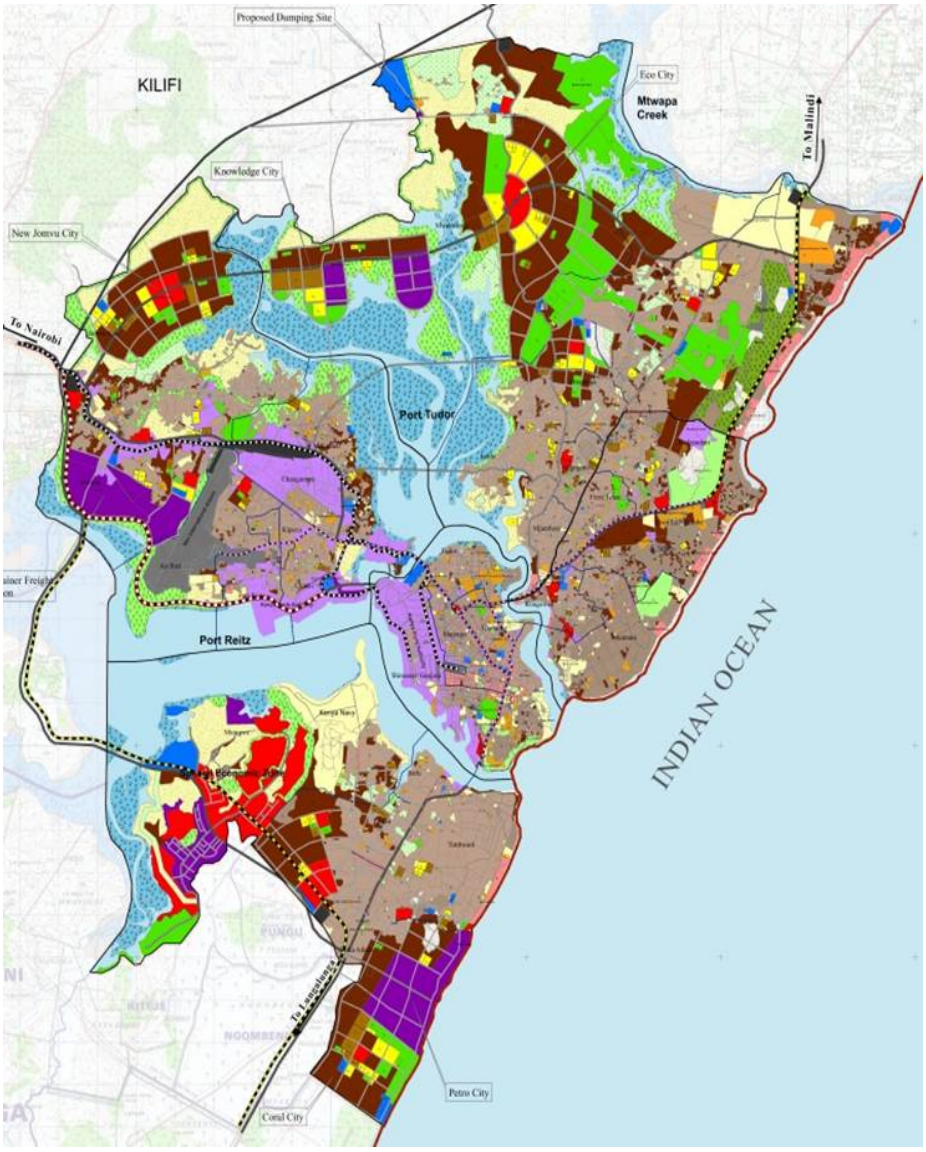
The County Government of Mombasa
in Collaboration with
Ministry of Land, Housing and Urban Development

Consultancy Services for Digital Topographical Mapping and the Preparation of Integrated Strategic Urban Development Plan for Mombasa Town

Mombasa Kwanza



ISUD PLAN-2035 MOMBASA

Popular Version
October 2015

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LIST OF ABBREVIATIONS

ATM	Automated Teller Machine
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
APDK	Association for the Physically Disabled of Kenya
BAU	Business As Usual
BD	Biological Diversity
BR	Bed Room
BRT	Bus Rapid Transit
BRTS	Bus Rapid Transit System
CAGR	Compound Annual Growth Rate
CBD	Central Business District
CBO	Community Based Organization
CCTV	Closed Circuit Television
CEM	Chief Executive Member
CFS	Container Freight Stations
CIP	Capital Investment Plan
CWSB	Coast Water Services Board
CZR	Coastal Zone Regulations
DCR	Development Control Regulations
DEC	District Environmental Committees
DEM	Digital Elevation Modelling
DGPS	Differential Global Positioning System
DMA	District Metering Area
DMP	Disaster Management Plan
DSM	Digital Surface Model
DTM	Digital Terrain Model
Easter DRC	Eastern Democratic Republic of Congo
EEZ	Exclusive Economic Zone
EIAs	Environmental Impact Assessments
EMCA	Environmental Management And Coordination Act
EMP	Environmental Management Plan
EPZ	Export Promotion Zone
EWS	Economically Weaker Section
FAR	Floor Area Ratio
FOB	Foot over Bridge
FOP	Financial Operating Plan
G/R	Growth Rate
GDP	Gross Domestic Product
GIS	Geographical Information System
GoK	Government of Kenya
HCV	Heavy Commercial Vehicle
HH	House Holds
HIG	Higher Income Group

ICT	Information and Communication Technology
ICZM	Integrated Coastal Zone Management
IDA	International Development Association
ISUD Plan	Integrated Strategic Urban Development Plan
JKIA	Jomo Kenyatta International Airport
KAA	Kenya Airport Authority
KAA	Kenya Airport Authority
KeNHA	Kenya National Highway Authority
KeNHA	Kenya National Highway Authority
KeRRA	Kenya Rural Road Authority
Kg	Kilo Gram
KISIP	Kenya Informal Settlement Improvement Programme
KMP	Kenya Municipal Programme
KPA	Kenya Port Authority
KURA	Kenya Urban Road Authority
LAPSSET	Lamu Port - South Sudan - Ethiopia Transport
LCV/LGV	Light Commercial Vehicle/Light Goods Vehicle
LFPR	Labour Force Participation Rate
LGA	Local Government Act
LIG	Low Income Group
LRT	Light Rail Transit
mg	Mili Gram
MIA	Moi International Airport
MIG	Middle Income Group
mm	Mili Meter
MMC	Mombasa Municipal Council
MOWASSCO	Mombasa Water Supply & Sanitation Company
MT	Million Tonne
MW	Mega Watt
NEMA	National Environment Management Authority
NMT	Non-Motorized Traffic/Transport
OD	Origin-Destination
pa	Per Annum
PCI	Per Capita Income
PDD	Physical Planning Department
PDP	Participatory Development Plan
PHPDT	Peak Hour Peak Direction Traffic
PPP	Public Private Partnership
PSV	Public Service Vehicle
ROW	Right of Way
RWA	Residential Welfare Association
SEZ	Special Economic Zone
SGR	Standard Gauge Railway
SME	Small and Medium Sized Enterprises
SSCC	Sub-Sector Commercial Centre
STP	Sewerage Treatment Plan

SWM	Solid Waste Management
TDR	Transfer of Development Rights
TOD	Transit Oriented Development
TOR	Term Of Reference
TTI	Teachers Training Institute
UDD	Urban Development Department
UNESCO	United Nations Educational, Scientific and Cultural Organization
WSP	Water Service Providers
WTP	Water Treatment Plan

1 INTRODUCTION

1.1 BACKGROUND

The project 'Digital Topographical Mapping and Preparation of Integrated Strategic Urban Development Plans for Cluster Towns' is a part of the Kenya Municipal Program (KMP). The KMP aims[1] to strengthen local governance and improve urban service delivery in selected urban municipalities by reforming frameworks for urban governance, municipal restructuring, strengthening of planning mechanism, financing and capacity building, and investment in infrastructure and service delivery improvements in the towns. The programme aims to create a broader national framework for municipal reforms and investments – a framework that is flexible and sustainable and can reach all local authorities over the medium to long term. The KMP has the following four components:

1. Institutional restructuring and empowering local governments;
2. Participatory strategic planning for urban development;
3. Investment in infrastructure and service delivery; and
4. Programme management, monitoring and evaluation.

The current project is a part of above component 2 'Participatory Strategic Planning for Urban Development' of Kenya Municipal Programme (KMP).

1.2 PURPOSE OF ISUD PLAN

The purpose of the ISUD Plan is to:

- **Define a vision for future growth and development of the areas over the next 20 years**. Overall vision based on ground realities and ethos of the city is to be prepared for midterms (10 year) and long term (20 year) as appropriate period for the strategic planning and in line with Kenya's Vision 2030.
- **Provide an overall integrated physical framework for urban growth of Mombasa city:** After digital topographic mapping of the planning areas of Mombasa city and detail analysis of existing situation, an overall integrated physical framework is to be prepared to fulfill the current and future requirements.
- **Provide a basis for coordinated programming of projects and budget, thereby serving as a downstream management tool:** A realistic implementation plan is to be prepared for all identified projects along with capital investment plan.

1.3 OBJECTIVES

The ISUDP Mombasa has been prepared with following objectives:

- To review the policy documents, secondary data, identify data gaps and conduct primary surveys to fulfil the data gaps
- To analyse existing situation and identify demand-supply gaps, challenges and potentials
- To define a vision for future growth and development over the next 20 years
- To develop alternate growth scenarios and concept plan for future development
- To develop a Structure Plan, showing current and proposed land use and infrastructure

[1] *http://www.worldbank.org/en/news/loans-credits/2010/05/04/kenya-municipal-project-support-first-phases-municipal-program*

- To develop Strategic Sector Plans
- To prepare Action Area Plans within overall framework of structure plan
- To develop planning policies, guidelines and regulations
- To prioritize projects, prepare implementation & Capital Investment Plan (CIP)
- To develop monitoring and evaluation plan
- To prepare digital topographical maps and develop GIS data base
- To conduct participatory planning exercises in the city to identify ccitizens' priorities
- To provide hands-on training to key staff of the planning department on plan

1.4 SCOPE OF WORK

The scope of work includes Digital Topographical Mapping and Preparation of Integrated Strategic Urban Development Plan for Mombasa city covering a total area of 287.94 km^2 as per the discussion held with the Client and is shown in **Table 1-1.**

Table 1-1: Planning area of Cluster I Town - Mombasa

Descriptions	Planning Area (in km^2)
Mombasa Planning Area (Land mass + Water Mass)	(222.82 + 65.12)= 287.94

Mombasa City: The mapping and planning area entails Mombasa county/city boundary area of jurisdiction including all areas of settlement overlaps. The Plan covers the entire land mass 222.82 km^2 and 65.12 km^2 of water mass of Mombasa county/city.

The main scope of work of this assignment is:

- Digital Topographical Mapping:
  - Preparation of an up-to-date digital topographical map;
  - Placing of acceptable permanent (monumented) and accurate ground control points;
  - Ground control survey data;
  - Digitization of all cadastral maps of all registered parcels; and
  - Create Digital Terrain Model (DTM).
- ISUD Plan:
  - A situational analysis of the current socio-economic, physical, environmental and cultural characteristics of the city;
  - Formulation of a Vision;
  - Structure plan with detailed land use and zoning regulations;
  - Strategic Sector Plans:
    - Transportation Plan;
    - Environmental Management Plan;
    - Disaster Management Plan;
    - Cultural Heritage Conservation Plan.
  - Development of planning policies and zoning regulations;
  - Capital Investment Plan; and
  - Training.

It may be noted that though components of Digital Topographic Mapping and ISUDP are mentioned separately these two components are not isolated from each other and are integrated in terms of the analysis and outputs.

1.5 DURATION OF STUDY

As per ToR the ISUDP plan preparation exercise was to be completed in twelve months, however, due to unavoidable delays the planning period has been increased to fourteen months.

1.6 COMMENCEMENT AND COMPLETEION OF THE PROJECT

The Consultant's team was mobilized as per the staffing schedule given. A kick off meeting was organised at the board room of Chief Executive Member (CEM) Land, Planning and Housing, on 15th September 2014, where the project team met the Ministry of Land, Housing and Urban Development officials (the Client), the County officials, representative from UN-Habitat and other Stakeholders. The objective of this meeting was to obtain overall guidance, discuss the planning and mapping area, training of the counterpart staff and tentative plan for inception report, including field visits, listing of stakeholders, initial stakeholders' consultations, initial data collection, etc. and to modify the work plan based on the Client's feedbacks. After the first meeting at Ministry level, the project team met the coordinator and started the project with a field reconnaissance. A Notice of Intension of Plan was published on Newspaper on 17th October 2014, to inform the general public.

The final ISUDP and CIP were presented to the stakeholders on 15th and 16th October 2015, where it was approved by the stakeholders and the County Government. The project stands complete with submission of the final ISUDP and CIP report.

1.6.1 Stakeholder Consultation

The consultations included focus group discussions with selected stakeholders, one to one discussions and workshops. The participants shared their ideas and concerns, and often proposed solutions. The problems and recommendations generated by these consultations have been utilised for finalising the proposals of ISUDP.

Workshops: Following workshops were conducted in Mombasa in line with requirement of ToR as shown in **Table 1-2**:

Table 1-2: Schedule of Workshops

S. No.	Workshops	Date
1	Launch Workshop / Inception Report Presentation	1st October 2014
2	Situational Analysis Workshop & Visioning Workshop	11th & 12th February 2015
3	Preliminary Map Validation and Interim Report Presentation	21st & 22nd May 2015
4	Workshop for the ISUD Proposals	5th August 2015
5	Workshop on Final ISUD Plan and Capital Investment Plan	15th & 16th October 2015
6	Official launch of approved ISUD Plan and Capital Investment Plan	5th November 2015

1. Inception Report Presentation Workshop
   This gave the participants an opportunity to understand the objective of the ISUDP and the process that would be followed. It also gave them an opportunity to meet the consultants and for the stakeholders to express their aspirations.

2. Situational Analysis and Visioning workshop
   This allowed the consultants to present the As-Is situation and provided stakeholders the opportunity to verify and rectify this analysis. Participants were told to work in thematic groups (sector based) and come up with issues, challenges that the town is facing and also specific suggestions to address the same. Further they came up with an overall and sector specific vision for Mombasa in 2035. This exercise was instrumental in arriving on a vision for Mombasa.

3. Preliminary Map Validation and Interim Report Presentation
   This workshop allowed the consultants to present the thematic studies both in quantitative form (demand-supply gap) and spatially (coverage on ground). The stakeholders were given opportunity to verify the same. The alternate growth scenarios (population based) for future development and concept plan for future spatial development was also presented to the stakeholders for their suggestions and approval.

4. Workshop for ISUDP Proposals
   The consultant presented the sector wise draft proposals to stakeholders for their suggestions and approval. Participants were given opportunity to prioritise the identified projects as what they considered to be the top ten most important issues to be addressed at the implementation stage.

H.E. Hassan Joho, Governor of Mombasa in Final ISUDP & CIP Workshop

Hon. Hazel Katana, Deputy Governor of Mombasa in Final ISUDP & CIP Workshop

Mr. Francis Thoya, CEM, Dept. of Lands Planning & Housing, CGM

Mr. Solomon Ambwere, Ministry of Land Housing and Urban Development (UDD)

5. Final workshop

   This was an opportunity for the consultants to present the final ISUD Plan and CIP to the H.E. Governor of Mombasa and other stakeholders for final approval of the plan.

Mr. Jabu Salim, CO, Dept. of Lands Planning & Housing, CGM

Presentation by Ms. Deepa Tripathi, Urban Planner, ICT Pvt. Ltd

Presentation by Mr. Swarup Mukherjee, Transport Planner, ICT Pvt. Ltd

Presentation by Mr. Charles Dadu, Urban Planner & Urban Designer, Geodev

Presentation by Mr. Richard Onchaga, GIS Expert, Geodev








Stakeholders Consultation Photos

Monthly Meetings: A Technical Committee was formed to hold a monthly progress review meeting on a monthly basis. It was formed under the Chairmanship of the Chief Officer; Land, Planning and Development and comprised of the KMP Team from the Directorate of Urban Development, Ministry of Land, Housing, Urban Development; County Officials and Consultants' Team. The monthly meetings to date have been held on the dates below:

- 1st October 2014
- 10th November 2014
- 8th December 2014
- 21st January 2015
- 9th February 2015
- 18th March 2015
- 22nd April 2015
- 19th May 2015
- 25th June 2015
- 16th July 2015
- 4th August 2015
- 22nd September 2015

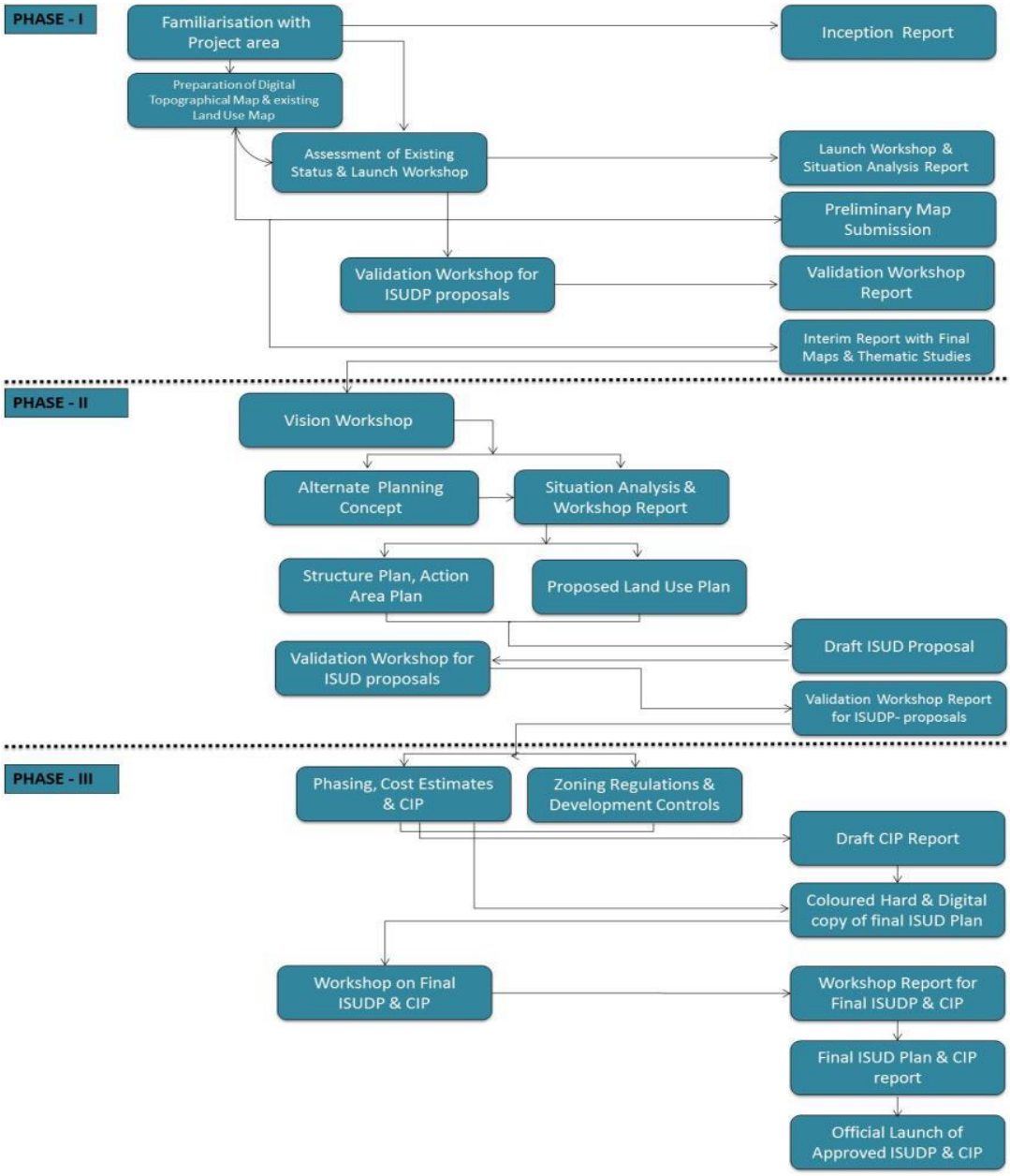
Apart from the above, regular meetings were held and presentations made to the members of County Assembly of Mombasa.

1.7 METHODOLOGY

For better understanding of the methodology, it has been divided into 3 phases, 6 stages and 33 activities. The core tasks of phase I are the assessment of the status quo of the town, including basic topographical as well as land use mapping. Core activities under phase II are the formulation of the vision, developing alternative planning concepts, and preparing structure and action area plans along with proposed land use mapping. Phase III activities include the preparation of a capital investment plan. Participatory plan preparation is an integral part of the whole process.

The Figure 1.1 shows the key tasks undertaken according to the specifications in the Terms of Reference.

Figure 1-1: Preparation of Digital Topographical Mapping and Integrated Strategic Urban Development Plan for Mombasa



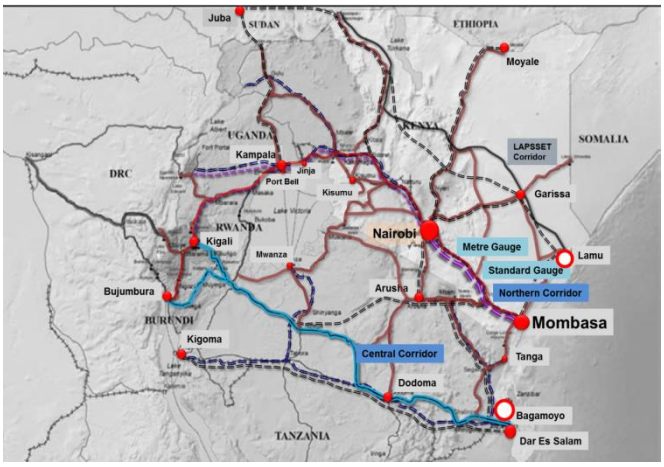
2 . CITY PROFILE AND PROJECTION

2.1 LOCATION AND CONNECTIVITY

2.1.1 Regional Context

Geographically Mombasa is located between the latitudes 3° 80´ and 4° 10´ S and longitudes 39° 60´ and 39° 80´ E. It is the second largest city and major seaport of Kenya, located in south-eastern part within the country **(Figure 2-1).** It is well connected to neighbouring countries in the region including Uganda, Rwanda, Tanzania and Burundi through Northern Corridor, Central Corridor and proposed LAPSSET Corridor.

Figure 2-1: Regional Road & Rail Connectivity of Mombasa



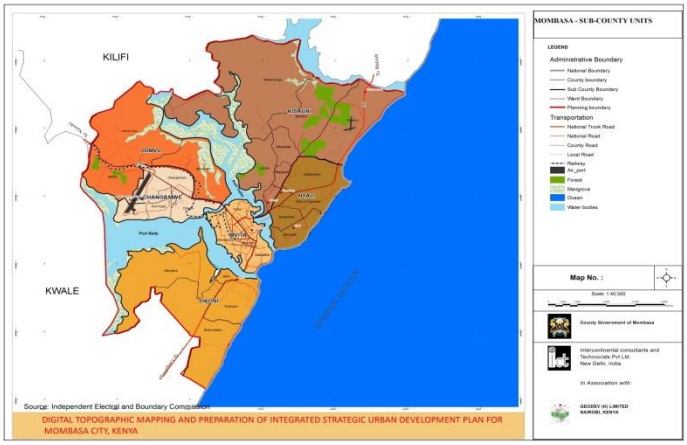
Harbour has been the main reason for existence and growth of Mombasa as the second largest city in Kenya and a major urban centre in region. It provides base for most of the industrial development, commercial activity and employment in Mombasa. Tourism also gradually became one of the main economic pillars of Mombasa.

Since, cities such as Dar-es-salaam, Bagamoya, Mawanza and Tonga in neighbouring country Tanzania are becoming more competitive than Mombasa. But the ongoing upgradation and expansion of Mombasa port will accelerate economic growth and prosperity of Mombasa. Thus, tapping on Mombasa's projected growth like the upcoming Special Economic Zone (SEZ), Northern By-Pass, Export Processing Zone (EPZ), Commuter Rail, Likoni Bridge, Small and Medium Enterprises Parks (SME), , Dongo-Kundu By-Pass, Standard Gauge Railway (SGR) project, etc.; make the surrounding towns also have high potential to become secondary urban nodes to Mombasa city in future. The ISUDP Mombasa identifies and strengthens these potential nodes and growth corridors to guide development of region with Mombasa. Growth and development within Mombasa shall both support and propagate growth in neighbouring towns/urban centres.

2.1.2 Administrative

Administratively, Mombasa County is divided into six sub-counties/constituencies namely Changamwe, Jomvu, Kisauni, Nyali, Likoni, and Mvita. Changamwe and Jomvu are situated in Mainland West, which is the industrial hub of the city. Kisauni and Nyali are situated in Mainland North, which is the most populous. Likoni is situated in Mainland South and Mvita is situated in the Island, which houses the most developments per unit area. These constituencies or sub-counties are

Figure 2-2: Sub County Units



further divided into Electoral Wards. There are a total of 30 electoral wards in Mombasa County as shown in **Table 2.1** and **Figures 2.2 and 2.3.**

Table 2-1: Administrative and Political Units within Mombasa County

S. No.	Constituency/ Sub-County	No. of Wards	Name of Wards	Land Area (km^2)
1.	Changamwe	5	Port Reitz, Kipevu, Airport, Miritini, Chaani	18.56
2.	Jomvu	3	Jomvu Kuu, Magongo, Mikindani.	34.81
3.	Kisauni	7	Mjambere, Junda, Bamburi, Mwakirunge, Mtopanga, Magogoni, Shanzu	81.95
4.	Nyali	5	Frere Town, Ziwa La Ng'ombe, Mkomani, Kongowea, Kadzandani.	22.83
5.	Likoni	5	Mtongwe, Shika Adabu, Bofu, Likoni, Timbwani	50.51
6.	Mvita	5	Mji wa Kale/ Makadara, Tudor, Tononoka, Shimanzi/ Ganjoni, Majengo.	14.16
Total		**30**		**222.82**

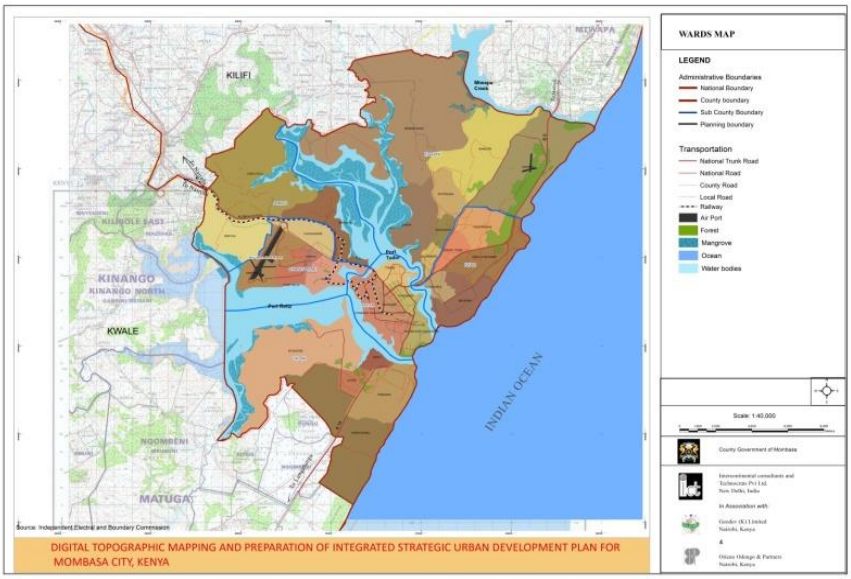
Source: *IEBC – Final Report of Boundaries of Constituencies and Wards*

2.1.3 Spatial Growth

The growth model, in general, as observed in Mombasa evolves from harbour to a manufacturing base and eventually leading to a trading/commercial growth centre. Unfortunately, the rapid growth has taken place without corresponding capacity of the town planning and management institutions to guarantee sustainable livelihoods. The existing urban planning and implementation tools have failed to provide orderly and attractive guidelines. As a result, a myriad of problems including proliferation of slums, squatter's settlements, sub-standard construction of buildings, traffic congestion, competing land uses, ribbon pattern of development and urban sprawl have been restraining Mombasa and rendering it inefficient and unsustainable.

The planning area covers a total area of 287.94 km^2 consisting of a land mass of 222.82 km^2 and a water mass of 65.52 km^2. Out of this total area, 44.4% undeveloped, residential use covers 28% (most of which is informally developed), commercial 2%, educational 1.8% and transportation 6.2% in year 2015. The gross population density of the planning area is 42 persons /hectare.

Figure 2-3: Ward Map of Mombasa



2.2 FUTURE OUTLOOK

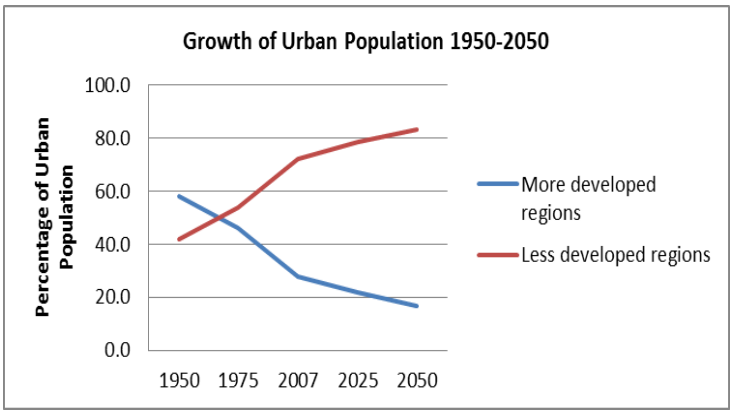
2.2.1 Demographic Growth Scenario

Projection of the population of Mombasa is derived on the basis of Kenya National Bureau of Statistics – time series census data. As there is no change in the area in each census year, thus, census data is the best source to provide a true picture of the rate of change in population.

2.2.1.1 Global Trend

In today's increasingly global and interconnected world, over half of the world's population (54 per cent) lives in urban areas. World is projected to add 2.5 billion people to the urban population by 2050, with nearly 90 per cent of the increase concentrated in Asia and Africa. The urban population in developing countries will grow at a rate five times faster than the urban population in developed countries and the urban population of developing countries will increase by 2.4 billion between 2010 and 2050, or 15 times that of developed countries. (Refer **Figure 2.4**)

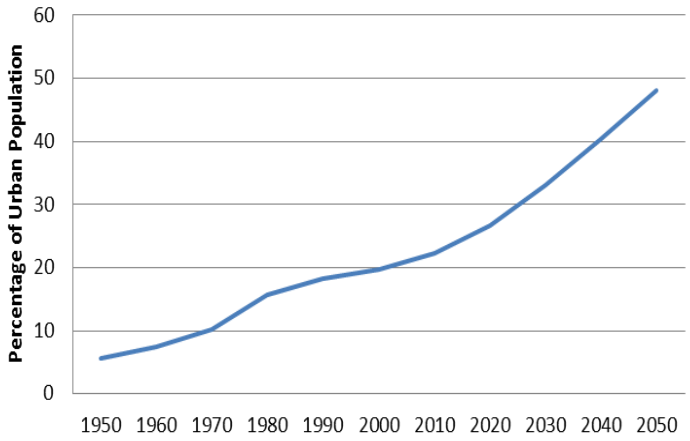
Figure 2-4: Percentage Growth of Urban Population in More Developed & Less Developed



2.2.1.2 National Trend

As per *"United Nations Department of Economic and Social Affairs/Population Division; World Urbanization Prospects, The 2007 Revision",* the current (year 2015) estimated urban population of Kenya is around 11,126,000 and it is expected to reach 16,925,000; 25,076,000; 35,192,000 and 40,789,00 by year 2025, 2035, 2045 and 2050 respectively. According to these estimates by the percentage, Kenya's urban population is likely to be double from 24.1% in year 2015 to 48.1% in year 2050. **Figure 2.5** presents percentage of projected growth of population in Kenya.

Figure 2-5: Projected Growth of Urban Population (%) Kenya - 2050



2.2.1.3 Mombasa Population Projection

The process of urbanization historically has been associated with other important economic and social transformations, which have brought greater geographic mobility, lower fertility, longer life expectancy and population ageing. After Nairobi, Mombasa is the second important driver of development and poverty reduction. Nevertheless, rapid and unplanned urban growth threatens sustainable development when the necessary infrastructure is not

developed or when policies are not implemented to ensure that the benefits of city life are equitably shared. Today, despite the comparative advantage around sixty percent of population in Mombasa lives in sub-standard conditions. Mombasa is facing unplanned development, rapid sprawl, pollution, and environmental degradation, together with unsustainable production and consumption patterns. The current population of Mombasa is approximately 1.1 million in year 2015. Following are the demographic indicators, for Mombasa, which influence population growth:

- Crude Birth rate per 1,000 population (2013): 35.1 (Kenya average 38.4).
- Crude Death rate per 1,000 population (2013): 8.9 (Kenya average 10.4).
- Natural increase rate per 1,000 population (2013): 26.2 (Kenya average 28.0).
- Total fertility rate (average births per childbearing woman; (2010): 4.7 (Kenya average 4.8).
- Life expectancy (2013): male 57 years; female 56 years (Kenya average - male 58 years; female 61 years).
- Infant Mortality Rate per 1000 birth (IMR) (2005-2010): 60 (Kenya average 65).

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects-The 2010 Revision and Mombasa County Development Profile 2013

The population projections have been carried out by both statistical and scenario based methods for Mombasa City/County for planning purpose based on the trend available from *Kenya National Bureau of Statistics,* census reports and other relevant assumptions. The population projections done for three scenarios are as follows:

High Growth Rate: In this growth scenario, the population will grow with an average growth rate of 8% in twenty years (2015-2035), assuming that natural growth will continue as it is and in-migration will gradually increase due to capital intensive investment, resulting more development and employment opportunities. Initially, the growth rate will increase annually by 0.01% for first five years, and then it will continue to grow by 0.11% to 0.19% every year from 2020 to 2029, followed by 0.2% to 0.25% growth rate in last five years of the total plan period of 20 years. In such case the population of Mombasa will grow to 3.1 million by year 2035.

Medium Growth Rate: Under this scenario, the population will grow with an average growth rate of 5% in twenty years (2015-2035), assuming that the natural rate of growth will decrease at 0.01% for the first ten years and then will decline by 0.05% per year. It is presumed that improved medical / health facilities will result in decrease in mortality rate and increase in life expectancy. The in-migration rate (currently 2%/annum) will increase by 0.01 percent every year for the first ten years, followed by 0.06% till the horizon year 2035. It is presumed that with economic growth, employment opportunities and improved infrastructure (especially speed transport connectivity) both pull-push factor will work in balancing migration. Thus, population of Mombasa will grow to 2.3 million.

Low Growth Rate: In this scenario, the population of Mombasa is assumed to be growing at an average growth rate of 2.6% in twenty years (2015-2035). It is assumed that population growth i.e. both natural growth rate and in-migration will reduce considering that population deflection will take place and the flow of return will be diverted to the development of new areas which will by 0.02% every year during the plan period. Therefore, the population in horizon year will be 1.7 million. This can happen only, if strict measures are taken to control population both in terms of natural growth and in-migration. Based on the experience in the

developing world, it requires intensive efforts by government in terms of educating people and promoting population control measures on one hand and to provide ample economic opportunities in the region in order to combat in-migration.

Population growth in port cities around the world, especially among developing countries, continues to grow at higher rate than the projected growth. In fact, market economy plays a major role in increasing or decreasing the rate of in-migration i.e. port/commercial cities attract more investment compared to other cities and thus provide more opportunities for the livelihood and in turn attracts more in-migration.

Economic growth trend: Mombasa being the second most important city in Kenya will continue to dominate the urban landscape of the country after Nairobi. The interplay of economic, social, political and historical/colonial factors will play an important role in attracting as well as deflecting population.

Due to **push and pull factors,** Mombasa will continue to attract and absorb immigrants mainly from the surrounding urban and rural areas. In past, this trend has resulted in rapid growth of urban slums/informal settlements in Mombasa. The living condition in most of these slums is deplorable.

The following **Table 2.2** presents a comparison of the three scenarios of population growth in Mombasa.

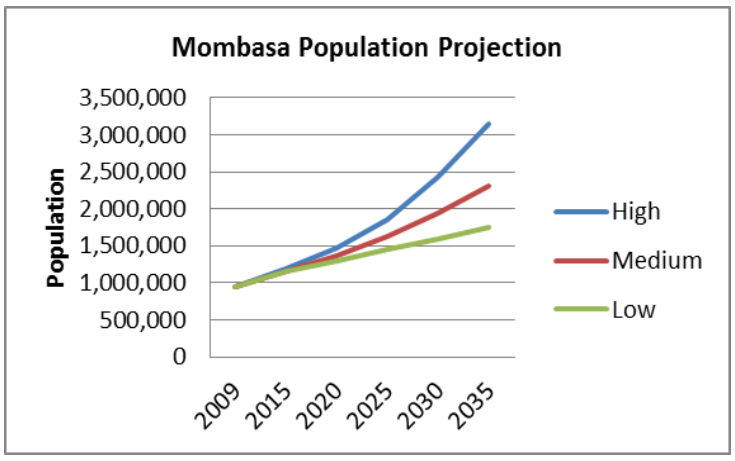
Table 2-2: Population Projection

Year	Population		
	High	Medium	Low
2009	939,370	939,370	939,370
2015	1,199,874	1,155,891	1,154,688
2020	1,476,718	1,373,991	1,302,332
2025	1,861,471	1,633,244	1,447,349
2030	2,440,223	1,941,413	1,599,558
2035	3,150,995	2,307,729	1,757,572

Source: Generated by Consultants

Based on the above analysis and after considering the past trend and growth potential in Mombasa and similar experiences in other developing countries, population projected by medium growth rate, which is similar to geometric growth method seems most appropriate for adoption. Therefore, it is proposed that the ISUD plan for Mombasa will be prepared for 2.3 million people for the horizon year 2035. The projected population of Mombasa is also presented graphically in **Figure 2.6**.

Figure 2-6: Mombasa Population Projections-2035



Floating Population

The current floating population is estimated to be less than 6% of the existing population. This estimate is based on primary survey (origin-destination) reflecting daily passengers coming and going out of Mombasa on roads connecting Mombasa. The percentage of daily passenger traffic on these roads is as follow:

- A109 - Nairobi road - 35% (majorly coming from Mazeras, Mariakani and Voi),
- B-8 Malindi road - 41% (majorly coming from Mtwapa, Kilifi and Malindi),
- Kengalani road towards Mwakirunge – 3% (majorly coming from Mazeras, Mariakani and Mtwapa) and
- A-14 Likoni-Ukunda road - 21% (majorly coming from Ukunda, Lunga-Lunga and Kwale)

Connectivity and efficiency of public transport system between Mombasa and neighbouring towns/settlements also plays an important role in influencing the volume of passenger traffic and discussions made with the County Government.

With ongoing and proposed development, it is assumed that both pull and push factors will have an impact on future population of Mombasa. With improved economic growth and efficient transport connectivity in next twenty years, the floating population in Mombasa is tend to increase. Thus, the floating population is estimated to be 8 to10% in 2035. The demand assessment of physical infrastructure includes perceived needs of the inhabitants and floating population of the city.

2.3 LAND REQUIREMENT PROJECTIONS

2.3.1 Landuse Standards

Allocation of land for different uses must be accomplished with foresight and anticipation of future requirements of a city. Space allocations for various facilities such as housing and health centres, schools and social halls should be made, bearing in mind that one generation may contribute for substantial benefit of a subsequent one.

To work out the future spatial requirement for the various facilities and utilities, the prediction of the magnitude and numbers of these facilities must be based upon the planning norms and standards. The Draft Physical Development Plan for Mombasa that was prepared in 1971 spelt out few key planning guidelines (standards) but was never been in force. Therefore, the standards given in Physical Planning Handbook 2008 have been reviewed and some have been modified based on prevailing standards in cities of similar nature across globe, while some of them have been adopted as it is to use in this Integrated Strategic Urban Development Plan for Mombasa. The planning standards used in this document are indicated in the following paragraphs.

2.3.2 Specific Standards for Public and Other Facilities

The ISUDP maintains the most of the spatial standards for public facilities and institutional establishments as outlined in the Physical Planning Handbook 2008. These spatial standards are given in below table 2.3.

Table 2-3: Pubic Facilities Norms

Public Purpose Facilities	Norms	
	1 per catchment population	Area Per Unit in Ha
Religious Institutions (churches, mosques, temples and shrines)	15,000	0.1

Public Purpose Facilities	Norms	
Cemetery/ Burial Ground	150,000	5.0
Electric Crematorium/ Cremation Ground	1,000,000	2.5
Community Room	15,000	0.075
Library	100,000	0.015
County Library	City Level	0.1
Community Centre	100,000	1.0
Amphitheatre	500,000	1.0
Cultural Centre	500,000	1.0
Night Shelter	1,000,000	0.1
Old age home	500,000	0.1
Working men's/women's hostel	500,000	0.1
Orphanage/children centre/destitute home	1,000,000	0.1
Care centre for physically & mentally challenged	1,000,000	0.1
Integrated Office Complex	500,000	10
Socio – Cultural centre/Exhibition cum fair ground	City Level	15
International Convention Centre	City Level	10

2.3.3 Postal and Tele-Communication

Post offices must be accessible to the general population. Each community of 250,000 people should have one sub-post office. Table 2.4 presents recommended norms for postal and tele-communication facilities. It may be noted that these standards were prepared some time ago, and certain functions have changed. For example, postal services have declined in importance due to the power of mobile phone technology, on the one hand, and the competition from courier services. However, in general the recommendations are valid and will be adhered to in the land use planning.

Table 2-4: Postal and Telecommunication Facilities Norms

Postal and Tele-Communication	(1 per catchment population)	Area Per Unit in Ha
Sub-Post office	250,000	0.01
Post office	500,000	0.075
Head Post Office	City Level	0.25
Telephone exchange of 40,000 lines	400,000	4.0
Telegraph booking and delivery office	500,000	0.17

2.3.4 Fire Stations

For a population of 150,000 people, one sub-fire station is required. This would include space for the station storage and parking. An area of 0.5 hectare would be sufficient for this purpose. Table 2.5 presents recommended norms for fire stations and disaster management cum rescue centre.

Table 2-5: Fire Station Norms

Fire Stations	(1 per catchment population)	Land required/ Facility Ha
Sub-Fire Station	150,000	0.5
Disaster Management cum Rescue Centre	500,000	1.0

2.3.5 Security Facilities

The police stations would cater for approximately 50,000 people. To accommodate a station and auxiliary facilities about 2 hectares of land is required. Table 2.6 presents recommended norms for health facilities.

Table 2-6: Security Facilities Norms

Security	(1 per catchment population)	Area Per Unit in Ha
Police Post	50000	0.2
Police Station	50,000	2.0
Juvenile Home	500,000	2.0
Police Firing Range	City Level	10
Police Headquarters	City Level	5.0
Police line	City Level	10
Prison	City Level	16
Police Training Institute/College	City Level	5.0

2.3.6 Health Facilities

Health centre should be available for primary health care. One Health facility is needed for every 30,000 people. A dispensary or small clinic with a chemist shop is recommended for every 5000 people. Each neighbourhood should be provided with at least three dispensaries or small first aid clinics. An area of 0.5 hectares would be sufficient. Table 2.7 presents recommended norms for health facilities.

Table 2-7: Health Facilities Norms

Health Facilities	(1 per catchment population)	Area Per Unit in Ha
Level 5 City Level – Referral Hospital (Public & Private)	1,000,000	8
Level 4 District Hospital (Public & Private)	100,000	4
Level 3 Health Centre	30,000	2
Level 2 - Basic Health Sub Centre Nursing Homes	10,000	1
Level 1 - Dispensary/ Small Clinic with Chemist Shop	5,000	0.5
Women Hospital	500,000	5.0
Drug Rehabilitation center	500,000	5
Establishment of care center for blinds	500,000	5
Hospital for mentally & physically challenged	1000,000	5
Veterinary clinics	50,000	0.1
Veterinary Hospital	1,000,000	5.0
Communicable disease hospital	1,000,000	4

2.3.7 Educational Facilities

Pre Schools should be established in residential areas or within existing primary schools and within walking distances for all pre-school pupils. It is desirable that a pre-primary school is attached to every primary school. These schools will, therefore, follow the same distribution pattern as primary school at 3,500 catchment population. In addition, a kindergarten independent of primary school should be provided for 2,500 catchment population. The primary school should have all basic facilities. A minimum area of 1.2 hectares is required for each primary school and a catchment radius of 300 metres walking distance. The land required for secondary school and higher level education facilities are given in Table 2.8.

Table 2-8: Educational Facilities Norms

Facilities	(1 per catchment population)	Area Per Unit in Ha.
Primary School (Class I to VIII)	3,500	1.2
Senior Secondary(Class IX to XII)	8,000	3.4
Youth polytechnic	60,000	3.5
Special Schools	100,000	3.5
General College	150,000	10
Engineering college	500,000	10
Medical College	5,00,000	10
Teachers Training Institute (TTI)	500,000	0.5
Fire Training Institute/College	1,000,000	5.0
National Polytechnic	1,000,000	10
University	1,000,000	50

2.3.8 Recreational Facilities

Provision of greens/parks, play grounds and recreational facilities are vital because most of the population of Mombasa is generally deprived of open and recreational spaces. One to two hectares of open space is required for 5,000 people. Thus, each neighbourhood is provided with a park and a playground for benefit of environment and a healthy society. The way side plantation, green belt and area for social forestry have also been incorporated in the plan. Table 2.9 presents recommended norms for recreational facilities

Table 2-9: Recreational Facilities Norms

Facilities	(1 per catchment population)	Area Per Unit in Ha.
Greens/Parks		
Cluster park	5,000	0.5
Neighborhood Park	15,000	1
Sub Sector Park	150,000	2
Sector Park	500,000	5
City Park	1,000,000	10
Multi-Purpose Play Grounds		
Cluster playground	5,000	0.5
Neighbourhood Playground	15,000	1
Sub Sector Playground	150,000	2
Sector Playground	500,000	5
City Level Multi-purpose Play Ground	City Level	10
Sports Facilities		
Stadium	500,000	5
Sports Facility - Sector Level	500,000	10
Sports Facility - City Level	1,000,000	30
Other Recreational Facilities		
Zoo	City Level	50
Amusement park	500,000	30
Recreation Club	500,000	0.5
Social Halls/ and Community Centres	25,000	0.25

Facilities	(1 per catchment population)	Area Per Unit in Ha.
Coastal Park	City Level	50
Water Sports Park	City Level	50

2.3.9 Commercial Facilities

A corner shop is needed at estate level to fulfil basic requirement including bread and milk. Convenience shopping centre consisting of a few shops catering for everyday needs of the population has been provided at cluster level. A site of 0.5 hectare is sufficient for neighbourhood shopping centre. The neighbourhood shopping centre would cater for all retail needs of the population, including shops such as pharmacies, butcheries, grocery, hardware, clothing and others and service centre. Table 2.10 presents recommended norms for commercial facilities.

Table 2-10: Commercial Facilities Norms

Facilities	(1 per catchment population)	Area Per Unit in Ha.
Corner Shop (Estate Level)	350	0.01
Convenience Shopping - Cluster Level	5,000	0.25
Neighbourhood shopping including service centre	15,000	0.5
Sub Sector Commercial Center	150,000	10
Sub- CBD	500,000	50
City Centre/ CBD	City Level	100
Wholesale Market	500,000	10
Organised Informal market	150,000	0.5
Slaughter house	1,000,000	2

2.3.10 Other Services

The other facilities include fuel station, LPG godowns and integrated transport terminals. Norms for the same are given in Table 2.11.

Table 2-11: Other Facilities Norms

Facilities	Norm
Fuel Station	1 for 150 ha of gross residential area in residential use zone 1 for 40 ha of gross industrial area 2 for each freight complex
LPG Godowns	1 per 40,000 population
Integrated Direction Terminals	1 on each major entry-exit point (10 ha)

2.4 FUTURE LAND REQUIREMENTS

Population growth is not directly related to growth in demand for land. There are several factors in land demand, of which the most important are:

- How much land within the existing built-up area is unused?
- Will densities increase or reduce in future?
- Are any corrections required to the existing land use pattern which will affect land requirements?

One of the failures of past planning has been not to provide formal housing or serviced land in advance of population growth. This has resulted in unplanned and haphazard growth in

the city, which not only presents difficulties in subsequent servicing, but also prevents orderly planning of the urban area. It is, therefore, important to plan in advance for projected urban growth and thereby enable provision for essential housing and infrastructure in an orderly fashion.

Although the ISUDP's Terms of Reference requires planning for a 10-20 years period, it is nevertheless of great value to look further into the future and thereby protect essential communications routes and, therefore, for transportation planning a period of 30 years has been considered.

2.4.1 Existing land use

The total area of Mombasa accounts for 287.94 sqkm of which 222.82 sqkm km is land mass and 65.12 sqkm is water mass. Currently, it accommodates approximately 1.1 million people (estimated in year 2015) with an average gross density of 42 persons per hectare. The existing land use of Mombasa shows that within 288 square kilometres there is considerable land available for development which is currently mainly lying vacant.

2.4.2 Density projections

Density allocation is affected by: demographic patterns; market forces; user preferences; and less of technical limitations. The following principles shall guide densification process:

- Population growth and limited brownfield land supply in the right places means densities of new development needs to be relatively high.
- In line with sustainability principles, the re-use of previously developed land presents an opportunity for the most efficient use of land, thereby, enabling the preservation of greenfield land, as well as preserving scarce land resources and creating conditions for choice of sustainable transport modes (including walking).
- Well-located high density development can enable people to live and work in the same location and reduce the need to travel, particularly by private cars. It can also support a range of local services and create more energy efficient developments and, hence, contributing towards more sustainable settlements.
- High density development is a way of making best use of scarce land resources in the most sustainable locations and enabling the development of more self-contained settlements. High density development can also produce visually and exciting sustainable settlements.

Within the developed area of 11,032 Ha, there is a considerable amount of under-used and low density development. In view of limited available land and foreseen development of the economy, will strengthen and land values will increase and therefore, the land-owners will have the incentive to redevelop (or sell to someone else who will redevelop) their land. It is already happening in Nyali and Mavita sub-counties. Thus, densification is likely to take place within the near future, in present low density areas. Densification through redevelopment is likely to happen in areas relatively close to CBD. However, this will not take place with higher pace unless and until the area is provided with better infrastructure services especially sewer, water supply, drainage etc. ISUDP proposes that about 65 percent of the county's new housing will be located at greenfield 'urban extension' areas. Whilst these new development areas will need to incorporate a mix of dwelling types, these should be developed as more 'urban' than sub-urban in character and consequently should be developed at relatively high densities, aiming to achieve around 138 dwelling unit per hectare across the extension.

2.4.3 Enhancing Population Holding Capacity in Existing Built-up Areas

There is potential for enhancing the holding capacity of excising built up areas through re-densification. The high value land resources shall be upgraded using development norms, which will be related to:

- types of residential development and its potential for higher absorption.
- re-densification of housing areas having lower densities.
- increasing density to the optimum level along the primary distributors and district distributors roads and the mass transportation networks.
- employment generating areas/places or centers, which are creating demand for more housing units.
- augmentation of physical infrastructure like water supply, sewerage, drainage, solid waste management and improvement of transportation network capacity.
- augmentation of social facilities like education, health services, recreational facilities and markets, etc.

Considering the existing spatial distribution of population vis-à-vis services/facilities, a broad urban development strategy has been proposed to harness the available land resources to the fullest. It is recommended to enhance the population holding capacity of already developed areas, by providing improved services and infrastructure, to its optimum capacity.

2.4.3.1 Land requirements

The land requirement depends on projected population and proposed density. The proposed population density has been worked out based on the projected population, land available for future development, potential for densification in already developed area and trend and past experience in cities of similar nature and also keeping sufficient room within the current planning boundary for future urban expansion i.e. beyond year 2035. Table 2.12 shows projected land demands, using proposed gross density of 104 persons per hectare at the county level.

Table 2-12: Projected Land Requirement

Estimated Population 2015	**1.1 mil**
Current developed area (hectares)	**11,174**
Current gross population density (persons/ha)	42
Land available in county, which can be made available for development, excluding environmentally sensitive, agriculture, forest etc. (ha)	9,899
Projected population for 2035	**2.3 mil**
Proposed Gross population density (persons/ha)	104
Proposed Net Population density (within proposed developable area excluding area under agriculture, forest, ponds, quarry and future development) (p/ha)	114
Additional Land required to accommodate future population (based on net density) in ha	**9,014**
Population to be accommodated in existing developed area	35%
Population to be accommodated in new development	65%
Total Land required including existing developed land (hectares)	**20188**
Total land mass area (ha)	22,283

3 . DEVELOPMENT CONCEPT

3.1 VISION

The case of Mombasa is unique; it has gained global recognition for being the largest port in East Africa and a vital gateway for imports to Kenya and its neighbouring countries including Uganda, Burundi, Rwanda, Southern Sudan, Ethiopia and Tanzania. The long term vision for Mombasa capitalizes on this strength. Several cities in the world have used to be a world class commercial hub as a tool to position themselves as a regional leader in development. As such the Vision-2035 for city of Mombasa is to become number one city in region i.e. **"Mombasa Kwanza"...**

"A Prosperous, Vibrant and Modern Regional Commercial Port City Protecting Natural and Heritage Resources with High Quality Standards of Living"

where all the people would be engaged in productive work with a better quality of life, living in a sustainable environment. This will, amongst other things, necessitate planning and action to meet the challenge of provision of adequate housing, particularly for the weaker sections of the society; addressing the problems of small enterprises, particularly in the unorganized informal sector; dealing with the issue of informal settlements/slums, up-gradation of old and dilapidated areas of the city; provision of adequate infrastructure services; conservation of the environment; preservation of Mombasa's heritage and blending it with the new and complex modern patterns of development; and doing all this within a framework of sustainable development, public-private and community participation and a spirit of ownership and a sense of belonging among its citizens.

3.2 GOALS

To achieve the vision for Mombasa, ISUDP proposes a set of goals covering following seven areas critical of development. These key goals will guide the future physical planning of the city.

1. City of Vibrant Economy

Making Mombasa a vibrant world class commercial hub in Africa by 2035:

- Maintaining position of Mombasa Port as number one in region,
- providing adequate working spaces for 0.52 mil workers in tertiary sector,
- providing adequate working spaces for 0.25 mil workers in industrial sector,
- promoting tourism and service industry.

2. City of Seamless Connectivity and Green Transport

Developing a comprehensive traffic and transport system in Mombasa (road, rail, air and water networks) with:

- Modal Split Ratio: mass public transport and other transport 70:30 with excellent quality of public transportation,
- 10% non-motorized Green Trips (pedestrian, bicycle facilities),
- 100% of National and Regional roads to be paved and designed to international standards,
- 1 major public transport node at every 500 m (at walkable distance),
- 30 minutes travel time (between origin and destination) within Mombasa.

3. City of Affordable Homes

Making Mombasa a city of affordable housing with:

- Public – Private Housing Ratio 30:70
- Public Rental Housing – 50%
- Affordable housing-60%
- A Slum free city

4. City of well Nurtured Environment

- **Coastal Environment**
  - Restore degraded areas
  - Protect against sea-level rise
- **Mangroves**
  - Restore degraded areas
  - Protect against sea-level rise
  - Zero-net loss due to urban development
- **Water Resources**
  - Restore polluted areas
  - Explore innovative ways to augment supply through protection of run-off
  - 100% conservation of all water bodies
- **Biodiversity**
  - Restore degraded forest areas
  - Maintain bio-diversity at post-restoration level
  - Zero net loss of existing forests
- **Air Quality**
  - Achieve Improved Pollution Standard Index
  - Use of renewable and “green” energy

5. City of Quality living for all

- Provide adequate parks and play grounds/ Recreational Facilities
  - 4.37 sqm parks and play grounds /capita
  - 1 local open space within walking distance

6. City of Endearing Character and Unique Local Identity

- Conservation of all historic and culturally important sites and promotion of culture and heritage for locals and tourism.
- Minimum of 1 recreational destination in each proposed sector.
- Developing regional tourism corridor linking all coastal heritage/tourist sites starting from north to south i.e. Lamu to Diani-Ukunda to Tsavo national park in the east.
- Urban design strategies for key urban areas in the city to enhance their identity and character.

7. City of Sustainable Resource Management

Water Supply

- Safe Drinking Water for all.
- Water supply network coverage: 100%
- Reducing water demand by:
  - Rainwater harvesting for all new urban developments above 0.4 ha,
  - Water saving devices for all new urban developments,
  - Water active leakage control: 30% (2025) & 20% (2035),
  - Water recycling for non-potable use,
- Metering in the supply system.

Sewerage & Sanitation

- Safe sanitation facility for all,

- Develop and manage public conveniences,
- Sewerage Coverage: 70% (2025) & 100% (2035),
- Separate wastewater sewerage and storm water drainage: 70% (2025) & 100% (2035).

Storm Water Drainage

- Provide high quality and sustainable environment to the citizens of Mombasa by constructing new drains and missing links;
- Align, develop and maintain existing drains.

Solid Waste Management

- Develop integrated waste management facility,
- Waste segregation at source,
- Recycling rate: 15% (2025) & 50% (2035),
- Restrict illegal dumping and open burning of waste.

Street Light

- Coverage of whole city with street lights to make it a safe city.

Fire Stations

- Provide fire stations as per norms,
- Ensure that the firefighting department is fully equipped to cater city level fire-requirements with latest machines, vehicles and trained staff.

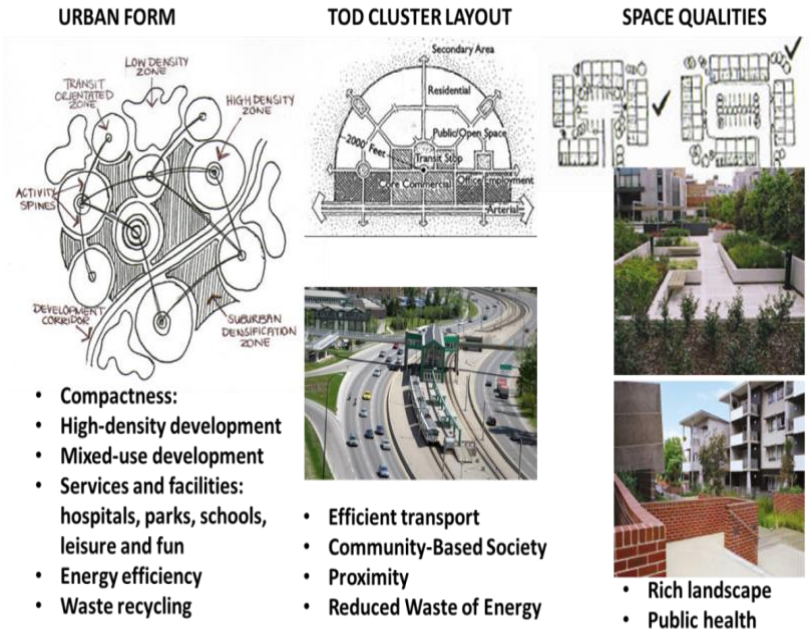
Social Infrastructural Facilities

- Provide education facility for all as per norms,
- Provide health facilities for all as per norms.

3.3 PROPOSED DEVELOPMENT CONCEPT

The development concept of the planning area has been arrived at out of an in-depth interpretation of the county area using its structuring elements leading to delimitation of the site into conceptual and analytical zones. The structuring elements of the county area are factors or features which play pivotal role in shaping the nature, form and direction of urban development and growth. Conceptual and analytical zones/sectors comprise of the division of the area into parts in accordance with characterization and functionality. The salient features of proposed development concept for Mombasa city are:

- Developing a compact, vibrant and transit oriented city,
- Improve land efficiency by minimum greenfield development,
- Energy efficient city,
- Decentralised development with new employment centers,
- Creating affordable and quality homes to meet needs and aspirations,
- Providing a good living environment (e.g. access to facilities and amenities),
- Managing and improving the environment and infrastructure,
- Conserving natural and built heritage and identity,
- Consolidating and



Concept of a Compact City

reserve land for future needs.

Guided by these above key considerations, the ISUDP for Mombasa has been prepared. The selected concept for Mombasa is the compact city with radial road structure which promotes transit oriented development corridors and development of comprehensive new townships along with the corridors. This plan focuses on linking the development corridors radiating out from the CBD and connecting the various areas of Mombasa to the city centre. (refer figure 3.1) The key features of the proposal are:

Figure 3-1: Selected Concept Plan for Mombasa City

3.3.1 Significance of Mombasa in Region

Mombasa is very strategically placed in East Africa, well connected with northern and central corridors connecting Mombasa with Kampala in Uganda, Kigali in Rwanda and Bujumbura in Burundi, and Dar-es-salam and Dodoma in Tanzania. The proposed 'Lamu Port-South Sudan-Ethiopia Transport' (LAPSSET) corridor (300kms in north of Mombasa) and ongoing International Freight Rail corridor - Standard Gauge Railway (SGR) provide Mombasa with an opportunity to strengthen its connections further with neighbouring countries in the region. Thus, with ongoing up-gradation of the Port, Mombasa holds a strong potential to become a regional hub. Mombasa will keep growing and expanding as magnet of attraction for people from all over the region, until efficient public transport connectivity is developed between Mombasa and nearby towns to intercept in-migration to Mombasa. The ISUDP proposes to achieve a balanced pattern of urbanization within the city by developing an efficient and integrated multi-model transport system.

3.3.2 Protect Environmentally Sensitive Areas

The development concept proposes management of natural resources and the related environment infrastructure and services in a manner that would lead to optimisation of use of natural resources, and reduction / abatement of pollution; conservation and development of the natural features with a view to enhancing their environmental value; and development and preservation of open spaces, greens and landscape / recreational areas.

Land Suitability: The suitability for development has been assessed from several perspectives; including elevation whereby the high points and low points were assessed; gradient where suitability in terms of percentage of slope has been analysed, natural drainage system along with other like sea beaches, marine parks and reserves, mangroves forest and coastal area were assessed to understand the ecologically sensitive areas in Mombasa.

The digital terrain model (DTM) reflects that most of the land in Mombasa is relatively flat. The highest point in the county is Mwakirunge, located at about 128m above mean sea level (amsl), while the lowest elevation is below 0.5m amsl located at a few places catering to nearly 1.2 percent of total area of the county. Fifty percent of total area of Mombasa is almost below 40m height and eighty percent area is below 60m height.

The degree of slope is a good indicator of land suitability for the proposed development. Three types of areas have been identified in terms of land suitability i.e. land suitable for development without any intervention, land suitable for development with well-designed storm water management, riparian area conservation and protection; and land not suitable for development. The Contour map, DTM and Slope map of Mombasa are presented as Figures 3.2, 3.3 and 3.4 respectively. The slope map reflects that that in general, the degree of slope in Mombasa is very gradual. Over ninety percent of the total land has a slope less than 12%. Mwakirunge in Kisauni and some parts in Miritini touching Port Reitz reflect slope in-between 12%-14%. The land with a slope of less than fifteen percent is classified as suitable for development. The slope analysis suggests that most of the land in Mombasa is suitable for development without inducing development cost variations.

Forest and nature reserves were also considered and these are less than 5% of the available land. Whereas there is not an exclusive proposal to expand land under this component, the constitutional requirement of forest/green cover shall be integrated with mainstream development as is the case with on-plot greening. Tidal variation is another consideration.

Figure 3-2 : Contour Map

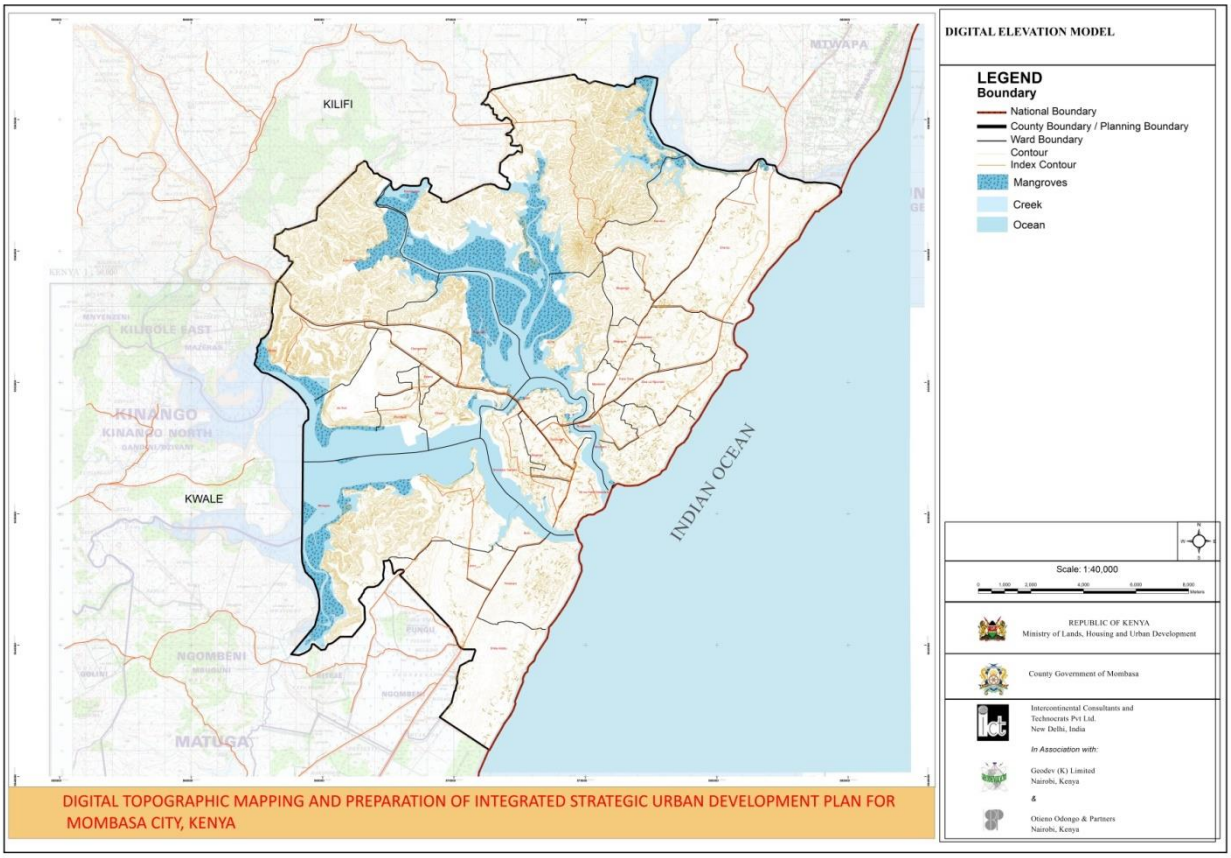


Figure 3-3 : Digital Terrain Model

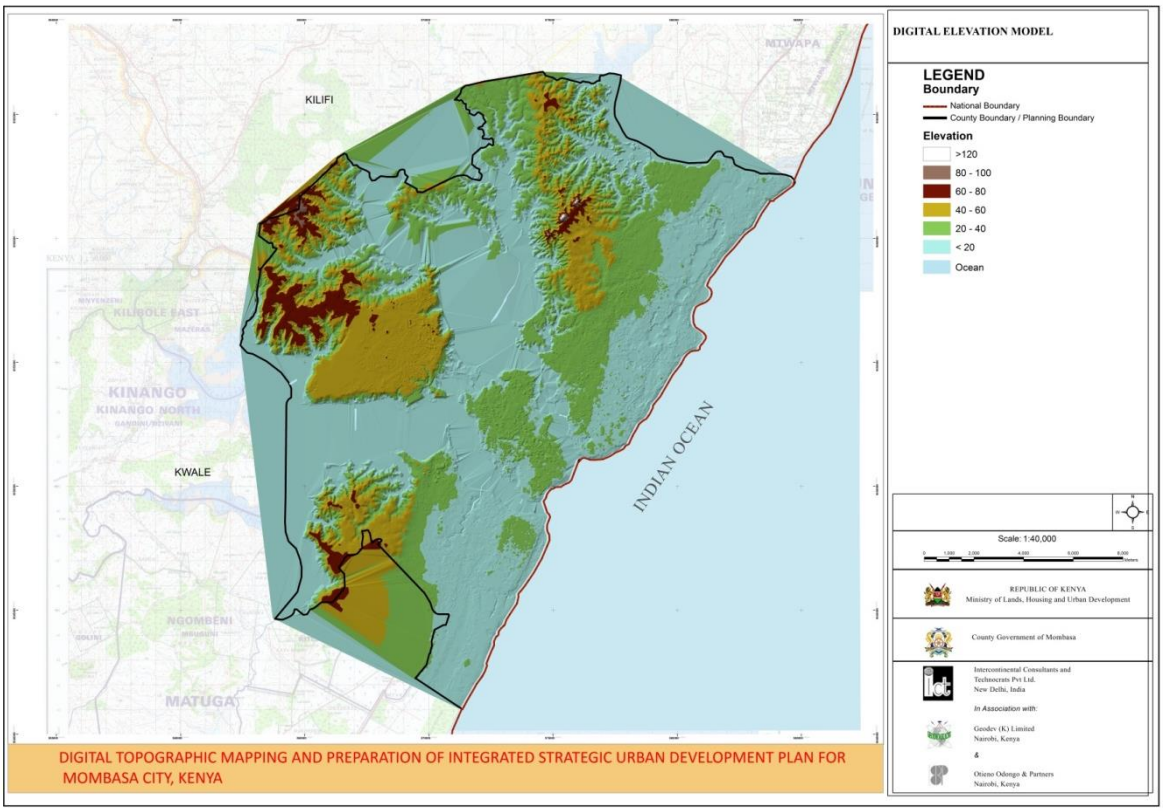
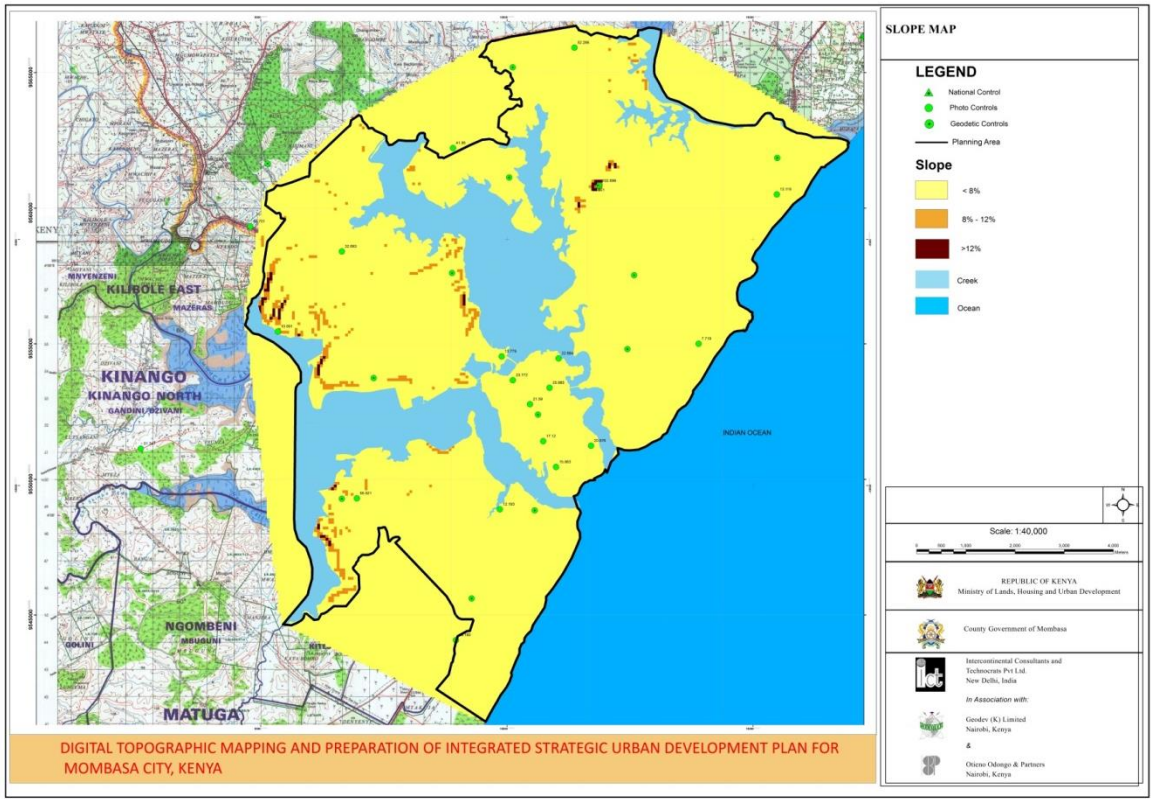


Figure 3-4 : Slope Map



3.3.3 Development Potential and Constraints

Mombasa has huge potential to develop in terms of environment and economy, as explained in previous paragraphs. As far as development constraints are concerned, the ecologically sensitive areas like beaches, mangroves, coast line, Marine Park, marine reserve, creeks, forest, etc. work both as potential sources for development as well as a constraint in the development. ISUDP proposes to convert these constraints into strength by linking these with the overall integrated development process and enhancing urban environment of Mombasa by proposing:

- No development on land below 0.5m contour, which is around 1.4% of total landmass or 321 ha.
- Maintain 60m setbacks from the ocean (high tide line) for development followed by 15m road reserve i.e. totalling 75m buffer before building line.
- Maintain natural drainage lines as much as possible and greening drained seasonal wetlands wherever possible,
- Land suitable for development: Residential areas upto 14% slope, Industrial area 8% slope (40-60m)
- Conservation of environmentally sensitive areas (Forest, Pond, Agriculture land, Riparian reserve etc. totaling to around 5% of total landmass or 1065 ha)
- Conservation and rehabilitation of mangroves forests coverage, as estimated around 2000 ha in year 2015 along the shore.
- Maintain a green buffer along the creeks and borders of the county in north and west,
- Achieve and maintain a cumulative 10% as green areas in the city.

The Figures 3.5 and 3.6 present development potentials and constraints with environmentally sensitive areas.

Figure 3-5: Land Suitability Mapping (development potential & constraint)

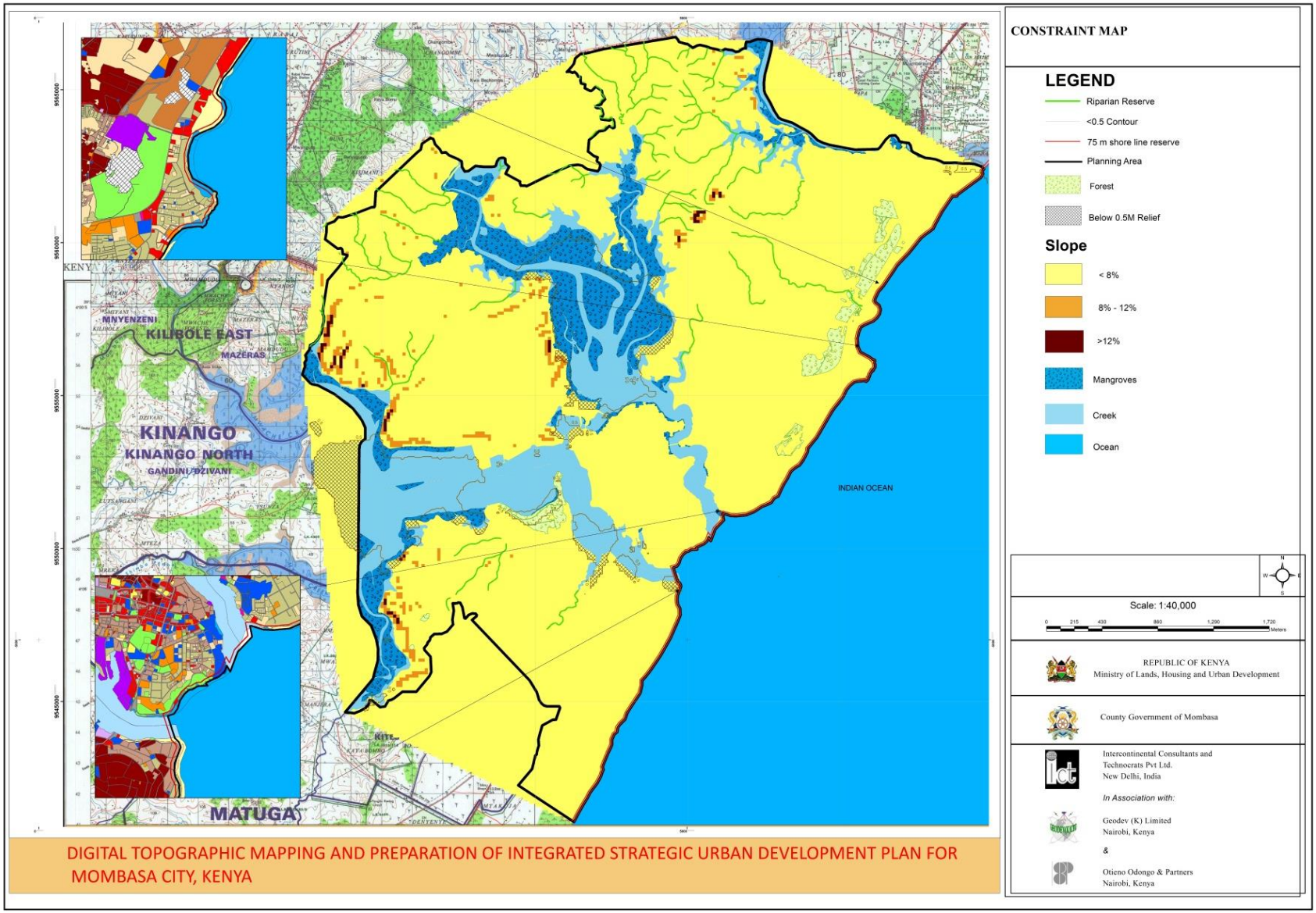
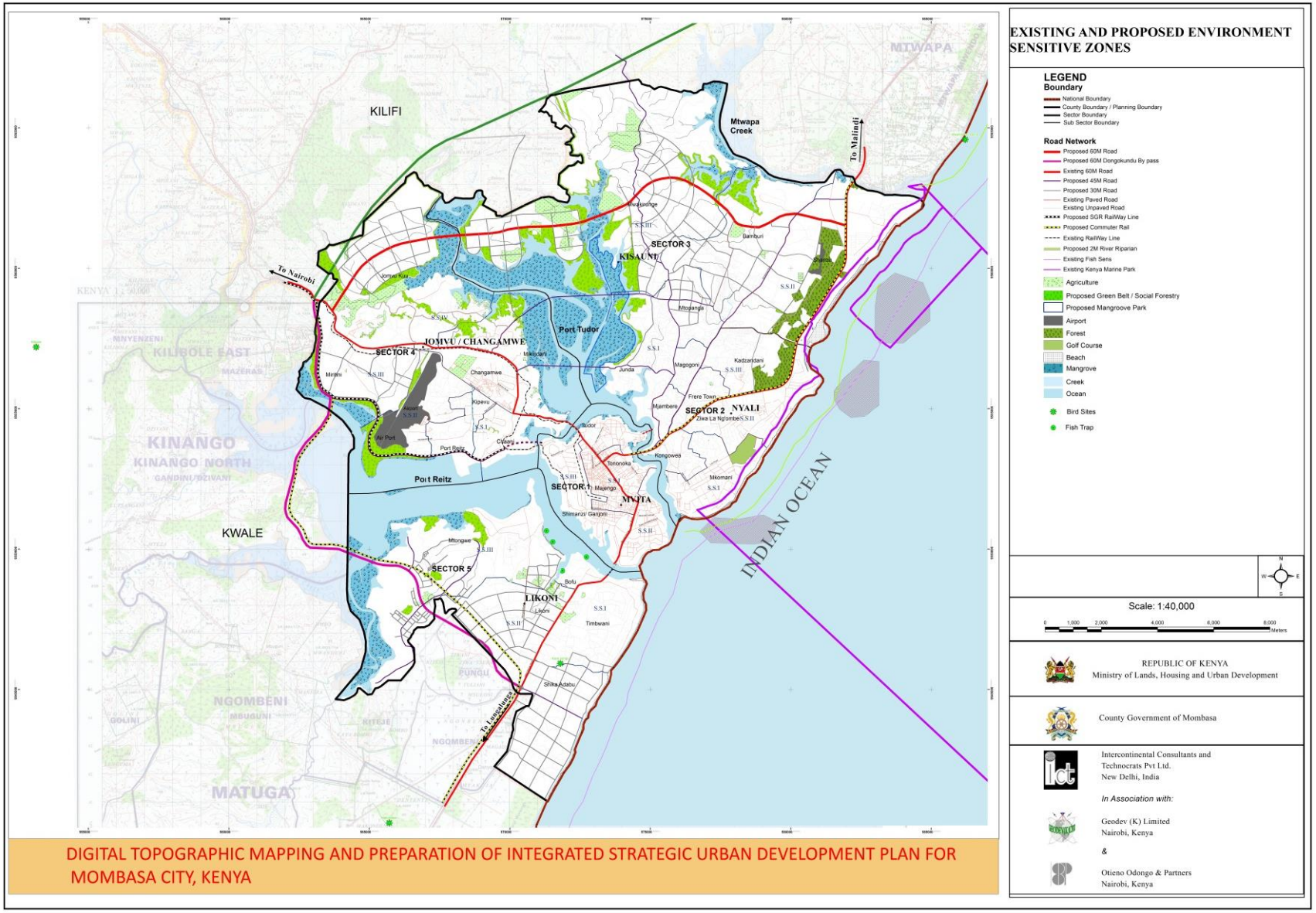


Figure 3-6: Environmentally Sensitive Area



3.3.4 New Development Integrated with High Speed Corridor

To achieve a functional balance among residential areas, community facilities and employment centers, the proposals focus on the new developments in the green field areas and intensifying the city area outside the CBD. The high speed corridor will connect key features of the city as well as the proposed new employment nodes. A part of the projected population of Mombasa will be distributed along these high speed corridors. The high speed corridors will link both the existing and new neighbourhoods/townships in Mombasa and make travelling from one part of the city to another a seamless experience.

High density mixed development is proposed along this high speed corridor by developing new townships in green field areas, benefitting residents with easy access to public transport and ready amenities nearby. This will translate to greater travel convenience; less distance to be travelled to access goods, services and employment opportunities; help address to traffic congestion; create lower car usage; reduce transport-based CO^2 emissions and promote more social interaction and bonding.

At a broader scale, it shall promote reverse-flow of movement in the public transport system by encouraging commuting away from city centre out to major employment hubs located in Sub-CBDs in outer areas, thereby, offsetting the pressure at the CBD.

The high speed corridor can initially have Bus Rapid Transit (BRT) with transit stops distributed at regular intervals or alternatively, in the future with enough population catchment and necessary funding, Light Rail Transit (LRT) system may be explored.

3.3.5 Decentralized Planning

Decentralization is also proposed to reduce peak-hour congestion from traffic flowing in and out of the city-center. The conceptual approach is to bring jobs closer to home. Each of these hubs will have a different economic focus and unique identity, while the present CBD will continue to be the key business and financial centre of Mombasa. A system of planning units has therefore, been suggested for this purpose, based on spatial planning guidelines.

3.3.6 Low and High Rise Development with Medium and High Density

The plan is based upon low and high rise development with medium and high density character by year 2035 with harmonious and coherent interrelationships among various uses and activities. The existing gross and net population density in year 2015, is 42 pph and 148 pph respectively. Whereas the proposed gross residential density in year 2035 is 104 pph. The proposed average residential density in greenfield development (high density – high and medium rise) is 450 pph in year 2035.

3.3.7 Infill or Brownfield Development

Intensifying developed area /redeveloping brownfield sites will provide opportunity to reuse the land both for housing and infrastructure, including roads, underground utilities and street lighting, etc. The ISUDP proposes to prepare a redevelopment strategy for accommodating more population in a planned manner. This approach is to be taken up on priority in all use zones for efficient and optimum utilization of the existing land, both in formal and informal areas. There is a large proportion of underused land with a number of vacant land/parcels as well as dilapidated built-up areas in the city. Many of these areas are owned by the Government. Such areas are suggested to

Example: Brownfield Development in Informal Settlement

be planned for complete redevelopment with higher density in order to make optimum use of land resources as per the prescribed norms.

3.3.8 Control of the Fringe Development

Mombasa is witnessing ribbon development along major roads although at a slow pace. Future uncontrolled development immediately outside the development plan area can ruin the ambience of the city. In order to curb such development, a peripheral green belt is proposed in the north and north-west to be maintained wherever possible, unless conversion is warranted under special circumstances. The other city boundaries in the north-east, east and south-east are naturally barricaded by ocean.

3.3.9 Conservation of Heritage Buildings and Renewal of Old Town

Sustainable development is much more than building infrastructure or preserving the environment. It is about putting the community at the heart of development. It is also about building rooted and cohesive communities, as well as preserving local character and sense of identity through preservation of built and natural heritage. The entire old town of Mombasa is highly congested and requires a conservation and urban renewal pans involving a substantial capital investment. A 3-R strategy is proposed to be adopted for conservation of buildings:

- Maximum- Retention
- Sensitive -Restoration
- Careful- Repair

Conservation of buildings can be selected based on:

- architectural significance and rarity,
- cultural, social, religious and historical significance,
- contribution to the environment and identity,
- economic impact.

3.3.10 Quality Living

It is not just about providing good housing but it is also about creating a total good quality living environment. The planning of residential areas will take into account not only the physical layout and architecture of housing blocks but also how schools, shops, medical facilities, parks, places of worship, and offices are within easy access. Designated residential areas will be well-served by proposed public transport and road networks. There will be more ground level open spaces and parks, and community spaces at intermediate levels to facilitate community bonding.

3.4 Planning Hierarchies/ Decentralized Planning

A planned city, for its convenience, should have a hierarchical cellular structure with its nucleus to contain essential facilities and services at different levels. The city is proposed to be planned based on a hierarchical system of planning units with provision of dispersed services and facilities based on the hierarchy of planning entities, in order to improve the quality of life of present and future residents of the city. ISUDP proposes development as per hierarchy of planning units and proposes standards for basic facilities/services as per planning hierarchy.

There are two hierarchies of spatial planning units, as per Physical Planning Handbook 2008 viz. Estate and Neighbourhood. The characteristics of these planning unitsare given below:

I. Estates

An estate is a spatial planning unit, which is adequately provided for in terms of basic community facilities and has an identity. The service centre which forms the focal point of the estate satisfies the minimum walking distance from the perimeter. The population of an estate should be able to support the services within the physical entity. It is recommended that an estate shall have around 100 households.

It has all of the following characteristics:

- Common housing design,
- Common services,
- Common entry and exit,
- Uniformity in plot size and design,
- Well-defined development period,
- Population around 350.

II. Cluster

The pattern of a community module is conceived as residential area containing a 'cluster', which is a basic planning unit of 5,000 persons, with a kindergarten, cluster playground/park as its focus.

- An almost self-contained unit,
- It may include several estates,
- Population is 5,000.

III. Neighbourhood

Additional hierarchical facilities are to be provided at the higher level planning units like Neighborhood of 15,000-20,000 persons

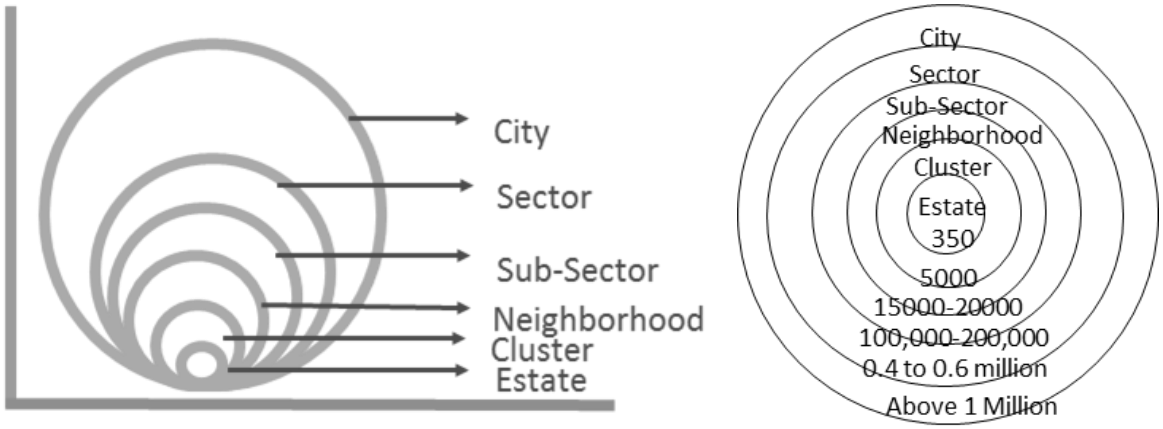
- Socio-economic identity,
- Common facilities such as schools, recreational, shopping centres, etc.
- An almost self-contained unit,
- It may include several clusters,
- Population is 15,000.

It may be noted that beyond neighbourhood, there are no planning units given in the Physical Planning Handbook but to cover mid-level and higher level, the following additional planning units are suggested:

IV. Sub-Sector with Population of 150,000 (100,000 to 200,000)
V. Sector with Population of Population is 500,000 (0.4 to 0.6 million)
VI. City with Population of 2,307,729 (1 million +)

The pattern of a community module is conceived as residential area containing an 'estate', which is a basic planning unit of 350 persons, with a corner shop and tot lot park as its focus. Additional hierarchical facilities are to be provided at the higher level planning units of Cluster of 5,000 persons (14 estates); Neighbourhood of 15,000 persons (3 Clusters); Sub-Sector of 150,000 persons (10 Neighbourhood); Sector Level (3 Subsectors) and City 2,307,729 (5 sectors). The concept is schematically presented in **Figure 3.7.** The facilities proposed for the hierarchical planning units are listed in the following section.

Figure 3-7: Proposed Hierarchy of Planning Units for Mombasa



Hierarchy		Population	Comprise		Commercial Centres	
	Estate	350	100	HH	Corner Shop	
	Cluster	5000	14	Estate	Convenience Shopping	
	Neighborhood	15000	3	Cluster	Neighbourhood shopping including service centre	
	Sub-Sector	150000	10	Neighborhood	Sub Sector Commercial Center	
	Sector	500000	3	Sub-Sector	Sub- CBD	
	City	2307729	5	Sector	City Centre/ CBD	

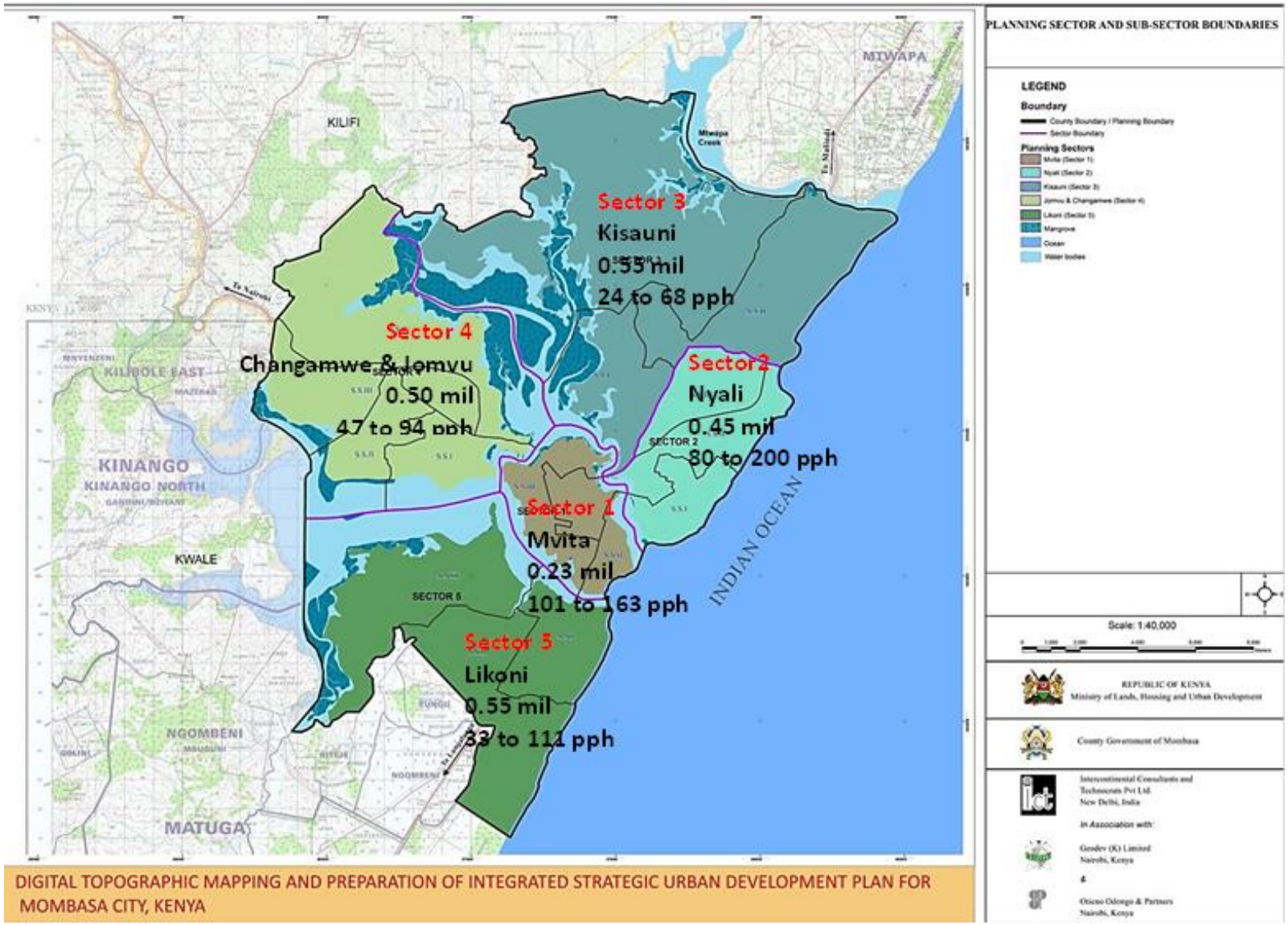
3.4.1 Division of town into sectors and sub-sector

The town is divided into 5 Planning Sectors as shown in Figure 3.8. Each sector has been further divided into sub-sectors. There are total 16 sub-sectors. It may be noted here that demarcation of all planning hierarchies below sub-sector level namely the Clusters, Neighbourhoods and Estates is a part of detail planning (which should be made at the detailed planning level exercise). The allocations of facilities are suggested in accordance with the population norms considering the geographical spread of existing and planned development. Table 3.1 presents proposed population distribution and densities at sector level.

Table 3-1: Proposed Population Distribution and Densities

Sector	2009				2035			
	Area (sqkm)	Population	Population Density (P/sq Km)	Population Distribution (%)	Projected population	Projected Population Density [p/sqkm]	Assigned Population Distribution	Remarks
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Sector 1 Mvita	14.1	143,128	101	15.2	230,773	163	10% (-5.2%)	Decongest CBD
Sector 2 Nyali	22.8	185,990	81	19.8	456,931	200	19.8% (0%)	Maintain Existing Character
Sector 3 Kisauni	81.9	194,065	24	20.7	558,470	68	24.2% (+3.5%)	Densification and satellite town
Sector 4 Jomvu-Changamwe	53.3	250,179	47	26.6	503,085	94	21.8% (-4.8%)	Port, Aeropolis, CFS, SGR Yard
Sector 5 Likoni	50.5	166,008	33	17.7	558,470	111	24.2% (+6.5)	SEZ, Petro city and Satellite town
Total	222.8	939,370	42	100	23,07,729	104	100%	

Figure 3-8: Planning Sectors and Sub-sectors



4 . STRUCTURE PLAN

4.1 INTRODUCTION

The growth model in general as observed in Mombasa evolves from harbour to a manufacturing base and eventually leading to a trading/commercial growth centre. Industrial development required supporting residential development on one hand and on the other hand the pressure on land impacted the land values, spatial growth and demographic profile. Due to market demand, ancillary and service industries, warehousing facilities, logistic sector, truck and heavy vehicle parking areas begin cropping up around the Port and industrial area. Tourism also gradually became one of the main economic pillars of Mombasa. This was the stage where the unplanned proliferation of developmental activities started and a strong need for planning intervention was felt. Gradually the real estate value of land in core city area and area surrounding port increased and commercial development intensified. As a result worker population increased and forward linkages were established as services like institutional development, development of financial institutions, corporate offices, industry amongst others.

Unfortunately, the rapid growth has taken place without corresponding capacity of the town planning and management institutions to guarantee sustainable livelihoods. The existing urban planning and implementation tools have failed to provide orderly and attractive guidelines. As a result, a myriad of problems including, the proliferation of slums, squatter settlements, sub-standard construction of buildings, traffic congestion, competing land uses, ribbon pattern of development and urban sprawl have continuously chocked Mombasa, rendering it inefficient and unsustainable.

The Integrated Strategic Urban Development Plan (ISUDP) deals with existing and proposed land use, population density, etc within the planning area. It has been prepared after analysing the existing situation of land use, environmental sensitivity, regional setting, linkages, provision of services, etc. The development concept for the structure plan is explained in Chapter 4 of this report.

4.2 GROWTH TREND

Mombasa, being the oldest town in Eastern Africa has thrived through maritime trade in Indian Ocean and Persian Gulf. The oldest settlement within the town is at Port Tudor which is famous in use of dhows for scraping, painting and repair. The earliest substantial structure, Fort Jesus, was built in the 16th century by the Portuguese. Around the Fort clustered some significant houses and the population of the town was ranged between 10,000 to 30,000 people. It was until in the late 19th century when change in the physical aspect of the town started to be felt. The leadership power changed from the Portuguese to Omanis and back again, but eventually British took over. A Protectorate was established and the construction of the railway line commenced.

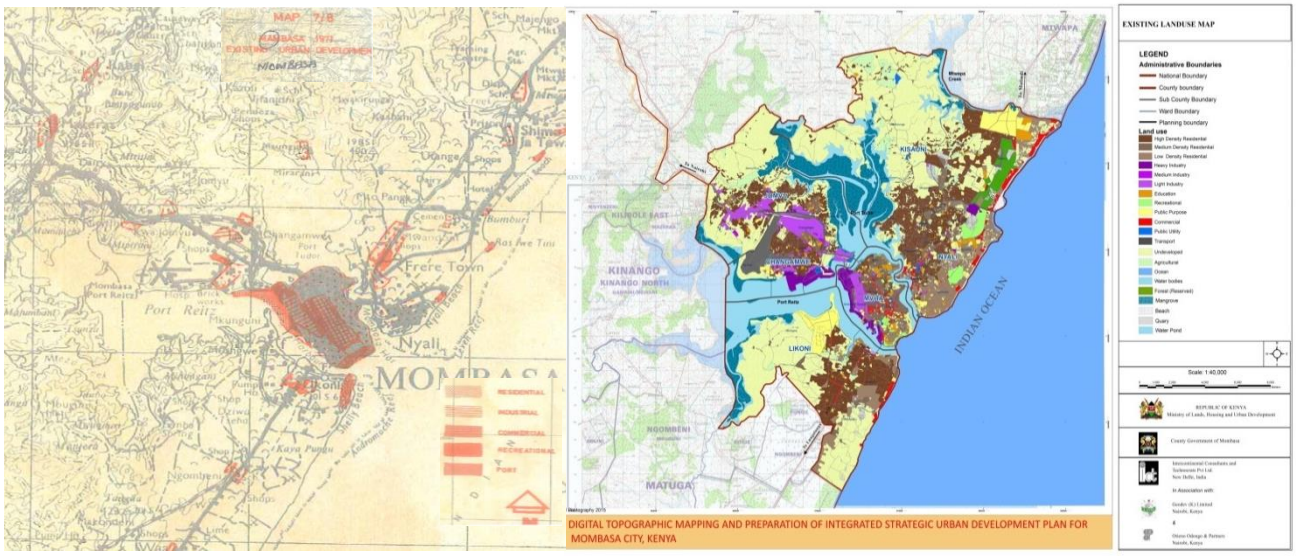
Kilindini area experienced a face lift when large areas of land were purchased to facilitate the construction of a port, railway line and industries. The railway line linked Treasury Square near Fort Jesus to Kilindini and to the causeway joining the Island to the Mainland. The development of the port and railway acted as enzymes of growth of the town. By mid 1930s, new streets, shopping areas and high class residential areas had emerged through the implementation of the 1926 scheme (Mombasa Town Planning Scheme) which also saw the relocation of the railway station to the center of the Island. The newly established port and few industries attracted labor from within and outside the town. The need for cheap accommodation by these labourers led to the sprouting of informal settlements which became to be known as ‘Majengo’.

In 1969, Mombasa town was the 3rd largest town in East Africa with a population of 250,000 people. It also had the largest harbor on the East African coast and provided among African cities a unique set of living conditions.

Currently Mombasa accommodates around 1million people and has grown along three radiating main roads; Mombasa-Nairobi road (A109), Mombasa-Malindi road (B8) and along Mombasa-Ukunda road (A14). These are the axes of the growth pattern of Mombasa town. Growth towards the north western, western and south western sides is limited due to the presence of the Indian Ocean. Development has also been hampered by two creeks: Tudor Creek and Kilindini Harbour which separate the island from the main land (refer Figure 4-1).

The island area forms the core of the city and it's where the CBD is located. It forms part of the concentrated settlement pattern while the peripheral areas of town have scattered settlements because of poor provision of infrastructure and services. It appears that the town will tend to grow towards the south, east and north because there's availability of land in these areas and growth limitation to the west where the ocean is located.

Figure 4-1: Spatial Growth Trend



Source: Mombasa Draft Physical Development Plan-1971 and 2015 Land use Map Generated by Consultant

4.3 GROWTH POTENTIAL

The vision 2030 focuses on broad National policies aimed at making Kenya a globally competitive Nation and Mombasa County plays a significant role in translating the national vision and aspiration into specific interventions, while addressing its own needs. Considering envisaged projects and vision 2030, prevailing and projected market trends, Mombasa seems to have huge potential to grow and develop in future. Following are few significant ongoing and upcoming projects that are likely to impact growth of Mombasa:

1. Mombasa port

Mombasa port attained a throughput of one Million TEUs in the year 2014. In 2013, having handled 894,000 TEUs, KPA was ranked among the top 120 ports in the world out of over 5000 Ports worldwide. With the ongoing technological up gradation and proposed investment, Port of Mombasa has the potential to be ranked even higher in the list of the World Top Container Ports. This will have direct and positive impact on employment generation and per capita income in Mombasa. Up gradation of Mombasa port includes following initiatives:

i. Dredging and Deepening of Mombasa Port with the purpose of deepening the channel to 14.5 metres to enable larger vessels to access the port.
ii. Modernisation and computerisation of Mombasa port facilities is on-going
iii. Replacing the old vessels in Mombasa and establishing cruise ships and floating hotels network in the Indian Ocean to promote tourist activities.
iv. Construction of Second Container Terminal

2. Dongo Kundu Bypass

Dongo Kundu Bypass is proposed by KeNHA, it link Likoni-Ukunda Road (A 14) in Likoni mainland to Mombasa Road (A 109) near Miritini. It will connect the proposed Dongo Kundu Free Trade Zone in Likoni mainland. Two major bridges are proposed between Likoni mainland and Tsunza Peninsula and Tsunza Peninsula to Mwache west of Moi International Airport. Port Reitz and new container terminal will be connected to Dongo Kundu Bypass through Kipevu Link Road aligned south of Moi International Airport.

Dongo Kundu Bypass will provide the much needed connection between Likoni mainland and Mombasa Road. Road transport from free trade zone in Dongo Kundu, new container terminal at Port Ritz and Mombasa Port will have direct access to Mombasa Road A-109.

3. Standard Gauge Railway Line

Government of Kenya is developing Standard gauge line in two phases,

i. Phase 1: Mombasa to Nairobi (Construction started)
ii. Phase 2: Nairobi to Malaba and Kisumu (Preliminary Design in progress)

Regional railway corridor once developed will enhance connectivity of Mombasa County with other important cities in Kenya and neighboring countries.

4. Regional Roads

Mombasa is located in a very important position in terms of regional road network in East Africa. Following three major road corridors pass through in East Africa consisting inter-country Trunk roads, proposed rail corridor and other communication lines.

i. Northern Corridor
ii. Central Corridor
iii. LAPSSET Corridor

Several other inter-connecting roads are proposed to be improved and new roads to be developed under “Northern & Central Corridor Road Capacity Upgrade Project”. These roads will further improve connectivity of Mombasa with other major corridors and major cities in East Africa.

5. Commuter Rail Services

There is a proposal of developing Commuter Rail Service in Mombasa, feasibility studies and preliminary designs was completed in November 2013

6. Four Laning of Mombasa – Mariakani

Mombasa Road A-109 is presently a two lane undivided carriageway. KeNHA proposed to develop A-109 from two-lane to four-lane from Mombasa to Mariakani.

7. Likoni Bridge

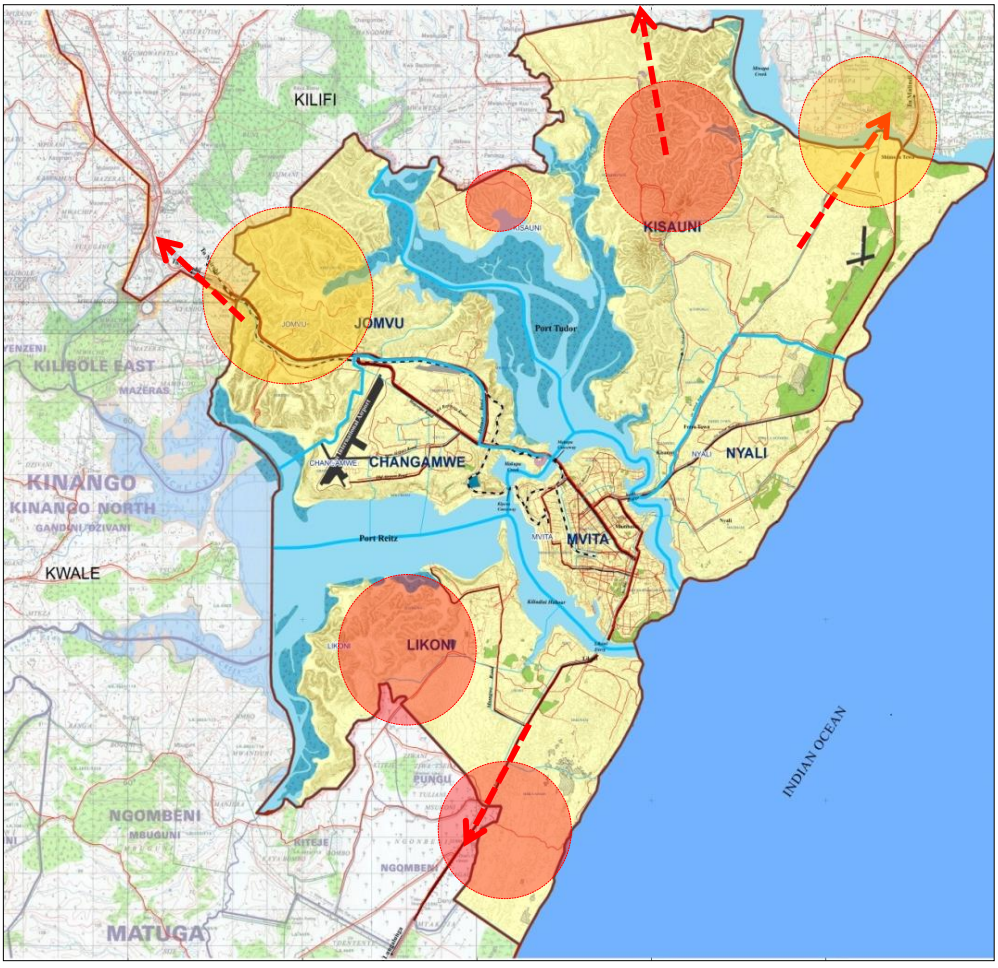
Likoni mainland and Mombasa Island is presently connected through ferry service only. KeNHA carried out a feasibility study to develop a vehicular bridge between Mombasa Island and Likoni mainland. Clear height of the proposed

bridge is kept more than 50 Metre to allow movement of ships through this creek to reach Mombasa Port.

8. **Special Economic Zone (SEZ)**
   Master plan of SEZ in under preparation. SEZ will cover over 937 hectare area in likoni. It will be developed in three phases, starting from year 2018 and is expected to generate employment for around 27,000 workers.
9. **Power Supply**
   Commissioning of the Kipevu III 120 megawatt thermal plant in Mombasa by KENGEN
   Upgrading of High voltage transmission lines – from 220KV to 415KV (Mombasa to Nairobi) is under way.
10. **Land management**
    County government has initiated computerisation of all land registries, this will have direct impact on real-estate development in Mombasa.
11. **Other significant projects include:**
    - Development of Resort Cities
    - Development of SME Parks
    - Mzima Pipeline Rehabilitation and Augmentation
    - LPG handling Facilities Installed in Mombasa
    - Mwaeche Dam

Spatially Mombasa is likely to grow in all directions in future, except east i.e. sea front. Major development will take place towards Kisauni (northern mainland), Likoni (southern mainland) and Jomvu-Changamwe. Figure 4-2 presents directions of potential spatial growth in Mombasa.

Figure 4-2 : Potential Growth Trend



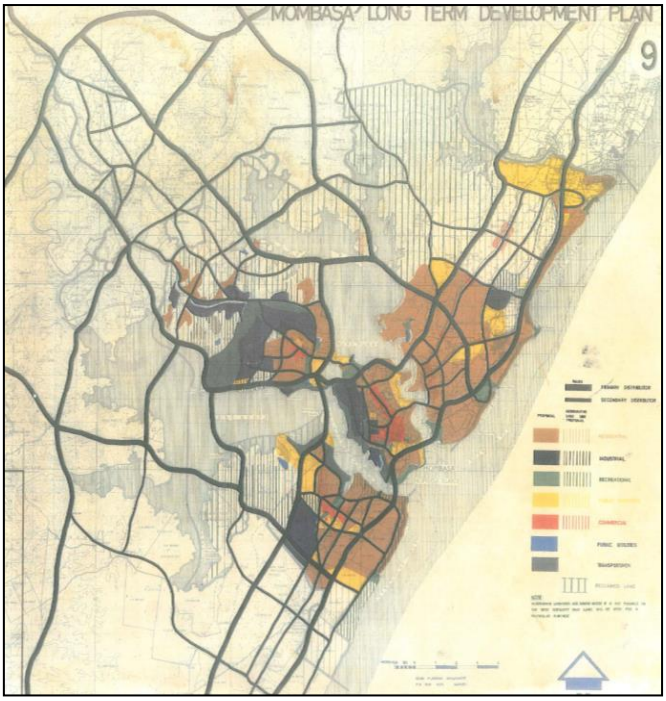
4.4 PREVIOUS PLANNING EFFORTS

Mombasa Town Planning Scheme-1926: The first attempt to plan Mombasa was in 1926 when a Mombasa Town planning scheme was prepared by a preparatory authority (Municipal Board) under the provisions of the Town Planning Ordinance. This scheme outlined guidelines on the development of the railway station, port at Kilindini, streets, industrial as well as residential areas. The scheme applied to most of Mombasa Island. Other schemes prepared at the same period were Mkomani Town Planning Scheme which applied to Mkomani area and Changamwe Repooling Scheme which affected some land adjacent to Magongo road and Port Reitz road on the West Mainland.

Comprehensive Long Term Physical Development Plan-1962: A comprehensive long term physical development plan covering the whole of the former Mombasa municipal area was prepared in 1962. This master plan had projected that the population of Mombasa would reach to about 250,000 people by the year 1980. However, 9 years later after the adoption and publication of the master plan the population had already grown approximately to the same projected figures.

Mombasa Draft Physical Development Plan-1971: This scenario prompted the preparation of another plan in 1971 – Mombasa Physical Development Plan. The plan spells out extensive and well- coordinated programs for the construction of roads, water supply, harbour expansion, sewage disposal and housing that were supposed to accommodate that unprecedented growth in the difficult topographical conditions which prevail in the area. The plan proposed settlement of people in the north and south mainland areas to avoid future overcrowding of the island. It also proposed that a transportation network be designed to encourage and stimulate decentralization of population, industries and services off the island. The plan also provided a framework within which ministries, the Local authority (now the county government) and other development agencies were to carry out their policies for government in order to produce a satisfactory urban environment. The broad development directions of this development plan of Mombasa are still relevant; however this ISUDP will address the existing development issues and will also integrate the new development with existing one. **Figure 4.3** presents proposed landuse map of Mombasa 1971.

Figure 4-3: Mombasa Proposed Land Use Plan- 1971-91



Source: Mombasa Draft Physical Development Plan (1971-1995)

4.5 LAND ADMINISTRATION AND LAND TENURE

4.5.1 Land Administration

Dale and McLaughlin (1999) define land administration as the processes of regulating land and property development and the use and conservation of the land, the gathering of revenues from the land through sales, leasing, and taxation, and the resolving of conflicts concerning the ownership and use of land. From the definition, we can deduce that land administration is concerned with three main aspects; ownership, the value and the use of land.

Land administration systems in Kenya are generally not efficient and transparent. They previously been described as being bureaucratic, expensive, undemocratic and prone to abuse, resulting in inordinate delays and injustice in the administration of land *(Republic of Kenya, 2009)*. The inefficiency and lack of transparency provides opportunities for corruption and other malpractices.

The current constitution of Kenya and the subsequent land laws that have been enacted emphasize the need to computerize land records or generally to create a land information system that will facilitate efficient and transparent land administration. To that effect, the National Land Commission Act, 2012 in particular, provides that a land information system be established both at the national and county governments level. To this effect, under ISUDP an up to date cadastral and landuse for Mombasa County has been prepared in GIS format which will make the administration of land within the county easy and effective.

4.5.2 Land Tenure

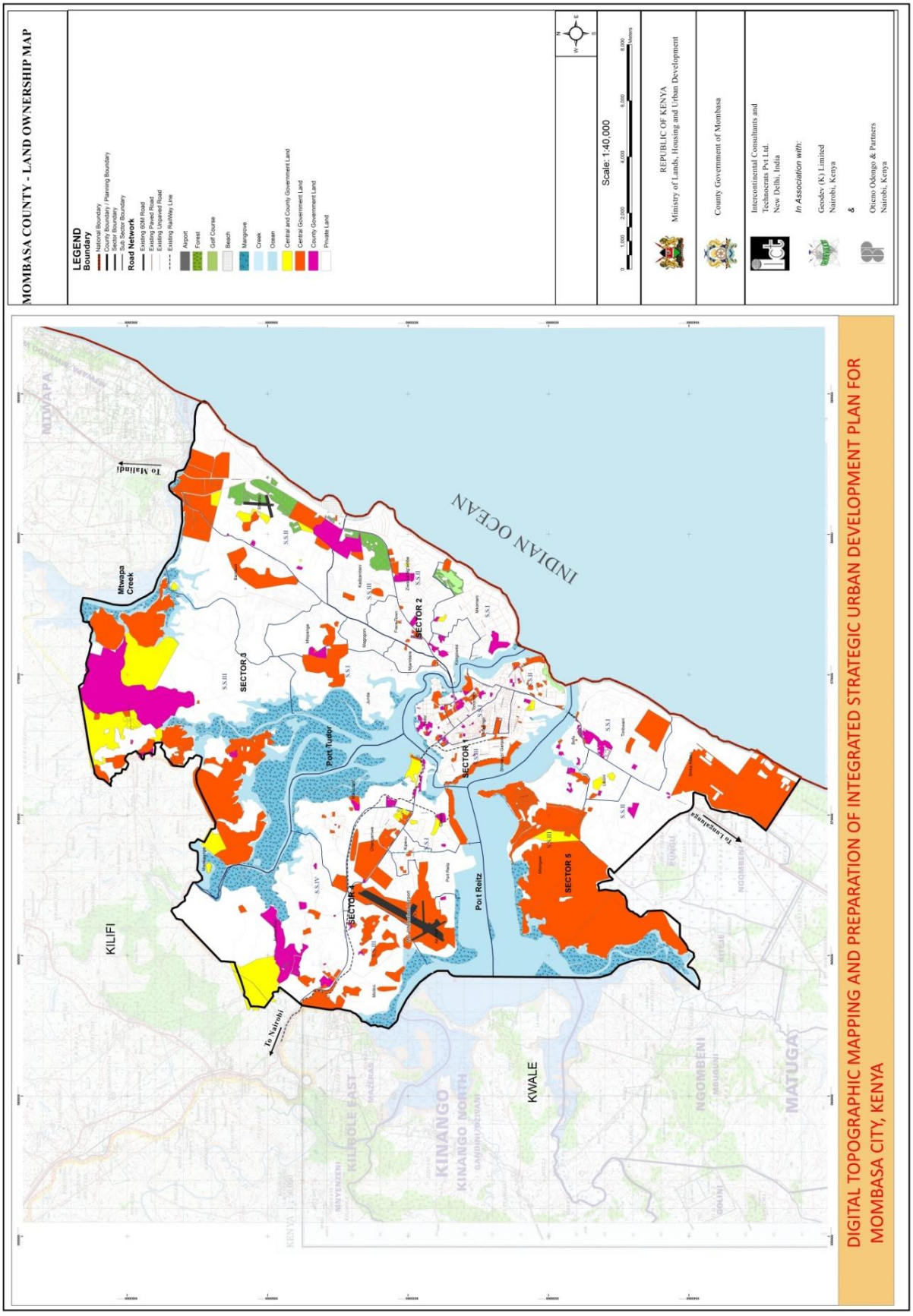
Land ownership and land rights in Mombasa are complex, and this is so mainly because of the political and historical background that has rocked the city which traces its back way to the era when Mombasa was under the rule of the Sultan of Zanzibar. In this era, land was allotted to his subjects, mostly Arabs and Asians, and it was registered in accordance with the Sultanate law. After independence, the Kenya Government undertook the initiative to honour the registration. The result was that most of the land, especially on the Mombasa Island, remained the property of the Arabs and a few Asians. Subsequently most of the owners left the country. As a result much of the land which is not Government owned e.g. in Kisauni, belongs to such absentee landlords. Such absentee landlords do not develop or sell their land; instead they let the land to other people who use it while paying some form of rent to the owner's agents or relatives when they are available. As a result it is common in Mombasa that the owner of a house is not the owner of the plot on which the house is erected, and that most of the developers are tenants.

ISUDP provides an up to date cadastral and landuse for Mombasa County in GIS format along with development control regulations and building by-laws which will make the administration of land within the county easy and effective. Refer Figure 4.4 for land ownership details.

4.6 MAJOR ISSUES/ OBSERVATIONS

1. The current road system in the county was originally designed for low traffic and most of the road networks have not been expanded for quite a long period of time while cars and human traffic has continuously increased leading to congestion in roads and streets. Also, most of these roads were designed for light traffic but are now being used by heavy commercial vehicles.
2. Most of the residents reside on land owned by absentee landlords who, through agents, enter into temporary lease arrangements with local residents and institutions. This arrangement however results to tenants lacking long term security for the properties developed.

Figure 4-4: Land Ownership Map



3. Housing estates can be better planned to meet the growing need of the increasing population. Currently, there is no order and support services such as sewer and storm water drainage systems are inadequate or in deplorable state.
4. The growth of the town has been haphazard and unplanned resulting to emergence of informal settlements.
5. There is lack of hierarchy of commercial spaces. Most of the commercial activities including wholesale and retail are concentrated in the CBD area. Beyond the CBD, commercial activities appear to have developed without any planning
6. Development control has been ineffective within the planning area majorly because of the existing land tenure system.
7. Infrastructure and community facilities are not provided in a planned manner.
8. Public land is very limited; it may be necessary to establish a land bank from private landowners as well as recover the already grabbed ones.

4.7 NORMS OF LAND USE

The categorisation of proposed land use is based on that given in the Physical Planning Handbook. But the standards for allocating land for various land uses given in Physical Planning Handbook, does not fulfil the functional requirements of Mombasa, as it mainly applicable for small towns. Therefore the percentage of land allocated for different uses, based on and is in accordance with the prevailing land use standard in cities of similar population and function across continents, projected land requirements for Mombasa and to create balance among various land uses considering local conditions and guidance of the Physical Planning Handbook.

4.8 PROPOSED LAND USE

Land is the most critical issue in planning, as all activities consume space. Mombasa County is experiencing high growth to accommodate the people, their activities and related infrastructure. This development plan therefore has made efforts to ensure equitable distribution of facilities without disturbing the ecological balance.

The primary considerations for deciding the spatial structure of the city are to meet the demand of the future needs, strong transportation network, green character to the city and protection of sensitive areas. The proposed land use structure is expected to provide a balance in the physical, social and economic character of the city by developing activity nodes away from the presently developed high density areas, to act as counter magnets for pulling away the undesirable growth from the central areas. The spatial structure of the city will be harmonious with coherent interrelationship between various activities under the proposed uses. The land use is tied up intrinsically with an efficient transport system, which is also proposed to be improved to cope with the future demand. With the fast and efficient and multimodal transportation network, it has been considered most suitable to adopt decentralized multi-nodal (multiple Sub-CBD) activities in the city instead of mono-centric city with hierarchy of development in respect of CBDs to minimize the number of trips and trip length.

The following section presents long term development framework for Mombasa County by indicating broad land use classifications, transportation corridors in relation to land uses, and location of utilities and services. Based on proposals of different sectors of the study, the Table 4.1 and Figure 4.5 present the existing and proposed land use (2015 - 2035). It also illustrates that there is no change in the City limit. Therefore, the total area of Mombasa remains the same.

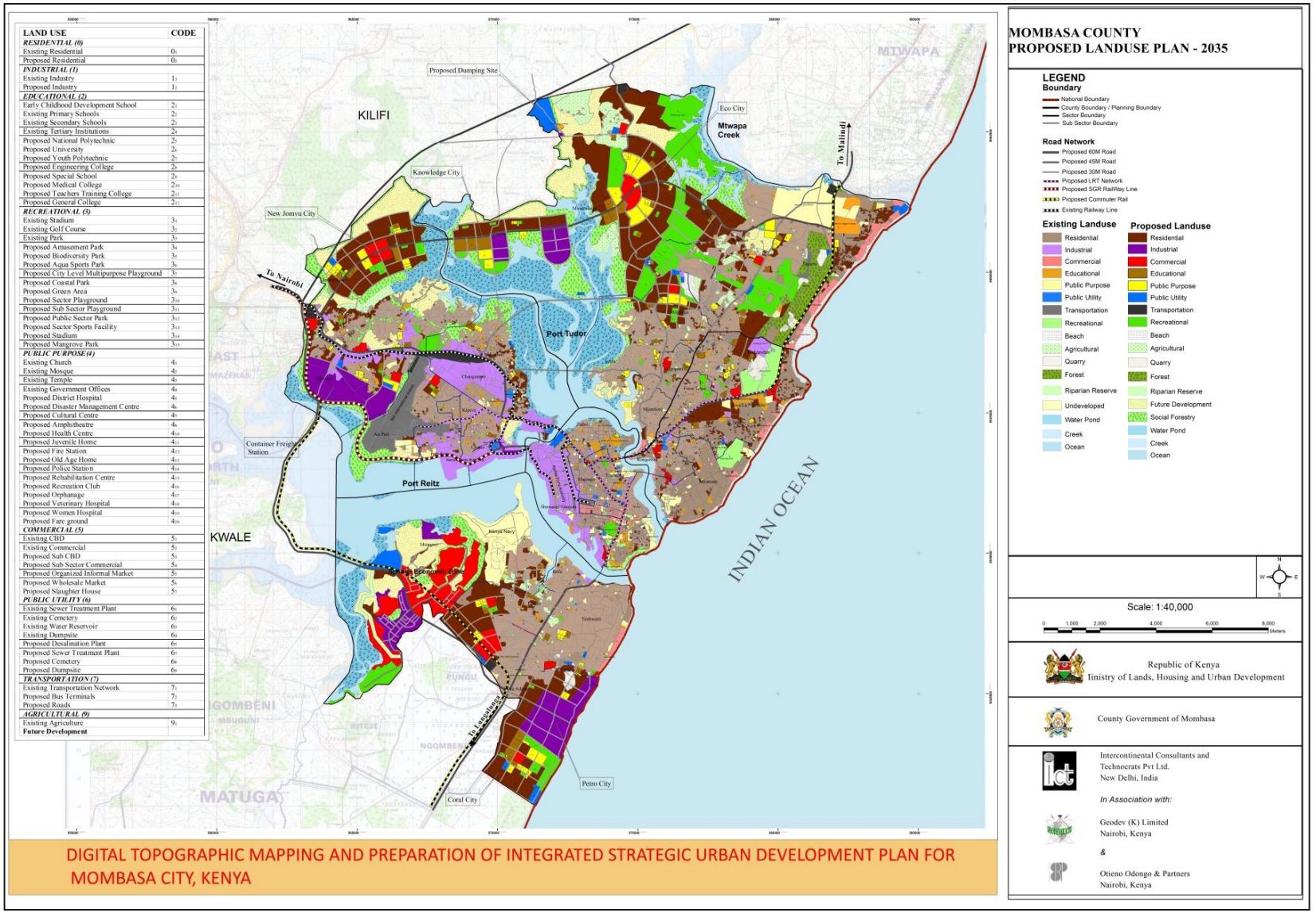
Table 4-1: Existing and Proposed Landuse 2015-2035

S/No.	Land Use	Existing Land Use 2015		Proposed Land Use 2035	
		Area (Sq km)	% Area	Area (Sq km)	% Area
1.	Residential	62.52	28.06	78.03	35.5
2.	Industry	12.17	5.46	27.82	12.6
3.	Educational	4.07	1.83	11.15	5.1
4.	Public Purpose	9.61	4.31	17.84	8.1
5.	Commercial	4.5	2.02	12.26	5.5
6.	Public Utility	0.67	0.3	8.91	4.1
7.	Transportation	13.84	6.21	27.87	12.7
8.	Undeveloped	98.99	44.43	0	0.0
9.	Agricultural	6.75	3.03	6.75	3.1
10.	Recreational & Beach	4.36	1.96	18	8.2
11.	Forest	2.82	1.27	2.82	1.3
12.	Water Pond	0.08	0.04	0.08	0.0
13.	Quarry	2.04	0.92	1	0.5
14.	Future Development	0	0	7.23	3.3
	Total Developable area		**100**	**219.76**	**100.0**
15.	Riparian	0.39		0.39	
16.	Other Non-Developable area	0		2.82	
	Total Non-Developable area			**3.21**	
Total	**Land Mass**	**222.81**	**77**	**222.97**	**77**
	Water Mass	**65.12**	**23**	**64.97**	**23**
	Area	**287.94**	**100**	**287.94**	**100**

4.8.1 Residential

Residential land was adopted as the basic unit for projecting and budgeting for future land requirement. The projected component increases the percentage of land for residential from the current 28.06% to 35.5% in 2035. As for the density, the plan projects gross population density from the current 42pph to 104pph in 2035. The proposed residential land use covers approximately 7803Ha representing approximately 35.5% of the entire proposed developable area in Mombasa. This takes into consideration the current residential land use of 6252 ha and an additional 1551 ha to cater for the future housing demands. The plan earmarks areas for different: high, medium and low density housing areas in responding to various housing needs of diverse socio-economic groups. The house distribution by typology shall remain as earlier articulated, thus 25% for economically weak section; 35% for low income; 30% for middle income; 10% for high income. The existing and proposed residential use is presented in Figure 4.6. The existing and proposed residential densities are described in section below.

Figure 4-5: Proposed Land use Plan for Mombasa – 2035



High Density Residential

Existing area:

- Likoni: Jamvi Ya Wageni, Vyemani, Shika Adabu, Kwa Waitiki
- Kisauni: Kisauni, Bamburi, Bombolulu, VoK, Ziwa La Ngombe
- Nyali: Kisumu Ndogo, Kwa Karama, Bombolulu, Kisimani, Mshomoroni
- Island: Majengo Mainland West parts of Jomvu, Mikindani, Migadini etc

Proposed areas: All proposed green field development is high density residential development, it includes proposed development in areas including Shika Adabu, Shonda (Mtongwe), Mwakirunge, Maunguja II and Jomvu Kuu. Proposed population average density of these areas is around 450 pph.

Medium Density Residential

Existing areas: Mkomani, Bombolulu, Bamburi, Utange, Bamburi, Shanzu, MtoPanga, New Nyali, Bamburi Vescon, Kiembeni and Miritini. Population density of these areas is 100-150 pph.

Proposed areas: With the proposed brown field development The existing low-density areas will naturally medium density areas in new residential areas are Nyali and Island. Proposed population density of these areas is 200-250 pph.

Low Density Residential

Existing area: Some of the existing low density areas are New Nyali, Shanzu, Kizingo, Nyali English Point, Shelly Beach, Nyali Reef Area, Nyali Nakumatt and Kizingo.

Proposed areas: No new areas are proposed for low density housing

4.8.2 Industrial Use Plan

Current industrial area in Mombasa is 5.46% of total developed area. This plan proposes to increase the total percentage to 12.56%. Three types of industries namely light, medium and heavy industries are proposed in the city. (refer Figure 4.7)

Light Industry

These are industries such as furniture and shoe making, consumer electronics, clothes making, home appliances repairing, Jua kali and flour milling among others. Light industries have been proposed in Mwakirunge, Maunguja II and Miritini areas. The plan also proposes some light industrial activities such as wood and metal workshops, dry cleaners and printing among others within residential areas. The minimum plot size proposed under light industries is 0.05ha.

Medium Industry

Some medium industries already exist within the county. These are salt processing, meat processing and export processing zones. Proposed medium industries include SEZ and leather processing. The minimum plot size for medium industry is 2ha.

Heavy Industries

Existing heavy industries are mainly located in Changmwe and includes oil refineries, cement, wire and steel manufacturing, beer brewing, boat building and repairing industries. The minimum plot size for medium industry is 10ha.

Figure 4-6: Existing and Proposed Residential Use Plan

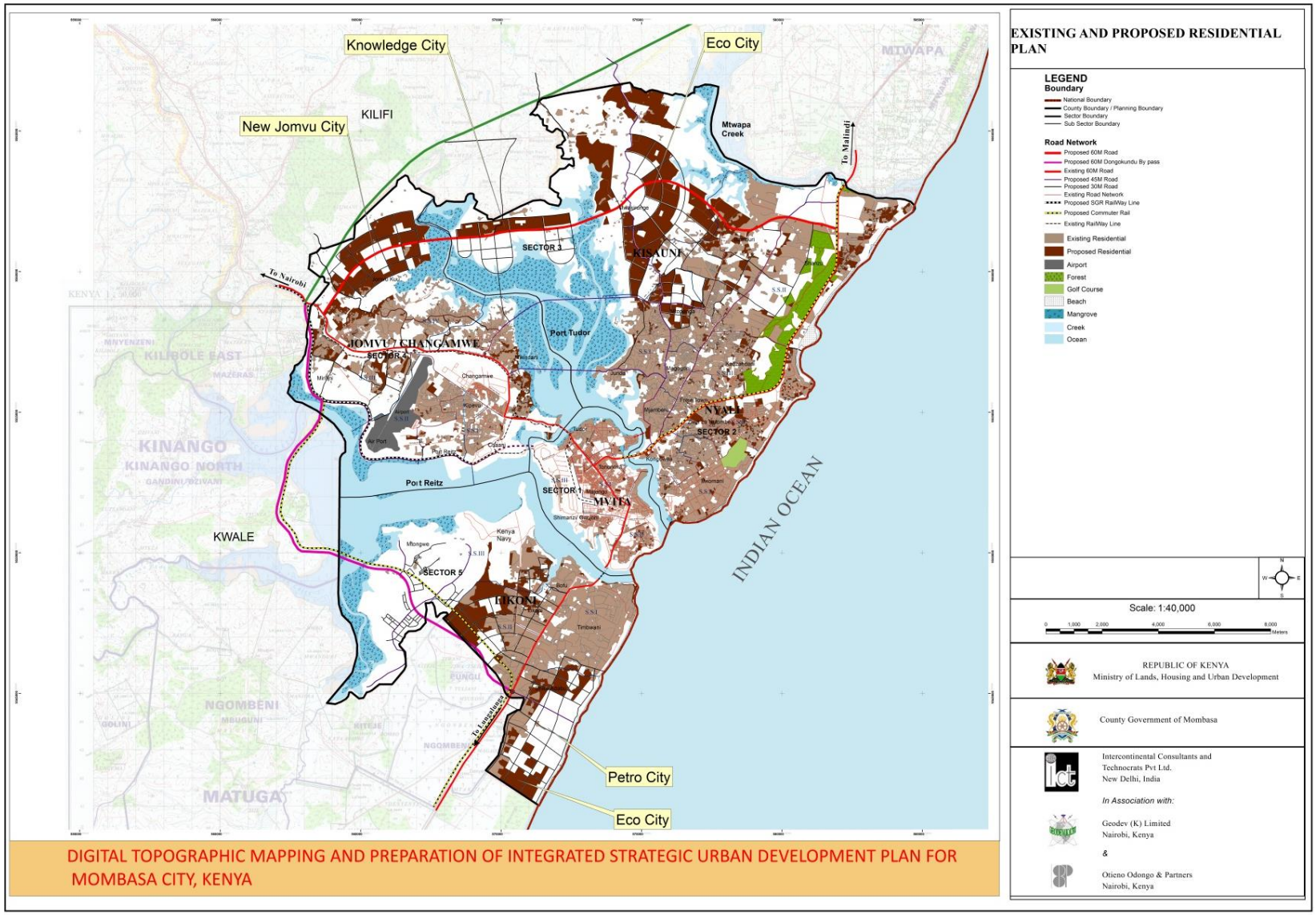
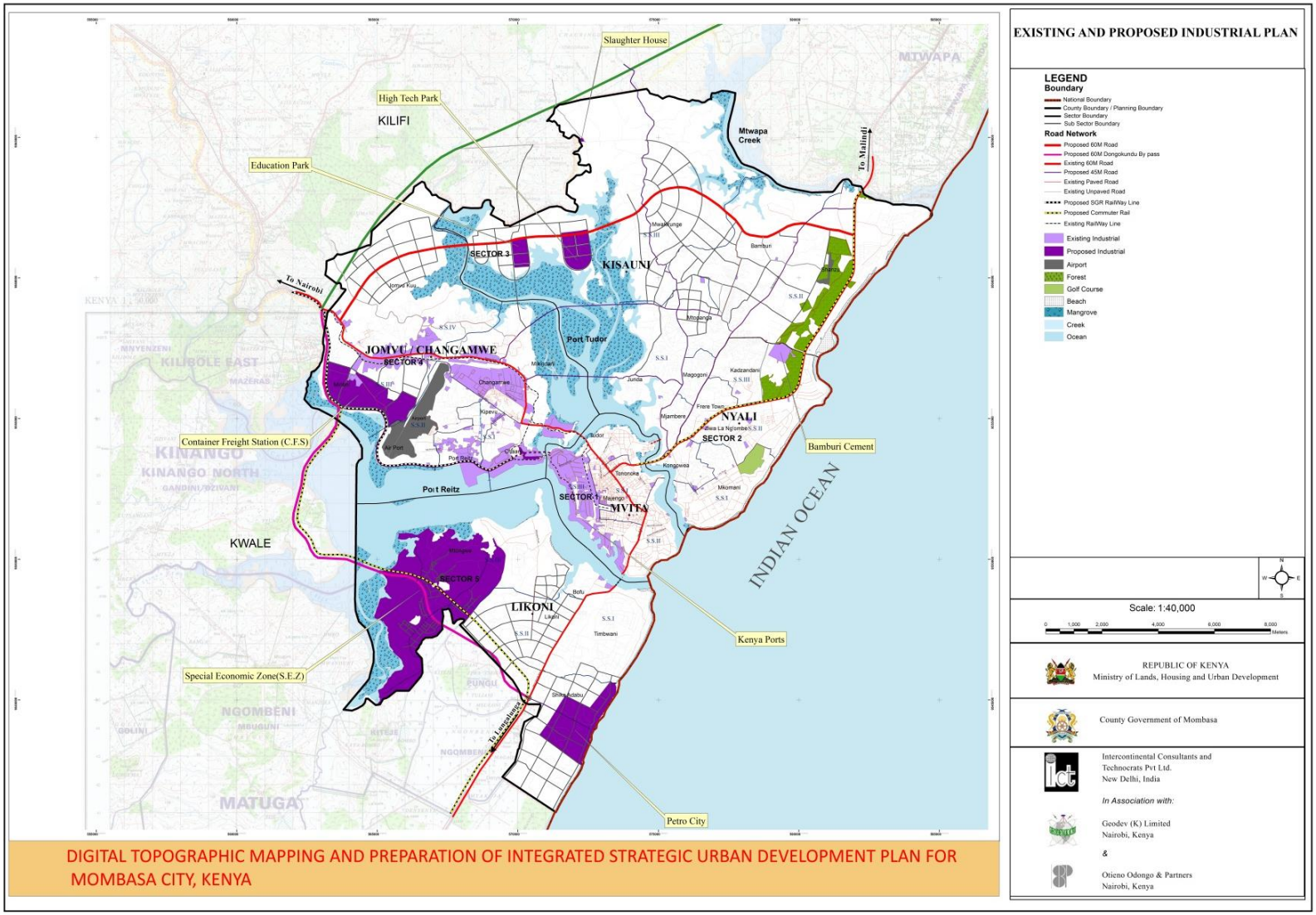


Figure 4-7: Existing and Proposed Industrial Use Plan



4.8.3 Commercial Land Use

Existing commercial area is 2.02% of the total developable areas within the county. This area is proposed to increase to about 5.58% of the total developable area by 2035. This due to the proposed corner shops, cluster level shopping areas, neighbourhood shopping and service centers, sub-sectoral commercial centres, Sub-CBDs, wholesale markets among others. These new commercial areas are distributed all over the county as illustrated in the Figure 4.8.

4.8.4 Education Use Plan

With a projected population of 2,307,729 by the year 2035, an addition of 508 education facilities will be required. These new facilities includes 263 primary schools, 189 secondary schools, 34 youth polytechnics, 7 special schools, 2 engineering colleges, 2 medical colleges, 4 teachers training institutes, 1 fire training institute/college, 1 national polytechnic, general colleges 4 and university 1 are is demanded by 2035. The total land to be occupied by these educational facilities is 5.1% of landmass. An additional 50 hectare has been reserved for Education Park in proposed knowledge city for professional training institutes. Location of existing and proposed educational facilities is shown in Figure 4.9.

4.8.5 Public Purpose

Public purpose facilities includes health facilities, security facilities, community facilities like religious institutions, libraries, post offices, government offices among others. The current developable under public purpose is 4.31% and is expected to rise to 8.12% by year 2035. Development of land for public purposes is generally expected to be intertwined within the residential and commercial developments. Location of existing and proposed area under public purposes is illustrated in Figure 4.10.

4.8.6 Public Utility Use

Land under public utilities will increase from 0.30% to 4.05% due to newly proposed facilities such sewer treatment plants (6), fire stations (12), cemeteries/burial grounds (8), electric crematorium/crematorium grounds (2) among others. This increase provides adequate land for infrastructure and services provision for the current and future generations of Mombasa. Figure 4.11 shows the location of existing and proposed public utility facilities in the city of Mombasa.

4.8.7 Transportation Use

Mombasa County requires new roads to open up the interior areas and expansion of existing roads in order to accommodate the rapid growth in road transport. The locals majorly over rely on road transport. There's need to provide alternative means of transport such as commuter rail within the county. This plan also provides for new parking areas, bus terminals, container freight stations, commuter rail stations among others as shown in Figure 4.12. The total area occupied by transportation will thus increase from the current 6.21% to 12.68% by year 2035.

Figure 4-8: Existing and Proposed Commercial Use Plan

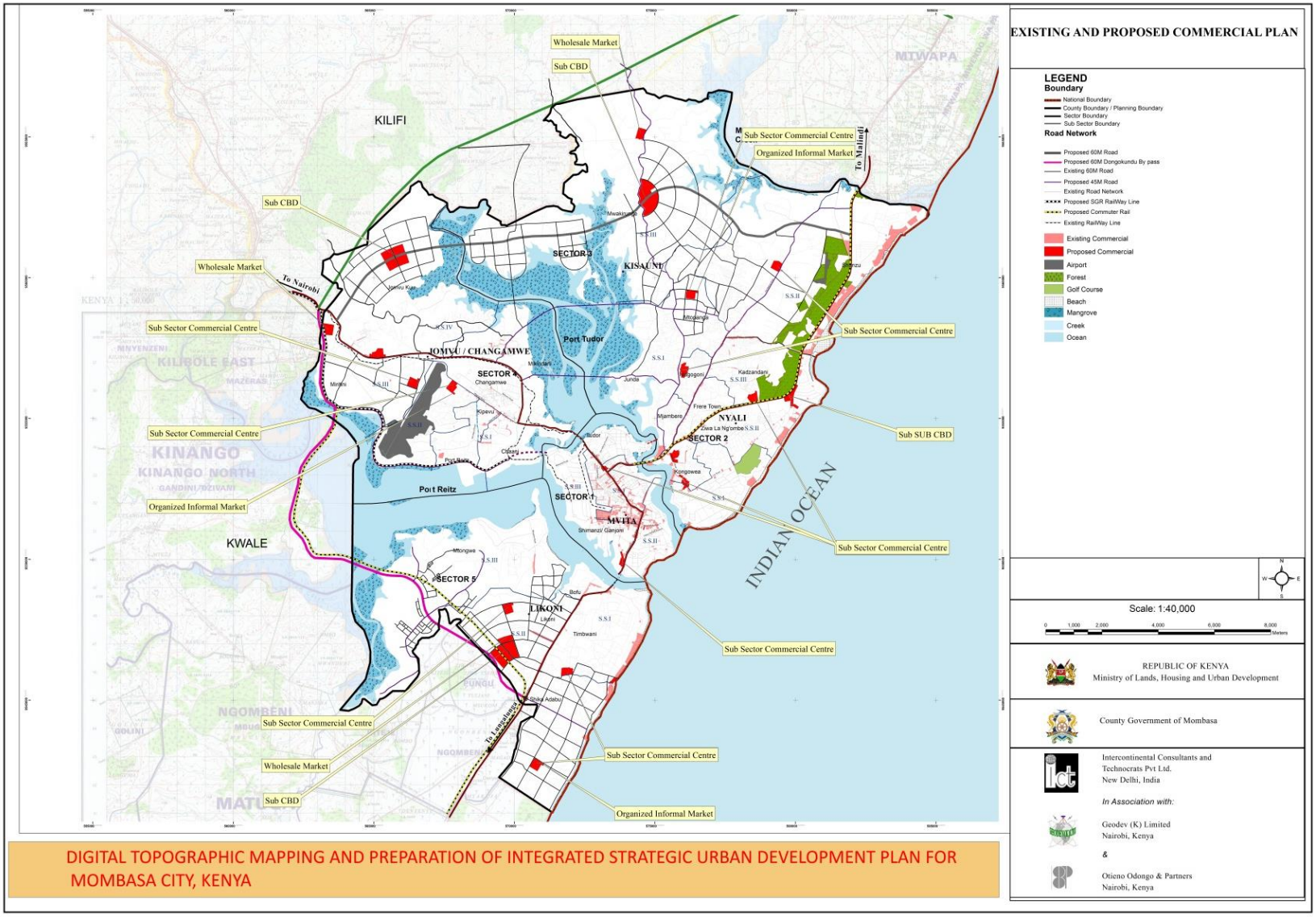


Figure 4-9: Existing and Proposed Education Use Plan

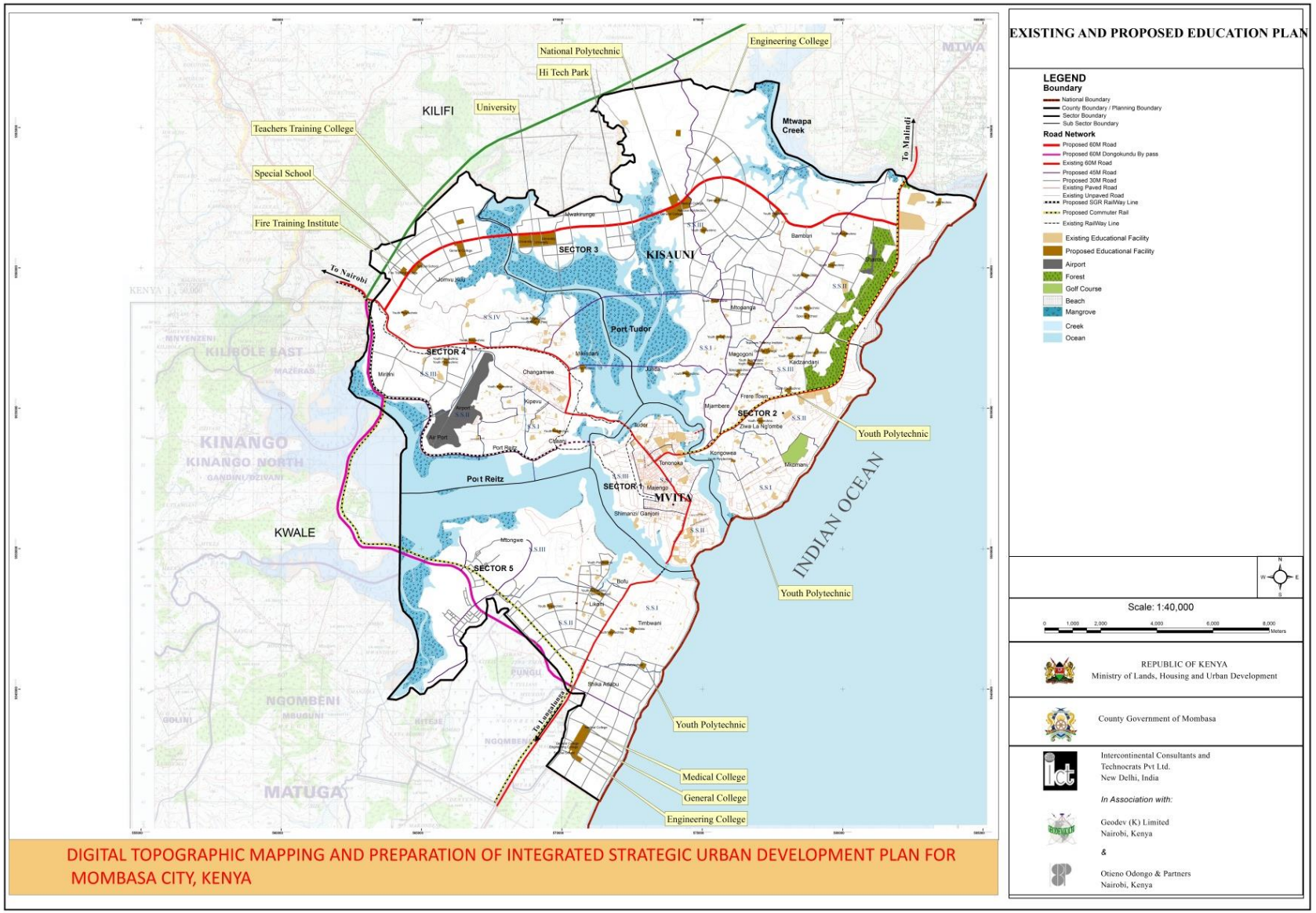


Figure 4-10: Existing and Proposed Public Purpose Use Plan

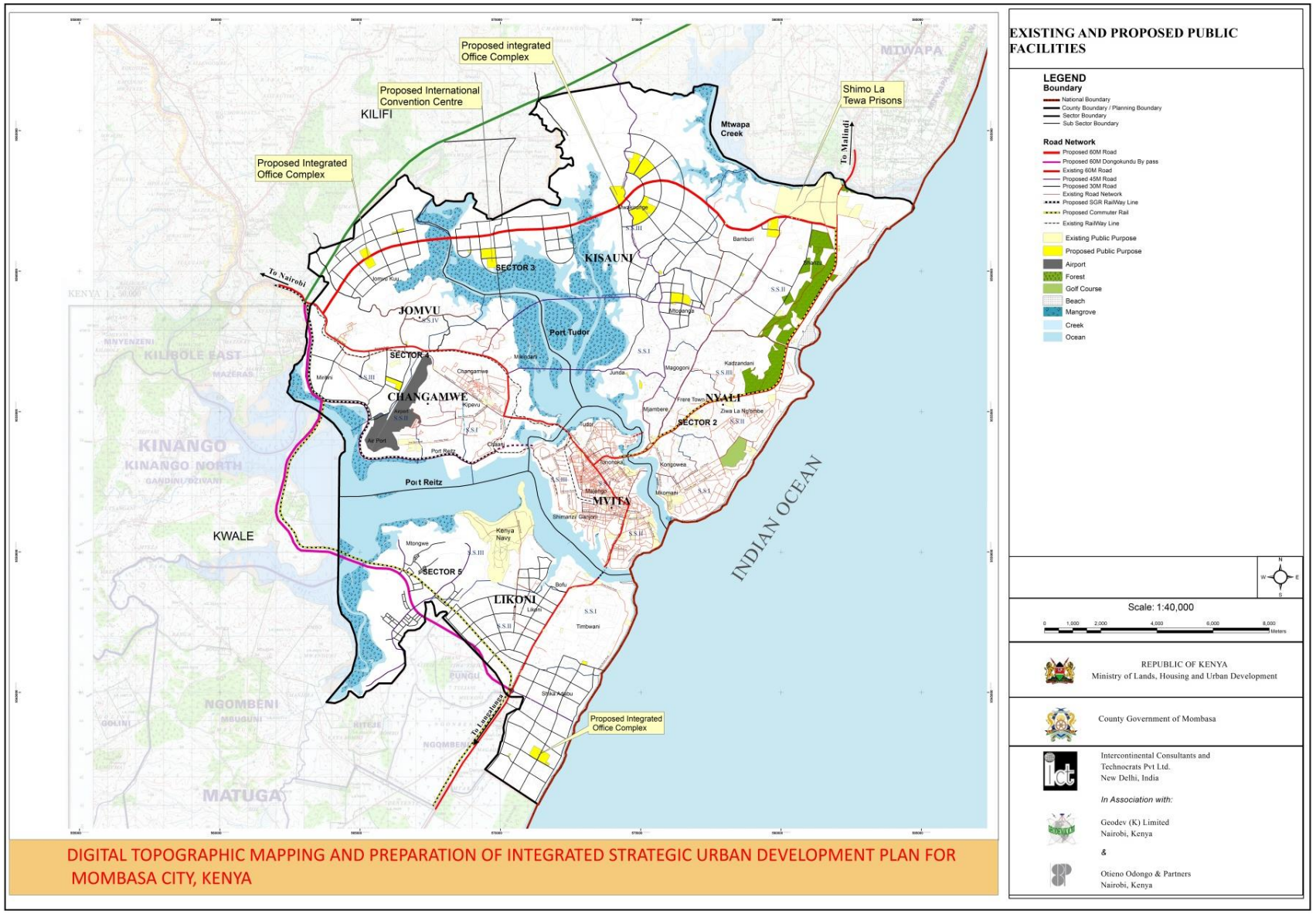


Figure 4-11: Existing and Proposed Public Utility Use Plan

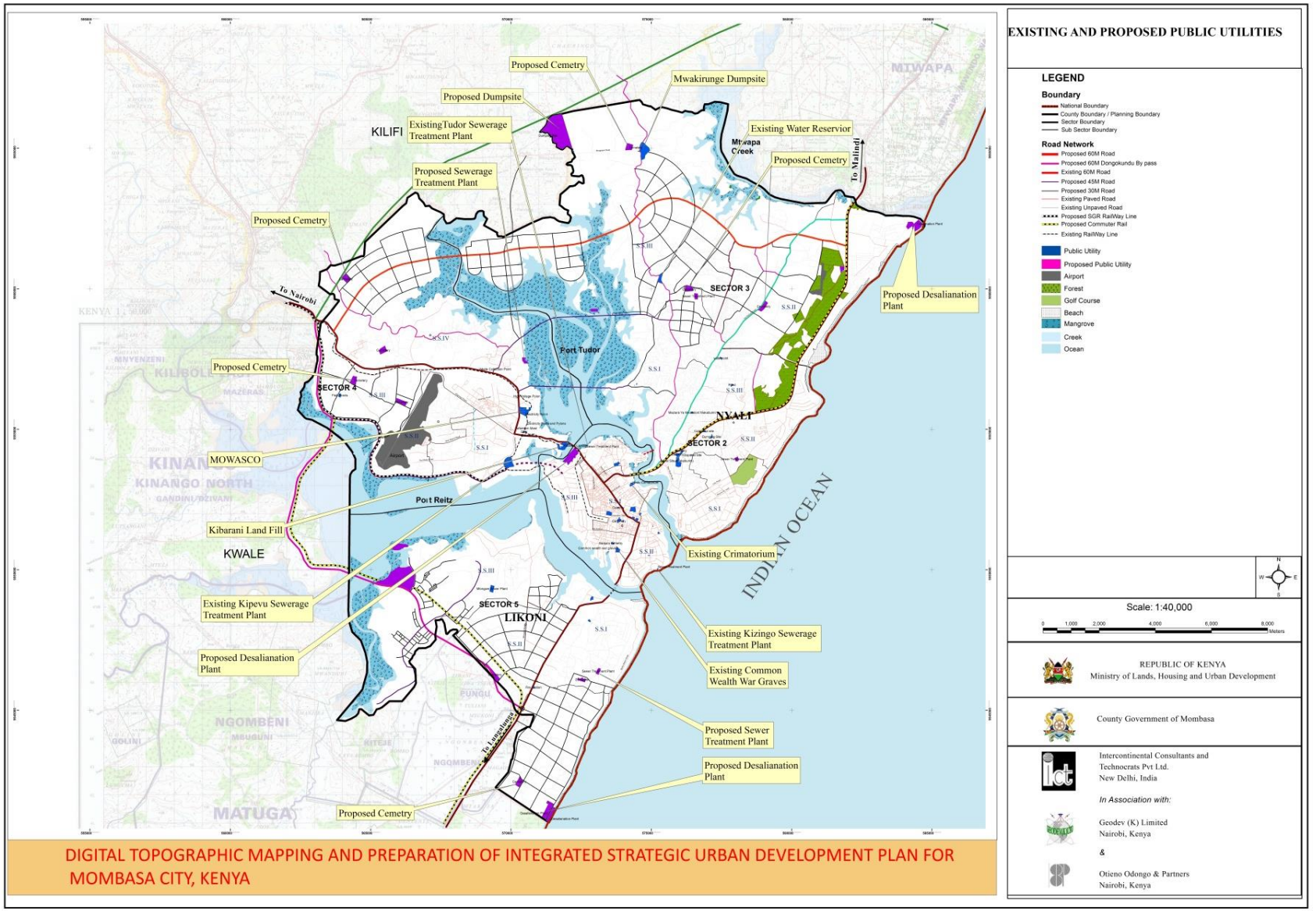
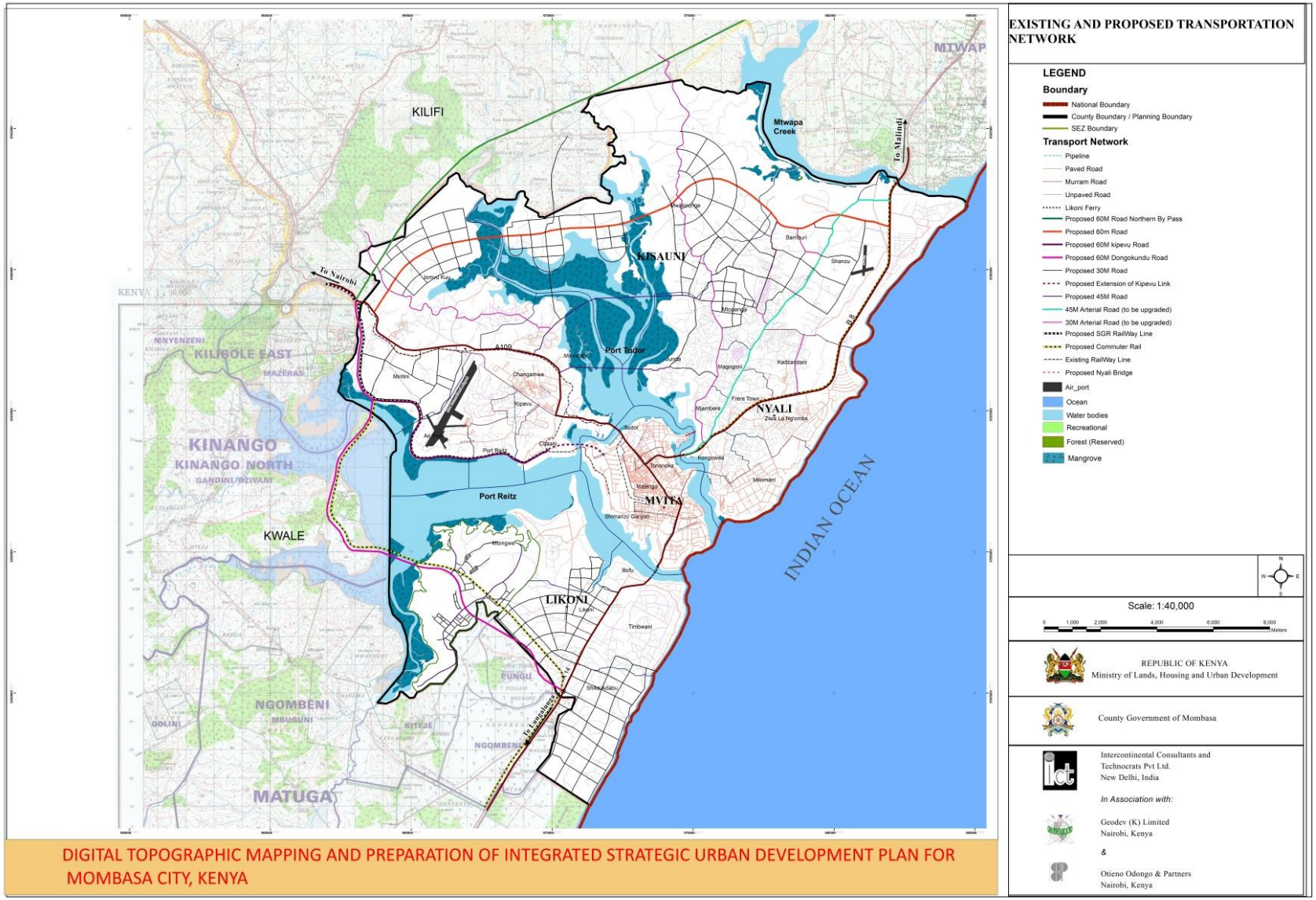


Figure 4-12: Existing and Proposed Transportation Use Plan



4.8.8 Recreational Land Use

Recreational areas are a tangible reflection of the quality of life in a city. They provide identity for residents and are a major factor in the perception of quality of life in a given urban area. These areas determine how liveable an urban areas is. Recreational facilities accounts for 1.96% of developable area. For sufficient provision of recreational facilities by year 2035, this plan has provided 8.19% of developable land. Some of the facilities proposed include play grounds, greens/parks, sports facilities like stadiums and amusement parks among others as shown in Figure 4.13.

4.8.9 Agriculture Use Plan

Urban agriculture acts as a supplementary source of livelihood of food and fuel for many households in an urban area. The agricultural potential that exists within the county must be exploited to the benefits of the locals. This plan therefore preserves the existing agricultural areas which occupies a total area of 6.75km^2. Figure 4.14 illustrates the agriculture use map of Mombasa.

4.8.10 Environmental Sensitive Areas

Within Mombasa County, there are environmentally significant areas such as forests and water ponds that are important because of their unique environmental qualities. They offer scenic beauty and provide habitats for plants and wildlife. This plan therefore proposes to conserve and protect the existing forest cover, water ponds and riparian occupying an area of 2.82km^2, 0.08km^2 and 0.39% respectively. Some of the existing quarries will be converted to other uses thus the reduction in share from 0.92% for existing to 0.46% in year 2035. Figure 4.15 presents the environmentally sensitive areas in Mombasa.

4.8.11 Other Land Uses

Land for Future Development: ISUDP proposes to reserve reserves 723 hectare land for future development, which accounts for 3.3% of the total proposed developable land.

Non-developable Land: ISUDP proposes no development on 282 hectare land which is below 0.5 m contour from sea level.

Figure 4.16 illustrates land reserved for future development in Mombasa.

Figure 4-13: Existing and Proposed Recreational Use Plan

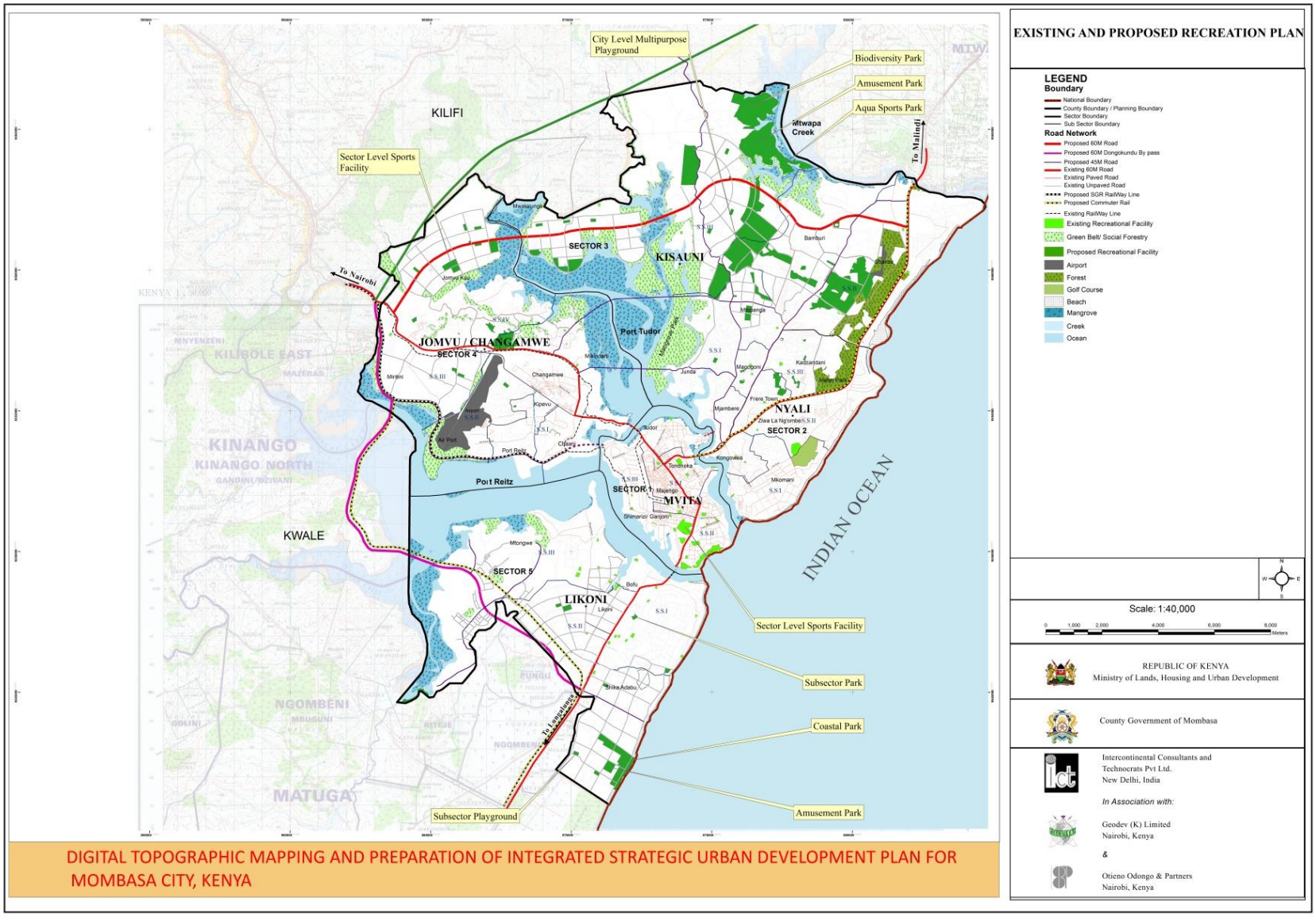


Figure 4-14: Agriculture Use Plan

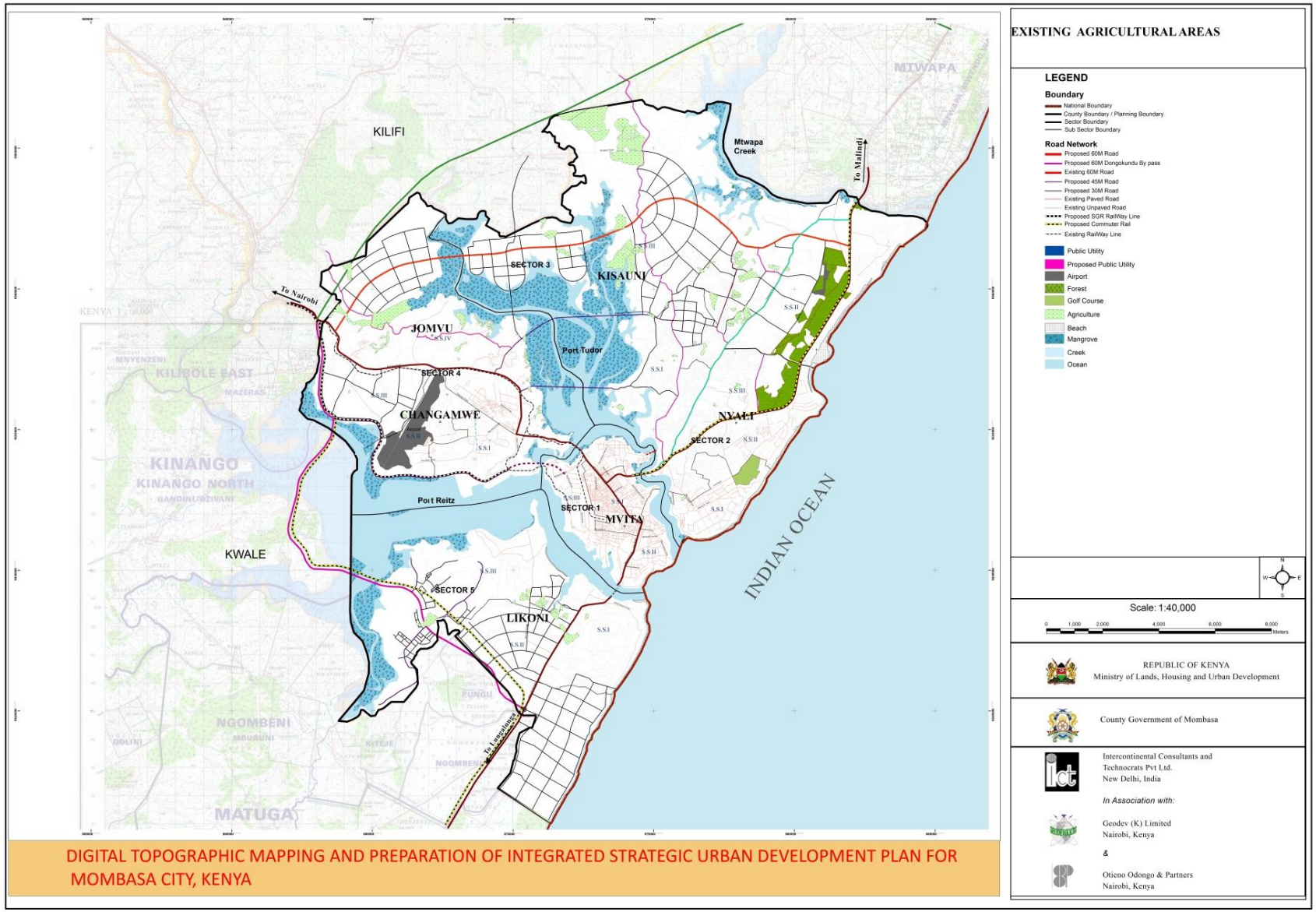


Figure 4-15: Environmentally Sensitive Area

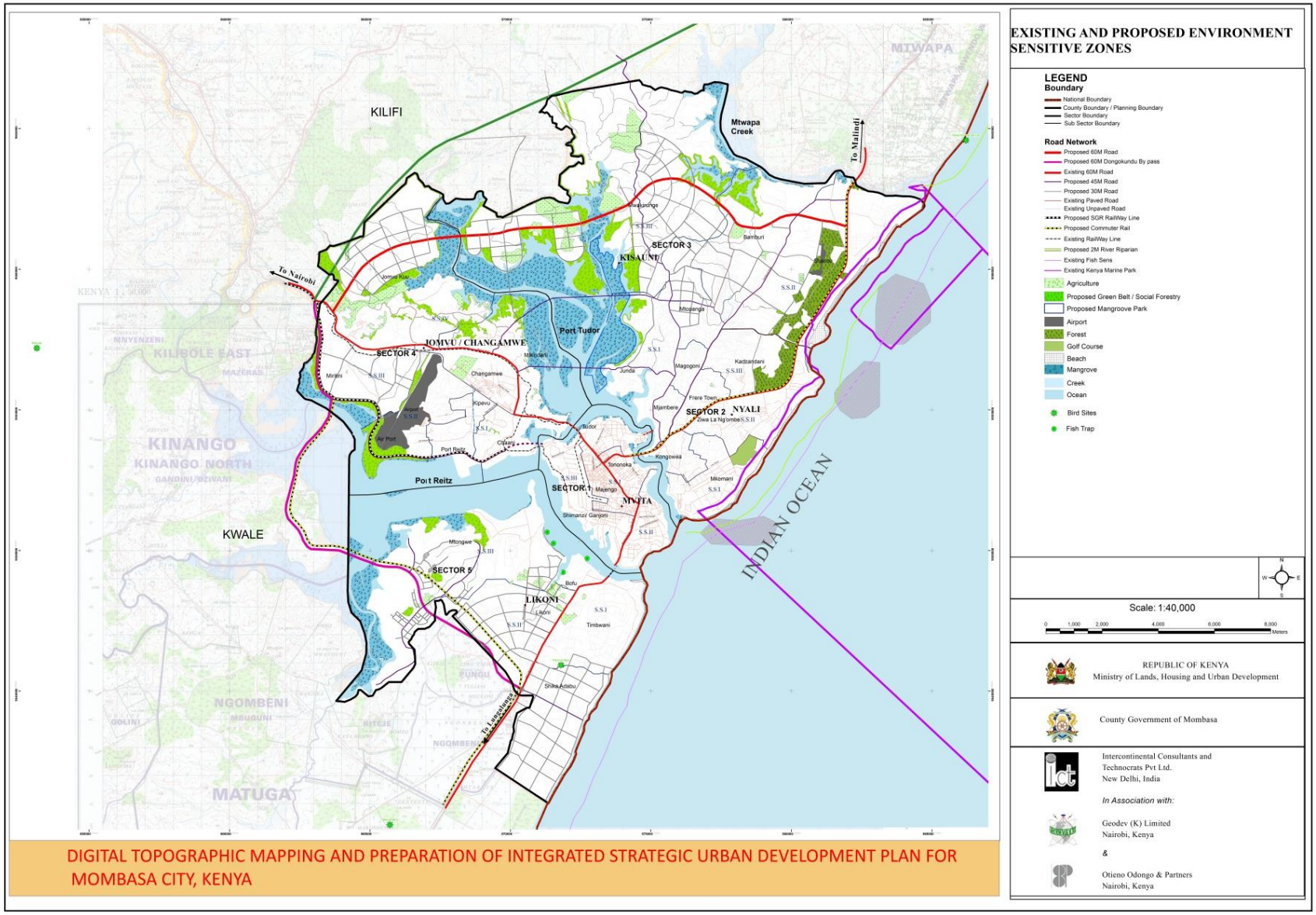
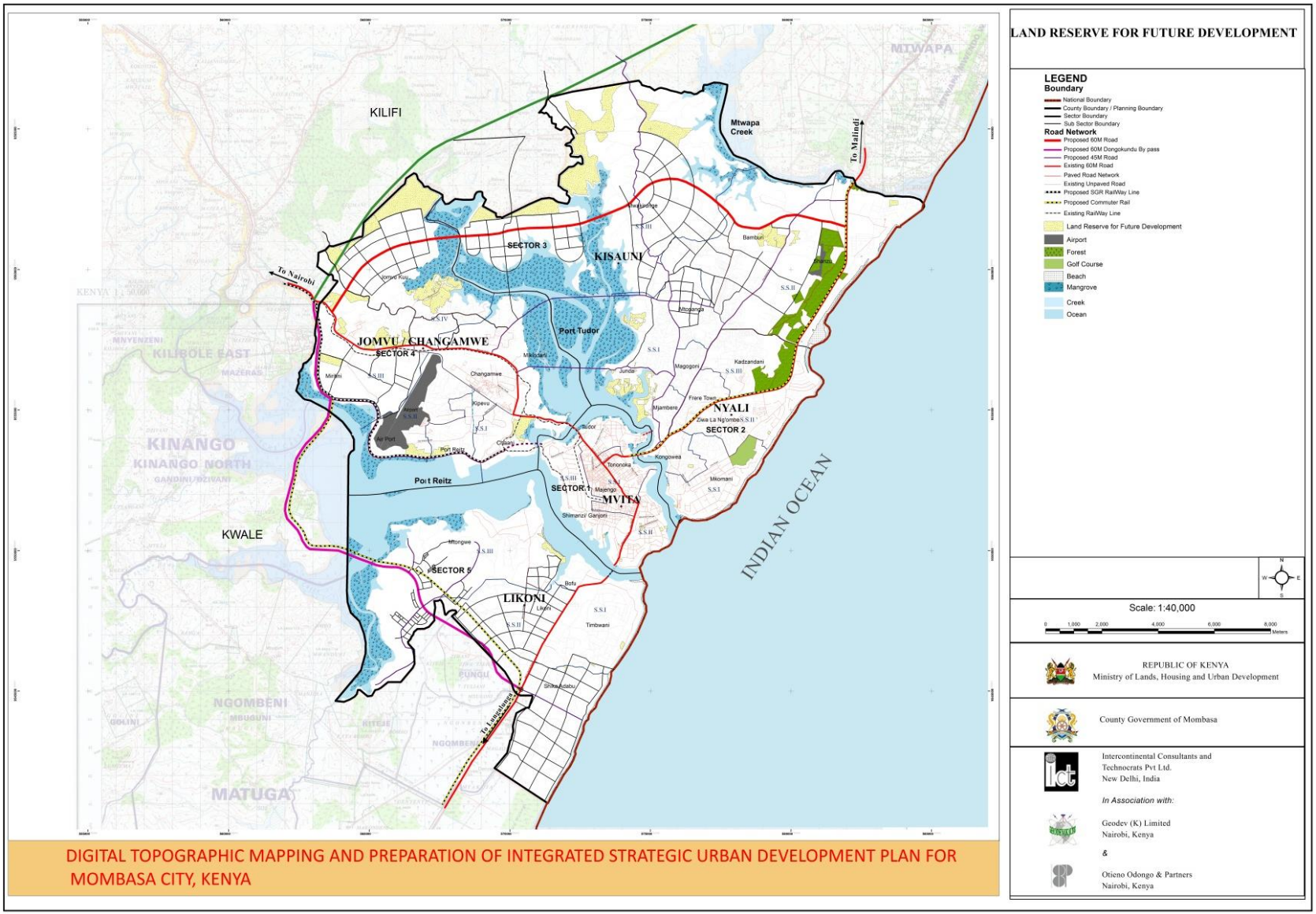


Figure 4-16: Land Reserve for Future Development



4.8.12 Land use at Sector Level

Based on urban profiling, sector level land use studies, and input by key informants this section presents broad indicative propositions for Mombasa to guide the development of various areas pending detailed studies. These propositions will ultimately inform land use policy directions for Mombasa:

i. Sector I - Mvita (Island)

These propositions mainly affect Mvita Sub-county that is the urban core for Mombasa:

- Promote mixed-use development
- Encourage densification and compactness – revise plot ratios and/or plot coverage upwards – (ref. Kizingo and Ganjoni)
- Undertake urban renewal/redevelopment of selected areas – Majengo, Tononoka, Mwembe Tayari, Shimanzi (industrial and residential), and Tudor
- Revitalize the Mombasa Old Town conservation by integrating a renewal component
- Redevelop the port area for purposes of growth, decongestion, and accessibility.

ii. Sector II and III - Nyali and Kisauni (Mainland North)

These propositions mainly affect Nyali (Sector II) and Kisauni (Sector III) that form the northern suburban and peri-urban growth areas for Mombasa:

- Promote mixed-use development, largely residential and commercial furnished with service centres of different identities:
    - *Mkomani Special Business District* – with nucleus at Nyali Cineplex
    - *New Nyali centre* – high income commercial development with specialized shops and professional offices around Nakumatt nyali
- Commercialization of sections of Lincks road in Nyali; upgrade/expand links road.
- Maintain existing character of Nyali.
- Develop a new high density high rise compact transit oriented township at Mwakirunge (Eco-city) along with proposed high capacity public transport corridor with as Sub-CBD with work centres, key community facilities such as colleges, health facilities, world class stadium and sports facilities.(refer figure 4.17)
- Develop international level recreational zone Mtwapa creek from Mwakirunge to Shanzu with facilities like bio-diversity park, zoo, amusement park, integrated with water sports facility etc.
- Develop Mtwapa creek for water sports and high density- high income residences and the same character can be replicated towards Kilifi/Mtwapa side of the creek.
- Informal settlement improvement largely through redevelopment. This should address the squatter menace, especially around Kiembeni/Chembani-Vikwatani area. Initiate negotiations with land owners and squatters towards possibility of acquisition of the land.
- Consider relocation of the prison to outlying areas like Kilifi County in long run and replace this with amusement facilities such as stadium.
- Establish retail market at Majaoni to take advantage of peri-urban production
- Develop Serena-Shanzu corridor for tourism and hospitality.
- For Kisauni area, discourage proliferation of roadside service points such as petrol stations to avoid street congestion.
- Develop Maunguja II area as knowledge city on proposed high capacity public transport corridor connecting Nairobi road to Malindi road with a university, hi-tech industrial park, education park, international convention centre, international trade fair ground and institutional and industrial housing with all basic socio-cultural facilities. (refer figure 4.18)

Figure 4-17: Eco city – Kisauni (Concept Plan)

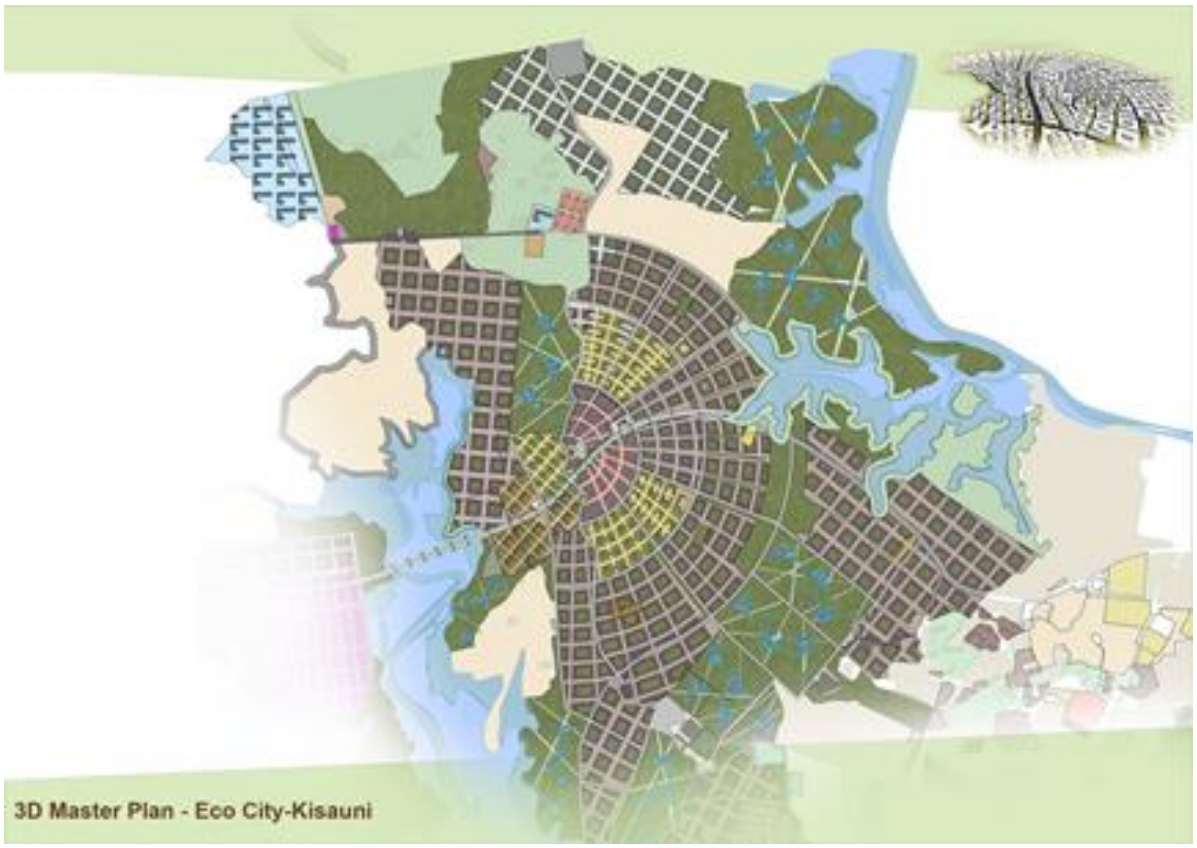
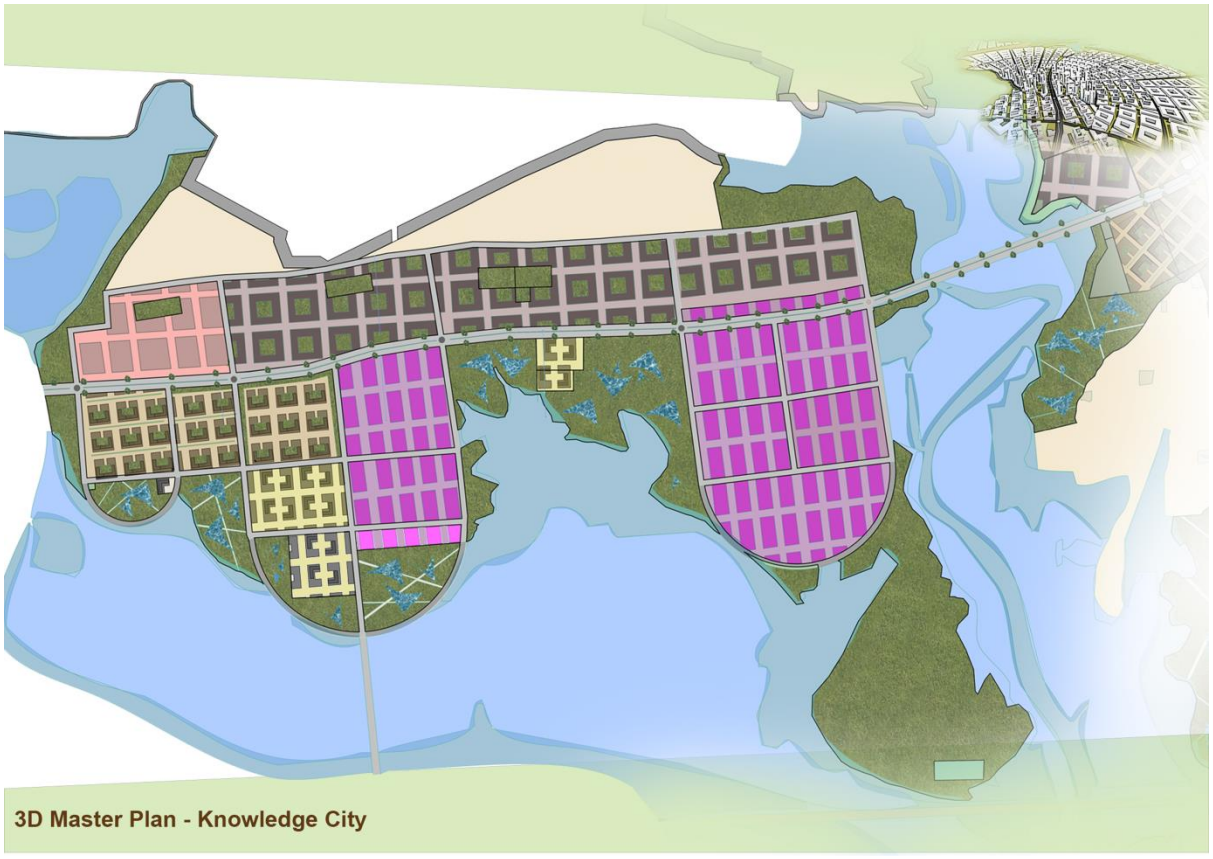


Figure 4-18: Knowledge City –Kisauni (Concept Plan)



iii. Sector IV - Changamwe and Jomvu (Mainland West)

These propositions mainly affect Changamwe and Jomvu Sub-counties that form the western suburban and peri-urban growth areas for Mombasa:

- Promote as industrial zone and transport zone based on the Port of Mombasa, oil refinery, and international airport
- Develop a new high density high rise compact transit oriented township at Jomvu Kuu (New Jomvu city) along with proposed high capacity public transport corridor with as Sub-CBD with work centres, key community facilities such as colleges, health facilities, stadium and other sports facilities.
- Develop high-density residential facilities to support low-income labour force working at the industrial establishments
- Redevelopment/ regularisation of Informal settlements in Chaani, Jomvu, Mikindani, and Miritini areas
- Link Mainland West with Mainland North by water transport (Tudor creek) to decongest the CBD and to link the Industrial West with residential areas in Kisauni, Bamburi and Nyali.
- Upgrade access roads – open link from new container terminal at the port and the southern by-pass and to Miritini area
- Shift existing CFS (container freight stations) from Nairobi road to the allocated site.

iv. Sector V – Likoni (Mainland South)

These propositions mainly affect Likoni Sub-county that forms the southern suburban and growth areas for Mombasa:

- Provide for growth of the Port of Mombasa (extension/decentralization) to accommodate petroleum industry (Shika Adabu) and Special Economic Zone (Dongo Kundu Area)
- Develop a new high density high rise compact transit oriented township at Dongo Kundu Area - Shika Adabu (Coral city) along with proposed high capacity Dongo Kundu by-pass and SGR with as Sub-CBD with work centres, key community facilities such as colleges, health facilities, stadium and other sports facilities.
- Informal settlement improvement and regularization (including the Waitiki farm)
- Develop Likoni's Shelly beach area for recreational purpose and bring it to the level of north coast and south coast.
- Promote fishing activities (provide fish processing facilities)
- Likoni Channel – consider findings of ongoing feasibility study for overpass.

The sector wise proposed land use has been presented to provide a more detailed picture of proposed land use.

Figure 4.19 illustrates land use map of Mvita (Sector I)

Figure 4.20 illustrates land use map of Nyali (Sector II)

Figure 4.21 illustrates land use map of Kisauni (Sector III)

Figure 4.22 illustrates land use map of Changamwe- Jomvu (Sector IV)

Figure 4.23 illustrates land use map of Likoni (Sector V).

Figure 4-19: Proposed Land use – Sector 1 (Mvita)

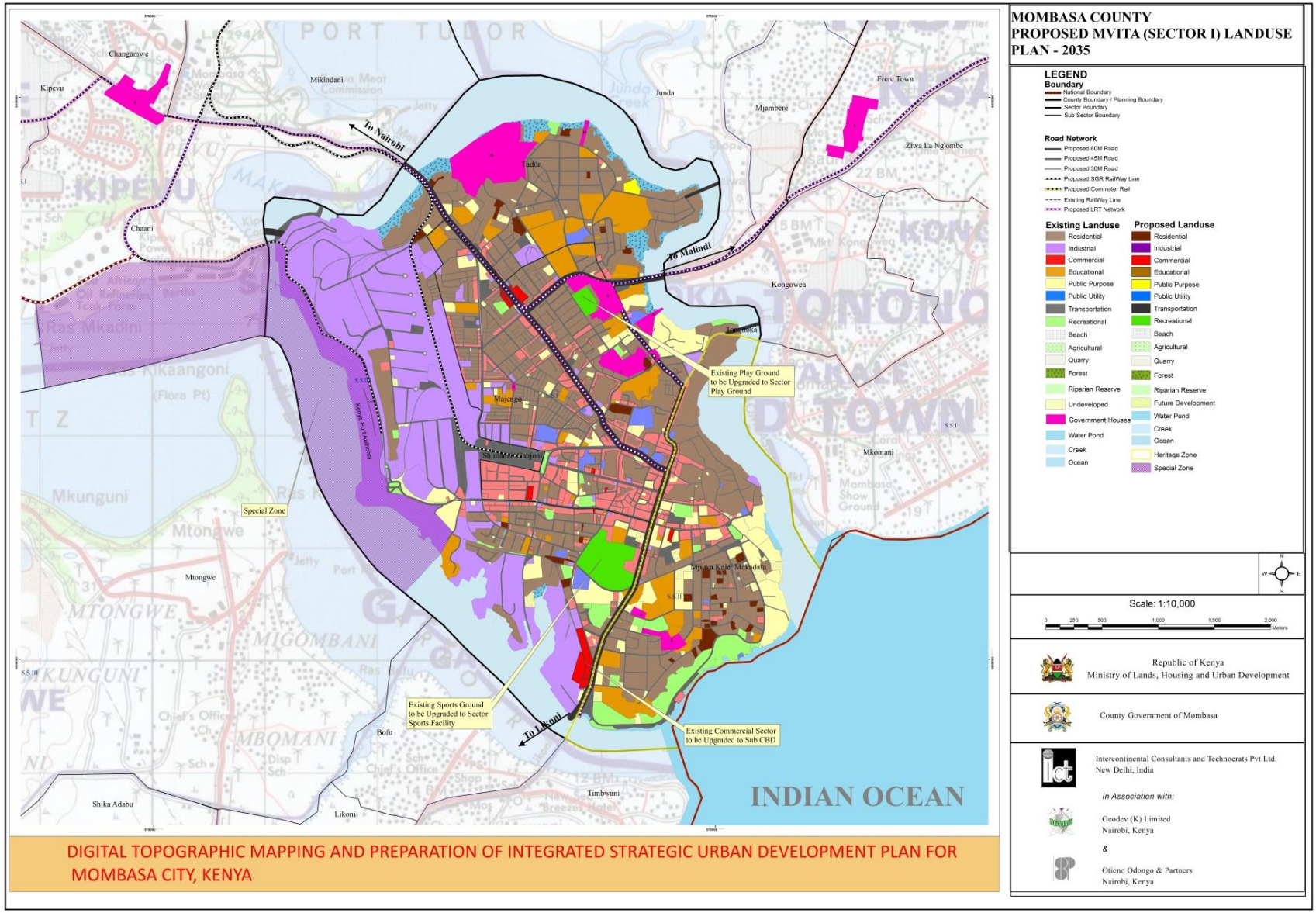


Figure 4-20: Proposed Land use – Sector II (Nyali)

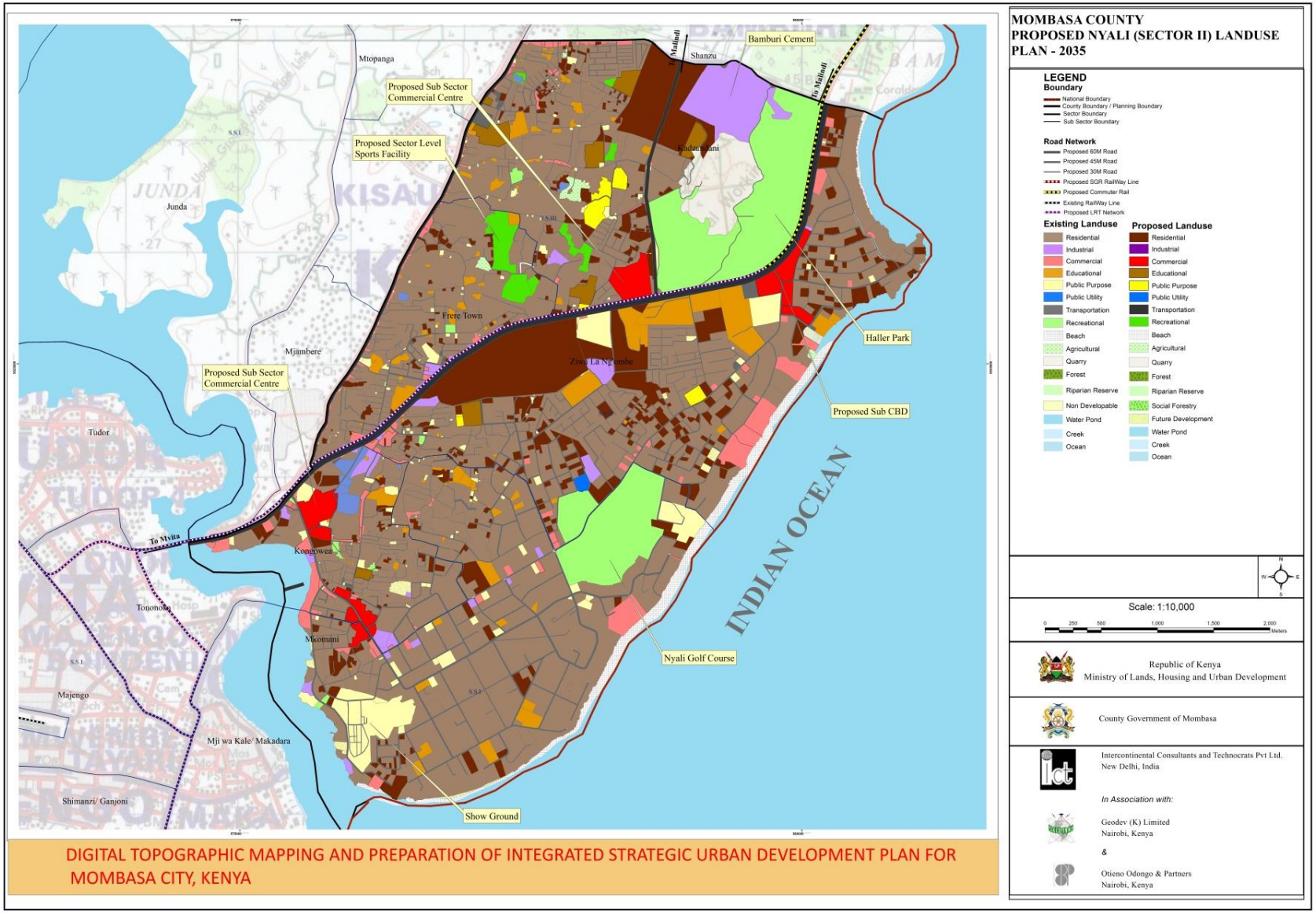


Figure 4-21: Proposed Land use-Sector III (Kisauni)

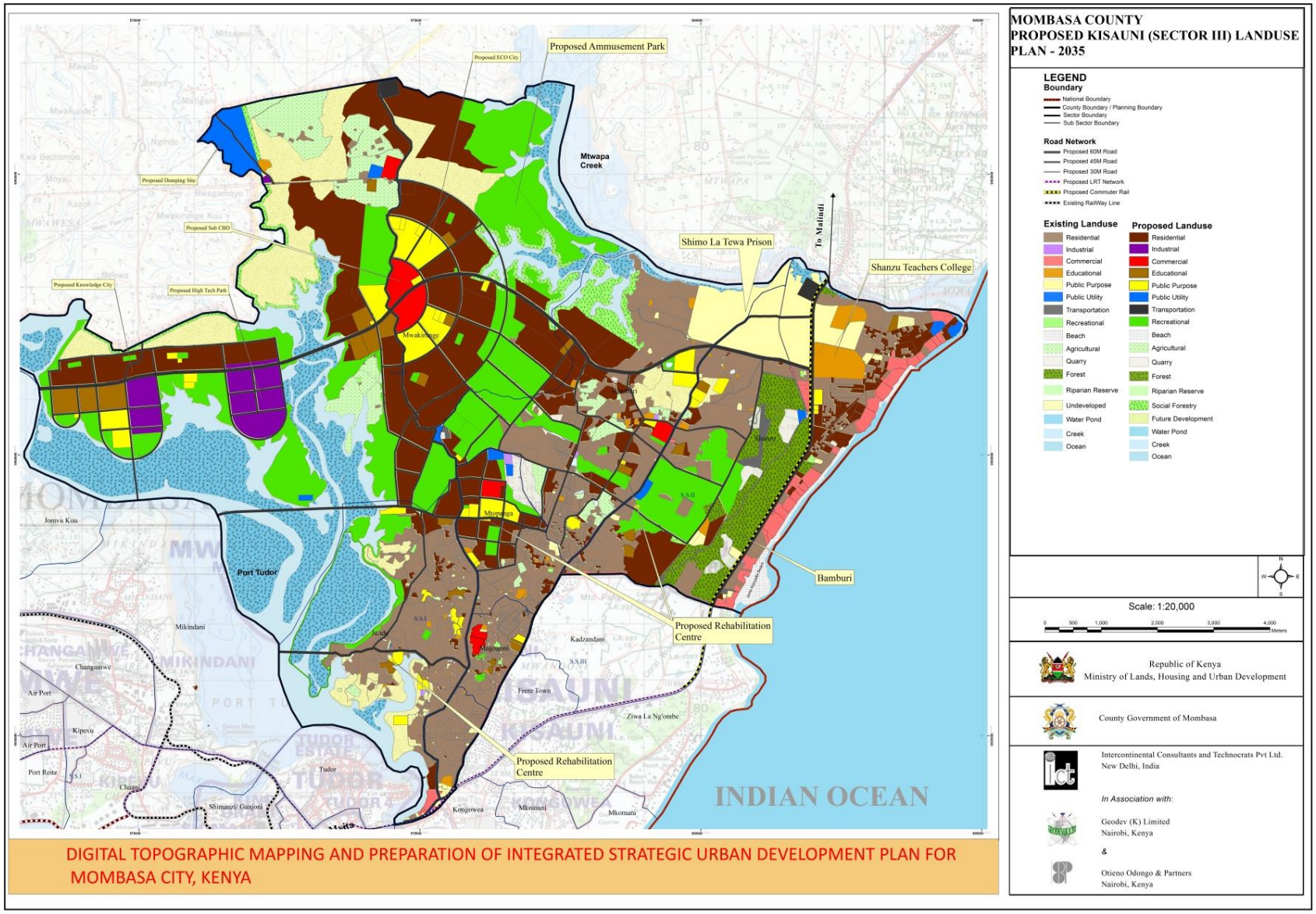


Figure 4-22: Proposed Land use – Sector IV (Changamwe- Jomvu)

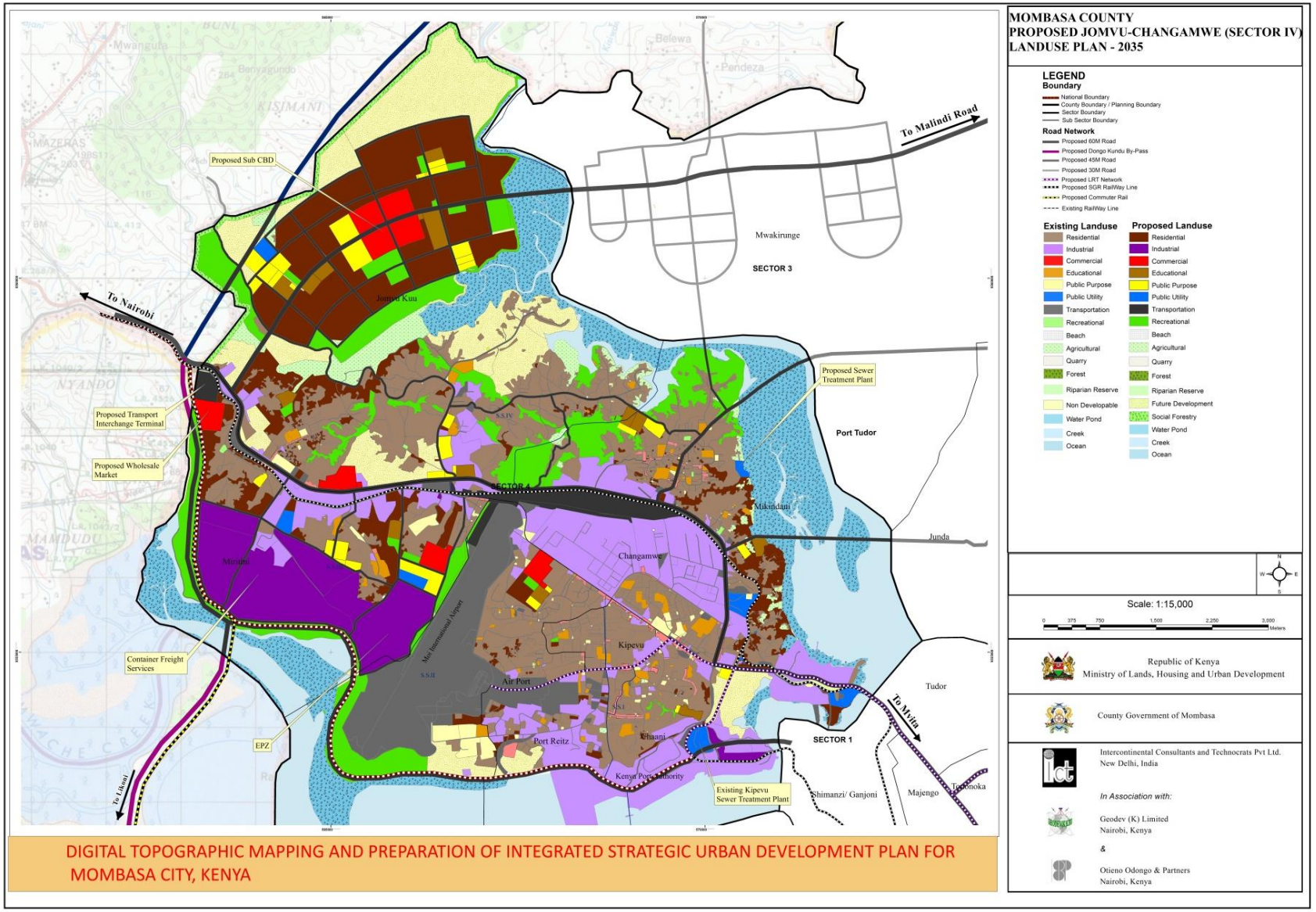
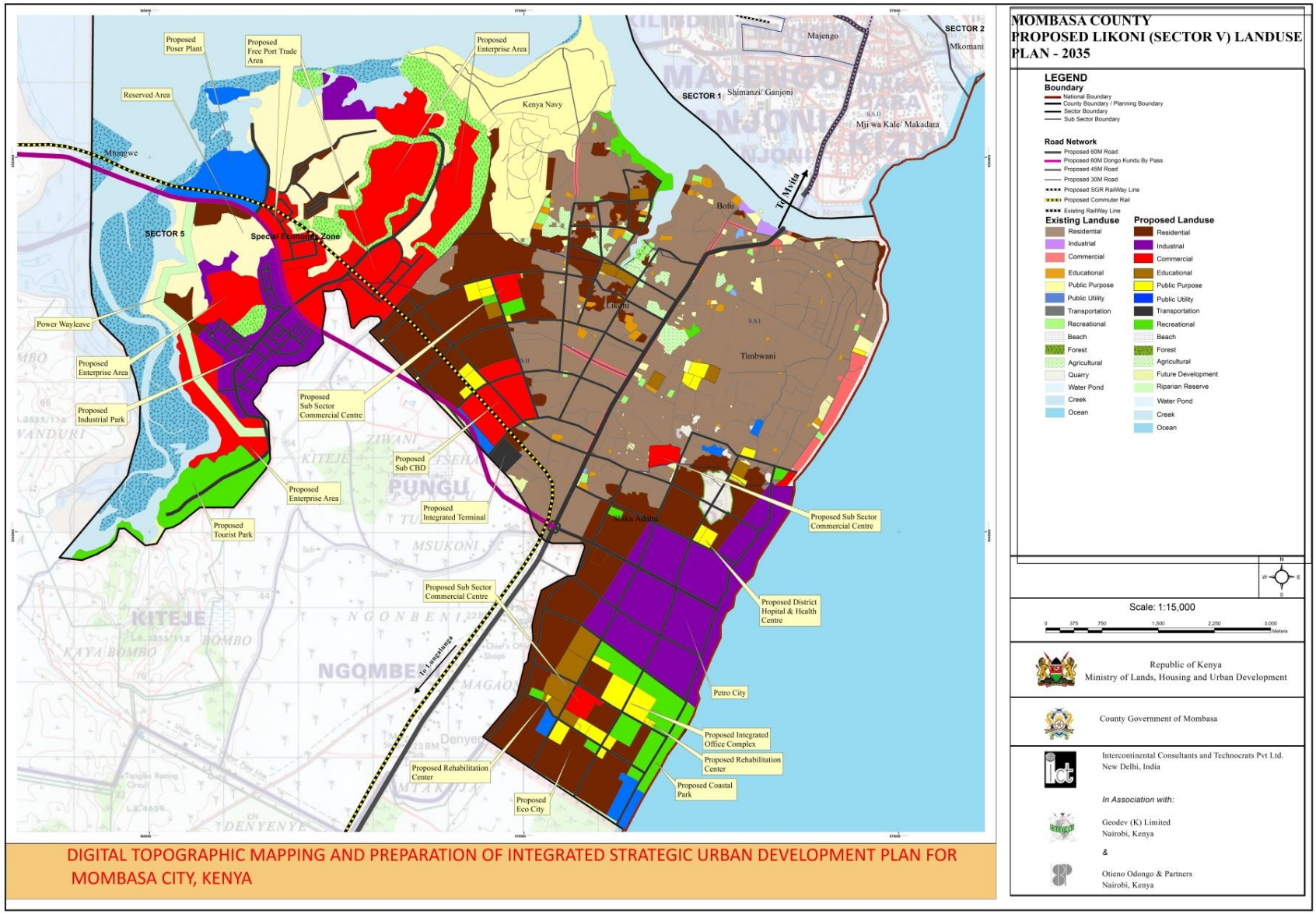


Figure 4-23: Proposed Land use – Sector V (Likoni)

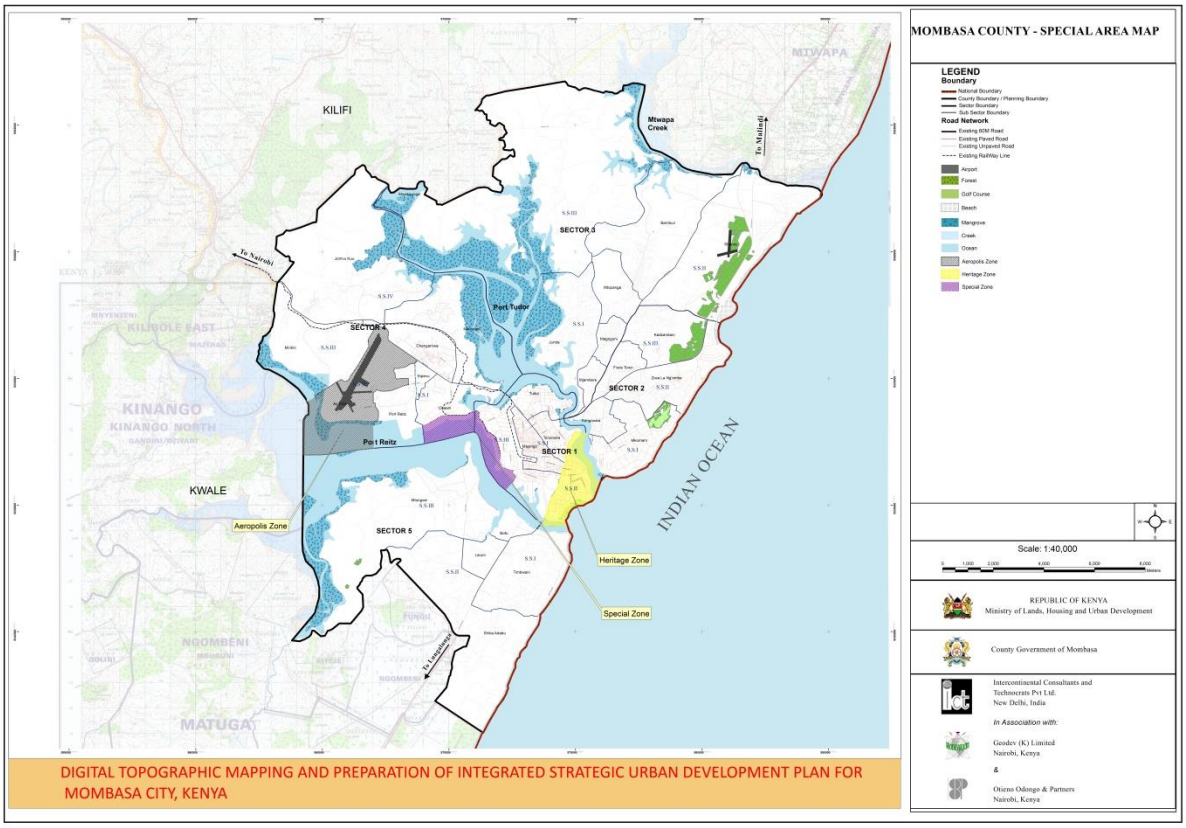


4.9 SPECIAL AREA

The Special Area as defined in the ISUDP is (i) Old Town (ii) Port area and (iii) Airport district (refer Figure 4.24). These are characterized by distinct character and different land uses. Therefore, it is important that the areas, which are already established with identified uses, continue to play an active economic role.

The strategy is to provide suitable framework for allowing activities appropriate to the character of the areas as per the individual schemes having greater flexibility in terms of permitting variety of uses. Required parking and open spaces will have to be provided as per the norms. The regulations for Special Area are different from other areas. The objective is to bring these areas within overall spatial planning framework of city.

Figure 4-24: Proposed Special Area



4.9.1 Old Town

Mombasa old town has a rich history dating back to the 9th century AD. From an economic perspective, the area has an old port and harbor, a market and system of informal bazaars, as well as retail shops and cafes. In terms of tourism, the area has key attractions of a cultural and historical nature, including the Fort Jesus museum and a collection of monumental and decorated historical buildings. It also hosts key civic and administrative offices and banks. Other than 2 major spines – Nkrumah road and Makadara road, the larger district is served by a fairly old organic and pedestrian-based road network that filters through local residential quarters and street bazaars to emerge at different locations along Digo road, which forms the edge between what are perceived as the Old and the new town quarters. For details refer chapter 7 – Action Area Plan.

4.9.2 Mombasa Airport (Aeropolis)

The aeropolis is built around the Moi International Airport, Mombasa. Moi International Airport is located 10 km west of Mombasa city (Figure 4.1). The Mombasa-Nairobi Highway

runs adjacent to the airport, and is the main route of access between Nairobi and the airport. This special planning area is defined by the need to manage land use and human settlement related activities happening within the airport's area of influence. Spatially, the special area is defined as all that area bound by Magongo road, Port Reitz road, the Port Area, Kipevu link road and the Dongo Kundu bypass to join with Mombasa-Nairobi Highway near Miritini.

The airport is the second the biggest and one of busiest in Kenya. It is one of the four airports (JKIA/Nairobi, Moi/Mombasa, Kisumu, and Eldoret) that connect Kenya to the world, especially through charter plains that carry tourists to the coastal circuit. The airport offers services such banking, taxis, car hire, tour bookings, bars, restaurants and other services located at the arrivals.

The Aeropolis is herein defined as an independent zone to provide for a range of airport and aviation related use and development opportunities as well as a limited range of industrial and other use and development. The Plan recognizes that the primary use of the zone shall be an airport but takes into consideration that there may be opportunities to use the land surrounding the aerodrome facilities for other uses and developments.

Broad Proposals

Upgrading of roads and related services: this should include implementation of the Northern corridor transport improvement projects by the Ministry of roads that are networked to the airport. This includes the widening of the 2 km of access road to the Moi International Airport (Barrack Obama Road), improvement to the approximately 2 km access to Port Reitz Hospital (Old Airport Road), 1 km of Mbaraki Road/Mnazi Road, 1 km of Archbishop Makarios Road, and 360 m of Mwakilingo Street and construction of a 4-lane flyover over the railway line, from Mwakilingo Street to Lumumba Road.

Operational Controls or Restrictions: in order to reduce noise around the airport, noise preferential routes (i.e. take-off paths) should be developed to minimize the noise impact on local communities by ensuring that departing aircraft fly along corridors over those areas that are least populated as far as is practicable.

Management of growth of human settlement by restricting such growth within permissible zones and subjecting the same to recommended height restrictions. This will also entail the relocation of parts of settlement that lie within restricted areas to recover such land.

Noise Mitigation: this will largely entail noise mitigation by management; there will be need to monitor the way airlines and aircraft types operate through a noise monitoring and flight-track keeping system. This will entail recording the levels of noise generated by departing and arriving aircraft as well as their departure and arrival tracks. Noise categorization of aircraft will enable the airport to consider a mix of aircraft types by the noise levels they produce, in order to achieve the maximum number of allowed air transport movements at certain times of the day whilst controlling the overall noise emissions to the environment. Aircraft operators should be encouraged to adopt quiet operating procedures and to observe published noise abatement procedures.

Land use Zoning: there shall be several ways of associating or separating functions within the airport zone based on functional and site location requirements. Figure 4.25 presents Aeropolis plan.

i. ***Airside zone versus Landside zone:*** The airside zone is composed of the runway and core facilities of the airport while the landside zone shall feature general support

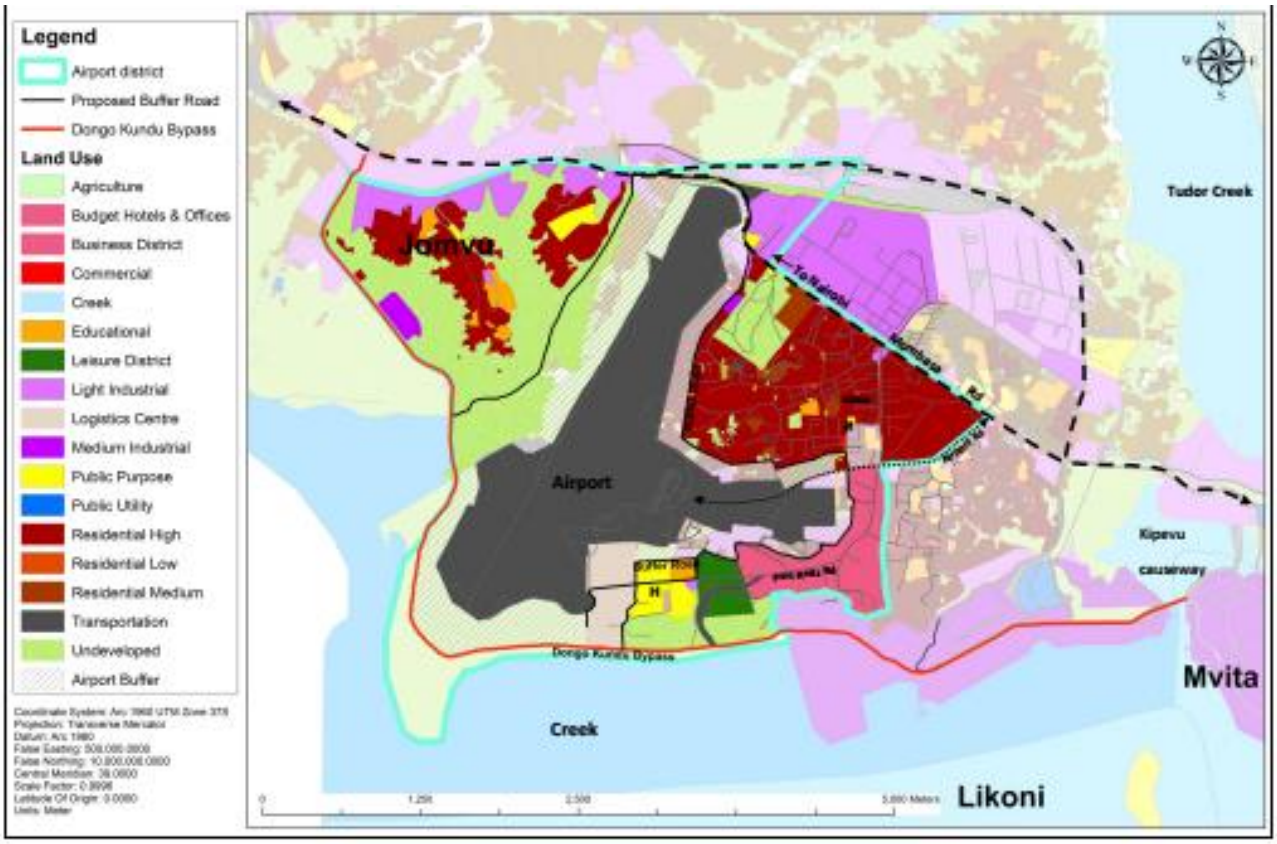
facilities and other uses compatible with the airport operations.

ii. ***Public Safety Zones:*** there shall be defined areas of land at the ends of the runways within which development is restricted in order to control the number of people on the ground at risk of death or injury in the event of an aircraft accident on take-off or landing. There should be no increase in the number of people living, working or congregating in these zones and instead, over time, the number should be reduced as circumstances shall allow.

iii. ***Obstacle Limitation Surfaces:*** The Obstacle Limitation Surfaces apply to an area where airport operations and airspace are critical and this area needs to be protected from inappropriate development.

iv. ***Buffer Zone:*** there shall be established through land recovery or acquisition a buffer zone of about 60 metres wide around the airport in form of a perimeter road and greenbelt to serve as transition between the airside and the landside zones.

Figure 4-25: Special Area - Aeropolis



Land acquisition strategy: The controls proposed in this plan may also require the airports authority to take steps to acquire properties, through imminent domain (compulsory acquisition) and acquisition of rights over the affected land, with a view to clearing the land if, within certain locations, third party risks are assessed as being above tolerable levels. In some cases an alternative use for the land may be acceptable. Such acquisitions will also be necessary for strategic growth purposes. Thus future development plans will be required to take account of and be consistent with these guidelines.

4.9.3 Mombasa Port

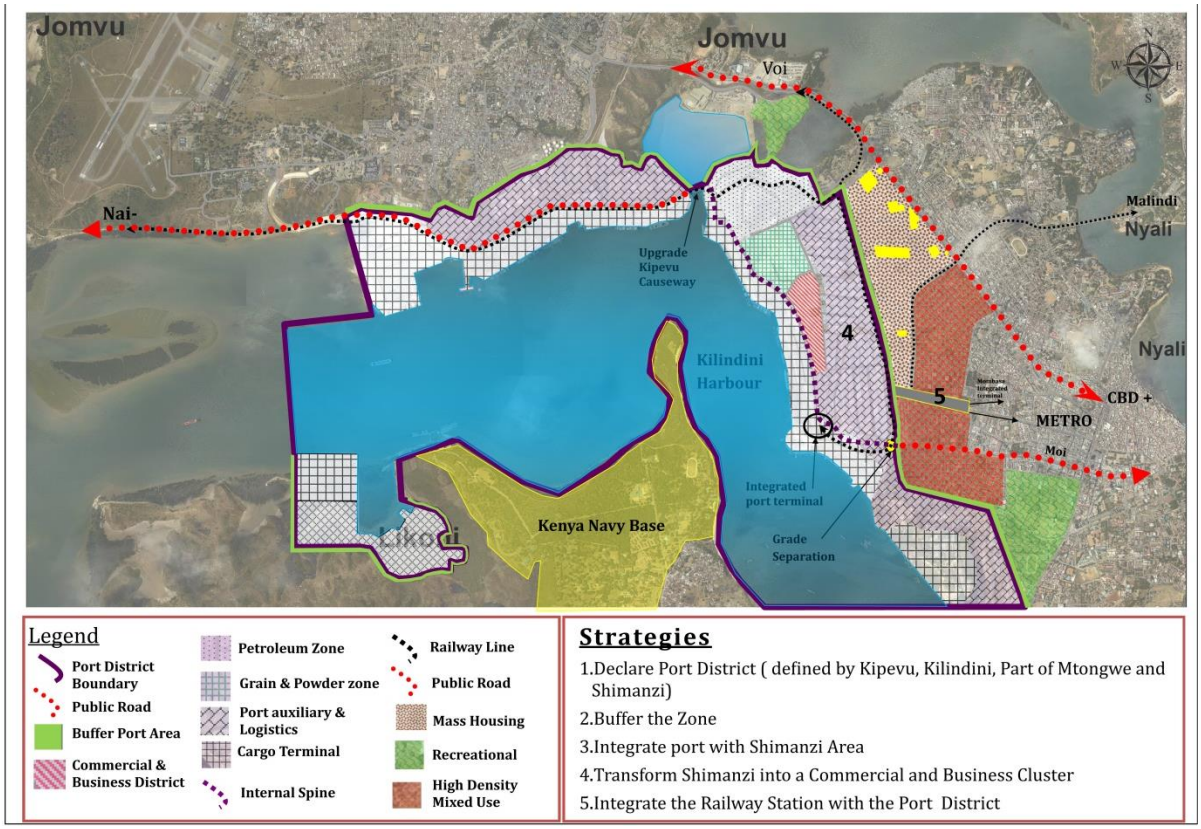
This Port Area Plan applies to the area demarcated as Port Area covering part of Port Reitz, Shimanzi, Kilindini, and part of Mtongwe. This plan should be read in conjunction with the action area plan for Mombasa's CBD and can be seen as supplementary to it. (refer Figure 4.26)

Existing Situation

The port area currently depicts the following:

- Disjointed development of port and city
- Congestion – cargo and traffic
- Poor connectivity/accessibility
- Old/outdated infrastructure and buildings
- Land use incompatibility – residential and port functions, including petroleum industry
- Physically constrained site and vulnerability with respect to safety

Figure 4-26: Special Area - Port (Location)



Expected Benefits

- Enhance relationship between port and city.
- The increase in real estate property values,
- The preservation historical and local heritage also re-use of historic building,
- The improvement of water quality and water ecology by means of the advanced management processes
- Providing of opportunities for new uses and activities, representing of new economic regeneration opportunities for declining inner city areas,
- Supporting tourism not only at the city level, but also regionall, nationally and internationally.

- Providing new work areas and creation of job opportunities.
- The improvement of the environmental conditions in the port area.
- The advancement of better services of transport and social services
- Optimization of relationship between water and the city.
- Encouraging of economic investment on formerly degraded areas.
- Improvement of the city's image which provides right marketing strategies.

Broad Proposals

The compatibility of a port with its environs is made possible by proper planning of the port, control of pollution generating sources and land use planning of the area surrounding the port. The aim is to provide the best possible conditions for the needs of the port, community in the surrounding area and the ecology of the environment.

Port planning must be seen in the context and part of an area-wide comprehensive planning and land use programme. The situation of the port in terms of location, size and configuration need to be coordinated with patterns of residential, industrial, commercial and other land uses of the area, taking into account the effects of the port on the people, flora, fauna, the atmosphere, water courses/ocean and other facets of the environment.

It is advisable to control land in the vicinity of the port so as to obviate possible conflict between port and city traffic but also to avoid experiences arising from non-conformity of purposes or land uses.

Thus it is highly recommended to link the approval of all developments within Port Area with the County's building/land use approval system (including any expansion or alteration of land use) to enable systematic provision for development of commercial business planning in the county. This implies that:

i. Any development should be subjected to guidelines provided by relevant authorities (NEMA, Coast Development Authority, Maritime Authority, Local body).
ii. Any building construction within port premises will be permitted only after obtaining approval from the local development authority.

Specific Proposals (Actionable)

It is recommended that the future development of the Port Area be anchored on the following:

- Declare Port District as Special Area (defined by Kilindini, Kipevu, Shimanzi, and Part of Likoni, Port Reitz, Mtongwe)
- Create a buffer Zone around the port district
- Integrate the port with its context:
    - ✓ Upgrade Kipevu causeway and link the port functions on Mombasa Island to Port Reitz and to Dongo Kundu by-pass through Kipevu Link
    - ✓ Upgrade Moi Avenue
    - ✓ Develop and integrate port with rail system to Metropolitan Mombasa and Beyond
    - ✓ Integrate port with Shimanzi Area and transform Shimanzi into a Commercial and Business Cluster

- Rehabilitate local transport network integrating both road and rail to enhance accessibility within the port area
- Renewal/upgrading of port auxiliary infrastructure
- Integrate the Railway Station with the Port Area, preferably as an integrated station (road and rail)
- Development of high density clusters of housing and mixed use development adjacent to the port area to support labour/human resource and business components
- Control of pollution, especially of the sea ecosystem from solid waste waste proliferation and spillage of oil and other effluent.
- The adoption of corporate social responsibility (CSR) by the port management to engage in general upkeep and improvement of the port area and its environs, including beautification, occasional clean-ups, provision of communal infrastructure in public spaces, and security installations.
- Kenya Navy Base and Mombasa SEZ: It is advised that the County jurisdiction together with port management consult the national government through Director of Physical Planning for integration of these functions with the broader ISUDP for Mombasa (refer Figure 4.27 and 4.28)

Figure 4-27: Special Area - Port (1)

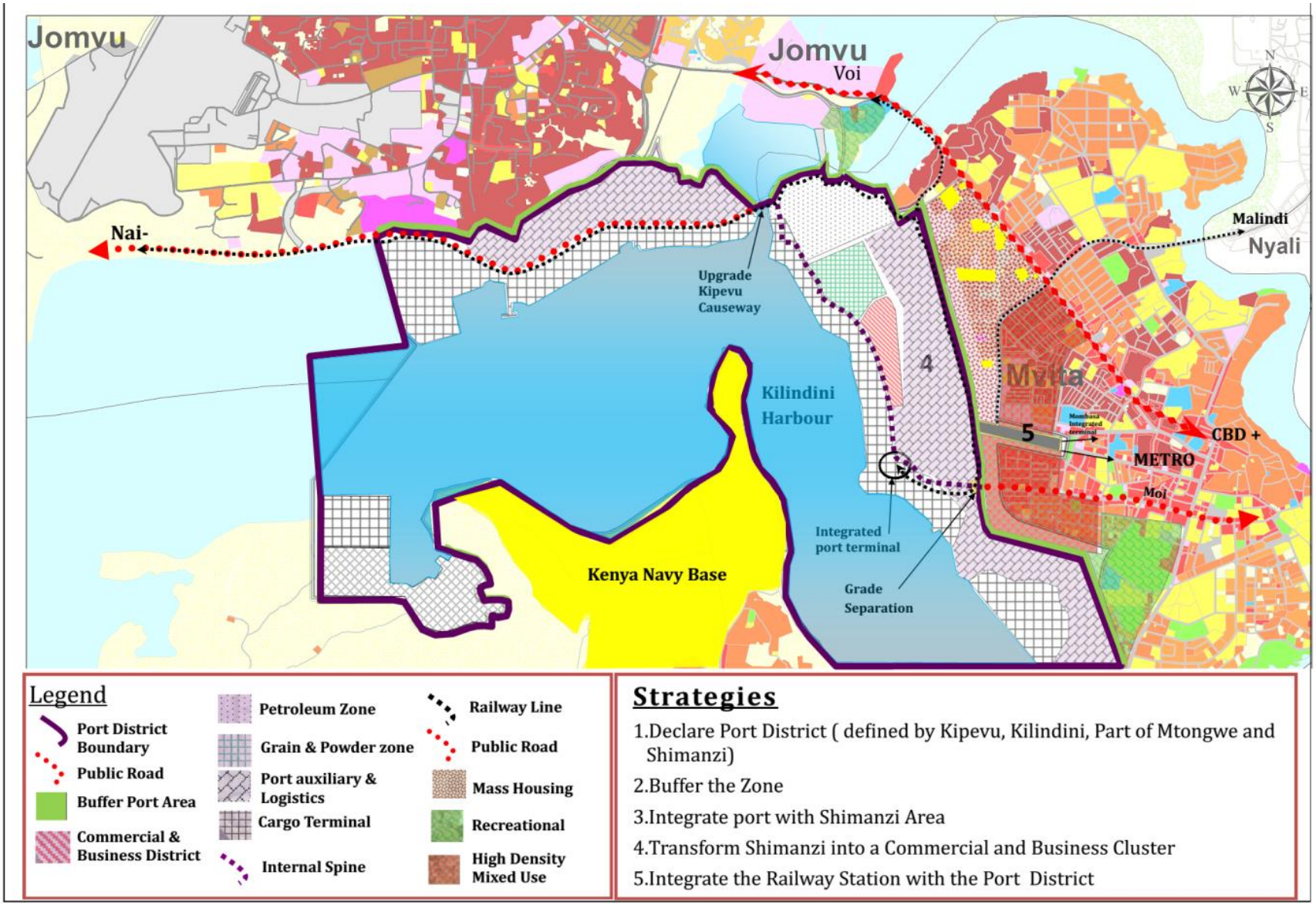
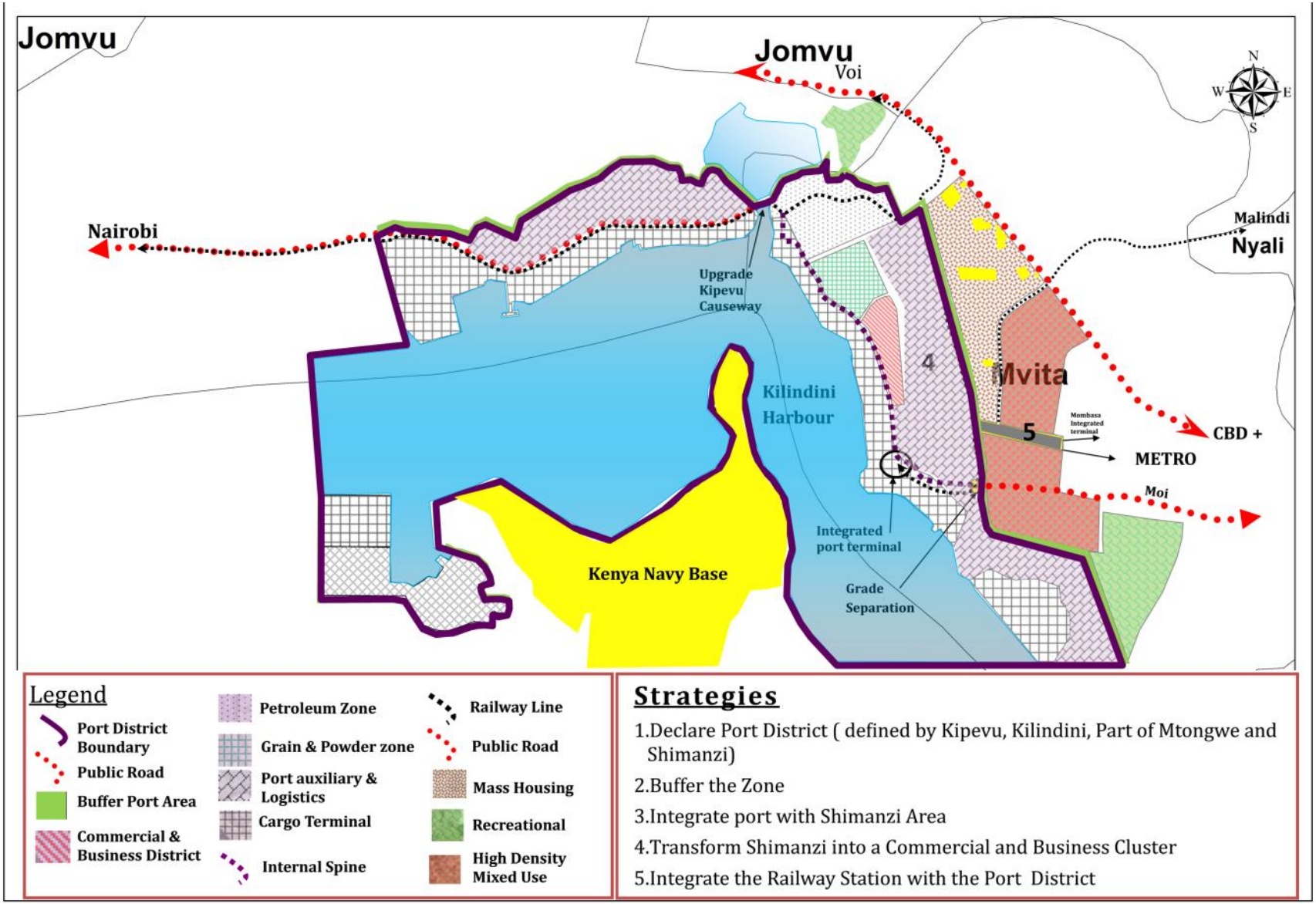


Figure 4-28: Special Area - Port (2)



5 . STRETEGIC SECTOR PLANS

5.1 INTRODUCTION

The aim of this ISUDP is to make Mombasa work efficiently and equitably. In order to achieve this it is essential to develop sectoral strategies and integrate the city development with the region. This chapter presents sector wise proposals for sectors including Economy and Employment, Physical and Social Infrastructure (public facilities), Housing and Informal Settlements, Transportation, Environment Management and Disaster Management, Tourism Management, and Cultural Heritage Conservation Plan. The strategic sector goals are based on stakeholder's aspiration and vision for city for the horizon year 2035. Sectoral strategies are developed in consultation with officials of concerned line departments / parastatals. These sector strategies are instrumental in achieving the desired goals by utilizing all the available resources (internal and external) in a sustainable way.

5.2 ECONOMY AND EMPLOYMENT

5.2.1 Economic Growth

The Kenya Vision 2030 aims to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. The economic pillar aims to achieve an average economic growth rate of 10 per cent per annum and sustaining the same till 2030 in order to generate more resources to meet the Millennium Development Goals and vision goals. The Medium Term Plan (MTP) of the vision 2030 focuses on broad national policies aimed at making Kenya a globally competitive nation, wherein Mombasa County plays a significant role in translating the national aspiration into specific interventions, while addressing its own needs.

5.2.1.1 Kenya's GDP Growth Rate

Time series data on economic performance of Kenya for the seven years shows that GDP has not grown as per target set in Kenya Vision 2030. The economic and institutional reforms (Kenya Economic Recovery Strategy for Wealth and Employment Creation 2003-2007) coupled with optimism and investors' confidence led to continuous growth of the economy from 2.9 per cent in 2003 to 7 per cent in 2007. In late 2007 to 2009 the economic growth dropped by 5.5 per cent and continued to perform poorly due to post election violence, uncertainty in the investment arena and the global recession. Since 2010 to date the economy has been resilient against indigenous and exogenous shocks and this can be attributed to strong fiscal and monetary policies. Kenya rebased its economy in 2014, which seen it jump from a third world country to a middle income country with an improved growth rate from 4.7 per cent to 5.7 per cent and GDP per capita of $1,246. According to the economic survey 2015, the country's GDP growth rate was slowed down by security concerns, negative travel advisories and fear of spread of Ebola etc.

5.2.1.2 Economy of Mombasa County

Key economic activities in Mombasa include port and shipping, tourism, industries, trading, and fishing. Mombasa is also the industrial nerve centre of Kenya outside Nairobi. The Port of Mombasa is the largest in East Africa, serving not only as the hub of imports and exports for Kenya, but also as the port for landlocked countries (Uganda, Burundi, and Rwanda, etc.). The Port has given opportunity to many transport and logistics companies. Apart from port oil refinery, cement factory and trade activities also plays major role in its economy.

Mombasa is also a centre of coastal tourism in Kenya. Its northern shoreline is renowned

for its vibrant entertainment offers. Besides, Mombasa Island's other major attractions are the Old Town and Fort Jesus. Nyali, Bamburi, and Shanzu beaches are located north of the city. Shelly, Tiwi and Diani beaches are located south of Mombasa. A number of luxury hotels exist on these beaches.

5.2.1.3 Labour force and Labour Market Projections

Mombasa is expected to be the Centre for Urban Excellence with a high end services based economy and a large industrial base.

- The total workforce will be 1.29 million in 2035, meaning thereby the labour participation rate would be 56 %.
- Bulk of employment in tertiary sector (68%)
- Sustained employment in secondary sector (20%)
- Employment in informal sector (10%)
- Primary Sector (2%)
- The key drivers of economy would be the service sector and the Industry sector.
- Significant investment would be needed for creating jobs and skilled workforce.

Refer Figure 5.1, Figure 5.2 and Table 5.1.

Figure 5-1: Labour Force Projection, 2035

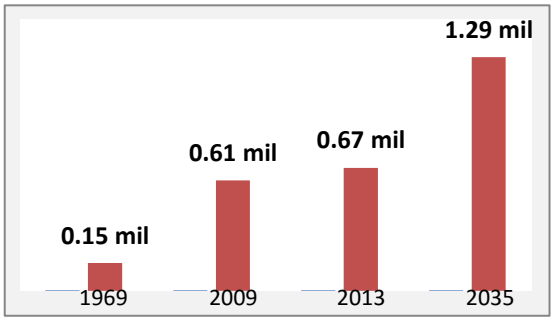


Figure 5-2: Sectoral Composition of Labour Force (%) - 2035

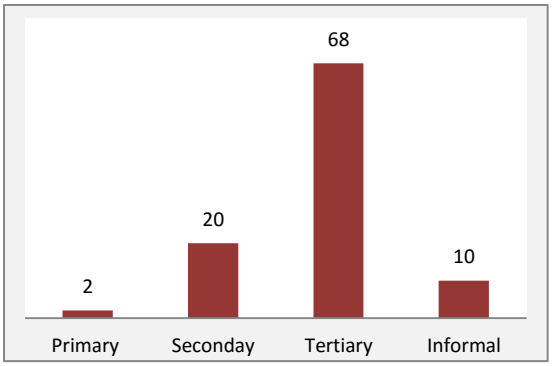


Table 5-1: Labour Market Projections - 2035

Sl. No	Sector	Labour Force	LFPR (%)
1	**Primary Sector**		**2**
	Agriculture and Fisheries	25847	2
2	**Secondary Sector**		**20**
	Manufacturing	90463	7
	Small & Medium Enterprise	116310	9
	Service Industry	51693	4
3	**Tertiary Sector**		**68**
	Trade and Commerce	258466	20
	Port Shipping and Transport	232619	18
	Construction	129233	10
	Govt./Semi Govt	103386	8
	Tourism	64616	5
	Services Sector	51693	4
	Others	38770	3
4	**Informal Sector**	129233	10
	Total Labour Force	**1292328**	**100**

Source: Consultants Estimate

5.2.2 Economic Goal: To provide a favourable business environment and employment opportunities

5.2.3 Proposed Strategies for Economic Development

The strategic aim is to promote balanced and sustainable economic development and employment generation within the city, developing a range of economic sectors. The following strategies are proposed for economic development:

5.2.3.1 Hierarchy of Commercial Areas

ISUDP proposes a five-tier system of Commercial Areas is envisaging to accommodate required shopping, commercial office and other service activities like cinema, hotel and restaurant and various community services and facilities in an integrated manner. In addition, some components of commercial use are also provided under mixed use, non-hierarchical commercial centres, and informal sector in the selected areas along the high capacity transport corridor. (refer Figure 5.3) The commercial sector proposals include :

- Sub CBDs at sector level, Sub-Sector Commercial centres are proposed to be developed as facility corridors along major transport networks to prevent unintended and unplanned ribbon development and for better synergy between public transport and work centres.
- Development of Integrated Freight Complexes / Wholesale Markets at the urban periphery.
- Mandatory provisions for service and repair activities.
- Informal shops, weekly markets, handicrafts bazaars, used books / furniture / building materials bazaars to be developed.
- Enhancement of FAR.

5.2.3.2 Informal Sector

Large sections of unemployed and under employed population within city and nearby small towns look forward to Mombasa for employment and enter the city to move up the economy ladder. This brings forth a multitude of small enterprises and petty trading activities in the informal sector. Thus, Mombasa has an equally large informal sector. This sector with highly reduced needs of floor space and investment is important as a source of employment and services in the economic fabric of the city. Thus ISUDP proposes following:

- Organising existing informal markets
- Earmarking of 'Hawking' and 'No Hawking' Zones at neighbourhood and cluster levels.
- The weekly markets to be identified and planned / developed.
- Developing new areas for informal trade to be developed and integrated with housing, commercial, institutional and industrial areas.
- Provision of common basic services like toilets, water points, etc.
- Institutionalizing designs of stalls, push-carts and mobile vans.
- Involvement of NGOs envisaged.

5.2.3.3 City Level Wholesale Markets

In case of existing developed areas, all wholesale markets generated with hazardous materials should be developed in decentralized manner and shifted to the areas assigned for these. All unauthorized encroachments / projections on roads / government land should be removed to facilitate easy movement of traffic. Further extension of the wholesale activity in the Walled City and its Extension shall be totally stopped by giving incentives and disincentives as under:

It is proposed to develop three new wholesale markets as counter markets to cater to the demands of the growing population of Mombasa only, near the rail and road entry points. The new wholesale markets shall provide facilities for:

- Warehousing and storage facilities.
- Servicing, lodging and boarding, idle parking and other required facilities

5.2.3.4 Small and Medium Enterprises

Small and Medium Enterprises (SMEs) plays a major role in economic development, particularly in developing economies. According to World Bank surveys (2010) studies indicate that formal SMEs contribute up to forty five percent of employment and up to thirty three percent of GDP in developing economies; these numbers are significantly higher when taking into account the estimated contributions of SMEs operating in the informal sector.

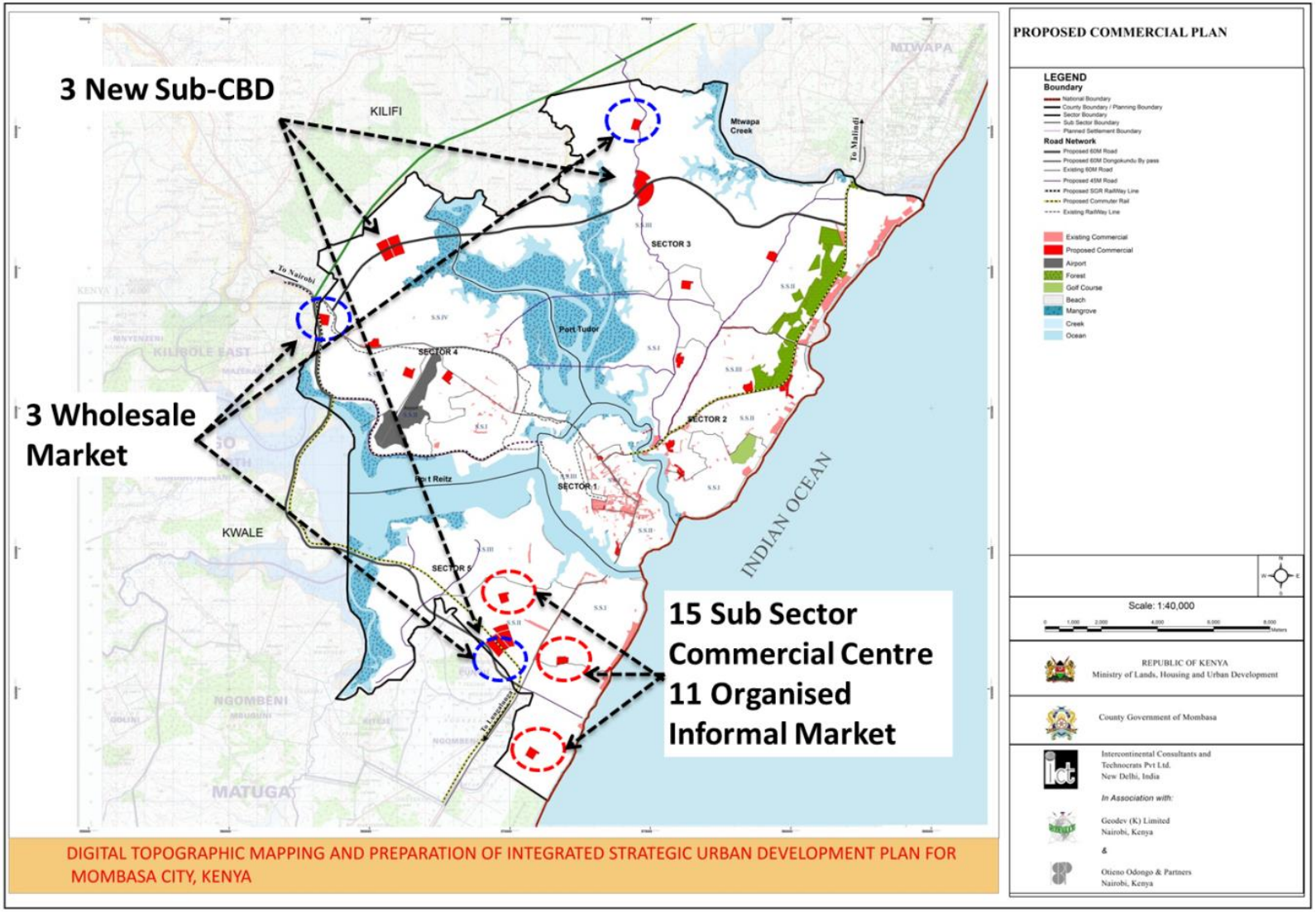
Access to credit is the most Owing to the problems associated with accessing alternative credit facilities, a large proportion of SMEs in Mombasa County rely more on self-financing in terms of retained earnings. The implication, therefore, is that SMEs do not have adequate credit to meet the needs at different levels of growth. It is observed that life span of most of the SMEs is around three to four years due to lack of adequate financing information.

The National government has shown great determination to formulate tangible and lasting policies and/or programmes to support the SME sector as portrayed in the government blue print of vision 2030. The Kenya vision 2030 also promises to set up a SME park in Mombasa County.

ISUDP recommends following measures aimed at encouraging growth of SMEs sector:

- Formulate county led SMEs policies aligned with overall SMEs policy
- Establishing an entry level guidelines for SMEs
- Establish tailored training Institutes for SMEs
- Establish SMEs oriented financial institutions
- Provide incentives loans to women SMEs

Figure 5-3: Existing and Proposed Commercial Facilities



5.2.3.5 Industry

Today, Mombasa hosts a significant number of industries spread across all sectors of economy. Specifically the service industry leads where shipping lines, ship repair and servicing yards, container freight stations, transport, clearing and forwarding firms and grain bulk handling leading the pack. Additionally, there are number of manufacturing industries such as export processing (apparel) companies, oil refineries, (both edible and petroleum), glassware, flour mills and car assembly plants located across the country. The upcoming economic activities include a revived carpentry industry specializing in local wood artefacts etc. Mombasa is also a centre of coastal tourism in Kenya.

Keeping in view the position brought out above as also in the context of the continuing pressure of population growth in Mombasa, the following broad policy would be required for the industrial sector:

- Develop new activities like IT industry, etc
- Develop Special Economic Zone
- Promote hi-tech and low volume-high value added industries, which are not labor intensive.
- Encourage modernization and technological up-gradation of existing industries required for day-to-day needs of the people of the city.
- Take corrective measures with regard to industries in non-conforming industrial areas in terms of environmental and other norms as may be prescribed.
- Provide suitable incentives and disincentives, and other measures, for shifting and relocation of industrial units not conforming to the land use norms.
- Review, and possibly widen, the scope of permissibility of household industrial units subject to adherence to pollution control norms and environmental considerations, fire safety regulations and other relevant factors, particularly the aspect of infrastructure services.
- Special provisions for service and repair centres.
- Enhancement of FAR.

The proposed industrial worker density is 120 workers per hectare and industrial sector would provide employment to a total of 0.25 million industrial workforce. Table 5.2 presents the existing and proposed employment in industrial sector.

Table 5-2: Existing and Proposed Employment in Industrial Sector

Industries	Area Ha	Employment Direct	Indirect Employment	Total Employment
Existing Industries				
Area under Industrial use	1217	120,000	-	120,000
Existing Port & Expansion	-	6,921	250000	256,921
Proposed Industries				
Special Economic Zone • Port • Free Port Free Trade Zone • Industrial Park • MICE Area • Tourism Park • Service Area • Power Plant	905	27,000	-	27000

Industries	Area Ha	Employment Direct	Indirect Employment	Total Employment
• Enterprise Area • Residential Area				
Hi Tech Park* (Business process outsourcing (BPO), Knowledge Process Outsourcing (KPO) and Software Export and Tech Habitat)	110	35000	105000	140000
Education Park • IT Training college, • Cyber Security Research and Development Centre, Supply Chain Management, • Financial Services, • Business Management and International Marketing, Fashion and design schools, • Hospitality Management, • Hospital Management, • Knowledge management	50	3000	2000	5000
Industrial Estate /EPZ	100	12000	3000	15000
CFS (existing 100 ha + 50 ha new area)	50	Included in indirect port employment		1200
Petro City	350	1200	-	1200
Total	**2782**	**205,121**	**360,000**	**565,121**

*Hi-Tech Park will also include Shopping Malls, Hotels, and Commercial Centres etc so as to provide quality support services

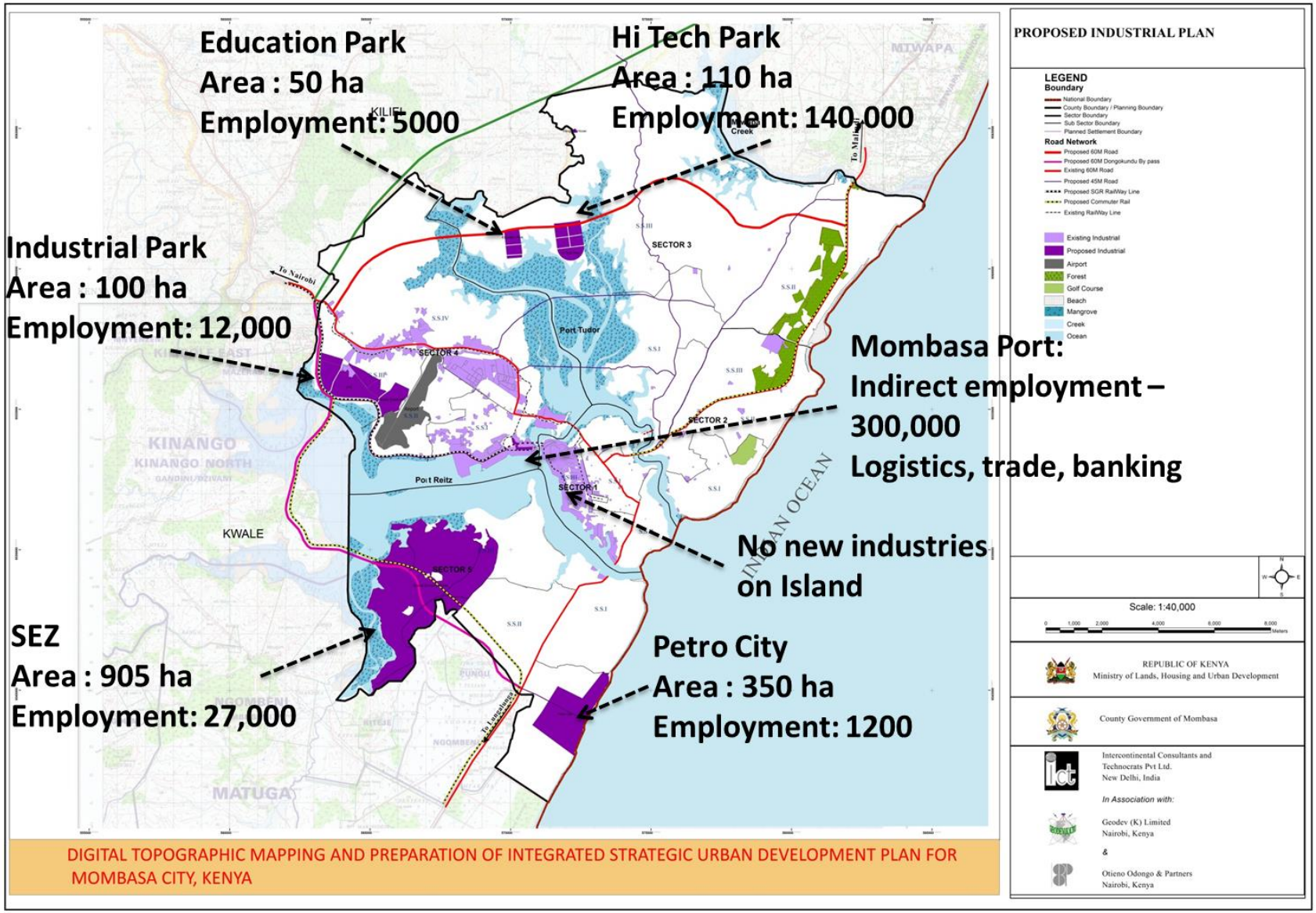
Note:

1. Port:
    a. Indirect employment in port is approximately 150,000. It includes employment in Road marine cargo tracking, Road tracking support, cargo distribution etc. The projected indirect employment in Port for year 2028 is approximately 250,000. (Source- Kenya Port Authority, Mombasa).
    b. It is assumed that the share of indirect employment in port industry (in case of road marine cargo tracking and road tracking support) will fall at least by 20-30% once SGR is fully operational.
2. Hi Tech Park
    a. This 35,000 direct employment in IT Park will be further augmented by 3 times this number, as every single IT job created further creates 3 indirect jobs, and wherever the IT Industry has been established, the indirect employment has benefited all cross sections of the society, as the direct employment has to be technically skilled.
3. Special Economic Zone:
    a. The indirect employment in SEZs depends upon backward and forward linkage of the SEZ industry with local supplies of raw materials, other required inputs and the ancillary employment opportunities generated by the operations of the SEZ. These include transport, communication, automobile, civil aviation, shipping, tourism, hospitality, packaging, banking, insurance, etc. Employment opportunities are thus generated for both unskilled and skilled labour. The indirect employment is considered to be three times the number in direct employment.

4. Education Park:
    a. In order to develop the requisite talent for the Knowledge Industry, a new state of the art Knowledge City is proposed, which will have world class educational faculty and excellent infrastructure. It can be developed on public-private partnership mode to create a centre of excellence. The courses which will be offered in the Knowledge city Education City will be designed in accordance to the needs of the Knowledge Industry e.g IT Training college, Cyber Security Research and Development Centre, Supply Chain Management, Financial Services, Business Management and International Marketing, Fashion and design schools, Hospitality Management, Hospital Management and Knowledge management etc.
5. CBD:
    a. In view of decentralisation, it is proposed to develop no new industries on Island.

    Refer Figure 5.4 for proposed industrial plan for Mombasa.

Figure 5-4: Existing and Proposed Industrial Areas



5.2.3.6 Fisheries

ISUDP proposes following strategies and projects for development of fisheries sector:

Proposed Projects

- Construction of a modern fish market and equipped with adequate cooling facilities.
- Construction of or procurement of a modern fishing boats
- Construction of a modern fish banda including a meeting hall.
- Identification and facilitation in pond construction
- Constructing at least three cold storages, processing and packaging centers, auction yards and transport connectivity.
- Construction of a modern fishing port for use by commercial fishing vessels
- Construction of a specialized fish market.
- Construction of or procurement of modern deep sea vessels and purchase of appropriate fishing gears
- Develop more jetties
- Training in fisheries management, Aquaculture, fishing gear technology, seamanship etc.
- Regular sea and land patrols

5.2.3.7 Urban Agriculture

ISUDP proposes following strategies and projects for development of urban agriculture:

- Develop water harvesting technologies,
- Promotion of drought tolerant crops
- Provision of subsidized fertilizers and relief seed,
- Promotion of organic manure and high yield seeds
- Explore sinking of boreholes for irrigation
- Promote soil conservation and soil fertility
- Strengthen marketing
- Create an agriculture incubation centre
- Encourage cottage industries and strengthen value chain development
- Provide funding for agricultural based activities

5.2.3.8 Exclusive Economic Zone (EEZ)

EEZ is the area of sea, seabed and subsoil from 12 to 200 nautical miles offshore. It is beyond jurisdiction of the county government. It possesses the Marine National Park and Marine National Reserve.

Marine National Park spreads over an area of 10 square kilometre and is a strictly no take away zone

Marine National Reserve spreads over an area of 200 square kilometre and allows following activities

- Sustainable aquaculture
- Regulated Commercial fishing
- Tourism practices in coral reef area

5.2.4 Goal, Strategies and Project

The goals, strategies and projects that have been identified for overall economic development are presented in Table 5.3.

Table 5-3: Economic Development: Goal, Strategies and Projects

Goals	Strategies	Projects
To provide a favourable business environment and employment opportunities	Provide new industrial and commercial areas	• Allocate land for new industrial areas • Allocate land for new commercial areas
	Reduce the cumbersome business approval process	• Single window approval system
	Improve infrastructure in Industrial and Commercial Areas	• Notification of the land demarcated for commercial and industrial development
		• Electricity Supply in the proposed commercial and industrial area
		• Construct motorable Roads within proposed Industrial area
		• Construct truck terminals and warehouses
		• Provide incentives to promote Green Industries
	Improve business environment (Business Licensing & Enforcement)	• lowering transaction costs • reducing the rates of business licenses and making advertising cost effective • clear guidelines on the number of business licenses required
	Promote Small & Medium Enterprises (SMEs)	• Formulate county led SMEs policies aligned with overall SMEs policy • Establishing an entry level guidelines for SMEs • Establish tailored training Institutes for SMEs • Establish SMEs oriented financial institutions
	Organise Hawkers and Informal Investment /Jua Kali	• Develop hierarchy Organize Informal Market including at Sub-Sector Level • Allocate informal traders designated areas • Introduce weekly market concept • Training & capacity building on products improvement
	Promote Fishing Industry	• Construction of a modern fish market and equipped with adequate cooling facilities. • Construction of or procurement of a modern fishing boats • Construction of a modern fish banda including a meeting hall. • Identification and facilitation in pond construction

Goals	Strategies	Projects
		• Constructing at least three cold storage, processing and packaging centers, auction yards and transport connectivity. • Construction of a modern fishing port for use by commercial fishing vessels • Construction of a specialized fish market. • Construction of or procurement of modern deep sea vessels and purchase of appropriate fishing gears • Training in fisheries management, Aquaculture, fishing gear technology, seamanship etc • Regular sea and land patrols • Develop more jetties
	Promote Marine Industry	• Commercial Ship Repair
	Modernisation of Markets	• Modernise Mackinnon (Marikiti), Sega market in Majengo and Kongowea market
	Promote Urban Agriculture	• Develop water harvesting technologies, • Promotion of drought tolerant crops • Provision of subsidized fertilizers and relief seed, • Promotion of organic manure and high yield seeds • Promote soil conservation and soil fertility • Strengthen marketing • Create an agriculture incubation centre • Encourage cottage industries and strengthen value chain development • Provide funding for agricultural based activities
	Government promotion	• Create a conducive environment for trade and investment. • Develop Business Information Centre • Youth Enterprise Development Fund • Provide entrepreneurial training to youth • Encourage mixed development • Give incentives to investors in EPZ & SEZ • Tax free incentives to SME • Coffee and export tea zones / set policies to make the county develop • Integration of major economy sectors related to port, industries, agriculture, fishing and tourism.

5.3 PHYSICAL INFRASTRUCTURE

5.3.1 WATER SUPPLY

5.3.1.1 Background

Mombasa County does not possess any surface water sources and therefore it heavily depends on water sources from outside the county for its potable needs. The water received from Mzizima, Baricho, Marere and Tiwi together accounts for 45470 cubic meters per day (average of daily water received in past six months). Apart from these, the county also sources its water from 452 shallow wells spread across the entire county, three permanent springs, four water pans and a number of borewells operated by private investors, NGOs and CBOs (10360 cubic meters per day). The water from these sources is saline, just meeting the acceptable levels. Maximum depth that can be drilled to access ground water ranges from 50-60m. The water is supplied through the following six main water supply schemes including Kisauni, Nyali, Island North, Island South, Likoni and Mainland West. Following are the major water supply challenges being considered:

- Inadequate water supply (area covered 70%, population served 50%)
- Old infrastructure or low level of infrastructure development
- Inadequate storage facilities
- Groundwater salinity and seawater intrusion
- Ground water pollution
- High Non Revenue Water levels

5.3.1.2 Water Demand Projection 2035

Water demand projections for Mombasa are based on current average supply and demand. This was then compared to the water demand calculation using Ministry of Environment, Water and Natural Resources (MEWNR) design standards. To reach the overall demand, non-domestic water demand including institutional, industrial, commercial and consumptions and consumption by floating population are also calculated. Therefore, the total water demand forecasted is the sum of the following:

- Domestic water demand, including 20% water losses in distribution systems
- Non-domestic water demand including :
    - Institutional and other public water demand (including demand of floating population)
    - Industrial demand

The water demand projections for the year 2025 and 2035 have been calculated and are shown in **Table 5.4.** These projections are based on design standards of Water Design Manual for Water Supply Services in Kenya (October 2005). The calculation for domestic water demand projections assumes the following percentages of population living in different dwelling units in Mombasa: 10% of population live in high income areas, 30% of the population is in middle income housing while the rest 60% belong to low income category housing. As per the Water Design Manual, the water consumption rates are determined by income categories as follows: high income dwelling unit's 250litres/person/day; middle income dwelling units 150litres/person/day and low income dwelling units 75litres/person/day. The calculated projected water demands are:

Table 5-4: Water Demand Projections

2015	2025		2035	
	Population - 1633244		Population - 2307729	
Water Availability	**Domestic Water**			
55830* m^3/day (approx)	**Demand**	**Gap**	**Demand**	**Gap**
	187823 m^3/day	131994 m3/day	265389 m^3/day	209559 m3/day

2015	2025		2035	
	Population - 1633244		Population - 2307729	
	Non-Domestic Water (including demand for floating population)			
	75129 m3/day		106156 m3/day	
	Total Water (Domestic, Non-Domestic and Floating Population)			
	262952 m3/day	207123 m3/day (Deficit)	371544 m3/day	315715 m3/day (Deficit)

Note: Demand includes 20% unaccounted-for water (UfW).

- Current total water requirements per day is = 186,098 m^3/day which will be 262,952 m^3/day in 2025 and 371,544 m3/day in 2035.
- The non-domestic water demand is estimated to be 40% of the total domestic water demand.

5.3.1.3 Proposed Water Supply Schemes

For the horizon year, when all water resources will be develop it is assumed that water availability from the BWSS connected customers will be 24/7 and will meet water demand by 90% in 2025 and 85% in 2035. This deficit will be partially covered by local water sources i.e. small bore well in Mombasa County. Table 5.5 presents the potential water supply from BWSS and UCBWSS sources. Refer Figure 5.5 for bulk water supply trunk infrastructure.

Table 5-5: Potential Water Supply from BWSS and non-BWSS Sources

	2025	2035
Projected Water Demand (m3/d)	262,952	371,544
Potential Water Sources and Proposed Water to be Supplied (m3/d)		
Baricho	106,594	80,395
Mzizima	13,370	59,050
Marere	6,051	3,173
Tiwi	10,000	8,662
Mwache Dam	102,859	145,838
Msambweni Aquifer/ Mkurumudzi Dam	-	15,191
Total (m3/d)	238,874	312,309
Deficit (m3/d)	24,078	59,235

Note: Demand includes 20% unaccounted-for water (UfW)

5.3.1.4 Other Potential Water Sources

1) Recycled Water

In Mombasa, utilization of recycled water could be used only for non-portable commercial use including gardening, car wash etc. This will have a positive effect on per capita water demand and will help reducing the total urban water demand. The recycling of wastewater has following advantages:

- improves sustainability and water security
- reduces stress on environmental sources.
- residual organic matter in recycled water is beneficial for plants/ agricultural production.
- provides opportunities where they are currently lacking.

A prerequisite for any recycling efforts should be an efficiently operating gravity wastewater system, a treatment plant and a recycling plant; these will be in operation only by year 2025. Consequently, initiation, design and establishment of a recycling system in Mombasa can be considered only by 2025. Thus it is recommended that the provisions for recycling

should be included in the Sewage Master Plan for Mombasa. It is expected to meet at least 10% to 15% of the non-portable water demand of Mombasa by 2035.

2) Rainwater Harvesting

Rainwater harvesting (RWH) is not only useful for domestic purposes, but can also be used for gardening, industrial/ commercial applications that have heavy water requirements. RWH will likely see heightened importance as a water security measure in the context of climate change. The United Nations Commission on Sustainable Development has called for the use of rainwater harvesting to supplement water supplies in countries around the world.

Promotion and construction of rainfall harvesting technology is deemed suitable in the Mombasa and recommended as a means of augmenting the amount of water available. Promoting and construction of the RWH facility is recommended as a means of augmenting the amount of water available. It is expected to meet at least 5% to 10% of the non-portable water demand of Mombasa by 2035.

3) Desalination

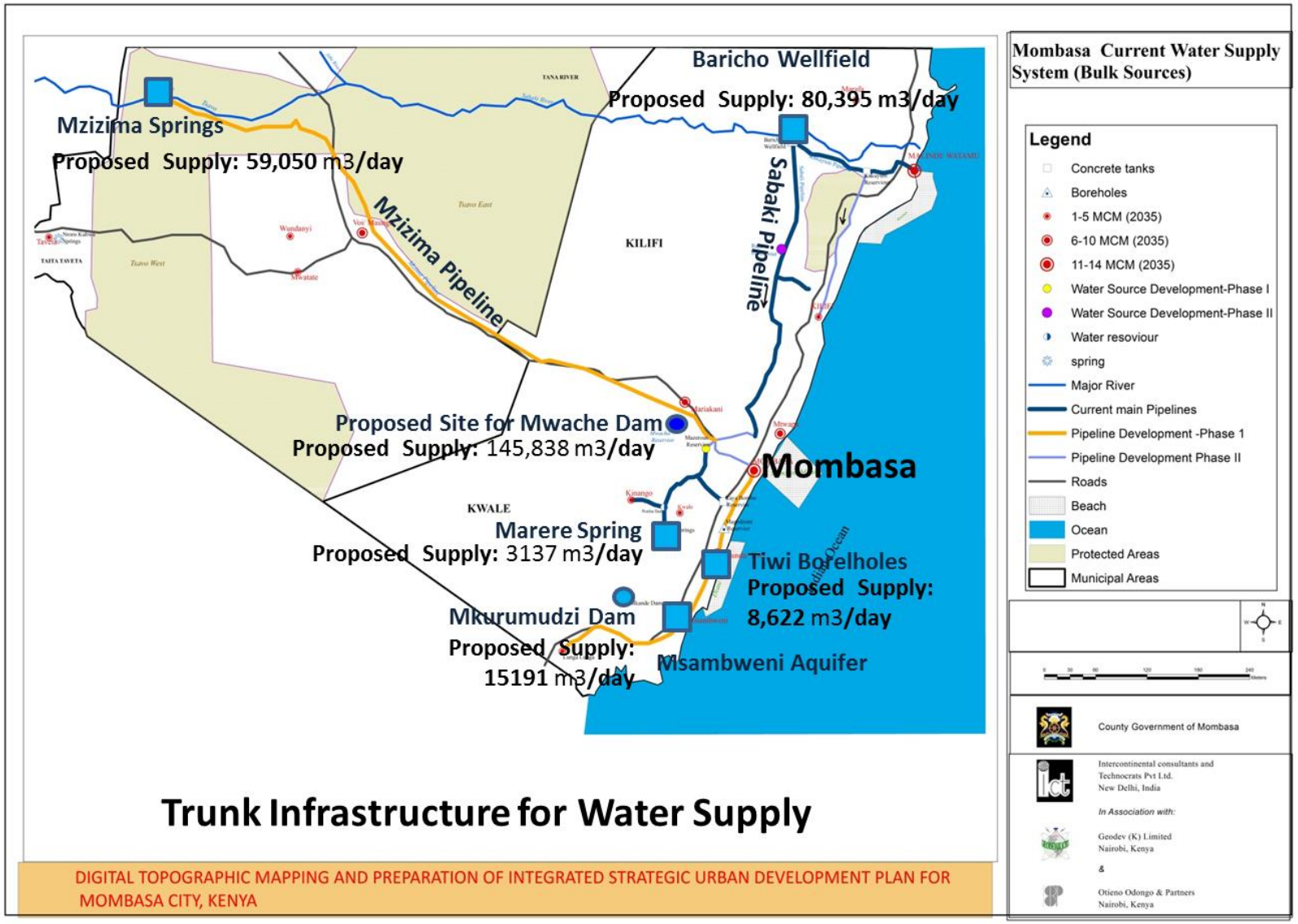
Desalinated seawater can make up the deficit of natural water resources and meet the part of potable water demand, irrespective of the availability of other natural water sources. Furthermore, seawater desalination plant can be erected near demand centres, eliminating the need for long pipelines.

Major constraints of desalination are environmental impacts and high energy cost:

- Mombasa coastline is rich in marine life and marine reserves, and eco-sensitive areas, thus allows very few potential locations for desalination plants.
- Energy costs - variance in electricity tariffs, as most of the energy production in the country is based on hydropower.

Energy costs, energy availability and the wide range of environmental aspects can constitute serious obstacles and need to be carefully investigated in the future. At this point, weighing the pros and cons of desalination as a source of water to Mombasa, desalinisation of sea water is may be feasible and it may be considered as a source of water supply beyond 2035.

Figure 5-5: Water Supply – Trunk Infrastructure



5.3.1.5 On-Going Project - Master Plan for Water Supply for Mombasa County

It is important to note that the Government of Kenya, Ministry of Environment, Water and Natural Resources (MEWNR) has received credit from International Development Agency (IDA) to undertake Master Plan for Water Supply for Mombasa. This project is currently under preparation in supervision of MOWASCO. Its overall goal is to improve water access in county with a special focus on sustainability of services, customer focus and access for the (peri) urban poor.

5.3.1.6 Goal, Strategies and Project

The goals, strategies and projects that have been identified for water supply are presented in Table 5.6.

Table 5-6: Water Supply: Goal, Strategies and Projects

Goals	Strategies	Projects
Safe Drinking Water for all	**Source Augmentation**	• Baricho production extension • Sabaki-Mombasa Pipeline segment rehabilitation
		• Development of the Mwache Dam, including water treatment plant, pumping station, main transmission pipelines and the New Mwache Tank (NMT)
		• Increasing water abstraction from the Mzizima Springs
	Improving the transmission system	• Repair of old pipe lines
		• Laying down New Pipe lines (phased manner)
	Improvement of Distribution system	• Instalment of Community Water Point in informal areas and public places
	Water Management Plans	• Mandatory provision of water harvesting building design • Recycle waste water (projected Sewage Flow 219, 865 m^3/day)
	Public awareness and asset management plan	• Awareness program among the people for the use of protected and unprotected sources of water
		• Asset Management System (GIS Mapping of water supply network) Ongoing.

5.3.1.7 Proposed Projects

For achieving the aforesaid goal and implementing the strategies various projects have been identified, the same have been described in Table 5.7. Refer Figure 5.6 for water supply proposals.

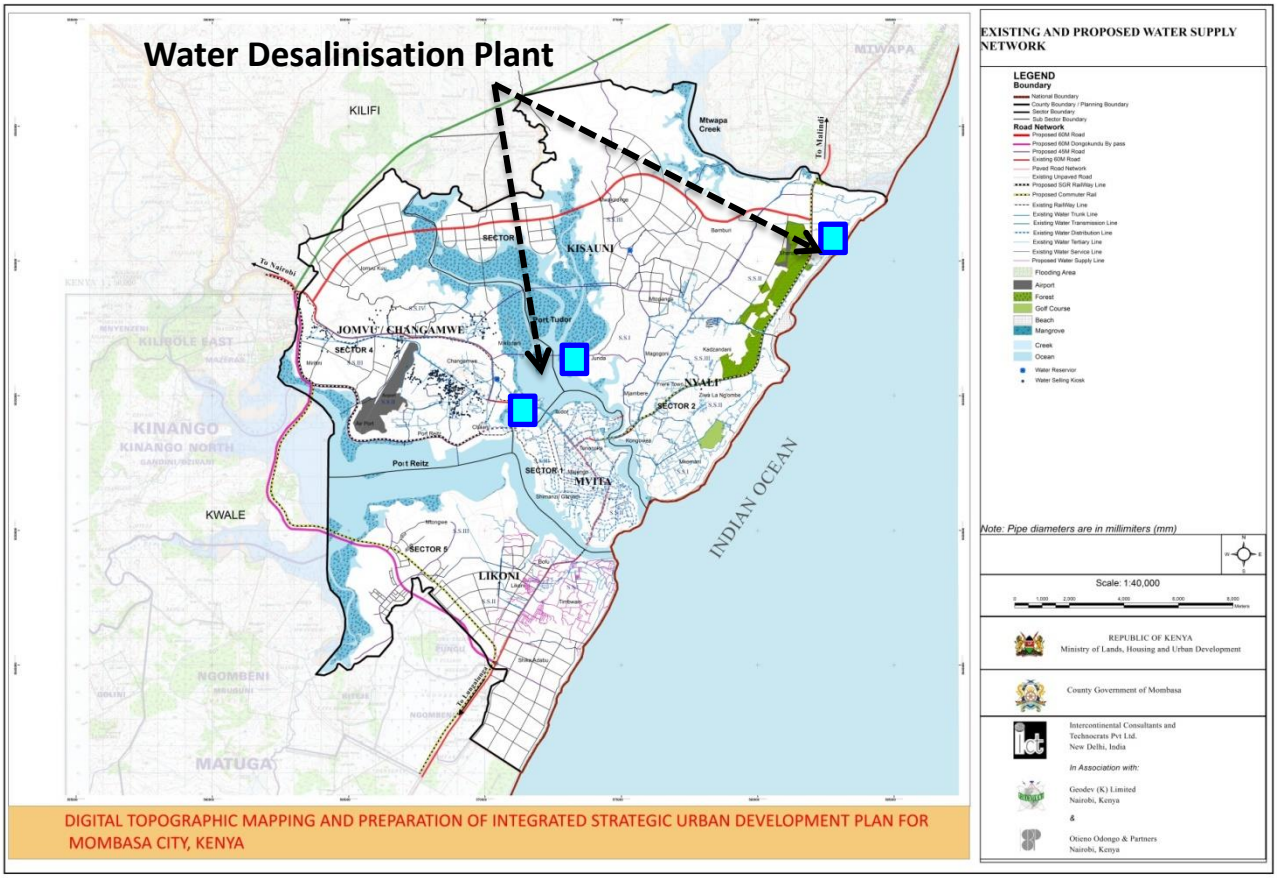
Table 5-7: Water Supply Projects

Projects/ Programs	Quantity	Unit
Preparation of Water Supply Master Plan*	1	No.
Repair and Replacement of old pipe lines where ever needed along with excavation, laying, compacting soil after laying in	483	KM
Technological up-gradation of the old Pumping Stations*	-	-
Source development and intake for Mombasa	312,309	M^3
Laying down distribution line (Likoni)	79.4	KM
Converting traditional consumer water meters to digital water meters	45,467	No.
Campaign for use of hygiene water and management of water every year	5	No.

*ongoing project

Note : the total length of the proposed pipe network in rest of the area of Mombasa including specification of pipe diameter for the trunk, secondary and distribution lines will be determined as part of water master plan. The ongoing water master plan will also determine which of the existing laid pipelines need to be rehabilitated or replaced.

Figure 5-6: Existing and Proposed Water Supply Infrastructure Plan



5.3.2 SEWERAGE AND SANITATION

5.3.2.1 Background

Currently only 15% of the total population within the county is served by the sewerage system while remaining 83.9% rely on on-site sanitation disposal methods while 1.1% do not access to any type of toilet. Sewer system network in Mombasa is aging and serving only a fraction of the population. It covers parts of the Island and parts of Mombasa West mainland. Mainland North and South lack a sewerage system. The shortage of water in Mombasa and lack of funds to undertake capital investment projects has delayed extensions of water borne sewerage, forcing the residents to rely on on-site systems for sewage management.

The percentage of the households in Mombasa having septic tank system is on the lower side (flush toilet - 31.3%) and mainly in practice among the hotels, most public buildings and in high-income residential areas. A great majority of households in Mombasa, (about 67.5%) use pits latrines (VIP Latrine 14.1%, Pit latrine Uncovered 44.1% and Pit latrine Covered 9.3%) while about 1.1% households do not have access to any type of toilet.

5.3.2.2 Sewerage Treatment Facility

The County has two Sewer Treatment Plants (STPs) located at Kizingo and Kipevu. The details of STP are as follows:

1. Kizingo STP is located within the Island where there's a golf course - between State House and Florida Club (Chinese Restaurant). It's an underground plant constructed 20yrs ago with a design capacity of 10,000m3/day. It is currently non-functional. Kizingo treatment plant collapsed 20 years ago and need some million Kshs for its rehabilitation[1]. And due to absence of functional sewerage system on the Island, some of the residents empty effluent into the Indian Ocean without treatment.
2. Kipevu STP is located in West Mainland (Changamwe). It has a design capacity of 17,100m3/day but it's supplied with waste water amounting to between 6,000 & 7,000m3/day. It serves residents of Changamwe, Port Reitz, Magongo and Jomvu.

5.3.2.3 Future Sewage Generation

The sewage flow/wastewater return has been assumed to be 80% of metered water entering the households. The estimated sewage flows in Mombasa in future years is summarized in Table 5.8**.** The total generation of wastewater / sewage will be about 219,865 m^3/d in horizon year 2035 including flows due to floating population.

Table 5-8: Future Sewage Generation in Mombasa

S. No.	Description	2015	2025	2035
1	Population	11,55,891	16,33,244	23,07,729
2	Estimated Water Supply (excluding 20% UFW) (M3/d)	92,355	191,099	249,847
3	Sewage Flow (80%) (M3/d)	73,884	152,879	199,878
4	Sewage Flow including infiltration (M3/d) (10%)	7,388	15,288	19,988
5	Total Sewage Flow (MLD)	81,272	168,167	219,865
6	Current Sewage Collection & Treatment related Infrastructure (M3/d)	27,100	27,100	27,100

[1] Coast Water Services Board's (CWSB) report, 2012

S. No.	Description	2015	2025	2035
7	Gap in infrastructure for collection/ treatment (M3/d)	54,172	141,067	192,765
8	Infrastructure Required	Sewage Collection, Treatment and Disposal system		

Source: Consultant Computed based on population, water supply and sewage generation rates (2015)

5.3.2.4 On-going Project

5.3.2.4.1 Waste Water Master Plan

It is important to note that the Government of Kenya, Ministry of Environment, Water and Natural Resources (MEWNR) has received credit from International Development Agency (IDA) to undertake Waste Water Master Plan for Mombasa Town and selected towns within the Coast Region. This project is currently under preparation in supervision of Coast Water Services Board (CWSB). This projects aims at identifying a sound and rational strategy for the development of sewerage services in Mombasa and selected towns (Kwale, Kilifi, Malindi, Voi, Lamu Island and Hola) over the next 25 years to improve the quality of effluent to rivers, Indian Ocean & groundwater & to safeguard the health of city's residents. This Waste Water Master Plan for Mombasa will come up with a phased investment programme for immediate/ short term plan (2015-2020), medium term plan (2021-2025), and long term plan (2026-2040) and will recommend a treated effluent disposal/ reuse strategy for the effluent from Kipevu and Kizingo WWTPs.

5.3.2.5 Proposed Interventions

The main goal for Sewerage and Sanitation is to provide 100% access to sanitation facilities by year 2035. This goal can be attained by adopting following strategies:

5.3.2.5.1 Sewerage System

In view of the fact that Waste Water Master Plan for Mombasa is under preparation and rehabilitation of existing sewerage infrastructure is likely to commence soon, ISUDP proposes that the recommendations of the same may be accepted for sanitation solution in town.

However, based on above factors and the current situation (15% coverage by sewerage system, financing from national government; mixed topography of small hills and plains; high density in core area and scattered settlements in fringe areas) ISUDP proposes following

- Develop a water carriage system in the core area i.e. Island, North Mainland (Niyali and Kisauni), West Mainland (Changamwe and Jomvu) and South Mainland (Likoni).
- Onsite sanitation with suitable septage management system to be proposed for areas with congested houses and difficulty in construction & connectivity to sewer network (informal settlements)
- Increase coverage of collection network and connections over time
- Off-site treatment and disposal coupled with onsite septage management for community/individual septic tanks
- Adopt bio-degradation technologies economically feasible and locally suitable and minimise energy requirement in transport and create less pollution
- Suitably tackle critical issues of sludge management, odour control and mosquito menace

- Encourage reuse of recycled treated effluent water for non-portable purpose and waste to energy concept in treatment of waste
- Encourage various alternatives for low cost sanitation ;
- Awareness generation for safe sanitation

The sanitation facilities available and proposed are presented in Figure 5.7.

5.3.2.5.2 Individual Toilets

The goal of safe sanitation for all can only be achieved when each citizen of Mombasa has access to sanitary toilets and therefore, latrines other than flush latrines have been considered as insanitary latrines. The individual household toilet requirement has been calculated based on the insanitary toilets (households with access to pit latrine and other/no latrine). Hence, 69% households will be requiring sanitary individual toilets in Mombasa. About 227,876 existing household latrines are required to be converted into flush latrines in Mombasa currently to make it a city with safe sanitation. It is assumed that all new development will have necessary administrative mechanism to enforce the construction of safe toilet before giving approval for construction. It is proposed to subsidies for individual toilets for low income households.

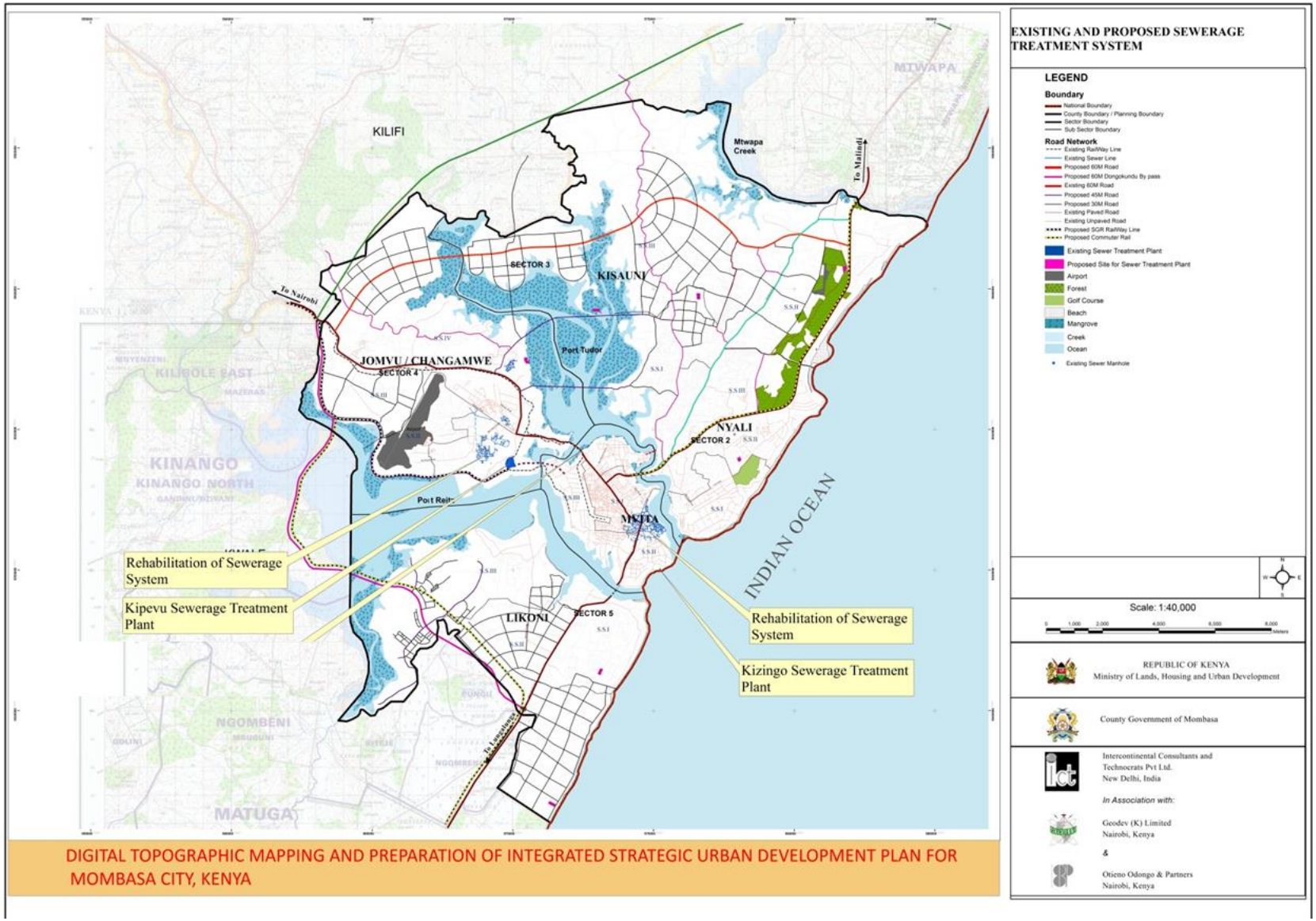
5.3.2.5.3 Public Toilet, Public Bath and Public Urinal

It is proposed to build public toilet (including bath and urinal) in all public places in Mombasa. The projected demand for public toilet for the horizon year 2035 is 23 in Mombasa. Each public facility may have about 5 toilet, 2 baths and 3 urinals. In case of public beaches, the number of baths can be increased depending on the demand. The exact location will be decided at the time of implementation; however these will be mainly located in market areas, public beaches and public buildings etc.

5.3.2.5.4 Community Toilets, Community Bath and Community Urinal

The projected demand for community toilet for the horizon year 2035 is 21 numbers. Each community toilet will have 5 toilet seats, 4 bath rooms and 2 urinals. However, the exact number of seats will depend on population served in an area. These community toilets have been proposed mainly for the slums and informal settlements where decentralised system is proposed as the main sewer system will not be accessible. Since the community toilets are supposed to take care of household level demand, therefore, the individual household toilets will not be required if the community toilet is provided in the area.

Figure 5-7: Existing and Proposed Sewerage System



5.3.2.6 Goal, Strategies and Project

The goals, strategies and projects that have been identified for safe sanitation are presented in Table 5.9.

Table 5-9: Sewerage and Sanitation: Goal, Strategies and Projects

Goals	Strategies	Projects/ Programmes
Access to safe sanitation facilities for all	Toilets facilities in every house	• Link functional toilet design with building approval system
		• IEC measures for safe sanitation practice • Provide public toilets in city especially in the markets, bus stops, public beaches etc • Structured communication for regular usage and maintenance of toilets
	Rehabilitation of Existing facility	• Rehabilitation of Sewer Lines • Rehabilitation of Trunk Sewer Lines • Rehabilitation of Pumping Stations (West Mainland & Old Town) • Upgrading Kipevu Waste Water Treatment Plant • Water Borne Sanitation Facilities (On-site Sewer Lines & Centralised Septic Tank) – Tudor, Tom Mboya, Jomo Kenyatta & Mzizima • Rehabilitation of 16 Sea Outfalls
	Providing sewer system in whole town area as required	• Adopt on-site sanitation & septage management for congested areas; • Provide separate system for drainage and sewerage • Increase coverage of collection network • Provide off site treatment and disposal coupled with on-site septage management (decentralized treatment facilities) STP – 10, Existing -2 and Proposed - 8 @ 2.5 ha each • Encourage reuse of recycled treated effluent water for non-potable purpose • Encourage various alternatives for low cost sanitation ; • Awareness generation for reduce, reuse and recycling of waste water • Waste Water Master Plan for Mombasa is under preparation
	Providing community and public toilets	• Construct community toilets in informal settlements (1/25 families) where individual toilets are not feasible
		• Public Toilets in market areas, bus stops, public beaches and public buildings etc. • Encourage cost recovery & community management for public toilets

5.3.2.7 Proposed Projects

For achieving the aforesaid goal and implementing the strategies various projects have been identified, the same have been described in Table 5.10.

Table 5-10: Sewerage and Sanitation Projects

Projects/ Programs	Quantity	Unit
Preparation of Waste Water Management Master Plan*	1	No.
Changamwe Re-pooling Sewers and Rehabilitation of Existing Sewers on West Mainland and Island		
Establishment of Septage Management through Decentralized Waste Water Treatment System (DEWATS)	192,765	M^3
Community Toilets with Bath and Urinals including 20% area for circulation	21	No.
Public Toilets with Bath and Urinals including 20% area for circulation	23	No.
Septic tank with soak pit	44	No.
Sludge Removal Mobile Vacuum Tank	5	No.
Capacity Building and Training for staffs	LS	-
Campaign for Creating demand for toilets, school sanitation, Cleanliness campaigns every year	5	No.

5.3.3 STORM WATER DRAINAGE

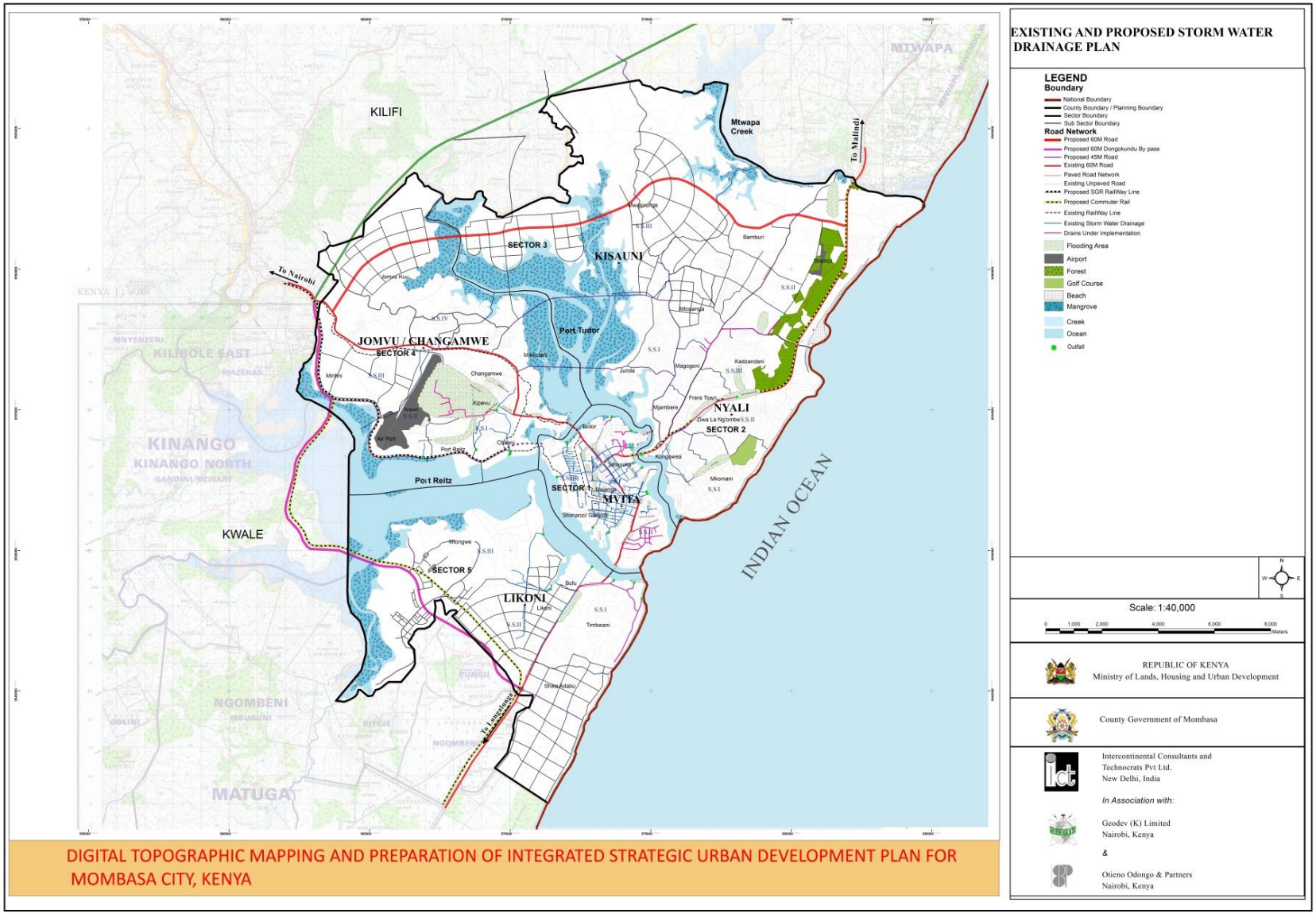
5.3.3.1 Background

Storm water drainage is important to collect and dispose the runoff water due to rainfall. The rainfall in Mombasa is average and needs immediate attention to avoid water logging in low lying areas. Currently storm water drainage covers 10% of the total area and 25% of total population of Mombasa. The existing drain length is about 60.4 km and the drains length currently under construction 30km. Almost 98 % of the existing roads do not have storm water drains. There are 5 major natural water ways in Mombasa. The existing flood prone areas include Manzi Moja Road, Tangana Road, Moi Road, Railway stn roundabout, Lumumba road, Changamwe – refinery road, Shimanzi industrial area, Likoni road, Kisauni etc. (refer Figure 5.8)

5.3.3.2 Projected Demand

The demand calculation for drain is done as per the road length. The total length of drain should be double the length of road in a town. The total road length existing 1191 km and proposed road length is 269 km and hence total requirement for storm water drain is 2920 km. out of which 60 km road length is existing and 30km is under implementation, thus net storm water drainage length required by year 2035 is 2830km. It is assumed that the drains along unpaved roads will be constructed as and when they are paved (Murram road 146 km and Earthen road 658 km).

Figure 5-8: Existing and Proposed Storm Water Drainage System



5.3.3.3 Goal, Strategies and Project

The goals, strategies and projects that have been identified for storm water drainage are presented in Table 5.11.

Table 5-11: Storm Water Drainage: Goal, Strategies and Projects

Goals	Strategies	Projects
To provide high quality and sustainable environment to the citizens of Mombasa by developing a comprehensive drainage system.	Surface Drainage Network in whole city	• Construction of drains along existing roads without drain (1100 km) and proposed roads (269 km)
	Construct new drains and missing links; align, develop and maintain existing drains	• Improvement of existing storm water drains • De-silting and Alignment; • Lining and covering of major storm water drains • Construct primary drains • Construction of secondary drains • Improve/ repair existing primary and secondary drains • Plantation along natural drains
	Reduce Incidences of Flooding	• Remove the encroachment of drains in market area • Regular cleaning of existing drains to avoid flooding during rainy season

5.3.3.4 Proposed Projects

For achieving the aforesaid goal and implementing the strategies various projects have been identified, the same have been described in Table 5.12.

Table 5-12: Storm Water Drainage Projects

Projects/ Programs	Quantity	Unit
Prepare master plan for storm water drainage	1	No.
Construction of drains along existing paved roads without drains	2830	km
Plantation along natural drains	-	-
Remove the encroachment of drains in market area	-	-
Regular cleaning of existing drains to avoid flooding during rainy season	-	-

5.3.4 SOLID WASTE MANAGEMENT

5.3.4.1 Waste Generation

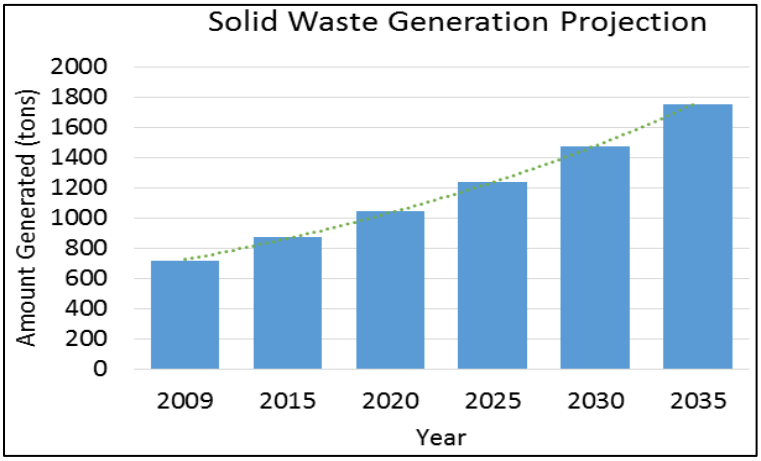
Solid waste generation rates are influenced by economic development, the degree of industrialization, public habits, local climate and the presence of industries like tourism that tend to produce more waste for a given urban area. Mombasa generates at least 875

tonnes of solid waste per day. Approximately 460 tonnes (53%) of the total solid waste generated is formally managed while the rest (47%) is informally disposed through methods such as burning, burying and illegal dumping which poses high potential risks to environmental pollution. The island, being the main commercial area of the county, generates 55% of the total waste which is formally managed. Solid waste production in Mainland South is estimated to be 100 tonnes per day.

5.3.4.2 Solid Waste Generation Projections

Urban Waste generation in sub-Saharan Africa is approximately 62 million tons per year as depicted by a World Bank publication (*What a Waste - A Global Review of Solid Waste Management 2012*). The publication further details out that waste generation per capita ranges from 0.09 to 3.0 kg per person per day and the average waste generation is 0.65 kg/capita/day. Based on this, it is projected that in the 2035 Mombasa County shall be the home to about 2,307,729 residents. Using an average per capita generation rate 0.76kg per person per day for Mombasa County, it is approximated that a total of 1,044.23 tonnes of waste will be generated per annum by the year 2020, 1,241.27 tonnes by the year 2025, 1,475.47 tonnes by 2030 and 1,753.87 by year 2035. There is therefore need for an establishment of a proper solid waste management system in order to provide healthy living and working environmental conditions for today's and future generation. Figure 5.9 presents the solid waste projection for Mombasa.

Figure 5-9: Solid Waste Projection Trends



5.3.4.3 Ongoing Projects

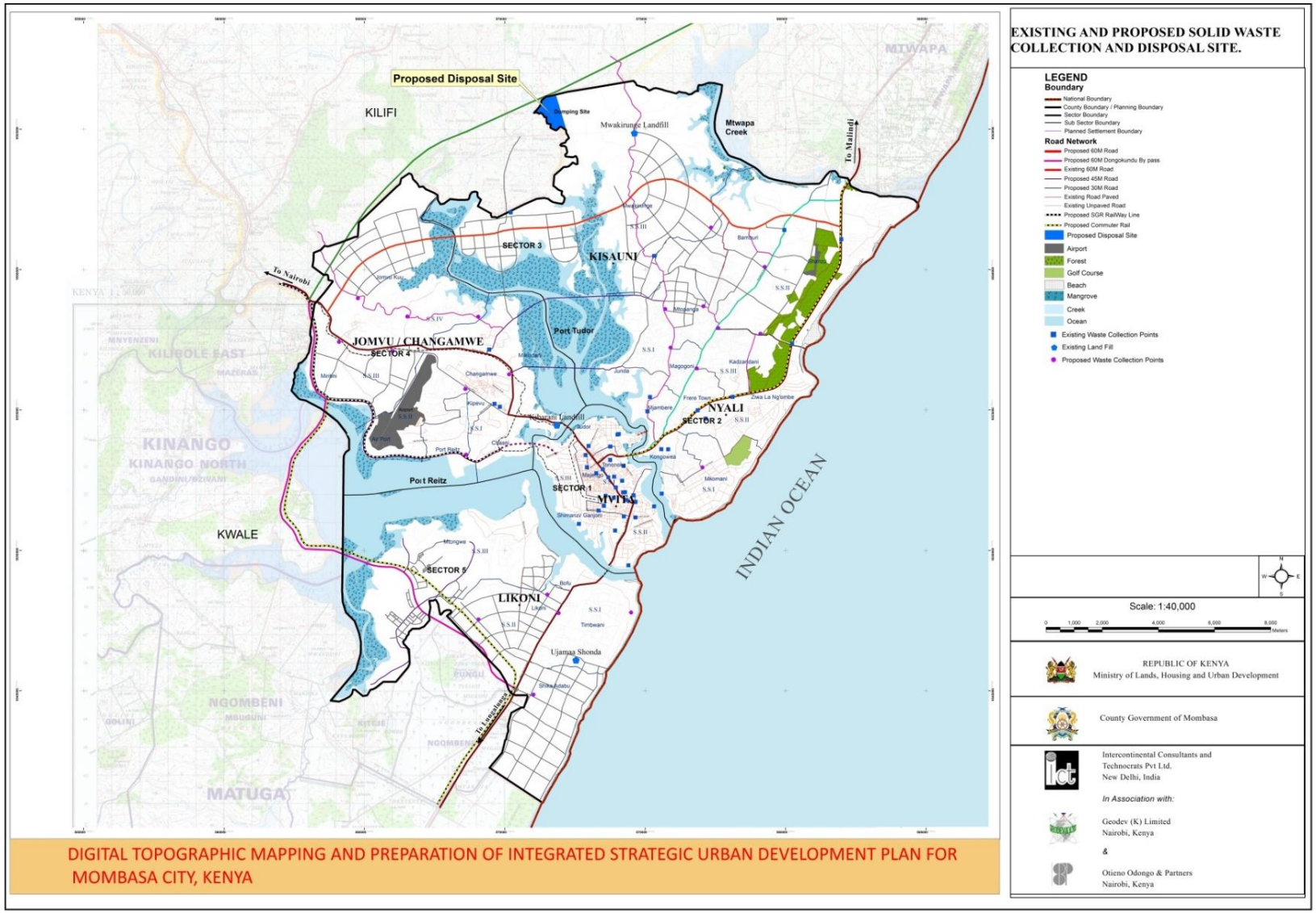
Master Plan for Solid Waste Management is under preparation it is titled as "Productive and sustainable job creation for Mombasa's young men and women through waste management". This is a project currently being carried out by Kuza Project and is funded by the UK Department for International Development. The project mainly seeks to address selected root causes of youth unemployment in Mombasa County.

5.3.4.4 Goal

The goal is to treat solid waste at landfill site with proper collection and segregation at source.

Refer to Figure 5.10 for proposed solid waste management site.

Figure 5-10: Existing and Proposed Solid Waste Management Site



5.3.4.5 Proposed Projects

For achieving the aforesaid goal and implementing the strategies various projects have been identified, the same have been described in Table 5.13.

Table 5-13: Solid Waste Management Projects

Goals	Strategies	Projects	Quantity	Unit	Remarks
To build a healthy, safe, secure and sustainable solid waste management system fit for a world-class city	Establish an integrated solid waste management system	Develop an integrated waste management site including landfill site at Mwakirunge area	70	Ha	The proposed sites belongs to the Central Government and private individual. Thus, will need to be acquired.
		Construct a perimeter fence to secure the proposed dumpsite area	4.07	km	The land need to be secured after acquisition to keep off land grabbers.
		Construct and pave access roads leading to the proposed dumpsite site	All	km	The dumpsite should be easily accessible.
		Gradually close Kibarani dumpsite and develop modern waste treatment/ recycle facility or recreational site	-		Feasibility study to be conducted to select viable option for development
		Ujamaa Shonda dumpsite to closed & new site to be developed in SEZ	-	-	Avoid dumping of waste in middle of residential area and develop integrated waste management site at SEZ
	Separate treatment for special waste	Develop Composting sites for biodegradable waste at subsector level	15	No	
		Develop incineration facility in all big hospitals	18	No	
		Set up integrated waste management facility after sewerage system is in place	2	No	
		Explore the possibility of PPP	-	-	

Goals	Strategies	Projects	Quantity	Unit	Remarks
	Enhance waste collection & disposal mechanism	Introduction of 2 bin system for segregation of waste at source. Door to door collection system to be established in long run Recruit more staff for waste collection Provide adequate and accessible skips & dustbins	Per standards on Remarks Column	Holding Capacity	Dustbins installed must have at least two compartments to allow separate collections of recyclable and non-recyclable materials.
					Be of a nominal capacity of 90 litres, made of plastic and have handles.
					Height 700mm; Maximum external diameter 640mm (including handles)
					Provision Standards:
					Offices: 2,600 litres per 1,000m2 floor space
					Retail: 5,000 litres per 1,000m2 floor space
					Restaurants: 1,500 litres 20 dining spaces
					Hotels: 50 litres per bedroom
					Schools: 1,000 litres per 100 pupils
		Prepare a County Solid Waste Management Policy	1	Document	
	Public awareness campaign	Awareness programme for segregation of waste at source and for solid waste management system in general.	5	No	
	Eliminate dangers posed by Mwakirunge & Kibarani dumpsites	Plant tree cover on the two sites.	Spacing & Number Depending on type of trees	Number & Spacing Distance (m)	Tree cover will help in decomposing the already dumped waste. It will also reinstall the aesthetic of the sites

5.3.5 ELECTRICITY AND STREET LIGHT

The county is well covered with electricity supply network. The urban area has more coverage than the peri-urban. Areas lacking connections include Mwakirunge, Maunguja II, Dongo Kundu and Shika Adabu.

Electricity tariff applies universally all over the country. Individual customers pay their own monthly bills directly to Kenya Power while the County Government of Mombasa pays for street lighting.

5.3.5.1 Demand & Supply Gap Assessment of Electricity and Street Lighting

The current electricity demand for Mombasa County is around 350MW and is projected to be 1470MW by the year 2030 as shown in Table 5.14.

Table 5-14: Current and Projected Power Demand

2015	2017	2020	2025	2030
350MW	400MW	530MW	870MW	1470MW

5.3.5.2 Strategies to address issues on Electricity and Street Lighting

Improve access to electricity

- Lower the cost of power connection to facilitate low income to have power connection
- Harness other forms of clean energy such as Solar and Wind.
- Extend the power grid to unserved areas in the county.

Improve street lights coverage to enhance safety within the city

- Install street lights along all major roads.
- Repair all faulty street lights and high masts.
- Erect high masts at all major road junctions
- Install community high masts in informal settlements and open public places.

5.3.5.3 Proposed Project Details

1. Construct four new power sub-stations at the following locations to improve on security of supply and reliability to customers.
2. Improve access to electricity within the County by:
   - Extending grid electricity to Dongo Kundu, Mwakirunge & Maungunja Settlement.
   - Supply electricity to all primary and secondary schools and polytechnics in the County.
   - Upgrade the existing distribution network to enhance capacity additional customers.
   - Install a 33 kv Capacitor at Nyali primary substation.
3. Lower the cost and improve supply of power by:
   - Construct a 700 MW gas-fired plant at Dongo Kundu by the National Government.
   - Construct a 300 MW coal-fired power plant north of Mombasa near Mombasa Cement Company by the National Government.
4. Adopt and encourage the use of green energy:
   - Encourage the use of solar power systems in all government offices, public health facilities and in schools.
   - Install solar street lighting systems along the roads.
   - Enhance security of supply while transporting increased volumes of refined petroleum products in the county and other regions by replacing the existing 14-inch oil pipeline with a new 20-inch pipeline.

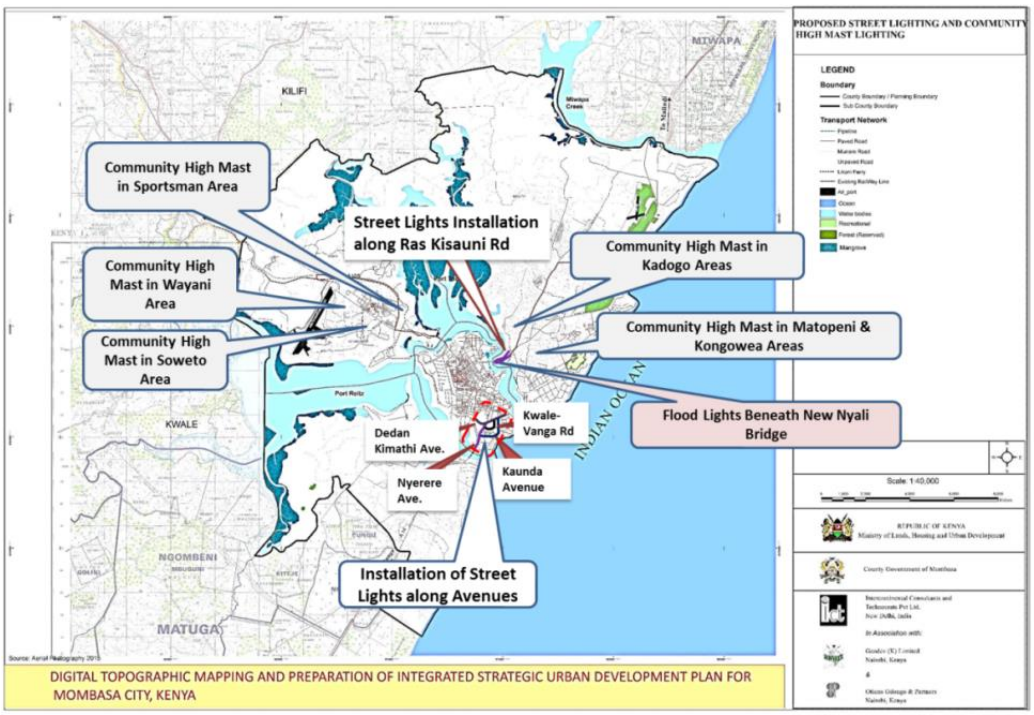
5.3.5.1 Strategies and Project

The strategies and projects that have been identified for electricity and streetlight are presented in Table 5.15 and Figure 5.11.

Table 5-15: Goal, Strategies and Projects for Power and Street Light

Goals	Strategies	Projects	Quantity	Unit	Remarks
Improve access to electricity for all residents	Extend the power grid to unserved areas in the county	Construct power lines to supply Mwakirunge, Maunguja II, Dongo Kundu and Shika Adabu areas with electricity	-	-	Unserved areas with power are mainly towards the periphery of the county.
	Encourage the use of alternative energy sources e.g. solar	Install solar lighting & heating systems in all public buildings, learning institutions & health facilities	All	No	All public building should be encouraged to use green energy like solar systems
	Lower the cost of power connection	Provide subsidies and loans for power connection	-	-	Government can subsidies the cost of power connection. Banks can also offer loans which customers can repay through their monthly bills.
Enhance street lights coverage to boost security	Light up all major roads	Install street lights along major roads	3,853	No	Broken street lights should be repaired. Use of solar lights for street lighting should be given priority.
		Install high mast at major road junctions	54		
	Light up crowded areas & open public places	Install community high masts		No	This will enhance security as well as encourage doing of business till late hours of the night.
		• informal settlement areas	32		
		• Public beaches	8		
		• Public gardens	3		

Figure 5-11: Proposed and Ongoing Streetlight and High Mast Light



5.4 SOCIAL INFRASTRUCTURE

This section presents strategies and proposals of social/community infrastructure. The key aim of community infrastructure planning is to ensure that the:

- City/ town are sufficiently supplied with social infrastructure/ community infrastructure;
- Social infrastructure/ community infrastructure is distributed as equitably as possible;
- Social infrastructure/ community infrastructure is effectively and efficiently configured so that service providers can respond to changing local community needs flexibly over a long time period.

5.4.1 EDUCATIONAL FACILITIES

5.4.1.1 Gap Assessment

The gap assessment is based on the availability of educational facilities as per norms given in the *Physical Planning Handbook 2008 and norms estimated by the consultant.* In absence of norms for higher education facilities in Physical planning handbook, Kenya, Consultant has proposed norm for the same based on prevailing in cities of similar status in other parts of the world.

The overall estimated gap in educational facilities in year 2035 will be 508 facilities (Primary School (including pre-primary)-263; Senior Secondary-189; Special School-7, Youth Polytechnic-34; Engineering College-2; National Polytechnic-1; Medical College-2; Teachers Training College- 4 etc. In terms of spatial coverage most of the educational facilities are concentrated in core city area i.e. Island, while areas like Kisauni, Jomvu Kuu, Miritini, Junda, Motopanga, Mwakirunge and Shanzu are either partially covered or not covered at all. In qualitative terms, none of the colleges and universities in Mombasa fulfil prescribed norms and standards.

5.4.1.2 Goal

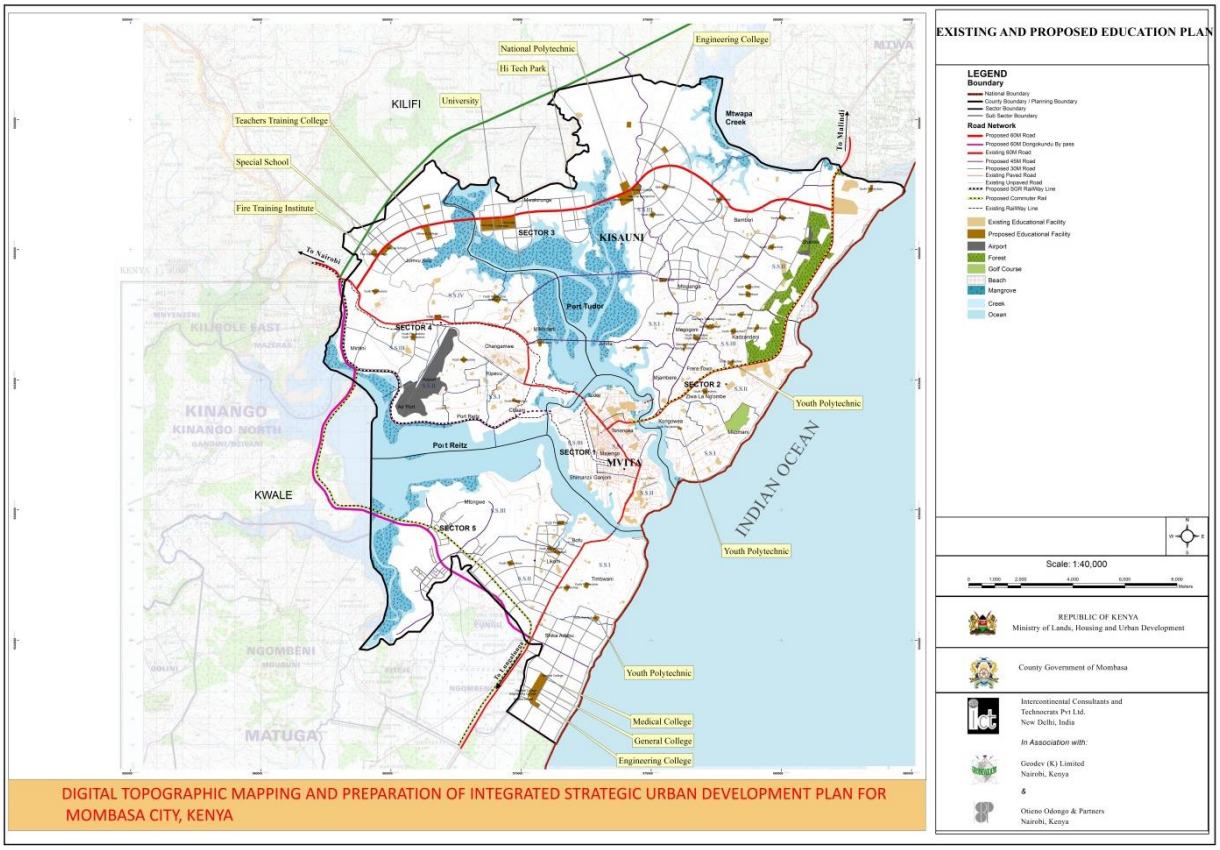
The overall goal is to facilitate access to educational facilities to promote social inclusion and cohesion and facilitate quality of services. Table 5.16 and Figure 5.12 presents the proposed educational facilities for Mombasa.

Table 5-16: Proposed Education Facilities for 2035

Facilities	(1 per catchment population)	Area Per Unit in Ha.	No of Services Required	Land Required by 2035 in Hectare
Primary School (Class I to VIII)	3,500	1.2	263	315.6
Senior Secondary(Class IX to XII)	8,000	3.4	189	642.6
Youth polytechnic	60,000	3.5	34	-
Special Schools	100,000	3.5	7	24.5
General College	150,000	10	4	40
Engineering college	500,000	10	2	20
Medical College	5,00,000	10	2	20
Teachers Training Institute (TTI)	500,000	0.5	4	20
Fire Training Institute/College	1,000,000	5	1	5

Facilities	(1 per catchment population)	Area Per Unit in Ha.	No of Services Required	Land Required by 2035 in Hectare
National Polytechnic	1,000,000	10	1	10
University	1,000,000	50	1	50

Figure 5-12: Existing and Proposed Educational Facilities



5.4.2 HEALTH FACILITIES

Health facilities are one of the most important in the daily lives of ordinary people. These facilities comprise hospital, nursing home and dispensary. The county hosts one coast level referral hospital and five government hospital, two faith based, one NGO run and ten privately run hospitals serving the entire county and has a total bed capacity of about 1386 patients. Coast Provincial General Hospital is also situated in Mombasa. Other major facilities include Mombasa Hospital, Aga Khan and Pandya Hospitals, these are privately owned. Other lower level hospitals include Tudor and Port Reitz level four hospitals.

5.4.2.1 Goal

The overall goal is to provide improved access to quality health care services through developed health infrastructure

5.4.2.2 Proposed Strategies

The following strategies are proposed to meet the requirements of health related infrastructure:

1. **To rehabilitate and expand existing health facilities**

a) Constructing a modern maternity wing in Port Reitz Hospital
b) Construct and equip dispensaries in the following nine administrative wards without Tier 2 facilities: Kipevu, Bofu, Timbwani, Ziwa la Ng'ombe, Mkomani, Kadzandani, Mtopanga, Magogoni and Bamburi
c) Renovate dilapidated Tier 2 facilities at Magongo, Miritini, Jomvu, Chaani, Majengo, Ganjoni, Kaderbouy, Kongowea and Frere town.
d) Upgrade, fully equip and renovate the existing lab into a fully operational food and pharmaceutical laboratory
e) Acquire, equip and automate county commodity warehouse with an extensive logistical system
f) Renovate and expand facility level stores
g) Acquire and maintain county and facility-based incinerators

2. To establish referral hospitals and emergency medical services

a) Construct additional Tiers 2 health facilities in the heavily populated areas of Aldina, Owino Ohuru and Mrironi.
b) Construct theatres, inpatient wards, and modern maternity wings, diagnostic and rehabilitation departments at Tudor and Likoni Hospitals, Jomvu Health Centre and Mlaleo Health Centre
c) Construct and equip a new Tier 3 hospital for Kisauni sub-county
d) Procure ambulances for each sub-county and referral hospitals

3. To ensure sufficient provisions for target group oriented specialized facilities

ISUDP proposes provisions for Senior Citizens and Mentally Challenged by way of specialized / target group oriented facilities, which will also relieve the pressure on general hospitals to some extent. These facilities include:

a) Construct Drug Rehabilitation Centers at sub-county level and in Likoni sub-county and in Kisauni sub-county on priority.
b) Establishment of Old age home-cum care center,
c) Establishment of care center for blinds.
d) Developing Hospital for mentally & physically challenged and make Port Reitz Hospital's mental unit autonomous
e) Developing Communicable disease hospital
f) Developing Veterinary Hospital

4. **To improve customer satisfaction and perception**

ISUDP proposes following measures to improve customer satisfaction and perception:

a) Recruitment of more health workers
b) Regular training and capacity building of health workers
c) Regular maintenance and refurbishment of existing infrastructure
d) Implement complaint management system

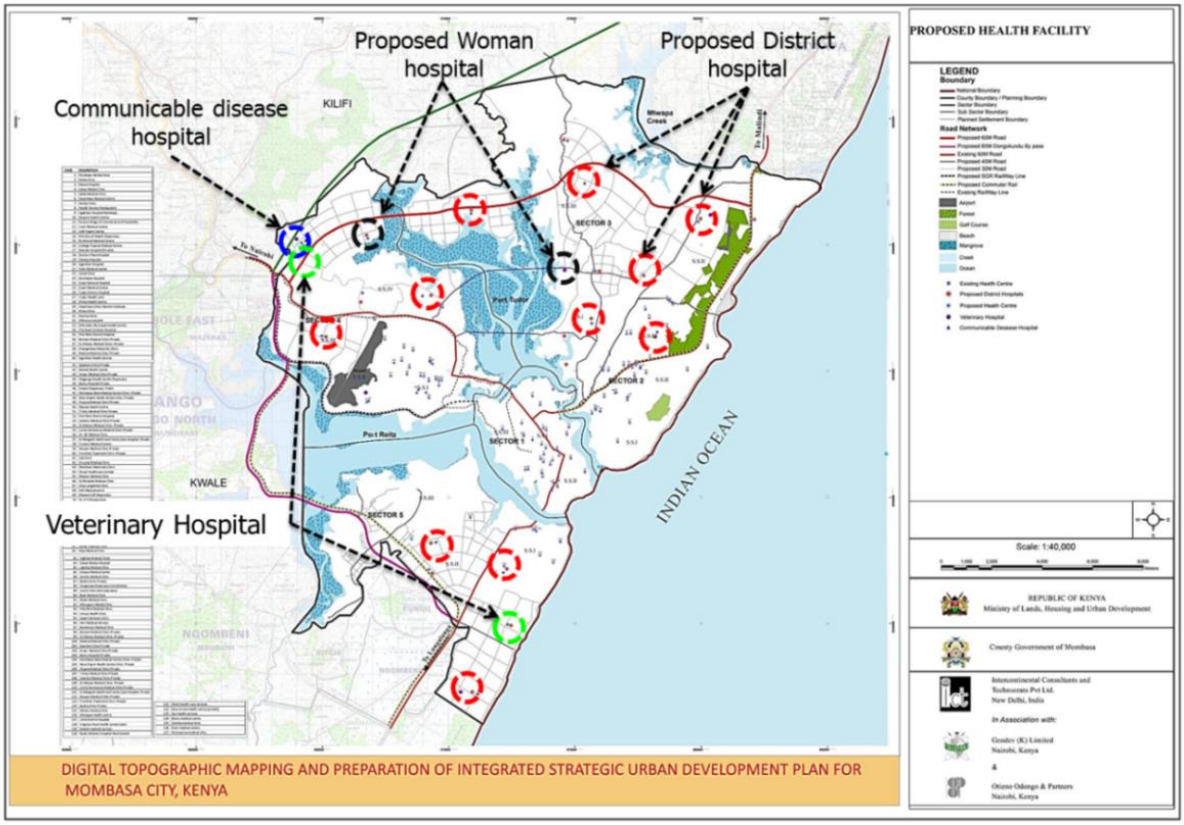
Proposed requirement of health facilities along with their area is shown in Table 5.17. Figure 5.13 presents the existing and proposed health facilities.

Table 5-17: Proposed Health Facilities for 2035

Facilities	(1 per catchment population)	Area Per Unit in Ha.	No of Services Required	Land Required by 2035 in Hectare

Level 5 City Level – Referral Hospital (Public & Private)	1,000,000	8	3	24
Level 4 District Hospital (Public & Private)	100,000	4	21	84
Level 3 Health Centre	30,000	2	17	33
Level 2 - Basic Health Sub Centre Nursing Homes	10,000	1	14	-
Level 1 - Dispensary/ Small Clinic with Chemist Shop	5,000	0.5	149	75
Women Hospital	500,000	5	86	10
Drug Rehabilitation centers	500,000	5	4	20
Establishment of care center for blinds	500,000	5	2	10
Hospital for mentally & physically challenged	1000,000	5	2	10
Veterinary clinics	50,000	0.1	43	4.3
Veterinary Hospital	1,000,000	5	2	13
Communicable disease hospital	1,000,000	4	1	4

Figure 5-13: Existing and Proposed Health Facilities



5.4.3 SECURITY

5.4.3.1 Goal

The overall goal in terms of security is provide a secured living environment to citizens of Mombasa.

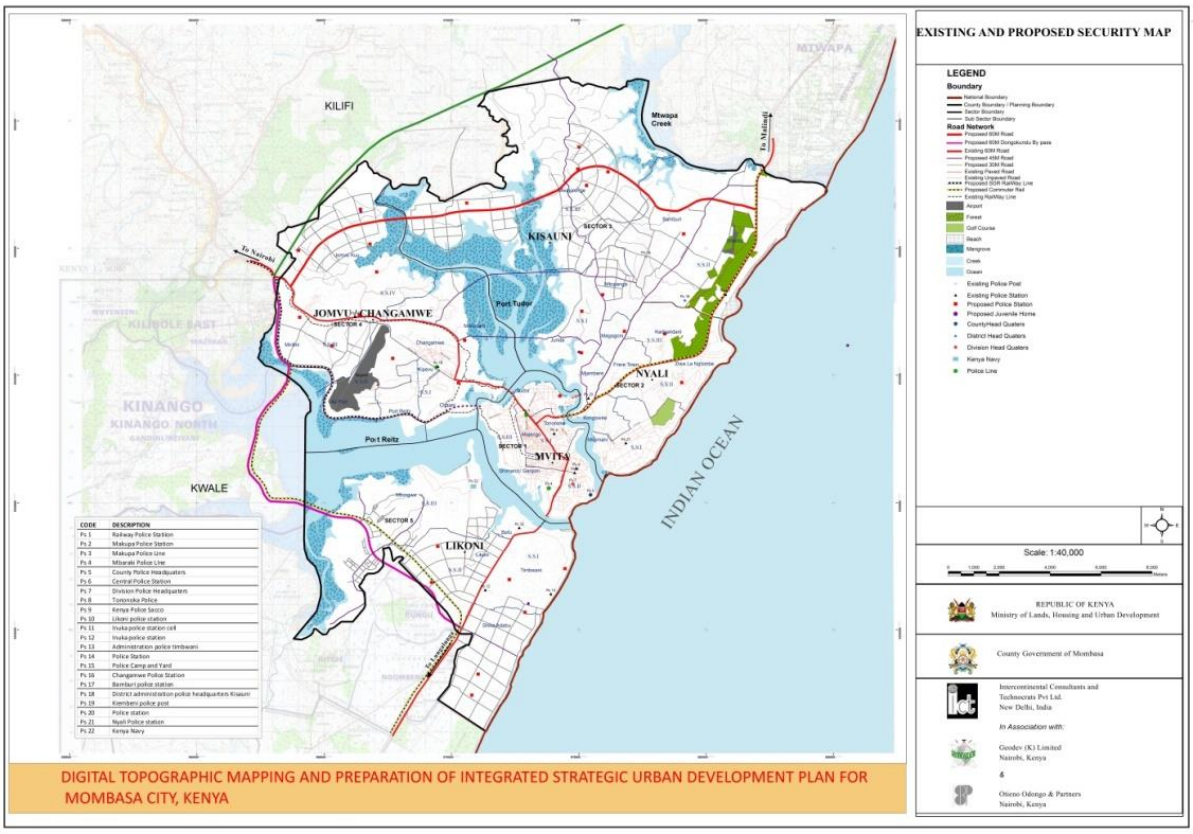
5.4.3.2 Proposed Strategies and Projects

Proposed requirement of security facilities along with their area is shown in Table 5.18. Figure 5.14 presents the existing and proposed security facilities.

Table 5-18: Proposed Security Facilities for 2035

Facilities	(1 per catchment population)	Area Per Unit in Ha.	No of Services Required	Land Required by 2035 in Hectare
Police Post	50000	0.2	43	8.6
Police Station	50,000	2	34	68
Juvenile Home	500,000	2	3	6
Police Firing Range	City Level	10	1	10
Police Headquarters	City Level	5	0	
Police line	City Level	10	0	
Prison	City Level	16	0	
Police Training Institute/College	City Level	5	0	

Figure 5-14: Existing and Proposed Security Facilities



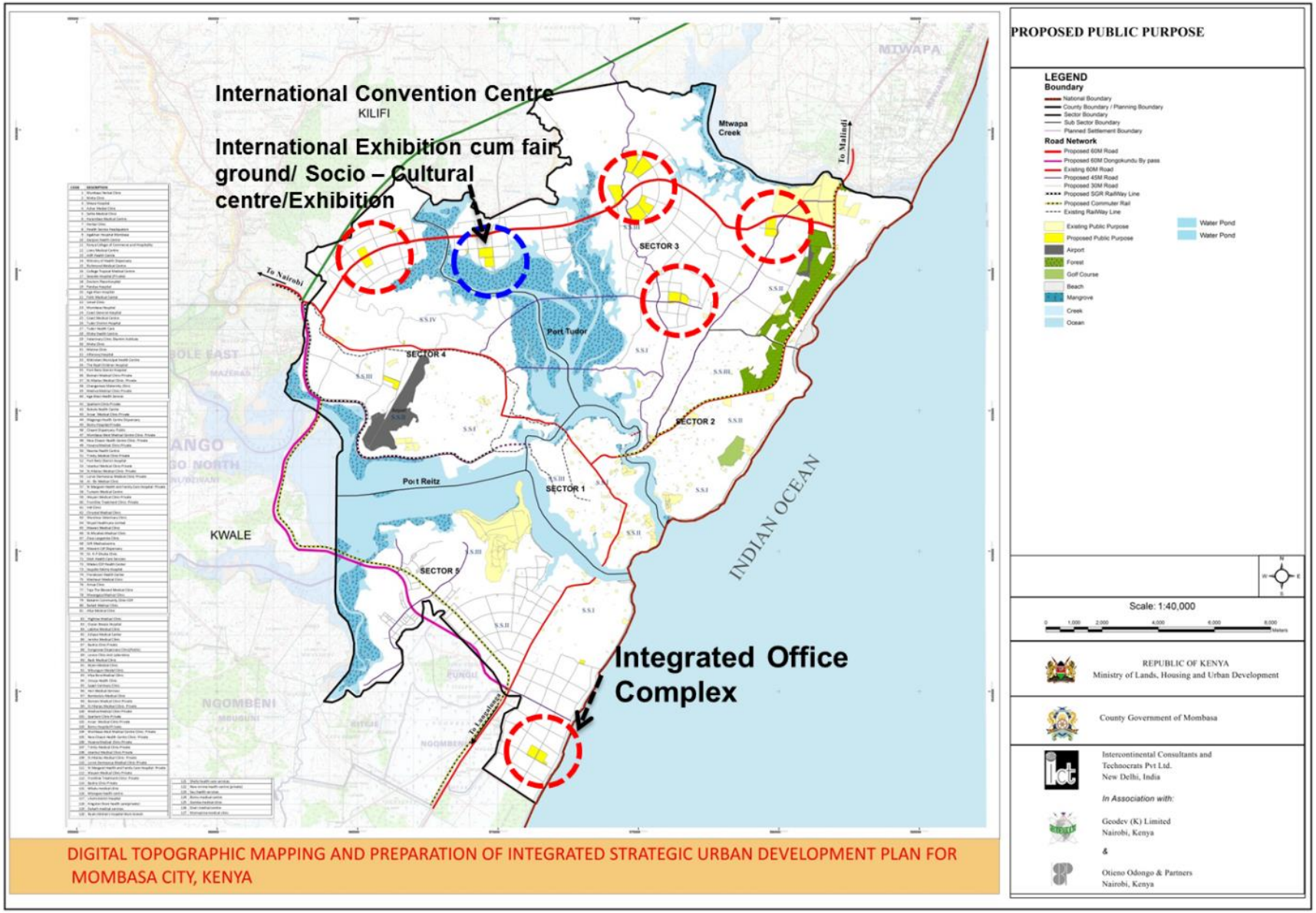
5.4.4 OTHER SOCIO-CULTURAL FACILITIES

Apart from the education, health and security services, there are other socio-cultural services which are also equally important for city development. These services include religious center, community halls, post offices, telecommunication, auditoriums, old age homes, grave yards etc. The detail requirements of these facilities are shown in Table 5.19 for the projected population in 2035. Figure 5.15 presents the existing and proposed socio-cultural facilities.

Table 5-19: Proposed Other Social-Cultural Facilities for 2035

Facilities	(1 per catchment population)	Area Per Unit in Ha.	No of Services Required	Land Required by 2035 in Hectare
Religious Institutions (churches, mosques, temples and shrines)	15,000	0.1	77	7.7
Cemetery/ Burial Ground	150,000	5	8	40
Electric Crematorium/ Cremation Ground	1,000,000	2.5	-	-
Community Room	15,000	0.075	144	10.8
Library	100,000	0.015	20	0.3
County Library	City Level	0.1	-	-
Community Centre	100,000	1	23	23
Amphitheatre	500,000	1	3	0.3
Cultural Centre	500,000	1	4	1.8
Night Shelter	1,000,000	0.1	2	0.2
Old age home	500,000	0.1	3	0.3
Working men's/women's hostel	500,000	0.1	2	0.2
Orphanage/children centre/destitute home	1,000,000	0.1	2	0.2
Care centre for physically & mentally challenged	1,000,000	0.1	2	0.2
Integrated Office Complex	500,000	10	5	100
Socio – Cultural centre/Exhibition cum fair ground	City Level	15	1	15
International Convention Centre	City Level	10	1	10
Sub-Post office	250,000	0.01	8	0.08
Post office	500,000	0.075	-	-
Head Post Office	City Level	0.25	-	-
Telephone exchange of 40,000 lines	400,000	4	-	-
Telegraph booking and delivery office	500,000	0.17	-	-

Figure 5-15: Existing and Proposed Socio-Cultural Facilities



5.4.5 FIRE SAFETY

5.4.5.1 Projection and Demand and Supply Gap

The existing fire stations do not meet the current demand for fire safety services. The standards for providing fire stations in a city like Mombasa is 1 fully equipped station per 150,000 people. Going by the mentioned standards, Mombasa County should have 8 fire stations currently (year 2015) and a total of 15 stations by the year 2035.

5.4.5.2 Ongoing Project Details

Recent Project Implemented

- Construction of Likoni fire station building structures under Phase I of the project

Projects Prepared

- Phase II of the Likoni fire station project which involves buying of firefighting equipment and office furniture for the station as well as installing new fire hydrants.

Future projects in pipeline

- Reviving of Changamwe fire station
- To construct additional fire stations in Kisauni, Nyali, Jomvu Kuu and Miritini
- Establish firefighting training school(s) within the county

5.4.5.3 Proposed Projects

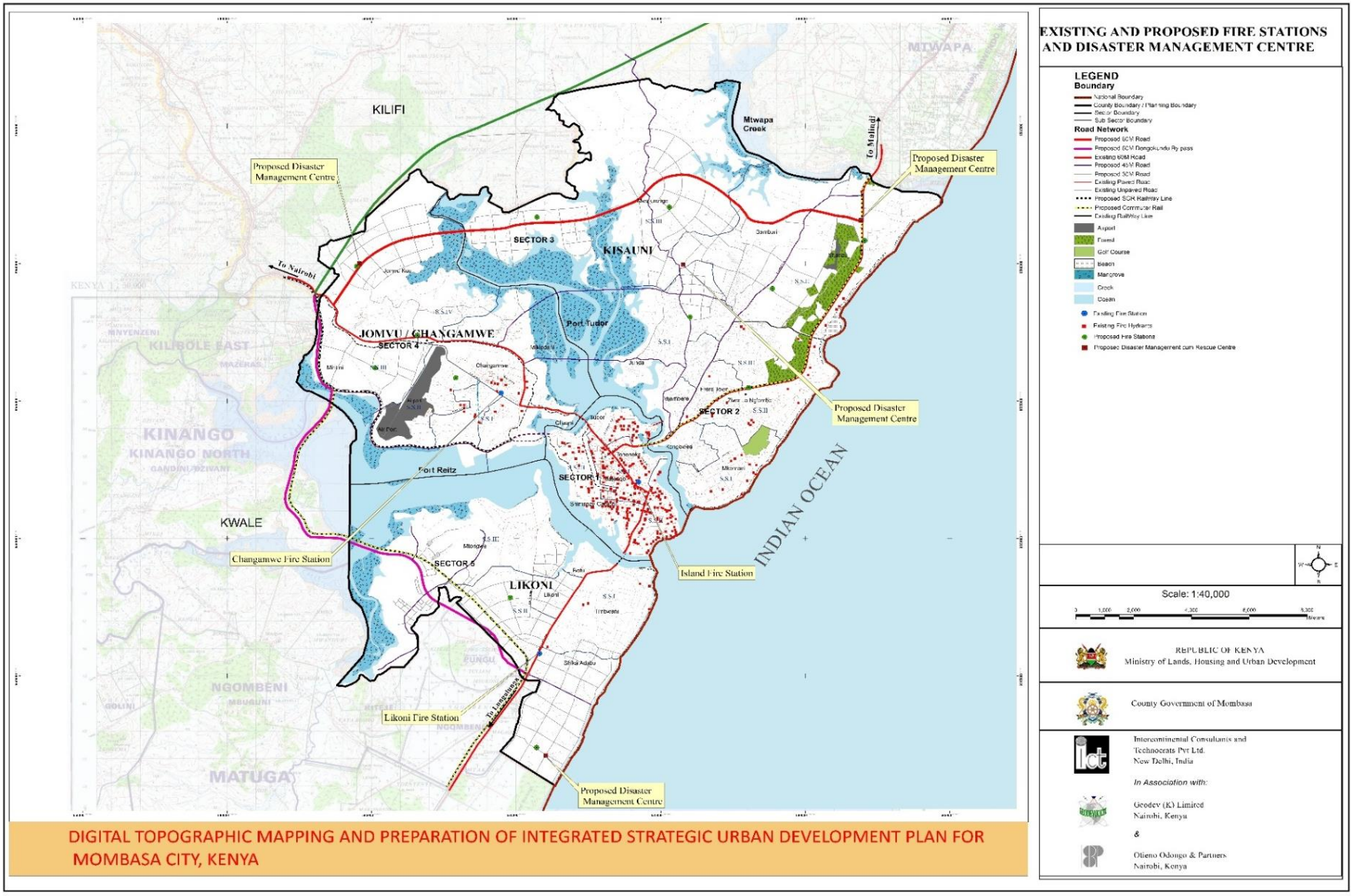
For achieving the aforesaid goal and implementing the strategies various projects have been identified, the same have been described in Table 5.20 and Figure 5.16.

Table 5-20: Fire Safety Projects

Goals	Strategies	Projects	Quantity	Unit
To have an effective and efficient firefighting and disaster management unit for the county	Enhance fire safety in the county to meet current & future demand	Acquire land & build more fire stations in:	12	No.
		Kisauni:- Maunguja II, Next to Punda Milia Paradise Hotel (Shanzu), Marimani (Mwakirunge), Dickson Children Center along Old Malindi Road & Vikwatani areas.	0.5ha/ station	
		Nyali:- Opposite Sheikh Zayeed Children's Home		
		Changamwe:- Wayani Area		
		Jomvu: - Miritini Primary School area, opposite total petrol station along Nairobi-Mombasa highway at entry junction to Jomvu area & undeveloped area north of Miritini Seconday School.		
		Likoni:- Bububu Elite School & Proposed Petrocity areas		
		Redevelop & modernize Changamwe, Likoni and Mombasa Island fire stations	3	No.

Goals	Strategies	Projects	Quantity	Unit
		Formulate, adopt, implement & enforce a county fire safety policy	1	Document
	Reduce response time to 5 minutes	Setup 1 Fire training institute	1	No
		All public buildings must be equipped with firefighting equipment.	-	
		Regular fire-drills to be organized in public buildings	-	
		Regular checking of firefighting installation within built-up areas	-	
		Increase personnel in the current fire station to match the city's requirement	-	
		Repair the non-functional fire hydrants and install new as per planned expansion	-	
	Enhance disaster management mechanism	Acquire land & build 4 disaster management cum rescue centres	4	No.
		Likoni: - Near Kwale-Mombasa boundary & next to proposed fire station.	1ha/center	
		Kisauni: - next to Shimo La Tewa prison (Shanzu) & Guu Tatu areas		
		Jomvu: - Next to proposed fire station in Miritini north of Miritini Secondary school		
		Prepare a Disaster Management Plan	1	Study
		Map out all the disaster prone areas	1	No

Figure 5-16: Existing & Proposed Fire Stations & Disaster Management Centers



5.5 HOUSING AND INFORMAL SETTLEMENT PLAN

5.5.1 Future Housing Requirement

The current housing units in Mombasa (for residential purpose) are 320,814. Based on the projected population growth and an average household size of 3.5 persons per household and assuming 1 dwelling unit for 1 household (HH)[2], number of residential units required in 2035 is estimated to be 649,910. This means an addition of 329,096 households shall be added. Therefore, the total land required under residential use by 2035 is estimated to be 7803 hectares.

Goal: To ensure 'Shelter for All'

Policy for Housing and Shelter: The policy regarding "Shelter" is based on the goal of ensuring 'Shelter for All' by harnessing the potential of the public, private / corporate and household sectors.

The aim of housing policy is to:

- Ensure effective housing and shelter options for all citizens, especially for the vulnerable groups and the poor, by creation of adequate housing stock on either rental or ownership basis.
- Arrest and improvement of deteriorating housing conditions.
- Encouraging integrated, participatory approaches to slum upgrading, including income-generating activities that effectively combat poverty.
- Promote research on the development of low cost building materials and construction techniques.
- Facilitating increased investment by the formal and informal private sector, in the production of housing for low and middle-income urban dwellers.
- Creating a Housing Development Fund to be financed through budgetary allocations and financial support from development partners and other sources.
- Encourage public agencies as facilitator through policy and strategic interventions.

Housing has a strong spatial relationship with employment, social services and other urban activities. The policy for development of housing could act as major tool for influencing the efficiency and equity of urban areas, besides its direct role in the provision of shelter.

5.5.2 Proposed Housing Strategy

The plan aims at ‘housing to be developed through a mix of re-densification, redevelopment and creation of new housing in urban extensions’.

Provision of new housing shall take place in two broad contexts that is 35 percent of additional housing demand will be accommodated as brownfield infill densification while 65 percent of additional housing demand will be accommodated as Greenfield extension area housing.

In view of the limited availability of land, construction cost, affordability of the citizens and increased requirement of housing, group housing is to be promoted and plotted residential development is discouraged.

Provision of homes has also been made for the elderly, night shelters and hostels.

[2] May not be the case where households use single rooms

Looking at the possible distribution of housing types, the future requirement of shelter provision will be dominated by small dwelling units.

A flexible land use policy through philosophy of mixed use has been proposed with a view to meet the demand for space for retail trade, health facilities, primary schools, tuition centers, guest houses and banks, etc. in residential areas.

It is proposed to adopt a multi-pronged strategy for providing of housing stocks and for delivery of serviced land, involving both the private sector and public sector agencies.

To make the construction activity environment friendly, the choices of alternative building materials and techniques are to be affected and promoted for construction activity. Building technology parks and mobile expositions for cost effective materials and techniques are to be explored for new housing areas and redevelopment schemes.

A number of initiatives have been identified in the following sub-sections that would promote increased housing delivery in Mombasa city, as well as promote the sector as an instrument of urban poverty reduction. Following are the proposed strategies for development of housing:

1) Development of New Housing Areas

- ISUDP proposes to accommodate sixty-five percent of additional housing demand through greenfield development. With objective to maintain a functional balance between residential areas, community facilities and employment centers, it is proposed to develop three new transit oriented compact townships namely Eco-city in Kisauni, New-Jomvu city in Jomvu and Coral city in Likoni. In addition to this it is also proposed to develop a Knowledge city in Maunguja-II, Kisauni. All these new townships are proposed to be developed along high capacity (mass transit) transport corridor.
- These new developments would be mixed use, high density (average density 450 pph) and medium and high rise. It is proposed to have high employment and residential densities around all proposed major transport corridors as it will provide greater travel convenience, lower car usage, reduce per capita pollution, protect environment, create convenience of community facilities and amenities and will result in more social interaction, bonding and safe neighbourhoods.
- **Proposed Housing Composition:** In view of the limited supply of land, high cost of land, construction cost and affordability of majority of people living in Mombasa, ISUD plan proposes the following housing typology:
    - Economically Weak Section (EWS) – about 25%
    - Low income – about 35%
    - Middle income – about 30%
    - High income – about 10%
- **Proposed Housing Typology:** It is proposed to create housing by means of both group housing (70%) and plotted housing (30%).
- Provisions have been made for government housing, industrial worker housing and institutional housing including public - private housing in 30:70 ratio or higher. Refer Figure 5.17.

2) Brownfield or Infill Development

ISUDP proposes to accommodate thirty-five percent of additional housing demand through brownfield development. With objective of making use of vacant and underused properties in already developed areas. For optimal utilization of resources, it is proposed that at-least twenty five percent of brownfield re-

densification should be done both on formally and informally developed parts of the city, in form of mass housing in areas where it is feasible for example *Buxton, Changamwe, Makande and Likoni.* It will provide opportunity to reuse the land both for housing and infrastructure (roads, underground utilities and street lighting), provide more open space and better living environment. Other methods for re-densification can be spot zoning and corridor development with high density, re-densification in areas of lower densities and enhancing holding capacity of land by providing infrastructure.

Housing demand at sector level has been worked out for year 2035 and same is presented in **Table 5.21.**

Table 5-21: Housing Demand by Type at Sector Level - 2035

	Sector -1 Mvita	Sector - 2 Nyali	Sector- 3 Kisauni	Sector- 4 Changamwe /Jomvu	Sector - 5 Likoni	TOTAL	Percentage
Total Housing Demand-Units	20,090	66,631	90,047	53,838	98,491	329,097	100%
EWS / *(1BR)*	-	9,995	23,412	19,920	25,608	78,935	25%
Low Income Group (LIG)*/(2BR)*	4,420	9,995	36,019	24,227	39,396	114,057	35%
Middle Income Group (MIG)*/(3BR)*	9,643	19,989	28,815	8,614	31,517	98,578	30%
High Income Group */(4BR)*	6,027	26,652	1,801	1,077	1,970	37,527	10%

The total minimum floor space required to develop housing under various categories is 2,879 hectares considering the unit area on an average basis of ground coverage and FAR permissible. Further considering the minimum ground coverage and number of floors the building foot print or area required on ground to build housing units is only 1,049 hectares compared to additional area proposed for housing development i.e. 1,547 hectares. Table 5.22 presents minimum floor space required by year 2035.

Table 5-22: Minimum Total Floor Space Required by 2035

Unit Type	No. of Dwelling Units Required	Minimum Unit Size (m²)	Minimum total Floor Space (m²)	Net Land (Lot) Assigned	Ground Coverage (%)	Number of floors	Plot Ratio
EWS/poor (1BR)	78935	40-50 (45)	3,552,030	118 Ha	80%	4	1: 3.0
Low Income Group (2 BR)	114057	60-70 (65)	7,413,640	308 Ha	75%	3	1: 2.5
Middle Income Group (3 BR)	98578	80-120 (100)	11,829,360	591 Ha	70%	2-3	1:2.0
High Income Group (4BR)	37527	130-180 (160)	6,004,320	400 Ha	60%	2-3	1:1.5
Note: Any plot above 1 acre (or 4000 sq. m) will still be still be subjected to the following regulatory standards: Ground coverage – 50%; Number of floors – 2 to 3; Plot Ratio – 1: 1.5							

Following is the proposed specification for Apartments:

- Minimum plot size – 1500 -4000 sq. m (About ¼ to 1 acre)
- Ground coverage – 40%

- Plot Ratio – 1: 2.5, FAR -250
- No. of Floors – 4-8
- Flats per floor – 4

Following is the proposed specification for Group Housing:

- Minimum plot size – 4000 sq. m (about 1 acre)
- Ground coverage – 30%
- Plot Ratio – 1: 1.5 – 2.0 , FAR -200
- No. of Floors – 4-8
- Flats per floor – 4

Redevelopment of Government housing estates: There are ten housing estates in Mombasa county including Changamwe estate, Tudor estate, Buxton estate, Mzizima estate, Likoni estate, Khadija estate, Nyerere estate, Mvita estate, Tom Mboya estate and Anderson Garden estate.

The county government has taken initiative to redevelop existing government housing estates. Table 5.23 presents the proposed redevelopment of government housing estates.

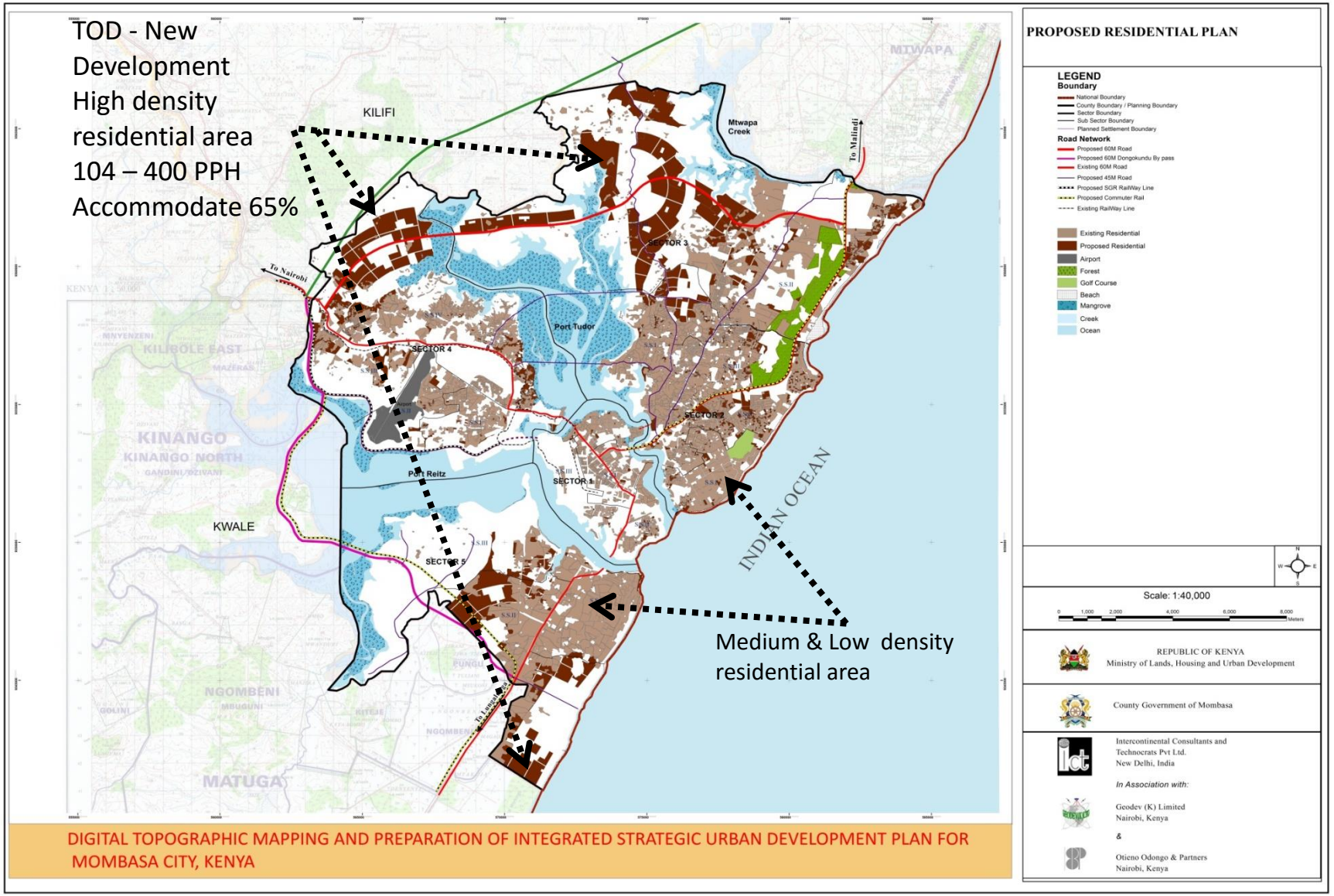
Table 5-23: Proposed Redevelopment of Government Housing Estates

Sl. No	Housing Estate	Area (acres)	Existing Housing	Proposed Development	Proposed Housing Unit Types	Residential to Commercial Ratio
1	Changamwe Estate	32	Single DU: 446 1BR DU:308 2 BR DU:71 3BR DU: 3	Mix use	MIG and HIG	80:20
2	Tudor Estate	21	Single DU:- 1BR DU:81 2 BR DU:160 3BR DU: 3	Mix use	HIG housing	40:60
3	Mzizima Estate	16	Single DU: 12 1BR DU:79 2 BR DU:18 3BR DU: 3	Mix use	HIG housing	20:80
4	Likoni Estate	10	Single DU: 1BR DU:180 2 BR DU:120 (customs) 2BR DU: 48	Mix use	LIG, MIG and HIG housing	80:20

3) Initiatives to Increase Supply of Developed Land

Non-availability of serviced land in Mombasa is a major constraining factor for private sector to take up housing projects especially for the poor. The development plan proposes public- private partnership or private sector involvement in construction of public housing. As far as availability of developed land is concerned, the government initiatives are required in terms of involvement of government departments for taking lead in developing the land with services, infrastructure etc. At the same time the private sector should also be encouraged to develop land so that serviced plots could be made available to the public for construction activities.

Figure 5-17: Existing & Proposed Residential Use



4) Rental Housing Initiatives
5) Housing for Urban Poor
6) Mixed Use Housing
7) Private Sector Involvement
8) Night Shelter and Hostel for Working Men and Women
9) Security of Land Tenure

5.5.3 STRATEGY FOR INFORMAL SETTLEMENTS

As per department of Planning, Land and Housing, County Government of Mombasa, about 65% of the residents of Mombasa are housed in informal settlements. This problem is worsened by the land ownership system where privately owned land is let to "tenants-at-will," many of whom have for generations rented the land upon which their temporary houses are built. Due to lack of planning, most government and private land which is freehold and owned by "absentee landlords" living elsewhere has been transformed into informal settlements. Furthermore, residents claim ownership of the government land. These informal settlements are built on "planned" and "unplanned" areas which do not have formal planning approval. They are characterized mostly by low quality houses and the lack of, or inadequate infrastructure and social services.

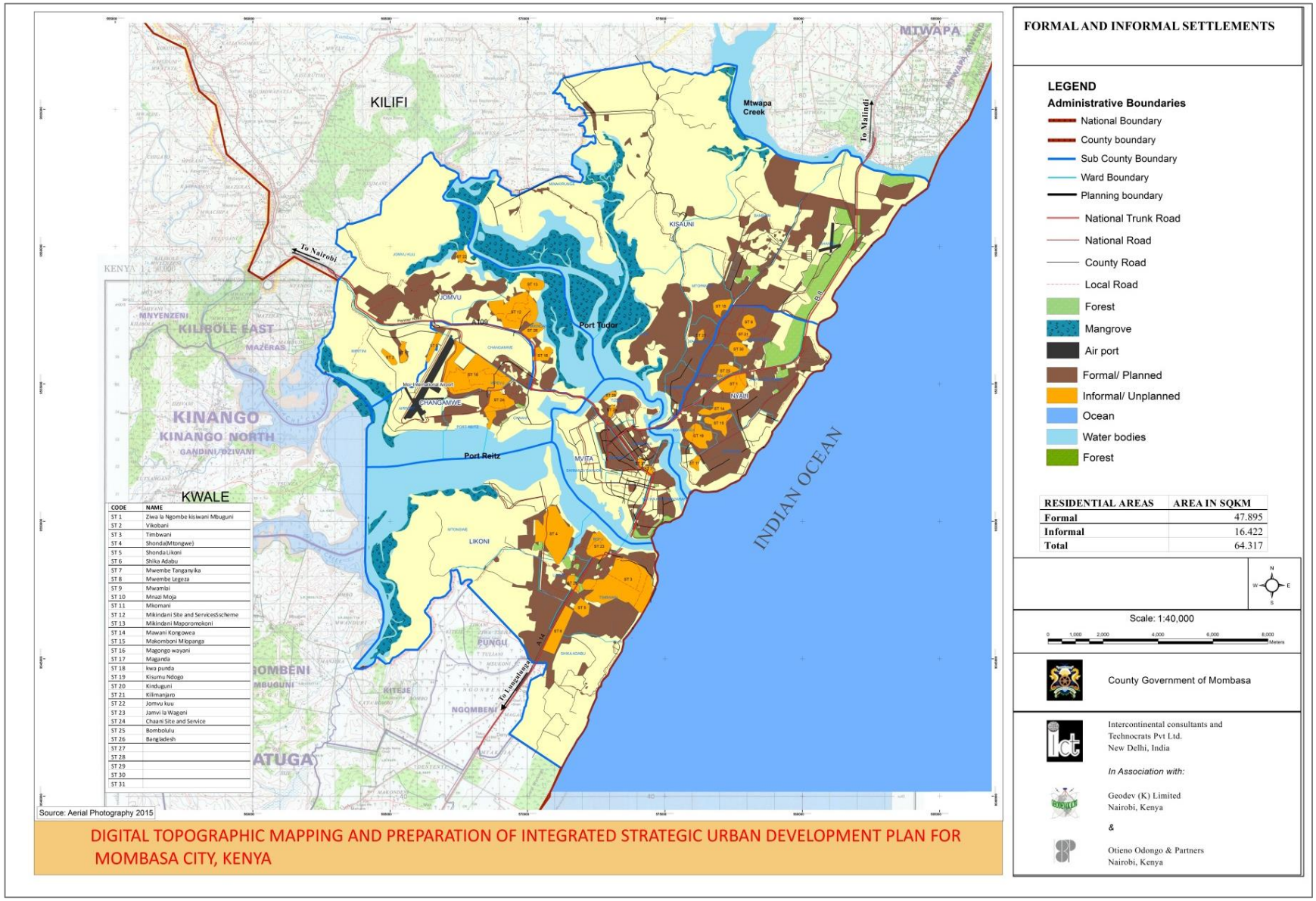
Formalisation of informal settlements and provision of infrastructure facilities in informal settlements is going on in Mombasa under following three programmes:

- KENSUP- Kenya Slum Upgradation Program in Ziwa la ngombe settlement
- MSUP - Mombasa Slum Upgrading Program : Capacity building, water and sanitation to support improvement of livelihoods in the slums at Tudor and Ziwa la ngombe
- KISIP – Kenya Informal Settlement Improvement Program in 7 informal settlements

It is proposed to conduct a detailed survey in prioritized informal settlements against criteria such as land values, land ownership, tenure status, dwelling unit density, land availability, location in relation to employment and services and access to transport nodes and routes before finalising the option for development of informal settlement. Figure 5.18 present options for informal settlement development. Figure 5.19 presents the existing informal settlements in Mombasa.

Figure 5-18: Informal Settlement Development Options

Figure 5-19: Location of the Informal Settlements in Mombasa County



CODE	NAME
ST 1	Ziwa la Ngombe kiswani Mbuguni
ST 2	Vikobani
ST 3	Timbwani
ST 4	Shonda(Mtongwe)
ST 5	Shonda Likoni
ST 6	Shika Adabu
ST 7	Mwembe Tanganyika
ST 8	Mwembe Legeza
ST 9	Mwamlai
ST 10	Mnazi Moja
ST 11	Mkomani
ST 12	Mikindani Site and ServicesScheme
ST 13	Mikindani Maporomokoni
ST 14	Mawani Kongowea
ST 15	Makomboni Mlopanga
ST 16	Magongo wayani
ST 17	Maganda
ST 18	Kwa punda
ST 19	Kisumu Ndogo
ST 20	Kinduguni
ST 21	Kilimanjaro
ST 22	Jomvu kuu
ST 23	Jamvi la Wageni
ST 24	Chaani Site and Service
ST 25	Bombolulu
ST 26	Bangladesh
ST 27	
ST 28	
ST 29	
ST 30	
ST 31	

5.6 TRANSPORTATION

5.6.1 INTRODUCTION

Mombasa Road (A-109), Nyali Road (B-8) and Likoni-Ukunda Road (A-14) are the three major intercity trunk roads originate from or terminate at Mombasa. These roads carry long distance traffic and heavy vehicles. Port-bound trailer trucks utilize Mombasa Road (A-109) to carry goods from Mombasa to other cities in Kenya and other neighborign countries. However, parts of Mombasa Road (A-109), Nyali Road (B-8) and Likoni-Ukunda Road (A-14) also carry urban traffic generated everyday by the daily commuters within county boundary. Existing traffic on major roads within Mombasa exceeds its acceptable limit under existing and projected traffic conditions. An organized public transport system is unavailabe in Mombasa. This plan incorporates possible transport sector improvement proposals to address the issues under exsiting and projected traffic condition.

5.6.2 EXISTING AND PROJECTED TRAFFIC

Traffic volume on major roads and their capacities are analysed to assess the existing road space demand. Road capacity standards are obtained from “Road Design Guidelines for Urban Roads, 2001 – Ministry of Local Government, Government of Kenya”. **Table 5.24** shows peak hour traffic on major roads in Mombasa.

Table 5-24: Traffic and Capacity of Major Roads in Mombasa

Location	Peak Hour	No of Lanes	Capacity	V/C Ratio
Mombasa Road from Mombasa County Boundary to Miritini	1,155	2	1800	0.64
Mombasa Road from Miritini to Makupa Causeway	3,478	4	2700	1.29
Jomo Kenyatta Avenue from Makupa to Ronald Ngara Road intersection	3,587	6	4900	0.73
Jomo Kenyatta Avenue from Ronald Ngara Road intersection to Barclays Roundabout	4860	6	4900	0.99
Digo Road from Barclays Roundabout to Moi Avenue Roundabout	6,098	6	4900	1.24
Nyerere Avenue from Moi Avenue Roundabout to Likoni Ferry	4,810	6	4900	0.98
Haile Selassie Road west of Digo Road	2,262	4	2700	0.84
Moi Avenue west of Digo Road	4,073	4	2700	1.51
Shimanzi Road north of Beira Road	1,147	2	1800	0.64
Nyerere Avenue at Likoni Ferry Access Road	1,079	4	2700	0.40
Lumumba Road south of Ronald Ngala Rd	3,133	4	2700	1.16
Sheikh Abdullas F Road/Tom Mboya Avenue from Buxton to Barclays Roundabout	4,610	4	2700	1.71
Nyali Road (B-8) east of Nyali Bridge	4,966	6	4900	1.01
Nyali Road (B-8) near Shimo La Tewa Prison	1,697	2	1800	0.94
Kengelani Road near Mwakirunge	225	2	1000	0.23
Likoni-Ukunda Road (A-14) near National Oil Corporation	733	2	1800	0.41
Likoni Road (A-14) near Likoni Ferry Access Road at Likoni Mainland	2,112	2	1800	1.17

**Road Design Guidelines for Urban Roads, 2001 - Ministry of Local Government, Government of Kenya*

5.6.3 GOAL OF TRANSPORTATION SECTOR DEVELOPMENT AND STRATEGIES

Transport sector development goal for Mombasa is "Safe, convenient and affordable movement of people and goods throughout the county, provide transport infrastructure and services to support a long term sustainable growth of Mombasa."

Transportation strategies for Mombasa County are to integrate and improve Road, Rail, Water, Air, Pedestrian and Non-Motorized Transport system components that set out to achieve mobility and accessibility goal of Mombasa County and to guide transportation sector investment decisions in Mombasa over the next 20 years.

Transportation strategies for Mombasa are comprised of various improvement proposals of different transport system components. The strategic framework sets out an approach for accommodating additional 1.36 million people expected to live in the County by 2035 and the resulting growth in demand on the transportation system. It brings together strategies on road capacity augmentation wherever possible, new proposed roads linkages, intersection improvements, classification of road, passenger and goods terminals, water transport, air transport, non-motorized and pedestrian facilities and introduction of planned public transport system. Each of these proposals is analysed based on existing and projected demand and are presented in the following sections in this chapter.

Purpose of development of transport strategy of Mombasa is to ensure improvement in road connectivity, equitable space for all road users, and availability of public transport, efficient goods transport, establish connectivity between residence and work place, safety for pedestrians and NMT users, integrate all modes of transport e.g. road, rail, water and air transport in a thriving urban environment.

5.6.3.1 Road Network Proposal

Road network in Mombasa need improvements in terms of road condition, classification, road widening, new proposed road linkages and intersection improvements. The following subsections detailed out each of the development proposals.

Primary distributor roads in Mombasa Island are paved in existing condition with footpath and drainage system. Roads in north mainland, west mainland and south mainland are paved partially and storm water drain system is unavailable in unpaved roads.

Table 5.25 presents length of paved road, murram road and unpaved/earthen roads.

Table 5-25: Existing Road Condition in Mombasa

Road Type	Length of Road (in Km)	Percentage
Paved Road	387.459	32.54%
Murram Road	145.609	12.23%
Unpaved Road/Earthen Road	657.707	55.23%

Total length of proposed paved road would be around 803 Km distributed in all sub county locations in Mombasa.

1) Classification of Roads

Classification of roads in terms of hierarchy is essential to identify facilities required for each category of roads. Classifications of rural road and urban road categories as mentioned in Physical Planning Handbook are utilised to classify existing roads in Mombasa.

Table 5.26 presents classification of roads in Mombasa under existing condition.

Table 5-26: Classification of Existing Major Rural Roads in Mombasa

Road Name	Road Classification
Mombasa Road (A-109) up to Barclays	International Trunk Road (Class A)
Magongo Road (C-109 L)	International Trunk Road (Class A)
Likoni-Ukunda Road (A-14)	International Trunk Road (Class A)
Buxton to Likoni Ferry Road (A-14R)	International Trunk Road (Class A)
Nyali Road (B-8)	National Trunk Road (Class B)
Airport Road (C-110)	Primary Road (Class C)
Moi Avenue-Makande Road (C-114)	Primary Road (Class C)
Kidunguni-Mtongwe Road (C-109)	Primary Road (Class C)

International trunk roads, national trunk roads and primary roads are maintained by Kenya National Highway Authority (KeNHA). Major urban roads other than the listed above, which are called primary distributor or arterial roads, district distributors and local distributors, are categorized and maintained by Kenya Urban Road Authority (KURA). Some local distributors and access roads are categorised and maintained by Kenya Rural Road Authority (KeRRA).

2) Road Widening

Daily and peak hour traffic volume in some of the national and international trunk roads and primary roads under rural road category in Mombasa exceeds their capacity under existing traffic condition and also under projected traffic condition in horizon year 2035. Some of the urban roads in Mombasa also need expansion to accommodate projected traffic. Based on traffic volume and projected traffic analysis, following roads are identified, which need capacity augmentation and up-gradation,

- Mombasa Road (A-109)
- Nyali Road (B-8)
- Airport Road (C-110)
- Magongo Road
- Kengeleni Road
- Old Malindi Road
- Link Road

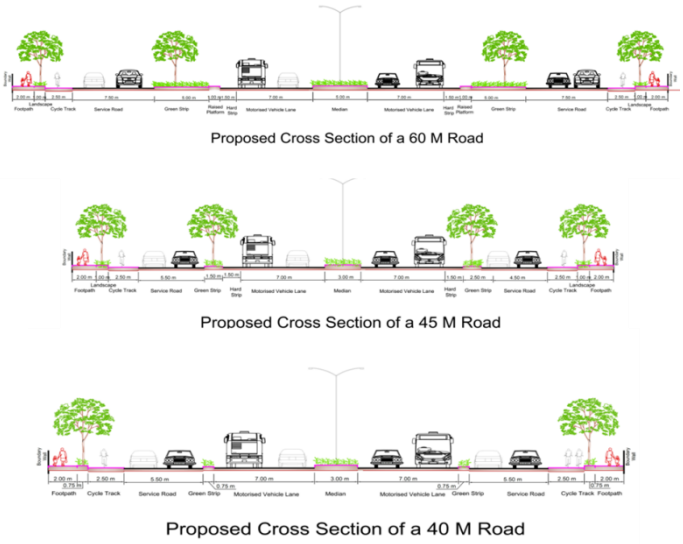


Figure 5-20: Proposed Typical Road Cross Sections of Major intercity Roads

3) Committed Road Improvements

Different government agencies in Mombasa have been working on several road improvement proposals. These proposals are incorporated in the future proposed road network plan as committed developments.

International and national trunk roads in Mombasa are maintained and developed by Kenya National Highway Authority (KeNHA) and they are considering following improvement proposals,

- Four-laning of Mombasa Road (A-109) from Mariakani to Mombasa
- Four-laning of Airport Access Road (C-110)
- Second Nyali Bridge

KeNHA in collaboration with JICA have been working on the following proposals,

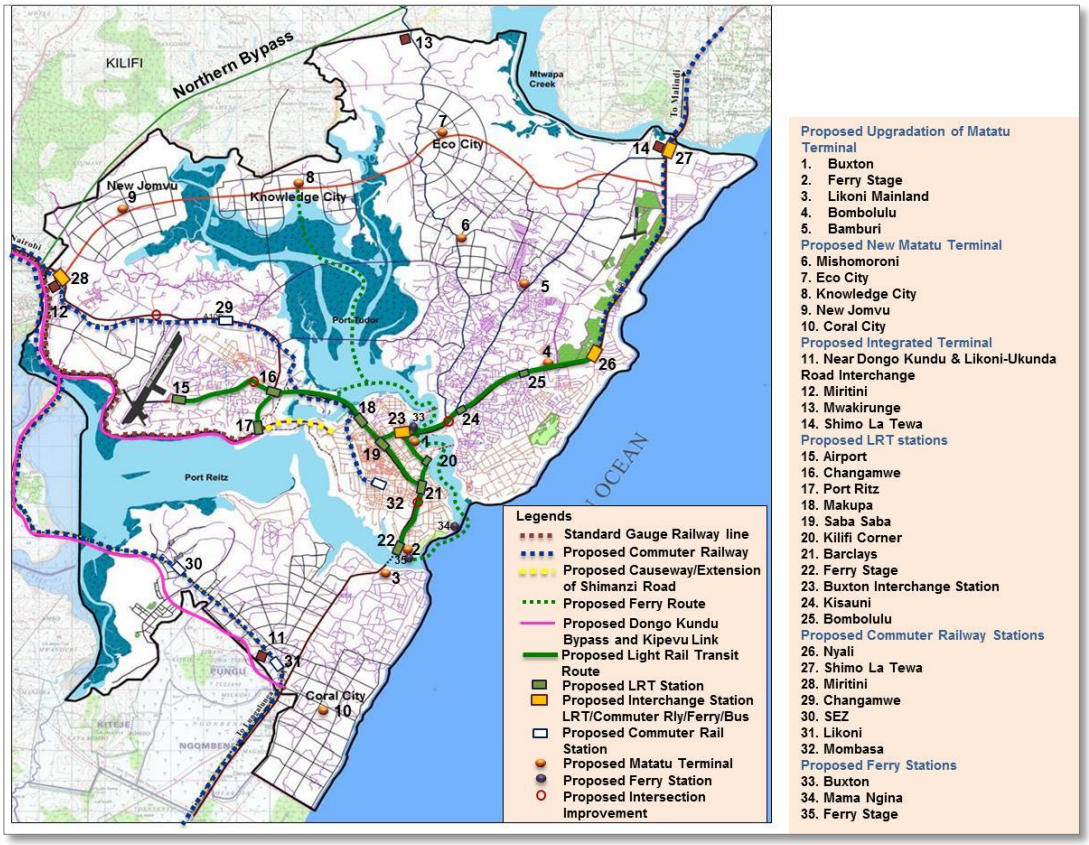
- Dongo Kundu Bypass
- Northern bypass
- Likoni Bridge

Kenya Urban Road Authority (KURA) presently identified following two of the roads in Kisauni area for up-gradation.

- Bombolulu-Kisauni two lane road
- Kiembeni-Bamburi two lane road

Presently Department of Transport & Infrastructure of County Government of Mombasa is working on different alternative alignments of Northern Bypass and water dam proposal. **Figure 5.21** presents proposed road network and all other transport proposals for Mombasa.

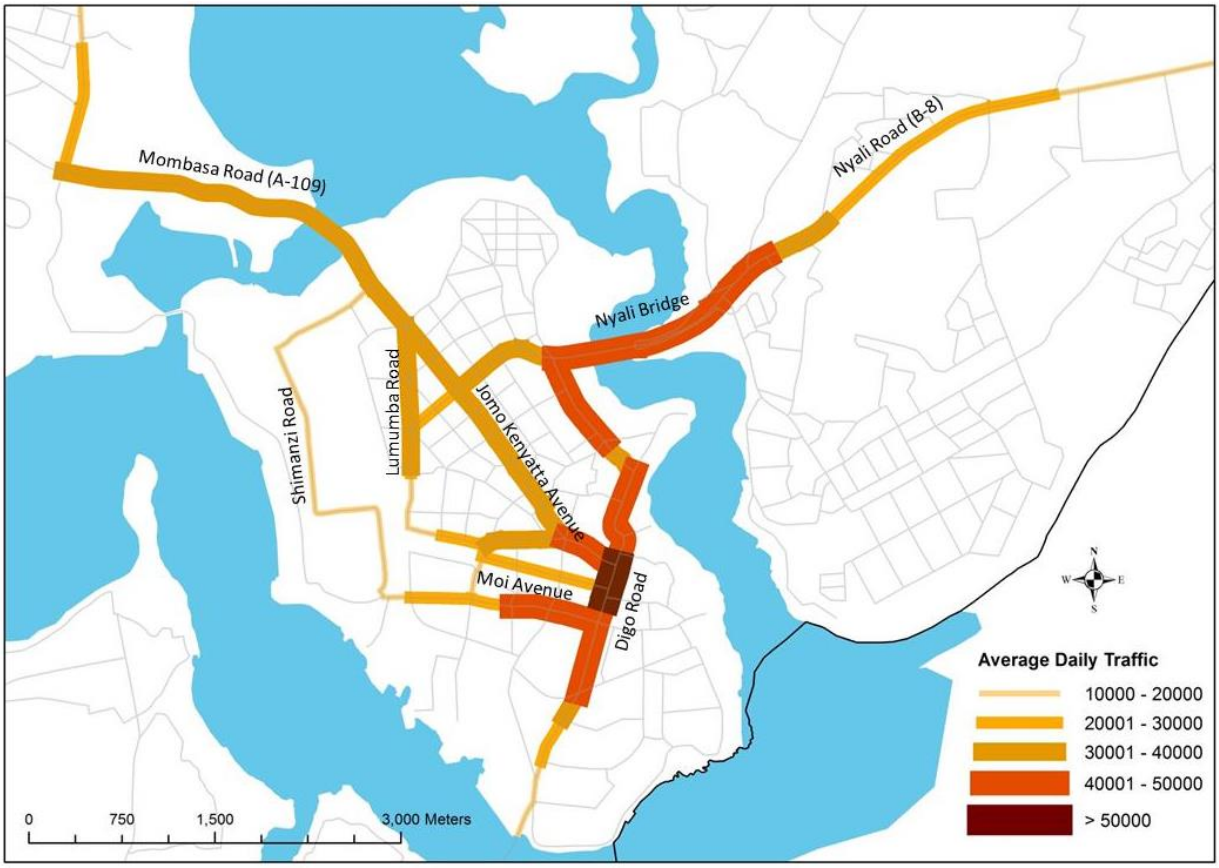
Figure 5-21: Transport Proposals for Mombasa



5.6.3.2 High Demand Corridor

Passenger travel demand on Mombasa Road (A-109), Jomo Kenyatta Avenue, Digo Road, Nyerere Avenue, Nyali Road (B-8) and Sheikh Abdulla F Road near Buxton and Abdel Nasser Road near Marikiti are observed to be higher than other roads in Mombasa. These roads connect the main CBD area in Mombasa Island with other parts of the county. **Figure 5.22** presents high passenger demand corridors in Mombasa.

Figure 5-22: High Passenger Demand Corridor of Mombasa



5.6.3.3 High Capacity Public Transport System

Matatu and mini buses are catering the demand of public transport system in Mombasa under existing conditions. However, matatu and mini buses are operated by cooperatives or saccos. Fare tariff and matatu operation are controlled by these saccos and as a result facilities provided in matatu service are below standard and unsafe for passengers. It is also analysed that number of new registered matatus in Kenya are reducing for the last five years.

Public transport demand assessment study may be conducted by the County to identify the best possible public transport option on high demand corridor to be introduced in Mombasa.

1) City Bus Service

A city bus system could be introduced as a new public transport system in Mombasa. City bus system could be designed in a way to provide a high quality, reliable, comfortable, accessible and affordable public transport system in Mombasa. A feasibility study may be conducted for proposed city bus system in Mombasa to find possibilities of implementation.

2) Bus Rapid Transit System

A Bus Rapid Transit (BRT) system is a bus service facility in an identified area, where buses ply through dedicated BRT lanes and passengers access to the buses at the BRT bus stops. BRT has several components and BRT operations are controlled from a central system and bus route and timing related information are disseminated through public address systems at the bus stops and terminals. BRT system can carry 10,000 to 15,000 peak hour peak direction passenger volume. BRT system in Curitiba in Brazil and Bogota in Colombia and many other cities in the world have been successfully introduced BRT.

3) Light Rail Transit System

Light Rail Transit (LRT) system is one of the urban mass transport system comprised of rolling stock, signal system operated on railway track on viaduct and station buildings. Operating speed and frequency of a LRT system is higher than other road based transit system. LRT system can carry 20,000 to 30,000 passengers in peak hour peak direction. Several cities of Africa including Addis Ababa and Lagos have successfully introduced LRT system. Potential and constrains of a LRT system are presented in **Table 5.60**.

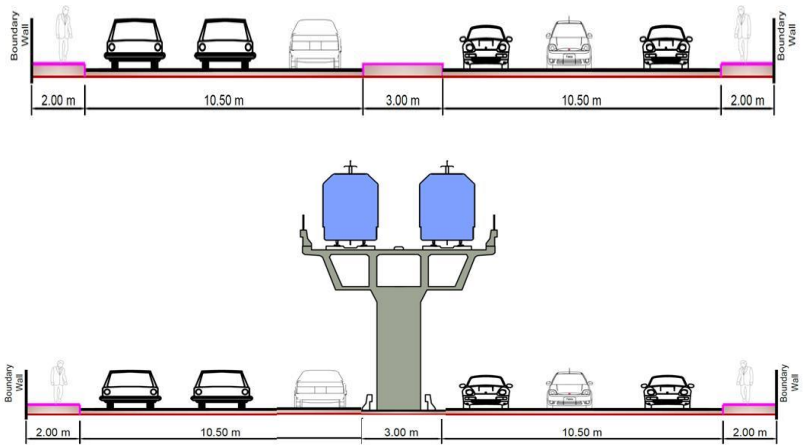


Figure 5-23: Typical Cross Section of a Road with Proposed LRT System

Figure 5.24 presents proposed LRT routes and stations in Mombasa.

Figure 5-24: Routes and Stations of Proposed LRT System in Mombasa

A

detailed feasibility study for installation of LRT system in Mombasa may be conducted by the relevant government agency.

5.6.3.4 Rail Transport

Mombasa is connected to other cities in Kenya and its neighbouring countries through existing metre-gauge railway line. Container freights from Mombasa port are transported to different destinations through existing metre gauge line. The existing railway line is parallel to Mombasa Road (A-109) from Nairobi to Mombasa. The line is bifurcated after Changamwe, one line goes to the Port and the other line terminates at Mombasa railway station for passenger services. Due to lack of up-gradation and maintenance of the metre gauge track, less than 5% of containers are transported through rail system at present and

there is only weekly passenger train service and it takes 24 hours to cover the distance between Mombasa and Nairobi.

1) Standard Gauge Railway

Kenya Railway Corporation, Government of Kenya started construction of Standard Gauge Railway (SGR) line from Mombasa to Nairobi and further to Malaba. Mombasa-Nairobi line of SGR is supposed to be operational by 2017.

It is expected that SGR will cater to 30% of container freight transport demand from Mombasa Port. The proposed SGR line will be aligned parallel to Kipevu link of Dongo Kundu Bypass. The line will be terminated at Port Ritz of Mombasa port. SGR will also have a train marshalling yard in near Kipevu link.

2) Proposed Commuter Railway

Mombasa railway station is located at the merging point of Haile Selassie and Mwembe Tayari Road and is connected through existing metre gauge railway line. Based on existing and projected daily commuting demand of the passengers between Mombasa and neighbouring cities in Kilifi and Kwale County, a commuter rail system can be developed utilizing the existing railway tracks and upgrading it to a Standard Gauge Railway for passenger services. Commuter railways are a suburban rail system that runs on heavy rail track and it has a capacity to carry 30,000 passengers per hour or more. Commuter rail system connects neighbouring cities located within a range from 15 Km to 200 Km from the main city. Regular commuting of people residing in cities or town located along a commuter railway line gets facilitated. Three commuter railway lines are proposed in Mombasa county, which will improve connectivity with neighbouring counties of Kwale and Kilifi,

- Mombasa to Voi in Taita Taveta County
- Mombasa to Malindi in Kilifi County further extended up to Lamu
- Likoni mainland to Lunga Lunga in Kwale County

5.6.3.5 Water Transport

Water transport is available from Mombasa Island to Likoni mainland over Kilindini Harbour. However, this ferry route is in conflict with the regular passage of ships to Mombasa port. Tudor creek is navigable for ferry service from south of the Island up to east of Kisauni, low tide water level is not suitable for ferry navigation north of Kisauni. However, a dredged canal could be developed from Kisauni up to proposed Knowledge city. This will facilitate projected passenger movement from proposed Eco City, Knowledge city to Mombasa CBD. Based on existing and projected passenger demand analysis between the Mainland County and Mombasa Island, following two ferry routes are proposed in Tudor Creek.

- Changamwe – Buxton – Mama Ngina Drive – Ferry Stage
- Proposed Knowledge City – Buxton - Mama Ngina Road – Ferry Stage

5.6.3.6 Air Transport

Moi International Airport (MIA) is the second important airport in Kenya after Jomo Kenyatta International Airport. It is located west of the County south of Mombasa Road (A-109). Port Ritz creek form the south boundary of the airport. Moi International Airport caters to existing tourist passengers coming to Mombasa.

Kenya Airport Authority (KAA) identified proposals for Moi International Airport that includes additional parking areas, widening of Airport Access Road (C-110), resurfacing of airport runway and a new ground based signal facility. With improved communication and signal systems and efficient scheduling and operations, MIA could handle existing and projected

tourist passenger demand. Moi International Airport could also be developed as pilots training centre.

5.6.3.7 Transit Oriented Development (TOD)

Transit orient development (TOD) is proposed to be promoted along the public transport network, bus/transit station should be made nucleus of centre of various activities like housing, schools, commercial and public places etc. It will help to increase the bus/transit system ridership and revenue thereof. Conversely, the bus transit corridors should pass through such already developed urban nodes.

Transit Oriented Development Corridor (TOD) is proposed to be developed in Mombasa County along the new proposed primary distributor road connecting proposed Eco City-Knowledge City-New Jomvu. Mixed use development is proposed both side of the corridor with a proposed density of 400 persons per hectare. A TOD could be developed based on bus based or rail based transit system depending on the proposed and achieved density along the corridor. A minimum 60 metre Right of Way (ROW) is proposed for the TOD corridor. Following transit stations are proposed to be developed,

- Shimo La Tewa
- Eco-City
- Knowledge City
- New Jomvu
- Mombasa Road (Miritini)

5.6.3.8 Parking Management

Central Business District (CBD) area consists of offices, commercial establishments to cater to the requirement of the whole county area under existing condition. Net parking demand of the study area is derived to be 5,468. With the growth of business in CBD and redevelopment possibilities, parking demand in CBD area will grow in coming years. However, proposed commercial centres located north, west and south mainland of the county is expected to attract many new businesses. Considering all possibilities future parking demand in Mombasa CBD area are derived to be 8,000 spaces.

Based on projected parking demand, a multi-storeyed car parking building is proposed to be developed at the existing off-street parking area located on Baluchi Street south of Makadara ground. Multi-storeyed car parking building will accommodate commercial establishments and Tuk Tuk parking at ground floor level. Entry to the parking building will be from Baluchi Street which is proposed to be restricted to one-way during peak hour of operations. Exit from the parking building will be opened at Nkrumah Road.

Redevelopment of any existing property to multi-storeyed car parking inside Mombasa CBD is proposed be encouraged by the county government. Multi-storeyed car parking building could be developed through Public Private Partnership (PPP) and it could be an additional source of revenue to the county government.

CBD areas in Mombasa will be complied with the approved parking guidelines and standards.

5.6.3.9 Pedestrian Facilities

Pedestrian facilities are an important component of a transport system in Mombasa where walk trips constitute 47% of all trips in the county. Majority of the observed pedestrian trips are work trips followed by business and education. It is found that high volume of pedestrians cross Sheikh Abdulah F Road south of Buxton, Ronald Ngara Road near Poly

Technic, Digo Road near Fontanella, near Ferry access in Island and Likoni mainland in a day. High volume of pedestrians walk along Digo Road, Sheikh Abdulla F Road in Island; Kengeleni Road, Old Malindi Road and Nyali Road (B-8) in north mainland; and along Mombasa Road (A-109) in Changamwe and Likoni-Ukunda Road (A-14) in south mainland.

Facilities required for pedestrian walking along a road corridor is proposed to be provided that include pedestrian pathways on both sides. Width of pedestrian path is proposed to be minimum of 2.00 metre; it could be more depending on pedestrian volume on that corridor. Pedestrian path need to be separated through curb stone, level difference and guard rail from the vehicular roads. Following roads are proposed to have pedestrian path on both sides,

- Mombasa Road (A-109) Miritini to Makupa
- Nyali Road (B-8) from Kongwea to Shimo La Tewa
- Kengeleni Road
- Old Malindi Road
- Likoni-Ukunda Road (A-14)

5.6.3.10 Non-Motorized Transport Facilities

Non-Motorised Traffic (NMT) in major roads in Mombasa Island constitutes 2% to 6% of the total traffic in a day and 15% to 20% in some roads in north mainland, west mainland and south mainland. NMT comprised of bicycle, hand cart and animal drawn cart. However, it is observed most of the roads in Mombasa lack NMT facilities. NMT facilities are proposed for

Nyali Road (B-8), Sheikh Abdulla F Road, Abdel Nasser Road, Kengeleni Road, Old Malindi Road and Likoni Ukunda Road (A-14).

5.6.3.11 Proposals for Mombasa CBD

Transportation sector improvement projects are identified through the study analysis which supports the goal and strategies are consolidated and presented in the final report. Major short term implementable proposals are as follows,

- Multi-storied Car Parking Building at south of Makadara ground on Baluchi Street
- Shimanzi Road extension to join Kipevu Link of DOngo Kundu Bypass
- Development of Bus terminal building at the existing Ferry stage

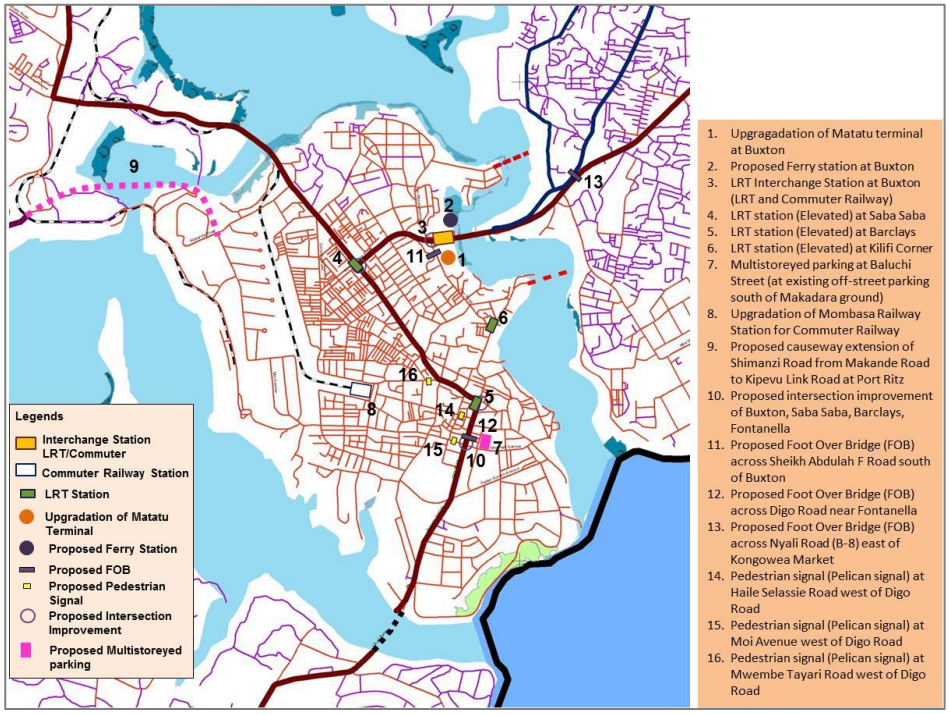
Long term proposals in terms of Public Transport include,

- Light Rail Transit System
- Commuter Rail System
- Transit Oriented Development

Road Widening proposals,

- 4-Laning of Mombasa Road (A109) from Mombasa County boundary to Changamwe
- 4-Laning of Mombasa-Malindi Road (B-8) from Nyali Bridge to County Boundary
- Widening of Kengeleni Road
- Widening of Old Malindi Road

Figure 5-25: Transport Proposals for Mombasa CBD Area



5.6.4 ENVIRONMENT AND DISASTER MANAGEMENT PLAN

5.6.4.1 INTRODUCTION

Environmental information is critical as inputs into the planning process in order to strive towards a sustainable city. The environment of the city can essentially be seen in terms of two components of urban management- the environment per se or the habitat, and services management. The former pertains to the natural features and resources including the elements of air and noise, water (water bodies i.e. ocean, drains and ponds and ground water) and land with reference to open spaces, green areas and other surface and sub-surface conditions. The latter is related to the built environment and includes the environmental infrastructure, i.e. water supply, sewerage, solid waste disposal, and transportation network. This section outlines proposals and also makes an assessment of changes that may occur during the implementation of the ISUD Plan and to devise ways of avoiding or mitigating such impacts at the planning and implementing stage.

5.6.5 GOAL

To protect, conserve, manage and regulate the environment and natural resources for socio-economic development.

5.6.6 PROPOSED ENVIRONMENT MANAGEMENT STRATEGY

ISUDP proposes issue specific strategy to help alleviate the current environmental challenges while at the same time mitigating potential impacts in the future. A three fold approach is proposed to be adopted:

1. Management of natural resources and the related environment infrastructure and services in a manner that would lead to optimisation of use of natural resources, and reduction/abatement of pollution.
2. Conservation and development of the natural features with a view to enhancing their environmental value.
3. Development and preservation of open spaces, greens and landscape/ recreational areas.

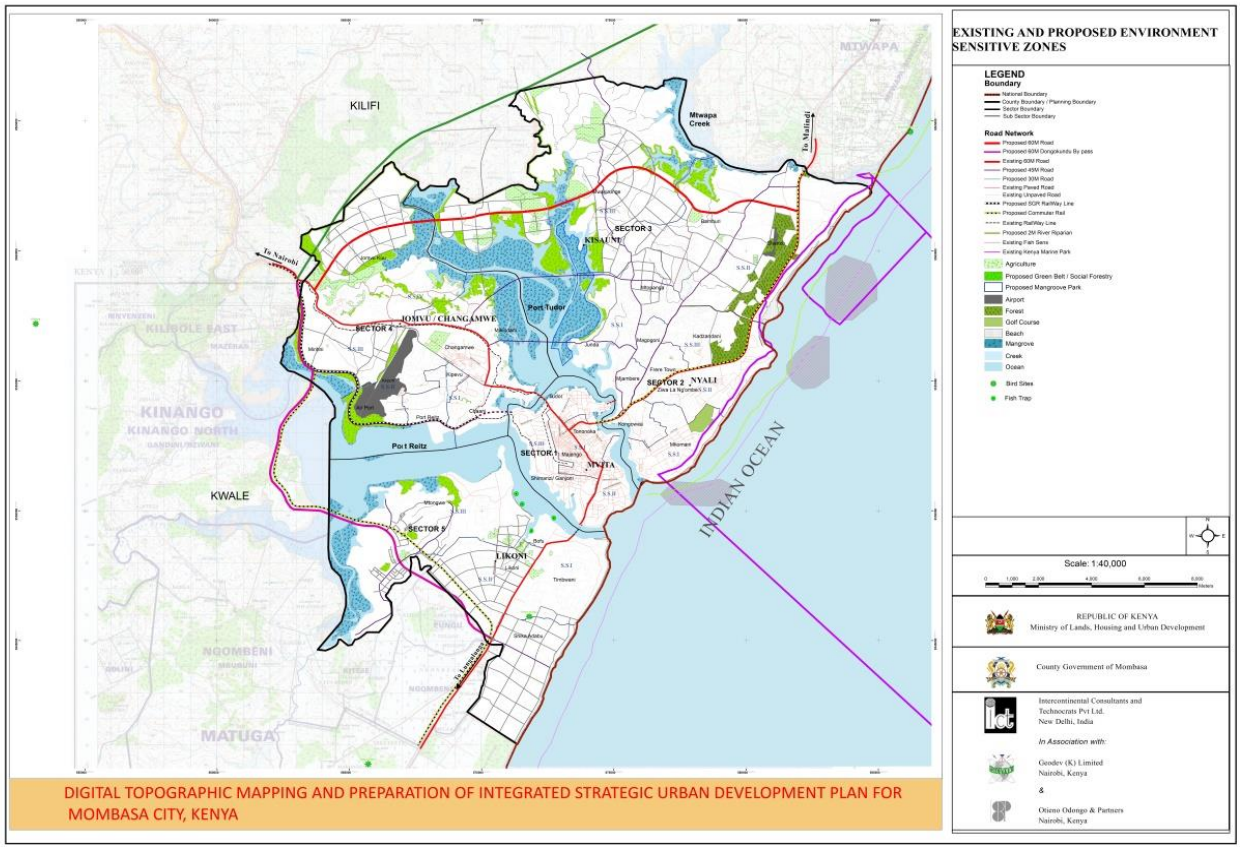
The following are some of the major strategies and projects that may be undertaken as a priority within the county:

5.6.6.1 Protect Environmentally Sensitive Areas

a) Protection and rehabilitation of mangrove forest

b) Shoreline Management Plan

Figure 5-26: Environmentally Sensitive Areas



5.6.6.2 Develop Recreational Area, Green Zones and Maintain Forests

The following strategies/projects are recommended for establishment green and open spaces:

a) Reserves 1800 ha i.e.8.1% of developed area against existing 436 ha (1.32%) area for developing recreational facilities. It is proposed to maintain a cumulative 10% of developed land as green.

   a. It is proposed to achieve at least 4.37 sqm /capita space as public park and play ground.

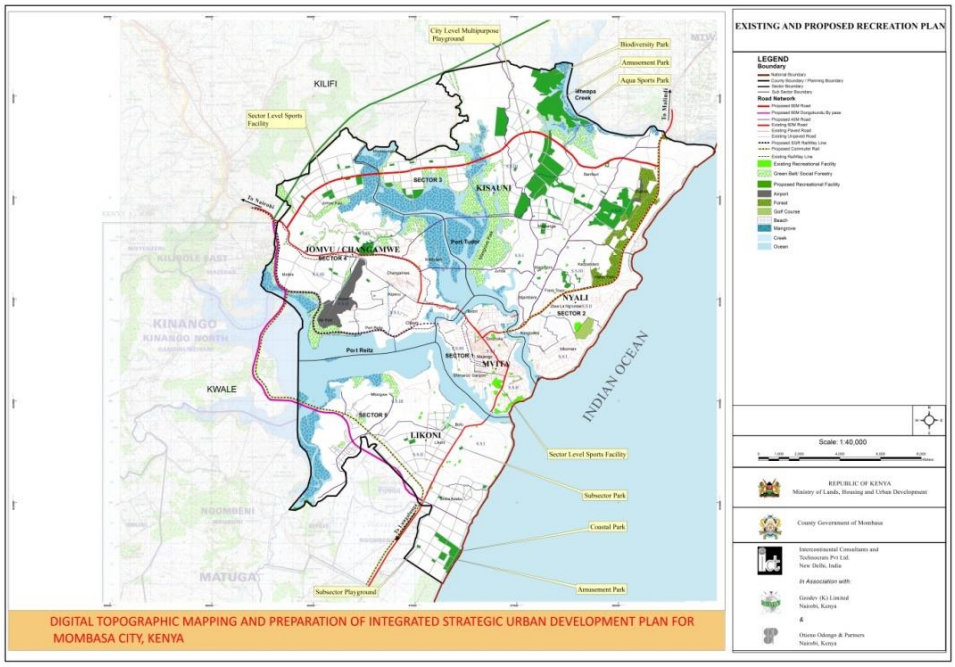
   b. It is also proposed to provide at least 1 local park/open space within walking distance in each neighbourhood.

b) Develop a hierarchy of recreational facilities, distributed equally as per hierarchy of planning norms from neighborhood level to city level. These facilities are presented in table 5.27.

Table 5-27: Land Required for Recreational Purpose

Public Purpose and Institutional Use	Norm- Land Require Per Facility (ha)	Land Required by 2035 in Hectare
Greens/Parks		
Cluster park	0.5	231
Neighbourhood Park	1	154
Sub Sector Park	2	30
Sector Park	5	20
City Park	10	10
Multi-Purpose Play Grounds		
Cluster playground	0.5	231
Neighbourhood Playground	1	154
Sub Sector Playground	2	26
Sector Playground	5	25
City Level Multi-purpose Play Ground	10	10
Sports Facilities		
Stadium	5	15
Sports Facility - Sector Level	10	50
Sports Facility - City Level	30	30
Other Recreational Facilities		
Zoo	50	10
Amusement park	30	30
Recreation Club	0.5	2.5
Social Halls/ and Community Centres	0.25	21.0
Coastal Park	50	60
Water Sports Park	50	75

Figure 5-27: Proposed Recreational/Green Area



c) Maintain the existing green and recreational areas including:

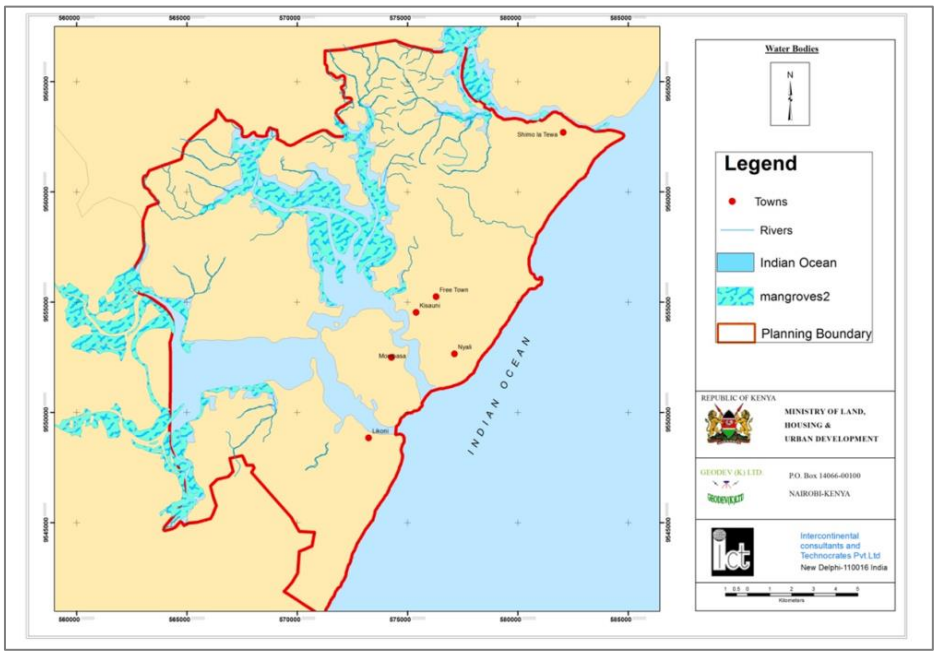
d) It is proposed to maintain the natural drainage to the extent possible.

e) The mangroves forests coverage, estimated at 2000 ha at present, fringing the shore to be maintained and where degradation is intense shall be rehabilitated through intervention.

f) A green buffer shall be maintained along the creeks to provide ecological functions and also to protect the creeks from any encroachment.

5.6.6.3 Protection measures for catchment areas of water resources

Figure 5-28: Main Surface Water Resources in Mombasa



5.6.6.4 Built Climate Resilience in City

Mombasa is particularly vulnerable to climate change since it lies in the coastal plain, which is around 6 kilometres wide. The Island lies between sea level and about 128 metres above mean sea level and very marginal land area i.e. less than 1% lies below 0.5 m contour level. The key adaptation measures that could be required in development plans would include:

- Integrating the requirement of appropriate setbacks from drainage channels and sea shore. These setbacks would ensure a no development area below 0.5 m above mean sea level.
- Introduction of roof water harvesting to reduce storm water. As a guide, the county can demand that residential sites, which exceed an area of 2400 sqft (40 ft x 60 ft), shall adopt rain harvesting facility.
- Appropriate infrastructure designs to accommodate expected changes in precipitation.

5.6.6.5 Protection of Ground Water Resources

a) All public institutions, especially schools and hospitals that use pit latrines to be funded to convert to septic tanks and linked with the proposed sewer network to control the polluting to ground water.

b) Proposed compatible land use for south coast that preserves ground water quality. This is particularly important in order to preserve the best ground water resources in Mombasa. There is a proposal for a Special Economic Zone and a Petro City so it is critical that these developments be very carefully regulated to preserve ground water quality.

c) Prioritize provision of sewer system in the county.

5.6.6.6 Promote Water Conservation

a) Establish demonstrative projects to promote rainwater harvesting at household scale.

b) Another potential project is to establish demonstrative projects on recycling of greywater.

c) Both rain water harvesting and grey water recycling will need to be considered in urban land development design and new housing delivery systems (Planning Regulations and Building Code). The county may introduce a mandatory clause to include rainwater harvesting and grey water re-use for a certain category of buildings.

5.6.6.7 Protect Marine Resources from Pollution

a) The county government needs to strengthen the coordination with the Kenya Maritime Authority to enforce the maritime laws that seeks to forestall pollution from maritime sources.

b) Conduct safe sanitation campaigns at county level to create awareness among masses for better handling of wastes instead of direct disposal into the environment.

c) Establish a full fledge sewerage system with integrated waste treatment facilities for solid as well liquid waste.

d) The long term approaches to control sewage pollution to be installed and new sewage treatment plants alongside the repairs of the existing ones, adoption of the whole community approach to reducing waste, recycling wastes and exploration of new technologies to minimise the use of marine ecosystem as a waste discharge basin.

5.6.6.8 Maintain Air Quality

a) In the short term, the county may establish an air quality monitoring system in specific sites that are representative of the air quality in Mombasa. The precise air quality monitoring points can be located within the Island, north coast, south coast and Changamwe and study may be conducted to determine the exact locations.

b) Monitoring air quality should follow and the data used to monitor impacts of specific projects as there will be a baseline on which to assess the air quality impact.

5.6.6.9 Maintain Noise Level

a) The first action would be for the county government to establish the noise profile of Mombasa urban area.

b) Once noise maps are developed, the county may consider developing noise action plans which again are a requirement under EMCA. Section 24 requires that the action plan should seek to, among others, protect the designated silent zones.

5.6.6.10 Develop Coastal Zone and Maintain CZR

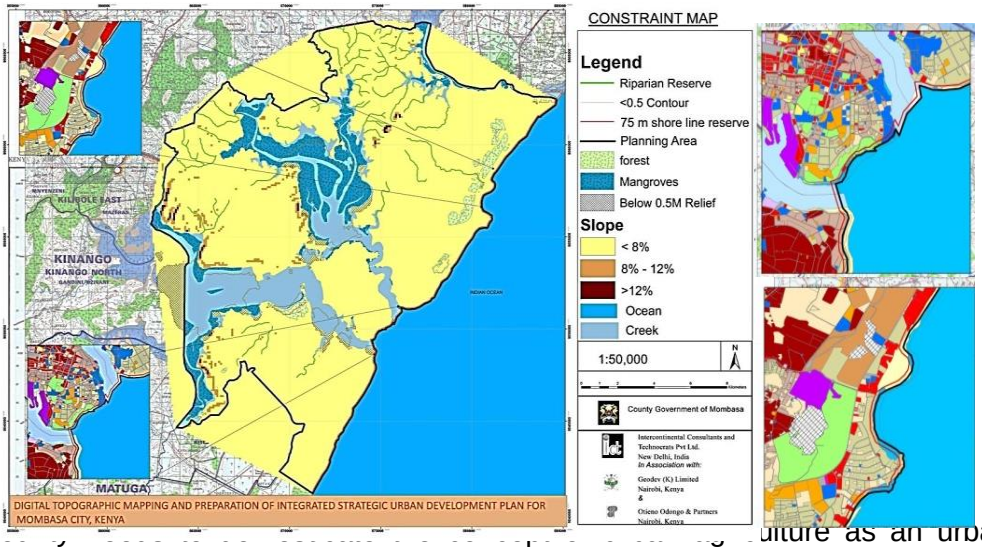
a) Translate the ICZM into county level regulations and align these regulations with the provisions of the Physical Planning Act1996 that applies to coastal areas and riparian zones. These regulations will lead to actionable strategies for coastal development.

b) The Physical Planning Act 1996 empowers the Director of Physical Planning to declare special planning areas based on documented evidence that the areas are needed to ensure developments in harmony with the environment.

c) Need to implement the appropriate setback from the ocean for developments as proposed in ISUDP that is 60 m buffer followed by 15 m road reserve totalling 75m. Refer **Figure 5.29** for development constraint map highlighting 75m buffer setback from the high tide line.

d) For the developments whose footprints over-lap this buffer zone, it is recommended that the land lease holder be informed of this requirement and that the development be reviewed upon expiry of the lease.

Figure 5-29: Marine Park and Coral Colonies in Mombasa



5.6.6.11 Impl

a) The c[illegible] culture as an urban planning operational concept as far as the urban agriculture is land use planning category translated into realty within the ISUDP.

b) It is proposed to maintain the agriculture land under same use and encourage modern methods of farming.

c) Explore use of grey water and run-off to facilitate irrigation for the proposed green areas and kitchen gardens in residential areas.

5.6.6.12 Promote Sustainable Fishing Practices

a) The first action would be to identify and promote livelihood activities that are acceptable, sustainable and have genuine development potential.

b) Strengthening fisheries regulations and empowering implementing institutions to enforce laws;

c) Opening up beaches and actively promote deep sea fishing to spread out fishing efforts across the ocean.

d) Develop and upgrade infrastructure required to promote fishing

5.6.6.13 Develop Sustainable Built Environment

a) Training of concerned government officials on the concept of sustainable built environment.

b) Capacity building of officials at the county environment department to ensure enforcement of the current environmental laws and regulations.

c) Defining policies for sustainable built environment that are applicable to Mombasa.

d) Improvement in public transportation system to discourage growth of number of private vehicles that often lead to traffic congestion and air pollution.

5.6.7 DISASTER MANAGEMENT

Goal, Strategies and Project: Table 5.28 presents the identified projects, constraints and strategies for disaster management.

Table 5-28: Goals, Strategies and Projects – Disaster Management

Goals	Strategies	Projects	Quantity	Unit
To develop effective and efficient firefighting and disaster management unit in Mombasa to enhance efficient response to disasters within the County	To develop better coordination among institutions responding to disaster incidences	Network all institutions with emergency operation services e.g. KRCS, KPA, KAA.	-	-
		Reactivate the sub-county Disaster Management Committees and emergence response units	-	-
		Develop fire policy	1	No
		Develop county policy on disaster management	1	No
	To identify indicators of disaster risks and disaster prone areas in county	Carry out disaster mapping for the county	1	No
	To reactivate the sub-county	Prepare county Disaster Management plan	1	No

Goals	Strategies	Projects	Quantity	Unit
	Disaster Management Committees and emergence response units	Develop, update regularly and widely disseminate information on disaster risks.	-	-
		Record, analyze and summarize information on disaster occurrence, impact and losses.	-	-
	Allocate adequate funds for disaster management and response.	Establishment of a disaster management committee and trust fund.	1	No
	To reduce the loss of life and property as a result of disasters	Establish early warning system and enhance risk assessments	1	No
		Training on incidence command systems; Fully equipped fire brigade and ambulances	-	-
	To reduced response time to 15minutes to disasters within the County	Establish fully equipped disaster management cum rescue centers at sector level	4	No
	To integrate disaster risk reduction in building approvals	Effective development and maintenance of public buildings and offices	-	-

5.7 TOURISM MANAGEMENT PLAN

5.7.1 Introduction

Kenya remains one of the most well-established tourism destinations in sub-Saharan Africa. The country has since 1980s competed globally as one where tourism is one of the leading growth sectors in the global economy and a major generator of employment, accounting for between 4 to 11 per cent of total formal employment in the country. Mombasa has traditionally been famous for its typical mass tourism model of large hotel resorts and all-inclusive packages. The sandy beaches flavoured with tropical climate, constitute a significant component of Mombasa's/Coast tourism product. Besides, it also hosts several tourist attraction resources on land and at the sea. This plan situates tourism to remain central to Kenya's economic landscape subject to a range of structural adjustments in the sector.

5.7.2 The Goal

The overall goal is the development of Mombasa as regional tourist hub and to provide a framework for raising the standard of living of the people through the socioeconomic benefits of tourism.

5.7.3 Strategies for Tourism development

1) Development/upgrading of tourist infrastructure and their routine management for local optimization in use and regional integration

Regionally, this will entail upgrading of the entire coastal corridor from Lamu on the north to Kwale on the south (Diani/Ukunda/Shimoni/Shimba Hills) through Malindi, Kilifi, Mombasa. Further, this corridor has to be integrated with the Tsavo wildlife and tourism area. **(Refer Figure 5.30, 5.31).** Several recommendations apply under this strategy:

a) The need to upgrade the transport corridor between Kwale and Lamu to allow for mass transit.
b) The need to upgrade the infrastructure and amenities at the various nodes along the corridor – Ukunda, Mombasa, Kilifi, Malindi/Watamu, and Lamu.
c) Enhancement of security along the entire corridor, including surveillance, patrols, and emergency centres at strategic locations in Ukunda, Mombasa, Kilifi, malindi/watamu, mpeketoni, and Lamu.
d) Upgrading of linkages between the Lamu-Kwale tourism corridor with Tsavo National Park.
e) To enhance/maintain existing tourism sites/ infrastructure
f) To develop infrastructure and provide recreation facilities to tourists and local residents.
g) Enhance connectivity of heritage and tourist precincts using multi-modal transport networks – air, water, rail/LRT, cycle tracks and walkways and adequate parking areas with basic facilities.
h) Diversify and Introduce new avenues for promoting tourism
i) Secure tourist areas for round-the-clock use
j) Continuous marketing of tourism products in Mombasa County locally and abroad.

Figure 5-30: Proposed Tourism Development Corridor

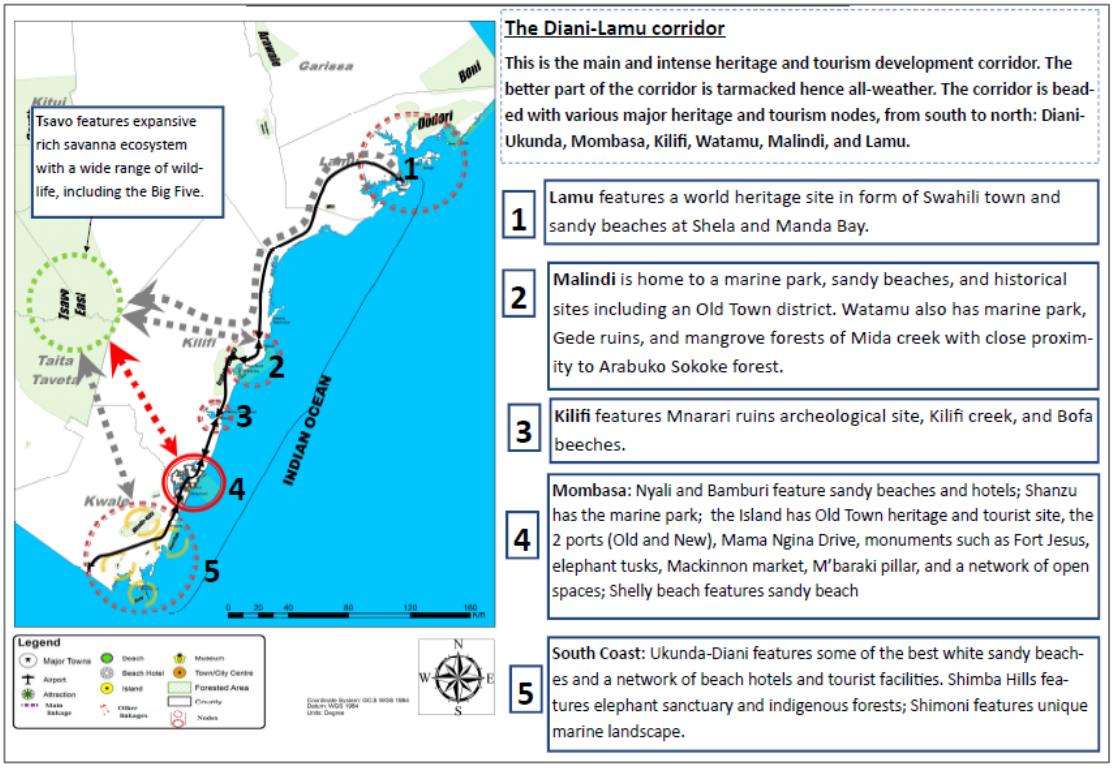
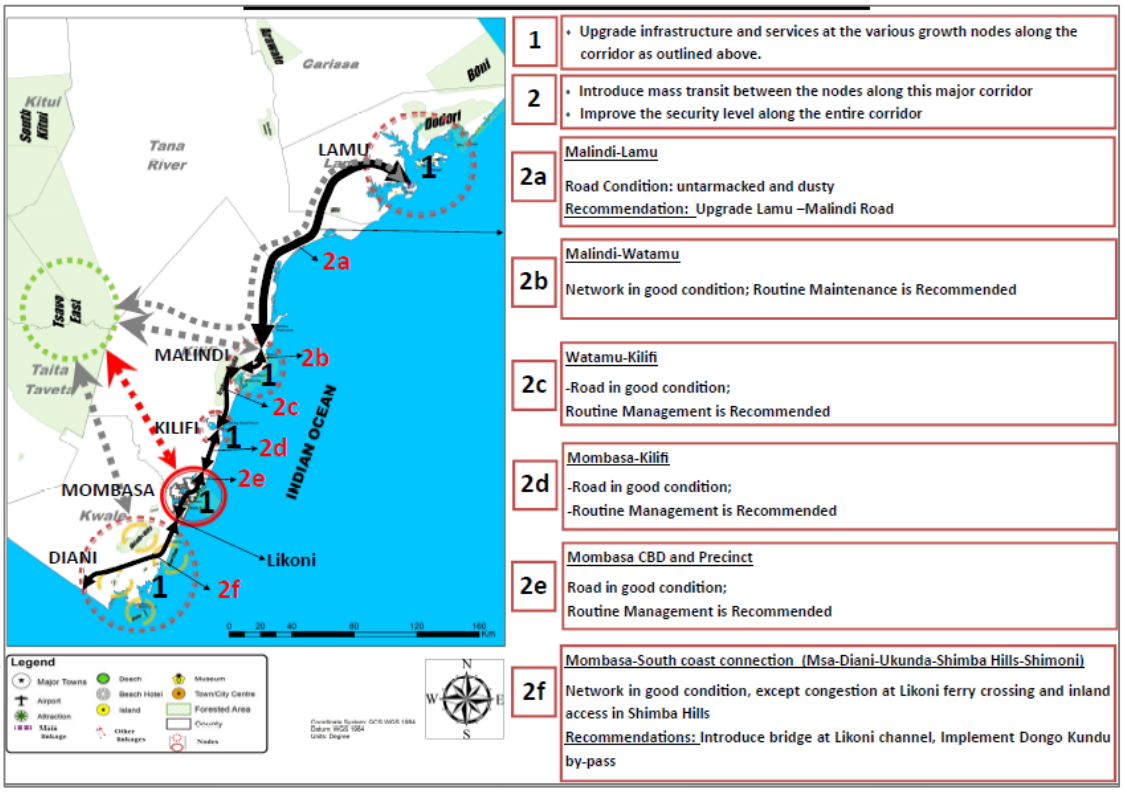
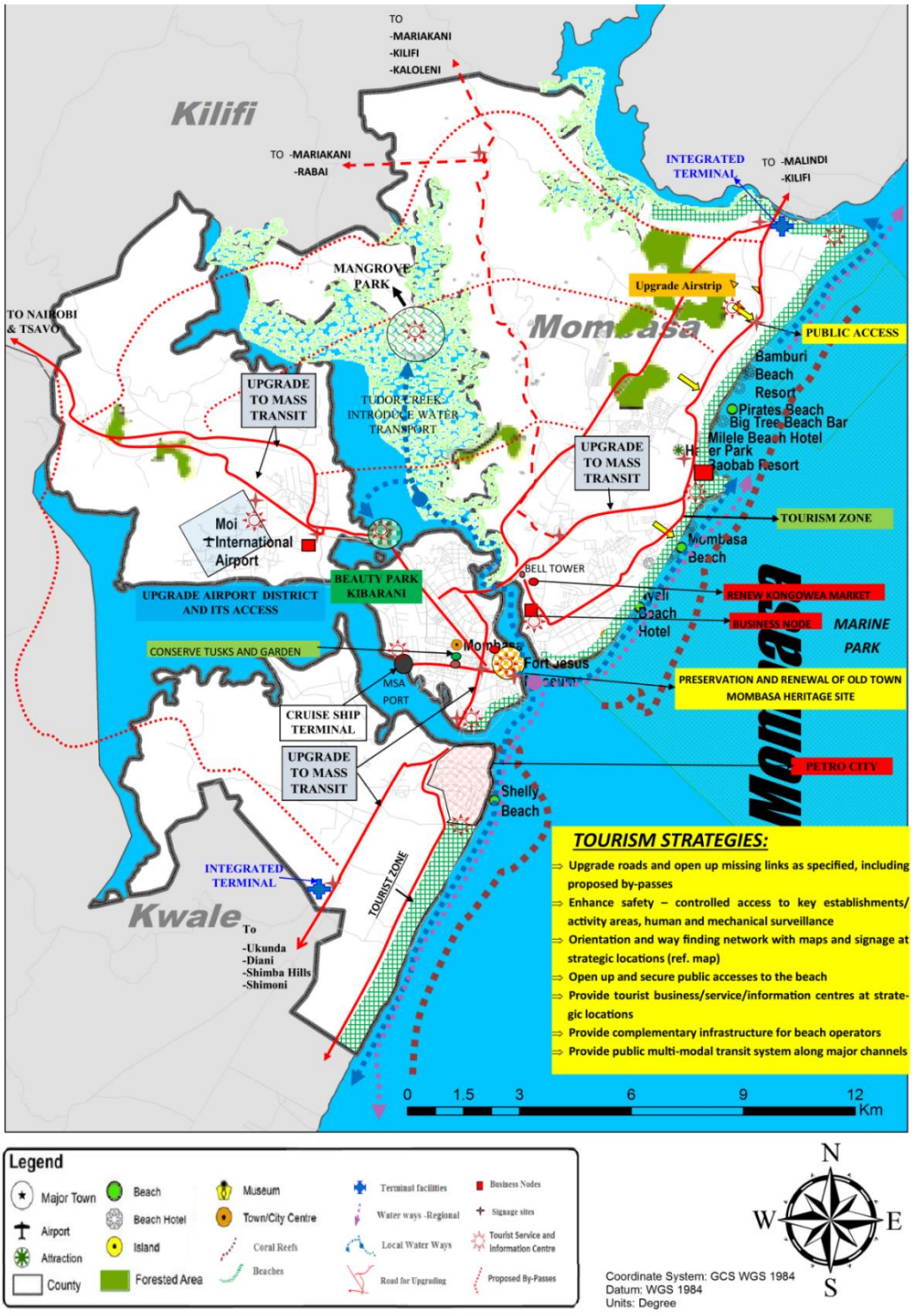


Figure 5-31: Proposed Tourism Regional Connectivity



1	• Upgrade infrastructure and services at the various growth nodes along the corridor as outlined above.
2	• Introduce mass transit between the nodes along this major corridor • Improve the security level along the entire corridor
2a	Malindi-Lamu Road Condition: untarmacked and dusty Recommendation: Upgrade Lamu –Malindi Road
2b	Malindi-Watamu Network in good condition; Routine Maintenance is Recommended
2c	Watamu-Kilifi -Road in good condition; Routine Management is Recommended
2d	Mombasa-Kilifi -Road in good condition; -Routine Management is Recommended
2e	Mombasa CBD and Precinct Road in good condition; Routine Management is Recommended
2f	Mombasa-South coast connection (Msa-Diani-Ukunda-Shimba Hills-Shimoni) Network in good condition, except congestion at Likoni ferry crossing and inland access in Shimba Hills Recommendations: Introduce bridge at Likoni channel, Implement Dongo Kundu by-pass

Figure 5-32: Proposed Tourism Plan for Mombasa



5.7.4 Goal, Strategies and Project

Table 5.29 presents the identified projects, constraints and strategies for tourism sector.

Table 5-29 : Goals, Strategies and Projects for Tourism Development

Goals	Strategies	Projects	Quantity	Unit	Remarks
Development of Mombasa as regional tourist hub and to provide a framework for raising the standard of living of the people through the economic benefits of tourism	Development/ upgrading of tourist infrastructure at the regional level	Upgrading of A109 Upgrading of C 103, 106, 107, 115 Upgrading of A14 Upgrading of B8	-	Item	Inter-county (Kwale, Mombasa, Kilifi, lamu, and Taita-Taveta) initiative to enhance connectivity of Kwale-Lamu corridor and the Tsavo
	Development/ upgrading of tourist infrastructure	Construction of new hotels	-	-	New hotels can be constructed within the demarcated commercial areas in the plan
		Improve access to tourist sites	-	-	Roads serving tourist sites need to be improved
		Proper management of solid waste in town	-	-	Provision given under SWM
		Develop detailed plan for developing new tourist sites	1	No.	A detailed feasibility study to be conducted for developing new tourist site including Coastal Park, Mangroves Park, Bio-Diversity Park, Aqua Sports Park, Zoo, Amusement Park etc.
		Tourist Business and logistics Centre	5	No	Provide 1 for each sector (sub county)
		Mombasa Seaways (Water transport system)- Develop terminals	7	No.	Harbour area; north coast; south coast
		Mombasa Seaways (Water transport system)- Purchase Motor boats	6	No.	Harbour area; north coast; south coast

Goals	Strategies	Projects	Quantity	Unit	Remarks
		Tudor Creek Restoration Project	-	-	Elimination of slum conditions; pollution reduction; and beautification
		Development/Upgrading of Public Beach Sites	3	No	Shelly; Nyali, Bamburi
		Tourist Information centres at sector level	7	No	3 sites already identified: Uhuru Gardens, County land between City Mall and Naivas in Nyali, and in Shanzu near Serena Hotel Apart from sector also develop tourist information centres at airport, bus terminals etc.
		Establish cultural centres at sector level	5	No	(3 acres each)
		Establish Institute of Hospitality Management	1	No	Covered in education facilities
		Create a handicraft market to promote local skills and economy	5	No	At each sector level
	Diversify tourism model from mass tourism to include small-scale ecotourism and other thematic areas like health and conference	Construction of budget hotels and guest houses	5	No	To be developed by Private sector
		Handicraft market	3	No	One each for Island, northern corridor, and southern corridor
		International Convention Centre	1	No	
		Modern Stadium	1	No	
		Aqua-sports park	1	No	
		Trade fair and Expo Ground	1	No	

Goals	Strategies	Projects	Quantity	Unit	Remarks
		Construction of a modern referral hospital	1	No	Covered in health sector
		Build a cruise offloading Berth complete with an immigration centre. Purchase a cruise ship to ply Build Hotel near the port facility	1	No	
	To create a safe, efficient, simple-to-use mobility and transportation network for both residents and visitors	Walkways and footbridges	-	Item	Covered in transport sector
		Signage and directions to tourism sites/precincts	-	Item	At major tourist areas – about 5 clusters
	Secure tourist areas for round-the-clock use	High Mast lights/ flood lights	15	No	At major tourist areas – about 5 clusters
		Police booths	15	No	One in each subsector
		Construct watch towers & establish first-aid centres	15	No	In all public beaches
		CCTVs	-	-	At major tourist areas – about 5 clusters

5.8 CULTURAL AND HERITAGE CONSERVATION AND MANAGEMENT PLAN

5.8.1 Introduction

Kenya features several World Heritage Sites approved by the United Nations Education, Social and Cultural Organization (UNESCO). Mombasa and the coast of Eastern Africa are particularly rich in heritage because of their strong historical links with the Asian-Arabic regions through the Indian Ocean Trade. These include Fort Jesus, Gede ruins, Jumba la Mtwana, Mnarani ruins, Shimoni caves, Vasco da Gama's pillar, etc. spread along the coast of Kenya. Over the years, this heritage has faced intense pressure from modern development thereby calling for counter-measures in terms of regulatory controls and other conservation mechanisms. This ISUDP seeks to integrate the aspect of heritage with development to ensure rich and diverse city. It endeavours to exploit efficiently the benefits

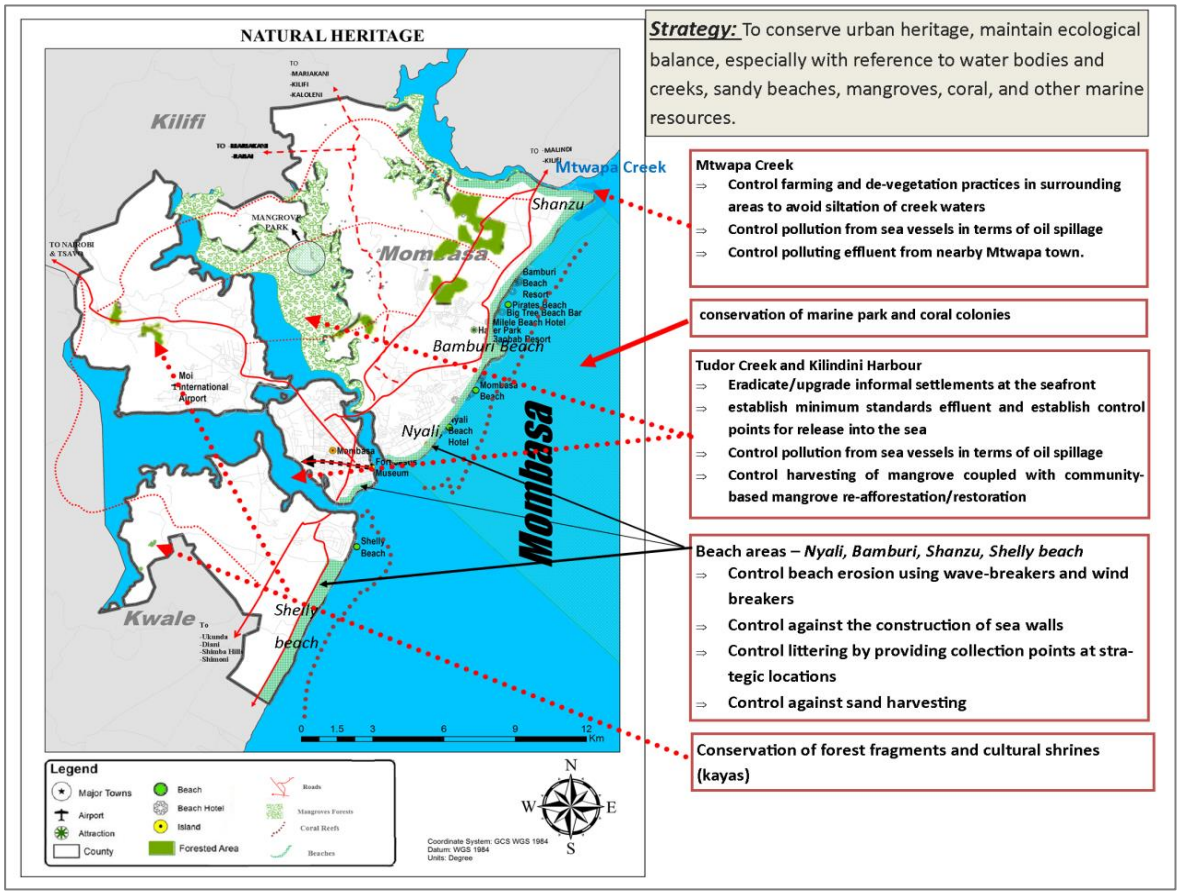
of urban heritage sector and secure its right position in the economic sector of the city and its region.

5.8.2 Strategies for heritage conservation

The ISUDP identifies strategies relevant to both natural and built heritage. These shall be pursued concurrently and shall be area-specific based on the situation at hand.

1) To Conserve Natural Heritage

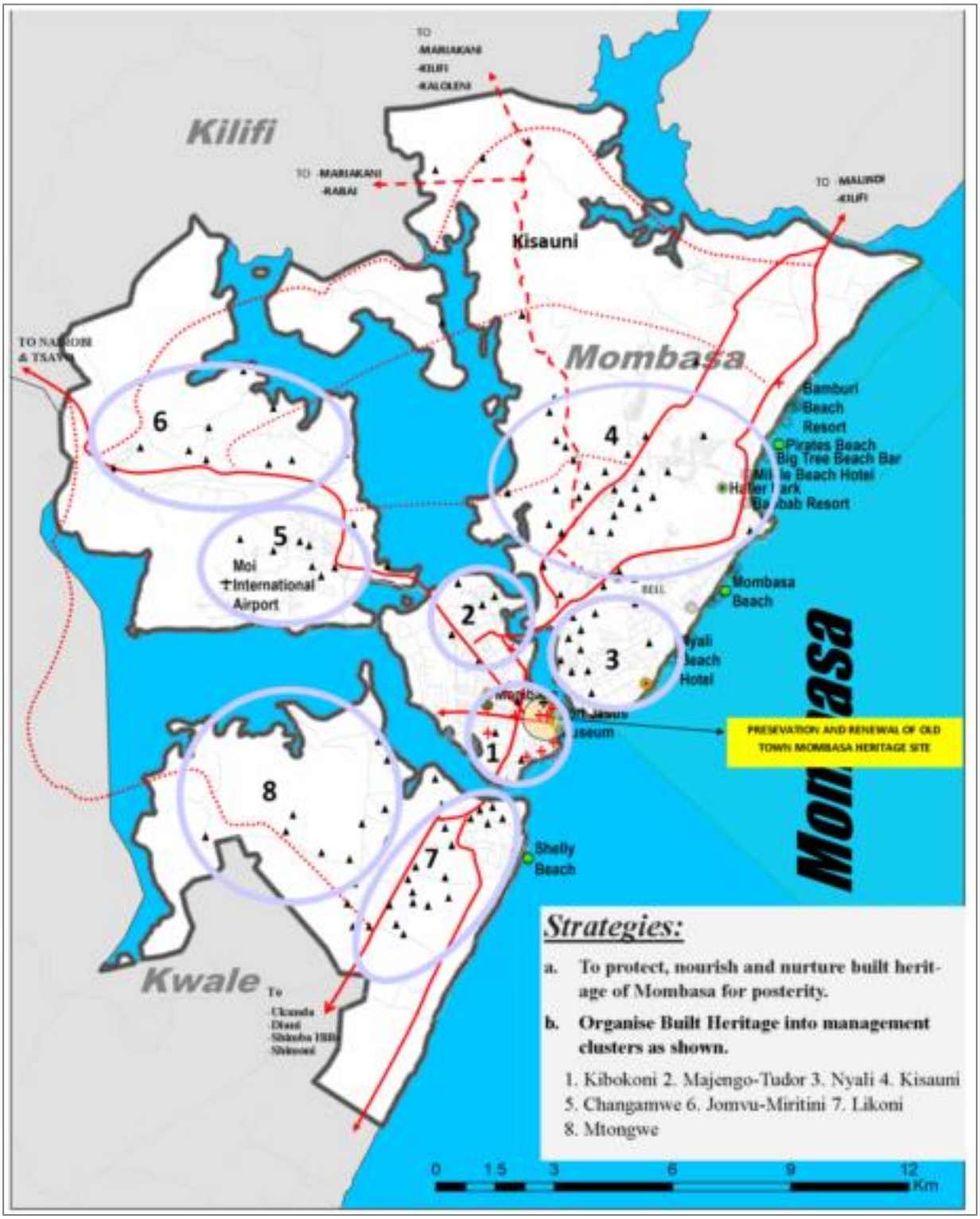
Figure 5-33: Proposed Natural Heritage Management Plan for Mombasa



2) To Protect, Nourish and Nurture Built Heritage

ISUDP proposes to protect, nourish and nurture built heritage of Mombasa for posterity (pass it on to the coming generations). Further, to organize built heritage into management clusters for ease of management. Historical sites, buildings, and monuments shall be listed and group and various localities across the city, with each cluster under area manager who will maintain the register for their area. These will be reporting to the County manager. This plan has identified about 8 clusters namely, Kibokoni, Majengo-Tudor, Nyali, Kisauni, Changamwe-Jomvu, Likoni, and Mtongwe. **Figure 5.34** presents proposed built heritage management plan for Mombasa.

Figure 5-34: Proposed Built Heritage Management Plan for Mombasa



5.8.3 Goal, Strategies and Project

Table 5.30 presents the identified projects, and strategies for cultural heritage and conservation sector.

Table 5-30 : Goals, Strategies and Projects for Cultural Heritage Development

Goals	Strategies	Projects	Quantity	Unit	Remarks
To conserve urban heritage for posterity	To maintain ecological balance, especially with reference to water bodies and creeks, sandy beaches, mangroves, coral, and other marine resources.	Mangrove conservation	-	Item	Tudor creek & Mtongwe
		Informal settlement eradication	-	Item	Tudor creek
		Pollution control	-	Item	Tudor, Mtwapa, Shanzu, Bamburi, Nyali, Likoni
		Desalinization	-	Item	Tudor, Mtwapa, Shanzu, Bamburi, Nyali, Likoni
		Installation of wave-breakers	-	Item	Shanzu, Bamburi, and Likoni
	To protect, nourish and nurture built heritage of Mombasa for posterity (pass it on to the coming generations). Further, to organize built heritage into management clusters for ease of management.	Establish/conserve sites and monuments of cultural/heritage value at strategic locations	-	Item	Provide site and monuments at selected public spaces, along highways, intersections of major routes
		Cultural Centres	5	No.	One in each sector
		Revitalization of the Old Port and Fish Market	-	Item	Mombasa Old Town/ Forodhani
		The Swahili Bazaar – food, textile, art and crafts, etc.	-	Item	Mombasa Old Town, Majengo
		Upgrading of Swahili Cultural Centre	1	No.	Mombasa Old Town
		Upgrading of community playfields	3	No.	Makadara, Kibokoni
		Swahili Studios	1	No	Mombasa Old Town
		Augmentation of water and sanitation			Mombasa Old Town, Majengo
		Street lighting project	-	Item	Mombasa Old Town, Majengo
		Restoration of historical monuments	-	Item	Mombasa Old Town, Kizingo, Ganjoni

Goals	Strategies	Projects	Quantity	Unit	Remarks
		Upgrading of historical markets	3	No	Mackinnon, Majengo, Kongowea
		Beautification of historical streets	-	Item	Mombasa Old Town, Majengo, Nyali
		Restoration of historical monuments and buildings	-	Item	Mombasa Old Town, Majengo, Nyali, Railway station, King'orani
	Protection, promotion, and enhancement of culture	Calendar of Performing arts and cultural festivals	-	Item	
		Apprenticeship in traditional craftsmanship	-	Item	
		Academic curricular on culture for integration in schools/colleges	-	Item	

6 ACTION AREA PLAN

6.1 INTRODUCTION

These are area-specific interventions that provide focused proposals based on prioritized problem areas and objectives. This ISUDP has prioritized 4 subjects for action planning and a total of 7 action plans. These have been accompanied with urban design interventions for illustrative purposes and are prepared within overall framework of Structure Plan. The list of action area plan is presented in Table 6.1.

Table 6-1: Proposed Sites for Action Area Plan

Subject	Action Area Plan and Urban Design
Urban Heritage and Tourism	1. Mombasa Old Town 2. Mama Ngina Drive 3. Coastal Park at Shelly Beach 4. Kenyatta Public Beach at Bamburi
Local Economy	5. Redevelopment of Kongowea Market
Environmental	6. Redevelopment of Kibarani Dumpsite
Informal Settlement	7. Jomvu Kuu Informal Settlement
CBD Functionality	8. Overall Plan for CBD

6.2 ACTION AREA PLAN 1: MOMBASA OLD TOWN

6.2.1 Objectives of the Action Area Plan

The area action plan for Mombasa Old Town is anchored on the following:

- To integrate the historical district with the modern town for mutual socio-cultural and economic benefit while preserving and promoting its rich heritage for posterity.
- To articulate a framework for provision of key amenities and services for support of tourism, employment, and community life in Mombasa Old Town.
- To provide an urban design and management framework that will protect the fragile built heritage of the district from rapid transformation of urban growth and motorization.

6.2.2 Proposed interventions

- Integrate Mombasa Old Town to the wider city *(market, public spaces, street network, entry/exit points ["gateways"]*
- Integrate land and water environments *(seafront design, water transport, jetty/landing site)*
- Preservation of townscape *(nodes, landmarks, popular routes, edged/boundaries, building heights, unique building typologies & fabrics)*
- Networking of public spaces and buildings *(micro/Local, neighbourhood, urban)*
- Adaptive re-use of space and buildings *(Public, private, communal)*
- Revitalization of local/traditional economy *(bazaar concept, tourism network)*
- Motor traffic calming and promotion of pedestrian use *(motorized commercial precincts versus pedestrianized (periodic) commercial bazaars)*
- Preservation and promotion of local culture *(events, performing arts, & crafts)*
- Revitalization of infrastructure *(Water, sanitation, storm water drainage, ICT – all cabling to be subsurface)*

Figure 6-1: Action Area Plan Proposals for Mombasa Old Town

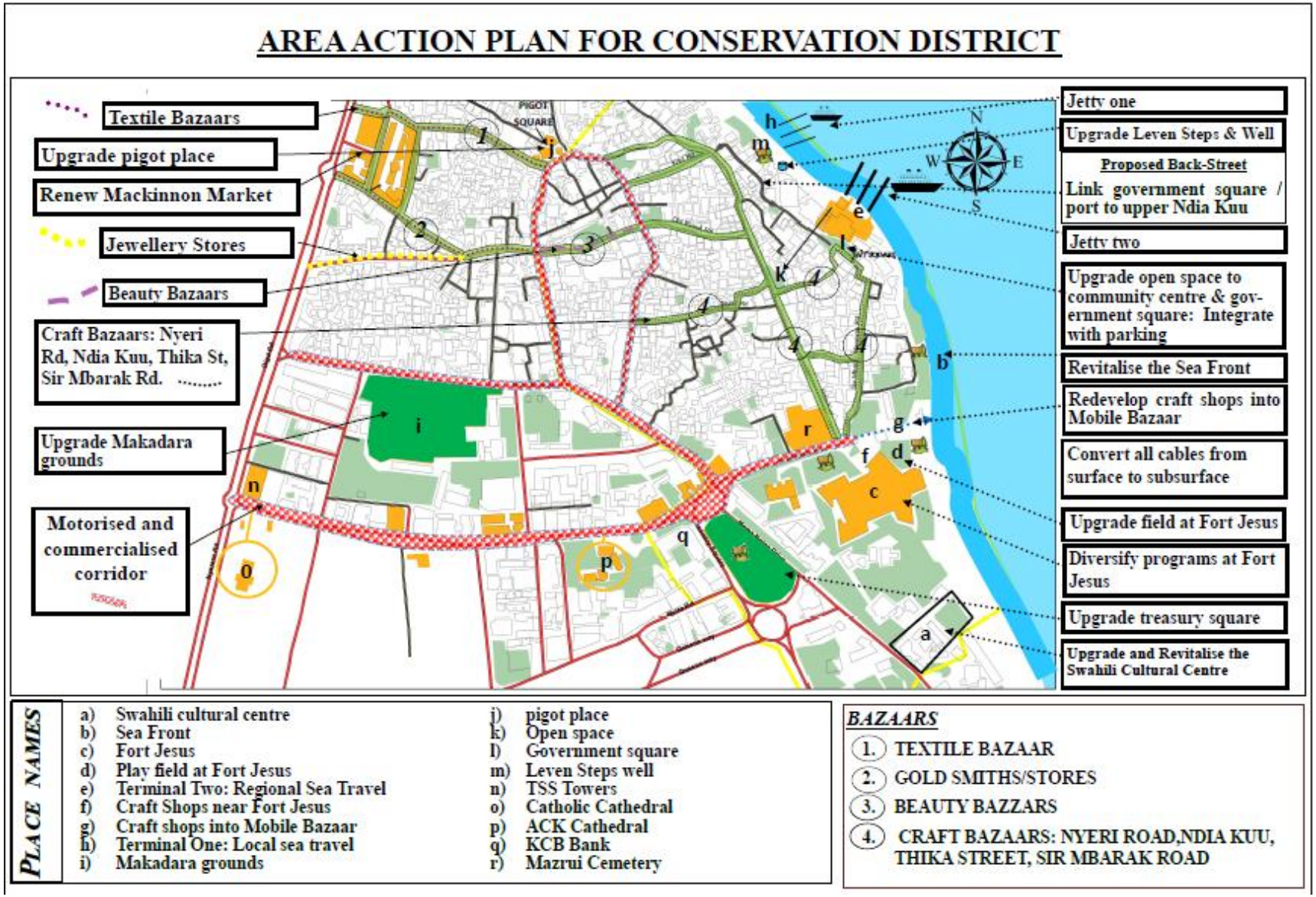


Figure 6-2: Fort Jesus Area Design

Figure 6-3: Proposed Jetty 1 at Leven and Jetty 2 at Old Port Entrance

Jetty 1 at Leven Steps

Jetty 2: Old Port Entrance

6.3 ACTION AREA PLAN 2: MAMA NGINA DRIVE

6.3.1 Objectives of the Action Area Plan

The area action plan for Mama Ngina Drive seeks to achieve the following:

- To integrate the Mama Ngina with the urban network for enhanced accessibility and utility.
- To secure the seafront site for development of public amenities in form of a waterfront Park serving both formal and informal activities, but also public and private possibly through public-private partnership.
- To provide an alternative and attractive site for leisure and tourism for residents and visitors of Mombasa County.
- To provide a forum for exposition and exchange of culture and heritage for Mombasa and the region at large

6.3.2 Proposed interventions

The design and beautification of Mama Ngina drive is not a new thing; it is indeed about continuous design and improvement from time to time. The last major facelift for the park was completed around 2007 and ever since there have been incremental efforts mainly to do with upkeep of the park rather than upgrading. This action plan projects this to continue but also proposes a significant upgrading of the infrastructure especially to cater for informal business operators, and for a more interactive environment for the visitors.

The plan proposes 5 activity areas for enhancement namely:

- **The promenade** with nature trails, boardwalks, and observation points
- **The Bazaar** to cater for the informal vendors that is well zoned by categories of activities for ease of servicing and management.
- **The Park and Plaza** on the second row of the park looking into the bazaar. The park shall also cater for cyclists and joggers, while the plaza shall cater for performing arts but could also double as parking in off-peak times.
- **Golf Course** to be secured and given a facelift so that its level of patronage can increase substantially and enable cross-subsidy in the upgrading and upkeep of the public realm of the park.
- **Amenities:** this will entail the addition of conveniences like washrooms that are commensurate with level of visitation but also the provision of logistics and service points.

Overall, the proposal divides the park into 2 intervention areas; Zone A encompasses the larger part to the west that is predominantly public with the larger public park and a promenade attached to the bazaar. Zone B on the other hand has just the bazaar and promenade with the rest of the green area being the golf course under the private Mombasa Golf Club.

Figure 6-4: Mama ngina Drive – Zones in Intervention Area

Figure 6-5: Action Area Plan Proposals for Mama Ngina Drive – Zone A

Figure 6-6: Action Area Plan Proposals for Mama Ngina Drive – Zone B

6.4 ACTION AREA PLAN 3: COASTAL PARK AT SHELLY BEACH, LIKONI

6.4.1 Objectives of the Action Area Plan

The area action plan for Shelly Beach seeks to achieve the following:

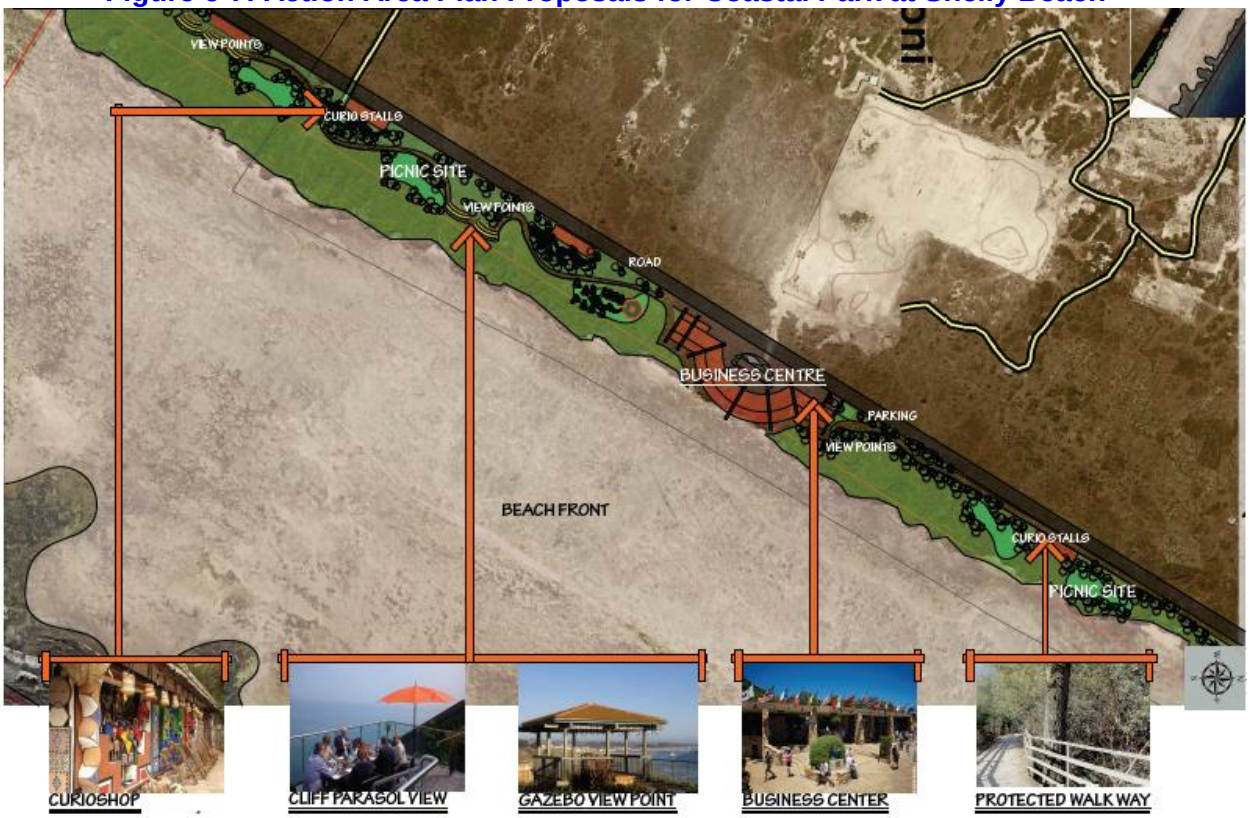
- To integrate the Shelly Beach Area with the urban network for enhanced accessibility and utility.
- To secure the seafront locations for development of public amenities in form of a Coastal Park and a buffer road.
- To provide an alternative and attractive site for leisure and tourism for residents and visitors of Mombasa County.
- To provide an environmental management framework that will guide and regulate the upkeep of Shelly Beach

6.4.2 Proposed interventions

The action plan for Shelly Beach area proposes a Coastal Park for public use that will feature the following:

- Amenities for beach operators such as crafts stalls and changing rooms
- Beach walks, nature trails, and picnic sites
- Convenience store
- Mini shelters such as gazebos for beach users
- Observation points at strategic locations

Figure 6-7: Action Area Plan Proposals for Coastal Park at Shelly Beach



6.5 ACTION AREA PLAN 4: KENYATTA PUBLIC BEACH

6.5.1 Objectives of the Action Area Plan

The area action plan for Kenyatta beach seeks to achieve the following:

- To secure the seafront site for development of public amenities in form of a beach Park serving both formal and informal activities, but also public and private possibly through public-private partnership.
- To provide an alternative and attractive site for leisure and tourism for residents and visitors of Mombasa County.
- To provide a forum for exposition and exchange of culture and heritage for Mombasa and the region at large
- To provide an environmental management framework that will regulate the upkeep of Shelly Beach and the balance of tourism with conservation

6.5.2 Proposed interventions

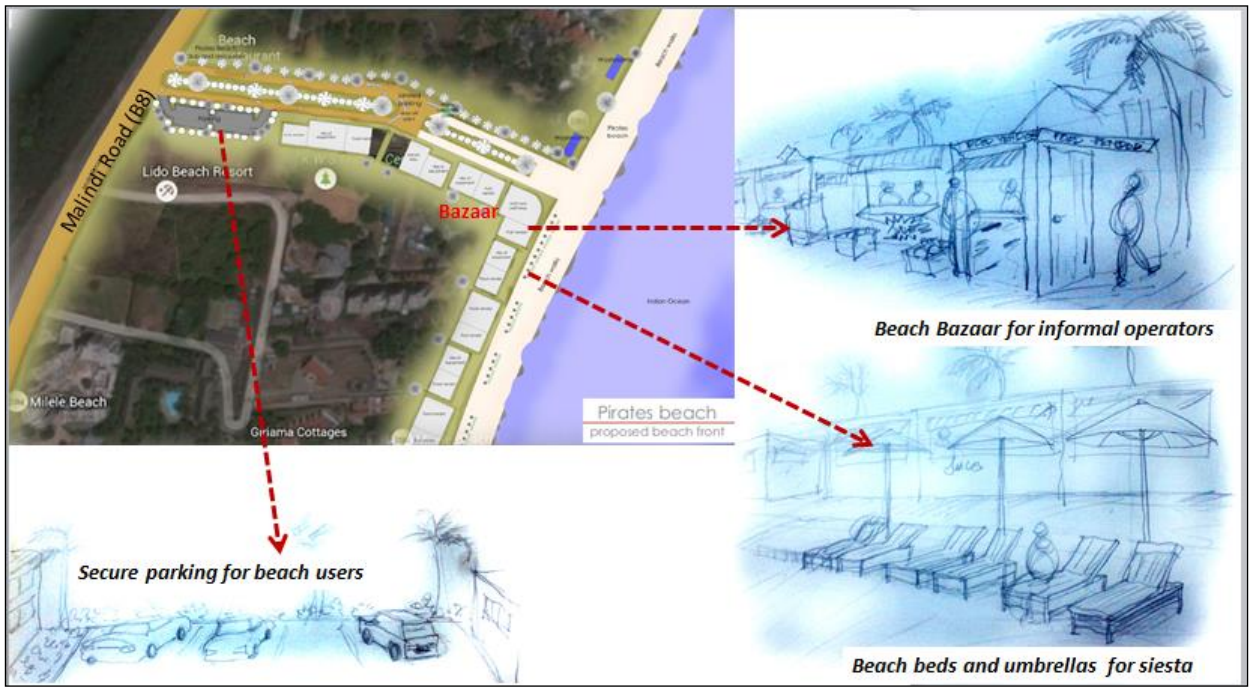
The plan proposes 5 activity areas for enhancement namely:

- **Amenities for Beach Operators:** This will accommodate the bazaar activities by providing decent sales points with uninterrupted access and facilities for its upkeep in terms of water supply, power, and waste management.

- Parking area: both short-term and long-term dimensions will be addressed. This may call for a public-private partnership for affordability and exclusion of operational bottlenecks.
- **Water leisure transport:** this shall be improved by inviting the private sector to invest in projects like speed boats, the floating hotel, and glass boats to the marine park at affordable price. The County government will give the necessary incentives.
- Fishermen point: This will include provision for a landing and a logistics point for preparation, departure, and arrival of fishermen and their tools of trade. This shall be put at one of the extreme corners so as not to interfere with the mainstream public activities.
- **Amenities:** this will entail the addition of conveniences like washrooms that are commensurate with level of visitation but also the provision of logistics and service points.
- **Security:** security shall be beefed using mixed techniques such as human surveillance, neighbourhood watch, and provision of CCTV and other mechanical installation at strategic points in order to observe both the sea-side and land-side components of leisure and business at Kenyatta beach.

Overall, all construction shall be light-weight and of frame and skin that is easy to assemble or disassemble as need may be.

Figure 6-8: Action Area Plan Proposals for Kenyatta Public Beach



6.6 ACTION AREA PLAN 5: KONGOWEA MARKET

6.6.1 Objectives of the Action Area Plan

The area action plan for Kongowea market seeks to achieve the following:

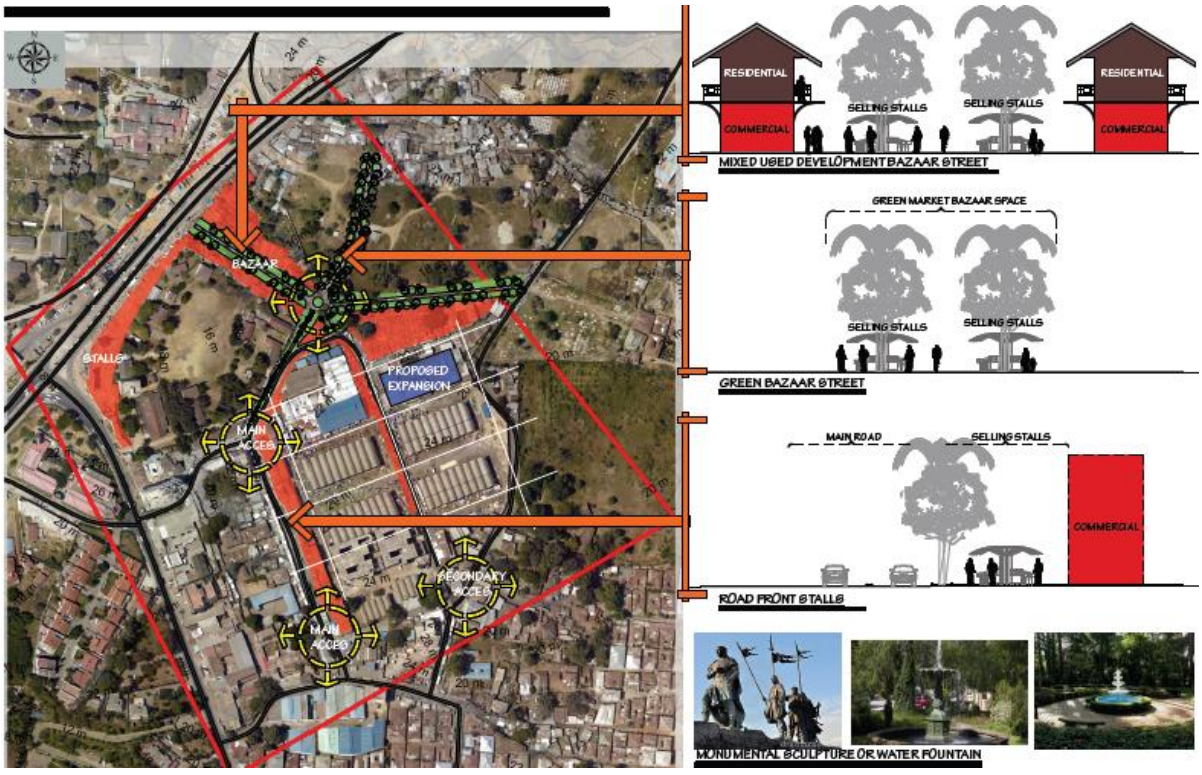
- To integrate the historical market with the urban network for enhanced accessibility and utility.
- To improve the environmental conditions within and around the market to enhance public health conditions and environmental aesthetics, as well as ameliorate threats related to decay of the market.
- To provide an urban design and management framework that will cater for the market's growth needs

- To creatively integrate the formal and informal sector for mutual socioeconomic benefit and enhanced livelihood opportunities.
- To achieve optimal utilization of space and land as a resource in order to make the market a competitive land user.

6.6.2 Proposed interventions

- **Provision of alternative entry and exit points:** This will link the market to different fronts using motorized and pedestrian accesses. The access to the market will be provided using 3 access points with 2 of these located along Lincks road being motorable and that along malindi road shall be exclusively for pedestrian use.
- **Decongestion of streets and rationalization of circulation:** – This will entail redistribution of informal activities lining the market's precincts through the planning and design of compact mixed use commercial bazaars. Circulation for both commercial vehicles and private automobiles within market precincts shall be one way.
- **Growth of market:** The strategy for growth of market shall mainly entail intensification of land use through infill densification and mixed used multilevel commercial streets radiating from the market.
- **Renewal of the Market precincts:** this will mainly entail landscaping of the market precincts to create a green ribbon along the access roads and a public node adjacent to the market. The design of this public space shall discourage encroachment by vendors but also there shall be constant monitoring to safeguard the same.
- **Creation of thematic trade bazaars (street-based):** these shall be branded to reflect and operationalize the traditional economy of Mombasa Old town which is hinged on maritime activities, textile, traditional cuisine, and beauty and ornamentation.
- **Provision of security infrastructure:** This will entail adequate flood lighting and surveillance installations at strategic locations inside and around the market. There shall be also controlled access points for ingress and egress of traffic.

Figure 6-9: Action Area Plan Proposals for Kongowea Market in Mombasa



6.7 ACTION AREA PLAN 6: REDEVELOPMENT OF KIBARANI DUMPSITE

6.7.1 Objectives of the Action Area Plan

The area action plan for Kibarani dumpsite seeks to achieve the following:

- To restore the site from the devastating effects of hosting waste management operations to acceptable environmental standards
- To provide a clean, safe, and pleasant public space accessible to all for leisure-related functions.
- To provide an appropriate site for engagement in arts, crafts, and related activities for promotion of culture and civic life
- To provide a site for enhancement of city image and preservation of institutional memory using components such as monuments, pavilions, or amphitheatres.

6.7.2 Proposed interventions

Upon rehabilitation, there are several propositions that the site can be developed into as outlined below:

- **A civic park for Mombasa residents** centred on a major monument and landscaped picnic/leisure gardens. This will also serve a ceremonial role by hosting certain civic events. The monuments should promote collective memory such as in honour of societal heros.
  Possible developments: monument, landscaped garden and nature trails, garden furniture, street lighting, jetty and boat rides
- **An Arts and Culture Park** to display Mombasa's arts and cultural prowess in both performing arts and craftsmanship. This will tap into tourism and patronage that will contribute towards betterment of livelihoods.
  Possible developments: arts pavilion, amphitheatre, jetty, and boat rides
- **Construction of access roads:** This will link the park to different locations on the island and mainland, especially the west. Pedestrians from west mailnland will access the site directly using an access off A109, having joined a walkway on the southern carriage of the highway at the Changamwe roundabout. All motorists from west mainland as well as all users approaching from the island shall access it through an road running parallel to the rail line going into Shimanzi area. This they will join at Makande, as illustrated.

Figure 6-10: Action Area Plan Proposals for Redevelopment of Kibarani Dump Site

6.8 ACTION AREA PLAN 7: REDEVELOPMENT OF JOMVU KUU INFORMAL SETTLEMENT

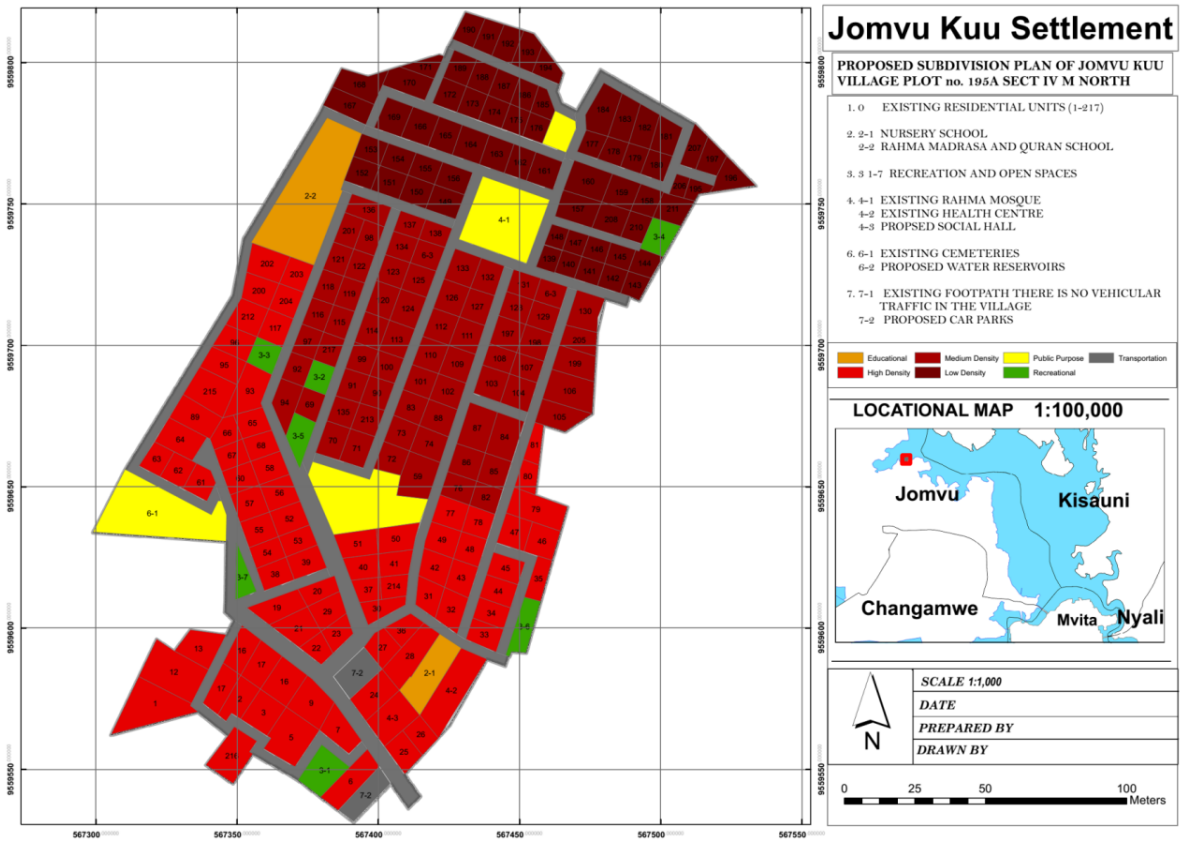
6.8.1 Objectives of the Action Area Plan

- To regularize the settlement by refining its layout in terms of plot geometry and road network for efficient use of land and reticulation of services
- To intensify the use of land by proposing densification of suitable areas of the settlement
- To resolve the security of tenure and provide entitlement to land.

6.8.2 Proposed interventions

- Reblocking of the settlement in terms of plot geometry and road network for efficient use of land and efficient reticulation of services.
- Densification of parts of the settlement for optimization of land use and expansion of public purpose through land readjustment.
- To upgrade community facilities for improvement of amenity in the settlement.
- To improve the quality living environment through greening and general landscaping.

Figure 6-11: Proposed Subdivision Plan for Jomvu Kuu Settlement



6.9 ACTION AREA PLAN 8: CBD - MOMBASA

6.9.1 Objectives of the CBD Action Area Plan

- To improve connectivity and a more efficient transport network
- To provide a strategy for decongestion of the CBD
- To articulate a strategy for renewal/revitalization of degraded parts of the CBD
- To provide strategies for crime-reduction in affected parts of the CBD
- To provide a sustainable densification strategy for the CBD

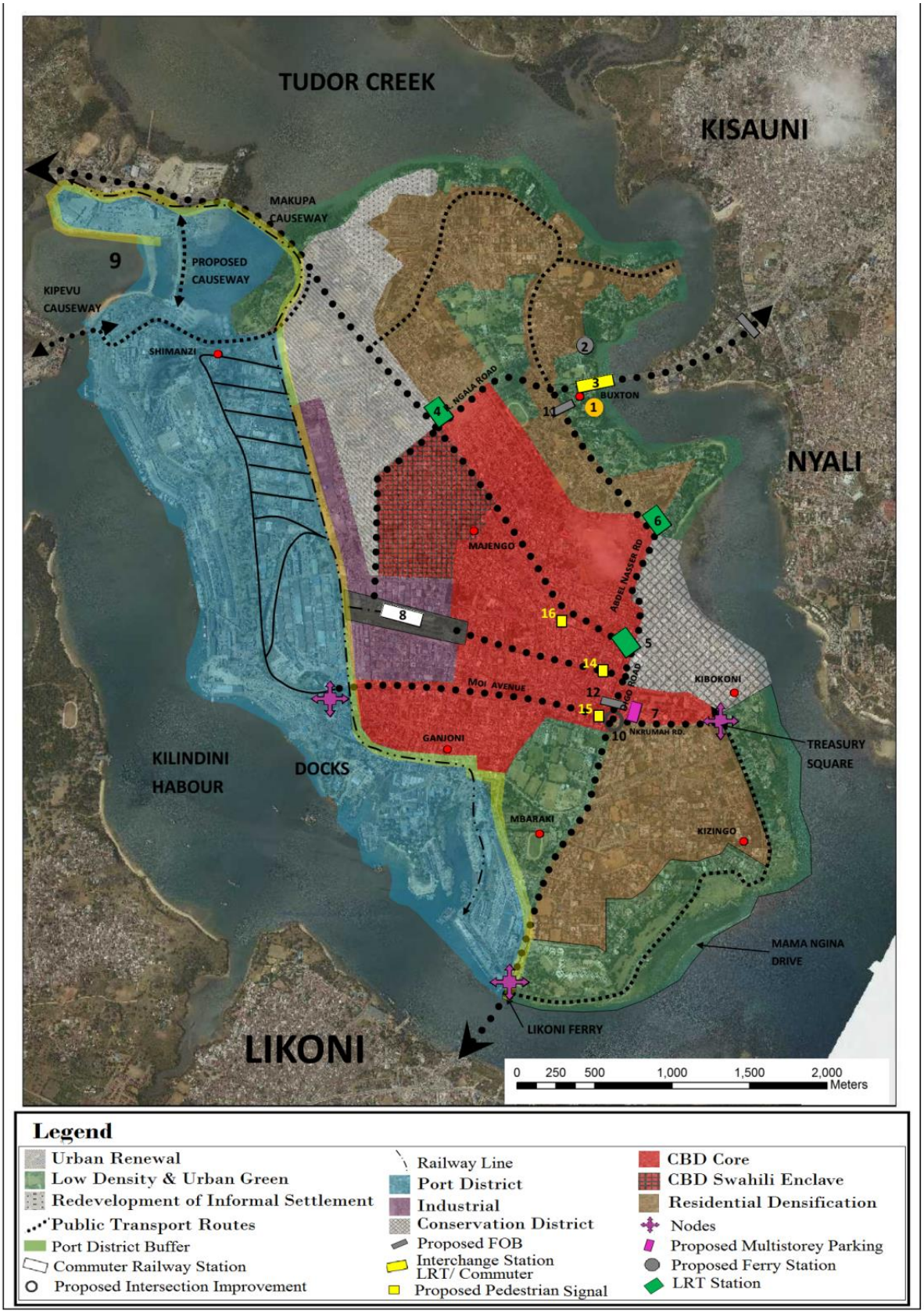
6.9.2 Proposed interventions

Integrated Strategic Urban Development Plan for Mombasa proposes following measures to address planning issues in CBD

- Develop Public Transport System - City Bus system/LRT System/Ferry System/Commuter Rail System
- Provide Inter-modal transport exchange stations at strategic locations such as Saba saba, Barclays, Docks, and Likoni.
- Extension of Shimanzi Road to connect Kipevu Link of Dongo Kundu Bypass
- Phasing out of Matau services
- Intersection Improvement
- Pedestrian facilities FOB/crossing
- Provide a multi-storey parking on part adjoining Makadara grounds
- Upgrade ring roads along Tudor, Shimanzi, and Ganjoni areas for better connectivity and decongestion
- Revitalize rail and road network within the Port Area and link the same to Likoni and to Mainland West
- Renew and conserve the historical areas such as Kibokoni and Majengo.
- Upgrade/augment trunk infrastructure in major growth clusters such as Kizingo, Tudor, and Ganjoni.
- Revitalize/rehabilitate waste treatment plants at Kipevu and Kizingo areas.
- Rehabilitation and extension of existing water and sewer lines

Benefits to overall Functionality of CBD: Mombasa CBD area houses 90% of commercial and business activity in Mombasa County. Time loss and energy loss in the work trips during morning and evening peak hour causes detrimental effect on business profits. ISUDP proposal on investment in public transport system is expected to save at least 16% of travel time in peak hour work trips. Proposed Multi-storeyed parking building will provide covered and secured parking facility inside CBD and a source of revenue to County. Urban renewal of old town, redevelopment of informal settlements, provision of basic services and infrastructure and decongestion will not only drastically improve quality of living but also improve efficiency in terms of business and overall functionality of CBD.

Figure 6-12: Mombasa CBD Action Plan



7 . DEVELOPMENT CONTROL AND ZONING REGULATIONS

7.1 INTRODUCTION

7.1.1 Development control

Effective development control is essential if planning is to achieve its objectives. History has shown that urban planning has suffered from two main problems.

The first is the fact that statutory plans either do not exist, or are very out of date. This project, with its emphasis on Strategic Planning is intended to recognise the problem of plans going out of date: a strategic plan goes into detail by phases, typically five years at a time, and thereby can respond to changing economic and social circumstances.

The second is that development control has been very weak. Political and economic pressures to make a special case for specific developments have been addressed by preparing Part Development Plans. Thus planning has been piecemeal, and not adhering to a single urban plan.

Two things should be different with the coming into effect of this ISUDP.

1. By having a digital topographical cadastral map of the entire urban area it will be possible to identify, with certainty, the zoning of a specific parcel of land. Furthermore planning consent can be linked to other matters affecting the land, such as access to services, Rates valuation, etc.
2. Development can be phased in a structured way. Thus development should not be permitted on land which is not zoned for development unless permitted under use zone in the current five year period. This allows servicing provisions to keep in line with land development.

Stakeholder's consultations revealed many complaints about the current development control system. It is recommended that the following procedures should be adopted.

1. All land records to be digitised, building approval process to be made efficient and improve building bylaws enforcement and implementation efficiency.
2. All planning should be linked to a GIS data base, thus allowing consistent and fair application of the subdivision of land and zoning regulations.

7.2 BUILDING CONTROL STANDARDS

The Land Use Zone controls volume, height of buildings as well as its use under provisions of the Building Standards. These regulations are designed to prevent a mixture of buildings used for different purposes in one area, and to ensure the suitable environment for the specific type of land use. Following section presents the building control standards:

7.2.1 Residential Use

Table 7.1 presents indicative dwelling unit sizes.

Table 7-1: Indicative Dwelling unit Sizes

Number of Rooms	Dwelling Units Size (sqm)
One Bed Room	40-50 (45)
Two Bed Room	60-70 (65)
Three Bed Room	80-120 (100)
Four Bed Room	130-180 (160)
Five Bed Room	190-240 (220)

The residential areas are developed either as (a) plotted development or (b) group housing/ flatted development. The density pattern i.e (high density, high medium density, low medium density or low density) are followed for working out the pattern of development with respect to the size of plot to number of dwelling units on each plot, setbacks, plot ratio and the number of storeys/ height of the building.

7.2.1.1 Density of Development

Density in development may be defined by population size, plot coverage and the number of dwelling units. The level of Density is determined by availability of services such as water, sewerage, size of roads, etc, and the zoning recommended. In recommending gross residential densities care should be taken that they create in spatial and functional meaning an independent system of the built-up area (both multi-family and one family dwelling units) well provided with day-to-day services, recreation and communication network. For the purpose of controlling the intensity of development Table 7.2 presents a range of densities as per Physical Planning Handbook 2009, that can be adopted. These may be varied depending on the type of waste disposal, availability of piped water, and the level of building technology to be applied.

Table 7-2: Recommended Densities for Residential Development

Type of Dwelling	Density	No of Dwellings per Ha		Space Allocation Per Dwelling Unit in sqm	
		Existing	Proposed	Existing	Proposed
Bungalow detached	Low density	10	10	1000	1000
	Medium density	16	30	500	350
	High density	35	40	285	250
Semi-detached and row housing	Low density	20	35	417	300
	Medium density	32	50	333	200
	High density	70	80	250	150
Multi–Family dwellings	Low density	50	70	200	150
	Medium density	60	80	167.6	125
	High density	70	100	142.8	100
	Special Density (Rental Housing)	133	160	75	60

7.2.1.2 Plot Area

The residential areas can have both the plotted and group housing developments. Keeping in view the cost of the land and the construction of a building with the affordability and the subsidy which would be extended to the category of low income groups, an indicative

minimum plot size is given in Table 7.3. the plot size is generally determined by the type of housing in the given scheme whether consisting of row housing, detached or semi-detached units. These may be vary depending on the level and adequacy of the above mentioned factors and recommended plot coverage.

Table 7-3: Recommended Minimum Plot Size for Different Housing Schemes

Type of Residential Development	Minimum Plot Sizes in Sq m					
	Detached		Semi Detached		Row Housing	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Slum rehabilitation and upgrading schemes	223.2	80-100	148.8	60-80	111.6	50-70
Low cost housing	334.8	100-200	223.2	100- 150	167.4	70 - 100
Normal housing development	465	200-300	309.7	150-250	232.5	100-200

Note: The Competent Authority shall be competent to disregard variation of up to 5 % on plot size to grant the norms applicable to the lower category of plot size in accordance to the following requirements:

(i) The minimum size of the residential plot shall be 50 sq.m unless reduced further with the approval of the Government.

(ii) 100 % ground coverage shall be eligible for regularization of construction already existing on payment of charges as notified.

(iii) Permissible plot ratio shall not be more then prescribed.

(iv) The number of dwelling units shall depend upon their size and pot ratio for a particular size of plot.

(v) Basement if constructed shall not be counted into plot ratio provided the space is used for parking and storage.

(vi) If the building is constructed with stilts, the areas of non-habitable height used for parking shall not be counted into plot ratio but would be counted towards height of the building.

(vii) The minimum setbacks shall be as per the provisions indicated in Table 7.4.

7.2.1.3 Building Lines (set back lines)

This is the minimum distance of a house or an ancillary structure from the plot boundary. The principle value of building lines is either to achieve a visual effect or reserve a certain access of area of ground. It is not necessary to set uniform lines, they maybe flexibly drawn to produce spatial coherence and variegated character. The recommended minimum setback of dwelling from plot line is presented in Table 7.4.

Table 7-4: Minimum Setback of Dwelling from Plot Lines

Type of Residential Development	Minimum Set back of Dwelling from Plot Line (m)					
	Front		Side		Rear	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Slum rehabilitation and upgrading schemes	2.5	1.5	1.5	-	3	1.5
Low cost housing	3	2	1.5	-	4.5	1.5
Normal housing development	6	3	3	1.5	4.5	3.0

Note:

(i) In case the permissible coverage is not achieved with the above-mentioned setbacks in a plot, the setbacks of the preceding category may be allowed.

(ii) Plot owners or allottees seeking extra coverage, additional floor or built up space shall have to pay a penalty and compounding charges as decided by the competent authority on the approval of the Government.

(iii) The amount so collected be deposited in an escrow account by the Local Authority, to be utilized for developing parking sites, augmentation of amenities and environmental improvement.

(iv) The encroachment on public land and within right of way shall not be regularized.

(v) Every applicant seeking sanction or regularization of additional plot ratio and/ or height shall submit a certificate of structural safety obtained from competent authority.

The Physical Planning (Building and Development Control) Rules, 1998 provides for a building line of 9m. for roads above 18m. wide and 6m. for roads between 6m. and 18m. However, if the road is less than 6m., the building line should be the width of that road plus the difference between 6m. and the road.

No buildings should be constructed on the open space, in front of the building, created by the building line, except for a fence or boundary wall.

7.2.1.4 Distance between Buildings

a) The distance between any two dwellings, front to front, across a street, walk or common area shall be not less than equal to the total height of the taller building.

b) Street Width: It is recommended that the width of streets or access lane in a residential area be determined by the number of dwelling units or plots to be served. The minimum street width for given number of plots may be indicated as shown in Table 7.5. It is further recommended that the street network be hierarchical so that in the future urban areas will have a high rise urban morphology even in residential areas

Table 7-5: Minimum Street Width Per Given Number of Plots

Number Of Plots	Street Width
1 to 30	9m
31 to 60	12m
or	
up to 500 m length	9m
501 to 750 m length	12m
751 to 1000 m length	18m
1001 m or more length	24/30m

7.2.1.5 Plot Coverage and Plot Ratios

The essence of fixing plot coverage is to ensure a healthy environment and allow for expansion and improvement of infrastructural facilities and social amenities. The recommended plot size, coverage and ratio are shown in Table 7.6 below.

Table 7-6: Plot Ratios and Plot Coverage

	Minimum Plot size (Ha)	Maximum Plot Coverage %	Plot Ratio
Low density Bungalow			
Existing	0.2	50	-
Proposed	0.1	40	1:1
Medium density Bungalow			
Existing	0.045	65	1:3
Proposed	0.030	60	1:2
Multi-family dwelling			
Existing	0.02	60	1:4
Proposed	0.02	60	1:2.5
High density			
Existing	0.03	70	-
Proposed	0.015	70	1:3

7.2.1.6 Residential Plots (Group Housing)

The minimum requirements are as follows:

1) Minimum plot size for Group Housing shall not be less than 4000 sq. m (about 1 acre)
2) The Ground coverage shall not be more than 30%
3) The density may vary according to area of dwelling unit size and the number of dwelling units within each permissible plot ratio of 1 : 1.5 - 2.0
4) Plots for group housing should be located on roads facing a minimum width of 18 meters (12 meters in case of existing built up areas and 9 meters in informal settlements).
5) Developer shall ensure that 10 % of plot ratio or 10-15 % of dwelling units, whichever is more, are constructed for community service personnel or servants. Such area should have area between15 to 25 sq.m per dwelling unit.
6) If the building is constructed with stilts, the area of non-habitable height, and is proposed for parking, landscaping etc., such floor space shall not be counted into plot ratio
7) The basement constructed and used for parking, storage, utilities and services shall not be counted into plot ratio
8) The maximum height of the building shall not be more than 26 meters.
9) Special housing for urban poor to cover majority of population considering their affordability should be the dwelling unit in range of 45-50 sq.m per dwelling unit.

7.2.1.7 Residential Apartment Scheme

It is a scheme for development for construction of apartments on a plot having five or more in number with common services shall be permitted on the following conditions:

1) The minimum plot size shall be 1500 sq.m.
2) The road shall not be less than 12 meters abutting the plot and in case of existing plot in built up areas 9 meter road shall be the minimum requirement.
3) The minimum coverage of the plot shall not be more than 40 %.

4) The maximum Permissible plot ratio shall be 1: 2.5.
5) The minimum space for recreational purpose shall not be less than 10 % of the plot area for tot lot, landscaping etc.
6) The maximum height of the building blocks shall not be more than 26 meters.

7.2.2 Mixed Use Regulations

It is a well-recognized fact that in the absence of adequate provisions to meet certain demand for space for a particular activity, the available built up space is used (for other than normally permitted use) due to the demand and better economic return, often certain uses are permitted/approved in the premises in residential areas, and falls under mixed use category subject to further change as per the changing requirements. Such changes in the use of premises are not done on the approval of the Competent Authority in most cases, and therefore, invite attention for unfair practices. Hence it may be appropriate to frame regulations so that some kind of discipline is followed, and the uses to be allowed and the extent can be regulated through measures to be taken to counter the effect of such non-intended use in such premises.

a) Principles for Mixed Use

Mixed use means the provision for non-residential activity in residential premises. The policy aims to balance the socio-economic need for such activity and the environmental impact of the said activity in residential areas. Mixed use allows access to commercial activities in the proximity of residences and reduces the need for commuting across the zones in the city. It also manages and mitigates impact related to congestion, increased traffic and increased pressure on civic amenities.

b) Types of Mixed Uses

(i) Commercial activity in the form of retail shops along minimum 12 m wide road.

(ii) Other activities broadly in the nature of Public and Semi-public facilities in plots abutting minimum 18 m wide road.

(iii) Professional activity in plots abutting 40 m wide road.

c) Activities not permitted in mixed use

The following activities shall not be allowed under mixed use:

(i) Retail shops of building materials (timber and timber products except furniture), marble, iron and steel, firewood, coal and any fire hazardous and other bulky materials.

(ii) Repair shops, workshops of automobiles, tyre resoling and re-trading and battery charging etc.

(iii) Storage, godowns and warehousing.

(iv) Junk shops.

(v) Printing, dyeing and varnishing.

(vi) Any other activity that may be notified from time to time by the Government.

d) Registration of mixed use premises and payment of charges

(i) In respect of residential premises if already under mixed use or intended to be put to mixed use, the owner / allottee / resident of plot / dwelling unit in the case of group housing shall be required to declare such mixed use and deposit the charges as prescribed by the Competent Authority.

(ii) No modifications to the building for using residential premises for non-residential activities shall be permitted unless the allottee / owner obtains sanction of revised building plan and has paid the necessary charges or fees.

(iii) Consultation with the Residential Welfare Association (RWA) shall be done for the purpose declaring mixed use streets.

7.2.3 Commercial Streets and Areas

The commercial streets / stretches of streets of areas shall be declared and may be notified as commercial streets or commercial areas by the Competent Authority:

(i) Where more than 70 % of the plots abutting road of 18 m or more, in a stretch of at least 200 m length in regular plotted development which are under commercial use, provided that no street in residential area shall be notified as commercial street.

(ii) Where more than 70 % of the properties abutting roads of less than 18 m width, in a stretch of at least 100 m in length in informal settlements shall be declared as Commercial Street.

(iii) Any street less than 6 m width in informal settlements and if declared commercial streets shall be only a pedestrian street and no vehicular traffic be allowed.

(iv) There should be a separate Vendor's Policy to regulate this activity as it provides self-employment opportunity to the urban poor to earn their livelihood.

7.2.4 Industrial Development

The sub-division of Industrial Use Zone into plots for development of industrial estates/parks shall be governed by the following norms:

(i) The development of industrial area may have plotted development for non-polluting individual industrial units. Some part of industrial estate may be used for flatted group industry and service industries. The industrial area should have an access/approach from major roads.

(ii) The industrial estate shall have minimum 20-25 % of the area reserved for the following facilities:

(a) Sub Fire Station, Banks, Petrol Pump, Restaurants

(b) Police Station, Waste Disposal Dumping Yard, Truck Terminal, parking area, Taxi stand etc.

(c) Industrial Area Centre (Commercial Centre) to accommodate commercial and other facilities, show rooms etc.

(d) Electric Sub-station, Water Supply Tank, Common effluent Treatment Plant etc

(e) Other facilities such as Recreational Club, Associations, Community Hall, Medical Centre, Administrative Block and other allied common facilities.

(iii) New Industrial Estate should be located on the main roads or secondary roads.

(iv) No road within the industrial estate shall be less than 9 to11.5 m wide (collector road).

(v) There should be minimum 10-15 % of the area for landscaping and developed as park and buffers (organized open space). Minimum 10 m wide buffer should be provided all along the industrial area with tree plantation.

(vi) One ECS parking per 100 sq.m floor area be provided.

The size of plots, plot ratio and setbacks permissible in industrial estates are given in **Table 7.7**.

Table 7-7: Requirements of Industrial Plots

Type	Existing Development	Min Plot Size (Ha)	Max. Ground Coverage %	Plot Ratio	Maximum no. of floors allowed	Minimum Setback		
						Front	Side	Rear
Light Industry	Light industries and/ or vacant	0.05	75	1: 1	2.00	6	3	3
Medium Industry	Medium industries and/or vacant	2	50	1:1	2.00	9	6	4.5
Heavy Industry	Large industries and/or vacant	10	30	1: 0.6	2.00	12	6	9
Slaughter-house	Existing slaughter-house and/or vacant	2	40	1:0.8	2.00	9	3	4.5

7.2.5 Educational Use

The size of plots, plot ratio and setbacks permissible in educational plots are given in **Table 7.8**.

Table 7-8: Requirements of Educational Plots

Type of use proposed	Min. Plot Size (Ha)	Max. Ground Coverage %	Plot Ratio	Maximum no. of floors allowed
Primary schools	1.2	25	1: 0.5	Ground Plus 1
Secondary schools	3.4	30	1: 0.9	Ground Plus 2
Special schools	3.5	30	1: 0.6	Ground Plus 1
Youth polytechnic	3.5	30	1: 0.6	Ground Plus 1
Research institute	10	20	1: 0.8	Ground Plus 3
University	50	10	1: 04	Ground Plus 3
Engineering College, National Polytechnic	10	20	1: 08	Ground Plus 3
Medical training college	10	20	1: 08	Ground Plus 3
Management training/ teachers training institute	5	30	1: 1.2	Ground Plus 3

7.2.6 Health Facilities

The size of plots, plot ratio and setbacks permissible in plots under health facilities are given in **Table 7.9**.

Table 7-9: Requirements of Plots under Health Services

Type of use proposed	Min. Plot Size (Ha)	Max. Ground Coverage %	Plot Ratio	Maximum no. of floors allowed
Sub-county Level - Referral Hospital	8	25	1 : 1	4
District level hospital	4	25	1: 0.75	3
Health Centre	2	30	1:0.9	3
Basic health sub-centre/nursing home	1	30	1:0.9	3
Communicable disease hospital	4	25	1:1	4
Dispensary	0.5	40	1:0.8	2
Veterinary hospital	5	30	1:0.6	2

7.2.7 Proposed Public Purpose

The size of plots, plot ratio and setbacks permissible in plots under public purpose use are given in **Table 7.10**.

Table 7-10: Requirements of Plots in Public Purpose Use

Public Purpose Facility	Min. Plot Size (Ha)	Max. Ground Coverage %	Plot Ratio	Maximum no. of floors allowed
Integrated office complex	20	25	1:1.5	4 - 8
Convention centre	10	20	1:0.8	4
Socio – Cultural centre/ Exhibition cum fair ground	15	10	1:0.2	2
Fire station	0.5	20	1:0.4	2
Prison	16	10	1:0.3	3
Juvenile home	2	25	1:0.75	3
Police station	2	30	1:1.2	4
Rehabilitation centre	0.5	25	1:0.75	3
Sub- Sector level community centre	1	25	1:1.0	4
Community hall	0.3	25	1:1.0	4
Orphanage	1	25	1:0.5	2

7.2.8 Recreational Facilities

The size of plots, plot ratio and setbacks permissible in plots under recreational facilities are given in **Table 7.11**.

Table 7-11: Requirements of Plots in Recreational Use

Type of use proposed	Min. Plot Size (Ha)	Max. ground Coverage %	Plot Ratio	Maximum no. of floors allowed
City park	10	1.5	1:0.015	1 (Ground)
Amusement park	10	10	1:0.2	2 (Ground Plus One)
Zoo	10	5	1:0.5	1 (Ground)
Integrated sports centre – City Level	30	10	1:0.2	2 (Ground Plus One)
Integrated sports centre –Sector Level	10	10	1:0.2	2 (Ground Plus One)
Sector park	5	1.0	1:0.01	1 (Ground)
Sector playground	5	1.0	1:0.01	1 (Ground)
Stadium	5	10	1:0.2	2 (Ground Plus One)
Cluster park	1	1.0	1:0.01	1 (Ground)
Sub-Sector park	2	1.0	1:0.01	1 (Ground)
Sub-Sec playground	2	1.0	1:0.01	1 (Ground)
Cluster playground	1	1.0	1:0.01	1 (Ground)

7.2.9 Standard/ Norms for Fire Safety

7.2.9.1 Buildings Construction Materials

Type of building materials or methods used should be in a position to resist fire for some minutes in order to minimise the spread and intensity of fire as shown in Table 7.12. This also ensures safe evacuation of occupants or users.

Where any combustible roof covering material including thatch, shingles and bituminized felt on boarding is used and the plan area of such roof is more than 20m^2, the distance between the building so covered and any boundary of the site on which such building is situated should be not less than 4.5m. If the slope of a building roof does not exceed 60 degrees, a minimum distance of 1.0m between any two such areas should be provided whereas if the roof is in excess of 60 degrees a minimum distance of 1.0m measured horizontally and 3.0m measured along the slope of such roof between any two such areas should be provided.

Table 7-12: Type of Building Occupancy and Fire Resistance Minutes for Materials Used

Occupancy Type	Fire resistance, minutes
Entertainment & public assembly, Theatrical & indoor sport, Places of instruction, Worship, Outdoor sport, Moderate & Low risk commercial service & industrial, Museum, Plant room, Offices, Hotels, Dormitory, Domestic residence, Detached dwelling house, Moderate & Low risk storage, Parking garage	60
High Risk Commercial Service, Exhibition halls, High Risk Industrial, Places of Detention, Hospitals, Large Shops, Wholesaler Stores, High Risk Storage	120
Source: Kenya National Planning & Building Code, 2009	

7.2.9.2 Emergency Routes

Any building of a height more than three storeys should be provided with not less than two escape routes. No emergency routes are required if the travel distance from the farthest point in any room, measured along the escape route, to the nearest escape door is less than 30m or in any building of not more than three storeys in height. Refer Table 7.13.

Table 7-13: Minimum Width Standards for Escape Routes

Maximum number of persons	Minimum width, (mm)
120	1100
130	1200
140	1300
150	1400
160	1 500
170	1600
180	1700
190	1800
200	1900
Source: Kenya National Planning & Building Code, 2009	

7.2.9.3 Exit Doors

Where the population of any room is not more than 25 persons the width of any exit door should be at least 900mm. Any classroom, lecture room or boardroom that has a population of more than 50 persons or any other room that has a population of more than 25 persons should have not less than two exit doors. One such door should open in the direction of travel along the escape route. Where population is more than 240 persons, three or more exit doors should be provided.

7.2.9.4 Fire Detection and Alarm Systems

All occupied areas within any building which exceeds 30m in height or contains any storey exceeding 5,000m^2 in floor area, should be equipped with fire detection, and manually activated fire alarm system and an emergency evacuation communication system.

7.2.9.5 Fire Hydrants

Any building exceeding 12 m in height or with a total floor area exceeding 1,000m^2 should be provided with fire hydrants on the basis of not less than one per 1,000m^2 or not less than one per storey. Hydrants provided should have a 24m or 30m long fire hose together with couplings and a 16mm internal diameter nozzle,

In any permanent amusement park or exhibition ground, shopping centre or group housing, cluster housing, or town house complex ground or raised hydrants should be installed. They should be placed at a distance not greater than 90m from these facilities.

Public fire protection in cities and major towns is crucial. Thus fire hydrants should be installed in public rights-of-way, City-owned property, or City-approved easement and connected to local authority water mains. Public fire hydrants should be located in streets or roads dedicated to public use. Locations these hydrants should be approved by the relevant authority prior to installation.

The hydrant bonnets should be colour coded in accordance with Kenya Bureau of Standards to show the amount of water that can be discharged out of them as shown in Table 7.14. Red banding on hydrants mainly show that they are out of service.

Table 7-14: Fire Hydrants Color Coding and its Meaning

Marking of Fire Hydrants Bonnets and caps	
Bonnet Colour	**Liters per Minute**
Green	4,000 or greater
Orange	2,000 - 4,000
Red	less than 2,000
Source: Kenya National Planning & Building Code, 2009	

Hydrants should not be used for any other purpose other than fire protection without express permission from the relevant authority.

7.2.10 Standard/ Norms for Electricity Sub-Stations and Street Light

Power Connection

In order to have electricity connection, a person has to make an application to Kenya Power requesting for the same. Application procedure entails 4 steps:

Step 1 – Filling and submitting an application form to the nearest Kenya Power office. This can also be done online.
Step 2 - Upon receipt of application, Kenya Power technician visits applicant's site to assess the requirements for preparation of cost estimates after which a quotation is sent to applicant.
Step 3 – Customer pays connection fee.
Step 4 – Construction and metering.
Refer Table 7.15

Table 7-15: Substation location

Capacity of line	Way leave
11 KV	10m
33KV	20m
40KV	20m
66KV	30m
132KV Single circuit towers	50m
132KV Double Circuit towers	60m

Street Lights

Street lighting steel poles are placed at an interval distance of between 30m – 35m depending on the wattage used and height of the poles. Wattages used are 70 Watts & 150 Watts. The higher the wattage the greater the interval distance between the poles.

The poles goes as high as 8m from the ground for standalone steel poles and at a maximum of 7m when the lights are fixed on the electricity poles running along a road.

7.3 LAND USE ZONING REGULATIONS

The basic purpose and function of zoning is to divide a city into residential, commercial, industrial, recreational, heritage, transport, Special area under major use zones that are for the most part separate from one another as far as specific landuse is concerned, with the use of property within each zone being reasonably uniform. Zoning has been done to control the physical development of the land and the types of uses that each individual property may be put to landuse and thereby helping proper planning of Mombasa to achieve the desired built urban environment.

Uses Permitted/ Permissible/ Prohibited

The various zones indicated in the proposed landuse plan for both existing and future areas indicate the predominant use, which should be roughly at least 50% of the area. The other uses permitted/ permissible/ prohibited are as given below and on following pages. The permissible uses are allowed on with special permission of local authority, considering local safety and considerations of reduction of pollution. Zoning regulations for various uses are presented below:

7.3.1 Residential Use Zone

The Residential Use Zone can be subdivided into

a) Primary Residential Zone
b) Mixed Residential Zone and
c) Unplanned/ Informal residential Zone

Activities allowed in Residential Zones

- Residences – Bungalows, multi-family dwellings (multi-storey flats/apartments), row housing, detached, semi-detached, residential-cum-work
- Hostels, rental houses, old age homes, community halls, police posts, guest houses (not exceeding 200 sq.m in floor area),
- Day care centres and kindergartens
- Corner shops, small shopping centres, health facilities (dispensaries, nursing home, etc.)
- Educational buildings, religious premises, library, gymnasium, park, technical training centres, exhibition and art galleries, clubs, banks/ ATM, matatu stops/boda boda stands (not exceeding 100 sq.m in floor area), post offices, hostels of non-commercial nature

Activities/Restricted uses/uses permitted with special sanction of the Competent Authority in Residential zone

- Night shelters, petrol pumps, motor vehicle repair workshops/garages, bakeries, storage of LPG gas cylinders, cemeteries, restaurants and hotels (not exceeding 200 sq.m in floor area), small butcheries
- Printing presses, cinema halls, auditoriums, markets for retail goods, weekly markets (if not obstructing traffic circulation and open during non-working hours), informal

markets, small workshops, municipal, county and central government offices, police stations

- Public utility buildings like electrical distribution depot, water/sewerage pumping stations, water works, fire stations, telephone exchanges/mobile towers, matatu stations/ boda boda stands (occupying a floor area not exceeding 200 sq.m)

Activities Prohibited uses in Residential zone

- Heavy, large and extensive industries: noxious and hazardous industries
- Warehousing, storage go-downs of perishables, hazardous, inflammable goods
- Workshops for motor vehicles- matatu/boda-boda/buses etc.
- Slaughterhouses, hospitals treating contagious diseases (e.g. Tuberculosis)
- Wholesale market, sewage treatment plant/disposal works, water treatment plant, solid waste dump, outdoor games stadium, indoor games hall, shooting range, international conference centre, courts, sports training centre, reformatory, garrisons, etc.

Residential Use Zone (Unplanned/ Informal Use Zones)

Uses Permitted

Residence-plotted, (detached, semi-detached and row housing) group housing houses, residential-cum-work, hostels and boarding houses, night shelters, foreign missions, *social hall*, community room, local (retail shopping), health clinics, dispensaries, kindergartens, nursing home and health centers, professional offices, educational buildings (nursery, primary, secondary school, college), research institutes, community centers, religious premises, weekly markets, library, gymnasium, park/community toilets, plant nursery, technical training center, banks, police stations, informal markets, taxi stand/ tuk-tuk stands, bus stops, electrical sub-station, water pumping station, post offices, hostels of non-commercial nature.

Permissible Uses/ Activities

Petrol pumps, motor vehicle repairing workshops/ garages, household industry, bakeries and confectionaries, burial-grounds, restaurants and hotels, markets for retail goods, municipal, county and national government offices, multipurpose shops, matatu stations/ boda boda stands and any other existing use which is not detrimental to its surrounding uses or to the environment in general.

Uses/ Activities Prohibited

Heavy, large and extensive industry: noxious, obnoxious and hazardous industries, warehousing storage godowns of perishables, hazardous, inflammable goods, turnkey yards, workshop for buses etc. slaughter-house, wholesale *markets*, hospitals, hospitals treating contagious diseases, sewage treatment plant /disposal work, water treatment plant, solid waste dumping yards, outdoor games stadium, indoor games stadium, shooting range, zoological garden, botanical garden, picnic hut, international conference center, courts, sports training center, reformatory, police battalion office, forensic science laboratory, any other obnoxious and hazardous use.

***Amendments to permitted/restricted/prohibited uses**:* The competent authority may from time to time add to amend the above list by considering overall land use compatibility through notification.

Note: Before granting permission for development the approving authority shall consult the relevant agency or department, will where it appears that the development is likely to:

a) adversely affect any land in the area;
b) create or attract traffic which may result in material increase in the volume of traffic entering or leaving the main road or using a level crossing over railways.
c) adversely affect adjacent airports or seaports.
d) adversely affect the environment.
e) adversely affect adjacent water resources.

7.3.2 Commercial Use Zone

In commercial use zone includes (Retail shopping zone), General business and commercial Sub CBD, whole sale godowns, ware-housing and regulated markets. The following uses / activities are permitted, permissible and prohibited.

Uses Permitted

In the Commercial Zone, building or premises shall normally be permitted only for the following purposes and accessory uses:

1) Cinema Theatres subject to Cinema Rules issued from time to time, Assembly Halls, Colleges, Reading rooms, Higher Educational Technical and Research Institutions, Petrol Filling Stations, Automobile Show Rooms, Service Stations and Automobile Workshops with permission of parking vehicles occupying a site area not exceeding 200 sq.m. with installation not exceeding 10 H.P. All uses permitted with the special sanction of the Authority in Residential Use Zone.

2) Commercial and business uses including all shops, stores, markets and uses connected with the display and sale of merchandise, either wholesale or retail excluding explosive obnoxious products and other materials likely to cause health hazards not exceeding an area of 1000 sq.m.

3) Business Offices, Banks and other commercial and financial institutions occupying a floor area not exceeding 1000 sq.m.

4) Warehouses, repositories and other uses connecting with storage or wholesale trade occupying a floor area not exceeding 1000 sq.m but excluding storage of explosive or products which are either obnoxious or likely to cause health hazards.

5) Manufacturing and service establishments and commercial uses using electric motors not exceeding 20 H.P. and/or employing not more than 20 workers excluding those that are obnoxious or hazardous nature by reason or odor, effluent, dust smoke, gas, vibration, noise etc. or otherwise likely to cause danger or nuisance to public health or amenity.

6) All uses permissible in residential zone are permissible in this zone.

Uses Permitted with Special Sanction of Competent Authority

The following may be permitted with special sanction of the Authority:

1) All commercial and business uses including all shops, stores, storages, markets, shopping centers and uses connected with the display and sale of merchandise, either wholesale or retail but excluding explosives, obnoxious products and other materials likely to cause health hazards without limitation of floor area.

2) Government Offices, Business Offices and other Financial Institutions without limitations of floor area.

3) Warehouses and other uses connected with storage or wholesale trade, but excluding storage of products which are either obnoxious or likely to cause health hazards.

4) Commercial and entertainment centers including Touring Talkies subject to Cinema Rules issued from time to time, Sports Stadium, Recreation Complexes, Research Experimental or Testing Laboratories not involving danger of fire explosive or health hazards.

5) Organized parking, tot lots, Multistory Parking, Bus Terminal and Depot, Transport Terminals, Motor Garage and Workshops.

6) Educational, Technical and Research Institutions.

7) Garment Industries irrespective of the number of persons employed where Authority is satisfied of its non-objectionable nature based on its performance characteristics.

8) Hotels, Lodges, Cold Storage, Food Courts, Informal Market and Informal Retail Shopping.

9) Weekly Markets on identified locations, Service and Repair Centers, Building Materials Markets, Old and New Car Show rooms.

10) Convention Centers, Trade Centers, Stock Exchange/Market Center, Travel Agencies, Tourist Center.

Uses Prohibited

All uses not specifically mentioned above are prohibited in this zone.

7.3.3 Industrial Zone

Uses Permitted

In Industrial Zone, buildings or premises shall be normally permitted for the following purposes and accessory uses:

1) All uses permissible in the Commercial Use Zone with the special sanction of the Authority except residential uses.

2) Residential buildings for security and other essential staff required to be maintained in the premises.

3) All industries using electrical power utilizing machinery not exceeding 100 H.P. or with employees not exceeding 100 number, but excluding all industries of obnoxious and hazardous nature by reasons or odor, effluent, dust, smoke, gas, vibration etc. or otherwise likely to cause danger or nuisance to public health or amenity.

Uses Permitted with Special Sanction of the Authority

Following uses may be permitted with special sanction of the Authority:

1) Storage of petroleum, timber, explosive and inflammable and dangerous materials.

2) All industries up to 200 H.P. where sufficient precautions have been taken to the satisfaction of the Authority to eliminate noxious or dangerous effluents.

Uses Prohibited

All uses not specifically permitted as mentioned above shall be prohibited.

7.3.4 Institutional Area

In the Institutional Area buildings and premises shall be normally permitted for the following purposes and accessory uses, where the site area does not exceed 5 Ha.

1) Government and Semi-government Offices, Professional Offices

2) Art Galleries, Museums, Aquarium, Public Libraries, Social and Cultural Institutions and Religious Buildings.

3) Hospitals, Sanatorium and other Medical and Public Health Institutions.

4) Parks, Play Grounds, Swimming Pools and other Public and Semi-public open spaces.

5) Broadcasting Installations and Weather Station.

6) Public Utilities, Storage and Public Yards, Municipal and Community Facilities.

7) Installation of Electric Motors upto 20 H.P. may be permitted for the uses incidental to the uses mentioned in items (i) to (iv) above.

8) Incidental residential uses for essential staff required to be maintained in the area.

9) Hospitals, Laboratories, Social and Cultural Conference Hall, Religious Centers, Guest Houses, Museum, Auditorium, Police Station, Jail, Fire Station.

Uses Permitted with Special Sanction of the Authority

The following uses may be permitted with the special sanction of the Authority:

1) All uses normally permitted in the Zone Occupying a site area exceeding 5 Ha.

2) Transportation Terminals including Bus Station, Parking lots, Helipad etc.

3) Auditorium, Community Halls.

4) Circuses, Sports Stadium, Recreational Complex, Exhibitions, Fairs and Guest Houses.

5) Colleges and Institutions of Higher Education Research, Technical and Training in nature.

6) Crematorium, Cemeteries, Burial.

7) Installation of Electric Motors beyond 20 H.P. for the uses mentioned above.

8) All Commercial Uses incidental to Institutional uses without any installation.

9) Petrol Filling Station and Service Stations with installation not exceeding 5 H.P.

10) Computer/Software and IT enabled Services.

Uses Prohibited

All uses not specifically permitted as mentioned above shall be prohibited.

7.3.5 Open Space and Recreational Zone

Uses Permitted

In the Open Space and Recreational Zone, buildings or premises shall be normally permitted for the following purposes and accessory uses:

1) All Public and Semi-public, City Park, Coastal Park and Open Spaces, Parks and Play grounds, Zoological and Botanical gardens, Nurseries, Water Front Development, Museums and Memorials.

2) Installation of Electric Motors not exceeding 5 H.P. may be permitted for pumping water for gardening purposes.

Uses Permitted with Special Sanction of the Authority

The following uses may be permitted with special sanction of the Authority:

1) Transportation Terminals, Restaurants, Motels, Auditoriums and Open Air Theatres, Exhibition, Circus, Fairs and Festival Ground, Public Utilities.

2) Incidental Residential Uses for essential staff required to be maintained in the area.

3) All activities incidental to recreational use as may be decided by the Authority.

4) Installations that may be necessary for the uses mentioned above.

5) All Agricultural Uses outside the Municipal Area.

6) Burial and/or Burning Grounds or Crematorium.

7) Gymnasium, Police Post, Water Sports Training Center and Swimming Pool.

8) Spot Zoning for specific activity and High Commercial Corridor Development along the major transportation routes.

Uses Prohibited

1) All uses not specifically permitted as mentioned above shall be prohibited.

2) For the buildings/structure ancillary to the above uses can be permitted not more than the 2 % of the total area.

7.3.6 Transportation Zone

Uses Permitted

In the Transportation Zone buildings or premises shall be normally permitted only for the following purposes and accessory uses:

1) Roads, Goods Shed Terminals, bus stops, Bus Depot, Bus Terminals, Truck Terminals, Airport, Air Strip, Helipad, Port and Shipping, Ferry stations, Jetties, Fishing port, Cruise landing port, Railway, Railway station, Yards, Warehouses, Storage, Container Fright Stations, Petrol Filling and Service Station.

Uses Permitted with Special Sanction of the Authority

The following uses may be permitted with the special sanction of the Authority:

1) All related uses incidental to development of the roads and other transport modes including essential housing.

2) Hotels, Exhibition Ground, Convention Center etc.

Uses Prohibited

1) All uses not specifically permitted as mentioned above shall be prohibited.

7.3.7 Agricultural Zone

Uses Permitted

In the Agricultural Zone buildings or premises shall be normally permitted only for the following purposes and accessory uses:

(i) All agriculture uses.

(ii) Farm-House, Building for Agricultural activities subject

(iii) Diary and Cattle Farms, Fish Farms.

(iv) Poultry Farms, Stud Farms.

(v) Forestry.

(vi) Storing and Drying of Fertilizers incidental to the agricultural activities.

(vii) Petrol Pumps.

Uses Permitted with Special Sanction of the Authority

The following use may be permitted with special sanction of the Authority:

(i) Parks and Play Ground, Camping Sites and other Recreational uses.

(ii) Sewage Farms and Garbage Dumps, Burial Grounds.

(iii) Temporary Touring Cinemas.

(iv) Utility Services may be permitted without spoiling the natural features.

(v) Buildings that may be permitted in the zone subject to the condition as stipulated by the Authority for residential layout for growing rural population or housing the urban poor who are at the poverty line.

Uses Prohibited

(i) All uses not specifically permitted as mentioned above shall be prohibited.

7.3.8 Airport Zone

These guidelines provide a framework to co-ordinate and guide the use and development of land within the airport area. The guidelines contain general policy advice on development management within the airport district and sets out the planning controls which will apply to development in various locations within the airport district to manage such development, including the future use of land. Critically, the guidelines seek to ensure that the primary use of the district for airport and related purposes is not compromised and that maximum benefits are gained from the use and development of land that is not required for aviation activities.

i. **Land Subdivision:** There shall be no fixed subdivision standards. The size of any lots subdivided within the Airport zone shall be determined by the intended use of the site.

ii. **Plot Setbacks:** There are no fixed minimum setback requirements; instead these shall be defined from precinct to precinct as shall be necessary to meet the intent of

the Airport zone, protect the character of the surrounding area, protect the amenity of neighboring properties, and provide access for essential and emergency services.

iii. **Offensive Uses:** Use or development for the purposes of noxious or hazardous Industry or of dangerous goods stores shall not be located within 300 metres of land zoned for residential or special use such as a hospital or school.

iv. **Building heights:** maximum height of buildings that are nearest to the airport shall be determined by the Obstacle Limitation Surfaces requirements and shall be up to about 9 metres on condition that the Obstacle Limitation Surfaces are not compromised and about 15 metres for those outside the obstacle limitation surface.

v. Compatibility of Land Uses: Ensure that generally any proposed use or development:

- Will not affect airport operations through nuisance including birds, vermin, air pollution;
- Will not breach aircraft and airport operations safety and security requirements;
- Are compatible with and related to aircraft operations ;
- Are uses that require separation from settled areas due to potential impact on an amenity;
- Give preference to public and government uses and activities over private interests; and
- Are, in the case of private uses and activities, leased at commercial rates.

vi. **Priority Uses:** Give priority to uses that have a direct link with Airport activities and should be located in proximity to airport activities. These include –

Airside Uses	**Landside uses**
• Runways • Runway strips • Taxiways • Aprons • Passenger terminal • Bomb threat area • Freight movement • Aerodrome access • Aircraft maintenance • Aircraft catering and servicing • Aircraft refuelling • Air traffic control • Communication facilities • Navigational aids • Airport lighting • Emergency services • Aerodrome administration • Aerodrome maintenance •	• Staff housing • Budget hotels • Hospital • Service industries • Day Care Centre • Earthworks • Educational • Indoor Sport and Recreation • Place of Assembly • Public Buildings • Public Works • Residential Care • Establishment • Parking lots • Club • Concrete Batching Plant • Dangerous Goods Store • Earthworks • Food Premises • Industry – Light • Industry – General • Public Building

Planning Controls across Key Land Uses

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Controls	Key Land Uses			
	Accommodation	Light Industrial / Storage	Commercial Office	Bulky Goods Retail
Site Coverage (max)	50%	80%	70%	70%
Floor Area Ratio (FAR)	1.2	0.8	1.2	0.8
Front Setback	6	6	6	6
Front Setback (secondary frontage)	3	3	3	3
Rear Setback	3m up to 14m and then in 1.0m for every 5m of building height thereafter	To Building Code specification	3m up to 14m and then in 1.0m for every 5m of building height thereafter	To Building Code specification
Side Setbacks	3m up to 14m and then in 1.0m for every 5m of building height thereafter	To Building Code specification	3m up to 14m and then in 1.0m for every 5m of building height thereafter	To Building Code specification
Landscaped Area	30% site area	10% site area	20% site area	10% site area
Building Height	10 Storey's	10 metres	10 Storey's	10 metres
Podium Heights (where basement car parking proposed	Max 1m	Max 1m, where applicable	Max 1m	Max 1m, where applicable
Façade lengths	Maximum unbroken façade length of 15m	Maximum unbroken façade length of 25m	Maximum unbroken façade length of 15m	Maximum unbroken façade length of 25m

7.3.9 Port Development

The compatibility of a port with its environs is made possible by proper planning of the port, control of pollution generating sources and land use planning of the area surrounding the port. The aim is to provide the best possible conditions for the needs of the port, community in the surrounding area and the ecology of the environment.

Port planning must be recognized as an integral part of an area wide comprehensive planning land use programme. The location, size and configuration of the port need to be coordinated with patterns of residential, industrial, commercial and other land uses of the area, taking into account the effects of the port on the people, flora, fauna, the atmosphere, water courses/ocean and other facets of the environment.

There is a need to control land in the vicinity of the port in order to ensure that possible clash between port and city traffic is minimized. Experiences on non-conforming purposes or land uses have indicated the need for control. Thus it is

proposed to link approval of all developments within Port with County's building/land use approval system (including any expansion, alteration land use) to enable systematic provision for development of commercial business planning in county.

i. Any development should be subjected to guidelines provided by relevant authorities (NIMA, Coast Development Authority, Maritime Authority, Local body).

ii. Any building construction within port premises will be permitted only after obtaining approval from the local development authority.

7.3.10 Coastal Development

i. It is recommended that a 75-meter buffer zone (60m buffer followed by 15m road) be adopted for new developments from the average high water mark at the time of development application.

ii. Beach developments should be subjected to guidelines provided by relevant authorities (Coast Development Authority, Maritime Authority, Kenya Ports Authority and NEMA)

iii. Around navigational Aid beacons, a radius of 700metre buffer zone should be adopted.

iv. Developments should be avoided in high-risk areas such as erosion prone areas, hilly areas, slopes and conservation areas.

v. To provide sufficient buffer zone between developments and present shoreline.

vi. Entry and service roads to be provided and maintained in coastal reserve along beaches.

vii. Minimize the effect of air circulation with height control, design and location of buildings (does not exceed the natural canopy of surrounding trees).

viii. Coastal dunes must be preserved in all development proposals (Conditions).

ix. Usage of all vehicle type on beaches and dunes is not allowed.

x. Permanent development along the shoreline that blocks tidal movement e.g. sea walls is not allowed unless by allowed specification of the relevant construction authority.

xi. Sand excavation in the active zone which is within a distance of 1km from the low tide is not allowed.

xii. It is not encouraged to undertake beach reclamation activity because its impacts the natural beach processes. However, for any development e.g. beach reclamation one must obtain Environmental Impact Assessment license. It should also fulfill criteria on safety, preservation, productive and pollution free.

xiii. The sewerage and drainage system of all developments at the beach should be directed to an interior system and not discharged into the sea.

xiv. Fishing will not be allowed on artesian waters about 1km to the sea from the low water mark, as these are the shallow fauna breeding grounds and the activity destroys marine biodiversity.

7.3.11 Regulations for Heritage conservation and Urban Design

The following provisions shall guide the development and design of heritage areas:

1) All mangrove forests and cultural shrines shall be gazetted and cutting down of trees in these areas shall be prohibited.
2) The harvesting of sand in beach areas is prohibited
3) Commercial fishing and harvesting of coral in the marine park is prohibited
4) The following guidelines are recommended for heritage areas:
   - Minimum plot size shall be ¼ acre
   - Maximum floor area ratio shall be 1.0
   - Building density shall be about 30units/Ha
   - Number of floors shall be 2 to 3
   - Restrict commercial and public purpose (religious, cultural e.t.c) along the main streets
   - Restrict non-essential motor traffic to the main outer streets (Nkrumah road, Makadara road and Samburu road)
   - All listed buildings, street frontages, open spaces in the conservation area shall be preserved for their historical or architectural value.
   - External modification such as extension to listed buildings shall require special permission, and such modification shall not affect more that 20% of the building
   - Building lines to property along irregular streets shall be determined and provided on case-by-case basis
   - Maintain external wall finishes to stone and plaster
   - All street-level buildings must provide transition space in terms of benches, alcoves, of front porch.

Buffer zone: a band of 2 rows of buildings immediately outlying the conservation area shall be isolated for moderate control:

- Limiting number of floors between 5 and 7
- Minimal use of glass/ glazing (not more than 25% of façade area)
- Use of light-coloured walls
- The use of hipped roofs and rectangular floor plans

Provide/conserve sites and monuments of cultural/heritage value at strategic locations including public spaces, along highways, intersections of major routes etc. – several of these already exist that need maintenance – The Old Port, Mandhry mosque, Fort Jesus, Mombasa cathedral, and Town hall in Old Town, Elephant tusks on Moi Avenue, Nyayo monument at Makupa, the Bell Tower at Lights (Nyali Bridge) together with statues such as the Wavell and Allidina Visram at Treasury Square. Similar ones should be placed at all public beaches, along Mama Ngina Drive, and at all entry-exit points of the city.

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8 . CAPITAL INVESTMENT PLAN (Summary)

8.1 BACKGROUND

The capital investment plan (CIP) has taken consideration of prioritization by stakeholders during the workshop of draft proposal within the overall framework of the options of practicability, feasibility and implementability along with availability of funds. After considering the priorities of stakeholders, the priorities were weighed in terms of feasible and practically implementable projects.

These projects have been selected from the list prioritized projects, which are needed immediately and will have maximum impact in improving the quality of life of people in minimum time.

8.2 CAPITAL INVESTMENT PLANS

The CIP has been prepared for first three years, while the implementation plan has a long term time span of twenty years i.e. up to 2035 and therefore Capital Investment Plans are needed to be prepared as three year rolling plan and to be reviewed yearly, as mentioned in the Urban Areas and Cities Act, 2011.

The implementation of the different projects described above should be factored in the Annual Financial Plans.

When preparing annual financial plans based on the Capital Investment Plan, particular attention should be paid to:

- Analysing costs over the project life cycle (capital investments and foreseeable costs including maintenance and operation, repairs and replacement);
- Exploring ways of maximising co-benefits on community sustainability and resiliency;
- Considering all types of physical investments;
- Preparing project-based risk assessment and risk management strategy covering a broader scope of possible threats to the city ;
- Sources of funding.

Three areas that can improve the sustainability of the Capital Investment Planning process are to:

- Build a strong CIP administrative structure within the county;
- Build up a robust commissioning and delivery capacity;
- Hire experts for specific professional expertise to support the process.

Table 8.1 presents a summary of capital investments selected to be implemented in 1st three years of Phase -I.

Table 8-1: Summary of Capital Investment Plan

Sl. No.	Projects (2016-17 to 2018-19)	Cost Million Ksh	
		Estimated Total Cost	Expected expenditure in initial 3 years Ksh
1	Establishing Sustainable Finances	10	10
	Water Supply		
2	Reinforcement/ Replacement / Augmentation of Existing Network; Extension/Laying of New Network; Water Kiosks (50); Consumer Meters (30,000); Bulk Meters. (Funded by : French Development Agency, AFD)	1,982.67	Funded by AFD
	Sewerage		
3	Rehabilitation and Upgradation of the Existing Waste Water Treatment Plant	204.86	204.86
4	Provision of 21 No. community toilets and sanitation facilities in the informal areas	36.17	36.17
5	Provision of 23 No. public toilets and sanitation facilities in markets and public areas	23.77	23.77
6	Changamwe Repooling Sewers and Rehabilitation of Existing Sewers on West Mainland and Island (Funded by : French Development Agency, AFD)	389.39	Funded by AFD
	Transportation		
7	Developing Bus Terminal	389.32	389.32
	Developing Multi-storeyed car park (PPP)	688.66	PPP
8	Causeway	497.4	497.4
	Drainage		
9	Provision of 684 km drains	2,489.76	2,489.76
	Security Lighting		
10	Improving Security -Additional Street Lights (2300)	126.5	126.5
11	Improving Security - Additional High Mast Lights (43)	112	112
	Housing		
12	Provision of Basic Services for Urban Poor in four Informal Settlement (Kwa Punda, Kidunguni (A&B), Manoni, Mwamlai)	392.75	392.75
13	Low-Cost Housing for urban poor 600 housing units (Jomvu Kuu, redevelopment & densification)	493.69	493.69
	Informal Sector		
14	Redevelopment of Kongowea Market	149.85	149.85
	Environment		
15	Establish four Disaster Management cum Rescue Centres at Sector level (4 no)	400	400
16	Construction of septic tanks in Primary Schools (96 no)	43.2	43.2
17	Strengthening the county capacity to manage septic tanks (5 No. Exhauster trucks)	92.5	92.5

Sl. No.	Projects (2016-17 to 2018-19)	Cost Million Ksh	
		Estimated Total Cost	Expected expenditure in initial 3 years Ksh
18	Develop coastline management strategy and establish local management systems	71.5	71.5
	Other Project		
19	Establish two Youth & women empowerment centres	200	200
20	Establish two Rehabilitation & treatment centres	400	400
21	Develop Mombasa International Convention Centre	500	500
22	Establish GIS lab	7.5	7.5
	Total	**9,701.49**	**6,640.77**
Estimated budgeted expenditure for development for year 2016-17 to 2018-19			15,166.62
Net Surplus			8,525.85

As per the implementation schedule of these selected projects, around Ksh. 6640.77 million would be needed during first three years. As per the mandate of ToR, 3 year CIP is to be prepared and every year the CIP would be added for the 3rd year.

Based on analysis of the county budget and income and expenditure trend and improvement of county's revenue collection system, a total budgeted expenditure for development is Ksh. 4,165.00 million for current year (2015-16). Estimated expenditure budget for development for next three years is Ksh. 4582.00 million for 2016-17), Ksh. 5040.00 million for 2017-18 and Ksh 5544.00 million for year 2018-19.

Therefore, the investment needed (Ksh. 6640.77 million) on prioritised and feasible projects can be easily funded by the development funds available with County Government for first 3 years (Ksh. 15,166.62 million).

9 . PLAN IMPLEMENTATION MONITORING AND REVIEW

9.1 INTRODUCTION

Implementation Plan for ISUDP defines how the plan will be implemented over a period of time. The plan contains individual projects and institutional responsibility to implement them. These projects include physical infrastructure (water supply, sewerage, solid waste management, storm water drainage, etc.), transport system improvement, economic development, urban environment and disaster management, tourism and heritage development, institutional development, financial management, etc.

9.2 PHYSICAL IMPLEMENTATION PLAN

The physical implementation plan contains the time period for various activities of all the identified project for short term, medium term and long term along with list of departments responsible for implementation.

Phasing

Identified projects in all sectors are analyzed and arranged in an order based on its importance and ease in implementation. The entire planning period is 20 years and it is divided in to four phases, each with five years duration including Phase I (2016-17 to 2020-21), Phase II (2021-22 to 2025-26) Phase III (2026-27 to 2030-31) and Phase IV (2032-33 to 2035-36). The following section presents a sector wise implementation plan generated for the 20 year implementation period in phased manner. The sectoral implementation plan contains the time period for various activities of the entire identified project for short term, medium term and long term along with list of institutions responsible for implementation.

9.3 MONITORING AND REVIEW

Monitoring and review of implementation is essential as it will make the plan more responsive to emerging socio-economic needs. Implementation of the plan can be effective only when monitored, reviewed and evaluated at periodic intervals. Long range plan needs to be reviewed every five years as there are likely to be many unforeseen changes in the ground situation. Monitoring framework judges the performance of implementation of the projects in various sectors of the plan with their priority. Monitoring and evaluation of ISUDP has three purposes:

- To evaluate the effectiveness of the planning process, or assess the effectiveness of the phases in the preparation of the ISUDP. The results of the evaluation will be used to improve the preparation of detailed sector plans in the next stage. Monitoring and evaluation will also be used to assess coordination within the ISUDP implementation committee. This type of monitoring and evaluation is generally qualitative, interactive, and participatory.
- To evaluate the implementation of proposed priority projects, or assess the progress and level of achievement of development projects. Quantitative results will be used to evaluate whether goals and targets have been reached. Time lag between various implementation of the schemes and emerging needs of the people. Review of the appropriateness of the plan policies and the proposals. The results of the evaluation will be used to improve action plans for the following year.

- To evaluate the benefits of projects prioritised under ISUDP, or assess the impact of the amount of expenditure incurred to achieve the improvements. The results will be compared with the baseline conditions of the city periodically. Wherever the progress is falling short of the plan expectations, appropriate course corrections need to be devised.

The plan is divided into four phases with an interval of five year. The targets which are not achieved during that period will be forwarded to the next phase. The planning process needs reforms and capacity building to meet the project targets adequately such as preparation of Sector and Neighborhood Plan or the Scheme etc. The local level participation and co-ordination also would be required for implementation of the ISUDP. Each and every program of action has to be coordinated and implemented for which the budgetary support will have to be made by the concerned department to make the plan a success. It may also be necessary to reorganize the functions of the departments of the CGM for their efficient functioning and accountability. The involvement of the people, the non-government organizations and the women organization is equally important in the process of implementation of ISUD Plan. It is further suggested that quarterly monitoring of the delivery outputs should be undertaken while annual review of the performance of the plan should be carried out involving the stakeholders. During monitoring and evaluation critical changes may become evident and necessary adjustment can be made.

The Lands, Planning and Housing department in conjunction with other stakeholders is encouraged to develop a set of measuring indicators against which the performance of the plan can be evaluated, taking into account outcome of the relevant variables.

9.4 PROCEDURE FOR MONITORING

The procedure involves following stages namely:

- Set up a ISUDP implementation monitoring unit
- Develop a set of monitoring indicators against which the performance of the plan can be evaluated
- Observe the performance of ISUD plan implementation against indicator
- List changes required to be made in the plan on the basis of the results of the performance
- Examine the obstacles and problems causing delay (if any) in the implementation of the projects and assess the same.
- Updating the baseline data on demography, land use, land resources, project / program activities, services and utilities etc.
- Examine environmental changes that have occurred in respect of flora, fauna, vegetation, natural resources, ecology, heritage sites or protection zones etc.

9.4.1 Monitoring Unit

It is proposed to establish a monitoring and evaluation systems to assess effectiveness of implementation of ISUDP. A dedicated Monitoring Unit with modern data processing facilities should be set up which would be responsible for collection and analysis of primary and secondary data and bringing the important changes to the notice of the implementing agency comprehensively. This unit should also be in-charge of overall monitoring of implementation of the approved development plans and layout plans.

9.4.2 High-level Committee/Steering committee

A suitable mechanism by way of high-level committee/Steering committee under H.E. Governor is also proposed to be set up for periodic review and monitoring of the plan. To enable this, apart from targets arising from various infrastructure plans etc., other action points emerging from the proposals made in the plan for various sectors would also be listed

out, to enable monitoring of timely implementation / identifying the need for any changes / corrections.

9.4.3 Management Action Groups

It is proposed that for follow up planning and integrated implementation of the ISUDP, the following management action groups are formed and initiatives are taken for addressing the major issues. These groups would work on following planning indicators

9.4.4 Planning Indicators

The following would be the indicators of physical and socio-economic changes to be monitored periodically.

1. **Demographic**: Population size, Population distribution in relation to holding capacity, Age sex structure, Household size, Rate of migration, Causes of migration etc.
2. **Land use:** Land use pattern, Development / Layout plans/ Sector level plans/Neighbourhood plans etc.
3. **Housing:** Household with essential services, Land Assembly and Private Sector Participation in Housing and Land Development, Low cost housing, Regularisation & Up-gradation of Unauthorised Colonies and areas of mixed use, Local level Planning Regulations etc.
4. **Social Infrastructure:** Mortality Rate and Infant Mortality Rate, health facilities for special need groups, access of population to safe drinking water, access to low cost sanitation, removal of solid waste per capita, distribution of police and fire services, requirement of old age homes, working women's hostels, education centres for special groups etc.
5. **Transport:** Provision of public transport system including bus service/LRT/water transport etc., percentage trips by public transport (modal split), cost of using and operating different modes, passenger capacity and distance travelled by public transport per year in relation to population, facilities provided for NMT, requirement of car and bus parking.
6. **Economic Aspects:** Distribution of households by income, consumption expenditure, employment, participation rate, employment in different sectors, development of new industrial areas, growth of informal sector, development of Sub-CBD and decongestion of CBD etc.
7. **Environment:** Air pollution, Water pollution, Noise, Quality of underground water, quality of water of sea, mangroves conservation, conservation of marine ecology etc.
8. **Natural Disasters:** Floods intensity areas & effected population, any other natural disasters etc.

9.4.5 Spatial Monitoring

A GIS database has been created as part of the ISUD Plan. The GIS is to be used as a monitoring tool for ISUD-Plan and other projects and investment in all sectors part of the database. It should be regularly updated with all on-going and future projects and investments.

Provision has been made to setup a GIS lab in lands planning and housing department of county government and hands-on training has also been given to the relevant staff on the operation of the GIS lab and handling and utilisation of GIS database.

The GIS database should be up-dated every 5 years at least, based on a new urban inventory and analysis process.

9.4.6 Financial Monitoring

It is proposed to establish an Annual Financing Plan Committee, following that a Coordinator should be appointed to monitor the implementation of the Annual Financing Plan. The Coordinator should work closely with the finance department especially with the accounting officer under the County Executive Member for Finance.

Responsibilities of the coordinator consist of project monitoring and oversight including management of resources, scheduling, risk management, quarterly status reports and their presentation to the public.

9.4.7 Public Participation

The main aim is to improve the effectiveness and validity of implementation processes and to increase the acceptability of plan proposals and decisions. This will fully involve the community in investment choices and management decisions.

For public participation in process of implementation and monitoring it is proposed to form a Citizens committee for implementation and monitoring of ISUDP. One or two representatives of citizen committee should be part of ISUDP implementation and monitoring committee at county level. This will help to identify not only that how many people have been effectively benefitted from a particular investment. The information provided by the people on the progress of project could also help in identifying and addressing the problems and constraints in implementation. It will not only give them certain pride of ownership but will also contribute to wise management and monitoring.

People's participation should also be encouraged at stages of the project (designing, implementing and maintaining any sanitation system) in order to safeguard sustainability, through collective efforts as well as transparent procedures.

9.4.8 Review

Timely review of the ISUD plan with the help of above groups and monitoring unit shall ensure mid-term correction and modifications if needed in the Plan Policies as well as the implementation procedures, which will help to re-adjust the events in the plan that could not be foreseen or anticipated during the Plan Formulation. If the plan is timely monitored and appropriately reviewed, the policies can be moulded in the right direction according to the present needs of the people of the city.

9.5 Implementation Directions

ISUDP Mombasa sets the direction for the development for the next 20 years. It also presents the broad level land uses, zoning and implementation method. After approval and adoption the subsequent phase will include the following key tasks:

- Prepare Strategic Environment Assessment Plan for ISUDP Mombasa
- Conduct detailed study for establishing sustainable finance in County
- Strengthen concerned departments in terms of capacity, resources, logistics, etc
- Establish Land Bank and develop measures to manage it.
- Prepare Detailed Plans for proposed new townships/ neighbourhoods.
- Implement priority projects after securing funds
- Ensure aesthetic design of all visual elements in the urban areas.
- Prescribe Urban Design Guidelines to guide and oversee physical developments.

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