



**UNIVERSITY OF NAIROBI
DEPARTMENT OF ARCHITECTURE AND BUILDING SCIENCE
SCHOOL OF BUILT ENVIRONMENT**

**THE IMPACT OF A DEVELOPMENT POLICY ON
KILIMANI NEIGHBOURHOOD – CITY- OF
NAIROBI.**

BY

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REQUIREMENTS OF MASTER OF URBAN MANAGEMENT DEGREE IN THE
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DECLARATION

I, Rutto Reuben Cheruiyot, do hereby declare that this Research Project is my original work and has not been presented for a degree in any other university.

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DEDICATION

This work is dedicated to two great women: my wife Mary and my mother Margaret.
Their inspiration, encouragement and prayers enabled the realization of this Research.

You are the wind beneath my wings!

And to Victor, Vanessa and Joy.....*you inspired me all the way*

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ABSTRACT

Various studies have been done on impact of development policy on the evolution of urban land uses. However, few focus on development standards for neighbourhood development. It is due to the above stated shortcoming that this research is imperative in evolving a comprehensive body of knowledge for enhancing neighbourhood development as a spatial development process as well as urban environment process. Neighbourhood development phenomenon has over the years attracted scholars from a wide range of disciplines. Leading the team are the Urban Planners, Land Economists and Geographers and Sociologists. However, what these scholars have presented are segments of knowledge that indeed aids an evolution of a comprehensive body of knowledge that can be utilized by urban development stakeholders for the betterment of the neighbourhoods' spatial and structural development.

The rapid population growth and sustained economic growth in the city of Nairobi has accentuated the encroachment of commercial activities to the middle density residential zones adjacent to the Central Business District. Up to the early 1990s, Kilimani neighbourhood was fully residential with predominantly maisonettes and bungalows sitting on half acre plots and fully serviced with water, sewer, and electricity as well as tarmacked roads. Land use changes from 1990s albeit majority were (are still) illegal put pressure on the planning authorities to rezone the neighbourhood by revising the development densities and users, consequently marking the turning point to the neighbourhood's development. This meant maximization of land use as opposed to the earlier residential maisonettes and bungalows sitting on half-acre plots. The unfolding scenario as described above has seriously strained the existing infrastructure services notably roads, water and sewer which are yet to be expanded despite the policy being applied in the development approvals. This work was prompted by search for a unifying and comprehensive policy framework Kilimani neighbourhood development taking cognisance that the current development policy framework for the neighbourhood has become obsolete, archaic, presenting relics of colonialism and therefore were geared towards preserving class segregation. The policy framework envisaged herein includes those regulations that define and appertain to land use development such as plot ratios, plot coverage, building materials, building setbacks, user zones and land surrender among others.

Therefore this study was geared towards evaluating the impacts of 1993/1996 development policy for Kilimani in view of the Impact on Land-use and infrastructure capacity. This study therefore examines the impact of the development policy on neighbourhood development and analyses the emerging land use patterns as occasioned by the policy. The main objective of the study is to appraise the existing development policy used in Kilimani neighbourhood towards evolving alternative policy in view of the existing neighbourhood's infrastructure capacity. To articulately undertake the main objective of the study, three specific objectives being: to examine the evolution of land use in Kilimani as occasioned by the development policy in the neighbourhood, to evaluate the neighbourhood's development problems arising from inadequate provision

of infrastructure and finally to suggest an alternative development scenario for Kilimani neighbourhood. The study acknowledges the importance of implementing appropriate development policy derived from deductive scientific knowledge through measurements. This consequently raises levels of development acceptability at a given time and place in light of culture, technology and economic conditions. In order for the policy to achieve the above, they should be feasible and specify clearly, taking cognisance that construction activity plays a contributory part in the urban economic growth.

Research methodology employed in this study includes a reconnaissance survey of the neighbourhood, which was done to assist in the delimitation of the study area. For data collection, the study relied on secondary information as the primary data was collected through techniques such as questionnaire administration, informal interviews alongside direct participant observation and field photography of salient features. The survey was conducted with the help of two research assistants. The spatial sample frame for the study was defined by the northern extents consisting of Argwings Kodhek road and to the south by Ngong Road. The two major roads run parallel to each other and are the main transportation hubs linking the various access roads within the neighbourhood. The western and eastern extent of the spatial frame was defined by Menelik Road and Rose Avenue respectively. Major access arterials considered within this framework included Ring Road Kilimani and Kirichwa Road among others. This spatial frame constitutes approximately 75 percent of Kilimani's land area as well as representing true attributes of the neighbourhood. The scope of the variables looked at in terms of infrastructure were transportation characteristics of the neighbourhood, water supply, sewer disposal systems and capacities as these are the major engines of a functional neighbourhood unit. The development policy issues evaluated in the study are those which define and appertain to land use development such as plot ratios, plot coverage, building materials, building setbacks, user zones and land surrender among others. The study relied on 120 household as the sample frame for the study.

This study concludes that for a functional neighbourhood to be achieved there must be concerted efforts of the local authority in terms of developing appropriate development policy which reflects the societal aspirations. However, this requires the input of the local residents. This study imperatively notes that the desired development policy for the neighbourhood shall only be achieved in the altar of appropriate infrastructure developments in the neighbourhood, for they are the basis upon which other developments shall be anchored.

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CHAPTER ONE: INTRODUCTION

1.0: Background of the Study

Land uses in Nairobi and Kilimani in particular have evolved over the decades as a result of planning attempts. The first plan for Nairobi which was prepared in 1892 only took cognisance of the need of railway employees, the Europeans and Asian traders and never took into account the needs of the native Africans. However, it laid the foundation for the physical appearance of Nairobi by recommending zoning, particularly for residential areas in a racial segregation manner by grouping different racial groups into zones. The second Master Plan, which was prepared by a team of South African and British Planners, was done in 1948 and laid down the guidelines for legitimising the city's growth as a colonial city by earmarking land for residential, industrial and other uses (White *et al.* 1948). It introduced the neighbourhood concept in city planning and is largely responsible for the present layout of the industrial area, extensions of the road network and replacing the railway line with the current dual highways. This was purely a land use plan based on the principles of the garden city concept, emphasising wide boulevards with grass medians and generous sidewalks as well as landscaped traffic roundabouts, large parkland, forest reserves and wide riparian reserves for aesthetic and functional reasons. In spite of its beautiful appearance, the plan seemed to segregate various races living in the city. In the initial stages, the plan seemed to work due to the colonial administration's emphasis on implementation. However, dynamism in political

and social variables propelling city development changed drastically against the plan after independence and the plan became irrelevant soon after (Obudho and Owuor, 1991). Another attempt at planning the city was the Metropolitan Growth Policy of 1973, which was a multi-sectoral development plan that laid a strategy for integrated urban development through recommending future space requirements in light of rising city population. These recommendations included decentralisation of the industrial centres to the east and northeast of the city, the creation of other satellite centres, creation of three main bypasses and limiting employment within the Central Business District to 100,000 (Nairobi Metropolitan Growth Strategy, 1973). This plan relied on foreign and central Government funding for its commissioning. However, the plan whose horizon ended in the year 2000 achieved very little partly due to poor articulation and statutory regulations governing planning system and plan implementation. Further, the assumed financial and technical support was not provided and as a result its implementation did not take place. This did not curtail urban growth despite inadequate infrastructure prompting the *Rezoning Policy of 1979* which went against recommendations of the metropolitan policy by intensifying development within the city, thus advocating for a more concentrated Central Business District through allowing higher development densities.

However, no attempts were made to evaluate and/or improve the urban infrastructure services and utilities such as water supply, parking and recreational facilities among others, which would be affected by the proposed higher densities. Since then, planning has been done on an *ad hoc* basis with study groups dealing with specific aspects of the city's growth. The recommendations of these studies are documented in the Omamo

Commission Report, Nairobi We Want, Local Authority Service Delivery Action Plan (LASDAP) and Informal Settlements Development Strategy among others. These were purely single-issue plans that were not linked to the city's general plan.

Over the last three decades, there has been spirited development control efforts meant to bring land use changes in the city. This has been done through intensification of developments through rezoning, revising development densities and through changes and/or extension of users to increase the development capacity of existing land as exemplified by the *Rezoning Policy of 1979*. Though this process is reactionary rather than proactive it has been very instrumental in increasing the development capacity of the city (Kiamba, 1988). The rate of intensification has officially depended on the capacity and availability of the public utilities (more so the water, sewerage and transport corridors). For instance between 1974 and 1979 when the first phase of the Chania Water Scheme was completed and the water supply improved, the zoning situation was revised. This has led to evolution of seven distinct spatial internal structure in terms of land uses namely residential, commercial, industrial, institutional, recreational, transportation and agricultural which even though strictly is not an urban land use, has persisted in peri-urban neighbourhoods.

Based on the economic status, the evolved residential areas fall into four categories namely: - Upper – Income (low density) covering the largest area of about 11,000 hectares or 16 percent of the city consisting of privately owned homes, some of which have plots as big as five acres. Medium-Income (medium density): occupying 4,070

hectares consisting of almost 6 percent of the city's urban space with variations in density and levels of development in various districts falling within this category, as some of these estates are government-owned, Housing Finance Corporation of Kenya owned as well as private developers owned. Low-Income (high density) covering an area of 4,500 hectares or 6.5 percent of the city's area mainly concentrated in the eastern part of the city. Most of the housing estates in this category were until recently owned by City Council of Nairobi. Finally, the informal settlements occupied by the poor are covering an area of about 2,190 hectares. It is therefore evidenced that Nairobi has accommodated its growth through intensification of land uses and expansion into new areas, some of which are ecologically fragile (Lamba, 1993). From the above, it is evident that the planning adopted has largely been negative and reactive rather than being positive and proactive (Gilbert and Guglar, 1981).

As earlier stated, the Nairobi Metropolitan Growth Strategy of 1973 recommended expansion of the then existing industrial areas in order to develop an additional seven secondary industrial areas next to residential estates for income generation as well as reducing transportation needs to other employment centres. Since then, the city has witnessed a major extension and currently the total area occupied by industrial activities is 2,370 hectare. However, the policy on location of small-scale industrial sites has not been adequately implemented and has triggered an acute shortage of serviced open-air industrial workplaces. Apart from the commercial activities in the Central Business District, seven satellite commercial centres next to the proposed industrial areas were proposed for immediate development to serve the local needs of various neighbourhoods

and those immediately adjacent. It is also important to note that new comprehensive housing development schemes were planned with at least a small commercial centre. This has led to the growth of commercial centres within residential areas.

Table 1.1: Land Use Distribution in the City of Nairobi

Land Use	Area (Hectares)	Proportion Percentage
High Income Residential	11,000	16.1
Medium Income Residential	4,070	5.9
Low Income Residential	4,500	6.6
Unplanned slums and squatter settlements	2,190	3.2
Commercial	270	0.4
Industrial	2,410	3.5
Institutional	7,480	11.0
Recreational	15,330	22.4
Agricultural	21,150	30.9
Total	69400	100.0

Source: (Lamba, 1994)

Apart from Westlands shopping centre occupying an area of 10 hectares, majority of the proposed commercial centres are not properly functioning as envisaged necessitating intensification of the Central Business District through the revision of the plot ratios and coverage, consequently pushing employment beyond service capacity levels and creating serious parking and transportation problems. Currently, the total land covered by commercial land use is 260 hectares of which the Central Business District occupying 220 hectares. Institutional land use including airports, airfields, government institutions, hospitals, schools, universities, colleges, prisons and military barracks occupies approximately 10.9 percent of city land. The two forest reserves within the city are Ngong and Karura Forests occupying 1,240 and 940 hectares respectively.

Although Nairobi is always referred to as a major political, commercial and industrial centre, a large portion of its land is still under agricultural cultivation. In 1995, land-use report stated that 20,950 hectares were still under agricultural use totalling to almost 31 percent of the total city land. The transport network in the city is more than 2,000 kilometres of road length ranging from national highways linking Nairobi to other parts of the country to unpaved earth tracks providing access to individual properties and accounts for 28 percent of the total city's land surface.

1.1: The Development Policies within Kilimani Neighbourhood

In cognition of the above stated development control huddles, the Nairobi City Council on its *Town Planning Committee* meeting of 16th January 1979 approved a new development control Policy for Kilimani neighbourhood which falls within zone 4 of the council's development zones. This zone includes Thompson Estate and spans towards the Upper Hill Estate where it borders with zone 1 being the Central business district of the city and to the north it includes Kileleshwa and Upper Parklands. The recommended user for this zone was low to middle residential user allowing flats and maisonettes with minimum plot size of 0.01 hectare. It was further stipulated in this policy that plot coverage was to be guided by provision of sewer. However, where sewer was not available, the provision of septic tanks or conservancy tank was the alternative. Under the later situation the permitted ground coverage and plot ratio was 35 percent while those of the septic tank or conservancy tank was 20 per cent.

In September 1981 the policy was revised so as to facilitate the accommodation of comprehensive schemes in the area. The policy operated in plots where ample infrastructure services more so the sewer was available. Under the revised policy which included zones 1, 2 and 3 all developments were based on ground coverage of 35 percent and plot ratios of 75 percent. The minimum plot frontage of 6.0 metres was recommended. The minimum plot sizes where comprehensive schemes could be developed were lowered from 2.471 acres to 0.4 hectares. The above-mentioned policy had far reaching development effects on the area as most property owners having plots larger than 0.8 hectares were more inclined to subdividing them to accommodate comprehensive developments. This connotes that most of the developments became economic oriented and more housing units could be accommodated within a given plot leading to higher the income through sale of the housing units without stressing on infrastructure services provision more so the roads. On 13th May 1987 the above policy was repealed vide *Minute 24 of Works Town Planning Committee* by reducing minimum plot sizes on sewer to 0.05 hectares for single dwelling unit and plots without sewer remained at 0.2 hectares for the same. High-rise developments were limited to sewer areas and plots of 1.0 hectares and above while 10 percent open space was to be surrendered to city council free of cost.

From 1990s there has been high influx of none residential users such as offices and commercial users. Whereas some of these are approved, majority of them are illegal conversion. The professional offices were allowed on the basis of non-availability of offices in the city centre and provided that the inclusion of the professional office was not to alter the residential character of the property. Under *Minute 15 of the Works and Town*

Planning Committee Meeting held on 17th October 1978 professional offices were to be located in residential areas at the discretion of the council. The policy stated that professional offices would not be permitted within a radius of 1.5 kilometres of another office of commercial centre. However, in 1979 vide *Minute 23* of the *Works and Town Planning Committee* meeting held on 16th February, 1979 this policy was amended and additional condition was imposed that changes of users for professional offices were to be restricted to registered professional owner occupier only with no alterations to the existing residential property.

A planning task force of technical sub-committee of the Nairobi Town Planning Liaison Committee was instituted in August 1991 to formulate development guidelines on Kilimani and Hill areas taking into consideration the infrastructural and social amenities in order to respond to the development pressure. Initially the two neighbourhoods were low-density residential areas, but since 1960s when the Ministry of Works Offices were constructed within the vicinity and being the only office at the time, the character of the area has been changing rapidly from low-density residential development to high rise office blocks. The development of both Government and private office blocks also accelerated forcing the City Council of Nairobi to re-zone this area for commercial and office development. Since then, intensive development started and more is still expected further necessitating the need to have adequate guidelines for the development of the area. On realization of the above stated development threshold, Nairobi City Council's Planning and Architecture Department in collaboration with Ministry of Lands and settlement (Physical Planning Department) did a thorough survey between the years 1991

to August 1993 with a view of determining and formulating development policy to enhance functionality of the area in accommodating development spill-over from the Central Business District. (Nairobi City Council 1996)

The policy proposals, which this Task Force came up with proposed offices, flats, Residential hotels, Apartments and Institutional development for Zone 4 (Kilimani neighbourhood). This presents mixed development typology, which takes cognizance of the dominant (pioneer) developments and the serviette (office block) developments. Various scholars have given the advantages of the mixed land-use that it takes cognizance and provides an ideal spatial identity to land uses in a neighbourhood as well as defining the limits of each land-use objectively, leading to a considerable knowledge on many specialized sub-units, which make up the composite notion of a neighbourhood. Secondly, they have noted that it considers the composing elements of land-uses in a given neighbourhood in isolation by considering locational functionality of each land-use independently and finally that it leads to a generalized knowledge of individual site requirements in terms of activity systems and linkages.

In order to obtain commercial development in the area, the policy recommended that the commercial activities be maintained and contained within the four centres being Hurlingham, Yaya Centre, Caledonia and Valley Arcade. The centres were also to include commercial offices and flat developments. It further stated that Yaya Centre and Valley Arcade be expanded so as to provide higher order services. Within this context, the plots between Hurlingham and Yaya Centre, and immediate frontages to Argwings

Kodhek road on both sides were to be granted commercial user. It was further recommended that the plot ratio of 150 percent and ground coverage of 35 percent be allowed in Hurlingham and Yaya Centre shopping centres (Previously the plot ratio was 75 percent and ground coverage of 35 percent). Within this policy framework, all commercial development were to provide basement parking facilities for own use and on site parking for patrons while no expansion was to be undertaken at Caledonia due to its proximity to State House. This entailed minimisation of commercial activities and related traffic flow in the neighbourhood. Arising from the field survey observations and the many change of use applications received by the council from Kilimani, it was found advisable to devise a rational planning approach to the area's development. This rational approach entailed formulation of a planning policy that would accommodate where possible the existing developments through changes of user to facilitate orderly developments and minimize abuse of planning regulations. The philosophy behind the policy was the feeling that the 1978 and 1979 policies were restricting developments.

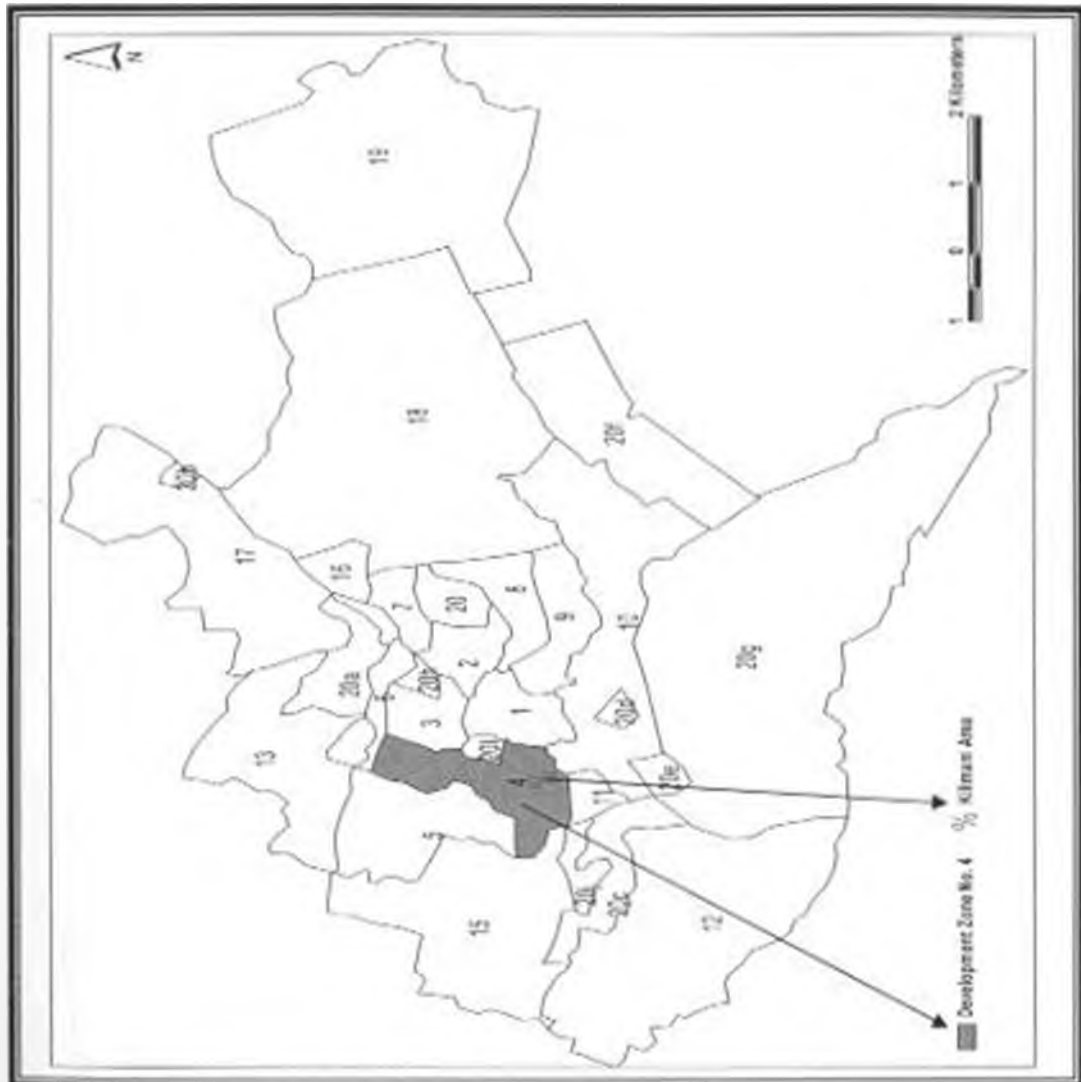
Since then, the demand for office spaces in Kilimani area has steadily risen over the years due to various factors such as inadequate car-parking facilities in the Central Business District as occasioned by general congestion in the Central Business District, high rents and pollution in the Central Business District. In general, the above negative factors have continually contributed to the relocation of offices and other non-residential users to Kilimani due to the neighbourhood's proximity to the Central Business District. This development trend has been allowed to continue unabated yet the investment in infrastructure has not accordingly been expanded to accommodate the same. This

necessitated a development policy reformulation between 1993 and 1996 which took cognizance of the above stated development handicaps towards the attainment of sustainable neighbourhood development. The 1993/1996 policy further envisaged that with expansion of the service centres, more office spaces were to be provided and that the demand for change of use from residential to professional offices in Kilimani would be reduced. However, in order to harmonize professional office development in the area, the policy recommended that all professional offices were to maintain the residential character in terms of development, plot ratio and ground coverage. Therefore, the previous density and intensity of development control at ground coverage of 35 percent and plot ratio of 75 percent of the residential user were to be retained and allowed only on plots of minimum size 0.1 hectares of single dwelling units not within comprehensive schemes. For purposes of land administration, professional offices were to be taken as a change of user from residential to offices to facilitate changes in title and valuation. The professional offices were to provide on site parking facilities within their own plots.

For residential hotel development, it was recommended that the plots were to be of minimum size 0.2 hectares as the proposed developments were to maintain the residential character in terms of plot ratio and ground coverage. Residential hotels were to be located along the major roads and were not to condone loud (juke boxes) music or provide disco facilities so as to minimize noise pollution. The above are by no means clearly distinctive and each must of necessity involve elements of the others and they can be looked upon as representing a process of growing incisiveness and insight as the emphasis swings from conventional aggregate land-use basis towards multiplicity of decision-making situations

through which a given neighbourhood develops. Therefore, it is on the basis of this policy scenario whose impact this study was geared to critically evaluate and evolve an alternative policy for Kilimani neighbourhood development.

Map: 1.1: Land Use Policy Zones of Nairobi City



Source: (City Council of Nairobi, 1996)

Table 1.2: the existing Land use policies in the city

Zones	Current Land Use	Proposed Land Use	Existing Minimum Plot Size (Ha)	Proposed Maximum Plot Size (Ha)	Existing Maximum Plot Ratio	Existing Maximum Plot Coverage	Proposed Maximum Plot Size	Proposed Maximum Plot Coverage	NOTES
1 A	Commercial/Residential Light Industry	Commercial/Residential Light Industry	0.05, 0.1 and 0.04	0.04	1.25	0.75	2.0	0.80	Highrise flats PR=1.0 GC=0.35
1 B	Offices/Residential	Commercial/Offices/Residential	0.1 and 0.2	0.04	0.40 2.0	0.33	2.0	0.80	Highrise flats PR=1.0 GC=0.35
2	Commercial/Residential	Commercial/Residential	0.05 and 0.1	0.04	1.25 0.50	0.75 0.33	2.0 0.75	0.80 0.35	Flats not allowed
3.	Residential	Residential	0.1 or 0.2	0.1	0.40	0.33	0.75	0.35	Flats and Masoneries allowed where there is no sewer PR=25% (Septic tank) or 20% (conservé tank)
4	- do -	- do -	0.1 or 0.2	0.1	0.50	0.33	0.75	0.35	Flats and Masoneries allowed where there is no sewer PR=GC=25% (septic tank) or 20% (conservé tank)
5	Residential	Residential	0.3	0.2	0.05	0.33	0.75	0.35	No Flats but Masoneries allowed. There is no sewer PR=GC=25% (septic or 20% (conservé tank)
6	- do -	- do -	0.4 0.3	0.2	0.50	0.33	0.75	0.50	- do -
7	- do -	- do -	0.4 0.08	0.04 (on sewer)	0.50	0.50	0.75	0.50	Special scheduled area (Mithare)
8	- do -	- do -	0.04	0.04	0.05	0.05	0.75	0.05	Special scheduled area (Eastlands)
9	Industrial	Industrial	0.04	0.04	3.6	0.75	3.0	0.80	Ancillary use to occupy a maximum of 20% of the total permitted plot
10	Residential	Residential	0.04	0.04 (on sewer)	0.50	0.33	0.75	0.35	Comprehensive schemes will be allowed with a max density of 35 units per ha
11	- do -	- do -	0.04	0.04 (on sewer)	0.05	0.05	0.75	0.50	Special scheduled area (Kibera)
12	Residential	Residential	1.0 2.0	1.0					One unit per plot permitted, flats and Masoneries not allowed, adequate wastewater

									water to be supplied (Kamuk/Ampan) adequate wholesome water treated
13	- do -	- do -	20 10 0.2	0.2	-	-	-	-	Where there is no sewer PR=GC=25% (septic Tank) or 20% (Conserve Tank), one unit per plot permitted
14	- do -	- do -	20	0.2	-	-	0.75	0.35	One unit per plot permitted, adequate water supply required
15	Agricultural Residential	Residential	0.11 ha Township	0.1 ha Township, 0.04 (on Sewer)	0.50	0.20	0.75	0.50	PR=GC=0.25 (Septic tank) PR=GC=0.20 (conserve tank) Terraced houses allowed Adequate water supply necessary (Thicket) (special density area)
16	Agricultural Residential Industrial	Residential Industrial	10	0.2	1.25	0.75	2.0	0.80	Adequate water supply required (Ramma)
17	Agricultural Residential	Residential	-	0.04 (on sewer)	-	-	0.75	0.50	Where there is no sewer, min plot size = 0.1 ha. Special scheduled area (Kahawa/Kasarani)
18	- do -	- do -	-	0.04 (on sewer)	-	-	0.75	0.50	Where there is no sewer, min plot size 0.1 ha Special scheduled area (East of Embakasi Airport) where there is no sewer, minimum plot size=0.1 ha
19	Agricultural	Agricultural Residential	-	2.0	-	-	-	-	Special Density area (Eastern Extension) max of 3 units per plot allowed
20	Public	Public	-	-	-	-	-	-	Forest Game Reserve, Defense Areas etc

Source: (City Council of Nairobi, 1996)

1.2: Statement of the Problem

This work was prompted by search for a unifying and comprehensive policy framework Kilimani neighbourhood development taking cognisance that the current development policy framework for the neighbourhood has become obsolete, archaic, presenting relics of colonialism and therefore were geared towards preserving class segregation. The policy framework envisaged herein includes those regulations that define and appertain to land use development such as plot ratios, plot coverage, building materials, building setbacks, user zones and land surrender among others. Therefore this study was geared towards evaluationng the impacts of 1993/1996 development policy for Kilimani in view of the Impact on Land-use and infrastructure capacity.

1.3: Objectives of the Study

This study was aided through a set of objectives which were imperative in guiding the study. The objects here begin with the broader outlook of the study problem which was to be conceptualised through the general study objective and finally translated to specific study objectives as below detailed.

1.3.1: General Objective

The general objective of the study was to appraise the impact of 1993/1996 development policy for Kilimani towards evolving an alternative policy to guide neighbourhood's development in view of the existing infrastructure.

1.3.2: Specific Objectives

Accordingly, to expedite the above stated general objective, the below stated specific objectives were formulated:-

- i) To examine the evolution of the land uses as occasioned by the 1993/1996 policy for neighbourhood development.
- ii) To evaluate the neighbourhood's development problems arising from the policy inception.
- iii) To evolve an alternative policy frame for the neighbourhood's development.

1.4: The Research Questions

This study sought to answer the below stated research questions: -

- i. Is there correlation between increased development densities, infrastructure capacity and the neighbourhood's environmental well-being?
- ii. Is there need for a guided spatial development in Kilimani neighbourhood.

1.5: Research Assumptions

The study having its niche in applied social science, many factors which acts in concert and may not be easily controlled came into play. However, the researcher made the below stated assumptions: -

- i. The national urbanisation rate shall continue to rise and Nairobi city shall continue to bear the burden of absorbing this population in higher proportion relative to other towns in the country. Kilimani neighbourhood is therefore geared to continue experiencing influx of immigrants consequently leading to the neighbourhood's population expansion.
- ii. The evolution of land uses in the neighbourhood has been guided by the principles of rational thinking, which postulates that the developers have perfect knowledge of development opportunities and market frontiers for the purposes of profit maximization. In this regard, the neighbourhood shall continue experiencing mixed user typology of developments.
- iii. The infrastructure capacities in the neighbourhood are envisaged not to be expanded in the middle term planning horizons spanning to 20 years.

1.6: Justification of the Study

Stemming from the above discussions, it is evident that over the years the challenge to Nairobi's management in general and development control in particular to a large extent has remained achieving proper balance between socio-economic functions and physical environment that allows for the health and well being of all its residents.

The *ad hoc* manner under which planning and general management of the city has been done has not appropriately articulated the integration of economic, infrastructure, environmental as well as physical thresholds to the city's development. The main

preoccupation of this type of planning has been creation of distinctive land uses in the city with varying development densities. In some areas, residential development sprung up due to space availability with minimal effort of providing basic infrastructure such as water, sewerage and roads. From the foregoing, it is clear that Nairobi needs a new management strategy that analyses the city's current form and functions. One that makes allowances for projected future growth patterns as well as proposed infrastructure development. Indeed, there is need for an intervention that is comprehensive enough to look into other institutional reforms that are needed to make any planning proposals a reality. In this regard, there is need for a plan that will be able to influence the city's economy and redistribution of the economic benefits between different sectors of the economy. It is also imperative that a new management intervention be able to take into consideration the impacts of the two most important global trends such as urbanisation and globalization as across section examination of the city's past and present planning mechanisms reveal various weaknesses that impedes the ability to guide physical and economic development consequently leading to haphazard developments.

Planning for a city such as Nairobi has two basic dimensions: The first is concerned with the management of urban growth and renewal in order to provide an efficient location for economic activities and satisfy the needs of the residents and the second with the location pattern and differential rates of economic and population growth within the metropolitan space. These have traditionally been the concerns of urban planning and management on one hand and national urban development strategies or regional policy and development on the other hand. However, the multi faceted and complex nature of city problems

necessitates that specific legal and institutional arrangement for the management of the city is instituted. With the adoption of Agenda 21, environment has become a central issue in human settlement planning and management. However, environmental issues cannot be isolated from other aspects of the city. Therefore, a suitable conceptual framework and appropriate tools for integrating environmental considerations in the city planning shall only be captured through enactment of a well articulated sustainable strategic metropolitan plan to create ecological balance with other aspects of the city's development. As spatial aspects of town planning is concerned with the orderly, aesthetic and healthy layout of buildings and land-uses, the primary concern with the physical environment should still come out clearly with the evolved planning policy framework taking cognisance that environmental degradation, which is being experienced in the Kilimani neighbourhood, is partly as a result of uncontrolled physical developments manifested in mushrooming of incompatible land uses.

The best approach in achieving land-use compatibility is to consider land-use in relation to transportation and link land development to the provision of infrastructure. This vision would be achieved via control over land subdivisions and the entire urban development. Although the 1973 Nairobi Metropolitan Growth Strategy recognised complementary investment in infrastructure, the land use planning was rarely tied to resource allocation culminating to failure in achieving the envisaged development pattern(s). The above corroborates the fact that land-use planning, as a development control tool cannot be divorced from socio-economic, environmental and political factors affecting plan implementation. It is gamine to note that effective plan implementation should be

intertwined with resource allocation, which should be further consistent to the national development policy. In this regards, what Nairobi needs most is not the reactionary plans which have characterised the city's landscape over the decades but a more proactive approach to urban management involving an integrated process of planning, public investment, construction, operation, maintenance and rehabilitation (Devas, 1993).

Introduction of democratic principles of governance in recent years at national and local levels necessitates the need to allow citizen participation in matters pertaining to urban (planning) management. A new management intervention that is democratic, consultative and participatory is normally advantageous in avoiding conflicts and harmonising all opinions for the welfare of all citizens. The new wave of democratisation in governance has resulted in increased calls for decentralisation of government power and authority to other arms of government. In the city, this management wave should be translated by clearly spelling out the role of various institutions in the management process to enhance efficiency and accountability (Lee-Smith, 1989; Cohen, 1981).

Despite all the limitations that have plagued past planning initiatives such as lack of political good will, monitoring and evaluation, it is noted that inadequate financial resources, which is paramount in urban planning have played a critical role in the failure of these initiatives. In view of past failures, only a plan that articulates the national development agenda such as poverty alleviation and localising the agenda at the neighbourhood level within the urban planning initiatives can take off (Hillhorst, 1990; Hake, 1977). In the same vein, with a proper development control framework in place,

Nairobi will be able to muster sufficient support from bilateral and multilateral sources to implement programs. A collaborative mechanism needs to be put in place for various plan implementers such as the Nairobi City council, Ministry of Local Government and Physical Planning Department of the Ministry of Lands and Housing, which spells out the different roles to be carried out by these institutions in reducing the unnecessary delays in plan implementation and actualisation, and thus save on scarce resources. It will also reduce instances of duplication of projects and uncoordinated planning which in the past has led to conflicting operations and haphazard developments (Doomkamp, 1982).

The above being the case, a Strategic Neighbourhood policy framework, which lays emphasis on the provision of basic human needs and that, which lay down proposals that are needed to safeguard natural resources as is intended to be demonstrated by this study shall remain the altar on which neighbourhood development shall be achieved. The Neighbourhood Policy Development Plan progresses in phases namely the preparation of the study proposal, sensitization of the civic, council officers and all the stakeholders in the preparation of situation analysis reports, data collection and analysis, preparation of the strategic plan and action plans. There is therefore need for a multi-sectoral plan that implements policies through its ability to co-ordinate and brings coherence to the single issues raised by the various sectors thus becomes a reference plan for all. It should address strategic policy issues at the neighbourhood level (Devas and Rakodi, 1993).

The main characteristics of a strategic neighbourhood development plan are: - permissive participation of all the stakeholders, cross-sectoral co-ordination and integration of the

needs of the various sector (education, housing, health, infrastructure and social services), linkage to the budgeting resources so as to ensure implementation, practice of the environmental conservation and neighbourhood development ideas, resolution of conflicts among participants, linkage to and from national policy issues and usage of community based data collection methods.

Unlike other planning processes, strategic neighbourhood planning approach is advantageous for it provides a single policy plan to be referenced by all the sectors thus resolving sectoral conflicts, it is action oriented, it shows financial feasibility of the recommended projects, it does not require excessive time or effort in data gathering, it is dynamic and thus responsive to the needs of the growing society, it is priority based defining capital plan thus enables projects to be implemented incrementally, it provides for formulation of facility plans and development projects to implement it, it is participatory in approach thus promotes feeling of plan/project ownership, resource accessibility, conflict resolution as well as promoting people's awareness and perception of their immediate environment alongside building people's capacity to articulate their and their solutions hence promoting sense of pride, confidence towards resource conservation. This is imperative in meeting the current generation's needs without jeopardising the ability of the future generation to meet theirs. It is within this framework that this study as harbinger critically analysed the impact of the existing policy for Kihmani neighbourhood alongside creating an understanding by analysing historical development trends in the neighbourhood.

This study acknowledges the importance of implementing appropriate and measurable development policies which are acceptable at a given time and place in light of cultural, technological and economic conditions prevailing in the society. In order for the development policy to achieve the above, it should be feasible and specified clearly; taking cognisance that construction activity plays a contributory part in the urban economic growth. Gross construction output constitutes typically around 8 percent to 12 percent of gross domestic product in many developing countries. In this regards sound construction activity therefore begins with workable and efficient building regulations and codes. As the government is encouraging investment through construction industry to boost economic growth control measures are required to ensure it does not act to discourage those wishing to invest.

An efficient and well-coordinated development policy will benefit the Nairobi city council in terms of enhanced revenue base accruing from the respective levies, fees and charges as well as address the issue of environmental conservation within optimized land utilization as well as contributing towards lessening the risks of disasters through collapse of buildings or fire hazards. Indeed, Kilimani neighbourhood presents an ideal area for study of neighbourhood development in that it represents some of the neighbourhoods in the city that experiences the most intensive and accelerated commercial and social growth within rigid and un-expanding infrastructure framework. The location represents the evident growth patterns that are currently being witnessed within the city today and serves as a case study of city growth in other sections of the city. Granted that the

neighbourhood comprise of mixed land use patterns, the study ultimately gives an insight as regards how activity patterns relate and how they compete over space.

1.7: The Scope of the Study

The study was conducted in Nairobi's Kilimani neighbourhood which is situated within Zone 4 of the city's planning zones. Spatially the neighbourhood is located approximately 3.0 kilometres west of the city centre and constitutes an area of approximately 15.0 square kilometres. The spatial sample frame for the study was defined by the northern extents consisting of Argwings Kodhek road and to the south by the Ngong Road. The two major roads run parallel to each other and are the main transportation hubs linking various access roads within the neighbourhood. The western and eastern extent of the spatial frame was defined by Menelik Road and Rose Avenue respectively. Major access arterials considered within this framework included Ring Road Kilimani and Kirichwa Road among others.

The spatial frame used in the study constitutes approximately 75 percent land area of Kilimani neighbourhood and represents true attributes of land uses within the neighbourhood. The scope of the variables looked at in terms of infrastructure were transportation characteristics of the neighbourhood, water supply, sewer disposal systems and capacities. The above stated variables constitutes basic infrastructure system for neighbourhood's growth and development, thus are the social overhead capital or the sum total of societal investments supporting the development of a country (UNCHS, 1989 and

World Bank, 1994:2). The existing development policies which were evaluated in the study are those that define and appertain to land use development such as plot ratios, plot coverage, building setbacks, user zones and land surrender among others.

1.8: Study Methodology

This section describes the methodology used in the study and details out the study's sampling design, data sources, analysis and presentation. Research methodology employed in this study includes a reconnaissance survey of Kilimani neighbourhood, which was done to assist in the delimitation of the study area. For data collection, the study relied on secondary information as the primary data was collected through techniques such as questionnaire administration, informal interviews alongside direct participant observation and field photography of salient features. The survey was conducted with the help of two research assistants.

The spatial sample frame for the study was defined by the northern extents consisting of Argwings Kodhek road and to the south by Ngong Road. The two major roads run parallel to each other and are the main transportation hubs linking that the various access roads within the neighbourhood. The western and eastern extent of the spatial frame was defined by Menelik Road and Rose Avenue respectively. Major access arterials considered within this framework included Ring Road Kilimani and Kirichwa Road among others. This spatial frame constitutes approximately 75 percent of Kilimani's land area as well as representing true attributes of the neighbourhood. The scope of the variables looked at in terms of infrastructure were transportation characteristics of the

neighbourhood, water supply, sewer disposal systems and capacities as these are the major engines of a functional neighbourhood unit. As stated earlier the development policies which were evaluated in the study are those standards which define and appertain to land use development such as plot ratios, plot coverage, building materials, building setbacks, user zones and land surrender among others. The study relied on 120 households as the sample frame for the study.

1.8.1: Sampling Design

A reconnaissance survey was first conducted in July 2006, the period when questionnaires and interview schedules were also formulated, units of observation and analysis identified and sampling procedures designed. To reduce costs and control the quality of data collected, 120 households within the spatial sample frame were randomly selected for the administration of household questionnaires. The study also involved conducting of traffic surveys so as to find out the predominant transport modes and travel characteristics in the neighbourhood as well as their traffic volume on cordon points based along the following transport corridors:-

- Ring Road Kilimani and Ngong Road Cordon Point
- Ring Road Kilimani and Argwings Kodhek Road
- Menelik Road and Ngong Road.
- Kindaruma Road and Ring Road Kilimani
- Rose Avenue and Ngong Road
- Kindaruma Road and Rose Avenue

1.8.2: Sources of Data

The study used both primary and secondary data sources as described in the following sections:-

1.8.2.1: Primary Data

Primary data collection methods involved the use of questionnaires, empirical observation and field photography. Questionnaires were administered to the households and were designed to gauge the resident's perception on the emerging neighbourhood development problems in the study area. A hand-held camera was used to collect and record data on the state of neighbourhood development problems in Kilimuni. Primary data collection also involved traffic surveys, which aimed at establishing travel characteristics and magnitude of traffic along various roads within the neighbourhood.

1.8.2.2: Secondary Data

Secondary data sources involved the systematic identification, location and analysis of documents containing information related to the research problem under investigation more particularly the development policies in the neighbourhood. In this regard, both published and unpublished information were reviewed for an overview of the theory on

the principles of sustainable neighbourhood policy development, towards building a conceptual framework on the subject matter. Sources of secondary literature included past theses, journals, and books among others.

1.8.3: Data Analysis and Presentation

Data collected on the above factors was analysed using both cartographic, descriptive and inferential statistical techniques, which include the computation of frequencies, percentages, tables and charts alongside maps and photographs which were used for the spatial diminution of the phenomenon under consideration. This analysis culminated to various thematic maps produced through Geographic Information Systems (GIS) overlay, texts, charts, graphs and plates. Household data was specifically analyzed using Statistical Package for Social Scientists software.

1.9: Limitations of the Study

Funding is a major obstacle to studies relying on social surveys. This normally limits the scope of the study in terms of period (temporal) and spatial coverage thus the scope of the study area was reduced to allow for the limited funding. Lack of detailed maps on the study area and bureaucracies in obtaining information from various authorities delayed the study and made the study to drag beyond the time frame anticipated at the beginning of the study. This is corroborated by the fact that during field survey, the interviewees

were not freely willing to divulge information, more so that information appertaining to the household income. The households within Kilimani neighbourhood presents diversified working class professionals whose days are preoccupied by various professional endeavours. Therefore to capture them, it was imperative that the personal interviews could only be undertaken during the weekends, consequently delaying the study period beyond what was anticipated. At city Hall, it was particularly difficult getting detailed and consistent data on various land use attributes from all levels of staff calibres due to embedded feared of being apprehended by the superiors.

Professional firms which are commercially driven fell short of charging fees for their time of interview. They therefore could not provide consistent and accurate information.

1.10: Operational Definition of Terms used in the Text

Development: Pursuant to Section 3 (a) of the Physical Planning Act (Cap. 286), the term denotes making of any material change, alteration of density of any buildings or land or the subdivision of any land.(GOK 1996)

Development Policy: Refers to all land use and building development regulations, principally used as means of measuring and monitoring performance and evaluation of plans and planning proposals, and are usually established and enforced by local authorities.(GOK 1996)

Sustainable Development: The concept of sustainable development first came into prominence in 1980. It was subsequently popularized by the Brundtland Report of 1987 through the publication of '*Our Common Future*'. The Brundtland Commission defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This inevitably requires the making of value judgments that link the positive definition and the operational objectives that grant result in the attainment of sustainable development.

(Brundtland Report 1987:245)

1.11: Organization of the Text

This research is organized into six chapters. Chapter one introduces the study concept by detailing out the study objectives, research questions, study assumptions, methodology uses in the study as well as operationalising definition of key terms used in the text. Chapter two focuses on the literature review and the conceptual framework. This chapter details various scholarly arguments on what constitutes a neighbourhood and its growth process. Chapter three presents background information to the study area. Chapter four which is an analysis chapter presents land use dynamics and the neighbourhood's development challenges while chapter five discusses the physical infrastructure capacity and their implications to neighbourhood development. Chapter six is a presentation of arising development issues and the proposals for an alternative development model which indeed is a recommendation for the achievement of an envisaged neighbourhood's development policy. This work culminates with bibliography and various appendixes.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUALISATION OF NEIGHBOURHOOD DEVELOPMENT

2.0: Overview

This chapter examines the existing literature in the pool of knowledge on the deductive bases of neighbourhood redevelopment as well as exploring knowledge gaps on the same. The chapter culminates with a conceptual framework which indeed is a scholarly presentation of the researcher's view of a stepwise neighbourhood development using deductive bases presented by other scholars.

Neighbourhood development phenomenon has over the years attracted scholars from a wide range of disciplines. Leading the team are the Urban Planners, Land Economists, Geographers and Sociologists. This has led to an evolution of a comprehensive body of knowledge that can be utilized by urban development authorities for the betterment of the neighbourhoods' structural transformation. From these scholarly discussions, it emerges that sustainable neighbourhood development concept is no longer a black box, but a phenomenon well understood, and therefore can be modelled both in spatial and philosophical terms. A comprehensive review of literature on what constitutes sustainable urban neighbourhood development can broadly be categorized principles of urbanisation and sustainability, theories on city growth and models for the postulation of land-use

differentiation and finally literature on the anchors of sustainable neighbourhood development. However, the body of knowledge that constitutes optimization of spatial coverage and anchors of neighbourhood development are scarce. This study was therefore geared towards providing an empirical basis on what deductively constitutes a neighbourhood and the evolution of the same.

2.1: Principles of Urbanization and Sustainability

The main causes of Nairobi's population growth have been in migration. This has been a result of the economic disequilibrium characterizing Kenya's dual economy of rural and urban sectors further motivating perceptions of better economic opportunity for the urban immigrants. Since independence, Nairobi has experienced growth as occasioned by rural-urban due to the removal of the colonial restrictions on movement of people into the urban centres. By 1979, the rural urban drift had accounted for 2.5 percent of Nairobi's population growth (Muganzi, 1996). Indeed, it has been established that the rate of rural - urban migration mainly to Nairobi is determined by the rate of economic development of the city (Oucho, 2000). This occurs as a result of wide income differentials between Nairobi and other urban and rural areas.

Other factors which are largely non-economic such as level of education, the erosion of cultural safety nets in the rural areas and the presence of supportive relatives or friends in the city have also raised affinity in the migration pattern. From the time of independence, women migrating from the rural areas have gradually increased in numbers. This is

attributable to the substance of the socio-cultural milieu, economic and community foundations of the men-women relations, which have changed overtime with the transition from a traditional to a modern society. A major contributory factor has been argued to be land ownership. This was initiated by the Swynerton Plan of 1954, which undermined women economic rights in various ways through land consolidation. The implementation of the plan that resulted in the conversion of land into a form of private property held by an individual (males) systematically alienated women nation-wide to an extent that less than 4 percent of women have land registered in their names (Kenya Human Rights Commission, 1998). Due to constraints emanating from women being excluded from ownership of land and the benefits accruing thereof, as well as erosion of traditional support systems, the majority of women (mainly single, divorced and widows) opt to migrate to urban areas in search of employment. Natural population growth rates which is considered to have been caused by the higher education levels for women in the city and the use of family planning by more women in Nairobi as compared to the other areas has reduced infant mortality rates in the city. The Nairobi's high population growth rate continues to be associated with many social, economic and environmental problems.

A number of *ad hoc* study groups have been set up in Nairobi to help solve the city's growth. The findings and recommendations of these studies however have not been able to solve the city's growth problems consequently the city has continued to grow unabated and by 1962, the African population was over seven times that of Europeans implying a rise in demand for housing. The quest to house African population by the colonial masters led to the demarcation of zones within the city for developing African housing

such as Pumwani, Shauri Moyo and Kibera. On the other hand, the European population continued to reside in affluent areas that included Kileleshwa, Parklands and Kilimani the study area. This therefore became the harbinger for Kilimani neighbourhood's characteristic and over the past four decades, there has been explicit policy enactment for population distribution and facilitation of a balanced spatial development of Nairobi. However, experience shows that the above policies and programs failed to effect population re-distribution significantly and that Nairobi has continued to grow leading to an increasing incidence of urban poverty, inadequate access to: housing and basic services, the proliferation of slum and squatter settlements, urban environmental degradation and more particularly important: water, sewer, drainage and sanitation (Obudho and Owuor, 1997). The failure of these policies/strategies to effect population redistribution significantly (and especially from Nairobi) has been due, in part, to the fact that the level of primacy in Kenya is still relatively high (though reducing). This meant that Nairobi will continue to be the centre of all administrative, political, social, cultural, and economic activities. Besides, institutional arrangements to fully implement some of these strategies have been weak.

The rapid population growth and sustained economic growth in the city has meant that those zones adjacent to the Central Business District became alternatives for residential and commercial development. Thus, Kilimani area and other estates notably in zones 3, 4 and 5 has since felt the above pressure. Up to the early 1990s, the above stated city's development zones were characterised by low-density to medium density residential developments of predominantly maisonettes and bungalows sitting on half acre plots and

fully serviced with water, sewer, electricity and all weather roads. However, the period between mid 1990s to date has witnessed radical land use transformation in the area from residential to commercial. High-rise development in the form of commercial buildings, apartments and office blocks were developed. Traffic congestions and high cost of rent in the city centre forced a number of businesses to move away from the middle of the city. The above events quickly placed Kilimani neighbourhood on the receiving end and transformed itself into a convenient location for these migrating commercial entities. This meant maximization of land use as opposed to the earlier residential maisonettes and bungalows sitting on half-acre plots. The unfolding scenario as described above has seriously strained the existing infrastructure services notably roads and sewer which are yet to be expanded.

2.2: Urban Land-Use Differentiation

An array of urbanisation scholars have postulated various concepts on the basis of urban growth and the land use differentiation within the cities. These concepts include the post colonial city, the city of enterprise, the city on the highway and the city of towers among others. In this regard, Miller (2001) in Boston's Fenway neighbourhood postulated that the link between communities and natural systems begins with recognition that nature exists within the place where people live and work. Just as human culture is shaped by ecological conditions; human behaviour on the other hand impacts on urban nature through city and neighbourhood design. Nairobi was founded and developed as a colonial town to serve purely the interests of the colonial powers and not the native population. As

such. Nairobi is one of the several Post colonial cities whose structure is a product of cultural contact between industrial European powers and traditional based agrarian economy and therefore colonization played a dominant role in shaping its urban form. In order to create congenial environment the built environment borrowed heavily the characteristics of European architecture.

For instance, neighbourhoods like Kilimani, Kileleshwa and Parklands among others still bear the characteristics of European architecture. Such neighbourhoods are characterised by evidence of old buildings based on colonial architecture and planning considerations, conversion of existing residential buildings into commercial use, changes in plot sizes due to subdivisions to accommodate changing use and for speculative purposes as well as changes in typology as occasioned by deviation from bungalow type housing to high-rise flats has led to changes in image of the neighbourhood by accentuating new design aspects, users and activity patterns as evidenced by Ngong Road façade of the study area where shopping complexes tend to suck other stand alone retail enterprises within the surrounding neighbourhoods as shoppers are introduced to the conventional one stop shopping concept. Towards this end, Kilimani area is soon becoming an enterprise zone by virtue of the migration of the above activities. This constitutes what is considered as city of enterprise. Therefore, alongside with the city's growth, the neighbourhood is equally dependent on the nature and level of commercial activities it supports and the level of physical infrastructure that has been put in place (Lynch, 1978: 343).

2.3: Theories on Urban Spatial Structure

There exist a body of literature constituting theories on land use and urban spatial structure stemming from the classical and Neo-Marxist period advances of human activity development systems and institutions such as households, firms, governments, and other institutional organisations interacting with space over time. Some of the leading figures behind these theories Neo-Marxist have been discussed below.

2.3.1. Classical Theories

Alonso's work of 1960s presented a model of the interaction of land values and land uses and proceeded by detailing how individual households achieves its own equilibrium in the face of land supply *vis a viz* location of goods and services within an urban setup. He then built on individual behaviour to attain a model of aggregate market equilibrium, where supply and demand quantities as well as prices are equalized. In this regard, he introduced the theory by focusing on an individual, household or firm bent on a series of activities. Alonso noted that individuals arrive in the market wishing to buy land for a home or business and face the double decision of how large a parcel to purchase or rent and how close to the centre of the city having diversified infrastructure differentiations should he or she locate. Alonso's model assumed a city of single employment and shopping centre with equal transportation in all directions where no zoning or other restrictions on development exists. The theory also assumes that the household or firm has perfect knowledge of the price of land and the cost of commuting throughout the city.

In the case of the household the individual has a given income, which can be spent on land, therefore commuting to the city centre from whatever location is chosen and the composite good. Therefore an individual household's equilibrium is achieved through selective combination of quantity of land, distance from the city centre and quantity of the composite good that as a combination will maximize its satisfaction but stay within its income constraint. The household makes this selection in the face of a given structure of land costs, which are higher near the centre and become lower with increasing distance from the centre. Therefore, household's choice is a function of its preferences and income levels. This corresponds to opportunity combination of land quantity, distance and amount of the composite goods which yields the greatest feasible satisfaction.

In the second stage of the theories Alonso derived bid price curves for the individual residents and the urban firm and uses them to find individual equilibrium. The bid price curve is the set of hypothetical prices for land which the individual household or firm could pay at various distances from the city centre. Alonso therefore noted that the household or firm will choose that location at which real price structure touches the lowest of the hypothetical bid price curves which connotes the bid price associated with the highest level of satisfaction. Alonso finally achieves a theoretical equilibrium for the entire aggregate market and postulated that the process of clearing the market to arrive at equilibrium begins at the centre of the city. The most central site goes to the user with the steepest bid price curve which is the user-bidder whose preferences for a location drop off most quickly with increasing distance from the centre.

After the amount of land consumed by user number one has been determined, the bidder with the second, steepest bid-curve will locate on the next site outward from the centre, thus the final price at the city centre is actually determined by the price of land at the city's outer edge and its distance away from the centre. In effect, this model simulates a process, which potential users bid for land and the property owners sell or rent the land to the highest bidder. Thus, he noted that land use pattern of a city is a function of bid-rent function of various users so that the city is just large enough to accommodate all user's land needs for the supply and demand prices are equalized in such a way that no user of land can increase his firm's profit or the household's satisfaction by moving to another location or buying either more or less land while no landlord can increase revenue by changing the price of the land. Alonso's formulation thus explains how preferences on the demand side and land and location opportunities on the supply side are mediated through the market mechanism to establish land use. This explains the particular locational of Kilimani neighbourhood in the Nairobi context.

Wingo's work of 1961 provides another systematic and rigorous statement on locational pattern on urban activities in the framework of equilibrium theory otherwise called *Transportation-Oriented Theory* of land use. In his postulations, Wingo directed his attention mainly to residential development by first developing concepts of transportation demand; considering the spatial relationship between home and work. With the journey to work viewed as technological link between labour force and the production process, he defined demand for movement as the total employment multiplied by the frequency (Wingo, 1961). supply and demand quantities are equalized so that the city is just large

enough to accommodate all user's land needs without any vacant land existing drawing on the concept of accessibility, he uses as a unit of measurement the cost of transportation either on the time spent in movement between points or the out-of-pocket costs for these movements expressed in money equivalents for distance and number of trips. Therefore, Wingo achieves this location equilibrium by substituting transportation costs for space costs. On the supply side he uses transportation costs to establish the distribution of household sites at varying position rents which is the annual savings in transportation costs compared to the highest cost location in use

On the demand side, if prices for other goods competing for the household income are held constant, the rents households are willing to pay are based on the classic utility concept, which holds that the greater the unit rent, the fewer the units of space consumed. This view of space use immediately involves density, and the smaller the quantity of space consumed in the more accessible location; the higher the density which reflects in the spatial distribution of these densities in the urban area. The framework Wingo proposes functions under the assumption that the behaviour of those controlling residential spaces and households seeks to maximize their returns. He specifies these factors as those determining spatial distribution of densities, locations of employment centres, transportation technology and the marginal value households place on residential space. Wingo then uses his model to determine the spatial distribution of densities, rents, spatial distribution, value and extent of land required for residential land use. However, choices of location are also influenced by social values, tastes, symbols and choices which frequently vary among different social and ethnic groups of a pluralistic society.

Therefore, there is a growing emphasis in theoretical research on social process as explicit and direct expressions of land-using behaviour.

The above being the case, Firey's Work (1974) has been very influential. Disturbed by the general acceptance of a "rationalistic" approach to the explanation of land use with a strong explicit or implicit emphasis on self-regulating economic forces that distribute people and uses in the urban area, Firey studied sections of Boston to determine how values and ideals functioned in respect to past and existing land use patterns. He noted that these rationalists readily acknowledged the reality and effectiveness of social values in spatial adaptation but he made no attempt to incorporate the empirical concession into their theoretical system. All factual departures from the kind of spatial order called for by the theory are lumped together into a loose category of "*limiting*" or "*complicating*" factors. This category embraces "custom" moral attributes and "*taboos*", political and administrative measures, cultural biases, traditional patterns among others. These are supposed to limit or complicate the natural competitive process, but they are not regarded as ultimate causative factors. He therefore set out to test two propositions. -

First, he noted that socially rooted values exert causative influence on urban land use patterns and secondly he observed that rationally functioning interests such as market-governed forces in exerting a causative influence land use patterns stem directly from larger cultural systems and cannot be viewed as self-given ends in themselves. Studying locational trends in Boston's Beacon Hill, he concluded with respect to the first proposition that space may not only be a productive agent but also a symbol and that

people in groups choose locations not only in relation to market considerations but also in response to social values.

In the Beacon Hill section, he identified three kinds of influences which values exerted on land use what he terms the "*retentive*" the "*recuperative*" and the "*resistive*" and on the basis of his tests concludes that values are indeed self-sufficient ecological forces and that they have a very real causative influence upon land use. In highlighting the origins and the preservation of historic sites in Central Boston, which he uses as examples of symbolic attributes attached to an area becoming embedded in the social values of the people. Therefore, Firey points out that social values are not a result of fetishism with space as a conscious object of veneration but rather a result of processes of social organization, with which residence of an area identify with. The second purpose of Firey's study was to discover whether locational processes could be wholly separated from a cultural context. He therefore concluded from his study of the retail centre in Boston, and the South End, that "rational" determinants of land use are themselves contingent upon a particular culture - bound value system and the cultural component is central to locational processes. In this regard, he concluded that failure to recognize cultural component in spatial adaptation in Wingo's and Alonzo's studies was a major omission in seeking to explain land use differentiation in the city.

Webber (1929) utilized interaction as the basis for conceiving of urban communities. He distinguished between the "place community" as one in which interaction occurs in a particular metropolitan community and the "*non-place community*" as one in which

interaction extends to widely scattered places over the face of the earth. With modern transportation and communications developments having the effect of stretching distances, - individuals, firms, organizations and institutions more and more transactions and maintain communications on a global basis. Thus their ties may extend to a variety of non-place communities as well as exist within a particular urban place. He considers that the study of systems of interaction within the urban region is no longer a sufficient scope for metropolitan planning, a more complete view is one which considers how the place population may also be a part of various non-place community space or realm populations, each with what it terms as its own "*space-field*" for interaction (some global, some national while some are regional). These dynamics are traced through "*linkages*" which are defined as "*dependency ties*" relating individuals, groups, firms and other entities to one another. These, he calls "*the invisible relations*" that bring various interdependent business establishments, households, voluntary groups, and personal friends into working associations with each other into operating systems.

His spatial view of linkages involves viewing of the city in terms of spatial patterns of human interaction, the flow of communications, people and goods. Secondly, he viewed the city as physical form of space adapted for various human activities and the networks of communications and channels of transportation. Finally, he viewed the city as a configuration of activity locations - the spatial distribution of various types of activities by economic functions, social roles and other ways of classifying activities. Towards this end, he would therefore measure spatial linkages (the flow of information, money, people

and goods) as well as study the channels used, space forms adapted for human interaction and locations of activities.

Guttenberg (1960) conceives of urban structure and city growth in terms of accessibility on what he calls "*a community effort to overcome distance*" in the sense that human interaction is the underlying reason for minimizing distance. He viewed interaction as the basic determinant of urban spatial structure. His work focused primarily on the physical - facility aspect of a total system of theory. In place of the simple two-part view of activities (space use of facilities and interconnecting channels of transport and communications), he identifies three components, distributed facilities, undistributed facilities with these being a function of the third component "*transportation*". The rationale states that if transportation is poor, the work places trade centres and community services will tend to assume a pattern of distributed facilities if it is good these activities will assume more concentrated patterns in the form of undistributed facilities. He thus maintains that urban spatial structure is intimately connected with the aggregate effort in the community to overcome distance.

Concentric-Model Concept postulated by the Chicago school sociologist called Burgess in the year 1925 explains composite land use arrangements as an ecological process in the city. This model sees the city as consisting of series of five concentric zones. At the core is the "loop" district with its shopping areas, its theatre districts, its hotels its office buildings, banking houses and other businesses, which seek a central location. In small communities these business functions intermingle; in large cities they form more or less

distinct sub-districts. Adjoining the loop and fanning out into the next zone is the city's commercial area. Here the market districts and the older wholesale districts and warehouses are located. To-day many of these uses seek outlying locations. When the city is situated on the edge of a body of water, its port functions in most cases are interspersed with these functions. Usually industries, which do not require much ground, are also located here. Cutting across this and the remaining outer zone along railroad rights-of-way and forming long wedge-like areas are the industrial sections of the city.

The second zone is the zone of transition which is identified by the variety and changing character of its uses. Here the residential areas begin. In one portion of the zone, there may be an island-like cluster of "*first-citizen*" homes persisting behind brick walls and iron fences, clinging tenaciously to the respectability that once marked the entire area. In some sections of large cities such structures may have been supplemented by high-rise apartment houses. In others the old structures may still be standing, but with antique shop or boutique signs signifying new ones. In some locations the now-shabby homes display signs advertising "rooms to let" or "light-house keeping apartments". Often other sections of the zone, particularly those adjoining the industrial wedges, contain residential slum areas.

The second zone blends into a third zone consisting largely of "*working men's homes*" which is homes to factory workers. The fourth zone contains the large residential areas of the city. This is the area where the white-collar workers and middle-class families are found. Later, Burgess dealt more fully with a fifth ring, a commuter's zone. In this ring

are the suburban communities found along the arteries transportation. This is where the middle-class and upper-income groups reside. To indicate observable tendencies in the internal structure of the city, Burgess traced the dynamics of change. He observed that as growth occurs each inner zone of the generalized diagram tends to invade the next outer zone, following what the human ecologist refers to as a sequence of "invasion-succession". In contrast, when urban areas are decreasing in population, the outer zones tend to remain stationary but the inner fringe of the transitional zone tends to recede into the commercial district.

In this connection the accompanying contraction of the commercial district and a consequent expansion of the transitional area are frequently interpreted to mean the creation of "permanent" commercial as well as residential slums. As a theoretical description of the relative positions of the major functional areas of land use in a city and how they change over the years, the elemental simplicity of this approach has had considerable appeal. While it is a useful visual way to describe broad and general tendencies at work in the patterning of urban land uses, in many respects it is an oversimplification. Subsequent work relating to the sector and multiple-nuclei approaches, as described below, provides theoretical descriptions of land use patterns, which take into account the assumptive basis of the concentric model.

Sector model as postulated by Hoyt (1939) in a study of residential areas in the United States provided new insights into the patterning of land uses that led to a theoretical explanation of residential land uses in terms of wedge-shaped sectors radial to the city's

centre and along established lines of transportation. This concept holds that the different income classes of a city tend to be found in distinct areas described in terms of sectors of a circle centred on the central business district. The high-rent or high-rise residential areas can be identified in particular sectors and there is a graduation of rentals downwards from these high rental areas in all directions. Intermediate rental areas or those ranking next to the highest rental areas adjoin the high-rent areas on one or more sides tending to be located in the same sector as the high rental areas. Low-rent areas occupy the outer sectors of the city from the centre to the periphery.

Viewed in the context of change, the theory holds that similar types of use originating near the centre of the city tend to migrate within the same sector and away from the centre. High-rent areas and high-price areas are conceived as having a dominant area growth exhibiting the following growth characteristics; high-grade residential growth tends to proceed from the given point of origin along established lines of travel or toward another existing nucleus of buildings or trading centres. The zone of high-rent areas tends to progress toward high ground which is free from risk of floods and spread along lake, bay, river, and open fronts where such waterfronts are not used for industry. High-rent residential districts tend to grow toward the section of the city, which has free, open country beyond the edges and away from the "dead end" sections, which are limited by natural or artificial barriers to expansion. The higher-priced residential neighbourhood tends to grow toward the homes of the leaders of the community. Trends of movement of office buildings banks and stores pull the higher-priced residential neighbourhoods in the same general direction. High-grade residential areas tend to develop along the fastest

existing transportation lines and continue in the same directions for a long period of time. Deluxe apartment areas tend to be established near the business centre in old residential areas. Real estate promoters may bend the direction of high-rise residential growth.

The operations of these characteristics are observable in the way boulevard developments have been left for the exclusive outlying subdivisions - a move attributed to the automobile. This trend has been accelerated by the availability of expressway systems and regional shopping centres owing to the almost universal use of the automobile. With some exceptions these moves have been found to occur in the same sectors. Through the "trickle-down" process the abandoned homes, often too expensive to maintain for succeeding groups of lower income level, become small housekeeping apartments, interspersed with a few properties taken over by institutions. Parts of these areas may be cleared later to make way for the exclusive high-rent apartments developments. The sector theory thus provides a more detailed explanation of residential patterns of land use than that set forth in the concentric-zone formulation, particularly in the more discriminating way in which it deals with the dynamics of growth processes. The theory has also had profound effect in stimulating awareness of the need for a theory of urban land use. With the many social and economic changes in central cities that have occurred since the publication of this theory, this need is stronger than ever today.

The last of the explanatory theories is the Multi-Nuclei Concept, which was postulated by Harris and Ullman in 1945. The concept is built around the observation that frequently

there are a series of nuclei in the patterning of the urban land uses rather than the single central core postulated by the other two theories. Harris and Ullman in 1945 observed that sometimes these are district centres in the original metropolitan that persist as growth centres as new centres as urbanization proceed. Harris and Ullman further noted that the number of nuclei and the functions of each district vary from one metropolitan area to another of which the Central Business District clearly serves as one nucleus. Others may appear in the form of industrial or wholesaling centres where specialized economic activities of similar or complementing character have gravitated, while others may emerge in the guise of major outlying retail centres.

Towards this end, Harris and Ullman identified four factors that tend to account for the emergence of separate nuclei in urban land use patterns. One is the inter-dependence of certain types of activities and their need for close physical proximity. The second is natural clustering tendency among certain types of activities that find it mutually profitable to locate together as evidenced in retail centres, medical centres and outlying office-building centres. Third is the converse of the last embodied in the appearance of centres to accommodate activities that may have no particular affinity for one another but are inimical to other uses by virtue of the traffic they generate, the extensive railway or truck-loading facilities they require among others.

Finally there is the related factor of high rents or high land costs which have the effect of attracting or repelling users in the process of nucleation. The concept recognizes many of the realities of contemporary metropolitan area land use patterns. However the theory needs modification based on empirical investigations of the kind undertaken by Hoyt

before it can operationally be used a descriptive explanatory model for urban land use. It also requires a clearer differentiation between factors explaining the structure and dynamics of change.

Figure 2.1: Generalized explanations of the land use patterns of cities

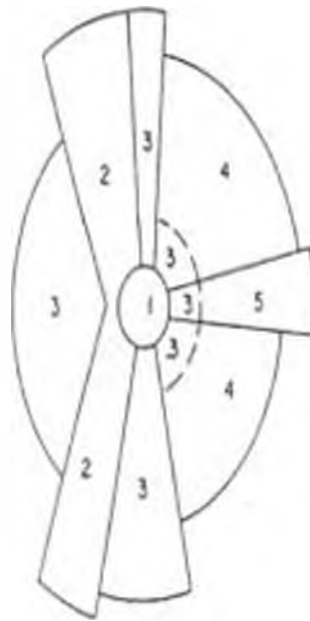
CONCENTRIC ZONE CONCEPT

- 1 Central Business District
- 2 Zone of Transition
- 3 Zone of Workingmen's Homes
- 4 Zone of Better Residences
- 5 Commuters Zone



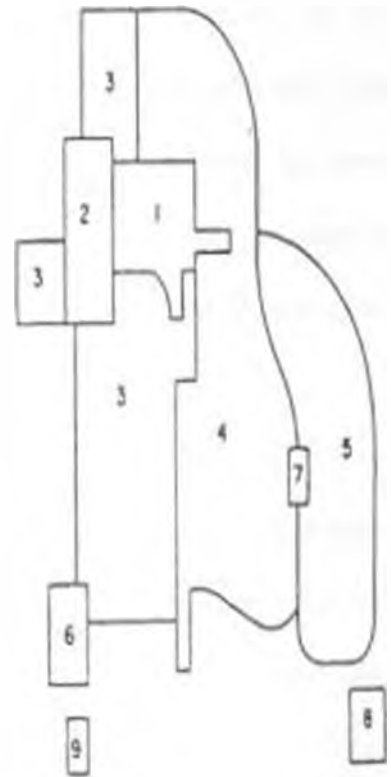
SECTOR CONCEPT

- 1 Central Business District
- 2 Wholesale and Light Manufacturing
- 3 Low-Class Residential
- 4 Middle-Class Residential
- 5 High-Class Residential



MULTIPLE NUCLEI CONCEPT

- 1 Central Business District
- 2 Outlying Business District
- 3 Heavy Manufacturing
- 4 Residential Suburb
- 5 Industrial Suburb
- 6 Heavy Manufacturing
- 7 Outlying Business District
- 8 Residential Suburb
- 9 Industrial Suburb



Source: (Harris and Ullman, 1945)

2.3.2. Modern (Neo-Marxist) Theories

Sometime in the 1970s, the city-planning movement began to revolutionise to a point of self-destruction. Conventional land use planning generally and regulations to guide the use of land in particular, seemed more and more discredited that it regulates urban growth instead of encouraging it yet cities are machines of wealth creation. Therefore, the chief aim of planning must be to oil the machinery (Lynch, 1978: 343). Over the years worsening congestion levels and the high costs of rent has necessitated commercial activities to shift from the Central Business District to the urban peripheries. In this regard, the major highways linking the cities have tended to attract these activities. The above trend has been advanced in Nairobi. This emerging concept is what has been referred to as the Urban Development Corridor concept, which has taken precedence since 1970s chiefly from urban planning experts who were convinced of the potentials of city commercial corridors in terms of commercial and economic growth.

Hall (1977) argued that the critical problem for cities today is that management interventions have managed to destroy much of the innovating entrepreneurship that was once the important economic feature of central metropolitan areas. As a reaction to the sentiments expressed by Hall (1977), proactive urban planning have since envisaged urban development corridor concept which involves transforming city thoroughfares into strategic business hubs that promote commercial and neighbourhood activities through intensification of land uses defined by main city street, bus stops, commercial and sometimes industrial activities on either of the corridor. This concept revitalizes

contemporary urban structure which seeks to make better use of land resource. In a city like Nairobi where businesses are being driven out from the Central Business District by traffic congestion and related problems, the urban corridor concept has stood out as an alternative of freeing the city and promotion of urban development. Further, concept provides opportunities to identify potential commercial activities and to help structure and strengthen the identity of different neighbourhoods around specific corridors and to further generate the formation of urban corridors. In this regard, urban neighbourhoods shall continue to be important components of this concept. The corridors usually of mixed land-use typology presents high density development along the highway promoting passenger transport and provides for growth and change (Lynch, 1977). The existing quality environment between the corridors can be protected to allow for open space that can be utilized as recreational ground for the occupants of the urban corridor.

The concept of the city of towers was born in the early 1920s as an advancement of the concept expressed above by Le Corbusier based on Paris landscape, which was dotted with historic 12th Century neighbourhoods comprising single storey residential units. Le Corbusier's initial proposal of eighteen uniform 700 feet high towers would have been entailed demolition of the existing neighbourhood and no doubt aroused a lot of outcry in the City Council of Paris and among the public who referred to him as a barbarian. This concept is exemplified in Nairobi by the old European neighbourhoods such as Kilimani, Parklands and Kileleshwa among others which are currently transforming to the city of towers as occasioned by the planning policies of 1981, 1987 and 1991 which has enabled erection of high-rise residential developments. The city of towers is even set to be

redefined further by the entry of commercial activity where residential functions were within a framework of an upgraded infrastructure to accommodate these emerging activity patterns (Hall, 1977).

2.4: Neighbourhood Development Theories

In Kenya, a wide range of regulations and statutes has been enacted for purposes of controlling development process. These regulations and statutes adversely affect majority of urban dwellers that have very little or no say in their formulation and implementation yet the goals of settlement planning must be the welfare of all human beings (Agevi, 1990). Therefore a good human settlement is one where the housing needs of everyone are satisfied without adversely affecting the man-nature relationship or legitimate interest of the people. The building standards and regulations are found in several Acts of Parliament which include the Physical Planning Act (1996). The Act ensures that standards are applied in structure and regional plans to allocate various urban uses and infrastructure services on the basis of existing population. The Act achieves this through enactment of standards in subdivisions stipulated by statutory road sizes for the various types of neighbourhood hierarchy. Other measures stipulated by the Act includes carriageway widths of control land use activities through zoning which segregates land parcels into broad classifications of appropriate use.

The Public Health Act (Cap 242) which specifies construction materials, lighting and ventilation, sizes of rooms, space around buildings, erection and use of temporary or moveable buildings and use of a building before occupation certificate is issued. The

Building Code (1968) which specifies the minimum requirements for materials, technical details on the sizes and specifications of buildings, Regulates and recommends building practices and procedures. In this regard, Code 44 gives the safe bearing capacities of various sub soils, requirements for building components such as those for lighting and ventilation as well as building materials.

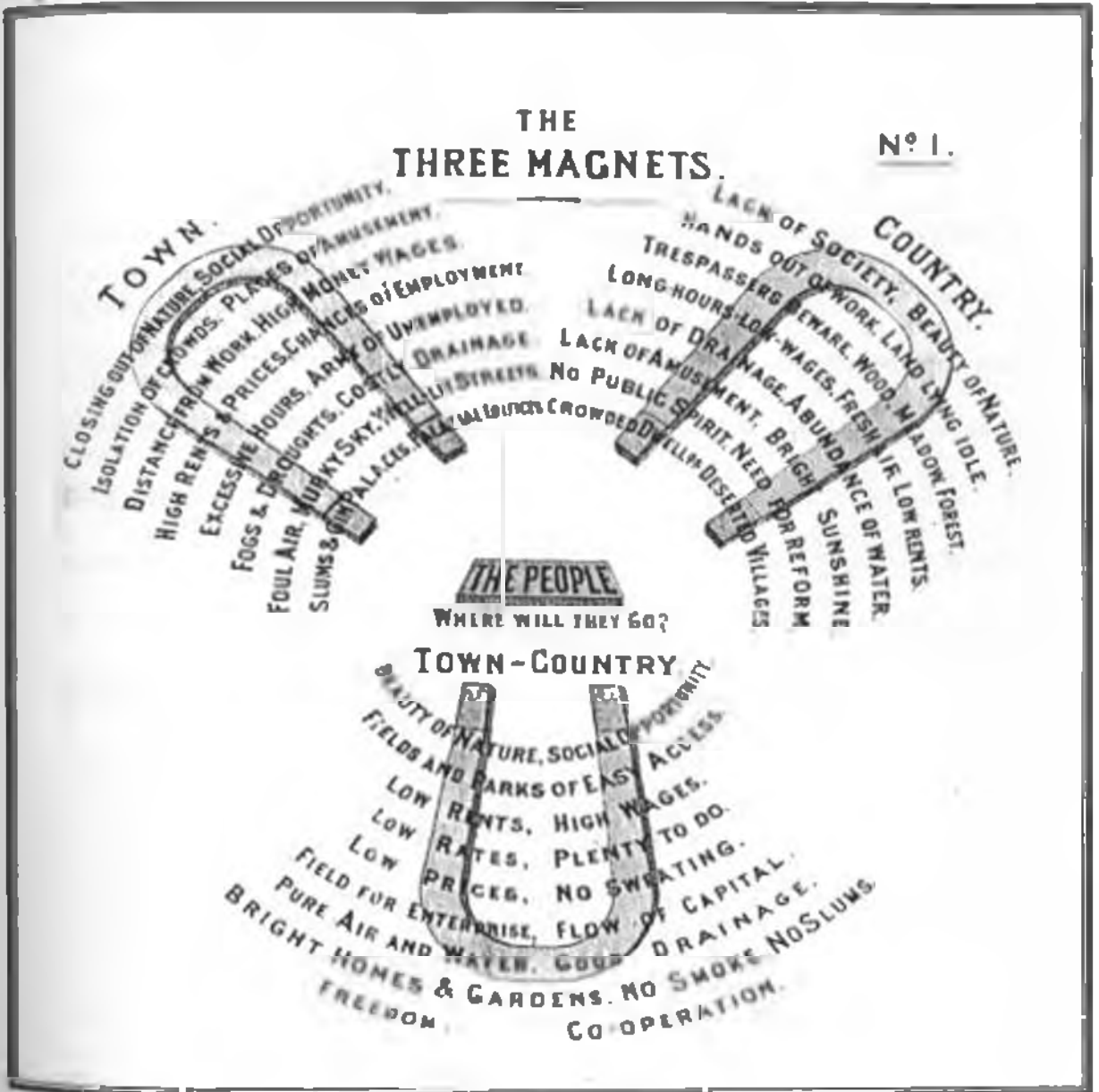
The standards and requirements specified by the above legislation and the council's adoptive by-laws should capture the aspirations of the community on which it is to be applied and should be acceptable at any given time. It was premised in this study that infrastructure in the study area is already overstretched and the same shall not be expanded in the near future. However, the city dwellers and private investors can provide for the infrastructure alongside housing if there is enabling environment provided by the government through support to local initiative, and in showing how essential changes can come about. Similarly the level and distribution of community services and amenities can only be effectively determined by the community or neighbourhood groups that will ultimately use them and/or be responsible for their management and maintenance. It is, therefore, suggested that governments should withdraw from direct provision of certain urban services and concentrate on facilitating action by private firms, non governmental organisations and the self-help efforts of the neighbourhood's residents. Complex regulations pertaining to the registration and development of land and lack of financing for the urban infrastructure undertakings have resulted in poor state of most neighbourhoods.

Urban speculation and its disintegrating effect upon the environment aroused the public consciousness during the 19th century as characterised by literary works of Ruskin, Geddes, Carlyle, Shaftsbury, Charles Dickens, Engels and Disraeli which sheds light on the issues with the force of their insight and talent (Galla, 1963). Among these luminaries was Patrick Geddes whose 1892 Edinburgh Outlook Tower, which presented the whole complex of urban life. Geddes work postulated human existence as an integration of physical with socio-economic improvements. He further gave credence to what was later to become regional planning or by extension city planning. Ebenezer Howard disturbed by the depressing ugliness and haphazard urban growth theoretically postulated a town in which the land would remain in the single ownership of the community while dwellings would be distributed about a large central court where the public buildings would be located while the shopping centre would be on the edge of the town and industries on the outskirts. The city would have a population of some 30,000 people in an area of 1,000 acres. Surrounding the entire city would then be a permanent belt of agricultural land of 5,000 acres

To understand Neighbourhood development, one needs to look at its historical perspective of a city for whichever the size of a city, there must be distinct workable unit of the human scale with which to weave the urban pattern into a workable whole entailing social attachment rather than detachment. Opinions among social scientists differ on the effectiveness of the neighbourhood principle as a means of overcoming social detachment. Some contend it is imperative to re-establish a "face-to-face" relationship through neighbourhood association, others expect that people will seek

their friends no matter what distances may separate them, even while they remain only chance acquaintances and remain strangers with their next door neighbours thus the concept has been criticised that it leads to grouping of people that inevitably results in compulsory class distinctions (Gallan, 1963).

Figure 2.2: The celebrated Howard's diagram from Garden cities of Tomorrow



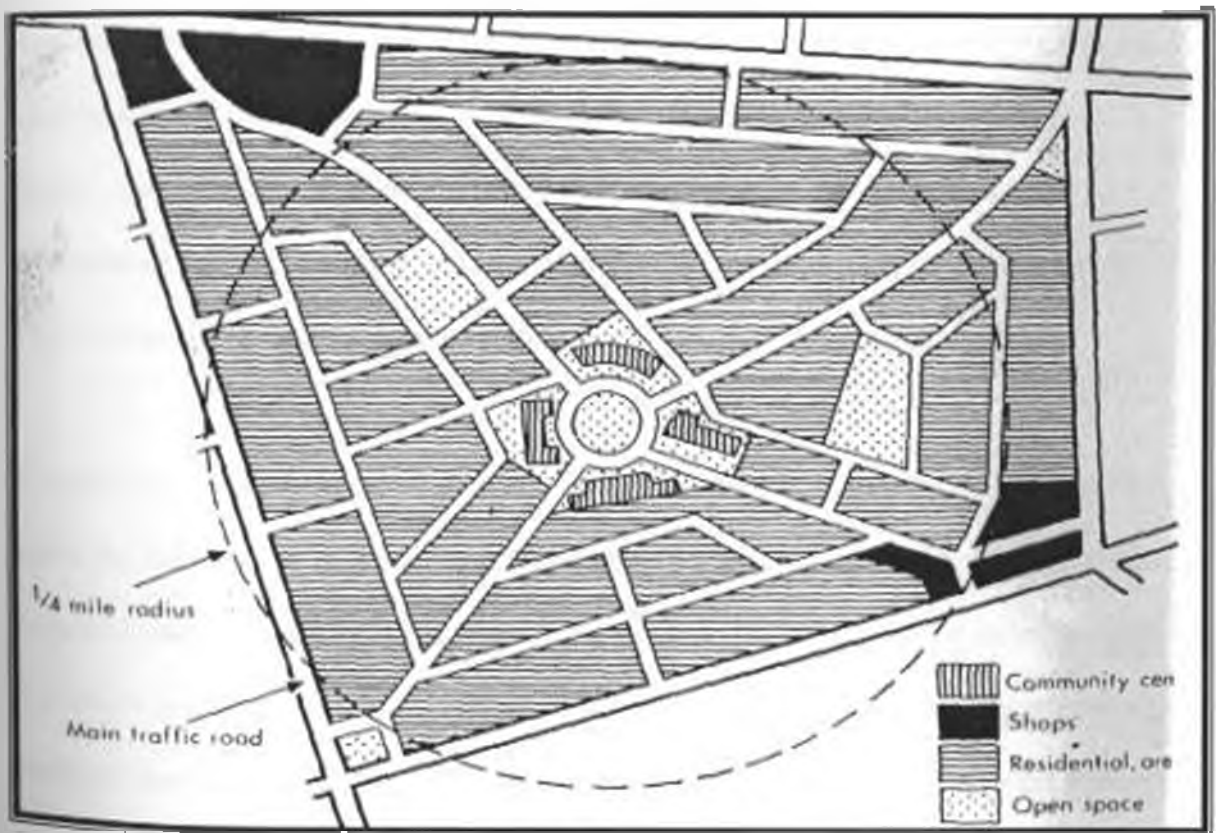
Source: (Lynch, 1981: 49)

The neighbourhood concept embraces physical environment where a community thrives within reach of basic services, goods, find convenient transportation to and from work. It would therefore consist of well-planned and coordinated road network, shops, schools, churches and other social facilities within direct reach by the community living within the neighbourhood. One of the earliest authorities to attempt a definition of the neighbourhood in specific terms was Clarence Perry. Although opinions differ to some degree, the definition he set forth in the Regional Survey of New York and Its environs in 1929 is still a valid to date. He described the neighbourhood unit as that populated area, which would require and support an elementary school with an enrolment of between 1,000 to 1,200 pupils. This would mean a population of between 5,000 and 6,000 people developed as a low-density dwelling district with a population density of 10 families per acre. The neighbourhood unit would occupy about 160 acres and have a shape, which would render it unnecessary for any child to walk a distance of more than half a mile to school. Within this framework, about 10 per cent of the area would be allocated to recreation while through-traffic arteries would be confined to the surrounding streets while internal streets remain limited to service access for residents of the neighbourhood. The unit would be served by shopping facilities, churches a library, and a community centre, the latter being located in conjunction with the school.

Neighbourhood unit is repeatedly referred to in proposals for urban reorganization though suggested form varies widely, its characteristics is fairly consistent. The

suggested population appropriate for a unit should range between 3,000 to 12,000 people. Some authorities have expressed a desire for units of smaller size than a school district, believing the nature of the neighbourhood requires a relatively smaller size generally 1,000 and not to exceed 1,500 families. Despite the variations in the scholarly annunciations, the principle of the neighbourhood unit runs through all considerations for social, physical and political organization of the city, for it represents a unit of the population with basic common needs such as education, recreation and other service facilities thus becomes the standard on which the size and urban designs emerges.

Figure 2.3: An Illustration of Clarence's neighbourhood unit concept



Source: (Lynch, 1981)

Other scholars have since presented a comprehensive view of the neighbourhood as a component of the successively larger segments in a city structure to include elementary schools, a small shopping district and a playground. These facilities are grouped near the centre of the unit so that the walking distance between them and the home does not exceed half a mile. An elementary school with a standard enrolment of between 600 and 800 pupils will represent a population of about 1,700 families in the neighbourhood unit. Two such units will support a junior high school with a recreation centre in conjunction therefore the walking distance does not exceed one mile from the centre to the most remote home. Four units will therefore require a senior high school and a commercial centre. It will also be an appropriate size for a major park and recreation area. The grouping of four neighbourhood units forms a "community" with a population of about 24,000 people. The component parts of this community pattern are integrated and such communities may be arranged in whatever combinations depending on the sources of employment and communication corridors.

Neighbourhood differentiation, creation and revitalization in cities like Nairobi was borne through zoning practices that take into consideration all economic and socio-cultural factors affecting particular neighbourhoods. It entails a careful balance of all the forces that come into play. However, today Nairobi witnesses extravagant zoning practices providing areas for commercial and industrial uses resulting to urban pattern

devoid of residential improvements. Consequently excessive land values render it too expensive to allot adequate open spaces for recreation and educational facilities.

Stemming from the above, a functional neighbourhood's basic components entails learning institutions, shopping centres, open spaces (recreational facilities), ambient parking and co-ordinated vehicular and pedestrian circulation systems among others. The ordering and relationship of these components should determine the level of functionality and ultimate neighbourhood sustainability. Neighbourhood units enables people to know each other as they engage in group activities which generate civic interest; clubs for social, political, intellectual discussion as well as recreation activities through which local problems are aired and common resistance to undesirable trends is generated and greater amenities encouraged. Further, the essence of neighbourhood identity is to enable people retain identity and character through insisting upon adequate zoning and ascertain that the will of the majority is not violated by a selfish few.

Towards this end, neighbourhoods stem insidious growth of obsolescence within its confines and aid adjacent communities to do the same. While an improvement can increase value, deterioration can cause a slum which should be mitigated through proactive sustainable planning, encouraging constant community vigilance and desirable place where people live and work. It is therefore gamine that a neighbourhood's environmental aesthetics be conserved.

Table 2.1: The Recommended space requirements for a typical neighbourhood

THE NEIGHBORHOOD UNIT			257
	Population	Number Children	Size in Acres
	2,000.....	450	3.25
	3,000.....	600	4.0
	4,000.....	800	5.0
	5,000.....	1,000	6.0

As a rule a Playground for fewer than 200 children is impracticable for operation, and more than 1,200 children require two or more separate playgrounds. A minimum size of 3 acres for a Playground is recommended.

STANDARDS FOR RECREATIONAL ACTIVITIES*

Type of Recreational Activity	Space Requirements for Activity per Population	Ideal Size of Space Required for Activity	Recreational Area Wherein Activity May be Located
<i>Active Recreation</i>			
Children's play area (with equipment)	0.5 acre per 1,000 pop.	1 acre	Playgrounds - neighborhood parks - community parks, school playgrounds
Field play areas for young children	1.5 acres per 1,000 pop.	3 acres	Playgrounds - neighborhood parks - community parks
Older children - adult field sports activities	1.5 acres per 1,000 pop.	15 acres	Playfield - community park - district park
Tennis - outdoor basketball - other court sports	1.0 acres per 5,000 pop.	2 acres	Playfield - community park
Swimming	1 outdoor pool per 25,000 pop.	Competition size plus wading pool	Playfield - community park
Golfing	1 18 hole course per 50,000 pop.	120 acres	Community park - district park
Parking at recreational areas	1 acre per 4,000 pop.	varies	Playfields, community, district and regional parks

* *Urban Land*, May 1961, by George See, Director, Intra-County Regional Planning Commission, Denver, Colorado.

STANDARDS FOR RECREATION AREAS*

Type of Area	Acres per 1,000 Population	Size of Site (acres)		Radius of Area Served (miles)
		Ideal	Minimum	
Playgrounds	1.5	4	2	0.5
Neighborhood parks	2.0	10	5	0.5
Playfields	1.5	15	10	1.5
Community parks	3.5	100	40	2.0
District parks	2.0	200	100	3.0
Regional parks and reservations	15.0	500-1,000	varies	10.0

* *Urban Land*, May 1961, by George See, Director, Intra-County Regional Planning Commission, Denver, Colorado.

Source: (Gallion, 1963: 257)

As a component of environmental conservation, open spaces or the neighbourhood recreation facilities must be taken cognisance as creativity and conservation centres and thus should be within 300 metres walking distance of the dwelling area it serves. This distance is particularly important in densely populated neighbourhood like Kilimani and should be adjacent to community centre(s) or elementary schools. The market place, which is a centre for the exchange of goods, has always been the focal point of the neighbourhood and represents the smallest commercial unit within the main city

boundary. A network of street system and parking points should augment this towards improving the movement of people and goods. It ranges from the movement of an individual on foot to the daily hordes of commuters entering and leaving the neighbourhood from work place, house and other points across the city. Therefore, a series of routes traversing variety of purposes such as work, entertainment, shopping, transportation of raw materials and manufactured products, education, relaxation and law enforcement among others must be incorporated in the neighbourhood development. The mixture of these demands for transport and the vehicles to serve them compounds the equation for the system.

2.4.1: Towards a Conceptual Model for Kilimani Neighbourhood Development

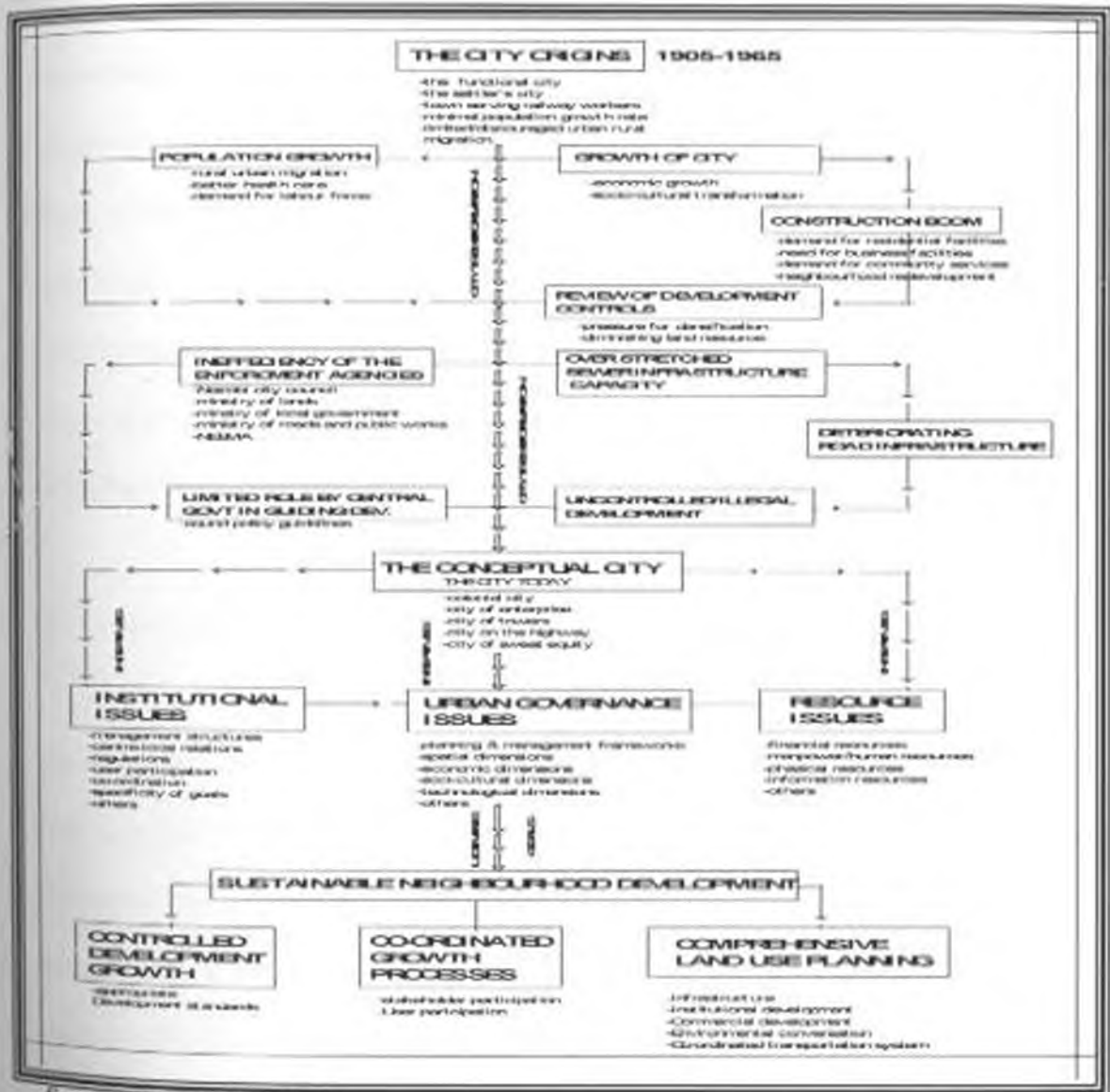
As illustrated by Figure 2.5 below, it is envisaged that sustainable neighbourhood development proceeds in stepwise manner starting with an understanding of the origin of the city of Nairobi between the years 1905 to 1965. This period was characterised by steady economic growth entirely managed by the colonial government. Population growth rate was minimal owing to limited/discouraged rural urban migration. Being a settler's abode, it was planned and zoned along racial lines favouring the white minority against the Asian and African races. With large expanse of undeveloped land, the city grew multi-directionally without any strain. The period after 1965(after independence) however witnessed a rapid city transformation caused by an unprecedented city growth rate. Rural urban migration became the single most cause of rising population growth rate. Demand

for residential/business facilities triggered a construction boom. Rising city population (see 4.2: Historical Background of the Study Area) resulted in demand for more services in the face of unexpanded infrastructure base. Road, sewer and water services which had not been upgraded were forced to shoulder the overstretched demands. Pressure of densification also demanded a review of development controls to allow for more construction in the face of diminishing land resource. The above strain was further worsened by inefficiency of the enforcement agencies in taking charge of emerging trends and defining a solution. Amidst the above events, the central government took a back stage leaving the rest of the enforcement agencies moribund and in conflict with each other. The ultimate result was a city that by 1990 was reeling in the middle of dysfunction and disorder. From the year 2000 thus, new initiatives by private sector interest groups (Karengata and others) have been set in motion in a bid to return the city to its past glory.

Figure 2.5 below therefore underscores the need for understanding of the historical overview regarding growth of cities in Europe and America in 1800 through to 1900 to evolve a conceptual model that would guide in solving the problem afflicting the urban environment in Kenya and Nairobi in particular. Theories of sustainable neighbourhood development are crucial in developing a sustainable model for the city. A study of institutional issues, governance issues and resource issues are fundamental in the pursuit of evolving a functional planning and management framework. As concluded in the conceptual model, the above

initiatives are geared towards the realisation of a sustainable neighbourhood development agenda, whose key tenets include: Controlled City Development, Coordinated growth/ development processes, Comprehensive land use framework and Stakeholder participation.

Figure 2.4: Conceptual model for neighbourhood development



Source: (Researcher, 2008)

CHAPTER THREE

BACKGROUND INFORMATION ON THE STUDY AREA

3.0: Introduction

This chapter highlights the salient features that have influenced and perpetuated Kilimani neighbourhood development viewed in light of the dynamic development policies which have often targeted the neighbourhood in the recent past. For the neighbourhood to continually support developments there are socio-economic, political, legal and physiographical factors that must be unique to the neighbourhood. It is therefore imperative that a clear and detailed understanding of these factors in conjunction to neighbourhood's development be done.

3.1: Location of the Study Area

Nairobi City which Kilimani neighbourhood forms part of is located at latitude $1^{\circ} 16'S$ and longitude $36^{\circ} 48'E$ and is situated at approximately 1660 metres above the sea level. Spatially, the city's total area is approximately 694 square kilometres. Kilimani neighbourhood is situated in Zone 4 of the city's planning zones. The neighbourhood is located about 6.0 kilometres west of the city centre and is approximately 15.0 square kilometres in area. The northern extents are defined by the Arkwings Kodhek Road and to the south by the busy Ngong Road. The two major roads run parallel to each other and

are the main hubs that the various access roads within the neighbourhood are linked. The major access roads within the neighbourhood include Ring Road Kilimani, Kirichwa Road, Rose and Wood Avenues among others.

The stretch of the study area comprises of general flat landmass. It is strategically sandwiched between the vibrant Ngong and Argwings Kodhek roads with link roads enabling access from either side of the two nerves. The emerging commercial activities have occupied predominantly the front plots overlooking both the main and feeder roads so that the largely residential activities are relegated to the rear plots. Indeed, the commercial activities continue to eat up into the residential neighbourhoods as a number of former residential plots are continually being converted into commercial use.

3.2: Historical Background of Kilimani Neighbourhood

The commitment of the British Government to the colonization of East Africa was marked by the decision to connect Uganda with the Kenyan coast by rail. The site on which the City of Nairobi has grown was chosen for its suitability as a railway depot due to its geographical location roughly halfway between Mombasa and the final destination of the railway line at Port Florence (*now Kisumu*). The railway company moved its headquarters from Mombasa to Nairobi in 1899 and was joined in the same year by the Government Administration of Ukamba province, which until then had its office in Michakos. The depot and sidings were sited on the flat black cotton soil, which covers the south and eastern parts. The European housing and coffee estates occupied the

wooded ridges of fertile red soil to the north and west of the railway centre. The other separate housing areas originated as Indian railway workers' huts (*coolies Ladhies*), the washer men's (*dhobie*) quarters and housing associated with the Indian Bazaar. This together with the European business centre set the pattern of the growth. There were relatively few Africans working on the construction of the railway and there is no mention of their accommodation in the town at that time (Etherton 1982).

Plague broke out twice in the bazaar area and this led to the setting up of a commission in 1906 to investigate the sanitary conditions of the town. Both the Engineer and the medical experts found the existing site of the town totally unsuitable for further development as the future capital of East Africa. The possibility of its removal was debated for about 5 years until it was agreed that the proposal was outside the bounds of practical politics. In 1912, the same pattern was repeated through the occurrence of a plague occasioning the formation of another commission and a new report was produced, which firmly advised a well defined and separate quarters for Europeans, Asiatic and Africans. This therefore marked the harbinger of racial segregation whose impact was felt much later in the periods preceding independence.

A local government commission led by Justice Leedham in 1928 made the next major review of the town's structure and development. It proposed boundary changes which absorbed within the new municipality most of the previously autonomous housing areas under separate government administration otherwise known as the Nairobi Extra Provincial District of 1928. In 1948, there was a master plan for colonial capital prepared

by a team of South African Planners, this neither altered the Municipal boundary nor did the overall disposition of the zones established within it thus endorse the development of the town as a colonial city. Consequently, what were described in the plan as residential zones indicated areas of European and Asian housing, while housing for Africans were situated next to the area designated for industrial expansion. Roundabouts, public open space, neighbourhood units and spectacular civil centres were the ingredient of a plan, which seemed to offer an ideal opportunity for the creation of a garden city in East Africa. At the time of the plan, the Nairobi's population was 109,000 with an annual growth rate of 5 percent. This was projected by the Planners to flatten so as to reach 270,000 by the year 1975. They therefore envisaged a population of 250,000 as being both likely and desirable within the existing 1928 boundaries.

During the next 15 years Nairobi developed more or less along the lines prescribed by the Master Plan, but the employment opportunities which were expected in the city as a result of independence in 1963, raised the population to 266,800 already more than the Planners' target by the year 1975. The new government was to review the city's potential for expansion, with the result that the 1927 boundary enclosing 30 square miles of Extra-provincial District except in the case of the large European coffee estate sandwiched between the Kikuyu reserve and the northern edge of the city Dagoretti together with the low-density suburbs of Karen and Langata and the Nairobi National Park now came within the boundary. Expansion of the city of Nairobi was expected to take place partly within the built-up area, where 50 percent remained undeveloped, but mainly on 20 square miles of black cotton soil and ranching land on the east of Nairobi.

By 1967, the urbanisation process was at climax occasioning shortages in water supply, shelter and traffic congestion. The Nairobi urban study group was thus formed so that it could study all those important economic, social and physical variables on a comprehensive basis and compile Nairobi's urban information system and growth frontiers. The group therefore emerged with the following recommendations:

- i. The direction across the Nairobi regions towards which the metropolis was to expand and towards which the future city boundary extensions were to take place.
- ii. Infrastructural adjustments that would be required to accomplish the development objectives.
- iii. The proposed physical lay out of the city through its various stages of developmental accretion in the proposed growth direction and the detailed method of implementing the proposed physical plan.
- iv. The socio-economic development plan for the city and the policy measures to be used in its implementation including the methods of financing the required development.

The above guidelines were therefore to help in the development of the city to the year 2000 subject to revisions and modifications by the permanent council planning staff to meet any future circumstances and needs. The Nairobi Urban Study Group further recommended that urban development accretion would not be permitted to take place to the north and west on the Kikuyu plateau in order to preserve the rich agricultural land. Instead, they recommended that urban growth would be channelled across the Athi plains

towards Thika thus avoiding the Nairobi Park, Jomo Kenyatta International Airport and its noise belt. The above annunciations reveal that the growth of the city continued along the racial segregation and was only replaced by social segregation after independence in 1963. As such, residential neighbourhoods which were European and Asiatic based, has since attracted the social high class. Therefore, up to early 1980s the neighbourhood was fully residential with predominantly maisonettes and bungalows sitting on half acre plots fully serviced with water, sewer, electricity and bitumen roads. However, in the 1990s, due to traffic congestions and high cost of rent in the city centre a number of businesses moved away to Kilimani neighbourhood triggering a radical transformation of land use from residential to commercial.

The above stated events quickly placed Kilimani neighbourhood on the receiving end, transforming it to a convenient location for these migrating commercial entities and has since marked a turning point to land use planning within the neighbourhood. This growth has since been contained by maximization of land uses as opposed to the earlier residential maisonettes and bungalows sitting on half acre plots. Towards this end, change of users has become rampant with an urge of accommodating rapid commercial activities as characterised by Nakumatt Mega Supermarket and other commercial activities. Most of the land in this area is privately owned. Some of the plots have freehold titles while some are on leasehold. Before independence the entire land in the area was owned by non-Africans. Majority of them were serving in the colonial government while some were executives working for multinational entities that were in Nairobi then. Presently there is a mix of ownership as occasioned by 1993/1996

development policy. Most land has been bought and developed by among others, churches, private clubs and diplomatic missions. The neighbourhood is currently presenting diversity of buildings. The traditional European maisonettes and bungalows sitting on half acre has been replaced with high rise and mixed development typology.

3.3: Physiographical Background of the Study Area

The physiographic conditions of Kilimani neighbourhood compares favourably to that of the wider Nairobi. This section presents highlights on the effects of topography, altitude, geology, pedology, drainage and vegetation among others on the neighbourhood's development. Generally, the topographical features of Kilimani area are controlled by the effects of volcanic activity that dominated the geological history of Nairobi since Miocene times. Volcanic lava flows originating from the Rift Valley flanks gave rise to prominent physiographic units namely the Kikuyu Highlands, Ngong Hills and the Eastern lava plains of Athi and Kapiti. Faulting has dominated the Rift Valley flanks and the Ngong Hills. The Lari-Ondiri fault West of Kikuyu Railway station is the only source of the groundwater which leaves the area towards the eastern zone. The zone was at one time the only source of water supply for Nairobi city. The elongated range of the Ngong Hills is the most outstanding physiographic feature, with moderate slopes towards the eastern zone, dissected by scarps representing the end of individual lava flows.

The Kilimani neighbourhood is generally flat with gentle slope towards the eastern side of the neighbourhood starting from Yaya Centre downwards. There is a mixture of loam

and red soil which is ideal for vegetation growth. The type of soil also ensures that a variety of developments can be implemented without many alterations to land configuration or soil excavation. The area is endowed with rich vegetation cover on open spaces and also along the roads. This aspect differentiates the neighbourhood from the low income neighbourhood such as Jamhuri where trees are virtually being cut down to create space for construction. The neighbourhood lies on the upper slopes of a ridge draining into lower part of Kirichwa Kubwa River, which in turn empties into Nairobi River. The ridge is generally flat, running from Kawangware neighbourhood through Valley Arcade and southwards towards Ngong Road and eastwards into lower part of Kirichwa Kubwa valley synonymous with City Mortuary and Nairobi Baptist Church off Ngong Road. The topographical configuration of the neighbourhood disposes it to various developments topology for it allows the development of reasonable drainage network and other allied infrastructure. The sections below grant an in-depth presentation of the physiographical base of the study area

3.3.1: Topography

Nairobi region and Kilimani in particular lies at the edge of the Great Rift Valley to the west with an elevation of 2,300 metres to 1,500meters above the sea level with the centre being 1,700metres above the sea level. Its geology and topography have been greatly influenced by tectonic forces due to formation of the Great Rift Valley. Nairobi's topography also features deep valleys cut by the Nairobi, Mathari, Masongawai and Ngong and other streams flowing from the foothills of Aberdare Mountains. Kilimani neighbourhood is characterized by Kikuyu dissected slope, which also dominates the

north western parts of the city covering Northern Dagoretti, Upper and Lower Hill areas, Lavington and Westlands.

3.3.2: Geology

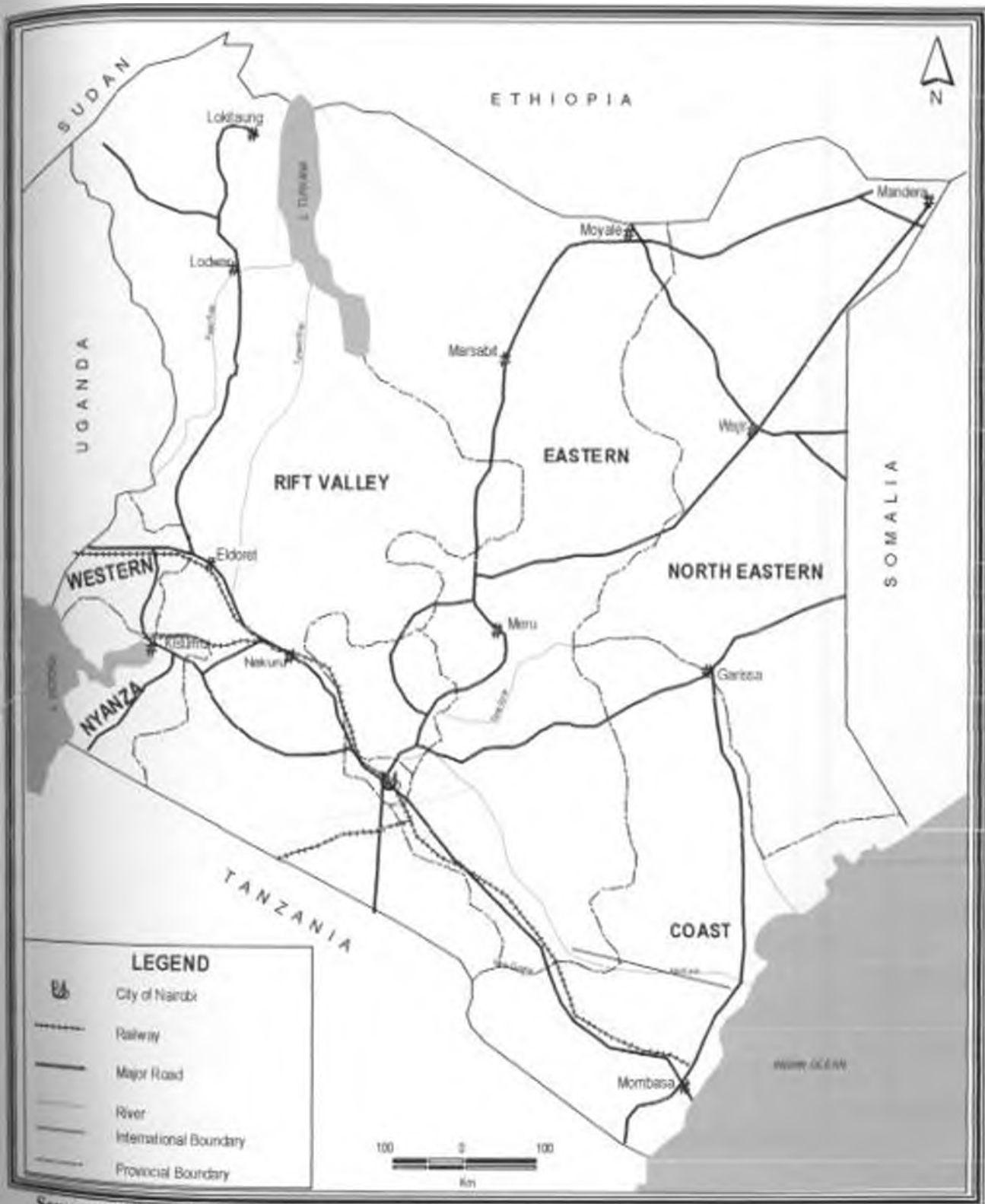
The geological history of Kilimani neighbourhood is dominated by widespread volcanic activity, which exerts a controlling influence on its landforms, drainage pattern and climate. Tertiary lavas, welded tuffs and pyroclastics overlie poorly exposed, folded and faulted metamorphic rocks gneisses and schist of Precambrian era. All volcanic rocks within Nairobi have undergone extensive faulting near the flanks of the rift and have been subject during the intervening tectonic periods to sub-aerial weathering. The outcrop rocks are closer to the ground surface and are covered by thin layers of overburden soils.

The neighbourhood and its environs lies within the seismic intensity zone of between 6 to 7 on the Richter's scale and is prone to moderate seismic risk with occasional shocks and tremors. Therefore the area requires consideration of seismic risk and effects in the design of structures. To reduce losses from geologic and hydrologic hazards, all engineering structures within Kilimani require specific site engineering design and construction to increase the capacity of the structures to withstand the hazards given that the hazards associated with landslides and expansive soils are significant in Nairobi. Damages to structures located in the fault zones can be high where land use is intensive.

In summary, the geology of Nairobi has been dominated by rifting and volcanism associated with tectonic movements. The city has three basic geological structures

namely, the Mbagathi phonolitic trachyte which contains numerous closely spaced felsar phenocrysts about half an inch long in a grey, rather coarse groundmass containing a little nepheline. Lavas occurring across the Nairobi Game Park and part of Athi plains are in composition intermediate between phonolitic and alkali trachyte. The phenocrysts often display sub parallel alignment, indicating the direction of flow of the lava. The second geological structure being the Nairobi trachyte (Pliocene), which dominates northern and western part of the city including Kilimani. The geologic nature of this rock type is that its pale grey moulted lava of fresh surface having a glistening appearance due to numerous tiny feldspar crystals. Finally, there is the Kerichwa valley tuffs contain a variety of rocks, the most important being devitrified welded tuffs (the Nairobi stone) used extensively for building purposes.

Map J.1: Location of Nairobi in Kenya



Source: (GOK 1993)

Map A.2: The study area



Source: City Council of Nairobi (1996)

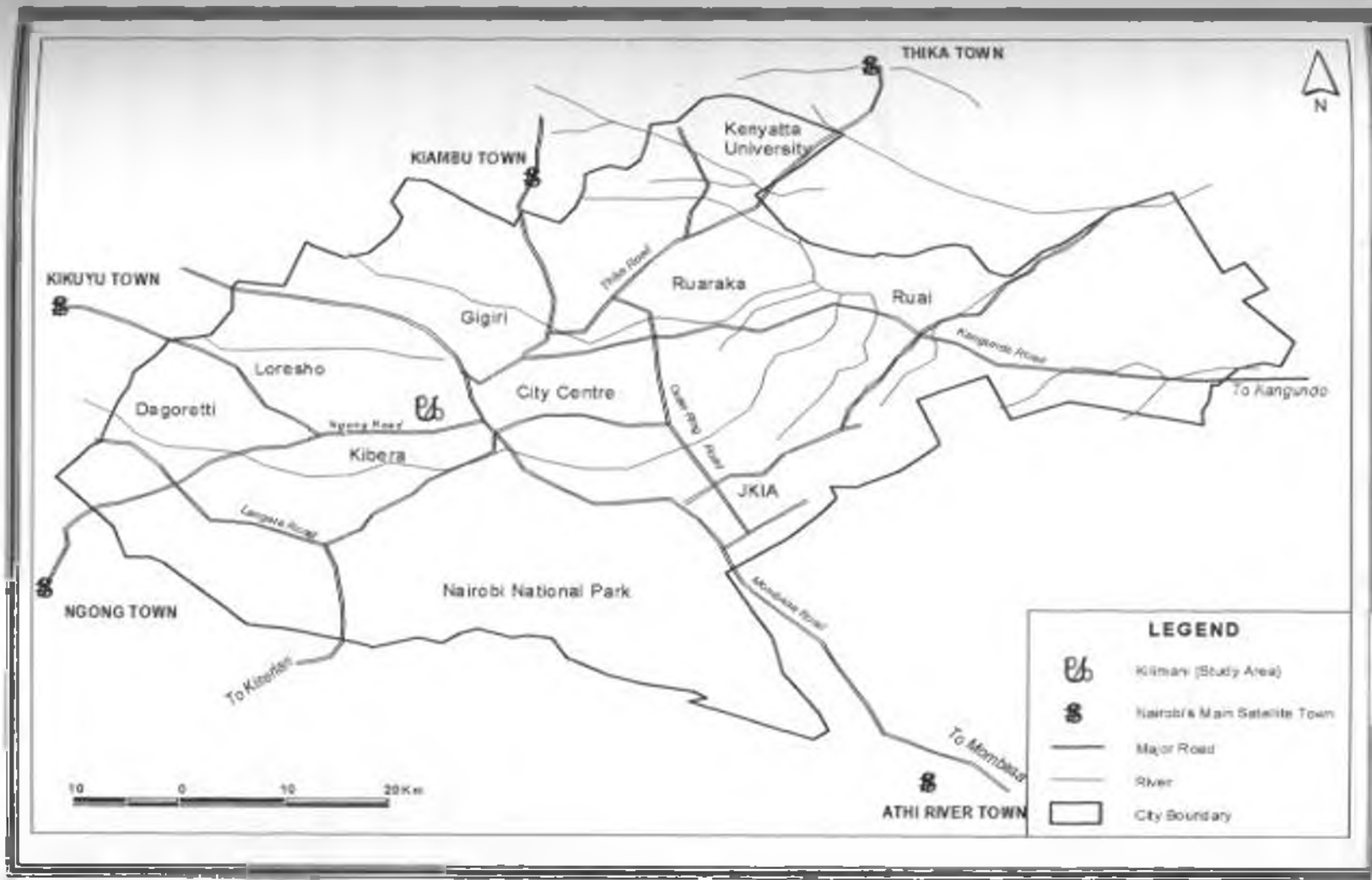
Figure 2.1: Aerial Photograph of the Study Area



Source (GOK 2003)



Map 1.1: The study area in the Nairobi context



Source: City Council of Nairobi (1996)

3.3.3: Hydrogeology

The hydrogeology of Nairobi City and Kilimani in particular is controlled by the nature and morphological set up of the various volcanic lava flows and the configuration of the old land surface of the Basement rock system. To corroborate this, the river drainage system and indeed the groundwater table gradient closely follow the easterly direction of the lava flows. Aquifers occur within the Kirichwa Valley Tuffs and sediments in the interface between Nairobi phonolite and Kapiti phonolite of the Athi series of tuffs and lake sediments. In the southern part of the Nairobi area, deep aquifers are encountered within the old land surface of the Basement rocks. The old lava flows, namely trachytes and phonolites are compact and impermeable and are as such includes the main streams and rivers draining the Kikuyu Highlands towards the Nairobi area which are perennial but are fed by a spring that arises within the Kirichwa valley tuffs and the trachytic lavas thus a number of buried channels containing groundwater occur beneath the Nairobi City centre. These channels represent the old river courses of the Nairobi River and its tributaries and are encountered during geotechnical drilling for building works. The subsurface geological conditions underlying the City centre and the Industrial area as far as Ngong River reveal that the Nairobi phonolite is overlain by Kirichwa valley tuffs and sediments. It is also known from drill holes that between the outcrop of the Kirichwa valley tuffs of the central city area and the trachyte escarpment to the west of the Highway a buried channel of about 25 metres deep exists and is filled with black cotton soils, clays and debris that accumulated at the foot of the trachyte scarp. Valley Road extending to Kenyatta Avenue follows the direction of an old buried stream course whose water flows onto the Athi Plains.

Towards this end, the groundwater in the Nairobi Area occurs in aquifers which are mainly fluvial or lacustrine deposits intercalated with weathered tuffs and sediments. The hard trachytes and phonolites are unfractured, impervious and yielding insignificant water output due to poor transmissivity. Perched water table occurs in permeable lateritic sediments overlying the trachyte formation just below the ground surface, while deep aquifers are encountered in the weathered materials on old land surfaces between lava flows. Faulted, fissured and jointed volcanic formations if encountered at depth are good aquifers depending on the degree of fracturing.

3.3.4: Pedology

Kilimani consists of well-drained red volcanic-coffee soils and loamy soil underlain by Kirichwa Valley tuffs, below which lies the Nairobi Stone. Both the soils and geology have good load bearing qualities and can adequately support the varied developments. The red coffee soil is a residual soil formed in regions where drainage conditions are generally good and the red colouration is due to staining by iron oxide. Residual soil may occur as laterites and when rainwater leaches out the soluble rock materials it produces silt chocolate coloured soils or whitish sandy soils. The red soils are generally compressive and have low moisture content. These soils are generally cohesive with high coefficient of permeability. Along the river courses and stream valleys poorly drained swampy peat soils occur and display deep grey coloured organic layers. The soils near the volcanic bedrock may be compacted and consolidated depending on the degree of weathering of the bedrock surface and Kilimani neighbourhood exhibits the combination

of the above stated soil types. This area is underlain by the Nairobi trachyte all the way to Dagoretti environs. The area north of the Nairobi River which includes Parklands and Westlands is mainly underlain by the Kirichwa valley tuffs overlain by well drained, extremely deep red to dark reddish brown friable clay soils partly with ferruginous murrum at depth. The soils are developed on volcanic tertiary foot ridges of dissected lower slopes of major volcanic flows.

The soils of Nairobi bears great semblance to their parent rocks thus consists of black cotton soil, murrum and red coffee soil. Black cotton soil, comprising of the Athi Plains phonolites have weathered into black cotton like substance of up to 3 feet in depth with secondary formation at the junction with the parent rock. The soil is easily detected by the grass vegetation and stunted thorn trees, which it carries. It has many adverse physical properties for its sticky, waterlogged and dries up in dry weather making deep cracks below the surface. On the other hand, murrum soils which forms the boundary between immature kind of soil described as 'a wedge of pisolitic ironstone (murrum) occurs as a result of well drained and eroded low scarps formed on the edges of the Nairobi Trachyte layer Red Coffee' soil, which dominates Kilimani neighbourhood, is red to yellow red in colour and gradually yielding another soil type known as the red coffee soil as the slope and elevation of the plateau increases. Finally, mixed soils are found on the un-dissected part of the plateau, soil conditions are mixed owing to the gentle-undulating topography which characterises the city. This causes the two major soil types to occur intermittently with irregular distribution depending on how well each piece of land is drained.

3.3.5: Drainage

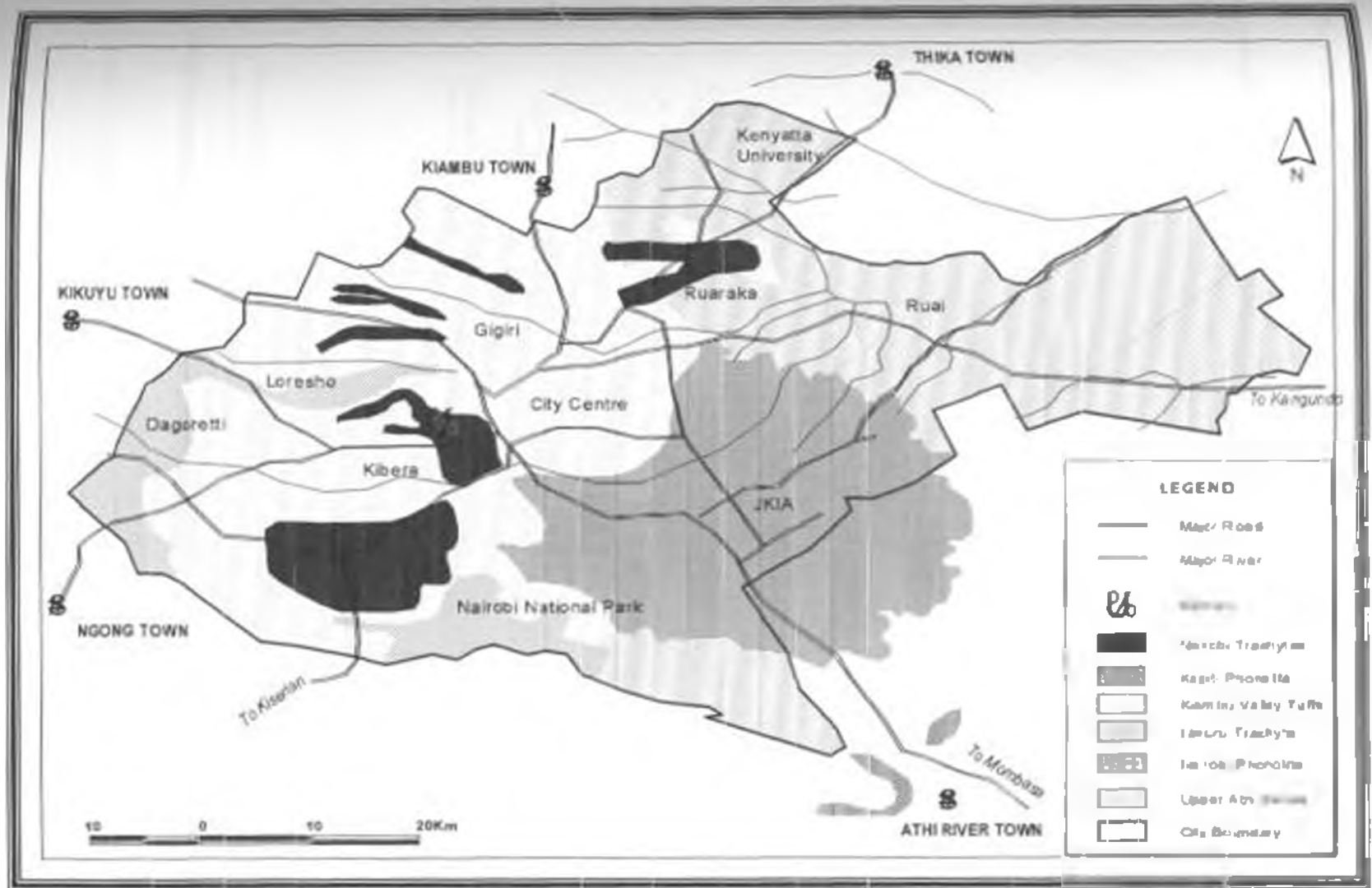
The hydrology of Kilimani neighbourhood is controlled by the nature of the various volcanic lava flows and configuration of the land surface and the basement system. Nairobi area lies within the Upper Athi-River Basin and is traversed by a number of rivers, the main ones being Nairobi, Ngong, Muthan and Gitathuru Rivers. All these are tributaries of the Athi River and are generally characterized by low (often negligible) dry weather flows and considerable flows during the wet seasons. The Kikuyu springs feed the Nairobi River while Mbagathi springs in Ololua Forest feed Mbagathi River, which becomes Ngong River. The natural drainage system of Nairobi is formed by a system of rivers traversing the city. Connecting to these major natural watercourses is a network of manmade drainage system developed to serve particular development zones particularly housing estates and the Central Business District. The river basins have a bimodal pattern of river flows occurring at two distinctive seasons, may-June and October- December. The pattern corresponds well with the rainfall distribution within the sub-basins.

3.3.6: Vegetation

The existing vegetation in Kilimani exhibits a rich variety. There are many mature trees including: *Jacaranda (jacaranda mimosifolia)*, *Grevillea (Brachylaena huilenis)*, *Acacia* sp., *Acrocarpus fraxinifolius* Indian Ash, *Albizia* ssp, Candle nut tree (*Aleurites moluccana*), *Araucaria bidwillii* (Bunya Bunya Pine), *Araucaria columnaris*, *Araucaria cunninghamiana* Neem trees (*Azadirachta, bottle*), Bush Tree (*Calli stemom*).

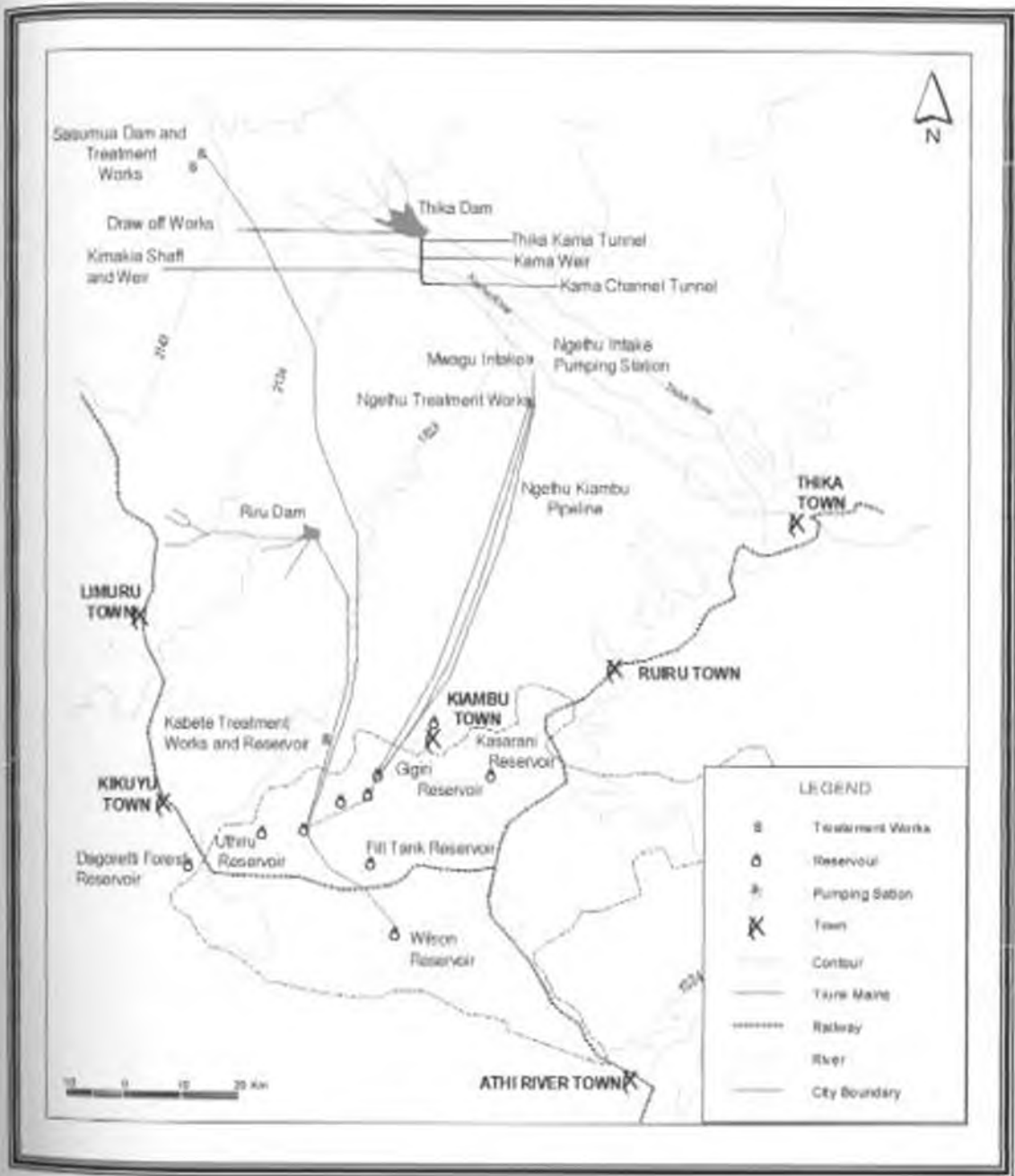
Casuarinas spp., *Crouton megalocarpus* and *C. macrostachrus*, Cypress, Plums, Loquat, Eucalyptus, *Ficus benjamina*, F. green ash, Junipers *procera*, mangoes among others. This is indeed a rich variety of trees providing beautiful scenery and shade. A variety of grasses also exist. Although many of these trees appear mature and in some cases old, the proposed neighbourhood growth model takes cognisance of their existence and attempt to preserve as many of them as possible particularly those along plot boundaries and in the existing and proposed open spaces.

Map 3.4: The Geology of Nairobi area



Source: City Council of Nairobi (1974)

Map 3.5: The regional water resources



Source: City Council of Nairobi (1974)

3.4: Climatological Background of the Study Area

The climate in the Nairobi and Kilimani area in particular is predominantly influenced by its equatorial position and the large scale pressure systems of the African continent and Indian Ocean. However, topography strongly influences the magnitude of the climatic elements and to a lesser extent their seasonal distribution. The East African weather is convergent and governed by movement of the sun between the tropics of Capricorn and Cancer across the equator. With the sun overhead the land warms and a low pressure band develops across the country known as the Inter Tropical Convergence Zone (ITCZ) or the Equatorial Trough. The ITCZ lags behind the sun by 2 to 6 weeks and is usually 200 nautical miles wide. The North East and South East trade winds meet at the ITCZ and generally raise the air to form clouds which in turn intensifies the day to day weather activity. Places near the equator experience two clearly distinct rainy seasons coinciding with when the ITCZ is overhead on its way north and south. For Kenya this occurs during April/June and October/December.

In Nairobi during the rainy season, afternoon or evening showers and thunderstorms may develop but much rain also falls during the night and early morning. The months between the two rainy seasons especially from June to August tend to be rather cloudy and cool but are generally dry. Daytime temperatures in Nairobi during July and August often remain below 20° C and night temperatures can fall to 5 C. September and early October are much warmer and sunnier with only a few showers developing. The hottest months are January to March but temperatures are never unpleasantly high. Throughout the year

mornings in Nairobi are often overcast, the sky being covered by a thin layer of low stratus cloud. This cloud base may be only a few hundred feet above the ground and frequently envelopes the neighbouring hills. Fog sometimes occurs, mainly on the plains South East of Nairobi. The amount and frequency of rain is largely governed by altitude. Towards this end, Kilimani which lays in the higher part of the city enjoys a relatively cooler climate as opposed to Eastlands, which is drier and hotter.

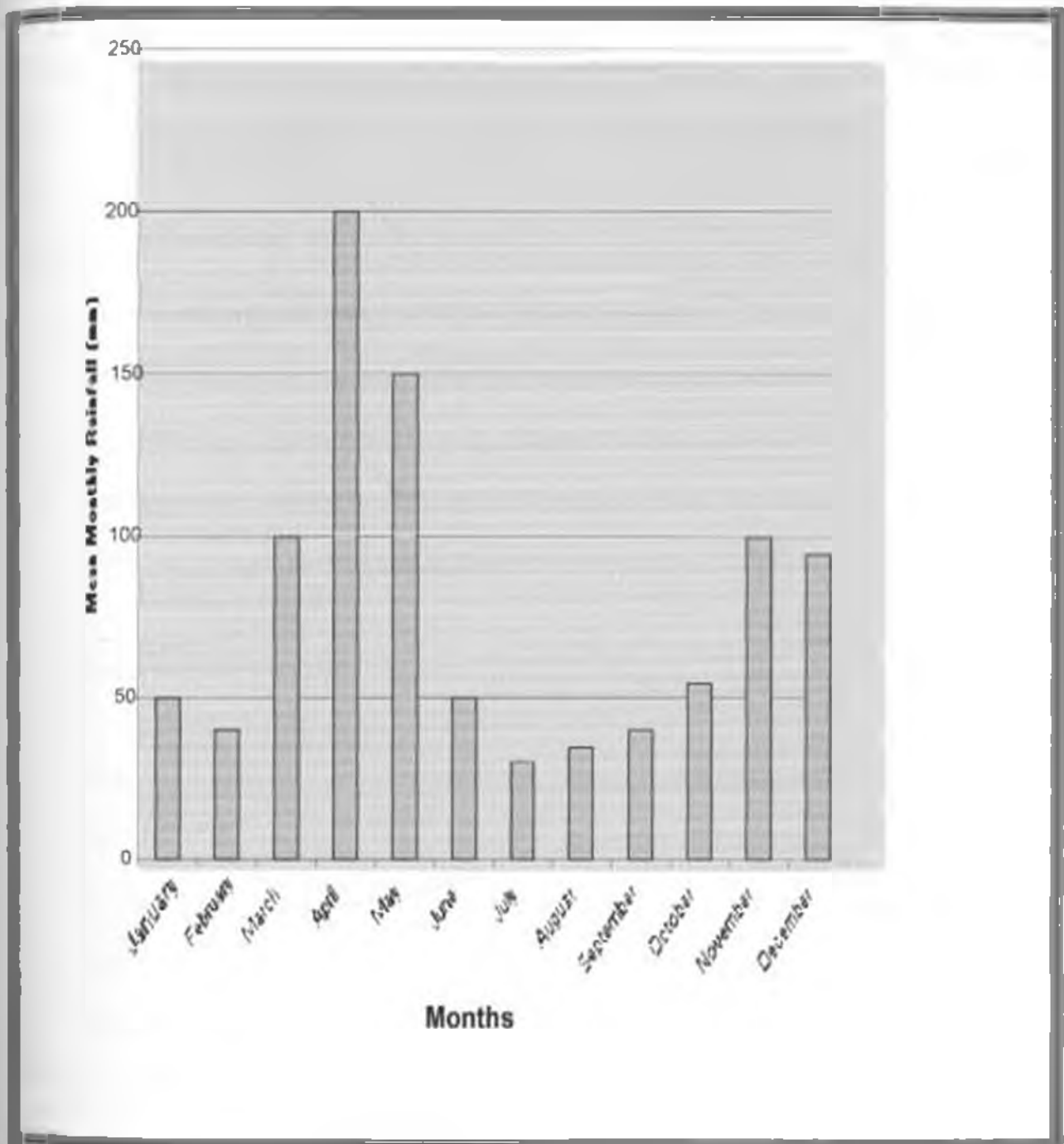
3.4.1: Rainfall

Nairobi has a bimodal rainfall pattern, in which the maximum (peak) rainfall season occur in March- April constituting long rains while November-December constitutes short rains. The rainfall regime is complicated by unreliable annual rainfall intensity. However, the running annual average rainfall is 875mm, which varies from 500mm to more than 1500mm. Thunderstorms do occur, nearly always during the afternoon or evening, during most months of the year but they are rare during the period June/ August. Hail is comparatively rare in Nairobi area, unlike other areas such as western Kenya.

3.4.2: Temperature

Average, daily temperature varies from 17° C in July/August to 28°C in March. The maximum daily range of temperature is quite large 10° C to 30° C in May and February respectively.

Figure J.2: Mean Monthly Rainfall



Source: (Researcher, 2008)

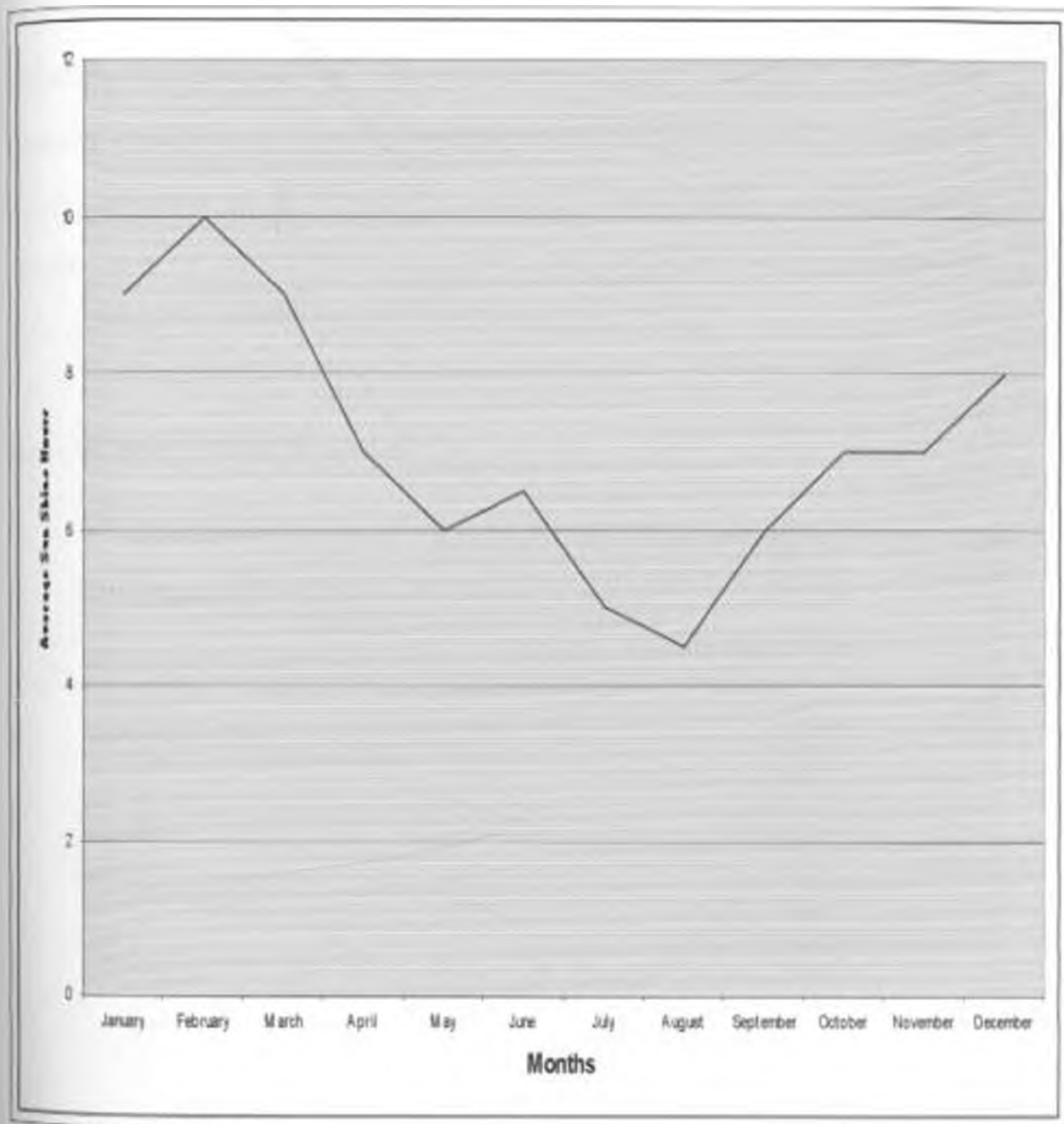
3.4.3: Wind Patterns

A significant feature of the climate of Nairobi is the frequency with which wind flows from the North East and to a somewhat lesser degree to the South East. These are the North East and South East Monsoon winds, which blow very steadily with mean wind speed at a maximum in December. Winds also remain high during January, February and March and coincide with the period of higher potential evaporation. The strongest winds occur during the dry season just prior to the long rains when speeds of 20 to 25 miles per hour are frequent from mid-morning to early afternoon while at other times of the year wind speed are usually ranging between 10 to 15 miles per hour. The short lived squalls of up to 70 miles per hour associated with thunderstorms have been known to occur.

3.4.4: Sunshine and Solar Radiation

Solar radiation and sunshine are intertwined and Kilimani experiences a total of about 2,500 hours of bright sunshine per annum, which is equivalent to annual mean of 6.8 hours of sunshine per day. July and August are characterized by cloudiness and during these months the average daily sunshine in Nairobi is 4 hours. Frequently there are several days in succession when the sun fails to penetrate the thick strato-cumulus cloud cover although on other days the cloud does break for a short period. There is about 30 percent more sunshine in the afternoon than in the morning and the eastern part of Nairobi receive more isolation than western parts where Kilimani neighbourhood is situated due to the topographical influence of Kikuyu escarpment. The sunshine and solar radiation follows rainfall regime and are at the peak in February followed by January.

Figure 3.3: Average Monthly Sun Shine

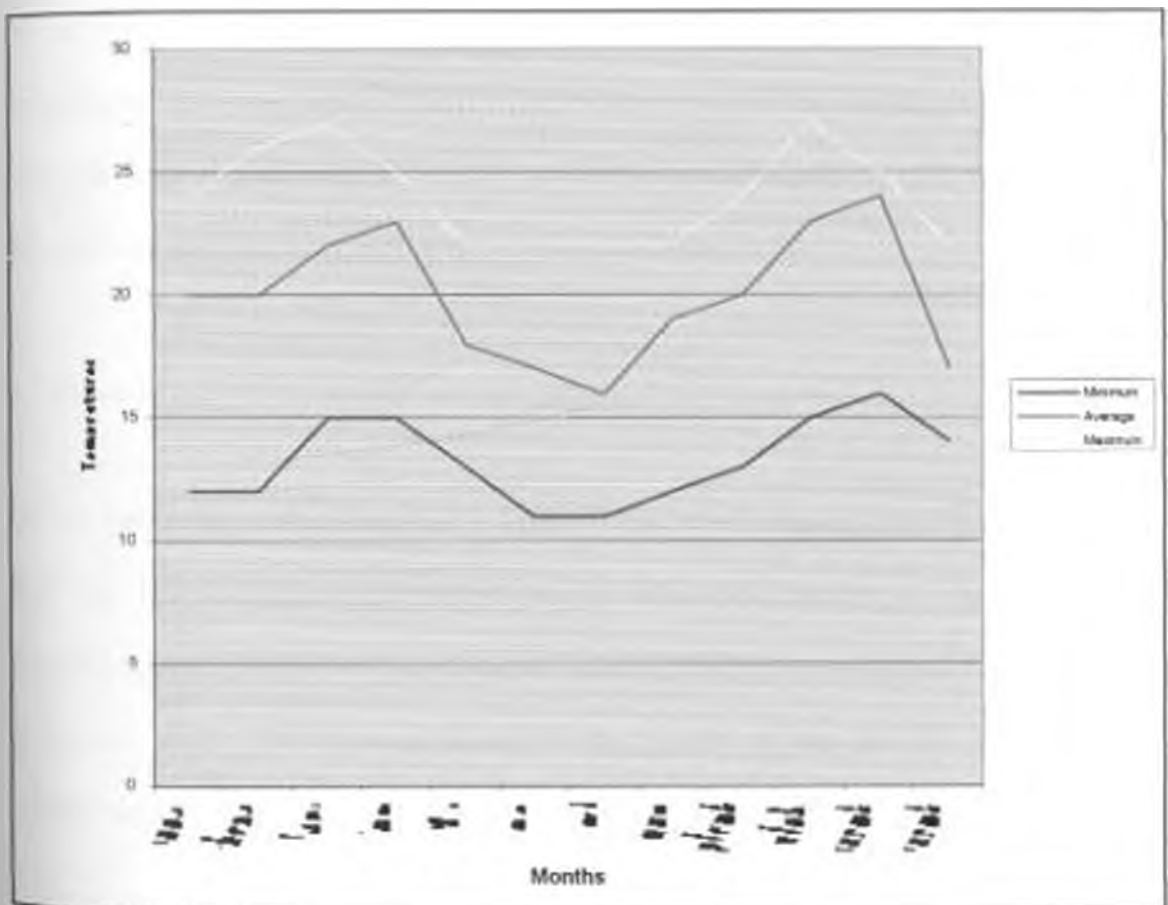


Source: (Researcher, 2008)

3.4.5: Humidity

The moisture content of air in Kilimani is seldom high enough to cause human discomfort. As earlier indicated, Nairobi temperatures are never high and as the highest humidity's tend to occur when the temperature is low, the uncomfortable combination of a high temperature and high humidity is rare. The maximum relative humidity generally occurs near dawn whereas the minimum relative humidity occurs in the rainy season. In early mornings, the air is frequently at or very close to saturation.

Figure 3.4: Monthly Diurnal Temperature



Source: (Researcher, 2008)

3.4.6: Evaporation

The annual variation of evaporation is as expected from consideration of temperature, wind speed, direction and sunshine factors. The mean annual evaporation as measured by pan slightly exceeds the mean rainfall at the altitude of Nairobi but it would be expected that at higher altitudes this position would be reversed. The peak evaporation values are during March, followed by January, February and October. The Mean yearly evaporation is 172 mm, the highest annual evaporations is 1951mm while the lowest is 1519mm.

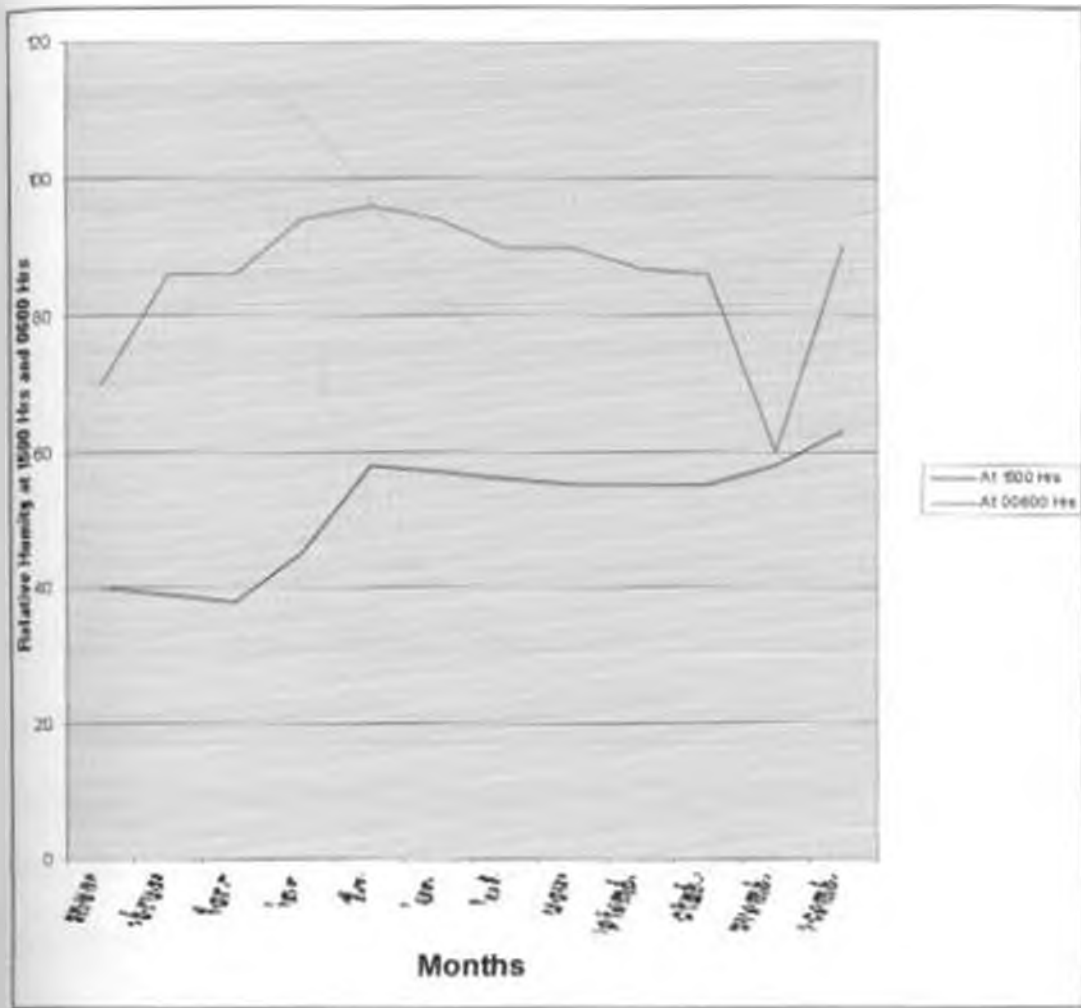
3.4.7: Smog

Smog is common during the rainy season and as such presents the greatest hazards to aeroplanes during the period. This is mostly associated with the development of towering cumulus and cumulo-nimbus clouds. A further hazard common in Nairobi is the formation of low stratus clouds during the early morning.

3.4.8: Heat Balance

On hot sunny days, when the wind is light, considerable turbulence is experienced in the first few 100 feet above the ground due to differential heating of the surface, and dangerous down draughts frequently occur in areas where the configuration of the ground is uneven. Such conditions occurring in the vicinity of an airfield will affect the performance of the aircraft with low power to weight ratio.

Figure 3.5: Relative Humidity in percentage at 1500 Hours and 0600 Hours



Source: (Researcher, 2008)

3.5: Physical Infrastructure

The development of infrastructure and provision of services are necessary programmes for growth, improvement of livelihoods and national development within the urban diasporas. Although such programmes do not directly contribute to economic production, their indirect contribution is crucial in sustaining the production process. While there is no consensus on the precise impact of infrastructure on growth, many

studies on the issue, have concluded that this is substantial and often greater than the contribution of investment in other forms of capital (World Bank, 1994).

The plans to construct sewer line system in Kilimani neighbourhood were conceived in the early 1970s. Sewer reticulation plans were prepared by the Nairobi City Council Water and Sewerage Department and were completed in October 1975. The proposal was to extend the existing Chromo trunk sewer to cover the Thomson, Kilimani and Hill Area. The contract was in two phases, Part I and Part II. Construction for Part I commenced in September 1978 and was completed in February 1981 while Part II started in March 1979 and was completed in March 1983. The sewer project was financed partly by the City Council and the European Economic Community. The final apportionments chargeable to plot owners were approved by the City Commission in January 1986 while the initial provisional apportionment was approved in October 1977. Since the last sewer project, there has never been an additional upgrading despite the sewer system continuing to serve an ever increasing capacity which was not anticipated in design. This poses a major challenge as regards sustainability of the sewer system. The site analysis undertaken in the neighbourhood reveal that the sewer problem is not so much inadequacy but lack of regular repair and maintenance of existing facilities to sustain their optimum functionality.

3.5.1: Sewerage

The study area is adequately served with a sewage network. However, with rapid development changes taking place within the area, there may be need to review the network to allow a bigger capacity of sewer disposal.

3.5.2: Water Supply.

Kilimani neighbourhood is connected to City Council of Nairobi's fresh water mains. Where new subdivision schemes have been carried out, the new subplots are connected with water after relevant applications are lodged by the developers and after the relevant fees are paid for connection to the mains or extension from the mains. In new schemes, it is mandatory for the developers to pay for the extension of water pipes from the existing mains. The population pressure currently being experienced in the city has led to water rationing especially in the low income residential zones. Kilimani neighbourhood occasionally experiences the water shortages though at a minimal scale. The city council has attempted to address the increasing demand by constructing extra dams with donor support to reduce the water deficit in the city.

As earlier mentioned, water services in Kilimani neighbourhood are currently not adequate to sustain substantial expansion in the development of increased number of domestic and/or commercial properties in the short term. The major sources of water in

the area is Kabete Water Works via the Hill tank reservoir and the flow is by gravity. Currently, the supply from Kabete Water Works is at maximum nevertheless the water demand in the area exceeds its availability. Because of this deficit, the study area do experience inadequate water supply with low pressure at times.

3.5.3: Roads

Roads within the study area were designed to serve low-density development. While this is adequate for this purpose, the same is not true if they are to serve an increased traffic flow and additional parking requirements in areas changing from residential to offices and commercial development. While most of the access roads are butumised, a number of roads are only murrum, rough and dusty with no specific carriage ways. There are also a number of under developed ring roads. Indication is that there is need for widening and opening up of the underdeveloped roads.

3.6: Community Facilities

The main shopping centres in the area are Uchumi Hyper, Nakumatt Prestige, Adams Arcade, Valley Arcade, Hurlingham, Caledonia and Yaya Centre; they are situated along the busy Ngong Road, Argwings Kodhek and Gitanga Road. There are chains of self-service store together with other types of retail shops. At the same time, there is inadequate provision of car parking and open spaces within the shopping centres.

3.7: Population Dynamics

The City of Nairobi is among the key urban areas in Kenya that has continued to experience high rates of demographic transition. This is mainly due to the urban rural migration as well as natural population increase. Table 4.1 presents a summary of population growth in the city between 1969, when the first census was done to 1999.

Table 3.1: Population Census for the City of Nairobi between 1969 to 1999

Year	Demographic Attributes			
	Total Population	No. of Households	Population Density	Area (Km ²)
1969	509286	*	*	*
1979	827775	206474	12120	684
1989	1324570	382863	1911	693
1999	2143254	619426	30779	696.1

Source: (Government of Kenya-Population and Housing Census Surveys 1969, 1979, 1989 and 1999)

Note: * Represents data that was not availed by the census survey.

With an inter-censal population growth rate of about 4.9%, the city's population is projected at about 2,855,792 accounted for by 890,376 households currently representing the housing demand. This is projected to 5,852,736 persons by 2020 with 1,959,668 households representing housing demand in 2020 as illustrated by Table 4.2 below

Table 3.2: Population and Total Housing Demand for Nairobi

Years	1999	2005	2010	2015	2020
Total Population	2143254	2855792	3627472	4607671	5852736
Housing Demand	649426	8900376	1158181	1506536	1959668

Source: (Government of Kenya 2001)

Note: The 1999 Census Survey used as base for projection

The table underscores that an increase of the city's population will subsequently lead to an increased number of households, hence an increased housing demand which must be met by both public and private investments. According to the 1989 population and housing census survey, the population for Westlands Division where the study area is located stood at 69,411 persons, with 20,377 households. The 1999 census survey however revealed that the area's total population had increased to 20,7610 persons accounted for by 61,258 households. From the foregoing, the inter-censal growth rate for the total population as well as the number of households is estimated at 12%. The current housing demand in the area is approximated at 40221 units, and is projected to 220152 units in 2020 as illustrated by Figure 4.3 below.

Table 3.3: Projected Housing Demand in Westlands Division

Item	Projection Years				
	1999	2005	2010	2015	2020
Projected Housing Demand	20377	40221	70883	124920	220152

Source: (Researcher, 2008)

Note: Projection based on the number of households in 1989 and 1999 census surveys for the wider Westlands Division where Kilimani neighbourhood is located

The above projection justify that an increase in the population of the city will lead to an increased housing demand. Similarly, an increase in the population in Westlands area, including Kilimani as accompanied by an increase in the number of households will create room for an increased demand in housing. This will further lead to increased economic development activities in the neighbourhood as already characterized by major commercial/shopping centres. Currently, commercial and offices are located in Kilimani are exemplified by Yaya centre, Nakumatt Prestige, Uchumi and Hurlingham commercial centres. These businesses employ workers both at managerial and lower levels.

3.8: Planning Policies

The urban planning system and procedure has been top-down and sector based, a process that has created deficiencies in urban development and management. As a result of the above, services have been provided without proper plans necessitating *ad hoc* provision of the services consequently increasing the cost of supply of the services per area and per capita respectively (Attahi, 1992:116 and Bartley, 1993:87). Further, costly investments in the city service especially basic infrastructure such as roads and drainage and water supply have been wasted for lack of maintenance. Traditional or conventional practices based on outdated and inappropriate legislation have continued to be applied in the city's settlement planning and management. This has incorporated rigid and unaffordable

standards within various planning schemes including master plans and squatter upgrading programmes creating property demolition especially in informal settlements.

General principles meant to govern land use in the city are encoded in the Local Government's Adoptive by-laws and the Building Code, The Local Government Act (Cap 265), Physical Planning Act (Cap 286), The Public Health Act (Cap 242), The Registered Land Act (Cap 281), World Bank II Standards and other measures used to control development such as planning regulations and policies among others. In reality these instruments have not been strictly administered due to inadequacy in skilled personnel and equipment. This has rendered the rate of identification of unauthorised users in Kilimani too low and often too late as compounded by poor vigilance on illegal developments. There is also in clarity in some of the clauses in the guidelines and regulations raising conflicts due to the absence of effective co-ordination. Often, there is political pressure, which hinders the demolition especially of complete illegal structures. The current planning problems can also be attributed to the past poor land use decisions by the colonial and the post-independent administration and thus *ad hoc* development of the Kilimani neighbourhood has continued

The most critical problem of the development control in the city is land speculations whose origin dates back to the colonial notion of "*no man's land*" which the colonialists used to acquire large tracts of land as either private property or as leases extending to 99 years without regards to the community needs and aspirations (Banyikwa, 1988, Obudho, 1988: 114, and Lee Smith and Lamba, 1998:124). They constructed private residential

homes on large plots, particularly on the ridges to the west and the northern part of the city where Kilimani neighbourhood is located.

From the beginning, different land uses emerged on racial basis. The African areas were left to develop spontaneously with very little attempt to provide them with infrastructure while the European zones such as Kilimani were carefully planned in conformity to accepted standards, densities and development principles. This has persisted to date with low-income zones experiencing poor planning, low levels of infrastructure provision and vice versa. Indeed, the colonial legacy is still a significant feature, which is reflected, in the built urban environment in Nairobi and Kilimani neighbourhood in particular. The British urban planning and architecture is scattered in the neighbourhood four decades after independence, despite substantive amendments to the corpus of inherited planning laws and practices (Amis, 1983:26).

Planning at all scales is still being seen as technical and legal activity particularly land tenure and land rights have also generally undergone little revision in the city since independence. Consequently, problems arising out of conflicts between customary and colonial land and housing allocations systems have therefore not been resolved in Kilimani. Rapid urbanisation in the city have only exacerbated and inhibited the prospects for co-ordinated and managed growth, thus the colonial urban policies are being propagated in post colonial periods.

3.8.1: Existing Development

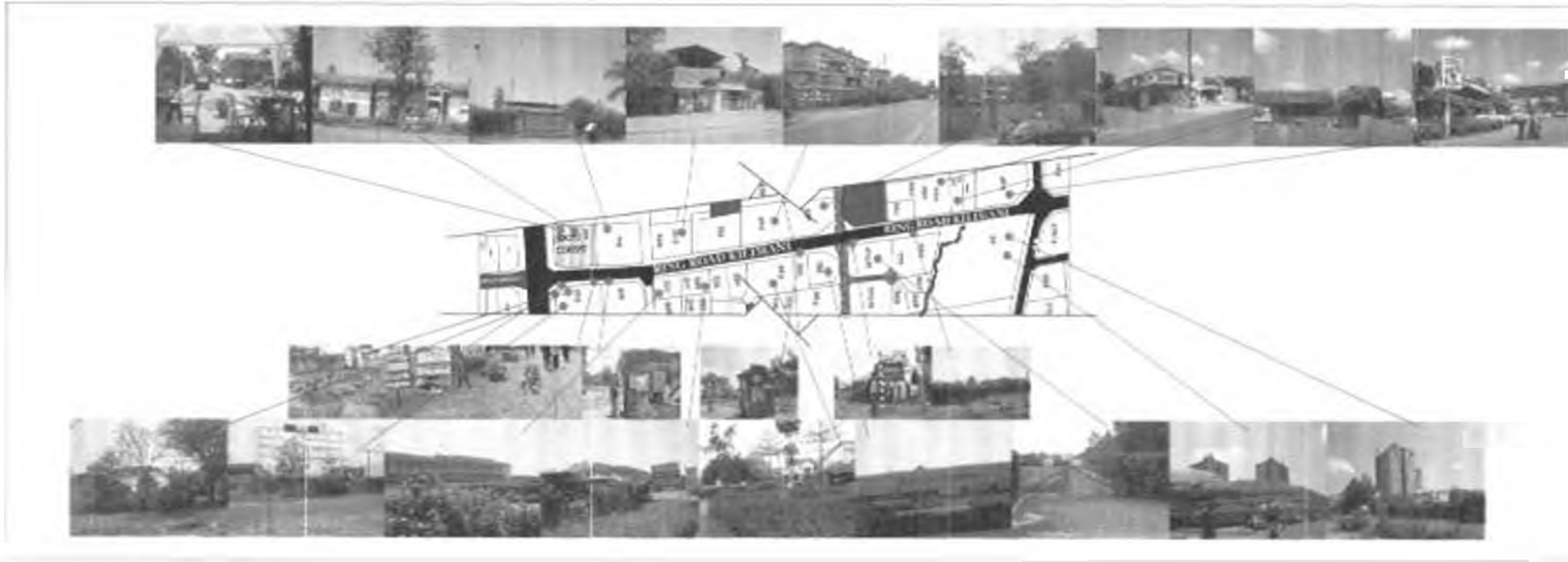
Originally, the area was exclusive low density residential. Although this scenario still holds, there are middle-density residential neighbourhoods for civil servants and institutional employees. The sub-division of plots into smaller units has increased the housing and population density. As earlier mentioned, the study area has six main commercial centres namely Uchumi Hyper, Nakumatt Prestige, Hurlingham, Yaya Centre, Valley Arcade, Caledonian and Adams Arcade. The area is also served by a variety of community facilities both public and private. These include schools, hospitals, clinics, clubs and Non Governmental Organizations. A major development in the area is a high influx of commercial offices for private individuals and organizations. This necessitates a planning intervention that would guide and harmonize the development in the area. As illustrated in Fig. 4.8.1 below, the various developments are interspersed along the major arteries within the neighbourhood.

3.8.2: Developments in Kilimani

The demand for offices in Kilimani can be attributed to various factors such as lack of appropriate office space in the Central Business District, inadequate car parking facilities in the Central Business District, general congestion in Central Business District, high rents in Central Business District and noise and air pollution in Central Business District. In general, these factors in concert have contributed to relocation of offices and other non-residential users outside the Central Business District to the environs such as

Kilimani. Within Kilimani neighbourhood, commercial offices and activities are concentrated in Hurlingham, Yaya Centre, Caledonia and Valley Arcade commercial centres as well as the plots between Hurlingham and Yaya Centre and intermediate frontages to Argwings Kodhek Road on both sides at plot ratio of 150 percent and ground coverage of 35 percent.

Figure 4.6: Existing developments along ring Road Kilimani



source (Researcher, 2008)

Figure 3.7 Existing developments along Ngong Road



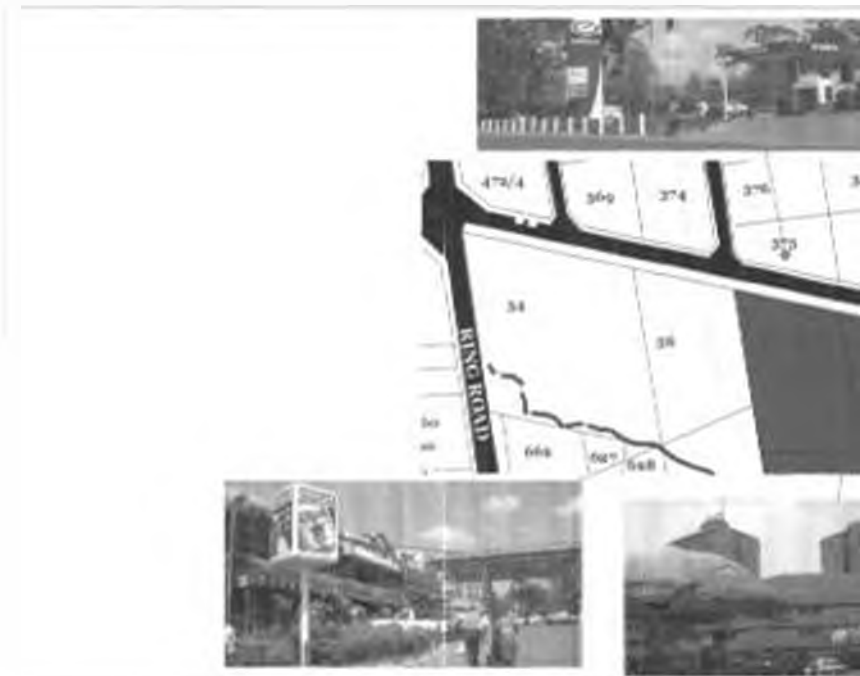
source (Researcher, 2008)



NGONG ROAD

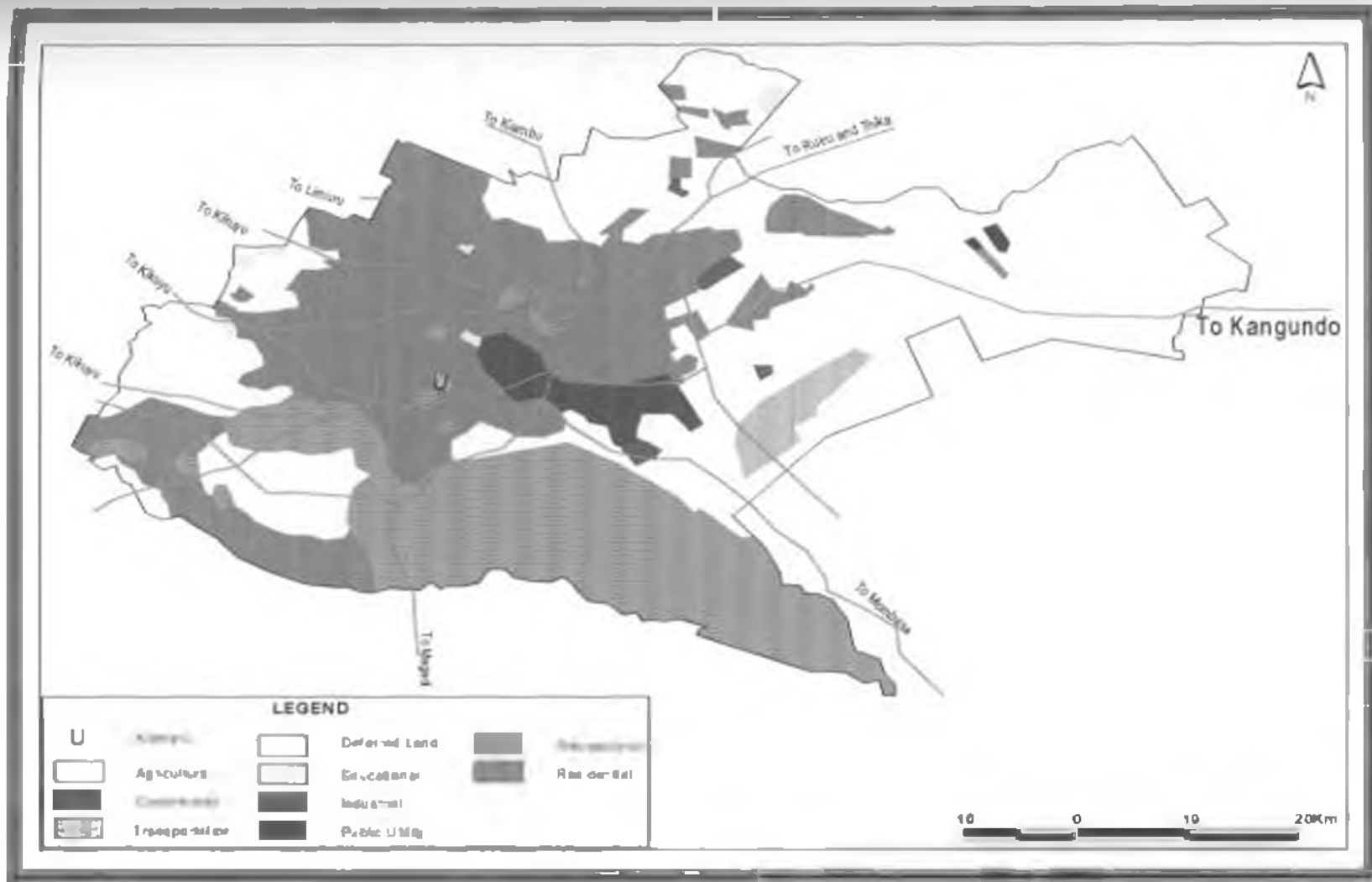


Figure 3.8: Existing developments Arqwings Kodhek Road



source (Researcher, 2008)





Source: City Council of Nairobi (1996)

CHAPTER FOUR

THE IMPLICATION OF THE POLICY ON THE LAND USES

4.0: Introduction

This chapter discusses the emerging neighbourhood development problems and underscores that these problems originate from the development densities and the emerging neighbourhood's household profile. Household socio-economic profile is a major determinant of urban neighbourhood development. Whereas the household size has a bearing towards water demand, other factors such as levels of income underscores the type of residential neighbourhood that one would prefer to live in. Land use dynamics are among the factors that directly contribute to a neighbourhood's physical development. This chapter therefore discusses some of the land use dynamics in Kilimani neighbourhood and emerging implications to the areas development. In this regard, this chapter details the evolution of land uses and critically evaluates the emerging neighbourhood's development problems. The chapter culminates with the synthesis of the main developmental issues in the neighbourhood.

4.1: Length of Stay in the Neighbourhood

The field survey revealed that 54.1 percent of the residents have lived in the neighbourhood for between 1 to 5 years. On the other hand, whereas 24.3 percent have

lived in the area for over 11 years, 18.9 percent have similarly lived in Kilimani for between 6 to 10 years. However, only 2.7 percent have lived in the area for less than one year. From the foregoing presentation, it is argued that households who have lived in the neighbourhood for a considerable period of time are likely to appreciate some of the neighbourhood development problems, which are eminent in the study area. Further to this, it is also likely that such households are likely to participate in recommending policy options towards a sustainable neighbourhood development.

4.2: Nature of Employment and Income

Approximately 45.9 percent of the households in Kilimani are in formal employment, compared to 29.7 percent who are on self-employment, 8.1 percent are retired, 5.4 percent unemployed and 2.1 percent are in informal employment. It was also evident that household monthly income levels in Kilimani are high as illustrated by Table 4.1 below.

Table 4.1: Households income levels in Kilimani

Income Level (KShs-month)	Number	Percentage of Households
Below 20,000	11	8.1
20,000 - 50,000	8	5.4
50,000 - 100,000	20	16.2
Over 100,000	14	10.8
No answer	66	59.5
Total	120	100.0%

Source: (Field Survey, 2008)

4.3: Distance to Work Place and Modal Split

The survey further underscored that a majority of households in Kilimuni, as corroborated by 29.7 percent have their work places located between 2 to 5 km from their residential areas, compared to 26.7 percent whose work place is between 6 to 9 kilometres from their residential neighbourhood. On the other hand, only 8.1 percent commute for less than 1 km to get to their work places, with another 10.8 percent travelling for over 8 kilometres. Related to distance to place of work in Kilimuni is the modal split, as depicted in Table 4.2 below.

Table 4.2: Household modal split in Kilimuni

Modal Split	Number	Percentage of Households
Private means	67	56.8
Public means	26	21.6
Private and public	3	2.7
No answer	3	2.7
Not applicable	21	16.2
Total	120	100.00

Source: (Field Survey, 2008)

It is evident from Table 4.2 above that private mode of transportation is the predominant transport mode at the households level, despite the fact that a majority of the household members have their work places not near their residents. From the study each household owns an average of 2 cars. Public transportation mode accounts for 21.6 percent of the

households while 2.7 percent of the households stated that they prefer both private and public means. The implication as noted is that there will be need to design a versatile vehicular infrastructure that favours both private and public modes of transportation.

4.4: Level of Access to Community Facilities and Services

These services include shopping centres, social halls, schools, postal services, health centres and religious institutions among others.

4.4.1: Commercial Centres

The immediate Kilimani neighbourhood has three major commercial/shopping centres. As indicated by Table 4.3 below, the shopping centres in proximity with the neighbourhood includes Nakumatt and Uchumi supermarkets and Yaya Centre. Presently, Nakumatt and Uchumi Supermarkets are the predominant households' shopping centres as they represent 25 percent of household shopping preference. Although Yaya Centre is the oldest shopping/commercial centre within the study area, it accounts for only 16.2 percent of the households. This is because the shopping complex does not offer a wide range of household goods as Nakumatt and Uchumi Supermarkets.

Table 4.3: Shopping Preferences of the Kilimani Households

Shopping/Commercial Centre	Number	Percentage of Households
Nakumatt and Uchumi Supermarkets	80	67.6
Yaya Centre	19	16.2
Junction Mall	8	5.4
All above	10	8.1
No answer	3	2.7
Total	128	100.00

Source: (Field Survey, 2008)

The above results imply that there is a dynamic consumer behaviour pattern that could be driven by an urge for alternative commodity types and different style as regard customer care/service. It also leads to the conclusion that the older shopping facilities exhibit problems of access in terms of location and available parking lots.

4.4.2: Educational Facilities

Kilimani is well served by both public and private schools. However, the private schools dominants the neighbourhood. Private schools in the area are well equipped with good facilities hence their popularity and number as shown on Table 4.4 below.

Table 4.4: Type of Schools in the Neighbourhood

School type	Number	Total land area (M ²)
Private Primary schools	6	4569
Public Primary schools	3	456
private Secondary institutions	2	369
Public Secondary institutions	1	1478
Private tertiary institutions	6	56
Public tertiary institutions	5	-

Source: (Field Survey, 2008)

Indeed, this is justified by the fact that 50 percent of the households have their children attending schools within the neighbourhood. Generally, it was also found out that 45.9 percent of the households have their children attending schools, which are over 5 km from their areas of residence, compared to 27 percent who have their children attending schools located up to 2 km from their residential areas.

The revelation that most of the households have their children travelling for up to 5 kilometres to attend schools outside the neighbourhood is an indication of heavy transport demand that parents must contend with. For instance, children who have to travel longer distances have to spend more on transportation, whether public, private or school owned transport. As Table 4.5 reveals, it is likely that households who have enrolled their children in schools, far from the neighbourhood mainly rely on school transport.

Table 4.5: Major School Transport Mode

School Transport Modes	Number	Percentage of Households
Private means	27	21.6
Public means	10	8.1
School transport	38	32.4
Boarding school	16	13.5
No answer	29	44.4
Total	120	100.0%

Source: (Field Survey, 2008)

Whereas 32.4 percent of the households in Kilimani rely on school transport system as provided by individual schools, 21.6 percent on the other hand depend on private means, where the children are dropped at school in the morning and collected in the evening by parent or guardians. Interestingly, only 32.4 percent rely on public transportation systems. It is viewed that with increased development density, through intensification of land use in Kilimani, school transport system in the neighbourhood will continue facing a major challenge in view of factors such as traffic congestion.

4.4.3: Health Facilities

Kilimani has several health facilities which are both public and privately owned. Access to these facilities is also adequate. For instance, 67.6 percent of the households have at least health facilities located less than one kilometre within their residential areas, with another 27 percent having such facilities located at approximately two kilometres from their homes. Only 5 percent suggested that they have to travel for up to 5 kilometres to

access health facilities. However, with the increased densification of the neighbourhood, it is envisaged that in future, demand for health facilities is likely to increase.

4.5: Waste Management

Just like in most neighbourhoods in the city, Kilimani is not served by City Council of Nairobi's solid waste management systems. Because of this 94.6 percent of households, institutional and commercial establishments rely on private contractor services. Table 4.6 presents the frequency of solid waste collection in the neighbourhood.

Table 4.6: Frequency of waste collection in Kilimani

Frequency of Waste Collection	Number	Percentage of Households
Once a week	10	8.1
Twice a week	100	83.8
Daily	7	5.4
No collection	3	2.7
Total	128	100.00

Source: (Field Survey, 2008)

It is apparent that most of the households have their wastes collected twice a week. As opposed to 8.1 percent who have their wastes collected once a week only 5.4 percent reported that their waste is collected daily. The 2.7 percent of the respondents who do not have a collection service represents those who mainly resort to indiscriminate management techniques, mainly open dumping. Indeed, among those without a collection

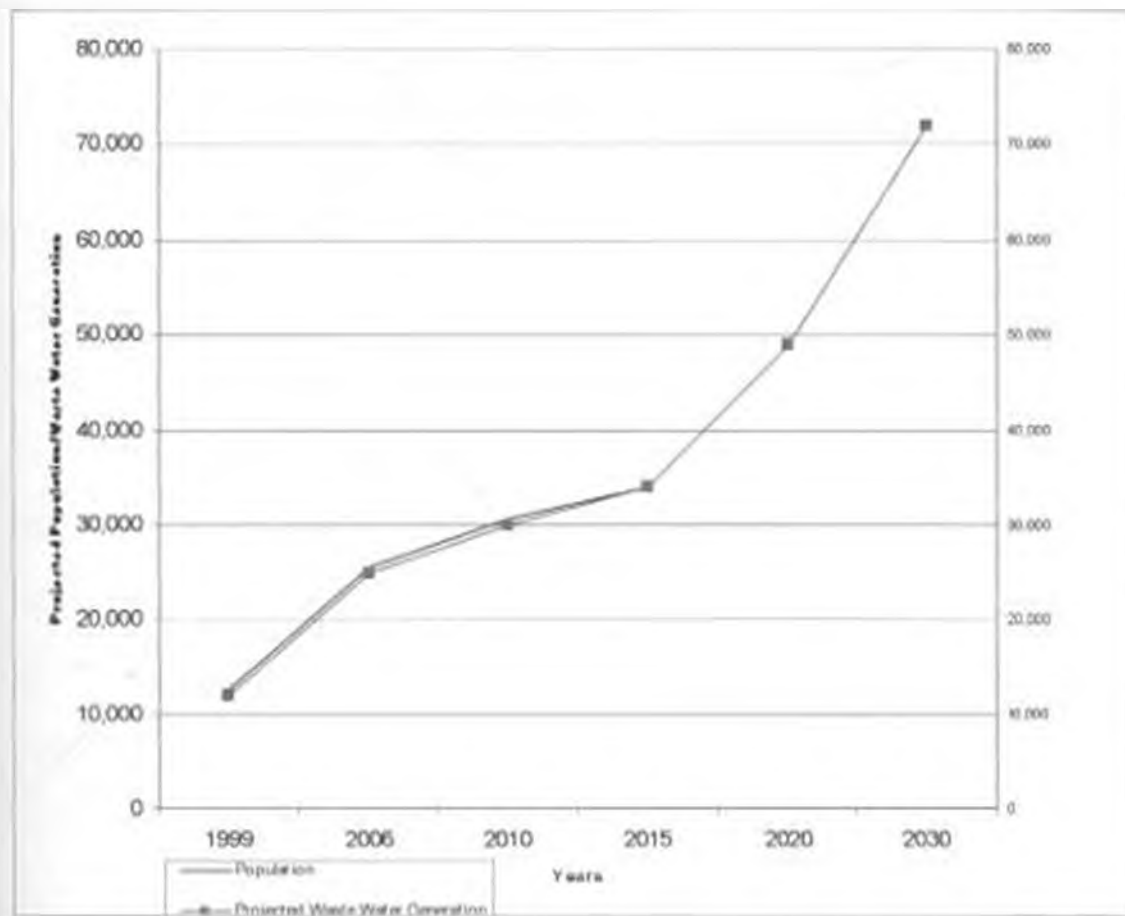
service, 54.1 percent acknowledged their use of open disposal technique, which has significantly degraded the neighbourhood.

At a per capita solid waste generation rate of 1 kg, Figure 4.1 presents the forecast for domestic solid waste generation in Kilimani area. It shows that an increase of the areas population is accompanied by a subsequent increase in domestic solid waste generation. If these are not well management, then the problem of domestic solid waste management is bound to increase in the neighbourhood.

4.6: Development Control and Land Uses in the Neighbourhood

Kilimani was originally a residential neighbourhood with predominantly maisonettes developed on half-acre plots. The study area originally accommodated a total of 1500 half-acre plots with maisonettes complete with servant quarters. Each housing unit had an average plinth area of $300M^2$. The current total plinth area for the 1500 half acre units is $450,000M^2$. The revision of planning standards from the 1990s allowed densification and the half-acre plots began to be subdivided. The aforementioned revised development standard led to the subsequent conversion of existing residential units into commercial activities and establishment of new high-rise commercial and residential buildings. This is justified by the results of the study where the commercial activities alone have given rise to additional plinth area of over $375,000M^2$ while new high-rise structures accounts for additional plinth area of $75,350M^2$ compared to the original plinth area of $450,000M^2$.

Figure 4.1: Forecast for domestic solid waste generation in Kilimani



Source: (Researcher, 2008)

The common housing prototype in the study area is multifamily residential flats, whose users were changed from single-family dwelling units. While flats account for 43 percent of residential housing types in Kilimani, maisonettes accounts for 5.4 percent, with bungalows accounting for 13.4 percent. A bungalow is, herein defined as a house that is built on one level normally occupied by one household, on the other hand, a maisonette is a house built on two floors but of single-family occupancy. Hitherto, changes in development densities without an increased investment in infrastructure and services, is

one of the factors that have contributed to problems such as unreliable and frequent water shortages coupled with bursting sewer pipes.

Pursuant to section 29 of the Physical Planning Act (Cap 286), and section 166 of the Local Government Act (Cap 265), the responsibility of development control is the responsibility of local authorities. Towards this end, poor enforcement of development control measures by City Council of Nairobi has led to several developers constructing structures without the council's procedural approval. For instance, although the council has stipulated in its zoning regulation that residential development in Kilimani areas should not exceed four floors, the survey revealed that there are various blocks of apartment, which have contravened this regulation. This is corroborated by 21 percent of the households acknowledging that their neighbourhood has been characterised by illegal extension of buildings. Similarly, another 51 percent revealed that the previously existing public open spaces have been encroached on by private developers.

4.6.1: Residential Land-Use and Ownership

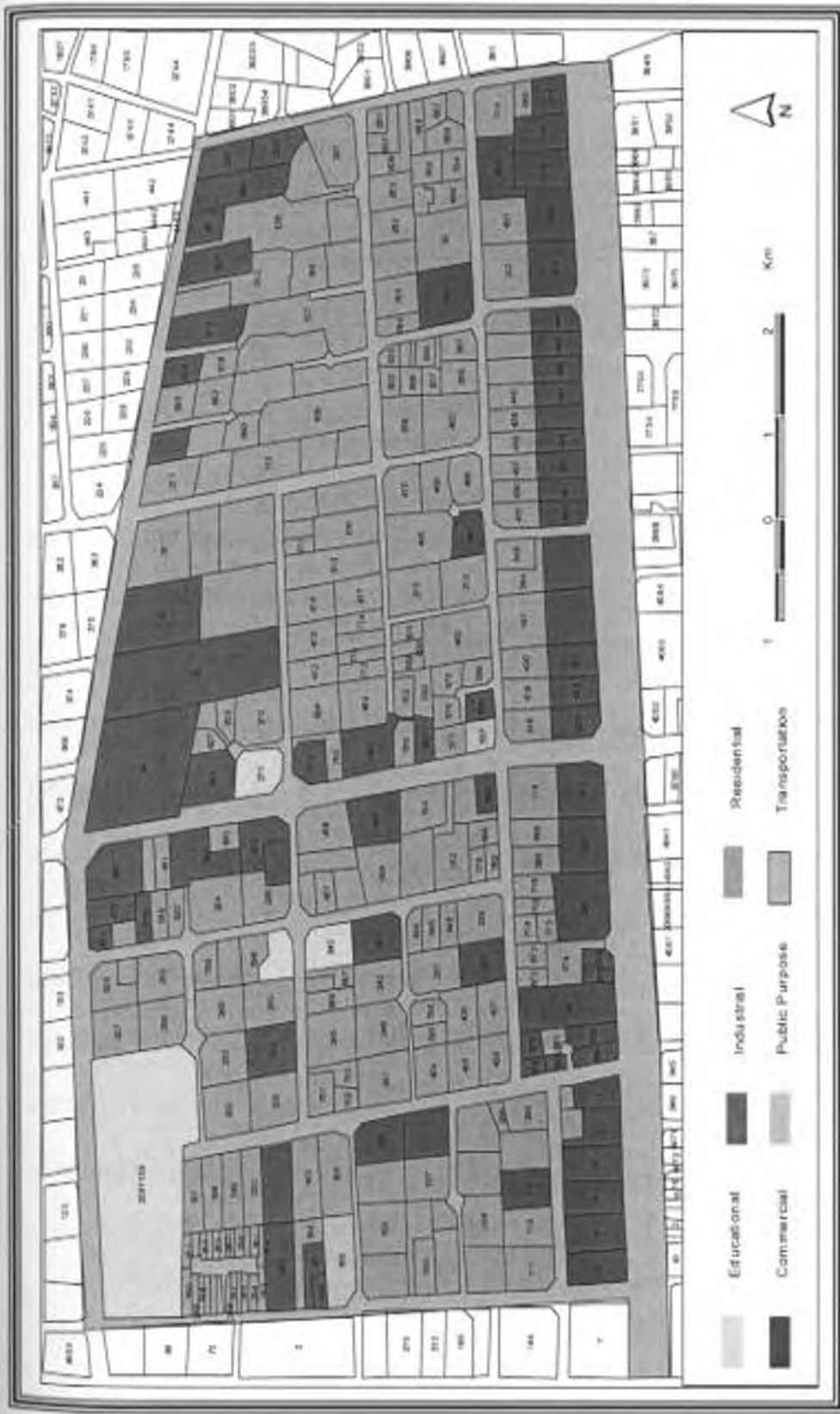
Approximately 59 percent of residents in Kilimani are tenants whose monthly rental payments varies as illustrated by Table 4.7 below. The majority of the tenants pay a monthly rent ranging between Kshs 20,000 to 40,000. However, rental range in the area is dependent on the number of rooms, as well as the housing topology. In this case, a four bed roomed apartment house would have a much higher rental value than a two bed roomed apartment.

Plated.1: A plot whose density has been changed from single to multi dwelling units



Source: (Field Survey, 2008)

Map 4.1. Planning Land Use Patterns



Source: City Council of Nairobi (1996)

Table 4.7: Monthly rental range in Kilimani

Rent (Kshs./month)	Number	Household Percentage
Less than 10000	8	6.67
10000 - 20000	12	10.00
20000 - 40000	42	35.00
Above 40000	16	13.33
No answer	42	35.00
Total	120	100.00

Source: (Field survey, 2008)

Although the approved plot ratio and ground coverage for residential plots in Kilimani are 75 and 35 percent respectively, the survey showed that these have been far exceeded by most developments in the neighbourhood consequently increasing pressure on the local infrastructure and services, such as roads, water supply and sewer. In this regard, this study underscored that although 82 percent of plots in Kilimani have retained the required 0.5 acre by city council's zoning regulations, this is bound to change in future as the area continues to experience intensive densification. This is evident by the fact that in totality, vast majority of plots in the area have already been subdivided to provide room for more residential developments. In furtherance of the discussion, the result of the field survey reveals that all the multi-family dwelling apartments in the area have exceeded the recommended plinth area coverage of 75 percent.

4.6.2: Commercial Land Use

Commercial land uses in Kilimani are concentrated along Argwings Kodhek Road, consequently manifesting as Yaya and Hurlingham shopping centres. The concentration of the commercial activities along a single road has occurred at the background of Ngong Road which is also a major transport artery in the neighbourhood, and designated as a ribbon commercial zone. However in the recent past, Ngong Road has also started experiencing surge in commercial developments vide changes of users of residential properties to commercial and professional office users. As the case of residential user, the survey established that most of the commercial users in the area have their plinth area exceeding the recommended areas as illustrated by table 5.8 below which reveals that out of the 71 sampled commercial user plots, 65 percent have maintained the approved minimum plot size of 0.5 acre, with 35 percent having been subdivided to sizes below this minimum requirement. In spite of this, the field survey revealed that indeed, due to rapid development in the area, many plots both below 0.5 acre and above under commercial user are likely to be further subdivided as land for commercial use in the central business district continues being scarce.

Table 4.8: Size of sampled commercial plots in Kilimani

Size of Land (acre)	Number of Plots	Percentage of Plots
Plots size less than 0.5 acre	59	65
Plots size equal/more than 0.5 acre	12	35
Total	71	100

Source: (Field survey, 2008)

The reason why most plots have maintained the required 0.5 acre in Kiliman is because their owners preferred to change their use from residential to commercial, without redeveloping the original residential development. However, this has occasioned developments with inadequate space elements for parking leading to on road or road side parking which grossly contributes to traffic congestion along selected roads.

Plate 4.2: Poor development control - A Kiosk located on road reserve



Source: (Field survey, 2008)

Table 4.9: Ground coverage of selected plots

Ground Coverage	Number of Plots	Percentage
Ground coverage less'equal to 75%	5	7
Ground coverage more than 75%	66	93
Total	71	100

Source: (Field survey, 2008)

4.6.3: Educational Land Use

According to the Physical Planning Handbook (2002), the provision of learning facilities depends on the age of the students as well as the number of students. Generally, the minimum recommended plot size for a primary school within a neighbourhood is about 3.0 acres for a single stream school. On the other hand, a plot size of 5 acres is recommended for a double stream. Further pursuant to the physical planning standards underscores that since all schools expand, even if a school will start as a single stream initially, it should be located the minimum land size of 9.6 acres or thereabout so as to forestall the problem of land shortage in case there is need for expansion. As Table 4.10 below reveals, most of the sampled schools complied with the aforementioned physical planning regulations.

Table 4.10: Main primary educational institutions in Kilimani

Name of Institution	Plot Size (Acre)	Minimum Recommended Size (Acre)
St. Christopher's	26	3.9
Allen Groove School	5	3.9
Milimani Primary School	16	3.9

Kilimani Primary School	15	3.9
Cavina School	4	3.9
St. Nicholas	1	3.9
St Nicholas kindergarten	5	3.9
Norec junior school	0.25	3.9

Source: (Field survey, 2008)

The Physical Planning Hand Book (2002) further reveals that for a technical institutions including colleges, the recommended minimum plot size is 8.7 acres. In spite of these requirements, field survey reveals that all the sampled technical institutions were accordingly approved by City Council of Nairobi although they never fulfilled the required physical planning standards. For instance, according to Legal Notice No. 56 of 1989, the land size for a university should be at least 50 hectares. Table 4.11 however reveals that none of the institutions met this requirement.

Table 4.11: Main technical educational institutions in Kilimani

Name of institution	Plot Size (Acre)	Minimum Recommended Size (acre)
Daystar university	3.7	8.7
French school	4.9	8.7
ARCC	1.2	8.7
Egerton Campus	0.2	8.7
Cyber tech training	0.6	8.7
La Contessa College	1.2	8.7
Secretarial Academy	1.2	8.7
Africa Nazarene university	4.9	8.7

Source: (Field survey, 2006)

4.6.4: Public Purpose and Community Facilities Land Use

As the name denotes, community/public facilities are integral part of a residential neighbourhood. Kilimani is therefore no exception. These include among others social halls, libraries, and religious institutions. The most predominant public purpose and community facility in Kilimani neighbourhood, revealed by the field survey are religious and health institutions. However as corroborated by Table 4.12 below, ground coverage, whose main objective is to facilitate circulation and environmental quality has however been compromised by most of these developments. High ground coverage for most community facilities in Kilimani, such as churches explains why most of these facilities do not have adequate parking spaces.

Table 4.12: Ground coverage for selected community facilities in Kilimani

Name of Facility	Percentage Ground Coverage	Recommended Coverage (%)
Deaf Church Y.M.F	19	35
Masaha Hospital	100	35
Scripture union centre	54	35
Nairobi Baptist church	102	35
Nairobi women's hospital	71	35
Jehovah witness	9	35
Eritrean Orthodox	17	35

Source: (Field survey, 2008)

4.7: Total Plot Area for Land Use Activities

Table 4.13 below corroborates that main land use in the area are residential, commercial/institutions and transportation. Presently, residential development accounts for 72 percent of total land use, while commercial establishments/institutions accounts for 24 percent. On the other hand, transportation accounts for 4 percent.

Table 4.13: Ground Coverage for Selected Community Facilities in Kilimani

Land Use	Total Plot Area (m ²)	Percentage of Total
Residential	2606000	72
Commercial/Institutions	850000	24
Transportation	144000	4
Total	3600000	100

Source: (Field survey, 2008)

4.8: Summary of Issues

The chapter has discussed some of the development problems in the study areas, as occasioned by development standards in the neighbourhood. It has been shown that although Kilimani was initially zoned for low-density development, the revised development standards over the years have led to densification of both residential and commercial activities. Further to this, as the demand for housing, especially to high-income households in the city continues, property owners in Kilimani have responded by changing development densities of their plots so as to develop more dwelling units in view of anticipated economic gains. Similarly, due to scarcity of commercial office

spaces in the city's central business district, the revised development standards in Kilimani has led to more commercial establishments relocated to the area, especially along Argwings Kodhek and Ngong Roads. All these have resulted to development challenges that include, but not limited to dilapidated roads, poor waste management and traffic congestion. It is also imperative to note that illegal developments have continued unabated to manifest in the neighbourhood. This has partially been perpetuated by lack of good will on the part of the council to enforce development regulations.

CHAPTER FIVE

THE IMPLICATIONS OF DEVELOPMENT ON PHYSICAL INFRASTRUCTURE CAPACITY IN THE NEIGHBOURHOOD

5.0: Introduction

This section discusses the capacity of the existing physical infrastructure to sustain expanding land uses in the neighbourhood. This chapter specifically covers water supply, sewer reticulation, storm water drainage, road network and condition, as well as a detailed inventory of traffic volume among major transportation corridors.

5.1: Water Supply

Rapid population increase in Nairobi and Kilimani neighbourhood in particular, has subsequently increased water demand, beyond the available supply. The aftermath of this is unreliable and frequent water shortage, as corroborated by 78 percent of the households who reported such frequent shortages. Furthermore, in Kilimani, 97 percent of the households rely on Nairobi Water and Sewer Company for water supply. On the other hand, 3 percent of the households have boreholes.

The severity of water shortage is summarized in Table 5.1, which shows that up to 27 percent of households experience water shortage of at least four days.

Table 5.1: Frequency of water shortage in Kilimani

Frequency of Water Shortage/work	Number	Percentage of Households
1 day or less	26	21.6
1 up to 2 days	20	16.7
Up to 4 days	32	26.7
Seven Days a week	10	8.3
No answer	32	26.7
Total	120	100.00

Source: (Field Survey, 2008)

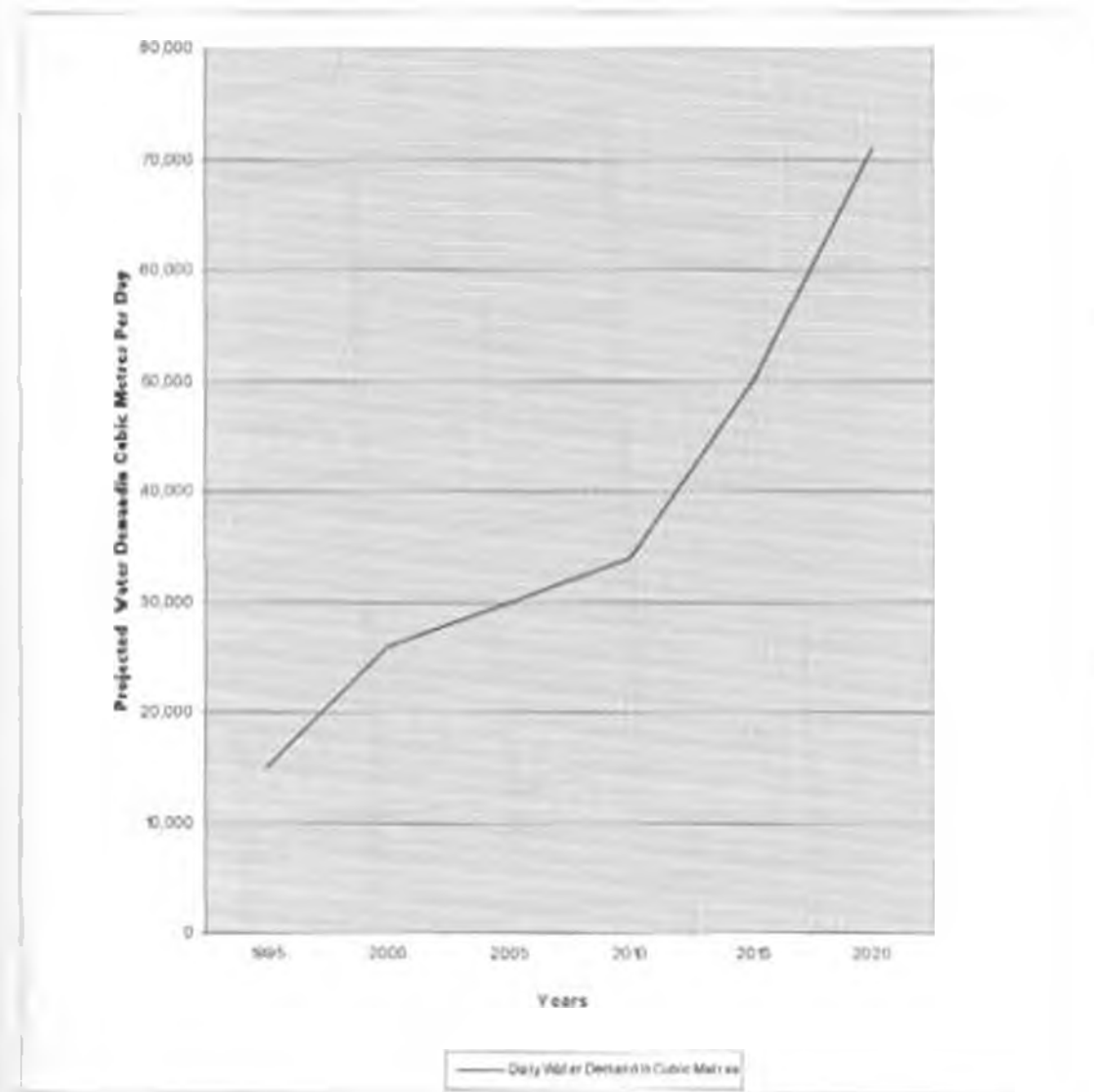
As already mentioned before, one of the factors that has contributed, to frequent water shortages in the neighbourhood is increased demand through land densification, with little investment in water service delivery. At an estimated per capita domestic water consumption 130 litres per day, Figure 6.2 presents a forecast for water demand in Kilimani area. Currently, it is estimated that with a population of 25,569 water demand is at 31,870M³ per day. With an increased population, this figure is expected to subsequently increase to 1391m³ day by 2021. If this increased demand is not adequately addressed, it is anticipated that water shortage in Kilimani is bound to increase.

5.2: Storm Water Drainage

Approximately 45.9 percent of the households in Kilimani have roads fronting their residence designed with storm water drains. However, an indication that 37.8 percent of the roads fronting houses do not have these facilities reveals those sections of the neighbourhoods that are likely to be affected by flooding during rainy seasons. This notwithstanding, such road surfaces tend to wear quickly, hence increasing cost of

maintenance. It was also observed that some of the existing storm water drains are blocked as a result of poor maintenance, further increasing the road maintenance cost.

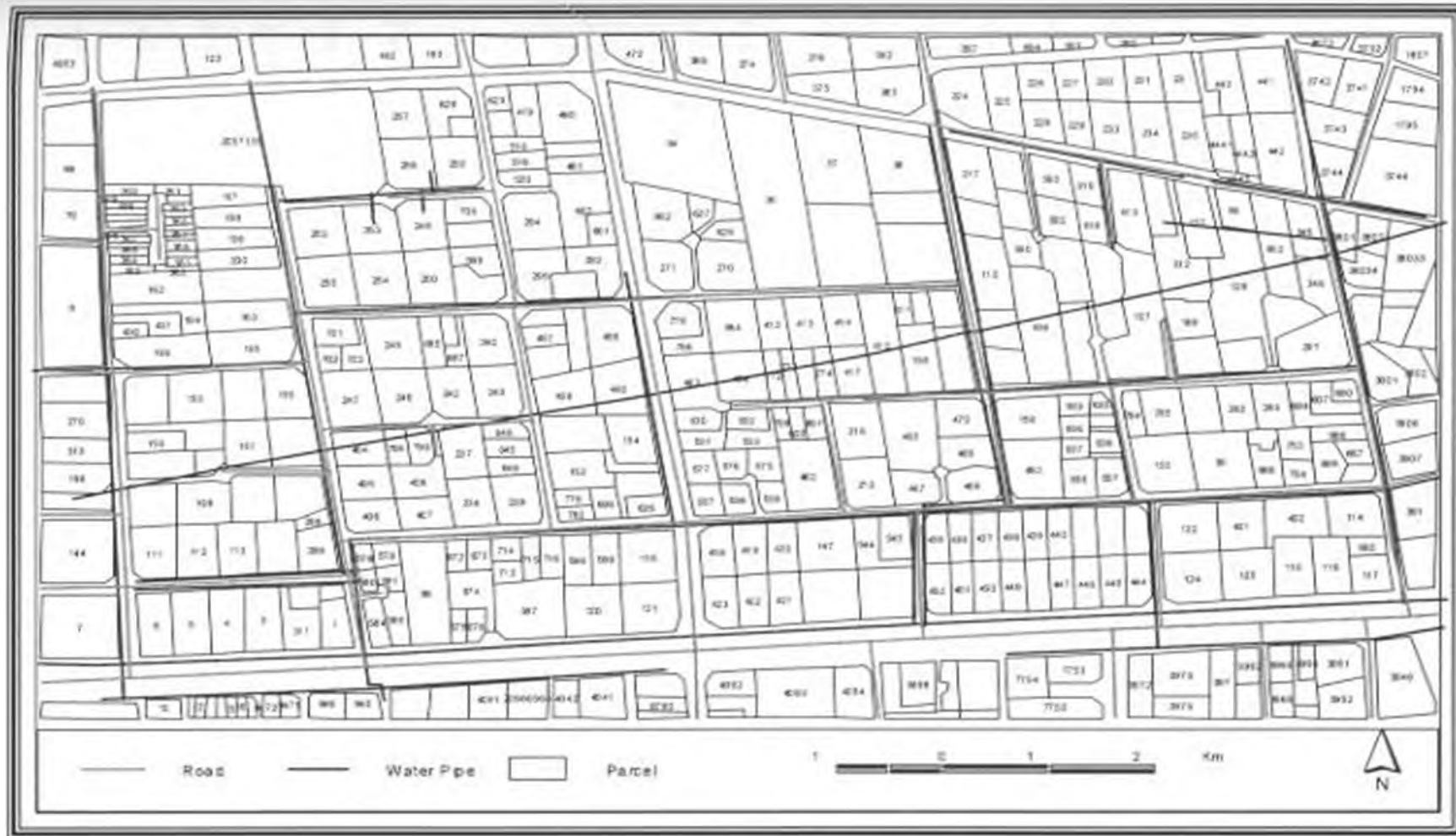
Figure 5.1: Forecast for water demand in Kilimani



Source: (Researcher, 2008)

Note: The 1999 population and housing census survey used as base year for projection

Map A.1: Water reticulation in the study area



Source: (Researcher, 2008)

5.3: Waste Water Management

Kilimani neighbourhood is adequately served by City Council of Nairobi's sewer reticulation system. The average sewer size in diameter in the area is 200 mm. This was however designed when the neighbourhood was predominantly residential, with mainly single family dwelling units developed on individual plots. However, with densification as characterised by change of residential development density from single to multi-residential dwelling units and change of residential users to commercial users, the amount of wastewater generated in the area has surpassed the originally planned sewer capacity.

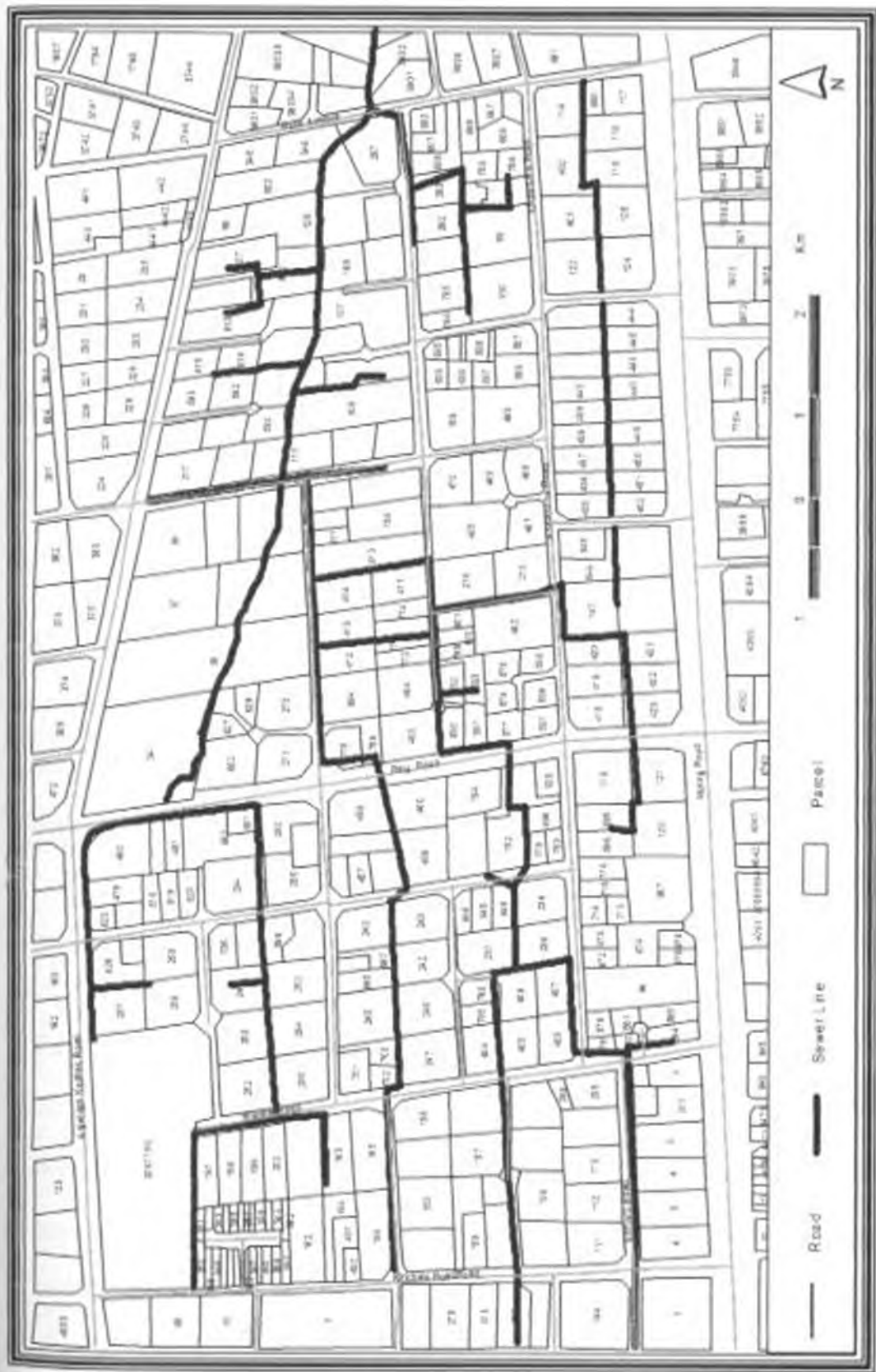
Table 5.2: Forecast for waste water generation in Kilimani

Year	Population	Projected Waste Water Generation (m ³ /Day)
1999	12698	1320
2006	25569	2659
2010	30569	3179
2015	34026	3538
2020	49036	5100
2030	72065	7495

Source: (Researcher, 2008)

The study assumes that at water consumption of 130 litres per person in a given household, 80 per cent of domestic water consumed is released as waste water. It is therefore evident that an increased population due to densification in the neighbourhood is likely to increase the capacity of utilization of sewer facilities in Kilimani. If no investments are pursued in a near future, then problems such as blockage or overflow of sewer facilities is likely to be experienced. This will further accelerate environmental problems such as those related to pollution in the neighbourhood.

Map 5.2: Sewer reticulation in the study area's



Source: City Council of Nairobi (1996)

5.4: Road Network

The research revealed that approximately 75.7 percent of roads in Kilimani are well butimised, with only 21.6 percent on gravelled. Usually, some of these roads become impassable to both pedestrians and motorists during rainy seasons. Furthermore, dust emanating from gravelled roads is also a major air pollutant.

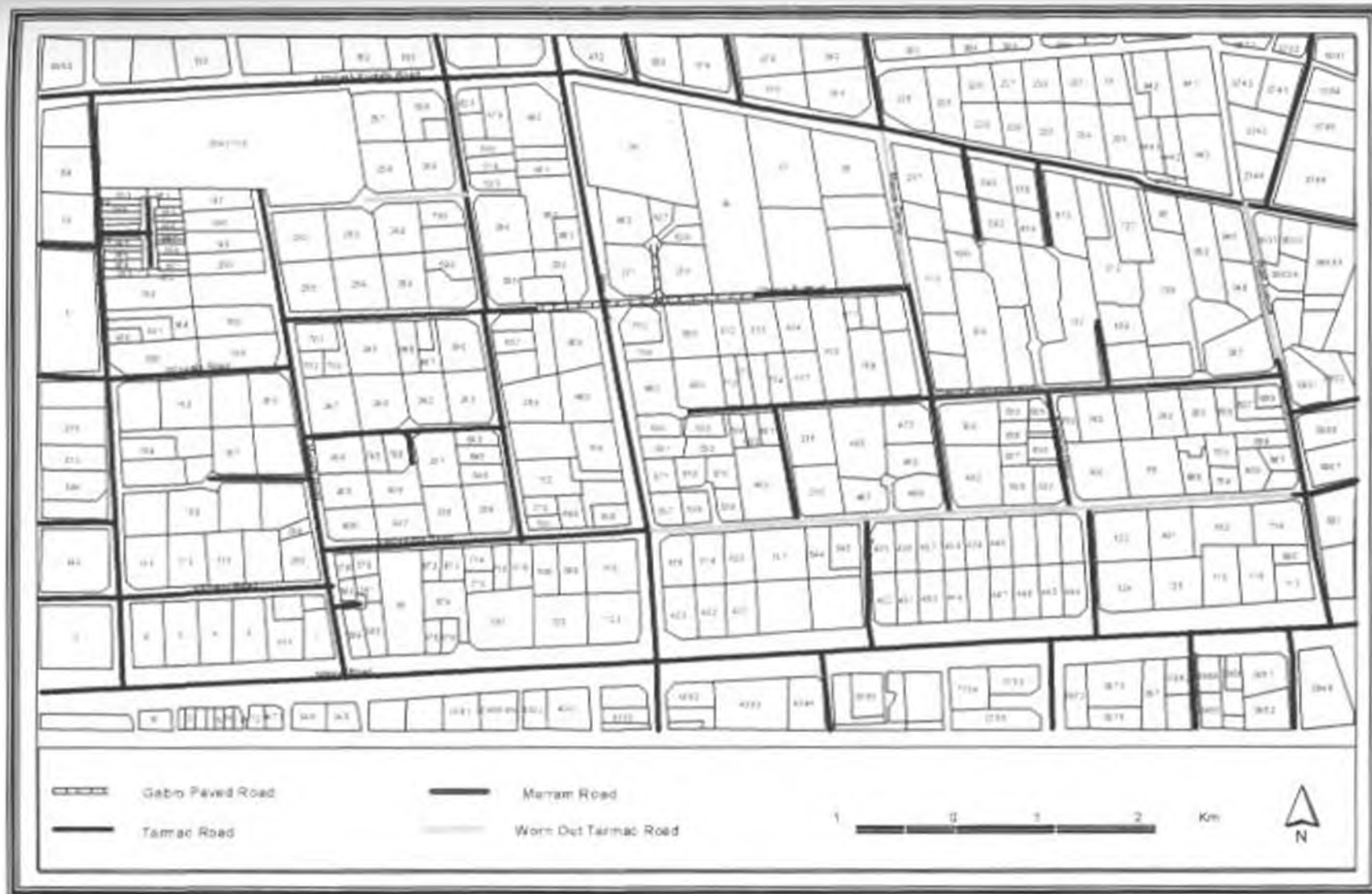
5.4.1: Traffic Volume Inventory along Cordon Points

This section presents the existing traffic volume in Kilimani neighbourhood. It specifically analyzes traffic flow and volume on seven selected cordon points along the major roads in the study area. This was done during peak and off peak hours respectively, between 7:30 am – 8:30 am, and between 10:30 am – 11:30 am.

5.4.2: Ring Road Kilimani and Ngong Road Cordon Point

Table 6.3 shows that the modal split along Ring Road Kilimani and Ngong Road during the peak and off peak hours is varied. Generally, traffic volume at the junction of these two roads during peak and off peak hours is dominated by saloon cars (48 percent and 46 percent). Total traffic volume is also high at peak hour (1328 vehicles) and progressively declines to 1117 vehicles towards off peak hours.

Map 3.3: Road conditions in the study area



Source: (Researcher, 2018)

Table 5.3: Peak and off peak hour traffic along Ring Road Kilimani/Ngong Road

Modal Choice	Peak Hour No.	Percentage	Off Peak No.	Percentage
Saloon car	639	48	520	46
Station wagon	162	12	223	20
Public service vehicles	339	25	137	12
School vans bus	48	4	15	1
Pickups	51	4	117	10
Trucks/lorries	35	3	39	3
Motorcycles	16	1	24	2
Bicycles	38	3	17	1
Total	1328	100	1312	100

Source: (Field survey, 2008)

Accordingly, this information underscores that personal saloon cars are among the major causes of traffic congestion during the peak hours

5.4.3: Ring Road Kilimani and Argwings Kodhek Road

Argwings Kodhek Road traverses Kilimani through Yaya Centre and Hurlingham, which are major commercial/shopping centres in the neighbourhood. The road is also very busy both during peak and off peak hours. This is because besides serving the study area, it similarly joins Gitanga Road, which serves Kawangware, a densely populated neighbourhood. Volume of traffic at the cordon point along Ring Road Kilimani/Argwings Kodhek Road has been presented in Table 5.4 below.

Table 5.4: Peak and Off Peak Traffic-Ring Road Kilimani/Argwings Kodhek Road

Modal Choice	Peak Hour No.	Percentage	Off Peak No.	Percentage
Saloon car	1778	57	1361	52
Station wagon	461	15	570	22
Public service vehicles	703	23	404	15
School vans bus	31	1	33	1
Pickups	29	1	12	1
Trucks/lorries	5	0.2	60	2
Motorcycles	22	1	52	2
Bicycles	69	2	98	4
Total	3098	100	2610	100

Source: (Field survey, 2008)

The table reveals that traffic volume at the cordon point along the two roads is generally high, at peak hour, but decline during the off peak periods. Most notable decline is registered by private saloon cars. This seems to suggest that there are many saloon cars during the peak hours, than in off peak hours, because most of them are used to travel to work in the morning and back home in the evening.

5.4.4: Menelik Road and Ngong Road.

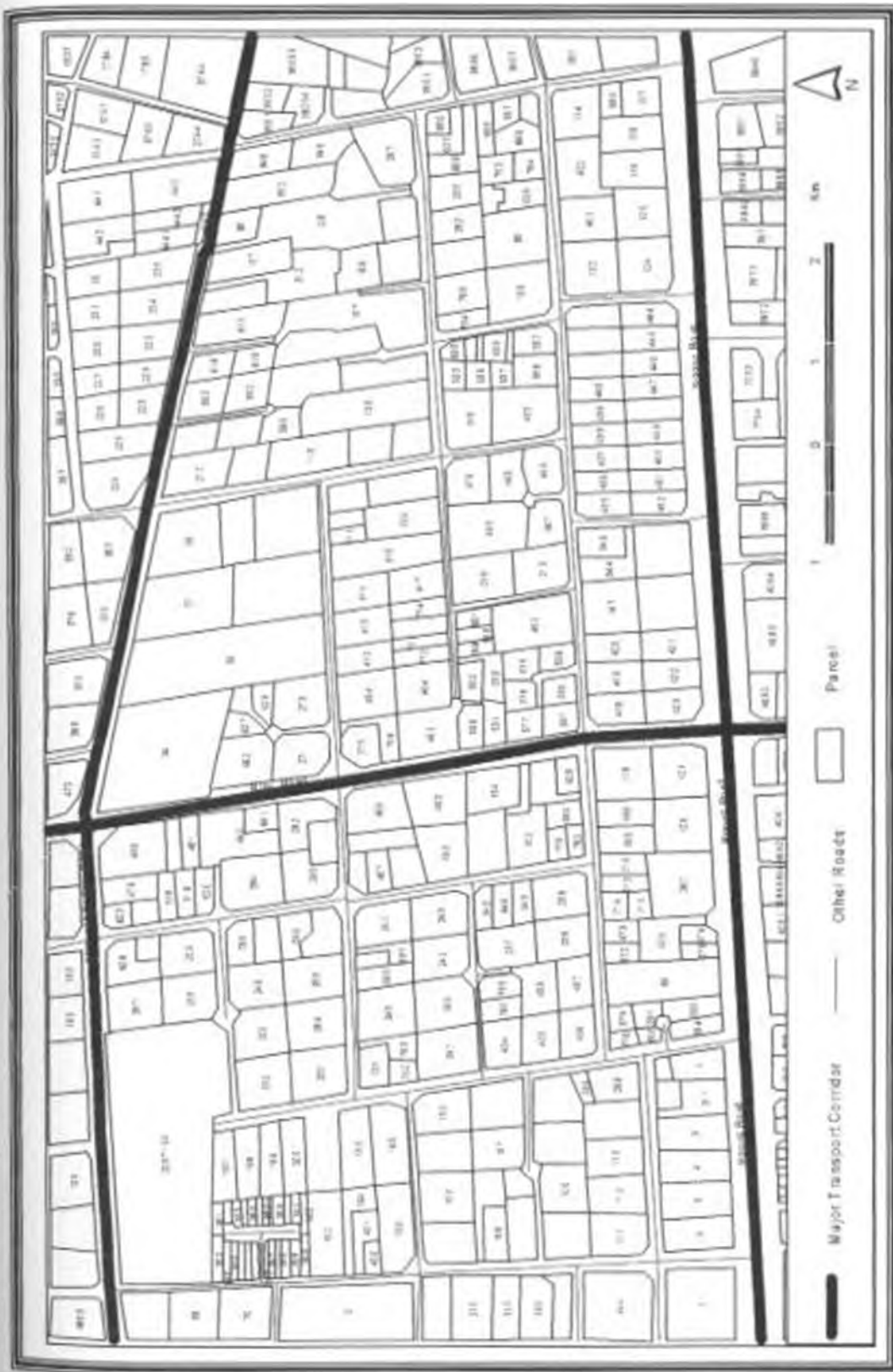
Menelik Road is located to the eastern side of the study area, off Ngong Road. As summarized in Table 5.5, unlike other cordon points discussed before, the traffic volume along Menelik-Ngong Road cordon point is less busy, as mainly characterized by absence of public service vehicles. This is because Menelik Road is not designated to be used by public vehicles. The road is not also frequented by school buses because most of the pick up/dropping points are located along Ngong and Argwings Kodhek Roads

Table 5.5: Peak and off peak traffic-Meneklik Road/Ngong Road

Modal Choice	Peak Hour No	Percentage	Off Peak No.	Percentage
Saloon car	18	43	22	29
Station wagon	10	24	14	18
Public service vehicles	-	-	-	-
School vans/bus	-	-	-	-
Pickups	12	29	12	16
Trucks/lories	4	10	6	8
Motorcycles	2	5	10	13
Bicycles	-	-	12	16
Total	43	100	76	100

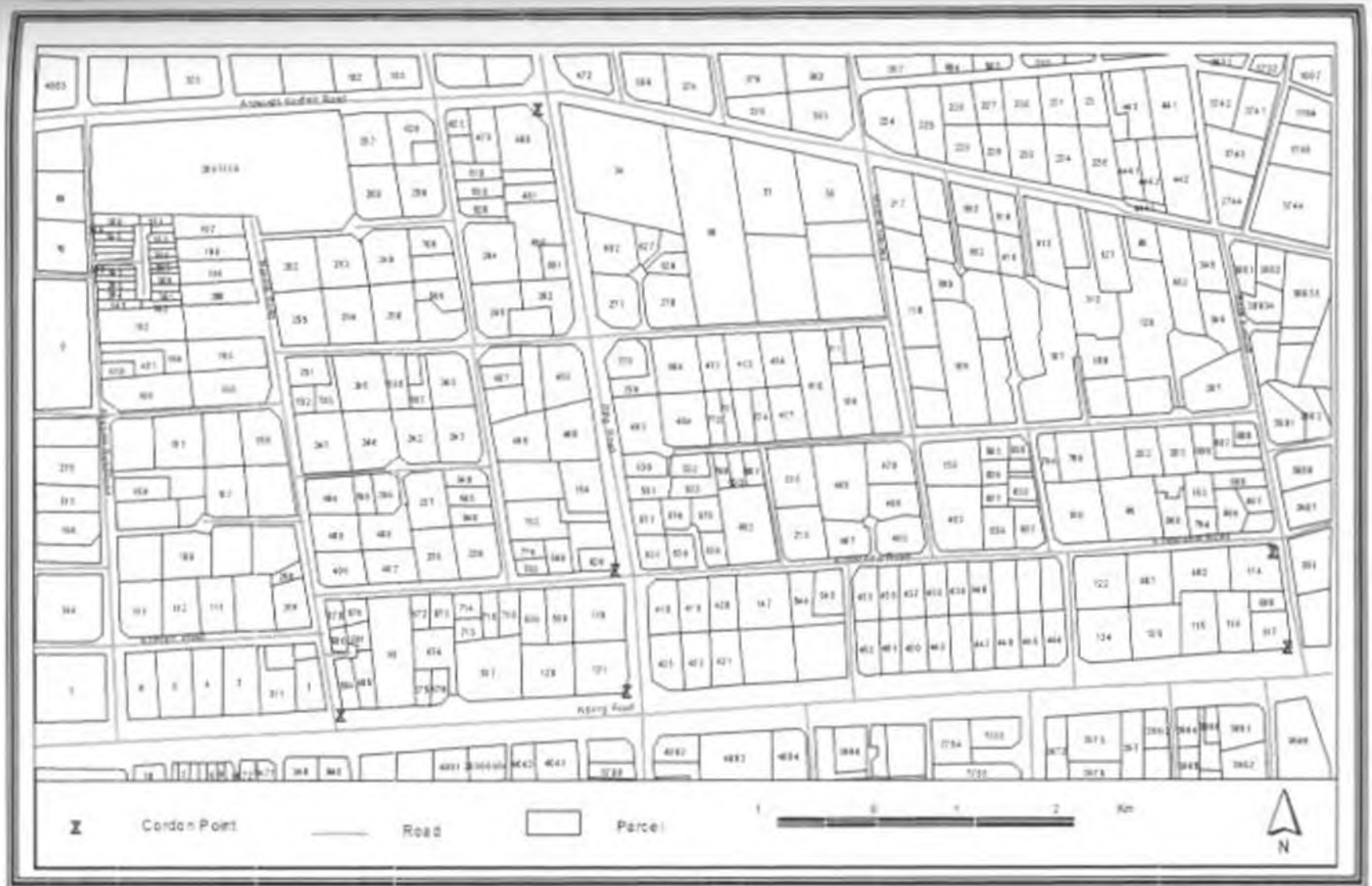
Source: (Field survey, 2008)

Map 8-4: Main Transportation Corridors



Source: (Researcher 2008)

Map 4.2: Traffic Survey Cordon Points

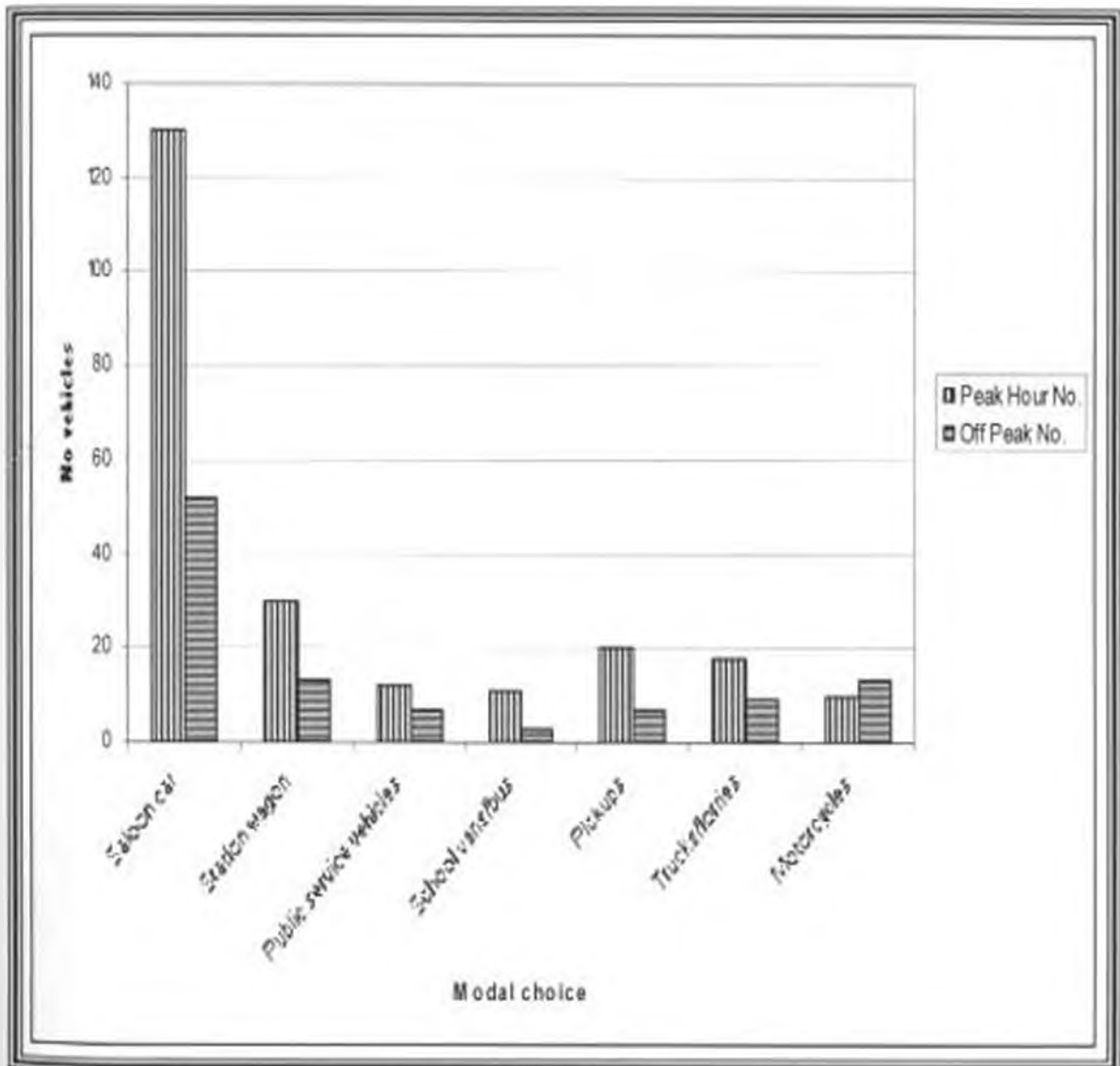


Source: (Researcher, 2018)

5.4.5: Kindaruma Road and Ring Road Kilimani

Traffic survey at the cordon point along Kindaruma Road-Ring Road Kilimani further shows that high traffic volume is recorded during peak hours, and low traffic volume recorded during off peak hours.

Figure 5.2: Peak and off Peak Traffic-Kindaruma Road/Ring Road Kilimani



Source: (Field survey, 2008)

It is apparent from Figure 6.6 that saloon cars dominates the modal split along Kindaruma Road and Ring Road Kilimani at both peak and off peak hours, as indicated by 51 percent and 44 percent respectively. However, it is emerging that the volume of public service vehicles (buses and matatus) is quite low, compared to the cordon point along Ring Road Kilimani and Argwings Kodhek Road, and Ring Road Kilimani and Argwings Kodhek Road. This is because Kindaruma Road/Ring Road Kilimani cordon point does not constitute the major transport corridor in the neighbourhood.

5.4.6: Rose Avenue and Ngong Road

The fifth cordon point was selected at the intersection of Rose Avenue and Ngong Road. Whereas Ngong Road is a major transportation corridor located at the extreme southern part of the neighbourhood, on the other hand it is one of the longest roads in the neighbourhood. It is situated off Ngong Road at the southern part of the study area, and off Denis Pritt Road, to the northern part of the neighbourhood. It is worth noting from Table 5.6 that traffic at the cordon point along Rose Avenue and Ngong Road is minimal. Particular reference is made to the decline in traffic volume of all transport modes.

Table 5.6: Peak and off peak traffic - Rose Avenue/Ngong Road

Modal Choice	Peak Hour No.	Percentage	Off Peak No.	Percentage
Saloon car	40	58	27	44
Station wagon	17	25	14	23
Public service vehicles	1	1	-	-
School vans bus	-	-	-	-
Pickups	2	3	-	-
Trucks lorries	2	3	-	-
Motorcycles	1	1	8	13
Bicycles	6	9	12	20
Total	69	100	61	100

Source: (Field survey, 2008)

The above trend could be explained by the fact that much of the road's section (Rose Avenue) is in a dilapidated state. For example, there is a glaring difference in traffic volume along this cordon point, to that of the other cordon points along roads such as Ring Road Kilimani and Argwings Kodhek Roads. This corridor is also least preferred by the motorists such as school buses/vans and motor cycles.

5.4.7: Kindaruma Road and Rose Avenue

Kindaruma Road is also located at the southern part of the study area, and runs parallel to Ngong Road. Table 5.7 has summarized traffic volume of various transport modes as recorded at the cordon point along Kindaruma Road/Rose Avenue.

Table 5.7: Peak and Off Peak Traffic – Kindaruma Road/Rose Avenue

Modal Choice	Peak Hour No.	Percentage	Off Peak No.	Percentage
Saloon car	90	42	63	44
Station wagon	52	24	26	18
Public service vehicles	-	-	-	-
School vans/bus	19	9	8	6
Pickups	20	9	15	11
Trucks/lorries	10	5	14	10
Motorcycles	11	5	-	-
Bicycles	11	5	16	11
Total	213	100	142	100

Source: (Field survey, 2008)

The table indicates that although no public transport vehicles were observed at Kindaruma Road/Rose Avenue cordon point, the total volume of other transport modes, notably saloon cars, school buses/vans, lorries and bicycles has significantly increased compared to the cordon point along Rose Avenue/Ngong Road. This could be explained by the fact that since Kindaruma Road has low traffic volume, hence many motorists and

non motorists prefer using it so as to avoid the traffic jam along Ngong Road, and is more so with traffic moving towards Thompson and Dagoretti areas

Plate 5.1: Poor state of Kiadaruma Road



Source: (Field survey, 2008)

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5.5: Implications of Traffic Inventory in Kilimani Neighbourhood

First, the inventory of traffic volume along the selected cordon points in the study area has accordingly revealed that traffic generation in the study area vary during off peak and peak hours. Generally, high traffic volumes are recorded during the peak hours (7:30 am to 8:30 am). Second, it is apparent that private cars, as one of the modal choices in the neighbourhood, constitute the highest percentage of vehicular traffic in the neighbourhood, both during the peak and off peak hours.

With an increased population in the neighbourhood occasioned by increased densification of land uses. This situation is anticipated to increase in future, hence aggravating the problem further. Third, the traffic survey has further shown that Ring Road Kilimani and Ngong Road Cordon Point, and ring Road Kilimani and Argwings Kodhek Road have the highest traffic volume both during peak and off peak hours. Similarly, this is projected to increase with increased population in the area.

CHAPTER SIX

TOWARDS SUSTAINABLE KILIMANI NEIGHBOURHOOD DEVELOPMENT: FINDINGS, RECOMMENDATIONS AND CONCLUSION

6.0: Introduction

The general focus of this study has been to illuminate some of the emerging neighbourhood development challenges in Kilimani, and based on this; recommend strategic policy implications towards neighbourhood development. Based on the analyses presented in the previous chapters, this chapter summarizes the major findings of the study, and subsequently culminates by presenting proposed policy framework towards an alternative neighbourhood development in the study area.

6.1: The Study Findings

Pursuant to the specific objectives of the study, the following are the findings of the study:-

6.1.1: Access to Community Facilities

The study has shown that households generally enjoy easy access to community services. As illustrated in Fig. 6.1 below most households are located less than 500 metres away from facilities such as educational facilities, health facilities and commercial facilities.

However, some of these facilities, particular reference is made to commercial facilities such as commercial offices are currently developed with no regard to the existing land use compatibility to the existing residential users, hence leading to problems that include, but not limited to traffic congestion. For example, although Ngong Road and Argwings Kodhek Road Corridors have been designated as the major commercial zones of the neighbourhood, commercial development are still dominant in other areas within the neighbourhood, whose user should be residential only.

Fig. 6.1: Level of access to community facilities in Kilimani



Source: (Researcher, 2008)

6.1.2: Poor Development Control

According to the Physical Planning Act (Cap 286) and the Local Government Act (Cap 265), the responsibility of development control within the city is vested on the City Council of Nairobi. Contrary to this, the field survey revealed that indeed, there are several developments that exist in the neighbourhood, including those that are currently being developed that were not approved by the City Council of Nairobi. Some of these include food kiosks, furniture shops and other illegal structures that have been erected on public spaces and along the road reserves.

Further to this, although the zoning regulations of Kilimani states that the plot ratio shall not exceed 75 per cent and that the ground coverage must not also exceed 35 per cent, it is glaring from the survey that there are several developments in the neighbourhood that does not measure to these standards. Similarly, the areas zoning regulations further articulates that high-rise residential development shall only be limited to four floors, however, it was evident that there are several residential developments in the area which exceeds the stipulated sky line.

6.1.3: Limited Investment in Infrastructure and Services

Kilimani neighbourhood, over recent years, has experienced unprecedented increase in population. This has been accelerated by increased densification in the area, which has made residential developments previously used as single dwelling units being converted to multi-family dwelling units. In addition, some of the residential developments have

had their users extended to commercial development, or their users completely changed to commercial development.

In spite of the above, City Council of Nairobi has done little to increase the capacity of the existing infrastructure such as water supply, sewer reticulation and solid waste management among others. For instance, although solid waste management is one of the core responsibilities of the council, to date, the service delivery in Kilimani is undertaken by private operators, and indication that the authority's capacity to offer the services is evident from this study. On the other hand, because of high population increase in the area, the demand for services such as water has tremendously increased. However, considering that City Council has not investment in improved water supply, this underscores why some households in Kilimani experience water shortage.

6.1.4: Poor Maintenance of Existing Infrastructure Facilities

Most of the existing infrastructure facilities in Kilimani are poorly maintained, as evident by dilapidated roads and bursting water pipes, storm water drains among others. Poor maintenance of these infrastructure facilities has significantly contributed to several problems in the neighbourhood. For example, roads, which are poorly maintained directly, accelerate traffic congestion, especially during peak hours. Such roads also indirectly increase transport costs related to vehicle maintenance. It has already been noted that a majority of the modal split for school transport in Kilimani is dominated by school buses and private cars. On the other hand, poorly maintained water pipes directly contribute to water shortage within some sections of the neighbourhood

6.2: Recommendations

Having taken consideration of all the emerging issues, this study come up with the below discussed recommendations. It was further found imperative to explore the institutional framework on which these recommendations should be implemented. Therefore, the institutional framework for the implementation of recommendations is also detailed in the succeeding sections.

6.2.1: Specific recommendations for the study area

6.2.1.1: Enhancing Development Control

It is proposed that the City Council of Nairobi should enhance development control, as a tool for planning, in Kilimani and other similar neighbourhoods in the city. In this context, zoning requirements such as floor index, plot coverage, sky limit and plot size should be adhered to.

6.2.1.2: Preparation of a Local Physical Development Plan

Pursuant to the Physical Planning Act (Cap 286), a local physical development plan should be prepared for Kilimani neighbourhood. Such local physical development plans have been prepared for areas such as Karen, in the City. The envisaged strategic aim of the local physical development plan is to provide a detailed spatial framework for land use in the area, with a general objective of controlling land use conflicts. Through this, it

recommended that the study area be divided to various planning or development blocks/zones. Each zone should have specific approved users as well as development control standards.

For instance, presently, commercial development in Kilimani is mainly restricted along Ngong and Argwings Kodhek Road transportation corridors, while the rest of the areas are predominantly residential, or a mixture of residential, commercial and institutional development. There is therefore need to rezone the neighbourhood to enable grouping of functions in rational format. In particular, commercial activities should be moved to demarcate commercial zones to curb the emerging trend where commercial and institutional spots are dotting the neighbourhood. Open spaces also need to be identified and revitalized either by way of repossessing land owned by absentee landlords or as an initiative by the City Council of Nairobi through purchase of idle land.

Arising from the field survey and the many changes of user applications received by the City Council of Nairobi, it is advisable to devise a rational planning approach for development in Kilimani area. This rational approach would entail formulation of planning policy that would compromise of accommodation where possible of the existing development, control of development and future development guidelines. The issue of accommodation is important in that some of the existing developments have been granted change of user while others, though illegal would easily meet planning standards either in operation or proposed control mechanism would facilitate orderly development and minimise abuse of planning regulations and requirements.

(a) Service Centres Development

In order to obtain commercial development in the area, it was recommended that: -

- i) Commercial activities be maintained and contained within the four existing commercial centres being Hurlingham, Yaya Centre, Caledonia and Valley Arcade. The centres will allow for commercial, offices and flats development. Commercial, office and flats development.
- ii) That Yaya Centre and Valley Arcade be expanded so as to provide higher order services.
- iii) That plots between Hurlingham and Yaya Centre, and immediate frontages to Argwings Kodhek Road and Ngong Road on both sides be granted commercial use.
- iv) That plot ratio of 2.0 and ground coverage of 0.5 be allowed in Hurlingham, and Yaya Centre shopping Centre. (Currently the plot ratio was 150 percent and ground coverage was 35 percent).
- v) All commercial developments should provide basement-parking facilities for own use, and on site parking for patrons.
- vi) No expansion should take place at Caledonia due to its proximity to State House resulting in the need to minimize commercial activities and their related traffic flow in that neighbourhood.

(b) Professional Offices Development

As earlier mentioned, it was felt that the 1978 and 1979 policies were restrictive in terms of ownership and the 1.5 kilometres radius requirement. Therefore it was felt in 1981 that the professional ownership of the property on which the profession is practised be removed and thus any professional/consultant who wish to locate his office within the designated area be allowed to do so without the restrictions. However it was the discretion of the City Council to define the professions. It is further envisaged that with expansion of the service centres more office space were to be provided and that the demand for change of user from residential to professional offices in other areas were to reduce. This policy was maintained in the 1993 policy for the neighbourhood under consideration. However, in order to harmonise professional office development in the area, it is herein recommended by this study that that: -

- i. All professional offices should maintain the residential character in terms of development, plot ratio and ground coverage being 0.5 and 0.75 respectively.
- ii Professional offices should be located on plots of a minimum of 0.1 hectares only to allow ample parking areas for the clients of the firm and for the manoeuvrability of the vehicular flow within the property.
- iii. For purposes of land administration, professional offices should be taken as a change of user from residential to offices to facilitate changes in title and valuation.

- iv. All professional offices should be located in single dwelling units satisfying condition Number (i) above and should not be allowed within comprehensive schemes or flat developments.
- v. Professional offices should provide adequate on site parking facilities within their own plots.

(c) Residential Hotels

For residential hotel development, it is herein recommended by this study that: -

- i) The plot should be of minimum 0.2 hectares and above, located along either Argwings Kadhok or Ngong roads or within the designated commercial centres within the neighbourhood.
- ii) The development should maintain the commercial developments in character as provided for by the plot ratio and ground coverage.
- iii) Residential hotels should not play loud (juke boxes) or provide disco facilities so as to minimise noise level.

(d) Residential Developments

The rest of the area within the neighbourhood should remain residential and the developments be guided by plot ratio and ground coverage being 0.5 and 0.75

respectively. The minimum plot sizes for single family residential units should be 0.5 hectares, 0.5 hectares for multi-family residential developments (flats) and 0.1 hectares for the comprehensive development units. This is meant to discourage a single family residential development which consumes larger spaces while accommodating few people, consequently leading to urban sprawl. The urban sprawl is in the long run expensive in terms of the provision of infrastructure, both physical and social.

The proposed plot sizes, coverage and ration for the various land use categories herein are envisaged to adequately allow for on site and the establishment of basement car parking which should also be established as a policy. This will have a positive benefit of alleviating parking problems in the neighbourhood. It is imperative to note that parking spaces is already a problem in the neighbourhood as well as the entire city. On land economics principles, it is imperative to note that the bid rent or the location rent for the various land uses and more particularly the existing residential land-uses are not viable. This has necessitated changes of user and the re-development to intensive use of the high-rise multifamily apartments. A number of similar specialised units in the neighbourhood will exert a much greater influence on potential tenants, leading to higher land-values.

(e) Social Amenities

This study has underscored the adequacy of the schools in the neighbourhood both at the primary and at the nursery school level. It is on this basis that this study proposes a halt in the provision of both public primary and nursery schools. Whoever, the provision of these facilities should be allowed for the private developers as the study has also revealed

that majority of the parents in the neighbourhood prefer taking their pupils to private schools as opposed to public schools. In this case, the Council should strive to maintain proper land sizes for future expansion of the existing public schools to accommodate future student enrolments. Alongside with the above proposal, the council should divorce the provision of social halls to private developers. These developments should be accommodated within either residential or commercial plots and hired out for public use as churches or for other social activities. These activities should also be allowed to be accommodated within the existing schools particularly over the weekends and during the school holidays of which the school administration shall charge for the space usage.

6.2.1.3: Eliminating Time Delay in Plan Approval Process

The above being the case, there is a need to decentralize planning within the City of Nairobi, in the long run: this should be seen as a strategy for enhancing development control. Presently, the responsibility for plan approval, including site visit by the council's authorities is directly organized from City Hall. The study is therefore recommending that the city should be divided into planning zones, with each zone representing the eight administrative divisions in the city. Each zone should have planning officers whose office should be located within the respective zones. Since Kilimani falls within Westlands Division, then matters pertaining planning within this zone shall be handled by the zone planning officers. Through this strategy, the span of control in respect to development control is likely to be enhanced.

The above is envisaged to reduce the time duration spent on approving developments at City Hall. Most developers are discouraged to pursue development permission from City Hall because of the long procedures normally followed before a plan can be approved. This explains why some residential structures, mostly multi-family dwelling units, were developed without seeking the council's approval such as those related to change of residential development density or extension of user.

6.2.2: Expansion and Maintenance of the Capacity of Existing Infrastructure

It is proposed that the existing infrastructure in the neighbourhood should be expanded in tandem with rapid population increase. These include among others water reticulation and sewer. This is detailed to include a major expansion with appropriate sewer and water pipes of the water and sewer reticulation. Towards this end, this study therefore proposes that the upcoming high-rise developments should have adequate underground water storage tanks from where they can boost the water to high levels storages for the supply to the top floors. Alongside with this proposal, the developers should also strive to integrate City Council water supply with the rain water harvesting since the neighbourhood receives adequate annual rainfall as earlier discussed.

Since the neighbourhood also has adequate water bearing aquifers, the residents should also be encouraged to sink more boreholes as much as possible, particularly the social institutions such as the school, hospitals and residential hotels should be encouraged to sink their own bore-holes. These are known to be major water consumers yet they have the capacity of sinking boreholes. The public institutions should be assisted by the

appropriate ministries through relevant council departments. The council should also strongly consider the introduction of either levying either direct or indirect capital apportionment on the developers for the purposes water and sewer infrastructure expansion. The direct apportionment shall involve the council at the time of plan approval compelling or as an approval condition compelling the developer to upgrade the water and sewer infrastructure serving the proposed development. The indirect apportionment should entail the council taxing the developer and creating a fund for the expansion of the infrastructure.

Roads particularly those directly serving the proposed service centres such as Argwings Kodhek and Ngong Roads should be made dual carriage ways to accommodate the anticipated development. In principle, a minimum of 20 metres main road is desired to accommodate the anticipated developments. As such, the main carriage way should be 10 metres, 5 metres on street parking and 5 metres pedestrian walking way on both sides. The parking in the service centres should be catered for in line with the existing City Council of Nairobi by-laws. The expansion of the roads should also go alongside with the removal of round about and replacing the same with proper interchange channels which are not impediments to traffic flow. The traffic flow shall also be enhanced by the installation of the traffic lights. Alongside with these requirements, the plans for the residential hotels, restaurants, offices and comprehensive residential developments must clearly provide for either basement or on site parking before the development plan may proceed for the approval and implementation. For major developments such as the supermarkets, the developers must as a prerequisite provide traffic management plan.

There is a need to regularly maintain the existing infrastructure in the neighbourhood, such as roads, sewer and water reticulation. Accordingly, an inventory of these facilities should be undertaken with an objective of establishing the extent of resource capacity needed for infrastructure enhancement.

6.2.3: Transport and Circulation System

The study has identified Ring Road Kilimani and Arqwings Kodhek Roads as major transportation corridors within the neighbourhood but lacking capacity to handle the increasing volumes of traffic. It is therefore recommended that the two roads are expanded and matatu stages be introduced at strategic points. This would enable smooth traffic flow. In addition, Marcus Garvey Road in its disused state should be brought back to good form to aid in off loading traffic into Arqwings Kodhek Road instead of choking the feeder roads (Ring Road in particular) as is the case now in the neighbourhood.

6.3: General Recommendations

6.3.1: Environmental Impact Assessment

It is proposed that all the proposed major developments in the neighbourhood, which are likely to have adverse negative impacts, should be subjected to Environmental Impact Assessment (EIA), in accordance with the provisions of Environmental Impact Assessment regulations of 2003. This proposal should be enforced by National Environment Management Authority (NEMA) in conjunction with the City Council.

Map 6.1: Proposed I and C Use Pattern



Source: (Researcher, 2018)

6.3.2: Multi-Sector Partnership

Investment capital projects should not be dominated by the public sector, yet there are a number private institutions or organizations, which are based in the neighbourhood, which can be integrated to complement the council in areas such as infrastructure and service development and maintenance.

6.3.3: Policy Issues

The declining social housing development and the construction industry have become oriented towards satisfying the demands of groups with higher purchasing power, synonymous with privatisation and restitution concepts which have found niche in the management of public affairs radically altering the housing market in the transitional economies such as Kenya. This has brought significant changes in the types of dwellings being constructed as private construction companies have become more oriented towards the provision of housing for the high-income groups. The Kenyan government has sought to pursue policies aimed at improving the housing standards for its citizens with departure from the policy of mass construction of the 1960s to 1970s, which is viewed as having encouraged obsolescence of the housing stock. In endeavour to raise the level of housing stock, the government ought to consider the question of obsolescence of housing stock. Extensively refurbishing or replacing the existing stock should address this. Equilibrium between the construction and the space standards per person and common community area ought to be taken cognisance of due to massive population pressure currently being experienced in the major urban centres of the country; while the same has

little public utility land left and limited resources to meaningfully undertake public housing construction schemes. The use of development wave for tackling the problem of obsolescence involving systematic demolition and reconstruction should be adopted as a strategy for the realisation of adequate shelter and making urban regeneration possible. In this regards, plot coverage and ratios for the purpose of urban neighbourhood development should also be revised so that high rise development be encouraged rather than single family dwellings consuming massive spaces while accommodating small proportion of population. Utilisation of areas between the blocks can increase space standards so that the replacement blocks are larger than the initial blocks.

Many households in the Kenyan urban centres have gained greater control over their housing needs through the acquisition of land tenure with similar rights to freeholds. There has been substantial growth in owner occupation, with a decline in social housing. The financial and legal infrastructure to support private housing market has not developed at the same pace as the market in Kenya. In particular, housing finance market to support the owner-occupier purchase housing is emerging from embryonic state. Further, legal framework for the management of large blocks of flats in multiple and mixed private and public ownership has been slow in development in Kenya. The problem suggests that creation of legal tenure akin to freehold is not sufficient to either create an efficient housing market or to enable the mobilisation of capital tied up in real estate assets. Rather, tenure changes need to be accompanied by measures to create appropriate financial and legal infrastructure for these are the rubrics of sustainable neighbourhood development.

Although there have been important responses aimed at alleviating shelter situation in the urban centres in Kenya which is the essence of sustainable urban neighbourhood development. The net on going results of the above stated trend is the reduction of quantitatively and qualitatively housing access for the poor and vulnerable in the society. This is compounded by an already disturbing demographic trend in urban centres. The response may vary from liberalising the housing market to reducing government intervention and pursuing measures aimed at supporting the private ownership of the real estate, such as land registration, surveying standards and land administration. However, all these major strategies needs more support through the development of appropriate legal, financial infrastructure and social housing development for those whom market forces solutions are not possible before they can be regarded as being successful. These should include enacting legislation on the maximum ceiling size of land to be owned by an individual and/or an organisation to reduce land speculation in the urban centres. This shall further promote effective policy formulation and enhancement of market efficiency. The process of land subdivision, change of users, survey standards and land registration through decentralisation into an Act for control and regulation of land administration should strongly be considered.

Sensitising the community regarding social barriers hindering women and other vulnerable group's fundamental rights to customary or communal land rights and their equitable access to and development of land should be strengthened. This shall remain achieved at the altar of socially, economically and culturally responsive land tenure legislation and regulatory framework for enhancing security of tenure for all socio-

economic groups. Indeed, establishment of Community Land Trust (CLTs) to facilitate security of tenure and ensure the enjoyment of targeted subsidies by the low-income and other vulnerable groups must be incorporated in the entire programme. The Government and the Local Authorities should undertake formulation of land management policy alongside undertaking land banking to cater for future shelter provision and sustainable neighbourhood development needs. To overcome the bottleneck of housing finance for shelter provision, programmes such as mobilisation of local funds for channelling to vulnerable groups for shelter provision, development of secondary mortgage market, strengthening existing financial institutions and harmonisation of legal instruments for housing finance institutions, promotion and or strengthening housing co-operation and mortgage programmes as a way of encouraging investments in poor neighbourhoods and further evaluation of housing financial institutions lending terms with a view to making them affordable should also be prioritised. This is envisaged to be the direction for the sustainable neighbourhood development because the group development in the form of comprehensive schemes is viable in maintenance of the housing stock, neighbourhood environment and proper development policy.

The ideals of neighbourhood development should encompass adequate shelter and infrastructure provision as well as the use of appropriate construction technology. Broadly, this should translate to increasing accessibility within the housing neighbourhoods, safe water and energy supply and the improvement of waste disposal systems. Rationalising the use of imported energy by finding cost-effective alternatives through developing and promoting the role of renewable energy sources should also not

be divorced from this endeavour. This can be achieved through capacity building programmes in management of infrastructure and services at the Local Authority level. The use of appropriate technology through observation of proper quality control measures, revising building codes (standards) and adoption of indigenous building materials into the syllabus of building construction courses at various educational levels is a sure way of capacity building for the provision of sustainable neighbourhood development. As an integral part of sustainable neighbourhood development which encompasses adequate shelter provision and management among others, it's worth noting the linking role that information plays. Towards this end, programmes such as institutionalizing data collection and dissemination as a city-based project should be prioritized. This will involve liaison with research institutions for action-oriented research whose findings can be implemented. This will help in the establishment of a National Housing and Human Settlements documentation centre of which Kenya Building Research Centre and other allied research institutions should be integral part.

Further, to encourage middle level professionals in the construction industry, the gazettelement of training and information dissemination of the already adopted standards for public acceptance should be undertaken. In furtherance to the above, such fora as national workshops and conferences to promote awareness on the use of local materials and technologies should be encouraged. The government should prioritise restructuring the Kenya Building Research Centre if effective promotion and co-ordination of the performance of the building material industry and shelter provision at large is to be achieved. The Kenya Building Research Centre shall be charged with the responsibility

of launching programmes of making more use of type plans, improved tendering, construction and monitoring procedures. The Kenya Building Research Centre should enter in partnership with allied institutions such as the Departments of Architecture and Building Science of the national universities in promoting research and formulation of strategy on national construction industry after thorough study of the industry including housing policies and the impact of various housing schemes on environment. The partnership should further explore the possibilities of carrying out joint survey on the building materials and prepare research programme on utilisation of the local building materials and evaluate the performance of the local production units to improve capacity.

6.3: Areas for Further Research

This research proposes further research on the possibility of enacting appropriate institutional framework involving public-private partnership in the sustainable neighbourhood development. This framework should be broad based to include shelter and infrastructure (social and physical) provision alongside environmental conservation.

6.4: Conclusion

A neighbourhood development policy detailing appropriate standards for human development should be pursued as a national goal. This shall remain achieved at the altar of sound environmental conservation policies and programmes geared towards promoting practices and consumption patterns that conserve and protect environment such the use of appropriate technology in the energy and water. As such, programmes such as relocating and upgrading informal settlements from marginal locations to appropriate land suitable for shelter development should achieve minimum displacement, cost effectiveness and effective community participation. In this regard, interplay between Physical Planning Act (*Cap 286 of the Kenyan Laws*) and the Environmental Management Act (1999) should in this case manifest through the enforcement of the Acts in the Part Development Plans clearly marking open spaces as well as spelling out development procedures for developing fragile ecosystems for shelter provision.

This research has clearly underscored that issue-focussed programmes towards the realization of shelter development goal transcend economic (fiscal), socio-political, legal and environmental domains. Cardinals among these programmes are the reduction of population growth rates via aggressive national family planning campaigns. To curb against rural-urban migration, which is attributed to poor housing situation in the urban centres the level of national economic growth should be at a higher rate than the national population growth rate. Rural development synergies such as promotion of rural non-farm activities to stabilise rural incomes should also be enacted if rural-urban migration

has to be reduced. This programme should also entail poverty alleviation policies such as targeting investment in urban centres and restructuring the industrial sector to become more efficient, capable of competing with imported goods. As a national development agenda, the central authority should endeavour at strengthening regional based development bodies through funding and encouraging research on integrating underdeveloped regions into the national economy. Institutional reform agenda with a broad-based stakeholder's involvement should be prioritised. The envisaged reform should entail building collaborative networks with international partners: None Governmental Organisations, Community Based Organisations and Private Sector for this will enhance local participation and civic engagement. Key areas where collaboration should be sought include capacity building, implementation of municipal reform programmes, and formulation of mechanisms for decentralization and housing infrastructure development. The reform agenda should entail revising the by-laws, preparation of appropriate land use legislation and enforcement at community level. This can only be achieved if the community is adequately involved in the land use plan preparations, housing designs, construction and management. From the foregoing, it is eminent that the holistic notion that is embedded in sustainable neighbourhood development dictates that an integrated urban plan particularly for Nairobi should be enacted and implemented. The plan should take cognisance of range of economic, social development and environmental policies. These should include but not limited to policies directed at particular economic, legal and social policies for the development of the city's infrastructure, financial capacity and land reform agenda.

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APPENDIX A

UNFR AND PHYSICAL SURVEY QUESTIONNAIRE

INTRODUCTION

As part fulfilment for award of a degree of Master of Urban Management at the Housing and Building Research Institute, University of Nairobi, I Reuben Cheruiyot Rutto (Reg. No. W/50/P/7833/2003) is conducting research on THE IMPACT OF DEVELOPMENT STANDARDS ON SUSTAINABLE NEIGHBOURHOOD IN KILIMANI AREA (See attached letter)

This is therefore to confirm that the data being collected is purely for research purposes and will be treated with strict confidence.

Your co-operation is highly appreciated.

Thank you.

Reuben C. Rutto
B arch. Hons U.O.N. (Nbi)
P.O. Box 49805-00100
Nairobi

Cell: 0722-306179.

A: HOUSEHOLD DATA (EITHER SPOUSE OR HOUSEHOLD HEAD)

- A.1) NAME Estate/Court..... Hse No.
- A.2) Are you Head of Household? Spouse Sex
- A.3) How long have you lived in this neighbourhood?
- A.4) How long do you expect to stay around here?
- A.5) Number of Children Males Females
- A.6) Ages
- B. EMPLOYMENT/SHOPPING CHARACTERISTICS;

B.1) Please indicate the nature of your employment:

Monthly Income *(tick one)* (i) Below Kshs. 20,000.00 (ii) Between Kshs. 20,000.00 &

50,000.00 (iii) Between Kshs. 50,000.00 & 100,000.00 (iv) Between Kshs. 100,000.00 &

400,000.00 (v) Over Kshs. 500,000.00

B.2) Do you work full time? Part time

Unemployed Retired

B.3) Please give the distance to and from your work place:

B.4) Which means do you use to work?

B.5) Where do you do your shopping?

B.5) How much do you spend on the following per month?

(i) Grocery kshs. (ii) Cereals kshs.

(iii) Clothing kshs. (iv) Cutlery and other kitchenware kshs.

(v) Clothing kshs. (vi) Furniture and accessories kshs.

(vii) Others (Specify)

C. EDUCATION INSTITUTIONS

C.1) Which school do your children attend?

C.2) Is the school within the neighbourhood? Yes No

Distance from residence *(tick)*

200m 2km over 5km

C.3) Is the school outside the neighbourhood? Yes No

C.4) Distance from residence

C.5) What means of transport do they use to go to school?

D. HEALTH;

D.1) How many members of your household have been sick within the last 3 Months?

D.2) What type of sickness?

D.3) Were Causes related to dwelling water sanitation

D.4) How far is the nearest health Facility *(tick)*

200m 2km over 5km

E. PLOT/HOUSE OWNERSHIP

E.1) Are you owner of plot on which the house is built? *(tick one)*
Yes No.

E.2) Indicate the method of Financing (I or self owner) Either from savings, tenant purchase, Mortgage, Bank Loan, Others-specify.

E.3) Are you owner of house you and household live in? *(tick one)*
Yes No.

E.4) Are you tenant of the House? *(tick one)*
Yes No.

E.5) Are you tenant of the land? *(tick one)*
Yes No.

E.6) What is the rent per month?

E.7) Are you sharing the house with someone else? *(tick one)*
Yes No.

F. LANDLORDS

F.1) Were the drawings for the house(s) approved by the NCC before construction?*(tick one)*
Yes No.

F.2) How long did you take to complete this house? *(tick one)*
Under 1yr within 3yrs Over 5yrs

F.3) What challenges did you faced constructing the house?

- H.7) Does the family own a car *tick one*) Yes No If yes No. of cars
- H.7) What crucial facilities are lacking near your house?
 Shopping centre Nursery school Primary school Health centre Play
 ground Library others (specify)-

I THE SURROUNDING

- G.1) Are there adequate open spaces and gardens within your neighbourhood?
- G.2) Are there Illegal extensions of buildings?
- G.3) Is there evidence of encroachment into public spaces?

J FUTURE PLANNING

- H.1) What would you propose as vital design aspects for future residential development in this neighbourhood ? (Rank 1" 3 choices)
- Bigger sizes of individual units
 - Improved circulation within the units
 - Well maintained access roads free from encroachment
 - Well managed garbage disposal system
 - Functional storm water and sewer system
 - Adequate open spaces
- H.2) How many rooms would you prefer for your own household?
- H.3) What is the maximum number of units (Bungalows/Block of flats) would you wish to have within the court?
 Give reasons
- H.4) What nature of Development control standards do you think should be enforced in this neighbourhood ?
- H.5) Which materials would you like used for:
- | | |
|------------|----------|
| Foundation | floors |
| Walls | Windows |
| Doors | Finishes |
| Roof | |

K FINAL COMMENTS

Please summarise below your other concerns regarding nature of your habitable environment.

Thank you.

APPENDIX B

ENFORCEMENT AGENCIES QUESTIONNAIRE

INTRODUCTION

As part fulfilment for award of a degree of Master of Urban Management at the Housing and Building Research Institute, University of Nairobi, I Reuben Cheruiyot Rutto (Reg. No. W/50/P/7833/2003) is conducting research on THE IMPACT OF DEVELOPMENT STANDARDS ON SUSTAINABLE NEIGHBOURHOOD IN KILIMANI AREA (See attached letter)

This is therefore to confirm that the data being collected is purely for research purposes and will be treated with strict confidence.

Your co-operation is highly appreciated.

Thank you.

Reuben C. Rutto
B.arch Hons U.O.N. (Nbi)
P.O. Box 49805-00100
Nairobi
Cell 0722-306179.

A. RESPONDENT PERSONAL DATA:

- A.1) NAME
- A.2) Organization/Employer
- A.3) Designation
- A.4) Year of Service

B. DUTIES AND RESPONSIBILITIES

- B.1) Are you directly in charge of enforcing control standards within your jurisdiction?
- B.2) Please describe briefly the nature of control standards you deal with
- B.3) What are your employer's targets?

B.4) At what level do you confirm that the standards are well adhered to?

C. NATURE OF DEVELOPMENT CONTROL STANDARDS

C.1) Are the standards you apply relevant to the area being applied?

C.2) Do they undergo occasional review? After how long?

C.3) How stiff are the penalties you impose on those who do not comply

C.4) What kind of levies, charges do you impose?

C.5) Has it improved your revenue base?

D. LEVEL OF SUCCESS

D.1) In your opinion have the control standards contributed in any way to the positive growth of your neighbourhood ?

D.2) What is the level of response from the users/developers?

D.3) Are there conflicting areas?

D.4) What challenges do you face as an organization in enforcing the standards?

Thank you.

APPENDIX C

DEVELOPERS QUESTIONNAIRE (ARCHITECTS, QUANTITY SURVEYORS, ENGINEERS, CONTRACTORS)

INTRODUCTION

As part fulfilment for award of a degree of Master of Urban Management at the Housing and Building Research Institute University of Nairobi, I Reuben Cheruiyot Ruto (Reg No W/50/P/7833/2003) is conducting research on THE IMPACT OF DEVELOPMENT STANDARDS ON SUSTAINABLE NEIGHBOURHOOD IN KILIMANI AREA (See attached letter)

This is therefore to confirm that the data being collected is purely for research purposes and will be treated with strict confidence.

Your co-operation is highly appreciated

Thank you

*Reuben C Ruto
BArch Hons U.O.N. (Nbs)
P.O. Box 49805-00100
Nairobi
Cell 0722-306179.*

A. RESPONDENT PERSONAL DATA:

- A.1) NAME
- A.2) Organization/Employer
- A.3) Designation
- A.4) Professional Experience

B. DUTIES AND RESPONSIBILITIES:

- B.1) Please briefly list down the type of control standards that you must satisfy?

B.2) Where do you submit your documents/plans etc for approval

C. NATURE OF DEVELOPMENT CONTROL STANDARDS

C.1) Are the development control standards relevant to this area?

C.2) Has it ever been reviewed?

After how long?

C.3) How stiff are the penalties when not complied?

C.4) What kind of levies, charges do pay?

C.5) Do they affect your profit margins?

D. LEVEL OF SUCCESS

D.1) In your opinion have the control standards contributed in any way to the positive growth of your neighbourhood?

D.2) What is the level of efficiency?

D.3) Are there conflicting areas?

D.5) What challenges do you face as professionals in abiding by the standards?

D.6) What challenges do you expect to face in your professional undertaking with reference to this neighbourhood.

Thank you.

APPENDIX D

ZONING POLICY-NAIROBI

WARD	AREAS COVERED	Gr %	Pk %	Dept. Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
1A	Central Business District (CBD)			100/400	Commercial Residential/High Industry	0.05	
	• Core CBD	40	400				
	• Peri-CBD	40	400				
	• West Of Tom Mboya St	40	400				
	• East Of Tom Mboya St	40	400				
1E	Upper Hill Area			100/400	Commercial Offices/ Residential	0.05	
	• Block 1 - Offices (Community)	40	400				
	• Block 2 - Offices	40	400				
	• Block 3 - Residential	40	400				
	• Block 4 - Institutional (KNEF)	40	400				
2	Eastleigh			100/400	Commercial Residential (High-rise Flats)	0.05	
	• Eastleigh District Centre	40	400				
	• Eastleigh County Residential	40	400				
	• Perpetua/California	40	400				
	• Elmslie/Stanley	40	400				
3	Commercial	40	400	100/400	Commercial Residential (High-rise Flats)	0.05	
	• Residential	40	400				
	• Commercial	40	400				
	• Residential	40	400				
	• Residential	40	400				

WARD	AREAS COVERED	Gr %	Pk %	Dept. Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
3	Parklands			100/400	Commercial/Residential (High-rise Flats)	0.05	
	• Commercial	40	400				
	• Residential	40	400				
	• City Park Estate / Upper Parklands	40	400				
	• Westlands						
4	Westlands CBD			100/400	Commercial/Offices Residential (High Rise Flats) - Four Storeys Max	0.05	
	• Westlands/Mtamboni Hill						
	• Block 1 Commercial	40	400				
	• Block 2&3 Offices & High-rise Residential	40	400				
	• Block 4 Offices	40	400				
5	Spring Valley			100/400	Residential (Apartments allowed on street only) - Four Storeys Max	0.05	• Policy Under Review
	• Riverside Drive						
	• Kileleshwa	20	200				
	• Jolani	20	200				
	• Thompson						
6	Upper Spring Valley			100/400	Low-Density Residential One-Family Homes	0.2	• Maximum Allowed On Several Areas Of Lavinton
	• Kyrna	20	200				
	• Leribe						
	• Lavinton/Barnard Estate						
	• Onyiah	20	200				
7	Mathara	20	200	100/400	Low-Density Residential	0.2	Single Family Dwelling
	• New Mathara	20	200				

WARD	AREAS COVERED	Gr %	Pk %	Dept. Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
7	Mathara Valley			100/400	High-Density Residential (Flats) Informal Settlements (Slums)	0.05	Special Scheduled High-Density Informal Developments
	• Mathara North						
	• Lower Harome	40	400				
	• Karibungu						
	• Kariakoo District						
8	Old Eastlands			100/400	These largely constitute old City Council housing - ripe for high-rise high density redevelopment	0.05	• Special Scheduled Areas • NCC 242-243 service • Schemes as Low-Income Housing
	• Stuart Moyo						
	• Marogo						
	• Bafra						
	• Kadoma						
9	Makumbura	40	400	100/400	Residential - • Mixed Development • Flats • Mansions • Bungalows • Semi-detached Schemes • Condominiums (Single Homes)	0.05	• Comprehensive Subdivision allowed • Maximum of 2 House on Type Plot design
	• Dandora Neighbourhood (Block B2)	40	400				
	• Uhuru (1-3)	40	400				
	• Bura Bura (1-4) (Blocks 72-79)	40	400				
	• Unga (1-2)	40	400				
10	Komarock	40	400	100/400	Residential - • Mixed Development • Flats • Mansions • Bungalows • Semi-detached Schemes • Condominiums (Single Homes)	0.05	• Comprehensive Subdivision allowed • Maximum of 2 House on Type Plot design
	• Commercial	40	400				
	• Residential	40	400				
	• Residential	40	400				
	• Residential	40	400				

W ward	AREAS COVERED	GC %	PR %	Dept Ref. Map	TYPE (%) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
16	Baba Daga			100-4001	Industrial Zone Residential (Mixed) Residential Development	0.05 lower if comprehensive	High Density Residential
	• Industrial	80%	80%				
	• Residential	20%	20%				
		20%	20%				
17	Ngomda (Karyaba)			100-4001	Industrial Zone Residential (Mixed) Residential Development		• Region with unplanned development hence "Shedder approval" vide TP resolution of 16.747
	Gibara 44 & 45	80%	20%				
	Zimmerman	30	30				
	Kahawa West	30	30				
	• Commercial	30	30				
• Residential	30	30					
• Industrial	30	30					
18	Karurani			100-4001	• Agricultural • Residential Mixed Development	• 2.0 • 0.05 or more • 0.1 Ha. if not on paper • lower than rest of land being acquired	Area has potential for residential development on-again by land buying speculators and land speculators
	• Cityworks	30	30				
	• City City	30	30				
	• Sports View	30	30				
	• Meru	30	30				
	• Njiru	30	30				
• Riin	30	30					
19	Special Scheduled Area Outside Nairobi Boundary			100-4001	Agricultural Residential (Mixed) Development		• Area fully influenced by site dynamics • NCC not in control of development • Overwhelmingly dependent on services of the city
	• Gebura Karuri						
	• Warden						
	• Kariaksa Estate						

W ward	AREAS COVERED	GC %	PR %	Dept Ref. Map	TYPE (%) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
20	Public/strategic Reserved Area (General)			100-4001	Special strategic facilities and Developments		Reservation requires to be clearly defined
	• State House						
	• JICA Airport						
	• Wilson Airport						
	• Military Sites						
	• Military Airbase Embuigh						
	• DoD Headquarters						
• Kalawa Barracks							
• Langata Barracks							
• Defense College, Kariri							
• Force Memorial Hospital							
21g	Recreational And Forest			100-4001	Public Open Spaces, Reserve and Recreational Facilities		
	• City Park						
	• Arboretum						
	• Ngong Forest						
	• Karura Forest						
	National Game Park						
	Stadiums						
• Moi Sports Complex, Kaburi							
• City Stadium							
• Nyayo Stadium							
Uhuru Park							
Central Park							
Uhuru Gardens							