface and sub-surface soil and water pollution** ● Store construction chemicals in designated areas with proper containment measures; ● Develop a spill prevention and response plan to address accidental releases of hazardous materials; ● Conduct educational programs for construction crews on proper soil management practices and the importance of preventing soil pollution; ● Use designated areas for concrete washout and provide proper containment and disposal methods. Consider using environmentally friendly concrete additives.	● Existence and use of designated areas for chemical storage ● Existence and implementation of a spill prevention and response plan ● Construction team training records on soil and water pollution ● Designated areas for concrete washout	Contractor Proponent RE Contractor's Environmental Officer	Monthly Throughout construction period	N/A
	● Conduct water monitoring during and after construction	● Water monitoring reports	Contractor Proponent RE	Quarterly throughout the construction period	300,000

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
Surface water contamination	• Preventing wet concrete and cement from entering watercourse; • Stockpiles to be kept away from watercourses; • Prepare a spill contingency response plan and procure appropriate equipment for oil and • fuel spill management; • Develop a water quality monitoring programme in collaboration with relevant lead agencies; and • Procure an oil spill response kit and build capacity of staff to respond effectively to potential oil spillages	• Implementation of measures to prevent wet concrete and cement from entering watercourses • Documentation of stockpile locations and their distance from watercourses • Existence and implementation of a spill contingency response plan and procurement and availability of an oil spill response kit • Existence and implementation of a spill contingency response plan	Contractor Proponent RE	Monthly Throughout construction period	100,000 to obtain spill kits for the four project areas
Solid Waste	• Provide clearly labeled bins for source separation of different types of waste (e.g., metal, wood, concrete) to encourage recycling; • Train construction workers on the importance of source separation and proper disposal practices to minimize contamination; • Develop and implement a comprehensive program for the	• Existence of clearly labeled bins for different types of waste • Implementation of training programs for construction workers • Existence and implementation of a	Contractor Proponent RE Contractor's Environmental Officer	Monthly Throughout construction period	1,000,000

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	reuse and recycling of construction waste materials, including concrete, wood, metal, and other recyclables ● Prioritize material efficiency and waste reduction by planning construction activities to minimize excess materials and packaging; ● Provision of toilet facilities for use by the contractor staff and other workers during construction and operation phases respectively. Provide portable sanitary conveniences for the construction workers for control of sewage waste. A ratio of approximately 25 workers per chemical toilet should be used; ● Develop strategies (waste management plan) for management of specific waste streams prior to construction phase; ● Store hazardous wastes such as used oils and other chemicals in bunded areas away from watercourses.	waste reuse and recycling program ● Existence and accessibility of toilet facilities for construction and operation phases ● Existence and implementation of a waste management plan ● Documentation of storage areas for hazardous wastes.			
	● Design proper waste skips to avoid overflow	● Proper design of the waste facility ● Appropriate waste facility location	Design team	Once during design	Design costs

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	● Locate the waste management facility away from drainages and natural water sources ● Locate the waste with consideration of wind direction	away from water sources and wind direction considerations			
Air Pollution	● Use water spray systems to control dust at the active construction sites; ●	● Water consumption rates for dust suppression;	Contractor Proponent RE	Monthly Throughout construction period	3,000,000
	● Schedule high-dust activities during low-wind periods	● Reduction in visible dust levels in the air	Contractor Proponent RE		N/A
	● Provide workers with personal protective equipment (PPE) like dust masks	● Compliance with PPE usage among construction workers	Contractor Proponent RE	Monthly Throughout construction period	483,000
	● Display warning signs and implement traffic control measures.	● Visibility of warning signs to motorists and pedestrians	Contractor Proponent RE	Monthly Throughout construction period	500,000
	● Train construction workers on dust control measures and the use of personal protective equipment.	● Training records indicating topic trained attendance and participation rates	Contractor's Environmental Officer	Monthly Throughout construction period	100,000
	● Engage with the local community to provide information on the air quality impact challenges they are encountering and establish their mitigation measures.	● Feedback from the community on the effectiveness of dust suppression efforts	Contractor's Environmental Officer	Monthly Throughout construction period	70,000

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	• Inform nearby residents and businesses about construction activities and potential dust impacts	• Communication to the public regarding the ongoing works;	Contractor's Environmental Officer	Monthly Throughout construction period	Covered under signage costs
	• Undertake regular dust monitoring (PM_{10} and $PM_{2.5}$) throughout the construction phase.	• Air quality measurements during high-dust and low-wind periods • Dust monitoring records.	Contractor's Environmental Officer	Daily monitoring records	300,000
	• Implement dust control measures to minimize the visual impact of airborne particles generated during construction.	• Implementation of dust control measures to minimize airborne particles during construction	Contractor's Environmental Officer	Daily during construction	Included in dust suppression cost
Sedimentation (Soil Loss)	• Practice selective vegetation clearing where necessary; • Schedule construction activities to avoid periods of heavy rainfall when the risk of runoff is higher; • Cover soil stockpiles and construction materials on site and on transit to prevent wind and water erosion; • Minimize the extent of grading and disturbance to natural terrain, preserving existing vegetation and soil structure.	• Documentation of areas subject to selective clearing • Adherence to construction schedules that avoid periods of heavy rainfall • Compliance with guidelines for minimizing terrain disturbance • Records of the use of excavated soils	Contractor Proponent RE Contractor's Environmental Officer	Monthly Throughout construction period	No additional cost

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	• Use excavated soils for backfilling while carry away excess soil for appropriate disposal. • Carry out slope protection along the steep slopes to rehabilitate areas where excavation has taken place to prevent future collapse and erosion.	for backfilling and documentation of excess soil disposal practices			
Noise and Vibration	• Use equipment that is properly fitted with noise reduction devices such as mufflers;	• Installation and utilization of noise mufflers on machinery.	Contractor Proponent RE	Every time a new equipment is introduced	N/A
	• Use equipment that have low noise emissions as stated by the manufacturers;	• Documentation of equipment specifications regarding noise emissions	Contractor's Environmental Officer	Every time a new equipment is introduced	N/A
	• Workers should be provided with personal protective equipment;	• Availability and usage of personal protective equipment (PPE) among workers;	Contractor Proponent RE	Throughout construction period	Covered in PPE cost
	• The residents will be informed ahead of the commencement of works;	• Documentation of communication done with residents;	Contractor's Environmental Officer	Weekly Throughout construction period	150,000
	• Encourage the adoption of low noise technology and practice for machines during construction.	• Documentation of equipment specifications	Contractor Proponent RE	Throughout construction period	N/A

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		regarding noise emissions	Contractor's Environmental Officer		
	• Limit operation for specific loud pieces of equipment or operations to daytime.	• Document indicating Adherence to designated construction hours.	Contractor's Environmental Officer	Throughout construction period	N/A
	• Require contractors to prepare and implement a Vehicle & Traffic Management Plan (VTMP).	• Existence and implementation of a Vehicle & Traffic Management Plan (VTMP)	Contractor Proponent RE Contractor's Environmental Officer	Monthly throughout construction period	200,000
	• Undertake noise monitoring at the construction sites	• Noise monitoring reports	Contractor's Environmental Officer	Daily, throughout construction period	200,000
	• Monitor the conditions of the structures along the construction corridors to ascertain their baseline conditions before construction begins.	• Regular inspection and observation of the structures • Residents feedback	Contractor	Continuous during construction	Part of EHS performance monitoring
Potential impact on traffic/ obstruction of temporary access	• Develop a comprehensive traffic management plan that includes measures to minimize congestion, regulate traffic flow, and ensure safe pedestrian movement;	• Existence and implementation of a comprehensive traffic management plan • Implementation of clear and visible	Contractor Proponent RE	Weekly Throughout construction period	2,000,000

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	• Use clear and visible signage to inform the public about construction activities, detours, and expected delays. Communicate construction schedules in advance; • Schedule construction activities during off-peak hours to minimize disruption to normal commuting times; • Identify and promote alternative routes for motorists to bypass construction zones, reducing congestion on primary routes; • Provide safe and well-marked pedestrian walkways, ensuring that pedestrians can navigate around construction zones without compromising their safety; • Engage with the local community through the SEC committee to inform them about construction plans, potential traffic impacts, and mitigation measures. Solicit feedback and address concerns; • Plan construction activities in phases to minimize the extent of road closures and traffic disruptions at any given time;	signage at construction sites • Adherence to construction schedules that prioritize off-peak hours • Identification and promotion of alternative routes to bypass construction zones • Existence and accessibility of safe and well-marked pedestrian walkways around construction zones • Documentation of community awareness and feedback on traffic impacts • Coordination with emergency services to establish and maintain clear emergency access routes			

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	• Coordinate with emergency services to establish clear emergency access routes and ensure that construction activities do not impede their response.				
Health and Safety Impacts	• Provide comprehensive safety training for all workers, emphasizing hazard awareness, safe work practices, and emergency procedures.	• Existence and implementation of safety training programs	Contractor Proponent RE	Regular training on onboarding of new staff Throughout construction period	200,000 for every 25 committee members 120,000 for Fire Risk Training to all staff annually 100,000 for First aid training to all staff Annually
	• Ensure the use of appropriate PPE, such as hard hats, safety glasses, gloves, and respiratory protection.	• Implementation and use of appropriate personal protective equipment (PPE)	Contractor's Safety Officer	Daily inspection and supervision reports	Included in PPE provision costs Supervision included in Safety Officer's cost
	• Conduct regular inspections and audits to identify and address potential hazards on the construction site.	• Existence and implementation of regular inspection and audit programs	Contractor's Safety Officer		100,000 paid to the safety officer monthly to monitor; 150,000 Annual External HSE Auditor
	• Develop and communicate emergency response plans to address potential accidents or incidents promptly.	• Emergency response Plan • Communication of emergency	Contractor's Safety Officer	Daily	Safety Officer Cost

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		response plans through tool box talks ● Incidents and accidents records			
	● Provide safe working tools to adhere to the ergonomic principles to minimize strain and prevent musculoskeletal disorders.	● Safe working tools provided ● Zero cases of ergonomic disorders during the construction phase	Contractor Proponent RE	Annually	Included in the medical examination costs
	● Promote overall worker well-being through wellness programs and initiatives addressing both physical and mental health.	● Existence and implementation of wellness programs addressing physical and mental health including fitness to work medical examination	Contractor	Annually	50,000
Drainage Impacts	• Designate emergency overflow routes or areas where excess water can be safely directed during heavy rainfall that will help to prevent flooding in critical areas by providing an alternative path for excess water; ▪ Develop and implement comprehensive storm water management plans that address the entire watershed;	● Identification and signage of designated overflow routes ● Existence and implementation of a comprehensive storm water management plan ● Implementation and functionality of early warning systems	Contractor Proponent RE	Monthly Throughout construction period	250,000

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	▪ Assess and Implement early warning systems to provide timely alerts about potential flooding that could guide on construction timings; ● Develop and enforce construction waste management practices to prevent improper disposal of construction debris and materials into drainage channels.	● Documentation of construction waste management practices ● Inspection reports indicating waste management practices			
Natural resource depletion	● Construction contract should stipulate that the Contractor sources materials from an approved site; ● The tender documents should specify required standards and certification for procurement of all materials and appliances; ● The sources of all required materials should be inspected prior to acquisition to confirm that they are legitimate operations; ● The contractor should ensure that he sources construction materials sustainably; ● The contractor should ensure that the storage area for materials is good so as to avoid spoils and waste; ● Possibly invest in local capacity building to enhance the skills and	● Inclusion of material sourcing requirements in the construction contract ● Obtain relevant certifications and licenses at the material sourcing sites ● Inclusion of required standards and certification details in tender documents ● Existence and implementation of material source inspection processes	● Proponent procurement department Contractor procurement	Monthly Throughout construction period	Cost covered under material sourcing cost

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	capabilities of local craftsmen and suppliers, ensuring that they can meet project requirements; ● Collaborate with local industries to develop and supply materials that meet project specifications, fostering a sustainable supply chain.	● Documentation of sustainable sourcing practices for construction materials ● Existence and maintenance of proper storage areas for construction materials ● Existence and implementation of collaboration with local industries			
	● Obtain permits and any relevant documentation on the construction sources of water	● Sources of construction water ● Water abstraction permits where relevant ● Records on the amount of water used on a daily basis to assess resource utilization ● Water bills	Contractor Proponent RE	Monthly	Water for dust suppression included in dust suppression cost Construction water amount covered in construction cost Water abstraction permit covered in construction cost
SOCIAL IMPACTS					
Incidence of HIV/AIDS	● Implement comprehensive sexual education programs that	● Community education	Contractor	Quarterly Throughout	4,000,000

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
	cover safe sex practices, STD prevention, and the importance of consensual relationships. ● Ensure easy access to condoms and other forms of contraception to encourage safe sexual practices.	programme in place with the curriculum coverage; ● Availability and accessibility of condoms and contraceptives.	Proponent RE	construction period	
Ineffective Grievances redress mechanisms	● Grievances shall be addressed through the GRM document developed for KISIP II	● Existence of the grievance redress mechanism document	Proponent Contractor RE	Monthly Throughout construction period	200,000
GBV-Sexual Exploitation and Abuse (SEA) of communities by project workers and Sexual Harassment (SH) amongst project workers	Undertake sensitization and training on gender-based violence	Trainings undertaken	Contractor	During recruitment	Contractor training cost
Child Exploitation and Abuse	Undertake sensitization and training on child labour	Trainings undertaken	Contractor	During recruitment	Contractor training cost
Exclusion of disadvantaged and vulnerable groups e.g., PWDs, elderly, youth, the sick, the poor, single-women, OVC etc.	Ensure that all vulnerable persons benefit from the opportunities presented by the projects to be implemented. This will include the recruitment of casual laborers and also compensation of lost household assets and livelihood restoration interventions	Monitor the Grievance received	Contractor	Continuously	No additional cost

Construction Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
Inadequate stakeholder engagement	a stakeholder engagement plan has been prepared and will be implemented during all phases of the project	Stakeholder engagement reports	Proponent Contractor RE	Continuously	50,000

9.5. Operation Phase Environmental and Social Impacts Management and Monitoring Plan

Table 97: Operations Phase ESMMP

Operations Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
ENVIRONMENTAL IMPACTS					
Noise and air pollution during road maintenance	• Use efficient machinery and equipment during repairs and road maintenance if any • Sensitize maintenance personnel to switch off machinery when not in use	• Feedback from community • Noise monitoring reports	Contractor Proponent RE	Quarterly Throughout operations of the project	500,000
	• Undertake road repairs during the day	• Feedback from community			
Energy demand for the streetlights and high mast lights	• Use solar powered streetlights and floodlights • Enhance use of energy saving fittings/methods	• Energy consumption records-Annual Audit reports	Proponent RE	Annual	100,000
Possibility of flooding due to blocked drainage system	• Sensitize locals on importance of proper waste disposal • Install visible warning signs advertising fines for littering waste into the drainage system • Conduct regular inspection of the drainage system • Regularly remove trash and litter	• Number of Community sensitizations undertaken • Installed signages • Inspection records • Drainage cleaning/clearing schedule and records • Annual Audit reports	Proponent RE	Annual	200,000
SAFETY IMPACTS					
Possible vandalism and	• Employ security personnel or community watch programs;	• Presence of security	Proponent RE	Annual	200,000

Operations Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
theft of accessories	● Educate the community on the importance of infrastructure protection. ● Engage local authorities and law enforcement in monitoring and preventing vandalism ● Educate the community on the importance of infrastructure protection. ● Engage local authorities and law enforcement in monitoring and preventing vandalism ● Promptly repair any damage and strengthen preventive maintenance.	personnel or community watch programs at vulnerable sites ● Develop an incident reporting system for immediate response to vandalism or theft ● Community feedback on awareness and reported incidents of attempted vandalism ● Incidents reported and actions taken by law enforcement in response to vandalism ● Number of community education programs conducted ● Records of reported damages and			

Operations Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		timelines for repairs			
Accidents from speeding vehicles	• Implement speed limits and enforce traffic regulations. • Install speed bumps or rumble strips where necessary • Display prominent road signs indicating speed limits.	• Number of reported speeding incidents and actions taken; • Inspection reports confirming the installation of speed bumps or rumble strips • Inspection reports confirming the installation of speed bumps or rumble strips	Proponent RE	Annual	200,000
Trips and fall into uncovered drainage	• Ensure the drainage system is covered especially near the pedestrian access areas • Ensure clear warning signage are displayed	• Drainage design • Annual audit report	Proponent RE	Annual	200,000
Dilapidated roads and vandalism	• Ensure proper drainage system is developed alongside the road • Ensure timely renovation and effective maintenance of roads • Enforce fines to road use violators	• Inspection reports • Road inspection and maintenance records • Road use laws and regulations	Proponent RE	Annual	200,000

Operations Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
Possibility of spread of waterborne diseases from contaminated piped water	• Regularly test and monitor water quality from public watering points for waterborne pathogens • Educate the public on safe water practices • Implement water treatment measures as needed	• Frequency of water quality testing specifically for waterborne pathogens • Documentation of water treatment measures implemented based on testing results	Proponent RE	Annual	500,000
Destruction of roads and amenities from riots and demonstrations	• Conduct awareness campaigns on the importance of the infrastructure and its impact on the community. • Communicate the potential consequences of destructive actions during riots and demonstrations; • Familiarize project stakeholders with legal consequences for engaging in destructive actions; • Collaborate with local authorities to enforce legal measures against those involved in vandalism.	• Documentation of sessions or materials used to familiarize stakeholders with legal consequences • Community feedback on their understanding of the infrastructure's importance and impact • Records of collaboration with local authorities for legal enforcement	Proponent RE	Annual	200,000

Operations Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		• Number of legal actions taken against individuals involved in vandalism			
SOCIAL IMPACTS					
Possibility of encroachment along the access road	• Sensitize locals on penalties associated with encroachment to road reserves	• Coming up with policies and regulating laws	Proponent RE	Annual	200,000
Maintenance cost	• Use quality material during the construction phase to reduce cost of maintenance • Engage local communities in road maintenance efforts to foster a sense of ownership and responsibility • Train and sensitize maintenance staff on effective technologies • Conduct regular maintenance and inspection of the road	• Records of quality of materials used • Contracts issues to local for road maintenance • Training records • Inspection reports	Proponent RE	Annual	200,000
Inadequate stakeholder Engagement Exclusion of disadvantaged and vulnerable groups	• Engage stakeholders and share project information widely and in a timely manner through diverse, feasible and accessible channels of communication e.g., public forums.	• Number of Vulnerable and disadvantaged groups mapped in each of the settlements. • Minutes of all meetings held with	Proponent RE	Annual	N/A

Operations Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		disadvantaged groups.			
Ineffective Grievance Management	• Log, date, process, resolve, and close out all reported grievances are in a timely manner.	• Number of nature of cases received and logged (updated GR logs/register). • Number and type of pending grievances. • Number of GRC meetings conducted and grievances resolved in the GRC meetings. • Number and type of facilitations done for the SEC/GRC to solve community Grievances. • Number of grievances resolved in a timely manner. • Number of grievances escalated to national courts and the World Bank Grievances Redress Service	Proponent RE	Annual	200,000

Operations Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsibility	Monitoring Frequency	Estimated Cost (KES)
		and Inspection Panel.			

9.6. Decommissioning Phase EMMP

Decommissioning refers to the formal process of bringing to an end. As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased.

This EMP should be treated as a guiding document that will be employed in the initial stages of the decommissioning. Detailed procedures will be developed with the cause of decommissioning in mind by competent persons and agencies. Below presents the EMP of the decommissioning phase for the proposed project.

Table 98: Decommissioning Phase ESMMP

Decommissioning Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsible party	Time Frame	Cost (Ksh)
ENVIRONMENTAL IMPACTS					
Demolition waste	• Adopt an integrated solid waste management system i.e. through a hierarchy of options: Source reduction; Recycling; Reuse; Sanitary land filling.	• Integrated waste management system • Inspection report	Contractor Proponent RE	One-off	Part of construction cost
	• All structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible.	• Structure tracking records	Contractor Proponent RE	One-off	Part of construction cost
	• All foundations must be removed and recycled,	• Tracking records	Contractor Proponent RE	One-off	Part of construction cost

Decommissioning Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsible party	Time Frame	Cost (Ksh)
	reused or disposed of at a licensed disposal site.				
	● Where recycling/reuse is not possible, the materials should be taken to a licensed waste disposal site.	● Waste tracking records	Contractor Proponent RE	One-off	Part of construction cost
Rehabilitation of project site	● Implement an appropriate re-vegetation programme to restore the site to its original status.	● Re-vegetating programme	Contractor Proponent RE	One-off	200,000
	● Consider use of indigenous plant species in re-vegetation.				
Increased occupational health and safety risks	● Adherence to the Occupational Health and Safety Rules and Regulations stipulated in the Occupational Safety and Health Act, 2007.	● Occupational Health and Safety Audit report during Decommissioning	Contractor Proponent RE	One-off	200,000
	● Provision of appropriate personal protective equipment as well as ensuring a safe and healthy environment for demolition workers.				
	● Mitigate demolition workers accidents by enforcing adherence to safety procedures and preparing contingency plan for accident response.				

Decommissioning Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsible party	Time Frame	Cost (Ksh)
Noise and Vibration	• Sensitize demolition vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	• Training records	Contractor Proponent RE	Weekly During decommissioning	N/A
	• Sensitize demolition drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, offices, hospitals, residential houses and schools.	• Training records	Contractor Proponent RE	Weekly During decommissioning	N/A
	• Ensure that demolition machinery is kept in good condition to reduce noise and vibration generation.	• Inspection records	Contractor Proponent RE	Weekly During decommissioning	N/A
	• Ensure that all generators and other equipment used are insulated or placed in enclosures.	• Inspection records	Contractor Proponent RE	Weekly During decommissioning	N/A
	• The noisy construction works will be planned to be during the day.	• Inspection records	Contractor Proponent RE	Weekly During decommissioning	N/A
SOCIAL IMPACTS					
Local Employment	• Prioritize hire of locals for all unskilled labour. • Implement a local recruitment plan that is fair and transparent (including recruitment processes that	• Fair and transparent local recruitment plan in place. • Recruitment processes (job adverts, interviews, selection etc.).	Contractor Proponent RE	One-off	200,000

Decommissioning Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsible party	Time Frame	Cost (Ksh)
	ensure inclusivity of both men and women, vulnerable individuals, minority clans, ethnic groups etc. • Adhere to labour laws, and labour management practices (timely renumeration, equitable compensation for both genders for equal work etc.) • Create awareness to workers and the community on worker and project grievance redress mechanisms.	• Number of locals employed based on gender, vulnerability, ethnic group, clan etc. • Type of employment (skilled, semi-skilled and unskilled). • Grievances raised, those aggrieved, status of resolution.			
Local Sourcing	• Source materials from local businesses/communities. • As applicable, give opportunities to businesses owned or operated by vulnerable individuals.	• Number and types of businesses sourced from. • Number and types of businesses owned and operated by vulnerable individuals.	Contractor Proponent RE	One-off	Procurement cost
Inadequate stakeholder Engagement Exclusion of disadvantaged and vulnerable groups	• Share project information widely and in a timely manner through diverse, feasible and accessible channels of communication e.g., public forums. • Introduce measures for affirmative action that would ensure especially persons with disability, the	• Number of Vulnerable and disadvantaged groups mapped in each of the settlements. • Minutes of all meetings held with disadvantaged/vulnerable groups.	Contractor Proponent RE	One-off	200,000

Decommissioning Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsible party	Time Frame	Cost (Ksh)
	elderly and women have access to job opportunities. • Undertake recruitment transparently, while ensuring the inclusion of disadvantaged groups. • Develop and implementation of a stakeholder engagement plan. • Engage stakeholders throughout the project phase as guided by the approved stakeholder engagement plan.				
Ineffective Grievance Management	• Constitute a Local Grievances Committee in consultation with all community segments and incorporate the existing local dispute resolution mechanisms. • Implement a workers grievances mechanism. • Create awareness on the culturally appropriate and accessible GRM to all community segments including vulnerable individuals and households and CSOs . • Log, date, process, resolve, and close-out all reported	• Local Grievances Committee in place, composition of committee. • Number of nature of cases received and logged (updated GR logs/register). • Number and type of pending grievances. • Number of GRC meetings conducted and grievances resolved in the GRC meetings. • Number and type of facilitations done for the SEC/GRC to solve community Grievances. • Awareness of community and workers on project and worker GRMs.	Contractor Proponent RE	One-off	N/A

Decommissioning Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsible party	Time Frame	Cost (Ksh)
	grievances in a timely manner. • Ensure proportionate representation of disadvantaged persons in the local grievances committee. • Enable the GRM to provide for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity.	• Number of grievances resolved in a timely manner. • Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.			
Gender-Based Violence Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)	• Develop and implement a policy on SEA/SH. • Map the GBV referral pathways and create awareness among women and men on the risk of SEA/SH. • Ensure the GRM is SEA/SH-responsive. • Ensure all those with physical presence on site sign and understand the Code of Conduct. • Put in place measures for monitoring GBV/sexual harassment.	• Number of Inductions sessions on SEA/SH. and signing of Code of Conducts. • Signed Code of Conducts. • Number of, SEA and SH cases reported and resolved. • Number of Community sensitization sessions on SEA and SH. • Number of Continuous training and awareness training done through toolbox talks. • Number of IEC materials done to create awareness. • Number of stakeholder engagements conducted on GBV/SEA/SH. • Establishment of a grievance responsive GRM.	Contractor Proponent RE	One-off	N/A

Decommissioning Phase Environmental Impact	Proposed Mitigation Measure	Monitoring Indicator	Responsible party	Time Frame	Cost (Ksh)
Child Exploitation and Abuse	• Ensure each employee signs a code of conduct that covers child protection ensuring no children are employed on site in accordance with national labour laws. • Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police. • Employ workers who are 18 years and above, and with a valid national ID at the time of hire. • Implement and monitor the employment register regularly. • Comply with the national labor laws and labour management practices. • Put visible signage on site "No Jobs for children."	• Records of Child protection cases reported in the project. • Develop a child protection Code of Conduct. • Number of Inductions sessions on Child protection Code of Conducts. • Number of refresher awareness training on Child protection Code of Conducts. • Number of staff who have signed Code of Conduct.	Contractor Proponent RE	One-off	N/A

CHAPTER TEN

10. CONCLUSION AND RECOMMENDATIONS

10.1. Conclusion

Trans-Nzoia KISIP 2 projects identified in collaboration with the community, prioritize essential elements such as roads, drainage systems, sanitation, and street lighting. Following a thorough screening, various methods were used in impact identification, prediction, evaluation and analysis. Taking into account factors like project location, design, available alternatives, regulatory compliance, and community feedback, the ESIA assessment identified that the proposed project will have both positive and attendant negative impacts during its implementation phase. For each potential impact, the study determined its likelihood and consequence and recommended mitigation measures to enhance the positive impacts and minimize magnitude of the negative.

Some of the project positive impacts highlighted in the study are creation of employment opportunities, development of area due to improved road infrastructure, enhanced visibility and security within the area, reduced flooding and damaging of the infrastructures. On the other hand, the negative impacts include air and noise pollution, occupational safety and health risks, storm water blockage causing flooding, possible vandalism and theft and displacement of people.

During the survey, only twenty-three (23) PAPs were recorded to be along the road construction corridor and will be resettled as per the RAP report recommendations.

10.2. Recommendations

The contractor will prepare the following social management plans

- ✓ *Labour Management Plan,*
- ✓ *Child Protection Strategy,*
- ✓ *Gender-based Violence Action Plan,*
- ✓ *Waste Management Plan,*
- ✓ *Contractors Code of Conduct,*
- ✓ *Gender Inclusivity Strategy,*
- ✓ *HIV/Aid Prevention Strategy.*

The contractors will be required to engage services of a qualified Environment, Health and Safety Officers and Social Safeguards Officer at the time of Project implementation.

At Project implementation stage, the contractor with approval of the supervising engineer will prepare periodic Environmental and Social Implementation Report. The reports will provide status of implementation of risks & impacts management measures to date from the project start to the end of the reporting period.

From an Occupational Health and Safety approach, the contractors will ensure they undergo the following;

- OSH risk assessment, Registration of workplaces, Safety and Health (OSH) Audit, Fitness to work assessment of employees,
- Training of all workers or workers' representatives in basic Occupational Safety and Health, Accident and incident reporting, Compensation of injured workers who die or get injured and disabled.

At Project completion stage, within the Defects Liability Period, Trans Nzoia County Government will initiate an Initial Environment and Social Audit for the Project as required by EIA/EA Audit Regulations of the year 2003 amended in 2019 and subsequent annual self-audits. The Audit will develop an Environment and Social Audit Action Plan (ESAAP) that will be used to track Project Environment and Social Compliance during Operations Stage

i. All unforeseen social impacts which will result from displacement of project affected persons during project construction phase will be addressed as per the provisions of RPF
ii. Grievance redress system should be made -GBV responsive before commencement of works
iii. Project workers should have a transparent, open, available and anonymous GRMs for lodging grievances which should be solve in a timely manner
iv. Issues of climate smart interventions and gender should be given a priority during the entire project life cycle

The main recommendation of this ESIA is the need for concerted implementation of the EMP and Monitoring Plans by the proponent. These recommendations include;

i. Develop an ESMMP implementation action plan
ii. Develop the traffic management plans that will be used during the construction phase Development of an ESMMP implementation action plan prior to construction
iii. Provide adequate notice to the public on the areas to be cleared

iv. Develop the Implement the traffic management plans that will be used during the construction phase
v. Obtain all the required construction and operational permits before commencement
vi. Develop the Health and Safety management plans
vii. The contractor should comply with the approved designs and implement ESMP developed by the consultant
viii. Include the proposed mitigations in the tender contract and tender documents so that the contractor who will be selected for the project will be bound to implement them.

On the basis of a commitment by the proponent to implement the proposed measures to mitigate the potential negative environmental, safety, health and social impacts associated with the life cycle of the proposed project. it is within our expert opinion that the project be issued an ESIA License as per the Environmental Management and Coordination Act Cap. 387 of the Laws of Kenya.

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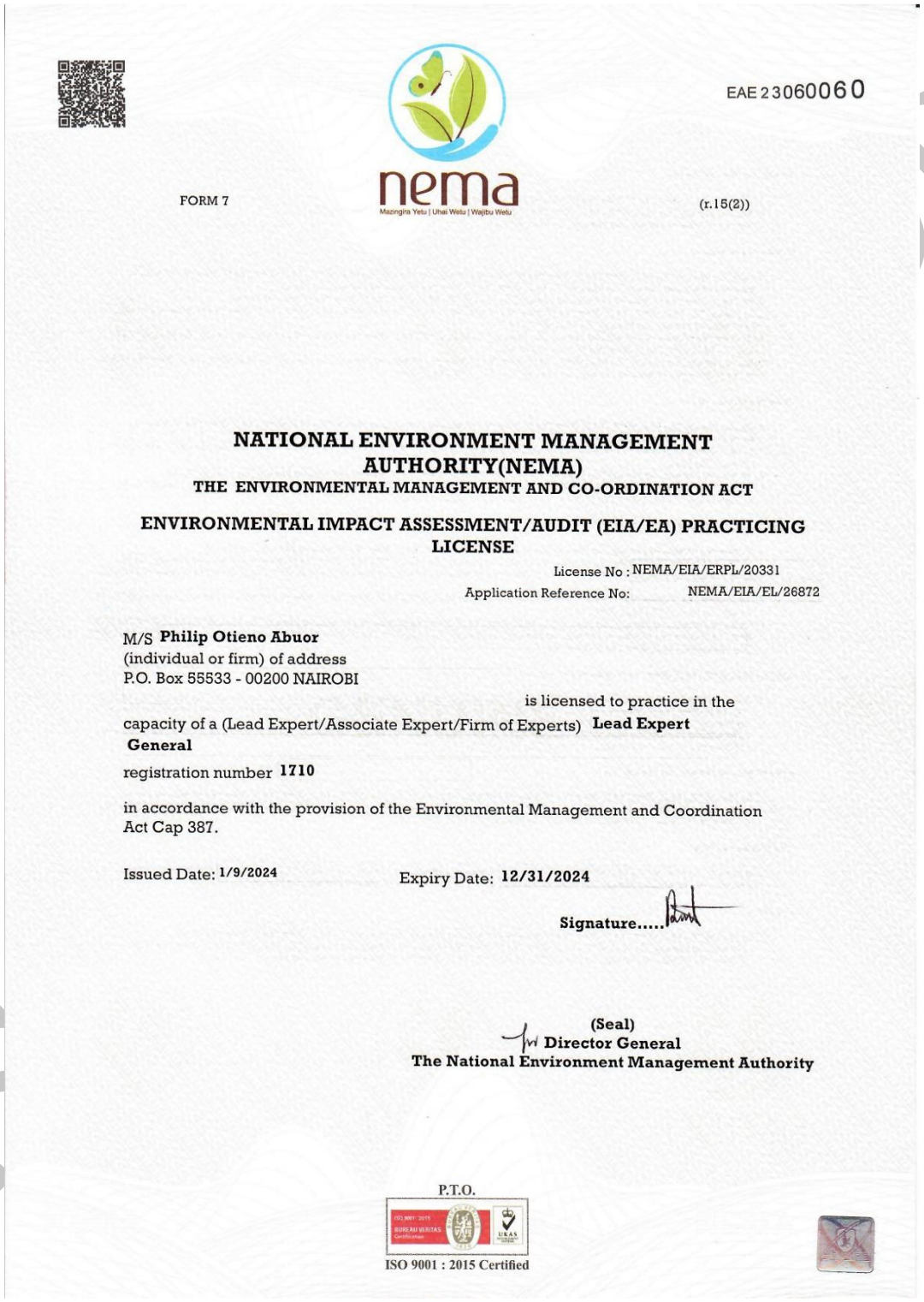
12 APPENDICES

Appendix I: Project Team

NAME	Role	Qualifications
Philip Abuor	Teal Leader	Lead EIA Expert/MSC Environmental Science
Dr. Dan Adino	Sociologist	PhD in Sociology
Eva Illa	Assistant Expert	Bachelor of Environmental Studies and Community Development

The following Experts have been Authenticated and their certificates presented below:

Appendix II: NEMA Expert Licenses



EAE 23060060

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/20331
Application Reference No: NEMA/EIA/EL/26872

M/S **Philip Otieno Abuor**
(individual or firm) of address
P.O. Box 55533 - 00200 NAIROBI

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert General**

registration number **1710**

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

Issued Date: **1/9/2024** Expiry Date: **12/31/2024**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001 : 2015 Certified

13 ANNEXES

ANNEX I: Baseline Assessment reports

a) Water Quality

b) Noise Monitoring

c) Air Quality Report

ANNEX II: Bill of Quantities

ANNEX III: Abbreviated RAP Report

ANNEX IV: Social Screening Checklist

ANNEX V: Environmental Screening Checklist

ANNEX VI: Focus Group Discussion Guide

ANNEX VII: Socio economic survey tool

ANNEX VIII: Minutes of the community meetings held

ANNEX IX: List of participants of community participation meetings

ANNEX X: Asset Inventory

ANNEX XI: List of SEC members

ANNEX XII: Land Ownership Document