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**Study of Transformations of Built Forms  
in Ngara Area, Nairobi.**

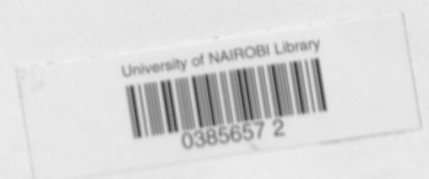
By

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**B.Arch (hons), UoN.**

A Research Project Report Submitted in Partial Fulfillment for the Award of  
Degree of Master of Architecture of the University of Nairobi.

2012



**DECLARATION**

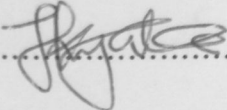
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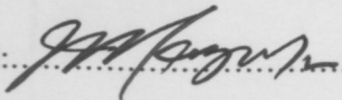
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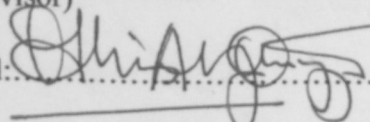
To my beloved family

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throughout this work. They guided and directed me through the whole process tirelessly and their effort culminated in this volume.

The department of Architecture and Building Science, University of Nairobi, for awarding me the Norwegian Masters-Southern and East African Research Cooperation for Habitat (NOMA-SEARCH) Scholarship Programme.

The completion of this study would not have been possible without knowledge gained from lecturers of the Department of Architecture and Building Science, and Prof. Ed Robins and Prof. S. Ochieng of the Oslo School of Architecture (AHO) for their support and guidance during the first year of study.

### **To my beloved family.**

I extend my appreciation to the Nairobi City Council for allowing me to access their archival materials for this research and Local Authority office in Ngara for their assistance during field work.

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I also express my sincere gratitude to my family which stood by me during difficult times, special thanks to Charity, Mum and Dad.

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## ABSTRACT

Transformations of the built form has for a long time been a challenge to the expanding and sprawling cities and a concern of many urban designers.

This is driven by different motives like the quests for better urban life, search for economic sustainability, adaptability of forms for changing functions which has shown little or no regard to urban public spaces and their uses. Open public spaces have greatly been ignored in the transformations.

This thesis intended to contribute to this discussion, proposing particular design strategies. In order to do this, transformations were documented and detailed in selected buildings of Ngara area, which have undergone tremendous transformations in the last two decades and their ability to accommodate change.

This thesis sought to investigate and propose design guidelines for transformations of urban built forms and spatial adaptations and to bridge the gap between architecture and urban design.

The transformations in Ngara area are not coordinated and are a result of private investments and therefore bear no similarity between one plot and any other, it is a matter of private interventions since the local authorities are not concerned with conservation or planning but the existing city bylaws.

Ngara area is dramatically transforming from a largely low lying single storey building fabric to an increasingly dense collection of multi-storey buildings developing within a tight and unchanging plot and street structure.



## 1.0 CHAPTER ONE: INTRODUCTORY BACKGROUND

The city of Nairobi is in a continuous process of change and re-adjustment of its different parts, which are spontaneously developed or deliberately planned under different socio-economic and political conditions in different periods.

Over time, different parts of the city of Nairobi, which is the capital of Kenya, have undergone various physical and functional transformations. It is observed that in spite of several controls, especially, the planned residential areas of the city have experienced morphological transformation in land use pattern with a minor change in the spatial layout to adapt to the community needs. As a result, the planned residential areas tend to transform into an unplanned state in relation to their physical layout and distribution of non-residential function (commercial functions).

Urbanization has led to increase of urban population causing spatial expansion of urban areas which is highly inhibited by inadequate space for expansion in our cities; this has caused pressure on land and physical infrastructure (Sheuya, 2004). To respond to the challenges of urbanization (rapid increase in urban population) the current developments in the city of Nairobi are characterized by transformations of the existing built forms and land use evidenced by alterations of the existing built forms and demolitions for new multi-storey built forms.

Fig.1.1 Nairobi city Map showing study area. Source: Google Earth, 2011



YEAR	AREA IN SQ. KM	POPULATION
1900	18	
1906		11,512
1919	25	
1926	84	29,864
1936		49,600
1944		108,900
1948	91	118,900
1962		266,795
1963	684	342,764
1969		509,286
1979		827,775
1989	693	1,324,570
1999	696	2,143,254
2009	692	3,138,369

Table 1.1 Nairobi's area and population in 100 year period.

Source: Halliman & Morgan, 1967; Kenya Bureau of statistics, 2010.



Fig.1.1 Nairobi city Map showing study area. Source: Google Earth, 2011

Ngara area which is at the periphery of the Nairobi's CBD is one such area that is undergoing tremendous spatial transformations with no regard to the existing infrastructure and services. This area was originally zoned for Asian community when Nairobi boundaries were changed in 1927 to accommodate the rising population and enhance segregation (plan for a settler capital). After the colonial regime, settlement was liberalized which necessitated the movement and settlement of other communities in the area.

Currently, the market demands for housing and commercial space in the city has put the area in a continuous state of transformation from single family dwelling houses to hostels, guest houses and hotels and mixed use developments are coming up. Adaptability of the built forms is a critical point to note in this area as it forms the first phase of transformations, 'change of use'.

The growing number of colleges in the immediate neighborhood and the CBD has created the necessary demand for student hostels leading to change of use of the aged building to hostels.

Original dwelling houses of 1-2 levels provided human scale level of interaction between the dwellers and the built forms while the current high-rise developments have no consideration to the human scale and value of open public spaces.

Therefore this research sought to study and analyze the transformations of the built forms of this area giving the author's views about the future of this area. At the end, it also attempted to formulate guidelines for transformations in other regions of the city.

## 1.1 PROBLEM STATEMENT

Transformations take place without prior consideration to the infrastructural capacity of the available services and may lead to densification and contribute to settlement degradation through pressure on limited facilities and infrastructure.

Informal structures tend to take advantage of the open spaces occupying road reserves and unused access roads to accommodate the increasing economic needs of the population. This leads to poor quality of public open spaces and the structures inhibit access and service delivery in the area under transformation.

As noted by Sheuya (2004) “continued transformations of built forms and land uses which are triggered by need for economic gains and which are not guided by statutory urban planning regulations may lead to densification and congestion,” this is a likely situation in Ngara area if the transformations are continued without consideration to the existing facilities given the increase in population.

Transformation of a neighbourhood can increase and improve the local economy, as Ngara area is transforming to mixed use neighbourhood with the number of dwellers and activity rising on undefined spatial distribution gradually filling any open available space, congestion is unavoidable in this area unless controlled which can lead to health risks.

Ngara residents association is also concerned,

The more than 10 outdoor kitchens used by the hawkers have no running water and there is only one toilet for the whole market. The lack of

hygiene and population density of the market has attracted plenty of rats to the area and generally downgraded the neighbourhood in terms of real estate value, (Association chairman, [http://allafrica.com/stories, 26/04/2010](http://allafrica.com/stories/26/04/2010)).

## 1.2 OBJECTIVES OF THE STUDY

This study was initiated with the following main objectives:-

- i. **To explore and document morphological, spatial and built forms transformations taking place in Ngara area.**

The study attempts to describe and explain the changing building types in terms of their architectural *form* characteristics, *socio economic* aspects and the related *social practices*, which have led to the combination of existing low-lying buildings and emerging building types in Ngara with the purpose of informing and guiding future design and urban development.

This study aims at understanding the phenomenon of transformation so as to inform future architectural and planning practices.

- ii. **To identify the main actors and drivers of transformations, (*social, economic, political*).**

The author strongly believes that these transformations are spontaneously initiated by owners of capital without prior consideration of other factors, therefore, the researcher sought to identify the main forces and principal factors behind the changes.



- iii. To suggest policy measures needed in order to guide and control transformations and densification in Ngara area and other areas of the city suburbs.

### 1.3 RESEARCH QUESTIONS

Nairobi's urban development owes its origin to the colonial planning systems which was pegged on racial segregation; however, the post colonial planning systems are based on class (wealth). To address these transformations, the research questions are:

- a) What are the morphological, spatial and built forms (typological) transformations taking place in Ngara?
- b) How does the transformation of the built forms take place in Ngara area?
- c) What are the reasons for transformations, forces behind transformations and who are the transformers?
- d) What are the results (impacts and benefits) of transformation of urban built forms?

### 1.4 JUSTIFICATION AND SIGNIFICANCE OF THE STUDY

Urbanization in Africa has reached unprecedented rates as more and more people migrate from the rural areas to the cities due to complex social economic and cultural factors coupled with the natural growth of the cities themselves. According to UN-HABITAT (2008) Africa still had 39.1% of its total population living in cities, making it the least urbanized region in the world. However, in 2005, Africa had 43 cities with more than one million inhabitants up from 28 a

decade earlier. It is projected that by 2015 there will be 59 cities exceeding one million inhabitants (UN-HABITAT, 2008).

Urban Population						
	Urban Population in %			Urban Population Growth Rate in %		
	1980	2000	2020	1980-85	2000-05	2020-25
World	39	47	57	2.6	2.2	1.7
Africa	27	38	49	4.4	4.0	3.0
Europe	69	75	80	0.8	0.3	0.1
North America	74	77	82	1.2	1.0	0.9
Central America	60	67	73	3.1	2.0	1.5
South America	68	80	85	3.1	1.8	1.1
Asia	27	38	50	3.6	2.8	2.0
Oceania	71	70	72	1.4	1.3	1.3
Developing Countries	29	41	52	3.8	2.9	2.1
Developed Countries	71	76	81	0.9	0.5	0.3

Table 1.2 World urbanization trends by continents. Source: World Resources 1998-99.

The table above shows the growing trends of world's urban population, cities must also adjust accordingly to absorb the rising population; one way of adjusting is through transforming the neighbourhoods to cater for socioeconomic needs of the rising population. The transformations in Ngara area can be attributed to the urbanization trends seeking to adjust to the needs of the city development.

The city of Nairobi, being one of Africa's cities with over 1million inhabitants has been experiencing high urbanization rates. In 100 years, it has grown from a railway town to a colonial capital to achieve a city status and a regional and business hub for East Africa and now with a population of more than 3.1M (GOK, 2009 census report) people spread over an urban administrative area of 684sq.km (Republic of Kenya, Central Bureau of Statistics, website) projected to be a metropolis by 2030 covering 40km radius (Kenya Vision 2030).

The city is not static but dynamic and undergoing continuous spatial transformations and therefore the study is important to establish, define and control the city growth through a design strategy that can be applied in other parts of the city.

Nairobi, which is a peripheral zone of the Nairobi's CBD and within the Kenya Nairobi, which presently has a population of more than three million people (Central Bureau of Statistics, 2009), growing at an annual rate of 4.3%, is expanding horizontally as well as transforming its existing architectural form to accommodate the increasing population and the myriad of social and economic activities and functions that go with it. While these trends are likely to exert pressure on social, economic and cultural aspects, the physical form of the city is changing in line with the evolving demands.

Therefore, knowledge on the nature of the changes is needed for a better understanding of the built environment of the city. This knowledge could be of great importance to architects, urban designers, planners, policy makers and others involved in the development and management of built environment in cities, especially in the cities of the South.

Fig 1.1 The area of study shown in the context of Nairobi. Source: adapted from JICA.

This area of study as shown in figure 1.1 above was characterized by low-rise (single storey) buildings initially owned and occupied by former Asian railway workers dating back to early twentieth century that are gradually diminishing being replaced by high-rise buildings (dramatic transformations).

## 1.5 SCOPE AND LIMITATIONS OF THE STUDY

This section delineates the physical scope of the site of the research and choice of Ngara Area that is under study.

Ngara area which is a peripheral zone of the Nairobi's CBD and within the Kenya Vision 2030 of Nairobi Metropolis has undergone spatial and morphological transformations of the built forms in the last two decades with accelerated changes in the last decade.

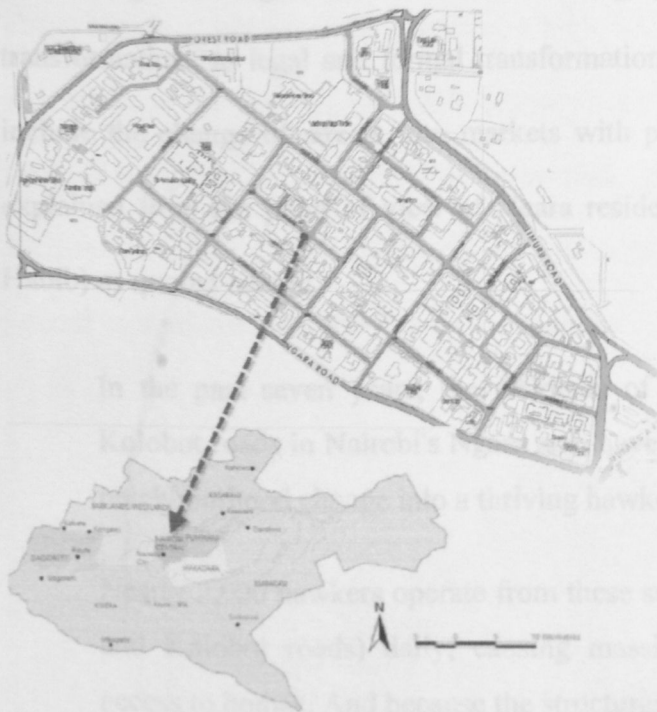


Fig.1.2 The area of study shown in the context of Nairobi. Source: adapted from JICA.

This area of study as shown in figure 1.3 above was characterized by low-rise (single storey) buildings initially owned and occupied by former Asian railway workers dating back to early twentieth century that are gradually diminishing being replaced by high-rise buildings (dramatic transformations).



The ground coverage allowed was 35% with a plot ratio 0.75 which restricted the buildings to a maximum of two levels. Policy reviews of 1980s found out that the area was embracing the functions of the CBD and was later classified as having the character of the city centre. The policy reviewed the ground coverage to 80% (same as CBD) and plot ratio to 2.5. This was the advent legal basis for the transformations.

The changes in Ngara are multifaceted ranging from illegal and informal transformations to legal and formal transformations. The illegal transformations include the change of streets into markets with poor infrastructure and can be explained from the point of view of Ngara residents association chairman (Taj Habib) as quoted below;

In the past seven years, the residents of Tiwi, Kienjeku, Shilingi and Kolobot roads in Nairobi's Ngara area have watched their quiet, tree-lined neighbourhood change into a thriving hawkers' market.

Nearly 2,000 hawkers operate from these streets (Tiwi, Kienjeku, Shilingi and Kolobot roads) daily, causing massive traffic jams and blocking access to homes. And because the structures used by the hawkers are made of wood or plastic, they pose a high fire risk ([http://allafrica.com/stories, 26/04/2010](http://allafrica.com/stories/26/04/2010)).

The formal (legal) changes in Ngara area are characterized by demolitions of the predominantly single storey buildings and their replacement by multi-storey buildings of various forms and styles. These changes have been effected in the last two decades but rapid transformations started emerging in the last ten years, this research is concerned with transformations in the last two decades.

For the purpose of this research, the single storey buildings are referred to as “*Indian type*” and the multi-storey buildings are referred to as “*emerging building type*”

The *Indian building type* (in this study) refers to buildings built during the British colonial period (from 1927) by the Indian ethnic population, example shown in figure 1.4 below.

These buildings are generally one storey high with doors opening into the street with rear side opening to a verandah. Windows are of timber louvers/casements or steel casements. The detailing includes plain plastered and painted (white) surfaces and characteristic Indian decorations with most of the houses having the year of construction inscribed on the front facade.



Fig.1.3 *Indian building type* that characterized Ngara area is undergoing transformations.

Source: Author.

*Emerging building type* (in this study) refers to multi-storey buildings that are replacing low-rise buildings (Indian type) in Ngara area, example shown in figure 1.4. The form of these new built forms in Ngara area largely comprises variations of simple rectangular plan form with various heights and façade treatments. The construction technology and materials used in this category include local as well as imported varieties. Despite the differences in styles, the emerging type buildings share the multi-storey attribute and together form a group of high rise objects inserted into the former low rise fabric within the last two decades or so, hence their collective name as “*emerging type*”. Within the basic form, the architectural features of the individual buildings comprise various styles and shapes in their components and finishes. The architectural character (form and features) of the buildings vary from one building to another depending on the functional requirements of the buildings.



Fig.1.4 Emerging building type (apartments) along Munae road. Source: Author, 2010.

Some built forms have adopted the traditional elevations with windows punctured into walls while others have provided curtain wall elements and yet others show the combination of both. The emerging architectural character depicts variety within the basic multi-storey format. Further descriptions of the type are discussed in the fieldwork chapter.

Ngara area is bordered on two sides by the upcoming Thika super highway whose construction is expected to end by 2012. Due to this fact, private developers have moved to invest in this area projecting land values to go high and demand for residential and commercial premises to escalate.

Therefore, a higher level of morphological and spatial transformations of the existing built forms is expected in this area leading to the author's interest in the area of study.

This research is part study of urban transformations which is broad; therefore the research is limited to functional and physical transformations of the built forms in Ngara area; at individual scale and morphological and spatial transformations of Ngara area at urban level.

The study is limited to transformations that have taken place during the post independence city with interest in the last two decades which the author believes the transformations have been tremendous. During this period (1990 to present) the transformations have been evident since policy reviews were made by the City Council of Nairobi to legalize the development of the multi-level (high-rise)



developments. The transformations have gained momentum in the last fifteen years (this is the core period under study) as evidenced by most built forms in the area.

The study is also limited to study of transformations of urban built forms of Ngara West area of Nairobi and it is assumed that the transformations taking place in this place are similar in other parts of the city.

The research is constrained to Ngara West, the region defined by Murang'a road, Ngara road, Forest road and Limuru road as shown in figure 1.5 below.



Fig.1.5 Map showing the area of study. Source: adapted from JICA maps, study of Nairobi, 2003.

Financial constraints deterred the author from visiting other cities of the world for a case study on urban transformations; therefore, the author relied on book cases to compare the transformations in Ngara with other cities of the world.

## **1.6 OPERATIONAL DEFINITIONS OF VARIABLES**

### **1.6.1 Transformations**

On the analysis of transformations in Ngara area, the author is concerned with the following categories of transformations;

- Morphological transformations – largely the author refers to the changing form of the emerging built forms of the area at urban level, the general spatial layout of the streets and open spaces and the changing skyline at urban level of Ngara area.
- Functional transformations - this refers to the change of use of the built forms from serving a particular function to another which the author studied at plot level.
- Spatial transformations – this refers to the general layout of the area looking into comparing the open spaces with the built up area.

### **1.6.2 Transformation of Built Forms**

Building transformation (in the context of this research) is defined as an alteration or extension involving construction activity and using materials and technology in use in the locality (Tipple, 1991:4). An alteration involves internal changes in the layout of a building; it does not increase the total net floor area.

An extension is an addition (horizontal or vertical) that adds space to the layout of a building. Housing transformation is a process implemented in phases dictated by the transformers' economic capacity and involves change of construction materials and technology depending on the locality.

### **1.6.3 Morphological Transformations**

Urban morphology is the study of the form of human settlements and the process of their formation and transformation (<http://www.answers.com/topic/urban-morphology>, 13/04/2010).

Morphological transformations in the context of this research refer to the changes of the urban form that are taking place in Ngara area, how the emerging building types (high-rise) has changed the image and perception of the neighbourhood.

It is also used to refer to the changes of street structure, size and functional operations of the built forms.

### **1.6.4 Spatial Transformations**

Spatial transformations as used in this research refer to the changes in terms of space use, layout and change of land use.

### **1.6.5 City Form**

City form is closely linked to structure and morphology. The city form is based on the natural constraints of climate, temperature, topography.

### **1.6.6 City Structure**

The structure of a city can be understood as the location of different activities and the relationships of space in urban environment. It is the arrangement of land use in urban areas and the degree of connectivity and accessibility (Wikipedia, 12/04/2010).

## 1.7 STRUCTURE OF THE STUDY

This study is organized into three principal parts; part one comprising of chapter one to four, is basic introduction covering the introductory and theoretical background to the study, chapter two is the research literature review while chapter three details the research design and methodology.

Part two of the thesis is the fieldwork research, background to the area of the study and analysis which is covered in chapter four and five, the last part is chapter six giving the summary of research findings, conclusions and recommendations and the references respectively.



## 2.0 CHAPTER TWO: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

This chapter concentrates on the discussions of transformations at two levels; urban level (morphological transformations) and typological and architectural scale of transformations of built forms. It further examines the concepts and theories of transformations as approached by different authors.

In morphological analysis authors are concerned with the entire whole, that is, neighbourhoods, urban centres, cities like transformation of Paris under Haussmann (Panerai, 2004, p.138) and consider the major elements of the neighbourhoods such as the streets and open public spaces as opposed to typological analysis which details the components of a building.

The system of morphological analysis regards the street system, plot pattern and buildings pattern as an integral part of the town plan which took form and was transformed in the process of urban evolution.

Typo-morphological analysis approach takes elements, structures of elements, organism of structures as the components of the urban structure when applied to individual buildings and towns. For individual buildings, the elements represent the building materials, the structures of elements correspond to the walls and the organism is thus the entire buildings.

Moshi (2008) explains typomorphological approach in the context of urban transformations,

Typo-morphological approach places the materiality of the city – solids and voids (buildings and open spaces) at the centre of discourse. Starting with the built form, as an organism, the city is seen as constantly changing yet reflective in accordance with an accumulation of individual and group actions (p. 16).

These two types of morphological investigations that are characterised as the study of urban space and architectural typology give emphasis to the analysis of town plan and internal structure of urban fabric respectively. For instance, Makachia, in his studies on housing transformations analyzed the typological transformations at household levels where an individual built form's elements are transformed in terms of spatial layout, form and function. That is change in room layouts, structure (walls), materials and extensions aimed at increasing the net floor area of a built form (Makachia, 2005, p.5).

In the morphological approach, the built form forms the basis of analysis. The physical and spatial aspects are analysed in terms of how and why they evolved to their current state.

## **2.1 BUILT FORMS TRANSFORMATIONS**

Transformations of built forms are defined as an alteration or extension involving construction activity and using materials and technology in use in the locality (Tipple, 1991). An alteration involves internal changes in the layout of a building; it does not increase the total net floor area. An extension is an addition (horizontal or vertical) that adds space to the layout of a building. Housing transformation is a process implemented in phases dictated by the transformers' economic capacity

and involves change of construction materials and technology depending on the locality.

Transformation of built forms can occur through alterations or additions to the existing building or demolitions for development of new buildings. Transformations start at household level and progress to affect the whole neighbourhood and as also discussed by Anyamba in his research paper, *informalization of a planned neighbourhood*, where he finds out that individual house owners extend their houses without consideration to planning regulations and principles under which the neighbourhood was planned (Anyamba 2004).

## 2.2 IMPACTS OF TRANSFORMATIONS

Housing transformations have positive (increased earnings and accommodation of relatives who are trying to establish themselves in the city) effects on the livelihoods of owner households in particular and the settlement in general.

As a key strategy for shelter delivery, tenants are able to find accommodation and at city level this tries to reduce housing shortage. Housing transformations in informal settlements provides working spaces and improves the local economy of the settlements (Sheuya, 2004, p.173)

Continued transformations are likely to increase housing densities in areas where development control is not enforced by city authorities without consideration to public spaces and amenities. Housing transformations has led to excessive densification evidenced by the dramatic increase in plot ratios and in-house overcrowding. Sheuya (2004) elaborates that housing transformations can lead to

occupational health hazards, indoor pollution, poor sanitation, reduced household privacy, land (plot boundary) conflicts and reduced accessibility.

Acioly and Davidson (1996) argue that in situations where there is shortage of housing and plot sizes allow housing extensions, there will be a natural densification of settlements.

### **2.3 URBAN MORPHOLOGY AND TRANSFORMATIONS**

One approach of understanding the city is through urban morphology:

Urban morphology is the study of the form of human settlements and the process of their formation and transformation (<http://www.answers.com/topic/urban-morphology>, 13/04/2010).

The study seeks to understand the spatial structure and character of a metropolitan area, city, town or village by examining the patterns of its component parts and the process of its development. This comprises of the functional, economic and organizational responses to the opportunities presented to the city and how these responses change over time ([http://en.wikipedia.org/wiki/Urban\\_morphology](http://en.wikipedia.org/wiki/Urban_morphology), 25/10/2010). The study of how social and economic structures play out in the physical layout of a city (urban grain) is a significant subfield of urban morphology.

Morphology is the knowledge of external form; morphology describes urban form as it is and deals with the external form of the city, both voids and solids.

Urban morphology in the context of this study refers to the form and structure of the area under study.



The concept of structure is related to the principles governing the development of the city, for instance the street structure (the grid of Ngara) and the plot structure in the different parts of the grid.

In other words, urban structure denotes the governing principles. Urban morphology denotes the form as it is observed. One perspective of seeing and explaining the form and structure of the city is through spatial concepts and techniques used in the production of the built environment, which Panerai (2004) refers to as “architectural models”. In this approach discussion is limited to the work of the architect alone and within this only the conceptual issues – leaving out the socio economic conditions as autonomous.

The transformation of Paris under Haussmann (Panerai, 2004) for instance, provides an example of structure of intervention based on global operation and reorganization of an urban territory in which architects were part of the elite or class in power in that their aim and cultural models tended to be the same as those of their clients.

Panerai (2004) gives a further example of morphological transformation under CIAM (Congres International d’Architecture Moderne, 1928) agenda, in which the urban block as a spatial and formal unit of city organization was abolished and “buildings became objects, leading to complete explosion of the urban tissue of which the Unite d’Habitation is the complete manifestation” “Unite d’Habitation” is an approach by Le Corbusier in which one building was intended to contain all the elements of an urban block.

Urban morphology as an interdisciplinary field sees “Urban Morphology” as “the study of the city as a human habitat” (Moudon, 1997, p.3). Urban morphologists focus on the tangible results of social and economic forces: they study the outcomes of ideas and intentions as they shape the ground and mould our cities. Typo-morphological approach places the materiality of the city – solids and voids (buildings and open spaces) at the centre of discourse. Starting with the built form, as an organism, the city is seen as constantly changing yet reflexive in accordance with an accumulation of individual and group actions. In this approach, the physical world is inseparable from the processes of change to which it is subjected and provides a common platform upon which the city can be studied and understood by various disciplines. “The reality of the built environment sometimes brutally informs us of the operating ideologies, the economic conditions and the social relations (Panerai, 2004, p. x)”.

Gauthier (2005) defines Typological process as:

The most fundamental mode by which the built environment is transformed... the type “predetermines” morphological change, as it simultaneously provides the conditions that make transformation possible and constrains future rounds of change (p. 87).

Gauthier argues that since morphological transformations are induced by changes in social needs, a cross examination of the morphological and social determinants, allow for a fuller explanation of the creation and transformation of the *type* through *typological process* (Gauthier, 2005, p.88).

This development of the notions of type and *typological process* provides for the formulation of morphological explanations for transformations (morphogenesis)

of the built environment instead of resorting to explanatory frameworks based exclusively on external conditions of development, as is the case for most theoretical perspectives. To explain further, Malfroy believes that:

In the flow of history any built object (a house or several houses together) tends to be subject to a partial conditioning from previous forms (the formative matrix) and to have partial influence on the form of successive interventions. This dialectical interconnection of form in time between forming and formed suggests the hypothesis of morphogenesis of built form (Malfroy, 1998, p.29).

Thorns (2002) discusses the evolution of the European city following the industrial revolution: According to Thorns, the major transformation of the pre-industrial city took place with the rise of the industrial world. The new cities were the result of a combination of technological change and the creation of a new economic system, one based on trade, but also upon the creation of wealth through use of capital. The nineteenth century saw the development of a new form of urbanism, the industrial city. The rise of the industrial city thus saw the creation of both factory production and urban residential districts close to the new forms of employment creating areas of tenement dwellings. The new physical structure was one of narrow streets and crowded dwellings (Thorns, 2002, p.15). Historically, the European city was shaped first, by the distance one could comfortably walk, then by travel using a variety of public transport beginning with the horse- drawn omnibus, followed in the twentieth century by the electric tram, suburban and subway rail lines and the private motor car (Dyos, 1954).



Thorns also notes that in cities created as part of colonialism, (which can be seen as a by-product of the industrial revolution) in such areas of the world as African countries; cities were often initially administrative and political cities with trading functions. Their structure was created to reflect the power and cultural values of the colonial elites rather than being a product of industrialization.

Contribution to urban transformations in African context is enhanced by Moshi (2008) in his study of transformation of *kariokoo* area of Dar es Salaam.

Moshi (2008) focuses on how and why the inherited colonial city centre of Dar es Salaam, the area of *Kariakoo* in particular, has transformed in the way it has in the post-colonial period. Emphasis in the thesis is on the transformation of the urban form through the development of a building particular to *Kariakoo*.

The objective of the study is to describe and explain the changing building types in terms of: their architectural *form* characteristics, *socio economic* aspects and the related *social practices*, which have led to the complex combination of existing and emerging building types in *Kariakoo* with the purpose of informing and guiding future design and urban development.

The study concludes that new approaches are needed to plan and coordinate the emerging individual efforts of change and such patterns as observed in *Kariakoo*. The study notes that earlier attempts to plan *Kariakoo* using conventional approaches have failed. The question is how to engender coordination among the different urban levels to enhance the emerging identity and character rather than chasing away the development opportunities which no doubt are contributing to national and regional development.



## 2.4 TYPOLOGICAL AND ARCHITECTURAL TRANSFORMATIONS

This section discusses transformations at a smaller scale where individual plots and built forms are being transformed by the dwellers or the owners. The transformations alter the form and increase the net floor area of an individual building, change of use is also part of the transformations as most of the extensions accommodate commercial activities within a residential building. The single built form transformation also plays an integral part of urban transformations since the concentrations of the individual built forms create the urban centre.

Makachia (2005) in his investigation of the influence of house-form on dweller initiated transformations through case studies in Nairobi, concentrates on the inhibition of house-form on the quality of dweller-initiated transformations through case study evaluations using observations, functional and spatial analyses in Nairobi. The study isolates typological strategies that encompass grouping, storeys, courtyards and detachment in unit(s) design and analyze the ensuing transformation type. The analysis is based on the resulting transformation type including; function (residential or otherwise), form and magnitude (plinth area, ground coverage and storeys) and technology (permanent or temporary).

The study confirms the inhibitions of form to dweller-initiated transformation in housing design strategy and proposes a strategic approach that envisage the phenomenon. It places the phenomenon in policy directions for housing production.

Further the study finds out that the form as a design strategy can promote or deter dweller-initiated transformations and in the process generate varying environmental qualities.

Anyamba (2004) in his paper, '*informalisation of a planned neighbourhood in Nairobi*', looks at how Buru Buru (a residential estate planned in 1970s) has transformed over a thirty year period. The study finds out that individual plot owners violate nearly all the by-laws to extend their houses for commercial purposes or to increase rental units, all extensions are aimed at generating additional income for the family.

The study notes that increased extensions are creating an urban edge along the spine road with increased plot coverages and plot ratio which are still within the limits of the by-laws governing the area. The disparity can be partly attributed to the fact that plots adjoining the central spine measure approximately 400M<sup>2</sup> whereas the average plot measures 150 square metres. The other reason could be that the property owners are willing to increase densities by building extensions but within the council's by-laws without building on public land (Anyamba, 2004).

The paper has investigated how a planned neighbourhood has been transforming without statutory guidelines but as desired by the owners. He finds out that the transformations can be contained within the by-laws to increase the densities without violating the laws.

The extensions are not coordinated within the neighbourhood but individual decision.

The discussion on typological transformations tries to find out the changes to the form and functional transformations through various case studies. The authors argue that the original form and plot size and configuration affect the typological transformations. The discussion on urban transformations is wide and long with different authors taking different concepts of investigations and analysis, others putting concepts to explain further, for example, Gauthier's presentation of type and typological process enlightens about the complexity involved in conceptualizing and analyzing typological changes in an urban context. One of the concepts he puts forward is: "leaving aside natural cataclysms, every morphological transformation is humanly produced" (Gauthier, 2005). Drawing from this perspective, he then proposes a methodological approach for the study of typological changes. In the proposal, he calls for a combined analysis of the material realm as well as the related social practices.

## **2.5 CONCEPTUAL FRAMEWORK**

According to educational researcher Smyth (2004) a conceptual framework is described as a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Reichel & Ramey, 1987). When clearly articulated, a conceptual framework has potential usefulness as a tool to scaffold research and, therefore, to assist a researcher to make meaning of subsequent findings. The framework is a research tool intended to assist a

researcher to develop awareness and understanding of the situation under scrutiny and to communicate this. As with all investigation in the social world, the framework itself forms part of the *agenda for negotiation* to be scrutinised and tested, reviewed and reformed as a result of investigation (Guba & Lincoln, 1989).

For the purpose of this research, the conceptual framework is used to investigate the two approaches to analysis of urban transformations as outlined in table 2.1 below.

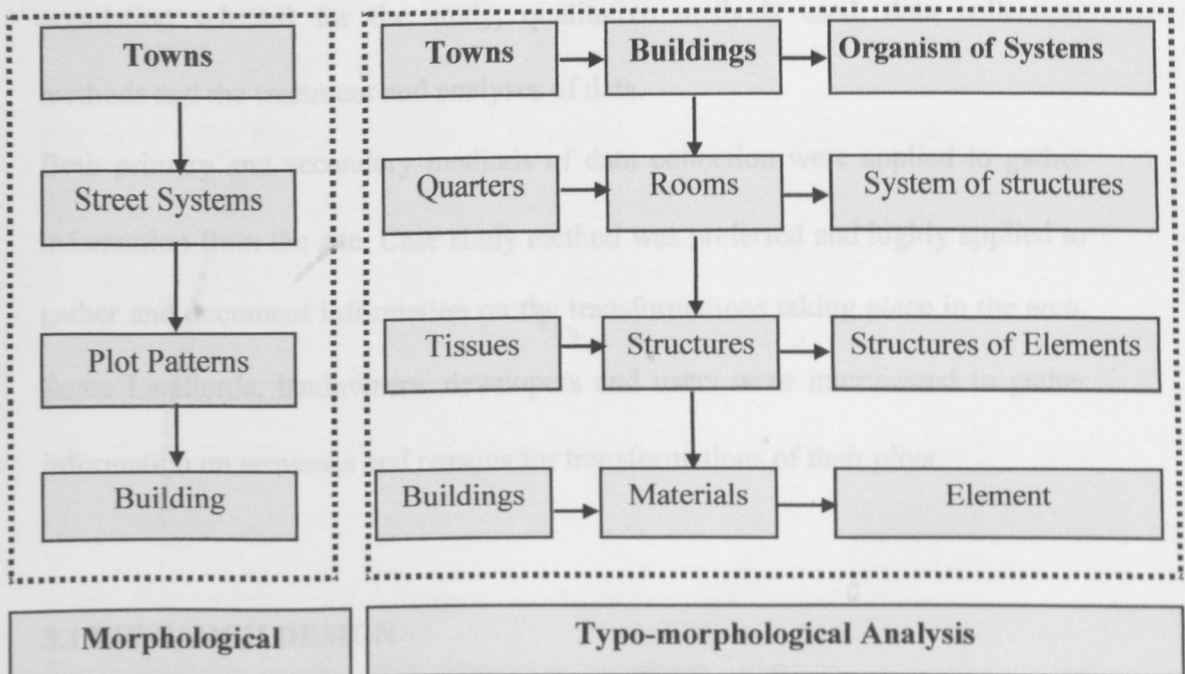


Table 2.1 Hierarchical level of urban system in the morphological analysis and Typological analysis. Source: adapted from Sima, Y & Zhang, D.



### **3.0 CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY**

This chapter focuses on the research design and methodology procedures used in this study. The chapter begins with a discussion of the research design employed in the research and follows to discuss qualitative research design as the methodology.

Data analysis by means of univariate, bivariate and multivariate analysis used for the treatment of data in this study is discussed in detail. Included are details of the population selected for the study, qualitative methods used, data collection methods and the treatment and analyses of data.

Both primary and secondary methods of data collection were applied to gather information from the site. Case study method was preferred and highly applied to gather and document information on the transformations taking place in the area. Some Landlords, landowners, developers and users were interviewed to gather information on sequence and reasons for transformations of their plots.

#### **3.1 RESEARCH DESIGN**

The starting point for this research design was the research questions that were carefully developed. In essence, the research design answered the question: How are we going to get answers to these research questions?

Research design is the blueprint of research (Yin, 2002). It is the specification of methods and procedures for acquiring the information needed for solving the problem. Questionnaires and samples for investigation were decided while framing research design.

Based on Yin (2002), I used the research design as a blueprint of research to deal with the following problems:

- **What questions to study** - actors, reasons, what are the transformations, impacts of morphological and typological transformations in Ngara area
- **What data is relevant**, - type of transformations (incremental or dramatic), plot sizes, typo-morphological changes.
- **What data to collect**, - key transformations, time of plot acquisition, year of construction, order of construction if incremental.
- **How to analyze the results** – maps, charts, tables

The case study design was identified as the most applicable approach for this research to answer the research questions, it is discussed below.

### 3.1.1 Case Study Design

Case study as a research design according to Yin (2002) is an empirical inquiry that investigates a phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.

Yin (2002) explains further that the case study design is used because the researcher wants to cover contextual conditions believing that they might be pertinent to the researcher's phenomenon of study.

Based on the above definitions, the case study design was chosen for the research due to the following reasons:

First, since the main objective of this research was to document transformations and investigate the forces and processes that contribute to transformations of built forms in Ngara area.

Second, the transformations were being studied in the context of a city fragment, it was necessary to emphasize the role of the context in which they occur.

Third, the research was taking place in real-world situation, as noted by Yin (2002) where it is not possible to separate the process (transformations) from the setting (the city fragment under study, Ngara area) in which it is occurring. The inability to separate the process from the context implies that the researcher has no control over the behavior of events.

Fourth, since the transformations in the area under study began after independence and most of the impact began being felt from late 1990s to present, it can be argued that the transformations of built forms in Ngara are relatively contemporary.

### **3.2 RESEARCH METHODOLOGY**

To achieve the objectives of this study, an appropriate methodology had to be selected and suitable tools for data collection (and analysis) had to be chosen (Mouto, 2001). Primarily there are two distinct approaches that inform the gathering of data in any research project, namely the qualitative approach and the quantitative approach. This study adopted qualitative methodology as discussed hereafter.

### 3.2.1 Qualitative Methodology

The qualitative methodology is grounded in the interpretive social sciences paradigm.

Qualitative forms of investigation tend to be based on recognition of the importance of the subjective, experiential 'lifeworld' of human beings. Such reflection is the province of phenomenology reports (Babbie, 1995; Blanche & Durrheim, 1999). Gilbert (1993) notes that qualitative methodologies provide avenues that can lead to the discovery of these deeper levels of meaning. Easterby-Smith *et al.* (1991) describe the task of the qualitative methodologist as to capture what people say and do as a product of how they interpret the complexity of their world, and to understand events from the viewpoints of the participants.

Qualitative research methodology seeks out the 'why', not the 'how' of its topic through the analysis of unstructured information – things like interview transcripts, open ended survey responses, emails, notes, feedback forms, photos and videos. It doesn't just rely on statistics or numbers, which are the domain of quantitative researchers.

In qualitative research, data samples are usually not collected through random selection but rather *purposive reasoning*, which is to say they are chosen for how well they typify the characteristics of a certain class or the phenomenon under study.



### **3.3 RESEARCH TECHNIQUES**

The qualitative techniques used in this research are explained below in detail in their respective modules.

#### **3.3.1 Sampling and Data collection**

This section illustrates how buildings and transformers were selected for the study. It also gives reasons why they were selected, how they were sampled and how data was collected from the study sample and explains how variables under study were measured.

#### **3.3.2 Sampling Process**

The area under study is the region identified as Ngara West; bordered by Limuru Road, Forest road, Murang'a road and Ngara road. Using the base maps of Ngara (from JICA, 2003) area the transformed buildings and plots were identified and plotted on the layout. Further the original built forms were identified through physical observation. The built forms for study were numbered and serialized based on the road where located. Since the dwellings have no specific names, they were numbered and marked on the map to make reference possible.

Since the buildings are many, I identified only three categories of building, that is, transformed buildings, buildings that have undergone change of use and the buildings under transformation (under construction). The total number of buildings listed under the three categories is 72.

This list of buildings which was visually confirmed and marked by going around the streets became the study population.

A representative population sample was picked based on total number of dwellings identified in the three categories above. Based on visual level of transformations, a sample size was chosen and the buildings to study allocated numbers on the base map for in-depth case study.

Having selected the buildings to study, the next step was to establish the current state of the building by visiting individual buildings and enquiring from the owners and caretakers about the original building, drawings and the intended use of the building if under construction. Most of the information on the buildings was observable. Some caretakers did not have the drawings but with the help of the Nairobi City council and the architects I was able to get the drawings.

### **3.4 DATA COLLECTION AND DATA RECORDING TECHNIQUES**

The methods used in this study encompassed the gathering of secondary information from written sources obtained from various areas. Data collection was undertaken through field visits and observations, the breakdown of actions, methods and output are indicated in table 3.1.

The bulk of the sources were books, journals, photographs, online articles and reports all collected from various Libraries. Other sources contacted were the Kenya National archives and the Nairobi City Council; internet sources were also applied. The bulk of the information required for the study was collected by the researcher himself. To establish the level of transformations in Ngara area, the elements of morphological and typo-morphological analysis were listed as

identified in the literature review and from author's observations. This list was used as an aid in analysis of the transformations in Ngara area.

Activity	Technique	Output
General data collection	Observations Photographic registration Archival and Interviews	General description of the morphology and the architectural typologies of the area of study (Ngara)
In-depth case documentation (Description of cases (buildings/site))	Observations, Photographic registration, Archival search for drawings and document outsourcing Interviews	Morphological and typological analysis

Table 3.1 The breakdown of actions, methods and output for the research. Source: Author.

The tools used for data collection included: observations and photography, unstructured interviews and archival outsourcing. Physical observation was the main method of data collection.

### 3.4.1 Archival Research and Literature

The knowledge of the area of study before the transformations was important for this study, therefore, I embarked on archival research of the original Ngara area as planned. Due to scanty literature available on Ngara, I was only able to get little information and maps of the area. Time series aerial photographs could only be traced from 2002 to present, these formed part of the morphological analysis.

### 3.4.2 Interviews

Interviews as methods of data collection were applied in cases where the researcher needed information that was not available from physical observation. Since knowledge from the transformers point of view was needed, I interviewed

landlords and users on the reasons for changing their buildings and the users on their views about the transformations.

### 3.4.3 Physical Observation

What the respondents say during interviews cannot always be trusted and needs to be cross-checked against the scenario on the site because what people say represent the way they perceive issues or problems being investigated and to some extent depends on one's memory. I, therefore, relied on physical observations to identify the current state of the existing built forms as part of the documentation.

Observation was the most suited method since the primary objective was to map and document the transformation taking place in Ngara area. Marshall and Rossman (1999) define observation as "*the systematic noting and recording of events, behavior and artefacts (objects) in the social setting chosen for study.*"

Physical observation of the site incorporated the following:

- Physical observation for documentation of the original and existing situation.
- Mapping the transformations through identifying the key changes of the built forms.
- Demographic study – use, people using, change of use/user, typological changes.

### 3.4.4 Case Study Technique

The starting point of this research was to identify the area of study, Ngara area was selected through identifying the relevant tools for carrying out the research such as availability of literature, graphical and other visual material. This area has observable transformational features of built forms and morphological transformations which form the core of this study.



Earlier studies showed that the phenomenon of informality and transformations in Nairobi is complex and diverse, and therefore, carrying out a generalised study could not create a deeper understanding of the phenomenon, (Anyamba, 2006). I concentrated on a fragment of the city and selected few cases for transformational analysis in order to fully understand the transformations in a planned area. I considered the following factors in order to identify the buildings and plots to analyse the transformational analysis.

- Age of the buildings – time of construction
- Construction materials of the buildings
- Technology of construction
- Types and typologies – residential, commercial, institutional
- Transformational analysis – gradual (incremental), dramatic, materials, changing architectural styles

In all this, the impacts of the transformations on the infrastructure and urban fabric were thoroughly analyzed.

Case study method was highly applied because the research is taking place in a real-world situation where it is not possible to separate the process (transformations) from the context where they are taking place. As the main objective of the research is to get an in depth understanding of the causes and effects of transformations, the case study method proves the most applicable to study and document the transformations.

#### **3.4.5 Drawings and Photographs of the Buildings**

Observations and interviews were complemented with drawings and images of the buildings under study. Drawings of the chosen built forms including plots and plot coverages were sourced from the architects, landlords, City Council and

property managers. Floor plans and elevations of the buildings were provided for comparison with the original built forms. The changes in ground coverages and plot ratios were highlighted at typological scale.

Photographs showing different aspects of the buildings such as building materials, use of indoor and outdoor spaces, solid waste management, public space utilization and road encroachment were taken and analysed at different periods to show transformations. The aerial images of the area were used to compare the current morphology of the area and the original as planned and developed.

### 3.4.6 Data Recording

Location of the building (sheet map)	Image	Nature of inquiry (data collection method)	Information to collect	Morphological and typological analysis
		<ul style="list-style-type: none"> <li>-Observations</li> <li>-Photography</li> <li>-Interviews</li> <li>-Archives</li> </ul>	<ul style="list-style-type: none"> <li>- Plot acquisition</li> <li>-Year of construction</li> <li>-Ownership</li> <li>-Use of building</li> </ul>	<ul style="list-style-type: none"> <li>-Alterations</li> <li>-Change of use</li> <li>-Extensions</li> <li>-Transformation processes (gradual, dramatic)</li> </ul>

Table 3.2 Data recording strategy. Source: Author's own construct.

## 4.0 CHAPTER FOUR: MORPHOLOGICAL ANALYSIS OF URBAN TRANSFORMATIONS IN NGARA AREA

Morphological analysis concentrates on the physical form of the area of study, blocks and buildings by selecting, producing, analyzing and interpreting maps and drawings, therefore, this chapter presents summary of findings and morphological analysis of urban transformations at neighbourhood level.

### 4.1 DESCRIPTION OF THE AREA OF STUDY

Nairobi, the capital of Kenya, is a city of over three million people and home to Kenya's seat of government. The city according to Tiwari (1981 p.123) was first incorporated in 1900 as the township of Nairobi, and the city status was granted in 1950. At present, the city is not only important to East Africa, but also to Africa as a whole.

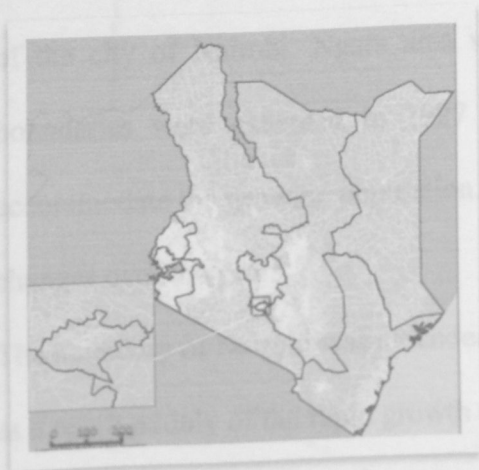


Fig.4.1 The geographical location of Nairobi in Kenyan map. Source: <http://www.provincialadministration.go.ke>

The study area is located in Nairobi, Kenya as referred to in figure 4.1. Ngara area is a peripheral zone just outside the Nairobi's central business district located approximately 2.5KM from Nairobi's CBD to the north of the city.

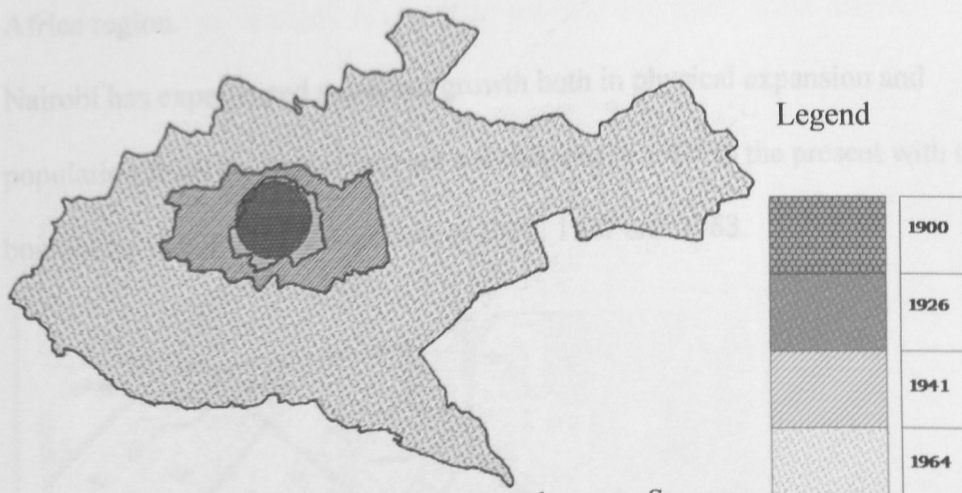


Fig. 4.2 Nairobi's growth through time and space. Source: Tiwari, 1980, cited in Kinuthia 2011, p. 1.

The development of the area is synonymous with the development and expansion of the city of Nairobi. Ngara area was planned and developed when the city boundaries were extended in 1927 to cover an area of 30 square miles to accommodate the growing population. Figure 4.2 above shows the city boundaries changes over the years.

The boundary of Nairobi was extended in 1927 to cover 30 square miles (77 km<sup>2</sup>) as a result mainly of the rapid growth of the urban centre both in terms of population and infrastructure. From 1928 to 1963, this boundary remained the same with only minor additions and excisions taking place.

In 1963, the boundary of Nairobi was extended to cover an area of approximately 266 square miles (686 km<sup>2</sup>).



From this early growth, the city's functions have developed and expanded such that today it has achieved an overwhelming dominance in the political, social, cultural and economic life of the people of Kenya and the whole of the Eastern Africa region.

Nairobi has experienced sustained growth both in physical expansion and population from the time it became a settlement in 1901 to the present with the boundaries changing several times in 1920, 1927 and 1963.

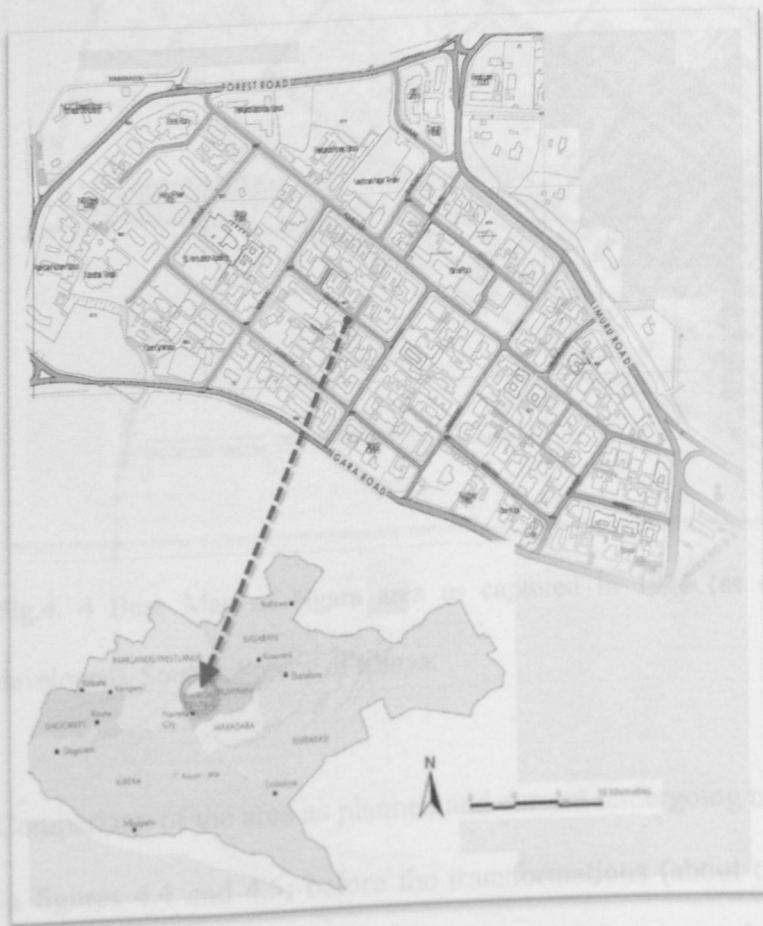


Fig.4. 3 Location of the area of study. Sources: adapted from JICA.

## 4.2 MORPHOLOGICAL ANALYSIS OF URBAN TRANSFORMATIONS IN NGARA AREA

This section analyses the changes in spatial structure of Ngara area at urban level, it looks into the changes of street layout and the open space transformations.

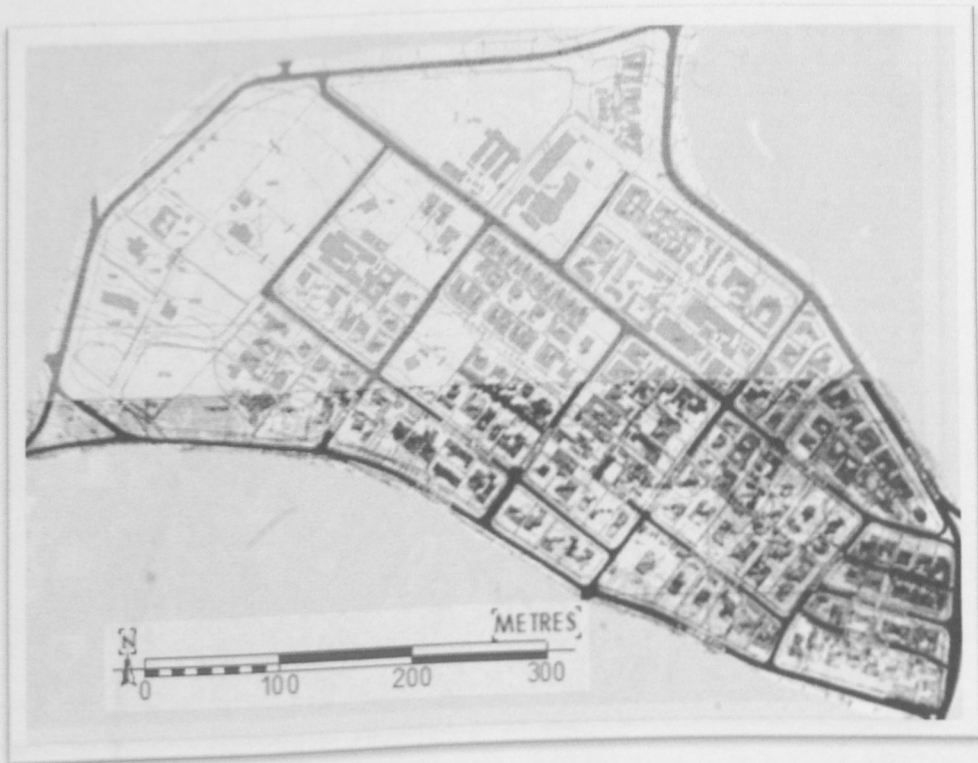


Fig.4. 4 Base Map of Ngara area as captured in 1976 (as originally planned and developed). Source: Survey of Kenya.

Comparison of the area as planned and current undergoing transformations shown in figures 4.4 and 4.5; before the transformations (about two decades ago), the area was largely a residential neighbourhood of low-lying dwellings sparsely built with a series of open spaces as shown above in figure 4.4.

The area was purely a residential neighbourhood planned with grid iron structure of street layout. All the plots had back lanes for servicing the plots. Plot structure has remained the same and the street layouts and size has not been changed, there have been fewer voids and more solids.



Fig.4. 5 Aerial image showing the area under study as captured in this satellite image of January 2011. Source: GoogleEarth.com

The street layout and character of the area has remained the same (as shown in figure 4.5 above) with changing skyline brought by the change in building heights, the spatial layout has changed from plot to plot due to the individual plot transformations and changing land uses.

The changing morphology is more pronounced along major circulation routes along the edges of the area of study; this was found out by walking along the

roads within the area of study and through physical observation all the transformed built forms identified. The transformations are marked on the base map below.

Multi level built forms were identified along the major circulation routes, that is, Limuru Road, Ngara Road and Forest Road. The functions of the emerging built forms are varied depending on the location with most of them being commercial outlets along the main roads, interior emerging forms are mainly residential dwellings and mixed use developments.

The space between buildings is being gradually reduced due to increase in ground coverage. Increased plot coverage is leaving little open space with some buildings being developed covering the edges of the plot leaving no open space between two neighbouring plots and only light wells within the building as the only spaces. The open space (within the plot) is only at the front. Spatially this has completely changed the original planning concept which had more open space than built space within the plot, change of ground coverage from 35% to 80%. Open space between buildings is increasing along the street boundaries to offer parking in front of the buildings.



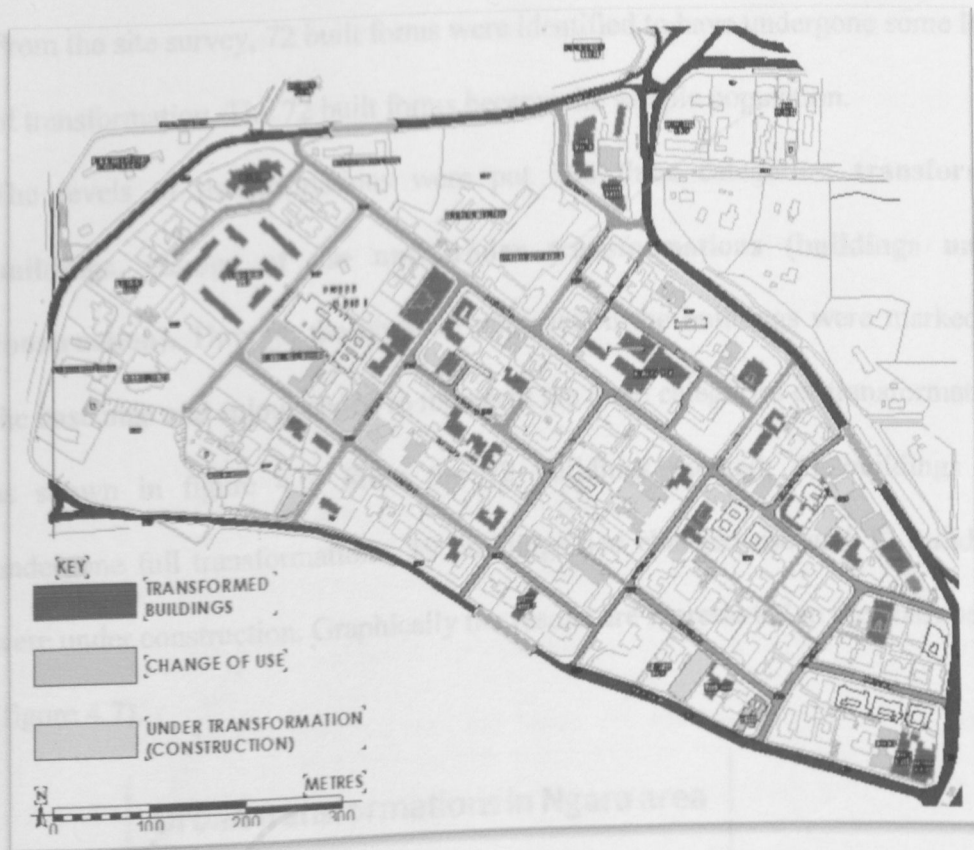


Fig.4. 6 Base map as captured in 2003 showing detailed Transformations in Ngara and the emerging transformations. Source: adapted from JICA.

- *Unmarked plots have not undergone any notable change, although the author noted that some of the plots along Tiwi Street had been abandoned and there was no evidence of any activity going on.*
- *Informal kiosks are mushrooming along the roads and other open spaces (especially along spine roads and frontages) and street markets are created along three streets but the author did not consider them as part of the transformations since he is concerned with transformations of the legally built forms in Ngara.*

From the site survey, 72 built forms were identified to have undergone some level of transformation. The 72 built forms became the sample population. The levels of transformations were put into three categories; **transformed buildings, change of use and under transformations (buildings under construction)**. Through the physical observation the buildings were marked on the base map and colour coded to represent the three categories of transformations as shown in figure 4.6. From the 72 buildings marked; 41 buildings had undergone full transformations, 19 buildings had changed use and 12 buildings were under construction. Graphically the results are represented in the chart below (figure 4.7).

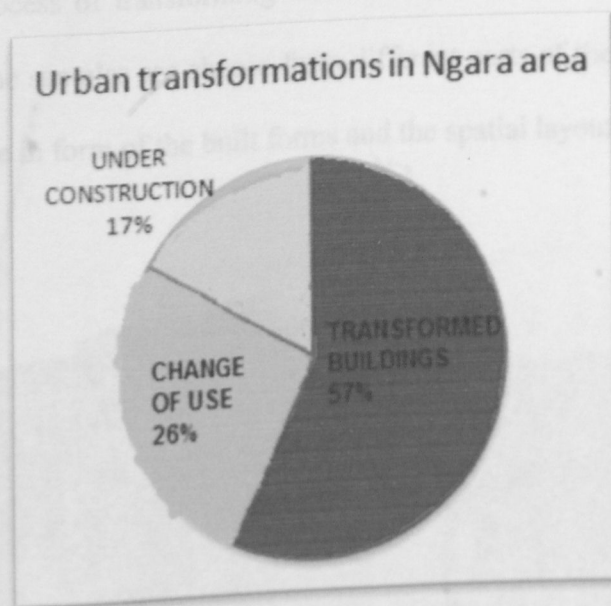


Fig.4. 7 Chart representing the transformations in Ngara area. Source: Author.

From the survey, 57% of the buildings had fully transformed, 26% had undergone change of use while 17% was under construction, figure 4.7 above. The transformations are spread out in the entire area as identified although it was

observed that the main transport routes had higher numbers of transformed buildings. Ngara Road, Kolobot Road and Limuru Road had higher numbers of transformed buildings which were changed to mixed use, hotels and office buildings. Limuru Road had the highest concentration of commercial outlets fronting the road.

#### 4.3 NEIGHBOURHOOD LEVEL TRANSFORMATIONS

To explain further the neighbourhood level of transformations the author randomly sampled plots and buildings that have undergone transformations or are in the process of transforming and the cases are presented by the illustrations below. The samples are chosen from different parts of the study area to represent the change in form of the built forms and the spatial layout of the area.



Fig.4.8 The changing morphology emerging multi-storey fabric. Source: author.



Fig.4. 9 The changing skyline of Ngara area to resemble the Nairobi's CBD. Source: author.

The morphological changes entail the demolitions of the single storey *Indian type* buildings and replacing with multi level contemporary building types.

The emerging typology is varied in terms of function and style; the mixed use developments include a continuous commercial ground floor space partitioned into small shops and rented to different operators, upper levels accommodate offices or hotel rooms in most mixed use developments. Other developments are designed purely hotel developments or office buildings accommodating the functions of the said facility.





Fig.4.10 The changing building types; change from low-lying to high-rise. Source: author.

The emerging built forms appear like forms inserted into the residential neighbourhood.

There is no clear spatial separation between the ground floor and upper floors since the emerging buildings are varied in terms of function and style; some have utilized the ground floor for parking while other functions take upper levels, mixed use developments have ground floor functions different from upper levels and underground parking. Most hotel and club buildings have ground floor functions slightly different but supportive functions for upper levels of the building.



Fig.4.11 A blocked service lane. Source: Author.

Some streets have been converted to markets making it hard for traffic to pass.

Figure 4.11 above shows a section of Jua Lane that has been closed off and has become a dumping site and a security threat (hiding place).

Most back lanes, as shown in figure 4.11, have been blocked; some have been closed for security reasons while others have accommodated informal kiosks and markets. This is impacting service delivery especially solid waste management.

The emerging buildings with no set backs from the back lanes have left the back lanes as dead spaces, with the high rise developments, the lanes become narrow corridors where residents are afraid of walking.

...imposed on the first two levels with offices occupying the middle levels. This upper levels are living quarters.

Spatial distribution of the developments is a key factor to note as these developments, the distribution of different typologies of the developments is highly influenced by the transport networks. The prime land fronting the space has the highest level of transformation, only attracting good quality.



Fig.4.12 Informal kiosks mushrooming along Kolobot road. Source: author

Some streets have been converted to markets making it hard for traffic access; other open spaces are being taken over by informal kiosks impacting the quality of the open spaces.

In general the spatial transformations in Ngara area are filling up open spaces at plot level and at communal level. The increase in ground coverage and plot ratio has engineered the drop in quality and quantity of open spaces in Ngara area.

The morphological transformations are characterized by demolishing single level houses for multi level mixed use developments to cater for commercial, offices and living requirements, retail outlets are accommodated on the first two levels with offices occupying middle levels while upper levels are living quarters.

Spatial distribution of the developments is a key factor to note on these developments, the distributions of different typologies of the developments is highly influenced by the transport networks. The prime land fronting the spine has the highest level of transformations mostly attracting retail outlets.

## 5.0 CHAPTER FIVE: ARCHITECTURAL AND TYPOLOGICAL TRANSFORMATIONS IN NGARA AREA.

### 5.1 DESCRIPTION OF BUILT FORMS; OVERVIEW OF TYPOLOGIES IN NGARA AREA

#### i) Original Dwellings – Indian type

The *Indian type* was mostly constructed during the colonial period, in the 1920's and 1930's. These buildings were largely occupied by the Indian ethnic community as described in the master plan zoning up to the early independence period. The ground coverage allowed was 35% with a plot ratio 0.75 which restricted the buildings to a maximum of two levels.



Fig. 5.1 Indian type dwellings built in 1929 undergoing transformations. Source: Author



Policy reviews of 1980s found out that the area was embracing the functions of the CBD and the area was classified as having the character of the city centre which necessitated reviews. The policy reviewed the ground coverage to 80% (same as CBD) and plot ratio to 2.5. This was the advent and legal basis for the transformations.

## **ii) Contemporary buildings (emerging type) - The Changing Morphology**

From a largely residential neighbourhood with a predominantly low lying morphology as inherited at independence, Ngara area is transforming to a mixed use neighbourhood (commercial, residential and offices) of various activities. In recent times, the trading activities have intensified along Limuru road and with them the morphology has been changing in adjustment to the demands of the increasing commercial activities and residential space.

These morphological changes of Ngara area, in the post colonial period, have been centred on changes from the low-rise urban fabric to an increasingly multi-storey fabric.

In the ongoing changes, the emerging multi-storey buildings which in this study have been collectively referred to as “*emerging type*” comprise individual formal and functional variations. The emerging urban morphology is that of complex variety rather than clear presentation of styles.

To illustrate the complex architectural varieties of the emerging type, the author has “subjectively” grouped them with respect to function into four groups which

he names as follows: residential flats, office blocks, mixed use developments, hotels and guest houses.


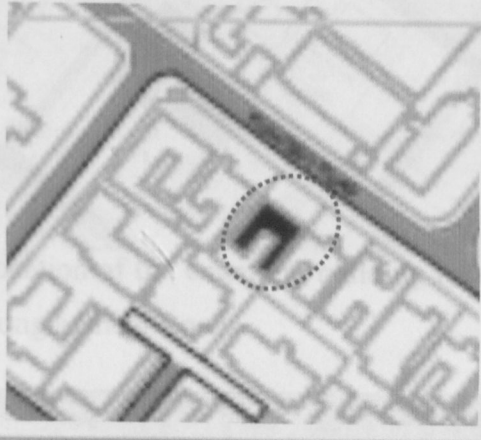
To analyse the urban transformations in the area the author has split the analysis into morphological and typo-morphological (architectural typology) analysis.


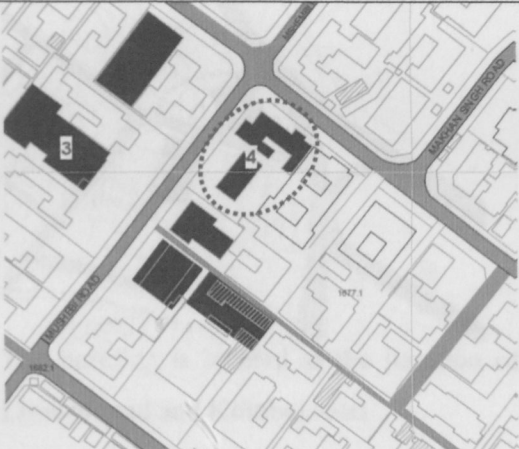




Fig. 5.2 Emerging multi storey fabric. Source: Author.

Residential flats along Kipkabus Road, this is the Emerging multi-storey built forms in the area which the author has collectively referred to as the “*emerging type*”.

## 5.2 FUNCTIONAL AND TYPO-MORPHOLOGICAL TRANSFORMATIONS: Examples from the study area.

Building Type (functional)	Image	Location	Morphological Transformations analysis/ Remarks
Residential flats	 <p data-bbox="427 594 825 710">Emerging residential dwellings along Kolobot Road</p>	 <p data-bbox="836 806 1364 1060">The building is located along Kolobot road – initially a residential dwelling changed to hostels and then demolished to construct residential flats.</p>	<p data-bbox="1391 312 1904 491">Transformation from the low-level dwellings of <i>Indian type</i> to multi level residential flats.</p> <p data-bbox="1391 525 1904 854">High-rise residential flats are emerging as a solution to housing needs and the need to reap maximum benefits from the plot irrespective of the region within the neighbourhood.</p>

<p><b>Office Blocks</b></p>	 <p>Emerging office buildings juxtaposed within a low-lying neighbourhood along Mshebi Road.</p>	 <p>Location of the emerging building type along Mshebi Road.</p>	<p>Multi storey building on amalgamated plots along Mshebi road.</p> <p>The original built form was demolished to put up the multi level office block.</p> <p>The adjacent low rise built form is a characteristic of Ngara built forms, it was later demolished.</p>
<p><b>Mixed use developments</b></p>	 <p>Multi-level mixed use built forms that are replacing the original residential built forms</p>	 <p>Location of the plot at the junction Ngara road and Munae road.</p>	<p>Mixed use development along Ngara Road featuring shops and offices on the lower level and residential rooms on upper levels.</p> <p>The elevations feature characteristic residential typology with resemblance to other residential dwellings.</p>







<p><b>Hotels and Commercial Premises</b></p>	 <p>Resultant typology after demolition of the original type is a hotel.</p>	 <p>The building is located at the junction of Limuru road and Kolobot road</p>	<p>The original built form was an Indian type (interviews with the client). Change of use to ladies' hostels. Demolished in December 2009 for construction of the mixed use development (shops, restaurants and hotel rooms. Resultant typology is a multi storey building (5 levels). Built with local materials featuring glazed elevations.</p>
<p>road alterations.</p>	 <p>Hotel building along Limuru road developed on a plot that initially was occupied by an <i>Indian type</i> building.</p>	 <p>Location of the built form (hotel) along Limuru road</p>	<p>Limuru road corridor - <i>Emerging typologies</i> forming a new edge along Limuru road are mostly commercial premises creating a new urban structure of the region.</p> <p>Hotel development and commercial premises are the contemporary buildings forming the morphology of Limuru road which is the edge of the area.</p>

Table 3.1 Examples of functional morphological transformations in the area of study. Source: Field survey 2011.


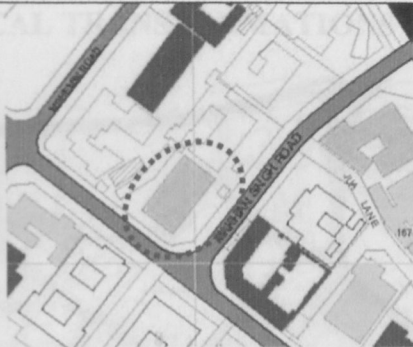



<p><b>Hostels &amp; Guest Houses</b></p>	 <p>Low rise built form originally for communal use (social hall), undergone change of ownership and use</p>	 <p>located at the junction of Kolobot Road and Markan Singh Road</p>	<p>Low rise building transformed from a residential house to a guest house. Change of use is a stage of transformation as most low lying houses were altered to accommodate hostels and guest houses before demolitions for multi-functional buildings.</p>
<p><b>Change of Use and alterations.</b></p>	 <p>Original building with minor alterations</p>  <p>Extensions at the rear of the plot.</p>	 <p>Located along the Kolobot road, it's among the plots serviced via back lane.</p>	<p><i>Indian type dwelling of 1929 gradually undergoing transformations in two fold, that is, change of use and extensions – the rear open space is infilled while the main house is altered to provide rental units.</i></p> <p>The main house has been altered to create more rental units' the form but the net floor area has not been changed.</p>

Table 5.1 Examples of functional morphological transformations in the area of study. Source: Field survey 2011.

### 5.3 DETAILED EXAMPLES OF TYPOLOGICAL TRANSFORMATIONS

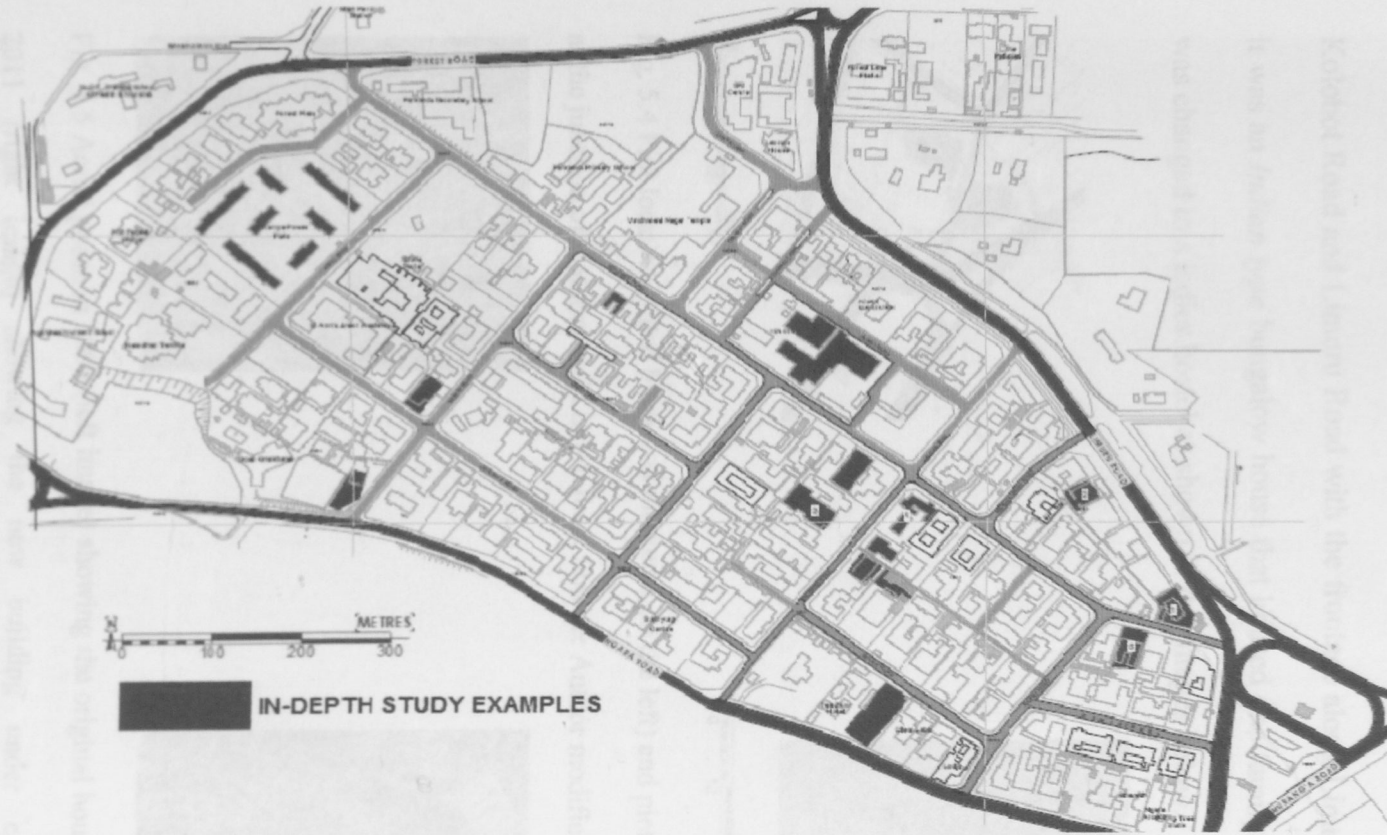


Fig. 5.3 Map of the area under study showing the selected case studies. Source: adapted from JICA.



### 5.3.1 Example 1: plot no. 209/1242 Limuru Road

This plot is irregular in shape, plot size is 0.0809 hectares developed at ground coverage of 80% and 2.5 plot ratio (current building), located at the junction of Kolobot Road and Limuru Road with the frontage along Limuru road. Originally it was an *Indian type* bungalow house that housed one family. Later the building was changed to a ladies hostel as shown in the images below.

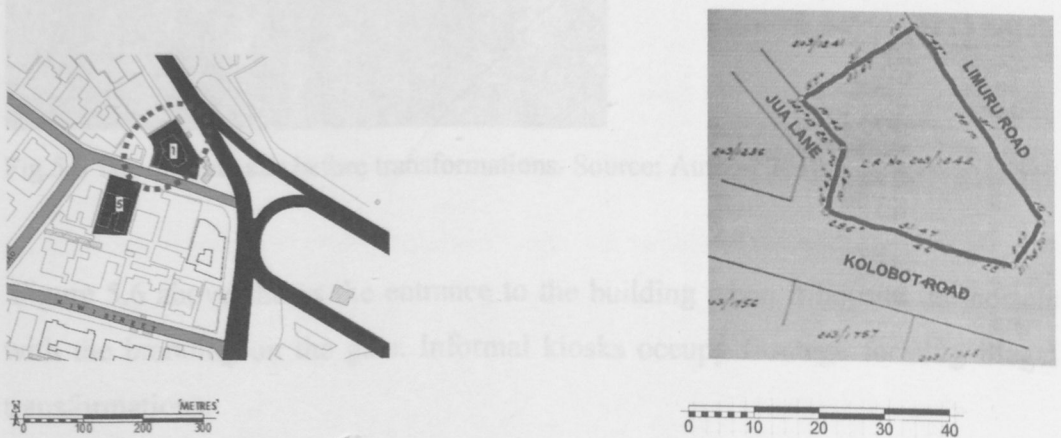


Fig. 5.4 Plot location (filled black and marked 1 on the left) and plot configuration (right) at the junction of Kolobot and Limuru road. Source: Author modified.



Fig. 5.5 Aerial photo in 2009 (left image) showing the original house and aerial photo in 2011 (right image) showing the new building under construction. Source: GoogleEarth.com





Fig.5.6 The original site before transformations. Source: Author, 2010.

Figure 5.6 above shows the entrance to the building when it housed the hostels with the branding on the gate. Informal kiosks occupy frontage forming illegal transformations.



Fig. 5.7 Original built form. Source: Author, 2010.

The original building (figure 5.7) before it was demolished in 2010 for a mixed use Development. It housed hostels before transforming to a 5-level mixed use development.

The new upcoming building (at finishing level at the time of field work) is a seven level hotel building with a restaurant and shops on the ground floor and residential rooms on the upper floors. It has a basement parking accessed from a service lane, Jua Lane.

The form of the building is a truncated rectangle intermarried with semi-circles (a characteristic of the Indian type), balconies and terraces are extra features of the building.

Morphologically the changes include aspects such as: extreme proximity of adjacent buildings (spanning from edge to edge), spontaneous shops and restaurants (figure 5.5) and spontaneous vertical circulation routes.

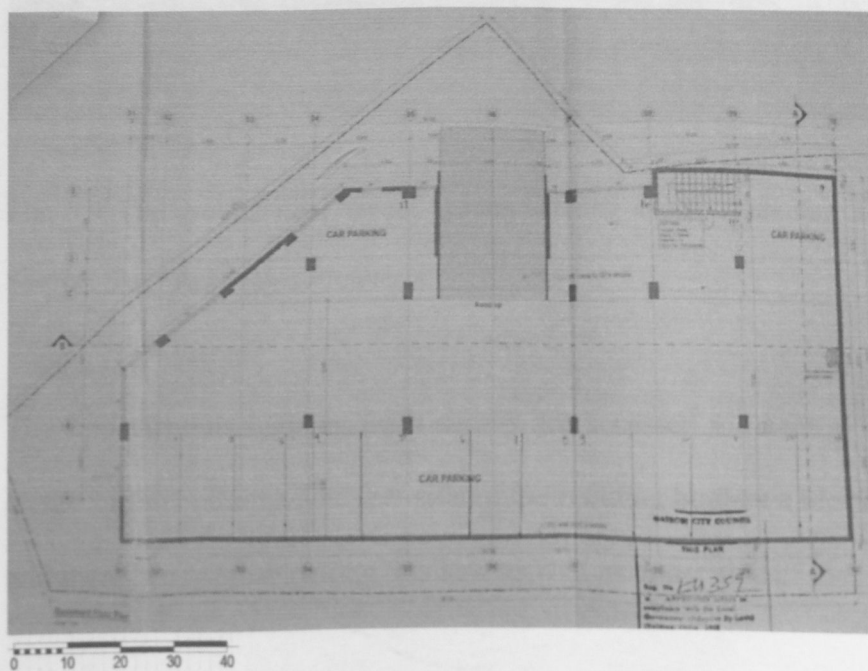


Fig. 5.8 The layout of the building capturing the lower ground floor for car parking.

Source: Skair Associates Architects.

The spatial structure of the new building follows the profile of the plot configuration with main access from Limuru Road and parking in front of the building. Service and basement entrance are provided from the service lane.

The first floor has restaurant accessed from the left side of the building via a separate staircase that links with the fire exit staircase case.

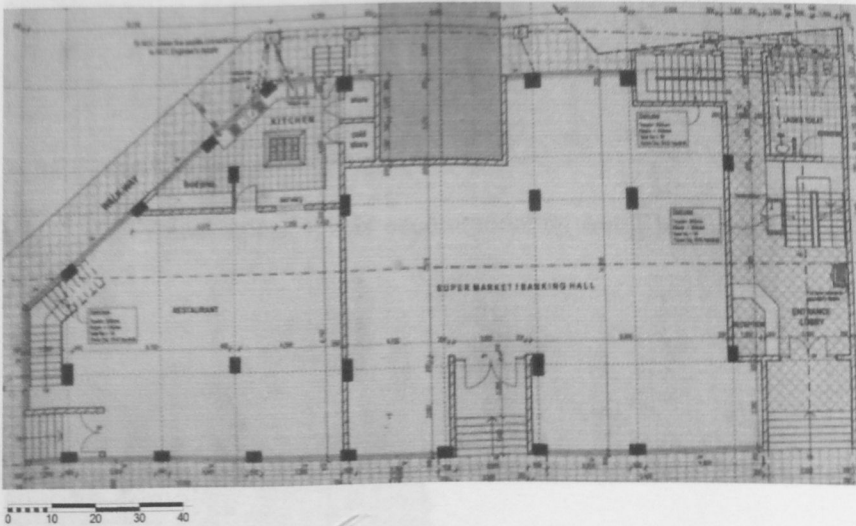


Fig. 5.9 The ground floor layout accommodating shops, restaurant and supermarket.

Source: Skair Associates Architects.

The upper rooms housing hotel rooms are accessed via central staircase at the centre of the building. The rear side of the building borders a blocked service lane and there is no setback along this lane as well as upper side of the plot.

Fig. 5.11 Emerging hotel development at the junction of Limuru Road and Kolobos Road

Source: Author

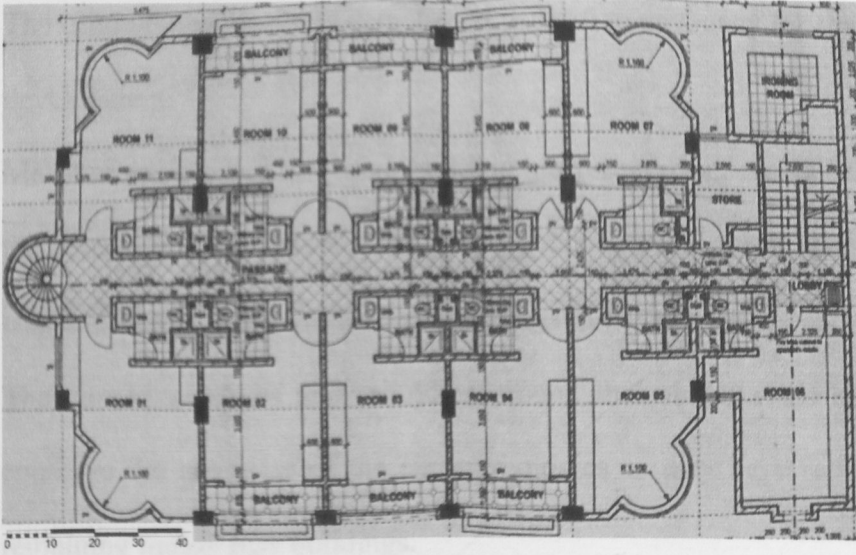


Fig. 5.10 Typical upper levels accommodating hotel rooms. Source: Skair Associates Architects.



Fig. 5.11 Emerging hotel development at the junction of Limuru Road and Kolobot Road. Source: Author.



The original dwelling was demolished in 2010 to pave way for the high-rise hotel development.

Morphologically this emerging building has resemblance to the original building; the parapet walling covering the roof, the cornice and gutter around the roof is a characteristic of many Indian type buildings in the area.

The curved windows and mouldings round the windows are also designed to conserve the character of the early typologies as they have resemblance to the remaining *Indian type* buildings.

There is no notable transformations of the materials used as stone is chiefly used with plaster and paint finish.

The form of the building has resemblance to other existing typologies (*Indian type*) giving a notion of conservancy of the architectural form of the early typologies.

Fig. 5.12 Flat location (highlighted on the left) and plot configuration (right image) along Liners Road. Source: adapted from JICA.

The original house was a one level *haveli* type dwelling house as described by the owner who bought the house and changed use to a club (Rabi Club); the owner bought and operated the club until December 2010 when he demolished for a multi-level development to provide more rental space.

### 5.3.2 Example 2: plot no. 209/1238 Limuru Road

The second case is located on plot number L.R 209/1238 along Limuru road and owned by a private individual who bought it from the Asian owner a long time ago (the owner could not tell exactly when he bought the plot with the original dwelling). The plot measures 85 by 90 feet and currently under construction, a six level hotel building is coming up.

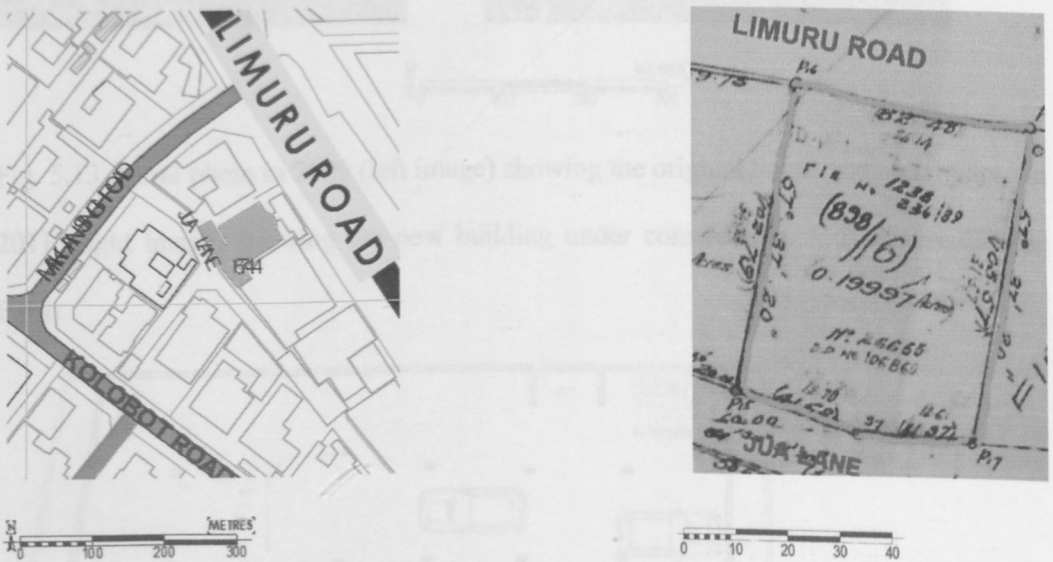


Fig. 5.12 Plot location (highlighted on the left) and plot configuration (right image) along Limuru Road. Source: adapted from JICA.

The original house was a one level *Indian type* dwelling house as described by the owner who bought the house and changed use to a club (Rabi Club); the owner bought and operated the club until December 2010 when he demolished for a multi-level development to provide more rental space.

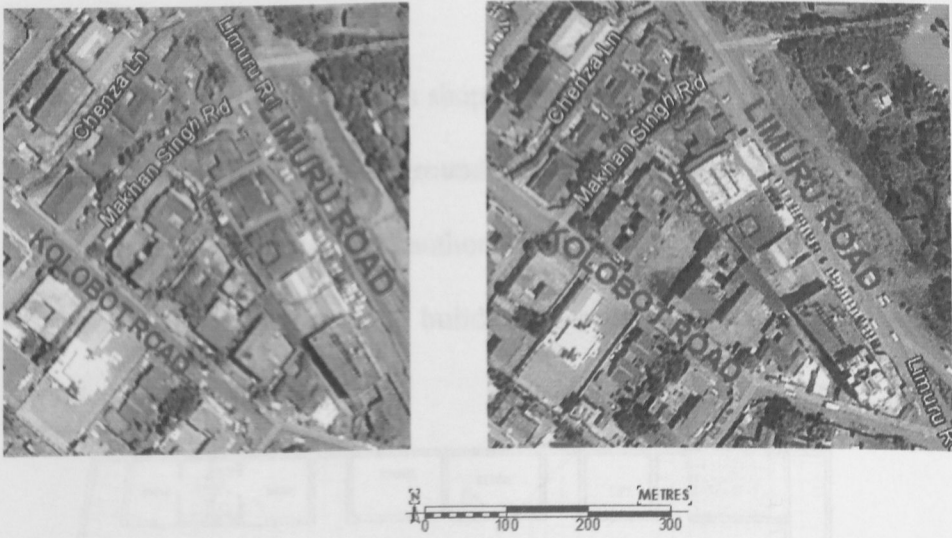


Fig. 5.13 Aerial photo in 2009 (left image) showing the original house and aerial photo in 2011 (right image) showing the new building under construction. Source: Google Earth.

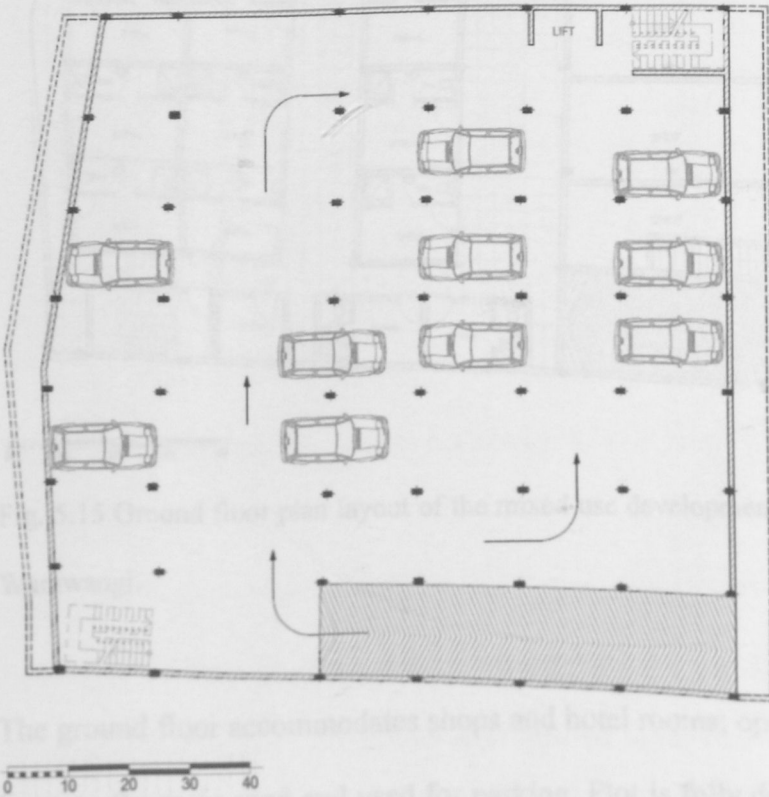


Fig. 5.14 Basement floor plan layout of the building under construction. Source: Architect J.M Wamwangi.

The ground floor accommodates shops; first floor houses the club while the upper levels are hotel rooms. The ground coverage is 80% and 2.5 plot ratio, the maximum allowed by the local authorities. The only open space is left at the front (9Metre building line) with the building spanning from edge to edge, parking is provided at the basement.

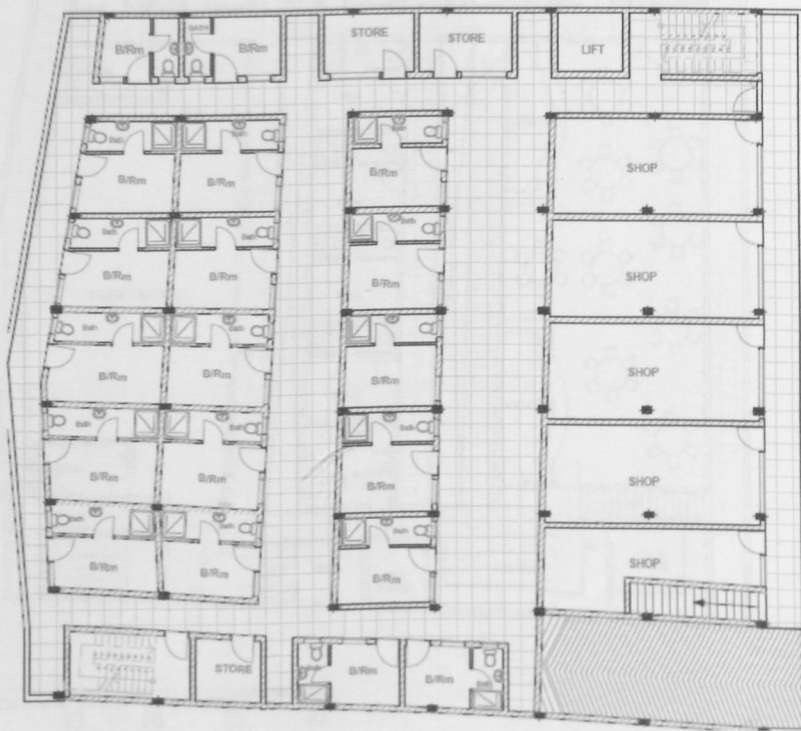


Fig. 5.15 Ground floor plan layout of the mixed use development. Source: Architect J.M Wamwangi.

The ground floor accommodates shops and hotel rooms; open space on the plot is fronting the main road and used for parking. Plot is fully development from edge to edge providing only open space on the front as opposed to the early typologies which had both frontage and rear open spaces.



This development is a clear example of a fully transformed plot showing all the aspects different from the existing typologies of the early developments. The new built form expresses functional, morphological, spatial and architectural typological transformations.

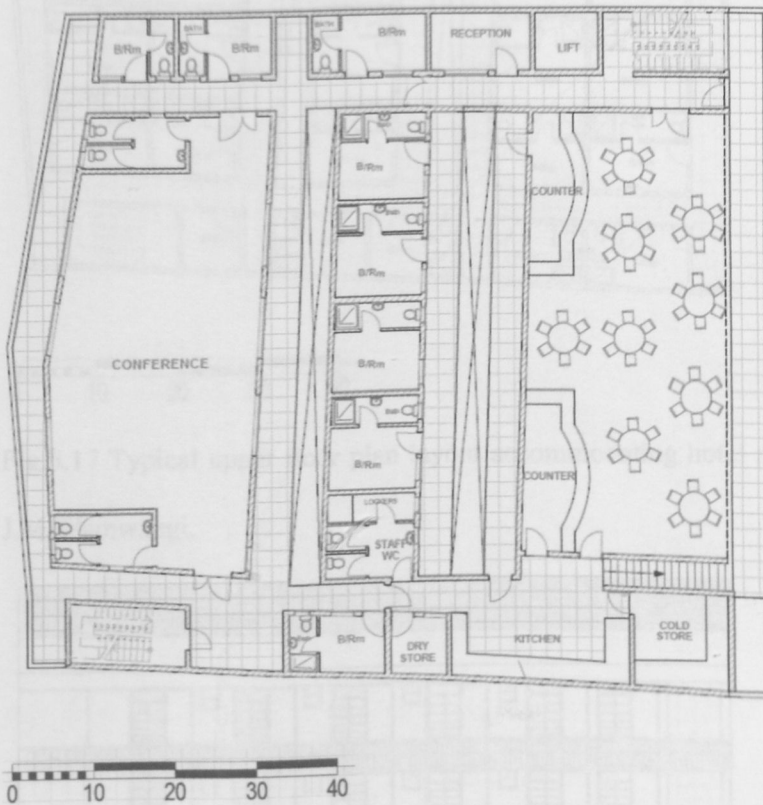


Fig. 5.16 First floor layout. Source: Architect J.M Wamwangi.

First floor layout shown in figure 5.16 above accommodating restaurants and hotel rooms; due to high plot coverage, lighting is achieved from internal openings which appear too narrow as compared to the width of primary spaces.

Fig. 5.18 First Elevation of the building. Source: Architect J.M Wamwangi.

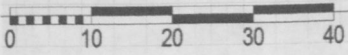
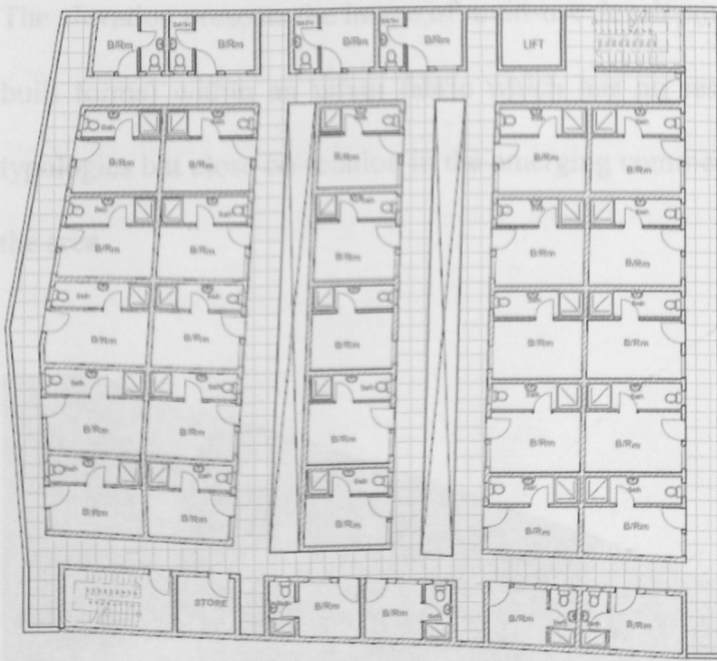


Fig.5.17 Typical upper floor plan layout accommodating hotel rooms. Source: Architect J.M Wamwangi.

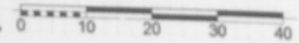


Fig. 5.18 Front Elevation of the building. Source: Architect J.M Wamwangi.

The elevation presents the image of multi-use development (residential and office built forms) within an urban fabric which has no resemblance to the original typologies but close co-relation to the emerging commercial developments within the area.

The Indian type building was demolished in February 2010 to develop the hotel.



Fig. 5.19 Plot no. 209/1238 Limuru Road under construction after demolitions of the original Indian type dwelling. Source: Author

Fig. 5.23 Plot location (highlighted) and plot configuration along Mohabi Road under construction of a multi-level hotel building. Source: adapted from JKCA.

### 5.3.3 Example 3: plot no. 209/1249/2 Mshebi Road

The fourth case is located along Mshebi road and is under construction, a hotel is being developed. The original plot was owned by an Asian and had one level bungalow; it was bought by the current owner who converted it to a guest house. The Indian type building was demolished in February 2010 to develop the hotel.

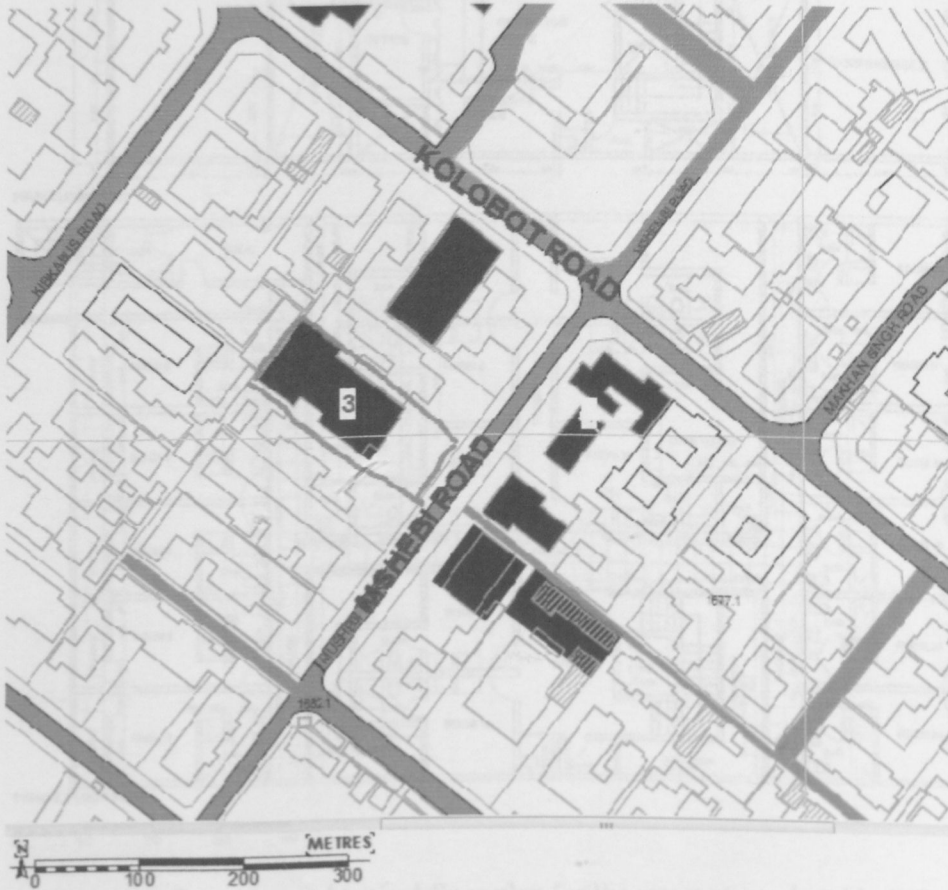
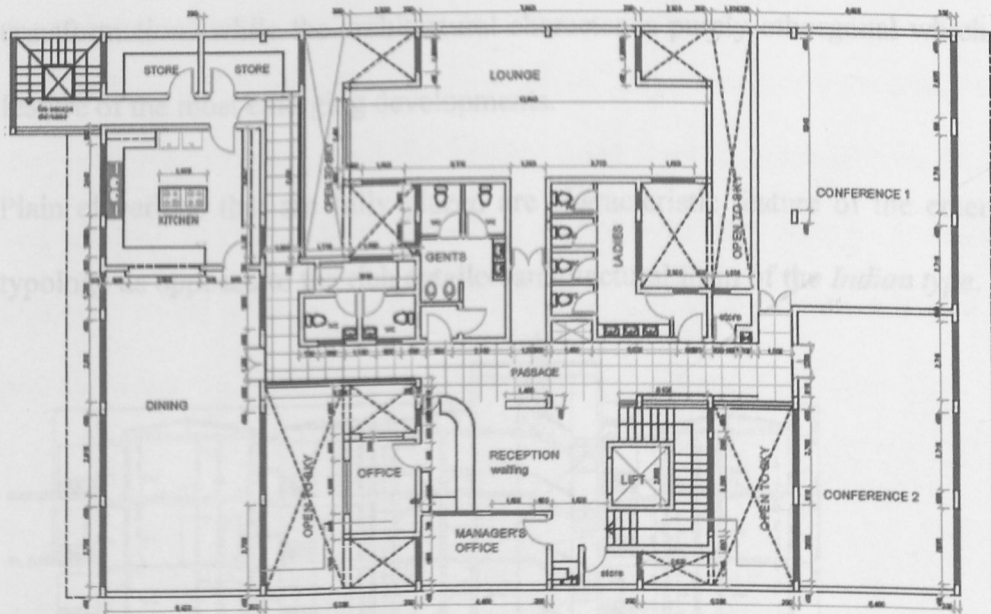
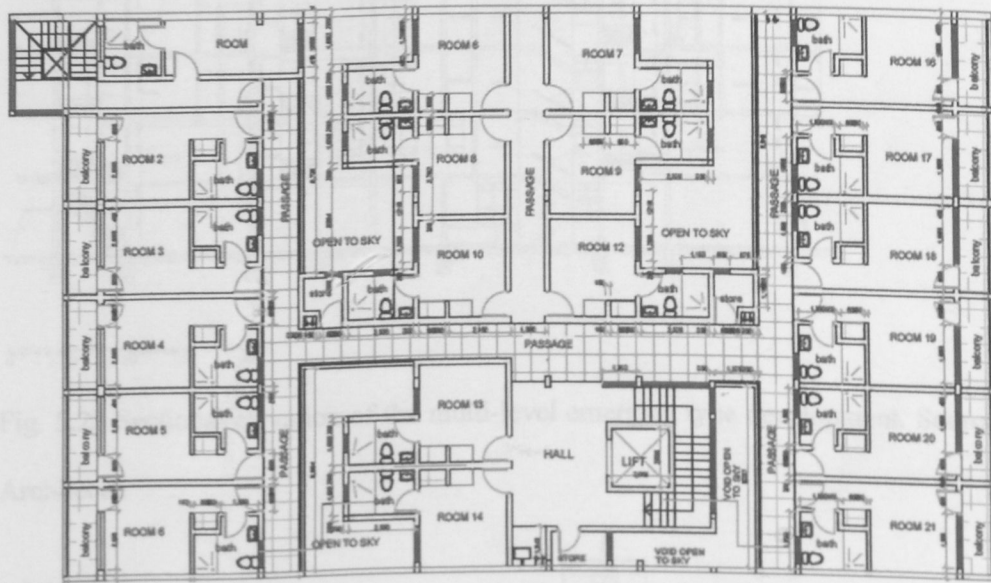


Fig. 5.20 Plot location (highlighted) and plot configuration along Mshebi Road under construction of a multi-level hotel building. Source: adapted from JICA.





FIRST FLOOR PLAN



TYPICAL FLOOR PLAN

Fig.5.21 First floor plan and typical floor plan for the seven storey hotel building. Source: Tej Architects.

A typical floor plan of the upcoming hotel building as shown in figure 5.21; The ground floor accomodates surface parking under the building and services; the first floor is a restaurant for the hotel while the upper levels accommodate hotel rooms. The emrging building shows functional andmorphological

transformations while the architectural character is purely orthogonal which is a feature of the most emerging developments.

Plain elevations that are fully glazed are characteristic feature of the emerging typology as opposed to the rich detailed architectural form of the *Indian type*.

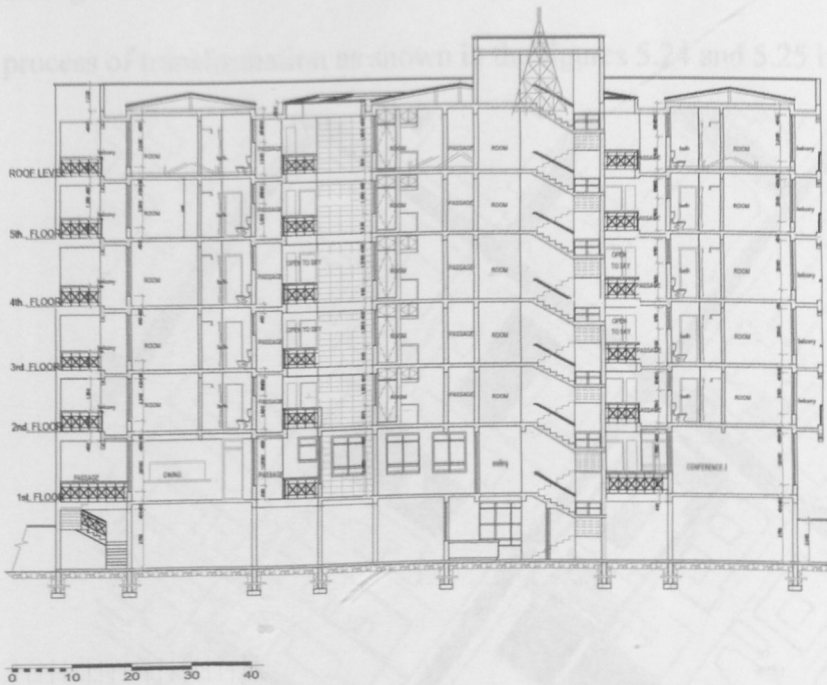


Fig. 5.22 Sectional elevation of the multi-level emerging type development. Source: Tej Architects.

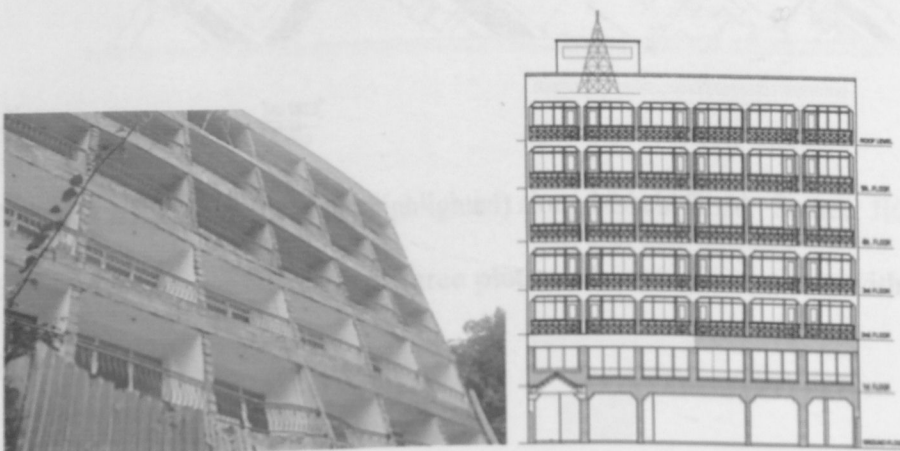


Fig. 5.23 Seven level hotel building is coming up on a site which originally housed an Indian type dwelling along Mshebi Road. Source: Author

#### 5.3.4 Example 4: Plot no. 209/242/28 & 9 Mshebi Road

A case study of 'change of use and extensions' as a process of transformations at the junction of Kolobot Road and Mshebi Road. This is a case of both dramatic and gradual transformations involving demolitions and phased development through vertical extension. Change of use is also identified on this plot as a process of transformation as shown in the figures 5.24 and 5.25 below.

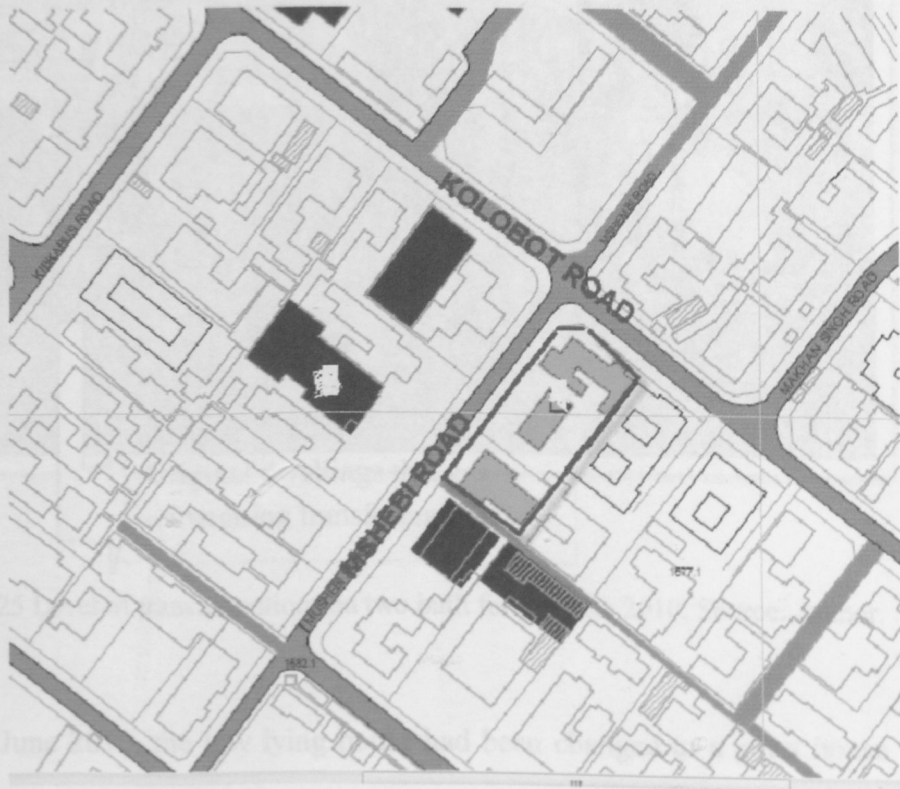


Fig. 5.24 Location of the plots (highlighted) along Mshebi Road. Source: JICA.

Figure 5.24 above is a case of three plots under transformations within the same period of time.

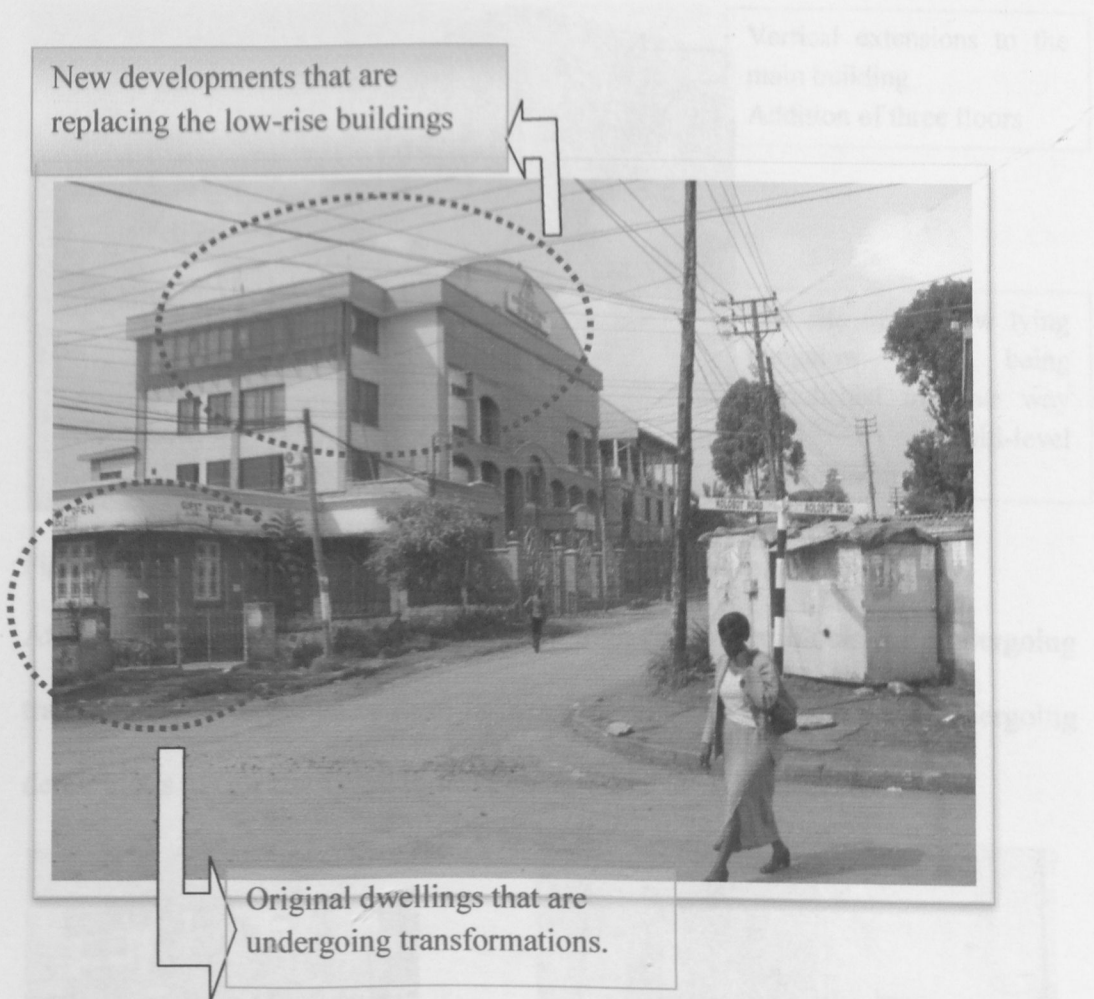


Fig. 5.25 Level of transformations on two built forms, June 2010. Source: Author.

As at June 2010, the low lying house had been changed to a guest house which was later closed and left idle. The high rise office building looked complete and had no signs of future expansion. The images hereafter (figure 5.26) show the situation after one year (June 2011) with the building under transformation, vertical extension of three floors.



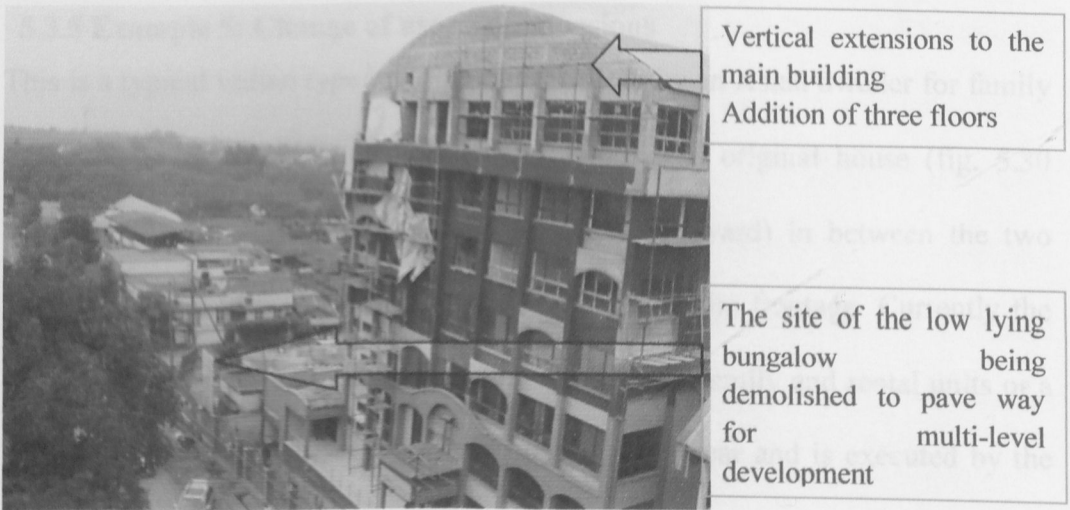


Fig. 5.26 The plots under transformations in June 2011. Source: author

At the time of fieldwork (June 2011) the high-rise office block was undergoing transformations (addition of three floors) while the low lying house is undergoing demolitions to construct a multi level commercial development.



The two plots before the transformations (June 2010)



The office building has three extra floors (October 2011)

Fig. 5.27 Two plots during the transformation process. Source: Author.

Images in figure 5.27 above showing the two plots discussed above before and after transformations, the guest house has been demolished for new development while the office building has three extra floors.

### 5.3.5 Example 5: Change of use and Extensions

This is a typical Indian type building built in 1929 by an Asian dweller for family living. It is undergoing gradual transformations; the original house (fig. 5.30 below) is a courtyard type enclosing a space (courtyard) in between the two wings. The rear is a larger open space compared to the frontage. Currently the owner is transforming the house to accommodate the family and rental units or a guest house. The extension is a new building at the rear and is executed by the new owner. This is a case of a built form under transformations through horizontal extensions and change of use.



Fig. 5.28 Location plan for the plot (highlighted) along Kolobot Road. Source: adapted from JICA





Fig. 5.30: Front facade of the 1929 Indian type dwelling house undergoing gradual transformations both at house level and plot level, extension at the rear. Source: author



Fig. 5.31 The extension to the house at the edge of the courtyard makes it a multi-dwelling facility or guest house. Source: Author



Fig. 5.32 An aerial view of the extension at the rear (brightly coloured roof). Source: Author.



## **5.4 ASPECTS OF TRANSFORMATIONS IN NGARA AREA**

### **5.4.1 Morphological aspects of the transformations**

- Change of building typologies from low rise to high-rise, change from residential to office buildings, hotels and mixed used developments. There is also change in walling materials from stone to glass.
- Closure of circulation routes especially service lanes in order to increase security and create defensible spaces.
- Superficial transformations to the built forms' fabric, such as alterations and extensions to change from one family dwelling to rental units, change of use, amalgamation of plots for larger developments and change from low rise to multi level developments.

### **5.4.2 Functional aspects of the transformations**

The change of use from one family dwelling to hostels and guest houses, development of hotels, office buildings and mixed use developments in the area is a characteristic change in functional aspects of the area. Most of the alterations and extensions are done without consulting the professionals but are done by builders engaged by the property owners.

### 5.4.3 Typological aspects of the transformations

- A complex mix of the old low lying building type and the new vertically sprawling multistory building type as the area is gradually changing from low rise to high rise developments.



Fig. 5.33 Morphology of Ngara area as defined by the transformations. Source: Author.

The originally planned and developed Ngara area of low rise residential typologies is transforming to mixed use neighbourhood of varied typologies of mixed low and high rise developments as depicted in this image.

## **6.0 CHAPTER SIX: SUMMARY OF FINDINGS, CONCLUSIONS AND**

### **RECOMMENDATIONS**

This chapter puts together in summary form the transformations in Ngara area as found out on field work and analysis in chapter five. Summarized and detailed discussion of transformations is undertaken, conclusions are drawn from the discussion and the recommendations made from the conclusions.

#### **6.1 SUMMARY OF FINDINGS**

This section provides the answers to the research questions that the author set out to investigate, the research questions are:

- a) What are the morphological, spatial and built forms (typological) transformations taking place in Ngara?
- b) How does the transformation of the built forms take place in Ngara area?
- c) What are the reasons for transformations, forces behind transformations and who are the transformers?
- d) What are the results (impacts and benefits) of transformation of urban built forms?

The questions have been answered hereafter in their respective order.

Figure 6.1 presents a detailed and illustrated summary of the findings of the study.



**SUMMARY OF TRANSFORMATIONS**



**5 TOTAL CONVERSION:** Formerly a residential house remodelled to accommodate a restaurant and a pub in the first two levels and hotel rooms on the upper levels.



**6 RESIDENTIAL FLATS:** original dwellings being replaced by multi-level flats (3-bedroomed apartments) on this plot along Kipkabus road



**7 OFFICES:** KenGen Plaza along Kolobot road, a clear transformation from residential to office developments



**8 CHANGE OF USE:** conversion of residential to hostels  
● Informal Kiosks encroaching into the main roads



**9 DEMOLITIONS AND RECONSTRUCTION:** Demolishing residential dwellings for High-Rise flats

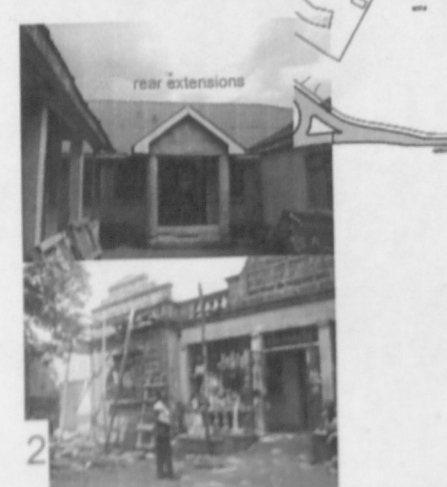


**4 Typical Ngara area residential dwellings that are undergoing transformations; this built form has since been demolished, a multi-level office block being put up**

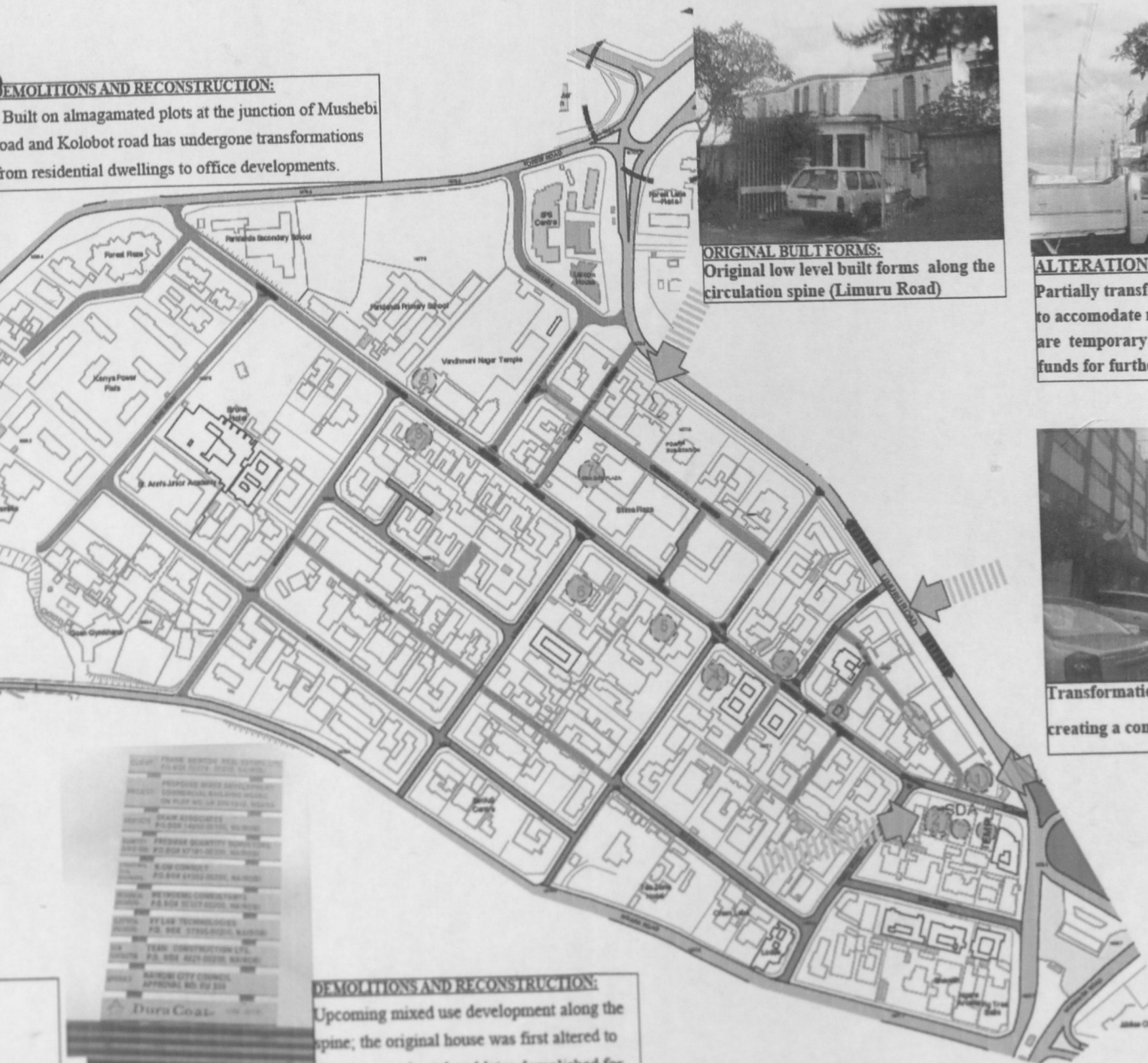
**DEMOLITIONS AND RECONSTRUCTION:** Built on amalgamated plots at the junction of Mushebi road and Kolobot road has undergone transformations from residential dwellings to office developments.



**3 CHANGE OF USE:** Residential houses have been converted to hostels



**2 ALTERATIONS & EXTENSIONS:** This 1929 building is undergoing gradual transformations: - extensions at the rear to get more space for owner-living and rental rooms in the old house - partitioning of the existing house for rental - change of use: -currently used for storage of street market products - later to be changed from one user to rental housing or a guest house



**ORIGINAL BUILT FORMS:** Original low level built forms along the circulation spine (Limuru Road)



**ALTERATIONS & EXTENSIONS:** Partially transformed house along the spine to accommodate retail outlets. Such alterations are temporary to allow the owners raise funds for further transformations



Informal activities and developments taking advantage of uncontrolled transformations to encroach to the main passages



Transformations along Limuru Road creating a commercial edge of the area



Tremendous Transformations resulting in Retail outlets along the circulation spine (Limuru road)

**CHALLENGES/PROBLEMS/EFFECTS OF URBAN TRANSFORMATIONS**

- 1. URBAN SPRAWL:** Uncontrolled Encroachment/development of unplanned and informal structures within the area and along access Lanes
- 2. CONGESTION:** Both traffic and spatial congestion is being experienced in this area as the population is growing against constant resources and facilities causing strain on infrastructure. Traffic congestion, burst sewer lines are exhibit for pressure caused by the transformations. Lack of common open space in the area is a concern of spatial intervention, the encroachment of retail outlets calls for sustainable approach towards containing this aspect of transformations.

**1 DEMOLITIONS AND RECONSTRUCTION:** Upcoming mixed use development along the spine; the original house was first altered to function as a hostel and later demolished for multi level mixed use development.

Fig. 6.1 detailed summary of transformations in Ngara area. Source: field survey, 2011.



### **6.1.1 Change of use or transformation by slight adjustment**

This is the transformation by functional change rather than the physical change of the spaces inside. It has been widely practiced with change of use from single family dwellings to hostels and guest houses. This has provided the owners with more income from the same premises.

### **6.1.2 Alterations and extensions to existing built forms**

This is additions (vertical and horizontal) and divisions of the existing built forms to increase the number of rooms in the house to satisfy the needs of the dwellers as well as the owners who sublet their houses.

Moreover, most additions are done when the built forms are acquired by new owners and are followed by change of use and introduction of new activities like commercial facilities.

### **6.1.3 Total conversion of built forms**

This is the type of transformation where the built forms have been totally converted through alterations and additions to perform different functions from the originally designed functions, for instance, the conversion of residential dwellings to restaurants, night clubs and retail outlets.

#### **6.1.4 Demolitions and Reconstruction**

Due to change in technology, availability of materials and need for increased earnings the land owners are demolishing the low rise built forms for erection of multi storey built forms to increase rental income from the plots. The new built forms are varied in terms of typology and functions depending on the landlords.

#### **6.1.5 Reasons for Transformations**

Alterations or transformations are done to dwelling units to increase accommodation capacity of the built forms for home residence, commercial use, for rental residential purposes and for rental commercial purposes.

##### **Socio-economic reasons**

Social reasons for transformations include land owner's desire to own houses, a dweller's desire to become a landlord/lady and greed for money from landlords. The plot owners argue that there is "enough" space in the front and back and there is no limit for vertical extensions, so most of them find it logical to alter either front or back or both sides of the dwelling unit leading to varied extensions of the built forms.

Economic reasons or the desire to reap maximum benefits from the plot is another reason pushing the plot owners to redevelop their plots as one landlord told me that the small house cannot accommodate many tenants and he wanted to rent as many units as possible.

Availability of credit facilities from local commercial banks (upon production of land title deed) is facilitating the transformations of the built forms.

### **Physical and Design-related reasons**

Plots with large open space cause the owners and dwellers think that the space is too large and can gain more economic value if they increased the size of the buildings. Open public spaces and road reserves are viewed as idle land and are vulnerable spaces, this has happened along Kolobot, Kienjeku and Tiwi Streets that have been converted to street markets. Since the transformers don't own the open spaces, they only put up temporary structures.

### **Institutional Reasons**

Institutional reasons include rigidity of the urban authority by-laws which are not accommodative to emerging and pertinent issues with regard to neighborhood management and livelihood pursuit.

Other institutional factors are high levels of corruption and inadequate capacity within the urban councils' development control departments such that they do not fully investigate the impacts and requirements of the increased developments.

The policies of decentralization are making the periphery a crucial zone for redevelopment, Ngara area is affected by this condition.

### **Socio-Economic Impacts**

Socio-economic factors have pushed the land owners to transform their built forms in search for higher earnings from their land.

The sprawling of commercial activities (formal and informal) along the main road is highly affecting traffic flows in the area, and quality of the open spaces and

## **6.1.6 Impacts of the Transformations and the Resultant Features**

### **Physical Impacts: Pressure on existing infrastructure**

The existing 9-metre wide roads are forced to bear high capacity heavy commercial vehicles supplying building materials and servicing the emerging developments leaving the roads in a deplorable conditions and state of disrepair.

The office and commercial developments have led to influx of people into the area leading to traffic congestions.

The developments are emerging against unchanging sewerage, water and storm water drainage leading to overload since they have not been designed to support the extra population.

- Natural surveillance could be improved as the people on the upper levels of the emerging buildings have direct views into the compounds of the low lying buildings.
- Densification is inevitable, Ngara area is transforming to a high density neighbourhood of mixed commercial and residential high-rise developments.

### **Socio-Economic Impacts**

Socio-economic factors have pushed the land owners to transform their built forms in search for higher earnings from their land.

The sprawling of commercial activities (formal and informal) along the main road is highly affecting traffic flows in the area, and quality of the open spaces and



pedestrian movements. Socially the residents are affected by the informal street markets outside their dwellings which are affecting their social life.

- Economic reasons; transformations result in increased wages from rents and working space, the transformers reported that there was increased demand for housing, commercial and office space in the area as many tenants sought space out the central business district.
- Personal privacy of the remaining low lying buildings seems to be compromised as the occupants in the upper levels of the emerging developments are in full view of the public in the compounds of the low lying buildings.

### **Socio-Cultural Impacts**

Ngara area was planned and developed for the Asian community with low rise built form typologies depicting the cultural values of the Asians. The cultural identity was evident on the articulation of the entrances, decoration on doors, balconies and the courtyard spaces enclosed by the built forms. The current transformations are not conservative of the cultural identity and the architectural typologies of the original dwellings. Emerging built forms depict modern developments using glass and curtain walling that resemble the character of the central business district.

### **Environmental Impacts**

Reduction in plot size, increase in plot ratio and ground coverage has reduced the quality of spaces especially the reduction in the amount of open spaces has caused

restriction in day-lighting and ventilation of many emerging built forms. The emerging hotel developments have their rooms lit from enclosed light wells which admit inadequate amounts of day-light leading to heavy use of artificial lighting. This reduces the quality of spaces and increases energy consumptions of the built forms. Artificial ventilation as shown by air-conditioning equipment installed in the multi-storey built forms results in emissions of carbon dioxide to the atmosphere which pollutes the environment.

The transformations are taking place within unchanging facilities such as solid waste management; the increase in population against constant facilities is causing strain on the environment, uncollected garbage was found on some sections of the area.

The increase in built up area means reduction in the open space and subsequence reduction on the amount of vegetative cover on the ground, trees have been cut in most plots to pave way for larger buildings hence adversely affecting the microclimate of the area.

### **Transformations is a Process**

Most case studies have shown that transformations in Ngara area take place through phased developments and through certain steps of development;

Change of use —→ Extensions and Alterations —→ Demolitions

The process of transformations observed in Ngara area is an incremental development process starting with change of use, alteration and extensions followed by demolitions for multi level built forms.

## 6.2 CONCLUSIONS

The main objective of this study was to explore and document morphological, spatial and built forms (typological) transformations taking place Ngara area of Nairobi.

Two levels of transformations were documented, namely, morphological and typological transformations.

The results of transformations at morphological level are explained below while typological transformations are given in table 6.1.

### 6.2.1 Morphological transformations

Ngara area is dramatically transforming from a largely low lying single storey building fabric to an increasingly dense collection of multi-storey buildings developing within a tight and unchanging plot and street structure.

- **Gradual transformations** – this involves alterations on the existing houses changing the layout and adding spaces horizontally or vertically. Transformation is a process, the owners start with extensions, alterations and change of use in order to raise capital for construction of the required high-rise development.
- **Tremendous spatial and morphological changes** – mostly evidenced by demolition of existing buildings and replacing them with high-rise developments with different functions and character.

The transformations in Ngara area are not coordinated and are a result of private investments, therefore, bear no similarity between one plot and any other, it is a

matter of private interventions since the local authorities are not concerned with conservation or planning but the existing city by-laws; the authorities grant change of use for such constructions works.

The study has found out that the plot structure has not changed but the building heights have changed to heights that, according to the scheme, demanded bigger plots leading to amalgamation of some plots.

As a result there is a mixture of functionality of buildings all through the area, causing a mixed use neighbourhood. All the developments are commercial oriented with Limuru road leading in transformations and commercial activities.

Recent transformations have transformed Limuru road into a commercial edge characterized by high-rise buildings while the interior of Ngara area still has the original low-rise residential buildings which are undergoing transformations.

Limuru road is transforming into fully commercial front with hotels, shops, offices and mixed use developments all opening into the road. The buildings that have not undergone typological transformations along Limuru road have undergone change of use from one-family dwelling to commercial premises. With little extensions and alterations they have been converted to shops, restaurants and guest houses.

The sections along Kolobot and Ngara roads are transforming to mixed use neighborhood with multi-functional built forms encompassing hotels, offices, residential flats and commercial outlets.



The inner sections (Kipkabus, Munae, Chemilil and Keiyo Roads) are transforming to residential neighbourhood while the outer sections are commercializing at the edges enclosing a residential neighbourhood in the middle.

### 6.2.2 Typological Transformations

Table 6.1 below shows the results of typological transformations of built forms in Ngara area.

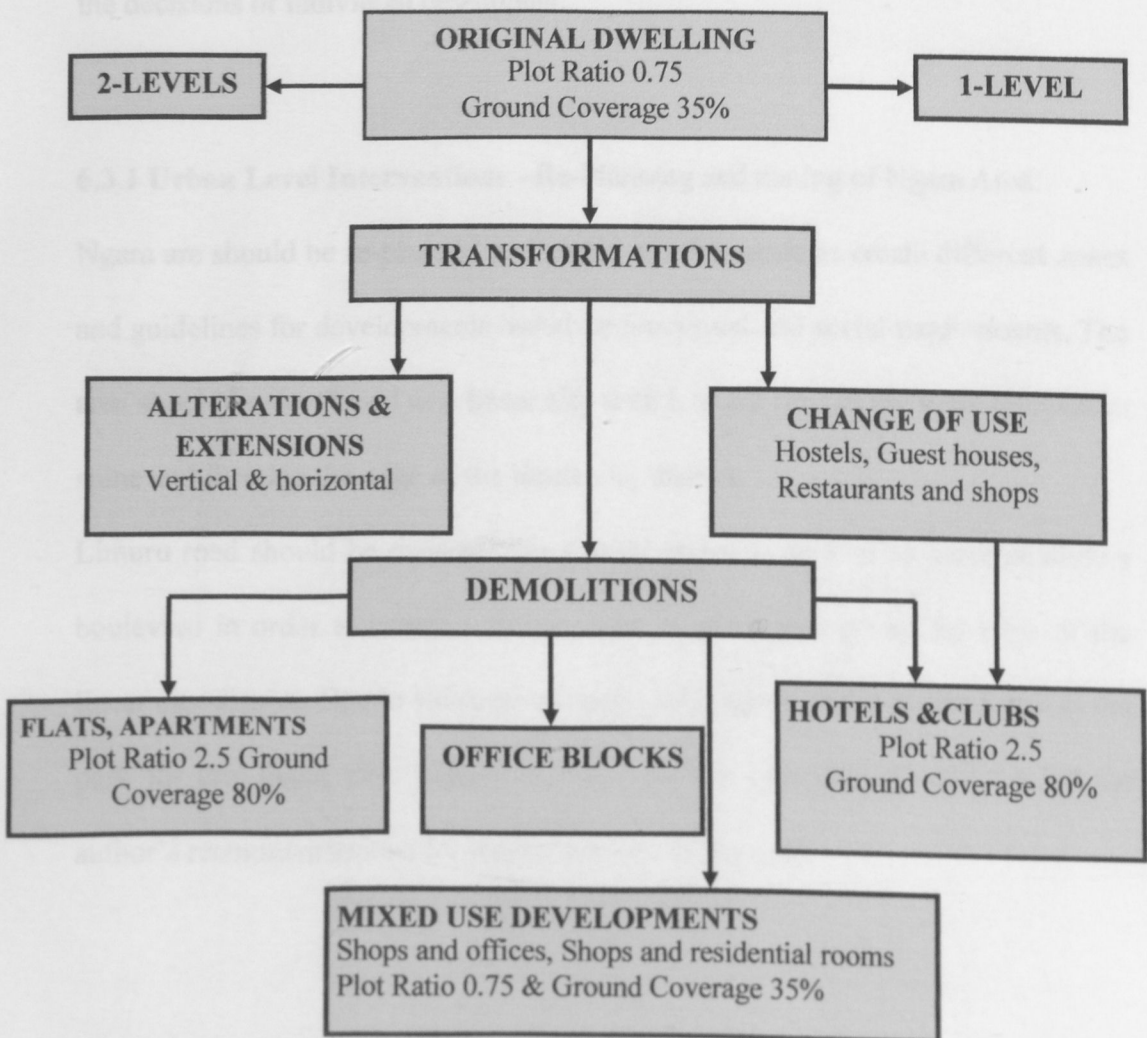


Table 6.1 Types of transformations and the processes. Source: author's own construct.

## 6.3 RECOMMENDATIONS

Cities have grown through transformations of the existing structure; Nairobi city is no exception and has transformed from a railway town to a business hub in East Africa. Therefore, transformations is a way of developing a city through readjustments of its peripheral zones as it is happening in Ngara area. The author views that transformations are inevitable and unstoppable in this area but they must be coordinated by the city planning authorities and not left to be guided by the decisions of individual developers.

### 6.3.1 Urban Level Interventions - Re-Planning and zoning of Ngara Area

Ngara area should be re-planned and zoned at urban scale to create different zones and guidelines for developments based on functional and social requirements. The area should be developed as a linear city with Limuru road as the main circulation spine and forming the edge of the linear city district.

Limuru road should be expanded to a thirty meter wide road to accommodate a boulevard in order to create a strong sense of place and act as the edge of the linear city district. Due to shortage of open public space, the boulevard acts as the park for this linear city. Figures 6.2 and 6.3 are graphical presentation of the author's recommendations for redevelopment of the road.

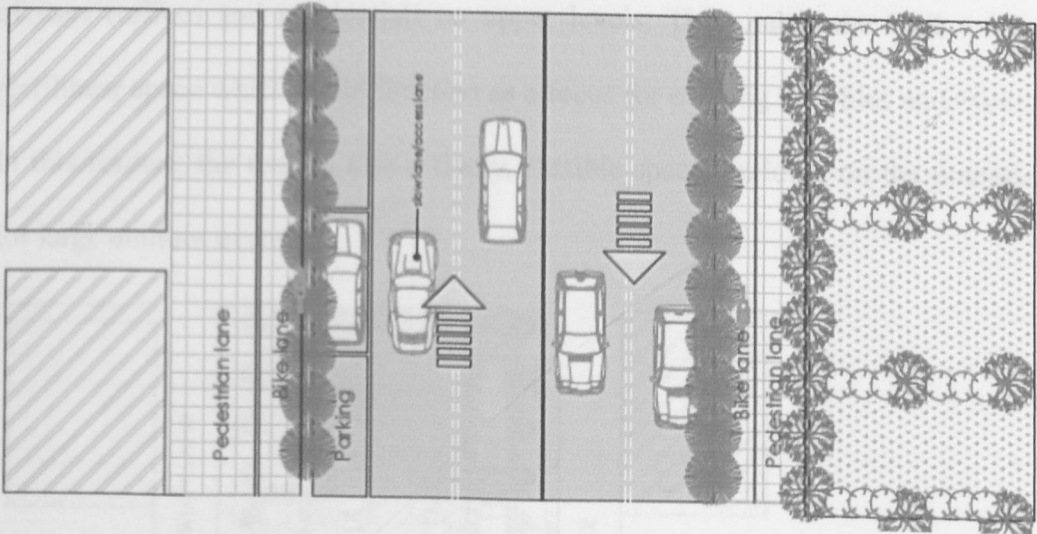


Fig.6.2 Layout for expansion and redevelopment of Limuru road. Source: Author

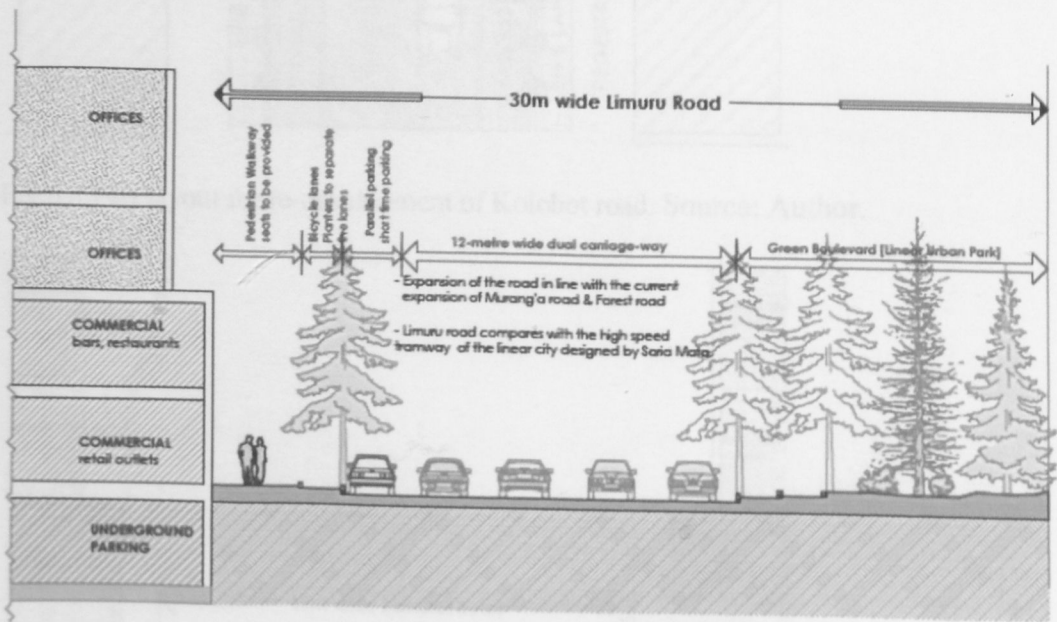


Fig.6.3 Cross section of Limuru road showing the recommended building heights and street character. Source: Author.

Kolobot road should be expanded to eighteen metres wide and create a commercial front opening to the road. The scale of buildings along these two streets should both contain and enhance the character as shown on figure 6.4 and 6.5 of the street providing active uses (retail outlets) at ground floor and a range

of uses (offices and residential) on upper levels. This makes the road a long rectilinear space which could function as a focus for evening activities and events. In this respect, the road is also a lively, flexible space, building on the potential for large outdoor events.

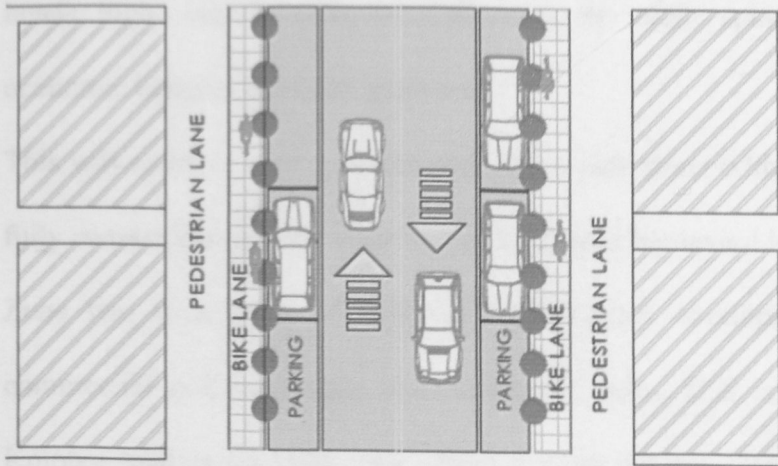


Fig.6.4 Part layout for re-development of Kolobot road. Source: Author.

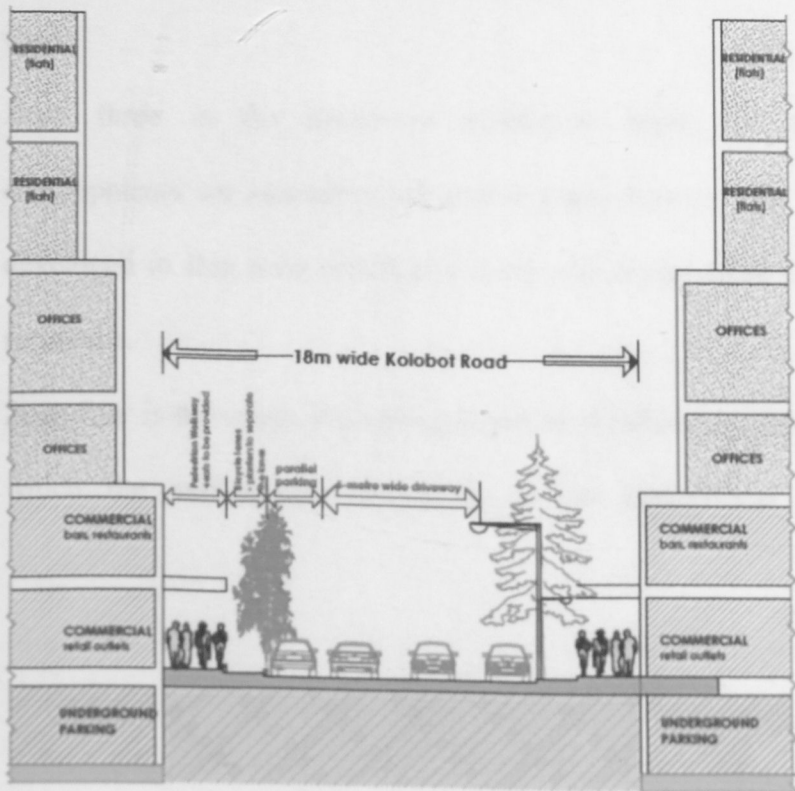


Fig.6.5 Cross-section of the recommended Kolobot road. Source: Author.



Ngara area should be zoned into four distinct zones as shown in figure 6.5;

Zone one is a commercial layer of retail outlets and offices, this is the area enclosed by Limuru road, Kolobot road and Oshwal road and extends along Murang'a to cover the entire Ngara road. This is a high-rise zone, up to four levels high, mainly with orientation to the main spine tapping maximum economic benefits from the spine road.

This will result in both a commercial and a park street with one edge of the road fully commercial and the other which carries the boulevard is a park.

Zone two is a layer of 6-10 level mixed-use developments comprising of commercial outlets, offices and residential units. This is the inner zone with Kolobot road as the main spine which divides the area into two parts; the author recommends a maximum of 6 levels east of Kolobot road and 10 levels to the west.

Zone three is the innermost residential layer; all high-rise residential developments are recommended in this zone, flats up to 6 levels of flats to be developed in this zone which is a quiet and serene conducive environment for residence.

Zone four is the urban edge along forest road defined by institutional built forms which the author recommends to be an institutional zone for academic

institutions.

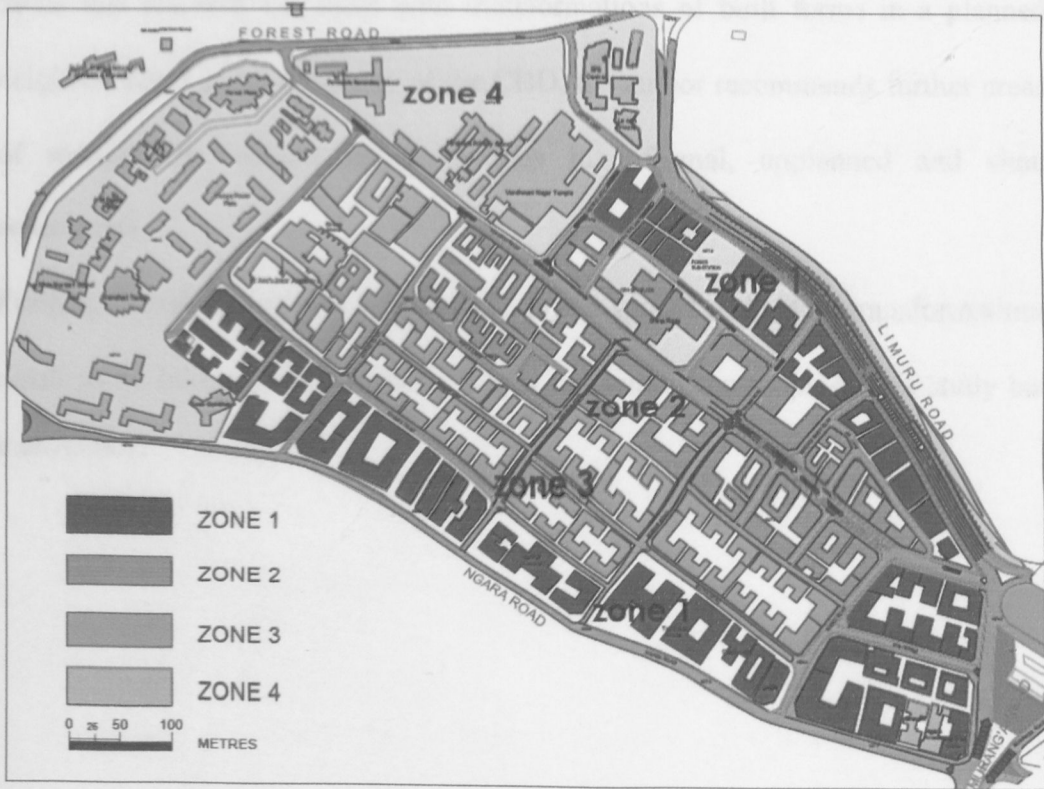


Fig. 6.6 Recommended zoning for Ngara area. Source: adapted from JICA maps

### 6.3.2 Typological Interventions

The challenge of transformations at typological level can be addressed through the architects and urban planners to develop and implement systems that are adaptable to the changing socio-economic and spatial requirements of the area. The typology design should put into consideration the rapid urbanization rate which has led to rise in demand for residential and commercial spaces. The design of the typology should also put into consideration the architectural concepts as originally planned and advocate for conservation of the original typologies.

### 6.3.5 Further Areas of Research

Since this research has dealt with transformations of built forms in a planned neighbourhood at the periphery of the CBD, the author recommends further areas of research to include transformations in informal, unplanned and slum settlements.

Further, the relationship of city growth, urban sprawl and urban transformations needs to be investigated further as it was not within the scope of this study but interrelated.

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