LAPSSET CORRIDOR PROGRAM

REPUBLIC OF KENYA

PRELIMINARY MASTER PLAN FOR LAMU PORT CITY AND INVESTMENT FRAMEWORK

Building Better Outcomes

LAPSSET CORRIDOR DEVELOPMENT AUTHORITY

APRIL, 2017

PRELIMINARY MASTER PLAN FOR LAMU PORT CITY AND INVESTMENT FRAMEWORK

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Date…….....…….....…

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County Secretary

Date...….....……..……

PLAN APPROVAL

I certify that the Plan has been prepared and published as per the requirements of the Physical Planning Act Cap 286

…….....

Physical Planning Officer

Date…….....

MINISTRY OF LANDS AND PHYSICAL PLANNING

CERTIFIED

…….....

Director of Physical Planning

Date…….....…….....

APPROVED

…….....

Cabinet Secretary for Lands and Physical Planning

Date…….....…….....

APRROVED DEVELOPMENT PLAN No…….....…….....

FOREWORD

The Vision of the Ministry of Transport, Infrastructure, Housing and Urban Development is to be global leader in provision of transport infrastructure, maritime economy, the built environment and sustainable urban development. Lamu Port South- Sudan, Ethiopia Transport (LAPSSET) Corridor Program is an integrated regional infrastructure program which is a critical component of Kenya Vision 2030, broadly intended to enhance trade and logistics in the region by providing an alternative and strategic corridor to serve the landlocked neighbouring countries of Ethiopia and South Sudan. It is also intended to position Kenya a regional hub in trade and logistics service by providing the country with a second transport corridor and port as well as provide a platform for opening up vast regions of the country which have been under developed.

The purpose of Integrated Master Planning & Investment Framework for the Port City of Lamu is to align stakeholders and unlock funding and delivery in order that there is a clear path to deliver the socio-economic and environmental benefits linked to the LAPSSET Corridor Infrastructure project.

The Master Plan and Investment Framework provides a diagnostic of development issues, infrastructure and urban development trends facing Lamu through identification of gaps and opportunities. A range of diagnostic tools to explore the implications of planned proposals and future opportunities was applied. The diagnostic was shaped and explored with relevant stakeholders leading to development of a complete picture and alignment of stakeholders to recognize the potential linkages between projects.

Through engagement with key stakeholders, a Planning Framework was developed in order to provide an overarching strategy for Lamu. The plan identifies a number of projects and initiatives that can build upon committed projects catalyse opportunities and manage potential impacts. This is aimed to align action and unlock economic opportunities and deliver sustainable growth for Lamu which is inclusive and contributes towards alleviating poverty and inequality.

The Integrated Lamu Planning and investment Framework serves as an exemplar approach which can be scaled for the rest of the LAPSSET Corridor and be used to inform delivery of other large scale infrastructure projects in Kenya.

James Macharia, EGH
CABINET SECRETARY
TRANSPORT, INFRASTRUCTURE, HOUSING AND URBAN DEVELOPMENT

PREFACE

Every present reality that we enjoy is a product of a great vision, from advanced transport and infrastructure developments around us to efficient systems and services that cater for our needs. Lamu County contains key LAPSSET Corridor infrastructure projects such as Lamu Port, pipelines, Standard Gauge Railways, Highways, International Airports, Resort Cities, Crude and Product oil Pipeline, Power and Energy Infrastructure, fibre optics among others. This position Lamu County as a conducive Special Economic Zone ideal for Freight Logistic and Industrial hub, Information-Communication and Technology park and a world class tourist and recreational Zone; driving forward the Country's Vision 2030 Economic Pillar of a sustained economic growth.

Lamu County is endowed with vast natural resources ranging from Fish and Livestock, Minerals, Wildlife, sandy beaches, Marine Ecosystem and conducive weather greatly contributing to the social and economic livelihood of the County through crop production, livestock production, fisheries, tourism and mining. These natural resources available together with capable human resource and the envisioned Investment Infrastructure Development blended together, form the basic ingredients of the Country's economic growth by facilitating Kenya's industrial development agenda.

The Integrated Planning and Investment Framework of Lamu Port city developed by the LAPSSET Corridor Development Authority (LCDA) in partnership with WS Atkins International Ltd and Howard Humphrey's East Africa seeks to: Identify infrastructure and urban development gaps and future needs of Lamu, give projections of the economic potential of the planned projects, Propose complementary projects for investment in Lamu to enhance economic returns for the planned projects and Identify key anchor projects for uptake by the private sector and enhances Private Sector entry and collaboration with government agencies and on social and environmental management, borrowing from world class best practices and standards.

The Master Plan and Investment Framework therefore provides a holistic view of the Lamu County and pivotal details to guide the development in the short, medium and long-term.

Amb. Dr. Francis Muthaura, EGH
CHAIRMAN
LAPSSET CORRIDOR DEVELOPMENT AUTHORITY

ACKNOWLEDGMENTS

The development of Lamu Master Planning and Investment Framework became successful due to tireless efforts of various actors within the National Government County Government and Private Entities. I wish to acknowledge roles and contributions of every individual and institutions that contributed towards the preparation and completion of this Planning Initiative. My deep gratitude goes to LAPSSET Corridor Development Authority (LCDA)'s Board and Staff in ensuring that the Planning exercise was undertaken effectively.

My deepest gratitude further goes to the National Department of Physical Planning, County Departments of Physical Planning in Lamu, Meru, Laikipia, Marsabit, Samburu and Baringo Counties by contributing their planning expertise and time towards successful development of this Planning & Investment Framework.

I wish to appreciate Government institutions such as the Ministry of Transport, Infrastructure, Housing and Urban Development; Ministry of Lands & Physical Planning; Ministry of Energy & Petroleum; Ministry of Tourism; Ministry of Environment & Natural Resources; Ministry of Water & Irrigation, National Environment Management Authority (NEMA), Kenya Ports Authority (KPA), Kenya National Highways Authority (KENHA), Kenya Airports Authority, Kenya Pipeline Company, Kenya Railways Corporation, Kenya Investment Authority (KenInvest),National Land Commission, Kenya Maritime Authority, Vision 2030,National Museum of Kenya among others. I further extend my appreciation to the private sector institutions: REPCON Associates Ltd, World Wildlife Fund (WWF), Centre for Urban & Regional Planning (CURP)**,** WS Atkins International Ltd and Howard Humphrey's East Africa. I wish to recognize the Government of United Kingdom's support in realization of this Planning initiative.

I sincerely thank everyone who contributed directly or indirectly towards the development of this Integrated Master Planning and Investment Framework of Lamu Port City.

Silvester Kasuku, MBS, CMILT
DIRECTOR GENERAL/CEO
LAPSSET CORRIDOR DEVELOPMENT AUTHORITY

EXECUTIVE SUMMARY

Lamu Planning and Investment Framework is a guideline for implementation of LAPSSET Corridor Program which is a regional flagship project, intended to provide transport and logistics infrastructure aimed at creating seamless connectivity between the Eastern African Countries of Kenya, Ethiopia and South Sudan. The Purpose is to align stakeholders around a shared vision for Lamu and to unlock funding and delivery in order that there is a clear path to deliver the socio-economic and environmental benefits linked to the LAPSSET Corridor project.

The vision of the Lamu Planning and Investment Framework is to ensure that Lamu node becomes a gateway into Kenya and a hub for producing/exporting Kenyan products to the world through inclusive development that provides new employment opportunities and a better quality of life.

The Objectives of Lamu Planning and Investment Framework include the following:

- Economy – Support the development of the port and surrounding special economic zone (SEZ) so that Lamu can act as both a place where products are manufactured and as a hub for exporting and importing goods,

  -Transform the national, regional and local economy by putting in place the right infrastructure and investment mechanisms to enable new economic sectors to thrive at Lamu.

- Social - Support communities in Lamu so that they can either continue with their existing livelihood or gain new skills to access the many new job opportunities that development of Lamu will offer,

  -Develop the proposals for Lamu by fully engaging with the local community and other stakeholders, so that Lamu is developed in an inclusive way.

- Environment – Protect Lamu's natural assets including its marine and terrestrial habitats, its wildlife and landscapes, whilst enabling managed access to these areas for the local community and visitors to the area,

  -Minimise impacts on the natural resources by developing urban areas in a green and compact way that promotes mix uses, optimum use of land, public transport and liveability.

- Tourism – Establish and market Lamu as one of the major magnets for tourism in Kenya, by diversifying and increasing the tourist offer, and protecting and enhancing the Lamu's cultural heritage.

- Security – Improve security in Lamu by improving the quality of life of existing residents and designing in a way that promotes inclusion and incorporating appropriate security measures.

- Phasing – Take a phased approach to development so that the long term transformation of Lamu is managed in a way that enables delivery.

The Process of Developing the Planning and Investment Framework for Lamu City involved: Diagnostic (Economic opportunities and Environmental & Cultural sensitivities defined), Stakeholder engagement, Developing Framework (Stakeholders aligned around a shared vision and overarching strategy for Lamu, Supporting infrastructure requirements defined, Priority actions and projects identified that can build upon committed projects, catalyze opportunities and manage potential impacts and Joint working arrangements with LAPSSET Corridor Development Authority (LCDA) to strengthen capacities), Engagement, Finalize Planning & Investment Framework. Road Map to support implantation is provided whereby Practical path to support next steps of implementation outlined and Scale to other nodes on the LAPSSET Corridor.

The Lamu Planning and Investment Framework is phased into Initial Development, Medium Term Development and Full Development. Phasing will be influenced by several factors such as: Economic drivers and investor interest, Availability and supply of water for industrial, commercial and residential; Availability of power generation and distribution networks for industrial, commercial and residential use; Workforce skills and capacity to take up opportunities in Lamu; Security and safety factors which may restrain investment, tourism and in-migration to take up employment.

The implementation of the Lamu Planning and Investment Framework will require a focus on four priority projects that have been defined to catalyse investment. They include: Project 1 –Planning and social management framework, Project 2 –Structuring the Special Economic Zone (SEZ), Project 3 –Power and water Infrastructure and Project 4 –Investment and promotion strategy. The aim is to define further the technical scope of the individual projects, and define the components of the project that would help scale up the approach and sphere of influence.

Lamu Planning and Investment Framework gives provision for Lamu SEZ Planning Authority comprised of LAPSSET Corridor Development Authority (LCDA), National Environmental Authority (NEMA), National Construction Authority (NCA), National Land Commission (NLC) and County Government of Lamu. Support Staff from relevant Government Agencies will also form part of the team. Mandates of the Lamu SEZ Planning Authority include: Plan Making, Planning Approvals, Plan Monitoring and Planning Enforcement.

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ACRONYMS AND ABBREVIATIONS

AGOA	African Growth an Opportunity Act
ASAL	Arid and Semi-Arid Land
BRT	Bus Rapid Transit
CCECC	China Civil Engineering Construction Corporation
CESAs	Critically Environmentally Sensitive Areas
CSP	County Spatial Plan
CWSB	Coast Water Services Board
CURP	Centre for Urban Regional Planning
EAC	East African Community
EMCA	Environmental Management and Coordination Act
FEED	Front End Engineering Design
FDI	Foreign Direct Investment
ICT	Information & Communication Technology
IMF	International Monetary Fund
IWPP	Independent Power and Water Project
KIZAD	Khalifa Industrial Zone Abu Dhabi
LRT	Light Rail Transit
LCDA	LAPSSET Corridor Development Authority
LCIDP	Lamu County Integrated Development Plan
TARDA	Tana & Athi River Development Authority
GASP	German assisted Settlement Programmes
GDP	Gross Domestic Product
KENHA	Kenya National Highways Authority
KENINVEST	Kenya Investment Authority
KNBS	Kenya National Bureau of Statistics

KPA	Kenya Ports Authority
LAPSSET	Lamu Port Southern Sudan-Ethiopia Transport
NCA	National Construction Authority
NEMA	National Environment Management Authority
NSP	National Spatial Plan
PPP	Public Private Partnership
SEZ	Special Economic Zone
WWW	World Wildlife Fund

1. INTRODUCTION

Atkins Acuity and Atkins Howard Humphreys East Africa working with LAPSSET Corridor Development Authority (LCDA) and the project sponsor the British Foreign and Commonwealth Office have developed an Investment Framework for Lamu. This document is structured as follows:

Section 1 – Introduction and understanding the context

Section 2 – Vision for Lamu

i) Integration with other plans
ii) Vision statement
iii) Objectives
iv) Economic Vision and assessing economic potential

Section 3 – Site Analysis

i) Site analysis and capacity assessment
ii) Land use and ownership
iii) Environmental constraints and opportunities

Section 4 – Investment Framework Strategy

i) What makes a successful city
ii) Preferred Planning Framework Strategy
iii) Phasing
iv) Establishing a supporting infrastructure platform

Section 5 – Implementation

i) Planning and Social Management Framework
ii) Structuring the Special Economic Zone
iii) Infrastructure - Water and Power
iv) Promotion and investment framework
v) Roadmap

Scope of this Infrastructure and Investment Framework

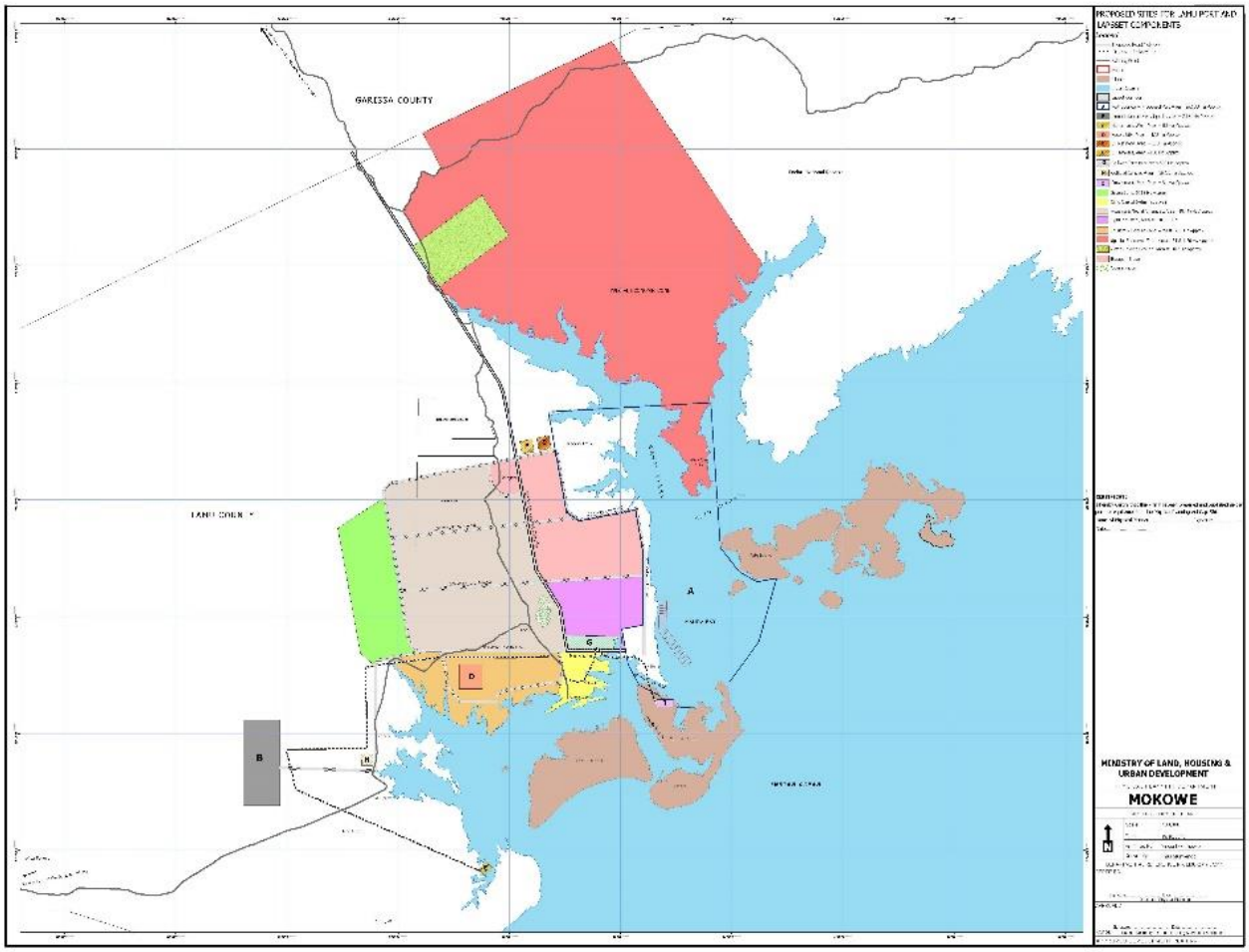
The Lamu Investment Framework is focused on the Lamu node within the LAPSSET corridor (see map 1 below). The scope of this project is to establish a planning and investment framework for Lamu to guide implementation of the LAPSSET Development Corridor. The Investment Framework aims

to align stakeholders around a shared vision for Lamu and to unlock funding and delivery in order that there is a clear path to deliver the socio-economic and environmental benefits linked to the LAPSSET Corridor project.

The Investment Framework includes the following:
An integrated vision and objectives for Lamu, including an economic vision for Lamu.
A framework plan - developed through engagement with key stakeholders in order to provide an overarching strategy for Lamu (including identification of priorities, projects and exploration of financing options). It defines high level requirements to accommodate future economic activities and population growth including residential, industrial, commercial facilities, special economic zone and tourism development opportunities.

A supporting infrastructure platform - Infrastructure needs and requirements are identified based upon the projected population and proposed land uses. This includes preparation of high level requirements for transport, water, drainage, power and solid waste management.
Priority projects - The plan defines a four priority projects and initiatives that can build upon committed projects, catalyze opportunities and manage potential impacts.
Phasing and implementation - The framework provides a flexible and phased plan that can guide public and private long term investment while generating maximum benefits for all.
The approaches and recommendations in this Investment Framework are applicable to other nodes in the LAPSSET Development Corridor, however it is not within the scope of this project to provide proposals for other nodes in the corridor.

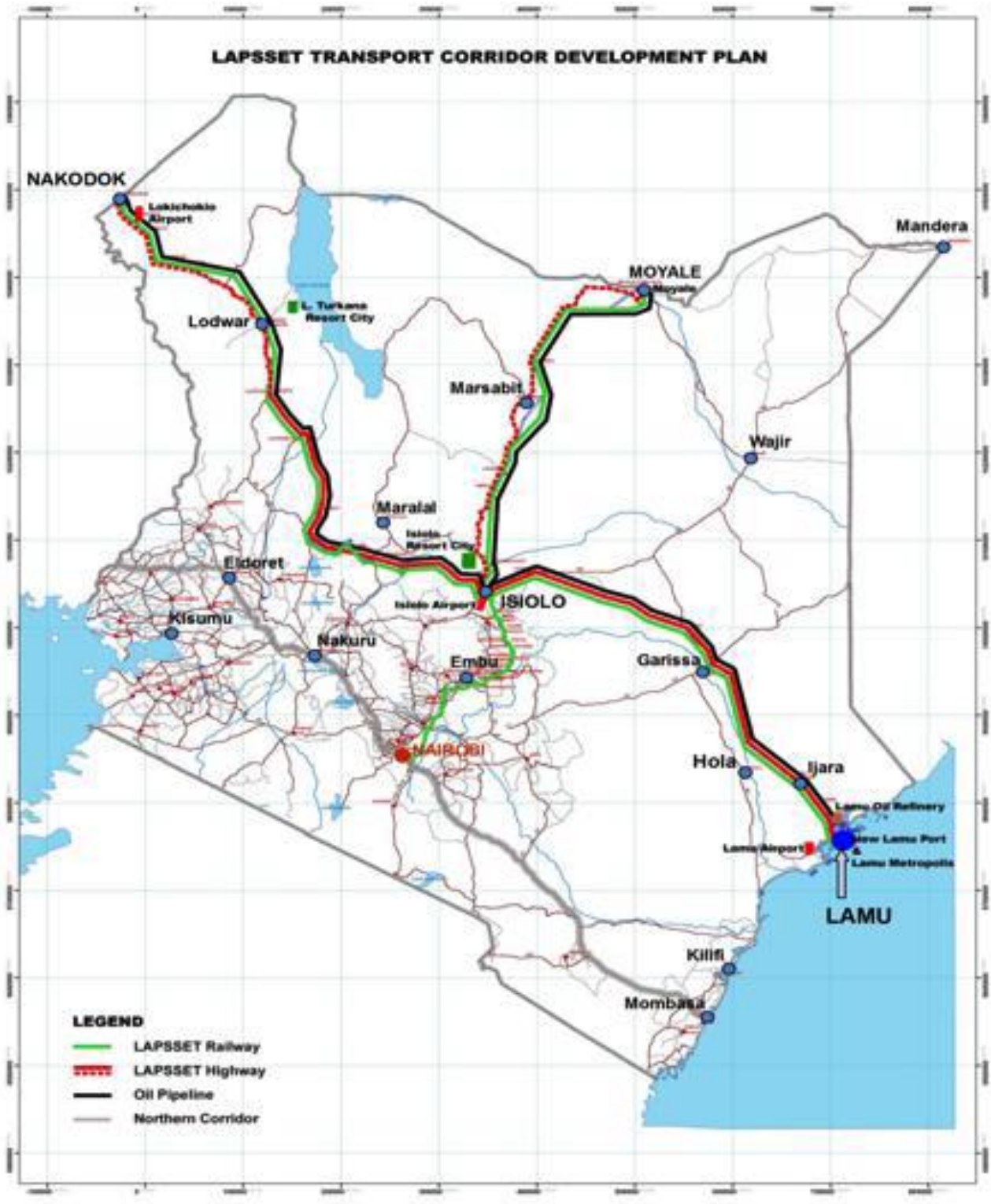
Map 1: Port Development Plan for Lamu LAPPSET node



Understanding the context

The LAPSSET Corridor Program is Eastern Africa's largest and most ambitious infrastructure project bringing together Kenya, Ethiopia and South Sudan (see map 2 below).

Map 2: The LAPSSET Transport Corridor



The LAPSSET Corridor program is part of Kenya Vision 2030 Strategy, which is the long term national development strategy which aims to transform Kenya into an industrialising, middle income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. The three key pillars of the Vision 2030 are: economic; social and political. LAPSSET corridor is an

important part of the economic pillar and will help the country achieve its economic growth aspirations.

This mega project consists of seven key infrastructure projects as set out in Table 1: Lamu is a key node on the LAPSSET development corridor, and will be a key focus for the infrastructure projects identified in the table below. The development of the Lamu Port and the oil pipelines which will terminate at Lamu will be key catalysts of development at Lamu. Development of a Special Economic Zone and Resort City will generate significant employment and commercial opportunities for the town and will help transform the town into a major new metropolis housing a substantial population. To support this transformation international and interregional transport links will be improved through a new railway, new and improved highways and an airport, and new power and water infrastructure to meet the needs generated by industrial and residential users will be established.

Table 1: LAPSSET development corridor key infrastructure projects

Project	Description of subcomponents	Status
1. Port	The project consists of 32 deep sea berths at Manda Bay estimated to cost US $5 Billion. Currently, three berths are being constructed by the Government of Kenya costing US $480 million, first berth will be ready in June 2018 and the other two in December 2020. The other berths are intended to be constructed and operated by the private sector.	Supporting port infrastructure such as port headquarters (LAPSSET plaza), police station, power connection to national grid and water network are completed, construction of port housing for management and security is still ongoing. Dredging works started last year and are still ongoing. ESIA study for the port was completed in 2014. A study to explore the technical and financial structuring of the Port is due to commence in 2017.
2. Pipeline	Oil pipelines will be financed and delivered by private sector investment and consist of: Crude Oil Pipeline from Lokichar to Lamu to Isiolo. In the longer term additional crude oil pipelines may be extended to link with fields in South Sudan.	Crude oil pipeline from Lokichar to Lamu along with tank storage and loading facilities is under FEED (Front End Engineering Design). 53 ha of land have been reserved for oil tank storage and an oil refinery

	As end user demand grows in East Africa the opportunity exists to develop a refinery at Lamu along with product pipelines to serve Kenyan and Ethiopian markets. Kenya and Ethiopia have signed bilateral agreement for the development of a product oil pipeline.	with a capacity of 125,000 bpd at Lamu. The refinery would comprises crude and product tank farms, primary and secondary processing units, administrative service area and construction yard.
3. Railway	Inter-regional standard gauge railway lines from Lamu to Isiolo, Isiolo to Nakodok (Kenya/South Sudan border) and Juba (South Sudan), Isiolo to Moyale (Kenya/Ethiopia border) and Addis Ababa (Ethiopia), and Nairobi to Isiolo. Kenya and Ethiopia have signed bilateral agreement for developing the railway. A feasibility study was completed in 2015 by CCECC. Costs for construction of railway within Kenya along with procurement of rolling stock are estimated at US$ 12.9 billion including civil works, tracks, rolling stock, signal and telecommunications, buildings.	Preliminary engineering and feasibility studies have been completed for Kenya-Ethiopia route.
4. Highways	LAPSSET aims to build inter-regional highways connecting Lamu to Isiolo, Isiolo to Nakodok and Juba (South Sudan), Isiolo to Moyale and to Addis Ababa (Ethiopia), and Lamu to Garsen (Kenya). Kenya has agreed with the government of Ethiopia and South Sudan to develop these highways under the LCDA. Total construction of highways within Kenya is an estimated US$ 1.4 billion.	Detailed engineering designs for Lamu – Garissa – Isiolo (537 Km) are completed. The World Bank has approved a US$ 500 million loan for the construction of Nakodok – Lokichar road (738 km). Construction has commenced. 505 km of road between Isiolo – Marsabit – Moyale are completed. Travel time between Moyale (Kenya/Ethiopia border town) and Nairobi has been reduced from about

		60 hours (more than three days) to 8 hours. Construction of Lamu – Witu – Garsen (112 KM) has been prioritised for construction in order to connect with existing road infrastructure. Construction works are expected to start early this year. Sections within Ethiopia to the Kenya border have also been completed.
5. Airports	International airports are proposed at Lamu, Isiolo and Turkana with an estimated cost of US$ 188 million, US$ 175 million and US$ 143 million respectively. The Airport at Lamu and Turkana need upgrading and a new Airport is proposed at Lamu. The Government of Kenya owns and is responsible for constructing and maintaining international airports, but it is suggested that passengers and cargo terminals should be constructed, owned and operated by private entities under the PPP framework.	Intermediary airports are under construction to build up air transport and logistic business case for international airports. Preliminary facilities (2.3 km runaway and terminal building) at Manda airport in Lamu have been completed. With plans for further connections. 1 km runway in Isiolo airport is completed and terminal building is also completed. Work at Lake Turkana airport has not started yet.
6. Resort City	Three resort cities have been proposed at Lamu, Isiolo and Lake Turkana with an estimated cost of about US$ 970 million, US$ 200 million and US$ 42 million respectively. Investment on these resort cities are expected to come from private funds under PPP framework. Lamu Resort City will mainly comprise a convention centre as the core facility, amusement centre, terminal station, culture centre and fisherman's wharf as sister	Preparation work for a master plan for Lamu Resort city and Metropolis is underway.

	cities. Though initially they shall all be interconnected via a road, it is planned that in the long run they will be linked by the more efficient study for LAPSSET.	
7. Power and Water supply	The multipurpose High Grand Falls Dam along the Tana River.	Further feasibility studies are required to develop and update previous studies undertaken for this project.

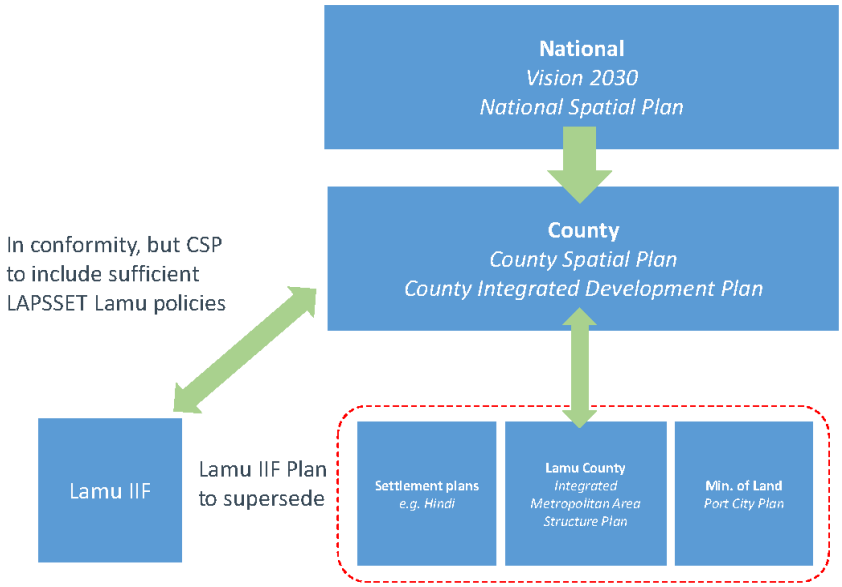
2. Vision for Lamu

Introduction

This section sets out the vision for Lamu Infrastructure and Investment Framework. The vision has been agreed through stakeholder consultation and has been developed to be consistent with the aims and objectives of national policy and to ensure that it can be incorporated into the County Spatial Plan and other local level plans (Local Physical Development Plans and Urban Plans).

Integration of the Investment Framework with other Plans

The Lamu Investment Framework sits within a hierarchy of plans that guide development in Kenya (see diagram below). The framework will help to achieve the aims of the strategy set out in the Kenya Vision 2030, and is consistent with the strategies and guidelines set out in the National Spatial Plan. The following provides a brief summary of the status and key aims of the various plans and strategies that will impact on development at Lamu.



Kenya Vision 2030 – was prepared by the Government of Kenya. It covers the period 2008 – 2030 and sets out the long term development blueprint for the Country. The overall vision is to create a globally competitive and prosperous nation with a high quality of life by 2030. This vision is based on three pillars: economic - to maintain a sustained economic growth of 10% per annum over the next 25 years; social - a just and cohesive society enjoying equitable social development in a clean and secure environment; political – an issue-based, people centred, result-oriented, and accountable democratic politics. In driving forward the socio-economic development of the Country the vision

identifies various strategies that will need to be implemented, these strategies will be supported by a series of flagship projects that includes LAPSSET.

The LAPSSET corridor is identified as a link between Lamu, Kenya's North Eastern province, Ethiopia and Southern Sudan. The project involves the development of a new transport corridor from the new port at Lamu through Garissa, Isiolo, Mararal, Lodwar, and Lokichogio to branch at Isiolo to Ethiopia and Southern Sudan. Projects within the corridor identified in Vision 2030 comprise: a new road network, railway line, oil refinery at Lamu, oil pipeline, Lamu Airport and free port at Lamu (Manda Bay) in addition to resort cities at the coast and in Isiolo and Turkana.

National Spatial Plan (NSP) - was prepared by the Department of Physical Planning in the Ministry of Land and Physical Planning. It covers the period 2015 – 2045 and addresses land use, socio-economic and environmental issues to achieve balanced and sustainable spatial development and optimal land use across the country. The NSP provides comprehensive strategies and policy guidelines to deal with issues of rural and urban development, modernizing agriculture, infrastructure, energy production, mining and industry, and sustainable human settlements. It provides a spatial framework for anchoring Vision 2030 flagship projects. The NSP envisions spatial development of the Country to promote the achievement of competitiveness prosperity and high quality of life for citizens in line with the aspirations of Vision 2030.

The NSP acknowledges the need for better distribution of urbanisation in Country. The LAPPSET corridor (and its key components) are identified in the NSP and are crucial to spurring growth in northern parts of the Country which will help with this re-distribution of urbanisation. As such the NSP takes deliberate effort to direct infrastructure investments to towns in the LAPPSET corridor. Lamu is identified as a gateway town, which needs to have its functionality and liveability enhanced to make it more attractive and competitive. The NSP supports Lamu as an emerging growth area and identifies several projects such as the development of the Special Economic Zone (SEZ) and the resort city as critical to achieving this.

Lamu County Spatial Plan (CSP) – this is in the process of being prepared by the County Government of Lamu. The CSP contains strategies and policies regarding the desired spatial form of the County, it will cover the period 2017 – 2026. The vision in the draft plan sets out visions for each of the wards in the County (Faza, Kiunga, Basuba, Hongwe, Mkunumbi, Hindi and Mkomani) it does not provide a vision for the LAPSSET Lamu node. The draft plan does refer to the LAPSSET project, identifying the different elements of the project such as the port, the corridor (for railway, pipeline

etc.), oil refinery, resort city, international airport, and port city. The CSP identifies that the Port City will reach a population of 1.25 million by 2050.

The CSP does not include a plan showing the red line boundary of the area that is covered by the LAPSSET projects. It is recommended that the final CSP should include a plan showing the area that the project includes. It is also recommended that the CSP should have additional policies related to LAPSSET Lamu node including:

Definition of a vision for Lamu node – using the vision in this Investment Framework.

Definition of the overall quantum and land use types within the Lamu node – using the quantum set out in this Investment Framework.

A statement that further detailed planning requirements will be set out in a detailed masterplan and development guidelines (to be prepared by LCDA and the County Government of Lamu).

Defining the extent of green buffer and defining appropriate uses such as managed recreational and agricultural use that retain openness and restrict development to ancillary uses.

Lamu County Integrated Development Plan (LCIDP) – was prepared by the County Government of Lamu. It covers the period 2013 – 2017. The LCIDP makes reference to LAPSSET and identifies the components of the project in detail and identifies the benefits of the project to Lamu County. As drafted the LCIDP and this Investment Framework are consistent and as such there do not appear to be any issues with harmonisation that need to be resolved.

Integrated Lamu Metropolitan Area Structure Plan – The County Government of Lamu is in the process of preparing this plan, and draft was published in 2016. The plan sets out a detailed land use zoning plan for the port, industrial area and new metropolis. There are several key differences between the detailed land use zoning proposed in the Integrated Metropolitan Area Structure Plan and land use zoning in this Lamu Investment Framework. Before it is approved, the Integrated Lamu Metropolitan Area Structure Plan will need to be amended to incorporate the land use zoning as set out in the Lamu INVESTMENT FRAMEWORK, to ensure that the vision and objectives of the Investment Framework are achieved.

Vision statement

The Lamu node will become a gateway into Kenya and a hub for producing and the exporting of Kenyan products to the world through the development of a new port and international airport.

Lamu will be developed in a way that is inclusive so that it provides new employment opportunities and a better quality of life for both the existing population of Lamu and the Kenyans who come to make Lamu their new home.

In making the transition from the Lamu of today to the Lamu of tomorrow, the rich natural and cultural heritage of the area will be protected and enhanced, through an approach to urbanisation that promotes a compact and green city.

Objectives

In achieving the vision for Lamu the following objectives will need to be achieved:

Economy – Support the development of the port and surrounding special economic zone (SEZ) so that Lamu can act as both a place where products are manufactured and as a hub for exporting and importing goods.

Economy - Transform the national, regional and local economy by putting in place the right infrastructure and investment mechanisms to enable new economic sectors to thrive at Lamu.

Social - Support communities in Lamu so that they can either continue with their existing livelihood or gain new skills to access the many new job opportunities that development of Lamu will offer.

Social – Develop the proposals for Lamu by fully engaging with the local community and other stakeholders, so that Lamu is developed in an inclusive way.

Environment – Protect Lamu's natural assets including its marine and terrestrial habitats, its wildlife and landscapes, whilst enabling managed access to these areas for the local community and visitors to the area.

Environment – Minimise impacts on the natural resources by developing urban areas in a green and compact way that promotes a mix of uses, efficient use of land, public transport and liveability.

Tourism – Establish Lamu as one of the major magnets for tourism in Kenya, by diversifying and increasing the tourist offer, and protecting and enhancing the Lamu's cultural heritage.

Security – Improve security in Lamu by improving the quality of life of existing residents and designing in a way that promotes inclusion and incorporating appropriate security measures.

Phasing – Take a phased approach to development so that the long term transformation of Lamu is managed in a way that enables delivery.

The Economic Vision and Assessing Economic Potential

The economic vision for Lamu is of a sustainable industrial economy that provides inclusive economic opportunities locally, supports the achievement of Kenya's economic development strategies, and strengthens integration and economic development across East Africa. The creation of a Special Economic Zone and a new metropolis at Lamu and the investment in major infrastructure as part of the LAPSSET project will be the basis for achieving this vision.

This section presents a diagnostic review of the national and local economic context to inform the economic vision for Lamu. It also provides an overview of the scenario methodology used to examine the economic impact of proposals at Lamu.

National economic context

Economic and Social Objectives

Vision 2030 sets the goal of Kenya becoming a newly industrialising "middle-income country providing a high quality of life to all its citizens by the year 2030." Vision 2030 sets out an economic development programme that covers all regions of Kenya and aims to deliver annual GDP growth of 10%.

A key route to achieving this goal is industrialisation of the Kenyan economy. The Industrial Transformation Programme (2015) aims to increase the formal manufacturing sector's share of GDP to over 15%. The plan also supports expansion of skilled service sector activities.

Expansion of the industrial sector and commercialisation of other sectors, such as agriculture, will create productive and high quality employment opportunities. This is imperative to address issues of unemployment, particularly amongst the youth, and provide a path to prosperity for the people of Kenya. The Second Medium Term Plan (MTPII) includes a long-term target of creating 1 million new jobs annually. Industrialisation will also support formalisation of the Kenyan economy. Whilst currently a significant majority of employment is in the informal sector (estimates suggest 83%[1]), Vision 2030 aims for formal sector employment to reach 40% of total employment.

The industrial development of Lamu around the port and other major infrastructure can provide opportunities for the development of manufacturing and other industries. This will support the economic development of an area that has historically experienced low levels of investment. Target industries for Lamu should provide significant employment whilst building upon and adding value to existing local activities (such as livestock farming and fishing), particularly in producing goods for the export market.

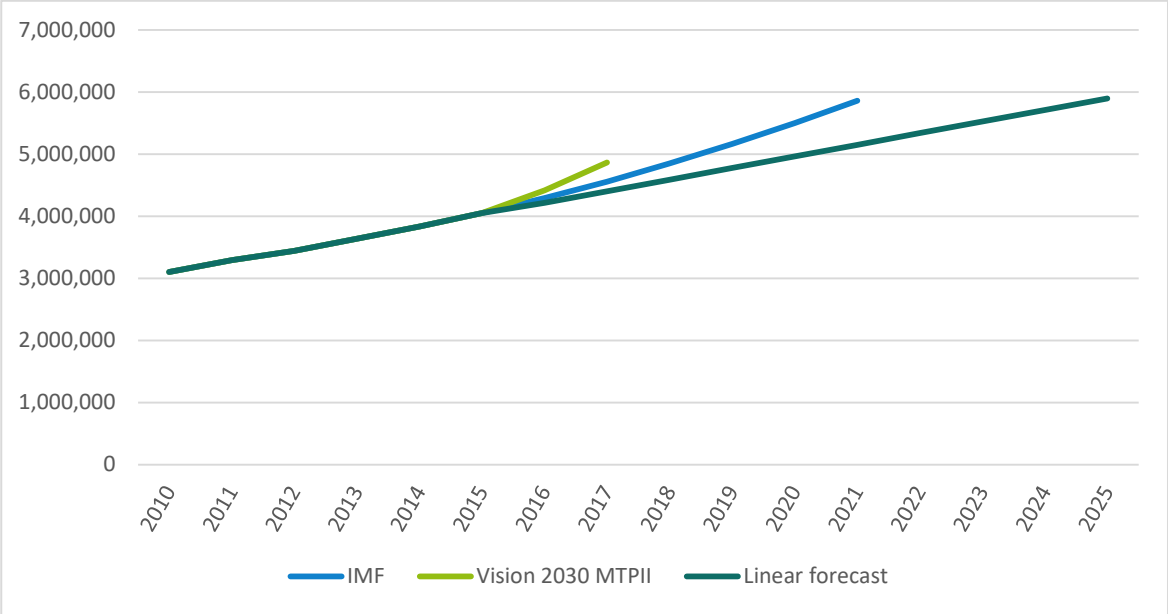
Current conditions

Growth: Annual GDP growth (holding prices constant) in Kenya averaged 5.5% from 2010 to 2015. The IMF's World Economic Outlook 2016 predicts that GDP growth is set to rise in the period up to 2021, following significant infrastructure investment and strong performance of the manufacturing sector supported by low oil prices. Figure 1 plots the GDP projections of the IMF and those contained in the MTPII, as well as an extrapolation of GDP growth based on recent trends. This indicates the

[1] KNBS. 2016. Economic Survey 2016

gap between historical performance and the economic potential. The IMF note that economic and export diversification, supported by continued investment in infrastructure, will be critical for realising growth in Kenya and other economies in the region.

Figure 1: GDP forecasts for Kenya (KSh m, constant 2009 prices)



Key sectors and strategies: Currently, agriculture and manufacturing constitute the largest sectors in Kenya, representing 30% and 10% of GDP respectively[2]. However, the two sectors only contributed 24% of total GDP growth between 2010 and 2015 (holding prices constant). Growth rates in both sectors have been below the national growth rate, whilst growth in the services sectors has generally been strong. This is demonstrated in Figure 2, which compares sectoral contribution to GDP in 2015 with contribution to total growth between 2010 and 2015. Those sectors below the 45° line are those which have contributed less to growth in Kenya over the last five years than their significance to the economy (as measured by share of GDP in 2015) would suggest.

Key manufacturing sub-sectors for growth include agro-processing (including livestock and fish), textiles and apparel, leather and construction materials. The development of Special Economic Zones is the flagship policy for supporting growth in the sector.

The principal strategies for agriculture are to increase the processing of products for export, thereby adding value and creating agro-processing employment, and improving agricultural production, for example through a Coastal Disease Free Zone for livestock and irrigation projects for the ASALs. Mombasa has been proposed as an agro-processing hub, however a large proportion of the ASALs

[2] KNBS. Economic Survey 2016.

are along the LAPSSET corridor. Lamu would therefore be a potential export hub for goods produced along the corridor. Additionally, the development of a modern fishing port at Lamu features in the Industrial Transformation Programme.

In the tourism sector, international arrivals and tourism earnings have fallen year on year since 2011, due to the global downturn and perceptions of security in Kenya[3]. Vision 2030 aims for Kenya to become a top 10 long haul tourist destination. To achieve this goal, resort cities are being established in Lamu, Lake Turkana and Isiolo. Other initiatives include improving the ecosystem management of Kenya's coastline and improve its parkland.

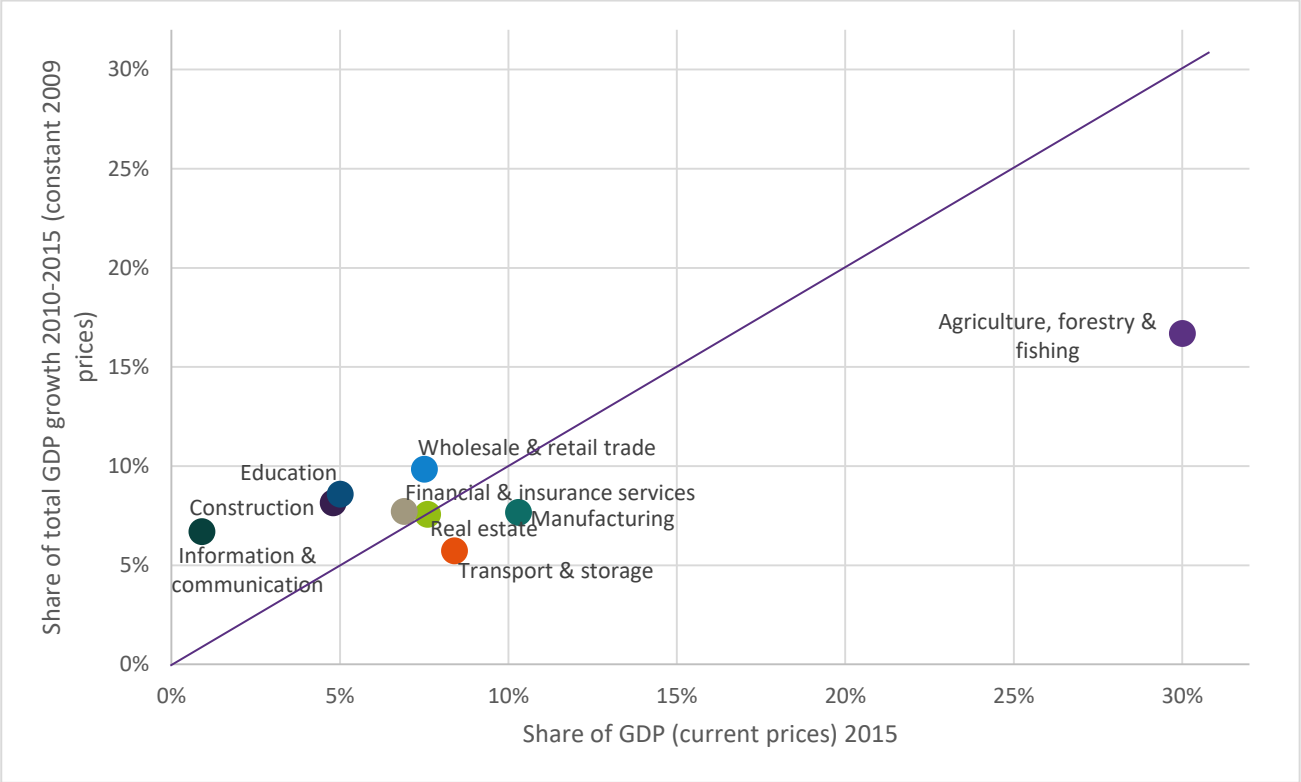
Oil, gas and minerals was introduced as a priority sector under MTPII, based on recent oil and gas discoveries, including offshore gas in the Lamu basin. Kenya currently has inadequate infrastructure and technical capacity to take advantage of these deposits. Lamu, as the end point of the oil pipeline component of the LAPSSET corridor, could act as a centre for development of related industries, such as petrochemicals, when these resources are fully developed.

The service sector, particularly ICT and financial services, has also become a key growth sector for Kenya and Vision 2030 targets employment growth in these sectors. However, the sector and strategies to support it currently centre on Nairobi, where the available skills and infrastructure are currently present. This is therefore likely to be a less significant concern for Lamu, particularly in the short term.

The development of Lamu is therefore principally an opportunity to accelerate growth rates in the manufacturing and agricultural sectors and provide an opportunity to stimulate Kenya's tourism sector. Longer-term, there may also be the opportunity to develop petrochemicals and related sectors as well as services as this becomes a more prominent component of the Kenyan economy.

[3] KNBS. Economic Survey 2016.

Figure 2: Comparison of selected sectors size contribution to total GDP and to GDP growth, 2010-2015



Source: KNBS Economic Survey 2016

Exports: Kenya's principal exports are coffee and tea, horticultural products, mineral oils, vegetables and articles of apparel and clothing. The Industrial Transformation Programme identifies further development of agro-processing industries and light manufactured products such as apparel as key sectors. Lamu can provide the required infrastructure and facilities to support export-oriented activity in these sectors and diversification into sectors with similar skills and infrastructure requirements, and thereby support a programme of export-led growth and diversification.

Employment: Formalisation of employment remains a significant challenge in Kenya. Estimates by Kenya National Bureau of Statistics suggest that informal employment accounts for 83% of total employment and that in recent years this proportion is increasing. Formal employment has the potential for greater labour productivity, skills development and employment security. Creating formal sector employment is therefore an important component of Kenya's economic and social development programme.

Investment: Domestic and inward investment in Kenya has been increasing. Levels of gross fixed capital formation have increased year on year from 2011 to 2015 though at variable rates, partly driven by significant infrastructure investment. Foreign Direct Investment (FDI), as measured by the

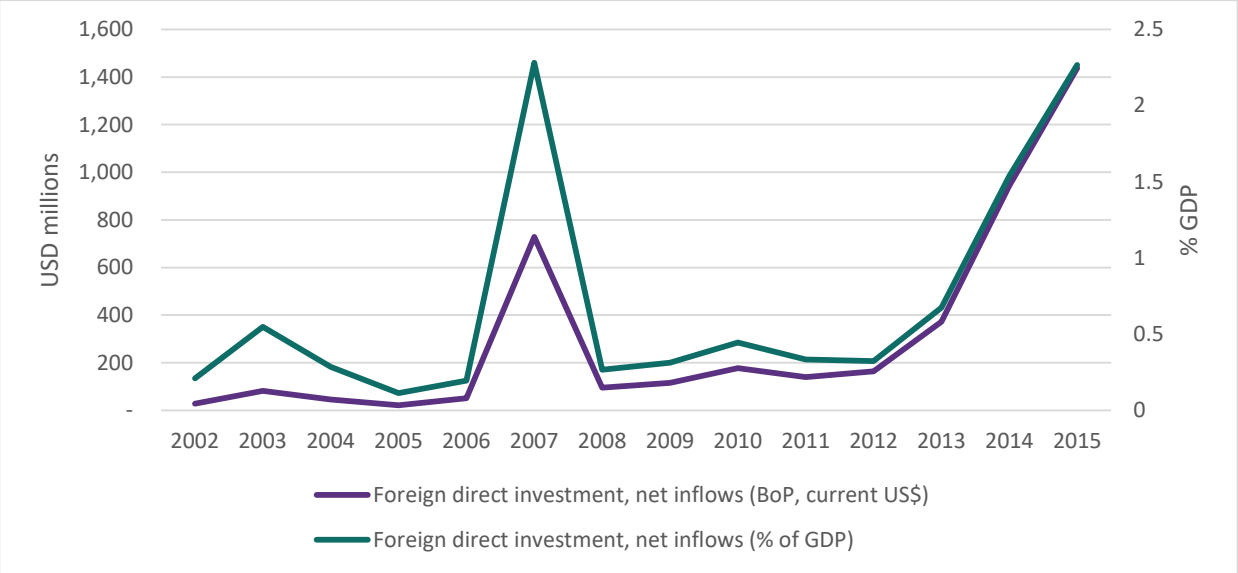
IMF, has grown significantly since 2012, both in absolute value and as a proportion of GDP, as shown in Figure 3.

Factors cited by international investors as supportive of investment in Kenya are domestic market growth potential, the skill profile of the workforce, quality of infrastructure and access to other markets. Barriers to investment include length of time required for registering property and work permits and high costs of electricity connections[4]. UNCTAD have identified the reliability of the power supply, tax administration and security as challenges for investors[5]. To attract investment, development of an industrial zone in Lamu will have to address these issues by demonstrating adequate investment in power infrastructure. Designation as a Special Economic Zone under the 2015 Special Economic Zones Act (see Box 1) should address issues regarding tax and business regulation.

Competitiveness: The World Economic Forum's Global Competitiveness Index 2016-2017 ranks Kenya 96th out of 138 economies, with an overall score of 3.9 out of 7. Influential factors are similar to those relevant for inward investment. Within the components of the index, Kenya performs best on 'Health and primary education', 'Labour market efficiency'; 'Financial market development', 'Goods market efficiency' and 'Business sophistication' (all rated 4 or above). Kenya's key weakness within the index, and the only dimension against which it scores below 3.5 out of 7 is 'Infrastructure'. Other problematic factors for doing business include corruption, tax rates, access to financing, inefficient government bureaucracy and inadequate supply of infrastructure. Within this context, the importance and potential impact of the LAPSSET corridor investments and the benefits conferred by the Special Economic Zone designation for enabling development at Lamu is clear.

[4] KNBS. 2015. Foreign Investment Survey
[5] UNCTAD. 2012. Investment Guide to Kenya.

Figure 3: Foreign direct investment inflows to Kenya, 2002-2015



Source: IMF World Economic Outlook 2016

Box 1: Special Economic Zones Act 2015

With the passing of the Special Economic Zones Act in 2015, areas can now be designated Special Economic Zones (SEZs).

Various types of sites can be SEZs, including free trade zones, industrial parks, science and tech parks, tourist and recreational/MICE zones, business service parks, and livestock zones.

SEZ designation confers benefits to enterprises located within the zone, such as exemptions from the Excise Duty Act, Income Tax Act, EAC Community Customs Management Act, VAT Act and stamp duty. SEZ enterprises are also entitled to work permits for up to 20% of their

Local economic context

Demographics

The population of Lamu County in 2017 was estimated at 137,180[6]. 80% of the population live in rural areas and most urban residents live in Lamu Town, which has a population of 21,994. The population includes several minority ethnic groups, some of whom such as the Boni and Sanye engage in traditional hunter-gatherer lifestyles. All ethnic groups and both rural and urban dwellers need to be considered in the economic development model for Lamu.

As across Kenya, the population of Lamu is young. Estimates for 2017 suggest that the population of working age (15-64) represent 56% of the population but those aged under 29 represent 69% of the population. This young population represents a future opportunity for economic growth, as an increasing proportion of the population will be of working age. To realise this opportunity, there is a

[6] Lamu County Integrated Development Plan 2013-2017

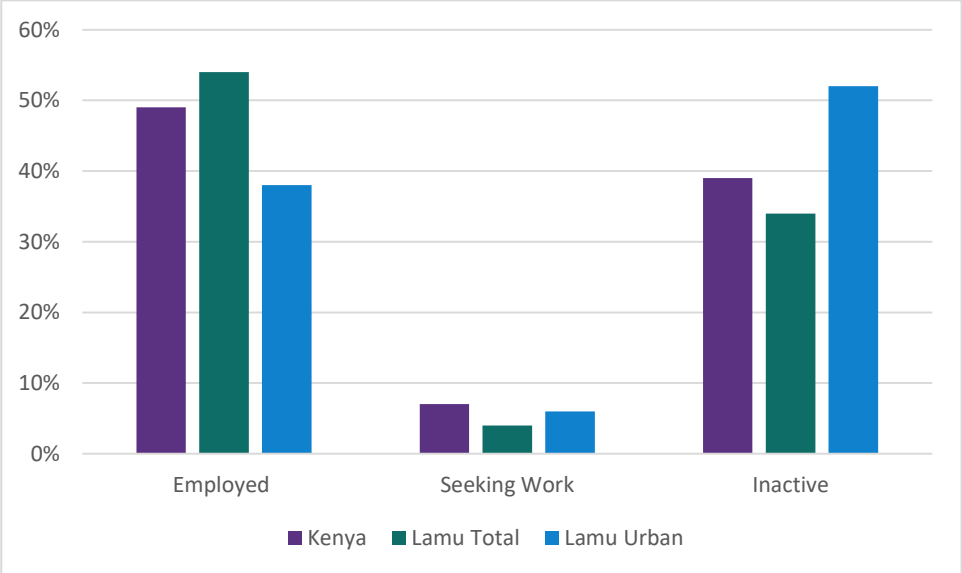
need to ensure there are sufficient employment opportunities, that these are accessible to local people and that they are in productive and well-paying jobs.

Employment

Data from the 2009 Population and Housing Census suggests rates of unemployment are lower in Lamu than nationally, at 4% compared to 7%. This is true of both rural and urban populations. There is no available data on the quality of employment however (for example, what proportion is in the formal sector).

Economic inactivity is high amongst urban residents of Lamu, as demonstrated in Figure 4. 52% are economically inactive, compared to 40% for urban residents nationally and 39% for the total national population. The difference is most significant for female residents (67% are economically inactive compared to 47% nationally). This may be related to cultural norms regarding women in employment.

Figure 4: Economic activity in Kenya and Lamu (% of population aged 5+)



Source: KNBS Population and Housing Census 2009

The LCIDP estimates poverty rates of 45% in urban centres and 29% in rural areas, citing key reasons as unemployment, subsistence economic lifestyles and lack of access to finance. This makes clear that despite low measured levels of unemployment, poverty is widespread. Employment may be poorly paid or provide insufficient hours of work. LAPSSET is identified by the LCIDP as an opportunity to relieve poverty in the future.

Information on skills, proxied by data on educational attainment from the 2009 Census, suggests that educational attainment is lower in Lamu County than the national average. A greater proportion of people in Lamu have only a primary school education or less[7]. The LCIDP identifies that school capacity is generally adequate, but secondary school performance and the state of local skills training institutions is poor.

This suggests there is a need to create better quality and inclusive employment opportunities in Lamu. Initially, many of these jobs will need to be accessible to those with low skills. Light manufacturing can employ large numbers of low skilled workers whilst ensuring high labour productivity relative to activities such as agriculture, reflected in higher levels of pay. Additionally, manufacturing employment can provide skills to employees. In particular, this model of development has proved successful in East Asia.

Local livelihoods

While there is no data on the sectoral distribution of economic activity in Lamu, the LCIDP notes that the main economic activities in the county are:

Crop production, including cash crops. Projects outlined in the LCIDP to support farmers include improving production techniques and promoting agro-processing, for example developing a fruit processing plant.

Livestock production, particularly cattle. Providing adequate marketing facilities and supporting medical programmes are projects identified in the LCIDP.

Fishing is the main economic activity for the residents of Lamu Island. Fishing activity is currently below its potential due to inadequate equipment and facilities (e.g. landing sites and cold storage). In particular, local fishermen are unable to undertake deep sea fishing.

Whilst the above represent major activities and sectors for employment, tourism is also an important sector for the area, given its beaches, natural environment and fauna and the UNESCO World Heritage status of Lamu Old Town. There are 2 classified and 181 unclassified hotels. The LCIDP identifies a need for greater coordination and marketing of tourist activities. Mineral resources and industrial

[7] 77% of the Kenyan population aged 3 or above had their highest level of educational attainment as primary school or lower, compared to 83% in Lamu. Nationally, 22% of people completed a secondary, tertiary or university education, compared to 14% in Lamu.

development are proposed as potential future sectors for growth in the LCIDP, particularly developing local industries for export, including food processing.

The industrial development of Lamu and the infrastructure projects along the LAPSSET corridor, particularly the Lamu Port, provide a significant opportunity to develop these central activities further. Food and beverage processing for export can support greater value added to agricultural and livestock products whilst providing employment opportunities. Mineral resources, where viable, can be commercially developed making use of the transport corridor for access to markets. The improvement of transport infrastructure and the development of a Resort City can support the tourism sector in Lamu.

Constraints on growth

The LCIDP also identifies infrastructure and utility constraints on development and economic growth. Transport infrastructure is currently limited, for example roads are largely untarmacked. Access to tapped water is only available in urban centres and there is limited access to modern sanitation infrastructure. Electricity is provided using diesel generators to some areas of the county, though grid connectivity is almost complete. Landlessness and land ownership issues are a significant concern in the county. There is a risk of increased coastal flooding due to climate change. Additionally, the environment of some areas of the county is becoming degraded through deforestation, water pollution and depletion of key ecosystems such as mangroves. The development of Lamu will need to address these issues to realise sustainable economic development.

Economic rationale of proposals for Lamu

Port: The development of a port at Lamu will allow for relief of the congested Port of Mombasa and provide the opportunity to develop export-oriented manufacturing or agro-processing industries, or those that make use of global value chains, in Lamu. The development of the Port can also support export of oil following its transport to Lamu along the LAPSSET corridor. The development of appropriate port facilities can also support a deep sea fishing industry.

Port Industrial Area: The Port Industrial Area will provide employment land and infrastructure required to support industrial and agro-processing activity. These activities will add value to agricultural and livestock products produced by communities along the LAPSSET corridor and of fishing activity based around Lamu. Manufacturing activity in other sectors, for example construction materials, will provide further employment opportunities. The activities contained within the Port Industrial Area can support the aims of Vision 2030 regarding agriculture and manufacturing. Proximity to the port will allow for the export of products, particularly heavy goods, and access to

imported inputs where these are required. Development of an industrial zone accommodating clusters of activities will allow for agglomeration benefits – low transaction costs supporting linkages between specialised firms and access to a shared labour market.

Resort City: The development of a Resort City can develop Lamu's already strong tourist offer. Current assets include the natural environment and cultural heritage, particularly the UNESCO World Heritage Site of Lamu Old Town. In addition, development of the Port, Special Economic Zone and Lamu Metropolis will increase demand from business tourism. There may also be a demand for short term or long term lets either as second homes or from business people on long-term trips.

Special Economic Zone: The Special Economic Zone can provide an environment that attracts investment in manufacturing and other industries including logistics and service related activity.

Airport: As demand for travel to the area increases, either for business or tourism purposes, the current airport infrastructure may prove inadequate, requiring investment in upgrading of facilities to allow further air connections and routes to serve Manda. A site has been reserved for a new international airport to be developed in the future as demand develops.

Economic opportunities and future scenarios

To explore the economic potential of projects at Lamu projects, three scenarios were used: population-led; project-led; and a benchmarking-led scenario.

Population led scenario

This scenario uses projections of the population of Lamu County, based on those contained within the LCIDP, to estimate the required level of employment to support the future population of Lamu. Using the Vision 2030 priority sectors, an assumed distribution of employment by sector was developed and employment land requirement for key industrial sectors identified. This is a no-migration scenario and focuses on understanding how to meet the employment needs of the local population. This is therefore a minimum requirement for the Lamu projects.

This scenario suggests that, without migration, the population of Lamu County will be around 221,600 by 2040. The economically active population aged 15-64, equivalent to the labour force, will number 71,400. The total required employment land, based on the assumed distribution of employment by sector, would be approximately 940 ha. Key outcomes of this scenario are presented in Table 2.

This defines the minimum requirement for the development of Lamu by 2040, to provide employment opportunities for the local population in line with current economic policy objectives, in particular those of Vision 2030.

Table 2: Key outcomes of the population-led scenario for the development of Lamu

	2020	2025	2030	2035	2040
Male Population	75,200	85,300	95,500	105,600	115,800
Female Population	68,700	78,000	87,300	96,600	105,800
Total Population	143,900	163,300	182,700	202,200	221,600
Population aged 15-64	78,900	89,500	100,200	110,800	121,500
Economically active population aged 15-64	46,400	52,600	58,900	65,200	71,400
Employment land for key industrial sectors[8] (ha)	607	689	771	853	935

Project led scenario

This scenario is a 'maximum capacity' scenario. It assesses the capacity for economic activities and employment based on full development of the available land under several land parcels (referred to as 'projects') defined in the Port Development Plan (PDP) produced by LCDA for the area. After considering environmental constraints, this scenario assumes the full potential of the proposed economic activities are realised and that all labour demand that is not met by the local population can be met through migration to the Lamu area.

The developable land area was identified for each constituent project, removing environmentally constrained areas and land required for infrastructure. A mix of economic activities and phasing assumptions for development were derived for each project. Associated labour demand was estimated using international standards for employment densities. Demographic assumptions on household size were used to estimate the total population of the Lamu Metropolis. This population has been compared to the projected local population under the population-led scenario to give an indication of the number of migrants that would be required to meet labour demand in Lamu.

Key outcomes of the scenario are summarised in Table 3. This scenario considers almost 18,300 ha of employment land. It estimates that appropriate full development of this land could support 988,000 employees; the manufacturing sector alone accounts for almost 600,000 employees. This level of

[8] Employment land requirements were estimated for: Wholesale and retail trade; Transport and storage; Manufacturing (light and heavy); Information and communication; Financial and insurance activities; Professional, scientific and technical activities; and Real estate activities.

direct employment and required employment in social services implies a population of 2,565,000. This is considered to represent the extent of development currently envisaged in the medium - long term within the Lamu Metropolis.

Table 3: Key outcomes of the project-led scenario for the development of Lamu

	2020	2025	2030	2035	2040
Employment land (ha)	1,936	3,976	8,181	13,427	18,283
Labour demand	74,903	166,755	385,265	657,124	988,479
Total associated population	194,329	432,628	999,532	1,704,843	2,564,512
Indicative migrant population	50,458	269,325	816,797	1,502,676	2,342,913

Benchmarking led scenario

The two scenarios above provide quantitative parameters for the potential scale of the Lamu development. The benchmarking-led scenario identifies potential economic activities that could be developed in Lamu and the requirements for these activities. It also examines international examples of SEZs and similar industrial developments to identify key considerations for successful development of a special economic zone in Lamu.

Potential activities have been identified following an assessment of demand drivers. This exercise is summarised in Table 4. Relevant domestic demand drivers include GDP and population growth, inward investment and investment in infrastructure. Production activities oriented towards export opportunities, whether making use of local inputs or integrating into global supply chains, have also been considered. This assessment of potential activities draws on examples of the development of industrial zones in East Africa and internationally and an assessment of Kenya's competitive advantages and contextual factors. In particular, the importance of investments in infrastructure and logistics, the erosion of labour cost advantages in China and India and Kenya's relative labour cost advantage, its regional role and strong comparative labour productivity, and access to markets in the USA for light manufactured goods produced in Africa through African Growth an Opportunity Act (AGOA).

The assessment has focused on labour intensive manufacturing activities that match the profile of the local and national labour force. This reflects the importance of manufacturing, and light manufacturing in particular, as a driver of economic development in sub-Saharan Africa. Relevant

sectors and activities are summarised in the table below. It is important to note that a full demand assessment will be required to determine the viability and viable scale of these sectors.

Table 4: Assessment of relevant economic activities for Lamu

Sector	Main products	Specific activities	Market drivers
Metals processing	Steel	Long and flat steel products service centres Stamping/pressing of steel/aluminium sheet Welded steel tubes Hot-dip galvanising facilities General machine shop facilities Fabrication workshops	Focus on domestic demand. Drivers: GDP and population growth; Urbanisation; Investment (infrastructure); Growth of industrial activity; Consumer disposable income; Substitution by other materials
	Copper	Copper tube manufacture Brass castings	
	Aluminium	Aluminium extrusion facilities Aluminium foil mills Aluminium casting facilities	
Building materials	Aggregates	Sand, gravel and crushed stone	Focus on domestic demand. Drivers include: GDP and population growth; Urbanisation; Investment (infrastructure); Growth of industrial activity; Consumer disposable income; Substitution by other materials.
	Cement	Cement plant Clinker grinding plant	
	Light manufacture building products	Pre-stressed and pre-cast concrete products Ready mix concrete factories uPVC windows and doors Float glass and glass panels (IGU) Plasterboard, cement board	
Light manufacturing	Apparel	Apparel and textiles. Facilities often specialise in a	Globalised supply chains; Competition in clothes retailing; Shift in

		particular operation or component, e.g. patterns, cutting, embroidery, trims, etc.; or assembly.	manufacture away from East Asia; Abundance of low skilled labour force in East Africa; Established export-oriented industry in Kenya; Market access (e.g. AGOA).
	Furniture and wood products		Local expertise
Food and beverage sector	Storage facilities Flour production Frozen fruit and vegetables Fruit and vegetables preserves in containers Beverage production Food packaging facilities Meat processing Fish processing Edible oils Pasta/noodles/couscous Vegetables/potato crisps and snacks		Similar drivers apply domestically and internationally. These include: population and economic growth; disposable income; shifts in consumer choices (e.g. increasing meat and soft drinks consumption, demand for packaged or processed foods); Kenya as a major agricultural producer.
Heavy industrial facilities	Metallurgical facilities Basic chemicals Petrochemicals		Significant capital investments. Require large, accessible markets due to large production capacity of plants. Other key investment criteria: raw material availability (ores, gas, oil); energy costs.
Tourism	Leisure tourism	Coastal resorts Ecotourism Cultural heritage Cruise tourism	Economic growth and disposable incomes (domestic and international); Consumer choices (e.g. ecotourism); Perception and marketing of Kenya/Lamu (e.g. security concerns). Industrial development of area to drive business tourism.
	MICE/Business tourism		

Key siting and environmental requirements for the various sectors were identified, as presented in Table 5. These can be used to inform the assigning of land to uses in preparation of high-level plans.

Table 5: Physical requirements by priority industrial sector

Sector	Locational requirements	Infrastructure requirements	Environmental concerns	Typical lot/plot size
Metal processing sector	Good access to road/railway network	Reliable supply of low cost electricity or gas	Air pollutants Water pollutants	1-2 ha for smaller workshops to 10-20 ha for larger facilities
Buildings materials: heavy industrial sector	Depends on facility: if clinker grinding plant then next to port, or close to raw materials source	Energy intensive	Noise, dust and air pollution.	10 ha
Light industry	Close to road/rail network	Medium-low energy intensity	More Limited	2ha -6 ha
Apparel manufacture	Access to power and workforce	Less energy intensive - reliable power supply	More Limited	< 1Ha
Food & beverage sector	Close to water source	Significant quantities of water, energy intensive	Wastewater & emissions to air (flue gases, dust & odour)	various
Heavy industrial facilities	Safeguarding site close to the port	Energy intensive, fresh/sea water for cooling purposes	Air pollutants; Odour; Water pollutants; Safeguarding areas for hazardous facilities.	300 ha per industry sector

Various international examples of industrial clusters, including SEZs, were explored as case studies. From these case studies, some key preconditions for success were identified:

Multi modal transport infrastructure is critical for the transport of goods and people;

Adequate customs clearance procedures are of critical importance for export-oriented activities, as well as the quality of physical infrastructure;

One stop shop central facilities for business regulations can simplify investment and operations by businesses;

Accommodation for workforce provided or close to site is important as a reliable supply of labour is critical;

Some provision of ready-to-move-in factory shells can reduce the cost of investment and can support local SMEs;

Training provision and skills development initiatives can be used to support major activities. Clustering of activities with backward and forward linkages is beneficial, as best evidenced by the 'industrial symbiosis' associated with Kalundborg Industrial Network in Denmark.

The case studies demonstrate that the size of industrial economic zones tends to be from less than 1,000 ha to a maximum of 5,000-6,000 ha. The largest included case study is the 41,700 ha Khalifa Industrial Zone Abu Dhabi (KIZAD) but this area includes residential and other uses. For comparison, the identified land for the development of Lamu, as the combined net developable area of the Port Industrial Area and Baragoni Node is 6,000 ha. This therefore represents a very large industrial area by international standards.

Service-based special economic zones tend to be smaller – Sophia Antopolis in France for example contains only 650 ha of business premises, though density of development is much lower and the total area of 2,300 ha largely consists of green land. This model could be appropriate for the more environmentally sensitive peninsula to the north of the Lamu Metropolis.

3. SITE ANALYSIS

Introduction

This section sets out a summary analysis of the LAPSSET Lamu node, Lamu County and the environmental constraints that need to be taken into account when planning the future development of the area.

Land use, ownership and settlements

Lamu county has a land surface area of 6,273 km^2 composed of 5,517 km^2 of arable land 650 km^2 of non-arable land, 130 km^2 of coastline and 308 km^2 under water mass.

The three main types of land tenure in Lamu County are public land; private land and community land. The Lamu CIDP (2013-2017) states that all land in the county is public land, owned primarily by the National Government except for a relatively small area of about 233 km^2 which is either privately owned or community land (GoK, 2014). The County Government of Lamu is custodian of public land from recently revoked ranches irregularly allocated to private developers. Land owners in the county have title deeds, and some people in the settlement schemes and ranches have also been issued with letters of allotment.

Land ownership and squatter occupation is a concern for various communities such as the Swahili, Arabs, Korei, Boni and Orma and is the perennial source of conflict between farmers and livestock herders. There are 13,000 households who have title deeds, which means only 42% of the county households have land ownership. The majority of the county residents, especially in Lamu East have no title deeds and live on ancestral land as squatters. Most of the landowners are also keeping their parcels idle, without much economic benefit.

Land insecurity is a common problem in the county as the majority of Lamu residents have neither title deeds nor letters of allotment to the land they live on or draw their livelihoods from. This poses a threat to Lamu's biodiversity and local livelihoods. There are squatters in the county (such as those located within Amu Ranch) as a result of widespread evictions by ranch owners in the area.

The county comprises two constituencies; Lamu East and Lamu West. The wards include Mkomani, Shella, Faza, Kiunga, Basuba, Hindi, Mkunumbi, Witu, Hongwe and Bahari. The Islands of Lamu, Pate, Manda, Ndau and Kiwayu and the settlements of Mpeketoni and Witu are also part of the county. Since settlement work begun in 1974, four settlement schemes have been completed and cover an area of approximately 31,924 hectares which have been registered include Mpeketoni, Lake Kenyatta

phase 1 and 2, Hindi Magogoni and Hongwe. Some of these schemes were established by the German assisted Settlement Programmes (GASP) who provided the necessary infrastructure facilities such as roads, water-pipes and extensions to schools. However, the majority of schemes lack electricity, postal facilities, and health facilities and have poor road networks.

Rates of urbanization in the county have been relatively slow, focused on Lamu, Mpeketoni, Witu, Hindi and Mokowe. Lamu is the major urban centre within the county, primarily due to its strategic location and as a tourist centre. Mpeketoni was designated as a market centre as it is the fastest growing centre in the County due to its strategic location in a high potential agricultural zone and its link to an international trunk road Garsen-Mokowe to Somalia.

Witu, Hindi and Mokowe are also growth centres that have maintained their status as they are located along the international trunk road Garsen-Mokowe road. These centres have been proposed to be growth points just like Mpeketoni above.

Pate, Siyu and Kizingitini are island villages with rich historical and cultural environments. These villages attract domestic and international tourism. The communities have retained their original traditional and cultural values. There is a lack of infrastructure facilities and poor road networks on these islands.

Environmental constraints and opportunities

Summary of environmental policies and plans

The draft Lamu County Spatial Plan 2016-2026 sets out the following environmental policies based on the national policies and acts that need to be taken into consideration when planning development at Lamu:

Dodori National Reserve and Kiunga Marine Reserve are gazetted

Ensure the protection and conservation of the mangrove forests. Mangrove forests and swamps in Lamu are gazetted.

Conservation of coral reefs.

Mitigate fishing disruption resulting from LAPSSET project through construction of a harbour to cater for local marine production as well as maintaining and improving all the fish landing sites.

Protection of sand dunes as water reservoirs and breeding grounds for turtles.

Fresh water is one of the biggest concerns in the county. Water catchment areas and wetlands mainly in Hindi are under high pressure and drying up, it is therefore proposed to gazette wetlands which means encroachment of these areas will be prohibited.

Heritage preservation of historical sites such as Mkunumbi, Bahari, Faza and Hongwe.

Protection of the unique Tana River delta eco-system and as a resource for agriculture.

The following National legislation is also of relevance to development at Lamu:
Forestry Act – establishment of rich biodiversity areas as gazetted and protected areas.

Urban areas and cities Act, 2011

National Land Commission Act

Environmental Management and Coordination Act (EMCA)

Water Act, 2002

Key development issues

There are numerous Gazetted and Protected Areas as set out in the table below. There is also areas of habitat beyond these protected zones and wildlife that occupy and travel through the area, these need to also be taken into account when preparing detailed planning for the area.

Table 6: Environmental constraints and opportunities

Name	Designation
Boni Natural Reserve	Gazetted in 1976 and protected area under Wildlife Conservation and Management Act (2013).
Dodori Natural Reserve	Gazetted in 1976 and protected area under Wildlife Conservation and Management Act (2013). Coastal and riverine forests, mangroves, swampy grasslands and savannah.
Kiunga Marine Natural Reserve	Protected area under Wildlife Conservation and Management Act (2013)
Witu forest	Gazetted through Legal notices No.454 of 1962 and No. 81 of 2000. Forest Ecosystem Management Plan prepared under Forest Act 2005 as this is an ecosystem was identified as a global biodiversity hotspot.
Amu Ranch	Community based conservation initiative established in 2011, anchored by Lamu Conservation Trust and supported by David Sheldrick Wildlife Trust.

Lungi Forest	This has been designated as a forest reserve but not gazetted. Occupies the area between Dodori and Boni National Reserves, forming a wildlife migratory corridor between these two reserves. The area is under gazettement by Kenya Forest Services.
Awer Community	This is a community conservation initiative created in 2013. Vast areas of indigenous, open canopy coastal forest host a diverse range of vegetation and wildlife, many species of which are classified as endangered.
Mangrove forests and swamps	Mangrove forests and swamps in Lamu are gazetted. Mangroves are important stabilizer of coastline by reducing erosion from storm surges, currents, waves and tides.

Coastal zone issues

The Kenyan coast features a diverse marine environment including estuaries, mangroves, seagrass beds and intertidal reef platforms and coral reefs, which are vital for the diversity and reproduction of marine organisms. These coastal ecosystems are regarded as some of Kenya's most valuable ecosystems; and some are protected as marine national parks and reserves (including Kiunga north of Lamu). Lamu sits within a rich biodiversity hotspot, the whole coastal strip offers a mosaic of habitats. As well as diverse and important terrestrial habitats, the marine environment is sensitive.

Lamu county has the largest mangrove forest cover in Kenya mostly concentrated in the Lamu archipelago, with forest cover of more than 300 km^2 (Ken Sea, 2006). The rapidly increasing human population at the coast, which results in increased demand for more agricultural land, wood products for fuel, house construction and industry, has put pressure on terrestrial ecological systems and means that forests and woodlands are continually under threat and all have been modified by human use.

Lamu has various swamps from which the majority of the rivers/streams that flow through the county drain into or from. These include the fresh water marshes of Ziwa Roka, Ziwa Gambi, Ziwa Kiboko, and Ziwa Kambe. There are numerous small pans, likely of karstic origin, but little surface drainage around the Lake Kenyatta settlement scheme.

Archaeology and cultural heritage

Lamu Old Town is a UNESCO World Heritage site, it is the oldest surviving Swahili town in East Africa, designated by UNESCO in 2001. The town is characterised by beautiful stone buildings and carved doors influenced by Arabic, Persian, Indian, European and Swahili building styles, and includes a cluster of 160 historic houses. The buildings are well preserved and show the development of the Swahili building technique using lime, coral and mangrove poles. The narrow street pattern originates from the Arab traditions, it inhibits motorised vehicle use and creates a unique character.

The dwellings in the town are clustered into small wards consisting of closely related lineages. Around the rest of Lamu County there are various cultural and sacred sites.

Topography

Lamu County lies between zero and 50 meters above sea level. The area is generally flat and characterized by low, almost level plains with the exception of the coastal sand dunes and the Mundane sand hills. Few of the slopes of these hills exceed 5^0. Because of the low lying nature of the land, large parts of the county are susceptible to flooding especially during high tides.

The main topographical features include coastal Island and Dudol plains, sand dunes. The county has four major catchment areas categorized as Dodori coastal zone, Duldol, Lamu bay drainage and Tana River Delta.

Summary of constraints and opportunities

The map below provides a summary of the analysis of key environmental constraints and opportunities these include:

Protected and gazetted habitats.

Fishing grounds and landing sites.

Marine habitats (coral reefs, mangroves, sea grass).

Landscape features (rivers, wetlands, beaches and sand dunes).

Critically Environmentally Sensitive Areas[9].

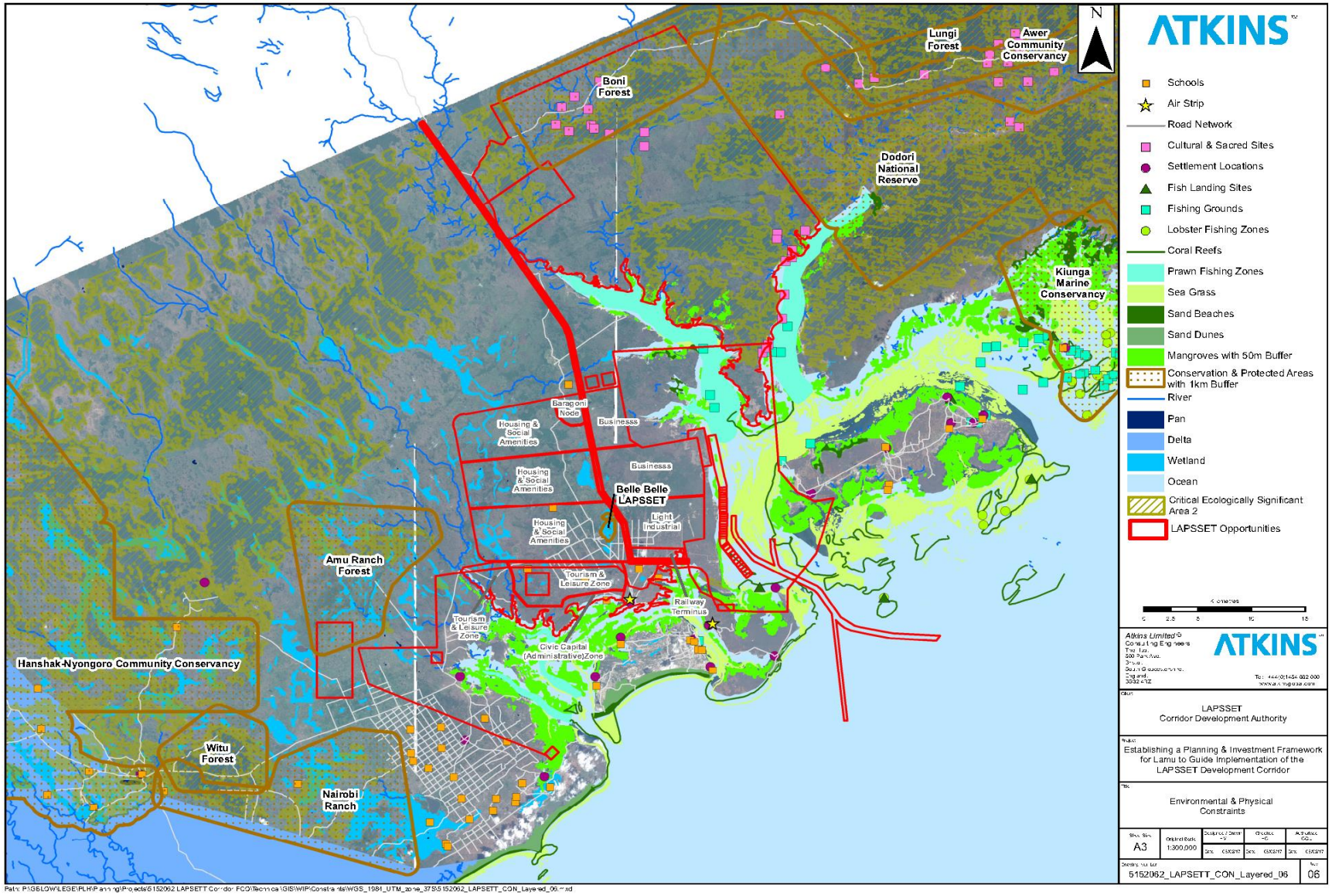
Cultural and sacred sites.

Existing settlement locations.

Exiting infrastructure such as roads, schools and airstrips.

[9] Identified through surveys and analysis undertaken by WWF

Map 3: Environmental opportunities and constraints



In reviewing the environmental constraints the following approach has been applied:

Gazetted and protected environmental areas – development in these areas should be avoided by all means, a 1km buffer area around these environmentally sensitive areas has been defined to help safeguard sites and guard against encroachment.

Rivers and water bodies must be protected – a 30m buffer zone along these assets is recommended.

Sacred sites and sites of local / heritage importance should be safeguarded. These sites should be protected and could be integrated into landscape.

Seasonal wetlands should be protected and development should be avoided or they should be incorporated into the landscape design. Green buffer zones have been proposed to protect these wetlands. Flood risk assessment and drainage management studies are recommended to better understand flood risk around these areas to inform the identification of flood alleviation and mitigation measures which may be appropriate.

Belle Belle (pond) within Hindi-Magagoni settlement is protected.

Mangroves are gazetted**,** a 50m buffer is recommended to ensure protection and conservation of this highly important vegetation for the county and for Kenya.

Environmental opportunities

Although there are some significant constraints (both environmental and other) to be addressed in the development of Lamu, the environment and cultural heritage of the area also provides a range of opportunities:

By bringing a significant number of jobs and investment to the area in a planned and controlled manner, this can enable the protection and enhancement of the most pristine natural areas that might otherwise be threatened by those seeking land to pursue a livelihood.

There are opportunities to improve access to valuable natural assets (in a controlled and sensitive way), enabling more people to enjoy them.

There is an opportunity to maximise the value that the heritage assets such as the World Heritage Site and other scared sites offer, by upgrading facilities and extending the tourist offer in Lamu. This could provide much needed revenue to maintain and protect these assets.

By implementing an eco-system services approach to development the benefits that environmental assets offer can be fully understood and utilized.

4. Investment Framework Strategy

Approach to developing the investment framework strategy

This section sets out the preferred investment framework strategy. This includes a Framework plan which has been developed through consultation with stakeholders. Further detailed planning will be required, this is set out in the priority project: Planning and Social Management Framework, and this needs to be subject to a programme of community engagement before being formally adopted.

The framework plan has been based on the following:

A set of common assumptions.

Environmental requirements and quality of life.

A review of what makes a successful city informed by international benchmarks.

A land use budget and development model tool to align the planning of land with socio economic parameters and associated infrastructure requirements.

In developing the framework strategy a series considerations have been analysed in order to refine and develop a preferred investment framework strategy (see diagram below).

Environmental constraints (identified in chapter 3) have helped to assess the capability and potential of land to support development at the Lamu node. The guiding principles for defining developable parcels of land include:

Avoiding development within gazetted, protected areas and applying a 1km buffer around them.

Avoiding development in Critically Environmentally Sensitive Areas (CESAs).

Providing a buffering around rivers and water bodies.

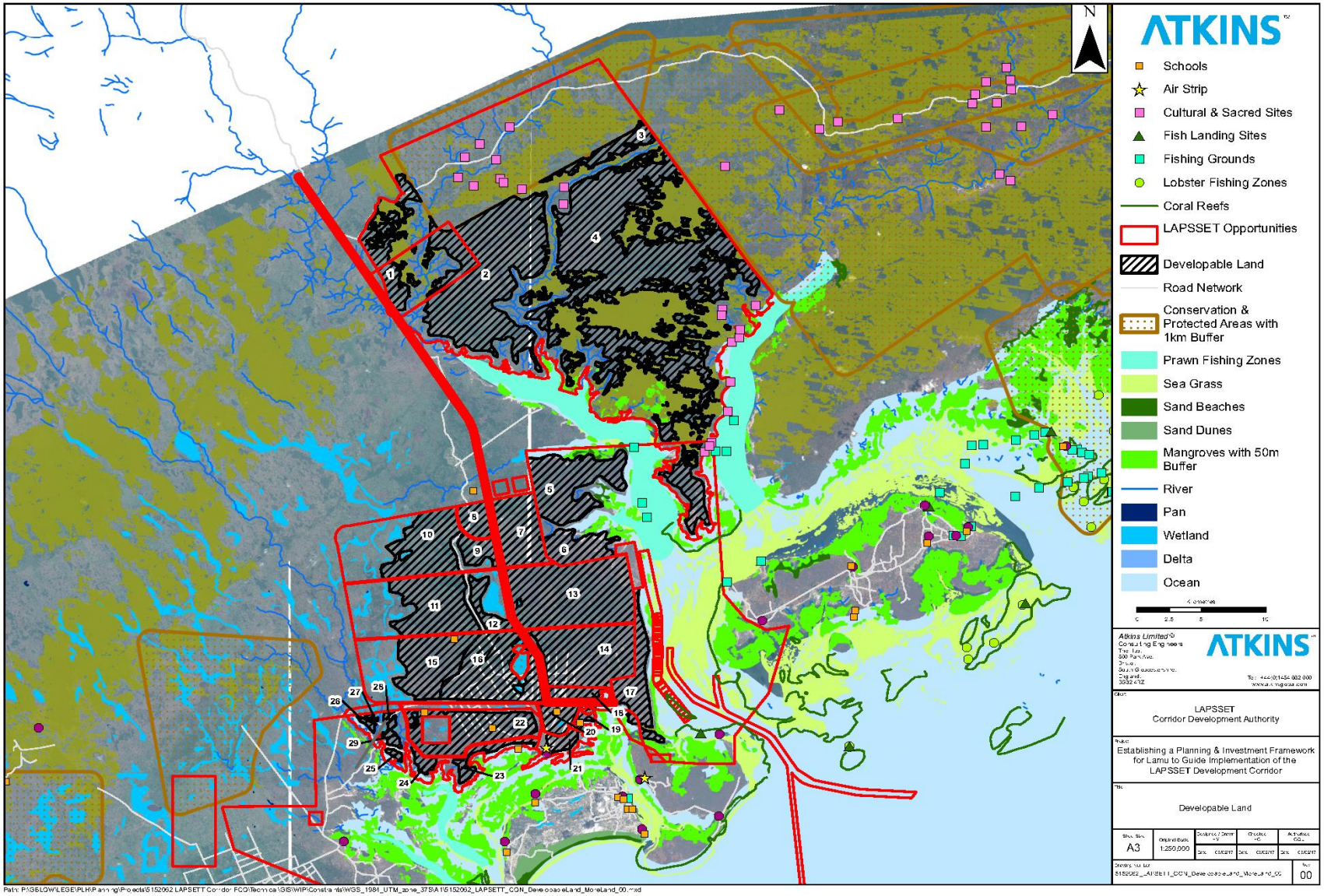
Providing a buffer around sacred sites.

Avoiding development in seasonal wetlands.

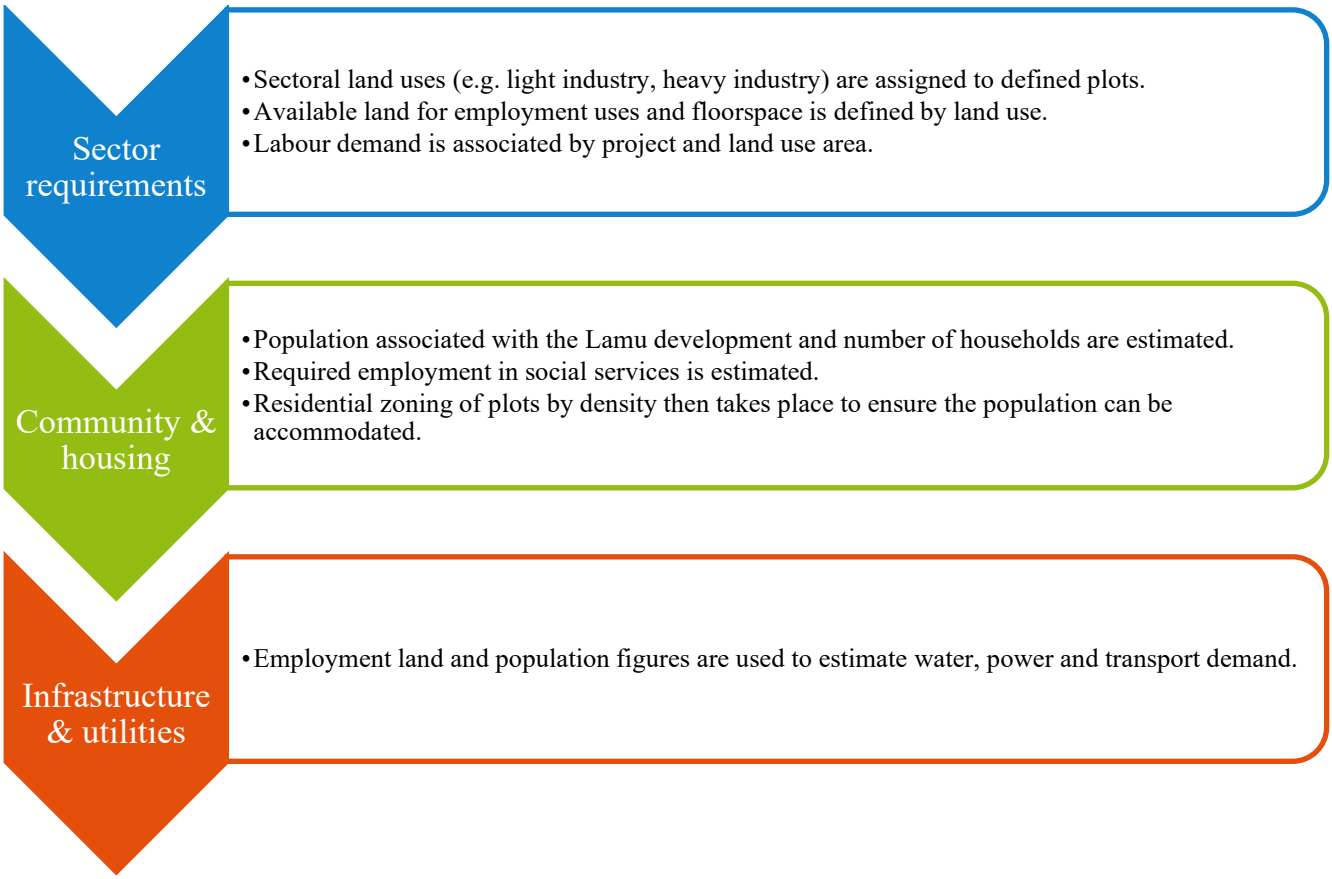
Ensuring protection of mangroves with a 50m buffer.

The outcome of this is the developable land parcels identified in the map below. These formed the basis of defining the gross development areas that were fed into the land use budget and development model tool.

Map 4: Potentially developable areas



From the land areas identified above, high-level development parcel areas have been defined in line with urban design principles discussed in more detail below. These areas have been measured and inputted to a spreadsheet-based development model tool. The process applied through this tool is summarised below.



Appropriate economic or residential uses were identified for each plot. For industrial and commercial uses, this was informed by considering the relevant sectors and their siting and infrastructure requirements as identified under the benchmarking scenario.

Within the development model tool, a series of assumptions regarding employment density by activity have been applied to generate estimates of labour demand associated with the industrial and commercial land uses. As with the project-led scenario discussed in regards to the economic vision (see chapter 2), the model assumes that there is full demand for these economic activities and that labour demand is fully met by migration to the Lamu node.

From estimates of labour demand, estimates of population and the number of households are derived. These population estimates relate to the Lamu node development (not Lamu County as a whole). The estimates and consideration of the urban design principles discussed below were then used to define

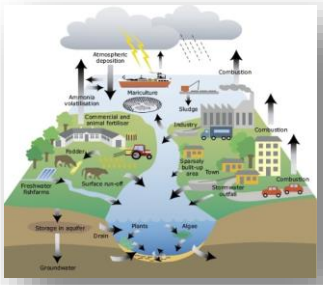
the zoning of mixed use/residential land according to density, in order to ensure the population can be accommodated (allowance was also made for services, public facilities and open space to meet the needs of the population).

Finally, from estimates of employment land and population, estimates have been developed for power, water transport demand (in terms of generated trips), and solid waste facilities.

What makes a successful city?

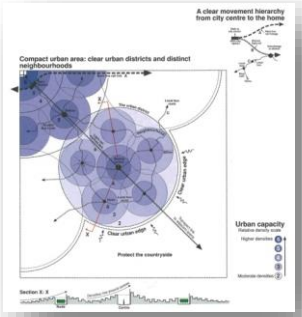
International benchmarks suggest there are a number of city planning principles that make for successful cities that include: responding to the capacity of natural systems; developing accessible neighbourhoods with a choice of public transport; developing a community that incorporates a mix of jobs and facilities; incorporating green infrastructure; ensuring resources are used efficiently; and ensuring the approach to development is deliverable.

Responsive



Meeting needs of the population working within capacity of natural systems.

Accessible and Healthy

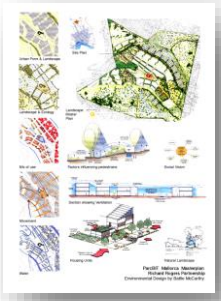


Transport networks structured to support new communities. Public transport planned from the outset linked with development.

Community Focus

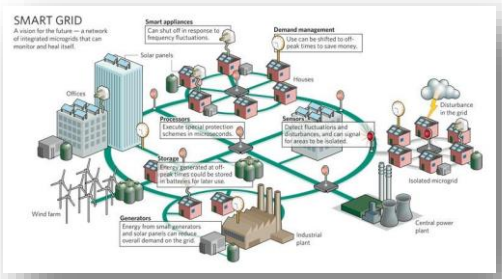
Mixed use communities with local employment and community facilities accessible by walking and cycling.

Green Infrastructure



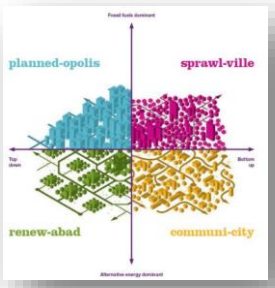
Development restricted in environmentally sensitive and risk prone locations.
Afforestation, green - blue network.

Resource Efficient



Building performance
Renewable Energy – Waste, Wind, Solar
Low carbon smart infrastructure

Deliverable



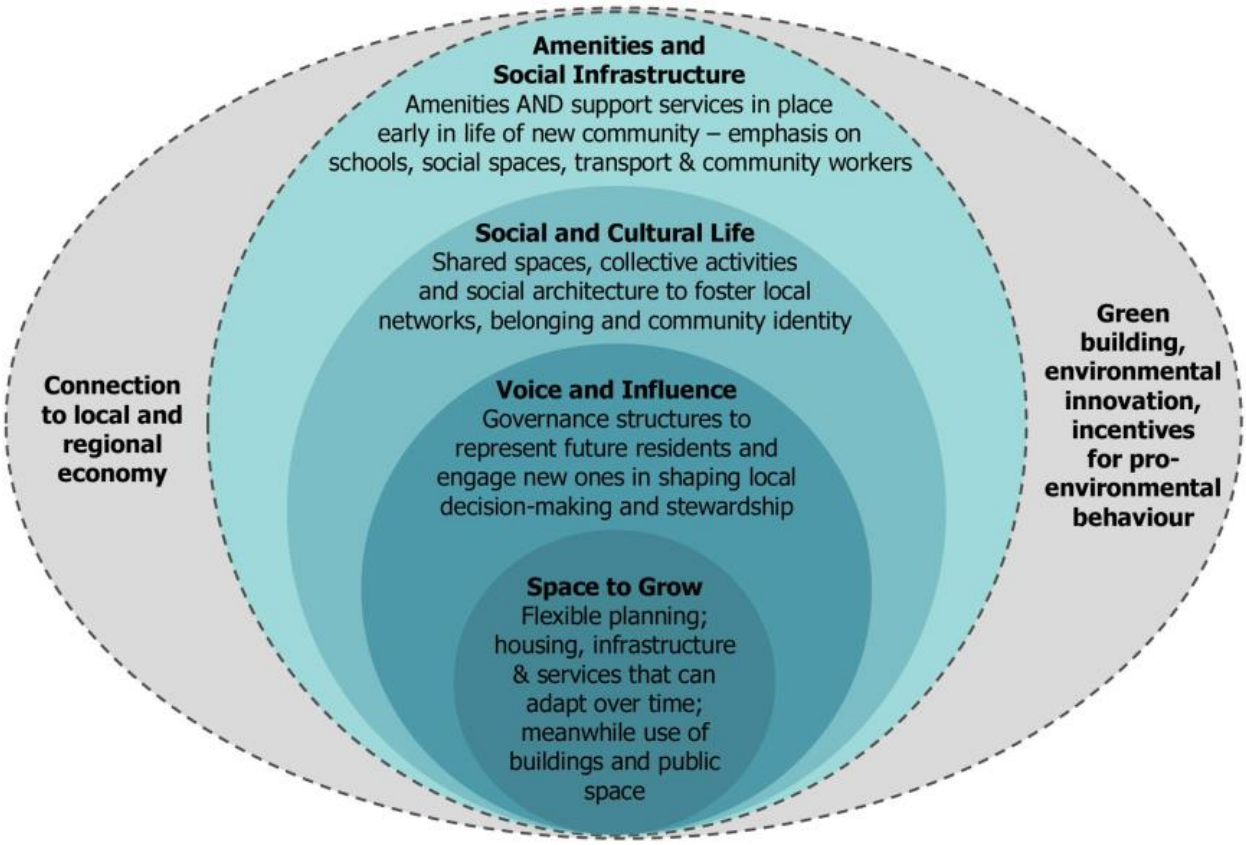
Integrated, viable approach to delivery

Through a careful and considered approach to Lamu's development, Lamu could become Kenya's first Eco-city. To achieve this a detailed master planning should incorporate the Eco-city features in the table below.

Table 7: Eco-City Features

Theme	Features / indicators
Carbon	- Commitment to low or zero annual greenhouse gas emissions. - Commitment to local energy production and minimised energy consumption with emphasis on renewable energy contribution.
Transport	- Promoting an 'Active Travel' network, this is a network that enables travel by physically active means including walking and cycling. - Incorporating mass transit provision - Minimise use of the private vehicle by developing a road network and setting car parking standards that encourage more sustainable modes of transport.
Food	- Promote local food production in order to reduce the 'food miles' of produce consumed (i.e. the distance that food is transported).
Resources	- Encourage reduced rates of waste per capita. - Minimise waste streams to ensure waste is reduced, reused, recycled or recovered.
Water	- Incorporate Sustainable Urban Drainage and other blue infrastructure. - Encourage reduced rates of water consumption and increased use of grey water recycling and rain water collection.
Biodiversity	- Commitment to no net loss of biodiversity. - Incorporate green infrastructure.
Health	- Manage land use and transport to ensure good air quality. - Encourage health lifestyles.
Economy	- Support the local economy so that it improves local economic performance. - Promote job creation to ensure that there is a balance between homes and jobs.
Urban form	- Encourage accessibility and connectivity. - Incorporate high quality public realm.
Resilience	- Achieve a good level of disaster preparedness. - Develop appropriate and adaptable infrastructure.
Wellbeing	- Encourage wellbeing by enabling community development and social networks to thrive.

In bringing the new community to life at Lamu it is important to consider how the new community is integrated with existing community, the issues below will be important to achieving this.



As set out above an important feature of what makes a successful city is a green infrastructure network. The green infrastructure network can help reinforce the other principles of successful cities (such as being responsive and accessible) and will be crucial to achieving the features of an eco-city. Key features of a green infrastructure network are:

Connecting green spaces as part of a regional system and landscape

Including a system of parks and green spaces for a range of functions

Incorporating walking and cycling routes

Enabling sustainable drainage infrastructure systems

Net positive biodiversity impact

Protecting sensitive wetland areas

Providing multiple attractions and active uses (which can generate income)

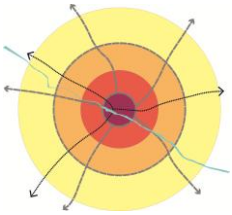
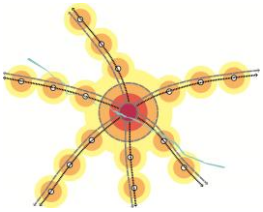
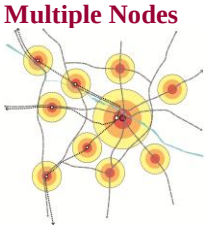
Managing access in a safe and secure manner

Managing the landscape

Preferred Planning Framework strategy

In developing the preferred framework strategy different city development models were considered: single core, transit oriented and multiple nodes. Each model of city development has advantages and disadvantages which are set out below.

Table 8: Comparison of Urban development models

Single Core 	**Transit Oriented** 	**Multiple Nodes** 
Advantages **- One City Centre** **- Strong identity** **- Viable development** **- Concentrated infrastructure**	Advantages - Multiple employment centres - Density enables better services - Accessible by public transport - Walkable - Planned neighbourhoods	Advantages - More specialised hubs - Self-sufficient - Local jobs & services - Planned neighbourhoods - Responding to natural environment - Protection of agriculture land
Disadvantages **- Congestion** **- Poor liveability** **- Poor access to peri-urban areas** **- Pressure on core**	Disadvantages - Up-front investment - Requires co-ordinated approach - Regulations need to be strengthened - Requires land assembly - Requires public sector interventions	Disadvantages - Up-front investment - Requires co-ordinated approach - Regulations need to be strengthened - Requires land assembly

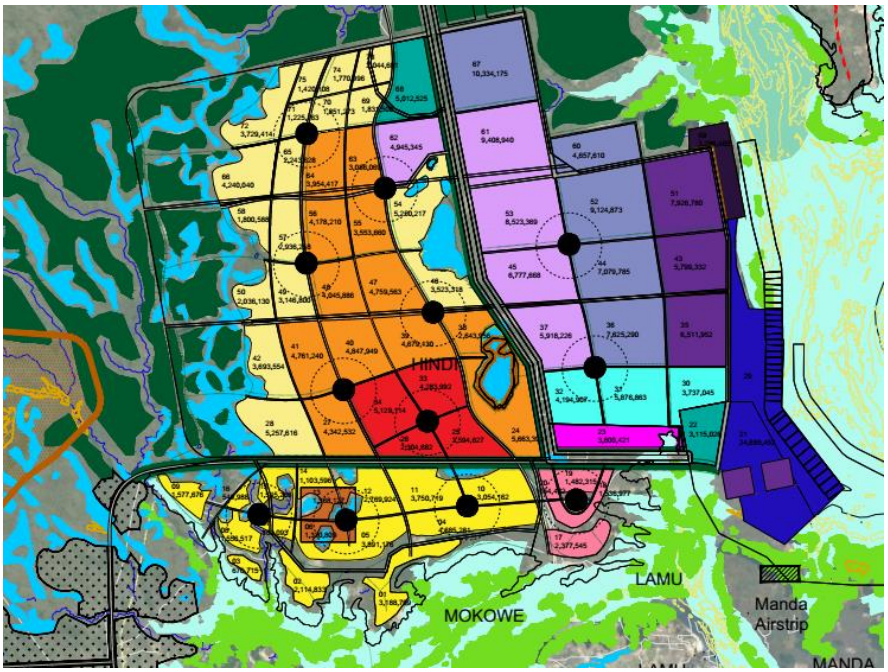
The preferred approach for Lamu separates the port industrial area from the supporting mixed use township area, in order to locate industrial uses away from residential areas, and to ensure that access to the industrial areas can be controlled (which is important as they will be managed as an SEZ).

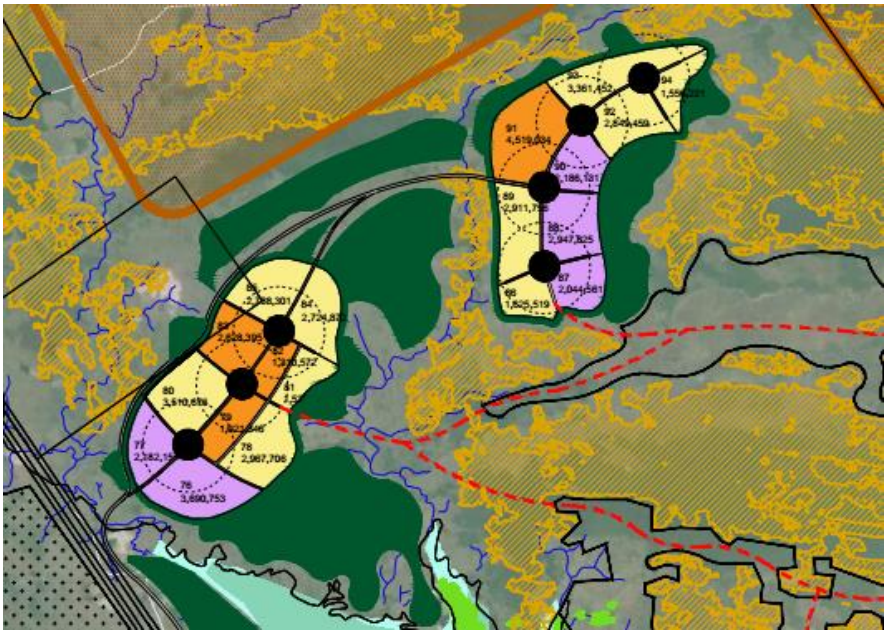
The overall model of city growth is one that should be based on a transit oriented approach to development, with a hierarchy of centres, with a town centre providing the main focus for shopping, services and employment and a series of district and neighbourhood centres serving local shopping and service needs. The neighbourhood centres are within walking distance from all residents, and the hierarchy of centres are connected by a public transport system, that would also link the township with the Port Industrial areas and other development areas. To the north of the township and Port Industrial Area are two self-contained nodes that are proposed for light industrial zones and mixed use areas including residential areas served by neighbourhood centres. The development areas will be connected with each other and with the existing communities at Lamu by both non-motorised and public transport systems to enable adequate access and connectivity between, homes, work, services and other public facilities.

The preferred long term development strategy for the full development of Lamu node is set out in the plan below. This includes a total of 9,550 ha, and includes the full development of: the Port (401 ha); the Oil Tank Storage and Refinery (33 ha), Port Industrial Area South and North (with a total of 7,577 ha of employment land); the Tourism & Leisure Zone around the Resort City (885 ha total area); and the Special Economic Zone nodes (to the north) (654 ha). The phase will also see the full development of Lamu Metropolis incorporating the township area and green buffer zones.

Table 9: Full Development Phase

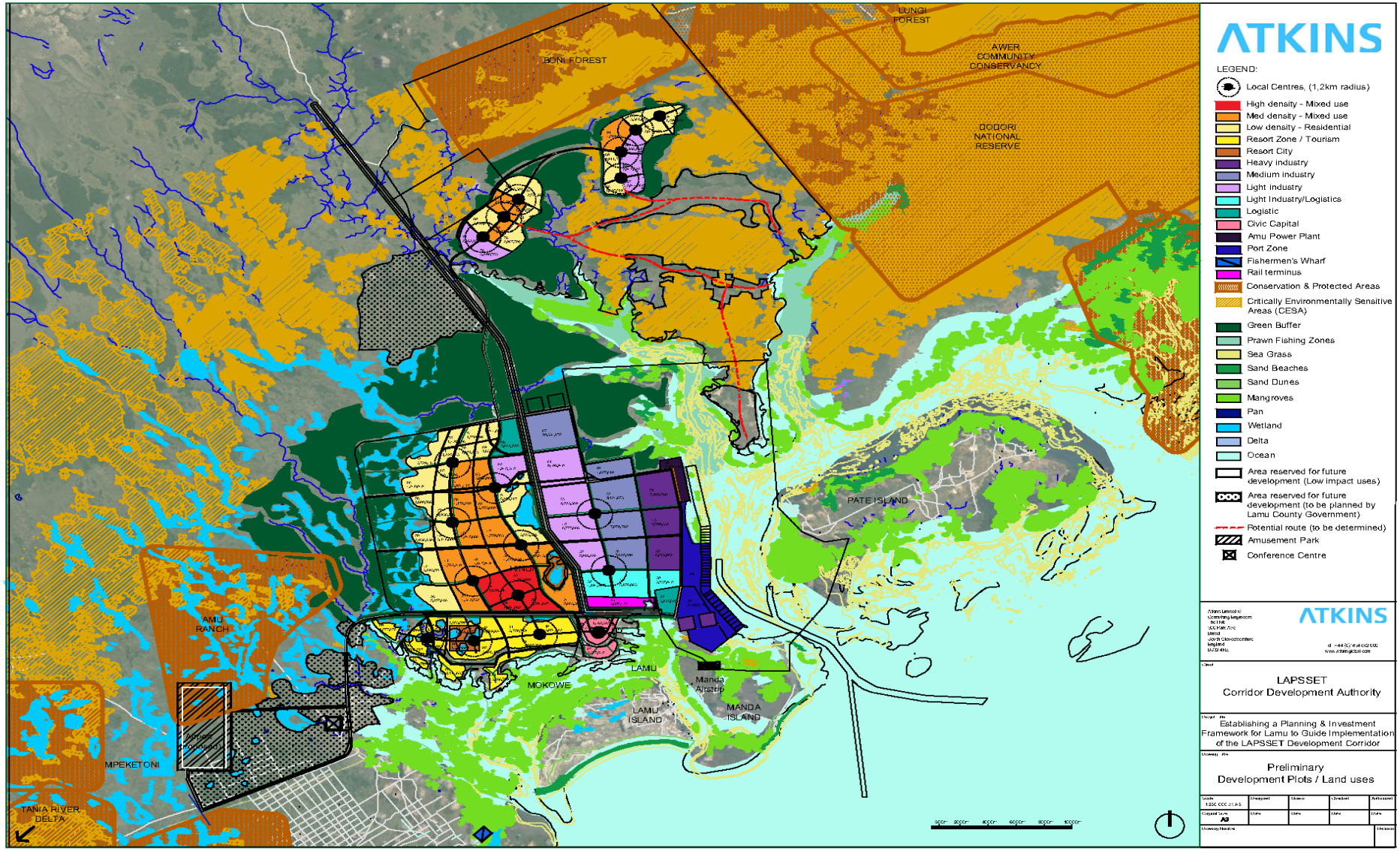
Development strategy	Key Development Statistics

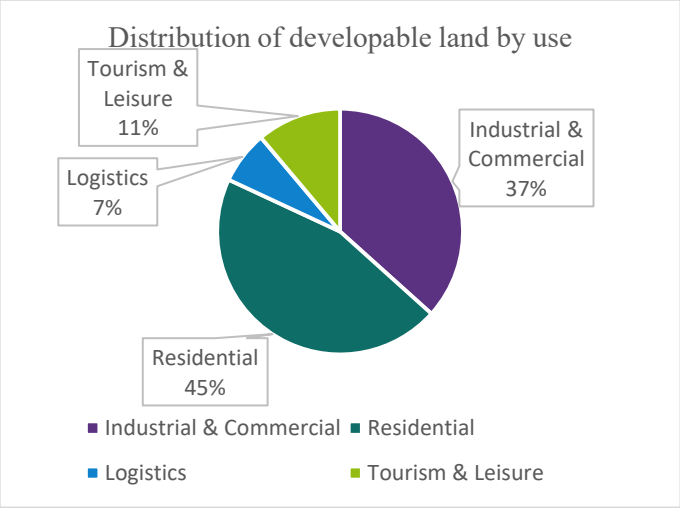




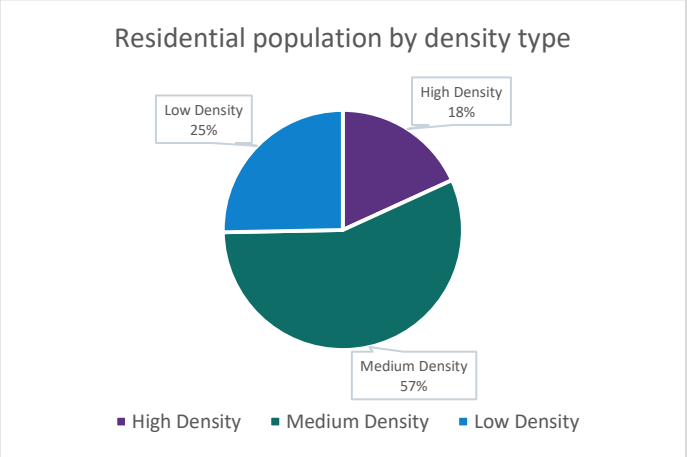
- Total developable land 19,875 Ha (excluding reserved areas and green buffers).
- Total labour demand: 424,800
- Total population: 1,102,000
- Total households: 374,800
- Capacity to house 1,158,500 people, or 394,100 units.
- Power demand: 1,430 MW
- Water demand: 279,700 m^3/day

Map 5: Full Development Phase

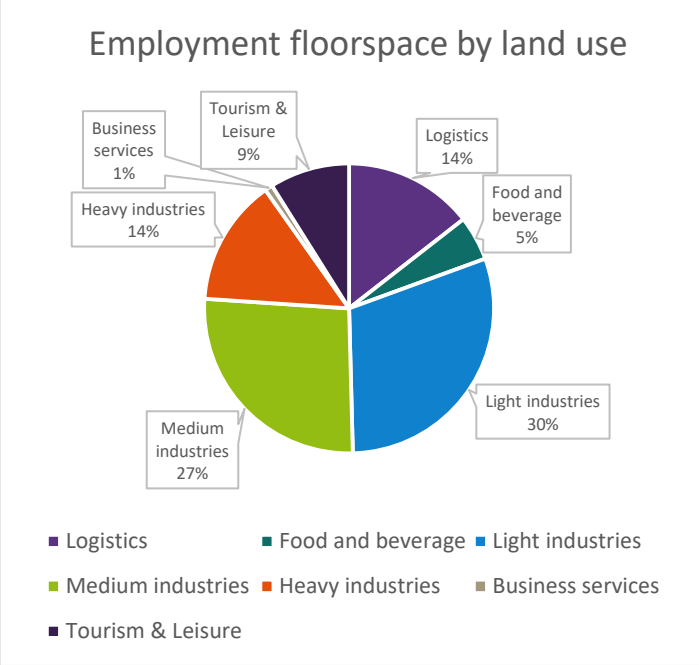




Residential use represents the biggest land take.



The resident population is accommodated in predominantly medium density residential premises.



The light industries sector takes up the largest proportion of the floor space.

Further definition of project components

Port industrial zone and light industrial zone

The port industrial zone will incorporate those sectors that need to be located in close proximity to the port for operational reasons (see chapter 2). The port industrial zone will also include a light

industrial and logistics zone in the wider area, accommodating a range of industrial units (in terms of size, type, layout and quality) to suit occupier needs. The industrial zone will be laid out in a way that allows for easy servicing and access for occupiers and suppliers, and will include local centres with shops and services that will cater to the needs of workers.

Special Economic Zone

The special economic zone should incorporate all areas within the Lamu node, this will include the port, the port industrial zone, resort city and tourism and leisure zone and the supporting township area.

As demand requires additional self-contained SEZ nodes could be developed on the peninsula. Given the sensitive environment in this location, these should be focused only in those areas identified. The uses suitable would include light industrial development or services and focused on low environmental impact / green industries as well as ancillary residential and commercial development.

Tourism and Leisure Zone and Resort City

The Resort City is where the initial focus for tourism related development will take place at Lamu serving and complementing the existing cultural and natural heritage resources and the accommodation offer concentrated around Lamu Town and other offshore islands. The resort city concept is to have a hub of activity set within a conserved and managed natural landscape framework. The resort city a central area in southern part of the Lamu node on the main land. In later phases tourism and leisure development would grow adding additional clusters to the initial phase. The Resort City takes advantage of the coastal location, and the ease of access to Lamu old town World Heritage Site, local villages and cultural and sacred sites.

The following sets out the short term and medium term components of the Resort City development. In the short term the Resort City will be focused on the Kenyan domestic market, and re-establishing Lamu on international visit itineraries.

Table 10: Components of the Resort City and other Tourism Infrastructure

Short term components	Medium term components
Management plans for existing natural and cultural heritage resources including marine environment. Opportunity for interpretation facilities, basic amenities, campgrounds and ecologies. Diversify and expand markets utilising existing airport - seek to develop new direct routes to serve	Lamu will be a key node in the LAPSSET tourism circuit. Tours along corridor would be linked by travel by road/air. Seek to establish cruise ship tourism linking with regional East Africa, Indian Ocean, Middle East circuits.

Lamu including other Kenyan cities, safari destinations and regional routes up to 3,500km which could be supported by current runway infrastructure and aircraft which have the potential to make thinner non domestic routes economical such as the Embraer 170/190/195[10]. Enhance landside infrastructure to Manda Airport including improved connection to the mainland at Kililana possibly including a temporary/fixed crossing. Broaden, strengthen and expand the hotel and accommodation offer to appeal to include greater representation of higher key accommodation addressing mid– high end regional East African and international markets. As well as short breaks, sun, sea and sand there is potential to widen accommodation to link with niche markets including special interest tourism (e.g. spa /wellness, eco tourism and cultural heritage). The first phase of Resort City will help to establish a hub. Develop the business tourism segment: with a 3-4* hotel in the resort city supporting short and long stay serviced accommodation for rent/sale with associated recreation uses. Plan to engage the community in the tourism sector using the existing tourism trust fund which is available to support grants and loans to small businesses. Opportunities exist to build on the distinctive Lamu cuisine, and homestay opportunities linking with opportunities for adaptive use of historical buildings within Lamu Town. Eco tourism and special interest tours – cultural and natural heritage resources.	Provide additional facilities for events and conferences. Develop the tourist facilities at the proposed Fisherman's Wharf. Develop and widen the retail offer to broaden appeal to a tourist market. Develop other tourism and leisure hubs in the Lamu node, potentially to the north, to take advantage of natural and landscape assets.

Civic capital, housing and social amenities zones.

The civic capital will accommodate all the city scale public services focused in a central zone so that they can serve the metropolis as a whole. This will include the administrative buildings for the County Government of Lamu, headquarters for services such as the police and other security services and

[10] Destinations including East Africa Community destinations, Addis Ababa, Gulf States, Johannesburg, Cameroon, Gabon and Angola are within range and could become commercially viable connecting Lamu to destinations and international hubs additional to Nairobi.

public facilities such as hospitals, government functions, institutional uses and higher education. Housing areas will be a mix of high to low density, and the exact form and mass of the housing will be determined through more detailed master planning. These areas should provide for a mix of uses, including social amenities such as schools and health centres, but also shops and services and leisure uses.

Phasing

The phasing of the development will be an important factor in the success of Lamu. Phasing will be influenced by several factors

Economic drivers and investor interest.

The availability and supply of water for industrial, commercial and residential use.

The availability of power generation and distribution networks, for industrial, commercial and residential use.

Workforce skills and capacity to take up opportunities in Lamu.

Security and safety factors which may restrain investment, tourism and in-migration to take up employment.

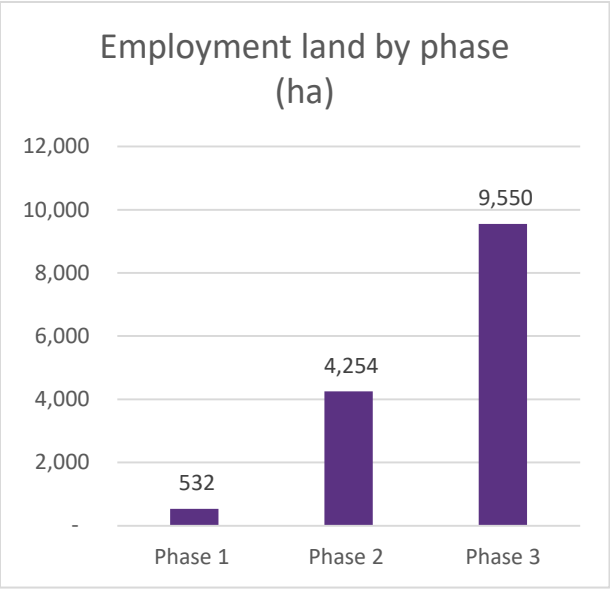
The timescale for reaching full development as set out in the plan above is not identified as it will be subject to the factors set out above, a detailed demand assessment would provide greater certainty around timescale for development. The long term development strategy therefore includes three phases:

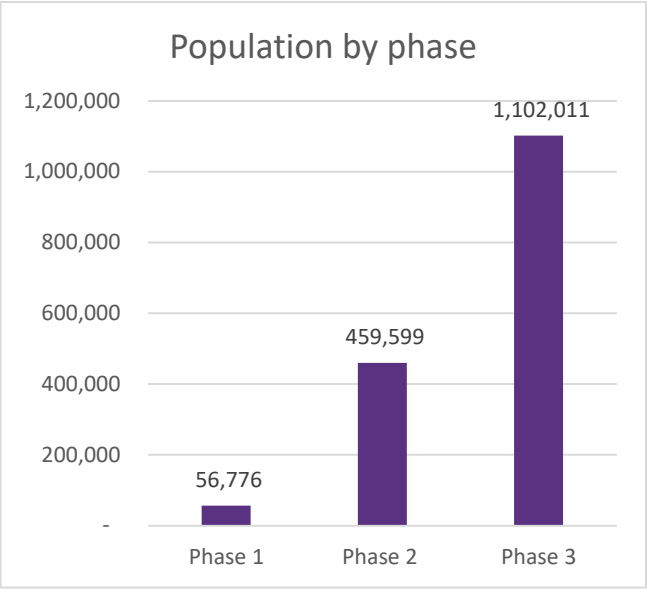
Phase 1: Initial development

Phase 2: Medium term

Phase 3: Full development

In total 9,550 ha of employment land will be developed and there would be additional population of 1,102,000. Employment land and population are split across the three phases as follows:

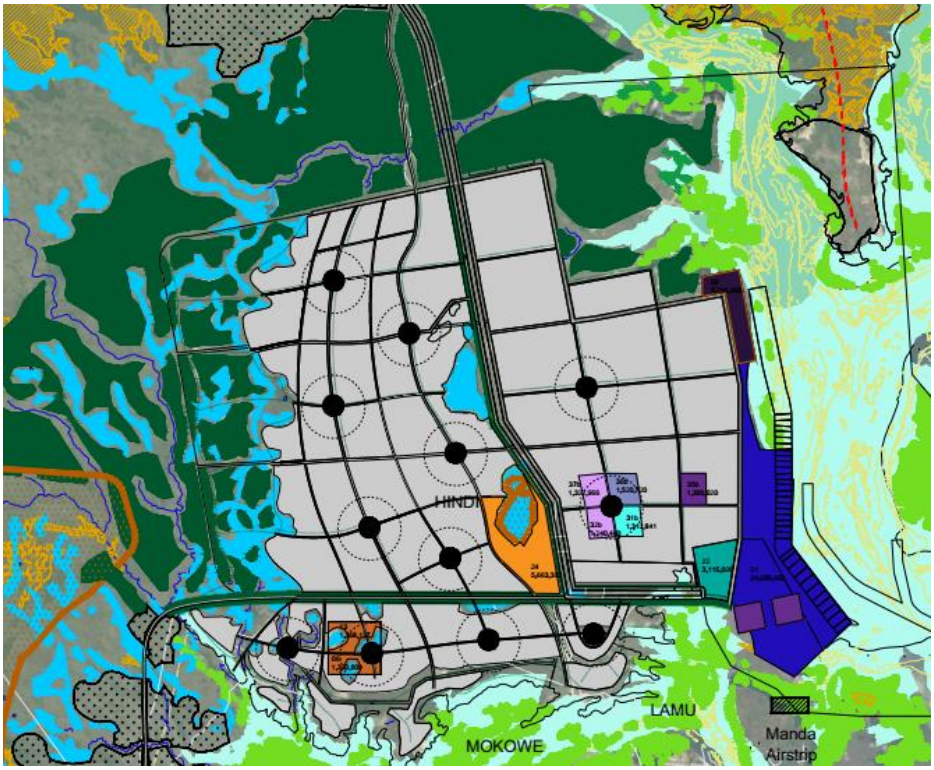




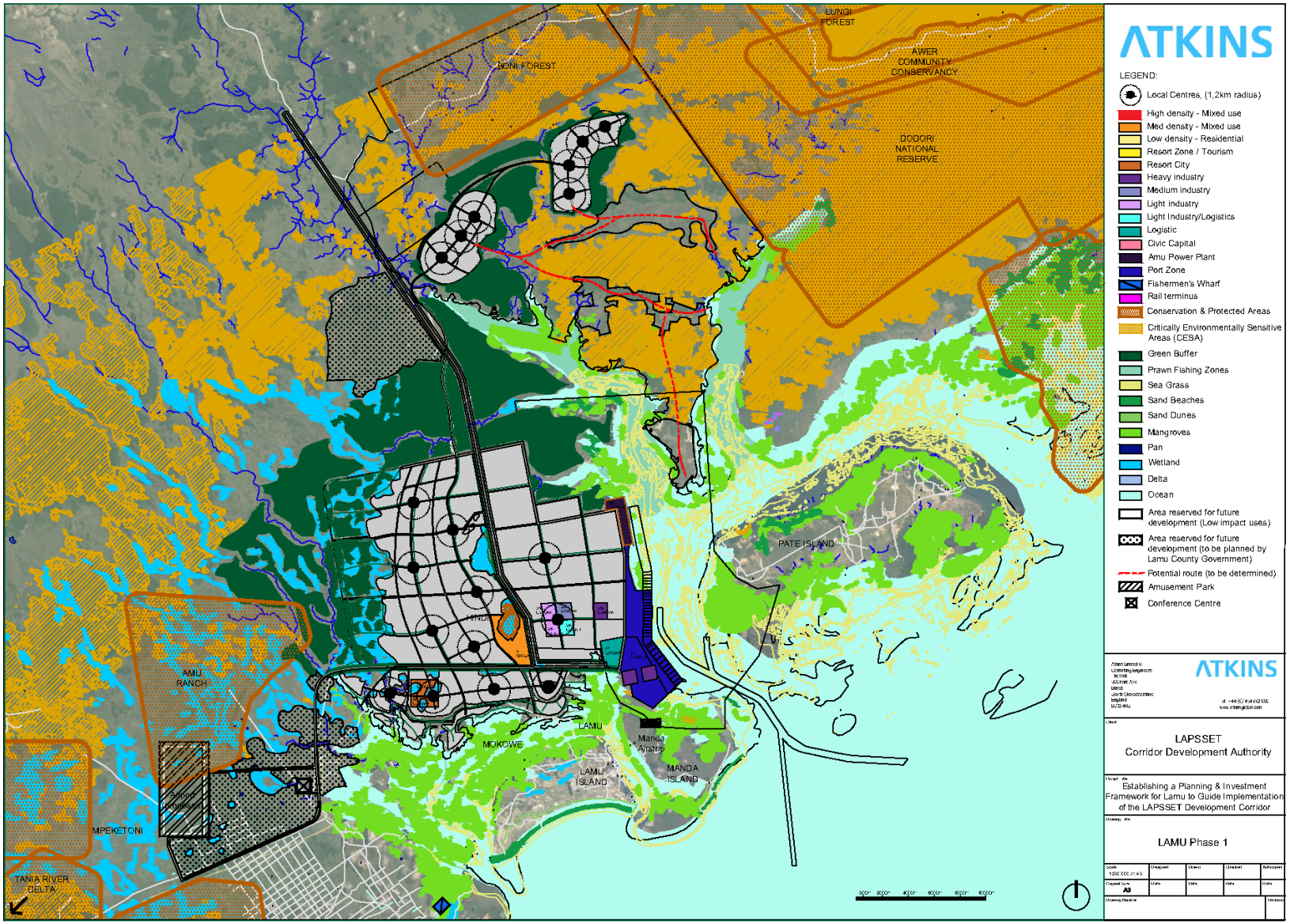
Phase 1: Initial development

Phase 1 will focus on the first phase of the Port Industrial Area (c. 460 ha of employment land) the Port will consist of an initial 3 berths and accompanying logistics area (64 ha). Some heavy industry will be developed in close proximity to the port (85 ha). The oil storage and loading facility will be developed within the port zone. The initial phase of the Resort City (28 ha) will be built out and first phase of the residential township will be established around a neighbourhood centre. The proposed Amu Power Plant first phase and/or an Integrated Water and Power Plant (IWPP) will be constructed partly to support the power needs from the industrial and residential uses in this initial phase of development.

Table 11: Initial Development Phase

Development strategy	Key development statistics
	- Total labour demand: 21,900 - Total population: 56,800 - Total households: 19,300 - Capacity to house 64,900 people, or 22,100 units. - Power demand: 75 MW - Water demand: 14,900 m^3/day

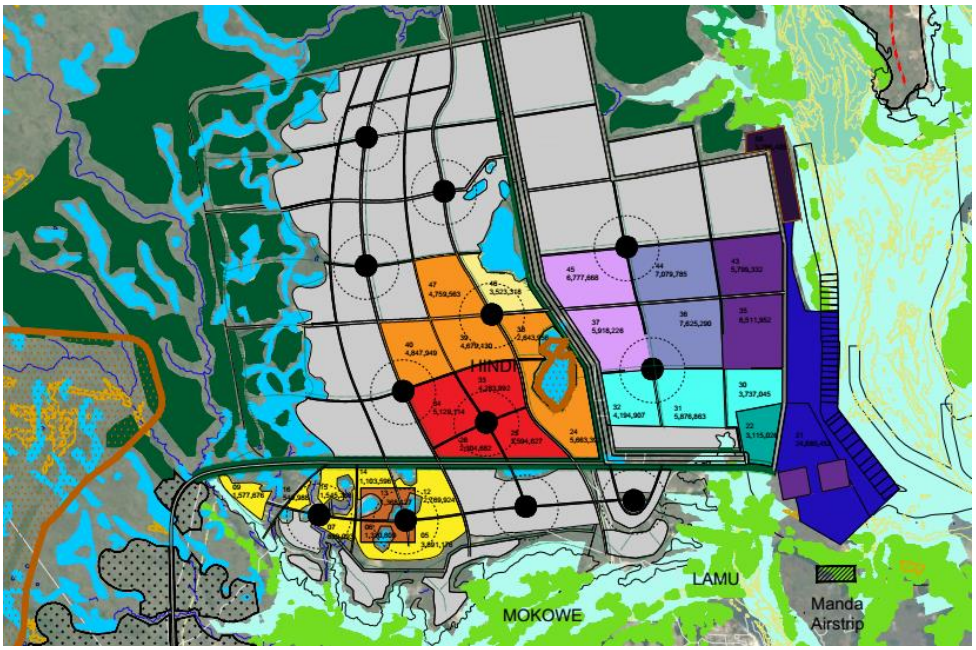
Map 6: Initial Development Phase



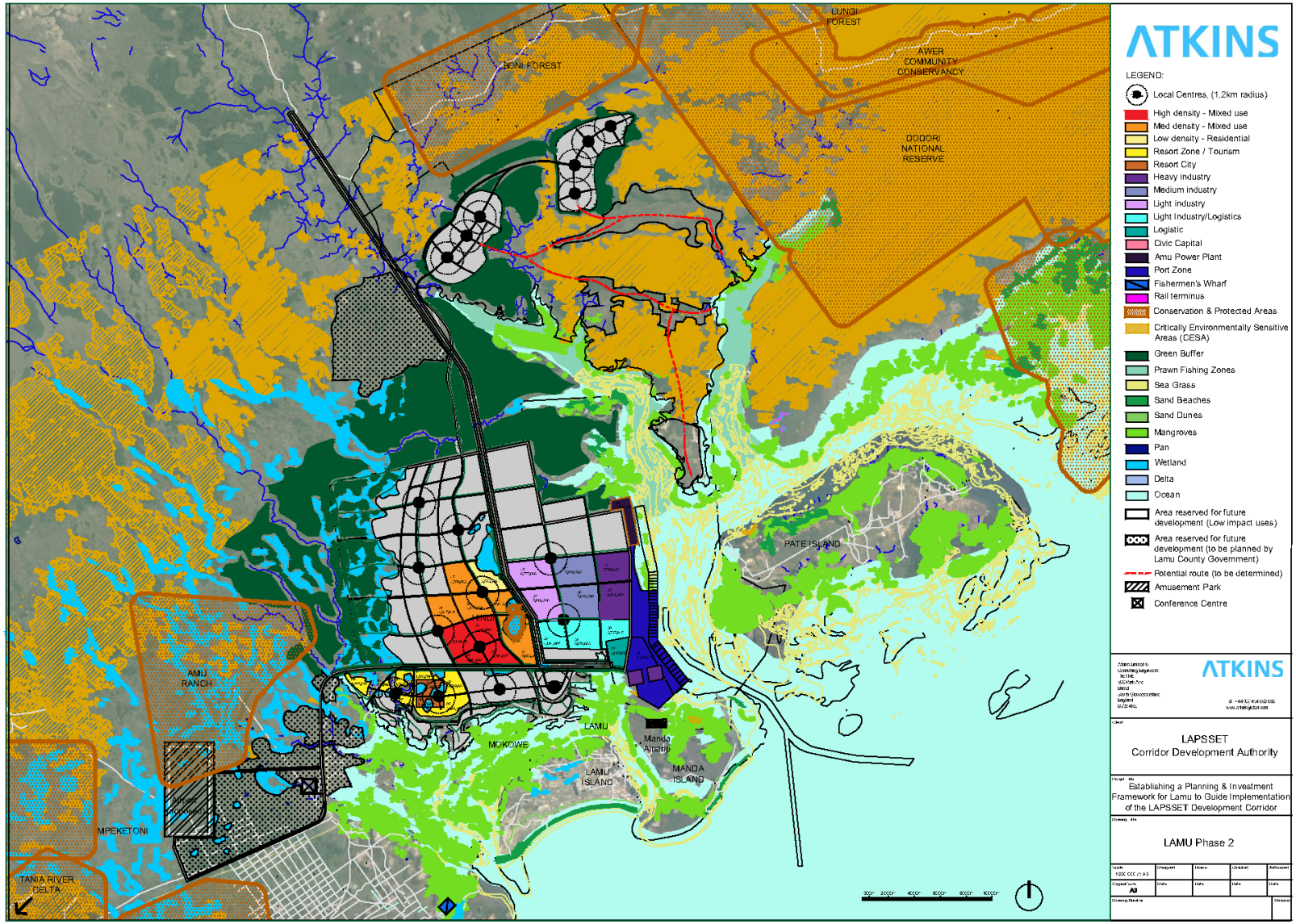
Phase 2: Medium term development

In phase 2, there will be full development of the Port Industrial Area (south) and development extending to the north, this will include a total 3,681 ha of employment land. The oil refinery will be developed (33 ha). There will be greater provision of land for medium and heavy industries (1,789 ha). The Resort City will be fully developed (70ha) and wider Tourism & Leisure Zone will be established (320 ha total area). The residential township will be expanded around a southern core.

Table 12: Medium Term Development Phase

Development strategy	**Key Development Statistics**
	- Total labour demand: 177,200 - Total population: 459,600. Around 2/3 likely to be migrants. - Total households: 156,300 - Capacity to house 485,900 people, or 165,300 units. - Power demand: 630 MW - Water demand: 119,800 m^3/day

Map 7: Medium Term Development Phase



Establishing the Supporting Infrastructure Platform

The key development areas at Lamu will be supported by an infrastructure platform which will be phased to be implemented in line with development so that infrastructure services are in place to attract and meet demand from prospective industrial, commercial and residential occupiers.

The infrastructure platform required includes linkages with the strategic LAPSSET infrastructure projects as well as the enabling utility, transportation, solid waste management, environmental and social infrastructure required to make Lamu Node a success.

Port

Summary of existing proposals

The Port project is one of the strategic LAPSSET project. It consists of 32 deep sea berths at Manda Bay estimated to cost US $5 Billion. Currently, three berths are being constructed by the Government of Kenya costing US $480 million, first berth is due to be completed in June 2018 and the other two by December 2020. The other berths are intended to be constructed and operated by the private sector. The port is to be directly linked to the planned logistics and industrial facilities within the adjacent port industrial area. It will be directly connected with other Strategic LAPSSET projects including the road, pipeline, railway and airport.

Planned facilities

32 Berth Facility when completed

Dredging of main channel underway due to be complete 2018.

Construction of three Initial berths is underway financed by Government of Kenya. Concession/s to be let for the construction and operation of the remaining berths.

Further 3 berths to follow as a second phase.

28,000 Ha of land identified for the port including associated oil storage/tank farm and loading facilities.

A detailed technical and financial study is to be completed during 2017 to explore options for structuring the finance and delivery of the next phases of the port including consideration of finance using PPP. LCDA working with AfDB - NEPAD Infrastructure Project Preparation Facility is to prepare a PPP Transaction Advisory Study to include a review of the existing project feasibility studies, including all technical options, conduct financial and legal due diligence, undertake market sounding and related analysis as well as structuring and definition of the scope of the project, preparation of transaction plan, financial models and schedule. This is expected to be completed in the 2017/18 financial year.

Phasing

First berth under construction to be completed in 2018. A further two berths to be completed by 2020. There is currently no estimated date for the completion of the full 32 berths. The exact type of berths to be planned are subject to the conclusions of further studies.

Issues and opportunities

Linked to the potential industrial sectors to be located at Lamu as well as opportunities linked to LAPSSET, the domestic and wider East Africa markets the port will serve. The type of berths that could be accommodated within the port are set out in Table 13 below including the requirements that these types of berth would have and the sectors that these berths would cater for. These were identified with in the previous 2009 JPC study. The requirements and links to economic sectors and benchmark examples have been added by Atkins.

Table 13: Indicative port terminal types and requirements

Terminal type	**Coal import terminal**	**Bulk solid terminal**	**Container terminal**	**General / break bulk terminal**	**Bulk Liquid terminal**
Planned Berth types	1 for coal carrier up to 30,000 DWT	4 for general cargo ships up to 100,000 DWT	5 for container ships up to 100,000 DWT	10 for cargo ships up to 30,000 DWT	3 for liquid oil carrier: Product Oil: 30,000 DWT Crude Oi Export: 200,000 DWT LNG import: 30,000 DWT
Requirements			18m draft Large area for: Quay apron (mooring and loading/unloading), Storage yard, Handling equipment,	12m draft Large area for: Quay apron (mooring and loading/unloading), Storage yard, Transit sheds	

			Building and facilities (administration, workshops, customs…) Rail yard		
Selected industry sectors to use terminal	Coal power plant	Clinker grinding plant Grain terminal Phosphates, fertilizer	Apparel Packaged food Bottled beverages	Metal processing Building materials Livestock	Refined petroleum Crude oil export LNG (power generation and process industries
Examples					
	Manjung Power Plant, Malaysia	Mombassa Port	Durban Port	Port Olvia, Ukraine	LNG Terminal, Singapore

Notes: DWT deadweight tonnes

Atkins has identified additional potential for other types of facilities that could be considered within plans for the port. These include:

RoRo terminals in order to accommodate vehicle and heavy equipment import and export.

Other specialist terminals including ship repair and offshore oil and gas servicing facilities.

Industrial bulk handling (for example to support power and processing plants)

Fishing port- the Ministry of Agriculture and Fisheries has plans to develop Lamu as a centre of deep water fishing which will require a harbour to accommodate the fleet along with and processing facilities.

Port services (pilotage, tugs) and port-related services (agencies, port supplies…)

Ferry, cruise terminals and marinas

Navy and security facilities.

It is recommended that the feasibility and market is explored through the upcoming Port PPP and feasibility studies.

Pipeline Infrastructure

Summary of existing proposals

The first phase of pipeline development for LAPSSET are for a heated 840 km crude oil pipeline connecting oilfields in Kenya along with a storage and tanker loading facility at Lamu. This will have a capacity of an estimated 300,000 barrels per day. The capital expenditure for the pipeline is expected to be in the order of US $4.7bn.

Planned facilities

There will be a need for a tank farm with working capacity of 199,785m^3 proposed at Lamu (4 days of supply). Additional tank farm storage could be planned for US $365m. The export terminal will be located at Lamu. Three options for the loading facility and pipeline have been evaluated including:

Option 1 - Single point jetty close to Manda Island

Option 2 - Single point jetty between Ras Tenewi & Ras Mwana

Option 3 - Loading jetty at Lamu Port

A loading jetty within the southern part of the Port Industrial area has been identified by LCDA and Government of Kenya as the preferred option (Option 3).

The tank facility will be located at the southern edge of Lamu Port with land in this area also reserved for a future oil products refinery.

Phasing

Previous studies have estimated a six year design and construction period for the pipeline and associated facilities. Further studies are to be undertaken to confirm the final routing and loading options including comparative evaluation of the cost, viability, timelines and construction methodology. The power and water options associated with the pipeline and storage facilities are also to be finalised.

Issues and opportunities

A pipeline serving Lamu Port will helped to unlock further potential downstream opportunities and provide the foundation for a possible petrochemicals cluster to be developed within the Port Industrial area.

Key issues and opportunities identified in preparation of the planning and investment framework are: Earlier studies undertaken by Toyota Tuscho and JPC highlighted the opportunity for an oil refinery at Lamu. Kenya Pipeline Company is undertaking further economic and market studies to define the potential for development of the Petrochemicals industry nationally which is due for completion in 2017.

Demand for a refinery normally driven by end user demand both within Kenya and the wider East Africa market.

Export opportunities also exist by sea, and via railway and a potential product pipeline.

Locating the oil storage facility outside of the Port industrial area could compromise future opportunities.

The pipeline alignment and loading terminal options are to be finalised. The space and setback and safeguarding requirements for accommodating a pipeline and tank storage facilities within the Port Industrial area have been considered in the proposed zoning and need to be considered in the next stages of detailed master planning.

Railway and Rail Hub

Summary of existing proposals

Two studies have been undertaken to explore the feasibility of a LAPSSET Corridor railway in JPC (2009) and China Civil Engineering Construction Company (2015) which have been considered to help inform the planning and investment framework. The data referred to below relate to the CCECC study.

Plans for the railway are for a Standard Gauge Railway (SGR) to link Lamu with Ethiopia and South Sudan (1,776 km of the railway will be in Kenya). The railways will consist of a single track line with passing loops. There will be branches at Isiolo to Nakodok and Moyale. In addition, the study also considers a branch linking from Isiolo to Nairobi linking the LAPSSET Corridor by rail to the capital. Trains would take approximately 7 hours 10 mins to reach Isiolo and further 6 hours to Moyale or 10 hours 30 mins to Nakadok. It is proposed that the railway will run diesel traction engines with potential for future electrification. The line capacity would be for around 28 trains per day with a maximum speed of 120 km/h.

The main rationale for the project is for freight services, particularly serving Ethiopia and South Sudan. The railway is likely to be used for the transportation of: liquids, bulk, break bulk, containers and refined petroleum. Estimates for passenger demand are also considered.

The previous freight estimates which have been prepared are summarised below.

Table 14: Summary of pass through freight traffic demand (10,000 tonnes per year)

Section and distance	Projected freight flows	Initial – 2025	Medium Term – 2030	Long term – 2040
Lamu-Isiolo	Lamu - Isiolo	409	806	1650
544 km	Isiolo Lamu	223	525	910
Isiolo Nakadok	Isiolo – Nakadok	-	370	500
755 km	Nakadok - Isiolo	-	225	325
Isiolo Moyale	Isiolo – Moyale	-	-	610
477 km	Moyale - Isiolo	-	-	300

Source: China Civil Engineering Construction Corporation (2015)

The overall cost of the project was estimated to be in the order of USD 10.4bn and construction with a financial rate of return between 9 and 12% depending on phase.

Table 15: LAPSSET Railway - Key statistics

Section	No. of stations	Investment cost USDbn[11]	Financial Internal Rate of Return %	Construction period
Lamu - Isiolo	5	3.3	10.5	2 years
Isiolo – Nakadok	10	4.2	9.22	5.5 years
Isiolo - Moyale	10	2.9	12.63	4 years
Total	20	10.4		

Source: China Civil Engineering Construction Corporation (2015)

Planned facilities

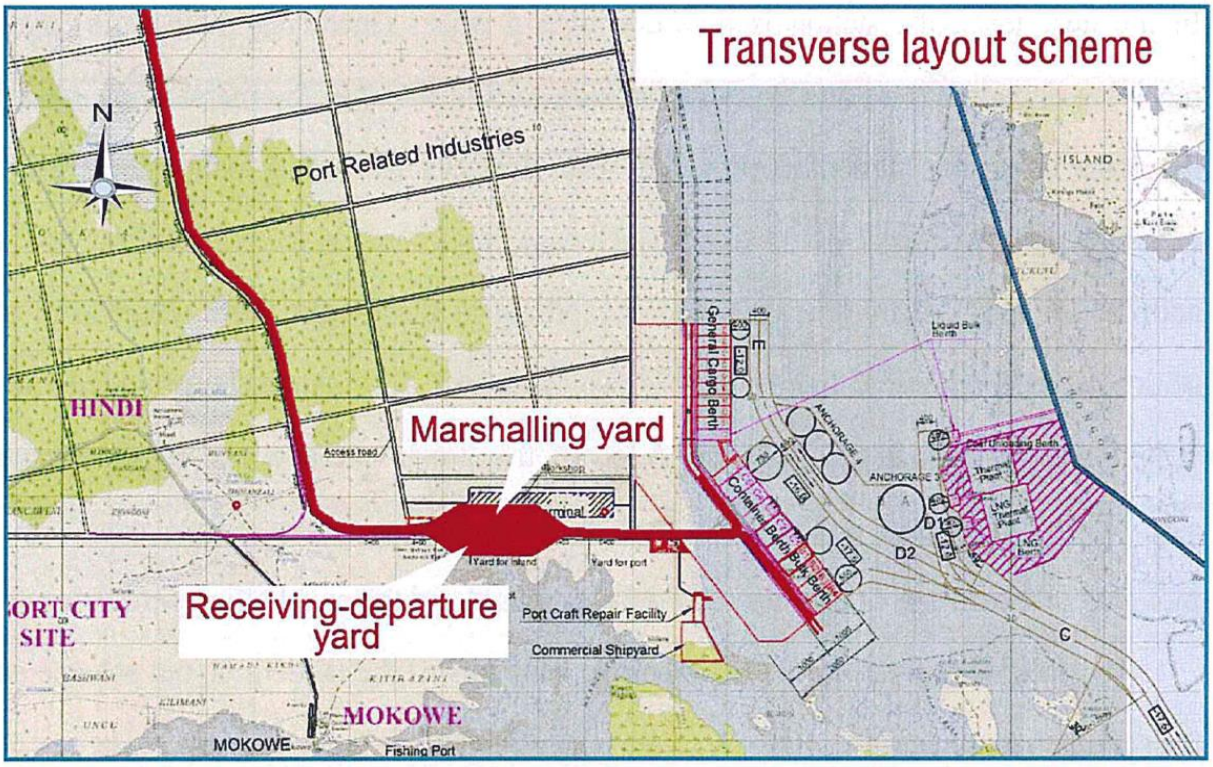
Facilities planned at Lamu as part of the project include

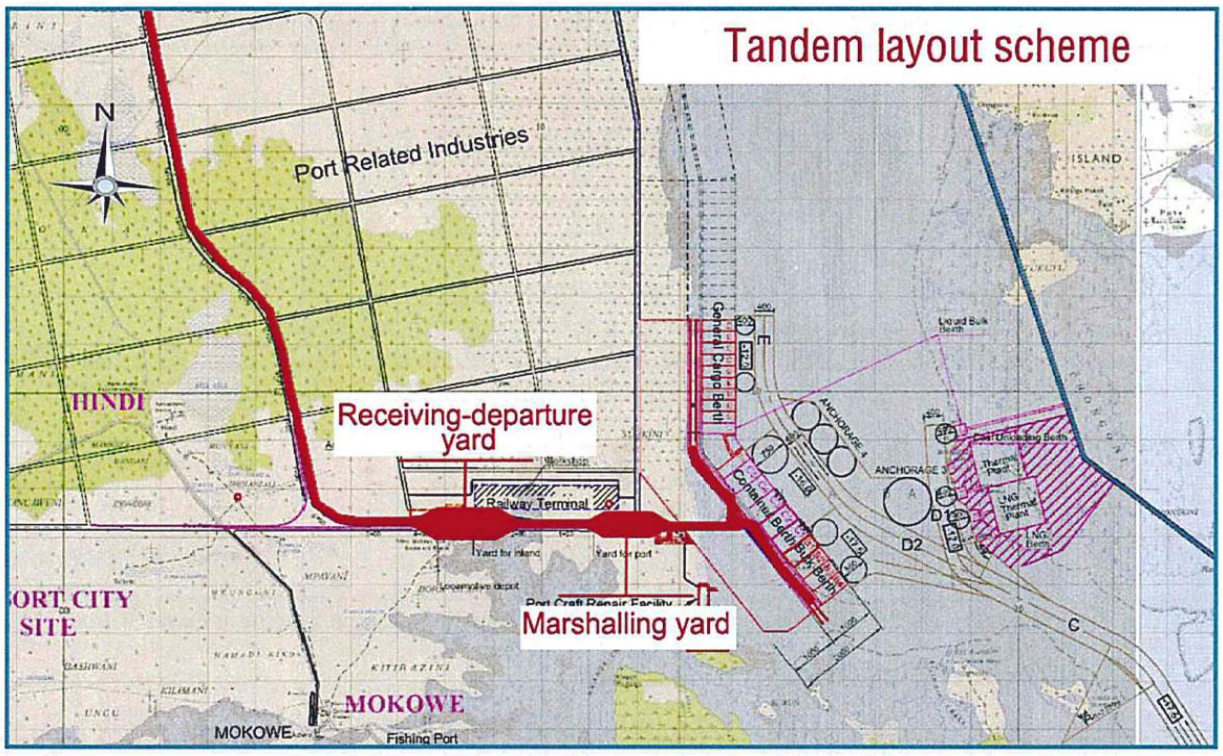
At Lamu a freight terminal is proposed which would also be the main terminus and depot for the railway. The estimated cost of this facility is around USD 36m. Two alternative layout options were considered for the depot (see below). The transverse layout was deemed most effective from an operational and cost perspective.

[11] Investment cost includes rolling stock

The marshalling yard and terminal would include a freight line spur into the port to enable efficient loading.

Alternative layout options for Lamu Freight yard





Phasing

A phased approach to development has been recommended for the line. The Chinese study assumed that the Lamu Isiolo phase would be completed first followed by the lines to Nairobi and Nakadok and finally the link to Moyale and onwards to Ethiopia. Recent discussions indicate that the Lamu-Isiolo-Moyale phases are likely to be progressed first with other sections being implemented subsequently. There is currently no firm timetable for implementation of proposals.

Issues and opportunities

There are a number of issues that remain with the proposed railway:

There is no up to date freight demand model informed by detailed analysis of industrial and economic demand. An assessment is required of current and future freight demand potential along the route and from Ethiopia and South Sudan. This should be supported by empirical analysis of current demand and informed assumptions to inform forecasts of accounting for planned projects and economic development potential.

There is no current assessment of minerals resources potential linked to the LAPSSET Corridor and nearby areas. Such demand could underpin the rationale and timing of proposals. The Ministry of Mining is to undertake such an assessment to identify economically viable and accessible resources. Previous studies have indicated potential minerals projects which could help to support or link with industrial activities at Lamu and other locations on LAPSSET. Some resources may also have potential for export.

Existing studies were undertaken prior to Addis-Djibouti line which has changed the competitive environment. The linkage and potential competition from a possible link between Moyale-Isiolo-Nairobi – Mombasa routing via the SGR could also impact on phasing and viability of the Isiolo-Lamu section.

There is no appraisal of the cost benefit analysis of the railway vs. freight transport by road. The wider economic, social and environmental costs and benefits of the project would help to establish its importance and help inform technical and financial structuring of the project.

Airport provision

Summary of existing proposals

The most recent study of airport proposals at Lamu was conducted in 2009 by JPC consultants.

There is an existing airport (ICAO: HKLU) at Manda Island which is an ICAO Cat 2C and is not equipped with radio navigation, instrument landing or lighting aids which affects its hours of

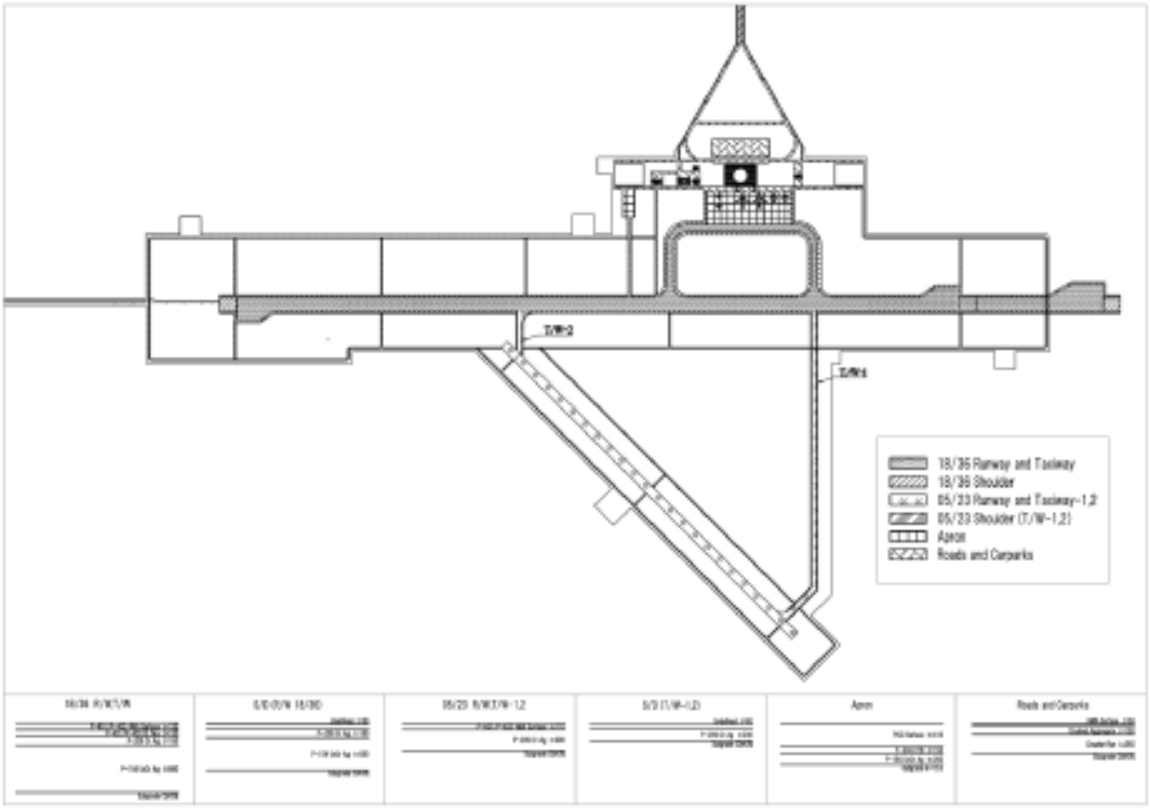
operation and potential for disruption during unfavourable conditions. There are two runways at Manda, RWY 15/33 [2000 x 30 metres] paved with asphalt and RWY 08/26 [1463 x 24 metres] surfaced with coral as per the current aerodrome charts. However, certain operators/airlines apply a usable length on RWY 15/33 of 1663m for safety reasons, due to the limitations noted above.

Demand was 44,670 passenger per annum (PPA) in 2007 and is projected to be 74,611 PPA for 2015, and 87,069 PPA for 2020. The airport has a domestic routes focus mainly for small General Aviation aircraft and regional Turboprops, with currently several scheduled flights per day to Nairobi. Operators include Safari link, Air Kenya, Fly 540/Fly Sax, Jambo Airways etc. Scheduled and Charter Flights from Nairobi originate from Jomo Kenyatta International Airport or Wilson Airport with direct flights to Manda or via Malindi Airport, Ukunda Airport and Moi International Airport Mombasa.

Planned facilities

There is a long term plan to establish a new international airport Category 4E to cater initially for 850,000 PPA and ultimately 1.2m PPA. This consists of two runways: one 2.5km extendable to 3km. The rationale for the airport is based on accommodating medium-long haul aircraft such as the B757 in order to accommodate larger charters as well as wide bodied aircraft.

Planned layout of proposed Lamu international airport



Phasing

There is no clear timetable for the development of the international airport. The level of capacity implied by the new airport is considerable and significant progress would need to be made in the growth of Lamu Port city before a facility of that scale would be needed.

Issues and opportunities

There are opportunities to upgrade the facilities at the existing airport at Manda Island and to improve access to the mainland by building a bridge, in order to increase the capacity of the airport. In addition, there is available land for additional freight and passenger facilities to be expanded.

Linking Manda airport and the mainland will enable equipment and machinery to be brought in by air to support development of the oil and gas sector as well as other industries requiring efficient air transport platform to support import/export of time sensitive or high value, light weight inventory. One sector which could benefit is shellfish and crustaceans and other high value agricultural products which would benefit from an efficient cold chain linking to potential end markets.

Potential for further upgrading runway facilities at Manda should also be explored (for example runway upgrades and extensions and development of a taxiway to improve hourly capacity) utilise the potential of these facilities before a larger airport is required.

Expansion of Manda airport is likely to be sufficient in the short and medium term particularly with the advent of short range narrow body economical aircraft which have come to market since previous studies were completed and have changed the commercial dynamics of the industry. Aircraft have been designed which enable lower volume routes to secondary and tertiary destinations to be served economically.

The site of the international airport has been safeguarded within the plan to support long term development needs of the area. Several environmental issues were noted in relation to the planned site. However, it is understood that alternative runway options are being considered which could reduce the environmental impact of the project.

Highways

Existing provision

The existing road network in Lamu County is composed of 170km in Lamu East Constituency and 675km in Lamu West constituency whereby 99% of this road network is unpaved.

Planned projects and improvements

The proposed road network for the LAPSSET corridor starts at Lamu Port and passes through the towns of Garissa and Isiolo where it splits into two arms; Isiolo – Nginyang –to link South Sudan and Isiolo – Marsabit – Moyale to link Ethiopia.

The proposed improvements to the strategic road network include:

Spot improvements and maintenance works on Malindi – Garsen – Hola – Madogo (B8). Technical and financial proposals evaluation reports together with draft contract agreementhave been submitted to the World Bank for no objection.

Mokowe Township Roads – 15 km being procured under the roads 10,000 programme for low volume sealed roads.

Lamu – Garissa - Isiolo highway 570 km over 3 years construction period over three stretches:

Development of highway between Lamu and Garsen

Development of highway between Lamu and Garissa

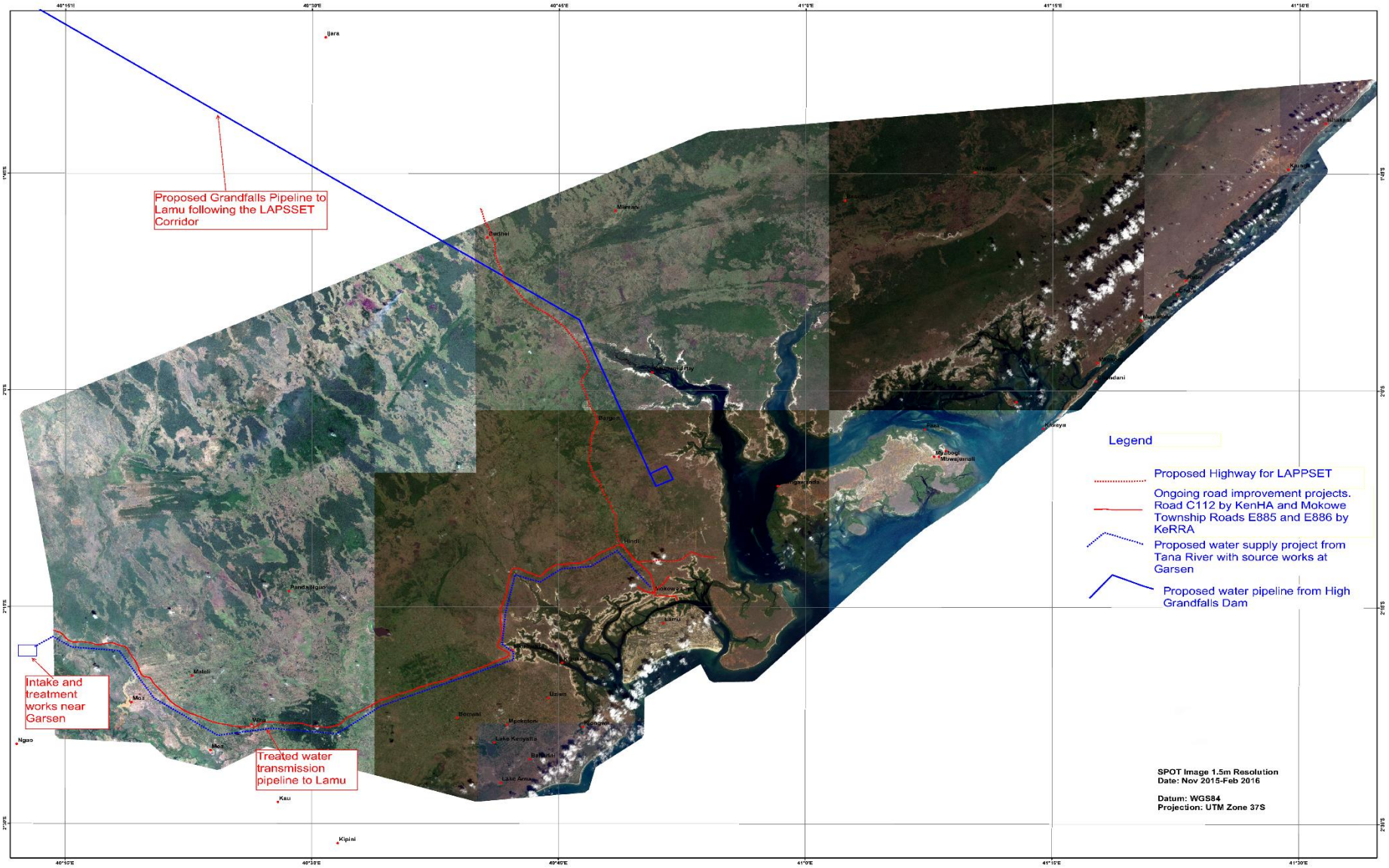
Realization of highway connecting Garissa and Isiolo

Development of the Highway connecting Isiolo with Nginyang - Inception Report Preparation at 50% complete and final designs to be completed in Dec 2017.

Nginyang' to Lokori to Lokichar - Designs are complete and scheduled for upgrading under Design, Finance, Build and Maintain framework.

Leseru – Kitale – Lodwar – Lokichokio – Nakodok at the border with Southern Sudan has its designs complete and World Bank has committed to fund construction of Loichangamatak – Nakodok section (298Km) while KfW has committed to finance Kitale – Chepkorniswo (66Km). GoK will finance construction of Lokichar – Loichangamatak (45Km). AfDB, JICA and Exim Bank of China have also expressed interest in funding other sections but with no commitment yet.

Map 8: Proposed transport and water infrastructure to support LAPSSET



Future demands

In order to understand the future level of transport demand to inform the strategic level road network and phasing assumptions a basic analysis of trip demand was carried out. This has helped to inform the planning and investment framework.

Table 16: Trips Generation estimates by phase

Phase	Total Trips Generated
1	258,808
2	2,032,636
3	4,696,184

NB – trips rounded to nearest thousand. The projected trips exclude freight and logistics movements associated with the Port.

The implications of this level of demand are as follows:

The level of demand generated in Phase 1 will require largely 2 lane roads. The cost of constructing this 7m wide 2 lane single carriageway with 2m wide shoulders would be between US $0.95 - 1.4$ million per kilometre.

Phase 2 will require expansion of Trunk road and minor collector roads to 4 lanes, and the major collector road to 6 lanes

Phase 3 will require 6 lane Trunk road and minor collector roads, and an 8 lane major collector.

Issues and opportunities

The proposed transport networks for Lamu would need to incorporate the following:

Establish a **multimodal transportation system** (local sea transport, road transport, bus and mass transit options as well as walking and cycling networks).

Build **trunk roads** that provide a carriageway with pedestrian walkway on both sides, including space allocated for mass transit options, this system will mainly connect specific zones such as port, industrial areas, commercial districts and existing communities. Designed for efficient movement and mobility.

Build **secondary roads** (Major Collectors) that provide a carriage way with pedestrian walkway and cycle lanes on both sides, this is a subsidiary system to Trunk Road and links facilities to specific zones. Designed for medium speed and compliment both access and mobility.

Build **district roads** (minor collector) that provide carriageway with walkways on both sides, cycle lanes, these are local roads within facilities and zones. Designed for slow speed mainly for access.

Transport Strategy for Lamu

To develop a successful new city at Lamu a transport strategy needs to be developed that seeks to reduce the need to travel by providing local employment, shops and services close to where people live. It also needs to provide an affordable and efficient public transport system that links the township with the key employment centres such as the Port Industrial area and the Resort City.

There are different options for the public transport system, the initial phase of the system is likely to include a bus network, in later phases a high frequency rapid system such as Light Rail Transit (LRT) or Bus Rapid Transit (BRT). The BRT / LRT system would operate on the routes with the heaviest demand, and stations would be located at key nodes and bus routes serving neighbourhoods and other parts of metropolis would connect into the BRT / LRT stations.

A comprehensive cycling and walking network along green corridors and green streets would be a key component within a multi-modal system. Streets would give priority to non-motorised transport modes.

The development of community transport schemes and car sharing clubs to minimise private vehicle ownership would be encouraged.

As there is a significant industrial component to the metropolis, the development of some dedicated freight routes could help to reduce conflict between freight and other road users.

The transport strategy should be developed in tandem with the detailed masterplan in order that they can be effectively integrated. There are plans to develop a transport strategy for Lamu during 2017/18.

Power and energy infrastructure

Existing provision

Existing power infrastructure includes the following:

National Transmission Network

The 475km 220/400kv line and associated substations run from Mombasa to Nairobi where it will be part of the Nairobi metropolitan ring network forming the 400KV, double circuit transmission line at Suswa- Isinya complete with substations.

Nairobi metropolitan ring at Suswa- Ngong has 45km 220kv double circuit line and 2x90MVA, 220/66KV substation at Ngong.

Loiyangalani 430km 400kv transmission line is evacuated to Suswa to form the ring network.

Eastern Africa interconnector (Ethiopia-Kenya) -686km 500kv HDVC bipole, 400KV substation. Phase 2 upgrade to 2000MW

Nearest major power stations

The nearest power station is at Rabai where the 220kv line originates.

400/220kv substation works at Mariakani which evacuates power to Isinya substation.

There is a long development pipeline of energy projects within Kenya (exceeding 5,000 MW). Projects which come on stream will be grid connected and provide options for bringing additional power to Lamu subject to sufficient capacity within transmission and distribution networks.

Renewable energy

Kenya is diversifying its renewable energy by expanding the production of energy through wind, geothermal and solar.

The wind farm in Loiyangalani near Lake Turkana is expected to generate 300MW. Ngong wind farm generates about 7.5MW at the moment with plans to expand the same to about 25MW underway.

Large scale solar energy is being considered. A few private companies have installed their own solar energy for example like Williamson tea has installed PV in their tea farms. These operate in conjunction with standby generators to address the issue of intermittency.

Geothermal energy production is currently delivering about 30% of the total energy nationally.

Distribution network

Linking with the national transmission network there is an existing substation at Hindi within the study area which has a capacity of 1x23mva on 220kv line with a provision for expansion to accommodate more circuits. The substation is currently about 10% loaded which means there is room for expansion up to 3 more circuits of 3x23mva. This has potential to contributing to meeting the need of part of the first phase of development.

Planned projects and improvements

There are a number of planned projects Lamu which are currently under consideration:

Proposed Amu Power project (1,000MW) is a coal power plant (368ha) which is expected to proceed subject to environmental approvals. The project would be delivered in phases and includes upgrades to the transmission network including a 400kv double circuit to the national grid.

Renewable Energy Projects:

Hydro power supply (700MW) is envisaged by the Tana & Athi River Development Authority (TARDA)

Wind farm (90MW) is proposed at Mpeketoni area to take care of future demands

Transmission and distribution network improvements.

The transmission and distribution is being improved by KETRACO and Kenya Power as they roll out new projects to improve the evacuation of power from their various generation centers.

Future demands

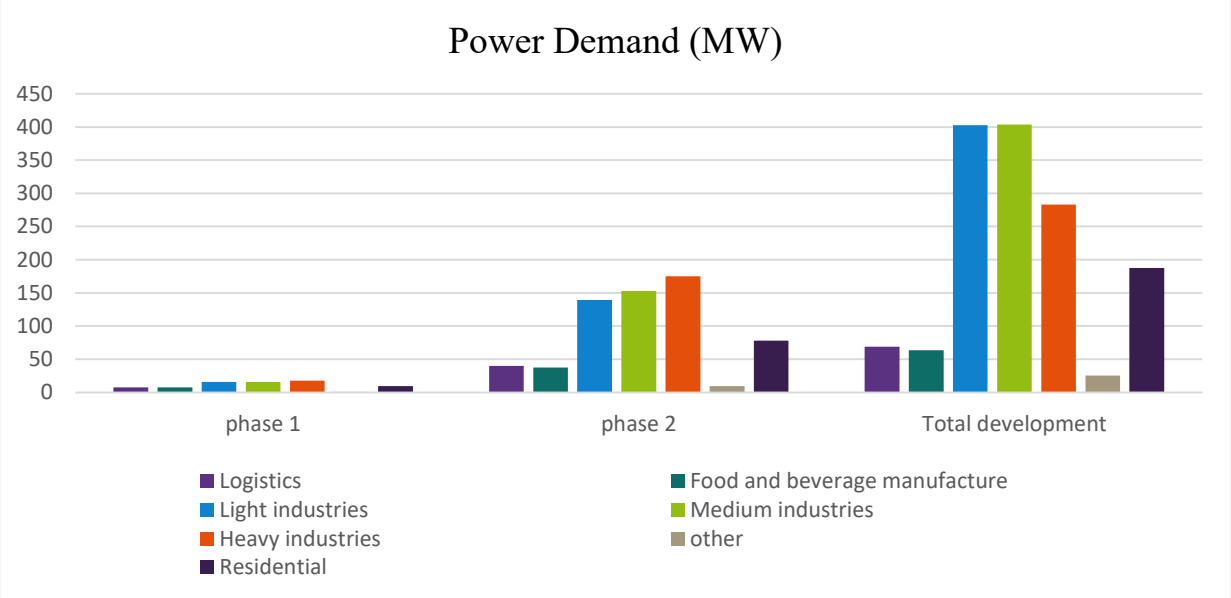
The future power demands generated from the preferred investment framework strategy are identified in the table below.

Table 17: Power demand estimates by phase

Phase	MW (cumulative)
1	75
2	632
3	1,434

The power demands by sector in each phase are identified in the chart below. Light and medium industries are the sectors with the largest power demands.

Figure 5: Power demands by sector and phase



The estimated power needs would require additional infrastructure as follows:

The total load for phase one is anticipated to be about 75MW. This will require 4x23mva transformer configuration. Phase one will utilize existing spare capacity in the Hindi substation, assuming that the project will be rolled out immediately and the available load is not taken up by other projects.

The total load for Phase two is anticipated to be about 632MW. Ten substations would be required for this load, each with a configuration of 4x23mva.

The total load entire development would require about 1,434MW. This would require 20 substations each with a configuration of 4x23mva.

Issues and opportunities

The following issues and opportunities related to power and energy infrastructure have been identified.

The national power demand strategy is being prepared with the Kenya Government expanding the generation of power through a diverse range of sources including geothermal, wind, hydro, solar, coal and nuclear. The target is to have the power supply generation reach 24,000MW by 2030 with the peak demand reaching 18,000MW, utilized through the various sectors around the country. **Potential impediments in delivering generation projects and transmission network improvements need to be considered.**

There are environmental issues with the proposed **coal power plant** which are currently under consideration by NEMA. The Amu power coal plant is expected to receive approvals. However, the financial case for the project is not known. The project may face similar challenges to other planned grid connected power projects.

Options for captive power including Integrated Water and power project and renewable energy options should be reviewed. Consideration of a wider range of power options is recommended to ensure a secure and reliable source of power at cost effective tariffs at each stage of development to mitigate the potential risks of gaps in supply, performance or infrastructure delivery.

The **transmission lines** are planned to be upgraded to operate at 400kv to ensure stability, resilience and reliability.

The **transmission network** will form a ring in Nairobi and the same will be interlinked to the neighboring East African countries.

It is recommended a technical and financial feasibility study is undertaken to review options for delivering power and water serving the needs of projects and communities at Lamu.

Costs of power generation

End users at Lamu SEZ will wish to seek cost effective energy supplies and tariffs which are competitive for their industry and increasingly for multinationals meet other corporate objectives

which may include environmental targets. The overall tariff costs are reflective of overall CAPEX and OPEX costs as well as the cost of finance. An indicative comparison of various technologies is highlighted in Table 18.

The table highlights that there is a strong financial case for exploring the feasibility of considering gas combined cycle generation and opportunities for solar PV, wind and other technologies to serve Lamu alongside the current pipeline of projects and to develop projects to address the needs of end users at Lamu paying particular attention to potential large scale users.

Table 18: Comparative costs by energy generation technology

Technology	**Benchmark**	**CAPEX USDm/MW**		**OPEX USD/MW per annum**	
		Lower	Upper	Lower	Upper
IWPP CCGT	Gulf	0.79	0.91	Not available	Not available
Waste to energy	India	0.83	1.2	27657	89885
Gas CCGT	Global	0.97	-	14505	-
Geothermal (Flash)	USA	1.39	6	99553	222355
Solar PV	India	1.53	1.81	11063	14750
Onshore wind	Europe	1.61	1.94	23000	28750
Coal	UK	2.27	2.85	30600	76500
Solar Parabolic trough	China and India	3.08	4.55	44000	45000
Offshore wind	Europe	4.29	6.08	100000	160000
Nuclear	Global	4.8	-	72000	-

Source: World Energy Council – World energy Perspective: Cost of technologies technology costs (2013)

Opportunity for captive power projects

As well as the overall cost of power tariffs the issue of security and availability of power (as well as water) is a critical issue which needs to be addressed to unlock the development of Lamu Port City. It is essential that power and water is in place in advance to enable development. There is potentially significant coordination risk if the implementation of current power and water supply projects were to be delayed.

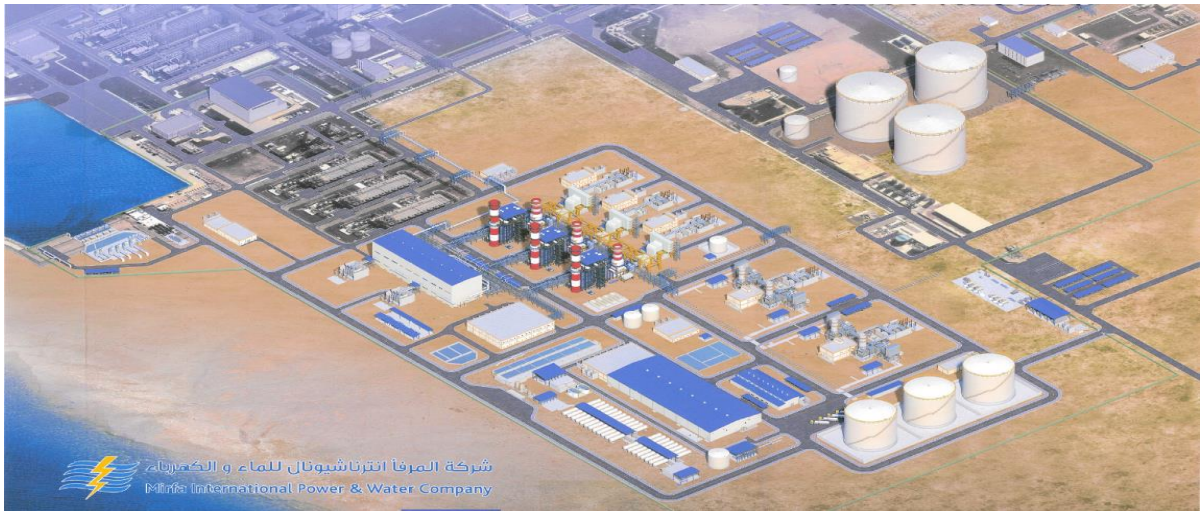
To overcome this issue, other special economic zones projects have developed linked or captive power projects in order to reduce dependency on other providers and uncertainty for potential project investors.

A IWPP project is typically developed on a modular basis and can be sized depending on both power and water needs. Either this solution could be developed to provide a secure and resilient source of power during the early phases of development as a stop gap and then combined with grid connected power options as projects come on line. Alternatively, it can be scaled and provide a further source of revenue for the SEZ company.

In the case of Lamu, a SEZ authority could establish an Independent Power and Water Project (IWPP) which would include power generation with water desalination/storage. The project could be developed underpinned by power and water supply agreements with customers within the special economic zone which may include oil and gas sector users and other larger power users who would otherwise develop their own captive power projects incorporated with their facilities. Surplus or additional power and water could be supplied to the grid or other sold to end users in the vicinity of Lamu or distributed to other nodes along LAPSSET Corridor or the coast. The project could also be promoted as a separate power and water project to serve the area. However, the opportunity to align end users would be lost.

It is possible to develop a small sized facility to meet the needs of the initial phases. For example a reverse osmosis desalination plant would require in the order of 5-10 MW of power which can be added to the needs of the first phase (68MW) plus additional need for which there is demand.

A more representative mid-scale facility would be in the order of 500-650MW developed in phases. This scale of facility allows for potentially reverse osmosis and multi stage flash (MSF) distillation technologies to be deployed which could provide a more cost effective and energy efficient solution. Much larger facilities are common in the Gulf States and Singapore in the order of 1,000-1,800 MW. Typical capital investment costs are in the order of USD 789-910 per kW. An IWPP would require a supply of natural gas which although non-renewable is a relatively clean, efficient and cost effective power source. Liquified Natural Gas (LNG) could be delivered and stored with in the port industrial area and piped to the facility. In the longer term Kenya may develop its own offshore natural gas resources which are currently under exploration.



An example of a large sized facility is the Mirfa IWPP in Abu Dhabi. This project consists of a new combined cycle gas fed power plant (1,240 MW), new reverse Osmosis desalination plant (30 MIGD), open-cycle GT Power Plant (360 MW) & rehabilitation of existing MSF desalination (22.5 MIGD).

Solar power

There may be potential for Lamu SEZ to develop a captive solar power facility on a temporary or permanent basis with surplus power fed to the grid.

For example, in Malaysia the Melaka Green City Development Company promoted a small sized 8MW facility on a seven hectare site to provide power for a city expansion project feeding surplus power to the grid. This project has a payback period of around seven years and was constructed over.

At Lamu the availability of power during daytime hours may be suitable for community use and light industries such as apparel industries and others who do not require night time working. In addition, there are also options for combining power storage. At present the option of including storage is typically more expensive than grid connected power but costs are falling and expected to be in parity within ten years.

Example solar power facility - Hang Tuah Jaya, Malaysia.

Next steps

The potential sizing scaling of the facility and technical and financial structuring options should be explored in parallel with master planning and PPP feasibility studies for the port and Special Economic zone. This will enable the potential for infrastructure bundling to be explored to find the optimal solution. An IWPP can also serve the pipeline and in order to determine the potential for power and water supply facilities to be financed and delivered with the Port and SEZ.

Telecommunications

Existing provision

Safaricom who is one of the leading service providers has partnered with KETRACO to link Lamu and the entire coastal region with fibre optic line. The routing follows the power transmission line network. This means the availability of fibre is is partly considered and can be extended to ready for connection to customers.

Mobile masts are also being increased on Lamu Island and its environs to enhance connectivity.

Planned provision

This is as per the agreement which service providers have with KETRACO.

Issues and opportunities

The challenge now is the number of ready customers as the lines are available. The coastal region is now a huge market for the telecommunication providers and is expanding.

The availability of high capacity broadband networks is required to link with power, water networks, oil pipeline, railway, port, airport and security functions. It is critical that infrastructure is scaled as these networks are developed normally infrastructure requires its own dedicated lines to ensure security and resilience. Measures to ensure the cyber protection of these systems are also required.

Expansion of the mobile tower network and associated points of presence would benefit from a connected and reliable power and broadband network to enable data backhaul, monitoring and security of supply which is more challenging if towers are dependent on standalone power generators.

Industrial and commercial uses with potential for growth at Lamu may have requirements for high capacity ICT connections particularly with developments in the industrial internet whereby manufacturing systems are interconnected and linked with supply chain and logistics networks. It will be important to consider specialised requirements within master planning.

Lamu node is to be developed as a planned and integrated city. There is greater potential than within existing areas for the city to incorporate "smart city" components from the outset to deliver benefits to residents, workers and visitors as well as optimise the performance of infrastructure. These components will be addressed at the next stages of master planning.

Water supply, sewerage and drainage

Water resources and supply

Existing provision

Lamu County lacks reliable surface water resources (rivers). Current water demand in Lamu is 3,000m3/d. The following are the existing Water resources in the county:

Shella Wellfields – These have reached their limit

Lake Kenyatta Water Supply – Five boreholes serving Mpeketoni, Mapenya, Kiongwe and Mkunumbi

The LKSS boreholes have also reached their limit

Himwa Water Supply – Located 5 km from Port. Production = 500 m^3/d

Magogoni Water Supply – 30 m^3/d

Mokowe Water Supply Project - serves a population of 5,000, including the port area. This is the "Lamu Port Immediate Water Demand Project" commissioned in 2016

Kizingitini Water Supply Project – a desalination plant with 3.0m^3/h capacity – this has been commissioned.

Planned projects

There are several planned water supply projects which include:

Reverse Osmosis Desalinisation Plant - This project is being promoted by a private sector promoter for a site in the vicinity of the port industrial area. The project has potential to supply around 5000m^3/d. However, environmental issues and high power consumption and costs (CAPEX and OPEX need to be thoroughly investigated against the capacity of the plant to be adopted. In addition, it may be appropriate to review alternative locations for the project to minimise potential environmental impacts. The opportunity for an Integrated Water and Power Project has not previously been considered and it is recommended that LCDA explore this as a possible option.

Garsen-Lamu Water Supply Scheme – This project is proposed by the Coast Water Services Board (CWSB). It has been identified in their Water Supply Masterplan. The intake is located on the Tana River at Garsen. The project consists of: well intakes; raw water pumping; treatment works; treated water pumping and transmission pipelines for both raw and treated water. The capacity is estimated at 120,000m^3/d, with an initial Phase I capacity of 40,000m^3/d. The project is located downstream of planned irrigation projects. The cost of Phase 1 is US $182m. The design is at preliminary stages and CWSB are seeking funds for implementation. However, there is risk of a finance gap which could delay or stall this project from proceeding.

At 40,000m^3/d, Phase I Garsen-Lamu Water Supply Scheme would be adequate to supply water demand for LAPSSET Phase I.

Grand High Falls Dam - This is a multipurpose dam by Tana and Athi Rivers Development Authority (TARDA) aimed at providing domestic and industrial water to Lamu. It will also produce 700MW of hydro-power; provide water to irrigate 100,000ha of land and be used to regulate flooding of the Tana River.

The water apportioned to supply Lamu demands is 106,000m^3/d from Nanigi Barrage, as indicated in the National Water Masterplan. This is a long term project to serve part of LAPSSET corridor and Lamu with water. The project can be developed independent of the dam. Water can reach supply areas by gravity without the need for pumping.

The capacity of the two projects, Garsen-Lamu and High Grandfalls Dam is 140,000 + 106,000 = 246,000 m^3/d against ultimate water demand for Lamu of 280,000m^3/d. At this early juncture therefore, two strategies should be taken to ensure long term security of water supply for Lamu town, and a portion of the LAPSSET corridor downstream of Garissa town as follows:-

Move the intake from the proposed Nanigi Barrage to a site upstream along the Tana River, to a site to that is at least 300m above sea level to enable supply of the lower portion of the LAPSSET corridor and Lamu town by gravity thus cutting on OPEX for the project. This will also eliminate competition for water with the planned massive irrigation projects along the Tana River.

Negotiate with TARDA and other relevant authorities to get a higher water allocation from the 106,000m^3/d (1.23m^3/s) as proposed in the National Water Masterplan, to 520,000m^3/d (6m^3/s). This will be adequate to serve a Lamu town and a portion of the LAPSSET corridor from Garissa to Lamu. With the Grand Falls and Masinga Dams regulating flow in the Tana River Basin, this will be easy to accomplish.

The cost of initial phase providing 40,000m^3/d is in the region of US $315m. The potential lead in times for planning, construction of the two dam options could be significant. In addition, previous feasibility studies for the Grand High Falls Dam have highlighted environmental issues which would need to be addressed satisfactorily for the project to receive support from international donors.

Future Demands

The future water demands generated from the preferred investment framework strategy are identified in the table below.

Table 19: Water demand estimates by phase

Phase	m^3/d (cumulative)
1	14,912
2	119,808
3	279,681

From the above, the first Phase of the proposed Garsen-Lamu Water Supply Scheme of 40,000m3/d would be adequate to serve water demands generated by Phase 1 of the planning and investment framework. However, for phase 2 of the project to proceed additional water supply scheme options are required as the full capacity of Garsen-Lamu Water Supply Scheme will barely be adequate. Full development of the planning and investment framework (phase 3) would imply water demand of 280,000m^3 per day which will be more than the water allocated for Lamu, which includes the 106,000 m^3/d at Nanigi. It is therefore prudent to have the water allocation at Nanigi increased to 6m^3/s as indicated above.

Issues and opportunities

Action is required to de- risk the implementation of the planned water schemes. A financing study to support implementation of the Garsen -Lamu pipeline is a priority.

To support this work it is recommended that a techno-commercial review and cost benefit analysis of existing and potential water supply schemes is undertaken along with evaluation of additional options which can meet the water needs of the Lamu area and wider water catchment affecting other parts of LAPSSET including Garissa. Such a study can consider tariff structures and issues affecting the feasibility of implementation of the options.

In addition to the existing water schemes those additional options which should be considered include:

Desalination options. These have potential to provide water at high quality for commercial and industrial water users and other users. The viability and affordability of tariffs will be a consideration. In addition, electricity tariffs may influence the feasibility of the scheme. However, there is scope to explore combined water storage to benefit from off peak tariffs as well as the option of an Integrated Water and Power Project. The potential local environmental impacts of desalination plants (including management of heated water, water heating) require careful site selection to mitigate potential impact on the marine and terrestrial environment.

There are opportunities for **Recycled water** in Lamu – However, a prerequisite for any effective recycling efforts depends on an effective sewerage system. A sewerage system therefore needs to be implemented in Lamu before any recycling opportunities can be realised. Recycling of wastewater will have positive effect on reduction of total water demand from conventional water sources as it can be used for gardening and cleaning operations. Recycling of water and consideration of a separate non potable water system within the port industrial area is recommended for consideration which may be implemented at the project or zonal scale.

Within the planning and development guidelines for the project mandatory integration of **rainfall harvesting infrastructure** should be implemented as part of the overall approach to sustainable drainage. Rooftop harvesting is recommended as a means of augmenting water availability, and can be very effective as Lamu experiences two rainy seasons in a year. The availability of low cost uPVC/Plastic tanks and gutters makes it easy for individual households to install roof harvesting infrastructure that produce clean potable water.

The strategy to be adopted for meeting water demands associated with the planning and investment framework is likely to be to implement the first Phase of Garsen-Lamu Water Supply Scheme after that additional water supply schemes will be required which may include a combination of desalination/IWPP other water options including ultimately the High Grand Falls Dam project which is identified as a strategic LAPSSET project.

Sewerage and sanitation

Existing provision

Lamu Island is currently served through pit latrines and septic tanks. There are no waste water treatment plants at present.

Planned projects

A sewage treatment Plant is under design for Lamu Town. The main Treatment plant will be located on the Island while a smaller treatment plant will be located on the mainland at Mokowe. The demand that will be generated by LAPSSET was not included in the design of the ongoing sewerage project.

Future Demands

The future waste water demands generated from the preferred investment framework strategy are identified in the table below.

Table 20: Waste water estimates by phase

Phase	m^3/d
1	11,000
2	95,000
3	218,000

Issues and opportunities

Suitable lands needs to be identified now for the treatment plant that will cater for future and ultimate demands associated with the planning and investment framework proposals.

Some expansion of the planned facility may be possible to serve short term needs. However, a strategic site at an appropriate location will be required for the treatment works.

Storm water drainage and coastal protection infrastructure

Existing facilities

There is no current storm water drainage or coastal protection infrastructure in place in Lamu.

Planned provision

There are no storm water drainage or coastal protection projects planned for Lamu.

Future Demands

Increased urbanisation in Lamu will increase rain water run-off as a result of an increase in hard surfaces (buildings, roads etc.). It is not possible to model the likely run-off effects at this stage in the planning of Lamu. Surface water drainage will therefore need to be modelled as more detailed master planning is undertaken.

Issues and opportunities

As the detailed master planning is developed there is an opportunity to incorporate sustainable urban drainage (SuDs) as part of a green infrastructure (GI) network. The design and management of GI should take into account climate change and seek to mitigate this. This should include reducing and attenuating surface water runoff and providing areas for flood retention and biodiversity.

In developing detailed design guidelines for the Lamu node, there is an opportunity to incorporate building level SuDs such as green roofs, which help attenuate water and manage the flow of storm water run-off.

The following issues also need to be considered in developing the approach to storm water drainage and coastal flooding:

A coastal zone management approach is required.

Ecosystem based adaptation is an opportunity.

Special approaches will be required for industrial areas.

Solid Waste Management

Existing facilities

There are no formal solid waste management facilities at Lamu and waste is disposed of at a non-engineered dumpsite approximately 1.5km from the town centre. In addition, waste collection systems do not cover all residents. As a result littering and sporadic open burning of waste is common practice. Some informal scavenging of recyclable materials takes place, however, no reliable data is available to indicate how much.

Planned provision

There are currently no formal plans for future solid waste management facilities.

Future Demands

The World Bank predicts that by 2025 Kenya will have an average waste generation rate of approximately 0.6kg per person per day of municipal solid waste[12]. Currently (2017) waste generation in Nairobi is around 0.6kg per person per day. As such, it is assumed that an average of 0.6kg is representative in terms of calculating waste estimates. Table 21 below provides an indication of the amount of waste likely to be generated at Lamu over the three phases of development.

Table 21:Municipal Solid Waste Generation Estimates

	Phase 1	**Phase 2**	**Phase 3**
Population	56,776	459,599	1,102,011
Waste (Tonnes per day)	34	276	661
Waste (Tonnes per annum)	12,447	100,667	241,338

Note – Numbers may not add up due to rounding.

In addition, there will be some commercial and industrial wastes that may arise from the proposed industries. These are likely to be a mix of both municipal type wastes and hazardous wastes and may be both liquid and solid wastes.

[12] "What a Waste – A Global Review of Solid Waste Management". World Bank, 2012

Issues and opportunities

The development of a metropolis at Lamu, will make it necessary that a formal solid waste management system is implemented. As detailed plans are prepared for Lamu a waste management strategy will need to be developed. The following issues need to be considered as part of a waste management strategy:

Dedicated systems for storage, collection, sorting and management required.

Policies to reduce, recycle and manage waste.

Relevant options phased to align with current and future population to be identified.

Suitably engineered and designed treatment and disposal facilities that could reduce the reliance on uncontrolled dumping and look, where possible, to promote waste up the internationally recognized waste hierarchy.

Options to generate electricity to support the growth and expansion of the city.

It is possible that a waste to energy facility (WtE) could be developed to manage the projected waste for Phase 3. This would help to reduce reliance on landfill whilst generating much needed electricity (potentially around 15-20MWe). Only the ash from the combustion process would require disposal - around 20% of the volume of the waste burned (approximately 48,000 tonnes per annum).

If WtE were considered then a site with sufficient space for the waste to energy facility and an adjoining landfill should be found. The WtE plant requires approximately 6-8 hectares and the landfill may require around 15-20 hectares (although this is dependent on the rate of fill, final height of the landfill and the operational life of the landfill).

5. IMPLEMENTATION

Introduction

This section considers the implementation of the Lamu Investment Framework, by providing more detail on four selected packages. Projects have been selected through discussions with LCDA and other stakeholders and include:

Package # 1 - Planning and social management framework

Package # 2 - Structuring and financing the SEZ

Package # 3 - Power and water infrastructure

Package # 4 - Investment and promotion strategy

The aim is to define further the technical scope of the individual projects, and define the components of the project that would help scale up the approach and sphere of influence. This ensures that maximum impact is achieved through the creation of critical mass to attract interest for appropriate funding sources. In addition to the technical component of the projects, specific consideration is given to the investment raising strategy and potential funding streams that could be mobilised.

These should not be treated as prescriptive guidance for investment and implementation but rather as opportunities and illustrative examples of delivery that can be applied to other projects that could require loan, grant or land value capture mechanisms to secure completion.

It should be noted that the information provided is indicative at this stage and further studies, in particular further feasibility studies, technical and financial structuring would need to be undertaken to validate initial findings as presented below.

Package #1 Planning and Social Management Framework

Technical description

The development of the Lamu node at LAPSSET is anticipated to generate a population of approximately 1,100,000 and accommodating 425,000 jobs when the area reaches the completion of the full development phase. It is also anticipated that a large proportion of the future population will be migrants to the area attracted by the job opportunities and facilities that the LAPSSET projects will offer. This is clearly a significant level of development, transforming the mainland area from its current state of limited development to a metropolis.

Development of such a large industrial area and supporting township in Lamu, an area that is associated with a unique culture and sensitive environment, if not planned properly could result in environmental degradation from pollution, change in land utilisation patterns, increased demand for natural resources, and effects to the unique ecosystem of Lamu. It will also have significant impacts on the existing Lamu County population that need to be managed.

Achieving the level of development that is proposed requires a detailed approach to planning and social management in the land areas that form part of the LAPSSET Lamu node. Developing in detail a planning and social management framework is a key priority in order to:
Clarify roles and responsibilities for planning the area (e.g. who assumes the appropriate powers for implementation);

Provide sufficient detail and building guidelines to make informed planning decisions;

Ensure the vision and objectives are achieved;

Provide investor confidence and certainty to developers;

Ensure that businesses locating in the area will act responsibly;

Safeguard the natural environment and biodiversity;

Manage land effectively; and

Ensure the development is inclusive and successful.

The planning and social management framework includes various components which can be packaged into three projects, each with individual components.

Project 1 – Planning Framework – Develop an institutional framework for planning the area within the Lamu node, prepare detailed master planning for the Lamu node, develop a monitoring approach to ensure that development is prepared in line with the adopted masterplan.

Project 2 – Environmental Management Framework – In parallel with the preparation of a detailed masterplan, a Conservation Plan for Lamu County should be prepared, based on field survey to map the habitats and wildlife of the area with greater accuracy, and setting out the most important areas for formal and informal protection and restoration with wildlife corridors etc. The detailed masterplan once prepared will need to be subject to Strategic Environmental Assessment. An Environmental Management Plan should be prepared for specific project proposals in the Lamu node.

Project 3 – Social Management Framework – needs to be established, based on the preparation of plans and strategies including: a community engagement strategy, a resettlement and compensation

plan, a security and health strategy, a corporate social responsibility policy and skills and training programmes.

Components

Project 1 - Planning Framework

Institutional component

The crucial first step in developing the Lamu node is to establish the institutional framework for planning the land within the Lamu node, all land outside the boundary of the Lamu node would continue to be under the jurisdiction of the County Government of Lamu. The recommended approach will need to comply with the legislative framework set out in the Urban Areas and Cities Act. Establishing a Lamu SEZ planning authority, would help to achieve a co-ordinated response to planning, that provides investors and developers with a quicker and less complex route to gaining development approval (subject to their proposals being acceptable). Under this approach the SEZ planning authority would be established with a decision making committee made up of representatives from NEMA, NCA, NLC, LCDA and the County Government of Lamu. The decision making committee would be supported by staff from each of these agencies. The SEZ planning authority would have powers to make plans (e.g. detailed masterplans or integrated area structure plans), approve development proposals, gather and analyse evidence in order to monitor the plans and enforce any planning contraventions. Consultation on plan making and planning approvals would be as per existing legal frameworks.

Proposed Framework for Planning

If the above option for an institutional framework for Lamu SEZ is not implemented, the County Government would retain these planning powers, but would need to consult with agencies including the LCDA etc.

LCDA has already prepared a human resource and organisational plan for the scale up of its organisation. This needs to be harmonised with the preferred institutional option for planning to consider the nature of capabilities which need to be developed along with organisational structures, processes and procedures. The roles of other agencies and the defined arrangements for interorganisational working should be formalised.

Master planning to elaborate the planning and investment framework including development management guidelines.

The preferred investment strategy framework provides an initial high level indication of how development could be planned in Lamu. However, further detailed stages of planning are required to ensure that the vision for Lamu is properly implemented. A LAPSSET Lamu node detailed masterplan should be prepared by LCDA and the County Government of Lamu or a Lamu SEZ planning authority (as described above). The requirement for a concept masterplan depends on the status and implementation of the Lamu Metropolis Plan.

A detailed masterplan would need to provide details of land use zoning, urban design, infrastructure and transport including the road network (including reserve widths), and identify neighbourhoods, blocks and plots, building heights and massing, and a phasing plan. If necessary, project specific master plans could also be prepared by LCDA or project promoters.

Evidence to develop the masterplan would include a transport and freight model and more detailed site analysis (considering land use, environmental and physical constraints and topographic features). The land use proposals would also be informed by economic and market demand studies (refer to Project 4).

The masterplan should be developed with a GIS system or City information model to provide an effective management toll for ongoing planning and asset management and an effective basis to enable an integrated planning approach.

Using these tools a computer 3D model of the masterplan would help a wider audience (including the community and investors) visualise how the metropolis will look, acting as a promotional and community engagement tool.

Development control guidelines and development parameters would be prepared alongside the masterplan. This would define the requirements of part of the report includes suggested guidelines that define what project developers will need to consider when executing plans for each parcel and would include:

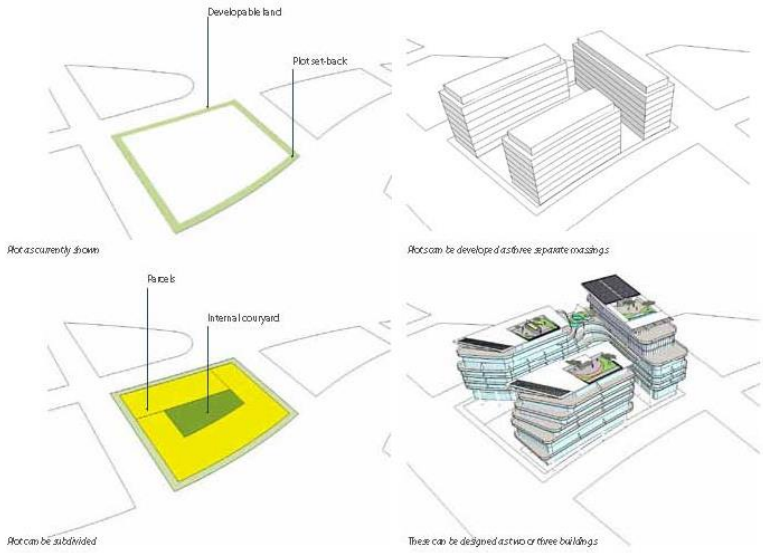
Access and public realm.

Industrial - building heights, plot coverage and set backs

Residential – building heights, densities

Commercial – building heights, plot coverage and set backs

Environmental management guidelines (linked to Project 2).



The masterplan should mainstream sustainable design principles to achieve resilience, this would include:

Prioritising protection of environmentally sensitive areas and disaster prone areas;

Minimizing the carbon footprint of development (this also has the advantage of saving cost);

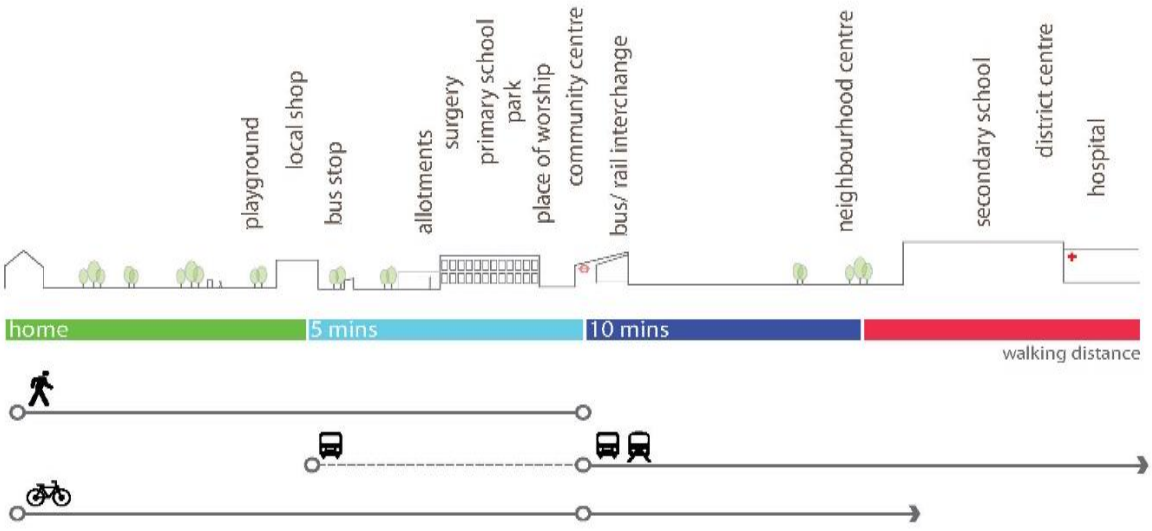
Design streets that encourage walking, the use of non-motorized transport and public transport, and plant trees for shade and carbon dioxide absorption.

Integration of transportation and utilities planning within the masterplan proposals harmonized with overall planning requirements. The effective planning and management of rights of way to accommodate different transport modes within the city as well as management of infrastructure following the principles of a smart infrastructure approach will be required.

Produce high quality public green spaces with special ecological and heritage value by highlighting Lamu biodiversity and cultural richness, avoid the creation of heat islands, and protect the local biodiversity and seasonal wetlands for rainwater retention and absorption.

The master planning should define **a green space network strategy** to identify the green infrastructure to be protected and management and enhancement approaches as well as an approach to new green spaces. In particular, this should establish the approach to the green buffer that is identified in the preferred investment framework strategy. The green buffers would be appropriate for agricultural, horticulture, forestry or recreational use with development restricted to ancillary facilities, in order to retain the open character of these areas. `

A **community infrastructure strategy** should be prepared. This will define the requirements for a range of community infrastructure facilities based on the projected population for the Lamu node, including: kindergartens and schools; health centres and hospitals; places of worship; sports facilities and open spaces. The level of provision should be based on national planning standards and where necessary calibrated to local circumstances. Where there are no planning standards available, the level of provision should be based on international best practice. The strategy should define the best location for the facilities in order to allow people to access facilities within a reasonable walking or cycling distance or a short journey on public transport. Land requirements and quality standards should also be defined. The strategy will include considering how the provision of facilities would be financed and delivered including the responsibilities of the SEZ Authority, Lamu County and other public service providers.

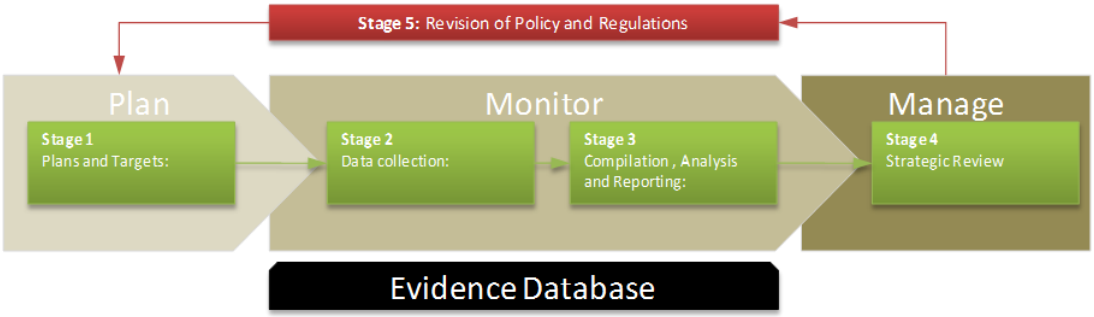


The master plan will incorporate a **transportation and infrastructure strategy**. The terms of a separate transportation study to link with the master plan are under preparation. Effective land use-transport integration is required to harmonise proposals in preparation of the master plan.

The proposals for infrastructure planning and concept design of utility networks will be based on design standards applicable in Kenya and where appropriate international standards and to industry best practice. The methodologies used shall conform to the latest techniques while ensuring the use of available materials and economic solutions. At all times, balance will be made between capital and maintenance costs. Interrelationships between infrastructure types will be considered to enable an integrated approach including the use of ICT enabled smart solutions and the option of a shared utility corridor approach.

Monitoring framework

Developing a monitoring framework for planning that tracks progress against delivery of the masterplan, vision and objectives, will be important in helping to deliver development in a manner that is in line with the approved masterplan. Depending on the institutional arrangements for planning in the Lamu node (see above), monitoring would be the responsibility of the SEZ authority or the County Government of Lamu.



The monitoring framework will need a set of key performance indicators (KPIs) to measure progress against. There will also be a need to develop data collection and monitoring processes (e.g. GIS, city information models, or other tools) so an evidence base can be gathered on an ongoing basis to analyse progress. The monitoring framework should also establish reporting procedures, so that there is public oversight of progress and any corrective actions.

Project 2 – Environment Management Framework

Lamu is a biodiversity hotspot, the ecology in Lamu is widely recognised as one of the richest along the entire coast of East Africa and its ecosystems have worldwide recognition. The County needs a **conservation plan** based on field survey to more accurately map the habitats and wildlife of the area. The conservation plan will set out the most important areas of habitats for formal or informal

protection and restoration. It should also set out how wildlife corridors, endangered and vulnerable species should be protected from the impacts of development.

There will be a need to carry out **Strategic Environmental Assessment** (based on international standards) of the development of the Lamu metropolis (based on a detailed masterplan) during the construction and operation phases of development. The SEA would consider the impacts of development at Lamu on the natural environment, habitat and livelihoods by establishing a baseline and quantifying potential impact on terrestrial fauna, marine habitat including coral reef, sea grass and mangroves, fisheries, pastoralists and livestock.

The SEA would need an assessment of construction activities and what effects on the natural environment these might have e.g. sedimentation may arise from construction activities that could affect coral reefs, mangroves and marine life.
The aim of the process is to minimise impacts from development, so the process of identifying impacts should help to inform amendments to the proposed development. Otherwise, mitigation actions and offsetting during construction and operation should be identified e.g. mangrove restoration, planting mangroves, mangrove seed propagation.

There will also be need to ensure that **environmental management policies are in place** to ensure industrial processes are managed to mitigate environmental harm and comply with the appropriate environmental regulations.
A **risk assessment** should be carried out to identify areas of potential risk to natural disasters and environmental hazards accounting for the future risks associated with climate change. This will help inform where new development should be located so that it avoids areas at significant risk of hazards. This should be used to help inform the master planning.
Effective planning of **surface water drainage and flood management plan** will need to be prepared for the Lamu node. This will require integrated modelling to improve understanding of flood risk and interaction between different sources of flooding/drought. The plan should include the identification of high risk areas and flood mechanisms connecting sources and receptors, and an understanding of hazards generated by different flood risk sources. This work will need to be co-ordinated closely with the preparation of a **coastal management plan** that sets out policies to manage the coastal zone including conserving nature and landscapes, maintaining or enhancing public access to the coast and management practices.

Project 3 – Social Management Framework

A key priority in developing a social management framework will be for the LCDA and the County Government of Lamu to develop a **community engagement strategy**, which set out how they plan to engage local communities on the Investment Framework, planning, environmental and social management frameworks. It will be important to undertake a stakeholder mapping exercise to identify stakeholders (anyone who has an interest in the outcome of the development of Lamu, both those contributing to or affected by the project), analyse the role and expectations of stakeholders and prioritise their needs so that they can be engaged appropriately.

The community engagement strategy should develop public awareness strategy that will engage the community through a community events programmes (work with existing Wanjiku) and through any other appropriate means.

There is a significant area of land within the Lamu node that has been identified for settlement (e.g. Hindi Phase I and Phase II) some land has been allocated and titles have been distributed. Much of the land identified in the preferred investment framework strategy is community land, so the approach to land ownership, resettlement and compensation needs to be resolved in parallel with planning for the area. A first step will be to identify all land ownerships and leases in the area using Ministry of Land data. A detailed **resettlement and compensation** plan will then be developed for resettling those with existing land or leases, defining the approach to compensation (through land swaps or guarantees of replacement residential / commercial premises), developing a strategy for resettlement defining clearly the phasing and location for resettlement, and setting out the process for organising and implementing the plan.

The LAPSSET SEZ authority should develop a LAPSSET **Corporate Social Responsibility** policy aligned with international standards, that encourages companies that locate in the SEZ to operate in a sustainable manner by committing to the following:

Economic – commit to the long term economic growth of the local area by for example developing and supporting local supply chains.

Environmental – commit to applying the highest environmental standards to their business practices

Social – commit to supporting the training and development of the local community e.g. through providing apprenticeships The policy should require companies to provide or help fund the provision of community facilities that would be needed to support development of the metropolis.	

The SEZ authority / LCDA and the County Government of Lamu should develop a **training programme** to enable both the existing local population and incoming residents to maximise their potential access to job opportunities that LAPSSET Lamu node will offer. This will include:
Developing a women's skills programme.

Tapping into national training initiatives by promoting them locally.

Develop links with 'nearby' university (e.g. Garissa) to develop programmes that link with the SEZ target sectors. Accommodating higher education and vocational training facilities within Lamu aligned with priority sectors and industries (the Kenya maritime academy is one such example of a facility already being planned).

Mandate that medium and large sized SEZ companies adopt apprenticeship schemes targeted at the local population.

A **security and health strategy** should be developed in order that the security and health issues for the local population and those of incoming residents can be fully appreciated and planned for. The strategy should consider the integration of new residents with existing communities, in particular: properly planned temporary construction camps should be planned; disease prevention and health awareness schemes should be developed; worker health screening programmes should be devised. There will also be a need to update the security plan to align with the phased approach to development set out in the detailed masterplan, to ensure that security measures such as local policing, coast guard and military presence are scaled up according to the build out rates for development.

Costs and investment

The following are the likely range of indicative costs for preparing each component of the project, the actual fee value would need to be determined depending on whether work is carried out by

consultants or staff within the relevant agencies, the detailed scope of work, the availability of existing data, desired timeframes for completion and risks attached to carrying out the work.

Project 1

Indicative costs for the advisory services to develop the planning framework are:

Assist with developing institutional framework for planning including engagement associated with master planning- $100,000 – $150,000

Prepare a concept masterplan for all phases - $1,000,000-$1,500,000. Detailed masterplan (phase 1 – approximately 530ha) - $600,000 - $1.2m

Undertake transport studies and modelling - $600,00 - $1m

Prepare a green infrastructure strategy - $60,000 - $100,000

Prepare a community infrastructure strategy - $40,000 – $60,000

Infrastructure planning strategies - $200,000 -$400,000.

Project 2

The estimated costs for the advisory services to develop the environmental management framework are:

Prepare a conservation plan - $100,000- $200,000

Undertake SEA for the detailed masterplan (phase 1 – approximately 530ha) - $150,000 - $200,000

Prepare a surface water drainage and flood management plan - $100,000 – $200,000

Prepare a coastal management plan - $100,000 - $150,000

Project 3

The estimated costs for the advisory services to develop the social management framework are:

Prepare community engagement strategy - $60,000 - $100,000

Prepare a resettlement and compensation plan – $60,000 - $100,000

Prepare a corporate social responsibility policy - $15,000 - $30,000

High level strategy for identification of training programme requirements - $50,000 -100,000

Prepare a security and health strategy - $20,000 – $40,000

Partners / Stakeholders

It has been recommended that a Lamu SEZ planning authority is established as set out above. Assuming this agency is established, there would be a number of agencies that wold be partners in developing the planning and social management framework for Lamu including: the County Government of Lamu; the LCDA; the National Environment Management Authority (NEMA); National Construction Authority (NCA); and National Land Commission (NLC).

Depending on the particular component of the projects there is likely to also be a need to involve other ministries and agencies such as the Ministry of Lands and Physical Planning; Ministry of Transport and Infrastructure; Ministry of Education and the Ministry of Defence. The Special Economic Zone Authority are spearheading the development of SEZ areas and will also be a key stakeholder.

As well as these national government agencies, there will be a need to work with others such as NGOs like WWF and general public, local community groups and representatives.

Financial

The planning and social management projects would be funded by funds raised from government and/ or could be part funded by IFI donor agencies.

Recovery Mechanisms and Benefits

In general it is unlikely that the funding for the planning and social management framework projects can be recovered, there might be some opportunity to recover fees from the planning approval process, along with service charges relating to utility and other services. The structuring of charges would need to be compatible with provisions of the Kenyan legal framework.

The benefits of the planning and social management framework projects would be:

A coordinated approach to planning.

Best practice sustainable development principles ingrained in the development.

Greater certainty for investors and developers around what they would be able to invest in and build.

Investment associated with development opportunities identified in the masterplan.

Climate resilient development, meaning that investments are future proofed against the risks associated with climate change.

Development that has minimised impacts on the environment and existing society and cultures.

Habitat and wildlife protected with the associated eco-system services benefits that this brings.

Development that manages water and flooding issues appropriately.

Gaining community ‘buy in’ to proposed development approach for the area.

Equitable approach to compensating people for the loss of their land.

Investors and businesses acting in a responsible manner with the long term interests of the area and Kenya at heart.

Greater social inclusion and access to employment opportunities.

A more healthy and secure population.

Potential Risks

In order to successfully implement the proposed planning and social management projects, the following risks should be considered early on in order to develop necessary mitigation measures. In addition, there are a number of market risks and implementation difficulties which may be faced during the implementation of planning projects. A number of these are broadly summarised below.

Table Potential Risks

Risks	Mitigation Measures
Disagreement on the institutional framework for planning powers	To inform the discussion Define the pros and cons of the approach, show examples of best practice and the impacts of failing to agree on an institutional framework for planning. Make use of existing legislative powers that each agency has.
Lack of consensus on the detailed masterplan	Stakeholder mapping a community engagement strategy to be prepared. Ensure that County Government and LCDA work in partnership to develop the masterplan.
Masterplan is over ambitious or lacks viability	Market test and iterate proposals.
Lack of local capability to implement the proposals	Develop an institutional framework for planning that helps make use of existing capacity and enables the strengthening of capacity where necessary.
Investors don't invest due to concerns that plans are environmentally damaging	Undertake SEA based on international standards in parallel with masterplan preparation to ensure environmental impacts are minimised and where necessary mitigation measures are in place.
Lack of public support for proposals	Develop a public awareness campaign that promotes the benefits of the scheme to the local and national population.
Resettlement of existing land owners / lease holders is not supported	Engage early with land owners and the community to explain compensation measures and the processes for resettlement.

Package # 2 - Structuring the Special Economic Zone

Technical Description

The designation of a Special Economic Zone can provide a mechanism to channel activities to areas of opportunity. In the case of Lamu it will help:

Provide an institutional mechanism to finance and co-ordinate the delivery of infrastructure.

Establish an infrastructure platform which can support the attraction of investment in productive economic activities and the development of a city scale community;

Create a strong identity and image for Lamu that signals progression in policy development.

Enable provision of a wider range of economic and social infrastructure, including health and education.

Improve competitiveness through efficiency enhancements to administrative procedures and infrastructure development and operation.

Improves ease of investment through ease of administration and direct marketing utilising a one-stop shop.

Effective coordinated delivery and maintenance of necessary infrastructure.

Overcome barriers to support the mobilization of international investment which may be delivered through international business partnerships and private sector investment.

A focus of new regional development initiatives to spread the economic and social benefits of change to the wider community.

The historical progression of policy responses relating directly to trade and industrial change/development can be characterized in four stages:
First Stage -Free Ports and Free Trade Zones

Second Stage –Export Processing Zones

Third Stage –Special Economic Zones

Fourth Stage –Science Based Parks and Cross National Zones

The first stage of policy responses targeted the designation of land for 'special uses' such as Free Ports and Free Trade Zones with bonded warehouse facilities dating back to the 16th Century. The concept targeted enhancement of trade between countries and the relaxation of the taxation on goods to facilitate trade.

The second stage of policy responses saw the introduction of the Export Processing Zones (EPZs) which emerged in the late 1950s and developed over 20 or 30 years. EPZs are characterized by industrial estate type development within a fenced boundary. Generally promoting a small number of industrial/manufacturing processes for export related activities they also seek to attract a high proportion of foreign direct investors and foreign companies to be involved in the process.

The third stage saw the introduction of Special Economic Zones in the 1980s which provide the platform for a wide range of economic activities to benefit from preferential policy programmes. The spatial areas targeted by Government reflected significant regional development initiatives focusing on the rebalancing of activities either away from areas of high levels of congestion/development or

to benefit communities which had previously had limited access to opportunities within their existing settlements. SEZs provided the basis for integrated community development rather than the focus on encouraging singular manufacturing activity.

Kenya has recently made the shift from export processing zones towards SEZ development through the SEZ Act 2015. Criticism in terms of benefits and creation of meaningful economic value delivered through EPZs has led the government to freeze new investments within EPZs and gradually phase out related incentives. Existing investors in the EPZs will eventually be required to either pay taxes in line with Kenya's taxation laws or relocate/re-apply to be considered for investments in the newly formed SEZs. Lamu is one of the three pilot SEZs in Kenya, along with Mombasa and Kisumu. The development of SEZs in Kenya is being spearheaded by the Special Economic Zone Authority.
The fourth stage, which continues to evolve today, of Science Based Industrial Parks or Technopolis and Cross National Growth Zones extended the SEZ concept to focus on research based activities and international cooperation as key themes.

Components

Boundary and Concept of Lamu SEZ

As noted above, traditionally key objectives of economic zones were the promotion of exports and Foreign Direct Investment developed as fenced-in enclaves in remote areas and with a focus on manufacturing activities. Increasingly the zone development concept has moved towards integrated, mixed-use, large scale mega zones. These zones allow a wider range of activities, focusing on multi-market products and not just export. They usually provide purpose built facilities and have a one-stop shop for zone regime regulation. Prominent successful examples include Jebel Ali in UAE, Hainan SEZ and Shenzhen SEZ.

Case Study: Jebel Ali SEZ

Technopark: 21 km², sectors: water, health, engineering, energy, and logistics.

Dubai investments park: 23 km², mixed-use industrial, commercial and residential complex. Industries: building materials, food & beverages, furniture, plastic, power & utilities, printing press, construction, pharmaceutical, textiles, oil.

Dubai industrial city: 55 km², sectors: food & beverage, base metal, mineral products,

chemicals, transport equipment and parts, machinery and mechanical equipment. Dubai world central (including: the airport, logistics city, and aviation city):140 km², sectors: logistics, aviation, commercial, exhibition, residential. Jebel Ali port.	

The proposed Lamu SEZ consisted of several separate clusters including the port, the industrial area, a dedicated tourism area and identified areas for residential and mixed uses. These are situated close to one another and are adjacent to the existing and designated future residential areas of the local population.

It is recommended that a single SEZ authority is set up as to cover the development and management of all of the clusters as a multiproduct SEZ in accordance with the Act. Experience from elsewhere suggests that the establishment of the Special Economic Zone as one zone would be more effective compared to the establishment of several separate zones. Key benefits include:
A single and strong administrative body for a SEZ that can promote consistent investment policy regime and labour policy.

Greater and more diversified opportunity for potential investors.

Provision of quality infrastructure and appropriate plan and design across the area.

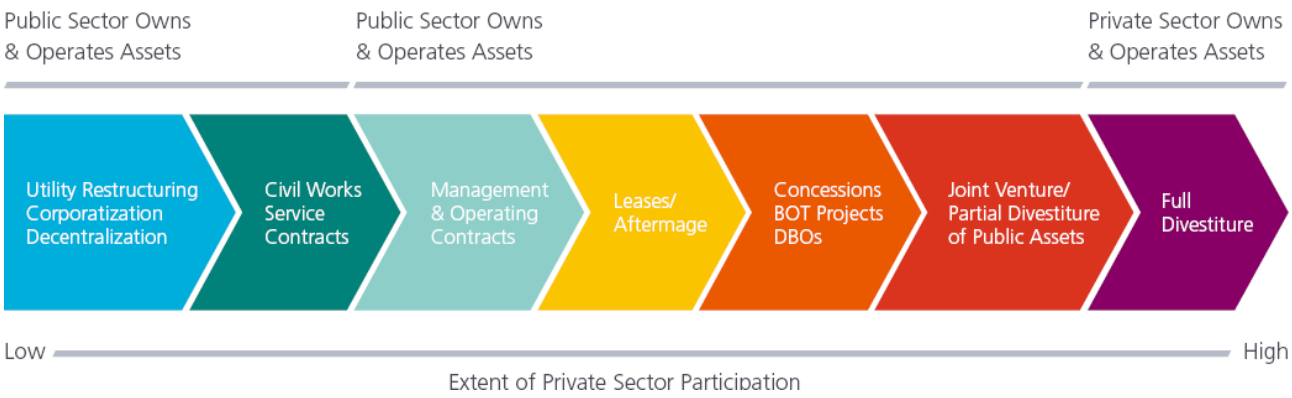
Flexibility for change of uses as market dictates without competition between zones.

It would be important for the zone to be developed with an explicit regional development agenda in place, taking into account comparative advantages and requirement for jobs for the nearby communities. Within the SEZ, the institutional arrangements would enable the development of sub zones and projects which may be managed within the framework of the overall zone.

Ownership and Development

The development and ownership of SEZs varies depending on the role assumed by the public and the private sectors. The following diagram illustrates various combinations of ownership and management of assets.

Range of potential PPP models



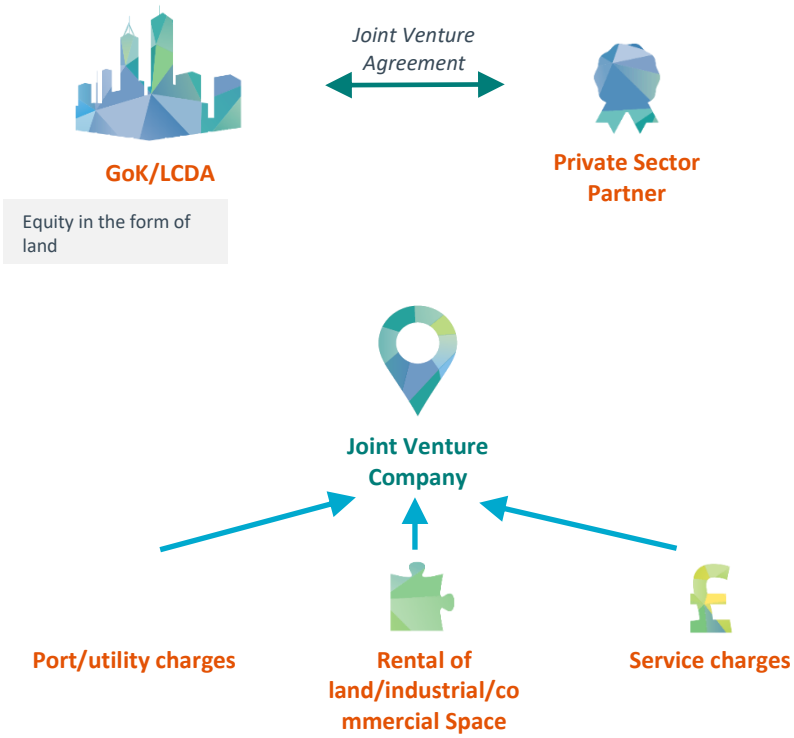
LCDA is embarking on a detailed PPP structuring study for the Port and SEZ to determine the most appropriate structure for implementing the project. Based on the consultation and review of options undertaken as part of the planning and investment framework the option for a Government – Private Sector Joint venture Company (ies) emerged to develop the port and associated land within the SEZ area.

This option would allow partners to share proportionately in the revenues and risks. A key benefit would be for the government to retain more control over the development of the land and at the same time gain from both capital injection and commercial expertise coming from a private partner. Such an approach has been widely used with examples provided by the Djibouti Free Trade Zone and Dakar Special Economic Zone.

A common option could be for the government of Kenya to put equity in the form of land and the private partner to invest in capital. The JVC would have the responsibility of development of the zone and provision of services, infrastructure and utilities or there could be a further option of providing infrastructure as concessions with other private entities.

The role of the County government as the existing custodian of common land was noted. The consideration of compensation and royalty payments covering services provided by government and the institutional interfaces between the SEZ authority, government and other parties need to be considered in relation to the overall institutional structure.

Illustrative model of a simplified joint venture structure



Cost and Investment Requirements

Before a possible public-private partnership can be considered fully, it would be important to define the product and potential terms and conditions attached to it. It would be important to establish the market demand that will provide a basis for investment interest, the legal requirements of such a JVC as well as ownership and share in the losses.

It is recommended that LCDA initiates the undertaking of a detailed PPP Feasibility Study. This would cover the following aspects:

Financial, technical and legal study.

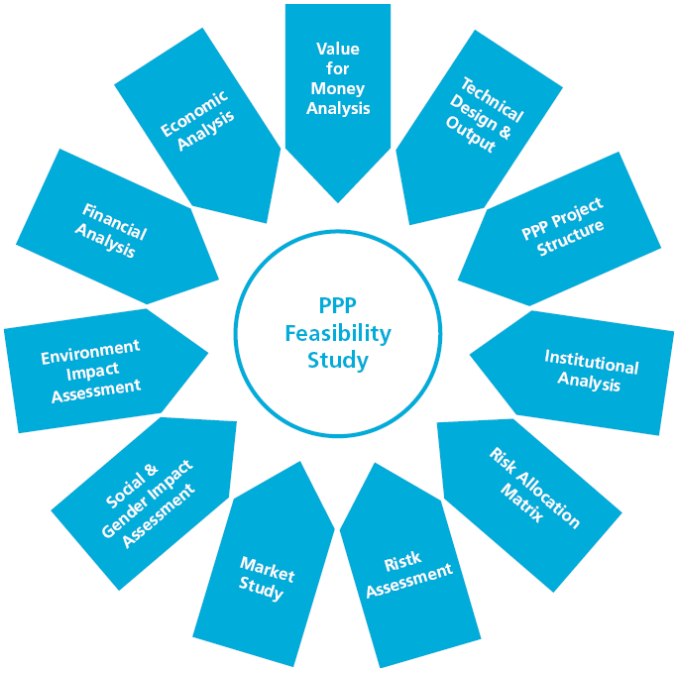
Development of a comprehensive financial model, with detailed assumptions and financial analysis.

Based on the results of the study, an ideal PPP structure can be identified.

PPP mode.

Phasing, if necessary.

Amount of government support required, if necessary.



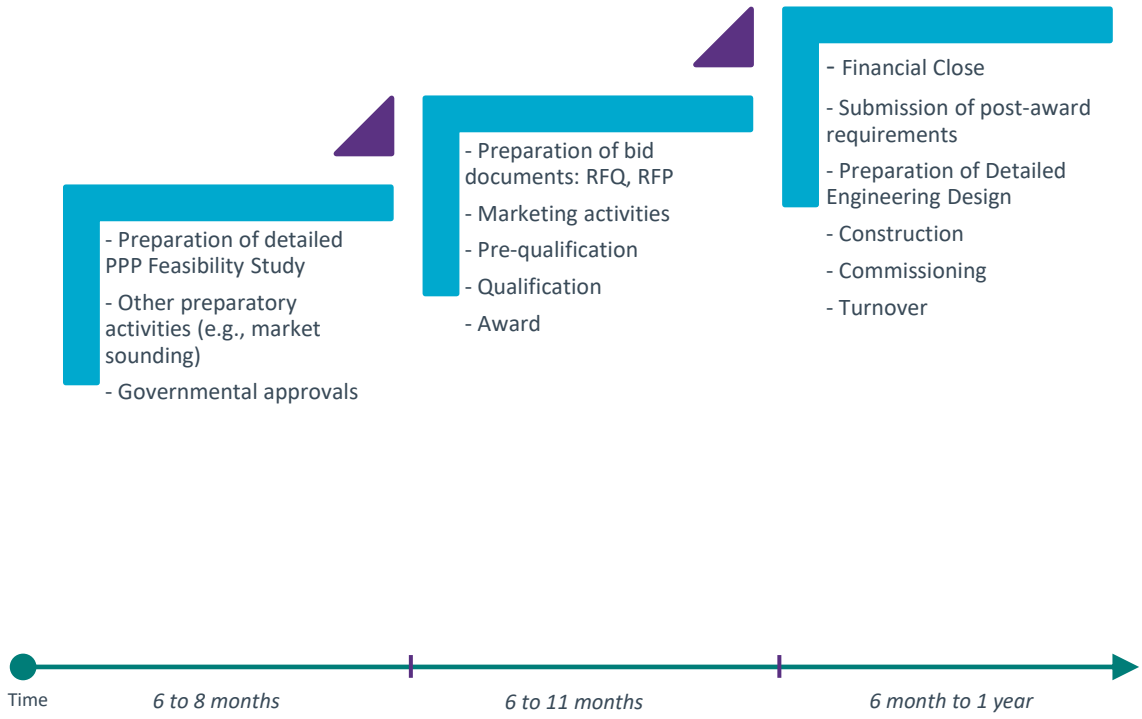
Market sounding and stakeholder consultations.

Preparation of the bidding documents including the PPP contract and the output specifications.

Launching the project for tender.

Estimated Cost $1,000,000 - $2.0m

A typical timeframe for such a JVC to come to financial close is provided below. Depending on governmental procedures this timeframe could be extended.



Roles and Partners

For Lamu there are several agencies that have differing roles in the SEZ structure:

Kenya SEZ Authority – Regulatory function to designate and regulate SEZs: Designate public and private land as SEZs and public or private land owners or their agents as SEZ developers/ operators. Facilitate government services e.g. licensing within SEZs. Monitor compliance.

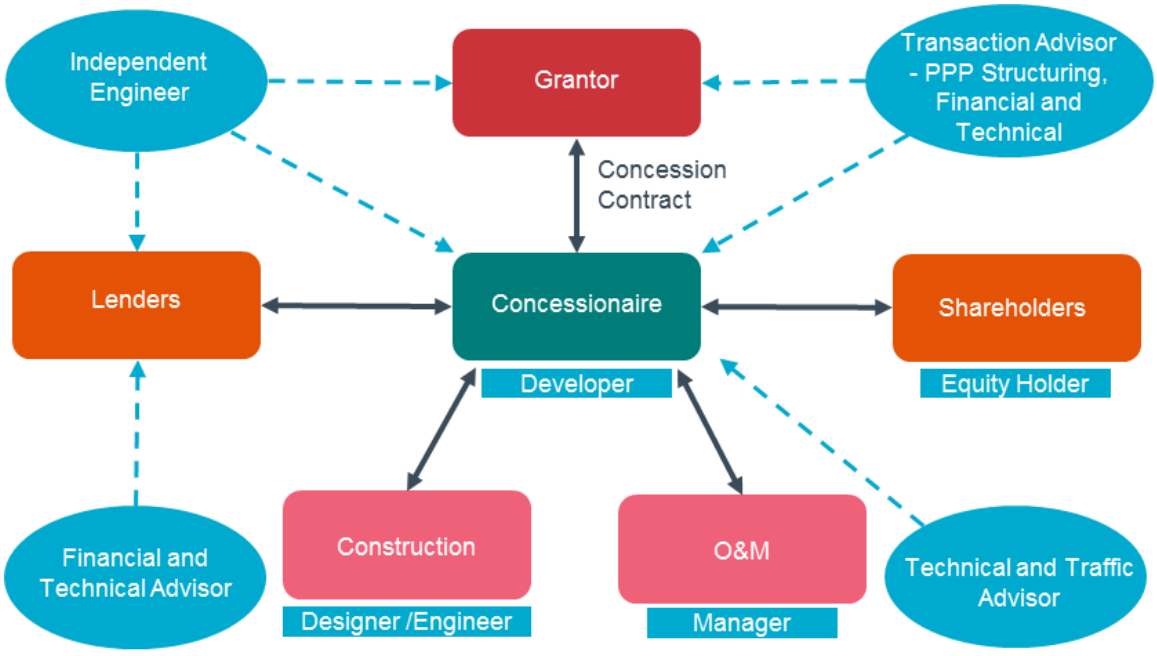
LCDA: Conduct strategic planning. Select site(s) and package land; establish land use guidelines. Conduct initial feasibility studies. Select developer and enter development agreement. Coordinate

offsite infrastructure with other concerned ministries. Training/workforce development and social services.

Developer - Land use planning: land-use master plan for their project (consistent with a detailed masterplan prepared by the SEZ planning authority or County Government of Lamu – see Planning and Social Management Framework) and prepare the land accordingly (grading, levelling, and other preconstruction activity). Provision of onsite infrastructure (roads, water distribution, water and waste water treatment, power distribution, power generation, solid waste management. In most cases offsite infrastructure is the responsibility of the government.

Operator (potentially same as Developer) – Facility leasing: manage lease and rental agreements with investors and assume responsibility for main services of the zone (e.g. maintenance, security). Utilities provision. Provision of other value added services such as business and training centres, medical and child care services, transport, and recruiting. Marketing. The SEZ authority/regulator and other parts of government (a national or local investment promotion agency) typically carry out some marketing activities.

For the establishment of a Public Private Partnership, key parties involved are set out below:



Financial

The SEZ Developer generally takes on the main financial risk of the project and orchestrating its various components during the SEZ's development

From the government's perspective to enhance the attractiveness of the SEZ to a private partner, there are a number of enhancement investments that could be offered to shift resource/risk allocation from the private sector and improve the terms and conditions of the transaction:

Engineering and master planning

Building of offsite and "enabler" infrastructure.

Internal basic infrastructure – notably for more developmental projects

If public sector funding is not available then the following could provide initial funding to initiate the development:

Infrastructure development funds - A special fund created through contributions of donors, private sources and export credits earmarked for infrastructure development, such funds are managed by an intermediary such as a development bank, which grants funds to the Government to develop or on-lend to developers at a margin.

Soft loans - multilateral financial institution such as the International Finance Corporation or the Kuwait Development Fund have provided soft loans to SEZs in the past.

Guarantee facilities –Facilities such as the World Bank's partial risk guarantee are a possibility to provide debt funding where a sovereign back-to-back guarantee is available.

Recovery mechanisms and benefits

The involvement of the private sector can help resolve a number of issues encountered by the government such as insufficient funds, inefficient planning and project sectors, ineffective deliver and inadequate maintenance.

Key benefits of a JVC approach are as follows.

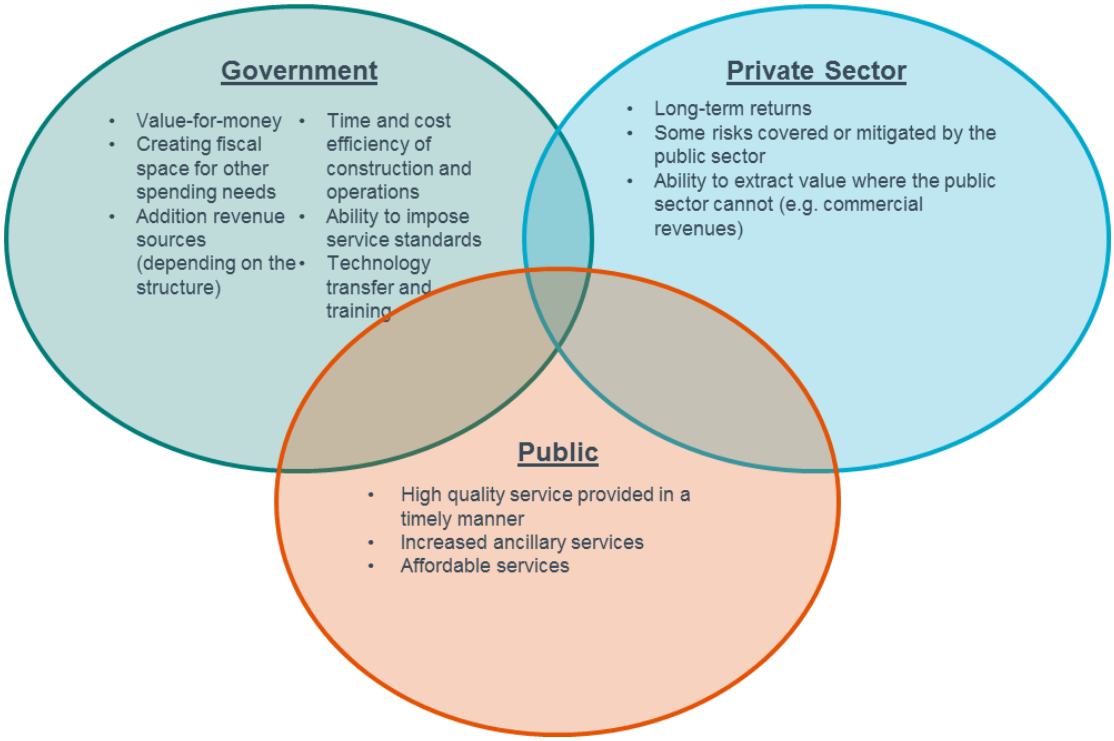

Government
Value-for-money
Creating fiscal space for other spending needs
Addition revenue sources (depending on the structure)
Time and cost efficiency of construction and operations
Ability to impose service standards
Technology transfer and training
Private Sector
Long-term returns
Some risks covered or mitigated by the public sector
Ability to extract value where the public sector cannot (e.g. commercial revenues)
Public
High quality service provided in a timely manner
Increased ancillary services
Affordable services

Table Potential risks

Key Project Risks are set out below:

Risks	Mitigation Measures
Site - The risk that the site on which the project stands/will stand has characteristics which makes the construction, operations and maintenance of the project more expensive than anticipated. These may be due to existing assets on the site or unanticipated geological conditions.	Detailed study to identify site constraints from the outset
Design, Construction and commissioning - The risk that the infrastructure being constructed/improved does not meet the design and construction standards set out in the PPP contract.	Close monitoring and supervision of construction by the public agency involved.
Financial - The risk that the operations and/or construction of the project will not be funded sufficiently.	Feasibility study for structuring PPP and project finance for the project.
Operations and maintenance - The risk that the project will not be operated and maintained in accordance with the standards set out in the PPP contract	Close monitoring by the public agency involved
Demand - The risk that the actual demand for the service provided by the project is lower than the projected demand.	Detailed study to assess market and demand to inform the strategy at the beginning.
Competition - Risk that a competing facility is constructed and as a result, projected revenues from the project is not met.	Consideration of comparative advantages and potential competition to be included in the detailed market study

Regulatory - This risk that the government will enforce new regulations that will prevent the private sector from constructing, operating and maintaining the project under conditions contemplated in the PPP contract. This can also refer to the risk that the government will not be able to enforce regulations necessary to enable the private sector to undertake construction, operations and maintenance of the asset under conditions contemplated in the PPP contract.	Consultation with relevant ministries to ensure regulations are reflected in the PPP contract.

Package # 3 Power and Water Infrastructure

Technical Description

Power and water supply will be crucial for development of the Lamu node. Since the power supply is currently adequate for phase one of the development, it would be prudent to tap into this to take advantage of the available power supply from Kenya Power. As for phase 2 various options exist to bring grid connected power to the area requiring upgrade and reinforcement of the national transmission network and the local distribution network.

The availability of power at competitive tariffs is an important consideration for industrial, commercial and domestic customers. Several planned power projects ae located within the vicinity of Lamu. In addition to existing projects additional options including the consideration of gas combined cycle generating turbines/IWPP and additional renewable energy options should be evaluated and addressed as part of the overall energy and utilities planning for the project. Power will only be a challenge if the uptake of power is exceeded by the developers involved in the project. As it is now the power is not fully utilised awaiting serious developments to take place to underpin the case for transmission and distribution network upgrades.

There is an acute scarcity of water supply in Lamu town. This can be supplied as soon as possible by adopting desalination of sea water which can be implemented by private companies in collaboration

with Lamu Water and Sewerage Company and Coast Water Services Board. However, planned water supply projects for Lamu which are identified in the Water Masterplan for CWSB and in the National water Masterplan should be implemented to supply future phases of LAPSSET. However, there is a need for finance raising and exploration of options of further options for funding is required to unlock implementation.

The long term power and water requirements for the LAPSSET project need to be addressed in order that the Lamu node can reach its full potential. There are several options for achieving this:

Project 1 - The Tana River water dam would generate about 700MW power which will be available for the Lamu project. This means that if the same is rolled out and put into the grid, the supply to Lamu would be more than adequate. This is because the coal and Hydro mix will avail 1700MW to the Lamu Port.

During construction stage continuous engagement with the power provider will be required as the power for the site works will be required for temporary works and for permanent power connection. Their actual requirements will be considered especially the civil works where substation and other trenching works will be carried out to house the control switchgear.

Project 2 – Garsen – Lamu Water Supply Scheme will involve construction of an intake on the Tana river at Garsen, raw water pumping station, raw water transmission pipeline, treatment works, treated water pumping station, 78 km of treated water pipeline and a terminal reservoir strategically located within Lamu town.

Project 3 – High Grandfall Dam Water Supply for Lamu - will involve construction of an intake on the Tana river at Nanigi Barrage (it is suggested that this location be moved upstream to a location where gravity supply is feasible), raw water pumping station, raw water transmission pipeline, treatment works, treated water pumping station, 200 km of treated water pipeline and a terminal reservoir strategically located within Lamu town.

Project 4 – Integrated Water and Power Plant – will involve the construction of an Integrated Water and Power Plant. This provides both power, through a Combined Cycle Gas Turbine (CCGT) plant which is combined with a desalination plant to provide water. IWPP can be provided in modular form, so that the power and water capacity can be scaled up as demand increases with the phase of development.

Project 5: Complementary on site renewable able energy options including waste to energy and embedded renewable energy options which can be linked with project proposals.

Components

Project 1 will consist of the following components

A feasibility study for the specific sites will be carried out and the same will be used to address the power requirements for the development. This will be carried out in conjunction with the architectural master plan.

Concept design will be prepared once the architectural designs are ready and this will inform the load demands for the project.

There will be a need to liaise with Kenya Power and the relevant bodies in the project to take care of the power issues and to confirm the availability of the power supply.

Both Garsen-Lamu and High Grand falls schemes are still in the Conceptual Design Phase. The following tasks are required to be carried out before development of the projects can be carried out.

Feasibility study to identifying exact locations and technical specification of the various components of the projects and procurement model to be adopted for their implementation.

Production of engineering designs and drawings for various components of the projects – This shall involve carrying out detailed population projections, water demand projections, project special coverage (which may not be confined within LAPSET corridor) and production of Tender Documents.

Carrying out environmental and social impact assessments for the project and obtaining various clearance permits from WRMA, NEMA and other local authorities to permit construction of the projects.

Tendering, tender evaluation and award of the contract(s)

Construction of various components of the project.

Financing and funding strategy

Cost & investment requirements

The estimated cost of implementation of Phase 1 of the Garsen-Lamu scheme is US $182m to supply 40,000m3/day. The indicative CAPEX cost is therefore estimated at US$4,550/$m^3$ of water produced daily.

Indicative CAPEX cost for an IWPP is US $750-875 / KW so for 1,400mw plant to meet needs for Lamu it would be US $1b – 1.25bn.

Partners/stakeholders

Some of the key partners to the development are:
World Bank, IMF, USAID, UKAID, China, Bank of Africa, etc.

Some of the Stakeholders in the power sector for projects 1 and 4 are:
Kengen, who are mandated to generator electricity in the country from various sources.

Ketraco who are mandated to transmit electrical power from the substations to the load centres on High voltage (132kv to 400kv at the moment).

Kenya Power have the role of distributing power to the consumers who are domestic or industrial

Energy regulatory Commission which deals with the tariffs of the power sector.

Projects 2 and 3 - The key partners and stakeholders for the project will be Lamu Water and Sewerage Company and Coast Water Services Board. Project 5 could be promoted by the SEZ Company in association with project promoters within the zone complying with regulatory standards and norms.

Financial

The likely option for financing these power and water projects is through PPP.

Recovery mechanisms and Benefits

The financial viability of the project will be considered at a later stage when designs are complete. Tariffs for services provided would be collected from end users by the utility provider. Differential tariffs would be structured to address different customer types.
Power and water supply agreements would be the mechanisms for establishing the terms between parties.

Potential risks

In order to successfully implement the proposed projects, the following risks should be considered early on inorder to develop necessary mitigation measures. In addition, there are a number of market risks and implementation difficulties which may be faced during the implementation of the integrated water and power project and other power and water projects. A number of these are broadly summarised below.

Risks	Mitigation Measures

Lack of funding	Seeking developers on the project, workshops to encourage investors and incentives for their investments.
Political interruptions - especially during election years when developers are slowed down by political temperatures in the country	Leaders challenged to carry out peaceful campaigns.
Security risk from terrorism threats	Deploy sufficient security in the Lamu area.
Power demand not matching development	Carry out detailed demand modelling. Remove potential impediments to implementation including coordination risk.
Length of water transmission pipeline may attract extra demands and thus increasing the scope of the project	Provision of local water supplies such as boreholes to communities encountered along pipeline routes

Package #4 Investment and promotion

Technical Description

It is common for the SEZ authority to have primary responsibility for marketing and promotion, and for investor aftercare, while a separate national investment promotion authority (IPA) performs these roles for FDI outside the zones.

There will be a need in Lamu SEZ to develop a market targeting strategy to promote Lamu and the LAPSSET corridor as an investment destination and identify the mechanisms necessary to deliver the strategy.

Promotional activities can be considered to focus on the establishment of a continual flow of investment into the host country. The process of investment promotion is broken down to identify core components which enable the overall objectives to be achieved. The core components are:

Image Building;

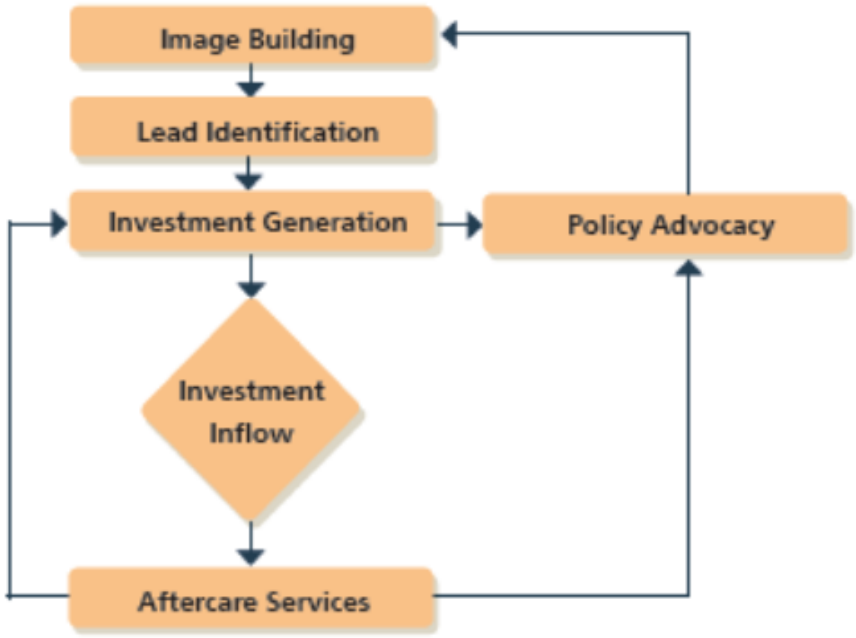
Lead Identification;

Investment Generation;

Investment Flow;

Aftercare Services;

Supporting Policy Advocacy.



Marketing, including the timing of promotional efforts is crucial as many programmes start too early when not much planning or development has been made on site discouraging potential future investors who would perceive this as lack of progress.

It is also important to highlight that investment promotion is not a static strategy and requires constant identification of leads. At a national level, according to FIAS a typical country with a reasonably positive image and a relatively experienced IPA, an overall conversion rate of just 0.1 percent of contacts to investments can be expected.

Components

Market and investor identification

It is critical that the development of the SEZ is market-tested and responds to investor needs. The first step to the strategy would be to assess the economic potential and define the potential uses and investors that could be attracted to the SEZ. This will not only inform market and promotion efforts but is directly linked to planning and structuring of the SEZ and the investment phasing.

Furthermore, it could help identify anchor investors. Many successful SEZs globally follow this approach in which substantial effort is put to attract specific high-profile investment at the outset that can create a follow up network of suppliers, investors and partners.

Key elements of the market and investor targeting strategy are:

Economic demand assessment - analysis of trade data and trends.

Assessment of sources of comparative advantage (e.g. labour costs, natural resources, location, market access preferences).

Trade databases and identification of target companies in priority sectors.

Government to Government proposals – engagement with partners

Private sector development proposals of IFIs.

Input from investors (e.g. interviews, surveys).

Benchmarking.

A typical timeframe for the completion of a market study is 4-6 months.

Coordination and Marketing

Following the market assessment and identification of potential investors, there will be a need to develop a strategy for approaching investors and marketing material that will be used for promotional purposes.

A number of materials can be prepared for this purpose and these include:

Investment prospectus

Introductory movie and physical model following the development of a detailed masterplan

Newsletters that inform about investment developments, plans and events

Market studies and project profiles.

The scale of activities to be undertaken by the SEZ authority or LCDA will influence the extent of the human resource activities. A human resources plan will need to be defined to take into account the anticipated levels of services based both on the scale of activities and the likely skills set required to complete the activities at the promotional phase and also providing services to investors. Similarly there will be a need to allocate adequate funding for all activities and services.

Coordination with other concerned agencies will be crucial. It is suggested that the development of a market and promotional strategy is undertaken with the contribution of these agencies to allow the smooth operation, creation of maximum impact in terms of exposure avoiding duplication and ensure backward and forward synergies with local suppliers and networks.

It is critical that LCDA is working in partnership with other organisations:

National and International Partnering: capacity building with partner organisations e.g. KenInvest and Brand Kenya;

Establishing links with appropriate departments in Ministries to help with investor queries;

Facilitation services for existing investors and development and investment services to existing investors.

Local Business Partnering: developing matchmaking mechanisms e.g. Chamber of Commerce

Targeting Market and Aftercare services

This element involves activities related to identifying potential investors and developing a strategy to approach them. It is a proactive effort that goes beyond the participation in events.

As a first step it is suggested that the authority organises and participates in promotional events and campaigns in target countries in order to promote Lamu SEZ as an investment destination, focusing on the identified priority sectors. This could be through the organisation and participation in trade fairs and conferences.

However, it will be important to develop a lead identification approach that could proactively target specific sectors, countries and potential investors through constant contact. This could include:

Mail & telephone campaigns

In-bound and out-bound missions

Investment seminars, both industry specific and general

Direct marketing

In addition, there will be a need to develop services to assist investors in the following areas:

Identification of potential joint-venture partners and/or local suppliers.

Business registration procedures, attain the necessary government approvals and funding packages.

Cost & investment requirements

The investment requirement will be dependent on scale of activities and services the authority will be providing. It is suggested that LCDA proceeds with the undertaking of a market and investor identification strategy and Investment promotion strategy that will help define potential economic activities and investors and approach to engage and gather interest.

Typical cost: US$ 625,000 – $1.025m for strategy development plus staffing requirements for supporting delivery of the strategy.

Partners/stakeholders

As there is already ongoing promotional activity undertaken at the national level it will be important to coordinate and work with the following partner agencies.

KenInvest

Brand Kenya

Sector champions: Ministries

Chamber of commerce

Overseas representation through embassies and consulates

Financial

N/A

Recovery mechanisms and Benefits

An investment promotion strategy will define clearly potential activities for Lamu SEZ and comparative advantages of the area providing a basis for the development of opportunities for local employment. It will provide an effective communication across to potential investors that are considering new production sites both from within Kenya and more importantly from international markets. It will further help differentiate Lamu for targeted activities and signal the preparedness of the area for investment. According to LT Wells and A.G Wind the net present value of pro-active investment promotion is approximately $4 for every $1 spent.

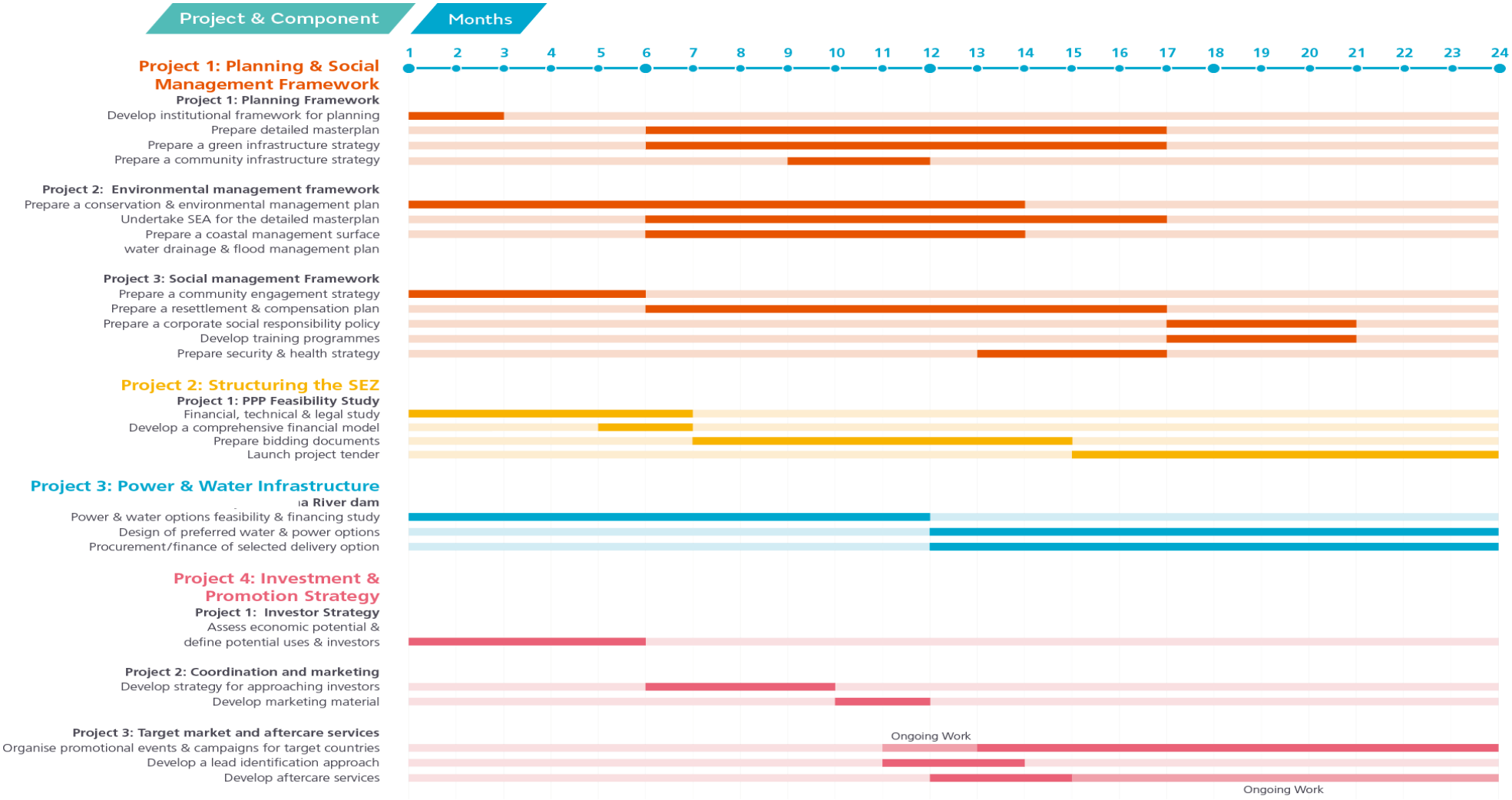
Potential risks

In order to successfully implement the proposed projects, the following risks should be considered early on inorder to develop necessary mitigation measures these are broadly summarised below.

Risks	Mitigation Measures
Investors - The risk that there is lack of investors' interest.	- Detailed study to identify and target specific investors. - Appropriate material to be developed and approach to contact potential investors.
Capacity - The risk that the agency cannot respond to investors queries	Appropriate human resource strategy and training. Coordination with national agencies that hold information and/or are responsible for regulations and business registration
Coordination - The risk that there is no collaboration with national agencies	Consultation and close collaboration with relevant agencies from the beginning. Potential for secondment from national agencies to ensure cooperation and knowledge transfer

Implementation Roadmap

The implementation of Lamu Investment Framework will require some immediate action on the 4 priority projects over the next 2 years. The roadmap below identifies the components of each priority project and identifies the likely timelines for completing the work.



Next steps

This Planning and investment framework was endorsed by stakeholders at a launch event in Nairobi on 7th April 2017 attended by the Cabinet Secretary representing the Ministry of Transport Infrastructure and Urban Development and more than 100 other government and private sector and NGO stakeholders. The event received widespread national media coverage.

The National Ministry of Physical Planning has received this plan and is formalising adoption through statutory planning processes relating to the Lamu County Spatial plan and other supporting planning strategies.

LAPSSET Corridor Development Authority is coordinating action to implement the Planning and Investment Framework including the four priority packages defined to support the next stages of implementation.

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