

# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR CONSTRUCTION OF THE PROPOSED LIKONI CABLE EXPRESS PROJECT ACROSS THE LIKONI CHANNEL, MOMBASA COUNTY

(LAND REFERENCE Nos.: MOMBASA ISLAND BLOCKS XXVI/1011, 1012, 1013; AND MOMBASA BLOCK – 1085)



*OVERVIEW OF PROPOSED PROJECT LOCATION-LIKONI CHANNEL – MOMBASA COUNTY*

Prepared for:



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Prepared by:



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**(VOLUME 1: MAIN REPORT)**

NOVEMBER, 2020

**SUBMISSION LETTER**

25<sup>th</sup> November 2020

Director General,  
National Environmental Management Authority,  
Popo Road, South 'C'  
P O BOX 67839-00200,  
NAIROBI, Kenya.

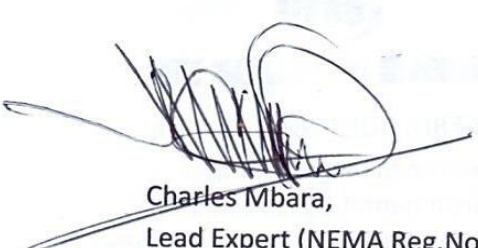
Dear Sir,

**RE: SUBMISSION OF ESIA STUDY REPORT FOR CONSTRUCTION OF THE PROPOSED LIKONI CABLE EXPRESS PROJECT FOR LIKONI CABLE EXPRESS LIMITED – LOCATED ACROSS THE LIKONI CHANNEL, MOMBASA COUNTY.**

***LAND REFERENCE PLOT LR. Nos.: MOMBASA ISLAND BLOCKS XXVI/1011, 1012, 1013; AND MOMBASA BLOCK – 1085***

We hereby submit the above study report on behalf of the proponent, Likoni Cable Express Ltd., for your consideration and approval. We confirm that this study report has been done in accordance with the provisions of the Environmental Management and Coordination Act (Cap 387) as well as the Environmental (Impact Assessment and Audit), Regulations of June 2003 and other relevant pieces of Kenyan legislation.

Yours Sincerely,

  
Charles Mbara,  
Lead Expert (NEMA Reg.No.0121),  
Oligerm Holdings Limited.

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TEL: 020 2404185

25/11/2020

**CERTIFICATION**

This study report has been prepared by Oligerm Holdings Ltd. The report has been done with reasonable skills, care and diligence in accordance with the Environmental Management and Co-ordination Act (Cap387) and the Environmental (Impact Assessment and Audit) Regulations, Legal Notice No.101 of June 2003. We certify that the particulars given in this report are correct to the best of our knowledge.

**FIRM OF EXPERTS**

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**Lead Expert:** Charles Mbara – NEMA Registration Certificate No.: 0121

**Signature of Lead Expert:** .....

**Rubber Stamp**



**PROJECT PROPONENT**

**Name:** LIKONI CABLE EXPRESS LTD.

**Nature of the Business:** INFRASTRUCTURE DEVELOPMENT – Transport Services

**Date of assessment:** 28<sup>th</sup> September 2020 to 17<sup>th</sup> October 2020

**Contact Person:** John Mutakaa – Project Manager

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**Email Address:** [jmutakaa@sis.co.ke](mailto:jmutakaa@sis.co.ke)

**SPECIFIC PROJECT DETAILS**

**Proposed Project:** Construction of Cable Car Express Project across the Likoni Channel

**Site Location:** Likoni Channel, Mombasa County.

**Gerald Chege:** Managing Director

**LIKONI CABLE EXPRESS LIMITED,** P.O. Box 501-00502, Nairobi, Kenya.

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**Signature of Proponent:** .....

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**THE OTHER EXPERTS**

ACKNOWLEDGEMENT


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**Signature**

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**Date**

**2. Clyde Aruwa (Environmental Specialist and NEMA Registered Associate Expert – No.: 10100)**



-----  
**Signature**

-----  
**25.11.2020**

-----  
**Date**

## ACKNOWLEDGEMENT

---

We, the Consultants (OLIGERM HOLDINGS LIMITED) acknowledge with gratitude the opportunity provided by the Proponent (LIKONI CABLE EXPRESS LTD.) to undertake this Environmental and Social Impact Assessment Study and prepare an ESIA Study Report for the proposed construction of LIKONI CABLE EXPRESS across the Likoni Channel in MOMBASA COUNTY.

This report will be submitted to NEMA HEADQUARTERS, NAIROBI for review and consideration, for approval and issuance of EIA licence to the Proponent to proceed with the Construction of the proposed project.

The ecological and environmental data collection as well as baseline marine and terrestrial biodiversity survey was facilitated by Mr. John Mutakaa (the Project Manager) who arranged and funded site field surveys and stakeholder engagement between **28<sup>th</sup> SEPTEMBER and 17<sup>th</sup> OCTOBER, 2020.**

We highly appreciate the support and Cooperation accorded to us by Mr. Aaron Mutiso (KFSL Communications – Point of Contact), Mr. Francis Kazungu (Deputy County Commissioner, Likoni Sub-County in Mombasa County – State Department for Interior and Co-ordination of National Government) and Mr. Samuel Lopokoiyit (County Director of Environment – Mombasa County).

Finally we would like to convey our deepest appreciation for the support provided by Mr. Mugandi Kalinga who undertook the initiative to arrange and administer ESIA Questionnaires to the BEACH MANAGEMENT UNITS located along the MTONGWE SHORELINE in Mombasa Mainland South.

We also appreciate SIS Architects and all Support Technical Consultants namely:

Benson Kimeu – Topo Survey Engineer (Nile Survey and Geo-Solutions Ltd)

Mr. Ehzil Pandiyan – Geotechnical Investigations (Southern Engineering Company Ltd)

Mr. Kothanda Reddy – Geotechnical Investigations (Southern Engineering Company Ltd)

Mr. Paul Kimani – Geotechnical Investigations (Southern Engineering Company Ltd)

Mr. Evans Ombati – Quantity Surveyor (Construction Cost Consultancy Ltd)

Mr. Anzaya Akatsa and Mr. Evans Kadoyo – Architects (SIS), and other Experts who have not been mentioned here, to whom, we earnestly recognize their efforts.

Last, but not least; local community members with whom our field survey staff were able to engage and administer the ESIA Questionnaire and obtain responses and contributed immensely to the success of this study.

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# NON-TECHNICAL EXECUTIVE SUMMARY

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## E1: Introduction

Likoni Cable Express Limited a privately initiated and funded Private Public Partnership (PPP) comprising Kenya Ferry Services Limited (KFSL) as the contracting authority and Likoni Cable Express Limited [Trapos Limited] (a consortium incorporating Kenya's Trapos and Doppelmayr Garaventa Group, an Austrian Company as the private partner) with approval of the Government of the Republic of Kenya.

The firm intends to develop an express cable and rope system project with the aim of providing a functional connection between Mombasa Island (MI) and Mombasa Mainland South (MMS) both separated by the Likoni Channel which is currently crossed through ferries operated by the Kenya Ferry Service Limited (KFSL).

## E2: Background

### E2.1: Mombasa City

Mombasa is the second-largest city in Kenya, with a population of over one-million residents. A regional cultural and economic hub, the city has a large port and an international airport and is an important regional tourism centre. Mombasa Island itself may not be the main tourism attraction, other tourists locations are in the north and south of Mombasa. The city continues to grow rapidly primarily fuelled by migration due to economic activities. While relatively well connected to the North and West through car bridges, the city's sole connection to the South is a ferry service. Every day, over 300,000 commuters and 6,000 vehicles travel between Likoni on the mainland and Mombasa Island causing significant congestions during the peak travelling hours.

### E2.2: Challenges

The ferry service is a critical part of the city's transport system but is also faced with a number of challenges including:

- Pressure is exerted to the existing resources especially during peak times which may result to lost man hours.
- During these times, long vehicle queues may be experienced;
- While the landing ramps have been expanded, the existing roads connecting to the ramps (ramp approaches) remain narrow making traffic management capability limits the number of ferries that can load and offload simultaneously;
- Ships entering and leaving the port of Mombasa create logistical challenges by disrupting Ferry movements across the channel;
- Over the years, both human and vehicle traffic using the Ferry service have been increasing exponentially. This has continued to exert pressure on the existing resources

### E2.3: Remedial Measures

There is an urgent need to deal firmly with these challenges and elevate the infrastructure in Mombasa County to internationally acceptable standards. This will require additional key investments in the following critical areas:



- Expansion of the Mombasa port; which is expected to increase cargo volume by 400 per cent from the current 20 million tons handled at the facility annually;
- Creation of a Vision 2030 Special Economic Zone Mombasa modelled on Shenzhen will have about 9 million people working and living in the zone;
- One of the Resort cities under vision 2030 will be in South Coast as a part of government efforts to double the tourist arrivals to three million visitors annually;
- Under Vision 2030 Second Medium Term (2013-2017) deliverables in the area of Improvement of Shipping and Maritime facilities (section 3.1.3), modernization of ferry services to increase passenger capacity is explicitly mentioned.

The Likoni Cable Express is considered as part realization of that aspect of the Vision, and, the provision of a Cable Car Express connecting Mombasa Island to the Mainland South Coast as anticipated in this Cable Car Express Project is targeted at eliminating this bottleneck and further underpinning on-going initiatives aimed at opening up Kenya’s South Coast for economic development.

### **E3: The Project**

The Likoni Cable Express will be a state-of-the-art multi-gondola cable car system running across the 500 meter Likoni channel. This innovative passenger transport solution will make the journey time across the channel between three to four minutes. The service will operate 24 hours a day and seven days a week.

#### **E3.1: Project Components**

The project will consist of three components namely:

- Two stations, one a drive station and the other a return station
- Two towers and rope
- Cars (Gondolas)

#### **E3.2: The 90 meter high cable and rope structure**

This 90 meter high cable and rope structure will intrude into the general skyline of Mombasa in a manner previously unforeseen in the area

The structure will establish itself as a magnificent and iconic addition to the skyline of Mombasa.

### **E4: The Project Implementation (Milestones) Schedule**

<b>STEPS</b>	<b>YEAR</b>	<b>MILESTONE</b>
<b>1</b>	<b>2013</b>	Expression of Interest to Ministry of Transport
		Concept to Kenya Ferry Services Limited
<b>2</b>	<b>2014 – 2015</b>	Feasibility Study undertaken and presented to stakeholders for approval
		Approval of project by stakeholders

<b>3</b>	<b>2015 – 2016</b>	Concession negotiations up to initialling
<b>4</b>	<b>2018</b>	Finalization of Project Agreement
		Cabinet approval for project
		Signing of Project Agreement and issuance of Commercial License
<b>5</b>	<b>2019</b>	Conclusion of Agreement CPs
		Technical Tests (GI) and Studies (ESIA)
		Financial Close
		Design and Documentation
		Contracting
		Implementation of preparation works
<b>6</b>	<b>2020</b>	Site Works:– <ul style="list-style-type: none"> <li>• Construction of Stations,</li> <li>• Construction of Towers and Civil Works</li> </ul>
		Equipment fabrication/manufacture
		Equipment installation and
		Design of Operation System and Procedures
<b>7</b>	<b>2021</b>	Completion of Construction and Installation process
		Operation test period;
		Commencement of Operations

## **E5: Feasibility Study and ESIA study**

**E5.1: The feasibility study:** The study has defined the proposed project in terms of site location, engineering scope, social and environmental impacts, and physical and economic displacement impacts, among others; which paved the way for Detailed Design which were contracted out to a Consortium led by SYNTHESIS LIMITED.

**E5.2: ESIA Study:** As part of the Feasibility Study and, in keeping with both Kenyan and international legal requirements for sustainable development; the cable and rope project was subjected to an Environmental and Social Impact Assessment for the design, implementation, commissioning, operation, and decommissioning.

## **E6: Special Studies**

### **E6.1: Geo-technical Survey Report of the proposed project site**

The Geo-technical survey shall be conducted before the commencement of construction works at the site of the proposed project. The Project manager has assured the consultants that, this will be done.

### **E6.2: Topographical Survey determining the land area required for the proposed project**

This was done in order to determine and demarcate the boundaries of the project and the footprints of the buildings and structures with respect to the land available.

The survey also shows the sloping of the surface (topography) of the site location and the existing structures and objects on the ground, which includes: trees, poles, booths, cables, water and oil pipelines and other structures.

### **E6.3: Wind speed and strength over Likoni Channel**

Wind speed records and data collected over time along the Likoni channel were reviewed. This was done to get an understanding of the wind speeds in the project area. This knowledge from historical data and forecast is important to establish the average or expected magnitude of the wind speeds, in order to determine whether it exceeds the threshold that the system can withstand.

### **E6.4: Baseline Marine and Terrestrial Biodiversity Survey**

The Marine Ecologist conducted Environmental Baseline Marine and Terrestrial Biodiversity Survey and Validation (fauna and flora data base) excursion on the shores of the channel, within 100 metres of the project landing sites on both sides of the channel (MI and MMS). The findings and results have been captured in Chapter 4 of this study report.

### **E6.5: Ambient Air Quality Measurements**

An evaluation and assessment of the ambient air quality in the project site shall be conducted before construction commences.

The findings of this assessment shall provide baseline data (measurements) upon which monitoring and evaluation of the impacts of the project on the ambient air quality during project implementation (project's construction and operation) shall be tagged. This will help in quantifying the contribution or impact of the project on the quality of air in the project area.

### **E6.6: Noise and Vibrations**

An evaluation and assessment of the noise and vibration levels in the project site shall be conducted before construction commences.

The findings of such an assessment shall provide baseline data measurement upon which monitoring and evaluation of noise and vibrations during project implementation ( project's construction and operation) This will help in examining the contribution or impact of the project on the levels of noise and vibrations in the project area.

### **E6.7: Traffic Management**

A traffic management plan shall be developed by the Proponent (i.e. LCE and KFSL) in conjunction with the relevant authorities (e.g. KeNHA and Mombasa County Government) and stakeholders. The traffic management plan shall aim to provide alternatives and mitigation proposals for interruption of traffic during the construction phase of the project.

## **E7: ESIA Study**

### **E7.1: Environmental and Social Impact Assessment Study (ESIA)**

An Environmental Impact Assessment (EIA) is a systematic analysis of projects, policies, plans or programmes to determine their potential environmental, economic and socio-cultural impacts, the significance of such impacts and to propose measures to mitigate the negative adverse ones.

In Kenya the ESIA studies are anchored on Section 58; Application for Environmental Impact Assessment Licence (Part VI Environment Impact Assessment) of Environment Management and Coordination Act (Cap 387) which requires; “Any person, being a proponent of a project - to apply for and obtain an EIA license from National Environment Management Authority (NEMA) before he/she can finance, commence, proceed with, carry out, execute, or conduct any undertaking specified in the SECOND SCHEDULE of the Act.”

### **E7.2: Second Schedule**

The Second Schedule of EMCA (Cap 387) specifies projects that require to be subjected to EIA Studies and particularly lists criteria under Section 2 (General) as follows:

- (a) an activity out of character with its surrounding;
- (b) any structure of a scale not in keeping with its surrounding;
- (c) major changes in land use.

#### ***E7.2.1: (Replaced) SECOND SCHEDULE***

(Legal Notice No.150 dated 19th August, 2016); specifies in Section 2, under Item (4) Transport and related infrastructure projects such as (g) Metro transport facilities are “*High Risk Projects*”.

### **E7.3: World Bank Environmental and Social Safeguards Policy for ESIA Study**

This policy requires Environmental Assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision-making.

The EA is a process whose breadth, depth, and type of analysis will depend on the nature, scale, and potential environmental impact of the proposed investments.

The EA process takes into account the Natural Environment (air, water, and land); Human Health and Safety; Social Aspects (involuntary resettlement, indigenous peoples, and cultural property) and Trans-boundary and Global Environmental Aspects.

### **E7.4: International Finance Corporation (IFC, 2012) Policy on Environmental and Social Sustainability**

This policy requires initial screening and categorization of each proposed project to determine the appropriate extent and type of environmental assessment needed.

The resulting category also specifies IFC’s institutional requirements for disclosure in accordance with IFC’s access to information policy.

Projects can be placed into one of four categories, depending on the type, location, sensitivity, and scale of the project, as well as the nature and magnitude of its potential environmental impacts. The different categories are listed in the *table*.

**Table 1.1: The Four IFC categories of Project Classification**

Category	Description
<b>Category A</b>	Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented.
<b>Category B</b>	Business activities with potential limited adverse Environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.
<b>Category C</b>	Business activities with minimal or no adverse environmental or social risks and/or impacts.
<b>Category FI</b>	Business activities involving investments in FIs (Financial Intermediaries) or through delivery mechanisms involving financial intermediation.  <i>*This category is not applicable to the Project being considered here.</i>

#### **E7.5: Screening of the Proposed Project**

Screened against the above Schedule and criteria, it is concluded that; the proposed Likoni Express Cable Project requires a full cycle ESIA Study.

#### **E7.6: Scope of ESIA Study**

Contractual Scope of the ESIA Study is defined by the Study Terms of Reference (TOR) (**Annex 1.1**) and was guided by the requirements in Section 58; Application for Environmental Impact Assessment License (Part VI Environment Impact Assessment) of Environment Management and Coordination Act (Cap 387), which stipulates Study Tasks as follows:–

- a) The baseline environmental conditions of the ESIA study area;
- b) Description of the proposed Project;
- c) Description of the relevant environmental laws;
- d) Public consultation through interviews and administration of questionnaires;
- e) Identification and discussion of anticipated adverse environmental, economic and socio-cultural impacts generated during the implementation of the proposed Project;
- f) Propose Appropriate mitigation measures; and
- g) Develop Environmental and Social Management Plan

The Kenyan requirements were supplemented by reference to World Bank Operational Policies (OP4.01-Environmental Assessment; OP 4.04-Natural Habitats; 4.36-Pest Management; 4.20-Indigenous Peoples and 4.12 –Involuntary Resettlement) as well as International Finance Corporation (IFC) guidelines for Environmental Impact Assessments

#### **E 7.7: Approach and Methodology**

This ESIA study was conducted in accordance with Kenya Environmental Legislative Requirements, International Finance Corporation (IFC, 2012)- Policy on Environmental and Social Sustainability as well as World Bank Environmental and Social Safeguards Policy for ESIA Studies.

The goal of this approach was to identify environmental, economic and socio-cultural impacts resulting from implementation of the proposed project determined on the basis of the baseline conditions established during the field surveys and information obtained from the document reviews.

As for subjective predictions of the impacts, the site area was subjected to environmental scoping process. This was a process of evaluating the significance of the project impacts and possibilities of generating significant environmental, economic and socio-cultural impacts and developing appropriate mitigation measures

The study included the following:

### **E7.7.1: Scoping Process**

#### ***E7.7.1.1: Data Collection (Documentary Review)***

Secondary data was obtained by document reviews from diverse sources such as Government of Kenya planning documents and policy blue prints, professional reports and similar studies in the proposed project area, which provided an insight into the environmental, ecological socio-economic, socio-cultural and biophysical baseline for the proposed project area.

Preliminary opinions formed from review of this documentation were re-validated during fieldwork undertaken within the proposed project location

#### ***E7.7.1.2: Field Survey and Assessment***

Fieldwork largely entailed on site investigations to familiarize with the baseline environment of the area potentially affected by the project. Analysis of potential impacts was based on investigations undertaken within the project area and data on physiographic, pedology, hydrology and drainage, ecology and cover vegetation, land tenure, settlement and land-use patterns, ecologically and economically sensitive resources were collected.

Fieldwork entailed several stand-alone studies namely:–

- (a) Land Use surveys
- (b) The flora and fauna mapping study
- (c) The Air Quality and Noise Monitoring survey
- (d) The Marine Sediment and Water Quality survey
- (e) Stakeholder Engagement and Socio-economic survey

#### ***E7.7.1.3: Detailed ESIA Study Activities***

The study involved a series of activities carried out in liaison with the Likoni Cable Express Limited (i.e. Trapos Limited and Concessionaire – Kenya Ferry Services Ltd) as the Client and Proponent.

The Consultants also roped in Departments of Transport at the National Government level and at the County level, the responsible Mombasa County Government departments, State Department for Interior and Co-ordination of National Government(formally Provincial Administration), Local business community leaders (Kiosk owners) and Matatu owners and drivers at the proposed project area, and the Matatu Owners Association – Mombasa Branch.

The Consultants also engaged other organizations in the project area with the main purpose to sharing their experiences and views with respect to the impacts of the proposed project on the economic and socio-cultural aspects of their livelihoods.

Effective evaluation of the environmental, economic and socio-cultural baseline status was achieved through interviews (consultative meetings and discussions) and physical inspection of the entire project area. The baseline conditions provided the starting point for the impacts predictions and benchmark for the mitigation measures.

Detailed study activities are listed under the Terms of Reference, and the outputs for each activity are outlined in the sub-sections below:

- (i) **Review proposed project** details to understand the project magnitude and the overall implementation plan.
- (ii) **Establishment of current baseline** conditions to provide a foundation for the impact predictions and a benchmark for the development of mitigation measures
- (iii) **Describe policy, legislative and regulatory frameworks** relevant to the proposed project as a basis for developing a compliance monitoring protocol for the construction and commissioning phases of the proposed project.
- (iv) **Environmental and social impacts assessments** for the identification of significant impacts to the environment and the communities, small business and *matatu* operators including cumulative and induced impacts.  
Types and levels of impacts as well as criteria for developing suitable mitigation measures and an environmental management plan.
- (v) **Comprehensive Environmental and social management and monitoring plan** indicating Expected Negative Impact, Recommended Mitigation Measures, Responsible Persons, Monitoring Plan, Timeframe and Estimated costs.

#### **E7.7.1.4: Stakeholder Engagement Legislation**

**Article 35** of the National Constitution 2010 provides for access to information as follows:

- 35. (1) Every citizen has the right of access to (a) information held by the State; and (b) information held by another person and required for the exercise or protection of any right or fundamental freedom.*

Further, **Article 69 (1) (d)** requires the State to encourage public participation in the management, protection and conservation of the environment, thereby giving legal foundation for stakeholder consultation in environmental assessment process. Stakeholder consultation as conducted for this ESIA was partly in fulfilment to above stated legal obligation.

**Section 17 of Legal Notice 101 of June 2003** requires that all environmental assessment process in Kenya to incorporate public consultation. This is a requirement informed by the awareness that stakeholders are largely in the constituency likely to be impacted by proposed developments and it is imperative that they be informed of the project following which they can make informed comments and reactions to the proposed development. It is also important to ensure that all stakeholder concerns as well as aspirations are identified and incorporated in project development, implementation and operation.

### ➤ Objectives

Against such background, a number of consultations were undertaken with all stakeholders to the proposed project with the following objectives:–

- Inform the primary, secondary and other stakeholders of details of the proposed Project; and
- Collect views on the positive and negative impacts anticipated by the resident community and stakeholders and how these can be overcome.
- To clarify stakeholder interests and concerns in the proposed project area;
- To better define scope and magnitude of potential impacts of implementing the proposed project based on stakeholders' feedback.

### ➤ Benefits

The following public consultation benefits are associated with a Developer.

- The developer will benefit from the local knowledge;
- Costs may be saved as key issues are identified by the public and studies are focused on key issues as opposed to a broad range of issues;
- Measures to reduce impacts and enhance benefits will be identified with stakeholders;
- Relations with the communities in the vicinity of the development will be improved;
- Delays in decision making may be reduced because of good participation early in the process;
- The public are unlikely to raise objections to the project; and
- The developer's image and reputation will be enhanced.

### ➤ The following public consultation benefits are associated with the Civil Society and Public.

- Capacity is built through people playing an active role during the process. The skills learnt can be used in other community projects;
- Civil Society and the public rights are exercised and protected by participating; and
- Inputs will influence the form and nature of the development and is likely to lead to better development that takes societies needs into account.

### ➤ The following public consultation benefits are associated with the Decision Makers.

- Public participation will improve decisions since there is access to a broader range of perspectives and opinion on the proposed development;
- The development is likely to be more sustainable as it takes people's needs and views into account; and
- Governance and the legitimacy of the government will be improved.

#### ***E7.7.1.5: Data analysis and impact prediction***

Upon data analysis, potential environmental impacts (both positive and adverse) were predicted based on available tools. The magnitude, significance, and acceptability of predicted impacts were



evaluated with a view to determining whether observed adverse impacts are significant enough to warrant mitigation.

The potential environmental impacts were described in both quantitative and qualitative terms through application of existing body of knowledge, checklists, flow charts, and monographs and from input from diverse stakeholders.

In particular, impact prediction in this study drew heavily on five documents namely:-

- (i) Environment (Impact Assessment and Audit) Regulations of June, 2003 (Legal Notice No.101)
- (ii) **Replaced SECOND SCHEDULE** (Legal Notice No.150 dated 19th August, 2016); which specifies that: Item (4) Transport and related infrastructure projects such as (g) Metro transit facilities are “*High Risk Projects*”
- (iii) The World Bank Safeguard Policies
- (iv) The Sectorial checklists for the Roads Sector developed by the World Bank;

Impacts were further screened for occurrence and significance of residual impacts (those which cannot be mitigated satisfactorily) and cumulative impacts with a view to providing a basis of making recommendations on the way forward for the project.

Findings from these surveys are reported starting from Chapter Five below whereby accruing information formed the basis for impact prediction.

#### ***E7.7.1.6: Formulation of Environmental and Social Management Plan***

Measures or interventions necessary to minimize, reduce, avoid or offset identified adverse impacts were evaluated and presented in form of an Impact Mitigation Plan for the proposed project.

Such evaluation also included an assessment of Project Alternatives as reported in **Chapter Six below**.

The ESMP also identified modalities for monitoring and evaluation to ensure compliance in implementation of proposed mitigation measures. This involved development of monitoring indicators and procedures for continuous generation of project monitoring data and information.

#### ***E7.7.1.7: Reporting Procedure***

This Report highlights salient social and environmental issues associated with the design, construction and operational aspects of the proposed Project. The Report has been prepared under contract by Lead Experts from OLIGERM HOLDINGS LIMITED, an Environmental Firm of Experts duly registered and licensed by NEMA (NEMA Registration No.1573) and registered experts and professionals.

The ESIA Study methodology as described above culminated with production of a Draft Environmental and Social Impact Assessment Study Report. The report was done within pre-agreed time frames so as to comply with the requirements of Environment (Impact Assessment and Audit), Regulations of June, 2003.

The report schedule comprised a scoping report, draft final ESIA study report and final ESIA study report. The scoping report and the final study report were submitted to NEMA for review. In addition to the above, the Lead Consultant had continuously briefed the Project Manager, the Proponent/Client and local NEMA regional office in Mombasa.

### **E7.7.1.8: The ESIA Study Team**

This Environmental and Social Impact Assessment study was undertaken by a multi-disciplinary team bringing together skills as follows:-

- Charles Mbara (Team Leader and Lead Expert )
- Patrick Gwada (Marine Ecologist and Lead Expert)
- Clyde Aruwa (Associate Expert)
- Milcah Asamba (Sociologist)
- Vincent Omondi (Logistics)
- Gilbert Ochieng (Economist)

### **E7.7.1.9: Technical Support Consultants**

This ESIA Study also drew heavily from technical input provided by Technical Support Consultants as indicated here below:

- Proponent (Executive Chairman – LCE (Trapos) Limited),
- Equipment Suppliers / Private Partner (Doppelmayr Garaventa Group – an Austrian Company),
- Concessionaire (Kenya Ferry Services Ltd),
- Project Managers (Synthesis Architects),
- Mechanical and Electrical Engineers (Atkins Global),
- Topographical Survey Engineers (Nile Surveys Geosolutions Ltd., NSGS),
- Geotechnical Investigators (Southern Engineering Company Limited),
- Quantity Surveyors (Construction Cost Consultancy Ltd)

## **E8: Findings of the Study**

Based on impact prediction and scoping tools, potential impacts from proposed construction and operation of proposed Likoni Cable Express project have been predicted and analysed with outcome as follows:-

## E8.1: Positive Impacts:

### (i) Project Benefits meet Vision 2030 Objectives

<i>Benefit Description</i>	<i>Specific Aspect</i>
<i>Vision 2030 Objectives</i>	Project supports Vision 2030 Section 3.1.3 of Second Medium term objective of delivering additional ferries
	Project supports Vision 2030 Section 4.1.3 Second Medium term objective of increasing South Coast Tourism
	Infrastructure is a Tourist Attraction itself
	Offers panoramic views of the entire Mombasa region from 80-90 meters high
	Tourists to and from South Coast will no longer be delayed
	Project can quickly be marketed to be an Icon of Mombasa

### (ii) Other Project Benefits

<i>Benefit Description</i>	<i>Specific Aspect</i>
<i>Urban Movement</i>	Reliable technology and means of transport
	Fast (i.e., Crossing time: 2 minutes, 55 seconds)
<i>Environmental (Eco-Friendliness)</i>	Green Technology
	Doesn't pollute environment
	Very low operational power requirements (eg.330kW running)
<i>Maritime Interaction</i>	Project meets International maritime clearance standards (65 metre clearance ) and could accommodate world's largest Cruise Ship
<i>Security and Safety</i>	Retains Kilindini Corridor isolation from Northern Corridor
	Aerial Cable Cars to be equipped with CCTV cameras
	Project entries and exits to be equipped with state-of-the-art screening equipment
	Some of system's cars will be fitted out to Ambulance standards capable of transporting emergency patients in a timely fashion

### (iii) Project Benefits-Regional Mass Transit-(Decongestion of Mombasa City)

<i>Benefit Description</i>	<i>Specific Aspect</i>
<i>Regional Aerial Mass Transit Integration and decongestion of Mombasa Island</i>	Likoni Project will become the Pilot and key contributor to the larger Mombasa Integrated Mass transit Plan
	Project will be the anchor to the Mombasa Cable Transit (MCT) Aerial Master plan which has already garnered PPP pre- Approval which can be expanded throughout the Region (i.e. Mombasa City, Nyali, and Airport Transit Lines)
	The integrated system will greatly reduce automotive traffic in Mombasa by allowing commuters to enter the Island by air (i.e. above ground level, via Cable Cars)

## **E8.2: Adverse Impacts:**

- **During Construction phase;** the most salient observation from this study is that construction activities are likely to interfere with ships entering and leaving the port of Mombasa.
- Secondly; this will also create logistical challenges by disrupting Ferry movements across the channel and as a consequence with operations of the Kilindini Harbour, which is the economic lifeline for hinterlands in both Kenya and the region.
- Thirdly, this could interfere with cargo flow into and out of the Port which could have stifling effects on both the nation and Regional economies and can cause Mombasa Port to lose the esteemed position as the Port of Choice in the region.

Efforts must therefore be made to prevent and mitigate such losses.

Once completed, the massive engineering structure will permanently intrude into the Mombasa skyline and thus alter the landscape completely while imposing a height capping for vessels with mast heights above the design vertical clearance of 69 m above sea level.

However, this KES 5.0 billion worth of investment is likely to be a major attraction to the coastal city and could even replace Fort Jesus as the Main attraction while simultaneously decongesting Mombasa CBD to the advantage of both visitors and town residents and inhabitants.

## **E9: The Environmental and Social Management Plan (ESMP)**

A core outcome of this ESIA study process was the formulation of an ESMP to guide resolution of adverse impacts anticipated from construction and of the proposed project. Core features of the ESMP are as follows:–

### **E9.1: Impact Mitigation Strategy and Plan**

Design of the project was largely guided by the principle of avoidance as the core mitigation strategy. Thus, by analysing alternative alignments of the cable and rope system project, it was possible to choose one with minimal impacts on the social and biophysical environment which was in itself, a strategic intervention towards mitigation.

Key observations are that most adverse impacts are short-term and will cease to exist once civil works ends while residual impacts will require careful monitoring and coordination with relevant Lead Agencies.

Towards implementation of the Impact Mitigation Plan, several sub-plans have been developed to address specific regimes of impacts as follows:-

- 1) A Construction Management Plan to ensure orderly execution of construction activity.
- 2) An Environmental Mitigation Plan to guide general resolution of environmental concerns at both construction and operation phases
- 3) A Health and Safety Plan to resolve OHS concerns,
- 4) A Traffic Management Plan to resolve all traffic related concerns,
- 5) A Landscape Conservation Plan,
- 6) A Communication Plan to guide dissemination of project information to stakeholders.

### **E9.2: Core Players in Impact Mitigation**

The burden of mitigation largely lies with the Project Contractor under supervision by the project manager (Supervising Consultant)

The Contract for Civil Works will bear relevant clauses binding the contractor to institute environmental mitigation as recommended in this study. Thus, in this case, the core monitoring strategy for this project will be through site meetings, in which case, it is recommended that respective County Environmental Coordinators for Mombasa and Kwale be invited to such meetings.

Other stakeholders such as the Mombasa County Labour Officer should also initially attend such meetings to ascertain that measures towards securing the health and safety of workers have been put in place.

In addition to the above, the Head of Coastal Archaeology at the National Museums of Kenya should also be invited to such monitoring meetings to safeguard the archaeological finds where such finds are detected.

When completed, the Project will be subject to statutory environmental and quality audits during the Defect Liability Period and the Contractor will be liable to repair all defects including those pertaining to environmental mitigation.

Overall, it is the impression of this study that, the proposed Project is a critical economic undertaking to which national and regional development targets are tied.

It is one of the Vision 2030 flagship projects and, subject to adoption of mitigation measures and proposal made here-in, it should be supported by all.

### **E9.3: Recommendation**

- Through this ESIA Study Report, the proponent Likoni Cable Express Limited (incorporating Kenya Ferry Services Ltd as the contracting authority and Trapos Ltd (a consortium incorporating Kenya's Trapos and Doppelmayr Garaventa Group, an Austrian Company as the private partner); wishes to disclose that the proposed development of cable expressway project will generate impacts during its implementation, however most of these impacts will be insignificant and will be readily mitigated and managed by the contractor during the construction phase.
- The majority of adverse impacts identified are of a short-term nature and will cease once the civil works phase is completed.
- Further, other impacts will be contained through effective planning and management using available means of mitigation.
- By such disclosure, the prayer of the client to NEMA is for the project to be granted environmental licensing.

## ACRONYMS AND ABBREVIATIONS

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<b>AEWA</b>	African Eurasian Water Bird Agreement
<b>AIDS</b>	Acquired Immuno-Deficiency Syndrome
<b>asl</b>	above sea level
<b>BOQs</b>	Bill of Quantities
<b>Cap</b>	Chapter of the laws of Kenya
<b>CBD</b>	Central Business District
<b>CDA</b>	Coastal Development Authority
<b>CIDP</b>	County Integrated Development Plan
<b>CITES</b>	The Convention on Trade in Endangered Species
<b>CMS</b>	Convention on the Conservation of Migratory Species of Wild animals
<b>DEC</b>	District Environment Committee
<b>DG</b>	Director General
<b>EA</b>	Environmental Assessment
<b>EIA</b>	Environmental Impacts Assessment
<b>EMCA</b>	Environmental Management & Coordination Act, 1999
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>ESMP</b>	Environmental Social Management Plan
<b>ESU</b>	Environmental & Social Unit
<b>EU</b>	European Union
<b>FAO</b>	Food and Agriculture Organisation
<b>g-C -m2 yr-1</b>	Grams Carbon per square metre per year
<b>GDP</b>	Growth Domestic Product
<b>GHG</b>	Green House Gas
<b>GM(SP)</b>	General Manager (Special Projects)
<b>GoK</b>	Government of Kenya
<b>GPS</b>	Global Position System
<b>HIV</b>	Human Immuno-Virus
<b>IMP</b>	Impact Mitigation Plan
<b>IUCN</b>	International Union for the Conservation of Nature
<b>KALRO</b>	Kenya Agriculture and Livestock Research Organisation
<b>SIS</b>	Synthesis Architects
<b>KeNHA</b>	Kenya National Highways Authority
<b>KeRRA</b>	Kenya Rural Roads Authority
<b>KFS</b>	Kenya Forest Service
<b>KMA</b>	Kenya Maritime Authority
<b>KPA</b>	Kenya Ports Authority
<b>KURA</b>	Kenya Urban Roads Authority
<b>KWS</b>	Kenya Wildlife Service
<b>LN</b>	Legal Notice

<b>m, m2, m3</b>	Metre, square metre, cubic metre
<b>MCA</b>	Member of County Assembly
<b>MDGs.</b>	Millennium Development Goals
<b>MNB</b>	Mombasa Northern Bypass
<b>MI</b>	Mombasa Island
<b>MMS</b>	Mombasa Mainland South
<b>MNBR</b>	Mombasa Northern Bypass Road
<b>MOR</b>	Ministry of Roads
<b>MOU</b>	Memorandum Of Understanding
<b>MTP</b>	Medium Term Plan
<b>NEMA</b>	National Environment Management Authority
<b>NMK</b>	National Museum of Kenya
<b>NMK-CFCU</b>	NMK Costal Forest Conservation Unit
<b>OHS</b>	Occupational Health and Safety
<b>OP</b>	Bank Operational Policy
<b>OSHA</b>	Occupational Safety and Health Act
<b>PCU</b>	Project Coordination Unit
<b>PE</b>	Project Engineer
<b>PET</b>	Potential Evapo-transpiration
<b>ppm</b>	Parts per million
<b>PRSP</b>	Poverty Reduction Strategy Paper
<b>RAP</b>	Resettlement Action Plan
<b>RE</b>	Resident Engineer
<b>TOR</b>	Terms of Reference
<b>UNCED</b>	United Nations Conference on Environment and Development
<b>UNEP</b>	United Nations Environment Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>USAID/REDSO/ WCA – Abidjan</b>	United States Agency for International Aid / Regional Development Services Office / West and Central Africa
<b>WB</b>	The World Bank
<b>WB SGPs</b>	World Bank Safe Guard Policies
<b>WMCA</b>	Wildlife Management and Conservation Act
<b>WRMA</b>	Water Resources Management Authority
<b>µg</b>	microgram (unit of measure)

# CHAPTER 1: INTRODUCTION AND BACKGROUND

## 1.1 Introduction

Likoni Cable Express Limited, a privately initiated and funded Private Public Partnership (PPP) comprising **Kenya Ferry Services Limited (KFSL)** as the *Concessionaire* (contracting authority) and **Trapos Limited** (a consortium incorporating Kenya's Trapos and **Doppelmayr Garaventa Group**, an Austrian Company as the private partner) with approval of the Government of the Republic of Kenya.

The firm intends to develop an express cable and rope project with the aim of providing a functional connection system between Mombasa Island (MI) and Mombasa Mainland South (MMS) which are separated by the Likoni Channel which is currently crossed through ferries operated by the Kenya Ferry Service Limited (KFSL).

## 1.2 Background

### 1.2.1 Mombasa City

Mombasa is the second-largest city in Kenya, with a population of over one-million residents. A regional cultural and economic hub, the city has a large port and an international airport and is an important regional tourism centre. Mombasa Island itself may not be the main tourism attraction, other tourists locations are in the north and south of Mombasa. The city continues to grow rapidly primarily fuelled by migration due to economic activities. While relatively well connected to the North and West through car bridges, the city's sole connection to the South is a ferry service. Every day, over 300,000 commuters and 6,000 vehicles travel between Likoni on the mainland and Mombasa Island causing significant congestions during the peak travelling hours.



*Figure 1.1: Passengers disembarking the Ferry*



### **1.2.2 Current Challenges**

The ferry service is a critical part of the city's transport system but is also faced with a number of challenges including:

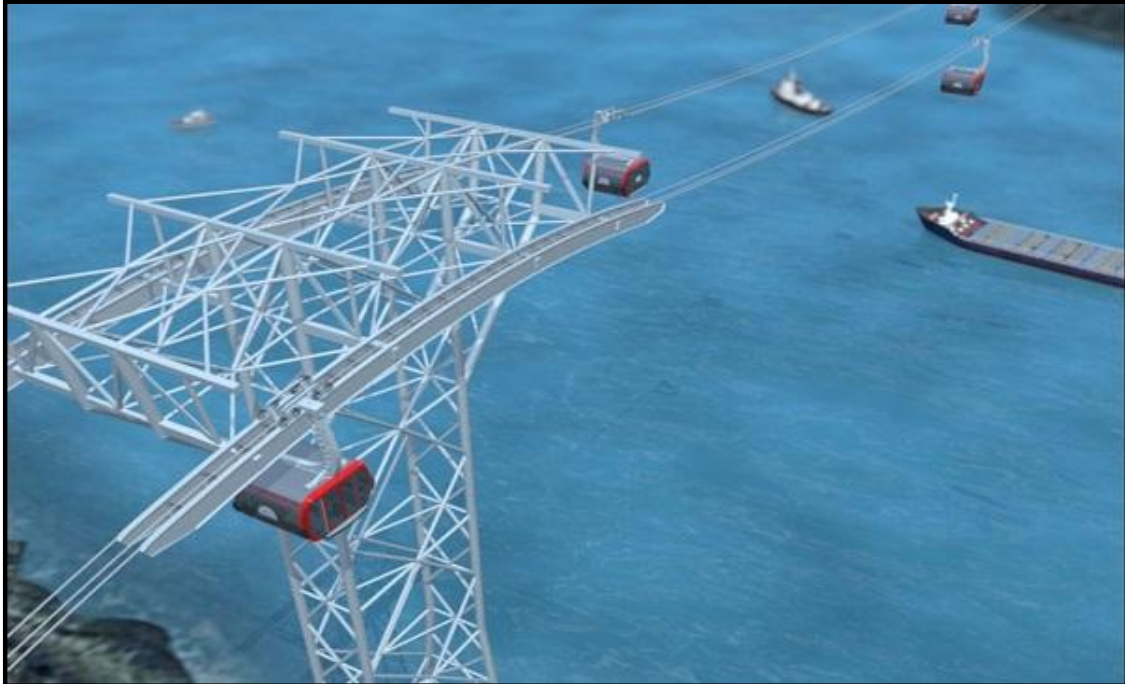
- Pressure is exerted to the existing resources especially during peak times which may result to lost man hours.
- During these times, long vehicle queues may be experienced;
- While the landing ramps have been expanded, the existing roads connecting to the ramps (ramp approaches) remain narrow making traffic management capability limits the number of ferries that can load and offload simultaneously;
- Ships entering and leaving the port of Mombasa create logistical challenges by disrupting Ferry movements across the channel;
- Over the years, both human and vehicle traffic using the Ferry service have been increasing exponentially. This has continued to exert pressure on the existing resources

### **1.2.3 Required Action**

There is an urgent need to deal firmly with these challenges and elevate the infrastructure in Mombasa County to internationally acceptable standards. This will require additional key investments in the following critical areas:

- Expansion of the Mombasa port; which is expected to increase cargo volume by 400 per cent from the current 20 million tons handled at the facility annually;
- Creation of a Vision 2030 Special Economic Zone Mombasa modelled on Shenzhen will have about 9 million people working and living in the zone;
- One of the Resort cities under vision 2030 will be in South Coast as a part of government efforts to double the tourist arrivals to three million visitors annually;
- Under Vision 2030 Second Medium Term (2013-2017) deliverables in the area of Improvement of Shipping and Maritime facilities (section 3.1.3), modernization of ferry services to increase passenger capacity is explicitly mentioned.

The Likoni Cable Express is considered as part realization of that aspect of the Vision, and, the provision of a Cable Car Express connecting Mombasa Island to the Mainland South Coast as anticipated in this Cable Car Express Project is targeted at eliminating this bottleneck and further underpinning on-going initiatives aimed at opening up Kenya's South Coast for economic development.



*Figure 1.2: Artistic Impression of Cable Cars crossing to and from Mombasa Island and Mainland South*

### **1.3 The Proposed Project**

A full disclosure of the proposed project is provided in **Chapter Two** below. The proposed project aims at constructing a cable and rope system connection across the Likoni Channel with Drive Station Terminal anchored on Mombasa Island side and Drive Station Terminal on Likoni mainland side.

#### **1.3.1 Project Ownership**

The Proponent (**LIKONI CABLE EXPRESS LIMITED, of P.O. Box 501-00502, Nairobi, Kenya**) a privately initiated and funded Private Public Partnership (PPP) entity owned by Kenya Ferry Services Limited as the **Concessionaire** (contracting authority) and **Trapos Limited** (a consortium incorporating Kenya's Trapos and **Doppelmayr Garaventa Group**, an Austrian Company as the private partner) with approval of the Government of the Republic of Kenya.

The Kenya Ferry Service Ltd (KFSL) and Trapos Limited have signed a project agreement for the implementation of the Likoni Cable Express Project.

This was as a result of conclusion of negotiations between KFS as the contracting authority and Trapos Ltd (a consortium incorporating Kenya's Trapos and Doppelmayr Garaventa Group, an Austrian Company as the private partner)

### **1.3.2 Project Land ownership**

In the agreement, KFSL is responsible for providing the land on which the project is to be constructed and the plots of land that have been provided by KFSL are registered under the following land reference numbers:

- *PLOT LR. No.: MOMBASA ISLAND BLOCKS XXVI/1011, 1012, 1013; AND MOMBASA BLOCK – 1085. (Copies of Title Deeds attached as Annex 3)*

### **1.3.3 Proposed Project Objectives**

- **Major Objective:**

- ✓ The proposed project will provide a functional connection between Mombasa Island and Mombasa main land.

- **Other Objectives:**

- ✓ Project supports Vision 2030 Section 3.1.3 of Second Medium Term objective of delivering additional ferries
- ✓ Project supports Vision 2030 Section 4.1.3 Second Medium Term objective of increasing South Coast Tourism
- ✓ To reduce/end delays for Commuters and Tourists crossing to and from South Coast
- ✓ Provide a reliable and fast means of transport (e.g., Crossing time: 2 minutes, 55 seconds)

### **1.3.4 Project Justification**

The proposed project is intended to augment the ferry services offered by KFSL. The project shall exist in harmony with the ferry services and the proposed project shall contribute to the achievement of some of the Vision 2030 objectives.

The proposed project shall provide a fast, efficient and reliable means of crossing the channel. The system is also eco-friendly and does not pollute the environment because it uses electricity to drive the system. The system has low power requirements (330 Kw running) which will be very beneficial to the Kenyan economy.

The project shall help in relieving the pressure on the ferry services and it is anticipated that a good number of pedestrians shall opt to board the cable car instead of the ferry because of its efficiency, speed and attractiveness.

The project shall also serve as a tourist attraction and this shall increase the number of visitors to the area and also provide a new income stream for KFSL.

## 1.4 The ESIA Study

An Environmental Impact Assessment (EIA) is a systematic analysis of projects, policies, plans or programmes to determine their potential environmental, economic and socio-cultural impacts, the significance of such impacts and to propose measures to mitigate the negative adverse ones.

### 1.4.1 Scope of the ESIA Study

➤ *Geographical Scope of the Study*



*Figure 1.3: Map of Project Location indicating proposed Project Area*

➤ *Legal Scope of the Study:*

▪ **EMCA (Cap 387) – Section 58**

In Kenya the ESIA studies are anchored on Section 58; Application of Environmental Impact Assessment Licence (Part VI Environment Impact Assessment), of Environment Management and Coordination Act (Cap 387) which requires; “Any person, being a proponent of a project - to apply for and obtain an EIA license from National Environment Management Authority (NEMA)

before he/she can finance, commence, proceed with, carry out, execute, or conduct any undertaking specified in the SECOND SCHEDULE of the Act.”

- **The Second Schedule of EMCA (Cap 387)**

The Second Schedule of EMCA (Cap 387) specifies projects that require to be subjected to EIA Studies and particularly lists criteria under Section 2 (General) as follows:

- (a) an activity out of character with its surrounding;
- (b) any structure of a scale not in keeping with its surrounding;
- (c) major changes in land use.

- **Legal Notice No.150, dated 19th August, 2016 – (Replaced) SECOND SCHEDULE of EMCA**

The replaced Second Schedule of EMCA specifies in Section 2, under Item (4) Transport and related infrastructure projects such as (g) Metro transport facilities are “*High Risk Projects*”.

- **World Bank Environmental and Social Safeguards Policy for ESIA Study**

This policy requires Environmental Assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision-making.

The EA is a process whose breadth, depth, and type of analysis will depend on the nature, scale, and potential environmental impact of the proposed investments.

The EA process takes into account the Natural Environment (air, water, and land); Human Health and Safety; Social Aspects (involuntary resettlement, indigenous peoples, and cultural property) and Trans-boundary and Global Environmental Aspects.

- **International Finance Corporation (IFC, 2012) Policy on Environmental and Social Sustainability**

This policy requires initial screening and categorization of each proposed project to determine the appropriate extent and type of environmental assessment needed.

The resulting category also specifies IFC’s institutional requirements for disclosure in accordance with IFC’s access to information policy.

Projects can be placed into one of four categories, depending on the type, location, sensitivity, and scale of the project, as well as the nature and magnitude of its potential environmental impacts. The different categories are listed in the *table*.

**Table 1.1: The Four IFC categories of Project Classification**

Category	Description
<b>Category A</b>	Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented.
<b>Category B</b>	Business activities with potential limited adverse Environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.
<b>Category C</b>	Business activities with minimal or no adverse environmental or social risks and/or impacts.
<b>Category FI</b>	Business activities involving investments in FIs (Financial Intermediaries) or through delivery mechanisms involving financial intermediation. <i>*This category is not applicable to the Project being considered here.</i>

➤ **Contractual Scope of the ESIA Study**

The contractual scope of this study is defined by the **Terms of Reference (TOR) [ANNEX 1.1]** for this Study and was guided by the requirements in Section 58; Application of Environmental Impact Assessment Licence (Part VI Environment Impact Assessment) of Environment Management and Coordination Act (Cap 387), which stipulates Study Tasks as follows:-

- a) The baseline environmental conditions of the ESIA study area;
- b) Description of the proposed Project;
- c) Description of the relevant environmental laws;
- d) Public consultation through interviews and administration of questionnaires;
- e) Identification and discussion of anticipated adverse environmental, economic and socio-cultural impacts generated during the implementation of the proposed Project;
- f) Propose Appropriate mitigation measures; and
- g) Develop Environmental and Social Management Plan

The Kenyan requirements were supplemented by reference to World Bank Operational Policies (OP4.01-Environmental Assessment; OP 4.04-Natural Habitats; 4.36-Pest Management; 4.20 n-Indigenous Peoples and 4.12 –Involuntary Resettlement) as well as International Finance Corporation (IFC) guidelines for Environmental Impact Assessments.

➤ **Thematic Scope of the Study**

The substantial focus and scope of ESIA Studies is stipulated in the **Third Schedule** to Legal Notice 101 of EMCA. The following issues may, among others, be considered in undertaking of environmental impact assessments.

▪ **Ecological Considerations:**

*(a) Biological diversity including -*

- (i) Effect of proposal on Number, Diversity, Breeding Habits, etc. of wild animals and vegetation;
- (ii) Gene pool of Domesticated plants and animals e.g. monoculture as opposed to wild types.

*(b) Sustainable use including -*

- (i) Effect of proposal on Soil Fertility;
- (ii) Breeding Populations of fish, game or wild animals;
- (iii) Natural Regeneration of woodland and sustainable yield;
- (iv) Wetland Resource degrading or wise use of wetlands.

*(c) Ecosystem maintenance including -*

- (i) Effect of proposal on Food Chains;
- (ii) Nutrient Cycles ;
- (iii) Aquifer Recharge, Water Run-off rates, etc.;
- (iv) a real extent of Habitants;
- (v) Fragile Ecosystems.

▪ **Social considerations including -**

- (a) Economic impacts;
- (b) Social cohesion or disruption;
- (c) Effect on human health;
- (d) Immigration or Emigration
- (e) Communication; roads opened up, closed, rerouted
- (f) Effects on Culture and Objects of Cultural Value

▪ **Landscape**

- (a) Views opened up or closed;
- (b) Visual impacts (features, removal of vegetation, etc.);
- (c) Compatibility with surrounding area;
- (d) Amenities opened up or closed, e.g. recreation possibilities.

▪ **Land uses -**

- (a) Effects of proposal on current land uses and land use potentials in the project area.
- (b) Possibility of multiple use
- (c) Effects of proposal on surrounding land uses and land use potentials.

- **Water:**

Important aspects to consider are the effects of the proposal on:

- (a) Water Sources; i.e., the Quantity and Quality of (i) rivers; (ii) springs; (iii) lakes (natural and man-made); (iv) underground water; (v) oceans;
- (b) Drainage Patterns / Drainage Systems;

In designing the scope of investigations under the ESIA Study for the proposed project, this Third Schedule to EMCA formed a fundamental technical and legal checklist.

➤ **Screening of the Project**

Screened against the above Scopes, Schedules and Criteria, it is concluded that; the proposed Likoni Cable Express Project requires a full cycle ESIA Study.

### **1.5 Objectives of Environmental and Social Impact Assessment Study**

The objectives of the Environmental and Social Impact Assessment (ESIA) study are:

- ✓ To fulfil the legal requirements as outlined in Section 58 to 67 of the Environmental Management and Coordination Act (EMCA) and Part I and II of the EIA/Audit Regulations, 2003;
- ✓ To obtain background biophysical information of the site and legal and regulatory issues associated with the proposed development
- ✓ To assess and predict the potential impacts during site preparation, construction and operational phases of the proposed project;
- ✓ To make suggestions of possible alterations to the proposed design, based on the assessment findings;
- ✓ To propose mitigation measures for the potential significant adverse environmental impacts and safety risks;
- ✓ To allow for public participation;
- ✓ To consider the net Project cost in the long term; and
- ✓ To prepare an Environmental and Social Management and Monitoring Plan.

### **1.6 Approach and Methodology**

Essentially, a full cycle ESIA Study entails four major stages namely:-

- Screening,
- Detailed Investigations,
- Public Review and,
- Final Report Stage activities highlighted here below:



### 1.6.1 Screening Stage

- The process of developing a project report is a legal requirement under Section 58(1) of the EMCA-(Cap 387) (**Principal Statute**). Further, Section 6 of Part 1 of the Legal Notice No.101 stipulates that “An application for an Environmental Impact Assessment License” shall be in the form of a Project Report; in the form set out in the First Schedule to these Regulations, and the applicant shall submit the application together with the prescribed fee to the Authority.
- However, towards fast tracking the ESIA Process, NEMA now requires all large scale ESIA Projects to proceed straight to Detailed ESIA Study without need for preparation of a Project Report.
- The requirement for payment of prescribed fee to the authority (**Legal Notice No. 13211 of 2013**) was also scrapped by NEMA, effective January 2017.

#### ➤ **Preliminary Activities and Terms of Reference (TOR)**

- a) Preliminary activities include:
- (i) Defining the Terms of Reference (TOR) for the ESIA study for proposed LIKONI CABLE EXPRESS PROJECT
  - (ii) Determining the personnel required for the study
- b) A brief clear and explicit summary of the project; listing what the development project entails is extremely helpful at this stage.
- c) Review existing laws and regulations that are applicable to the proposed project along with the regulating authorities.
- d) Review technical, financial and managerial resources available for the proposed project.
- e) Identify the team that will carry out the EIA procedure along with a TEAM LEADER who will be overall in charge of the study.

#### ➤ **Terms of Reference**

The Consultants prepared Terms of Reference (TOR) for the Detailed ESIA Study and submitted to NEMA for review on 24<sup>th</sup> September, 2020, and approval granted on 28<sup>th</sup> September, 2020.

The Terms of Reference specified that; the Study Report should where possible, contain description of the following:

- ✓ Description of the nature of the proposed project;
- ✓ The location of the project including the physical area that may be affected by the project’s activities;
- ✓ The activities that shall be undertaken during the project construction, operation and decommissioning phases;

- ✓ The design of the project;
- ✓ The materials to be used, products and by-products, including waste to be generated by the project and the methods of their disposal;
- ✓ The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation of the project;
- ✓ An action plan for the prevention and management of possible accidents during the project cycle;
- ✓ A plan to ensure the health and safety of the workers and neighbouring communities;
- ✓ The economic and socio-cultural impacts to the local community and the nation in general;
- ✓ The project budget, and;
- ✓ Any other information the Authority (NEMA) may require.

## **ANNEX 2: Copy NEMA Approval for TORs**

### **1.6.2 Detailed Investigation**

Activities of the Detailed ESIA Stage followed the Study work plan approved as part of the Terms of Reference (TOR) as outlined here below:-

#### **(i) Data Collection**

- Secondary data for the proposed project location was obtained from diverse sources such as Government of Kenya (GoK) planning documents and policy blue prints, professional reports and releases, etc. all of which provided an insight into the socio-economic and biophysical baseline for the target area.
- Preliminary opinions formed from review of such documentation were re-validated during fieldwork undertaken within the proposed project location.

#### **(ii) Field Surveys**

Fieldwork largely entailed onsite investigations to familiarize with the baseline environment of the area potentially affected by the proposed project.

- Analysis of potential impacts was based on investigations undertaken within the proposed project area where data on physiographic, pedology, hydrology and drainage, ecology and cover vegetation, ecologically and economically sensitive resources were collected.
- The Flora and Fauna mapping study
- The Air Quality and Noise Monitoring survey
- Stakeholder Engagement and Socio-economic survey

Findings from these surveys are reported starting from **Chapter Three** below whereby accruing information formed the basis for impact prediction.

### **1.6.3 Public Review**

#### **(i) Data analysis and impact prediction**

Upon data analysis, potential environmental impacts (both positive and adverse) were predicted based on available tools.

The magnitude, significance, and acceptability of predicted impacts were evaluated with a view to determining whether observed adverse impacts are significant enough to warrant mitigation.

The potential environmental impacts were described in both quantitative and qualitative terms through application of existing body of knowledge, checklists, flow charts, and monographs and from input from diverse stakeholders.

In particular, impact prediction in this study drew heavily on three documents namely:-

- ✓ The Third Schedule to Legal Notice 101 (EIA Regulations)
- ✓ The World Bank Safeguard Policies
- ✓ The Sectorial checklists for the Roads Sector developed by the World Bank;

Impacts were further screened for occurrence and significance of residual impacts (those which cannot be mitigated satisfactorily) and cumulative impacts with a view to providing a basis of making recommendations on the way forward for the proposed project.

#### **(ii) Formulation of an Environmental and Social Management Plan**

Measures or interventions necessary to minimize, reduce, avoid or offset identified adverse impacts were evaluated and presented in form of an Impact Mitigation Plan for the proposed development.

Such evaluation also included an assessment of Project Alternatives as reported in **Chapter Six** below.

The ESMP also identified modalities for monitoring and evaluation to ensure compliance in implementation of proposed mitigation measures.

This involved development of monitoring indicators and procedures for continuous generation of project monitoring data and information.

### **1.6.4 Reporting Procedure**

The ESIA Study methodology as described above culminated with production of a Draft Environmental and Social Impact Assessment Study Report.

The study was formulated in line with Regulation 18 of Legal Notice 101 (EIA Regulations) of EMCA which requires that:-

*(1) A proponent shall submit to the Authority, an environmental impact assessment study report incorporating but not limited to the environmental following information:-*

- a) the proposed location of the project;*
- b) a concise description of the national environmental legislative and regulatory framework, baseline information,*
- c) and any other relevant information related to the project; the objectives of the project;*
- d) the technology, procedures and processes to be used, in the implementation of the project;*
- e) the materials to be used in the construction and implementation of the project;*
- f) the products, by-products and waste generated project;*
- g) a description of the potentially affected environment;*
- h) the environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated;*
- i) alternative technologies and processes available and reasons for preferring the chosen technology and processes;*
- j) Analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.*
- k) an environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment; including the cost, time frame and responsibility to implement the measures;*
- l) provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;*
- m) the measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;*
- n) an identification of gaps in knowledge and uncertainties which were encountered in compiling the information;*
- o) an economic and social analysis of the project;*
- p) an indication of whether the environment of any other state is likely to be affected and the available alternatives and mitigating measures; and such other matters as the Authority may require.*

## 1.7 The ESIA Study Team

This Environmental and Social Impact Assessment study was undertaken by a multi-disciplinary team bringing together skills as follows:-

### ➤ **Oliger Holdings Ltd – Study Team**

- Charles Mbara – NEMA Registered Lead Expert (Reg. No.: 0121) – Team Leader
- Patrick Gwada – NEMA Registered Lead Expert (Reg. No.: 1588) – Marine Ecologist
- Clyde Aruwa – NEMA Registered Associate Expert (Reg. No.: 10100) – Environmental Specialist
- Milcah Asamba – Nema Registered Lead Expert (Reg. No.: 0947) – Sociologist
- Gilbert Mbara – Economist

### ➤ **The ESIA Study also drew heavily from Technical Support Team namely:-**

- Mr. Benson Kimeu – Topographical Survey Engineer (Nile Survey and Geo-Solutions Ltd)
- Mr. Ezihl Pandiyan – Geotechnical Investigation (Southern Engineering Company Limited)
- Mr. Kothanda Reddy – Geo-technical Investigations (Southern Engineering Company Ltd)
- Mr. Paul Kimani – Geo-technical Investigations (Southern Engineering Company Ltd)
- Mr. Evans Ombati – Quantity Surveyor (Construction Cost Consultancy Ltd., (CCC)
- Mr. Thomas Nesler – Equipment Supplier (Doppelmayr Garaventa)
- Mr. Michael Hofer – Equipment Supplier (Doppelmayr Garaventa)
- Mr. Anzaya Akatsa – Architect (SIS Ltd)
- Mr. Evans K'adoyo – Architect (SIS Ltd)
- Mr. John Mutakaa – Project Manager – Architect (SIS Ltd)

## 1.8 Reporting and Documentation

A comprehensive ESIA study Report containing key findings has been compiled by the Consultants in accordance with Environment Management and Coordination Act (Cap 387) guidelines for consideration and approval.

In preparing the Study Report, the Consultants paid attention to the following issues as specified in the Second Schedule of the Environmental (Impact Assessment and Audit) Regulations, 2003:

- ✓ Ecological Considerations including: Biological diversity, sustainable use, and ecosystem maintenance;

- ✓ Social Consideration including: Economic impacts, social cohesion or disruption, effect on human health, communication, and effects on culture and objectives of culture value;
- ✓ Landscaping including: views opened up or closed, visual impacts (features, removal of vegetation, etc.), compatibility with surrounding area, and amenity opened up or closed e.g. recreation possibilities;
- ✓ Land Used including: effects of proposal on current land uses and land use potentials in the Project area, possibility of multiple use, and effects of the proposal on surrounding land uses and land use potentials; and ,
- ✓ Water including: water sources (quantity and quality) and drainage patterns/drainage systems.
- ✓ Waste Disposal Systems, including: Liquid waste (sewage/effluent) disposal systems and solid waste management systems.

## **1.9 Structure of the ESIA Study Report**

### ➤ **Rule 18(1)**

This ESIA study report has been prepared in accordance with the requirements of Rule 18(1) of the Environmental (Environmental Impact Assessment and Audit) Regulations of June, 2003, which describes the content of an ESIA study Report.

This report incorporates the information as required in Rule 18(1) namely:

- The proposed location of the project;
- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project;
- The objectives of the project;
- The technology, procedures and processes to be used, in the implementation of the project;
- The materials to be used in the construction and implementation of the project;
- The products, by-products and waste generated project;
- A description of the potentially affected environment;
- The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short term and long-term effects anticipated;
- Alternative technologies and processes available and reasons for preferring the chosen technology and processes;

- Analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies;
- An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment including the cost, time frame and responsibility to implement the measures;
- Provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;
- The measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;
- An identification of gaps in knowledge and uncertainties which were encountered in compiling the information; and
- An economic and social analysis of the project.

## **1.10 Presentation of the ESIA Study Report**

This report is presented in **ELEVEN (11) Chapters** which integrate the content for ESIA Study Reports as stipulated in Regulation 18 of LN 101. The Chapters are as follows:

- **ACKNOWLEDGEMENT**
- **LETTER OF SUBMISSION**
- **CERTIFICATION**

### ***NON-EXECUTIVE SUMMARY***

**CHAPTER 1: INTRODUCTION AND BACKGROUND** – This Chapter describes the introduction and background, brief description of proposed project, the ESIA study including rationale, scope, objectives and TOR for the study; approach and methodology of the study, ESIA study Team, consultant’s compliance, reporting and documentation.

**CHAPTER 2: DESCRIPTION OF PROPOSED PROJECT**–This Chapter describes proposed project location and access, nature and proposed project design, sustainable design elements of proposed project, proposed project activities, construction waste disposal methods, estimated project cost and project implementation schedule.

**CHAPTER 3: ENVIRONMENTAL SETTING OF THE PROPOSED PROJECT LOCATION** – This Chapter describes location and basic information of proposed project, including physiographic and natural conditions, socio-economic setting, cultural and historical heritage in order to achieve an understanding of the proposed project environmental setting.

**CHAPTER 4: BASELINE MARINE AND TERRESTRIAL BIODIVERSITY SURVEY**–This Chapter describes marine and terrestrial biodiversity situation analysis in the proposed project area; the

baseline survey methodology; marine baseline flora, marine sediment fauna, mangrove benthos, terrestrial vegetation and terrestrial fauna.

This Chapter therefore provides baseline data on marine and terrestrial biodiversity parameters of the project area.

**CHAPTER 5: POLICY, LEGISLATIVE AND ADMINISTRATIVE FRAMEWORK** – This chapter defines the policy, legislative and institutional frameworks which will govern development, implementation and operation of the proposed cable and rope system project across the Likoni Channel(Likoni Cable Express Project)

**CHAPTER 6: ANALYSIS OF THE PROPOSED PROJECT ALTERNATIVES** –This Chapter describes alternative approaches and options towards securing project site alternatives so as to ensure rationalized selection of the most optimal investment package suitable for the proposed project.

**CHAPTER 7: STAKEHOLDER ENGAGEMENT-** This Chapter describes in detail stakeholder engagement plan including legislative requirements, approach and methodology, identification of Project Affected Parties(PAPs) during the proposed project implementation, schedule for public consultation with different groups will be developed, including number and timing of public input and the methods to be employed (e.g. media announcements. town hall meetings questionnaires, one-on-one meetings, and public ESIA steering committees).

The study shall focus on relevant issues and recommend specific investigations, such that the resulting ESIA is useful to decision makers and it shall addresses the concerns of IAPs.

**CHAPTER 8: IDENTIFICATION OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS** – This chapter provides an analysis of the potential environmental and social impacts likely to ensue from implementation of the proposed project implementation as currently packaged. Impact analysis as unveiled in this Chapter was approached from different directions, applying diverse diagnostic tools and processes leading to a build-up of core issues that constitute potential impacts from the cable and rope system project. Tools applied include:-

- ✓ Baseline characterization to identify pre-existing environmental and social concerns including sensitive resources
- ✓ Review of requirements of both policy and legal framework of the Government of the Republic of Kenya
- ✓ Screening against international standards for sustainable development; and
- ✓ Screening against stated stakeholder concerns and interests.

Potential environmental and social impacts from different phases of project development (pre-construction, construction, operation and decommissioning phases) have been identified and interpreted as summarized in **Table 8.1**.

**CHAPTER 9: MITIGATION MEASURES AND MONITORING PROGRAMMES-** This Chapter highlights the mitigation measures and monitoring programmes for the anticipated negative impacts envisaged during the implementation of the proposed project. The potential impacts



and the possible mitigation measures have been analysed under four categories: Design phase, Construction phase, Operational phase and Decommissioning phase.

**CHAPTER 10: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)**- This chapter presents an Environmental and Social Management Plan (ESMP) that will be implemented by the Proponent and Contractor to prevent and/or reduce significant negative environmental and social impacts to acceptable levels.

The aim of the Environmental and Social Management and Monitoring plan (ESMMP) is to provide a road map to the Proponent/Contractor on how to address the identified environmental and social impacts, requirements for labour specialization (responsibility), frequency of monitoring activities, and estimated cost implications of the Proposed Project.

**CHAPTER 11: CONCLUSION AND RECOMMENDATIONS** – This Chapter describes the conclusion and recommendations of this Environmental and Social Impact Assessment Study.

- ✓ A brief non-technical summary of the report findings and recommendations.

## **REFERENCES**

## **ANNEXES**

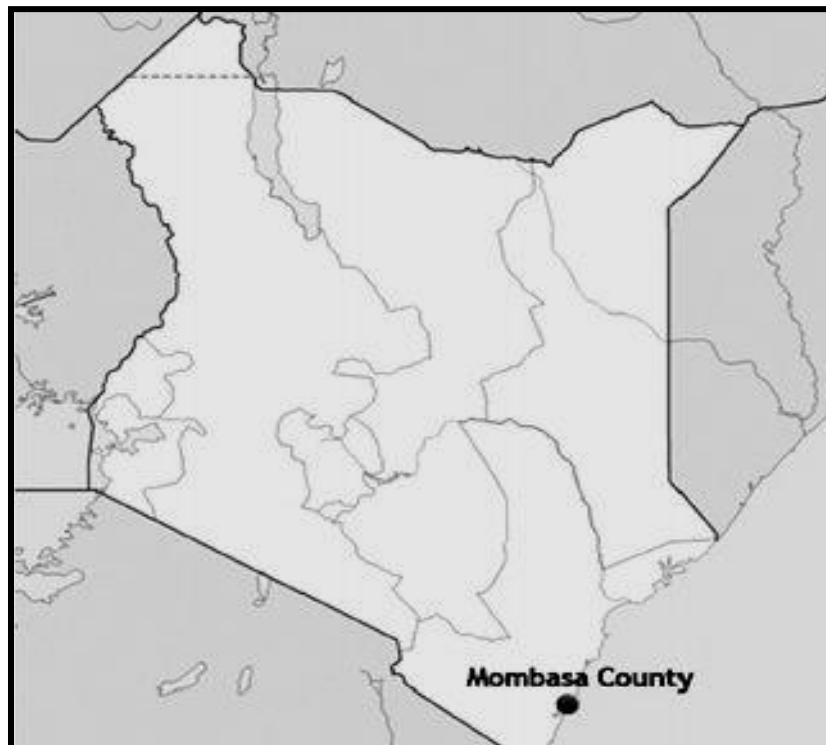
## CHAPTER 2: DESCRIPTION OF THE PROPOSED PROJECT

### 2.1 Project Location

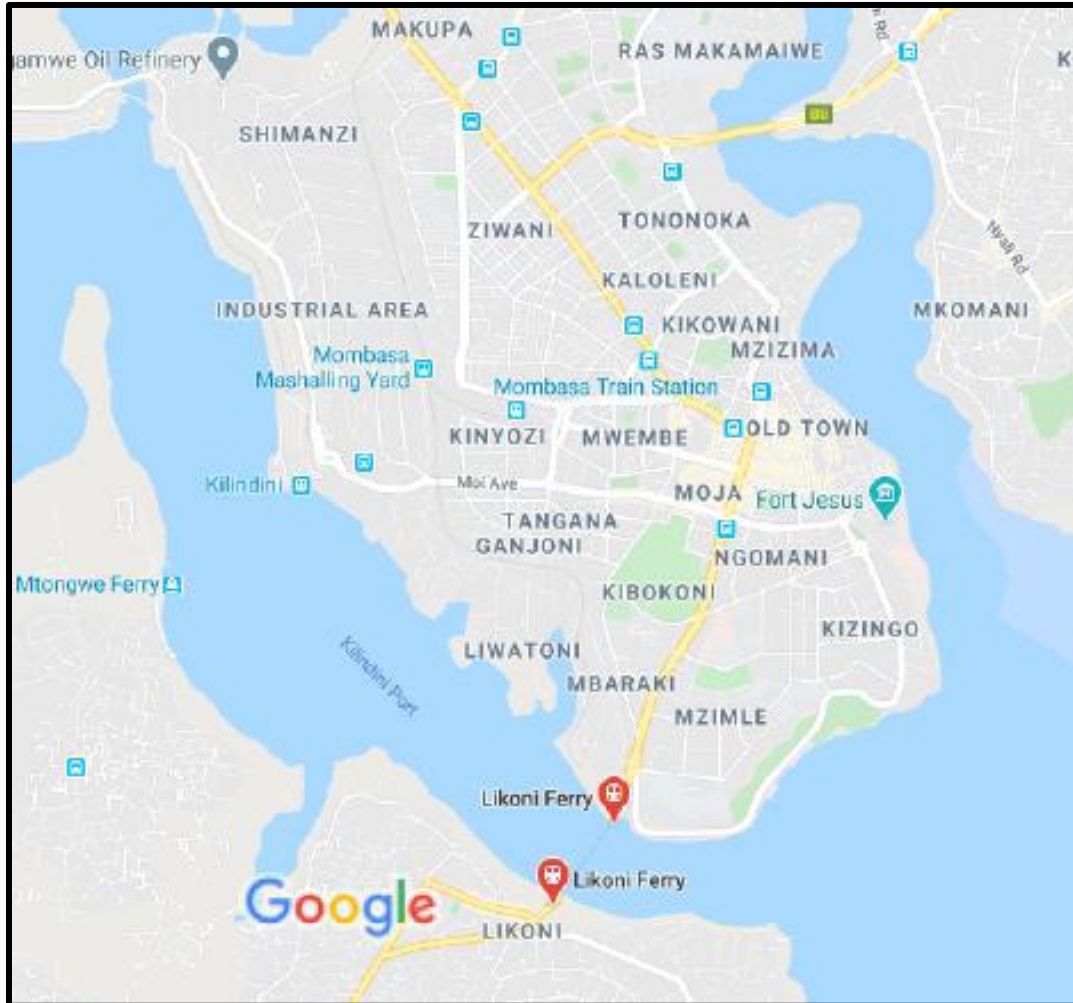
#### 2.1.1 Location of Kenya and Basic Data

Kenya is located in east Africa, which lies on the equator. With the Indian Ocean to its south-east, it is bordered by Tanzania to the south, Uganda to the west, South Sudan to the north-west, Ethiopia to the north and Somalia to the north-east.

- Total area: 580 000 km<sup>2</sup> (11 227 km<sup>2</sup> of water bodies)
- Population: about 43 million people (Wesley, 2011)
- Languages: English, Swahili
- Capital City: Nairobi
- Currency: Kenyan shilling
- Climate: Kenya's climate varies from tropical along the coast to temperate inland to arid in the north and northeast parts of the country. The "long rains" season occurs from March/April to May/June. The "short rains" season occurs from October to November/December.



*Figure 2. 1: Google Map of Kenya indicating Mombasa County*



*Figure 2. 2: Map of Mombasa showing location of Likoni Channel*

### **2.1.2 Proposed Site Location and Access**

From the Makupa Roundabout, head south west along Jomo Kenyatta Avenue (Mombasa Road) towards Mwembe Tayari. Move for about 2.6 km until you arrive at Mwembe Tayari. At the roundabout, take the third exit onto Digo Road (right turn). Head southwards for about 1 km and continue straight onto Nyerere Avenue. Continue on Nyerere Avenue for about 1.3 km till you arrive at Likoni Ferry. The proposed site for the drive station will be on the left, the current waiting/parking bay for trucks.

### **2.1.3 Access Roads to Likoni Channel**

The site is situated by the A14 highway. This is the trunk road that comes from Mombasa town to Lunga Lunga via Ukunda. The highway is broken at Likoni by the Likoni channel. Movement of vehicles and foot traffic across this channel is currently facilitated by the Kenya Ferry Services Limited.

#### **2.1.4 Project Area**

The project is located in Mvita and Likoni Constituencies. The Drive Station (Island Terminus) is situated on the Island side which is in Mvita constituency; while the Return Station (Mainland Terminus) is situated on the Mainland side which is in Likoni constituency.

The Mama Ngina Waterfront Park is situated to the East of the project location. There are some marine docks and yards (owned by SECO and Bamburi Cement) to the West.

To the south of the project location is the mainland south where there is a bus terminus, stalls for traders and businesses to sell their wares.

#### **2.1.5 Proposed Project Site Description**

The proposed project site is located at the Kenya Ferry sites of operation. The site is characterised by paved surfaces and some rocky and sandy ground, especially on the island side, at the truck waiting bay. The surfaces are majorly paved and tarmacked because of the trunk road passing through the site location and the docking ramps that are found in the vicinity.

There are also some booths and semi-permanent structures present.

### **2.2 Proposed Project Design**

#### **2.2.1 Project Design Concepts and Basic Considerations**

The cable alignment should be in a straight line between stations and the towers to improve on the system's efficiency and minimize implementation cost.

The project design also had to consider the available parcels of land and the minimum height requirements for marine navigation. The project also does not interfere with any site of historical and cultural heritage importance. During construction and excavation, any artefacts or historical/archaeological findings discovered, shall be submitted and reported to the National Museums of Kenya.

#### **2.2.2 Project Components**

The Likoni Cable Express will be a state-of-the-art multi-gondola cable car system running across the 500 meter channel. This innovative passenger transport solution will operate seven days a week with a journey time of three to four minutes. The Project will have 22 cable cars (gondolas) which will carry 38 passengers per cabin. It will carry 11,000 commuters per hour in both directions which will be a total of 180,000 people a day.

- The proposed project will consist of three components namely:
- Two Stations (a Drive Station and the other Return Station),
- Two Towers and Rope

- Cars (Gondolas)

The cable car project will link Mombasa Island and Likoni Mainland Side The drive station will be on the Island side while the return station will be on the Mombasa Mainland South side.

There shall be sufficient tower-station separation in order to achieve sufficient and acceptable rope incline.

The design also ensures sufficient clearance above high tide level for maritime traffic by ensuring the minimum clearance over the channel (70 m) is achieved.

Ability to integrate/interface with existing functions

The project components shall bring about minimal interruption of ferry service since the goal is to integrate and augments the cable car express with the ferry services. There will be an overall redesign of the area around the station to integrate with the current ferry infrastructure and operations.

The project implementation shall, in the process, bring about improvement of the general project area. This will come about with general improvements of infrastructure around the project area and the construction of a common pedestrian entry and screening point for both ferry users and users of the cable car. The security and screening of both ferry and cable car commuters shall be combined.

The stations and boarding platforms shall be accessible for all, including people living with disability, with all floors being serviced by lifts.

### **2.2.3 Mombasa Island Side**

Island Side (Drive) Station Geographical Coordinates; **Latitude:** 4.0768°S **Longitude:** 39.6664°E

The Drive Station is situated on land that is under the ownership and jurisdiction of KFSL. The structural appearance of the drive station shall be a magnificent structure that will have an iconic & strong image that projects civil pride. The aesthetics shall resonate with the context of the area surrounding the project location.

The Drive Station is well designed and shall have sufficient space for circulation for pedestrians.

The Drive station will offer a seafront recreation area where there shall be shops and restaurants. There shall also be opportunities for advertising and retail (shops).

There is a provision for interface with public transport and pedestrian traffic patterns. This shall be through a drop-off point for *matatus* (public service vehicles).

The **Ground Floor** comprises of:

- Security screening point and Security office
- Circulation area with entry and exit points

- Offices
- Substation Generator
- Toilets

There are two **Basement Floors** that have been assigned for parking. The Basement 01 level will also house the service yard for the cable cars. The cable cars shall be moved up and down through the various levels via special lifts for the cable cars.

The **Mezzanine floor** has been designated for lobbies for commuters. The **First floor** comprises of shop stalls and lobbies. This floor also has washroom facilities.

The **Second floor** has been designated for the parking of the Cable Cars. This is where extra cable cars and specialised gondolas shall be parked and on standby to be deployed for use when needed. The cable cars shall be moved through the cable car lifts.

The **Third floor** shall be the station's *Boarding Floor*. This area comprises of:

- A boarding & alighting platform
- Token activated access gates
- A Control room to oversee operations & flow of commuters
- Sufficient lobby space for embarking & disembarking
- Multiple escalators, lifts and staircases for accessibility to all areas
- Carrier elevator for delivering cars to maintenance garage in the basement below

The **Fourth floor** shall be the *recreation floor with a lobby and an open terrace* for site seeing and viewing.

There shall be an office at the **Sixth floor** which shall be accessed via a lift and staircase.

#### **2.2.4 Mombasa Mainland South Side (Likoni)**

Mainland South Side (Return) Station Geographical Coordinates; **Latitude:** 4.0831°S, **Longitude:** 39.6621°E

The location of the Return Station is the appropriate location to achieve the desired rope alignment with the island side. It is situated on land that is under the jurisdiction of KFSL. Part of this land includes a 0.029 hectare portion of the A14 road reserve, for which KeNHA has granted permission for the Project to use.

The Return Station is designed to be integrated with the ferry operations and integrate with vehicular movement on the A14 trunk road. The Return station shall be a structure that shall be constructed integrating (above) with the road while ensuring sufficient vertical clearance for vehicles.

The return station shall also have a strong iconic structural appearance. The aesthetics shall resonate with the context of the area surrounding the project location. KFSL activities shall be incorporated (security and police booth, weigh bridge and toll payment, etc.)

Pedestrians and cable car commuters shall be channelled through a common security screening point. There shall be ample lobby space for sufficient circulation of commuters.

The **First floor** shall comprise of shop stalls and washroom facilities. The staff lounge shall also be on this floor.

The **Second floor** shall be the return station's *Boarding Floor*. This area comprises of:

- A boarding & alighting platform
- Token activated access gates
- An office to oversee operations & flow of commuters
- Embarking and disembarking lobbies creating sufficient space for embarking & disembarking of commuters
- Lifts, escalators and staircases for accessibility to all areas
- A restaurant lounge and a veranda for recreation and enjoyment

## **2.3 Sustainable Design Elements of the Proposed Project**

### **2.3.1 Landscape and Ecology**

The proposed project shall be implemented within a space that does not have a lot of vegetation. The project does not intend to clear significant number of trees and vegetation. This therefore implies that the project shall have minimum negative impact on the landscape and ecology of the project location.

### **2.3.2 Natural Lighting**

The design of the building has taken advantage of natural lighting by maximizing on window space. This is evident in the design of the drive and return stations, especially on the circulation lobbies (ramps and stairs) and at the waiting and boarding lobbies.

### **2.3.3 Emergency Preparedness and Response Systems**

The design of the proposed project incorporates emergency preparedness and response systems and procedures, e.g. emergency brakes, provision for an ambulance gondola.

### **2.3.4 Fire Protection/Fighting Systems**

The design of the proposed project incorporates fire-fighting equipment and systems; and fire exits to be installed in all the project components as per the recommendations by the OSH guidelines.

### **2.3.5 Energy Supply**

The proposed project shall source its energy mainly from the Kenya Power. There is a Power House in the site plan that shall contain the power unit. There is also a back-up generator that shall provide power in cases of emergency or power outage.

### **2.3.6 Water Supply**

The proposed project shall source its water mainly from Mombasa Water Company.

### **2.3.7 Drainage Systems Designs**

The project design has carefully considered the drainage of surface run-off. The design considers a proper drainage system for surface run-off.

***The Architectural Designs and Drawings of the Proposed Project are attached as ANNEX 9.***

## **2.4 Proposed Project Activities**

### **2.4.1 Planning and Design Phase Activities**

This phase entailed prefeasibility, feasibility and designing of the proposed project and included the following:

- ✓ Designs and Drawings
- ✓ Geo-technical Survey
- ✓ Topographical Survey
- ✓ Wind speed and strength measurements
- ✓ Environmental Baseline Validation (fauna and flora data base)
- ✓ Ambient Air Quality Measurements
- ✓ Noise and Vibrations
- ✓ Traffic Management Plan

The planning phase considered type and nature of materials to be employed and involved careful consideration and balancing of the proposed project site physical conditions and *ergonomics in line with total costs as well as economic value of the project and scenic ambience and visibility of the general project area/location.*

The services of qualified architects, responsible for developing the plans and other experts were involved such as; Civil Engineers, Quantity Surveyors, Geotechnical surveyor, Structural Engineers and EIA experts.

### **2.4.2 Preparatory Activities**

- **Preconstruction investigations:** will include thorough investigation of the proposed project site to determine the physical and biological status of the site (Geotechnical Surveys)



- **Construction of site office for Project manager and Clerk of Works:** site office will be constructed and equipped with the necessary furniture, office equipment, computers and telephones
  - ✓ The site office will be a refurbished Container.
  - ✓ Sanitary facilities (Latrines) will be constructed and connected by sewer lines to the receptors of soak pits which shall be constructed for the temporary disposal of waste water and liquid wastes
- **Construction of Contractors Site office:** site office will be constructed and equipped with the necessary furniture, office equipment, computers and telephones
- **Construction of Building Materials store:** Stores for safe storage of building materials including cement, plumbing equipment and paints that can be affected by bad weather conditions should be constructed at the proposed project site. The store will be made of timber and GCI sheet
- **Construction of sanitary facilities for workers:** Temporary sanitary facilities should be constructed for workers. In addition to above there should be washrooms and clean water for drinking. This will be in compliance with OSH, Act of 2007
- **Sourcing and Transportation of building materials:** Building materials will be sourced from various supply destinations and will be transported to the proposed project site in trucks, vans and other transportation methods. It is highly anticipated that most of the materials will be sourced from the local area and greater emphasis should be laid on this because it will make economic and environmental sense as it will reduce transportation costs and environmental impacts.
- **Storage of building materials:** Building materials will be stored on site. Bulky ones such as rough stones, ballast, sand and steel will be carefully piled on site. In order to avoid piling large quantities of these materials on site, it is recommended that; that the contractors place orders in portions of immediate requirements at short notices.

### 2.4.3 Construction Phase Activities

- **Proper Construction activities**
  - ✓ **Site clearing and levelling:** The commencement of construction will initially comprise site clearing and levelling. This will involve use of heavy machinery mainly bulldozers.
  - ✓ **Excavations for foundations and foundation works:** Excavations will be carried out to prepare the site for construction of perimeter wall, drainage systems and the foundations. This will involve use of heavy machinery mainly excavators.

- ✓ **Disposal of excavated top soil:** top soils at the site will be excavated and transported to a site approved by the County Government engineer.
- ✓ **Drainage system:** trenches will be excavated as per specifications provided in the designs by Synthesis Architects and approved by the authorities and to the appropriate invert levels. Part of the excavated soils will be returned to be filled and watered to level the compound.
- ✓ **Masonry, concrete work and related activities:** In general substructure construction will involve lots of masonry work and will include: stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These works are labour intensive and will be supplemented by use of specific and specialized machinery and equipment.
- ✓ **All concrete mixes: will conform** to the required standards and specifications issued by the Structural Branch of Ministry of Works.
- ✓ **Super structure construction:** The superstructure construction will include the following: *structural steel works*, the formwork and moulds. This phase will involve steel cutting, welding and erection.
- ✓ **Roofing and sheet metal works:** Roofing activities will include steel metal cutting, raising the steel rafters and structural members of the roof and fastening.
- ✓ **Electrical works:** will include installation of electrical gargets and appliances such as electrical cables, lighting, and sockets.
- ✓ **Plumbing:** will involve installation of pipe work for water supply and distribution. In addition there will be connections to the receptors of sewer lines. Plumbing activities will include metal and plastic pipes, cuttings, use of adhesives, metal grinding and wall drilling.

All construction works and activities should conform to the laid out OSH and Environmental Regulations and procedures in order to conserve the environment and minimise the risks of occupational accidents and hazards.

#### **2.4.4 Description of Operational Phase Activities**

The operational phase activities of the proposed project will include:

- **Transportation Activities**
  - ✓ Cable car operations across the channel
  - ✓ Ferry operations which shall continue integrated with the project
  - ✓ Bus Stage for public transport operators on the Island and Mainland terminus.

- ***Trading/ Business Activity***

The design of the Island (Drive) Station has provisions for Trading Stalls and recreation lounges where restaurants can be set up.

- ***General Maintenance and Servicing***

- ✓ Gondola Maintenance and Servicing
- ✓ Replacement of worn out materials, machine and equipment parts.
- ✓ Electrical gadgets and equipment,
- ✓ Water pipes and utility service lines
- ✓ Fresh painting

- ***Waste Disposal***

Disposal of solid waste through solid waste bins will be installed at specific designated locations in the project area. These bins will be emptied on a regular basis.

Disposal of liquid waste (waste water) will be done through a well-maintained disposal/sewer system.

#### **2.4.5 Description of Decommissioning Phase Activities**

During decommissioning the proponent will be required to dismantle and demolish the structure and restore the site to its original status. This is a reverse of the construction phase

- ***Demolition Works***

Upon decommissioning, the project components including buildings, pavements, drainage systems, parking areas and perimeter fence will be demolished. This will produce a lot of solid waste, which can be reused for other construction works or if not reusable, disposed of appropriately by a licensed waste disposal company.

- ***Dismantling of Equipment and Fixtures***

All equipment including electrical installations, partitions and pipe-work among others will be dismantled and removed from the site on decommissioning of the project. Priority will be given to reuse of these equipment in other projects. This will be achieved through resale of the equipment to other building owners or contractors or donation of this equipment to schools, churches and charitable institutions.

- ***Site Restoration***

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil.

- ***Solid Waste Generated***

Some solid wastes will be generated during construction of the project. These will include metal cuttings, rejected materials, surplus materials, surplus soil, excavated materials, paper bags, empty cartons, empty paint cans and solvent containers, broken glass among others. The proponent will take steps to minimize the generation of such waste and to ensure proper disposal procedures.

The proponent will be responsible for waste management within the project area and will put in place measures such as provision of waste handling facilities and ensuring prompt and regular waste disposal.

On decommissioning, large quantities of solid waste will be generated from demolition works and equipment dismantling. The proponent will provide measures for recycling, reuse or disposal of such wastes.

## 2.5 Proposed Project Cost

*Construction of the proposed Project is estimated to cost KES: 5.00 Billion*

## 2.6 Project Implementation Schedule

STEPS	YEAR	MILESTONE
1	2013	Expression of Interest to Ministry of Transport
		Concept to Kenya Ferry Services Limited
2	2014 – 2015	Feasibility Study undertaken and presented to stakeholders for approval
		Approval of project by stakeholders
3	2015 – 2016	Concession negotiations up to initialling
4	2018	Finalization of Project Agreement
		Cabinet approval for project
		Signing of Project Agreement and issuance of Commercial License
5	2019/2020	Conclusion of Agreement CPs
		Technical Tests (GI) and Studies (ESIA)
		Financial Close
		Design and Documentation
		Contracting
		Implementation of preparation works

<b>6</b>	<b>2021</b>	Site Works:– <ul style="list-style-type: none"> <li>• Construction of Stations,</li> <li>• Construction of Towers and Civil Works</li> </ul>
		Equipment fabrication/manufacture
		Equipment installation and
		Design of Operation System and Procedures
<b>7</b>	<b>2022</b>	Completion of Construction and Installation process
		Operation test period;
		Commencement of Operations

## CHAPTER 3: ENVIRONMENTAL SETTING OF THE PROJECT LOCATION

### 3.1 Location in Kenya and Basic Information

Mombasa is a City that is found on the coast of Kenya. It is located about 490 Kilometres (304 miles) South East of Nairobi in the Mombasa County. It comprises of a mainland and an island. The Central Business District (CBD) is located on the island.



*Figure 3. 1: Map of Mombasa County*

### 3.2 Physiographic and Natural Conditions

#### 3.2.1 Physical and Topographic Features

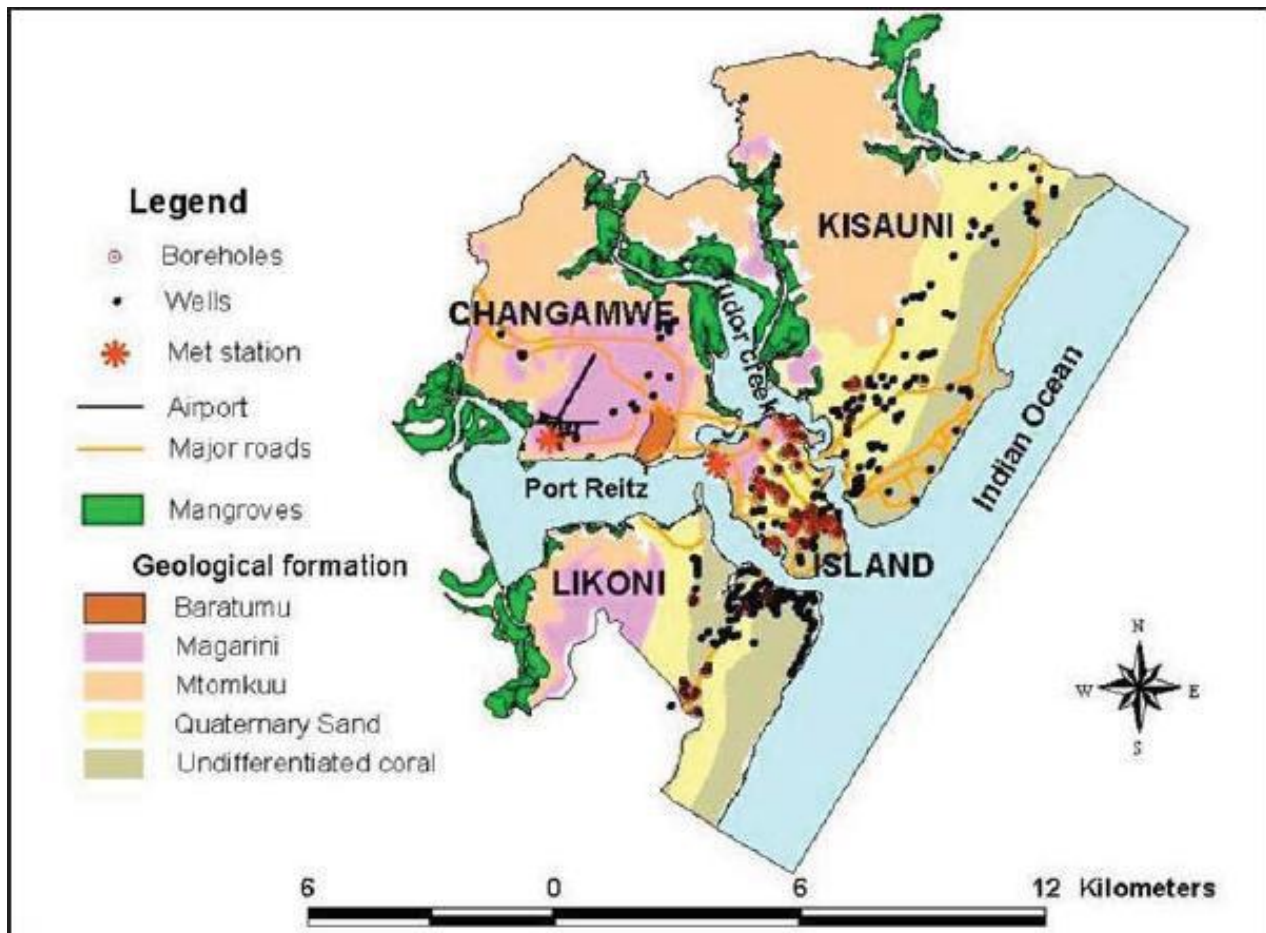
Mombasa is located between 8 – 100m above sea level on the coastal lowland. Mombasa County is characterised by a flat topography, which is common in the coastal strip (Lowlands).

The geological (physical) characteristics of Mombasa area is categorized as follows:

- i) A Coastal Plain area between Kisauni on the northern mainland and Mtongwe on the southern mainland including Mombasa Island. A coastal terrace consisting of elevated coral reef along the coast.
- ii) The western area of Mombasa is composed of a rock layer of ground shale and sand. This area is composed of materials from the tertiary system and the Mesozoic system.
- iii) Mountainous plateau made of sandstone.

The town of Mombasa is centred on Mombasa Island, but extends to the mainland. The island is separated from the mainland by two creeks, Port Reitz in the south and Tudor Creek in the north. Mtwapa creek is found to the north of Mombasa County and it marks a separation with Kilifi County.

The seabed at the Likoni channel and Kilindini area is very deep. The Kilindini Harbour is a natural harbour for the reason that the seabed is very deep and steep.



**Figure 3. 2: Geological Map of Mombasa**

(Source: Munga et.al, *Pollution and Vulnerability of Water Supply Aquifers in Mombasa Kenya*, 2004)

### 3.2.2 Climatic Conditions

Mombasa has two seasons made up of the dry season and the rainy season. The Climate is characterized by high temperatures and frequent rainfall.

Mombasa has a tropical wet and dry climate which is influenced by the Monsoon winds. Mombasa is situated at Longitude 39 degrees 40 minutes East and Latitude 4 degrees 4 minutes South. Mombasa has an ocean climate, and has two monsoon seasons, namely the South-eastern Monsoon and the North-eastern Monsoon

The months of April and May have high amounts of rainfall, while rainfall is minimal between January and February. Mombasa's average annual rainfall is 640mm.

Mombasa has only a slight seasonal temperature variation, with high temperatures ranging 29 C to 34°C on average. The average maximum temperature is 32.6 degree Celsius in March, and the average minimum temperature is 20.3 degree Celsius in August.

### 3.2.3 Wind Characteristics

The average Wind speed and direction data from 2003 to 2010 as recorded by the meteorological department of Moi International Airport in Mombasa gives a picture of the wind characteristics of Mombasa.

The average wind speed calculated from a 100-year measurement return period in Mombasa is 30.3m/sec.

The direction of the prevailing the winds was mainly from South-Southwest or South direction. The unit of the wind speed is shown by Knots with 1 Knot being equal to 0.5m/sec. The wind speed is shown as an hourly wind speed.

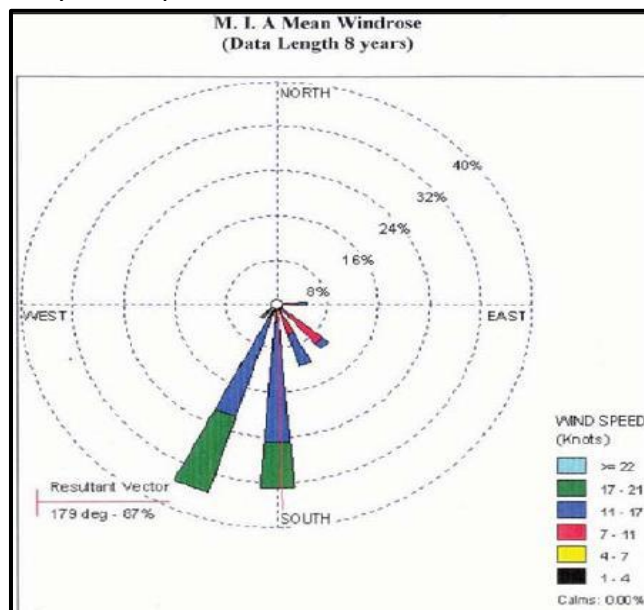


Figure 3. 3: Wind Rose (Average Wind Speed and Direction) at the Moi International Airport Station (2003-2010)  
Source: Meteorological Department of Moi International Airport



### 3.2.4 Tide

The lowest and highest tide level is -0.1m and 4.1m. The wave height is relatively small since there is a coral reef around the entrance of the harbour. The maximum speed of the tide at the entrance of the harbour is about 0.5 knots. The tide data of Kilindini Harbor is shown below

**Table 3.1: Tidal Levels at Mombasa Port**

<b>Kilindini Harbour</b> Latitude: 4° 04'' S Longitude: 39° 39'' E Height: in meters above datum	<b>HAT</b>	+4.1m
	<b>MHWS</b>	+3.5m
	<b>MSL</b>	+1.88m
	<b>CDL</b>	0
	<b>LAT</b>	-0.1m

Source: Meteorological Department of Kenya Port Authority

## 3.3 SOCIAL AND ECONOMIC SETTING

### 3.3.1 Administrative Units of Mombasa County

The County is divided into six (6) Sub-Counties (Constituencies) namely, Kisauni, Jomvu, Changamwe, Likoni, Mvita and Nyali.

Mombasa County has 30 wards.

The Likoni channel is located between Mvita and Likoni Constituencies.

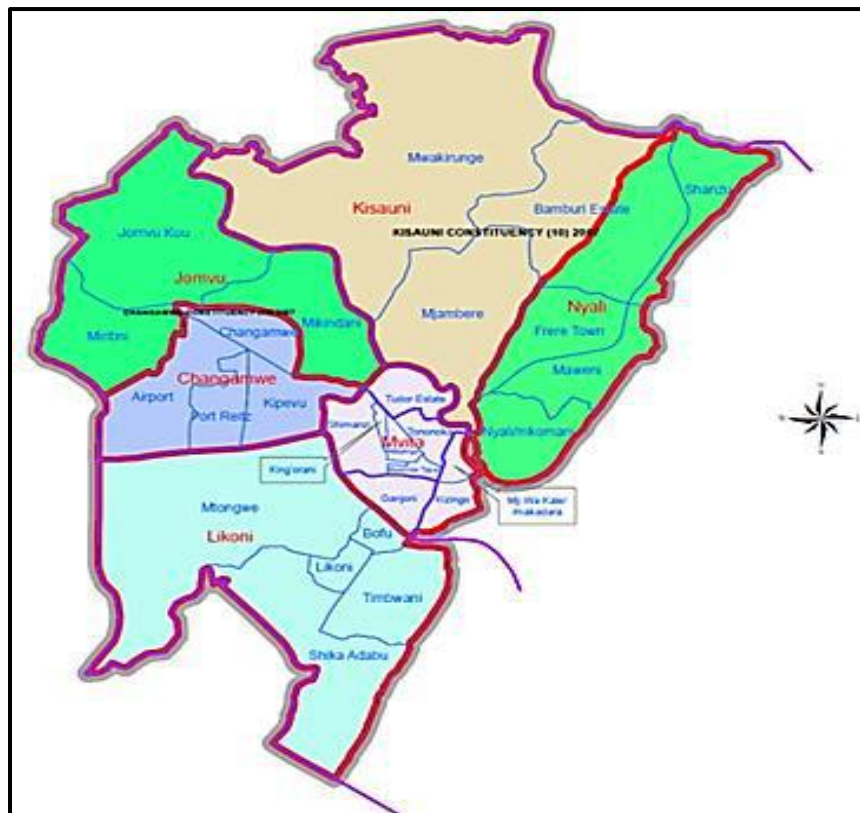


Figure 3. 4: Administrative Map of Mombasa County

### **3.3.2 Population**

Mombasa is the second largest city in Kenya. The population of Mombasa County stands 1,208,333 people, according to the 2019 Population and Housing Census. The county has a population density of 5,495 persons per square kilometre.

Mombasa has a cosmopolitan population. However, the Swahili and Mijikenda people are the majority. Other communities include the Taita, Akamba and Kikuyu as well as a significant population of Luo and Luhya people from Western Kenya. Mombasa's unique blend of Africa, India and Arabia, can be attributed to its history as a major port of trade between Europe, Asia and Africa.

The major religions practiced in the city are Islam, Christianity and Hinduism.

### **3.3.3 Economic Activity**

Tourism is the main economic activity in Mombasa and the Kenyan coast area at large. Tourism is estimated to be contributing 45% to the regional economy.

Mombasa is well known for tourism. It is a centre of coastal tourism in Kenya. Mombasa Island's main attractions are: the Old Town and Fort Jesus. The Nyali, Bamburi, and Shanzu beaches are located north of the city. The Diani and Tiwi beaches are located south of Mombasa. Several luxury hotels exist on these beaches and attract large numbers of visitors.

Mombasa is a major trade centre and home to Kenya's largest seaport, the Kilindini Harbour. The port of Mombasa is a major contributor to the economy of Mombasa and Kenya at large. Shipping and Port activities contributes about 15% to the regional economy. Many people in Mombasa are employed at the port. Others also come from different parts of the country too to work at the port.

Manufacturing and processing industries also contribute to the economy of the region. Other industries in Mombasa include: Limestone mining, cement manufacturing and Oil refinery.

### **3.3.4 Transport**

Mombasa County has a well-connected road network and significant transport infrastructure. Mombasa is the point at which the Kenya-Uganda railway, which was built by the British, begins. The City is also the terminus of the modern Standard Gauge Railway.

The Port of Mombasa is the largest sea port in East Africa. It is a naturally deep harbour and has 19 deep water berths and two oil terminals. Rail connects the port to the interior. Tourist Cruise ships also frequently dock at the port.

The Moi International Airport serves Mombasa with flights to and from different parts of the country and from different countries.

There is no bridge between Mombasa Island and the south coast, the distance is served by ferries operated by the Kenya Ferry Service at Likoni in the south coast of Mombasa. Recently, the Dongo Kundu Bypass Highway has been constructed. It connects the mainland of Mombasa County to the south coast easing the burden on the ferry services.

### **3.3.5 Land Use**

The proposed construction area of the Project for both Mombasa Island side and Likoni side are urbanized. Most of the land is used for commercial activity and residential settlement.

### **3.3.6 Cultural and Historical Heritage Setting**

Mombasa has a rich 2 000 year old record of history with a variety of cultural and historical heritage sites. One of the most renowned sites is the historic Fort Jesus. The fort has been classified as World Heritage Site by UNESCO. This 16th Century Fort was the apex of a historic struggle for control of the Kenya coast between the Portuguese army and the Shirazi Arabs. The war fought around Mombasa for hundreds of years with endless battles over this period.

The Old Town (*Mji wa Kale*) of Mombasa is embellished in Arab architecture and interlaced streets and alleys. Mombasa town has some old buildings and structures (including temples, mosques) which date back decades.

Due to its historical and strategic status as a port gateway town and trade centre, Mombasa is a melting pot of diverse peoples and cultures. The richly diverse fusion of Indian, Arabic and African in Mombasa is incredibly exhilarating and this bustling, heaving, colourful commercial and cosmopolitan port town is a stimulating, fascinating experience. Contemporary Mombasa is an astonishing city where many cultures are woven into its rich tapestry and become a part of its atmosphere.

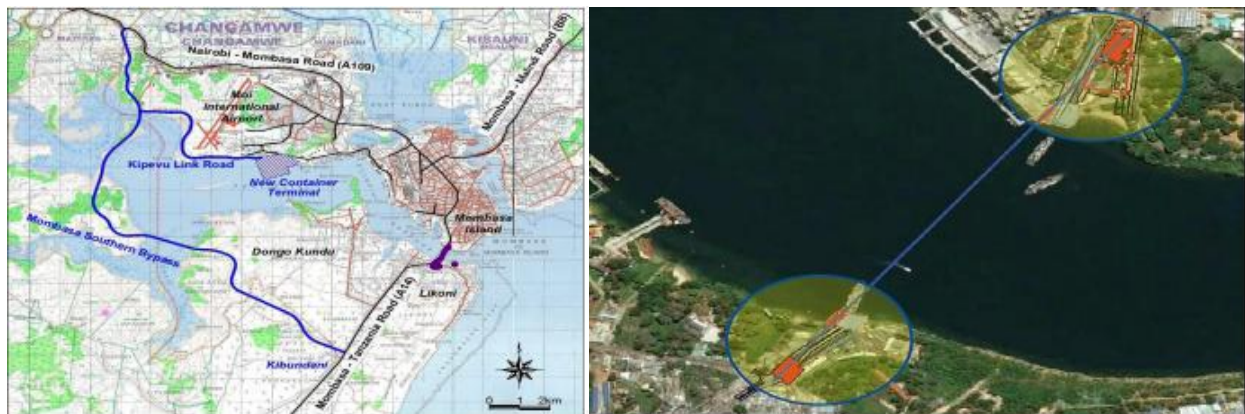
Some other important sites include: Mama Ngina Waterfront Park, and some old buildings and structures (e.g. temples, mosques).

## CHAPTER 4: BASELINE MARINE AND TERRESTRIAL BIODIVERSITY SURVEY

### 4.1 Overview

The environment around the LCE Project area (Fig. 4.1) is located within area of jurisdiction of the Port of Mombasa. The geographic position of the port area is approximately 4' 00' S, 39" 40' E. The Port of Mombasa as a facility is one the most important pieces of infrastructure and a critical transport hub for the region (so called the “gateway seaport”) for East Africa’s trading route (KPA Handbook, 2015). The environment around the LCE Project area is endowed with diverse natural marine and terrestrial resources that support different economic activities, and provide livelihoods, employment and income to its inhabitants and the national economy.

This part of the ESIA report deals with biodiversity, water and sediments quality around the LCE Project area, and aims at characterizing them and identifying the potential impact the proposed LCE project may have on the marine and terrestrial environment and how these impacts can be mitigated. It is also noted that there are cumulative impacts from other developmental initiatives. For instance, there are on-going roads up-grade around the Port which includes the Dongo-Kundu bypass, Gate City Bridge, floating bridge, and the realignment of the port exit route. This is on top of the so many KPA projects of Container terminal expansions, improving Berths, the Dongo Kundu SEZ project, amongst others.

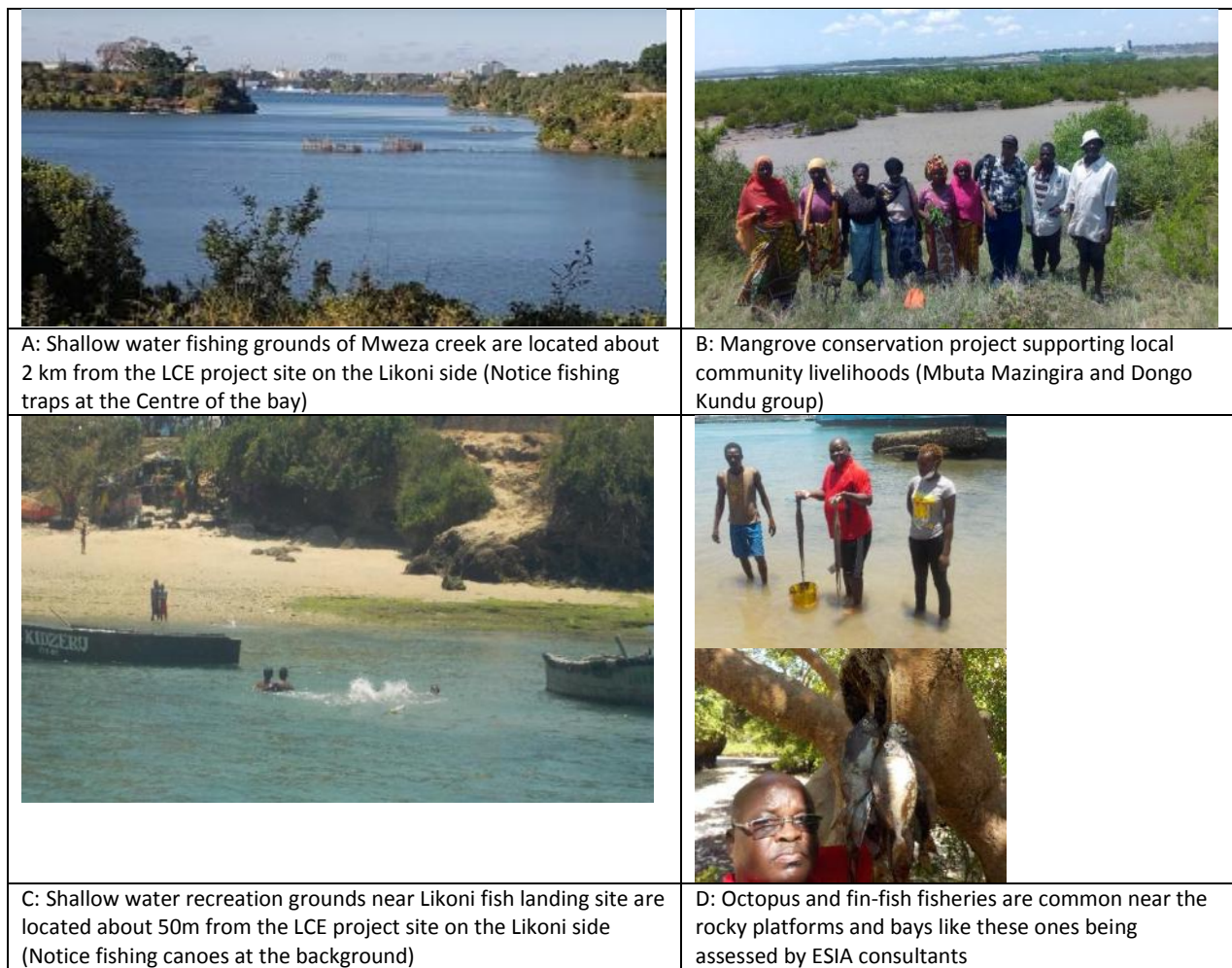


*Figure 4. 1: Collage of Base Map and Google Earth image showing location of proposed cable car crossing through Likoni channel from Mombasa Island to Likoni.*

## 4.2 Situation Analysis

### 4.2.1 Natural Resources and their uses in the project area

The main natural resources in the project area are marine and terrestrial resources (Fig 4.2) occurring in the ocean and land near the proposed LCE project areas. The ocean supports fisheries which is an important source of livelihood and income to many households. Tourism is another activity that depends on marine resources. A big population of tourists that come to Mombasa and other coastal counties visit the corals for snorkelling and diving. The natural resources base is also constituted by 3 main habitat zones, that is mangroves (which provide building materials particularly poles), sea grass beds and seaweed zones (both which are important for fisheries and faunal conservation). In between these habitat zones is a rich mix of biodiversity (fisheries, marine conservation species, and a host of macro and micro fauna in sediments, water column, and mangroves). The project area is also endowed with the natural harbour which supports port and other maritime activities and provides employment to a big population of the residents of Mombasa.



**Figure 4. 2: Plate series showing different natural resources from marine waters near the proposed LCE sites**

#### **4.2.2 Ocean Climate and Oceanographic Indicators**

The oceanographic environment around the LCE Project area is characterized by a hot tropical region where the weather is influenced by the great monsoon winds of the Indian Ocean, which also influences the climate and weather systems that are dominated by a large-scale pressure system of the western Indian Ocean and the two distinct monsoon periods. Comparatively dry weather conditions are experienced in the Project area from November/December to March, when the North-East Monsoon predominates. On the contrary, cooler and rougher conditions obtain in the Project area in the South East Monsoon (SEM) from May to October.

The key oceanographic indicators include:

##### **a) Tides**

Tides around the LCE Project area (Mombasa Port Area) are semidiurnal with a mean amplitude of 3 m, spring tide amplitude of > 4 m and neap tide amplitude of approx. 2 m. As a result, currents in reef channels and creeks are very fast and complete a full cycle in approximately 12.5 hours. The Kenya Marine and Fisheries Research Institute (KMFRI) maintains a tide gauge in Mombasa Harbour as part of the global sea level monitoring network. Annual tide tables are published by the Kenya Ports Authority and KMFRI. Sea level rise for the Western Indian Ocean, as a component of global climate changes are projected to be in the global range of 20-50 cm per 100 years.

##### **b) Currents**

Currents in the LCE project area are dominated by separate offshore and inshore processes. Offshore currents are dominated by the East African Coastal Current (EACC) formed by the northward deflection of the South Equatorial Current when it hits the African mainland in southern Tanzania and northern Mozambique. The EACC flows northwards throughout the year, accelerated during the SEM when reinforced by the prevailing winds to speeds of 0.5-0.75 m/s, and slower during the NEM when the monsoon winds blow counter to the current, at speeds of < 0.25 m/s. At times, southwards-flowing currents may be reported, though the Somali Coastal Current does not penetrate as far south as the Project area (Mombasa Port Area). Flow of inshore and fore reef waters are strongly influenced by tidal flushing patterns, and tend to flow with prevailing winds rather than the offshore EACC. At the channel entrance, maximum current speeds of approx. 1 ms<sup>-1</sup> can occur, with ebb currents tending to be slightly stronger than flood currents.

##### **c) Waves**

Wave action around the LCE Project area (Mombasa Port Area) is dependent on the direct wind stress of local winds. Wave action may also arise from swells, significant wave height, bottom friction and depth of water over the fringing reefs. Although waves in the near-shore waters of the entrance to Mombasa port are small, they are common a feature. The largest waves (2 m) occur during the South East Monsoon when the winds are strongest. Within the channel, waves

can propagate directly in as far as Fort Jesus, but to the north and south where fringing reefs occur waves first shoal and break on the reef edge and then propagate with new frequencies and amplitude, on the reef platform, beaches and on the coral-cliff banks near Fort Jesus.

#### **d) Marine habitats and Biodiversity**

Marine habitats include primarily mangrove areas listed as protected areas and found within Port Retz area. There are few seagrass beds and soft coral heads near the proposed development site of LCE. The seagrass beds and coral areas are listed as breeding and feeding areas and have different protection status (KWS institutional arrangements – controls and regulations). From the outer reef slope at 15-25 m depth, the bottom is primarily a rocky platform on which the overall reef and lagoon silt. Within LCE Project area, the substrate is predominantly made of rocky boulders, beach cast and an intertidal rocky platform below cliffs that extend up to the land above. Other marine habitat features within LCE Project area include hard-substrates, rocky substrates, and artificial man-made physical structures in Bamburi Dry Bulk Berths (next to Likoni Ferry offices on the Island side) consisting of water pylons, berths, dolphins, etc.

Marine habitats very close to the LCE Project area are in moderate to bad condition, largely due to general maritime, KFSL, and KPA operations that has seriously degraded them, and scheduled dredging and pollution from multiple sources. Further off, legal and management protection within the Mombasa Marine National Reserve and local hydrodynamic processes protect MPAs from adverse effects of dredging and pollution activities, but they are still, nonetheless, subject to natural pressures (climate change, coral bleaching, ocean acidification, ocean physical pressures, amongst others) as well as anthropogenic pressures related to land-based sources of pollution, shipping pollution, heavy resource extraction (overfishing) by fishermen and a host of cumulative impacts associated with activities occurring elsewhere.

#### **4.2.3 Potential Challenges to Sustainable Development associated with LCE project activities**

Over the recent past, the following flagged developmental issues have been cited as relevant to Mombasa County and Likoni sub-county and may constitute potential barriers to sustainable development around the LCE project areas:

- a) Destruction/degradation of coastal habitats/resources, especially around the main ocean creek of Mombasa Island – i.e., Kilindini Harbour (mangrove forest clearing; land reclamation for development; sewage and waste water discharges; dumping of solid wastes and debris; changes in longshore sediment drift);
- b) Alterations of fresh-water flow and sediment loads into the coastal zones, especially around Kilindini Harbour (resulting in increased sedimentation on Kilindini Harbour);

- c) Over-fishing and destructive fishing practices in both designated fishing areas as well as in protected areas;
- d) Increased maritime shipping traffic and consequential incidences of oil spills around the Kilindini Harbour with disastrous consequences to habitats, biodiversity, and livelihoods;
- e) Recently, the 1997-98 El-Nino event and 2016 coral bleaching in Kenya related to Global Climate Change.

## **4.3 Baseline Survey**

### **4.3.1 Methodology for Marine Baseline Assessment**

Marine baseline environmental characterization was undertaken through literature survey of different studies conducted in the project area and any identified gaps filled through a rapid field survey conducted between 5<sup>th</sup> and 12<sup>th</sup> October 2020. The rapid survey work also served as a validation exercise for the literature reviewed from studies conducted in the project area.

### **4.3.2 Specific Protocols for Marine Baseline Assessment**

In particular, the following were done during field assessments:

#### **a) LCE mangrove vegetation patch area near Mama Ngina**

A small patch of mangrove site is situated at the eastern end of proposed LCE project area and is a heavily “disturbed” mangrove forest patch (Fig 4.3). The methods and protocols for mangrove habitat sampling are adapted from Thom, B.G. (1984), Tomlinson, P.B. (1986), Green EP et al (2000).

A total of six (6) mangrove trees were encountered. A portable Global Positioning System (Garmin-eTrex SUMMIT) was used to mark these areas. The GPS readings were recorded in field data sheets. At each mangrove site, the following floral parameters were measured for all the trees: (i) number of trees, (ii) species identity, (iii) tree height and wood quality class. Similarly, for mangrove seedlings (young trees up to 1 m in height and with DBH, 2.5), the following floral parameters were measured: (vi) species identity, (vii) number of recruits, (viii) the stage of growth of recruits (= regeneration class).

#### **b) LCE mangrove fauna area near Mama Ngina**

For the mangrove faunal components, a count was made of crab holes present in five (5) pre-determined quadrats of 1m<sup>2</sup>. In addition, crab movements were observed for a period of 10 minutes during spring low tides. This was augmented with representative photos of visible crabs and other epifaunal components encountered (Fig 4.3).

#### **c) LCE submerged benthic habitats**

Sampling from submerged benthic habitats was done in four blocks (two blocks on either side). The four blocks (Fig 4.4) were named Mama Ngina (block-1), Bamburi Dry Berth (block-2), Shelly beach (block-3), and Base titanium (block-4). The main sampling protocol was rapid visual



survey (qualitative visual surveys). This was done from 30 locations (from about 2-m radius circular transect). The 30 locations were distributed as follows: 10 on the Mombasa mainland side of the channel and 20 on the Likoni side of the channel (Fig 4.5). The following habitats were assessed:

- i. Seagrass
- ii. Seaweeds
- iii. Coral and sponge forms
- iv. Sediment fauna

At each of the thirty (30) sampling locations, any unfamiliar specimen was collected carefully, retrieved into pre-labelled hard plastic collection bags, placed into an additional carrier plastic jar and labelled (double labeling to minimize human error). The samples collected were placed in a cool jar and taken to KMFRI laboratories where they were received by a special team of laboratory staff for pre-analysis processing. Sampling techniques involved beach walk, shallow water walks, or snorkelling depending on the water levels (Fig 4.6).

Additional sampling for macrofauna was taken from sediments using corers (6cm diameter). All benthic sampling methods and protocols were adapted from the CRIMP port survey protocols (Hewitt and Martin (2000)).



**Figure 4. 3: A – Mangrove tree sampling sites; and B – Sampling Methods near the proposed LCE project sites**

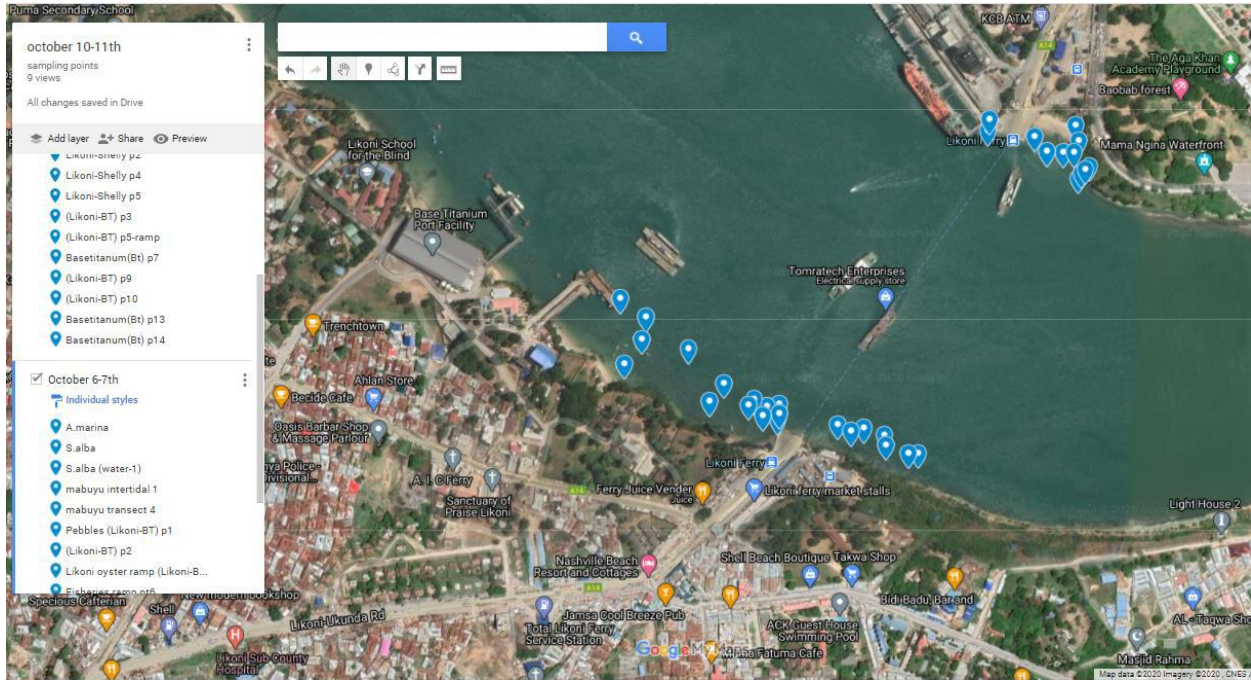


*Figure 4. 4: Photo images of the four (4) sampling blocks for the assessment of marine biodiversity near the proposed LCE project sites*

### 4.3.3 Methodology for Terrestrial Baseline Assessment

#### a) Vegetation sampling protocols

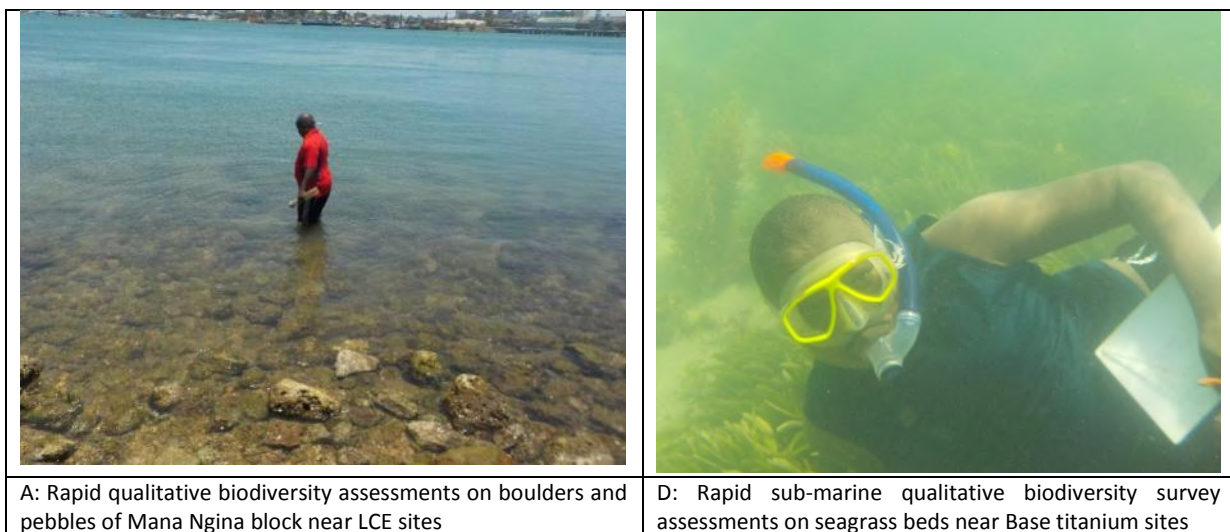
Vegetation sampling was undertaken along the fringes of Likoni creek from October 17<sup>th</sup> to October 18<sup>th</sup>, 2020, working with a plant taxonomist from NMK. This period fairly corresponds to a “dry season sampling”. A distance of 100m from the ferry ramp were the main sampling blocks and the fringes of Likoni creek were surveyed by use of qualitative visual surveys (Fig 4.7). In total, for the entire distance of the fringes of Likoni creek, fifteen (15) sampling points were identified, examined and inventory of representative flora and fauna observed and recorded. Each main vegetation type was identified to species level and photographed to provide an overview of plant diversity and composition. The main reference guide for taxonomic identification was the List of East African Plants databases while the botanical uniqueness (endemic and threatened plants) status was cross-referenced to, and confirmed from, the updated IUCN Red-List of plants (2012).



**Figure 4. 5: Submarine sampling sites (30 locations) for marine biodiversity near the proposed LCE project sites**

**b) Faunal sampling protocols**

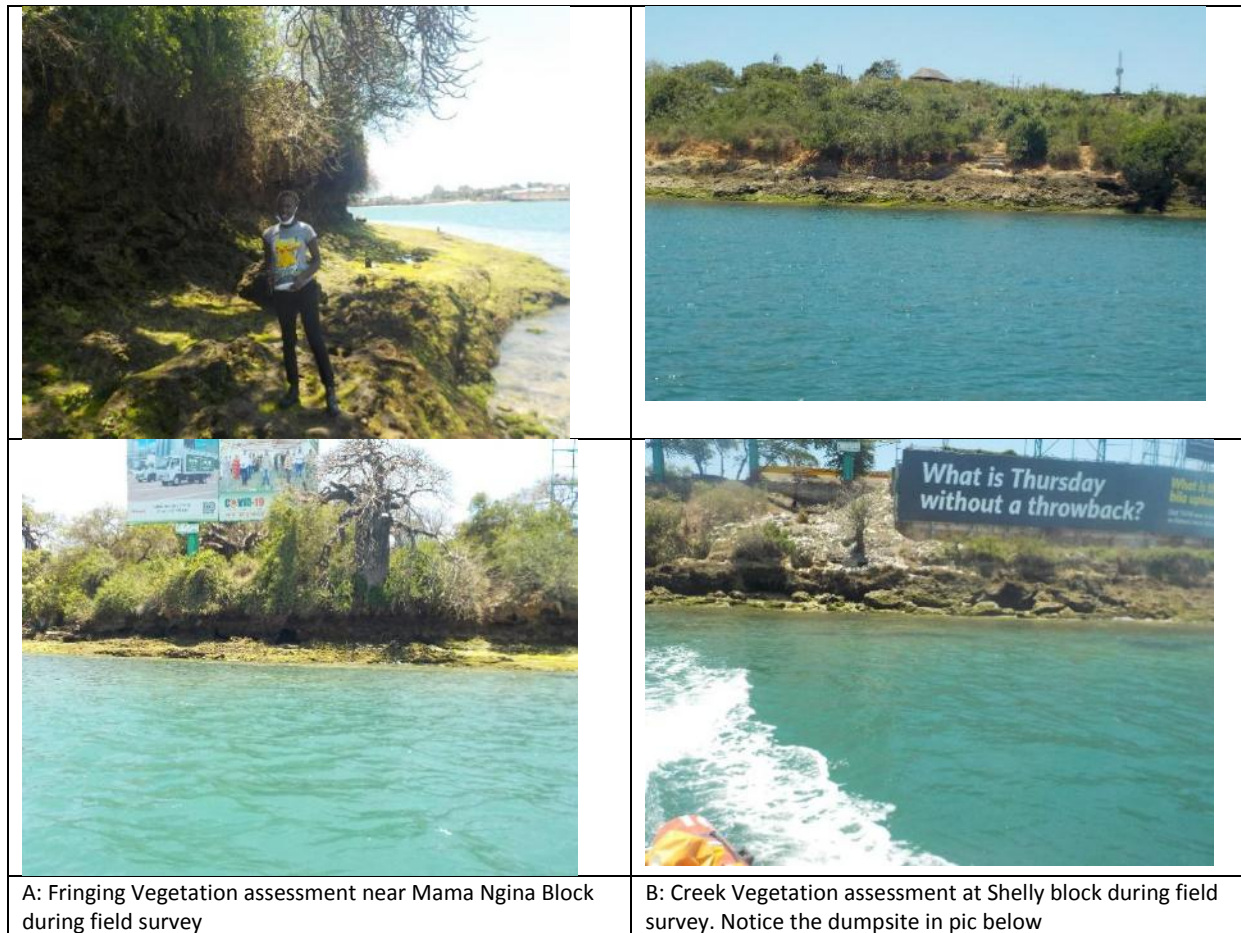
For the faunal components, rapid visual observations and photographic techniques were used. This simplified technique was informed by the fact that biodiversity hotspots for fauna are outside these areas. A simplified survey protocol was adopted [adapted from the twin methodology of Howell’s (1993) and Bowkett et al, (2007) to record presence of various wild faunal components, if encountered during the transect walk.



A: Rapid qualitative biodiversity assessments on boulders and pebbles of Mana Ngina block near LCE sites

D: Rapid sub-marine qualitative biodiversity survey assessments on seagrass beds near Base titanium sites

**Figure 4. 6: Submarine benthic sampling protocols of marine biodiversity near the proposed LCE project sites**



A: Fringing Vegetation assessment near Mama Ngina Block during field survey

B: Creek Vegetation assessment at Shelly block during field survey. Notice the dumpsite in pic below

**Figure 4. 7: Terrestrial sampling protocols of marine biodiversity near the proposed LCE project site**

## 4.4 Results:

### 4.4.1 Marine baseline flora

#### i. Mangroves

About six adult trees were encountered belonging to only two (2) species: *Sonneratia alba* (3 trees) and *Avicennia marina* (3 trees). Six (6) class one regeneration seedlings were seen belonging to *Avicennia marina* (2), *Sonneratia alba* (1), *Cerips tagal* (2) and *Rhizophora mucronate* (1). The site is currently heavily polluted with solid waste and plastic materials (from activities up around Mama Ngina recreation area).

#### ii. Seagrass

All the four blocks sampled had sea grass, but the distribution and abundance varied as depicted in Table 4.1.

**Table 4. 1: Occurrences and distribution of seagrasses at 4 sampled blocks near the proposed LCE project sites**

<i>Species</i>	<i>Mombasa Island Creek Side Blocks</i>		<i>Likoni Creek Side Blocks</i>	
	<i>Mama Ngina (1)</i>	<i>Bamburi Dry Berth (2)</i>	<i>Shelly beach (3)</i>	<i>Base titanium (4)</i>
<i>Cymodocea rotundata</i>	X	X	X	√
<i>Cymodocea serrulata</i>	√	X	√	X
<i>Halodule uninervis</i>	√	X	√	√
<i>Halodule wrightii</i>	√	X	X	X
<i>Halophila ovalis</i>	X	X	X	√
<i>Halophila stipulacea</i>	X	X	X	√
<i>Thalassia hemprichii</i>	√	√	√	√

### iii. Seaweeds

All the four areas had micro- and macrophytes (seaweeds), but the distribution and abundance varied as depicted in Table 4.2.

### iv. Coral and sponge forms

A number of free-living forms of corals, sponges and other invertebrates were also encountered. These are presented in annex 4.2 and 4.3.

**Table 4. 2: Occurrences and distribution of seaweeds<sup>1</sup> at 4 sampled sites near the proposed LCE project site**

<i>Species</i>	<i>Mombasa Island Creek Side Blocks</i>		<i>Likoni Creek Side Blocks</i>	
	<i>Mama Ngina side (1)</i>	<i>Bamburi Silos side (2)</i>	<i>Shelly beach side (3)</i>	<i>Base titanium side (4)</i>
<i>Calcerous algae</i>	√	X	X	√
<i>Caulerpa spp</i>	√	X	√	√
<i>Enteromorpha crassa</i>	√	√	√	X
<i>Gelidium</i>	√	X	√	√
<i>Gracilaia</i>	√	X	X	√
<i>Sargassum vulgare</i>	X	X	√	√
<i>Ulva</i>	X	X	√	√

Several other epiphytic seaweed communities were encrusting and/or covering seagrass, sponges, rocky substratum, amongst others, including the species *Colpomenia*, *Jania*, *Amphiroa*, *Codium*, *Padina*, and *Galidiella*. Also included in the epiphytic communities are

<sup>1</sup> Species gallery is provided in annexe-4.3

epibionts (faunal) such as hydroids, sponges, ascidians and several others not identified to genus level.

#### 4.4.2 Marine Sediment Fauna

The sediment macrobenthic community is represented by about 20 different taxa (Figure 4.8). In terms of dominance, 80% benthos were accounted for by representatives from 5 taxa: oligochaeta, polychaeta, nematoda (Figure 4.8).

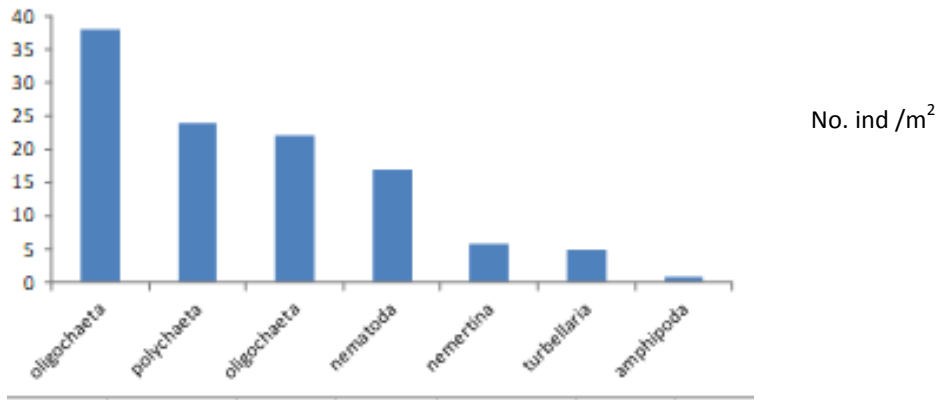


Figure 4. 8: The sediment benthos from sub-tidal flats of Likoni Creek near LCE sampled sites (October 2020)

#### 4.4.3 Mangrove Benthos

From the sole mangrove block, ground microbenthic burrows per meter square averaged at 11, with a maximum of 16 and a minimum of 3 burrows/meter square (Table 4.3). The dominant mangrove species were *Sesormia* and *Uca* species.

Table 4. 3: Mangrove benthos (based on 8 quadrats observations in October 2020 (Data Gwada 2020).

Animal burrows in 1 x 1m plots		Species and abundance values	
Variable	Value	Species	Cumulative (8 quadrats)
Max	16	<i>Sesormia</i>	45
Min	3	<i>Uca</i> spp-1	21
Avg	10.9	<i>Uca</i> spp-2	8

#### 4.4.4 Terrestrial vegetation

From the vegetation sampled and analyzed (Fig 4.7), a total of about 24 different plant species (Table 4.4) are reported as associated with areas earmarked for LCE project on either side of Likoni Creek, the main highlights were:

- (i) There was none observed from the Bamburi Dry Berth block;
- (ii) Shelly beach block had the highest vegetation types, followed by Base Titanium block, while Mama Ngina block had the least types;

- (iii) The plant species encountered in the other three (3) blocks are typical of the relics of species types known from Coastal Forest Ecosystem;
- (iv) From the vegetation, only one (1) plant species was confirmed invasive species, that is a couple of bush heads of *Lantana camara* from both Shelly beach block and Base titanium block;
- (v) There were NO encounters of endangered or near threatened plant species as listed under IUCN classification criteria.

**4.4.5 Terrestrial Fauna**

- i. There were NO encounters of endangered or near threatened terrestrial faunal species as listed under IUCN classification criteria;
- ii. A number of opportunistic observations as depicted in Figure 4.9.






*Figure 4. 9: Main types of terrestrial vegetation near the proposed LCE project site*

**Table 4. 4: The main vegetation types observed during LCE qualitative surveys (After Gwada and Saeed Chidzambwa (NMK) © 2020)**

Local Name (if known)	CFCU Code	Family	Scientific Name	Mombasa Island Creek Side Blocks		Likoni Creek Side Blocks	
				Mama Ngina (1)	Bamburi Dry Berth (2)	Shelly beach (3)	Base titanium (4)
Mnyombo	205	Anacardiaceae	<i>Lannea sp-1</i>	√			
Mnyumbu	205	Anacardiaceae	<i>Lannea sp-1</i>			√	
Mkode	230	Apocynaceae	<i>Thevetia peruciana</i>	√		√	√
Mnyala	112	Aroliaceae	<i>Cussonita sulcar</i>			√	
Mwinika Ini	293	Asparagaceae	<i>Asparagus rasemosa</i>			√	
Mubuyu	131	Bombacaceae	<i>Adansonia digitata</i>	√		√	√
Mbambakofi	146	Caesalpiniaceae	<i>Afzelia quanzensis</i>	√		√	
Mvinde	164	Casuarinaceae	<i>Cassuarina angustifolia</i>			√	√
	121	Combretaceae	<i>Terminalia oivinni</i>	√			
	136	Euphorbiaceae	<i>Pycnocomma littoralis</i>			√	
	136	Euphorbiaceae	<i>Acacypha glandylosa</i>				√
Mtserere	264	Labiatae	<i>Hoslundia oppositifolia</i>				√
	132	Malvaceae	<i>Hibiscus sp</i>	√		√	
Mwarubaini	197	Meliaceae	<i>Azadraeta indica</i>			√	√
Mkoma	314	Palmae	<i>Hyphaene combresa</i>	√		√	√
Mnazi	314	Palmae	<i>Cocos nusphera</i>	√		√	√
Mkunazi	190	Rhamnaceae	<i>Ziziphus mauritania</i>			√	
Mkoko	122	Rhizophoraceae	<i>Rhizophora mucronata</i>				√
Mvunza Jembe	232	Rubiaceae	<i>Boreria pedisellata</i>			√	
Mkungu wa Pwani	232	Rubiaceae	<i>Guetiada speciosa</i>	√			√
Mkoko Bara	222	Sapotaceae	<i>Sideroxyton imermee</i>				√
Chidori	195	Simaroubaceae	<i>Harrisoni abyssinika</i>			√	
	263	Verbenaceae	<i>Lantana camara</i>			√	√



	
<p>Kenya Ferry Services for providing necessary coxswain and safety at sea equipment during the survey and guiding on dangerous sites</p>	<p>KFS Security Services for providing necessary security in the creek and bay areas which have street families and homeless people</p>
	
<p>KMFRI team of scientists for laboratory services in the marine taxonomic analysis and identifications</p>	<p>NMK Lead taxonomist (Saeed Chidzunga) for assistance with field work and cross-referencing plant specimen to CFCU referencing databases for taxonomic identification</p>

**Figure 4. 10: Acknowledgements**

# CHAPTER 5: POLICY, LEGISLATIVE AND ADMINISTRATIVE FRAMEWORK

## 5.1 Overview

This chapter defines the policy, legislative and institutional frameworks which will govern development, implementation and operation of the proposed cable and rope system across the Likoni Channel(Likoni Cable Express Project)

By design, the proposed project cuts across many sectors of the economy, some of which enjoy protection under diverse local, national, regional and global policy/ legal tools. Oligerm Holdings Ltd Consultants have analysed the requirements of such tools as part of the ESIA process to ensure that; the proposed project output attains the goals of social acceptability, economic viability and technical sustainability in line with internationally accepted standards for good practice.

## 5.2 The Policy Framework

### Policy Thrust:

Since independence, successive Kenya governments have pursued the policy of sustainable development. This was later on captured and elaborated in the Environmental Management and Coordination Act (Cap 387) and later on accorded constitutional weight in the National Constitution of 2010 which declared a safe environment to be a universal right for every Kenyan.

**Four policy frameworks** are considered relevant to development of the proposed Project namely:-

- a) National Policy Framework for Development Planning
- b) National Policy Frameworks for Transport including the roads sub sector
- c) National Policy Framework for Environmental Management
- d) Policy Frameworks for the Mombasa County Government

### 5.2.1 Policy Framework for Development Planning

**Sessional Paper Number 10 of 2012** on Kenya Vision 2030; is the National Economic Blueprint Policy that entrenches Kenya Vision 2030 as the long-term development strategy for Kenya towards achieving a *“globally competitive and prosperous country with a high quality of life by 2030.”* Specifically, Vision 2030 aims at transforming Kenya into *“a newly industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment* as anticipated in the Millennium Development Goals which is anchored on 3 pillars:

- ❖ **The Economic Pillar** aims to achieve a sustained annual growth rate of 10% by 2030,
- ❖ **The Social Pillar** seeks to create a just, cohesive and equitable social development, and;
- ❖ **The Political Pillar** envisions a democratic system that is issue based, people centred, results oriented and is accountable to the public.

**The Kenya Vision 2030** is being implemented in five year successive Medium Term Plans (MTP).

- The first plan covered the period 2008-2012. The Medium Term Plan (MTP 2013-17) is the second in a series of successive 5-year plans.
- The second MTP 2013-2017 draws on lessons learnt in implementing the first MTP. It seeks to implement the flagship projects identified under Vision 2030 over the five year period together with other incomplete flagship and projects and programs in the previous Medium Term Plan.

It will also take due cognizance of the devolved structure of government following promulgation of the Constitution of Kenya 2010 and recent discovery of oil and mineral resources in the country.

***Relevance of proposed Project to the Economic Pillar:***

- The project promotes investment in the six priority sectors of tourism; agriculture; wholesale and retail trade; manufacturing; I.T.-enabled services (previously known as business process outsourcing); and financial services identified under the Economic Pillar 2;
- Vision 2030 seeks to achieve and sustain annual GDP growth rate at 10% up to 2030 and thereby generating resources required to address targets set out in the Sustainable Development Goals.  
This creates the urgent need of investing in both Flagship Projects and requisite infrastructure.

Against this backdrop, the proposed provision of a cable and rope system linking Mombasa Island to Mombasa Mainland south as currently conceived is fully harmonized with the vision as it will touch and underpin all six areas identified under the Economic Pillar.

***Relevance to the Social Pillar:***

- With regard to environmental quality, Vision 2030 anticipates a Kenyan nation characterized by a clean, secure and sustainable environment by 2030 and sets the goals for 2012 and which are yet to be achieved as:
  - (i) to increase forest cover from less than 3% at present to 4% ,and,
  - (ii) to lessen by half all environment-related diseases.
- Specific strategies will involve promoting environmental conservation in order to provide better support to the economic pillar flagship projects and for the purposes of achieving the Sustainable Development Goals (SDGs); improving pollution and waste management through the design and application of economic incentives; and the commissioning of public-private partnerships (PPPs) for improved efficiency in water and sanitation delivery.
- Kenya will also enhance disaster preparedness in all disaster-prone areas and improve the capacity for adaptation to global climate change.
- In addition, the country will harmonize environment-related laws for better environmental planning, management and governance.

***The proposed Project as an Enabler to Vision 2030:***

- Realization of the objectives and targets of the three pillars hinges on successful implementation of the enablers or foundations namely;-
  - Infrastructure,

- ICT, Science, Technology and Innovation,
- Land Reforms, Public Sector Reforms,
- Labour & Employment,
- Ending Drought Emergencies,
- National values and Ethics,
- Security, Peace Building and Conflict Resolution.

### **5.2.2 Policy Framework for Transport Including the Roads Sub-sector**

**Sessional Paper No. 5 of 2006** on the Development and Management of the road sub-sector for sustainable economic growth provided the legal and institutional framework for the management of roads.

The Sessional Paper which was approved by Parliament on October 19, 2006, also spelt out policies to be pursued by the Government in the medium term for sustained growth.

The goal of the policies outlined in this Sessional Paper is *to attain an efficient road sector that supports and promotes economic growth through the cost-effective provision and maintenance of infrastructure that is necessary for safe and reliable road transport.*

The key objectives of the policies are: -

- To reduce transport costs and travel time by improving the condition of roads, including reducing congestion on urban roads by increasing capacity.
- To increase accessibility
- To optimise use of available resources
- To increase the resources available for investment in the road sector
- To enhance preservation of existing road assets
- To create a conducive environment for increased private public partnership
- To enhance road safety and cater adequately to the needs of Non-Motorized Traffic (NMT)
- To enhance ownership through stakeholder's participation in the road sector
- To achieve an optimal institutional framework for effective implementation

#### ***The Road Sector Investment Programme-RSIP (2010-2024):***

The RSIP outlines the strategies, programmes and projects for the development of Kenya's road infrastructure in the short, medium and long-term to enable achievement of the Kenya Vision 2030.

In order to exploit the growth potential from tourism, agriculture, manufacturing, wholesale and retail trade, business process outsourcing and financial services, it is necessary to improve and develop roads.

The RSIP will enable the Government to pursue its policy as outlined in the Sessional Paper No. 5 of 2006 on the Development and Management of the Road Sub-Sector for Sustainable Economic Growth.

The policy will guide the Road sub-sector in ensuring that environment, gender issues, the needs of non- motorized transport, and the requirements of the physically challenged are among the core considerations in roads matters.

The main purpose of this RSIP is *“to provide good roads for a globally competitive and prosperous Kenya”*.

Its specific objective is *to detail the country’s road network infrastructure development and maintenance needs for the medium and the long term in order to facilitate guided, secure, aggressive, timely and quality investment for maximum benefits to the overall economy.*

The RSIP includes: -

- (i) An outline 15-year investment plan; and
- (ii) A detailed 5-year implementation programme.

The RSIP covers all road works from construction of new roads to rehabilitation and maintenance utilizing all resources that are expected to be made available.

This Programme outlines prioritized road sub-sector investments and associated budgetary requirements designed to modernize our roads network in line with Kenya Vision 2030.

To achieve this will require the country to invest upwards of Seven (7) Trillion Kenya Shillings on our roads in the plan period. Implementation of the RSIP promises the enhanced mobility and connectivity necessary to accelerate the transformation of Kenya into a globally competitive economy.

***Sessional Paper No. 2 of 2012 on the Integrated National Transport Policy:***

Substantial progress has been made in roads following the reforms informed by the Sessional Paper No. 5 of 2006.

Prior to the reforms of 2006 in the roads sub-sector, the uncertainties, duplication of roles and inconsistency in the road asset management system largely contributed to poor state of roads in the country.

The reforms under the Sessional Paper No 5 of 2006 realized the four basic building blocks necessary for effective roads management; i.e. Ownership, Clarified Responsibility, Stable Financing and Commercialized Management.

In May 2009, the Integrated National Transport Policy (INTP) was developed to clarify the roles of the various players in the delivery and management of transport infrastructure and services.

The INTP seeks to address the challenges in the transport sector through integration of transport infrastructure and operations as well as responding to market needs of transport. In a bid to plan future road investments, the Ministry of Roads developed a Road Sub-Sector Investment Programme (RSIP) 2010 to 2024 which outlines the strategies, programmes and projects for the development of Kenya’s road infrastructure in the short, medium and long term.

The state department responsible for roads shall implement and periodically update the RSIP for national trunk roads and county roads to ensure prioritization for existing and future road network.

Planning of maintenance Works will be systematic and in accordance with the Road Sector Investment Programme (RSIP) for the period 2010 to 2024 published in May 2011.

### **5.2.3 Policy Frameworks for Environment and Development**

#### ***Sessional Paper No 1 of 1996 on Environment and Development:***

Sessional Paper No 1 of 1996 is the official statement on national policy on environment and was released in 1996 following recommendations of the National Environment Action Plan (NEAP) of 1994.

The NEAP process had been launched earlier in 1992 following the Country's participation in the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro during which Kenya alongside other nations became a signatory to Agenda 21 which called on all nations to pay closer attention to environmental management at national level.

Through Sessional Paper No 1 of 1996, the Kenya Government guarantees every citizen the inalienable right to a clean and healthy environment and commits to pursue a policy strategy of integrating environmental sensitivity into national development planning process and sets broad policy objectives as follows:

- a) Optimal use of natural land and water resources in improving the quality of human environment;
  - b) Sustainable use of natural resources to meet the needs of the present generations while preserving their ability to meet the needs of future generations;
  - c) Integration of environmental conservation and economic activities into the process of sustainable development;
  - d) Meeting of national goals and international obligations by conserving bio-diversity arresting desertification, mitigating effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.
  - e) Among other provisions, Sessional Paper No. 1 of 1996 also sets out sectorial priorities for environmental sustainability which in most cases have been operationalized through formulation of guidelines for quality and environmental management in respective sectors.
  - f) The Environment Management and Coordination Act (EMCA, Cap 387) has since also been enacted to secure implementation of the national policy on environment.
- ✓ Execution of an ESIA Study for the proposed project is in line with EMCA Cap 387 and Legal Notice No. 101 of Environmental (Impact Assessment and Audit )Regulations of June 2003 will secure harmony with the aspirations of the National Policy on Environment and Development.

#### **5.2.4 Policy Frameworks for Mombasa County Government**

##### ***The Mombasa County Integrated Development Plan (2013-2017):***

- ✓ The County Government of Mombasa has already developed a County Integrated development plan which is modelled along the Vision 2030 format and cascades down the various pillars to relevant issues within the County.
- ✓ The Strategy paper outlines the National Status and aspirations for each pillar, to provide a background to the County situation analysis and Strategy. On infrastructure, the vision is “to provide cost-effective world -class infrastructure facilities and services in support of Vision 2030”.
- ✓ Poor infrastructure has been identified as a major constraint to doing business and,
- ✓ It’s repeatedly cited as a necessity in improving the livelihoods by people living farming and pastoralist areas.

**The CIDP`s (2013-2017)** operating Vision is to make Mombasa County a vibrant modern regional and commercial hub with a high standard of living for its residents.

- ✓ This vision appreciates that Infrastructure is a basic pillar for global competitiveness and a foundational enabler towards the county`s vision.
- ✓ Improving transport infrastructure in the county is primarily aimed at reducing traffic congestion within the CBD and this will eventually be achieved by offering various planned alternatives including;
  - Water transport is likely to contribute to a reduction of transport congestion in Mombasa if it is made attractive.
  - If use of cars in Mombasa is discouraged at the same time increasing parking fee.
  - Construction of commuter railway from west mainland to the island, from CBD to Nyali and on to the Likoni ferry.
  - Construction of a second Nyali bridge from Tudor area to Mishomoroni
  - Construction of the Dongo-kundu bypass linking Port Reitz to Mainland South.
  - Improvement of ferry services at Likoni and Mtongwe with new vessels and reconstructed approach roads.
  - Construction of a marshalling yard to take care of heavy commercial vehicles.
  - Construction of a bus terminal for public transport.
- ✓ Essentially, the development of the proposed project is in line with stated strategies for economic transformation in the County.
- ✓ The proposed project enjoys overwhelming support within the County Government leadership

### **5.3 World Bank’s Safeguard Policies**

The World Bank is not involved in any way in the development of the proposed project.

However, the Bank is an international pace-setter in securing sustainable development in which case, the Safeguard Polices find direct application in any project pursuing sustainability.

As such, this ESIA Study Report has been formulated to address and cater for both Kenyan and World Bank requirements for impact assessment.

The World Bank’s safeguard policies are designed to ensure that projects proposed for Bank financing are environmentally and socially sustainable, and thus improve decision-making.

An analysis of possible triggers of the WB SGPs by the proposed project (Table 4.3) indicates that the project is likely to trigger 1 out of 10 WB safeguards which are briefly highlighted in sections below.

For a full description of all WB safeguard policies, the reader is referred to [www.worldbank.org](http://www.worldbank.org).

**Table 5. 1: Analysis of Potential Triggers to World Bank Safeguard Policies**

WORLD BANK SAFEGUARD POLICY		TRIGGERS	TRIGGER MECHANISM
No.	Description		
1	Environmental Assessment (OP4.01)	<i>Triggered</i>	Project is category A and must undergo mandatory Environmental Assessment in line with OP4.01
2	Natural Habitats (OP 4.04)	<i>Not Triggered</i>	Project does not passes through any natural vegetation belts or along riparian areas
3	Forestry (OP 4.36)	<i>Not triggered</i>	Project does not traverse protected forests
4	Pest Management (OP 4.09)	<i>Not triggererd</i>	Project has no known interaction with this trigger
5	Physical Cultural Property (OP 4.11)	<i>Not triggered</i>	Project has no known interaction with this trigger
6	Indigenous Peoples (OP4.10)	<i>Not triggered</i>	Project has no known interaction with this trigger
7	Involuntary Resettlement (OP 4.12)	<i>Not triggered</i>	Project has no known interaction with this trigger
8	Safety of Dams (OP 4.38)	<i>Not triggered</i>	Project will not involve construction of dams
9	Projects on International Waters (OP 7.50)	<i>Not triggered</i>	No project activities are planned for in International Waters
10	Projects in Disputed Territories (OP 7.60)	<i>Not triggered</i>	Likoni Cable Car Project does not traverse disputed territories
	<b>Total triggers</b>	<b>1</b>	

**Environmental Assessment (OP 4.01):**

OP 4.01 requires Environmental Assessment (EA) for projects proposed for Bank financing to ensure that they are environmentally sound and sustainable, and as a basis for decision making.

Under OP 4.01 projects are screened and assigned either of four categories each of which requires different levels of environmental assessment as follows:-

- a) **Category A:** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented.



These impacts may affect an area broader than the sites or facilities subject to physical works.

- b) **Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.
  - c) **Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.
  - d) **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary in subprojects that may result in adverse environmental impacts.
- ✓ The proposed construction of the proposed project has been assigned Environmental Category 'B' and hence requiring environmental assessment.

From experience, subjecting of proposed projects to environmental and social impact assessment as stipulated under EMCA, Cap 387 and its tools simultaneously resolves requirements of OP 4.01 and the same will be achieved in terms of the project under review.

OP 4.01 also requires full disclosure of Projects which, in the case of the proposed project has been partly achieved through Stakeholder Engagement as reported in **Chapter Seven** below while more disclosure will take place during the Public Review Period stipulated for ESIA Study Reports.

During this process, the ESIA Study Report will be made publicly available to project-affected groups within the entire project location at places to be specified by NEMA following which, their comments will be incorporated into the final ESIA Study Report and will also influence design of the project.

#### ***OP 4.12 on Involuntary Resettlement:***

OP 4.12 requires that a Resettlement Action Plan (RAP) be prepared for all projects that anticipate displacement of both settlements and livelihoods.

The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.

**However, although; there** are numerous small businesses (mainly kiosks and *matatus* on both Mombasa Island and Mombasa mainland sides-Likoni side); it is further noted that; the proposed project site **does not include** the areas currently occupied by these businesses.

The proposed project land is owned by Kenya Ferry Services Limited.

**During construction** phase, the project site will be cleared to create space for construction works and other related activities.

This process will thus not displace people from livelihoods and property in full trigger of OP 4.12 and will not require a **Resettlement Action Plan** to set out how to relocate the businesses and their owners.

***OP 4.04 on Natural Habitats:***

This Policy seeks to ensure that World Bank-supported infrastructure and other development projects consider the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society.

The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present).

Specifically, the policy prohibits Bank support for projects which would lead to the significant loss or degradation of any Critical Natural Habitats, whose definition includes those natural habitats which are legally protected, officially proposed for protection, or unprotected but of known high conservation value.

- ✓ The proposed project does not traverse protected areas nor does it pass through natural disturbed habitats along riparian areas whose full biodiversity status is not fully assessed for conservation ranking.
- ✓ Although, given that the conservation status for individual species as required of by Legal Notice 160 of Cap 387 is yet to take place, no pre-cautionary principle has been invoked in this Study and therefore OP 4.04 is not triggered.
- ✓ A full fauna and flora mapping of the Drive and Return Terminal pillars of the proposed project has been conducted as reported in **Chapter 4 above**.

***OP 4.10 on Indigenous People:***

Communities fitting the description of Indigenous Peoples as defined in OP 4.10 have not been encountered within the proposed project location, more so in spite of claims of occurrence of such people in Mombasa County.

***OP 4.11 on Physical Cultural Property:***

This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.

Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water.

Their cultural interest may be at the local, provincial or national level, or within the international community.

- ✓ The entire inland coastline of Mombasa along the three creeks of Port Reitz (including Mweza and Mbaraki Creeks), Tudor and Mtwapa are of immense historic value on account of ancient civilizations.

- ✓ Activities in construction of the proposed project will remain attuned to requirements of Cap 260 of the laws of Kenya especially with regard to chance finds and Cultural Impact Assessment.

### **5.3.1 Harmonization of WB and GOK requirements for social and environmental sustainability:**

Experience has shown that both OP 4.10 of the World Bank and EMCA (Cap 387) are generally aligned in principle and objective in that:-

- Both require Environmental Assessment before project implementation leading to development of comprehensive Environmental and Social Management plans to guide resolution of social and environmental impacts as anticipated.
- Both require public disclosure of ESIA Study Report and stakeholder consultation during preparation,
- While OP 4.01 of World Bank stipulates different scales of ESIA Study Report for different category of projects, EMCA requires ESIA Study Report for all sizes of projects, which are required to be scoped as relevant
- Where EMCA requires consultation of Lead Agencies comprising of relevant sectors with legal mandate under Government of Kenya laws, the WB has equivalent safeguards for specific interests.
- The Bank requires that stakeholder consultations be undertaken during planning, implementation and operation phases of the project which is equivalent to the statutory annual environmental audits at the operation phase of projects in Kenya.
- The understanding of this ESIA Study is that, pursuit of an in-depth Study process as stipulated by EMCA (Cap 387) is adequate to address all World Bank requirements for environmental and social assessment.

## **5.4 Legal Regulatory Frameworks**

### **5.4.1 Constitutional Provisions**

Kenya now has a new Supreme law in form of the National Constitution which was promulgated on the 27th August, 2010 and which takes supremacy over all aspects of life and activity in the New Republic.

- ✓ **Section 42** of the Constitution guarantees the right to a clean and healthy environment for all citizens through a raft of measures while Section 69 (1)-f requires the State to Establish systems of environmental impact assessment, environmental audit and monitoring of the environment.
- ✓ In **Sections 69 and 70**, the Constitution has identified National Obligations in respect of the environment and Enforcement of Environmental Rights respectively as follows:-

**Section 69 (1): The State shall—**

*(a) ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;*

- (b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;*
  - (c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;*
  - (d) encourage public participation in the management, protection and conservation of the environment;*
  - (e) protect genetic resources and biological diversity;*
  - (f) establish systems of environmental impact assessment, environmental audit and monitoring of the environment;*
  - (g) eliminate processes and activities that are likely to endanger the environment; and*
  - (h) 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.*

➤ **Section 70** provides for enforcement of environmental rights thus:-

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

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

*(a) to prevent, stop or discontinue any act or omission that is harmful to the environment;*

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

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

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

- ✓ Essentially, the New Constitution has embraced and provided further anchorage to the spirit and letter of Cap 387 whose requirements for environmental protection and management have largely informed Sections 69 through to 71 of the Document.

➤ In **Section 72** however, the constitution allows for enactment of laws towards enforcement of any new provisions of the Supreme Law.

#### **5.4.2 Requirements of Reigning Environmental Legislation in Kenya**

The framework law on environment, the Environmental Management and Coordination Act (Cap 387), was amended in May 2015 and took effect on 17 June 2015.

The Act makes diverse provisions towards securing sustainable environmental management as follows:-

##### ***(i) EMCA requires EIA for all new projects***

- **Section 58** requires that an Environmental Impact Assessment (EIA) study precede all development activities proposed to be implemented in Kenya. The Act further requires that EIA studies so designed, be executed in accordance with the Guidelines for Conduct of EIAs and Environmental Audits (Kenya Gazette Supplement No. 56 of 13th June 2003) as published by the National Environmental Management Authority (NEMA).
- **The Second Schedule** of EMCA (Cap 387) specifies projects that require to be subjected to EIA studies. Under this schedule, there is no minimum size threshold below which an EIA is not necessary.
- Indeed, an appraisal of the proposed project triggers requirements for an EIA under this Second Schedule.
- **Replaced Second Schedule** (Legal Notice No.150 dated 19th August, 2016); specifies that: Item (4) Transport and related infrastructure projects such as (g) Metro transit facilities are “High Risk Projects”
- The ESIA Report has thus been prepared in compliance with the above requirements.

##### ***(ii) EMCA provides for gazettelement of Environmental Regulations:***

Under EMCA (Cap 387), NEMA has gazetted legal tools that govern conduct of EIAs and general environmental protection. The proposed project has been screened against these tools with results that all nine tools will be triggered.

Detailed analysis of the trigger mechanism and modalities for mitigation are provided in **Chapter 8**.

Specifications of these guidelines would require to be captured in the Contracts for Construction to ensure that contractors are legally bound to undertake mitigation alongside general construction work.

**Table 5. 2: Analysis of the Project triggers to EMCA (Cap 387) and its tools**

<b>REGULATION</b>	<b>FOCUS</b>	<b>STATUS</b>
Legal Notice 101 of June 2003 – Environmental (Impact Assessment and Audit) Regulations, 2003	This is the tool that gives legal foundation to conduct of ESIA Studies in Kenya.	<i>Triggered</i>
Legal Notice 160 of 1st Dec 2006- Environmental Management and Co-ordination Act (Conservation of Biological Diversity) Regulations 2006	This legislation requires full measures be taken to prevent introduction of alien/ invasive species of flora and fauna and is important because of the Prosopis menace in the coast.	<i>Triggered</i>
Legal Notice 19 (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009	Regulation 17 requires special measures to be taken to prevent siltation of the seashore.	<i>Triggered</i>
Legal Notice 61 of 22nd May 2009- Environmental Management and Co-ordination Act (Noise, and Excessive Vibration Pollution) (Control) Regulations, 2009	Sets standards for noise levels	<i>Triggered</i>
Legal Notice 120 of 29th Sept 2006- Environmental Management and Co-ordination Act (Water Quality Standards) Regulations 2006	Regulation 24 prohibits any kind of pollution of water meant for fisheries, recreation or any other use and sets quality standards for diverse waters.	<i>Triggered</i>
Legal Notice 121 of 29th Sept 2006- Environmental Management and Co-ordination Act (Waste Management) Regulations 2006	Sets standards for waste management	<i>Triggered</i>
Prevention of Pollution in Coastal Zone and other segments of the environment regulations, 2003	Regulation 3 prohibits discharge any hazardous substance, chemical, oil or oily mixture into the territorial waters of Kenya or any segment of the environment.	<i>Triggered</i>
National Sand Harvesting Guidelines, 2007	Sets guidelines for sustainable sand harvesting in Kenya	<i>Triggered</i>
Legal Notice 73 of 31st May 2007 - Environmental Management and Co-ordination Act (Controlled Substances) Regulations	Sets guidelines on handling and use of controlled substances. There will be need to screen the location for controlled substances	<i>Triggered</i>
Legal Notice No.34 Environmental Management and Co-ordination (Air Quality) Regulations, 2014	Sets standards for Air Quality	<i>Triggered</i>

### ***(iii) EMCA requires inter-Sectorial Coordination in project development***

In recognition that EMCA(Cap 387) is an umbrella law coordinating diverse sectorial statutes all of which are still in force, Legal Notice 101 requires that the respective sectors be consulted as Lead Agencies in making decisions pertaining to environmental assessment for projects in respective sectors.

- ✓ This is to ensure that NEMA does not approve projects that contradict sector policies and legislation. In conformity with this requirement, we have screened the proposed development against most relevant statutes to map out the potential triggers.
- ✓ In sections below, we highlight sectorial laws and policies likely to be triggered by the proposed project as currently proposed.

### **5.4.3: Requirements of Other Relevant Legislation**

#### ***Kenya Maritime Authority Act, 2006:***

This Act of Parliament provides for the establishment of the Kenya Maritime Authority with responsibility to monitor, regulate and coordinate activities in the maritime industry.

The Act allocates functions to the KMA which are deemed relevant to development and operation of the proposed Project as follows:-

- administer and enforce the provisions of the Merchant Shipping Act, 2009 (No. 4 of 2009) and any other legislation relating to the maritime sector for the time being in force;
- co-ordinate the implementation of policies relating to maritime affairs and promote the integration of such policies into the national development plan;
- develop, co-ordinate and manage a national oil spill contingency plan for both coastal and inland waters and shall in the discharge of this responsibility be designated as the “competent oil spill authority”;
- maintain and administer a ship register;
- deal with matters pertaining to maritime search and rescue and coordinate the activities of the Kenya Ports Authority, the Kenya Navy and any other body engaged during search and rescue operations; and
- enforce safety of shipping, including compliance with construction regulations maintenance of safety standards and safety navigation rules;

We (OLIGERM CONSULTANTS) will request a representative of the KMA to sit in Coordination Committees charged with supervising the development of the proposed project which would guarantee that interests of the KMA will be factored in the development of the cable and rope system across Likoni Channel.

KMA is also the designated Kenyan Focal Point for MARPOL Convention and is key in spearheading initiatives against marine pollution.

### **Kenya Ports Authority Act, 1978:**

Kenya Ports Authority Act (Cap 381) became effective on 20th January 1978 with the objective of providing for the establishment of the Kenya Ports Authority and connected purposes.

The Act provides a generally generous mandate to the KPA but, **section 2 (j)** is relevant to construction activity in the proposed project site as it confers power on the KPA to prohibit, control or regulate the use by any person of the services performed, or the facilities provided, by the Authority; or the presence of any person, ship, vehicle or goods within any port or on any premises occupied by the Authority.

Deployment of all construction equipment for use in the proposed project will require authorization by the KPA.

### **Fisheries Act, 1989:**

Fisheries Act No.5 of 1989 provides for the development, management, exploitation, utilization and conservation of fisheries and for connected purposes. **Sections 7(1)** and **8(5)** are relevant in construction of the proposed project as they criminalize illegal fishing thus:-

*7 (1) No person shall use any vessel for fishing in Kenya's fishery waters unless there is in force in relation to the vessel a valid certificate of registration.*

*8 (5) Any person who catches fish in Kenya fishery waters without a licence, or in contravention of the conditions imposed on a licence, issued under this Act shall be guilty of an offence and liable to a fine not exceeding twenty thousand shillings or to imprisonment for a term not exceeding two years or to both.*

- ✓ Contractors and staff engaged in the proposed project construction will be required to adhere to provisions of this law.

### **Explosives Act (Cap 115):**

This Act makes diverse requirements in the handling and use of explosives thus:-

#### ➤ **Licence necessary to deal in explosives**

*(1) No person, other than the manufacturer, shall sell, deal in or dispose of any explosive unless he is in possession of a licence granted under this Act.*

*(2) For the purposes of this section, a manager, as defined in the Mining (Safety) Regulations (Cap. 306, Sub. Leg), who in outlying districts and in accordance with rules supplies other consumers, shall not be deemed to be a dealer, unless he sells at a profit.*

*(3) Any person who contravenes subsection (1) shall be guilty of an offence and liable to a fine not exceeding three thousand shillings or, in default of payment, to imprisonment for a term not exceeding one year.*

#### ➤ **Permit necessary to acquire blasting materials**

*(1) No person shall purchase or otherwise acquire blasting materials except under the authority of, and to the extent authorized in, a written permit issued by an inspector.*



*(2) No person shall sell or dispose of blasting materials to any person who fails to produce at the time of the transaction a permit of the type referred to in subsection (1) nor shall any person sell or dispose of any such materials in excess of the quantity referred to in such permit.*

*(3) Any person who contravenes this section shall be guilty of an offence and liable to a fine not exceeding three thousand shillings or, in default of payment, to imprisonment for a term not exceeding one year.*

➤ ***Prohibition of importation and exportation of explosives without permit***

*No person shall import or export, or cause to be imported or exported, any explosive, unless he has obtained a permit issued, in the case of blasting materials, under the authority of an inspector, or, in the case of other explosives, by any person authorized by the commissioner.*

- ✓ All blasting works in the construction of the proposed project will adhere to the requirements of this statute.

***The Occupational Health and Safety Act of 2007***

The Occupational Safety and Health Act, 2007, is an Act of Parliament to provide for the safety, health and welfare of all workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.

The Act applies to all workplaces and workers associated with it; whether temporary or permanent.

The main aim of the Act is to safeguard the safety, health and welfare of workers and non-workers.

- **Part 9** states that the occupier or employer shall establish a health and safety committee where twenty or more people are employed and such an employee shall prepare a written statement of his general policy with respect to the safety and health at the work place.
- Further, the occupier shall prepare annual safety and health audits by a qualified person.
- ✓ It is thus recommended that all Sections of the Act related to this project, such as provision of protective clothing, clean water and insurance cover are observed so as to protect all from work related injuries or other health hazards.
- ✓ The same are captured in the ESMP including commentaries in section 10.4.5.

***The Public Health Act (Cap. 242)***

The Public Health Act provides for the protection of human health through prevention and guarding against introduction of infectious diseases into Kenya from outside, to promote public health and the prevention, limitation or suppression of infectious, communicable or preventable diseases within Kenya, to advice and direct local authorities in regard to matters affecting the public health to promote or carry out research and investigations in connection with the prevention or treatment of human diseases.

This Act provides the impetus for a healthy environment and gives regulations to waste management, pollution and human health all of which are infringed by road construction and operation activities.

- **Part IX, Section 115** states that no person shall cause nuisance or condition liable to be injurious or dangerous to human health.
- **Section 116** requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health.
- Such nuisance or conditions are defined under **section 118** waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health.
- Other nuisances are: accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.
- ✓ All camps established for purposes of construction of the proposed project shall be operated in harmony with the Public Health Act Cap 242 which has largely informed section 10.4.5 below.

### ***The Penal Code (Cap. 63)***

**Section 191** of the Penal Code states that any person who voluntarily corrupts or fouls water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence.

**Section 192** of the same act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons in dwellings or business premises in the neighbourhood or those passing along public way, commit an offence.

### ***The Water Act, 2002:***

The Water Act 2002 came into effect in March 2003. The Water Act 2002 provided the legal framework for management and conservation of water resources in line with the new policy changes.

New institutions with separate functions were established, and decentralized decision making is reflected in autonomous regional bodies.

- **Section 25** of the Act requires a permit to be obtained for among others any use of water from a water resources, discharge of a pollutant into any water resource
- According to **section 29** of the same Act, application for such a permit shall be subject to public consultation as well as an environmental impact assessment as per the Environmental Management and Coordination Act (Cap 387)
- Under **Section 35**, conditions of the permit may also be varied if the Authority feels that the water so used is causing deterioration of water quality or causing shortage of water for other purposes that the Authority may consider has priority.
- ✓ Construction activity under the proposed project especially pertaining to sourcing of construction water and operations within riparian areas will adhere to conditions of the Water

Act 2002 and its Legal Notice 171 of 28<sup>th</sup> Sept 2007 (The Water Resource Management Rules 2007).

***The Physical Planning Act (Cap 286):***

Cap 286 provides for the preparation and implementation of physical development plans for connected purposes. It establishes the responsibility for the physical planning at various levels of government mainly the District Level.

The Act provides for a hierarchy of plans in which guidelines are laid down for the future physical development of areas referred to in the specific plan. The intention is that the three-tier order plans, the national development plan, regional development plan, and the local physical development plan should concentrate on broad policy issues.

The Act also promotes public participation in the preparation of plans and requires that in preparation of plans, proper consideration be given to the potential for economic and social development.

***The Wildlife Management and Conservation Act, 2013:***

The Wildlife Conservation and Management Act, 2013, came into force on 27<sup>th</sup> December 2013 and apply to all wildlife resources on public, community and private land. Under Section 34, the WCMA enforces the requirement for Environmental assessment thus;-

- ✓ A user or other related right shall not be granted under this Act where the requirement for a strategic environmental, cultural, economic and social impact assessment licence under the Environmental Management and Coordination Act (Cap) has not been complied with.
  - ✓ The wildlife resource base of the traverse is not fully understood in which case, this study has taken liberty to conduct a full inventory of fauna and flora of the traverse as reported in Chapter Seven below.
- ***Schedule Six*** and ***Schedule Seven*** of the Wildlife Management and Conservation Act 2013 lists species that are considered endangered and invasive in Kenya respectively. The same have been applied as screening tools in this ESIA Study.

***The Forest Conservation and Management Act, 2016***

This is an ACT of Parliament to give effect to Article 69 of the Constitution with regard to forest resources; to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country and for connected purposes.

The Forest Conservation and Management Act, 2016 applies to all forests on state, community and private land whereby the focus is on:-

- a) good governance in accordance with Article 10 of the Constitution;
- b) public participation and community involvement in the management of forests;
- c) consultation and co-operation between the national and county governments;
- d) the values and principles of public service in accordance with Article 232 of the Constitution;

- e) protection of indigenous knowledge and intellectual property rights of forests resources; and,
  - f) international best practices in management and conservation of forests.
- ✓ As part of this ESIA Study, all the sacred groves occurring near the proposed project site have been mapped and clearly documented to ensure informed decision making in construction activity.

***Development Authority Act No 6 of 1989 (The Coast Cap 444)***

The Coast Development Authority Act was enacted in 1989 and commenced on January 18th, 1999 expressly to provide for the establishment of the Coast Development Authority (CDA) to plan and co-ordinate the implementation of development projects in whole of the Coast Province and the exclusive economic zone and for connected purposes. ‘

- Under **Section 8**, the Cap 444 outlines functions of the CDA as follows:-
  - a) to plan for the development of the Area and initiate project activities identified from such planning in the development and through the Government generally;
  - b) to develop an up-to-date long range development plan for the Area;
  - c) to initiate such studies, and carry out such surveys of the Area as may be considered necessary by the Government or the Authority, and to assess alternative demands within the Area on the natural resources thereof, and initiate, operate, or implement such projects as may be necessary to exploit those natural resources including agriculture (both irrigated and rain-fed), forestry, wildlife and tourism industries, electric power generation, mining, and fishing, and to recommend economic priorities;
  - d) to co-ordinate the various studies of schemes within the Area such that human, water, animal, land and other resources are utilized to the best advantage and to monitor the design and execution of planned projects within the Area;
  - e) to effect a programme for both monitoring and evaluating the performance of projects within the area so as to improve such performance and establish responsibility thereof, and to improve future planning;
  - f) to co-ordinate the present abstraction and use of natural resources, especially water, within the area and to set up effective monitoring of abstraction and usage;
  - g) to cause and effect the construction of any works deemed necessary for the protection and utilization, of the water and soils of the Area including hydro-power development for multipurpose utilization of water resources;
  - h) to ensure that landowners in the Area undertake all the measures specified by the Authority to protect the water and soils of the Area;
  - i) to identify, collect, collate and correlate all such data related to the use of water and other resources and also economic and related activities within the Area as may be necessary for the efficient forward planning of the Area;
  - j) to maintain a liaison between the Government, the private sector and other interested agencies in the matter of the development of the Area with a view limiting the duplication of effort and ensuring the best use of the available technical resources;

- k) to examine the hydrological effects and the subsequent ecological changes on the development programmes and evaluate how they affect the economic activities of the persons dependent on river environment;
  - l) to implement development projects and programmes whose primary objective is to promote socio-economic development of the Coast Province in particular and Kenya in general;
  - m) to plan and liaise with the relevant authorities as necessary in the exploration and development of the extensive fishing and marine activities in Kenya especially the exclusive economic zone.
- ✓ The proposed project falls within the planning jurisdiction of the CDA and is therefore subject to this Act. Indeed, CDA did confirm that development of a cable car project over Likoni channel was initially their concept.

**Roads Act 2007:**

The core feature of the Kenya Roads Act 2007 which came into effect in September 2007 was the creation of three autonomous Authorities (KeNHA, KeRRA and KURA) to take care of national, rural and urban roads respectively.

**Sections 3(2) (b), 4(2) (b) and 10(2) (b)** are quite relevant to development and operation of power distribution lines as they place all road reserves under the respective jurisdictions of KeNHA, KeRRA and KURA depending on the category of the road.

- ✓ In essence, any infrastructure service provider intending to utilize a road reserve will require consent of the respective road authority.

Further, under **Section 27**, the respective road authority has power to cause relocation of infrastructure from the road reserve thus:-

*(2) Where any infrastructure utility is located within a road reserve, the provider or operator of such infrastructure utility shall, upon written request by the responsible Authority, relocate such infrastructure utility to a location or alignment approved by the Authority at no cost to the Authority.*

*(3) Where an Authority intends to exercise any power under sub-section (2) it shall give reasonable notice of its intention to do so to the person having control of such infrastructure utility, and such person shall cause to be removed such infrastructure utility within sixty days.*

*(4) Where, under subsection (2) or (3), any person having control of an infrastructure utility fails to remove such infrastructure utility within the time stated in the notice, the concerned Authority may remove such infrastructure utility at the cost of the person who was unable to comply with the notice under subsection (3).*

Given the provisions of the Roads Act 2007, it is important that all developers targeting to use road reserves to liaise closely with the relevant road authorities. The same position was articulated during consultations with KeNHA and KURA undertaken as part of this study.

### ***The County Government Act 2012***

The County Government Act of 2012, which has been adapted to the Constitution's State and County structure in relation to devolution, stipulates the County planning issues in Part IX. The County Government Act declares the County Integrated Plan to be central to the County's administration and prohibits any public spending outside of the plan.

The Act clarifies that the County Integrated Plan to be broken down into the economic plan, physical plan, social environmental plan and spatial plan.

Also, the Act states that the County Plan commands,

- County Integrated Development Plan
- County Sectoral Plans
- County Spatial Plan
- Cities and urban areas plans as stipulated by Urban Areas and Cities Act

### ***The Traffic Act (Cap. 403)***

The Act empowers police officers to stop and remove from the road vehicles producing noxious emissions or to charge their owners in a court of law.

Under the Traffic Rules, every motor vehicle shall be constructed, maintained and used so that no avoidable smoke or visible vapour is emitted there from.

Pollution of the atmosphere occurs on the highway either by use of adulterated petroleum products or non-roadworthy vehicles, aircraft, rail-locomotives and ships.

The Traffic Act requires that the vehicles shall only use the fuel specified in the vehicle license. The control of vehicular pollution is an example of grossly inadequate standards and enforcement.

The Traffic Act prohibits the operation of motor vehicles that emit black fumes that pollute the air and cause visibility problems.

The problem with this requirement is that there is no standard measure or definition of what constitutes black fumes or visibility problems.

The Act does not address specific pollutants that are particularly harmful, such as Lead and carbon monoxide.

- **Part (V)** of the Traffic Act deals with driving and other offences relating to the use of vehicles on road and is therefore critical in terms of management of safety within roads.
- ✓ This section, therefore will largely apply in the management of safety in the proposed project and access roads.

### ***The National Transport and Safety Authority Act, 2012:***

This law provides for the establishment of the National Transport and Safety Authority with the sole role of ensuring provision of safe road transport in Kenya.

Specifically, the functions of the NTSA are to:-

- a) *advise and make recommendations to the Cabinet Secretary on matters relating to road transport and safety;*

- b) *implement policies relating to road transport and safety;*
  - c) *plan, manage and regulate the road transport system in accordance with the provisions of this Act;*
  - d) *ensure the provision of safe, reliable and efficient road transport services; and*
  - e) *administer the Act of Parliament set out in the First Schedule and any other written law.*
- ✓ In pursuit of stated functions, the NTSA Act 2012 empowers the Authority to advise the Government on national policy with regard to road transport system and develop and implement road safety strategies in which case, the NTSA is a fundamental stakeholder in the operation and management of the proposed project.

### ***National Construction Authority Act 2011 (NCA)***

The Act provides that the National Construction Authority has the following mandates:

- a) *Promote and stimulate the development, improvement and expansion of the construction industry;*
- b) *Advise and make recommendations to the Minister on matters affecting or connected with the construction industry;*
- c) *Undertake or commission research into any matter relating to the construction industry;*
- d) *Prescribe the qualifications or other attributes required for registration as a contractor under this Act;*
- e) *Assist in the exportation of construction services connected to the construction industry;*
- f) *Provide consultancy and advisory services with respect to the construction industry;*
- g) *Promote and ensure quality assurance in the construction industry;*
- h) *Encourage the standardization and improvement of construction techniques and materials;*
- i) *Initiate and maintain a construction industry information system;*
- j) *Provide, promote, review and co-ordinate training programmes organized by public and private accredited training centers for skilled construction workers and construction site supervisors;*
- k) *Accredit and register contractors and regulate their professional undertakings;*
- l) *Accredit and certify skilled construction workers and construction site supervisors;*
- m) *Develop and publish a code of conduct for the construction industry; and*
- n) *Do all other things that may be necessary for the better carrying out of its functions under the Act.*

### ***The Lands Act No. 6 of 2012:***

The Land Act was enacted by Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes.

The Act applies to all land declared as (a) public land under Article 62 of the Constitution; (b) private land under Article 64 of the Constitution; and (c) community land under Article 63 of the Constitution and any other written law relating to community land.

The Land Act guarantees security of tenure for land under (a) freehold; (b) leasehold; (c) such forms of partial interest as may be defined under the Act and other law, including but not limited to easements; and (d) customary land rights, where consistent with the Constitution and guarantees equal recognition and enforcement of land rights arising under all tenure systems and non-discrimination in ownership of, and access to land under all tenure systems.

Under the Lands Act 2012, The **Way-leaves Act (Cap 292)** and The **Land Acquisition Act (Cap. 295)** have been revoked but Sections 8 and 9 allow for Compulsory Acquisition as an option in acquiring land for public utility. This section will come in handy in formulating a Resettlement Action Plan for the Project.

### ***The Land Registration Act, No. 3 of 2012:***

The Land Registration Act (LRA), 2012 was assented to on 27<sup>th</sup> April, 2012 and commenced on 2nd May, 2012 with the objective and purpose of revising, consolidating and rationalizing the registration of titles to land to give effect to the principles and objects of devolved government.

- **Sections 18 to 21** of the LRA 2012 deal with establishment and maintenance of boundaries to land. **Section 21(1)** is relevant to development of power distribution lines in it that it criminalizes interference with boundaries thus;- Any person who defaces, removes, injures or otherwise impairs a boundary feature or any part of it unless authorized to do so by the Registrar commits an offence and is liable on conviction to imprisonment for a term not exceeding two years or to a fine not exceeding two hundred thousand shillings or to both.
  - ✓ This is relevant to all road construction including construction on road reserves, as is the case in the proposed Project. The project should respect all boundaries.
- Under the LRA 2012, Statutes previously related to land property namely;- The Indian Transfer of Property Act 1882, The Government Lands Act, (Cap 280), The Registration of Titles Act, (Cap 281), The Land Titles Act, (Chapter 282) and The Registered Land Act, (Cap. 300) now stand repealed.

### ***The Environment and Land Court Act No.19 of 2011:***

This law was assented to on 27<sup>th</sup> August 2012 and commenced on 30<sup>th</sup> August 2012 to give effect to Article 162(2)(b) of the Constitution; to establish a superior court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land, and to make provision for its jurisdiction functions and powers, and for connected purposes.

- **Section 13 (1)** of the Act gives the Court original and appellate jurisdiction to hear and determine all disputes in accordance with Article 162(2)(b) of the Constitution and with the provisions of this Act or any other written law relating to environment and land.

In exercise of its jurisdiction under **Article 162 (2) (b) of the Constitution**, the Court shall have power to hear and determine disputes relating to environment and land, including disputes:-



- relating to environmental planning and protection, trade, climate issues, land use planning, title, tenure, boundaries, rates, rents, valuations, mining, minerals and other natural resources;
- relating to compulsory acquisition of land;
- relating to land administration and management;
- relating to public, private and community land and contracts, choses in action or other instruments granting any enforceable interests in land; and
- any other dispute relating to environment and land.

This statute is deemed relevant to all development proposed for implementation in Kenya as it provides for legal recourse for disputes relating to environment and land.

This is a law that the developer should take recourse to especially given the numerous disputes associated with land acquisition and tenure in the coast area.

### ***The Agriculture Act (Cap 318):***

This statute seeks to promote and maintain a stable agriculture, to provide for the conservation of the soil and its fertility and to stimulate the development of agricultural land in accordance with the accepted practices of good land management and good husbandry

This Act primarily guides and regulates farming practices.

The Agriculture Act is the principal land use statute covering, inter-alia, soil conservation and agricultural land use in general.

In 2009, the Minister for Agriculture gazetted:

- **The Agriculture (Farm Forestry) Rules, 2009** with the objective and purpose of promoting and maintaining farm forest cover of at least 10 per cent of every agricultural land holding and to preserve and sustain the environment in combating climate change and global warming.
- **Rule 5 (1)** requires every person who owns or occupies agricultural land shall establish and maintain a minimum of 10% of the land under farm forestry which may include trees on soil conservation structures or rangeland and cropland in any suitable configurations; provided that the species of trees or varieties planted shall not have adverse effects on water sources, crops, livestock, soil fertility and the neighbourhood and should not be of invasive nature.
- **Rule 6** allows an inspector to take action within area of jurisdiction to ensure that land owners and occupiers comply with requirements of rule 5 above.
- **Regulation 10** on harvesting of farm trees requires the following:

*Every land owner or occupier shall ensure that harvesting of trees shall be done in such a manner as to maintain a 10 per cent tree cover at all times, with large scale harvesting requiring a harvesting plan as governed by the provisions of the Forests 2005.*

*The District Agricultural Committee shall establish mechanisms to facilitate the process of notification and approval for ease of harvesting by land owners or occupiers.*

*A person shall not harvest trees from a farm forest without notification and approval as provided for in paragraph (ii).*

*Harvesting, processing and movement of farm forest products for commercial purposes shall be governed by the provisions of the Forests Act 2005.*

- ✓ From this analysis, it is apparent that an innovative approach to treatment of on-farm trees has been established.
- ✓ As such, contrary to past practices, contractors contemplating removal of farm trees to create way leaves will require authority from the Sub County Agricultural committees.

***Public Procurement and Disposal Act, 2005:***

The purpose of this Act is to establish procedures for procurement and the disposal of unserviceable, obsolete or surplus stores and equipment by public entities to achieve the following objectives -

- to maximize economy and efficiency;
- to promote competition and ensure that competitors are treated fairly;
- to promote the integrity and fairness of those procedures;
- to increase transparency and accountability in those procedures; and
- to increase public confidence in those procedures;
- to facilitate the promotion of local industry and economic development

- ✓ All procurement of services related to the proposed project will be subject to this statute.

***The National Museums and Heritage Act-Cap 216 (2006):***

Kenya is rich in its antiquities, monuments, cultural and natural sites which are spread all over the country and the Act aims to preserve this national heritage.

The National Museums of Kenya is the custodian of the country's cultural heritage, its principal mission being to collect, document, preserve and enhance knowledge, appreciation, management and the use of these resources for the benefit of Kenya and the world.

Through the National Museums of Kenya many of these sites are protected by law by having them gazetted under the Act.

- **Section 30** of the Act requires all discoveries of buried artefacts to be reported to the NMK/GoK.
- In is a requirement under this law for Cultural Impact Assessment Studies coordinated by the NMK to precede development in any culturally sensitive site including the entire Kenya's coastline in which case, the NMK has been contacted in the case of the proposed development planning.

### 5.4.3 Codes, Specifications and Standards

#### **(i) The Ministry of Roads – Environmental and Social Unit:**

The Ministry of Roads has established an Environmental and Social Unit (ESU) in the Roads Department whose objectives is to achieve a comprehensive policy in terms of environmental management in the road sub-sector and to strengthen the capacity within the Ministry to be able to handle environmental and social issues. The role of the ESU is to:-

- 1) Develop environmental road sub-sector standards and guidelines;
- 2) Ensure compliance with Environmental Management and Co-ordination Act of 1999, and Environmental Impacts Assessment and Audit Regulation of 2003 as they relate to the road sub-sector;
- 3) Review and update Roads Department documents e.g. standard specification and contract documents;
- 4) Participate in inspection for certification of substantial completion of work carried out by the roads department;
- 5) Screen proposed road rehabilitation project to determine environmental impact assessment category;
- 6) Review environmental and social management plans that have been prepared;
- 7) Set up a system for continuous monitoring and periodic surveillance;
- 8) Audit road rehabilitation, improvement and maintenance activities;
- 9) Work with and obtain feedback from the District and Provincial Engineers on all roads.
- 10) Liaise with Government, parastatals and non-governmental organisations concerned with environmental issues including NEMA, with a view to addressing common priorities;
- 11) Create awareness and sensitise the public with regard to proposed road projects, their potential impacts and the need for planning in the event that people are going to be affected;
- 12) Ensure compliance of the road sub-sector EIAs with public consultation and disclosure procedures as required by the Environmental Management and Co-ordination Act and the requirements of the various international financing institutions and development partners;
- 13) Set up a computerized environment and socio-economic database relevant to road work activities

#### **(ii) Standard Specification for Road and Bridge Construction:**

The Ministry of Roads produced the “Standard Specification for Road and Bridge Construction” in 1986. These are often referred to when addressing aspects of road projects environmental impacts.

The Standard Specifications for Road construction has guidelines on environmental protection and mitigation.

- Standard Specification **Clauses 116, 117, 125, 135, 138** address protection of the environment, with regard to water, health, safety and accidents, water supply, maintenance of the engineers’ staff houses, offices, laboratories, and attendance upon the engineer and his staff.
  - ✓ The provisions of these laws, standards and codes must not be contravened during project implementation, thus the provisions are largely supportive of EMCA 1999; must form part of

the legal basis for environmental mitigation, avoidance, prevention, compensation, restoration and enhancement. The following key clauses are included in the specifications:

➤ **Section 1: General**

- Clause 115, Sub-clauses (c), (e), (f), (g), (i) and (k) General conditions for protection of environment;
- Clause 116 Protection of water resources;
- Clause 117 Health, safety and accede
- Clause 118 Preservation and maintenance of fences and gates
- Clause 119 Use of explosives;
- Clause 120 Protection of existing works and services;
- Clause 124 Provision of land;

➤ **Section 6: Quarries, borrow pits, stockpile and spoil areas.**

- ✓ The Standard Specifications for Road construction has guidelines on environmental protection and mitigation.
- ✓ Standard Specification Clauses 116, 117, 125, 135, 138 address protection of the environment, with regard to water, health, safety and accidents, water supply, maintenance of the engineers' staff houses, offices, laboratories, and attendance upon the engineer and his staff.
- ✓ The provisions of these laws, standards and codes must not be contravened during project implementation, thus the provisions are largely supportive of Cap 387; must form part of the legal basis for environmental mitigation, avoidance, prevention, compensation, restoration and enhancement.

***(iii) Guidelines for Prevention and Control of Soil Erosion in Road Works, 2010***

The guidelines main objective is to benefit all persons engaged in the road works (Engineers, consultants, contractors and supervisors) and is not informed on the extent of damages caused by uncontrolled run-off from the road corridor.

It acknowledges that road works potentially result in environmental hazard through the spillage of carbon products, contaminating the surrounding land, dust and noise pollution, interference with the drainage pattern hence extensive soil erosion.

The guidelines therefore focus to minimize the damages to the environment through the use of innovative construction methods and procedures which are less damaging to the environment in controlling soil erosion.

The guidelines discuss several issues on the soil and water conservation principles which entail:

- i) The design and construction of water ways and soil erosion control measures in road drainage systems;
- ii) Soil erosion control measures needed in upper and lower catchment areas;

- iii) Soil erosion and their mitigation measures against anticipated damages from the road drainage discharge;
  - iv) Use of vetiver grass to stabilize and heal erosion damages; and
  - v) Indicative cost of soil and water conservation measures for planning purposes.
- ✓ The said guidelines will apply directly in the mitigation of soil erosion occasioned by construction activity.

#### ***(iv) Environmental Guidelines for Roads and Bridges, 2010***

The guideline for roads and bridges provides detailed analysis of environmental issues arising from road works along with mitigation measures that have been used in the national and the international contexts.

The main focus is on simply, fulfilling the law that requires assessing the state of environment before and after the road construction period hence achieving sound environmental management for the road transportation system.

It also addresses environmental practices to be followed during the development stages starting from tender, feasibility, design, construction, operation and maintenance phase.

The guidelines recommend;

- i) Preparation of full EIA study to be completed at feasibility and updated at the design stage,
  - ii) The certificate for environmental compliance should be issued prior to the issuance of certificate of road completion,
  - iii) The guidelines are expected to be used in conjunction with existing and future regulations and guidelines developed by the government in particular NEMA,
  - iv) Emphasizes on the environmental sustainable guidelines that calls for health and Environmental quality objectives (ecosystem protection, clean air, avoiding mobility and mortality)
- ✓ Preparation of this ESIA report is meant to partly address requirements of this policy guideline.

### **5.4.4 International Conventions, Treaties and Agreements**

#### ***5.4.4.1 General Treaties***

According to the Registrar of International Treaties and other Agreements in Environment, there are about 232 treaties which are legally binding to Kenya. A total of 9 such treaties can be triggered in the proposed Project as tabulated below.

**Table 5. 3: International Treaties deemed relevant to the proposed project**

<b>SR. NO.</b>	<b>CONVENTION</b>	<b>STATUS</b>	<b>REASON</b>
1	<b>Convention on International Trade in Endangered Species of Wild Fauna and Flora</b>	<i>Triggered</i>	Threats to biodiversity largely remain unknown as most of the floral species not assessed for IUCN Red List data.
2	<b>Convention on the Elimination of all forms of Discrimination against Women, 1979.</b>	<i>Triggered</i>	Women form the bulk of poor rural population in Likoni area of Mombasa
3	<b>Convention on the Conservation of Migratory Species of Wild Animals, 1979.</b>	<i>Triggered</i>	Several bird species were encountered in the proposed project location
4	<b>The 1985 Vienna Convention on Protection of the Ozone Layer</b>	<i>Not Triggered</i>	There is no likelihood of use on Ozone depleting substances in the proposed project construction.
5	<b>The 1987 United Nations Montreal Protocol on substances that deplete the ozone layer</b>	<i>Not triggered</i>	As above
6	<b>The 1992 United Nations Framework Convention on Climate Change (UNFCCC) which led to the Kyoto Protocol of 1997</b>	<i>Triggered</i>	Any activity that involves heavy use of fossil fuels and importation of materials such as steel in the proposed project construction has a heavy carbon foot print.
7	<b>Convention on Biological Diversity</b>	<i>Triggered</i>	Sacred shrines within vicinity of proposed project location are reservoirs of rare, near endemic fauna and flora.
8	<b>Cartagena Protocol on Biosafety to the Convention on Biological Diversity, 2000</b>	<i>Not triggered</i>	The Project will not involve introduction of Plant Species
9	<b>International Plant Protection Convention (Revised), 1997</b>	<i>Not triggered</i>	The Project will not involve introduction of Pest Species
10	<b>Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade</b>	<i>Not triggered</i>	There is no possibility of use of controlled substances in construction
11	<b>Stockholm Convention on Persistent Organic Pollutants</b>	<i>Not triggered</i>	There is no possibility of use of controlled substances in construction
12	<b>African Convention on the Conservation of Nature and Natural Resources (1968)</b>	<i>Not triggered</i>	The implementation of proposed project will not exploit water resources and rangelands and therefore shall not trigger this convention
13	<b>Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972</b>	<i>Triggered</i>	Construction in close vicinity of marine areas could cause siltation of the sea and creeks

14	<b>The Convention on Wetlands of International Importance (Ramsar 1971)</b>	<i>Triggered</i>	Possible siltation of mangrove wetlands
15	<b>Convention on the Protection of World Cultural and Natural Heritage, 1972, which also protects threatened plants</b>	<i>Triggered</i>	Possibility of threatened plants occurring in the proposed project location. However there are no designated cultural sites.
16	<b>United Nations Convention to Combat Desertification 1994</b>	<i>Triggered</i>	Construction will convert natural vegetation to a concrete surface
	<b>Total Triggers</b>	<b>8</b>	

#### 5.4.4.2 Marine Pollution Treaties

Kenya has ratified several conventions in effort to regulate the ship source pollution;

- **The MARPO 73/78 Convention addresses pollution from ships** by oil; by noxious liquid substances carried in bulk; harmful substances carried by sea in packaged form; sewage, garbage; and the prevention of air pollution from ships.
  - ✓ The Convention, as modified by the 1978 Protocol, is known as the "**International Convention for the Prevention of Pollution from Ships, 1973**, as modified by the Protocol of 1978 relating thereto", or, in short form, "MARPOL 73/78". Regulations covering the various sources of ship-generated pollution are contained in the five Annexes of the Convention.
  - ✓ The Convention has also been modified by the Protocol of 1997, whereby a sixth Annex was added.
- **The International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC90)** is the international instrument that provides a framework designed to facilitate international co-operation and mutual assistance in preparing for and responding to major oil pollution incidents and requires States to plan and prepare by developing national systems for pollution response in their respective countries, and by maintaining adequate capacity and resources to address oil pollution emergencies

Most importantly, OPRC 90 and OPRC-HNS Protocol 2000 provide the mechanism for Parties to request assistance from any other state Party, when faced with a major pollution incident.

- **International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969** which provides for intervention in the deep sea incase pollution in the high sea is likely to cause pollution in our territorial sea to prevent, mitigate or eliminate grave and imminent danger to the coastline or related interests from pollution or threat of pollution of the sea by oil or substances other than oil, following upon a maritime casualty or acts related to such a casualty, which may reasonably be expected to result in major harmful consequences.
  - ✓ **Annex V of MARPOL** is relevant to the bridge construction stage as it generally prohibits the discharge of all garbage into the sea, except as provided otherwise in regulations 4, 5, and 6 of the Annex, which are related to food waste, cargo residues, cleaning agents and additives and animal carcasses.

- ✓ Under the *revised MARPOL Annex V*, garbage includes all kinds of food, domestic and operational waste, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically.
  - ✓ Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities.
- ***Convention on the prevention of Marine pollution by Dumping of Wastes and other matter 1972 (London Convention, 72)*** which aims to prevent, reduce and where practicable, eliminate pollution caused by dumping or incineration at sea of wastes.

## **5.5 The Institutional Framework**

This Study recognizes 2 institutional set-ups that are critical to the successful execution of the EIA process as outlined below.

### **5.5.1 Environment Management and Coordination Act (Cap 387)**

In 2001, the Government established administrative structures to implement EMCA, 1999 (now Cap387) as follows:-

- **The National Environment Council:** The National Environment Council (the Council) is responsible for policy formulation and directions for the purposes of the law. The Council also sets national goals and objectives and determines policies and priorities for the protection of the environment.
- **The National Environmental Management Authority:** Cap 387 allows for formation of the National Environmental Management Authority (NEMA) as the body charged with overall responsibility of exercising general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment.

Under the Act, NEMA was established in 2001 when the first Director General was appointed by the President.

In order to align to requirements of National Constitution 2010, Cap 387 has devolved functions to Counties. Thus; this ESIA Study recognizes NEMA as the sole regulator of EIA processes in Kenya.

Indeed, the second objective of the ESIA Study Report is to facilitate Environmental Licensing of the proposed project in which case, the Report has to ensure compliance with all standards as set out by NEMA in capacity of Environmental Regulator in Kenya.

The ESIA Study process has thus been tied up to the NEMA institutional framework at Head Office and County levels.

- ✓ **Public Complaints Committee:** Under Cap 387, a Public Complaints Committee has been established to provide an administrative mechanism for addressing environmental harm.



- ✓ The Committee whose membership include representatives from the Law Society of Kenya, NGOs and the business community has the mandate to investigate complaints relating to environmental damage and degradation.

### **5.5.2 The Kenya National Highways Authority – KeNHA**

Part of the project is on the Mombasa to Lunga Lunga road reserve. KeNHA is responsible and has administrative rights over the land (road reserves) on all highways in the country.

KeNHA was consulted and gave permission for the project to use a part of the road reserve on the Likoni Mainland South side for the construction of the return station.

## CHAPTER 6: ANALYSIS OF PROJECT ALTERNATIVES

### 6.1 Overview

In this chapter, alternative approaches and options towards securing project site alternatives have been explored to ensure rationalized selection of the most optimal investment package.

**Regulation 18 (1-i & j)** of Legal Notice No.101 – Environmental (Impact Assessment and Audit ) Regulations – of June, 2003, requires an analysis of alternatives including project site, design and technologies and reasons for preferring the proposed **site, design and technologies adopted.**

In line with this requirement, an extensive analysis of alternatives was undertaken in respect of the proposed Project as outlined in sections below.

### 6.2 Basis for Analysis of Alternatives

#### 6.2.1 Key Design Criteria:

- ✓ The cable alignment should be in a straight line between stations and the towers to improve on the system's efficiency and minimize implementation cost. A slight change in direction at the tower increases the project cost by about US\$3-5
- ✓ It necessary that there is sufficient distance between tower and station to allow for a gentle rope incline. Given the height of the towers for the Likoni Cable Express project, it is desirable that the stations be between 150-200m from the tower.
- ✓ The tower heights should provide sufficient clearance above the route to ensure the cars do not interfere with any current or likely future users across the route. The towers have to allow the passage of marine vessels without hindrance. A minimum clearance of 65M has been given.
- ✓ KFS is implementing the Likoni Cable Express project as a system that enhances its mandate to getting commuters across the channel in an efficient, reliable and safe manner. It is therefore necessary that the LCE works by fully integrating with the existing ferry functions so as to complement.
- ✓ The design of LCE should ensure that the overall project in implementation and operation fit within the broad and long term KFS strategy and master plan, including the planned developments within the plots KFS owns within the channel proximity.
- ✓ The ferry crossing is part of the overall transport infrastructure linking Mombasa Island to the South Coast mainland. Because LCE is designed to integrate with the ferry service, it should also take cognizance of any proposed infrastructure improvements within the project area by KENHA and/or KURA, who have jurisdiction of providing mobility beyond the ferry operation area.

## 6.2.2 The Available Project Land

Following the meetings between various project implementation parties in February 2016, KFS identified the parcels of land that would be available for the project as follows:-

### 6.2.2.1 Mombasa Island Side

**(a) Parcel A:** The parcel of land on right hand side of the ferry approach road where there is KFS offices and the police station.

➤ This parcel cannot be used because of the following challenges:-

- Any viable alignment across the channels places the towers and the other station outside of KFS jurisdiction
- The size of the parcel and its location does not allow for proper integration of the LCE into existing functions.
- It already accommodates functions that are key to the operation and security of the ferry area (KFSL offices and Police station). These would require relocation to give way to development.

**(b) Parcel B:** The series of plots on the left hand side of the approach road bordering Mama Ngina Drive and extending from the Likoni roundabout to the sea front.

➤ This parcel is considered the more appropriate because of the following reasons:

- **The current functions on the property are temporary and easy to relocate**
- It allows more options for locating the towers and the other stations on land that KFS has jurisdiction over
- The size and location of the parcel allows for an easy integration of LCE with the existing ferry functions.



*Figure 6. 1: Location of available parcels on the Island side*

#### **6.2.2.2 Likoni Mainland (South) Side**

**(a) Parcels C & D on the right hand side of the ferry exit road where currently there are market stalls and a bus park.**

- The parcels border the exit road and front the ocean.
- These two parcels are not considered viable for LCE because they are too close to the ocean.
- If they are to be considered for the stations, the towers would need to be about 100m into the ocean, which would affect maritime traffic.



**Figure 6. 2: Location of available parcels C&D on the mainland side**

**(b) Parcel E that currently accommodates KFSL main office.**

This property is approximately 600m from the ferry operations area (Ramp area).

- This is not considered suitable because of the following reasons:-
  - The plot already accommodates KFSL main offices. Relocation of the same would not be viable or appropriate
  - The plot is close to the ocean and should it be considered for the station, the tower would have to be about 100m into the ocean to achieve the desired rope incline
  - The location of the parcel at 600m from the area of ferry operations means there would be significant human traffic realignments which would present serious challenges.
  - It would not be possible to use any of the plots on the island side of the channel for the other station/tower to achieve the desired alignment.



**Figure 6. 3: Location of Parcel E on the map**

### 6.2.3 The Proposal

Following the analysis of the available development land against the design parameters for the project, the following alignment was arrived at: -

#### 6.2.3.1 Mombasa Island Station:

➤ **The main station would be built on parcel B.**

- ✓ The total land requirement for the station is approximately 0.75acres, to be able to accommodate the building footprint of 0.5acres.
- ✓ Parcel B is large enough to adequately accommodate and still allow KFSL to implement other developments planned within the said parcel.
- ✓ The tower on the island side will be situated on the ramp, but on the right edge where it does not interfere with the current ferry docking arrangement
- ✓ It is proposed that the commuter processing for the ferry and LCE will be integrated.
- ✓ The distance between the station and tower will be 160m, which give a rope incline of 160. This is acceptable.
- ✓ The general area from the roundabout to the ferry approach would be upgraded to enhance the integration of the services.
- ✓ The station would accommodate the following functions among others:-
  - Mechanical equipment that runs the cable car system

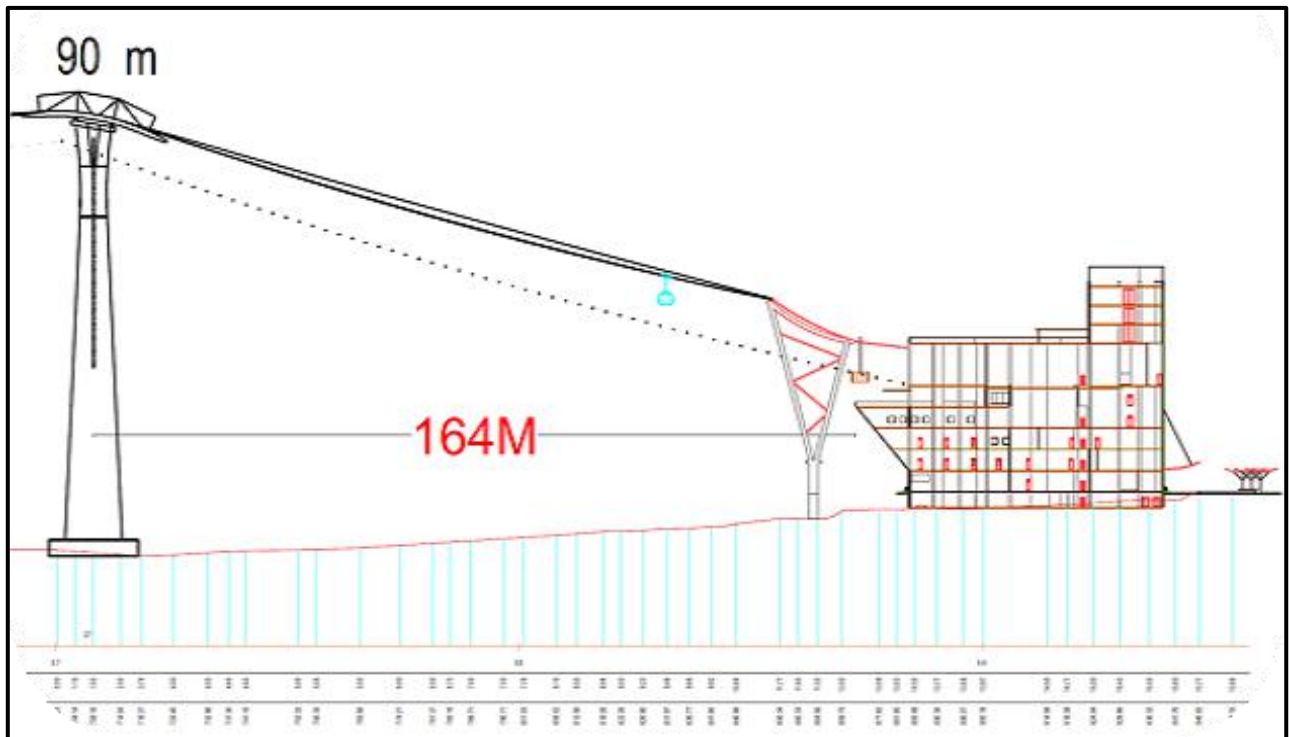
- Lobbies and circulation ways for commuters
  - Security screening points for the commuters
  - Utility rooms to accommodate power supply equipment generators UPS systems, Switch Gears etc.
  - Water storage and treatment facilities
  - Ticketing booths/ stands transformers, backup
  - Retail outlets and revenue generating recreation and commercial spaces h. Security surveillance rooms
  - Staff facilities – offices, recreation rooms, changing rooms
  - Working areas for staff – offices
  - Parking space for cable cars
- ✓ Maintenance and cleaning workshop/garage for cars and components m. Meeting and training rooms
  - ✓ Washroom facilities for general public
  - ✓ Lifts, staircases and escalators
  - ✓ Car Parking facilities for customers in the basement areas



**Figure 6. 4: Location of Drive station**



*Figure 6. 5: The proposed main station located on parcel B, taking up approximately 1 acre.*



*Figure 6. 6: Island side tower (90M high) and station*

### **6.2.3.2 Likoni Station Terminal**

The Likoni station is a return station and its main function will be to enable passengers to embark and disembark from the cars.

No drive equipment is to be installed in this station and only minimal maintenance work is anticipated to be undertaken within the station. However, minimal staff spaces will be included in the station design.

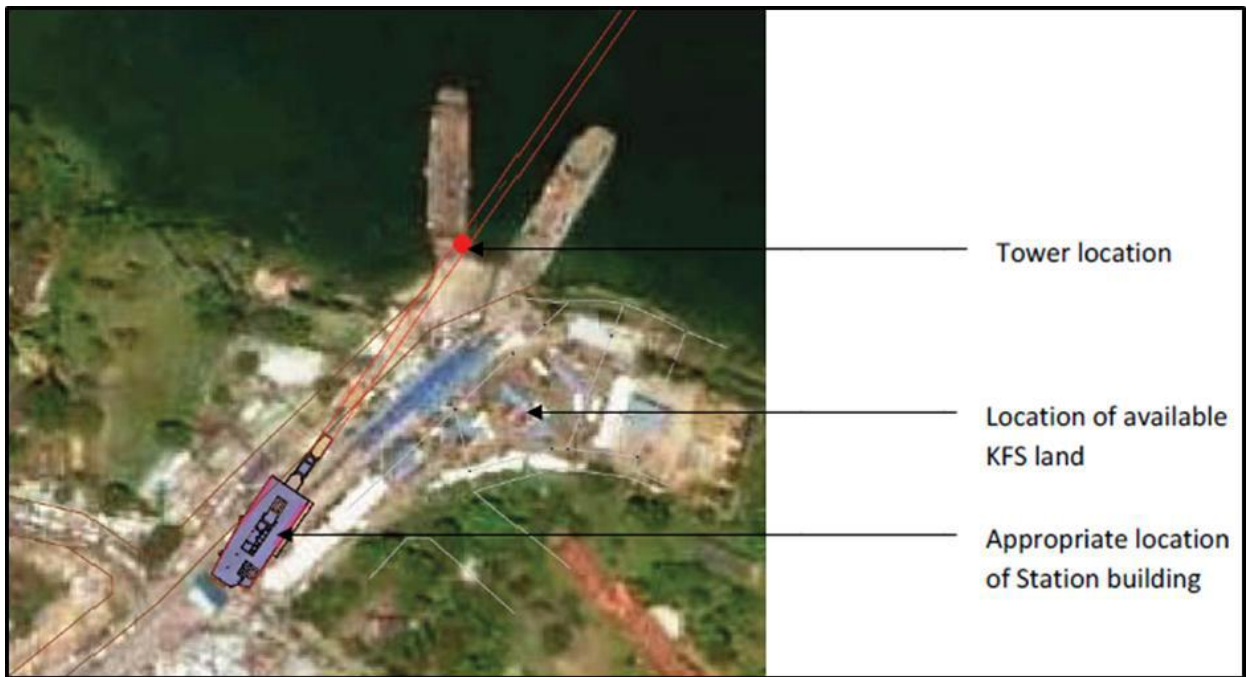


➤ **Location and integration with existing space**

- ✓ It is noted that the area around this side of the ferry crossing is constricted, and the available KFS land is not appropriately located to allow the station terminal to be constructed on it.
- ✓ **It is therefore proposed that the terminal building will be incorporated within the existing movement channels so that the cable line is properly aligned.**

In this regard, we note the following: -

- Part of the terminal building is proposed to be built above the vehicular access into the ferry.
- This is the section that is aligned with the towers and the drive station
- The station will be supported on pillars with sufficient clearance as will be required
- The separation between the supports will be sufficient to allow two lanes on either side
- The weigh bridge will be incorporated in the design on one of the lanes so that it is designated for trucks
- The other lane will have payment points for motorists. It is proposed that as an improvement to the KFS payment system, and electronic pay and access system should be employed so that regular users of the ferry can have seasonal or prepaid tokens that can be scanned or swiped.
- As part of the terminal building construction, we propose that the access and exit driveways shall be rehabilitated and aligned to enhance operational efficiencies. This shall be subject to the standards as approved by Kenya National Highways Authority (KENHA
- There shall be spaces for vehicular control and monitoring that shall be incorporated on the ground level, to assist in enhanced operations for the ferry service



**Figure 6. 7: Appropriate location of Station building**



**Figure 6. 8: Mainland side location for station and tower, showing the integration with existing traffic and operations.**

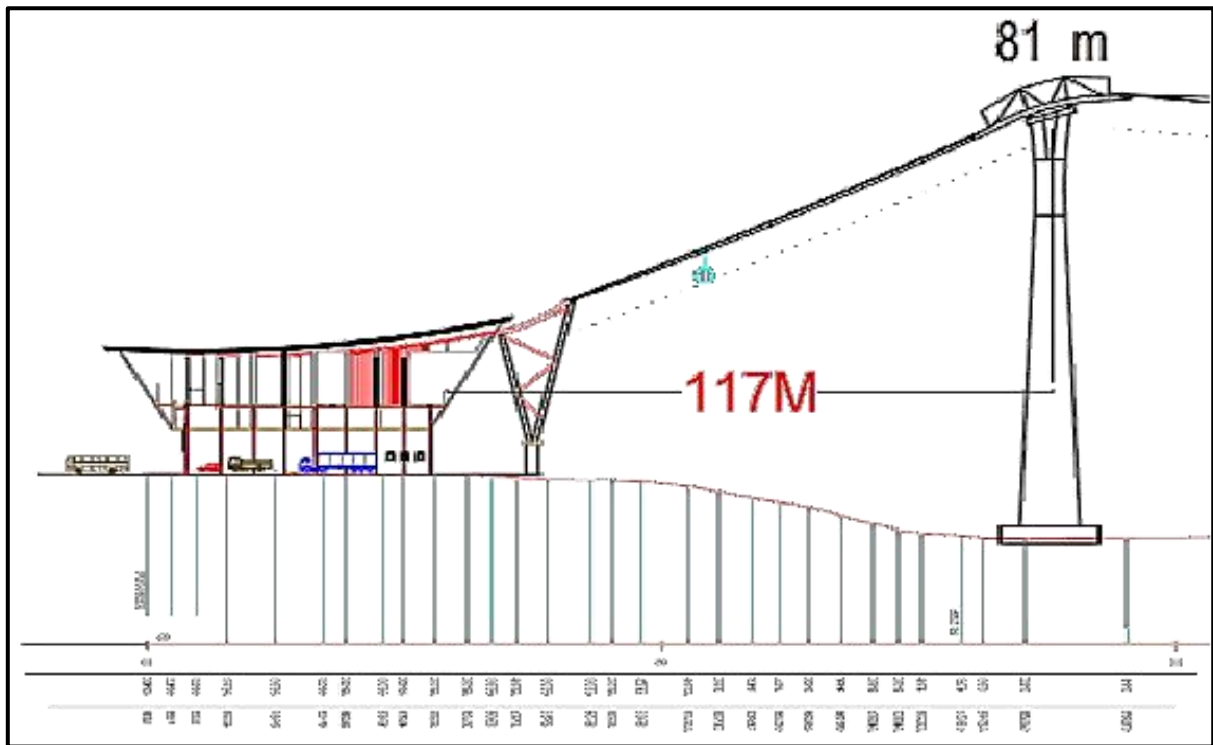


Figure 6. 9: Island side tower (81M high) and station

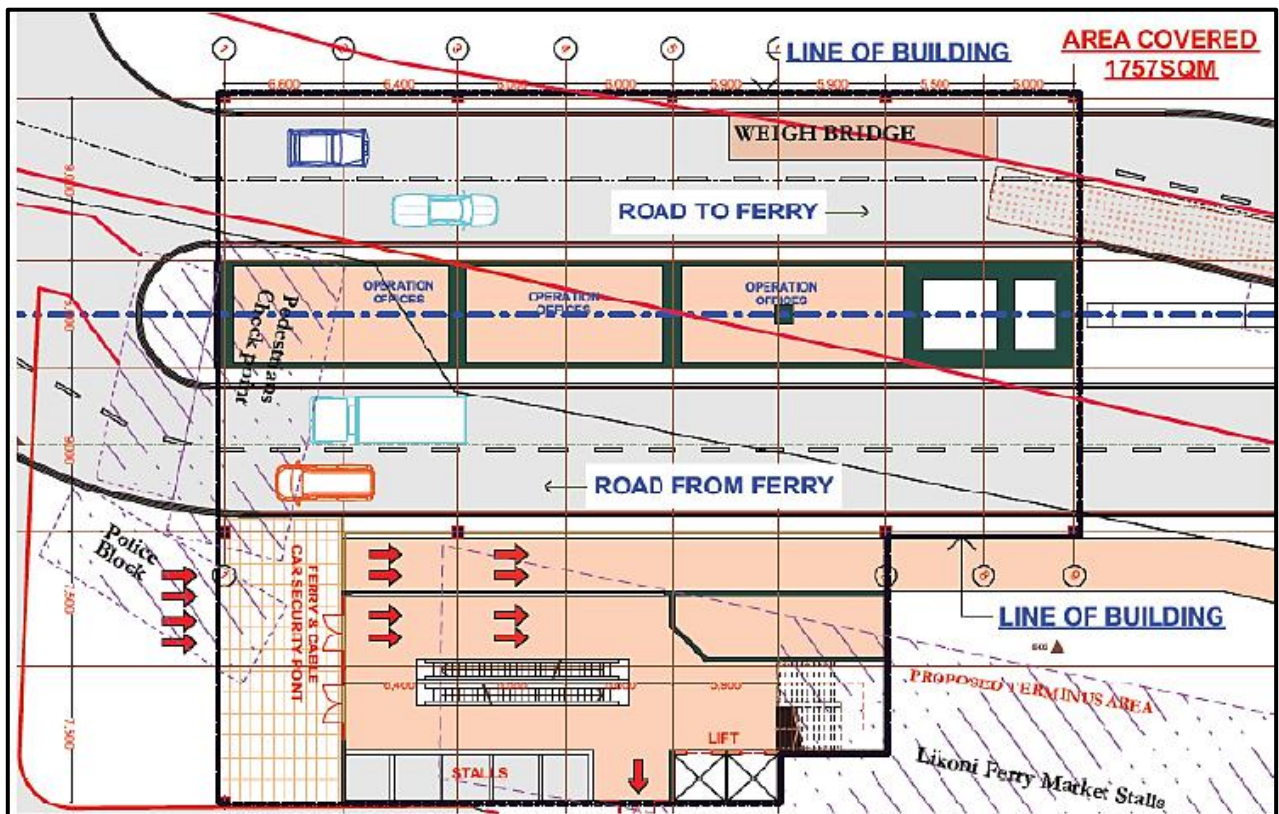
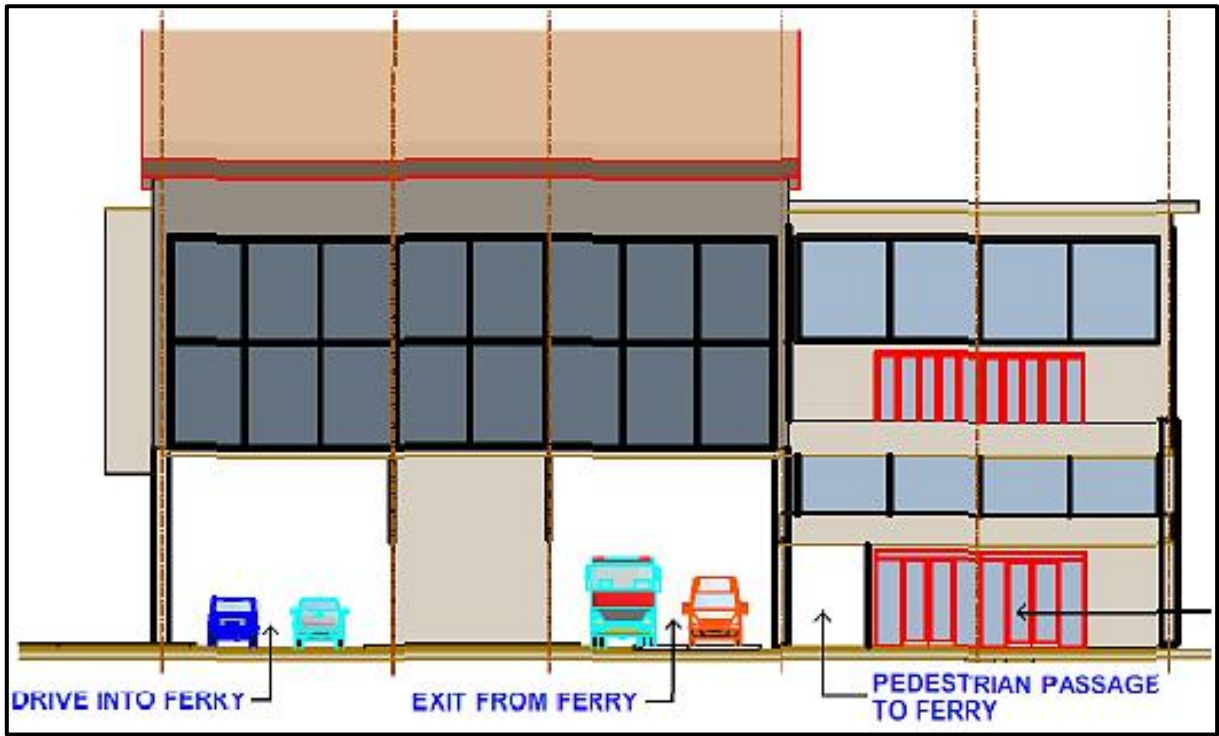
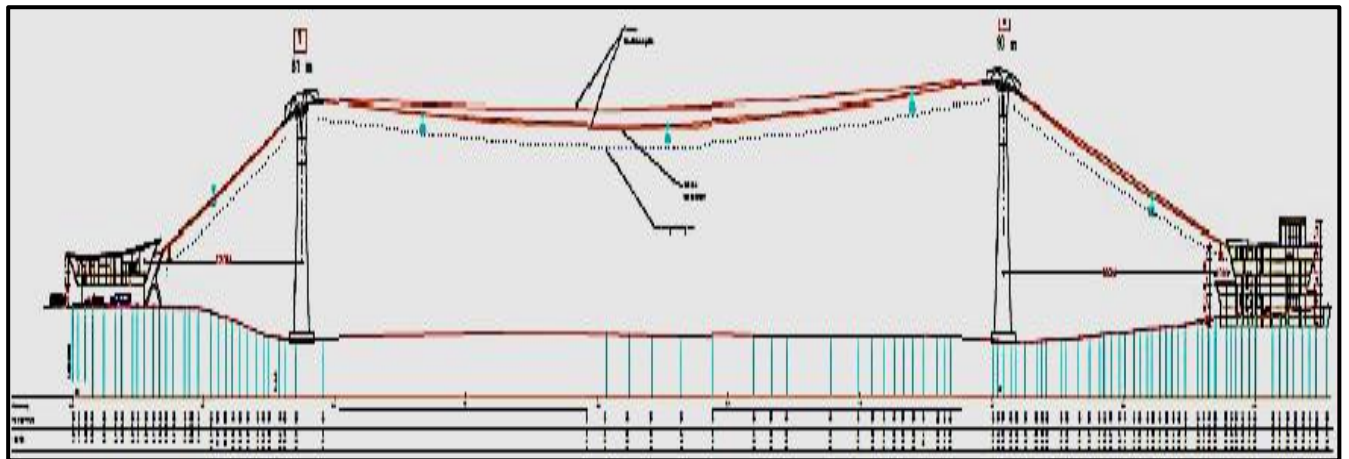


Figure 6. 10: Ground Layout plan showing proposed integration of ferry vehicular and pedestrian traffic with LCE



*Figure 6.11: View of the station built over the access road to ferry (Mainland Side)*



*Figure 6.12: Section across the channel*



*Figure 6. 13: Alignment across the channel*

### **6.3 Levels in Analysis of Design Alternatives Considered**

In the analysis of alternatives in respect to the project several criteria including the three specified in Regulation 18(1) (i) & (j) of LN 101 were further amplified as follows:-

#### **6.3.1 Criteria One: Merits of Alternative Alignments**

- Does the site optimize on net economic benefits
- Does site selection minimize on social, economic and environmental impacts
- Does site selection harmonize with land-use plans as influenced by the physical layout of the land among other factors
- Does site selection resonate with local felt needs

#### **6.3.2 Criteria Two: Alternatives to the Preferred Design:**

➤ **Issues considered included:**

- Alternatives to the entire projection of Project as currently proposed
- Alternatives to cable and rope type as proposed
- Alternatives in the provision of ancillary facilities

#### **6.3.3 Criteria Three: Analysis of the Zero Option**

- Past, current and future effect/ impacts of the road as currently existing
- Anticipated benefits of proposed upgrading.

- Any other considerations

In the sections below, reasons behind decisions made in respect of the proposed project are rationalized under specific headings below:-

## **6.4 Approach to the Analysis of Design Alternatives**

Assessment of alternative design considerations largely applied to the components of the project which will involve creation of safety and orderly operation of the cable and rope project.

### **6.4.1 Design Considerations (1)**

A total of 10 different considerations were applied to the project designs as outlined here below:

- Critical design parameters for Physical locations on the site:
  - ✓ The cable car project links Mombasa island and Likoni mainland
  - ✓ Sufficient tower station separation
  - ✓ Ability to achieve requisite clearance over the maritime channel
- Design Considerations for Physical alignment on the site
  - ✓ Sufficient clearance above high tide level for maritime traffic
  - ✓ Acceptable rope inclines by creating sufficient tower station separation
- Design Considerations on Location for drive station (Island)
  - ✓ Appropriate location to achieve desired rope alignment
  - ✓ Location on land property KFS has jurisdiction /ownership
  - ✓ Ability to integrate/interface with existing functions
  - ✓ Minimum interruption of ferry services by project components
  - ✓ Improvement of the general project area
- Design considerations for Provisions of Layout for Drive Station (Island)
  - ✓ Station in public building handling 300,000 persons per day
  - ✓ Commuters using ferry and cable car will pass through the station
  - ✓ The drive station will offer opportunities for advertising retails outlets
  - ✓ There will be an overall redesign of the area around the station to integrate with current ferry infrastructure
  - ✓ Provision for interference with public transport and pedestrian patterns
  - ✓ Combined security band screening of commuters (ferry and cable car)
  - ✓ General improvement of the infrastructure around the proposed project area.
- Design considerations for Drive station Ground Floor Layout (Island)

- ✓ Sufficient circulation for pedestrians
- ✓ Security monitoring an Integration with existing Exit points
- ✓ Linkages to elevated areas through multiple
- ✓ Utility services location
- Design considerations for Station Floor Layout
  - ✓ A boarding (& alighting) platform
  - ✓ Control room to oversee operations & people flow
  - ✓ Sufficient lobby space for embarking & disembarking
  - ✓ Escalators, lifts and staircases
  - ✓ Carrier elevator for delivering cars to maintenance garage below
  - ✓ Token activated access gates
- Design consideration for Drive Station Appearances (Island Side)
  - ✓ An aesthetics that has resonance with context
  - ✓ Iconic & strong image that project civil pride
  - Design consideration for Return Station location
    - ✓ Appropriate location to achieve desired rope alignment
    - ✓ Location on land/property KFS has jurisdiction
    - ✓ Ability to integrate/interface with existing ferry functions
    - ✓ Minimal interruption of ferry service by project component
    - ✓ Improvement of the general project area
- Design consideration for Return Station Layout Plan (Mainland Side)
  - ✓ Alignment with Drive station
  - ✓ Integration with vehicular movement
  - ✓ Incorporation of KFS activities (security, weighing, paying etc.
  - ✓ Vertical clearance for vehicles
  - ✓ Channelling of pedestrians through a shared screening point
  - ✓ Ample lobby space
- Design considerations for Return Station (Elevation and Section)
  - ✓ Sufficient vehicle clearance
  - ✓ An aesthetics that has resonance with
  - ✓ Strong and iconic image in station design

## 6.4.2 Analysis of Design Considerations (2)

### 6.4.2.1 Preliminary Analysis:-

Section on design considerations above provides a description of all the 10 alternative design considerations. The design consideration alignments underwent preliminary screening based on fundamental criteria namely:- (i) Potential impacts and, (ii) Efficiency and Safety during the operation of the project.

### 6.4.2.2 Technical Level Analysis:-

A highlight of the criteria and process adopted in analysing the options is provided in Table 9.2 below. A total of four broad criteria broken down into 11 sub- criteria (evaluation fields) deemed to have critical influence on project realization and optimization of impacts (Table 10.2) were applied and used to rank each of the four options.

**Table 6 . 1: Criteria applied in technical level analysis of alternatives**

Core Criteria	Sub Criteria	
<b>Conformity with Project Objectives</b>	1	Efficiency as the project operation
	2	Potential impact of the project in decongesting Mombasa CBD
	3	Provision of an efficient passenger transportation route between the Island and Mainland
	4	Potential to support Tourism driven development in Mainland South
<b>Project Cost Factor</b>	5	Total project cost (construction cost, compensation cost, etc.)
	6	Maintenance costs of the Expressway
<b>Environmental and Social Costs</b>	7	Potential environmental and social impacts
	8	Potential impact on land-use and ease of land acquisition
	9	Buildings / facilities in target project area
<b>Other Factors</b>	10	Aesthetic harmony of project and approach viaducts with surrounding landscape
	11	No disturbance on traffic flow including navigation during construction

### 6.4.2.3 Concurrence by Coordination meeting

The outcome of analysis of alternatives was subjected to further screening by the Technical Backstopping Support Team for the study and they were in concurrence with the outcome of the analysis.



## **6.5 Analysis of the No-Project Option**

The 'do nothing' or 'without project' option is not really an alternative since the objective of the Project is to construct a cable and rope project to divert the traffic from already overloaded ferry services and to decongested the CBD of Mombasa city.

There has been significant increase in congestion on the existing ferry services thus necessitating the need.

The without project scenario will continue to increase the negative impacts generated by increased traffic loads on insufficient capacity of the existing roads (traffic congestion, noise, low speed, higher emissions, accidents, etc.).

## CHAPTER 7: STAKEHOLDER ENGAGEMENT

### 7.1 STAKEHOLDER ENGAGEMENT PROCESS

The consultant will identify all affected people (e.g. people affected by construction activities and during operation) and will facilitate dissemination of information to relevant authorities and interested and affected parties (IAPs) concerning the proposed project.

NGOs and government departments and agencies that may have a stake in the Project and its effects should be consulted.

A Stakeholder Consultation Plan will be prepared by the consultant, providing an opportunity for the relevant authorities and IAPs to raise issues and concern pertaining to the proposed project and allow the identification of the additional alternatives and recommendations.

A schedule for public consultation with these different groups will be developed, including number and timing of public input and the methods to be employed (e.g. media announcements, town hall meetings, questionnaires, one-on-one meetings, and public ESIA steering committees).

Public consultation should occur, at least, during the inception and collection of baseline information, and at the draft report stage.

An annex of ESIA should summarize the Public consultation process and the results of the consultation process.

More detailed information will be gathered through this process which the study team could anticipate. Issues not raised by the IAPs will be addressed by the environmental impact assessment report.

The study shall focus on relevant issues and recommend specific investigations, such that the resulting ESIA is useful to decision makers and it shall address the concerns of IAPs

### 7.2 Legal Foundation for Stakeholder Consultation in Kenya

#### 7.2.1 Provisions of the National Constitution

**Article 35** of the National Constitution 2010 provides for access to information as follows:

*35. (1) Every citizen has the right of access to (a) information held by the State; and (b) information held by another person and required for the exercise or protection of any right or fundamental freedom.*

Further, **Section 69** (1) (d) requires the State to “encourage public participation in the management, protection and conservation of the environment”, thereby giving legal foundation for stakeholder consultation in environmental assessment process.

Stakeholder consultation as conducted for this ESIA study was partly in fulfilment to above legal obligations.

### **7.2.2 Requirements of EMCA (Cap 387)**

**Section 17**; of Legal Notice 101 of June 2003, requires that all environmental assessment processes in Kenya to incorporate public consultation. This is a requirement informed by the fact that stakeholders are largely in the constituency likely to be adversely impacted by proposed developments.

### **7.3 Objectives of Consultations**

It is also important to ensure that all stakeholder concerns as well as aspirations are identified and incorporated in project development, implementation and operation. Against such background, a number of consultations have been undertaken with cross sections of stakeholders to the proposed project with the following objectives:

- To inform primary, secondary and other stakeholders of the details of the proposed development;
- To clarify stakeholder interests and concerns in the project area;
- To better define scope and magnitude of potential impacts of implementing the project based on stakeholders' feedback.
- Collect views on the positive and negative impacts anticipated by the resident community/stakeholders and how these can be overcome

### **7.4 Benefits of Public Consultation**

#### **7.4.1 Benefits to a Developer**

The following public consultation benefits are associated with a developer.

- The developer will benefit from the local knowledge;
- Costs may be saved as key issues are identified by the public and studies are focused on key issues as opposed to a broad range of issues;
- Measure to reduce impacts and enhance benefits will be identified with stakeholders;
- Relations with the communities in the vicinity of the development will be improved;
- Delays in decision making may be reduced because of good participation early in the process;
- The public are unlikely to raise objections to the project; and
- The developer's image and reputation will be enhanced.

#### **7.4.2 Benefits to Civil Society and Public**

The following public consultation benefits are associated with the Civil Society and Public.

- Capacity is built through people playing an active role during the process. The skills learnt can be used in other community projects;
- Civil Society and the public rights are exercised and projected by participating; and

- Inputs will influence the form and nature of the development and is likely to lead to better development that takes societies needs into account.

### 7.4.3 Benefits to Decision Makers

The following public consultation benefits are associated with the decision makers.

- Public participation will improve decisions since there is access to a broader range of perspectives and opinion on the proposed development;
- The development is likely to be more sustainable as it takes people’s needs and views into account; and
- Governance and the legitimacy of the government will be improved.

## 7.5 Approach to Stakeholder Engagement

### 7.5.1 Stakeholder Identification/Stratification

Consultants encountered diverse categories of stakeholders during the field survey conducted between Monday (28<sup>th</sup> SEPTEMBER, 2020) and Friday 16<sup>th</sup> OCTOBER, 2020) within the proposed project location.

For ease of treatment and study, stakeholders were lumped into three broad categories as follows:-

- Fundamental Rights Holders
- Legal Mandate Holders
- Marine Trade Stakeholders
- Third Party Interests

Core features and groups within each broad category are highlighted in sections below.

#### ***(i) Fundamental Rights Holders (FRH):***

A total of 8 groups which hold fundamental rights in the proposed project area were identified as summarized in the Table below.

The fundamental rights extend far beyond national borders and are shared by generations yet to be born who have an inherent entitlement to a healthy, functional environment

***Table 7 . 1: Fundamental Rights Holders***

<b>Sr. No.</b>	<b>Stakeholder Category</b>	<b>Stake in the Likoni Cable Express Project</b>	<b>Number Identified</b>
<b>1.</b>	<b>Kenyan Citizens; Present and in Future</b>	Constitutional /inherent right to a clean health environment	<i>Ordinary Kenyans</i>
<b>2</b>	<b>Residents of Kenya’s Mainland South</b>	Inherent right to a reliable and efficient means for accessing Mombasa Island	<i>Ordinary Ferry users</i>

3	<b>Residents of Kenya's Mombasa Island</b>	Inherent right to a reliable and efficient means for accessing Mombasa Mainland South	<i>Ordinary Ferry users</i>
4	<b>Stakeholders to Land</b>	This category includes individual, corporate and other categories of owners and occupants to land and land-based resources in the proposed project area	<i>Ordinary traders and business people in the proposed project area</i>
5	<b>Ancestral/Sentimental Heritage Holders</b>	They hold special sentimental value to the property/business on account of many years of residence	<i>Museums of Kenya</i>
6	<b>Vulnerable Groups</b>	This category comprises individuals or groups who are disadvantaged in life either on account of advanced age, physical, mental, illness or other challenges.	<i>Beggars were identified in Likoni Mainland South</i>
7	<b>Nature-based Livelihood Systems</b>	People operating livelihood systems such as traditional artisanal fishing, extraction, etc. are likely to suffer displacement or blockage from resources that sustain livelihoods systems.	<i>Some identified but in the proposed project site</i>
8	<b>Operators of Capital Resources</b>	This category includes utility providers owning water, power supply and oil pipelines which may be affected by the project	<i>Non in project site</i>

Source: ESIA Team

**(ii) Legal Mandate Holders (LMH):**

Stakeholders identified under this category include those in National Government, County Government and State Corporations whose mandates confer jurisdiction over the proposed project area.

From analysis of the legal framework as documented in Chapter Five, 20 Statutes are deemed to have over-bearing influence on the proposed project area while simultaneously conferring specific mandates to 21 respective institutions

**Table 7 . 2: Bona fide Legal Mandate Holders**

Sr. No.	Legal Tool	Custodian	Legal Mandate	Relevance to Proposed Project
1	<b>Schedule 4 of the National Constitution, 2010</b>	Allocates non devolved functions for National Government	Coordination of National Government	<i>Administrative oversight, security functions in bridge development and operation</i>
2	<b>KDF Act, 2012</b>	KDF	National Security	<i>KN relies on the Likoni channel in delivering national obligations</i>

3	<b>Kenya Roads Act, 2007</b>	KeNHA	Development and maintenance of classified roads in Kenya	<i>KeNHA has mandate over the road reserves</i>
4	<b>The Physical Planning Act (Cap 286)</b>	State Department of Physical Planning	Coordinate all spatial planning at National and county level	<i>Proposed development of proposed project has to harmonize with both National and County Spatial Plans</i>
5	<b>County Government Act, 2012</b>	County Government of Mombasa	Have planning jurisdiction for Mombasa County	<i>Planning for proposed project has to harmonize with Mombasa County CIDP and CSP</i>
6	<b>KMA Act, 1978</b>	Kenya Maritime Authority – KMA	Planning Jurisdiction over maritime areas in Kenya	<i>Questions of maritime safety during project construction and operation.</i>
7	<b>CDA Act (Cap 446)</b>	CDA	Coordinate all development Planning in the Coast region	<i>Has undertaken spatial planning for the area under jurisdiction</i>
8	<b>KPA Act</b>	Kenya Ports Authority	Has mandate in developing Marine Transport in Kenya	<i>Impacts of proposed project construction and operation on navigation within the Likoni Channel</i>
9	<b>KRC Act</b>	Kenya Railways Corporation	Has mandate to develop and operate the national railway network	<i>No Assets of KRC in MMS will be displaced by proposed project</i>
10	<b>WMCA, 2013</b>	KWS	Manage and preserve the national wildlife heritage	<i>No habitat for special concern bird spp will be impacted negatively</i>
11	<b>Museums and Heritage Act, 2006</b>	NMK	Protection of the cultural and archaeological heritage	<i>Excavation for Drive and Return Stations( Piers) could interfere with archeological heritage</i>
12	<b>Water Act, 2002</b>	WRMA	Management of the National water resource base	<i>Construction in riparian areas requires WRMA approval</i>
13	<b>Forests Act, 2005</b>	KFS	National custodian for all vegetation including	<i>Mangrove formations fall under the Jurisdiction of KFS.</i>
14	<b>National Land Commission Act, 2012</b>	National Land Commission	NLC is designated Land Acquiring Authority in Kenya	<i>NLC will acquire land for the proposed project</i>

15	OSHA, 2007	Directorate of Occupational safety and Health Services	Has regulatory mandate on Occupational Safety and Health matters.	<i>Proposed Project Construction will comprise working places under jurisdiction of the DOSHS</i>
16	EMCA, 1999 (cap 387)	NEMA	Has national mandate for environmental regulation.	<i>Need for proposed project to conform to environmental regulatory standards set by EMCA (Cap 387)</i>
17	Fisheries Act	State Dept. of Fisheries	Management of the fisheries resource base	<i>Has jurisdiction over the Kilindini Channel fisheries and its BMUs</i>
18	Electric Power Act, No. 11 of 1997	Kenya Power Transmission Company Ltd (KETRACO)	To build and operate power transmission lines	<i>Proposed project may displace several power transmission lines</i>
19	Kenya Ferry Services Act	Kenya Ferry Services Limited	Mandate to operate ferry transport	<i>KFS is the <b>contracting authority</b> for the proposed project</i>
20	Kenya Civil Aviation Act (Cap 394)	KCAA	Develop and operate a safe, economically sustainable and efficient civil aviation system	<i>Proposed project falls within radius of aeronautical height limits imposed by the KCAA</i>

Source: ESIA Team

### (iii) Other Categories

**Table 7.3: Other Stakeholders**

Sr. No.	Stakeholder Category	Stake in the Likoni Cable Express Project	Number Identified
1.	Kenya Chamber of Commerce and Industry (Mombasa Chapter)	Traders and Businesses organization in Mombasa	
2	Kenya Red Cross Society	Emergency Services Provider	
3	Kenya Association of Tour Operators(KATO)	Tourists using the channel to cross over. Potential clients of the project once it is completed.	
11.	Relief Service Providers	Provision of relief support to distressed groups in hinterland	<i>Delays in service delivery to victims of strife</i>
12.	Consumers in Hinterland	They rely on goods supplied through the port of Mombasa	<i>Delayed access to essential supplies from designated suppliers.</i>

10.	Services Sector	Trade in banking, money transfer, insurance for the cargo handling sector	<i>Reduced business volume</i>
9.	Manufacturers and traders in hinterland	Trade in processing of imported inputs e.g. Iron and Steel, Chemicals etc.	<i>Reduced production upon delays in delivery of imported inputs</i>
4.	Community based groups e.g. churches, self-help groups, etc.	Community level service delivery	<i>Destabilization associated with loss of asset and operating bases.</i>

### 7.5.2 Stakeholder Engagement Plan

This Engagement plan provides an opportunity for the relevant authorities and Interested and Affected Parties (IAPs) to raise issues and concerns pertaining to the proposed project and allow the identification of the additional alternatives and recommendations.

#### ***Administration of ESIA Questionnaires by Mr. Aaron Mutiso***

Category /Name of Stakeholder	Date and Venue of Consultation	Location	Environmental and Social issues raised
Residents of Kenya's Mainland South	7.10.2020 up to 16.10.2020	MI- side	Noise and Air pollution
Residents of Kenya's Mombasa Island	7.10.2020 up to 16.10.2020	MMS-side	Noise and Air pollution

#### ***Administration of ESIA Questionnaires by Mgandi Kalinga***

Category /Name of Stakeholder	Date and Venue of Consultation	Location	Environmental and Social issues raised
Residents of Kenya's Mainland South	7.10.2020 up to 16.10.2020	MI- side	Noise and Air pollution
Residents of Kenya's Mombasa Island	7.10.2020 up to 16.10.2020	MMS-side	Noise and Air pollution

#### ***Administration of ESIA Questionnaires by Clyde Aruwa***

Category /Name of Stakeholder	Date and Venue of Consultation	Location	Environmental and Social issues raised
Residents of Kenya's Mainland South	7.10.2020 up to 16.10.2020	MI- side	Noise and Air pollution
Residents of Kenya's Mombasa Island	7.10.2020 up to 16.10.2020	MMS-side	Noise and Air pollution



**Key Contact Interviews by Charles Mbara and Clyde Aruwa**

Sr. No.	Legal Mandate Holders	Details of Meeting		Breakdown of Attendance		
		Name of Key Contact Person	Venue/Date	F	M	Total
1	KATO	Monika Solanki	KFSL office	1	0	1
2	KATO	Ishpal Oberoi	KFSL office	0	1	1
3	KATO	Shamsheer Mawji	KFSL office	0	1	1
4	KATO	Michael Muriithi	KFSL office	0	1	1
5	National Land Commission – Mombasa County	Edward Bosire	Uhuru na Kazi building	0	1	1
6	Physical Planning – Mombasa County	Paul Manyala	Uhuru na Kazi building	0	1	1
7	CDA	Dr. Mohammed Keinan Hassan	CDA office	0	1	1
8	Southern Engineering	Ezhil Pandiyan	SECO office	0	1	1
9	Base Titanium	Collins Odawa	Base Titanium office	0	1	1
10	NMK	George Ghandi	Museums of Kenya office	0	1	1
11	NMK	Phillip Wanyama	Museums of Kenya office	0	1	1
12	Gulf Energy Depot	Walter Kolil	Gulf Energy Mbaraki Depot office	0	1	1
13	Department of Internal Security and Government Coordination-	Francis K. Kazungu	DCC office – Mtongwe, Likoni Sub County	0	1	1
14	KMA	Khalfan Baya	KMA office	0	1	1
15	KMA	Stella Muthike	KMA office	1	0	1
16	County Director of Environment	Samuel Lopokoiyit	NEMA County office	0	1	1
17	State department of Fisheries	Collins Nduro	Fisheries office	0	1	1
18	State department of Fisheries	Kennedy Shikami	Fisheries office	0	1	1
19	County Fisheries Department	Asha J. Milingo	Fisheries office	1	0	1
20	CEC – Transport / Environment	Dr. Godfrey Nato	County Department of Transport office	0	1	1

## 7.6 Modalities Stages in Stakeholder Engagement

Stakeholder Consultation in the ESIA process for the proposed project took place in three (3) phases as follows:-

- **Prefeasibility Stage Consultations:** This targeted sensitization aimed at building consensus on selection of alternative by pass alignment
- **Feasibility Stage Consultations:** Activities at design stage built on consultations already undertaken at prefeasibility with the aim of consolidating broader stakeholder input in the process.
- **ESIA Stage Consultation Activities:** The consultations at this stage built on earlier prefeasibility and feasibility stages and focused on sensitization of the Mombasa county political leadership and the general surrounding communities to approve the proposed project.

The consultation involved detailed background and genesis of the proposed project, technical aspects of the proposed project, positive and negative environmental and social impacts and possible mitigation measures for those deemed to be of adverse nature.

### 7.6.1 Prefeasibility Stage:

Prefeasibility stage activity largely focused at project identification and conceptualization whereby the main outcome was a preliminary design clear on type of proposed project and its alignment.

Consultations at this stage aimed at selling the project concept to diverse stakeholders and allowing them an opportunity to participate in the Project Screening.

**Table 7 . 4: Feasibility stakeholder meeting held on 29th April, 2015 at Kenya Ferry Services Board room.**

Sr. No.	Names of Persons in Attendance	Position
1	Musa Hassan Musa	Managing Director(Kenya Ferry Services Ltd)
2	Hon. Hamisi M. Mwindanyi	MCA – Mombasa County
3	Hon Mohammed Madundo	MCA – Mombasa County
4	Bishop Mwangaki Ngiki	Bishop – Ushindi Baptist Church
5	Mrs. Consolata Muriuki	Ministry of Transport and Infrastructure Development
6	Samuel Gitau	(M.W.A) National secretary general and Coast Chairman
7	Mr. Michael Muriithi	KATO
8	Mr. Ali M. Mbarak	Kenya Maritime Authority(KMA)

### **ANNEX 7.1: KFS board approval of the proposed project**

### **Resolution of Stakeholders Forum**

The forum consisted of 8 members and after elaborate discussions resolved as follows:

1. That the project for the proposed multilevel Terminus is supported and approved by stakeholders to proceed to implementation
2. That the project for the proposed Likoni Cable Express solution is supported and approved by stakeholders to proceed to implementation level.
3. The Kenya Ferry Services undertakes to consider and improve on concerns raised on the current operation levels and liaise with other government agencies which may affect its services to ensure smooth and efficient operations

### **7.6.2 Feasibility Study Phase**

Activities of the Feasibility Study Phase were aimed at assessing the viability and feasibility for the proposed bridge project and this involved detailed assessment of environmental and social impacts.

Consultations at this stage were aimed at interrogating specific concerns and issues emergent from the prefeasibility study.

### **7.6.3 Detailed ESIA Stage Consultations:**

**These consultations** essentially employed Leaders meetings as entry points to access both target communities and special interest groups.

Issues emerging from this stage have essentially informed the impact prediction process and by extension, the ESMP prepared to resolve environmental and social concerns.

## **7.7 PROGRESS AND OUTCOME OF STAKEHOLDER ENGAGEMENT**

The progress and outcome of the stakeholder engagement under the auspices of the ESIA study for the proposed Likoni Cable Express Project; is as outlined as follows:

### **7.7.1 The Statistics**

The **Table** below provides a documentation of the Stakeholder Engagement Process during Feasibility Study and Detailed ESIA Stage.

A total of **35 formal meetings** were held essentially to gather views from diverse stakeholders and when interviews held with **over 45 stakeholders** were met during the detailed ESIA Process.

**Table 7 . 5: Summary Detailed ESIA Study Stage Consultations**

Category of Meeting	Details of Meeting				Breakdown of attendance by gender		
	Stakeholder	Venue	Date	M	F	Total	
<b>Focus Group Discussion</b>							
1	Kenya Maritime Authority (KMA)	KMA offices	16.10.2020	1	1	2	
2	State Department of Fisheries	Fisheries	16.10.2020	2	1	3	

		offices				
3	Museums of Kenya	NMK offices	19.10.2020	2	0	2
<b>Key informant Interviews</b>						
1	Kenya Red Cross Society	Red Cross offices	6.10.2020	1	0	1
2	Director – Coast Development Authority(CDA)	CDA offices	6.10.2020	1	0	1
3	County Coordinator – National Land Commission	Uhuru na Kazi Building offices	7.10.2020	1	0	1
4	County Physical Planner	Uhuru na Kazi Building offices	7.10.2020	1	0	1
5	Deputy County Commissioner	Mtongwe office	12.10.2020	1	0	1
6	Base Titanium	BT offices	13.10.2020	1	0	1
7	Southern Engineering Company Ltd	SECO office	13.10.2020	1	0	1
8	Gulf Energy	Mbaraki Depot office	12.10.2020	1	0	1
9	County Chief Executive for Environment/Transport	CEC office	17.10.2020	1	0	1
<b>Special Interest Groups</b>						
1	Kenya Association of Tour Operators(KATO)	KFS offices	07.10.2020	4	1	5
2	Coast Beach Management Units Trustee	KFS Offices	07.10.2020	8	0	8
<b>TOTAL NUMBER OF STAKEHOLDERS CONSULTED</b>						<b>29</b>

***Annex 7.2: Brief for key informant interviews***

***Annex 7.3: ESIA Questionnaires administered to members of Mtongwe Beach Management Units***

***Annex 7.4: ESIA Questionnaires administered to Selected PAPs***

***Annex 7.5: KPA Response***

## **7.7.2 Synthesis of Emergent Issues**

### **7.7.2.1 Core Environmental and Social Issues arising from Design Stage Stakeholder Engagement**

#### **➤ Concerns were centered on the following issues:-**

- Possibility of proposed project being realized and time frames
- Security concerns during proposed project operational phase
- The fate of the Kenya Ferry Services and pedestrian crossing
- Modalities for information flow

#### **➤ Response by Consultant**

- ✓ *The proposed project has been approved by Kenya Government and shall be realised in due time*
- ✓ *The proponent shall put measures in place to ensure security during the construction and operational phase of the proposed project*
- ✓ *Kenya Ferry Services Ltd is the contracting authority in this project and therefore stands to benefit from the project proceeds to the fullest*
- ✓ *The pedestrian crossings shall not be interfered with at all*
- ✓ *Kenya Ferry Services Ltd shall put in place modalities for information flow to the general public*

### **7.7.2.2 Core Environmental and Social Issues arising from Focus Group Discussion**

#### **1) Engagement with Kenya Marine Authority (KMA)**

#### **➤ Concerns were centered on the following issues:-**

- Cable car needs a clearance of more than 70 meters above sea level
- There is need to consult with KCAA over maximum height required
- Safety and navigation is crucial and therefore Construction phase of the proposed project should be done during off peak hours to avoid disruption of shipping activities
- In case of operational failure , the cable car may fall on crossing ferries or inbound/outbound ships from Kilindini channel
- Stringent measures need to be put in place to ensure such risks are minimized and satisfactory contingency measures are put in place in the unlikely event that it happens
- Reporting of accidents/incidents during the construction and operation phases is mandatory
- This must be done to EMECC
- There is need to have measures in place to prevent cable car users from throwing litter into the sea.
- The proponent need to inform the authority on the project schedules before commencement of operations to issue Notice to Mariners
- The proponent must ensure proper public consultation before commencement of the construction works and must put in place a Grievance Handling Mechanism

#### **➤ Response by Consultant**

- ✓ *Express Cable Car will clearance of 80 meters above sea level*
- ✓ *KCAA has been consulted*

- ✓ *Construction phase of the proposed project shall be done during off peak hours*
- ✓ *Power back up systems have put in place in case of power failures*
- ✓ *The proponent shall put in place satisfactory measures to minimize risks during the operation of the project*
- ✓ *Accident reports must be done to EMECC*
- ✓ *The proponent must ensure solid wastes not thrown into the sea*
- ✓ *The proponent shall inform the authority of the project schedules*
- ✓ *A detailed and thorough stakeholder engagement has been done for this study*



**Figure 7. 1: Engagement with KMA at their head office**

## **2) Engagement with Kenya Ports Authority (KPA)**

### ➤ **Concerns were centered on the following issues:-**

- The lowest point of the cable catenary must not be less than 70 metres above (HAT) to allow ships with largest possible air drafts to pass under with sufficient clearance at all states of tides.
- Disruption of shipping traffic: during the rigging of cross wires and cables; during breakdowns of cable car system.
- KPA shall not be held liable in case of contact with ship arising from breakdown of cable system.
- KPA shall not be held liable for time loss arising from disruption to shipping due to failure of the system. KPA shall not be held responsible for claims from shipping lines due to delays.
- Pollution to the marine environment that may result from civil works activities during construction.

### ➤ **Response by Consultant**

- ✓ *Comments are noted and shall be incorporated in the project*
- ✓ *The project team shall continue to engage with KPA in case of any matter arising*

### **3) Engagement with State Department of Fisheries**

#### **➤ Concerns were centered on the following issues:-**

- Recommended MOU between Coast Beach Management Units (BMUs) and Project Proponent in cases where adverse impacts or disturbances caused by construction or operation of the project shall affect fishing activities
- Invitation to attend the Monitoring meetings should be sent to the Department
- Proposed project is good and supported and encouraged to proceed
- Consult widely especially the fisher folks, BMUs and general public
- Compensation to affected parties should be paid promptly

#### **➤ Response by Consultant**

- ✓ *MOU between CBMU recommended*
- ✓ *Department shall be invited to monitoring meetings*
- ✓ *Wider consultation undertaken*
- ✓ *Compensations are envisaged in this project*



**Figure 7. 2: Engagement with State Department of Fisheries at their (Coast) regional office**



**Figure 7. 3: Engagement with Mombasa County Department of Fisheries**

#### **4) Engagement with Coastal Archaeology Department**

- Any disturbance of the earth's surface beyond 20 cm below the ground (e.g. trenching or digging) shall require survey and recovery of potential archaeological, paleontological and historical objects before the development is executed
- The intervention by NMK is known as Heritage Impact Assessment, Heritage Impact Assessment, Archaeological Impact Assessment and Salvage / Resume archaeology is undertaken by archaeologists from NMK

#### **➤ Response by Consultant**

- ✓ *Archaeologists from NMK shall be invited during excavations for foundations for Drive and Return stations to examine and collect any artefacts there in.*

#### **7.7.2.3 Core Environmental and Social Issues arising from engagement with from Key Informant interviews**

#### **5) Munawar N. Alibhai (Mombasa / Diani Resident)**

#### **➤ Concerns were centered on the following issues:-**

- This is a very good project
- The project shall decongest the ferry crossing back and forth the Likoni channel
- This will be safe, fast and healthy crossing of the channel
- It will be great help to the elderly, the disabled and mothers with children
- It is a much needed service for those crossing the channel on a daily basis

#### **➤ Response by Consultant**

- ✓ *Comments are highly appreciated*

#### **6) Kenya Red Cross Society**

#### **➤ Concerns centered on the following issues**

- Supports the proposed project
- Reduce pressure by public blames on KFSL for not providing adequate resources to cross the channel
- Consider emergency evacuations of patients during critical conditions
- Consider a special gondola ambulance equipped up to critical care standards
- Consider how essential services like fire engines and advanced ambulances can cross the channel during emergency incidents

#### **➤ Response by Consultant**

- ✓ *Comments highly appreciated and shall be incorporated into the designs*

#### **7) Kenya National Chamber of Commerce and Industry – Mombasa Chapter**

#### **➤ Concerns were centered on the following issues:-**

- Supports the proposed project
- The proposed project will create opportunities for trade and tourism

#### **➤ Response by Consultant**

- ✓ *Comments highly appreciated*



## **8) National Land Commission**

### **➤ Concerns were centered on the following issues:-**

- The proposed Cable Car project require space to adequately to transport solutions it seeks to offer across the Likoni channel to MI and MMS
- It is an interesting technology that will promote both local and foreign tourism
- The proposed project is fulfilment of Vision 2030
- The Commission does not have any adverse comments on the proposed infrastructure development

### **➤ Response by Consultant**

- ✓ *Comments highly appreciated*



**Figure 7. 4: Engagement with Mr. Bosire of NLC at the regional office**

## **9) County Physical Planning Department**

### **➤ Concerns were centered on the following issues:-**

- The proposed Cable Car project require space to adequately to transport solutions it seeks to offer across the Likoni channel to MI and MMS
- Necessary study needs to be done to establish the space required in harmony with other modes of transport infrastructure
- County Government is working on Covid-19 urban Policy which highly targets the ferry crossing areas
- The project proposal should address the fears that arise from ferry crossing challenges
- Provide adequate space for passenger lounge

### **➤ Response by Consultant**

- ✓ *Comments highly appreciated and shall be incorporated into the designs*



*Figure 7. 5: Engagement with Mr. Manyala the Regional Physical Planning Coordinator*

**10) Deputy County Commissioner (Mr. Francis K. Kazungu)**

➤ **Concerns were centered on the following issues:-**

- The proposed project is viable and overdue
- The office is in support of proposed project implementation
- Its implementation will be a development addition to the people of Mombasa Mainland South in terms of business and decongestion of the Likoni channel
- Public Participation is key component of the proposed project Approval
- In order to achieve the objective and smooth implementation of the proposed project, it is the feeling of this office that local elected leaders meet to approve the project
- Public meeting (BARAZA) to be convened after leaders approval

➤ **Response by Consultant**

- ✓ *Comments highly appreciated and shall be conveyed to the Project Manager to ensure compliance*



*Figure 7. 6: Meeting with the Deputy County Commissioner of Likoni Sub-County, Mr. Francis K. Kazungu*

### **11)CECM – Transport/Environment (Dr. Godfrey Nato)**

➤ **Concerns were centered on the following issues:-**

- The proposed project is in line with infrastructure projects envisioned in Vision 2030
- The proposed project shall improve movement of people between Likoni and Mvita
- Backup generator will use fossil fuel thereby increasing the carbon footprint
- The two stations (Drive and Return) will be the point of convergence for the different transport models and will therefore require careful mitigation
- There will be no displacement of people since the project is on Kenya ferry property
- However, businesses routines may be affected
- Other than the management of waste that would be generated by commuters, the project is feasible with little environmental effects
- The structural integrity of the cable should be considered since the channel experiences strong winds

➤ **Response by Consultant**

- ✓ *Comments highly appreciated and shall be conveyed to the Project Manager to ensure compliance*



**Figure 7. 7: Meeting with the CECM for Environment, Dr. Godfrey Nato**

#### **7.7.2.4 Core Environmental and Social Issues arising from Special Interest Groups interviews**

### **12)KATO – (Ishpal Oberoi – Chairperson)**

➤ **Concerns were centered on the following issues:-**

- Project is well encouraged and should be clean and safe
- Landing sites should be well developed and envisage luggage movement and safety
- Insurance cover will be necessary
- Gondola should not be overloaded and the maximum capacity should be 60% of the actual capacity

- Proponent should charge more to cover the cost
- Proponent should allow for full private gondola private hire
- High standards of maintenance and cleanliness are necessary at all times
- Gondola advertisements should be allowed
- Sufficient Parking facilities, a proper *matatu* stage, clean toilets and refreshments should designed and planned
- Proper gondola design is primary priority in making the channel crossing experienced memorable

➤ **Response by Consultant**

- ✓ *Comments highly appreciated and shall be conveyed to the Project Manager to ensure compliance during operational phase*



**Figure 7. 8: Engagement meeting with members of KATO**

**13) Coast Beach Management Units Trust**

➤ **Concerns were centered on the following issues:-**

- Members of Coast BMUs exploit fisheries resources within and near the proposed project site
- Environmentally sensitive areas will be affected by the proposed project
- The terrestrial ecosystem within the sensitive areas pose a risk during project implementation
- Maintain Clean environment by disposal of organic and biological wastes properly
- Observe occupational health and safety risks to avoid accidents, injuries ,air and noise pollution
- Oil and oil wastes discharges must be disposed off in an environmentally sound manner
- Establish a management plan and monitoring plans to address social impacts

- The proponent (Project Manager) should nominate registered members of the Coast BMU to mitigate any arising conflicts

➤ **Response by Consultant**

- ✓ *Comments highly appreciated and shall be conveyed to the Project Manager to ensure compliance during operational phase*

**7.7.2.5 Summary from ESIA Questionnaires**

Respondents		Location	Environmental and Social issues												Score
No	Name		1	2	3	4	5	6	7	8	9	10	11	12	
1	Abass Shauri Abass	Kenya Ferry (on site)	√	√	√	No	No	√	√	√	√	√	√	√	100%
2	Trizia Kinyua	Kenya Ferry (on site)	√	√	√	No	No	√	√	√	√	√	√	√	100%
3	Peter Wambugu	Kenya Ferry (on site)	√	√	√	No	No	√	√	√	√	√	√	√	100%
4	No name	Kenya Ferry (on site)	√	√	√	No	No	√	√	√	√	√	√	√	100%
5	Cliford Gitari	Kenya Ferry (on site)	√	√	√	No	No	√	√	√	√	√	√	√	100%
6	Saidi Ngala	On site	√	√	√	No	No	√	√	√	√	√	√	√	100%
7	Dama Ali Kumba	On site	√	√	√	No	No	√	√	√	√	√	√	√	100%
8	Fredrick Kioko Mwanthi	On site	√	√	√	No	No	√	√	√	√	√	√	√	100%
9	Mamu Yahya Faki	Likoni fish trader – on site	√	√	√	No	No	√	√	√	√	√	√	√	100%
10	Mbwana Baru Mbwana	Likoni fisherman	√	√	√	No	No	√	√	√	√	√	√	√	100%
11	Fatuma Mwananeno	Likoni – mama karanga	√	√	√	No	No	√	√	√	√	√	√	√	100%
12	Hamisi Saidi Mwamowe	Likoni BMU Chairman	√	√	√	No	No	√	√	√	√	√	√	√	100%

## **7.8 Conclusion and Recommendations**

### **7.8.1 Conclusion**

- ✓ Total number of stakeholders consulted was **41**
- ✓ All PAPs consulted praise the proposed project and confirm it will decongest the Likoni Channel
- ✓ All PAPs confirmed the proposed project is a safe and efficient system to cross the channel
- ✓ All PAPs confirmed; there will be no air and noise pollution during operational phase and further; that the system is safe and secure

### **7.8.2 Recommendations**

In the overall all the Project Affected Parties consulted support and approved the construction of the proposed project, however all recommended further wider consultations specifically as follows:

- ✓ Kenya Ferry Services Ltd should hold a leaders Conference to approve the proposed project.
- ✓ The Conference should preferably be chaired by Deputy County Commissioner -LIKONI Sub-County ,and,
- ✓ Kenya Ferry Services Limited should hold a Public Meeting (*BARAZA*) to be Chaired by Deputy County Commissioner -LIKONI Sub-County.
- ✓ This Baraza should provide ultimate proposed approval by the resident community.

### ***Annex 7.8: Signed Schedule of PAPs Consulted***

# CHAPTER 8: IDENTIFICATION OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

## 8.1 Background

Chapters 3 through to 6 above have documented the environmental and social baseline preceding development of the proposed project to set the background for impact analysis (the most critical outcome of an Integrated Impact Assessment Process including ESIA Studies).

It is the outcome of impact assessment that informs decision making on the future direction in project development in which case, a full-proof system for impact prediction and analysis is fundamental to the integrity of an ESIA process.

This chapter provides an analysis of the potential environmental and social impacts likely to ensue from implementation of the proposed project implementation as currently packaged.

Impact analysis as unveiled in this Chapter was approached from different directions, applying diverse diagnostic tools and processes leading to a build-up of core issues that constitute potential impacts from the cable and rope system project.

Tools applied include:-

- Baseline characterization to identify pre-existing environmental and social concerns including sensitive resources
- Review of requirements of both policy and legal framework of the Government of the Republic of Kenya
- Screening against international standards for sustainable development; and
- Screening against stated stakeholder concerns and interests.

Potential environmental and social impacts from different phases of project development (pre-construction, construction, operation and decommissioning phases) have been identified and interpreted as summarized in **Table 8.1**.

## 8.2 Positive Impacts during Design Phase

### 8.2.1 Employment Opportunities

Generally, the design phase is associated with positive impacts mainly manifested through creation of business opportunities for professionals involved in the design work and support staff hired in the enumeration surveys.

These professionals include but not limited to the following:

- ✓ Architects
- ✓ Civil, Structural and Electrical Engineers
- ✓ Geotechnical Surveyors
- ✓ Topo Surveyors
- ✓ Enumerators and Survey Assistants

- ✓ Environmental Assessment Consultants
- ✓ Equipment Suppliers

The country benefits from generation of additional planning data which will influence policy decisions within long timeframes. Certainly, the database compiled from design report will find consumption far beyond the confines of this project.

### **8.3 Positive Impacts during Construction Phase**

#### **8.3.1 Employment Opportunities**

- **The proposed Project will directly and indirectly create employment** for a number of workers, especially casual workers within Likoni Sub-County and Mombasa County at large.
  - These economic benefits will accrue through creation of employment opportunities for both skilled and semi-skilled labour engaged in construction and supervision.
  - However, the exact number cannot be predetermined at this stage. All in all, the services of the following groups of workers will be required during the construction phase:
    - ✓ Contractor;
    - ✓ Casual labourers;
    - ✓ Site manager;
    - ✓ Foremen;
    - ✓ Masons;
    - ✓ Carpenters;
    - ✓ Electricians;
    - ✓ Plumbers;
    - ✓ Painters;
    - ✓ Transporters;
    - ✓ Security agents; and Landscapers.
- **Cash injection into the local economy**
  - Benefits associated with cash injection into the national and local economies:
- **Investments**
  - The bulk of investment of the proposed project will go into procurement of construction material and hiring of the contractor.
  - Construction will thus open up extensive trade opportunities for local business community
  - At local level, communities will benefit from supply of food stuffs for workers during construction phase.

#### **8.3.2 Opportunity for technology transfer:**

- Construction will expose local artisans to expatriates in both construction and supervision and thus accord them opportunities to acquire new skills, technologies and approach to doing things all of which amount to enhancing the local technical capacity.
- Within the proposed project location; potential PAPs will also be organized into groups and will receive training both of which will find consumption even outside the project sphere and time frame.



### **8.3.3 Provision of Market for Supply and Transport of Building Materials:**

The Project will require supply of large quantities of construction materials most of which will be sourced locally in Mombasa County and in the surrounding areas. Producers and suppliers of materials such as building stones, timber, electrical cables, paint, sand, and cement will thus get market for their goods. This will provide ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials. However, the hard rocks that will be excavated from the site during construction will also be reused.

The contractor should however take note that; opening up of borrow areas to reach quality stone or murrum involves stripping off cover vegetation and top soil with attendant loss of biodiversity and, depending on the depth of quarrying, shallow groundwater pathways can be impacted. And also that; non-rehabilitated quarry spoils also pose a danger to people, livestock, and wildlife and can form breeding grounds for mosquitoes.

### **8.3.4 Provision of Market for Food Vendors and Owners of Nearby Business Premises**

The construction workers will attract food vendors in the area to supply food to the construction workers. The food vendors will therefore increase their sales and income as a result of selling food to the construction workers. In addition, the owners of the nearby business premises are also likely to benefit as a result of the construction workers purchasing some of the items from their shops

## **8.4 Negative Impacts during Construction phase**

### **8.4.1 Local Increase of Construction Traffic**

The construction of the proposed project will require huge quantities of materials to be routinely delivered by numerous heavy trucks plying the local roads and this will make local increase of construction traffic inevitable.

Construction vehicles in Kenya are notorious for their wanting respect for traffic rules and the rights of other road users. On numerous occasions, such attitude is a precursor for traffic accidents.

However, there is unlikely to be significant increased traffic jams at the ramps on MI and MMS sides as a result of the construction vehicles turning to the proposed Project site.

### **8.4.2 Noise Pollution and Vibration**

Noise pollution and vibration is likely to occur due to site excavation, grading and offloading of construction materials at the proposed site. Noise pollution and vibration is also likely to occur as a result of excavation activities, use of pocker vibrator, use of mixers and communication from construction workers on site. However, since excavation will be manual and explosives are not likely to be used, adverse impacts to the construction workers and neighbouring premises will not be experienced.

### **8.4.3 Occupational Health and Safety**

Construction sites always present an element of danger. Construction workers are likely to encounter accidental injuries as a result of the intensive engineering and construction activities including erection and fastening of materials, metal grinding and cutting, concrete work, steel erection and welding among others.

Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. Deaths have also been experienced as a result of poor construction activities leading to occupational health and safety concerns.

Workers are also likely to be exposed to diseases from building materials during the construction phase of the Project. It is therefore recommended that before the construction phase of the proposed Project commences, building materials will be inspected according to the occupational health and safety standards.

Occupational health and safety of the workforce will have to be monitored by the respective contractor's supervisors and foremen. As long as proper procedures are followed and personal protective equipment (PPE) provided and their use enforced, risks of accidents and incidents can be substantially reduced.

➤ **Hazards Associated with Construction in a Marine Area:**

✓ **Occupational health and safety concerns for construction crew:-**

Construction of a 90m high structure above an ocean creek poses huge safety and health risks to both professional and non-professional staff deployed.

Risks may be attributed to probability of fatalities associated with accidental fall, injury from plant and equipment or chronic ailment from exposure to cold winds, ocean floor conditions among others.

✓ **Marine pollution threats:**

Pollution threats are likely to emanate from spillage of concrete mix, chemicals, sewage, waste water, oils and fuels from construction vessels and buoys deployed in the construction area

In Kenya, a pollution incident in 1998 resulted in the spilling of 5,000 tonnes of fuel into a mangrove creek.

✓ **Safety hazards:**

These include fire hazards posed by fuel bulking, use of fire in maintenance workshops, accidents in the workplace, build-up of serpents and rodents from poorly stacked stores, etc.

### **8.4.4 Air Quality Impacts**

Potential impacts on the air quality during construction phase will be due to exhaust and dust emissions generated in and around the construction site by the construction equipment. Motor vehicles used to mobilize materials for construction and operating of construction vehicles and equipment would cause a potentially significant air quality impact by emitting pollutants through exhaust emissions. The sources of air emission can be grouped into three categories namely:

- Point Source;
- Area Source; and
- Line Source

A point source is a single source of emission with an identified location; an area source is when the sources of emission are many widely distributed point sources having relatively comparable significance; and a line source is when the sources of emission from a number of fixed or moving facilities have relatively comparable significance, such as roads.

Dust emission is likely to occur during demolition of any existing structures and site clearance, excavation and spreading of top soil during construction of the proposed Hydropower Plant especially if the activities are taking place during dry seasons. However, there will be very small possibility of particulate matter (PM) suspended and settled particles affecting the site workers and even neighbours health, since construction method of minimum excavation and nil cart away of soil will be applied and only residual material and debris carted away.

During the period of maximum construction activity, the fuel consumption at the Project site is expected to rise significantly and the background concentrations of Suspended Particulate Matter (SPM), Respiratory Particulate Matter (RPM), Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>) and both Carbon Monoxide (CO) and Lead (pb) are also expected to rise.

These emissions can have significant cardio-pulmonary and respiratory effects on the local population; the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac condition.

The impact of such emissions can be greater in areas where the materials are sourced and at construction site. Activities associated with site clearance, excavations, spreading of the top soil during construction, frequent vehicle turning and slow vehicle movement loading and off- loading areas can be implicated in this process.

Even then, dust and exhaust gas emissions from construction machineries will be small and temporary. Therefore, no adverse impacts, except for those close to the construction site, are likely to be affected. On completion of construction, the adverse impacts of SPM, RPM and engine emissions on ambient air close to the construction site will be eliminated.

### ***Emission of Atmospheric Pollutants***

#### **Operation of moving plant and equipment:**

Baseline monitoring of air quality undertaken as part of this ESIA indicated worrisome levels of atmospheric lead (Pb) and daytime noise levels generally exceeding statutory limits set by NEMA.

Generation of fumes, dust and noise during construction activity is likely to aggravate already strained scenario which could expose people to health hazards.

Elevated noise and dust levels are not desired anywhere near human settlements and will require mitigation.

### **Emissions from the Crusher and Asphalt Plants:**

Crusher and Asphalt Plants pose the most drastic of environmental impacts through emission of smoke, fumes, dusts, noise, noxious smell, heat and vibrations thus posing dangers to both operators and neighbourhood residents and their properties.

Indeed, dust from crusher plants has been observed to choke vegetation and crops while aggravating respiratory complaints in the neighbourhoods.

## **8.4.5 Waste Generation and Impacts**

### **8.4.5.1 Solid wastes**

Construction activities create solid wastes that need to be disposed off in an environmentally sound manner. Such wastes include:

- Excavated materials from the earth works;
- Timber from used formwork;
- Paints, lubricants and petroleum wastes;
- Containers, cement paper bags and other packaging materials;
- Metal, glass, plastic containers and other unwanted materials; and
- Food remains

Soils will be excavated at the proposed project site; the excavation works to level the site and to come up with the basement will result in the generation of the excavated material.

These wastes may have a direct impact on the neighbouring premises. Disposal of the same solid wastes off-site could also be a social inconvenience if done in wrong places. The off-site effects could be un-aesthetics view, pest breeding, unhygienic conditions, chocking of nearby drains and stream and pollution of physical environment. Proper waste management will however be taken into consideration and proper dumping done according to the requirements and directions of the Environment Department of Mombasa County Government and NEMA.

### **8.4.5.2 Waste water including human waste**

#### **➤ Sanitation concerns for construction crews:**

The massive sea of humanity to be engaged in the construction have specific sanitation needs whose inadequate supply would see any available bush, gully, etc. turned into a toilet with attendant threats to public health due to open defecation.

#### **➤ Concerns from the contractor's camp**

Concerns from Contractors camps are many and diverse including the following:

Cases of effluent water from Contractors' kitchens and bathroom areas being released into nature in raw form in-spite of reigning legislation are increasingly common and this has potential to compromise quality of water supply

#### **8.4.6 Increased Water Demand**

During the construction phase, the construction works will create additional demand for water in addition to the existing demand at the project area. Water will mostly be used in the following activities:

- Concrete works including curing;
- Controlling dust on site;
- Washing of machinery and equipment;
- Preparing of mixtures, including water based emulsion paints;
- Washing and drinking by construction workers;
- General cleaning; and
- Landscaping.

Increased water demand could result in increased Project costs, increased health risks due to shortage, and increased soil erosion if not properly managed.

##### ➤ **Pressure on fresh water resources:**

Freshwater is not easy to come by within Mombasa inclusive of proposed project area where the main supply is from private boreholes, and wells.

The design process must allow for alternative source of water such as borehole drilling supplying construction site thus averting pressure on community water sources. The option of sinking boreholes that can later on revert to communities should be explored.

#### **8.4.7 Increased Energy Consumption**

The proposed Project will consume fossil fuels to run transport vehicles and construction machinery. The machinery will include: construction vehicles and compactors. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. Electricity will also be used during the construction of the proposed Project. It should be noted also that manual labour as a source of energy will mainly be used during construction of the proposed Project. Efficient management of energy consumption is therefore required for optimal performance of the Project and to control Project costs.

#### **8.4.8 Increased Storm Water Runoff from New Impervious Areas**

Construction of the proposed Project and access driveway could result in additional runoff through creation of impervious areas. These areas generally have higher runoff coefficients than natural area, and increased flood peaks are a common occurrence in developed areas. The storm water runoff is likely to increase the flooding along access roads and low-lying areas.

#### **8.4.9 Extraction and Use of Construction Materials and Procurement**

Construction materials such as hard core, ballast, cement, rough stone and sand required for the construction will be obtained from quarries, hardware shops and sand harvesters. These materials are mainly extracted from natural resource bases such as river banks, and forests among others. Since substantial quantities of these materials will be required. The availability and sustainability of such resources at the extraction sites will be negatively affected as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be

significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts.

#### **8.4.10 Oil and Fuel Spills**

The machinery to be used in the Project will have moving parts which will require continuous oiling to minimize the usual corrosion or wear and tear. Possibilities of such oils spilling and contaminating the soil on site are real. Likewise, combustion processes would require fuels, which may lead to fuel spills. Irrespective of these possibilities, no significant adverse effects are expected as a result of fuel and oil spills given the scope, nature and duration of time to be taken on the operation of the proposed Project.

Where oil and spares are poorly harnessed, the same are likely to compromise aesthetic quality with potential wash off into water resources. Further, soil already contaminated by oil immediately becomes hydrophobic and can no longer attract or hold water hence rendering it ecologically and agriculturally inert.

#### **8.4.11 Potential Interference with Operations of Mombasa Port**

- ✓ Proposed project construction will require partial closure of Likoni Channel for extended periods of time which is likely to interfere with smooth operations of Mombasa Port (the largest sea port in East Africa) whose handling of imports drives the economies of Kenya and the region.
- ✓ Without these imports, the economies of Kenya and the EAC which are powered largely by imported oil, would grind to a halt.
- ✓ Imports comprise 87 per cent of the total weight of goods handled by Mombasa Port with 78% mainly comprised of oil and industrial raw materials being destined for the Kenyan market, with the remainder transiting to the region.
- ✓ Uganda remains the largest of the hinterland destinations, accounting for 81.9 per cent of the transit traffic (equivalent to 6.34 million tonnes) followed by South Sudan, Tanzania, Democratic Republic of Congo, Rwanda, Somalia, Burundi and Ethiopia in that order.
- ✓ Cargo handling is also a multi-billion trade bringing together many stakeholders including shipping lines, merchants, cargo handlers and transporters, service providers etc. all of whom are likely to suffer economic shocks any interference with port operations.
- ✓ The proponent of the proposed project has spent numerous hours negotiating with the KPA on modalities of managing the construction process so as to minimize impact on port operations but, this threat remains real.

#### **8.4.12 Social Concerns**

##### **The whole question of Basic Rights at the Workplace:**

A trend is emerging in Kenya whereby most construction contracts are won by foreign based companies better known for cost effective delivery on contracts but with huge attendant

environmental and social costs including contempt for contractual obligations sealed in law, deployment of language-challenged supervisors, poor community integration, poor respect for workers' rights inclusive of basic pay, working hours, grievance procedures among others.

It is becoming increasingly common to read of violent confrontations between communities and foreign workers, labour disputes, worker grievances etc., largely traceable to poor work ethics.

➤ **Social Vices associated with construction crews:**

Construction activity will engage and deploy numerous people on a daily basis to villages which have otherwise been culturally isolated from the rest of the world.

Such exposure is likely to occasion cultural shocks and tendencies associated with multitudes to the detriment of local residents.

Core hazards would include proliferation of social vices key among them commercial sex, drug and alcohol abuse, juvenile delinquency, among others, whose pressure points would manifest in explosion of teenage motherhoods, breakdown of homes, escalation of sexually transmitted diseases including HIV and AIDs, social disorders, among others which would rapidly erode gains associated with cash injection from construction activity.

#### **8.4.13 Impact on existing infrastructure and services:**

The project is likely to interface with several service lines such as an oil pipeline, water pipelines, power transmission and distribution lines, national highways etc. all of which serve vital functions in the local, national and regional economies and whose disruption is likely to occasion massive suffering.

#### **8.4.14 Generation of Soil Sediments**

**Impacts from Cutting and Spoiling:**

Release of sediments into marine waters from drilling and excavation for the towers and Terminal piers (**Drive and Return Stations**) has potential to interfere with marine aquatic ecosystems through reduction in light penetration or sedimentation of the ocean floor both of which have consequences to fauna and flora.

A comprehensive system for managing the earthworks to militate against soil deposition into the shoreline will have to be developed by the engineering team (Legal Notice No. 19 of EMCA 1999- The Environmental Management and Co-ordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations, 2009).

#### **8.4.15 Concerns on Biodiversity**

Issues here include:-

➤ **Introduction of Alien Species in Ballast Water:**

Mobilization and delivery of marine construction equipment will most likely entail use of ballast water whose disposal has previously been associated with introduction of alien species.

Though the extent of introduction of alien species at Mombasa Port from the more than 100 vessels that call into the port remains unknown, this threat remains real given that the contractor

will import marine construction plants from offshore and the Convention on Ballast Water (MARPOL73/78) requires to be adhered to.

➤ **Potential for introduction of Invasive Species from Construction Material:**

One of the most common adverse impacts of construction activity in Kenya is the introduction of invasive species brought in mainly in contaminated building material- stones, sand, ballast, etc.

Once introduced, the species spreads quickly to colonize the area and become a noxious weed, of which the best example is the *Prosopis chilensis* (Mathenge) tree.

In case of the proposed project, there is fear that introduction of the Mathenge weed close to the intertidal areas has potential to completely colonize and destroy the mangrove ecosystem with very costly impacts even to local livelihoods.

The environmental specialist at Construction Stage will require monitoring sand sourcing very strictly and undertake surveillance for emergence of *Prosopis* seedlings at the proposed project location.

➤ **Impact on Endangered Floral Species:**

No tree species of conservation interest on account of being either Neither Threatened or Vulnerable were recorded in the proposed project location.

While development of the proposed project and approach roads may not affect each of the said species, increased pressure on land anticipated from commissioning of the project will completely change their habitats leading to increased threats to their existence.

➤ **Loss of Biodiversity in Undisturbed Sites:**

Undisturbed sites such as sacred and isolated groves are known to be reservoirs of floral biodiversity including germplasm stored in the soil gene reserve.

While efforts were made to map standing biodiversity along the proposed project frontage shoreline, the same was not done for soil gene reserves in which case, their reservoirs are not fully appreciated more so, given the long period of viability dispelled by seed of some indigenous species.

Stripping of top soil in such sites could amount to major loss of gene banks of unknown value.

➤ **Impact on Habitat for Birds:**

Proposed construction will have potential impact on their habitats/shelter, cover from prey, shelter from sun-heat, and foraging grounds.

Birds that were covered in the survey were terrestrial and coastal/marine bird species.

Some birds are insectivorous feeding on insects, seeds and fruits; others predate on other birds. Common characteristics with the birds are that they move from one place to another looking for food. As they move they rely on connectivity of vegetation mosaic for local movement, foraging and cover.

Construction works will therefore create breaks to the connected habitat for the birds.

Bird preys may be made vulnerable to predators due to limited vegetation cover.



Clearance of vegetation might reduce foraging grounds for some species of birds.

Construction works and indirect development will considerably affect; for instance the ground feeding birds that depend on seeds from grasses and insects, canopy feeding birds, and birds that derive their food from swamps.

Associated to developments of the project, such as expansion of settlements and trading centres, will potentially favour growth of scavenger bird populations such as the Indian Crow that will prey on other species.

➤ **Impact on Mammals:**

Most of the mammals occurring in the area are rodents. These include rats, elephant shrew, hedgehog, porcupine, squirrels, moles, African hare.

Other include mammal species is monkey. Monkey and squirrel prefers areas with trees, while others prefers grass areas, woodland and near farm areas. The construction works has potential of destroying habitats for the mammals.

The various groups will be affected in varying magnitude depending on the habitat affected most.

Ground movements of ground moles across the land will be prevented by the hard strata and compressed layers of the terminals (Drive and Return Stations).

Clearance of trees and shrub species might reduce habitat ranges and foraging areas for the monkeys and squirrels.

#### **8.4.16 The Carbon Footprint Factor**

##### ***GHG emissions in Construction Activity:***

This ESIA Study assumes that all material to be used in construction works will be sourced locally as a way of cutting down on carbon miles.

Irrespective of this, transportation to the point of construction will involve burning of fossil fuels and attendant release of GHG gases into the atmosphere. The greater the distance travelled, the more the GHG released.

Though carbon emission will be greatly reduced through local sourcing of materials, importation of oil-based products such as fuels, lubricants, bitumen and the steel required in drainage structures has a huge impact on carbon emissions.

## **8.5 Positive Impacts during Operation Phase**

Provision of a functional rope and cable system connection between Mombasa Island and Mombasa Mainland South is economically and politically strategic as it will enhance connectivity of Mombasa to the southern markets inclusive of Tanzania and entire COMESA region.

### **8.5.1 Provision of a functional connection to Mombasa Mainland South:**

Plans to provide a rope and cable connection between Mombasa Island and mainland south have been mooted since 2012 and the realization through the proposed project will be an achievement on its own.

It will be a major and historic leap towards enhancing political integration of the South Coast Region which has always felt alienated from the rest of country and will be affirmative in expanding the economic base of Mombasa County.

### **8.5.2 A New Landmark for Mombasa**

Upon commissioning, the proposed project will be reputed to be the biggest express cable car on the African Continent and without doubt, will be the most imposing and domineering structure within Mombasa and the neighbourhoods, towering high over the Likoni Channel and in the process, provide a new reference point and landmark for Mombasa.

This essentially will redefine the Mombasa landscape.

### **8.5.3 Provision of a Second Southern Exit for Mombasa**

Mombasa currently relies on the Likoni Ferry Service to cross traffic (pedestrians and motorists) to and from the Mainland South which is a precarious arrangement in case of failure.

From traffic counts on ferry users conducted as part of the pre-Feasibility Study, it was observed firstly, Mombasa bound traffic is dominant in the morning while in the evening, the reverse is true which implies that Likoni is essentially a dormitory town which accommodates the Mombasa Town Labour force.

Thus, delays in moving this traffic volume to work must be costly to the Mombasa economy and the proposed re-routing of motor vehicles to the proposed project while civilians cross to the CBD either on board public transport or through the ferry will both eliminate traffic conflict on the ferry and greatly relief pressure on the service.

Elimination of traffic conflict on the Ferry Service will also greatly reduce incidence of accidents on pedestrians.

Past suspension of ferry services forced commuters to wait for hours to get to their homes while emergency evacuation suffers a similar fate.

Provision of a second crossing option in form of the rope and cable system will indeed come as a big relief to both planners and commuters.

### **8.5.4 Enhanced Trade with Mombasa's Southern Hinterland:**

Removal of transport bottlenecks posed by the ferry crossing point will facilitate trade between Kenya and the COMESA Region down to Zambia.

As well, the slump in sectors such as tourism, mining, agriculture etc. in the south coast will ease on account of the improved operating environment.

### **8.5.5 Enhanced Quality of life for MMS Residents:**

The Mombasa hinterland in Likoni and beyond will greatly benefit from functional road connection to the CBD which will henceforth enhance service delivery including response to medical emergencies.

### **8.5.6 Decongestion of the Likoni Channel**

The KFSL currently deploys 4 vessels to transport passengers and vehicles during peak demand hours.

However, Ferry service is often discontinued to allow passage for vessels and pilot boats destined to and from Mombasa Port which often leads to congestion of the channel.

Indeed, the KFS are convinced that deploying additional ferries to expand capacity would only further congest the channel and increase chances for marine accidents.

Reduced demand for ferries as expected from traffic diversion to the bridge is a step towards mitigating marine congestion and attendant hazards.

### **8.5.7 Increase of Revenue Base for Kenya Ferry Service**

Operations of the Kenya Ferry Service are financed by the National Government to the tune of 65% with only 35% being financed from own revenue estimated at KES 1 million daily and mainly accruing from levies charged on motor vehicles using the Ferry.

With the implementation of the proposed project the KFSL being the concessioners stands to gain and will likely raise its revenue stream, with charges from using the cable car express and facilities.

Eventually, KFSL may become entirely reliant on the project after 25 years period is over (i.e. when the project shall be handed over to the KFSL).

## **8.6 Negative Impacts during Operation Phase**

Adverse impacts from the operation phase have been identified as follows: -

### **8.6.1 Visual Intrusion/ Barrier in the Mombasa Skyline**

Mombasa skyline is largely dominated by low buildings with the tallest building – Bima towers being only 67 meters tall.

Within the proposed project location, the 45.6m high Cannon Towers is the highest building while at the Port Reitz Shoreline, the KPA Control Tower cuts into the skyline at 90 metres.

South of the KPA Tower and across the Channel, all buildings are essentially single storied and hardly ever emerging beyond the general tree canopy height.

The proposed project structure will therefore comprise a drastic, irreversible intrusion into the Mombasa skyline especially overhead the Likoni Channel.

### **8.6.2 Hazards of Marine accidents around the Drive Station Pier:**

The main Drive station pier will be erected in the shallow end of the Mombasa Island ramps close to KFS offices and Port Police station.

Introduction of the pier/tower will create a major physical obstacle which could impede docking and undocking of ferries with possibility of accident occurrence.

This incidence is considered significant given that this zone is frequented by light vessels approaching the engineering workshops

### **8.6.3 Hazards associated with Oil and Chemical Spills into the Channel:**

Vehicles contribute a number of pollutants to urban storm water in addition to metals and volatile organic compounds.

Engine coolants and antifreeze containing ethylene glycol and propylene glycol can be toxic and contribute to water quality impairments.

Oil, grease, and other hydrocarbons related to vehicle use and maintenance also pollute urban runoff.

They come from disposal of used oil and other fluids on the ground or into storm drains, spills of gasoline or oil, and leaks of oil and other fluids from vehicles.

In addition, hydraulic oil is ubiquitous at industrial sites and is difficult for facilities to control at the source, contributing these hydrocarbons to storm water. Runoff from residential car washing also contributes oil and grease to the storm water system.

The vehicle exhaust that is deposited on roads also contributes dioxins and polycyclic aromatic hydrocarbons (PAHs), highly toxic chemicals that persist in the environment.

PAHs also leach from coal tar-based sealants used on paved roads and parking lots.

Requirements of The Prevention of Pollution in Coastal Zone and other Segments of the Environment Regulations (EMCA 1999), 2003 are quite clear on this.

### **8.6.4 Increased Atmospheric Emissions and Noise from Motor Vehicles:**

From baseline surveys undertaken as part of this study, levels of atmospheric pollutants-Lead (Pb) and Noise in the project area currently exceed statutory limits while particulate matter is also quite high.

Upon commissioning of the new project and access roads and diversion of traffic, there is likely to be a sharp increase in noise levels beyond the tolerance limits

The problem is likely to be more severe in the Mombasa Island where the viaduct will bring the noise source close to neighbouring offices and High-rise residential areas.

### **8.6.5 Overall Strategic Impacts**

#### **➤ Population Explosion and Increased Pressure on Infrastructure:**

One of the stated goals for proposed project is to anchor development of Mombasa Mainland South (MMS) area especially through support to the proposed Mombasa Special Economic Zone (SEZ).

Once the project is commissioned, land use in the MMS area which is currently dominated by informal settlement is likely to see an upsurge in High-rise residential and commercial estates with attendant increase in population, pressure on infrastructure and services.

#### **➤ Encroachment on Fragile ecosystems**

Thus, for a place that currently lacks basic services such as organized/ centralized water supply, sewerage system etc., unless the new demand is properly managed, immitigable pressure on

environmental resources on account of increased solid and liquid effluent, non-planned settlements, encroachment on fragile areas are likely to ensue.

➤ **Functional Connection between MI and MMS**

The whole development of a functional connection between Mombasa Island and the MMS inclusive of the proposed special economic zone presents a new planning opportunity whose exploitation can help achieve the proposed economic transformation in the south coast area.

**8.7: Salient Impacts**

- Born of the impact analysis highlighted in **8.2-8.4** above, salient observations emerge as follows:-
- The bulk of adverse impacts will manifest at the construction stage while benefits will mainly accrue from commissioning and operation of the project and associated infrastructure.
  - Creation of business opportunities during design and construction activity for both foreign and local contractors remains the most salient positive impact at construction phase
  - Interference with operations of Mombasa Port and attendant economic shocks on account of periodic closure of the Likoni Channel during construction emerged the most drastic adverse effect whose impact is likely to be felt in the entire hinterland spreading into rest of Kenya, Uganda, South Sudan, Rwanda, Burundi, DR Congo and northern Tanzania.
  - Hazards (pollution, illegal activity, accidents) associated with project construction in a marine area are a major concern at construction phase.
  - Upon commissioning, the new rope cable system will connect the mainland south to the island and by extension, to the rest of Kenya thus bridging a physical barrier that has previously hindered socio-economic and political integration of the south.
  - The proposed project will contribute to enhance access to markets as far south as the COMESA Region and in the process, stimulate greatly needed economic recovery in Kenya's South Coast.
  - Operation of the project (and its linkage to the proposed Mombasa Southern Bypass Road and the Special Economic Zone are both) is likely to open up the Likoni and adjoining Kwale County for economic development which will attract investment in real estate and commercial ventures with attendant influx of population of both investors and speculators, Unless proper planning is adopted, especially with regard to land zoning and provision of infrastructure and services.
  - Non sustainable development is likely to ensue leading to resource and environmental degradation

**Table 8. 1: Summary of Anticipated Impacts**

S/No.	Impacts	Activity, Area and Pollutant Source	Negative Impacts		Positive Impacts		No Impacts
			Short Term	Long Term	Short Term	Long Term	
<b>A</b>	<b>Construction Phase</b>						
1	Employment Opportunities	Skilled labour, unskilled and semi-skilled labour.			√	√	
2	Provision of market for supply of building materials	Making available the raw materials needed for construction of the proposed Project.			√		
3	Provision of market for food vendors and owners of the nearby business premises	Supply of food to the construction and purchase of items from the nearby business premises.			√		
6	Local increase of construction traffic	Transportation of construction materials to site and disposal of demolished material from site.	√				
7	Noise pollution and vibration	Use of compactors, vibrators and communication from construction workers.	√				
8	Occupational health and safety	Accidental fall, injuries from falling objects and hand tools etc.	√				
9	Impact on air quality	Emissions from DGs, SO <sub>2</sub> , NOX, SPM, CO, PM etc.	√				
10	Disposal of solid and liquid waste	Earth from excavations, food remains and waste water.	√				
11	Increased water demand	Water used for mixing of concrete and other construction works.	√				
12	Energy consumption	Use of manual labour, and fuel used in the DGs and other construction machines including transportation vehicles.	√				
13	Increased storm water runoff from new impervious areas	Storm water runoff from the pavements.	√				
14	Extraction and use of construction materials and procurement	Extraction of sand, ballast, cement etc.	√				
15	Oil spills	From construction machines within the proposed Project site.	√				
<b>B</b>	<b>Operation Phase</b>						
1	Employment Opportunities	Skilled and semi-skilled labour, including security guard and landscapers.				√	

S/No.	Impacts	Activity, Area and Pollutant Source	Negative Impacts		Positive Impacts		No Impacts
			Short Term	Long Term	Short Term	Long Term	
2	Increase in revenue to national and local authorities	Through tax paid.				√	
3	Increase aesthetic value of the surrounding area	Aesthetic of the surrounding area.				√	
4	Solid waste generation	Industrial waste					√
6	Energy consumption	KPLC mainly					√
7	Increased water use	Industrial water use					√
9	Disposal of waste water	Water for use in sanitation		√			
10	Increased storm water flow	Rainfall.		√			
<b>C</b>	<b>Decommissioning Phase</b>						
1	Rehabilitation	Landscaping				√	
2	Employment opportunities	Skilled, semi-skilled and unskilled labour.			√		
3	Noise and vibration	Demolition activities.	√				
4	Solid waste generation	Demolition activities.	√				
5	Occupational health and safety impacts	Accidental fall, injuries from falling objects and hand tools and dusts emissions which can lead to respiratory diseases.	√				
6	Reduction of industrial facilities	Demolition of hydro power generating equipment		√			

## CHAPTER 9: MITIGATION MEASURES AND MONITORING PROGRAMMES

### 9.1 Overview

This Chapter highlights the mitigation measures and monitoring programmes for the anticipated negative impacts envisaged during the implementation of the proposed project. The potential impacts and the possible mitigation measures have been analysed under four categories: Design phase, Construction phase, Operational phase and Decommissioning phase.

The consultants have adopted a mitigation strategy involving; the review of the chronology of events towards development of the proposed project as captured in section ***E5.13 The Project Implementation (milestones)Schedule***; revealing the tortuous path previously taken in evaluating diverse options to fine-tune a package that delivers on project goals within optimal financial, social and environmental costs.

Thus, the core mitigation strategy in the project was to review and adopt an alignment that served to avoid, reduce and manage environmental and social concerns as follows:-

- ✓ Avoiding a design option which would disorganize operations of the Kenya Ferry Service as this would disastrously shut down Mombasa with attendant socio-economic and political costs.
- ✓ Selecting an alignment for the proposed project that avoided pouring traffic into Mombasa CBD as a strategy to mitigate traffic congestion.
- ✓ Avoiding alignments with potential to impact on heritage resources such as the Mama Ngina Waterfront Park.
- ✓ Selection of an alignment that avoided infringing on existing business properties, shelter and livelihoods.
- ✓ Efforts to link proposed project design to the Infrastructure Master plan for Mombasa City especially in favouring of the Western Express Corridor for enhanced traffic management.
- ✓ As such, to the largest extent possible, the strategy and action plan in formulating the mitigation measures is to prevent impact occurrence, a position secured by ensuring that recommendations made here-in are incorporated into and influence final outcome of the project design process in which case, the latter process also becomes part of the mitigation programme.

In pursuit of this strategy, all mitigation measures will be sealed at Detailed Design Stage by adopting measures as follows:-

- ***The Environmental and Social Management Plan unveiled in Chapter Ten below*** will be integrated into the Final Design Report- as a standalone chapter and also to moderate design decisions



- The same will be provided for in the BOQs to ensure funding allocation for environmental and social mitigation
- Clauses binding parties to affirmative action on the ESMP will be integrated into Contracts for Construction to ensure that the contractor is legally bound to implement impact mitigation.

## **9.2 Mitigation of Design Stage Related Impacts:**

The **Impact Mitigation Plan** summarized in **Table 9.1** below reflects respective action at the design stage of the proposed project.

Site disturbance during field surveys have been minimized through use of existing tracks to access sites of interest and always to avoid any damage.

As well, for field work, sober and serious minded survey teams were selected and sensitized on the need to observe safety requirements during enumeration and site surveys and this has greatly mitigated incidence of accidents.

## **9.3 Mitigation of Construction Stage Related Impacts**

### **9.3.1 Reduction of Local Construction Traffic**

Construction activity will impose severe restrictions to traffic movement, which will be felt in the entire city. The Proponent (LCE and KFSL) shall work to create a traffic management solution in conjunction with both KeNHA and the Transport and Infrastructure Department of MCG. A Traffic Management Plan will be developed and disclosed to all stakeholders, and implemented to the City Roads. The contractor will also use signs and barriers to direct vehicles and pedestrian traffic as needed around the construction site. Some activities may also be scheduled during off-peak traffic times to minimize impacts

### **9.3.2 Minimization of Impacts Associated with Material Sourcing and Transport**

- ✓ Material sourcing should seek to exploit existing quarries rather than open new ones.
- ✓ Any new quarries opened will be required to meet all statutory requirements including an environmental license issued by NEMA.
- ✓ Local sourcing of quality material will cut down on both financial and environmental costs associated with emissions.
- ✓ In all cases, preference will be given to material from quarries operated from grid power supply.
- ✓ As well, the Contractor will be bound to deploy a serviceable fleet to ensure minimum emission levels.
- ✓ Material supply to construction sites will seek to utilize existing road network where possible while any new opening should target sites earmarked for pavement development.
- ✓ In the event that new access routes will require to be opened especially at MMS, the same should target areas reserved for rural roads so that, the same will be graded and serve the community both during and after road construction.

### **9.3.3 Minimization of Disruption of Existing Infrastructure and Service Lines**

Two major pipelines lie across the proposed project site in both MI and MMS while the entire MI has an intensive network of water supply and drainage lines.

The contractor will provide alternative connections prior to displacement of target sections. As well, where sections of the pipeline will be replaced, the aim should be to always replace with better quality materials.

The Contractor will put in place a Construction Management Plan to guide orderly scheduling, phasing and conduct of construction activity

### **9.3.4 Minimization of Noise and Vibration**

The Proponent of the proposed Project shall put in place several measures that will mitigate noise pollution and vibration arising during the construction phase. The following noise-suppression techniques will be employed to minimize the impact of temporary construction noise at the Project site.

- Install portable barriers to shield compressors and other small stationary equipment where necessary.
- Prescribe noise reduction measures if appropriate e.g. restricted working hours, transport hours and noise buffering.
- Consult with the surrounding community on the permissible noise levels and best working hours.
- Use quiet equipment (i.e. equipment designed with noise control elements).
- Co-ordinate with relevant agencies regarding all construction activities in the Project area.
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.
- Construct mainly during the day. The time that most of the neighbours are out working.

### **9.3.5 Minimization of Interference with Mombasa Port Operations**

Through consultation with the KPA's Operations Department, strategies for forestalling pro-longed closure of the Likoni Channel during proposed project construction have been identified as follows:-

- ✓ Proposed project construction will be approached from the periphery (shoreline) and will always leave on navigable channel available for use by vessels
- ✓ KPA should adopt a convoy method where many vessels are held in the waiting area, then cleared to enter or leave the port in convoy to optimize on time,
- ✓ Coordination of all operations/movements of buoys with the Control Tower to avoid conflict with vessels

- ✓ All construction craft will flash the red hazard light at all times when in motion so as to warn all other users of the channel.
- ✓ Despite all measures identified, conflict between proposed project construction and port operations remains a major concern whose effective management will require, among others, a very strict management of the Contract for Works.

### 9.3.6 Minimization of Impacts on Biodiversity and Carbon Sink

Measures will be taken as follows:-

#### ➤ *Conservation of sensitive flora and fauna*

- Flora and fauna mapping and screening against the IUCN Red List undertaken as part of this ESIA indicated that no species considered endemic, threatened, endangered or locally important are found within the project location.
- Secondly, all habitats that could be displaced by the proposed project occur extensively in the area which allows room for affected populations to re-establish and recover but this notwithstanding, measures will be taken as follows:-

(i) All trees located in the proposed project site but outside of Drive and Return Drives specific locations will be left intact,

(ii) Preservation of the biodiversity of shrines:

Given that Kaya forests have been maintained intact over generations, they are important reservoirs of biodiversity-more so, soil gene banks.

Thus, in the extreme case where non disturbed sites will be displaced by the proposed project, the above-ground genetic resource will require to be mapped for re-introduction elsewhere.

More critically, all top soil from such sites will be recovered and re-deposited at designated undisturbed sites (possibly other kaya sites) where the gene bank can be preserved and recovered through natural germination.

Requirements of the Environmental (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 shall apply.

(iii) Protection of the Endangered Species:

- ✓ Ten tree species which are registered by the IUCN as Near Threatened, Vulnerable and Endangered were recorded on the slopes of the Mweza Creek but further investigation revealed that all species occur commonly in areas outside of the proposed project boundaries in which case, the project construction does not further endanger the same.
- ✓ Towards protection, seedlings of the same species will be propagated and used in re-forestation of sites disturbed by the proposed project.
- ✓ A community outreach programme will be undertaken, as well, to promote conservation of biodiversity including the two species.

(iv) A reforestation plan will be implemented to replace the trees to be displaced by the proposed project and to cater for those to be lost otherwise.

- ✓ Reforestation will aim to replace lost trees as documented above giving priority to the special concern trees.
- ✓ Locally active conservation groups will be strengthened to bulk seedlings of locally important trees some of which will be used in reforestation and planting on communal sites.

(v) Mitigation against introduction of alien species:

All requirements of MARPOL 73/78 will be observed by the Contractor under close monitoring by the KMA in capacity of designated MARPOL Focal Point in Kenya.

(vi) Insurance against possible introduction of colonizing species:

Associated with material sourcing is the question of alien species of which *Prosopis chilensis* and *Leceana lucocephala* are the worst culprits in the coastal region. Both weeds establish from seeds ferried in construction material.

Thereafter, the weeds form aggressive colonies which turn impossible to control especially where roots can access sub-surface saline water.

Mitigation of this occurrence will require that sand be source only from fluvial coastal deposits exploited fresh without bulking and provided that the organic layer is stripped and isolated.

The Magarini Cooperative society site is recommended for this purpose.

### **9.3.7 Minimization of Impacts on Habitat for Avian Fauna:**

There is no designated Important Bird Area (IBA) within the proposed project site. The nearest site of this nature is the Shimba Hills Forest.

However, Kenya is a signatory to CITES (Convention on International Trade in Endangered Species of Fauna and Flora), the Bon Convention (Convention on Conservation of Migratory Species) and its daughter Agreement – the AEWA (Afro-Eurasian Water Birds Agreement) all of which are deemed relevant to the proposed project where some of the 67 birds occurring within the area are featured in the IUCN RED List.

One of the 12 special concern birds is endemic to the Kenyan Coast but, this notwithstanding, all birds occur extensively elsewhere in Kenya and the region and given that this habitat range is extensive, development of the proposed project has no chance of significantly affecting the habitat of these species.

However, intensive monitoring of populations is recommended.

### **9.3.8 Minimization of Landscape Change during Construction**

Landscape change within the Drive and Return Station Terminals in both MI and MMS shall be irreversible and the same will be aggravated by the aerial projection of the design, which militates against reforestation to tone down the contrast.

Initial consultations conducted for this ESIA have identified this impact as being a major concern for many people and the recommendation is for stakeholder participation to be expanded at the DD so as to allow as much public and professional input on the bridge design as possible.

### **9.3.9 Minimization of Loss and Damage to Cultural and Heritage Resources**

Loss of Cultural Heritage will be mitigated through:-

#### ***Zoning out of Cultural Heritage sites for preservation:***

- Under this category were identified sites such as Mama Ngina Gardens and surrounding areas.
- The same study should be expanded at Detailed Design to map out all resources and clarify status of the Sultan of Zanzibar Palace for which information is not currently available.

#### ***Incorporation of Chance Find and Recovery Procedures:***

- In line with requirements of OP 4.11, the services of the NMK will be retained during construction stage to facilitate monitoring for chance finds which will then be recovered as appropriate.

#### ***Zoning out Shrines and Groves for Protection:***

- Selection of the project location and alignment of approach roads took care to avoid traversing all known shrines and minor groves.
- Where any grounds will be traversed, respective elders and leadership were contacted for guidance on mode of reparation and concurrence.

### **9.3.10 Environmental, Health and Safety Measures in the Construction Area**

Contingency plans will be prepared covering all aspects of Occupational Health and safety during construction.

Key among these is the need to deploy sober staff under supervision, enforcement of a code of operations backed up by insurance cover for all staff.

A strict system for ensuring observation of a drug, alcohol, violence free working environment should be enforced.

Measures have been identified as follows:-

#### ***(a) Mitigation of Impacts on General Health and Safety:***

The Contractor shall comply with all standard and legally required health and safety regulations as promulgated by Occupational Health and Safety Act and the Factories and Other Places of Work Regulations.

The Contractor shall provide a standard first aid kit to field staff;

A comprehensive code of operations will be developed, implemented and supervised to ensure that Likoni Channel remains clear for vessels to pass. Economic sanctions should be imposed under contract to discourage non-compliance.

The Contractor shall ensure that staff is made aware of the risks of contracting or spreading sexually transmitted diseases, particularly HIV/AIDS and how to prevent or minimize such risks;

The Contractor shall be responsible for the protection of the public and public property from any dangers associated with construction activities, and for the safe and easy passage of pedestrians and traffic in areas affected by the construction activities;

All works which may pose a hazard to humans and domestic animals are to be protected, fenced, demarcated or cordoned off as instructed by the RE. If appropriate, symbolic warning signs must be erected;

Speed limits appropriate to the vehicles driven are to be observed at all times on access and haul roads. Operators and drivers are to ensure that they limit their potential to endanger humans and animals at all times by observing strict safety precautions;

No unauthorized firearms are permitted on site;

The Contractor shall provide the appropriate Personal Protective Equipment for staff

***(b) Fire Prevention and Control:***

The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of his activities on site;

The Contractor shall ensure that there is basic fire-fighting equipment available on site;

Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires. 'Hot' work activities shall be restricted to a site approved by the Resident Engineer (RE);

Smoking shall not be permitted in fire hazard areas.

The Contractor shall ensure that all site personnel are aware of the fire risks and how to deal with any fires that occur. This shall include, but not be limited to regular fire prevention talks and drills and, posting of regular reminders to staff.

Any fires that occur shall be reported to the RE immediately and then to the relevant authorities.

In the event of a fire, the Contractor shall immediately employ such plant and personnel as is at his disposal and take all necessary action to prevent the spread of the fire and bring the fire under control;

Costs incurred through fire damage will be the responsibility of the Contractor, should the Contractor's staff be proven responsible for such a fire.

***(c) Emergency Procedures:***

The Contractor shall submit a Method Statement/ Comprehensive Health and Safety Plan covering the procedures for the main activities which could generate emergency situations through accidents or neglect of responsibilities.

These situations include, but are not limited to accidents at the work place including falling of the platforms, accidental fires; accidental leaks and spillages and vehicle and plant accidents.

Specific to accidents at work place:

- ✓ The Contractor shall ensure that his employees are drilled in the procedure for working in sensitive areas including marine areas
- ✓ He shall comply with all safety conditions imposed by the Kenya Maritime Authority and other Agencies to ensure safety of workers at all times.
- ✓ The Contractor shall also ensure that the necessary equipment for work in hazardous area – protective boots, PPEs, helmets, etc., are provided
- ✓ The Contractor will continuously train employees on safety procedures including use of PPEs.

***(d) Mitigation of HIV/AIDS:***

The contractor in consultation with implementing agencies responsible for HIV/AIDS will mount educational campaigns to keep workers sensitized on the reality of this pandemic

He shall monitor activities regularly to assess effectiveness and impact.

This should include an initial, interim and final assessment of basic knowledge, attitude and practices taking account of existing data sources and recognizing the limitations due to the short timeframe to show behaviour change.

The assessment will be supported by qualitative information from observations on workers behaviour.

***(e) Mitigation of Solid Waste:***

- ✓ All storage and construction sites are to be kept clean, neat and tidy at all times.
- ✓ No burying or dumping of any waste materials, metallic waste, litter or refuse shall be permitted.
- ✓ The Contractor must adhere to Environmental Management and Co-ordination (Waste Management) Regulations 2006.
- ✓ The Contractor shall implement measures to minimize waste and develop a waste management plan to include the following:-
- ✓ All personnel shall be instructed to dispose of all waste in a proper manner;
- ✓ At all places of work the contractor shall provide litter collection facilities;
- ✓ The final disposal of the site waste shall be done at the location that shall be approved by the RE, after consultation with local administration and local leaders;
- ✓ The provision of sufficient bins (preferably vermin and weather-proof) at the camp and work sites to store the solid waste produced on a daily basis;

- ✓ Wherever possible, materials used or generated by construction shall be recovered at the conclusion of each task for safe disposal including recycling.
- ✓ Provision for responsible management of any hazardous waste generated during the construction works.

**(f) Wastewater and Contaminated Water Management:**

- No grey water runoff or uncontrolled discharges from any site or working areas (including wash-down areas) to adjacent watercourses and/or water bodies shall be permitted;
- ✓ Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site.
- ✓ This particularly applies to water emanating from concrete batching plants and concrete swills;
- ✓ The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses including the creek areas;
- ✓ All concrete works should be covered with plastic sheeting, tarps or another type of barrier until fully cured
- ✓ Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained and the water table not endangered;
- ✓ Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted;
- ✓ The Contractor shall notify the RE of any pollution incidents on site.

**(g) General Materials Handling, Use and Storage:**

- All materials shall be stored within the Contractor's camp unless otherwise approved by the Resident Engineer (RE);
- ✓ Stockpile areas shall be approved by the RE;
- ✓ All imported fill, soil and/or sand materials shall be free of weeds, litter and contaminants
- ✓ Sources of imported materials shall be listed and approved by the RE
- ✓ The Contractor shall ensure that delivery drivers are informed of all procedures and restrictions (including 'No go' areas) required;
- ✓ Any electrical or petrol driven pumps shall be equipped and positioned so as not to cause any danger of ignition of the stored product;
- ✓ Collection containers (e.g. drip trays) shall be placed under all dispensing mechanisms for hydrocarbons or hazardous liquid substances to ensure no contamination from any leaks is reduced;
- ✓ Regular checks shall be conducted by the Contractor on the dispensing mechanisms for all above ground storage tanks to ensure faulty equipment is identified and replaced in timely manner;
- ✓ Only empty and externally clean tanks may be stored on bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.



**(h) Control of Criminal Activity:**

- ✓ The Contract for Construction will criminalize any activity prohibited under Kenyan Law.
  - ✓ This will include smuggling, drug and substance abuse, illegal fishing, all forms of violence, discriminatory practices among others.
  - ✓ The RE Staff will conduct regular monitoring to track all complaints.
- **A Communication Plan will be put in place for purposes of ensuring timely dissemination of project related information to all stakeholders.**

## **9.4 Mitigation of Operational Stage Related Impacts**

- Proposed mitigation activities at this stage are focused on minimizing hazards associated with presence of a modern, state-of-the-art multi-gondola rope and cable system running across the 500 meter channel.
- The innovative passenger transport solution will operate seven days a week with a journey time of three to four minutes.
- The proposed project will consist of three components namely: two Stations (a Drive Station and the other Return Station), two Towers and Rope, and 25 running Cars.

### **9.4.1 Minimization of Storm Water Effects**

Rainwater runoff comprises of storm water, which flows into both surface water and ground water. Proper management of this resource ensures that storm water discharge is free from contamination. A good storm water management policy should include:

- Good housekeeping to avoid contamination of storm water;
- Provision of slit traps in storm water drains; and
- Regular inspection and cleaning of storm drains

### **9.4.2 Minimization of Solid and Liquid Waste Pollution**

➤ ***Disposal of Solid wastes during Operational phase***

- During the operational phase of the proposed project both biodegradable and non-degradable wastes will be generated. This type of waste is also referred to as garbage, refuse or trash and consists mainly of Bio-degradable waste which is food and kitchen waste, green waste paper and non-biodegradable wastes such as plastics, glass bottles, cans, metals and wrapping materials.
- The proposed project management will provide waste bins at strategic locations including offices, lounge and within the compound and each bin will be marked specifically for each type of waste as indicated here below:

**BIN 1:** Steel (metallic) waste;

**BIN2:** Glass waste;

**BIN3:** Fibre waste;

**BIN3:** Aluminium waste;

**BIN4:** Plastics waste;

**BIN 5:** Fabric/Foam waste, and,

**BIN 6:** Paper waste.

- These wastes will be collected by trucks on a daily basis and disposed at the Mombasa County Dumping sites.
- **Hazardous and Industrial wastes:** will be collected in bins located at various locations within the project area and will be collected and disposed at designated sites by Mombasa County Government.

➤ ***Waste water and human waste disposal during the Operational Phase***

- These wastes will be directed to existing washrooms

### **9.4.3 Minimization of Occupational Health and Safety Impacts**

- In order to prevent and minimize OSH impacts, the relevant laws, regulations, and guidelines should be implemented and followed.
- This shall help in identifying and pro-actively avoiding OSH risks.
- Personal protective equipment and supplies should also be sufficiently provided to all workers at the project location.

### **9.4.4 Minimization of Height Capping**

The prospect of a vessel with a draft height in excess of 69 m above the HWM trying to access the Mombasa Port in future is real though remote, given that the highest draft vessels - the Super Panamax category have a draft height of 54 m and the tendency in marine vessels size growth favours lateral extension.

However, given the dynamic and non-predictable nature of innovation, a vertical projection in vessel size growth could also be explored in future; in which case a 69m high structure across the Likoni entrance will render Mombasa unsuitable for such ocean vessels.

All is not lost though given that, both the Mbaraki area and the new Lamu Port do not suffer height limitations and are therefore accessible to vessels of any size category.

### **9.4.5 Minimizing of Visual Intrusion into the Mombasa Airspace**

Construction of the proposed project will permanently and irreversibly change the Mombasa skyline and this has no known mitigation.

It however presents an opportunity for change and for marking a new milestone and landmark for Mombasa treading the path blazed by the Statue of Liberty in the USA, Canadian National Tower in Canada, the London Bridge in UK, Eifel Tower of Paris and other major international landmarks that went on to become major landmark tourist attractions and earners of revenue.

To enhance this esteemed status, development and design of the proposed project should borrow and incorporate as much detail of the local heritage as possible which requires extensive consultation in the process.

#### **9.4.6 Minimizing of Exposure to Airborne Pollutants and Noise**

- According to the Kenyan noise regulations, the noise levels during the day at three sites exceeded the maximum permissible noise level of 50 dB(A) for a residential zone.
- The noise levels at all sites during the night exceeded the maximum permissible noise level of 35 dB(A) for a residence zone.

### **9.5 Mitigation of Negative Impacts during Decommissioning Phase**

#### **9.5.1 Minimization of Noise and Vibration**

The Proponent of the proposed Project shall put in place several measures that will mitigate noise pollution and vibration arising during the decommissioning phase.

Noise-suppression techniques to be employed to minimize the impact of temporary demolition noise at the Project site can be found in *section 9.3.4* of this report.

#### **9.5.2 Efficient Solid Waste Management**

The proponent through the contractor will make sure that the demolition wastes generated are disposed by the private waste management company that will be contracted to an approved dump site.

Materials containing recycled content should be recycled when possible or handed over to a recycling company.

Waste generated on site should be adequately collected and stored for safe transportation to the disposal sites.

#### **9.5.3 Minimization of Occupational Health and Safety Impacts**

To reduce the occupational health and safety impacts during the operation phase of the proposed Project, the Proponent is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2007.

In this regard, the Proponent is committed to provision of appropriate personal protective equipment, as well as ensuring a safe and healthy environment for workers as outlined in the Environmental Management Plan (EMP).

Workers accidents especially in deep curing operations and elevated areas shall be mitigated by enforcing adherence to safety procedures and preparing a contingency plan for accidents.

## **9.6 Net Benefit/Worth of the Project**

Overall, the proposed project enjoys a highly positive benefits profile as it strongly supports policy aspirations towards a just, cohesive society living in a newly industrialized, globally competitive Kenya as envisaged in Vision 2030.

This Study recommends that project development should proceed but factor in the mitigation measures recommended herein. Implementation of this ESMP will however require close follow-up and scrutiny to ensure achievement and sustenance of this esteemed net positive profile of the project.

Requirements for monitoring are explored further in this chapter.

### **9.6.1 Feasibility of Impact Mitigation**

Majority of impacts have readily available means for mitigation while some of the negative impacts will acquire positive effects after mitigation.

Thus, upon application of the Impact Mitigation Programme, majority of the impacts are dispensed with and the project is likely to achieve an overwhelming net positive effect.

It is expected that there will be no land acquisition within the scope of the proposed work. This is because the project exists within the boundaries of land owned by KFSL.

### **9.6.2 Phasing of Mitigation Action**

Mitigation of impacts associated with civil works has been planned in the design and allowance has been made in the Bills of Quantities (BOQs).

Also the contract for civil works bears several relevant clauses binding the contractor to implement environmental and social mitigation as outlined in **Table 10.3 below**.

### **9.6.3 Responsibility for Mitigation**

As per the ESMP below, responsibility for mitigating impacts of civil works falls on the contractor under the supervision of the Supervisor of Works (SOW) or his appointed representative.

## **9.7 Environmental and Social Monitoring Requirements**

**Environmental monitoring** refers to the systematic collection, analysis and interpretation of data on environmental parameters through periodic measurements.

Accruing information would facilitate tracking of levels of anticipated impacts and to monitor compliance in implementation of mitigation measures.

Through periodic observations, it is possible to detect and remedy previously non-anticipated impacts before they turn catastrophic.

Further, through continuous assessment of both the negative and positive benefits of a project, it is possible to determine the net impact (change) emanating from a project and thus determine its worth.

Environmental monitoring falls in three categories as follows:-

- (1) Baseline Studies to document local environmental conditions of the project site.
  - Since project impacts are generated by interaction between local environmental conditions and project activities, a study of baseline conditions facilitates prediction of impacts as already undertaken in Chapter Seven of this ESIA study.
  - The documented baseline environment also provides a permanent benchmark against which long-term changes due to project activities can be monitored
- (2) Routine measurement of effects through measurements on environmental parameters is undertaken during project implementation and operation so as to detect changes attributed to the project.
- (3) Compliance monitoring is effected through regular review of monitoring returns coupled with independent periodic sampling of environmental parameters and indicators.
  - By evaluating the level of parameters against previously agreed standards, the supervising authority is able to monitor compliance with regulatory requirements.
  - Surveillance and routine inspections also form part of compliance monitoring.

To be successful, monitoring and evaluation begins with clear project design followed by identification and elaboration of appropriate criteria and indicators.

This document provides guidance about incorporating monitoring and evaluation elements in each stage of the project cycle.

### 9.7.1 Requirements of the ‘Impacts Monitoring Programme’

Table 9.3 provides the framework proposed for biophysical monitoring.

At construction stage, the Contractor will conduct biannual monitoring for all parameters specified mainly through sampling (pollutants) and counts in case of flora and fauna.

In case of pollutants, samples will be analysed at the SGS Laboratories.

**Table 9. 1: Framework for Environmental Monitoring**

Parameter	Specific Location	Monitoring Criteria
Ambient Air quality through sampling	<i>Drive Station Terminal Site and Return Station Site</i>	Particulate Matter (PM), Carbon Monoxide (CO), Nitrogen Oxides (NO/NO <sub>2</sub> ), Sulphur
Noise through onsite measurements	<i>Drive Station Terminal Site and Return Station Site</i>	Equivalent sound Level (Leq: dB), Vibration level (dB), Traffic volume
Floral monitoring and counts	<i>Entire Corridor</i>	Dalbergia melanoxylon, Dialium orientale, Pseudobersama mossambicensis, Erythrina sacleuxii, Lasiodiscus ferrugineus, Psychotria punctate, Premna chrysoclada, Pavetta mangallana, Pavetta crebrifolia, Pavetta subacana, Ochna thomasiana
Bird Monitoring and counts	<i>Entire Corridor</i>	Eurasian Honey Buzzard, Roseat Tern, Greater Crested Tern, Sooty Gull, Black Headed Heron, Grey Heron, Cattle Egret, Black Kite, Senegal Lapwing, Sacred Ibis, Woolly Necked Stork

**Table 9. 2: Monitoring Programmes**

Parameters		Monitoring Method	Indicator	Frequency	Responsibility
<b>Catchment Conservation</b>	Regulatory activities at the catchment areas	<ul style="list-style-type: none"> <li>• Inspection of development plans from regional authorities</li> <li>• Inspection of monitoring and evaluation programmes</li> <li>• Visual inspections</li> <li>• GIS</li> </ul>	Status on implementation of plans and activities within the catchment areas	Annually	<ul style="list-style-type: none"> <li>- Regional development authorities</li> <li>- Ministry of Water Resources</li> <li>- Catchment Boards</li> <li>- Ministry of Agriculture</li> <li>- Local Authorities.</li> <li>- ERB</li> </ul>
	Soil Erosion	<ul style="list-style-type: none"> <li>• Visual inspection</li> <li>• Record of periodic assessment</li> <li>• GIS</li> </ul>	Agricultural husbandry practices Vegetation cover on highly erodible sites Re-vegetation of previously eroded sites	Twice a year to cater for seasonal variation	<ul style="list-style-type: none"> <li>- Regional Development Authorities</li> <li>- Ministry of Agriculture</li> <li>- Local Authorities</li> <li>- Local NGOs</li> <li>- ERB</li> </ul>
<b>Air Emission/ Ambient Air Quality</b>	Dust	<ul style="list-style-type: none"> <li>• Visual inspection</li> </ul>	Airborne particles	Twice during the dry season	- Utility
	Climatic Conditions	<ul style="list-style-type: none"> <li>• Keeping record of meteorological data from automatic data logger or the nearest KMD station</li> </ul>	Wind speed and direction, temperature, relative humidity, solar radiation, rainfall amounts	Continuous recording	- Utility
	Ozone	<ul style="list-style-type: none"> <li>• Propriety gas measuring meters</li> </ul>	24 hour averages and daily maximum concentrations	Quarterly for the life of the project	<ul style="list-style-type: none"> <li>- Utility</li> <li>- Independent Consultant</li> </ul>
<b>Water Quality</b>	Effluent Discharge from Facility	<ul style="list-style-type: none"> <li>• Samples for laboratory analysis</li> </ul>	Measured levels of: total suspended solids, biological and chemical pollutants, Oil and grease	Quarterly for life of the project	<ul style="list-style-type: none"> <li>- Utility</li> <li>- Independent Consultant</li> </ul>
<b>Noise</b>	Occupational Noise	<ul style="list-style-type: none"> <li>• Periodic measurement with noise meter</li> </ul>	Time averaged measurements in dB{A} at work areas within the plant boundary	Weekly	<ul style="list-style-type: none"> <li>- Utility</li> <li>- OHSD [MoL]</li> </ul>
<b>Waste Management</b>	Solid & Liquid Waste	<ul style="list-style-type: none"> <li>• Tracking all waste</li> </ul>	Waste streams and volumes generated on site	Continuous	<ul style="list-style-type: none"> <li>- Utility</li> <li>- NEMA</li> <li>- ERB</li> </ul>

			Generated quality of Effluent and Sludge		- Local Authorities
	Healthcare Waste	<ul style="list-style-type: none"> <li>Tracking all hazardous waste and establishing storage, handling and disposal methods</li> </ul>	Generated qualities of Used oils Solvents Sludge Process residue	Continuous	<ul style="list-style-type: none"> <li>Utility</li> <li>NEMA</li> <li>ERB</li> <li>Local Authorities</li> </ul>
<b>Health and Safety</b>	Adoption and implementation of EHS policies	<ul style="list-style-type: none"> <li>Annual EHS Audits</li> </ul>	Identified and established targets	Continuous	<ul style="list-style-type: none"> <li>Utility</li> <li>ERB</li> </ul>
	Employee EHS training	<ul style="list-style-type: none"> <li>Inspection of records of training programs including fire drills, environmental and safety training</li> </ul>	Annual record on status and updates	Continuous	<ul style="list-style-type: none"> <li>Utility</li> <li>ERB</li> <li>OHSD</li> </ul>
	Development and maintenance of EHS plans, procedures and manuals	<ul style="list-style-type: none"> <li>Annual EHS audits</li> <li>Inspection of plans, procedures and manuals</li> </ul>	Annual records of staff training programs executed	Annually	<ul style="list-style-type: none"> <li>Utility</li> </ul>
	Occupational health and safety monitoring	<ul style="list-style-type: none"> <li>Reporting of accident and incidents, safety breaches and to equipment</li> </ul>	Annual statistical records and safety reports	Continuous	<ul style="list-style-type: none"> <li>Utility</li> <li>ERB</li> <li>OHSD</li> </ul>
	EHS Audits	<ul style="list-style-type: none"> <li>Inspection of previous EHS internal audit records</li> </ul>	Number and type of corrective actions raised Status on implementation of corrective actions	Quarterly for Internal Audits and Annually for External Audits	<ul style="list-style-type: none"> <li>Utility</li> <li>Independent Auditor</li> <li>ERB</li> </ul>
	<b>Other Environmental Health and Safety Issues</b>	Maintenance of Fire Appliances	<ul style="list-style-type: none"> <li>Inspection of maintenance and servicing records of fire appliances</li> </ul>	Quarterly record of reports by local fire appliance dealers	Quarterly
Social Concerns		<ul style="list-style-type: none"> <li>Inspection of record of concerns from the community</li> <li>Review of record of stakeholder consultations</li> </ul>	Number, type of complaints Socio-economic status Implementation of agreed actions	Annually / Every six months	<ul style="list-style-type: none"> <li>Regional Development Authorities</li> <li>Utility</li> <li>Stakeholders</li> </ul>

## **9.8 Compliance Monitoring Strategy**

This activity is essential to ensure implementation of recommended mitigation measures and to thus secure the overall environmental quality of any project.

The monitoring activities should primarily target implementation of recommended mitigation measures in addition to surveillance for new impacts.

In addition to specification of impacts and required mitigation activities, the plan also identifies key players in each activity and the recommended timing of interventions.

The Environmental and Social Action Plan for the Project also essentially constitutes its compliance monitoring program.

Key features of the compliance monitoring programme are as follows:-

### **9.8.1 The Monitoring Authority:**

The burden of implementing impact mitigation will fall on the Project Contractor under supervision by Supervisor of Works under the capacity of Employer.

The Supervisor of Works (SOW) will monitor activities of the Contractor to ensure compliance with contractual requirements including implementation of this ESMP.

Where issues not anticipated in this report do arise, the SOW will notify the proponent and Contractor for action.

### **9.8.2 Need for NEMA to participate in Monthly Site Meetings:**

NEMA is the body charged under Cap 387 with overall coordination of environmental management in Kenya.

While NEMA coordinates this by regulating the EIA process for projects, there is need for NEMA to follow-up further on implementations of ESMPs as prepared for this proposed project.

This ESMP therefore, recommends that the County Environmental Officers for Mombasa be invited to all monthly site meetings on this project and are facilitated to attend the same under the project.

By being represented in site meetings, NEMA will enjoy an excellent opportunity to monitor implementation of the ESMP and to keep track on any emerging issues.

### **9.8.3 Monitoring Reports**

A number of monitoring reports will be developed as follows:

#### ***(i) ESIA Study Report under Cap 387:***

This ESIA Study Report as currently prepared provides a documentation of the baseline environment of the proposed project area and the adjoining areas, and thus provides a useful datum against which future monitoring can take place.

The ESIA Study Report also includes a project-specific ESMP detailing the means for mitigating identified impacts.

It therefore lays the basis for monitoring.



**(ii) Annual Audit Reports:**

The proposed Project will be subjected to an annual environmental audit in line with Cap 387.

The report will include a summary of the environmental performance of the facility/enterprise vis-à-vis the Environmental Management Plan prepared and, a synthesis of Emergent Concerns.

**(iii) Signed Minutes of Monthly Site Meetings:**

Following every site meeting, minutes of deliberations will be produced by the SOW, confirmed, signed and adopted as a basis for following up on Contractor's activity.

# CHAPTER 10: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

## 10.1 Overview of the ESMP

This chapter presents an Environmental and Social Management Plan (ESMP) that will need to be implemented by the Proponent and Contractor to prevent and/or reduce significant negative environmental and social impacts to acceptable levels.

The aim of the Environmental and Social Management and Monitoring plan (ESMMP) is to provide a road map to the Proponent/Contractor on how to address the identified environmental and social impacts, requirements for labour specialization (responsibility), frequency of monitoring activities, and estimated cost implications of the Proposed Project.

The consultants considered all the proposed project components during the preparation of this comprehensive ESMP.

The consultants further used best practices developed in other parts of the world, the costs of mitigation measures and of the institutional and training requirements to implement the mitigation measures were equally estimated.

Compensation to the affected parties for impacts which cannot be mitigated will need to be considered where applicable.

A comprehensive work program, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measure will be prepared based on the budget guidelines.

The following ESMP (**Tables 10.1; 10.2; 10.3 and 10.4**) have been structured in such a manner to provide a basis for implementation of the Environmental Management System (EMS) ISO 14001 principles for the life of the proposed development.

It should be further noted that the proposed ESMP is not static; allowance has been made for it to evolve through the life of this project. Such a characteristic is seen to be important to key factors and processes that may change through the life of the project.

It is therefore necessary to alter proposed mitigation and monitoring methodologies in order to determine the best approach to deal with such changes.

This ESMP includes the necessary specialist input to determine, mitigate and manage any environmental impacts that the proposed development may have, relating to bio-physical and socio-economic aspects.

Specific attention has been made to ensure that the ESMP conforms to the following criteria:

- ✓ Identifies specific quantifiable monitoring regimes;
- ✓ Delineates key lines of accountability;
- ✓ Associates mitigation and monitoring tasks to specific impacts;
- ✓ Gives guiding costs of implementation,

- ✓ Where practically possible identifies key indicator, which can be utilized for environmental performance monitoring
- ✓ Ensures flexibility to enable incorporation of additional monitoring and mitigation techniques as deemed necessary throughout the life of the project
- ✓ Conforms to all best practice principles by acknowledging the existence of both long term and immediate impacts and the resulting mitigation measures necessary to deal with such impacts
- ✓ Identifies commitments made by the proponent with regard to its environmental performance.

The following tables form the core of this ESMP for Design, Construction, Operational and Decommissioning phases of the proposed project.

The tables provide details of all necessary mitigation measures as well as the person responsible for implementing and monitoring such measures.

The tables should be used as checklist on site and show **Anticipated Impacts, Mitigation Measures, Implementation Period, the Required Resources and Responsible Persons to take action.**

Modalities for mitigation of impacts and their phasing are presented in the Environmental Mitigation and Management Plan provided in the Tables 10.1; 10.2; 10.3 and 10.4 below.

From Table 10.2, it is apparent that most of the mitigation activity will take place during the construction phase.

However, planning for the mitigation will take place at design stage (this stage) to ensure that such mitigation is incorporated and allocated for in the project design.

Thus, the first action in mitigation will be a thorough scrutiny of the Design Report to ensure that the ESMP provided in this report has been fully incorporated and allocated for.

Further, all mitigation to be implemented during civil works will be allocated for in the Bills of Quantities and captured in the Contract for Construction.

The Project Manager (Design & Construction) will hire a qualified Supervision of Works (SOW) Engineer to ensure full implementation of contractual tasks in mitigation.

## 10.2 Environmental and Social Management Plan (ESMP)

### 10.2.1 Environmental and Social Management Plan for Design Phase

**Table 10. 1: Environmental and Social Management Plan for Design Phase**

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
<b>1.Minimization of Design Stage Impacts</b>					
Site disturbance from bush clearing during field surveys	Use of existing tracks to access sites of interest and to avoid any damages	Survey Team	No damages during initial survey	Feasibility stage	No Cost
Accidents during survey works	Sober and serious minded survey teams were selected	Survey Team	No accidents	Feasibility stage	No Cost
Lack of Safety during field surveys	Sensitized on the need to observe safety requirements during enumeration and site surveys	Survey Team	Compliance with safety requirements	Feasibility stage	No Cost
	Observe safety Code of Conduct	Survey Team	Compliance with Safety requirements	Feasibility stage	No cost
<b>2.Minimization of site disturbance during geo-technical surveys</b>					
Excavations and Drilling Impacts	Use regularly serviced equipment	Geo-tech survey Teams	Compliance with Safety requirements	Design Stage	No cost
Noise and Vibrations' Impacts	Machine operators to use ear muffs		Compliance with Safety requirements	Design Stage	No cost

### 10.2.2 Environmental and Social Management Plan for Construction Phase

**Table 10. 2: Environmental and Social Management Plan for Construction Phase**

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
<b>1. Mitigation of impacts associated with Material Sourcing and Transport</b>					
Generation of GHG in the transportation of construction materials	Local sourcing of construction materials	COW/Contract or	Inspection and observation	Throughout construction phase	No additional cost
Road hazards during Material Transportation	Implement a Traffic/Transport Safety Code	COW/Contract or	Inspection and observation	Throughout construction phase	Contractor Insurance

<b>Expected Negative Impacts</b>	<b>Recommended Mitigation Measures</b>	<b>Responsible Party</b>	<b>Monitoring Means</b>	<b>Time Frame</b>	<b>Cost (KES)</b>
<b>High Demand for raw material</b>	Source building materials from local suppliers who use environmentally friendly processes in their operations	COW/Contractor	Inspection and observation	Throughout construction phase	No additional cost
	Sand ballast, hard core are extracted from registered quarry and sand mining firms whose facilities have undergone satisfactory environmental impact assessment/audit and received NEMA approval.	COW/Contractor	Inspection and observation	Throughout construction phase	No cost
<b>Carbon footprint in transport of construction materials and equipment</b>	Preference to already mobilized TSPs	COW/Contractor	Inspection and observation	Throughout construction phase	No cost
<b>2. Mitigation of Traffic Impacts during Construction</b>					
<b>Construction activity will impose severe restrictions to traffic movement, which will be felt in the entire city.</b>	The Proponent in conjunction with both KeNHA and County Gov. must develop Traffic Management plan and disclose it to all stakeholders in the city	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	200,000
<b>3. Disruption of Existing Infrastructure and Service Lines</b>					
<b>Two major pipelines lie across MI and MMS</b>	Contractor to provide appropriate protection prior to commencement of work in proximity	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	40,000
<b>Entire MMS has water supply networks and drainage lines</b>	Replace with better quality where necessary	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	100,000
	Put in place construction plan for orderly scheduling of	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	100,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	phasing and conduct of construction activities				
<b>4. Clearance and Excavations for Foundations for the Drive and Return Station Terminals</b>					
<b>Clearance and levelling of Drive and Return Station sites</b>	Proper site staging to ensure that the maximum amount of existing vegetation is left in place during the excavation phase  Leave a continuous buffer of vegetation around the site perimeter to intercept any sediment that might be transferred off site via surface water flow	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	150,000
<b>Soil disturbance due to excavations for foundations</b>	Cover exposed soil as soil is moved around site and as soil stockpiles are formed and reformed	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	50,000
<b>Soil erosion and sediment into the Ocean</b>	Cover all exposed soil as soon as soils are exposed  Time works so that excavation does not take place during periods of rain	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	50,000
<b>5. Minimization of Noise and Vibration</b>					
<b>Noise and Vibrations pollution</b>	Install portable barriers to shield compressors and other small stationary equipment where necessary	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	
<b>Escalation of noise levels</b>	Prescribe noise reduction measures if appropriate  e.g. restricted working	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	10,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	hours, transport hours and noise buffering.				
<b>Emission of pollutants (Pb), dust, fumes, vibrations from operation of plant and equipment</b>	Use quiet equipment (i.e. equipment designed with noise control elements).	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Limit pickup trucks and other small equipment to a minimum idling time	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Construct mainly during the day. The time that most of the neighbours are out working	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
<b>6. Minimization of interference with Mombasa Port Operations</b>					
<b>Pro-longed closure of the Channel during project construction</b>	Co-ordination with KPA (control tower) and KMA on schedules and timetables for marine vessels	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Construction will be approached from the periphery (shoreline	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Contractor will always leave a navigable channel available for use by vessels	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	A convoy with many vessels released at the same time will be adopted	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	All construction crafts	Resident	Inspection and	Throughout	No cost

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	will flash the red hazard light at all times when in motion so as to warn all other users of the channel.	Engineer/Contractor	observation	construction phase	
	A fairly strict management of the Contract for Works.	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
<b>7. Minimization of Impacts on Biodiversity and Carbon Sink</b>					
<b>Loss of sensitive flora and fauna</b>	Conservation of flora and fauna	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	10,000
	All trees outside the actual Drive and Return stations will not be cut down	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Preservation of the biodiversity of shrines:	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Protection and preservation of the Endangered Species	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	A reforestation plan will be implemented to replace the trees to be displaced	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	50,000
	Mitigation against introduction of alien species	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Insurance against possible introduction of colonizing species:	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
<b>8. Minimization of Impacts on Habitat for Avian Fauna:</b>					
<b>Loss of habitat for avian fauna</b>	There is no designated Important Bird Area (IBA)-within the proposed project	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost



Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	However, intensive monitoring of populations is recommended.	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	10,000
<b>9 Minimization of Landscape Change during Construction.</b>					
<b>Landscape change at Drive and Return Station Terminals</b>	Changes will be aggravated by the aerial projection of the design, which militates against reforestation to tone down the contrast.	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
<b>10. Minimization of Loss and Damage to Cultural and Heritage Resources</b>					
<b>Loss or damage to cultural resources</b>	Zoning out of Cultural Heritage sites for preservation	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Zoning out shrines and groves for protection	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
	Incorporation of Chance Find and Recovery Procedures	Resident Engineer/Contractor	Inspection and observation	Throughout construction phase	No cost
<b>11. Environmental, Health and Safety Measures in the Construction Area</b>					
<b>Impacts to General Health and Safety:</b>	Comply with OSHA, 2007 and Other Places of work regulations	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	200,000
	Provide standard First Aid Kit at work place Ensure staff are aware and trained on what to do in case of accidents and emergencies	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	200,000
	Develop Comprehensive Code of Operation to ensure channel remains open for vessels to pass	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	20,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	Economic sanctions should be imposed under contract to discourage non-compliance	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases(e.g. HIV/AIDS)	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	100,000
	Protection of the public and public property from any dangers associated with construction activities	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	CAR Insurance
	Ensure the safe and easy passage of pedestrians and traffic in areas affected by the construction activities	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Pedestrian traffic management plan
	All works which may pose a hazard to humans and domestic animals are to be protected, fenced, demarcated or cordoned off as instructed by the RE. If appropriate, symbolic warning signs must be erected;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Hoarding and protection budget
	Operators and drivers are to ensure that they limit their potential to endanger humans and animals at all times by observing speed limits and strict safety precautions	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	No unauthorized firearms are permitted on site;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Provide the appropriate Personal Protective Equipment for staff	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	500,000
<b>Fire Prevention and Control</b>	The contractor to take all reasonable and precautionary measures to ensure fires are not started on site	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Ensure that basic fire-fighting equipment is available on site	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	300,000
	Ensure that flammable materials are stored under conditions that will limit potential for ignition and spread of fire.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	200,000
	'Hot' activity restricted to sites approved by the Resident Engineer (RE)	Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Smoking shall not be permitted fire hazard areas	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Ensure all personnel are aware of fire risks and how to deal with them  Costs incurred due to fire damage shall be the responsibility of the RE	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
<b>Accidents at Work place:</b> <b>Including falling of the platforms, accidental fires; accidental leaks and spillages and vehicle and plant accidents</b>	Prepare and submit Method Statement/Comprehensive health and safety plan to deal with emergency or negligence saturations at site which may lead to accidents at work place	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	100,000
	Continually train employees on safety procedures including PPEs	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	100,000
	Ensure availability of PPEs for work in hazardous areas(i.e. gum boots, hand gloves, helmets etc. are provided)	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Covered above
	Comply with safety conditions imposed by Kenya Maritime Authority (KMA)	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	200,000
<b>Mitigation of HIV/AIDS:</b>	Contractor in consultation with relevant agencies responsible for HIV/AIDS will mount educational campaigns to keep workers sensitized on the reality of this pandemic	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Covered in 11 above
	Monitor activities regularly to assess effectiveness and impact.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	50,000
	The assessment will be supported by qualitative information from observations on workers behaviour.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Covered by above

Expected Impacts	Negative	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
<b>Mitigation of construction Waste</b>	<b>Solid</b>	All storage and construction sites are to be kept clean, neat and tidy at all times.  No burying or dumping of any waste materials, metallic waste, litter or refuse shall be permitted.	Contractor  Resident Engineer (RE)	Inspection and observation	Throughout construction phase	300,000
		Ensure adherence to Environmental Management and Co-ordination (Waste Management) Regulations 2006	Contractor  Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
		Implement measures to minimize waste and develop a waste management plan to include the following	Contractor  Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
		All personnel shall be instructed to dispose of all waste in a proper manner;	Contractor  Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
		At all places of work the contractor shall provide litter collection facilities;	Contractor  Resident Engineer (RE)	Inspection and observation	Throughout construction phase	50,000
		The final disposal of the site waste shall be done at the location that shall approved by the RE, after consultation with local administration and local leaders;	Contractor  Resident Engineer (RE)	Inspection and observation	Throughout construction phase	100,000
		The provision of sufficient bins (preferably vermin and weather-proof) at the	Contractor  Resident Engineer (RE)	Inspection and observation	Throughout construction phase	100,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	camp and work sites to store the solid waste produced on a daily basis;				
	Wherever possible, materials used or generated by construction shall be recovered at the conclusion of each task for safe disposal including recycling.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	50,000
	Provision for responsible management of any hazardous waste generated during the construction works	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Covered above
	All personnel shall be instructed to dispose of all waste in a proper manner;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	At all places of work the contractor shall provide litter collection facilities;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Covered above
<b>Wastewater and contaminated water management</b>	No grey water runoff or uncontrolled discharge from any site or working areas shall be permitted	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	100,000
	Water containing such pollutants such as: cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site.  This particularly applies to water emanating	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	200,000

<b>Expected Negative Impacts</b>	<b>Recommended Mitigation Measures</b>	<b>Responsible Party</b>	<b>Monitoring Means</b>	<b>Time Frame</b>	<b>Cost (KES)</b>
	from concrete batching plants and concrete swills;				
	Cover all concrete works with plastic sheeting, tarps or another type of barrier until fully cured	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	120,000
	Prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses including the creek areas;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	50,000
	Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained and the water table not endangered;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	Covered above
	Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No additional cost
	The Contractor shall notify the RE of any pollution incidents on site.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
<b>General materials handling, use and storage:</b>	All materials shall be stored within the Contractor's camp unless otherwise	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	approved by the RE;				
	Stockpile areas shall be approved by the RE;	Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	All imported fill, soil and/or sand materials shall be free of weeds, litter and contaminants	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Sources of imported materials shall be listed and approved by the RE	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Ensure that delivery drivers are informed of all procedures and restrictions (including 'No go' areas) required;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Any electrical or petrol driven pumps shall be equipped and positioned so as not to cause any danger of ignition of the stored product;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Collection containers (e.g. drip trays) shall be placed under all dispensing mechanisms for hydrocarbons or hazardous liquid substances to ensure no contamination from any leaks is reduced;	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	Regular checks shall be conducted by the Contractor on the dispensing mechanisms for all above ground storage tanks to ensure faulty equipment is	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost



<b>Expected Negative Impacts</b>	<b>Recommended Mitigation Measures</b>	<b>Responsible Party</b>	<b>Monitoring Means</b>	<b>Time Frame</b>	<b>Cost (KES)</b>
	identified and replaced in timely manner;				
	Only empty and externally clean tanks may be stored on bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
<b>Control of criminal activity:</b>	The Contract for Construction will criminalize any activity prohibited under Kenyan Law.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	This will include smuggling, drug and substance abuse, illegal fishing, all forms of violence, discriminatory practices among others.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
	The RE Staff will conduct regular monitoring to track all complaints	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost
<b>Fuel and Hydraulic FluidSpills</b>	Heavy machinery operators should be required to use hydraulic fluids that are less toxic, or more environmentally compatible, than traditional hydraulic fluids.	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	100,000
	Have a spill response system and plan in place Ensure all staff working on site know how to	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	20,000

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	respond to spills				
<b>Sanitation Concerns from Construction Crew</b>	Ensure there are sanitation and ablution facilities available for site staff	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	1,000,000
<b>High Demand for Water Use</b>	Employ water conservation methods and processes Encourage recycling of water	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	500,000
<b>High demand for Energy Use</b>	Use energy saving appliances and equipment Encourage switching off of lights and appliances that are not in use	Contractor Resident Engineer (RE)	Inspection and observation	Throughout construction phase	No cost

### 10.2.3 Environmental and Social Management Plan for Operational Phase

*Table 10. 3: Environmental and Social Management Plan for Operational Phase*

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
<b>1. Mitigation of Height Capping</b>					
<b>Vessel with a draft height in excess of 69 m above the HWM trying to access the Mombasa Port in future is real</b>	Maintain minimum working and operation height of 70m	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No cost
<b>2. Minimization of Visual Intrusion into the Mombasa skyline</b>					
<b>Visual intrusion into Mombasa skyline</b>	The design of the proposed project should borrow and incorporate as much detail of the local heritage as possible which requires	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No cost

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
	extensive consultation in the process				
<b>3. Minimizing of Exposure to Airborne Pollutants and Noise</b>					
<b>Airborne Pollutants and Noise</b>	Ensure noise levels during the day at the site do not exceeded the maximum permissible noise level of 50 dB(A) for a residential zone, according to the Kenyan noise regulations	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No cost
	Ensure noise levels at all sites during the night do not exceeded the maximum permissible noise level of 35 dB(A) for a residence zone.	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No cost
	Install noise barriers and low noise pavement	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	Site Hoarding
	Attach noise absorbing panels under elevated sections	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No cost
	Set environmental facility zones such as green belt	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	100,000
	Install warning signs on road for horn ban in tunnels	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	Operation phase signage budget
	Develop a mechanism to record and respond to monitoring results and complaints	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No cost

<b>Expected Negative Impacts</b>	<b>Recommended Mitigation Measures</b>	<b>Responsible Party</b>	<b>Monitoring Means</b>	<b>Time Frame</b>	<b>Cost (KES)</b>
<b>4. Ensuring Efficient Solid and Liquid Waste Management</b>					
<b>Soiled and liquid waste disposal</b>	Waste should be managed efficiently through segregation and treatment of the various types of waste that will be produced.	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No cost
	Each type of waste (i.e. Solid Waste, Ablution Waste, and Liquid Waste) should be treated in accordance to the respective management action required.	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	No additional cost
<b>5. Minimization of Occupational Health and Safety Impacts</b>					
<b>Occupational Health and Safety Impacts</b>	Prevent and minimize OSH impacts by developing and implementing OSH Policy	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	SOP prep. budget
	Identifying and pro-actively avoiding OSH risks.	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	
	Personal protective equipment and supplies should also be sufficiently provided to all staff	Project/Maintenance manager	Inspection /Observation	Throughout operational phase	OSE budget

## 10.2.4 Environmental and Social Management Plan for Decommissioning Phase

**Table 10. 4: Environmental and Social Management Plan for Decommissioning Phase**

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
<b>1. Demolition Waste Management</b>					
<b>Demolition Waste</b>	Use of an integrated solid waste management system i.e. through a hierarchy of options: Source reduction; Recycling; Reuse; Sanitary land filling.	Project Manager and Contractor	Inspection and Observation	One-off	250,000.00
	All structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible.	Project Manager and Contractor	Inspection and Observation	One-off	No cost
	All foundations must be removed and recycled, reused or disposed of at a licensed disposal site.	Project Manager and Contractor	Inspection and Observation	One-off	No cost
	Where recycling/reuse is not possible, the materials should be taken to a licensed waste disposal site.	Project Manager and Contractor	Inspection and Observation	One-off	No cost
<b>2. Rehabilitation of Project Site</b>					
<b>Vegetation Disturbance</b>	Implement an appropriate re-vegetation programme to restore the site to its original status.	Project Manager and Contractor	Observation	One-off	Project landscape budget
	Consider use of indigenous plant species in re-vegetation.	Project Manager and Contractor	Observation	One-off	Project landscape budget
<b>3. Minimization of Occupational Health and Safety Impacts</b>					
<b>Increased Occupational Health and Safety Risks</b>	Adherence to the Occupational Health and Safety Rules and Regulations stipulated in the Occupational Safety and Health Act, 2007.	Health and Safety Manager	Inspection, Meeting and Observation	Throughout decommissioning period	No cost

Expected Impacts	Negative	Recommended Mitigation Measures	Responsible Party	Monitoring Means	Time Frame	Cost (KES)
		Provision of appropriate personal protective equipment as well as ensuring a safe and healthy environment for demolition workers.	Proponent	Inspection and Observation	Throughout decommissioning period	Project preliminaries
		Mitigate demolition workers accidents by enforcing adherence to safety procedures and preparing contingency plan for accident response.	Health and Safety Manager	Meeting and Observation	Throughout decommissioning period	No cost
<b>4. Minimization of demolition noise and vibration</b>						
<b>Noise and Vibration</b>		Sensitize demolition vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used.	Project Manager and Contractor	Meeting	Throughout demolition period	No cost
		Sensitize demolition drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, offices, hospitals, residential houses and schools.	Project Manager and Contractor	Meeting	Throughout demolition period	No cost
		Ensure that demolition machinery is kept in good condition to reduce noise and vibration generation.	Project Manager and Contractor	Inspection	Throughout demolition period	No cost
		Ensure that all generators and other equipment used are insulated or placed in enclosures.	Project Manager and Contractor	Inspection	Throughout demolition period	Equipment specification
		The noisy construction works will be planned to be during the day.	Project Manager and all site foreman	Observation	Throughout demolition period	No added cost

### 10.3 Emergency Response Plan (ERP)

Emergencies and disasters can occur any time without warning. Construction sites are, more so, prone to such accidents. Thus it is important for the proponent to prepare for them, and be in a good position to act to minimize panic and confusion when they occur. Emergency Response Plans (ERP) will have to be instituted throughout the project cycle.

**Table 10. 5: Emergency Response Plan**

Emergency Response Plan Components	Actions/Requirements	Responsibility
<b>Potential Emergency</b>	Identification of all potential emergencies associated with the proposed project at the project site. Include, Fires, Accidents & Incidents, Security, and Terrorism etc.	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>Emergency Operations Coordinator (EOC)</b>	Designate a primary and secondary contact person.	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>Emergency Contact Numbers</b>	Give & display contact for Fire station, Ambulance, Police, Hospitals, and others	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>Installation of Emergency Equipment</b>	Install: <ul style="list-style-type: none"> <li>• Fire sensors,</li> <li>• Fire alarms,</li> <li>• Fire extinguishers,</li> <li>• Fire hose,</li> <li>• Panic alarm button,</li> <li>• Provision and enforcement of use of PPEs,</li> <li>• Emergency Communication equipment, such as Phone &amp; alarm bells</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>Training for Emergency Response</b>	Regular training for emergency response	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>Trained in the Use of Emergency Equipment</b>	Employees training in the use of emergency equipment	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>First Aid</b>	<ul style="list-style-type: none"> <li>▪ Provision of first aid kits,</li> <li>▪ First aid management training</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>Signage</b>	<ul style="list-style-type: none"> <li>▪ Install Fire sensors</li> <li>▪ Warning and Safety Signage</li> <li>▪ Signage, action poster,</li> <li>▪ Alarm bell/ panic button</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>

<b>Procedure for Rescue and Evacuation</b>	<ul style="list-style-type: none"> <li>▪ Evacuation plan,</li> <li>▪ Warning system,</li> <li>▪ Assembly site</li> <li>▪ Shelter in place plan.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>
<b>Occupants Emergency Contact Information</b>	List of all occupants, residents & their activities	<ul style="list-style-type: none"> <li>▪ Proponent during operation phase</li> </ul>
<b>ERP Review</b>	Annual ERP review	<ul style="list-style-type: none"> <li>▪ Contractor during construction and Decommissioning phases.</li> <li>▪ Proponent during operation phase</li> </ul>



## CHAPTER 11: CONCLUSION AND RECOMMENDATIONS

**Chapter Eleven** provides the conclusion and recommendations of this Environmental and Social Impact Assessment Study.

### 11.1 The Report

Likoni Cable Express Limited a privately initiated and funded Private Public Partnership (PPP) comprising Kenya Ferry Services Limited (KFSL) as ***the contracting authority*** and Trapos Limited (a consortium incorporating Kenya's Trapos and Doppelmayr Garaventa Group, an Austrian Company as the private partner) with approval of the Government of the Republic of Kenya intends to develop ***an express cable and rope project*** with the aim of providing a functional connection between ***Mombasa Island and Mombasa Mainland South*** which are separated by the Likoni Channel that is currently crossed through ferries operated by the Kenya Ferry Services Limited (KFSL).

Over time, the increase in volume of passenger and vehicular traffic across the channel has challenged the viability of the ferry service especially during peak demand hours which are characterised by huge backlogs of humanity and motor vehicle traffic waiting to cross.

Expansion of the ferry service is constrained by the need to keep the Channel free for use by vessels calling into the Kilindini harbour, and whose movement requires interruption of the Ferry Service thus constraining time-efficient demand management.

Provision of a rope and cable system connecting Mombasa Island to the Mainland South Coast as anticipated in the proposed project Construction Project is targeted at eliminating this bottleneck and further underpinning on-going initiatives aimed at opening up Kenya's South Coast for economic development.

Following conclusion of a feasibility study that defined the project in terms of site location, engineering scope, social and environmental impacts, physical and economic displacement impacts, the proposed Project is currently undergoing a Detailed Design under leadership of a Consortium led by **SYNTHESIS ARCHITECTS of P O Box 15226-Langata South, Nairobi, Kenya.**

As part of the Feasibility Study, the proposed Project was subjected to an Environmental and Social Impact Assessment study covering the design, implementation, commissioning and decommissioning phases.

This Report highlights salient social and environmental issues associated with the design, construction and operational aspects of the Project.

The Report has been prepared under contract by Lead Experts from **OLIGERM HOLDINGS LTD.**, an Environmental Firm of Experts duly registered and licensed by NEMA (NEMA Registration No. 1573) and other Technical Support Consultants including Architects, Surveyors, Engineers and Equipment Suppliers.

## **11.2 Scope of the ESIA Study**

### **11.2.1 Legal Scope in the ESIA Study**

Conduct of ESIA Studies in Kenya is legally anchored in the Environmental and Coordination Act (EMCA) Cap 387 and its Amendment of 2015.

Section 58 of EMCA as amended in 2015 requires all projects proposed for implementation in Kenya be subjected to integrated environmental impact assessment as directed by NEMA. The Second Schedule of EMCA specifies projects that require to be subjected to EIA studies and particularly lists criteria under Sub-section 1 (General) as follows:-

- (a) an activity out of character with its surrounding;*
- (b) any structure of a scale not in keeping with its surrounding;*
- (c) major changes in land use.*

Screened against this Schedule and criteria, the proposed Project and approach roads are deemed to require a full cycle ESIA Study.

The 69 meter high structure will intrude into the general skyline of Mombasa in a manner previously unforeseen in the area.

Construction activity is also likely to interfere with operations of the Kilindini Harbour, which is the economic lifeline for hinterlands in both Kenya and the region.

### **11.2.2 Thematic Scope of the Study**

The substantial focus and scope of ESIA Studies is stipulated in the Third Schedule to Legal Notice 101 of 2003 – Environmental (Impact Assessment and Audit) Regulations of EMCA.

## **11.3 Findings of the Study**

Based on impact prediction and scoping tools, potential impacts from proposed project construction and operation have been predicted and analysed with outcome as follows:-

### ***Positive Impacts:***

- ✓ Positive impacts of the proposed project will accrue from provision of a functional rope and cable system connecting the MMS area to the rest of Kenya through Mombasa, a factor that will greatly mitigate current feeling of isolation and resultant political resentment.
- ✓ The proposed project will open up MMS for economic development and enhance access to markets down to COMESA region and thus anchor all pillars to Vision 2030.

### ***Adverse Impacts:***

- The most salient observation from this study is that at construction stage, the proposed project could interfere with cargo flow into and out of the Port which could have stifling effects on both the nation and Regional economies and can lead Mombasa Port losing the esteemed position as the Port of Choice in the region during the construction period. Efforts must be made to militate against such losses.
- Once completed, the massive engineering structure will permanently intrude into the Mombasa skyline and thus alter the landscape completely while imposing a height

capping for vessels with mast heights above the design vertical clearance of 69 m above sea level.

- However, this KES. 5.5 billion Worth of investment (pa capita cost of KES 1.9 million) is likely to be a major attraction to the coastal city and could even replace Fort Jesus as the main attraction while simultaneously decongesting Mombasa CBD to the advantage of both visitors and town inhabitants.

## **11.4 The Environmental and Social Management Plan (ESMP)**

A core outcome of this ESIA process was the formulation of an ESMP to guide resolution of adverse impacts anticipated from construction and operation of the proposed project.

Core features of the ESMP are as follows:-

### **11.4.1 Impact Mitigation Strategy and Plan**

Design of the project was largely guided by the principle of avoidance as the core mitigation strategy.

Thus, by analysing alternative alignments of the project, it was possible to choose one with minimal impacts on the social and biophysical environment which was in itself, a strategic intervention towards mitigation.

Key observations are that most adverse impacts are short-term and will disappear once civil works ends while residual impacts will require careful monitoring and coordination with relevant Lead Agencies.

Towards implementation of the Impact Mitigation Plan, several sub-plans have been proposed to address specific regimes of impacts as follows:-

- 1) A **Construction Management Plan** to ensure orderly execution of construction activity.
- 2) An **Environmental Mitigation Plan** to guide general resolution of environmental concerns
- 3) A **Health and Safety Plan** to resolve OHS concerns,
- 4) A **Traffic Management Plan** to resolve all traffic related concerns,
- 5) A **Landscape Conservation Plan**,
- 6) A **Communication Plan** to guide dissemination of project information to stakeholders,

### **11.4.2 Core Players in Impact Mitigation**

The burden of mitigation largely lies with the Project Contractor under supervision by the Supervising Consultant.

The Contract for Civil Works will bear relevant clauses binding the contractor to institute environmental mitigation as recommended in this study.

Thus, in this case, the core monitoring strategy for this project will be through site meetings, in which case, it is recommended that respective County Environmental Coordinators for Mombasa and Kwale be invited to such meetings.

Other stakeholders such as the District Labour Officer should also initially attend such meetings to ascertain that measures towards securing the health and safety of workers have been put in place.

When completed, the Project will be subject to statutory environmental and quality audits during the Defect Liability Period and the Contractor will be liable to repair all defects including those pertaining to environmental mitigation.

Overall, it is the impression of this study that, the proposed project is a major economic undertaking to which national and regional development targets are tied.

It is one of the Vision 2030 flagship projects and, subject to adoption of mitigation measures and proposal made here-in, it should be supported by all.

### **11.5 Recommendations**

- Through this ESIA Study Report, the proponent wishes to disclose that the proposed development of the rope and cable system project has impacts that can readily be mitigated and managed.
- The majority of adverse impacts identified is of a short-term nature and will cease once the civil works phase is completed.
- Further, other impacts can be contained through effective planning and management using available means of mitigation.

By such disclosure, the prayer of the client to NEMA is for the project to be granted environmental licensing.

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