

**THE ROLE OF DECISION MAKING AND MANAGEMENT OF CONSTRUCTION PROJECTS IN
FOSTERING SUSTAINABILITY FOR INTENSIVE URBAN DEVELOPMENT THROUGH PUBLIC
HOUSING INITIATIVES IN SOUTH AFRICA**



Prepared by:

NOMBUSO NOMFUNDO QWABE

206514113

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College of Agriculture, Engineering and Science

University of KwaZulu-Natal

Howard Campus

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Supervisor: Dr. Vittorio Tramontin

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PREFACE

The research contained in this dissertation was completed by the candidate while based in the Discipline of Construction Studies, School of Engineering of the College of Agriculture, Engineering and Science, University of KwaZulu-Natal, Howard College, South Africa. The research was self-funded.

The contents of this work have not been submitted in any form to another university and, except where the work of others is acknowledged in the text, the results reported are due to investigations by the candidate.

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DECLARATION 1: PLAGIARISM

I, Nombuso Nomfundo Qwabe, declare that:

- (i) The research reported in this dissertation, except where otherwise indicated or acknowledged, is my original work;
- (ii) This dissertation has not been submitted in full or in part for any degree or examination to any other university;
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons;
- (iv) This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
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- (v) Where I have used material for which publications followed, I have indicated in detail my role in the work;
- (vi) This dissertation is primarily a collection of material, prepared by myself, published as journal articles or presented as a poster and oral presentations at conferences. In some cases, additional material has been included;
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Conference paper:

Tramontini, V., Qwabe, N. (2017). Towards sustainable human settlements in South Africa: emerging approaches through a case study analysis. ASOCSA-2017 Proceedings 11th Built Environment Conference, 6-8 August 2017.

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- You have never disappointed me Father. I should have known that You wouldn't start now.
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- I also appreciate all the officials who always thought I was out to get them.
- Thank you so much to my CSIR team who have supported me endlessly.

DEDICATION

To my mother who had a prayer for every tear.

ABSTRACT

The current discourse in sustainable development is centred on the 17 Sustainable Development Goals stipulated in the 2030 Agenda for Sustainable Development as well as the New Urban agenda. The resilience, inclusiveness and safeness of human settlements and the need to readdress the manner in which these are planned, financed, developed, governed and managed is at the forefront of the narrative. In the South African context this sought-after target of integrated and sustainable human settlements delivery has seen a trajectory riddled with a myriad of policies and programmes. One of the predicaments at the heart of the new urban agenda globally, and South Africa specifically, is whether population growth should be accommodated by extensive or intensive urban development. Both approaches have gained support in the South African context in recent years.

The research looked at the role of decision making and management of construction projects within the context of producing sustainable housing through intensive redevelopment in South Africa and particularly in Durban. The intensive redevelopment approach indeed seems to address the ideals of the New Urban Agenda, however a case study analysis and an overview of recent research related to intensive redevelopment through building conversion and renovation has revealed that efforts to date do not address sustainability issues comprehensively. The study paid special attention to the social aspect of sustainability, which reflects recent increasing awareness that the construction industry must support the sustainable development agenda by including social considerations throughout the construction project life cycle in hopes of achieving sustainable buildings and communities. An environmentally friendly building requires only the minimizing of its environmental impact, however a sustainable building asks for more. The sense of a community is fundamental for a sustainable building, since it should increase social equity, cultural and heritage issues, human health and social infrastructure, as well as safe and healthy environments.

The research adopted a multi-dimensional approach involving an extensive literature review, individual and focus group interviews with stakeholders, a questionnaire-based survey conducted with the occupants of buildings involved in intensive urban redevelopment and case studies' analysis. Findings demonstrated that the New Urban Agenda needs to recognise and respond to drivers such as the demand for central city living from low and middle income

groups desperate for the access to amenities and economic opportunities it provides. Core urban areas, inner suburbs and old transport routes are full of derelict and under-utilised land, former buffer strips and run-down buildings in need of renewal and regeneration. There are unrivalled opportunities within South African municipalities to rehabilitate worn-out infrastructure, to install new energy and communication systems, and to refurbish and construct better buildings. Rerouting capital flows to retrofit existing urban assets makes sense from a resource efficiency perspective. Long-term considerations, global thinking and local action, responsibility and transparency from a management and decision making perspective, and the purposive application of the principles of sustainability throughout a project lifecycle and to all stakeholders promotes continual improvement and distinctive steps towards archiving sustainable buildings and communities through the process of conversions and rehabilitation of existing buildings in urban areas.

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LIST OF ABRIVIATIONS

Aids	Acquired Immune Deficiency Syndrome
BNG	Breaking New Ground
CBD	Central Business District
CIB	Conseil International du Bâtiment
COGTA	Department of Cooperative Governance and Traditional Affairs
CPM's	Construction Project Managers
CRU	Community Residential Units
DOH	Department of Housing
DHS	Department of Human Settlements
EU	European Union
HIV	Human Immunodeficiency Virus
IPCC	Intergovernmental Panel on Climate Change
KZN	KwaZulu-Natal
KZNDHS	KwaZulu-Natal Department of Human Settlements
LTDF	Long Term Development Framework
MDG	Millennium Development Goals
NDP	National Development Plan
NPC	National Planning Commission
NHF	National Housing Forum
RDP	Reconstruction Development Programme
SACPCMP	South African Council for the Project and Construction Management Professions
SDGs	Sustainable Development Goals
SHIs	Social Housing Institutions
SHRA	Social Housing Regulatory Authority
UN	United Nations
SDG	Sustainable Development Goals
UNCED	United Nations Conference on Environment and Development

WECD

World Commission on Environment and Development

CHAPTER 1: INTRODUCTION

1.1 Background

The current discourse in sustainable development is centred around the seventeen Sustainable Development Goals which were stipulated in The 2030 Agenda for Sustainable Development and in the New Urban agenda (United Nations, 2017). The resilience, inclusiveness and safeness of human settlements and the need to readdress the manner in which they are planned, financed, developed, governed and managed is at the forefront of the narrative. In the South African context the sought-after target of integrated and sustainable human settlements delivery has seen a trajectory riddled with a myriad of policies and programmes which have essentially given rise to two current discourses: intensive urban consolidation linked to overarching strategies of urban regeneration, and extensive development through mega-projects of mixed-income housing (Tissington, 2013).

Despite being at the forefront of the development narrative globally, sustainable development is not a single and well defined concept. According to Berardi (2013), at least one hundred definitions have been given and new meanings are continually being added to the term. However, what is apparent is that sustainable development considers the interdependence and balance amongst economic, ecological, and social pillars (WECD 1987; UNCED 1992; CIB 1999). Moreover, sustainability has often been considered and evaluated exclusively according to the environmental dimension, leaving out the two other significant aspects (Hueting & Reijnders, 2004). The social aspect of sustainability, in particular, is integral and is often the most overlooked (Osman & Karusseit, 2008).

Since the Brundtland Report in 1987, there has been an increasing awareness that the construction industry must support the sustainable development agenda by including social considerations throughout the entire construction project life cycle (Boyle et al, 2010). The significance of this factor is emphasized by Berardi (2013), in suggesting that an environmentally friendly building requires only the minimizing of its environmental impact, but a sustainable building asks for more. The sense of a community is fundamental for a sustainable building. A building that encompasses sustainability should increase social equity, cultural and heritage issues, traditions, human health, and social infrastructure, as well as safe and healthy environments. In addition, the need for expanding the conceptualization of the

sustainable development concept in relation to construction projects has been encouraged by calling for the broadening of the research topics related to construction (Levitt 2007). This vision includes focusing on social sustainability processes that need to be addressed and integrated into construction projects. “Future research should show through real case studies how sustainable buildings are promoted, realized and managed. This will help clarifying the criteria which buildings have to meet to be defined as sustainable” (Berardi. 2013).

One of the first steps in achieving the sustainability goal in the South African context, is implementing strategies that are economically, environmentally and socially sustainable into public housing development (Ahadzie et al, 2008). Sustainability needs to be a consideration made throughout all the stages of construction in the provision of human settlements. However, construction costs have been the most important consideration for the implementation of any public housing projects (Coimbra & Almelda, 2013). Cost has also played a prominent role in decision-making in the process, this is not surprising as the sustainability of these buildings largely rests on the choices of principal decision – makers in the construction process (Mulliner et al, 2013).

This research was aimed at investigating the benefits and barriers of current public housing approaches in South Africa, and assessing the role of decision making and management of construction projects in fostering social sustainability in South African public housing initiatives, with particular regard to intensive urban redevelopment.

1.2 Problem statement

The implications of a unilateral approach to decision making and management of construction projects has led to the neglect of the critical aspect of social sustainability in the development of sustainable human settlements in the South African context.

1.3 Research Questions

1. What are the benefits and barriers of current approaches to affordable public housing in South Africa?
2. How do decision makers and project managers incorporate sustainability in affordable public housing redevelopment?

3. What is the inhabitant perception in regards to sustainability issues related to housing initiatives in the inner city?

1.4 Study Objectives

1. A. To understand the benefits and barrier of current affordable public housing approaches.
B. To investigate decision maker perception on current approaches for affordable public housing delivery.
2. To assess the role of decision making and management of construction projects in fostering sustainability in affordable public housing redevelopment projects.
3. To evaluate inhabitant perception of social sustainability aspects implemented to public housing initiatives in the inner city.

1.5 Methodology

- The approach used for the study is positivism and intepretivism and the research methodology is based on an exploratory mixed method. The methodology consists of both qualitative and quantitative research methods of collecting and analysing data. An extensive literature review was conducted to identify gaps and to establish a theoretical framework for the area under study.
- A qualitative study based on case study analysis comparing two housing developments (Cornubia housing development and Hawaii housing project) was undertaken to identify possible barriers and benefits of the two different approaches to public housing initiatives being currently implemented in South Africa. This phase involved participants and on-site observation, and a focus group with inhabitants on both sites.
- This preliminary study and the relevant results informed, the rest of the research that primarily focused on the analysis of sustainability issues in inner city projects. This phase was conducted through semi-structured interviews with KwaZulu-Natal Department of Human Settlements (KZNDHS) and eThekweni Municipality Officials, and through focus group interviews with Social Facilitators and Projects Managers of public housing projects developed in Durban.

- In order to investigate the inhabitant perception of the impacts of public housing initiatives in the inner city on social sustainability issues, a questionnaire-based survey was conducted with the inhabitants of the Port View and Strathdon Housing Projects in Durban. For this component of the study preference was given to housing projects and residents in close proximity to the researcher to minimize travelling costs. Some of the respondents were referrals suggested by other participants arising from a snowballing approach.
- Quantitative data was analysed through descriptive statistics using SPSS version 25 and for the qualitative part of the research, a thematic approach on data analysis was taken to identify and analyse themes emerging from the data gathered. Findings and discussion are presented in chapter 4. Figure 1-1 (below) provides a flowchart showing an overview of the methodology adopted for the study.

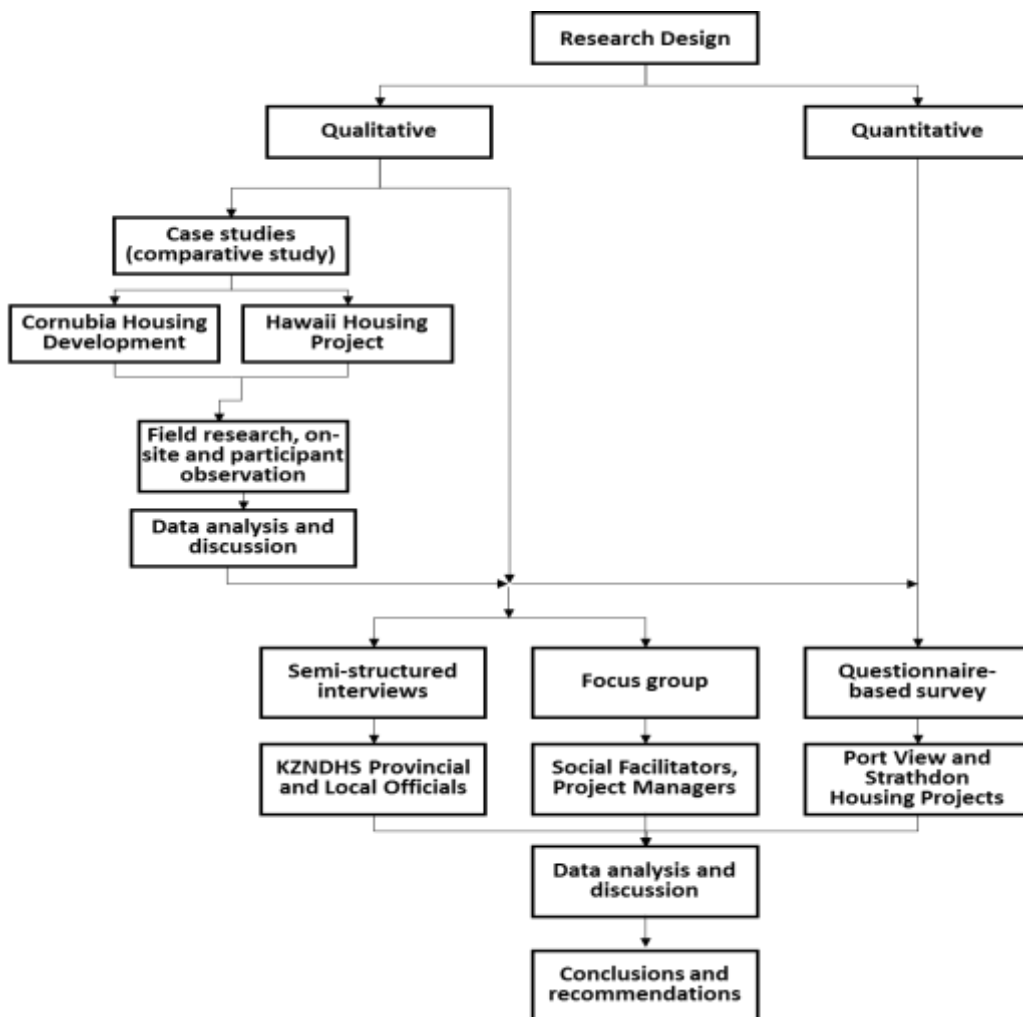


Figure 1- 1: Research Methodology Flow-chart

1.6 Assumptions

The study is subject to the following assumptions, namely:

- Participant's responses are accurate, comprehensive and a true reflection of their situation.
- The survey questionnaires carried out was answered truthfully and accurately.

1.7 Limitations

The limitations of the study are:

- Only Construction Project Managers from provincial government and Social Housing Institutions in KwaZulu-Natal were considered.
- The research was conducted within a time frame of eighteen months.
- The research was limited to KwaZulu-Natal due to resource and financial constraints. As consequence of this, the inner-city public housing initiatives that were selected and analysed for the study were located in the Durban area.

1.8 Ethical Considerations

- In an effort to conform to internationally accepted ethical standards, names of research participants were not recorded in this research, thus assuring anonymity.
- The aim of the research was explained to all participants and all their responses were kept confidential.
- No compensation whatsoever, e.g. money, gifts etc. was given to participants.
- Partaking in this research was at freewill and the participants had the option to withdraw from the study at any time and with no consequences.
- The information provided for the purposes of this study was provided by the participants own accord, free of an undue influence.
- The information provided is to be used strictly for research purposes and will be disposed of accordingly by the University of KwaZulu-Natal within a relevant time period after completion of the dissertation.

- All University of KwaZulu-Natal ethical requirements were fulfilled and followed.

1.9 Study Significance

The myriad of policies and initiatives in South Africa regarding housing for low-income people have so far not reached the declared target of creating integrated and sustainable human settlements. The extensive development of low-density housing in green-fields has produced land-consuming and mono-functional settlements, increasing social segregation and the need not only for more sustainable housing but also for expensive infrastructure development. The backlog in comparison to that of 1994 has increased and a proliferation of informal settlements has occurred as result of unsuccessful policies and the growing urbanisation. The recent Sustainable Development Goals have pointed out the importance of addressing urbanisation and housing issues through principles of inclusion, resilience and sustainability.

This study is therefore important to uncover and suggest possible new directions to be explored in housing planning, design, delivery and operation management for low income groups in South Africa, towards fostering the creation of more sustainable and inclusive communities, particularly from a social sustainability perspective. Outcomes also could inform policy review in light of social sustainability principles and more bottom-up driven approaches based on community engagement throughout the process of construction and management of public housing initiatives.

1.13 Outline of Dissertation Structure

Chapter 1: This chapter is an introduction to the study. The problem that prompted this research study and the fundamental elements of this research in the form of objectives were clearly outlined in this chapter.

Chapter 2: This chapter is a critical and analytical literature review of the context of this thesis. Detailed findings pertaining to the area of study were obtained from reviewing textbooks, journals, conference proceedings, previous research dissertations and case studies from various sources that addressed the topic under study

Chapter 3: This chapter outlines and describes the research methods to be employed by the researcher in order to facilitate data gathering and collection from the field. Knowledge of

research methodologies will be employed to select a strategy that would be feasible given a set of some limitations such as time and money.

Chapter 4: This chapter will comprise of the presentation and analysis of data that will be obtained from the field and discussions.

Chapter 5: This chapter concludes the research confirming whether the researcher achieved the objectives of this research. It is hoped that the research findings will provide information which will facilitate the curbing of the problem.

1.14 Chapter Summary

This chapter introduced concepts this study will follow. It identified a research problem, research objectives and questions and the research methodologies that were used to obtain the objectives. The following chapter contains a thorough literature review of previous research in a similar field.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter provides a conceptual, policy and legislative framework in addition to the exploration of extensive literature. The trajectory of housing policy in the South African context, emerging development approaches, the current sustainability and global urban agenda as well as the relationship between decision making, sustainability and construction are outlined. It also provides a critical review of the current challenges faced in the South African context and of the new emerging approaches in addressing the housing problem.

2.2 Sustainable Development & the Global Urban Agenda

The worlds' rapidly growing cities generate more than seventy percent of the global GDP and account for the same amount with regards to energy consumption. Cities have also become primary settings for the mitigation of problems such as climate change and poverty can be mitigated. As a result, how cities develop has increasingly become critical to sustainable development globally. How sustainable development is approached in cities is essential to achieving the implementation and execution of global sustainability agendas (Fabre, 2017). The following subsections provide an overview of sustainable development as a concept and the global urban agenda trajectory from the Tolendo Declaration to the Sustainable Development Goals.

2.2.1 Sustainable Development

Sustainable Development as a concept was introduced in 1980 in the World Conservation Strategy and the International Union for the Conservation of Nature publications. It was formally introduced by the United Nations World Commission on Environment and Development in 1987 in the 'Our Common Future' issue. This is where it was defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, through striking a balance between economic, environmental, and social priorities (Yang, Xu, & Shi, 2017). Sustainable development currently informs multi-sectorial strategies and plans, and continually serves as the foundation of global policy documents.

The concept also emerged at a time where there was increasing awareness of an impending ecological crisis. The 1960's and early 70's introduced a shift in the notions of growth,

sustainability, development and progress. Technological and scientific advances were at an all-time high and would only progress further, however this resulted in great damage to the natural environment. There was also a heightened awareness of the threats which pollution, non-renewable resource depletion and rapid population growth posed to the environment and the survival of future generations. Notable scientific research based on the damage caused to the environment emerging at the time were Paul Ehrlich's "The population bomb" (1968), Edward Goldsmith's "A blueprint for survival" (Goldsmith et al. 1972) and Rachel Carson's "The silent spring". A new mode of thinking was stimulated which sought to counteract the damage which would further result from unlimited economic growth and technological advancement (Du Pisani, 2006).

Conferences such as the United Nations Conference on the Human Environment (Stockholm 1972) were the first of a sequence of international conferences directly aimed at raising the concept of sustainability which also featured in several of then introduced principles. It was recognised that development needed to be sustainable and not solely focus on economic and social matters, but also on matters related to the use of natural resources and recently cultural factors too. In the 1980s the new paradigm of sustainable development was popularized and became more widely utilized (Du Pisani, 2006).

2.2.2 Sustainable Urban Development and the Global Urban Agenda

The World Commission on Environment and Development (Brundtland Commission, 1987) affirmed that the basis of urban problems stem from urbanisation, the process of urban development which is characterized by the expansion of built-up areas and the growth of population in cities and towns. Subsequently urbanization-induced change is a fundamental motivation for the formation and evolution of global urban policy (Brundtland, 1987). The Commission called for an increase of sixty-five per cent in the capacity of the developing world to produce and manage its urban infrastructure, services, and shelter merely to maintain the extremely inadequate conditions. At that point ten percent of the world lived in cities with populations of one million and above. Recent statistics show that as of 2014, fifty-four percent of the global population resides in urban areas (UN, 2014). Urban issues highlighted by the Brundtland Commission then, such as, the lack of land, services, and facilities needed for an adequate human life, such as; clean water, sanitation, schools, transport and informal settlement are even more rampant in this day (Yang et al., 2016).

In light of the current and previous challenges, both policy and academic discourses have been geared towards a more sustainable urban future (Fu & Zhang, 2017). Currently urban sustainability serves as a concept encompassing urban regeneration, green economy, social justice and many others (Suzuki et al, 2010). A comprehensive set of strategies, principles and concepts were introduced by the United Nations which are in-line with the renewed and updated notion of sustainability. Various international organisations and stakeholder groups were appointed to critically discuss priorities and issues they regarded as significant to consider for a sustainable future. The need for an integrated framework became critical and the arising fundamental themes and issues from the discussions were categorized according to priority. The top priority factors then set the stage for policy regarding sustainable development goals, subsequently determining the direction and progress of urban areas globally (Yiu & Saner, 2014).

To date urban development is heavily influenced by sustainability. The criteria spoke to twelve considerations that had to be made in the hope of achieving sustainable urban development to the slightest degree. They are:

1. Sustainable construction materials and building methods
2. Sustainable transport, with a major focus on public transport
3. Transition to renewable energy alternatives and energy efficiency
4. Zero waste via re-use of all waste outputs as productive inputs.
5. Sustainable water use and re-use of treated sewerage
6. Local and sustainable food
7. Enhancing biodiversity and the preservation of natural habitats
8. Valuing authentic cultural diversity, community and citizen participation.
9. Equity and fair trade at all levels
10. Health, well-being and soulfulness
11. Education
12. Air pollution & reducing emissions (Swilling, 2006).

2.2.2.1 Millennium Development Goals (the urban perspective)

Adopted at the Millennium Summit in 2000, the United Nations Millennium Declaration recognizes the grim conditions of the world's poor and disadvantaged. Its Millennium Development Goals (MDGs) communicated the obligation of member states to combat child

mortality, HIV/AIDS, poverty and promote environmental sustainability, global partnerships in development amongst others. The eight goals included:

1. Eradicating extreme poverty and hunger,
2. Achieving universal primary education,
3. Promoting gender equality and empowering women,
4. Reducing maternal and child mortality,
5. Improving maternal health,
6. Combating HIV/AIDS, malaria and other diseases and
7. Ensuring environmental sustainability all within a context of
8. Creating a 'global partnership for development.

While the MDGs had urban dimensions, the goals were criticized for ignoring cities. Only target 11 of MDG 7 had a specific urban dimension: “achieving by 2020 a significant improvement in the lives of at least 100 million slum dwellers” (Michael Cohen, 2014). The MDGs were also used as tools to advocate for improved services for the urban poor. However, problems emerged with both the framework and implementation. With regards to implementation, the urban poor were rarely involved in the interventions designed to assist them. Local governments were also seen as missing from the MDG process, they also lacked the resources and capacity to implement changes on the ground needed to achieve the MDGs. Subsequently, the overall ideal of a global partnership for development was seen as too top down (Klopp & Petretta, 2017).

Problems also existed with the tools for social, spatial and statistical analysis when measuring cities with high levels of informality, poverty and slum formation. Economic, social and environmental aspects were not integrated into the MDGs (United Nations, 2013). MDG monitoring and review did not begin until five years after the goals were adopted and even then, data often lagged by three or more years (UN, 2014a). In addition, measurements were tracked at a national level, making city-level comparisons difficult. Overall, available data sources and MDG monitoring were of poor quality and problematic assumptions were often made (Satterthwaite, 2003).

Two years of intergovernmental negotiations with extensive civil society input ensued before the expiration of the goals to construct the post-2015 development agenda. The objective

was to directly address the failures and correct shortcomings of the MDGs. Urbanization became a key focus of concern in the reflections, and became a crosscutting element of almost every sustainable development concern (United Nations, 2013). However, a stand-alone goal for urban areas and human settlements was strongly advocated for. The argument was that such a goal would cast a spotlight on urban challenges and increase policy attention towards giving cities more visibility for advocacy and funding purposes (Lucci, 2014). Global organizations including UN Habitat, Cities Alliance, the Sustainable Development Solutions Network, the Communitas Coalition and many others, mobilized and launched a massive and ultimately successful campaign for the ‘urban development sustainable goal’. In September 2015 when the 2030 Agenda for Sustainable Development was adopted, the initial part of the campaign was won, and the goal became one of seventeen Sustainable Development Goals (Parnell, 2016). However, prior to the adoption of the goal the Toledo Declaration was signed.

2.2.2.2 Toledo Declaration

A meeting was held by the Spanish Presidency of the Council of the European Union in Toledo, Spain in June 2010. The session was held with the core topic of ‘integrated urban regeneration’ within a global financial, economic and social crisis in Europe specifically. European cities had been identified as facing a major challenge of overcoming long standing challenges such as pressure on resources, climate change, globalisation, demographic change etc. The strain was felt strongly within the urban context where urban environments had deteriorated and increasing risk of exclusion and social fragmentation loomed. The Toledo Declaration ultimately set out the European Union’s political commitment to defining and applying integrated urban regeneration as one of the key tools of the 2020 Strategy with the objective of creating a model of an sustainable, intelligent and social city (EU, 2010). Table 2-1 (below) shows the problems and solutions identified in the Toledo Declaration.

Table 2- 1 Problems & Solutions identified by the Toledo Declaration

TOLEDO DECLARATION	
Identified Problems	Proposed Solutions
Declining quality of life & welfare	<p>Citizen participation in urban development and the involvement of the private sector as a crucial tool for an integrated approach.</p> <p>Recalling that the overall urban quality is determined by the quality of public spaces and urban man-made landscapes and architecture is</p>

	an essential requirement for establishing a pleasant environment for the urban population and for the global attractiveness and competitiveness of the city.
Deteriorating housing stock	Renovation and physical upgrading of the existing housing stock using different and innovative approaches.
Inadequate use of spatial planning	Stressing the convenience and effectiveness of spatial and urban planning as a policy lever for integrating environmental, social and economic objectives.
Urban Sprawl	Taking into account the suitability of urban recycling, and/or compact city planning as strategies to minimize land consumption, preventing unnecessary conversion of greenfields and natural areas to urban land.
Transportation	Reducing transport needs by the promotion of proximity and mixed-uses schemes, while at the same time stimulating more sustainable mobility by: prioritising non-motorised (walkable and cyclable cities) less pollutant means of transport, supporting affordable and efficient public transport accessible for all-notably for deprived neighbourhoods.
Increasing energy consumption	<p>Boosting energy efficiency in existing buildings by improving the thermal insulation of exterior walls, roofs and glazing, and the efficiency of heating and other installations, considering the physical conditions of the building stock.</p> <p>Improving the management of energy and material resources and flows in the city, including the whole water cycle, waste, etc., striving to close urban metabolic cycles locally and to reduce the ecological footprint; promoting renewable energies and implementing them and their use in cities.</p>
Green spaces	Protecting natural, landscape, forestry, water resources, agricultural areas, etc. around cities and strengthening their links or articulation with cities (for example, with green belts and/or corridors connected to and in continuity with

the network of public parks and spaces), ‘re-greening’ the existing city, etc.

2.2.2.3 Sustainable Development Goals

In anticipation of the December 2015 expiration of the Millennium Development Goals, the UN General Assembly adopted in September 2015 an ambitious agenda for sustainable development up to 2030. The agenda was centred on the Sustainable Development Goals for 2030 that encompass social, environmental and economic dimensions. There are seventeen goals and one hundred and sixty-nine targets in total which together propose a seemingly complete view of what is necessary to achieve sustainability across the board (Figure 2-1). Countries were given the challenging task of translating the goals into feasible policies and strategies based on their various contexts (Gabel et al, 2015).



Figure 2- 1 Sustainable Development Goals

The agenda highlights the significance of making cities and human settlements inclusive, safe, resilient and sustainable as one of the Sustainable Development Goals (UN, 2015). Specifically, access to adequate housing is rated as critical in the hope of improving the living conditions of low-income groups and allow them to advance economically and socially. This factor also highlights the necessity to ensure access to basic services and appropriate infrastructure to realize the requirements of adequate living conditions.

In comparison to the MDGs, the principles illustrate narrower objectives in achieving sustainable development, opposed to the broader view provided by the MDGs. The majority of the principles encompass practices of the environmental sustainability and global partnerships (Yiu & Saner, 2014). In an insightful analysis, Parnell (2016) points out five major ways in which the SDGs are different from the MDGs. First, the goals are universal, applying to every place not just poor countries. Second, the economic, social and environmental dimensions of sustainable development are explicit, and more integrated together with a strong recognition of ecological limits and planetary boundaries. Third, recognition exists of the need to leverage innovation in technology to create better sources and monitoring of data at different scales. Fourth, global development is explicitly linked to global finance. Finally, the urban sustainable development concedes that, in an urban world cities can be pathways to sustainable development.

The new global development focus on cities also came with a new set of targets that reach beyond the focus on housing and slum upgrading to include safe, affordable, accessible and sustainable transport, participatory and integrated planning, green and public spaces, improved air quality and waste management, climate resiliency and natural disaster risk reduction (Hak et al, 2016). These targets draw on urban planning, design and architecture into the heart of the development enterprise in an unprecedented way. What is unfolding is how the urban sustainable development goal and its targets and indicators will integrate into and help improve existing urban process, policy and planning in cities across the world. For each target there is also an evolving indicator framework led by the UN Statistical Commission (Holden, 2013). Table 2-2 (below) shows various targets and indicators of the SDGs.

Table 2- 2 Targets & indicators of sustainable urban development

Target	Indicator
By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.	Proportion of urban population living in slums, informal settlements or inadequate housing.

By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.	Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities.
By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.	Ratio of land consumption rate to population growth rate. Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically.
Strengthen efforts to protect and safeguard the world's cultural and natural heritage.	Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage.
By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities.
By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.	Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities.
Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.	Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city.

Substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.

Support and strengthen the participation of local communities in improving water and sanitation management.

Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management. (United Nations, 2015).

2.3 Urban Development in the South African Context

During South Africa's history of colonialism and later apartheid, its cities were subject to stringent political processes which involved rigorous population control policies and forced removals. Legislation such as The Group Areas Act of 1950, served as powerful tools for state intervention in controlling the occupation, use and ownership of urban land and buildings on a racial basis. All inter-racial property transactions were also state controlled to further ensure segregation. Apartheid policies were aligned seamlessly with urban planning philosophies of exercising control in all society in order to curb spatial disorder and chaos. Inequitable, inefficient and environmentally damaging results ensued. The pursuit of spatial segregation and racial supremacy created a fragmented urban form (Donaldson, 2001). Figure 2-2 (below) illustrates the structure of South African cities that are as a result characterized by gaps of land used for industry and major highways to buffer the Central Business Districts (CBD) from black townships. The townships were isolated from the cities but located close enough to supply cheap labour (Osman, 2013). Post-Apartheid, the CBD has largely been abandoned by white owned businesses which moved into new suburban centres and the inner city has since experienced an influx of black South Africans and foreign immigrants. However, the structure of the city remains unchanged and fragmented (Housing Development Agency, 2013).

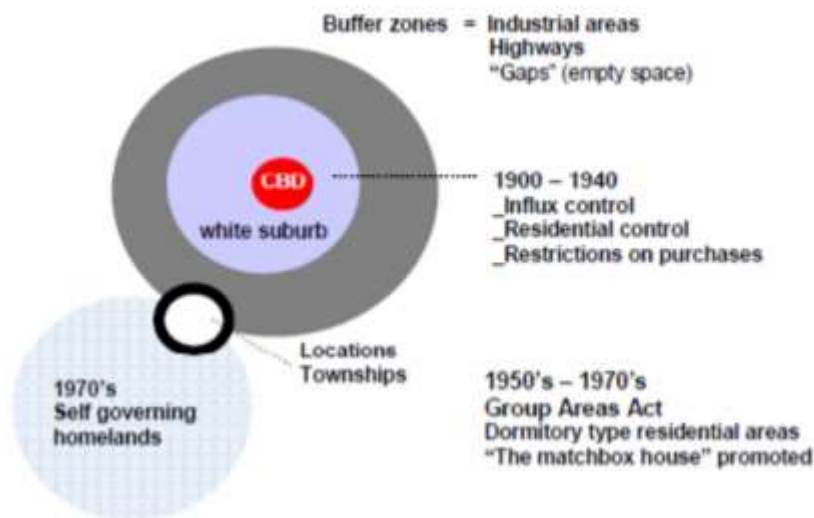


Figure 2- 2 Current structure of South African cities (Osman et al, 2013)

Inefficient and unsustainable patterns adopted from the apartheid era planning continue to persist more than 20 years into post-apartheid. Unsustainable trends such as the continuation of mono-functional and peripheral located development of low-income human settlement continue to emerge (Musvoto et al, 2016). Huchzermeyer (2003) argues the Neo-liberal and Marxist perspectives that cities and their human settlement component are moulded by the way they are financed is the reason why segregated developments have continued to prevail since 1994.

The South African urban population is expected to exceed seventy percent of the entire country by 2030 (UN, 2014). The growth of the urban population is not only unique to South Africa, the urbanisation level in Africa was projected to at fifty percent by 2035 and fifty-eight percent in 2050 (IPCC, 2014). Despite urbanisation having the potential to offer better economic opportunities to low-income groups migrating from rural areas, the unmanaged growth of cities, like those in South Africa, is currently having negative environmental, health and social impacts, increasing the pressure to develop new urban paradigms. As the population continues to grow, the high costs of urban sprawl and a primarily road-based transport system become apparent progressively. Underprivileged families trapped on the periphery continually have to bear the brunt of lengthy and complex journeys to school and work. The state has also had to endure the additional costs of sprawling infrastructure

networks, inefficient transport systems and duplicate municipal facilities instigated by a strained spatial form (Turok, 2016b). Figure 2-3

Although the planning system has remained mainly unchanged for over 20 years, advances have been made through the distinctive restructuring of the legislative and regulatory frameworks, government institutions and resource allocation systems. However, there has been a tendency of pursuing contradictory policies due political unrest (Turok, 2016a). Additionally mismanagement across government structures and the lack of capacity have resulted in poor implementation of good policies and coordination failures (Presidency, 2014). Watson (2014) advised that, the South African dilemma is not unique in the context of other urbanising low and middle-income nations. In spite of global progressive policies and plans, countries such as South Africa need to focus on policies that address their local realities and avoid reproducing urban models pursued by wealthier nations. Other critiques speak of the lack of an integrated, multi-sectorial approach to sustainable urban development in South Africa (cogta, 2016).

The Department of Cooperative Governance and Traditional Affairs (2016), identified the key challenges of urban development in the South African context as four factors;

1. Land use structures and the formal property market which have seen a significant increase post-apartheid have failed to address the issue of well-located, decent and affordable human settlements. The lack of land reform and restitution particularly within urban areas has said to also be a contributor.
2. The dependency on cars and aspirations for a suburban lifestyle across classes has resulted in resource intensive and inefficient forms of settlement. That, in combination with a coal-based energy system have proven to challenge sustainable urban development.
3. Social divisions created during apartheid have continued to segregate urban settlements and have been reinforced by high land values and limited access to resources by a majority of South Africans. The rise of the black middle-class has resulted to racial mixing to an extent, however the same has not resulted for the poor.
4. The disparity in income and access to services and opportunities across the South African population is a legacy of apartheid education and the migrant employment

system has produced spatial poverty snares. A large concentration of the urban poor is located within townships and informal settlement in the peripherals of urban areas.

2.3.1 Urban Development within the Durban context

Municipal planning in Durban is shaped by a variety of strategic documents, such as the Integrated Development Plan, the Spatial Development Framework and the Long Term Development Framework. These documents provide the overall policy guidance for municipalities and such is the case with eThekweni Municipality. Emphasis is placed on economic growth and pro-poor strategies while in the pursuit of sustainable development through environmentally friendly practices (Hannan & Sutherland, 2015). However, Durban has a fragmented urban form, which creates inefficiencies and reinforces exclusion. As is the case with most cities in South Africa, this is heavily informed by apartheid planning and reinforced by current management strategies (Freund & Padayachee, 2002).

The hilly topography complicates compact development and adds to the expense of urban infrastructure and flat building sites. The pattern of new development over the last 15 years or so has tended to extend low density sprawl and make inefficient use of land. Building on the periphery has proven costly in terms of bulk infrastructure resulting in drawn-out negotiations with developers over who should pay. Large private landowners have in the past been able to dictate the form of the city by controlling the location and density of new building (Mapetla, 2008).

The central city has suffered from a loss of private investment and physical decay, partly caused by poor precinct management. However, it remains a unique asset at the heart of the transport network because it maximises access to economic opportunities, educational facilities, the harbour, civic centre and a range of important amenities. Unregulated and uncoordinated house building, particularly in and around the townships and traditional areas, have frustrated local communities and hampered the metro's plans for integrated development. The existing transport system has serious flaws, including fragmentation, unreliability, overcrowding and poor safety. People face long journeys to work and spend a much larger proportion of their incomes on transport than in other countries, partly because of the inefficient form of the city. Forty-one percent of commuters use minibus taxis and thirty-six percent use private vehicles. Both modes have been growing, despite not receiving any operating subsidies from the government. Public buses and trains receive all the

subsidies, but account for only twelve percent of all trips and have not been growing (City Planning Commission, 2016).

Greater care needs to be exercised over the physical growth of the city, avoiding ad-hoc decisions on particular projects which undermine the long-term spatial strategy. More attention should be given to redesigning and enhancing public spaces that promote social cohesion and integration, such as the revitalised beach-front (Sutherland et al, 2013). Regeneration as an urban development tool has been identified as crucial in Durban and over the past decade, the city has witnessed dramatic changes in its landscape through regenerative initiatives driven by the local, provincial and the national government. These efforts are characterized by the development of mega and large scale projects such as, waterfronts, stadiums and conference centres. However, urban planners in Durban argue that as much as the integration of sustainability is crucial in development and planning, it is difficult to achieve due to the complexities of contrasting priorities of growth and redistribution (Turok and Parnell, 2009). Ultimately demands placed on cities by the global economy and broader state agendas often become the determining factor in strategic interventions resulting in neo-liberal pro-growth agenda becoming dominant. The city has been subject to public criticism for its use of mega-projects as an urban regenerative tool. Developments such as Ushaka Marine and Moses Mabhida Stadium were criticized due to their high fiscal requirements, uncertain benefits and costs and the critical role they play in determining future urban programmes (Hannan & Sutherland, 2014).

The scale and scope of the challenges facing Durban are beyond the capacity of any single organisation to address. They require dialogue, debate, learning and cooperation across civil society, business, labour, universities, NGOs and various state entities to develop a shared strategy for the city. Working together will help to overcome gaps in knowledge and understanding of each other, and mobilise a larger pool of resources (Sutherland et al, 2013).

2.4 Emerging Urban Development Approaches

At the heart of the new urban agenda is a dilemma on whether the growth of population should be addressed through intensive or extensive urban development. The approaches have both gained support within the South African context recently (Turok, 2016). The following chapters discuss in greater depth the two current discourses.

2.4.1 Extensive Urban Development

The past decade has seen many developing and emerging economies adopting extraordinarily large, and simultaneous expansion of multi-billion dollar human settlement programmes. New large-scale human settlement programmes have been initiated by all of the original BRICS countries as well as Argentina, Angola, the Democratic Republic of Congo, Rwanda, Ethiopia, Mexico, Sri Lanka and Indonesia (Buckley, Kallergis, & Wainer, 2016). These large scale developments have been mainly uncoordinated, sporadic and have failed to address current and past housing affordability concerns and the shift towards them has been interpreted as a restructuring of past planning and policy interventions (Eskerod et al, 2015).

Within the South African context the extensive approach focuses on planned urban extensions, new satellite cities and mega-projects, incorporating mixed use and mixed income housing, such as Cosmo City in Johannesburg (figure 2-4) and Cornubia in Durban (Sutherland *et al.*, 2015). However, some critics mentioned the risk for mega-projects being built on cheap peripheral land as reinforcing urban fragmentation and exclusion (Turok, 2015).



Figure 2- 3 Cosmo City Johannesburg

2.4.1.1 Pros and Cons of Extensive Urban Development

Arguments in favour of extensive urban development suggest that the draw card for these projects is they are relatively uncomplicated to develop. Innovation through urban design is relatively easier to execute in green-field developments and allows for a well-structured urban form (Haaland & Bosch, 2015). Starting from scratch in this way also means avoiding the pitfalls of congestion, pollution and overcrowding in existing urban settlements. There are

more risks associated with a ‘mega approach’ than with others. There is a greater chance of major cost overruns, quality problems, undervalued environmental degradation, and the effects on social and economic development are easily overstated. These are universal concerns with large-scale infrastructure projects (Fyrvbjerg *et al.* 2003).

2.4.2 Intensive Urban Development

Intensive urban development, which includes upgrading informal settlements, can be achieved through infill projects on vacant, better located land, which may also incorporate incremental housing schemes, and higher density redevelopment of existing buildings aligned to an overarching plan of urban regeneration. Higher density and participatory processes in decision making, planning and design are important aspects of this approach (Sutherland *et al.*, 2014; Turok, 2016; Tomlinson, 2015). It has been used as a strategy by governments to shift from the provision of peripheral located housing to a more in-depth scope of ensuring that low-income households have easy access to economic centres (Figure 2-5). This seems to reflect an increased interest in the socio-economic sustainability of human settlements (Turok, 2014).



Figure 2- 4 inner-city dilapidated building and on converted into public housing (Johannesburg Social Housing Company, 2012)

2.4.2.1 Pros and Cons of Intensive Urban Development

According to UN-Habitat (2013, 2014) the efficient use of land and resources is a primary argument for absorbing growth within established cities. It has the potential to strengthen the social fabric of cities through incremental schemes, address the issue of poverty and congestion directly is also a big draw-card. It can also be used as an effective tool to consolidate existing cities and revitalise decaying urban districts and aid in the rejuvenation of worn-out infrastructure. For countries such as South Africa whose citizens were subject to physical marginalization in regards to their access to urban areas, intensive development can bring burdensome commutes on an unreliable transport network to an end. This is highly valuable to workers who spend an estimated twenty to thirty-five percent of their incomes on transport costs in South Africa (Organisation for Economic Co-operation and Development, 2011).

Although the objectives for intensive urban development are seemingly positive it is largely criticized for issues such as gentrification and urban marginality. These occurs when the poor are pushed out of spaces which they identify as home because they cannot afford to pay the high rentals associated with the new developments. Rentals prices have a bearing on who gets included in the city and who gets excluded and in some way cast out (Wacquant, 2013).

2.5 The Role of Housing in Sustainable Urban Development

Housing is one of the most important public policies affecting urban development and, as such, it has a significant potential to contribute to sustainable development. Various problems with regards to cities globally are related to housing. How cities deal with urbanisation is also dependent on whether housing is positioned as a priority. Housing has continually been a determining factor on how cities are shaped, in many instances by producing or perpetuating fragmentation and inequality. How cities have chosen to address housing development has resulted in financial and environmental costs that far outweigh what these cities can afford. There is continued advocating for sustainable principles, looking holistically at environmental, social, cultural and economic impacts, to become the drivers for addressing the challenge of developing sustainable urban areas. The UN-Habitat has increased efforts to establish housing an integral component in the debate around sustainable development by orchestrating housing with national and urban development targets (World Bank, 2016).

Individuals and households are moving into ‘inner core’ cities, where jobs are being created and household incomes are higher. In 2011, almost 63% of South Africa’s population lived in urban areas (up from fifty-three percent in 1994), with just four city-regions (Gauteng, Cape Town, eThekweni and Nelson Mandela Bay) accounting for forty-two percent of this population. Figure 2-6 (below) is a graph showing urban population growth in South African cities between 1996 and 2011 (Integrated Urban Development Framework, 2016).

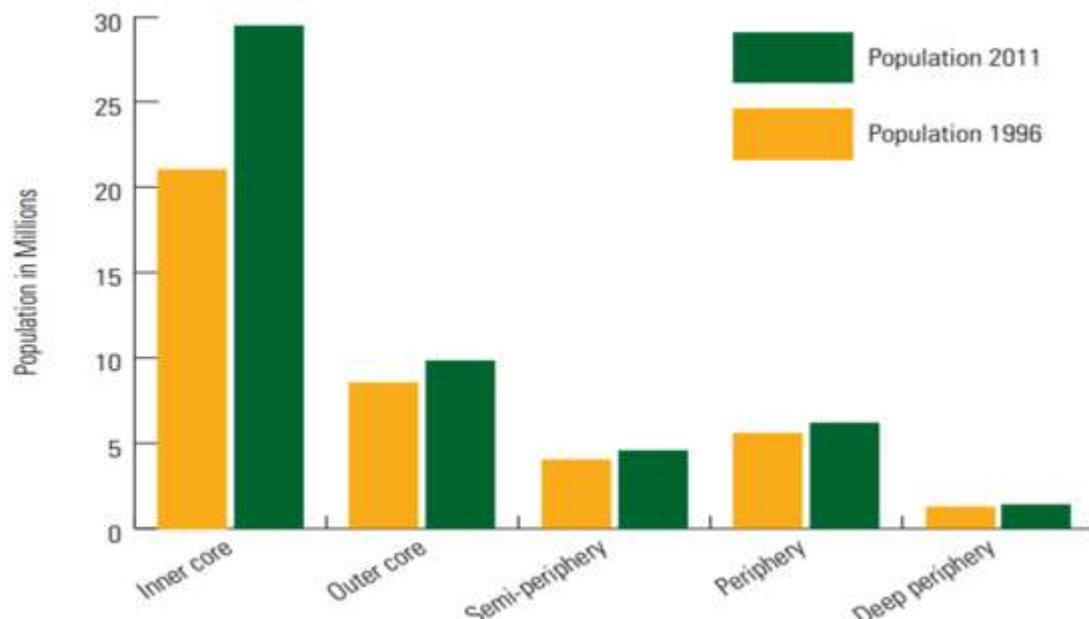


Figure 2- 5 Population change 1996 and 2011 (IUDF, 2016)

Green and sustainable principles, looking holistically at environmental, social, cultural and economic impacts, should become the drivers for addressing the challenge of developing sustainable human settlements. The New Urban Agenda, released through the Habitat III Conference in 2016, is oriented to face these challenges globally by readdressing the way cities and human settlements are planned, financed, developed, governed and managed in a coordinated and integrated manner. The implementation of the New Urban Agenda will contribute to the implementation of the 2030 Agenda for Sustainable Development and its specific goal aimed at making cities and human settlements inclusive, safe, resilient and sustainable (UN, 2016).

The 2030 Sustainable Development Goals have been labelled as ambitious, however the World Bank (2016) called for innovative and inclusive approaches as the future of cities depends on how well and how soon access to adequate housing will be provided for all. Positioning housing at the centre of local and national urban agendas is said to be

instrumental to achieving the goals. Below are some guiding principles that should be considered in order to place housing at the centre.

1. Housing is as much an integrating element of urban planning as it is inseparable from urbanization.
2. Access to adequate housing for all can be enabled through strong governance, long-term policy and finance as well as systemic reforms.
3. National strategies with detailed time frames, provisions and detailed action plans should accompany housing and slum upgrading policies.
4. In order for urban development to result in social sustainable and inclusive cities, human rights standards and principles must be considered.

2.6 South African Human Settlements & Urban Development Legislative & Policy Framework

Since 1994 the South African Government has acknowledged the importance of ensuring the access to adequate housing as a basic human right. Section 26 of chapter two of the Constitution of South Africa states in fact that "everyone has the right to have access to adequate housing" (Gov SA, 1996), in line with the article 25(1) of the United Nation Universal Declaration of Human Rights of 1948. Consequently, in the last two decades several policies have been issued by the South African Government to promote the achievement of this target. However, obsolete planning and design schemes, location far from economic opportunities, inadequate quality of subsidised houses and lack of amenities and community services have often prevented low-income households and human settlements from achieving targets of inclusion, safety and sustainability (Sutherland *et al.*, 2014).

There is a raft of primary and secondary legislation relevant to different aspects of housing in South Africa. A list of relevant secondary legislation is provided below:

- Housing Act 107 of 1997 (amended by Acts 28 and 60 of 1999; Act 4 of 2001) (Housing Act)
- Prevention of Illegal Eviction from and Unlawful Occupation of Land Act 19 of 1998 (PIE Act)
- Rental Housing Act 50 of 1999 (amended by Act 43 of 2007) (Rental Housing Act)

- National Norms and Standards for the Construction of Stand Alone Residential Dwellings Financed through National Housing Programmes (April 2007)
- (Social Housing Act 16 of 2008 (Social Housing Act)
- White Paper: A New Housing Policy and Strategy for South Africa (1994)
- Breaking New Ground: A Comprehensive Plan for the Development of Sustainable Human Settlements (September 2004)
- National Housing Code (2000, revised in 2009)

The following subsections provides an overview of legislation and policy deemed important for the study, and that which informs current urban development programmes and strategies centred on housing.

2.5.1 National Housing Forum (1992-1994)

The National Housing Forum (NHF) was created as a necessity in the backdrop of rapid urbanisation and a transitioning economic and political environment. Created as a result of a meeting between the Independent Developmental Trust and the Developmental Bank of South Africa on hostels, its main aim was to address increasing housing grievances and debate on issues on an inclusive basis for the benefit of all South Africans. “South Africa’s housing policy has its roots not directly in the ANC’s RDP, but in the 1992-1994 National Housing Forum negotiation” (Huchzermeyer and Karam, 2016:70).

Discussions in the NHF were primarily based on the role of the private sector and that of the state in regards to housing provision for the marginalized as well as the housing typology to be provided. Subsequently policies sought to include wider access to adequate housing and corrective measures. Stakeholders involved in the process included labour associations, non-governmental organisations, private contractors, civil society organisations and political parties (Tissington, 2012).

2.5.2 The Housing White Paper (1994)

The Housing White Paper is the principal, overarching national housing policy. It provided the agenda for the country’s ambitious housing development goal of constructing one million state-funded houses in the first five years of the post-apartheid government in office (Department of Housing, 1994). The significant principles of policy and development which were introduced in the White Paper have had, and continue to have far reaching influence in guiding development in respect to housing policy and implementation (Huchzermeyer, 2006).

In 1994, the Department of Housing was faced with the challenge of addressing the housing crisis through subsidised housing for low-income households. This proved to be a mammoth task as 86% of households were estimated to be earning less than R3500 per month (Rust, 2006). The challenge of a considerable and ever increasing backlog, the dire housing needs of the poor and limited state resources were at the forefront of the policy. The Reconstruction Development Programme (RDP) which was part and parcel of the ruling party's manifesto which sought to provide a million state-subsidised housing in five years. The White Paper furthermore outlines strategies for the provision of adequate housing through quick release of land, encouraging saving and strengthening public-private partnerships.

2.5.3 The Housing Act (1997)

The Housing Act serves as the key piece of legislation in the country. Policy principles that are outlined in the white Paper are legally entrenched in the Act. The Act primarily sets the premise for the sustainable housing development process and sets general principles for all three spheres of government. The act also set the basis for the financing of national housing programmes. Housing development is defined in the Housing Act,

“The establishment and maintenance of habitable, stable and sustainable public and private residential environments to ensure viable households and communities in areas allowing convenient access to economic opportunities, and to health, educational and social amenities in which all citizens and permanent residents of the Republic will, on a progressive basis, have access to a. permanent residential structures with secure tenure, ensuring internal and external privacy and providing adequate protection against the elements; and b. potable water, adequate sanitary facilities and domestic energy supply.” (DoH, 1997; Republic of South Africa, 1997).

Section 2(1) the Act states the housing needs of the poor must be given priority by local, provincial and national government and entrenches this by requiring government to ensure meaningful consults with communities and individuals in housing development. The Act also calls for the reasonable provision of housing tenure variations. Section 2(1) (e) the Act calls for a housing development process that fosters economic, social and racial integration in urban areas. It also goes on to promote higher densities to ensure economical utilization of services and land. Amendments were made to the Act in 1999 and 2001 respectively (DoH, 1997).

2.5.4 Breaking New Ground (2004)

Breaking New Ground (BNG) was adopted in September 2004 and did not introduce a new policy direction, it did however outline a new comprehensive plan aimed at the development of sustainable human settlements. The policy clearly expressed the significance of inner city affordable housing development as a tool for integration and a means to readdress historical spatial inequality (Charlton & Kihato, 2006). BNG further articulated the potential of affordable housing initiatives such as Social Housing to facilitate the acquisition, rehabilitation and conversion of vacant office blocks and other vacant/dilapidated buildings as part of a broader urban renewal strategy (DHS, 2004).

The BNG housing plan introduced a provision for affordable rental housing as a priority of national housing policy, whereas, the provision of low-income rental housing had taken a back seat to Restructuring Development Programmes housing development in the Housing White Paper. Despite this progression rental housing programmes have either targeted middle-income earners, or have not been implemented at scale (Tissington, 2013). The use of Social Housing interventions and financial loans for individuals who earned above R3500 were also envisioned to create a demand for housing located within the inner-cities. The policy also made an emphasis on rental housing as a catalyst to enhance mobility and promote integrated societies (DHS, 2004).

BNG essentially defined four primary ends:

- Sustainable human settlements: It introduced sustainable human settlements as, well-managed entities in which economic growth and social development are in balance with the carrying capacity of the natural systems.
- Integration: BNG introduced integration through the shift from housing to human settlements and green-field developments in the outskirts to urban spatial restructuring.
- The Upgrading of informal settlements: urban inclusion through the progressive eradication of informal settlements is stipulated in the policy, “informal settlements must urgently be integrated into the broader urban fabric to overcome spatial, social and economic exclusion” (Rust, 2006).

2.5.5 Housing Code (2009)

The National Housing Code, was first published October 2000 and contains the BNG-compliant National Housing Programmes which are the building blocks in the provision of sustainable human settlements. It further sets out primary policy norms and standards, guidelines and principles underpinning all national human settlement programmes (Department of Human Settlements, 2009). A new housing policy has been promised since 2010, however it has seemingly taken longer than expected (Turok, 2014).

2.5.6 Social Housing Act (2008)

The Acts' main objective is to establish and promote a sustainable social housing environment and defines the functions of national, provincial and local governments in respect of social housing, it also allows for the undertaking of approved projects by other delivery agents with the benefit of public money and gives statutory recognition to Social Housing Institutions (SHIs). Further, it provides for the establishment of the Social Housing Regulatory Authority (SHRA) and defines its role as the regulator of all SHIs that have obtained, or are in the process of obtaining, public funds. SHRA also deals with the accreditation of SHIs in terms of this legislation and regulations pursuant to it (DHS, 2008).

2.5.7 National Development Plan (2012)

The National Development Plan stipulates the plan of government to reduce inequality and eliminate poverty by 2030. Chapter eight of the plan is on the transformation of human settlement and the national space economy. Its key points in relation to urban development are:

- Systematic response to spatial patterns that intensify economic efficiency and social inequality.
- Taking stock of the potential and needs of different urban and rural areas within the context of emerging development corridors in South Africa.
- The revision of housing policies for the realization of the constitutional housing rights of South Africans and to ensure the restructuring of cities and towns through housing delivery approaches.
- To support and incentivise active citizenship in spatial development through interventions such as social compaction and citizen-led neighbourhood visions.

- Guiding planning in South Africa through principles that create sustainable, equitable, liveable, efficient and resilient spaces, as well as foster social cohesion and economic opportunities.
- The development of a national spatial framework that addresses current integrated development deficiencies and the progressive development of governance and the administrative capacity to undertake planning at scale. (National Planning Commission, 2011)

2.5.8 The Integrated Urban Development Framework (2016)

The Integrated Urban Development Framework (IUDF) is government’s policy position on guiding the future growth and management of urban areas. It is also a response to the Sustainable Development Goals (SDGs), Goal 11 in particular. It is also makes additions to various NDP chapters and provides a specific vision for urban South Africa. The framework aims to guide the development of inclusive, resilient and liveable urban settlements, while directly addressing the unique conditions and challenges facing South Africa’s cities and towns. It established that integrated management and urban planning is essential for coherent development to redress apartheid geographies and facilitates spatial integration. Its vision for urban South Africa is based on that of the National Planning Commission, which is:

“By 2030 South Africa should observe meaningful and measurable progress in reviving rural areas and in creating more functionally integrated, balanced and vibrant urban settlements. For this to happen the country must: clarify and relentlessly pursue a national vision for spatial development; sharpen the instruments for achieving this vision; and build the required capabilities in the state and among citizens” (National Planning Commission, 2012: 260).

Four strategic overall goals were introduced to achieve this visions, these include spatial integration, inclusion and access to economic and social opportunities, to harness sustainable economic growth and enhance governance through increasing state capacity. From these goals nine priority levers to effect urban transformation were sourced which culminated in tangible short-medium and long term goals. These goals however were not given distinctive timeframes, below are a number of the short-to medium term goals:

- **The prioritization of inner city regeneration:** The renewal and redevelopment of inner cities should focus on the provision of affordable housing options and the improvement of urban management and public sector investment. This goal requires the partnership of housing finance institutions, the private sector and the state.
- **The development of urban design norms and standards:** safe and liveable inclusive urban spaces should be produced by smart urban design. The creation of sustainable human settlements and rental stock must be achieved through innovative and differentiated norms and standards that include public spaces, social facilities and green infrastructure.
- **Road infrastructure:** Non-motorised Transport is central to functional human settlements. Infrastructure plans and road designs should therefore consider NMT infrastructure and implementation should encompass the perspective of all users including the disabled. Access to social infrastructure and the safety and inclusivity of public spaces needs to be prioritized.

2.6 Contemporary challenges to South African Housing

Despite the above mentioned policy and legislative advances, there are still serious deficiencies, in terms of both implementation and policy framework. For example, despite a clear commitment to urban integration and integrated development, housing policies and practices are producing unintended spatial results that are not entirely dissimilar to those produced under apartheid. Namely, poor quality housing badly located on the outskirts of urban areas and the continued growth of informal settlements on often unsuitable and hazardous land. Evidently policy shifts do not always equate to meaningful implementation and practice, which requires a greater commitment at all levels from the actors involved in the process to effectively implement demanding measures.

2.6.1 The Housing Backlog

The White paper on Housing estimated that 1.5 million units was the housing backlog in 1994. Seventy-two thousand urban sites were said to be in need of upgrading and there were approximately 450 000 hostels that needed upgrading. In the 1996 Census 1.5 million households were showed to be living in informal houses in the urban areas. By 1999 the total housing backlog was estimated to be as high 3.7 million units by the then National Department of Housing. The most recent figures show that the backlog stands at

approximately 2.1 million units. It is evident that the backlog has increased considerably since 1994, this has been accounted to unemployment, limited access to housing finance and rapid urbanisation. However, about 2.8 million houses and units, and just over 876 774 serviced sites, were delivered, allowing approximately 12.5 million people access to accommodation and a fixed asset since 1994' (The Presidency of the Republic Of South Africa, 2014:68).

The housing backlog is problematic because of the security and stability adequate formal housing awards people. According to Collier & Venables (2013), suitable housing also improves people's health, dignity and enables them to effectively participate in the labour market. Housing also serves as an economic asset that can support the livelihoods of generations, therefore state efforts to improve housing conditions can boost people's living standards and transform the prospects of poor communities.

2.6.2 Informal Settlements

Informal settlements, despite unsanitary and insecure living conditions, are generally formed in areas that offer a strategic location for low-income groups to access better economic opportunities and favoured community networks (Turok, 2015a). Extreme measures of forced eviction and demolition of shacks in urban areas, adopted in the past as necessary to address the goal of eradicating poverty and the housing backlog, were mostly unsuccessful and, on the contrary, a proliferation of informal settlements in peri-urban areas continues to occur (Figure 2-7) (Sutherland *et al.*, 2014).



Figure 2- 6 South African informal settlements (Daily Maverick, 2017)

The increasing number of informal settlements also relates to the inefficiency of the policy and model for formal low-cost housing delivery in sustaining the growing urbanisation. Typical

RDP settlements are low-density developments with detached single-storey units, built generally on peripheral, cheap and available land, with the subsidy allocated for the construction of the top-structure of the unit. However, the houses have often been found of sub-standard quality, not complying with the building regulations and serviced by poor infrastructure making inefficient use of water, energy and other resources (Lodge, 2003; NPC, 2012). Settlements were generally located on the urban outskirts and isolated from social services and livelihood opportunities, therefore not producing sustainable neighbourhoods, but creating mono-functional settlements (Turok, 2014) and increasing the exclusion and spatial marginalisation of low-income communities (Sutherland *et al.*, 2014; Turok, 2016).

Despite the more integrated and holistic underpinning philosophy, housing has continued to be provided mostly as poor-quality construction and “physical shelter rather than part of an integrated human settlement with access to jobs, amenities and community services” (Turok, 2016: 14). More recent policies have generally rejected top-down approaches of eviction and relocation of inhabitants of informal settlements far from their location, unless under exceptional circumstances. Resettlement, if necessary (e.g. in case of hazardous site conditions), should on the contrary be a last resort and follow a bottom-up approach planned and implemented in agreement with the community (DHS, 2009). Since as early as 2004, the South African government recognised the importance of in-situ upgrading of informal settlements as an overt target of the BNG policy (DHS, 2004). The government subsequently launched the Upgrading Informal Settlements Programme and associated grant money to assist municipalities with upgrades. In order to better support the implementation of the programme, the Department of Human Settlements designed the National Upgrading Support Programme in 2010, which provides guidance, practical tools and assistance to municipalities in the process. However, given the growth in the number of informal settlements, the inherent complexity of upgrades and the commitment required by all the stakeholders involved, some communities have had to wait for years to receive their upgrades (Bosworth, 2016).

2.7 Sustainability and the construction industry

The building sector is receiving increasing attention in world-wide policies for sustainable development (UNEP-SBCI, 2009). This attention to the building sector arises from its energy

consumption and GHG emissions which, in developed countries, represent 30 and 40% of the total quantities respectively (UNEP-SBCI, 2009). The increasing relevance of the building sector in undeveloped and developing countries justifies greater attention towards sustainable buildings. In fact, in these countries, the building sector is showing high growth rates (Berardi, 2013). The need for economic growth in these countries has fuelled a huge demand for construction projects, however the environmental and social concerns have been overshadowed. Construction projects in developing countries have profound impacts on communities, the environment and social features with an immense weight within the economy (Ghoddousi and Hosseini, 2012). The sustainable urban development strategy of retrofitting dilapidated buildings in the inner city into housing requires an understanding of the impact of decision making and management on the process (Nguyen and Altan, 2011). The following section provides an overview of sustainability and the construction industry, achieving sustainable buildings through retrofit and the decision making and management processes of retrofitting.

2.7.1 Sustainable Construction

The construction industry has been found to have damaging effects on the environment by means of waste generation, energy and water depletion and several other forms of damage to the environment. The damage has led to experts and environmentalist calling for sustainable ways of carrying out construction activities. Subsequently, there have been numerous definitions and interpretations of sustainable construction. However, the common thread has been the call for elimination of the negative impacts on the built environment and an enhancement of social well-being, in the search for economic development. Below are a number of definitions given over the years for sustainable construction.

Definition	Reference
<p>“The set of processes by which a profitable and competitive industry delivers built assets (buildings, structures, supporting infrastructure, and their immediate surroundings), which: enhance the quality of life and offer customer satisfaction; offer flexibility and the potential to cater for user changes in the</p>	<p>Ogunbiyi et al., 2014, p. 89</p>

future; provide and support desirable natural and social environments, and maximise the efficient use of resources”.

“(1) Showing concern for people by ensuring they live in a healthy, safe and productive built environment and in harmony with nature; (2) Safeguarding the interests of future generations while at the same time, meeting today’s needs; (3) evaluating the benefits and costs of the project to society and environment; (4) minimising damage to the environmental and its resources; (5) improving the quality of buildings and services and promote social cohesiveness; (6) using technology and expert knowledge to seek information and in improving project efficiency and effectiveness; (7) legislating compliance and responsibility”.

Zainul Abidin, 2010, p. 422

“Agenda 21 on Sustainable Construction for developing Countries defined sustainable construction as a complete process which is aimed at restoring and maintaining relationship between the natural and built environments, and creating settlements that affirm human dignity and encourage equity.”

United Nations, 2014

The construction industry provides various physical facilities (e.g., dams, roads, bridges, residential and commercial buildings, factories, recreational facilities amongst others), these have an impact on society, environment and economy. Therefore, the balance between the three elements of sustainability plays a significant role in the construction industry compared to other industries, and it is strongly recommended that the industry’s success must be considered based on sustainability as well, rather than traditionally solely on time, cost and quality.

Various sustainability-assessment tools and methods have been introduced, particularly by advanced countries and a few developing ones, to assess the sustainability performance of buildings. For instance, in the UK, the Building Research Establishment Environmental Assessment Method was the first method of rating, assessing and certifying the sustainability

of buildings, based on an overall score of pass, good, very good, excellent and outstanding (Whang & Kim, 2015). The Leadership in Energy and Environmental Design assessment system, which was developed by the United States Green Building Council, rates the sustainability of green buildings according to their design, construction and operation. In Hong Kong, Building Environmental Assessment Method Plus is one of the green-building certifications. The International Initiative for a Sustainable Built Environment developed the SBTool assessment method to rate the sustainability performance of buildings, which focuses on the environmental, economic as well as social aspects of sustainability. Despite the significant impact of the construction industry on economic and social development, the extant literature and the existing sustainability assessment tools suggest that the bulk of the studies and methods on the subject still focus on the environmental aspect of construction sustainability solely (Hui et al, 2017).

To find ways to implement sustainable construction, firstly it is important to identify possible drivers and constraining factors, so that industry professionals (government authorities, contractors, project managers) can subsequently act upon them effectively. Table 2-4 below shows sustainability drivers and barriers of sustainable construction identified in different countries.

Table 2- 3 Country based drivers and barriers of Sustainable Construction

Country	Drivers and Barriers	Reference
Chile	Drivers: regulations, company awareness, corporate image, client demand, cost reduction, market differentiation, suppliers. Barriers: lack of financial incentives, designers work alone, economic needs of higher priority, environmental costs not included in the cost structure, governmental bureaucracy, lack of knowledge on sustainable technologies, lack of environmental concern, affordability.	Serpell et al, 2013
Malaysia	Drivers: government regulations, green technology funding, non-compliance penalties, formulation of policies, entities and a national sustainable construction roadmap.	Shafii et al, 2006

Barriers: lack of awareness on sustainable building, lack of training and education, the higher cost of sustainable building options, procurement issues, regulatory barriers, lack of professional capabilities/designers, disincentive factors for local material production, lack of case studies/examples.

United Kingdom	Drivers: client awareness, building regulations, client demand, financial incentives, investment, labelling/measurement, planning policy, taxes/levies. Barriers: affordability, building regulations, lack of client awareness, lack of business case understanding, lack of client demand, lack of proven alternative technologies, lack of one single labelling/measurement standard, planning policy.	Pitt et al, 2009
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2.7.1.1 Challenges in the adoption of sustainable construction practices

Research has shown that the desire to commit to sustainable practices in the construction industry is driven by both the internal and external factors. For instance, drivers for the adoption of sustainable construction include financial incentives, legislation and client demand. The need for the adoption of sustainable construction practices is particularly heightened within the context of urbanisation where city expansions and modernisation are a source of global environmental pollution, economic advances, and urban fragmentation. However, the adoption of sustainable construction practices has been slow especially within developing countries. A wide range of challenges such as unstable economy, lack of data and transparency and corruption affect the construction industry in these countries (Perera et al., 2014). In addition, lack of the formal education on sustainability, financial and political constraints and sociocultural challenges further impede the adoption of sustainability. According to Othman and Ahmed (2013), the main challenges influencing the sustainable delivery of construction projects in developing countries come under five major groups. These are technical, human development, managerial, political and environmental, social and economic challenges. These present themselves in some of the following ways:

- **Fear of higher investment costs and low profitability from the client perspective:**

Sustainable Construction requires a long term view, considering initial capital cost, against running costs of the structure. The major economic benefits of sustainable construction are reduced operation and utility costs, reduced maintenance costs, and an overall improvement in the buildings performance and efficiency (Zhou & Lowe, 2003). It is also perceived that the short term costs of sustainable practices are too high to justify their application in a highly competitive market. Despite the substantial advances in best practice, there is a lag in the application of sustainable practices that improve building performance. This lag is mainly due to: the lack of client demand; and the belief that sustainable methods are more expensive than traditional construction methods. Cost consultants can add a significant margin of ten percent to capital costs to allow for more sustainable solutions (Sweett, 2007). As stated by (Halliday, 2008), the construction industry has long behaved in a secretive manner. Clients, contractors and stakeholders are generally reluctant about revealing information on costs. As a result, information on the costs of sustainable building has emerged slowly. It is increasingly being realized, that some requirements that were once assumed to increase costs, are actually proving to be cost neutral or better.

➤ **Lack of government policies, programmes and general commitment:**

The lack of government policies/support, building codes on sustainability, legislation and government commitment have been identified as barriers of sustainable construction (Häkkinen & Belloni 2011). Dadzie and Dzokoto (2013) suggested that the sustainable construction concept would be successful if stakeholders especially government put in place legislation that would require sustainability policies and also the development of various policy documents to enforce sustainability in all aspects of their development. The success of sustainable construction is highly reliant on the commitment of government and the formation of legislation. Due to the many benefits associated with sustainable design and construction, governments and should lead by progressively incorporating sustainable design and construction practices into new construction projects so that private organizations and individuals can emulate (Osaily, 2010).

➤ **Lack of innovative leadership practices that inform transparent decision making:**

Innovation has long been recognized as one of the major factors contributing to national economic growth, international competitiveness, and human living standards

(Robichaud & Anantatmula, 2011). However, innovation has a complicated and industry sensitive nature, and it varies from industry to industry. Unlike other industries, construction involves the production of unique projects on site by a variety of teams that are temporarily brought together. This dynamic constitution of resources and locations brings a great challenge to innovation at project level. Sustainable development requires changes compared to the current situation. There are different strategies to proceed (either with help of reducing consumption, improving efficiency or developing substitutive and less harmful solutions) but in all cases, innovations are needed. The innovation process needs technology experts that are capable and willing to facilitate the transfer of knowledge continually. In addition the process needs actors that promote innovations with help of coordination, communication and network building (Gerlach 2000). Berardi (2013), found that uninterested stakeholders with impactful power or knowledge, are the main barriers to the adoption of sustainable practices in construction projects.

2.7.2 Sustainable buildings

There have been various sustainability assessment systems and tools that have come to the fore over the past few years which offer a framework of what a sustainable building entails. Through the years, these systems have contributed to increase the awareness about criteria and objectives of sustainability, and they have become a framework of reference to assess the sustainability of buildings (Cole, 2012). According to these systems a building is sustainable if it is built in an ecologically oriented way which reduces its impact over the environment. However, many limits have recently showed in these systems stated, their evaluation is limited to the physical boundaries of the building, and it is mainly interpreted from the environmental perspective (Berardi, 2011).

Consequently, sustainability assessment methods have been accused of reducing the sustainability of a building to the functioning of individual environmental criteria reflecting an idea of a building as a consumer of resources (Conte & Monno, 2012). However, Hoffman and Henn (2010) suggest that the construction industry will continue to stall in addressing environmental needs if the social and economic pillars of sustainability are not also adequately addressed. The International Council for Research and Innovation in Building and Construction (CIB) presented ten principles for a sustainable building (Figure 2-8);

Principles for sustainable building

1. Apply the general principles of sustainability, and hence, promote continual improvement, equity, global thinking and local action, a holistic approach, long-term consideration of precaution and risk, responsibility, and transparency.
2. Involve all interested parties through a collaborative approach, so that it can meet occupants' needs individually and collectively, and be respectful of and consistent with collective social needs through partnership in design, construction, and maintenance processes.
3. Be completely integrated into the relevant local plans and infrastructure, and connect into the existing services, networks, urban and suburban grids, in order to improve stakeholder satisfaction.
4. Be designed from a life-cycle perspective, covering planning, design, construction, operation and maintenance, renovation and end of life, considering all other phases during the evaluation of performance at each phase.
5. Have its environmental impact minimized over the (estimated or remaining) service life. This takes into consideration regional and global requirements, resource efficiency together with waste and emissions reduction.
6. Deliver economic value over time, taking into account future life-cycle costs of operation, maintenance, refurbishment and disposal.
7. Provide social and cultural value over time and for all the people. A sustainable building must provide a sense of place for its occupants, be seen as a means of work status improvement for the workers, and should be related and integrated into the local culture.
8. Be healthy, comfortable, safe and accessible for all. Health criteria include indoor air quality whereas comfort criteria include acoustic, thermal, visual and olfactory comfort. It must allow safe working conditions during its construction and service life, and full accessibility to everyone in the use of building facilities.
9. Be user-friendly, simple and cost effective in operation, with measurable performances over time. Operation and maintenance rules must be available for both operators and occupants at any time. People should understand the philosophy and the strategies included in the building and should be incentivized to behave sustainably.
10. Be adaptable throughout the service life and with an end-of-life strategy. The building has to allow adaptation by changing performance and functionality requirements, in accordance with new constraints (CIB, 2010).

Figure 2- 7 Principles for sustainable building (CIB, 2010)

2.7.2.1 Socially Sustainable Buildings

Until a few years ago, the sustainability of buildings only looked at the operational life of buildings and at building materials only. To this day the social dimension of sustainability

within the context of sustainable buildings is overlooked (Beradi, 2013). People perceive a building, by its impact and effects in different ways. This is a constraint on the spread of sustainable buildings given the difficulty of establishing common sustainable requirements between people (Dempsey et al, 2011). The differences between stakeholders imply different points of view in sustainability priorities, and consequently, they make the identification and the characteristics of a sustainable building dependent on a specific point of view (du Plessis & Cole, 2011).

Numerous attempts at defining the social aspects of a building have generally considered concepts such as quality of life or sustainable livelihood. The importance for a building to contribute in creating a sense of community is an important requirement of sustainable building. However, the practical meaning and the forms to prove these aspects remain uncertain. The social dependence of sustainability in the building sector could be addressed through a participative process in which different stakeholders express and contribute with their idea of sustainability (Moffat & Kohler, 2008). Understanding social context in buildings requires knowledge sharing between individuals, through participative decisions (Bagheri & Hjorth, 2007). Studies have shown that it is important to enlarge spatial boundaries in evaluating sustainability in order to consider the connections between a building and its surrounding site. Consequently, the community can often represent a better unit of analysis for a complete evaluation of sustainability. This allows for better evaluations of the crosscutting effects of sustainability (2010).

Beradi (2013) suggested that if an environmentally friendly building can be realized almost everywhere by minimizing its environmental impact, a sustainable building then requires more. The sense of a community becomes fundamental for a sustainable building. It should increase social equity, cultural and heritage issues, traditions, human health, and social infrastructure, as well as safe and healthy environments. A sustainable building has to consider the impact of the building on the physical and mental health of the occupiers as well. Psychological and social functions of a residential building shift the meaning of the building from that of a physical living place to that of a home, this encourages the consideration of community that a sustainable building must contribute in fostering. Figure 2-9 (below) is a framework of various aspects socially sustainable buildings should foster. Building should be able to withhold future growth through flexible planning that ensure infrastructure and

services adaptability to growth; Government structures should be put in place to represent current and future occupants to help shape future decision making; shared spaces should foster local networks, a sense of belonging and community identity; and access to amenities and support services should be insured.

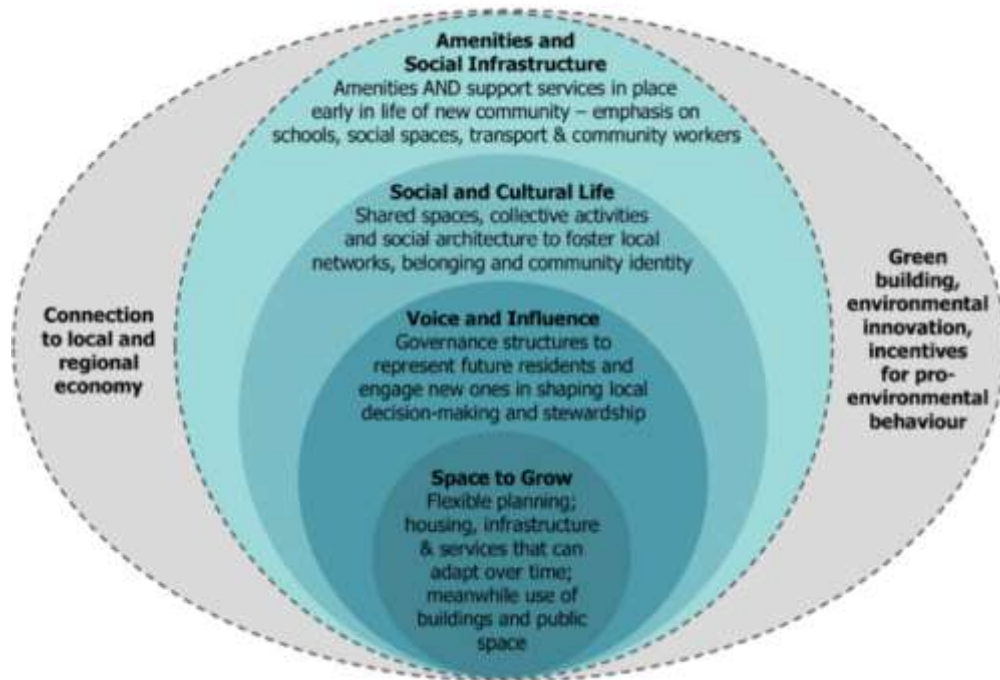


Figure 2- 8 Design for Social Sustainability Framework (Young Foundation, 2011)

2.7.3 Retrofitting and Sustainable Development

Wood (2014) defines retrofit as the adaptation of new use on an old building. The new reduces the operational energy and maximizes the enduring benefit of the embodied energy that is already incorporated in the existing bricks-and-mortar. Rey (2004) described retrofitting as any kind of upgrade of an existing building to improve its energy efficiency and environmental performance, reduce water use, and improve the comfort and quality of the space in terms of natural light, air quality, and noise. A complete rehabilitation of the building in relation to its functional, spatial, aesthetic, energetic and structural aspects, so as to give it a new role also in terms of architecture, considering its strategic position within the urban fabric.

Renovation processes are complex, highly interdisciplinary systems, which involve stakeholders across a broad spectrum of disciplines and potentially affect the everyday lives

of a large number of people (Beim & Madsen, 2015). Subsequently, a deep renovation is not merely about optimizing the technical performance of a building, but prescribes a holistic approach, in which measures are considered for their inter-dependence rather than as separate elements from the built environment. Developing major retrofitting alternatives for existing buildings to include sustainability initiatives can decrease operation and maintain costs; reduce environmental impacts; and can increase building adaptability, durability, and resiliency within other views. Due to this the buildings may be less costly to operate, may grow in value, last longer, and contribute to a preferable, healthier, and more convenient environment to the occupants who live in them. In comparison to new developments, retrofitting also promotes both tangible and intangible benefits. Retrofitting fosters the avoidance of waste associated with construction and conserves embodied energy associated with new developments. It is also relatively more cost-effective; it generates greater investment returns and having low energy, operating and lifecycle cost. Contrary to new developments, retrofitting can be done within a shorter time frame. However, understanding processes of sustainable urban retrofit at a city scale, and within the context of city visions, also requires the development of an integrated perspective on long-term socio-technological systems (Elzen, Geels & Green, 2004).

2.7.4 Decision-making and Management in sustainable construction

Every stakeholder involved in a building process can play a role in developing the construction industry and even more in achieving targets of sustainable construction. Among the others, the key role of decision-makers is emphasized in supporting the long-term vision of the construction industry. Construction Project Managers are in an exclusive position at project level to change the industry and ensure the continued development of the industry. They can be drivers of change alongside their traditional role (Hills et al, 2008). According to Griffith (2002), developing and implementing new innovative ways to procure, design, construct, use and maintain development are recognized as a challenge for construction industry especially for sustainable construction. These innovative ways should meet an even more demanding range of expectations from clients, industry and society that focus on time, cost, quality, safety and environmental impact. Griffith further stated that the interaction between the traditionally separate processes and management functions is the much needed change that can enhance the performance of the construction process (2002). Thus, Construction Project Managers as a driver for these changes should be responsive to some key challenges:

- Improving the effectiveness and efficiency of the construction process by greater interaction between key phases.
- Producing good quality products in a working environment that is healthy and safe and minimizing the improper effect to the project surroundings and inhabitants.
- Making holistic and long-term improvements to the built environment in order to meet the changing demand of clients, industry and the public.

The lack of existing information, technologies and assessment methods give an illusion that sustainable building process are impossible to attain. However, Häkkinen et al. (2011) suggested that the adoption of new processes and working methods can be achieved through changing how decisions are made in the management level and introducing new tasks and actors in the process. Robichaud et al. (2011) stated the most significant steps toward delivering a sustainable building are performed during the feasibility and design phases. These phases are considered important because in the planning phase, materials and construction methods are identified and the manner in which end-users will live are determined (Mills & Glass, 2009). The main challenges in this phase are the setting clear goals, client and end user involvement, the setting of evaluation methods and tools, timing, communication and coordination as well as economics. Integration of sustainability into project management practices in essence requires the incorporation of social, economic and environmental principles into effective project delivery systems. The key question is: how can decision-makers offer a comprehensive and coherent package of decision-making tools in order to facilitate the transition to sustainability thinking (Turner, 2006)? Part of the answer lies in the difference between the drive for economic investment and sustainable practices (Langston, 2013).

Decision makers should be concerned with how current decisions about man-made and natural capital have an impact upon future well-being (Atkinson, 2008). The challenge moving forward therefore is to find a balance where economic pulls and social pushes can be balanced against resource consumption and environmental impact in a strong sustainability paradigm. This would provide decision-makers with strategic advice to enable them to recognize and implement balanced outcomes. (Langston, 2013) Table 2-5 (below) shows a list of questions, set by Langston (2013), which decision makers should be asking and raising with stakeholders in attempt of developing sustainable buildings.

Table 2- 4 Questions for construction stakeholders to develop sustainable buildings (Langston, 2013).

Manufacture	Context
<p>Does the manufacturer have an environmental management plan?</p> <p>Are new raw materials a renewable resource?</p> <p>Does the manufacturing process involve hazardous materials?</p> <p>During manufacture, are greenhouse gas emissions minimal?</p> <p>Does the manufacturing process generate untreated pollution?</p> <p>Are product components manufactured from recycled materials?</p> <p>Are the majority of raw materials imported from overseas?</p> <p>Is manufacturing waste sent to landfill?</p> <p>Are significant amounts of manufacturing waste recycled?</p> <p>Are most products packaged?</p>	<p>Is the site in a remote location?</p> <p>Is the site environmentally sensitive or protected?</p> <p>Was an environmental impact statement prepared for the project?</p> <p>Are there rare or endangered species near the site?</p> <p>Will the site's natural features be significantly disturbed?</p> <p>Is site stability and erosion control a particular objective?</p> <p>Are affected site areas reinstated upon completion of construction?</p>
<p>Design</p> <p>Is environmental performance a specific design objective?</p> <p>Were outcomes evaluated using a life-cost approach?</p> <p>Was embodied energy considered in the decision process?</p> <p>Are there significant heritage implications to be considered?</p>	<p>(Langston,2013)</p>
<p>Construction</p> <p>Will the construction process generate untreated pollution?</p> <p>Will the construction process generate untreated pollution?</p> <p>Will environmental impacts during construction be monitored?</p> <p>Will construction waste be primarily recycled?</p> <p>Usage Does the intended function use water efficiently?</p> <p>Will pollutants be discharged directly into the environment?</p>	

Is waste recycled?

Are significant energy minimization strategies in place?

Is noise transmitted to surrounding spaces?

Demolition

Are most demolished materials recyclable?

Does non-recyclable waste involve hazardous materials?

Are all components sent to landfill biodegradable?

Has a deconstruction plan been developed?

2.7.4.1 Setting clear goals

Setting clear goals is important for sustainable construction due to its complexity of incorporating economic, environmental and social considerations, therefore a lack of adequate knowledge for developing a project brief with clear target is a hindrance to sustainable building. Decisions and project goals should be made before site selection and design. All stakeholders should be included in the process of setting the goals and highlighting priorities (Häkkinen & Belloni, 2011). Early consideration of sustainability is vital for delivering a sustainable building, therefore it is important to begin with the end in mind. This means that the owner and project manager have to establish clear sustainability goals before design and construction phase. Emphasis is placed on setting sustainable priorities during the project feasibility as it allows for the establishment of a framework for all future decision making. So, the chance for significant changes or wrong decision making that lead to cost inefficiency can be reduced (Robichaud & Anantatmula, 2011).

2.7.4.2 Evaluation methods and tools

Sustainable buildings have different requirements from those that are conventional due to the objectives and strategies put in place for achieving sustainable construction (Kubba, 2010). Methods of managing sustainable buildings should be developed and used by all relevant stakeholders (Häkkinen & Belloni, 2011). Furthermore, they should be able to set performance-based requirements that are measurable and that can also be monitored and maintained during the entire process. Häkkinen et.al (2011) emphasize that the objectives and requirements should be expressed clearly and quantitatively. Furthermore, some methods should be for comparisons, quality control and monitoring. Kubba (2010) supported

this by stating that the progress of the sustainable building process should be managed by measurable targets related to a specific requirement. These targets should be measured by tools which challenge the design and construction team. Tools such as computer-aided programs should be employed to measure and assess energy saving early and throughout the design process. This enables the design team to produce alternative concepts that focus on minimizing energy consumption from the onset. The utilization of these tools requires training, which gives rise to the fact that project leaders need continuous training to increase their knowledge and offer various strategies in projects (Häkkinen & Belloni, 2011).

2.7.4.3 Stakeholders' involvement, integrated and collaborative process

According to Arditi et al. (2009), the selection of the right stakeholders and having them give their input at the right time is important in the objective of sustainable construction. The participation of the relevant stakeholders within the right time frame or phase in the construction process heavily influence the outcomes of a project. A study conducted by Williams et al (2007) found that in spite of consulting planning authorities through advertising planning applications, there were occasions where stakeholders who should have been involved were not. They stated that if they participated earlier, they could have influenced the adoption of sustainability objectives. Furthermore, they found that in some cases the important stakeholders participated too late to introduce sustainability elements. For example, landscape architects argued that if they had been involved early in design stage, they could have had impactful influence (Williams et al, 2007).

Additionally, end users should be actively involved in reaching building specification, their involvement is realized as one of the drivers of innovation (Häkkinen & Belloni, 2011). Direct communication and collaborations with end users impacts the implementation of the social dimension of sustainability within buildings and project managers can harness the input of end-users in building specifications. A collaborative planning process, guided by project managers is required. This process can improve the communication and foster the exchange of ideas and knowledge amongst stakeholders.

2.7.4.4 Economics

A barrier to sustainable building is the concern of high investment costs and higher risk of unforeseen costs in its process. This high risk of unforeseen costs are related to unfamiliar techniques, the lack of experience, additional testing and inspection in construction, a lack of

manufacturer and supplier support and a lack of performance information (Häkkinen & Belloni, 2011). However, the cost implications of sustainable buildings are not clearly articulated. Häkkinen et.al (2011) stated that the constructing of a building that is energy efficient does not increase the investment cost significantly. On the other hand, Robichaud et al. (2011) stated that initial cost of sustainable building can be higher than conventional building. However, Arditi et al. (2009) believe higher cost can be recovered in the long-term because of cost saving in operation and maintenance. Nonetheless, an investor does not have long-term relations with the operating of buildings and might be uninterested in maintenance or operation cost savings.

Providing cost estimation for clients helps them have a more realistic assumption of sustainable building cost. Early estimation of costs can be done during the collaborative planning process. The process accelerates decision making and ensures all stakeholders are aware of costs and offer alternatives where possible. The economics of each decision should be considered and it is the responsibility of project managers to provide a conceptual cost estimate for review to the client (Kibert, 2005). Robichaud et al. argued that it is possible to maximize sustainable practices at efficient costs if professionals and experts in design and construction can be involved early in project design. Although, making this integrated team needs more upfront investment, the extra cost can be recovered by decreasing cost related to fixing avoidable errors (2011).

2.8 Criteria deducted from literature

Figure 2-10 (below) shows categories identified through literature review as critical for social sustainability implementation in housing development. They have been used as a back-drop to compare against while analysing the case studies that follow in the study.

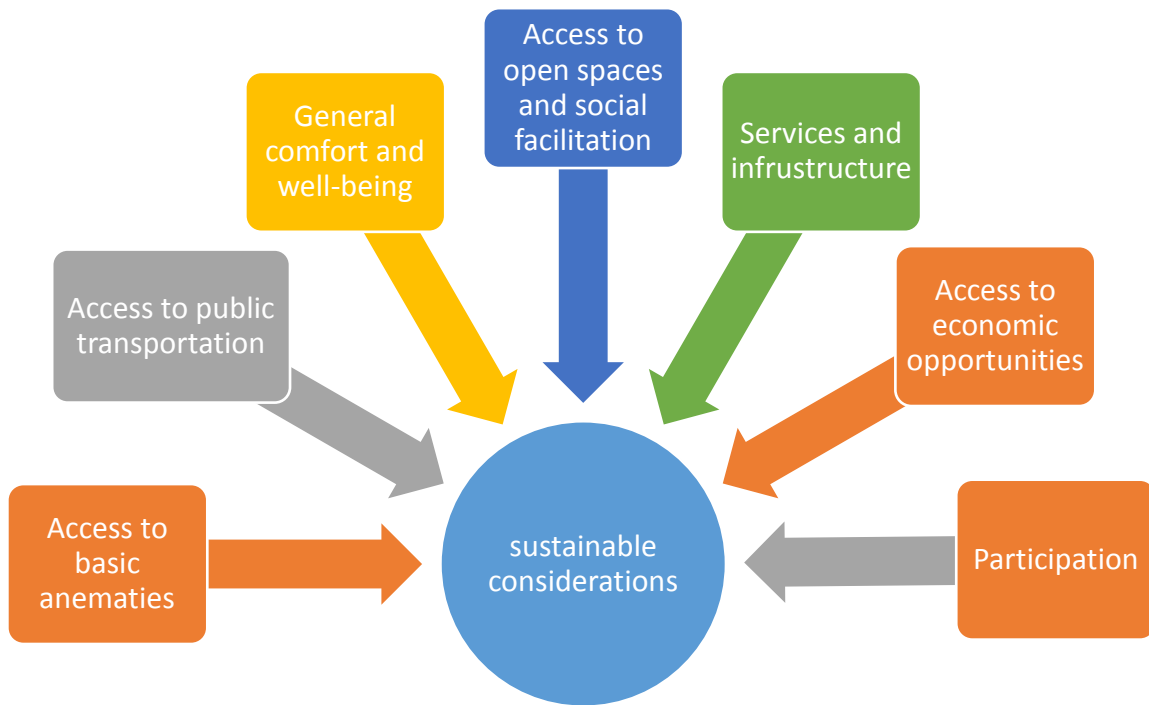


Figure 2- 9 Identified social sustainability categories

2.9 Chapter Summary

This chapter outlined an extensive literature review in relation to sustainable urban development within the global and local context, emerging urban development approaches, the role of human settlement as a catalyst for urban development and ultimately the role decision making and management in the realisation of sustainable buildings and ratification. The literature review laid the foundations to design the research methods and instruments, which are discussed in the next chapter presenting the research methodology used in this study.

3. CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

This chapter gives an overview of the research methods and methodology used in this research. Research methods are the various techniques, methods and procedures used in research (Kothari, 2004; Rajasekar et al., 2006) and research methodology is the systematic way of solving the research problem. Research methodology can also be described as a way of obtaining, organising and analysing data (Polit and Hungler, 2004). Essentially, methodology is aimed at laying out the sequence of the research. This research is aimed at investigating the benefits and barriers of current public housing approaches, and assessing the potentially integral role of decision making and management of construction projects in fostering social sustainability for South African public housing initiatives, with particular regard to an intensive urban redevelopment approach.

3.2 Research Design

A research design is the structure within which the research is conducted (Bhattacharyya, 2006). It has also been described as the process that specifies all the assumptions of the research and the methods of data collection and analysis (Creswell, 2009). It provides answers to the question: What type of study should be undertaken to provide satisfactory answers to the research problem? (Prozesky and Mouton, 2001). A research design attempts to portray an accurate profile and characteristics of people, situations or groups and it enables one to have a clear picture of the phenomena under study (Polit & Hungler, 2004). According to Creswell (2009: 3) the selection of a research design can also be based “on the nature of the research problem or issue being addressed, the researchers’ personal experiences, and the audiences for the study”. The study employed the use of both quantitative and qualitative research approaches (mixed method). For the qualitative component of the study, semi-structured interviews, a focus group, observation and a interviews from a comparative study were conducted. The quantitative element a questionnaire based survey was utilized.

The cross-sectional study design

Cross-sectional studies, also known as one-shot or status studies, are the most commonly used design in the social sciences. This design is best suited to studies aimed at finding out

the prevalence of a phenomenon, situation, problem, attitude or issue, by taking a cross-section of the population. They are useful in obtaining an overall ‘picture’ as it stands at the time of the study. They are ‘designed to study some phenomenon by taking a cross-section of it at one time’ (Babbie 1989: 89). Such studies are cross-sectional with regard to both the study population and the time of investigation.

Deductive Study

Study designs based on deductive rather than inductive logic, are flexible and are often non-linear and non-sequential. The study designs mainly entail the selection of people from whom the information is explored and gathered. The parameters of the scope of a study, and information gathering methods and processes are often flexible and evolving; hence, most qualitative designs are not as structured and sequential as quantitative ones. Figure 3-1 (below) is a flow-chart showing the research design structure for this study. The research tools were semi- structured interviews, focus groups, questionnaires and observation.

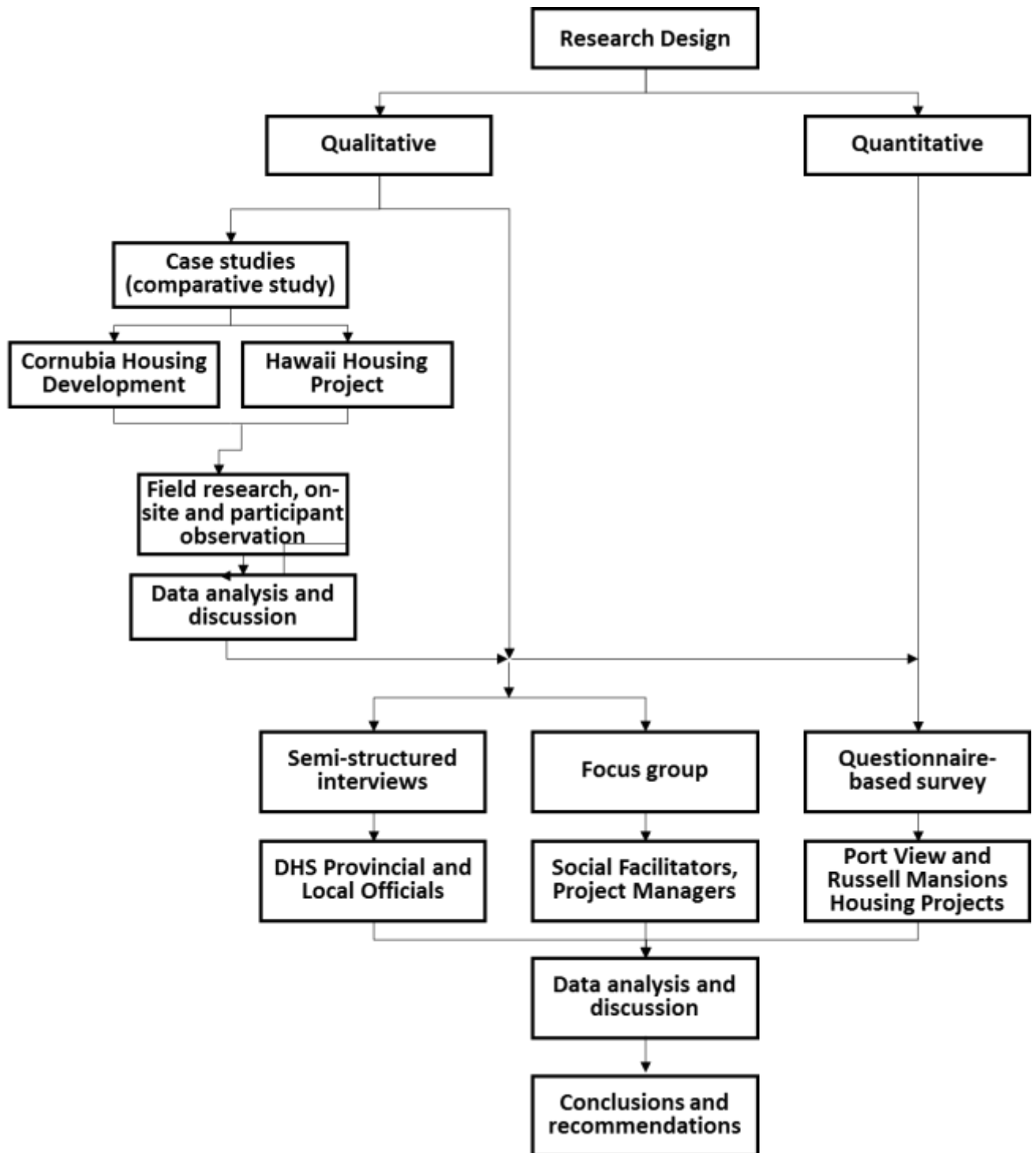


Figure 3- 1 Research Design structure flow-chart

3.3. Research Approaches

3.3.1. Qualitative Research

Qualitative research is naturalistic; it attempts to study the everyday life of different groups of people and communities in their natural setting (Burns & Grove 2003). Qualitative research is a methodical and subjective approach which facilitates and makes it possible for the researcher to gain in-depth knowledge and status of the research participants' reality (Holloway, 2005). The qualities or attributes expected to be possessed by researchers using qualitative research methods include but are not limited to; being a good listener, non-judgmental, friendly, honest and flexible (Kothari, 2004). Qualitative research aims at answering the 'how' and 'why' of a given phenomenon thereby providing the necessary in-depth understanding of the process (Cassel & Symon, 1998).

➤ Interviews

The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses (Kothari, 2004). Interviews are optimal for collecting data on individuals' personal histories, perspectives, and experiences, particularly when sensitive topics are being explored. Generally, an interviewer asks respondents questions so as to obtain answers relevant to the research question. This method can be conducted either through personal interviews or telephone interviews. a) Personal Interviews - The interviewer asks questions generally in a face-to-face contact to the other person or persons b) Telephone Interviews – The interviewer collects information by contacting respondents on telephone itself.

Interviews can be structured or unstructured. Structured interviews consist of a set of predetermined questions that are asked in a prescribed order, and the interview follows a rigid procedure. On the other hand, unstructured interviews are more flexible, and do not follow a system of pre-determined questions and standardised techniques of recording information (Kothari, 2004).

➤ Observation

Information is acquired by observing the process at work (Bhattacharyya, 2006). The observation method is used when collecting data on naturally occurring behaviours in their usual contexts. This method basically entails acquiring information by way of the researcher's own observation, without interviewing the respondents. The information

obtained relates to what is currently happening and is not affected by either the past behaviour or future intentions or attitudes of respondents (Creswell; 2009). According to Kumar (2013), there are two types of observations, participant and non-participant. Participant observation refers to the researcher participating in the activities of the group being studied with or without their knowledge. Whereas non-participant observation, is the observation of the group without interference from the research.

➤ **Focus groups**

A focus group as a strategy through which opinions, attitudes or perceptions towards an issue, product, service or programme, product, service or issue are explored through open discussion between a group and the researcher. The researcher raises an issue or asks questions that stimulate discussion in the group (Kumar, 2013). Focus groups are effective in attaining data on the cultural norms of a group and generating broad overviews of issues of concern to the groups or subgroups represented (Creswell, 2009).

3.3.2. Quantitative Research

Quantitative research is concerned with the measurement of quantity or amount and it is used when dealing with phenomena that can be expressed numerically (Kothari, 2004). Quantitative research answers the 'where', 'what', 'who' and 'when' questions (Silverman, 2000). It is empirical in nature and is also sometimes referred to as scientific research (Atieno, 2009) A major limitation of quantitative research is that it focuses on numbers only and the results can be misleading as all other factors are ignored.

➤ Questionnaires

This is a data collection technique conducted through asking questions to those who are thought to have the desired information (Bhattacharyya, 2006). In general, a questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms. To enhance the chances of a successful survey, it is imperative for questionnaires to be carefully constructed so that relevant information is collected. Advantage of this inflexibility is that it allows for meaningful comparison of responses across participants and study sites. However, it requires a thorough understanding of the important questions to ask, the best way to ask them, and the range of possible responses (Creswell, 2009).

The questionnaire was used for data collection in this research as it makes the quantification of information possible and data analysis is generally made easier. The questionnaire was structured in manner therefore making it less time consuming to collect the data and also simplified the statistical process. The advantages of using questionnaires include but are not limited to; they relatively time and cost effective, a wide geographical area is covered, facilitation in the collection of relatively more data on a condensed basis, findings can be processed relatively easy and anonymity is maintained (Popper, 2008). The major disadvantages of using questionnaires is the relatively low response rate associated with their use, the limited control under which questionnaires are completed, for example, an inappropriate person could fill in the questionnaire and that there is no way to tell how truthful a respondent is being (Ibid).

3.4. Sources of Data

3.4.1. Primary Data

Primary data is the type of data which is original in nature as it is collected for the first time (Kothari, 2004 and Creswell, 2009). Examples of primary data collection methods include observations, surveys, experiments and interviews (Driscoll, 2011).

3.4.2. Secondary Data

Secondary data is the data that has already been previously collected by someone else and having gone through the statistical process (Kothari, 2004). It can either be published or unpublished data. Examples of secondary data include but are not limited to journals, magazines, diaries, newspaper articles, reports prepared by academic scholars and existing databases. It is important that before the use of secondary data, the researcher ensures the reliability and adequacy of such data.

The use of secondary data through literature reviews was of paramount importance to this research as it identified issues relating to role of decision making and management of construction projects within the context of producing sustainable housing through intensive redevelopment in South Africa and particularly in Durban. This process was aimed at recording and examining various aspects as discussed by numerous authors in journals articles, and government publications.

3.5. Sampling

A population is the collection of units, under any field of enquiry, which the researcher wants to study. A finite part of a population is studied to gain information and understanding about a whole and the results are then generalised about the whole. A good sample should be a true representation of the population as this will help in generalising the results to the whole population (Creswell, 2009). While there are a variety of sampling procedures; this study employed non-probability sampling (convenience sampling).

3.5.1. Types of sampling techniques

3.5.1.1 Probability sampling

Probability sampling is where each sample has an equal and known chance of being selected or has a non-zero chance of being selected in the sample (Wretman, 2010). Some common methods for selection under probability sampling are;

Random Sampling

According to (Creswell, 2009), random sampling is a method that ensures a known probability of each elementary unit of being chosen, e.g. winning a lottery. The different types of random sampling are;

- Simply random sampling – It is a method that allows that each member of a population has an equal chance of being selected (Molenberghs, 2007).
- Systematic random sampling – This method entails selecting one unit on a random basis and choosing additional elementary units at evenly spaced intervals until the desired number of units is obtained. Typically a systematic sample would select every person from the list of potential respondents (Molenberghs, 2007).
- Stratified sampling - This method involves independently selecting a separate simple random sample from each population stratum which may be based on proportion.

3.5.1.2 Non-probability sampling

Non-probability sampling is a technique in which the units of the sample are selected on the basis of personal judgment or convenience, with the probability of any unit of the population being chosen unknown (Wretman, 2010). The different types of random sampling are;

- Convenience Sampling - This is when elementary units are conveniently chosen from a population for observation (Creswell, 2009). Due to the study limitations such as

time and cost, the study utilised this sampling technique in an effort to obtain a large number of completed questionnaires quickly and economically.

- Judgment Sampling - Here the researcher uses their discretion is based on the characteristics of the population to select a sample (Creswell, 2009).

3.5.2. Sample Size

The sample size is the selected number of people to be chosen to represent the population (Molenberghs, 2007). The sample should be large enough to answer the research questions (Zikmund et al., 2010). A large sample size helps in minimizing ‘sampling error’ which is the discrepancy that may result from drawing conclusions on the basis of a small sample. For the purpose of this study, the sample is in accordance to the table 3-1 (below).

Table3- 3 Sample table

Methodology	Location of sample	Sampling method	Sample size	Description of Sample
Qualitative	Cornubia & Hawaii housing developments – KwaZulu-Natal Durban.	Semi-structured interviews	Twenty-eight participants (14 from each development)	Occupants of public rental housing in the inner-city (intensive development) Occupants of public rental housing in the outskirts of the inner-city (extensive development)
Qualitative	KZNDHS offices	Semi-structured interviews	Four participants	Managerial officials from the municipality and provincial government
Qualitative	Durban	Focus group	Five participants	KZNDHS social facilitators and construction project managers
Quantitative	Durban	Questionnaire based survey	One hundred and forty participants targeted	Occupants of public rental housing

			Seventy-four usable responses	(Port View & Strathdon social housing developments)
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3.5.3. Sample selection bias

Sample selection bias is the improper selection of a study sample for analysis leading to some of the study conclusions being inaccurate as a result of the sample not being truly representative of the population intended to be analysed. Below is an illustration of the sampling designs and sampling procedures used.

3.6. Validity and Reliability

According to Kothari (2004), in research, validity refers to the extent to which an instrument measures what the researcher intends to measure. Whereas reliability is concerned with the accuracy and precision of a measurement procedure. Validity and reliability are two essential characteristics of a good measurement tool (Groth-Marnat, 2003). Questionnaire content validity was scrutinised through developing the questionnaire from the literature review and conducting a pilot study by distributing the questionnaire to sample respondents and asking them to check for clarity and content, so as to test any weaknesses, ambiguities, potential response rate and comprehensibility of the questionnaire in order to improve its quality.

Zikmund (2010) defined pilot testing as the administration of a questionnaire to a small group of respondents, in the instance allowing researchers to detect ambiguity or bias in the questions. Based on the feedback, revisions were made to the questionnaire. There are different methods that can be used to measure reliability of a scale which include; generalizability theory, item-response theory, Cronbach's alpha (Tavakol and Dennick, 2011) and corrected item-total correlations (Iacobucci & Duhachek, 2003). The Cronbach's alpha is most widely used metric to measure the reliability of an instrument by measuring the internal consistency of a scale (Tavakol and Dennick, 2011).

3.7. Instrument Administration

Table3- 4 Research instrument administration

No.	Research Objective	Research Method	Research Approach
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1.	A. To understand the benefits and barrier of current affordable public housing delivery strategies in Durban.	Focus group	Qualitative
		Literature Review	
	B. To investigate decision maker perception on current approaches for affordable public housing delivery in Durban.	Literature Review	Qualitative
		Semi-structured interviews	
2	To assess the role of decision making and management of construction projects in fostering sustainability in affordable public housing redevelopment projects in Durban.	Literature Review	Qualitative
		Focus group	
3.	To evaluate user perception of social sustainability aspects implemented to public housing initiatives in the Durban inner city.	Questionnaire based survey	Quantitative

3.7.1 Objective One A

A comparative study was undertaken in order to meet objective One A, which was to understand the possible barriers and benefits of the current housing delivery strategies. The methodology primarily adopted a case study method, which included an empirical investigation based on a qualitative approach through observation and focus group interviews. An in-depth review of literature provided an overview of the main challenges faced in South Africa in relation to the need for shifting from the concept of housing provision for low-income groups to the creation of integrated, sustainable, inclusive, safe and resilient

human settlements. The review has also argued two main discourses emerging from the current debate around the topic.

The case study analysis was conducted through an empirical field investigation involving observation on site and semi-structured interviews with focus groups of fourteen participants on each of the two selected sites (twenty eight participants). The focus group method was utilised to attain a deeper understanding of the qualitative aspect of what is happening on the ground. The case studies were carried out and analysed through primarily a social sustainability lens, which also has significant implications in terms of economic impact on communities and households. The interviews were conducted on site with the two focus groups of public housing inhabitants, who were eighty percent female and within the age range 28 to 63 years.

3.7.2 Description of Study Areas

Cornubia Project

The first case study was the Cornubia megaproject development, which is a public-private partnership between the eThekweni Municipality and Tongat Hullet Group and is located in the northern development corridor of eThekweni Municipality, 15 km south of King Shaka International Airport and Dube Trade Port megaproject. The project consists of a large housing component, commercial and light industrial development, and social facilities (Department of Human Settlement, 2014). In its original proposal the development aimed to provide 50,000 homes of which 20,000 were to be subsidised housing, 90 ha of industrial platform, over 1 million m² of commercial space and 400 ha dedicated to a rehabilitated open space system (KZNDHS, 2014).

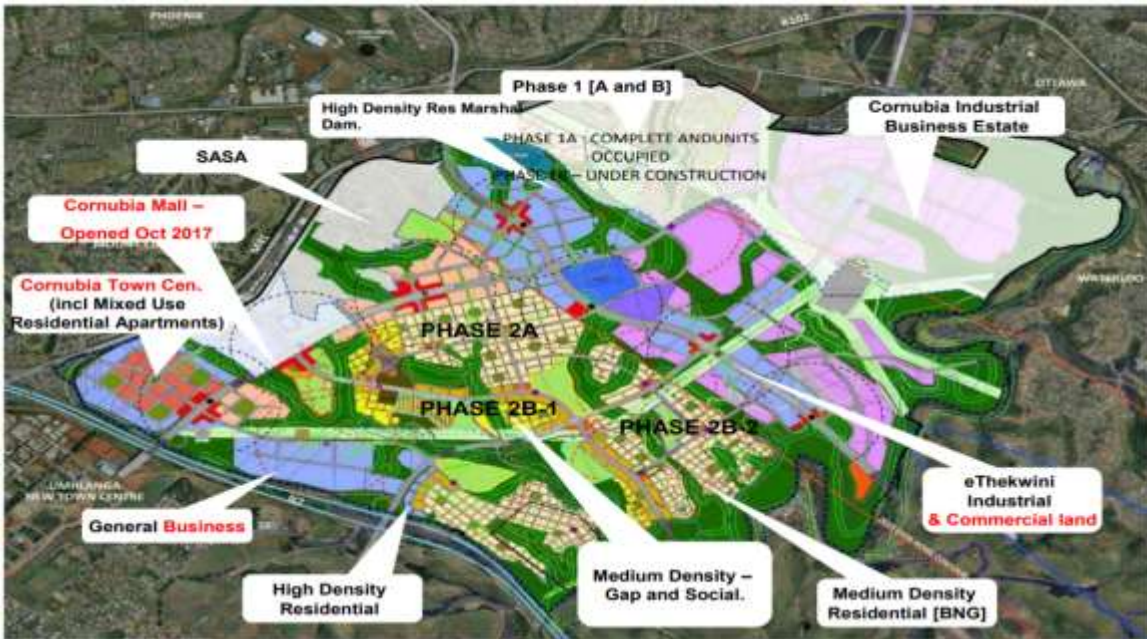


Figure3- 1 Cornubia mix-use development map (eThekweni Municipality, 2013)

Hawaii Housing Project



Figure3- 2 Hawaii housing project location map (Qwabe, 2018)

The second case study was the Hawaii apartment blocks which was initially a time-sharing holiday complex consisting of three buildings known as Hawaii east, west and central blocks. The apartments were purchased by the First Metro Housing Company, a social housing institution, in June 1999. The apartments were renovated and became operational as social housing units in January 2000, with full occupation by the end of March 2000. The building is

located at the corner of Rutherford and Gillespie streets, between the area known as the 'Golden Mile' and the Durban Harbour. The 128-unit building is comprised of bachelor to two bedroom units, which are between 37 m² and 66 m² in size.

3.7.2 Objective One B

In order to investigate decision maker perceptions on current approaches for affordable public housing delivery in Durban and to understand the benefits and barrier of current affordable housing delivery strategies in the City, a review of literature, programmes, policies and plans in the South African context broadly and specifically in Durban was conducted. Decision maker perceptions were addressed through semi structured interviews with KZNDHS and eThekweni Municipality officials who had been identified as key decision makers. Semi structured interviews were conducted with the following participants; Chief of Operations, Head of Sustainable Human Settlements and the Head of Social Housing and Institutional Management Unit.

In terms of the sourcing or recruitment of the sample, research was conducted through literature and government websites as to understand the housing delivery approaches and systems in South Africa. From the results the researcher was able to understand the structure of the departments and identify key personnel and stakeholders which were important to interview for the study. The Chief of Operations of KZNDHS was contacted first via his email address which was available for public use on the departments' website. He was also able to assist in identifying personnel which would be essential to the study, which is how the Head of the Social Housing and Institutional Management Unit and Head of Sustainable Human Settlements were identified. Their email addresses were provided by the Chief of Operations and were also available on the website, they were then contacted and agreed to partake in the study and all participants provided gatekeepers letters.

3.7.3 Objective Two

A review of literature was conducted to attain the current narrative and inform the direction of the empirical research element. In order to assess the role of decision makers and management in fostering social sustainability in housing redevelopment projects in Durban a review of literature on concept of social sustainability and impact on decision making within the context of human settlement development was conducted. This objective was met through empirical research which included the following; semi structured interviews were

conducted with KZN-DHS official who is the Head of Sustainable Human Settlements. A focus group was formulated with the following participants; the Department's Social Facilitators who are responsible for ensuring social sustainability considerations are made and applied in construction projects and provincial Construction Project Managers. The aim was to source where they fit within the chain and their degree of success as well as their challenges. Construction Project Managers from the two leading Social Housing Institutions (SOCHO and First metro Housing Company) in Durban were interviewed separately due to their experience within the delivery of affordable public housing specifically within the Durban inner city context.

In regards to sourcing or recruitment of the mentioned participants for the study the KZNDHS Social Facilitator's and provincial Construction Project Mangers' contact details and permission to contact them was sourced from the Head of Sustainable Human Settlements. They were then emailed and gave consent to taking part in the study. First Metro Housing Company and SOCHO was Identified by the Head of Social Housing and Institutional Management Unit as the implementing agents of urban redevelopment through human settlements in the Durban inner-city. Their contact information was found on both company websites and were contacted to attain permission to interview their project managers for the study. Gatekeepers letters giving consent to participate in the research were provided.

3.7.4 Objective Three

This objective was intended to be the only quantitative component of the study. In order to evaluate user perception of social sustainability aspects implemented in public housing initiatives in the Durban inner city, a survey was conducted through the use of questionnaires. The targeted participants were those who live in affordable public housing within the Durban inner city (Port View & Russell Mansions). Questionnaires were handed out to random users over a period of a week. The researcher was specifically targeting one hundred and forty participants (seventy from each apartment block) for the study. The questionnaires was handed out due to that being the most reliable and cost effective way to ensure participants partook in the study. Those who had time were asked to spare a few minutes to complete the questionnaire and hand it back to the researcher. As an alternative a boxes were placed at the reception of both buildings next to the security guards, for those who did not have the

time to complete the questionnaire when handed to them. Permission to utilize the boxes was granted by both property managing companies.

3.7.4.1 Description of study areas

Port View housing project

Port View is a 142 unit inner city development between St George's Street and Diakonia Avenue that resulted from the conversion of four buildings to affordable rental residential units and ground floor commercial units. The development is located in the inner city area and is made up of bachelor units, one bedroom units and two bedroom units.



Figure3- 3 Port View housing location map (Qwabe, 2018)

Strathdon Housing Project

Strathdon is a high rise building and was purchased by First Metro in 2002. It consists of 66 residential units. It is situated on 94 St. Georges Street in Albert Park, Durban, 4001. The building comprises of between bachelor and two bedroom units and they range from 23.0m² to 68.0m² in size.

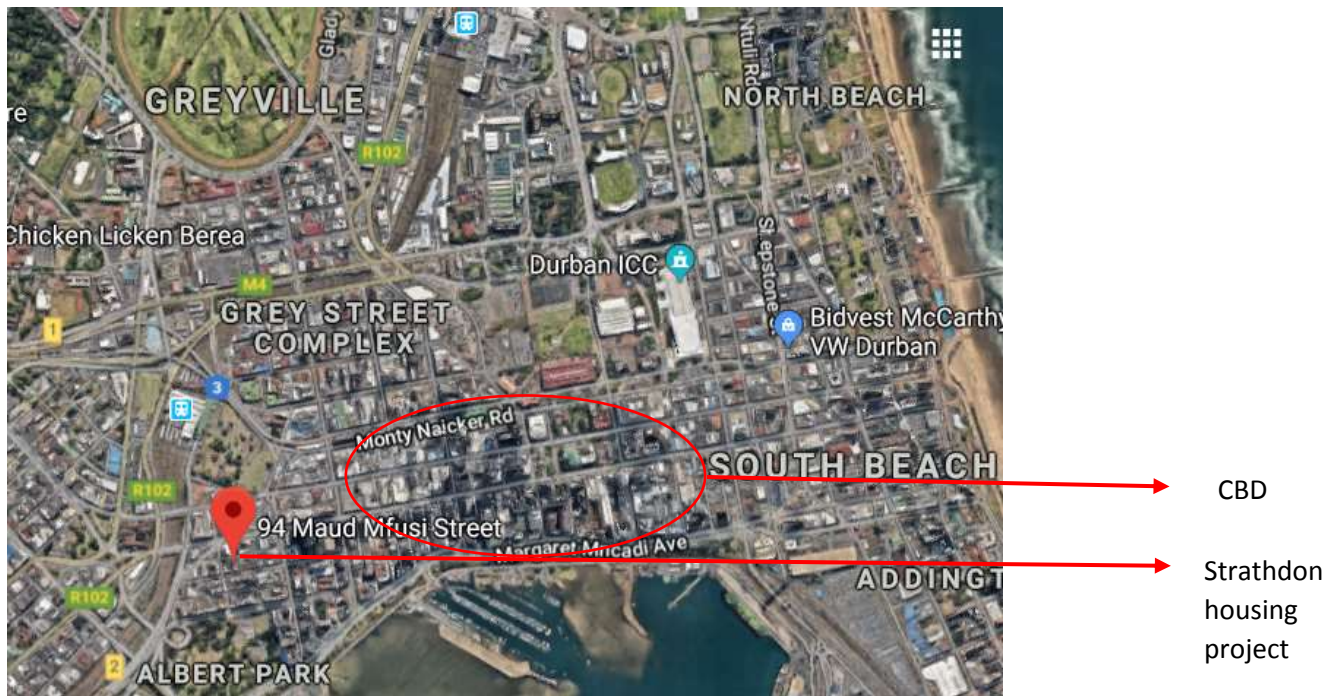


Figure3- 4 Strathdon housing location map (Qwabe, 2018)

3.8. Response rate

The response rate is the percentage of people who respond to a research survey. The higher the response rate, the more the survey results are representative of the target population (Punch, 2003). The response rate has been linked to the validity of analysed data from surveys, for example a research study can be considered unacceptable as valid research due to low response rates (Carley-Baxter, 2009).

3.9 Data Collection and Interpretation

Upon completion of the questionnaires by the samples, the researcher captured the data using IBM SPSS version 25. Measures of frequency were determined. Scaled responses were ranked by their means and standard deviation. By means of content analysis, the EXCEL software package was used to draw inferences from the qualitative responses using thematic groupings.

3.10. Chapter Summary

The chapter outlined the research methodology used in this research. The research methods, tools and procedures which were used to gather information were defined. The next chapter focuses on the presentation and analysis of the research findings.

4. CHAPTER FOUR: FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the research findings after the data was collected, coded and analysed. The findings from the research tools will be presented and then discussed afterwards. From the chosen research tools and strategies the findings are presented and a discussion is offered after all findings have been undertaken.

4.2 Empirical site investigation and observations

The following section deals with the observation of both sites by the researcher. The observation findings were supported by some of the comparative study interview findings. The observations were done of three days.

4.2.1 Cornubia Development

The building structures in Cornubia were clearly new and a modern take on public housing. The researcher was granted permission to photograph an empty unit by KZNDHS and observe those inhabited without taking pictures. The interior of the units seen by the researcher were duplexes (two levels). The finishes were minimalist and white and class doors in every unit. Occupants had a small garden space at the front of their units, which most had taken pride in and nurtured. Occupants had seemingly enough space throughout the units to accommodate those with disabilities. Infrastructure and services were adequate, which can be attributed to the development being a relatively new green-field development. There were parking spaces available for those with private vehicles and open spaces equipped with playing facilities for children. The open spaces were well maintained and most units faced the spaces. Accessibility in terms of emergency services was adequate to all units. Waste management services were seen on site removing waste from all units and the area was relatively clean.

Alarmingly in the over four hours spent on site on the first day, the researcher only spotted a minibus taxi once. It has to be considered that it was during the late hours of the morning presumed morning rush had passed and afternoon rush had not yet commenced. The closest amenities were considerably far, however some occupants had opened tuck shops in order to supply necessities such as bread and milk conveniently. The prices were however notably

higher than those found in structured outlets. Below are pictures taken by the researcher of the site that speak to some of the above made points.



Figure 4- 1 Cornubia housing structures



Figure 4- 2 Cornubia waste management and open spaces



Figure 4- 3 Inside of an empty cornubia unit

4.2.2 Hawaii Housing Development

Hawaii was in need of maintenance judging from its condition from the outside, however once inside the building was considerably clean and well up kept physically. The entrance had security guards present and occupant access was remote controlled. However, the researcher noticed that a number of people without remotes accessed the building without being questioned by security guards. The building had two lifts in the foyer, but according to the security guard, only one had been working for months. The light was problematic in the sense that it required occupants to walk down or have another occupant recall it from the bottom in order to access it from floors higher than ground floor. The researcher was granted access into a one-bedroom occupied unit on the sixth floor. The interior was small and cluttered with three beds in the living room area and three more in the bedroom. The room was considerable dark and the air quality pointed at ventilation issues. Inadequate space for a person using a wheelchair or any form of impairment that required space to manoeuvre was noticed by the researcher, as well as in the passages leading up to the units. Overall passages and corridors were uncomfortably narrow. Waste management seemed to be problematic as, all floors had discarded waste in the passages that was not in municipal bags or bins.

The location of the building was surrounded by various amenities, Addington Hospital and Addington Primary school were notably a walking distance away. Transportation (minibus taxis and municipal buses) was readily available outside the entrance of the building throughout the duration of the researcher's stay. There were no open spaces seen within the building for social interactions and tenants hung their wet washing inside their units and in the corridors.



Figure 4- 4 Hawaii housing development structure



Figure 4- 5 Inside of an occupied Hawaii unit



Figure 4- 6 Passages and bathroom in a Hawaii unit



Figure 4- 7 inner-city minibus taxi rank and bus depot

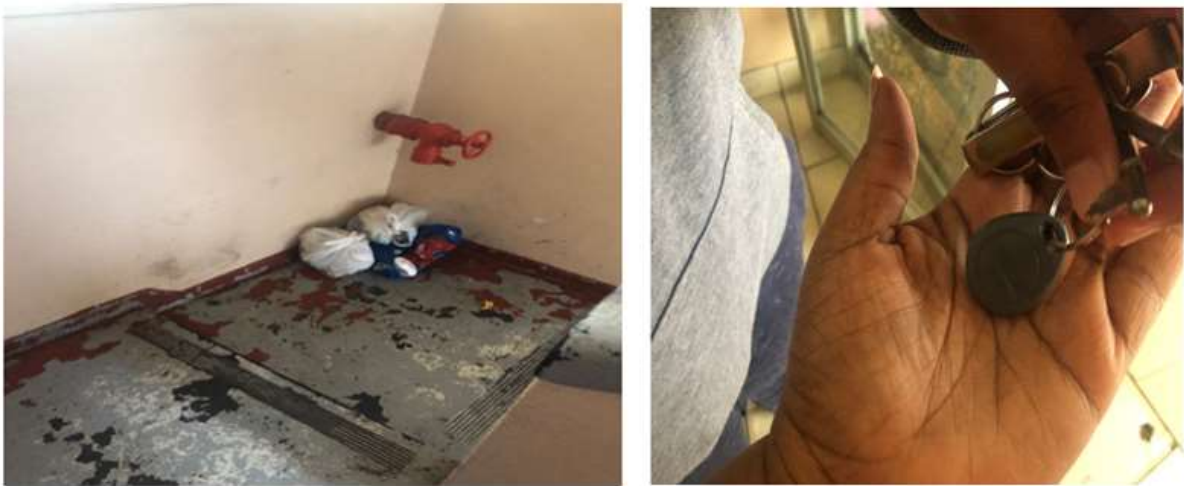


Figure 4- 8 excess dumped waste in the building passages and access remote used by tenants at the Hawaii development

4.3 Comparative study findings

A thematic analysis of the data collected in both sites gave rise to seven main themes, they were identified as:

1. Access to public transportation
2. Access to basic amenities
3. Access to economic opportunities
4. General comfort and well-being
5. Open spaces and social facilitation

The themes are related to each other through varying degrees, encapsulated in the overarching theme of ‘extensive and intensive urban redevelopment’ and are vital in

understanding end-users' perceptions of emerging housing delivery strategies. The following sections are organised into the above-mentioned themes.

4.3.1 Access to public transportation

The study found that participants from Hawaii had access to constant and considerable reliable transportation routes and options. The building is situated in close proximity to taxi ranks and bus depots. Amounts and time spent on traveling were considerably lower than those in Cornubia. Most participants generally walked to work due to the close proximity to their work places.

Whereas, participants from Cornubia were highly vocal on being subjected to burdensome (time and cost) commutes on unreliable transport networks on a daily basis. This finding is in line with of Lucas (2011), who in her study on social exclusion in South Africa due to transport difficulties, summarized the four key problems with South African public transportation, i) the legacy of apartheid planning and new post-apartheid housing development patterns, ii) low access to private vehicles and public transit services, iii) affordability issues linked with high levels of reliance on the use of minibus taxis.

What was ultimately gathered from this regard is that the location of settlements and relevant economic and social implications are interlinked and crucial to public housing beneficiaries. it is important to consider that, less than a third of public housing homeowners have a job (Turok & Borel-Saladin 2015). Also, the average commuting times for black households increased from 88 to 102 minutes a day over the last decade because of where new housing developments have been constructed and the slow progress with public transport reforms (Kerr, 2015).

4.2.3 Access to basic amenities

Amenities such as schools, shops, public health care facilities as well as cultural and religious sites were reported as being walking distance away from the Hawaii project. This meant drastic savings on cost and time spent on daily travelling. Shopping centres such as The Wheel and The Workshop which accommodated big chain stores and the presence of informal markets with cheaper produce were also easily accessible to the participants. The close proximity of Addington Primary School had led to participants admitting their children in the school. Easy access to public health care in the form of Addginton Hospital was mentioned as a big advantage to the participants. Participants were distinct in expressing the value of

residing within close proximity to public services and amenities that significantly impacted their daily lives in terms of convenience and finances. This finding is in line with the assertion made by Huchzermeyer (2004) that, low-income subsidised housing that caters to household or individual needs in close proximity to educational and health care facilities, can contribute significantly to the lives of the disadvantaged urban poor.

At the time of the study Cornubia Mall had not opened, which could one of the reasons why participants spoke out about limited access to shopping outlets. Access to public health care and cultural and religious sites was also reported as burdensome. The participants further expressed their dissatisfaction with the additional financial and administrative expenses that came with changing schools for their children due to the relocation. Whereas some were unable to initiate the changing of school process due to their children being the grades eleven and twelve, this ultimately resulted in high transportation costs. Those participants who were on chronic medical care also complained about the financial and administrative expenses of changing hospitals and clinics.

4.3.3 Access to economic opportunities

The access to economic opportunities, due to the location of the inner-city development, had afforded a number of the participants and their families with long-term informal trading and employment opportunities which were mainly casual and contract based.

Majority of the participants from Cornubia stated that keeping their previous employment (majority domestic workers and casual workers) had become financially unviable. Therefore most strung on the hope of attaining employment opportunities from the continual development of commercial and industrial spheres of Cornubia in the future. This finding in aligned to that of Franklin (2011), who asserted that the complete relocation of residents to greenfield developments, as opposed to settlement upgrading resulted in the disruption of livelihood opportunities and fragile community networks that also lead to potentially livelihood opportunities (Franklin, 2011). Regardless of the social problems associated with informal settlements, residents indicated that families in these settlements were socially cohesive and had fostered closely-knit social networks which are non-existence in the new relocated area. This contradicts the BNG's assertion of creating integrated sustainable human settlements. Another major problem raised by participants is that resettlement of informal settlements affected the livelihood strategies of the urban poor such as stokvels, burial

societies and saving schemes. As residents correctly indicated, to pursue these strategies in a new location is very difficult and unsustainable. Unfortunately many respondents were cynical to engage in these activities with strangers. That sense of mutuality and collectiveness which existed in informal settlements had degenerated into autonomous and selfish practices. Some participants acknowledged the thought of renting out or letting go of their homes, as some had allegedly done, for the seemingly better economic prospects that the inner-city had for them. According to Tissington et al (2010), many state housing developments have become residential dormitories and beneficiaries often abandon their houses in order to move back to informal settlements or other informal housing in proximity to jobs and livelihood opportunities.

4.3.4 Access to safe open spaces and social facilitation

With regards to access to safe open spaces, participants from the Hawaii development stated that they did not have a safe open space within their building for social interactions or safe spaces for their children to play. Three participants expressed being frustrated about there not being areas restricted for smokers as well. The lack of a common safe open space resulted in constant arguments with neighbours about drinking and smoking in the corridors, which led to smoke entering their units through the windows and disorderly behaviour of occupants. They further mentioned the design of the building did not aid in fostering social interaction with other occupants. The open spaces that were available were located outside of the building but were considered as crime hotspots.

The participants from Cornubia were pleased with the several open spaces created in all subsections of the development. The open spaces were developed mainly as a central point surrounded by housing units facing the space. This made it possible for parents to watch over their children play from the comfort of their homes. The open spaces were also fitted with playing equipment to foster social interactions amongst occupants. The open spaces were reported as also big enough to accommodate adult social interactions such as braais.

4.3.5 General comfort and Health and Safety

In regards to end-user satisfaction with the physical structure of houses and settlements, the participants in Cornubia were generally pleased with the physical structure and housing typologies afforded to them. A majority of the participants felt their houses afforded them flexibility and space which contributed to their general comfort. There were no complaints

about acoustics, humidity or aesthetics. The participants also felt as though health and safety considerations had been made for them within their units and the surrounding area which ensured easy access for emergency health care and police services.

The participants in Hawaii however expressed their dissatisfaction with the high density levels, which negatively contributed to their perception of general comfort. What was flagged as notable concerns was the limited space and close proximity of neighbours, ventilation concerns during cooking and hot days, lighting concerns during the day depending on the location of the unit within the building and high humidity. This finding is aligned to statements made by Ibrahim (2007) occupants of tall buildings building are often unhappy with general comfort factors such as, aesthetics, serenity, lighting, ventilation, acoustics and humidity associated with tall building living. Participants also spoke about numerous health and safety issues that they experienced on a regular basis. Wind induced vibrations which lead to headaches were mentioned. According to Ubertini (2017), humans have subjective sensitivity to floor acceleration that, in turn, can cause discomfort in the form of annoyance, headache, or sickness. The building was also said to not adequately accommodate those who are physically challenged. Space in the passages and inside the units was very limited. The most problematic issue was reported as the space in the bathroom and passages and general lift accessibility. The building did however have ample space in the foyer and a designated gate for those who are physically challenged. However all the participants stressed that the opportunities and benefits of being located within the inner city far outweighed any reservations they had about the physical environment of their house and building block. This factor supports the evidence found in a study conducted by the Centre on Housing Rights and Evictions, which also indicated that the greater majority of residents residing in the inner city would rather tolerate poor living conditions than moving to the urban edge (Housing Development Agency, 2013).

4.4 Interviews findings

Semi- Structured interviews consisting of fifteen semi-structured questions (Appendix B) were employed. The interviews were created by the researcher to explore the stance of the KZNDHS and eThekweni Municipality on human settlements delivery in Durban and the

perception of officials on the current approaches and challenges emanating. A number of themes emerged from data analysis and were grouped into the following themes:

1. Current housing delivery strategies and rationale
2. Main public housing development challenges
3. Inner-city housing development challenges
4. Future inner-city retrofit housing development plans

4.4.1 Current delivery strategies and rational

The respondents stated that the main objective of the department was to accelerate housing delivery through holistic and effective planning and through the economical utilisation of resources. That is the basis from which plans and strategies emanated. They future articulated that all housing development decisions also have to be aligned with various policies and legislation including; the National Development Plan, Outcomes Eight, Provincial Growth Strategy, Municipal Housing Sector Plan, Municipal’s Long Term Development Framework just to mention a few. The delivery and choice in strategies was reported as highly political and complex in addition to being cross-departmental and cross-sectorial, which further complicated matters. However decisions about housing development with the KwaZulu-Natal context is ultimately the responsibility of the KZNDHS and is funded at national level, for needs arising at municipal level.

The current strategies and targets were identified as those stipulated in the department’s 2015-2020 strategic plan. Throughout the period they had and would prioritize developments initiatives dubbed ‘mega catalyst’ that inform the future municipal developments. These are developments such as Cornubia and form part of the national strategy which identified and fifty mega projects throughout the country that will include BNG, gap, rental, social housing as well as serviced sites for incremental housing. Below is a table of these planned developments in KZN.

Table 4- 1 planned housing developments in KZN

MUNICIPALITY	PROJECT NAME	ESTIMATED UNIT YIELD
ETHEKWINI	Cornubia	28000
	Cornubia North	30000

ILEMBE	Greater Drienfontein	4600
	Hyde Park	15000
MSUNDUZI	Ethembeni	4000
	Signal Hill	3000
NEWCASTLE	Johnston Blaaubosch Cavarn	7500
UMHLATHUZE	Emphangeni	10000

According to the respondents this scale orientated strategy is what the municipality needs as it currently has the highest backlog in the province and the second highest in the country. Besides the 'mega catalyst' projects, the department still is and will continue with the implementation of the entire National Housing Programme which includes; informal settlement upgrade, emergency housing, rural housing, social housing programmes etc. The strategy to deliver these was separated into long-term projects and rental programmes with the objectives of addressing informal settlements through upgrading, greenfield relocations and rural housing. With regards to the rental programmes, the objective is to realize the goal of setting the municipality as a landlord of rental stock through CRU's, Council rental stock and Social Housing development.

4.4.2 Main housing delivery challenges

Financial Restrictions & Backlog

All respondents pointed to financial restrictions and the current housing backlog as the biggest challenge in housing delivery in Durban. According to eThekweni Municipality (2017) based on the annual allocation from National and Provincial Departments, it would take over 80 years to eliminate the current backlog in eThekweni (with a 1% growth scenario). The total amount required by the City to clear the current backlog is estimated to be approx. R100b over a period of time. This figure excludes funding towards supporting densification. The respondents stated that it would take deeper involvement of private sector to meet the deadline, however strategies to incentivise the private sector to get involved in the subsidised housing market had been slow at best. It is only recent mega developments such as Cornubia that saw Hulet Sugar partnering with government in large scale public housing delivery.

Growth of Informal Settlements & land invasions

The respondents also counted the unabated growth of informal settlements as a major challenge to the delivery of housing in Durban. Attempts to eradicate these forms of settlement, such as upgrading and relocations, had led to an increase and new mushrooming in other areas. Weak legislation to curb land invasions or growth of existing settlements was blamed. Invasion of privately owned land and buildings within the City was reported as prevalent. As a result the City was compelled by Courts to accommodate invaders which subsequently lead to the jeopardising of the housing programme by disrupting budgets and encouraging queue jumping. Invasion of ecologically sensitive open spaces (declared as DMOSS) including land deemed high risk (eg. floodplains) created further challenges for the City, forcing them to relocate households and provide unplanned alternative housing.

4.4.3 Inner-city development challenges

- The respondents stated that some of the inner-city buildings were either occupied by vagrants or partitioned into cubicles by slumlords for cheap accommodation housing criminals and illegal immigrants. They had achieved this by taking advantage of loopholes in land legislation to invade land owned by absentee landowners. After residing on the land for some years, the land invaders claimed the right to reside on the land arguing that the Interim Protection of Informal Land Rights Act No. 31 of 1996 protects people with insecure tenure from losing their rights to, and interest in, land pending long-term land tenure reform. Sadly, failure by land legislation to resolve these land disputes have created a deadlock situation where neither the landowner nor the land invaders can win outright unless they both compromise.
- The financial model used by the government in attempt to purchase buildings within the inner city was said to not be viable in most instances. They found it difficult to compete with the private sector in bids and were often outbid. In some cases the refurbishment requirements of buildings made it financially unfeasible to purchase buildings. All the officials acknowledged the high demand of inner city housing and the government was failing to meet the demand. They stated that land prices are considerably higher in cities and they subsequently push up the prices of available buildings and that cheaper and suitable land is primarily available in the city periphery.

Peripheral land was described as lacking economic opportunities, basic services and infrastructure, hence problematic.

- Silo approach which makes cross-sector and cross-departmental collaborations difficult in the quest to achieve inner city human settlement development was flagged as a challenge. The process of purchasing buildings was explained as challenging, lengthy and required collaborative effort of a number of state institutions that unfortunately did not work together in such targets.
- A considerable amount of well-located vacant land was said to be subject to land claims. In the Plans for urban restructuring and many projects on well-located land were designed prior to the announcement of the land restitution process. As a result of this land originally identified for the development of housing within the inner city had to be returned to its owners. In some cases the process of dealing with land claims had slowed development.
- The respondents spoke of the challenges they had faced in regards to accredited Social Housing Institutions Prior to 2014 the city had only two SHI's at their disposal. This resulted in the institutions having too much on their plate and subsequently hampering delivery. However, after a series of workshops aimed at providing assistance in getting more accredited SHI's, they received five new. A majority of these institutions are still awaiting land and building allocations. However, what was evident was that a large bulk of the projects which were underway or close to delivery were not located within the inner city.

4.4.4 Future inner-city development plans

Below is a map provided by the officials for future inner-city housing development plans in Durban. A number of these had been in the pipeline for years. Specifications on the number of units were unclear at the time of the study. However all developments were said to planned as Social Housing.

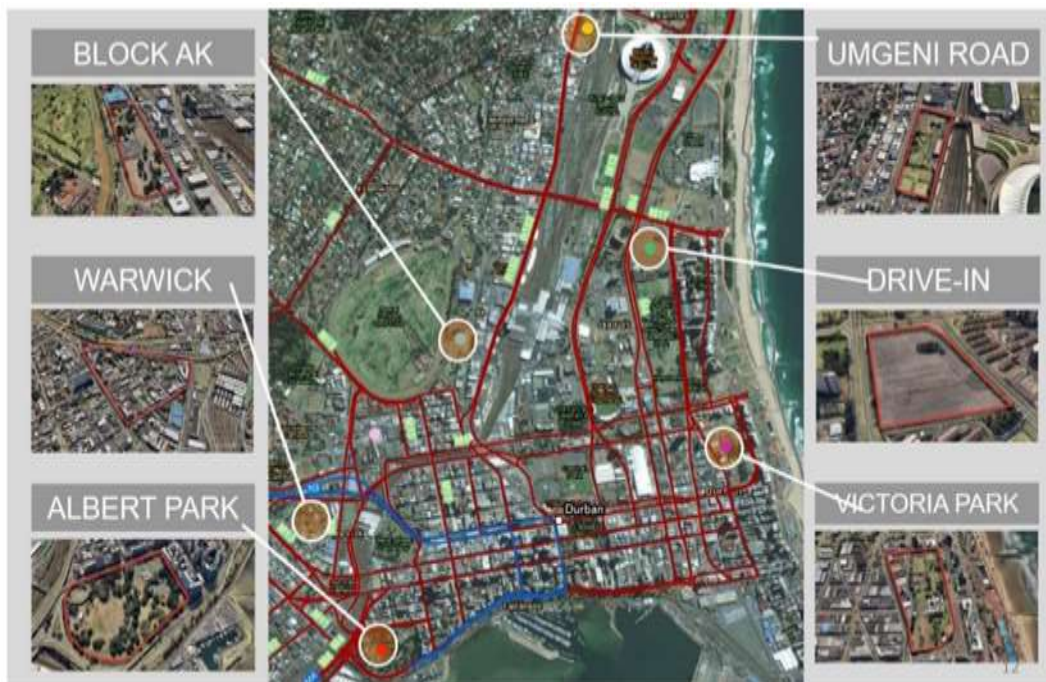


Figure 4- 9 planned inner-city housing developments

4.5 Focus Groups Findings

The aim of conducting a focus group interviews with KZNDHS social facilitators and project managers was to attain an understanding of the management process of inner-city housing delivery. Additionally, the issues they considered as barriers and drivers of achieving socially sustainable buildings for housing and recommendations were discussed. The barriers, drivers and recommendations provided by the participants were studied and thematically arranged. The themes were: knowledge, tools and methods, working environment factors, bottom line, and government support.

- A common problem among stakeholders was found to be a lack of knowledge about sustainability and sustainable construction practises. The majority of group stated that they were reluctant to implement or enforce sustainable construction concepts due to their lack of knowledge and cost concerns especially amongst large projects. This result aligns with the finding of Chan et al (2018) that a lack of skilled professionals limits the implementation of sustainable construction practices.
- Lack of training and education was subsequently highly ranked among the respondents. The general consensus was the influence of this barrier in overcoming not only current challenges but future ones as well. The concept of sustainable development and sustainable construction needed to be introduced/ reintroduced to

all stakeholders. The government's support alongside that of educational institutions would have to effectively result in the development of continuous training and programmes for all stakeholders. This would be beneficial for further improvement of the awareness and knowledge of sustainable-construction practices among future construction professionals as well.

- Lack of government incentives and statutory requirements was rated as a significant barrier, which is justified as it is believed (Zhou & Lowe, 2003) that government's role in promotion of sustainable construction practices is unquestionably important. Stakeholder and private sector involvement require motivation/ enforcement from the government particularly in South Africa as sustainable construction is in its infancy.
- The perceived higher cost of sustainable building as opposed to conventional buildings was one of the most significant barriers according to the respondents. They expressed that cost was the biggest driving factor in their projects and even unverified perceptions that involved an increase in cost were avoided unless legally enforced. This result reaffirms an element of bias in the perceptions of industry practitioners in sustainable construction practices, despite available evidence that it is possible to procure sustainable buildings without significantly higher initial costs (Ametepey et al, 2015).
- The respondents expressed that they worked in a challenging environment where the government (the supposed enforcer and supported) is the client. That in itself brought about dynamics of politics, state funds, corruption, pressure to deliver at scale, and public interference amongst others. Sustainable construction considerations and practises faded in the midst of all those internal and external pressures. They were also critically short staffed and distances between sites throughout the province meant that they were also spread thin. Time spent on sites was therefore too limited to ensure sustainable practices were considered and implemented by contractors and project teams. Interaction between the respondents and contractors was usually crisis based in terms of time and cost overlaps and quality issues. What arguably needed to happen according to the respondents was a structural overhaul in how the province and subsequently the municipality approached housing development and not just in the inner-city.

- With regards to end-user participation, the respondents stated that the process of beneficiary identification and physical location of the beneficiaries often made it impossible to meet and communicate with them through the stages of development. In all cases beneficiaries were communicated with (by a separate department) once buildings had been completed and were then orientated on their new homes in regards to maintenance etc. A change in the process would ultimately result in an increase in expenditure and delivery timeframes and further complicate the construction process. Issues about numerous and constantly changing inputs from beneficiaries would be difficult to implement and would subsequently result in the disappointment of many (which then strikes the political cord of the process). Housing had been utilised as a political bargaining chip since the end of apartheid by the ruling party. Interference with the voters was expressed as ‘shunned upon’.

4.6 Questionnaire based survey findings

The following section focuses on the data analysis and the presentation of the findings of the primary data collected from the beneficiaries. Illustration instruments such as a tables and graphs have been used to provide clarity on some of the responses. The data has been explained and interpreted in text form.

4.6.1 Reliability Statistics

Internal consistency estimates reliability by grouping questions in a questionnaire that measure the same construct. Table below shows the Cronbach’s alpha co-efficient for the scaled responses of each of the key constructs. All constructs were found to have statistically acceptable levels of internal consistency, namely Cronbach’s Alpha values > 0.700 (Pallant, 2013). There is therefore between 69.8% and 90.9% probability that the constructs each measured a single underlying concept. The scale used to evaluate user perception of social sustainability aspects implemented in public housing initiatives in the Durban inner city. Below is a table of the Likert scale used for the study:

Table 4- 2 Likert Scale used in the study

1	2	3	4	5
Strongly disagree	Agree	Neutral	Disagree	Strongly disagree

Table 4- 3 Cronbach's alpha

	Cronbach's Alpha	No. of items
SECTION C: Access to public transportation	0.745	5
SECTION D: Access to basic amenities	0.712	5
SECTION E: Access to economic opportunities	0.794	5
SECTION F: General comfort and well-being	0.700	5
SECTION G: Services and infrastructure	0.733	5
SECTION H: Open spaces and social facilitation	0.703	5
SECTION I: Participation	0.733	5

4.6.2 Response Rate

The below figure illustrates the number of returned questionnaires versus those that were distributed to respondents. Data analysis is reflected in the form of percentages. This figure indicates that a hundred percent of questionnaires were distributed, sixty-one percent were returned however five percent of the returned questionnaires were spoilt. This resulted in fifty-six usable returned questionnaires and thirty-nine percent were not returned.

Some of the respondents raised concerns about filling in the questionnaire, fearing that their identities might be compromised. The researcher explained that their identities would not be revealed, but some still refused to participate regardless. Few were adamant that they were happy with the conditions of the houses and therefore did not see the need to fill in the questionnaire. A few attempts were made to try to contact some of the respondents who had expressed interest in partaking in the study by calling and repeatedly visiting their homes to no avail. Some of the questionnaires were spoilt either deliberately or by mistake.

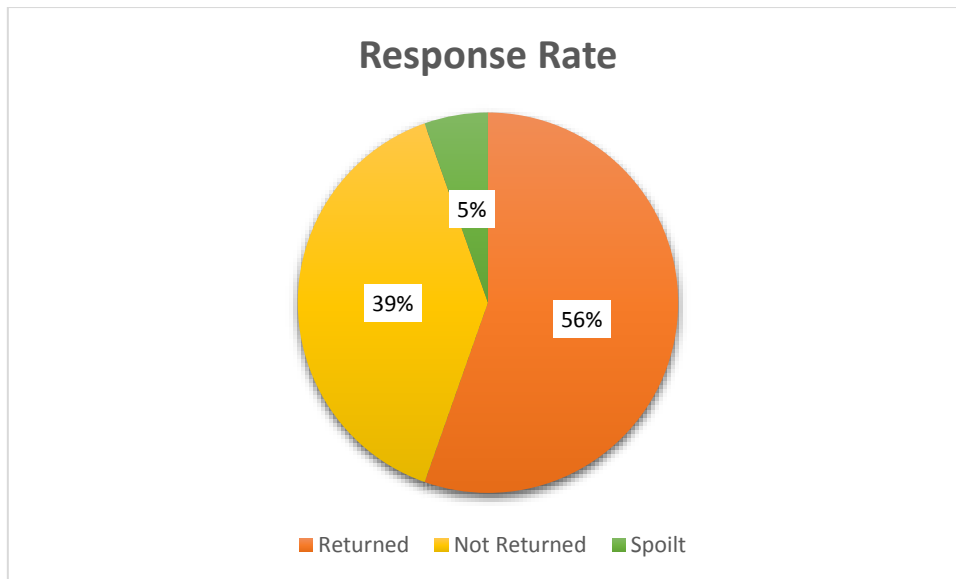


Figure 4- 10 Response rate graph

4.6.3 Demographic Background

Respondents included in the study ranged from ages eighteen to fifty-seven, with the largest group being those between the ages of thirty and forty. Sixty-five percent of the respondents were females and fifty-eight percent were educated up to grade eleven and twelve. Seventy-eight percent of the respondents were employed with forty-five being permanently employed. Monthly incomes ranged from R501 to over R3500 with the majority earning between R2501-R3500 per month. Below is a table with all the demographic information of the study participants.

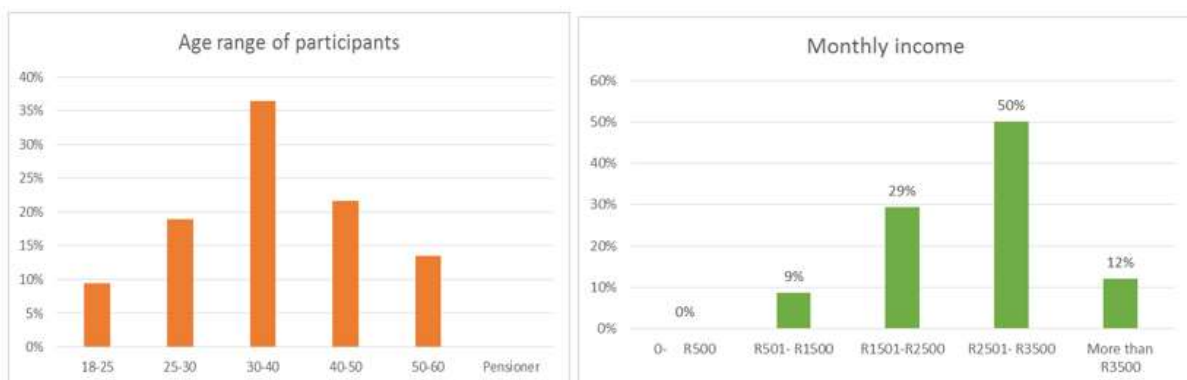


Figure 4- 11 age range and monthly income graphs



Figure 4- 12 gender and employment typology graphs

4.6.4 General housing information

The researcher needed to understand the housing context from which participants were answering from. Therefore questions enquiring about the number of people the participants lived with in their units, the unit typology they had, the number of years they had been living in the building and where they lived prior to the buildings were deemed important for creating a foundation for the data analysis. What became apparent from the data is that a majority of the participants had lived in the neighbouring townships and urban peripherals prior to the buildings. Almost half of the participants had lived in the buildings for over a decade and the majority lived in one bedroom apartments with between three and four people per unit. Below are graphs depicting the exact findings from the enquiry.

The stipulated number of people per unit was made by property managing agents (SOHCO Social Housing). The bachelor units had a restriction of a maximum 2 persons. The single bedroom units had a limit of three people, while the two bedroom had a restriction of five people. Over fifty percent of the respondents stated that three-four people lived in their unit, just over twenty percent lived by themselves or with one other person and eighteen percent stated that five or six people lived in their unit including themselves.

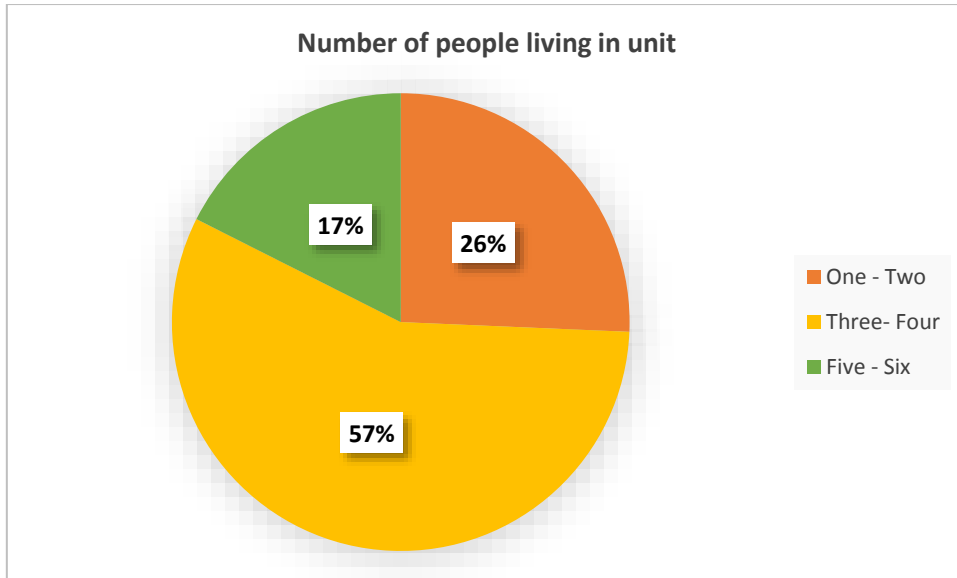


Figure 4- 13 number of people per unit graph

The buildings were made up of bachelor, single bedroom and two bedroom units. Forty-six percent of the respondents resided in single bedroom units and thirty-one percent had a two bedroom unit, while twenty-three percent had a bachelor unit.

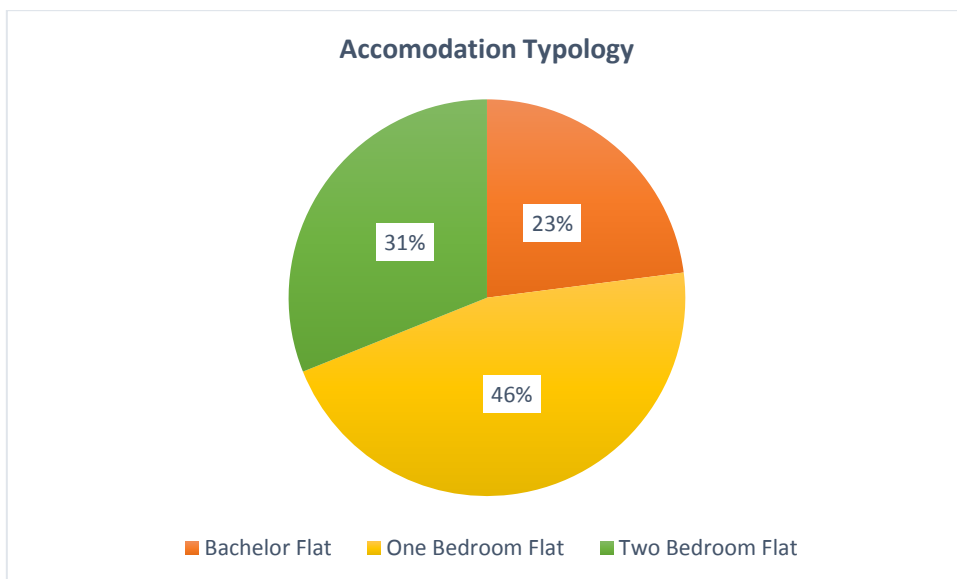


Figure 4- 14 accommodation typology graph

When asked how long the respondents had been living in their units, forty-nine percent stated that they had lived there for over ten years. Nineteen percent expressed they had been living there for between one and five years, while those that had been living there between five and ten years had constituted thirty-two percent.

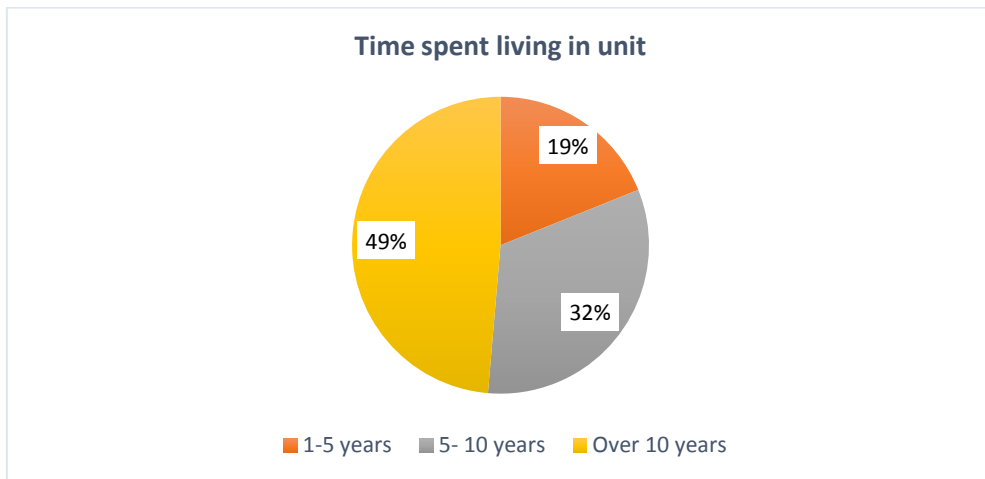


Figure 4- 15 number of years in unit graph

The largest percentage (forty-nine) of the participants previously lived in neighbouring townships, followed by those who lived in the urban peripheral (thirty-two percent). Fourteen percent were originally from outside of Durban and twelve percent were previously located in the outer urban areas. The rest of the participants were from rural areas and different parts of the inner city.

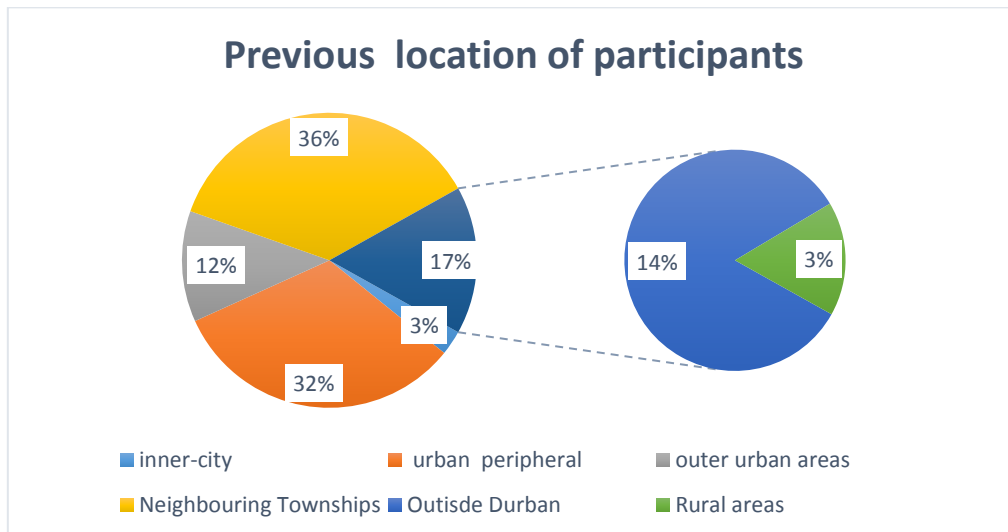


Figure 4- 16 previous location of participant's graph

4.6.5 Main findings

4.6.5.1 Access to public transportation

This section required the users to indicate their degree of agreement or disagreement with statements that pertained to their access to public transportation. The participants ranked their degree of disagreement from a value of 1 to 5 (strongly disagree to strongly agree).

Table 4- 4 Access to public transportation

Access to public transportation (n=74)								
Statement	1	2	3	4	5	Mean	Standard deviation	Ranking
I have convenient access to public transportation.	0%	10.8%	17.6%	51.4%	20.3%	3.8108	.88636	1
I have access to affordable public transportation.	2.7%	37.8%	27.0%	29.7%	2.7%	2.9189	.94734	2
I have access to various public transport modes.	0%	10.8%	20.3%	54.1%	14.9%	3.7297	.84881	3
The public transport I have access to is reliable.	0%	13.5%	48.6%	33.8%	4.1%	3.2832	.74980	4
I consider the routes taken by the public transport I use to be reasonable.	0%	13.5%	56.8%	29.7%	0%	3.1622	.64161	5

The average participant agreed with the statements that they had access to convenient public transportation ($\bar{x} = 3.8108$ and $s = .88636$) and access to various transportation modes ($\bar{x} = 3.7297$ and $s = .84881$). The average participant disagreed with the statement that the public transportation they had access to was affordable, however the data ranged from neutral to

disagreeing ($\bar{x} = 2.9189$ and $s = .94734$). The average participant was however neutral in regards to public transportation being reliable ($\bar{x} = 3.2832$ and $s = .74980$).

The results of this section indicate that the inner-city development provided participants with the benefits of various transportation modes which were convenient in the most part. These findings reflect the assertion that access to public transportation is one of the biggest drawing cards of low-income earners into cities (Charlton & Kihato, 2006). Berardi makes the linkage between transportation and sustainable building by stating that the interconnections of a building with the surrounding infrastructure (public transportation, workplace, public buildings) are more and more recognized as unavoidable aspects of a sustainable building (Berardi, 2011). Transportation networks have been also been recognized as critical to the spatial transformation of South African urban areas in the National Development Plan (2011).

Findings also indicate that even though various public transportation modes are reliable and accessed conveniently, there were issues with affordability. This finding reflects that status of public transportation across the country which had been deemed unaffordable (Bickford, 2014).

The analysis indicates that participants perceive various transport modes and convenience as the main benefit in relation to access to public transportation within the inner-city. The statistical average of access to public transportation was computed to a value of 3.381, which suggests that the users were mainly neutral in their perception. Statistics are graphically computed below:

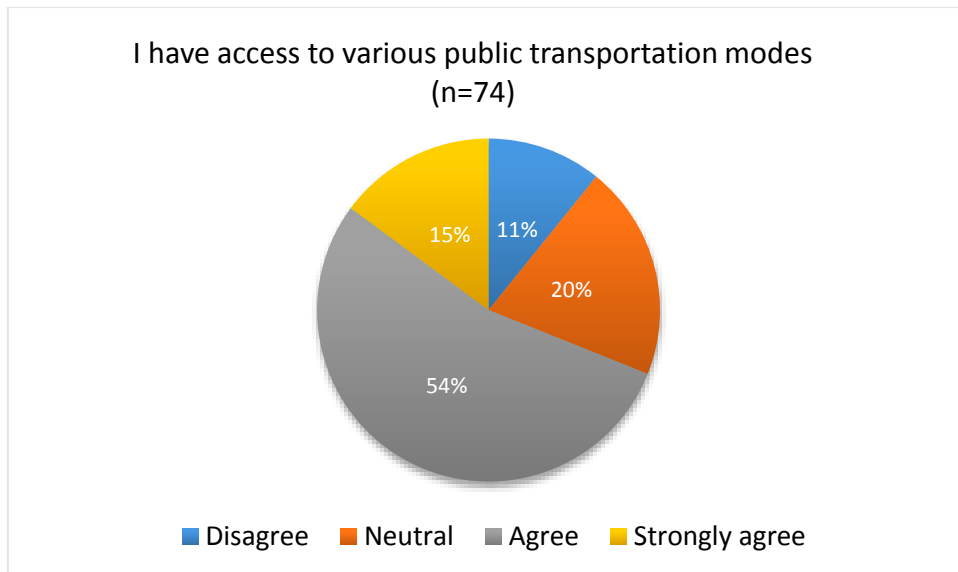


Figure 4- 17 access to various modes of transportation

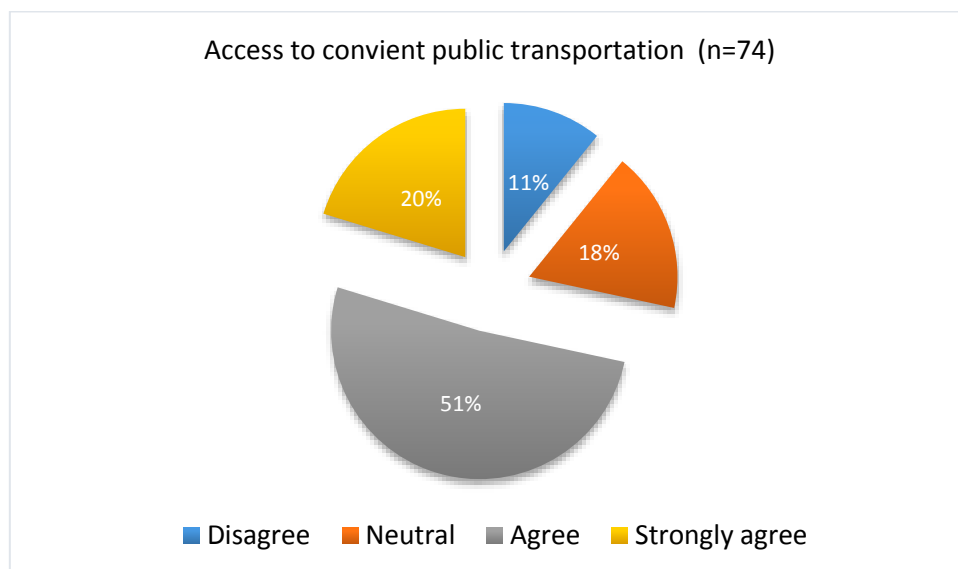


Figure 4- 18 access to convenient transportation

4.6.2.2 Access to basic amenities

This section required the users to indicate their degree of agreement or disagreement with statements that pertained to their access to basic amenities. The participants ranked their degree of disagreement from a value of 1 to 5 (strongly disagree to strongly agree). The results of the investigation were as follows:

Table 4- 5 Access to basic amenities

Access to basic amenities (n=74)

Statement	1	2	3	4	5	Mean	Standard deviation	Ranking
I live within reasonable proximity to public health care facilities.	0	0	24.3	56.8	18.9	3.9459	.65984	1
I consider the distance between where I live and public schools not to be burdensome.	0	2.7	37.8	48.6	10.8	3.6757	.70435	2
There are various shopping outlets easily accessible to me from my unit.	0	0	23.0	63.5	13.5	3.9054	.60066	3
I have adequate access to religious and cultural sites.	2.7	28.4	48.6	20.3	0	2.8649	.76435	4
I have adequate access to emergency services.	0	28.4	41.9	29.7	0	3.0135	.76737	5

The average participant agreed with the statements that they lived within reasonable proximity to public health care facilities ($\bar{x} = 3.9459$ and $s = .65984$), had access to various

shopping outlets ($\bar{x} = 3.9054$ and $s = .60066$) and did not consider the distance to schools, from their units as burdensome ($\bar{x} = 3.6757$ and $s = .70435$). Whereas the average participant was neutral about having access to religious and cultural sites ($\bar{x} = .8649$ and $s = .76435$) and emergency services ($\bar{x} = 3.0135$ and $s = 76737$).

The results of this section indicate that inner-city developments provided participants with the benefits of access to various social amenities. These findings reflect the assertion that the integration of housing into the existing social structures of the inner-city improves the quality of life for those who are located within it. The shift from housing to sustainable human settlements repeatedly calls for integration of the housing component into amenities and community services (Turok, 2016b). Osman (2013) reiterates this sentiment by suggesting that government housing funding should be directed at developing “one hour walk(able)” neighbourhoods and the shared domain of public space and amenities.

The analysis indicates that participants perceive their access to social amenities such as schools, public health care, shopping outlets and religious and cultural sites outlets generally to not be burdensome. The statistical average of access to social amenities was computed to a value of 3.4811, which suggests that the users were mainly neutral in their perception of access to social amenities. Statistics are graphically computed below:

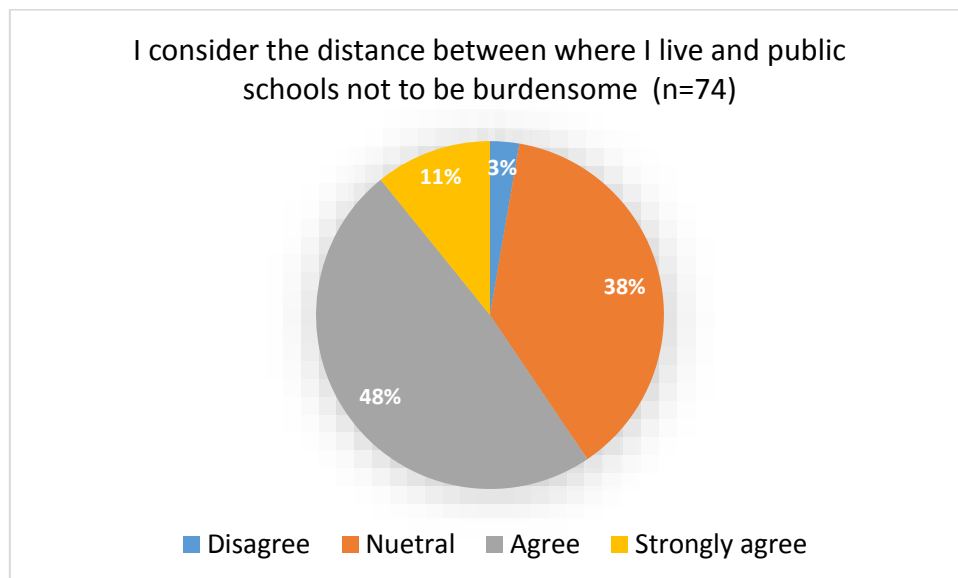


Figure 4- 19 distance between unit and schools

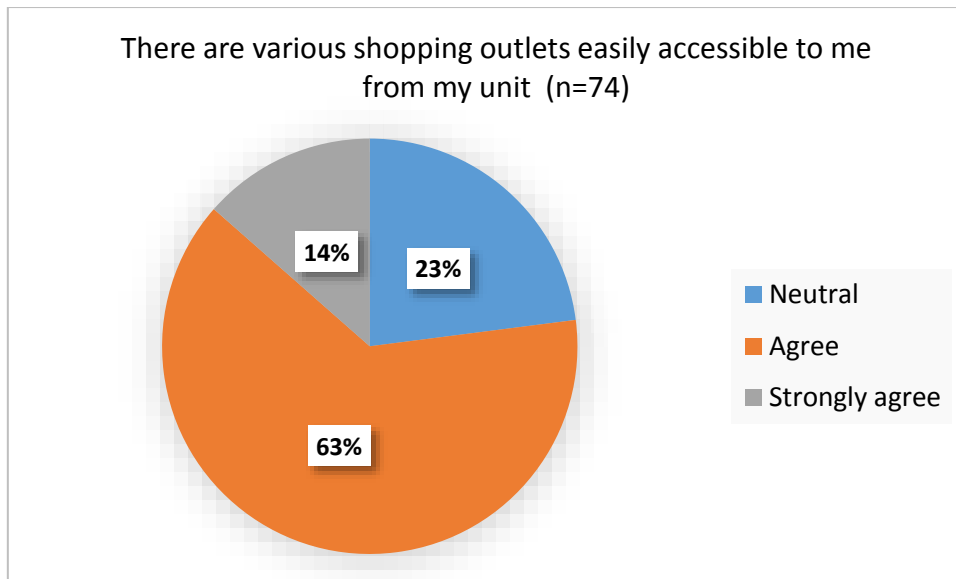


Figure 4- 20 access to shopping outlets

4.6.2.3 Access to economic opportunities

This section required the users to indicate their degree of agreement or disagreement with statements that pertained to their economic opportunities, and those of their 'family' members since residing in their units. The participants ranked their degree of disagreement from a value of 1 to 5 (strongly disagree to strongly agree). The results of the investigation were as follows:

Table 4- 6 access to economic opportunities

Access to economic opportunities (n=74)								
Statement	1	2	3	4	5	Mean	Standard deviation	Ranking
My family and I have been able to access permanent employment due to the location of my unit.	27.0	55.4	10.8	6.8	0	1.9730	.81043	1

The location of my unit has enabled my family and I to access informal trading opportunities.	17.6	29.7	29.7	23.0	0	2.5811	1.03377	2
My location has assisted my family and I in taking advantage of contract based employment.	18.9	47.3	23.0	10.8	0	2.2568	.89229	3
The location of my unit has enabled my family and I in accessing casual employment.	13.5	20.3	16.2	50.0	0	3.0270	1.1229	4
My economic status, and that of my family has improved since I moved in to my unit.	10.8	23.0	29.7	36.5	0	2.9189	.84881	5

The average participant disagreed with the statements that they had been able to access permanent employment opportunities ($\bar{x} = 1.9730$ and $s = .81043$) or those that were contact based ($\bar{x} = 2.2568$ and $s = .89229$). The average participant agreed that they had been able to access to casual based employment opportunities ($\bar{x} = 2.9189$ and $s = .84881$) and to having had their economic status improved since moving into their unit ($\bar{x} = 3.0270$ and $s = 1.1229$). In regards to accessing informal trading opportunities, the average participant was neutral (\bar{x}

= 2.5811 and s = 1.03377) however the same percentage of those who were neutral also disagreed (29.7%).

These findings reflect the assertion made by Wilson (2011) that depriving low income groups and the poor of affordable housing opportunities within inner-cities, was ultimately depriving them of vital livelihood strategies and economic opportunities that the housing could potentially facilitate. According to COGTA (2016) there is a growing alignment nationally, between economic opportunity and population concentration in cities, and thus of improved access to economic opportunities for people residing within inner-cities. This seems to allude to a direct correlation between inner-city living and access to economic opportunities and livelihood strategies. 36.5% of participants recorded that their economic status and that of their families had improved since occupying their units. This finding reiterates the importance of public housing development through retrofitting dilapidated buildings in the inner cities as not only an urban development and housing strategy but once that has a direct impact on the quality of life of low income groups.

The results of this section indicate that inner-city developments provided participants with the benefits of increased access to economic opportunities. The statistical average of access to economic opportunities was computed to a value of 2.5135. Statistics are graphically computed below:

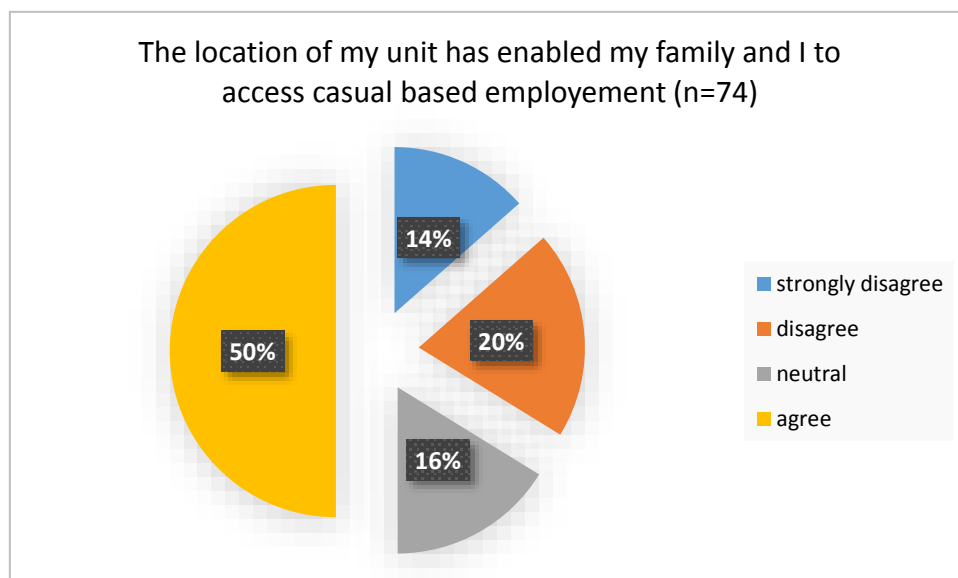


Figure 4- 21access to casual based employment

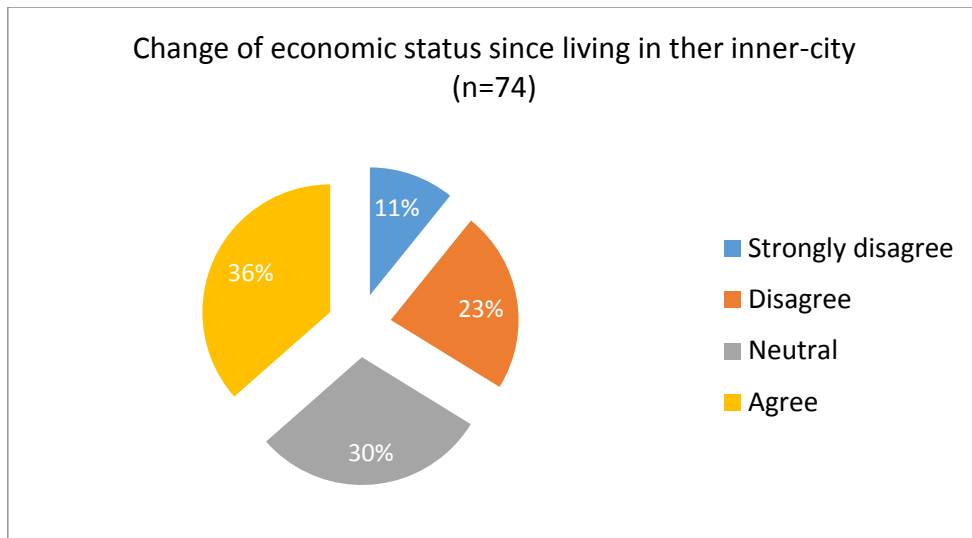


Figure 4- 22 change of economic status

4.6.2.4 General comfort and well-being

This section required the users to indicate their degree of agreement or disagreement with statements that pertained to their perception of general comfort and well-being fostered by their respective buildings. The participants ranked their degree of disagreement from a value of 1 to 5 (strongly disagree to strongly agree). The results of the investigation were as follows:

Table 4- 7 general comfort and well-being

General comfort and well-being (n=74)								
Statement	1	2	3	4	5	Mean	Standard deviation	Ranking
I have adequate ventilation in my unit.	4.1	40.5	33.8	21.6	0	2.7297	8.4881	1
The structure of the building is conducive to my health and safety and that of my family	4.1	31.1	29.7	32.4	2.7	2.9865	9.5793	2

The height of the building does not have a negative impact on my general comfort and health and that of my family.	4.1	36.5	31.1	27.0	1.4	2.8514	.91658	3
The layout of my unit is conducive to me well-being and that of my family.	9.5	41.9	21.6	27.0	0	2.6622	.98310	4
The lighting and acoustics in my unit are suitable to my general comfort and that of my family.	4.1	31.1	35.1	27.0	2.7	2.9324	.92649	5

The average participant were neutral to all of statements within the section. The average participant was neutral to the building having adequate ventilation ($\bar{x} = 2.7297$ and $s = 8.4881$) and to the structure of their unit being conducive to their health and that of their families ($\bar{x} = 2.9865$ and $s = 9.5793$). The average participant was also neutral to the impact of the height of the building ($\bar{x} = 2.8514$ and $s = .91658$), the layout of their units ($\bar{x} = 2.6622$ and $s = .98310$) and to the lighting and acoustics of their units ($\bar{x} = 2.9324$ and $s = .92649$).

Even though the average participant gave a neutral response, it is important to consider the responses in terms of percentages. 45% of the participants disagreed to having adequate ventilation in their units and 35% perceived the structure of their buildings as not conducive to their health and safety. 41% perceived the height of their buildings to have a negative impact on their general comfort, 51% had the perception that the layout of their units was

unconducive to their well-being and lastly, 35% perceived the lighting and acoustics of their units to be unsuitable to their general comfort.

These findings contradict Berardi (2013) who stated that a sustainable building has to consider the impact of the building on the physical and mental health of the occupiers and that psychological and social functions of a residential building shift the meaning of the building from that of a physical living place to that of a home. This statement was also echoed by principle eight of the Sustainable Building Principles (CIB, 2010) which states that for buildings to be considered as sustainable, they need to be healthy, comfortable and safe for occupants. The criteria includes indoor air quality, comfort, acoustic, thermal, visual and comfort. The finding alludes to the notion that in spite of previous constructs of access to transportation and social amenities, this construct looked at the impact of a well located public housing buildings on its occupiers and the findings challenge the sustainability of the buildings. The statistical average of general comfort and well-being computed to a value of 2.8324. Statistics are graphically computed below:

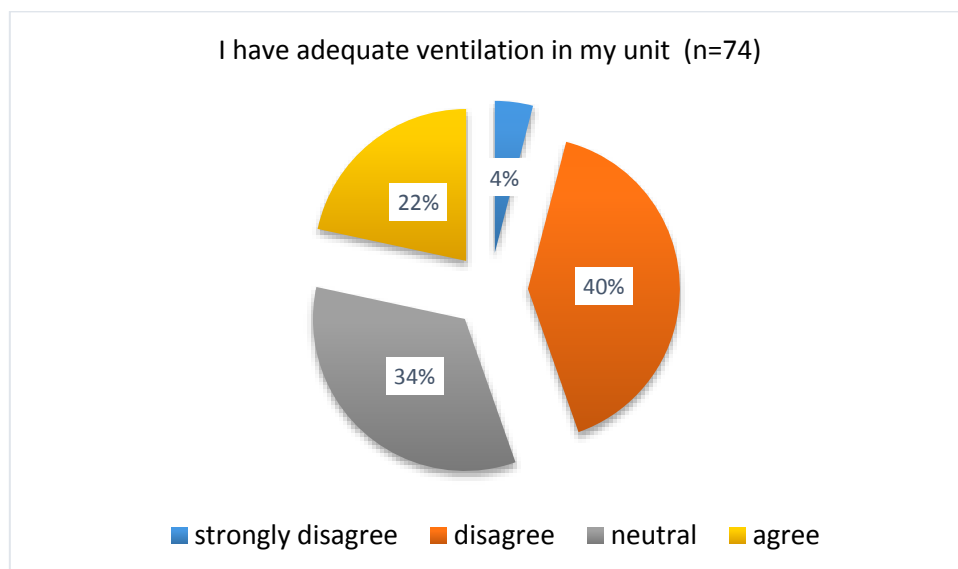


Figure 4- 23 ventilation in units

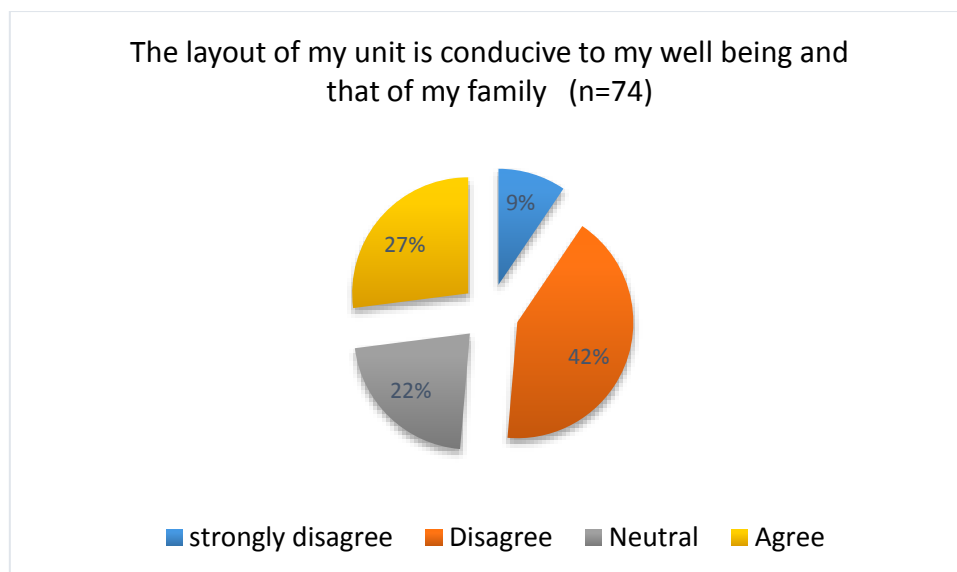


Figure 4- 24 layout of units

4.6.2.5 Services and infrastructure

This section required the users to indicate their degree of agreement or disagreement with statements that pertained to their perception of services and infrastructure in their buildings. The participants ranked their degree of disagreement from a value of 1 to 5 (strongly disagree to strongly agree). The results of the investigation were as follows:

Table 4- 8 services and infrastructure

Services and infrastructure (n=74)								
Statement	1	2	3	4	5	Mean	Standard deviation	Ranking
I have adequate and reliable access to basic services (electricity, water and sanitation) in my unit.	1.4	37.8	41.9	18.9	0	2.7838	.76338	1
There is a suitable waste management system in our building.	6.8	33.8	35.1	23.0	1.4	2.7838	.92559	2

The building is adequately maintained by the property management company.	1.4	32.4	36.5	28.4	1.4	2.9595	.85109	3
I am pleased with the general security and access restrictions in our building.	27.0	47.3	20.3	5.4	0	2.0405	.83484	4
My access to basic services has improved since residing in my unit.	1.4	36.5	37.8	24.3	0	2.8514	.80550	5

The average participant disagreed with being pleased with the general security and access restrictions in their building (\bar{x} = 2.0405 and s = .83484). The average participant was neutral about the maintenance of the buildings (\bar{x} = 2.9595 and s = .85109), there being suitable waste management system (\bar{x} = 2.7838 and s = .92559) and access to reliable basic services (\bar{x} = 2.7838 and s = .76338). The average participant was neutral about their access to basic services improving since residing in their unit (\bar{x} = 2.2514 and s = .850550).

The findings asserts access to basic services was not notably problematic, and the integration of a buildings into existing infrastructure ensures access to local infrastructure and services which is not overtly expensive for local government. It affirms the third principle of sustainable buildings (CIB, 2010) which stated a sustainable buildings needs to be completely integrated into the relevant local plans and infrastructure, and connect into the existing services, networks, urban and suburban grids, in order to improve stakeholder satisfaction. The only concern that that was raised in this construct was the issue of security and access control which could be improved upon by managing agents.

The results of this section indicate that access to basic services was mainly unproblematic for participants. The statistical average of access to economic opportunities was computed to a value of 2.6838. Statistics are graphically computed below:

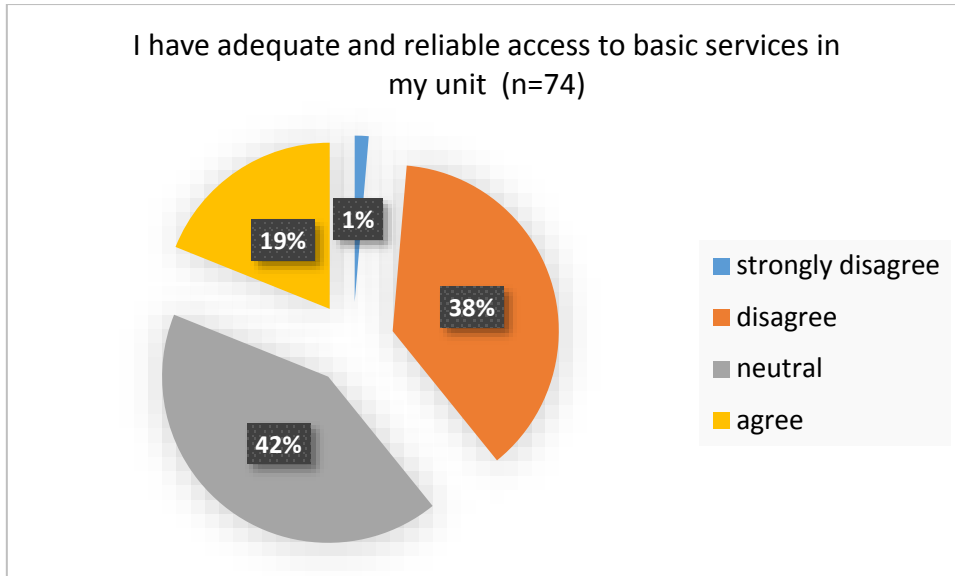


Figure 4- 25 access to basic services

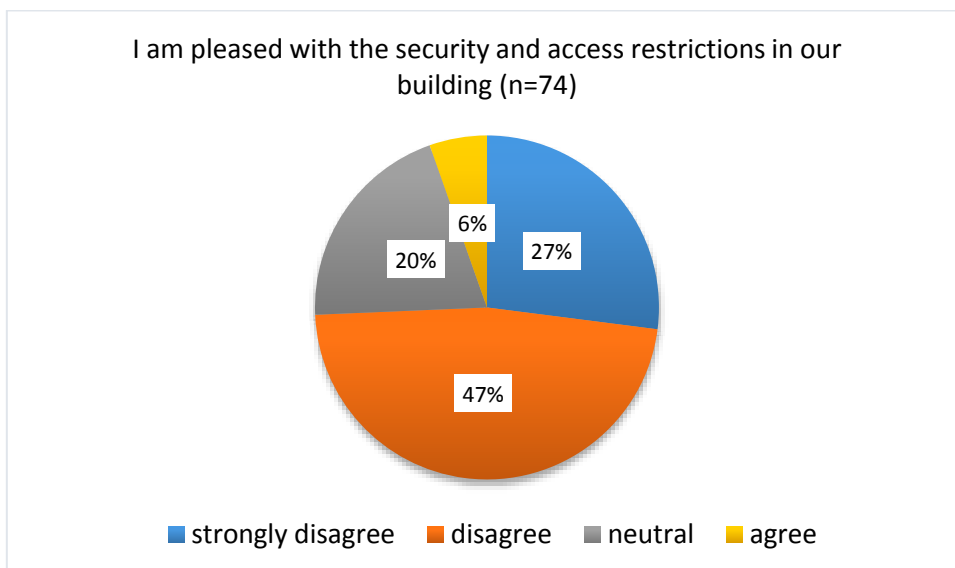


Figure 4- 26 security and access restrictions

4.6.2.6 Open spaces and social facilitation

This section required the users to indicate their degree of agreement or disagreement with statements that pertained to open spaces and social facilitation in their buildings. The participants ranked their degree of disagreement from a value of 1 to 5 (strongly disagree to strongly agree). The results of the investigation were as follows:

Table 4- 9 open spaces and social facilitation

Open spaces and social facilitation (n=74)

Statement	1	2	3	4	5	Mean	Standard deviation	Ranking
There is a safe open space available in the building.	28.4	64.9	6.8	0	0	1.7838	.55567	1
I have access to safe open spaces outside of the building.	10.8	43.2	40.5	5.4	0	2.4054	.75705	2
Social interaction is fostered in the building structure.	8.1	44.6	39.2	8.1	0	2.4730	.76253	3
There are play areas available for children in the building.	31.1	55.4	12.2	1.4	0	1.8378	.68300	4
There are areas restricted for smoking in our building	12.2	51.4	35.1	1.4	0	2.2568	.68368	5

The average participant disagreed with the following statements: that there was a safe open space within their building ($\bar{x} = 1.7838$ and $s = .55567$), that there were available play areas for children in their buildings ($\bar{x} = 1.8317$ and $s = .68300$), there were areas restricted for smoking ($\bar{x} = 2.2568$ and $s = .68368$), and that social interactions were fostered through the structure of their buildings ($\bar{x} = 2.4730$ and $s = .76253$). The average participant also did not have access to safe open spaces outside of the buildings ($\bar{x} = 2.4054$ and $s = .75705$).

This finding suggests that people who live within the inner-city do not have access to safe public open spaces. It is also supported by the finding from the comparative study where residents spoke out about there being open spaces available which were perceived as crime hotspots. Further than that, that study participants did not have access to these spaces within their buildings either. This is concerning because Lee *et al* (2015) suggests that urban green

spaces provide environmental benefits through their effects on negating urban heat, offsetting greenhouse gas emissions, and attenuating storm water. They also have direct health benefits by providing urban residents spaces for physical activity and social interaction, and allowing psychological restoration to take place. Berardi (2013) frames the concern from a sustainable building context by stating that it is important that a building contribute in creating a sense of community through fostering social interactions through design and deems this as an import requirement of sustainable building.

The results of this section indicate that inner-city developments did not provided participants with safe open spaces or social interaction and the buildings did not foster these interactions as well through design. The statistical average of access to economic oppportunities was computed to a value of 2.1514. Statistics are graphically computed below:

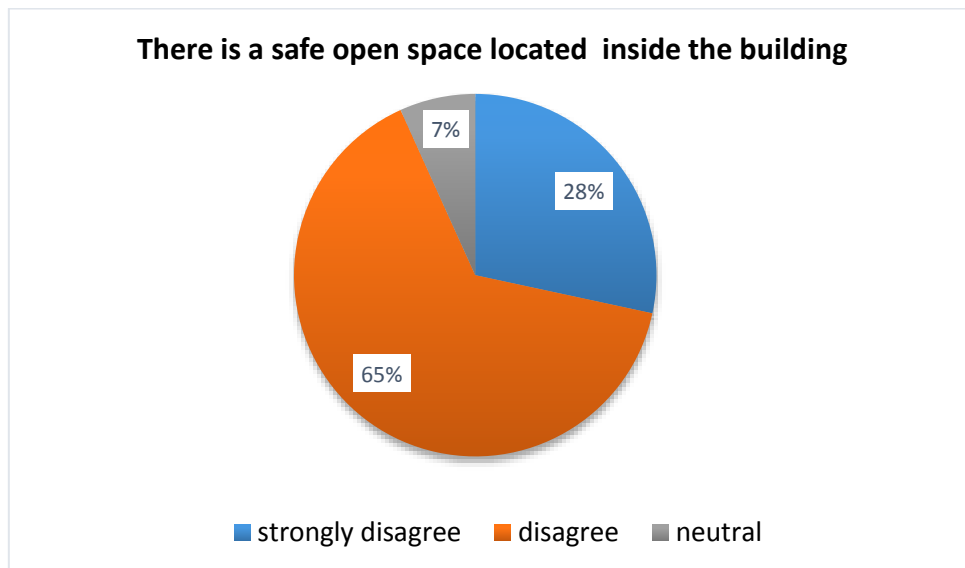


Figure 4- 27 safe open spaces in buildings

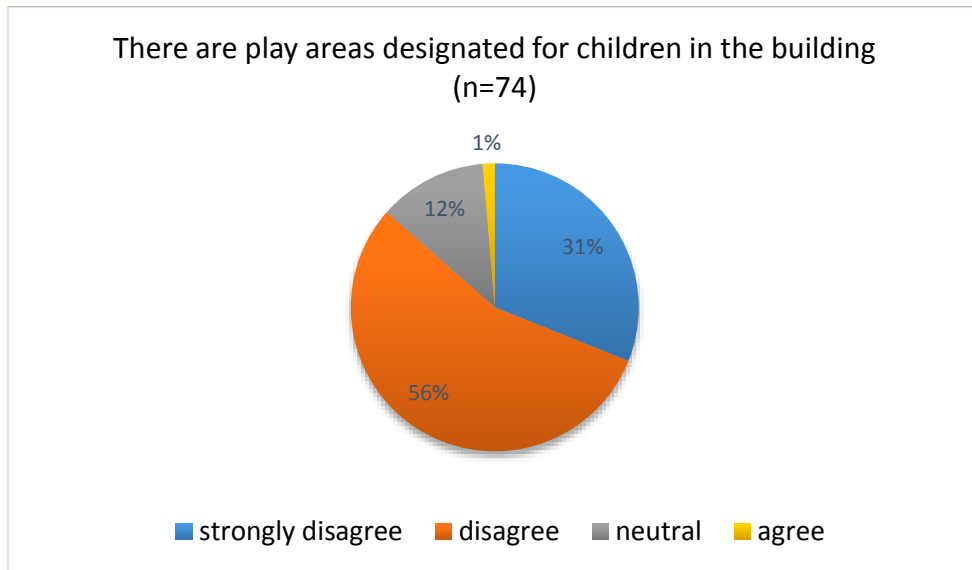


Figure 4- 28 demarcated spaces for children

4.6.2.7 Participation

This section required the users to indicate their degree of agreement or disagreement with statements that pertained to participation in housing delivery. The participants ranked their degree of disagreement from a value of 1 to 5 (strongly disagree to strongly agree). The results of the investigation were as follows:

Table 4- 10 participation

Participation (n=74)								
Statement	1	2	3	4	5	Mean	Standard deviation	Ranking
I consider it very important to partake in the process of developing public housing.	12.2	35.1	39.2	13.5	0	2.5405	.87881	1
Participation results in a better units for occupants.	17.6	25.7	17.6	37.8	1.4	2.7973	1.17017	2
I participated in at least one stage of the development of my unit	16.2	52.7	31.1	0	0	2.1486	0.67606	3

I am generally satisfied with my unit.	28.4	47.3	21.6	2.7	0	1.9865	.78502	4
There are visual representations of culture and identity in building.	28.4	3t5.1	29.7	6.8	0	2.1486	.91685	5

The average participant disagreed that they considered it important to partake in the process of housing delivery (\bar{x} = 2.5405 and s = .87881) and were neutral about participation resulting in better units for occupants (\bar{x} = 2.7973 and s = 1.17017). However, the average participant did not participate in any stage of the development of their units (\bar{x} = 2.1486 and s = 0.67606) and was generally unsatisfied with their units (\bar{x} = 1.9865 and s = .78502). The average participant also disagreed with seeing visual representations of culture or heritage in the buildings (\bar{x} = 2.1486 and s = .91685).

This finding asserts the statement made by Parr & Zaretsky (2010) that the community can often represent a better unit of analysis for a complete evaluation of sustainability including the social dimension and that it allows for better evaluations of the cross-scale effects of sustainability. This is reiterated by Dempsey *et al* (2011) who suggested that end-users need to partake in the decision making process in sustainable building. In relation to cultural and heritage representation, Beradi (2013) stated that buildings should provide social and cultural value over time and for all the people who occupy it. A sustainable building must provide a sense of place for its occupants and should be related and integrated into the local culture and heritage.

The average study participant acknowledge the importance of participation but did not perceive it to have a direct linkage to acquiring a better unit. However, the same average participant did not partake in the delivery of their unit but was generally unsatisfied with that very same unit. The statistical average of participation was computed to a value of 2.2568. Statistics are graphically computed below:

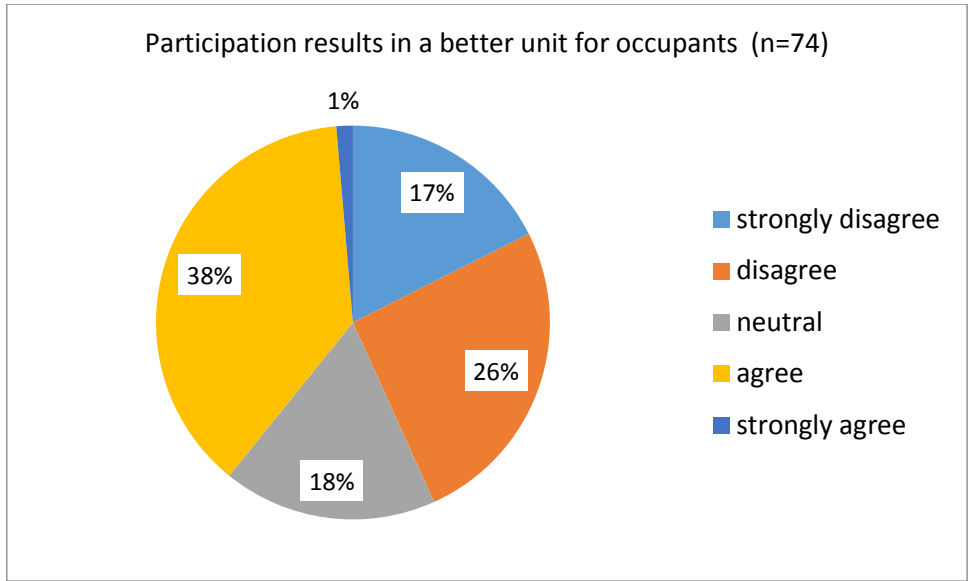


Figure 4- 29 participation results in better units

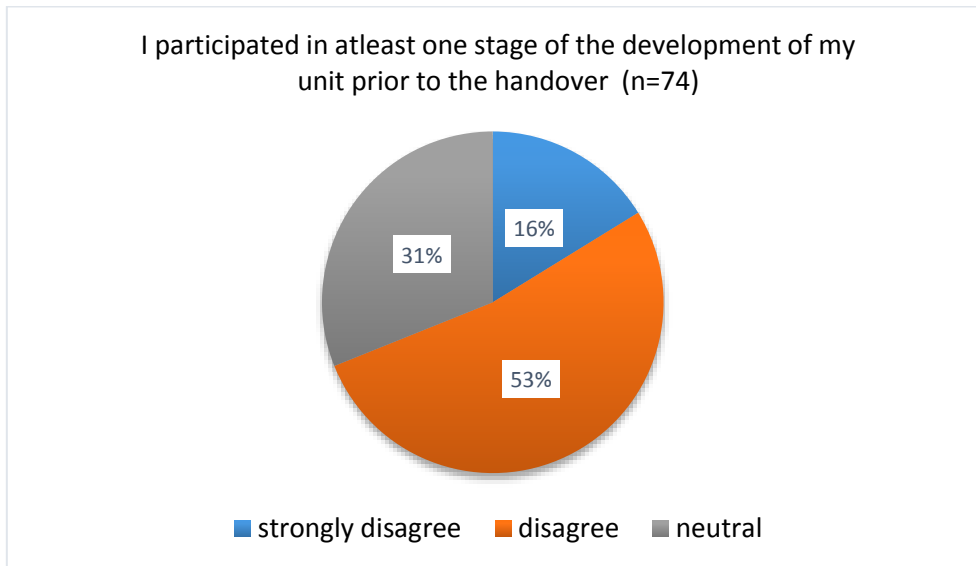


Figure 4- 30 participation in unit delivery

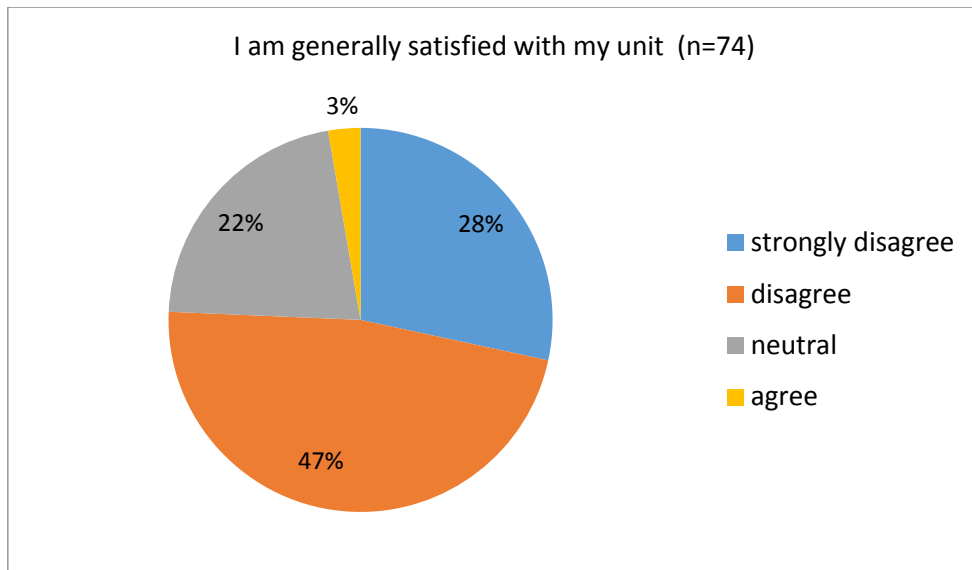


Figure 4- 31satisfaction with unit

4.8 Chapter Summary

The purpose of this chapter was to present the research findings from data collected through the methodology presented in chapter three. Below is a diagram showing how all the elements of the study came together to present findings and discussion and the overall gist of the study.

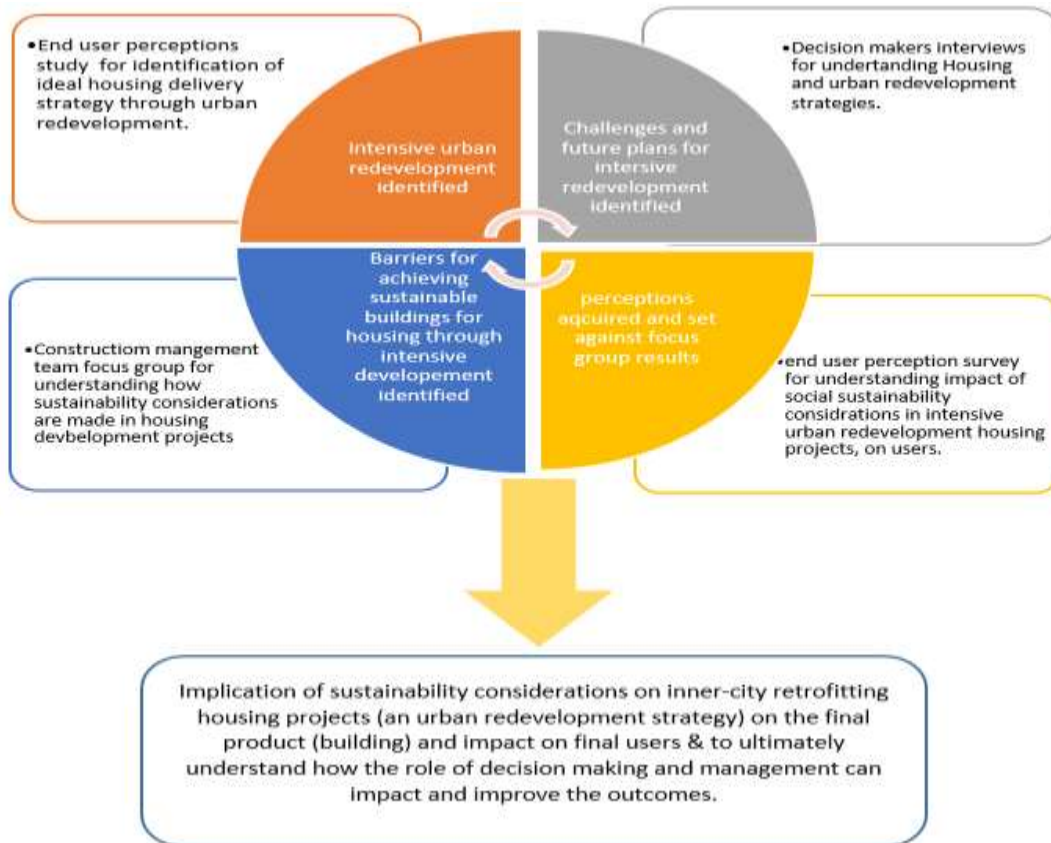


Figure 4- 32 structure of study

5. CHAPTER FIVE: CONCLUSION & RECOMMENDATIONS

5.1 Introduction

The purpose of this chapter is to summarise the study by reviewing the research problem, the objectives of the study, the research findings, challenges, future possibilities, recommendations and the final summary and conclusion. This is achieved by analysing the results of the study against the research objectives and hypotheses.

5.1.1 Problem statements

The implications of a unilateral approach to decision making and management of construction projects has led to the neglect of the critical aspect of social sustainability in the development of sustainable human settlements.

5.1.2 Study objectives

The primary objective of the study was to analyze the role of decision making and management of construction projects within the context of producing sustainable housing through intensive redevelopment in South Africa and particularly in Durban. This objective was achieved by

- Investigating decision maker perception on current approaches for affordable public housing delivery in Durban,
- Understanding the benefits and barriers of current affordable public housing delivery in Durban,
- Assessing the role of decision making and management of construction projects in fostering sustainability in affordable public housing redevelopment projects in Durban, and
- Evaluating user perception of social sustainability aspects implemented to public housing initiatives in the Durban inner city.

This research was aimed at investigating the benefits and barriers of current public housing approaches in South Africa, and assessing the role of decision making and management of construction projects in fostering social sustainability in South African public housing initiatives, with particular regard to intensive urban redevelopment. In understanding the context to which the study would be set (Durban), the researcher undertook desktop research and observation to identify challenges of the city in relation to sustainable buildings and

human settlement development. The degeneration on the inner-city, affordable housing delivery through 'mega projects' in the outskirts of the city and public rental housing through ratification of dilapidated buildings with the inner-city, were at the forefront of the narrative. Further enquiry led to the understanding that both efforts to regenerate the inner city and the development of sustainable human settlements could be made simultaneously through urban redevelopment and the utilization of housing development as an approach. Furthermore, the method had been endorsed in the Sustainable Development Goals and the global urban agenda at large through goal eleven.

The first objective was made with the intention to understand South African housing delivery strategies. The objective was then separated into two, the first component of the objective was to determine the benefits and barriers of these strategies with regards to sustainability and global urban agenda. Cornubia and Hawaii housing development projects were identified as representational of current strategies. Cornubia fit the brief as an example of extensive urban redevelopment through mixed use development with a huge human settlement component. On the other hand Hawaii (an inner city building located within the Durban inner city which had been converted to affordable rental housing years prior) was identified as an example of intensive urban redevelopment. Empirical research through focus groups and interviews and observation was then conducted.

5.1.2.1 Objective One A

With sustainable development as a lens the researcher asked a handful of residents from both developments a number of questions to help determine the best approach in terms of end user satisfaction (the human impact). What was evident was that considerations towards housing structure and layout were important to the wellbeing of end-users. Access to reliable transportation networks which were available in the inner-city improved the livelihoods of those who were participants from Hawaii and remained a desire for those within the outskirts of the inner-city. Access to basic amenities such as schools, public health care, religious sites and shops was highly ranked by all participants. Health and safety considerations in the development of housing also proved to be vital to participants. Access to safe open spaces for social interactions were also flagged as important to the participants. From the answers a set of indicators or considerations to be made in development were deducted. Figure 5-1 displays sustainable considerations that were identified from the comparative study (informed by

literature). Intensive redevelopment became the strategy most likely to address the considerations when implemented correctly through housing development and was used as a lens throughout the rest of the study.

5.1.2.2 Objective One B

The second component of the first objective was aimed at determining the perception of provincial and municipal decision makers with regards to housing delivery strategies as a whole and inner-city housing development to retrofitting specifically. The respondents spoke of challenges of the current approaches which ultimately informed the direction of housing development in Durban. Challenges such as the lack of financial resources, the current housing backlog and lack of land availability were suggested as the most distinct in housing delivery in Durban. Additionally what hindered inner-city housing delivery from being at scale was identified as the current financial model that was failing to avail inner-city land and the silo approach to development which was fundamentally cross-sector and cross-departmental dependent. Issues of illegal occupation of inner city buildings and the availability of accredited SHIs in Durban were also listed as challenges.

5.1.2.3 Objective Two

Thereafter the researcher sought to determine how the delivery of sustainable buildings could be achieved when intensive urban redevelopment was used as a strategy. This led the researcher to interviewing managers and more decision-makers in the process of ensuring sustainability considerations were made at housing development. A focus group was formed with the project managers, social facilitators and the representatives from the SHI's were interviewed separately. The barriers and benefits of social sustainability implementation were discussed and the results suggested that sustainability considerations were complex to make in an environment driven by factors such as; performance, costs, time, political motivations, corruption to mention a few. Issues such the lack of participation of the end-users, sustainability education and limited capacity further complicated matters. The discovery that sustainability implementation was the responsibility of contractors and they played a monitoring and evaluation role in the process and were often overwhelmed with work, long distances between development and limited time on each site to ensure such considerations were adequately made. Essentially the achievement of sustainable buildings

was expressed as challenging and including public participation in various stages of housing development was seen as an impossible feat.

5.1.2.4 Objective Three

For the third objective two buildings were identified within the inner-city (port view and Russell Mansions) and questionnaires were administered in both building, with the aim to understand how end users perceived social sustainability aspects implemented at construction level in their day-to-day lives and how decisions and management of the process impacted their lives. The study found that participants had not partaken in any stages of the delivery of their units. Thus there had been unable to have an input. Most participants felt that they would not have benefited in a better unit had they been granted participation but the average participant was unhappy with their units. Regardless of a significant amount of participants not being happy with issues such as; structure and layout of units, access to safe open spaces, basic services and had safety and comfort concerns, the general stance was that participants were happy with location of their unit which were notably better than their previous housing situations. If participants were generally happier to be living within the inner city and were greatly unhappy with the development/ construction of their buildings, socially sustainable considerations (alongside those of the environment and economy) needed to be made to improve the daily experiences of end-users.

5.2 Conclusion

The findings suggested that intensive urban development through the reuse of an inner city building has highly benefitted low-income inhabitants in terms of the proximity of economic and social centres. However, there are structural, financial and procedural barriers related to the redevelopment of existing buildings in the inner city that local governments are currently encountering. The better physical housing environment provided by a new mega-project such as Cornubia is apparent, however occupants complained of additional financial pressure due to the distance from economic opportunities and transportation issues, employment loss due to relocation, and the dissatisfaction with the break in social ties.

The tension between formal housing delivery and the incorporation into the urban fabric of informal development is one of the core aspects of the debate around urban growth and relevant housing needs in South African cities. In addition to informal settlement upgrading,

medium-to-high density intensive urban redevelopment solutions based on infill housing, incremental housing schemes and participatory approaches offer interesting sparks for future studies.

The study also showed that, although known for its benefits, such as energy and resource conservation, cost efficiency, well-being, consistent quality and health and safety, the adoption of sustainable construction is challenging due to industry or country-specific barriers. Moreover, rather than focusing on general benefits or barriers, priority must be given to those which fit well with local conditions or are of utmost significance. The researchers' intention for this study was to also investigate industry practitioners' awareness, knowledge and understanding to develop a picture of the current state of sustainable construction, as this is believed to be the stepping stone for successful adoption. The findings suggest that the level of adoption of sustainable construction practices is poor in the context of human settlement development in Durban, which is believed to be due to the legislative and stakeholder-related factors. Namely, lack of legislative requirements, lack of education focusing on sustainability, lack of awareness and knowledge, and reluctance to adopt new sustainable technologies and lack of participation of end users. Thus, the first implication of this study for decision makers is to enable a legal and policy environment that will facilitate the achievement of sustainable development through sustainable-construction practices, where government plays significant role.

Along with effective enforcement of policies, it is essential to improve the knowledge and understanding about sustainable practices among the industry stakeholders. Early stage and long-term sustainability awareness and knowledge could be achieved through regular training, seminars and workshops, and more importantly incorporating the concept of sustainability into the higher education curriculum. Moreover, incentives to promote sustainability among practitioners and investors would be crucial, particularly financial incentives for the private sector willing to adopt sustainable practices in their projects.

5.3 Recommendations for future research

Based on the findings of this research, the following recommendations are proposed for future research endeavours:

- The study was confined to research within the KwaZulu-Natal region. It would be beneficial to analyse similar information within the other regions in order to determine if they are faced with similar shortcomings or to ascertain if issues are regional specific.
- The study looked specifically at the public sector and from an urban development and housing perspective. An analysis on barriers and drivers of sustainable construction from a private sector outlook would be beneficial.

5.4 Chapter Summary

This chapter interpreted and discussed the findings of the study. The study investigated the role of decision making and management of construction projects within the context of producing sustainable housing through intensive redevelopment in South Africa and particularly in Durban. Most of the findings of this research support what was found in literature. The findings of this study suggest that the implications of a unilateral approach to decision making and management of construction projects have led to the neglect of the critical aspect of social sustainability in the development of sustainable human settlements. The scope of the findings were intended to draw a picture of the lack of sustainable construction adoption and implementation in the country. The reported drivers are strong enough to motivate policy makers and industry stakeholders to address the barriers and invest in overcoming them. Efforts to overcome these barriers would provide motivation for significant sustainable construction adoption and implementation and consequently promote the adoption of these practices in South Africa.

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APPENDICES

APPENDIX A: INTERVIEW SECHDULE

QUESTIONNAIRE FOR INNER-CITY HOUSING PARTICIPANTS

Data Analysis	
Category	Rating
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Section A: Demographics

Age	_____ years
Gender	<ol style="list-style-type: none"> 1. Male 2. Female
Highest grade passed	<ol style="list-style-type: none"> 1. Did not attend school 2. Grade 1-3 3. Grade 4-6 4. Grade 7-8 5. Grade 9-10 6. Grade 11-12
Number of dependants	<ol style="list-style-type: none"> 1. 1-2 2. 3-4 3. More...
Are you employed	<ol style="list-style-type: none"> 1. Yes 2. No 3. Self employed
Type of employment (if employed)	<ol style="list-style-type: none"> 1. Casual 2. Fixed Contract 3. Open ended Contract 4. Permanent
Household monthly income	R_____

Section B: Housing Details

How long have you been living in this flat?	<ol style="list-style-type: none"> 1. Under 1 year 2. 1- 5 years
---------------------------------------------	------------------------------------------------------------------------------------------

	<ul style="list-style-type: none"> 3. 5- 10 years 4. Over 10 years
What is the size of your unit?	<ul style="list-style-type: none"> 1. Bachelor 2. One bedroom 3. Two bedroom
How many people live in the unit?	<ul style="list-style-type: none"> 1. 1 2. 2 3. 3 4. 4 5. 5 or more
Prior to moving into my unit I lived	<ul style="list-style-type: none"> 1. In the inner-city 2. In the outskirts 3. Outer urban areas 4. Neighbouring township 5. Outside of Durban 6. Rural areas
Is your current living situation considerably better than the one you had prior to moving into your unit?	<ul style="list-style-type: none"> 1. Yes 2. No

Section C: Access to public transportation

Please indicate your degree of agreement/disagreement from 1 = strongly disagree to 5 = strongly agree to the following statements.

	1 Strongly disagree	2 Disagree	3 Uncertain	4 Agree	5 Strongly agree
1. I have convenient access to public transportation.					
2. I have access to affordable public transportation.					
3. I have access to various public transport modes.					
4. The public transport I have access to is reliable.					

5. I consider the routes taken by the public transport I use to be reasonable.					
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Section D: Access to basic amenities

Please indicate your degree of agreement/disagreement from 1 = strongly disagree to 5 = strongly agree to the following statements

	1 Strongly disagree	2 Disagree	3 Uncertain	4 Agree	5 Strongly agree
1. I live within reasonable proximity to public health care facilities.					
2. I consider the distance between where I live and public schools not to be burdensome.					
3. There are various shopping outlets easily accessible to me from my unit.					
4. I have adequate access to religious and cultural sites.					
5. I have adequate access to emergency services.					

Section E: Access to economic opportunities

Please indicate your degree of agreement/disagreement from 1 = strongly disagree to 5 = strongly agree to the following statements

	1 Strongly disagree	2 Disagree	3 Uncertain	4 Agree	5 Strongly agree
1. My family and I have been able to access permanent employment due to the location of my unit.					
2. The location of my unit has enabled my family and I to access informal trading opportunities.					

3. My location has assisted my family and I in taking advantage of contract based employment.					
4. The location of my unit has enabled my family and I in accessing causal employment.					
5. My economic status, and that of my family has improved since I moved in to my unit.					

Section F: General comfort and well-being

Please indicate your degree of agreement/disagreement from 1 = strongly disagree to 5 = strongly agree to the following statements

	1 Strongly disagree	2 Disagree	3 Uncertain	4 Agree	5 Strongly agree
1. I have adequate ventilation in my unit.					
2. The structure of the building is conducive to my health and safety and that of my family.					
3. The height of the building does not have a negative impact on my health and safety and that of my family.					
4. The layout of my unit is conducive to me well-being and that of my family.					
5. The lighting and acoustics in my unit are suitable to my well-being and that of my family.					

Section G: Services and infrastructure

Please indicate your degree of agreement/disagreement from 1 = strongly disagree to 5 = strongly agree to the following statements

	1 Strongly disagree	2 Disagree	3 Uncertain	4 Agree	5 Strongly agree

1. I have adequate and reliable access to basic services in my unit.					
2. There is a suitable waste management system in our building.					
3. The building is adequately maintained by the property management company.					
4. I am pleased with the general security and access restrictions in our building.					
5. My access to basic services has improved since residing in my unit.					

Section H: Open spaces and social interactions

Please indicate your degree of agreement/disagreement from 1 = strongly disagree to 5 = strongly agree to the following statements

	1 Strongly disagree	2 Disagree	3 Uncertain	4 Agree	5 Strongly agree
1. There is a safe open space available in the building.					
2. I have convenient access to safe open spaces outside of the building.					
3. Social interaction is fostered in the building structure.					
4. There are play areas available for children in the building.					
5. There are areas restricted for smoking in our building					

Section I: Participation

Please indicate your degree of agreement/disagreement from 1 = strongly disagree to 5 = strongly agree to the following statements

	1 Strongly disagree	2 Disagree	3 Uncertain	4 Agree	5 Strongly agree
1. I consider it very important to partake in the process of developing public housing.					
2. Participation results in a better units for occupants.					
3. I participated in at least one stage of the development of my unit					
4. I am generally satisfied with my unit.					
5. There are visual representations of culture and identity in building.					

Interview questions: Comparative study participants

1. Which public housing development do you currently live in?
2. How long have you been living in the development?
3. How many people do you live with in your unit?
4. What is the size of your unit?
5. Where did you live prior to your unit?
6. Do you have access to public transportation?
7. What challenges are you facing in regards to access to public transportation? What are the possible solutions?
8. Do you have access to amenities such as public health care, schools, religious and heritage sites and shopping outlets?
9. What challenges do you encounter in regards to accessing amenities? What are the possible solutions?
10. Do you have access to economic opportunities and livelihood strategies?
11. What are the challenges in regards to accessing economic opportunities and livelihood strategies? How can these be mitigated?
12. Is your current unit and building conducive to your general comfort and wellbeing? If not, how so?
13. What measures can be put in place to improve your general comfort and well-being in your unit or/ and building?
14. Do you have access to safe open spaces for social interactions? If not, what are the challenges?
15. Does your unit/building foster social interactions? If so, how? If not, how?

Interview questions: Social Facilitators and Project Managers

1. What role do you play in housing development, and how long have you been in the role?
2. What type of projects have you worked in your professional capacity?
3. What would you say sustainable development is/ entails?
4. Do you think there is a link between housing and sustainable development, if so how?
5. Are there also linkages between sustainable development and the development of public housing, if so what would you say they are?
6. Are there social sustainable construction considerations made in the construction of public housing? If so, please provide examples, if not please elaborate why?
7. If there are considerations made, what is your role in terms of the implementation of the considerations?
8. Do you think there are benefits in making social sustainability considerations in public housing development? If so, what are they? If not, kindly explain why?
9. What do you think should be the impact of these benefits on housing delivery?
10. Do you think there are barriers as well? If so, please name a few.
11. How have these barriers (if there are any) impacted housing delivery?
12. What challenges and opportunities are there for sustainability considerations in your line of work?
13. What impact do you think could be made by the implementation of sustainability considerations?
14. Which stakeholder in your opinion are best fitted to be drivers of ensuring implementation of sustainability considerations in public housing development? Kindly explain why?
15. At which stages should they be making these considerations and why?
16. Are end-users/ beneficiaries involved in any of the stages of their development? If so, which stages and why?
17. Do you think their role in the process can be deepened (if there is one)? If so how? And what have been the barriers?

Interview questions: Provincial and municipal officials

1. What is the role of the department in public housing delivery?
2. What is your role specifically in the delivery of public housing delivery?
3. What are the challenges, in terms of public housing delivery, associated with your position?
4. How do you mitigate the challenges?
5. What are the current housing delivery strategies in Durban?
6. What are these strategies informed by?
7. What are the main challenges within the Durban context?
8. What is your stance of the department in terms of urban development?
9. What are the department's plans with the number of dilapidated buildings within the Durban inner-city?
10. How many of these buildings have been converted into public housing?
11. What have been the challenges and benefits of this process?
12. What are the measures put in place by the government to overcome the challenges and harness the potential of these buildings?
13. Are the programmes, plans and policies put in place by the department aimed at urban redevelopment in Durban? If so, which? If not, what has been the hindrance?
14. Are there any inner-city public housing developments in the pipelines? If so, where?

APPENDIX B: ETHICAL CLEARANCE DOCUMENTATION

INFORMED CONSENT FORM

Project Title: The role of the decision making and management in fostering sustainability for intensive urban redevelopment through public housing projects in South Africa: a Durban case study.

Specific Location:

My name is Nombuso Nomfundo Qwabe (student number 206514113). I am registered Masters Candidate at the University of kwaZulu Natal. My research theme is entitled, 'The role of decision making and management of construction projects in fostering sustainability for intensive urban development through public housing initiatives in South Africa'. You are being asked to take part in this research project. I will explain the project to you in detail. You should feel free to ask questions at any time. All potential interviewees are being asked to volunteer for participation in the research study.

My contact details are:

Email- 206514113@stu.ukzn.ac.za

Cell- 0814798836

The contact details of my supervisor are:

Email- tramontin@ukzn.ac.za

Office Number- 031 260 1771

Specific Enquiries (HSSREC Research Office contact details):

Contact: Mr. P. Mohun

Tel: 031 260 4557

E-mail: mohunp@ukzn.ac.za

Description of the project:

The primary objectives of this study are to investigate decision maker's perception on current approaches for affordable public housing delivery in Durban and to understand the benefits

and barriers of current affordable public housing delivery in Durban. The role of decision making and management of construction projects in fostering sustainability in affordable public housing redevelopment projects in Durban will be assessed. As well as an evaluation of user perception of social sustainability aspects implemented to housing initiatives in the Durban inner city.

The core research questions are:

1. What are the benefits and barriers of current approaches to affordable public housing in South Africa?
2. How do decision makers and project managers incorporate sustainability in affordable public housing redevelopment?
3. What is the inhabitant perception in regards to sustainability issues related to housing initiatives in the inner city?

Procedures:

Interviews:

- Will take place once you have been contacted, informed of the parameters of the research, have read over the informed consent form, and have signed the consent form.
- Interviews will be conducted and responses documented (interviews may be recorded)
- The time required will depend on the nature and depth of your responses
- Participants may be contacted again to elaborate on a response or for clarity

Risks or discomfort:

There are no potential risks or discomforts that will be associated with the research process.

Benefits of this study:

There will be no direct benefit to you for taking part in this study. The benefits of the research will contribute towards an existing body of knowledge.

Compensation:

There is no form of compensation for you.

Voluntary participation and withdrawal:

Participation in research is voluntary. You have the right to refuse to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may skip questions whatever you decide, you will not be disadvantaged in any manner.

Questions, Rights and Complaints:

If you have any questions about this research project or any concerns about your rights as a research participant in this study, please feel free to contact me (see contact information at the beginning of the document).

Confidentiality:

As the primary focus of the research is to document opinion on, and perspectives on the role of decision makers and management in fostering sustainability for intensive urban redevelopment through public housing projects in the Durban context, there is no need for confidentiality unless you (the interviewee) request such anonymity (see below). The research is of public interest and most of the themes are in the public domain.

Consent statement:

Do you give your consent for: *(please tick one of the options below)*

Your name, position and organization, or	
Your position and organization, or	
Your organization or type of organization <i>(please specify)</i> , or	
None of the above	

To be used in the report?

I..... (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT

DATE

Please write your email address below if you wish to receive a copy of the final research report:

Dear Participant

INFORMED CONSENT LETTER

My name is Nombuso Nomfundo Qwabe. I am registered Masters Candidate at the University of KwaZulu-Natal. My research theme is entitled, 'The role of decision making and management of construction projects in fostering sustainability for intensive urban development through public housing initiatives in South Africa. You are being asked to take part in this research project. I will explain the project to you in detail. You should feel free to ask questions at any time. All potential interviewees are being asked to volunteer for participation in the research study.

Please note that:

- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.
- The interview may last for about 1 hour and may be split depending on your preference.
- Any information given by you cannot be used against you, and the collected data will be used for purposes of this research only.
- Data will be stored in secure storage and destroyed after 5 years.
- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
- The research aims at knowing the challenges of your community relating to resource scarcity, peoples' movement, and effects on peace.
- Your involvement is purely for academic purposes only, and there are no financial benefits involved.
- If you are willing to be interviewed, please indicate (by ticking as applicable) whether or not you are willing to allow the interview to be recorded by the following equipment:

	willing	Not willing
Audio equipment		
Photographic equipment		
Video equipment		

I can be contacted at:

Email: 206514113@stu.ukzn.ac.za

Cell: +27814798836

My supervisor is Mr. Vittorio Tramontin who is located at the School of Engineering at the University of KwaZulu-Natal, Howard College.

Contact details: email: tramontin@ukzn.ac.za Phone number: +2731 260 1771

You may also contact the Research Office through:

P. Mohun

HSSREC Research Office,

Tel: 031 260 4557 E-mail: mohunp@ukzn.ac.za

Thank you for your contribution to this research.

Physical Address
201 Charter House
13 Brand Road
Glenwood
Durban

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Postal Address
P O box 30125
Mayville 4058
Tel: 031-201 4165
Fax: 031-201 1981

12 March 2018

Dear Sir/Madam

Letter of authority – permission for interview

This letter serves to confirm that Nombuso Nomfundo Qwabe (student number 206514113), who is a MScConstruction Management scholar, has been granted permission to carry out an interview with me in my capacity as Durban Portfolio Manager of SOHCO. For any queries, please do not hesitate to call me.

Kind regards

A handwritten signature in black ink, appearing to read 'Muzi Majola', enclosed within a circular scribble.

Muzi Majola
Portfolio Manager – SOHCO



human settlements

Department:
Human Settlements
PROVINCE OF KWAZULU-NATAL

<i>Enquiries: Mr M. Zungu</i>	<i>203 Church Street</i>
<i>Ref: Letter of Authority – Ms NN Qwabe</i>	<i>Pietermaritzburg</i>
<i>Tel: 033-392 6434</i>	<i>3201</i>
<i>E-mail: Mbali.mhlongo@kzndhs.gov.za</i>	<i>website: www.kznhousing.gov.za</i>

To Whom it may concern
School of Built Environment and Development Studies
University of KwaZulu Natal
Mazisi Kunene Road
Glenwood
Durban

Dear Sir/ Madam,


RE: LETTER OF AUTHORITY – PERMISSION FOR INTERVIEW

I, Mr. M.O.S Zungu hereby confirm that I have granted permission to Ms Nombuso Nomfundo Qwabe 206514113 (student number) who is studying towards MSc Construction Management to interview me in my capacity as the Chief of Operations in the KwaZulu Natal Department of Human Settlements.

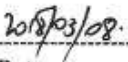
I trust that Ms Qwabe will successfully complete her MSc and I also commit that during the time of interview she will be afforded due respect and that she will diligently conduct her research as required at all times maintaining confidentiality and professionalism.

Yours faithfully,

Regards,



Mr. M.O.S. Zungu
Chief of Operations
KZN Department of Human Settlement



Date

19 April 2018

Ms Nombuso Nomfundo Qwabe (206514113)
School of Engineering
Howard College Campus

Dear Ms Qwabe,

Protocol reference number: HSS/0293/018M

Project Title: The role of the decision making and project management in fostering sustainability for intensive urban redevelopment through public housing initiatives in South Africa: A Durban case study

Approval Notification – Expedited Application

In response to your application received 11 April 2018, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



Professor Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Vittorio Tramontin
Cc Academic Leader Research: Dr Randhir Rawatlal
Cc School Administrator: Ms Nombuso Dlamini

Humanities & Social Sciences Research Ethics Committee

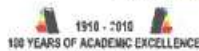
Professor Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/3580/4657 Facsimile: +27 (0) 31 260 4800 Email: ximban@ukzn.ac.za / smymam@ukzn.ac.za / mohunp@ukzn.ac.za

Website: www.ukzn.ac.za



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E MAIL: firstmetro@fmhc.co.za

6th March 2018

To Whom it may concern
School of Built Environment and Development Studies
University of KwaZulu Natal
Mazisi Kunene Road
Glenwood
Durban
4041

Dear Sir/Maddam

Letter of authority – permission for interview

This letter serves to confirm that Nombuso Nomfundo Qwabe (student number 206514113), a MSc-Construction Management scholar, has been granted permission to carry out an interview with me in my capacity as Projects Administrator of First Metro Housing Company.

For any queries, please do not hesitate to call me.

Kind Regards

**LESLIE BEHRENS
PROJECTS ADMINISTRATOR**



human settlements
Department:
Human Settlements
PROVINCE OF KWAZULU-NATAL

203 Church Street, Pietermaritzburg, 3201, Private Bag X 9157, Pietermaritzburg, 3200
Tel: +2733 392 6418, Fax: +2733 392 6518, Cell: 072 583 2609, E-mail: Lawrence.Pato@kzndhs.gov.za,
Web: www.kzndhs.gov.za

To Whom It May Concern

Please be advised that Nombuso Nomfundo Qwabe, student number 206514113 a Master of Science (Construction Management) candidate at the University of KwaZulu-Natal has been granted permission to conduct interviews with the department's Social Facilitators and myself in aid of her research.

For further information please contact me on lawerance.pato@kzndhs.gov.za.

Kind Regards,

A handwritten signature in black ink, appearing to be 'L. Pato', written over a dotted line.

Mr. L. Pato

Chief Director: Sustainable Human Settlements

DATE: 2018-03-09



Association of Schools of Construction of Southern Africa

The Eleventh Built Environment Conference

6 - 8 August 2017, Durban, South Africa

Conference Proceedings



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Towards sustainable human settlements in South Africa: emerging approaches through a case study analysis

Vittorio Tramontin¹, Nombuso Nomfundo Qwabe²
¹ Tramontin@ukzn.ac.za, ² missnqwabe@gmail.com
University of KwaZulu-Natal, Construction Studies
Programme, Howard College Campus, Durban 4041,
+27(0)312601771, +27(0)745897223

ABSTRACT AND KEYWORDS

Purpose of this paper

The purpose of this paper is to analyse the emerging discourses around low-cost housing strategies in the South Africa context and to investigate two exemplary case studies reflecting the two divergent models.

Design/methodology/approach

The methodology is based on the critical review of the current challenges and new emerging formal low-cost housing strategies and models, and on the empirical investigation of two exemplary case studies through focus group interviews with inhabitants and the manager of local government's Department of Human Settlements.

Findings

The desired target of creating integrated human settlements in South Africa has not been reached through the housing policies and delivery models implemented so far. Two new discourses are currently advancing: intensive urban consolidation linked to overarching strategies of urban regeneration, and extensive development through mega-projects of mixed-income housing. The interviews highlighted that low-income inhabitants of the intensive redevelopment in an urban environment highly benefitted from the proximity to social and economic centres and this is to them a more important factor than a better quality of physical housing environment that new green-field projects can provide.

Research limitations/implications (if applicable)

The study focus on two exemplary case studies in the area of Durban. The findings open the research to further studies oriented to investigate how to manage effectively in the construction process the transition towards principles of sustainability for South African human settlements, also through new housing policies and delivery models.

Practical implications (if applicable)

The findings of the study can stimulate further development of policy initiatives towards integrated, sustainable and resilient human settlements in South Africa.

What is original/value of paper. The paper compares and contrasts possible benefits and barriers associated to the two opposite emerging discourses around the current low-cost housing paradigm in the South African context, through the analysis of two exemplary case studies.

Keywords: Sustainable Human Settlements, Urban Regeneration, Intensive Urban Consolidation; Extensive Development; Mega-Projects.

1. INTRODUCTION

The 2030 Agenda for Sustainable Development highlights the importance of making cities and human settlements inclusive, safe, resilient and sustainable as one of the Sustainable Development Goals (UN, 2015). In particular, the access to adequate housing is considered critical to improve the living conditions of low-income groups and allow them to advance socially and economically. This issue also brings to attention the need for accessing basic services and appropriate energy infrastructure to fulfil the requirements of adequate living conditions.

In developing countries, such as South Africa, these challenges affect a large part of the population. In 2015, 14.4 percent (%) of the South African households were living in state-subsidised dwellings, whereas 14.1% lived in informal houses and 6.9% in traditional dwellings. With an unemployment rate of almost 27%, poverty and fragility of low-income groups remain among the most serious concerns for the country (Stats SA, 2016).

Since 1994 the South African Government has acknowledged the importance of ensuring the access to adequate housing as a basic human right. Section 26 of chapter two of the Constitution of South Africa states in fact that "everyone has the right to have access to adequate housing" (Gov SA, 1996), in line with the article 25(1) of the United Nation Universal Declaration of Human Rights of 1948. Consequently, in the last two decades several policies have been issued by the South African Government to promote the achievement of this target. However, obsolete planning and design schemes, location far from economic opportunities, inadequate quality of subsidised houses and lack of amenities and community services have often prevented low-income households and human settlements from achieving targets of inclusion, safety and sustainability (Sutherland *et al.*, 2014; Turok, 2016).

The process of urbanisation has increased the challenge, resulting in the housing backlog continuing to grow (Ibid.) and incrementing the pressure on the urban environment and low-income groups. Alternative land and housing planning and design schemes, different financing mechanisms represent some of the topics which are at the centre of the

debate to provide sustainable solutions to the growing population in urban areas and relevant housing needs (Ibid.; Western Cape DHS, 2013). Green and sustainable principles, looking holistically at environmental, social, cultural and economic impacts, should become the drivers for addressing the challenge of developing sustainable human settlements.

This paper provides a contribution to the debate by reviewing the current challenges in the South African context, and by analysing the emerging approaches around formal low-cost housing strategies, particularly through the lens of the preliminary findings from the empirical investigation of two exemplary case studies in the Durban area.

The following section provides a critical review of the current challenges faced in the South African context and of the new emerging approaches to the housing problem. Then, the methodology adopted for the study is explained in detail, followed by the assessment and discussion on selected case studies. Finally, conclusions and recommendations are proposed.

2. FROM HOUSING PROVISION TO SUSTAINABLE HUMAN SETTLEMENTS

The urbanisation level in Africa is projected to rise from 40% in 2010 to 50% around 2035 and 58% in 2050 (African Development Bank, 2011). Urbanisation has the potential to offer better economic opportunities to low-income groups migrating from rural areas. On the contrary, unmanaged growth of cities is currently having negative environmental, health and social impacts, increasing the pressure on African cities, which need to develop new urban paradigms.

In South Africa, urban population is growing and is expected to exceed 70% of the entire population of the country by 2030 (UN, 2014). The increasing concentration of population in cities, particularly low-income groups, and consequent economic, social and environmental impacts pose massive challenges in terms of housing, infrastructure and basic services, but also food, education, health and resource conservation. The consequent risk is the persistence of poverty, inequality, social exclusion and spatial segregation while cities grow due to the migration of low-income groups (UN, 2016). The New Urban Agenda, released through the Habitat III Conference in 2016, is oriented to face these challenges globally by readdressing “the way cities and human settlements are planned, financed, developed, governed and managed” (ibid.: 1) in a coordinated and integrated manner. The implementation of the New Urban Agenda will contribute to the implementation of the 2030 Agenda for Sustainable Development and its specific goal aimed at making cities and human settlements inclusive, safe, resilient and sustainable.

According to recent figures, South Africa’s housing backlog still stands at 2.1 million of units, decisively more than the estimated deficit of 1.5 million houses in 1994 when the Government started formal subsidised housing programmes (Tomlinson, 2015). This occurs although the Government has provided since 1994 2.5 million subsidised houses and 1.2 million serviced sites, with a significant increase of the housing subsidy

over this period and an escalation of state spending on housing and community amenities from 1% to 3.7% of GDP (Ibid.). These numbers indicate that South African cities cannot keep up with the current demand for housing, at least not using traditional housing models and delivery methods.

The urban population living in informal settlements decreased from 17% in 2002 to 11% in 2014. Nevertheless, the percentage of households living in informal dwellings has only decreased slightly from 13.6% to 13.1% (Stats SA, 2016). This mismatch is likely to depend on increases in households living in informal dwellings in the backyards of other dwelling types. Also, the number of informal settlements has increased significantly in the same time period (from 300 to 2225) (Tomlinson, 2015), growing faster than the rate of low-income housing delivery. This makes new approaches to the relationship and integration between formal and informal city necessary, in order to accept the informal sector as an important component of urban planning in South African contemporary cities.

Informal settlements, despite unsanitary and insecure living conditions, are generally formed in areas that offer a strategic location for low-income groups to access better economic opportunities and favoured community networks (Turok, 2015a). Extreme measures of forced eviction and demolition of shacks in urban areas, adopted in the past as “legitimate” to address the goal of eradicating poverty and the housing backlog, were mostly unsuccessful and, on the contrary, a proliferation of informal settlements in peri-urban areas has occurred (Sutherland *et al.*, 2014). More recent policies have generally rejected top-down approaches of eviction and relocation of inhabitants of informal settlements far from their location, unless under exceptional circumstances. Resettlement, if necessary (e.g. in case of hazardous site conditions), should on the contrary be a last resort and follow a bottom-up approach planned and implemented in agreement with the community (DHS, 2009a). Since as early as 2004, therefore, the South African government recognised the importance of in-situ upgrading of informal settlements as an overt target of the “Breaking New Ground” (BNG) policy (DHS, 2004). The government launched therefore the Upgrading Informal Settlements Programme and associated grant money to assist municipalities with upgrades. In order to better support the implementation of the programme, the Department of Human Settlements designed the National Upgrading Support Programme in 2010, which is oriented to provide guidance, practical tools and assistance to municipalities in the process which should be based on a participatory approach. However, given the growth in the number of informal settlements, the inherent complexity of upgrades and the commitment required by all the stakeholders involved, some communities have had to fight for much time before getting upgrades (Bosworth, 2016).

The increasing number of informal settlements also relates to the inefficiency of the policy and model for formal low-cost housing delivery in sustaining the growing urbanisation. The Reconstruction and Development Programme (RDP) for housing was initiated in 1994 as a strong state-driven large-scale formal housing delivery programme through the provision of state subsidised housing to address inequality and housing

backlogs, following the principles set out in the White Paper on Housing (Sutherland *et al.*, 2014). Typical RDP settlements are low-density developments with detached single-storey units, built generally on peripheral, cheap and available land, with the subsidy allocated for the construction of the top-structure of the unit. However, the houses have often been found of sub-standard quality, not complying with the building regulations and serviced by poor infrastructure making inefficient use of water, energy and other resources (Ibid.; Lodge, 2003; NPC, 2012). Settlements were generally located on the urban outskirts and isolated from social services and livelihood opportunities, therefore not producing sustainable neighbourhoods, but creating mono-functional settlements (Turok, 2014) and increasing the exclusion and spatial marginalisation of low-income communities (Sutherland *et al.*, 2014; Turok, 2016). In 2000, in a judicial challenge known as “Grootboom ruling” the Constitutional Court contended that post-1994 South African housing policy was not meeting the right to housing as protected in the Bill of Rights, and then a review of the policy was claimed as necessary (Huchzemeyer, 2011). However, shifts in policy do not always correspond to meaningful implementation in practice, which requires a greater commitment at all levels from the actors involved in the process to effectively implement demanding measures (Ibid.).

The review of the national housing programme in 2004 led to the already mentioned “Breaking New Ground” policy, which adopted a more holistic approach to housing and should have shifted the focus towards integrated communities, providing social and economic facilities (Sutherland *et al.*, 2014). However, despite the more integrated and holistic underpinning philosophy, housing has continued to be provided mostly as poor-quality construction and “physical shelter rather than part of an integrated human settlement with access to jobs, amenities and community services” (Turok, 2016: 14). Moreover, the new National Housing Code of 2009 highlighted the lack of any environmental criteria in the common low-cost housing practice and stated that energy consumption patterns of low income households have emerged as one of the most influencing factors to the national electricity demand (DHS, 2009b). Houses and settlements have generally been designed without consideration of basic passive design criteria and energy efficient principles, which have the potential to offer significant benefits to low-income households in terms of energy savings and better indoor comfort. The new National Housing Code however includes only a few qualitative energy saving criteria, in the form of suggestions and not specific requirements. Also, the new South African regulation on energy usage in buildings (SANS 10400-XA) does not provide specific requirements for low-cost houses, which, on the contrary, should be addressed through a specific approach due to the critical socio-economic implications.

A new more articulated housing policy has been promised since 2010, but it has taken longer than expected (Turok, 2014). Current discourses revolve around two opposite approaches to accommodate the population growth: extensive development or intensive urban development (Turok, 2016). The extensive approach focuses on planned urban extensions, new satellite cities (Ibid.) and mega-projects, incorporating mixed use and mixed

income housing, such as Cosmocity in Johannesburg and Cornubia in Durban (Sutherland *et al.*, 2015). However, some critics mentioned the risk for mega-projects, being built on cheap peripheral land, of reinforcing urban fragmentation and exclusion (Turok, 2015b).

Intensive urban development, which includes upgrading informal settlements, can be achieved through infill projects on vacant, better located land, which may also incorporate incremental housing schemes, and higher density redevelopment of existing buildings aligned to an overarching plan of urban regeneration. Higher density and participatory processes in decision making, planning and design are important aspects (Sutherland *et al.*, 2014; Turok, 2016; Tomlinson, 2015; Boyco and Cooper, 2011) which can play a key role in both intensive and extensive approaches. The new target of the government seems therefore to shift from the provision of housing to a more in-depth scope of ensuring that low-income households have easy access to economic centres (Turok, 2014). This seems to reflect an increased interest in the socio-economic sustainability of the human settlements.

The following sections describe in detail the methodology followed for the study and analyse two exemplary case studies in the area of Durban (KwaZulu-Natal province) which represent two initiatives reflecting the two contrasting approaches. The analysis is oriented to investigate in more depth possible benefits achieved by inhabitants in terms of sustainability in order to face the challenges highlighted through the literature review.

3. RESEARCH APPROACH AND METHODS

The methodology combines a theoretical approach with a case study method, which includes an empirical investigation based on a qualitative approach through observation and focus group interviews.

The in-depth review of the literature has provided an overview of the main challenges faced in South Africa in relation to the need for shifting from the concept of housing provision for low-income groups to the creation of integrated, sustainable, inclusive, safe and resilient human settlements. The review has also argued the main discourses emerging from the current debate around the topic.

In light of these findings, the analysis of two case studies in the Durban area, representative of the two opposite discourses emerging from the literature, has been utilised to highlight possible benefits and challenges related to the two different models in respect to sustainability implications, particularly from an inhabitant perspective. The case study approach has been adopted being an empirical inquiry able to investigate a phenomenon within its real life context, providing multiple sources of evidence (Yin, 1994). The case study paradigm assisted in providing a more in-depth and contextualised understanding of some of the issues emerged through the literature review.

The case studies were carried out and analysed through primarily a social sustainability lens, which also has significant implications in terms of

economic impact on communities and households. According to Berardi (2013), the most overlooked dimension of the concept of sustainability is the social aspect. The sustainability of buildings is often measured by ecological factors, however this evaluation is limited to the physical boundaries of the building, and it is mainly interpreted from the environmental perspective. As a result, sustainability assessment methods have been accused of reducing the sustainability of a building to the functioning of individual environmental criteria (Conte and Monno, 2012). Perhaps the main challenge to social sustainability assessment is that people perceive buildings and their impact in various ways. A number of stakeholders are part and parcel of the development process of a settlement, which implies different points of view in sustainability priorities and the request for more intense participatory processes.

The social sustainability aspect of human settlements development is largely enforced and entrenched by the Habitat III New Urban Agenda, Common African Position for Habitat III and UN-Habitat Sustainable Development Goals. While analysing the case studies, this research looked primarily at the following aspects of social sustainability: end user satisfaction with physical structure of houses and settlement; proximity to economic opportunities and amenities; safety; transportation-related issues for inhabitants; end-user involvement in the development of the settlement; comfort and quality of life with the possibility of expansion from those aspects expressed by participants.

The case study analysis was conducted through an empirical field investigation involving observation on site and semi-structured interviews with focus groups of fifteen participants on each of the two selected sites. The provincial Human Settlements Manager was involved in the discussions and interviews. The approach of focus groups was utilised to attain a deeper understanding of the qualitative aspect of what is happening on the ground.

From the findings from the literature review and the case study analysis, possible suggestions have been derived to contribute to the debate.

4. CASE STUDY ANALYSIS AND DISCUSSION

The preliminary findings of the analysis of case studies, which is part of a broader research, are reported. This preliminary study serves to scratch the surface of intensive and extensive development and their impact on sustainability as per the perception of the end users, particularly from a social perspective and relevant economic implications.

The case studies reflect two different approaches that the South African government seems to be exploring in terms of human settlement planning and delivery. The case studies are firstly presented in the following sections, then the results of the empirical investigation are discussed.

4.1 Cornubia project

The first case study is the Cornubia megaproject development, which is a public-private partnership between the eThekweni Municipality and Tongat Hullet Group and is located in the northern development corridor of eThekweni Municipality, 15 km south of King Shaka International Airport and Dube TradePort megaproject. The project consists of a large housing component, commercial and light industrial development, and social facilities (Department of Human Settlement, 2014). In its original proposal the development aimed to provide 50,000 homes of which 20,000 were to be subsidised housing, 90 ha of industrial platform, over 1 million m² of commercial space and 400 ha dedicated to a rehabilitated open space system (Tongaat Hulett, n.a.).

The Cornubia project constitutes a representation of extensive development in the form of large-scale, mixed-use and mixed-income green-field human settlement projects which mirror a 'megaproject' approach to addressing the housing crisis in South African cities. This approach emerged from the BNG Policy with the specific intention of addressing housing backlogs and persistent urban segregation. These mega-projects are promoted as having the potential to drive economic growth, create employment opportunities, restructure the pre-1994 space economy and ensure that benefits trickle down to the poor and disadvantaged (Sutherland et al., 2014). Instead of mere low cost settlements, these projects aim to also establish industrial and commercial hubs and various options in housing typologies and income groups that are targeted. Essentially, the focus seems to be to create what is often envisaged by private and public partnerships as 'better living conditions', which however consider secondarily the already established economic and social centres for low-income groups.

4.2 The redevelopment of an existing building in Durban inner city

The second case study is related to the approach of intensive urban development, based on the reuse of an existing building block located in the Durban city centre. The overarching philosophy in this case is that more intensive growth and human settlement enhancement can be realized through infill projects on vacant land or higher density redevelopment of existing inner city buildings (Turok, 2016). The arguments for intensive development vary from the efficient use of land and infrastructure to its potential to consolidate existing cities while also revitalising and regenerating older urban districts (UN-Habitat, 2014).

4.3 Research Findings

The dilemma between intensive and extensive approach to urban settlement development is essentially related to a challenging quid pro quo between preparing for new urban growth on green-field sites, versus revitalising older urban areas, including the upgrading of informal settlements.

In regards to end-user satisfaction with the physical environment of houses and settlements, the participants in Cornubia were seemingly pleased with the physical structure and housing typologies afforded to them. A majority of the participants felt their houses afforded them flexibility and space which contributed to their general comfort.

The participants in the inner city however expressed their dissatisfaction with the high density levels, which negatively contributed to their perception of safety and general comfort. What was flagged as the biggest issue in this regard was the limited space and close proximity of neighbours and restrictions such as the lack of playgrounds and access to public spaces. However all the participants stressed that the opportunities and benefits of being located within the inner city far outweighed any reservations they had about the physical environment of their house and building block. This factor supports the evidence found in a study conducted by the Centre on Housing Rights and Evictions, which also indicated that the greater majority of residents residing in the inner city would rather tolerate poor living conditions than moving to the urban edge (Housing Development Agency, 2013).

What can be gathered from this is that the upgrade of the quality of houses has provided benefits to the Cornubia settlement's beneficiaries. This is a positive turn from the past which saw RDP settlements experience deficits in building quality and other deficiencies which often provoked growing community unrest (Turok, 2016).

In terms of transportation-related issues and proximity to economic centres, the study found that inhabitants within the inner city redeveloped building had constant and considerable access to economic opportunities and amenities, with 80% of the participants having found permanent employment and small business opportunities since moving into their flat. Amenities such as schools, shops, public health care facilities as well as cultural and religious sites were all walking distance away. This meant drastic savings on cost and time spent on daily travelling.

Participants in Cornubia were all highly vocal on being subjected to burdensome (time and cost) commutes on unreliable transport networks on a daily basis. Majority of the participants stated that keeping the previous employment they had before moving to Cornubia became financially unviable, therefore they strung on the hope of attaining employment opportunities from the development of commercial and industrial spheres in Cornubia in the future. An astounding 60% of participants considered forfeiting their houses for the opportunities and conveniences that accompanied the location of their former informal settlements, as some of their previous counterparts had done. The participants also expressed their dissatisfaction with the break in social ties (supporting structures, cultural and religious aspects) as well as the additional financial and administrative expenses that came with being forced to change school for their children due distance and cost implications.

What can be gathered from the above is that location of settlements and relevant economic and social implications are critical to beneficiaries. Therefore it is important to consider that, according to Turok and Borel-

Saladin (2015), less than a third of RDP homeowners have a job. Also, the average commuting times for black households have increased from 88 to 102 minutes a day over the last decade because of where new housing developments have been constructed and the slow progress with public transport reforms (Kerr, 2015).

End-user engagement and participation in the development of both projects was limited to the final stages according to those participants who were engaged with the initial handover process. Therefore, possible input in terms of requirements and needs coming from the final users and beneficiaries, which could positively affect planning and design choices, was not considered at all.

In response to the interviews and observations on site, the provincial Manager of the Department of Human Settlements addressed the difficulties of developing inner city human settlements at scale. The Manager mentioned that there were at least sixty dilapidated buildings in Durban, twenty-six of which are located within the inner city. However he mentioned redevelopment is restricted by the following factors:

- Some of these buildings were either occupied by vagrants or partitioned into cubicles by slumlords for cheap accommodation housing criminals and illegal immigrants. They had achieved this by having taken advantage of loopholes in land legislation to invade land owned by absentee landowners. After residing on the land for some years, the land invaders claimed the right to reside on the land arguing that the Interim Protection of Informal Land Rights Act No. 31 of 1996 protects people with insecure tenure from losing their rights to, and interest in, land pending long-term land tenure reform. Sadly, failure by land legislation to resolve these land disputes have created a deadlock situation where neither the landowner nor the land invaders can win outright unless they both compromise.
- The financial model used by the government in attempt to purchase buildings within the inner city was at times not viable. They found it difficult to compete with the private sector in bids and were often outbid. In some cases the refurbishment requirements of buildings made it financially unfeasible to purchase buildings.
- Silo approach which makes cross-sector and cross-departmental collaborations difficult in the quest to achieve inner city human settlement development. The process of purchasing buildings is challenging, lengthy and requires the collaborative effort of a number of state institutions.
- Land availability and financial restrictions were unveiled as the biggest barrier to the development of human settlements within the inner city. A considerable amount of well-located vacant land is also subject to land claims. In the Durban context, plans for urban restructuring and many projects on well-located land were designed prior to the announcement of the land restitution process. As a result of this land originally identified for the development of housing within the inner city had to be returned to its owners. In some cases the process of dealing with land claims has slowed development.

5. CONCLUSIONS AND RECOMMENDATIONS

The growing urbanisation in South Africa and the migration from rural areas to cities pose challenges for the development of sustainable communities in urban environments, increasing the pressure on low-income groups. This paper has reviewed the main challenges currently related to the necessary shift from housing provision to the creation of sustainable human settlements. The analysis of two case studies in the Durban area expanded on it and discussed possible benefits and barriers related to contrasting emerging formal housing delivery models based either on intensive urban consolidation or extensive development.

The findings suggest that intensive urban development through the reuse of an inner city building has highly benefitted low-income inhabitants in terms of the proximity of economic and social centres. However, there are structural, financial and procedural barriers related to the redevelopment of existing buildings in the inner city that local governments are currently encountering. The better physical housing environment provided by a new mega-project such as Cornubia is apparent, however inhabitants complained the additional financial pressure due to the distance from economic opportunities and transportation issues, employment loss due to relocation, and the dissatisfaction with the break in social ties.

The tension between formal housing delivery and the incorporation into the urban fabric of informal development is one of the core aspects of the debate around urban growth and relevant housing needs in South African cities. In addition to informal settlement upgrading, medium-to-high density intensive urban redevelopment solutions based on infill housing, incremental housing schemes and participatory approaches offer interesting sparks for future studies.

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