

the kijiji kit

a strategy for slum upgrading in Nairobi, Kenya

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Master of Architecture

AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

This thesis is sited in Mukuru-Kwa-Njenga, a slum community in Nairobi, Kenya. Like many others around the world, this community faces issues of health, sanitation, mobility, and basic services. Through the investigation of these issues, a set of guidelines have been developed to help this slum community become a responsible and supportive environment that promotes participation from its residents, local governments, and the global population.

After first acknowledging the complexity of the situation with regards to the formation and growth of slums, and the multi-layered problems that exist within them, the guidelines presented here are combined and herein named “Kijiji Kit”. “Kijiji” means “communal settlement” in Swahili. Hence, the Kijiji Kit is a resource tool for slum communities that can help build communal living environments for the urban poor. It consists of probable methods of zoning processes (determined through site analysis), community infrastructure essentials (such as health care and educational facilities), and individual infrastructure systems (such as rainwater collection). It is not a physical entity but a long-term working model of the community operating on three scales: city, community, and individual. On a city scale, collaboration between governments, institutions, municipalities, public and private sectors, and the community is integral. The responsibilities of the state, specifically in terms of funding and policies, play a significant factor in strengthening urban slums. On a community scale, certain infrastructural systems and basic services are required, such as public transit, health care, and housing to ensure that proper support exists for the community to function effectively. Slum upgrading is one method that can begin helping communities develop resourcefully and independently. Finally, the individuals who form the community must be active participants in the processes that affect them. They must want change and be willing to put the time and dedication into the processes that will bring positive growth to their community.

Based on the basic needs of the most vulnerable population – the orphans – the Kijiji Kit is a comprehensive and holistic approach to improving life in urban slums and calls for an overlapping of many disciplines, including architecture. Architecture is an essential component in developing and structuring communities. This thesis explores the social impact of architecture and how it can bring change to both the physical and social environment of slum communities.

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DEDICATION

To the Cana Family Health and Rescue Center and my family.

TABLE OF CONTENTS

| | | |
|-----|--------------------------------------|-------|
| | Abstract | v |
| | Acknowledgements | vii |
| | Dedication | ix |
| | Table of Contents | xi |
| | List of Illustrations | xiii |
| | Preface | xviii |
| | Introduction | 1 |
| 1.0 | GLOBALIZATION AND ITS TRENDS | |
| | On Slums | 6 |
| | On HIV/AIDS | 10 |
| 2.0 | SITE ANALYSIS | |
| | Kenya | 16 |
| | Nairobi | 18 |
| | Mukuru Slums | 28 |
| | Cana Family Health and Rescue Center | 34 |
| 3.0 | THE STRATEGY | |
| | Resettle, Rebuild or Upgrade | 42 |
| | What is Slum Upgrading? | 44 |
| | The Challenge | 46 |
| | The Process | 48 |
| 4.0 | THE KIJIKI KIT | |
| | The Kijiji Kit | 53 |
| | Zoning Processes | 54 |
| | Kijiji Infrastructures | 63 |
| | Decentralized Infrastructures | 79 |
| 5.0 | MUKURU KWA NJENGA: 2030 | 94 |
| 6.0 | PRICIPLES FOR CHANGE | |
| | Practice | 102 |
| | Participation | 104 |
| | Partnership | 106 |
| | Conclusion | 108 |
| | Appendix A: Case Studies | 112 |
| | Appendix B: Technical Data | 140 |
| | Endnotes | 149 |
| | Bibliography | 153 |

LIST OF ILLUSTRATIONS

INTRODUCTION

- i.i Image of a child wandering along the edge of the Mukuru slums in Nairobi, Kenya....2
Source: Images by author.

CHAPTER 1

- 1.1 Population projections by region. 1999-2000 (millions).....6
Source: The Millennium Development Goals 2006, UN-HABITAT.
- 1.2 Population vs. GDP by 10 largest cities.....6
Sources: Planet of Slums; Mike Davis (Population rank from Thomas Brinkhoff: www.citypopulation.de; GDP rank from Denise Pumain: Scaling Laws and Urban Systems).
- 1.3 Annual Growth of City and Slum Populations. 1999-2000 (%).....6
Source: The Millennium Development Goals 2006, UN-HABITAT. Diagram by author.
- 1.4 Rocinha Favela-Bairro.....8
Source: http://ecos-aqui.blogspot.com
- 1.5 A slum community encroaching onto a sewage line in Mumbai, India.....8
Source: http://onlybombay.blogspot.com/2007/02/mumbais-slum-scandal.html
- 1.6 Kibera – the oldest slum in Nairobi.....8
Source: http://www.oikumene.org/es/activities/la-reda/recursos-y-enlaces/reda-galeria-de-fotos/water-and-sanitation-at-the-kibera-slum-nairobi-kenya.html.
- 1.7 25 Years of AIDS.....10
Source: 2006 Report on the Global AIDS Epidemic. UNAIDS Joint United Nations Programme on HIV/AIDS, UN-HABITAT.
- 1.8 HIV prevalence among men and women aged 15-49 in urban and rural areas in selected sub-Saharan African countries. 2000-2004 (%).....12
Source: 2006 Report on the Global AIDS Epidemic. UNAIDS Joint United Nations Programme on HIV/AIDS, UN-HABITAT.
- 1.9 Orphans living in urban and rural conditions in selected countries of sub-Saharan Africa. 2000-2004 (%).....12
Source: The Joint UNAIDS/UNICEF/USAID collaboration July 2004 Report on New Orphans Estimates and Framework for Action.
- 1.10 Increasing Population of Orphans in sub-Saharan Africa. 1990-2010.....12
Source: The Joint UNAIDS/UNICEF/USAID collaboration July 2004 Report on New Orphans Estimates and Framework for Action.

CHAPTER 2

- 2.1 An analysis of Kenya by Terrain.....16
Source: Map of Kenya. 1:10,000. John Bartholomew & Sons Ltd., 1983.
- 2.2 An analysis of Kenya by Climate.....16
Source: http://unosat.web.cern.ch/unosat/asp/prod_free.asp?id=42.
- 2.3 An analysis of Kenya by Population Density.....16
Source: Center of International Earth Science Information Network (CEISIN). http://sedac.ciesin.org/gpw/country.jsp?iso=KEN.
- 2.4 An analysis of Kenya by Tribe Distribution.....16
Source: Kenya (Cartographic Material). United States: Central Intelligence Agency, 1974.
- 2.5 An analysis of Kenya by Vegetation.....16
Source: Kenya (Cartographic Material). United States: Central Intelligence Agency, 1974.
- 2.6 An analysis of Kenya by Agriculture.....16
Source: Kenya (Cartographic Material). United States: Central Intelligence Agency, 1974.
- 2.7-9 Images of downtown Nairobi's major streets and business district.....18-19
Source: Images by author
- 2.10 Nairobi's Kenyatta International Conference Center.....20
Source: Image by author

| | | |
|---------|---|-------|
| 2.11 | Nyayo Monument..... | 20 |
| | <i>Source: Image by author</i> | |
| 2.12 | The Cooperative Bank Headquarters..... | 20 |
| | <i>Source: Image by author</i> | |
| 2.13 | Nairobi's Slum Enumeration..... | 22 |
| | <i>Source: Kenyan Population and Housing Census, 1999.</i> | |
| 2.14 | Sections of the urban fabric of three typical slum typologies..... | 23 |
| | <i>Source: Illustration by author</i> | |
| 2.15 | Nairobi's Transportation Systems..... | 24 |
| | <i>Source: Map of Nairobi (http://www.hassconsult.co.ke/map/nbinewmain.htm)</i> | |
| 2.16 | Nairobi's Public and Municipal Services..... | 26 |
| | <i>Source: Map of Nairobi (http://www.hassconsult.co.ke/map/nbinewmain.htm)</i> | |
| 2.17 | View of corrugated metal rooftops of one of Nairobi's many shantytowns..... | 28 |
| | <i>Source: http://zh.globalvoicesonline.org/hans/category/topics/diaspora/</i> | |
| 2.18 | A major market street in a Nairobi slum..... | 28 |
| | <i>Source: http://blog.redcross.ca/adamjohnston/</i> | |
| 2.19 | A residential courtyard in a Nairobi slum..... | 29 |
| | <i>Source: http://www.mwelu.org/</i> | |
| 2.20 | A residential pedestrian street corridor in the Mukuru slums..... | 29 |
| | <i>Source: Image by author</i> | |
| 2.21-22 | The Ngong River being used as a garbage dump site and latrine for slum residents living in the surrounding area..... | 30-31 |
| | <i>Source: Images by author</i> | |
| 2.23 | Aerial image of the Mukuru slums in Nairobi, Kenya..... | 32 |
| | <i>Source: Google Earth Pro aerial image capture</i> | |
| 2.24 | Plan of site boundaries and CFHRC's facilities..... | 34 |
| | <i>Sources: Map of Nairobi (http://www.hassconsult.co.ke/map/nbinewmain.htm); Google Earth Pro aerial image capture</i> | |
| 2.25 | Existing community infrastructures and building typologies of CFHRC..... | 36-37 |
| | <i>Source: Images and plans by author</i> | |
| 2.26 | Images of CFHRC's existing community infrastructures..... | 38-39 |
| | <i>Source: Images by author</i> | |

CHAPTER 3

| | | |
|-------|--|----|
| 3.1-3 | Diagrams of three slum improvement strategies: 1 Resettle; 2 Rebuild; 3 Upgrade..... | 43 |
| | <i>Source: Illustrations by author</i> | |

CHAPTER 4

| | | |
|-----|--|----|
| 4.1 | Three zoning areas (circulation, community, agriculture) and the proposed process timelines for each zone..... | 54 |
| | <i>Source: Diagram by author</i> | |
| 4.2 | The Circulation Zone's processes and routes..... | 56 |
| | <i>Source: Diagram by author</i> | |
| 4.3 | The Community Zone's processes and phases..... | 58 |
| | <i>Source: Diagram by author</i> | |
| 4.4 | The Agricultural Zone's processes and phases..... | 61 |
| | <i>Source: Diagram by author</i> | |
| 4.5 | Groundwork Infrastructures element..... | 64 |
| | <i>Source: Diagrams by author</i> | |
| 4.6 | Health & Sanitation element..... | 66 |
| | <i>Source: Diagrams by author</i> | |
| 4.7 | Housing element..... | 68 |
| | <i>Source: Diagrams by author</i> | |
| 4.8 | Education element..... | 70 |
| | <i>Source: Diagrams by author</i> | |
| 4.9 | Social Support Structure element..... | 72 |
| | <i>Source: Diagrams by author</i> | |

| | | |
|-------------------|--|-----|
| 4.10 | MarketPlace element..... | 74 |
| | <i>Source: Diagrams by author</i> | |
| 4.11 | Culture and Identity element..... | 76 |
| | <i>Source: Illustration by author</i> | |
| 4.12 | Water Collection: Diagrams of a simple Domestic Rainwater Catchment System and a Communal Rainwater. Catchment Reservoir System..... | 80 |
| | <i>Sources: http://www.eng.warwick.ac.uk/DTU/rwh?index.html; http://www.unep.or.jp/etc/Publications/Urban/UrbanEnv-2/9.asp</i> | |
| 4.13 | Framework-Infill System: Exploded axonometric diagram showing the different phases of the proposed adaptable housing system..... | 82 |
| | <i>Source: "Elemental Program Rethinking Housing in Chile" from Praxis Issue 8: Re: Programming; Taller de Chile.</i> | |
| 4.14 | Upgrading and Infill Details: Section of a typical slum home with different upgrading and infill details..... | 84 |
| | <i>Source: Diagram by author</i> | |
| 4.15 | Illustration of Solar Cooker essentials, how it works, and temperature range..... | 86 |
| | <i>Source: http://www.solarcookers.org/basics/how.html</i> | |
| 4.16-18 | Images of the CookKit Program in Kenya..... | 86 |
| | <i>Source: http://www.solarcookers.org/about/programs/multkenya.html#images</i> | |
| 4.19 | Ventilated Improved Pit (V.I.P.) Latrine..... | 88 |
| | <i>Source: TAG Technical Note No. 13: The Design of Ventilated Improved Pit Latrines; D. Duncan Mara.</i> | |
| 4.20 | The new community washroom facility in the Mukuru Slums..... | 90 |
| | <i>Source: Image by author</i> | |
| 4.21-24 | Interior images of the new washroom facility..... | 90 |
| | <i>Source: Images by author</i> | |
| 4.25 | The community organizers and volunteers who coordinated the implementation and construction of the facility..... | 91 |
| | <i>Source: Image by author</i> | |
| CHAPTER 5 | | |
| 5.1 | Proposed plan of Mukuru Kwa-Njenga in 2030..... | 94 |
| | <i>Source: Image by author</i> | |
| 5.2 | View into the Permanent Market Pavilion..... | 96 |
| | <i>Source: Image by author</i> | |
| 5.3 | View of the Mobile Clinic Station and Health Clinic..... | 97 |
| | <i>Source: Image by author</i> | |
| 5.4 | View of the Public Square/Playground and the Cana Community Center..... | 98 |
| | <i>Source: Image by author</i> | |
| 5.5 | View of the Cana Rescue Home and activity along the pedestrian pathway..... | 99 |
| | <i>Source: Image by author</i> | |
| CHAPTER 6 | | |
| 6.1 | Selected logo's, icons, and images of governments, community groups, organization, and people working to create better communities for the urban poor..... | 107 |
| | <i>Sources: http://www.canada.gc.ca; http://www.kenya.go.ke; http://www.un.org/english; http://www.architectureforhumanity.org; http://www.sidarec.org; http://50x15.amd.com; http://www.grameen-info.org; http://www.solarcookers.org/basics/why.html; http://www.ruaf.org.</i> | |
| APPENDIX A | | |
| A.1 | A view of Petare, a slum community in Caracas, Venezuela..... | 112 |
| | <i>Source: http://www.spraguephoto.com/photo_index_detail.lasso?id=13413&skip=2223&bigskip=2200</i> | |
| A.2 | Painted steps to enliven the pedestrian path in Petare..... | 112 |
| | <i>Source: http://www.spraguephoto.com/photo_index_detail.lasso?id=13414&skip=2223&bigskip=2200</i> | |

| | | |
|---------|---|-----|
| A.3 | Hassan Fathy..... | 114 |
| | <i>Source: http://www.rdsf.com/WS/HF/hassan_fathy.asp.</i> | |
| A.4 | Site plan of New Gournā in Luxor, Egypt..... | 114 |
| | <i>Source: http://web.mit.edu/4.611/www/L19.html</i> | |
| A.5 | A residential building revealing the vernacular style of construction used for the New Gournā community..... | 114 |
| | <i>Source: http://www.geocities.com/arc.hassanfathy/gourna-e.html</i> | |
| A.6 | Sam Mockbee with a resident of Hale County, Alabama and the resident's two sons..... | 116 |
| | <i>Source: Rural Studio: Samuel Mockbee and an Architecture of Decency; Dean, Andrea Oppenheimer Dean.</i> | |
| A.7 | Three students working on the Sanders-Dudley House (2001) in Sawyer ville..... | 116 |
| | <i>Source: Rural Studio: Samuel Mockbee and an Architecture of Decency; Dean, Andrea Oppenheimer Dean.</i> | |
| A.8-9 | Bryant (Hay Bale) House built in 1994, and the changes the house has adapted over time (2000)..... | 118 |
| | <i>Source: Rural Studio: Samuel Mockbee and an Architecture of Decency; Dean, Andrea Oppenheimer Dean.</i> | |
| A.10-12 | The Akron Boys and Girls Club..... | 118 |
| | <i>Source: Rural Studio: Samuel Mockbee and an Architecture of Decency; Dean, Andrea Oppenheimer Dean.</i> | |
| A.13 | Aerial view of Fernao Cardim bairro in Brazil..... | 120 |
| | <i>Source: Favela-Bairro Project: Jorge Mario Jauregui; Machado, Rudolfo (editor).</i> | |
| A.14 | A before and after photograph of a pedestrian walkway that was constructed as part of an upgrading project in one of the bairro's of Rio de Janeiro, Brazil..... | 120 |
| | <i>Source: Favela-Bairro Project: Jorge Mario Jauregui; Machado, Rudolfo (editor).</i> | |
| A.15 | A diverging pedestrian pathway, with public lighting and planting, the result of an upgrading project in one of the bairro's of Rio de Janeiro, Brazil..... | 120 |
| | <i>Source: Favela-Bairro Project: Jorge Mario Jauregui; Machado, Rudolfo (editor).</i> | |
| A.16 | The logos of ACORN (the grassroots community group in New Orleans) and of the main participating universities: Cornell University, Columbia University, and the University of Illinois at Urbana-Champaign..... | 122 |
| | <i>Source: http://www.rebuildingtheninth.org/events.</i> | |
| A.17 | ACORN Housing/University Partnership representative presenting "The People's Plan" to possible funding partners in New York City..... | 122 |
| | <i>Source: http://www.rebuildingtheninth.org/events.</i> | |
| A.18 | A public unveiling of "The People's Plan"..... | 122 |
| | <i>Source: http://www.rebuildingtheninth.org/events.</i> | |
| A.19 | Aerial view of Sultanbeyli in Istanbul, Turkey..... | 124 |
| | <i>Source: Google Earth Pro image capture.</i> | |
| A.20-23 | Day and night images of public pedestrian spaces in Sultanbeyli..... | 124 |
| | <i>Source: http://www.sultanbeyli.bel.tr.</i> | |
| A.24-27 | A public services building's construction sequence in Sultanbeyli..... | 124 |
| | <i>Source: http://www.sultanbeyli.bel.tr.</i> | |
| A.28-32 | Examples of the different ways in which micro-financing can help the poor start a form of income generation..... | 126 |
| | <i>Source: http://www.grameen-info.org/index.html.</i> | |
| A.33 | Muhammad Yunus, founder of Grameen Bank, meeting with the women of a community in Bangladesh..... | 126 |
| | <i>Source: http://www.grameen-info.org/index.html.</i> | |
| A.34 | Beera Baptist Mission Church in Johannesburg, South Africa..... | 128 |
| | <i>Source: http://www.holeinthewall.org/za.</i> | |
| A.35-37 | Images of the "Door of Hope" (baby bin)..... | 128 |
| | <i>Source: http://www.holeinthewall.org.za.</i> | |
| A.38 | The Nyumbani sign at the entrance of the orphanage in the town of Karen..... | 130 |
| | <i>Source: Image by author</i> | |

| | | |
|-------------------|---|---------|
| A.39 | An aerial view of the Nyumbani Orphanage grounds in Karen..... | 130 |
| | <i>Source: http://www.nyumbani.org/orphan_hist.html.</i> | |
| A.40-46 | Images of the construction of the Nyumbani Village..... | 132 |
| | <i>Source: http://www.nyumbani.org/village_pics.html.</i> | |
| A.47 | Entrance sign from the main road into Mully Children’s Family Ndalani Branch..... | 134 |
| | <i>Source: Image by author</i> | |
| A.48-50 | A few of the many activities and programs that occur at in MCF..... | 134 |
| | <i>Source: http://www.flickr.com/photos/danscott77/741537860/in/ set-72157600117437932.</i> | |
| A.51 | Green beans growing inside the greenhouses..... | 137 |
| | <i>Source: http://www.flickr.com/photos/danscott77/741537860/in/ set-72157600117437932.</i> | |
| A.52 | A panoramic view of the greenhouses and the landscape beyond at MCF Ndalani Branch..... | 137 |
| | <i>Source: Image by author.</i> | |
| APPENDIX B | | |
| B.1 | Standard Formulas and Charts for Rainwater Catchment Systems..... | 140-141 |
| | <i>Sources: Formulas: http://www.unep.or.jp/etc/Publications/Urban/UrbanEnv-2/9.asp; Nairobi’s Monthly Rainfall Statistics: http://www.weather.com/outlook/travel/ businesstraveler/wxclimatolog/monthly/graph.</i> | |
| B.1 | Stakeholders Matrix..... | 142-147 |
| | <i>Source: Method: Development Workshop, Allen Cain</i> | |

PREFACE

In September 2006, I had the opportunity to go to Nairobi, Kenya and work with the Cana Family Health and Rescue Center (CFHRC) located in the slum community of Mukuru Kwa-Njenga. Upon arriving at CFHRC, I stepped out of the van and swarms of children from Cana Elementary School came to see who had arrived. Although there have been volunteers and foreigners visit in the past, these children were extremely excited and it seemed as though they had never seen a foreigner before. Having barely stepped out of the van, I had children holding on to each of my fingers, others grabbing my arm and clinging on to my waist yelling “Mzungu! Mzungu!” (White-man! White-man!). At first, I felt their small hands, rough and covered in what I hoped was just dirt. However, after reading countless articles describing the over-crowded and unsanitary conditions of slum communities, I could not help but think of what else could have microscopically made their way on to the children’s hands. Within minutes my thoughts shifted to their smiling faces and excitement in seeing a “petite Asian girl with straight hair,” forgetting for a moment about the conditions and circumstances they lived in.

During my visit, I heard many stories, most of them about AIDS and the effect it has had on their community, along with stories of the many children who are living without their parents, who have no place to go, no food, no care, and an uncertain future. Walking through the streets and visiting some of the residents’ homes was a completely different experience than any article could describe. I was constantly hopping over streams and puddles of garbage, mud, and excrement. After only a short time, my shoes were covered in mush and it was not even the rainy season. As I walked through the doorway of one of the homes, the bright sun disappeared and I was in a small dark room. I could feel the sun’s heat radiating from the sheet metal onto my skin. Having the opportunity to visit several homes made me realize how difficult and uncomfortable daily life must be. None of the homes I visited had access to water or electricity, and during my visit I saw only one outhouse in the neighbourhood.

Despite the filth and poverty, the directors of the CFHRC, Joseph and Mary Mambo, have done significant work in this area building a health clinic, school, church, and orphanage. With the help of local residents, non-government organizations (NGO’s), the Government of Kenya (GOK), and the European Union (EU), CFHRC has recently opened a public pit latrine in Mukuru and seek to continue building more projects and develop resources that support and improve the community’s living conditions. Their positive influence has helped them establish a good rapport among the residents and they are beginning to see the community change for the better.

I was humbled by all those who had helped me arrange my trip and for their hospitality during my visit. I am thankful to Stephen and Marion Thuo who helped me organize my trip prior to my arrival in Kenya; I am

very grateful to Joseph and Mary Mambo for giving me the opportunity to observe and learn from all the work they are doing in their slum community; to Kuka, who graciously took me in and around during the latter part of my visit; and to Shiro and Jane, who took time off on several occasions to show me around downtown Nairobi.

Whatever is written here about Mukuru Kwa-Njenga and the CFHRC is based on what I observed and learned. If there is any discrepancy in this thesis, it is not the fault of the directors, volunteers, or community but my own. I hope that my research will help them further develop their community and support their future projects and visions.

INTRODUCTION

The Door of Hope is an orphanage located in Johannesburg, South Africa. It began with a hole, also referred to as the “baby bin,” made in the wall of Berea Baptist Mission Church in August, 1999. This simple design provides a place for desperate mothers – unable to care for their children – a safe place to leave their baby with no questions asked. When a baby is dropped off through the hole, an alarm signals workers in the church, who immediately retrieve the baby and begin caring for it. The baby-bin is also used by police officers when they find newborns abandoned along the street or in dump yards. Since its inception up to June 2007, over 560 babies have been cared for and given a home.¹ In Johannesburg alone, it is estimated that approximately 40-50 babies are abandoned each month and left to starve and perish. *The Door of Hope* began in response to what was, and continues to happen among the urban poor in Johannesburg.

We are living in an urban world. Cities are making history, growing faster than ever before with populations outnumbering rural areas. Though urbanization is not a new trend, over the past decade it has been established as one of the most powerful. With such rapid growth, local services and infrastructure are not able to adequately support large populations. Such support systems – including access to clean water, sewage treatment, and housing – are vital for survival and need to be supplied, supported, and sustained. As a result of deteriorating services, millions of people are living in crowded, unhealthy environments that lack the most basic necessities. Continuing deterioration, coupled with rapid population growth lead to these communities becoming the breeding grounds for disease, poverty, depression, and violence. Unmapped as if they do not exist, they may be setting the trend for future urban living. Are overcrowded and neglected environments the communities of the future?

Africa is one of the world's fastest growing regions and its cities are experiencing an influx of people from rural areas. Ravaged by civil wars and famine, Africa is also the poorest region of the world. Of all the issues the continent has faced, HIV/AIDS has most recently been on the forefront of the global forum. Since its initial detection in 1981, it has become an epidemic with overwhelmingly grave effects on human development and unpredictable consequences for future generations. Research has shown that this epidemic affects not only one's health, but enables negative development challenges in public services, governance, and other more urgent humanitarian situations, such as food shortages, poverty, and hostility. It has been stated that “HIV/AIDS accentuates existing difficulties, compelling us to confront many simultaneous problems, all of which need resolution”²

The consequences of AIDS for future generations have yet to be determined. Worldwide, AIDS is the leading cause of death for people aged 15-49, traditionally the healthiest and most able-bodied demographic. It is fully



recognized that this disease is not only a threat to those infected, but also devastating to children, families, and communities.³ HIV/AIDS is imposing an even greater burden on the world's societies that are just trying to make it through the cracks of today's globalizing economy, with millions of orphans in need of support and care. How will this crisis impact the future? With the main population of adults decreasing by the millions, and their children being made orphans, the only thing we can be certain of is our collective intervention today to help ensure a better future.

The task of trying to "solve the problem" may be impossible. However, there are many examples of communities all over the world that have improved their social and physical environments through collaborative practice, partnership, and participation. By working with governments, professionals, and organizations, communities can develop ways to alleviate current struggles for survival. In particular, architectural interventions can create a framework that helps societies develop into healthy, stable, and independent environments. Like the *Door of Hope's* baby-bin, these interventions can trigger processes that will emerge as inhabitants are offered and provided with the tools that involve taking ownership of their community. As designers, we are trained to solve issues of space and the built environment through form, and to create a connection between the social and the physical. Intervention of form can function as a catalyst, allowing processes of change to emerge on their own. One simple idea can plant the seed for a progressive movement to flourish in a community.

This thesis considers that all parties involved are working in partnership with each other. It will assume that the architect is engaged by a local community group, helping them develop an analysis of their current economic, social and physical conditions. Through this analysis, policies and development strategies can be created and used to create networks for funding. Funding will come from non-government organizations and the United Nations, as part of a pilot project seeking to achieve the Millennium Development Goals. This thesis will also assume that the local and national government are ready to make changes to their policies, incorporating slum communities in their zoning laws.

This thesis is organized under three major scales: city-scale, community-scale, and individual-scale. The first three chapters investigate the city-scale and larger issues that are at play in the cities of the slum community. Chapters four and five focus on the community-scale. The Kijiji Kit is exemplified through the slum community of Mukuru Kwa-Njenga and investigates what a slum community needs and how it can implement slum upgrading. The final chapter focuses on key principles behind the success of any community development project and what is needed by everyone involved: the municipalities, organizations, communities, and professionals.

FIGURE i A child wandering along the edge of the Mukuru slums in Nairobi, Kenya.

1.0 > GLOBALIZATION & ITS TRENDS

“One billion people around the world now live in city slums and their numbers are set to double over the next 25 years. But slums are no more inevitable than they are acceptable. While it may be difficult to overcome relative poverty, it is perfectly possible to ensure that the poor are provided with adequate shelter and basic services.”⁴

– Anna Tibaijuka –

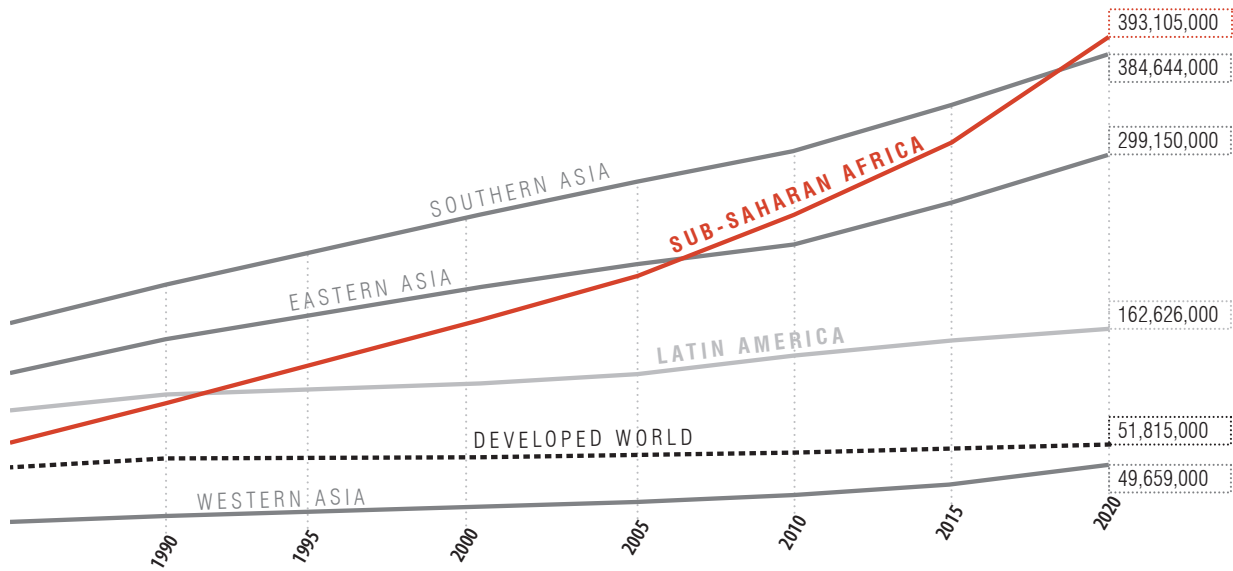


FIGURE 1.1 Slum Population Projections by region 1990-2020 (millions)

- Sub-Saharan Africa
- Latin America & the Caribbean
- Asia
- Developed World

| 2000 | 1996 |
|-----------------|---------------------------|
| Population Rank | GDP Rank (2000 pop. rank) |
| 1 Tokyo | Tokyo |
| 2 Mexico City | New York |
| 3 New York | Los Angeles |
| 4 Seoul | Osaka |
| 5 Sao Paulo | Paris (25) |
| 6 Mumbai | London (19) |
| 7 Delhi | Chicago (26) |
| 8 Los Angeles | San Francisco (35) |
| 9 Osaka | Dusseldorf (46) |
| 10 Jakarta | Boston (48) |

FIGURE 1.2 Population versus GDP by 10 largest cities

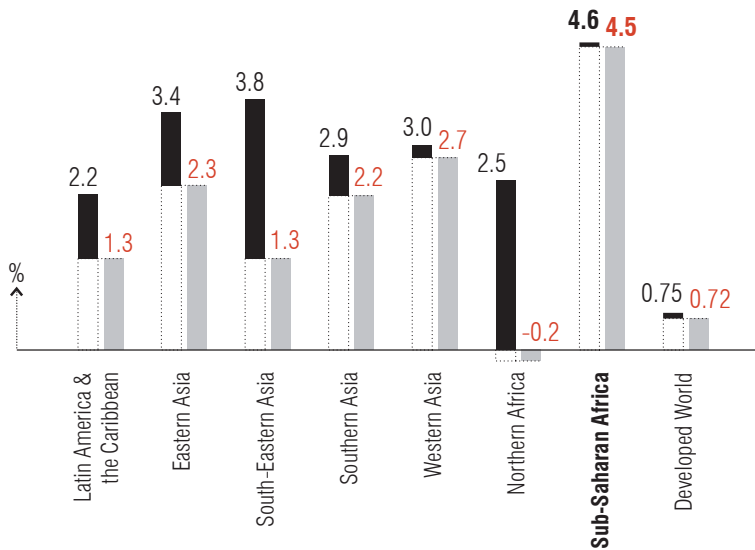


FIGURE 1.3 Annual Growth of City and Slum Populations 1990-2001 (%)

- Urban Growth
- Slum Growth

ON SLUMS

Slums, informal settlements, shantytowns, favela, ghettos: all of these words describe an urban typology that has become the focus of intense interest for architects, urbanists, social-economists, and scholars such as Rem Koolhaas, Robert Neuwirth, Jeffrey D. Sachs and Mike Davis. Although not new, this urban typology of squalid, overly-dense communities has burgeoned over the last decade to over 1 billion people. Today, almost half of the world's urban population are living in slums.

What is a "slum"? The UN-HABITAT report, *The Challenge of Slums*, defines "slum" as a "household or group of individuals living under the same roof that lack one or more of the following conditions: access to safe water; access to sanitation; secure tenure; durability of housing; and sufficient living area."⁵ This operational definition, officially adopted at a UN meeting in Nairobi on October 2002, is "restricted to the physical and legal characteristics of the settlement," and shies away from the more difficult-to-measure social dimensions; however, in most cases, is equally related to both the economic and social circumstances of the individual or community.⁶

In 2005, Asia alone had approximately 580 million people living in slums, with a majority of the increase occurring in two regions: Eastern Asia, with 212 million and Southern Asia with 276 million. Asia's growth was followed by sub-Saharan Africa, where 199 million people were recorded to be living in slums. By 2020, Africa's slum population is expected to more than double exceeding both Southern and Eastern Asia, with a slum population of 393 million people, the highest growing rate in the world. Southern and Eastern Asia's populations will rise to an estimated 385 million and 299 million respectively (Fig. 1.1).⁷

When we see the statistics on growing populations in cities, we typically assume, through preconceptions, that urbanization equals advancing technologies. However, in his book, *Planet of the Slums*, Davis reveals the reality of Third World urbanization and how its dynamics "both recapitulate and confound the precedents of the nineteenth- and early-twentieth-century Europe and North America."⁸ The size of a city's economy in relation to its population size unexpectedly have little in common and the assumption that urbanization and economic prosperity go hand-in-hand is decoupled when you begin to look at the developing world, and especially the countries in sub-Saharan Africa (Fig 1.2). So how have these countries, with lack of urban employment and declining agricultural productivity, been able to sustain the highest annual urbanization rates? Davis explains:

"These cities, in spite of their stagnant or negative economic growth, and without necessary investment in new infrastructure, educational facilities, or public-health systems – have harvested this world agrarian crisis. Rather than the classical stereotype of the labour-intensive countryside and the capital intensive industrial metropolis, the Third World now



FIGURE 1.4 Rocinha Favela-Bairro, a hillside shantytown in Rio de Janeiro, Brazil.

FIGURE 1.5 Dharavi Slums, a slum community encroaching onto a sewage line in Mumbai, India.

FIGURE 1.6 Kibera, the oldest slum in Nairobi, Kenya.

*contains many examples of capital-intensive countrysides and labour-intensive deindustrialized cities. "Overurbanization," in other words, is driven by the reproduction of poverty, not by the supply of jobs. This is one of the unexpected tracks down which a neoliberal world-order is shunting the future."*⁹

Some argue that the condition of cities in the developing world is a natural progression towards economic development and that these communities are moving in the right direction in terms of increased commerce and trade. Yet these new urban centres are experiencing a back-track of progression. In March of 2005, the British government released *The Commission for Africa Report*, with the clear message that urbanisation is one of the most significant challenges facing Africans today, second only to the HIV/AIDS epidemic.¹⁰ Conditions are unliveable and overcrowded with insecure housing, lack of ownership, and lack of basic public services such as electricity, roads, and sewage. Education is extremely limited and the degree of health risk is very high. Slum life creates enormous physical, sociological and psychological burdens on its residents propagating fear and insecurity, violence and exclusion. Yet, as adverse as it may seem, countless people are moving into urban slums for two main reasons – anticipated low-costs of living and employment opportunity in the informal market: "generally small scale industries and commercial activities that are not registered enterprises but provide large amounts of products and services that people use each day."¹¹ Without these small exchanges of products and services, many cities in the developing world would come to a standstill. Furthermore, the streets of these communities are constantly filled with people and activity, collectively creating a more communal and socially dynamic environment. But these few positive attributes do not in any way justify the continued existence of slums and should not be used as an excuse for the slow progression towards the goal of providing basic living necessities for all, and especially for the most vulnerable population – the orphans, the community's future. Therefore, there is an urgent need for low-cost urban living that focuses on generating a community that supports the millions of children who are currently growing with no support.

In his book *Shadow Cities*, Neuwirth reveals a new way of looking at these communities. Rather than seeing them as dilapidated, hopeless, and "invisible", what the world's squatters need the most is the right to stay where they are. Through this simple foundation, the future progress of these communities can begin to take a step towards improvement.

*"Today, the world's squatters are demonstrating a new way forward in the fight to create a more equitable globe. Without any laws to support them, they are making their improper, illegal communities grow and prosper. We don't need to crush their communities with our hard-nosed conception of property rights. Instead, we can learn from them how possession can trump property: how people with no right to any land can produce more housing than people who have a title deed."*¹²

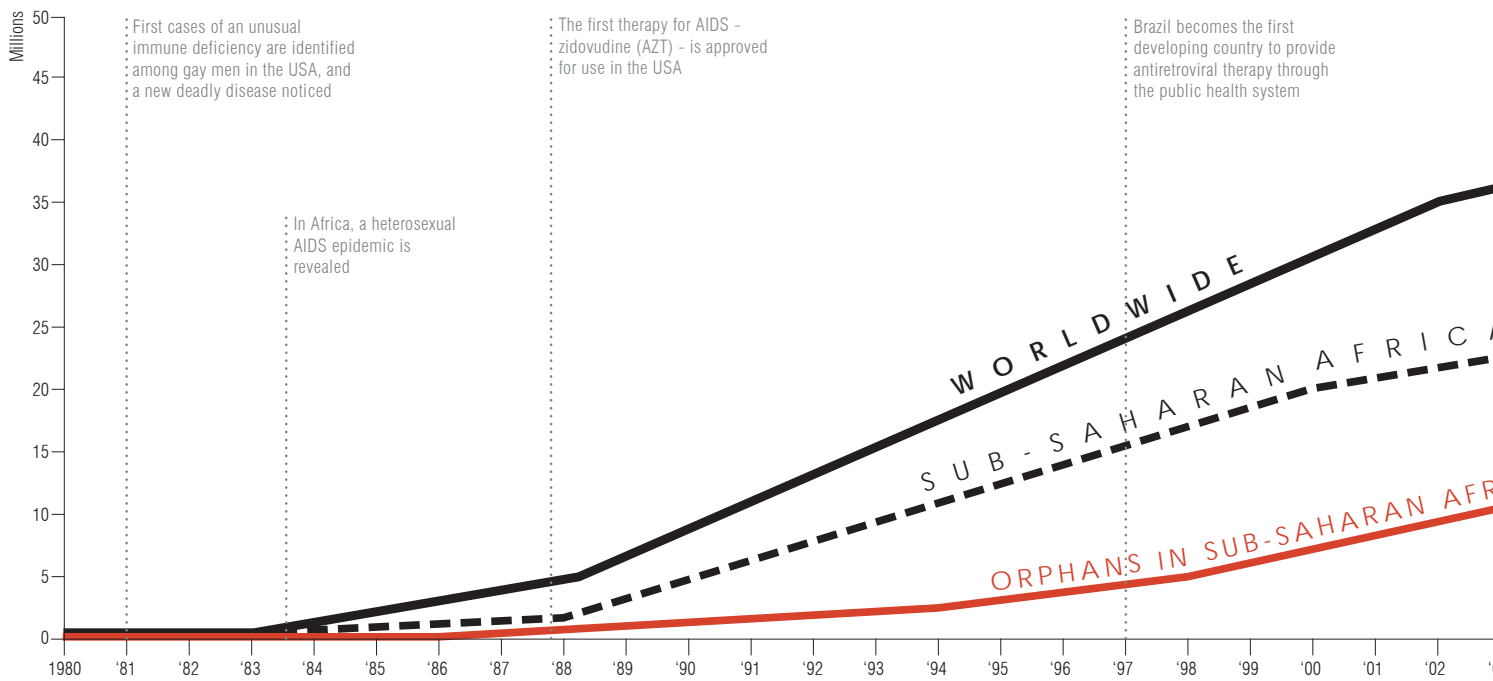


FIGURE 1.7 25 Years of AIDS

— People living with HIV/AIDS
 — Children Orphaned by AIDS in sub-Saharan Africa

ON HIV/AIDS

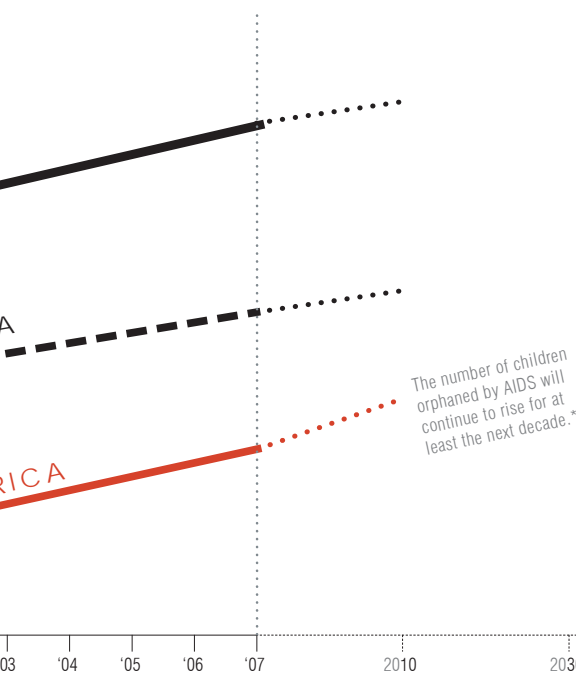
HIV/AIDS was first detected in 1981 in the United States. Realizing its rapidly spreading character, the government and citizens took action to stop its spread. As of 2004, the number of deaths in the U.S. due to HIV/AIDS had dropped 8%. Today, there are approximately 1.2 million people infected by HIV/AIDS in the United States, with the cumulative estimated number of deaths of persons with AIDS being 529,113.¹³ Currently, the HIV prevalence rate in the United States is 0.6 percent. Canada has a lower prevalence rate of 0.3 percent. Sub-Saharan Africa however, tells a different story as urbanisation is not the only major issue this region is facing.

In Botswana, the AIDS prevalence rate is 24.1 percent, in Zimbabwe 20.1 percent, in South Africa 18.8 percent and in Kenya 6.1 percent.¹⁴ In just 25 years, HIV has incessantly spread from a few remote cases to nearly every country in the world, infecting 64 million and killing 25 million people thus far. Today, there are 39 million people in the world living with HIV/AIDS. Out of that, 24.5 million are in sub-Saharan Africa – over 60% of the world total (Figure 1.7). Everyday, 5,500 Africans die of AIDS, accumulating to approximately 2 million people per year, a total that is staggeringly greater than the cumulative 529,113 deaths since 1981 (to 2004) in the United States. This is not to diminish the severity of HIV/AIDS in the United States or any other developed country; nor is it to lessen the importance of treatment and prevention. The emphasis of these statistics is simply to illustrate the extreme conditions that are present today in Africa.

“If AIDS was at the rate in the United States that it is in Africa, we would not be concerned with cost. We would build [houses and clinics] and keep building until we can put a stop to this pandemic.”¹⁵

A majority of the deaths due to AIDS in sub-Saharan Africa occur in the 19-45 age group – the range that is supposed to be the major working and economic force of a country (Figure 1.8). With the current generation of parents, teachers, nurses, and doctors dying, the number of orphans is on the rise, with a staggering 15 million orphans in sub-Saharan Africa. In Zambia, 23 percent of all children are orphans, with numbers expected to rise to 1 in 3 by 2010. In Swaziland, it is expected that up to 15 percent of the entire population will be orphaned by 2010.¹⁶ With communities losing a generation of adults, the responsibility of raising these children lies in their extended families and their community.

The orphaning of millions of children and the devastation that most of them will face is unlike anything humanity has encountered. Less than seven percent of children who require treatment for HIV/AIDS are able to receive it. Worldwide, an estimated 380,000 children under age 15 died of AIDS in 2006 alone – that is comparable to losing 85 percent of Toronto’s children in that same age group.¹⁷ With the majority of this pandemic occurring in developing nations, it will be the children living in



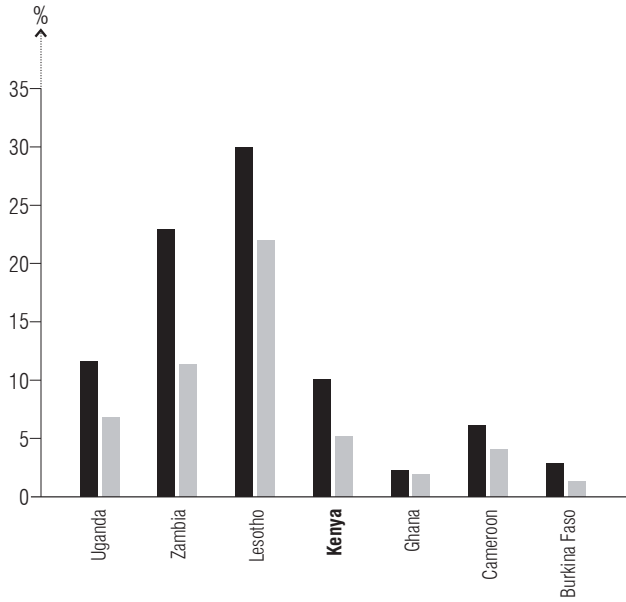


FIGURE 1.8 HIV prevalence among men and women aged 15-49 in urban and rural areas in selected sub-Saharan African countries 2000-2004 (%)

- Urban HIV Prevalence Rate
- Rural HIV Prevalence Rate

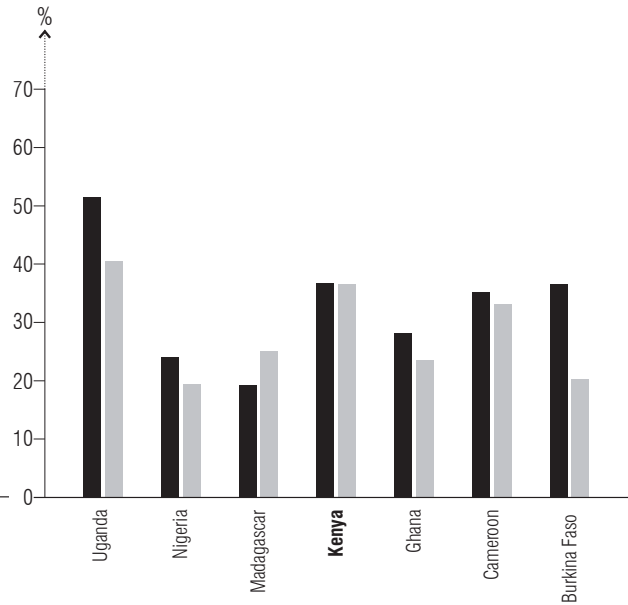


FIGURE 1.9 Orphans living in urban and rural conditions in selected countries of sub-Saharan Africa 2000-2004 (%)

- Urban condition
- Rural condition

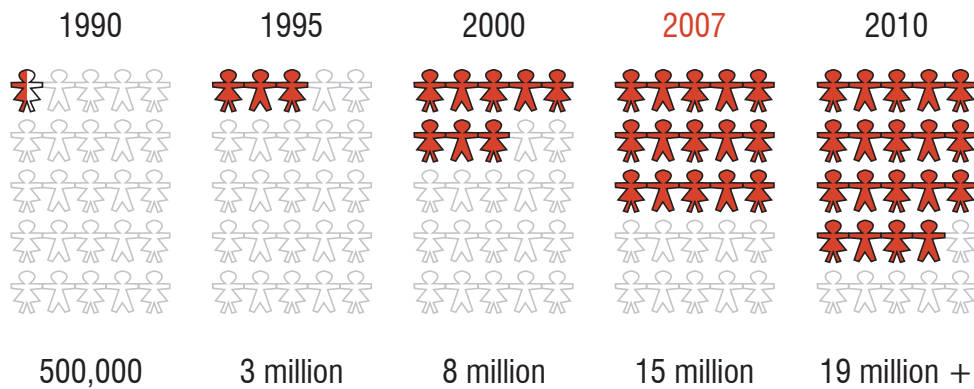


FIGURE 1.10 Increasing population of orphans in sub-Saharan Africa 1990-2010

👤 Represents 1 million orphans in sub-Saharan Africa

those nations that will be carrying the weight of this pandemic's burden. Beyond the 2.3 million children actually infected with HIV, there are over 15 million children in sub-Saharan Africa who have lost one or both parents to AIDS, and approximately 44 million orphans who have lost their parents due to all causes faced by many developing nations (AIDS, malaria, poverty, conflict, etc.). By 2010, there will be approximately 18 million orphans due to AIDS, and 53 million orphans due to all causes in sub-Saharan Africa (Figure 1.10). Moreover, if current infection rates continue, the demographical impact on this region will be tremendous: "up to 60% of Africa's 15 year olds will not reach their 60th birthday."¹⁸

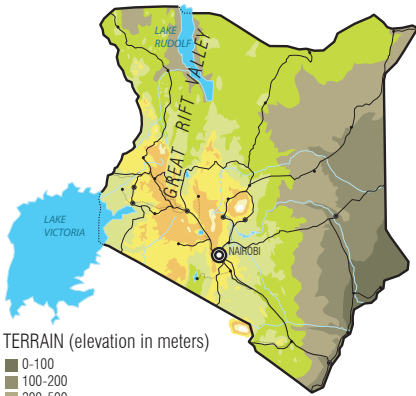
The HIV/AIDS epidemic affects every aspect of a child's life – from family, school, the community, and the child's social world. The impact of AIDS deprives youth of their right to a childhood. Ten-year-old girls take on the responsibilities of the mother when their parents pass away. Many are unable to attend school and must find work in order to feed and raise their young siblings. Children do not get the chance to cope with the tragic loss of their parents, something that they may not be able to comprehend or handle at such a young age – generating further psychological and emotional trauma. Because economic and social forces of the nation (parents, teachers, doctors) are dying, sub-Saharan Africa is facing the worst orphan crisis in the world. Children are losing key role models that educate, guide, and equip them to become significant social and economic contributors for the future. Today's generation of children are at an increased risk as more and more of them end up on the city streets (Figure 1.9) and in slum communities, preventing a healthy and safe environment in which to grow and learn, effectively diminishing their chances of escaping poverty.

In spite of the difficult circumstances, there are many individuals, organizations, and institutions, like *The Door of Hope*, that are acting upon the urgency of the orphan crisis. *Nyumbani* is another orphanage located in Karen, a suburb of Nairobi, Kenya. Founded in 1992, it is the first hospice for HIV positive (HIV+) orphans, providing comprehensive nutritional, medical, spiritual and psychological care. 'Nyumbani', meaning 'home' in Swahili, is raising approximately 100 children ranging in age from newborns babies to as old as twenty-three years of age. These orphans come from all over Kenya and represent all tribes and ethnicities of the country. The orphanage is currently working on *Nyumbani Village*, a self-sustaining community that will house both the orphans and the elderly that have been left behind by the "middle" generation. This community will consist of group homes and community institutions with the purpose of creating a nurturing and healing environment, in hopes of raising a generation of children to proficient adults. "The goal is to provide compassion and service to all affected by AIDS, so that they will rise up to lead productive, safe, and comfortable lives."¹⁹ By taking the orphan and basing the growth of a community around the care and upbringing of these future residents, and by striving to provide their basic human necessities, the future for the orphan and for the city is taking a step in the right direction.

2.0 > SITE ANALYSIS

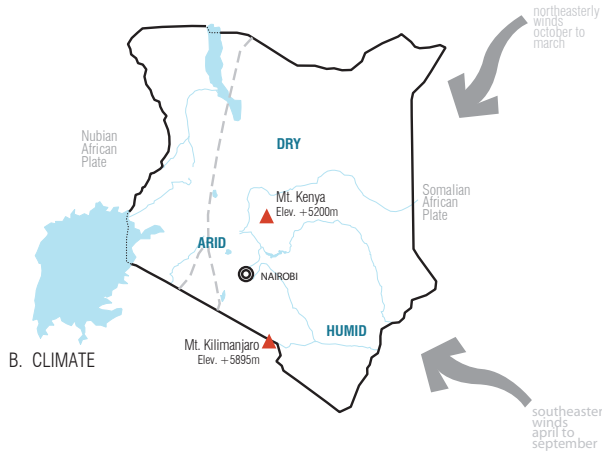
“Cinders and fumes from untended piles of burning trash mingle with ash and smoke from charcoal cooking fires where women prepare meals. At night, kerosene fumes from lanterns join the stew. More than 80 percent of Nairobi’s households use charcoal for cooking, but the air is worst in neighbourhoods such as this, which lack both electricity and trash removal.”²⁰

– Molly O’Meara Sheehan –

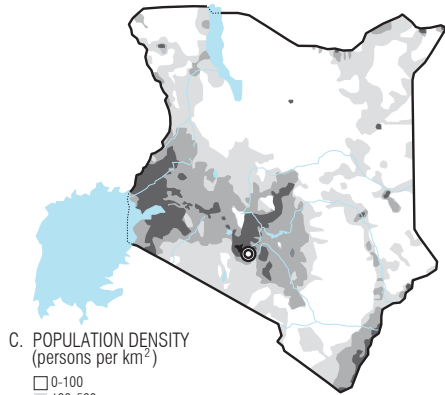


A. TERRAIN (elevation in meters)

- 0-100
- 100-200
- 200-500
- 500-1000
- 1000-1500
- 1500-2000
- 2000-3000
- 3000-4000
- >4000

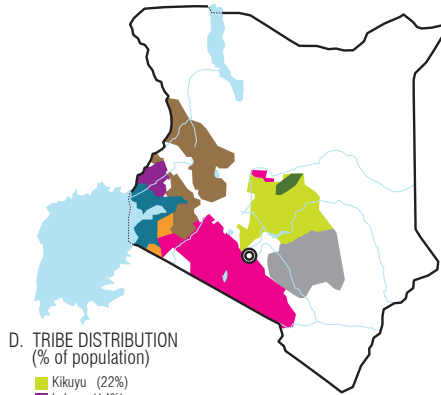


B. CLIMATE



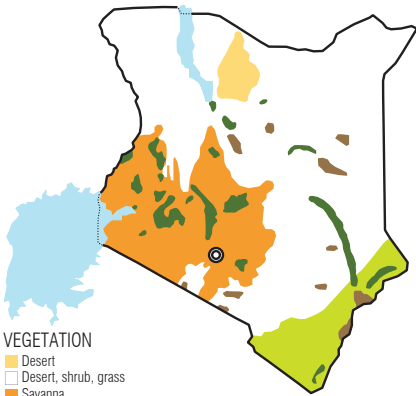
C. POPULATION DENSITY (persons per km²)

- 0-100
- 100-500
- 500-1000
- 1000-1500
- >1500



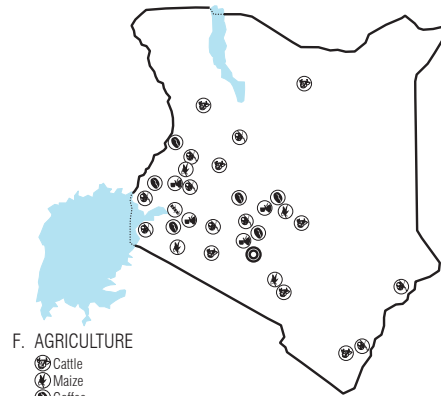
D. TRIBE DISTRIBUTION (% of population)

- Kikuyu (22%)
- Luhya (14%)
- Luo (13%)
- Kalenjin (12%)
- Kamba (11%)
- Kisii (6%)
- Meru (6%)
- Maasai (2%)
- Other African (13%)
- Minority (1%)



E. VEGETATION

- Desert
- Desert, shrub, grass
- Savanna
- Coastal bush
- Montaine, riverine and coastal forest
- Marsh and swamp



F. AGRICULTURE

- Cattle
- Maize
- Coffee
- Tea
- Sugar
- Cotton

KENYA

In 1895, the British government decided to build a railway through Kenya into Uganda, a classical acclaim to Victorian engineering. The Kenya Uganda Railway (KUR) took six year to complete, costing many labourers their lives, and also costing much more financially than what the railway would give in return after its completion. However, it transformed the future of East Africa, founding and contributing to the growth of Nairobi, what is now the capital city of Kenya.²¹

Despite colonialism – having won their independence by the British in 1964 – the cultural identity of the Kenyan people is still very strong today. There are many tribes in Kenya whose ancestors came from all over Africa beginning from around 1000 AD. The first immigrants from West Africa are a Bantu-speaking people where the following tribes stem from: Gusii, Kikuyu, Akamba and Meru tribes. By the end of the 15th century, these tribes grew and occupied most of southern and western Kenya. The tribes of the Maasai, Luo, Samburu, and Turkana stem from the Nilotic-speaking people who came from the Nile Valley in Southern Sudan at the end of the 16th century. Smaller tribes have also continued to move in and out of Kenya throughout its history up until around the beginning of the 20th century.²²

Since its independence, the country has grown to become one the most rapidly urbanizing countries in sub-Saharan Africa, with an annual urban population growth rate of 4.4%. Yet despite Kenya's growing cities that generate over 65% of their national GDP, urban poverty is a major concern with over 71% of the urban population living in a slum.²³

Kenya has also been in decline in terms of provisions of health services. Infant and under five mortality rates have been on the rise, with at least 12% of children born alive not reaching the age of five.²⁴ Kenya is also facing an HIV/AIDS prevalence rate of 10% among the urban population, and 5.6% among the rural population ranging in the age of 15 to 49. With a total population of 34.2 million people, greater than 1.3 million people are living with HIV.²⁵ As a result of the AIDS pandemic, there are over 1.1 million children under the age of 17 that have been orphaned due to AIDS in Kenya, with just over half of them growing up in slum communities.

In spite of this data and rapid urbanization trends, “Kenya lacks any policy or strategy for urban development” and in many cases is still recognized as a rural nation.²⁶ This perception must change and local governments and national institutions must understand the role and needs of the urban sector, which includes slums, in order for Kenya to successfully develop both socially and economically.

FIGURE 2.1 – 2.6 An analysis of Kenya
by: A. Terrain;
B. Climate;
C. Population Density;
D. Tribe Distribution;
E. Vegetation;
F. Agriculture.







FIGURE 2.7 - 9 *PRECEDING PAGE* Images of downtown Nairobi's major streets and business district.

FIGURE 2.10 *TOP LEFT* Nairobi's Kenyatta International Conference Center.

FIGURE 2.11 *CENTER LEFT* Nyayo Monument located in the city's Uhuru Park.

FIGURE 2.12 *BOTTOM LEFT* The Cooperative Bank Headquarters located adjacent to the 1998 U.S. Embassy Memorial Park in Nairobi's central business district.

NAIROBI

Named after a water hole known in Maasai as *Ewaso Nyirobi*, meaning “cool waters”, the Rift Valley settlement of Nairobi became the staging point for Britain’s East Africa’s railway expansion. The railway was extended down the Rift Valley and back up around Lake Victoria into Uganda. By 1905, Nairobi had already become a large and flourishing town with the settlement consisting mainly of railway buildings and separate areas for Europeans, Africans, and Indians, the two latter being the main construction labourers of the railway. When a small Indian bazaar was established, Nairobi soon became a trading centre and the commercial and business hub of the British East Africa settlement.

In 1907, Nairobi became the capital of Kenya, attracting more and more rural migrants. As the population continued to grow under British rule, the city remained greatly segregated, with British settlers moving into the suburbs and migrants settling in camps built for the railway workers. The city’s expansion infuriated several indigenous groups including the Maasai and Kikuyu people, as British development continued with little regard for the ways of African tribal land ownership. Amidst the uproar, Nairobi was declared a municipality in 1919 and an official city in 1954.

Unlike many other slum communities, the uniqueness of Nairobi’s slums is their lack of change since their formation: they have been in virtually the same conditions for almost half a century. Their disconnection to the city center makes municipal services difficult to access them and therefore among the most dangerous places to live. There is no protection, security or authority over slum communities provided by the law, resulting in fear, harassment and violence in the streets. The lack of public infrastructure, such as connection to a sewage system and garbage collection, results in more pollution and enables the spread of more viruses, deteriorating an already dire situation. There are no roads for ambulances, police or fire trucks to access these communities – the built environment being a huge part of this problem. Also adding to these issues is land ownership policy, or lack of a policy, in Nairobi. Four out of every five slum residents are renters.²⁷ Virtually all housing is temporarily built and is dangerous and unstable to live in, with catastrophic possibilities during extreme weather conditions.

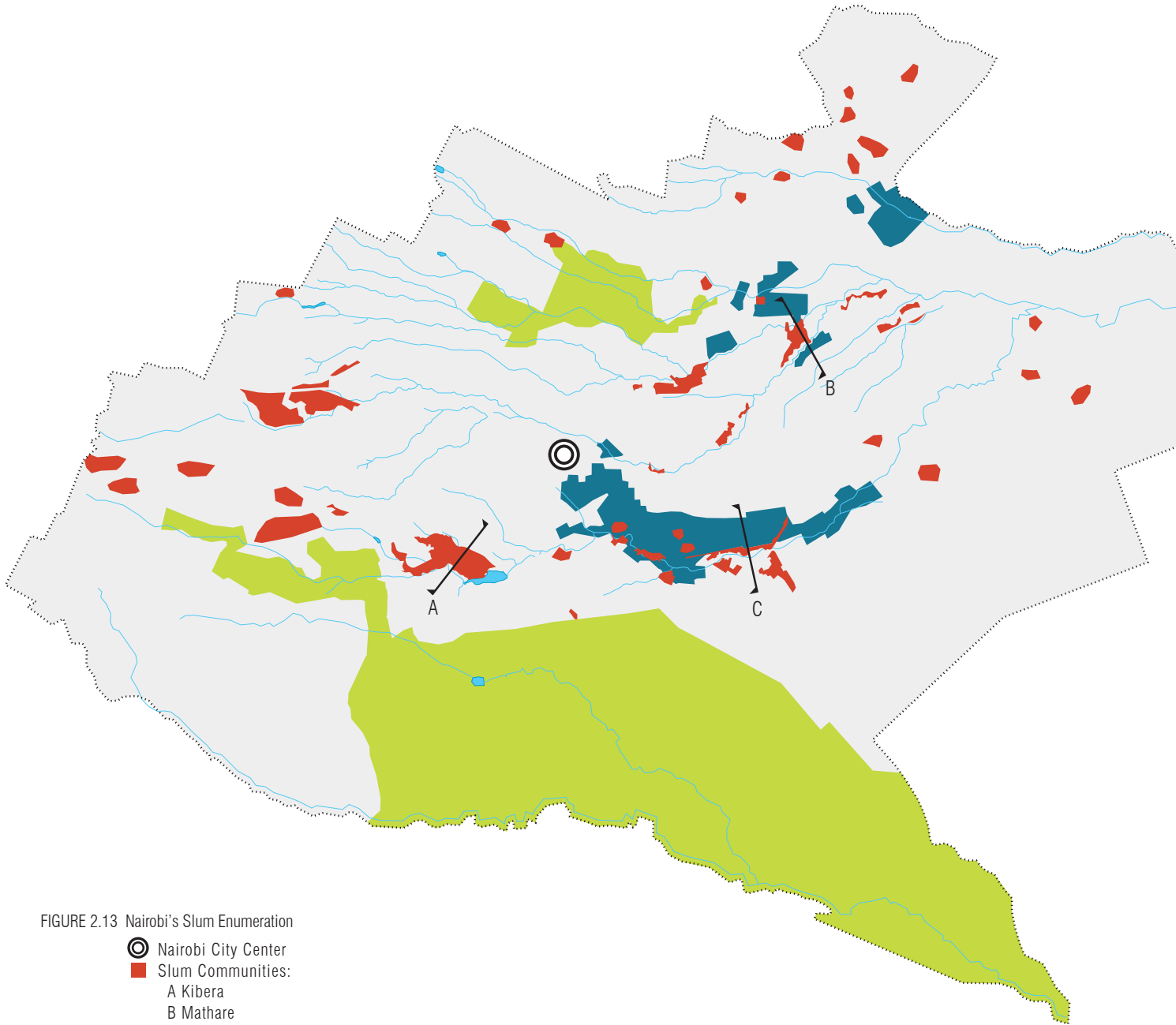


FIGURE 2.13 Nairobi's Slum Enumeration

- ⊙ Nairobi City Center
- Slum Communities:
 - A Kibera
 - B Mathare
 - C Mukuru
- Parklands
- Industrial Sector

SLUM TYPOLOGIES

Nairobi has a population of almost 2.9 million people. Of that population, over 60% of the population lives in shantytowns that take up only 5% of the city's designated residential area. As a result, these communities have very high densities, unsanitary conditions, and lack the most basic services. There are up to 2,300 residents per hectare, with as many as 400 people sharing one toilet, and only 22% of slum households have access to water connections.²⁸

Kibera is the largest slum community in Nairobi, with a population of over 700,000 people squeezed onto less than 5km² of land. It is also one of the oldest slums, dating back to World War 1, where it temporarily housed Nubian soldiers from the Kings Africa Rifles.²⁹ Mathare and Mukuru are the second and third largest slums in Nairobi, with populations of an estimated 500,000 and 400,000 people, respectively.³⁰

Most of Nairobi's slums have developed along side industrial sectors of the city and river banks, situated on steep hillsides, in floodplains, or downstream from industrial polluters – the least desirable living areas, leaving these residents most vulnerable to disease and natural disaster. As shown in Figure 2.13 and Figure 2.14, these slum typologies are conveyed through Kibera (Type A), Mathare (Type B), and Mukuru (Type C). Although unhealthy, these locations are ideal for low-income residents as they are inexpensive, undeveloped, and are typically located near major transportations routes, such as highways and railways. These routes provide access to the city where many people find employment. They also become major areas where informal market opportunities are created and established.

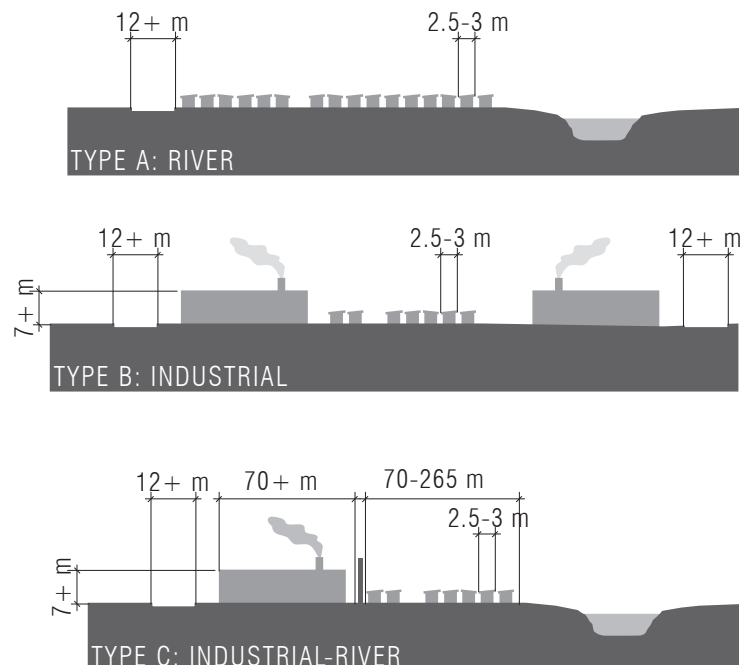
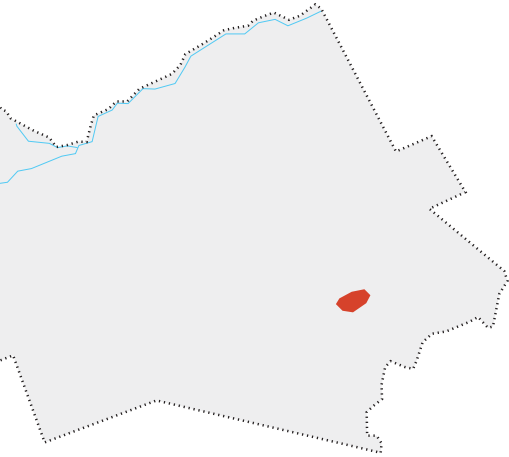


FIGURE 2.14 Sections of the urban fabric of three typical slum typologies.

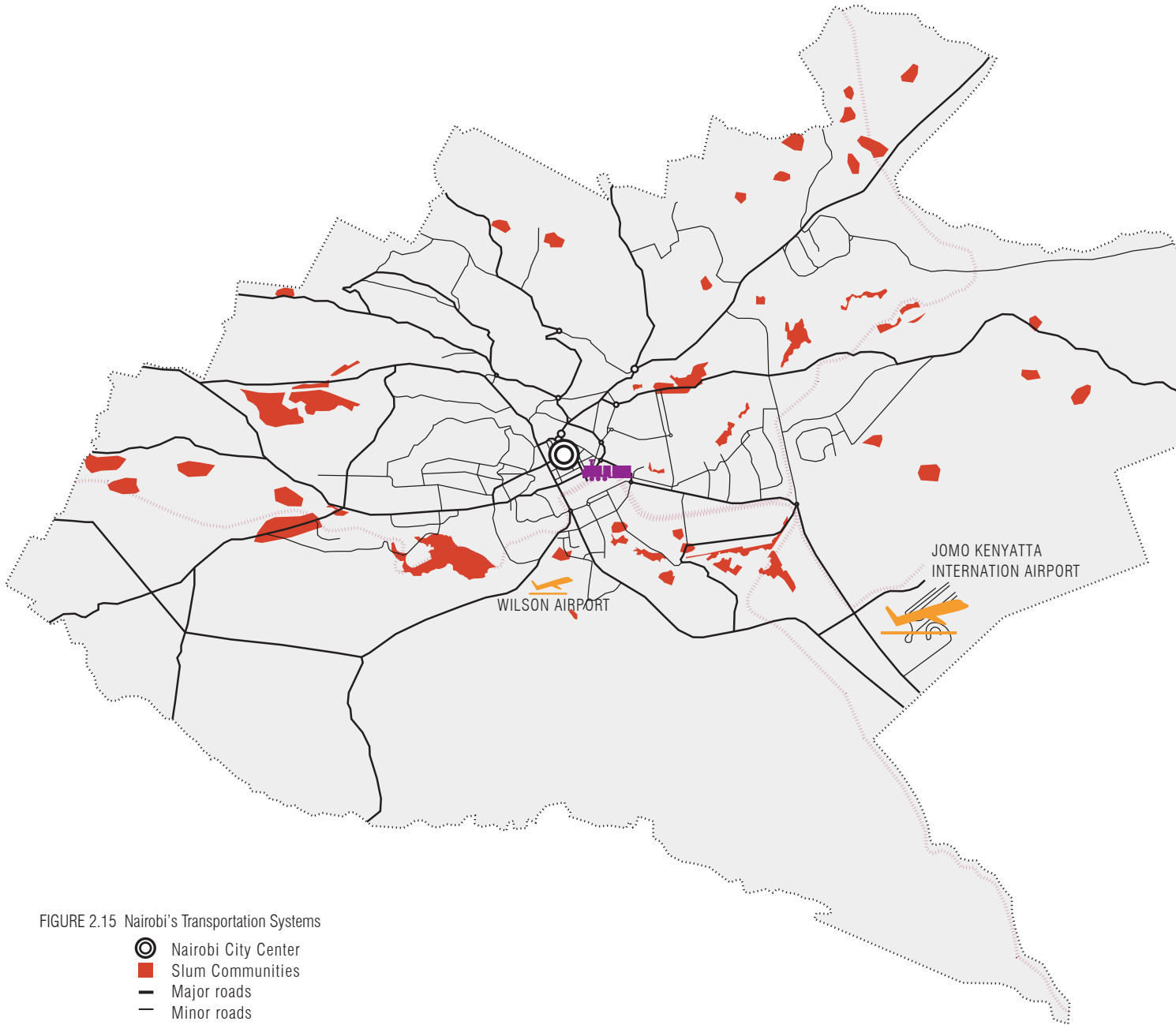


FIGURE 2.15 Nairobi's Transportation Systems

- ⊙ Nairobi City Center
- Slum Communities
- Major roads
- Minor roads
- ⋯ Railway
- 🚂 Main Train Station
- ✈️ Airport

TRANSPORTATION

Access to major transportation routes is very important for a slum resident. These routes take them to the city, where they can find employment, set up informal businesses, and find materials and other resources.



PUBLIC TRANSPORTATION:

Matatus are the most common means of public transportation in Kenya. Also referred to as “Nissans”, they are 14-passenger vans, consisting of at least two people running the service: the driver and the tout, whose responsibility is to fully load the vehicle with passengers and collect the fare. Matatus start from a specific location called “stage”, and take a designated route, most of the time not leaving until the vehicle is full. Passengers can also get on the matatus by waiting along the side of the road with an arm out, signalling to the driver that they would like to be picked up. As long as the vehicle is not full, the driver will pull over to let them in.



BIKING:

Despite affordability and difficult road conditions in the slum communities, biking is also a common form of transportation. They are used to get to the city and transfer goods to and from the informal markets. Bikes have also been used in other innovative ways, such as a market stall, where individuals sell their goods or services right from the bike, transforming it into a repair stand for services such as sewing, bike repairs, and shoe repairs.



WALKING:

This is the most common means of transportation for a slum resident. Many residents awake before sunrise to walk for up to two hours to get to work. Most circulation routes in the slum communities are only accessible by foot. Barely wide enough for two people, these pathways are not paved or maintained. Some of the “newer” shantytowns have thin slabs of concrete paved as pathways that slope towards the center, acting as the sewage and drainage system, lessening the chances of flooding from occurring in homes.

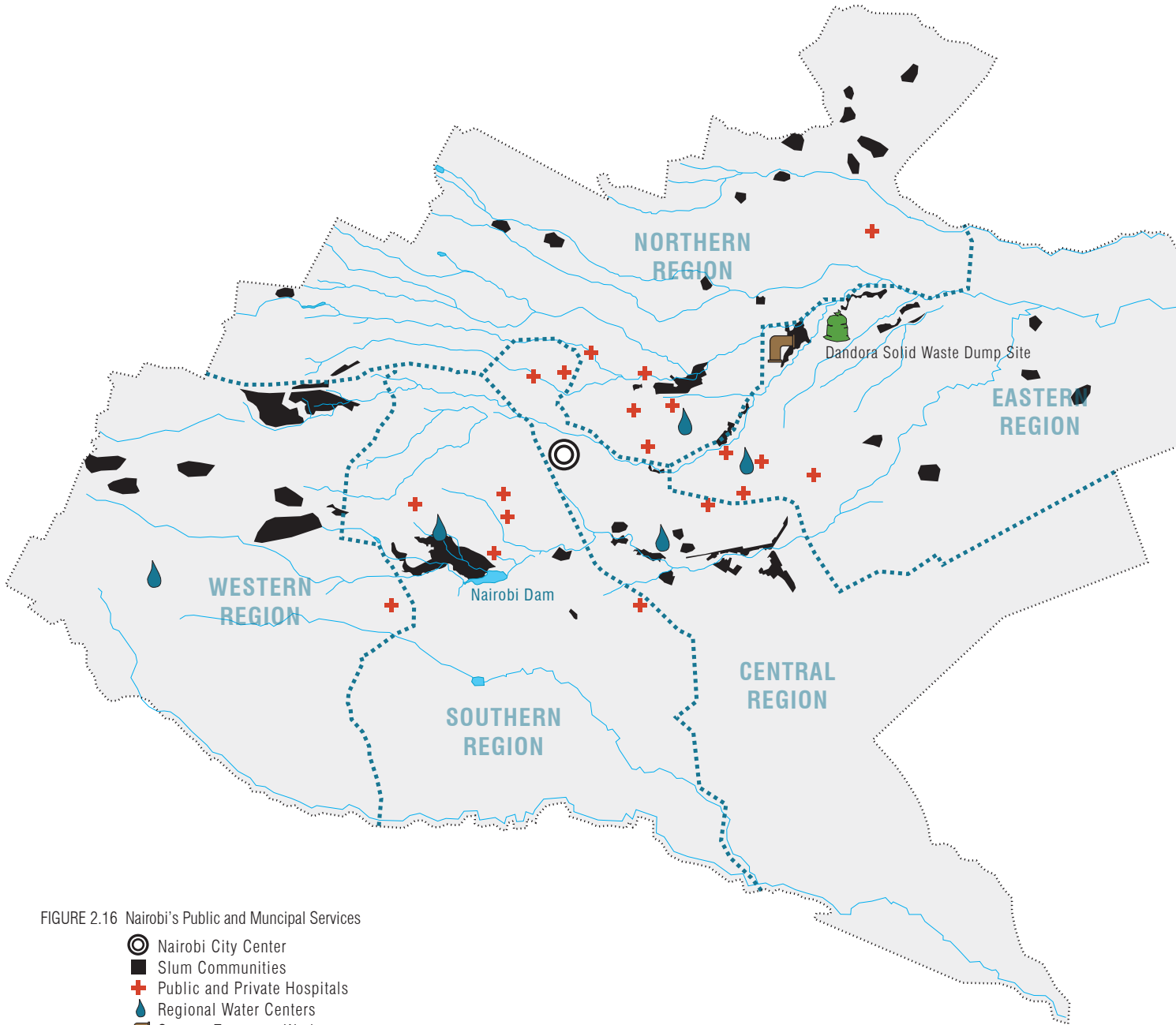


FIGURE 2.16 Nairobi's Public and Municipal Services

- ◎ Nairobi City Center
- Slum Communities
- ✚ Public and Private Hospitals
- 💧 Regional Water Centers
- 🏠 Sewage Treatment Works
- 🗑️ Municipal Garbage Disposal Site

PUBLIC SERVICES

WATER MANAGEMENT

With a rapidly growing population, Nairobi is consistently experiencing acute water supply shortages, in addition to problems with distribution, waste, illegal connections, overloading and mismanagement. Currently, water management is decentralized into five areas in hopes that management would be more successful. However, access to clean water is still inequitable. Public water taps serve only 3% of slum households and private companies have built water pumps, from which most slum residents buy their water at much higher costs than that of municipal water. The high-income groups, comprising less than 10% of the population, consume 30% of domestic water, while low-income groups, making up 64% of the population, consume only 35%.³¹

SANITATION

Sanitary conditions are particularly poor in Nairobi's slums where a majority of residents resort to pit latrines that are over-used and inadequately maintained. With no homes connected to a sewage system, most excrement ends up in the rivers. Unfortunately, the term "flying toilets" has been coined from these slums, referring to the situation when people relieve themselves in plastic bags, tie them up and fling the bag as far away as possible. This clearly leads to extremely unhealthy environments and generates an exceedingly higher risk of spreading disease and illness.³²

REFUSE COLLECTION

Dandora is the principle dumping site for Nairobi's solid waste; however, the municipal collection service is inefficient and restricted to only a few areas in middle- and high-income areas. The result is the dumping of waste along the rivers and piles of burning rubble along the streets. With no municipal recycling, many private companies have taken the initiative and developed recycling programs in slum communities. Slum residents are hired to pick through piles of garbage for scraps of metal, plastics, or other recyclables to earn a bit of money.³³

HEALTH

All of the above services are linked as they all affect the health of Nairobi's residents. There are great disparities in health care between informal settlements and middle- and high-income areas. As their living conditions differ, the high density of informal settlements – combined with the lack of access to clean water (water management), poor hygiene (sanitation), and polluted environments (refuse collection) – result in common illnesses of diarrhoea, malaria, tuberculosis, and HIV/AIDS, among most slum dwellers, especially children. Due to the location of informal settlements, slum residents are further away from health facilities; however, this is insignificant as most are likely unable to afford access to the private clinics or government hospitals. Hence, there is a demand for more affordable health facilities in these communities to better their health, in turn, increasing productivity and development.

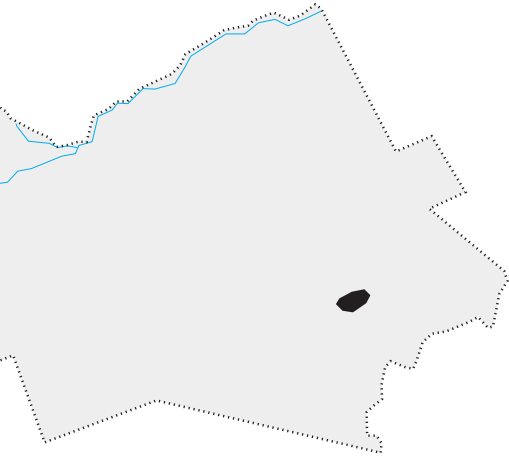






FIGURE 2.17 *OPPOSITE LEFT* View of corrugated metal rooftops of one of Nairobi's many shantytowns.

FIGURE 2.18 *OPPOSITE RIGHT* A major market street in a Nairobi slum.

FIGURE 2.19 *ABOVE LEFT* A residential courtyard in a Nairobi slum.

FIGURE 2.20 *ABOVE RIGHT* A residential pedestrian street corridor in Mukuru slums.





FIGURE 2.21 - 22 The Ngong River being used as a garbage dumping site and latrine for slum residents living in the surrounding area.



FIGURE 2.23 Aerial photograph of the Mukuru slums in Nairobi, Kenya



MUKURU SLUMS

The Mukuru slums is located on the south-east side of Nairobi, along the Ngong River. With a population of over 400,000 people, this community emerges as a 4km wide spine that stretches as far as 15km long. Unlike Kibera, an “old-style” shantytown with houses still made from wood, mud and dung, Mukuru is a “newer” shantytown where houses are made from corrugated metal sheets nailed to unstable wooden frames. A house in Mukuru is typically 10-12m² and consists of only one living space, shared among 3 to 6 people. There is no plumbing or electricity connected to the homes, which means no running water, no toilets, and no lights. Many of the residents buy charcoal or kerosene for cooking, and buy water from private taps. Some residents retrieve water from the nearby river, despite contamination by refuse and sewage.

The Mukuru slums consists of five districts: Lunga-Lunga, Kwa-Rueben, Kayaba, Fuata-Nyayo (South B), and Kwa-Njenga. The community is very dense and is travelled through by mostly narrow dirt paths. The current open “sewage system” is merely a shallow ditch located either in the middle or on the side of the path. During rainy seasons, the streets turn into mud trenches, making it almost impossible to walk through, let alone carry materials and produce on bikes or trolleys. Overflow of a mixture of rainwater, mud and excrement into people’s homes are constant occurrences.

MUKURU KWA-NJENGA

Mukuru Kwa-Njenga is the specific site of focus for this thesis. It is located on the east side of the Mukuru slums, where the Cana Family Health and Rescue Center (CFHRC) operates various programs and services. Within this site is a private triangular-shaped lot owned by a banking institution. This plot of private land is surrounded by a concrete block wall, approximately 7m tall, and contains an abandoned building. What looks to be an old factory site is now a wasteland, with very little informal settlement on this private lot. The reason behind the lack of settlement in this area is unknown, but is likely due to forced evictions.

Other than the legal issues of the site, the triangular lot has the physical capacity to help Mukuru Kwa-Njenga upgrade their current conditions. It can be used to develop infrastructures that are needed and expand on the ones that currently exist. By working in partnership with planners and architects, Mukuru Kwa-Njenga can become a safe, open and communal environment for its inhabitants.



FIGURE 2.24 Plan of site boundaries and the CFHRC facilities.

- 1 Cana Elementary School
- 2 Cana Deliverance Church
- 3 Cana Family Health Clinic
- 4 Cana Rescue Home
- 5 CFHRC Offices



CANA FAMILY HEALTH AND RESCUE CENTER

The Cana Family Health and Rescue Center (CFHRC), located in Mukuru Kwa-Njenga, is a community organization that was started by Joseph and Mary Mambo, a couple who felt the need to help the urban poor of the neighbourhood. They began their journey in this community by establishing a health clinic as Mary was a registered nurse. Through external and community support, the health clinic has flourished, making a significant impact on the community. With over 300 patients being treated for HIV/AIDS, tuberculosis, and many other illnesses, the health clinic serves not just as a clinic, but also includes a pharmacy and an information-counselling center, bringing awareness to the community on HIV/AIDS. They inform residents on what HIV/AIDS is, how to prevent contraction, and how to live a healthy life, all in effort to reduce the stigma that is still very strong among the residents.

As the clinic became more established, new support programs emerged which included a church, an orphanage and an elementary school. These programs have become networks that form a community organization for the area. They receive donations of food and clothing from both public and private sectors. Residents have stepped up and are becoming active members of development, working with private companies and non-government organizations (NGO's) to build a communal washroom facility that provides toilets, shower stalls, and a general store selling water and basic sanitation. On Sundays, the church overflows with people, while the rest of the week it runs daily services during lunch hour, a food and clothing bank, and community meetings. The orphanage began with a few young girls and is now home to twenty, ranging in age from 3 to 14, with one caretaker. Even though the demand is great, the orphanage's current building does not have the capacity to take in more children. The Cana Elementary school has over 100 students enrolled from Standard 1 through to 5 (equivalent to grades 1 through 6). The school consists of five 10m² classrooms with approximately twenty students in each class. There is a very small tuition fee to cover the cost of books, papers, pencils, and chalk; however, many children still cannot afford the small fee. Lunch is provided for the school children – the only meal of the day for many of them.

One of CFHRC's many visions is to open a larger Rescue Home, for both young girls and boys. Now seven years running, the CFHRC works not just to support the community, but also to support the orphans – the future of the community – who need these facilities to develop and grow into skilled adults. Without these support facilities, these children would not have the education or positive influence they desperately need.



CFHRC OFFICES

AREA: 67 sq.m.

STAFF: 2 directors

VOLUNTEERS: 3-7 volunteers (avg.)
1 secretary
1 project director
1 social worker

RESCUE HOME (ORPHANAGE)

AREA: 88 sq.m.

NUMBER OF ORPHANS: 20 orphan girls

STAFF: 1 mom (care-giver/guardian)

DELIVERANCE CHURCH

AREA: 53 sq.m.

ATTENDANCE: 250 people (Sunday avg.)

STAFF: 2 pastors
3 elders
2 social workers

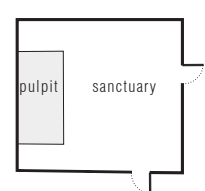
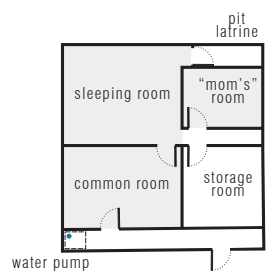
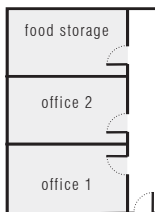


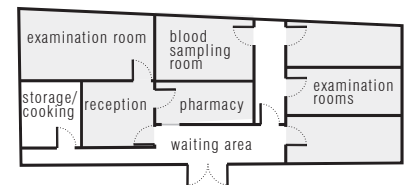
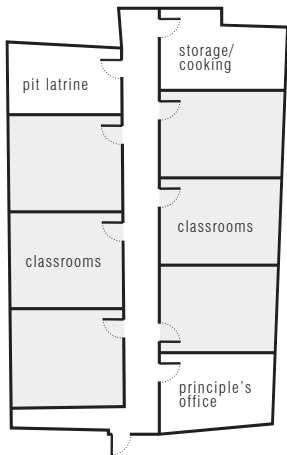
FIGURE 2.25 Existing community infrastructure and building typologies of CFHRC.



| ELEMENTARY SCHOOL | |
|-------------------|-------------------------------------|
| AREA: | 233 sq.m. |
| ENROLLMENT: | 120 students (Grades 1 through 5) |
| STAFF: | 7 teachers 2 cooks 2 cleaners |

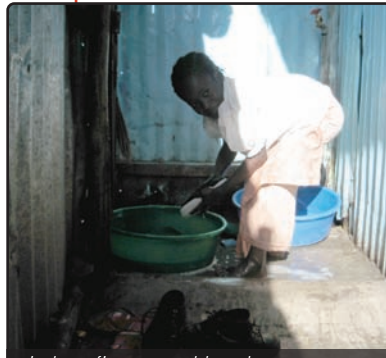
| HOUSING | |
|------------------------|-----------------|
| AREA: | 15 sq.m. (avg.) |
| PERSONS PER HOUSEHOLD: | 3-6 people |

| HEALTH CLINIC | |
|------------------|--|
| AREA: | 120 sq.m. |
| PATIENTS: | 300+ patients |
| PERMANENT STAFF: | 5 nurses 1 blood technician 1 pharmacist 1 counsellor |
| TEMPORARY STAFF: | 1 visiting doctor (1-2 visits per month) |





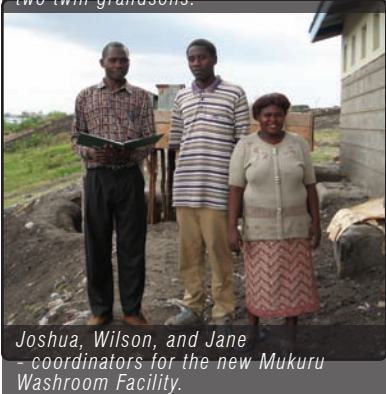
Joseph and Mary Mambo with their two twin grandsons.



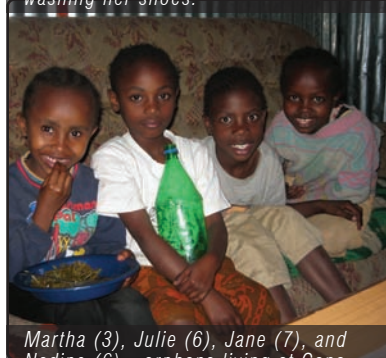
Judy, a five-year old orphan washing her shoes.



Singing and dancing during an overnight prayer meeting at Cana Deliverance church.



Joshua, Wilson, and Jane – coordinators for the new Mukuru Washroom Facility.

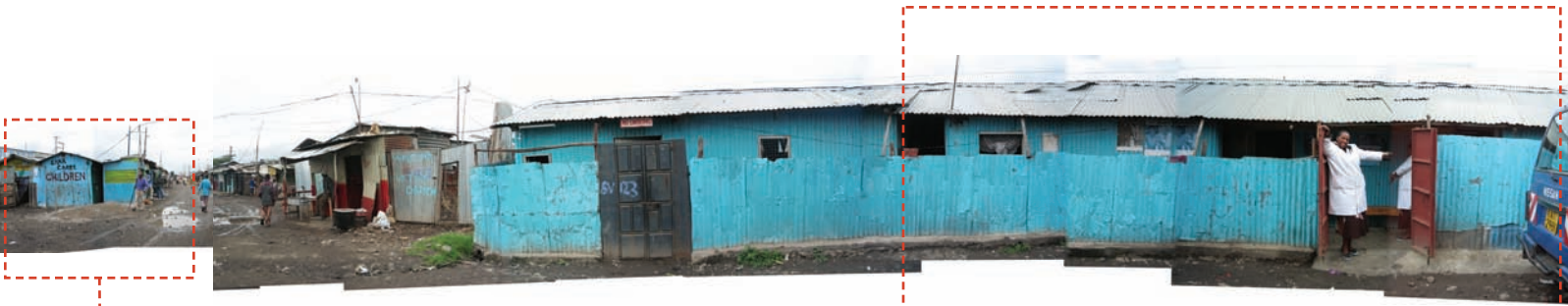


Martha (3), Julie (6), Jane (7), and Nadine (6) – orphans living at Cana Rescue Home.



Jane, doing her homework.

FIGURE 2.26 Images of CFHRC's existing community infrastructure.
LEFT TO RIGHT: Cana Rescue Home; Cana Deliverance Church; Cana Elementary School; Cana Family Health Clinic.



Grade 5 students during class at Cana Elementary School.



The Principle of Cana Elementary School.



School children playing in the only open area they have.



Sharon (27 and HIV+) with her two sons (the youngest is also HIV+).



Hana, a 79 year old grandmother taking care of an orphaned boy of the neighbourhood.

3.0 > THE STRATEGY

“Collaboration between different government departments and local governments, civil society and the private sector is needed. Decentralization of economic and physical planning to local authorities would increase the effectiveness of urban management, if supported by adequate financing and capacity at local level... More community outreach work could go a long way to promote healthy living and health education, if local institutions – such as local governments and civil society organizations – were strengthened.”³⁴

– Kathrin Senner –

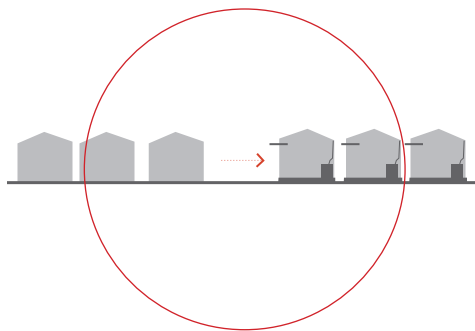
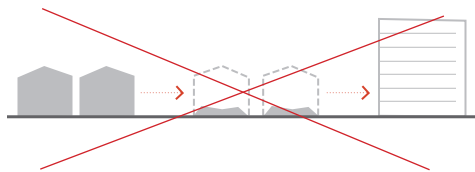
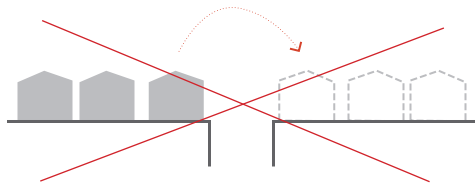


FIGURE 3.1 - 3 Diagrams of slum improvement strategies:
1 Resettle; 2 Rebuild; 3 Upgrade.

RESETTLE, REBUILD, UPGRADE

RESETTLE

Many attempts to *clean-up* slums have been made by governments, as slums have generally been seen as problems of unplanned and unwelcome neighbourhoods that need to disappear. However, slums house over 70% of the world's population. These residents, also referred to as squatters, have established strong roots in their slum communities, making attempts to resolve political, legal, and ethical circumstances, extremely complex. A past attempt included relocating the squatters to resettlement sites which were typically outside of the city. During the 1970's and 80's, Brazilian squatters from *Brasilia Samambaia* were one of the communities whose governments attempted this resettlement method.³⁵ Despite government efforts, slums continued to emerge in most cities due to a significant number of urban employment opportunities. This resettlement method also proved to be very costly as it required major government funding not only for the physical move, but also for new public services, in particular public transportation for commuting workers.

REBUILD

Another similar attempt at eliminating slums was the *clear and redevelop method*. This required clearing the site, temporarily housing residents at remote locations, building new homes, and then resettling the residents into these new homes. With high demands of cost and time, high-rise buildings were often proposed in an effort to house more people, but experience has shown that the residential density of a high-rise development is not much greater than that of a central city slum. As well, high-rise developments lack the opportunity for ground-level shops and informal markets, where low-income families could operate a small business from their home.³⁶

UPGRADE

The final alternative to displacing and clearing is *collaborative slum upgrading*. Collaborative slum upgrading is a process that promotes healthier self-sustaining communities without having to move or relocate. This consists of providing basic services to a community, such as training centers, public latrines, and safe housing. It also involves creating decentralized infrastructures that give slum residents affordable opportunities to improve their living conditions. Therefore, slum upgrading consists of "improving basic infrastructures such as water reticulation, sanitation, storm drainage, and electricity, up to a satisfactory standard." This standard equals basic availability. It involves developing existing networks and creating new programs that create opportunities for residents to improve their living environment and simultaneously make the residents, and hence the community, increasingly independent.³⁷ It mobilizes the residents to take responsibility and ownership for how their community should develop. Therefore, participation not just from the residents, but also from professionals, governments, and the community residents is crucial for collaborative slum upgrading to succeed.

WHAT IS SLUM UPGRADING?

Slum upgrading is the process of improving the well-being of a community through programs that provide basic services – such as clean water supply, adequate drainage, sewage treatment, and refuse collection. The benefit of slum upgrading is an improved living environment without being displaced. The investments already made to properties remain and, with upgrading, are enhanced. This is significantly more cost efficient than removing residents to an uneconomical alternative that may not be easily adaptable for them. Experience has shown that slum upgrading projects are associated with particularly high social and economic benefits. For example, when upgrading was used El Mezquital, Guatemala, infant mortality rates fell by 90 percent and crime by 43 percent.³⁸

Cleaning the environment through the removal of garbage and other hazards is a key aspect of upgrading, as well as improvements to streets and pedestrian walkways. These physical improvements are only the beginning: health issues should be addressed through the provision of clinics and health awareness programs; school facilities and trained teachers are needed to provide basic education; financial programs for income earning opportunities need to be made available that will support the general economic health of a community. Community services such as garbage removal foster an incentive to form a community management and maintenance group.

Upgrading is not concerned with the physical construction of homes or buildings; instead, it invests in improvements, offering financial loans to individuals according to what they can afford. The focus of slum upgrading should be on the fragmentation of land, how land should be organized and divided, based on orientation, zoning, and access to services. The manual labour and physical creation of homes can and should be decided by the owner, based on what they can afford. Currently, the slum residents of Nairobi do not have rights that protect them from wrongful evictions or rising rent prices. Policies need to be changed to ensure that slum residents have basic housing rights and individual protection. This involves policy makers, governments, and designers to reassess current policies and change them so that it considers the rights of the urban poor.

There are two factors that must first be met for the success of slum upgrading:

1. Upgrading must respond to a real need; and
2. There must be a committed partnership between the city, the community and its residents.

The people must truly want and understand its value, which makes local participation critical. Communities are a reflection of its inhabitants, therefore requiring slum upgrading to be as local as possible. Projects must be designed from the “bottom-up,” working with the communities so that they decide what services they receive, and when they should be

implemented. As inhabitants, they understand what the needs are in their community. Once a project is under way, the residents should continue to be involved throughout the design and building processes so that a sense of value and appreciation for their community can be achieved. Upgrading, therefore, involves workshops that educate residents on communication, construction, and other vocational skills. By building their knowledge, it increases the residents' opportunity for employment, and raises the standard of education in the community. The residents will gain a skill, and at the same time, build their environment the way they want it to function, giving them the control and responsibility for the future of their community.

Upgrading is also the most flexible means of improving the lives of the urban poor. Rather than focusing on a strict timeline, the interventions of slum upgrading vary in scale, and therefore, vary in timing and expansion. The design and process of slum upgrading is incremental and has the capacity to change at any phase, depending on the response by the residents of the community to the intervention. The design is open-ended and the process can take on a different course through its evolution; and it is this flexibility that allows it to fit in the context of the site.

Not only is upgrading an affordable alternative to clearance and relocation, which costs up to 10 times more than upgrading, it is also the least disruptive on established social and economic networks. The results of upgrading are highly visible, immediate, and make significant differences in the quality of life of the urban poor. It engages the residents to participate in shaping and directing their future. Upgrading the living environment of slums is the start to becoming recognized citizens and communities.

THE CHALLENGE

“The “thing” we call a “city” (or building or a built environment) may be a work of art, but it is also the outcome of a “process” that we call “urbanization.” ”³⁹

– David Harvey –

In *The End of Poverty*, Jeffrey D. Sachs identifies urbanization as the most significant trend fuelling economic growth today. Cities are growing at faster rates than ever before, and for the first time, urban populations outnumber the rural. In 2005, the world’s urban population was 3.17 billion out of a total world population of 6.45 billion people. By 2030, it is estimated that the urban population will increase to more than 5 billion people, a rate that is almost two times faster than the world’s population growth. Whether it is a small community of 2,000 inhabitants or a mega-city of over 10 million, urbanization has placed the future of humanity in growing cities, and the developing world will be accountable for over 90 per cent of the growth.

REDEFINING “PLACE”

The slums of Nairobi are “map-less” – no formal mappings of these communities have been documented, no basic services are provided, and their streets are simply nameless. The municipalities have tried turning a blind eye to them and have made attempts to “cleanse” their cities of this urban typology through forced evictions or demolition. Legally these communities do not exist; however, these are *places* where people live –where they eat, sleep, work, play, and raise families. Slums need to be recognized as significant *places* containing movements and routes that interconnect with each other and are significant contributors to the greater city life.

Doreen Massey, a British social scientist and geographer, defines *place* as open and hybrid, a product of interconnecting flows and routes, and is progressive. In her essay, *‘A Global Sense of Place’*, she gives us an interpretation of place which highlights the dynamic characteristic of slums:

“... what gives a place its specificity is not some long internalized history but the fact that it is constructed out of a particular constellation of social relations, meeting and weaving together at a particular locus. ... Instead then, of thinking of places as areas with boundaries around, they can be imagined as articulated moments in networks of social relations and understandings, but where a large proportion of those relations, experiences and understandings are constructed on a far larger scale than what we happen to define for that moment as the place itself, whether that be a street, or a region or even a continent ... If places can be conceptualized in terms of the social interactions which they tie together, then it is also the case that these interactions themselves are not motionless things, frozen in time. They are processes.”⁴⁰

REDEFINING URBANIZATION

The challenge professionals face today is not in how the future is predicted, but how it is shaped. This shaping relates to both the physical form and social structure. The difficulty with the urbanization of slums in terms of a spatial construct is in the “persistent habit of privileging things and spatial forms over social processes as a whole.”⁴¹ David Harvey suggests that although the architectural practice emphasizes social relations and processes, it is still strategically held that “the city is a thing that can be engineered in such a way as to control, contain, modify, or enhance social processes.”⁴² These social processes can be accomplished through the engineering of physical form, accentuating form over process. Yet in the case of slum communities, social processes already exist and are engineering the physical form. Inhabitation happens first and infrastructure follows. Harvey further suggests that the relationship between processes and things cannot be separated and that “social processes in general (are) fundamental to the construction of things that contain them.”⁴³ The challenge facing architecture today is not to romanticize processes or these environments, but to redefine what urbanization means in the contemporary city. As such, the architect Teddy Cruz, who is doing significant work in the urban shantytowns of Tijuana, Mexico, takes the position that:

“If contemporary art, architecture, and urbanism do not enter the socio-political, economic, and cultural dimension of the territories they occupy, they are destined to continue being isolated formal events, perpetuating the idea of the city as a static repository of objects instead of revealing its potential as a dynamic field whose thickness is made of the complexity of its multiple forces and mutating histories and identities.”⁴⁴

THE PROCESS

There is a clear identifiable crisis and the built environment is part of this crisis; however, the situation is much more complex and specific than merely building new homes or clearing garbage. Solutions need to steer clear from preconceived notions and universal data. Many people forget that Africa is a continent with 53 different countries, discussing “solutions for Africa” as if the problems they face are universally the same. Every African country is facing different economical, social, and geographical circumstances, and the issues are highly contextualized requiring greater detailed solutions that focus on a local rather than on a regional basis.

THE PRECONDITION OF BASIC NEEDS

“... all parts of the world have the chance to join an age of unprecedented prosperity, building on global science, technology, and markets. But you will also see that certain parts of the world are caught in a downward spiral of impoverishment, hunger, and disease. It is not good to lecture the dying that they should have done better with their lot in life. Rather, it is our task to help them onto the ladder of development, at least to gain a foothold on the bottom rung, from which they can then proceed to climb on their own.... When preconditions of basic infrastructure (roads, power, ports) and human capital (health and education) are in place, markets are powerful engines of development. Without these preconditions, markets can cruelly bypass large parts of the world, leaving them impoverished and suffering without respite. Collective action, through effective government provision of health, education, infrastructure, as well as foreign assistance when needed, underpins economic success.”⁴⁵

What is first essential in order to achieve successful development is to ensure that the basic needs of every individual are met. Maslow's Hierarchy of Needs consists of a five-tiered structure of physiological to psychological elements. These elements are preconditions that drive individuals towards positive growth.⁴⁶ As shown in Figure 3.4, these needs are: physical, security, social, ego, and self-actualization. Cities must provide these needs to their inhabitants in order for positive growth to take place. Unfortunately, many of these basic needs are not met by slum communities and as a result, lack positive growth. However, if Maslow's theory of *basic needs*, and Massey's theory on *place* are visualized through social processes, *place* must then address *basic needs* in order for processes to occur. If all the *basic needs* are met, then *place* becomes processes of positive growth.

Take for example Sultanbeyli in Istanbul, Turkey. It is a slum community that began with twenty-four families who, upon coming to the city, could not find affordable housing. As a result, the families came together and silently began living on illegal land. Over the past thirty years it has grown into a metropolis of over 360,000 people. Brick by brick, the residents of Sultanbeyli have met their basic needs and discovered the great effectiveness that results in their ability to get together and

organize themselves in ways that allow social processes to perpetuate and drive the force behind development. The need for basic necessities and humanity's inherent sense of living has created places where content transcends form.

Nairobi's challenge in this process is particularly complex. Not only are there physical barriers to development, but also social and legal barriers, corrupt governments and political hurdles that all relate to one another by policy. The process of upgrading Nairobi's slums requires politicians, designers, businesses, and slum residents, all levels of the economic, political, and social ladder to be involved. In partnership with the community, needs must be assessed at an urban, local, and individual level, and prioritized accordingly. It requires a "bottom-up" approach to development and the catalyst to the developmental process is the built environment.

Slum communities are filled with informal markets generating micro-level economics. They are a positive source for employment that governments and professionals could begin tapping into by working with community-based organizations. At a small expense, slum dwellers could be hired to build sewage lines, collect garbage and compost organic waste. In other words, cities can enable their citizens to improve their own communities by facilitating involvement. If organic waste such as paper, food scraps, and even human excrement is composted, it can be used to nourish urban agriculture, reducing the disposal of waste. Urban agriculture is estimated to provide 15% of the world's food supply, coming directly from approximately 800 million urban farmers. In Nairobi, agriculture provides the highest self-employment earnings in small businesses and the third highest for all of Kenya.⁴⁷ Cities should also revise their policies on transportation, land use, and micro-credit, to further the impoverished dwellers ability to make a living in the city. By first establishing the preconditions of basic needs, it will enable these communities to flourish independently. As a consequence, unequal shares in the urban market could potentially help cities manage slums. All of this requires collaborative practices, partnership, and participation between professionals, governments, and communities.

The process this thesis proposes is the Kijiji Kit. This kit is a working model and a set of guidelines for slum upgrading that a community can use to mobilize its inhabitants for positive change. It seeks to ensure that the basic needs of the most vulnerable population of the urban poor are met, and provide resources that will enable future generations to more actively participate in the global economy. The kit is a strategy that is divided into three sections: Zoning Processes, Kijiji Infrastructures, and Individual Infrastructures. This section portrays the complexity of the process and tackles Mukuru Kwa-Njenga's issues on three scales: city, community and individual. These sections are discussed in the following chapter.

4.0 > THE KIJIJI KIT

“After decades of absence from the main spheres of architectural discourse, the phenomenon of the metropolis as a site for research and experimentation is beginning to recapture the imagination of architects. This renewed attention our profession is giving to the socio-cultural, political, and economic forces at stake in the city could redefine the operational processes of architecture itself, as well as the role of architects in the context of city development. Certain practices in contemporary architecture and urbanism are generating the re-evaluation of notions we have perpetuated as immutable in describing certain typologies and concepts in our field.”⁴⁸

– Teddy Cruz –

THE KIJJI KIT

“Kijiji” is the Swahili word meaning “communal settlement.” Hence, the Kijiji Kit is a series of infrastructural elements that are designed to form a healthy and socially dynamic communal environment in which to live. Communal living is an approach to helping the orphans in the region acquire basic needs. The kit is divided into three major sections: Zoning Processes, Kijiji Infrastructures, and Infill Systems. Each section looks at the community on different scales and develops a strategy that will help the community process information on what services and infrastructures they need, how to acquire these needs, and when to implement them. This kit demands professionals and communities to partner in the design and construction processes.

There are many examples of the urban poor around the world who have come together to support the needs of their communities despite a lack of resources. In Rio de Janeiro – a city where one third of its population is living in favelas – Jorge Mario Jaruegui Architects responded to their city’s urban poor and began working with local residents, municipalities, and drug-lords that territorially claim different areas of the favelas, on projects to penetrate and revitalize these hillside communities. From pedestrian walkways to communal kitchens, every intervention promoted a new and positive perspective of the community, which in turn, supported and built up the sociological and economic status of the favelas. Architecture, in this sense, “demonstrates the power of urban design in realizing social change and engaging marginalized people in the revitalization of their own communities.”⁴⁹

The product from the use of the Kijiji Kit is the process. Through the process of networking and building, the aim is that the community will provide the basic needs of its orphaned children, while creating better living environments for all its slum residents. The process will change the community both physically and socially. As each community embarks on the upgrading process, they will in turn act as a node leading to a greater network of communal environments. This network of communities is decentralized, with each community setting their own plans, ideas, methods, and resources for development. Still, each community can begin sharing their ideas, working together towards the same vision of improving the lives of the urban poor. The Kijiji Kit is a catalyst to starting a community’s urban upgrading process and acquiring the basic needs for communal living.



FIGURE 4.1 Diagram indicating the area of the three zones (circulation, community, agriculture)

ZONING PROCESSES

Zoning Processes analyzes a community's issues on a broader city-wide scale. It considers where the community is geographically located, and how it relates to the greater city network through circulation routes and specified land zoning. It involves providing vehicular access to the community so that services such as medical ambulances, mobile health clinics, fire trucks, and police cars have access to the site. It connects the community to the city, and encourages municipalities to view slums as an essential part of the city network. As Mukuru Kwa-Njenga is located between a major industrial sector and the Ngong River, the community has been divided into three major zoning sections (circulation zone, community zone, and agricultural zone) according to its site conditions.



TO NAIROBI

CITY CENTER

TIMELINE

REDEVELOPMENT SITE

TO BE DEMOLISHED

CONNECTIONS TO MUKURU/CITY CENTER VIA PROPOSED CIRCULATION ROUTE

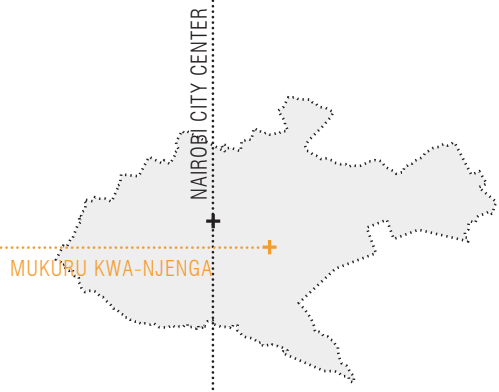


EXISTING CONDITIONS



PROPOSED NEW ROAD

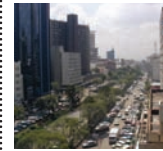
FIGURE 4.2 The Circulation Zone's processes and routes.



[1 CIRCULATION ZONE]

For Mukuru Kwa-Njenga, the circulation zone is located on the north side of the site, closest to the city's industrial sector. A main vehicular street, herein named Mukuru Avenue, is proposed that runs south from Lunga-Lunga Road, cutting east-west through the site, and back up, creating a traffic loop. This road will connect Mukuru Kwa-Njenga to the transportation grid, acknowledging it as a part of the city. It will create opportunities for new matatu routes, access for mobile doctors, ambulances, police cars and fire trucks. It will also give the residents a quicker way of getting to the city center. The new Mukuru Road will be a public avenue for the community, creating a market hub for the growing informal economic sector.

This implementation and process of construction involves partnership and support by the Government of Kenya (GOK). The government policies involving slum communities must allow roads, such as Mukuru Avenue, to be constructed and connected to the city sewage system. With the major industrial sector located just north of this road, the necessity of a drainage system is to ensure that toxins and other hazards do not penetrate further into the community and towards the Ngong River, protecting the health of the residents, as well as the environment.



STREET SIDE MARKET



BIKE MARKET



MOBILE HEALTH CLINIC



MATATU

[2 COMMUNITY ZONE]

The community zone contains local community programs and public spaces, such as the community center and health clinic, and is intended to be a buffer between the major circulation zone and the residential area. What must first be assessed by the community is the level of need for each essential community support system (listed and outlined in the Kijiji Infrastructures). From this assessment, support programs will be designed and implemented accordingly. For Mukuru Kwa-Njenga, the need for a better orphanage is of highest importance, and is therefore designed in the first phasing process.

This zone relies on participation by the residents to help in the design process and construction of all the facilities. It requires architects and other designers to facilitate in the design and construction meetings, running workshops that teach the residents construction methods and skills that will be used, and to coordinate the design, construction and funding of the project. Finally, this zone requires the support and partnership of the government, NGO's and private sectors through the provision of funding and material resources.

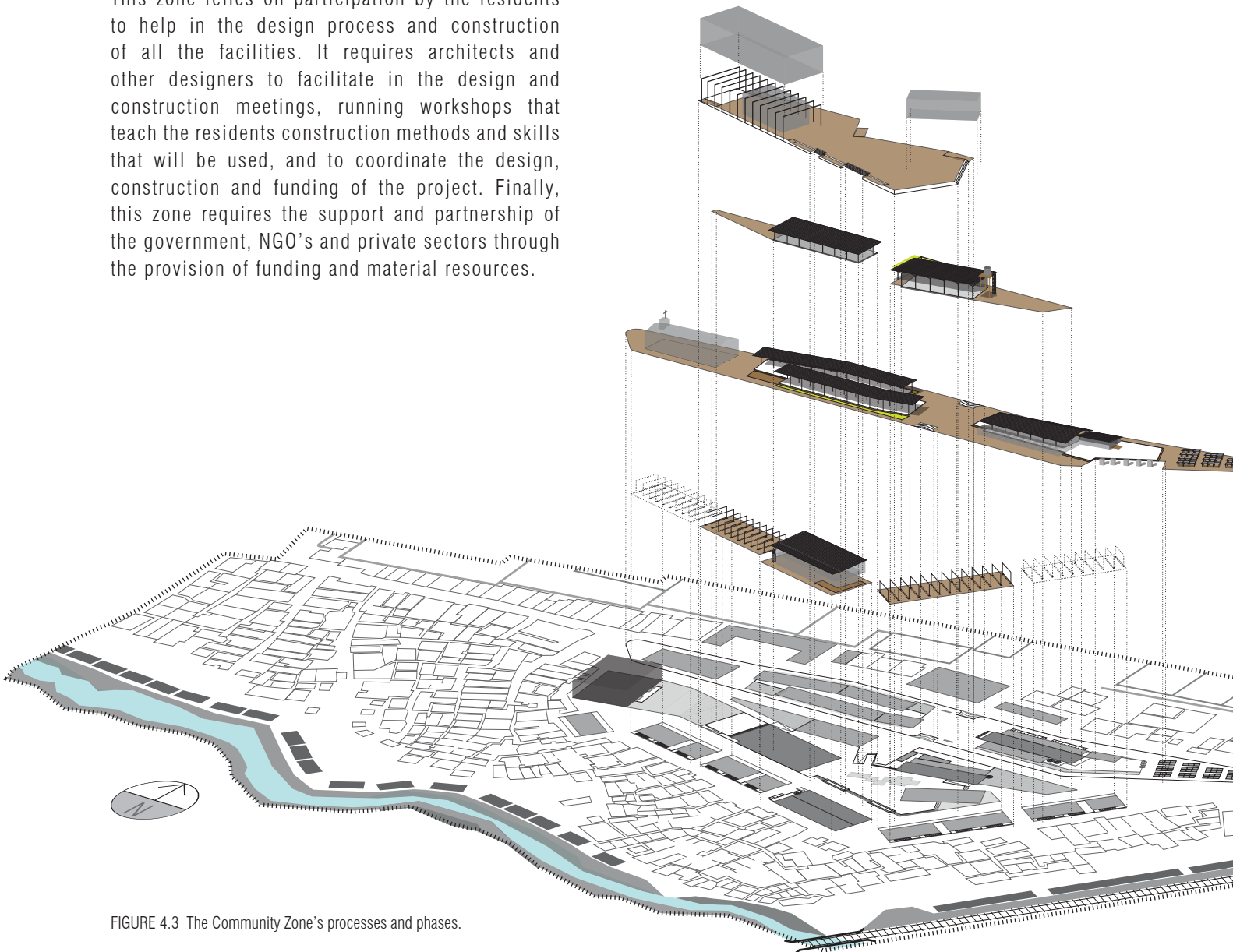


FIGURE 4.3 The Community Zone's processes and phases.

NETWORK DISTRIBUTION AND CRITERIA

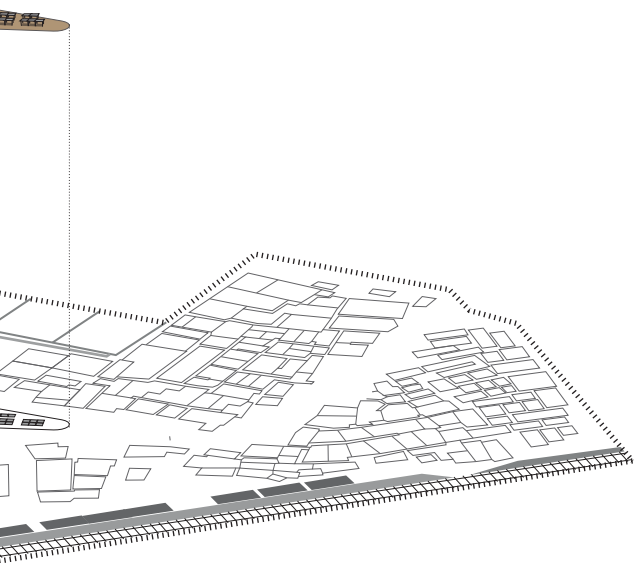
| LEVEL OF NEED | EXISTING | HIGH | MEDIUM | LOW |
|---------------------------|----------|------|--------|-----|
| GROUND INFRASTRUCTURE | | | | |
| HOUSING | | | | |
| Orphanage | | | | |
| Individual Home | | | | |
| EDUCATION | | | | |
| MARKET PLACE | | | | |
| HEALTH & SANITATION | | | | |
| Health Clinic | | | | |
| Water (Availability) | | | | |
| Hygiene (Washroom Avail.) | | | | |
| Refuse Collection | | | | |
| SOCIAL SUPPORT | | | | |
| CULTURE & IDENTITY | | | | |

COMMUNITY PHASING PROCESS

| | | |
|-------|---|---|
| PHASE | 1 | Orphanage Housing: structural framework ONLY |
| PHASE | 2 | Communal Services Pavilions: Public Washrooms Pavilion Garbage Pavilion Community Water Pump Market Place Community Church |
| PHASE | 3 | Health Clinic Social Support Structure Offices |
| PHASE | 4 | Community Center Finance and Housing Center Public gathering spaces, landscaping |

SITE INFORMATION AND DEMOGRAPHICS

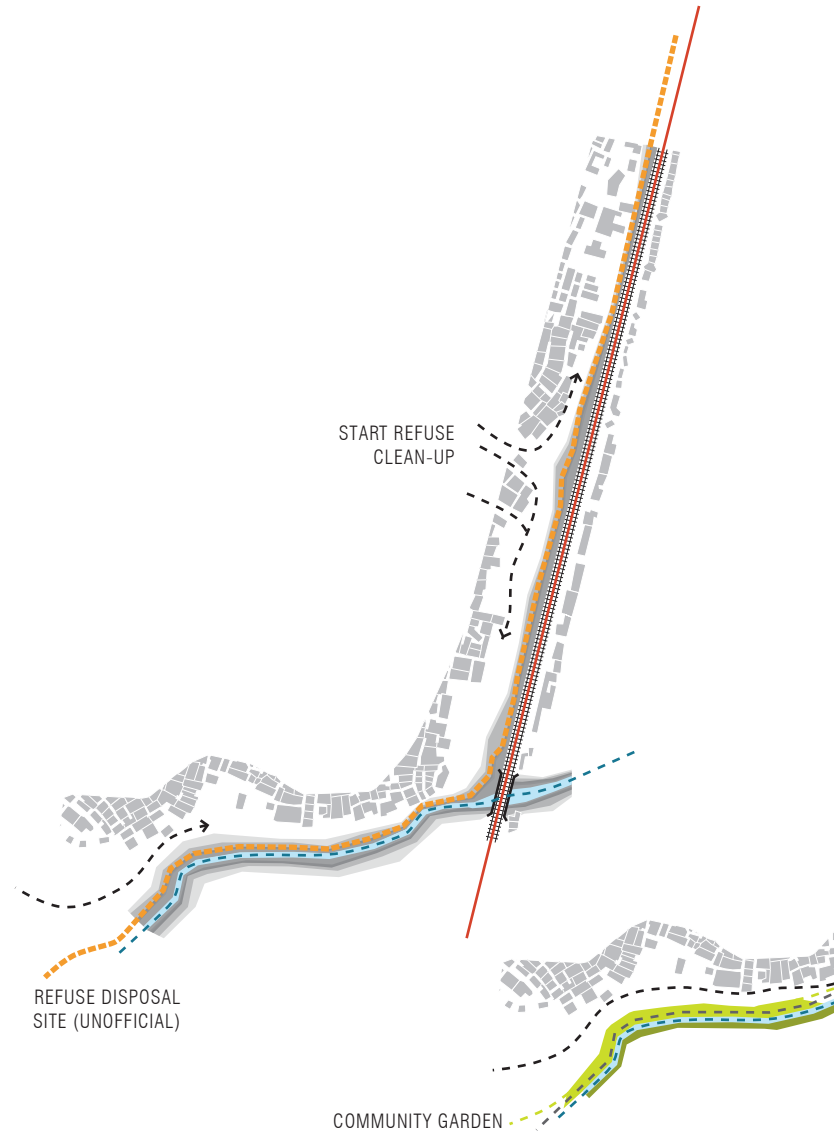
| | |
|--|-------------------------------------|
| SITE AREA: | 68,580 sq.m. (approx.) |
| POPULATION | |
| SITE AREA: | 2450 - 3700 people (610 households) |
| MUKURU: | 400,000 people |
| DISTANCE TO NEAREST TOILET FACILITY: | 500 m |
| DISTANCE TO NEAREST PUBLIC WATER PUMP: | 500 m |



[3 AGRICULTURAL ZONE]

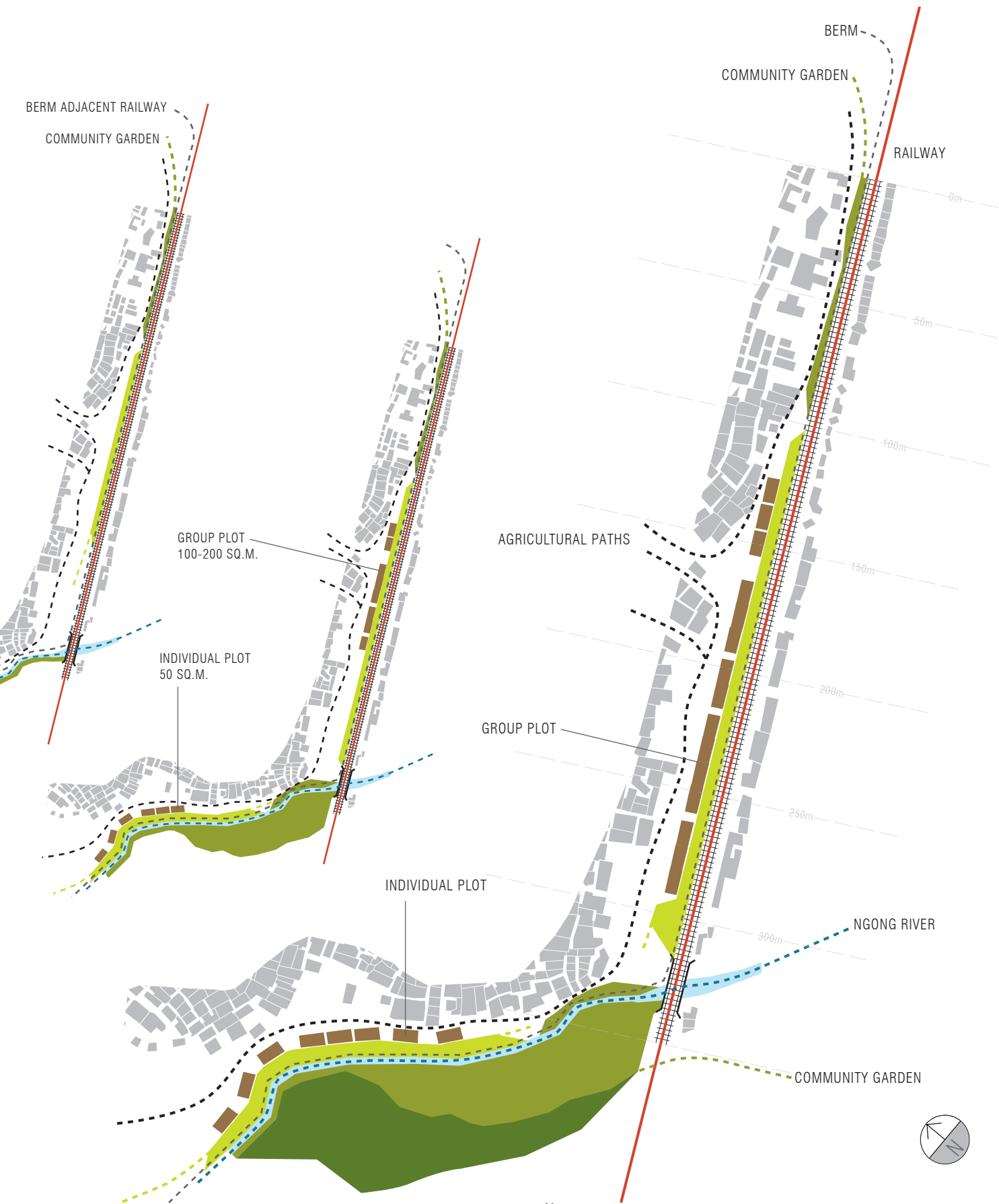
The benefit of the site location of Mukuru Kwa-Njenga is its proximity to the Ngong River. With the river located at the south end of the site, this area is designated as the agricultural zone, promoting urban agriculture, environmental responsibility, as well as providing general drainage of the site. The first step in developing this zone is in the removal of refuse in the Ngong River, and generating a sustainable culture throughout the community. The river is highly polluted and requires the residents to come together and start a clean-up program, ensuring that the use of the river as a dumping site stops – by providing an alternate designated dumping location. Cleaning also requires coordination with other communities and industries located upstream, to ensure that toxins and garbage are not dumped into the river, drifting down towards Mukuru.

Once the river is at a clean standard and the land along its edge is ready for cultivation, plots can be delineated for residents to rent for at least one or two harvests (based on what the individual can afford.) In this way, the residents are given more opportunities to save financially. Although the plots may not produce excess crops for market sales and profit, it will help support households with some of the daily food requirements, which in turn, helps them save on food costs. The finances they save can be used for other needs, such as water or school fees. This zone is also a way of promoting urban agriculture.



| AGRICULTURAL PERAMETERS | |
|--------------------------|------------------------------|
| Avg. Rainfall: | 760 mm |
| Main Annual Temperature: | 19-24 Celcius |
| Rainy Season: | Nov-May |
| Dry Season: | June-Oct |
| Main Crops: | Maize, Potatoes, Kale, Beans |

FIGURE 4.4 The Agriculture Zone's processes and phases.



KIJIJI INFRASTRUCTURES

Kijiji Infrastructures are a list of seven elements that are essential for any thriving independent slum community. These elements consist of:



Groundwork Infrastructure



Health & Sanitation



Housing



Education



Social Support Structure



Market Place

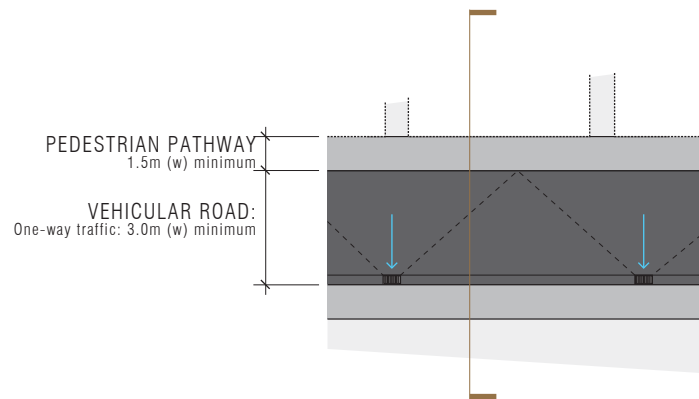


Culture & Identity

These elements are not placed in a hierarchical order and are based on the basic needs of the individual and the community. The urban poor of Mukuru Kwa-Njenga face different struggles than those of Rio de Janeiro. These struggles include HIV/AIDS, government corruption, and the lack of property rights. Therefore, as each community faces different circumstances and situations, each of the Kijiji infrastructures are equally essential and should be strategically implemented based on the community's needs and priorities. As each need is met, opportunities for community development will emerge and processes will be generated.

The major public strip in Mukuru Kwa-Njenga's upgrade proposal is flanked by two one-way vehicular streets and holds the permanent and temporary market places, the Communal Services Pavilion, and the local church (Cana Deliverance church) standing at the west entrance of the site. South of the major public strip is the community zone where the majority of institutional and community services are located, such as the elementary school, health clinic and Cana office headquarters. Designated public and semi-public areas for the community are created among these institutions, which then connects to the adaptable housing structures and the orphanage. These are the most private programmatic elements covering the southern edge, flanking the agricultural gardens and Ngong River.

MAIN CIRCULATION ROAD



COMMUNITY GARDENS AND AGRICULTURAL PLOTS

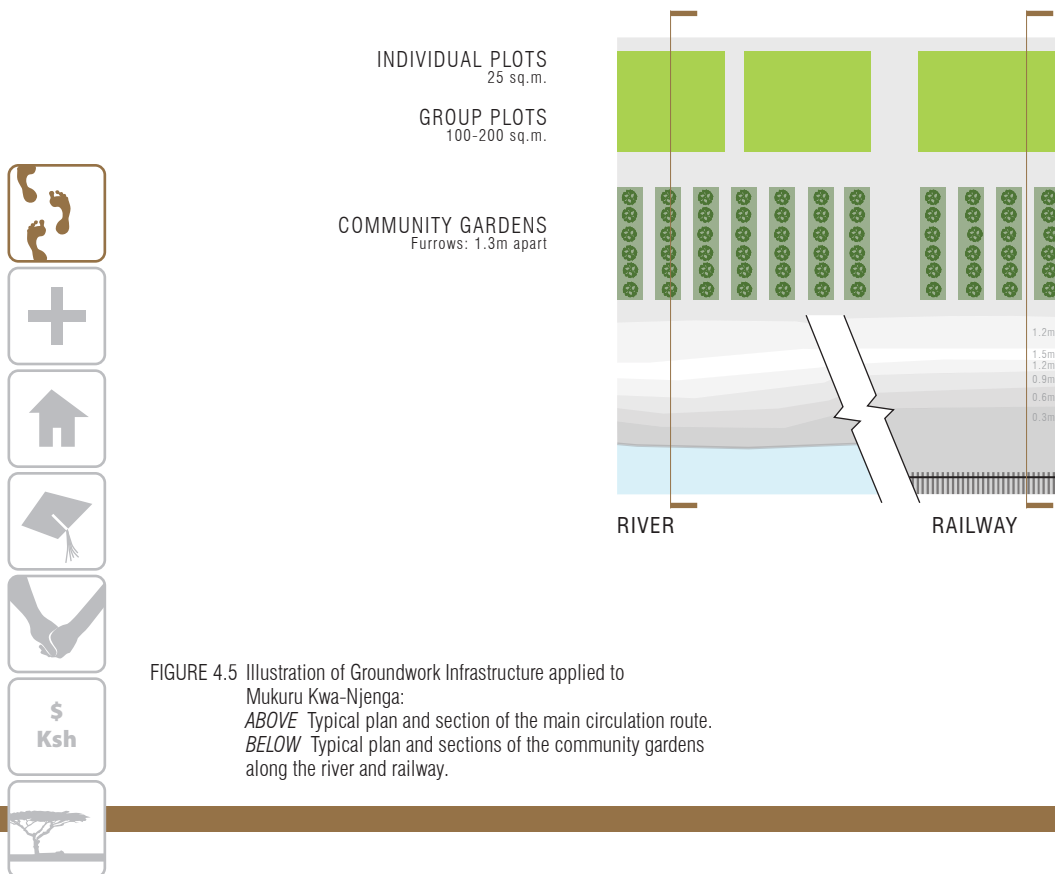
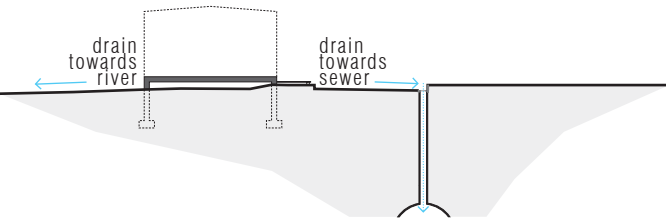


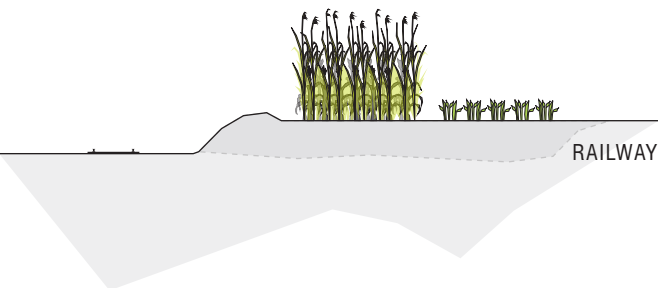
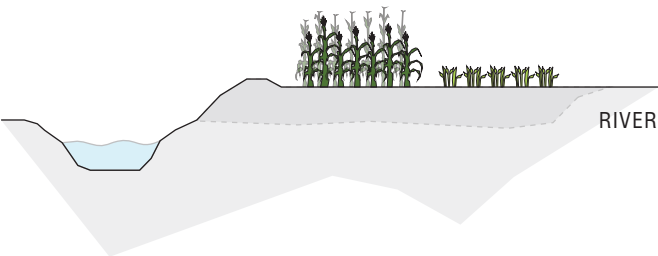
FIGURE 4.5 Illustration of Groundwork Infrastructure applied to Mukuru Kwa-Njenga:
ABOVE Typical plan and section of the main circulation route.
BELOW Typical plan and sections of the community gardens along the river and railway.

[GROUNDWORK INFRASTRUCTURE]

Currently Mukuru Kwa-Njenga is located on the outskirts of the city grid and is perceived by the municipalities as non-existent. As a result, no roads have been created, no services have been provided, and there is no government acknowledgement of the area on its needs (unless there is an election coming up.) With the development of a main vehicular road, the community will be connected to the city's transportation grid and will help public transportation, mobile health clinics, as well as market opportunities to develop and flourish. Groundwork physically puts the community on the city map and gives the community access to services.

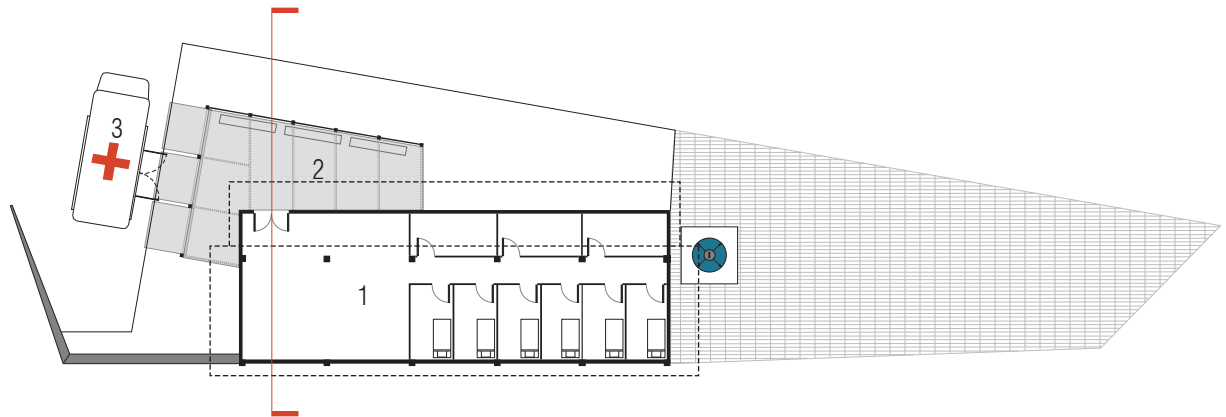


As the main form of public transportation is by matatus, the provision of roads will increase opportunities for more serviceable routes. A Mobile Health Clinic program can be implemented, providing accessible and affordable health services to people that desperately need it. Drainage and sewage treatment issues can be addressed and in collaboration with municipalities, a main sewage line can be installed underground to keep the streets clean and lower the spread of disease and illness. The design of specified vehicular and pedestrian routes also ensures a fluid circulation through the site, making more efficient use of space while still keeping the dense character of the neighbourhood. Groundwork may also include street lighting. Based on the current program “Adopt-a-Light” – in operation in Nairobi through support from public and private sectors – this partnership has been a success in providing safer streets throughout the city, and should be extended to slums to further improve the security of the city as a whole.⁵⁰



Urban agriculture is another program that has started in the slums of Nairobi. Spatially juxtaposed with other urban activities – competing for land, labour, and resources – urban agriculture makes a vital contribution to the household economy of the urban poor.⁵¹ In Kibera, urban farmers are engaged in agriculture primarily to meet the food needs of their households. Although farmers may not produce enough food for income generation or at times not enough for their total food requirements, they would be far worse off if they did not engage in urban agriculture because of the generally high prices of staple foods and fresh produce.⁵² Urban agriculture is not a marginal activity because it plays a key role in the urban households' survival by providing a form of employment and food, allowing families to save money for other necessities.

HEALTH CLINIC



COMMUNAL SERVICES PAVILION

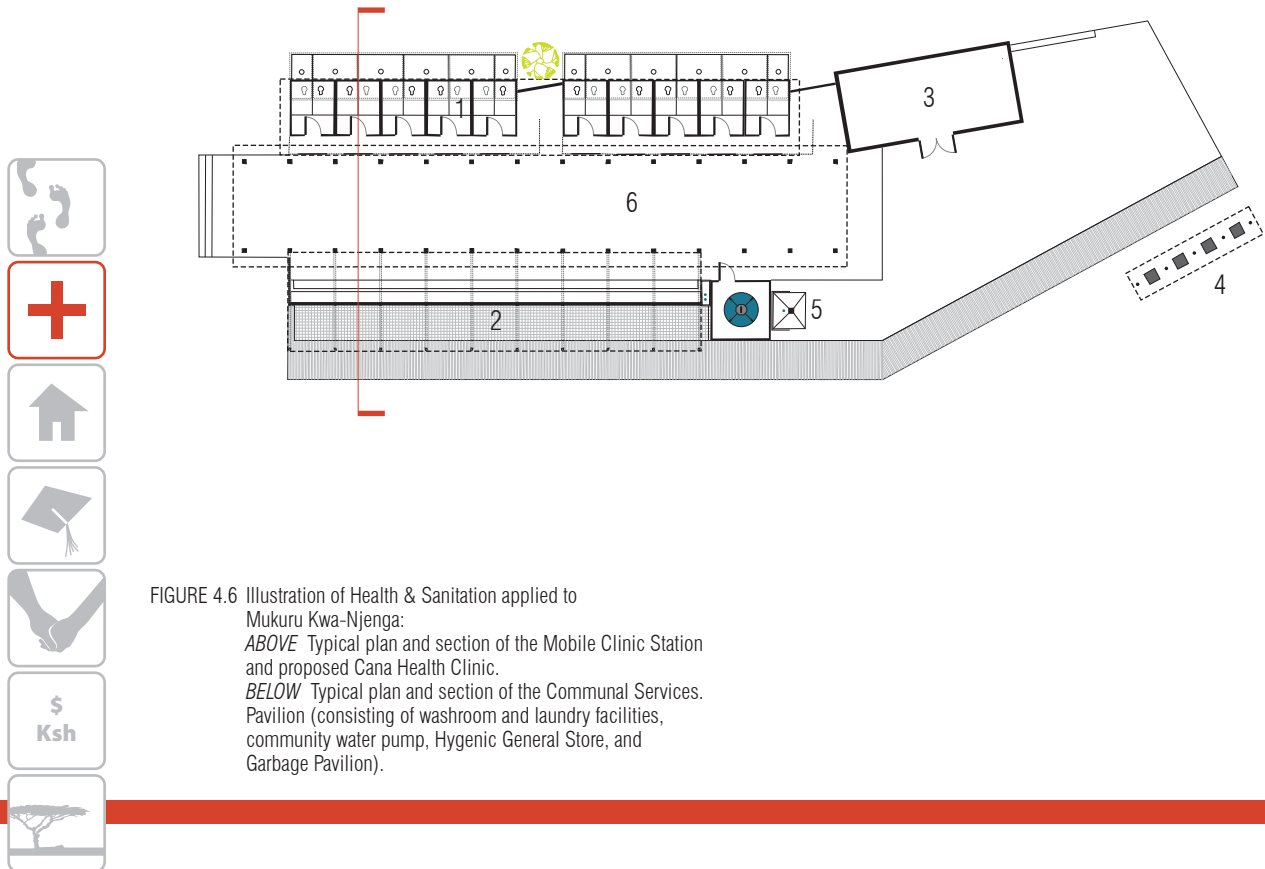
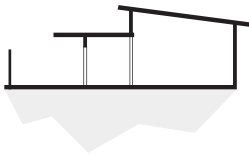


FIGURE 4.6 Illustration of Health & Sanitation applied to Muku Kwa-Njenga:
ABOVE Typical plan and section of the Mobile Clinic Station and proposed Cana Health Clinic.
BELOW Typical plan and section of the Communal Services Pavilion (consisting of washroom and laundry facilities, community water pump, Hygienic General Store, and Garbage Pavilion).

[HEALTH & SANITATION]

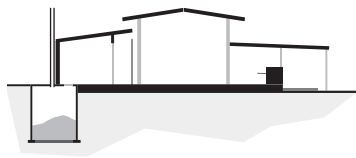
Health and sanitation services are unarguably necessary for every community; however, many slum communities in Nairobi lack this essential service. Houses do not have washrooms or running water, and many residents resort to flying toilets. This is a major concern for residents as it does not promote a healthy lifestyle and contributes to the spread of disease and sickness in the community.



- 1 Health Clinic 185 m²
- 2 Waiting Area 60 m²
- 3 Mobile Clinic Station 30 m²

HIV/AIDS, malaria, and tuberculosis, are also placing major strains on health facilities. The Mobile Health Clinic is already part of the health system in Mukuru, where a visiting doctor comes to the Cana Health Clinic once or twice a month. The major obstacle the mobile clinic faces are extremely poor road conditions and a lack of space. With no room to manoeuvre, the vehicle must park in front of the Cana Health Clinic, blocking both the clinic entrance and the road. Creating a place where the mobile clinic can arrive, park, and treat patients, is needed. As a visual acknowledgment of a service provision, it promotes a positive aspect of the community.

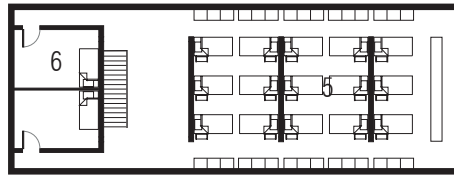
Programs such as garbage collection and communal laundering are also ways a community organization can develop positive growth. The success of these programs relies on the residents. Through the support and use of the services, these facilities will promote cleaner environments and healthier lifestyles.



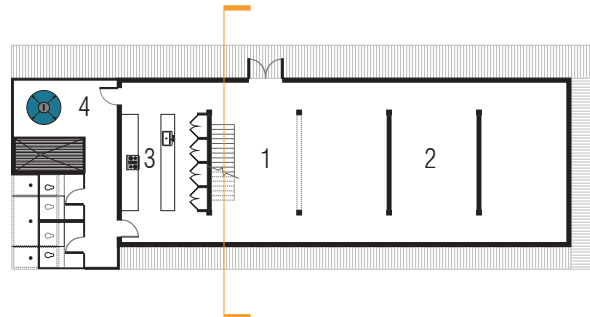
- 1 Ventilated Improved Pit (V.I.P) Latrines 185 m²
- 2 Communal Laundry Pavilion 100 m²
- 3 Office/General Store 40 m²
- 4 Garbage Collection Pavilion 9 m²
- 5 Water Pump 10 m²
- 6 Gathering/Work Space

This thesis proposes the design of a Communal Services Pavilion. This pavilion includes washrooms (in the form of Ventilated Improved Pit Latrines), a communal laundry area, a garbage collection area, and a community water pump. These specific programs are based on the needs of Mukuru Kwa-Njenga's residents, and are intended to change depending on the specific community. Servicing of this facility is decentralized, meaning it is to be run and coordinated by the local community organization. As more communities implement this type of facility, they become nodes of a larger network of communal living environments.

ORPHANAGE

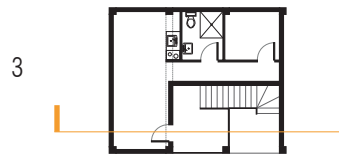


SECOND LEVEL

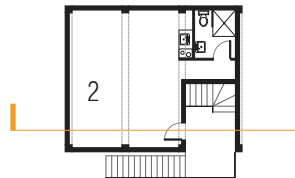


GROUND LEVEL

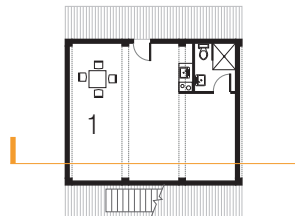
MULTI-UNIT HOUSING



THIRD LEVEL



SECOND LEVEL



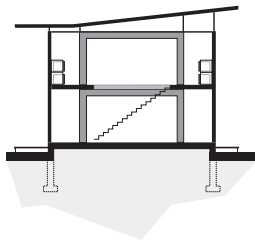
GROUND LEVEL



FIGURE 4.7 Illustration of Housing applied to Mukuru Kwa-Njenga:
ABOVE Typical plan and section of the proposed Cana Rescue Home (orphanage).
BELOW Typical plans and section of the 3-storey adaptable housing.

[HOUSING]

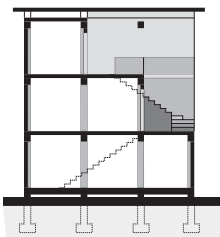
In Nairobi, over 9% of children under the age of 15 are orphans.⁵³ As this young segment of the population grows, a facility providing shelter, food, and care is needed to ensure that they have a place to grow and become intelligent, skilful adults. An orphanage is an essential component in every Nairobi slum community, and should be run and supported by the community organization. The city also needs to support such institutions because the investments made on these children will likely determine the city's future.



- 1 Foyer/Gathering Area
- 2 Common Room/Play Area 54 m²
- 3 Kitchen 25 m²
- 4 Amenities Area 56 m²
- 5 Children's Bedroom (30 beds) 120 m²
- 6 Mother's Bedrooms (2 rooms) 15 m²/room

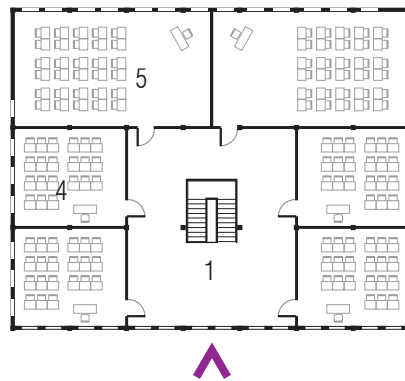
Housing, as an element of the Kijiji Kit, is not concerned with the actual construction of homes, but prioritizes the structural and functional condition of existing homes, and the fragmentation of designated residential land. Most of the homes in Mukuru do not have foundations and are built directly on dirt, without any flooring, using only rough timber and corrugated metal for the super-structure. With no raised floor, sewage and rainwater flooding are constant occurrences, and the corrugated metal structures promote insecurity among the communities. For example, many illegal acts, such as robbery and rape, occur during rainstorms as the sound of rain hitting the metal walls and roofs drowns out the screams of the victims. Therefore, this element brings to focus design solutions that resolve these current issues.

Nairobi also faces very complex land-rights issues. Many slum homes are built on private land or on public land given – often under the table – to large-scale builders, who rent out their tenement housing. Although the residents pay their landlords rent, they do not have rights to the property and as such are in constant fear of eviction due to rising rent prices that many cannot afford. Thus, policies need to be reassessed to protect the rights of the residents and appropriate basic safety and proper maintenance of the homes.

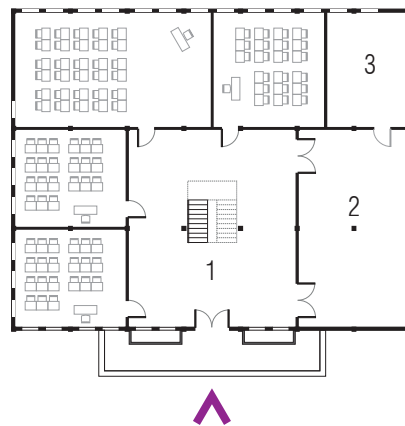


- 1 Residential Unit Type 1 72 m²
- 2 Residential Unit Type 2 61 m²
- 3 Residential Unit Type 3 50 m²

ELEMENTARY SCHOOL



SECOND LEVEL



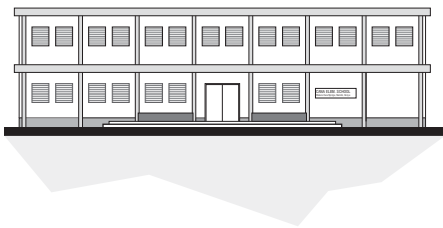
GROUND LEVEL



FIGURE 4.8 Illustration of Education applied to Mukuru Kwa-Njenga:
ABOVE Typical plans and section of the relocated Cana
 Elementary School (relocated to the existing building on site).

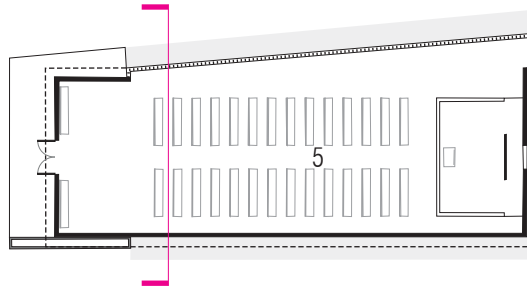
[EDUCATION]

Education is essential for the future growth of every community and every child. Currently, the Cana Elementary School is providing basic education for children aged 5-13. It provides these children a place to learn, grow, and gain skills for their future. With current classroom sizes insufficient for the number of students per class, and for the provision of Mukuru Avenue, the Cana Elementary School will be relocated into the abandoned building located on-site, adjacent to the current location of the elementary school. This retrofit will provide larger classroom sizes, an assembly hall, and a kitchen where the children will be provided lunch.

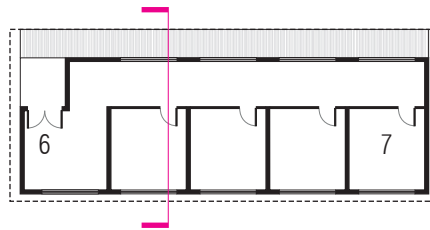


- 1 Foyer
- 2 Assembly/Dining Hall 62 m²
- 3 Kitchen 27 m²
- 4 Small Classroom 30 m²
- 5 Large Classroom 60 m²

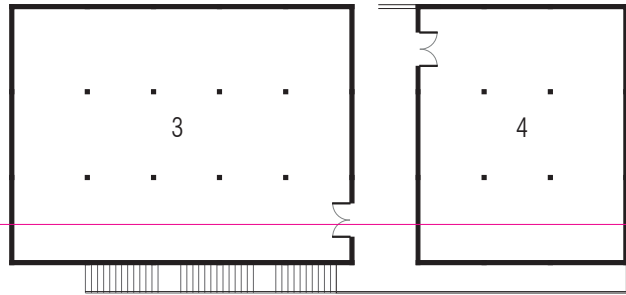
CHURCH



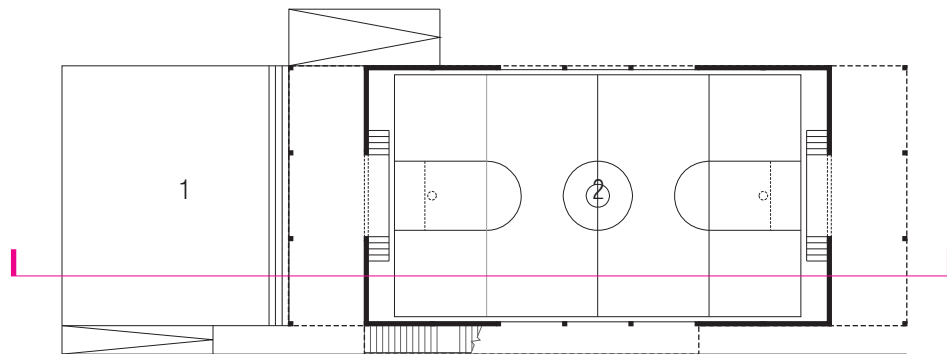
TYPICAL OFFICE



COMMUNITY CENTER



SECOND LEVEL



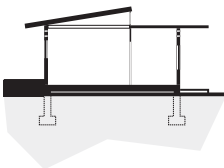
GROUND LEVEL



[SOCIAL SUPPORT STRUCTURES]



5 Sanctuary 228 m²

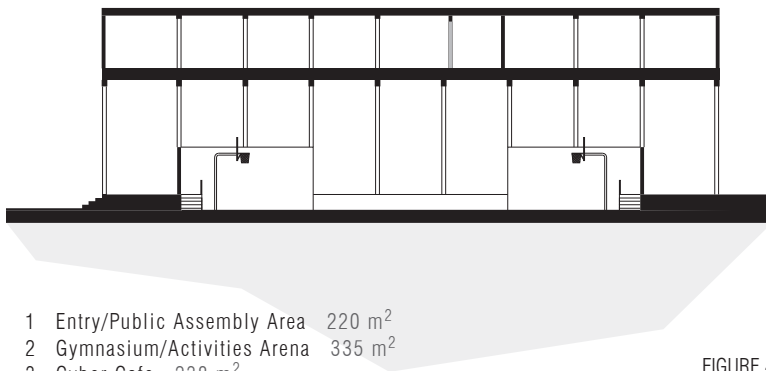


6 Entry/Reception
7 Office 17 m²

Social Support Structure ensures that all members of the community are being served, helps to provide a field assessment of what the community still requires, and identifies the major issues that still exist. It consists of mobile social workers, community volunteers, and facilities that support the community organization, such as CFHRC. The mobile social workers check-up on the status of their communities on an on-going basis by walking around neighbourhoods, making door-to-door visits to the elderly and bedridden patients due to AIDS or other illnesses, and by organizing a variety of community-empowering programs.

For Mukuru Kwa-Njenga and CFHRC, the Social Support Structure includes a community center, where people can gather and run a variety of projects and programs; a Financial Services Center that will give the urban poor an opportunity to set up micro-loans for their business or upgrading of their home; a Social Services Center, serving as a headquarters for the mobile social workers; a spiritual support center, such as Cana Deliverance Church, providing a place for spiritual growth and counselling; and a head office for the CFHRC.

Other services that can be developed or donated include a Cyber-Café, where people can access the internet and other technological services, and an Adult Training Center, located on the second floor of the community center that provides courses on financial management skills, and other basic computer and technological skills.



1 Entry/Public Assembly Area 220 m²
2 Gymnasium/Activities Arena 335 m²
3 Cyber Cafe 238 m²
4 Multi-Purpose Room 144 m²

FIGURE 4.9 Illustration of Social Support Structure applied to Mukuru Kwa-Njenga:
ABOVE: Typical plans and section of the proposed Cana Community Center.
CENTER: Typical plan and section of the proposed Cana Deliverance Church.
BELOW: Typical plan and section of proposed offices for CFHRC and Finance & Housing Center.

PERMANENT MARKET PAVILION

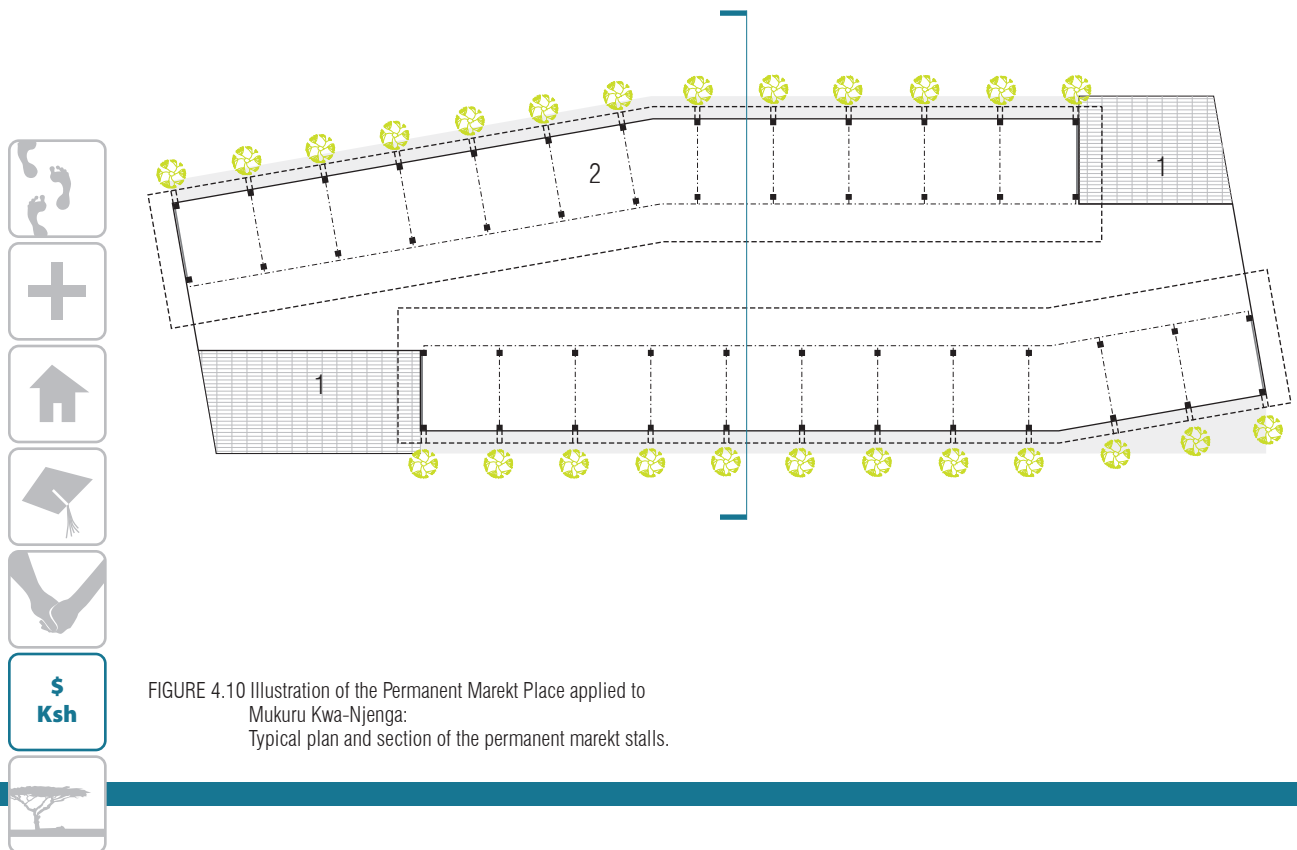


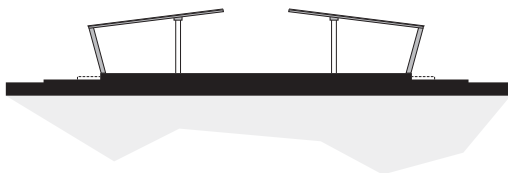
FIGURE 4.10 Illustration of the Permanent Market Place applied to Mukuru Kwa-Njenga: Typical plan and section of the permanent market stalls.

[MARKET PLACE]

The Market Place is the “business district” of the community. It supports the growing informal sector and is designed to provide a central place where informal markets can grow to support the residents, and therefore the community.

Strategically located in the major public zone of the site, the Permanent Market Pavilion will consist of 23 market stalls of approximately 15m² for individuals to sell their goods. It is a dynamic financial- and social-exchanges hub that supports the community and the individual, providing a consistent location for businesses to run on a daily basis.

An area for temporary market stalls will also be designated – ideally emerged – for entrepreneurs to come and set up their own stalls and sell their goods/services for the day. The proposed upgrading plan for Mukuru Kwa-Njenga designates an open area on the east entrance of the major public strip for temporary market stalls to be set up by the individual, and taken down by the end of the day. This area allow the market place to further expand along Mukuru Avenue and grow as the demand and circulation along this public spine increases.



- 1 Entry
- 2 Typical market stall 18 m²

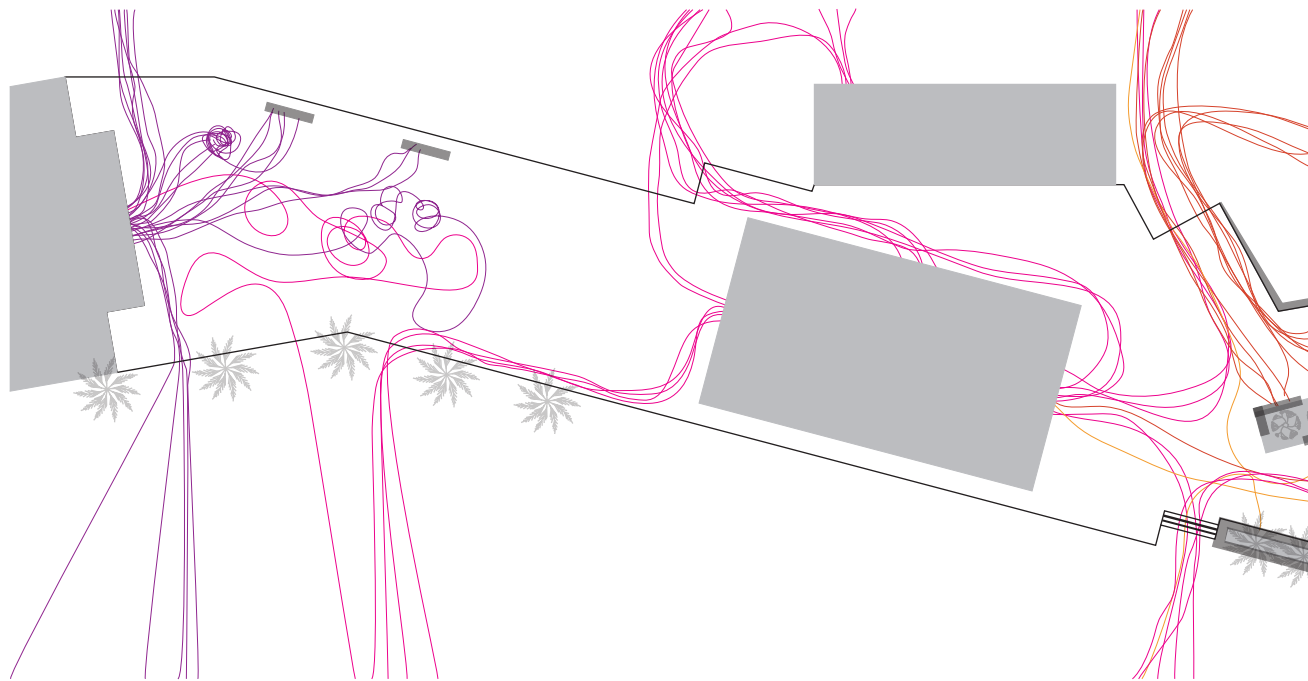
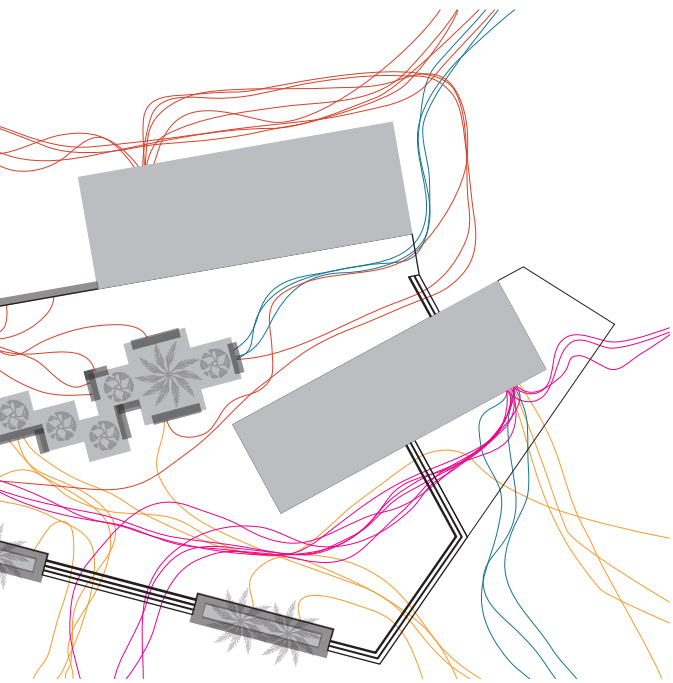


FIGURE 4.11 Illustration of Culture & Identity applied to Mukuru Kwa-Njenga: Diagram showing the movement and activity of people through and around the major public gathering areas.



[CULTURE & IDENTITY]

Culture and Identity is the kijiji element that is not a physical, but social outcome of upgrading. It is the public life of the community. The importance of this element lies in the need for belonging, recognition, and development by every individual. The culture of the community is a reflection of the enthusiasm and energy of the residents, and thus requires their participation. Identity is the shared collective vision and goal of the community, and thus, can only be revealed through its residents. As a community organization develops and more residents become involved in the upgrading process, a sense of responsibility and pride is optimistically generated. Through the design of public spaces, the residents of a community has a place to interact, a place to get away from the everyday, a place to run activities, or a place to just rest. It aims to empower the slum dwellers and inspire a sense of respect and pride for their community. The potential to create unity among residents and generate a collective identity can be supported through the design of mobile clinic stations, public gathering spaces, agricultural gardens, and playgrounds. Simultaneously, this will provide clean and safe play areas for children and meeting places for people to mingle and chat. All these attributes work towards establishing a networking environment that generates positive growth.

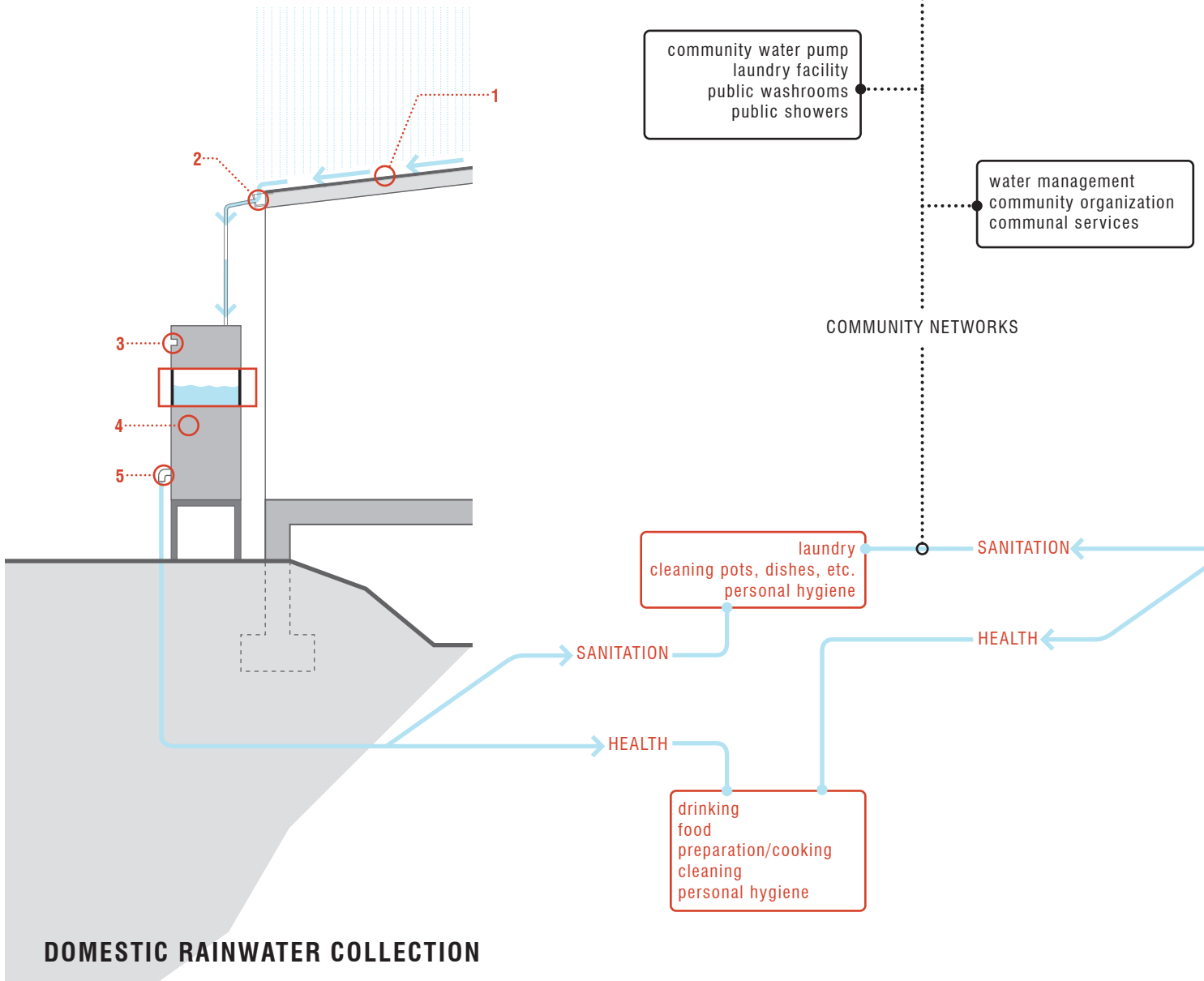
DECENTRALIZED INFRASTRUCTURES

This section details different infrastructures and practices that can be implemented at the individual level. They are decentralized projects that involve techniques designed to help community organizations build systems, such as rainwater catchment systems, garbage collection, sustainable ventilated pit latrines, etc. and promote the use of these systems to the residents. The purpose of this section is to inform slum communities and its residents of different practices that they can learn and use that will improve the condition of their daily lives. Through the support of the community, the residents should be encouraged to dispose of their garbage at designated garbage pavilions rather than throwing it into the river; through community awareness programs, residents should be informed of the health hazards that come with excreting in the river, or via the use of “flying toilets”, and be encouraged to use the public latrines, even though it may not be as “convenient”. This section concedes the implementation of pilot projects by community residents, private corporations, and NGO’s. Continually expanding with new ideas, this section explains how to design and implement some of these systems.

- 5 ESSENTIALS FOR GOOD RAINWATER COLLECTION:**
- 1 Catchment Efficiency
 - 2 Gutter Slope
 - 3 Height of Overflow
 - 4 Storage Efficiency
 - 5 Height of Tap

TYPICAL HOUSEHOLD (H.H.)
 4-6 residents

Daily Water Demands = 25litres
 Roof Catchment Area = 10m² (typical)
 Avg. Annual Rainfall = 700 mm / year
 Daily Available Water = 17 litres / day
 (from rainwater harvesting)
 Storage Tank Size = 3.3 m³ (minimum)



CANA RESCUE HOME*30 children, 2 adults*

Daily Water Demands = 170 litres
 Roof Catchment Area = 258 m²
 Avg. Annual Rainfall = 700 mm / year
 Daily Available Water = 445 litres / day
 (from rainwater harvesting)
 Storage Tank Size = 5.3 m³ (minimum)

COMMUNAL SERVICES PAVILION*for service and maintenance of communal washrooms and laundry services*

Roof Catchment Area = 217 m²
 Avg. Annual Rainfall = 700 mm / year
 Daily Available Water = 375 litres / day
 (from rainwater harvesting)
 Reservoir Size = 7 m³ (minimum)

[WATER COLLECTION]

Two-thirds of Kenya is arid/semi-arid making access to water scarce. With over 50% of the population lacking access to safe or adequate water supply, rain water collection is one method that can help with water supply shortages. In Africa, Kenya is leading the way in promoting rainwater catchment systems. Since the late 1970s, many projects have emerged in different parts of Kenya, each with their own designs and implementation strategies. These projects, with the efforts of locally trained builders known as “fundis” – who are operating privately and using their own indigenous designs – have been responsible for the construction of many rainwater tanks throughout the country. Where cheap, abundant, locally available building materials, appropriate construction skills and experience are absent, ferro-cement tanks have been used for both surface and sub-surface catchments.⁵⁴

PUBLIC FACILITIES RAINWATER COLLECTION

FIGURE 4.12 *OPPOSITE LEFT* Diagram of a simple Rainwater Catchment System for individual household. *LEFT* Diagram of a Rainwater Catchment System for the community (located at the Communal Services Pavilion).

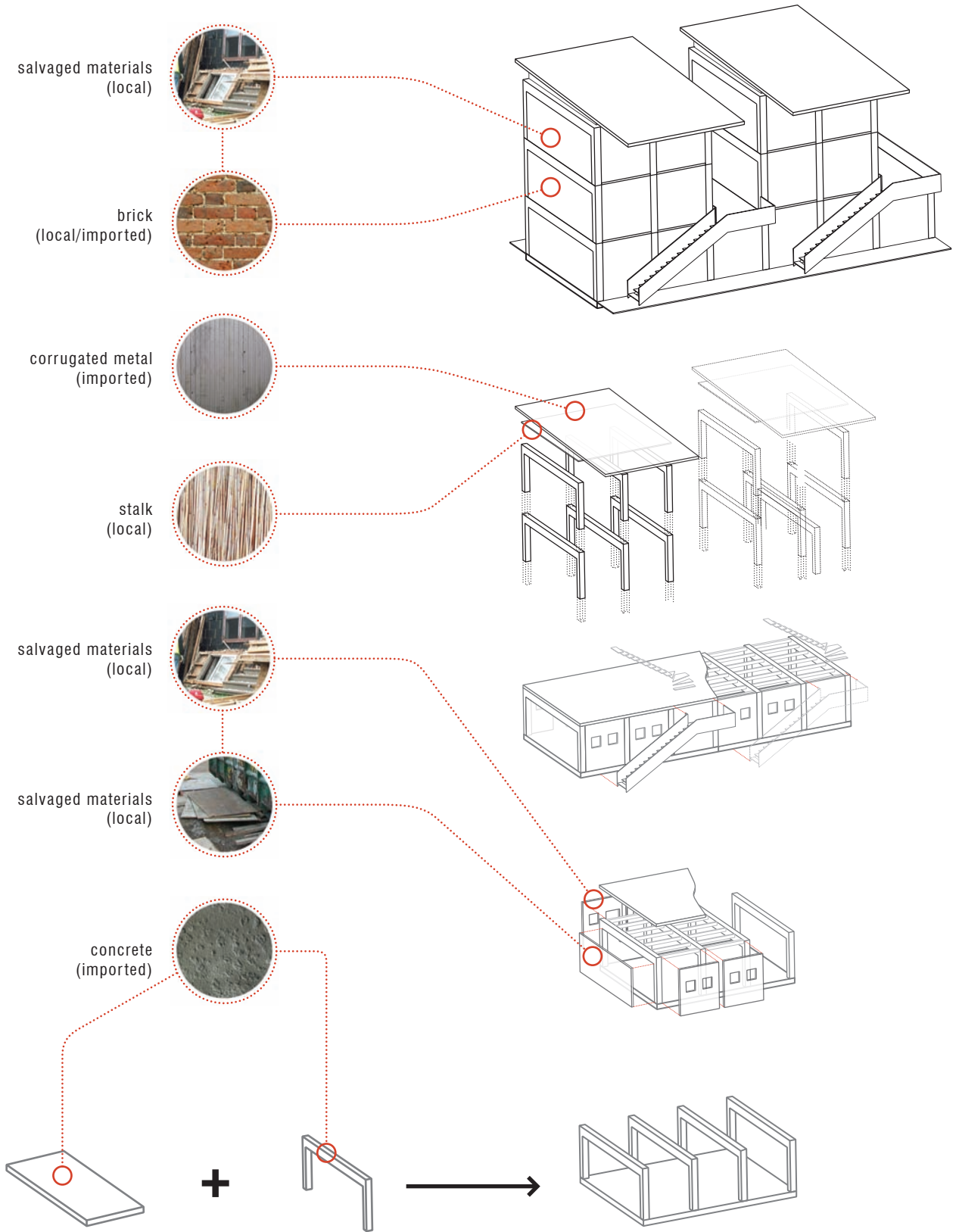


FIGURE 4.13 Exploded axonometric diagram showing the different phases of the proposed adaptable housing system (from the framework, to the final housing structure).



[FRAMEWORK-INFILL SYSTEM]

FOR ADAPTABLE HOUSING

The proposed housing system for Mukuru Kwa-Njenga takes an adaptable approach. It consists of a simple concrete post-beam structure that forms a framework where residents can then infill with recycled, salvaged and affordable materials. This system is based on affordability and flexibility, while ensuring that the houses are structurally sound and sustainable.

The community organization must work with non-government organizations and the business sector to help fund the construction of the concrete structures. Upon completion of the frames, residents can “fill-in” the structure, making the walls, and roofs themselves using new, recycled or reusable materials that they can afford. Ideally these homes would be connected to the public sewage system and plumbing lines.

Nairobi is located on the Rift Valley, where Nubian African Plate and the Somalian African Plate meet, placing the city in an earthquake risk zone. The framework-infill system this thesis proposes should react well during an earthquake, as the housing structure is supported has a foundation, and the super structure made with reinforced concrete. Also, if local materials, salvaged and recycled materials that are light-weight, are made and used by the residents, the damage will be decreased if they happen to fall during an earthquake. The risk of fire during an earthquake is also a concern. However, as the proposed framework uses reinforced concrete, it should not collapse even in the risk of fire.

Earth-based masonry, adobe, or soil cement is also an option for wall materials. They can be tied and framed to the concrete framework, which should stand well during an earthquake. These materials are also locally built and can provide opportunities for creating local employment.

Ventilation and air flow also need to be considered in new home construction. Existing slum homes currently do not have windows, causing health risks from excessive intake of kerosene and charcoal fumes from cooking. Elements, such as windows and air vents, are important as they help move harmful fumes out of the interior space. They will also help control interior heat gain by allowing air to flow through the space, keeping the building cooler. As metal work is common in Nairobi, a metal shutter is one option for window coverings that can be built by the local people, raising another form of vocational training and employment.

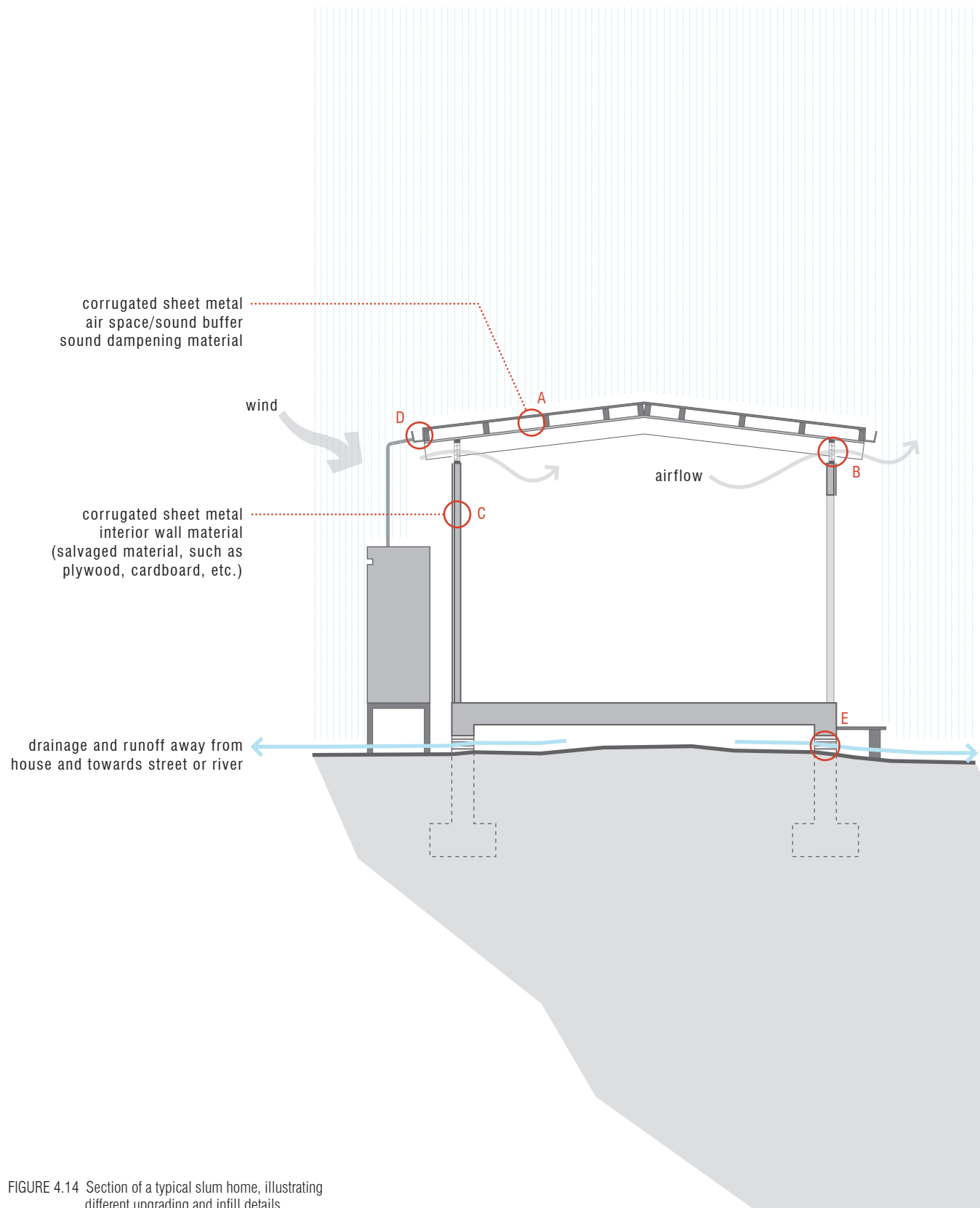


FIGURE 4.14 Section of a typical slum home, illustrating different upgrading and infill details

[UPGRADING AND INFILL DETAILS]

FOR EXISTING HOUSING

This section identifies four details that could be added to an existing slum home to improve its current condition:

A A new roofing structure which consists of an airspace and sound-damping material, such as maize stalks, to be placed under the corrugated metal roof to help dampen noise from rain, and help control the heat gain of the interior space.

B A natural air vent located just below the roof can help filter clean air into the home, and keep the indoor air moving, helping to keep indoor temperatures cooler.

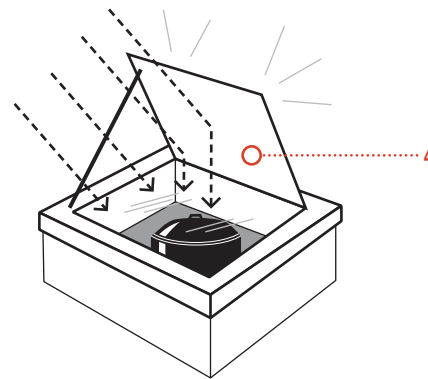
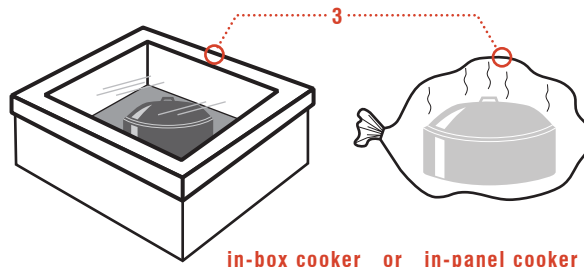
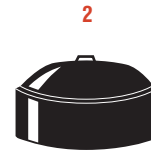
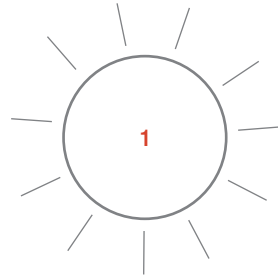
C A cladding system for the house structure can be proposed and designed to make the walls cooler, and help dampen noise from rain hitting the metal surface

D A simple gutter can be built along the roof edge, which can collect and direct rainwater to a storage tank. With proper water management, this can supply over half of a households daily water needs.

E A base, which gives the homes a foundation and a raised floor, ensuring that flooding into the homes does not occur, and that water drains away from the structure towards the street and river.

SOLAR COOKER ESSENTIALS:

- 1 the sun
- 2 dark, shallow, thin metal pot
- 3 heat retainer
- 4 sunlight capture device (optional)



[SUSTAINABLE ENERGY SOLUTIONS]

SOLAR ENERGY

Currently, most residents use charcoal or kerosene as a cooking device. This is both hazardous and dangerous for human and environmental health. Solar Cookers International (SCI) is an organization that “assists communities to use the power of the sun to cook food and pasteurize water for the benefit of people and environments.”⁵⁵

There are many benefits that come from solar cooking. They can help residents save money that normally would go towards buying charcoal or kerosene, and use it for other necessities. By using the sun’s energy, no waste, smoke, or ashes are produced making them a cleaner cooking device. Solar cookers also reduce exposure to smoke and gas and as a result, are much safer. This sustainable solution, as well as photovoltaic energy systems, should be promoted by private corporations and NGO’s, informing slum residents of healthier and sustainable ways of improving their overall living environment.

In Kenya, a program entitled Sunny Solutions, was started by SCI to help increase market-based solar cooker access in areas affected by environmental degradation, waterborne illnesses, and high incidence of HIV/AIDS. They are working in partnership with a local community organization, Nyakach Community Development Association (NYACODA). Launched in 2000, this entrepreneurial program teaches local women how to make and use solar cookers, providing women with a skill and an income-generating opportunity through the selling of the actual cooker (CooKit), or selling food cooked in them. This benefits both the individual and the community of women, and empowers them by ensuring decentralized access to this inexpensive solar cooker. The CooKit program has been awarded, and sustainable solutions such as this should be further investigated.

“The ‘OYWA’ CooKit, locally developed and assembled by Nyakach women, is more affordable and more durable than factory-built models. The OYWA, and the women that developed it, received a top award at the 2005 Pan-African Women Invent and Innovate awards ceremony, organized by the Global Women Inventors and Innovators Network, whose awards are considered the world’s leading accolade for women inventors and innovators”⁵⁶

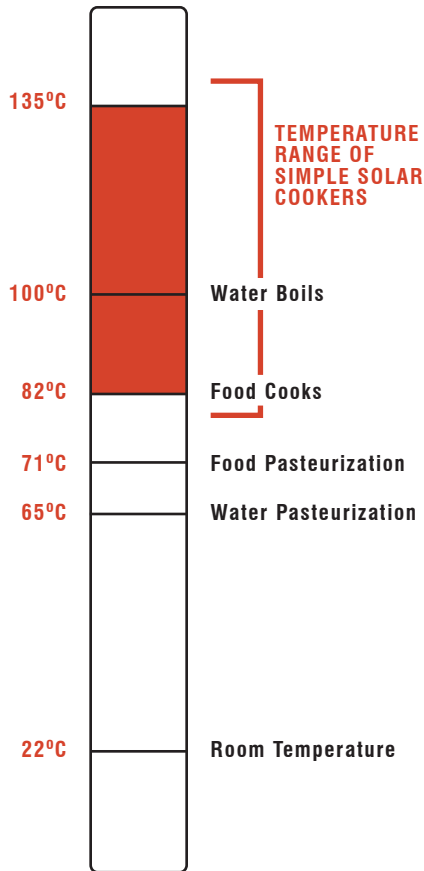
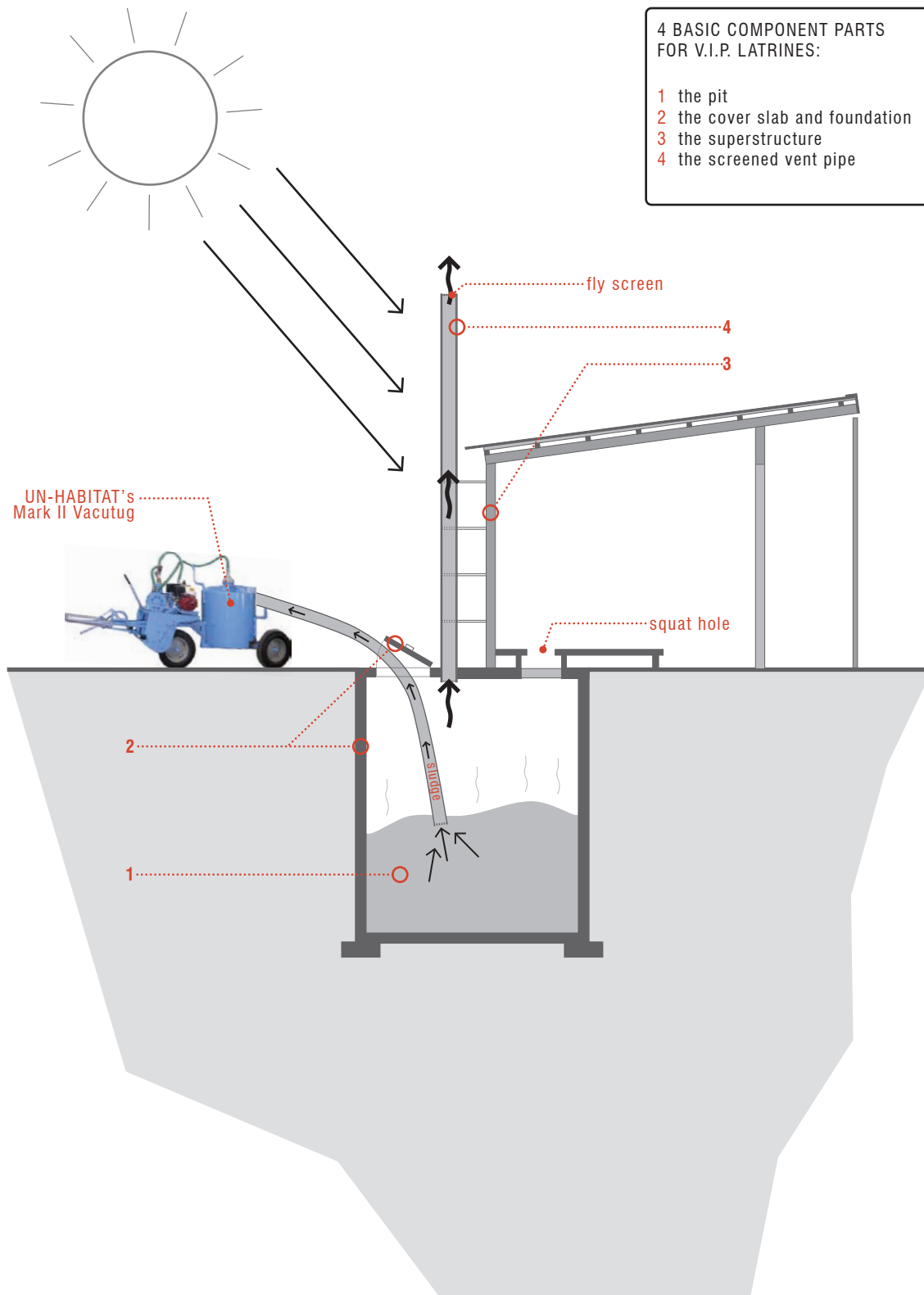


FIGURE 4.15 Illustration of the Solar Cooker essentials, how it works, and the temperature range of a simple Solar Cooker.

FIGURE 4.16-18 *TOP TO BOTTOM*: Image of the CooKit Program in Kenya; two women preparing a pot of food using an in-panel cooker; the cooked food using a solar cooker.



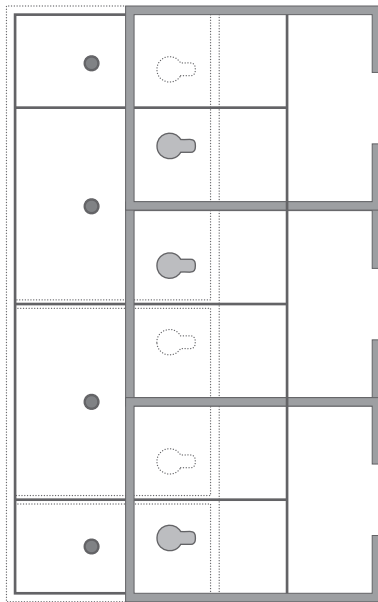
4 BASIC COMPONENT PARTS FOR V.I.P. LATRINES:

- 1 the pit
- 2 the cover slab and foundation
- 3 the superstructure
- 4 the screened vent pipe

[VENTILATED IMPROVED PIT (V.I.P.) LATRINES]

MULTI-COMPARTMENT ALTERNATING PITS

The result of the lack of sanitation facilities and water supply is the spreading of excreta-related diseases, responsible for a large portion of the sickness and mortality in slum communities. Excreta control is of paramount importance if disease and illness are to be reduced. The Ventilated Improved Pit (V.I.P.) Latrine is similar to a traditional pit latrine, except it includes a vertical vent pipe, fitted with a flyscreen at the top opening. The pipe helps with both odour and fly control, improving the longevity and use of the latrine.⁵²



PLAN

There are two types of VIP Latrines: a single-pit latrine and an alternating-pit latrine. With high demands for such facilities, an alternating-VIP latrine is recommended for Mukuru Kwa-Njenga. This pit is designed to be a permanent sanitation facility, managed and controlled by the community organization, with regular removal of the pit contents ever two to three years. The community must encourage the residents to use the facility, and NGO's and the government must help support such programs through funding and pit-content removal. Currently, the Mukuru WASH Program, run by local community residents, has worked in collaboration with the Community Empowerment and Development Services (CEDS), the European Union, and the Government of Kenya, to build a sanitation facility in the community. This facility is located in Mukuru Kwa-Rueben, an approximately 15-20 minute walking distance from Mukuru Kwa-Njenga. This new facility has access to a main water source, however is designed with a rainwater catchment system, as water is naturally scarce. This facility includes 16 toilet/shower stalls, 8 stalls for males and females each, and a general hygiene store selling toilet paper, soaps, shampoos, etc. This project is a start to better health and is moving the Mukuru Slums in the right direction.

FIGURE 4.19 Diagram of a Ventilated Improved Pit (V.I.P.) Latrine.

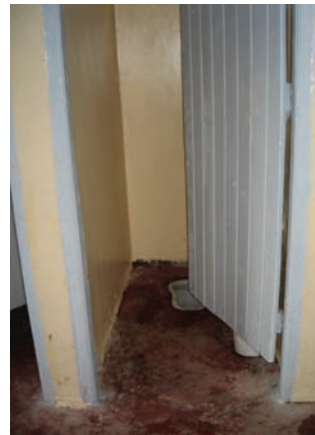




FIGURE 4.20 *OPPOSITE TOP*: Image of the new community washroom facility in the Mukuru Slums. This facility is located at an approximately 15-20 minute walking distance from the CFHC.

FIGURE 4.21-24 *OPPOSITE BOTTOM*: Image of the entrance into the female washroom stalls; image of the shower; image of the toilet (located in the same stall as the toilet); image of the sink located at the entrance (notice reads: "Wash Your Hands After Your Needs")

FIGURE 4.25 *ABOVE*: Image of the community organizers and volunteers who coordinated the construction of this facility.

5.0 > MUKURU KWA-NJENGA : 2030

“The imagined place is constructed of connections, not of separations; of readings, not categorisations.”⁵⁸

– Teddy Cruz –





PLAN

- 1 Mukuru Avenue
(one-way vehicular roads)
- 2 Pedestrian Paths
- 3 Mobile Clinic Station
- 4 Cana Health Clinic
- 5 Communal Services Pavilion
- 6 Temporary Market Place
- 7 Permanent Market Pavilion
(and other possible locations
for permanent markets to be
established)
- 8 Cana Deliverance Church
- 9 Cana Elementary School
- 10 Public Square/Playground
- 11 Cana Community Centre
- 12 CFHRC Head Office
- 13 Finance and Housing Centre
- 14 Public Gathering Area
- 15 Cana Rescue Home
(Orphanage)
- 16 Adaptable Housing

- A View into Permanent Market Pavilion
- B View of Mobile Clinic Station and Health Clinic beyond
- C View of Public Square/Playground and the Cana Community Center
- D View of the Cana Rescue Home and the pedestrian pathway

FIGURE 5.1 Proposed plan of Mukuru Kwa-Njenga in 2030 (with application of the Kijiji Kit).





FIGURE 5.2 View into Permanent Market Pavilion

FIGURE 5.3 View of Mobile Clinic Station and Health Clinic beyond.





FIGURE 5.4 View of Public Square/Playground and the Cana Community Center

FIGURE 5.5 View of the Cana Rescue Home and activity along the pedestrian pathway.

6.0 > PRINCIPLES FOR CHANGE

“Skilful practitioners understand the interdependence between design and emergence. They know that in today’s turbulent... environment, the challenge is to find the right balance between the creativity of emergence and the stability of design.”⁵⁹

– Nabeel Hamdi –

ON PRACTICE

Physical and social environments are intrinsically linked, and architecture continues to strive to bring the two together. When working with the urban poor in the developing world, many architects naturally describe their purpose as an ethical responsibility. Yet whether or not an architectural project is based on ethics or profit, the end product reaches and affects the global population. Thus, architects must address the issue of urban slums and the inherent issues associated with slums.⁶⁰ When architecture and slum upgrading come together, better communities are made possible. Architecture and slum upgrading are not just about the physical structure, but about building close-knit interdependent networks, linking diverging positions and organizations together to resolve today's issues. These networks must continue to exist and motivate individuals to act. More importantly, they must be used to plan long-term strategic approaches that produce opportunities for a brighter and more prosperous future.

Practice is the art of learning to make things possible. It is about expanding one's boundary of understanding and crafting skills that will affect people and environments in a tangible way. As a practice, architecture has the power to change the way people think of space by encouraging exploration of unfamiliar territory in design. In this sense, architects take on the role of agent, facilitator, and initiator. Whether in a built or abstract form, designers are equipped with the necessary expertise to align patterns of the social environments with its physical environment. The dense living of over 1 billion people is a part of the 21st century urban landscape. These landscapes are theoretically the "laboratories" that can teach, reveal, and inform designers of new ways of practice, and to explore emerging conditions of the city, building methods, materials and applications.

The developing world is showing us that professionals are needed in the process of urban change and renewal. They are being called upon to think beyond form, and to see themselves as designers of processes. As the work of the architect attempts to connect both the physical and social aspects of the community, the creation of "form" becomes a product of the community's processes in slum upgrading, and the architect is the catalyst triggering the process.

Jauregui and his team of architects realize that "their architecture serves a social purpose – architecture cannot afford to be disliked by the community. It must be understood to be accepted, maintained, and kept functioning by the population."⁶¹ Jauregui's architectural interventions in the favelas of Brazil may appear simple, but its impact is extremely sophisticated. Such interventions include the cleaning out of the Faria River located at the edge the Fernao Cardim favela-bairro, and a sewer system installed, resulting in a cleaner environment and water. New roads were paved along the river, flanked with public seating and railings along the rivers edge. Vehicular and pedestiran bridges were fixed and

expanded to maintain a continuous flow of movement and communication between the two sides of the river, encouraging safety and public life to flourish in the community. This visibly illustrates the value of slum upgrading – a progressive, holistic approach to urban design, one that recognizes the value of social research and re-investment in these emerging urban conglomerates rather than the past attempts of demolition and displacement.⁶²

“We cannot forget that (slum communities) are the product of resistance and transgression. In a time when architecture has been so distant from the political ground and the social fabric that shapes it, the critical observation of these settlements and the assessment of the possible tactics of intervention to assist their organic evolution is a risk worth taking.”⁶³

ON PARTICIPATION

Participation among the community and its residents is fundamental. It entails the right of people to become involved in the decisions that affect their lives. Slum residents are likely to participate at the local level where they are most directly linked. The challenge is to find ways to integrate them into the design and policy making processes. One method that has been successful is through “Participatory Rapid Appraisal” (PRA) derived by Robert Chambers.

Participatory Rapid Appraisal first originated from the philosophy known as Rapid Rural Appraisal (RRA). RRA first emerged in the late 1970’s and was intended for *learning by outsiders* about rural life and conditions in different parts of the world. It was *extractive*, meaning, the outsider gathered information by being with the local people, interacting face-to-face, exploring the site, and using a range of methods to crosscheck the information gained.

“[The outsider] determines the agenda, obtains and takes possession of the information, removes it, organizes and analyses it, and plans and writes papers and reports. ... [They] are collectors, processors and producers of outputs.” PRA, on the other hand, is learning through collaboration and is participatory, meaning, “[the outsider] encourages and allows [the local people] to be dominant, to determine much of the agenda, to gather, express and analyse information, and to plan.”⁶⁴

Although it originated from a rural perspective, PRA entails a “growing family of approaches and methods to enable local people to share, enhance, and analyse their knowledge of life and conditions, to plan and to act.”⁶⁵ It is not limited to the rural community, and has also been applied in urban conditions. It is an interactive method of investigation that promotes diversity and flexibility, and is a way in which the community can come to their own conclusions on their living conditions, what they cherish and what they lack, and to develop a plan that would change their current situation for the better. Conditions of housing, health, education, and physical conditions, such as road, walkways, and refuse would be analysed, and as the community shares their knowledge, an open forum is created, shared and owned by the community. Analytical methods based on process and participation designates the outsider – such as the architect – as coordinating the community and getting them started on the undertaking of analysis and creating design solutions that can be shared, analyzed and revised.

This process of analysis would be used to help the architect get the community involved in the design process, to determine what the community truly needs, and to develop a set of ideas and designs that are encouraged by the community, rather than forced onto them. Robert Chambers establishes six basic principles and objectives of PRA and is to be used as a guideline. These are:

1. Residents' knowledge and capabilities
2. Relaxed Rapport
3. Diagramming and Visual Sharing
4. Sequences
5. Training and Reorientation for Outsiders
6. Sharing and Spread.

As a facilitator, the architect should encourage local residents to be dominant, to establish the program, to gather, to express and analyse information, and to plan the stages of the project. The architect becomes a catalyst, a learner, and a consultant, and his/her responsibility is to "establish rapport, to convene and to enquire, on the methods, and to encourage improvisation from traditional systems."⁶⁶

ON PARTNERSHIP

Partnerships with industries, organizations and individuals are necessary in any development project, and design professionals become mediators in the field, working together and collaborating between “bottom” community organizations and “top” government, private, and public investment sectors. As architects are trained to be aware of policies, their expertise in this area can be used to help communities voice their concerns to the city.

Even with practice and participation, the success of any approach, method, or program requires mutual partnership and collaboration between individual and facilitator (architect), facilitator and government, community and government, and government and global society. Each community must have a local organization generating grassroots leadership, community initiative, and influence in neighbourhoods that are forgotten or ignored by those in power. The community organization works with professionals and governments to ensure basic services, such as access to clean water, become available. They work in partnership with non-government organizations that provide links to the global network of funding and international support. It is through these partnerships that an upgrade from their current living conditions and community rebuilding can begin.

Partnership requires interdependence and shared ownership. There are currently 28,900 international Non-Governmental Organizations (NGO's) and approximately 20,000 trans-national networks globally. Kenya alone has over 500 NGO's,⁶⁷ Nepal has over 1200 NGO's, 210,000 in Brazil, and 1 million in India.⁶⁸ Private corporations and economically striving organizations make up the “donor community” – the money power. The “local community”, provides a diversity of interests, languages, cultures, and dreams. Although the globalizing economy and development have widened the gap between the rich and the poor, we have learned that development is an on-going process.⁶⁹ Globalization offers the power to connect to information, resources and technologies on local, national, and international levels. This ongoing development process, combined with good practice, willing participation, and mutual partnership, is what will enable change for slum communities, by revealing opportunities and making resources accessible to all societies instead of a select few.



FIGURE 6.1 Selected logo's, icons, and images of governments, community groups, organizations, and people working to create better communities for the urban poor.

CONCLUSION

Sub-Saharan Africa is facing a medical crisis that is orphaning children by the millions and creating a generation that must develop into adults without the guidance of parents or other positive role models. This is the “lost generation” – the most vulnerable population who desperately need communities to give them the support and structure they require. Unfortunately, urban slums – communities with no water, no lavatories, and no services – are the places that just over half of this lost generation is trying to grow, learn, and gain positive and hopeful futures. Grandmothers and extended family members are left having to care for this orphaned generation, while they themselves are living in squalor and trying to support their own immediate families. This is not acceptable. Cities must respond to the needs of its inhabitants – from the most basic physical adjustments to the more complex social and political transformations – and allow these slums become thriving communities giving not only orphans but the greater population of urban poor a humane and progressive standard of living.

“The architect has to imagine spaces, orderings, materials, aesthetic effects, relations to environments, and deal at the same time with the more mundane issues of plumbing, heating, electric cables, lighting, and the like. The architect is not a totally free agent in this. Not only do the quantities and qualities of available materials and the nature of sites constrain choices but educational traditions and learned practices channel thought. Regulations, costs, rates of return, clients’ preferences, all have to be considered to the point where it often seems that the developers, the financiers, the accountants, the builder, and the state apparatus have more to say about the final shape of things than the architect. The process of ‘doing architecture’ entails all these complications. ‘Doing architecture’ is embedded, spatiotemporal practice. But there is, nevertheless, always a moment when the free play of the imaginations – the will to create – must enter.”⁷⁰ (Harvey, 2000)

As Harvey makes clear the complexities of ‘doing architecture’, the analysis and design of Mukuru Kwa-Njenga confronts the problems of the individual, community, and city in terms of development and implementation for the long-term. It calls on designers to work with residents and grassroots community groups, and demands participation from NGO’s, local and national governments, and the international community. The Kijiji Kit – generated based on slum upgrading – illustrates the essential elements needed to form a thriving community, and demonstrates the complexity of issues, networks, and partnerships required. Slum upgrading is the most cost-efficient, self-helping, and decentralized method of improving slum conditions. It requires the residents to take ownership of their communities and participate in the design process, voice their opinions and concerns, and help make decisions, without having to relocate. It is a method that sees the potential in people, and relies on the individual to initiate and think progressively. Hence, the Kijiji Kit is a guideline that emphasizes the importance of holistic thinking from all backgrounds,

educations, and fields. It is about creating design proposals that generate an understanding of processes and how certain interventions will positively impact the future of a community.

Slum communities are in need of better living conditions. Architects must respond to this need. Whether it is in building new policies, negotiating between large corporations, or facilitating design workshops, the architect's role is in envisioning the physical needs that will raise both the physical and social quality of community life. 'Doing architecture' can help generate new policies that acknowledge these communities and allow them to improve. It impels NGO's, the private sector, and the developed world to get involved and help fund community projects, and it advocates participation and partnership among residents, politicians, and designers.

Architecture must be concerned with creating a milieu of understanding that slums are the places of the future. By setting this understanding, more strategies will be developed and implemented that are able to provide the basic needs for the lost generation, all striving towards improving the living environments of slums. The Kijiji Kit is a guide that helps the urban poor see the potential their community has for prosperity and a brighter future. The kit is a proposal that supports the most vulnerable demographic, setting standards based on their needs and taking into account the greater affect it will have on the city. As cities are like organisms, constantly growing, changing, and adapting, so is the Kijiji Kit. The intention of the kit is to assist communities in implementing change through visualizing their needs and potentials. As different community's face different physical and social circumstances, modification of the kit may be required for the respective community. The kit is not a finite list, but a book of endless possibilities that seek to help a city grow towards a better future. With many communities around the world struggling just like Mukuru Kwa-Njenga, there must be many schemes created in the imagination of architects to help these communities see their potential, and work together towards it.

APPENDIX A > CASE STUDIES



FIGURE A.1 View of Petare, a slum community in Caracas, Venezuela.

FIGURE A.2 Painted steps to enliven the pedestrian path in Petare.

[PETARE : CARACAS, VENEZUELA]

Petare is a bairro (the Portuguese word for community) that immensely grew during the oil boom of the 1970's. Located on the eastern hills of Caracas, Venezuela, its growth developed as a result of the construction of a six-lane highway that connected the region to the eastern outer cities. During the highway's 10-year construction, the foothills of Petare were occupied by barracks of workers, making it a prime site for squatters. Today, this pedestrian city stretches six-square-kilometres and is home to almost 1 million inhabitants. With an outstanding density of 768 inhabitants per hectare – in comparison to Manhattan with 515 inhabitants per hectare – Petare is one of the most innovative urban settlements on appropriately handling property rights, producing less waste and spending less energy than most urban regions of the world. Petare maintains roof gardens, dry toilets, community centers, gymnasiums, urban cable cars, flexible growing houses, and incredible amounts of incomplete infrastructure. Architecture's involvement in the community's development process came about through the initiative of the residents, in partnership with architects from Urban Think Tank, and working with the city municipality, and their government, and is setting the stage for a successful development process.¹

The community of Petare is one of millions of communities of the 21st century that have emerged not out of the minds of architects, but out of the inhabitants and out of necessity. In view of globalization as process, these communities are changing the urban landscape and have emerged amidst harsh conditions. Yes – cities are growing faster than current services and infrastructures can handle; and yes – cities are struggling to keep up with the growth and do not know how to alleviate this pressure. Thus, informal cities such as Petare are teaching us that architecture and urban design must be engaged in the evolution of the community and become laboratories of technological, conceptual and social issues of growth. These communities exemplify the need for social and political design and innovation, and should be studied and imitated with a similar purpose – to help improve the living conditions of the most vulnerable.

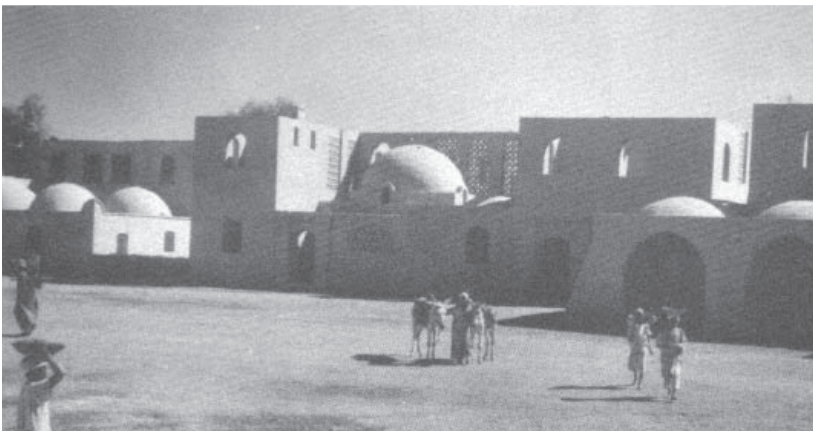
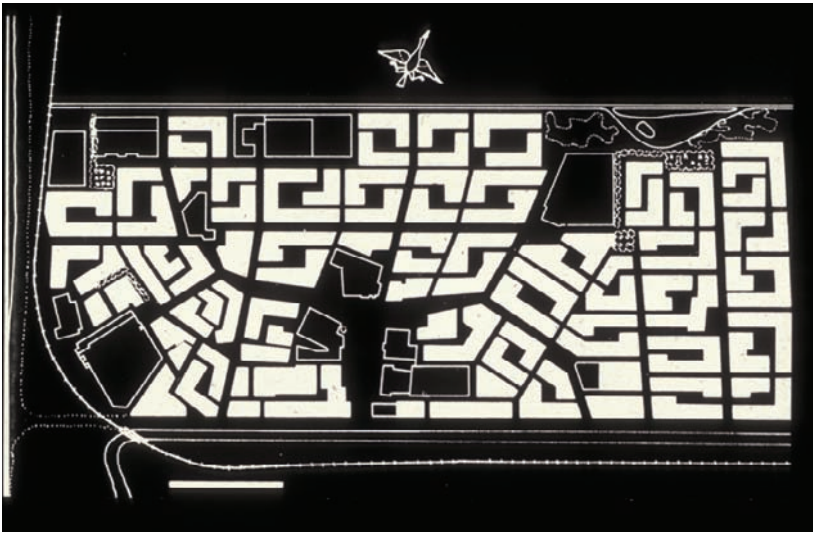
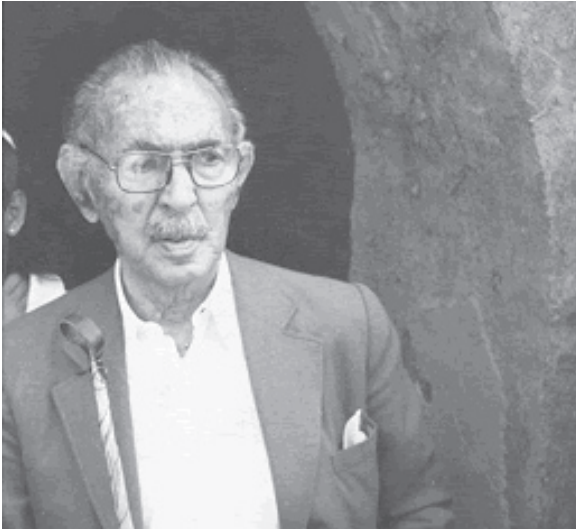


FIGURE A.3 Hassan Fathy

FIGURE A.4 Site plan of New Gourna in Luxor, Egypt.

FIGURE A.5 Image of a residential building portraying the style of construction used for the New Gourna community.

CASE STUDY #1 | NEW GOURNA

| | |
|----------------|--|
| ARCHITECT: | Hassan Fathy |
| LOCATION: | Luxor, Egypt |
| DATE: | circa 1948 |
| CONTEXT: | rural village, improving housing for the poor |
| BUILDING TYPE: | residential, village, urban planning and development |
| CLIMATE: | hot, arid |



Hassan Fathy is an architect who devoted himself to developing improved housing for the poor. He believed in building as a collective action, and both the architect and the dweller were essential components of the building equation.²

In 1945, he worked with the Egyptian Department of Antiquities to build the village of New Gourna, near Luxor, Egypt, in pursuit of providing cost-effective housing for an entire entrenched community of entrepreneurial excavators. He worked with the residents, using inexpensive materials, and local methods. He acted as both an architect-designer and an architect-facilitator, working with residents and designing with their needs in mind to ensure that the livelihoods of the poor were not ignored. The New Gourna Village was partially built from 1945 to 1948, where difficulties arose during this time. Despite Fathy's best intentions and his devotion to the project, the labourers and eventual residents of the New Gourna village did not want to move and took every opportunity to sabotage their new village in order to stay where they were. Despite the ideal location, the site was eventually abandoned and unused.

Why were the residents hesitant and reluctant to move? What does this mean for the architect? The result from Fathy's attempt may not have been what he expected, however it raises the key question of "how to create a culturally and environmentally valid architecture that is sensitive to the ethnic and regional tradition without allowing subjective values and images to intervene in the design process."³ This case study confirms the importance of working in partnership with the residents, as they will be the ones most affected by slum upgrading projects. Keeping established networks in a community intact and realizing the desires of the residents is essential for success.

Fathy's experiment emphasizes the importance of having a transparent and solid relationship between the people, a deep respect and sensitivity towards the culture and lifestyle of the people, and assembling an honest analysis of what the individuals of the community truly need and want. The inhabitants must be both active participants and decision makers throughout the entire process. Without their support and cooperation, the buildings will be sterile, unloved, and untended.



FIGURE A.6 Sam Mockbee with a resident of Hale County and the resident's two sons.

FIGURE A.7 Three students working on the Sanders-Dudley House (2001) in Sawyerville, a small town located approximately 18km northwest of Hale County, Alabama.

CASE STUDY #2 | HALE COUNTY, ALABAMA

| | |
|----------------|---|
| ARCHITECT: | Rural Studio |
| LOCATION: | Hale County, Alabama |
| DATE: | 1990 to present |
| CONTEXT: | rural county, along Alabama's poverty-stricken "black-belt" |
| BUILDING TYPE: | housing, community and public buildings |
| CLIMATE: | temperate |



In Alabama, Sam Mockbee has been a driving force in bringing the local municipalities, the architect, and the people together. Founded in the early 1990's, Mockbee set up the Rural Studio, a program at Auburn University where architecture students are able to work in partnership with the residents of Hale County to design and build projects for underprivileged members of the community. Hale County is one of Alabama's poorest and neglected rural districts with many residents living below the poverty line. It has a population of just over 17,000 people, the demographic consisting predominantly of African-Americans.⁴

Mockbee believed that,
*"The best way to make real architecture is by letting a building evolve out of the culture and place. These small projects designed by students at the studio remind us what it means to have an American architecture without pretence. They offer us a simple glimpse into what is essential to the future of American architecture, its honesty. ...Architecture as a discipline [is] rooted in community and its environmental, social, political, and aesthetic issues and shows students that they can make a difference. ...as architects, their goodness is more important than their greatness, their compassion more eventful than their passion."*⁵

This belief stems from Mockbee's convictions as an architect and artist:

1. The architectural profession has an ethical responsibility to help improve living conditions for the poor;
2. The profession should "challenge the status quo into making responsible environmental and social changes"

Rural Studio has allowed students to build cost efficient and sustainable homes for many of the local families in need, and has also contributed to the community with the design and construction of public gathering places, churches, community centres, and extra-curricular clubs for children and adults. The students use cost-effective materials and sustainable methods to keep costs low, making homes affordable for residents and public buildings feasible for the municipality. The projects



FIGURE A.8-9 *TOP LEFT:* The Bryant (Hay Bale) House in 1994.
TOP RIGHT: The changes the house has adapted over time (2000).

FIGURE A.10-12 The Akron Boys and Girls Club
LEFT FROM TOP TO BOTTOM: The ruin-like structure before construction began; a community meeting being held in the newly renovated building; the club at dusk.

integrate the residents throughout the design process and promote participation, responsibility, and social change. These simple, yet innovative steps taken by the architecture school have not only made an impact on the lives of the recipient individuals and their families – and the design students themselves – but have been instrumental in starting a transformation process for the entire community. It exemplifies the power architectural interventions can have in bringing change to a poverty-stricken neighborhood, and emphasizes the importance of the partnership between the designer, the resident, and municipality. Through this partnership, Hale County is well on its way to becoming a healthier and growing community.



FIGURE A.13 Aerial view of Fernao Cardim favela-bairro in Brazil; some of the major upgrading projects implemented in this community are: the construction safer and cleaner pedestrian pathways; building retaining walls and bridges along and across the river.

FIGURE A.14 A *before and after* photograph of a pedestrian walkway that was constructed as part of an upgrading project in Fuba Campinho, a favela-bairro in Rio de Janeiro, Brazil.

FIGURE A.15 A diverging pedestrian pathway with public lighting and planting in one of the favela-bairro's of Rio de Janeiro as part of an upgrading project.

CASE STUDY #3 | THE FAVELA-BAIRRO PROJECT

| | |
|----------------|---|
| ARCHITECT: | Jorge Mario Jauregui Architects |
| LOCATION: | Rio de Janeiro, Brazil |
| DATE: | 1993 to present |
| CONTEXT: | hillside communities, along edge of the city |
| BUILDING TYPE: | urban renewal, community facilities, public buildings |
| CLIMATE: | hot, humid |



One third of Rio de Janeiro’s population lives in favelas – shantytowns built on steep rocks along the coast of Brazil that lack basic services and infrastructures. In response to the needs of the urban poor, Jorge Mario Jauregui Architects began working on projects in the favelas to penetrate and revitalize these shantytowns. Working with municipalities, the local residents, as well as drug-lords that territorially claim different areas of the favelas, The Favela-Bairro Project was established in 1993 to try and turn these favelas (*shantytowns*) into functioning bairros (*communities*).

Over the past decade, Jauregui’s team of architects have carried out various projects in more than ten favelas. These projects have made positive impacts on the communities and range from the construction of safer pedestrian walkways, to community centers and recreational facilities, job training programs, and even communal kitchens. The success of the various interventions is in how they promote a positive perspective of the community, in turn supporting and building up the sociological and economic status of the favela. They have promoted a communal environment and stronger identity to these favelas through the construction of communal kitchens and laundry facilities, naming the streets, numbering buildings, accessing underground infrastructure, constructing pedestrian pathways, public squares, and social and recreational spaces.

This project is an application of the slum upgrading and exemplifies its success. The major principle gathered from the Favela-Bairro Project is that it is not concerned with the construction of housing, but gauges its projects based on the social conditions of a favela and its long-term needs that will improve the daily lives of the residents. It seeks to break the segregation between the rich and poor, while being sensitive to the cultural and political boundaries. Architecture, in this sense, “demonstrates the power of urban design in realizing social change and engaging marginalized people in the revitalization of their own communities.”⁶

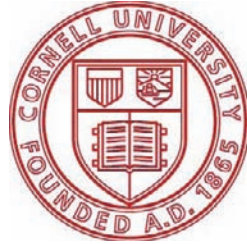


FIGURE A.16 The logos of: ACORN (the grassroots community group in New Orleans) and the main participating universities (Cornell University, Columbia University, and University of Illinois at Urbana-Champaign).

FIGURE A.17 ACORN Housing/University Partnership representative presenting "The People's Plan" to possible funding parties in New York City.

FIGURE A.18 A public unveiling of "The People's Plan".

CASE STUDY #4 | THE PEOPLE'S PLAN

| | |
|----------------|--|
| ARCHITECT: | ACORN with Cornell University, Columbia University, and the University of Illinois at Urbana-Champaign. AHUP |
| LOCATION: | New Orleans, Louisiana |
| DATE: | 2005 to present |
| CONTEXT: | disaster relief from Hurricane Katrina |
| BUILDING TYPE: | housing, urban renewal |
| CLIMATE: | humid subtropical |



In 2005, New Orleans, Louisiana was hit by a Category 5 hurricane that ripped through the city killing over 1,800 people, destroying thousands of homes, and displacing thousands of families. Two years later, there are still countless families living in large warehouses, others having to move and live out of state, and more trying to rebuild their homes with the little resources they have left.

ACORN is a grassroots community group that has made a great impact on New Orleans and the community of the Lower 9th Ward (W9), the area hardest hit by the storm. Working in partnership with architecture students from Cornell University, Columbia University, and University of Illinois at Urbana-Champaign, the students and ACORN have developed a master plan for W9 that helps residents reclaim their properties and homes. The students have gone into the neighbourhoods, meeting with the residents and including them in the design process, ensuring that the proposed re-design of the community is the best-fit solution for those living in the area.

This project has not always been met with support by the municipalities. The original decision made by politicians was to clear and develop the area into a vast green-space, not considering the property rights of the original residents. ACORN and the participating universities have had to face much political challenges due to government policies against their favour. The students have stepped in and negotiated with municipalities on protecting the rights of the resident and the future development plan of W9; and the negotiations have paid off.

In partnership with ACORN, construction has now started on rebuilding the area into the community it once was, bringing the residents back to their neighborhoods, only this time with stronger levees and better designed houses.² Collaboration with a grassroots community organization and the architect (in this case, the students of the participating universities) is necessary, and constant negotiation with government policy makers is part of the process. This project, known as “The People’s Plan,” is just one example of the community-architect-government partnership and how it can work.



FIGURE A.19 Aerial view of Sultanbeyli in Istanbul, Turkey.

FIGURE A.20-23 *LEFT COLUMN:* Day and night images of public pedestrian spaces in Sultanbeyli.

FIGURE A.24-27 *RIGHT COLUMN:* A public services building's construction sequence in Sultanbeyli.

CASE STUDY #5 | SULTANBEYLI

| | |
|----------------|---|
| ARCHITECT: | residents of Sultanbeyli |
| LOCATION: | Istanbul, Turkey |
| DATE: | circa 1969 |
| CONTEXT: | squatter development, housing on illegal land |
| BUILDING TYPE: | housing, community buildings, public services |
| CLIMATE: | temperate continental |



Starting in 1969 with approximately twenty-four families, this slum community in Istanbul, Turkey is now a metropolis of over 300,000 people. Through networking and communally organizing themselves, residents have worked together to create a thriving, self-sustaining community. They have built homes, schools, community facilities and even their own Sultanbeyli City Hall, which is now a thriving centre for organized departments of planning, public works, sanitation, and even a public transit system.⁸ This remarkable achievement has created sources for an established economy for the residents of Sultanbeyli and for millions of people living in the surrounding area. Despite the great networks and establishments, the community itself is still technically illegal, as residents have settled, developed and built on land that they do not own.

This study shows the significance and power behind the networking and organizing of a small group of people, and the impact and growth they can achieve. Rather than ignoring these “illegally-forming” communities, politicians saw this community and realized the need for low-cost living. They have allowed the residents to develop their community and have shown their support by simply providing access to public services, such as drainage, water, and electricity. This type of “illegal settlement” should not be replaced or broken by displacement, nor should they be seen as negative. Governments should see these communities as resources and support them as positive aspects in the growth of their city.

If more and more communities are able to organize themselves in the same manner as Sultanbeyli, and are able to connect with professionals to facilitate their development, the potential to provide opportunities for the urban poor are immense. Traditional “top-down” planning must be overcome, and professionals need to start working with grassroots groups and community organizations so that innovative ideas of form and space for the present urban city can be realized. Sultanbeyli, along with many other slum communities, are “illegally” built. However, through discovering the great effectiveness that results in the ability to get together and organize as a community, these “non-places” soon become “places”.



FIGURE A.28-32 LEFT: Examples of the different ways micro-financing can help the poor start a form of income generation.

FIGURE A.33 ABOVE RIGHT: Muhammad Yunus, creator and founder of Grameen Bank, meeting with the women of a community in Bangladesh.

CASE STUDY #6 | GRAMEEN BANK

| | |
|----------------|--|
| FOUNDER: | Professor Muhammad Yunus |
| LOCATION: | Jobra, Bangladesh |
| DATE: | circa 1974 |
| CONTEXT: | micro-credit financing, international economic development |
| CLIENTELE: | poor (particularly female) |
| CREDIT SYSTEM: | based on small loans, small transactions |



Professor Muhammad Yunus is the founder of the Grameen Bank, a micro-credit program that has changed the world of economic and international development. The Grameen Bank provides credit to the poor by “removing the need for collateral, [and is a] banking system based on mutual trust, accountability, participation and creativity.”² It finally connects the poor – previously viewed as “un-bankable” – to the global economic system, and channels the development of the socio-economic conditions of the poor. Professor Yunus believed that if financial resources were available to the poor on terms and conditions that were appropriate and reasonable, “these millions of small people with their millions of small pursuits can add up to create the biggest development wonder.” And he was right. As of May 2007, the Grameen Bank has 2,431 branches, providing services to 7.21 million borrowers, 97 percent of whom are women.

Professor Yunus acknowledges that his ideas did not come all at once, nor was its success achieved overnight. Over the course of three decades, with enormous energy and dedication, this program grew organically, from “ground-up”, through an ongoing and repeated process of “action and correction, re-action and re-correction.”¹⁰ Collaboration with the village people, talking to thousands of journalists, bankers and other professionals, were all part of the success of the program.

In the Western world, sixty dollars could probably buy a pair of jeans, but in Bangladesh, the cost of those jeans is a loan that gives a woman the means to purchase materials such as bamboo to make furniture, or livestock such as goats to produce milk. Over time, the loan is paid off and income is established for the household. This loan is a simple concept that, if directed to all fields of development including design, can start building better communities. No matter how small the intervention, design can be used to visualize the issues and begin processes of revealing the major questions that need to be addressed.

This case study exemplifies the great resourcefulness of the urban poor. Professor Yunus persistent vision shows that time and dedication are needed for such ideas to become successful.



FIGURE A.34 TOP: Berea Baptist Mission Church in Johannesburg, South Africa.

FIGURE A.35-37 LOWER IMAGES: Images of the "Door of Hope" (baby-bin).

CASE STUDY #7 | THE DOOR OF HOPE

| | |
|----------------|---|
| FOUNDER: | Berea Baptist Mission Church (senior Pastor Cheryl Allen) |
| LOCATION: | Johannesburg, South Africa |
| DATE: | circa 1999 |
| CONTEXT: | orphanage located in the city, anonymous baby drop-off |
| BUILDING TYPE: | church, orphanage, public service |
| CLIMATE: | dry, subtropical |



The Door of Hope is an orphanage located in Johannesburg, South Africa and began with a hole made in the wall of the Berea Baptist Mission Church in August, 1999. With 40 to 50 babies abandoned every month and left to die of starvation or exposure, the church felt the need to do something about this issue and have made this hole – or the “baby bin” – where unwanted babies can be dropped off. The baby-bin is a simple unit with a sensor alert that signals workers in the church when a baby has been placed in the bin, who then immediately retrieve and begin caring for the child. Babies are also personally dropped off by mothers directly to the workers at the church. Hospitals call asking the church to pick up a baby whose mother had abandoned the child after birth, or from police officers who find babies abandoned along the side of the road. As of June 2007, the Door of Hope has helped over 560 babies about 50 of whom came through the hole in the wall, and almost 200 have gone for adoption.¹¹

The Door of Hope demonstrates how a simple installation can affect the social process and outcomes of a community. This bin has allowed a network to develop between the church, the police force, and the hospital, that brings change to a city. Although it is a small intervention, it alters the process of abandonment of a child and instills a sense of hope in the city, rather than a sense of despair. It is a perfect example of the impact a small intervention can make. If designers start constructing ideas based on processes that will generate change and cater to the needs of a community, over time, the social impact will be immense.



FIGURE A.38 The entrance to Nyumbani Orphanage in the town of Karen, located just outside of Nairobi, Kenya.

FIGURE A.39 An aerial view of the grounds of Nyumbani Orphanage in Karen.

CASE STUDY #8 | NYUMBANI CHILDREN'S HOME, LEA TOTO, & THE NYUMBANI VILLAGE

| | |
|----------------|--|
| FOUNDER: | Father Angelo D'Agostino |
| LOCATION: | Karen, Nairobi, Kenya |
| DATE: | circa 1992 |
| CONTEXT: | orphanage for HIV infected children, community outreach organization |
| BUILDING TYPE: | orphanages, community centers, village |
| CLIMATE: | moderate |



Despite the fact that 75% of babies who test positive at birth will eventually not develop the disease themselves – as babies carry many of their mother's antibodies through their first year, giving a 'false positive' – mothers abandon them anyway, on the uninformed assumption that they too have AIDS.

Founded in 1992, Nyumbani Children's Home is an orphanage that has actively responded to the rising number of HIV infected children born in Africa every day. Nyumbani means 'home' in Swahili and cares for approximately 100 HIV positive (HIV+) children ranging in age from newborns to twenty-three year olds. When a baby is taken in, it is cared for until a definite assessment of their HIV status can be made. Children found not to have the virus are adopted or find other homes. Children who are HIV+ are given the best nutritional, medical, and in particular, anti-retroviral therapy, psychological, academic, and spiritual care available, living at Nyumbani until they become self-reliant. These children are of different tribes and ethnicities from all over Kenya, many of them referred to through Nyumbani's own community outreach Program – Leo Toto.

Meaning 'to raise a child' in Swahili, Lea Toto is a community-based outreach program providing services to HIV+ children and their families in several slum communities of Nairobi, Kenya. This program started through recognizing that even with the orphanage, there was still a pressing need to support the growing number of HIV+ children. Launched in 1998, the Lea Toto Program is a support system that is based on the Home Based Care (HBC) model, and has one goal: "to improve the quality of life of the affected through a package of comprehensive care for the client and his/her family."¹² This package includes basic medical and nursing care, counseling and psychological support, spiritual guidance, relief for social needs, HIV transmission prevention education, promotion of community empowerment/ownership, and self-help. It allows HIV+ children to stay with their parents, or caregivers in their communities, and has proved to be a cost-effective and positive way to reach those in need.

Since its inception, Lea Toto has helped over 2,000 patients, and today has over 1,500 clients. This organization, along



FIGURE A.40-46 Images of the construction of the Nyumbani Village. Construction labour for the village was mostly done by member of the surrounding community.

with the orphanage, exemplifies the need for such programs and community-based care. The main principle gained from this example is the importance of the community-organization partnership. This partnership relies on each other to take positive steps towards nurturing and caring for vulnerable children. As a result, it will bring positive changes in the children's lives, which will help them grow into confident adults. The Nyumbani organization has exemplified this partnership through the Lea Toto Program, as well as their new project, The Nyumbani Village in Kenya. This Village will be a self-sustaining community to serve orphans and elders who have been left behind by the "lost generation" of the AIDS pandemic.

One thousand acres of land was donated by the Kitui District County Council to be used for the Nyumbani Village. The site is located 3 hours east of Nairobi in one of the poorest districts, and has the highest number of AIDS orphans around the area. The Village plans to accommodate 1280 – 1600 individuals, with approximately 100 dwelling units, each designed to house a grandmother/caretaker looking after 7 to 10 children. The Village will also include a community center, health center, primary school, technical training center, a police post, staff and guest housing.

The goal of the Village is to combine the energy of youth and maturity of elders, creating a stable family that cultivates "healing, hope, and opportunity."¹³ It provides orphans with a family-like setting under the stewardship of elderly adults, while still meeting their basic physical needs. With a vast area of tillable land, the residents will be self-sustaining through agriculture, poultry, dairy, and other agricultural projects. The Village's construction method is to use locally available resources, and to manufacture materials on site, with the exception of steel sheets for roofing and glass for windows. As well, the major labour force will be hired locally, providing vocational training and employment opportunities, which support both the Village and the surrounding community. If all communities were to have this kind of vision and this kind of goal, the risk that many orphans face will decrease immensely and the future of the city will be optimistic.



FIGURE A.47 The entrance from the main road into Mully Children's Family (MCF) Ndalani Branch.

FIGURE A.48-50 Activities that take place in MCF.
FROM TOP TO BOTTOM: MCF children during an assembly; MCF boys playing a game of competitive soccer; local women hired to farm the crops grown at MCF.

CASE STUDY #9 | MULLY CHILDREN'S FAMILY

| | |
|----------------|---|
| FOUNDER: | Charles Mulli |
| LOCATION: | various locations, Kenya |
| DATE: | circa 1989 |
| CONTEXT: | self-sustaining community for orphans and street children, rural setting |
| BUILDING TYPE: | orphanage, community centers, schools, greenhouses, etc. |
| CLIMATE: | moderate |



Mully Children's Family (MCF) is a Christian, non-denominational, non-profit, rehabilitation organization for street children, orphans, abandoned, abused, HIV/AIDS affected and infected, desperate and neglected children who have no home and no one to care for them. In 1989, Charles Mulli, a Christian church leader and businessman, directed all his resources to establish this home. Since then, it has grown to an organization that has helped over 4,000 children, with 1,287 children currently in care. MCF was founded "to ensure that the children, young people and the marginalized members of society access justice, social and economic empowerment, and a decent and dignified livelihood."¹⁴ They seek to rehabilitate both physical and psychological circumstances of street and orphaned children – who have been abandoned, abused, and neglected – by providing shelter, food, clothing, education, vocational training, medical care, psychological, and spiritual support.

MCF has grown from one home-based care center to 3 homes- and 3 community-based centers located all over Kenya. The programs and activities carried out at the MCF centers consist of: formal education (from pre-school to university); non-formal education (carpentry, agriculture, metal-work, construction, tailoring, etc.); sports and recreational activities (football, basketball, drama, music, dance, etc.); spiritual guidance (Bible clubs, outreach, choir, devotions); income generating activities (horticultural farming, building construction, carpentry, etc.); HIV/AIDS outreach to beneficiaries within the homes as well as outreach to the community at large; counseling programs; street outreach programs (feeding, medical care, clothing, spreading the gospel).

There are the 6 centers that MCF are currently running:

MCF Eldoret is the parent home. Situated in the town of Eldoret, 320 kilometers west from the Nairobi, it reaches out to the needy children in Western Kenya. It caters to mainly street children and HIV/AIDS orphans, both boys and girls, from newborns to 13 year old children.

MCF Ndalani is the second home and was established in 1996. It is located approximately 108 km southeast of Nairobi on 80 acres land. Due to its close proximity to the city, it caters to the needs of children in the Nairobi area. Ndalani is the largest home, with 530 former street boys and girls between 7 and 23 years of age living on campus and receiving care and support through the various programs which include formal education, technical education, and horticulture farming programs for self-sustainability.

MCF Yatta Rehabilitation Centre is a third rescue center, specifically focusing on street girls in the Yatta province. This home provides children with their physical and spiritual needs – specifically medical care, parental love, spiritual nourishment, and emergency relief food. Teaching primary health care, cookery, child care, housekeeping and general home science is highlighted in order to improve their living standards and prepare them for future responsibilities in their families. In addition, they are taught skills that result in economic empowerment. These skills include tailoring, hair dressing, agriculture, and basketry. The rehabilitation center also reaches out to the surrounding community to develop HIV/AIDS awareness programs through drama, audio-visuals (cinema) and the formation of a health center for street girls.

MCF Kangundo Community-Based Center was established as a response to the increased number of children orphaned by HIV/AIDS and the constant increase of child laborers in Kangundo province. At this center, 132 children come and receive food, formal education, medical care, and other basic needs on a daily basis, while still living at home with their relatives or caretaker.

MCF Vipingo Community-Based Center is located along the coast of Kenya in Vipingo, a rural low-income area of the Kilifi district. This center is similar to MCF Kangundo, and is currently helping 141 orphans, child laborers and many other children in need of special care and protection.

MCF Kipsongo Community-Based Center is a feeding program for the street children of Kipsongo slum in the town of Kitale. As a result of this program, the number of children loitering on the streets has been reduced; it has helped children stay in school, and provides children with a source of food.

During my visit to Kenya, I had a chance to visit the MCF Ndalani. The two hour journey, on several overcrowded matatu's was definitely worth it. I was given a tour of the entire campus by one of the resident pastors. Walking around the campus and seeing all the different activities made me realize that housing these vulnerable children is only one small part of what MCF does. They provide the children with a full educational system, consisting of an elementary school, high school, and vocational training center, that equip children of all academic levels for future opportunities. They have a health clinic and HIV/AIDS program that

supports the children who need medical attention. They have acres of cultivated land that keeps them self-sustaining. The crops that they farm include a wide range of fruits and vegetables – mangos, papayas, tomatoes – and staple foods, such as maize and potatoes. They also raise livestock, such as cattle and chicken. In 1996, they began a business venture with a private corporation in the Netherlands, growing and exporting GradeA green beans. Seeing the detailed technology and high quality of the greenhouses was astonishing, and I was very excited to learn of their global partnership that is helping them gain financial support and expand on their current resources.

The self-sustainability also applies in the construction of all the buildings on the campus. Through the vocational program, some of the young adults living at MCF are trained in building construction and metal work, and have built all the facilities, welded all the metal and assembled all the windows and doors. However, the work does not remain internal. Local residents around the area are also hired to farm the land, help with construction work, and other areas when necessary.



MCF is a true success story and one that should be imitated by other communities. The key principles gained from this organization is how communities can develop in a self-sustaining way, how they can have global partners working together to support one another, and how many people benefit from one main goal: helping those in need. The operations of MCF exemplify the way a community should be networked and how it should function.



FIGURE A.51 *TOP*: Green beans growing inside the greenhouses. These beans are then sifted for Grade A quality by hired labourers from the surrounding community, and exported to Europe.

FIGURE A.52 *BOTTOM*: A panoramic view of the greenhouses and the landscape beyond at MCF - Ndalani Branch.

APPENDIX B > TECHNICAL DATA

RWC Storage Tank Sizing:

Residential

DEMAND:

water consumption per person = 5 litres/person/day
 # of people = 5
 total consumption = 5 litres/person/day x 5 people
 = 25 litres/day

>Therefore, the daily water demand per household is 25 litres.

SUPPLY:

Roof Area = 10m² (approx.)
 Run-off Coefficient = 0.9
 (for new corrugated G1 roof)

Average annual rainfall = 700mm/year
 Annual available water

(assuming all is collected) = [Roof Area] x
 [Avg. Annual Rainfall] x
 [coefficient]
 = 10m² X 0.7m x 0.9
 = 6.3m³/year

>Therefore, assuming all the run-off rain is collected, the daily water available is 0.017m³/day (17 litres/day).

>Since the demand of 25 litres/day exceeds the supply of 17 litres/day, the expected demand cannot be met by the available harvested water. Careful water management is therefore required.

Cana Rescue Home

DEMAND:

water consumption per person = 5 litres/person/day
 # of people = 32
 total consumption = 5 litres/person x 32 people
 = 160 litres/day + 10 litres*
 = 170 litres/day

*The 10 litres added is for extra cleaning, cooking, etc.

>Therefore, the daily water demand per household is 170 litres.

SUPPLY:

Roof Area = 258m² (approx.)
 Run-off Coefficient = 0.9
 (for new corrugated G1 roof)

Average annual rainfall = 700mm/year
 Annual available water

(assuming all is collected) = [Roof Area] x
 [Avg. Annual Rainfall] x
 [coefficient]
 = 258m² X 0.7m x 0.9
 = 162.5m³/year

>Therefore, assuming all the run-off rain is collected, the daily water available is 0.445m³/day (445 litres/day).

>Since the demand of 170 litres/day is less than the daily supply of 445 litres/day, rainwater harvesting can supply all of the water needs of the orphanage.

FIGURE B.1 The formulas and process of calculating the minimum storage tank size for a rainwater catchment system applied to a typical slum house and the Cana Rescue Home, based on month Average Annual Rainfall, demand, and supply.

STANDARD FORMULAS AND CHARTS FOR RAINWATER CATCHMENT SYSTEMS

| SUPPLY | MONTH | RAINFALL (mm) | RAINFALL HARVESTED (m ³ /month) | | CUMULATIVE RAINFALL HARVESTED (1) | |
|--------|-------|---------------|--|-----------|-----------------------------------|-----------|
| | | | Residential | Orphanage | Residential | Orphanage |
| | | | Mar | 91 | 0.819 | 13.467 |
| Apr | 241 | 2.169 | 11.84 | 2.988 | 25.307 | |
| May | 190 | 1.71 | 21.13 | 4.698 | 46.437 | |
| Jun | 38 | 0.342 | 55.96 | 5.04 | 102.397 | |
| Jul | 18 | 0.162 | 44.12 | 5.202 | 146.517 | |
| Aug | 23 | 0.207 | 8.82 | 5.409 | 155.337 | |
| Sep | 30 | 0.27 | 4.18 | 5.679 | 159.517 | |
| Oct | 61 | 0.549 | 5.34 | 6.228 | 164.857 | |
| Nov | 150 | 1.35 | 6.97 | 7.578 | 171.827 | |
| Dec | 107 | 0.963 | 14.16 | 8.541 | 185.987 | |
| Jan | 58 | 0.522 | 34.83 | 9.063 | 220.817 | |
| Feb | 51 | 0.459 | 24.85 | 9.522 | 245.667 | |
| TOTAL | | | 9.522 | 245.667 | | |

| DEMAND | MONTH | RAINFALL (mm) | DEMAND (m ³) | | CUMULATIVE DEMAND (2) | |
|--------|-------|---------------|--------------------------|-----------|-----------------------|-----------|
| | | | Residential | Orphanage | Residential | Orphanage |
| | | | Mar | 91 | 0.527 | 5.21 |
| Apr | 241 | 0.527 | 5.21 | 1.054 | 10.42 | |
| May | 190 | 0.527 | 5.21 | 1.581 | 15.63 | |
| Jun | 38 | 0.527 | 5.21 | 2.108 | 20.84 | |
| Jul | 18 | 0.527 | 5.21 | 2.635 | 26.05 | |
| Aug | 23 | 0.527 | 5.21 | 3.162 | 31.26 | |
| Sep | 30 | 0.527 | 5.21 | 3.689 | 36.47 | |
| Oct | 61 | 0.527 | 5.21 | 4.216 | 41.68 | |
| Nov | 150 | 0.527 | 5.21 | 4.743 | 46.89 | |
| Dec | 107 | 0.527 | 5.21 | 5.27 | 52.1 | |
| Jan | 58 | 0.527 | 5.21 | 5.797 | 57.31 | |
| Feb | 51 | 0.527 | 5.21 | 6.324 | 62.52 | |
| TOTAL | | | 6.324 | 62.52 | | |

| minimum STORAGE TANK SIZE | DIFFERENCE BETWEEN CUMULATIVE (1) & (2) | |
|---------------------------|---|-----------|
| | Residential | Orphanage |
| | 0.292 | 8.257 |
| | 1.934 | 14.887 |
| | 3.117 | 30.807 |
| | 2.932 | 81.557 |
| | 2.567 | 120.467 |
| | 2.247 | 124.077 |
| | 1.99 | 123.047 |
| | 2.012 | 123.177 |
| | 2.835 | 124.937 |
| | 3.271 | 133.887 |
| | 3.266 | 163.507 |
| 3.198 | 183.147 | |

| STAKEHOLDER | STAKEHOLDER INTERESTS | OPPORTUNITIES FOR STAKEHOLDERS | OPPORTUNITIES FOR PROJECT |
|--|--|--|---|
| United Nations - UNICEF, - UN-Habitat, - UNEP | - Millennium Development Goals (MDG): improve the lives of the urban poor, support structure for developing countries/cities | - use the Kijiji Kit as a pilot project demonstrating achievement of the MDG - social responsibility | - funding - international support and recognition for future replication |
| International Philanthropic donors/NGO's | - promote social responsibility - right funding goes to right project - improve lives of those less fortunate | - supporters get to see their donations in action - achievement of goals, ideals - use project for publicity to raise funding for NGO | - funding - international support and recognition |
| National elected politicians | - Media Profile - Demonstrate Leadership - Get more votes - control - power | - gain recognition of the people promotes good moral standings to the people - helps them in future re-election | - help channel funding from central government - national support and recognition |
| Ethnic Group leaders | - ethnic group recognition and pride - traditional values to be respected and promoted | - create community solidarity - engage participation of ethnic group members in supporting the implementation of projects - support and trust gained from citizens | - grassroots leadership established - cultural values and practices considered in projects |

STAKEHOLDERS MATRIX

PART 1

| THREATS FOR STAKEHOLDERS | THREATS FOR PROJECT | ENGAGEMENT STRATEGY |
|--|---|---|
| <ul style="list-style-type: none"> - none | <ul style="list-style-type: none"> - international attention may attract visitors who may disrupt activities in community | <ul style="list-style-type: none"> - negotiate a budget contribution - sign a project agreement - establish credibility through analysis, knowledge, and expertise - develop and state the beneficial solutions - illuminate advantages and state risks involved - exude confidence in ideas |
| <ul style="list-style-type: none"> - project may be risky - may take too long to see results - not engaging or of interest | <ul style="list-style-type: none"> - funding may back out - visions may not agree | <ul style="list-style-type: none"> - secure agreement for long term commitment - find common ground - clarity of beliefs - illuminate advantages - exude confidence in ideas - develop media opportunities for NGO |
| <ul style="list-style-type: none"> - project may not work out - may not get political support from citizens who are not part of this community - may be required to support more than one project (when government is not ready to do so) | <ul style="list-style-type: none"> - attention only for political gain - funding promised but never received - may be influenced by landowners or economic interests who are against the project | <ul style="list-style-type: none"> - find common ground - provide vivid evidence, facts, logical solutions - understand their views and develop mutually beneficial solutions - provide public and media opportunities for politician to be associated with the project |
| <ul style="list-style-type: none"> - urban communities are often multi-ethnic and domination by one group causes social exclusion of minorities - power struggle - feeling of leadership being taken away | <ul style="list-style-type: none"> - project may provide threat to traditional authority and cause resistance to project - fear by residents due to negative view by stakeholder - traditional leaders are often patriarchal and may interfere with women's equal participation in project | <ul style="list-style-type: none"> - create formal project advisory group with all of the different ethnic group leaders as members to build solidarity and mitigate conflicts - promote women's membership in above group - find common ground - illuminate advantages of multi-ethnic cooperation - be educated in each others cultural and ethnic values - understand everyone's views |

| STAKEHOLDER | STAKEHOLDER INTERESTS | OPPORTUNITIES FOR STAKEHOLDERS | OPPORTUNITIES FOR PROJECT |
|--|---|---|--|
| Land owners | <ul style="list-style-type: none"> - protect ownership - profit-making - source of income (from rent prices) - easy money - control of rent/tenant | <ul style="list-style-type: none"> - value of property could be raised with upgrade - services, which are lacking, can be provided | <ul style="list-style-type: none"> - cooperation with changes to site/property - information on site conditions, tenants, etc. |
| Renters (slum residents in Nairobi are not actually squatters) | <ul style="list-style-type: none"> - trying to keeping rent prices low - improved access to services - access to water - improved living environment - tenant rights - location convenient to inner city employment and economic activities | <ul style="list-style-type: none"> - empowerment through recognition of their rights as urban citizens - healthier living environments - opportunities for micro-financing - urban agriculture - employment opportunities - secure tenure rights - more living space | <ul style="list-style-type: none"> - cooperation, building of trust, interdependence, support - analysis of the community needs, assessment of renters state (financially, socially, physically) - self-help building keeps costs low |
| Community leaders/teachers/nurses/social workers | <ul style="list-style-type: none"> - helping surrounding community - provide service to community - source of employment | <ul style="list-style-type: none"> - help further develop community services - assist in finding funding, partnership, support | <ul style="list-style-type: none"> - partnership, getting awareness of project goals out the residents and promote buy-in - support for project |

STAKEHOLDERS MATRIX

PART 2

| THREATS FOR STAKEHOLDERS | THREATS FOR PROJECT | ENGAGEMENT STRATEGY |
|---|--|---|
| <ul style="list-style-type: none"> - empowered and organized community may challenge exploitation and high rents - project may demand that Government change policies and zoning - more maintenance, less power | <ul style="list-style-type: none"> - resistance to project - threats made to project and the residents - attempts by landowner to raise rents when new services installed - forced removals and expropriation of belongings of the poorest residents who can not pay | <ul style="list-style-type: none"> - develop mutually beneficial solutions - provide evidence of profit-making opportunities through statistics/spreadsheets - explore political alliance with Government to expropriate or force-purchase land in favor of residents and redistribute it giving local residents legal tenure rights |
| <ul style="list-style-type: none"> - change in lifestyle - breaking down of existing networks - fear of conflict with land-owning interest groups - fear of becoming homeless due to project construction | <ul style="list-style-type: none"> - participation puts demands on time and resources of the poor who have little of either to spare - takes time away from economic activities - slow progress may cause apathy and - resistance, lack of participation | <ul style="list-style-type: none"> - conduct participatory appraisal to capture communities wishes, felt needs and concerns. - ensure that community residents are aware of the project goals and plan - establish open, transparent and public consultation mechanism that includes all - connect emotionally, show understanding and commitment - self-awareness, understand their views - be precise with their needs and wants - establish credibility and trust, listening to what they have to say |
| <ul style="list-style-type: none"> - project demands may be time consuming above their regular professional tasks - too much investment (mentally, socially, physically) - lack of commitment or motivation | <ul style="list-style-type: none"> - if not engaged as allies from the beginning could form passive resistance, land discourage participation | <ul style="list-style-type: none"> - publicly recognize their roles as leaders and creators of public opinion - establish credibility and trust through understanding, commitment and self-awareness - listen to what they have to say (as they are also most connected to the residents) - foster their professional pride in improved facilities such as schools and health facilities |

| STAKEHOLDER | STAKEHOLDER INTERESTS | OPPORTUNITIES FOR STAKEHOLDERS | OPPORTUNITIES FOR PROJECT |
|--------------------|--|---|--|
| Women of community | <ul style="list-style-type: none"> - supporting family and orphans of the community - finding employment - often the breadwinners in their families - reducing violence in their neighborhoods | <ul style="list-style-type: none"> - opportunities for women's empowerment by taking leadership roles in the project and the community - give them support - improved access to services make daily life easier - more employment/entrepreneurial opportunity | <ul style="list-style-type: none"> - partnership - participation - leadership among community |
| Orphans | <ul style="list-style-type: none"> - survival - right to play | <ul style="list-style-type: none"> - give them support - a place to belong, identify with - safe and healthier environment - open spaces to play | <ul style="list-style-type: none"> - provides a real need, energy, motivation - promote child-to-child care and rehabilitation |

FIGURE B.2 This matrix is an analysis of the stakeholders involved and how a project can affect each of these specified groups.

STAKEHOLDERS MATRIX

PART 3

| THREATS FOR STAKEHOLDERS | THREATS FOR PROJECT | ENGAGEMENT STRATEGY |
|---|---|---|
| <ul style="list-style-type: none"> - project demands may be time consuming above their domestic and income generating responsibilities - intrude on daily life - process may feel too long | <ul style="list-style-type: none"> - slow progress may cause apathy - resistance, lack of participation | <ul style="list-style-type: none"> - ensure women's participation in all project consultations and meetings and that their voices are heard - encourage equity in committees, groups and forums - connect emotionally, show understanding and commitment - self-awareness, understand their views - be precise with their needs and wants - establish credibility and trust, listening to what they have to say |
| <ul style="list-style-type: none"> - networks may break, change may affect growth of child | <ul style="list-style-type: none"> - none | <ul style="list-style-type: none"> - use participatory diagnostic tools to understand child's points of view, needs and concerns - show care, leadership - gain trust, self-awareness, and commitment - incorporate their own stated needs into project planning |

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