

# **DIASPORA UNIVERSITY TOWN**



**STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)**

## **DRAFT REPORT**

FOR

**30,000 STUDENTS UNIVERSITY, 90,000 RESIDENTS TOWN**

**UNIVERSITY TOWN DEVELOPMENT PLAN**

ON

**3,000 ACRES LAND**

## CERTIFICATION

This Draft Report for the Strategic Environmental Assessment report for the University Town has been prepared under the leadership of Dr. Justin K. Maghanga, NEMA Lead Expert Reg. No. 6642 of Justrotech Environmental Solutions. The report has been prepared with reasonable skills, care and diligence in accordance with the National Guidelines for Strategic Environmental Assessment of 2012.

We certify that the particulars given in this report are correct to the best of our knowledge.

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- ✦ TaitaTaveta County Commissioner.
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- ✦ Ministry of Lands and Settlement
- ✦ Commission for University Education
- ✦ National Lands commission
- ✦ National Construction Authority (NCA).
- ✦ Kenya Wildlife Service.
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## ABBREVIATIONS

AD	Anaerobic Digestion
ALARP	As low as reasonably practicable
AMR	Annual Monitoring Report
CSR	Corporate Social Responsibility
DUT	Diaspora University Town
EA	Environmental Audit
EIA	Environmental Impact Assessment
EM&MP	Environmental Management and Monitoring Plan
EMCA	Environmental Management and Coordination Act
EOI	Expression of Interest
FAO	Food and Agriculture Organization
FORREMS	Forest Range Rehabilitation & Environmental Strengthening Project
GIS	Geographical Information Systems
IAIA	International Association for Impact Assessment
IAS	Interested and Affected Stakeholders
IEC	Independent Expert Commission
KENHA	Kenya National Highway Authority
KNCP	Kenya National Cleaner Production Center
KRDS	Kenya Rural Development Strategy
KWS	Kenya Wildlife Service
LAC	Limits of Acceptable Change
MEMR	Ministry of Environment and Mineral Resources
NCA	National Construction Authority
NEC	National Environment Council
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NRMP	Natural Resources Management Programme
NWRMS	National Water Resources Management Strategy
PPP	Policy, Plan or Program
PRSP	Poverty reduction strategy paper
SERC	Standards Enforcement Review Committee
SEA	Strategic Environmental Assessment
SEO	Strategic Environmental Objective
SOE	State of the Environment Report
SFRA	Strategic Flood Risk Assessment
TAC	Technical Advisory Committee
TOR	Terms of Reference
UNCED	United Nations Conference on Environment and Development
UNEP	United Nation Environment Programme
USAID	United States Agency for International Development
WHO	World Health Organization
WPI	Worcester Polytechnic Institute



## **DEFINITION OF TERMS**

### **Agenda 21**

A comprehensive plan of action to be taken globally, nationally, and locally by organizations of the United Nations' system governments and major groups that was agreed at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992.

### **Alternative**

The range of choices open to plan and decision makers for delivering of the plan objectives.

### **Anaerobic Digestion**

A process where biodegradable material is broken down in the absence of oxygen in an enclosed container. The end products: carbon dioxide, methane and solids/liquids known as digestate which can be used for fertiliser, compost or Solid Recovered Fuel (SRF). The methane gas released by the process is normally burnt to generate heat and power.

### **Annual Monitoring Report**

Assesses the implementation of Environmental measures as the plan is developed.

### **Baseline Data**

Data that describes issues and conditions at the inception of the SEA. It serves as the starting point for measuring impacts and performance and is an important reference for evaluation.

### **Biodiversity, Flora and Fauna**

Biodiversity is the variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems' (United Nations Convention on Biological Diversity 1992). Flora is all the plants found in a given area. Fauna is all the animals found in a given area.

### **Cumulative Effects/Impacts**

Are combined or additive effects on the environment over time or space when added to other past, present, or reasonably foreseeable actions. The effects/impacts may seem insignificant in isolation, but collectively they are significant.

### **Environment Impact Assessment**

Is the umbrella term for the process of examining the environmental risks and benefits of project-level proposals. It is the critical examination of the effects of a project on the environment. An EIA identifies both negative and positive impacts of any development activity or project, how it affects people, their property and the environment. EIA also identifies measures to mitigate the negative impacts, while maximizing on the positive ones. EIA is basically a preventive process. It seeks to minimize adverse impacts on the environment and reduces risks. If a proper EIA is carried out, then the safety of the environment can be properly managed at all stages of a project- planning, design, construction, operation, monitoring and evaluation as well as decommissioning.

### **Environmental Management and Coordination Act**

The Environmental Management and Coordination Act (EMCA), 1999, is the framework law on environmental management and conservation. EMCA establishes among others the following institutions; National Environment Management Authority, Public Complaints Committee, National Environment Tribunal, National Environment Action Plan Committees, and County Environment Committees.

**Ex Ante Assessment**

An evaluation of the environmental feasibility of a PPP during the formulation phase, by looking at the expected or intended results of a PPP and predicting and extrapolating its potential significant impacts.

**Ex Post Assessment**

An evaluation of the results after PPP implementation. It provides an opportunity to assess the implementation of a PPP, consider alternatives, and adjust a PPP to avoid or enhance the results.

**Geographic Information System (GIS)**

Is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.

**Green Technology**

The science and technology developed and applied with a goal to protect the environment. The techniques incorporate green chemistry, environmental monitoring, and more that are applied to make sure the environment remains protected with the goal to conserve nature, and to remedy the negative impact that humans have on nature. Green technology is applied to breathe life back into a damaged ecosystem or prevent the ecosystem from damage. It offers a lot of benefits to not only nature itself but also for a clean and greener human lifestyle. Human beings need Earth to stay alive. This technology ensures that the Earth remains healthy for all life to continue existing. It is also referred to as environmental technology or clean technology.

**Hazardous Waste**

Waste that poses substantial or potential threats to public health or the environment.

**Indicator**

A signal that reveals progress (or lack thereof) towards objectives; it provides a means of measuring what actually happens against what has been planned in terms of quantity, quality, and timeliness.

**Irreversible Negative Impact**

An impact that cannot be undone in time using reasonable means.

**Iterative**

The act of repeating a process usually with the aim of approaching a desired goal or target or result. Each repetition of the process is called an "iteration" and the results of one iteration are used as the starting point for the next iteration.

**Kenya Wildlife Service**

It is a state corporation that was established by an Act of Parliament (Cap 376), now repealed by WCMA (2013), with the mandate to conserve and manage wildlife in Kenya, and to enforce related laws and regulations. KWS undertakes conservation and management of wildlife resources across all protected areas systems in collaboration with stakeholders.

**Lead Agency**

Means any Government Ministry, Institution, Department, Parastatal, State Corporation or Local Authority, in which any law vests functions of control or management of any element of the environment or natural resources

**Limits of Acceptable Change (LAC)**

Extremes in environmental quality beyond which society would find further change unacceptable. LAC relates to a level of environmental quality (usually biophysical) that is either desired or would be tolerated by society (often a qualitative value).

**Mitigate**

To make or become less severe or harsh.

**Mitigation Measures**

Mitigation measures are measures envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing a human action, be it a plan, programme or project. Mitigation involves ameliorating significant negative effects. Where there are significant negative effects, consideration should be given in the first instance to preventing such effects or, where this is not possible, to lessening or offsetting those effects. Mitigation measures can be roughly divided into those that: avoid effects; reduce the magnitude or extent, probability and/or severity of effects; repair effects after they have occurred; and compensate for effects, balancing out negative impacts with other positive ones.

**National Environmental Management Authority (NEMA)**

The National Environment Management Authority (NEMA), is established under the Environmental Management and Co-ordination Act No. 8 of 1999 (EMCA) as the principal instrument of Government for the implementation of all policies relating to environment. EMCA 1999 was enacted against a backdrop of 78 sectorial laws dealing with various components of the environment, the deteriorating state of Kenya's environment, as well as increasing social and economic inequalities, the combined effect of which negatively impacted on the environment. The supreme objective underlying the enactment of EMCA 1999 was to bring harmony in the management of the country's environment.

**Objectives**

A statement of what is intended, specifying the desired direction of change in trends.

**Plan**

A purposeful, forward-looking strategy or design, often with coordinated priorities, options, and measures that elaborate and implement policy. All the documents to which the Strategic Environmental Assessment (SEA) applies, including Spatial Strategy revisions and Development Plan

**Policy**

A broad statement of intent that reflects and focuses the political agenda of government and initiates a decision cycle. A general course of action or proposed overall direction that a government is or will pursue; a policy guides ongoing decision making.

**Pollution**

The addition of any substance (solid, liquid, or gas) or any form of energy (heat, sound, or radioactivity) to the environment at a rate faster than it can be dispersed, diluted, decomposed, recycled, or stored in some harmless form. Major kinds of pollution are: air pollution, water pollution, Noise pollution and land pollution.

**Program**

A coherent, organized agenda or schedule of commitments, proposals, instruments, and/or activities that elaborate and implement policy.

**Scoping**

The process of defining the extent and detail of a SEA, including the identification of strategic issues.

**Screening**

The process of deciding whether a document requires a SEA.

**SEA Expert**

An expert registered and licensed as per the SEA Guidelines

**Stakeholder**

Those who may be interested in, potentially affected by, or influence the implementation of a PPP. In the context of a SEA applied to development co-operation, stakeholders may include government, donor agencies, local communities, NGOs, and civil society.

**Strategic Environmental Assessment (SEA)**

Is the formal, systematic evaluation of the likely significant environmental effects of implementing a plan or programme before a decision is made to adopt it. It is a range of analytical and participatory approaches that aim to integrate environmental consideration into policies, plans, and programs and evaluate the interlink ages with economic and social considerations.

**Sustainability Issues**

The constitutional sustainability, including constitutional economic – social rights and environmental rights and environmental sustainability.

**Strategic Action**

The PPP i.e. the actual Policy, plan or program

**Threshold**

Levels that should not be exceeded; points at which irreversible or serious damage could occur, either to ecosystems and/or to social systems (health, safety, or wellbeing).

**Tier**

A layer or ranking in a hierarchy, as in policy, plan, or program.

**Trade-offs**

Refers to losing one quality or aspect of something in return for getting another quality or aspect. It implies a decision made with the full comprehension of both the up- and down-side of a particular choice.

## **NON-TECHNICAL SUMMARY**

### **1. INTRODUCTION**

The Diaspora University Town is a development plan for the meeting of constitutional rights and specifically the constitution rights article 43 and 42 as Kenya population increases.

Kenya Constitution 42. Every person has the right to a clean and healthy environment, which includes the right— (a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and (b) to have obligations relating to the environment fulfilled under Article 70.

Kenya Constitution 43 (1.) 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; and right to emergency treatment. (2) A person shall not be denied emergency medical treatment.

The Institution Town development Plan by the Taita Taveta County Assembly in accordance with Kenya Constitution 185 (4) A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county's resources; and (b) the development and management of its infrastructure and institutions.

The National Environmental Management Authority (NEMA) on screening the plan asked a Strategic Environmental Assessment (SEA) be undertaken.

The plan is for settling 90,000 residents in a Town settlement and creating a 30,000 students university in the Town. The land area to implement the plan is 3,000 acres.

### **2. SEA METHODOLOGY**

The following methodology is applied in the SEA:

- Consultations with the Plan developers; Understanding of the Plan and Visit of the Land.
- Screening of Plan
- Stakeholder consultations and Public participation
- Preparation of Terms of Reference and Scoping Report and Submission to NEMA for Approval.
- Baseline Data Collection.
- Environmental Impact analysis on Plan and Findings
- Mitigation Plan
- Alternatives and Evaluation of Alternatives.
- Environmental Management and Monitoring Plan (EMMP)
- Draft report for Public Presentation and stakeholder review.
- Final Report Compilation, validation and submission.

The Scoping involved an examination of environmental issues and a decision on the level of detail to be included in the SEA Environmental Report, in consultation with the National Environmental Management Authority.

This Environmental Report, then, documents the SEA process, detailing the collection of qualitative and quantitative baseline data and identification, prediction, evaluation and mitigation of potential significant effects on the environment as the plan is developed on the land.

### 3. DIASPORA UNIVERSITY TOWN PLAN

The Diaspora University Town plan is a plan for development of a Town that settles 90,000 residents and creates 30,000 students university as the anchor economic activity on 3,000 acres of land.

The plan incorporates creation of plots, roads and building on the plots as tabulated.

Plots/Usage	Plots	Size	Acres	Buildings	Square Meters
University Campus	2	155.79 & 58.89	214.68	80	450,000
University Hospital	1		55.06	10	100,000
University Parks	4	69.44, 26.79, 105.4, 34.42	236.05	10	10,000
University Stadium	1		47.09	5	100,000
University Research	1		19.81	5	8,000
University Golf Course	1		100	10	20,000
University Tourism	1		42.70	30	30,000
University Airstrip	1		65.46	2	5,000
Mall	1		20.88	5	50,000
Tech High	1		39.19	20	80,000
Bank	1		12.01	5	20,000
Design Build	1		9.31	5	30,000
Material Supply	1		9	1	10,000
Town Parks 1	1	62.86	47.07	5	3,000
Cemetery	1		47.10	2	2,000
Industrial Park	8	(10 x 6), 11.05, 10.72	81.77	30	30,000
Mining	1		13.86		
Town Administration/ Commercial/Apartments/Other	8	11.94, 4.7, 8.97, 8.13, 11.52, 19.18, 15.72, 13.29	93.45	40	20,000
Town Houses	6,400	0.125	800	6,400	1,376,000
Town Parks	292	0.125	36.5	60	6,000
Residential	80	0.25	20	80	24,000
Residential	30	0.5	15	30	10,000
Commercial/Other	107	0.5	53.5	200	100,000
Residential	15	1 acres	15	15	6,000
Commercial/Apts/Other	67	1 acres	67	100	300,000
Park/Commercial/Apartments	11	2 acres	22	50	30,000
Parking/Commercial/Apartments	19	2.2 acres	41.8	100	20,000
Parking/Commercial/Apartments	6	2.3 acres	13.8		
Apartments	10	4.6 acres	46	50	1,200,000
Schools/Parks	10	4.6 acres	46	40	160,000
Admin/Commercial/Schools/Apts	20	9.2 acres	184	110	800,000
Roads (Approx.)			494.91		
<b>Total</b>	<b>7,093</b>		<b>3,000</b>	<b>7,500</b>	<b>5,000,000</b>

The plan has five main development plans as follows:

- (1.) Town Development Plan
- (2.) University Development Plan
- (3.) Medical Hospital Plan
- (4.) Design-Build Plan
- (5.) Energy Plan

#### **4. STRATEGIC ENVIRONMENTAL ASSESSMENT FOR DIASPORA UNIVERSITY TOWN PLAN**

The Strategic Environmental Assessment (SEA) is undertaken to create an environmental assessment, management and monitoring plan as the plan is developed.

The SEA is an Ex Post Assessment. This is an evaluation of the legislated plan of developing of 90,000 residents and 30,000 Students University on 3,000 acres.

The SEA provides the opportunity to assess the plan implementation process, to establish the alternatives that can be considered as the plan is developed; to establish the targets indicators and mitigation measures as the land is evaluated; and to create an environmental management and monitoring plan that will be implemented alongside the plan development.

The undertaking of the SEA includes assessment of environmental topics as listed below:

- (1.) Biodiversity, Flora and Fauna
- (2.) Population and Socio-Cultural
- (3.) Human Health
- (4.) Soil
- (5.) Water
- (6.) Air Quality and Noise
- (7.) Climatic Factors
- (8.) Material Assets
- (9.) Cultural Heritage
- (10.) Landscape

The SEA incorporated environmentally sustainable plans for the topics as it establishes targets, indicators and practical mitigation measures for addressing the environmental concerns as well as creation of opportunities. The SEA ensures that environmental and social considerations are progressively applied in the plan development, implementation and operation.

#### **5. STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) OBJECTIVES**

The 10 objectives based on the 10 SEA topics are:

- (1.) To create an environment plan where every person who resides in the University Town at any given time can achieve their constitution rights and play their part in achieving a clean and healthy environment for the Town.
- (2.) To create a human healthcare plan that caters for every person constitutional right 43 (1.) 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; and right to emergency treatment. (2) A person shall not be denied emergency medical treatment.
- (3.) To preserve, protect, maintain and where appropriate during construction maintain and restore the biodiversity, Fauna and Flora post construction. Create a detailed Corporate Social Responsibility (CSR) plan on planting of exotic trees to enhance tree cover.
  - (4.) Apply soil in the sustenance of plants and humans. Protect the soil against degradation and pollution through waste and soil erosion through floods.
  - (5.) Ensure the right of clean water is achieved and when doing so the status of water bodies is protected, maintained and improved; and, waste water managed, treated and recycled.
  - (6.) Avoid, prevent or reduce harmful effects on human health and the environmental resulting from air pollution through dust, emissions, noise and toxic gases from waste; maintain and promote continuing improvement in air quality through planting of trees and vegetation; and, reduce emissions and tree cutting through the promotion of renewable energy and energy efficiency technologies.
  - (7.) Incorporate renewable energy as source of energy with a goal to increase trees through reduction of use of trees as source of energy and attainment of the minimal emissions of greenhouse gasses
  - (8.) Plan, development and progressively maintain water, roads and energy assets plans that meet and enhance the meeting of social and economic rights while complying with the clean and healthy environment as the population settles and a Town and University is development.
  - (9.) Incorporate plan to protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage while advancing the culture of the people of the region.
  - (10.) To provide a framework for identification, assessment, protection, management and planning of landscapes that has minimal impact on landscape and maximizes natural landscape visibility.

## **6. BASELINE ENVIRONMENT**

The existing environment was collected and assessed based on the 10 topics: Biodiversity, flora and fauna; population and social cultural; human health; soils and geology, water, air quality and noise; climatic factors, material assets; cultural heritage; and landscape.

The baseline environment assessment served to establish the sensitive or vulnerable areas, animals, plants, landscape and other considerations with a goal to have a plan that will guide in the development and create measures for avoiding, protecting and conserving the identified areas, animals, plants, landscape and other considerations.

The baseline environmental assessment was also done with a goal to provide data, identify existing problems and make predictions of how the growing data can affect the environment.

The following environmental topics were assessed and their baseline data, existing problems and the lively evolution in the absence of the development plan.

- (1.) Biodiversity, Flora and Fauna
- (2.) Population and Social Cultural



- (3.) Human Health
- (4.) Air Quality and Noise
- (5.) Soil and Geology
- (6.) Water
- (7.) Climatic Factors
- (8.) Material Assets
- (9.) Cultural Heritage
- (10.) Landscape

## **7. STAKEHOLDERS AND LINKAGES**

The stakeholders are the persons or persons assigned the responsibility to act on behalf of other life, nature and natural resources.

The stakeholders are further considered based on their impacts to the project that are either directly or indirectly and are of a positive or negative nature. How these impacts are interlinked and the role of different stakeholders.

More than 10,000 person's views were incorporated in the SEA establishment.

Those incorporated include: County Assembly members when approving the Institution Town development plan; Ndara B Community members during allocation of land; meetings; Questionnaires; workshops; over 3,000 persons through Jobs expression; and department's consultation.

## **8. FINDINGS**

The findings are that: Diaspora University Town Plan has integrated all recommendations arising from the Draft SEA report. The plan will have significant positive effects upon Kenya environmental management and protection as Kenya population continues to increase to 60 million 2030 and 90 million 2060.

Further the plan facilitates the environmental management and protection by:

- (a) Having a Town Sustainable Environmental Management Plan that would progressively implement measures that mitigate against environmental damage.
- (b) Having a Design-Build Environment plan that will ensure minimum impact on the environment.
- (c) The Medical Hospital plan of waste management will ensure minimum impact on the environment.

## **9. ENVIRONMENTAL IMPACTS ASSESSMENT AND ALTERNATIVES**

The different plans of development as established in the Diaspora University Town plan will have impacts.

### **a. Environmental Impacts Assessment**

Several objectives from the plans that were further classified to sub-plans were evaluated against the Strategic Environmental Objectives (SEOs.)

#### TOWN PLAN OBJECTIVES

- TO – Town Development Objectives
- EDO – Economic Development Objectives
- WWO – Water Waste Objectives
- CHO – Cultural Heritage Objectives
- CCO – Climate Change Objectives
- FRO – Flood Risk Objectives
- ICTO – ICT Objectives
- EMO – Environmental Management

#### UNIVERSITY PLAN OBJECTIVES

- ERO Education Research Objectives
- SMO Student Management Objectives

#### MEDICAL HOSPITAL PLAN OBJECTIVES

- PHO Public Health Objectives
- HO Hospital Objectives
- ERO Education Research Objectives

#### DESIGN-BUILD PLAN OBJECTIVES

- LPO. Land Planning Objectives
- HBO. Housing and Buildings Objectives
- RIO. Roads and Infrastructure Obj.
- UBO. Urban Design Objectives
- TMO. Transport and Movement Obj.
- GSO. Green Spaces Objectives

#### ENERGY PLAN OBJECTIVES

- SEO – Solar Energy Objectives
- WEO – Waste to Energy Objectives
- OSO – Other Sources Objectives

The objectives were evaluated based on the following four (4) categories:

- (1.) Likely to Improve status of SEOs
- (2.) Probable Conflict with status of SEOs unlikely to be mitigated
- (3.) Potential Conflict with status of SEOs likely to be mitigated
- (4.) No Likely interaction with status of SEOs

#### **b. Alternatives**

The plan was also assessed with consideration of several alternatives as follows:

Alternative 1: Unplanned Settlement Approach

Alternative 2: Land Increase to 4,500 acres, 6,000 acres and 9,000 acres

### Alternative 3: Settled Persons Decrease

The evaluation of alternatives was done through a comparative evaluation of the environmental effects of implementing the alternatives. The goal to understand how an alternative will likely improve, conflict with or have a neutral interaction with environmental components.

The evaluation of alternatives is done through Compatibility to determine how the alternatives would likely affect the status of the SEOs. The SEOs and the alternatives shown against each other to identify which interactions – if any – would cause effects on specific components of the environment.

## **10. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

The EMMP incorporates the measures that will be undertaken during development plan of the university and town. The EMMP Objectives are: Control adverse environmental impacts and Ensure actions needed to implement measures that limit environmental impacts are progressively done.

The predicted adverse environmental and social impacts for which mitigation is required are identified and briefly summarized as follows:

- (1.) Emission Standards
- (2.) Waste management
- (3.) Littering Control.
- (4.) Dust Air Pollution Management
- (5.) Noise Pollution Management
- (6.) Tree planting and management
- (7.) Parks, Riparian and Environmental protected areas.

The Impacts and Mitigation are further set based on a tabulation of every impact and analysis based on 10 elements as follows:

- (1.) Impact
- (2.) Objective
- (3.) Strategy Requirements
- (4.) Recommended Management and Monitoring Action
- (5.) Responsibility
- (6.) Costs
- (7.) Performance indicators
- (8.) Monitoring
- (9.) Reporting
- (10.) Compliance

A Town Environmental Department will be set-up and be responsible of ensuring the environment plan and this Strategic Environment Assessment (SEA) is progressively achieved. The environment department has several functions and mitigation measures that include:

- (1.) Emission Standards
- (2.) Waste management
- (3.) Littering Control.

- (4.) Tree planting and management
- (5.) Parks and Environmental protected areas.

The funding of the Environment is from persons who shall benefit from the clean and healthy environment. The EMMP incorporates progressive consultation with the environmental authorities NEMA offices so as to maintain environmental standards.

Various environmental sensitivities and issues were integrated into the plan through the SEA process. The SEA done through an iterative manner whereby plan developers adjusted the land development plan to suggestions made by other stakeholders and with consideration of the landscape.

The SEA objectives and targets incorporated the views of various stakeholders. Multiple revisions of this Draft SEA report were made to accommodate the views. More reviews will be made as the final draft is achieved.

The Environmental Management and Sustainability Strategy is to have the development and all development plans and activities comply with all relevant environmental and planning requirements – as well as with the SEA Final Report

Monitoring Strategy and Guidelines will be established by the Town environmental department in consultation with NEMA.

A detailed monitoring strategy and guidelines will also be implemented with a goal to assess the significant environmental effects as the development of the Town population, infrastructure, buildings, water, trees, vegetation, vehicles, technologies and other supplies progressively occurs.

Monitoring will help identify some environmental effects which may not have been envisaged, including positive and other medium and long-term effects.

Identification of environmental effects during monitoring may highlight problems which may indicate the need for remedial measures to alleviate environmental issues.

The existing environmental monitoring on the land is currently not done.

The findings from the Monitoring will be used to inform the residents of the Town and students through a publication of a set of guidelines, on the nature and extent of any proposed interventions at candidate Discovery Points and candidate Signature Discovery Points in order to improve the town management and environment. The guidelines prepared in consultation with the Environmental Authorities.

The development has a plan of 5 million square meters of space with 7,500 buildings. The need to have subsequent Environmental Impact Assessments especially after the 5 year development plan is complete is incorporated. The Environmental Impact Assessment (EIAs) will progressively review the

each new building to be added in the town based on the Strategy of the Town Development Plan and the Strategic Environmental Assessment (SEA).

The Environmental Survey and Monitoring will produce the following data on:

- Population Growth Patterns
- Health and diseases
- Housing and Buildings
- Roads
- Water quality and quantity
- Waste Production and Management
- Emissions
- Litter
- Dust and Air quality
- Noise Levels
- Trees and Vegetation Cover

Monitoring is based on indicators which allow quantitative measures of trends and progress over time relating to the Strategic Environmental Objectives (SEOs). Indicator to be monitored will be accompanied by the target(s) which were identified with regard to the relevant strategic actions.

The SEA incorporates the following in the monitoring based on each of the 10 Topics:

- (1.) Environmental Protection Objectives (EPOs)
- (2.) Target(s)
- (3.) Indicator(s)
- (4.) Monitoring Body
- (5.) Results

The Town Institution arrangement and set-up of Environment department define the responsibilities for mitigation and monitoring. Further the arrangement for coordination between various actors responsible for mitigation.

A reporting schedule is also incorporated based on the following:

- (1.) Mitigation Measure
- (2.) Timing Frequency
- (3.) Duration of the Mitigation Measures
- (4.) Reports
- (5.) Results of Mitigation and Monitoring Measures

The Environmental Management and Monitoring Plan (EMMP) incorporates an Environmental Management Monitoring Budget (EMMB) through the Town Environmental Department. The EMMB is for financing EMMP and has diverse budgets and budget sources of revenue incorporated.

The Environmental Management and Monitoring Plan (EMMP) institution strengthening and capacity building shall incorporate: Equipment Requirements and Training, Research and Studies.

## **11. SEA AND STRATEGIC ACTION**

The Strategic Environmental Assessment (SEA) strengthened the strategic action by introducing the 10 topics to be considered as the plan is implemented.

The SEA evaluation of the land and of the plan enables more adjustments to be made as the plan is applied to the land. The SEA sets up a reference point.

The SEA as the reference point will be able guide the developers and the residents of the town in achieving the goal of clean and healthy environment. This would otherwise have not been the strategic action without the SEA document.

## **1. STRATEGIC ENVIRONMENTAL ASSESSMENT**

Strategic Environmental Assessment (SEA) is a range of analytical and participatory approaches that aim to integrate environmental consideration into Policies, Plans, and Programs (PPP) and evaluate the interlinkages with economic and social considerations. Environmental Impact Assessment (EIA) process which in various circumstances has been confused with SEA, inadequately deals with cumulative, synergistic, secondary, and/or long-term impacts which can be addressed when policies, plans, and programs (PPP) are subjected to a Strategic Environmental Assessment (SEA) process.

SEA can analytically and systematically integrate environmental issues into PPP formulation through a rigorous stakeholder engagement process among others. SEA is not always mandatory for all PPPs. SEA developers are thus expected to follow the SEA administrative procedures to allow NEMA adequately advise on the need for a SEA.

### **1.1. TERMS OF REFERENCE**

Strategic Environmental Assessment (SEA) is being undertaken on the implementation stage of the Institution Town Development Plan as legislated and approved in accordance with Kenya Constitution 185 (4) A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county's resources; and (b) the development and management of its infrastructure and institutions.

The institution Town Development Plan was approved and legislated by Taita Taveta County Assembly on 12<sup>th</sup> May 2015.

The Plan is for the development of:

- A non-profit university for higher learning that will grow to 30,000 students enrolled.
- A well-planned town that will growth to about 90,000 residents that complies with Urban Areas and Cities Act 2011.
- Jobs Creation.
- Sustainable Environmental plan for Town.
- Land use of 3,000 acres.
- 7,093 plots demarcated from 3,000 acres.
- 120 Km estimated Road network of Avenues (100ft) and Streets (100ft or 60ft).
- Water and Sewage System.
- Renewable energy applications: Solar, Wind and Waste to Energy
- Design and Building of Roads, Storm Water and Sewage infrastructure.
- Design and Building of Town Houses and Apartments for residential.
- Design and Building of University buildings for learning.
- Design and Building of Medical Hospital for provision of healthcare
- Design and Building of Sports Stadium for recreation
- Design and Building of Parks and Fields for recreation and environmental management
- Design and Building of commercial and industrial buildings
- Design and Building of schools and vocational schools.

The Strategic Environmental Assessment (SEA) for the proposed Diaspora University Town will integrate Environmental and Social consideration into the project and objectively evaluate the inter linkages of this development plan with economic considerations.

The SEA will bring an element of objectivity to the evaluation of the different development options and to encourage open, decentralized and transparent decision making for the sustainability of the project.

The SEA process will give interested parties an opportunity to comment on the environmental and social impacts of the proposed plan or programme and thereafter to be informed during the decision-making process of the plan implementation.

## **1.2. KENYA CONSTITUTION AND LEGISLATION SEA REFERENCE**

The strategic environment assessment (SEA) is done with reference and to comply with the Kenya Constitution, Kenya Parliament Acts, Taita Taveta County Assembly Acts and other County Acts.

### **a) Kenya Constitution**

Kenya Constitution 42. Every person has the right to a clean and healthy environment, which includes the right— (a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and (b) to have obligations relating to the environment fulfilled under Article 70.

Kenya Constitution 69. (1) The State shall— (a) ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits; (b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya; (c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities; (d) encourage public participation in the management, protection and conservation of the environment; (e) protect genetic resources and biological diversity; (f) establish systems of environmental impact assessment, environmental audit and monitoring of the environment; (g) eliminate processes and activities that are likely to endanger the environment; and (h) utilise the environment and natural resources for the benefit of the people of Kenya.

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

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

(2.) On application under clause (1), the court may make any order, or give any directions, it considers appropriate— (a) to prevent, stop or discontinue any act or omission that is harmful to the environment; (b) to compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or (c) to provide compensation for any victim of a violation of the right to a clean and healthy environment.



#### **b) Environmental Management and Coordination Act (EMCA), 1999 (Rev 2015)**

The Environmental Management and Coordination Act (EMCA), 1999 (Rev 2015), is the framework law on environmental management and conservation.

EMCA establishes among others the following institutions:

- National Environment Management Authority
- Public Complaints Committee
- National Environment Tribunal
- National Environment Action Plan Committees
- County Environment Committees.

The National Environment Management Authority (NEMA) was established as the principal instrument of government charged with the implementation of all policies relating to the environment, and to exercise general supervision and coordination over all matters relating to the environment.

In consultation with the lead agencies, NEMA is empowered to develop regulations, prescribe measures and standards and, issue guidelines for the management and conservation of natural resources and the environment.

The Act provides for environmental protection through;

- Environmental impact assessment
- Environmental audit and monitoring
- Environmental restoration orders, conservation orders, and easements.

#### **c) Other Relevant Plans, Programmes and Legislation**

These are policy and strategy plans, programmes and legislation, which would influence, or be influenced by the plan are listed below.

While there are many plans, programmes and legislation that will relate to the SEA in accomplishing the strategic level only significant texts will be assessed.

- Sessional Paper No. 2 of 2009 on Forest Policy.
- Sessional Paper No. 2 of 2008 on Livestock Policy.
- Forests Act 2005 by Kenya Parliament.
- Sustainable Development Goals by United Nations Accessed online at: <https://sustainabledevelopment.un.org/index.php?menu=1300> on 12/5/2016 at 9am.
- Food and Agriculture Organization (FAO) Of the United Nations Rome, (2006)
- Agro-industrial parks Experience from India.
- Legal Notice No. 101: The Environmental (Impact Assessment and Audit) Regulations. (2003).
- "Public Health Policy, 1994."
- "The Building Code 1997."

- “Environmental (Impact Assessment and Audit) Regulations, 2003.”
- “Environmental Management and Coordination Act (EMCA) of 1999.” Rev (2012).
- “Land Act No. 6 of 2012.”
- “Land Registration Act No. 3 of 2012.”
- “National Land Commission Act No 5 of 2012.”
- “Physical Planning Act Cap 286 of 1996.”
- “Urban Areas and Cities Act No. 13 of 2011.”
- “Economic Recovery for Wealth and Employment Creation Strategy, 2006.”
- “Energy Act, CAP 314 of 2006.”
- “Waste Management Regulations, 2006 (Legal Notice 121) *NEMA/SEA/5/2/044*
- “Water Quality Regulations, 2006 (Legal Notice No. 120).”
- “Controlled Substances Regulations, 2007 (Legal Notice No.73).”
- “Kenya Vision 2030 of 2007.”
- “National Environment Action Plan, 2009.”
- “Noise and Excessive Vibration Pollution (Control) Regulations, (2009) (Legal Notice No. 25).”
- “Sessional Paper No. 3 of 2009 on National Land Policy.”
- “Wetlands, Riverbanks, Lake Shore and Sea Shore Management Regulations, 2009 (Legal Notice No. 19).”
- “Constitution of Kenya of 2010”
- Taita Taveta County Planning Bill, 2016.
- Taita Taveta County Water and Sanitation Bill, 2016.
- Taita Taveta Health Services Bill, 2016.
- Taita Taveta County Culture Heritage Bill, 2016.
- Taita Taveta County Control of Air and Noise Pollution and Public Nuisance Bill, 2014.
- Taita Taveta County Outdoor Advertising Bill, 2014.
- Taita Taveta County Abattoirs Bill, 2016.
- Taita Taveta County Alcoholic Drinks Control and Licensing Bill, 2014.

### 1.3. DRAFT SEA ENVIRONMENTAL OBJECTIVES

**Table 1:** SEA Draft Objectives and SEA Targets

SEA Topic(s)	Draft Objectives	Draft SEA Target(s)
<b>Population and Socio-Cultural</b>	<b>Objective 1:</b> To create an environment plan where every person who resides in the University Town at any given time can achieve their constitution rights and play their part in achieving a clean and healthy environment for the Town.	<ul style="list-style-type: none"> <li>• House 90,000 residents the right way as a way of achieving housing rights.</li> <li>• Incorporate persons into clean and healthy environment initiatives at their homes and in public areas through Responsible Waste management practice.</li> </ul>
<b>Human Health</b>	<b>Objective 2:</b> To create a human healthcare plan that caters for every person constitutional right 43 (1.) 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; and right to emergency treatment. (2) A person shall not be denied emergency medical treatment.	<ul style="list-style-type: none"> <li>• Advance Right of Healthcare through healthcare facilities.</li> <li>• Design buildings with goal to achieve the rights of healthcare and housing rights.</li> <li>• Incorporate persons in public health at their homes and public areas.</li> </ul>
<b>Biodiversity, Flora and Fauna</b>	<b>Objective 3:</b> To preserve, protect, maintain and where appropriate during construction maintain and restore the biodiversity, Fauna and Flora post construction. Create a detailed Corporate Social Responsibility (CSR) plan on planting of exotic trees to enhance tree cover.	<ul style="list-style-type: none"> <li>• Require land physical plan to include ecosystem services.</li> <li>• Incorporate green infrastructure provisions in the land use plans.</li> <li>• Incorporate preservation of trees in the land physical plan.</li> <li>• Incorporate CRS plan on tree planting in line with Presidential directive during launch of national tree planting exercise.</li> </ul>
<b>Soil</b>	<b>Objective 4:</b> Apply soil in the sustenance of plants and humans. Protect the soil against degradation and pollution through waste and soil erosion through floods.	<ul style="list-style-type: none"> <li>• Maintain built surface cover to a target of less than 20%.</li> <li>• Plant Trees.</li> <li>• Harvest rain water to avoid soil erosion and floods.</li> </ul>
<b>Water</b>	<b>Objective 5:</b> Ensure the right of clean water is achieved and when doing so the status of water bodies is protected, maintained and improved; and, waste water managed, treated and recycled.	<ul style="list-style-type: none"> <li>• Meet the supply of quality water to residents, university operations and other town needs.</li> <li>• Collect and treat the waste water to have minimal pollution of air, other water bodies and soil. Apply Anaerobic Digestion (AD).</li> <li>• Recycle waste water as part of sustainability.</li> <li>• Harvest rain water through creation of a Dam.</li> </ul>

SEA Topic(s)	Draft Objectives	Draft SEA Target(s)
<b>Air Quality and Noise</b>	<b>Objective 6:</b> Avoid, prevent or reduce harmful effects on human health and the environment resulting from air pollution through dust, emissions, noise and toxic gases from waste; maintain and promote continuing improvement in air quality through planting of trees and vegetation; and, reduce emissions and tree cutting through the promotion of renewable energy and energy efficiency technologies.	<ul style="list-style-type: none"> <li>• Have low kilometers driven at the Town through alternative transport methods and through plans of walking or cycling.</li> <li>• Have over 200,000 thousand trees in the Town a ratio of 1 person to 2 trees.</li> <li>• Incorporate low emissions vehicles.</li> <li>• Tarmac or pave all roads and maintain them with goal to reduce dust and noise at all times.</li> </ul>
<b>Climatic Factors</b>	<b>Objective 7:</b> Incorporate renewable energy as source of energy with a goal to increase trees through reduction of use of trees as source of energy and attainment of the minimal emissions of greenhouse gasses	<ul style="list-style-type: none"> <li>• Reduce overall emissions of carbon.</li> <li>• Through Town plan achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy.</li> <li>• Minimal Greenhouse Gas Emissions.</li> <li>• Application of Renewable Energy.</li> </ul>
<b>Material Assets</b>	<b>Objective 8:</b> Plan, development and progressively maintain water, roads and energy assets plans that meet the enhance the meeting of social and economic rights while complying with the clean and healthy environment as the population settles and a Town and University is development.	<ul style="list-style-type: none"> <li>• Through new town development meet the constitution right of clean and healthy environment for the Kenya growing population.</li> <li>• Have a development and sustenance budget that supports the water and wastewater supply and management infrastructure and services.</li> <li>• Apply renewable technologies in the supply of energy through waste to energy, solar energy and wind energy.</li> </ul>
<b>Cultural Heritage</b>	<b>Objective 9:</b> Incorporate plan to protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage while advancing the culture of the people of the region.	<ul style="list-style-type: none"> <li>• No unauthorised physical damage or alteration of the context of cultural heritage features.</li> <li>• Provisions for cultural heritage in the architectural designs of buildings.</li> <li>• Preservation of cultural heritage associated with trees through the preservation of the trees.</li> </ul>
<b>Landscape</b>	<b>Objective 10:</b> To provide a framework for identification, assessment, protection, management and planning of landscapes that has minimal impact on landscape and maximizes natural landscape visibility.	<ul style="list-style-type: none"> <li>• Preserve from damage designated landscapes when implementing plan.</li> <li>• Incorporate ornamental landscaping techniques.</li> </ul>

## 1.4. SEA PROCESS

**Table 2: SEA Process**

SEA Stage	Actions	Status/Comments
<b>Plan and Land</b>	Kenya Constitution 185 (4) A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county’s resources; and (b) the development and management of its infrastructure and institutions.	Plan approved, and land allocated. Ongoing SEA Integrates plan and land.
<b>Scoping</b>	Scoping Report with focus on environmental issues and key likely significant effects and guided by stakeholder’s consultation and NEMA.	Scoping Approved
<b>Land Existing Environment</b>	Take account of existing environment by making changes to the plan where necessary and identify gaps in baseline data.	Draft SEA
<b>Plan Description &amp; Review of Other Plans</b>	Application of environmental protection objectives and other relevant plans. How they will be considered, where relevant, by the plan.	Draft SEA
<b>Objectives, Indicators and Targets</b>	Identify relevant objectives, indicators and targets and ensure good linkages between objectives, indicators and targets. Further link the indicators to existing or proposed data sources.	Draft SEA
<b>Alternatives</b>	Identify and evaluate alternatives that are realistic and capable of implementation, considering the objectives and geographical limits of the plan and land.	Draft SEA
<b>Likely Significant Effects</b>	Use Environmental Sensitivity Mapping where relevant for assessing significant effects. Use environmental objectives to assess plan policies and objectives and assist in identifying significant effects.	Draft SEA
<b>Mitigation Measures</b>	Refine (by possibly omission or adjustment) the current list of Discovery Points by the findings and mitigation measures arising from the SEA; Guide the designs for works (if any) at Discovery Points by the findings and mitigation measures arising from the SEA; and Provide criteria to be considered in the undertaking of any lower-tier for individual Discovery Points.	Draft SEA
<b>Environmental Report and Non-Technical Summary</b>	Highlight areas of constraints and opportunities in the SEA by using maps. Ensure reporting is concise and to the point that it makes decision-makers and non-environmental stakeholders aware of SEA findings. Document how the SEA and plan-making processes have been integrated and what changes have occurred because of the SEA. Assess the full range of environmental effects including, cumulative/ in combination effects associated with other relevant Plans. Link potential effects to proposed monitoring and mitigation measures. Integrate findings into the SEA Environmental Report.	Draft SEA

SEA Stage	Actions	Status/Comments
<b>Consultation on Draft SEA Report</b>	Consider SEA related feedback from submissions and those from environmental or other statutory authorities.	Draft SEA
<b>Amendments Following Integration</b>	Ensure that material alterations are screened in terms of SEA that full SEA are undertaken where relevant.	Final SEA Report
<b>SEA Statement</b>	Ensure transparency of SEA process by ensuring that SEA Statement is correctly prepared that includes: how environmental considerations have been integrated into the Plan, how the SEA Environmental Report and submissions and observations on the SEA have been considered during the preparation of land use plan; the reasons for choosing the land plan, as adopted, in the light of the other reasonable alternatives dealt with; and monitoring measures.	Final SEA Report
<b>Plan Adoption Including Monitoring</b>	Set up a monitoring programme to provide data on environmental quality, as monitored by environmental authorities. Ensure monitoring reports are prepared during implementation of the Plan to determine whether SEA is having the desired outcomes of environmental protection, and whether intervention is required due to thresholds having been exceeded.	SEA Implementation.

### 1.5. SEA METHODOLOGY AND STAGES

The Strategic Environment Assessment (SEA) process provides an overview of the environmental baseline as well as establishing a set of environmental objectives, at a strategic level, that need to be achieved during the development of a Plan.

The SEA process is divided into stages that are designed to be applicable in development plans and programmes.

The SEA process is an interactive process that involves collecting of information, identifying impacts, developing mitigation and revising proposals throughout.

The SEA is adapted to the scale and nature of the development strategy, as the strategy and the SEA progress concurrently.

The stages are progressive and include: Policy, Plan or Program (PPP), screening; scoping report; review by NEMA; draft report where the environment baseline is created and alternatives; stakeholder's participation and public review; and the final report that incorporates alternatives, mitigation and monitoring measures that is adopted and approved by NEMA for implementation.

#### **1.5.1. POLICY, PLAN, OR PROGRAM (PPP)**

The Policy, Plan or Program (PPP) initiates the Strategic Environment Assessment.

#### **1.5.2. SCREENING**

Screening determines whether there is a need for the SEA for the plan or programme. The Plan was screened by NEMA in accordance with EMCA, it was decided that an SEA should be undertaken to ensure that environmental factors are fully integrated into the strategy of the plan development and land use.

#### **1.5.3. SCOPING REPORT**

The scoping process identifies a proposed scope of assessment, including spatial, temporal, and technical scope, based on a high-level review of the potential effects.

The technical scope includes a methodology for identifying potential receptors of impacts.

The draft objectives of the SEA which have been developed during this phase are the specific assessment criteria against which the Strategy options and proposals of land use will be appraised and applied in the establishment of the potential environmental impacts.

These objectives are proposed in this document and will be further developed through consultation on this scoping report with key stakeholders and other organisations.

#### **1.5.4. SCOPING REPORT REVIEW BY NEMA**

The scoping report was reviewed by NEMA and the progression to draft report approved.

#### **1.5.5. DETAILED SEA STUDY AND SEA DRAFT REPORT**

The information on the current state and health of the environment of the land and surrounding area, and particularly with consideration of receptors that may be present that the plan can pose risk.

The information will provide baseline against which any potentially significant environmental effects can be determined.

The baseline information will also be used to identify the key environmental issues, constraints and opportunities of the plan and land use. The information providing the basis from which the scope of the SEA and the framework of SEA objectives is identified.

For this SEA, the identification of the environmental baseline was completed concurrently with the scoping stage. The environmental topics that must be initially considered for all SEAs were considered.

#### ***The Environmental Topics***

1. Biodiversity, Flora and Fauna
2. Population and Social Cultural
3. Human Health
4. Soils

5. Water
6. Air Quality
7. Climatic Factors
8. Material Assets
9. Architectural, Archaeological and Cultural, Heritage
10. Landscape

From this list, issues can be scoped into or out of, the SEA, depending on whether they are considered likely to affect or be affected by the plan strategy.

Due to the scale of the area and range of environments included in the Strategy, the baseline information has been compiled at two levels.

**Level 1.** Describes the Plan to be implemented as established in 2.0.

**Level 2.** Baseline Information of Area.

#### **1.5.6. STAKEHOLDERS AND PUBLIC REVIEW**

The assessment process will consider each option that will be proposed by the Strategy and use the assessment criteria set out to identify potential environmental effects and evaluate their significance.

#### **1.5.7. SEA FINAL REPORT**

Consultation with both statutory and non-statutory organisations will be undertaken throughout the development of the SEA and Strategy and will continue through the issue of this scoping report to the key stakeholders with feedback requested.

#### **1.5.8. DOCUMENTING SEA PROCESS**

The SEA process is documented through:

- Survey Questionnaires.
- Stakeholder Notes, Pictures and Discussion points.
- Meetings Minutes, Speeches and Speeches.
- Plans and Agreements

### **1.6. SEA APPLICATION FOR THE PLAN**

The SEA Draft and Final Report will be established as the reference document for the University Town development plan regarding the Environment.

The mitigation that shall incorporate the considerations of alternatives shall be done in consultation with NEMA.

The monitoring strategy and guidelines shall be progressively implemented by the system set-up by the Town developers and the monitoring process by NEMA.



## **2. DIASPORA UNIVERSITY TOWN PLAN**

The Diaspora University Town Plan is a conceptualized plan that considers the growth of Kenya population and the Constitutional rights of Kenyans.

The plan is established through Kenya Constitution 1.

- (1) All sovereign power belongs to the people of Kenya and shall be exercised only in accordance with this Constitution.
- (2) The people may exercise their sovereign power either directly or through their democratically elected representatives.

The plan is a Kenya Constitution legislated plan established through Kenya Constitution 185

- (4) A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county's resources; and (b) the development and management of its infrastructure and institutions.

The plan was approved at Taita Taveta County Assembly on 12th May 2015 in accordance with Kenya Constitution 185 (4).

The plan is set up to advance Kenya Constitution rights in article 43.

- (1) 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.

The plan, when advancing constitution rights article 43, is also set to achieve and comply with Kenya Constitution article 42 right.

Kenya Constitution 42

Every person has the right to a clean and healthy environment, which includes the right— (a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and (b) to have obligations relating to the environment fulfilled under Article 70.

Kenya Constitution 69.

- (1) The State shall— (a) ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits; (b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya; (c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities; (d) encourage public participation in the management, protection and conservation of the environment; (e) protect genetic resources and biological diversity; (f) establish systems of environmental impact assessment, environmental audit and monitoring of the environment; (g) eliminate

processes and activities that are likely to endanger the environment; and (h) utilise the environment and natural resources for the benefit of the people of Kenya.

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

Kenya Constitution 70.

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

(2.) On application under clause (1), the court may make any order, or give any directions, it considers appropriate— (a) to prevent, stop or discontinue any act or omission that is harmful to the environment; (b) to compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or (c) to provide compensation for any victim of a violation of the right to a clean and healthy environment.

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

## 2.1. PLAN DEVELOPMENT STAGES

The Diaspora University Town has four progressive development stages, namely:

- Plan Development.
- 9 Primary Resources Development.
- 5 Year Development Plan.
- Yearly sustainable Development Plans.

The SEA falls under the Plan 5 Year Development Stage and Yearly Development and Sustainable Plans.

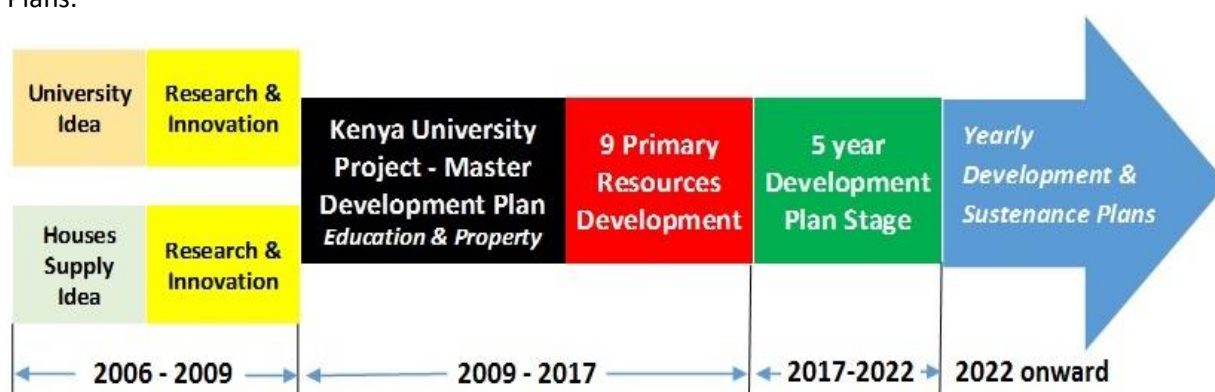


Figure 1: Stages of Plan Development

### 2.1.1. Idea Research and Innovation Stage

The plan origin is from two ideas. A housing idea and an Education idea.

### **2.1.2. The Master Development Plan Stage**

The Plan development stage conceptualized the project and created the Institution Town Development Plan. The outcome of the stage was the Master development Plan that incorporates diverse plans for development.

### **2.1.3. Nine (9) Primary Resources Development**

The nine (9) primary resources are resources set up for the achievement of the plan and are listed as follows:

- Master Development Plan
- Parent Institution
- Property Developers
- Land
- Design-Build Plan
- Energy Plan
- Finance Plan
- County Government Incentives
- National Government Incentives

### **2.1.4. Five (5) Year Development Plan**

The five (5) year development plan starts the receipt of the resources by a Trust for the Implementation of the plan on land resource received or to be received. The five (5) year development plan was started by the receipt of land.

### **2.1.5. Yearly Development and Sustainable Plans**

The stage will follow the 5 Year development plan and will be implemented through yearly development Plans.

### **2.1.6. Current Status**

The following is progressing:

- Master Development Plan (MDP) adjustments to meet Kenya Constitution, SEA requirements and other legislated requirements.
- The plan is progressing in the 9 Primary Resources stage as the Trust continues to receive and develop the plan.
- The plan is progressing in the 5 Year Development stage as the SEA and preparations continue.

### **2.1.7. Decision to Undertake SEA**

The Policy, Plan Program (PPP) was reviewed by the National Environment Management Authority (NEMA) and the following noted:

1. The PPP is a land use plan.
2. The proposed Diaspora University Town will lead to several projects that will require to be subjected to the Environmental Impact Assessment (EIA) process.

In view of this the proposed plan is to be subjected to the Strategic Environment Assessment (SEA) Process.

### 2.1.8. Scoping Report

A scoping report to be prepared and submitted to NEMA for review in line with the provisions of section 57A of the Environment Management and Coordination Act (EMCA) Cap 387, the Environmental (Impact Assessment and Audit) regulations of 2003 and the National Guidelines for Strategic Environmental Assessment, 2012 in Kenya.

## 2.2. PLAN GOALS AND OBJECTIVES

The plan goals and objectives are primarily based on advancement of Kenya constitution rights and specifically advancement of Kenya Constitution 43 and Kenya Constitution 42 Rights.

### 2.2.1. Advancing Kenya Constitution 43 Rights.

The primary goal and Objective of the plan is the advancement of Kenya Constitution rights 43 of food, healthcare, housing, clean water, social security and education.

### 2.2.2. Kenya Constitution 42 Right of Clean and Healthy Environment.

The Institution Town Development Plan in advancing the rights in Kenya Constitution 43 also considers the right to clean and healthy environment. Kenya population is currently growing at 1.2 million persons which is about 3,000 persons a day.

The plan is established with consideration that the growing population increases the demand of resources that come from the nature and in so doing impact the environment as the demand of water, food, energy, transport and other products that sustain life increases.

The plan considers that Kenya's population is at about 48 million 2017, is expected to grow to 65 million by 2030 and 95 million by 2050. The plan is for providing the growing population with their right to clean and healthy environment.

**Table 3:** Kenya Projected Population Growth and Urban Population

Year	Population	Yearly % Change	Yearly Change	Density (P/Km <sup>2</sup> )	Urban Pop %	Urban Population
2020	52,186,722	2.53 %	1,227,284	92	28.2 %	14,737,720
2025	58,610,170	2.35 %	1,284,690	103	30.7 %	17,973,485
2030	65,411,901	2.22 %	1,360,346	115	33.3 %	21,766,907
2035	72,599,575	2.11 %	1,437,535	128	36 %	26,148,088
2040	80,090,725	1.98 %	1,498,230	141	38.8 %	31,090,842
2045	87,770,496	1.85 %	1,535,954	154	41.7 %	36,595,049
2050	95,504,636	1.7 %	1,546,828	168	44.6 %	42,636,284

**Source:** Worldometers

The plan considers that currently, most Kenyans, do not get the right of clean and healthy environment every day and the biggest contributions results from air pollution through dust and pollution of water through waste.

The plan considers that failure to plan environmental sustainable plans denies children aged below 18 years their right to a clean and healthy environment.

### 2.2.3. University

The plan is setup to be started through the development of a non-profit university for higher learning. The University is planned to grow to 30,000 students. The students from various disciplines will be enrolled over time.

The university would be set-up to progress Kenya Constitution right 33. (1) Every person has the right to freedom of expression, which includes— (a) freedom to seek, receive or impart information or ideas; (b) freedom of artistic creativity; and (c) academic freedom and freedom of scientific research.

Through information, ideas, scientific research and innovation, the University will progressively develop and ensure the sustenance of the town especially the environmental sustenance.

### 2.2.4. Town

A well-planned town that will progressively grow to 90,000 residents and comply with the Urban Areas and Cities Act passed 2011. The Urban Areas and Cities Act (2011) requires the following be incorporated in an area to be called a Town when having a population of 10,000 persons or more and less than 500,000 persons. The tabulated requirements are incorporated;

**Table 4:** Urban Areas and Cities Act (2011) Town Development Requirements

Economic & Social	Residential	Public	Environmental
1. Training Institution 2. Polytechnic 3. Libraries 4. Airstrip 5. Sports and Cultural 6. Heath Facilities 7. Community Centres 8. Funeral Parlour 9. Child Care Facilities 10. Pre-Primary Education 11. County School 12. Markets 13. Radio Station 14. Community Radio 15. Historical Monument 16. Religious Institution 17. Recreational Parks 18. Postal Services 19. Animal control and welfare	20. Town Houses 21. Apartments 22. Other Houses 23. Hotels	24. Roads 25. Street Lighting 26. Police Station 27. Town Court 28. Public Transport	29. Energy Supply 30. Cemeteries 31. Crematoria 32. Air pollution Control 33. Noise Pollution 34. Refuse Collection 35. Cemetery 36. Solid Waste Management

**Source:** Urban Areas and Cities Act 2011

### 2.2.5. Jobs Creation

The plan is set up to create jobs during the development and sustenance of the University Town residents and students.

It is through application of the human resource into work or jobs that plans like: housing, clean water, environmental sustenance and others; are developed, implemented and sustained.



**Figure 2:** Surveyor, Architects and Civil Works Technician professional review and plan site.

### 2.2.6. Land Use

The Development Plan is planned for development and usage of 3,000 acres (12 sq. m) that is on A23 road about 10 km from the Voi – Mombasa junction. The land planning is broken into two:

- 1,500 acres of land currently allocated to plan by members of a Community.
- 1,500 acres/3,000 acres to be acquired from neighboring land.

The plan objective is to meet the constitutional requirement of land as established in Kenya Constitution article 60 that states, “Land shall be used, held and managed in a manner that is efficient, equitable, productive and sustainable...”

The plan involves breaking down of the 3,000 to about 7,093 plots that are serviced by an infrastructure network of about 120-kilometres.

### **2.2.7. The 5-Year Development Plan.**

The 5-year development plan is a plan, in the development plan, which is set up to achieve an economically and environmentally sustainable town as follows:

- 20,000 jobs creation.
- Settlement of 30,000 town residents progressively as jobs are created.
- University to grow to 10,000 students.
- Demarcation and sub-division of 4,500 acres land to 7,070 plots.
- About 150km Road network serviced by streets and avenues.
- Water and Sewage System.
- Renewable energy applications: Solar, Wind and Waste to Energy
- Design and Building of Roads, Storm Water and Sewage infrastructure.
- Design and Building of Town Houses and Apartments for residential.
- Design and Building of University buildings for learning.
- Design and Building of Medical Hospital for provision of healthcare
- Design and Building of Sports Stadium for recreation
- Design and Building of Parks and Fields for recreation and environmental management
- Design and Building of Golf Course for recreation and environmental.
- Design and Building of Airstrip and Aviation Center.
- Design and Building of Industrial Park.
- Design and Building of Town Administration and Commercial Center.
- Design and Building of Cemetery
- Design and Building of Schools
- Design and Building of Other Residential property (Apartments and Other Houses.)
- Design and Building of Research Park.

### **2.2.8. Need for Consultations and Public Participation**

The plan advances public participation through consultation during the assessment stages and thereafter a requirement of a public annual meeting once every year in the 5-year development stage to inform the residents and the public of the project status and development plan for following year.

During the yearly development and sustainable stage year 6 onward, the plan sets a public participation every year to be attended by the residents who shall progressively settle in the town.

The plan shall further comply with the laws setup or shall be setup.

Issues to be addressed during public participation will include but not limited to:

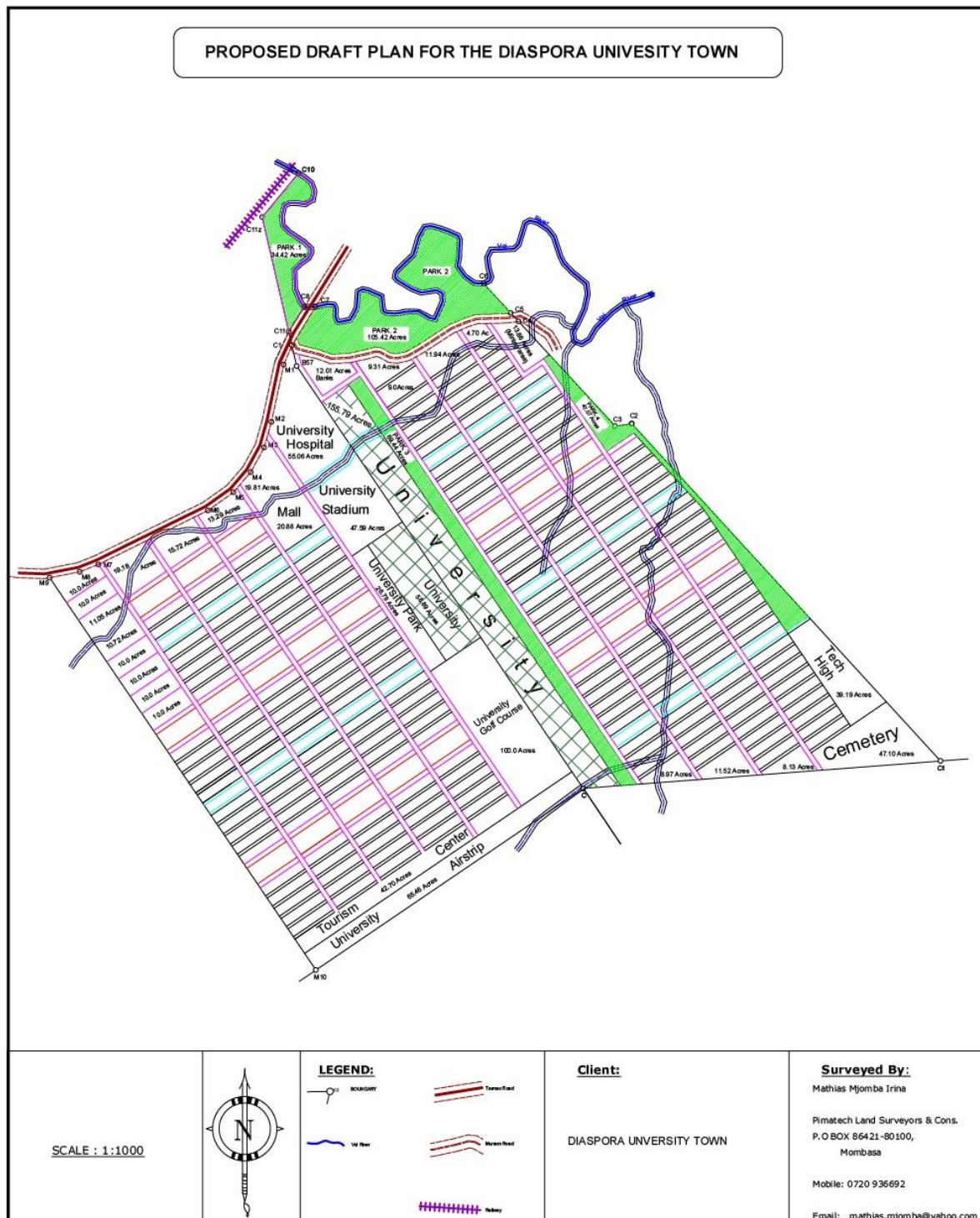
- Capacity building
- Gender mainstreaming
- Diversification of enterprises
- Improvement of livelihoods
- Linkages with Community Based Organisations and Non-Governmental Organisations
- Funding and sustainability of the proposed development
- Mechanisms of monitoring and evaluation of the project(s)



## 2.3. LAND AND BUILDING PLANS

The following plan creates 6,944 plots that are serviced by about 120 km road network to meet the 90,000 residents and 30,000 student's constitutional rights: in particular the social and economic rights in Kenya Constitution 43 and Environmental rights Kenya Constitution 42.

### 2.3.1. 7,093 Plots and 120 Km Road Network Plan



**Figure 3:** Proposed Subdivision 3,000 acres (Ndara 'B' 17 1,500 acres and Unallocated 1,500 acres)



**Table 5: Land 3,000 acres development plan allocation**

Plots	Plots	Size	Acres	Usage
University Campus	2	155.79 & 58.89	214.68	Education/Research
University Hospital	1		55.06	Education/Health/Research
University Parks	4	69.44, 26.79, 105.4, 34.42	236.05	Education/Sports/Recreation
University Stadium	1		47.09	Education/Sports/Recreation
University Research	1		19.81	Education/Biotech Research Park
University Golf Course	1		100	Education/Recreation
University Tourism	1		42.70	Education/Commercial
University Airstrip	1		65.46	Education/Commercial
Mall	1		20.88	Shopping/Entertainment
Tech High	1		39.19	Education – High School
Bank	1		12.01	Commerce/Entertainment
Design Build	1		9.31	Industrial/Commercial
Material Supply	1		9	Industrial/Commercial
Town Parks 1	1	62.86	47.07	Sports/Recreation/Environment
Cemetery	1		47.10	Burial/Environment
Industrial Park	8	(10 x 6), 11.05, 10.72	81.77	Industries
Mining	1		13.86	Industrial
Town - Different sizes	8	11.94, 4.7, 8.97, 8.13, 11.52, 19.18, 15.72, 13.29	93.45	Town Administration/Commercial/ Apartments/Religious
50 x 100 (Houses)	6,400	0.125	800	Town Houses
50 x 100 (Parks)	292	0.125	36.5	Town Parks/Riparian/Environment.
100 x 100	80	0.25	20	Residential
100 x 200	137	0.5	68.5	Residential/Comm/Parks-Fields
200 x 200	72	1 acres	72	Commercial/Apartments/Religious
100 x 800	11	2 acres	22	Park/Commercial/Apartments
100 x 900	19	2.2 acres	41.8	Parking/Commercial/Apartments
100 x 1,000	6	2.3 acres	13.8	Parking/Commercial/Apartments
200 x 1000	20	4.6 acres	92	Schools/Parks/Apartments
400 x 1000	20	9.2 acres	184	Admin/Commercial/Schools/Apts
Roads (Approx.)			494.91	
<b>Total</b>	<b>7,093</b>		<b>3,000</b>	

**Table 6: 9 Avenues Allocation**

		ROW	Distance (est.)
1	1 <sup>st</sup> Avenue	100ft (30m)	3,460 m
2	2 <sup>nd</sup> Avenue	100ft (30m)	3,420 m
3	3 <sup>rd</sup> Avenue	100ft (30m)	3,243 m
4	Univ Av (4 <sup>th</sup> Av)	100ft (30m)	3,258 m
5	Bank Av	100ft (30m)	500 m
6	Hospital Av (5 <sup>th</sup> Av)	100ft (30m)	3,000 m
7	Mall Avenue (6 <sup>th</sup> Av)	100ft (30m)	2,900 m
8	7 <sup>th</sup> Avenue	100ft (30m)	2,850 m
9	8 <sup>th</sup> Avenue	100ft (30m)	2,850 m
10	Industrial Avenue (9 <sup>th</sup> Av)	100ft (30m)	2,850 m
<b>Total</b>			<b>28,331 m (28.3 km)</b>

**Table 7: Town East Streets Allocation**

EAST Streets	ROW	Start Avenue	End Avenue	Distance Meters (Less Avenues)
1	<b>60ft (18m)</b>	Univ Av	2 <sup>nd</sup> Av	304 m
2	<b>60ft (18m)</b>	Univ Av	1 <sup>st</sup> Av	760 m
3	60ft (18m)	Univ Av	1 <sup>st</sup> Av	760 m
4	60ft (18m)	Univ Av	1 <sup>st</sup> Av	760 m
5	60ft (18m)	Univ Av	1 <sup>st</sup> Av	760 m
6	60ft (18m)	Univ Av	1 <sup>st</sup> Av	760 m
7	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
8	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
9	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
10	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
11	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
12	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
13	<b>100ft (30m)</b>	Univ Av	1 <sup>st</sup> Av	912 m
14	<b>100ft (30m)</b>	Univ Av	1 <sup>st</sup> Av	1,121 m
15	60ft (18m)	Univ Av	Park	1,134 m
16	60ft (18m)	Univ Av	Park	1,146 m
17	60ft (18m)	Univ Av	Park	1,157 m
18	60ft (18m)	Univ Av	Park	1,169 m
19	60ft (18m)	Univ Av	Park	1,181 m
20	60ft (18m)	Univ Av	Park	1,192 m
21	60ft (18m)	Univ Av	Park	1,204 m
22	60ft (18m)	Univ Av	Park	1,216 m
23	60ft (18m)	Univ Av	Park	1,216 m
24	60ft (18m)	Univ Av	Park	1,216 m
25	<b>100ft (30m)</b>	Univ Av	Park	1,216 m
26	<b>100ft (30m)</b>	Univ Av	Park	1,216 m
27	60ft (18m)	Univ Av	Park	1,216 m
28	60ft (18m)	Univ Av	Park	1,216 m
29	60ft (18m)	Univ Av	Park	1,216 m
30	60ft (18m)	Univ Av	Park	1,216 m
31	60ft (18m)	Univ Av	Park	1,216 m
32	60ft (18m)	Univ Av	Park	1,216 m
33	60ft (18m)	Univ Av	Park	1,216 m

34	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
35	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
36	60ft (18m)	Univ Av	1 <sup>st</sup> Av	912 m
37	60ft (18m)	3 <sup>rd</sup> Av	1 <sup>st</sup> Av	608 m
38	60ft (18m)	3 <sup>rd</sup> Av	1 <sup>st</sup> Av	608 m
39	60ft (18m)	2 <sup>nd</sup> Av	1 <sup>st</sup> Av	304 m
40	60ft (18m)	2 <sup>nd</sup> Av	1 <sup>st</sup> Av	304 m
41	60ft (18m)	2 <sup>nd</sup> Av	1 <sup>st</sup> Av	304 m
<b>Total</b>				<b>39,248 m (39.2 km)</b>

**Table 8: Town West Streets Allocation**

<b>WEST Streets</b>	<b>ROW</b>	<b>Start Avenue</b>	<b>End Avenue</b>	<b>Distance Meters (Less Avenues)</b>
Main	<b>100ft (30m)</b>	Mall Av	Industrial Av	912 m
5	<b>100ft (30m)</b>	Mall Av	Industrial Av	912 m
6	60ft (18m)	Mall Av	Industrial Av	912 m
7	60ft (18m)	Hospital Av	Industrial Av	1,216 m
8	60ft (18m)	Hospital Av	Industrial Av	1,216 m
9	60ft (18m)	Hospital Av	Industrial Av	1,216 m
10	60ft (18m)	Hospital Av	Industrial Av	1,216 m
11	60ft (18m)	Hospital Av	Industrial Av	1,216 m
12	60ft (18m)	Hospital Av	Industrial Av	1,216 m
13	<b>100ft (30m)</b>	Hospital Av	Dead End	1,520 m
14	<b>100ft (30m)</b>	Hospital Av	Dead End	1,520 m
15	60ft (18m)	Hospital Av	Dead End	1,520 m
16	60ft (18m)	Hospital Av	Dead End	1,520 m
17	60ft (18m)	Hospital Av	Dead End	1,520 m
18	60ft (18m)	Hospital Av	Dead End	1,520 m
19	60ft (18m)	Hospital Av	Dead End	1,520 m
20	60ft (18m)	Hospital Av	Dead End	1,520 m
21	60ft (18m)	Hospital Av	Dead End	1,520 m
22	60ft (18m)	Hospital Av	Dead End	1,520 m
23	60ft (18m)	Hospital Av	Dead End	1,520 m
24	60ft (18m)	Hospital Av	Dead End	1,520 m
25	<b>100ft (30m)</b>	Hospital Av	Dead End	1,520 m
26	<b>100ft (30m)</b>	Hospital Av	Dead End	1,520 m
27	60ft (18m)	Hospital Av	Dead End	1,520 m
28	60ft (18m)	Hospital Av	Dead End	1,520 m
29	60ft (18m)	Hospital Av	Dead End	1,520 m
30	60ft (18m)	Hospital Av	Dead End	1,520 m
31	60ft (18m)	Hospital Av	Dead End	1,520 m
<b>Total</b>				<b>38,912 m (38.9 km)</b>

**Table 9: Town East – West Connecting Streets Allocation**

	<b>ROW</b>	<b>Start Avenue</b>	<b>End Avenue</b>	<b>Distance Meters (Less Avenues)</b>
3 <sup>rd</sup> Stream N	60ft (18m)	Univ Av	Hospital Av	700 m
4 <sup>th</sup> Stream S	60ft (18m)	Univ Av	Hospital Av	700 m
20 <sup>th</sup> – 20 <sup>th</sup>	60ft (18m)	Univ Av	Hospital Av	700 m
<b>Total</b>				<b>2,100 m (2.1 km)</b>

### 2.3.2. 7,500 Buildings – 5 million Square Meters Plan

The 90,000 Residents rights of housing will be met per Kenya Constitution 43. (1) Every person has the right— (b) to accessible and adequate housing, and to reasonable standards of sanitation.

**Table 10:** Build Plan of 7,500 buildings on 7,093 plots

Plots/Usage	Plots	Size	Acres	Buildings	Square Meters
University Campus	2	155.79 & 58.89	214.68	80	450,000
University Hospital	1		55.06	10	100,000
University Parks	4	69.44, 26.79, 105.4, 34.42	236.05	10	10,000
University Stadium	1		47.09	5	100,000
University Research	1		19.81	5	8,000
University Golf Course	1		100	10	20,000
University Tourism	1		42.70	30	30,000
University Airstrip	1		65.46	2	5,000
Mall	1		20.88	5	50,000
Tech High	1		39.19	20	80,000
Bank	1		12.01	5	20,000
Design Build	1		9.31	5	30,000
Material Supply	1		9	1	10,000
Town Parks 1	1	62.86	47.07	5	3,000
Cemetery	1		47.10	2	2,000
Industrial Park	8	(10 x 6), 11.05, 10.72	81.77	30	30,000
Mining	1		13.86		
Town Administration/ Commercial/Apartments/Other	8	11.94, 4.7, 8.97, 8.13, 11.52, 19.18, 15.72, 13.29	93.45	40	20,000
Town Houses	6,400	0.125	800	6,400	1,376,000
Town Parks	292	0.125	36.5	60	6,000
Residential	80	0.25	20	80	24,000
Residential	30	0.5	15	30	10,000
Commercial/Other	107	0.5	53.5	200	100,000
Residential	15	1 acres	15	15	6,000
Commercial/Apts/Other	67	1 acres	67	100	300,000
Park/Commercial/Apartments	11	2 acres	22	50	30,000
Parking/Commercial/Apartments	19	2.2 acres	41.8	100	20,000
Parking/Commercial/Apartments	6	2.3 acres	13.8		
Apartments	10	4.6 acres	46	50	1,200,000
Schools/Parks	10	4.6 acres	46	40	160,000
Admin/Commercial/Schools/Apts	20	9.2 acres	184	110	800,000
Roads (Approx.)			494.91		
<b>Total</b>	<b>7,093</b>		<b>3,000</b>	<b>7,500</b>	<b>5,000,000</b>

### 2.3.3. 200,000 Trees

**Table 11:** 200,000 trees plan on Plots and Acres

Plots/Usage	Plots	Acres	Trees Area Acres	Trees
University Campus	2	214.68	40	15,000
University Hospital	1	55.06	15	5,000
University Parks and Fields	4	236.05	150	40,000
University Stadium	1	47.09	10	2,000
University Research	1	19.81	5	1,000
University Golf Course	1	100	40	20,000
University Tourism	1	42.70	10	2,000
University Airstrip	1	65.46	10	2,000
Mall	1	20.88	5	1,000
Tech High	1	39.19	10	2,000
Bank	1	12.01	5	1,000
Design Build	1	9.31	2	500
Material Supply	1	9	2	500
Town Parks 1	1	47.07	30	10,000
Cemetery	1	47.10	10	2,000
Industrial Park	8	81.77	10	2,000
Mining	1	13.86		
Town Administration/ Commercial/Apartments/Other	8	93.45	18	3,000
Town Houses	6,400	800	100	30,000
Town Parks	292	36.5	20	10,000
Residential	80	20	5	1,000
Residential	30	15	5	1,000
Commercial/Other	107	53.5	13	3,000
Residential	15	15	5	1,000
Commercial/Apts/Other	67	67	10	2,000
Park/Commercial/Apartments	11	22	5	1,000
Parking/Commercial/Apartments	19	41.8	10	2,000
Parking/Commercial/Apartments	6	13.8	5	1,000
Apartments	10	46	10	2,000
Schools/Parks	10	46	10	2,000
Admin/Commercial/Schools/Apts	20	184	30	10,000
Roads (Approx.)		494.91	150	25,000
<b>Total</b>	<b>7,093</b>	<b>3,000</b>	<b>750</b>	<b>200,000</b>

The provision of 200,000 trees planted on 25% of the land creates a planning guideline. More trees will be planted and shall be part of the town development plan.

## 2.4. TOWN PLAN

The Town plan will primarily deal with the settlement of persons and students. The plan goal is to sustain the people with their constitutional rights while safeguarding the environment.

### 2.4.1. 90,000 Residents Town

Kenya population growth requires new settlements. Taita Taveta County Population projected growth based on Kenya Growth.

**Table 12:** Taita Taveta Population Growth 2020 – 2050 Projection

Year	Population	Yearly % Change	Yearly Change	Density (P/Km <sup>2</sup> ) 17,084 Km <sup>2</sup>	Urban Pop %	Urban Population
2020	350,000	2.53 %	9,000	20	28.2 %	100,000
2025	400,000	2.35 %	10,000	23	30.7 %	122,800
2030	500,000	2.22 %	10,000	26	33.3 %	166,500
2035	560,000	2.11 %	12,000	33	36 %	201,600
2040	620,000	1.98 %	12,000	36	38.8 %	240,560
2045	680,000	1.85 %	12,000	40	41.7 %	283,560
2050	740,000	1.7 %	12,000	43	44.6 %	330,040

### 2.4.2. 90,000 Residents and 30,000 students Water Generation and Supply Plan

The water supply plan shall incorporate: water sources; water generation; clean water supply plan; and, Town water management department.

**Table 13:** 90,000 residents and 30,000 students Water Generation and Supply Plan

Plan	Details
<b>Water Sources</b>	<ul style="list-style-type: none"> <li>Water supply from developed Water Supply system.</li> <li>Water supply from rivers.</li> <li>Rain and Harvesting of Rain Water.</li> <li>Digging underground boreholes.</li> </ul>
<b>Water Generation</b>	<ul style="list-style-type: none"> <li>Purchase from Existing plans.</li> <li>Boreholes by University.</li> <li>Create storm water collection from house to dam.</li> </ul>
<b>Clean Water Supply Plan</b>	<ul style="list-style-type: none"> <li>Establish Water Infrastructure to supply every plot as a collective plan.</li> <li>Plot owner establish the pipes to supply the water needs.</li> <li>University builds Tanks for Water Management and Supply.</li> <li>Financing established in the Design-Build Plan as a long term loan and shared by the Plots serviced.</li> </ul>
<b>Town Water Management Department</b>	<ul style="list-style-type: none"> <li>A Water Management and Supply department established.</li> <li>Water fee funds the water consumption.</li> </ul>

#### **2.4.3. Town Management and Small Medium Enterprises (SMEs) Plan**

The plan incorporates an estimated 500 Small Medium Enterprises that shall be progressively established at the town to meet the basic and social needs of residents, students and visitors.

The social and economic needs to be met by SMEs include:

- Food
- Clothing
- Housing Maintenance
- Environment
- Entertainment
- Healthcare
- Personal and Social Needs and Services.
- Religious
- Children Basic Education
- Sports and recreation
- Professional Services

The Town SMEs plan is setup to require and ensure compliance with the Environment rights in article 42 of clean and healthy environment.

#### **2.4.4. Town Development Management Sustainable Environment Plan**

The Diaspora University Town Development, Management Environment Sustainable Plan is the plan that will be implemented as the Town development and management occurs every day to day.

This plan is a sustainable environment plan that shall comply with the environmental requirements, standards and laws as written in Kenya Constitution, Acts of parliament and county government legislated laws.

The creation of the Diaspora University Town Environment Sustainable plan incorporates that the highest possible environmental standards shall be continuously pursued by the builders, residents, students and visitors who shall be the beneficiaries of the environment of the town created when residing, studying or visiting the town.

The following findings and considerations are incorporated in the Town Development Management Sustainable Development Plan.

##### **(a) Population Growth, Slums and Environment**

As Kenya population continues to grow the development of environmental sustainable settlements has not kept pace. This has led to unplanned settlements that have impacted the environment negatively through water pollution, air pollution, river water system distraction, erosion, deforestation and other environment damages.

Slums that result from unplanned settlements constitute one of the biggest threats to the environment. In all urban areas in Kenya the growth of population inside the informal settlements is one of the biggest challenges facing the towns and cities.



In Voi, about 10 kilometers from where the Diaspora University Town will be located there are several informal settlements that are growing as unplanned settlements that are gradually transforming to become slums.

Voi has a population of about 45,000 persons today and of these persons about 70% are living in the unplanned settlements that are deteriorating.

Whereas the blame is centered on lack of land tenure, the fact is without good urban plans that meet the housing and basic needs of sanitation the environment will continue to suffer.

The Town Development, Management and Sustainable Environment Plan goal is to settle 90,000 residents and have 30,000 university on the 3,000 acres without incubating slums or leading to slums development. This achieved through a plan of about 25,000 residential units of housing (Town Houses, Apartments and Other Houses) and Town regulations that discourage Slums growth in areas neighboring the Town development.



**Figure 4:** *Housing to Mitigate from Slums Plan*

Kenya population will have grown to 65 million by 2030. This means the plan shall provide housing for part of the 20 million population growth.

Settling 90,000 residents in a town outside the populated areas will also impact the environment positively. Cities like Nairobi and Mombasa whose population has grown the most as persons settle in urban areas will experience a decline of migration from Taita Taveta as the plan is implemented. This will mean that this town environment plan will contribute toward the environment of the big cities and towns as migration to this cities and towns decline. Most of the persons migrating end up



in unplanned settlements once they migrate to big cities in search of jobs and then end up living in the slums and by doing so contribute to slums expansion that result from growth of population.

This Town Development Management Environment Sustainable Plan will not just be an environmental sustainable plan for the region surrounding the land but will impact the environment of other cities and towns that would have received immigrants who will otherwise now be catered for by this plan.

#### **(b) Water, Water Tanks and Sewage**

Water is a necessity of all life. The water resource just like land requires well thought out management plans if the water in an area will meet the role water plays in sustenance of life as well as the environment.

The world water resource is estimated at over 340 million cubic miles. With a cubic mile of water equal to more than 1.1 trillion gallons. This means the total water resource in the world is close to 400 trillion gallons of water. There is plenty of water if managed in a sustainable way.

Understanding all the different forms of water and their application to the environment is one of the keys to environmental sustainability. The Town Development Management Environment Sustainable plan has several water sustenance plans as tabulated.



**Figure 5:** Water inflow from Njoro Springs

### (c) Water Sustenance Plans

**Table 14:** Water Sustenance Plans

Plan		Details
<b>Human life Water</b>		90,000 persons who settle in the town will need to be sustained with clean water every day. Human beings every day require water for drinking, bathing, cleaning their house, cleaning utensils, cloths washing, toilet waste transportation, and for vegetation gardens.
<b>Domestic Animal's Water</b>		Just like humans, domestic animals consume water every day for their survival needs. The town water plan shall continuously be adjusted to meet the domestic animals water needs.
<b>Vegetation and Trees Water</b>		Vegetation and trees require water to grow and stay alive and to play there in the environmental system. This include carbon removal as the tree/vegetation take in the carbon dioxide and release back the oxygen. Vegetation and trees cannot play this important role without water. Water that sustains vegetation/trees is as equally important as the water for human and animal life. Vegetation and trees also play a big role in covering the soil to sustain water inside the ground.
<b>Recreation facilities Water</b>		Swimming pool, Golf courses, Sports fields are recreation sports that require water. Planning of the water usage for theses sports will ensure the environment impact is positive.
<b>Town Water and Sewage Department</b>		A water, sewage and storm water department will be open in the Town. The department will oversee the water supply to the town and the removal and recycling of waste water. The department will charge a fee for water usage and disposal.
<b>Water consumption and waste water removal</b>		Through the right selling price, water will be delivered to every plot. The waste water removal shall be done through a sewer line or a septic tank and the cost shall be charged to the user.
<b>Water Consumption per person provision.</b>		Water planning and management requires to have a constant supply of water every day to supply the needs of the persons. A provision of 200 litres shall be adopted as the average supply. The application of the newest technologies in water conservation shall be applied to include showerheads, toilets and other Green technology innovations.
<b>Water recycling provisions</b>		Treated water from sewer lines shall be considered for the usage in watering the plants at town, golf course and other applications.
<b>Water Sources</b>	<b>Rainfall.</b>	About 500 mm falls every year in the region. This shall constitute a water supply for the town. A dam supplied by collection of water from roofs shall be incorporated.
	<b>Underground Boreholes.</b>	To meet the water needs of town boreholes shall be established that supply the main water tanks.
	<b>Maziwa Springs pipe.</b>	This natural water supply with pipes from Maziwa springs that pass along the land region shall be incorporated in the water supply plan.
	<b>Voi River</b>	Water would come from Voi river and other streams.
	<b>Purification and recycling</b>	Purification and recycling of water shall be incorporated in the water supply of the Town.

<b>Water Tanks</b>	Water Tanks development shall progress as residents and students increase. When town is fully developed to 90,000 residents and 30,000 students the water tanks in the town will have the capacity to hold 20 million litres of water a day. The tanks will be installed to be able to manage the supply of about 7.3 billion litres of water every year. The water tanks at the high points of the land or on top of built structures
<b>Sewage</b>	The sewage plan shall transport the waste water from properties to a treatment plant.



*Figure 6: Example of 5 million litres gallons tank.*

#### **(d) Energy and Power Lines**

Every person and home consumes energy through cooking, lighting, cloth washing, food refrigeration, charging batteries of equipment and electronic devices and other uses. The energy generation source plays a big role in the environment of a region. Kenya biggest source of energy as population increases still comes from trees, as dry wood or charcoal. The use to trees as a source of energy impacts the environment negatively as the role of trees in the environment is diminished.

The Town planned energy sources for a sustainable environment include:

##### **i. Solar.**

Every Town House planned for development is planned to have an installation of the solar system that generates and supplies about 10,000 kWh hours a year. The generated power supply to meet the house needs and town needs of energy.

#### **Solar Power Generation & Supply Town House**



*Figure 7: Solar on Rooftop.*



## ii. Solar Street Lights

The streets will be light up with solar energy.



*Figure 8: Street lights.*

## iii. Waste to Energy

All organic waste from homes will be planned to become a raw material through working with technologies that lead to waste to energy.



*Figure 9: Biodigester Tanks.*

## iv. Wind Turbines



*Figure 10: Solar wind-turbines.*

## v. Power Lines

There will be about 120 km network of power lines that will distribute the energy to the consumption points/plots. This plan will be incorporated to have an underground and overhead lines through a mini-grid system to achieve a better environment for the Town.

**Table 15:** Power lines planning

<b>Overhead</b>	Overhead power lines are lines that are set above the ground that are over our heads. The positives include easily tapped, rerouted and modified to serve customers. The negatives are: they require posts to support them that change the aesthetics of a Town; the lines are affected by weather, birds, car accidents and other factors.
<b>Underground</b>	Underground lines are under the ground. The positives is they are not visible and the town aesthetics are better. Injuries that result from overhead cut lines are reduced. The negatives include: more difficult and expensive to modify after the cables have been installed. However, improvement of cable technology, installation pipes and other aspects of underground power lines are making the underground more attractive. The lines have led to positive environmental impact especially in areas with birds.

## (e) Trees and Vegetation

Kenya Constitution article 69. (1) The State shall: (b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya.

Trees and vegetation define the environment of a region and shape the culture of persons. Trees and vegetation are part of the air cycle where trees and vegetation play a role in breaking the carbon dioxide breathed out by most of the animals to carbon and oxygen so the oxygen can be reapplied in the sustenance of human and animal live. This cycle is crucial for the survival of all forms of life and thereby the need to have trees and vegetation grow as population grows. Trees also contribute immensely toward the sustenance of life and the environment.



**Figure 11:** Trees plan on the Public Road right of way. Avenue and Streets.

## i. Environment Roles of Trees and Vegetation

**Table 16:** Environmental Roles of Trees and Vegetation

Role	Details
<b>Food production</b>	Apples, Oranges, Plums and many of the fruits that nourish life with essential vitamins and nutrients that sustain a healthy body are produced through trees. Most of the vegetation in the world serves as food for humans and animals
<b>Production of Medicines</b>	Many of the medicines that are administered in hospitals have a substance coming from trees and vegetation.
<b>Air Recycle</b>	Air plays a role in the sustenance of life. Different forms of air play different roles. Oxygen once breathed in by humans collects the carbon inside the human body and this carbon is released to the atmosphere as carbon dioxide. Trees on the other hand take in carbon dioxide from the air through the bottom of the leaves and extract the carbon to release oxygen through the top of their leaves. The oxygen that will then be breathed in by humans to extract carbon from their bodies. Without trees and vegetation the environment risks having too much carbon dioxide that can be harmful to the environment if an imbalance to air recycling occurs.
<b>Energy</b>	Trees once dead and dried up are a source of energy. Trees become fire wood that once burned produces energy. Trees cut green can be turned to charcoal that is a source of energy.
<b>Air Pollution</b>	Trees and vegetation play role in reducing air pollution through dust.
<b>Falling Rain Water Management</b>	Trees and vegetation play a role in the management of rain water as the water falls on the ground. As rain water strikes trees and vegetation the dropping water speed is reduced. Secondly the trees and vegetation contribute to the soaking of the water into the ground as the water follows the roots of a tree and is absorbed by the vacuum places of the soil for future consumption of the trees and vegetation.
<b>Water Tower and River Water Management</b>	Kenyan Government knows of the importance of Kenya's five key "water towers" (Mount Kenya, the Aberdare Range, the Mau Forest Complex, Mount Elgon and the Cherangani Hills) and the role of trees on those hills and mountains play towards water supply in the capital city. Therefore these areas are protected against destruction of trees by farmers. Kenyan's have witnessed politician's debate regarding reservation of trees within Kenya's five water towers.
<b>Dust Management</b>	Trees contribute toward dust pollution by acting as wind-breakers. Trees contribute to this wind breaking. Trees broken down can be applied as munching
<b>Soil and Erosion Management</b>	Unlike other living things, through its roots, a tree contributes towards rock weathering and decomposition of organic matter which helps in soil renewal. Trees acts as a barrier to flood water, prevent soil erosion, reducing sediment going into rivers and increasing water absorption into the ground. This slows rainwater running off into swollen streams and helps lower peak flood levels.

<b>Wind Management</b>	Evergreen non-deciduous trees can be used to reduce wind speed and thus loss of heat from home/urban areas in harsh climatic zones. During windy and cold seasons, trees located on the windward side act as windbreaks. A windbreak can lower home heating bills and have a significant effect on reducing snow drifts. A reduction in wind can also reduce the drying effect on soil and vegetation behind the windbreak and help keep precious topsoil in place. The global devastation of tsunami and other killer winds would be lessened on the land if most areas have tall tree cover especially of indigenous nature.
<b>Temperature Management</b>	Trees play a big role in temperature management. Trees reduce the creation of excessive heat that results from sunrays.
<b>Beauty</b>	The more trees there are the more beautiful the surrounding environment is.
<b>Heat Management</b>	Water from tree leaves evaporates in the hot weather. The evaporated moisture cools the air around the tree. Since cool air is heavier than hot air, this cool air moves toward the ground making us feel cooler. A Town with concrete streets and parking lots create “heat islands” that are hotter than surrounding area. Provision of planted trees next to roads and in these areas helps lessen the heat island effect saving both energy and money.

## ii. Trees and Vegetation Provisions

The plan incorporates having vegetation cover in all the areas through grass and other planted vegetation in areas that are not covered by buildings, roads or constructed areas.

## iii. Cutting Provisions

Planning be done with a goal to preserve all trees and where possible the tree movement be considered. Trees leaves and roots contribute toward rain water storage in the ground and in the tree.



**Figure 12:** Tree Roots System.



#### iv. Road Provisions

Streets and Avenues provisional green areas for trees and vegetation.



**Figure 13:** Roads Design Incorporation of Trees

#### v. Plots Provisions

Each of the plots set aside for building shall have a building to vegetation cover that has at least 60% of the land allocated goes toward vegetation and trees.



**Figure 14:** University Buildings



**vi. Town House Provisions.**

On both boundaries of the plot trees shall be planted.



**GROUND FLOOR PLAN**

**Figure 15: Town House Plot Design**

#### (f) Roads, Vehicles, Noise, Dust and Air Pollution

As population grows so does the movement of people and the movement of goods and services that sustain life. Development Plans can help mitigate against pollution.

**Table 17: Town Plans for Pollution Mitigation**

Plan	Details
<b>Town Roads</b>	The town plan is set to have about 150 km road network that will be made up of streets that service the residential plots and avenues that service the streets, commercial plots and the university. The town residents as they settle will in there movement from one point to another use vehicles, motorcycles, bicycles and walk in the planned 150 km road network.
<b>Design-Build</b>	Roads shall be paved as service the settled plots and plots used for commercial and university education. Roads shall be paved through bitumen or blocks and constantly inspected and maintained as damage from wear and tear occurs. Roads design – build provisions of walking paths, environmental section of trees and grass and travel sections shall be incorporated.
<b>Vehicles</b>	As town develops so shall be the vehicles in the town that support the movement of people goods and services. The management plan adopted in the Town shall ensure that dust, noise and emissions pollution are at the lowest possible.
<b>Dust Pollution</b>	Dust results from expose of a ground on the road not being paved or the part not paved lack of cover and the exposure of the soil to wind or travelling cars. Dust limitation shall be through paving roads and ensuring a cover on the soil through planting grass and other vegetation cover.
<b>Noise Pollution</b>	Noise is generated as cars are driving through the driving surface and engine vibrations and exhaust system. Noise is generated through sound speakers. Noise pollution through vehicle driving shall be reduced through the constructed surface and the driving speeds. Noise pollution through engine vibrations shall be limited through a requirement that all vehicles in the Town be continuously serviced to ensure they do not contribute toward the pollution.
<b>Fuels Emissions Air Pollution</b>	Internal combustion engines of vehicles, portable and back-up generators, lawn mowers, power washers, can produce carbon monoxide a toxic which is a poisonous temporary atmospheric pollutant. Incomplete combustion of other fuels including: wood, coal, charcoal, oil, paraffin, propane, natural gas and trash can lead to carbon monoxide emission. The emissions pollution will be reduced by use of vehicles and energy sources that have limited emissions like electric cars, hybrid cars, solar and other energies that have zero emissions or low emissions. The emissions standard shall be kept through having vehicle emissions standards in the Town through vehicle emissions standards.

<b>Waste Air Pollution</b>	<p>Human Waste, Food waste, sewage waste and all wastes can pollute the air through smell.</p> <p>Development of a waste system that ensures the waste is managed through transportation sites, collection process and other processes shall be applied to ensure the waste system does not pollute the air.</p> <p>Incorporating the residents to the waste pollution system through ensuring each property resident keeps a waste plan that does not contribute to air pollution.</p> <p>Management of waste in a process that limits air pollution after waste is produced, put in disposal containers, transported to waste management and recycle system and in the recycle system.</p> <p>Application of waste to energy that applies waste toward the production of energy and eliminates waste put in landfills.</p>
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**Figure 16: Unmanaged Waste**

#### **(g) Rivers, Surface Water and Ground Water**

**Table 18: Legislative Protection of the Environment as a Mitigation Measure**

<b>Environment Management and Coordination Act (Rev 2015)</b>	<p>PART V – PROTECTION AND CONSERVATION OF THE ENVIRONMENT states:</p> <p>(1.) No person shall, without the prior written approval of the Director-General given after an environmental impact assessment, in relation to a river, lake or wetland in Kenya, carry out any of the following activities—</p> <ul style="list-style-type: none"> <li>(a) erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, or under the river, lake or wetland;</li> <li>(b) excavate, drill, tunnel or disturb the river, lake or wetland;</li> <li>(c) introduce any animal, whether alien or indigenous, dead or alive, in any river, lake or wetland;</li> <li>(d) introduce or plant any part of a plant specimen, whether alien or indigenous, dead or alive, in any river, lake or wetland;</li> <li>(e) deposit any substance in a lake, river or wetland or in, on or under its bed, if that substance would or is likely to have adverse environmental effects on the river, lake or wetland;</li> </ul>
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<p><i>(Continuation)</i></p> <p><b>Environment Management and Coordination Act (Rev 2015)</b></p>	<p>(f) direct or block any river, lake or wetland from its natural and normal course; or</p> <p>(g) drain any lake, river or wetland.</p> <p>(2.) The Minister may, by notice in the Gazette, declare a lake shore, wetland, coastal zone or river bank to be a protected area and impose such restrictions as he considers necessary, to protect the lake shore, wetland, coastal zone and river bank from environmental degradation and shall, in doing so, take into consideration the following factors—</p> <p>(a) the geographical size of the lake shore, wetland, coastal zone or river bank; and</p> <p>(b) the interests of the communities resident around the lake shore, wetland, coastal zone or river bank concerned.</p> <p>(3.) The Minister may, by notice in the Gazette, issue general and specific orders, regulations or standards for the management of river banks, lake shores, wetlands or coastal zones and such orders, regulations or standards may include management, protection, or conservation measures in respect of any area at risk of environmental degradation and shall provide for—</p> <p>(a) the development of an overall environmental management plan for a lake, river, wetland or coastal area, taking into account the relevant sectoral interest;</p> <p>(b) measures for the prevention or control of coastal erosion;</p> <p>(c) the conservation of mangrove and coral reef ecosystems;</p> <p>(d) plans for the harvesting of minerals within the coastal zone, including strategies for the restoration of mineral sites;</p> <p>(e) contingency plans for the prevention and control of all deliberate and accidental discharge of pollutions into the sea, lakes or rivers;</p> <p>(f) plans for the protection of wetlands;</p> <p>(g) the regulation of harvesting of aquatic living and non-living resources to ensure optimum sustainable yield;</p> <p>(h) special guidelines for access to and exploitation of living and nonliving resources in the continental shelf, territorial sea and the Exclusive Economic Zone;</p> <p>(i) promotion of environmentally friendly tourism; and</p> <p>(j) the management of biological resources.</p> <p>(4.) The Authority shall, in consultation with the relevant lead agencies, issue guidelines for the management of the environment of lakes and rivers.</p> <p>(5.) Any person who contravenes or fails to comply with any orders, regulations or standards issued under this section shall be guilty of an offence.</p> <p>43. Protection of traditional interests</p> <p>The Minister may, by notice in the Gazette, declare the traditional interests of local communities customarily resident within or around a lake shore, wetland, coastal zone or river bank or forest to be protected interests.</p>
<p><b>Town Plan and Provisions</b></p>	<p>The town environment plan shall take this on all the parts declared as river, wetland and requirements as set in protection and conservation of environment.</p> <p>The town environment plan shall ensure no pollutants are discharged to the rivers and wetlands. Where water is discharged to the rivers it shall have been treated and all pollutants removed.</p>

#### (h) Storm Water Drainage Development and Management

The town will be created at the low lands of steep hills. When rain falls the water rolling down from the steep hills can erode, leave bare bedrocks and create floods if not planned for in the development and management.

**Table 19: Storm Water drainage development and Management**

<b>Dams Provision</b>	Based on flow of water a dam can be created to contain the flow as water flows from the hills. The water thereafter guided through the town storm system. Creation of a dam would also have the water stored and used for University research farm.
<b>Trees and Vegetation</b>	Trees and vegetation protect erosion. The plan will extend to planting of trees and vegetation to the hills through the University department of environment that shall continuously research on best ways to manage the storm water to reduce erosion and maximum the water contribution to human, animals and tree's needs.
<b>Town Storm Water</b>	The flow of water shall be connected to the town storm system to move the water as the water passes through the town. This aimed at eliminating underground erosion and formation of soil erosion gullies.

#### (i) Hills, Ridges and Mountains

**Table 20: Hills, Ridges and Mountains Environment Management and Coordination Act 2012 Provisions**

<b>44. Protection of hill tops, hill sides, mountain areas and forests</b>	The Authority shall, in consultation with the relevant lead agencies, develop, issue and implement regulations, procedures, guidelines and measures for the sustainable use of hill sides, hill tops, mountain areas and forests and such regulations, guidelines, procedures and measures shall control the harvesting of forests and any natural resources located in or on a hill side, hill top or mountain area so as to protect water catchment areas, prevent soil erosion and regulate human settlement.
<b>45. Identification of hilly and mountainous areas</b>	<p>(1.) Every District Environment Committee shall identify the hilly and mountainous areas under their jurisdiction which are at risk from environmental degradation.</p> <p>(2.) A hilly or mountainous area is at risk from environmental degradation if—</p> <ul style="list-style-type: none"><li>(a) it is prone to soil erosion;</li><li>(b) landslides have occurred in such an area;</li><li>(c) vegetation cover has been removed or is likely to be removed from the area at a rate faster than it is being replaced; or</li><li>(d) any other land use activity in such an area is likely to lead to environment degradation.</li></ul> <p>(3.) Each District Environment Committee shall notify the Director-General of the hilly and mountainous areas it has identified as being at risk from environmental degradation under subsection (1).</p> <p>(4.) The Director-General shall maintain a register of hilly and mountainous area identified under subsection (1) to be at risk from environmental degradation.</p>

**Continuation: Hills, Ridges and Mountains Environment Management and Coordination Act 2012 Provisions**

<p><b>46.</b> <b>Re-forestation and afforestation of hill tops, hill slopes and mountainous areas</b></p>	<p>(1.) Every District Environment Committee shall specify which of the areas identified in accordance with section 45(1) are to be targeted for afforestation or reforestation.</p> <p>(2.) Every District Environment Committee shall take measures, through encouraging voluntary self-help activities in their respective local community, to plant trees or other vegetation in any area specified under subsection (1) which are within the limits of its jurisdiction.</p> <p>(3.) Where the areas specified under subsection (1) are subject to leasehold or any other interest in land including customary tenure, the holder of that interest shall implement measures required to be implemented by the District Environment Committee including measures to plant trees and other vegetation in those areas.</p>
<p><b>47.</b> <b>Other measures for management of hill tops, hill sides and mountainous areas</b></p>	<p>(1.) The Authority shall, in consultation with the relevant lead agencies, issue guidelines and prescribe measures for the sustainable use of hill tops, hill slides and mountainous areas.</p> <p>(2.) The guidelines issued and measures prescribed by the Authority under subsection (1) shall be by way of Gazette Notice and shall include those relating to—</p> <ul style="list-style-type: none"> <li>(a) appropriate farming methods;</li> <li>(b) carrying capacity of the areas described in subsection (1) in relation to animal husbandry;</li> <li>(c) measures to curb soil erosion;</li> <li>(d) disaster preparedness in areas prone to landslides;</li> <li>(e) the protection of areas referred to in subsection (1) from human settlements;</li> <li>(f) the protection of water catchment areas; and</li> <li>(g) any other measures the Authority considers necessary.</li> </ul> <p>(3.) The District Environment Committee shall be responsible for ensuring that the guidelines issued and measures prescribed under subsection (2) in respect of their districts are implemented.</p> <p>(4.) Any person who contravenes any measure prescribed by the Authority under this section or who fails to comply with a lawful direction issued by a District Environment Committee under this section shall be guilty of an offence.</p>
<p><b>48.</b> <b>Protection of forests</b></p>	<p>(1.) Subject to subsection (2) the Director-General may, after consultation with the Chief Conservator of Forests, enter into any contractual arrangement with private owner of any land on such terms and conditions as may be mutually agreed for purposes of registering such land as forest land.</p> <p>(2.) The Director-General shall not take any action, in respect of any forest or mountain area, which is prejudicial to the traditional interests of the local communities customarily resident within or around such forest or mountain area.</p>

<p><b>49.</b> <b>Conservation of energy and planting of trees or woodlots</b></p>	<p>(1.) The Authority shall, in consultation with the relevant lead agencies, promote the use of renewable sources of energy by—</p> <ul style="list-style-type: none"> <li>(a) promoting research in appropriate renewable sources of energy;</li> <li>(b) creating incentives for the promotion of renewable sources of energy;</li> <li>(c) promoting measures for the conservation of non-renewable sources of energy; and</li> <li>(d) taking measures to encourage the planting of trees and woodlots by individual land users, institutions and by community groups.</li> </ul>
<p><b>50.</b> <b>Conservation of biological diversity</b></p>	<p>(1.) The Authority shall, in consultation with the relevant lead agencies, prescribe measures necessary to ensure the conservation of biological diversity in Kenya and in this respect the Authority shall—</p> <ul style="list-style-type: none"> <li>(a) identify, prepare and maintain an inventory of biological diversity of Kenya;</li> <li>(b) determine which components of biological diversity are endangered, rare or threatened with extinction;</li> <li>(c) identify potential threats to biological diversity and devise measures to remove or arrest their effects;</li> <li>(d) undertake measures intended to integrate the conservation and sustainable utilisation ethic in relation to biological diversity in existing government activities and activities by private persons;</li> <li>(e) specify national strategies, plans and government programmes for conservation and sustainable use of biological diversity;</li> <li>(f) protect indigenous property rights of local communities in respect of biological diversity; and</li> <li>(g) measure the value of unexploited natural resources in terms of watershed protection, influences on climate, cultural and aesthetic value, as well as actual and potential genetic value thereof.</li> </ul>
<p><b>51.</b> <b>Conservation of biological resources in situ</b></p>	<p>The Authority shall, in consultation with the relevant lead agencies, prescribe measures adequate to ensure the conservation of biological resources in situ and in this regard shall issue guidelines for—</p> <ul style="list-style-type: none"> <li>(a) land use methods that are compatible with conservation of biological diversity;</li> <li>(b) the selection and management of protected areas so as to promote the conservation of the various terrestrial and aquatic ecosystems under the jurisdiction of Kenya;</li> <li>(c) selection and management of buffer zones near protected areas;</li> <li>(d) special arrangements for the protection of species, ecosystems and habitats threatened with extinction;</li> <li>(e) prohibiting and controlling the introduction of alien species into natural habitats; and</li> <li>(f) integrating traditional knowledge for the conservation of biological diversity with mainstream scientific knowledge.</li> </ul>

**Continuation: Hills, Ridges and Mountains Environment Management and Coordination Act 2012 Provisions**

<p><b>52. Conservation of biological resources ex-situ</b></p>	<p>The Authority shall, in consultation with the relevant lead agencies—</p> <ul style="list-style-type: none"> <li>(a) prescribe measures for the conservation of biological resources ex-situ especially for those species threatened with extinction;</li> <li>(b) issue guidelines for the management of— <ul style="list-style-type: none"> <li>i. germplasm banks;</li> <li>ii. botanical gardens;</li> <li>iii. zoos or aquaria;</li> <li>iv. animal orphanages; and</li> <li>v. any other facilities recommended to the Authority by any of its Committees or considered necessary by the Authority;</li> </ul> </li> <li>(c) ensure that species threatened with extinction which are conserved ex-situ are re-introduced into their native habitats and ecosystems where— <ul style="list-style-type: none"> <li>i. the threat to the species has been terminated; or</li> <li>ii. a viable population of the threatened species has been achieved.</li> </ul> </li> </ul>
<p><b>53. Access to genetic resources of Kenya</b></p>	<ul style="list-style-type: none"> <li>(1.) The Authority shall, in consultation with the relevant lead agencies, issue guidelines and prescribe measures for the sustainable management and utilisation of genetic resources of Kenya for the benefit of the people of Kenya.</li> <li>(2.) Without prejudice to the general effect of subsection (1), the guidelines issued or measures prescribed under that subsection shall specify— <ul style="list-style-type: none"> <li>(a) appropriate arrangements for access to genetic resources of Kenya by non-citizens of Kenya including the issue of licences and fees to be paid for that access;</li> <li>(b) measures for regulating the import or export of germplasm;</li> <li>(c) the sharing of benefits derived from genetic resources of Kenya;</li> <li>(d) biosafety measures necessary to regulate biotechnology;</li> <li>(e) measures necessary to regulate the development, access to and transfer of biotechnology; and</li> <li>(f) any other matter that the Authority considers necessary for the better management of the genetic resources of Kenya.</li> </ul> </li> </ul>
<p><b>54. Protection of environmentally significant areas</b></p>	<ul style="list-style-type: none"> <li>(1.) The Minister may, in consultation with the relevant lead agencies, by notice in the Gazette, declare any area of land, sea, lake or river to be a protected natural environment for the purpose of promoting and preserving specific ecological processes, natural environment systems, natural beauty or species of indigenous wildlife or the preservation of biological diversity in general.</li> <li>(2.) Without prejudice to subsection (1), the Authority may, in consultation with the relevant lead agencies, issue guidelines and prescribe measures for the management and protection of any area of environmental significance declared to be a protected natural environment area under this section.</li> </ul>
<p><b>56. Protection of the ozone layer</b></p>	<ul style="list-style-type: none"> <li>(1.) The Authority shall, in consultation with the relevant lead agencies, undertake or commission other persons to undertake national studies and</li> </ul>



	<p>give due recognition to developments in scientific knowledge relating to substances, activities and practices that deplete the ozone layer to the detriment of public health and the environment.</p> <p>(2.) The Authority shall, in consultation with the relevant lead agencies, issue guidelines and institute programmes concerning the—</p> <ul style="list-style-type: none"> <li>(a) elimination of substances that deplete the stratospheric ozone layer;</li> <li>(b) controlling of activities and practices likely to lead to the degradation of the ozone layer and the stratosphere;</li> <li>(c) reduction and minimisation of risks to human health created by the degradation of the ozone layer and the stratosphere; and</li> <li>(d) formulate strategies, prepare and evaluate programmes for phasing out ozone depleting substances.</li> </ul>
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The Town Environment Plan shall comply with the Kenya legislated laws and international requirements that are set for the environment as passed or enacted.

**(j) Waste Management and Health Hazard**

**Table 21: Waste Management and Health Hazards Plan**

Plan	Details
<b>Waste Management</b>	<p>Waste Management is the process and actions undertaken in the management of waste from the point waste is created to its final disposal or decomposition point. Waste can take any form that is either solid, liquid, or gas and each have different methods of disposal and management. Waste management incorporates all types of waste: industrial, biological, household, medical, human waste and animal waste. Production of waste results from Industrial extraction and processing of raw materials, human waste as urine and feces, Household waste as clothes, utensils and cleaning of house. Waste management process is set up to reduce the adverse effects of waste can have on human beings and animals health, the environment and the aesthetics of a place.</p>
<b>Town Waste Management Process.</b>	<p><b>Legal and regulatory framework.</b> Town will set a waste management in accordance with meeting the constitutional rights and legal framework as established by Environment.</p> <p><b>Collection of Waste</b> Town as the waste is produced in houses, parks, roads, commercial outlets, industries, hospitals and other processes.</p> <p><b>Transport</b> Town will set a waste transport system through sewer lines, trucks and other means.</p>
<b>Treatment and Waste Separation</b>	Town will have a treatment and waste separation plan.
<b>Disposal of Waste</b>	Town will in disposal apply recycling, supply of waste to technologies that apply waste to energy applications, production of fertilizer and disposal in landfills.

**Continuation: Waste Management and Health Hazards Plan**

Plan	Details
<b>Town Waste Reduce, Reuse and Recycle</b>	Reduction of waste brought to town, reusage of waste and recycle of waste system will be adopted at the Town.
<b>Reduce</b>	A product environmental system starts in the production plan of the product. Having products that reduce the waste production or have zero waste will reduce the waste in Town. Working with producers who supply the town "Reduce approach," shall be adopted.
<b>Reuse</b>	Having a reusage of waste approach will also enable the waste products be applied to other uses.
<b>Recycle</b>	Waste has become a producer of energy. Adopting a strategy that ensures this waste is used to establish energy will be applied. The recycle approach for goods that create toxics will be shipment of the waste product to the manufacturer.
<b>Waste to Energy.</b>	<p>Waste to Energy is the conversion of non-recyclable waste into usable heat, electricity, or fuel through a variety of processes, including anaerobic digestion, pyrolysis, incineration and others. Getting energy from waste is a non-hazardous waste management. The conversion of non-recyclable waste materials into electricity and heat generates a renewable energy and reduces carbon emissions. With diverse technologies available in the market the energy available waste can be managed through application in the production of energy to both improve the environment as well as supply energy. Some of the technologies that shall be considered for application are:</p> <p><b>Anaerobic Bio-digestion.</b></p> <p>This anaerobic digestion system is a collection of processes by which microorganisms break down biodegradable material in the absence of oxygen. Anaerobic digestion is widely used as a source of renewable energy. The process produces a biogas, consisting of methane, carbon dioxide and traces of other 'contaminant' gases. The nutrient-rich digestate also produced can be used as fertilizer. With the re-use of waste as a resource and new technological approaches that have lowered capital costs, anaerobic digestion plays a role in environmental improvement. Anaerobic digesters are also applicable in a sewage treatment plant. The Anaerobic digestion is good for the organic material from industrial effluent, wastewater and sewage sludge treatment. Through Anaerobic digestion, the amount of organic matter which might otherwise be destined to be dumped at sea, dumped in landfills, or burnt in incinerators is reduced. These advantages are good for the environment both in reducing the waste volumes as well as creating products.</p> <p><b>Pyrolysis</b></p> <p>Pyrolysis is a technological process that leads to thermal decomposition of waste materials at high temperatures in a vacuum or nitrogen gas. The burning leads to separation and change of the chemical composition of the</p>

<b>Waste to Energy.</b>	<p>waste products and when doing so leads to production of gas and electricity. The process also leads to production of carbon that can be applied as a fertilizer in farming.</p> <p><b>Incineration</b></p> <p>Incineration is the combustion of organic substances contained in waste and is applied in the waste treatment process. It converts waste into ash, flue gas and heat. The ash will be formed mainly by the inorganic constituents of the waste and may require cleaning of gaseous and particulate pollutants before they are dispersed into the atmosphere. Heat generated by incineration is used to generate electric power. To avoid risk to workers there is need to separate the highly toxic waste that produce harmful gases.</p>
<b>Waste Pay Principle</b>	<p>Waste pay principle is the principle of having a value for waste management added to the waste product. The person who will get the product pays an amount in advance to be refunded once they return the waste product. This mainly applicable in waste bottles.</p>
<b>Waste Collection</b>	<p>Domestic waste collection can be done in various ways including separation of waste to have organic, paper, plastics, clothing, glass, wood, metal and other.</p> <p><b>Organic</b></p> <p>Organic waste shall be removed as raw material for the renewable energy bio-digester or pyrolysis energy and gas production plant.</p> <p><b>Paper</b></p> <p>Shall be collected as a recycle raw material.</p> <p><b>Plastics</b></p> <p>Shall be collected separately as a raw material.</p> <p><b>Clothing</b></p> <p>The clothing shall be collected separately as a raw material.</p> <p><b>Wood</b></p> <p>Wood shall be collected separately and applied as a raw material to produce mulching products to be applied in cover of trees and flowerbeds to reduce dust.</p> <p><b>Metal</b></p> <p>Metal mainly from cans shall be collected as a recycle raw material.</p>
<b>Toxic Waste</b>	<p>Toxic waste is any material in liquid, solid, or gas form that can cause harm when inhaled, swallowed, or absorbed through the skin. Many of today's household products such as televisions, computers and phones contain toxic chemicals that can pollute the air and contaminate soils and water. Disposing of such waste is a major public health issue.</p> <p>Toxic materials can result from manufacturing, farming, construction, automotive, laboratories, and hospitals and may contain heavy metals, radiation, dangerous pathogens, or other toxins.</p> <p>Toxic waste is more abundant from the industrial revolution, causing serious global health issues.</p>

**Continuation: Waste Management and Health Hazards Plan**

Plan	Details
<b>Toxic Waste</b>	<p>Products such as cellular telephones, computers, televisions, and solar panels contain toxic chemicals that can harm the environment if not disposed of properly to prevent the pollution of the air and contamination of soils and water. A material is considered toxic when it causes death or harm by being inhaled, swallowed, or absorbed through the skin.</p> <p>The waste can contain chemicals, heavy metals, radiation, dangerous pathogens, or other toxins. Even households generate hazardous waste from items such as batteries, used computer equipment, and leftover paints or pesticides.</p>
<b>Waste Funding</b>	<p>The funding of waste shall incorporate several funding systems that include: Property fee that every property shall pay to fund the waste management; purchase of raw materials; credits to property rate for town maintenance; charging of a recycle amount that is refunded once the waste is returned this applicable to electronic waste, bottles and other waste; and other applications that maybe introduced.</p>

**(k) Fire, Floods, Emergency and Disaster Management**

**Table 22: Fire, Floods, Emergency and Disaster Management Plan**

Plan	Details
<b>Fire</b>	<p>Fire is a combustion that releases heat, light, and various reaction products. It starts with an ignition point where flames are produced. The flame is the visible portion of the fire. Fire causes physical damage and environmental damage through burning, hazard to human life and animals through burns; property damage; atmospheric pollution; and water contamination. Fire in certain circumstances has a positive effect when fire is applied to stimulating growth and maintaining ecological systems.</p> <p>If fire removes protective vegetation, heavy rainfall may lead to an increase in soil erosion by water. Also, when vegetation is burned, the nitrogen it contains is released into the atmosphere, unlike elements such as potassium and phosphorus which remain in the ash and are quickly recycled into the soil. This loss of nitrogen caused by a fire produces a long-term reduction in the fertility of the soil, which only slowly recovers as nitrogen is "fixed" from the atmosphere by lightning and by leguminous plants such as clover.</p> <p>Fire has been used by humans: in rituals; in agriculture for clearing land; for cooking; generating heat and light; for signaling; propulsion purposes; smelting; incineration of waste; cremation; and as a weapon or mode of destruction.</p>
<b>Floods</b>	<p>Floods occur when rain water accumulates, overflows on land and covers a land area that is not intended to be covered by water. Floods can also occur when there is an overflow of water from water bodies such as a river, lake, or ocean.</p> <p>As the town development occurs and about 30% of the land that previously soaked in rain water is covered by paved roads or buildings the excess water can</p>

<b>Floods</b>	<p>cause floods that lead to emergencies and disaster if not well managed. To ensure that floods are reduced the following shall be applied.</p> <p><b>Storm Water Disposal</b> The storm water disposal shall be applied to guide the water falling on the roofs and onto the roads to a dam or to the river for onward flow.</p> <p><b>Trees Planting</b> Trees consume water as well as enable water to penetrate under the ground. Planting more trees shall lead to deeper soaking of rain water and more consumption of the water.</p> <p><b>Dam Creation</b> The creation of a dam that excess water can flow into is another way to reduce floods.</p>
<b>Emergency and Disaster Management</b>	<p>To ensure that the town environment and town residents, animals, plants and property are protected from floods, fire and other hazards; an emergency and disaster management system shall be incorporated to include:</p> <p><b>Fire Department and Equipment</b> The fire department shall be responsible in ensuring that there is no fire outbreak and when a fire outbreak occurs the fire is extinguished in the fastest time possible. The equipment shall include the fire truck and other equipment and materials applicable.</p> <p><b>Fire Hydrants</b> The town shall have fire hydrants that shall be connected to the water supply system and shall be able to avail pressurized water as needed for extinguishing fire.</p> <p><b>Health Emergency Center.</b> The Town shall have a health emergency center and plan that shall be the point the person injured shall be taken to. During the start of the site work the center shall be in a vehicle and shall progress to built space.</p>

### (I) University Students Management

Students can be an environment hazard if there is no plan for Students management in relation to Environment. Students have been known to destroy trees and environment as they exercise their right to strike and present grievances.



**Figure 17:** Students burning tyres during a strike

**Table 23:** University Students Strike right and Right to clean and healthy Environment balance

Topic	Details
<b>Right to Strike</b>	Students shall be taught and made to understand the right to strike as established in Kenya constitution article 37. Every person has the right, peaceably and unarmed, to assemble, to demonstrate, to picket, and to present petitions to public authorities.
<b>Right to Environment</b>	Students shall be taught and made to understand the Kenya Constitution article 42. Every person has the right to a clean and healthy environment, which includes the right— (a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and (b) to have obligations relating to the environment fulfilled under Article 70. right to destroy the environment is not part of the right.
<b>Environment Pollution</b>	Burning of tyres is the most common strike defiance. When tyres are burned they can smolder for long periods of time, emitting hundreds of chemical compounds that pollute the air causing respiratory illnesses. Additionally the residue left behind can harm the soil as the residues filters into ground and the groundwater.
<b>University Strike Policy</b>	The university will have a strike policy that ensures the university students are taught to understand to protect and manage the environment.

#### **(m) Town Litter Management**

Litter is rubbish, leaves, vegetation, bottles, cigarette butts, cans, bottles, peelings, paper, and other products that are thrown by humans, leaves that fall from trees or other vegetation that is on public roads, residential property, commercial property or school property grounds. Litter has adverse environment effects and should be managed. Common litter that is dropped on the ground by humans include: plastic bags, plastic bottles, aluminum cans, cardboard boxes, paper, fruits peelings and other.



**Figure 18:** Litter finding its way to a river in Kenya.



**Table 24: Litter management and mitigation**

Topic	Details
<b>Pollution of Water</b>	Litter pollutes water that is consumed by humans, animals and plants. When litter is not managed this leads to water pollution and declines the sources of water that is needed for life. Pollution of water further reduces the amount of available oxygen for other aquatic life, such as fish. Litter consists of waste products that have been disposed improperly, without consent, at an inappropriate location.
<b>Litter Blockage of Drains</b>	Litter clogs storm-water drains and causes flooding when not managed the right way. Blockage then leads to floods.
<b>Cigarette Butts</b>	The most littered item in the world and in any town is the Cigarette butts. A town with 5,000 persons smoking an average of 20 cigarettes a day would produce 100,000 cigarettes butts or about 30 million butts. The cigarette butt takes more than 5 years to completely break-down based on the surface the butt lands on. To avoid cigarettes butts on public roads and public property strict town laws should be enforced. To avoid the cigarette butts flowing into the storm water system the butts should be managed in private homes and property that feed the storm water drainage system.
<b>Large Litter</b>	Tyres, Television sets, Batteries, Large Containers are sometimes dumped in land that is not developed or in preserved land. The dumped product occupy space and affects the environment of the place as nature destroys the item many a time producing toxics. To avoid such dumping a recycle and strict procedure shall be established and enforced.
<b>Hazardous Waste</b>	Hazardous waste litter occurs when waste that can produce toxic is dropped in any site. Motor vehicle tyres and waste oil are the most often dumped hazardous waste. The fact that hazards waste leads to pollution of air shall be taken into consideration when disposing toxic waste.
<b>Litter Life Cycle</b>	Litter can remain in the environment for an extended period before it eventually biodegrades. Some items can take even a million years such as glass, styrofoam or plastic. Technologies that can accelerate or recycle litter should be applied to reduce the life cycle of litter.
<b>Litter Effects to Wildlife</b>	Wildlife can become victims of litter as the animal are poisoned from litter close to their habitats. Cigarette butts once they find their way to rivers have been found in the stomachs of fish. Polythene bags have found their way to animals digestion system. Broken glass has been found trapped in the paws of animals. Managing litter is crucial in the protection of wildlife.



**Figure 19: Waste that includes Hazardous Waste disposed to a dump site in Kenya**

## (n) Information Communication Technology (ICT) Environment Plan

Information and communication technologies for environmental sustainability is the application of information and communication technologies (ICTs) within the field of environmental sustainability.

ICT has in the past 30 years gradually become part of the World environment and today plays a role in the management of human activity, waste, engines and other activities that affect the environment.

ICT greatest benefit is the provision of information and knowledge that can be applied toward creating a sustainable environment.

**Table 25:** ICT Environmental Plan

Topic	Details
<b>ICT and Human Activities</b>	<p>New technologies provide utilities for knowledge acquisition and awareness, early evaluation of new knowledge, reaching agreements and communication of progress in the interest of the human welfare. This includes ethical aspects of protecting human life as well as aspects of consumer safety and the preservation of our natural environment.</p> <p>More and more application areas are becoming relevant to sustainable development in industry, health care, agriculture and the information society, and they affect the perspectives of ICT, the environment, policy and science.</p> <p>More and more interest has been emerged as well to risk and disaster management, adaptation to climate change and resource use.</p>
<b>ICT and Emissions</b>	<p>There are various ways in which ICT would help reduce emissions:</p> <ul style="list-style-type: none"><li>- In buildings, improved controls and connected sensors will substantially reduce energy waste in heating, cooling and lighting. Integration of thermal storage and other demand reduction measures will save energy throughout the system.</li><li>-In energy, predictive analytics will help utilities match supply with demand. That will in turn allow them to optimize the use of renewable energy.</li><li>-On the demand side, smart appliances and commercial equipment will help “shave the peaks” in demand which tend to be so costly and inefficient to utilities to keep up with.</li><li>-In mobility, traffic flow (think smart traffic lights) and parking solutions will keep traffic moving efficiently and smoothly. Mobile apps will facilitate the use of alternative of modes of transport, ranging from walking to biking, to ride-sharing services and more conventional forms of public transportation. Virtually all of these will be cleaner than today’s primary options.</li></ul>
<b>ICT and Waste</b>	<p>There are key technologies relevant to achieve objectives of waste management:</p> <ul style="list-style-type: none"><li>* Online platforms: Online platforms provide options and alternatives to the user to look into reusing old stuff. The existing user is also encouraged to look for options to sell and regain value from the product before discarding the product as waste.</li><li>* Analytics: Accurate projections on total waste generated, waste type and identification of high waste generation areas enable effective planning and management of solid waste management services. Use of analytics during events</li></ul>



	<p>with large citizen involvement such as festivals and fairs can ensure smooth collection and transport of waste.</p> <ul style="list-style-type: none"> <li>* Automated waste collection system: Automated Waste Collection System (ACS) is a long-term solution and can take care the conventional methods like door-to-door, curb-side, block, community bins collections and transportation via chute system from high rise buildings with waste sucked through pipes and minimal human intervention</li> <li>* GPS devices and sensors on waste truck: GPS technology to route the waste collection trucks to optimize the collection efficiency and ensure contractors dump waste in designated places. It will also give a clear picture of waste generated per street.</li> <li>* Integrated asset management solutions: Integrated asset management of all waste infrastructure assets including the associated data, processes, information systems and governance for manageable operations and higher sustainability</li> <li>* Business process automation: Re-engineer, optimize and automate business processes using business process management solution to have a fully integrated and policy-driven set of automated business processes that increases efficiency and reduces service delivery costs</li> </ul>
<b>ICT in Energy Consumption /Efficiency</b>	<p>ICT can substantially reduce the environmental impacts of other sectors by increasing their energy efficiency. ICT can help all economic sectors to become more energy efficient – since ICT allows existing processes to be optimized or enables entirely new, more energy-efficient processes. The energy that could be saved by ICT-induced energy efficiency is estimated to be several times larger than the overall energy consumption of ICT itself. For example the European Commission stated that ICT will help them go a long way toward achieving its target of 20 % greenhouse gas reduction by 2020 by deploying ICT for energy efficiency.</p>
<b>ICT in Climate Change</b>	<p>Information and Communication Technologies (ICTs), such as satellites, mobile phones or the Internet, play a key role in addressing the major challenges related with climate change and sustainable development. ICTs are fundamental for monitoring climate change, mitigating and adapting to its effects and assisting in the transition towards a green and circular economy.</p> <p>Rapid advancement of Information and Communication Technology (ICT) is a blessing for mankind and incorporation of this revolutionary technology in serving mankind in this diverse domain is remarkable. Use of ICT in climate change mitigation, adoption and monitoring not only replacing the conventional techniques and systems also adding great accuracy, reliability and flexibility also provide diverse choices in related domains. ICT is contributing in a variety of domains: climate change monitoring and climate change adaptation as well as in Disaster Management. ICT based applications can help in reducing climate change impacts on the environment. By using ICT in climate monitoring we can provide real time observation, reduce cost, decrease power consumption, live tracking and real time data processing and analysis.</p>

**Continuation: ICT Environmental Plan**

Topic	Details
<b>ICT and Sustainable Use of Natural Resources</b>	<p>At present there is a worldwide crisis of natural resources, in particular of water resources, with emerging problems even in water abundant mountain areas. ICT is relevant to protecting water quantity, water quality, enabling water predictions, water management, and aquatic biodiversity. ICT can help in assessing water supply adequacy, modeling different supply and technology alternatives and factor in different usage technologies. This includes the development of dynamic Geographic Information Systems (GIS) for identifying water availability, storage, transmission and distribution, monitoring of water quality, optimization of the allocation between different water uses (e.g. treated drinking water, agriculture etc.) and water use management at a societal level including distribution systems (loss reduction) and utilization efficiency.</p>
<b>ICT for Biodiversity</b>	<p>With the advancement in ICT, we have invented many applications for biodiversity conservation. Examples are GIS, GPS, social networking devices, etc.</p> <p>Thus these devices have helped a lot for its conservation.</p> <p>Full forms of GIS and GPS:</p> <p>G.I.S. – Geographic Information System</p> <p>G.P.S. – Global Positioning System</p> <p>Applications of G.I.S. :-</p> <p>For wildlife: - an effective tool for managing analyzing and mapping wildlife data such as population size and distribution, habitats.</p> <p>Vegetation Research: helps to analyze vegetation character, quantity and distribution from the vegetation map GIS files.</p> <p>For marine: GIS technology allows for the integration of geographic data and advanced analysis of marine datasets.</p> <p>From the advancement of ICT, we can conclude that in upcoming years, we can decrease the threats to biodiversity and can conserve them in sitting home by monitoring them with many technological and communicational devices.</p> <p>Thus understand the importance of biodiversity conservation and use ICT in their favor.</p> <p>According to the World Bank’s Program on Forests, in developing countries, an estimated 1 billion rural poor depend at least partially on forests for their livelihoods, and about 350 million live in and around forests and are heavily dependent on them for economic, social, and cultural needs. Lack of proper management in this transition period might result in income inequality, loss of access to natural resources and loss of forest resources. ICT in forestry management is one potential pathway for mitigating climate change and scaling-up resource management in the forestry sector.</p>

<b>ICT in Industries</b>	<p>ICT is most often used in mass production, as computer control makes it possible to produce many identical items very quickly. But ICT is also useful in small batch and even one-off work, as computer control enables complicated shapes to be produced more accurately than by hand.</p> <p>ICT can help with designing products in many ways:</p> <ul style="list-style-type: none"> <li>-Drawings, graphics and diagrams can be produced and edited using graphics or design software.</li> <li>-Writing and drawings can be combined using desk-top publishing (DTP) software.</li> <li>-Pictures of existing products can be scanned and used in graphics, photo-editing or DTP software.</li> <li>-Database packages can be used to record and analyze survey data.</li> <li>-Spreadsheet software can be used to make Gantt or other planning charts, to produce graphs and charts, and to help with costing projects.</li> </ul>
<b>ICT in Agriculture</b>	<p>Information and communication technology in agriculture (ICT in agriculture), also known as e-agriculture, is developing and applying innovative ways to use ICTs in the rural domain, with a primary focus on agriculture. ICT in agriculture offers a wide range of solutions to some agricultural challenges. It is seen as an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. In this context, ICT is used as an umbrella term encompassing all information and communication technologies including devices, networks, mobiles, services and applications; these range from innovative Internet-era technologies and sensors to other pre-existing aids such as fixed telephones, televisions, radios and satellites. E-agriculture continues to evolve in scope as new ICT applications continue to be harnessed in the agriculture sector. More specifically, e-agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use ICTs in the rural domain, with a primary focus on agriculture. Provisions of standards, norms, methodologies, and tools as well as development of individual and institutional capacities, and policy support are all key components of e-agriculture.</p>
<b>ICT for Landscape Ecology</b>	<p>Landscape ecology is the study of the interactions between the temporal and spatial aspects of a landscape and the organisms within it.</p> <p>Interactions matter. To understand the distributions of plants and animals in a landscape you need to understand how they interact with each other, and with their environment. The resulting networks of interactions make ecosystems highly complex. Recent research on complexity and artificial life provides many new insights about patterns and processes in landscapes and ecosystems. ICT provides connectivity, criticality, feedback, and networks. Understanding ecological complexity is crucial in today's globalized and interconnected world. Successful management of the world's ecosystems needs to combine models of ecosystem complexity with biodiversity, environmental, geographic and socioeconomic information.</p>

**Continuation: ICT Environmental Plan**

Topic	Details
<b>ICT for Sustainable Urban Development</b>	<p><b>Town Residents Security</b></p> <p>A plan incorporated in all systems including residents to collect data and secure town.</p> <ol style="list-style-type: none"> <li>Public Safety <ul style="list-style-type: none"> <li>Video Surveillance</li> <li>Remote Security Monitoring</li> <li>Emergency Response Communications</li> <li>Smart Streetlights</li> <li>Mass Notifications</li> </ul> </li> <li>Vehicle <ul style="list-style-type: none"> <li>Smart Parking</li> <li>Parking Enforcement</li> <li>Vehicle Detection</li> <li>Mobile Payments</li> <li>EV Charging</li> </ul> </li> </ol>
<b>ICT in University</b>	<p><b>Mass Notification System</b></p> <p>The administration will be able to text all parents alerting them to a dangerous situation on campus.</p> <p>With the push of a button, the administration can lock down the entire campus making it impossible for anyone to enter or exit the premises.</p> <p>Individual teachers can push a button alerting the front office that they have a situation in their room.</p> <p><b>Campus Security</b></p> <p>All faculty members will have key fobs that will grant them access to the buildings. This information will be stored in a main database so the administration can see who is on campus and what time they arrived and left. If necessary, the administration can actually run reports on the comings and goings of the staff.</p> <p>With the key fobs, access can be limited to a select group of faculty members at any given time.</p> <p>Security cameras will be installed throughout the campus to monitor the campus 24/7.</p>
<b>ICT in Health Care</b>	<p>ICT plays a critical role in improving health care for individuals and communities. By providing new and more efficient ways of accessing, communicating, and storing information.</p> <p>ICT can help bridge the information divides that have emerged in the health sector in developing countries—between health professionals and the communities they serve and between the producers of health research and the practitioners who need it. Through the development of databases and</p>

<b>ICT in Health Care</b>	<p>other applications, ICT also provide the capacity to improve health system efficiency and prevent medical errors.</p> <p>ICT can enable doctors to do remote consultations and diagnosis, access medical information and coordinate research more effectively. More traditional technologies like radio and television have been beneficial in disease prevention and epidemic response. In Uganda, this has been evident in response to HIV/AIDS, Malaria and Cholera amongst other diseases. More recent technologies like mobile phones, email and the internet could also be used for health alerts to the general public and medical consultations. Collaboration is possible between physicians within and between medical sites. Physicians consulting each other on patient treatment and can help reduce the number of referral cases to main hospitals. Patients would then able to cut transport costs and unnecessary journeys that could result in further harm, especially to patients who are terminally ill.</p>
<b>Business &amp; Industry ICT Plan</b>	<p>ICT, of which telecom and IT constitute the core, is currently permeating and transforming every sphere of life, ranging from commerce, manufacturing, education and healthcare, to agriculture, banking, governance, media and entertainment. Today, telecommunication and ICT, in general, are essential to a country's economic development and competitiveness as recognized by the World Bank. Due to the powerful, disruptive and rapid forces unleashed by ICT tsunami, organizations not only struggle to harness the potential of ICT but can also be overwhelmed by the changes, complexity, competition and regulatory environment it brings up.</p>
<b>ICT for Environmental Risk Management</b>	<p>With our world class data centers, fiber networks, and cellular networks we will be able to sell many services that are usually sold by third parties.</p> <ul style="list-style-type: none"> <li>• Energy <ul style="list-style-type: none"> <li>▪ Smart Buildings</li> <li>▪ Condition-Based Monitoring</li> <li>▪ Remote Outage Notification</li> <li>▪ Smart Waste Management</li> </ul> </li> <li>• Utility <ul style="list-style-type: none"> <li>▪ Water Treatment</li> <li>▪ Water Management</li> <li>▪ Equipment Monitoring and Control</li> <li>▪ Hazardous Materials Emergency Response</li> </ul> </li> <li>• Transit <ul style="list-style-type: none"> <li>▪ Intelligent Rail, Rail Safety, and Transit Solutions</li> <li>▪ Fleet Management and Asset Tracking</li> <li>▪ Mobile Payments</li> <li>▪ Smart Roads and Traffic Management</li> </ul> </li> </ul>

### (o) Human and Wildlife Plan

Humans are now responsible for causing changes in the environment that hurt animals and plant species. We take up more space on Earth for our homes and cities. We pollute habitats. ... Human activity often changes or destroys the habitats that plants and animals need to survive.

**Table 26: Human and Wildlife Conflict Plan**

Topic	Details
<b>Human–wildlife conflict</b>	<p>Refers to the interaction between wild animals and people and the resultant negative impact on people or their resources, or wild animals or their habitat. It occurs when growing human populations overlap with established wildlife territory, creating reduction of resources or life to some people and/or wild animals. The conflict takes many forms ranging from loss of life or injury to humans, and animals both wild and domesticated, to competition for scarce resources to loss and degradation of habitat.</p> <p>Conflict management strategies earlier comprised lethal control, translocation, and regulation of population size and preservation of endangered species. Recent management approaches attempt to use scientific research for better management outcomes, such as behaviour modification and reducing interaction. As human-wildlife conflicts inflict direct, indirect and opportunity costs, the mitigation of human-wildlife conflict is an important issue in the management of biodiversity and protected areas.</p> <p>Human–wildlife conflict occurs with various negative results. The major outcomes of human-wildlife conflict are:</p> <ul style="list-style-type: none"><li>• Injury and loss of life of humans and wildlife.</li><li>• Crop damage, livestock depredation, predation of managed wildlife stock.</li><li>• Damage to human property.</li><li>• Trophic cascades.</li><li>• Destruction of habitat.</li></ul>
<b>Human Population Growth</b>	<p>As human populations expand into wild animal habitats, natural wildlife territory is displaced. Reduction in the availability of natural prey/food sources leads to wild animals seeking alternate sources. Alternately, new resources created by humans draw wildlife resulting in conflict. The population density of wildlife and humans increase with overlaps in geographical areas used increasing their interaction thus resulting in increased physical conflict. Byproducts of human existence offer un-natural opportunity for wildlife in the form of food and sheltered interference and potentially destructive threat for both man and animals. Competition for food resources also occurs when humans attempt to harvest natural resources such as fish and grassland pasture. Another cause of conflict comes from conservation biased toward flagship or game species that often threatens other species of concern.</p>
<b>Other Dimensions of Conflict</b>	<p>Human wildlife conflict also has a range of 'hidden' dimensions that are not typically factored in when the focus is on visible impacts. These can include health impacts, opportunity and transaction costs.</p>

<b>Conflict Resolution and Management</b>	<p>Management techniques of wildlife could be traditional techniques which aim to stop, reduce or minimize conflict by controlling animal populations in different ways. Lethal control has the longest history but has major drawbacks. Other measures, less costly in terms of life, are trans-location, regulation and preservation of animal populations. Modern methods depend upon the ecological and ethological understanding of the wildlife and its environment to prevent or minimize conflict; examples being behavioural modification and measures to reduce interaction between humans and wildlife.</p> <p>Potential solutions to these conflicts include electric fencing, land use planning, community-based natural resource management (CBNRM), compensation, payment for environmental services, ecotourism, wildlife friendly products, or other field solutions.</p> <p>In efforts to reduce human-wildlife conflict, World Wide Fund for Nature (WWF) has partnered with a number of organizations to provide solutions around the globe. Their solutions are tailored to the community and species involved. For example, in Mozambique, communities started to grow more chili pepper plants after making the discovery that elephants dislike and avoid plants containing capsaicin. This creative and effective method prevents elephants from trampling community farmers' fields as well as protects the species.</p>
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**(p) Town Development Environment Sustenance Plan and Budget**

The town development environmental sustenance plan and budget shall ensure the Town environment is planned and sustained every day to provide clean air, least noise pollution, waste management, tree cover and other environmental issues.

The sustenance budget shall fund the different areas that can impact the environment. The budget shall be implemented through a revenue and expense approach.

The revenues shall be set as follows:

**Table 27:** Town Development environment sustenance plan and budget.

Revenue Source	Details
<b>Waste Management fee.</b>	The fee shall be charged to enable waste removed from one property to the waste system applicable.
<b>Water and Sewer Fee</b>	The water and sewer fee shall supply the water and remove the water and shall be implemented through the Water department.
<b>Trees</b>	The Design-Build shall incorporate the planting of 200,000 trees in the contracts of building the plots and roads.
<b>Roads Maintenance fee.</b>	Each property through the Town management and maintenance budget shall pay a rate that shall be applied to the roads maintenance.

## **2.5. UNIVERSITY PLAN**

The university plan is a plan for advancement of education and shall be adopted from the WPI Plan as well as incorporate Diaspora and Kenya Scholars.

### **2.5.1. WPI Plan**

The WPI Plan is the University Plan of WPI University. The plan that is part of the Nine (9) Primary resources for development of University and Town will be adopted and implemented in Diaspora University. WPI plan emphasizes on innovation.

Quote from Book **“Shaping Our World Engineering Education for the 21st Century.”** *Published 2012.*

“The questions and challenges of engineering education in 2011 are congruent with the goals and nature of the WPI Plan as it was formulated 40 years ago. There are many lessons for us to learn, and they are laid out directly and well in this book. To see the congruence, we need to look no further than the subjects of WPI’s Great Problems Seminars that engage first-year students and are team taught by engineering professors and professors from other fields that would be needed to solve complex tecno-social problems:

- Feed the World
- Power the World
- Heal the World
- Grand Challenges

### **2.5.2. Diaspora Scholars Founders Plan**

The Diaspora Scholars Founders Plan creates a system for about 50 Diaspora Scholars to found the University.

This plan adds Intellectual Capital to the WPI Plan and further creates a transfer and sustenance plan of the WPI plan to be adopted at the Diaspora University.

Knowledge through education is today one of the most important tools of environmental sustainability. As the population of Kenya increases to the projected 90 million in the 50 years, knowledge shall be applied in the sustenance of life and the environment.

### **2.5.3. 30,000 University Students Plan**

The students plan is a plan to enable those becoming adults get their right to education as set in Kenya Constitution 43 and 33.

The plan further considers the students welfare through a strong economic system that is supported by the finance plan.



#### 2.5.4. Environment Integration to University Plans

**Table 28:** *Environmental Integration to University Plans*

Integration Plan	Comments
<b>University Department of Environmental Studies</b>	<p>Diaspora University will have an Environmental &amp; Sustainability Program that will be for educating students to be the custodians of the environment through knowledge. The students and department will be responsible for the research and innovation of the environment they would like to progressively have in the town every day.</p> <p>The department will apply and teach technological and scientific approaches in establishing solutions for the complex environmental issues associated with growth of population and management of resources.</p> <p>The department will lead in the establishment of sustainable solutions that advance cultural and environmental quality.</p> <p>The department will approach the environmental sustainable plan as one for improving the quality of life for those who reside, are students in the town or are visiting the town on a given day.</p> <p>On the other hand the approach will require that humans whose quality of life is to be improved be responsible in ensuring the natural resources are not wasted or destroyed as quality of human life is improved.</p> <p>Every student going through the university will be taught about environment through the interdisciplinary approach where engineering, innovation, entrepreneurship, technology studies are combined with the environmental impact.</p>
<b>University Project Center</b>	<p>Diaspora University adoption of project-based learning will incorporate The Diaspora University Town becoming a Project center. Students will be taught and thereafter apply the knowledge learned in classes and labs in the development of the Town environmental solutions.</p> <p>Through projects done students will become better advocates and developers of sustainable environmental solutions for the town and Kenya.</p> <p>Students will be able to communicate, discuss and be active in the environment of the town as the Town population grows and the university intake increases.</p>
<b>University Civil &amp; Environmental Engineering Departments</b>	<p>Through an integrated Department of Civil and Environmental Engineering as adopted from the parent institution, the design-build of the town will also be a project that will lead to education, design and construction in an environmental way be applied in the production of roads, utilities infrastructure, buildings, and waste management systems through project-based learning.</p>
<b>WPI Project Center</b>	<p>The parent institution WPI may also set a project-based learning center where students enrolled at WPI will be able to do projects at the town with a goal to offer environmental solutions.</p>

## 2.6. MEDICAL HOSPITAL PLAN

The Diaspora University (DU) Town Healthcare plan is designed to work towards meeting the healthcare needs as per Kenya Constitution 43. (1) Every person has the right to the highest attainable standard of health, which includes the right to health care services, including reproductive health care; (2) A person shall not be denied emergency medical treatment.

The Diaspora University Medical Hospital plan that will be implemented at the Diaspora University Town is spearheaded by Diaspora professionals who are working on a sustainable plan to be implemented alongside the University development plan with a goal to provide constitutional rights to students, town residents, visitors and Kenyans in general.

**Table 29: Diaspora University Medical Hospital Plan Goals**

Goal	Details
<b>Improve Healthcare in Kenya</b>	Expansion of healthcare needs as Kenya population expands to 60 million by 2030.
<b>Children Right to Life</b>	Decrease children deaths by working with mothers and parents.
<b>Jobs</b>	Create new jobs at Diaspora University Town and in Kenya.
<b>Education Opportunities</b>	Higher education opportunities in health sciences that young Kenyan adults who turn 18 years can be trained on to sustain healthy communities and nation.
<b>GDP Growth</b>	Expand Kenya GDP through the medical plans.
<b>Healthcare Disaster Management</b>	Be part of country preparedness for healthcare needs. Ebola virus outbreak showed that one cannot prepare enough for any potential healthcare emergency.
<b>Tourism</b>	Contribute to the expansion of tourism from the U.S to Kenya.

The Medical Hospital Plan consist of:

- (a) Healthcare Plan and,
- (b) Medical Hospital Environmental Plan.

### (a) Healthcare Plan

This incorporates non-medical support services and a medical departments. These will be implemented at various stages of Diaspora University and Town development.

#### i. Non-Medical Support Services:

- Medical Hospital Space and Hospital Building.
- Equipment's, medical and non-medical supplies.
- Social worker department, Interpreters.
- Pastoral/Spiritual Care.
- Speech therapy.
- Medical Evacuation and referral system.
- Ambulances and Helicopter transport and logistic.
- Risk management and Security department.

- Emergency and Disaster Management.
- Insurance. (Staff/Medical).
- Medical Records and medical/clinical scientific research.
- Food and nutrition.

**ii. Medical Departments and Divisions:**

- Emergency, casualty and out-patient departments/clinics.
- Intensive Care Unit (ICU).
- Maternity wards and Labour wards.
- Pediatric and Neonatology department.
- Surgical and Orthopedic department, Operation Rooms (theatres) and Observation rooms.
- Psychiatry/psychology departments and Geriatric care.
- Internal medicine, Gastroenterology, Nephrology, Respiratory medicine, Urology, Endocrinology and Diabetes management, Immunology, Genetics, Rheumatology and Neurology.
- Obstetrics and Gynecology.
- Physiotherapy, Prosthetics, Occupational Therapy,
- Oncology department.
- Ophthalmology, Neuropsychology, Otolaryngology
- Medical Doctors and Doctors Training.
- Nursing department and Nurses Training.
- Hospital Pharmacy and medicine procurement department.
- Diagnostics; medical laboratory, Radiology and function laboratories.
- Other Specialty Clinics: Ophthalmology, Ear Nose and Throat (ENT), Dialysis, Audiology, Rehabilitation, Anesthesiology, Dermatology, Obesity, Transplant, Autism, Sports medicine, Pain clinics. Infectious disease division.
- Dentistry.
- Blood/plasma donation and transfusion services. This incorporates non-medical support services and medical departments. These will be implemented at various stages of Diaspora University and Town development.
- Medical Hospital Space and Hospital Building
- Medical Doctors and Doctors Training
- Nurses and Nurses Training
- Medicine and Pharmacy
- Equipment and Supplies
- Diseases, Injuries and Infectious Diseases
- Medical Records
- Diagnosis, Radiology and Laboratories
- Medical Departments and Divisions: Emergency, ICU/CCU, Maternity, Pediatric, Observation, Surgery, Psychiatry, Immunology, Genetics, Gynecology, Physical Therapy, Occupational Therapy, Cancer & Blood, Orthopedics, Endocrinology, Prosthetics, Diabetes, Gastroenterology, Ophthalmology, Pulmonary, Neuropsychology, Otolaryngology, Rheumatology, Neonatology, Nephrology, Urology and Others

- Specialty Clinics: Eye, Dialysis, Respiratory, Audiology, Dentistry, Oncology, Rehabilitation Anesthesiology, Dermatology, Obesity, Transplant, Spine
- Autism
- Geriatric
- Pain Medicine
- Social Work, Interpreters, Pastor/Spiritual Care, Speech & Language,
- Ambulances: Vehicle and Helicopter
- Security, Safety, Emergency and Disaster Management
- Insurance
- Cancer Care Unit
- Food and Nutrition

#### **(b) Medical Hospital Environmental Plan**

The medical hospital plan will initially be allocated temporary space at the start of work at the site. A medical hospital environmental plan will be instituted based on the waste and disease control in compliance with the relevant regulatory authorities. The medical Hospital land and buildings plan is about 50 acres of land and 100,000 square meters of medical and learning space.

The medical hospital environment plan will be incorporated in the institution design to include:

- Waste management in general.
- Education program to all staff members on waste disposal, employee/patient protection, environmental protection to enhance and ensuring compliance.
- Standardized labels on waste containers, to ensure waste is appropriately disposed.
- Waste disposal following to established state protocols.
- Proper document of waste disposal
- Sewage management.
- Evacuation in case of a disaster,
- Fire management.
- Workers safety and Patient safety.
- Air quality.
- Trees and vegetation on land.
- Storm water management.
- Ambulance access.

Health care organizations are subject to severe penalties when waste is not disposed appropriately. Hospital waste typically falls into some basic categories which are subject to regulations written by different government agencies.

These categories include:

- Medical Waste
- Hazardous Waste
- Universal Waste.
- Drain/Waste Water.
- Recyclable waste non-Hazardous-Regular Trash
- PHI-Confidential Patient Health Information i.e. patient name, medical record number and demographics.

**(c) Waste Management – Regular Trash**

Regular trash will be placed in trash containers labeled as Trash Bins. No Confidential information, hazardous or medical waste will be placed in the regular trash bins.

**(d) Medical Waste -Biohazardous**

Disposal will be **Disposed in Red Containers lined with Red bags With Biohazard symbol.**



*Figure 20: Biohazard Sign*

**Bio hazardous Waste includes:**

- Gauze or bandages with any recognizable fluid blood or dry caked blood.
- Materials and devices with any amount of visible fluid/blood and/or otherwise potentially infectious body fluids.
- Contaminated single use or disposable speculums without batteries. Speculums with non-removable batteries are hazardous waste.
- Blood transfusion bags and/or tubing.
- Flexible walled suction canisters with free-flowing liquids, not solidified.
- Hazardous Waste Disposal.
- Any waste items with free-flowing body secretion containing blood components (e.g. urine, stools, pleural, peritoneal, amniotic fluids).

**(e) Medical Waste – Sharps Waste Disposal**

**Medical Waste Sharps:** Refers to devices that are designed to puncture or capable of puncturing or cutting the skin, that are contaminated with blood or potentially infectious body fluids. All sharps will be disposed/placed in Red clear sharp containers labeled with the word “sharp” AND the international biohazard symbol. These containers will have a narrow opening that fits the sharp object and are to be filled 3/4 before sealed. Examples include:

- Needles
- Syringes with or without needles attached
- Trocars
- Pipettes
- Scalpel blades
- Guide wires
- Blood vials
- Broken or unbroken glassware that has been in contact with infectious agents
- Serum bottles.

**(f) Medical Waste – Pathology Waste Disposal**

Pathology waste will be disposed in containers lined with red bags that has a biohazard symbol and is labeled with the words **“Pathology Waste” “Incinerate Only AND a Biohazard Symbol.** Pathology Waste refers to human specimens or tissues removed from a minor procedure, surgery or autopsies. This includes but not limited to

- Bone fragments
- Tissue, skin tags
- Biopsies, surgical specimens, limbs
- Organs and placentas
- Rigid walled suction canisters and flexible walled suction canisters with solidifier waste.

**(g) Medical Waste – Pharmaceutical Waste Disposal**

Pharmaceutical waste will be placed in containers labeled with the **international biohazard symbol and the words “incinerate only”** This includes all prescription and over the counter medications that do not require collection as trace chemotherapeutic or “hazardous waste”

- Liquid medications, injectable and oral
- Pills and tablets
- All IV bags and tubing, including saline
- All empty vials, IV sets
- Patches, lozenges, and medicinal lollipops.

**(h) Laboratory and Hazardous Waste Management**

Hazardous waste includes items that are toxic, flammable, corrosive, or reactive as defined by regulatory authorities that may be used in medical facilities or clinical/diagnostic laboratories. This include wastes that are known to pose a risk to the environment when improperly disposed. Hazardous waste will be placed in designated hazardous waste containers that will be labelled as such.

**NB:** Hazardous waste should not be placed in regular trash containers or medical waste containers.

The Medical Hospital Plan will assign Black Bins for Hazardous waste. Hazardous waste will be segregated so that incompatible material is not mixed together. Therefore, several hazardous waste containers will be utilized in various departments.

Hazardous waste may include but not limited to:

In the patient care areas:

- Aerosol. Metered dose inhalers
- Silver nitrate sticks
- Procedure Site marking pens/skin dyes
- Insulin vials or pens
- Flu vaccines with preservatives
- Nicotine patches
- Chemo therapy agents
- Disinfectant swabs

- Benzoin tincture and chloro-prep products
- Shampoos with selenium
- Barium
- Silver creams, unused silver wound dressing
- Expired pre-filled formalin containers
- Alcohol wipes
- Hand gels
- Sani wipes
- Vitamins

In the non-patient areas:

Aerosol Waste includes;

- All used or partially used cans
- Spray paint
- Compressed air or gases
- Lubricants
- Smoke detector test sprays

Flammable Waste will be labeled as such on Black Containers this will include but not limited to;

- Solvents and degreasers unused, used or partially used
- Oil based paints, stains vanish unused, or partially used
- Hand gels
- Surface cleaning chemicals and disinfectant solutions

#### **(i) Other Universal Waste**

- **Batteries:** Batteries will be placed in containers labelled 'batteries' universal waste with the accumulation start date.
- **Electronic Devices:** examples include; power strip extension cords, electronic staplers, table top lamps, clocks, printers, televisions, microwaves, pumps, cautery pens, calculators, glucose monitors and flash /pen lights.

Electronic devices will be handled with caution to ensure that they don't contain stored confidential information. Disposal will be done as per the manufacturer's instructions to ensuring that environmental and human safety is guaranteed at all times.

#### **(j) Medical Waste Incinerator.**

Medical waste incineration involves the burning of wastes produced by hospitals, facilities, and medical research facilities. These wastes include both infectious ("red bag") medical wastes as well as non-infectious, general housekeeping wastes. Incineration is considered the safest, most effective means of treatment and prevents harm to the environment and our health in general.

There are alternatives to incineration including autoclaving, chemical treatments, or ozone disinfection, but these technologies are admittedly incapable of completely destroying certain medical wastes, such as pharmaceuticals and specific pathological wastes.

## 2.7. DESIGN-BUILD PLAN

The Design-Build Plan is part of the 9 primary resources. It is a plan to produce 5 million square meters of space to support the development and sustenance of the 90,000 residents who settle in the town, the 30,000 university students who come to study in the Town and the visitors in the town at any given day.

The plan is set up to incorporate and comply with the following constitutional rights:

43. (1) 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;
- (d) to clean and safe water in adequate quantities;

42. Every person has a right to clean and healthy environment.

### 2.7.1. Road and Infrastructure Plan

#### (a) Street 60ft Right of Way



*Figure 21: Road Street design with environmental incorporations*

#### i. Design

- 10 feet. 5 feet on both sides shall be the shoulder of the road and shall have grass and trees planted.
- 10 feet. 5 feet on both sides shall have a walking path that shall be built through bricks or concrete.
- 6 feet. 3 feet on both sides of the road shall have a grass planted area.
- 34 feet. 17 feet on both sides shall be the road and street parking.

#### ii. Development Provisions

- Streets created shall be managed once created as basic roads.
- On the start of the construction of every street shall have a Design-Build Plan that shall incorporate the development of the 60 feet right of way.
- Streets development shall be done as the Town Houses they service are developed.



- The Street Design Build Plan shall include waste bins for pedestrians and signs of no littering.
- The Street Design-Build plan shall manage the roads for the first five years.
- The Street Design – Build plan shall be passed on to the Town Environmental Department at the end of 5 years. Thereafter the street maintenance and environmental management shall be implemented by the Town Environmental department.

**(b) Avenues**



*Figure 22: Road Avenue design with environmental incorporations*

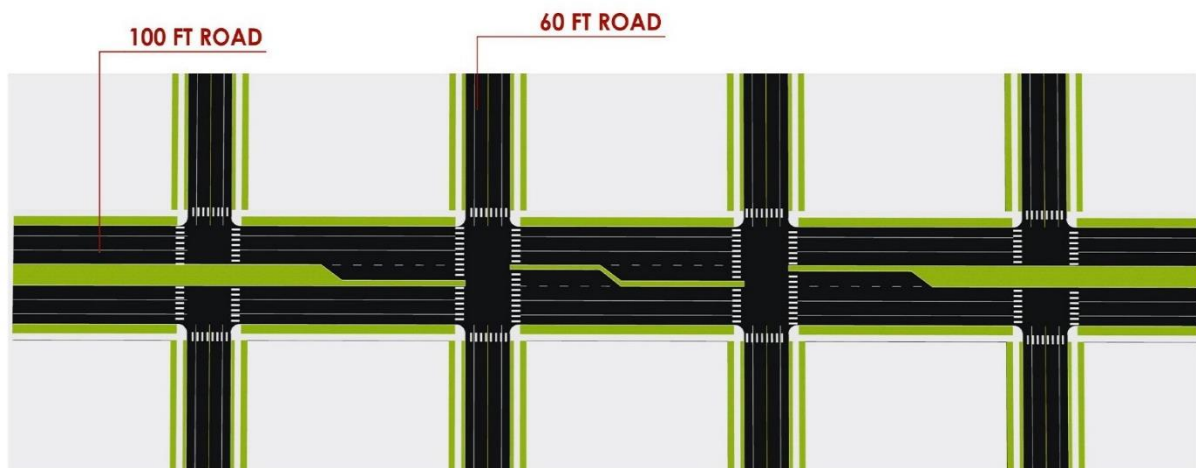
**i. Design**

- 10 feet. 5 feet on both sides shall be the walking path
- 14 feet. 7 feet on both sides shall have an environmental section planted tree and grass.
- 40 feet. 20 ft. each road with 3 sections cars and one lane for bikes.
- 16 feet. Mid - Section with trees and turning lanes for vehicles.

**ii. Provisions**

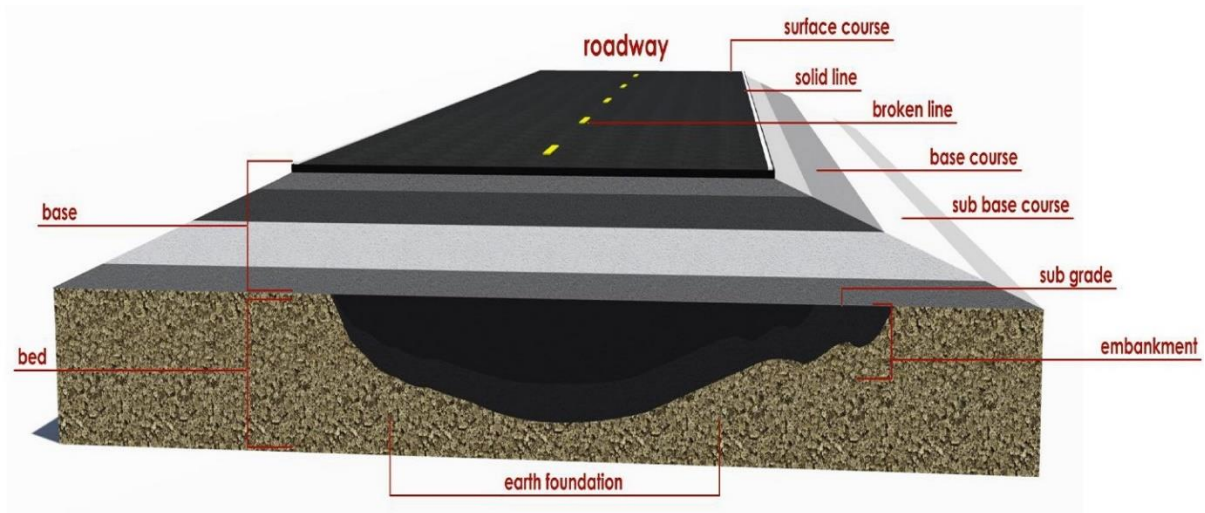
- Avenues shall connect the National Road to the Town Streets and shall service the streets, University, Commercial Centers.
- On the start of the construction of every Avenue, the Design-Builder shall file a Design-Build Plan that shall incorporate the development of the 60 feet right of way.
- The Avenue development shall be done as the streets and property the Avenues shall service is developed.
- The Avenue shall be managed through a five year Design-Build Avenue development and management plan that shall be implemented by the Design-Build Company.
- The Avenue plan shall be passed on to the Town Environment Department at the end of 5 years.

**(c) Integration of Avenues and Streets**



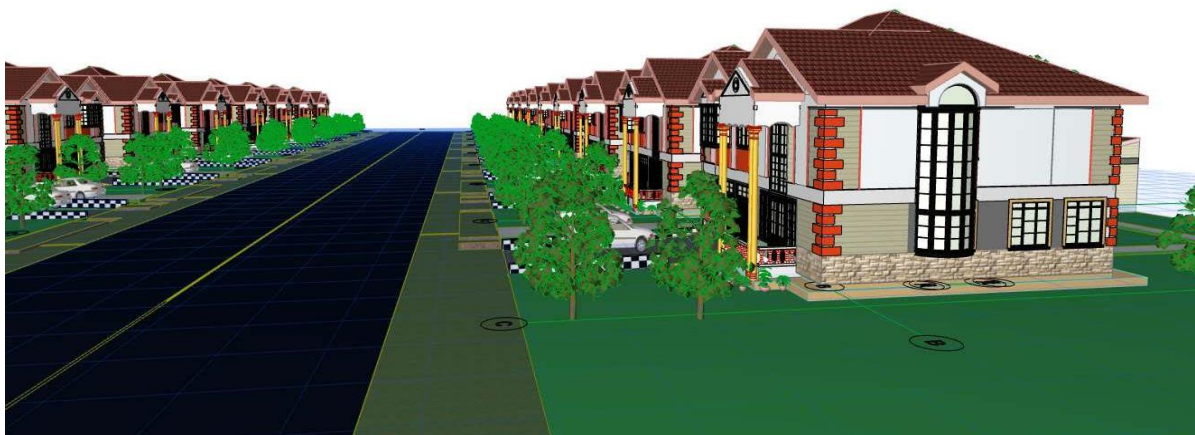
**Figure 23:** Road Street and Avenues connections

**(d) Building of Road**



**Figure 24:** Road building on earth surface.

**(e) Road Servicing Town Houses**



**Figure 25:** Road servicing Town Houses.



(f) Sewer Lines Servicing Town Houses and Other Plots



Figure 26: Sewer and Water Lines Infrastructure Design

2.7.2. Residential Town House Plan

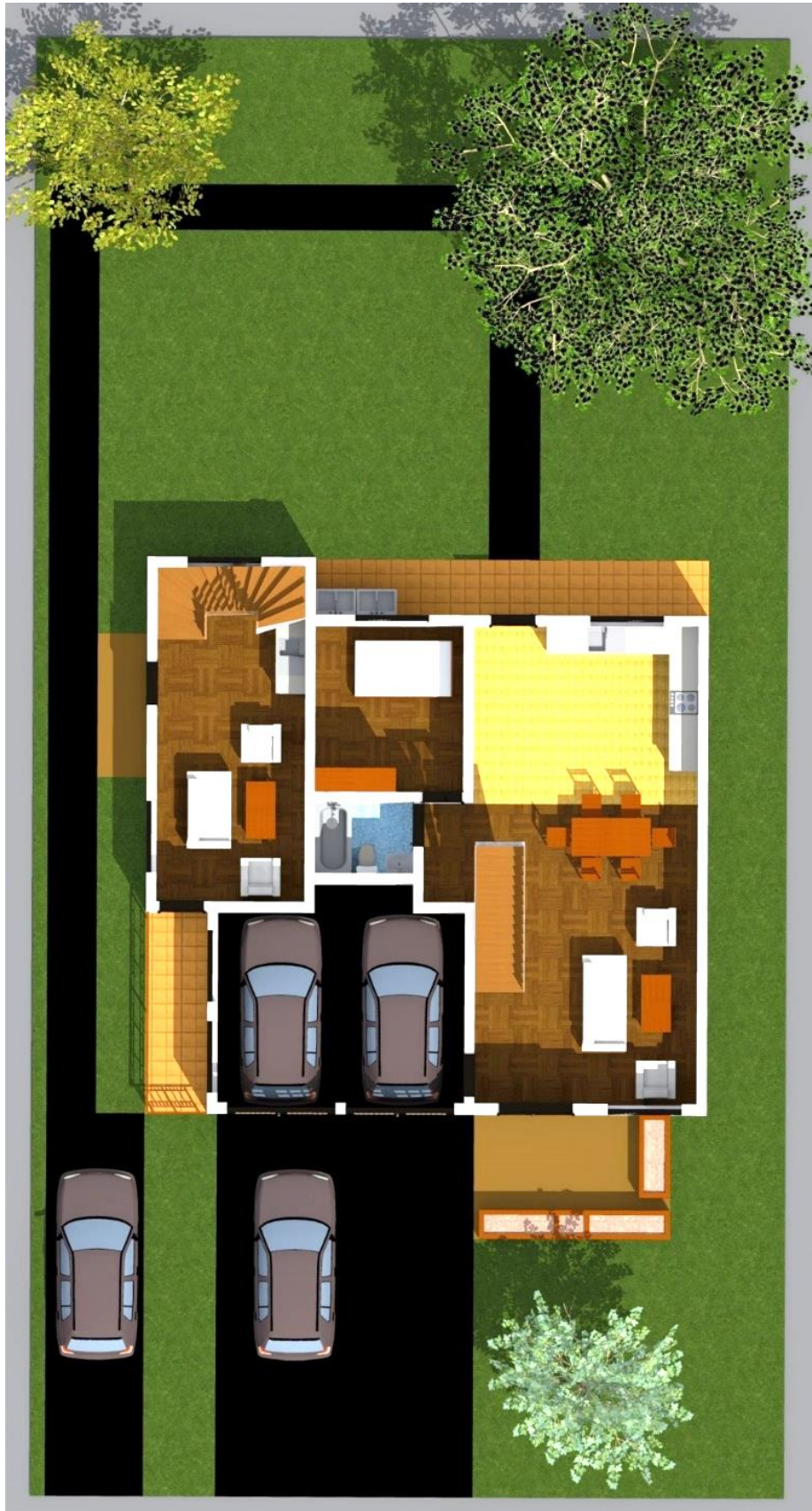
(a) Town Houses Design



Figure 27: Town Houses Design



**(b) Town House Plot Design**



**Figure 28: Town House Plot (50ft x 100ft) Design**

(c) Sewer and Water Supply

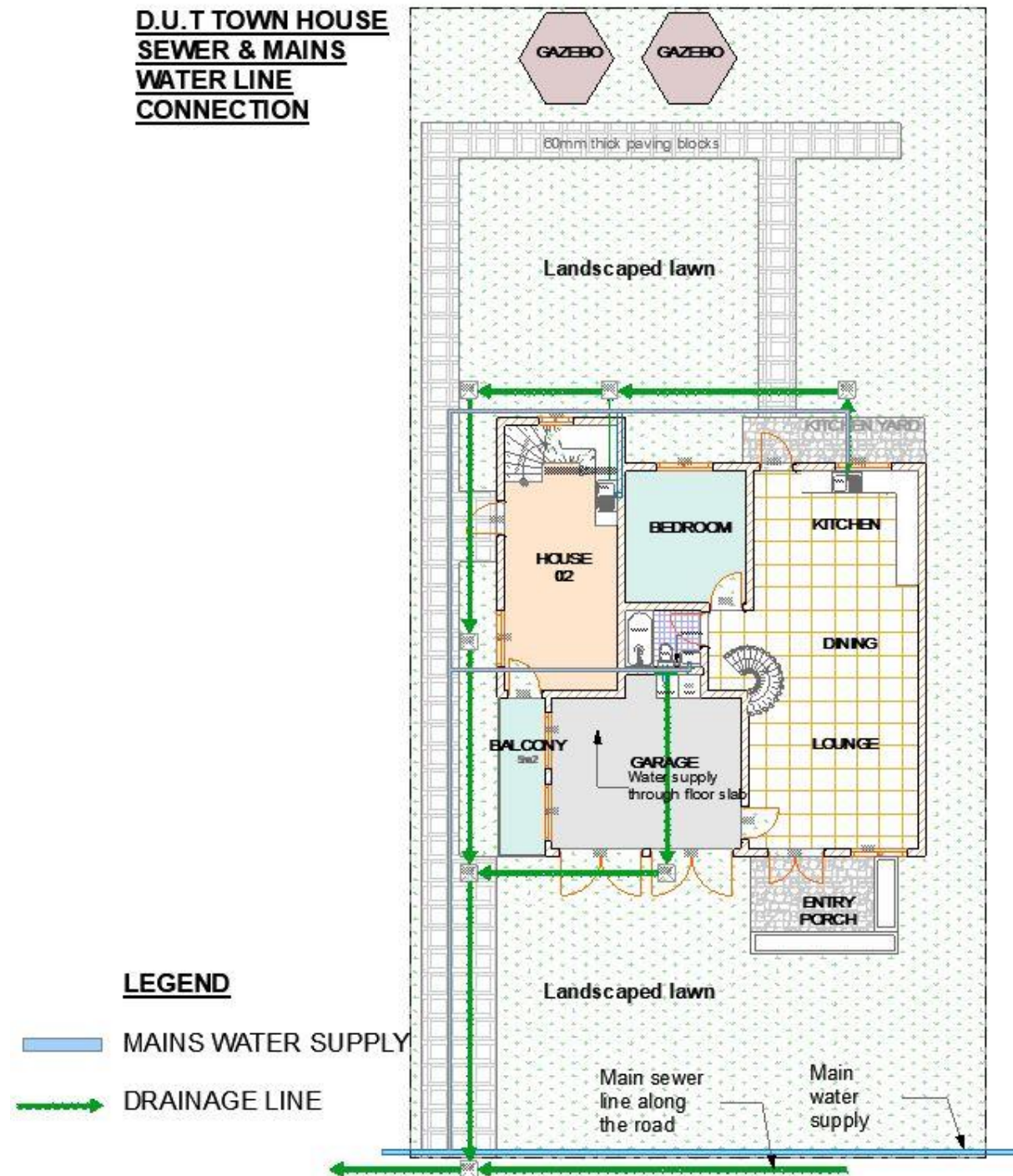
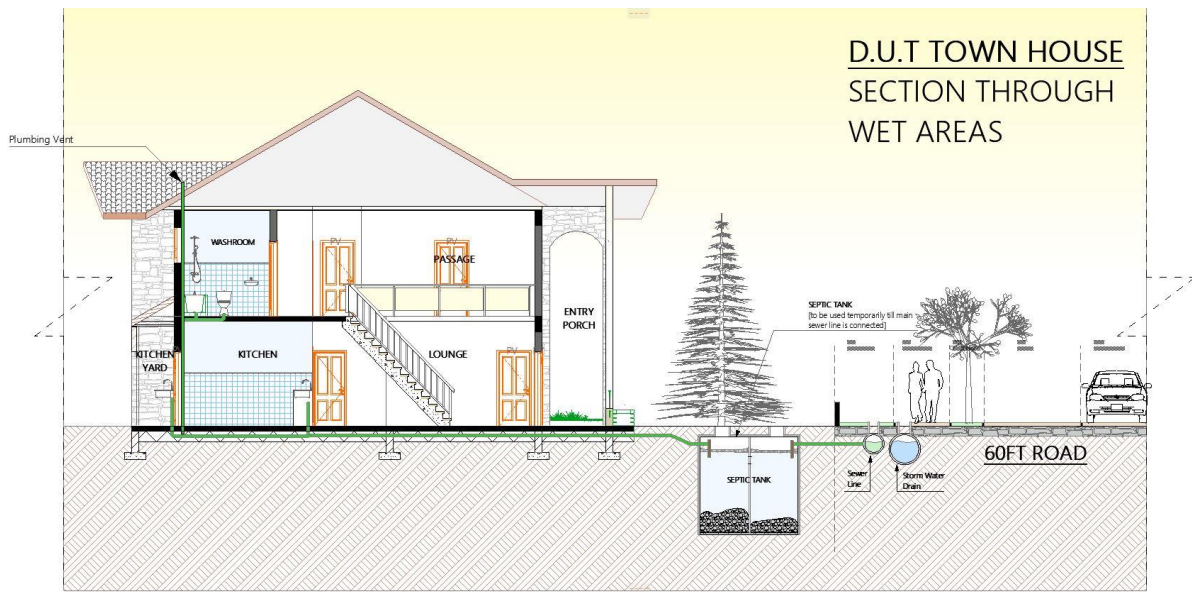


Figure 29: Town House Water and Drainage Plan



**(d) Town House Sewer or Septic Tank**



**Figure 30:** Design of Waste water removal through Septic tank and Sewer lines

**(e) Town House Design**



**Figure 31:** A Town House model of the 200 Models to be applied.

### 2.7.3. Residential Apartments Plan



*Figure 32: Apartments design*



*Figure 33: Apartments Design Aerial View*



#### 2.7.4. University Buildings and Property Plan



*Figure 34: University Buildings Design*

#### 2.7.5. Other Buildings Plans.

##### (a) Material Supply Management Warehouse



*Figure 35: Warehouse Design and Plot Design*



### 2.7.6. Design-Build Environment plan

The design-build environmental plan is the environmental plan that shall be implemented as the design-build plan of producing 5 million square meters of space through 8,000 buildings, 120km of roads and the planting of 200,000 trees.

#### (a) Land Demarcation and Roads Environment Plan.

The 4,500 acres Land demarcation plan is the sub-division to approximately 7,070 plots and service all the plots with roads. The Road network will be about 150 Km and broken down to streets and avenues.

#### (b) Land Built Area Design Environment Plan

The land built area design build environmental plan shall be based on not more than 40% of the land built with 60% remaining as natural.

The built are distribution shall be

#### (c) Labour Environment Plan

Failure to have a Labor Environment plan has led to unplanned settlements emerging next to many construction sites.



**Figure 36:** Unplanned settlement next to Runda estate.

The Design-Build plan will ensure that labor applied in the Design – Build

- Does not lead to creation of an unplanned settlement that leads to pollution because of failure of having a labor environment plan.
- Labor applied in the design-build during the day can create an unplanned settlement. The design-build labor will be incorporated to the housing plan.
- In compliance with the environment right shall ensure that all persons who supply labor to the project directly or indirectly through contracts shall advance the Kenya Constitution 42. Every person has the right to a clean and healthy environment.

#### (d) Materials Environment Plan

The material environment plan will consider the material application in the building as relates to proving an environment that protects human health and limits disaster. Inflammable material will be applied more as opposed to flammable material.

#### (e) Water Inflow, Sewage Outflow and Treatment Plant

The water inflow and sewage outflow is very crucial in the environment of any community. A house with no outflow of sewage can deny the rights of clean and healthy environment to those living in the house and in the community through air pollution.

##### i. Water Inflow

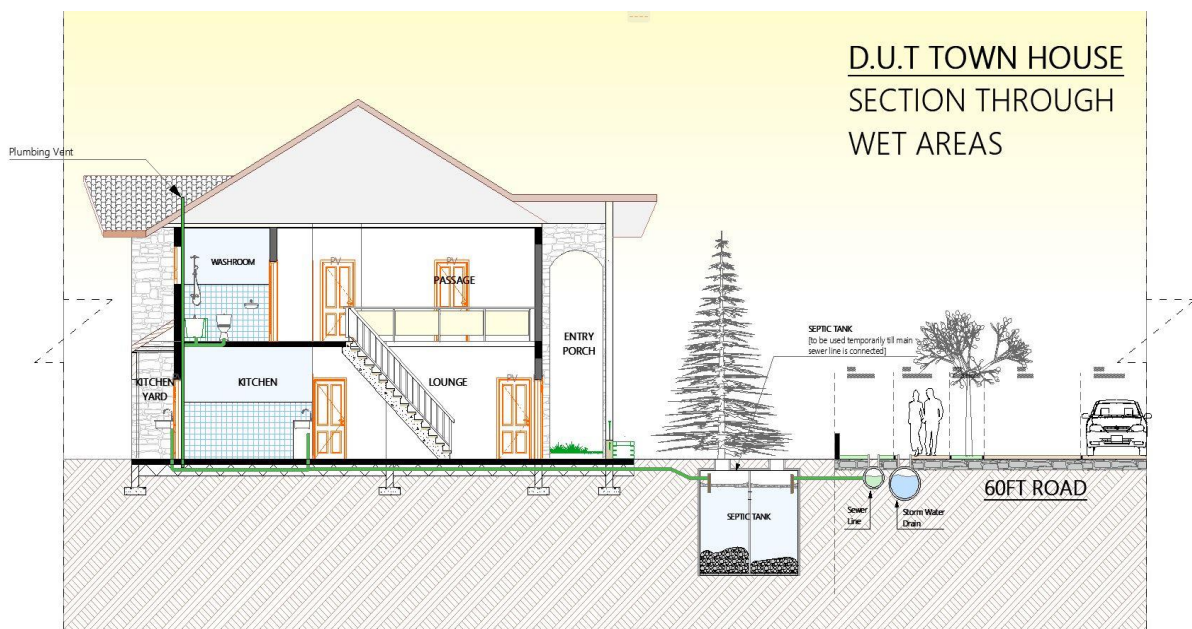
The Design – Build water inflow shall constitute the underground pipes, tanks that collect the water, the flow of water from tanks to houses and fire hydrants.

##### ii. Sewage Outflow

Once clean water is used to bath, toilets, cleaning utensils, cleaning house and washing clothing; the waste product will be disposed as the sewage outflow.

Sewage outflow is done through septic tanks and sewer lines that start from the house plot to merge to the road that transports the sewage. Sewer lines design is based on operation based on gravity.

The site sloping from the hills and with several ridges will mean sewer lines flowing to the lowest point that is close to the river and once treatment done the water can be discharged to Dam and river.



**Figure 37:** Design of Waste water removal through septic tank and sewer lines

### **iii. Treatment Plant**

The treatment plant shall constitute:

1. Lift Station Design: The design shall incorporate:
  - Wet well with storage tank for the incoming sewage
  - Manhole for receiving sewage from lift station
  - Specifications for materials used to construct the wet well and man hole
  - Pumps and motors for lift station operation.
  - Sizes of required pipes and material specifications.
  - Design of ventilation and odor control systems.
  - Noise control system
  - Electrical system
  - Instrumentation/Controls for running sewer lift station
  - Telemetry system for wireless transmission of lift station operation data and continuous monitoring to avoid backflow.
  - Security, safety and signage.
  - Operation and maintenance recommendations.

### **(f) Noise, Dust and Air Pollution**

The Design-Build environment plan will implement as many measures to reduce the noise, dust and air pollution.

#### **Measures to be implemented.**

- Areas of plot not occupied by house and constructed pavements will have grass, trees and other vegetation that shall limit the exposure of soil to wind thereby creating dust. The Design-Build on completion shall issue an environmental plot maintenance guideline with the goal to ensure each plot does not contribute toward dust pollution.
- The 60 ft. Street and 100 ft. shall be developed with consideration of dust, noise and air pollution as vehicles use the roads. No part of the road shall be left as bare soil. A maintenance plan shall be given.
- All Design-Build vehicles and machinery shall be maintained at a standard that meets low emissions, lowest noise possible when engine is running, lowest noise possible during excavation and all other measures incorporated that ensure the least pollution of air during the construction process.
- Material management shall be done in a way that cement and other materials that can be easily blown by wind to the air is managed with care to avoid air pollution from the materials.

### **(g) Rivers, Surface Water and Ground Water Pollution**

Voi River that forms the boundary of the site shall be a river in the project.

Constructed Dams shall be the surface water.

Through boreholes the water underneath the ground shall be part of the project.

The Design-Build shall implement the following:

- No sewer line shall directly be disposed to a river or surface water. All sewer lines shall lead to treatment plant or septic tank.
- No design shall be implemented for any plot to have waste in a dug hole that could pollute ground water.
- Fencing shall be done to limit direct access to the river to avoid pollution resulting from soil erosion.
- Where Dams are build a wall to prevent soil erosion to the dam shall be implemented.
- A detailed design guideline shall be given by the Design-Build for the maintenance of the designed environmental plan by the town environmental department once design and construction completed.

#### **(h) Storm Water Drainage System**

The constructed buildings and paved areas in the 7,070 plots will mean rain water will need an outlet. The paved roads will mean the draining of rain water through a developed system. The storm water shall be developed to drain the rain water to several constructed dams before the excess water is released to the river.

##### **Dams**

Dam's shall be put up at site plots as follows:

- Town Parks
- Golf Course

This shall ensure a reduction of overflows in the river.

The water as stored shall further improve the environment of the town as the water is applied in creation of moisture for trees during the dry season.

#### **(i) Waste Management Plan**

The Design – Build shall implement a waste management plan that ensures that all waste is planned for and disposed per plan set.

Design – Build shall incorporate the following:

- Waste collection bins in every plot during the construction process.
- Waste management plan that shall be adopted once designed building is complete and passed to the user.
- Waste disposal options. Emphasis shall be on waste to energy as approved in the Institution Development Plan.
- Waste disposal in the public plots (fields and parks) and public roads.
- Zero tolerance of littering.

#### **(j) Fire, Floods and Disaster Management Plan**

The Design-Build shall incorporate a fire, floods and disaster management plan in the design-build of the town.

The following shall be incorporated:

- Fire hydrants and pressured water supply to the fire hydrants.



- Signs of areas likely to experience floods during heavy rain storms. This based on the topography of the land and the constructed ground.
- Dams that can take in rain water coming from the upper ground to ease floods.
- Trees planting to serve as windbreakers. Wind contributes to spread of fire.
- Written disaster plans for different property with consideration of fire and floods.



**Figure 38:** Fire Hydrant incorporation

**(k) Trees Planting Plan**



**Figure 39:** Trees Planting in Town

The design-build shall implement the 200,000 Trees planting plan on roads and plots.

## **(I) Safety Provisions**

Safety provisions are provisions that will be applied during the design-build process with a goal to ensure safety and protect the environment. The provisions below are based on topics and the provisions made. The design-build process will progressively add on the topics and provisions as need arises.

- i. Design-Build fire safety sensors, primary extinguishing, evacuation, containment and other measures.

### *Provisions*

- An automatic fire detection and alarm system shall be designed, installed and maintained to the relevant standards in every building.
- First aid firefighting equipment including hand-held fire extinguishers selected and maintained to the relevant standards.
- Adequate access shall be provided to a minimum percentage of the building perimeter so that fire and rescue service vehicles can reach the source of a fire; this percentage increases with the aggregate area of the individual building.
- An automatic sprinkler system (fire suppression system) shall be designed, installed and maintained to the relevant standard.
- A smoke ventilation system which may be manually or automatically operated shall be installed.
- Firefighting water shall be supplied from inexhaustible sources e.g. boreholes/ dams

- ii. Design-Build safety on steps and railings constructed on ground site and buildings.

### *Provisions*

- Stairs/steps shall be installed between 30 deg. and 50 deg. from horizontal.
- Riser height and tread depth shall be uniform within each flight of stairs, including any foundation structure used as one or more treads of the stairs. Variations in riser height or tread depth shall not be over 1/4-inch (0.6 cm) in any stairway system
- Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width of the platform to less than 20 inches
- All parts of stairways shall be free of hazardous projections, such as protruding nails
- Treads for temporary service shall be made of wood or other solid material, and shall be installed the full width and depth of the stair.
- Winding and spiral stairways shall be equipped with a handrail offset sufficiently to prevent walking on those portions of the stairways where the tread width is less than 6 inches (15 cm).
- Handrails and the top rails of stair rail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 n) applied within 2 inches (5 cm) of the top edge, in any downward or outward direction, at any point along the top edge.
- When intermediate vertical members, such as balusters, are used between posts, they shall be not more than 19 inches (48 cm) apart.
- The ends of the rails shall not constitute a projection hazard.

- iii. Design-Build safety for elevations where applicable warnings signs posted.

#### *Provisions*

- Build a ramp or provide a graded surface when work areas are not on the same level. This will help prevent vehicle accidents and spillage of material.
- Mark/highlight step edges & transition areas (changes in elevations)
- Fixed stairs provided where access to elevations is daily
- Ladders inspected frequently. Those with defects withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."
- Suitable training is required for all employees who work at height. Employees should be trained in working on different pieces of equipment and surfaces, such as how to work safely on scaffolding, ladders, and roofs

#### iv. Design-Build safety on all materials used for any part of the construction.

##### *Provisions*

- Implement a written hazard communication program that includes an inventory of all hazardous chemicals used at the site. All container of hazardous substances must have a hazard warning and be labeled.
- A competent person(s) shall provide inspections of job sites, equipment and materials and includes ensuring that non-compliant tools and machinery are taken out of use by locking or tagging or removing them from the job site
- Keep aisles and passageways clear and in good repair to provide for the free and safe movement of material handling equipment and employees.
- All materials stored in tiers shall be stacked, racked, blocked, interlocked or otherwise secured. Structural steel, poles, pipe, bar stock and other cylindrical materials, unless racked, must be stacked and blocked to prevent spreading or tilting.
- No material shall be left unprotected to scatter at the site. An area of construction shall be clean as set in the design.

#### v. Design-Build safety on buildings engineering from natural forces like: Earthquakes, floods, cyclone winds and others.

##### *Provisions*

- The design shall consider the area wind patterns. The building walls shall consider the wind with concrete or complete positioned at wind paths and glass panels, windows and doors positioned in less windy paths.
- In the lowlands where there is potential for floods, the foundation shall be raised with the floor of building built such that a provision is made for potential floods.
- In reclining areas that may experience run-off water more trees shall be planted. Stronger concrete walls shall be built a few meters from ground.
- Where dams and swimming pools are built the design build safety plan shall incorporate the possibility of this dams collapsing due to earthquakes and other forces and shall establish a safety plan of the sudden excess water. The plan shall be one to limit injury and damage of property.

vi. Design-Build safety on breakage of glass material where used.

*Provisions*

- Glass, being transparent can be mistaken for an opening and cause head injuries. Addition of bands makes it more visible thus avoiding accidents.
- Where clear glass doors are used the design of doors shall be such that the glass cannot break when doors are open.

vii. Design-Build safety on balcony construction and railing especially for story buildings.

*Provisions*

- Every slab or balcony overlooking any exterior or interior open space which are 2 meters or more below shall be provided with parapet walls or guard rails of height not less than 1.20 metres and such guard rails shall be firmly fixed to the walls and slabs and may also be of blank walls, metal grills or a combination of both.
- Materials applied in balcony and railing shall be material that have the least deterioration from weather.

viii. Design-Build safety on ground surface slipperiness

*Provisions*

- If a surface is slippery with mud it shall be treated with stone.
- Any areas that are slippery should be signposted, and footwear with a good grip should be worn.

ix. Design-Build safety on weight in every floor.

*Provisions*

- Ensure that working platform is secure and check that it:
  - will support the weight of workers using it and any materials and equipment they are likely to use or store on it.
  - is stable and will not overturn.
  - is footed on stable ground or on a stable support or structure.
- The design shall establish the floor weight of a building with consideration of persons, equipment and other materials that shall be in the floor at a given time.

x. Design-Build safety on green roof use where applicable.

*Provisions*

- Where a green roof that involves planting of vegetation is applied the weight of the soil and vegetation shall be considered with relation to roof weight holding capacity.
- Vegetation whose seeds and leaves and other waste that can be harmful to persons or animals when blown by wind shall be avoided.

xi. Design-Build safety that leads to minimal damages on technologies used.

*Provisions*

- The designs and building products shall be such that they have the minimal damage on technologies.



- The design of roads shall be such that they have the minimal damages on cars.
  - The design of buildings shall be such that they have the minimal damage of electronic appliances.
  - The material application on buildings shall consider the potential damages on technologies that include: mobile phones, televisions, refrigerators and others.
- xii. Design-Build safety and security that minimizes burglary and maximizes security.
- Provisions*
- The designs shall look to create a community security system as opposed to an individual security system. This done through elimination of housing walls and having clear views of the neighborhood.
  - Maximizing security shall be done through diverse products of design.
- xiii. Design-Build safety for usage of buildings consideration based on numbers of occupants.
- Provisions*
- The design shall allocate the number of occupants or persons who can be in the building at a given time.
  - Where lifts/elevators are applied in a building the number of occupants and the weight shall be indicated.
- xiv. Design-Build safety through sign posting at places of construction work for redirection.
- Provisions*
- Adequate, safe and separate pedestrian and vehicular traffic routes should be provided on and around the site.
  - Signs of: Debris falling, rough roads, dust, noise and others shall be posted to inform persons.
- xv. Design-Build safety on speeds to be adopted in site and where necessary bumps.
- Provisions*
- Speed limits shall be posted at all roads.
  - Where cars and vehicles are required to slow down to the lowest safety speed bumps shall be installed.
  - The design-build team shall work closely with the town development and management in achieving and implementing the speed limits.
- xvi. Design-Build safety with consideration of evacuation.
- Provisions*
- All debris and other evacuation shall be done in well-established plans that ensure the debris or product evacuated does not litter, injure or damage the roads or property.
  - Where oversized equipment is to be evacuated from site after construction a written procedure of evacuation shall be established that considers the route and has minimal damage.

xvii. Design-Build safety on training and clothing gears.

*Provisions*

- Persons working at site shall have and/or shall PPE.
- The personal protection equipment and wear shall include shoes, helmets, reflectors and other equipment and wear for specialized work.
- Persons shall be trained and progressing certified on how to carry and use different equipment and technologies when working in the design-build.

xviii. Design-Build safety with consideration of equipment or technology malfunctioning.

*Provisions*

- Equipment and technology may malfunction and cause fires. A procedure to follow when an equipment catches fire shall be established for equipment and technology.
- The design-build personnel shall be trained and be ready to follow the procedures set in case of a malfunction of an equipment or technology.

xix. Design-Build safety on equipment & technology malfunctioning due to over-use; malfunctioning due to lubricants; or malfunctioning due to failure to inspect.

*Provisions*

- Equipment to be applied in the design-build shall progressively be inspected and an inspection sticker applied in the equipment.
- Lubricants applied in the equipment shall be per standards set and shall be progressively added and inspected.

xx. Design-Build safety on equipment & technology malfunctioning due to loosened bolts or wear and tear.

*Provisions*

- Equipment that wear out shall not be overused in the design-build. An equipment shall be inspected for wear and tear and where considered the wear and tear warrants the equipment not be applied any more the equipment shall not be applied.

xxi. Design-Build safety on equipment & technology malfunctioning due to human error and human exhaustion.

*Provisions*

- Persons operating equipment, machinery and technology shall be trained and issued with operational card. No person not issued with an operating card shall operate an equipment, machinery or technology.
- Persons operating equipment shall not use drugs, alcohol or any products that are stimulants to the body and mind. Random tests can be done.
- Persons operating equipment and technology shall not work more than 10 hours without sleep.

xxii. Design-Build safety based on natural weather, climate, natural vegetation and wildlife.

*Provisions*

- The design-build safety department shall establish guidelines that lead to safety from weather and climatic conditions including rain, strong winds and other factors. This shall be progressively reviewed.
- The safety department shall set guidelines on how to proceed with work where there is vegetation that is thorny and other vegetation that may have fluids and fruits that maybe harmful to a person.
- The safety department shall set guidelines on how to respond to any wildlife, insects and other life found in the site.
- Necessarily emergency equipment shall be at the design-build and a plan for execution.

#### **(m) Environmental Budget**

The Design-Build Environmental Budget shall be incorporated to ensure the Design-Build environmental plan is met and the provisions therein.

A budget toward environment shall be incorporated in the production cost of every square meter of space produced and every kilometer.

### **2.8. ENERGY PLAN**

The plan incorporates an Energy generation and supply through incorporation of Green Technologies.

The plan incorporates generation of energy through:

- Solar.
- Wind.
- Anaerobic Digestion Bio-digester or other technology.

### **Solar Power Generation & Supply Town House**



*Figure 40: Solar Energy on a Roof.*

## 2.9. FINANCE PLAN

The finance plan incorporates the following financing plans:

### (a) Diaspora Remittances

Diaspora remittances have in the past 25 years grown to reach \$2 billion (Kshs 200 billion). This has added about Kshs 1 trillion into the Kenya banks deposits currently at Kshs 3.5 trillion. The Kshs 3.5 trillion creates financing of about Kshs 2.5 trillion toward property, personal and SMEs. The Diaspora remittances in the next 5 years are expected to be about Kshs 1 trillion and the plan will tap this finances as they add to the Kenya Bank deposits and loan advances.



*Figure 41: Diaspora Remittances*

### (b) Education Academic Systems

The education academic systems that will be applied at the University consist development systems that through application in the development plan consist part of the finance of the plan.

### (c) Intellectual Property

The established Master Development Plan, University Courses and other Plans established.

### (d) Land Resource

The land resource that the project will be implemented on is part of the finance plan.

### (e) Human Resource

Kenyans in Kenya from diverse fields whose Human resource shall be applied in the project through Gross Domestic Product (GDP) growth systems is part of the finance plan. About 100 million hours of human resource will be applied in the developed of the plan.

**(f) Cash Finances**

From Diaspora and Kenyans who become Developers of Town Houses Planned and who open the Small Medium Enterprises (SMEs).

**(g) Kenya Banks finances.**

The Kenya Bank finance system is expected to grow to about Kshs 5 trillion loan advances by 2023. This will provide finance for houses, SMEs and other personal loans.

**(h) Global Finance market.**

The global finance market has billions of dollars produced every day that is looking to finance projects and make more money.

**(i) County Government Incentives.**

The project through the passing of the Institution Town development plan received Incentives through the revenues that the project will produce for the County.

**(j) National Government Incentives**

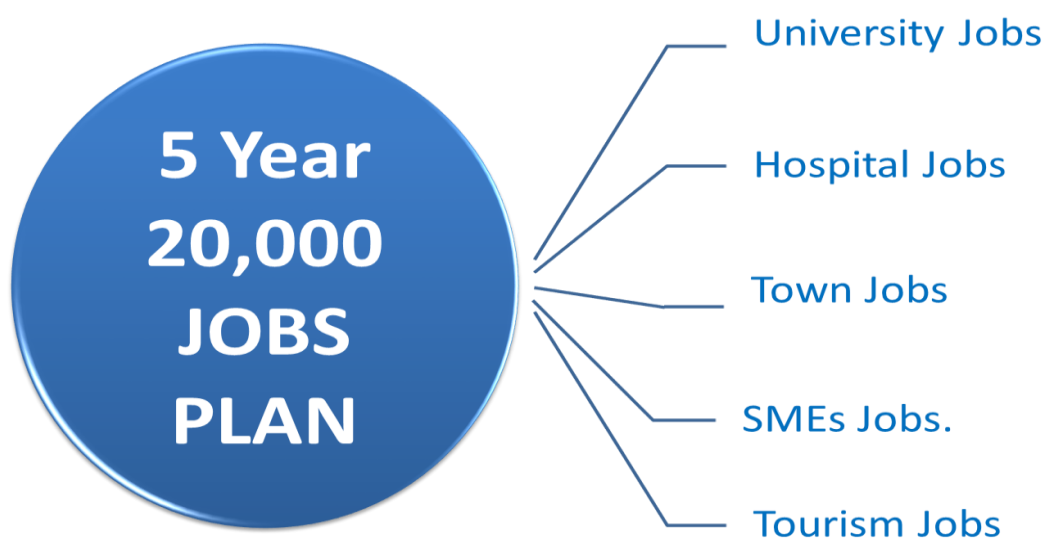
The project looks to get finance from national government incentives through tax refunds.

**2.10. PLAN DEVELOPMENT PROCESS**

**(a) Jobs Creation**

The plan development process incorporates 20,000 new jobs creation in the first 5 years. The jobs are classified into 5:

- Town Management and Sustenance Jobs
- University Jobs.
- Medical Hospital Jobs.
- SMEs Jobs
- Tourism Jobs.



**Figure 42:** 20,000 Jobs Creation

**(b) Integrated Productions and Outputs Approach.**

An integrated production and outputs approach goal is to meet the social economic and environmental rights as persons produce and create outputs that meet the rights.

**(c) First Integrated Productions and Outputs**

**Table 30:** Year 1. Production and Outputs of Roads and Built Space

Production	Plots	Space Outputs
University Space	1	12,000 Sq. Meters
Park and Fields	1	
400 Town Houses	400	72,000 Sq. Meters
Warehouses and Material Supply Building	2	16,000 Sq. Meters
Water Tank 2,000 cubic meters		
1,000 Trees Planting		
10 Km Road Network (2 km Avenue & 6 km streets)		
<b>Total (Rounded Up)</b>		<b>100,000 Sq. Meters</b>

The integrated development approach shall be aligned with:

- Jobs creation.
- Settlement of persons.
- Student's enrollment.
- Environment sustenance.

Persons getting jobs and settled in a given time shall have their economic, social and environmental needs met.

**(d) 5 Years Integration Sustainable Productions and Outputs**

The production and outputs shall progress through integrated plans until the 2 million sq. meters and 120 km road network integrated sustainable plan is complete as follows:

**Table 31:** 5 Year Production and Outputs of Roads and Built Space

Production	Plots	Space Outputs
University Projects Space	10	400,000 Sq. Meters
6,000 Town Houses	6,000	1,080,000 Sq. Meters
Other Residential and SMEs	700	520,000 Sq. Meters
Water Tanks 20,000 Cubic Meters		
200,000 Trees Planting		
120 Km Road Network (40 km Avenue & 80 km streets)		
		<b>2,000,000 Sq. Meters</b>

**(e) Integrated Development Approach**

**Table 32: Town, University and Design-Build 5 Year Development Integrated Approach.**

	<b>Jobs &amp; Town Residents Cumulative Growth</b>	<b>University Students Cumulative Growth</b>	<b>Design-Build Space &amp; Roads Cumulative Production</b>
<b>May- Aug 2019</b>	Jobs: 1,000 Residents: 200		Space: 20,000 sq. m Roads/Infrastructure: 4 km Trees Planted: 2,000 trees
<b>Sept- Dec 2019</b>	Jobs: 3,000 Residents: 1,000		Space: 100,000 sq. m Roads/Infrastructure: 10 km Trees Planted: 10,000 trees
<b>Jan-April 2020</b>	Jobs: 4,000 Residents: 3,000	Students: 1,000	Space: 200,000 sq. m Roads/Infrastructure: 15km Trees Planted: 20,000 trees
<b>May- Aug 2020</b>	Jobs: 5,000 Residents: 5,000	Students: 2,000	Space: 350,000 sq. m Roads/Infrastructure: 20 km Trees Planted: 35,000 trees
<b>Sept- Dec 2020</b>	Jobs: 6,000 Residents: 8,000	Students: 2,000	Space: 500,000 sq. m Roads/Infrastructure: 25 km Trees Planted: 50,000 trees
<b>Jan-April 2021</b>	Jobs: 7,000 Residents: 11,000	Students: 3,000	Space: 650,000 sq. m Roads/Infrastructure: 30 km Trees Planted: 65,000 trees
<b>May- Aug 2021</b>	Jobs: 9,000 Residents: 14,000	Students: 4,000	Space: 800,000 sq. m Roads/Infrastructure: 45 km Trees Planted: 80,000 trees
<b>Sept- Dec 2021</b>	Jobs: 11,000 Residents: 17,000	Students: 4,000	Space: 950,000 sq. m Roads/Infrastructure: 60 km Trees Planted: 95,000 trees
<b>Jan-April 2022</b>	Jobs: 13,000 Residents: 20,000	Students: 5,000	Space: 1.1 million sq. m Roads/Infrastructure: 70 km Trees Planted: 110,000 trees
<b>May- Aug 2022</b>	Jobs: 15,000 Residents: 22,000	Students: 6,000	Space: 1.25 million sq. m Roads/Infrastructure: 80 km Trees Planted: 125,000 trees
<b>Sept- Dec 2022</b>	Jobs: 17,000 Residents: 24,000	Students: 7,000	Space: 1.4 million sq. m Roads/Infrastructure: 90 km Trees Planted: 140,000 trees
<b>Jan-April 2023</b>	Jobs: 18,000 Residents: 26,000	Students: 8,000	Space: 1.6 million sq. m Roads/Infrastructure: 100 km Trees Planted: 160,000 trees
<b>May- Aug 2023</b>	Jobs: 19,000 Residents: 28,000	Students: 9,000	Space: 1.8 million sq. m Roads/Infrastructure: 110 km Trees Planted: 180,000 trees

<b>Sept- Dec 2023</b>	Jobs: 20,000 Residents: 30,000	Students:10,000	Space: 2 million sq. m Roads/Infrastructure: 120 km Trees Planted: 200,000 trees
<b>2024 – 2040</b> <b>Yearly Progression development plans through Yearly Budgets to grow to:</b> <ul style="list-style-type: none"> <li>• 60,000 Jobs</li> <li>• 90,000 Residents Town.</li> <li>• 30,000 Students University.</li> <li>• 5 million sq. meters of residential, SMEs, Education and Other Space.</li> <li>• 120 km road and infrastructure network.</li> <li>• Over 200,000 trees.</li> <li>• 5 million liters of Water in and out per day</li> </ul>			

## 2.11. RELATIONSHIP WITH OTHER RELEVANT PLANS AND PROGRAMMES

### (a) Housing and Water

The Plan shall be part of the County Planning as the plan creates a home of 90,000 residents of the growing population in Taita Taveta County.

#### i. Water

The plan shall be interlinked with the different Water supply plans in the County that include:

- Mzima Springs
- Boreholes

The plan shall link to the plans of the suppliers of Water.

#### ii. Housing

The plan shall be:

- Part of the National Plan to meet housing in Kenya.
- Interlinked with the NCA Act and Authority in the building of property that meets the standards of safety. The NCA will be part of the consulted team and shall be involved at all the stages of the project buildings development and implementation.
- Linked to the County Government planning and housing.

### (b) Education

The plan shall be linked with:

- Higher University education plans in Kenya and in the World.
- Primary and High school competency based curriculum.

### (c) Healthcare System

The medical hospital plan shall be part of the Kenya healthcare system as well as the Global healthcare system and shall interlink with other healthcare plans through:

- Referral
- Medicine
- Research



- Medical staff training.
- Medical equipment and supplies producers.

#### **(d) Environment**

The Plan shall be linked with environmental plan with regard to:

- Air and noise pollution and other legislation.
- Kenya Constitution Trees Planting Requirement. Kenya Constitution 69. (1) The State shall—  
(b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya.
- The University town plan links to this law through a plan of preserving and planting 200,000 trees.

#### **(e) Government Revenue and Services**

The plan shall link with the Government revenue through the taxes rates and fees collected by different government arms.

- The plan shall contribute to property rate as set in the Institution Town Plan.
- The plan shall contribute toward county revenue through permit and other fees.
- The plan shall link to National Government Plan revenue plan through taxes per Kenya Constitution article 209.

Kenya Constitution 209. (1) Only the national government may impose—

- (a) income tax;
- (b) value-added tax;
- (c) customs duties and other duties on import and export goods; and
- (d) excise tax.

The plan shall be linked to the services provided by the different arms of Government from the revenue contributed. This include: Public roads, security, judicial services, basic education and others.

#### **(f) Big 4 Agenda**

The Big 4 Agenda is a blueprint National Plan for the next 5 years for the provision of Housing, Advancement of the Healthcare, Food security and Small Medium Enterprises (SMEs).

The University town plan links to the Big 4 Agenda with consideration that the plan will meet housing needs for the 30,000 residents in next 5 years, advance healthcare through the medical hospital plan and advance SMEs growth.

#### **(g) Vision 2030**

The plan will link to the Vision 2030 goal to have a country with a per capita income of the global average of \$10,000. The plan is set to expand GDP as well as per capita income through industries, training and job creation. The plan development plan is one of achieving a per capita income of \$10,000 for the new town.

#### **(h) Standard Gauge Railway – Madaraka Express**

The plan will link to the SGR – Madaraka Express plan as the plan grows the number of persons using the SGR and also expands the volume of goods ferried through the SGR.



During the plan implementation the constitution bill of rights shall be applied in achieving the security.

**(k) Wildlife Plan by Kenya Wildlife Service (KWS)**

Taita Taveta has millions of wildlife in the 3.5 million acres Tsavo East and West National Parks. With 2.7 million acres in Taita Taveta. The area is also a migratory route for elephants and other large mammals.

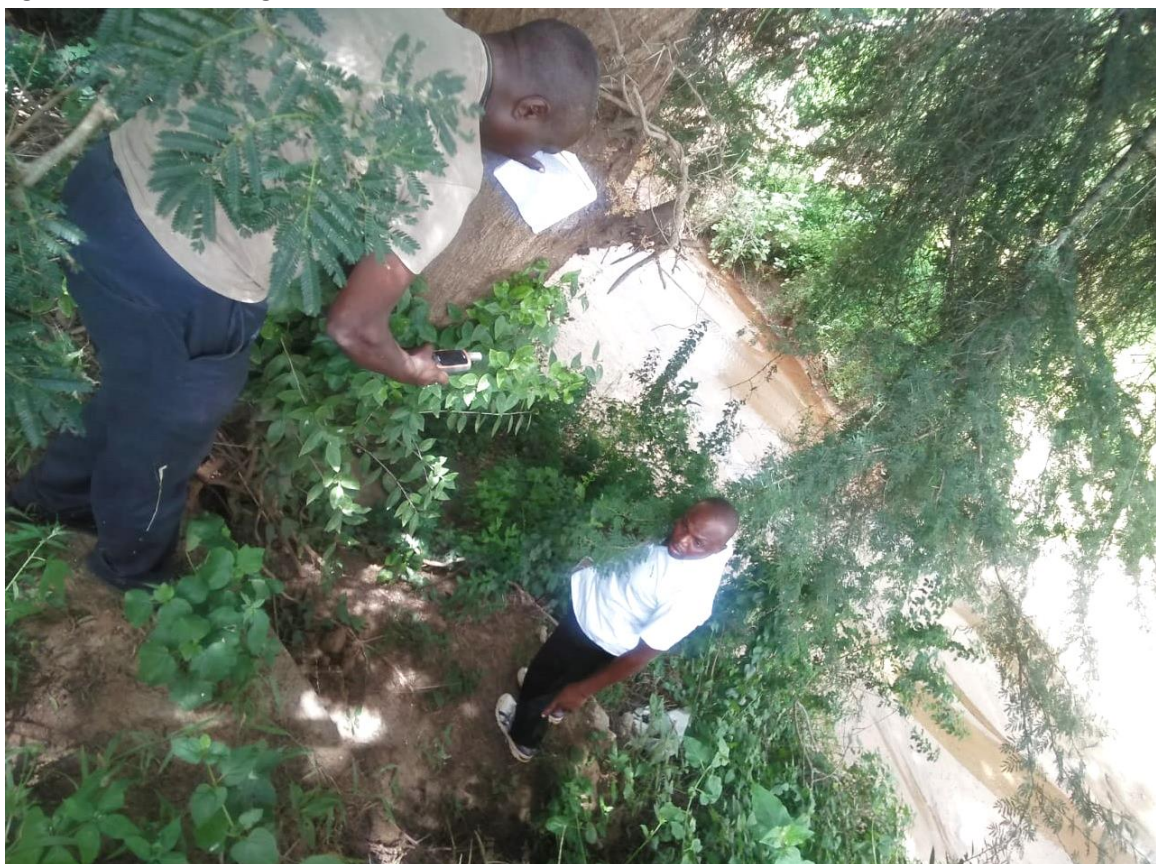
The wildlife plan by KWS is incorporated as a stakeholder. The plan shall follow the KWS plan for protecting both wildlife and humans and implement measures to avoid human wildlife conflicts.

The wildlife plan is for ensuring wildlife is sustained by the land and water resources as human population increases.

This plan is integrated to the Diaspora University Town.

The KWS plan shall take precedence where preservation of wildlife is concerned.

Diaspora University Town shall work hand in hand with KWS to do whatever possible to preserve wildlife. This shall include establishing a report of all wildlife they encounter as the development progresses and the mitigation measures established to ensure the wildlife are sustained.



**Figure 44:** KWS Official Assesses Site on Wildlife Usage.

## (I) United Nations Sustainable Development Goals (SDGs)

The Diaspora University Town is a sustainable development plan and thereby interlinks to the 17 sustainable goals. The plan shall achieve the goals for the people and environment.



*Figure 45: UN 17 Sustainable Development Goals.*

### **Goal 1: No poverty**

"End poverty in all its forms everywhere."

### **Goal 2: Zero hunger**

"End hunger, achieve food security and improved nutrition, and promote sustainable agriculture"

### **Goal 3: Good health and well-being for people**

"Ensure healthy lives and promote well-being for all at all ages."

### **Goal 4: Quality education**

"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all."

### **Goal 5: Gender equality**

"Achieve gender equality and empower all women and girls."

### **Goal 6: Clean water and sanitation**

"Ensure availability and sustainable management of water and sanitation for all."

### **Goal 7: Affordable and clean energy**

"Ensure access to affordable, reliable, sustainable and modern energy for all."

**Goal 8: Decent work and economic growth**

"Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all."

**Goal 9: Industry, Innovation, and Infrastructure**

"Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation".

**Goal 10: Reducing inequalities**

"Reduce income inequality within and among countries."

**Goal 11: Sustainable cities and communities**

"Make cities and human settlements inclusive, safe, resilient, and sustainable."

**Goal 12: Responsible consumption and production**

"Ensure sustainable consumption and production patterns."

**Goal 13: Climate action**

"Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy."

**Goal 14: Life below water**

"Conserve and sustainably use the oceans, seas and marine resources for sustainable development."

**Goal 15: Life on land**

"Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss."

**Goal 16: Peace, justice and strong institutions**

"Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels."

**Goal 17: Partnerships for the goals**

"Strengthen the means of implementation and revitalize the global partnership for sustainable development. "



### **3. ENVIROMENTAL ANALYSIS**

The environmental analysis includes:

- Baseline environment conditions, especially of areas to be affected. This includes areas to be constructed, roads nearby and rivers nearby. The baseline analysis based on 10 topics
  - Biodiversity, Flora and Fauna
  - Population and Social Cultural
  - Human Health
  - Soils
  - Water
  - Air Quality
  - Climatic Factors
  - Material Assets
  - Cultural Heritage – Architectural and Archaeological
  - Landscape
- The relevant legislative framework and related plans.
- An overview of public and stakeholders engagement in the process of SEA.
- The prediction and evaluation of impacts, including cumulative effects
- Alternative plan options considered and compared against environmental indicators.
- Justifications of preferred alternatives.
- Linkages with ongoing projects and how they fit in the plan

#### **3.1. BASELINE ENVIRONMENT**

The Baseline Environment will be the data that describes issues and conditions at the inception of the SEA. The baseline environment is done based on the environmental topics and it shall serve as the starting point for measuring impacts and performance. It shall also form an important reference for alternatives and for evaluation of alternatives.

##### **3.1.1. BIODIVERSITY, FAUNA AND FLORA – BASELINE ENVIRONMENT**

###### **(a) Introduction**

Biodiversity is defined as the wealth and diversity of living things. The variety, variations and collection of flora and fauna. In this SEA biodiversity is considered as current and future flora and fauna in the habitant of Taita Taveta County.

Taita Taveta County has total area of 17,000 sq. km or approximately 4.2 million acres of land. 2.7 million acres is allocated to Tsavo East and West that is home to hundreds of wildlife that include the big five - Lion, Elephant, Rhino, Buffalo and Cheetah. The 3.5 million acres Tsavo National Park (Tsavo East and Tsavo West) that extends of other Counties has close to 100 different wildlife and over 500 bird species. The park has rocks, plateau, river falls and dams.

The County has various springs, rivers, lakes, dams and streams that include: Mzima Springs, Njoro Springs, Tsavo River, Voi River, Athi River, Galana River, Lake Jibe, Lake Chale and other rivers, streams and dams.

The flora and fauna include hundreds of animal species, birds and vegetation. Taita Taveta County in the Taita Hills is stated to have about 21 species of fauna and flora that are not found anywhere else in the World.

The county has several hills and 48 forests on top of many of the hills. About 10,000 hectares is designated as forests.

**(b) Method of Baseline Environment Data collection and Assessment.**

The following methods were applied in the Baseline data collection and assessment.

- Visit to the site and surrounding areas.
- Questionnaires to residents of County.
- Workshops with Community Members.
- Discussions and inclusion of expert advice from government and other departments.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: Kenya Wildlife Service, Wildlife Works, Kenya Forest – Taita Taveta department and others.



**Figure 46:** Discussion on Wildlife at Wildlife Works

**(c) Baseline Environment**

**i. Flora**

They consist of exotic tree plantations and bush land but also pockets of indigenous forests.

Indigenous forests cover 41.5% of the area, 12% has exotic forests, 1% contains endemic species and 46% are bush land.



Taita Taveta area has 3 kinds of flora:

- High Altitude/High Elevation Flora: These includes areas such as the mountainous and hilly areas which receive high amounts of rainfall, are cool and experience higher rainfall than the rest of the areas.

The areas include Taita hills, Mbololo forests, Ngangao forests and areas of Mwatate. The areas are characterized by a high level of species and generic endemism with the forest ecosystem having more the 2000 species of plants of which 25 to 30% are endemic. The Taita Hills forests fauna consists of over 400 species with at least 123 endemic plant species. Ngangao and Mbololo forests have 7 of the endemic species.

- Midlands of Taita Taveta Flora. This include some parts of Taita Hills which are between 1000 to 1200 metres above the sea level.

These areas are characterized by dry spells and have woodland formations composed mainly of different *Acacia* species such as *Acacia mellifera*, *A. seyal*, *A. nilotica* and *Euphorbia* species such as *Commiphora* sp., *Ficus* sp., *Tamarindus indica* and *Terminalia brownii*.



**Figure 47:** *Acacia-Commiphora*

- Lowland Elevation Flora. This is the areas around Voi. The area is dry and is characterized by Arid and semi-arid vegetation which is a characteristic of Savanna vegetation. Tall grass, wooded *Acacia-Commiphora* associations and shrubs dominate the area.

In areas where the water table is high such as along Voi river, riverine vegetation dominated by *Croton macrocarpus*, *Croton megalocarpus*, *C. dichogamous*, *Acacia xanthophloea*, *Milicia*



*excelsa*, *albizia gummifera*, *-Kigelia africana*, *Adansonia digitata*, *Melia volkensii* and *Ficus thorningii*.



**Figure 48:** *Euphorbia candelabrum*

#### EXOTIC TREE SPECIES

Exotic trees have been planted in the upper areas mainly for agroforestry purposes. They include: *Grevillea robusta*, *Makhamea lutea*, *Terminalia brownie*, *Terminalia spinosa*, *Mangifera indica*, *Melia azedarch* and *Azadirachta indica*.

#### ENDEMIC PLANT SPECIES

Some of the endemic plant species include the African violet - *Saintpaulia teitensis*

#### THREATENED PLANT SPECIES

- African sandal wood *Osyris lanceolata*: Its wood has a rich colour, its medicinal and a factory has been set up in Tanzania to exploit it.
- *Ficus thorningii*: Common in riverine areas such as Voi River. Threatened by community because it's good for roofing.

#### INVASIVE PLANT SPECIES

Invasive plant species are quickly encroaching the area. Notable among them are: *Prosopis juliflora*, *Acacia mearsi*, *Lantana camara* and *Opuntia spp* such as *Opuntia stricta*, *Opuntia vulgaris* and *Acacia indica*.

## ii. FAUNA

The project area borders Tsavo East and Tsavo West National Parks which cover more than 62% of the county. Bordering the parks are community conservancies that act as Wildlife dispersal area. Tsavo National Park hosts wild animals such as Buffaloes, elephants, various antelopes, Giraffes, lions, leopards, rhinos etc and also about 600 bird species. The project should put in place measures to protect the wildlife and their habitats.

Livestock in the area include migrant animals such as camels, goats and cows that are brought to the area during droughts but they persist after the dry spells Crocodiles and hippos can be found in riparian areas.

### Endemic Fauna in Taita Taveta

Taita Taveta is characterized with some of the endemic faunal species especially bird species that include: Taita Thrush, the Taita White-eye and the *Taita Apalis*, a unique rear-fanged snake (*Amblyodipsas teitana*) an endemic toad (*Bufo Teitensis*), and diverse butterfly species such as: the Taita Glider (*Taita Charaxes*, *Cymothoe teita*, *Papilio desmond teita*) and Taita Swallowtail.

### (d) Legislative Requirements

**Table 33: Environmental Management and Co-ordination Act Legislation affecting Biodiversity, Fauna & Flora**

#### **48. Protection of forests**

- (1) Subject to subsection (2) the Director-General may, after consultation with the Chief Conservator of Forests, enter into any contractual arrangement with private owner of any land on such terms and conditions as may be mutually agreed for purposes of registering such land as forest land.
- (2) The Director-General shall not take any action, in respect of any forest or mountain area, which is prejudicial to the traditional interests of the local communities customarily resident within or around such forest or mountain area.

#### **49. Conservation of energy and planting of trees or woodlots**

- (1) The Authority shall, in consultation with the relevant lead agencies, promote the use of renewable sources of energy by—
  - (a) promoting research in appropriate renewable sources of energy;
  - (b) creating incentives for the promotion of renewable sources of energy;
  - (c) promoting measures for the conservation of non-renewable sources of energy; and
  - (d) taking measures to encourage the planting of trees and woodlots by individual land users, institutions and by community groups.

#### **50. Conservation of biological diversity**

The Authority shall, in consultation with the relevant lead agencies, prescribe measures necessary to ensure the conservation of biological diversity in Kenya and in this respect the Authority shall—

- (a) identify, prepare and maintain an inventory of biological diversity of Kenya;
- (b) determine which components of biological diversity are endangered, rare or threatened with extinction;
- (c) identify potential threats to biological diversity and devise measures to remove or arrest their effects;

- (d) undertake measures intended to integrate the conservation and sustainable utilisation ethic in relation to biological diversity in existing government activities and activities by private persons;
- (e) specify national strategies, plans and government programmes for conservation and sustainable use of biological diversity;
- (f) protect indigenous property rights of local communities in respect of biological diversity; and
- (g) measure the value of unexploited natural resources in terms of watershed protection, influences on climate, cultural and aesthetic value, as well as actual and potential genetic value thereof.

#### **51. Conservation of biological resources in situ**

The Authority shall, in consultation with the relevant lead agencies, prescribe measures adequate to ensure the conservation of biological resources *in situ* and in this regard shall issue guidelines for—

- (a) land use methods that are compatible with conservation of biological diversity;
- (b) the selection and management of protected areas so as to promote the conservation of the various terrestrial and aquatic ecosystems under the jurisdiction of Kenya;
- (c) selection and management of buffer zones near protected areas;
- (d) special arrangements for the protection of species, ecosystems and habitats threatened with extinction;
- (e) prohibiting and controlling the introduction of alien species into natural habitats; and
- (f) integrating traditional knowledge for the conservation of biological diversity with mainstream scientific knowledge.

#### **52. Conservation of biological resources ex-situ**

The Authority shall, in consultation with the relevant lead agencies—

- (a) prescribe measures for the conservation of biological resources *ex-situ* especially for those species threatened with extinction;
- (b) issue guidelines for the management of—
  - (i) germplasm banks;
  - (ii) botanical gardens;
  - (iii) zoos or aquaria;
  - (iv) animal orphanages; and
  - (v) any other facilities recommended to the Authority by any of its Committees or considered necessary by the Authority;
- (c) ensure that species threatened with extinction which are conserved *ex-situ* are re-introduced into their native habitats and ecosystems where—
  - (i) the threat to the species has been terminated; or
  - (ii) a viable population of the threatened species has been achieved.

#### **53. Access to genetic resources of Kenya**

(1) The Authority shall, in consultation with the relevant lead agencies, issue guidelines and prescribe measures for the sustainable management and utilisation of genetic resources of Kenya for the benefit of the people of Kenya.

(2) Without prejudice to the general effect of subsection (1), the guidelines issued or measures prescribed under that subsection shall specify—

- (a) appropriate arrangements for access to genetic resources of Kenya by non-citizens of Kenya including the issue of licences and fees to be paid for that access;
- (b) measures for regulating the import or export of germplasm;
- (c) the sharing of benefits derived from genetic resources of Kenya;
- (d) biosafety measures necessary to regulate biotechnology;
- (e) measures necessary to regulate the development, access to and transfer of biotechnology; and
- (f) any other matter that the Authority considers necessary for the better management of the genetic resources of Kenya.

#### **54. Protection of environmentally significant areas**

(1) The Minister may, in consultation with the relevant lead agencies, by notice in the *Gazette*, declare any area of land, sea, lake or river to be a protected natural environment for the purpose of promoting and preserving specific ecological processes, natural environment systems, natural beauty or species of indigenous wildlife or the preservation of biological diversity in general.

(2) Without prejudice to subsection (1), the Authority may, in consultation with the relevant lead agencies, issue guidelines and prescribe measures for the management and protection of any area of environmental significance declared to be a protected natural environment area under this section.

#### **(e) Existing Problems**

Problems exist that will progressively continue to pressure and threaten the environment and conservation of the biodiversity of Taita Taveta.

The lack of well-established plans that catalog the species in the County and progressively research on ways to ensure conservation as demand for resources increases for the growing human population and animal life will continue to pose problems to the diverse biodiversity. Some of the biodiversity may end up extinct if no plans are put to place to solve this.

Other problems will be poor settlements that affect the water in rivers, underground and destroy the fauna and flora found in the rivers.

Other challenges are the land use management. Reduction of land forestry land use through cutting of trees leads to erosion and destruction of fauna and flora.

Agricultural activities that put chemicals in the waters and the air will continue to affect the biodiversity of the fauna and flora.

Biodiversity is also impacted by recreational activities such as swimming in the rivers that disturb the species in the river.

The growing population and unplanned development through construction of houses can impact biodiversity when consideration is not given to waste management of the waste produced.

Biodiversity fauna and flora can also be destroyed if the planning of development does not take into consideration conservation. Having a conservation plan of fauna and flora should be strategy for planning developments and this SEA will conserve and have measures for biodiversity conservation.

**(f) Likely Evolution of Biodiversity, Fauna and Flora in the absence of Development Plan**

The 90,000 residents and 30,000 students creates an opportunity to have a good plan for the growing population.

Without this plan.

- More trees will be lost as opposed to being gained. This as trees continue to be used for energy. The plan would provide alternative energy.
- Conflict and deaths of animals. This resulting from human population growth with a plan for how to settle with the minimal impact to wildlife. When wildlife come to farms the first instinct of the persons is to kill the animal which would reduce the wildlife.
- The plan by having a University that incorporates research and innovation will advance the biodiversity fauna and flora conservation which would have otherwise not been the case. Population growth requires more food, roads, houses and other products that come from nature. The constant research and innovation will protect and conserve the environment.

### 3.1.2. POPULATION – BASELINE ENVIRONMENT

**(a) Introduction**

The plan is for providing the growing Kenya population with a home. The plan creates a home for 90,000 residents progressively.

Taita Taveta population continues to grow. In 2009 the population was 284,657 and living in 69,692 households. This is about 4 persons per household.

**Table 34:** 2009 Taita Taveta County Population Census Data

Sub-County	Population	Households
<a href="#">Voi</a>	89,458	23,087
<a href="#">Wundanyi</a>	71,513	16,648
<a href="#">Mwatate</a>	67,665	16,274
<a href="#">Taveta</a>	56,021	13,663
<b>Total</b>	<b>284,657</b>	<b>69,672</b>

The population is estimated have grown to about 400,000 by 2018. The population is projected to about 600,000 persons and 150,000 households by the year 2030 when Kenya population grows to reach 60 million.

The population growth will be mainly driven by the County location between the two major city Counties and especially the location of Voi, the most populous town. Voi is projected to progress in growth as an Urban Town and City.

This growing population will affect the environment as persons settle and build houses.

**(b) Method of Baseline Environment Data collection and Assessment.**

The following methods were applied in the Baseline data collection and assessment.

- Published population Census 2009 and 1999 Data.
- Visit to the project site and surrounding areas to assessment of population.
- Questionnaires
- Workshops with Community Members
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: County Government Departments

**(c) Baseline Environment**

There is a relatively low population where the plan development is set to occur. There are currently about 22 families living inside the land to be developed and form a population of about 120 persons.

With consideration that the plan is meant to cater for the growing population in Taita Taveta and Kenya; the plan baseline thus extends to surrounding towns and cities across the country.

The population that can be considered the baseline population is the residents in Voi. Most of the population in Voi is currently living in poorly planned areas.

The population of Taita Taveta County is currently estimated at about 400,000 persons and the persons in Kenya at about 50 million. A large population in Taita Taveta, about 80%, does not have an environmental plan that meets the right of clean and healthy environment (Kenya Constitution 42) for themselves and the families. This is about 350,000 persons.

Taita Taveta population is growing. The County population is expected to reach 600,000 by 2030. This will mean an increase of 200,000 persons by the year 2030.

The planned town of 90,000 residents will cater for the environmental plan of the increasing population as well as for persons in the Kenya population who do not have an environmental plan.

The Kenya population is expected to grow to 60 million. Currently about 80% do not have a good environmental plan of clean and healthy environment.



#### (d) Legislative Requirements

*Table 35: Urban Areas Cities Act of Parliament on Town*

##### **Urban Areas and Cities Act 2011.**

##### **CLASSIFICATION OF CITIES AND TOWNS BY SERVICES**

In classifying an area as a city, municipality or town, regard shall be had to the ability to provide the following services:

##### **Town—(Population at least 10,000)**

Street Lighting  
Cemeteries and Crematoria  
Libraries  
Heath Facilities  
Sports and Cultural Activities  
Abattoirs  
Refuse Collection  
Solid waste management  
Air noise  
Child Care Facilities  
Pre-Primary Education  
Community Centres  
Guest Houses  
Homestays  
Polytechnic  
Training Institution  
County School  
Airstrip  
Unclassified roads  
Museum  
Historical Monument  
Postal services  
Regional Radio Station  
Community Radio  
Funeral Parlour  
Cemetery  
Recreational Parks  
Management of Markets  
Marine Water front  
Animal control and welfare  
Religious Institution

#### (e) Existing Problems

The existing problems of population growth is lack of sustainable plans. Population growth leads to increase of demand for land that the person will apply as their sleeping place. Without plans that are sustainable the growth can decrease the land that is also required for food production; sustenance of other Biodiversity, fauna and flora; and for meeting the movement requirements of persons as they meet their daily human needs.

Growth in population has led to increase in motorbikes, vehicles and other modes of transport that pollute the air with dust when there is no development plan to cater for this.

Population growth also leads to more human waste. Without good planning this affected the environment negatively and can increase the human health problems.

**(f) Likely Evolution of Population in the absence of Development Plan**

The population will settle in more land if the town plan is not developed. The 90,000 residents could use even 10,000 acres of land with the plan.

There will be more unplanned roads to service the needs of the persons. This could be about 300 kilometers of earth roads created. More dust will be put into the air and have effect to the health of persons. The Town development plan has a 120 km road network and will conserve more land.

There will be no waste management system and this waste will affect the water. This could mean that the drinking water used by humans and animals is polluted by the waste.

The plan looks to apply green technology to meet the energy needs of the population growth. In the absence of plan the population will continue to use trees as the primary source of energy and by doing so affect the ecology that trees play that includes: wind break, water penetration to the ground, soil conservation and others. See plan Table 15: Environmental Roles of Trees and Vegetation

### **3.1.3. HUMAN HEALTH – BASELINE ENVIRONMENT**

**(a) Introduction**

Human health is the standard of health as envisioned in Kenya Constitution through the words in Kenya Constitution 43. (1) “Every person has the right to the highest attainable standard of health.”

The highest attainable standard of health is achieved through: the public prevention measures, built houses plan, financing budget plan, training of health workers, health built space, quality of services, research, medicines, ambulance transportation and other innovative standards developed progressively as population increases.

One of the measures of the standard of health is the life expectancy rate of a region. Kenya life expectancy rate is at about 64 years. Countries with high standards of healthcare have the live expectancy at 80 years.

The life expectancy rate shows that highest standard of healthcare is not yet achieved in Kenya as a comparison to other developed nations.

**(b) Methodology of Baseline Environment Assessment**

The following methods were applied in the Baseline data collection and assessment.

- Data on health facilities.
- Visit to health centers.
- Questionnaires



- Workshops with Community Members and residents.
- Assessment of standards of sanitation and clean water.
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: Hospitals, County Government Departments.



**Figure 49:** A Community workshop that discusses the community current plan

### **(c) Baseline Environment**

Human health standard incorporates the ability of the body to be healthy. Human health starts when life is created and is diverse for it involves the organized systems of the body:

- Integumentary system: Skin, Nails hair
- Skeletal system that is the bone structure of the body.
- Muscular System that attaches to the bone and enables the human body to make movement.
- Nervous System that includes the brain, spinal cord nerves and sensory organs
- Endocrine System that contains the glands that secrete hormones, chemical substances that regulates the body.
- Circulatory system that includes the heart, blood, arteries, veins, cells...
- Respiratory System that includes the nostril, lungs and the structures that take air to the lungs and out of the body.
- Digestive System includes organs that made one take in food mainly through the mouth, store it in the stomach and then eliminate it through the intestines and anus.
- Lymphatic System that includes the lymph nodes, lymphatic vessels, lymph, lymphoid organs, fluid balance, pathogens defense and defense from other foreign material.

- Immune System that is a defense system that protects from pathogens, allergens and cancer cells
- Unitary System that includes kidneys that excrete waste and control water and electrolyte balance of the body.
- Reproductive System that includes the male and female organs that enable persons to reproduce other human beings.

Human health incorporates: injuries; virus and bacterial diseases; human body systems and organ defects; physical and mental disabilities; long-term illness, acute and chronic disease; mental health and body and systems deterioration as one ages.

A human being can live to even more than 100 years.

### **iii. Health of Persons**

The baseline Human health of the region has persons living to even 100 years. However, the failure to produce enough food has led to those born today not getting enough food that will enable all their systems to grow to maximum health and capacity to support the body.

The increase of vehicles and failure to set standards of emission has resulted to air pollution that today affects the human health through foreign bodies finding themselves entering the body through the respiratory and digestive systems.

Injuries, bites from snakes and mosquitos are also common.

### **iv. Disease and Injury Contributors**

The diseases contributors were identified as:

- Unsafe drinking-water.
- Poor sanitation
- Spread through poor hygiene.
- Mosquitos
- Snake bites
- Spider bites.

#### **Common Diseases**

- Typhoid
- Diarrhea
- Stomach infection and ulcers
- Cholera
- Bilharzia
- Amoeba
- Malaria
- Cold
- Bronchitis
- Kidney problems

### **iii. Public Health**

Public health is the information provided to educate persons on matters relating to improving their health. The messages of public health include:

- Sanitation and hygiene
- Hand-washing
- Safe Sex and Condoms use.
- Keeping environment clean especially around children
- Water boiling before drinking
- Personal hygiene.
- Clothing wear and protection from temperature decline and rain.
- Use and Disposal of diapers.
- Use of sanitary towels.
- Garbage and Waste Disposal.

The information is through: Television, Radio, Health workers, Community meeting, Non-Government Organizations (NGO) workers, Neighbour, teachers in schools, Friend, Posters, Billboard, Garbage truck, Road show Demonstrations and announcements.

### **iv. Disability**

Disability results from the failure of the body systems or organs to function in the right, normal and healthy way. The World Health Organization (WHO) clarifies disability in relation to the physical, personal, social and environmental consequences of impairment.

Types of Disability

- Blindness or Visual disability.
- Deaf or Hearing disability.
- Speech disability.
- Physical disability.
- Self-Care disability.
- Mental disability.

There are persons affected by these disabilities in the population living around the area.

### **v. HIV/AIDS**

HIV that causes AIDS is a major social and economic challenge. To mitigate the spread the use of protection measures and constant free testing in the hospitals.

### **vi. Elderly**

As persons age, so do the systems that make up the body deteriorate. Medicine has played a big role in improving the healthcare of those aging as the medicines support the systems and organs that are aging. There are also equipment and institutions like nursing homes that ensure the aging process is healthy to the person.

The region does not have well established healthcare processes for the aging.

#### **vii. Treatment Facilities**

There are several treatment facilities that service the residents.

They include:

- Moi Referral Hospital – A government hospital located in Voi.
- Shelter St Joseph – A private hospital located in Voi.
- River Jordan – A private hospital located in Voi.
- Aga Khan Hospital – A private hospital in Voi.

Residents also go to Tanzania hospitals over 120 km – 300km away to:

- Faraday Hospital – A private hospital located in Himo, Tanzania.

#### **viii. Healthcare Hospital Standard**

The healthcare hospital standards in Voi keep improving as more facilities are open. The standards improved due to the facilities collaboration and the increase in the number of doctors in the area.

#### **ix. Diagnosis Standard**

The Diagnosis standards keep improving with more laboratories and diagnostic equipment available. The equipment include: X-ray machines, CAT – Scan machine, Ultra Sound and other equipment.

#### **x. Healthcare Equipment**

Healthcare equipment is crucial for the attainment of higher standards of healthcare. The region continues to work on the equipment. Some of the equipment not up to date include: Emergency stretchers; reclining beds and chairs; patient monitors among others.

#### **xi. Healthcare Finance**

The budget of healthcare is met through allocation of about 20% of the total revenues of county budget. The revenue from county budget sources are national government allocation and county rates, taxes and fees.

The second finance source is the National Insurance Hospital Fund (NHIF). This finance is through the national fund that persons contribute monthly.

The third finance is the direct payment for consultancy, diagnosis, medicine and other medical costs.

The total estimated budget of medical in Taita Taveta County is over Kshs 2 billion. This needs to keep growing as the highest standard of healthcare is achieved.

#### (d) Legislative Requirements

**Table 36:** Taita Taveta County Assembly Bill on health services

##### **TAITA TAVETA COUNTY HEALTH SERVICE BILL, 2016**

(k) (1) Private entities shall be permitted to operate hospitals, clinics, laboratories and other institutions in the health sector, subject to licensing by the appropriate regulatory bodies.

(2) Private health facilities shall be regulated within the county through collaboration between both National and County government.

(3) Quality standard assurances in the county shall have regulatory framework that co-ordinate with National government to ensure that standards are maintained with regular inspections for compliance.

Notwithstanding the provision of Public Private Partnership Act and subject to any other law regulating public- private partnerships, nothing under this Act shall prevent the county government of Taita Taveta County from entering into public-private partnerships for the purpose of establishing and strengthening health services

##### **PART VII – ADVANCEMENT OF PUBLIC HEALTH SERVICES**

**3.1.** (1) The county shall device and implement measures to promote public health to counter influences having an adverse effect upon individual, family and community health to reduce the burden of diseases imposed by communicable and non- communicable diseases by;

- a) Instituting measures to promote physical activity.
- b) The of health life style including regular physical activity and the provision of relevant facilities.
- c) Take steps to counter the excessive use of alcoholic products and the adulteration of such products.
- d) Take measures to reduce the use of tobacco and other addictive substances.
- e) The county shall promote general public health education.
- f) The county shall establish a comprehensive programme to advance reproductive health services.

(2) County government shall ensure that measures for managing environmental risk factors to curtail occurrence and distribution of diseases are put in place and implemented.

**3.2.** The County health department programs for TB, HIV, Malaria and nutrition in line with the national policy and guidelines.

(2) This program shall ensure;

- a) Reduction of the burden of malaria, TB, HIV and other emerging diseases.
- b) Promotion of nutrition services.
- c) Ensure the above receives drugs or any other commodities.
- d) Access to treatment by a trained health professional for the conditions.
- e) Ensure research is conducted to identify the factors associated with the above conditions.

##### **PART VIII – HUMAN BLOOD, BLOOD PRODUCTS, AUTOSIES AND BIOPSIES**

(1) a. There shall be County Blood Transfusion services governed by rules and regulations gazzeted by the County Assembly in Consultation with National blood transfusion.

b. There shall be established a county blood transfusion unit through gazettelement by County Assembly In consultation with the national blood transfusion.

(2) The county blood transfusion unit shall operate; deliver the transfusion services required in consultation with the National blood transfusion services.

The county transfusion unit shall;

- a) Coordinate blood transfusion services in the county
- b) Ensure availability of safe blood and blood products for transfusion
- c) Ensure safe transportation , storage and processing of blood and blood products

- d) All donors of blood or blood products shall have a right to access their results to enhance good lifestyles and management

#### **OFFENCES**

- a) No person shall remove blood, a blood product or tissue from the body of a living person without consent of the person or guardian.
- b) No person shall engage in unauthorized selling of blood, blood products and tissues from a living person.

#### **CONFIDENTIALITY**

- c) The county blood transfusion shall have the duty to maintain the results of the donor confidential unless authorized.

#### **PENALTIES**

Any person who contrivances or fails to complier with this section is liable to imprisonment for a period not exceeding six months or a fine not less than Kshs 100,000.

#### **PART 11—ROLE OF THE PRIVATE SECTOR**

- (1) The county Health Department or individual health institutions may enter into agreements with the private entities under **Public Private Partnership**, but in such instances the approval of the department responsible for health will be required, following consultation with the County Government.
- (2) Such partnerships shall be validated through a memorandum of understanding signed by the Governor if the partnership is to cover the entire health department.
- (3) No institution or health entities shall be allowed to engage in direct partnership with any partner without the involvement of the county Department of health.

#### **Environmental health**

- 1) **Occupation safety:** no developer shall be allowed to construct public premises without observing safety precautions and putting in place fire exits as may be prescribed. It shall be an offence punishable by a fine, imprisonment or both for any person or employer not to provide a safe working environment. The offence shall attract a fine not less than Kshs 50,000 or imprisonment for a period not exceeding six months or both.

#### **(e) Existing Problems**

Environmental factors are factors of the deteriorating human health. Most of the human health problems arise from environmental conditions.

Air quality influence and affects the human health as pollutants find their way inside the body. As more and more vehicles have become part of the day to day living, so have gases that are emitted from the combustion engines become part of the air.

Noise pollution that can potentially lead to hearing impairment, hypertension, annoyance and sleep disturbance is also in the increase as tuk and other form of transport increase. Noise also leads to changes in the immune system resulting to birth defects due to excessive noise exposure. Elevated noise levels can create stress, increase workplace accident rates, and stimulate aggression and other anti-social behaviors.

Human waste systems of pit latrines have negative impacts on groundwater, river water and drinking water quality. This affects health. The table shows the environmental topics and how each influences human health in a positive or negative



**Table 37: Environmental Topics and Human Health considerations**

Topic	Impact	Comments
<b>Biodiversity, Flora and Fauna</b>	+	A healthy well-functioning ecosystem with diverse flora and fauna has a positive impact.
	-	Biodiversity, flora and fauna loss can have a negative impact.
<b>Population</b>	+	Less population in an area may promote fresher, unpolluted air
	-	More population increases exposure to noise and air pollutants
<b>Soils and Geology</b>	+	Management of erosion.
<b>Air</b>	+	Management of Dust
	-	Airborne diseases as population becomes denser.
<b>Noise</b>	+	Management of noise output from persons and vehicles through the plan.
	-	Increased environmental noise as development activities occur. This may increase emotional and mental health impacts.
<b>Climatic factors</b>	-	Increased flooding and mosquitos leading to addition to infection.
<b>Water</b>	+	Facilitation of clean water.
	-	Waterborne diseases as waste water is disposed.
<b>Material Assets</b> Buildings	+	Good planned buildings can decrease healthcare infections
	-	Buildings can create and increase flooding
<b>Material Assets</b> Waste management	+	Good waste management systems will impact the environment positively
	-	Inappropriately-located waste management facilities will result in odour- and noise-related health issues
<b>Material Assets</b> Water	+	Clean, good-quality water is essential for good health
	-	Poor quality water from wells and boreholes leading to waterborne disease
<b>Material Assets</b> Wastewater infrastructure	+	Adequate and efficient wastewater treatment should maintain good water status.
	-	Poor wastewater infrastructure may pollute waters and impact on human health
<b>Material Assets</b> Energy	+	Decreased dependency on non-renewables equates to less air pollutants.
	-	Some renewable energy infrastructure may cause negative health impacts e.g. noise from wind turbines
<b>Material Assets</b> Forestry	+	A healthy forest increases ambient oxygen concentrations
	-	Recreational use of forests promotes mental and emotional wellbeing.
<b>Cultural heritage</b>	+	Well-preserved archaeological and architectural elements and their appreciation and enjoyment will result in a well-balanced and healthy mental state
<b>Landscape</b>	+	Health benefits from a scenic and aesthetically-pleasing landscape.
	-	Landscape destroyed by inappropriate development can lead to poor emotional wellbeing

#### **(f) Likely Evolution of human health in the absence of Development Plan**

Human health and environment go hand in hand. The absence of the development plan will mean deterioration of the environment which will in turn reduce the standard of human health.

The absence of the plan will lead to poor housing and expose the humans to mosquitos that cause Malaria and other parasites.

The absence of the plan will mean the standard of health will not advance with the population growth.

### **3.1.4. SOILS AND GEOLOGY – BASELINE ENVIRONMENT**

#### **(l) Introduction**

Soil is the earth's crust. It is formed of diverse mineral particles, organic matter, water, air and living organisms.

Soil is a resource that performs many functions including production of food, storage of water, support of structures and other biomass production.

Geology is the science which deals with the physical structure and substance of the earth, their history, and the processes which act on them. The Earth offers an almost endless variety of things to study, including minerals, rocks, fossils, soils, rivers, mountains, volcanoes, and earthquakes.

#### **(m) Methodology of Baseline Environment Assessment**

The following methods were applied in the Baseline data collection and assessment.

- Visit to the project site and surrounding areas to assessment of the soil and geology.
- Questionnaires
- Workshops with Community Members and Residents
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: County Government Departments

#### **(n) Baseline Environment**

##### **i. Soils**

The main soils in Taita Taveta County are Haplic Acrisols, Eutric Cambisols, Chromic Luvisols and Regosols. The areas of Sagalla, Taita and Kasigau are block-faulted basement (crystalline) rocks in the Mozambique belt composed of Precambrian paragneisses from metamorphosed pelitic arenaceous and calcareous sediments from about 290 to 180 million years ago. The dominant soils are cambisols and originate from weathered gneiss and are often gravely to sandy-loamy and shallow and are well drained and moderately fertile. On steep slopes and transitional zones the dominant soil types are Regosols, which are shallow soils, have high permeability and low water holding capacity.

In some areas, the soils are well drained to excessively drained, dark reddish brown to dark brown shallow to extremely deep, friable to firm and compact, sandy clay loam to clay. The soils are also characterized by high aluminum levels, low calcium levels, resulting in low cation exchange capacity and vulnerable to soil erosion. At the valley bottoms, alluvial soils (fluvisols) are apparently, characterized by young soils with fertility being moderate to high. They receive fresh sediments and nutrients during regular floods and occur in all larger river basins of Bura, Lumi, Mbololo, Mwatate and Voi Rivers.

## ii. Geology

The Geology of the land is composed of minerals that include limestone, magnesium... There are rocks, muarrum, sand in the streams and rivers. The land has hilly sections.

## (o) Legislative Requirements

*Table 38: Taita Taveta Bill on Sand Harvesting*

### **The Taita Taveta County Sand Harvesting (Amendment) Bill, 2018**

16. A person who intends to harvest sand for commercial purposes shall make an application for a license in the prescribed form accompanied by such fees as may be determined by the county executive committee member, to the sub county committee.

(1) The sub county committee shall consider each application made under section 16 and make recommendations to the licensing officer to issue a license to the applicant within thirty days of receipt of such recommendations.

Where the sub county committee is not satisfied with the application under sub section (1), the sub county committee shall reject the application, and inform the applicant of its decision within fourteen days.

(2) The licensing officer may issue different classes of licenses for different purpose as may be provided for in the Regulations.

## (p) Existing Problems

Soil is affected by agriculture, organic waste disposal, forestry, industry, extraction, mining and infrastructural development. These activities if not well planned can lead to soil degradation, acidification of soil, loss of soil stability, soil erosion, soil contamination and loss of biodiversity.

## (q) Likely Evolution of Soils and Geology in the absence of Development Plan

The absence of the development plan can lead to soil erosion. The plan by planting trees and vegetation will reduce the incidence of Soil Erosion.

## 3.1.5. WATER – BASELINE ENVIRONMENT

### (a) Introduction

Water that is formed by hydrogen and Oxygen is an important component of the human life and health. 60% of the human body is formed from water. Similarly all other forms of life: Vegetation, Trees, animals, insects, marine life and birds all are formed with a component of water.

The World water resource is made available through rain, rivers, underground water and Oceans. By nature water is mobile and keeps moving. It is based on this that water is applied to many uses.

Some of the major uses of water in human life sustenance is drinking of clean water to wash the internal organs and systems of the body. Water is also applied by humans in washing their external

body, their clothes, the appliances they use to feed themselves. In environment sustenance and human health, water plays the role of waste transportation.

### **(b) Methodology of Baseline Environment Assessment**

The following methods were applied in the Baseline data collection and assessment.

- Water Data.
- Visit to the project site and surrounding areas to assessment of population.
- Questionnaires
- Workshops with Community Members and Residents
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: County Government Departments.

### **(c) Baseline Environment**

#### **i. Water in Taita Taveta**

Taita Taveta has several springs which includes salaita, Little Lumi, Njoro Kubwa and Kitobo. Several of the springs and the perennial river Lumi drain into Lake Jipe. Ruvu River springs from Lake Jipe and flows towards Tanzania. Lake Challa and Jipe are the two freshwater lakes in the County and are located right on the border to Tanzania.

Lumi river basin in Taveta division arises from Mt. Kilimanjaro in Tanzania and empties into Lake Jipe and the Ruvu River is a surface outlet of Lake Jipe flowing into Tanzania. There are 2 lakes within the Lumi basin. The Crater Lake Challa and Lake Jipe. Tsavo river basin in Taveta and Wundanyi division- Tsavo River arises from Njukini springs in Taveta Division. It flows into Athi River.

Mwatate river basin in Mwatate Division, Mwatate river has Bura river as its major tributary and flow southwards through the national park into Kwale County.

The main rivers in the County are the Tsavo, Lumi and Voi rivers. Mzima springs is the major water supplier to Voi town and Mombasa City, while small springs and streams include Njukini, Njoro kubwa, Kitobo, Sanite, Maji Wadeni, Humas Springs and Lemonya Springs.

In addition, there are two lakes, Jipe and Challa, both found in Taveta area. Lake Challa is a crater lake with little economic exploitation, while Lake Jipe is slightly exploited through small scale fishing. Both lakes are served by springs emanating from Mt. Kilimanjaro.

The rainfall in Taita Taveta provides water to the County all year round as per graph. Underground water is also available through boreholes.

#### **ii. Voi River**

Voi River is a major river in Taita Taveta creates a borderline of land the Diaspora University Town will be established. The river has been used for irrigation, domestic, livestock and wildlife use and is

dry most of the months due to effects of climate change and economic factors from the growing population along the river banks.

These factors have degraded the river riparian as unregulated sand harvesting, brick making, charcoal burning and irrigation occurs. Consequently, Aruba dam in Tsavo East, a major watering point for the big five has dried up and catalyzed the Human-Wildlife conflict prevalent in the County.

The clearing of the riparian vegetation, in particular the large trees for conversion into charcoal has overtime rendered the river seasonal and flows only experienced during the rains.

### **iii. Water for Human Needs**

Water for human needs is the water used by humans to meet their daily needs on drinking, washing, washing clothes, flushing toilets, cleaning houses, watering gardens and other needs.

In countries with well managed water generation and supply systems a person needs can range from 50 litres to 200 litres a day. The minimum water requirement is the water needed for a person to achieve the minimum basic needs.

The Water generation and supply is not yet developed. Whereas there are ample sources of water and millions of litres of water every day and year are available through the rivers, rain and underground sources the infrastructure to have this water meet the needs of the persons in the County is not yet developed.

### **iv. Water and Pollution**

Water in its role of transportation is a route of environmental pollution. It is based on this that water should be assessed in the environmental consideration.

The water quality of the region is assessed based on underground water, river water, lake water and rain water exposure to pollution.

### **v. Water and Wildlife**

The millions of animals living in the Tsavo East and Tsavo West National Parks every day require water. When the animals don't get water, especially in the dry season, they can cause damage to water infrastructure and crops.

### **vi. Water Sources Developed or to be Developed**

There is Mzima Pipe One that was developed during the colonial times to supply water from Mzima Springs to the residents of the Coast region. The water is managed by the Coast Water Board supplies water to Taita Taveta, Mombasa and Kwale Counties. The biggest consumer is Mombasa County.

There is a plan to develop Mzima Pipe Two from the Mzima Springs.

There is a plan to develop water from Njoro Springs. The pipe would be developed along Voi – Taveta road and would end at Maili Kumi (About 10 miles) from Voi.

Boreholes and rivers provide the other sources of Water.

#### (d) Legislative Requirements

**Table 39:** *Taita Taveta Bill legislative on Water and Sanitation*

##### **THE TAITA TAVETA COUNTY WATER AND SANITATION BILL, 2016**

- (1) A person intending to carry out or maintain any water works shall apply for a permit to the Board.
- (2) A person who prior to the commencement of this Act was carrying out water works shall apply for a permit to the Board.
- (3) A person who contravenes this section commits an offence and shall be liable to a fine not exceeding one hundred thousand or to imprisonment for a term not exceeding one year or to both.
- (1) An application for a permit under section 20 shall where applicable be accompanied by an environmental impact assessment report in accordance with the Environmental Management and co-ordination Act, 1999 and shall specify among others—  
The purpose and nature of the works to be undertaken;  
The nature of works to be carried out;  
The duration within which the works are expected to be completed.
- (2) The Board shall, where the construction of works are to be undertaken on public property or where the works will affect a cross section of the residents, issue a public notice within fourteen days after such an application and invite any person to make comments or object to such an application.
- (3) A person may lodge an objection to application for a permit.
- (4) Every objection to an application shall be made in writing to the secretary of the Board setting out the grounds for an objection.
- (5) Every Board shall, upon receiving the application send a notice on the objection received to the applicant for a permit.
- (6) The Board may, where appropriate conduct public hearings on the objection.
- (7) An objector or an applicant for a permit may appear personally or by an advocate at the hearing of an application.
- (8) The Board shall consider the application within thirty days of such an application and may where it is satisfied that the applicant has fulfilled all the requirements of this Act or any other written law grant a permit in the prescribed form subject to any such conditions as may be prescribed fees.
- (9) Where the Board is not satisfied with the application, it may –Reject the application giving reasons and notify the applicant accordingly within thirty days of the decision to reject; or Make comments and recommendations thereon and return it to the applicant within thirty days.
- (10) An applicant to whom the application is returned under subsection (9) (b) may re – submit the application within sixty days.
- (11) On receipt of any revised application under subsection (10), the Board shall, within thirty days determine the application in accordance with this Act and upon such determination, if satisfied, issue a permit.

#### (e) Existing Problems

Deforestation and settlement in water catchment areas is affecting the water supply leading to dry-up streams. The land has several streams that have since dried up as population has settled in the hill tops.

Unmanaged water creates gullies and erode underground soil leading to landslides.

Whereas there is plenty of water in Taita Taveta that could meet the requirements of persons needs and animal needs there lacks development of infrastructure that will deliver the water to the usage and thereafter dispose it in the right way.

Where a dug hole pit latrine touches the underground water basin the human waste can pollute the underground water. Since water is mobile at all times the polluted water can move to other persons boreholes.

The lack of good sewerage of wastewater discharges introduces pollutants that include human waste solids, nutrients such as phosphorus and nitrogen in its various forms. This introduced to both surface and ground waters.

#### **(f) Likely Evolution of Water in the absence of Development Plan**

Because of the roles water plays, the planning of water is critical in the sustenance of life and the environment.

In the absence of the 90,000 resident's town that incorporates a water plan for the persons, the persons as population grows would not have a planned water supply and water disposal/recycle plan. This would mean more surface and underground water pollution.

The absence of the plan would also mean that persons would spend time in search of water. This would mean more roads and pathways created for the purpose of fetching water.

### **3.1.6. AIR AND NOISE – BASELINE ENVIRONMENT**

#### **(a) Introduction**

Air is a colorless, odorless, tasteless, gaseous mixture of gases that makes up the Earth's atmosphere.

The Properties of Air are

- Air is invisible.
- Air has weight.
- Air takes up space.
- Air has no odor or taste.

Air quality depends on weather and pollutants.

#### **i. Weather**

Moving air, called wind, falling water, Rain, sun rays are weather conditions that affect the air quality. Variance of temperatures also affects the air quality.

#### **ii. Air Pollution**

Air pollution occurs when gases, dust particles, fumes, smoke, odour are introduced into the atmosphere in a way that makes it harmful to humans, animals and plant. Things that pollute the air are called pollutants.

*Examples*



- Exhaust fumes from vehicles
- Burning of fossil fuels, such as coal, oil, or gas
- Dust particles
- Gases Emitted from Waste and decaying matter.
- Gases emitted from production of plastic
- Gases from paint.
- Radiation spills or nuclear accidents

### **iii. Air Pollution and Health**

- Asthma
- Allergies
- Respiratory illnesses.
- Stomach illnesses

### **iv. Noise Pollution**

Noise pollution is any loud sounds that cause discomfort and are either harmful or annoying to humans and animals. Noise pollution can be disruptive to humans' stress levels, may be harmful to unborn babies, and drives animals away by causing nervousness and decreasing their ability to hear prey or predators. Sounds that to the ears produce unpleasant effects, or are unwanted, are considered to be noise. Noise pollution generally interferes with normal activities, for example, conversing or sleeping.

#### *Examples*

- Airplanes, helicopters, and motor vehicles
- Construction or demolition noise
- Human activities such as sporting events or concerts

### **v. Noise Pollution and Health**

- Unwanted sound (noise) can damage physiological health.
- Hypertension
- High stress levels
- Tinnitus
- Hearing loss
- Sleep disturbances
- Other harmful health effects.

### **(b) Methodology of Baseline Environment Assessment**

The following methods were applied in the Baseline data collection and assessment.

- Visit to the project site and surrounding areas to assessment of air and noise pollution.
- Questionnaires
- Workshops with Community Members and Residents
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: County Government Departments

### (c) Baseline Environment

Kenya Constitution requirement of a clean and healthy environment sets the baseline of the environment with relation to air quality and noise pollution. The land area and region currently has the following pollutions:

#### i. Air Pollution

- Dust brown into the Air from exposed ground by wind or by moving vehicles.
- Emissions from cars passing close to the land.

#### ii. Noise Pollution

- Noise pollution when cars are passing through the rough roads.
- Noise pollution from winds.

### (d) Legislative Requirements

**Table 40:** *Taita Taveta Bill legislative requirement on Air Pollution*

#### **PART III --- AIR POLLUTION**

- 7.** A person shall not act in any way directly or indirectly causes, or is likely to cause, immediate or subsequent air pollution, or emit any liquid, solid or gaseous substance or deposit any such substances contrary to this Act.
- 8.** The department shall take necessary steps in order to control air pollution within the County, including ---
  - a) Promotion of alternative cooking technologies that are non-polluting;
  - b) Development of well ventilated buildings;
  - c) Regulation of smoking in enclosed spaces; and
  - d) Promotion of tree planting and expansion of forest cover.
- 9.** Every owner or operator of a controlled facility shall ensure that emission from the facility does not cause air pollution outside the facility, in excess of the prescribed relevant ambient air quality levels.
- 10.** (1) The occupier or operator of premises shall ensure that exposure of indoor air pollutants does not exceed the exposure limits stipulated under the Factories and other places of work (Hazardous Substances) Rules, 2007, and any other written law.  
(2) Where the hazardous substances referred to in subsection (1) are not covered under the legislation referred to therein, the occupier or operator shall apply the guidelines provided by the manufacturer or supplier of the substances.  
(3) The department shall make regular inspections of premises and ensure indoor pollutants do not exceed the recommended levels.
- 11.** Subject to any written law, the following operations shall be permissible within the County provided that they are not used for the disposal of refuse ---
  - a) Back – burning to control or suppress wildfire;
  - b) Firefighting rehearsals or drills conducted by County fire brigade;
  - c) Traditional or cultural burning of grasslands;
  - d) Burning for purposes of public health protection; and
  - e) Emission of air pollutants from all stationary and mobile sources as may be prescribed.
- 12.** The department may rise objection in the grant or renewal of a license relating to ---
  - a) The use of premises as a theatre, music hall, concert room or other place of amusement , or as a restaurant or eating house; or
  - b) The use of premises for the carrying on of any work or trade, on the ground that ---
    - i. The method adopted or proposed to be adopted by the applicant for preventing noxious or offensive vapours, gases or smell arising from such premises are not efficient; or

<p>ii. The granting of such license or the renewal thereof would be calculated to cause public nuisance or annoyance to persons residing in the neighborhood, or otherwise be against public interest.</p> <p><b>13.</b> The department shall, in collaboration with other departments and agencies of the County Government ----</p> <p>a) Provide methods of abating and regulating air pollution;</p> <p>b) Determine protected areas and special areas for the purpose of this Act;</p> <p>c) Promote public awareness campaigns relating to measures to safeguard the health of nonsmokers from second hand smoke; and</p> <p>d) Take steps to clean up any pollution where necessary.</p>
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**Table 41:** *Taita Taveta Bill legislative requirement on Noise Pollution*

<p><b>PART IV --- NOISE POLLUTION</b></p> <p><b>14.</b> A person shall not act in a way that directly or indirectly causes, or is likely to cause, noise pollution.</p> <p><b>15.</b> The department shall take necessary steps in order to control noise pollution within the county, including ---</p> <p>a) Measures to control noise in special areas like schools, hospitals, residential areas and libraries; regulating high noise levels associated with commercial machinery, public transportation and social activities; measures to regulate the businesses, factories and workshops which, by reason of noise, vibration or other causes, become a source of danger, discomfort or annoyance to the neighborhood , and to monitor the fulfillment of the conditions subject to which such businesses, factories and workshops shall be carried on under this Act; and</p> <p>b) Any other steps for implementing the County policy and strategy on control of noise pollution under this Act.</p>
--

## **(e) Existing Problems**

### **i. Air Quality**

- Population growth without planned systems for persons is destroying the environment.
- Trees that contribute to air quality are decreasing trees from use of trees for charcoal.
- There are no air quality plans established in the area.
- There are no plans for dust control in the area.
- Dust in the air is seen on the plants.
- Pollutants from road traffic and household fires, especially in urban areas, pose the main risk to air
- Air pollution can prevented through Town vehicles however vehicles from other towns and cities passing emissions would affect the Town and contributes to the complexity of assessment and monitoring.
- Smoke from wood and vegetation being burnt.

### **ii. Noise Pollution**

- Pollution through wind.
- Pollution through vehicles

#### **(f) Likely Evolution of pollution in the absence of Development Plan**

Every person added to the world immediately starts to cause air and noise pollution. In the absence of the plan the expected growth of population will lead to:

- More dust in the Air.
- Dust on leaves.
- More pollutant gases in Air as population grows.
- More noise pollution as persons drive and travel.

### **3.1.7. CLIMATIC FACTORS – BASELINE ENVIRONMENT**

#### **(a) Introduction**

Climatic factors and their environmental considerations are based on the host of interacting factors that influence the climate of a region. The factors include Surface Water, Rain, winds, Ocean Currents, topography, vegetation, elevation and latitude.

The Global climate system and any changes that occur within it is today changing the climate of. This changes are recorded through the changing weather patterns that lead to: Surface water availability; change of rain patterns with excessive water causing flooding; stronger winds; higher or lower temperatures.

Climatic factors can cause floods, dryness in vegetation and even lead to fires. The changing climatic factors is destroying the environment and mitigation measures need to be considered when implementing a development plan.

#### **(b) Methodology of Baseline Environment Assessment**

The following methods were applied in the Baseline data collection and assessment.

- Published documents on climate change
- Visit to the project site and surrounding areas to assessment of natural environment.
- Questionnaires
- Workshops with Community Members and Residents
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: County Government Departments

#### **(c) Baseline Environment**

Taita Taveta County is mainly dry, except for the Taita hills which are considerably wet. The effect of the South-Easterly winds influences the climate of the County. The hilly areas have ideal conditions for condensation of moisture, which result in relief rainfall. The elevation goes as high as 2,208 metres above sea level at the Wuria peak.

The County has bimodal rainfall whereby the long rains occur in the months of March to May with a maximum in April. The short rains occur between October and December with a peak in November. The rainfall distribution varies depending on elevation and aspect. The rainfall amount and

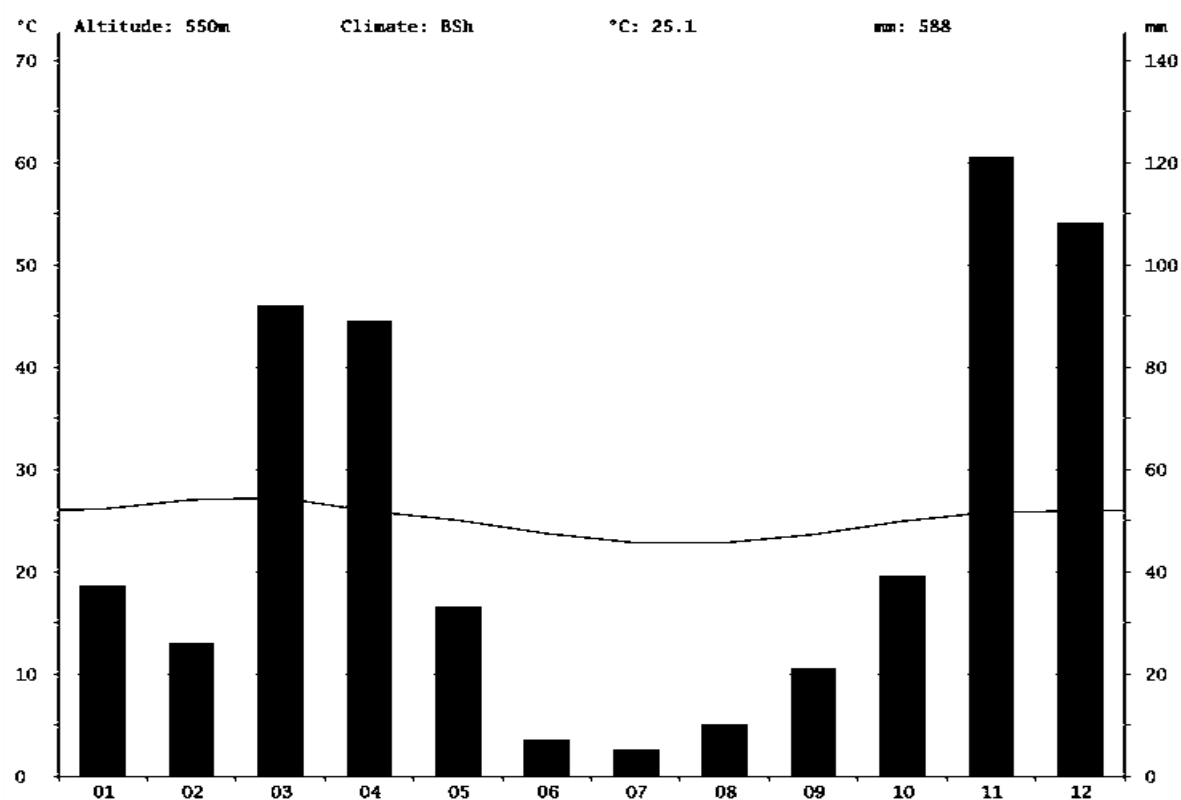
distribution depends on the altitude with the high area receiving higher rainfall than the lowland areas. During long rains, on average the highlands record 265 mm while the lowlands record 157 mm whereas during short rain. Annual rainfall is 1,200 mm and 341 mm for highlands and lowlands respectively. Annual mean rainfall is 650 mm,

The lowlands where the study area lies receive a maximum of between 450 – 750 mm annually and rainfall is more unreliable in amount and distribution. The lower parts are hot with mean temperatures of about 30°C. The potential annual evaporation rate is about 1800mm. There is therefore a net water deficit. All the rivers flowing through the lowlands are intermittent, with the exception of the Athi, Tsavo and Galana rivers.

The average temperature in the County is 23°C, with temperatures getting as low as 18.2°C in the hilly areas (Taita, Mwambirwa and Sagalla), while on lower zones, temperatures rise to about 25°C.

Voi area has a relatively high temperature from the sunshine. Climatic changes that cause increase in temperatures and decrease in rainfall is causing less growth of vegetation that is needed to sustain the millions of wildlife in the County and the growing population with food and water. Climate change and variability is an emerging threat to sustainable environmental and life.

Farmers have experienced reduced yields. Rising temperatures lead to high prevalence of pests and diseases, which affect productivity both in crops and livestock. Shifting seasons affect crop performance, while drought results in reduced pasture.



**Figure 50: Weather Pattern in Voi region**

This leads to animal – wildlife conflict that has wildlife leaving some of the areas they are supposed to be settled in search of food.

Floods are also common as excessive rain falls during sometimes.

#### **(d) Legislative Requirements**

Kenya Constitution requirements of planning by the County Governments.

**Table 42:** *Disaster and Firefighting Constitution Requirements*

<b>DISTRIBUTION OF FUNCTIONS BETWEEN THE NATIONAL GOVERNMENT AND THE COUNTY GOVERNMENTS</b>	
<b>Part 1 – National Government</b>	
24. Disaster management.	
<b>Part 2 – County Government</b>	
11. County public works and services, including—	
(a) storm water management systems in built-up areas; and	
(b) water and sanitation services.	
12. Fire-fighting services and disaster management.	

#### **(e) Existing Problems**

The hilly terrain in the area where the land area is a sign of potential flooding if there are heavy rains and there is no well development storm water disposal infrastructure.

The region temperatures rise as high as 40 degrees centigrade. If they rise higher due to heat emission the vegetation could be exposed to dryness that can lead to fires.

#### **(g) Likely Evolution of Climatic Factors in the absence of Development Plan**

The development plan reduces the risk of flooding and in its absence there would be more flooding as persons from the growing population settle without a storm water management system.

The risk of fires due to dryness caused by temperature rises that could result from heat emissions from combustion cars. The plan mitigates this through trees planting.

The conflict between people and wildlife would continue to grow as climatic factors fail to be management and continue to create an imbalance of food and water needed to sustain both human and wildlife with food and water.

### **3.1.8. MATERIAL ASSETS – BASELINE ENVIRONMENT**

#### **(a) Introduction**

Material Assets are the assets added into land with a goal to provide toward human life needs and sustain the environment for the current human beings and future generations.

The Material Assets planned for addition as a home of 90,000 residents is created as a Town that sustains persons living in the Town and the environment are:

- Roads.
- Houses.
- Water Generation and Supply.
- Sewage and Water Treatment.
- Waste Management.
- Energy Generation and Supply

#### **(b) Methodology of Baseline Environment Assessment**

The following methods were applied in the Baseline data collection and assessment.

- Development Plan Assessment.
- Visit to the project site and surrounding areas to assessment.
- Questionnaires
- Workshops with Community Members and Residents
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: National Construction Agency and County Government Departments

#### **(c) Baseline Environment**

The baseline was assessed based on the different material assets that will be required to be in place to meet the 90,000 residents and 30,000 students needs every day without impacting the environment negatively.

##### **i. Roads**

There are several roads servicing the land that the town will be developed. The roads include Mombasa – Nairobi A109 highway, Voi to Taveta (A23) highway.

The plan has a 120 km road network made up of avenues of 100ft and streets of 60ft.

The plan further incorporates planting of trees in the sections planned for trees.

##### **ii. Houses**

The houses plan is one that will plans for the production of housing in a planned way so as to meet the natural need of persons as set as a constitution right. Kenya Constitution 43. (1) Every person has the right— (b) to accessible and adequate housing, and to reasonable standards of sanitation;



The region does not have a plan of accessible and adequate housing with reasonable standards of sanitation. Persons end up constructing unplanned houses that do not meet their needs of health.

The highest standard of health includes house planning and good sanitation from the house.



*Figure 51: Unplanned House to Planned house*

### **iii. Water Generation and Supply**

The plan incorporates sources of water to include: Water supplied from rivers; Water supplied from boreholes dug inside the land; water supplied from harvesting water through rooftops.

The Water generation and supply plan will apply the following Assets to meet the generation and supply of water: Water pumps. Water tanks for storage; water pipes

The plan incorporates the supply of water to be progressively developed to supply 90,000 residents, 30,000 students and about 5,000 visitors in the town every day. As a collective plan the plan will provide about 200 litres a day per person to meet each person daily needs of water.

The water quality is incorporated in the design and building material and architectural designs. The plan will also incorporate Water storage and treatment.

The assets shall include the water pipes; water treatment management and services equipment; and storage tanks.

### **iv. Sewage and Water Treatment**

The water supplied once disposed as urine, waste water from bathing, waste water from washing clothes and dishes and waste water transporting human waste will be disposed through a sewer line.

The plan incorporates the use of new technologies to advance the treatment and creation of by-products that include: clean water, fertilizer and energy.

The energy created once applied in the energy plan will mean reduction of trees used as a source of energy.

The assets shall include the septic tanks, sewer pipes, treatment plant, waste-energy processing plant.

**v. Waste Management**

Waste in the Town will be classified based on the production source. Waste from homes that include: Organic waste from foods, Paper waste, plastic waste from plastic products, clothing waste, wood waste and metal waste.



*Figure 52: Waste Management Plant in a Town*

The plan incorporates a recycling plan that will lead to this waste becoming raw materials for industrial usage.

The plan incorporates industrial set-up that can apply this waste as raw materials for their production process.

The Assets will include: the machinery and equipment applied in the management and transportation of the waste; the industry equipment and technologies applied for processing the waste.

**vi. Methods Currently Used by Residents for Waste Disposal**

- Burn
- Rubbish pit in compound
- Garbage truck
- Reuse
- Sell
- Recycle
- Compost
- Throw on road
- River or Gully

## **vii. Energy Generation and Supply**

Energy for the Town is set to be provided through Solar set up on top of the roofs of housing; wind turbines; waste-energy; and from the National Grid.

The energy asset will be set through the energy plan that will produce the energy from the planned sources and supply the town.

## **(d) Legislative Requirements**

**Table 43:** *Functions of County Government*

<b>DISTRIBUTION OF FUNCTIONS BETWEEN THE NATIONAL GOVERNMENT AND THE COUNTY GOVERNMENTS</b>	
<b>Part 2 – County Government</b>	
The functions and powers of the county are—	
5. County transport, including—	
(a) county roads;	
(b) street lighting;	
(c) traffic and parking;	
(d) public road transport; and	
(e) ferries and harbours, excluding the regulation of international and national shipping and matters related thereto.	
8. County planning and development, including—	
(a) statistics;	
(b) land survey and mapping;	
(c) boundaries and fencing;	
(d) housing; and	
(e) electricity and gas reticulation and energy regulation.	
10. Implementation of specific national government policies on natural resources and environmental conservation, including—	
(a) soil and water conservation; and	
(b) forestry.	
11. County public works and services, including—	
(a) storm water management systems in built-up areas; and	
(b) water and sanitation services.	

## **(e) Existing Problems**

### **i. Roads and Transport**

Most of the roads are not yet developed and as cars pass they pollute the air with dust.

### **ii. Houses**

Most persons do not have good houses that provide to their health standards.

### **iii. Water**

The water is not yet well developed to have water supplied to each person at their home or place of need. Most time and energy is applied to fetching water.

#### **iv. Waste Management**

Waste has no management system and most persons dispose the waste on the ground thereby polluting the soil. A solid waste product that can take thousands of years to decompose disposed on the soil affects vegetation growth.

#### **v. Sewer and Treatment**

There is no sewage treatment for the persons already settling in the land. Their waste is disposed directly to the soil and finds its way to surface and underground water bodies.

#### **vi. Energy**

The source of energy is from electricity, trees and paraffin. This reduces the trees and in doing so limits the role tree play.

### **(f) Likely Evolution of Material Assets in the absence of Development Plan**

#### **i. Roads and Transport**

The absence of the 120 km paved road network that would service the 90,000 residents would mean the persons serviced by earth roads that lead to dust pollution and soil erosion.

#### **ii. Houses**

The absence of high quality houses development would mean the 90,000 persons would live in poorly constructed houses that could result to poor standards of health as persons are exposed to parasites, temperature variations, bacteria and other hazards that could be limited through a planned house.

#### **iii. Water**

The 90,000 persons would not have a good water supply plan and would spend a lot of time fetching for water. The water quality would also not be the best quality.

#### **iv. Waste Management**

Waste from the 90,000 persons would not be managed. Some of the waste would affect vegetation, domestic animals and wildlife. Most animals feed on plastic bags that were waste produced by failure to have a waste management system.

#### **v. Sewer and Treatment**

With no sewer the 90,000 persons who would have applied the sewer plan would continue to apply human waste and water waste disposal systems that pollute the soil, water and contribute to health problems.

#### **vi. Energy**

Trees would continue to be part of the energy supply.

### **3.1.9. CULTURAL HERITAGE – BASELINE ENVIRONMENT**

#### **(a) Introduction**

Cultural Heritage is classified into Archaeological and Architectural heritage.

##### **i. Archaeological heritage**

This is the inherited properties, inherited characteristics as transmitted by past ages, ancestors and generations. It covers everything, from objects, religious activities and buildings to the environment. Cultural heritage includes physical buildings, structures and objects complete or in part, which have been left on the landscape by previous and current generations. It includes structures built inside the land. The structures create the history of a community identity and pride.

The archaeological heritage includes ant hills, shrines and national ridges and rocks.

##### **ii. Architectural Heritage**

Architectural heritage is defined as meaning structures and buildings together with their settings and attendant grounds, fixtures and fittings; groups of such structures and buildings; and sites of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

Architectural heritage incorporates protected structure as defined as a structure or a specific part of a structure that is classified as a protected structure. In establishing a protected structure the protection can include: the exterior of the structure; the interior of the structure; the land area the structure occupies and the fixtures and features which form the interior or exterior of the structure.

#### **(b) Methodology of Baseline Environment Assessment**

The following methods were applied in the Baseline data collection and assessment.

- Visit to the project site and surrounding areas to assessment of population.
- Information from the
- Questionnaires
- Workshops with Community Members and Residents
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including but not limited to: County Government Departments

#### **(c) Baseline Environment**

The site has several structures that are classified as

##### **i. Archaeological heritage**

- Shrines.

##### **ii. Architectural Heritage**

- Ant hills
- Large trees





*Figure 53: Anthill established as a protected Structure*

**(d) Legislative Requirements**

The legislative requirements as established will be incorporated to the plan.

**(e) Existing Problems**

There is no preservation methods of cultural heritage.

**(f) Likely Evolution of pollution in the absence of Development Plan**

The cultural heritage will be lost as sites are forgotten and destroyed by weather, wildlife and humans.

### 3.1.10. LANDSCAPE – BASELINE ENVIRONMENT

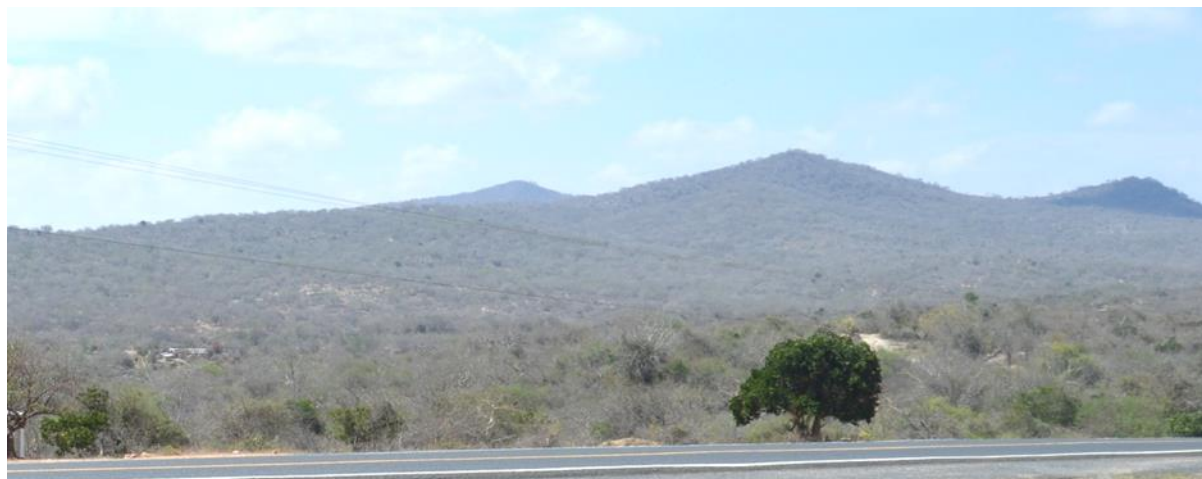
#### (a) Introduction

Landscape is the formed topography and scenery of a land area. The landscape is shaped by the land cover that includes: vegetation, trees, buildings, water, human settlements, and; human values which are a result of historical, cultural, religious and other interactions with formation of land.

#### (b) Methodology of Baseline Environment Assessment

The following methods were applied in the Baseline data collection and assessment.

- Photography of the land area.
- Topographical maps of the land.
- Visit to the land area site and surrounding areas to assessment of population.
- Questionnaires.
- Discussions and inclusion of expert advice.
- Research Data established and put out in the Internet.
- Discussions with the different departments including: County Government Departments and National Departments and other interested parties.



*Figure 54: Photo of the landscape.*

#### (c) Baseline Environment

Taita Taveta County is characterized by a number of ecological regions based mainly on relief and different climatic conditions.

There are three major topographical zones.

- The upper zone, suitable for horticultural farming, comprises of Taita, Mwambirwa and Sagalla hills regions with altitudes ranging between 304 metres and 2,208 metres above sea level. The Taita Hills cover an approximate area of 1,000 Km<sup>2</sup> and rise to a maximum elevation of 2,208 metres above sea level at Vuria peak.
- The lower zone consists of plains where there is ranching, national parks and mining. In the lowlands and transitional zone between the lowlands and the highlands, there lies the vast rangeland where the Tsavo National Parks (Tsavo East and Tsavo West National Parks) are located. These form the Tsavo ecosystem which comprises of distinct elements including rivers, springs, plains, plants and vegetation and wildlife.
- The third topographical zone is the volcanic foothills zone which covers the Taveta region with potential for underground water and springs emanating from Mt. Kilimanjaro.



#### i. Six Agro-Ecological Zones in the County

- UM-3 - Wundanyi, Sagalla, Bungule (has three to five dry months, it corresponds to seasonal semi-deciduous moist forest or a high grass - broad leaved trees savanna)
- UM-4-Wundanyi, Sagalla, Bungule (corresponds to woodland, it is either deciduous in subzone with unimodal rainfall as towards West Kenya and in Tanzania, or hard-leaved evergreen in bimodal rainfall subzones with two dry seasons as in East Kenya, where plants have hard or hairy leaves to avoid shedding them off twice a year. The grass is up to 1 m high.)
- LH2 - Wundanyi – (seasonal rainforest because of one or two dry months)
- LM-4, Challa and Bomeni (corresponds to woodland, it is either deciduous in subzone with unimodal rainfall as towards West Kenya and in Tanzania, or hard-leaved evergreen in bimodal rainfall subzones with two dry seasons as in East Kenya, where plants have hard or hairy leaves to avoid shedding them off twice a year. The grass is up to 1 m high.
- LM-5- Jipe, Bura, Bungule, Mwatate, Kishushe, Bachuma, Maungu, and Makwasinyi (the natural vegetation in is a short grass savannah with small leafed thorny trees and bushes).
- LM-6- Jipe, and Teita Sisal Estates (bush land with very short but still perennial grass, therefore it is suitable for ranching - if the grass is not degraded by overgrazing.

Crop production and dairy farming is practiced mainly in UM-3, UM-4 & LM-4 while Livestock keeping and ranching majorly in zone LM-5 and LM-6.

#### ii. Landscape for Development Land

The Landscape of the land plan will be implemented Appraisal identifies vulnerable features across the county including river banks,

#### (d) Legislative Requirements

**Table 44: Hill Mountain and Forests legislation**

##### **44. Protection of hill tops, hill sides, mountain areas and forests**

The Authority shall, in consultation with the relevant lead agencies, develop, issue and implement regulations, procedures, guidelines and measures for the sustainable use of hill sides, hill tops, mountain areas and forests and such regulations, guidelines, procedures and measures shall control the harvesting of forests and any natural resources located in or on a hill side, hill top or mountain area so as to protect water catchment areas, prevent soil erosion and regulate human settlement.

##### **45. Identification of hilly and mountainous areas**

(1.) Every District Environment Committee shall identify the hilly and mountainous areas under their jurisdiction which are at risk from environmental degradation.

(2.) A hilly or mountainous area is at risk from environmental degradation if—

- (a) it is prone to soil erosion;
- (b) landslides have occurred in such an area;
- (c) vegetation cover has been removed or is likely to be removed from the area at a rate faster than it is being replaced; or
- (d) any other land use activity in such an area is likely to lead to environment degradation.

(3.) Each District Environment Committee shall notify the Director-General of the hilly and mountainous areas it has identified as being at risk from environmental degradation under subsection (1).

(4.) The Director-General shall maintain a register of hilly and mountainous area identified under subsection (1) to be at risk from environmental degradation.

**(e) Existing Problems**

Extraction of limestone, rocks without a plan to preserve the landscape is changing the landscape. Pictures show white sections that such mining is occurring without a rehabilitation plan.

**(f) Likely Evolution of landscape in the absence of Development Plan**

The landscape could be affected by erosion and mining that is not planned.

### **3.2. SEA OBJECTIVES, TARGETS AND INDICATORS**

Strategic Environment Objective is a statement of what is intended, it specifies the desired direction of change in trends.

Targets are the means for providing verifiable evidence that you have actually met the objective. Indicators are signals that reveal progress (or lack thereof) towards objectives.

Indicators provide a means of measuring of what actually happens against what has been planned in terms of quantity, quality, and timeliness.

#### **3.2.1. BIODIVERSITY, FLORA AND FAUNA: Objectives, Targets and Indicators**

**(a) Objectives**

To preserve, protect, maintain and where appropriate during construction maintain and restore the biodiversity, Fauna and Flora post construction; and to create a detailed Corporate Social Responsibility (CSR) plan on planting of exotic trees to enhance tree cover.

**(b) Targets**

- Require land physical plan to include ecosystem services.
- Incorporate green infrastructure provisions in the land use plans.
- Incorporate preservation of trees in the land physical plan.
- Incorporate CRS plan on tree planting in line with Presidential directive during launch of national tree planting exercise.

**(c) Indicators**

- No loss or reduction of trees.
- No destruction of habitats and species
- Installation of green technologies.

#### **3.2.2. POPULATION: Objectives, Targets and Indicators**

**(a) Objectives**

To create an environment plan where every person who resides in the University Town at any given time can achieve their constitution rights and play their part in achieving a clean and healthy environment for the Town.

**(b) Targets**

- House 90,000 residents the right way as a way of achieving housing rights.
- Incorporate persons into clean and healthy environment initiatives at their homes and in public areas through Responsible Waste management practice.

**(c) Indicators**

- Increase in population in the Town.
- Have no litter as population increases.
- Have no exposed soil as population increases.

**3.2.3. HUMAN HEALTH: Objectives, Targets and Indicators**

**(a) Objectives**

To create a human healthcare plan that caters for every person constitutional right 43 (1.) 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; and right to emergency treatment. (2) A person shall not be denied emergency medical treatment.

**(b) Targets**

- Advance Right of Healthcare through healthcare facilities.
- Design buildings with goal to achieve the rights of healthcare and housing rights.
- Incorporate persons in public health at their homes and public areas.

**(c) Indicators**

- No health issues reported by the residents.
- Clean water, air and soil.
- Provision of emergency healthcare as needed.

**3.2.4. SOILS AND GEOLOGY: Objectives, Targets and Indicators**

**(a) Objectives**

To apply soil in the sustenance of plants and humans; and protect the soil against degradation and pollution through waste and soil erosion through floods.

**(b) Targets**

- Maintain built surface cover to a target of less than 20%.
- Plant Trees.
- Harvest rain water to avoid soil erosion and floods.
- Rehabilitation of extraction sites.

**(c) Indicators**

- No development in areas which may be considered at significant risk to landslides
- No development in areas considered at significant risk of erosion

- Greenfield land areas
- Sustainable quarrying of non-renewable sand, gravel and rock deposits
- Proportion of excavated area returned to productive use.
- Progressive rehabilitation of extraction sites per set rehabilitation targets

### **3.2.5. WATER: Objectives, Targets and Indicators**

#### **(a) Objectives**

To ensure the right of clean water is achieved and when doing so the status of water bodies is protected, maintained and improved; and, waste water managed, treated and recycled.

#### **(b) Targets**

- Meet the supply of quality water to residents, university operations and other town needs.
- Collect and treat the waste water to have minimal pollution of air, other water bodies and soil. Apply Anaerobic Digestion (AD).
- Recycle waste water as part of sustainability.
- Harvest rain water through creation of a Dam.

#### **(c) Indicators**

- Dirt in the water.
- Smell from water.
- Color in the water.



**Figure 55: Dirt in Water**

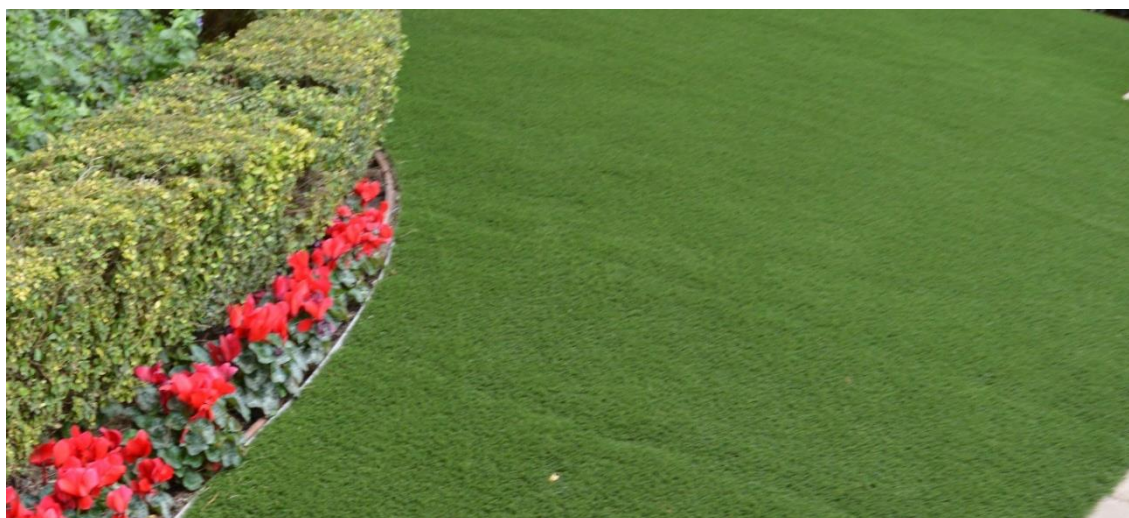
### 3.2.6. AIR AND NOISE: Objectives, Targets and Indicators

#### (a) Objectives

Avoid, prevent or reduce harmful effects on human health and the environmental resulting from air pollution through dust, emissions, noise and toxic gases from waste; maintain and promote continuing improvement in air quality through planting of trees and vegetation; and reduce emissions and tree cutting through the promotion of renewable energy and energy efficiency technologies.

#### (b) Targets

- Have low kilometers driven at the Town through alternative transport methods and through plans of walking or cycling.
- Have over 200,000 thousand trees in the Town a ratio of 1 person to 2 trees.
- Incorporate low emissions vehicles.
- Tarmac or pave all roads and maintain them with goal to reduce dust and noise at all times.
- Sound-proof your space. When you can't stop the noise at its source, you can do your best to keep it out. ...
- Keep noisy machines away from your bedroom and living areas.
- Spend time away from noise.
- Learn to meditate.
- Use earplugs and noise-canceling headphones. ...
- Install noise-reducing insulation and glass.
- Turn off Appliances at Home and offices.
- Shut the Door when using noisy Machines.
- Use Earplugs.
- Lower the volume.
- Stay away from Noisy area. ...
- Follow the Limits of Noise level. ...
- Control Noise level near sensitive areas. ...
- Go Green by planning of plots, vegetation and trees.



**Figure 56:** Growing grass and vegetation next to a road to control dust pollution.





**Figure 57:** Dust on Leaves in trees in Voi area during dry season.

**(c) Indicators**

- Dust on leaves and on walls.
- Paving of Roads
- Noise surveys
- Carbon Emissions on guard rails.



**Figure 58:** Black emissions on Guard Rails.

**3.2.7. CLIMATIC FACTORS: Objectives, Targets and Indicators**

**(a) Objectives**

Incorporate renewable energy as source of energy with a goal to increase trees through reduction of use of trees as source of energy and attainment of the minimal emissions of greenhouse gases.

**(b) Targets**

- Reduce overall emissions of carbon.
- Through Town plan achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy.
- Minimal Greenhouse Gas Emissions.
- Application of Renewable Energy.
- Ensure there is no flooding.

**(c) Indicators**

- Flooding.
- Vehicles
- Solar panels and renewable energy installations.

**3.2.8. MATERIAL ASSETS: Objectives, Targets and Indicators****(a) Objectives**

Plan, development and progressively maintain: water; houses; roads and transport; waste management; sewer and treatment; and energy assets plans that meet and enhance the meeting of social and economic rights while complying with the clean and healthy environment as the population settles and a Town and University is development.

**(b) Targets**

- Through new town development meet the constitution right of clean and healthy environment for the Kenya growing population.
- Through new Town development meet the right of housing requirements and have measures against unplanned settlement emergence.
- Have a development and sustenance budget that supports the water and wastewater supply and management infrastructure and services.
- Apply renewable technologies in the supply of energy through waste to energy, solar energy and wind energy.
- Reduce waste volumes through an integrated approach that incorporates education, recycling and energy.
- Maintain and/or improve drinking water quality and quantity as population of town increases while having 100% compliance with Drinking Water Regulations.
- Have waste water removal infrastructure and treatment.

**(c) Indicators**

- Number of persons participating in a waste recycling refuse
- Quantity of waste from bin collection service
- Overloaded Water Treatment Plants
- Inability to meet drinking water quality standards
- Inability to meet water supply pressure
- Overloaded Wastewater
- Inability to meet treated effluent discharge limits



### **3.2.9. CULTURAL HERITAGE: Objectives, Targets and Indicators**

#### **(a) Objectives**

Incorporate plan to protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage while advancing the culture of the people of the region.

#### **(b) Targets**

- No unauthorised physical damage or alteration of the context of cultural heritage features.
- Provisions for cultural heritage in the architectural designs of buildings.
- Preservation of cultural heritage associated with trees through the preservation of the trees.

#### **(c) Indicators**

- Physical damage or alterations of heritage features.
- Cultural heritage in buildings.
- Trees with cultural heritage.

### **3.2.10. LANDSCAPE: Objectives, Targets and Indicators**

#### **(a) Objectives**

To provide a framework for identification, assessment, protection, management and planning of landscapes that has minimal impact on landscape and maximizes natural landscape visibility.

#### **(b) Targets**

- Preserve from damage designated landscapes when implementing plan.
- Incorporate ornamental landscaping techniques.
- Have limited number of conspicuous developments that adversely impact upon vulnerable landscape features, viewing points and scenic features.
- Protect the visual amenity of scenic views, scenic views, scenic viewing points and scenic
- No developments to adversely impact upon sensitive landscapes, vulnerable landscape features and listed highly scenic views, scenic views, scenic viewing points and scenic routes.
- No loss of sensitive landscapes, vulnerable landscape features and listed highly scenic views, scenic views, scenic viewing points and scenic routes.
- Developments should be designed to conform to the visual amenity of the landscape.

#### **(c) Indicators**

- Number of developments adversely impacting upon vulnerable landscape features
- Number of vulnerable landscape features lost
- Number of developments interfering with the visual amenity of the landscape.

### **3.3. OTHER LEGISLATIVE FRAMEWORK AND OTHER PLANS**

#### **3.3.1. LEGISLATIVE FRAMEWORK**

##### **(a) Kenya Constitution Trees Requirement**

Kenya Constitution 69. (1) The State shall— (b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya.

The University town plan links to this law through a plan of preserving and planting 200,000 trees.

##### **(b) County Planning Bill 2016**

Types of County plans

1. (1) there shall be the following county plans within the county---
  - a) County integrated development plan;
  - b) County sectoral plans;
  - c) County spatial plan ;and
  - d) Cities and urban areas plan as provided for under the Urban Area and Cities Act
- (2) The County plans shall be for at least five years and shall form the basis for county budgeting and spending.

Approval of County plans

2. Every plan prepared in accordance with section 7 shall be approved by the county assembly pursuant to Article 185 of the Constitution.

##### **(c) Alcoholic Drinking Control Bill by Taita Taveta County Assembly.**

8. (1) A person intending to manufacture or otherwise produce any alcoholic drink in the county or to operate an establishment for the sale of an alcoholic drink shall make an application in Form 1 in the Second Schedule to the sub-county committee in the sub-county where the premises is to be situated and shall pay a prescribed fee.

(2) The application under subsection (1) shall include or be accompanied by—

- (a) a comprehensive proposal on the nature, orientation and other justification for the establishment of the alcoholic plant;
- (b) a disclosure as to whether the applicant has been previously convicted of an offence under this Act or any Act at any time in force relating to the manufacture, sale or consumption of an alcoholic drink, giving full particulars of the offence of which he was convicted, of the court by which he was convicted, of the date of the conviction;
- (c) such registration or identification documents as may be required by the sub-county Committee;
- (d) a detailed physical address, telephone number, facsimile number and email address of the applicant;
- (e) detailed information relating the proposed services to be provided;
- (f) where applicable, information relating to the previous experience in the provision of the services for which a licence is sought; and
- (g) any other information that the sub-county Committee may require.

(3) The sub-county committee shall, within twenty-one days after the submission of application for a licence, prepare a notice setting forth the names of all applicants, the types of licences applied for, the premises in respect of which the licences are applied for and the time, date and place of the meeting, and shall forthwith cause a copy of the notice to be—

- (a) published in the County gazette, Kenya Gazette and conspicuous place at the offices of the sub-county for a period of not less than twenty-one consecutive days;
- (b) posted in some conspicuous place at or near the applicant's premises;
- (c) sent to the National Police Service, or to such police officer as the Police Service may have notified the sub-county that it has appointed to receive it on his behalf; and
- (d) sent to the medical officer of health of the sub-county in which the premises in respect of which the licences are applied for are situated.

### **3.3.2. OTHER PLANS AND LINKAGES**

#### **(a) Big 4 Agenda**

The Big 4 Agenda is a blueprint National Plan for the next 5 years for the provision of Housing, Advancement of the Healthcare, Food security and Small Medium Enterprises (SMEs).

The University town plan links to the Big 4 Agenda with consideration that the plan will meet housing needs for the 30,000 residents in next 5 years, advance healthcare through the medical hospital plan and advance SMEs growth.

#### **(b) Vision 2030**

The plan will link to the Vision 2030 goal to have a country with a per capita income of the global average of \$10,000. The plan is set to expand GDP as well as per capita income through industries, training and job creation. The plan development plan is one of achieving a per capita income of \$10,000 for the new town.

#### **(c) County Government Revenue**

The plan will link to the County government revenue and expenditure plan as it expands the revenue to the County Government. Natural Material Cess, Property Rates, Permit fees, Entertainment Taxes and other fees meted on different products, enterprises and services will also grow the County's revenue.

#### **(d) Water Supply**

Taita Taveta County is not water scarce. Water supply in the County is from Mzima .The plan will link to the Mzima Water supply by the Coast Water Board.

The plan of the second Mzima springs pipe will be incorporated in the Water supply of the plan to enhance water provision in the area.

#### **(e) Standard Gauge Railway – Madaraka Express**

The plan will link to the SGR – Madaraka Express as the project plan will grow the town population and tourism and expand the transportation volume of the SGR.

**(f) Mombasa – Nairobi Highway road infrastructure**

Construction of all-weather roads in the university town linking to the Mombasa-Nairobi Highway plan will ensure that the Town is linked to Nairobi, Mombasa and other towns along the highway. This will ensure ease of movement between the residents and suppliers of basic needs not produced in the town through the highway. The plan will thus become part of the sustenance plans of the

**(g) Families in Land Resettlement Plan**

The plan was adopted after discussions with persons settled inside the land to be applied in the humanitarian progression of person's constitutional rights without infringement of others rights.

**Table 45: Families inside land Resettlement Plan**

<b>DIASPORA UNIVERSITY TOWN RESETTLEMENT DONATION NDARA 'B' 17 OCCUPANT</b>	
<b>1. Introduction and Parties</b>	
1.1.	The following resettlement donation is created to be applied for the resettlement of persons who are living inside Ndara 'B' 17 Land.
1.2.	Ndara 'B' 17 land is donated by Ndara 'B' Community members for the development of a University and Town as per Institution Town Development Plan legislated in accordance with Kenya Constitution Article 185 (4)
	185 (4) A county assembly may receive and approve plans and policies for—
	(a) the management and exploitation of the county's resources; and
	(b) the development and management of its infrastructure and institutions.
1.3.	The Institution Town Development Plan is a plan for advancing Kenya Constitution article 43 rights.
	Kenya Constitution 43.
	<b>43.</b> (1) 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.
	(2) A person shall not be denied emergency medical treatment.
1.4.	The beneficiaries of the plan include: Ndara B community members, Taita Taveta Residents, Kenyans and other persons who shall live and visit the town as well as study in the university.
1.5.	The parties to the donation are Diaspora University Trustees (The Donor) and persons as families occupying the land, (Recipients of the donation.)
<b>2. Resettlement Donation Terms</b>	
2.1.	Diaspora University Trust in establishing this resettlement donation states that it shall make a donation to the persons listed as a family and in accordance with the terms set in this resettlement donation.
2.2.	Diaspora University Trust states that the donation is not a compensation, but is a humanitarian donation to enable family progress in achieving their social-economic rights.
2.3.	Diaspora University Trust when making the donation requires a resettlement plan attached to this resettlement donation within 6 months from the date of the NEMA LICENSE ISSUE for the development of Ndara 'B' 17 land.
2.4.	The resettlement plan created and attached shall thereafter apply and the disbursement of the donation done per terms set in the resettlement plan.

### 3. Family

3.1. The family that this resettlement donation is established for are:

Father _____	Phone _____
Mother _____	Phone _____
<b>Children</b>	

### 4. Temporary Resettlement

- 4.1. This resettlement donation incorporates a temporary settlement for the family and persons forming the family as listed in 3.
- 4.2. The persons listed in this resettlement donation and those who maybe born by those listed shall continue to live inside the land until the resettlement plan is attached.
- 4.3. The persons listed shall during the temporary resettlement not build any permanent structures.
- 4.4. The persons listed shall comply with the environmental requirements as shall be set in the Strategic Environmental Assessment (SEA) Report.
- 4.5. The temporary resettlement conditions shall end once Resettlement Plan and Donation toward resettlement are complete.

### 5. Resettlement Donation

5.1. The Resettlement Donation is as follows:

Family		
Persons	_____ x Kshs _____	
Structure/s	( _____ to _____ max)	
Total		

- 5.2. The total amount shall form the capital to be applied toward the resettlement plan created and attached to this resettlement donation.
- 5.3. A picture of the structure/s in the land shall be attached.

### 6. Resettlement Plan Options

6.1. The resettlement plan shall be based on two options:

6.1.1. Resettlement inside the land.

The resettlement plan shall be developed to have family resettlement inside Ndara 'B' 17 land development plan. The plan shall be developed jointly by Diaspora University Town project development office and family and attached to this donation. The resettlement plan shall incorporate the Environmental requirements and the Institution Town Development plan passed.

6.1.2. Resettlement Elsewhere.

The resettlement plan shall be established by the family and shall be approved by the Diaspora University Trust when making the donation. When approving the Trustees assigned shall ONLY consider that the application of the donation benefits all the persons listed and is applied toward resettlement and advancing of person's economic and social rights. A family may seek help from the Diaspora University Trust in establishing a good plan. The trust shall offer the services for free.

6.2. With consideration that the donation will be applied as a capital into the resettlement plan persons can combine the two approaches as follows:

6.2.1. Start with the resettlement inside the land.

6.2.2. Sell Capital to the Trust under terms set in the resettlement plan and resettle elsewhere when ready to relocate.

### 3.4. OVERVIEW OF PUBLIC/STAKEHOLDER ENGAGEMENT UNDERTAKEN

Public/Stakeholders were engaged as follows:

- Public Meetings
- Questionnaires
- Workshops
- Meetings and Consultations

#### (a) Public Meetings

Several meetings were held to inform persons of the project.

- Ndara B Community and Persons Neighboring the land.
- Chamber of Commerce and Church Leaders meeting at Wundanyi.

#### (b) Questionnaires

Over 600 persons filled questionnaires

**Table 46:** Questionnaires filled by over 600 persons

#### **DIASPORA UNIVERSITY TOWN - STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)**

The Strategic Environmental Assessment (SEA) is done in compliance with:

- Kenya Constitution 42, 69 and 70.
- Environmental Management and Coordination Act (EMCA) 1999 (Rev 2015).
- Other National and County legislation. *Taita Taveta Bills: Planning (2016), Water and Sanitation (2016), Health Services (2016), Culture Heritage (2016) Air, Noise Pollution and Public Nuisance (2014) Outdoor Advertising (2014), Alcoholic Drinks Control and Licensing (2014).*

**Kenya Constitution Article 42** "Every person has the right to a Clean and Healthy Environment."

**Stakeholders Questionnaire:** Diaspora University Town Job (Worker), SME Developer, Town Settler and neighbors.

**Name:** \_\_\_\_\_ **Tel:** \_\_\_\_\_

- Do you welcome the project development in Taita Taveta? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- Have you filled an Expression of Interest for Job, SME or Supplier? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- Where do you live? **Taita Taveta County** \_\_\_\_\_ **Other Kenya County/Country** \_\_\_\_\_
- Do you welcome the Project University Education Plan? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- Do you welcome the Project Housing Plan of good housing and sanitation? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- Do you welcome the Project Jobs and SME Creation Plan? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- Do you intend to live in the Town as you work in the Town? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_
- List Environmental Factors you would like included in the SEA Draft report that will enable plan achieve a clean and healthy environment for those working and living in Town?

- Are there any other factors you would like included in the SEA Report to Protect Environment as the Town is developed?

*Additional Information can be established on the blank paper and attached to this questionnaire.*

#### (c) Workshops

Several Workshops were undertaken that included:

- Ndara B Mwangea Community members
- Material Suppliers workshop.
- Taita Taveta Chamber of Commerce and Church Leaders.

#### (d) Other Meetings and Consultations

Meetings and consultations were done with stakeholder departments and agencies.

**Table 47: SEA Stakeholder Consultation**

<b>STRATEGIC ENVIRONMENTAL ASSESSMENT STAKEHOLDER CONSULTATION</b> Kindly review the SEA Topics, Objectives and Targets. Thereafter provide any inputs through the questions below.		
<b>SEA Objectives and Targets</b>		
<b>SEA Topic(s)</b>	<b>Draft Objectives</b>	<b>Draft SEA Target(s)</b>
<b>Population and Socio-Cultural</b>	<b>Objective 1:</b> To create an environment plan where every person who resides in the University Town at any given time can achieve their constitution rights and play their part in achieving a clean and healthy environment for the Town.	<ul style="list-style-type: none"> <li>• House 90,000 residents the right way as a way of achieving housing rights.</li> <li>• Incorporate persons into clean and healthy environment initiatives at their homes and in public areas through Responsible Waste management practice.</li> </ul>
<b>Human Health</b>	<b>Objective 2:</b> To create a human healthcare plan that caters for every person constitutional right 43 (1.) 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; and right to emergency treatment. (2) A person shall not be denied emergency medical treatment.	<ul style="list-style-type: none"> <li>• Advance Right of Healthcare through healthcare facilities.</li> <li>• Design buildings with goal to achieve the rights of healthcare and housing rights.</li> <li>• Incorporate persons in public health at their homes and public areas.</li> </ul>
<b>Biodiversity, Flora and Fauna</b>	<b>Objective 3:</b> To preserve, protect, maintain and where appropriate during construction maintain and restore the biodiversity, Fauna and Flora post construction. Create a detailed Corporate Social Responsibility (CSR) plan on planting of exotic trees to enhance tree cover.	<ul style="list-style-type: none"> <li>• Require land physical plan to include ecosystem services.</li> <li>• Incorporate green infrastructure provisions in the land use plans.</li> <li>• Incorporate preservation of trees in the land physical plan.</li> <li>• Incorporate CRS plan on tree planting in line with Presidential directive during launch of national tree planting exercise.</li> </ul>
<b>Soil</b>	<b>Objective 4:</b> Apply soil in the sustenance of plants and humans. Protect the soil against degradation and pollution through waste and soil erosion through floods.	<ul style="list-style-type: none"> <li>• Maintain built surface cover to a target of less than 20%.</li> <li>• Plant Trees.</li> <li>• Harvest rain water to avoid soil erosion and floods.</li> </ul>
<b>Water</b>	<b>Objective 5:</b> Ensure the right of clean water is achieved and when doing so the status of water bodies is protected, maintained and improved; and, waste water managed, treated and recycled.	<ul style="list-style-type: none"> <li>• Meet the supply of quality water to residents, university operations and other town needs.</li> <li>• Collect and treat the waste water to have minimal pollution of air, other water bodies and soil. Apply Anaerobic Digestion (AD).</li> </ul>



		<ul style="list-style-type: none"> <li>• Recycle waste water as part of sustainability.</li> <li>• Harvest rain water through creation of a Dam.</li> </ul>
<b>Air Quality and Noise</b>	<b>Objective 6:</b> Avoid, prevent or reduce harmful effects on human health and the environmental resulting from air pollution through dust, emissions, noise and toxic gases from waste; maintain and promote continuing improvement in air quality through planting of trees and vegetation; and, reduce emissions and tree cutting through the promotion of renewable energy and energy efficiency technologies.	<ul style="list-style-type: none"> <li>• Have low kilometers driven at the Town through alternative transport methods and through plans of walking or cycling.</li> <li>• Have over 200,000 thousand trees in the Town a ratio of 1 person to 2 trees.</li> <li>• Incorporate low emissions vehicles.</li> <li>• Tarmac or pave all roads and maintain them with goal to reduce dust and noise at all times.</li> </ul>
<b>Climatic Factors</b>	<b>Objective 7:</b> Incorporate renewable energy as source of energy with a goal to increase trees through reduction of use of trees as source of energy and attainment of the minimal emissions of greenhouse gasses	<ul style="list-style-type: none"> <li>• Reduce overall emissions of carbon.</li> <li>• Through Town plan achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy.</li> <li>• Minimal Greenhouse Gas Emissions.</li> <li>• Application of Renewable Energy.</li> </ul>
<b>Material Assets</b>	<b>Objective 8:</b> Plan, development and progressively maintain water, roads and energy assets plans that meet the enhance the meeting of social and economic rights while complying with the clean and healthy environment as the population settles and a Town and University is development.	<ul style="list-style-type: none"> <li>• Through new town development meet the constitution right of clean and healthy environment for the Kenya growing population.</li> <li>• Have a development and sustenance budget that supports the water and wastewater supply and management infrastructure and services.</li> <li>• Apply renewable technologies in the supply of energy through waste to energy, solar and wind energy.</li> </ul>
<b>Cultural Heritage</b>	<b>Objective 9:</b> Incorporate plan to protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage while advancing the culture of the people of the region.	<ul style="list-style-type: none"> <li>• No unauthorised physical damage or alteration of the context of cultural heritage features.</li> <li>• Provisions for cultural heritage in the architectural designs of buildings.</li> <li>• Preservation of cultural heritage associated with trees through the preservation of the trees.</li> </ul>
<b>Landscape</b>	<b>Objective 10:</b> To provide a framework for identification, assessment, protection, management and planning of landscapes that has minimal impact on landscape and maximizes natural landscape visibility.	<ul style="list-style-type: none"> <li>• Preserve from damage designated landscapes when implementing plan.</li> <li>• Incorporate ornamental landscaping techniques.</li> </ul>

**Meetings Discussions**

With consideration of Topic and Objectives. Please provide any Baseline Data with reference to the Site Area that should be incorporated?

With consideration to the SEA Topic, Please provide any Target/s that you would like added in the Strategic Environmental Assessment (SEA) Draft Report?

Provide any Indicators that you would like considered with reference to the Targets tabulated and other Targets that you have added?

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Provide any Impacts with reference to secondary, cumulative, synergistic, short, medium and long term, permanent and temporary, positive and negative effects as well as the interrelationships between the environmental issue areas that you foresee as the Town grows to have 90,000 residents Town with a 30,000 student's university?

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How can some of the Impacts be mitigated and if a Public Body is funded to provide mitigation measures which mitigation measures will you provide as development plan progresses?

Are there any plans you would like to be linked to the Plan Implementation?

As the Annual Monitoring Report is created what information would you like added?

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**ALTERNATIVES**

The assessment of reasonable alternatives as part of the SEA process is required as part of an Environmental Report. Alternatives can be described as a range of options and trade-offs available to the plan makers for delivering the objectives of the plan. The identification of alternatives facilitates decision making and the strategic assessment enables more sustainable options to be identified.

The strategic alternatives considered must be realistic, reasonable and relevant to the goals and objectives of the plan.

The environment report will incorporate alternatives that will be part of the development process to include:

- Population. Lower number of residents and in so doing reduce the persons to land density ratio and expand the plan to more land acreage in same area subject to land available.
- Replace wetland with constructed dam.
- Replace cut tree with planted trees.
- Erect higher storied buildings to reduce the built ground area.
- Preserve biodiversity, fauna and flora through Town Parks
- Plan for Zero Emissions vehicles.
- Waste to energy Anaerobic Digestion.

Provide any other Alternatives you would like to be considered as the development plan progresses and Town population increases?

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### 3.5. EVALUATION OF PROJECT PLAN IMPACTS AGAINST SEOs

The different plans as established in the Diaspora University Town plan (article 2) will have impacts. Several plans objectives were evaluated against the Strategic Environmental Objectives (SEOs.)

**Table 48:** Strategic Environmental Objectives Codes

Topic	Strategic Environmental Objective (SEO)	Code
<b>Biodiversity Fauna Flora</b>	To preserve, protect, maintain and where appropriate during construction maintain and restore the biodiversity, Fauna and Flora post construction.	<b>B1</b>
	Create a detailed Corporate Social Responsibility (CSR) plan on planting of exotic trees to enhance tree cover.	<b>B2</b>
<b>Population</b>	To create an environment plan where every person who resides in the University Town at any given time can achieve their constitution rights and play their part in achieving a clean and healthy environment for the Town.	<b>P1</b>
<b>Human Health</b>	To create a human healthcare plan that caters for every person constitutional right 43 (1.) 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; and right to emergency treatment.	<b>H1</b>
	To create a human healthcare plan that caters for every person constitutional right 43 (2) A person shall not be denied emergency medical treatment.	<b>H2</b>
<b>Soil</b>	Apply soil in the sustenance of plants and humans.	<b>S1</b>
	Protect the soil against degradation and pollution through waste and soil erosion through floods.	<b>S2</b>
<b>Water</b>	Ensure the right of clean water is achieved and when doing so the status of water bodies is protected, maintained and improved.	<b>W1</b>
	Waste water managed, treated and recycled.	<b>W2</b>
<b>Air Quality and Noise Pollution</b>	Avoid, prevent or reduce harmful effects on human health and the environmental resulting from air pollution through dust, emissions, noise and toxic gases from waste.	<b>AN1</b>
	Maintain and promote continuing improvement in air quality through planting of trees and vegetation;	<b>AN2</b>
	Reduce emissions and tree cutting through the promotion of renewable energy and energy efficiency technologies.	<b>AN3</b>
	Incorporate renewable energy as source of energy with a goal to increase trees through reduction of use of trees as source of energy and attainment of the minimal emissions of greenhouse gasses	<b>AN4</b>
<b>Material Assets</b>	Plan, development and progressively maintain water, roads and energy assets plans that meet and enhance the meeting of social and economic rights while complying with the clean and healthy environment as the population settles and a Town and University is development.	<b>M1</b>
<b>Climatic Factors</b>	Incorporate renewable energy as source of energy with a goal to increase trees through reduction of use of trees as source of energy.	<b>C1</b>
	Attainment of the minimal emissions of greenhouse gasses	<b>C2</b>
<b>Cultural Heritage</b>	Incorporate plan to protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage while advancing the culture of the people of the region.	<b>CH1</b>
<b>Landscape</b>	To provide a framework for identification, assessment, protection, management and planning of landscapes that has minimal impact on landscape and maximizes natural landscape visibility.	<b>L1</b>

**(a) Town Plan 90,000 Residents, 30,000 Students on 3,000 Acres**

**Table 49: Town Plan Objectives evaluated against Strategic Environmental Objectives (SEOs.)**

<b>INTRODUCTION</b> Diaspora University Town plan of 90,000 residents settled on 3,000 acres through 7,000 plots and a road infrastructure network of 120 km incorporates: Town Objectives, Economic Development Objectives; Architectural Heritage Objectives. The objectives are evaluated against the Strategic Environmental Objectives (SEOs.)				
<b>TOWN PLAN OBJECTIVES</b> <b>TO</b> – Town Development Objectives <b>EDO</b> – Economic Development Objectives <b>WWO</b> – Water Waste Objectives <b>CHO</b> – Cultural Heritage Objectives <b>CCO</b> – Climate Change Objectives <b>FRO</b> – Flood Risk Objectives <b>ICTO</b> – ICT Objectives <b>EMO</b> – Environmental Management	Likely to Improve status of SEOs	Probable Conflict with status of SEOs unlikely to be mitigated	Potential Conflict with status of SEOs- likely to be mitigated	No Likely interaction with status of SEOs
<b>TDO1.</b> Develop a high quality green town with 200,000 trees planting plan.	B1 B2 P1 H1 S1 S2 W1 AN1 AN2 AN3 C1 CH1 L1	L1	M1	H2 W2 C2
<b>TDO2.</b> Meet water supply to all residents.	W1 H1 H2 W2 AN1 M1			B1 B2 P1 S1 S2 AN2 AN3 AN4 C1 C2 CH1 L1
<b>TDO3.</b> Through development plan and zoning develop a town that has more walking than driving.	H1 P1 AN1 M1	B2 L1	B2	H2 S1 S2 W1 W2 AN2 AN3 AN4 C1 C2 CH1
<b>TDO4.</b> Incorporate high quality and people friendly housing design.	P1 H1 S1 W1 W2 AN1 AN4 M1	S2	B1	B2 H2 AN2 AN3 C1 C2 CH1 L1
<b>TDO5.</b> Include the Town Residents in development through annual general meetings.	B1 B2 P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1 C1 C2 CH1 L1			
<b>TDO6.</b> Develop the Town as a University Town.	B1 P1			B2 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1 C1 C2 CH1 L1

**Continuation: Town Plan Objectives evaluated against Strategic Environmental Objectives (SEOs.)**

	<b>Likely to Improve</b> status of SEOs	<b>Probable Conflict</b> with status of SEOs unlikely to be mitigated	<b>Potential Conflict</b> with status of SEOs- likely to be mitigated	<b>No Likely</b> interaction with status of SEOs
<b>TDO7.</b> Incorporate an environmental sustainable plan that makes the town a great place to life in.	<b>B1 B2 P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1 C1 C2 CH1 L1</b>			
<b>TDO8.</b> Provide for recreational parks, fields and golf areas.	<b>B1 B2 P1 H1 S1 S2 W2 AN2 CH1 L1</b>			<b>H2 W1 AN1 AN3 AN4 M1 C1 C2</b>
<b>TDO9.</b> Provide for basic school areas for population aged 4 years to 18 years.	<b>P1</b>			<b>B1 B2 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1 C1 C2 CH1 L1</b>
<b>EDO1</b> Create 20,000 jobs and become self-sufficient in terms of Jobs so people can work and live in Town that has proper planning and sustainable development.	<b>P1 H1 H2 W1 W2 M1</b>		<b>B1 S1 AN1</b>	<b>B2 S2 AN2 AN3 AN4 M1 C1 C2 CH1 L1</b>
<b>EDO2</b> Through Diaspora Kenyans attract new industries and tourists in the Town.	<b>P1 H1 H2 WI W2 M1</b>		<b>AN1</b>	<b>B1 B2 S1 S2 AN2 AN3 AN4 M1 C1 C2 CH1 L1</b>
<b>EDO3</b> Provide training and infrastructure for nurturing entrepreneurs to start and develop their businesses. 500 SMEs expected by end of year 5.	<b>P1 H1 H2 WI W2 M1</b>			<b>B1 B2 S1 S2 AN1 AN2 AN3 AN4 M1 C1 C2 CH1 L1</b>
<b>EDO5</b> Ensure buildings and land for enterprise and jobs creation are of a high standard in terms of their design, layout, and infrastructure.	<b>P1 H1 H2 WI W2 M1</b>	<b>B1 L1</b>		<b>B2 S1 S2 AN1 AN2 AN3 AN4 M1 C1 C2 CH1</b>
<b>EDO6</b> To facilitate the provision of adequate and attractive housing that gives high quality of life to employees and residents and act as a selling point for investors in the town.	<b>P1 H1 H2 WI W2 M1</b>	<b>B1 L1</b>		<b>B2 S1 S2 AN1 AN2 AN3 AN4 M1 C1 C2 CH1</b>
<b>WWO1</b> In tandem with the population settlement, provide adequate clean drinking water working closely with suppliers.	<b>P1 H1 H2 WI W2 M1</b>		<b>AN1</b>	<b>B1 B2 S1 S2 AN2 AN3 AN4 M1 C1 C2 CH1 L1</b>

<b>WWO2</b> Provide waste water (sewer) tanks, infrastructure and treatment facilities.	<b>P1 H1 H2 W1 W2 M1</b>		<b>AN1</b>	<b>B1 B2 S1 S2 AN2 AN3 AN4 M1 C1 C2 CH1 L1</b>
<b>CHO1</b> To protect the architectural heritage through the prevention of protected structures.	<b>B1 CH1</b>			<b>B1 B2 P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1 C1 C2 L1</b>
<b>CHO2</b> To protect shrines and areas of interest.	<b>B1 B2 CH1</b>			<b>P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1 C1 C2 L1</b>
<b>CCO1</b> To adapt measures that lead to reduction of emissions that are associated with climate change.	<b>P1 HI AN1 AN3 C1 C2</b>			<b>S1 S2 W1 W2 AN2 AN4 M1 L1</b>
<b>FRO1</b> To develop a storm water collection and removal process that ensures there is no flood of water and also harvest this water into a dam.	<b>P1 B1</b>		<b>L1</b>	<b>P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1 C1 C2</b>
<b>FRO2</b> To plant trees that help in the soaking of water inside the soil through the root system.	<b>P1 B1 B2 AN2</b>			<b>H1 H2 S1 S2 W1 W2 AN1 AN3 AN4 M1 C1 C2 L1</b>
<b>FRO3</b> To create riparian buffer zones between all rivers and streams and maintain a minimum distance to mitigate against flood risk.	<b>P1 B1 B2 AN2</b>			<b>H1 H2 S1 S2 W1 W2 AN1 AN3 AN4 M1 C1 C2 L1</b>
<b>ICTO1</b> To facilitate the delivery of high-capacity ICT infrastructure in the town.	<b>P1 H1</b>	<b>L1</b>	<b>S1 B1</b>	<b>H2 S2 W1 W2 AN1 AN3 AN4 M1 C1 C2</b>
<b>ICTO2</b> To facilitate the provision and accessibility of WiFi zone in the town.	<b>P1 H1</b>			<b>B1 B2 H2 S2 W1 W2 AN1 AN3 AN4 M1 C1 C2 L1</b>
<b>ICTO3</b> To set-up and provide electricity, telephone and TV cables infrastructure to all plots.	<b>P1</b>	<b>L1</b>	<b>S1 B1</b>	<b>H1 H2 S2 W1 W2 AN1 AN3 AN4 M1 C1 C2</b>
<b>EMO1</b> To achieve the best air quality compatible with sustainable development and ensure vehicle and industrial emissions are within set Environmental Quality Standards.	<b>B1 B2 P1 H1 AN1 AN2 AN3 AN4 M1 C1 C2</b>			<b>H2 S1 S2 W1 W2 L1</b>
<b>EMO2</b> To have soil protection measures from contamination and set measures that ensure groundwater contamination does not occur.	<b>P1 H1 AN1 AN2 AN3 AN4 M1 C1 C2</b>		<b>B1</b>	<b>B2 H1 S1 S2 W1 W2 L1</b>

**Comments:****Town Development**

The Town development plan evaluation against Strategic Environmental Objectives (SEOs) shows that the plan has several mitigation measures that will lead to low levels of environmental sensitive areas. The plan well implemented has the capacity to achieve the SEOs and have minimal environmental impact.

**Economic Development**

The economic development plan contributes toward the development of the Town and the Town environment. The evaluation against Strategic Environmental Objectives (SEOs) shows the economic development will have positive environmental effects that achieve the SEOs.

**Cultural Heritage**

The plan provisions contribute towards the protection and management of architectural and archaeological heritage SEO (CH1). These provisions would also benefit the protection and management of environmental components including soil, water, human health and flood risk management.

**Flood Risk Management**

The provisions in the plan will contribute toward the management of the storm water. The evaluation against Strategic Environmental Objectives (SEOs) shows the flood risk management will have positive environmental effects that achieve the SEOs.

**Climate Change**

Climate change adaptation measures have the potential to have beneficial environmental effects on the SEOs.

**Water and Waste**

The draft plan measures and any additional requirements would have significant adverse environmental effects on the SEOs. Water and Waste management would further facilitate the development of the Town, Environment and contribute towards the highest standard of healthcare as well as toward the protection of human health.

**ICT**

ICT is going to contribute towards the development of the Town and Environment. The evaluation against Strategic Environmental Objectives (SEOs) shows that the ICT will infrastructure cables can result in potential impacts on environmental components including cultural heritage and biodiversity.

**Environment Management**

These contributes towards environmental protection and management, benefitting multiple SEOs including: biodiversity, air quality, human health, soil and water.



**(b) University Plan of 30,000 Students Education and Training**

**Table 50: University Plan Objectives evaluated against Strategic Environmental Objectives (SEOs.)**

<b>Introduction</b> The University Plan of 30,000 students was evaluated through several objectives as established from the Diaspora University Plan (Article 2.5). The objectives are evaluated against the Strategic Environmental Objectives (SEOs.)				
<b>UNIVERSITY PLAN OBJECTIVES</b> <b>ERO</b> Education Research Objectives <b>SMO</b> Student Management Objectives	<b>Likely to Improve</b> status of SEOs	<b>Probable Conflict</b> with status of SEOs unlikely to be mitigated	<b>Potential Conflict</b> with status of SEOs- likely to be mitigated	<b>No Likely interaction</b> with status of SEOs
<b>ERO1.</b> Advance education and research to sustain population growth.	<b>B1 B2 P1 H1</b> <b>H2 S1 S2 W1</b> <b>W2 AN1 AN2</b> <b>AN3 AN4 M1</b> <b>C1 C2 L1</b>			<b>CH1</b>
<b>ERO1.</b> Through project based learning sustain the environment.	<b>B1 B2 P1 H1</b> <b>H2 S1 S2 W1</b> <b>W2 AN1 AN2</b> <b>AN3 AN4 M1</b> <b>C1 C2 L1</b>			<b>CH1</b>
<b>SMO1.</b> Have zero tolerance to environment pollution through strikes.	<b>B1 P1 H1 H2</b> <b>AN2 AN4 C2</b>			<b>B2 S1 S2</b> <b>W1 W2</b> <b>AN2 AN4</b> <b>M1 C1 CH1</b> <b>L1</b>
<b>Comment:</b> <b>Education and Research</b> The University education and research plan supports the environment with the consideration that the population is increasing. Education and research is crucial for the sustenance of the population and the environment. The evaluation against Strategic Environmental Objectives (SEOs) shows the University education and research will have positive environmental effects that achieve the SEOs.  <b>Students Management</b> The student's management plan supports the environment. Biodiversity suffers most when trees and plants are damaged during student's strikes. The evaluation against Strategic Environmental Objectives (SEOs) shows the University Students Management plan will have positive environmental effects that achieve the SEOs				

**(c) Medical Hospital Plan to support 90,000 residents, 30,000 students and Others.**

**Table 51: Medical Hospital Plan Objectives evaluated against Strategic Environmental Objectives (SEOs.)**

<b>Introduction</b> The Medical Hospital Plan was evaluated through several objectives established from the Diaspora University Plan (Article 2.6). The objectives are evaluated against the Strategic Environmental Objectives (SEOs.)				
<b>MEDICAL HOSPITAL PLAN OBJECTIVES</b> <b>PHO</b> Public Health <b>HO</b> Hospital <b>ERO</b> Education Research Objectives	<b>Likely to Improve</b> status of SEOs	<b>Probable Conflict</b> with status of SEOs unlikely to be mitigated	<b>Potential Conflict</b> with status of SEOs- likely to be mitigated	<b>No Likely interaction</b> with status of SEOs
<b>PHO1.</b> Have zero tolerance to environment pollution.	<b>B1 B2 P1 H1</b> <b>H2 S1 S2 W1</b> <b>W2 AN1 AN2</b> <b>AN3 AN4 M1</b>			<b>C1 C2 CH1 L1</b>
<b>HO1.</b> Meet highest attainable standard of healthcare as set in Kenya Constitution 43 (1) (a)	<b>B1 B2 P1 H1</b> <b>H2 W1 W2</b> <b>AN1 M1</b>			<b>S1 S2 AN2 AN3</b> <b>AN4 C1 C2 CH1</b> <b>L1</b>
<b>HO2</b> Meet emergency treatment as set in Kenya Constitution 43 (2)	<b>P1 H1 H2 W1</b> <b>M1</b>			<b>B1 B2 AN1</b> <b>AN2 AN3 AN4</b> <b>C1 C2 CH1 L1</b>
<b>HO2</b> Plan for Biohazard waste management	<b>P1 H1 W2</b> <b>AN1 M1</b>		<b>B1 S2</b>	<b>B2 H2 S1 W1</b> <b>AN2 AN3 AN4</b> <b>C1 C2 CH1 L1</b>
<b>ERO1.</b> Advance education and research to sustain population growth with the highest standard of healthcare.	<b>B1 B2 P1 H1</b> <b>H2 S1 S2 W1</b> <b>W2 AN1 AN2</b> <b>AN3 AN4 M1</b>			<b>CH1 L1</b>
<b>Comment:</b> <b>Public Health</b> Public health contributes toward the sustenance of a healthy population and integrates this to the environment through ensuring a clean and healthy environment as part of public health. The evaluation against Strategic Environmental Objectives (SEOs) shows that public health will have positive environmental effects that achieve the SEOs  <b>Hospital</b> The hospital shall provide healthcare and meet the right of constitution as it progressively improves and generates the highest standard of healthcare. The evaluation against Strategic Environmental Objectives (SEOs) shows the hospital will have positive environmental effects that achieve the SEOs  <b>Education and Research</b> Education and research plan supports the environment. The evaluation against Strategic Environmental Objectives (SEOs) shows the education and research will have positive environmental effects that achieve the SEOs.				

**(d) Design-Build Plan of Houses and Social Infrastructure**

**Table 52: Design-Build Plan Objectives evaluated against Strategic Environmental Objectives (SEOs.)**

<b>Introduction</b> The Design – Build Plan was evaluated through several objectives established from the Diaspora University Plan (Article 2.7) Design Build Plan. The plan objectives were classified as land Planning Objectives; Housing and Buildings Objectives; Roads and Infrastructure Objectives; Urban Design Objectives; Transport and Movement Objectives; and, Green Space Objectives. The objectives were evaluated against the Strategic Environmental Objectives (SEOs) based on different impacts.				
<b>DESIGN-BUILD PLAN OBJECTIVES</b> <b>LPO.</b> Land Planning Objectives <b>HBO.</b> Housing and Buildings Objectives <b>RIO.</b> Roads and Infrastructure Obj. <b>UBO.</b> Urban Design Objectives <b>TMO.</b> Transport and Movement Obj. <b>GSO.</b> Green Spaces Objectives	Likely to Improve status of SEOs	Probable Conflict with status of SEOs unlikely to be mitigated	Potential Conflict with status of SEOs- likely to be mitigated	No Likely interaction with status of SEOs
<b>LPO1.</b> Plan incorporates plots that are serviced by streets and avenues.	P1 H1 H2 S1 S2 W1 W2 M1	L1	B1	AN1 AN2 AN3 AN4 C1 C2 CH1
<b>HB01.</b> Plan incorporates building of high quality houses, apartments, commercial buildings, university buildings and other buildings that have well well-designed open spaces and are linked to streets, water, sewer, storm water, ICT and power lines.	B2 P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1	L1	B1	C1 C2 CH1
<b>HB02.</b> Plan has an appropriate mix of house designs to cater for different household compositions of 1 to 12 persons in a housing unit.	P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1			B1 B2 S1 S2 C1 C2 CH1 L1
<b>RIO1.</b> Plan has 60ft Streets and 100ft Avenues Right of Way.	P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1	B1 B2 S1 S2	B2 L1	C1 C2 CH1
<b>RIO2.</b> Plan combines roads with ICT, Water, Sewer and Power lines infrastructure.	P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1			B1 B2 S1 S2 C1 C2 CH1 L1
<b>UD01.</b> Plan of 12 sq. km (3,000 acres) applies Urban design of settling 90,000 persons and providing education to 30,000 persons to have a 10,000 persons per square km density.	P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1		B1 B2 S1 S2	C1 C2 CH1 L1

**Continuation: Design-Build Plan Objectives evaluated against Strategic Environmental Objectives (SEOs.)**

	<b>Likely to Improve</b> status of SEOs	<b>Probable Conflict</b> with status of SEOs unlikely to be mitigated	<b>Potential Conflict</b> with status of SEOs- likely to be mitigated	<b>No Likely</b> interaction with status of SEOs
<b>UD02</b> Plan distributes population to all areas with each quarter of 3 sq. km section expected to have about 30,000 persons.	<b>P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1</b>		<b>B1 B2 S1 S2</b>	<b>C1 C2 CH1 L1</b>
<b>UD03</b> Plan encourage innovation in minimizing the ground built area to not more than 40%.	<b>P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1</b>		<b>B1 B2 S1 S2</b>	<b>C1 C2 CH1 L1</b>
<b>TMS01</b> Plan has streets and avenues with vehicle transport areas and walking areas to facilitate transport and movement.	<b>P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1</b>		<b>B1 B2 S1 S2</b>	<b>C1 C2 CH1 L1</b>
<b>TMS02</b> Plan has transportation to commercial centers and apartments with large concentration of people serviced with avenues.	<b>P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1</b>		<b>B1 B2 S1 S2</b>	<b>C1 C2 CH1 L1</b>
<b>TMS03</b> Plan has footpaths for those moving around when walking.	<b>P1 H1 H2 W1 W2 AN1 AN2 AN3 AN4 M1</b>		<b>B1 B2 S1 S2</b>	<b>C1 C2 CH1 L1</b>
<b>GS01</b> Plan has green space set as 60% of the land area and at least 20% of each plot area. The green space would have trees, grass and vegetation.	<b>B1 B2 P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1</b>			<b>C1 C2 CH1 L1</b>
<b>GS02</b> Plan has green space of about 15% of land area applied to parks, fields, golf course for recreation.	<b>B1 B2 P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1</b>			<b>C1 C2 CH1 L1</b>
<b>GS03</b> Plan has green space in riparian buffer zones, a minimum and maximum distance will be applicable	<b>B1 B2 P1 H1 H2 S1 S2 W1 W2 AN1 AN2 AN3 AN4 M1</b>			<b>C1 C2 CH1 L1</b>

**Comment:****Land planning**

The land planning incorporates the use of land in an efficient productive and sustainable way per Kenya Constitution 60. (1) Land in Kenya shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable.

The evaluation against Strategic Environmental Objectives (SEOs) shows that the plan supports the SEOs and will likely result in significant positive environmental effects on various environmental components.

**Houses and Buildings**

The housing plan supports the environment through the designs and the buildings that shall be implemented. With 5 million sq. meters and 120 km road network planned more than 1 billion pieces of material that will have waste through packaging, containers and transportation requirements the Design-Build plan will have the greatest impact in the short run on the environment.

The evaluation against Strategic Environmental Objectives (SEOs) shows that the plan supports the SEOs and will likely result in significant positive environmental effects on various environmental components.

**Roads and Infrastructure**

The Roads and Infrastructure plan incorporates the development of: streets, avenues, walk paths and the planting of trees in area provided. The infrastructure incorporates the development of: water supply, sewer drainage, power lines, storm water drainage and ICT cable lines.

The evaluation against Strategic Environmental Objectives (SEOs) shows that the plan contributes towards sustainable development and the protection of the environment.

**Urban Development**

The Urban design plan incorporates: sustainable development, environmental protection and environmental management.

The evaluation against Strategic Environmental Objectives (SEOs) shows that the plan contributes towards sustainable development and the protection of the environment.

**Transport and Movement**

The plan provisions will achieve the Transport and Movement of persons and goods in a safe way.

The evaluation against Strategic Environmental Objectives (SEOs) shows that the plan contributes towards person's safety, health, pollution and the protection of the environment.

**Green Space**

The development of green space that includes: parks, sports fields, golf course and other areas in plots will preserve biodiversity flora and fauna. The green space will improve air quality, human health and preserve soil.

The evaluation against Strategic Environmental Objectives (SEOs) shows that the green space plan contributes towards reduction of pollution, human health and the protection of the environment.

## (e) Energy Plan

**Table 53:** Energy Plan Objectives evaluated against Strategic Environmental Objectives (SEOs.)

<b>Introduction</b> The Energy Plan Objectives are established from the Diaspora University Plan (Article 2.5) Energy Plan. The objectives were classified as Solar Energy Objectives; Waste to Energy Objectives; and Other Sources Objectives. The Energy Plan Objectives were evaluated against the Strategic Environmental Objectives (SEOs.)				
<b>ENERGY PLAN OBJECTIVES</b> <b>SEO</b> – Solar Energy Objectives <b>WEO</b> – Waste to Energy Objectives <b>OSO</b> – Other Sources Objectives	<b>Likely to Improve</b> status of SEOs	<b>Probable Conflict</b> with status of SEOs unlikely to be mitigated	<b>Potential Conflict</b> with status of SEOs- likely to be mitigated	<b>No Likely interaction</b> with status of SEOs
<b>SEO.</b> Plan incorporates putting solar panels in every town house.	<b>B1 B2 P1 H1 H2 AN1 AN2 AN3 AN4 M1</b>			<b>S1 S2 W1 W2 C1 C2 CH1 L1</b>
<b>WEO.</b> Plan incorporates Waste to Energy solutions.	<b>P1 H1 H2 S1 S2 W1 W2 AN1 AN3 AN4 M1</b>			<b>B1 B2 AN2 C1 C2 CH1 L1</b>
<b>OSO.</b> Plan incorporates other energy sources that include: Hydro, Wind and generators	<b>B1 B2 P1 H1 H2 AN2 AN3 AN4 M1</b>			<b>C1 C2 CH1 L1</b>
<b>Comment:</b> <b>Solar</b> The solar energy plan would supply energy at the source of generation. This means usage of land for housing and energy generation. The evaluation against Strategic Environmental Objectives (SEOs) shows that the implementation of Solar contributes towards sustainable development and the protection of the environment.				
<b>Waste to Energy</b> The waste to energy plan would supply energy through turning waste to energy. This means the use of waste for energy generation. The evaluation against Strategic Environmental Objectives (SEOs) shows that the implementation of waste to energy contributes towards sustainable development and the protection of the environment.				
<b>Other Sources</b> The other sources of energy would contribute toward a better environment as trees stop being applied as a source of energy. The evaluation against Strategic Environmental Objectives (SEOs) shows that the implementation of other sources of energy contributes towards sustainable development and the protection of the environment.				

## 3.6. ALTERNATIVES AND EVALUATION OF ALTERNATIVES

### 3.6.1. Introduction and Rational for Alternative Development

This SEA considers reasonable alternatives, which can be implemented for the Diaspora University Town plan.

The alternatives are put forward with the consideration of the land and area the plan shall be implemented, the plan objectives and SEA objectives. The alternatives will be further evaluated following the identification of potential effects so as to inform the development of the Draft Plan. The evaluation of alternatives will inform the decision-making framework.

The rationale of the 90,000 Town residents plan and 30,000 students plan in 3,000 acres alternatives factors the Kenya population growth with consideration that persons have to get their rights that are recorded in the constitution.

The rational is also based on the following factors:

- Land availability and planning needs.
- Persons settled not reaching the persons planned for.
- Distribution of persons in settlement Clusters.

### 3.6.2. Alternatives

#### i. Alternative 1: Unplanned Settlement Approach

This alternative means that the growing population continue to settle on the land without a planned approach

#### ii. Alternative 2: Land Increase

The area the plan shall be implemented has open undeveloped land that is owned by community or is public trust land. The alternative is to increase the land area that the 90,000 residents shall be settled in. This alternative will decrease the population per sq. km.

The 90,000 residents inside 3,000 acres (12 sq. km) means 6,500 persons/sq. km.

Increase Alternatives

**Table 54:** Land Increases Alternatives

Land in Acres	Sq. Km	90,000 Residents	
		Persons/acre	Persons/Sq. Km
4,500 acres	18 sq. km	20 persons/acre	5,000 persons/sq. km
6,000 acres	24 sq. km	15 persons/acre	3,750 persons/sq. km
9,000 acres	36 sq. km	10 persons/acre	2,500 persons/sq. km

#### iii. Alternative 3: Settled Persons Decrease

The alternative would have less people settled in the Town.



### **3.6.3. Evaluation of Alternatives and Methodology**

The evaluation of alternatives provides a comparative evaluation of the environmental effects of implementing the alternatives.

The evaluation is done to understand how an alternative will likely improve, conflict with or have a neutral interaction with environmental components.

The methodology applied considers the relevant aspects of the current state of the environment in the land and area the project is to be developed.

The Strategic Environmental Objectives (SEOs) tabulated (Table 48) are used in the evaluation of alternatives.

The evaluation of alternatives is done through Compatibility. This done in order to determine how the alternatives would likely affect the status of the SEOs.

The SEOs and the alternatives are shown against each other to identify which interactions – if any – would cause effects on specific components of the environment.

Where the assessment identifies a likely conflict with the status of an SEO the relevant SEO code is entered into the conflict column.

These effects include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects.

Interactions that would potentially conflict with the status of an SEO and would be likely to be mitigated would be likely to result in potential significant negative effects however these effects could be mitigated.

The extent to which effects could be mitigated varies and there are three 'likely to be mitigated columns'

Interactions that would probably conflict with the status of an SEO and would be unlikely to be mitigated would be likely to result in a significant negative effect on the environmental component to which the SEO relates.

The degree to which effects can be determined is limited as the plan will be implemented through the lower tier environmental assessments and decision making of planning authorities. Nonetheless a comparative evaluation of the various alternatives can be provided.

**Table 55:** SEOs and the alternatives are shown against each other.

Alternatives	Likely to Improve status of SEOs to a greater degree	Likely to Improve status of SEOs to a lesser degree	Least Potential Conflict with status of SEOs likely to be mitigated	Potential Conflict with status of SEOs likely to be mitigated	Most Potential Conflict with status of SEOs likely to be mitigated	Probable Conflict with status of SEOs unlikely to be mitigated	No significant interaction with status of SEOs
Unplanned Settlement				S1 S2 C1	P1 H1 H2 W1 AN1	W2 AN2 AN3 AN4 L1	M1 C2 CH1
Land Increase 4,500 acres	P1 H1 W1 W2 M1	H2 AN1 AN2 AN3 AN4	S1 S2 C1			L1	C2 CH1
Land Increase 6,000 acres	P1 H1 W1 W2 M1	H2 AN1 AN2 AN3 AN4	S1 S2 C1			L1	C2 CH1
Land Increase 9,000 acres	P1 H1 W1 W2 M1	H2 AN1 AN2 AN3 AN4	S1 S2 C1			L1	C2 CH1
Population Decrease	P1 W1 W2 M1	H1 H2 AN1 AN2 AN3 AN4	S1 S2 C1 C2			L1	CH1

### 3.6.4. Predictions.

**Table 56:** SEOs and the alternatives are shown against each other.

Environmental Topic	Significant Positive Effect Likely to Occur	Potentially Significant Adverse Effect, If unmitigated	Residual Non-Significant Adverse Effect
<b>Biodiversity, Flora and Fauna</b>	<ul style="list-style-type: none"> <li>• Continuation of and further contribution towards the protection of biodiversity and flora and fauna.</li> <li>• Better management of human – wildlife conflict.</li> <li>• Providing material evidence, monitoring and guidelines to assist in the implementation of management plans for designated habitats to assist in achieving the conservation objectives.</li> </ul>	<ul style="list-style-type: none"> <li>• Loss, damage or disturbance of biodiversity flora and fauna in areas that will be covered by roads.</li> <li>• Disturbance and displacement of species.</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of habitats due to houses and road covers.</li> </ul>
<b>Population &amp; Socio-Cultural</b>	<ul style="list-style-type: none"> <li>• Planning of population growth.</li> </ul>	<ul style="list-style-type: none"> <li>• Unplanned settlements</li> <li>• Health factors</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of life due to bacterial diseases</li> </ul>
<b>Human Health</b>	<ul style="list-style-type: none"> <li>• Better Human health due to higher standards of health.</li> </ul>	<ul style="list-style-type: none"> <li>• Low life expectancy rate from low standards of healthcare.</li> </ul>	<ul style="list-style-type: none"> <li>• Disease transmissions due to higher density of persons.</li> </ul>
<b>Soil</b>	<ul style="list-style-type: none"> <li>• Protection of hydrogeological and ecological function of the soil resource.</li> </ul>	<ul style="list-style-type: none"> <li>• Adverse impacts on the hydrogeological and ecological function of the soil resource</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of an extent of soil function.</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>• Contribution towards the protection of water resource.</li> </ul>	<ul style="list-style-type: none"> <li>• Protected Areas, arising from changes in quality and flow.</li> </ul>	<ul style="list-style-type: none"> <li>• Flood related risks remain due to uncertainty</li> <li>• with regard to extreme weather events</li> </ul>
<b>Air Quality and Noise</b>	<ul style="list-style-type: none"> <li>• Improvement in air quality through dust reduction.</li> <li>• Design incorporates more walking and cycling that will reduce noise levels.</li> </ul>	<ul style="list-style-type: none"> <li>• Emissions to air.</li> <li>• Noise and greenhouse gases.</li> </ul>	<ul style="list-style-type: none"> <li>• Increases in greenhouse gas emissions and noise</li> </ul>
<b>Climatic Factors</b>	<ul style="list-style-type: none"> <li>• Low emissions</li> </ul>	<ul style="list-style-type: none"> <li>• Higher temperatures</li> <li>• Increased rainfall</li> </ul>	<ul style="list-style-type: none"> <li>• Drought</li> <li>• Flooding</li> </ul>
<b>Material Assets</b>	<ul style="list-style-type: none"> <li>• Adequate and appropriate water services.</li> <li>• Planned Roads</li> </ul>	<ul style="list-style-type: none"> <li>• Construction Waste Disposal</li> </ul>	

<b>Cultural Heritage</b>	<ul style="list-style-type: none"> <li>• Contribution towards the protection of cultural heritage.</li> </ul>	<ul style="list-style-type: none"> <li>• Damage of unknown archaeology and architecture during construction and operation of Town.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal residual effects.</li> </ul>
<b>Landscape</b>	<ul style="list-style-type: none"> <li>• Contribution to protection of landscape.</li> </ul>	<ul style="list-style-type: none"> <li>• Visual impacts and conflicts of protection of landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal residual adverse effects</li> </ul>

### 3.6.5. Cumulative Effects

Cumulative effects are the net results of environmental impact from a plan and the projects and activities resulting from the plan.

Cumulative effects of the Diaspora University Town will result from:

- The progressive settlement of persons to grow to 90,000 Town residents
- The progressive development of persons to grow to 30,000 University Students
- The design and building of buildings and roads.
- The changes of landscape views from the elevation of buildings.
- The planting, uprooting and relocation of fauna and flora.

Cumulative effects will be based on:

- Environmental impacts on sensitive areas.
- Spatial crowding or temporal overlap between plans and actions
- Removal of natural resources
- Addition of new products
- Alteration of the landscape.

To access the significant cumulative effects that will result from the implementation of the Diaspora University Town plan a set of questions were established as follows:

- What are the potential effects from the plan?
- Are the potential effects from the plan likely to be significant?
- If significant are those potential effects from the plan likely to be cumulative?
- Are there any valuable environmental resources likely to be affected by the potential effects that are cumulative?
- What is the sensitivity and/or capacity of the valued environmental resources?
- What is its state in relation to environmental quality standards or thresholds?
- Would additional impacts result in limits to be breached?
- How long and frequent are the potential impacts?

Studies established that the Diaspora University Town plan has the potential to have significant impacts on valued environmental resources in the surroundings.

The potential impacts were cumulative either being additive, synergistic or neutralizing, and partly indirect.

### Valued Environmental Resources

- Voi River.
- Seasonal Streams.
- Ground water resources.
- Wildlife: Thompson's gazelles, bush bucks, common duiker and baboons.
- Trees

**Table 57:** Cumulative Effects, Causes and Mitigation.

Cumulative Effects	Causes	Mitigation
<b>Waste Output</b>	<ul style="list-style-type: none"> <li>• Human Waste</li> <li>• Building Waste</li> <li>• Plants Waste</li> </ul>	<ul style="list-style-type: none"> <li>• Waste to Energy</li> <li>• Waste Water Treatment</li> </ul>
<b>Litter</b>	<ul style="list-style-type: none"> <li>• Human activity</li> </ul>	<ul style="list-style-type: none"> <li>• Dustbins</li> <li>• Litter collection</li> <li>• Litter fines</li> </ul>
<b>Biohazard Waste</b>	<ul style="list-style-type: none"> <li>• Medical Waste</li> </ul>	<ul style="list-style-type: none"> <li>• Special disposal</li> </ul>
<b>Water Consumption</b>	<ul style="list-style-type: none"> <li>• Human nature</li> </ul>	<ul style="list-style-type: none"> <li>• Water sourcing/generation, treatment and supply.</li> </ul>
<b>Energy</b>	<ul style="list-style-type: none"> <li>• Human needs</li> </ul>	<ul style="list-style-type: none"> <li>• Solar</li> <li>• Waste to Energy.</li> </ul>
<b>Vehicle Emissions</b>	<ul style="list-style-type: none"> <li>• Human Travel</li> <li>• Manufacturing</li> </ul>	<ul style="list-style-type: none"> <li>• Emission Standards</li> <li>• Vehicle inspections.</li> </ul>
<b>Storm Water</b>	<ul style="list-style-type: none"> <li>• Rainfall and construction</li> </ul>	<ul style="list-style-type: none"> <li>• Storm Water drainage</li> <li>• Dam</li> </ul>

### 3.7. Justification For Preferred Alternative

The preferred alternative is the university town development of 90,000 residents and 30,000 students be on 4,500 acres. This means a population density of 20,000 persons per acre.

### 3.8. Linkages With Other Plans

The plans will link to:

- Njoro Water project for water supply.
- Mzima Water Supply plan for water supply.
- Standard Railway Gauge (SGR) for transportation.
- Mombasa – Nairobi highway for transportation.

## **4. FINDINGS AND RECOMMENDATIONS**

### **4.1. FINDINGS**

The findings are that:

Diaspora University Town Plan has integrated all recommendations arising from the Draft SEA report.

The plan will have significant positive effects upon Kenya environmental management and protection as Kenya population continues to increase to 60 million 2030 and 90 million 2060.

The plan facilitates the environmental management and protection by:

- (a) Having a Town Sustainable Environmental Management Plan that would progressively implement measures that mitigate against environmental damage.
- (b) Having a Design-Build Environment plan that will ensure minimum impact on the environment.
- (c) The Medical Hospital plan of waste management will ensure minimum impact on the environment.

Some provisions would have the potential to result in significant negative environmental effects (these are described below), the magnitude and timing of which cannot be readily determined.

The integration of detailed mitigation (including a detailed Monitoring Strategy) into the Operational Programme means that significant residual adverse environmental effects will not occur.

The scope of the assessment (including description of baseline, the relationship to other plans and programmes and the evaluation of effects) has considered the environment of the land and region, Taita Taveta County and Kenya.

Taking into account the detailed mitigation (including detailed Monitoring Strategy) which has been integrated into the plan it has been determined that significant residual adverse environmental effects will not occur in either Taita Taveta or Kenya.

In order to be permitted, buildings for development in the land will require to progressive comply with the Environmental Impact Assessment on individual projects.

### **4.2. INTERRELATIONSHIP BETWEEN ENVIRONMENTAL COMPONENTS**

The SEA requires the Draft Environmental Report to include information on the likely significant effects on the environment.

The topics covered: Biodiversity, fauna and flora; Population; Human health; Soil; Water; Air Quality and Noise Pollution; Climatic factors; Material assets; Cultural heritage including architectural and archaeological heritage; and, Landscape.

The interrelationship between the topics is considered and the likely significant effects on environmental topics which are identified include those which are interrelated; those not affected by implementation.

- **Yes.** Means significant interrelationships between environmental components.
- **No.** Means few or no interrelationships between environmental components

**Table 58: Interrelationships between environmental components**

	Bio-diversity Fauna & Flora	Popula- tion & Social Cultural	Human Health	Air Quality & Noise Pollution	Water	Soil	Climatic Factors	Material Assets	Cultural Heritage	Land- scape
Biodiversity Fauna & Flora										
Population & Social Cultural	Yes									
Human Health	Yes	Yes								
Air Quality & Noise Pollution	No	Yes	Yes							
Water	Yes	Yes	Yes	Yes						
Soil	Yes	Yes	Yes	Yes	Yes					
Climatic Factors	Yes	Yes	Yes	Yes	Yes	No				
Material Assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Cultural Factors	Yes	Yes	Yes	No	Yes	No	No	Yes		
Landscape	Yes	Yes	No	No	Yes	Yes	No	Yes	No	



### 4.3. LAND PLAN ASSESSMENT AND RECOMMENDED CHANGES

The following is a holistic evaluation of the overall potential for land area environmental effects. Currently there is no existing Strategic Environmental Assessment (SEA) on the land assessed and the region assessed and this would form the SEA for the land and area surrounding the land.

**Table 59:** Land Plan Assessment and Recommended Changes.

Topic	Assessment	Recommended Changes
<b>Biodiversity Fauna &amp; Flora</b>	<ul style="list-style-type: none"> <li>• Land has diverse indigenous trees.</li> <li>• Land has Wildlife</li> <li>• Land has natural streams.</li> </ul>	<ul style="list-style-type: none"> <li>• Change the road design to accommodate the indigenous trees.</li> <li>• Create a Riparian section on the natural streams.</li> </ul>
<b>Population &amp; Social Cultural</b>	<ul style="list-style-type: none"> <li>• The land would require to support 90,000 residents and 30,000 students as a home.</li> </ul>	<ul style="list-style-type: none"> <li>• No changes recommended.</li> </ul>
<b>Human Health</b>	<ul style="list-style-type: none"> <li>• The human health standard will be affected by the population biodiversity, flora, fauna, water, soil and material assets.</li> <li>• The land plan has a Medical Hospital area allocated.</li> <li>• The land plan has allocation of walking paths and vehicle and motorcycle travel lanes of streets and avenues</li> </ul>	<ul style="list-style-type: none"> <li>• Incorporate underground tunnels and overhead roads and paths to improve on travel and safety as part of reducing the injury.</li> </ul>
<b>Air Quality &amp; Noise Pollution</b>	<ul style="list-style-type: none"> <li>• Air quality is affected by dust from land and pollen from vegetation.</li> <li>• Undeveloped land contributed to Noise pollution as vehicles travel.</li> </ul>	<ul style="list-style-type: none"> <li>• Cover land through paving to avoid dust pollution.</li> <li>• During improvement of land surface to be applied in vehicle movement use material that has least noise pollution.</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>• Water can be sourced from underground.</li> <li>• The land receives about 700 mm of rainfall every year.</li> <li>• Voi River and streams part of the land.</li> </ul>	<ul style="list-style-type: none"> <li>• Incorporate dams for harvesting Rain water.</li> <li>• Allocate boreholes to source water from underground.</li> <li>• Incorporate Riparian section along the rivers and streams</li> </ul>
<b>Soil</b>	The soils include: <ul style="list-style-type: none"> <li>• Murram</li> <li>• Sand and gravel</li> <li>• Loam and red soil.</li> <li>• Limestone</li> </ul>	<ul style="list-style-type: none"> <li>• No changes recommended</li> </ul>
<b>Climatic Factors</b>	No climatic factors effects.	<ul style="list-style-type: none"> <li>• No Change</li> </ul>
<b>Material Assets</b>	No material assets added into the land.	<ul style="list-style-type: none"> <li>• No change</li> </ul>
<b>Cultural Heritage</b>	<ul style="list-style-type: none"> <li>• Shrines</li> <li>• Anthills</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the areas and preserve them through setting of parks.</li> </ul>
<b>Landscape</b>	<ul style="list-style-type: none"> <li>• Hilly with ridges</li> </ul>	<ul style="list-style-type: none"> <li>• Preserve the landscape.</li> </ul>

#### 4.4. DEVELOPMENT PLAN ASSESSMENT AND RECOMMENDED CHANGES

The plan of 90,000 Residents Town and 30,000 students is a plan made up of several plans as presented as follows:

**Table 60:** Development Plan Assessment and Recommended Changes.

Topic	Assessment	Recommended Changes
<b>Biodiversity Fauna &amp; Flora</b>	<ul style="list-style-type: none"> <li>• Plan will add 200,000 trees.</li> <li>• Plan will conserve trees and vegetation that is not assessed in the house and built area.</li> <li>• Plan will conserve animals through the parks set-up</li> </ul>	<ul style="list-style-type: none"> <li>• Allocate a Park for Animals as needed.</li> <li>• Incorporate the moving of growing trees as opposed to cutting. The trees moved to planned areas of trees planting.</li> </ul>
<b>Population &amp; Social Cultural</b>	<ul style="list-style-type: none"> <li>• The plan is for 90,000 students and 30,000 students on 3,000 acres of land.</li> </ul>	<ul style="list-style-type: none"> <li>• The plan can consider increase of land in future.</li> </ul>
<b>Human Health</b>	<ul style="list-style-type: none"> <li>• Hospital Development.</li> <li>• Good housing development.</li> </ul>	<ul style="list-style-type: none"> <li>• Good planning for human health through hospital and housing.</li> </ul>
<b>Air Quality &amp; Noise Pollution</b>	<ul style="list-style-type: none"> <li>• Trees preservation and planting</li> <li>• Paved roads and speed limits.</li> </ul>	<ul style="list-style-type: none"> <li>• Have about 300,000 trees of the preserved and planted</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>• Supply from developed suppliers</li> <li>• Boreholes for supply</li> <li>• Tanks for storage</li> <li>• Pipes to all plots along the road infrastructure</li> <li>• Waste water removal through septic tank and sewer</li> </ul>	<ul style="list-style-type: none"> <li>• Have provision to note the water plan and infrastructure set-up for easy reference and preservation.</li> </ul>
<b>Soil</b>	<ul style="list-style-type: none"> <li>• No major movement of soil.</li> <li>• Application of stones into roads and housings.</li> </ul>	<ul style="list-style-type: none"> <li>• Build soil retention walls as needed based on the landscape</li> </ul>
<b>Climatic Factors</b>	<ul style="list-style-type: none"> <li>• Emissions control and regulations</li> <li>• Storm water drainage and dam.</li> </ul>	<ul style="list-style-type: none"> <li>• The streams that have dried up can be applied as dams for storm water.</li> </ul>
<b>Material Assets</b>	<ul style="list-style-type: none"> <li>• Houses and buildings</li> <li>• Roads</li> <li>• Water and sewer pipes</li> <li>• ICT cable</li> <li>• Energy power lines</li> </ul>	<ul style="list-style-type: none"> <li>• Have clear markings and plans on all addition assets.</li> </ul>
<b>Cultural Heritage</b>	<ul style="list-style-type: none"> <li>• No incorporations</li> </ul>	<ul style="list-style-type: none"> <li>• Incorporate shrines and anthills and come up with preservation and management plans.</li> </ul>
<b>Landscape</b>	<ul style="list-style-type: none"> <li>• Buildings to follow landscape</li> </ul>	<ul style="list-style-type: none"> <li>• Preserve landscape with building and roads following landscape.</li> <li>• Consider tunnels for roads.</li> </ul>

#### **4.5. RECOMMENDED MITIGATION MEASURES**

The results from the SEA indicate that the Diaspora University Town can be developed without significant effects on the environment. The conclusion is derived from the effective planning measures that are put in writing that will guide in the avoiding, reducing or offsetting any potential significant adverse effects.

The recommended mitigation measures shall be integrated into the development plan and shall become part of the development plan.

In terms of this SEA two forms of mitigation have been identified:

- **Plan Level Mitigation Measures.**  
These are measures that are incorporated into the Plan to avoid, reduce or offset significant adverse effects. The measures further relate to plan strategy that will be implemented.
- **Project Level Mitigation Measures.**  
These are measures that are recognised as good when undertaking a project of land use for settlement development.

##### **4.5.1. PLAN LEVEL MITIGATION MEASURES**

The plan as set in article 2 sets the development procedure and measures that the developing entity will adopt to achieve a sustainable settlement of 90,000 residents with an institution of 30,000 students.

The measures proposed are further based on:

- Collaboration and Co-ordination
- Data, Information and Knowledge Improvement.
- Monitoring Requirements
- Constitutional Bodies Consenting and Permitting requirements

The following measures are recommended:

##### **(a) Collaboration and Co-ordination**

*Measure 1:* A development mechanism for greater coordination between developer, suppliers, environmental experts and government be put in place to improve the effectiveness of the delivery of the environment plan. This can be through a committee set-up or department.

##### **(b) Data Collection, Sharing and Knowledge Improvements**

*Measure 2:* To progressively support the planning for attainment of the plan objectives and the strategic environment objectives there is need to collect data and improve on the data through sharing and scientific research. The developers put in measures for collation, management and dissemination of data and information collected and progressively improve on the measures through application of Information Communication Technology (ICT). This data and knowledge be shared and made public available so the data can be applied by the designers, approvers and permitting persons.

### **(c) Monitoring Requirements**

*Measure 3:* In accordance with the NEMA requirements the committee or department identified in (Measure 1) should co-ordinate the activities required in the monitoring the environmental effects of the implementation of the Plan. This will ensure that unforeseen adverse effects are identified at an early stage and appropriate remedial action taken as required. Monitoring of the socioeconomic impacts of each project should also be undertaken where this is required under law or the policy.

### **(d) Constitutional Bodies Consenting and Permitting**

*Measure 4:* Consenting processes by the bodies created by the Constitution should take into account the timelines set in the plan and the SEA. Achievement of the Right to clean and healthy environment as set by Kenya Constitution may not be achieved if there are unnecessary delays in the process of consenting and permitting by the constitutional bodies and persons assigned constitutional responsibility.

*Measure 5:* The consent process should, where appropriate, require those who are putting up buildings to incorporate the monitoring programmes and to assess the effectiveness of their mitigation measures. The goal should be to reduce or offset the effects of the developments made to the environment.

*Measure 6:* A report should be produced progressively that streamlines the SEA and development plan/s. This report will enable accounting for environment measures progressively.

## **4.5.2. PROJECT LEVEL MITIGATION MEASURES**

Project level mitigation measures are based on good practice. In setting up project level mitigation measures it is assumed that the Plan cannot guarantee all mitigation measures will be implemented. The project level mitigation measures are set up to consider the project as a whole.

### **(a) Project Mitigation Description**

- Avoid the disturbance and habitat removal as much as possible.
- Reduce the loss or disturbance of species and habitats
- Create a working area within which activity, plant and vehicle movement will take place.
- Take into consideration the sensitive periods such as breeding seasons or migratory periods of birds and animals and reduce the disturbance that may affect the breeding process.
- Plan and implement risk of collision and wildlife mortalities measures through control of equipment.
- Prevent the spillage of fluids, fuels, oils and/or waste materials.
- Prior to the commencement of installation and construction works issue notices.
- Build structures and flood defences systems that ensure no flooding or damage from flooding occurs.
- Reduce landfalls or landslides through building prevention measures. Keep a tracking process that monitors areas that can have landfalls and landslides.

#### **4.6. PROGRESSIVE EIAs FOR PLAN**

##### **4.6.1. 2 Million Sq. Meters, 120 km road & Infrastructure 5 year plan.**

The strategic environmental assessment would have a 5 year plan of delivery of 2 million sq. meters to support a population of 30,000 residents and 10,000 Students University.

##### **Productions**

- 6,000 Plots for Town Houses
- 120 Km Road Network
- 400,000 sq. meters University Buildings.
- 1.2 million sq. meters residential space
- 400,000 sq. meters SMEs space

##### **4.6.2. 3 Million Sq. Meters Progressive EIAs**

The Environmental Impact Assessment would be based on individual projects as the plan progresses and the town settlement increases from 30,000 residents to 90,000 Town residents and from 10,000 students to 30,000 University students.

## **5. RELEVANT TECHNICAL APPENDICES – STAKEHOLDERS AND OTHER**

SEA requires that the process include stakeholders who are informed about the plan and also provided the opportunity to influence and contribute toward the Environmental Plan and its progressive improvement.

The process of engaging stakeholders of the Environmental Plan was established through Kenya Constitution 185 (4) and thereafter based on the land location.

Collection of views from stakeholders is done with a view to:

- Mitigate against potential positive/negative impacts
- Incorporate local ideas and knowledge on environmental topics and land studies.
- Achieve expert advice on the plans for water, power, roads and other public infrastructure.

### **5.1. STAKEHOLDERS**

Through Kenya Constitution, Land, Persons Living inside Land, Persons neighboring land, Jobs Expression of Interest, County departments and other special interest groups have been identified.

The stakeholders Include:

- Taita Taveta County Assembly.
- Ndara B Community
- 3,000 Persons who have filled Jobs Expression of Interest
- Students.
- Neighbors
- Taita Taveta County Planning Department
- Taita Taveta County Agriculture Department
- Taita Taveta County Environment Department
- Taita Taveta County Water Department
- Deputy County Commissioner- Mwatate Sub County
- Taita Taveta County NEMA County Director
- National Construction Agency
- County Physical Planning Officer
- Kenya Wildlife Services
- Water and Sewerage Company
- Water Resources Management Authority (WRMA)
- Kenya Urban Roads Authority (KURA)
- Kenya National Highways Authority (KeNHA)
- Kenya Railways Corporation (KRC)
- Kenya Civil Aviation Authority
- Taita Taveta University
- Residents neighboring land.
- The Kenya Police Service
- The Kenya Prisons
- The Judiciary
- Taita Taveta Chamber of Commerce

## 5.2. STAKEHOLDER ANALYSIS

In this study, the 'importance' of a stakeholder is defined by whether the stakeholder is:

- **Directly Important**
- **Indirectly Important.**

**Directly Important** stakeholders are persons whose economic, social and environmental constitutional rights will be directly affected by the proposed development. They are viewed as more 'important' as they are first-hand recipients of the accruing impacts.

Indirectly important stakeholders are stakeholders who are part of the project but whose constitutional rights need not be directly affected by the proposed development. They are mainly government bodies resulting from the constitution for support and monitoring.

**Table 61:** Stakeholder Analysis.

Stakeholder	Importance Direct/Indirect
Taita Taveta County Assembly.	Indirect
Ndara B Community	Direct
Families inside Land	Direct
3,000 Persons Jobs Expression of Interest	Direct
Students	Direct
Persons Neighboring Land	Indirect
Taita Taveta County Planning Department	Indirect
Taita Taveta County Transport Department	Indirect
Taita Taveta County Agriculture Department	Indirect
Taita Taveta County Environment Department	Indirect
Taita Taveta County Water Department	Indirect
Deputy County Commissioner- Mwatate Sub- County	Indirect
Taita Taveta County NEMA County Director	Indirect
National Construction Agency	Indirect
County Physical Planning Officer	Indirect
Kenya Wildlife Services	Indirect
Water and Sewerage Company	Indirect
Water Resources Management Authority (WRMA)	Indirect
Kenya Urban Roads Authority (KURA)	Indirect
Kenya National Highways Authority (KeNHA)	Indirect
Kenya Railways Corporation (KRC)	Indirect
Taita Taveta University	Indirect
The Kenya Police Service	Indirect
Kenya Civil Aviation Authority	Indirect
The Kenya Prisons	Indirect
The Judiciary	Indirect
Taita Taveta Chamber of Commerce	Indirect



### 5.3. STAKEHOLDERS CATEGORY, DETAILS AND IMPACT LEVEL

**Table 62:** Stakeholder Category Details and Impact Level.

Stakeholder	Category	Details	Impacts (+, -)
<b>Taita Taveta County Assembly.</b>	Public	The County Assembly is created and members elected to provide toward the needs of the County residents. The assembly through passing of bills provides for the 14 Constitution functions of County Government through 185, 209 (3) and other laws.	+ More Revenues + Advancing Economic Social Constitution Rights.
<b>Ndara B Community</b>	Individual & Community	Ndara B Community is made up of about 5,000 persons. The community is a founder of the Town and University. The Community looks to plan for future generations in having education and a Town to reside in.	+ Economic Social Constitution Rights. + Better Environment
<b>Families inside Land</b>	Individual	The families settled inside the land are persons currently residing and sleeping inside the land.	+ Economic Social Constitution Rights.
<b>3,000 Persons Jobs Expression of Interest</b>	Individual	The project will create jobs and progressively settle persons who get jobs into the land.	+ Economic Social Constitution Rights.
<b>Students</b>	Individual	Institution Town Development Plan article 15 creates Scholarships from Fees and Entertainment Taxes The county government based on the revenue directly received from the project implementation in county shall in the first 5 years allocate 50% of all funds paid by, Design/Builder as permits and fees, Entertainment taxes from businesses incorporated and other applicable fees and charges, to a scholarship fund that will give 10 students' from each of the county 20 wards education in institution. The scholarship fund shall enable institution to give scholarships and enroll 200 students every year from the county.	+ Economic Social Constitution Rights. + Clean and Healthy Environment right progressive attainment.
<b>Persons Neighboring Land</b>	Individual	These are persons living in neighboring lands. Mostly farmers who could end up supplying the project with produce.	+ Economic Social Constitution Rights. - Noise, Landscape changes.
<b>Taita Taveta County Planning Department</b>	Public	The department is created for function 8. County planning and development, including— (a) statistics; (b) land survey and mapping; (c) boundaries and fencing; (d) housing; and (e) electricity and gas reticulation and energy regulation.	+ Economic Social Constitution Rights + Better Planning + Revenue to County.

<b>Taita Taveta County Transport Department</b>	Public	The department is created for function 6. County transport, including— (a) county roads; (b) street lighting; (c) traffic and parking; (d) public road transport.	+ Right of Clean & Healthy Environment.
<b>Taita Taveta County Agriculture Department</b>	Public	The department is created for function 1. Agriculture, including—(a) crop and animal husbandry; (b) livestock sale yards; (c) county abattoirs; (d) plant and animal disease control; and (e) fisheries.	+ Economic Social Constitution Rights - Health risks
<b>Taita Taveta County Environment Department</b>	Public	The department is created for function 3. Control of air pollution, noise pollution, other public nuisances and outdoor advertising.	+ Right of Clean & Healthy Environment + Better Health.
<b>Taita Taveta County Water Department</b>	Public	The department is created for function 13. County public works and services, including— (a) storm water management systems in built-up areas; and (b) water and sanitation services.	+ Right of Clean & Healthy Environment + Better Health.
<b>County Commissioner-Mwatate Sub-County</b>	Public	The County Commissioner office is head of Security. The project will integrate with the security system.	+ Better Security.
<b>Taita Taveta NEMA County Director</b>	Public	The office will be the monitoring office of the project.	+ Right of Clean & Healthy Environment
<b>National Construction Agency</b>	Public	The Agency is charged with the responsibility of ensuring that buildings are safe and secure.	+ Safe buildings. + Economic Social Constitution Rights
<b>Kenya Wildlife Services</b>	Public	The Kenya Wildlife Services department ensure the welfare of animals.	+Animal Rights -Human Animal Conflict
<b>Water and Sewer Company</b>	Public	The Water and Sewer Company manages the supply of water and removal of waste water	+ Right to clean water. + Right to highest standard of health
<b>Water Resources Management Authority (WRMA)</b>	Public	Water Resources Management Authority advice on water resources. This incorporates surface water and underground water.	+ Right to clean water.
<b>Kenya Urban Roads Authority (KURA)</b>	Public	KURA is responsible for the roads that connect settlements, industries and markets. The roads classified as D and E	+ Right to food.

*Continuation: Stakeholder Category Details and Impact Level.*

Stakeholder	Category	Details	Impacts (+, -)
<b>Kenya National Highways Authority (KeNHA)</b>	Public	KeNHA supplies the road network that connects persons to the international markets. The roads classified as A , B and C	+ Right to food. + Right to education
<b>Kenya Railways Corporation</b>	Public	KRC manages the railway network. The railway lines move persons and goods.	+ Right to food + Right to Education
<b>Taita Taveta University</b>	Institution	An institution of higher learning that educates persons.	+ Right to education
<b>The Kenya Police Service</b>	Public	A security service as established by Kenya Constitution.	+ Safety and Security
<b>Kenya Civil Aviation Authority</b>	Public	The authority that manages and oversees the aviation sector of airplanes and helicopters flying over Kenya airspace.	+ Safety + Economic growth
<b>The Kenya Prisons</b>	Public	The department that puts to prison persons convicted of crimes.	+ Safety and Security
<b>The Judiciary</b>	Public	The independent government arm of Kenya that interprets Kenya Constitution, adjudicates over civil disputes and makes judgment in criminal cases.	+ Safety and Security + Persons management
<b>Taita Taveta Chamber of Commerce</b>	Private	The chamber formed by business to advance business and private sector growth.	+ Economic growth

#### **5.4. STAKEHOLDER ENGAGEMENT METHODOLOGY**

The following methodology have been and are progressively being applied to engage stakeholders:

##### **5.4.1. County Assembly Institution Town Development Plan Approval.**

The Institution Town development plan was given to the County Assembly on February 2015 in accordance with Kenya Constitution 185 (4) A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county’s resources; and (b) the development and management of its infrastructure and institutions

The Education, Early Childhood and Vocational Committee was assigned to review the plan. The committee following review made the following recommendation:

While applying article 185 (4) of the Constitution of Kenya 2010 that reads committee A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county’s resources; and (b) the development and management of its infrastructure and institutions,” the committee resolved that the county assembly approves the undertaking of the University and Town development project in Taita Taveta County.

This position was informed by the many benefits as listed in the committee finds.

The Speaker put the plan in the floor for approval in the plenary sitting of the County Assembly, held on Tuesday 12th May 2015 at 2.30 pm. A majority of the members approved the plan.

#### **5.4.2. Ndara B Land Allocation Meetings to Plan.**

The plan required 3,000 acres to be implemented in Taita Taveta. Ndara B Community a holder of community land reviewed the plan and subsequently allocated land as a founding partner through several meetings that started May 2016 to August 2016.

#### **5.4.3. Ndara B Community Members Workshops**

Several workshops with Ndara B Community members were held in November 2018. The Workshops reveled the following:

There are about 1000 residents living in the village. The community lives in extreme poverty and deplorable conditions in dilapidated mud houses. The area is dry with no socio – economic activities.

The kids have cleared class 8; form 4 but are just home with no meaningful economic engagement and with no hope to proceed to the next level. The community members in Mwangea village are longing to have the project to reduce their poverty levels.

The community members feel that the project will be instrumental to improving their livelihoods economically, socially and also improve the environment. The project will lead to:

- Tree planting
- Decrease in charcoal burning
- Decrease sand harvesting
- Rehabilitation/restoration of Voi river which has dried due to sand harvesting
- Diversification of farming as an enterprise
- Opening up the area for economic activities
- Food security
- Improve water flow in the river for domestic and irrigation use since borehole water is saline
- Improved agriculture/food security
- Employment/job creation
- Living standards
- Better health care
- Better infrastructure
- Enhance trading in the area
- Schools : better education/ Adult literacy



**Figure 59:** Ndara B community member's workshops



#### 5.4.4. Material Suppliers Workshop.

Materials constitute the biggest addition of products during the development of a new Town. The material applied can make the environment better.

Taita Taveta has very few manufacturing of materials applied in the construction of buildings and roads. The Diaspora University Town project in both meeting the environmental needs as well incorporates the manufacturing of materials from the region.

This strategy will enable manufacturing to be integrated with recycling.



*Figure 60: Materials Supply Workshop*



*Figure 61: Waste Management to create Materials Supply.*

**Table 63: Material Supplies Workshop Minutes**

<b>Material Supply Workshop</b>
<p><b>Date:</b> 24<sup>th</sup> November 2018</p> <p><b>Attendance:</b> 45 persons</p> <p><b>Project Presentation:</b> Dan Kamau</p> <p><b>Project Design Presentations:</b> Rose Dama</p> <p>Workshop held at Diaspora University Town development offices in Voi. Ndara B Community Chairman and Diaspora University Trustee, Benjamin Mwandaa, opened the workshop.</p> <p><b>Presentation of Project by Dan Kamau</b></p> <p>Dan presented the history and progress of the project development plan. He presented the project as a jobs creation plan that is developed through a GDP growth system. He said that it is the human resource that develops any project for the sustenance of those developing.</p> <p>He stated the goal of the university town development plan is to meet Kenya Constitution 43 rights: healthcare, housing, education and others.</p> <p>He showed the workshop participants the constitutional laws applicable that included Kenya Constitution 42. Every person has a right to clean and healthy environment. The environment right achieved through proper planning for dust, waste and other pollutions.</p> <p><b>Presentation of Design by Rose Dama Msanzu</b></p> <p>Rose presented the ongoing designs as: Plots, Roads, Water, Sewer, Storm Water, Town Houses, University buildings, Hospital, Airstrip and other designs.</p> <p>She stated that the designers will be working closely with those who shall manufacture the material so as to achieve quality and specifications required.</p> <p>The material requirement design was presented as one that will have 500 million pieces material supplies that will be added into the land as buildings and roads.</p> <p><b>Comments, Questions and Discussions</b></p> <p>Alfani Ismain made a comment that the project was good and that the local supplies be given first opportunity and assurance that they will be the suppliers.</p> <p>In response this was assured. It was noted that the first materials to be applied into the project will be from local suppliers. This approach also aimed at enhancing the environment.</p> <p><b>Question by Mr. Gidson Mwasingo</b></p> <p>Can the local participate in the building of town houses through the plan presented? Can they pay slowly?</p>

**Answer**

Yes. The local persons will be invited to be part of every plan and participate as Town House developers. The Diaspora Kenyans in helping the local achieve this are looking to invest into a bank that can give loans to be repaid in 60 months to those who want to become developers using the Diaspora University Town system.

**Question by Mr. Shekla Mbogholi**

After the supply of the materials the structures are there will be having the Hospitals and the University, What plans do you have to the community or the people around the University working in the university as lectures? Are you having any plans to give scholarship?

**Answer**

The plan approved has 10 students from each of the 20 wards benefiting with education. This is a total of 200 students every year. The plan will benefit those around it with jobs.

**Ndara B Chairman Benjamin Mwandaa closing remarks:**

This is your project. Create your opportunity.

**5.4.5. Church Leaders and Chamber of Commerce Workshop – Wundanyi**

*Figure 62: Participants of Meeting at Wundanyi*

The workshop held at Wundanyi explored the benefits of a project. In attendance were church leaders and members of the Chamber of Commerce Taita Taveta.



**Table 64:** Minutes of Wundayi Church Leaders and Chamber of Commerce

<b>Wundayi Church Leaders and Chamber of Commerce</b>
<p><b>Date:</b> 7<sup>th</sup> June 2018</p> <p><b>Attendance:</b> 50 persons attended.</p> <p><b>Moderator:</b> Meeting Moderator Bishop Ronald Itambo of Mwatate</p>
<p><b>Bishop Justin Maghanga</b></p> <p>Opened the Workshop Meeting with a message and Prayer to God.</p>
<p><b>Dan Kamau Project Trustee Remarks</b></p> <p>The history and progressive stages the project has gone through to today. He said the project was started by Diaspora Kenyans through investing their capital. He said the Diaspora and Kenyans who have joined them continue to invest their capital resources as they develop a University and Town.</p> <p>The representatives of diverse organizations were further informed that the project is for creation of Jobs. That through the job one will be able to achieve their Kenya Constitution rights especially the rights in Kenya Constitution 43 and 42: Healthcare, Housing, Food, Social Security, Food, Clean Water, Education, Emergency Treatment, Clean and Healthy Environment.</p> <p>On how the project came to Taita Taveta, the residents of Taita Taveta County attending the meeting were informed that on February 2015, Dr. Wilson Endege and Bishop Donald Mwawasi, of Diaspora submitted an Institution Town Development Plan in line with Kenya Constitution 185 (4) “A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county’s resources; and (b) the development and management of its infrastructure and institutions.”</p> <p>The Taita Taveta residents learnt that the Education, Early Childhood and Vocational Committee reviewed the Institution Town Development Plan and recommended that the County assembly approves the plan. On May 2015 the plan was approved. Since then Diaspora and Kenyans have put in and continue to put in their capital resources to advance the project.</p>
<p><b>Benjamin Mwandaa, the Chairman of Ndara B Community Remarks</b></p> <p>Said that Bishop Donald Mwawasi would approach the community who would thereafter consider the project and allocate land and become founders of the University.</p> <p>He said that the Community did this, so the community members can get jobs and other persons can get jobs. He also stated that the community allocated the land so 200 students, 10 from each ward of the 20 wards in Taita Taveta, can get education opportunity as they join university every year.</p>
<p><b>Bishop Ronald Itambo of Mwatate</b></p> <p>The Bishop praised Benjamin Mwandaa and the Ndara B community for getting the project to Taita Taveta.</p>

## **Comments, Questions and Answers**

### **Bishop Justin Maghanga Remarks**

Times have changed and to move forward we should accept new Innovation. To progress we need higher learning institutions. The Diaspora University project is a welcome project. The church leaders accept and fully support the project.

### **Bishop Justin Maghanga Remarks**

We need to change our altitude to development. Especially when the development comes to change the lives of people positively. The population of Taita Taveta is rising. We need new facilities. We need to plan for the future generations.

### **Mr. Peter Mwabili, the Vice Chairman of KNCC – Taita Taita Chapter Comments**

The Kenya National Chamber of Commerce – Taita Taveta Vice Chairman commenting said the Chamber and business community supports the proposed project. He said the benefits that will come with the implementation of the project are immense. He said the business community will be able to expand their business as they supply the project.

### **Mr. Gidson Mwasigo asked what opportunities the local residents will be able to get.**

The answer was that the local persons can benefit based on their skills, talent, natural resources, vehicles and equipment. They should see themselves as partners of the project and when doing so improve their livelihoods and environment.

### **Question asked on how Wundanyi town located could benefit?**

This was answered based on the project tourism plan. It was noted that persons from abroad who have had a chance to visit Wundanyi loved the scenery as they drove up Wundanyi and the topography and hills could be a great tourism attraction. It was added that the University plan adopted from WPI will benefit Wundanyi and other Towns as students study through the project based learning approach.


### **Concern and Question was raised as to whether the Diaspora going to bring the Gay culture that is in the U.S.**

The Diaspora project was stated as having goals for development of housing and creation of Jobs. It was observed that the Diaspora Kenyans goal is to bring expertise and capital to create jobs. The persons, churches and religious organizations that will set up in the Town would primarily shape the culture. The project sees those settled as persons living in the County.

In closing the meeting Bishop Itambo asked through a raise of hands for persons to show those who supported the project. Almost all in attendance raised their hands. The Bishop resolved that the persons as residents of Taita Taveta and representation others, welcome and fully support the project.

#### 5.4.6. Public Questionnaires, Public Meetings and Workshops.

Persons neighboring the land have filled in about 600 questionnaires with over 80% of respondents welcoming the project.



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**NDARA 'B'/17 LAND STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)**

The Strategic Environmental Assessment (SEA) is done in compliance with:

- Kenya Constitution 42, 69 and 70.
- Environmental Management and Coordination Act (EMCA) 1999 (Rev 2015).
- Other National and County legislation.

All land in Kenya when used requires to be Assessed and an Environmental Assessment Report created. The SEA Final Report will institute a way to progressively monitor the environment and ensure the right of clean and healthy environment is met at all times.

Please fill in the following form.

Name: ELIPNATH SHALI MASANGA Tel: 0716664672

• Do you live in the land? Yes ☒ No ☐

• Do you live or neighbor the land? Yes ☒ No ☐

• Are you a Member of Ndara B Community? Yes ☒ No ☐

(A resettlement plan will be required to be filled by all persons living inside the Land Assessed.)

• Are you aware of the Diaspora University Project to be constructed in Ndara B? Yes ☒ No ☐

• Do you welcome the project development in the Area? Yes ☒ No ☐

• How long have you lived in the area 30 Years

• List any Environmental Factors you would like included in the SEA report?

Bowholes

Soil erosion prevention

Planting

Project of seedlings

Grass planting

• Are there any Cultural factors you would like included in the SEA report?

Irrigation on our farms

Additional information can be established in a paper and attached to this questionnaire.

Figure 63: One of the 600 Questionnaires filled.

A public meeting was held on August 2018.



**Figure 64:** Public Meeting

**Table 65:** Statement by Ndara B Community

On May 2016, Bishop Donald Mwawasi would bring to our Ndara b Community, an Institution Town Development Plan approved by Taita Taveta County in accordance with the Kenya Constitution 185(4). The approved Institution Town Development Plan needed 3000 acres to be implemented on. Our community would carefully consider the plan and the benefits to our community and to Taita Taveta.

Our community would grant a donation of 1500 acres. The other 1500 acres to come from the land bordering our land to the west that was not utilized.

Our community is happy with the project. We fully support the allocation of the yet to be registered land bordering the project to the plan so the plan can be implemented.

Using land to create jobs for young men and women who do not have jobs is the right usage of land.

Using land to advance education for those growing up is the right usage of land.

The 200 students who shall get to go to join the University shall benefit from the land usage. Using land to plan a Town development with a University, Medical Hospital and to become a home for thousands who shall find work and settle in the Town is the right usage of land.

Ndara B community members support the allocation of land the extra land to build the new Town and University.

Ndara B community members thank the Diaspora Kenyans for coming up with the plan that shall be developed.

We thank the County Assembly members for receiving the plan and approving the plan in line with Kenya constitution 185 (4).

**Table 66:** Statement by Pastor Pageil Mshila

I got news about this project back in the year 2016; I saw the benefit of the project especially the modernized health facilities offering treatment of the Diaspora comparing it to our ill equipped health facilities in our county. That's when I took a step to share with Bishop Mwawasi about Ndara B group Ranch.

After bishop and I consulted the Ndara B group ranch chairman; his committee and members were able to understand the benefits from the project. They decided to grant the land for the same, taking in mind that this is a mile stone in development of the County as well as improved education standards, improved health and employment opportunities.

We thank the Members of the County Assembly for accepting this noble project in accordance to the constitution Article 185(4).

God bless you and God bless Taita Taveta.

#### **5.4.7. Job Expression of Interest.**

The project is a jobs creation project. Over 3,000 persons so far have filled jobs expression of interest.

Those filling forms are considered stakeholders with reference to United Nations UN Sustainable goals Goal 8: Decent work and economic growth.

The goal is set to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

The goal makes a job seeker a stakeholder of the Job they shall get.



**Figure 65:** Ndara B Chairman reviews the files with Over 3,000 Jobs Expression of Interest



#### 5.4.8. Families in Land

Resettlement Meetings were held with families and resettlement documents established as planned (Ref. 3.3.2 (g) Table 45.)



**Figure 66:** Meeting with a family inside the land.

#### 5.4.9. Neighbors

The neighbors of the project are persons settled in the neighboring towns. The persons contributed to the environment assessment and were part of the persons who filled the 600 questionnaires.



**Figure 67:** Residents of Chaka Reli consulting on the proposed project

#### 5.4.10. Other Bodies and County Departments

##### (a) Taita Taveta NEMA Office

NEMA office stated they had received a public complaint that the construction of the university town had started without NEMA license. The NEMA officials said they visited the site did not see any construction. The structures built on the land were stated to be of persons who have built illegally without the approval of NEMA.

The NEMA office indicated that issues of water use, waste management and pollution control should be well addressed in the Environmental Management Plan. The NEMA office will work hand in hand with the project to ensure the environment plan is achieved as the project is implemented.



*Figure 68: Discussions of Project at NEMA Office. Respondent Josephine Khisa*

##### (b) Ecosystem Conservator

The diverse indigenous flora in Taita Taveta was discussed with the Ecosystem Conservator. The plan aims at conserving as many trees as possible. There will be no land clearing. The construction of roads and buildings will be done with consideration of the flora in the land. The office shall be available to offer advice as needed.



*Figure 69: Kenya Forest Service officer Mr Mang'ele contributes to SEA.*



### (c) Kenya Wildlife Services

Taita Taveta is the home of millions of wildlife. The County that is made up of 4.2 million acres has over the years led to animal corridors as population and animals have continued to coexist.



*Figure 70: Ms. Zainabu of KWS contributes to Strategic Environmental Assessment*

### (d) The Association of Kenya Elders (TAKE)



*Figure 71: NEMA Expert and Director of TAKE at TAKE Office in Voi*

TAKE has embraced the project and are partners in the implementation of Diaspora University. Their role is to meet the community and inform their membership of about 4,000 members of the benefits of project and how they can be part of project.

They act as a link between community and development sectors and advocacy of better Environment and Natural Resources Management. One of the key interests of TAKE is the Rehabilitation of Voi River through conservation of upstream source/catchment. They advocate that every villager must plant at least plant 100 trees during the rainy season. In Voi constituency they have piloted a program on the bare hills where school children will grow and water seedlings for one year. Four primary schools and two secondary schools have been identified for the activity.

#### **(e) Kenya Pipeline Company Limited**

The project should be prioritized since it addresses key issues in the community such as health and education. Enhance the capacity of service delivery. Environment is key to all other sectors of development.



*Figure 72: Aggrey Ochola and KPCL Officers*

#### **5.4.11. Summary of Engagements**

More than 10,000 persons in Taita Taveta were engaged directly as the plan and SEA resulted.

The engagements were done through:

- Plan Approval.
- Land Allocation
- Interviews
- Questionnaires
- Workshops
- Oral and Written Discussions
- Expression of Jobs Interest.

## 5.5. STAKEHOLDER PARTICIPATION, QUESTIONNAIRES AND WORKSHOP SUMMARY

*Table 67: Stakeholder participation details and comments.*

Stakeholder	Details and Comments
<b>Taita Taveta County Assembly.</b>	<p>Taita Taveta County assembly on February 2015 received plan in line with Kenya Constitution 185 (4) A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county’s resources; and (b) the development and management of its infrastructure and institutions.</p> <p>The Education, Early Childhood and Vocational Committee following review wrote, “While applying article 185 (4) of the Constitution of Kenya 2010 that reads, A county assembly may receive and approve plans and policies for— (a) the management and exploitation of the county’s resources; and (b) the development and management of its infrastructure and institutions,” the committee resolved that the county assembly approves the undertaking of the University and Town development project in Taita Taveta County. This position was informed by the many benefits as listed in the committee finds.</p> <p>The County Assembly on Tuesday 12<sup>th</sup> May 2015 approved the plan. The Speaker on the Resolution on the Approval of putting up a university and a Town development project in Taita Taveta wrote to the Governor and Copied the Investor, Donald Mwawasi, as follows: “This is to inform you of the decision of the plenary sitting of the County Assembly, held on Tuesday 12th May 2015 at 2.30 pm that deliberated on the Approval of an investor to put up a University and a Town development project in the County. Pursuant to the provision of article 185 (4) the County Assembly approved that the Investor be allowed to search and purchase adequate land in the County for the purpose of putting up the aforementioned project.”</p>
<b>Ndara B Community</b>	<p>Ndara B Community is made up of about 1,000 members and about 4,000 persons with the consideration of the children.</p> <p>The community received the approved plan in May 2016 and through meetings considered the plan and granted 1,500 acres of the 3,000 acres land needed for development in a process that ended August 2016. The community also became co-founders of the University and Town with a goal to achieve the benefits from the project for themselves, their families and for other residents of Taita Taveta.</p> <p>The Community is today founding the University and Town.</p>
<b>Families inside Land</b>	<p>There are about 22 families settled inside the land.</p> <p>15 families living inside the land see this as a great project for advancement of constitutional rights. Through the resettlement donation offered by the Trust they have signed the resettlement that will meet their rights as well as be part of clean and healthy environment attainment.</p>

<b>3,000 Persons who have filled Jobs Expression of Interest</b>	<p>The project offers a settlement that will grow to 90,000 residents.</p> <p>Taita Taveta has a population of about 350,000 persons many who:</p> <ul style="list-style-type: none"> <li>• Do not have a Job.</li> <li>• Would settle in the Town as they work in the town.</li> <li>• Do not have a waste management where they live and use pit-latrines.</li> <li>• Do not have clean water.</li> <li>• Are exposed to dust.</li> </ul> <p>Over 3,000 so far have expressed interest to be part of the project. Their comments are they would like to meet their food, housing, healthcare needs by becoming part of the project.</p>
<b>Students</b>	<p>The project offers a University that will grow to 30,000 students.</p> <p>The Institution Town Development Plan creates an incentive for 10 students from each of the 20 wards. In the first 4 years this will mean 800 persons in the county on finishing their high school will have an opportunity to progress to university.</p>
<b>Persons Neighboring Land</b>	<p>The land is neighbored by various communities. Voi Town is 10 km from the land.</p> <p>The persons who have filled Questionnaires have stated they welcome the project. They see the project as a great project for their children.</p> <p>The welcome the building of a hospital close to them that will meet their healthcare needs.</p>
<b>Taita Taveta County Planning Department</b>	<p>The project should observe and meet the various stages both legal and paralegal before the project implementation. The planning Department should be fully informed as their inputs are important for the success of the project infrastructure. Before the start of the project to its implementation stage.</p>
<b>Taita Taveta County Agriculture Department</b>	<p>The Agriculture department of the county government invites the project to intervene as a stakeholder in the implementation of the agriculture policy and moderation of the various smart farming methods for food-security for the county residences.</p>
<b>Taita Taveta County Environment Department</b>	<p>There is a change of guard at the helm of the department we are yet to get their comments. At the verbal brief discussion however it was obvious the department welcomes the project to fully comply with various statues of the laws by the county government and NEMA Act.</p>
<b>Taita Taveta County Water Department</b>	<p>The department of water and irrigation encouraged the Diaspora University Town to do due diligence and exploit other sources of water apart from the Mzima springs source for the projected residence usage before the project implementation.</p> <p>Waste water management should be put into top consideration given the envisaged population that is projected to reside in the town institution.</p> <p>As the plan is being implement the department would be happy to be part of the plan and oversee the supply the town with water as Mzima 2 pipeline is developed.</p>

*Continuation: Stakeholder participation details and comments.*

Stakeholder	Details and Comments
<b>County Commissioner</b>	<p>The County Commissioner office in participating in the project noted:</p> <ul style="list-style-type: none"> <li>• A detailed corporate Social Responsibility (CSR) plan on planting of Exotic trees to enhance forest cover in the county in line with presidential directive during the launch of the National Tree planting Exercise.</li> <li>• Consider waste management system</li> </ul> <p>There be proper dumping site in responsible waste management practice</p>
<b>Taita Taveta County NEMA County Director</b>	<p>The NEMA office indicated that issues of water use, waste management and pollution control should be well addressed in the Environmental Management Plan. The NEMA office will work hand in hand with the project to ensure the environment plan is achieved as the project is implemented.</p>
<b>National Construction Agency</b>	<p>National Land Commission is the Body mandated by law to see the attainment of safe and secure houses construction.</p> <p>The NCA offices in Voi in contributing toward the Strategic Environment Assessment (SEA) stated that the recycling waste water be expounded more as it is one of the key factors of sustainability.</p>
<b>Kenya Wildlife Services</b>	<p>A full study of the animals and the interrelation with wildlife will be done and incorporated in the final SEA.</p>
<b>Kenya Forest Department</b>	<p>The construction of roads and buildings will be done with consideration of the flora in the land. The office shall be available to offer advice as needed.</p>
<b>Wildlife Works</b>	<p>He felt that the project is timely because the project area experiences rampant charcoaling and deforestation.</p> <p>However he felt that the area could be an elephant dispersal area as they move towards Sagalla hills. He indicated that we should contact</p>
<b>Water and Sewerage Company</b>	<p>Considering the location of the Diaspora University and the water supply infrastructure in place /planned, there is need for a new water supply system for the facility to factor the population. Abstraction from Mzima pipeline is feasibility. Other alternative sources can be exploited.</p> <p>Waste water treatment and disposal emanating from the university and environs. Mzima two pipeline system can be considered.</p>
<b>Water Resources Management Authority (WRMA)</b>	<p>The Rural Water Users Association under WRMA visited the site at Mto Mwagoti DUP. the river passing along the site has the potential to accommodate a well – designed engineered dam which can serve the community and the university . The dam can be multi – purpose as a recreation center, yachting area, fishing area and water sport for the project residence and the community.</p>
<b>Kenya Urban Roads Authority (KURA)</b>	<p>The organization is undergoing service delivery changes and most of the functions are under the county government who has been mandated to manage city and town roads infrastructure.</p>
<b>Kenya National Highways</b>	<p>The project is important and has no effect on the KeNHA maintenance management system plan, for any concerns on the proposed Nairobi – Mariakani (Mombasa) express way.</p>

<b>Authority (KeNHA)</b>	Plans the DUP can source more information from the ministry in Nairobi Headquarters who will be able to give the latest development a progress on the project.
<b>Kenya Railways Corporation (KRC)</b>	The main concern is the preservation of the fauna and flora at the DUP site and makes improvements on the existing environment set-up. Promote close and friendly relationship with the community members who are the custodians of the project when fully implemented. The community infrastructure should be futuristic so as to accommodate development plans.
<b>MAZIDO International</b>	<p>MAZIDO INTERNATIONAL whose main agenda is dealing with arid and semi - arid zones of the coastal region and mainly in wildlife, livestock, climate change effects and their response weight down to the fact that the DUP site acts as a maternity area for wildlife especially the Tsavo elephants? Utmost attention should be paid into having an in-depth study to assess the effects on the Tsavo elephants in regard to before, during and after the project implementation.</p> <p>Another concern is the disposal of e-waste given that this will be a highly technological based institution. All mechanisms should be in place on the general disposal of all kinds of waste.</p> <p>To mitigate the rise of criminal behaviors and due to the population rise, there must be a mitigation plan on how to control such an explosion and more or so on slums that may arise due to the proximity of the project by the surrounding communities.</p> <p>To achieve bio – diversity conservation the project should liaise with KWS to integrate possible interventions highlighted by them.</p> <p>Mazido international were of the opinion that DUT plan should be aligned to the county integrated development plan (2<sup>nd</sup> generation) to avoid overlaps in overall development agenda.</p>
<b>Taita Taveta University</b>	The Diaspora University is a complement to the existing facility and this will bring an opportunity to co-operate and supplement each other. This is a welcome project to benefit the county citizens.
<b>Kenya Pipeline Company Limited</b>	<p>The project should be prioritized since it addresses key issues in the community such as health and education.</p> <p>Enhance the capacity of service delivery.</p> <p>Environment is key to all other sectors of development.</p>
<b>The Kenya Police Service</b>	The County Police Service welcomes the project and the planning should include matters of security and community policing to involve the local community. If the community welcomed the project then it's well and pursue the development.
<b>The Judiciary</b>	The Judiciary welcomes the project as long as all the lawful procedures are followed to the letter and the local community is fully involved in its implementation.
<b>Chamber of Commerce</b>	In a meeting in Wundanyi, the KNCC Taita/Taveta chapter fully support the implementation of the Diaspora University Town project which will benefit the citizens of Taita /Taveta by way of creating jobs and opportunities to our people both young and old.



*Continuation: Stakeholder participation details and comments.*

Stakeholder	Details and Comments
<b>TAKE The Association of Kenya Elders</b>	The Association of Kenya Elders (TAKE) Taita/Taveta county points out that: - community involvement in all stages of the project should be the priority so as to conserve the indigenous fauna and flora and add value to the existing natural set. Follow all the constitutional requirements and pay attention to CSR.
<b>Department of Public Health</b>	<ul style="list-style-type: none"> <li>• Livelihood improvements Activities.</li> <li>• Open Air markets (BAZAAR TYPE)</li> <li>• Solid and liquid waste management policy.</li> <li>• Health care at the community level.</li> <li>• Hygiene and sanitation.</li> <li>• Food production within the area.</li> <li>• Health referral system and security.</li> <li>• Small scale farming Technology improvement.</li> <li>• Security provision and plans for the area.</li> <li>• Setting aside land for future expansion of the town.</li> </ul>
<b>Kenya Red Cross</b>	<p>Kenya Red Cross is an emergency service provider in the fields of health and disaster. It is part of the Worldwide red cross organization.</p> <p>In participating in the SEA the following comments were made.</p> <ul style="list-style-type: none"> <li>• Technology – data should be collected with the use of technological devices which will give the actual state of the environment by running a series of tests to know the impact of unsafe practices in the environment.</li> <li>• Political – through engagement with leaders and government the strategic environmental plan might be allocated funds from the annual budget to facilitate its operations and therefore achieve its goals.</li> <li>• Legal – laws may be created to force people to comply with the safe environment achievement goals thus guaranteeing the success in implementation.</li> <li>• Climate change – accelerate mitigation action to reduce greenhouse gas emission and implement adaptation measures to increase our resilience with adverse climate impacts.</li> <li>• Restore and protect water quality – implement measures that achieve ongoing improvement in the environmental status of water bodies from the source.</li> <li>• Implementation of legislation – improve tracking of plans and policies and the implementation and enforcement of environmental legislation to protect the environment.</li> <li>• As the population is growing rapidly there will be need to develop a comprehensive strategic plan which will show how the population will be absorbed in the town with little or no damage to the environment.</li> <li>• The public body will be charged with functions or mandated to provide measures and make sure these measures are adhered to.</li> <li>• The public bodies should have a strategic plan and targets which will be analyzed in their annual reports.</li> </ul>



	<ul style="list-style-type: none"> <li>• Mitigation measures will be to create another oversight body charged with the mandate to provide supervision and guidance to make sure the development plan is a success.</li> <li>• Frequent engagements and briefing of stakeholders on the progress of the implementation.</li> <li>• The current state of the environment verses the goals and objectives and the forecasted state after 100% implementation and success.</li> <li>• Use of green energy- migration from energy sources which pollute environment such as fuel to proper safe source like wind and solar.</li> <li>• Noninterference with natural bodies of water such as rivers, lakes and oceans as they may have adverse effect in the future.</li> <li>• Buildings should be constructed at least 100m away from water bodied. Riparian land should not be constructed on.</li> <li>• Rehabilitation of mining sites – i.e. areas where mining of minerals has been done should be rehabilitated to forest and fish ponds as in the case of Bamburi Cement.</li> </ul>
<b>The Kenya Prisons</b>	<p>KENYA PRISON SERVICES – They highlighted that educating the community on matters of environmental pollution and what the constitution improves them to uphold. The supply of clean water should be regarded as a right for the community, thereby there should be ways explored on hoe to integrate this in the institution plan before it is implemented.</p> <p>The KPS was supportive of the building of well-planned housing facilities and health services which should be fully serviceable with expert personnel.</p> <p>The DUT should study on ways to harvest the river water by way of damming an identified area. This calls for a hydrological study of the area.</p> <p>Due to the vast area of developing the institution town there should be measures on security be put in place to control negative vices and also to take note that the town development is bond to attract other development in the nearby areas and possibly trigger the scramble for land around the proposed university town.</p> <p>The development of the institution town should consider a fully functional police service station or administration outpost before, during and after the DUP implementation for matters on security.</p>
<b>Material Suppliers Workshop</b>	<p>The forum held on 26<sup>th</sup>.11.2018 was a great indication when the presentation was well received and the material suppliers present were ready to face the challenge to create jobs by becoming manufacturers and suppliers of the various requirements that may be needed by the project during its implementation phase. The impact of the project is bound to have a positive effect on the citizens of the county of Taita Taveta.</p>

The project plan will continue to incorporate stakeholders and stakeholder views in the plans to be implemented progressively.

The following remarks and comments will be constantly incorporated in the different plans that shall be implemented.

## **5.6. PROGRESSIVE CONSULTATION AND DECISION MAKING**

The project plan approved requires a progressive consultation as established in the Institution Town development Plan.

### **5.6.1. Institution Town Development Plan Legislative Requirement**

The town development plan legislated in accordance with Kenya Constitution 185 (4) has the following requirements for progressive consultation and public participation.

#### **Administration and public participation provisions first 5 years**

- 1) In the first 5 years of development, the Institution Board of Trustees shall be the administrators of the institute town.
- 2) The Board of Trustees shall hold a public meeting once every year.
- 3) All persons working on site and residing on the site shall be eligible to attend the annual meeting.
- 4) The meeting shall discuss all issues relating to the settlement and any provisions to be adopted by the board in order to improve on the institution and town social welfare, security and other provisions for the benefits of those living in the town.

#### **Administration and public participation provisions Year 6 onward**

- 1) The administration of town in Year 6 onwards shall be per set laws.
- 2) The institute board of trustees shall pass on the town administration to the residents, public security system, and public court system and town administration laws at the time.
- 3) A town administration hall shall be developed and made operational by residents.
- 4) A police station shall be developed and made operational by national police.
- 5) A courthouse shall be developed and made operational by justice department.

The annual budget that will incorporate the views of the residents will be a decision making process of the project.

### **5.6.2. NEMA Annual Monitoring Report**

The NEMA Annual Monitoring Report will assess and monitor the implementation of the environmental measures and will be a decision maker with regard to the environment.

### **5.6.3. County Government Committees**

As provided in the Kenya constitution 195

195. (1) A county assembly or any of its committees has power to summon any person to appear before it for the purpose of giving evidence or providing information.
- (2) For the purposes of clause (1), an assembly has the same powers as the High Court to—
- (a) enforce the attendance of witnesses and examining them on oath, affirmation or otherwise;
  - (b) compel the production of documents; and
  - (c) issue a commission or request to examine witnesses abroad.

The Members of the County Assembly through various committees will influence the decision making on behalf of the public resident in the county.

#### 5.6.4. Judiciary

The Judiciary through the Kenya Constitution laws and other legislated laws will progressively influence the decision making of the developing town.

Examples of Kenya Constitution laws that will influence decision making.

Kenya Constitution 22. (1) Every person has the right to institute court proceedings claiming that a right or fundamental freedom in the Bill of Rights has been denied, violated or infringed, or is threatened.

(2) In addition to a person acting in their own interest, court proceedings under clause (1) may be instituted by—

- (a) a person acting on behalf of another person who cannot act in their own name;
- (b) a person acting as a member of, or in the interest of, a group or class of persons;
- (c) a person acting in the public interest; or
- (d) an association acting in the interest of one or more of its members.

Kenya Constitution 70.

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

(2.) On application under clause (1), the court may make any order, or give any directions, it considers appropriate— (a) to prevent, stop or discontinue any act or omission that is harmful to the environment; (b) to compel any public officer to take measures to prevent or discontinue any act or omission that is harmful to the environment; or (c) to provide compensation for any victim of a violation of the right to a clean and healthy environment.

## 6. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

### 6.1. INTRODUCTION AND OBJECTIVES

The EMMP is a plan that will incorporate the measures that will be undertaken during development plan of the university and town.

The EMMP Objectives are:

- Control adverse environmental impacts.
- Ensure actions needed to implement measures that limit environmental impacts are progressively done.

### 6.2. SUMMARY OF IMPACTS

The predicted adverse environmental and social impacts for which mitigation is required are identified and briefly summarized.

- Emissions
- Solid, Effluent and Biohazard Waste
- Litter.
- Dust Air Pollution
- Noise Pollution
- Tree Planting
- Water Parks, Riparian and Environmental Protected Areas.

In the summary a cross-reference to the SEA report or other documentation is made so that additional detail can be readily referenced.

**Table 68:** Emission Impacts and Mitigation

Emissions	
<b>Impact</b>	CO2 emissions from vehicles.
<b>Objective</b>	Eliminate impact on public health due to emissions of CO2.
<b>Strategy</b>	Set Emissions Standards for cars operating in the Town on CO2 requirements.
<b>Recommended Management and Monitoring Action</b>	Adoption of an inspection and sticker on all cars operating in the Town. Report on cars emitting smoke.
<b>Responsibility</b>	Town Environment Department
<b>Costs</b>	Inspection Cost.
<b>Performance indicators</b>	Set up CO2 measuring locations along the roads
<b>Monitoring</b>	Environment Department
<b>Reporting</b>	Environmental yearly reports
<b>Compliance</b>	Comply with the Emissions County and National standards

**Table 69: Solid and Effluent Waste Impacts and Mitigation**

<b>Solid, Effluent and Biohazard Waste</b>	
<b>Impact</b>	Solid and effluent waste from residential, commercial and industrial areas
<b>Objective</b>	Eliminate impact on air pollution, soil pollution and human health.
<b>Strategy</b>	Removal of agents of environmental pollution and proper disposal of wastes
<b>Recommended Management and Monitoring Action</b>	Develop a solid waste management plan that includes reduction, reuse, recycling, incineration, composting and land filling; have zero waste generation, reduction, re-use and/or recycling applications; set up segregation of waste to enable recycling; set-up temporary storage and timelines for storage before transfer to disposal stations; provide for a transfer to treatment stations or disposal stations without creating new waste; and, provide for treatment stations, landfills and waste management stations that have minimal pollution. Report on any sewer line breakage or smell.
<b>Responsibility</b>	Town Environment Department
<b>Costs</b>	Waste Disposal fees.
<b>Performance indicators</b>	Smell
<b>Monitoring</b>	Weekly/Monthly monitoring
<b>Reporting</b>	Environmental Report to Town Residents
<b>Compliance</b>	Comply with the provisions of County and Town Waste Management Regulations

**Table 70: Litter Impacts and Mitigation**

<b>Litter</b>	
<b>Impact</b>	Litter on the grounds that includes cigarette butts, water bottles, paper and other.
<b>Objective</b>	Eliminate impact on human health.
<b>Strategy</b>	Proper disposal and management of litter.
<b>Recommended Management and Monitoring Action</b>	Set up dustbins in strategic areas of the Town. Have fines for littering and monitoring persons who issue the fine to those who litter.
<b>Responsibility</b>	Town Environment Department
<b>Costs</b>	Litter fines and residents through property rates.
<b>Performance indicators</b>	Litter on the ground.
<b>Monitoring</b>	Daily/Randomly monitoring
<b>Reporting</b>	Environmental Report to Town Residents
<b>Compliance</b>	Comply with the provisions of County and Town litter Management Regulations

**Table 71: Dust and Air Pollution**

<b>Dust and Air Pollution</b>	
<b>Impact</b>	Dust particles in the air and on vegetation.
<b>Objective</b>	Eliminate dust in air pollution and its effects on human health.
<b>Strategy</b>	Cover of soil with paved roads, grass and vegetation where there is potential for dust generation.
<b>Recommended Management and Monitoring Action</b>	Develop paved roads. Plant grass and vegetation. Apply mulching through use of plants to eliminate dust pollution in flower beds. Create a reporting system when there is dust.
<b>Responsibility</b>	Town Environment Department
<b>Costs</b>	Residents through property rates.
<b>Performance indicators</b>	Dust on Cars, Shoes, Plants, Houses and clothes.
<b>Monitoring</b>	Daily monitoring
<b>Reporting</b>	Environmental Report to Town Residents
<b>Compliance</b>	Comply with the provisions of County and Town dust Regulations

**Table 72: Noise Pollution**

<b>Noise Pollution</b>	
<b>Impact</b>	Excessive Noise that disturbs sleep
<b>Objective</b>	Eliminate noise levels that impacts on human behavior, nature and health.
<b>Strategy</b>	Have standards of noise from persons, vehicles, music and equipment.
<b>Recommended Management and Monitoring Action</b>	Develop roads that have the least noise; Plant trees as buffers of noise; Set up noise levels; have sound proof walls in businesses that play music; have car standards that limit noise. Have regulations and fines for noise and monitoring persons who issue the fine to those who make noise.
<b>Responsibility</b>	Town Environment Department
<b>Costs</b>	Noise fines and Noise Regulations Costs.
<b>Performance indicators</b>	Noise in Town.
<b>Monitoring</b>	Daily/Randomly monitoring
<b>Reporting</b>	Environmental Report to Town Residents
<b>Compliance</b>	Comply with the provisions of County and Town litter Management Regulations

**Table 73: Tree Cutting and Planting Impacts and Mitigation**

<b>Tree Cutting and Planting</b>	
<b>Impact</b>	Trees contribute toward wind breaks, carbon removal from air.
<b>Objective</b>	Improve on the quality of human health.
<b>Strategy</b>	Plant as many trees as possible in the Town.
<b>Recommended Management and Monitoring Action</b>	Tree planting in all areas provided for and provisions for the minimum number of trees on plot of road sections. Ensure trees are not cut arbitrary.
<b>Responsibility</b>	Town Environment Department
<b>Costs</b>	Town Residents through personal expenses and property rates.
<b>Performance indicators</b>	Number of Trees on plot/ground.
<b>Monitoring</b>	Yearly
<b>Reporting</b>	Environmental Report to Town Residents
<b>Compliance</b>	Comply with the provisions of County and Town litter Management Regulations

**Table 74: Water, Riparian and Environmental Protected areas Impacts and Mitigation**

<b>Water, Riparian and Environmental Protected Areas</b>	
<b>Impact</b>	Water pollution, damage of trees, rivers and natural water bodies.
<b>Objective</b>	Through water system, parks, riparian zones and environmental protections manage the water resource and the environment.
<b>Strategy</b>	Treat Water, Preserve trees and manage riparian and environmental protected areas.
<b>Recommended Management and Monitoring Action</b>	Have an integrated recreation and management approach that enables protection through the persons using parks that preserve trees, riparian zones and environmental protected areas for recreation purposes of sight-seeing, relaxing and casual walks. Have signs that state the use and also facilitate those who are using grounds to monitor and report on usual activity.
<b>Responsibility</b>	Town Environment Department
<b>Costs</b>	Town Residents through property rates and water fees.
<b>Performance indicators</b>	Vegetation, natural vegetation and water levels.
<b>Monitoring</b>	Quarterly (3 months)
<b>Reporting</b>	Environmental Report to Town Residents
<b>Compliance</b>	Comply with the provisions of County and Town litter Management Regulations



### **6.3. MITIGATION MEASURES**

#### **6.3.1. Engagement by Plan Development.**

The plan development sets up an Environmental Department that will be responsible of ensuring the environment plan and this Strategic Environment Assessment (SEA) is progressively achieved.

The environment department has several mitigation measures that include:

- Emission Standards
- Waste Management
- Litter Control.
- Tree Planting and management
- Storm Water management
- Parks, Riparian and Environmental protected areas.

The environmental department has a funding for the persons who shall be applied in the environmental management and who shall institute the mitigation measures.

#### **6.3.2. Consultation with Environmental Authorities.**

The development will progressively consult with the environmental authorities NEMA offices. The consultation process enables the progressing plan to be progressively subjected to environmental standards through the consultation that shall include monitoring.

#### **6.3.3. Consideration of Alternatives.**

The development effects will be influenced by the growth of persons who settle in the land. Faster growth than development of housing could have the effect of pollution. The alternatives may not necessarily limit the growth but could be applied in

All alternatives with the exception of the decrease in population will contribute toward increased travel and this will lead to more emissions to air. It is crucial that there be established the emission standards.

With regard to buildings that include houses, education buildings, roads and other material assets the plans as they progress to be implemented will adjust based on the alternatives and on the SEA requirements.

#### **6.3.4. Iterative Approach to Preparation of the Operational Plan.**

Various environmental sensitivities and issues were integrated into the plan through the SEA process.

The SEA was done in an iterative manner whereby plan developers adjusted the land development plan to suggestions made by other stakeholders and with consideration of the landscape.

The SEA objectives and targets were also incorporated the views of various stakeholders. Multiple revisions of this Draft SEA report were made to accommodate the views. More reviews will be made as the final draft is achieved.

The Environmental Management and Sustainability Strategy is to have the development and all development plans and activities comply with all relevant environmental and planning requirements – as well as with the SEA Final Report

Monitoring Strategy and Guidelines will be established by the Town environmental department in consultation with NEMA.

#### **6.3.5. Detailed Monitoring Strategy and Guidelines.**

The purpose of the detailed monitoring strategy and guidelines is to assess the significant environmental effects as the development of the Town population, infrastructure, buildings, water, trees, vegetation, vehicles, technologies and other supplies progressively occurs.

Monitoring will help identify some environmental effects which may not have been envisaged, including positive and other medium and long-term effects.

Identification of environmental effects during monitoring may highlight problems which may indicate the need for remedial measures to alleviate environmental issues.

The existing environmental monitoring on the land is currently not done.

This monitoring will start the process of monitoring the land developed and the environment around the land.

The detailed Monitoring Strategy will progressively produce data and indications of impact activities at the discovery points, development sites and environmental control sites.

The monitoring will provide the type of mitigation responses required.

The plot sizes and building plans may change if the environmental monitoring strategy produces results that show that building activity will result in a negative impact on the environment. For this reason, a mid-term review of the plan is required to evaluate the discovery points and incorporate them into the plan.

The findings from the Monitoring will be used to inform the residents of the Town and students through a publication of a set of guidelines, on the nature and extent of any proposed interventions at candidate Discovery Points and candidate Signature Discovery Points in order to improve the town management and environment.

The guidelines will be prepared in consultation with the Environmental Authorities.

**Table 75: Potentially Significant Adverse Environmental Effects in unmitigated**

Topic	Potentially Significant Adverse Effect, if Unmitigated	Requirement
<b>Biodiversity Fauna &amp; Flora</b>	<ul style="list-style-type: none"> <li>• Arising from both construction and Town operation there is potential loss of/damage to biodiversity. This includes loss of vegetation and displacement of species.</li> </ul>	<ul style="list-style-type: none"> <li>• Indigenous Trees should be cut when absolutely necessary.</li> <li>• Tree planting in the Park areas.</li> </ul>
<b>Population</b>	<ul style="list-style-type: none"> <li>• As population settles the solid and effluent waste will progressively increase.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop waste management as population grows.</li> </ul>
<b>Human Health</b>	<ul style="list-style-type: none"> <li>• Human health will be affected by the factors associated with population grow that include waste, pollution and others.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a human health plan.</li> </ul>
<b>Air Quality &amp; Noise Pollution</b>	<ul style="list-style-type: none"> <li>• Deterioration of air quality as levels of dust increase.</li> <li>• Deterioration of</li> <li>• Human health deterioration from pollution.</li> </ul>	<ul style="list-style-type: none"> <li>• Paved roads</li> <li>• More tree cover</li> <li>• Smooth roads to limit noise vibrations</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>• The population settlement and development will lead to adverse impacts upon the surface and underground water bodies in quality, flow and/or morphology.</li> <li>• There could be increase in the risk of flooding.</li> </ul>	<ul style="list-style-type: none"> <li>• Good Water plans.</li> <li>• Storm water disposal plan.</li> </ul>
<b>Soil</b>	<ul style="list-style-type: none"> <li>• Damage to the hydrogeological and ecological function of the soil resource.</li> </ul>	<ul style="list-style-type: none"> <li>• Preservation of soils.</li> </ul>
<b>Climatic Factors</b>	<ul style="list-style-type: none"> <li>• Emissions to air including greenhouse gas emissions and other emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Set regulations for emissions.</li> </ul>
<b>Material Assets</b>	<ul style="list-style-type: none"> <li>• Failure to provide housing and adequate and appropriate sanitation that incorporates water services infrastructure, wastewater sewer infrastructure and treatment.</li> <li>• Increase in energy demand and failure to meet energy requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide Assets of housing, roads, energy, waste management that ensure environmental protection.</li> </ul>
<b>Cultural Heritage</b>	<ul style="list-style-type: none"> <li>• Potential effects on protected and unknown archaeology and architecture heritage arising from construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide for preservation.</li> </ul>
<b>Landscape</b>	<ul style="list-style-type: none"> <li>• Occurrence of adverse visual impacts and conflicts with the appropriate protection of landscape</li> </ul>	<ul style="list-style-type: none"> <li>• Incorporate landscape in the design.</li> </ul>

#### **6.3.6. Need for subsequent EIA.**

The development has a plan of 5 million square meters of space with 8,000 buildings will need to have subsequent Environmental Impact Assessments especially after the 5 year development plan is complete.

The Environmental Impact Assessment will progressively review the each new building to be added in the town based on the Strategy of the Town Development Plan and the Strategic Environmental Assessment (SEA).

#### **6.4. ENVIRONMENTAL PERFORMANCE MONITORING PROGRAM**

Monitoring is an ongoing process.

The measures identified for monitoring in this section will be further refined when the findings of the Monitoring Strategy for Plan candidate Signature Discovery Points emerge.

The Monitoring Strategy contains elements or levels of monitoring, as follows:

- Macro monitoring of population growth into the Town and the developments of transportation, waste and water infrastructure to support the growing population.
- Site Surveys of developments of buildings, infrastructure and trees. This will include impacts on wildlife, vegetation, landscape and other site features.
- Site Surveys to describe the specific effects on the ecology of areas that were observed as streams, rivers, wetlands and other areas.

The Environmental Survey and Monitoring will produce the following data:

- Population Growth Patterns.
- Health and diseases
- Housing and Buildings
- Roads
- Water quality and quantity
- Waste Production and Management
- Emissions
- Litter
- Dust and Air quality
- Noise Levels
- Trees
- Vegetation Cover

### 6.4.1. Compliance with National and International Standards.

**Table 76:** Compliance with National and International Standards.

Topic	Standard	Category	Compliance Requirements
<b>Biodiversity Fauna &amp; Flora</b>	<ul style="list-style-type: none"> <li>• Trees Planting</li> <li>• Wildlife Protection</li> </ul>	<b>Kenya</b> Constitution 69. Environment Act. Wildlife Policy <b>International</b> United Nations	Kenya Constitution 69. (1) The State shall— (a) ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources...(b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya.
<b>Population</b>	<ul style="list-style-type: none"> <li>• No Poverty</li> <li>• Zero Hunger</li> <li>• Quality Education</li> <li>• Sustainable Cities and Communities</li> </ul>	<b>Kenya</b> Constitution Rights in article 43 <b>International</b> United Nations 17 Sustainable Goals	Kenya Constitution 20 (5) In applying any right under Article 43, if the State claims that it does not have the resources to implement the right, a court, tribunal or other authority shall be guided by the following principles— (a) it is the responsibility of the State to show that the resources are not available. UN Sustainable Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
<b>Health</b>	<ul style="list-style-type: none"> <li>• Highest Standard of Healthcare</li> <li>• Good Health and Well-being</li> </ul>	<b>Kenya</b> Constitution Right 43 (1) (a) and (2) <b>International</b> UN and WHO	Kenya Constitution 43. (1) 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. (2) A person shall not be denied emergency medical treatment. UN Goal 3: Ensure healthy lives and promote well-being for all at all ages
<b>Soil</b>	<ul style="list-style-type: none"> <li>• Life on Land</li> <li>• Efficient use of land.</li> <li>• Soil pollution</li> </ul>	<b>Kenya</b> Kenya Constitution land use 60. <b>International</b> United Nations Sustainable Goals	Kenya Constitution 60. Land in Kenya shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable, and in policy. accordance with the following principles— (a) equitable access to land; (b) security of land rights; (c) sustainable and productive management of land resources; (d) transparent and cost effective administration of land; (e) sound conservation and protection of ecologically sensitive areas; (f) elimination of gender discrimination in law, customs and practices related to land and property in land; and (g) encouragement of communities to settle land disputes through recognised local community initiatives consistent with this Constitution. UN Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

<b>Water</b>	<ul style="list-style-type: none"> <li>• Clean Water and Sanitation</li> <li>• Life below Water</li> </ul>	<b>Kenya</b> Constitution Right 43 (1) (c) <b>International</b> UN and UNEP	Kenya Constitution 43. (1) Every person has the right— (d) to clean and safe water in adequate quantities; UN Goal 6: Ensure availability and sustainable management of water and sanitation for all
<b>Air Quality &amp; Noise</b>	<ul style="list-style-type: none"> <li>• Clean and Healthy Environment</li> </ul>	<b>Kenya</b> Constitution Right 42 <b>International</b> UN and UNEP	Kenya Constitution 70. (1) If a person alleges that a right to a clean and healthy environment recognised and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.
<b>Climatic Factors</b>	<ul style="list-style-type: none"> <li>• Take urgent action to combat climate change and its impacts</li> </ul>	<b>Kenya</b> Environment Management Act <b>International</b> United Nations Sustainable goals	UN and ECMA Act goals: <ul style="list-style-type: none"> <li>• Reduce, Reuse, Recycle Waste.</li> <li>• Use Less Heat and Air Conditioning.</li> <li>• Replace Light Bulbs.</li> <li>• Drive Less and Drive Smart.</li> <li>• Buy Energy-Efficient Products.</li> <li>• Use Less Hot Water.</li> <li>• Use the Switch "Off" and Switch Off</li> <li>• Plant Trees.</li> </ul>
<b>Material Assets</b>	<ul style="list-style-type: none"> <li>• Industry, Innovation and Infrastructure</li> <li>• Affordable and Clean Energy</li> </ul>	<b>Kenya</b> Urban Areas and Cities Act <b>International</b> United Nations Sustainable Goals	Kenya Constitution 43 (1) Every person has the right— (b) to accessible and adequate housing, and to reasonable standards of sanitation. UN Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
<b>Cultural Heritage</b>	<ul style="list-style-type: none"> <li>• Cultural Heritage Preservation</li> </ul>	<b>Kenya</b> County Cultural Heritage Bill	Preserve Cultural heritage: archeological and architectural.
<b>Landscape</b>	<ul style="list-style-type: none"> <li>• Responsible consumption and production</li> </ul>	<b>Kenya</b> Physical Planning <b>International</b> UN Sustainable Goals	UN Goal 12: Ensure sustainable consumption and production patterns.

#### 6.4.2. Targets and Indicators

Monitoring is based around indicators which allow quantitative measures of trends and progress over time relating to the Strategic Environmental Objectives (SEOs).

Indicator to be monitored is accompanied by the target(s) which were identified with regard to the relevant strategic actions.

**Table 77: Environmental Protection Objectives (EPOs) targets, indicators monitoring body and results**

Environmental Protection Objectives (EPOs)	Target(s)	Indicator(s)	Monitoring Body	Results
<b>1. Biodiversity Fauna Flora</b> To protect, conserve and restore habitats and species including interdependent species and habitats within the development area.	<ul style="list-style-type: none"> <li>• Achieve and maintain conservation for habitats and species</li> </ul>	<ul style="list-style-type: none"> <li>• No loss, reduction, fragmentation, disturbance, destruction of habitats and species</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environment Department</li> <li>• NEMA</li> </ul>	<ul style="list-style-type: none"> <li>• No reduction of species.</li> </ul>
<b>2. Population &amp; Social Cultural</b> As Town population increases, ensure environmental sustainability and Social Cultural diversity.	<ul style="list-style-type: none"> <li>• Population growth</li> <li>• Planned residential properties</li> </ul>	<ul style="list-style-type: none"> <li>• Increased population.</li> <li>• Avoid Unplanned Residential houses</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environment Department</li> <li>• Town Property Department</li> </ul>	<ul style="list-style-type: none"> <li>• No Slums</li> <li>• Diversity in Culture</li> </ul>
<b>3. Human Health</b> Protect human health by water, air and soil pollution control.	<ul style="list-style-type: none"> <li>• Manage and Monitor environmental elements linked to human health.</li> </ul>	<ul style="list-style-type: none"> <li>• Deterioration of water, air and soil quality.</li> </ul>	<ul style="list-style-type: none"> <li>• Town Hospital</li> <li>• Town Environment Department</li> </ul>	<ul style="list-style-type: none"> <li>• Better Health</li> </ul>
<b>4. Soils and Geology</b> <ul style="list-style-type: none"> <li>• Identify and protect landslide risk areas.</li> <li>• Identify and Protect areas with significant risk of soil erosion</li> <li>• Sustainable re-use of brownfield lands.</li> <li>• Sustainable use of greenfield lands</li> <li>• Sustainable quarrying of non-renewable sand, gravel and rock deposits.</li> </ul>	<ul style="list-style-type: none"> <li>• Developments in landslide risk areas</li> <li>• Developments in high erosion</li> <li>• Develop on brownfield land</li> <li>• Usage of excavated area</li> <li>• Turn brown fields to Greenfields.</li> </ul>	<ul style="list-style-type: none"> <li>• No development in landslides area</li> <li>• No development in high risk of erosion areas</li> <li>• Rehabilitation of brownfields</li> <li>• Buildings in excavated areas</li> </ul>	<ul style="list-style-type: none"> <li>• Town design &amp; construction</li> <li>• Town Environmental department</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced property damage.</li> <li>• Soil erosion management.</li> <li>• Reuse of excavated areas.</li> </ul>
<b>5. Water</b> <ul style="list-style-type: none"> <li>• Prevent Water quality and quantity deterioration.</li> <li>• Improve Water status in rivers, lakes, ground water and dams</li> <li>• Achieve and maintain required water quality standards.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain good status of lakes, rivers and ground waters.</li> <li>• Comply with water quality requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Water Quality.</li> <li>• Rain Water runoff.</li> <li>• Boreholes standards and inspection.</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environmental department</li> </ul>	<ul style="list-style-type: none"> <li>• Zero pollution of water.</li> <li>• Clean Water.</li> <li>• Efficient management of water.</li> </ul>



<b>6. Air and Noise Pollution</b> <ul style="list-style-type: none"> <li>• Have minimal air pollution.</li> <li>• Have minimal noise pollution.</li> </ul>	<ul style="list-style-type: none"> <li>• Set-up of emissions standards.</li> <li>• Inspection on Emission standards</li> <li>• Dust elimination plans.</li> <li>• Waste management plans.</li> <li>• Noise pollution regulations.</li> </ul>	<ul style="list-style-type: none"> <li>• Smell.</li> <li>• Healthcare cases from pollution.</li> <li>• Smoke from vehicles.</li> <li>• Residents reports on noise.</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environmental department</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced pollution.</li> <li>• Reduced incidences of healthcare problems associated with pollution.</li> </ul>
<b>7. Climatic Factors</b> <ul style="list-style-type: none"> <li>• Ensure low emissions from vehicles and machinery.</li> </ul>	<ul style="list-style-type: none"> <li>• Walking and cycling instead of vehicle use.</li> <li>• Use of electric vehicles.</li> <li>• Use renewable energies with low carbon outputs.</li> </ul>	<ul style="list-style-type: none"> <li>• Electric Cars in Town.</li> <li>• Fossil fuels consumption data.</li> <li>• Renewable energy consumption data.</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environmental department</li> <li>• University Environment Department</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced carbon emissions into the air.</li> </ul>
<b>8. Material Assets</b> <ul style="list-style-type: none"> <li>• In applying assets ensure the assets established take into consideration environmental protection measures</li> </ul>	<ul style="list-style-type: none"> <li>• Have designs of Assets: Buildings, infrastructure and roads incorporate environmental measures.</li> </ul>	<ul style="list-style-type: none"> <li>• Story buildings.</li> <li>• 60% design be for vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environmental department</li> <li>• University Environment Department</li> </ul>	<ul style="list-style-type: none"> <li>• Better planning and use of resources.</li> </ul>
<b>9. Cultural Heritage</b> <ul style="list-style-type: none"> <li>• Preserve the Cultural Heritage.</li> </ul>	<ul style="list-style-type: none"> <li>• Plan for the preservation archeological &amp; architectural heritage</li> </ul>	<ul style="list-style-type: none"> <li>• Ant Hills</li> <li>• Shrines</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environmental department</li> </ul>	<ul style="list-style-type: none"> <li>• Preservation of heritage</li> </ul>
<b>10. Landscape</b> <ul style="list-style-type: none"> <li>• Preserve and incorporate the design of Town to the landscape</li> </ul>	<ul style="list-style-type: none"> <li>• No landscape change.</li> <li>• Buildings and trees planted to enhance landscape.</li> </ul>	<ul style="list-style-type: none"> <li>• Design follows landscape.</li> </ul>	<ul style="list-style-type: none"> <li>• Town Environmental department</li> <li>• Town Design Team.</li> </ul>	<ul style="list-style-type: none"> <li>• No significant change on landscape.</li> </ul>

#### **6.4.3. Monitoring Sources**

Measurements for indicators generally come from existing monitoring sources.

Existing monitoring sources include those maintained by the relevant authorities e.g. Town planning authorities, Environmental Protection agency.

#### **6.4.4. Linkages between impacts identified in SEA study.**

Impacts identified in the SEA study.

- CO2 emissions from vehicles.
- Solid and effluent waste from residential, commercial and industrial areas
- Litter on the grounds that includes cigarette butts, water bottles, paper and other.
- Dust particles in the air and on vegetation.
- Excessive Noise that disturbs sleep
- Trees contribute toward wind breaks, carbon removal from air.
- Damage of trees, rivers and natural water bodies.

The following impacts are interlinked: CO2 emissions from vehicles; Dust particles in the air and on vegetation; Excessive Noise that disturbs sleep and Trees contribute toward wind breaks, carbon removal from air.

#### **6.4.5. Indicators to be measured.**

The indicators to be measured shall include:

- Water Quality
- Dust in air
- Emissions

#### **6.4.6. Methods to be Used**

Sampling Locations of:

- Plots
- Persons
- Houses/Buildings
- Vehicles
- Trees

#### **6.4.7. Sampling Locations**

There is not enough or money to gather information from all the land, vehicles, population, houses or other products. Sampling locations are set to achieve a representative sample (or subset) of the land or the population.

Sampling is the procedure for selecting the sample of areas, vehicles, population, houses or other products and can incorporate: Simple Random Sampling (SRS); Stratified Sampling; Cluster Sampling; Systematic Sampling; and Multistage Sampling in which some of the other sampling methods are combined in stages.

The sampling locations will be developed from the statistics established. A sampling frame that will be the source material or where the device will be placed to establish the sample will be established.

## **6.5. FREQUENCY OF MEASUREMENT**

### **6.5.1. Detection limits**

Environmental measurements will sometimes produce values that are below the method detection limit (MDL). Detection limits incorporates the set-up of methods to collecting method detection limit data and the treatment of MDL data that should primarily depend on the end-use of the data.

The MDL shall be determined by the environmental matrix that shall contain the analyte of interest. This shall incorporate the possible missing values (values below the MDL) that shall be specified before the initiation of a measurement effort.

When calculating a mean value for a source or area, the missing values at the MDL shall be set. This approach will minimize any significant risks associated with incorrectly assuming a low level of a toxic compound.

Where there is no risk minimum values shall be assumed to equal zero.

### **6.5.2. Thresholds and Corrective Action**

The occurrence of significant adverse environmental effects as the population increases and the settlement created will require consideration of the environmental effects in the context of the sustainable environmental plan. The environmental plan will be reviewed and part(s) changed.

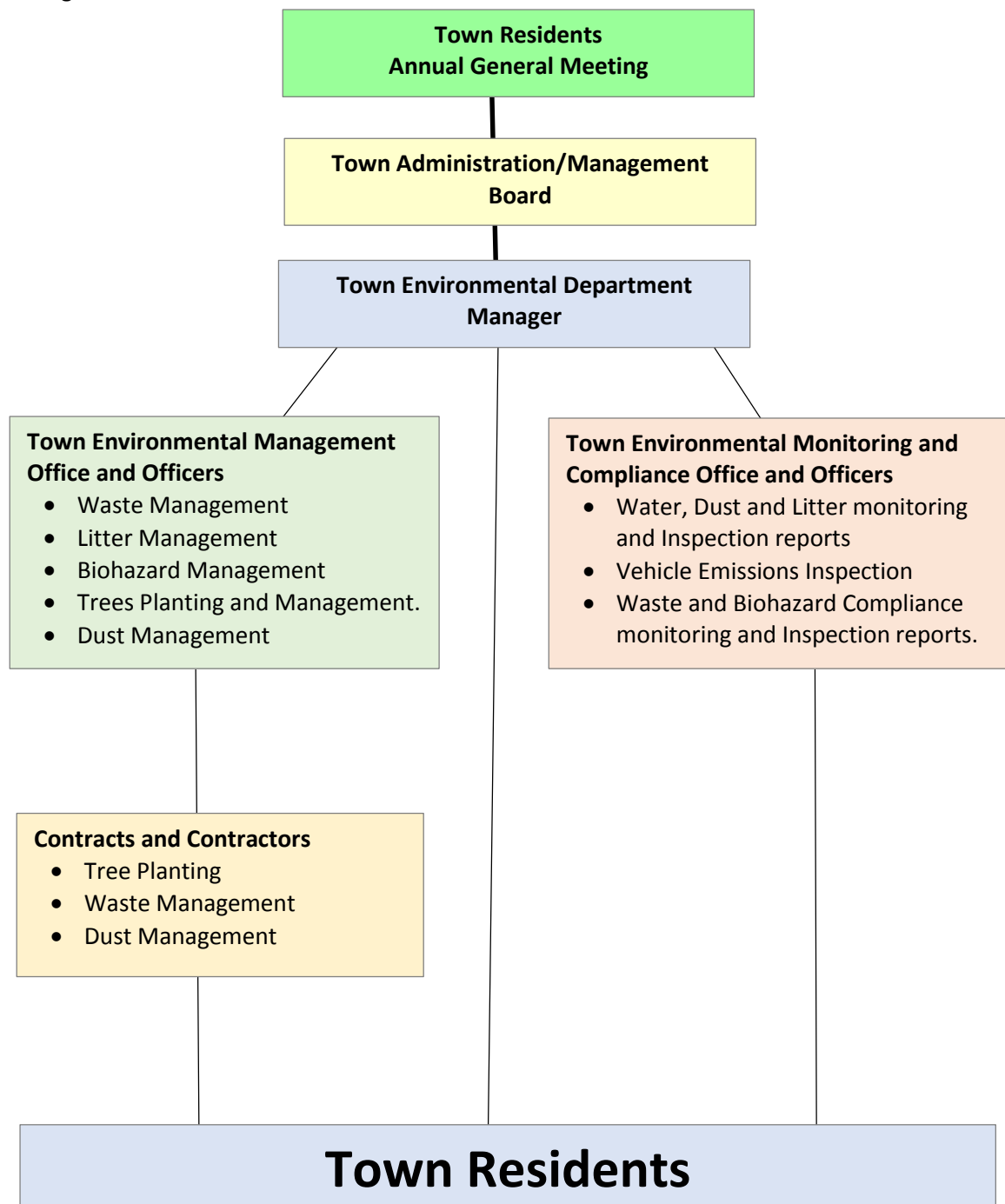
The number of residents and students in the town show from the Monitoring Strategy may show a negative impact on the environment. For this reason, a mid-term review of the plan is incorporated into the development plan.

Changes that could be made include:

- Slowdown of jobs creation
- Reduction of student's intake.

## 6.6. INSTITUTIONAL ARRANGEMENT

The Institution arrangement will define the responsibilities for mitigation and monitoring and the arrangement for the arrangements for coordination between various actors responsible for mitigation.



**Figure 73:** Environment Institutional Management Organization Chart

## 6.7. IMPLEMENTATION SCHEDULE AND REPORTING PROCEDURE

**Table 78:** Environmental Management Implementation Schedule and Reporting

Mitigation Measure	Timing	Frequency	Duration of the Mitigation Measures	Reports	Results of Mitigation and Monitoring Measures
<b>Water Quality</b>	Daily Inspection	Two Times a day	Always	Water Quality Report	Clean Water.
<b>Dust Pollution</b>	Monthly	Two times a month	Always	Air Quality Report	Clean Air.
<b>Emissions</b>	Monthly Inspection	One time Yearly for Vehicle	Always	Vehicle Emissions Report	Lower Carbon Monoxide emission to the Town environment
<b>Litter</b>	Monthly Inspection	Four times a Month	Always	Litter report	Limit litter inside the town grounds.
<b>General and Effluent Waste</b>	Monthly Inspection	Two times a month	Always	Waste Management	Disposal of waste in the right order.
<b>Biohazard Waste</b>	Monthly Inspection	Two times a month	Always	Waste Management	Disposal of waste in the right order.
<b>Trees Planting</b>	4 months Inspection	Weekly	Five years	Planted Trees Report	200,000 trees planted
<b>Riparian and Protected Areas</b>	4 Months Inspection	Monthly	Always	Riparian and Protected Areas Report	No encroachment or destruction of riparian and protected areas.
<b>Fire and Floods</b>	4 Months Inspection	Monthly	Always	Fire and Floods Report	Preparation and management of fire and floods.

The inspection periods are set based on recommendations and maybe adjusted as needed to meet the goals of those residing in town and to be effected by the environment.

## 6.8. ENVIRONMENTAL MANAGEMENT MONITORING BUDGET

The Environmental Management and Monitoring Plan (EMMP) incorporates an Environmental Management Monitoring Budget (EMMB) through a Town Environmental Department.

### Environmental Management Monitoring Budget

The EMMB to finance the EMMP has diverse sources of revenue incorporated.

*Table 79: Environmental Management Monitoring Budgets*

Budgets	Budget Source of Finance
<b>Environmental Management &amp; Monitoring Budget (EMMB)</b>	<p>The EMMB shall incorporate the initial investment of set-up of the Environmental Department.</p> <p>The EMMB shall include the 200,000 trees planting budget.</p> <p>The EMMB shall incorporate:</p> <ul style="list-style-type: none"> <li>• Management and Monitoring Team Budget</li> <li>• Litter Control Budget</li> <li>• Waste Management Budget</li> <li>• Emissions Compliance Budget</li> <li>• Medical Waste Budget</li> <li>• Design-Build Waste Budget</li> <li>• ICT Waste Budget.</li> <li>• Vehicles Waste Management Budget.</li> </ul>
<b>200,000 Trees Budget</b>	<p>Trees will be part of the complete building development.</p> <p>Every 10 sq. meters will incorporate a tree.</p>
<b>Litter Control Budget</b>	<p>Residents will contribute to this through set property fees.</p> <p>A fine imposed on those littering will add to this budget.</p>
<b>Waste Management Budget</b>	<p>Residents will contribute to this through a set property fees.</p> <p>Sale of waste through integration with industries that use recycle.</p> <p>Manufacturers recycling terms.</p>
<b>Emissions Compliance Budget</b>	<p>Vehicles Town policy of emissions control will create budget for compliance.</p> <p>The budget shall be a fee paid by the vehicle owner.</p>
<b>Medical Waste Budget</b>	<p>The medical waste budget shall be incorporated in the medical budget.</p> <p>The cost of medical waste disposal shall be covered by this budget.</p>
<b>Design-Build Waste Budget</b>	<p>The Design-Build waste budget shall be incorporated in the construction cost and recycling opportunities. The cost of waste disposal shall be covered by these budgets.</p>
<b>ICT Waste</b>	<p>The ICT waste shall be aligned with recycling opportunities. The recycling opportunity budget shall cover the ICT waste disposal. This done through the sellers of ICT products. If you bring an ICT product to the town you have to have a disposal plan.</p>
<b>Other</b>	<p>Other services as shall be incorporated. The budget shall be incorporated through the services rendered and through the different sources of revenue.</p>

## 6.9. INSTITUTION STRENGTHENING AND CAPACITY BUILDING

The Environmental Management and Monitoring Plan (EMMP) institution strengthening and capacity building shall incorporate:

- Equipment Requirements
- Training, Research and Studies.

### 6.9.1. Equipment

**Table 80: EMMP Equipment Requirements**

Equipment Type	Management and Monitoring Purpose
<b>Water Testing Equipment</b>	The Water testing equipment include in-field testing of a single analyte to multiple-component instrumental analysis in the laboratory. Handheld electronic meters will test water pH, turbidity and electrical conductivity. Laboratory water quality testing equipment will be applied to test wastewater and drinking water. The water tested will include water in tanks, dams, pipes, rivers, streams and other places. This carried out to meet regulatory requirements and to maintain safety.
<b>Carbon Dioxide Analyzer (CO2 Gas Analyzer)</b>	Carbon dioxide analyzers, also called CO2 gas analyzers, are devices that can detect and quantify the amount of carbon dioxide in a sample. Carbon dioxide analyzers will be uses for monitoring purposes and control of CO2.
<b>Dust Monitor</b>	The dust monitor measures the concentration of particles and fine particles such as dust, smoke, pollen, and other aerosols that are in the air.
<b>Incinerator</b>	An apparatus for burning biomedical waste material at high temperatures until it is reduced to ash.
<b>Dustbins</b>	For management and collection of waste that could otherwise become litter on the ground if not provided for.
<b>Environmental Light Measurement Equipment</b>	This include: Environmental Light Meter, Environmental Light Meter Data Logger and Environmental Light Sensors. This will enable the right lighting for different facilities.
<b>Methane Gas Analyzer (CH4 Analyzer)</b>	Methane Gas is emitted from decomposing waste. The analyzer will enable waste management.
<b>Emission Tester</b>	The tester checks to see if evaporative emissions from your gas tank are being emitted into the air.
<b>Dissolved Oxygen Analyzer / Dissolved Oxygen Monitor</b>	Dissolved oxygen is the amount of oxygen present in water and is a common indicator of water quality. Dissolved oxygen meters/analyzers measure oxygen levels in water.
<b>Gas chromatography</b>	Gas chromatography is used in analytical chemistry for separating and analyzing compounds that can be vaporized without decomposition.
<b>Soil Testing Kit</b>	The soil testing kit will be applied in measuring the soil acidity or alkalinity that influences how plants take up nutrients from the soil. The kit will includes tests for: pH, nitrogen, phosphorus and potassium.
<b>Other</b>	Other equipment as shall be innovated and progressively manufactured for the improvement of environment.



### 6.9.2. Training, Research and Studies

**Table 81: EMMP Training Research and Studies.**

Training	Program	Purpose	Certification	Training Institution (s)
<b>Environmental Sciences</b>	Degree Bachelors 4 years Masters 4 years	Understanding the Environment	BSc Degree MSc Degree	<ul style="list-style-type: none"> <li>• Pwani University</li> <li>• Kenyatta University</li> <li>• Diaspora University</li> <li>• Other Universities and Colleges</li> <li>• Vocational Technical Colleges.</li> <li>• Technical High Schools.</li> </ul>
<b>Environmental Planning and Management</b>	Degree Bachelor's 4 Years Master's 2 years	Holistic planning and Management of land development with consideration of natural environment, social, political, economic and governance with goal to sustainable outcomes.	BSc Degree MSc Degree	
<b>Environmental Conservation and Natural Resource Management</b>	Degree Bachelor's 4 Years Master's 2 years	Managing way people and natural landscapes interact. Brings together land use planning, water management, biodiversity conservation, and the future sustainability of agriculture, mining, tourism, fisheries and forestry.	BSc Degree MSc Degree	
<b>Earth Science</b>	Degree Bachelor's 4 Years Masters 2 Years	Encompasses <ul style="list-style-type: none"> <li>• Geology.</li> <li>• Oceanography.</li> <li>• Meteorology and Climatology.</li> <li>• Astronomy.</li> </ul>	BSc Degree MSc Degree	
<b>Environmental Technicians</b>	Diploma	Monitoring the environment and look for sources of pollution and contamination, including those affecting public health.	Diploma	
<b>Other Professionals</b>	Degree Diploma Certificate Job Training	Other services including: <ul style="list-style-type: none"> <li>• Research</li> <li>• Records keeping</li> <li>• Litter management</li> <li>• Tree management</li> <li>• Cleaning</li> </ul>		

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