

INTERIORIZING INFORMALITY

Resituating Adaptable Mixed-Use Housing within its Urban Vernacular.
Kambi Moto, Nairobi Kenya.

KATHLEEN KWEKWE KIVUTHA

A Practicum Submitted to Faculty of Graduate Studies in Partial Fulfillment of the Requirements of
the Degree of

MASTER OF INTERIOR DESIGN

Department of Interior Design
Faculty of Architecture
University of Manitoba
Winnipeg, Manitoba

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K. KWEKWE KIVUTHA



For Nazi and Kivutha

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ABSTRACT

My Interior Design practicum is an inquiry about the nature of urban informality through the study of present and emerging urban vernaculars within Kambi Moto, an informal area in Nairobi Kenya. I argue that unique vernacular characteristics manifest in everyday living and can be captured through the experience and knowledge of self-builders, entrepreneurs and dwellers within informal settlements. An understanding of these vernacular characteristics is instrumental in the designing of meaningful and effective social housing prototypes.

The main methods used to document vernacular characteristics include, post occupancy evaluations (POEs), time diaries, photographs and observation. Within an interior design context, these tools helped describe the spatial needs, wants and desires of the everyday dwellers of Kambi Moto.

The four resulting compact housing configurations support one-to-ten member households with provisions for a home-based business (HBB) or a rental unit. All units have an adaptable rooftop with a garden.

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PROJECT OVERVIEW

Through the design process, I am inquiring about the nature of informality to understand how urban vernacularism has and can further inform the design of adaptable mixed-use housing prototypes within informal settlements. Specifically, my intent is to begin to understand how everyday social and spatial languages of dwellers, entrepreneurs and self-builders create and sustain their living environments. I aim to integrate this knowledge and these experiences with my interior design expertise in developing four mixed-use housing prototypes that will enhance the social and spatial well-being of individuals and communities living within these informal settlements.

The site of this project is Cecilia Court in Kambi Moto: an urban informal settlement in Huruma, located northeast within Nairobi province in Kenya, and just a stone's throw away from the city centre. I have chosen this site because of the successful existing community federations like *Pamoja* Trust, a Non-governmental Organization (NGO), and Muungano wa Vijiji, a community-based organization (CBO), who together with the City of Nairobi and other partners are currently working on upgrading their informal settlement. This federation continues to effectively create and maintain a program whose main premises are to enable the self-builder and dwellers within the area to improve their individual and community well-being through the creation and maintenance of affordable housing.

Fig.1. Main Entrance to *Kambi Moto's* Cecilia Court.
Image by Author.



My research is geared towards an exploration of some of the dynamic processes of living, working and building in informal communities. Some of these processes include the daily routines and interior experiences of the residents of these informal settlements, local building history and technologies, the everyday business transactions of entrepreneurs, and emerging urban vernaculars within these communities. This research is significant because

it begins to strategically translate the deceptively latent knowledge present within these informal communities into information that can greatly influence the design of any adaptable mixed-use housing project in informal areas. This knowledge allows for a more integrated approach towards the planning, design and construction process.

Ananya Roy (2004), a Associate Professor in the department of City and Regional Planning at the University of California, realizes the challenges of dealing with informality within majority world countries, but she equally stresses the importance of reorienting production theory and policy in these countries. These theories, coupled with the personal and communal experiences and knowledge of the informal community members create an important body of knowledge from which interior designers can draw to better inform planning and design processes.

The objectives of this project are:

- to design mixed-use housing prototypes that are adaptable and informed by both the lived experiences of the inhabitants, entrepreneurs and self-builders, as well as the expertise of the interior designer;
- to design housing that supports present social and economic vernacular structures where rental options, home-based businesses, gardening and animal keeping are everyday practices that supplement or sustain livelihood; and
- to design compact housing that goes beyond providing shelter for its users, to improve the psychological and social well-being of the inhabitants and their community.

My research questions are as follows:

- How can an interior designer collect information that is indicative of the present and emerging urban vernaculars in informal settlements like Kambi Moto Nairobi Kenya?

- What are some of these present and emerging vernaculars?
- How can an interior designer interpret and synthesize the above information to effectively design adaptable housing prototypes for Kambi Moto informal settlement?

The biases and limitations experienced in this project include the proximity to site. It has been difficult to coordinate the collection of information because of the physical distance between the site location, Kenya, and my residential location, Canada. It was easier to collect both primary and secondary information when I was researching in Kenya but it became challenging to coordinate the collection of information after my departure.

The primary and secondary research information collected to model the clients and their experiences is barely substantial to model the true characteristics of the client. It would require much more time to collect useful data of daily routines and rituals of different households, in order to begin to analyze meaningful and effective patterns. That said, this project is an honest beginning at modeling the vernacular, which is the everyday details that shape lived experiences.

For the purpose of this inquiry, 'self-built' refers to the participation of the users in the planning, designing or construction and maintenance of both the interior and exterior of their homes (Fitcher & Turner, 1972). The self-built represents a growing participatory model where the dwellers of the home become influential in the planning, design and construction of their homes. No longer are the inhabitants of the houses viewed as a passive group who only inhabit the dwelling. This model allows designers to act as enablers where their design expertise complements the lived experiences and pragmatic skills and experiences of the self-builder who is also a dweller.

I will utilize the term 'Majority World' in preference to largely inaccurate,

Fig. 2. Member's of the Kambi Moto Community & Pamoja Trust. Image by Author (next page)



and non-descriptive terms such as 'Developing Countries', 'Third World', 'Least Developed Countries (LDC)' and 'the South/ Global South' (Appropedia, 2010). These terms describe these countries by what is thought to be 'lacking' rather than what these countries 'are'. The term Majority World brings to light the fact that these countries are home to the majority of humankind. The term was conceived by photographer Shaidul Alam who, like many, was perturbed by the negative connotations that arise from the use of popular terms that continue to portray poor communities as perpetually lacking in all aspects of life.

In addition, terms like 'developing' or 'least developed' result in a simplified understanding of development, which becomes indicated only by economic wealth and ignores other indicators like social, psychological, cultural and environmental wealth. According to the United Nations Development Program (UNDP, 2008), 'development' is about expanding choices so that people can lead lives that they value. The UNDP further

identifies three essential indicators of human development. These are living long and healthy lives, being knowledgeable and having a decent standard of living. The goals of development also include political, economical and social opportunities for being creative and productive in order to enjoy self-respect, empowerment and a sense of belonging to a community (UNDP, 2008).

For this inquiry, I will use John Turner's definition of development. According to Fitcher and Turner (1972) development is a composite of two independent variables namely "quantity" and "quality". Both quantitative scarcity and quantitative excess prevent the occurrence of an acceptable quality of life. While development in a poor country may require a quantitative increase in general consumptions, it may demand a reverse in wealthier countries. Within this definition, there is the recognition that development is not singularly a derivative of economic wealth and that development is possible through social, cultural, or technological avenues in the midst of economic hardships.

Jua Kali refers to the culture of informality or non-formality in Kenya. The term 'informal' was coined by Keith Hart (1973) in his article on informal income opportunities in Ghana, while the 1972 International Labor Organization (ILO) report on employment and poverty in Kenya was the starting point of the forthcoming reputation of the 'informal sector' (Sindzingre, 2006). According to the Government of Kenya (GOK),

The informal sector, locally referred to as Jua Kali, covers all semi-organized and unregulated activities largely undertaken by the self-employed or those who employ a few workers. This excludes all farming and pastoralist activities. Informal sector activities are carried out by artisans, traders and other operators under a variety of work sites such as temporary structures, markets, both developed and undeveloped plots, residential premises or street pavements...its main legal feature is that the businesses are not registered with the Registrar of Companies. Further, operators of the informal sector may or may not have licenses from relevant authorities for carrying out businesses.

(GOK, 1998, pg. 65).

Informal settlements are usually referred to as 'slums', 'shantytowns' or 'squatter settlements'. These settlements are sometimes illegal or unauthorized, built mostly on the periphery of cities, and are where a majority of the inhabitants live. The dwellings, usually constructed of scrap materials, are deemed substandard as a result of poor sanitation, infrastructure and illegal building practices.

This document is broken down as follows: Chapter One includes a project overview, site analysis and an explanation of the research methodology used in this study. Some of the topics explored in the site analysis include contextual issues, building analysis, zoning, climate and weather patterns, vegetation, soil and drainage. The research methodology included both quantitative and qualitative primary and secondary research. The main methods of collecting primary information include: photography, post occupancy evaluations (POE), time diaries and personal observation. This chapter also explains the different analysis and synthesis methods used to interpret the data collected.

Chapter Two is a literature review and theoretical analysis of two fundamental concepts related to this inquiry- namely, informality and vernacularism within an urban context. This chapter defines, deconstructs, then reconstructs contemporary notions of informality. Definitions of informality are explored and then dismantled to display the binary oppositions that cloud the present day understanding of informality. The concept is then resituated in an understanding of informality as a mode of operation.

The concept of vernacularism is investigated as a dynamic entity characteristic of informality. As in the previous case, vernacularism is defined, deconstructed and reconstructed to unveil the notion of vernacular as process. This definition allows for a more progressive understanding of vernacularism as a dynamic understanding of the present processes of the everyday lived experience.

This assertion allows for the possibility of emerging urban vernaculars as indicators of urban spatial languages. Within this resituated understanding of urban vernacularism, the knowledge and lived experiences of dwellers, entrepreneurs and self-builders become central in the design of effective mixed-use housing within these informal spaces.

The final concept of interiorizing informality weaves the previous concepts together with the intent of establishing an informal language that can be applied to draw spatial suggestions of how a contrived informal interior may conceptually manifest itself. The last half of this section utilizes the information and analysis collected from photographs, time diaries, community reports and POE's of these informal settlements, filtering these bits of information through the theoretical concepts investigated previously. Situational and context specific design characteristics emerge that guide the design stage.

Chapter Three explores the programming aspect of the inquiry that includes human factors and spatial analysis. Within the human factors analysis, the group and client profile is presented. The spatial analysis breaks down the information collected in the time diaries and POEs and represents it in the form of tables, graphs and adjacency matrixes. This chapter also examines building requirements in the areas of function, aesthetics, plumbing, electrical, lighting and mechanical requirements. Finally, a design guideline that synthesizes both the present and previous chapters is provided.

Chapter Four looks at two different areas of precedent that will inform the design of this inquiry- namely informal urban vernaculars and small-compact space design. Within informal urban vernacular, the Kambi Moto initiative was further studied to inform the reader of the project's community-led processes. Next, the architecture of Lamu, a fourteenth century Kenyan town, was also studied to shed light on past informal solutions to compact spaces within African urban areas. For compact space design, contemporary

Fig. 3. Drying shoes (Next Page). Image by Author.

urban solutions around the world were studied. These solutions to compact living were investigated. These areas have been identified as appropriate and relevant precedents for the above inquiry.

Lastly, Chapter Five presents the four proposed housing prototypes through the use of plans, sections, and perspectives. An explanation of the design and its connections with design and research objectives, theoretical concepts, programming requirements, and precedence analysis is discussed. Finally, in the conclusion, a reflection of the project is provided and list of recommendations for further study is presented.



RESEARCH METHODS

The approach used in this study is mixed methods research. I chose this methodological approach because it embodied a more multi-disciplinary approach that is in line with an evidence-based design approach where the design of the built environment is based on credible multi-disciplinary research to achieve the best possible outcomes. I also chose a mixed method approach because it is better suited to design-based research where a more integrated approach to the analyzing and synthesis of information is required. In a discipline where the pool of research information gathered rarely offers a precise fit with a project's specific context and situation, an approach to research that enables critical and creative thinking is required to develop appropriate design solutions for specific contexts and situations.

In this inquiry, I used four main methods to gather primary information, namely time diaries, post-occupancy evaluations (POEs), photography and observation. These methods allowed me to begin to understand some of the experiences of my clients that could be observed through their daily routines and rituals. These methods helped identify common latent patterns in daily routines and rituals, and shed light on my clients' perceptions, interactions, and relationships as they assumed their roles within the interiors of their homes. This approach goes beyond viewing the home as an artifact and instead "identifies the common codes of practice in the form of daily activities and routines that structure the spaces we use according to our cultural norms and practices that form the anthropology of space" (Asquith & Velinga, 2006, p. 130).

Time Diaries

Lindsay Asquith (2006) speaks of four approaches important in the methodological study of housing today. These approaches

Fig. 4. Hanging Clothes in upgraded *Kambi Moto* settlement (next page). Image by Author.



include the anthropological, social, behavioral and architectural approaches. She explains the anthropological level is the investigation of spatial and activity patterns in the home as universal to a culture. The sociological approach examines the spatial and activity patterns as shared by a group, community or household in the form of daily routines and rituals. The behavioral approach looks at the individual spatial behavior as determined by culture or social traits e.g. age and gender. Finally, she describes the architectural approach as the influence of a spatial type on space use. The importance of perceptions, interactions, relationships and identities of the individuals and groups as they occupy interior space is central to the illustration of a vernacular language that can guide design solutions in a specific context and situation.

In my project, quantitative information was collected through the use of time diaries. The time diaries allowed for the collection of data detailing how the individuals' spent their time in their homes. The time diaries (appendix A) included a record of activities performed, rooms within which they were performed, when these activities began and when they ended and with whom they are performed. These daily activities within the household can become understood as temporal motifs of the vernacular processes and becomes important in understanding a collage of emerging and present vernaculars within complex environments.

In this inquiry, each member of the households completed time diaries for one weekday and one weekend day. The information collected was analyzed to explore relationships between activities and their durations, activities and the time of day they are performed, and activities and the different room used to perform them. This information was also gender coded, to begin to understand gender relationships with respect to activity performance and room use within these households. It should be noted that the two days worth of time diary information were not sufficient to fully understanding daily patterns of the different household members, but for the purpose of this design based inquiry,

it is an honest beginning at understanding the processes of vernacular within these informal spaces and how these processes can affect and inform formal design processes.

Post Occupancy Evaluations (POE)

One of the main methods used in collecting qualitative research was POEs. POEs involve a systematic evaluation of the opinion about building use from the angle of the users. POEs assess how successful buildings match users' needs, and identifies ways to “improve building design, performance and fitness of purpose” (Watson, n.d.). Open-ended interview questions were used in the POE of the present homes in Kambi Moto's Cecilia Court. This method was chosen because it allowed the respondents to include more information, which included their feelings, attitudes and understanding of the subject matter. This also gave me the opportunity to connect more with the respondents in order to access their true feelings on the issues presented.

The POEs were based on the stay at their current self-built homes after recently moving from the previous one-roomed houses within the same settlement. The interview questions (Appendix B) addressed a number of topics that aimed at beginning to understand the lived experience of the urban informal dwellers within their environment. First, the questions were designed to identify the different users of these homes, their needs and the activities that went on within the interior environments. Questions concerning the utilities and the maintenance of the interior spaces were included to shed light on the functional processes with the house. The POEs also included questions on the users' desired qualities. These questions began to gauge user's satisfaction within their homes in areas that included thermal comfort, air quality, security, and style. Questions concerning communal space usage, and maintenance were asked to evaluate community interaction. Interviewees were probed about their knowledge in construction techniques and material preference.

Lastly, the interviewees were asked questions concerning the communal collaborative building approach and how it affected their lives. These questions were aimed at determining whether the communal collaborative self-build approach was successful in their eyes.

Two facilitators of the Cecilia Court Project were interviewed as well. This included the architect and the project manager. The open-ended questions were designed to inquire about the details of participatory process, major setbacks, emerging innovative materials and construction technology. A question was included to inquire about the relevance of the interior design profession within these projects.

Photo-Analysis

In this inquiry, photography was used to shed light on some cultural, social and behavioral adaptations made by dwellers upon moving into their current interior spaces. I wanted to understand why and how the dwellers of these interiors had changed and adapted their new interior spaces to make them more accommodating to their situation and context. I argue that these adaptations and changes made by the dwellers of Cecilia court are minute incarnations of a collective urban vernacular and become paramount in creating effective housing solutions that are grounded in the dwellers lived experienced.

In Susan Close's (2007) book, *Framing Identity: Social Practices of Photography in Canada (1880-1920)*, she highlights the concept of photography as a social practice. Close, an Assistant Professor of Interior Design at the University of Manitoba, emphasizes the importance of photography's use as a tool rather than as an art form. In light of an understanding of photography as a social practice drawing on methods of cultural analysis, Close argues that one can read it as visual text. In this inquiry, I will use the method articulated by Susan Close in reading a photograph.

To read a photograph, one accepts that an image can be viewed as a visual text. The image must be examined closely, and a detailed analysis made of the information or signs it contains. It can then be considered in relationship to related concepts and theory. (p. xvii)

In my study, I photographed the neighborhood, site and the interior spaces of four families in Kambi Moto's Cecilia Court. This process was complemented by observation and note taking. I used panoramic photographs to maintain a visual continuity that allowed for a detailed visual narration of interior spaces and adjoining exterior spaces. The photographs taken also included exterior photographs documenting the site and other informal areas within the region. Photo analysis was employed to examine interior spaces through a process of observation, questioning, inference, and interpretation. The panoramas and other photographs were closely observed in relations to the concepts of informality, vernacularism and interiority raised within the inquiry.



Fig. 5. Susan's rooftop view. Image by Author.

Literature Review and Theoretical Analysis

The literary and theoretical analysis includes data sourced through appropriate written materials, including books, reports, journals and websites that was chosen based on their relevance to the subject matter. This analysis is significant because it provides readers with a background of current knowledge on the topic while illustrating the significance of this new study. The literary and theoretical analysis review was divided into three different sections: Informality, Vernacularism and Interiorizing Informality. I used the literature review to summarize key information within these three topics in order to synthesize and re-organize and potentially resituate the past and present information within a design context. The literary and theoretical analysis is designed to reveal and recreate connections between theoretical and design concepts enabling the design process.

Some of the notable documents that informed the site analysis as well as the literary and theoretical analysis included the Huruma Informal Settlements Survey Report (Pamoja Trust, 2001), the Community Federations and City Upgrading: The Work of Pamoja Trust and Muungano wa Vijiji (Pamoja Trust, 2004) and the Kambi Moto Project report (Mukeku, 2004). The Huruma Informal Settlements Survey Report is a planning survey report that was compiled by representatives of the Huruma informal settlements, the Nairobi City Council, the Nairobi Informal Settlements Coordination Committee and Pamoja Trust on behalf and with the agreement of the residents of Huruma. The quantitative results of this research covered areas including: land, physical planning, shelter and infrastructure, income generation, environment health and sanitation, safety and security, education, household details and the history of the settlement.

The next central document used was Community Federations and City Upgrading: The Work of Pamoja Trust and Muungano wa Vijiji (Pamoja Trust, 2004). This document was prepared by Pamoja Trust and among other

important information, it documents the housing modeling and construction process of the Cecilia Court. This is important because it provided background on the planning, design and construction process of the dwellers of Kambi Moto's Cecilia court. The Kambi Moto Project Report (Mukeni, 2004) is a document prepared by one of the architect in charge of the project, Joseph Mukeni. This document provides more design-based information that includes: design principles in urban informal settlements, local history of slum upgrading interventions, and a detail case study of the housing delivery process in Kambi Moto.

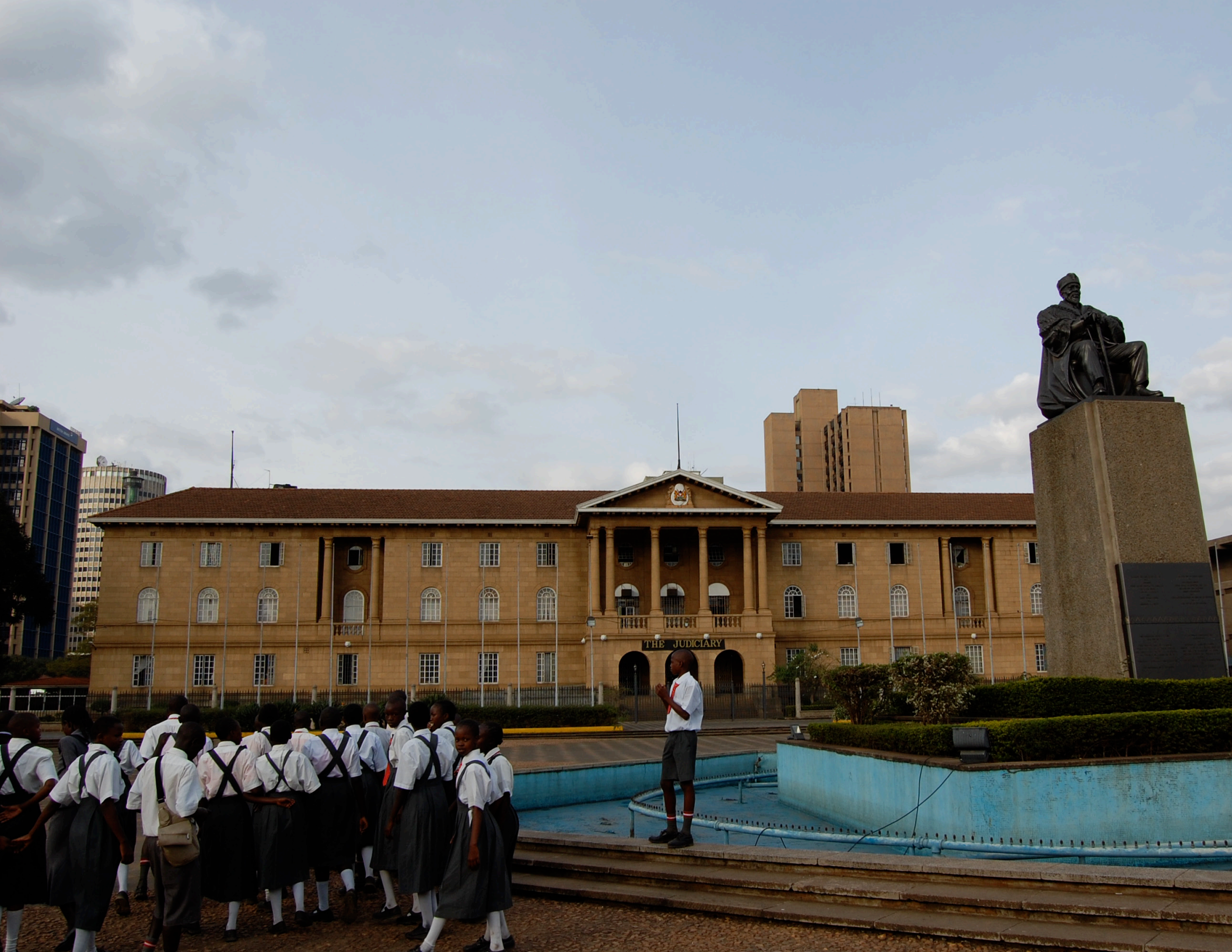
Precedent Analysis

Precedent analysis was used to study past examples of architecture that might influence the design solution. The precedent analysis looked to the 14th-century city of Lamu to explore informal urban vernacular architecture. The precedence analysis also looked to contemporary urban compact spaces to seek guidance in designing effective small spaces. Precedence of adaptable architecture around the world was also studied to conceptualize adaptable solutions related to the inquiry at hand.

Site Analysis

The site analysis included both qualitative and quantitative secondary research information aimed at understanding the informal urban settlement context through investigating the following elements: neighborhood context, history of slum intervention, location, size and zoning, natural physical features, man-made features, circulation, utilities, human and cultural context, and climate.

Fig. 6. A School trip. The Judiciary, a relic of a colonial past juxtaposed against a statue of the Mzee Jomo Kenyatta, the first black president of Kenya (next page). Image by Author.



SITE ANALYSIS

The following is a site analysis of Kambi Moto and its surrounding areas. This information was mainly gathered from The Huruma Informal Settlements Survey Report (*Pamoja* Trust, 2001), the Community Federations and City Upgrading: The Work of *Pamoja* Trust and Muungano wa Vijiji (*Pamoja* Trust, 2004) and the Kambi Moto Project report (Mukeni, 2004). This site analysis included both qualitative and quantitative secondary research information aimed at understanding the informal urban settlement context through investigating the following areas: contextual issues, the history of slum interventions, circulation, size and zoning, legal, natural physical features, utilities, sensory, and climate.



Fig 7: Panarama of *Kambi Moto* Informal settlement.
Image by Author.



Contextual Issues

Huruma informal settlements are located in the Starehe division of Nairobi, Kenya. These settlements have existed here for at least 28 years. Huruma informal settlements consists of six urban villages namely Mahira, Redeemed, Ghetto, Gitathuru, Kambi Moto, and Madoya. It covers 4.117 hectares and is situated between Outer-ring Road, Juja Road and Mathare Road. The total population of the five settlements was 6569 during the 2001 community enumeration exercise. There are 1105 tenants and 1002 structure owners in Huruma. The majority of the residents in the settlements are under the age of 18.

Huruma is adjacent to a major Army barracks and a well-known informal industrial area called Kariobangi that hosts a number of factories that manufacture products include paints, plastics, irrigation pumps, pool tables, car parts to name a few. The buildings within Kambi Moto area include residential and commercial buildings. Buildings in the bordering areas also include a military airbase and an informal industrial area. Huruma is close to the Sewage Works, a major sewage treatment facility servicing Nairobi city. Huruma is home to the biggest goat slaughtering industry in Nairobi.

Kambi Moto is home to 539 households, a population of 1241 people. The entire informal area is 0.4 hectares in size. This settlement was established



Fig. 8. Woman Preparing take-home meals
Fig. 9. Informal town centre, Ngong
Fig. 10. Home & Hardware Store, Korogocho.

All images by Author.

in 1975 as a market for vegetables and charcoal. In 1978 the population increased and the inhabitants began erecting low-cost houses to live in and rent out. On December 20th 2005, a fierce fire swept through the settlement, destroying most of the settlement. The name Kambi Moto means 'camp of fire' and was attributed to the 2005 fire as well as two other subsequent fires in 1997 and 1999.

Huruma informal settlements includes mainly residential, business and industrial areas compactly interwoven into each other. A community enumeration exercise held in 2001 identified 50 income-generating activities and categorized them into five groupings.

- Employed labor (8.6%) - waiters, slaughter house workers, bar men and women, drivers, minibus touts, office clerks, shop assistants, watchmen, domestic workers, etc.
- Casual labor (26.8%) – factory workers, construction workers
- Semi-skilled *Jua Kali* Artisans 22.7%- tailors, carpenters, cobblers, welders, mechanics and house builders
- Small business owners and hawkers (37.2%) – shops, garages, eateries, clothes stalls, hair salons and barbershops. Hawkers include roadside vegetable sellers, maize roasters, sugar cane vendors, sweet and cigarette vendors, clothes and hawkers.
- Others (4.7%) – herbalists and entertainers

There are far more self-employed residents living in the settlement than those employed in the formal sector. Over 67% of the Huruma population have lived in this area for 15 years or more, many have been born here and have no alternative rural home. Therefore, Huruma is a permanent home for most of its inhabitants. The average number of persons per household is 3.1 persons that seem to be attributed to a high incidence of single person households. Twenty-six percent of the households polled had a single occupancy while 14% of the households had 2 occupants.



The survey showed that 60% of the people working in Huruma worked outside the settlement and mainly traveled to their workplace on foot. The average monthly salary is 5000 Kenyan shillings (~71 Canadian dollars). The ratio of men to women in the settlement is almost equal. Households headed by women constitute only 19% of the total. Other households are comprised of single males, shared occupations or family homes.

Building Topology Analysis

Directly adjacent to the proposed building location are iron and mud residential structures, a school, a church, assorted formal and informal businesses, and the Huruma playground the only public amenity in the area and a handful of multi-storey residential buildings. The main materials used to build the different structures in the Kambi Moto area include stone, concrete, timber, mud, and iron sheets.

Fig. 11. Satellite image of *Huruma* Informal Settlements. Image courtesy of *Pamoja* Trust (previous page)

Fig. 12. Site Topology description. Images by Author.





Fig 13: Informal shanty housing juxtaposed against formal upgraded housing. Image by Author.

According to interviews with dwellers, stone is the preferred building material. Iron sheets and wood framing are preferable because they cost less, can be efficiently put up and dismantled and re-appropriated in a context where residents have no land tenure and can easily be evicted from their homes. The majority of the informal homes in the settlement are square or rectangular between 3.0 meters by 3.0 meters and 3.0 meters by 4.5 meters. Each house's footprint in the new Cecilia Court in Kambi Moto layout occupies roughly 20.25 square meters.

History of Slum Intervention

The current state of housing in Kenya originates from colonial times where the planning of the city was racially motivated with different zones for Africans, Asians and Europeans (Mukeku, 2004). Africans were allotted the least amount of land even though they had the highest density per hectare. After independence, this segregation continued. This time around fueled by socio-economic conditions where the most affluent people now occupied the areas previously allotted to the Europeans while the least affluent occupied the areas previously allotted to the Africans. The least affluent areas continued to exponentially increase in density due to rural-urban migration. This had serious implications because a significant amount of the incoming immigrants were arriving in the city without enough funds to rent conventional housing of any kind (Ng'ang'a, 1973). This situation resulted in the mushrooming of informal settlements.

Slum intervention within informal areas has been carried out in four different themes namely, the slum clearance and provision of public housing of the 1960s and early 1970s, site and service schemes of the 1970s, tenure and physical upgrading of the 1980s and the enabling approach of the 1990s to the present (Mukeku, 2004). The slum clearance and provision of public housing was carried out after independence to meet a short supply of adequate housing. The government of Kenya provided subsidized public

housing to ensure that every family lived in acceptable urban housing which comprised of two rooms, a separate kitchen and toilet to collectively accommodate five people (Mukeku, 2004). All houses that did not meet these standards were to be demolished. Consequently, many slum dwellers were displaced, but moved on to erect their informal dwelling elsewhere, hence multiplying informal settlements. The situation deteriorated further when the subsidized housing, intended for the low-income, was hijacked by middle-income families. This led to further gentrification (Ng'ang'a, 1973).

The sites and services schemes were mainly funded by non-governmental organizations (NGO's) like the World Bank and aimed at creating serviced plots. These serviced plots provided a basic service core comprising of kitchen and sanitation facilities upon which residents would build on gradually to attain a full house (Mukeku, 2004). These schemes were intended to benefit the low-income group by introducing the aspect of cost recovery. Here, the incremental nature of building would allow for the inhabitants to financially recuperate, hence sustaining the building process (Syagga, Mitullah & Gitau, 2001). This scheme equally did not succeed as it resulted in gentrification.

The tenure security and physical upgrading was setup to reexamine the failures of the previous schemes where the targeted group missed the benefits of the program. The main aim of this scheme was to give security of tenure to informal settlement dwellers, plan their settlement and provide physical infrastructure (Mukeku, 2004). It was envisioned that the slum dweller would then proceed to improve their homes. One main problem with this model was the lack of community participation in the initial planning of the settlements (Syagga, Mitullah, & Gitau, 2001).

The ongoing scheme is the enabling approach encouraged by international organizations and spearheaded by the World Bank. Instead of providing housing for informal settlement dwellers, the government is encouraged to

put into place structures that would enable informal settlement dwellers to upgrade their houses by themselves (Mukeni, 2004). This approach called for the need to revisit restrictive building standards, the need for security of tenure within informal settlements and from the need of more effective bureaucratic processes within the urban development and design (Mukeni, 2004).

Circulation

Kambi Moto consists of residential, commercial, institutional and industrial



Fig. 14. Districts, nodes and roads in Kambi Moto. Images by Author.

areas. Over three quarters of Huruma is accessible on foot while one quarter of the homes in Huruma are also accessible by motor vehicles. These access roads are mainly loose roads with roadside drains. Sixty percent of the working people work outside the settlement and mainly travel by foot. Others travel by public transport that includes matatus (mini-buses) and buses. Within the settlement, the main transportation of goods is by hand-carts and bicycles. Cars and trucks are usually restricted to main roads and some of the minor roads that have a larger width. The major road is surfaced with tarmac while the rest are all gravel roads.

Size and Zoning

The Nairobi City Council has agreed to set aside land at Kambi Moto to benefit the residents of these informal settlements. The land is crown land owned by the City Council but has been leased to the dwellers of Kambi Moto for 99 years. The land use currently includes residential, commercial and industrial zoning applications. In reference to setbacks and easements, this projects ground coverage is 80% compared to the standard 50%. Its plot ratio is 2.5 compared to the standard 1.5. (Mukeku, 2004). This means that the total floor area of a building can be 2.5 times the gross area of the plot on which it is constructed.

Legal

As noted above, the land that this informal area covers belongs to the Nairobi City Council and has been leased to residents of Kambi Moto for 99 years. This agreement was legalized through the signing a memorandum of understanding between the residents of Huruma, the City Council, Pamoja Trust and other concerned parties. The residents of *Huruma* are the main stakeholders and the beneficiaries of this settlement upgrading.

Natural Features

The vegetation is savannah and grassland that is predominant in the lower

regions of Eastlands, east of Nairobi city (Ikawa, 2006). Savannah is a mixture of trees and shrubs standing in tall dense perennial grass. Through direct observed and examining the satellite image of Huruma informal area, the Kambi Moto area has only a very few trees and hardly any shrubs or grasses. The soil is predominantly black cotton soil (Mukeku, 2004). Kambi Moto is flat and not prone to flooding, however, the area is poorly drained and sometimes runoff water gets into the houses. Kambi Moto is near the Nairobi River, which is extremely polluted and a major waste dump site.

Utilities

The survey conducted in 2001 by the residents of Huruma establishes that an average of two households out of every fifty had electricity (Pamoja Trust, 2001). This same survey also pointed out that Huruma settlements drew water from privately run water settlements where they were charged two Kenyan shillings for twenty liters of water (Pamoja Trust, 2001). In the telecommunications department, the survey established that the settlement did not have any public or private phone, however telephone facilities were available in the neighboring formal residential and business areas. Today almost all upgraded households in Huruma have electricity, running water and are connected to the city sewage system. The cell-phone is becoming the primary source of telecommunication within the informal areas.

Sensory

The main source of odor within Kambi Moto settlement comes from sewage overflow. Major noises include music from the neighborhood church on Sundays and public transport vehicles. Major pollutants include garbage collecting within public areas.

Climate

Although Kenya lies astride the Equator, the country's geographic features exert considerable influence on the weather patterns. Due to Nairobi's high

Fig. 15. Downtown Nairobi (next page). Image courtesy of Jeremy Moses.

altitude of 1700m, the weather is less tropical and is described as monsoonal (UNON, n.d.). There are four distinct seasons: warm-dry in January to late March, long rains from late March to early June, cool-dry from mid-June to early October, and short rains from mid-October to mid-December (UNON, 2010).

Temperatures in Nairobi on average remain between 18-28 degrees centigrade and may reach 10 degrees centigrade during the cool dry season. Humidity is higher during the day, running between 70-90% but drops to around 40-55% in the night. The sun rises in the east around 6.00-7.00 am and sets in the west around 6.30-7.00 pm depending on the month. The prevailing winds (monsoon winds) blow southeast and northeast (UNON, 2010).





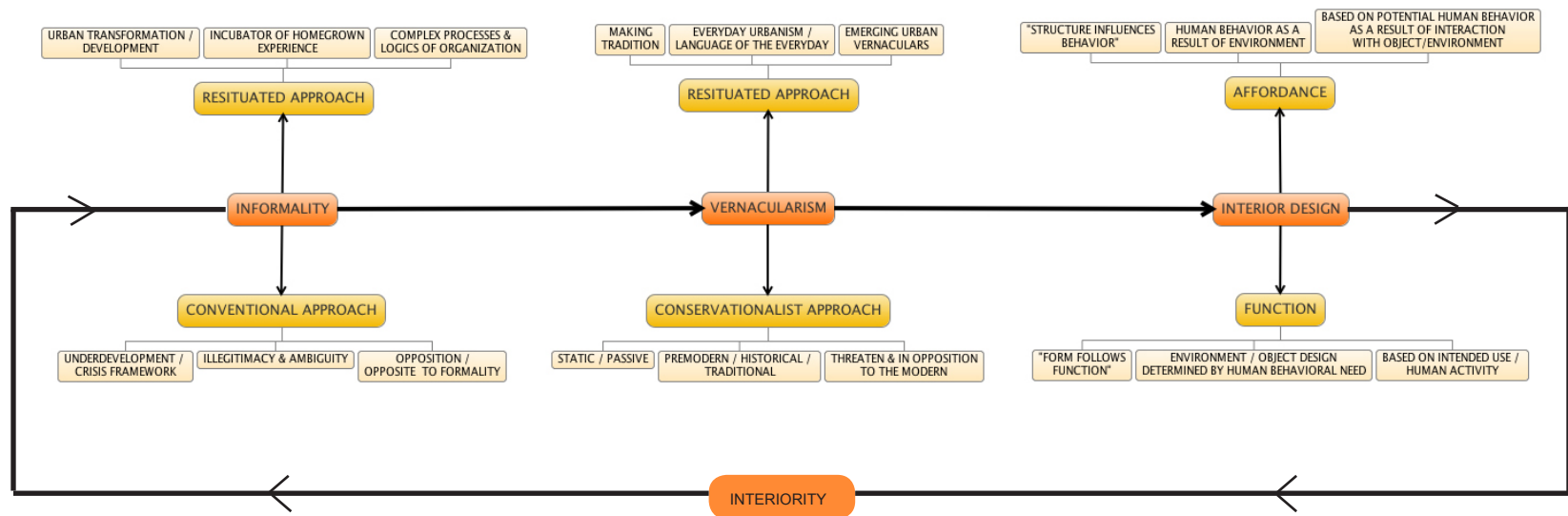


Fig 16. An informal Industrial area. Kariobangi, Nairobi (previous page). Image by Author.

Fig 17. A diagram summarizing important theoretical concepts. Diagram by Author.

LITERATURE REVIEW & THEORITICAL ANALYSIS

This chapter reviews concepts of informality, vernacularism, everyday urbanism and interiority in order to construct a framework for a context-specific design approach towards adaptable mixed-use housing in informal settlements. First, the concept of *informality* is introduced, followed by its antithesis, which defines informality as being opposite and in opposition to formality. The concept of informality is resituated when it is viewed as a mode of operation, and as an incubator for metropolitan urbanization. I argue that this resituating is significant as it authenticates the current processes that form everyday experiences in informal areas like Kambi Moto. A resituating of the concept of informality identifies these processes as inhabiting a complex logic that can inform the planning and design of the built environment.

The concept of *vernacularism* is key to understanding how informality can be resituated. The conservationist approach to vernacularism that understands the vernacular as static, pre-industrial, and historical is challenged and destabilized by the idea of an emerging vernacular. This resituating of the concept of vernacular as a process is further explored through the theoretical approach of everyday urbanism. The everyday urbanism approach seeks to authenticate the design and planning process by finding meaning in everyday processes of life thereby reconnecting human, social and cultural meanings with the built environment.

The concept of *affordance* is introduced as a potential design model for conceptualizing a wide array of design-related problems. The concept of affordance is explained as a relational approach to design that acknowledges the entanglement between designers, users and artifacts. The affordance approach is compared to the functional approach currently utilized in most design models. Affordances are then examined as possible indicators of

present and emerging vernacular. Methods to identify these connections are discussed.

Finally, the concept of *interiority* is used to conceptually describe characteristics of vernacular processes within interior spaces in informal areas. Inside informality looks at selected conditions of interiority with the intent of using these interior conditions to conceptually model characteristics that can describe interior environments within informal areas. These interior qualities and characteristics guide a design framework.

RESITUATING INFORMALITY

The term 'informal' in relation to income efforts, was first used by Keith Hart in his article on informal income opportunities in Ghana while studying a Northern Ghanaian group, the *Frafras*, as migrant workers in southern urban areas of Ghana (Hart, 1973). This term was later in International Labor Organization's (ILO) 1972 report on employment and poverty in Kenya (Sindzingre, 2006). According to the Government of Kenya (GOK), the informal sector, locally referred to as Jua Kali, refers to all semi-organized and unregulated activities that are usually initiated by self-employed people. They are usually artisans, traders, and others who operate in a variety of work sites such as temporary structures, markets, residential areas or street pavements. Legally, these businesses are not registered with the Registrar of Companies and the operators of these informal businesses may or may not have licenses from relevant authorities for carrying out business (GOK, 1998).

Alice Sindzingre (2006) notes that conventional definitions of the informal sector sometimes identify it as aligning itself with illegality and by extension, illegitimacy. She referred to a description of the informal sector where it is viewed as,

... inhabiting unregulated labor-intensive activities carried out by self-employed entrepreneurs of micro and macro enterprises that

take place outside regulations or formal firms. These unregistered informal activities including various degrees of illegality such as escaping taxation, non-compliance with labor regulation, smuggling, and financial transactions outside the monitoring of state or the banks (p.g 3).

This description is an example of how an informal-formal dualism inherent in the conventional understanding of informality reinforces hierarchical dichotomies, which can further align with and strengthen other dualisms. Through these dichotomies, the formal-informal begins to translate into, “state-non state, public-private, large-small firms, rigid-flexible norms, market-non market institutions, Western origin-‘traditional’, written-unwritten rules, impersonal- personal, legitimate-illegitimate, and efficient-inefficient enforcement” (Sindzingre, 2006 p.3) and developed-undeveloped.

This dualistic approach is used in the United Nations Housing Settlement Program (UNHSP) description of the term *slum* that has become synonymous with informal areas. As defined in the Program of Action adopted at the World Summit for Social Development, the UNHSP uses the term slum to “describe a wide range of low-income (squatter) settlements and human living conditions ... that exemplify the variety of manifestations of poverty” (2003, p. 8). The UNHSP (2003) further divides slums into two broad classes: slums of hope and slums of despair. Slums of hope are progressive settlements characterized by new, mostly self-built structures, which are usually illegal, but have been going through some process of development. Slums of despair represent declining neighborhoods, where environmental conditions and domestic infrastructure and services are undergoing a process of degeneration (UNHSP, 2003).

The above dualistic classification suggests that most informal settlements in the Majority World exist singularly and purely as one of hope or one of despair. The

Fig. 18. Rooftop view from *Kambi Motoi* (next page).
Image by Author.



intricacies and dynamic complexities within these vibrant settlements become reduced to dichotomies that speak of hope vs. despair, models vs. problems, informal vs. formal and first world vs. third world. Roy (2005) is quick to oust this simplistic understanding of informality as an opposition of formality. She argues that this polarized understanding is problematic because it leads to the equating of informality with poverty and formality with wealth. This narrow understanding is destabilized in slum-laden Mumbai where half of its twelve million residents are squatters and it has been estimated that its informal economy accounts for one sixth of India's entire GDP (Brand, 2005). Roy (2005) is quick to warn of the dangers of the creation of binary oppositions and how these classifications undermine the complex nature of urban development which in turn compromises policy response and action recommended and undertaken by international agencies, non-governmental organizations (NGO's), governments and other key players.

The association of slums exclusively with a crisis framework becomes a recurring conventional approach and departure point of the research, synthesis, analysis and solution basis of a complex urban phenomenon. As a result of this crisis framework, I argue that the concept of informality is prejudicially aligned solely with a lack of development and with illegitimacy. This alignment inevitably ignores the existence of past, present and potential homegrown solutions within these informal areas.

There is also a conceptual problem inherent in the classical understanding of informality. Roy (2004) and Sindzingre (2006) both argue that there is a definitional weakness that showcases inconsistencies in a dualistic understanding of informality. Sindzingre (2006) illustrates the vagueness and multiplicity of definitions of informal by highlighting the wide range of terms used to describe it. These terms include: “non-observed, irregular, unofficial, second, hidden, shadow, parallel, subterranean, informal, cash economy, black market, unmeasured, unrecorded, untaxed, non-structured, petty production, and unorganized” (p. 3). This further widens the multiplicity of meanings, leading to a creation of vagueness in the understanding of informality. As a result of this vagueness of understanding, the credibility and legitimacy of the various processes of informality are compromised.

Despite the above misunderstandings of informality, there has been a consistent expansion of the informal sector in most Majority World nations in Africa, South Asia and Latin America. Some experts view the rapid creation, development and evolution of informal settlements within urban cities in the Majority World nations solely, as a reflection of poverty and decay of various social, political and economic systems. Other experts view the same phenomenon as quite the contrary. There are four theories that attempt to describe this occurrence. The first theory, known as “lack of growth theory,” attributes the creation and growth of informal settlements to an increase in the poverty margin. This increase is thought to be directly related to the lack

of growth in the gross domestic product, GDP (World Development Bank, 1995). The second theory known as, “jobless theory”, views this phenomenon as underdevelopment and attributes it to changes in the structure of modern wage employment as GDP rises (UNDP, 1993). A third theory known as, “period of adjustment theory,” highlights the correlation between periods of adjustment in economies of Majority Worlds and the shift to informality.

Lastly, the fourth theory known as, “growth from below theory,” attributes some of the growth of the nation’s GDP to the small-scale enterprise sector (Chen, 1999) indicating latent growth in the informal sector and its favorable affect on these nations as a whole. This theory highlights the fact that small-scale enterprises in informal sectors are growing faster than large-scale firms in the modern sector and accounting for a notable portion of the nations’ GDP. This theory begins to define the part that informality plays within the economic structures of a Majority World country. Informality can now also become viewed as incubating past, present and potential homegrown solutions to its complex urban phenomena. A select group of writers, journalists and theorists have recognized the importance of this complex urban phenomenon.

Robert Neuwirth (2005), an investigative journalist, sees these informal communities as equally viable ingenious and innovative neighborhoods, going through a legitimate urban economical, political and social developmental phase. He views these informal, self-regulated cities as the cities of the future. Stewart Brant, founder of the *Whole Earth Catalogue* and author of *How Buildings Learn*, declares in his article “City Planet” (2005) that squatter cities are thriving markets with the most creative economies in the world. However, Neuwirth and Brant refrain from romanticizing conditions of the slums. They consistently inform us of the poverty within these communities, but they ask us to look beyond the international view that portrays slum dwellers in Majority World nations as helpless, hopeless and in need of salvation from developed nations.

Professor Ananya Roy (2004) also realizes the challenges of dealing with informality within Majority World countries, but she also speaks about the importance of reorienting production theory and policy in these worlds. Amos Rapoport (1969), a former professor in the Department of Architecture at the University of Wisconsin–Milwaukee specializing in sociology and psychology, agrees that there is a danger in applying western concepts to Majority World issues because these concepts represent only one out of many possibilities. Even though there is an added value in a cross-cultural analysis of issues, Rapoport (1969) stresses the importance of how local ways of life and specific needs are in informing everyday solutions. These ways of life and needs are indicative of present and emerging urban vernaculars of a people.

Because much of the urban growth of the twenty-first century is happening in Majority World countries, it becomes more clear that the planning and design community needs to be more attentive to the geographical, cultural, social, physical and economical context of these contemporary urban transformations. Even though planning and design processes are constantly borrowed across borders, the inappropriateness of applying ‘First World’ ideas to ‘Third World’ cities becomes more apparent within this current urban transformation (Roy, 2005). Roy continues to mention that there is an urgent need for the resituating of the production theory within these informal urban areas, which are mostly found within Majority World nations.

In Stewart Brant’s (2005) “City Planet”, he states that every week 1.3 million new people arrive to the world’s cities. Brant reports that in 1800, three percent of humanity lived in urban areas, in 1900 fourteen percent, and by 2007, the proportion of urban dwellers passed fifty percent (2005). Most of the current urban population lives in informal settlements in Majority World cities. According to Robert Nuewirth (2004), there are one billion squatters present in the world today and if current trends continue, there will be two billion squatters in the world by the year 2030. To keep up with this urban influx and



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in order to house everyone, Neuwirth estimates that the world would need to build 96,150 houses a day, which translates to 4000 homes an hour.

“Population expansion”, “demographic change”, “the vast impersonal forces of globalization”, failure in urban, national and international housing policies, and lack of genuine political will to address the improvement of housing and living conditions in informal settlements are some of the important factors raised by the Global Report on Human Settlement by the United Nations Human Settlements Program (UNHSP, 2003 pg 8-10). However, the creation of mixed-use housing still continues amidst these global complications. This construction of mixed-use housing is directly or indirectly influencing self-builders, entrepreneurs and dwellers within informal areas throughout various Majority World cities. Understanding the organizing logic and systems of norms that govern informal processes of living, building and working within informal areas, becomes essential in creating effective and meaningful situational and context specific solutions.

In summary, this section resituated informality by discounting a conventional approach that defines it as being opposite of and in opposition to formality. This incorrect approach further leads to an alignment of informality with ambiguity, illegitimacy and under-development. As a result, informality is perpetually viewed within a crisis-oriented framework. This crisis approach denies the existence of homegrown solutions incubated within informal settlements. The resituating of informality therefore allows for a more dynamic understanding of this term and the processes from which it originates. The resituating of the concept of informality is important to my project because my research seeks to produce insights into the processes of informality through an investigation of the daily actions of living, working and building within these areas.

Fig 19. Formal & informal buildings symbiotically coexisting. These informal restaurants enjoy bustling business from patrons within neighbouring offices and residential areas (previous page).

Informality as a mode of operation

Alsayyad and Roy (2004) propose that urban informality can be better

understood as a mode of operation in which it becomes viewed using an organizing logic, a system of norms that govern the process of urban transformation by structuring the very fabric of urban life. No longer is informality perceived as a standardized dichotomy in opposition to formality. Instead, the concept of urban informality as a form of metropolitan urbanization, allows designers and planners to understand informality as a series of [trans]actions that connect different economies and spaces to one another (Roy, 2004) [rather] than a static sector defined by its opposition to the formal sector. In this new perspective, important aspects lie in the system by which informality organizes itself. This approach can equally be applied to formality. As a result of this shift in perspective, there exists, as there should be, the possibilities of informality within the formal sector and formality within the informal sector. This interdependency between formality and informality is highlighted as the dynamism of the boundary between these two concepts becomes amorphous and unstable.

When urban informality is understood as a mode of urban development, its processes are seen as a vital metamorphosis of complex cultures. These complex urban cultures give rise to sophisticated combinations of happenings. These happenings make up the nonstructural populist trends that harbor the relationships between social behavior and the built environment. Within urban informality, these happenings can be further understood as the “manifestation of informal processes” (Alsayyad, 2004, pg 9). When informality is recognized as a way of being, a happening, a process, “urban informality as situated in many Third World cities (may emerge) as a new paradigm of an understanding of urban culture” (Alsayyad, 2004, pg 9). This paradigm shift allows those involved “to pose Third World questions of the First World in order to actively deviate from the old-style practices of evaluating ‘underdevelopment’ in light of ‘development’, and to engage with ‘elsewhere’ in order to unsettle ‘home’ and its certainties” (Roy and Alsayyad, 2004, pg 3). Viewing informality as a series of processes and activities orchestrated by the everyday living of

people within informal areas, allows us to pay attention to popular emerging situations and context-specific responses to personal and community life. Through this system of thought, it becomes clear that the man-made environment of informal areas are not just a mere practical tool for survival or the result of arbitrary happenings, but rather man-made environments with structure and that embody meaning (Norberg-Shulz, 1978). How, then, can we model our design and planning practices to seek to understand the intricacies of the everyday as vital latent pockets of knowledge in developing pragmatic, effective and meaningful built environments?

Margaret Crawford (2005) a professor of urban design and planning theory speaks of everyday urbanism as an approach to urbanism that finds it meaning in everyday living. Everyday living is far more than its perceived notions of ordinary and banal routines. Crawford views everyday life as a storehouse of signification that range[s] from the ordinary to the extraordinary that is sometimes latent within the mundane (2005). Even though the everyday may seem generic, upon close observation, the people who inhabit these spaces become highly specific in their daily activities. People react to specific situations with specific activities within a specific context. These collective reactions become manifested into past, present and emerging vernaculars. I argue that these collective reactions can be seen as a series of actions. These actions become a unit of an activity, an activity becomes a unit of the everyday, the everyday becomes a unit of the vernacular. By using time diaries, POE's and photograph analysis for my inquiry, both visible and latent patterns of a temporal and perpetual nature were witnessed and recorded. This information of the processes of the everyday begins to illustrate specific situations and contexts that are reflective of an informal vernacular.

In conclusion, an understanding of informal areas is dependent on each area's unique context and situation. This approach avoids a simplistic dualistic understanding of this complex concept. An understanding of informality as a

mode of operation allows for a more dynamic and sincere understanding of a complex concept, an understanding rooted in the everyday activities within urban informal areas. The activities within informal places and spaces affect and dictate spatial patterns. They unveil latent visions of lifestyle, values and worldviews of these cultures as conscious and creative adaptations of past experiences and needs to the present built environment. These processes of informality become manifest as past, present and emerging vernaculars within these contexts.

RESITUATING VERNACULARISM

In the book *Vernacular Architecture in the 21st Century: Theory, Education and Practice*, Marcel Vellinga (2006), a researcher and writer from Oxford Brookes University specializing in vernacular architecture and housing research, argues that limitations exist in the accepted definition of “vernacular” as being ‘pristine’, static, passive and in continued opposition to the modern and formal. This conservative and defensive view equally classifies vernacular architecture as solely consisting of pre-industrial buildings of tribal, folk or peasant cultures. As a result, there seems to be a tendency to solely emphasize the vulnerability of vernacular traditions at the mercy of globalization and modernization. Although the survival of vernacular traditions is being seriously threatened today, the continued tendency to view vernacular as “pre-modern, historical and traditional” to be analyzed in its primeval state and protected from modernization and change leads to a narrow understanding of vernacular as static, exclusive and outdated (Vellinga 2006, p. 83). By extension, this understanding negates the possibility of an emerging vernacular that result from this revered modernization. In this light, emerging vernaculars and their lessons are overlooked and become thrown out with the bath water.

Paul Oliver, an architectural historian, in his book *The Encyclopedia of Vernacular Architecture of the World*, describes vernacular architecture as



comprising “dwellings and other buildings of the people built to meet specific needs, accommodating the values, economies and ways of living of the cultures that produce them” (1997, p. xxiii). Similarly, in the book *Invitation to Vernacular Architecture* by Thomas Carter and Elizabeth C. Cromley (2005), professors of Architecture and Architectural History in the University of Utah and Northeastern University respectively, vernacular architecture is both a type of architecture and an approach to architectural studies. This approach emphasizes the intimate relationship between everyday objects and culture within the context of ordinary buildings and people. Dell Upton and John Micheal Vlach (1986), professors of Architectural History and American Studies and Anthropology respectively, in their book *Common Places: Readings in American Vernacular Architecture* define vernacular architecture simply as a common architecture that centers around what most people build and what they use.

Likewise, in the book *Built to Meet Cultural Needs: Cultural Issues in Vernacular Architecture*, Paul Oliver (2006) defines vernacular architecture as an “architectural language of the people with ethnic, regional and local dialects” (p. 3). Vellinga (2006) speaks of a more “dynamic approach to vernacular that views tradition as a conscious and creative adaptation of past experiences to the needs and circumstances of the present”(p. 91). Here, she sees vernacular as a source of knowledge that can become integrated with new forms, resources and technologies so as to develop culturally and environmentally sustainable architecture.

No longer is the concept of vernacular singularly described in a static historical perspective, but the vernacular also begins to reflect a strong community identity that manifests in distinctive qualities and becomes recognizable in patterns of everyday living. Inherent in this revised definition of vernacular, as a dynamic process of the everyday, is the idea that a group of people whom inhabitant a particular geographical area during various points in their history,

Fig 20. Washing clothes (previous page). Image by Author.

achieved a shared identity in behavior (Carter & Cromley, 2005). This notion of a shared identity in behavior allowing for a more dynamic understanding of vernacular that is less time-bound. This understanding leads to a more dynamic approach to vernacular that views tradition, a vernacular process, as a “conscious and creative adaptation of past experiences to the needs and circumstances of the present... allowing studies to focus on emerging traditions, as well as enduring ones”(Velinga, p. 83). This approach will help destabilizing of “the latent primitivism of the discipline (vernacular studies)... (that refuses to take seriously) New Age Californians, Singaporean Puritanism and West Africans in suits playing video games, so as to end that romantic nostalgia which has the effect of allowing only ‘western’ people to be the true inheritors of the industrial revolution”(Velinga, p. 91).

Nezar AlSayyad (2004), professor of Architecture and Urban Design and Planning, recognized that the conventional understanding where the vernacular included anything that is native or unique to a specific place, produced without the need for imported components and processes and possibly built by the individuals who occupy it, becomes limited and outdated. In a twenty-first century context, where culture and tradition have become less place-rooted and more information-based, AlSayyad (2004) and Velinga (2006) argues that there emerges a pressing need to readjust some commonly accepted attributes of the vernacular to reflect these present times. These integrated definitions allow for the possibility of viewing urban informal cultures as incubators of present and newly emerging urban vernaculars worthy of recognition and research. The acceptance of urban informal settlements as sites for emerging and enduring vernacular interior architecture and design allows us to view these vernaculars as significant and relevant in our present day reality. This is because they mirror a collective cultural, economic, environmental and social response to specific matters concerning home, work, social identity, cultural affiliation and aesthetic tastes, to name a few, and this knowledge is paramount in the design of meaningful interior spaces.

Everyday Urbanism: Vernacular as Process

If the study of or the development of vernacular architecture is approached as a process, then one can view the vernacular as a series of systematically informed actions taking place in a definite manner. These processes can then be studied to illustrate how interior design and architecture emerge from an everyday practice of living, and how these vernacular processes reflect shifting economic, environmental, social and economical needs of the inhabitants within these contexts. Inherent in this approach is the assertion that all ordinary buildings are the result of complex mental processes that are simultaneously shaped by culture, economics and environment and therefore become worthy of investigation. In this light, emerging vernacular architecture becomes less of a kind of building and more of an approach towards looking at a buildings (Upton & Vlach 1986) and interior spaces.

Mehrotra argues that architecture, (interior design) and urban planning have traditionally been involved with the creation of permanent static urban conditions through the weaving of infrastructure, actual buildings forms, and open spaces, while the kinetic fabric is what defines the reality of the city (2005). Mehrotra describes this kinetic fabric as consisting of people, the activities they perform and the temporary paraphernalia they use in the animation of their interiors and exteriors in the environments. Knowledge about this kinetic fabric is important in the creation of meaningful interior environments because this information includes everyday functional, aesthetic and behavioral patterns representative of the community of dwellers.

Margaret Crawford (2005), a professor of Urban Design and Planning Theory at Harvard Graduate School of Design, speaks of “everyday urbanism” as an approach to design and planning that “finds its meaning in everyday life, that always turns out to be far more than just the ordinary and banal routines that we experience” (p. 18). Crawford bases her ideas on the French

philosopher Henri Lefebvre, who sees everyday life as a repository of all kinds of meanings. Crawford adds that “these kinds of meanings range from the ordinary to the extraordinary” which may become concealed within ordinariness. This reconnection of human, social and cultural meanings with the everyday life-world in the planning, design and architecture is important because it authenticates the built form and makes it meaningful in its users’ day-to-day living. Norberg-Schulz in his book *Genius Loci* excellently summarizes this reconnection when he states that, “man dwells when he can orient himself within and identifies himself with an environment, or, in short, when he experiences the environment as meaningful. Dwelling therefore implies something more than shelter”(1979, p.5).

Henri Lefebvre (1991) argues in *The Production of Space* that the temporal is significant in everyday life. Michel de Certeau (1984), in *The Practice of Everyday Life*, explains the importance of temporality through the concept of tactics. De Certeau illustrates the concept of tactics as a mode of operation that describes individuals or groups which are fragmented in terms of space and maintain no specific site of operation but who are capable of swiftly combining according to a current necessity. This model of operation is characteristic of informal places and spaces where single-use environments are utilized for multiple activities and public spaces become temporarily animated and domesticated encouraging spontaneous social interaction. These environments are created or adjusted by the users to collectively reflect conscious and subconscious everyday processes which are shaped by the immediate everyday practices of living. These tactics can be mapped further through an understanding of emerging and present urban vernaculars. How can interior designers learn from enduring and emerging vernaculars? Can this knowledge be integrated into new methods of housing research in interior design?

I argue that vernacular interior architecture becomes relevant in the present



day reality when academia and professionals not only begin to share their cross-cultural and interdisciplinary research methods and findings, but also begin to resolve the dichotomy that privileges the knowledge by vernacular architecture academic experts over the everyday experience of those who live within these settlements. The everyday experience includes a wealth of rhythms, cycles and patterns that illustrate multiple temporalities that compose urban living. Within informal areas, self-builders, entrepreneurs and dwellers, to mention a few, create these rhythmic patterns in both temporal and spatial dispositions. An inquiry into the vernacular processes of informal urban areas assists in overlaying and connecting the kinetic landscape onto a static built form. This overlaying is important in showcasing the latent relationship between vernacular processes and temporal landscape within urban areas (Mehrotra, 2005).

An investigation of emerging vernaculars brings to the forefront important concealed activities that are a kinetic expression of the everyday. A proactive situational and context-specific design approach within informal settlements realizes the presence of existing and emerging urban vernacular and then encourages and intensifies it through utilizing the design expertise of the planner and designer (Crawford, Chase, & Kaliski 1999). The first step then becomes the mapping of these present and emerging vernaculars. This mapping is very important because it begins to animate the spatial behaviors of individuals and families that may sometimes seem static or culturally influenced while in reality, they are variable and determined primarily by context (Asquith & Velinga). These spatial behaviors begin to articulate a rather illusive context, informality, from the ground reality.

Lefebvre's conceptual triad provides a framework with which to address the planning and design of meaningful and effective spaces of difference. Richard Milgrom, professor of City Planning at the University of Manitoba, summarizes in his article "Lucien Kroll: Design, Difference, Everyday

Fig. 21. Preparing *muchicha* for dinner (previous page).
Image by Author

Life” summarizes Lefebvre’s understanding of space as inhabiting three elements: Representations of spaces, representational space, and spatial practice (Milgrom). Representations of space are the material forms of space represented through imagery and physically in the built environment. Representational space, also referred to as “lived space”, depicts the symbolic socio-cultural value produced by users of the space. Lastly spatial practices, also referred to as “perceived space”, denotes the way in which inhabitants use these spaces. Both concepts of representational space and spatial practices are important to this project because they provide avenues through which vernacular characteristics emerge and are manifested. These characteristics become paramount in outlining difference within these informal settlements, settlements that often become unjustly perceived as homogenous. Vernacular characteristics are situational and context-specific and as a result, vernacularized spaces illustrate both profound and subtle differences in diverse populations.

It becomes clearer that there exists past, present and emerging vernaculars simultaneously within these informal settlements. These vernaculars are important to designers because they begin to visually articulate the everyday life experience of the users of interior spaces. These articulations are animated and may become physically incarnated through both conscious and subconscious individual and collective spatial configuration made by dwellers. The question then becomes, how can interior designers create meaningful spaces that cater to these every changing vernaculars?

In summary, this section challenged the conservationist approach towards vernacularism. The idea of an emerging urban vernacular has destabilized the conservative understanding of vernacular as static, pre-industrial, and historical. The resituating of the concept of vernacular as process is further explored through the theoretical approach of everyday urbanism. Everyday urbanism is illustrated as an approach to design and planning that finds meaning

in everyday activities. Within this approach, the designer's role is to integrate their expertise in enhancing and intensifying the ongoing experiences of the everyday as a departure point for design and planning. The interior designer is therefore challenged to create a design framework that can meaningfully support these ever dynamic urban vernacular processes.

INTERIORIZING INFORMALITY

In this section, the concept of affordances is introduced as a potential design model for conceptualizing a wide array of design-related problems. The concept of affordances is explained as a relational approach to design that acknowledges the entanglement between the designers, users and artifacts. The affordance approach is compared to the functional approach currently utilized in most design processes. Affordances are examined as possible indicators of present and emerging vernacular and the methods to identify these connections are discussed.

Finally, the concept of interiority is used to conceptually describe characteristics of vernacular processes within interior spaces in informal areas. The section 'Inside informality' looks at some conditions of interiority with the intent of conceptually modeling characteristics that create desired interior environments within informal areas.

Affordances: A design framework

The concept of affordance first originated from John Gibson in his work in the field of perceptual psychology but has since been used in different disciplines including computer science, engineering, and architecture. John Gibson (1979) explains the

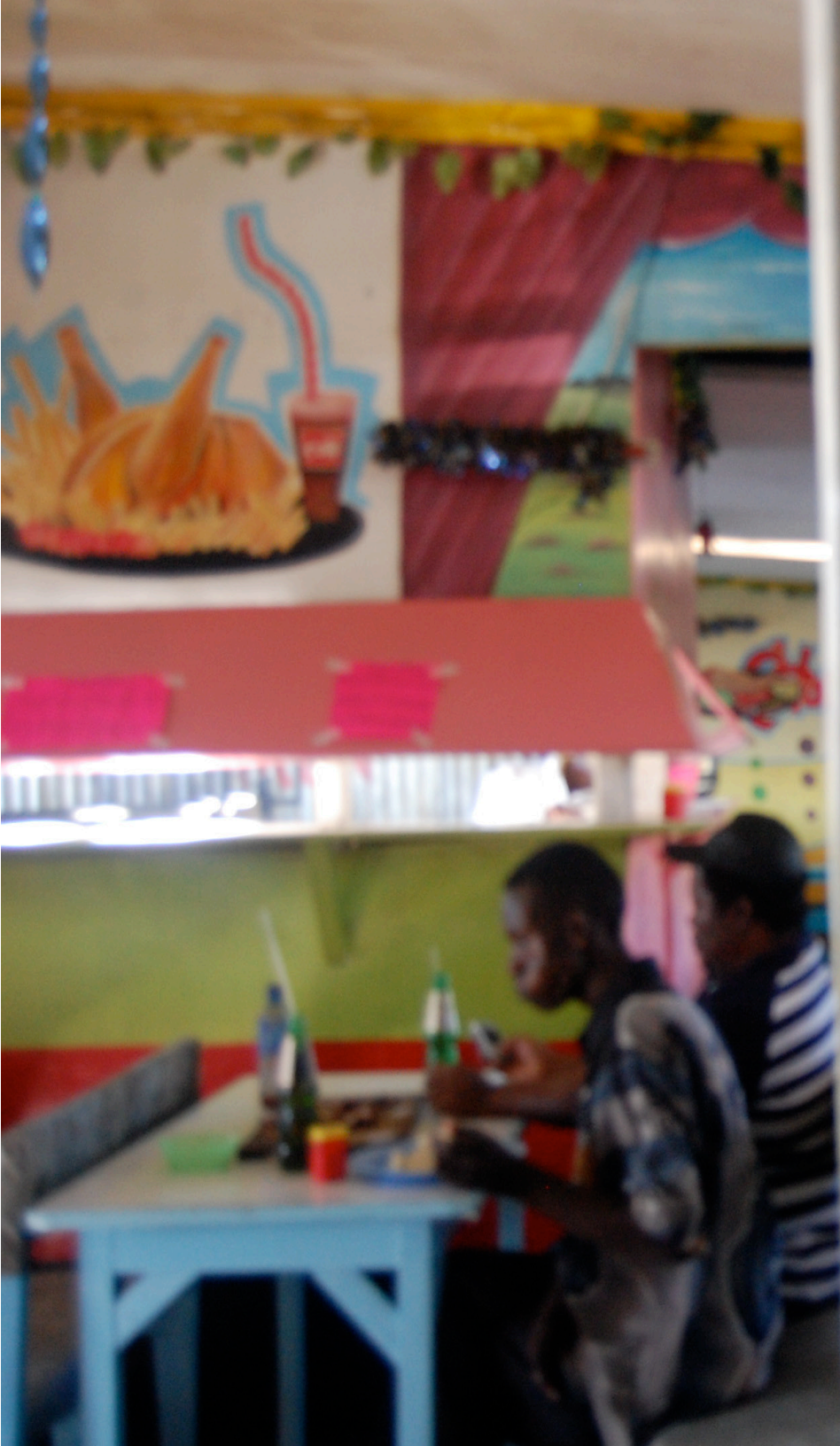
“affordances of the environment (as) what it offers the animal, what it provides, or furnishes, either for good or ill. The verb

afford is found in the dictionary, the noun **affordance** is not. I have made it up. I mean by it something that references both the environment and the animal in a way that no existing term does” (p. 127).

An affordance is measured relative to the human and is therefore unique to the human. Gibson adds that affordances are not abstract physical qualities, they are neither an objective nor a subjective property but are equally a fact of the environment and of human behavior. As a result, an affordance indicates the potential for behavior (relative to the environment) but not the actual occurrence of that behavior (Maier, Fadel & Battisto, 2009).

Design affordances can be viewed as the potential quality of the usability of an artifact to a specific user, keeping in mind that affordances both enable as well as dis-able. Maier, Fadel and Battisto divide affordances into two groups mainly artifact-user affordances (AUA) and artifact- artifact affordance (AAA). An AUA expresses an interactive relationship between an artifact and a user that neither can manifest alone while an AAA expresses an interactive relationship between one artifact and another artifact that neither the artifact nor the other artifact can manifest alone (Maier, Fadel & Battisto, 2009). An example of this is the design of chairs to allow them to be stacked on top of each other.

From Gibson’s theory, Maier, Fadel and Battisto (2009) identify three relational properties of affordances as complementarity, polarity and multiplicity. Complementarity relates to the entanglement relationship between both creators, artifacts and users (Maier, Fadel & Battisto, 2009). Creators in this context refer to both intended and unintended designers of spaces, both formal and informal. An avoidable implication of this relational property is that the affordance depends on the specific user and therefore it is possible the same artifact can afford different behaviors to different user groups.



Polarity alludes to the possibility of both positive and negative outcomes of an affordance towards the user (Maier, Fadel & Battisto, 2009). Maier, Fadel and Battisto privilege a relational approach over a functional approach because this approach is not blindsided by the accomplishment of the intended function. The polarity of the solution of the function is equally tested. In doing so, a solution is not seen as the right solution because it has fulfilled its function, but rather, a possible outcome that has greater effects than those intended.

Another relational property of affordance is multiplicity. An affordance may allow several abilities. An example Gibson offers (1979) is that water affords drinking, pouring, washing and bathing to mention a few. These multiple affordances may be either positive or negative (polarity). As a result, these three parameters can be used to describe the quality of a solution and how well the solution affords a use by a specific user.

How then can this relational model inform the spatial form of interior design? The conception of form is key in differentiating the concept of function from the concept of affordance. Whereas functions are independent of their form, meaning that a variety of forms can perform the same function, affordances are dependent on form (Maier, Fadel & Battisto, 2009). It is the form of an artifact that determines its intended or unintended usability to a specific user. Function-based theories move from form to function prescribing the spatial interpretation or embodiment of solutions based on the function, while potentially ignoring other relationships that these embodiments might afford. Therefore, the interior designer needs to move beyond only meeting the functional needs of the users but realize that the forms they design further enable or disable the users in intended and in unintended ways.

Fig 22. An informal restaurant (previous page). Image by Author.

From “systems thinking” comes the principle “structure influences behavior” (Forrester 1968; Senge 1990). In this light, structure affects affordances which

then affect behavior (Maier & Fadel, 2009). Through the concept of affordance, it is clearer that the structure of systems determine their affordances, which subsequently describe the behaviors possible within these environments. This realization is important in understanding emergent behaviors within interior environments. If present and emerging vernaculars are temporal and spatial manifestations of everyday processes of life, vernacular structures and interiors within informal settlements can be studied to identify the affordances that can aid and describe what behaviors these environments offer. Through understanding both positive and negative affordances within the built environment, the designer can either adapt or improve the design and hence the meaningfulness of interior environments for its users.

In conclusion, an affordance-based approach is more favorable than a functional approach in creating a meaningful design model because not only does a relational approach produce a functioning solution, it goes further to investigate the possible effects of this solution. A solution is investigated to expose its polarity, complementarity and multiplicity. In doing so, a solution is not viewed as the right solution because it has fulfilled its function, but rather, a possible outcome that has greater effects than those intended.

Interiority: Inside informality

In the previous sections, I illustrated how informality can sometimes become perceived as existing outside of formality. In this instance, formality is perceived as having rigid boundaries that define a structured interior while informality is perceived as lacking this structure. The perceived lack of structure is arguably demonstrated in the ambiguity and vagueness present in conventional definitions and measurements of the informal sector. As a result, informality becomes viewed as being outside an exterior relative to the interior called formality. However through an understanding of interiority and the conditions that create this abstract quality within informal settlements, a vernacular language becomes conjured up that enables the recognition and

definition of interiority within informal areas.

Although this inquiry looks to identify some interior characteristics specific to informal settlements, it becomes clear that these characteristics are ever-changing and give rise to a new and emerging vernacular. The task then is to become cognizant not only of the vernacular characteristics within informal areas, but most importantly, to provide a framework that is adaptable, meaningful and responsive to the ever-evolving vernacular. Through the mapping of temporal and ephemeral vernacular processes using photography, POEs, time diaries and the key documents mentioned in chapter one, I drew out interior characteristics that were later translated into design concepts. These concepts further guided my spatial interpretation of the adaptable mixed-use housing prototypes suited to these informal areas.

This section is guided by Christine McCarthy (2005), a senior lecturer in Interior Design at the University of Wellington, conceptual definition of Interiority found in her seminal article “Toward a Definition of Interiority”. According to McCarthy, interiority is a “theoretical and immaterial set of coincidences and variables from which an interior” emerges (p. 112) Interiority is therefore not defined by a set of absolute conditions but exists rather within a dynamic negotiation of actions. In the *Poetics of Space* Bachelard (1994) states that interiority is a condition prone to elasticity and ambiguity, allowing for an abnormal expansion of the meaning of interior to a point of abstraction. Interiority therefore exists as mode of being, a set of conditions or actions that are dependent on a unique set of parameters. In this case, interiority exists as a series of processes, a mode of operation and as a result, becomes well-suited in explaining informality.

McCarthy (2005) states that interiority does not exist as physical elements or properties like color, size or material but rather as the potential realities which offer the possibilities for “the colored, dimensioned and the material manifestations of an interior”(p. 112). Interior, unlike interiority, is grounded in

relative location and generally defined by its oppositional relationship to the exterior. Interiority becomes understood in describing an interior quality and as a result, becomes more suited towards describing conceptual characteristics that can later be used to generate different interior situations.

Some of the parameters that McCarthy utilizes to describe interiority include control, boundary, atmosphere and time. McCarthy writes that interiority understands that interiors are controlled and controlling. Through controlling space, it is limited, restrained and interiorized. In assessing control, McCarthy looks at the interdependent action of exclusion and inclusion, regulation, and permeability. Through my observation and in conversations I have had with dwellers of the settlement Kambi Moto, there exists a dynamic shuffle between inclusion and exclusion. The upgraded settlement Cecilia Court, unlike the rest of the informal area, is sectioned into courts. It is closed off from the rest of the settlement through gates and the inward orientation of the new buildings. The general public is not allowed to pass through this settlement, as is the norm in the rest of the informal settlement. By controlling who penetrates their boundaries, Cecilia Court dwellers have created a community within, but have excluded those outside. Within the old settlement, residential and business premises are both interwoven, increasing the level of permeability within the settlement. The old settlement appears more permeable, less regulated and more inclusive in comparison to the upgraded settlement layout.

Within the individual home of the inhabitants, the divide between private and public space is heightened. The bedrooms and kitchen are usually sectioned off through the use of fabric and it becomes clear that there is an order of control, which privileges the dweller over the visitor. The views of other objects within the public spaces within these interiors are controlled through the use of doilies and other fabric. So as a visitor rests within these interior spaces, there is a feeling of exteriority because one is excluded from viewing objects and some spaces like the kitchen that may be considered public in



other cultures.

Within interiority, McCarthy perceives the boundary as being associated with containment, enclosure, secureness, permeability, fragility, flexibility and mobility, to name a few. The level of enclosure increases as one moves from the public to the private realm within the informal settlement. Within the Kambi Moto settlement, the privatization of exterior spaces can be witnessed in the experience of passing by an enclosed interior space that has become exteriorized through the blurring music emanating from its confines. It is common to see hawkers interiorizing public spaces by creating temporary boundaries that momentarily claim this space. This can be done by spreading a sack cloth on which their wares are placed or by extracting an improvised structure that creates a temporary boundary to shelter their goods or services. There is an appropriation of boundary conditions as one moves from the public realm to the private one and this is witnessed in the different levels of control that reflect the interiorizing of the space.

In understanding the relationship between interiority and time, McCarthy stresses the temporal nature of interiority. This temporal nature of interiority can be illustrated by the schizophrenic nature of interior spaces within informal areas where kitchens and living rooms are used for grooming and sleeping, bathrooms are used for doing laundry, while bedrooms are as used for studying and eating depending on the time of day. In Kambi Moto, these temporal qualities would have otherwise remained latent but were recorded with the use of time diaries. This latent quality of informal spaces is mostly activated through performance of everyday temporal and ephemeral activities which inhabit both the public and private realms.

Improvisation of both interior and exterior spaces to fit temporal needs and activities is a common characteristic of interiority within informal areas. Even though the upgraded settlement defines spaces for intended activities, the time diaries revealed that the dwellers used the rooms at different times for different activities than expected. The temporal nature of the activities performed within these informal spaces interiorized both interior and exterior spaces by creating temporary boundaries that dynamically morphed with changes in activities and time of day. From the exterior, it was observed that spaces like the corridors were used for different activities at different times. The exterior paths became to function as kitchens, playgrounds, lounging spaces, selling spaces, and sometimes simultaneously occupied. These spaces existed as a collection of temporal activities that negotiated boundaries encouraging permeability and extension. These spaces seem to symbiotically exist through the sharing of resources from the most basic space to materials and infrastructure.

McCarthy describes atmosphere as the abstract immateriality of interiority that is evasive and atmospheric. Even though atmosphere may be contained in the form and shape of the physical space that defines it, it is not a sum of this physical space. It maintains “an ambience which is a space in and

Fig 23. Njuguna's living space Kambi Moto (previous page). Image by Author

of itself, just there, faint, suspended; it seems separated and parallel at the same time; its connecting points may come about by chance” (p. 121). This atmospheric quality speaks to the latency present within informal spaces. By latency, I mean the sometimes hidden but present everyday phenomenon of living. The temporal and ephemeral nature of activities within the informal areas lends itself to latency.

It can be concluded that some vernacular characteristics of informal environments can be derived from an understanding of its interiority. This understanding can be explored in terms of control, boundary, time and atmosphere. I have identified vernacular characteristics such as latency, temporality, improvisation and symbiosis as key characteristics within informal areas. These characteristics were then used to guide the spatial interpretation of the adaptable informal mixed-use housing within Kambi Moto.

CONCLUSION

Through this inquiry I argued that informality should be investigated within specific situations and contexts. This approach avoids a simplistic dualistic understanding of this complex concept. An understanding of informality as a mode of operation allows for a more dynamic and sincere comprehension rooted in the everyday activities within urban informal areas. The activities within informal places and spaces affect and dictate spatial patterns. These patterns unveil latent information of lifestyle, values and worldviews of these cultures that are both a conscious and a subconscious creative adaptation of past lived experiences to the present built environment. The processes of informality incubates past, present and emerging vernaculars within these contexts. As a result, this dynamic understanding of informality poses a question about the possibility and relevance of present and emerging vernaculars. How can knowledge about these vernaculars aid the interior designer in understanding the lived experiences of the users of these environments?

To challenge the conservationist approach to vernacularism, the idea of emerging urban vernaculars was introduced. This idea destabilized the conservative understanding of vernacular as static, pre-industrial, and historical. The resituating of the concept of vernacular was achieved through an understanding of everyday urbanism. This approach to design and planning derives its meaning from everyday activities and lived experience. Within this approach, the designer's role is to integrate their expertise by enhancing and intensifying the ongoing experiences of the everyday. This approach was explored by documenting the everyday activities and experiences of the inhabitants of Kambi Moto through time diaries and interviews (POE's). The interior designer is therefore challenged to create a design framework that can meaningfully understand and then support these dynamic urban vernacular processes within the interior environment.

In order to explain the design framework, the concept of affordances was examined. An affordance-based approach was identified as more favorable in creating a meaningful design model than a functional approach. This was because the relational approach used also produces a functioning solution but went further to investigate the possible effects of this solution on specific users. The quality of a solution was studied in relation to polarity, complementarity and multiplicity. The solution was studied to identify both intended and unintended outcomes as well as the degree of positivity and negativity. Within the relationship model, a solution depends on the specificity of its user, thus a single solution could afford different behaviors for different inhabitants. This approach was most suited to this inquiry because it took into account the entangled relationship between users, their activities and the artifacts they create and use. This approach emphasizes that the interior and exterior spatial environment within informal areas have influenced certain collective and individual behaviors that are intricately woven into a unique urban vernacular. Through the analysis of interior photographs, time diaries and post-occupancy evaluations, current design solutions in Cecilia Court

were revisited to investigate their effectiveness. This investigation further enhanced meaningful context and user specific design interventions.

Following an inquiry of interiority and the conditions that create this abstract quality within informal settlements, vernacular characteristics became conjured and this enabled the recognition and definition of an informal interiority. Finally through this context-specific understanding of interiority, a conceptual model of vernacular characteristics of Kambi Moto informal interiors was drawn up. This was the departure point of the interior design of informal spaces. These characteristics include: latency, parasitism, improvisation and temporality. In the chapter that follows, the characteristics that arise from the present vernacular of Kambi Moto will be interpreted as design concepts and further broken down into principles and elements that will guide the spatial intervention of the interior design of the mixed-use housing prototypes.



Fig 24. Waiting for the bus on Ngong Road, Nairobi.
Image by Author



DESIGN PROGRAMMING

The following section looks at programming information that helps understand the client, users and their environment by understanding the activities they carry out in their day-to-day lives, their needs and desires. This is detailed through activity, functional and aesthetics requirements tables. This chapter also examines technical requirements of the build form like lighting, electrical, plumbing, and mechanical. The functional requirements are further broken down through photoanalysis to examine affordances. A summary of the POEs and samples of time diaries are included to further inform the reader of the vernacular patterns of the client and users. A Kenyan Building Code analysis is also included. Finally, design guidelines are provided to inform the design solution.

HUMAN FACTOR ANALYSIS

The following section includes client and user profiles describing the client and their primary and secondary needs.

CLIENT PROFILE

- The client of this project includes the community of residents in Kambi Moto, who collectively form Muungano wa Vijiji (Muungano group) a community based organization (CBO), working in collaboration with the Pamoja Trust a local Non Governmental Organization (NGO), and the Nairobi City Council. Muungano group was formed around about thirteen years ago through the efforts of the local councilor, several NGO's and the residents themselves.
- The Muungano group was formed to address problems concerning poor housing, poor sanitation, insecurity and lack of essential services.
- The univocal concern agreed upon by the Mungano group which comprises of structure owners and tenants and all other stakeholders was the need for

land tenure regulation and consequently, affordable housing.

- The Kambi Moto informal settlement has more women (65%) than men (35%).
- There are more tenants (203) than structure owners (72).
- The average household consists of 2.7 persons that is well below the national average of 5.8.
- Only 8.6% are formally employed while the rest work for the informal sector as small business owners, artisans and casual laborers.

USER PROFILE

The user profile was determined by the interviews of four families as well as information from the enumeration process carried out by residents of *Huruma* Informal settlement of which Kambi Moto belongs (Pamoja Trust, 2004). The users are divided into four categories based on the primary needs of households.

Rent

- This user rents space from a structure owner.
- They consist of single occupant or double occupant households.
- The users are usually between the ages of 15-35 years (youth) in the single space and 0-40 years in the double occupant space.
- They work within or outside their settlement.
- Primary activities include cooking and eating, sleeping, lounging and grooming.
- Secondary activities include cleaning, playing and socializing.
- Secondary users may include visiting family and friends of renter usually for short stays.

Rent-Live

- This user owns their structure and rent part of it to the user group above.

- These users are usually between the ages of 0-50 years.
- The working members of this household work within or outside their settlement.
- Primary activities include cooking and eating, grooming, lounging, socializing and sleeping.
- Secondary activities include cleaning, socializing, gardening, playing and studying
- Secondary users may include visiting family and friends usually for short to long stays.

Live

- These users own their structure and use it solely for the purpose of living.
- These users are usually between the ages of 0-60 years.
- They consist of two to four occupants in a household mainly nuclear family.
- Secondary users may include visiting family and friends usually for short to long stays.
- The working members of this household work within or outside their settlement but do not open a home-based business.
- Primary activities include cooking and eating, grooming, lounging, socializing and sleeping.
- Secondary activities include cleaning, socializing, gardening, playing and studying, animal rearing and gardening.

Work-Live

- These users own their structure which includes run a home-based business within it.
- The home-based business enterprise (HBE) consists of a small-scale business where the owner runs a mini-general store known as a kiosk. The owner may also run an artisan studio, which usually requires the extended use of exterior spaces adjacent to home.
- The artisans include tailors, hair salonists, cobblers, and craftsmen among

others.

- These users are usually between the ages of 0-65 years.
- Primary activities include cooking and eating, grooming, lounging, sleeping, socializing and selling and/or creating (HBE).
- Secondary activities include cleaning, socializing, playing and studying, animal rearing and gardening,
- They consist of four to six occupants in a household
- The working members of this household work at home or in the settlement and beyond.
- Secondary users may include visiting family and friends usually for short to long stays.

Fig. 25. Kambi Moto community meeting. Image by Author.



ACTIVITY REQUIREMENTS

Rent

Activity	Noise/Activity Level	Grouping	Time Use
Grooming	quiet & active	individual	morning & evening
Eating	inbetween & active	mostly individual	morning, afternoon & evening
Cooking	inbetween & active	mostly individual	morning, afternoon & evening
Cleaning	in between & active	individual	morning & evening
Socializing	noisy & active	group	mostly evenings & weekends
Sleeping	quiet & passive	individual	mostly evening
Laundering	quiet & active	individual	mostly mornings
Studying	quiet & active	individual	mostly evenings
Playing	n/a	n/a	n/a
Animal rearing & Gardening	n/a	n/a	n/a

Rent-Live

Activity	Noise/Activity Level	Grouping	Time Use
Grooming	quiet & active	mostly individual	morning & evening
Eating	inbetween & active	mostly group	morning, afternoon & evening
Cooking	inbetween & active	mostly individual	morning, afternoon & evening
Cleaning	in between & active	mostly individual	morning & evening
Socializing	noisy & active	group	mostly evenings & weekends
Sleeping	quiet & passive	individual or group	mostly evening
Laundering	noisy & active	mostly individual	mostly mornings
Studying	quiet & active	individual	mostly evenings
Playing	noisy & active	group	throughout the day
Animal rearing & Gardening	quiet & active	mostly individual	morning & evening

Fig. 26. Activity requirement of the different users. Table by Author.

Live

Activity	Noise/Activity Level	Grouping	Time Use
Grooming	quiet & active	mostly individual	morning & evening
Eating	inbetween & active	mostly group	morning, afternoon & evening
Cooking	inbetween & active	mostly individual	morning, afternoon & evening
Cleaning	in between & active	mostly individual	morning & evening
Socializing	noisy & active	group	mostly evenings & weekends
Sleeping	quiet & passive	individual or group	mostly evening
Laundering	noisy & active	mostly individual	mostly mornings
Studying	quiet & active	individual	mostly evenings
Playing	noisy & active	group	throughout the day
Animal rearing & Gardening	quiet & active	mostly individual	morning & evening

Live-Work

Activity	Noise/Activity Level	Grouping	Time Use
Grooming	quiet & active	mostly individual	morning & evening
Eating	inbetween & active	mostly group	morning, afternoon & evening
Cooking	inbetween & active	mostly individual	morning, afternoon & evening
Cleaning	in between & active	mostly individual	morning & evening
Socializing	noisy & active	group	mostly evenings & all day weekends
Sleeping	quiet & passive	individual or group	mostly evening
Laundering	noisy & active	mostly individual	mostly mornings
Studying	quiet & active	individual	mostly evenings
Selling & Creating	Inbetween & active	group	throughout the day
Playing	noisy & active	goup	throughout the day
Animal rearing & Gardening	quiet & active	mostly individual	morning & evening

FUNCTIONAL REQUIREMENTS

Rent

Living Space

Activities: eating, socializing, watching TV/ Radio, grooming
square footage: atleast 7 sqm
Daylight & views: lots of natural light, views to interior courtyard & street

street

Privacy levels: public
Acoustic/ Thermal/Ventilation: thoroughly ventilated
Egress: direct to outside
Storage: display, closed and hidden

Sleeping Space

Activites: sleeping and grooming
square footage: atleast 3.4 sqm
Daylight & views: Controllable natural light
Privacy levels: Private
Acoustic/ Thermal/Ventilation: Quiet & thoroughly ventilated
Egress: through bedroom window or top and bottom floor
Storage: options for clothing hanging, flat and other items

Cooking Space

Activites: Food preparation, cleaning
square footage: atleast 2.9sqm
Daylight & views: Lots of natural light and views to outside
Privacy levels: semi-private
Acoustic/ Thermal/Ventilation: minimize heat and thoroughly ventilate
Egress: through living space
Storage: store cookware, groceries and miscellaneous items

Laundering Space

Activites: cleaning and drying clothes
square footage: atleast 3.0sqm
Daylight & views: exterior drying space and interior hanging option
Privacy levels: public
Acoustic/ Thermal/Ventilation: -
Egress: from bedroom window
Storage: outside drying space

Grooming Space

Activites: personal hygiene & storing
square footage: atleast 1.7sqm
Daylight & views: natural light nd controllable views to outside
Privacy levels: private
Acoustic/ Thermal/Ventilation: well ventilated
Egress: stairs to below or above floor
Storage: disply and closed storage

Gardening Space

Activites: NA
square footage: NA
Daylight & views: NA
Privacy levels: NA
Acoustic/ Thermal/Ventilation: NA
Egress: NA
Storage: NA

Rent-Live

Living Space

Activities: eating, socializing, watching TV/ Radio, grooming
square footage: atleast 13.5 sqm
Daylight & views: lots of natural light, views to outside
Privacy levels: public
Acoustic/ Thermal/Ventilation: thoroughly ventilated
Egress: direct to outside
Storage: display, closed and hidden

Sleeping Space

Activites: sleeping and grooming
square footage: atleast 4.0 sqm
Daylight & views: Controllable natural light
Privacy levels: Private
Acoustic/ Thermal/Ventilation: Quiet & thoroughly ventilated
Egress: through bedroom window or top and bottom floor
Storage: options for clothing hanging, flat and other items

Cooking Space

Activites: Food preparation, cleaning
square footage: atleast 3.0sqm
Daylight & views: Lots of natural light and views to outside
Privacy levels: semi-private
Acoustic/ Thermal/Ventilation: minimize heat and thoroughly ventilate
Egress: through living space
Storage: store cookware, groceries and miscellaneous items

Laundering Space

Activites: cleaning and drying clothes
square footage: atleast 4.0sqm
Daylight & views: exterior drying space
Privacy levels: public
Acoustic/ Thermal/Ventilation: -
Egress: exterior staircase or same as grooming space
Storage: outside drying space

Grooming Space

Activites: personal hygiene & storing
square footage: atleast 2.0sqm
Daylight & views: natural light nd controllable views to outside
Privacy levels: private
Acoustic/ Thermal/Ventilation: well ventilated
Egress: stairs to below or above floor
Storage: disply and closed storage

Gardening Space

Activites: gardening, animal keeping, laundering, socializing, storing
square footage: atleast 20 sqm
Daylight & views: open to the outside
Privacy levels: semi public
Acoustic/ Thermal/Ventilation: NA
Egress: through eterior stairs
Storage: to house gardening, animal and laundering accessories

Live

Living Space

Activities: eating, socializing, watching TV/ Radio, grooming
square footage: atleast 13.5 sqm
Daylight & views: lots of natural light, views to outside
Privacy levels: public
Acoustic/ Thermal/Ventilation: thoroughly ventilated
Egress: direct to outside
Storage: display, closed and hidden

Sleeping Space

Activites: sleeping and grooming
square footage: atleast 4.0 sqm
Daylight & views: Controllable natural light
Privacy levels: Private
Acoustic/ Thermal/Ventilation: Quiet & thoroughly ventilated
Egress: through bedroom window or top and bottom floor
Storage: options for clothing hanging, flat and other items

Cooking Space

Activites: Food preparation, cleaning
square footage: atleast 3.0sqm
Daylight & views: Lots of natural light and views to outside
Privacy levels: semi-private
Acoustic/ Thermal/Ventilation: minimize heat and thoroughly ventilate
Egress: through living space
Storage: store cookware, groceries and miscellaneous items

Laundering Space

Activites: cleaning and drying clothes
square footage: atleast 4.0sqm
Daylight & views: exterior drying space
Privacy levels: public
Acoustic/ Thermal/Ventilation: -
Egress: exterior staircase or same as grooming space
Storage: outside drying space

Grooming Space

Activites: personal hygiene & storing
square footage: atleast 2.0sqm
Daylight & views: natural light nd controllable views to outside
Privacy levels: private
Acoustic/ Thermal/Ventilation: well ventilated
Egress: stairs to below or above floor
Storage: disply and closed storage

Gardening Space

Activites: gardening, animal keeping, laundering, socializing, storing
square footage: atleast 20 sqm
Daylight & views: open to the outside
Privacy levels: semi public
Acoustic/ Thermal/Ventilation: NA
Egress:through eterior stairs
Storage: to house gardening, animal and laundering accessories

Live-Work

Living Space

Activities: eating, socializing, watching TV/ Radio, grooming
square footage: atleast 13.5 sqm
Daylight & views: lots of natural light, views to outside
Privacy levels: public
Acoustic/ Thermal/Ventilation: thoroughly ventilated
Egress: direct to outside
Storage: display, closed and hidden

Sleeping Space

Activites: sleeping and grooming
square footage: atleast 4.0 sqm
Daylight & views: Controllable natural light
Privacy levels: Private
Acoustic/ Thermal/Ventilation: Quiet & thoroughly ventilated
Egress: through bedroom window or top and bottom floor
Storage: options for clothing hanging, flat and other items

Cooking Space

Activites: Food preparation, cleaning
square footage: atleast 3.0sqm
Daylight & views: Lots of natural light and views to outside
Privacy levels: semi-private
Acoustic/ Thermal/Ventilation: minimize heat and thoroughly ventilate
Egress: through living space
Storage: store cookware, groceries and miscellaneous items

Laundering Space

Activites: cleaning and drying clothes
square footage: atleast 4.0sqm
Daylight & views: exterior drying space
Privacy levels: public
Acoustic/ Thermal/Ventilation: -
Egress: exterior staircase or same as grooming space
Storage: outside drying space

Grooming Space

Activites: personal hygiene & storing
square footage: atleast 2.0sqm
Daylight & views: natural light nd controllable views to outside
Privacy levels: private
Acoustic/ Thermal/Ventilation: well ventilated
Egress: stairs to below or above floor
Storage: disply and closed storage

Gardening Space

Activites: gardening, animal keeping, laundering, socializing, storing
square footage: atleast 20 sqm
Daylight & views: open to the outside
Privacy levels: semi public
Acoustic/ Thermal/Ventilation: NA
Egress:through eterior stairs
Storage: to house gardening, animal and laundering accessories

Selling and Creating Space

Activites: exchanging, making, displaying, storing
square footage: atleast 4.5 sqm
Daylight & views: naturall light & open to the outside
Privacy levels: public
Acoustic/ Thermal/Ventilation: NA
Egress:through door
Storage: displaying products and tools of the trade

AESTHETIC REQUIREMENTS

Rent

Spaces	Degrees of enclosure	Color/ Tone	Focus/ Orientation	Mood/ image	Fexibility
Living	open	warm	to kitchen or outside	clean, orderly, welcoming & airy	easy furniture rearrangement
Sleeping	partially enclosed	cool	-	relaxed, airy	possible movable partitions, modular
Cooking	partially closed to living space	warm	outside	airy, minimal, clean	adjustable storage
Grooming	fully enclosed	cool	-	clean, minimalistic	hidden storage
Gardening	-	-	-	-	-
Storing	both open and closed	-	-	-	modular, diverse

Rent-Live

Spaces	Degrees of enclosure	Color/ Tone	Focus/ Orientation	Mood/ image	Fexibility
Living	partially enclosed	warm	to kitchen or outside	clean, orderly, welcoming & airy	easy reconfiguration
Sleeping	mostly enclosed	cool	outside	relaxed, minimal	possible movable partitions
Cooking	visual separation from kitchen	warm	outside	airy, clean, orderly	adjustable storage
Grooming	fully enclosed	cool	-	clean, minimalistic	hidden storage
Gardening	mostly open & partially closed	warm	panorama	airy, open	easily converted to social space
Storing	both open and closed	-	-	compact, organized	modular, diverse

Fig. 27. Aesthetics requirements for the different users.
Table by Author.

Live

Spaces	Degrees of enclosure	Color/ Tone	Focus/ Orientation	Mood/ image	Flexibility
Living	partially enclosed	warm	to kitchen or outside	clean, orderly, welcoming & airy	easy reconfiguration
Sleeping	mostly enclosed	cool	outside	relaxed, airy	possible movable partitions
Cooking	visual separation from kitchen	warm	outside	airy, clean, orderly	adjustable storage
Grooming	fully enclosed	cool	-	clean, minimalistic	hidden storage
Gardening	mostly open & partially closed	warm	panorama	airy, open	easily converted to social space
Storing	both open and closed	-	-	compact, organized	modular, diverse

Live-Work

Spaces	Degrees of enclosure	Color/ Tone	Focus/ Orientation	Mood/ image	Flexibility
Living	partially enclosed	warm	to kitchen or outside	clean, orderly, welcoming & airy	easy reconfiguration
Sleeping	mostly enclosed	cool	outside	relaxed, airy	possible movable partitions
Cooking	visual separation from kitchen	warm	outside	airy, clean, orderly	adjustable storage
Grooming	fully enclosed	cool	-	clean, minimalistic	hidden storage
Gardening	mostly open & partially closed	warm	panorama	airy, open	easily converted to social space
Storing	both open and closed	-	-	compact, organized	modular, diverse
Selling/ Creating	open to public	warm and inviting	street	clean, orderly	modular, easily adaptable

PLUMBING, ELECTRICAL, LIGHTING & MECHANICAL REQUIREMENTS

Rent

Spaces	Lighting	Electrical	Plumbing	Mechanical
Living	ambient & task	2 switches, 3 outlets	-	-
Sleeping	ambient	1 switch & 2 outlets	-	-
Cooking	ambient	1 switch & 2 outlets	double sink	connection to sewage
Grooming	ambient	1 switch & 1 outlet	shower, sink & toilet	connection to sewage
Storing	ambient	1 switch & 1 outlet	-	-
Gardening	-	-	-	-

Rent-Live

Spaces	Lighting	Electrical	Plumbing	Mechanical
Living	ambient & task	2 switches, 5 outlets	-	-
Sleeping	ambient & task	1 switch & 3 outlets	-	-
Cooking	ambient	1 switch & 3 outlets	double sink	connection to sewage
Grooming	ambient	1 switch & 1 outlet	shower, sink & toilet	connection to sewage
Storing	ambient	1 switch & 2 outlet	-	-
Gardening	ambient	1 switch 2 outlets	utility sink	connection to sewage

Fig. 28. Plumbing, electrical, lighting & mechanical requirements for four different users. Table by Author

Live

Spaces	Lighting	Electrical	Plumbing	Mechanical
Living	ambient & task	2 switches, 5 outlets	-	-
Sleeping	ambient & task	1 switch & 3 outlets	-	-
Cooking	ambient	1 switch & 3 outlets	double sink	connection to sewage
Grooming	ambient	1 switch & 1 outlet	shower, sink & toilet	connection to sewage
Storing	ambient	1 switch & 2 outlet	-	-
Gardening	ambient	1 switch 2 outlets	utility sink	connection to sewage

Live-Work

Spaces	Lighting	Electrical	Plumbing	Mechanical
Living	ambient & task	2 switches, 5 outlets	-	-
Sleeping	ambient & task	1 switch & 3 outlets	-	-
Cooking	ambient	1 switch & 3 outlets	double sink	connection to sewage
Grooming	ambient	1 switch & 1 outlet	shower, sink & toilet	connection to sewage
Storing	ambient	1 switch & 2 outlet	-	-
Gardening	ambient	1 switch 2 outlets	utility sink	connection to sewage
Selling	ambient	1 switch & 2 outlets	-	-

ADJACENCY MATRIX

Rent

	LIVING	SLEEPING	COOKING	GROOMING
STORING				
GROOMING				
COOKING				
SLEEPING				

Rent-Live

	LIVING	SLEEPING	COOKING	GROOMING	STORING
GARDENING					
STORING					
GROOMING					
COOKING					
SLEEPING					

Live

	LIVING	SLEEPING	COOKING	GROOMING	STORING
GARDENING					
STORING					
GROOMING					
COOKING					
SLEEPING					

Live-Work

	LIVING	SLEEPING	COOKING	GROOMING	STORING	GARDENING
SELL+CREATE						
GARDENING						
STORING						
GROOMING						
COOKING						
SLEEPING						

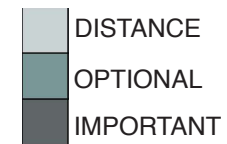


Fig. 29. Adjacency matrix showing relationships between spaces for different users. Table by Author

BUILDING CODE ANALYSIS

The following is a building code excerpt of pertinent information to the inquiry at hand. This building code is from the Local Government Adoptive By-Laws Building order 1968 of the Government of Kenya revised in 1987 and published by the Government Printer, Nairobi. The class is Domestic Building indented to be used wholly or predominantly for human habitation.

WALLS

54. Walls and Partitions of Blocks and Slabs

Non-load-bearing walls, partitions and individual panels. The requirements of by-law 46 and 51 of these By-laws should not apply to the construction of non-load-bearing walls or partitions or any individual panels, and the requirement of the by-law 32 of these By-laws will generally be satisfied for stability, if the size of the wall, walls or partitions or any individual panels are such that one dimension, either the length or the height, is not greater than the dimension shown in the following table and provided that for blocks up to 3 in. in thickness, alternative courses are reinforced in an approved manner.

TABLE

2" block	9'-0"
2 ½" block	10'-0"
3" block	12'-0"
4" block	14'-0"
4 ½" block	15'-0"
6" block	20'-0"
8 ¾" block	25'-0"

Provided that-

- (i) where both the length and the height of the wall, partitions or any

individual panels, would exceed those dimensions it must be divided into panels by vertical and horizontal supports of adequate strength and rigidity so that the above conditions are fulfilled;

(ii) the walls, partitions or any individual panels should be supported along two vertical opposite ends and, where required, horizontal:

(iii) the supported end should be attached to the main structure by bonding, inserting into a groove or by other methods of fixing.

FIRE RESISTANCE FOR BUILDINGS OTHER THAN SMALL HOUSES

87. Fire Resistance of floors, columns, beams and certain walls.

(1) In every building, other than a small house, which comprises of more than one storey, and is of a class and description specified in column (1) and (2) of the following table:

a) every floor above the lowest storey;

b) every load bearing wall, other than an external wall, wall separating buildings or fire-divisions wall;

c) every column and beam, other than one which by by-law 92 of these By-law applies; and

d) every wall closing a common stairway or a lift shaft;

should have the fire resistance specified in column (3) of the said Table in relation to the class and description of the building specified in column (1) and (2) respectively:

Provided that-

(i) where more than one period of fire resistance would be applicable, according to whether regard is had to the height, floor area or capacity of the building, the longer or longest periods shall be taken to be the required period of fire resistance; and

(ii) where a building is completely separated into two or more parts by fire division walls complying with by-law 84 of these BY-laws, or comprises

two or more dwellings, shops or other premises (not being individual flats) the requirement of this paragraph should apply to each part of the dwelling, shop, or premise if it were a separate building.

(2) Every opening in an internal wall enclosing a common stairway or a lift shaft shall, be protected by the doors or shutters shall have a fire resistance of less than half an hour.

(3) In this by-law “common stairs “ means a stairway intended for common use in a building for the access to a storey capable of being let in separate tenancies, or where more than ten people are employed on such storey; and “floor area” means in relation to a building the floor area of any one storey in that building.

TABLE

(1) Class of building:

Domestic building intended to be used wholly or predominantly for human habitation

(2) Height, cubic capacity, floor area (of any one storey):

(a) Exceeding two storeys but not exceeding 50 ft. in height, or

(b) Exceeding 1,000 sq. ft. in floor area

(3) Fire Resistance ½ hour

FIRE RESISTANCE- MISCELLANEOUS PROVISIONS APPLYING TO ALL BUILDINGS

91. Openings in external walls

(1) Unless the council agrees openings should only be permitted in external walls, where such walls are not within the distance described hereunder from a plot boundary other than one abutting onto the street:

(a) 7 ft. 6 in. in a central area;

(b) 5 ft. in any residential area; and

(c) 10 ft. in any other area:

Provided on the return wall or one at right angles to the nearest plot boundary, the distance of the opening from such a boundary, may be reduced to 2 ft. 6 in. or if the separating wall projects 2 ft. beyond the face of such a returning wall, the distance from the boundary may reduce to the thickness of the separating wall

(2) In the case of a building, other than a dwelling house of not more than two storeys, where any part of an opening in an adjoining storey, suitable provision shall be made to prevent the spread of fire from the lower to the upper opening.

(3) The requirement of paragraph (2) of this by-law should be satisfied if-

(a) the bottom of the higher opening is not less than 3 ft. above the top of the lower opening and not less than 3 ft. above the upper surface of the floor separating the storeys; or

(b) a balcony of non-combustible material with a solid floor or some similar horizontal protection is constructed between the two openings to project 2 ft. from the wall and extend laterally beyond each limit, for not less than 1 ft.; and

(i) where the lower or neither openings continues beyond that limit, for less than 1 ft.; and

(ii) where the upper opening continues beyond that limit, for not less than 2 ft.

STAIRS

133: Dimensions

(2) Stairs shall be constructed to have a constant and uniform rise and tread and, shall should be in the following maximum and minimum dimensions –

(a) dwellings;

(i) minimum width 2 ft. 6 in.

- (ii) maximum rise of step 7 ½ in.;
- (iii) minimum headroom 6 ft. 9 in.;
- (4) (a) No flight of stairs should exceed sixteen steps and intervals landings between flights shall have a minimum length of 2 ft. 3 in. except for stairs referred to in paragraph (2)
- (5) (a) Secondary fire escape stairs should be of an approved width and design, but in no case of less dimension than those described in (2) (a) of this by-law;
- (b) in special circumstances, the council, may permit, the use of an approved type of escape staircase.

134. Handrails

- (1) Unless, the council agrees otherwise, a handrail should be provided at each stair. In the case of stairs referred to in paragraph (2) (b) of by-law 133 of these By-laws, a handrail, on each side, should be provided and the outer handrail should be as continuous as is practicable throughout the stairway and all ends shall be finished off in a proper manner.
- (2) Handrails should not encroach more than 3 in. into the main width of the staircase.
- (3) Vertical balusters on stairs and balconies should not be spaced more than 5 in. apart.
- (4) Where other forms of railing and protection are used on the stairs or balconies, the infilling below the handrail, should adequately provide for safety of the person using it
- (5) No protective balustrade shall be less than 2 ft. 9 in. in vertical height above the nosing at the rake of the stair, nor less than 3 ft. in height at landing.

WATER SUPPLY

(143) Water Supply

- (4) Unless the council agrees, every building, should be provided with a stored

supply of cold water for domestic purposes taken from the main supply of the building.

VENTILATION OF BUILDINGS

150. Windows

Every domestic building should be provided with approved means of ventilation and should have a sufficient number of windows suitably positioned for direct communication with external air.

151. Area of window

(1) Every habitable room should have a window or windows opening directly into external air, which shall have for the purpose of daylight a total area, exclusive of frames, equal to at least one tenth of the floor area of such a room.

(3) In habitable rooms, windows should be constructed so that an area therefore equal to at least one twentieth of the floor area on the room should be made to the external air, and part of the area so required to open shall not be less than 5 ft.. 9 in. above the floor;

Provided that window which opens from a habitable room onto an enclosed verandah, conservatory or similar place should be deemed to open directly to the external air if that room and that place are together provided with windows which open directly into the external air, and would suffice for the purpose of this paragraph if they were the windows of a room having a floor area equivalent to the floor area of the first mentioned and that place.

155. Ventilation habitable rooms

(1) If required by the council, every person who erects a building, shall cause every habitable room to have approved permanent air vents of sufficient number, so arranged as to ensure cross or through ventilation to the external air.

(2) Air vents should be placed at a height of not less than two-thirds of the average height of the room.

156. Kitchens

- (1) Every dwelling of two or more habitable rooms should be provided with a kitchen of not less than 60 sq. ft., the minimum horizontal dimension of which is 6 ft.
- (2) Every kitchen should have a floor to ceiling height of at least 8 ft.
- (3) Every kitchen should be provided with a suitable sink and satisfactory means of cooking of food.
- (4) Every kitchen should be provided with appropriate light and ventilation.
- (5) In a dwelling consisting of one habitable room only, there should be provided a proper cooking place of not less than 35 sq. ft. in area having a minimum dimension of 4 ft. in depth and 7 ft. in height.
- (6) The area provided under paragraph (5) of this by-law shall be light and ventilated to the satisfaction of the council, and shall comply with the paragraph (3) of this by law as if it were a kitchen.

157. Larders-ventilation

- (1) Every dwelling with a kitchen shall provide with a pantry or larder of a capacity not less than 40 cu. ft. for the storage of food.
- (2) Every pantry or larder shall be ventilated to the external air by an opening fitting a fly proof cover, so construction as to allow an adequate flow of air.

158. Staircases- ventilation and lighting

All common stairs and common passages shall be adequately cross ventilated, and for common stairs sufficient natural and artificial lighting shall be provided.

159. Size and height of rooms

(1) Every habitable room shall be of an average height of not less than 8 ft. taken over the entire area of the room:

Provided that:

(i) If the room is a room, wholly or partly, in the roof of the building, it shall be 8 ft. at least in height over not less than 75 sq. ft. or one half of the area of the room measured at a height of 5 ft. above the floor level of the room, whichever is greater;

(ii) the height shall be increased from 8 ft. to 9 ft. at altitudes of less than 4000 ft. above sea level.

(4) Every habitable room shall have a superficial floor area of not less than 75 sq. ft.

Provided that:

(i) in every dwelling there shall be constructed one habitable room having a superficial floor area of 150 sq. ft. at least;

(ii) no habitable room shall have a cross dimension of less than 7 ft..

SANITARY CONVENIENCES

189. Bathrooms

Every dwelling shall be provided with a bathroom of not less than 25 sq. ft. in area having a minimum dimension of 3 ft. 6 in.

190. Lighting and ventilation of water closets and urinals

(2) A water closet entered directly from the external air shall be provided with sufficient opening for light and ventilation of not less than ten per cent of the floor area as near to the ceiling and as practicable and communicating with the external air.

MEANS OF ESCAPE IN CASE OF FIRE

212. Domestic and public buildings

(1) Any building which exceeds 2 storeys in height, in which the floor of any upper storey is more than 20 ft. above the surface of the street or the ground on any side of the building, shall be provided with such means of escape in case of fire, as the council may deem necessary.

213. Access from fire escape

Every fire escape from an upper storey, shall terminate at the ground level and at a point, where the dispersal into a safe area can be quickly accomplished:

Provided that, where a safe area can be localized on an upper floor of a building, which is easily accessible for the purpose of rescue, the means of escape may terminate at this point, if the safe area is of no greater height than 20 feet above adjoining ground level, and its railled off otherwise fenced to provide adequate protection for the persons using it.

SCHEDULED SPECIAL AREAS AND SPECIAL BUILDINGS

215. Scheduled residential accommodation

In high density or low-cost residential, where approved by the council, the requirements of by-law 216 and 227 of the By-laws, shall prevail, where they conflict with others of the By-laws.

216. Habitable rooms

Every habitable room should have a superficial area of not less than 75 sq. ft. with a minimum width of 6 ft. 6 in. and shall contain a minimum area of 40 sq. ft. for each person accommodating therein. In every dwelling, there shall be constructed no less than one habitable room having a superficial floor area of not less than 120 sq. ft.

217. Latrines and ablutions

(1) A latrine and an ablution, shall be provided either separate components, in which case each component shall have a minimum dimension of 4 ft. 6 in. by 2 ft. 6 in., or in a combined compartment having a minimum area of 18 sq. ft.

(4) For each family or group exceeding 6 persons, there shall be provided

one latrine and one ablution, or a combined water-closet and ablution as required in paragraph (1) of this by-law.

218. Cooking area

(1) Sufficient properly designed cooking areas shall be provided with suitable provision for the storage of food.

(2) If the cooking area is in the form of a covered recess or cooking area, it should have a superficial area of not less than 24 sq. ft. with a minimum dimension of 3 ft. 6 in.

(3) If the cooking area is proposed to be carried on inside a habitable area, the area of such a room should be increased to not less than 50 sq. ft. for each person accommodating therein.

(4) If the kitchen is provided in a dwelling, it should be of not less than 25 sq. ft. having a minimum dimension of not less than 4 ft. 6 in

(5) A flue shall be provided in every internal cooking space unless other satisfactory provisions are made, the flue shall be constructed to have an internal unobstructed area not less than 27 sq. in. and shall be constructed of suitable material and terminated at a point no less than 3 ft. above the roof level adjacent hereto, or not less than 1 ft. above the level of the ridge of the roof.

219. Washing facilities

(1) Facilities should be provided for washing clothes. The requirement of this by-law shall be satisfied if the washing slab or splash area are constructed at the minimum rate of one per six persons of a minimum size of 3 ft. by 2 ft. for the slab and 3 ft. by 3 ft. for the splash area. The area of additional persons shall be increased by 1 ft. for each additional person.

(2) The floors shall be constructed of 3 in. concrete thickness and laid a suitable foundation. They shall be trowelled to a hardwearing easily cleansed surface and kerbed in such a manner to contain water.

(3) The floor shall be laid to suitable falls and drained to an approved point of dispersal.

223. Internal walls

All internal walls shall be color-washed with a hard-wearing material.

225. Height of habitable rooms

(1) If a ceiling is provided, the height of a habitable room should be no less than 7 ft. 9 in. with a minimum height of 7 ft. and the portion below 7 ft. 9 in. must not exceed 25 percent of the floor area.

TIME DIARY ANALYSIS

WEEKDAY ACTIVITY VS TIME OF DAY

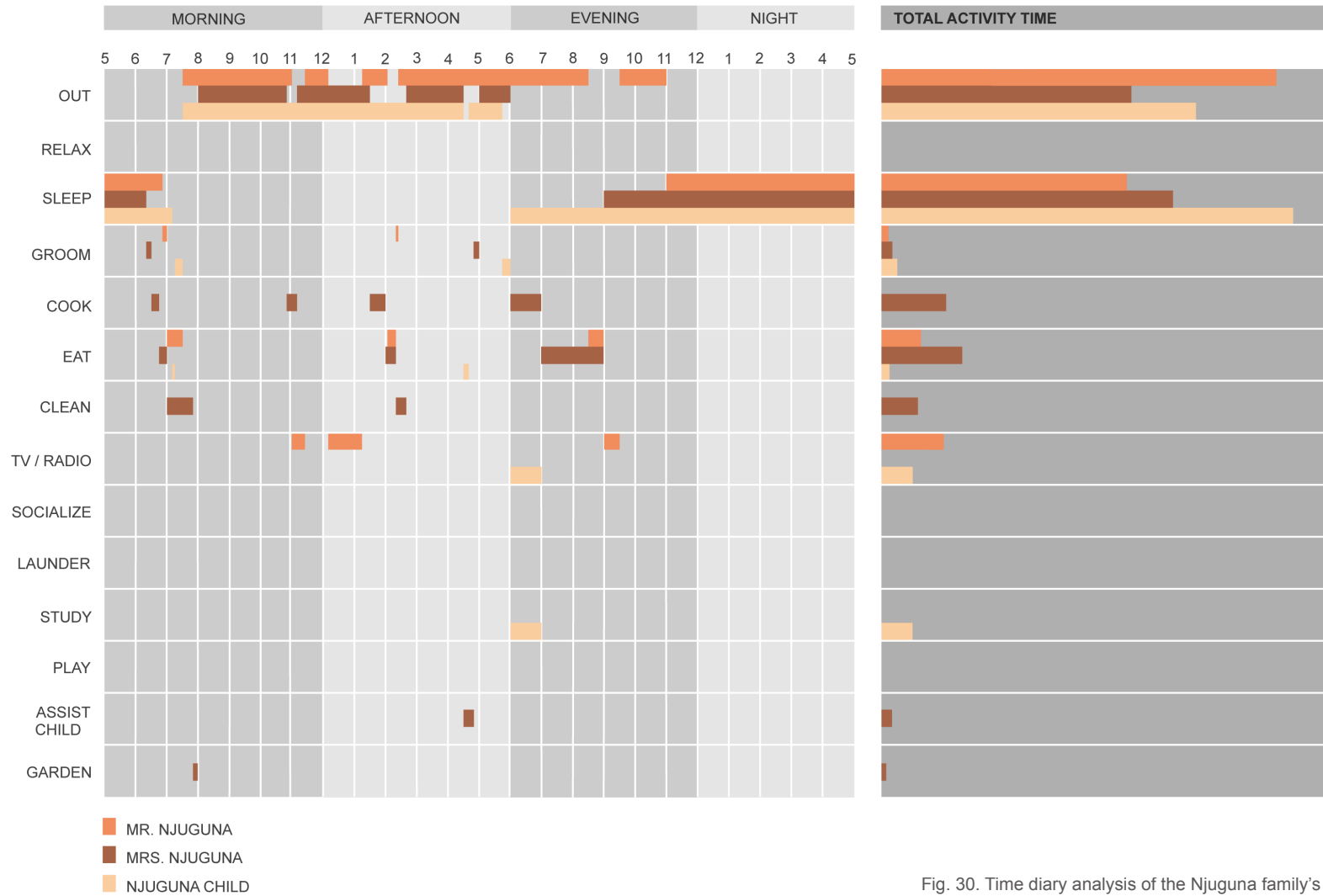
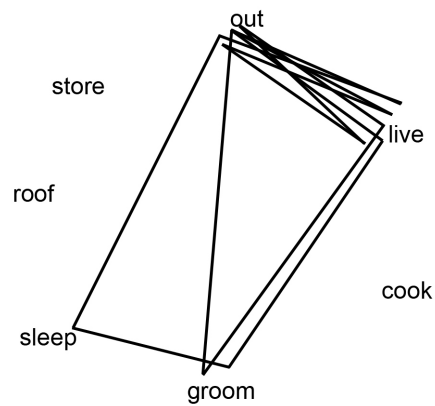


Fig. 30. Time diary analysis of the Njuguna family's daily activities in the weekday. Image by Author.

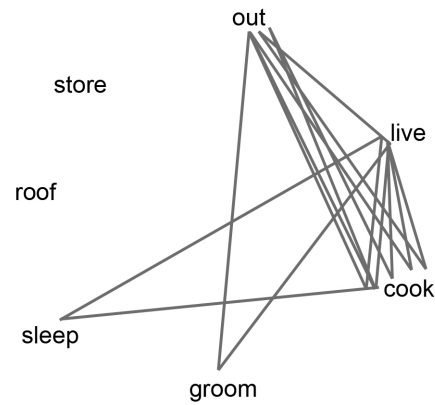
ACTIVITIES VS. THE SPACES (WEEKEND+WEEKDAY)



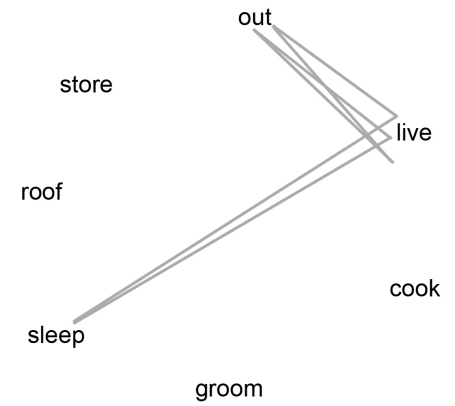
MOVEMENT OF USERS WITHIN THE HOME (WEEKDAY)



MR. NGUGUNA



MRS. NGUGUNA



THE NGUGUNA'S SON

Figure 31 is a time diary of Njuguna's daily activities in the weekend. The figure is divided into two main sections: a detailed activity timeline on the left and a summary bar chart on the right.

The detailed activity timeline on the left is organized by time of day: MORNING (6-12), AFTERNOON (12-5), EVENING (5-10), and NIGHT (10-6). The timeline is divided into 12 rows, each representing a different activity. The activities are color-coded: orange for MR. NJUGUNA, brown for MRS. NJUGUNA, and light orange for NJUGUNA CHILD. The timeline shows various activities such as sleeping, eating, working, and playing, with specific time slots indicated by colored bars.

The summary bar chart on the right, titled "TOTAL ACTIVITY TIME", shows the total activity time for each person in hours. The chart is organized into 12 rows, each representing a different activity. The bars are color-coded: orange for MR. NJUGUNA, brown for MRS. NJUGUNA, and light orange for NJUGUNA CHILD. The chart shows that Mr. Njuguna has the highest total activity time, followed by Mrs. Njuguna, and then Njuguna Child.

Legend:

- MR. NJUGUNA (Orange)
- MRS. NJUGUNA (Brown)
- NJUGUNA CHILD (Light Orange)

Fig. 31. Time diary of Njuguna's daily activities in the weekend. Image by Author.

Fig. 31. Time diary of Njuguna's daily activities in the weekend. Image by Author.

POST OCCUPANCY EVALUATIONS (POEs)

The following information was collected through interview sessions with selected inhabitants of Kambi Moto's Cecilia Court.

Identifying users

- The users in these homes ranged from one person to ten people. These consisted of a single occupant, two nuclear families and an extended family. Secondary users were usually short and long-staying relatives and friends.
- The ages of these users varied from 2 years to 45+ years. None of the families interviewed housed users with special needs.
- None of these families had gardens or home-based businesses because of the minimal space. One family kept rabbits. All families desired to have a garden and to keep small animal like chicken and rabbits. Three of the four families interviewed desired to maintain a home-based business varying from a fruit kiosk to a general store.
- None of these families had tenants but two families desired to rent out part of their homes to tenants for supplemental income.
- All of the families intended to make these homes their permanent homes and did not intend to move in the future.

User activities

- The daily activities identified by the interviewees included; cooking, eating, cleaning, laundering, grooming, studying, watching TV / radio, socializing, resting, sleeping, animal rearing and home renovations.
- All families commented that there was insufficient space to carry out all these activities.

Utilities

- Most families used charcoal and kerosene stoves to cook. Some families

used gas stoves. All families had electricity for lighting as well as indoor plumbing.

- All families stored water in large tanks above their homes as well as small containers around the house. This was insurance for when they did not receive water. However, all residents said that loss of water rarely happened in their new homes.
- Their household waste was disposed of through a local youth garbage collection unit that carried the waste to the city council dump.
- All households hand-washed their clothes and hung them outside on their roofs. In the case that their roofs were not accessible or the weather did not permit, they hung them in their living rooms or bedrooms.

Maintenance

- In terms of daily cleaning, all households found the concrete and stone interior easy to clean, however they lamented about the chipping floor. Most households favored having a tile floor but felt they were unable to provide that option at the time due to its high cost.
- Most families had already repaired or renovated a part of their home. This included painting and fixing broken equipment like toilet handles. All families felt it was their responsibility to repair and maintain their home.

Desired qualities

- All families found the thermal and lighting conditions of their homes satisfactory. Some families complained about noise levels from outside.
- All families were comfortable with the air quality of their homes except when the sewage outside was backed up.
- All families thought the security has greatly improved as a result of closing off Cecilia court to the public.
- All families thought they did not have sufficient storage for their household items.

- When asked what they would change about their homes, most families said they would increase the size of their homes as well as storage options. Some families would like balconies to lounge and sun bask. Most desired flower beds and a gardening area.
- All families took pride in decorating their homes. Some said that now that they were living in a more humane manner, it was their responsibility to emulate that change. Some interviewees said that it increased their sense of well being to live in a well decorated and clean home. Some said that they decorated their homes so that if guests or neighbors arrived their space looked well maintained.

Exterior spaces and communal spaces

- All the interviewees commented that exterior space was minimal and only allowed movement into the home. Most of the household representatives desired increased exterior common space so that they could extend interior functions like cooking and washing clothes outside.
- The interviewees also said that more exterior common space would also encourage communal living and provide ample space for their children to play.
- They all desired trees, flowers and shrubbery to be planted in these areas to allow for fresher air and shade. One interviewee desired murals to be painted to some exterior walls to peak the children's interest. This interviewee also desired the exterior spaces to be paved.

Building technology and materials

- The individuals interviewed were all trades people or had a trades person living in their household. This included two painters, a masonry and a welder.
- All interviewees favored stone as a building material because of its permanency and cultural prestige. Some household representatives favored reinforced bricks, concrete and interlocking bricks made from adobe.

Empowerment

- All the interviewees said they had been empowered by this community-led self-build project and felt it had increased their self esteem as individuals as well as strengthen them as community.

PHOTO-ANALYSIS & AFFORDANCES

PHOTO-ANALYSIS

The following is an analysis of four interiors within Kambi Moto's Cecilia Court. This analysis looked at cooking, living, groom, storing and circulation spaces. These spaces were photographed and analyzed to better understand the lived behaviors of the inhabitants with the hope of identifying some vernacular patterns and affordances.

Living

- Most of these interior spaces are packed with oversized furniture and equipment (fig. 30a-e). This has compromised the circulation within these spaces. This clearly indicates that the spaces provided are smaller than what the lifestyle of the users affords. Once visitors get into the living room, they can only remain seated unless they need to go to the bathroom because the space can only afford minimal movement.
- The natural light entering these spaces is usually from one direction, unless you are in a corner home (fig. 30a, b & d). This slightly darkens the space and compromises cross ventilation. Artificial light is at a minimum.

Fig. 32.(a)-(m) Interior environments of Kambi Moto
All images by Author

(a) Kamau's living room
(b & c) Njoki's living room



- Most of the users used fabric to conceal, decorate, protect, and partition space and form because it is an inexpensive material that also maintains an aesthetic appeal (fig. 30a, b-e). In some of the homes, the unfinished wall was covered with intricate lace fabric to conceal the rough bag-wash finish as well as to decorate the space (see fig. 30b & e). Fabric was also used to prevent damage to furniture and equipment, dust or dirt as illustrated by the tablecloths on the coffee tables, the seat covers on the couches and the doilies covering the television set and music systems.
- Fabric was also used to delineate space and create privacy between different functions and activities (fig. 30a & e). Here, fabric is used to create visual privacy through partial screening or completely blocking off views of different portions of the space. Thin vinyl sheets, straw mats and synthetic carpets were used to warm and conceal a deteriorating concrete floor.
- Most of the living spaces are oriented towards the concrete shelving system that was used for storage and display. This shelving system seemed to work for some households (fig. 30i) but not with others (fig. 30a). Wall units and cupboards provided additional storage (fig. 30c, e, g & i).
- In all households, add-on translucent drape filtered the view to outside. This

(d) Wanjiru's living room
(e) Njuguna's living room



emphasized the heightened need for privacy and control.

- In all households, an assortment of two and three-dimensional artworks were nailed to a wood trim re-appropriating its use from simply decorative to functional (fig. 30e). In another, the trim was used to secure a clothesline that afforded the drying of clothes within the interior (fig. 30a). In one household stuffed animals are displayed on the ledge of the sofa (fig. 30d). All of these acts display a multi-purpose approach to everyday use of space and objects and form within the interior.
- There were numerous customized shelving and display units built to fit into the nooks and crannies within the house (fig. 30e, g).

Cooking

- The cooking space did not seem to have sufficient horizontal working surfaces as most of the spaces photographed seemed to be cluttered with kitchen equipment, cutlery and others items (fig. 30f, h & i).
- There seems to be a need for temporal privacy. The kitchen area was

(f) Kamau's kitchen

(g) Njoki's kitchen

(f)



(g)



screened or left open to the living space depending on the people present within the living space (fig. 30h-i). In some homes, the kitchen was visually separated through a hang fabric. This fabric was mostly sheer and seemed to be more ceremoniously than functional, as the users working in the kitchen could still be seen and heard within in the adjacent living room.

- As in the living space, this space seemed too small and in need of creative storage solutions.

- These kitchens need to be better ventilated to avoid soot build-up noted. The soot is a result of using a kerosene stove.

- The natural light entering these spaces came from one direction, unless one lived in a corner home. This slightly darkens the space (fig. 30f & h). However, the connection to the outside through the view was noteworthy. Artificial light was minimal.

(h) Njuguna's kitchen

(i) Wanjiru's kitchen

(h)



(i)



- Circulation within these spaces was tight and it seems difficult for more than two people to work within this tiny space.
- In some homes, further delineation of space was done through the use of color.

Circulating

- The staircase in these homes was narrow and dark since there were no window openings. The only light that came through was when the bathroom door was open. The bathroom has a small window and the light is transferred to the staircase when its door is opened.
- In most households, the walls, nooks and crannies in the stair system became appropriated for the storage of a variety of equipment from baby strollers, water containers, buckets, tools to shoes (see affordance analysis)

(j) Njoki's bedroom

(k) A bedroom in a studio floor, Kambi Moto



(k)



fig. 31).

Storing

- The main storage spaces, in all homes in Cecilia Court, is a store located under the staircase and a cast concrete shelving unit. In all the households, the store underneath the stair was overflowing and disorganized because of insufficient space.
- There are many locations that seem to have afforded storage like the stairway itself and locations under and above furniture. Hanging and display storage has also been afforded by the nail able wood trim previously described. In one instance, the ledge of a sofa was transformed to display storage.

(l) Kamau's kitchen
(m) Njoki's kitchen



Sleeping

- In some of the homes, the sleeping area was section off the living area (fig. 30a, e, k & m), while in others it is located on the next floor (fig. 30j & l).
- The storage in these areas was provided through intended storage units like wardrobes and suitcases while hanging storage was appropriated through nailing the wooden trim and suspending clothing, hats, bags and other items (fig. 30j-m). There were no built-in features.
- In the households where the sleeping area was in a different floor from the living area, the sleeping space was divided into two zones, the sleeping and the storing zone (fig. 30j & l). In one home there was an additional grooming zone.
- Privacy was created through visually separating the sleeping space with fabric supported by a wooden frame or piece of rope (fig. 30a, e, j, k, & m).
- The use of double-deckers within these homes was unanimous due to the lack of space.
- The natural light distribution ranged from well-lit spaces to poorly-lit spaces. This was as a result of the orientation of the houses and their openings. However, artificial light was at a minimum.

Grooming

- All the bathrooms consisted of a shower, a knee height tap without a sink directly below the shower and an Asian style toilet.
- There was no storage space in this room. It is also very small.

AFFORDANCE ANALYSIS



Fig. 33. A collage describing certain vernacular behaviors within Cecilia Court interiors. Image by Author.

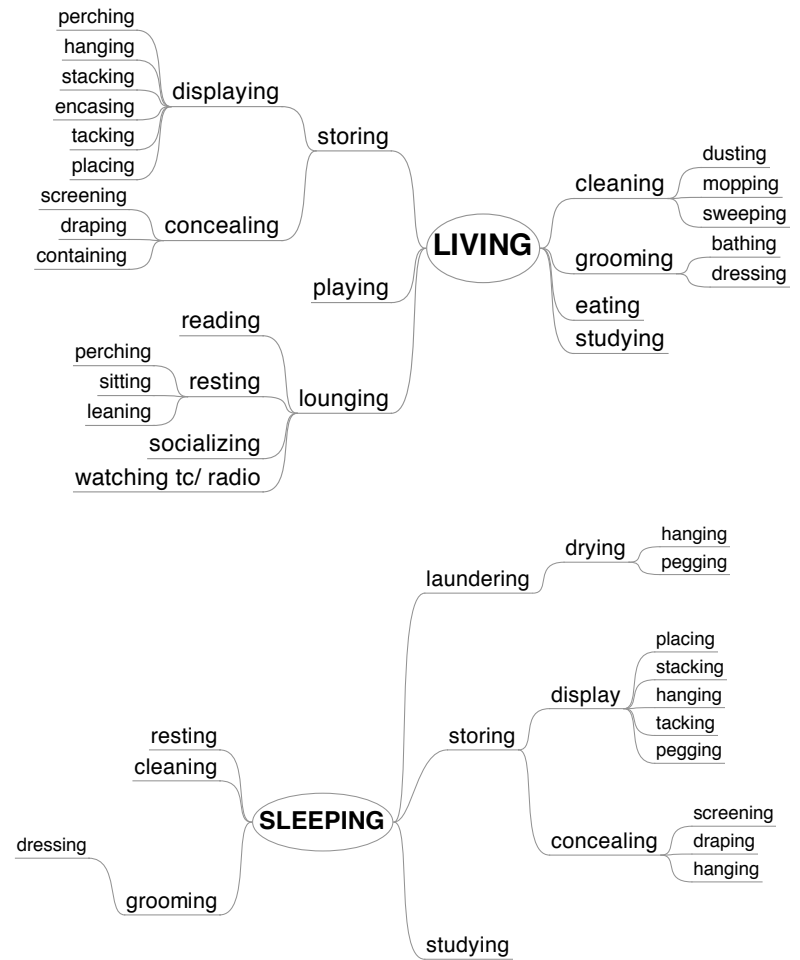
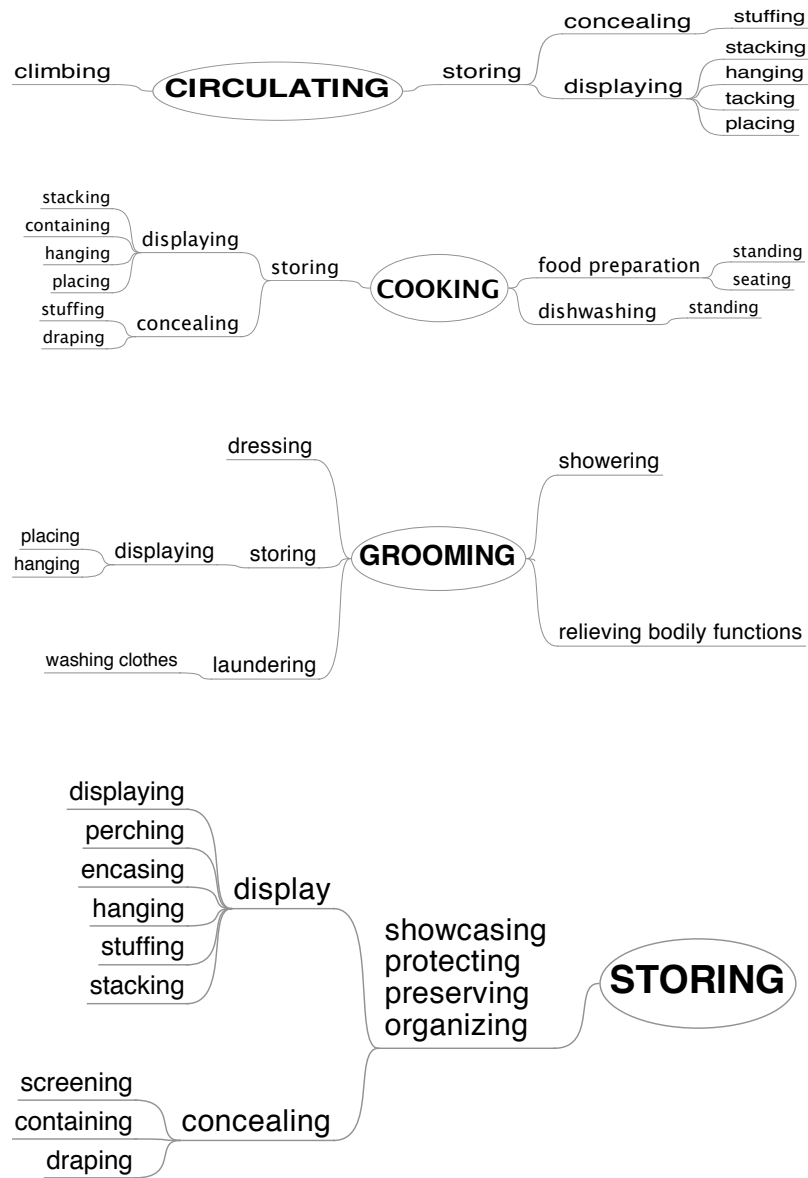


Fig. 34. Affordances: space- function- activity-behavior.
Image by Author.

DESIGN GUIDELINES

THEORATICAL CONCEPT	LATENCY
DESIGN CONCEPT	UNDERLYING, AMBIGUOUS, ILLUSIVE, HIDDEN ENERGY, POTENTIAL
DESIGN ELEMENTS & PRINCIPLES	•Controlled sense of movement •Use of texture, color and value to create varied illusions of depth •Distorted and segmented shapes and form •Use of negative form to loosely define space •Asymmetrical composition of elements within space •Upset sense of balance •Shifting focal points •Use varied scales to differentiate spaces •Use of non linear sequences of shape, color, and texture to create subtle rhythms
SPATIAL SYNTHESIS	•Consider skillfully concealing functional parts of the building elements and momentarily revealing them only to perform their function before skillfully tacking them away •Consider different scales of openings to control visual and physical permeability •Consider the use of corners to increase levels of privacy •Openings, walls, ceiling, circulation, and the floor should have hidden functions (potential) that become activated (kinetic) and then return to their hidden origin. Eg, reflective clerestory lip that can be moved to maximize light on ground floor

THEORETICAL CONCEPT	SYMBIOSIS
DESIGN CONCEPT	PARASITIC, ENCROACH, DIALOGUE, MUTATE, ACCRETION, INCREMENTAL
DESIGN ELEMENTS & PRINCIPLES	•Aggregate shapes and forms •Continuous lines, shapes, forms, texture and color used to connect adjacent spaces •Use of layering in shapes, forms and textures.
SPATIAL SYNTHESIS	•Consider connecting the different spaces with unifying functioning forms that adds value while providing connection and continuity. •Consider a relationship where each room carves out additional space from the under utilized space of the adjacent. •For light-locked spaces, consider translucent material that will allow light from adjacent space through •Consider cantilevering different floors, and spaces to increase sq footage and allow for more light •Consider shape-shifting forms and space that can serve multiple

THEORETICAL CONCEPT	TEMPORALITY
DESIGN CONCEPT	TEMPORARY, TRANSIENT, EPHEMERAL
DESIGN ELEMENTS & PRINCIPLES	•Utilize light to create shadows and highlights that will transform quality of environment as the day progresses •Use high contrast in hue and value to delineated and define shape
SPATIAL SYNTHESIS	•Allow for interior spaces to be easily manipulated to support dynamic daily activities through the use of movable interior parts like furniture and walls

THEORETICAL CONCEPT	IMPROVIZATION
DESIGN CONCEPT	INVENTIVE, FLEXIBLE, INCREMENTAL, DYNAMIC, HYBRID, SPONTANEOUS
DESIGN ELEMENTS & PRINCIPLES	•Use of implied lines and shapes that allow for the observer fill in for themselves •Allow for incomplete or subjective forms
SPATIAL SYNTHESIS	•Consider the use of a repeated form to generate spatial planes instead of using one mass •Consider a variety of interior building elements like walls, storage, vertical circulation, work surfaces that can temporarily remain at a location to perform a certain function and then become moved to another location to perform another •Consider the use of a wall system, interior and exterior skeleton, that can be altered to accept different materials, concrete, brick, stone, corrugated sheet, by inserting, dropping, etc •Every interior building element and spatial enclosures must offer a different function from the conventional one, e.g. the ceiling-floor acts also as storage compartments.

Fig .35. Design guidelines for mixed-use housing prototypes in Kambi Moto. Image by Author.

Fig. 36. Formal city. University of Nairobi students heading to class. Image by Author.







INFORMAL URBAN VERNACULAR

This section includes a detailed description of a typical home in Cecilia Court in Kambi Moto upgraded settlement as well as Lamu town in Coast Province, Kenya. These two examples represent two informal settlements, centuries apart in the making. Also included is a brief analysis of the desired attributes of these homes.

Cecilia Court

This Kambi Moto housing project was designed in conjunction with the residents of Kambi Moto, the City Council, Pamoja Trust and Tecta Consultants (Architects). The process was a participatory process that included a series of meetings with the residents to discuss their needs, dreams and aspirations. The process also included training on construction techniques and processes, since the dwellers were the builders of these homes. This process culminated in the construction of dense self-built incremental housing. The project continues.

At the overall settlement layout level, the houses are aligned back-to-back to form small clusters. The clusters comprise of a number of houses, often between three and five that open into and share a common outdoor space. The design of the new houses and the settlement layout deviates from the existing housing standards and planning parameters in a number of ways. One example is the ground coverage and the plot ratio are 80% and 2.5 respectively, compared to that of 50% and 1.5 as provided in the standards (Nairobi City Council By law, 2003).

The basic unit for the Kambi Moto housing project is a three-storey house. The ground floor space is intended to be used as a lounge space. This space includes a kitchenette and a storage space, tucked under the staircase. The

Fig. 37. Interior stair leading to bathroom, Cecilia Court (previous page). Image by Author.

Fig. 38. An satellite image of Huruma with Kambi Moto indicated). Image courtesy of *Pamoja* Trust.

Fig. 39. Location of Cecilia court within Kambi Moto. Image by Author.



first floor has a bedroom as well as a bathroom. For those houses facing the street, a balcony is attached to the bedroom space. The second floor is organized in the same way as the first floor. The next floor, the roof, is designed to be a terrace where the occupants of the houses can relax in convenient weather, hang their laundry or even practice some urban agriculture. The back-up water storage tank is located here.

Fig. 40. Mother and child play within Cecilia Court (previous page). Image by Author.





Fig. 41. Collages of Kambi Moto interiors (pg 112-113). Images by Author.

Fig. 42. A little girl plays on a narrow street in Lamu old town (next page). Image by Author.



Lamu

Lamu is one of the oldest towns in Kenya and is located in the Coast province. It is an archipelago nestled by Indian Ocean. The earliest historical reference of this town dates back to the fifteenth century (Ghaidan, 1975). The townscape is informal and quite intimate in scale with very narrow streets that only allow for pedestrians, carts and donkeys. It is reported that there are less than three cars on the island. The streets are too narrow for cars, motorcycles or trucks especially in the old town. Facades towards the streets are often windowless, interrupted only by entrance porches (Ghaidan, 1975).

The houses' footprints in the old town are usually less than two hundred and fifty square meters and cover 70% of the plot. This makes Lamu a very compact town. The stone-built houses in Lamu are self-contained and usually two storey or more, normally with an additional penthouse. Most of these houses have internal courtyards, covered walkways, verandas, terraces, and several niches. The layout of these houses are usually organized in a linear manner moving from public areas like porches to semi public areas like courtyards, sitting areas, to private areas like sleeping quarters.





Fig. 43. Night view of Lamu old town (previous page). Image by Author.

Fig. 44. Interior images of house in Lamu. Images by Author.



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COMPACT URBAN

This section includes a brief description of a six compact interiors within an urban setting that have influenced this design inquiry. The description also included a brief analysis of the desired attributes of these interior spaces.

Fig. 45. Women walking, Lamu (previous page). Image by Author.

Fig. 46. Negotiating minimal spaces, an overflowing pantry in a home in Kambi Moto. Image by Author.



Paco

Location: Mobile

Designer :Schemata Architecture Office and Jo Nagasaka

Size: 3m-box cube

Description: Single storey self contained cube unit with pop-top for single user.

Desirable Attributes: This structure's extreme compact nature allows for a multi-use of the space where everyday objects like beds, toilets, showers and tables become hidden to free up space to accommodate a temporal approach through the layering activities. This allows the space to remain uncluttered. This cube can be placed in the exterior or inserted in a house.



Fig 47: Interior and exterior collage of Paco by Schemata Architecture Office and Jo Nagasaka. Image courtesy of Schemata Architecture Office.

Engawa

Location: Tokyo, Japan

Designer: Tezuka Architects

Footprint: 74.48 sqm

Description: A one storey family house completely open to an interior courtyard.

Desirable Attributes: The design of this home utilizes a compact and minimalist approach by minimizing the use of partitions walls. The house is designed in a linear manner maximizing use of natural light and ventilation to each room. The use of a large movable window-wall maximizes lighting as well as allowing for an inside-out connection. The entire back wall acts as storage. The clever use of the traditional *engawa*, overhang, encourages a soother sheltered transition from inside to outside.



Fig. 48. Interior and exterior collage of Engawa by Tezuka Architects. Image courtesy of Tezuka Architects.

63.02 degrees

Location: Nakana, Japan

Designer: Schemata Architecture Office

Footprint: 25.58sqm

Description: A three-storey family house oriented at 63.02° from the street.

Desirable Attributes: The design takes a creative approach to an unusual footprint. The clever use of unusual angles allows for the creation of a unique residence with lots of character. The designer maximizes natural lighting through the placement of large windows as well as the orientation of the building. The placement of the windows and openings, beautifully frame views to the outside. The loft approach encourages a feeling of airiness while the austere use of materials and finishes allows for a clean look, which can further be personalized by the client.



Fig 49: Interior and exterior collage of 63.02 degrees by Schemata Architecture Office. Images courtesy of Schemata Architecture Office.

Circuit box

Location: anywhere

Designer: Studio x design group

Size: approximately 15sqm

Description: Single family residences

Desirable Attributes: flexibility

Circuit box is a possible answer to an adaptable inhabitation of space within the domestic realm. Depending on the present activity, the concept allows for temporal manipulation of objects and surfaces within the space. The interior space is transformed through the use of a series of ring partitions of different sizes nested within each other. By extracting and arranging the rings differently, activities like eating, lounging, studying can be supported using the same furniture components.

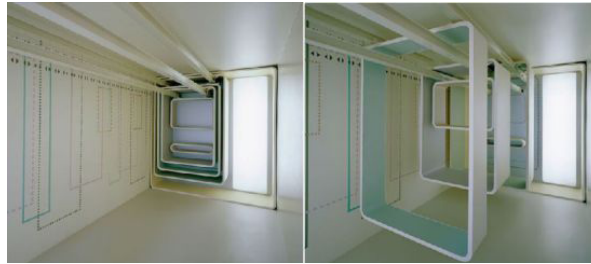


Fig. 50. Interior and exterior collage of Circuit Box. Images courtesy of Studio X Group.

Moriyama

Location: Tokyo, Japan

Designer: Ryue Nishizawa

Size: Varies between 16-30 sqm each

Description: A complex of single, double and triple storey studio-like spaces for private residence and rental units. These room-spaces represent a fragmentation of buildings into their constitutive parts to support an alternative pattern of inhabitation.

Desirable Attributes: The client has the option of clustering the single rooms according to their needs. The spaces are compact with minimal use of materials and finishes. The placement of the cuboids within the exterior landscape, creates public pathways, courts, and niches. These become places for pause, socialization and recollection. The maximization of space is encouraged through an encroaching of these cubes into the street. In one instance, the side of the complex touches the street boundary. Single large windows are consciously placed to encourage a flood of natural light while framing views to the courtyard and streets beyond.

Two courts

Location: Tokyo, Japan

Designer: Keji Ashizawa

Size: -

Description: Four-storey family house in urban environment.

Desirable Attributes: Even though the house seems narrow and windowless from the exterior, privacy and light issues are resolved through use of two cascading courtyard. These courtyards provide private outdoor spaces while casting a gradual light throughout the interior of the residence. The additional use of transparent materials and lightwells bath the residence in natural light throughout the day, softening the hard concrete walls and the ceilings.

CONCLUSION

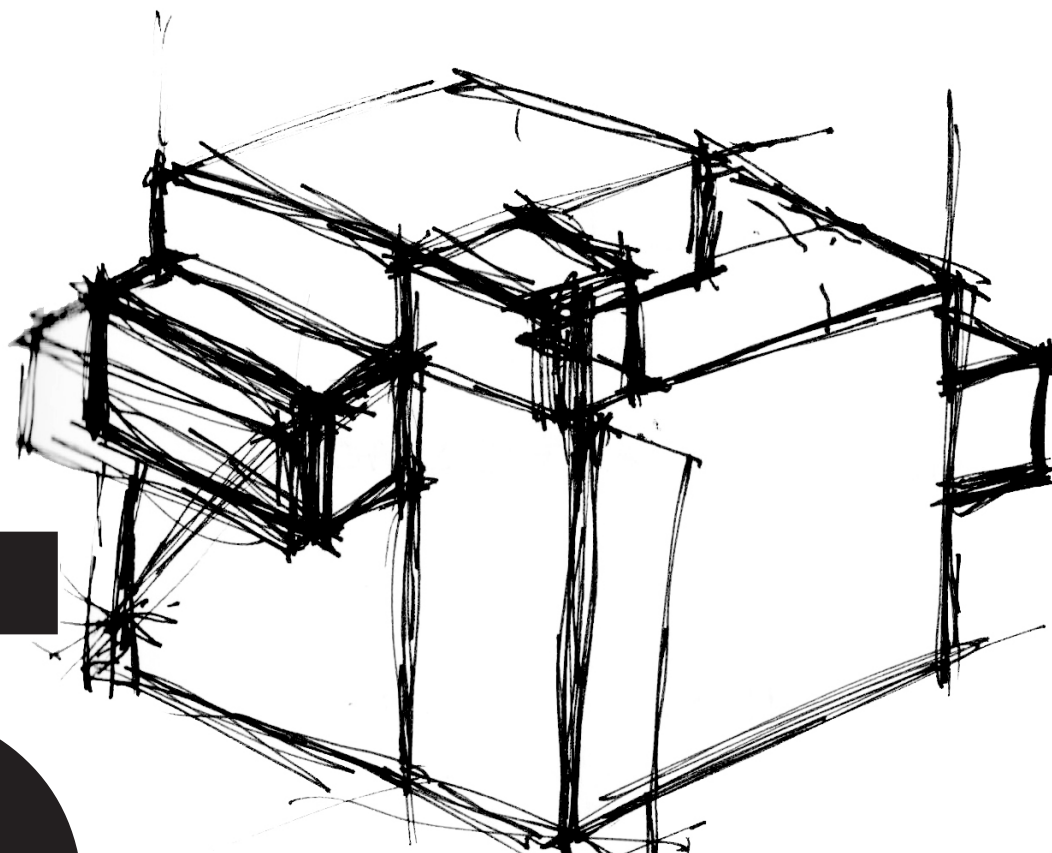
Through the study of the chosen informal vernacular and compact urban precedent examples, I have identified the follow attributes as paramount in the design of compact adaptable mixed-use housing prototypes for this inquiry.

- Creatively utilize compact space through the layering of activities. This can be done through using a flexible spatial framework that supports multiple activities.
- Maximize the use of natural light through the orientation of building, the size of its openings, building form, elimination of unnecessary interior partitions and the use of screening within interior spaces.
- Maximize ventilation through the use of courtyards and openings as well as loft spaces.
- Allow for a minimalist approach to partitioning spaces to allow the user the flexibility of convert each space to suit their needs.
- Use austere materials and finishes to lower cost as well as to allow the user to personalize the space further down the road.
- Encourage pause in in-between spaces by extending interior qualities to the outside through introducing overhangs, verandas and structures that afford lounging.
- Negotiate privacy through the use of screening and partitioning without compromising light quality or ventilation.
- Encourage a linear progression of movement with a direct flow from space to space with the intent of minimizing dead space.
- Explore the multi-uses of building elements and allow for creative reinterpretation e.g. a partitioning wall is also a storage unit or a stairway is also a storage unit.
- And finally, accommodate massive storage needs in a clever fashion through the use of concealed and displayed surfaces, in both expected and unexpected areas to maximize space use.

Fig 51: An interior of a mosque with a view of the indian ocean, Lamu (next page). Image by Author.



5



The design chapter details the spatial development of two units from idea to conception through the use of photographs, sketches, plans, sections, and perspectives. A discussion of the connections between the theory, research, programming and precedents is provided. Finally, the conclusion addresses lessons learnt and future research directions.

Negotiating Space

This chapter documents four compact mixed-use housing prototypes. These units were designed as an alternative to the previously constructed Cecilia Court unit (pg. 111-115). The units at Cecilia court were designed to support one type of user, a family of four or more, willing to own the structure. The proposed design responds to the 40% population who were either single or two-person household. This population also represents a significant number of residents who can not afford to own their homes but are prepared to rent from the structure owners. The POE's also revealed a symbiotic desire for structure owners to rent part of their home for supplemental income. Also noted was the need to accomodate provisions for home-based businesses, gardening and animal rearing.

My review of the research presented in the site analysis chapter (pg. 19-23), as well as the information gathered through interviewing Cecilia Court residents (POEs) made it evident that there are four types of potential users in Kambi Moto, namely rent, rent-live, work-live and live (pg. 67-69) and the new built form needs to respond to their diverse situations.

Through conversations with the residents of Kambi Moto, time-dairy analysis and the photoanalysis of their interior spaces, the main concerns identified were firstly, the small size of their homes and their shared exterior spaces and secondly, the need for multi-functional spaces that allow for home-based businesses, rental options and gardening. The latter concern was tackled

as follows. The resulting settlement occupies the same area as the previous one, but contains 56 households. While Cecilia court includes 55 structure-owner households, the new settlement has 40 structure-owned homes and provides housing for sixteen renters, a truer reflection of the vernacular situation of Kambi Moto. The new unit configurations support one to ten-member households. One unit provides for a home-based business. The other two contain rental units, while all four house types have an adaptable rooftop garden space. This rooftop space can also be expanded for future use.

I addresses the concern about limited space concern on a site, building and interior level. I designed site layout to encourage social pockets of spaces (see pg 136). I witnessed this idea of social pockets of space in the present layout of the Kambi Moto settlement. The new layout accommodated this vernacular by creating interior courtyard spaces. These social spaces afford the possibility for the temporary nature of socializing. Residents can stop for a chat, children can play, and community meetings can be held here. Similarly, the perimeter of the settlement also hosts a series of nooks and crannies that can be temporally animated and improvised by HBB's as an extension of retail interior spaces.

On a building level, I address the lack of sufficient space issue by including a basement as well as an adaptable roof space (see pg. 139-142). The Cecilia Court unit includes four levels and is approximately 80.08 sq. meters a unit while the proposed building included an additional basement level and varies from 144 -153.375 sq. meter units. The use of rigid-frame structure of reinforced columns and beams (see pg. 135) allows for the inclusion of multiple levels within the interior to maximize and activate latent space within the building (see pg. 150 & 152).

The use of selective extensions also negotiates and increase interior space (see pg. 139-142). This idea came from observing the symbiotic negotiation of space within Kambi Moto. (see pg. 23)

Finally, the interior addresses the space issue on multiple levels; namely the shifting unit configuration, the multiple levels approach, the placement of fenestrations, the interior building systems and suggested furniture systems. The shifting unit configuration allows the users multiple views from the different shifting floors within their units. This creates a sense of perceived spaciousness. The shifting units also creates an illusion of extended spaces where one could simultaneously see three different floors of their home unfolding in the distance (see pg. 161).

The multiple levels approach is possible as a result of 2.74 m (~9 ft.) floor-to-ceilings height and was a result of the rigid-frame structural system. This approach allowed me to divide two adjacent floors into three levels. In the yellow unit (rent and rent-live), these levels are divided into a storage space, a kitchen and a toilet (see pg. 151). In the work-rent unit configuration (purple), the work space is partially sunken into the basement level to increase shelving space for products as well as to allow an increase in the headroom space for a toilet underneath the stairs (see pg. 153). These strategies maximize latent space that are traditionally inactivate. The placement of these levels also takes advantage of the temporal nature of activities. In the yellow rental unit, the kitchen platform doubles as a temporary path to the living space.

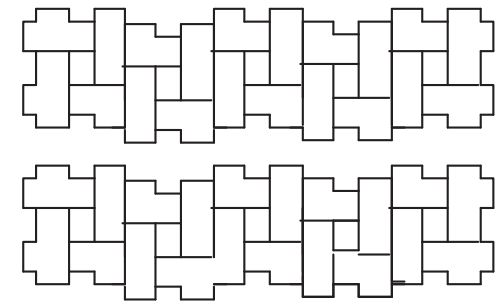
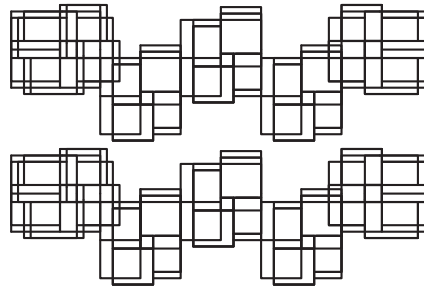
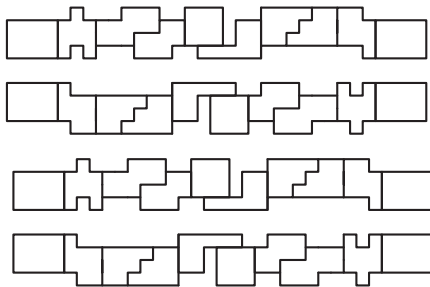
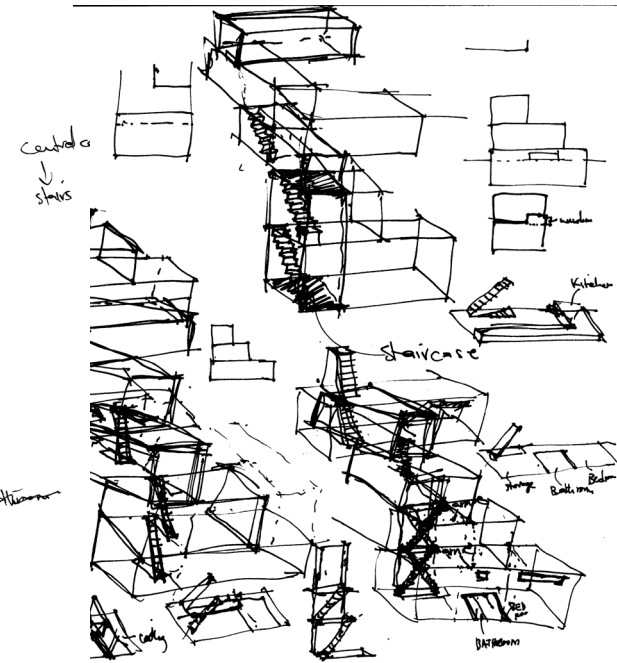
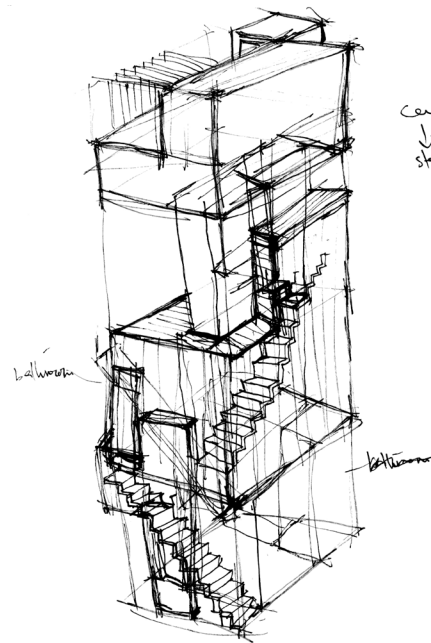
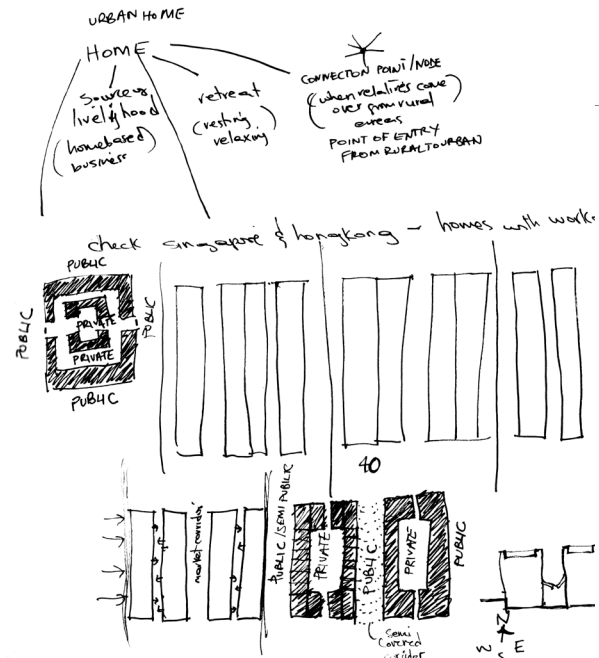
The placement of the window openings within the building also maximize of daylighting and views to the outside. In return, this helps create a feeling of spaciousness. The utilization of multiple windows on the jutting extensions that house the balconies, kitchen and bedrooms allows for extra light penetration, creating an airy feeling.

The interior building systems address the compact use and negotiation of space in a variety of ways. Building systems like walls, that are traditionally used as privacy barriers and/or to separate different spaces, acquire secondary functions as storage and display units and stairs railing (see pg. 150-153). These systems can both display and conceal items in a number of ways.

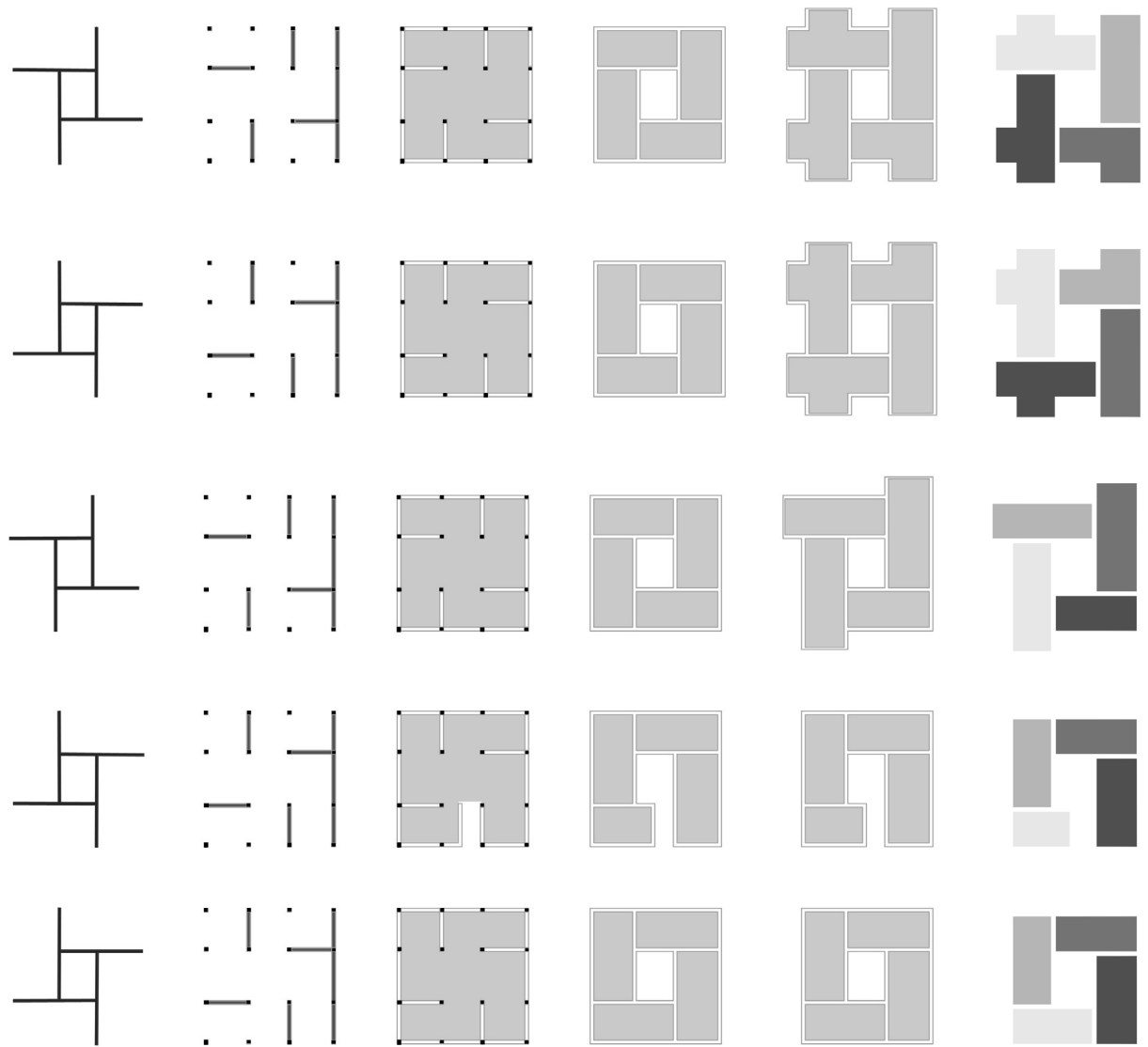
In my design, I was careful not to include solid full-sized walls except in the case of completely private spaces like bathrooms and some bedrooms. By studying the vernacular of the people, I know that by providing tack-able walls through the selective use of wood, any space can be converted into a semi-private space through the use of curtains. I utilized partial walls and screens to allow the penetration of light and selective views while still allowing for a sense of privacy.

Stairs that are traditionally used for circulation also acquire secondary uses as storage. In one instance (see pg 153), the construction of the stairs affords the creation of an additional bathroom space below. Also in some cases, the wall and stair systems work symbiotically to provide each other structural stability while this inter-connection allows for a minimal collective footprint (see page 150-153).

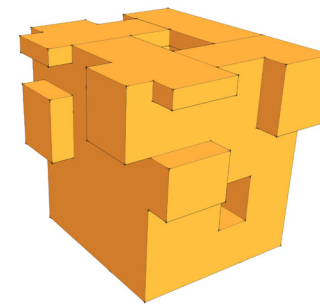
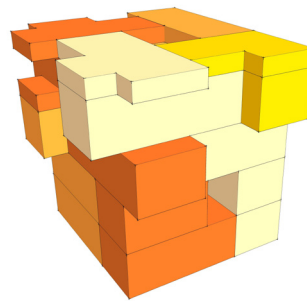
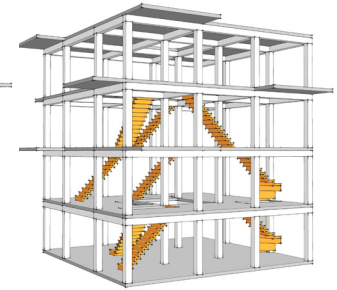
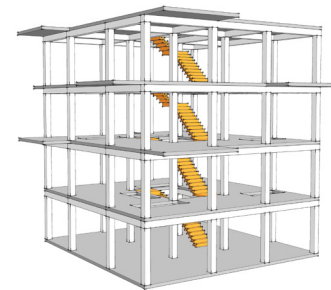
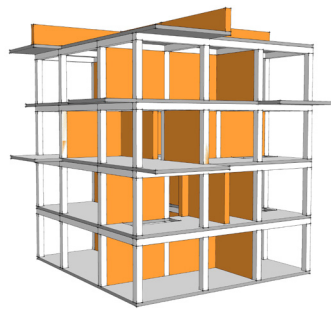
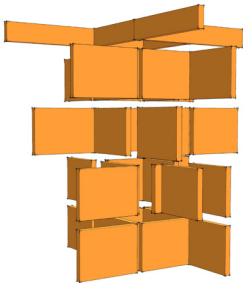
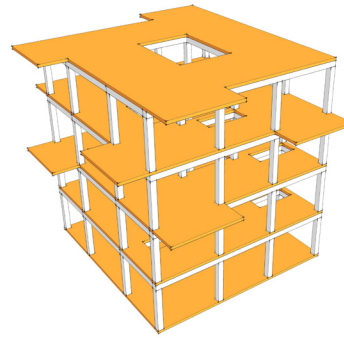
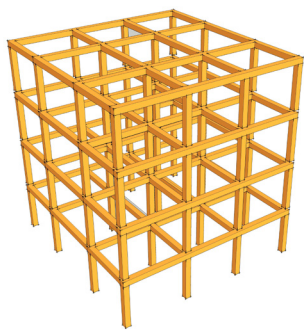
Finally, a furniture system has been suggested to the residents of Kambi Moto. This system is multi-functional and can be utilized as benches and stools, a bed platform and a wall unit while affording storage and display of the users' paraphernalia (see pg. 170). Some of the units of this system can be tacked within itself or hung to utilize latent space thus becoming activated into the desired use when necessary.



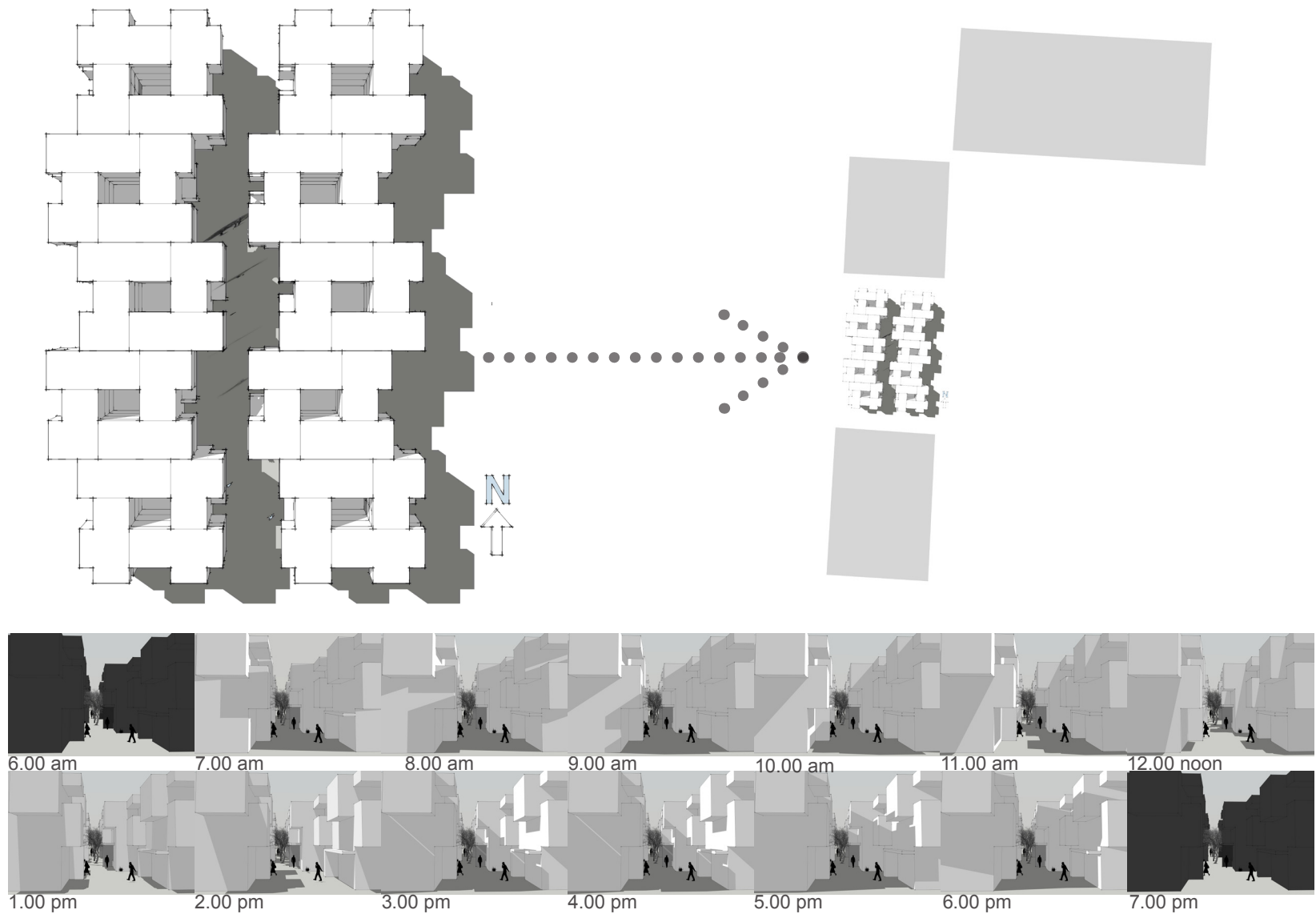
Early Exterior and Settlement Form Development



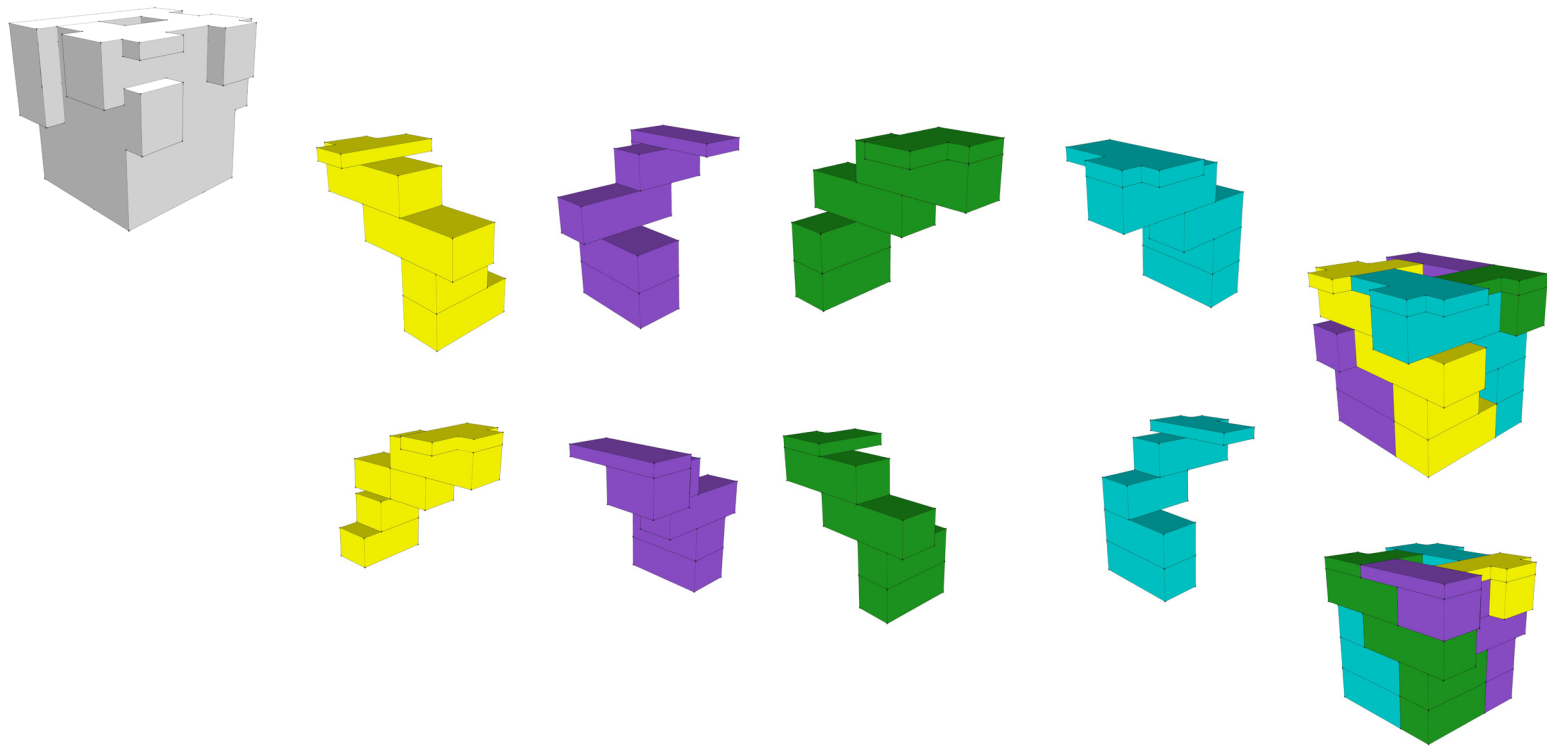
Concept, Structure, Space, Form, Extensions & Configurations



Structure, Partitions, Circulation & Massing



Kambi Moto Settlement Plan and Daylighting



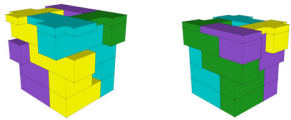
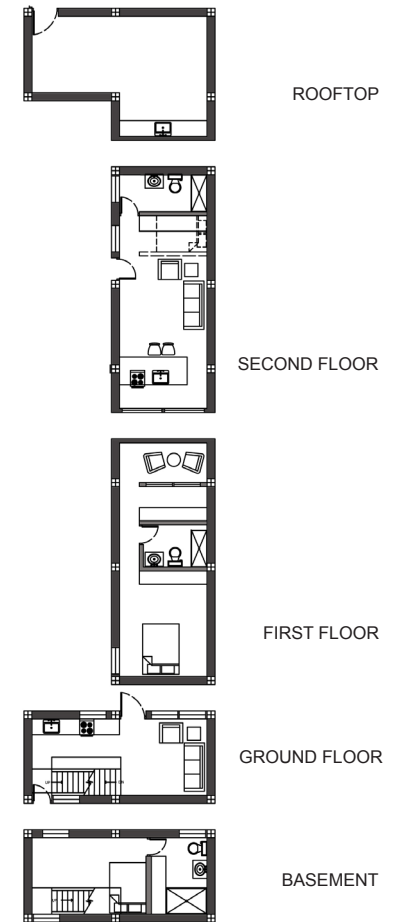
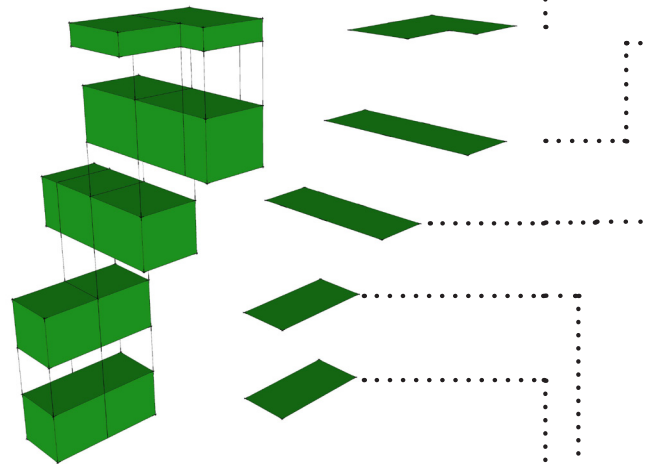
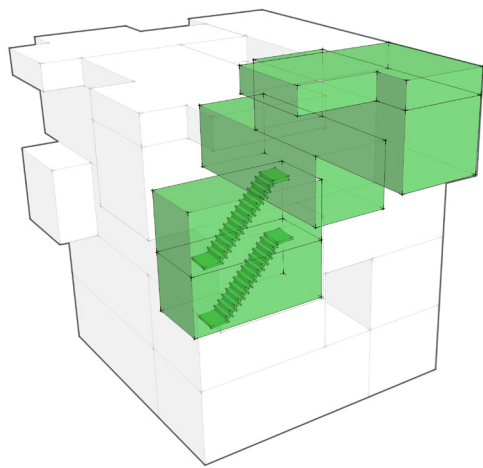
RENT 1	42.000 sqm
RENT-LIVE 1	107.250 sqm (excludes renter)
RENT 2	33.750 sqm
RENT-LIVE 2	110.250 sqm (excludes renter)
WORK-LIVE	148.125 sqm
LIVE	153.375 sqm

Unit Configurations & General Massing



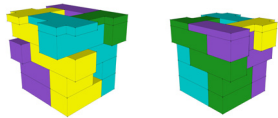
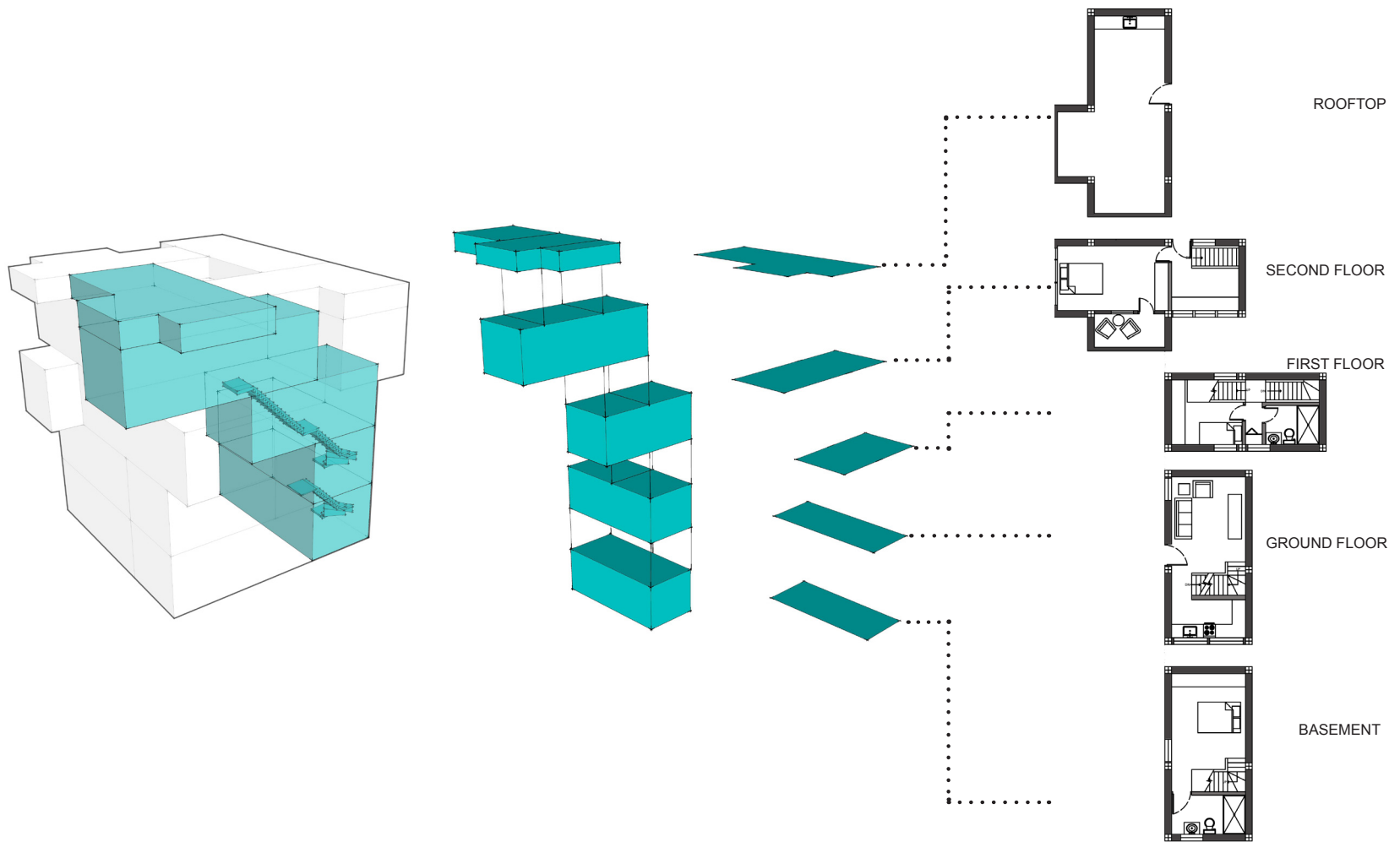
Interior Vernacular

DESIGN INTERVENTION | 138

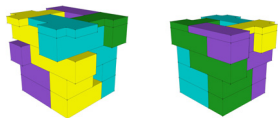
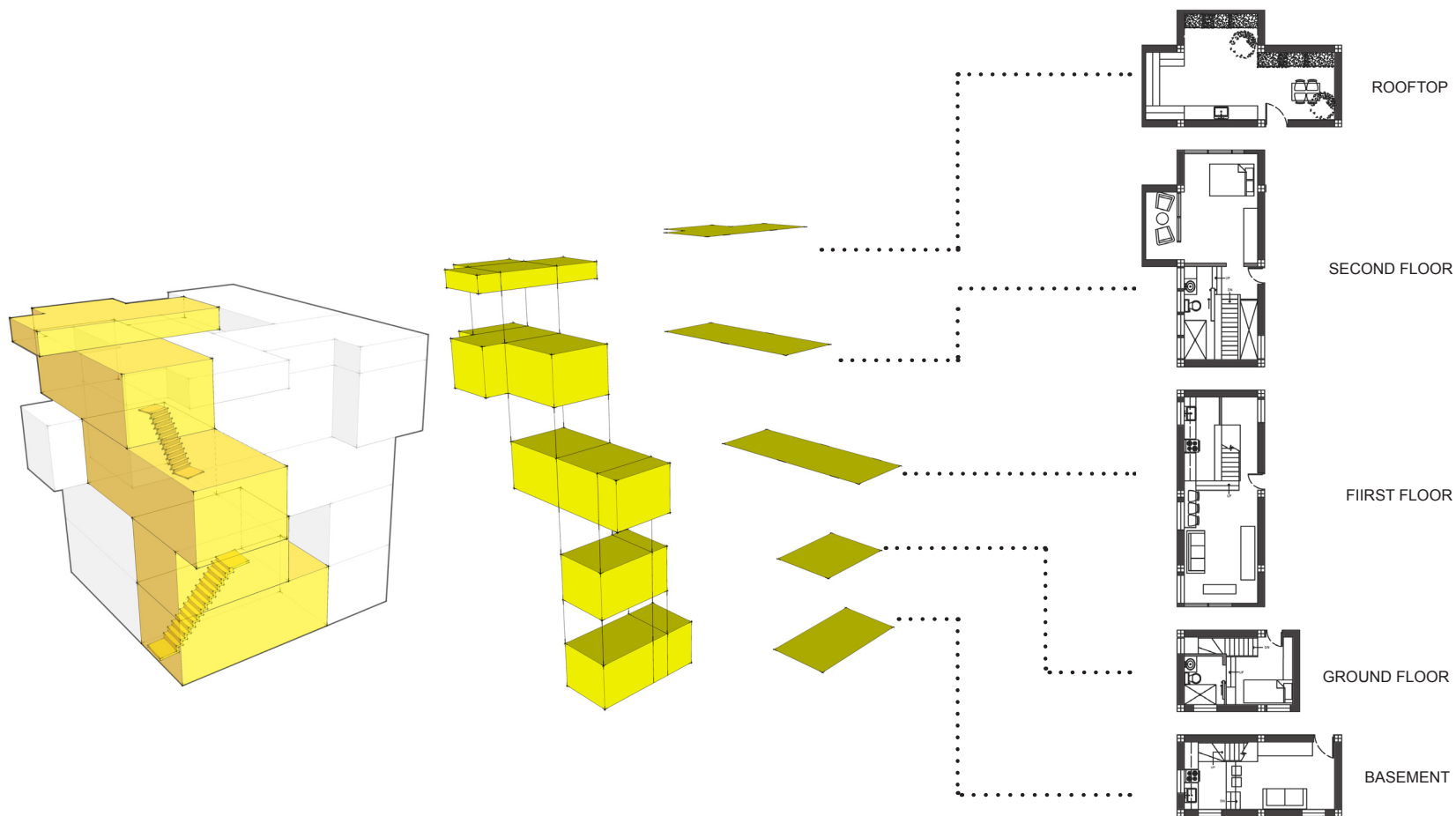


Rent & Rent-live

Interior Configurations Development



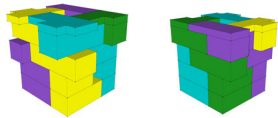
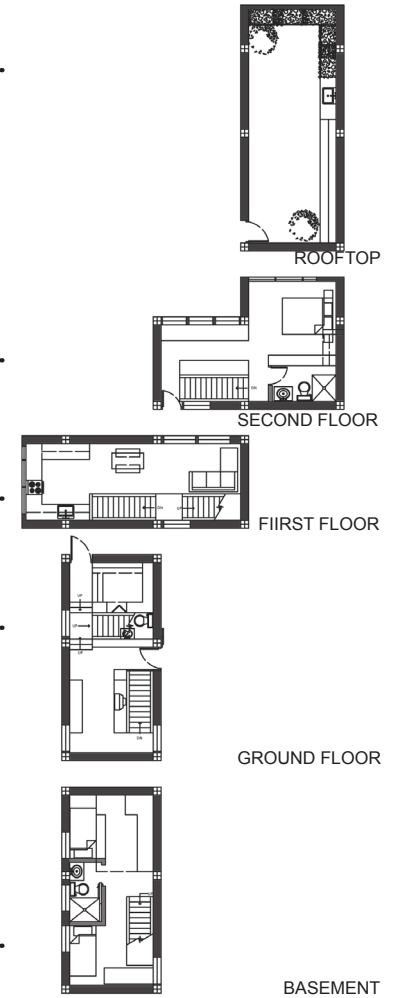
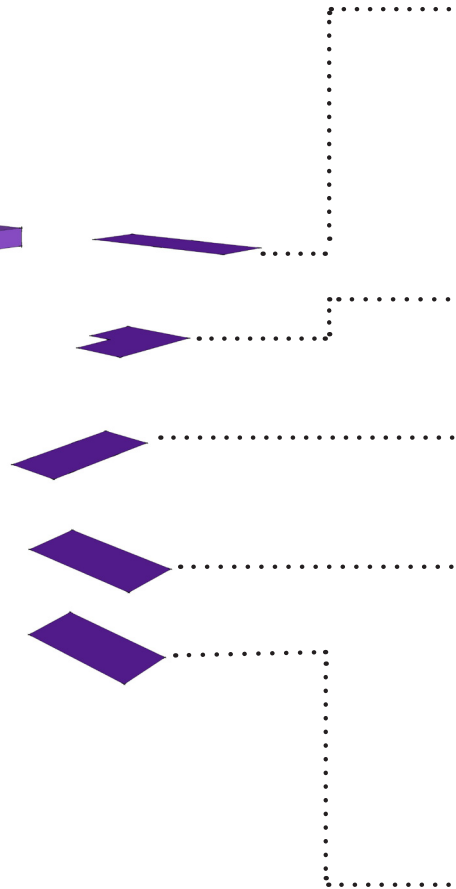
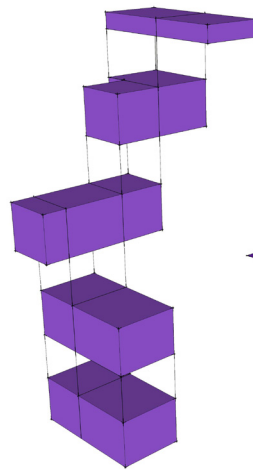
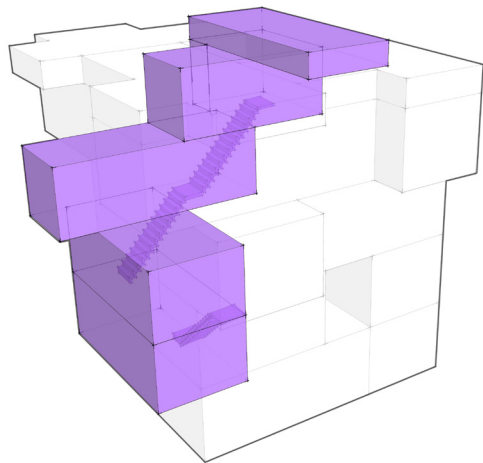
Live
Interior Configurations Development



Rent & Rent-Live

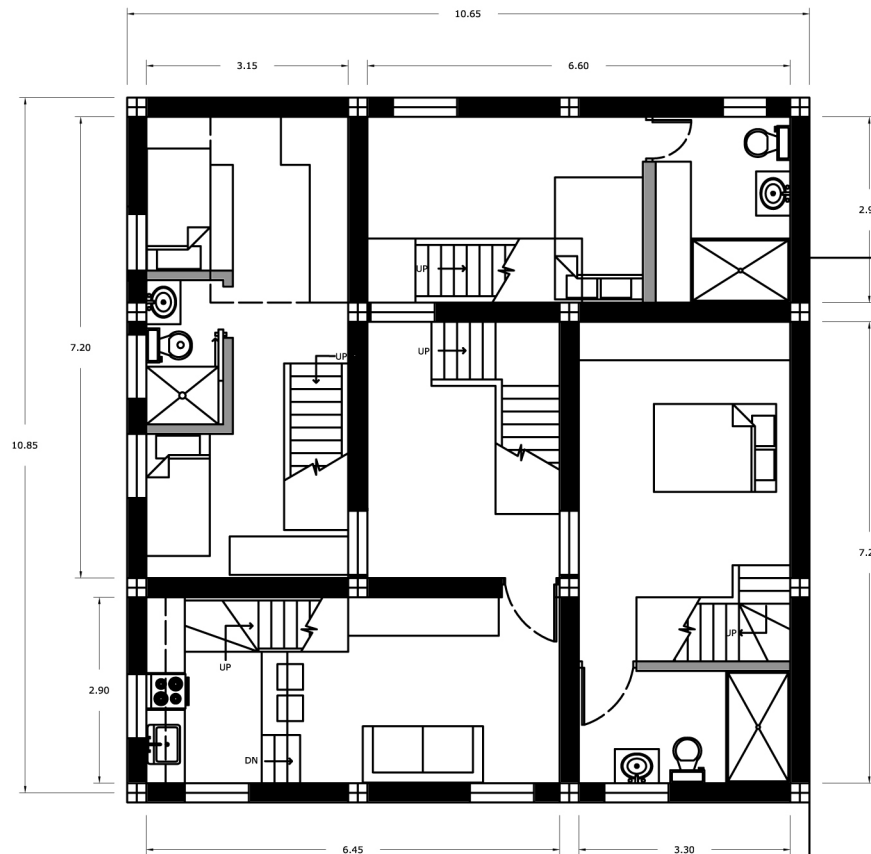
Interior Configurations Development

DESIGN INTERVENTION | 141

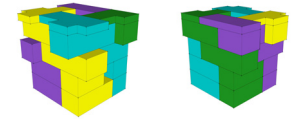


Work-Live

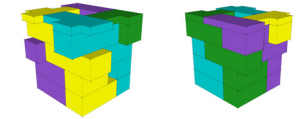
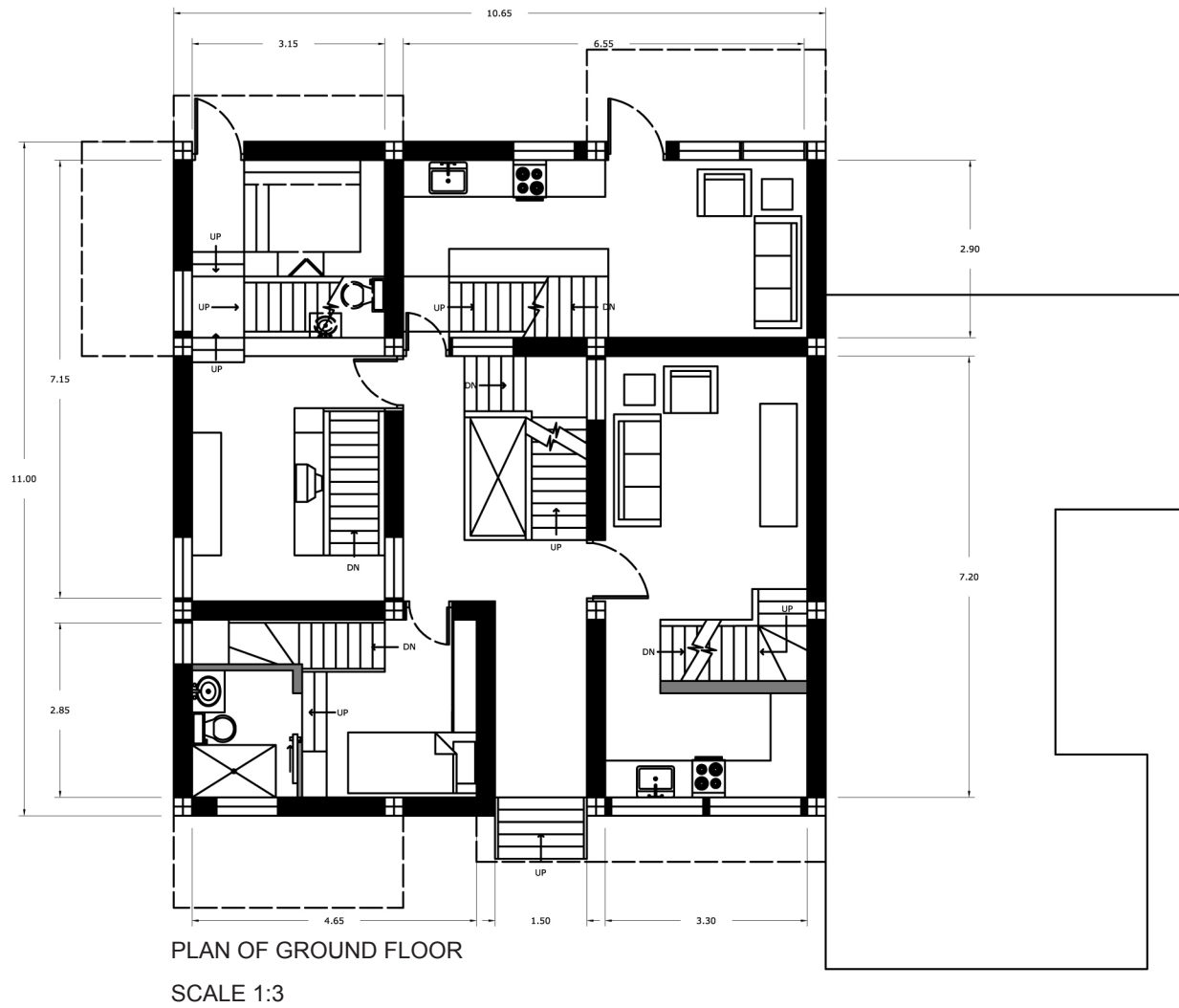
Interior Configurations Development



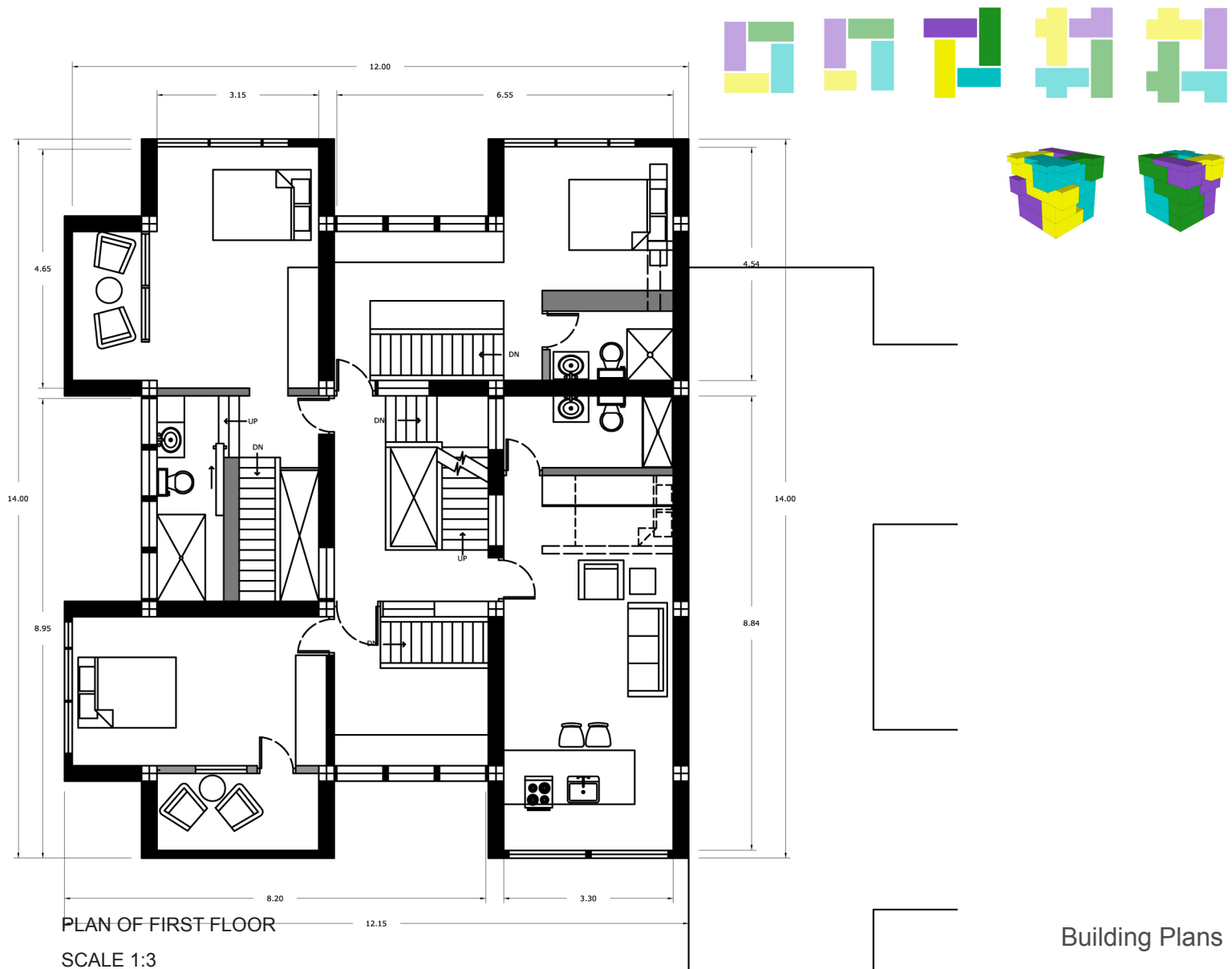
PLAN OF BASEMENT
SCALE 1:3

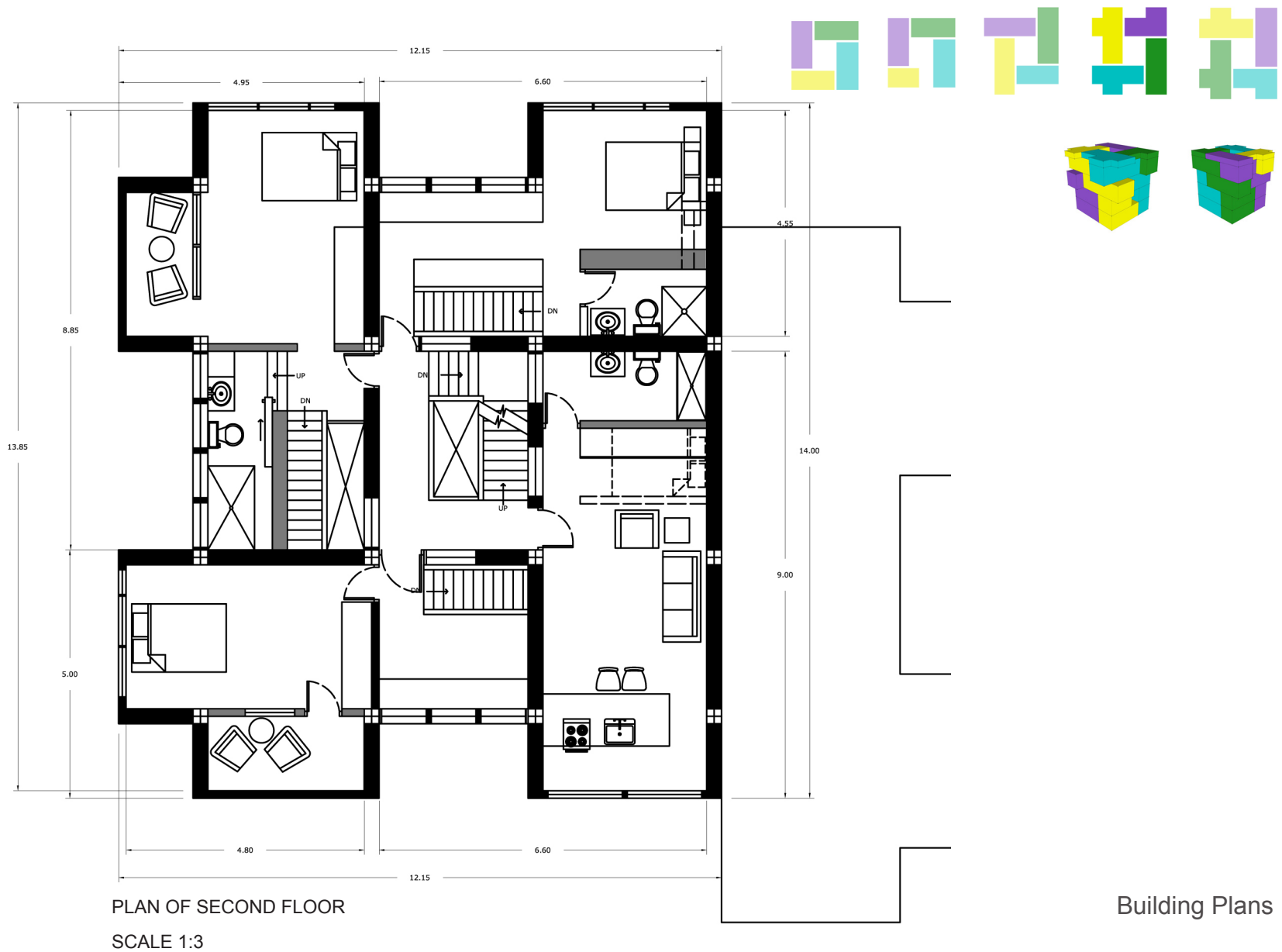


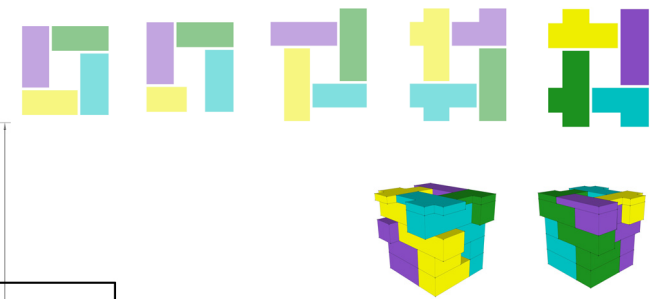
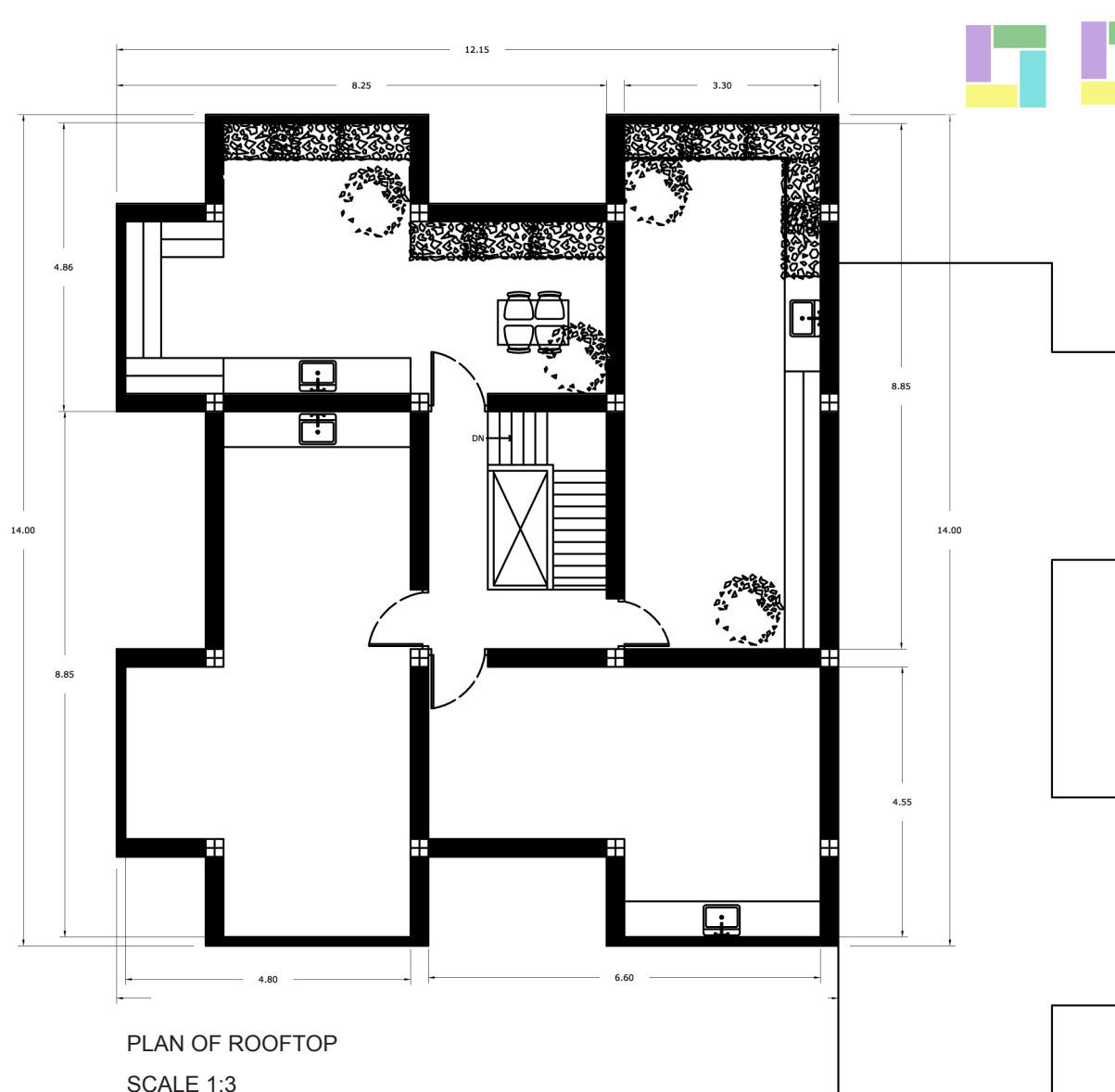
Building Plans



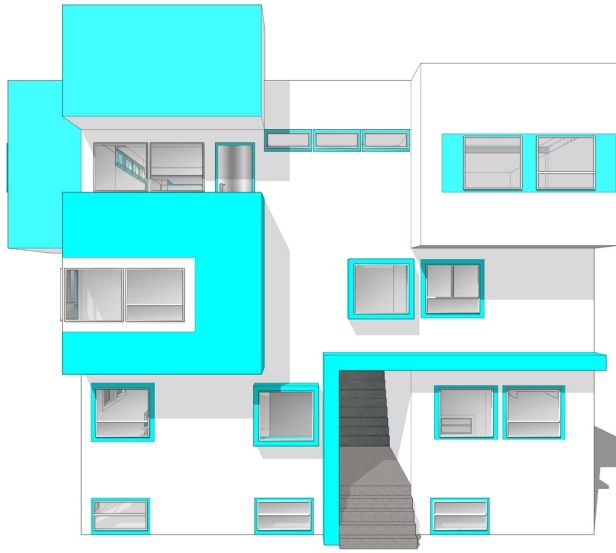
Building Plans



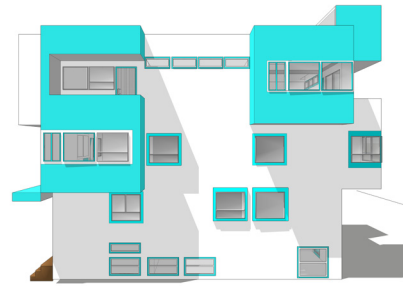




Building Plans



NORTH OF THE BUILDING



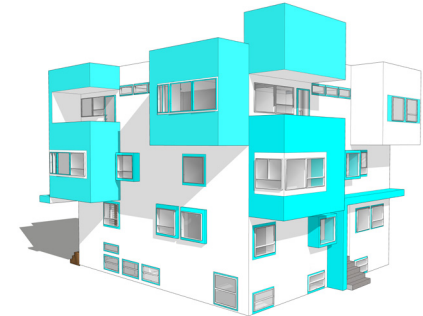
EAST OF THE BUILDING



SOUTH OF BUILDING



SOUTH-WEST VIEW



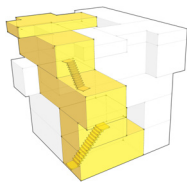
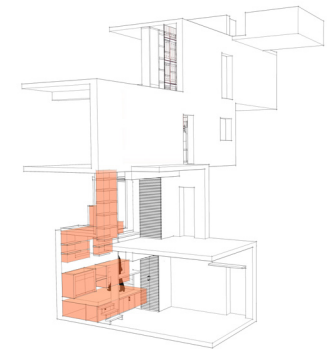
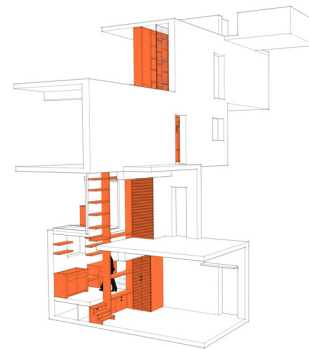
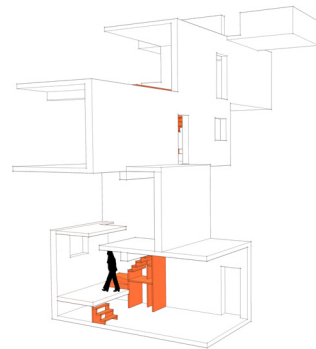
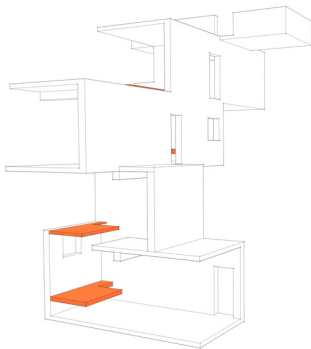
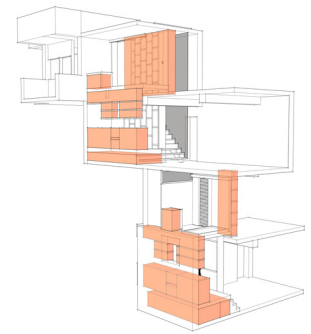
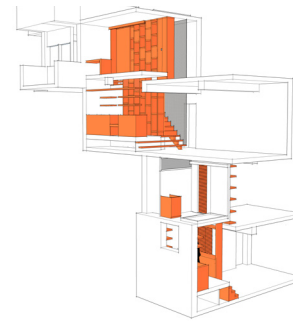
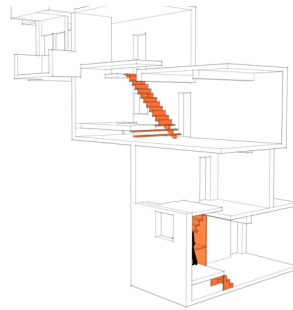
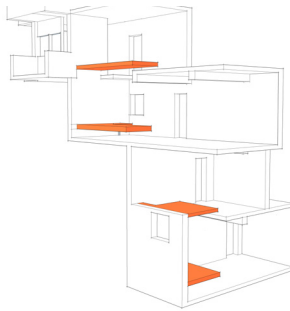
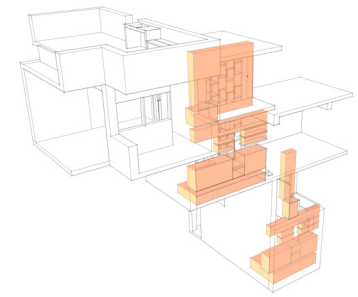
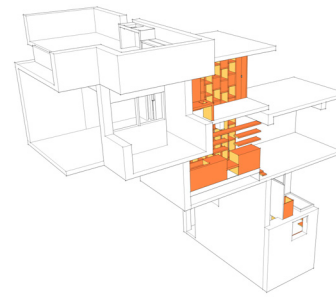
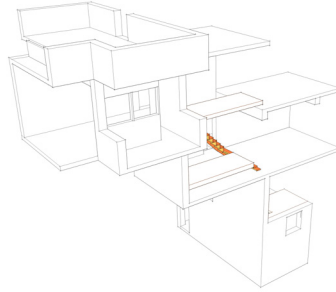
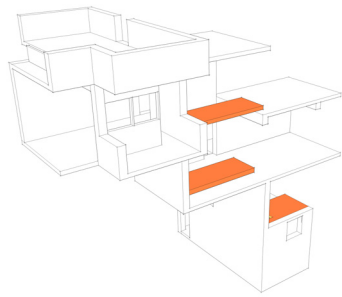
NORTH-EAST VIEW

Exterior Elevations & Perspectives



Settlement Perspectives

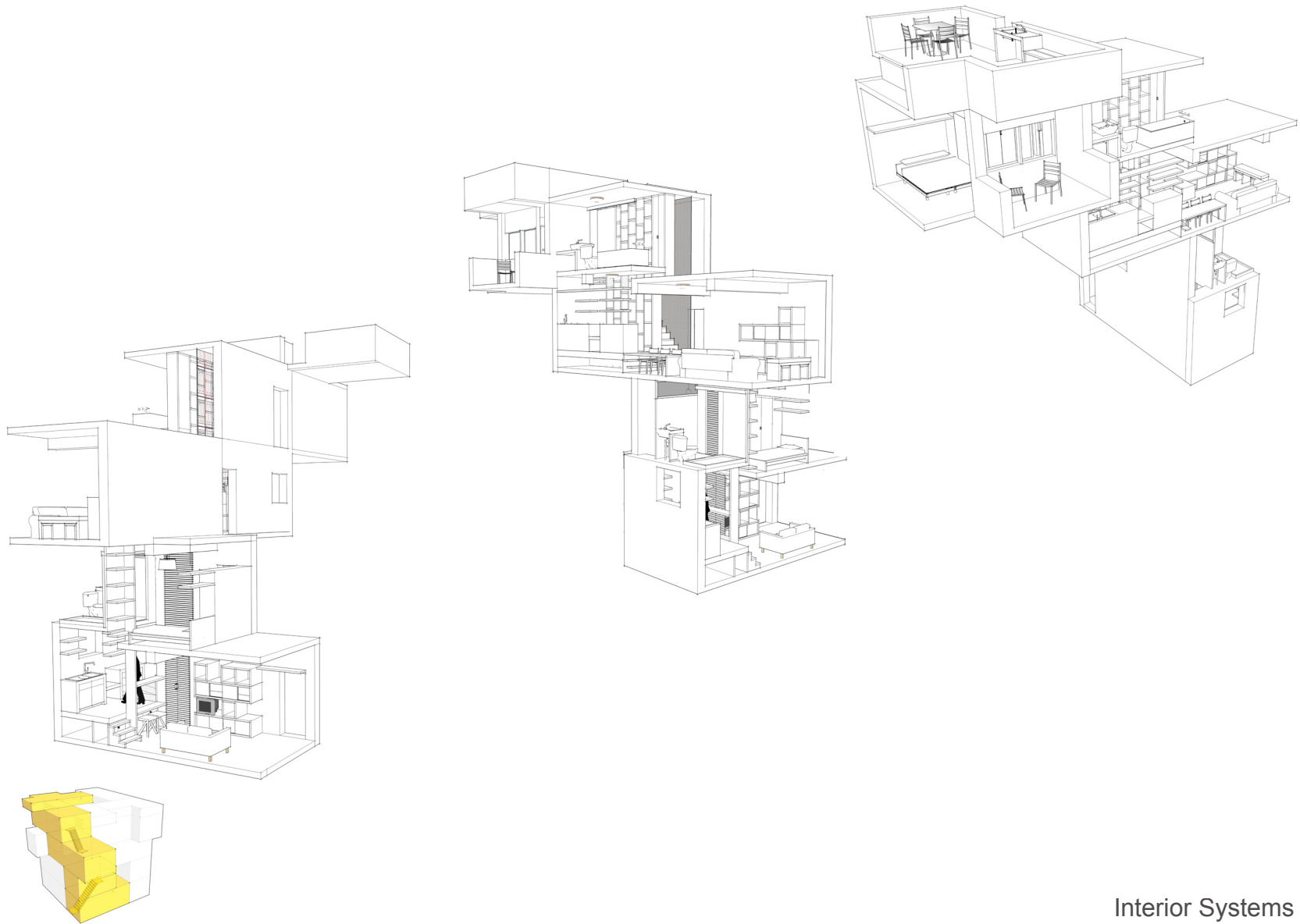
DESIGN INTERVENTION | 149



LEVELS, CIRCULATION, WALLS & BUILT-INS & STORAGE

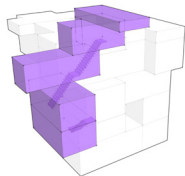
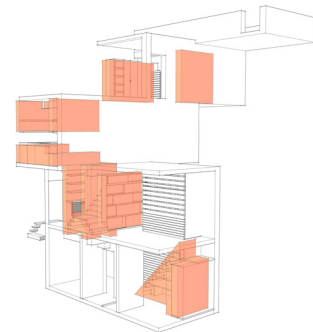
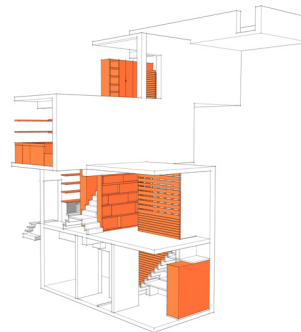
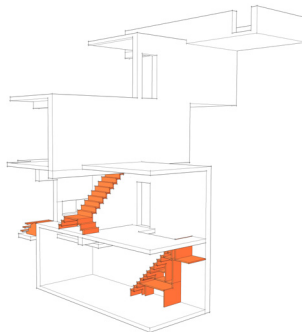
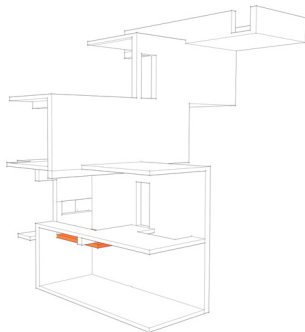
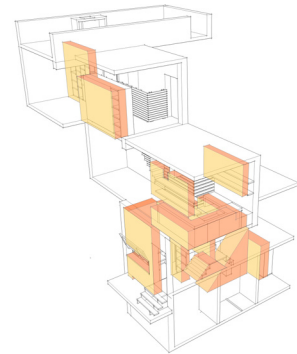
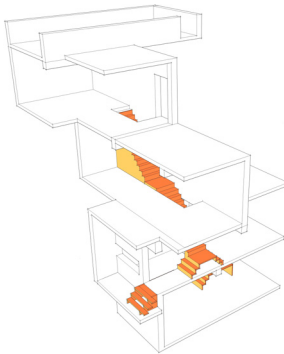
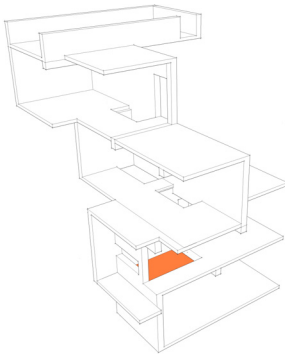
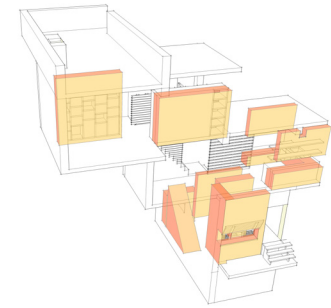
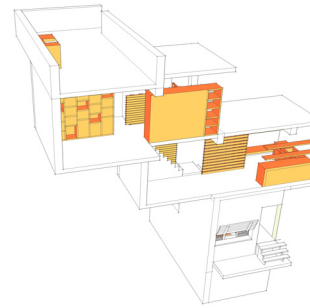
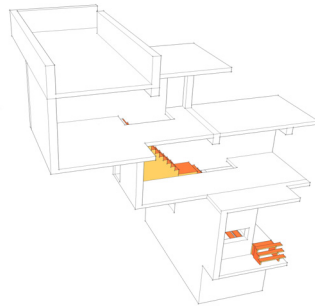
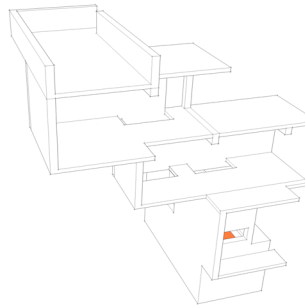
Interior Systems

DESIGN INTERVENTION | 150

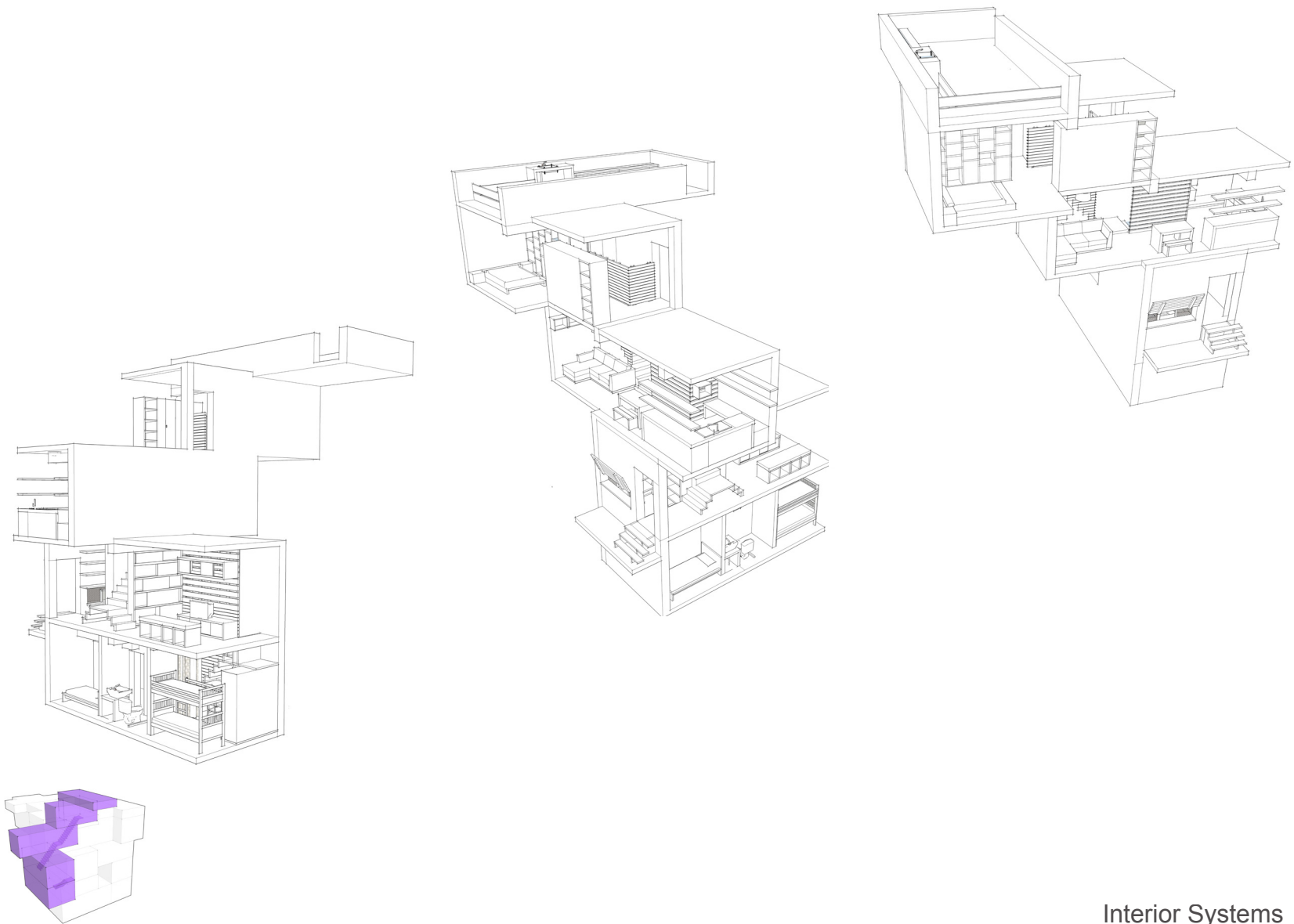


Interior Systems

DESIGN INTERVENTION | 151



LEVELS, CIRCULATION, WALLS & BUILT-INS, & STORAGE
Interior Systems



Interior Systems

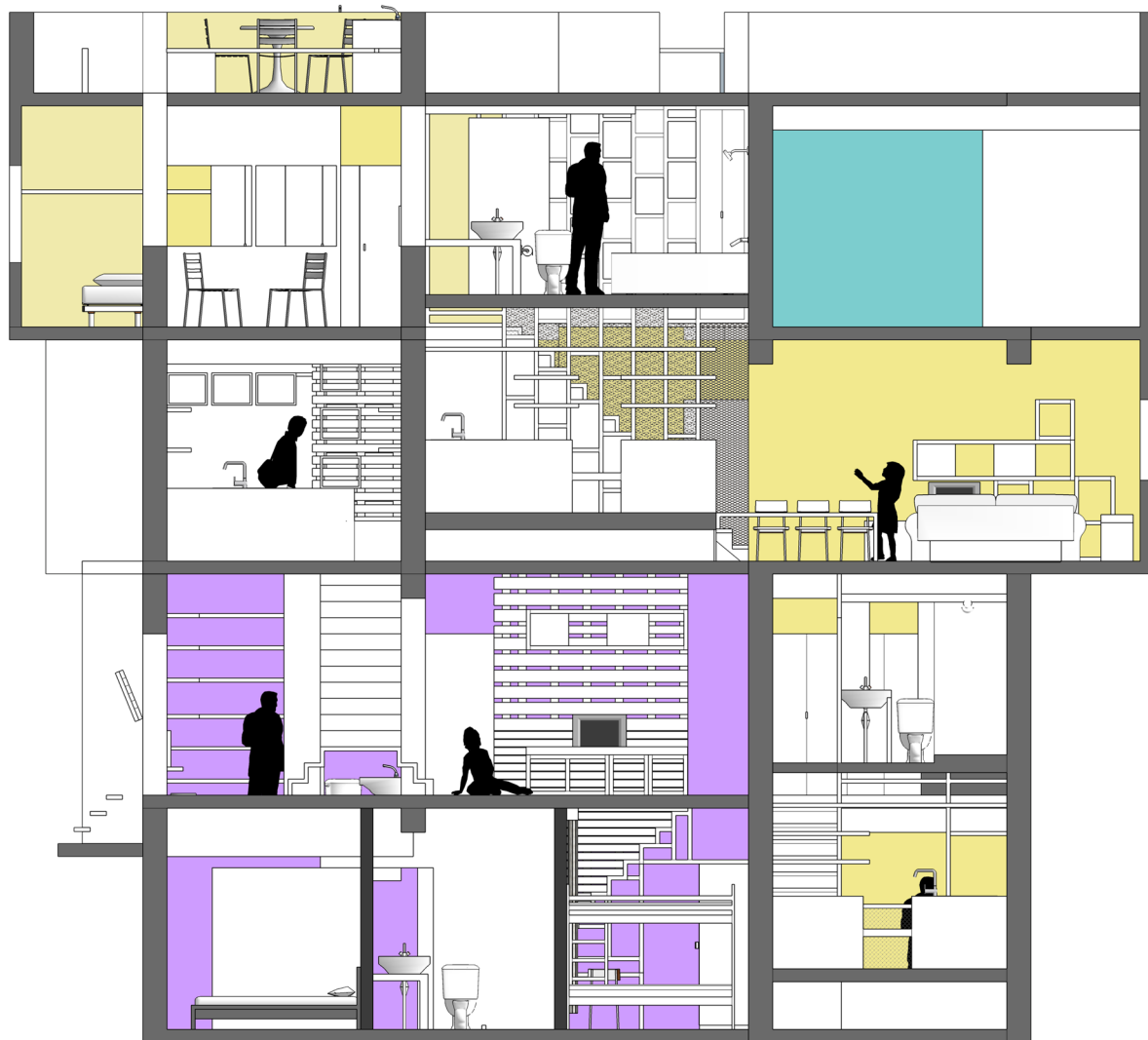
DESIGN INTERVENTION | 153



NORTH BUILDING SECTION



Building Sections



EAST BUILDING SECTION



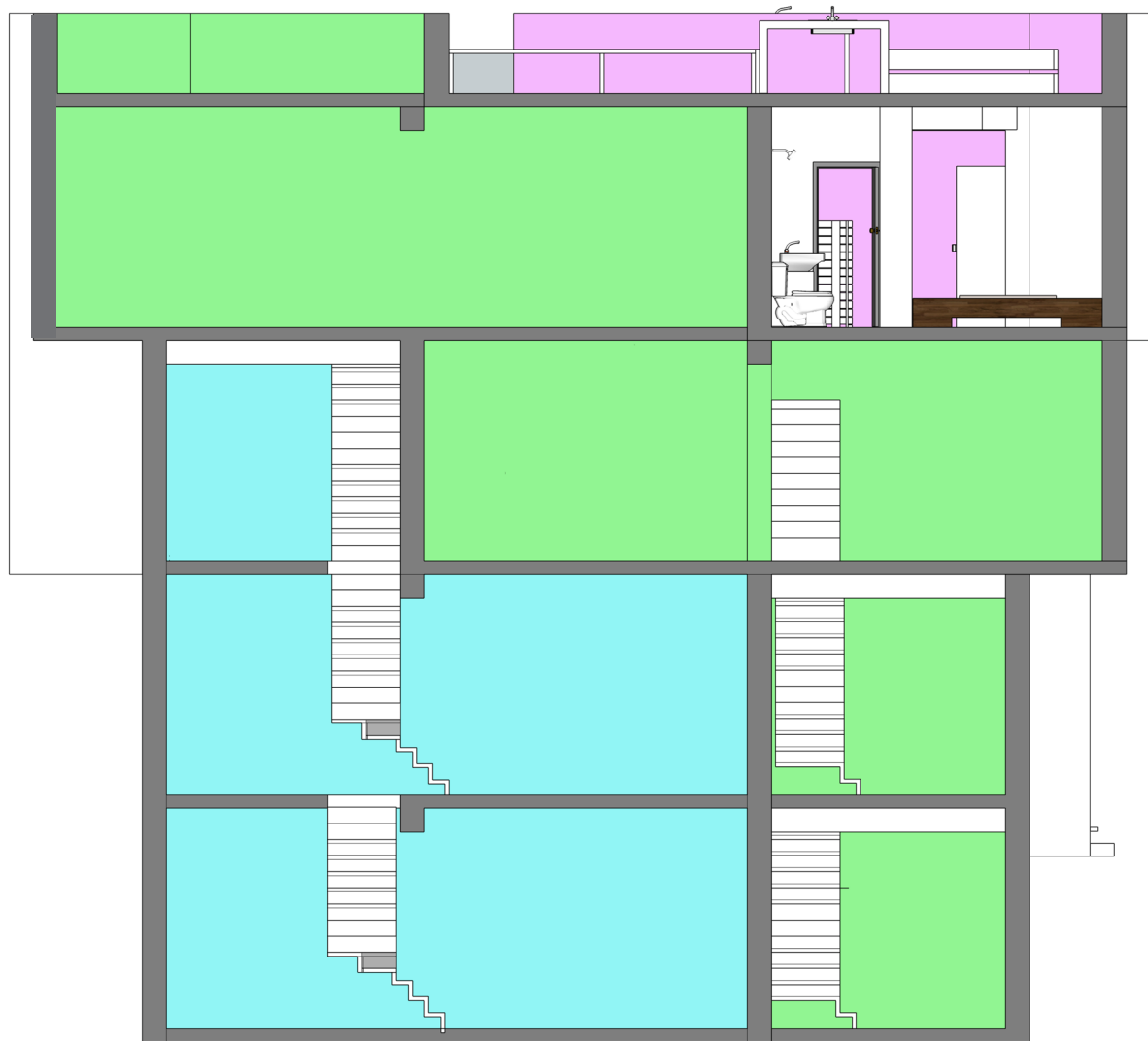
Building Sections



SOUTH BUILDING SECTION



Building Sections



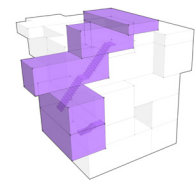
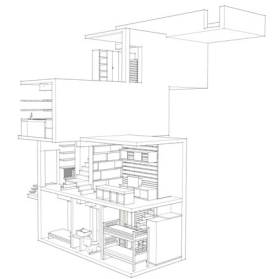
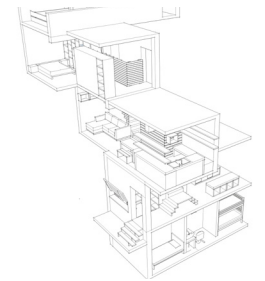
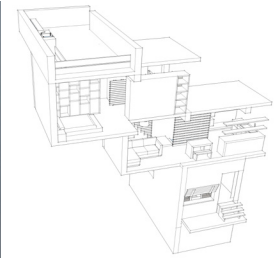
WEST BUILDING SECTION



Building Sections



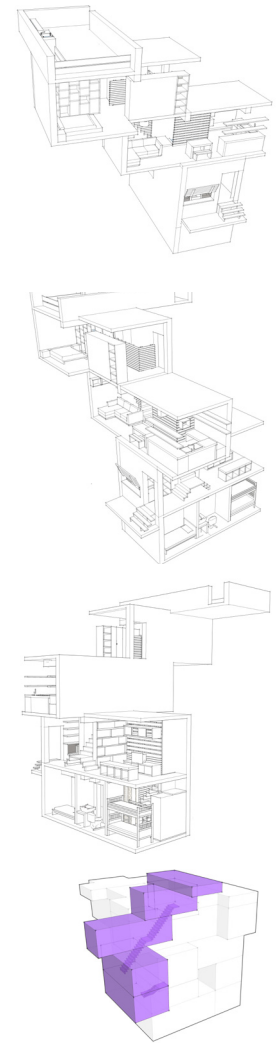
BASEMENT SLEEPING AREA



Interior Perspectives



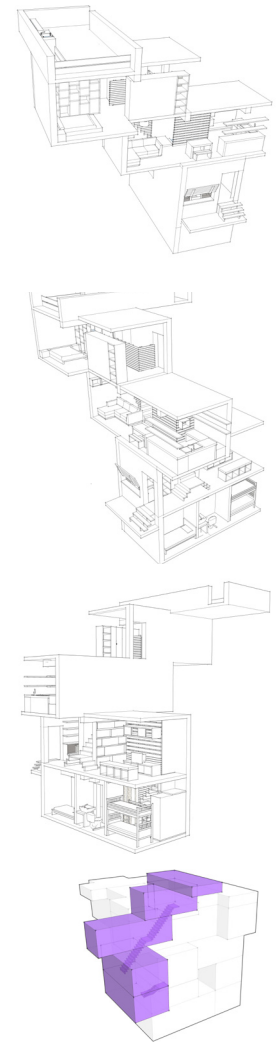
KIOSK & BATHROOM UNDERNEATH STAIRCASE



Interior Perspectives



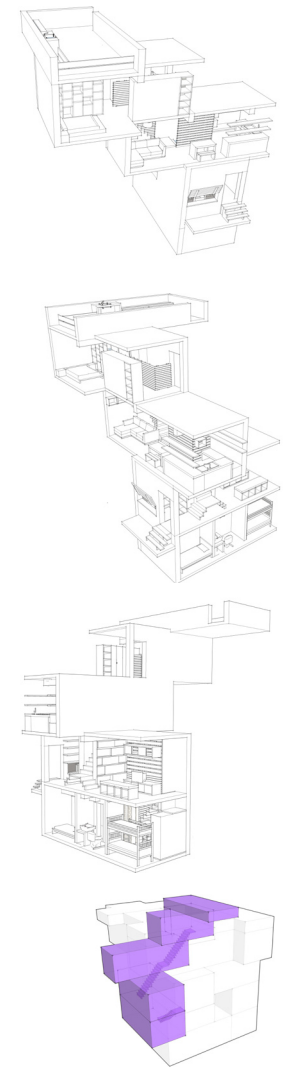
SECONDARY LIVING SPACE



Interior Perspectives



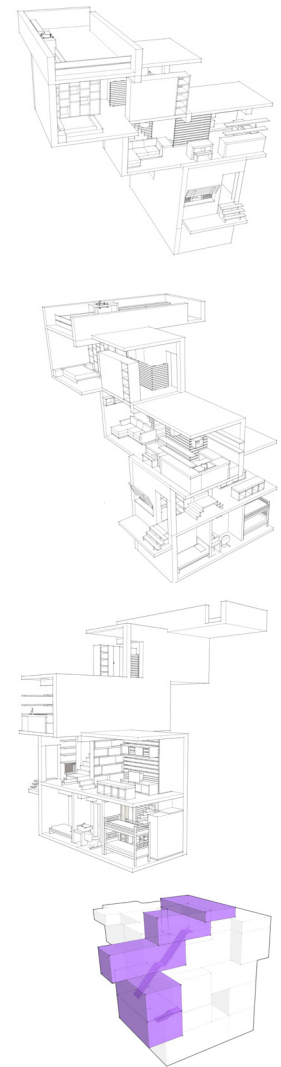
STAIR FROM GROUND TO FIRST FLOOR



Interior Perspectives



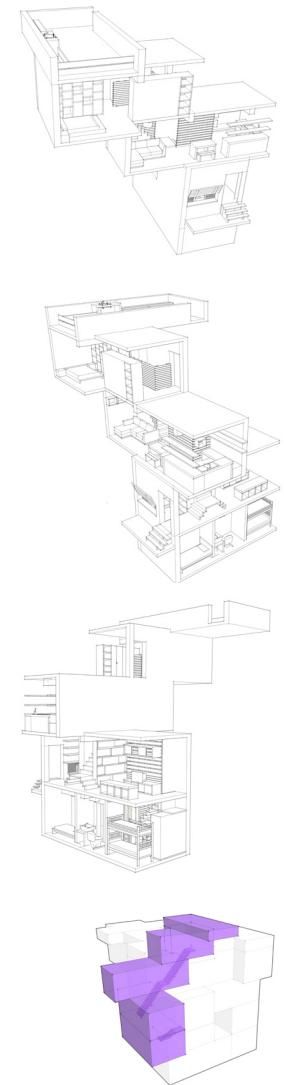
PRIMARY LIVING SPACE



Interior Perspectives



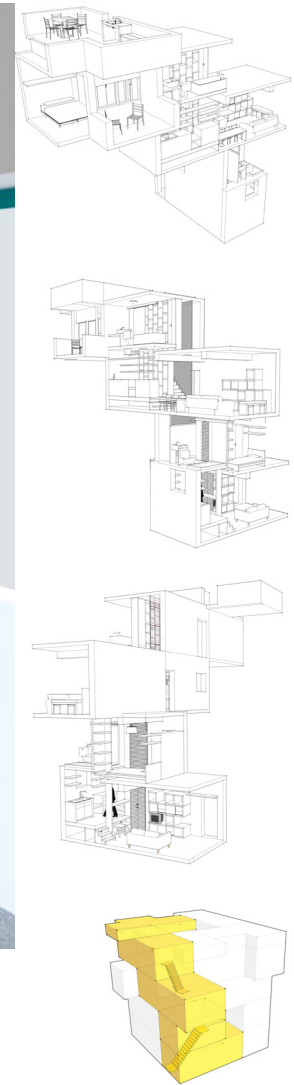
STAIR FROM GROUND TO FIRST FLOOR



Interior Perspectives



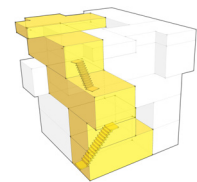
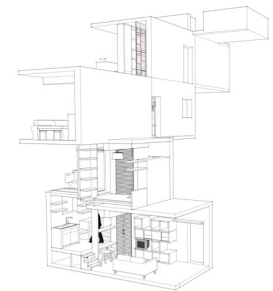
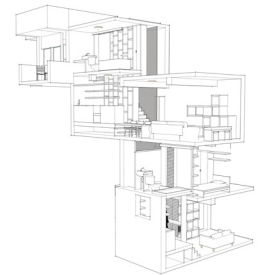
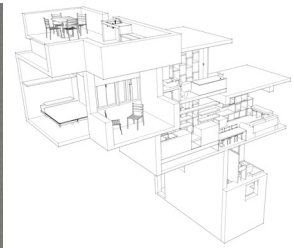
BASEMENT LIVING + COOKING AREA, RENTER



Interior Perspectives



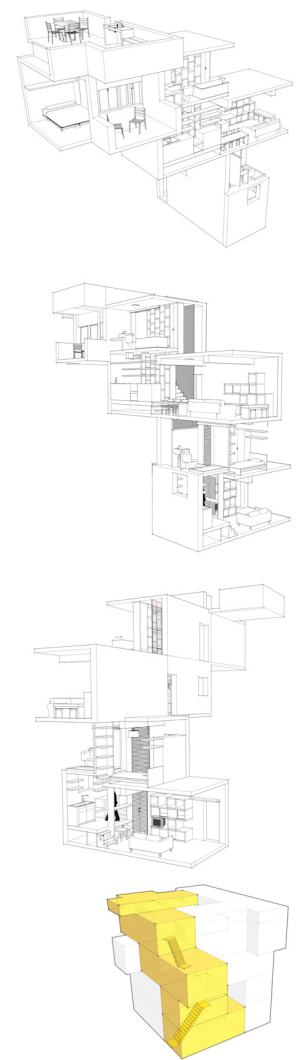
STAIRWAY TO SLEEPING SPACE, RENTER



Interior Perspectives



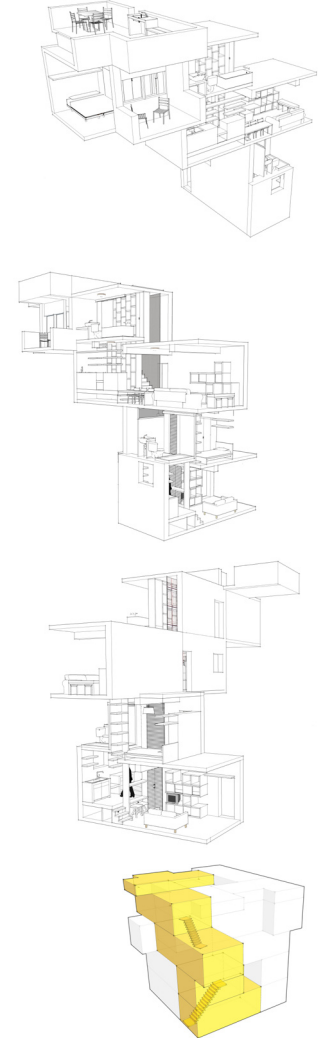
SLEEPING AREA + BATHROOM



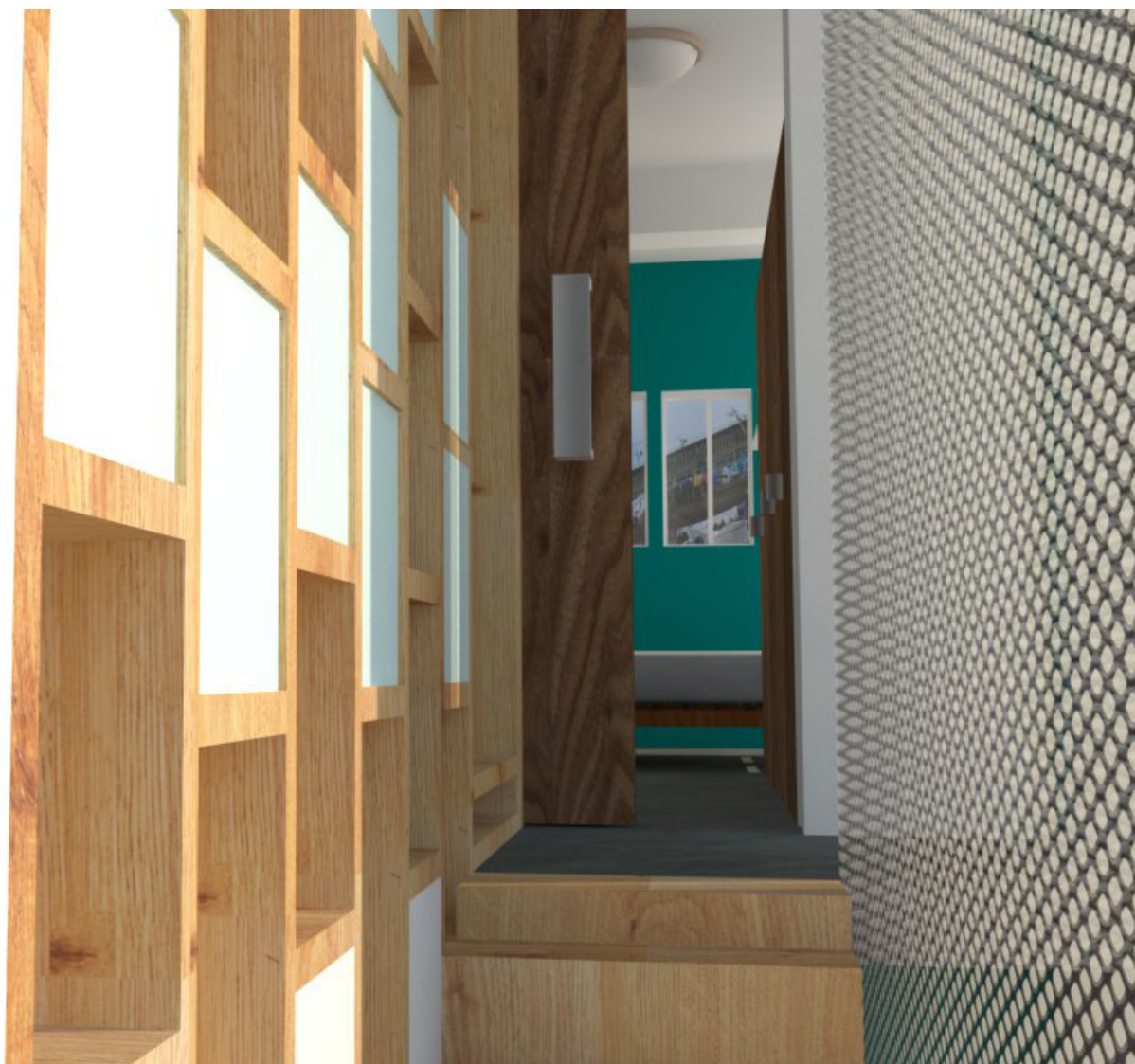
Interior Perspectives



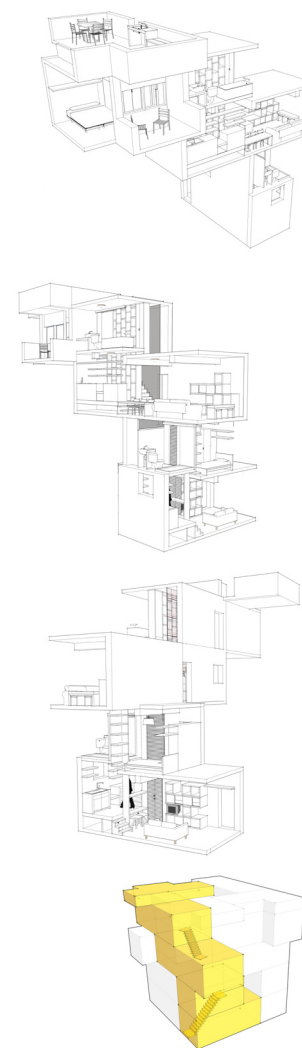
FIRST FLOOR LIVING + COOKING SPACE



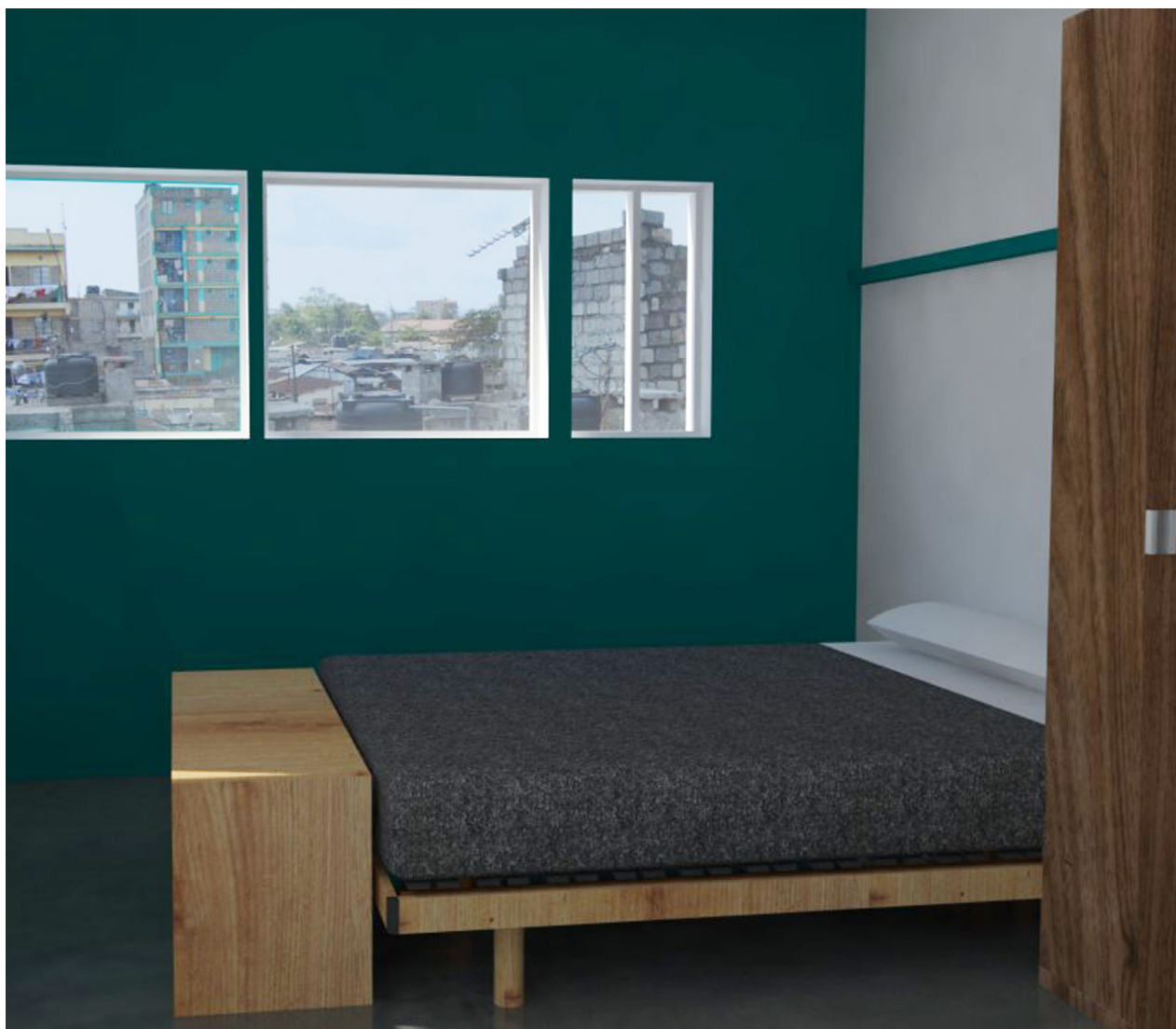
Interior Perspectives



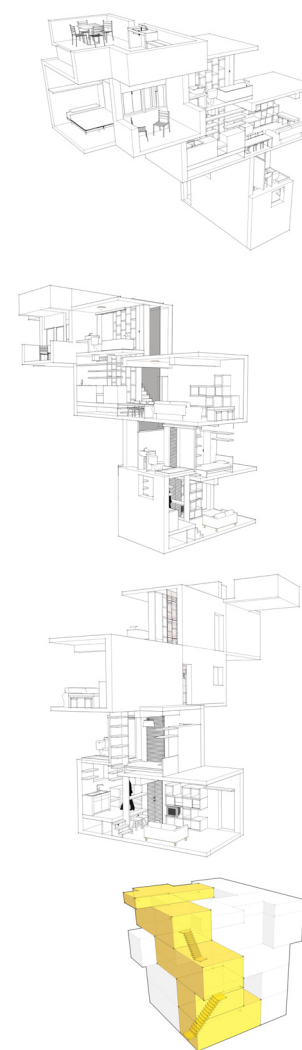
STAIR TO SECOND FLOOR



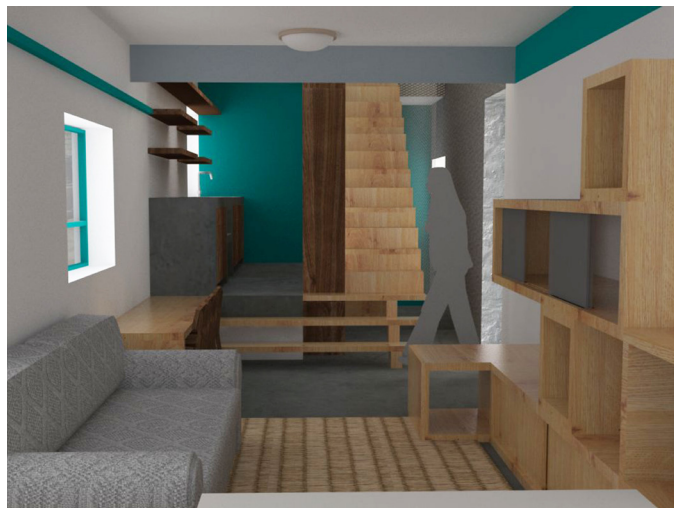
Interior Perspectives



SECOND FLOOR SLEEPING SPACE

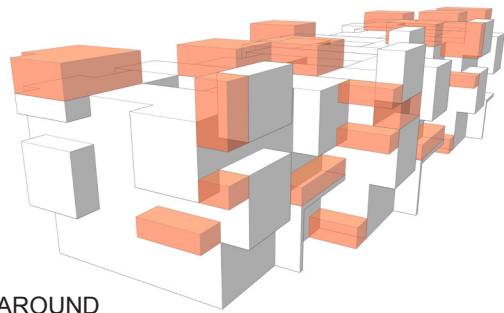


Interior Perspectives

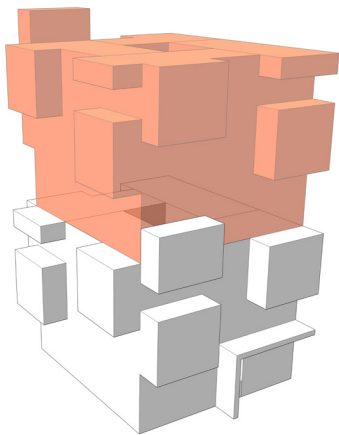
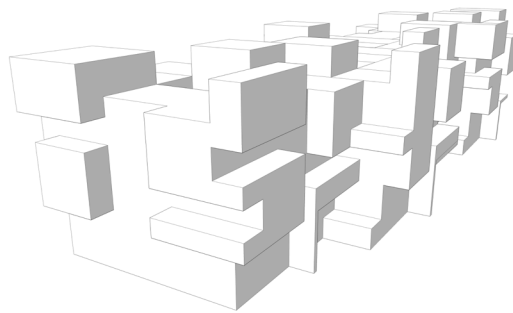


Furniture System

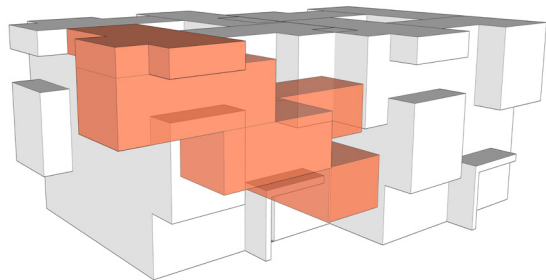
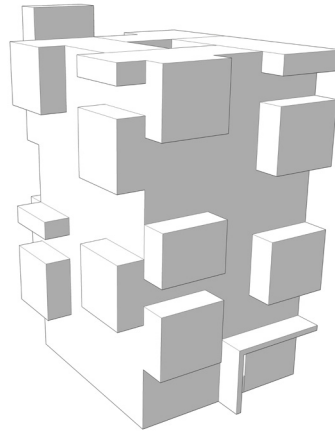
DESIGN INTERVENTION | 170



AROUND



ABOVE



WITHIN

Future Adaptations

DESIGN INTERVENTION | 171

CONCLUSION

The design of this project supports a diverse user-base from renters and structure owners to home-based workers and assorted family arrangements. The building unit configurations respond to the informal nature of relationships within Kambi Moto settlement through a shifting of the different units as one moves from the ground floor to the rooftop. This approach allows an ambiguous relationship between the building's interior and its exterior to develop. The exterior of the building does not divulge the informal interior configuration, but works to reveal a formal and cohesive exterior. As a result, this arrangement reflects the community ownership that is central to residents of Cecilia Court and members of Muungano wa Vijiji at large.

The overall interior design looked to the site analysis, theory, design programming, and precedents for guidance in the final design. The research information collected through time diaries, POEs and photo analysis was crucial to understand the lived experience of the residents of Cecilia Court and closely-guided design decisions. This personalized approach to a design investigation can equally be used to respond to formal and conventional arenas of interior design because it allows for a richer understanding of the client and users experience within interior spaces.

One of the shortcomings of this inquiry is the small data set of five households. A larger group of households and the opinions of more residents would be need to generate a more accurate and meaningful set of information that can aid in the description of the vernacular of Kambi Moto.

Because the design in this inquiry is intended to address the vernacular of the users, as pointed out in previous chapters, one of the challenging questions raised in this inquiry was at what point does the designer shape the user's

vernacular versus the user's vernacular shaping the design? In this context, what role does the interior designer play?

In my opinion, the role of the interior designer is geared towards developing a meaningful and effective interior infrastructure that can be adapted and animated by individuals and the community alike to reflect their specific needs and desired ways of living. In essence, the interior designer's role is to create a design that allows for a variety of affordances that the user can animate and manipulate to define their own vernacular.

In this light, a more community-based approach to the design development of the housing prototypes would be more suited to this project. Here, the designer in collaboration with the client and users collects, analyzes and synthesizes information pertaining to the needs, desires and experiences of the users. It is then the responsibility of the designer to develop a spatial response to this collective inquiry and present it to the client and users. This presentation can be followed by a dialogue between the users and designer that is directed at improving the design.

This project demonstrates that there are still questions that could be addressed with future research. They include exploring whether the interior designer should be encouraged to “create” or to “respond” to the notion of vernacular environments. What might be the implications of either approaches? Also, can the process and logic of informality help reshape the general approach to interior design?

In conclusion, there is a lot to be learned from processes of informality. I believe that this knowledge can be incorporated with conventional approaches to establish a more reflective and authentic approach to interior design, planning and architecture.

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APPENDIX A

Interview, Photography & Audiovisual Release forms



Department of Interior Design
Faculty of Architecture
201 Russell Building
Winnipeg Manitoba
Canada R3T 2N2
Telephone (204) 474-9458
Fax (204) 474 7532

CONSENT FORM CLIENT INTERVIEW, PHOTOGRAPHY AND/OR AUDIO-VISUAL RECORDING

I, _____, give my consent to have one or more of
(print name in full)
the following done: *(please check all that apply)*

- ☐ Interviewing
- ☐ Videotaping
- ☐ Audiotaping
- ☐ Photography

I understand that the recordings will be used for:

Title of Study: _____

I understand that the recordings will be stored in a secure, locked location that will protect the privacy of the person recorded, accessed only by members of the research team, kept for the time period outlined by University of Manitoba's Office of Research

Services schedule for research data, and destroyed according to legal requirements.

I understand that the recordings are the property of University of Manitoba, but I may request access to review them and/or retain a copy according to university policies and regulations..

I understand that I have the right to refuse to take part in this study or to refuse to have these recordings done. I also have the right to withdraw my consent at anytime (for example, before or even after the recordings have been made) and this decision will not have a negative effect on me or any members of my family.

☐ I understand that these recordings will be used only for the purposes noted above,

OR

In addition, I consent to these recordings to be used for:

- ☐ Demonstration at University of Manitoba
- ☐ Demonstration at sessions outside of University of Manitoba

I understand that I have the right to withdraw my consent for other uses of the recordings or/ and photographs at any time.

_____	_____	_____
Date	Signature of Participant or Legally Authorized to Consent	Relationship to Participant
_____	_____	
Printed Name of Investigator	Investigator's Signature	

APPENDIX B

Interview Questions for POEs

QUESTIONNAIRE FOR CLIENTS

Identifying users

Question: How many people live in this home permanently?

Question: What are the different ages of the people who live in this home?

Question: Do any of these people have special needs and abilities?
Tell me about any special needs these individuals might have.

Question: Do any family members, relatives, or friends live in your home temporarily. Can you please elaborate?

Questions: Do you have any tenants? Could you talk more about that?

Question: Do any of these people have special needs and abilities?
Tell me about any special needs these individuals might have.

User activities

Question: What are the different activities that go on in this home?
Can you please explain further?

Question: Do you have enough space for each of these activities?
Please elaborate further.

Question: Do you or any of your household members run a home-based business? Tell me more about this business?

Question: Do you aspire to run a home-based business?
Can you elaborate on that?

Question: Do you rear any animals or keep a garden?
Can you please tell me more about this?

Question: If given the opportunity, would you like to keep animals?
If given the opportunity would you like to keep a garden?

Utilities

Question: What are the different energy sources that you use?
What are some alternatives that you may be interested in trying?

Question: What is the water situation in your household?
Do you get water regularly? How do you store your water? How do you treat your water?

Question: How do you dispose of your household waste products? Please specify?

Maintenance

Question: Is your home easy to keep clean? Please be more specific?
Questions: If your home is not so easy to clean, what changes will you make to the selection materials used to enable it to be easier to clean?

Question: Tell me more about the maintenance and repair of your home thus far?

Desired qualities

Question: Can you hear noises from outside when in your home?
Tell me about these noises.

Question: Tell me about the temperature in your home.

Question: Tell me about the air quality of your home. Are there any smells from outside that interfere with the air quality indoors?

Question: Tell me about the security in your area.

Question: Tell me about the quality of natural light in your home.
Tell me about the quality of artificial lighting in your home.

Question: Do you have enough storage space?
Tell me the areas in your home that need storage? Please be more specific.

Question: Please describe your sense of style? Describe your choice of color. Please describe your choice of furniture and fixtures.

Question: How long do you intend to live in this home?

Question: How do you feel about your new home?
How did you feel about your previous home? Please explain any difference.

Question: Are there any improvements you would make to your new home?
Please explain further.

Question: What are the five most important issues with your current housing you would like to improve on? Please specify.

Exterior space and communal space

Question: How do you feel about the common spaces you share with your neighbors? Can you please explain further?

Question: What are some of the shared activities that take part within these common spaces? Is there enough space for all these activities?

Question: What do you like about the greenery and landscaping of your home and common areas? What do you dislike about it? What would you do to improve on it?

Building technology and materials

Question: What skills, talents or experiences do you have that are building related? Please explain further?

Question: What building materials do you favor most? Please explain why.

Question: What alternative building materials or techniques have you come across that you would like to see being used in your community? Please tell me more.

Question: Is there anything else you would like to add?

Empowerment

Question: Are you aware of the rules and regulations on making alterations to your house?

Questions: Do you feel that this housing process has left you empowered?

Question: Do you feel that the individual part you played was important in this collective housing process?

Closing

Question: If you are to redo this housing process, what would you have done differently?

Question: Please explain.

Is there anything else you would like to add?

QUESTIONNAIRE FOR FACILITATOR

Question: What role did you play in the planning, design and construction of Cecilia Court in Kambi Moto?

Question: Please explain in detail the participatory process involved in the planning, designing and construction of the Cecilia Court housing project at Kambi Moto.

Question: In your experience, what role do you think an interior designer should play in strengthening the planning, design and construction at Cecilia court, Kambi Moto?

Questions: What are some of the major setbacks you experienced in the Kambi Moto housing process? Please explain in depth.

Question: What are some alternative building materials and techniques you have investigated that can be used in future housing processes?

Question: How would you rank in importance: the exterior, the interior and the landscaping of the Cecilia Court? How much time, effort and money was put into determining each? Please compare.

Question: In hindsight, what are five of the most important issues that you would improve on with respect to Cecilia Court housing project? Please specify.

APPENDIX C

Informed Consent Forms Time Diaries



Department of Interior Design
Faculty of Architecture
201 Russell Building
Winnipeg Manitoba
Canada R3T 2N2
Telephone (204) 474-9458
Fax (204) 474 7532

To Whom It May Concern:

RE: INFORMED CONSENT

Research Project Title: Urban Informality and Self-built housing in Slum and Squatter Settlements

Main Researcher: Kathleen Kwekwe Kivutha

Delegate: _____

Reason: Time diaries and Perception graphs

Sponsor (if applicable): None

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and understand any accompanying information.

The purpose of the research is to collect information on selected informal areas in Nairobi Kenya. The collection of the information will be **time diaries and perception graphs**. The collection of information will be carried out between 30th June – 30th July 2009. A session will last anywhere from 1-2 hours.

There is no potential harm greater than which one experiences in the normal conduct of one's everyday life. Participants will be given the option of either using their real identities or aliases. The data collected will be stored in a lockable container accessible only by the research team. It will be destroyed in the next five years from the initial collection of the data and in the manner set by University of Manitoba guidelines.

The recordings collected are the property of University of Manitoba, but you can request access to view them and/or obtain a copy according to university policies and procedures. There will be no form of credit or remuneration.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study anytime and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

**K. Kwekwe Kivutha (Researcher): +1 (204) 803-7962 Canada
0721 999 326 Kenya**

Susan Close (Supervisor): +1 (204) 474 7183 Canada

This research has been approved by the Research and Ethics Board. If you have any concerns or complaints about this project you may contact any of the above named-persons or the the Human Secretariat at (204) 474 7122 or email Margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your record and reference.

Participant's Signature	Date
Researcher and/or Delegate's Signature	Date

APPENDIX D

Sample Time Diary

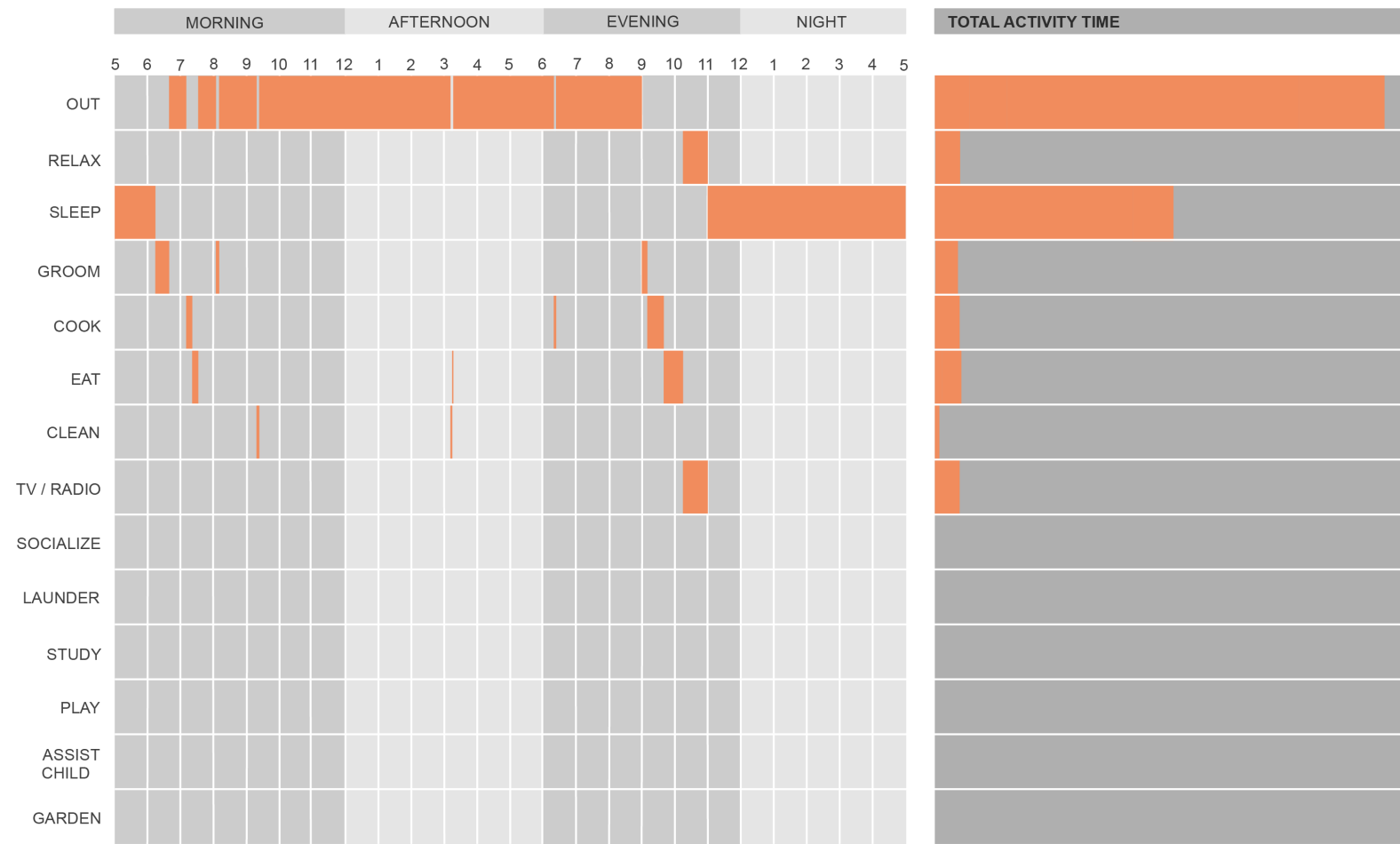
Mr Kamau, Male Adult, 03/07/09					
activity	activity type	time from	time to	duration (mi	room
wake up	waking	6.15am	6.15am	0	bedroom 1
dress	grooming	6.15am	6.18am	3	bedroom 1
visit toilet	personal hygiene	6.18am	6.21am	3	bathroom
wash face	grooming	6.21am	6.24am	3	kitchen
Brush teeth	grooming	6.24am	6.28am	4	kitchen
put on shoes	grooming	6.28am	6.30am	2	sitting room
fetch water	grooming	6.30am	6.33am	3	kitchen
shave beard	grooming	6.33am	6.40am	7	kitchen
OUT	OUT	6.40am	7.11am	31	OUT
prepare tea	cooking	7.11am	7.22am	11	kitchen
drink tea	eating	7.22am	7.33am	11	sitting room
OUT	OUT	7.33am	8.05am	32	OUT
visit toilet	personal hygiene	8.05am	8.11am	6	bathroom
OUT	OUT	8.11am	9.19am	68	OUT
picking work t	tidying	9.19am	9.24am	5	store
OUT	OUT	9.24am	3.12pm	348	OUT
return work to	tidying	3.12pm	3.15pm	3	store
drink water	eating	3.15pm	3.17pm	2	kitchen
OUT	OUT	3.17pm	6.20pm	183	OUT
pick jiko	cooking	6.20am	6.24pm	2	store
OUT	OUT	6.24pm	9.00pm	156	OUT
shower	grooming	9.00pm	9.10pm	10	bathroom
prepare supper	cooking	9.10pm	9.40pm	40	kitchen
take supper	eating	9.40pm	10.15pm	35	sitting room
rest/ music	resting	10.15pm	11.00pm	45	sitting room
sleep	sleeping	11.00pm	5.30am	390	bedroom 1

APPENDIX E
Materials

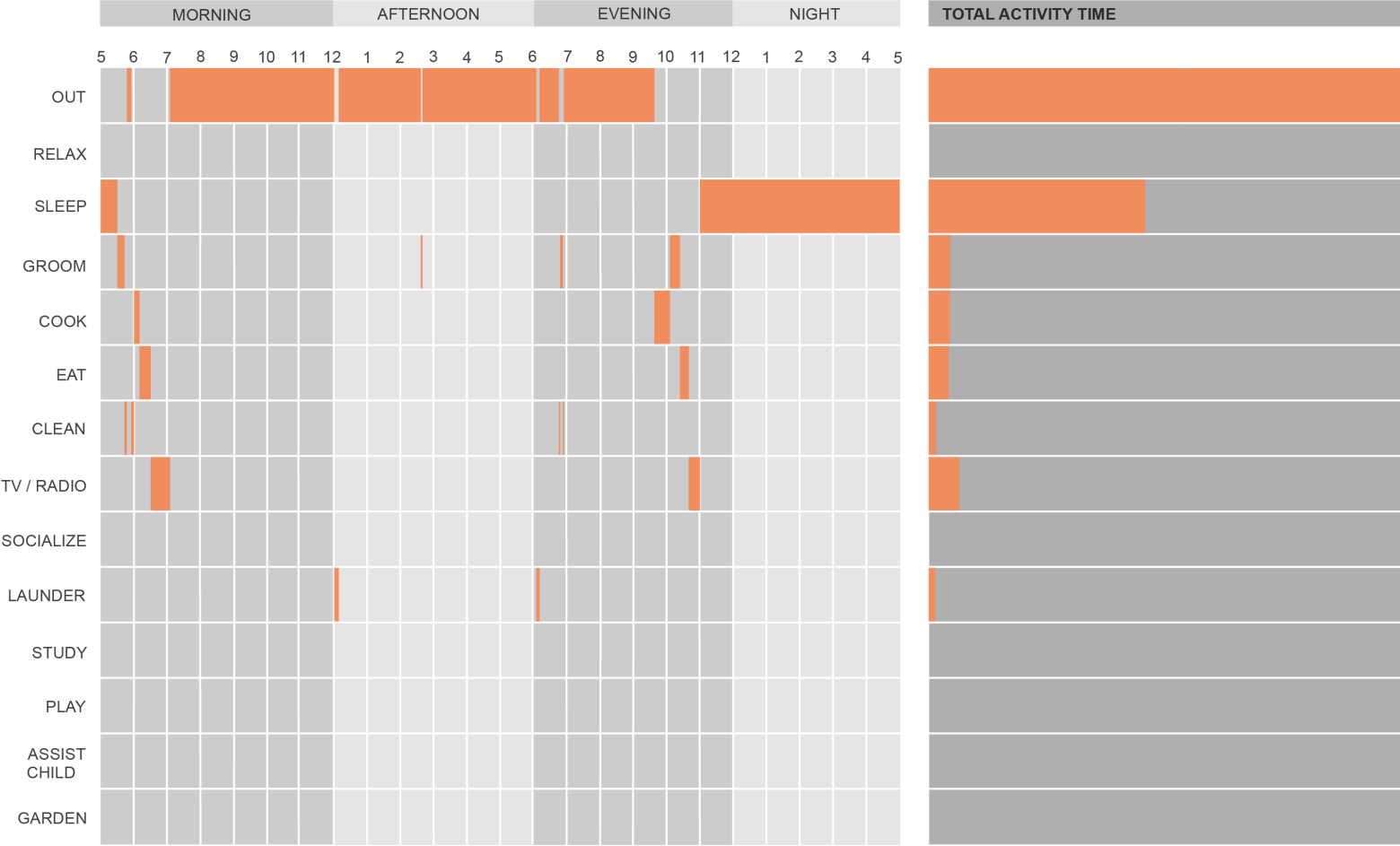


APPENDIX F Time Diary Analysis

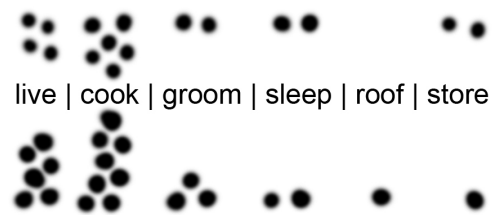
KAMAU WEEKDAY



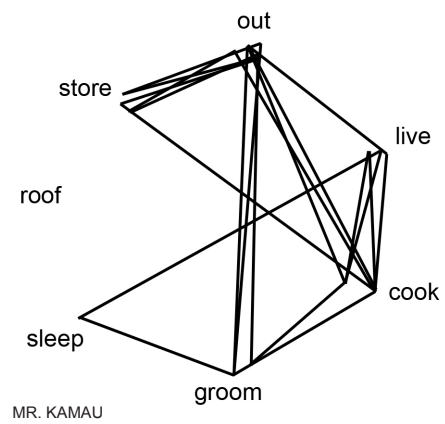
KAMAU WEEKEND



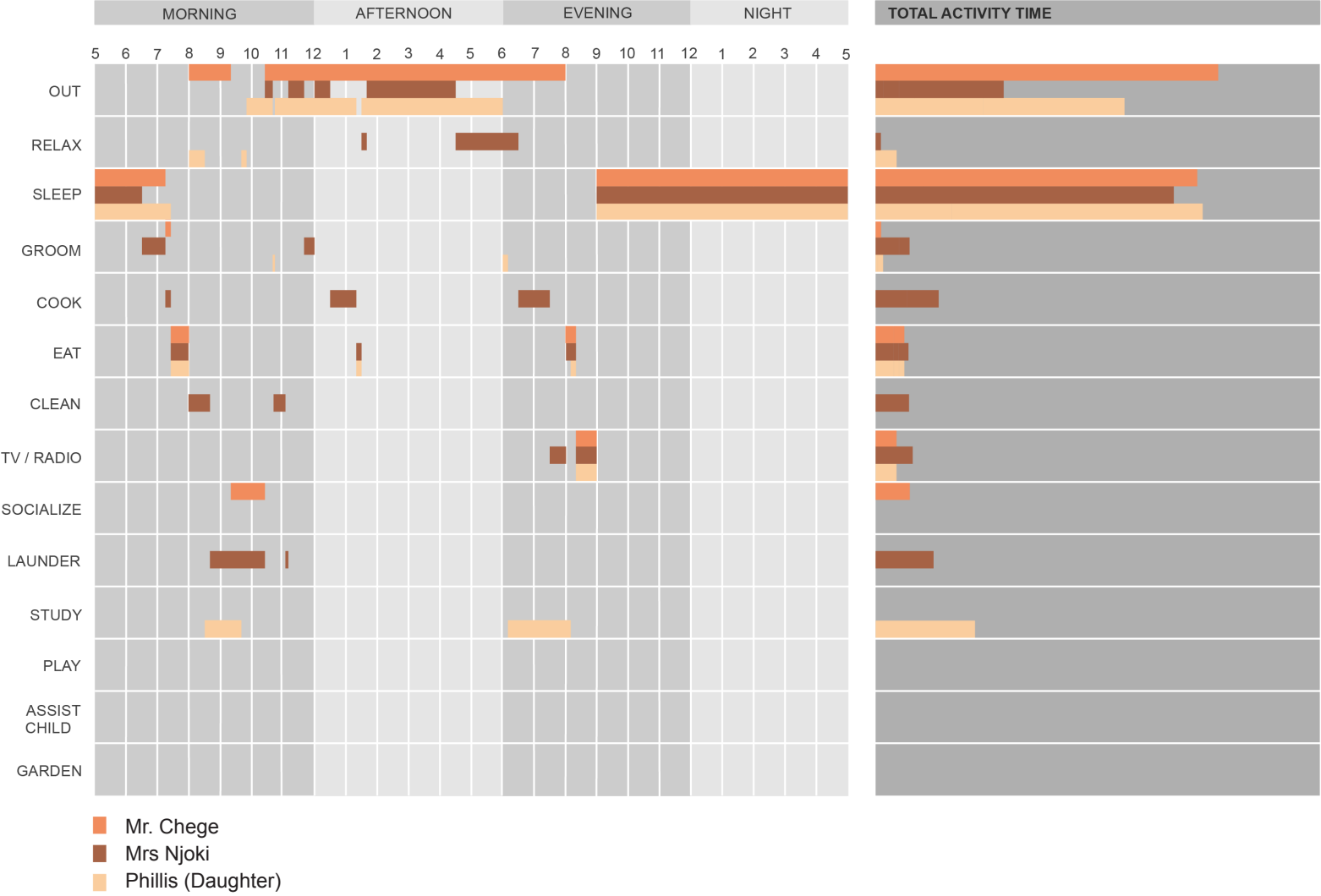
ACTIVITIES VS. THE SPACES (WEEKEND+WEEKDAY)



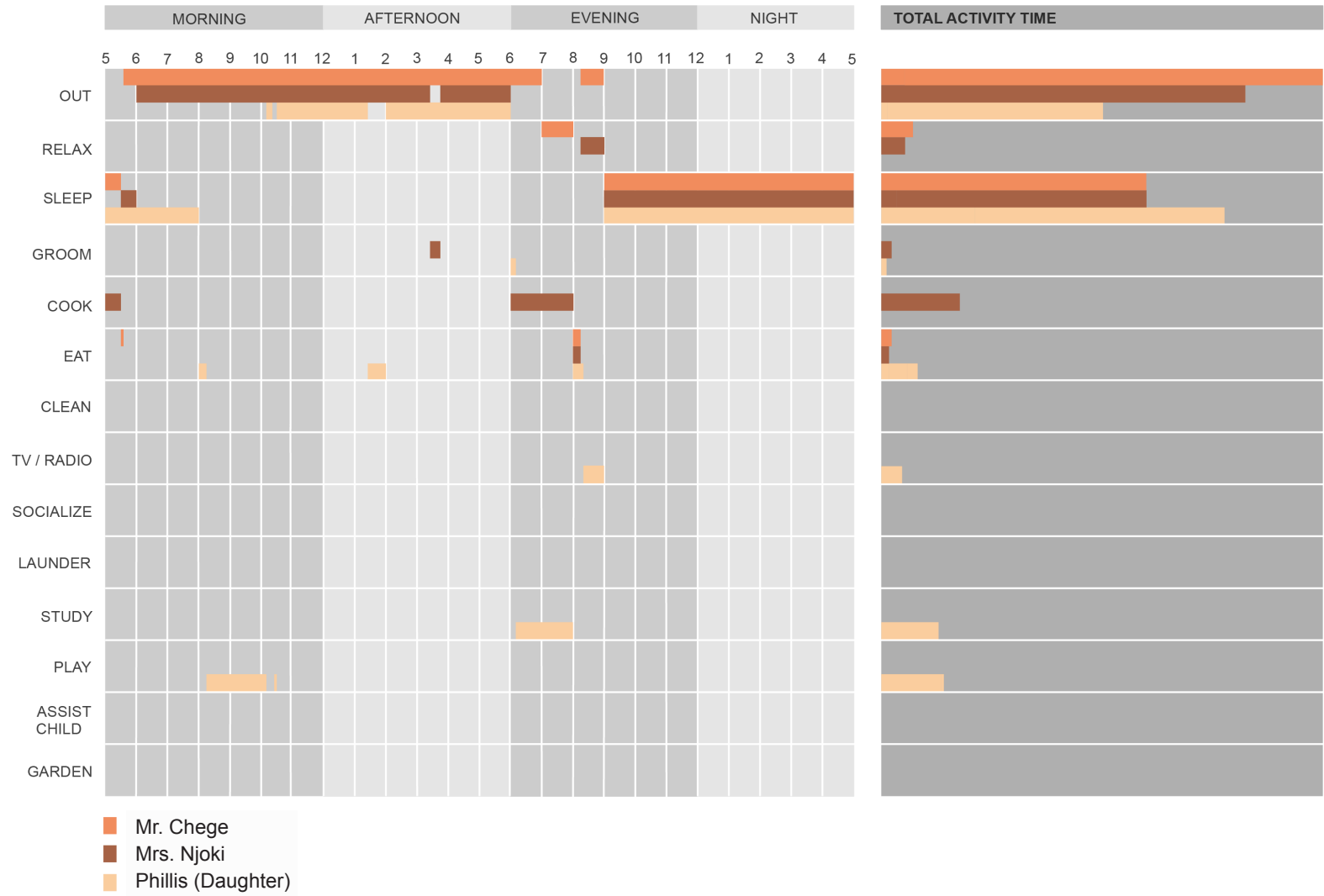
MOVEMENT OF USERS WITHIN THE HOME (WEEKDAY)



NJOKI'S WEEKDAY



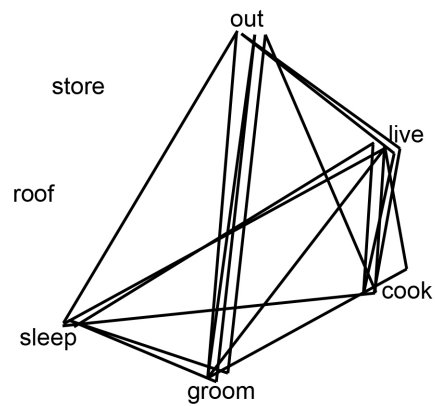
NJOKI'S WEEKEND



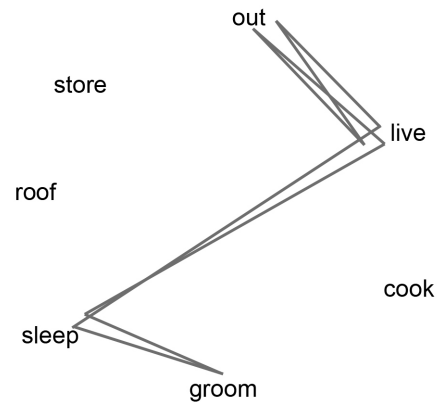
ACTIVITIES VS. THE SPACES (WEEKEND+WEEKDAY)



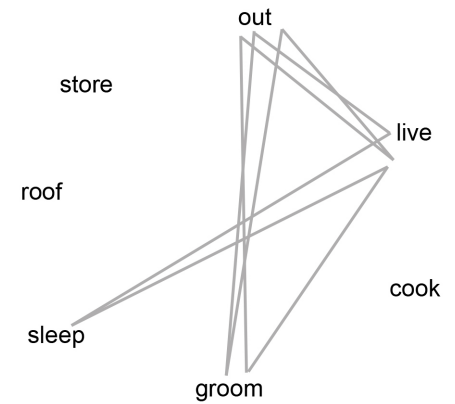
MOVEMENT OF USERS WITHIN THE HOME (WEEKDAY)



MRS. ZIPPORAH NJOKI

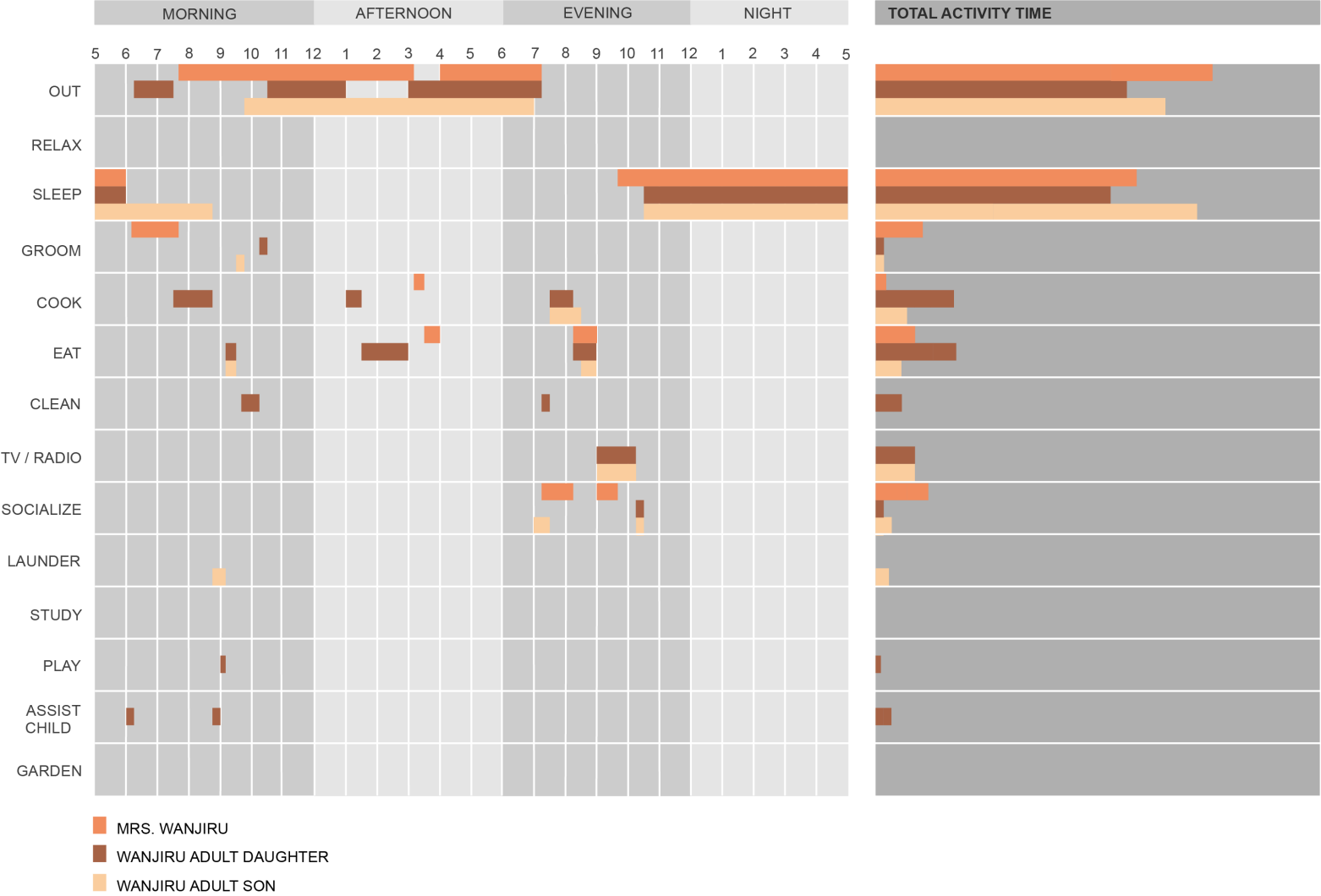


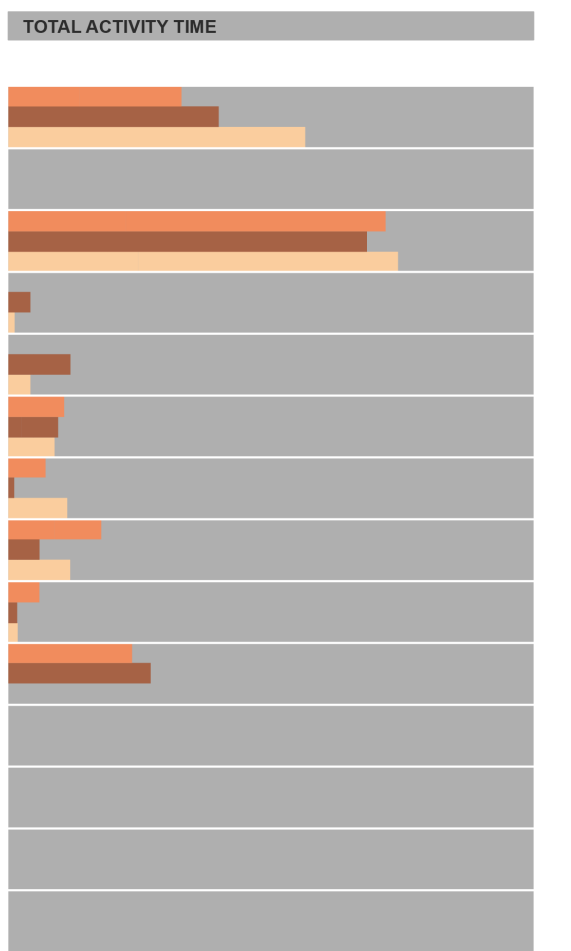
MR. PETER CHEGE



PHILLIS (DAUGHTER)

WANJIRU'S WEEKDAY

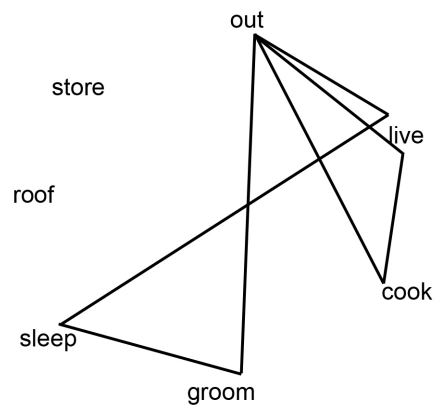




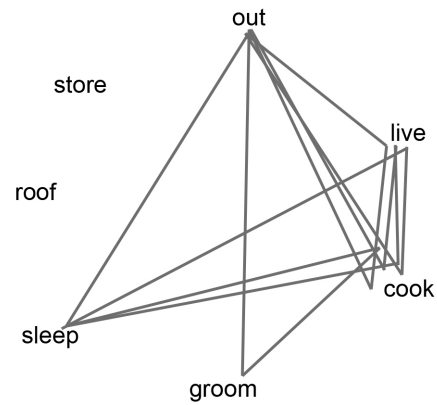
ACTIVITIES VS. THE SPACES (WEEKEND+WEEKDAY)



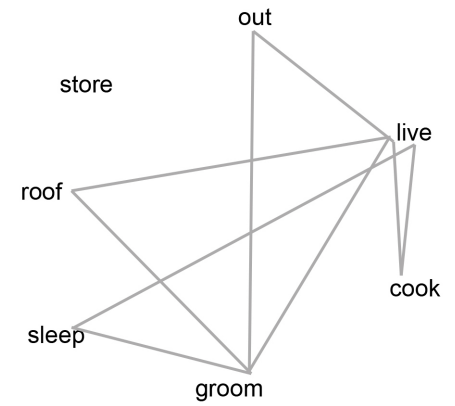
MOVEMENT OF USERS WITHIN THE HOME (WEEKDAY)



MRS. WANJIRU



MRS. NJERI (ADULT DAUGHTER)



MR. MUIRURI (ADULT SON)