

**EXPLORING AUTO-CONSTRUCTION IN INFORMAL SETTLEMENTS AS
AN ALTERNATIVE HOUSING STRATEGY IN CATO MANOR, DURBAN:**

A proposed incremental housing development

By

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At a time of rapid urbanisation, many in authority can only exercise the lightest touch when it comes to guiding urban change. This change is happening, despite planning. Now, more than ever, there is a greater focus on the role of the community in shaping their own built environment. This is our 'new normal'. This proposition comes at a time when we have a to do more with less, when so many of our big plans have failed, when big government promises a move to localism, and when there is an increasing emphasis on the relationship between urban resilience, social innovation and civil society.

— *Kelvin Campbell, Massive Small*

COLLEGE OF HUMANITIES

DECLARATION – PLAGIARISM

I,, declare that

The research reported in this thesis, except where otherwise indicated, is my original research.

This thesis has not been submitted for any degree or examination at any other university.

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DECLARATION

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. This document is submitted in partial fulfilment of the requirements for the degree of Masters in Architecture at the Faculty of Social Studies and the Built Environment, University of Kwa-Zulu Natal, Durban, South Africa. None of the work has been previously submitted for any degree or examination in any other University.

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DEDICATION

To my **Parents**, for allowing me the chance to chase my dreams, and always believing that I could do it.

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ABSTRACT

By 2030, 71% of the South African population will live in urban areas. Currently, 1 billion people worldwide live in informal settlements. Providing urban dwellers access to adequate housing is an immense challenge throughout the world and particularly in South Africa.

Cato Manor is one of the oldest informal settlements in Durban, and is home to 93 000 people. It is characterised by the resident's struggle to claim a Right to the City. Many people have settled here due to its proximity to the city.

In the South African context, the delivery and availability of housing remains a pressing issue. A long tradition of informal, self-built housing, or auto-construction has undoubtedly shaped the city, yet remains an unacknowledged resource in the strategy for housing.

In order to mitigate the socio-economic problems brought about by apartheid, and address the new constitutional right for all to have 'access to adequate housing,' the post-apartheid government implemented the Reconstruction and Development Programme to build and allocate houses.

The RDP project does not fully consider the needs of people, most of which experience financial instability and under-employment. Further the ever-growing backlog for RDP homes means that the average person is on the waiting list for 15-20 years.

Adequate housing entails the provision of more than just a house for residents in informal settlements. The incremental approach offers residents more flexibility, and an opportunity for their homes to grow with the family.

Through an exploration of the practice of auto-construction as a resource, the aim is to suggest a more holistic approach to housing, infrastructure and community networks in informal settlements. This is achieved by improving the quality, flexibility and satisfaction of living environments for residents of informal settlements.

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DEFINITION OF TERMS

AUTO-CONSTRUCTION: [noun]

1. The process of erecting one's own structure for occupation.

AUTO: word-forming element meaning 'self, one's own, by oneself.'

CONSTRUCTION: from Latin *constructus*, past participle of *construere* 'to heap up'

AUTONOMY: [noun]

1. from Greek *autonomia* 'independence, noun of quality from *autonomos*; 'independent, living by one's own laws'.
2. 'Not in accordance with the rules of formal'

INFORMAL SETTLEMENT: [noun]

1. An urban or peri-urban space in which housing has been erected, without official approval.
2. Residents of informal settlements have no legal claim to the land.
3. Erected housing is not in compliance with planning and building regulations

URBANISATION: [noun]

1. The process of transition from rural to urban society.

Urbanization reflects an increasing proportion of the population living in informal settlements defined as urban, due to migration.

DIALECTIC: [noun]

1. Of conversation, discourse

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ADEQUATE HOUSING:

1. Adequate housing is intended to encompass more than the structural requirements for housing. It fulfils psychological needs for privacy and personal space; physical needs for security and protection from inclement weather; and social needs for basic gathering points where important relationships are forged and nurtured.
2. Essential components of adequacy include:
 - Legal security of tenure
 - Availability of services, materials, facilities and infrastructure
 - Affordability
 - Habitability
 - Accessibility
 - Location
 - Cultural adequacy

RDP: [noun]

1. Reconstruction and Development Programme
2. Government subsidised housing

RDP IN-SITU UPGRADE: [noun]

1. Reconstruction and Development Programme carried out in existing informal settlements
2. Intending to upgrade existing informally constructed houses to meet RDP housing standards.

PROCESS: [verb]

1. a journey; continuation, development of progress

METHOD: [noun]

1. An orderly, regular way of doing things.

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CHAPTER 1.0

1.0

INTRODUCTION

This chapter contextualises the practice of auto-construction and sets out the exploration into the practice as a driver for an alternative housing strategy. The context in which this dissertation focuses is that of informal settlements. A critical evaluation of how residents shape their spaces to suit their needs will be undertaken, in an effort to produce a holistic architectural scheme in response to the challenges faced by many South Africans living in informal settlements.

1.1 RESEARCH BACKGROUND

1.1.1 INTRODUCTION

The phenomenon of our time is that of unprecedented Urbanisation. The modern city has been rapidly absorbing the world's population since the rise of modernisation and globalisation. This immense shift of the population from rural to urban entails a significant change in the very make up of our cities – be it political, social, physical or cultural identity. Statistics offer that the move towards cities is not stopping. In South Africa, it is projected that 71% of the population will live in urban areas by 2030 (UN Habitat, 2008)

With such a rapid rate of urbanisation, come grave implications for our cities. A great demand is placed on resources of land, water, sanitation, housing, transport, infrastructure and services. The city thus becomes a contentious site of extreme inequality. Particularly in Durban, as a result of apartheid planning, an increasingly wide gap emerges between occupants; some having access to such services and resources, whilst many do not have access to necessary services.

Spatial segregation imposed by the Apartheid planning still permeates the urban landscape of numerous South African cities. As urbanisation takes place, many urban migrants are forced to settle on the periphery of cities. As housing delivery becomes increasingly strained, and cannot meet the ever increasing demand with current policy, strategy and resources, urban migrants are forced into informal settlements and subjected to grossly inadequate services and access to infrastructure.

It is under these extreme conditions that the most creative solutions come to light. Residents of informal settlements make efficient use of scarce resources, practicing incremental development best as it is dictated by pragmatism. The everyday reality is that residents of informal settlements can only build when and as they can afford to. The development takes place in a way that is functional throughout the construction process. This means that the

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rest of the structure can still be used, as residents have no alternative living space during 'renovations.'

It must be acknowledged, especially in the South African context, that there is an extreme shortage of housing and associated services for the poor (Pithouse, 2008, UN Habitat, 2008). In order for the state to keep up with demand, a change in focus is required: shifting to an architecture that works within the constraints presented by the scarcity of resources, in the case of urban housing; land in the city and funding.

1.1.2 MOTIVATION / JUSTIFICATION FOR THE STUDY

In the South African context, the delivery and availability of housing remains a pressing issue for many. A long tradition of informal, self-built housing, or auto-construction has undoubtedly shaped the city, yet remains an unacknowledged resource in the strategy for housing. Current housing schemes force the urban poor to the periphery, reducing ease of access to the city, among other limitations. (Pithouse, 2008) Embracing the everyday practice of auto-construction and building on it may spur our cities on to becoming a fully inclusive space for urban innovation. Acknowledging a strong culture of informal place making may offer another means of addressing housing delivery within cities. (Malyam, 1996) This research seeks to explore the practice of auto-construction in informal settlements and its potential as a driver for an alternative strategy to 'housing'.

Current social housing models must be evaluated for their shortfalls in order to begin the journey towards a more successful and contextual response to the housing problem in Durban and many other parts of South Africa. Due to the extreme housing backlog, social housing schemes simply cannot facilitate the current numbers. Many housing schemes are located on the periphery of our cities, which sustains a great disadvantage to those located in these areas. Lower income earners cannot afford the extreme and expensive commute into the city from the periphery. The disproportionate amount of income spent on transport

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marginalises the already marginalised. There are fewer opportunities to earn an income for other family members in periphery rather than urban areas (Cross, 2001) Exploring the popular practice of auto-construction as an opportunity to mitigate the housing backlog is a necessary undertaking as it may provide for more efficient housing delivery.

As presented by Alejandro Aravena through his work with Elemental, it is imperative that architects challenge the current mindset towards social housing and be open to accept designs that subvert the status quo that produces architecture that will improve the everyday living conditions of residents in informal settlements (Aravena, 2014).

1.2 DEFINITION OF THE PROBLEM, AIMS AND OBJECTIVES

1.2.1 DEFINITION OF THE PROBLEM

During the apartheid regime, black South Africans were forced to the periphery of cities and engaged in the production of their own living environments in informal settlements. Post-Apartheid policy, and numerous redevelopment and redistribution programmes failed to make good on the right to access adequate housing for all, as stated by the new Constitution. Cities thus continued to perpetuate an exclusionary morphology, resulting in sustained spatial segregation. The consequent spatial inequality, rapid urbanisation and inadequate provision of affordable housing have contributed to the ever growing number of people forced into informal settlements under extreme conditions of insecurity and physical difficulty.

A top-down, bureaucratic approach to planning and housing fails to understand the fundamental aspects of the living situation of informal settlement residents, returning to an equivalent apartheid mentality of 'slum clearance.' The value of the informal settlements is entirely overlooked as a functioning community of resourceful and proud residents. Such settlements have been categorised as 'slums' that need to be 'eradicated,' with the displaced residents of such communities to be housed in government subsidy housing projects that are not congruent with the needs of residents. Shacks are viewed as a threat to the elite modernity of the South African city (Pithouse, 2010).

Housing projects that are implemented do not fully consider the needs of the residents for whom they are intended, most of whom experience financial instability and unemployment. Another common situation found in South African cities is that of complex social and familial circumstance, requiring a more flexible environment than the strict four person household. Many families require the option of adding to their space, be it for economic opportunity or simply to house larger or joint families.

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1.2.2 AIM

This dissertation aims to gain an understanding of both formal and informal methods and processes of housing currently used in the Cato Manor area of Durban. Researching more formalised housing schemes and their merits provides an understanding of how this can build upon the foundation of auto-construction to produce a scheme that lends itself to a more holistic and considered architectural outcome.

1.2.3 OBJECTIVES

The 'informal' is a part of every city (McGuirk, 2014). Since the emergence of modernisation and globalisation, the value of the informal practice, culture and existence has been afforded less importance with time; although the informal city continues to grow as a result of urbanisation. This dissertation seeks to acknowledge the existing culture of auto-construction in informal settlements by validating informal practice.

The provision of housing in South Africa is in a particularly stressed state, being unable to keep up with the extreme demand for housing. An objective of this dissertation, through evaluation of the existing situations, and exploration of the practice of auto-construction as a resource, is to suggest a possible aid to housing delivery by improving the quality, flexibility and satisfaction of living environments in informal settlements.

Addressing the problem of providing housing to an immense number of people, and aiming to make such housing sustainable in order to cope with rapid urbanisation requires a change of architectural approach. The objective is to suggest better quality, and more socially, culturally and physically sustainable housing by developing a framework that provides an opportunity for user participation during research and planning phases, and allows for physical incremental development by themselves.

1.3 SETTING OUT THE SCOPE

1.3.1 DELIMITATION OF THE RESEARCH PROBLEM

It is understood that every complexity of this research problem cannot be covered by this dissertation. The focus of this dissertation is that of development of auto-constructed housing in informal settlements through an architectural lens. It is beyond the scope of this research to thoroughly interrogate the legal rights and associated policies, acts and laws that affect the informal settlement resident. This research will be focused on a specific context; that of Cato Manor, and thus cannot be used to address a general area, or any solutions implemented on a national scale without the necessary research being conducted.

1.3.2 STATING THE ASSUMPTIONS

This dissertation assumes that there is an extreme shortage of land and provided housing projects in and within close proximity to the city. Further, that as a result of earlier apartheid city planning and subsequent land allocation, the land available for housing projects is on the periphery of the city. The already marginalised individuals, for whom this is the only option, do not want to live in periphery areas as it provides them with fewer economic and social opportunities.

1.3.3 KEY QUESTIONS

1.3.3.1 MAIN QUESTION

In an attempt to claim access to adequate housing the experiences and difficulties faced by residents of informal settlements must be understood. Such experiences entail the emergence into informal settlements, criteria for auto-construction of housing, conditions of housing and associated difficulties in claiming a space within the urban context.

What is the potential of auto-construction in the development of adequate housing in informal settlements?

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1.3.3.2 SECONDARY QUESTIONS

1. What are the spatial and physical requirements for housing in informal settlements?

This question aims to dissect the most essential needs of residents in informal settlements. This may include tenure security, adequate sanitation, electrification and so on.

2. How can users be integrated into the design and delivery of housing? This question

aims to integrate the users/residents into the design and planning process, and at a later stage, make use of their human capacity in order to allow for incremental development within a flexible framework.

3. What is the extent of auto-construction in informal settlements? This question aims to

understand the nature of auto-construction. This entails the interrogation of site selection, material selection, accommodation, building and current living conditions and satisfaction thereof. This also includes identification of the key elements that residents cannot build themselves.

1.4 THEORETICAL AND CONCEPTUAL FRAMEWORK

The theoretical and conceptual framework for this discussion will be discussed following the pattern of the overriding theory, supported by various concepts.

1.4.1 SUSTAINABILITY AND RESILIENCE

Addressing the issue of housing in a rapidly urbanising context cannot be undertaken without fully digesting and embracing the theory of sustainability. For the purposes of this dissertation, 'sustainability' cannot be merely discussed as a chapter within a broader collection of ideas. It is inherent to the practice of finding an alternative, lasting strategy and must be embodied in order to begin to cope with the rising pressure on our cities. The term 'sustainability' has been widely used to promote a range of ideas and subsequent connotations in recent discourse, losing some of its impact. For the purpose of this dissertation in the context of informal housing, the focus instead, will be on a single concept of the too-broad term 'sustainability,' which is 'resilience'.

A simple definition of resilience is being able to withstand difficult conditions. This is the aim of any architectural gesture that seeks to keep up with the exponential demand for housing in the city. The following theoretical framework cannot be developed without the concept of resilience in mind.

1.4.1.1 FLEXIBLE ARCHITECTURE

Flexible architecture is the physical manifestation of resilient cities. This theory is employed in an effort to extend the lifespan of the building. Designing and constructing a building that physically lasts, is ironically, sometimes not sustainable at all. True sustainability, and better yet; resilience, is achieved when people continue to use the building through changing needs, and means.

Conventional housing schemes deny the scope for extension or change at the hands of the user. However, people do modify their homes, albeit awkwardly or not easily. Resilience and

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flexibility go hand in hand: why build housing that becomes redundant so quickly? (Schneider & Till, 2007) In order to produce long-term housing, it must be designed with the ability to adjust over time, to accommodate changing needs and patterns.

To design a building form precisely for a function that is identified at a single period in time, does not allow inevitable growth and change over time. As needs change, the building is no longer able to fulfil the needs of the users because the changing function has not been accommodated for at the outset.

Many of the residents of informal settlements are faced with inconsistent financial and social situations. Catering for flexibility is therefore absolutely necessary to produce a scheme that is socially, financially and physically sustainable. The change in needs and patterns, along with the various forms of flexibility will be explored in depth throughout the following chapters.

1.4.2 RIGHT TO THE CITY AND SPATIAL JUSTICE

The theory of Right to the City in the context of informal settlements represents the resident's claim to urban land, and the right to participate in choosing and shaping their own living environments. The Right to the City defends one's citizenship, in both having access to the city, as well as an opportunity to exercise their citizenship. This theory will be explored fully in Chapter 2. In terms of exercising citizenship, the concept of Participation is introduced as the means by which one actively claims a Right to the City.

Spatial Justice is a theory entered around the physical aspect of justice and how this translates to how spaces are used, controlled and claimed. It is linked to Right to the City as it also engages with the exercise of one's rights and citizenship, but focuses only on the claim to physical spaces. This theory can be seen as the physical manifestation of the Right to the City. In the context of informal settlements, Spatial Justice is used to evaluate the just

or unjust distribution of urban land and resources, and the informal settlement residents' claim to them.

1.4.2.1 PARTICIPATION ARCHITECTURE

The above theories are concretised by the concept of Participation, as both the Right to the City and Spatial Justice cannot be claimed nor exercised without it.

The concept of 'participation' has taken various forms over the course of its popularity in planning and architecture. In this instance, the concept of 'participation' moves beyond the idea of consultation; be it superficial community interviews or unattainable ideals of the activist architect tailoring each unit for every family. In this instance, the real participation means allowing the user to make an on-going contribution to a space over time. The term 'user' in this case is the informal resident.

The purpose of this concept is to produce more meaningful and resilient architecture by allowing the scheme to change and adapt over time. Simply put, the aim is to make the architecture 'last-longer' by encouraging user development to fulfil the ever changing needs.

This form of participation challenges the role of the architect. It is not just the job of giving people what they want (sometimes we can't), but to show them what is possible. Habraken (1972) suggests that people should be involved in the process. He offers that the occupants' environment be capable of 'constant renewal,' thereby allowing character to develop and encouraging people to stay, rather than moving away due to having some stake or claim to a space they have contributed to.

Giancarlo De Carlo critiques the modernist tendency to reduce the role of the user to that of an 'abstract value', or an invisible consumer. He advocates rather for an architecture that is able to change with the transformations that the user imposes on it. (De Carlo in Schneider & Till, 2007)

1.4.3 INCREMENTAL DEVELOPMENT

Incremental development concretises the theory of participation, engineering the development to be 'completed' (for now) with a little help. The noble intention of incremental developments is to reach more people in need, and provide them with 'something', rather than providing 'everything' to a much smaller number of people.

Statistics of urbanisation in Africa, and supported by many contexts, such as Latin America who have already gone through their rapid urbanisation phase, support the fact that there is simply no way to address the demand for housing with the existing strategy and rate of supply of houses and associated services.

In an environment with scarce resources, the task is to make use of them to their fullest extent. This includes the most important resource for developing housing: human capacity. Previous methods for dealing with scarce resources were to either reduce the size of the house or to push housing projects onto the periphery, where land is cheaper. The first method effectively reduces the lifespan of the house as families cannot make do, and outgrow this space quickly. Periphery developments perpetuate social inequality and the exclusivity of the city (Harvey, 2003). The point here is that traditional models cannot do it all. Housing models throughout history have provided families with housing, but have often overlooked the complexities and nuances of what is needed to build a home, and a community. Sites and services programmes implemented in many parts of Latin America, provided for the other needs of families yet failed to provide adequate housing. Mass housing will be discussed in detail in Chapter 3.

Incrementalism (Elemental, 2016) shifts this focus onto what *can* be done with public money, and how to channel resources to produce what is needed but cannot be delivered. Elemental, a 'Do Tank' of social interest projects expresses the strategy of Incremental development as focussing on three key elements:

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- I. *Difficulty* – this element is centred around completing the more intensive, or ‘difficult’ parts of the scheme with sufficient design expertise, using public money, to ensure a quality product.
- II. *Collective action* – Aravena (2014) describes this concept best as ‘joining forces and splitting tasks’ with families. This entails the government funding coupled with design professionals engaging with the proposed residents to deliver the end product. In order to make more efficient use of scarce resources, the idea is that of employing user involvement as a resource to better the scheme.
- III. *Flexibility* – the intention behind this element of Incrementality is allowing schemes to grow over time due to user additions and alterations, essentially extending their ‘life span’ to better meet changing needs over time.

Here the possibility of improvement is facilitated by a framework that allows it to happen. The culture of auto-construction and self-improvement already exists, and will continue to take place in the informal city. The question is; how can we support and enable it? Incrementalism suggests we do this by channelling resources efficiently.

1.5 RESEARCH METHODS AND MATERIALS

1.5.1 RESEARCH METHODS

The approach towards the research for this dissertation is qualitative in nature and makes use of both primary and secondary data.

This research will make use of purposive, critical case sampling technique. The sample will focus on residents of the existing informal settlement in the Cato Crest area of Cato Manor. A sample size that is manageable and accommodates for any possible withdrawal of participants is selected, being approximately 12 people. This smaller sample size ensures a thorough exploration of information collected within the dissertation document. The approach towards auto-construction of individual housing units will be analysed. This is done by means of focus groups and interviews posed to the sample group of residents living in the selected informal settlement. Local businesses in the Cato Crest area were approached in order to gain access to residents living in informal settlements. Interviews were conducted with selected participants thereafter in groups of 3-4. I will ascertain who is actually responsible for the physical building, be it families or individuals (community builders) who do this as a job. Accessing organisations such as SDI (Slum Dwellers International) and ISN (Informal Settlement Network) can provide secondary data regarding informal settlement upgrading and the needs of members of informal settlements.

The second part of the research will deal with housing strategies: exploring housing schemes in the Cato Manor and specifically Cato Crest area. In order to do this, interviews with members of the eThekweni municipality dealing with housing projects will be conducted. These interviews aim to understand the motivation behind producing the housing schemes that have been implemented and those currently in the pipeline, how they aim to improve the housing situation and the perceived success and shortfalls of the schemes.

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An understanding of the more formalised housing schemes and their merits can aid in using the foundation of auto-construction to produce a scheme that has an architectural outcome. Investigating both the informal practice of auto-construction and the formal master planning/housing schemes allows a comparison of the consequent living conditions, aiding the development of a design strategy that aims to synthesise the two methods of 'housing' in order to produce a scheme that is both regulated to some extent but allows for incremental development and future expansion.

1.5.2 RESEARCH MATERIALS

The research being conducted is valid as it will be carried out in the current time period of 2016. Existing literature presents the concepts of Participatory Design (Albrecht, 1988) and Incremental Development (Habraken, 1972) as an effective tool at improving the design of housing. These concepts will be interrogated through the interview process.

The research aims to understand the everyday living conditions of residents of informal settlements in order to improve their everyday experience and right to housing. This will be done by gathering data and making observations of their behaviour and practices related to their living environment. Observations undertaken serve to support information gained through interviews and serve as a method of verifying the information and ensuring reliability.

The outcome of the research will be reliable as every effort will be made to ensure the integrity of the data is maintained throughout collection and analysis. Focus groups and interviews will be conducted in an open, unbiased manner free from coaxing subjects to give a particular response. Every effort will be made to maintain rigour throughout the research process. All research will be conducted in an ethical manner; all sources will be referenced, and anonymity of participants ensured where necessary.

CHAPTER 2.0

2.0

LITERATURE REVIEW:

THE INFORMAL CITY

The informal city is a phenomenon that has existed since the beginning of cities themselves, but has long remained hidden and thus unacknowledged as a fully functioning, and contributing part of the city system. Informality has grown exponentially as cities continue to expand, as a result of rapid urbanisation, with people arriving in cities without infrastructure to absorb them. As a result, a large proportion of the urban population live informally.

This chapter deals with the Informal City and its contributions and intersections with the formal city as we know it. Throughout this chapter, theories and concepts around informality and their potential as a resource will be interrogated.

Three components of the Informal City will be explored in this chapter:

- i) The Right to the City
- ii) Spatial justice and
- iii) Acknowledging Informality

2.1 RIGHT TO THE CITY

Introduction

The Right to the City was coined by French sociologist and philosopher Henri Lefebvre. It resurfaced in the discussion among political activists and academics in the debate of urban matters (Plyushteva, 2009). The initial concept gained popularity during its time in 1968 as it coincided with an historic protest in Paris. Lefebvre's use of the phrase is distinctly vague, its ambiguity giving rise to many interpretations supporting various causes.

This chapter sets out to explore what constitutes the Right to the City and how it can be understood in today's context. This will be discussed with particular reference to the South African housing situation in informal settlements in Durban. A comparison will be made against the Latin American situation where similar movements have taken place.

The aim is to make the connection between critical urban theory and practice, deliberating ways of implementing a realistic improvement in the struggle for the Right to the City through the process of auto-construction in informal settlements

Due to the many interpretations of Right to the City, overlaps exist in realm of urban issues, one of the more pertinent being Spatial Justice, which will be discussed in the following section. Through the lens of human rights within an urban context, why the Right to the City is significant to the contemporary fight for social and spatial justice will be explored.

Through the critical review of the struggle for a Right to the City by shack dwellers in Durban and the comparison to the Latin American situation, the ultimate goal is to propose a way forward for urban planning and housing, where a more equal Right to the City can be achieved.

Consequent Interpretations of Lefebvre's Right to the City

Mark Purcell (2003) links the concept of *Right to the City* fundamentally with that of citizenship. With respect to today's context he questions the effectiveness of the traditional idea of citizenship where socio-political process is influenced to a large extent by corporates as a result of globalisation. This implies that one's *Right to the City* must be implemented in a direct way, exercising the inherent right to configure the urban space in a variety of forms.

David Harvey rejects the idea of exercising the *Right to the City* in the form of codified legal practice, rather interpreting it and packaging it in a political approach (Harvey, 2008). He presents the notion of a transformed and renewed right to an urban life where every citizen has equal access:

"The Right to the City is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. (...) The freedom to make and remake our cities and ourselves is, I want to argue, one of the most precious yet most neglected of our human rights."

(Harvey, 2008:23)

Anna Plyushteva describes a statement such as Harvey's as presenting a 'real danger' of venturing into 'an intellectual wasteland of meaning everything to everybody' (Plyushteva, 2009). A similar fate has met the debate of topics such as development, well-being and globalisation, where the merits of the model can no longer be used in a practical sense as it is afflicted with intense emotional connotation and manipulation.

Within specific contexts, prevalent issues regarding the physical and social conditions within the urban fabric become relevant in order to assess the state of the *Right to the City*. James Holston (2008) researches the insurgence of democratic citizenship within an urban context.

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A changing paradigm is presented where the rights of the citizen are the point of focus rather than satisfying the needs of the poor, resulting in a more valuable opportunity for discourse. Here he explores urban poverty and segregation, focusing on the transition from needs-based to rights-based discourse in his work on changing notions of citizenship in Brazil. Based on marginalised areas in urban peripheries, he substantiates the relevance of citizenship on issues such as invasions, land tenure, legal conflict and 'auto-construction.'

Holston engages with the notion of urban citizenship on a social and spatial level, describing how the *Right to the City* evolves naturally through a practice such as auto-construction which paradoxically emerged out of a lack of dignity. He explains that being involved in the physical construction of the city itself, instilled inhabitants of the peripheral areas with a sense of pride and urban citizenship of the city. This is an example of exercising the right to change and proactively exercising the rights to one's citizenship, which he terms 'insurgent citizenship' (Holston, 2008).

The *Right to the City* essentially defends two elements of citizenship: the ability of every individual to access the city and the exercising of this citizenship by participating in the decisions that shape the nature of the city. Edésio *Fernandes (2007) echoes this attitude, stating that the Right to the City [consists] of the right of all city dwellers to fully enjoy urban life with all of its services and advantages – the right to habitation – as well as taking direct part in the management of cities – the right to participation. Purcell (2003) advocates for the access of equal rights, asserting that failure to do so results in individuals with power shaping the city for their own advantage, perpetuating the oppression and isolation of the already marginalised.*

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Contextualising the informal settlement in the urban struggle

In the South African context, the issue of informal housing has long been contested and is fundamentally linked with the concept of *Right to the City*. During the apartheid regime, blacks were forced to the peripheries of the cities where they engaged with the production of their own living conditions by building their own dwellings in circumstances of segregation and deprivation. As part of an example of how the *Right to the City* has been interpreted, implemented and subsequently lived, Plyushteva (2009) states that; the presence, auto-construction and collective action of slum dwellers has undoubtedly shaped the South African city, even in today's context. This struggle may be viewed as a fight over space, but further evolves into a struggle for social and spatial justice through the act of auto-construction of informal settlements.

The Shack Dwellers' Movement in Durban

Abahlali baseMjondolo is a movement that emerged in Durban in 2005 as a result of the contention between residents of the informal settlements and local government. Translated directly from Zulu, it means 'people who live in shacks.' (Spatial Agency, 2015) They seek to empower residents to exercise spatial justice and their *Right to the City*. As a grassroots organisation they advocate for the betterment of living conditions of the urban poor. Abahlali baseMjondolo campaigns for essential basic service delivery and the right to housing in the city. They have protested against the sale of vacant land that was promised to residents of informal settlements and identify as advocates for self-action, in this case defending the right to practice auto-construction.

Richard Pithouse, in the paper *Abahlali baseMjondolo & the Popular Struggle for the Right to the City in Durban, South Africa* (2010) deals with the history of squatters in Durban and their attempts at exercising their citizenship. After the abolition of apartheid, the right to housing was protected by the Constitution, as were laws passed for the protection of

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squatters against eviction. Housing policies were developed on the basis of subsidies per household in an effort to implement the new right to housing. The translation to the technicalities of building houses and the actual housing of South Africans, however presented a much more complex challenge. Housing projects soon became used for the personal and political interest of local powers, delivering a poor product that did not meet the needs of the intended recipients.

Other methods of improving housing conditions were attempted, such as the *Breaking New Ground* policy which aimed to integrate the existing settlements into the broader urban fabric. Through a phased upgrade from the 'in-situ' approach, the intention was to redress spatial, social and economic exclusion of these periphery settlements from the city. This received no political support and was never implemented (Pithouse, 2010).

This top-down, bureaucratic approach failed to understand the fundamental aspects of the situation of informal settlement residents, returning to an equivalent apartheid tactics of 'slum clearance' in order to build as new. The value of the informal settlements is entirely overlooked as a functioning community of resourceful and proud residents (Pithouse, 2010). Such settlements have been categorised as 'slums' that need to be 'eradicated,' with the displaced residents of such communities to be housed in government subsidy housing projects that are often incongruent with family situations. Many models are based on the 'ideal' western concept of the nuclear family comprising of 2 parents and 2,5 children.

In order to eradicate shack settlements, three strategies are employed: the first being the limiting and removal of basic services such as water, electricity and refuse removal whereby conditions in the settlement areas become unliveable in an attempt to get residents to 'voluntarily' move out. The second method is that of surveillance and police intimidation to prevent the growth of settlement areas. The third method is that of physically destroying established settlements. This destruction is followed by some previous settlement residents

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being allocated houses in peripheral developments, displacement of residents to state built shacks, termed 'transit camps' whilst many are left homeless. Mahendra Chetty, of the Legal Resource Centre states that the actions of the city are in 'flagrant breach' of the law. He notes that these evictions are committed in a callous and authoritarian manner on the most vulnerable members of our society.

Such actions by the government have been met with resistance by informal settlement residents in an attempt to be recognised and exercise their right to make their own decisions about where and how they would like to live. Many protesters have demanded the choice to remain in their centrally located informal settlements rather than be moved to housing projects on the periphery. This illustrates an exercise of the *Right to the City*, where housing is a need that cannot be restricted to formal state controlled efforts. Further the protestors demand recognition of grassroots urban planning by the state. This is echoed in the sentiments of the *Abahlali baseMjondolo* spokesperson, S'bu Zikode:

"[T]he time has come for poor people all over the world to define themselves, before someone else defines them, before someone else thinks for them, and acts for them. Do not allow others to define you. I'm pleading to intellectuals and NGOs to give us a chance to have a platform for our own creativity, for our own politics. Our politics is not a politics that originates from institutions of higher learning. It originates from our lives and from our experiences..."

The journal article *A Politics of the Poor - Shack Dwellers' Struggles in Durban*, (2008) by Richard Pithouse dissects the history of informal settlements in Durban since their emergence in Colonial times to present day. He states that informal settlements present an ambiguity in that they possess a sense of political and cultural freedom due to the proximity to the city, a certain brand of cosmopolitanism and independence from the state and are their own authority on the enforcing of 'tradition'. Malyam (1996) states that informal

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settlements are a 'place in Durban where families could breathe the air of freedom.' Conversely, the absence of the state in the creation of living environment subsequently means an absence of services such as electricity, water, sanitation, storm water drainage, roads, refuse removal and other necessary amenities.

The Latin American Paradigm

Justin McGuirk explores an architectural alternative to the housing crisis in Latin America in the text *Radical Cities: Across Latin America in Search of a New Architecture* (2014). The Latin American example is particularly pertinent to the South African context as we share a similar socio-economic climate as well as affinity for the practice of auto-construction in informal settlements or favelas and loteamentos (Hernandez, 2010).

In both contexts, private markets cannot meet the intense demand for affordable housing. Governments' lack of empathy towards the urban poor has sustained the austere attitude to housing and has left the validity of informal practice unacknowledged (McGuirk, 2014). He asserts that empathetic understanding of living conditions and needs in the urban context is essential to the mediation of the housing problem. The approach he advocates for is that of a collective grassroots action (much like Abahlali baseMjondolo) which will inspire a housing reform, both in practice and policy.

This paradigm shift occurred in Latin America as a result of a social reform where the political status quo regarding housing was rejected and residents from the socialist paradigm moved together as an active community without government support (Hernandez, 2010; McGuirk, 2014). Here communities displayed a direct democratic control over resources, engaging in the movement of creating their own environments and actively contributing to shared space. The exercising of Right to the City is clearly observed in this example of demonstrating subversive grassroots based architectural practice of auto-construction.

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Auto-construction is the physical manifestation of the Right to the City as it exemplifies the right to participate in the creation of one's own living conditions. These concepts are intrinsically linked to that of Spatial Justice by concretising the social movement into a physical act of resistance and insurgency.

2.2 SPATIAL JUSTICE

Spatial Justice is a term coined by Edward Soja, an urbanist and spatial theorist. In the most basic form, Spatial Justice centers on the spatial, or geographic aspect of justice or injustice. In the context of informality, as the focus of this dissertation, we look deeper into the Spatial Justice as the fair and equitable distribution in space of socially valued resources and the opportunity to use them (Soja, 2008).

Until recently, the physical manifestation of democracy, or as Soja terms it 'spatiality' was either overlooked or absorbed by related concepts of justice, but has never been the focus. Spatial justice is important as it is a valuable indicator of the status quo and offers an opportunity for critical empirical analysis to take place.

The aim of specific focus on the spatial aspect of justice moves beyond a theoretical understanding but can be further explored and used to achieve greater spatial democracy on a practical level. Exploration of this concept is essential to evaluating the context of informal settlements, where an element of both spatial justice and injustice is evident.

The understanding of space in this context is that of 'space as a container or stage for human activity' (Soja, 2008:2).

Here spatial justice is viewed as the physical manifestation of Lefebvre's Right to the City, where a prevailing connection exists to the concepts of social and spatial justice in the majority of literature on this subject. Harvey introduces the idea in *Social Justice and the City* (1973:86) where he poses the question:

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“Is there some spatial structure or set of structures which will maximize equity and efficiency in the urban system or, at least, maximize our ability to control the powerful hidden mechanisms which bring about redistribution? This is both a normative and a positive question for it suggests that we can explain current distributional effects by looking at existing spatial structures and also devise spatial structures to achieve a given distributional goal.”

Harvey here presents the notion of a ‘solution’ to the issue of social inequality in the city through the process of *redistribution*. He questions the existence and subsequent implementation of a [set of] structure(s) that may aid in equity within the city. The term ‘equity’ is specifically used here by Harvey rather than the term ‘equality’. This implies that he recognises an existing incongruity between the participants of the city. Equity here intends to remedy the inequality by giving *more* to those that are in *greater* need, rather than issuing an *equal* subsidy to all participants of the city, which does not mediate any of the discrepancy.

Social justice is exercised in that the previously excluded urban dwellers are able to live more humanely and have the opportunity to claim their right to their city through occupation of urban space. This impacts on the very nature of the urban fabric as it is altered and obligated to acknowledge the less formal practice that Malyam (1996) romanticises about as inherent to the city narrative.

Spatial justice is exercised in allowing unusable and unclaimed land to be fully utilised. This can be observed by the steep inclines on which *favelas* are built in Brazil (Hernandez, 2010) and the equally steep and undesirable terrain of the Kennedy Road settlement in Durban sandwiched between the dump site and large commercial buildings of Springfield. (Pithouse, 2008)

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The concept of making use of unclaimed land can be carried forward in that land that is too steep to be parcelled or other undeveloped municipal land be open to allow informal residents to build their homes. If housing supply cannot meet the demand within the narrow time frame, allowing underutilised land provides people with some of the much needed resources to fulfil their right to access adequate housing.

Further, the use of this land actively reduces urban sprawl, something that large periphery housing projects perpetuate. This concept can further be explained through the German term 'instandbesetzen,' rooted in two parts; 'instandsetzen' meaning 'to put in order' and 'besetzen' meaning to possess or occupy. This represents the ethical codex of improving a space through use. An active user, or resident in this case, is permitted use of the space (land) provided they make a positive contribution to it. (Gabrielsson 2005).

McGuirk refers to the example of Tupac Amaru, a social movement in Northern Argentina that engages with auto-construction: building social housing around a large swimming pool.

“Swimming pools are a relatively cheap way of making poor people feel rich...

*You can't put a price on the impact this swimming pool
has on a community's outlook.”*

McGuirk (2014:64)

This sentiment illustrates the sense of ownership and community spirit that is engendered in developments where residents have a say in the creation of their environments which is starkly contrasted by the austere temperament of peripheral social housing.

The approach that ordinary people take control over their city is followed by the notion that social structures are of primary importance, followed by the physical buildings themselves as secondary products of the community (McGuirk, 2014; Hatherley 2014).

2.3 ACKNOWLEDGING INFORMALITY

In the 1960's, architect John Turner presented the provocative idea of embracing informality and allowing it to happen. Studying how the poor manage to house themselves in the *barriadas* (informal settlements) of Lima, he wrote in the 1963 issue of Architectural Digest as representing 'the promise of things to come' (McGuirk, 2014). This study was undertaken in the context of a rapidly urbanising Latin America, where government housing projects were battling to keep up with the pace and scale of urbanisation.

Turner put forward the controversial view that the poor were better at satisfying their own need for housing, than waiting for the state to deliver it to them. It was evident that the state could not meet the demand, nor did they have the budget to provide housing for all (McGuirk, 2014). While asserting that governments' efforts were essentially a waste of time, Turner lauded the *barriadas* as the most fitting solution to date, that anyone had come up with in response to the problem of rapid urbanisation and the shortage of housing.

He presented the contrast between the 'supportive shack' in the city and the 'oppressive house' on the periphery of the city. The former, Turner argued, was better for an urban migrant, as they were closer to employment opportunity, and could save money on transport. Being located in a housing project on the periphery, however, entailed a much longer commute, meaning greater cost which would be imposed at the same time as residents would have to start paying for a household.

Turner, in his later writings, explored the dichotomy of autonomy and heteronomy, in this context; the self-determination of auto-construction and government controlled housing. Housing was interrogated from the perspective of the *barriadas'* informality rather than the formal, state approved view. He placed importance on how the unit served resident's needs rather than how it looked, if it was in sufficient proximity to amenities and opportunities and perhaps most importantly, whether it kept costs at a minimum.

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Jota Samper (2012) challenges the misconceptions of urban informality in the paper *Toward an Epistemology of the form of the Informal City: Mapping the process of informal city making*. He advocates that change must come from a systemic level in the form of perception of the informal city. He states that the network of informality must be studied from the perspective of the informal in order to understand them fully. Evaluating the systems that govern the informal city in terms of standards used in the formal city renders most aspects of informality 'grossly inefficient.' Regarding housing, he supports the philosophy of incremental development, outlining the case of its economic logic in terms of housing for the poor.

In terms of intervention in the space of the informal settlement, he states that the primary instrument in improving housing is tenure security. A multi-practice approach is favoured (Riley, Fiori & Ramirez, 2001) as is the goal for institutional reform, in-situ upgrading, tenure legalisation, and physical public infrastructure interventions.

Towards better practice, Samper offers accepting the phenomenon of informality as it is, and focussing on improving the liveability through an adaptive strategy that follows the logic of an evolving environment within an informal settlement.

Alejandro Aravena (2014) speaking from a similar Latin American context, which experiences a later stage of the urbanisation phenomenon, supports Turner. He urges city designers and planners to look to the 'problem' areas – informal settlements and slums themselves, for a solution as these are spaces of creativity, ingenuity and the most efficient users of resources.

Rahul Mehrotra in the forward to the text *Rethinking the Informal City* (Hernández, Kellett & Allen, 2010) echoes this sentiment, referencing the ability of the informal city resident to invent spaces, stretch the use of materials beyond the norm, establish networks and essentially 'extend the margins of the urban system' under extreme constraints. (Mehrotra in Hernández, Kellett & Allen, 2010). Further he dissects the work of Saskia Sassen, who also

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offers that the most meaningful production in a city often takes place in the informal city. The suggestion here is that we need to tap into the local logic and make use of the ingenuity and creativity of the marginalised urban poor that have very little, but manage to provide themselves with basic shelter.

McGuirk (2014) offers that informality *is* the city, that the informal tips the scales in its favour in terms of tangible built form, delivering more houses than governments and developers can. He suggests accepting the informal as the 'primary' condition rather than an 'aberration' that can be mitigated. Further, he categorically states that the Latin American example can be instructive in the improvement of the global housing situation and key to the urban struggle for the city of residents that engage in informal practice;

“Accepting the informal city as an unavoidable feature of the urban condition, and not as a city-in-waiting, is the key lesson that this generation of Latin American architecture can offer the world.”

(McGuirk, 2014:26)

Owen Hatherley, in critical review of Justin McGuirk's *Radical Cities* supports learning from informality as McGuirk does, applying these lessons in the 'rich' world context, leaving behind the top-down state projects which he categorises as a 'failure' (Hatherley, 2014).

Regarding the informal as a form of 'innovative urbanism' can be used to reframe the debate around the autonomous action of auto-constructed housing, using the phenomenon of urbanisation and consequent informality as the tool with which we (re)build (physically), and humanise (socially) the ever growing urban realm.

Informality and auto-construction, however presents various problems and limitations both socially and physically. This will be interrogated in the case studies and findings chapter.

CHAPTER 3.0

3.0

AN ALTERNATIVE TO MASS HOUSING

Housing has often been viewed statistically, particularly by governments as a commodity to be delivered. From a bureaucratic point of view, there is little to fault about this attitude. From a social perspective, however, this is problematic, and has contributed to many heartless mass housing schemes that have served numbers rather than people.

Now, more than ever it is necessary to re-evaluate the paradigm from which we approach a need such as housing. Rather than the traditional approach, the architect is challenged to rather look at housing as the creation of living environments that cater to the fundamental needs of people beyond that of basic shelter (Lees, 1990).

In this chapter, 'mass housing' is dissected. As a result of rapid urbanisation, the focus of housing was forced to shift to housing as many people as possible. In the context of this chapter 'mass housing' refers to developments geared at 'the masses' and intended to house a very large number of people.

Focussing on community based architecture, the concern is that with the emphasis on process and politics, the product – the physical architecture - is often overlooked. Community architecture and a clear architectural outcome will be explored throughout the chapter as key housing models through history are analysed.

With architecture as the subject of this dissertation and intended outcome of the research, it is important to challenge or redefine the role of the architect.

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The role of an architect goes beyond merely giving people what they want, which is how some developer driven 'community' projects are marketed. An architect's role is to interpret people's needs into a physical form that improves their environment on various levels. This extends to offering communities opportunities and showing them a new possibility beyond their expectation. The intention of such projects is to mediate the architect's vision with individual expression in order to achieve a solution that offers balance and essentially the best of both worlds in terms of design expertise and identification of needs by communities.

3.1 MASS HOUSING

Dissecting the history of state sponsored mass housing projects, various successes and shortcomings will be highlighted in the following housing projects. More important than the building form or scheme, these projects represent a particular zeitgeist, or thinking of the time for social architecture.

For many modernist housing schemes, the physical structures were of primary importance as the schemes were driven by numbers in order to address massive shortages. Little or no concern was afforded to the social implications of such spatial (re)ordering.

However, experimental housing projects that offered a different outlook to the 'mass housing' schemes of the time were also undertaken. One example of such, PREVI, will be discussed. Such experimental projects offer an insight into the value of residential involvement. Latin America in this instance, offers somewhat of a 'testing ground' to developing countries currently experiencing urbanisation as it hosted a variety of housing models, from mass housing, to sites and services projects and almost everything in between.

Mass housing is contrasted by a shifting paradigm of 'activist architecture' (McGuirk, 2014) which focuses on social structures being the impetus for design, followed by the physical buildings as a product. This outlook will be explored later in this chapter.

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Pedregulho Housing | Rio de Janeiro , 1952 - Affonso Reidy

The Pedregulho housing development was a unique scheme in that it offered a range of activity beyond that of housing, marketed as an all-inclusive ‘living’ space. Reidy’s design exemplified Modern Brazilian architecture of its time with its typical curves and strong material expression. It was intended to be progressive, yet be warm and inviting; more luxurious than other social housing schemes with panoramic views, and swimming pool. (McGuirk,2014). It upholds the famous design principles of Le Corbusier, making use of the free plan, pilotis, and a free façade. (Lim, Marett & Wong, 2015)



*Figure 1: Free plan and pilotis
Image source: ArchDaily*



*Figure 2: Curved shape of Pedregulho Housing
Image source: Centre for the Aesthetic Revolution.*

The intended residents were low income government workers, whose salaries were too low to afford standard city living in apartments. Pedregulho embodied the ideal of ‘upliftment’ in a time of political and social change, both physically and symbolically. Responding to the prominent topography of Rio de Janeiro, Reidy makes use of pilotis to raise the building over the landscape, looking over the city. Symbolically, the scheme aimed to uplift inhabitants by offering the total package of what ‘living’ entailed beyond mere accommodation. (Lim, Marett & Wong, 2015, McGuirk, 2014) It began as social housing, but currently it is unclear whether the state or city owns the land and has fallen into disrepair.

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At 260 meters long, the building accommodates 272 housing units of various sizes, with 68 units per floor. Two smaller apartment buildings, at 80m long sit below the main building. The Pedregulho housing development covers an area of 50 000m², comprising the four apartment blocks, a gym, health centre, playground, Laundromat, day-care facility, elementary school and a swimming pool.

The characteristic serpentine form of the building can be attributed to Le Corbusier's 1929 urban plan for Rio De Janeiro which entailed a highway over a series of curved residential buildings. (De La Barra, 2009)

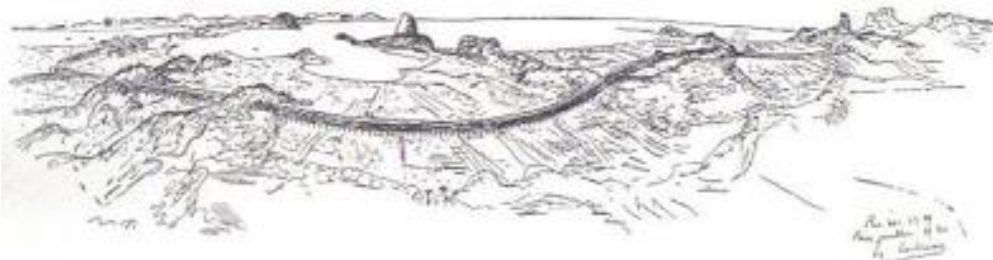


Figure 3: Urban Plan for Rio de Janeiro, Le Corbusier 1929
Image source: Centre for the Aesthetic Revolution.

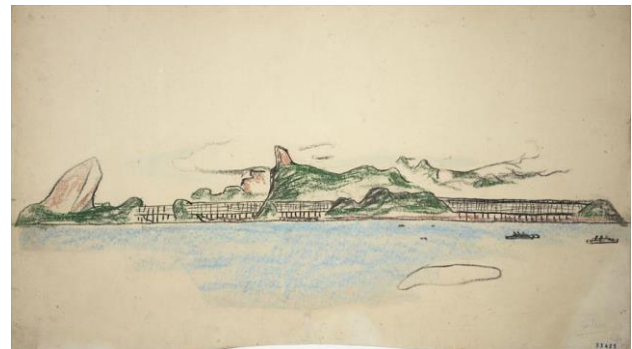


Fig 4: Urban Plans for Rio de Janeiro, Le Corbusier 1929
Image source: Fondation Le Corbusier

Pedregulho now stands in a state of disrepair as a result of both government and user neglect. Residents' needs were not fully considered through the design and implementation of Pedregulho, as it was designed as a mass housing scheme which focused on housing a

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number of people in dense living environments. No sense of ownership was felt by residents as they could not connect to the building on a social level.

A clue into the misunderstanding of the end user was the deliberate elimination of wash troughs and the assumption that the Laundromat and free 2kg of laundry detergent a year would be adopted as the preferred system. The intention was that this facility would both save the women time and prevent clothing from being hung from the windows. What was not considered was that the women liked to wash clothing together as allowed them time to socialise over a common activity. This resulted in the women using the swimming pool to launder their clothing. (Lim, Marett & Wong, 2015)

More than an anecdote, this is a lesson in the role of the architect. Overlooking the nuanced social values and practices of the user and focusing on only selected information can be detrimental to both the success of the project (cost) and users' quality of life.

Further, it brings to light the issue of architects' attempts to impose upper middle class values and practices onto the working-class. Assuming the people's aspiration for washing machines and saving time disregards the existing culture, desires and values.

By the early 1970s, modernist housing schemes were losing traction and being widely discredited across America and Europe as critics noted their failures to meet the needs of their users. Architects such as John Turner offered a new way of thinking about informality, which was gaining popularity. Charles Jencks famously pinpointed the moment Modernism died with the demolition of the infamous Pruitt-Igoe scheme in St Louis Missouri in 1972. McGuirk (2014) argues that the end of the modernist ideal came even earlier, with the proposal of the PREVI housing scheme in 1968. Along with the end of architects' power as the chief authority of city-making.

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PREVI , 1968

During the 1960s, Lima experienced extreme urban population growth that government housing schemes could not absorb. The result was residents engaging in auto-constructed housing in *barriadas*. The informal still today accounts for approximately 70% of the city. (McGuirk, 2014)

The Proyecto Experimental de Vivienda (PREVI) was initiated in 1968 by the Peruvian president with support from the United Nations. It aimed to respond to the growing problem of rapid urbanisation and resultant *barriadas*. It hoped to improve the lives of inhabitants through modern design and ‘regeneration’. Further, it was an attempt to reconcile informal growth and top-down planning which was beginning to fail across the globe.

This was a different kind of proposal, stepping away from the megablock and offering an ‘intelligent’ scheme of individual homes that families could later expand as they grew, something no tower block can offer. (McGuirk, 2014 pg 9) PREVI offered users ownership, another point of difference compared to other housing schemes of this size.

This idea was born from John Turner’s research of the *barriadas*. He viewed these spaces not as toxic slums to be eradicated but rather as ‘creative and efficient solutions to the needs of the poor.’ (McGuirk, 2014) Turner was against the strategy of forcing the poor to the periphery, further away from their jobs and burdened with unaffordable rents. Turner controversially stated that it was advantageous for the poor to build their own homes; that they were literally better off doing so.

In 1963, he wrote ‘No government – however wealthy, as the Venezuelan “superblock” project shows – can possibly finance more than a small proportion of the total demand for housing.’ Turner concludes his study on the *barriadas* with the slum as a solution, not the problem. (McGuirk, 2014)

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PREVI acknowledged his standpoint, and the project was an attempt to mediate the situation with a 'hybrid' solution, of modernism and slum. This would be articulated by a framework of solid architecture, designed to be expanded.

A design competition chose thirteen 'radical', 'avant-garde' architects from around the globe that were seen as experts in social housing who teamed up with 13 Peruvian architects to design the experimental project. The dream team included the Japanese Metabolists, English architect James Stirling, Charles Correa from India, USA's Christopher Alexander, Aldo van Eyck and many others. (Ramis, 2012)

The brief was based on a set of experimental principles:

1. Design based on the high-density, low-rise concept, and model for future urban expansion.
2. A growing house concept, with courtyard.
3. Configurations of housing clusters within the neighbourhood master plan.
4. Human-scale pedestrian environment in the neighbourhood.
5. Improved and new construction methods with earthquake resistance.
6. Neighbourhood landscape plan.

The popular solutions to mass housing of the time, the tower and Megablock, exemplified by Pruitt-Igoe, and Corb's Villa Radieuse, were singularly inflexible, and simply could not be built cheaply or fast enough to cope with demand. Meanwhile, *barriadas* were beginning to be viewed in a different light, recognised for their ingenuity and approach to the problem.

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Fig. 5: Model of Villa Radieuse, Le Corbusier, 1924
Image source: ArchDaily via Land 8



Fig. 6: Pruitt Igoe Housing, 1954
Image source: Brettman/Corbis for The Guardian

The schemes for PREVI were designed as a 'platform for change', an unprecedented combination of modernism and auto-construction from the slums. As a framework for expansion, a key element from the *barriadas* was preserved; that a house is a process and not an object. (McGuirk, 2014 pp 75)

Phase 1 consisted of 467 houses over 12 hectares. These were arranged in clusters of around 20 units or 'neighbourhoods', divided by streets. From the basic urban unit, a square block comprised of 4 houses with a courtyard, the outcome is almost unrecognisable as the original design. The space for expansion was to be upwards, retaining the courtyard.

Designed for gradual adaptation to families changing needs over time, alteration was anticipated in the original design, but close to 40 years on, inhabitants have transformed the units radically, both programmatically and visually. (Ramis, 2012). McGuirk (2014) describes the original designs as almost unrecognisable, a tell-tale architectural element such as James Stirling's PoMo porthole window giving away the architect to the trained eye. The original houses are 'encrusted' with balconies, additional floors, external staircases, and many decorative elements— gables, facades, tiles and paint. The dramatic changes of PREVI reflect a dynamic and cohesive community that is of extreme relevance today in the context of a housing crisis.

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Phase 2 was never realised. In the end, with 24 different designs and construction, PREVI was forgotten as an experiment; too diverse to be replicated. Deemed a failure by unrealised economies of scale (phase 2 was intended to roll out thousands of units), it is not without its lessons. The opportunity for expansion and change provided families with pride and a chance to realise aspirations. The success of PREVI was that residents did not move out with the improvement of their financial situations, but rather turned social housing into a community.

PREVI, was not a monotonous exercise in numbers, and perhaps that was its downfall. It marked a shift away from the dogmatic approach so synonymous with Modernism, and celebrated the informality of the *barriadas* through user defined transformation. Although seen as one of the great ‘almost-moments’ of twentieth century architecture, as McGuirk terms it, the lessons learnt are more valuable today than ever before.



Original architects: Clockwise from top left:
Charles Correa, Maki and Kurokawa, James Stirling,
unknown

Figure 7: PREVI housing as it stands after user
alterations and additions
Image source: domus

3.2 A CHANGING PARADIGM

John Turner after his work in Peru presented the unpopular perspective that the *barriadas* were a phenomenon to be celebrated. He argued that governments were wasting their time in their efforts to provide housing to rapidly urbanising cities, tokens in the face of a much larger scale housing crisis. He presented the notorious *barriadas*, as the most effective solution yet to the problem of urbanisation.

Turner was opposed to industrialised, standardised housing, which he described as socially alienating and 'technically incompetent' architecture, the kind proliferating by housing estates of the time. He evaluated the need for housing from a different point of view. He proved that a shack in the city was more beneficial to its inhabitants than living in a peripheral housing estate. He evaluated this position not as a question of preference, but that of logic; the poor in peripheral housing projects had to spend more to gain access to jobs and opportunities in the city, while simultaneously having to spend more on their homes.

Turner's reasoning considered both the micro-economic and macro-economic position. If governments cannot keep up with the demands of a rapidly urbanising population nor could they do anything to quell the demand for land or housing, they have no choice but to support actions of self-reliance by communities and the practice of auto-construction.

Turner puts forward that the greatest issue of our time boils down to a choice between autonomy and heteronomy – between relying on one's self, or relying on the government to provide. He famously stated that 'housing is a verb,' implying that the how a house satisfies the needs of its occupant is much more important than the way it looks. Satisfying the needs of the poor moves beyond the immediate physical qualities of the house; including such as location and access to opportunities. The way that Turner illustrates this juxtaposition is by comparing the 'supportive shack' vs. the 'oppressive house.' Turner asserts that the

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combined resources of the poor are far greater than that of the government. Rather than being given houses, what the poor really require is assistance with a method of distributing their resources and skills in a way that better serves them, rather than favouring a housing methodology that is easier for the government to implement and manage (McGuirk, 2014).

3.3 OPEN BUILDING

Open building is a concept developed by Dutch architect and theorist NJ Habraken. His contributions to the field of mass housing are centred around the integration of residents and users into the design process. Open building supports the conceptual framework of the participatory process and provides a spatial example of participation architecture.

Open building offers one of the earliest examples of designing for user participation. It is relevant to the discussion of auto-construction as it represents the integration of both top-down and bottom-up approaches to mass housing, which will be discussed further in this section.

Habraken introduces Open building as a concept that does not offer a precise definition, but rather a method aimed at providing long-term flexibility in response to a continually changing environment. *Supports: An Alternative to Mass Housing* (1972) presents the changing paradigm of a people driven process from a spatial perspective. This outlook is in contrast to some discussed in the critiques of mass housing that focused on numbers rather than people.

Social situations often change as families and people move through different phases of life. Habraken acknowledges the more particular and subjective aspect of providing housing in his concept. Social sustainability is a vital component of this approach, placing emphasis on the development of the community and local economy in an effort to establish stability. The incentive to improve and take care of one's environment is directly associated with security and permanence.

Habraken advocates for the involvement of people in the process of housing in order to avoid making assumptions of their needs and capacity (Lees, 1990; Habraken, 1972). He states that the environment should be capable of 'constant' renewal, which allows

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development of character; where people stay rather than moving away. This embodies the idea of resilience, whereby the lifespan of the development is extended by providing a supportive space that grows with the residents. An example of such investment is discussed earlier in the PREVI project. PREVI was designed with change in mind, and offered residents the opportunity to expand and alter their homes, which prolonged the lifespan of the built form and encouraged a long-standing community to grow and remain there. (McGuirk, 2014).

Habraken offers a critique of traditional architecture, that it is too permanent and not the only option, especially for a changing environment. When dealing with a dynamic context, the architecture must be fluid, mirroring the context in which it exists. When this is achieved, architecture is more socially sustainable and offers a more resilient, increased lifespan of the building itself.

Spatially, the concept of 'open building' describes the process between user and building in residential developments. The intention is that of reordering relationships and considering the agency of users. Here, support for an alternative to mass housing is advocated for; designing for openness, involving user capacity and inclusivity. The process recognises various actors' influence on design and construction and aims to respond to the on-going transformative nature of the built environment (Habraken, 1987).

Translating the new way of thinking into a spatial outcome, Habraken's approach is that of a participative and systemic process of both design and construction. This is of extreme importance in the context of informal settlements in South Africa as it offers a more critical approach to a developing context, engaging the user in participation rather than being limited to consultation only in the early stages of a project (Bennett, 2011).

Habraken developed the notion of separating the physical infrastructure of a building into two components, which he terms *Support* and *Infill*. Support refers to state provided

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infrastructure. Infill refers to what users could build on top of and between the Support structures (Spatial Agency, 2016).

Habraken asserts that the act of building is an expression of control over form, by both professionals and inhabitants. (Habraken, 1987) Such control takes place during building and is thus a temporary state. Once an occupant takes over, the act of decision making continues to take place, as does the transformation or 'building' resume.

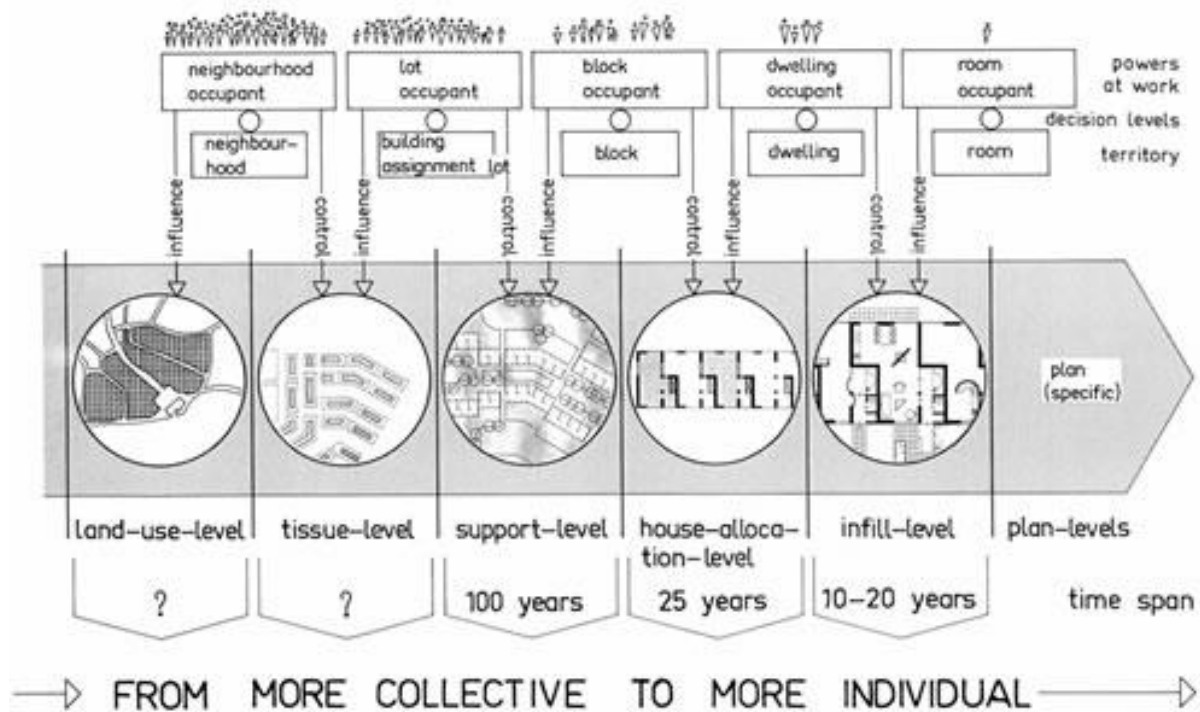


Figure 8: Flow diagram illustrating levels of decision making
Source: Cuperus, 2011

'We should not to forecast what will happen, but try to make provisions for the unforeseen.'

(Habraken, 1961 in Cuperus, 2001:2)

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In order to accommodate the unknown transformation, Habraken introduces the concept of 'levels of decision making' that take place during the 'building' process (which is incidentally not a once-off event by his description). The levels vary in scale from urban to individual (Cuperus, 2011).

Like Turner, Habraken encourages control over one's environment, presenting the view that with autonomy, comes responsibility. Using the levels of decision making, it is clear which parts of the system are user-determined – what users can and cannot change, as well as what onus falls on them to ensure the upkeep of a 'good' environment.

Habraken describes that the built environment, like any other system, sustains itself by transforming. This further emphasises the concept of resilience, achieved through the ability to alter the parts that make up the system.

Habraken describes the two contributors to this system; they are the buildings (physical) and the user (corporeal). An infinite symbiotic relationship exists between the two, each shaped by the other through a decision making process. He offers that in order to understand this transformation and why it happens and where, the relationship between man and building must be understood, each action and corresponding reaction.

Nabeel Hamdi echoes the sentiment that the relationship between building and user is dynamic and is thus in constant need of adjustment (Hamdi, 2010 in Bennet, 2011). In order to provide a resilient architecture, that continues to grow with people, it must be able to change.

In a context such as the South African informal settlement, where resources are scarce and demand is high, it is imperative that the approach taken makes efficient use of resources. Implemented infrastructure cannot rely on constant financial injection, thus must offer flexibility to its users in order to produce resilient housing developments. However, the

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bottom-up method, where users are entirely responsible for both the support and infill (auto-construction), should be balanced with some measure of a top-down 'framework' in which the flexible change takes place (Bennet, 2011, Massive Small 2011).

The advantage of implementing Open Building in a constantly changing environment is that it offers some measure of regulation and an ordering system. In the context of an informal settlement, where seemingly unregulated transformation takes place on a continuous basis, implementing an architecture that is supportive and yet adaptive requires a system that is resilient to change, offering support through a variety of conditions. Open building offers us a well-structured building process (by both professional and user) with clearly defined interfaces, allowing the change to take place, using a system that co-ordinates potential and constant change.

CHAPTER 4.0

4.0

TOWARDS INCREMENTAL DEVELOPMENT

Following on from lessons of mass housing and the emerging paradigm of thought that embraces the informal and its innate existence outside of formal systems, a spatial product is investigated with the intention of suggesting a more holistic and contextually appropriate response to deliver housing that is more socially, physically and economically sustainable.

An exploration into the phenomenon of auto-construction in urban environments as the 'urban vernacular' is undertaken in order to understand its prevalence and the similarities of built form that informal settlements take across the world.

The concepts of participatory design, principles and practice are interrogated in this chapter as part of the architectural product stemming the theories of Right to the City and Spatial Justice. This chapter acknowledges informality in an effort to synthesise a response to the main research question of exploring auto-construction, an inherently informal exercise, as a tool in the provision of adequate housing.

The concept of flexible architecture is supported by theories of sustainability and resilience in the context of an informal settlement. Further, the case for Flexible architecture is suggested as an opportunity to produce a more resilient architecture in a changing environment.

The concept and method of Synthesis will be explored in with the intention of collating the various concepts and theories unpacked throughout this literature review. This is intended to bridge the gap between theory and design practice.

4.1 URBAN VERNACULAR

The concept of 'informal' housing is not new, nor does it seem to be losing traction. Historically, the poor have constructed their dwellings around urban centers. Jorge Hardoy offers that self-help housing can be acknowledged as a characteristic of the Latin American city (Kellett & Napier, 1995). The difference in today's context is the scale of informal settlements as a result of urbanisation. Compared to Asia and Africa, urbanisation at this scale took place much earlier in Latin America during the mid-1960s, offering an extremely relevant study, and a chance to deal with urbanisation in South Africa with a more informed approach.

In South Africa, during the 1970s, many informal settlements were established, but done so on the periphery of cities as a result of apartheid planning and legislation. The perpetuating view of informal settlements was negative; that of visual and social pollution. Prejudice extended to questioning the morals, abilities and values of the residents that lived in the settlements as a result of their auto-constructed dwellings; with feelings that the 'improvised' nature meant that they were 'inadequate' and 'disorganised' (Kellett & Napier, 1995). American anthropologist Oscar Lewis further promoted the negative stereotyping of informal settlement residents through his (now discredited) 'culture of poverty' theory which offered that the poor were incapable of self-improvement.

Roderick Lawrence aimed to uncover 'how architectural features of domestic settings reflect, catalyse or inhibit social and psychological goals.' (Lawrence, 1987 in Kellett & Napier, 1995) He outlined defining qualities of domestic vernacular architecture to include; being identifiable as a type, meaning that qualities are shared across a numerically significant cluster. He noted that this construction be specific to a place, particularly in terms of building materials. The construction is characterised as traditional rather than academically inspired,

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and that it housed 'normal activities of ordinary people.' Using these definitions, many informal settlements qualify as vernacular buildings.

Lawrence goes on to promote consideration of reciprocal relationships between i) *physical and material factors*, namely availability of materials, technology, site, and climate, ii) *societal and cultural factors*, such as historical and social values, population, household composition and iii) *individual/human factors* entailing age, gender, marital status, beliefs, and experiences. His focus was on the detailed use and design of the home; how the form is used and how this changes during a person's life cycle.

When dealing with the provision of residential developments in the scope of this dissertation does, it is imperative to understand the resident. People differ from each other firstly, and differ from time to time on an individual level. Acknowledging that one person's need may change over time and designing in response to this ensures more resilient and sustainable architecture.

Amos Rapoport, a traditional-environment theorist focuses his work specifically on the informal settlement. He puts forward that the 'spontaneous settlement' as he calls it, is the contemporary equivalent of vernacular design as we know it. The key question that he poses is 'how successfully do spontaneous settlements respond to the cultural and aesthetic needs of their inhabitants?' (Kellett & Napier, 1995) He defines the 'spontaneous settlement' as 'cultural landscapes' that represent the decisions of many individuals over a long time period, yet add up to 'recognisable wholes.' He outlines characteristics of both process and product that exist in informal settlements. The 'process' characteristics include the reliance on a model, with variation, the extent of sharing a single model and the congruence of such a model with the needs of the user. Characteristics of 'product' entail the degree of cultural and place specificity, specific plan, model and morphology; specific materials, textures and colours, effective climatic response and the environment as the setting for a lifestyle and

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activity system. The concept of a shared model as a quality of the informal settlement is supported by Christopher Alexander, which explains the visual coherence of many informal settlements, although construction is seemingly bric-a-brac.

Understanding the physical commonalities of form in informal settlements is relevant to the research as the area of study is an informal settlement in Cato Crest. Interrogating the common characteristics of the 'model' such as materials, plans and so forth provide a starting point to understanding why these decisions are made. Further, this allows for informed decisions to be made regarding the flexible components of the design such as financial means, construction skill levels and how permanent or adaptable elements need to be. This research will be discussed in detail in the Case Studies and Findings chapter to follow.

Paul Oliver takes the Evolutionist view, fitting 'house-building' in different contexts into a framework of specialisation, including informal settlements. He presents evidence that skilled labour and small scale contractors exist in informal settlements. He acknowledges the importance of local knowledge in the contemporary urban context; stating 'yet it is clear that there is a world shortage of housing, that the materials, skills and financial expenditure necessary to meet it by modern means simply does not exist.' In support of Turner's view, he suggests that builders of informal settlements should be part of the solution to the urban housing problem.

Understanding informal settlements as an urban vernacular is important in order to embrace the local knowledge that exists, in an effort to facilitate the growth and development of auto-construction in these settlements in a way that makes efficient use of resources to provide highly contextual solutions.

4.2 PARTICIPATORY DESIGN, PRINCIPLES AND PRACTICE

It must be acknowledged in the South African context, that there is an extreme shortage of resources with regard to housing for the poor. Logic thus dictates, that the focus shift to an architecture that works within the constraints presented by the scarcity of resources, in the case of urban housing; land in the city and funding.

Aravena (2014) advocates for 'bringing the community into the process.' He urges city designers and planners to look to the 'problem' areas – informal settlements and slums themselves, for a solution as these are spaces of creativity, ingenuity and the most efficient users of scarce resources.

In other creative disciplines the idea of users as co-creators has become popular. Yet the architectural profession is reluctant to explore the users' contribution to the design product.

'Our obsession with the masses has blinded us to the people's architecture.'

– Rem Koolhaas, Junk Space.

(Koolhaas, 2004 in ArchDaily article, 2016)

This quote appeared in an introductory article for a Panel Discussion entitled 'With the Masses' for ArchDaily (2016), which goes on to dissect his musings. Koolhaas makes use of two key elements, seemingly the same yet with two entirely different connotations; he refers to 'the masses' which is described as a 'supposedly willing instrument of ideology' versus 'the people' which are 'a power to be reckoned with.'

The idea of user as designer originated around the 1970s, with Turner being the most notable and outspoken authority on the subject. Those architects who have embraced the idea, however struggle to carry it through to conclusion of a design product.

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Architectural movements, particularly Modernism, focused more on the architect (whose involvement ends at the conclusion of design) than the user (who experiences indefinite interaction with the product). Ironically, modernism produced much for the masses, but was often at odds with the *people*, whom the architecture supposedly intended to serve.

The challenge is set forth for the architectural profession to extend the scope of the profession and address the 'messy' field of engagement into what is traditionally regarded as 'the social sciences.' (Murray et al., 2007:23 in Bennet & Breed.) Any profession dealing with a product that affects the environment of people so directly should engage not only with their product, but the end-user too.

Giancarlo de Carlo, in *Architecture's People* offers a critique of Modernism's tendency to reduce the role of the user to a mere abstraction. This is clearly seen across many mass housing schemes throughout history and apartheid planning in South African cities. He advocates for the need to discover the 'real needs' of the user, and the method he proposes is that of 'exposing and acknowledging their rights to express themselves.' (Schneider & Till, 2007) He is open to acknowledge growth and flexibility, suggesting that architecture should be able to change with user imposed changes.

Habraken offers us the idea of Support and Infill, galvanising the thinking that the architecture and act of participation intends to empower the user in both the design and use of the dwelling. He proposes physical contribution to the built form by the user, beyond the token 'consultation' that many consider being enough 'participation' in a development, extending to both planning and physical building.

4.3 FLEXIBLE ARCHITECTURE

In an interview with Austrian architect Dietmar Eberle, entitled 'Domestic City,' the concept and meaning of flexible architecture and its place within a dynamic living situation in today's context is deliberated. Eberle states that infrastructure is the most public part of the city, explaining that identity is both formulated and connected via infrastructure. He acknowledges 'culture' as the key contributor to the environment, as 'what makes a place.' He identifies the architects' duty as creating frameworks for realising and representing various living conditions. (Steinemann, 2008)

'Our houses should be more like containers in the future, in which diverse conceptions of living can be represented and realised.' – Dietmar Eberle

(Steinemann, 2008: 73)

He puts forward that buildings are never used in the way that the architect anticipates. The average 'lifespan' of a building is approximately 15 years according to Eberle; the lifespan he speaks of refers to the use or programme of the building. In order to extend the lifespan of the building, it should be flexible because uses will always change.

He advocates for a high degree of user autonomy, much like Turner, and control over the atmosphere every person lives in. He believes that the development of concepts for residential buildings should be reduced to the design of structures that create framework conditions for individual habitation concepts.

Schneider and Till present a refreshingly clear outlook on flexible architecture in the book *Flexible Architecture* (2007), where they seek to understand long term housing. They begin with the sentiment that perpetuating current housing methods deny the scope for extension or change, calling this 'design stupidity.' 'Why build housing that so quickly becomes redundant?' is the key question. They go on to question what gives a building the ability to

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adjust over time. Complementing the thinking that there is an alternative to mass housing, they offer that there is an opportunity for architecture to be direct in construction, that even generic spaces can tolerate change and can offer retention of identity, that structures can be modest and feature in the background of living.

So what is flexible housing? Flexible housing is housing that can adjust to changing patterns and needs; both social and technological. Changing needs can include those that are personal (an expanding family), or practical (the onset of old age) or technological (upgrading of old services). Changing patterns can be illustrated by a changing demographic (the increasingly popular single person household), economic change (an increase in the rental market) or environmental (response to climate change). Time is also a key consideration of flexibility, with changes occurring both before and during occupation.

The argument presented by Schneider & Till (2007) is that there are more reasons to allow change, than there are to enforce staying the same. Flexible housing is inherently sustainable, as it aims to facilitate easier living through the inevitable changes that occur over lifetimes. The lifetime with which flexible architecture is concerned, however, is that of people rather than the building, offering that resilient architecture starts with tending to the needs of both people and environment. A useful description of flexible architecture is that it acts as a 'shock absorber, there to soak up the dynamics of living.'

Steven Groák (Schneider & Till, 2007) offers a distinction between two well-used terms that are often seen as interchangeable; adaptability and flexibility. He defines the former as 'capable of different social uses' and the latter as 'capable of different physical arrangements.' His clear cut definition does not consider that one may inspire the other, that an architecture that supports both the growing life cycle of social and physical sustainability is possible.

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The Dutch introduced the concept of 'polyvalency' which centres around the notion that space can be used in a variety of ways without having to make physical changes to the structure. (Schneider & Till, 2007)

The case for flexible housing can be summarised as being inherently sustainable. Modernism's fixation with ergonomics resulted in 'tight-fit functionalism' producing spaces that could only be used for a singular, preconceived purpose. Andrew Rabeneck (Schneider & Till, 2007) describes how inflexible construction techniques became a norm, with internal partitions being loadbearing, roof spaces being filled with trussed rafters, which made any future alterations impossible and prohibitively expensive. The more customised and more specific a design from the outset, the less flexible it is over time. (Schneider & Till, 2007)

Herman Hertzberger and Otto Steidle (Schneider & Till, 2007) offer the concept of 'incomplete space' to architects, as something to consider rather than fear. This entails a space and/or structure that is designed for and anticipates change; that is deliberately open to infill or other appropriation.

Luc & Xavier Arsène-Henry (Schneider & Till, 2007) summarise the concept of affording the right to user participation in a set of 'guidelines' for flexibility:

- i) Everyone should be able to fit out his home as he wishes, including the right to make mistakes.
- ii) Ability to express one's self as a function of his choices; a personable home
- iii) Engagement in creative acts of organising space in the living context; being a 'co-author' brings satisfaction

4.4 THE POWER OF SYNTHESIS & HUMAN CAPACITY

In order to fully understand the concept of 'synthesis' it is essential to interrogate the meaning of the word. Theoretically, the model describes the final stage in the process of dialectical reasoning, in which a new idea resolves the conflict between thesis and antithesis. Simply put, synthesis involves combining various ideas to form a new idea.

The intention for this chapter is to offer a case for synthesising the various ideas and concepts described throughout this dissertation. Synthesis presents an opportunity for a fresh conception and adjustment of paradigm. In response to an unprecedented global crisis for housing, a new take on the problem is essential.

Architect Alejandro Aravena introduces his take on synthesis in explaining how he tackles complex problems in the built environment with scarce resources. He refers to the power in design, which he attributes to the 'power of synthesis.' New ideas are essential to confront these kinds of constraints, many of them with very simple solutions.

Aravena's offering of synthesis, much like Turner, includes synthesising 'problem' and 'solution.' Turner's work and paradigm is discussed in greater detail in Chapter 2.3. In considering elements of the area in need of intervention, we are better able to synthesise resources, ideas, and skills – of both architect and inhabitant. The concept of synthesis is linked closely to that of participation as it relies on the input of more than just the architect. Through engaging in participatory planning with residents of informal settlements, architects are able to identify problems and better understand people's capacity to create their own living environments.

As the focus of this dissertation, auto-construction is at the fore front of the discussion of synthesis. In this case, combining both formal and informal building approaches are explored, throughout the stages of the project.

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Aravena encourages making use of the potential that exists in all cases – the people. In such situations with extreme constraints, a resource is created that is 100% usable – people's own building capacity. As he terms it, 'joining forces and splitting tasks' ensures that developers make invested money go further whilst simultaneously affording families the opportunity of freedom over their space, a sense of ownership and pride for their living environment.

Further, a sense of community is fostered as small acts of incremental growth are governed by negotiation with neighbours (Lees, 1990). This instills within the community a feeling of belonging, and encourages skills and knowledge transfer as people creatively build their environments together.

LITERATURE REVIEW: CONCLUSION

A changing paradigm is imperative in order to close the gap for housing provision in Durban. Resources and materials that are compatible with what is already used in informal settlements and akin to the skills base found in informal settlements should be used, presenting the attitude of facilitating the process of auto-construction rather than inhibiting it.

As the discussion reveals there is an urgent need to acknowledge the ingenuity, creativity and resilience of informal practice in order to move forward with the creation of an inclusive urban environment where residents may exercise their citizenship, allowing them the freedom to shape their own living environments in a more positive and supported context.

It is imperative that governments recognise the power of human capacity, and engage in a grassroots approach that reconciles housing policy to include participatory planning and equal access to the city, engendering a sense of inclusivity, resulting in more meaningful and sustainable innovation.

The South African situation currently perpetuates the 'all or nothing' approach which must be challenged. Addressing the right to housing can be approached incrementally, providing residents of the informal city with a solution more congruent with their inconsistent financial resources.

Exploring participatory architecture and embracing the existing practice of auto-construction presents the opportunity for the formal (architects and planners) and informal makers of our cities to learn from each other to create a sustainable living environment for the marginalised urban dweller. Public money is allocated to housing in any regard, yet through participatory planning and extensive consultation with the community on which the money is being spent, ensures that this money is utilised to its full potential.

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Through meaningful architectural gesture, the approach to housing can be amended to offer an alternative that is more socially, culturally and economically sustainable for the occupants of the informal settlement and city.

CHAPTER 5.0

5.0

PRECEDENT STUDIES

Introduction

In this chapter, precedents will be explored that synthesise top-down and bottom-up approaches to housing. The complexities of delivering a housing model that responds to the individual's needs as well as provides a measure of necessary regulation are well understood by the following architects.

Each project places emphasis on the context in which it is implemented, offering a critical response to the particular needs of the community, taking into account the socio-economic situation of the user, as well as the position of the state.

The precedent studies aim to interrogate the research question of the potential of user participation in the development of adequate housing. In the context of informal settlements, which is explored in the case study to follow, auto-construction is the form that user participation takes. In this chapter, various forms of user-participation are discussed.

The selected precedents embody the theories of sustainability and resilience, using the concept of flexibility in various ways. Through the concept of participation architecture, the Right to the City and Spatial Justice are acknowledged, and provide an opportunity to be exercised by users.

The precedents discussed in this chapter all present an innovative way of thinking in comparison to the other housing developments of the same period in their respective

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countries. Hailing from various parts of the world (each with their unique challenges) this offers a holistic view of 'different' approaches to the challenge of housing a rapidly urbanising world.

The Half a House scheme, developed by Elemental in Chile offers a simple solution to the complex problem of housing. This precedent exemplifies the concept of Incremental development, allowing residents to add to their homes as and when they can afford to. It embodies Habraken's concept of Support and Infill, the support half being provided by the state, with users providing the infill. Two projects from this concept will be discussed in this chapter; Quinta Monroy in Iquique and the Villa Verde Housing in Constitución.

Embracing Informality: A Sustainable Alternative to RDP (Holmes, 2014) is a scheme developed by Cape Town architecture student Lawden Holmes. This scheme galvanises Turner's ideology of looking to informality as a solution rather than a problem. This precedent is set in the context of an informal settlement in Du Noon and is thus highly relevant to the subject of this dissertation. It illustrates a solution to dealing with the phenomenon of auto-constructed homes, channelling them into more sustainable, long term developments. It makes use of incremental development, acknowledging the piece by piece approach that is prevalent in many informal settlements in South Africa.

Molenvliet Housing exemplifies Habraken's concepts of Open Building, making use of the Support and Infill method of construction, allowing user input in the form of decision making rather than physical contribution to the scheme. The focus of this precedent will thus be more on the spatial for this reason as well as the European context presents a contrasting socio-economic climate to that of the informal settlement in South Africa.

5.1 HALF A HOUSE – ELEMENTAL

Quinta Monroy – Iquique, Chile

No dissertation centred around auto-construction would be complete without the inclusion of arguably the most radical development in the design of social housing. The Quinta Monroy houses in Chile mark a watershed moment in the approach to housing in a developing world.

The firm behind the idea is Santiago based Elemental, led by Alejandro Aravena. The firm is different to most architectural practices. Set up in 2000, Aravena and transport engineer Andrés Iacobelli partnered, along with Chilean oil company COPEC. Their focus was social housing in Chile. Faced with inadequate government housing subsidies, they had limited options, but they did have a radical idea.

In 2003, after much lobbying, the government agreed to let the firm test their idea in Iquique, a northern area in Chile. Elemental were met with ninety-three families squatting illegally on half a hectare of urban land near the city centre. Their task was to legally house the families. The catch was that only \$ 7 500 was offered per family as a subsidy to both purchase the land and build the house. This budgetary conundrum meant that there was enough money to do one, but not the other.

Elemental set out to rewrite the equation of social housing (TED, 2014) Aravena offered that no known typologies could solve this question, and this is the reason for social housing always being located on the peripheries of cities. Aravena offers that people want to live in the city as it offers them access to jobs and amenities. The land in the city, however costs approximately three times more than the land used for periphery housing projects.

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Figure 9: Residents' expansions to Quinta Monroy houses
Image source: Elemental

Elemental's answer was simple: build each family half of a good house rather than a small one that would not meet their needs. Aravena articulates that a family lives reasonably well in a house of 60-80m². The budget would only allow 30m². The half he proposed that they would build is the half that families cannot do on their own. The 'hard' half encompassed the concrete structure, roof, kitchen and bathroom. The total living area built would only be 30m², 10m² smaller than what is normally provide in Chile- the average in South Africa is 36m². The houses were however arranged with spaces between them, offering residents an opportunity to extend as their finances allowed, adding rooms until they had a 60m² house.

Within a few years of taking occupancy, the families did exactly this. The voids of the defined structural frame were filled in with facades of plywood, plasterboard, timber and other available materials. The end product showed the individuality of the scheme, each unit offering different windows and paint colours. Justin McGuirk writes of his visit to Iquique; 'It was standardised concrete modernism alternating, like the fronts and backs of playing cards, with favela-style spontaneity.' (McGuirk, 2014: 82) Extensions are of varying quality and

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extent, some owners adding balconies and good quality windows, whilst others appear very informal between the concrete structures.



Figure 10: Quinta Monroy homes before (left) and after (right) user additions
Image source: Elemental

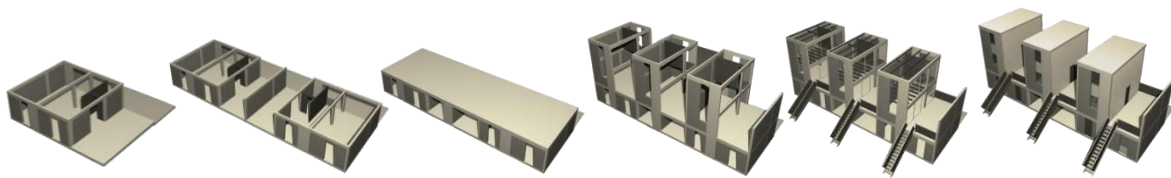


Figure 11: Model illustrating stages of construction for Quinta Monroy
Image source: Elemental

The Quinta Monroy project exemplifies Habraken's concept of Support and Infill. The Support in this instance is the half that is provided initially, including the kitchen and bathroom. The infill is thus the rest of the user built additions.

McGuirk compares Quinta Monroy to PREVI, discussed in Chapter 3. He states 'It was PREVI Mark 2, only this time dirt cheap.' His comparison is justified, as PREVI afforded residents the opportunity to make their homes their own. Quinta Monroy is designed for arguably more flexibility, essentially building less, with more for the user to do on their own.

The Quinta Monroy scheme presents a defined structural framework as the first half, and a user built second half at their own pace and means. Aravena presents that although most

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social housing models depreciate, a scheme such as Quinta Monroy is an investment that appreciates over time, allowing residents some social mobility should they choose to move on at a later stage. Some view the scheme as a stepping-stone, which is different to PREVI where most residents have lived for many years. This may not be a bad thing, with some residents being empowered by the scheme now capable of finding a different place to live. Continuing the comparison, both schemes allow participation in the physical end product of the home. Participation takes place post-delivery as the Quinta Monroy scheme is completed to a point, providing regulation to a certain extent, after which residents take over.

Considering that the majority of housing is auto-constructed, Aravena's offer can be seen as a valuable compromise and a step in the right direction when dealing with immense demand and very few resources.

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Villa Verde Housing – Constitución, Chile, 2010

Elemental applied the concept of their 'half-finished' home to a different context 10 years on from the Quinta Monroy housing project. Initially the 'half a house' concept was devised as a solution to deal with an extremely minimal budget, out of which came the opportunity for auto-construction. The latter is the impetus for this project; providing for the needs of residents and allowing the houses to gain value over time. (Stott, 2013)



Figure 12: Villa Verde homes before user additions
Image source: Cristian Martinez



Figure 13: Villa Verde with user additions (center)
Image source: Elemental

The Villa Verde Housing project had a larger budget, but Elemental chose to maintain their strategy of incremental construction and growth, believing that it would yield a better outcome for residents, stating 'we could have taken one of our own more economic typologies and used the extra money to finish them... but we thought of once again applying the principle of incremental construction and prioritization of the more complex components, this time with higher standards both for the initial and the final scenario' (Elemental in Stott, 2013).

This scheme can be seen as an attempt to illustrate that the original equation still holds its weight, even under a different budgetary situation. Elemental highlights here the intrinsic value of incremental growth and auto-construction. Villa Verde serves to demonstrate the

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concept of self-reliance and aspiration of residents. The architectural translation for this is providing flexibility and an opportunity for expansion. (Stott, 2013)

Compared to the earlier Quinta Monroy scheme, the defined structural framework of Villa Verde is arguably more aesthetically appealing and more 'homely' with the double pitch roof set in a more open, natural surrounding that suggests the feel of a neighbourhood. Homeowners still hold the eventual input of how the building will look, an opportunity to individualise one's living space to reflect a unique character.

The plans illustrate just one option for expansion to the initial framework, of which there are many configurations. The wet services are provided in the initial 'support' half of the scheme, pictured top left. An example of 'infill' is shown on the right. This example shows a home that could accommodate up to 6 people. A design such as this in the context of informal settlements would allow various family situations to be accommodated.

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Figure 14: Villa Verde Plans showing both initial design and potential expansion
Image source: Elemental

5.2 EMBRACING INFORMALITY

A Sustainable Alternative to RDP, Du Noon - Lawden Holmes

'Less is more' is a classic phrase, so often overlooked by the built environment. It is the principle upon which the Embracing Informality: A sustainable alternative to the RDP project brings a different perspective to the problem of backyard shacks. (Better Living Challenge, 2014) Lawden Holmes, a Cape Town architectural student, as one of the 23 finalists for the Better Living Challenge, presents the approach of transforming problems into assets for low-income households.

The aim of Holmes's project is to embrace the perpetual informality rife in South Africa, to learn from it and turn it into a usable solution. This concept can be accredited to Turner, and aims to put Turner's ideas into spatial practice. The idea came about after Holmes observed those around him regarding informality as a problem. He chose however, to engage in the reality of many South Africans, investigated its complexities and embrace the practice as something that is here to stay. Holmes offers that backyard shacks are already there, so why not just provide a more adaptable solution.

This precedent study is relevant to the subject of this dissertation. It shares a very similar context – that of an informal settlement in South Africa. This particular settlement is in Du Noon settlement in Cape Town. In this context, RDP homes have been implemented, as they have been in Cato Crest. The project investigates the phenomenon of backyard shacks and how they can be regarded as opportunities rather than problems.

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*Figure 15: RDP House Model – Lawden Holmes
Image source: Better Living Challenge*

A visit to Du Noon settlement prompted an architectural solution, uncovering the ‘need to address the living conditions the backyarders were living in.’ (Holmes, 2014) Acknowledging the urgency of the country’s growing population, Holmes investigated the current RDP model. He concluded that it ‘simply won’t do and is not the answer to South Africa’s housing needs.’ He outlines a need to address the density of informal environments, which the RDP model does not consider.

It is noted that even after the implementation of RDP homes, users continue to build backyard shacks. In many cases, this is done in order to provide supplementary income to residents who cannot otherwise afford the increased living costs (water and electricity) that come with an RDP home. (Brosius, 2016) This will continue to take place, until a model which addresses not only the physical needs but socio-economic situations of residents as well.

The housing module is a smaller component of a larger, context specific project for incremental upgrade of land for illegal shack dwellers. It deals with various housing

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typologies and commercial/retail opportunities. The key focus is that of securing tenure and affording access to urban opportunities.

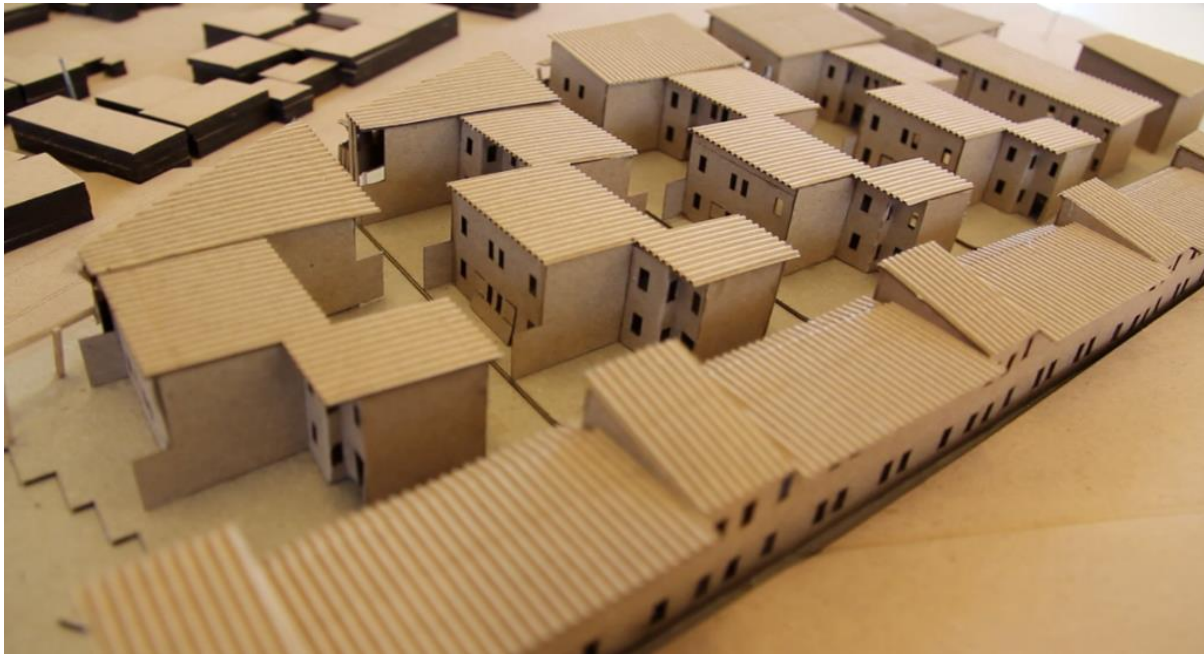


Figure 16: Starter Model – Lawden Holmes
Image source: Better Living Challenge

The scheme puts the concepts of incremental development into practice, developing a starter unit, to which users add to over time. Additions may be to extend the living area for the family or extra bedrooms for larger families; they could also be used to rent out, providing families with additional income. This scheme aims to address a variety of situations.

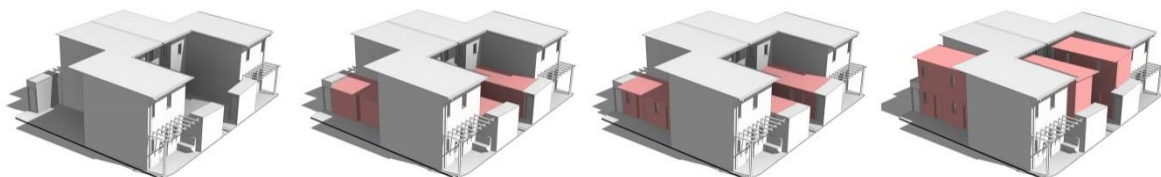
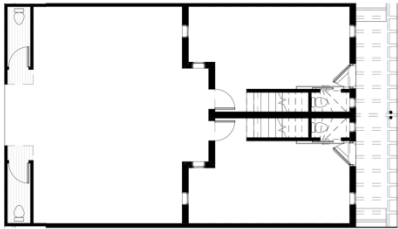


Figure 17: Incremental growth, 3D model
Image source: Future Cape Town

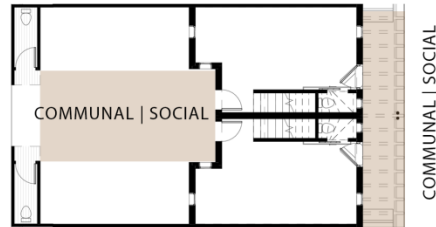
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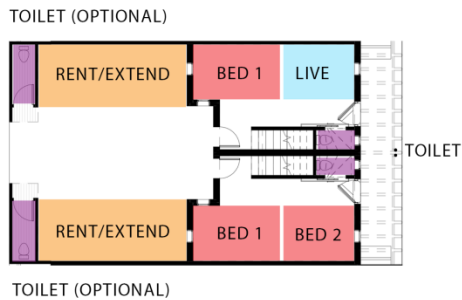
GROUND FLOOR PLAN | MODULE



GROUND FLOOR PLAN | COMMUNAL SPACES



GROUND FLOOR PLAN | VARIATIONS



FIRST FLOOR PLAN | VARIATIONS

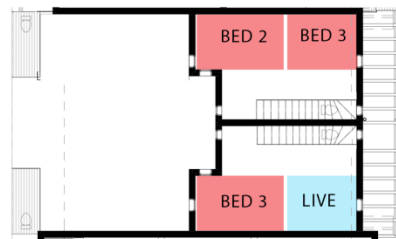


Figure 18: Incremental growth – plan
Image source: Future Cape Town

The starter unit developed by Holmes allows for variation of living spaces and bedroom over two floors, the room dimensions based on a double bed. The unit offers an opportunity for growth, with addition of auto-constructed backyard rooms, which can also be used for rental. This allows for additions to be undertaken using unskilled labour, keeping costs down.

Considering current backyard-room situations experienced in RDP housing models, the design affords maximum freedom for backyard tenants. The layout for the proposed design between the backyard rooms creates a communal space for socialising, washing, vigilance and a way to deal with storm-water runoff. (Future Cape Town, 2014)

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The concept of incremental development is also considered in this design. Over time, the rental income allows for the formal structure to be extended in place of the informal backyard rooms. The model intends that attaching additional rooms can take place in a manner that is safe, and both environmentally and socially friendly. Holmes explains simply, 'The housing unit turns the unsustainable problem of backyard shacks into a solution. The aim is to create an asset that appreciates in value over time.' (Future Cape Town, 2014)

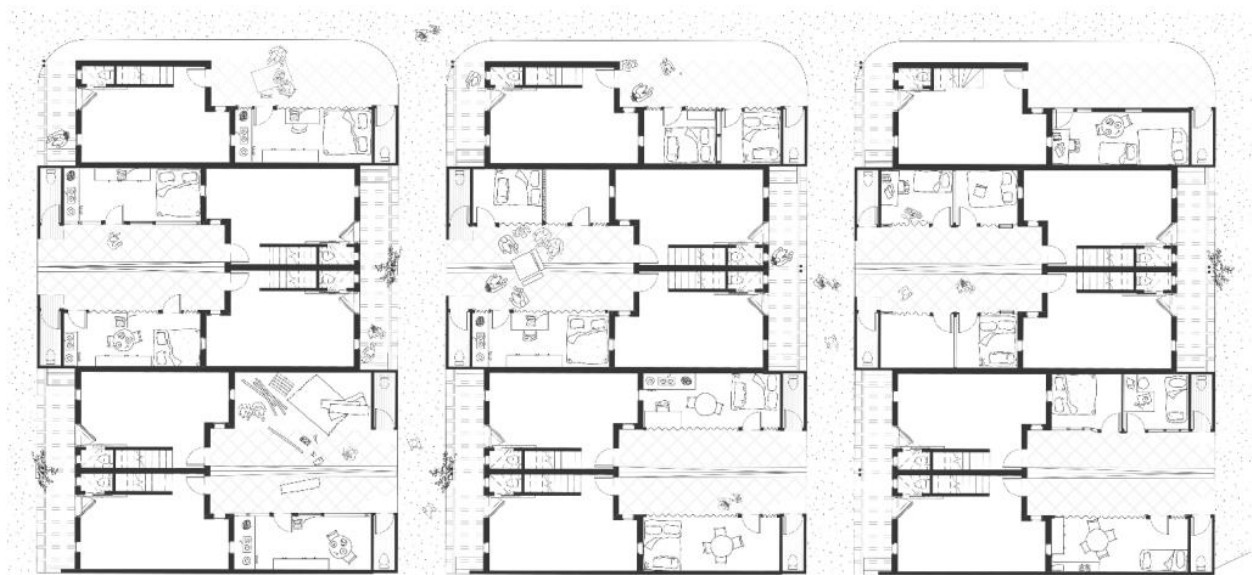
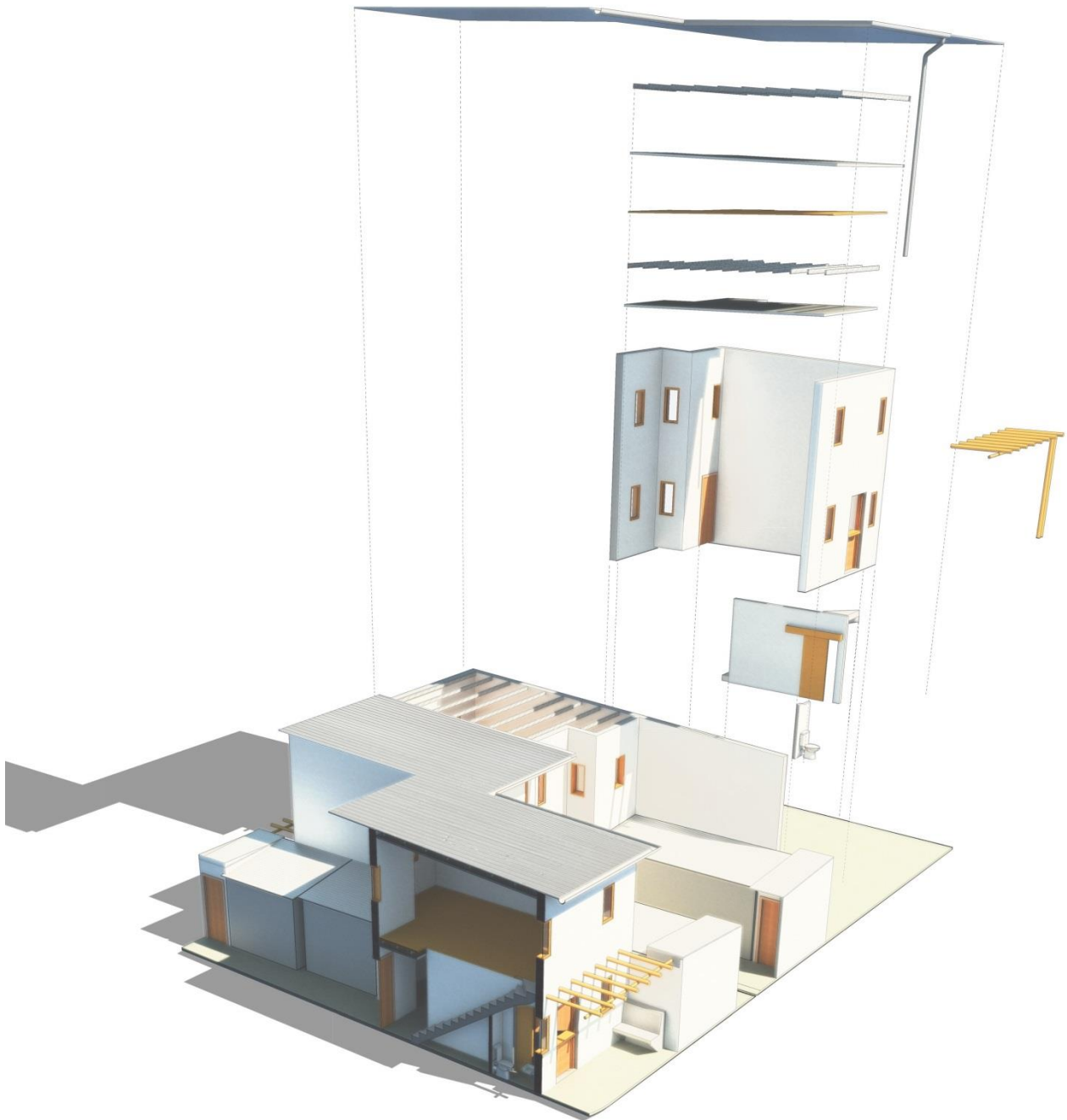


Figure 19: Populated plan of possible Backyard conditions
Image source: Better Living Challenge

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EXPLODED AXONOMETRIC | HOUSING MODULE TECTONICS

Figure 20: Axonometric of Starter Unit

Image source: Future Cape Town

5.3 FLEXIBLE HOUSING

Molenvliet Housing, Papendrecht, 1969- 1976 - Frans van der Werf

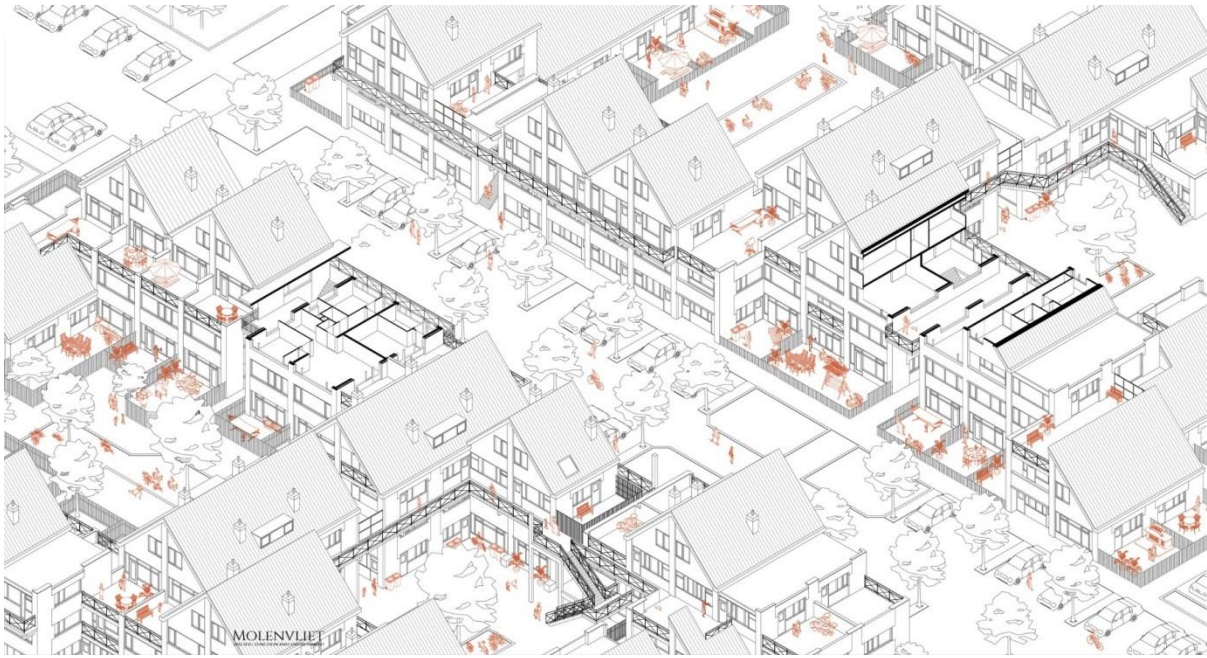


Figure 21: Impression of Molenvliet Housing
Image source: Christiaan Dorlas

Molenvliet Housing was one of the first projects built on the support and infill methodology. This offers us insight into the original intention of the scheme as it worked closely with Habraken's principles.

The SAR (Stichting Architecten Research or Foundation for Architects' Research) whom Habraken directed was founded in the Netherlands in 1965 with the intention of stimulating industrialization of housing. More generally, it sought to investigate issues surrounding the relationship between the architectural profession and the housing industry. They were open to creating a new window for architects in the design of Housing. (Kendall, 2000) This project subscribed to the ideals of the SAR and exemplifies Habraken's approach to housing.

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User development was key to the process and entailed the user making key decisions over three stages. The first is that of the overall neighbourhood plan, followed by the negotiation of built area and open space. The third stage of decision making entails the planning of the 'support' structure. The final stage is designing the infill on an individual scale, determining floor plans and finishes.

The support structure, an in situ concrete framework combines seven components;

- i) Floor decks – hosting vertical elements such as mechanical and stairs
- ii) Concrete piers – in situ, parallel to each other along a 4,8m square grid
- iii) Pitched roof – 45 degrees yielding habitable attic space
- iv) Timber frame – armature for façade elements
- v) Roof terraces on flat roof spaces of ground floor units
- vi) Open galleries allowing upper level access
- vii) Vertical service ducts

(University of Sheffield, 2016)

The support and infill methodology allowed for the free subdivision of the basic structure into a complex of individual apartments, ranging from single to 6-room units. Wall piers allow apartments to straddle over two or three bays. Initial decisions of partition wall placement were made with users. Infill 'kits' which included facades, were assembled following further discussion with users.

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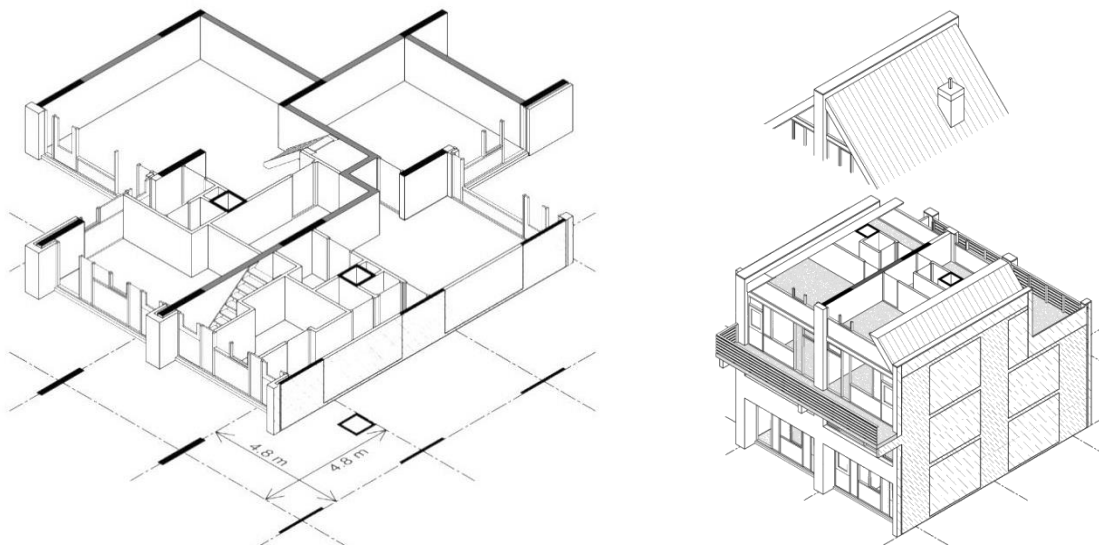


Figure 22: 3D impressions illustrating Support and Infill

Image source: Christiaan Dorlas

Contrary to other developments, where tenants were shown possibilities of subdivision, Molenvliet offered users with an empty support plan, which were gradually defined through a series of discussions.

Some critiques of Molenvliet were that the flexibility of floor plans were slightly limited as they were smaller per unit. As two adjoining units were very seldom available at the same time, the intended flexibility between units also failed to materialise. This was later resolved by the 1995 district renovation, which solved some of the technical problems, an example of such was shortening window piers. (Rook & Nagelkerke, 2006)

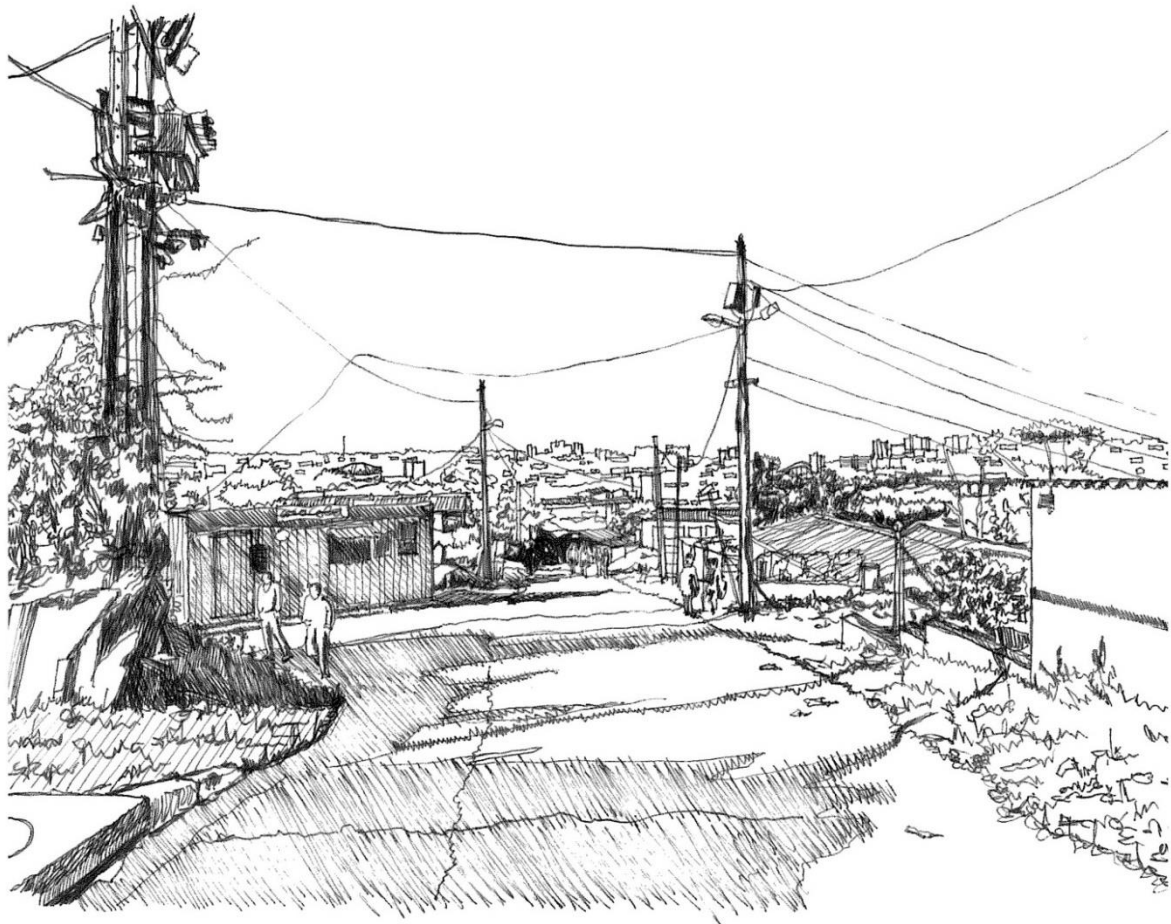
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CHAPTER 6.0

6.0

CASE STUDIES AND FINDINGS



*Figure 23: Cato Manor, 2015
Artists Impression: Michael Blumrick & Karl Fischer*

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Introduction

The case study in this dissertation is undertaken in the context of informal settlements in an urban area of Durban in which auto-construction takes place. It is relevant to the discussion as informal settlements are the focus area for this dissertation. The case study explores the practice of auto-construction in informal settlements, focusing on the various ways that residents' use it to shape their homes and the effect that it has on the surrounding spaces and larger settlement.

The case study aims to investigate the main research question of the potential of auto-construction as a tool in the provision of adequate housing. It is focused in the context of an informal settlement, Cato Crest. The above areas of focus are explored in an effort to understand the practice of auto-construction, in its existing state of application and the nuances around the potential of the practice as a resource in architectural intervention.

Within the informal context in which the case study is located, residents claim their Right to the City by practicing auto-construction and exercise their citizenship through actively seeking access to adequate housing as framed by the Constitution by claiming land on which to build their homes. Further, Spatial Justice is exemplified in the case study of informal settlements by the residents claiming urban land, and resisting relocation to periphery settlements. An assertion over the space is made through residents' participation in the creation of their living environments. In this instance, previously excluded residents claim their Right to the City through occupation and exercise spatial justice by undertaking the spatial practice of auto-construction.

Sustainability of auto-construction as a resource and resilience of informal settlement communities will be explored. The concept of Participation architecture will be investigated in terms of the extent of resident's engagement with building their own homes. Incremental

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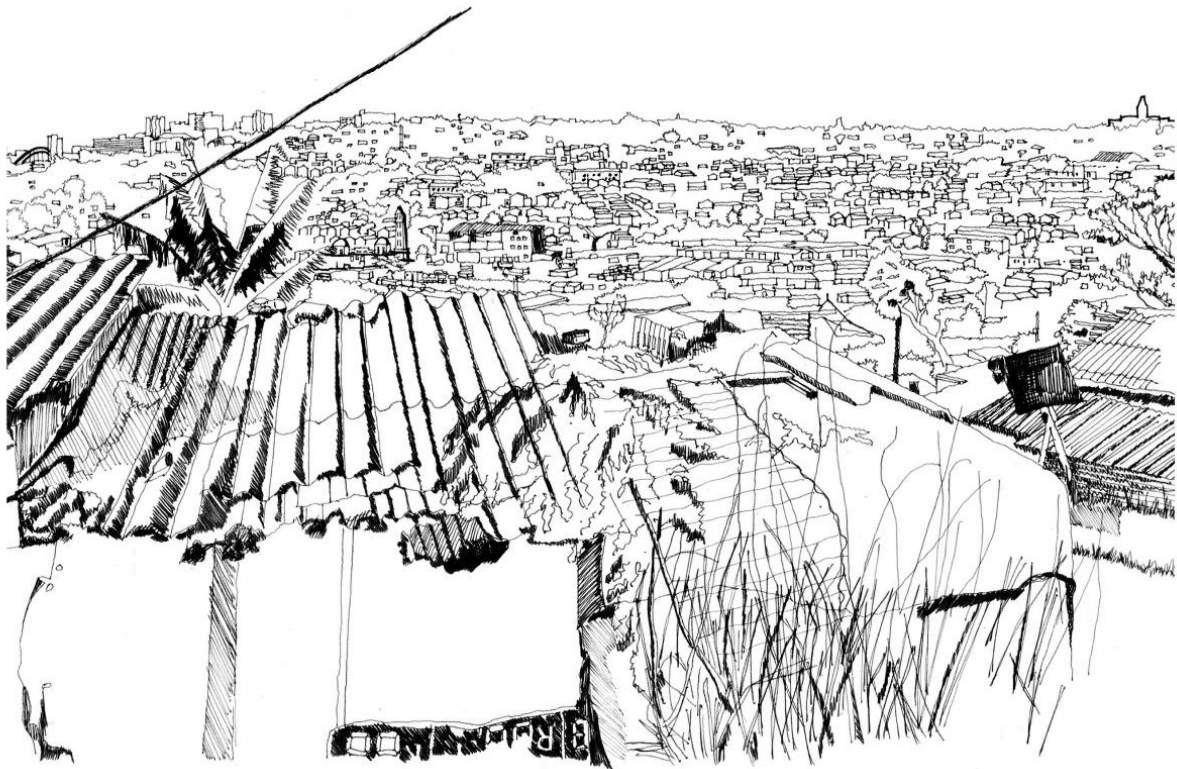
development will be examined through evaluating various construction methods used in the informal settlement context.

Historical Context

Shack settlements began to emerge in Durban post colonisation as a result of land dispossession and imposition of taxes in the late 19th century (Pithouse, 2008). Simultaneously, the movement of Indian workers who had completed their indenture moved into the city. Authorities acted against the construction of informal settlements and impose racial segregation under the guise of health and safety (Freund, 1995). The state sought to stem the influx of Africans into cities and policies were in place to locate them to the peripheries. Resistance was building, important concessions were won in shack settlements in Durban and by 1930s, there were thousands of Africans, Indians and Coloureds and a few whites in the largest settlement in Durban known as Cato Manor (Pithouse, 2008). By 1949, conflict between Indian landlords and black tenants resulted in black people not being allowed to own property. At this stage the informal settlement population stood at around 70 000 people. The city responded by providing basic services including roads, stormwater drainage, street lights and ablution blocks (Pithouse, 2008).

People continued to settle in Cato Manor due to its close proximity to the city with a population of 120 000 by 1958. The city began moving black shack dwellers to the periphery of the city. However, due to inability of the city to enforce policy, Africans were able to move into the city by the 1980s, and seized land, forming large autonomous communities, known as *imijondolo*. (Pithouse, 2008). Even today, urban migrants continue to move into informal settlements close to the city as they offer a better livelihood and opportunity for education and improving their circumstance.

6.1 CATO MANOR & CATO CREST



*Figure 24: Cato Manor, 2015
Artists Impression: Michael Blumrick & Karl Fischer*

Cato Manor is one of the oldest established informal settlements in Durban, and is home to an estimated 93 000 people. The area of focus for this research will be Cato Crest, which was home to 7610 households and a population of 17 860 in 2011. It is estimated to have grown since. The population is 99% Black African (Frith, 2011)

Many residents in Cato Manor are employed in the city, and surrounding areas and walk from the Berea to the CBD. It is well connected, with easy access to transport and offers employment opportunities. As discussed in the literature, urban housing is becoming increasingly important as a result of urbanisation. Cato Manor is one such example of where housing can be upgraded.

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Auto-construction is very clearly illustrated in the Cato Crest area, ranging from entirely user-erected informal dwellings to additions to formalised housing projects. A variety of both formal and informal economic activity takes place to support the vast number of inhabitants, from Hardware stores to 'tuck-shops'.

The progress of this case study will follow from the most informal structures in the Cato Crest area, to the more formalised RDP in-situ upgrading project, where residents have engaged in auto-construction to shape these homes to better suit their needs. The pros and cons of each method will be discussed throughout the study.

Upon first sight, it is apparent that many residents live in very informal conditions. Auto-construction takes place throughout Cato Crest, with residents purchasing their own materials and undertaking the construction themselves. The result is dwellings which have no structural support such as foundations, or bracing. Residents receive no subsidies, or building assistance. Dwellings are built very close to the street edge, and often abutt each other directly. This offers a measure of structural stability. However, the risk of fire is high, with many instances of fire having taken place in the Cato Crest settlements as a result of stoves and candles left unattended.

In such settlements, informal living is acknowledged by the municipality as they provide residents with ablution blocks, and have installed some services such as street lights. Ablution blocks are communal, and are housed in container structures. They are intended to provide users with running water and sanitation facilities. They are very well used as they service a large number of residents per ablution block.

Structures are extremely informal in most cases, with residents being reluctant to erect permanent structures as they are uncertain, due to lack of tenure security and some simply cannot afford to build with more permanent materials.

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Figure 25: View of informal timber dwelling structures and ablution block from Vusi Mzimela Road, 2016
Image source: Author's Own



Figure 26: View of informal dwelling structures from Vusi Mzimela Road, 2016
Image: Author's Own

Informal dwellings are constructed mainly in two forms; metal sheeting or timber. The majority of houses are mostly constructed from extremely thin corrugated metal sheeting that is supported by non-SABS timber poles. The sheeting makes up both walls and roofing, with

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a variety of heavy objects placed on roofs to aid in keeping the sheeting down. Ordinarily, no form of waterproofing, or insulation is used. No foundations are constructed, with a mixture of Umgeni sand and cement being used for flooring.

Most residents that engage in auto-construction (the vast majority of Cato Crest) purchase their own materials from the local hardware stores. One such store is Bassa's Hardware, conveniently located along the main road, Vusi Mzimela Road. They report that they service a very large volume of trade with residents intending to build their own informal houses. Bassa's hardware note that they have many repeat customers, with many residents purchasing materials from the store from time to time to repair their homes which suffer the results of weather damage, fire, and general wear and tear. Other repeat customers visit the store to add on to their homes, purchasing waterproofing materials, or more infrequently, timber panels to make their homes more stable and resistant to damage.

The metal sheeting construction method is reportedly the most popular choice, with timber being purchased mostly by the informal businesses constructing pre-fabricated house structures, which is discussed further in this case study.

Auto-constructed House: Cato Crest					
Material	Size	Description	Unit Cost	Quantity	Total Cost
Timber		Pine timber			
Corrugated Iron Sheeting	3m x 700mm	0.27mm sheeting	66	10	660
Gumpoles	2,4m	Non-SABS poles	32	8	256
Door	Standard	Pine	115	1	115
Window		4 pane window	91	2	182
Umgeni sand			10	6	60
Cement			65	2	130
Bolt and lock			100	1	100
					1503

*Figure 27: Cost table detailing materials and minimum costs for informal dwelling
Image: Author's Own*

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The above table details the absolute minimum cost of the simplest dwelling structure constructed from metal sheeting. Some residents offering that the figure is higher, between R 2000 – R 3000 for materials.

Although this information demonstrates that the financial cost of auto-construction is fairly low relative to rental of a social housing unit, or the cost of an RDP house, implying it is relatively cheap to build yourself, auto-construction where residents receive no assistance comes with many limitations:

Auto-construction in this context offers a poor building quality as residents have no formal training and generally opt for the cheapest building materials which offer very little structural strength. Further, as most settlements are not legally authorised, there are no minimum standards enforced upon structures by any regulatory body.

Safety is of great concern in informal settlements, as a result of questionable structural integrity of structures. Residents compromise existing RDP homes by breaking walls, and extending homes horizontally as well as by adding additional storeys above. RDP homes are not designed for extensions to take place, compromising foundations, for example which are designed to accommodate a single storey. Waterproofing is also compromised through additions using incongruent materials such as a corrugated metal structure fixed to brick (pictured below).

Building components such as staircases require some measure of building knowledge and skills to be properly erected and safe for use. This is not always the case with auto-constructed homes, leaving residents exposed to risk of structural failure and potential injury.

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Fire is another safety concern in informal settlements. Materials commonly used in informal settlements (timber, corrugated sheeting) burn very easily. Timber support poles and other timber panels are treated with creosote, which is extremely flammable. The density of the settlement and proximity of homes to each other result in fast spreading fires through settlements. Fires often occur at night, as candles are used due to lack of electricity. This leaves many residents vulnerable to injury and at risk of losing their homes.



*Figure 28: Corrugated sheeting extension
Image source: Author's own*



*Figure 29: Self-erected stair to upper storey extension
Image source: Author's own*



*Figure 30: Unsafe metal sheeting construction
Image source: Author's own*



*Figure 31: Poor quality block construction
Image source: Author's own*

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In addition to physical limitations, auto-construction comes with social challenges. Many residents, due to a lack of adequate housing and services such as sanitation experience a lack of dignity. Housing conditions in some instances can be extremely testing, impacting on the individual on a social level. Access to adequate housing for all was granted by the Constitution in order to provide people not only with a physical home, but a sense of dignity and citizenship.

Without subsidies, the financial pressure of constructing a home as well as attending to the unavoidable and frequent maintenance that comes with an auto-constructed home is inexplicably high. The majority of residents in informal settlements are low to medium income earners, for whom constant financial demands are difficult to bear.

Timber construction is also used in some cases, mostly by local businesses producing prefabricated timber units for sale. This offers a slightly more formalised model, used by residents in informal settlements that do not engage in auto-construction themselves.

Prefabricated Timber Construction

Throughout Cato Manor, businesses exist that provide the opportunity to purchase a ready-made timber house. A single unit consists of four panels, one of which has a window and door, and a roof. The standard dimensions are 3m x 2,5m. This 7,5m² offering is intended to house a family of four, and costs R 3 000. The price is slightly negotiable if purchasing two, to approximately R 5 500. Pine, pallets, and corrugated metal sheeting for the construction are sourced from the local hardware stores. An option extra of linoleum is used for waterproofing.

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Figure 32: Unit for Sale, Harry Gwala Road
Image: Author's own



Figure 33: Salvaged materials
Image source: Author's own



Figure 34: Panel on display, Harry Gwala Road
Image source: Author's own

Businesses such as these illustrate a need for homes that are not constructed by the users themselves. Although many residents choose to engage in auto-construction to build their homes cheaply, purchasing materials and supplying the physical capacity; not all residents can or wish to undertake the physical aspect of auto-construction themselves. Construction in most informal settlements is a male dominated activity. This option provides for both those who wish to purchase rather than build themselves, and women led households for whom this is a simpler option.

6.2 FINDINGS

RESIDENTS' RESPONSES TO AUTO-CONSTRUCTION IN INFORMAL SETTLEMENTS

Interviews with residents revealed further details of auto-construction and incremental development of informal dwellings in the Cato Crest area.

Interviewees were African male, most of whom share a very similar living situation. Interviews with residents of informal settlements in Cato Crest reveal that auto-constructed housing is the norm. Residents are very well established in the area, living in Cato Crest for a number of years. They state that they prefer to continue living in the area as it is well located and convenient for them; they simply want to have better housing. One of the interviewees has lived in Cato Crest in an informal shack for 18 years next to the BP Garage on Vusi Mzimela Road. He came to the settlement because his brother lived there. He lives alone in his house, which is approximately 16m² (4m x 4m).

This information reveals that people wish to live in urban areas, even if this means living in an informal settlement. Further, that auto-constructed homes in informal settlements are not temporary living conditions for many residents. The RDP backlog is extreme, revealing that a housing model that can be constructed efficiently in a short time period is required to mitigate this backlog.

This particular resident uses timber to construct his house as it is cheaper, easily removable and less permanent than brick, explaining that uncertainty is always a factor to consider, even after 18 years. The major problem with timber construction is that it is prone to degradation and fire, which is reported a major problem in such settlements as they occur frequently due to use of candles and stoves. Timber panels and poles are also often treated with creosote which is extremely flammable, accelerating the damage of shack fires.

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Residents engaging in auto-construction, get some assistance from friends with the construction of the dwelling. Materials are purchased at their own cost from the local hardware store; included above. Most residents do not pay rent, and are responsible for their own maintenance. They consider that the incremental development method offers them a chance to add, or upgrade as and when they have the funds available to do so.

This information and interviews with Bassa's Hardware store convey that residents' continually spend money on maintenance as they build from materials that are prone to damage, meaning that financial injections into their home are not economically sustainable as no improvement in terms of better quality materials or improvement of size takes place; it merely maintains the basic structure comprised of basic materials that need to be replaced continually.

Most residents in auto-constructed housing do not have access to electricity; some of them do connect illegally to electrical connections. This is a dangerous practice which has resulted in injury. Running water is provided in the form of taps, and ablution blocks, but water points are not available to every home. This informal settlement is one example where residents have not been afforded the right to access adequate housing as outlined in the Constitution.

Addressing the question of the spatial and physical requirements for housing in informal settlements, residents were asked to describe their ideal home. Residents generally responded with a standard preference of 2 bedrooms, a living and kitchen area and their own bathroom. Some cited that they would like to support other family members, in which case they would require more space, and prefer the option to extend their homes as some residents have done with their RDP homes.

In response to the above feedback, residents broached with the idea of an incremental housing model whereby a basic structure and services are provided, and users are to provide the infill, residents seemed approving of the concept, stating that they build on their

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own anyway, and this would help them immensely and offer them the opportunity to improve their homes as and when they could.

Although residents undertake auto-construction and are happy to provide the human capacity required to create and improve their living structures, completely unaided and unregulated auto-construction is problematic. As a result of the lack of good quality materials and appropriate construction skills, auto-constructed housing in this context does not often progress 'enough' or to an adequate standard where families can live comfortably. For the initial build, residents outlay money to purchase materials and construct their dwelling. Over a short period of time homes degrade due to weather damage, wear and tear and other factors such as rot and even fire. Residents are thus forced to spend the money that could be used to improve the home's size, materials and finishes on maintenance. This situation is a continual cycle of repair and damage rather than a home as an appreciating asset.

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RDP IN-SITU UPGRADING

Exploring housing models is necessary in order to understand residents' needs and living situations and how they respond to various physical environments. This study in the context of Cato Crest focuses on the RDP model, which was implemented by the post-apartheid government in an effort to respond to the socio-economic problems faced by South Africans. The RDP was tasked with building and allocating homes to ensure access to adequate housing for all.

Cato Crest is one area in which RDP in-situ upgrading projects took place. The intention with such projects were to provide formal housing and deliver services to residents, including water, electricity, sanitation, roads and refuse removal.

This component of the research was undertaken on a site inspection visit with a group of Community Liaison Officers from the eThekweni Municipality's Department of Human Settlements.



Figure 35: Cato Crest Area 1, 2016
Image source: Google Maps

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This case study is focused on the area around the Cato Crest Library, known as 'Area 1'. Houses are the standard 36m² as per RDP; with 2 bedrooms, a bathroom and living/kitchen area. This project entailed 1000 homes, of which 742 were built. The subsidy for each house is R110 000, with services, but in this case only R 80 000 was made available per house.



Figure 36: View of Settlement from Cato Crest Area 1

Image source: Author's own

Interviewing a Community Liaison officer revealed that the greatest challenge in Cato Crest in terms of housing delivery is political; and the problem of demand vs. delivery. In Cato Crest, the demand for homes is incredibly high, with most residents waiting an average of 20 years on the subsidised housing list before being provided with an RDP house. He went on to explain that Cato Crest is an extremely dense area, with 'too many shacks, and too many people.'

It is very common that residents engage in auto-construction, adding to the RDP houses to create extra rooms for family members or for supplementary rental income. Living in an RDP house means paying for services that one does not have to pay for when living in a shack. Most additions of 'backyard shacks' are for the purpose of supplementary income to pay for increased expenses. Another reason for the construction of 'backyard shacks' is that RDP

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houses are based on the nuclear family of 4 family members which is not the case for a large number of families. Additional structures are constructed in a variety of materials; timber, some from block work and most commonly corrugated metal sheeting. Extensions to the RDP houses range from extremely informal to plaster with decorative elements.



*Figure 37: Informal rooms for rental, Cato Crest Area 1
Image: Author's own*

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*Figure 38: Living / kitchen area of RDP House, Cato Crest Area 1
Image: Author's own*

Although it is planned that services are in place before or during the construction of housing, this is not often the case. Houses are delivered first, without services. This has resulted in residents constructing makeshift long-drop style sanitation, which is extremely unhygienic. The municipality has attempted to make up for the lack of service delivery by installing water points and communal ablution blocks. Currently, water and electricity services are being retrofitted in Cato Crest Area 1.

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*Figure 39: Informal additions to RDP house
Image source: Author's own*



*Figure 40: Makeshift sanitation
Image source: Author's own*

Some double storey flat units have been erected in Cato Crest as part of a separate project. Although these flats are occupied and 'are better than a shack,' according to Community Liaison Officers, residents prefer a stand-alone house over a flat, as upper floor residents do not have land per se that is their own, disallowing them the opportunity to develop their homes. Individual houses with access to ground floor provide residents with an opportunity to extend their homes, which is something that is of extreme importance to them, as noted by Community Liaison Officers that frequent the area.

RDP project layouts are not very dense; with the governmental regulation of an 80m² plot with 36m² houses. This low density arrangement lends itself to infill; in this case: backyard shacks. As mentioned earlier, the greatest challenge in Cato Crest is that of too many people, too few houses. Shacks achieve a greater density, than RDP houses do, which is a strong critique of the RDP scheme.

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THE MUNICIPAL OUTLOOK

Housing in South Africa is unfortunately not just about the delivery and access to what the constitution deems 'adequate housing.' it is an extremely politicized topic, which has noticeably affected and continues to affect the most marginalised members of our population. The Municipal Government's views on housing and that of residents are contrasting in various instances. This contrast will be explored throughout this section;

An interview with members of the eThekweni municipality's Human Settlements revealed the challenges and attitude towards informal settlements and housing from local and national level. From the start it is clearly stated that housing is treated with a top-down approach. National government sets a target, which is simply implemented by the municipal government

One of the driving forces behind in-situ upgrading of informal settlements is political interest. As a result of particular issues being pushed as part of the 'development agenda' as a political move, implementation of housing projects are often delayed. This has resulted in the extreme time frame on the waiting list to receive an RDP home for most residents in informal settlements. It could also be argued that such slow roll out of homes has contributed to the prevalence of auto-constructed homes and emergence of informal settlements.

In addition to the strict top-down approach, another challenge faced by residents in improving or building their own homes is that financial institutions do not generally lend to lower income earners. Compliance with building standards and regulation for housing projects is also something that is extremely tedious and unrealistic in a country where informality is integral to the development of many. The number of regulatory frameworks put in place by government authorities, particularly for housing projects can result in further delays, and an unwillingness to test housing models other than the RDP housing model. The

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eThekweni municipality is dictated to by national and provincial standards, with no leeway on the standards as meeting targets (numbers) is the priority.

This means there is no focus on community-led projects. 'We push numbers,' is the simply explained reality. If the allocated budget is spent for the 2016 year, for example, the following year, a larger budget will be allocated. 'You cannot question your political leadership,' is another statement made, explaining that the mandate must be followed, for example to provide 400 000 houses in 2015.

Residents present a very different view; that people need homes, and will build them by any means necessary. The approach is straightforward, and acknowledges the human need for shelter as a necessity. Participants of auto-construction do not consider issues of building standards, and take a clear bottom-up approach to building their homes, deciding where and how they will build them.

However, it is explained by the interviewees that it is not always practical or achievable to meet all of the targets set. Electrification of informal settlements, for instance is outlined in a mandate that comes from the Department of Energy. Departments of Transport, Services etc provide mandates to the eThwkwini Municipality. Housing must subscribe to the mandates set and achieve all of them in order to construct houses. To deliver one house is not just about a house, we need electricity, a road and water.'* This protocol extends the process. 'It's not housing anymore- it's Human Settlements' jokes one interviewee, explaining, 'it was about the house – now it's more than that.'

Alignment of the various departments involved in the delivery of a housing project and the co-ordination of their plans and budgets is extremely tedious and difficult to achieve. This is one of the main reasons why the municipality prefers Greenfields projects, as they are faster and provide more efficient delivery. It is acknowledged that informal settlements exist strategically round services. In order to upgrade an informal settlement, according to the

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system, existing services must first be upgraded, either formally or by bringing in mobile services such as clinics.

The housing process was described at length, the most notable elements of which are that there are no consultative processes that take place with the community. The process mostly entails a proposal being circulated from one department to the other in order to arrange implementation. The research undertaken is mostly a desktop survey and a physical assessment of geotechnical conditions.

It was openly stated that the budget for housing is simply not enough. 'We need a shift in policy and thinking in how we tackle informal settlements.' There has been some interest in adopting a new housing typology in an effort to reduce the cost and increase the delivery of housing. This entailed exploration of denser housing models such as three-story walkups. As explained earlier in the Case study of Cato Crest Area 1, this model is not one that residents are particularly interested in.

The shift towards a more bottom-up approach is supported by the interviewees. Broached with the topic of incremental development as being a potential approach to deliver cheaper and better housing, the response was that nationally there is political will, but at a local level there is not; as there are too many political agendas that influence housing delivery. In terms of tolerance of incremental development that does take place in the form of additions to RDP housing projects, it is encouraged to make positive contributions to homes behind closed doors.

*Although, as mentioned in the Cato Crest Area 1 case study, this is not always the case.

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SDI ALLIANCE

The Slum Dwellers International (SDI) is a social movement that aids the urban poor. They undertake grassroots initiatives dealing with housing development, informal settlement upgrading, securing land tenure and protecting residents against evictions and demolitions in the context of informal settlements.

The intention of this interview and analysis with members of the SDI Alliance and residents of informal settlements is to reveal the outlook of a collective body that is active in settlements throughout Durban. The SDI has been involved in in-situ upgrading projects in Cato Crest, Cato Manor and other areas such as Piesang Rivier, and Greylands in Inanda township.

The SDI is relevant to the discussion on auto-construction in informal settlements as they present the views of residents and provide information into the everyday experience of the informal settlement dweller. They provide a bottom-up approach which contrasts the top-down approach of the Municipality discussed earlier.

The key focus that arose from the members of the SDI alliance was that of community participation and community led projects. The main reason that this is a positive endeavour is that it avoids protests, something which often delays housing projects from moving forward.

The SDI advocates for a community led projects, stating that they have been successful in their experience. Some key quotes from interviewees that are both members of the SDI and residents of informal settlement on the topic community led projects from the interview are cited and discussed;

*“If they [the community] drive it, then they own it. They make and take responsibility
for their own decisions.” (SDI Alliance member, 2016)*

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This quote refers to the power of ownership and the positive actions that may be inspired upon claiming ownership. It indicates the position of the SDI on encouraging members to be actively involved in community led projects, empowering people to claim their right to participate in and shape their own living environments.

“Everything must come from the people.” (SDI Alliance member, 2016)

The attitude that is revealed in the above quote is that the people are the key driver in any process that affects them. It is explained that the involvement of ‘the people’ is imperative to provide a product or service that will ultimately serve them.

“While you wait for government services – we must do things for ourselves.”

(SDI Alliance member, 2016)

This quote makes referene to the strong sense of self-reliance and eagerness to undertake a movement towards bettering the living situations in informal settlements. However, the SDI Alliance advocates for a partnership with the municipality, acknowledging the need for such. This is openly conveyed in the statement of one member, ‘We need development that we cannot do alone.’ In 2005, in Amaoti, a township in Inanda, community members were trained by the SDI Alliance to undertake enumeration* of the area for a project. Thereafter, they work with the municipality to devise a layout for the potential project. The SDI does not have the resources, but can contribute a strategy.

The Municipality presents the concept of community led projects through their description of Batho Pele Principles. These are a set of principles intended to put people first in community projects undertaken by the municipality. Unfortunately, according to members of the SDI Alliance and uTshani Fund, this is not how the process actually takes place. The municipality offers an entirely top-down approach described by one interviewee as (to the community);

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'We need your help to do this thing that we decide.' The recommendation by the SDI Alliance is that the community should be the body to prioritise their own needs, and be led through the initiation and implementation of a project.

In terms of implementation, residents are prepared to physically carry out the construction. Currently, this is their way of exercising autonomy over their own space. Residents pool their resources (materials, skills and labour) to undertake the physical building of houses. They do not necessarily use their own resources (savings) to build from scratch, as they would rather use this to make improvements or alterations to a subsidised house. From the point of view of the SDI, the goal is to get as much out of the subsidy as possible. They are interested in providing and attaining housing that is congruent to the needs of the residents.

An example of such is Piesang Rivier, where a combination of the government subsidy and incremental development by residents proved a successful outcome. The average unit size was 56m², with a cost of R15 000. Residents pooled both their labour and savings to buy materials and build each home together.

**Enumeration is a complete, ordered listing or inventory of people, houses, services.*

Design

'We don't use municipal ideas or plans. We draw on the ground our dream.

My house is my dream."

The above quote explains that there is no a specific average requirement or consensus on the 'suitable average home' that could be extracted from the interviewees.

Precedent studies and literature discussed aim to offer an 'ideal' situation. However, this is not the case as explained by the above quote. For her, her home is an ultimate goal, and is unique to the individual. More important than aiming for the perfect 'ideal' home to suit everyone, the ability to change and adapt a home to suit one's individual needs is so

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important. This is explored in the concepts of Flexibility and Incremental development in the earlier chapters.

Every home undertakes a 'planning' exercise of sorts and physically draws out the plan of what they want from a home. This is usually limited by the budget. Professionals (in this case working with the SDI Alliance) oversee the design and the needs are averaged out and consolidate with the available budget. Flexibility is more important than a 'minimum average' as every family is different.

In the eThekweni area, most make use of concrete blocks as they are readily available. Residents emote that they are open to exploring cheaper and better building materials.

In-situ vs. Greenfields

The SDI Alliance advocates for in-situ upgrading projects to be undertaken instead of Greenfields or periphery sites developed. The reason for this is that people are already established in these areas in terms of employment, schooling. Simply explained, 'people want to be in the city.' That is why informal settlements popped up in urban areas to begin with. Proximity to the city is of extreme importance, providing better access to opportunities to improve livelihood and well as avoiding disproportionate (to income) transportation costs. Re-blocking is often undertaken in in-situ upgrading projects as it offers a better and more efficient layout for the provision of services.

The culture of self-reliance is strong in organised communities, with residents eager to get involved in providing for their own needs.

CHAPTER 7.0

7.0

RECOMMENDATIONS

7.1 INTRODUCTION

As rapid urbanisation takes place and the demand on the city's resources continues to grow, it is imperative that informal practice is acknowledged. Informality is an intrinsic part of African cities. Often overlooked, it is a phenomenon that has sustained many members of the population.

A shift in paradigm is required in order to cope with pace of urbanisation, and constant variables of a developing South Africa. Spatial segregation has shaped our cities in a way that has resulted in the emergence of practices such as auto-construction. This practice as a product of informality should be viewed not as a problem, but rather as an opportunity to develop a new strategy towards the provision of more sustainable and humane living environments for the great number of South Africans living in informal settlements.

7.2 ANALYSIS

It is clear that a housing model that is congruent with user's needs is required. Within the context of Cato Crest, the existing typology of the RDP model area does not meet the user's requirements, resulting in many residents engaging in auto-construction of 'backyard shacks' in order to supplement their needs.

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Auto-construction as a method of dwelling construction also presents many limitations for residents. This practice, although providing people with a space to live in the city, does not achieve the necessary standards for it to be deemed 'adequate' housing.

It is suggested that a combination of both a bottom-up and top-down approach would provide the necessary balance between flexibility and ensuring that a good quality housing scheme that does afford access to adequate housing and supporting services is delivered.

The proposed scheme is to take into consideration the outcomes of the research in the context of South Africa and in particular the area of Cato Crest, where the context for the design development will be undertaken.

Recommendations are based on the exploration of various literature, case and precedent studies and research discussed throughout this dissertation:

7.3 DESIGN

It is imperative that the overriding theories of sustainability and concepts of resilience be embodied throughout the architectural development. This is to be carried through from the conceptual stage and encompass all modes and levels of sustainability; physical, social, cultural and economic.

The practice of auto-construction is facilitated rather than inhibited in the development. However, it is recommended that design strategies that regulate the user-contributed elements be put into place in order to ensure the structural integrity and quality of the development.

There is an opportunity to capitalise on resident's contributions (physical and financial) by providing a good quality core structure as the starting point for further development. Residents' inputs become more sustainable, and can contribute significantly towards

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improving the unit rather than continually spending on maintenance as a result of poor quality structures.

The notion of community is vital to the success of the proposed development. The intention of the development is to engage people to be involved in the shaping of their own living environments. The development aims to foster a sense of community and build relationships between members by encouraging exchange, thereby extending the scope of the architecture and encouraging participation.

Participation includes all users of the development, including children, women and the elderly. It entails the involvement of users in various activities and areas of the development, which will be discussed further in this chapter. In terms of the provision of homes, it allows users to physically contribute to the development of their homes.

Individuals should be motivated to contribute to their own environment, bringing a sense of identity, variety and character to the scheme.

The underlying support provided by the scheme aims to guide these individual responses in a way that preserves the legibility of built form and space:

URBAN DESIGN FRAMEWORK

- i) The development should aim to deliver housing in an urban context, allowing easier access to the city.
- ii) Proximity to the city is valued, with good access to transport, employment, and available materials that facilitate the practice of auto-construction
- iii) Activate and define street edges.
- iv) Define public | private interface to create legible space
- v) Encourage urban character and acknowledge existing connections to urban fabric.

**EXPLORING AUTO-CONSTRUCTION IN INFORMAL SETTLEMENTS AS AN
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SITE DEVELOPMENT

- i) The overall scheme should activate the site by drawing movement through the site from surrounding streets. Movement patterns should be retained and used as a basis to create connections. This promotes easy navigation and passive surveillance throughout the development.
- ii) Passive design strategies should be employed; such as good North/South orientation. Shading devices should be used on the East and West and some on the North facades in order to regulate heat gain. Cross ventilation should be employed, reducing the need for mechanical ventilation, thereby adhering to the sustainable ethos of the project.
- iii) Local materials should be selected, as this is more sustainable and cost effective. Materials should be robust in order to reduce wear and tear, and require minimal maintenance in order to keep costs down.
- iv) Local labour should be employed as this is economically sustainable and provides employment for construction workers in the area.

THE ARCHITECT / USER DIALECTIC

The relationship between architect and end user is intended as a synergetic rather than a contentious one. It extends the physical concept of support and infill and outlines the contribution of the architect and user through varying scales of the scheme. Public zones and buildings are designed by the architect; this includes public open space, paving and landscaping. Participation takes place on a communal level in the public zones of the scheme: users produce infill in communal Building Workshops. The residential component is split into two parts following the support and infill method. The support component is designed by the architect to include the structural framework; slabs, columns, roofing, wet services in bathrooms and kitchen areas as well as staircases. The infill is provided by the

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end user, by enclosing walls and providing floor covering panels. The infill is non-structural, thus maintaining safety standards.

TPOLOGY

The recommended typology is that of a Mixed-use Incremental Residential Development. A breakdown of the terms is as follows;

i) Mixed-use

This is intended to accommodate the various needs and activities of residents in the area, including that of a social, economic and physical nature. The mixed-use element is owned by residents, allowing them an opportunity to earn a supplementary income by having a space to engage in economic activity themselves or to rent it out. This allows various levels of flexibility to be catered for in the design.

ii) Incremental

This component of the typology refers to the ability for users to expand and adapt their own spaces. The goal is to create homes that can grow with families over time, in size and variety of function. This implies that the home continues to meet the needs of users as it is flexible, assuring a more sustainable architecture.

iii) Residential

This component addresses the provision of housing units. Based on addressing the question of spatial and physical requirements for housing in informal settlements outlined in Chapter 1 and the feedback gained in the Case Studies and Findings chapter, deliverables for units are generated to comply with residents' needs. Flexibility is of extreme importance in the design of the residential module, allowing for specific families' needs to be accommodated.

PUBLIC ZONES

Mixed-use areas

- i) Mixed-use areas are intended to supplement the income of families. Some ways in which the spaces can be used, but are not limited to are; commercial activity (small businesses), or small rental units.
- ii) Mixed-use should be situated on the Ground Floor to maximize foot traffic along activated streets and axes through the site.
- iii) Size of the mixed-use module is based on the structural module of the residential units above, as the latter is more sensitive to the module size.
- iv) Service should take place from the main access street.
- v) Power points should be provided to these areas (electrical or solar power).
- vi) Water points should be provided to these areas.
- vii) Access to ablutions should be provided to these areas.

Building Support Workshops

- i) Building support Workshops should be accessible from Ground Floor.
- ii) Zoning of Building Support Workshops should allow easy road access for service.
- iii) Workshops should accommodate storage, wash and refuse areas in addition to workspaces.
- iv) Access to ablutions to be provided to these areas

Community Support

- i) Community Support spaces should be accessible from Ground Floor.
- ii) Buildings should be integrated into the public space, using physical or visual connections to public areas in order to encourage participation of community.
- iii) Access to ablutions to be provided to these areas.

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Parking

- i) Based on Case Studies and Findings, it is assumed that many residents will not be car-owners, thus on-site parking is not a priority. Mixed-use areas do have the potential of being used as a garage if residents do acquire cars at a later stage.
- ii) Street parking should be provided for public buildings .

Amenities

- i) Solar powered cell phone charging points should be provided on site

Pedestrian Movement

- i) In the initial stages, only pedestrian movement will take place through the site as vehicular movement will take place along the bounding streets only. As residents progress, they may acquire vehicles, which can be accommodated on the ground floor of the units by converting spaces into garages.
- ii) Existing pedestrian routes through the site should be preserved.

Open Space

- i) The existing Bellair Stream runs through the site area. This natural element should be preserved and treated as part of the public space.
- ii) The 100 year flood plains associated with the stream cannot be built upon. They should be utilized as open space in the form of community gardens or public space.

Service area

- i) Wash troughs, and washing lines should be provided.
- ii) A refuse area with a washable, hard surface should be provided.
- iii) This area should be easily accessible from the street.

PRIVATE ZONES: RESIDENTIAL

Tenure Security

- i) Tenure security must be afforded to residents of the proposed development. This assures residents of a measure of permanence as they are owners of land and building. Further, tenure security allows and encourages owners to invest in their homes. It incentivises owners to maintain their homes, which is key to a successful and safe living environment.

Flexibility

- i) It is recommended that the concept of flexible architecture be implemented in order to provide a means for users to easily change their spaces to suit their needs. The ability to change one's space is of extreme importance. This entails putting into practice the concepts of Open Building, using the Infill/Support method.
- ii) The merging of top-down and bottom-up approaches is exemplified in this strategy. The top-down element should be provided, and is the Support component of the scheme. The bottom-up approach is embodied in the Infill component of the scheme.
- iii) The design should address the two main challenges of both approaches:
 - allow flexibility in a state provided housing development
 - implement regulation of auto-construction

Incremental Development

- i) The design should employ the strategy of Incremental Development. This approach allows users to add on in stages and is much more financially suitable to the context as people may make additions as and when they can afford to. It allows the opportunity for dwellings to upscale as well as downscale as needs of the family change.

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- ii) In order to facilitate the incremental approach, the infill component should be regulated in order to achieve an adequate standard of construction. A strategy to assure structural quality, waterproofing, fire-proofing and other building standards is to be implemented. This can be undertaken through the design of a 'kit of parts' which provides for the needs and various configurations of infill.
- iii) The infill components are to be constructed by residents. Materials for construction of infill should be subsidised using project funds. Construction should be supervised in the Building Support Workshops.

Scale

- i) It is recommended that a low rise typology of three storeys be implemented for the residential component of the scheme:
 - Limiting the scheme to three storeys allows all units to access the ground, maintaining security of tenure rather than sectional titles. This simplifies the process of incremental development, as no structural work can be undertaken affecting other owners below the unit being developed.
 - A three storey development maintains a good connection to the ground, facilitating passive surveillance. The desired human scale mentioned above is preserved in a development of three storeys or under.
- ii) The number of dwelling units grouped together should be limited. This is recommended in order to foster a relationship between residents and avoid the anonymity that comes with very large scale housing projects. Maintaining a smaller group of dwelling units and encouraging interaction among residents provides passive security for dwelling units.

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Density

- i) Municipal guidelines, recommended that a density of 40 dwelling units per hectare be implemented. This accommodates 160 persons per hectare. This should be challenged, to increase the density of the residential components. As units are flexible, some may accommodate more people, which will alter this number.
- ii) Each unit should have access to outside space, such as courtyard, garden space or terrace.

Maintenance

- i) Building design should keep maintenance to a minimum as this is more sustainable in the context of Cato Crest as well as more congruent with the financial means of intended users. A three storey residential development excludes the need for lifts, reducing the need for maintenance.

TECHNICAL RECOMMENDATIONS

Structural Framework

- i) The structural framework should be a simple rectangular grid, and be repetitive in order to be economically efficient.
- ii) The Structural module should be based on the requirements of the residential unit, as other supporting functions are more adaptable in terms of size.
- iii) Structural frameworks should respond closely to the site topography.
- iv) The structural framework should include all foundations (engineered to carry the load of additions), roofing, services and structural columns.

Services

- i) Services should be grouped between residential units and accommodated in ducts.
- ii) Wet services and electrical points should be provided as part of the primary structure.

Infill

- i) Infill should be regulated in order to maintain a good standard throughout the development. This should be upheld by Building Support Workshops.
- ii) The structural framework should facilitate easy additions and alterations by residents.
- iii) A 'kit of parts' system consisting of a range of infill components should be devised to facilitate easy additions. This is based on the module of the structural framework, and should be designed to allow flexibility and multiple configurations. These are used as a guide for alterations for residents to expand their homes

CHAPTER 8.0

8.0

DESIGN DEVELOPMENT

8.1 INTRODUCTION

This project is intended to challenge the existing way in which we view housing. It presents a shift in focus from 'method' to 'process,' with the intention of providing users with more control over their spaces. This is explored through the application of the theories and concepts of Participation architecture and user-defined flexibility.

The design intervention aims to synthesise the theories and concepts discussed in the literature review, the applications of such in the precedent studies and the context specific findings of the case study.

The incremental residential component represents a method of flexible housing. It is one of many possible configurations. Of greater importance than the unit layout, which may change over context, climate and social structures, is the opportunity for flexibility.

It is hopeful that housing will move towards the provision of more flexible environments in the future, and that users will play a greater role in shaping their living environments.

For now, a catalyst must be employed, in order to kick-start the process of incremental and flexible living that enables the user to be a contributor to their living environment. For the purposes of this context-specific dissertation, this takes the form of a Building Workshop. This component represents the process behind incremental and flexible housing.

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This approach is intended to provide the user with the proverbial tools to be able to change their spaces. Here residents engage in the production of their living environments through the physical building of infill components to extend and adapt their homes, and contribute to the social quality, and character of their community through exchange with other residents.

8.2 SITE SELECTION CRITERIA

The following criteria were developed on the basis of selecting a site that is i) in need of a new strategy for housing, and ii) that is host to the practice of auto-construction. Informal settlements have long been established and are very much a part of the South African cities. The following criteria are imposed with the intention of finding the ideal informal settlement site that would best host a sustainable, incremental housing development.

1) Informal Residence

Evidence of auto-construction is one of the criteria for choosing a site. In order to facilitate the practice, it should already be exercised in the area.

2) Settlement Size

The selected site should be in a settlement of a reasonable size in order to implement an incremental housing development in a sustainable manner. Too few residents would not be enough to sustain the development and allow the full potential to be exercised.

3) Degree of Urbanity

Good urban characteristics are required for the development of this typology. Urban housing is necessary to attain access to the city. Proximity to the city, access to employment, transport, and other amenities are important criteria for the selection of a site.

4) Community Autonomy

The selected settlement should display auto-constructed (self-erected) informal dwellings. Sites upon which dwellings are constructed should be self-selected (not-government allocated). Residents should be established in the settlement.

5) Resistance

The settlement area selected should have some evidence of residents wanting to remaining on the site. This illustrates a measure of claiming access to the city by residing in an informal settlement within an urban context.

8.3 SITE OPTIONS

8.3.1 SITE A : CATO CREST

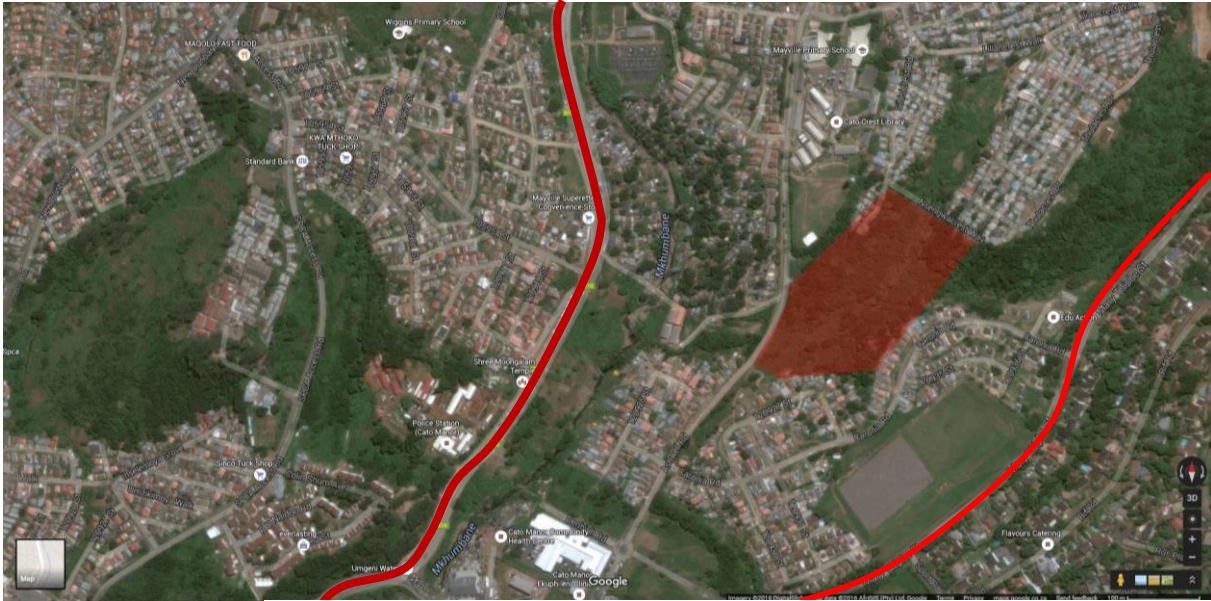


Figure 41: Cato Crest: site illustrated in red fill, with main arterials highlighted in red
Image source: Google Maps 2016

8.3.1.1 LOCATION

Ashwell Road, Cato Crest, Durban

8.3.1.2 JUSTIFICATION

This site was considered as it is part of the Cato Crest area. It is well located urban land and has good connection to amenities in the area. It is a Greenfields site and would provide well located urban housing to residents of the area.

8.3.1.3 ASSESSMENT

Informal Residence [6] - The site area is situated directly between areas of auto-constructed housing and formal RDP housing. There are no existing dwellings on site.

Settlement Size [6] – The Cato Crest settlement is large and fairly dense. There is a need for housing in the area; however there is no existing informal settlement on this site.

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Community Autonomy [5] - There is evidence of self-erected, auto-constructed dwellings in the Cato Crest area, but none on this particular site. These take the form of entirely user-erected informal dwellings or 'backyard shack' additions to RDP homes.

Degree of Urbanity [7] – Proximity to the city is good. Connections to main arterials are not direct, but are fair. Amenities are provided around the site but none exist on the site itself. Employment opportunities are available in the area.

Resistance [3] – A strong civil society exists in the informal settlement areas in Cato Crest. This site is closer to the formal housing developments than the informal settlement; thus is not a contested space where residents have taken action to remain.

Total: 27/50

8.3.2 SITE B : QUARRY ROAD



Figure 42: Palmiet: site illustrated in red fill, with main arterials highlighted in red
Image source: Google Maps 2016

8.3.2.1 LOCATION

M19 / Quarry Road, Palmiet, Durban

8.3.2.2 JUSTIFICATION

This site was considered as it is a well-established settlement and has been little intervention in the settlement. It has good connections to the Reservoir Hills area as well as that of Clare Estate.

8.3.2.3 ASSESSMENT

Informal Residence [7] - The site area is densely populated with informal, auto-constructed dwellings, and has been so for many years.

Settlement Size [6] – The informal settlement is one of four in the area, ranging from 300-500 informal dwellings. The Quarry Road settlement is extremely dense, over a relatively small area.

Community Autonomy [5] – the community of informal settlement residents practice auto-construction and live on the property without tenure security.

Degree of Urbanity [7] – Good connections to main arterials (M19, Mountbatten Drive O’Flaherty road), provides access to Reservoir Hills, Umgeni and Clare Estate. This implies good access to employment opportunities. Transport is available along these arterials allowing easier access for residents.

Resistance [6] – Residents in the Quarry Road area refused relocation to Parkgate in 2004. Family members have joined residents in the informal settlement, implying intention to remain in the settlement.

Total: 31/50

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8.3.3 SITE C : CATO CREST [SELECTED]



Figure 43: Cato Crest: site illustrated in red fill, with main arterials highlighted in red
Image source: Google Maps 2016

8.3.3.1 LOCATION

M10 (Vusi Msimela Road), Cato Crest, Durban

8.3.3.2 JUSTIFICATION

This site is selected as it is a well-established informal settlement and has a long tradition of auto-constructed housing. It is well located urban land, and offers good proximity to the city as well as good connections to other areas.

8.3.3.3 ASSESSMENT

Informal Residence [9] – The Cato Crest settlement is one of the more established settlements in Durban, densifying rapidly in the 1980s due to influx of African migrants. There is a very strong culture of informality and informal construction. Residents of informal settlements live in Cato Crest permanently, although in informal dwellings due to lack of tenure security. The implementation of in-situ RDP housing projects acknowledges the need

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for more stable and permanent residences. However, auto-construction continues to take place by residents of RDP homes as they extend their homes.

Settlement Size [8] – The Cato Crest is a large, dense settlement with 7610 households, and a population of 17 860 in 2011. A fair number of informal settlement residents are required in order to implement a sustainable, process-driven incremental housing development.

Degree of Urbanity [9] - This site offers good proximity to the city, illustrated by a large community of residents that walk to the CBD via Berea Road for employment. There is easy access to transport (taxi and buses) with good connections to main arterials – M10, Spine Road, Albert Luthuli. This implies good access to employment in the following areas: Berea, CBD, Cato Manor, Manor Gardens. There is provision of amenities such as the Cato Crest Library, Primary Schools, Superettes, Police Station, and various businesses (including hardware stores for materials).

Community Autonomy [8] – This site has only informal, auto-constructed dwellings. The sites are selected by residents themselves. This illustrates an act of autonomy and claim to urban land. There has been collective action among community members seeking state assistance and access to housing.

Resistance [9] – there is a strong civil society present in Cato Crest, with many service delivery protests being undertaken in recent years. Many residents migrate to the area to join other family members living in the informal settlement. This indicates the permanent intention to remain living here. Residents have resisted relocation to periphery settlements on many occasions.

Total: 43/50

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8.4 CONTEXTUAL ANALYSIS

8.4.1 MACRO CONTEXT

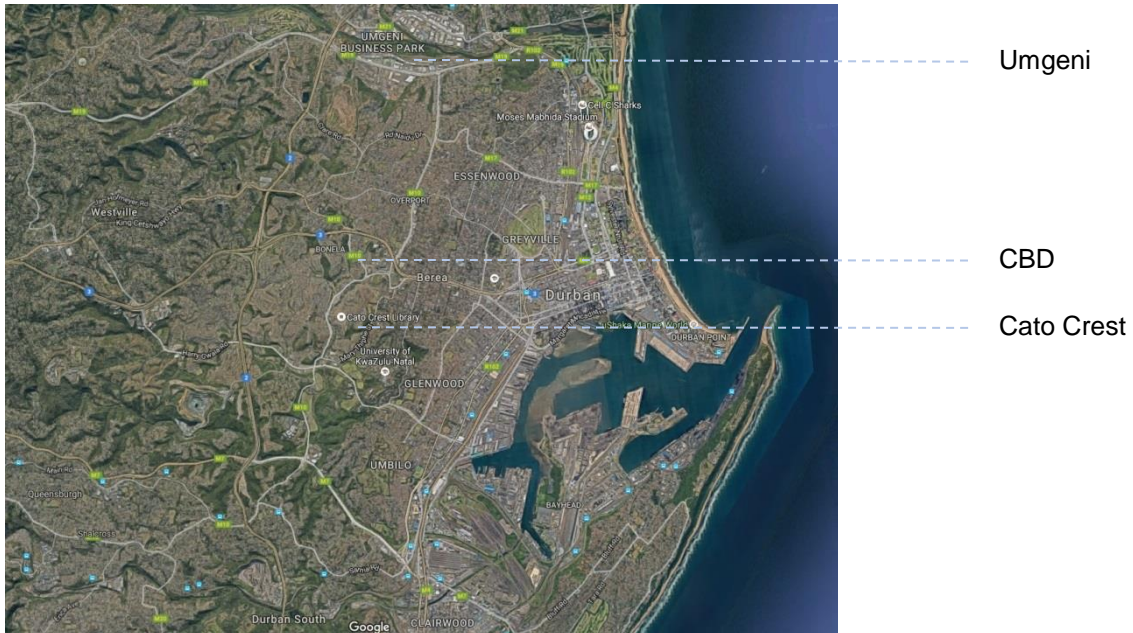


Figure 44: Macro Context, Durban
Image source: Google Maps 2016

8.4.2 MICRO CONTEXT

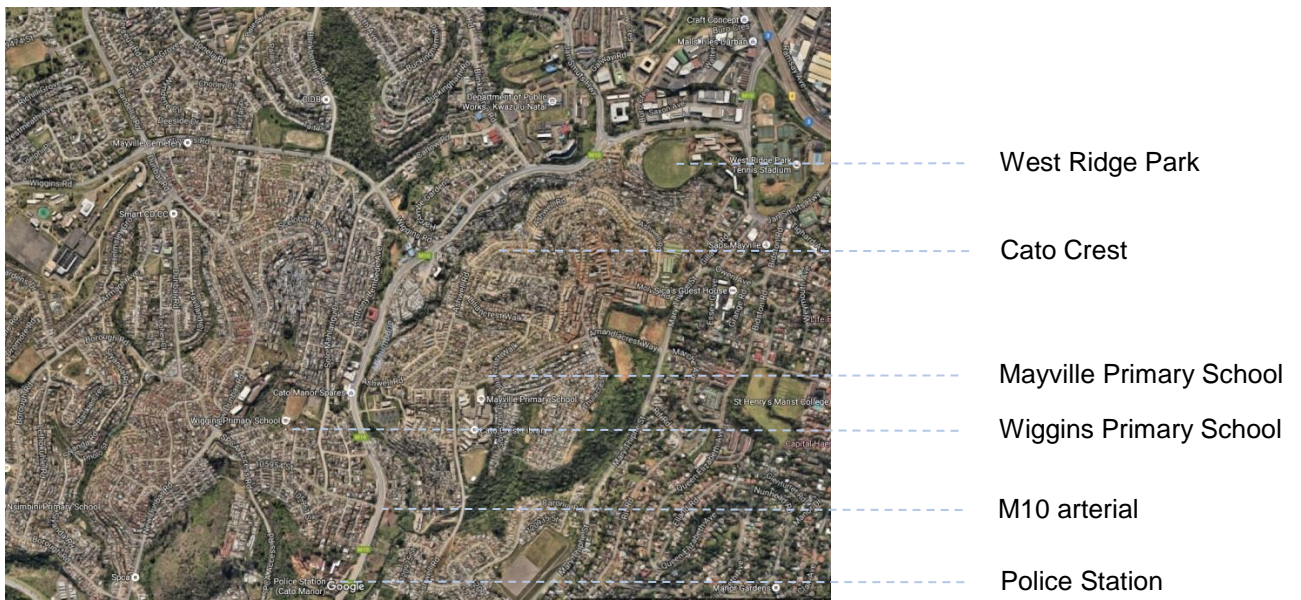


Figure 45: Macro Context, Durban
Image source: Google Maps 2016

EXPLORING AUTO-CONSTRUCTION IN INFORMAL SETTLEMENTS AS AN
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8.5 SITE ANALYSIS

8.5.1 VEHICULAR CIRCULATION



Figure 46: Vehicular Circulation and Intensity of usage ranging from high in red to orange in low
Image source: Google Maps 2016

8.5.2 PEDESTRIAN CIRCULATION



Figure 47: Pedestrian Circulation and Intensity of usage indicated by line weight
Image source: Google Maps 2016

8.6 THE BRIEF

Acknowledging the severe backlog of housing delivery in Durban and the ineffectiveness of the RDP model for informal settlements, the eThekweni Municipality in conjunction with The Department of Human Settlements have proposed an incremental residential development in Cato Crest, an area of Cato Manor in Durban. This development seeks to acknowledge the informal practice of auto-construction in informal settlements and provide residents with the support to use their energy and resources to improve their homes. It is intended to grow and change with the community through user input.

Due to the rapid rate of urbanisation, a typology that offers users the ability to change and expand their own homes has become a viable and sustainable means of coping with the extreme demand for housing by residents. This typology aims to make efficient use of well-located urban land, in order to mitigate urban sprawl and improve dense living conditions in informal settlements.

It is the aim of the project is to find an effective balance between top-down implementation and bottom-up practice to produce a sustainable and positive living environment.

The proposed architecture is to offer a new paradigm in residential building, offering user-participation and adaptable design solutions.

1) The Stakeholders



human settlements
Department:
Human Settlements
REPUBLIC OF SOUTH AFRICA



The **eThekweni Municipality** is the local government facilitating the development. Their involvement is that of undertaking the physical delivery of residential units and community

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facilities. The units delivered as part of this development are part of the housing quota which is set annually by National Government.

The Department of Human Settlements is a National department that aims to uphold the Constitutional Right to access adequate housing.

- Vision: A nation housed in sustainable human settlements
- Mission: To facilitate the creation of sustainable Human Settlements and improved quality of household life.

Informal Settlement Network is a bottom-up organisation representing the urban poor. They engage in community-led planning and development. The objectives of the ISN are;

- Create solidarity among urban poor – well organized, equipped with skills and knowledge to bring about change
- Build a national network for learning – encourage consultation of communities for state-led development plans.
- Develop community capacity to hold authorities to account
- Foster inclusive planning and development
- Involve the ordinary person in the process

The ISN runs the 'Right to the City' campaign, presenting a new approach to both social and physical aspects of urban living. This entails improving ties between socio-spatial justice and citizenship as well as improving living conditions. The focus is that of a people-centred, participatory and advocacy-based approach to urban development.

2) The Site

Informal Settlement in Cato Crest in Cato Manor, Durban.

3) The Typology

The development is envisaged as a **mixed-use incremental residential development**.

The themes of participation architecture, incremental development and flexible architecture are central to the architectural outcome of the design scheme.

4) The Focus

Exploring the long established practice of auto-construction as a means to develop an architectural solution to the issues experienced in Cato Crest;

- Large number of informal residents – requires dense residential development
- Income level – scheme to be congruent with income and financial means

5) Design brief

The brief for this project is to provide a residential development which facilitates the practice of auto-construction, providing sustainable, incremental housing:

- Make full use of human capacity and residents' labour to provide infill/support
- Devise a user friendly kit of parts which users make and use to expand homes
- Provide building support which can be produced on site
- View the house as an appreciating asset that families improve over time

6) Design Conditions

- Tenure security for residents in order to allow incremental development
- Site regulations to govern building intents

8.7 PROBLEM STATEMENT

As a result of rapid urbanisation, there is inadequate housing for a growing urban population. The existing housing typology employed is not coping with the pace and scale of the demand for housing in South Africa.

8.8 CONCEPTUAL FRAMEWORK

What: Provide alternative strategy to housing:

Bottom-up meets top-down

How: Incremental development - provide framework

Users infill / improve as and when they can afford to

Who: Residents of Cato Crest engaging in auto-construction

THE BIG IDEA:

Facilitate existing practice of auto-construction to build homes

THE STRATEGY:



tenure security



appreciating asset



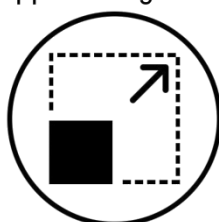
flexibility



kit of parts



auto-construction



incrementalism



participation



dense living

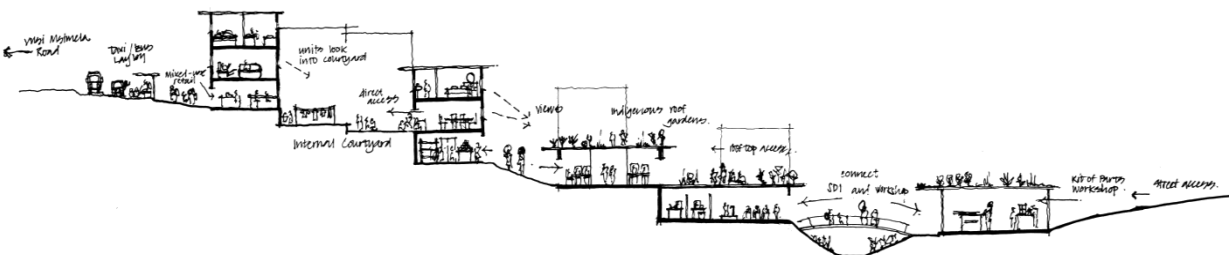
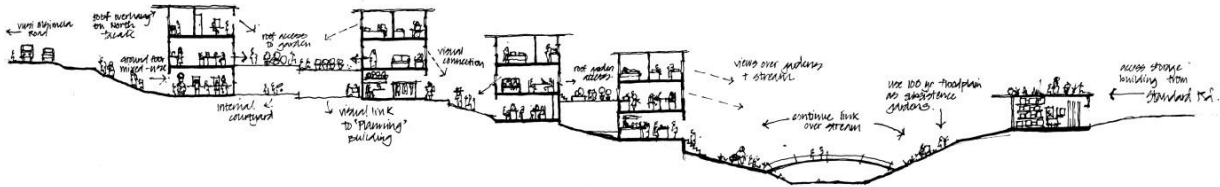
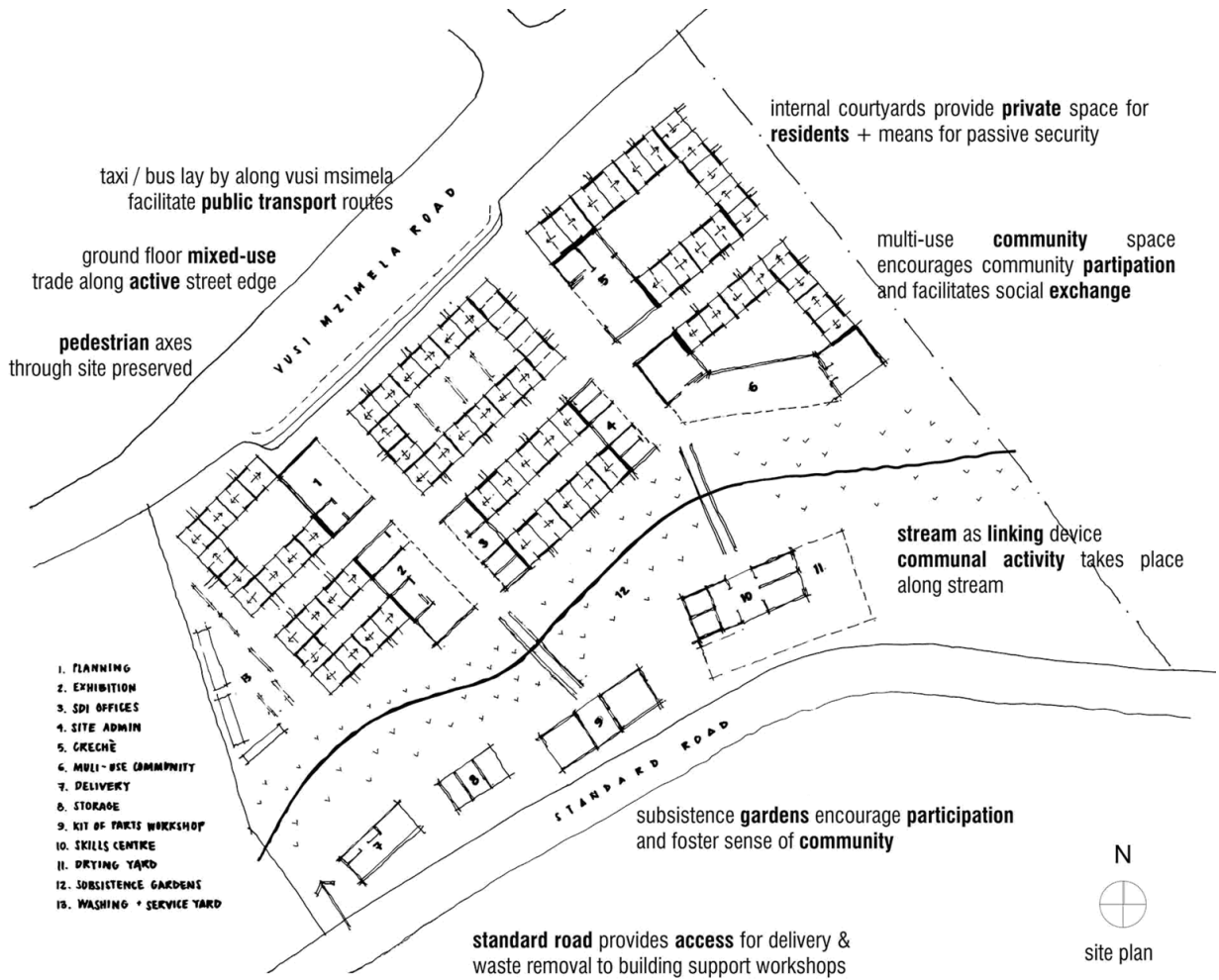
8.9 PROCESS SKETCHES:



- Activate edges of site – stimulate economic opportunity along ground floor mixed-use
- Taxi and bus lay-by along Vusi Msimela Road – activate site and alleviate traffic congestion.
- Integration between residential units and Building Workshops and Community Support facilities.
- Public buildings along pedestrian movement paths encourage participation.

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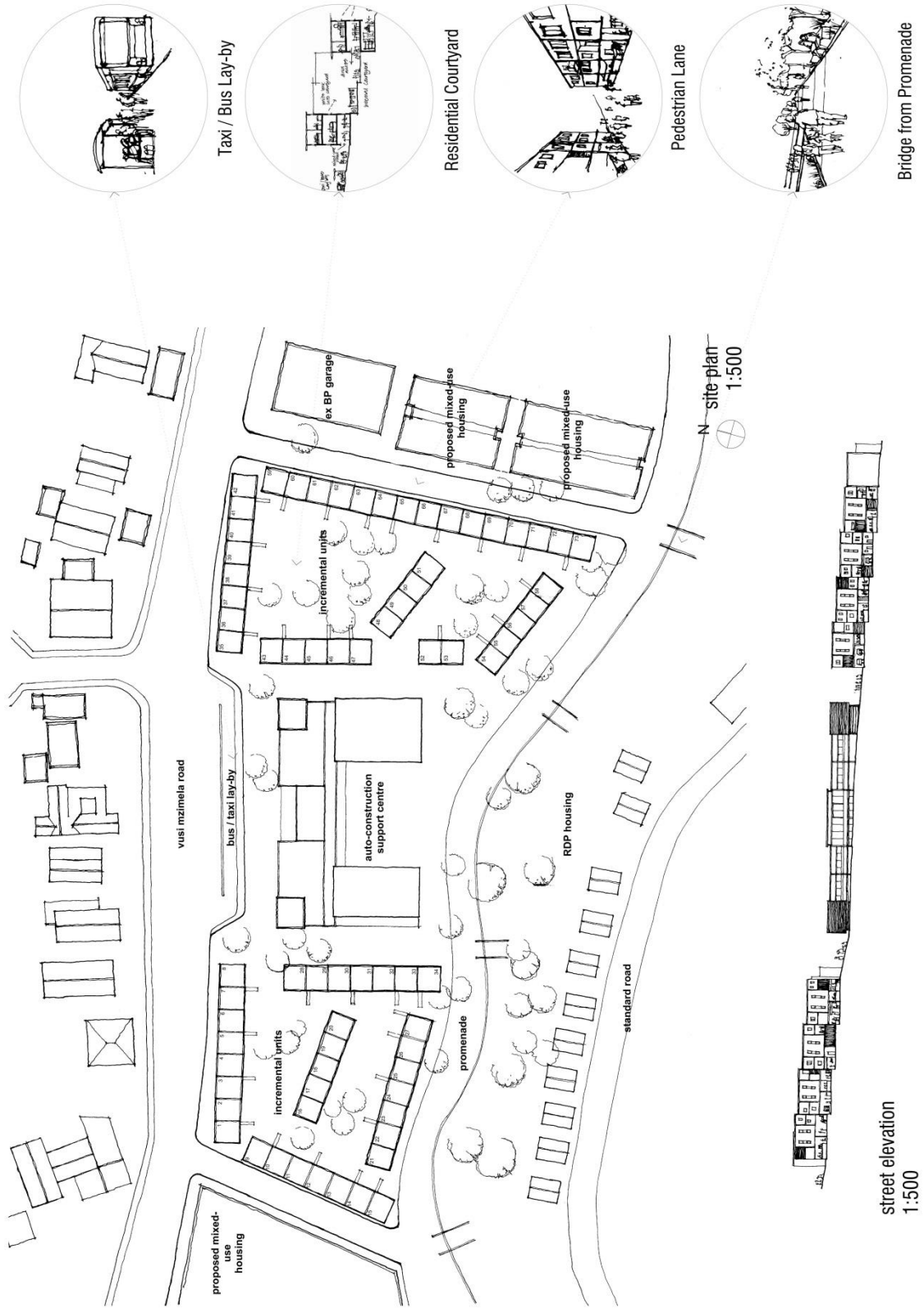
A proposed incremental housing development



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 ALTERNATIVE HOUSING STRATEGY IN CATO MANOR, DURBAN:

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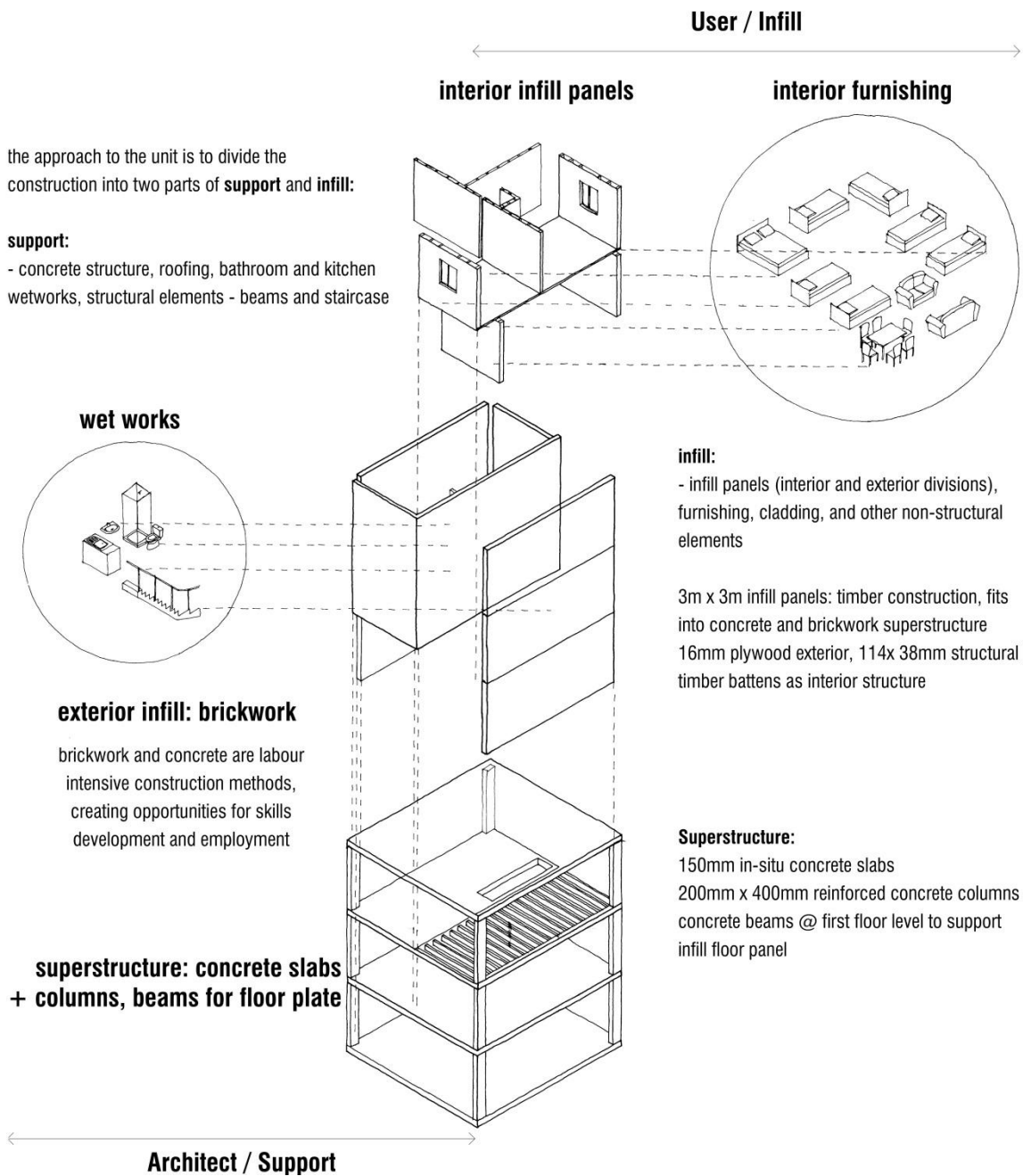
8.10 FINAL DESIGN DRAWINGS:



EXPLORING AUTO-CONSTRUCTION IN INFORMAL SETTLEMENTS AS AN

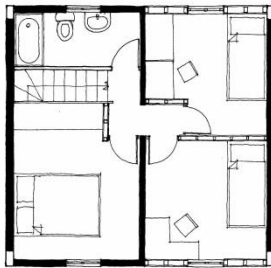
ALTERNATIVE HOUSING STRATEGY IN CATO MANOR, DURBAN:

A proposed incremental housing development

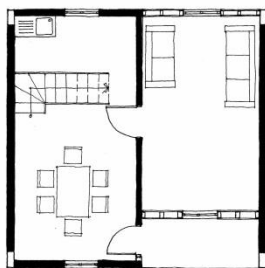


Unit Typologies:

1. **Family Unit**
4 persons



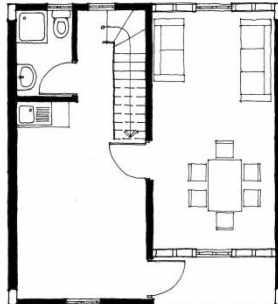
second floor plan
1:50



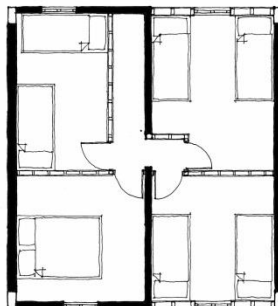
first floor plan
1:50

Expansion: 3 bedroom unit for the nuclear family, with separate dining area and living space
Infill: 4 x exterior infill panels, 1x interior infill, 1 x floor infill panel

2. **Extended Family Unit**
≥ 8 persons



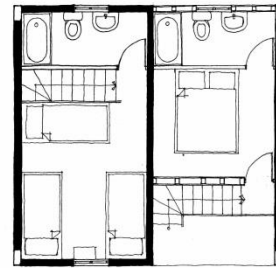
second floor plan
1:50



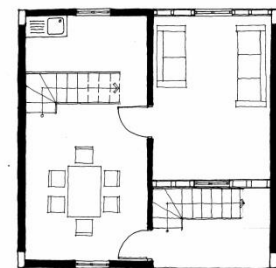
first floor plan
1:50

Expansion: 4 bedroom unit to accommodate extended family
Infill: 4 x exterior infill panels, 3x interior infill, 1 x floor infill panel
* kitchen and bathroom on ground floor

3. **Rental Unit**
≥ 4 persons + ≥ 2 persons



second floor plan
1:50

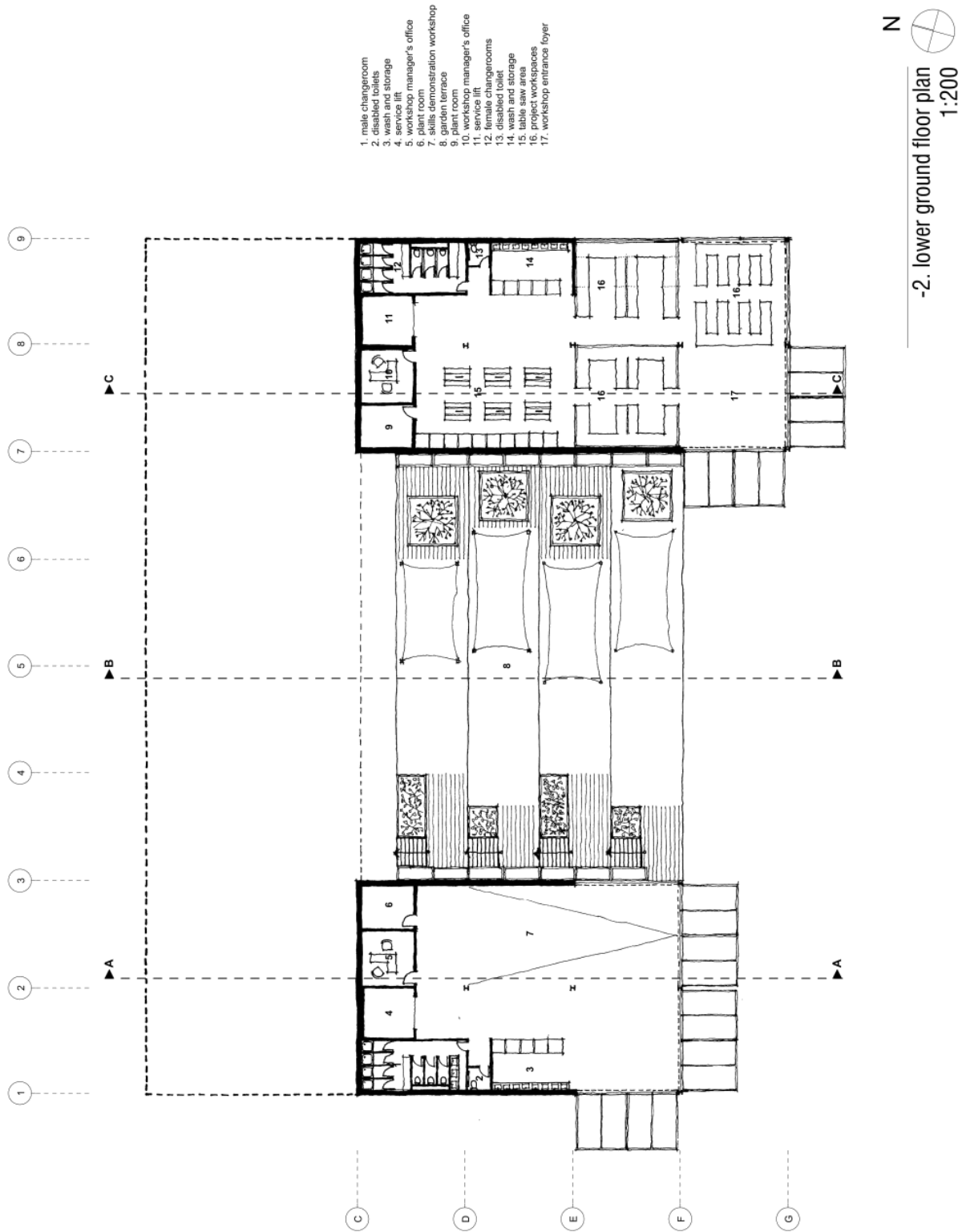


first floor plan
1:50

Expansion: 1 bedroom unit for small family, with studio rental unit
Infill: 4 x exterior infill panels, 1 x floor infill panel, 1 x exterior stair

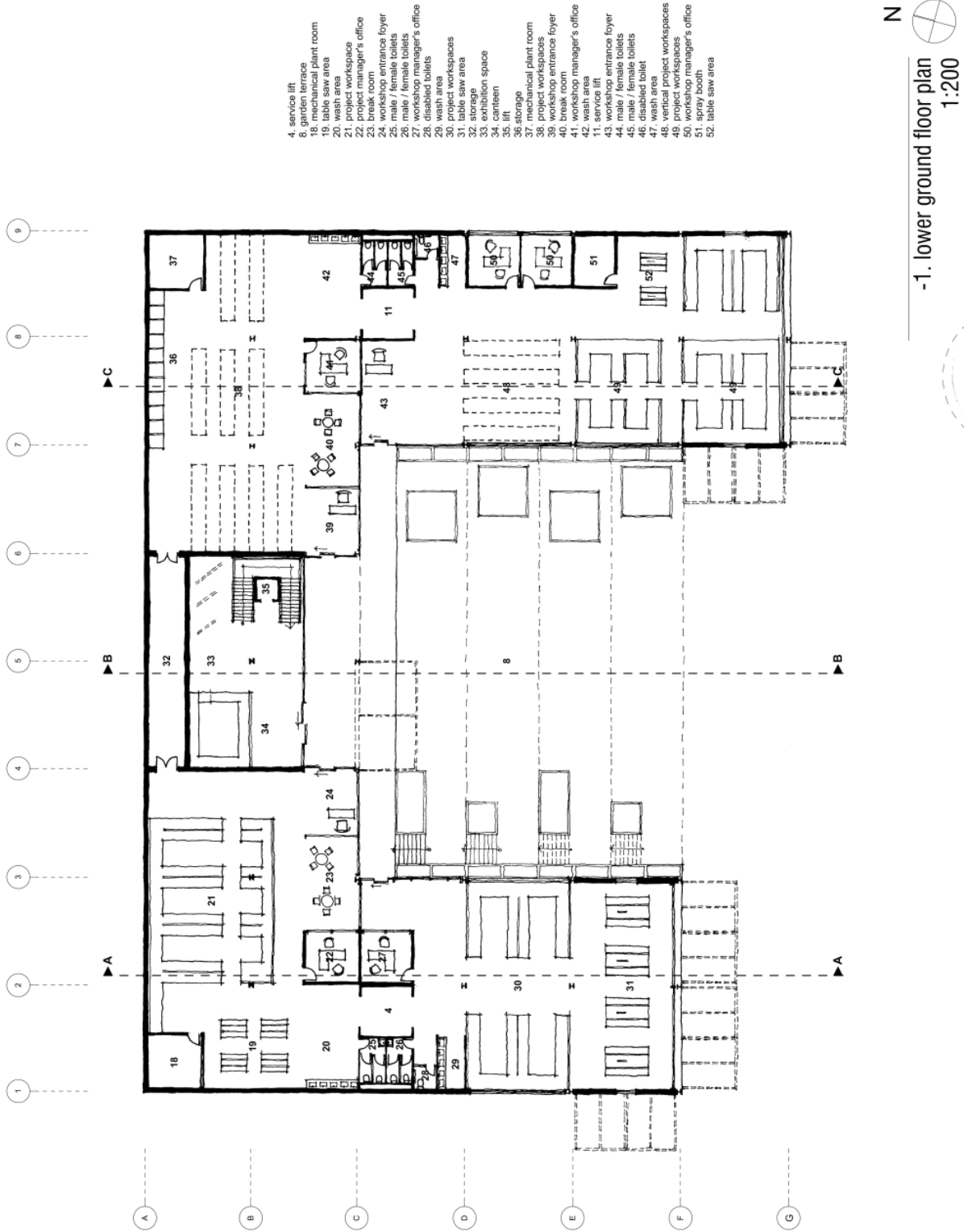
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A proposed incremental housing development



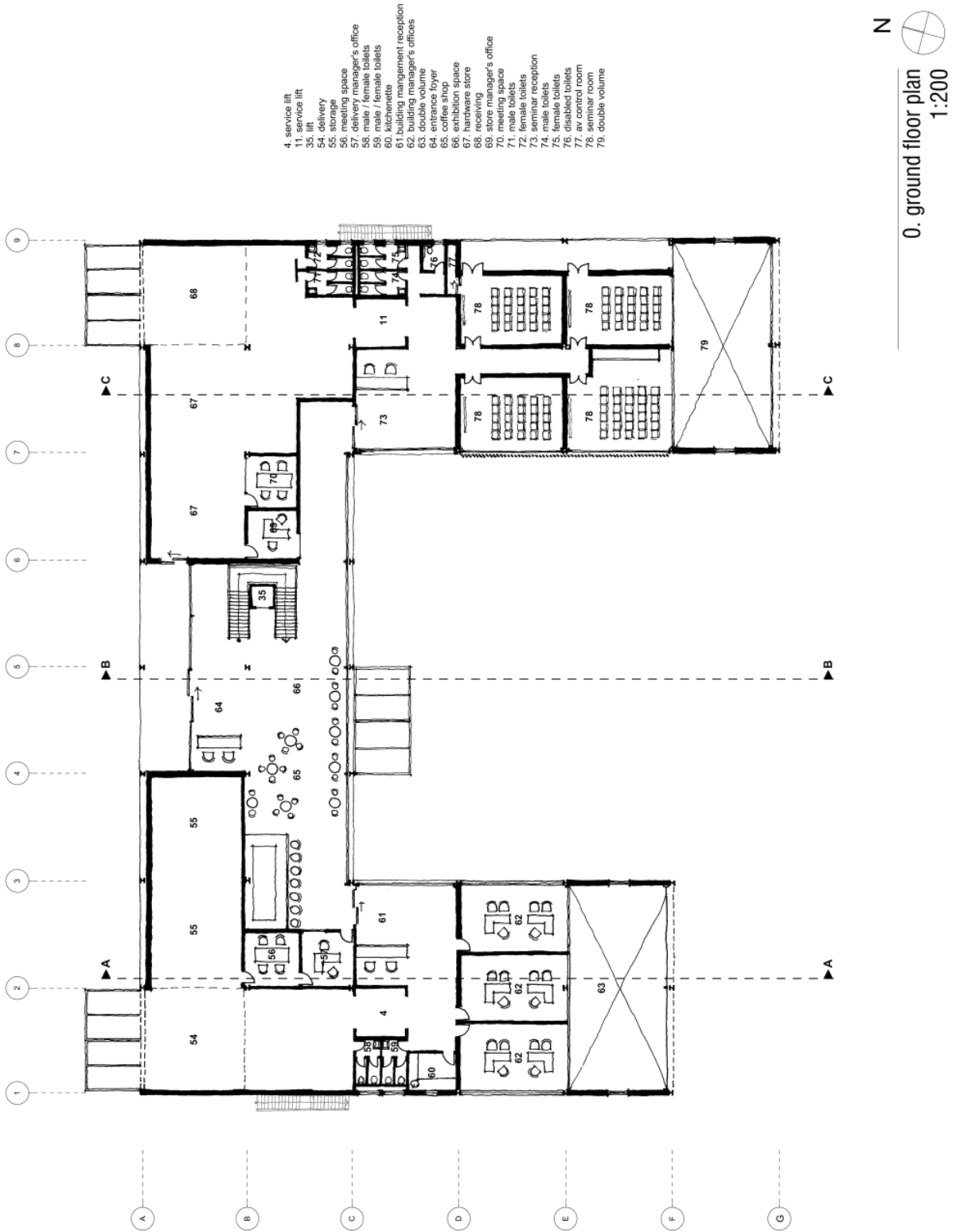
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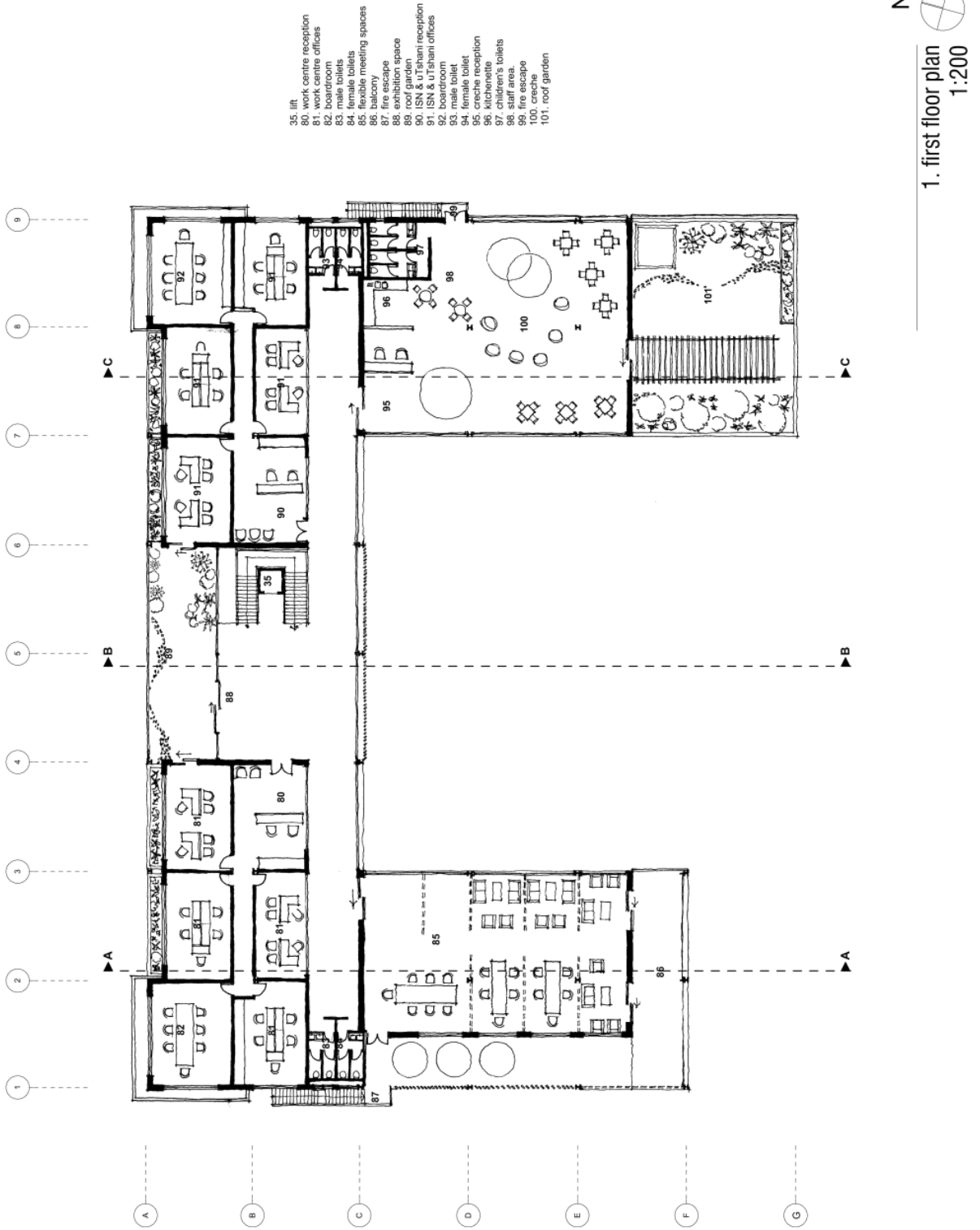
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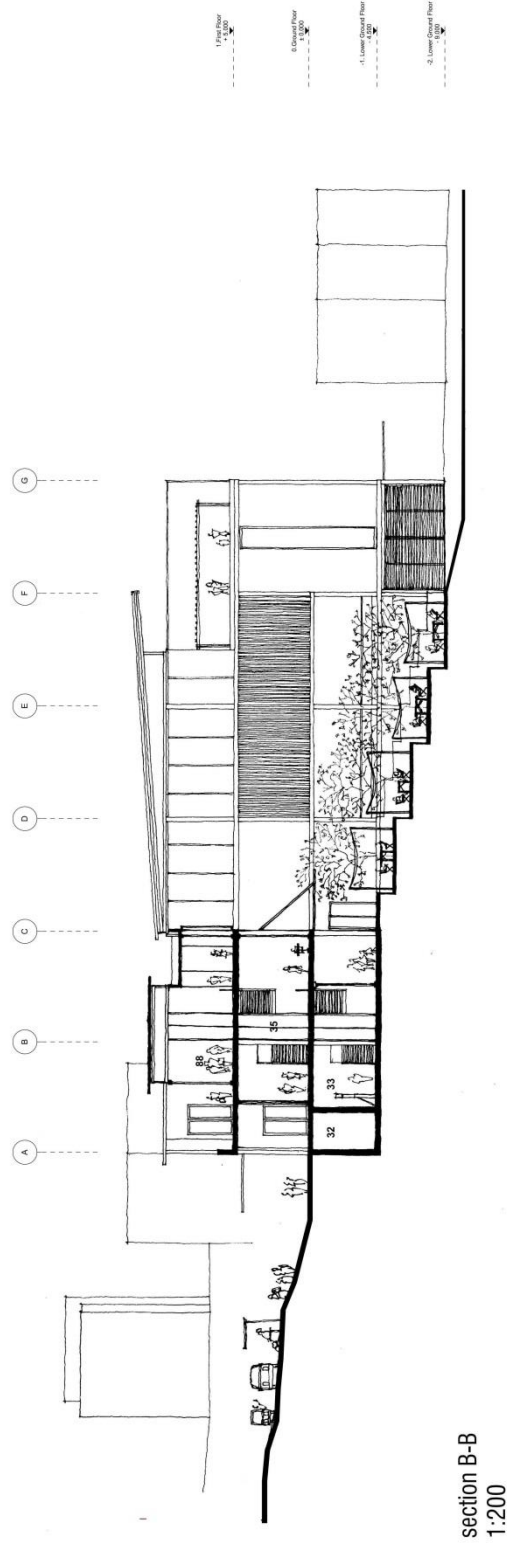
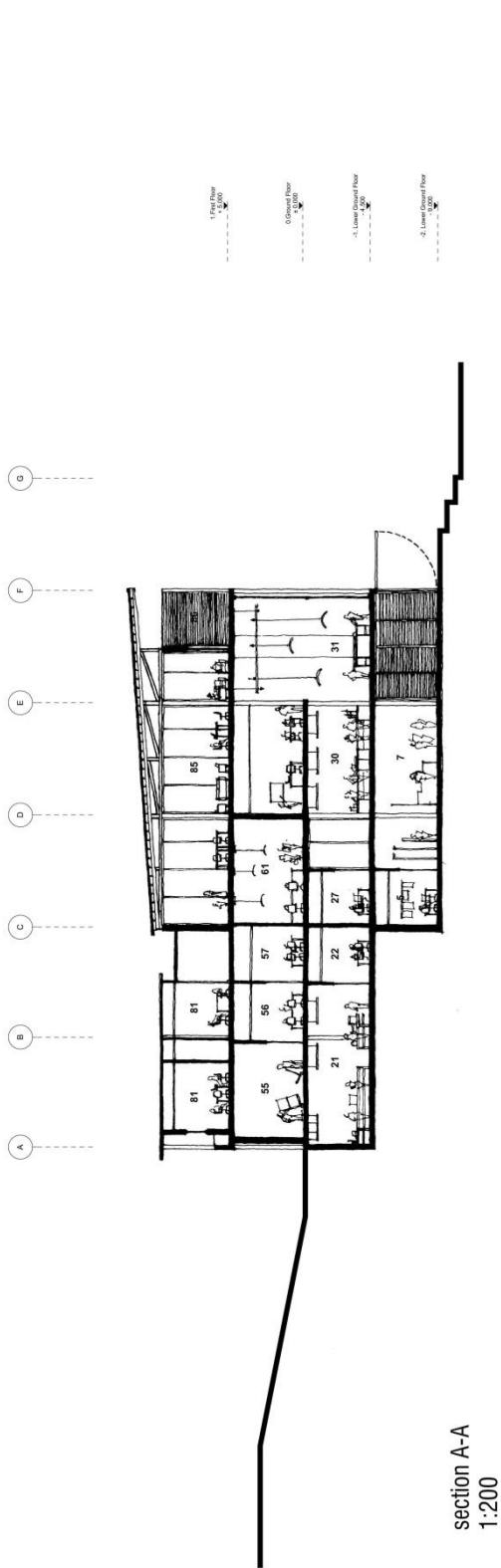
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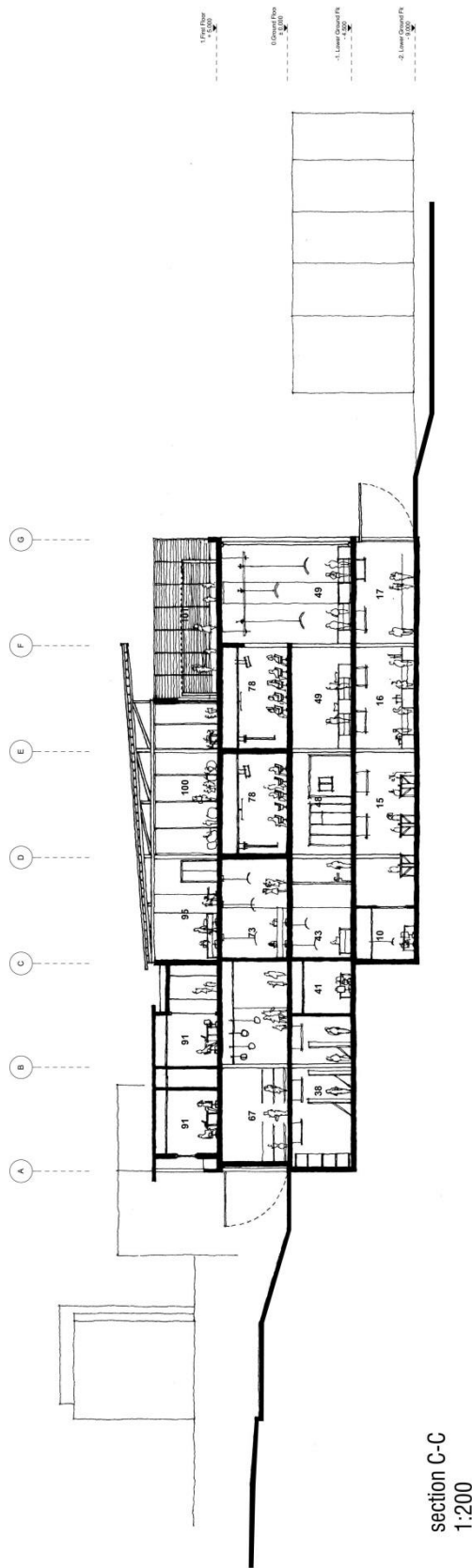
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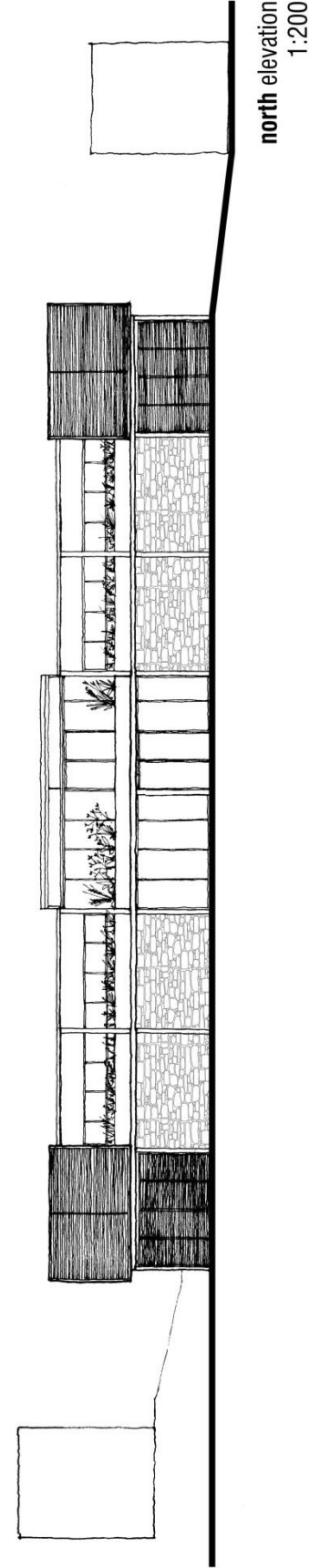
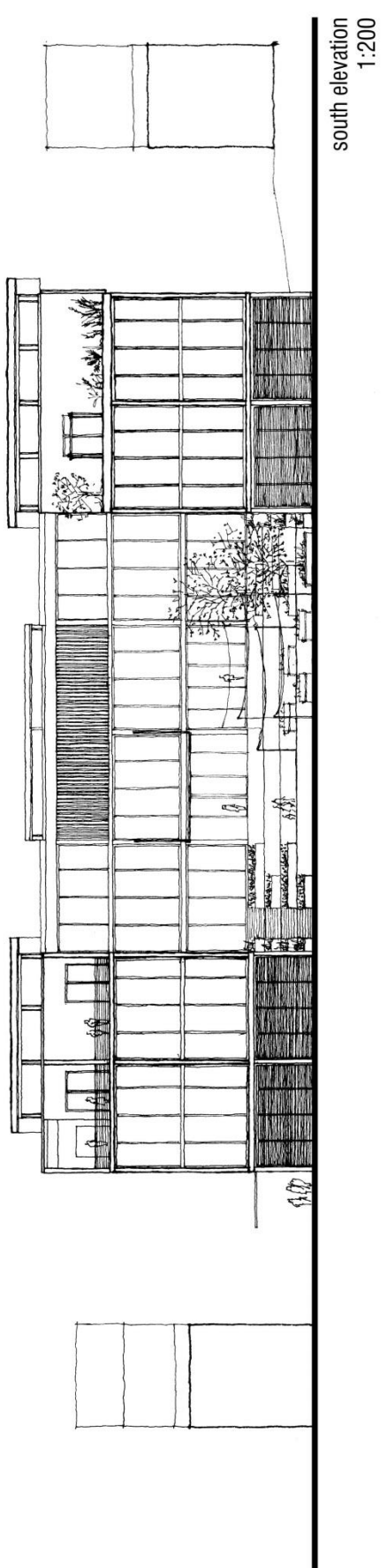
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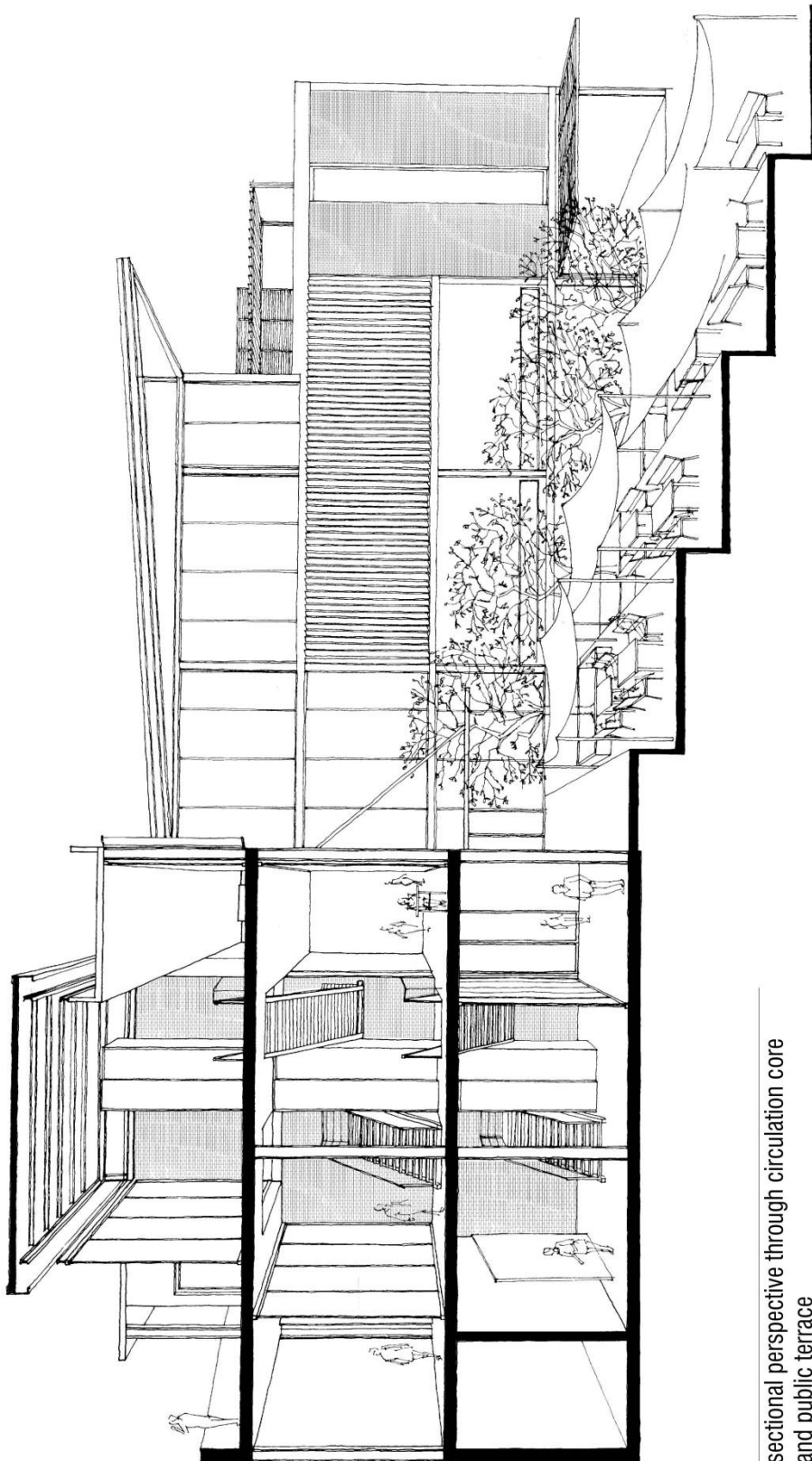
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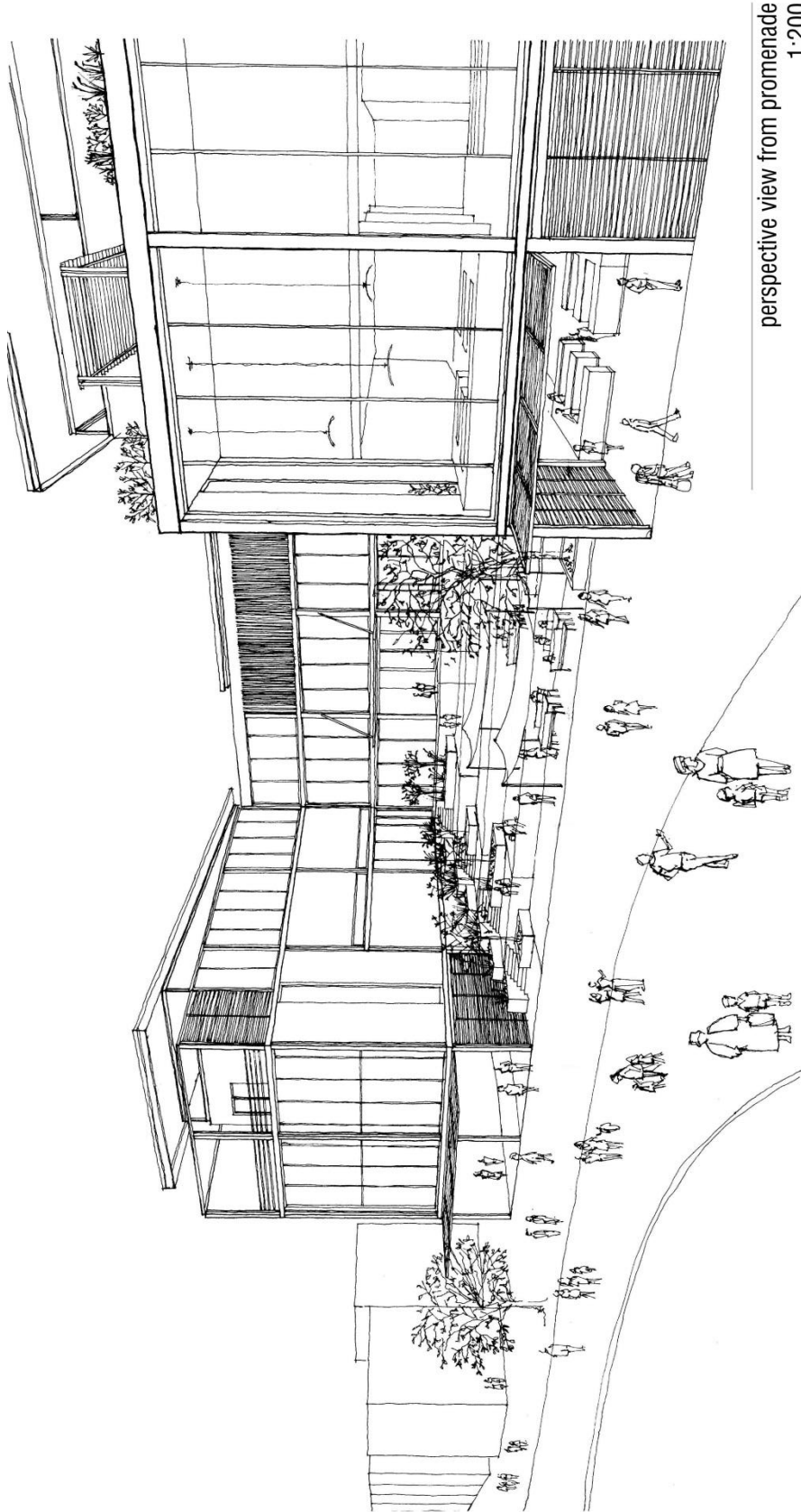
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sectional perspective through circulation core
and public terrace

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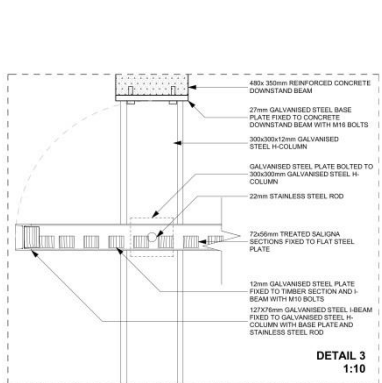
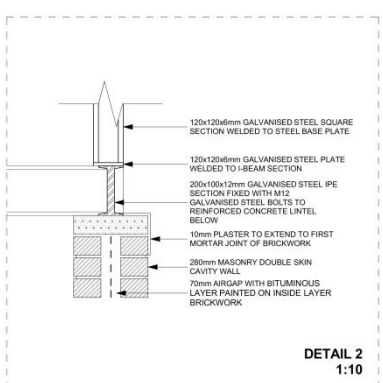
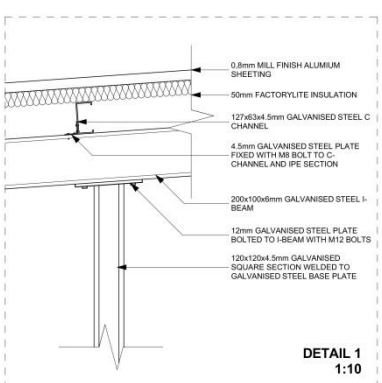
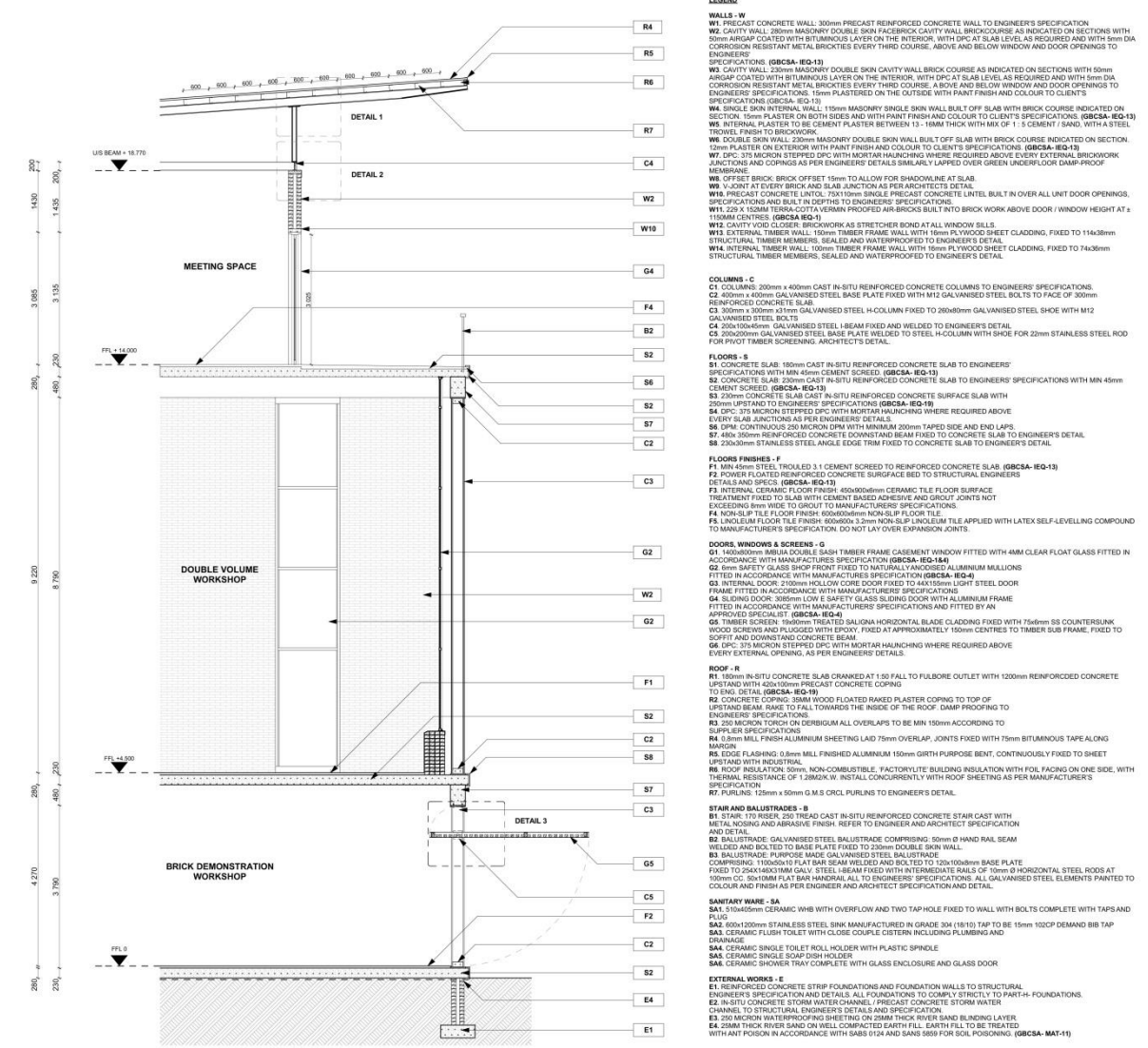
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perspective view from promenade
1:200

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