

**Ministry of Lands and Physical Planning**

**Draft National Land Surveying and Mapping  
Policy**

Sessional Paper No ... of 2021 (or 2022)

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## **Foreword**

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**Executive Summary**  
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## List of Acronyms/Abbreviations

AFREF	African Reference Frame
AG	Attorney General
ASAL	Arid and Semi-Arid Lands
AU	Africa Union
AUBP	African Union Border Program
CA	Communication Authority of Kenya
CG	County Governments
COG	Council of Governors
CORS	Continuous Operating Reference System
CRA	Commission of Revenue Allocation
CUE	Commission of University Education
DeKUT	Dedan Kimathi University of Technology
DRSRS	Directorate of Resource Surveys and Remote Sensing
EAC	Eastern Africa Community
EEZ	Exclusive Economic Zones
EOLCS	Extended Outer Limits of the Continental Shelf
GNSS	Global Navigation Satellite System
IBEA	Imperial British East Africa
ICJ	International Court of Justice
IEBC	Independent Electoral and Boundaries Commission
IHO	International Hydrographic Organization
IMU	Inertial Measurement Unit
ITRF	International Terrestrial Reference Frame
JKUAT	Jomo Kenyatta University of Agriculture Technology
JNAM	Joint National Mapping Agency
KCAA	Kenya Civil Aviation Authority
KIBO	Kenya International Boundaries y Office
KISM	Kenya Institute of Surveying and Mapping
KNBS	Kenya National Bureau of Statistics
KNSDI	Kenya National Spatial Data Infrastructure
KSA	Kenya Space Agency
KWS	Kenya Wildlife Service
LSB	Land Surveyors Board
MDA	Ministries, Departments and Agencies
MOFA	Ministry of Foreign Affairs
MoLPP	Ministry of Lands and Physical Planning
NAS	National Addressing System
NDOS	National Director of Surveys
NLIMS	National Land Information System,
NMHA	National Mapping & Hydrographic Authority

OP	Office of the President
PSC	Public Service Commission
SAGA	Semi-Autonomous Government Agency
SAIHC	Southern African and Islands Hydrographic Commission
SDI	Spatial Data Infrastructure
SG	Surveyor General
SOLAS	Safety of Life at Sea
TUK	Technical University of Kenya
TVETA	Technical and Vocational Education Training Authority
UAS	Unmanned Aerial Systems
UON	University of Nairobi

# **1 Chapter 1: OVERVIEW OF LAND SURVEYING AND MAPPING IN KENYA**

## **1.1 Definition of Land Surveying and Mapping Function**

Land Surveying and Mapping is a key enabler of national, regional and local planning. It is key in providing critical information necessary for sustainable economic development thereby contributing to poverty alleviation and wealth creation. The provision of spatial intelligence by Land Surveying and mapping, accelerates the achievement of the objectives of Vision 2030 and beyond by supporting smart decision making at both national and local scales.

## **1.2 Role of Land Surveying and Mapping in National Development**

Land Surveying and Mapping plays a critical role in the integrated management and sustainable development of national resources. The land surveying and mapping discipline encompasses a wide definition that leads to understanding the definite role or function that it plays in resource management. It represents the following multiple facets of resource management which should be protected by both policy and law.

### **a) Economic, Physical and Land Use Planning**

Economic, Physical and Land Use Planning are both supported by spatial data that is provided through land surveying and mapping in areas such as: national census; population studies; economic surveys; and national, regional, county and urban spatial plans including the provision of topographical maps for the formulation of part development plans.

### **b) Inventorying of national resources**

Inventorying of national resources is three pronged:

- i. The quantitative definition of the Kenyan territory is defined by the delineation, demarcation and maintenance of international boundaries;
- ii. The qualitative definition of the territory based on geological mapping, resource prospecting and exploration as well as ecological mapping; and
- iii. The mapping of the built environment for their effective management through 'as built survey' and topographic mapping.

### **c) Land Administration and Management**

The surveying and mapping of land leads to granting of rights by the state to both private and public entities. This crucial process is the basis of the national cadaster and includes identification and reservation of vital conservation and fragile ecological areas such as riparian and marine resource reserves.

#### **d) Physical Development**

Physical development is achieved through the implementation of physical and land use development plans through: subdivision and amalgamation of land parcels; delineation of urban areas as per the City or Urban Area Integrated Development Plans; physical infrastructure development in transport, energy, communication, agriculture and other sectors; as well as monitoring the implementation of physical developments.

#### **e) Deformation Monitoring and Maintenance of Infrastructure**

Bridges, dykes, dams, railway structures, roads, tunnels and buildings are all important engineering structures to societies around the world. The analysis, design, construction and maintenance of these structures are even more important to ensure safety, minimize failure and to protect the investments. Land surveying plays a critical role in providing the required data necessary for determining the structural stability and for deformation monitoring of these structures. Deformation monitoring of infrastructure is needed as a result of crustal movements due to factors such as changes of ground water level, tidal phenomena and tectonic phenomena.

#### **f) Data sharing**

Data sharing is facilitated through the design and development of Spatial Data Infrastructure (SDI) such as the proposed Kenya National Spatial Data Infrastructure (KNSDI) for the provision and maintenance of fundamental and thematic geospatial datasets.

#### **g) Governance**

Spatial intelligence in decision making supports governance in areas such as the definition of administrative and electoral boundaries; as well as in service delivery and emergency response framework supported by a geocoded National Addressing System (NAS).

### **1.3 Disciplines and Areas of Application**

Table 1 shows the different discipline areas within Land Surveying and Mapping and their application areas.

Table 1: Land Surveying and Mapping Disciplines and Application Areas

No.	Discipline	Area of Application
1	Cadastral Surveying (Title surveys)	National Cadastre
2	Geodetic Surveying	Spatial Reference Systems Gravity determination
3	Engineering Surveying	Setting out of Infrastructure Profile Mapping Infrastructure Surveying Deformation Monitoring
4	Topographical Surveying and Mapping	National and International Boundaries Aerial Mapping Physical and Land Use Planning Resource Mapping Aeronautical charts
5	Hydrographic Surveying	Bathymetric surveys Tidal Stream Surveys Water Dynamics Surveys and Monitoring Production of Nautical Charts
6	Underground and Mining Surveying	Oil and Mineral Exploration Underground Infrastructure Surveys Mining Cadastre
7	Geospatial Information Management	National Addressing System National Spatial Data Infrastructure

## 1.4 Situation Analysis of Land Surveying and Mapping Function

### 1.4.1 Historical Background

The necessity of civilian surveying and mapping services in Kenya was realized in 1895 when the British Government assumed the responsibility previously laid down and borne by the Imperial British East Africa Company who had been granted the charter in 1887 to operate what was known as the East African Protectorate. The ordinance survey was to meet immediate mapping needs for the colonial administration and the survey was mainly for titling of the white highlands for the settlers.

To provide means whereby land could be leased from the crown, the East Africa Land Regulation was provided in the Council in 1897<sup>1</sup>. Later, in 1902, the Crown Land Ordinance provided for the surveying services to be under the sub-commissioner working under His Majesty Commissioner of East Africa Protectorate. With increase in the number of settlers in the colony, surveying

<sup>1</sup>Section 3 and 8(a) of the Regulation

services increased and a section was created in the Department of Public works. The Engineer in charge of the Uganda Railway became the Chief Surveyor and also the Land Officer.

In 1905, a Land Commission was appointed to inquire into the land question in the protectorate. It recommended the reorganization of the land and survey branch of the Public Works Department whose details were ascertained in the Crown Land Ordinance No. 475 of 27<sup>th</sup> October 1905.

The Land Survey Ordinance and Regulations were passed by the Legislative Council in 1923. The Land Surveyors Board was subsequently included in the Legislature and the Land Surveyors (Amendment) Ordinance came to be in 1930.

The discovery of Gold in Kakamega and improved trade led to surveying of townships under the Department of Local Government, Lands and Settlement. This changed to the Department of Lands, Mines and Surveys in 1946. In 1949, Survey was separated from the Department of Lands, Mines and Surveys and set up as an independent department with the designation 'Survey of Kenya'.

In 1951, Survey Ordinance No. 22 of 1951 was passed by the Legislature. Section 5(i) of the Survey Ordinance made provisions for the Land Surveyors Board which was responsible for final drafting of the new survey regulations together with the preparation of the scale of fees for private Licensed Surveyors.

The Survey of Kenya Field Headquarters was built between 1951 and 1952 with recruitment of staff being done from United Kingdom and South Africa. Apart from triangulation, cadastral and topographical surveys, an emergency mapping unit was formed to fast-track topographical mapping through Aerial photography. The state of Emergency brought Survey of Kenya to be under the military.

From the first instance when Kenya existed as part of the Imperial British East Africa (IBEAF) then as a protectorate and later a colony of the British, the management of the resources guided by a policy whether written or not premised on the priorities and needs of the those governing. Through that history there was a balancing where the governed were considered and included depending on the level of agitation. This was best epitomized by the struggle for freedom that was primarily driven by the population that needed to take control of the management of the resources and in particular land. Throughout this process land surveying played a major role.

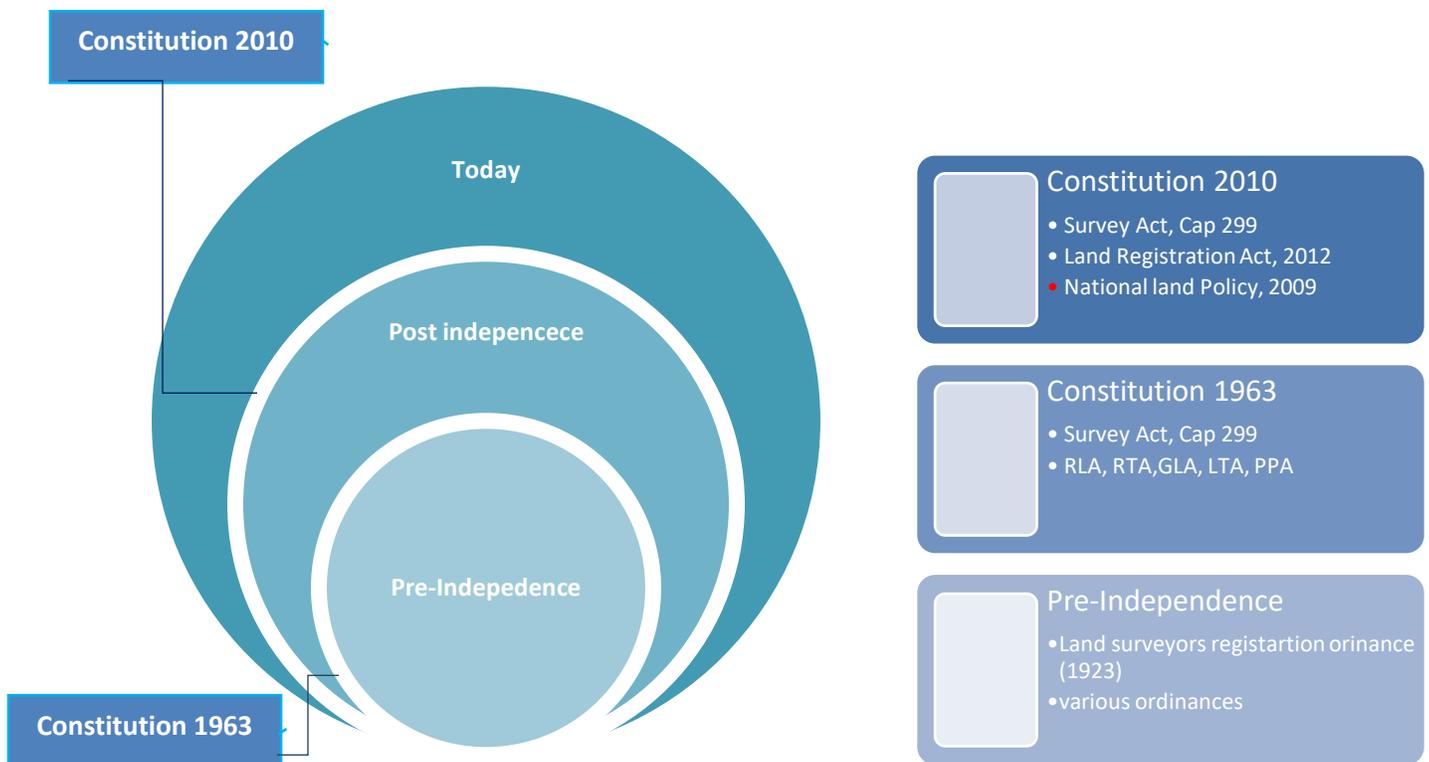
#### **1.4.2 The Policy and Legal Framework**

Currently there is no written policy to guide the practice of land surveying and mapping in various sectors of the economy. However key policies in land and infrastructure sectors have a direct

requirement of the land surveying and mapping function whereas others have an implied or salient need for the same. These include:

- a) National Land Policy, 2009;
- b) Physical Planning and Land Use Policy, 2017;
- c) Integrated Transport Policy, 2009; and
- d) Energy Policy.

The existing Legal Framework that supports or implements the land surveying and mapping function can be viewed as having evolved through three epochs where aspirations of Kenya were embodied in the 1<sup>st</sup> and the 2<sup>nd</sup> national constitutions and framed by the written salient policies.



**1.3.2.1 The Constitution of Kenya, 2010**

The Constitution of Kenya, 2010 is the Supreme Law of the land and other legislations draw authority from it. The Constitution therefore forms part of the legal framework supporting the review of the Survey Act.

**1.3.2.2 The Survey Act, Cap 299**

This is the main piece of legislation that governs the land surveying and mapping sector. The Survey Act, Cap 299 creates the main institutions for administering the function for the entire

government and regulate the profession. It creates the Survey of Kenya under the Director of Surveys and the Land Surveyors Board chaired by the Director of Surveys for the purpose of regulating the Licensed Surveyors.

### **1.3.2.3 Land Registration Act, 2012 and Land Act, 2012**

These Acts reference and require the surveying of land for purposes of a very vital part of establishing a robust and reliable national cadastre. These Acts were specifically provided for in the constitution to allow for consolidation of the many laws that defined different land tenures in order to bring coherence into the land administration. The Survey Act which supports this mandate is not exhaustive and a review would provide for the gaps that were created with the assent of the two Land Laws.

### **1.3.2.4 Other Legislation and Policies**

By the very nature of the surveying and mapping as core land management function most sectors of the economy have directly or indirectly drawn the service of the function. It is therefore to be found that the following laws have a demand for this function:

- i. The Physical and Land Use Planning Act, 2019;
- ii. The Urban Area and Cities Act, 2011;
- iii. The Community Land Act, 2016;
- iv. Sectional Properties Act, 2020;
- v. The Mining Act, 2016;
- vi. County Government Act, 2012; and
- vii. The Roads Act, 2007.

## **1.3.3 The Institutional Framework**

### **1.3.3.1 Survey of Kenya**

Survey of Kenya as an institution and the Survey Act as the core legal framework has served the government as the main source and focal point for most land surveying and related data and services. Survey of Kenya has decentralized services through delegation to regional (formerly provincial) and counties (formerly district level).

### **1.3.3.2 The Land Surveyors Board**

The Land Surveyors Board established under the Survey Act, Cap 299, makes provisions in relation to the registration, training and regulation of Land Surveyors and for connected purposes. The Board has the mandate to:

- a. regulate the practice of Licensed Surveyors;
- b. conduct the examination of candidates for admission as Licensed Surveyors;
- c. grant licenses to Land Surveyors;

- d. keep a register of all Licensed Surveyors;
- e. Take disciplinary proceedings against Licensed Surveyors;
- f. Hear and determine any dispute between any Licensed Surveyors and his client as to the fees charged by the Licensed Surveyors;;
- g. hear and determine any dispute between the Director of Surveys and a Licensed Surveyors as to the application of any regulations in which provision is made for reference to the Board; and
- h. advise the Director of Surveys on all matters relating to cadastral surveys in connection with the registration of land or of title to land under any written law for the time being in force.

### 1.4.3 Professional Training

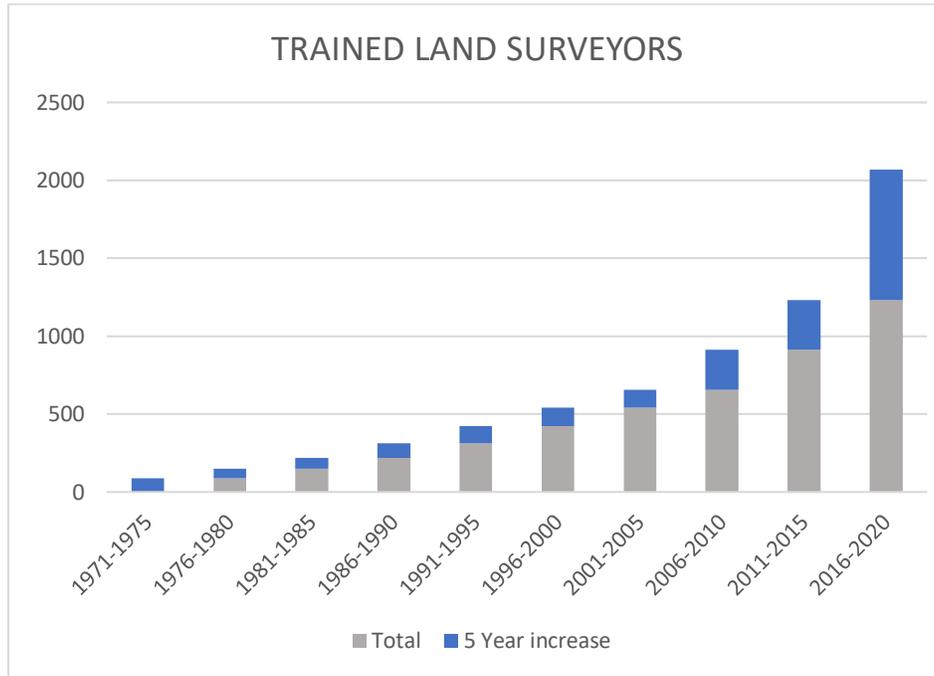
The University of Nairobi produced the first land surveying graduates in 1971. Since then up to the turn of the millennium, the university produced an annual average of 18 graduates. However, this gradually increased to 50 graduates in 2015. The number of universities offering degree courses in Land Surveying has also increased to 4 from 2016 and in the year 2020, the number of land surveying graduates was 165. Cumulatively, the country has produced 2,070 land surveying graduates by the year 2020. This translates to a 127% increase in the number graduates from the 4 local universities. Table 2 and Figure 1 show the number of land surveying graduates from the local universities from 1971 to 2020

**Table 2: Number of Land Surveying Graduates from 1971 - 2020**

Period	No. of Graduates	Running Total
1971 - 1975	88	88
1976 - 1980	60	148
1981 - 1985	69	217
1986 - 1990	96	313
1991 - 1995	110	423
1996 - 2000	117	540
2001 - 2005	115	655
2006-2010	257	912
2011-2015	318	1230
2016-2020	840	2070

*Source: Kenyan Universities (UON, JKUAT, TUK, DeKUT) 2021*

**Figure 1: Number of Graduate Land Surveyors from 1971 - 2020**



As at 2020, the ratio of land surveying graduates to the population was 1: 25,000. There is need to optimize the training of land surveying graduates for effective service delivery in the sector

#### **1.4.4 Professional Regulation**

In Kenya, the Land Surveying and Mapping profession is regulated by both the Land Surveyors Board established under the Survey Act, Cap 299 and the Institution of Surveyors of Kenya which is a professional association registered under the Societies Act. The Survey Act, Ca 299 and ISK’s constitution and bylaws define the mandate of professional regulation respectively. Within this framework, a healthy balance ensues, with the state discharging its duty to regulate the profession and protect public interest through the Land Surveyors Board. The Land Surveyors Board has stayed within its historical purview of licensing, discipline and maintaining professional ethics while ISK maintains the tradition of self-regulation and professional advocacy.

#### **1.4.5 The need for the Policy on Land Surveying and Mapping**

##### **1.4.5.1 Economic Growth**

With population growth and increased rate of development there has been great demand for individualization of tenure which has led to Survey of Kenya focusing mainly on cadastral surveying to meet this growing demand. Other functions such as geodetic control, topographical mapping, hydrographic surveying, international boundary surveys, photolithography and

National Gazetteer<sup>2</sup> have faced operational constraints due to inadequate budgetary allocation. Other sectors of the economy like Transport, Infrastructure, Energy, Agriculture and Environment Management, are developing rapidly and require spatial data derived from land surveying and mapping to support their operations. Due to the existing service gap, each sector has therefore been undertaking land surveying and mapping services to meet their needs in a largely uncoordinated approach.

Furthermore, in response to the existing service gaps, other government departments such as the Department of Resource Surveys and Remote Sensing (DRSRS), Kenya National Bureau of Statistics (KNBS), Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), Road Authorities<sup>3</sup> and the Independent Electoral Boundary Commission (IEBC) are playing a duplicating role in mapping. This has resulted in spatial data acquisition being done in silos with very little or no data sharing with an obvious cost to the exchequer.

#### **1.4.5.2 Technological Advancement**

The stipulated methods and approaches in the existing Survey Manual have been overtaken by significant advancement in technology. There is need to align the practice with currently available and deployed digital solutions for relevance and efficiency.

The private sector has adopted modern surveying technology much faster than Survey of Kenya and the rest of the public sector. With the increased deployment of new technologies in hitherto labor-intensive data acquisition segment of surveying has increased the capacity of the private survey sector to provide the surveying services required in the economy.

The constitution and the land laws also require that the National cadaster be migrated to a digital platform. The Ministry of Lands and Physical Planning has embarked on the development of the National Land Information Management System (NLIMS) with e-regulations being enacted to facilitate the migration. This will see the transformation of the cadastral surveying practice change drastically upon adapting to the new standards and methods.

With technological developments taking place, the field of mapping – that is collection, analysis, and representation of geospatial data – is continuously evolving; although the creation of geospatial data may seem to be an exclusively scientific and technological matter, the political and economic facets of geospatial data are often as predominant and complex as its scientific practice – which bring a number of challenges which requires a policy.

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<sup>2</sup> A Gazetteer of Geographical Names

<sup>3</sup> Kenya National Highway Authority, Kenya Urban Roads Authority, Kenya Rural Roads Authority and Kenya Roads Board

### **1.4.5.3 The Expanded Scope of the Surveying Practice**

The Survey Act touches on various surveying practice areas. Major emphasis has been laid on the on regulation of cadastral surveying. There is therefore need to regulate: Topographical Mapping, Engineering Surveying, Hydrographic Surveying and Geospatial Information Management. These areas have been mainstreamed in economic development and there is need to provide a policy direction on the practice of these branches of surveying in line with international best practices.

### **1.4.5.4 Incompatible Historical Legacy**

The Survey Act, Cap 299 was enacted in 1919 and revised severally up to the year 2020 to make provisions in relation to surveys and geographical names, the licensing of land surveyors and for connected purposes. Through the various amendments, the core mandate seldom deviated from the initial purpose of providing data for the cadaster.

Furthermore, the history of Survey of Kenya and the Survey Act demonstrates that any form of policy that gave direction to the function of surveying was largely driven by the need to serve interests and resolve prevailing challenges. This ad hoc approach denied the sector a comprehensive, futuristic and effective policy to provide other key services to other government agencies and development sectors. There is therefore need for a holistic approach in the development and implementation of a policy in the surveying and mapping sector.

### **1.4.5.5 New Constitutional Dispensation**

Under the constitution, 2010, Land surveying and mapping is a concurrent function to be undertaken complimentarily by both the National and County Governments. With devolution there is need to strengthen service delivery at the county level through deployment of qualified and Licensed professionals.

The Transition Authority, set up to oversee the unbundling of functions in the transitioning to the new constitutional dispensation, enumerated specific functions that fit within the purview of county planning and development<sup>4</sup>. It is noteworthy that the unbundling of the surveying function was not guided by any policy. The unbundling is still not fully implemented mainly due to the lack of a supporting policy and legal framework.

While it has been suggested that the fourth schedule of the Constitution of Kenya, 2010 has specified the functions that are devolved, it is noteworthy that the schedule only speaks to County Planning and Development with a sub-set of Surveying and Mapping. It is important to

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<sup>4</sup>*Transitional Authority: Unbundled Functions-Survey and mapping*

point out that Land Surveying and Mapping is an independent function that supports many other sectors and is not limited to County Planning and Development.

This Policy document sets out the National Government functions as:

- a) Policy Making;
- b) Quality control and assurance;
- c) Establishment of surveying and mapping standards;
- d) Regulation of surveying and mapping activities;
- e) Regulation of the surveying professionals;
- f) Provision of geodetic controls;
- g) International Boundary surveys;
- h) Provision and maintenance of up-to date Cadastre;
- i) Calibration of Survey Equipment;
- j) Survey, inspection and maintenance of county boundaries in collaboration with county governments;
- k) Providing advice on land development;
- l) Hydrographic surveys;
- m) Geospatial data management; and
- n) Establishment and maintenance of the Kenya National Spatial Data Infrastructure.

The Policy also sets out the County Governments functions as:

- a) Implementation of national land surveying and mapping policies and standards in the county;
- b) Establishment of 3<sup>rd</sup> - 4<sup>th</sup> order geodetic control network;
- c) Submission of reports on the status of the international and county boundaries to the national government;
- d) Provision and maintenance of up to date geospatial data including:
  - i. Identification, inspection and maintenance of boundaries of public land vested in or held by the County;
  - ii. Inspection and verification of land parcel boundaries for development control;
  - iii. Setting out and carrying out as built surveys of county government infrastructure;
  - iv. Deformation monitoring of county government infrastructure;
  - v. Certify surveys for the design and construction alignment of county government infrastructure and engineering works;
- e) Prepare and or certify base maps for physical and land use planning and infrastructure development within the county;
- f) Provide comments on development application in relation to land survey as provided in section 60(1) of the Physical and Land Use Planning Act, 2019 and any other written law;

- g) Conduct county specific hydrographic surveying activities and services in consultation with the Surveyor General and in compliance with national and international hydrographic laws and policies for the time being in force;
- h) Establishment and maintenance of parcel based County Geospatial Information System (GIS);
- i) Establishment and maintenance of a County Spatial Data Infrastructure and link to the Kenya National Spatial Data Infrastructure;
- j) Management of riparian reserves (rivers, lakes) in line with National Government policy;
- k) Ensuring survey equipment procured by the county are calibrated; and

## **1.5 The Problem**

Land Surveying and Mapping is critical to the economic, social, and cultural development of Kenya. Land was a key reason for the struggle for independence and land issues remain politically sensitive and culturally complex. Since the promulgation of the Constitution of Kenya, 2010 the Land Act and the Land Registration Act have consolidated the primary laws related to Land management and administration.

To date Kenya does not have a clear Land Surveying and Mapping Policy. The problems posed by the lack of a policy include:

- a) Uncoordinated approach by various government agencies in undertaking land surveying and mapping;
- b) Fragmented funding of various agencies to undertake aspects of Land Surveying and mapping leading to duplication of efforts and therefore wastage of resources;
- c) Acquisition of geospatial data in silos leading to lack of data sharing and data duplication hence increased costs to the government;
- d) Slow adoption and use of new technology in land surveying and mapping;
- e) Insufficient regulation land surveying and mapping;
- f) Uncoordinated curriculum development and implementation within institutions offering training and education in land surveying and mapping programs; and
- g) Lack of a supporting policy and legal framework to guide the unbundling of land surveying and mapping functions between the National and County Governments.

## **1.6 Justification for a Land Surveying and Mapping Policy**

Since pre- independence period, Kenya has lacked a comprehensive land surveying and mapping policy. Any form of policy giving direction to the practice of land surveying and mapping has largely been piece-meal, driven by the need to solve prevailing challenges. It is clear that throughout the history of land surveying and mapping in Kenya, the evolved piece-meal policies and legislation did not have an overarching policy direction with long term planning in mind.

The pre- and post-independence legal framework was a patchwork of legislations that were mainly reactive to the prevailing interests or challenges. Furthermore, significant formulation of the laws occurred in the pre-independence period and the primary beneficiaries of the policies and laws were the white settlers. During the time, a few policies were formulated to appease the native Kenyans who were agitating for land rights. An example is the policy that implemented the Registered Land Act, Cap 300 (Now Repealed) which provided for general boundaries in the individualization of land tenure in the Trust Land areas as a cost and time effective measure. The general boundaries have a tendency to perpetuate land disputes and have limited the development of a digital cadaster.

To this end it is imperative that a comprehensive policy is put in place to harmonize, consolidate and improve on existing policies and legislations on land surveying and mapping discipline in line with the Constitution of Kenya.

#### **1.6.1 Alignment to the Constitution of Kenya, 2010**

There is need to align the Land surveying and Mapping sector to the Constitution, 2010 and ensure coherence with other Land related policies and legislations. This will address the gaps that have been existing in the sector.

#### **1.6.2 Enabling geospatial data sharing**

Various inter-agency engagements that require geospatial data have been frustrated because the data is not easily shared due to bureaucracy or unawareness of existence of key geospatial datasets. As a result, there is a lot of duplication of land surveying and mapping services by various agencies where ordinarily the sharing of the available geospatial data would have saved significant amounts of public funds. In addition, this has brought the nation to a situation where the salient and ubiquitous need for land surveying and mapping services have not been optimized in many sectors due to the lack of a geospatial data sharing policy. To overcome these challenges, there is need to the implement a National Spatial Data Infrastructure to enable data sharing.

#### **1.6.3 Providing one stop Policy approach to Land Surveying and Mapping**

Over time there have been fragmented attempts to align the Land Surveying and Mapping sector. Most of these attempts have been largely piecemeal with other proposals not being implemented. There is need to consolidate all these efforts and bring an overarching policy to ensure that the Land Surveying and Mapping function is well coordinated.

In the recent past there has been pressure to have more efficient surveying service delivery by various development sectors. Several policy decisions have been made in a largely ad hoc approach and not all the policies have been implemented. Some cases in point include:

- a) The formulation of the draft Kenya National Spatial Data Infrastructure policy which has not been approved;

- b) An executive directive Cabinet Memo Ref. No OP.CAB.1/16A of 24<sup>th</sup> March, 2011, based on a Public Service Commission analysis recommending the transformation of Survey of Kenya into a semi-autonomous government agency (SAGA) was not implemented;
- c) Kenya Resource & Environment Mapping Unit (KREMU) now the Directorate of Resource Surveys and Remote Sensing (DRSRS), was converted into a fully-fledged resource mapping department thus fragmenting further the Land Surveying and Mapping services.
- d) The transfer of International boundary functions to the Kenya International Boundaries Office (KIBO) further fragmented the Land Surveying and Mapping Services.
- e) The formation of the Joint National and Resource Mapping (JNAM) as a multi-agency project launched to develop and facilitate the provision of secure and up to date geospatial data; and
- f) The establishment of the National Titling Centre to address the backlog in the provision of maps to support land registration.

This backdrop provides justification for the development of a Land Surveying and Mapping policy to bring coherence in the delivery of services so as to actualize the aspiration of Constitution of Kenya, 2010 as well as Vision 2030 (and beyond).

There is need to collect all the scattered functions of Land Surveying and Mapping that have been formed administratively and place them in one place by providing a policy direction and ensuring an appropriate legal and institutional framework in line with International best practices.

#### **1.6.4 Training & Capacity Building**

The University of Nairobi was the only university offering a bachelor's degree course in land surveying in Kenya with approximately 15-20 graduates per year (too few to meet the demand then) until the year 2000. Jomo Kenyatta University of Technology (JKUAT) introduced a bachelor's degree course in Geomatic Engineering in 2000 to meet the increasing demand for Surveying, mapping, GIS, Remote Sensing and Engineering surveying services, take advantage of the rapid advancement in space, computing and instrumentation and communication technologies, and to provide education and training opportunities at University degree level to correspond to the then rapid expansion of education/training opportunities at Certificate, Diploma and Higher Diploma level in Kenya. Over time, other institutions like the Technical University of Kenya (TUK), the Dedan Kimathi University of Technology (DeKUT) introduced bachelor's degree in land surveying related academic programmes with varying content and duration.

Following the introduction of geospatial engineering related courses by several institutions of higher learning and tertiary colleges in Kenya, there is a challenge of determining how well the curricular are aligned to the industry trends and needs, the comparative competence and

qualifications of the graduates from these institutions. In particular, the challenges facing training of land surveying is that of quality control and weak linkages between training institutions and the labour market.

Although the bachelors and higher degree levels are regulated by Commission for University Education (CUE), and the respective university Senates, staffing and accreditation of departments in tertiary institutions offering land surveying are loosely regulated and pose a challenge in quality. There is need to develop a database of all Universities and Technical and Vocational Education and Training (TVET) offering land surveying courses. In addition, there is need to require that all Lecturers and Trainers in land surveying be registered by a professional body.

The labour market which rely on both public and private sector training institutions for their human resource needs are faced with uncertainty and widening standards of products from these training institutions. This is due to the weak linkages between the industry and the training institutions that offer land surveying and mapping programmes. Traditionally, public institutions trained for the government but the focus has widened to include the more dynamic private sector. There is therefore need for closer collaboration to enable the training institutions to design and implement training programmes that address capacity development needs of the land service providers.

It is against this backdrop that it becomes necessary to develop a policy to guide the standardization of training and capacity building of land surveying professionals with robust continuous professional development.

#### **1.6.5 Survey Standards and Guidelines**

The current survey standards/manual were established many years ago (last revised in 1974). However land Surveying and mapping practice in terms of methods, procedures and technology has changed tremendously since then which renders the Survey Act and accompanying regulations inadequate to regulate modern surveying and mapping practice.

### **1.7 Approach Methodology**

The process of formulating this policy started with an analysis of the Survey Act, Cap 299, land sector laws, regulations, the National Land Policy, 2009 and other sectoral policies, relevant administrative procedures, government guidelines and circulars relating to land surveying and mapping. The taskforce carried out desktop review and analysis together with benchmarking with several countries.

Situational analysis and prepared reports that formed the basis for the initial draft of the policy which was then shared and discussed with stakeholders in various consultative forums. Further consultations with key government departments and agencies as well as key land sector stakeholders were held. Stakeholder validation workshop were held where several suggestions and comments were received, including request by several stakeholders for additional time for submission of more comments, both orally and in writing. The final Draft policy document has benefited from the foregoing consultative process which has been participatory and open as required by the Constitution of Kenya, 2010

## **2 Chapter 2: STRATEGIC DIRECTION FOR LAND SURVEYING AND MAPPING IN KENYA**

The current situation together with the historical background justify the need to deploy and coordinate the land surveying and mapping function in all the sectors of the economy in Kenya. Having had no specific policy on land surveying and mapping, it is strategic that a policy be formulated to enable an effective and measurable approach that would resolve the identified challenges and provide policy directions that will spur growth of the various sectors.

### **2.1 Vision of the Policy**

To ensure coherent provision of Land Surveying and Mapping services for efficient, effective, and sustainable land management.

### **2.2 Mission of the Policy**

To provide for comprehensive, current, accurate and accessible land surveying and mapping data and services for sustainable national development.

### **2.3 Overall Objective of the Policy**

To provide legal, institutional and technological framework for sustainable, efficient and effective land surveying and mapping service delivery both at the county and national levels.

### **2.4 Specific Objectives of the Policy**

The policy shall offer a framework of strategic directions to:

- a) Align the Land Surveying and Mapping Sector to the Constitution of Kenya;
- b) Strengthen the legal and institutional framework in Land Surveying and Mapping;
- c) Provide clear roles of the National and County Government on Land Surveying and Mapping;
- d) Ensure adequate training and capacity building;
- e) Establish the Kenya Institute of Surveying and Mapping as a centre of excellence;
- f) Regulate Land Surveying and Mapping profession;
- g) Develop standards, guidelines and regulations on Land surveying and mapping;
- h) Enhance the use of technology and research in Land Surveying and Mapping;
- i) Set up a repository for storing and sharing of spatial data and intelligence in the two levels of government;
- j) Enhance avenues for collaboration, partnership and synergies in public , private and other sectors in Land surveying and Mapping; and
- k) Develop a uniform reference framework for land surveying and mapping to facilitate national addressing system.

## **2.5 Policy Review**

The Land Surveying and Mapping Policy is a living document which provides guidelines and principles designed to facilitate seamless surveying and mapping services. The policy also provides framework for sectoral approach, legislative and institutional reforms. This Policy shall be reviewed every ten years to take into account current and future needs in view of social and economic dynamics.

## **2.6 Philosophy of the Land Surveying and Mapping Policy**

The policy sets out goals, standards, guidelines for present and future development, management, coordination and sharing of land survey and mapping data in Kenya. It consists of approaches which the government and other key agencies shall implement to achieve the desired goals.

This Policy and its implementation shall be informed by the following guiding principles:

- a) Recognition of land surveying and mapping as a concurrent function under the constitution;
- b) Decentralization of land surveying and mapping services;
- c) Integration of geospatial data;
- d) Sharing of geospatial data and intelligence;
- e) Clarity of roles and functions;
- f) Innovation and creativity;
- g) Standardization of the land surveying and mapping practice;
- h) Discipline and ethics of professionals;
- i) Inclusion and equity;
- j) Strengthening the administration of the land surveying and mapping;
- k) Transparency and accountability;
- l) Economic productivity; and
- m) Environmental sustainability and conservation of culture.

## 3 Chapter Three: Land Surveying and Mapping Policy Framework

### 3.1 Key Strategic Areas for Realignment

The situational analysis revealed key strategic areas that require realignment so as to ensure that the land surveying and mapping function is well deployed and utilized.

#### 3.1.1 Constitutional Alignment

Under the Constitution, 2010, Land surveying and mapping is a concurrent function to be undertaken complementarily by both the National and County Governments. With devolution there is need to strengthen service delivery at the county level through the deployment of qualified and licensed professionals.

The Transition Authority, set up to oversee the unbundling of functions in the transitioning to the new constitutional dispensation, enumerated specific functions that fit within the purview of county planning and development<sup>5</sup>. The unbundling of the land surveying and mapping function is still not fully implemented mainly due to the lack of a supporting policy and legal framework.

Article 186 (2) and (3) read with the Fourth Schedule of the Constitution of Kenya, 2010 stipulates that land surveying and mapping is a concurrent function to be undertaken by both levels of government. Article 6(2) requires the two levels of Government to work in the spirit of consultation and cooperation. Art. 1(4) states that the sovereign power of the people is to be exercised at the national level and county level. From the foregoing, this Policy therefore sets out the land surveying and mapping functions of National and county Government as follows:

National Government Functions:

- a) Policy making;
- b) Quality control and assurance;
- c) Establishment of land surveying and mapping standards;
- d) Training, capacity building and technical assistance for land surveying and mapping;
- e) Regulation of land surveying and mapping activities;
- f) Regulation of the land surveying professionals;
- g) Provision of geodetic controls;
- h) International Boundary surveys;
- i) Provision and maintenance of up-to date Cadastre;
- j) Calibration of Survey Equipment;
- k) Survey, inspection and maintenance of county boundaries in collaboration with county governments;

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<sup>5</sup>Gazette Notice 2238 dated 1<sup>st</sup> April 2016

- l) Providing advice on land development;
- m) Hydrographic surveying;
- n) Geospatial data management; and
- o) Establishment and maintenance of the Kenya National Spatial Data Infrastructure.

County Governments functions:

- a) Implementation of national land surveying and mapping policies and standards in the county;
- b) Establishment of 3<sup>rd</sup> and 4<sup>th</sup> order geodetic control network;
- c) Submission of reports on the status of the international and county boundaries to the national government;
- d) Provision and maintenance of up to date geospatial data including:
  - i. Identification, inspection and maintenance of boundaries of public land vested in or held by the County;
  - ii. Inspection and verification of land parcel boundaries for development control;
  - iii. Setting out and carrying out as built surveys of county government infrastructure;
  - iv. Deformation monitoring of county government infrastructure;
  - v. Certify surveys for the design and construction alignment of county government infrastructure and engineering works;
- e) Prepare and or certify base maps for physical and land use planning and infrastructure development within the county;
- f) Provide comments on development application in relation to land survey as provided in section 60(1) of the Physical and Land Use Planning Act, 2019 and any other written law;
- g) Conduct county specific hydrographic surveying activities and services in consultation with the Surveyor General and in compliance with national and international hydrographic laws and policies for the time being in force;
- h) Establishment and maintenance of parcel based County Geospatial Information System (GIS);
- i) Establishment and maintenance of a County Spatial Data Infrastructure and link to the Kenya National Spatial Data Infrastructure;
- j) Management of riparian reserves in line with National Government policy; and
- k) Ensuring survey equipment procured by the county are calibrated.

### 3.1.2 Geo-referencing of Surveys

**Requirement:**

The Constitution of Kenya, 2010, Chapter five on Land and Environment requires that all land parcels in Kenya must be georeferenced before registration. The Land Act 2012, the Land Registration Act, 2012 and the Community Land Act, 2016 have further defined geo-referencing to mean reference to an object by a specific location either on, above or below

the earth's surface. The Department of Survey is fully responsible to spearhead the process of geo-referencing. Georeferenced land parcels have unique coordinates that define the boundary of the land parcel. Geo-referencing of land parcels will result into a seamless national cadastral database.

**Current status:** Kenya currently supports two systems of defining boundaries i.e. fixed boundaries through survey and general boundaries through the demarcation<sup>6</sup> of boundaries. The issue of general boundaries has led to conflicts since the boundaries can easily be changed. In addition the authority in general boundaries is the Land Registrar who lacks the necessary training and background to resolve boundary disputes.

**Policy Direction:** The government shall:

- a) Review the Survey Act and any other Act of Parliament to provide that all land parcel boundaries must be georeferenced;
- b) Review the Survey Manual and other relevant regulations to provide for the use of modern technologies such as GNSS, Remote Sensing and Unmanned Aerial Survey (UAS) technology;
- c) Put deliberate measures to gradually map and fix the existing general boundaries currently captured in the national cadastre;
- d) Phase out general boundaries surveys as currently carried out under mutation surveys and ensure all surveys are fixed; and
- e) Develop geo-referencing guidelines and standards to guide the process of geo-referencing.

### **3.1.3 National, Administrative and Electoral Boundaries**

**Introduction:** Boundaries that require gazettment include and not limited to county, electoral, national reserves and forest boundaries. The Constitution of Kenya, 2010, established 47 Counties of Kenya as devolved Governments under one National government. The County boundaries assumed the boundaries of the Districts as delimited and described by the Districts and Provinces Act, revised 2012. The constitution gives the Independent Electoral Boundary Commission (IEBC) the responsibility of delimiting electoral boundaries in Kenya while other boundaries are delimited by the ministry responsible for the specific sector such as forestry and wildlife.

Most of these boundaries have only been delimited and are therefore not accurately delineated nor demarcated. Some parts of the boundaries follow natural resources such as rivers or manmade features such as roads. The general manner in which the boundaries have been delimited, creates overlaps and leads to conflicts. Several boundary conflicts between counties have been reported hence the need for delineation to be undertaken.

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<sup>6</sup> Determining and marking of boundaries

**Requirement:** Boundaries require accurate demarcation and delineation with boundary beacons described by geodetic coordinates showing all features forming part of the boundaries. Boundaries also require to be delineated according to the laid down standards and regulations. The responsibility of demarcation and delineation of gazetted boundaries lies with Survey of Kenya

**The current status:** Different government entities such as Kenya National Bureau of Statistics (KNBS), Independent Electoral Boundaries Commission (IEBC) and Kenya Forest Service (KFS) are producing boundary maps that are inaccurate, not compliant with standards and with overlapping boundaries, despite the mandate being vested with Survey of Kenya. These issues have increased cases of boundary conflicts therefore negatively affecting the social-economic development. There are also cases of encroachment of forests and wildlife reserves have also precipitated degradation of environment and human-wildlife conflicts respectively. The fact that there are no funds allocated to Survey of Kenya to carry out the demarcation and delineation of these boundaries has encouraged these entities to continue with these activities unaware of dangers posed.

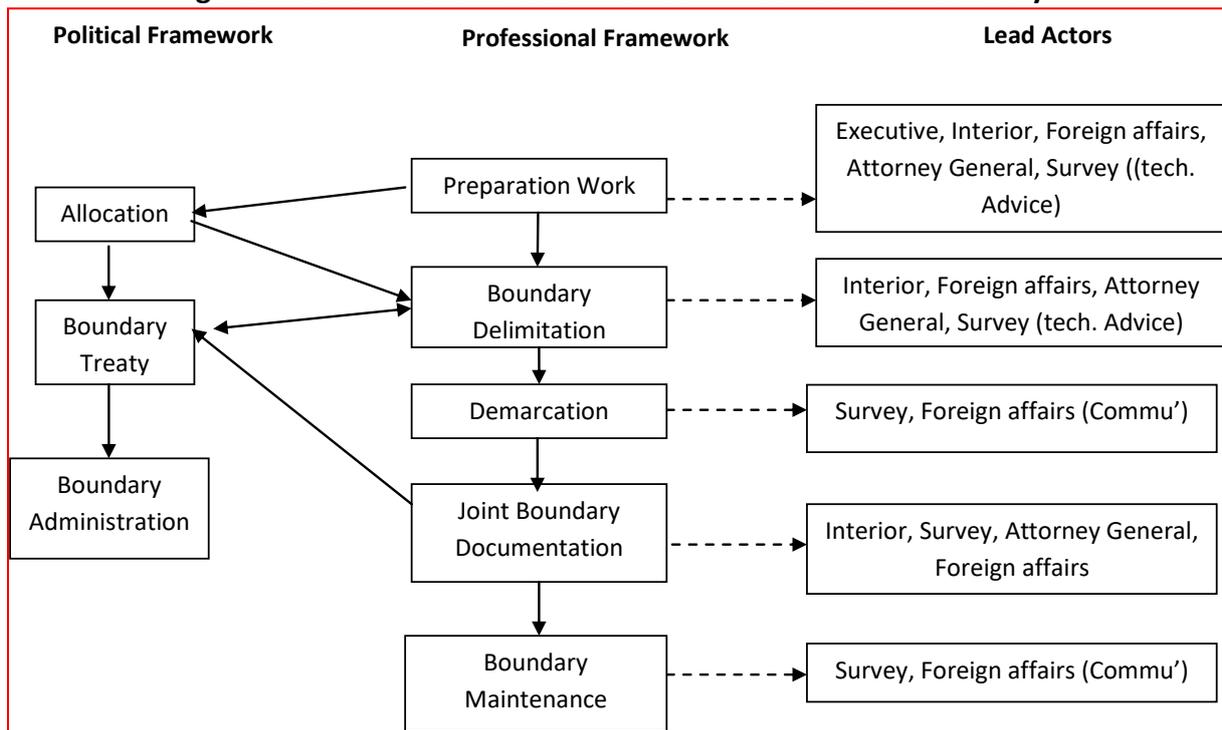
**Policy provision:** The government shall:

- a) Define the type of boundaries as estate, village, administrative units, electoral, forest, urban, game reserves, national parks, enumeration areas and educational zone;
- b) Provide adequate funding to the National Mapping and Hydrographic Authority for boundary delineation;
- c) Ensure boundaries that require to be gazetted are delineated before being gazetted;
- d) Ensure that boundaries are delineated by the National Mapping Authority and Hydrographic Authority;
- e) Ensure gazetted boundaries are delineated as per the survey standards and based on the official topographical basemaps; and
- f) Ensure gazetted boundary plans have copyright of the Government of Kenya and are deposited with Survey of Kenya as public records.

### **3.1.4 Survey of International Boundaries**

**Introduction:** African countries adopted colonial boundaries that were in place at independence. These boundaries require to be accurately defined to promote peaceful co-existence. The African Union Border Programme (AUBP) has noted the need for peaceful settlement of border disputes and the commitment to delimit and demarcate African boundaries as factors of peace, security, economic and social progress in order to foster regional integration and the harmonization of policies across the African continent. The African Union Border Programme (AUBP) set the year 2022 as the deadline for the delimitation and demarcation of all African boundaries. The process of international boundary making includes but not limited to bilateral negotiations, allocation, delimitation, agreements, demarcation, delineation, maintenance, administration and formulation of a boundary treaty that is then bilaterally executed through a Joint Committee from the two neighboring States. Various government entities are involved in the re-affirmation of the international boundary as illustrated in Figure 2.

**Figure 2: Government Entities Involved in International Boundary**



**Requirement:** Demarcation and delineation of international boundaries involves setting up of boundary beacons/pillars, numbering and computing geodetic coordinates, production of boundary maps, boundary description and regularly maintaining the boundary beacons/pillars. These activities are carried out by Joint Technical (Survey) Committee lead by Directors of Surveys from the two bordering states. The demarcated boundaries are defined by boundary pillars identifiable by name and geodetic coordinates for future boundary re-establishment.

**Current status:** The Kenya International Boundaries Office (KIBO) was created by Cabinet Decision Ref: OP/CAB.58/4A dated 11th September, 2014. The Office was tasked: to establish status of each international boundary; identify contentious and non-contentious section(s) of each boundary; prepare strategies for affirming; negotiating and/or defending the boundaries; lead bilateral discussions with neighbouring countries; and facilitate compliance with and alignment to international obligations relating to boundaries and territorial integrity. After the establishment of KIBO, all funds that were meant for international boundaries, including those for Survey of Kenya, were consolidated and put under its management. Hence, Survey of Kenya has to be facilitated by KIBO to meet her mandate on demarcation, delineation and maintenance of international boundaries. It is notable that there exists overlap, duplication, fragmentation of activities and resources together unclear reporting structures for the boundary activities required for the safe custody of resultant records.

Survey of Kenya, due to lack of funds has challenges in independently financing its mandate on international boundaries and is unable to extend geodetic control networks critical for accurately defining the boundaries. International practice on demarcation, delineation and

maintenance of the boundaries stipulates that this function should be done through a Joint Technical (Survey) Committees headed by Director of Surveys of both States.

**Policy Direction:** The government shall:

- a) Ensure that the component of survey and mapping of International boundaries becomes a function of the National Mapping and Hydrographic Authority for sustainability;
- b) Ensure synergy between the National Mapping and Hydrographic Authority and other government entities dealing with international boundaries and cross border issues;
- c) Guarantee accurate definition of International boundary using geodetic coordinates for Boundary Pillars from a uniform geodetic reference system;
- d) Ensure that the demarcation, delineation and maintenance of international boundaries is done in accordance to AUBP and the United Nations requirements; and
- e) Provide adequate funds to the National Mapping and Hydrographic Authority to enable execution of its functions.

### **3.1.5 Hydrographic Surveying Services**

Hydrography is the science of surveying and charting of maritime zones that include seas, lakes, and rivers. It is through hydrography that hydrographic surveying services are derived. Kenyan maritime zones require adequate hydrographic surveys and charting to enable sustainable maritime development and realization of the Blue Economy, an upcoming economic frontier geared towards achieving Kenya's Vision 2030 economic pillar, whose foundation must be built upon a rock-solid Hydrographic survey and nautical charting environment.

Approximately 80% of Kenya's trade by volume and 70% by value is conducted by sea and handled by ports. The Sea Lanes of communication that are depended upon for this trade are directly hampered by inadequate hydrographic survey and an inconsistent nautical charting environment.

Kenya is a signatory to United Nations conventions on the laws of the sea (UNCLOS), safety of life at sea (SOLAS) and international maritime organization and has been admitted as the 95<sup>th</sup> Member of the International Hydrographic Organization (IHO). Kenya is therefore obligated to meet her national and international mandate on hydrography as provided by these conventions.

Currently, the country meets her hydrographic obligations through administrative structures and bilateral arrangements that do not fully address comprehensive requirement of the country and has resulted in the unregulated collection, production, dissemination and use of hydrographic data. Consequently, international interests of resources within the Exclusive Economic Zones (EEZ) coupled by dependence on bilateral arrangement for hydrographic survey and nautical charting of our waters are a prerequisite for disaster in matters sovereignty and territorial integrity of the State and Nation of Kenya.

There is therefore need for deliberate strengthening of the Hydrographic Survey Office so as to adequately and independently undertake hydrographic surveys and nautical charting of

the Kenyan waters including the delineation of the Exclusive Economic Zone (EEZ), Extended Outer Limits of the Continental Shelf (EOLCS) and maritime international boundaries.

**Policy Direction:** The government shall:

- a) Strengthen the Hydrographic Office by establishing the National Mapping and Hydrographic Authority;
- b) Ensure implementation of SOLAS for safety in navigation, IHO and UNCLOS;
- c) Ensure participation, reporting and decision making at regional and international hydrographic bodies such as Southern African and Islands Hydrographic Commission (SAIHC) and International Hydrographic Organization (IHO);
- d) Develop capacity for hydrography and hydrographic services;
- e) Develop standards and specification for Hydrographic Surveying and Services aligning them with international requirements;
- f) Regulate hydrographic surveys, monitor maritime water dynamics and ensure uniformity and up to date nautical charts; and
- g) Setup a Kenya National Hydrographic Committee whose main function shall be to coordinate hydrographic activities and services in the county as well as to recommend policies, guidelines, and procedures in respect of hydrographic surveying services in the country.

### **3.1.6 Uniform Coordinate Reference System**

**Requirement:** There is need for a reliable National Geodetic Control Network to which all land surveying and mapping can be connected. This Network will allow for geo-referencing of existing surveys as well as introduce seamless connection between all surveys in Kenya. It will also make it easier to use modern surveying equipment. Since a uniform National Control Network benefits surveying and engineering projects nationwide, the possibility of Public Private Partnerships (PPP) should be explored. This may involve a unified coordinated approach by the Director of Surveys but involving key agencies<sup>7</sup> and Private Surveying Companies who are increasingly expressing interest in this matter.

**Current Status:** The National geodetic control network monumentation is in a state of disrepair. The information is also stored manually by Survey of Kenya and is not easily accessible to the industry players resulting in many surveys being based on local coordinates system and therefore not relatable to other surveys nationally. In addition the country is using a multiplicity of coordinate reference systems making it difficult to have a continuous representation of the land mass in one system.

The department of surveys embarked on the establishment of a Continuous Operating Reference System (CORS) in the year 2011. To date substantial work has been done by setting

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<sup>7</sup> Kenya National Highways Authority (KeNHA), Kenya Urban Roads Authority (KURA), Kenya Rural Roads Authority (KeRRA), Kenya Power, Rural Electrification and Renewable Energy Corporation (REREC)

up 18 Zero Order Control Points and 20 other complete CORS stations across the country though the system has not been officially launched for use by the public.

The CORS network still has room for intensification to allow for wider use to local scale especially for cadastral surveys. In addition mechanisms should be put in place to allow for the participation by the private sector in setting up CORS as is the case in other jurisdictions.

**The policy direction:** The government shall:

- a) Establish and adopt a Uniform Coordinate Reference System;
- b) Launch and operationalize the Continuous Operating Reference System (CORS);
- c) Establish a mechanism for continuous monitoring and modernizing of the geodetic reference system;
- d) Create a mechanism for Public Private Partnerships (PPP) to allow the participation of private sector in the intensification of the CORS network as driven by market demand;
- e) Cooperate and integrate with regional and international bodies for the establishment and maintenance of regional and international geodetic reference systems<sup>8</sup>; and
- f) Allocate budget for the expansion, maintenance, continuous monitoring and modernizing of the geodetic reference system.

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<sup>8</sup>AFREF and International Terrestrial Reference Frame (ITRF)

### **3.1.7 Riparian Reserves**

**Requirement:** A riparian reserve is a strip of land located on each side of a watercourse or adjacent to a stationary water body. Riparian reserves are critical to the economic, social and environmental wellbeing of any nation. The quality of the reserves is compromised by illegal encroachment, discharge of waste, developments and informal settlements, clearing the vegetation and diversion of rivers. In rural areas, some agricultural practices encroach into the riparian areas. Accordingly, effective management through the development of and adherence to sound legal, policy and institutional structures is required to realize the benefits of such reserves

**Current Status:** in the country, effective management of riparian reserves is hampered by among other challenges the multiplicity of statutes governing this area, different interpretations in the definition and measurement of riparian reserves. This has resulted to encroachment on reserves by physical developments and settlements. The government and other non-state actors have recently undertaken a vigorous initiative aimed at reclaiming riparian reserves and wetlands. More recently, there has been demolition of buildings constructed on riparian reserves resulting to economic losses. This has elicited mixed reactions from the public, civil society, and professionals due to the different interpretations of the extent and/or the width of the reserves.

#### **Gaps identified**

1. There are inconsistencies in the measurements of the spatial extents of riparian reserves for sea fronts, lakes, dams, rivers, and streams in Kenya;
2. There are inconsistencies in the points of reference used in the determination of riparian reserves in Kenya including centerline, riverbank, high water mark, specific contours and the centre of the spring;
3. There has been no comprehensive, systematic, or coordinated determination of the use and management of riparian reserves in Kenya;
4. There has been limited assessment of ecological conditions and the health of riparian reserves in Kenya;
5. There exists different sectoral laws regulations, standards, guidelines, programs and projects with a bearing on riparian land that has caused disharmony in the application of the law;
6. There is inadequate policy to address the measurement, use and management of riparian reserves in Kenya

**Policy direction:** The government shall:

1. Review the Survey Act, Cap 299 to make clear provisions on definition, measurement and points of reference of the Riparian Reserve;
2. Provide clear guidelines and standards on riparian reserves ;
3. Align sectoral laws and policies to harmonize the definition, measurement and points of reference of the Riparian Reserve;
4. Provide an integrated approach to protect, maintain and use of riparian reserves;

5. Provide a road map for surveying and mapping, profiling and delineation of riparian reserves along all water bodies in Kenya;
6. Prepare, publish and issue comprehensive boundary plans defining the identified riparian reserves.

### **3.1.8 Surveying and Mapping Standards**

**Requirement:** The Sessional Paper number 3 of 2009, The National Land Policy, 2009 recognized that land survey processes have been hampered by slow, cumbersome and outdated modes of operation, and failure to regulate non-cadastral surveys leading to the development of incompatible maps. The National Land Policy, 2009 proposed that the Survey Act (Cap 299) be amended to allow for the following requirements:

- a) mainstream the use of modern technology such as Global Navigation Satellite System (GNSS), Geospatial Information System (GIS) amongst others.
- b) streamline survey authentication procedures;
- c) regulate non-cadastral surveys;
- d) establish geodetic controls of adequate density preferably based on GNSS; and
- e) improve surveying standards in the general boundary areas through geo-referencing.

**Current Status:** The current survey standards/manual was formulated many years ago (last edited in 1974). The land surveying practice has however changed tremendously in terms of methods, procedures and technology rendering the Survey Manual inadequate to regulate the survey practice.

**Policy Direction:** The government shall:

- a) Review the land surveying and mapping standards in line with international standards and the current legislation while covering all disciplines of Land Surveying and Mapping; and
- b) Ensure that the land surveying and mapping Standard Operating Procedures (Survey Manual) are developed and reviewed every 5 years.

### **3.1.9 Regulation of Land Surveying and Mapping Practice**

**Requirement:** Land surveying and mapping is a professional-level practice that is generally governed by professional practice laws and regulations. This is key in maintaining standards and regulations ensuring due care to the public in all sectors that require land surveying and mapping services.

**Current situation:** The Survey Act, Cap 299 has put more emphasis on the regulation of cadastral survey. Consequently, the regulation of the Licensed Surveyors is limited to cadastral survey practice to the exclusion of other disciplines of land surveying. The vacuum creates room for persons to undertake other disciplines of land surveying that includes

Engineering Survey, Hydrographic survey, topographic survey and mapping, mining survey, geodetic survey, underground survey or Geo-Information Management in an unregulated manner. This has led to a gap where unqualified persons are providing services undetected and undeterred thereby compromising public safety. In addition, this has led to low numbers of Graduate Land Surveyors applying to be licensed.

**Policy Direction:** The government shall:

- a) Review the Survey Act to ensure that all disciplines of land surveying and mapping practice are regulated;
- b) Review the Survey Act to ensure both the land survey professional and practice are adequately regulated.
- c) Review the Survey Act to regulate the land survey profession and practice.

### **3.1.10 Education and Training of Surveyors**

**Requirement:** Land surveying is a profession with a specialized body of knowledge and skills and requires self-regulation like any other profession. For graduates to be recognized as professional surveyors, they are required to undergo specialized education and training. There is therefore need for standardized training of surveying professionals with a robust continuous professional development.

**Current Status:** Over the past years, there has been a proliferation of training of land surveying degree programmes by universities. Different universities have established different programs with varying course names, content and duration. These variations are not only confusing to potential students but also the labour market and the general public. At the technician level, the curriculum that is being used to train land survey technicians is outdated and thus not responsive to the labour market. Moreover, the technical graduates are being trained by professionals recognized by the professional and regulatory bodies. There is equally a proliferation of certificate level land surveying course, which are neither sufficient nor responsive to the demands of the current and future market nor recognized by the professional and regulation bodies.

**The policy Direction:** The government shall:

- a) Ensure standardization of course names, content and duration for Universities offering degree programs in Land Surveying;
- b) Ensure that the persons lecturing in the Universities are registered professionals and that the universities have adequate facilities to undertake Land surveying and mapping programs including but not limited to software, hardware and requisite laboratories;
- c) Ensure that the university programs are regularly reviewed and aligned to the current labour market;
- d) Standardize and regulate the entry level requirement to guarantee the competency of the qualifying professional at tertiary level trainings;

- e) Phase out certificate level training programs in Land Surveying as they lack in content and are unresponsive to the job market with the prevailing technological and development level; and
- f) Provide a robust mechanism for continuous professional development; and
- g) Strengthen Kenya Institute of Surveying and Mapping (KISM) as a center of excellence.

### **3.1.11 Geographical Names (National Gazetteer)**

#### **Requirement**

The standing committee on geographical names is required to regularly collect geographical names and update the National Gazetteer so as to advise the Cabinet Secretary on the spelling and standardization of all names on the maps of Kenya. This supports the updating of the topographical maps. The National Geographical Names Committee is responsible for the approval of geographical names in the National Gazetteer. Any person or organization intending to give a name to a geospatial feature, is required to apply to the committee for approval.

#### **Current Status**

Due to inadequate funding of the Survey Department, the committee has not been regularly fulfilling its mandate of collecting and approving the names as required, hence adversely affecting the timely publication of new and updated maps.

#### **Policy Direction**

The Government shall:

- a) Strengthen the Standing Committee on Geographical Names to include relevant stakeholders and have clearly defined roles;
- b) Enhance the capacity and funding of the standing committee on geographical names to enable it fulfil its mandate in a timely manner;
- c) Develop guidelines on the spelling and standardization of geographical names;
- d) Maintain and update a digital National Gazetteer and notify the public through the Kenya Gazette;

### **3.1.12 Topographical Mapping**

**Requirement:** Topographical mapping is a critical undertaking that provides crucial information that is required to support decision making as well as physical and infrastructure development. Updated Topographical maps provide a basis for physical and land use planning as well as infrastructure development. The preparation and updating of topographical maps by the Survey of Kenya lends a major support to the country's economic development. The government should ensure sufficient funding to enable it plan, acquire and provide up-to date mapping of the country.

**Current Status:** Kenya has not had regular topographical mapping programs, where mapping has been done it has been due to donor support or project driven. There is inadequacy in the provision of base maps for economic and land use planning. Topographical mapping in Kenya

is currently at a relatively small scale: 2/3 of the country is covered at a scale of 1:50,000 while the Arid and Semi-Arid Land (ASAL) areas are at a scale of 1:100,000. These maps are old and outdated and a new base map for the country is urgently required.

**Policy Direction:**

The government shall:

- a) Establish a National Mapping and Hydrographic Authority which shall have the responsibility of ensuring regular mapping and updating of existing maps;
- b) Ensure that Topographical maps are updated after every five years so as to capture and reflect current infrastructure and support economic planning and development;
- c) Maintain and update a digital topographic map for Kenya;
- d) Ensure that all agencies that generate geospatial data make it available to the National Mapping and Hydrographic Authority for the purpose of quality control as well as updating of the topographic maps;
- e) Ensure adequate funding and capacity building for the National Mapping and Hydrographic Authority;
- f) Undertake topographical mapping at a minimum scale of 1:50,000 for the ASAL, 1:25,000 for the rest of the country and 1:5,000 for the urban areas;

**3.1.13 Land Adjudication and Consolidation**

**Requirement:** Land Adjudication in Kenya started in 1956 to accelerate registration of land in trust land areas and was meant to be a program which was to be completed in 10 years<sup>9</sup>. Land Adjudication has however continued to the extent that it has now become a department thus having a permanency. Some of the reasons why Land Adjudication has acquired permanency are due to: the use of preliminary index diagrams where boundaries are not georeferenced; boundary conflicts leading to court cases that are yet to be resolved; limited budget making it difficult to address and complete the land adjudication issues; the continued employment of non-professionals to undertake survey work; and the requirement for Survey of Kenya to supervise the Land Adjudication Department has been difficult on the basis of how one department can supervise the work of another Department. Land Adjudication has been completed in most of the high potential areas and the areas remaining are within the ASAL areas. Land Adjudication in ASAL areas is more complex and requires geo-referencing.

**Current Status:** The Department of Land Adjudication and Settlement is required to prepare demarcation maps to support land registration in most of rural Kenya. Since the demarcation maps are not georeferenced, they have been the cause of many boundary disputes in the country for many years because they are inaccurate and therefore cannot be used to accurately re-establish boundaries.

Following the enactment of the Community Land Act in 2016, all unregistered community land will now henceforth be surveyed and registered under this Act which stipulates that the

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<sup>9</sup> Check the Lawrence Commission report

maps prepared to support land registration shall be georeferenced. Due to the advancement in surveying technology, it is now possible to take advantage of innovative surveying methods to produce more accurate maps and fast enough to support the land adjudication and consolidation process.

To fast track the preparation of maps to support the registration of land in the land adjudication areas, the National Titling Centre was setup administratively as a one stop shop. The National Titling centre brings together the Land Adjudication, Survey and Land Registration departments in one building for purposes of fast tracking the issuance of the titles.

### **Policy Direction**

The government shall:

- a) Ensure collaboration and cooperation between the Land Adjudication and the Survey departments in carrying out their functions;
- b) Allocate adequate funds to complete the pending land adjudication processes and fast track the objection and appeal cases related to Land Adjudication;
- c) Harmonize the Land Adjudication Act, the Land Consolidation Act and Land Registration Act with the Survey Act to ensure that the surveying component of the Land adjudication process is undertaken in accordance with the Survey Act to ensure that the boundaries are georeferenced.

#### **3.1.14 National Atlas of Kenya**

**Requirement:** The National Atlas of Kenya captures all facets of the country in form of maps. These include but not limited to the Geography, History and Climate; Water Resources, Environment and Forests; Land and Soils; Agriculture; Energy; Land Information; Population; Tourism and Wildlife; Education; and Health. The National Atlas is a book of maps which captures information about our national resources and requires to be prepared after every 10 years following the National Census.

**Current Status:** The preparation and publication of the National Atlas has faced many challenges due to inadequate resources. Consequently some of the information contained in the current edition of the Atlas is not up to date.

### **Policy Direction**

The government shall:

- a) Prepare a National Atlas every 10 years;
- b) Ensure that adequate resources are available for the National Mapping and Hydrographic Authority to support the preparation and publication of the National Atlas of Kenya in a regular and timely manner; and
- c) Maintain and update a digital National Atlas of Kenya.

### 3.1.15 As built Surveys

**Requirement:** The purpose of As-Built Survey is to show the physical development “as it is built” at completion and depicts the geospatial extent or layout of the physical development. The As-Built survey is necessary after construction is completed so as to check on the work of the contractor, verify contract compliance and for record purposes to update maps. In order to manage the built environment effectively, up to date maps are required across sectors. As-built surveys should incorporate surveys that locate and verify underground features such as piping that are usually covered during construction. Updated maps support coherent planning and development as well as inventorying of physical infrastructure.

**Current status:** As a matter of practice the development control cycle terminates in the enforcement of approved development. However, the record of the new development is not undertaken or maintained and where they are done they are not submitted to the National Mapping Authority. This results in poorly informed development approvals, causing unplanned destruction of infrastructure and expensive project delays. In addition if the as built surveys are done by a contractor, there is a potential conflict of interest by the contractors in relaying the actual information to the relevant authority. There is also a likelihood of the contractor focusing more on the structural component rather than the geospatial extent and submitting the final design instead of the as built survey.

**Policy direction:** The government shall:

- a) Require that all physical development in a built environment should have an “as built survey” to be deposited with the National Mapping Authority & Hydrographic to be used in updating the topographical map as well as providing a layer for street addressing so as to avail the real-time data across sectors and in particular for emergency response services;
- b) Put in place standards and guidelines for undertaking as built surveys;
- c) Put in place measures to award certificate of compliance once the “as built survey” has been undertaken and confirmed;
- d) Ensure that the Certificate of Compliance is issued on the basis of the “as built survey” among other conditions; and
- e) Ensure that as-built surveys are undertaken by an independent Land Surveyor.

### 3.1.16 Sectional Property Surveys

**Requirement:** Sectional Property Surveys is an expansion of the national cadastre from 2 to 3 Dimension. The adoption of the Sectional Registration regime for the built environment therefore facilitates the registration of land rights within the 3D environment.

Increasingly there is need by developers to develop their pieces of land in phases. If the land is under one title it presents a problem under Sectional Properties since the head title cannot be surrendered until the entire land has been developed. This therefore puts the application

of Sectional Properties in doubt since developers then do not favour it as a form of registration. There is therefore need to ensure that the land can be subdivided in phases to allow for separate head titles to be surrendered and thus allow for the application of Sectional Properties Act. In areas of mixed-use development, there is need for a mechanism of maintaining minimum economically viable parcel sizes concurrently with the ability to grant individual land rights to multiple land owners especially in high density/high value areas.

**Current status:** The Sectional Property Act enacted in 1987 (now repealed) did not gain traction because of several factors one being that the regime required a laborious conversion process of titles to the Registered Land Act (RLA) prior to registration of sectional property thereon. This major deterrent has now been resolved by the implementation of the Land Registration Act, 2012 which now requires that all land registration be based on the Land Registration Act, 2012. The possibility to register sectional property under the Registration of Documents Act has also been halted by the Sectional Property Act, 2020 which demands that all sectional properties hence forth be only registrable under the Sectional Properties Act, 2020.

While the Sectional Property Act, 2020 has addressed most of the shortcomings of the Sectional Properties Act, 1987, it is still focused on the separation of titles based on floor areas in a built up environment.

**Policy direction:**

The government shall:

- a) Review the Sectional Property Act, 2020 to make provision for:
  - i. phased development and mixed development;
  - ii. volume of space occupied in addition to the floor area in the computation of unit factors for different uses in mixed use development; and
  - iii. extension and renewal of lease by unit owners.

**3.1.17 Underground Utility Surveys**

**Requirement:** Underground utility surveys refers to detecting, positioning, and identifying buried utilities, including pipes and cables beneath the ground so as to create a comprehensive map of these utilities. Underground utility surveys are required in order to ascertain whether the choice of the new route or construction for the installation will affect any existing underground installations for water, sewer, electricity or any other communication facilities.

While the determination of position can be obtained with conventional or modern survey equipment, the detection and identification of underground utilities require special tools and techniques. Principally, underground utility mapping is the combination between two major fields of knowledge: geophysics and geomatics.

**Current Status:** Different utility companies carry out their underground surveys without consistent specifications resulting in digging up existing underground utilities. According to the Communication Authority of Kenya (CA), installation and maintenance of installation external communications infrastructure, preliminary survey is required.

Usually utility mapping are carried out by utility companies for planning and installation of new assets. However this has been happening without proper specification and accuracy between various utilities. This has led to haphazard laying of utility infrastructure. As built information on underground utilities is not usually properly stored and updated. Besides there is no requirement for any individual and organization to provide an accurately surveyed or endorsed as built plan for the underground utilities. There is need to harmonize underground survey and mapping in order to prevent catastrophic damages and disruption of existing utility services especially during excavation due to inaccurate or insufficient information on the underground utilities. Undisputedly, underground utilities increase with the increase in population to serve them better. However, a lack of information on the location of buried assets causes practical problems that increase costs and delay projects. More importantly, it increases the risk of injury for utility owners, contractors, and road users. The Survey Act has not prescribed the compilation and management of information on all underground utilities.

**Policy direction:**

The government shall:

- a) Review the Survey Act to provide for underground survey and mapping;
- b) Develop standards and specifications for underground survey and mapping;
- c) Ensure underground surveys are carried out as per the Survey Act; and
- d) Ensure cooperation and sharing of underground utility data within the framework of the Kenya National Spatial Data Infrastructure (KNSDI).

**3.1.18 Mining Surveys**

Mining surveying is the unquestionable source of information for managing safety, health, and risks in all mining methods and situations. A mine surveyor's contribution to mining includes, among others, preparation of the surface and underground plans. It is essential to maintain accurate plans for the use of current and future land users so that the positions of any potentially hazardous workings or infrastructure are permanently recorded. The information must be adequate to ensure that adjacent mine workings do not accidentally connect, with risk of flooding, contamination, or other safety hazards. Regulations may require minimum boundary pillars around mining properties.

Individual mines similarly require adequate information to prevent inadvertent undercutting of installations and the unplanned intersection of workings. It is essential to know all points underground relative to every place on the surface, particularly for the management of emergencies and rescues.

The European Union has detailed guidelines on mining policy and regulations. The guidelines note that addressing the challenges of secure and sustainable mines requires a policy framework that boosts innovation and entrepreneurship across the mining value chain. The guidelines state that mining surveying is crucial in the exploration and extraction of ores as it plays a significant role in safety and health, particularly in underground mines. The European Union observes that drone-based magnetic surveys<sup>10</sup> are critical innovations in exploration.

**Requirement:** The Licensed Surveyor should survey and prepare accurate and up-to-date plans and sections of the surface and any other underground workings to facilitate the correlation between surface and underground surveys. This may assist in the determination of underground mining boundary dispute, as well as ensuring the correlations between underground and surface infrastructure and property cadastre. To ensure that the mining cadastre is georeferenced all mining surveys should be carried out according to the Survey Act, Cap 299.

**Current Status:** Most of Kenya's mineral resources remain unexplored and/or underexploited largely because of the lack of geospatial and geological data and limited mineral exploration. Mining operations need to be undertaken sustainably to prevent harmful effects on the environment. Although the Environment Management and Coordination Act (1999) provides for initial environmental assessment and environmental audits, the challenge is to harmonize and align the regulatory policies and practices in the country's mining sector with existing environmental legislation. The Mining Policy mandates the Directorate of Resource Surveys and Remote Sensing to collect, store, analyze, update and disseminate geospatial information on natural resources, including land use and land cover mapping. Currently there is no specific legislation on mining surveys, which is key in mining operations. Because of lack of legislation in mining surveying, persons who currently carry out mining surveying are not registered and the survey plans are not submitted to the Surveyor General for record purposes.

#### **Policy Directions**

The government shall:

- a) Review the Survey Act to: incorporate mining Surveys; formulate standards and specification for mining surveys; and ensure that mining survey records are submitted to the Surveyor General as public records as envisaged in the revised institutional framework;
- b) Mainstream the mining cadastre into the National Land Information Management System (NLIMS).

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<sup>10</sup> This is a new system that can perform magnetic surveys with about 10 different sensors integrated in the drone. it makes it more environmentally friendly with no contact with the ground, as its automated

### **3.1.19 National Addressing System (NAS)**

**Requirement:** Addresses are required to facilitate the delivery of services such as water, sewerage, telecommunications, and electricity, refuse collection, billing, postal and courier, emergency response, goods delivery, serving summonses, household surveys, visiting among others. The KNSDI should include National Address Data as a fundamental dataset.

Survey of Kenya is required to generate core datasets to support national addressing system, which include parcel boundaries, topographic maps, administrative boundaries and geographic names. As a custodian of the core datasets, oversight responsibility for the implementation of national addressing system should lie within Survey of Kenya.

**Current Status:** Kenya has not had any National Addressing System in place despite past attempts by government ministries, departments and agencies. The government has realized the importance of a National Addressing System and currently the development of a policy is underway.

#### **Policy Direction:**

The Government shall:

- a) Review the Survey Act to include a National Addressing System (NAS);
- b) Ensure that topographical maps are up-to-date to support the National Addressing System;
- c) Develop standards and guidelines for data sharing amongst institutions involved in National Addressing System; and
- d) Develop the Kenya National Spatial Data Infrastructure (KNSDI) to support National Addressing System.

### **3.1.20 Unmanned Aerial Systems (UAS)**

**Requirement:** High resolution topographical and cadastral maps are required due to rapid infrastructural development in the country. This calls for a technology that allows faster and cost-effective real-time data acquisition. Conventionally, aerial photography has been the primary means for creating topographical maps - but this is only cost-effective for large mapping projects. Unmanned Aerial Systems (UAS) has emerged as a technology that can be used for a number of applications including land surveying and mapping. UAS has a perfect fit in that it can be used for mapping projects that are too small to be undertaken using conventional aerial photography but too large to be undertaken using ground based surveying methodologies. In addition, the UAS can be used to conduct as-built surveys, and inspect structures and job sites. High accuracies in the range of 5 cm (vertical) and 10 cm (horizontal) are achievable through the use of UAS because of the onboard Global Navigation Satellite System (GNSS) and high accurate Inertial Motion Unit (IMU). To use UAS for land surveying and mapping requires standards similar to conventional aerial photography.

**Current Status:** The Kenya Civil Aviation (Unmanned Aircraft Systems) Regulations, 2020 were gazetted on 30th March 2020 paving the way for the use of Unmanned Aircraft Systems (UAS).

These regulations were general to the use of UAS but not specific to Land Surveying and Mapping. While UAS have the ability to cost-effectively survey an area very quickly, the lack of standards and regulations means that the end product is not controlled and this can be dangerous in the long run or cause conflicts.

**Policy Direction:** The Government shall:

- a) develop regulations and standards for the use of UAS in land surveying and mapping;
- b) mainstream the innovative use of drone based spatial products and services; and
- c) review the Survey Act to include the use of UAS in land surveying and mapping.

### **3.1.21 Mobile Mapping**

Mobile mapping refers to an emerging technology for the collection of geo-information from a mobile platform, usually a vehicle. The platform is usually fitted with an array of sensors including Inertial Measurement Unit (IMU), Global Navigation Satellite Systems (GNSS), LiDAR, laser or any other sensor utilizing a part of the electromagnetic spectrum. Typical applications of mobile mapping include: Emergency response planning; Road mapping and highway facility management; and in-door mapping. By its very nature, mobile Mapping has a potential for privacy intrusion and as such it should be regulated. Kenya does not have policies on mobile mapping, yet the sector has great potential to play in national and economic development.

**Policy Direction:** The Government shall:

- a) Review the Survey Act to include the use of mobile mapping;
- b) Develop regulations and standards for the use of mobile mapping in Land Surveying and Mapping; and
- c) Promote the use of Mobile Mapping technology in Land Surveying and Mapping.

### **3.1.22 Remote Sensing**

Remote sensing is the process of acquiring information about an object or phenomenon without making direct physical contact with it. Remote sensing has wide applications, and can be used for the identification, inventory, mapping and land cover classification. It can also be used to enforce policy and compliance to regulations e.g. monitoring of encroachment on road reserves or public land etc.

Despite their widespread availability, Kenya has not yet fully utilized applications of remote sensing particularly for Land Surveying and Mapping. High resolution satellite imagery can be used to update topographical maps, land use maps and also to support Land Adjudication.

Different government entities typically invest in satellite imagery leading to data duplication and lack of sharing of the same which results into wastage of crucial resources. In addition, there is limited knowledge in the area of remote sensing and earth observation.

**Policy direction:** The Government shall:

- a) Develop guidelines and standards for the use of satellite imagery and aerial photography for production and updating of topographical maps;
- b) Mainstream the use of satellite imagery for use in Land Adjudication;
- c) Streamline the procurement and use of satellite imagery so as to reduce wastage of resources; and
- d) Expand capacity building in the area of Remote Sensing and Earth Observation.

### **3.1.23 Kenya National Spatial Data Infrastructure (KNSDI)**

**Requirement:** A National Spatial Data Infrastructure (NSDI) has a critical role to play in national and economic development. NSDI can be used to provide accurate and timely information for decision making, remove duplication in data collection and promote data sharing. For effective implementation of NSDI it should be anchored in policy and in law.

**Current Status:** Kenya has not yet implemented its NSDI, the Kenya National Spatial Data Infrastructure (KNSDI). Initial efforts started way back in 2001 and led to: the construction of the KNSDI centre; development of a KNSDI portal; as well as a draft KNSDI policy. Currently there is no policy, legal or institutional framework supporting the development of KNSDI. There is also need to develop standards and have in place a legal and institutional framework to facilitate data custodianship, data sharing and data pricing so as to facilitate KNSDI.

**Policy direction:** The government shall:

- a) Review the Survey Act to implement the KNSDI; and
- b) Setup a KNSDI committee as an inter-agency committee responsible for the development, coordination and implementation of the KNSDI.

### **3.1.24 Engineering Surveys**

**Requirement:** Engineering surveys is an imperative requirement in the planning and execution of nearly every form of construction works. This include all survey activities required to support sound conception, planning, design, construction, maintenance and operation of engineering projects, rights-of-way and easement acquisitions relative to the centerline of the project among others. Meaningful physical development requires direct or indirect application of Engineering surveys. This type of survey forms an essential element in the development of the human environment. It is therefore important that it is properly regulated to ensure informed design and safety standards since an unregulated environment can cause operational inefficiencies for industry.

**Current status:** Currently there is no uniform regulatory regime covering engineering survey in Kenya. Most engineering survey services are not regulated by the current Survey Act, Cap 299 and regulations. The engineering survey services are at the mercy of the data users, mainly design engineers and physical development contractors. One of the shortcomings of this is the inability to prevent unqualified or incompetent practitioners from offering or delivering engineering survey services. Besides, most public institutions responsible for

infrastructural developments have no dedicated organization structures/framework to handle the engineering survey components.

**Policy Direction:** The government shall:

- a) Review the Survey Act to provide for the regulation of engineering surveys;
- b) Ensure that there is a dedicated Survey office in all public institutions in-charge of infrastructural development and management. These offices should be under the supervision of a Land Surveyor; and
- c) Develop standards and guidelines for Engineering Survey services.

### **3.1.25 Survey Control Points**

Survey control points are necessary to facilitate land surveying and mapping. Control points can be used as starting points in surveying and as anchor points in coordinate and height transformations. Over time most of the Survey Control Points have been vandalized or destroyed during construction of infrastructure making it difficult for Land Surveyors to conduct their work and link the surveys that they undertake to a Uniform Coordinate Reference framework. It is therefore necessary for the government to institute measures to ensure that these Survey Control Points are protected.

**Policy direction:** The government shall

- a) Reserve an area of 6.0 metres radius for the fundamental survey control points together with a right of way;
- b) As much as possible locate the fundamental survey control points within public land;
- c) Ensure that no Environmental Impact Assessment report is approved for areas containing the fundamental survey control points unless such control points have been protected;
- d) Ensure that no rock blasting is carried within 100 metres of any fundamental Survey Control point unless reasonable measures have been undertaken to protect the control point; and
- e) Maintain and publish an up to date database of the fundamental survey control points.

### **3.1.26 Practice of Land Surveying and Mapping by Foreigners**

Land Surveying and mapping is a professional practice that requires to be regulated. Over time there has been an increase in the number of foreigners practicing Land Surveying and Mapping in Kenya. An increasing number of foreigners are currently practicing land surveying and mapping in the country without relevant practicing certificates or licenses due to the legal gap that regulates the survey practice. This fact continues to deny Kenyans who have received necessary training from securing jobs.

**Policy direction:** The government shall:

- a) Review the Survey Act to provide a robust mechanism for regulating foreigners practicing land surveying and mapping in Kenya; and
- b) Ensure that where foreigners are allowed to work there is skills transfer to the locals.

## 4 Chapter 4: Implementation Framework

### 4.1 Current Institutional Framework

The land surveying and mapping function is under the department of Surveys in the Ministry of Lands and Physical Planning. The department is established by the Survey Act (Cap 299) as Survey of Kenya, the official Government agency and authority for land surveying and mapping. The department is headed by a Director of Surveys and is organized into nine divisions namely:

1. Cadastral division;
2. Geospatial data management division;
3. Photogrammetry division;
4. Cartography division;
5. Land Adjudication division;
6. Hydrographic division;
7. Photolithography division;
8. Policy and research division; and
9. Geodetic division.

The functions of the department include:

- a) Establishing and maintaining a national geodetic control network that covers the whole country to facilitate other surveys and research;
- b) Producing and maintaining plans of property boundaries in support of land registration and to ensure guarantee and security of land tenure;
- c) Producing and continuously updating national topographical base-maps for the whole country at various scales for development planning and for production of other maps;
- d) Inspecting and maintaining national and international boundaries;
- e) Preparing and publishing the National Atlas of Kenya, as a documentation of National Heritage and promotion of Nation's identity; and
- f) Carrying out hydrographic surveys for safe navigation, exploration and exploitation of natural resources.

The existing institutional framework for Land Surveying and Mapping has led to over concentration on Cadastral Survey to the detriment of other types of survey such as Topographic Mapping, Establishment and Maintenance of a Geodetic Control Network and Hydrographic Surveying Services. As a result, the existing structure has not been effective and efficient in the provision of services.

The Survey Act (Cap 299) lays major emphasis on cadastral surveying and has minimal provisions that touch on other aspects of land surveying and mapping. As a result of this weak legal framework, regulation of the survey practice has been weak where some surveyors are able to practice without being registered. There has also been proliferation of quacks masquerading as Licensed Surveyors which greatly hamper the quality of survey services. In addition, the Survey Act (Cap 299) had combined the regulation of the survey practice and the registration and licensing of professionals, the Act did not provide sufficient provisions to address emerging trends and challenges within the survey sector.

Overtime there has been fragmentation of the surveying and mapping function being carried out by different administrative institutions without a clear legal framework which has led to overlap of mandates and functions. This has led to fragmented resources and duplication of functions. A testament to this is the creation of agencies performing some of these surveying and mapping functions such as the Joint National Mapping (JNAM) Initiative and the Kenya International Boundaries Office (KIBO). This policy and the review of the legal framework will therefore solve the issues of overlaps and fragmentation as espoused above.

The review of the Survey sector policy is to address the gaps that exist under the Act, and align the sector to the Constitution of Kenya, 2010. The devolved system of Government, the fourth Schedule, Art. 6(2) requiring the two levels of Government to work in the spirit of consultation and cooperation, Art. 1(4) and Art. 186 which provides for functions and powers of the national and county government and the Gazette Notice No. 2238 provide clear directions in alignment of the survey sector. This policy therefore provides for clear roles and functions to be performed by the National and County Governments in surveying and mapping.

Overtime, there has been an increase in the number of land surveying related academic programmes on degrees and diplomas offered by training institutions. There is need to ensure that appropriate resources and content are provided by the training institutions to produce high caliber graduates who will fit the needs of the industry. There is need for collaboration in the development and review of land surveying and mapping training programmes amongst the training institutions, the Commission for University Education (CUE), the Technical and Vocational Education Training Authority (TVETA) and Land Surveyors Board (LSB).

There is need for a center of excellence in surveying and mapping to nurture research, technology and continuous professional development of land surveyors. To address these needs this policy spells out the functions of the Land Surveyors Board and the Kenya Institute of Surveying and Mapping (KISM) to fill in the gaps. These institutions will therefore address the aspects of capacity building for the land surveying and mapping profession.

There has been scanty reference to Survey and Mapping in the existing policies (National Land Policy, 2009 and National Land Use Policy, 2017). This policy seeks to address the gap by providing for a holistic approach that provides for all survey categories, land survey and mapping services, regulation of the professionals, standards and institutional arrangements, and training as well as capacity building in the sector.

The worldwide trend has been to rationalize National Mapping Agencies (NMAs) and change them from producers of maps to becoming geospatial information agencies. Most Governments have made their NMAs like the Survey of Kenya, Executive Agencies or Semi-Autonomous Government Agencies (SAGA). Other Governments have consolidated the institutions dealing with land administration into one Executive Agency resulting in the amalgamation of the Departments of Surveys and Department of Lands and creating a Semi-Autonomous Government Agency (SAGA).

## **4.2 Structural Reform Principles**

The reform process in land surveying and mapping will be guided by the following key principles:

- a) Aligning the land surveying and mapping sector with the Constitution;
- b) Strengthening of the institutional framework to carry out the expanded land surveying and mapping mandate and functions in Kenya;
- c) Strengthening of the institutional framework for robust regulation of land surveying professionals;
- d) Creating clarity of mandate, roles and functions between the county and national governments;
- e) Developing clear policy, standards and guidelines to guide land surveying and mapping related matters;
- f) Enhancing training and capacity building for survey and mapping professionals;
- g) Enhancing avenues for cooperation, partnership, collaboration and synergies in public and private sectors in land surveying and mapping;
- h) Promoting, catalyzing and supporting sharing of geospatial data in the country;
- i) Promoting the use of modern technology in surveying and mapping;
- j) Promoting new approaches to research in the survey sector;
- k) Creating a conducive environment for increased investment and funding in the sector;
- l) Domesticating international treaties and agreement on land surveying and mapping matters that Kenya has signed and ratified i.e. UNCLOS and IHO;
- m) Adapting international best practices in the land surveying and mapping sector in Kenya; and
- n) Enhancing funding to the institutions to support the Land Surveying and Mapping function.

## **4.3 Existing Legal Framework for Surveying and Mapping**

The current legal framework is limited in scope and is inadequate to address existing challenges and emerging trends in the surveying and mapping sector. In order to address these challenges the following measures will be undertaken:

- a) Harmonize all existing policies and legislation cross referenced with the Land Surveying and Mapping Act;
- b) Review the Survey Act in accordance with this policy;
- c) Enact a separate law for the registration and regulation of land surveyors; and
- d) Align County legislation on County Surveying and Mapping function to the Land Surveying and Mapping Act.

## **4.4 Institutional Framework for Surveying and Mapping**

For the policy to be implemented, a robust institutional framework will be established to carry out the identified mandate, roles and functions that will deliver the envisaged surveying and mapping services for national development. The Institutional framework is supported by a legal framework that will:

- a) Create linkages between the various institutions performing Surveying and Mapping functions;
- b) Regulate all disciplines of Surveying and Mapping;

- c) Provide a clear mechanism for coordinating surveying and mapping activities;
- d) Provide a mechanism for advising the executive and other key agencies on all matters related to surveying and mapping;
- e) Accommodate the participation of the private sector in delivering mandates.
- f) Enhance avenues for cooperation, partnership, collaboration and synergies in public and private sectors in land surveying and mapping;

In order to give effect to the structural principles above, the government will establish new institutions and strengthen the existing ones as follows:

- 1) The office of the Surveyor General;
- 2) The National Mapping and Hydrographic Authority;
- 3) The Land Surveyors Board.
- 4) The office of the National Director of Surveys;
- 5) The Kenya Institute of Surveying and Mapping;
- 6) The office of County Director of Surveys established by the County Public Service;
- 7) Committees under the Surveyor General as follows:
  - a. The Kenya National Spatial Data Infrastructure Committee;
  - b. The Kenya National Hydrographic Committee; and
  - c. The Geographical Names Committee.

#### **4.4.1 The office of the Surveyor-General**

The Land Surveying and Mapping Act shall establish the office of the Surveyor-General with the following functions:

- a) Advice on national land surveying and mapping policies, guidelines, standards and strategies;
- b) prescribe standards for establishment of geospatial extent of areas of interest under any written land registration law;
- c) prescribe standards for the structure, storage, and provision of national geospatial data and cadastral survey datasets;
- d) prescribe standards and guidelines on riparian reserves;
- e) advise the national and county governments on all matters relating to land surveying and mapping;
- f) prescribe equipment to be used for land surveying and mapping;
- g) approve centres for calibration for land surveying and mapping equipment that requires calibration;
- h) establish and maintain a Kenya National Spatial Data Infrastructure clearing house;
- i) develop and enforce metadata standards;
- j) create and maintain the nodal links for Kenya National Spatial Data Infrastructure with partner agencies;
- k) disseminate Kenya National Spatial Data Infrastructure data;
- l) undertake research for the purposes of the functions under this section; and
- m) ensure compliance with the standards set for land surveying and mapping.

#### **4.4.2 The office of the National Director of Surveys**

The office of the National Director of Surveys will be established within the Ministry responsible for Lands and shall head the Cadastral Survey Department with the following functions:

- a) be responsible for the surveying of land as per the Land Registration Act, 2012 and any other written laws;
- b) establish the geospatial extent of areas of interest under any written land registration law;
- c) set standards for the structure, storage and provision of cadastral survey data;
- d) advise the Land Surveyors Board of non-compliance by Land Surveyors with the standards referred to in paragraph (c);
- e) determine whether cadastral survey datasets and cadastral surveys comply with standards set under paragraph (c);
- f) establish facilities for the receipt of cadastral survey datasets;
- g) determine conditions for the use of the facilities referred to in paragraph (f);
- h) store and provide access to cadastral survey data;
- i) monitor compliance with conditions set under paragraph (c);
- j) ensure timely updating and maintenance of the cadastre;
- k) undertake research for the purposes of the functions of the office of National Director of Surveys; and
- l) Co-ordinate cadastral surveying projects that cut across counties.

#### **4.4.3 The office of the County Director of Surveys**

Every County Government shall establish an office of the County Director of Surveys which shall be an office within the County Public Service Board and which shall have the following functions:

- a) implementation of national land surveying and mapping policies and standards in the county;
- b) establishment of 3<sup>rd</sup> - 4<sup>th</sup> order geodetic control network;
- c) submission of reports on the status of the international and county boundaries to the Surveyor General;
- d) Provision and maintenance of up to date geospatial data including:
  - i. Identification, inspection and maintenance of boundaries of public land vested in or held by the County;
  - ii. Inspection and verification of land parcel boundaries for development control;
  - iii. Setting out and carrying out as built surveys of county government infrastructure;
  - iv. Deformation monitoring of county government infrastructure;
  - v. Verification of surveys for the design and construction alignment of county government infrastructure and engineering works;
- e) Prepare and or certify base maps for physical and land use planning and infrastructure development within the county;
- f) Provide comments on development application in relation to land survey as provided in section 60(1) of the Physical and Land Use Planning Act, 2019 and any other written law;

- g) Conduct county specific hydrographic surveying activities and services in consultation with the Surveyor General and in compliance with national and international hydrographic laws and policies for the time being in force;
- h) Establishment and maintenance of parcel based County Geospatial Information System (GIS);
- i) Establishment and maintenance of a County Spatial Data Infrastructure and link to the Kenya National Spatial Data Infrastructure;
- j) Management of riparian reserves (rivers, lakes) in line with National Government policy; and
- k) Ensuring survey equipment procured by the county are calibrated.

#### **4.4.4 The National Mapping and Hydrographic Authority**

The National Mapping and Hydrographic Authority shall be established as a body corporate with perpetual succession, with the following functions:

- (a) establish, publish and maintain the national geodetic control network;
- (b) define, determine, prescribe and maintain a uniform national coordinate reference frame;
- (c) maintain and update a digital National Gazetteer of Geographical Name;
- (d) survey, re-establish, inspect and maintain international boundaries with neighbouring countries;
- (e) carry out mapping for land use and suitability analysis;
- (f) develop and maintain Kenya National Spatial Data Infrastructure fundamental datasets;
- (g) be the authority responsible for the preparation and publication of the official maps of Kenya including and not limited to administrative, topographical and thematic maps;
- (h) coordinate all hydrographic surveying activities and services in the country in compliance with national and international maritime laws for the time being in force;
- (i) prescribe hydrographic surveying standards and ensure adherence to the standards;
- (j) ensure comprehensive geographic coverage of hydrographic services, in cooperation with other Maritime agencies and Maritime Nations;
- (k) Maintain uniformity of nautical publications and nautical charts, taking into account the resolutions and recommendations of the International Hydrographic Organization (IHO);
- (l) Coordinate acquisitions, archiving, retrieval and dissemination of hydrographic data in order to ensure that hydrographic data, nautical publications and nautical charts are made available on a world-wide scale as timely, reliably and with minimal ambiguity in the country;
- (m) Undertake the collection of hydrographic data and the compilation of hydrographic or nautical charts;
- (n) Prepare, update, issue and or sell the nautical publications and nautical charts necessary for the safety of navigation within the maritime zone and the internal waters of the Republic of Kenya;
- (o) Provide services in the manner most suitable for the purpose of aiding navigation—

- i. by consulting with all the relevant maritime safety users in order to ensure that hydrographic surveying is carried out in accordance with the requirements of internationally accepted specifications and standards; and
  - ii. to issue sailing directions, lists of lights, notices to mariners and tide tables where applicable, satisfying the needs of safe navigation.
- (p) take the necessary steps to ensure that the navigational warnings relating to safe navigation within Kenya's maritime zone is communicated promptly to persons navigating in Kenya's maritime zone;
  - (q) supervise and validate public funded geospatial datasets;
  - (r) represent the government in international and regional organisations and facilitate co-operation at international and regional level;
  - (s) undertake research for the purposes of the functions under the Authority; and
  - (t) advise the government on all matters relating to mapping and hydrographic surveying.

#### **4.4.5 The Land Surveyors Board**

The Land Surveyors Board shall be established as a body corporate with perpetual succession. The board shall be responsible for the registration and regulation of land surveyors with the following functions:

- a) register land surveyors;
- b) conduct the examination of candidates for admission as Land Surveyors in accordance with the provisions of the surveying and mapping law;
- c) keep and maintain a Register of Land Surveyors and accredited firms in electronic format;
- d) to publish the names of Land Surveyors and accredited firms in a manner the Board may so determine;
- e) to take disciplinary proceedings against Land Surveyors for any form of misconduct in accordance with the provisions of the surveying and mapping law;
- f) advise the Surveyor General on all matters relating to the practice of land surveying and mapping;
- g) license Land Surveyors;
- h) collaboration with relevant authorities, accredit land surveying programmes in private and public universities and other tertiary institutions offering courses in land surveying and mapping;
- i) keep and maintain a register of accredited training institutions;
- j) To assess, approve or reject qualifications obtained from foreign institutions offering land surveying courses;
- k) oversee continuing professional training and development for Land Surveyors;
- l) oversee internship of Graduate Land Surveyors and Land Survey Technicians;
- m) determine the scale of fees to be charged for professional land surveying and mapping services rendered;
- n) To collaborate with Land Surveying training institutions, professional associations, Land Surveying and Mapping organizations and other relevant bodies in matters relating to training and professional development of Land Surveyors;
- o) determine and define disciplines of Land Surveying recognized under the surveying and mapping law; and

- p) develop and enforce a code of conduct for Land Surveyors.

#### **4.4.6 Kenya Institute of Surveying and Mapping (KISM)**

Kenya Institute of Surveying and Mapping shall be established as a body corporate with perpetual succession. The Institute shall be a centre of excellence in surveying and mapping and shall be managed and controlled by a Council. The Institute shall include following functions-

- (a) undertake training and capacity building for the Land Surveying and Mapping sector;
- (b) undertake research in Land Surveying and Mapping;
- (c) develop an incubation centre for knowledge sharing and promoting technology in Land Surveying and Mapping;
- (d) enter into association with other institutions of learning, within or outside Kenya, as the Institute may consider necessary or appropriate and in furtherance of the objects for which the Institute is established; and
- (e) provide leadership, best practices, research, support and/or training in Land Surveying and Mapping.

#### **4.4.7 The Geographical Names Committee**

The Geographical Names Committee shall be a standing committee set up at the Surveyor General's office. The Committee shall have the following functions;

- a. approving geographical names;
- b. developing guidelines on geographical names;
- c. advising the Cabinet Secretary as to the standardization and spelling of all geographical names on maps of Kenya, and in so doing the Geographical Committee shall have due regard to historical, orthographical and ethnic considerations.
- d. maintaining and updating a digital National Gazetteer; and
- e. publishing in the Kenya Gazette not later than the 31st day of March of every calendar year, in such manner as the Cabinet Secretary may direct, the National Gazetteer.

#### **4.4.8 The Kenya National Spatial Data Infrastructure Committee**

The Kenya National Spatial Data Infrastructure Committee shall be a standing committee of set up at the Surveyor General's office. The secretariat of the Committee shall be drawn from the Surveyor General. The Committee shall have the following functions-

- a. responsible for the development, coordination and implementation of the Kenya National Spatial Data Infrastructure;
- b. provide policy guidance and direction for the development and maintenance of the KNSDI, in collaboration with the bodies proposed in the policy;
- c. Formulate guidelines on metadata from data providers;
- d. Enforce compliance on submission of metadata subject to any subsisting copyright from data providers;
- e. Coordinate the uploading of data and creation of metadata by partner agencies;
- f. Establish Working Groups necessary for the development and maintenance of KNSDI;
- g. Coordinate the training and capacity building on KNSDI; and
- h. Resolve conflicts from users arising from using of data supplied through KNSDI.

#### **4.4.9 The Kenya National Hydrographic Committee**

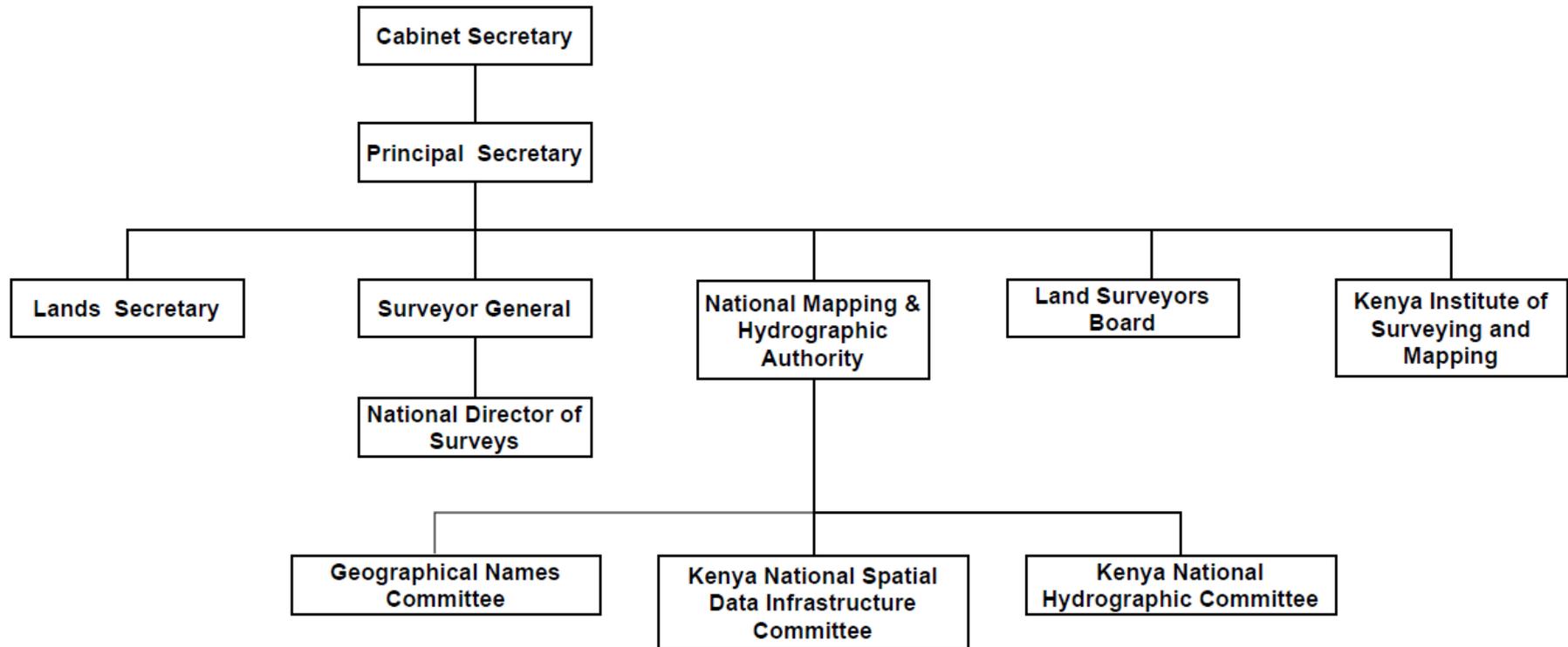
The Kenya National Hydrographic Committee shall be a standing committee set up at the Surveyor General's office. The secretariat of the Committee shall be drawn from the Surveyor General. The Committee shall have the following functions-

- a. coordinate hydrographic activities and services in the country;
- b. create awareness on the importance of hydrography and nautical charting;
- c. recommend policies, guidelines, and procedures in respect of hydrographic services in the country
- d. Identify and prioritize national requirements for hydrographic surveying services;
- e. Promote training in hydrographic surveying;
- f. Advise the government on matters related to hydrographic surveying; and
- g. Promote international cooperation in hydrographic surveying.

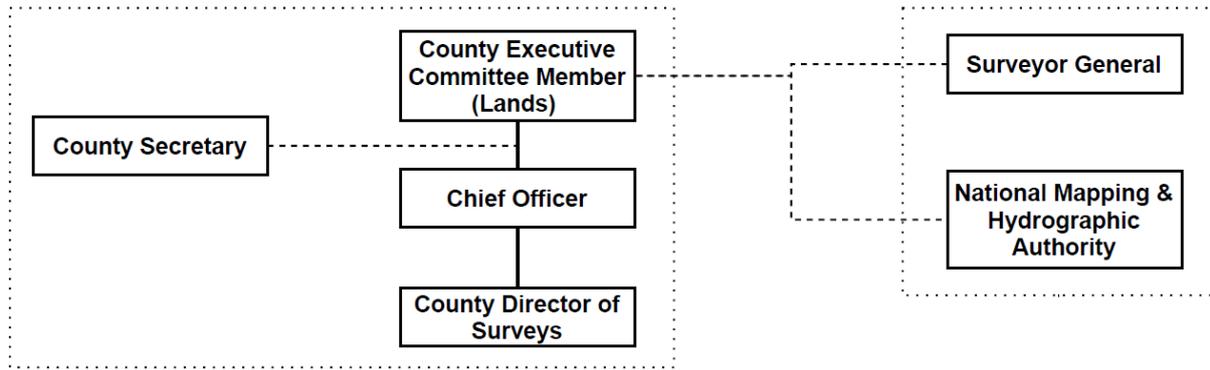
#### 4.5 Proposed Organization Structure

The offices described in the previous section have the reporting arrangements presented in Figures 3 for the National Offices and 4 for the County Offices. Figure 5 shows the indirect reporting relationship amongst the offices created in the structure.

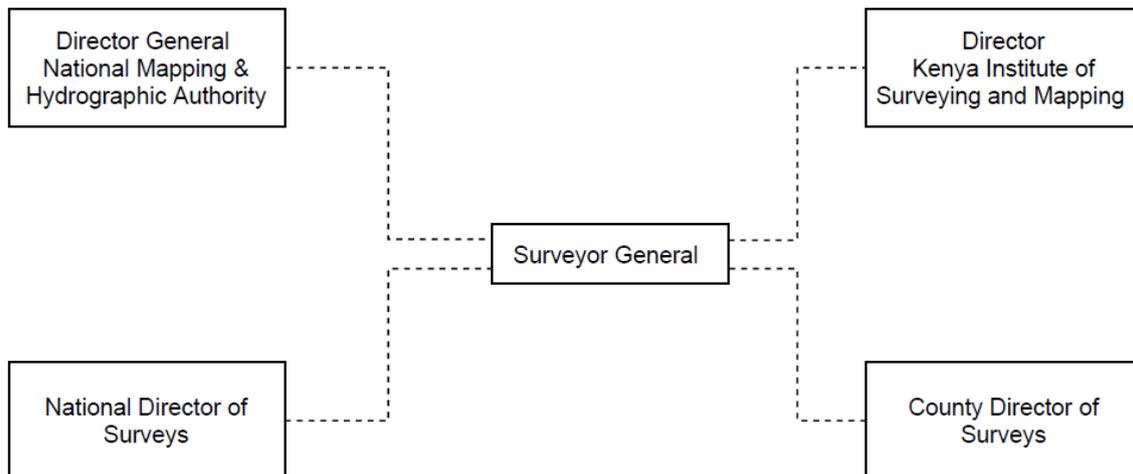
Figure 3: National offices structure and reporting arrangements



**Figure 4: County Director of Surveys structure and reporting arrangements**



**Figure 5. The indirect reporting relationships amongst the public service technocrats in the surveying sector**



#### 4.6 Implementation Matrix

The implementation matrix in Table 3 has been developed to aid systematic actualization of the land surveying and mapping policy. The matrix provides a road map to implement the policy and ensure realization of the benefits of land surveying and mapping as envisaged in this policy. The matrix is structured into 26 key policy areas, namely; aligning the survey and mapping sector with the Constitution, strengthening the existing institutional framework, survey practice regulation, develop clear policies, standards and guidelines, training and capacity building, geographical names, land adjudication, as-built surveys, sectional properties. The matrix has also identifies activities to be carried out by actors to achieve the policy goals, and the timelines within which these are to be achieved. Some of the key activities include: alignment of the land surveying and mapping sector with the constitution; establishment of the Land Surveyors Board as a body corporate; regulation of land surveying and mapping profession; amongst others.

**Table 3: Implementation Matrix**

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
<b>Constitutional Alignment:</b> Under the Constitution of Kenya, 2010, Land surveying and mapping is a concurrent function to be undertaken complimentarily by both the National and County Governments. With devolution there is need to strengthen service delivery at the county level through deployment of qualified and Licensed professionals.		
a) Develop a comprehensive constitutionally driven policy framework for the land surveying and mapping sector	MoLPP, CoG,	Short term
b) Enact laws to operationalize the policy prescriptions	Parliament	Short term
<b>Timely and accurate information access:</b> there is need to enhance access to timely and accurate information on land surveying and mapping when needed or requested by the general public in accordance with Article 35 of the Constitution of Kenya 2010		
a) Prepare an annual status report on land surveying and mapping	MoLPP CoG	Short term
b) Provide a mechanism for advising the executive and other stakeholders on all matters related to surveying and mapping	CGs NMHA SG NDOS	Short term
<b>Institutional framework:</b> Strengthen the institutional framework to carry out the expanded land surveying and mapping mandate and functions in Kenya;		
a) Mainstream the Surveying and Mapping Policy in the legal framework;	MoLPP AG KLRC Relevant Ministries CoG	Short term
b) Review the Survey Act in accordance with the policy direction;	MoLPP Parliament AG	Short term
c) Amend all the statutes cross referenced with the new Survey Act to establish coherence.	MoLPP OAG KLRC All stakeholder Ministries CoG	

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
d) Establish the following Institutions: <ul style="list-style-type: none"> <li>• The office of the Surveyor General;</li> <li>• The National Mapping and Hydrographic Authority;</li> <li>• The Kenya National Spatial Data Infrastructure Committee;</li> <li>• The Kenya National Hydrographic Committee;</li> <li>• The office of the National Director of Surveys;</li> <li>• The office of County Director of Surveys;</li> </ul>	PSC MoLPP CGs	Short term
e) Re-establish the following Institutions <ul style="list-style-type: none"> <li>• The Land Surveyors Board.</li> <li>• The Kenya Institute of Surveying and Mapping;</li> <li>• The Geographical Names Committee;</li> </ul>	PSC MoLPP CGs	Short term
<b>Registration and regulation of professionals:</b> Strengthen the institutional framework for robust regulation of land surveying professionals		
a) Enact a new and separate Act for the regulation of professional land surveyors; and	MoLPP Parliament AG	Short term
b) Establish the Land surveyors board as a body corporate	MoLPP AG Parliament	Short term
c) Regulate all disciplines of Surveying and Mapping;	LSB	Short term
<b>Geo-referencing of Surveys:</b> All land parcels in Kenya must be georeferenced before registration.		
a) Review the Survey Act and any other Act of Parliament to provide that all land parcel boundaries must be georeferenced	MoLPP Parliament AG	Short term
b) Review the Survey Manual and other relevant regulations to provide for the use of modern technologies such as GNSS, Remote Sensing and UAS technology	MoLPP, SG NDOS CoG NMHA NDOS	Short term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
c) Put deliberate measures to gradually map and fix the existing general boundaries currently captured in the national cadastre	MoLPP NDOS NMHA	Medium term
d) Phase out general boundaries surveys as currently carried out under mutation surveys and ensure all surveys are fixed	MoLPP NDOS NMHA	Long term
e) Develop geo-referencing guidelines and standards to guide the process of geo-referencing	MoLPP NMHA	Short term
<b>Boundary Delineation:</b> Boundaries that require to be gazetted such as administrative, electoral or forests should be delineated.		
a) Provide definition of boundaries and their delineation	MoLPP NMHA CoG IEBC KNBS MoI MoE KFS	Long term
b) Provide adequate funding to the National Mapping and Hydrographic Authority for boundary delineation	MoLPP NT CRA Parliament	Short term
c) Delineation of gazetted boundaries should be carried out in line with the survey standards and based on the official topographical base-maps	NMHA IEBC KNBS	Long term
d) Gazetted boundary plans should be deposited with the National Mapping and Hydrographic Authority as public records	NMHA IEBC KNBS	Long term
<b>Survey of International Boundaries:</b> all international boundaries should be demarcated and delineated with all boundary beacons/pillars regularly maintained.		
a) Ensure that the component of survey and mapping of International boundaries becomes a function of the National Mapping and Hydrographic Authority for sustainability	MoLPP Parliament OP MoFA	Short term
b) Ensure synergy between the National Mapping and Hydrographic Authority and other government entities dealing with international boundaries and cross border issues;	MoLPP NMHA OP	Short term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
	MoFA	
c) Guarantee accurate definition of International boundary using geodetic coordinates for Boundary Pillars from a uniform geodetic reference system	MoLPP NMHA OP AFREB AU EAC ICJ	Medium term
d) Ensure that the demarcation, delineation and maintenance of international boundaries is done in accordance to AUBP and the United Nations requirements	MoLLP NMHA MoFA OP	Long term
e) Provide adequate funds to the National Mapping and Hydrographic Authority to enable execution of its functions.	MoLPP NT CRA Parliament	Short term
<b>Hydrographic Surveying Services:</b> Kenya being a signatory to United Nations conventions on the laws of the sea (UNCLOS), safety of life at sea (SOLAS) and international maritime organization and as the 95 <sup>th</sup> Member of the International Hydrographic Organization (IHO), is obligated to meet her national and international mandate on hydrography as provided by these conventions.		
a) Strengthen the Hydrographic Office by establishing the National Mapping and Hydrographic Authority	MoLPP NT Parliament	Short term
b) Ensure implementation of SOLAS for safety in navigation, IHO and UNCLOS	MoLPP NMHA SG MoWS MoE MoTHUD Kenya Navy	Long term
c) Ensure participation, reporting and decision making at regional and international hydrographic bodies such as Southern African and Islands Hydrographic Commission (SAIHC) and International Hydrographic Organization (IHO);	MoLPP NMHA SG	Long term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
d) Develop capacity for hydrography and hydrographic services	MoLPP CUE NMHA KISM	Long term
e) Develop standards and specification for Hydrographic Surveying and Services aligning them with international requirements	MoLPP NMHA	Short term
f) Regulate hydrographic surveys, monitor maritime water dynamics and ensure uniformity and up to date nautical charts	NMHA MoTHUD IHO SAIHC	Short term
g) Setup a Kenya National Hydrographic Committee whose main function shall be to co-ordinate hydrographic activities and services in the county as well as to recommend policies, guidelines, and procedures in respect of hydrographic surveying services in the country	MoLPP NMHA	Short term
<b>Uniform Coordinate Reference System:</b> There is need for a reliable National Geodetic Control Network to which all land surveying and mapping can be connected. This Network will allow for geo-referencing of existing surveys as well as introduce seamless connection between all surveys in Kenya.		
a) Establish and adopt a Uniform Coordinate Reference System	MoLPP NMHA NDOS RCSM	Short term
b) Launch and operationalize the Continuous Operating Reference System (CORS)	MoLPP NMHA CoG RCSM	Short term
c) Establish a mechanism for continuous monitoring and modernizing of the geodetic reference system	MoLPP NMHA CoG	Medium term
d) Create a mechanism for Public Private Partnerships to allow the participation of private sector in the intensification of the CORS network as driven by market demand	MoLPP NMHA ISK	Medium term
e) Cooperate and integrate with regional and international bodies for the establishment and maintenance of regional and international geodetic reference systems <sup>11</sup>	MoLPP NMHA	Short term

<sup>11</sup>AFREF and ITRF

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
f) Allocate budget for the expansion, maintenance, continuous monitoring and modernizing of the geodetic reference system	MoLPP MoFA NT Parliament	Short term
<b>Riparian reserves:</b> Effective management of riparian reserves through the development of sound policy, legal, institutional frameworks, standards and guidelines to ensure a coordinated approach to their protection, use and management.		
Review the Survey Act, Cap 299 to make clear provisions on definition, measurement and points of reference of the Riparian Reserve.	MoLPP Parliament AG	Short term
Align sectoral laws and policies to harmonize the definition, measurement and points of reference of the Riparian Reserve.	MoLPP Parliament Relevant Ministries AG	Medium term
Provide an integrated approach to protect, maintain and use of riparian reserves	MoLPP NDOS NMHA CGs Relevant Ministries	Medium term
Provide a road map for surveying and mapping, profiling and delineation of riparian reserves along all water bodies in Kenya	MoLPP NMHA NDOS CGs Relevant Ministries	Short term
Provide clear guidelines and standards on riparian reserves	MoLPP NMHA NDOS CGs Relevant Ministries	Medium term
Prepare, publish and issue comprehensive boundary plans defining the identified riparian reserves.	MoLPP NMHA NDOS	Long term
<b>Surveying and Mapping Standards:</b> There is need to update the current Survey Manual to provide updated standards for land surveying and mapping in recognition of the tremendous		

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
changes in terms of methods, procedures and technology to strengthen regulation of the land surveying and mapping practice.		
a) Review the land surveying and mapping standards covering all disciplines in line with international standards and the current legislation.	MoLPP NMHA NDOS SG	Medium term
b) Ensure that the land surveying and mapping Standard Operating Procedures (Survey Manual) are developed and reviewed every 5 years	MoLPP NMHA NDOS SG	Medium term
<b>Regulation of Land Surveying and Mapping Practice:</b> Ensure Land surveying and mapping is a professional-level practice that is generally governed by professional practice laws and regulations.		
a) Review the Survey Act to ensure that all disciplines of land surveying and mapping practice are regulated	MoLPP LSB SG NDOS	Short term
b) Review the Survey Act to ensure both the land survey professional and practice are adequately regulated	MoLPP LSB SG NDOS	Short term
c) Enact a Land Surveyors Registration Act to regulate the land surveying and mapping profession and practice	MoLPP LSB SG NDOS	Short term
<b>Education and Training of Surveyors:</b> Standardize training of surveying professionals in tertiary institutions and provide a framework to support continuous professional development of the professional land surveyor beyond graduation.		
a) Ensure standardization of course names, content and duration for Universities and colleges offering degree and diploma programs in Land Surveying	MoLPP LSB CUE KISIM	Medium term
b) Ensure that persons instructing in the Universities and colleges are registered professionals and that the universities and colleges have adequate facilities to undertake Land surveying and mapping programs including but not limited to software, hardware and requisite laboratories	MoE CUE Tertiary Institutions LSB	Medium term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
c) Ensure that the university and college programs are regularly reviewed and aligned to the current labour market	MoE CUE	Medium term
d) Standardize and regulate the entry level requirement to guarantee the competency of the qualifying professional at tertiary level trainings	MoE CUE	Medium term
e) Phase out certificate level training programs in Land Surveying and Mapping as they lack in content and are unresponsive to the job market with the prevailing technological and development level	MoE LSB TVETA	Long term
f) Provide a robust mechanism for continuous professional development	LSB ISK	Medium term
g) Strengthen Kenya Institute of Surveying and Mapping (KISM) as a center of excellence	MoE MoLPP	Short term
<b>Geographical Names (National Gazetteer):</b> Ensure regular collection of geographical place names and update the National Gazetteer for standardization of all names on the maps of Kenya		
a) Strengthen the Standing Committee on Geographical Names to include all relevant stakeholders and have clearly defined roles	MoLPP NMHA CoG AG SG CA MOD MODA NLC MOCNH IEBC KNBS	Short term
b) Enhance the capacity and funding of the Standing Committee on Geographical Names to enable it fulfil its mandate.	MoLPP NMHA NT CRA Parliament	Short term
c) Develop guidelines on the spelling and standardization of geographical names	MoLPP NMHA SCGN	Medium term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
d) Maintain and update a digital National Gazetteer and publication in the Kenya Gazette	MoLPP NMHA SG SCGN	Medium term
<b>Topographical Mapping:</b> The preparation and updating of topographical maps to support the country's economic development.		
a) Develop and maintain up to date digital topographical map of the country	NMHA MoLPP SG	Medium term
b) Ensure adequate resources to plan, acquire and provide up to date topographical mapping of the country	NMHA MoLPP NT Parliament CRA	Short term
c) Ensure Topographical mapping is carried out every five years to support economic planning and development	MoLPP NMHA	Medium term
d) Ensure that relevant agencies that generate geospatial data make it available to the National Mapping and Hydrographic Authority for the purpose of quality control as well as updating of the topographic maps	MoLPP SG NMHA County Government Relevant MDAs	Medium term
e) Ensure adequate funding for capacity building for the National Mapping and Hydrographic Authority	MoLPP NMHA NT Parliament CRA	Short term
f) Undertake topographical mapping at a minimum scale of 1:50,000 for the ASAL, 1:25,000 for the rest of the country and 1:5,000 for the Urban areas	MoLPP NMHA County Government	Medium term
<b>Land Adjudication and Consolidation:</b> Fastrack surveying and mapping functions in Land adjudication processes		

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
a) Harmonize the Land Adjudication Act, the Land Consolidation Act and Land Registration Act with the Survey Act to ensure that the surveying component of the Land adjudication process is undertaken in accordance with the Survey Act to ensure that the boundaries are georeferenced.	MoLPP Parliament AG	Short term
b) Ensure collaboration and cooperation between the Land Adjudication and the Survey departments in carrying out their functions	MoLPP NMHA	Medium term
c) Allocate adequate funds to complete the pending land adjudication process and fast track the objection and appeal cases related to Land Adjudication	MoLPP NMHA NT Judiciary Parliament	Short term
<b>National Atlas of Kenya:</b> Ensure that all thematic information on national resources and development are captured every 10 years in the form of maps. These include but not limited to the Geography, History and Climate; Water Resources, Environment and Forests; Land and Soils; Agriculture; Energy; Land Information; Population; Tourism and Wildlife; Education; and Health.		
a) Prepare and publish a National Atlas every 10 years	MoLPP NMHA Relevant MDAs CGs	Long term
b) Ensure that adequate resources are available for the preparation and publication of the National Atlas of Kenya	MoLPP NMHA NT Parliament CRA	Short term
c) Develop , maintain and update a digital National Atlas of Kenya	MoLPP NMHA	Long term
<b>As built Surveys:</b> Ensure As-built surveys are carried out for all physical infrastructure after construction.		

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
a) Ensure that all physical development in a built environment should have an “as built survey” to be deposited with the National Mapping and Hydrographic Authority for updating the topographical map.	MoLPP SG NMHA CGs Relevant MDAs	Short term
b) Develop standards and guidelines for undertaking ‘as-built-surveys’	MoLPP SG NMHA	Short term
c) Ensure that “as-built” surveys are undertaken by a Land Surveyor	MoLPP SG NMHA CGs Relevant MDAs	Short term
d) Ensure that a Certificate of Compliance is issued once the “as-built” survey has been undertaken and confirmed	MoLPP SG NMHA CGs	Short term
<b>Sectional Property Surveys: Review the Sectional Properties Act,2020</b>		
a) Review the Sectional Property Act, 2020 to make provision for; <ul style="list-style-type: none"> <li>i. phased development and mixed development</li> <li>ii. volume of space occupied in addition to the floor area in the computation of unit factors for different uses in mixed use development</li> <li>iii. extension and renewal of lease by unit owners</li> </ul>	MoLPP Parliament AG	Medium term
<b>Underground Utility Surveys: Regulate underground utility surveys as part of development control of underground utilities</b>		
a) Review the Survey Act to provide for underground survey and mapping	MoLPP Parliament AG	Short term
b) Develop standards and specifications for underground survey and mapping	MoLPP NMHA NDOS	Short term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
c) Ensure underground surveys are carried out as per the Survey Act	MoLPP NMHA CGs SG NDOS Relevant MDAs	Short term
d) Ensure cooperation and sharing of underground utility data within the framework of the Kenya National Spatial Data Infrastructure (KNSDI)	MoLPP NMHA CGs SG NDOS Relevant MDAs	Medium term
<b>Mining Surveys:</b> Regulate mining surveys and ensure production of accurate and up-to-date plans and sections of natural resources below the earth surface.		
a) Review the Survey Act to incorporate mining Surveys	MoLPP Parliament AG	Short term
b) Formulate standards and specification for mining surveys	MoLPP NMHA SG Relevant MDAs	Short term
c) Ensure that mining survey records are submitted to the Surveyor General as public records	MoLPP NMHA SG All relevant MDAs	Sort term
d) Mainstream the mining cadastre into the National Land Information Management System (NLIMS)	MoLPP SG NDOS NMHA MoMP NLC	Medium term (Continuous)
<b>National Addressing System:</b> Support the development and implementation of the national addressing system and include National Address Data as a fundamental dataset of the KNSDI.		

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
a) Review the Survey Act to include a National Addressing System	MoLPP Parliament AG	Short term
b) Ensure that topographical maps are up-to-date to support the National Addressing System	MoLPP NMHA SG CGs	Medium term
c) Develop standards and guidelines for data sharing amongst institutions involved in National Addressing System	MoLPP SG NMHA All Relevant MDAs	Medium term
d) Integrate National Addressing System to the Kenya National Spatial Data Infrastructure (KNSDI)	MoLPP SG NDOS NMHA All Relevant MDAs	Medium term
<b>Unmanned Aerial Systems (UAS):—Regulate and promote the Use of UAS use for land surveying and mapping.</b>		
a) Develop regulations and standards for the use of UAS in land surveying and mapping	MoLPP NMHA SG All Relevant MDAs	Medium term
b) Mainstream the innovative use of drone based spatial products and services	MoLPP NMHA SG NDOS CGs All Relevant MDAs	Medium term
c) Review the Survey Act to include the use of UAS in land surveying and mapping	MoLPP SG NMHA NDOS CGs All relevant MDAs	Short term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
<b>Mobile Mapping:</b> Regulate and integrate the use of mobile mapping in surveying and mapping to accelerate national and economic development.		
a) Review the Survey Act to include the use of mobile mapping;	MoLPP Parliament AG	Short term
b) Develop regulations and standards for the use of mobile mapping in Land Surveying and Mapping; and	MoLPP SG NDOS NMHA CGs	Medium term
<b>Remote Sensing:</b> Mainstream the use of satellite remote sensing in land surveying and mapping functions.		
a) Develop guidelines and standards for the use of satellite imagery in topographical mapping, thematic mapping and Land Adjudication.	MoLPP NMHA SG	Medium term
b) Mainstream the use of satellite imagery for use in Land Adjudication	MoLPP NMHA SG NDOS	Short term
c) Build capacity in the area of satellite Remote Sensing and Earth Observation	KSA KISM	Long term
<b>Kenya National Spatial Data Infrastructure (KNSDI):</b> Develop the KNSDI and anchor it in policy and in law.		
c) Review the Survey Act to implement the KNSDI	MoLPP NMHA SG NDOS CGs	Short term
d) Setup a KNSDI committee as an inter-agency committee responsible for the development, coordination and implementation of the KNSDI	MoLPP NMHA SG NDOS CGs	Short term
<b>Engineering Surveys:</b> Regulate Engineering surveys to ensure informed and coordinated design in physical development.		
a) Review the Survey Act to provide for the regulation of engineering surveys	MoLPP Parliament AG	Short term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
b) Ensure Land Survey and Mapping function in public institutions responsible for infrastructural development are supervised by a Land Surveyor	PSC Relevant MDAs LSB CPSB	Medium term
c) Develop standards and guidelines for Engineering Survey services	MoLPP NMHA SG NDOS CGs	Medium term
<b>Survey Control Points:</b> Provide , protect and maintain adequate Survey Control Points and Fundamental Benchmarks and ensure accessibility.		
f) Reserve an area of 6.0 metres radius for Survey Control Points and Fundamental Benchmarks together with a right of way	MoLPP NMHA SG NDOS CGs	Long term
g) Locate the Survey Control Points and Fundamental Benchmarks within public land	MoLPP NMHA SG NDOS CGs	Long term
h) Ensure that protection of Survey Control Points and Fundamental Benchmarks is considered in preparation and approval of Environmental Impact Assessment report	MoLPP NEMA NMHA SG CGs	Short term

<b>Policy Requirement:</b>		
<b>Strategies /Activities</b>	<b>Actors</b>	<b>Timeline</b>
i) Ensure that no rock blasting is carried within 100 metres of any Survey Control Points and Fundamental Benchmarks unless reasonable measures have been undertaken to protect the control point	MoLPP NEMA NMHA SG CGs Relevant MDAs	Short term
j) Maintain and publish an up to date database of the Survey Control Points and Fundamental Benchmarks	NMHA	Short term
k) Develop guidelines and standards on protection and maintenance of Survey Control Points and Fundamental Benchmarks	MoLPP SG NMHA	Short term
<b>Practice of Land Surveying and Mapping by Foreigners:</b> Ensure a balance between technology transfer & capacity building and local content in the survey profession labour force		
c) Review the Survey Act to provide a robust mechanism for regulating foreigners practicing land surveying and mapping in Kenya	MoLPP Parliament AG	Short term
d) Ensure that where foreigners are allowed to work there is skills transfer to the locals.	MoINC Department of Immigration MoFA MoLPP LSB MoL Relevant MDAs	Short term

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