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Exploring food security as a catalyst for the adaptive reuse of architecture

Towards an agricultural hub in the inner city of Durban

Tegan Wright
212503292

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Master in Architecture

FINAL SUBMISSION

DECLARATION

Submitted in fulfilment of the requirements for the degree of Master of Architecture, in the Graduate Programme in Architecture, University of KwaZulu-Natal, Durban, South Africa.

I, Tegan Wright, protocol reference number: HSS/1071/018M, hereby declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. It is being submitted for the degree of Master in Architecture in the faculty of Humanities, within the school of Built Environment & Development Studies, KwaZulu-Natal, Durban, South Africa. None of the present work has been submitted previously for any degree or examination at any other university.



Tegan Ashley Wright

(212503292)

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Date

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DEDICATION

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ABSTRACT

Currently over half of South Africa's population lives in urban areas and this number is projected to continually increase. As a result, cities are exploring sustainability and resilience as a method for future development. Zero Hunger is one of the most important Sustainable Development Goals established by the United Nations. Although the availability of food in Durban is abundant, issues of accessibility, stability and utilisation are evident as a result of socio-economic, environmental and built form adversities. In conjunction, urban decay in the inner city is a growing challenge, fuelled by the impact of a lack of transformation, specifically in postmodern and apartheid city planning.

The aim of this dissertation is to explore aspects of food security as a generator for revitalising and regenerating obsolete buildings. This research uses the theory and concept of resilience as a primary base for establishing a link between issues of food security, and the decay and underutilization of existing buildings. Previous works and current policies regarding food security in South Africa are outdated and documentation on resilience in Durban focuses on the peri-urban and rural domains failing to address these issues within inner-city environments.

The research for this study follows a qualitative approach. Relevant literature and precedent studies are investigated to determine functions for food security and strategies for adaptive reuse. Local case studies are explored, through personally conducted interviews with local fresh produce traders, and project leaders involved with inner city regeneration, as a means for understanding these concepts in the context of Durban.

The research shows that dimensions of food security can be linked to various elements of Durban's socio-economic, environmental and built-form capacity. In addition, underutilised space can be repurposed as a platform for localised jobs, employment and skills, imperative for improving food security. This calls for an agricultural hub which can facilitate functions for business startups, small to medium agricultural producers, informal fresh produce traders and people vulnerable to food security for an improved quality of life.

PART 1

PART 1

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CHAPTER 1

BACKGROUND RESEARCH ON ISSUES

1.1 INTRODUCTION

1.1.1 Background

Currently, 460,000 people move every day through South Africa's largest trading and transportation hub, Durban's Warwick Junction. It has been estimated that 80,000 traders sell their goods here daily (Dobson & Skinner, 2009). The Early Morning Market, which has been in existence for more than 100 years, is one of the oldest markets in the city, with third- and fourth-generation traders. These entrepreneurs of the informal economy create tourism, activate public space and economic opportunity in Durban. The traders supply fresh produce and play a key role in ensuring food security for inner-city people.

In this context, food security can be defined as "Physical, social and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preferences for an active and healthy life." (Moyo, 2007) In conjunction, this activity is of vital importance to the traders, as it generates their main source of income.

Warwick junction is located in Durban's inner city, which in recent years has become subject to urban decay. Urban decay in the inner city is a growing challenge, fuelled by the impact of lack of transformation, specifically in postmodern and apartheid city planning. For many years, the city created an illusion for rural migrants of a vibrant place of productivity and plentiful opportunity, but in reality, it yielded increased poverty, crime, congestion, high levels of pollution and the conversion of natural ecosystems, which have all resulted in today's image of a city that is stagnant and in a state of decay (Potter, 1992).

In response to the urgent need to prioritise the regeneration of the inner city, Durban's Inner eThekweni Regeneration and Urban Management Programme (iTRUMP) was established in 1995. In addition, Asiye eTafuleni (AeT) was founded in 2006, whereby regeneration was focused in and around Warwick Junction for informal traders.

The study of their activities will provide input into the decay and obsolescence of buildings in the city and aid in determining the appropriate site for this study. An exploration of adaptive reuse . which refers to the process of using existing city buildings within a social, urban or economic crisis for transformation . seeks to reverse urban decay by establishing resilience through the theme of food security. Research into these critical issues for the city aims to explore solutions for resilient food security and provide a platform for those involved in agriculture to gain the necessary skills and knowledge to assist them in finding jobs and becoming entrepreneurs. This will ultimately create an opportunity for them to improve their quality of life.

1.1.2 Motivation/Justification of Study

Motivating this research is a personal interest in how the change in cities has led to their current state and how it is possible to transform existing space by addressing the fundamental dimensions of food security.

Currently, 62% of South Africa's population lives in urban areas (Worldometers, 2018). The United Nations (UN) projects this has increased further, as more people begin migrate to urban centres in search of job opportunities, education and an improved livelihood.

Urban fringe nodal expansion and lack of investment have impacted upon South African cities, resulting in inner city urban decay. The resilience framework for Durban focuses on the resilience of the urban fringes of the city, which are usually rural settlements; this means that solutions do not fully address the needs of inner-city communities.

The challenges of city communities include unemployment and poor living conditions, considered as the most significant contributors to food insecurity. The successful adaptation and transformation of Durban depends on addressing these challenges.

This calls for an architectural approach that both addresses the dimensions of food security and provides employment and improved quality of life for inner-city communities. The proposed agricultural hub aims to achieve this by transforming dimensions of food security related to business start-ups, small-scale agricultural production and informal fresh produce retail, thereby contributing to improved livelihoods and urban regeneration.

1.2 DEFINITION OF THE PROBLEM, AIMS & OBJECTIVES

1.2.1 Definition of the problem

Urban resilience

Resilience is a relatively new concept that is necessary for sustainability. It is suggested that resilient cities are able to adapt and transform in the face of adversity. Durban, like other South African cities, is subject to economic, social, political and environmental stresses. An exploration of the Cities Resilience Framework and Durban's Resilience Strategy will enable the creation of a platform to examine the link between resilience and architecture in inner-city Durban, thus allowing various city systems to resist these stresses.

Food insecurity

While South Africa is food secure at a national level, with experience of hunger having fallen since 2002, there is more flux into and out of hunger (Altman et al., 2009). At a household

level, there is worrying evidence in both urban and rural areas of a high prevalence of stunting, wasting and micronutrient deficiencies, especially among children, that is related to socio-economic factors (Drimie & McLachlan, 2013; Albert, 2009).

Urban decay

The state of decay in Durban's inner city can be attributed to the industrial movement, racial and political grievances, and apartheid city planning.

These factors have resulted in the slow decline of the inner city, as there is a dearth of basic services to support the population. This research aims to address these issues through the adaptive reuse of buildings within the inner city, providing functions that can address basic needs and services, as well as generate income for the urban population.

1.2.2 Aims

The aim of this research is to use the theory of resilience to explore how food security related to architecture can revitalise and improve inner-city Durban. Through the adaptive reuse of derelict and obsolete buildings in the inner city, this research looks to repurpose underutilised spaces for food growth, research, skills development and living.

1.2.3 Objectives

The objectives of this study are:

1. To determine the main issues surrounding food security in South Africa;
2. To explore how addressing these issues can provide suitable responses for generating architecture;
3. To determine how the dimensions of food security can be a generator for adaptive reuse of architecture;
4. To design an agricultural hub and living space as a platform for localised jobs, employment and skills for the disadvantaged in inner-city Durban; and
5. To develop a platform for new adaptive models relating to socio-economic, environmental and architectural resilience in South African cities.

1.3 SETTING OUT THE SCOPE

1.3.1 Delimitation of research problem

By researching the inner city, exploring key concepts and interacting with the traders of the Warwick markets, the core issues that give validity to the research can be verified.

Firstly, interrogating food security in Durban will provide a clear understanding of the link between the %arm+, where food is produced, and the %market+, where food is bought, sold and consumed. Secondly, exploring the relationship between food markets and culture in Durban will provide resilient solutions to food security. Lastly, it must be established that the adaptive reuse of architectural space benefits the creation of inclusive, resilient communities. The exploration of these issues, as well as other social, economic, logistical and environmental considerations will provide a deeper understanding for possible solutions and steps to take going forward.

Furthermore, it is necessary to explore the issues of postmodern and apartheid city planning, which have contributed to the problem, in order to ensure a better understanding for a revitalised city. Designing a building capable of addressing the cultural and environmental aspects of resilience will ensure a sustainable solution through food security, research, skills development and job creation.

The rigour of this research is ensured by the provision of a number of relevant, appropriate, and trustworthy sources bound to the delimitations of this study, which also include:

1. Understanding the history of Durban: briefly covering the history of the city to provide a background for the causes of decay.
2. Delineating the purpose and strategies of food security to determine the primary issues and possible solutions already available.
3. Defining the people who will be involved in the research, who will include:
 - people involved in agricultural start-up businesses;
 - small to medium agricultural producers;
 - the Early Morning Market Traders of Warwick (for their contribution to food security and connection with formal and informal markets); and
 - people vulnerable to food insecurity (with the aim of uplifting and empowering communities that are involved in agriculture).

1.3.2 Definition of Terms

Some of the architectural, scientific and general terms commonly used in this research are briefly defined below:

- Adaptive reuse . The process of reusing an existing site or building for a purpose different to the one first intended for the structure.
- Aeroponics . A cultivation technique whereby a nutrient solution, in the form of a fine mist, is sprayed onto the roots of a plant that hang suspended in the air.
- Aquaponics . A system of aquaculture, in which the waste produced by farmed fish or other aquatic creatures supplies nutrients to plants that are grown hydroponically, a process that, in turn, purifies the water.
- Climate Change . A change in global or regional climate patterns, in particular from the mid- to late-20th century onwards, attributed largely to increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
- Food Security . Physical, social and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preferences for an active and healthy life.
- Hydroponics . The cultivation of plants with their roots growing in liquid nutrient solutions rather than in soil; this is soilless growing conditions for plants.
- Urban Resilience . The capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow, no matter what types of chronic stresses and acute shocks they experience.
- Sustainable . A consumption method that leads to a resource not being depleted or becoming damaged.
- Urban Agriculture . Urban Agriculture (UA) is an industry located within or on the edge of a town, city or metropolis, which grows and raises, processes and distributes, a diversity of food and non-food products, using largely human and material resources.
- Vertical farming . The practice of producing food and medicine in vertically stacked layers, vertically inclined surfaces and/or integrated in other structures.

1.3.3 Stating the Assumptions

This dissertation is based on the following assumptions:

- . There are other dimensions to food security, in addition to availability of food.
- . Food security initiatives can provide sustainable solutions to agricultural activities in the city of Durban.
- . The dimensions of food security are linked to issues that contribute to urban degradation.
- . Urban degradation is a problem in the city of Durban.
- . Urban revitalisation is a crucial step in developing resilient cities.
- . Issues associated with urban regeneration in the inner city environment are urgent.
- . Architectural space and form influences the processes of urban regeneration.
- . Architectural adaptive reuse can sustainably enhance and revitalise built form.
- . Food security issues that are related to architecture can revitalise urban space and empower local communities.

1.3.4 Hypothesis

Improving the dimensions of food security, through a resilience lens, can generate viable options for the adaptive reuse of architecture in the Durban inner city.

Key Questions

This research will address a primary question and secondary questions pertinent to the search for possible solutions to the problem at hand.

Primary Question:

How can food security become a catalyst for the adaptive reuse of architecture?

Secondary Questions:

1. Why is urban resilience essential for revitalisation in inner-city Durban?
2. What factors influence food security in South Africa?
3. How can food security contribute to the adaptive reuse of architecture?
4. How can the adaptive reuse of architecture play a role in uplifting and empowering agricultural communities?

1.4 CONCEPTS AND THEORIES

The following concepts and theories support and feed the generation of arguments that form the basis of this research. The framework for this research defines three theories:

- . Urban Resilience;
- . The Social Theory of Culture; and
- . The Architectural Theory of Linkage.

Theory of Urban Resilience

The primary theory for this research is resilience. Urban resilience can be defined as the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow, no matter what kinds of chronic stresses and acute shocks they experience+(RF 100 Resilient Cities, 2016).

This research will explore Durban's resilience strategy; extracted from the Rockefeller Foundation's 100 Resilient Cities Framework, as well as other locally produced works by the global design firm Arup on resilient cities in South Africa. Durban has produced six resilient levers for change as the core focus for all initiatives regarding city development (eThekweni Municipality, 2017). Some of these are:

- . strengthening local communities and building social cohesion;
- . improving the effectiveness of education and skills development; and
- . managing environmental assets more efficiently.

Once these levers have been critically interrogated, this will form the basis for exploring issues dealt with in this research. Two predominant themes that fall under the broader umbrella of sustainability . more specifically, of urban resilience . are food security+ and architectural adaptive reuse+. These themes form the conceptual focus of repurposing space towards food security.

Food Security

This research will critically interrogate documentation and publications that support the goal of zero poverty and hunger in cities, as well as locally written literature on food policies that relate to the struggle for food security in South Africa. Some of these include:

- . adaptive models of the UN's Sustainable Development Goals;
- . the eThekweni Municipality's *Food Security Theme Report*; and
- . the UN's Food and Agriculture Organisation policies (FAO 2017).

These documents call for new patterns for agriculture and food systems that will enable sustainable food production. They will assist in determining the main issues surrounding food security, with knowledge of the organisations that pioneer research and training, and also allow for a deeper understanding of the process of achieving food security.

Adaptive Reuse

Adaptive reuse deals with the issues of a changing city and a constantly shifting society. Over the years, society's needs may change due to economic, social, political or environmental factors.

For example, the purpose of a building, constructed to serve a specific purpose, becomes redundant over the years, due to rapid world changes. With economic constraints experienced in developing countries, it becomes evident that there is a lack of capacity in repurposing the building, so it falls into disuse and contributes to urban decay.

The concept of adaptive reuse in this context seeks to discover 'lost spaces' like these and provide them with a sustainable purpose that uplifts and enhances both the community and the environment. This research will explore local case studies of adaptively reused buildings in South African cities. Interviews with the architects, planners and end users of these projects will provide a local understanding of the principles for successful adaptive reuse. Investigating these two themes through the lens of resilience will form a strong basis for the proposed design.

Theory of Culture

The work of Roger Keesing will be interrogated. As a social anthropologist and linguist, he explores various themes in his article, *Theories of Culture*, about the ways in which human communities develop cultural patterns, what shapes diverse cultures and the works of other cultural theorists. Richard Dobson's book, *Working in Warwick*, which takes a look at the cultural history and background of markets in Warwick, will also be examined in terms of the 'connection culture' and its impact on local food production and consumption through the preservation of cultural food traditions.

Theory of Linkage

The theory of linkage is explored with reference to *Finding Lost Space: Theories of Urban Design*, a book by Roger Trancik, an educator and practitioner in urban design. Trancik examines the principles of spatial design, the linkage between objects and the formation of a city. He investigates how they are both directly or indirectly related to producing spaces in

between or to move from %a+ to %b+. This will be useful in terms of closing the gap between the %a+ and the %b+, which is an integral part of this research and the design concept.

The theory of linkage refers to an understanding of human and cultural aspects of physical space. It examines the difference between space and place. Space only becomes place when it is given purpose and context. The theory appraises how people require a system of reliable and sustainable places in which to develop themselves, their lives and their culture (Trancik, 1990).

It may be argued that, in modern societies, the ability to create place has been lost. Owing to urban sprawl, the growth of %lost space+ in Durban is a growing phenomenon that has resulted in dilapidated spaces in which crime, poverty and social injustice are prevalent.

Summary

The conceptual and theoretical aspects of this research will form the foundation for the researcher to better comprehend the resilience theories of systems that make a city and how these influence architecture and urban development. A more informed and contextual platform becomes developed, once the researcher reaches an understanding about resilience and its relationship to the implementation of food security, and the adaptive reuse of architecture. From this platform, a suitable design solution can be proposed that aims to verify the hypothesis of the research.

1.5 RESEARCH METHODS AND MATERIALS

The research findings will provide the foundation for a conceptually strong, effective and efficient design. All of the research, whether primary or secondary, was undertaken in order to provide answers to research questions that would assist in the creation of a clear framework, within which the proposed building would be designed.

1.5.1 Research Methods

The research method will be a mixed method data collection, through personal observations and interviews for selected case studies. This will be achieved once a consensual agreement between researcher and participant has been established, allowing for the validity and rigour of this research. Moreover, to ensure the dependability of this empirical research, the findings will be stable and consistent over an extended period of time and across conditions.

Data will be collected after the researcher has ascertained the intended participants' points of view, opinions and experiences, not only of the market, but also of their cultural connection to food and the city. To build architecture and cities that are resilient, it is imperative that data to be gathered through interactions with and the inclusion of the immediate community, to ensure that all stakeholders are given a platform for involvement.

The intended participants will have the opportunity to elaborate on how they are affected by inner city decay and neglect, as well as the role that food security plays in their lives. The consent and confidentiality of all participants are vital aspects that ensure their safety and privacy during this research process.

1.5.2 Primary Sources

Primary data collection will be conducted by the author. It will be analysed to determine conclusions that aim to provide a framework for addressing the problem statement of this research topic. Various methods will be utilised to collect primary data, including interviews and case studies, and empirical data collection in the form of observations. This data will be qualitative, through means of the exploration of interviews and case studies.

Focused Interviews

A variety of interviews will be undertaken for the purpose of data collection. These will be in the form of informal discussions carried out by the author. Furthermore, interviews will be conducted with market traders within Warwick Junction, specifically the Early Morning Market Traders. This will provide a better understanding of their personal opinions and

experiences. Discussions will also be held with architects, such as those at the Design Workshop SA, who have successfully reused buildings in the inner city. An interview will be conducted with Richard Dobson, the project leader at AeT. This will provide an understanding of the stresses to inner city systems and the relationship between regeneration, resilience, food security and informal trade.

**(See appendix A, B and C)*

Case Studies

The study of buildings with a similar typology, context or function is crucial to understanding the processes and requirements for creating appropriate solutions to future theoretical and design challenges. Local case studies will be observed in relation to architectural adaptive reuse and urban food markets.

To obtain a deeper understanding of the fundamental principles for their success, conversations with the management and/or professionals who designed and managed the facilities in question are included. Typology, context and function are among the parameters utilised to isolate the buildings and areas to be critically analysed in this research.

From this analysis, results and conclusions drawn from the data will prove useful in terms of designing spaces of similar stature and complexity.

Case Study 1: The Early Morning Market

Case Study 2: The Pixley House . Design Workshop SA

Observations

Empirical data in the form of observations, video footage and pictures will be collected. The content of these observations will involve the daily activities of the market traders, their interactions with other traders, commuters and members of the public. Data will also include observation and documentation of the proposed site, its current use and the activity around it, in order to gain a deeper understanding of the context.

1.5.3 Secondary Sources

In conjunction with primary research, secondary research will be conducted by the author. This comprises an extensive literature review and detailed precedent studies. The review is the largest component of the dissertation and explores both the problem statement and the key questions of the dissertation. The information will be collected through: a review of

books, journals and theses written by a variety of authors; the primary data from questionnaires, conversations and case studies; and from the internet.

Literature Review

The literature review will focus on the theory of urban resilience. Furthermore, it will critically analyse two themes: food security and adaptive reuse as initiatives for creating a resilient city for Durban. Various theories on culture and linkage will assist in exploring these themes.

The secondary data sources will include various published materials, namely: books, journal articles and internet pages.

Precedent Studies

An exploration of international architectural projects will be undertaken in order to understand principles of architectural design that lead to successful buildings with a similar typology or function. The following precedent studies will be looked at through journals, books and photos:

Precedent Study 1: SESC 24 De Maio . Sao Paulo, Brazil

Precedent Study 2: Sugar Hill Social Housing . Harlem, New York

Precedent Study 3: Fiat Lingotto . Turin, Italy

1.6 CONCLUSION

The purpose of this chapter has been to introduce a clear structure and framework for this dissertation. It provides the background to and methodology for the topic, and then determines the key aims and objectives for the examination of the outcomes of the research. The combined primary and secondary research findings will inform the outcomes necessary to formulating a brief for the proposed architectural intervention. The findings will assist in determining strategies for the intended user relating to site selection, spatial requirements and accommodation schedules, as well as other aspects of the design.

CHAPTER 2

RESILIENCE FOR INNER CITY CHANGE



Figure 2.1: Warwick Triangle – An Artistic Impression (Author, 2018)

URBAN RESILIENCE AS A CATALYST

“Resilience is based on the shifting relationship between scales and between autonomy on the one hand and connectivity on the other.” (Allan & Bryant, 2011).

2.1 INTRODUCTION

To obtain a better understanding of resilience, this chapter examines literature pertaining to the history, conceptualisation and theorisation of urban resilience, through the hypotheses of Crawford Stanley Holling, Brian Walker and David Salt, Carl Folke, and Michelle Laboy and David Fannon. Furthermore, the question of the role of resilience as a driver for sustainability and upliftment in inner-city Durban will be explored through a comparison of the Cities Resilience Framework, developed by Arup and the Rockefeller Foundation, with the Resilient Cities Strategy for Durban that has been developed by the eThekweni Municipality.

Three key lenses . socio-economic, environmental and built form . are then formed by investigating the various principles of urban resilience to obtain highly focused strategies of revitalisation that meet the needs of inner-city Durban.

Key contextual issues pertaining to these lenses will be utilised to develop specific principles for sustainable environments within the municipality’s vision. This will support the eThekweni Municipality’s assertion that Durban, by 2030 [will become] a socially equitable, environmentally sustainable and functionally efficient municipality that boasts its status as a gateway to Africa and the world+(eThekweni Inner City Local Area Plan, 2016).

2.2 URBAN RESILIENCE

A Base for Resilience Theory

An analysis of alternative dimensions to this theory enables a critical perspective for understanding the various aspects of resilience theory. A socio-ecological resilience theory was developed in the 1970s by C.S. Holling, a Canadian ecological scientist known for combining systems and ecological theories for practical application in the modern world.

Holling explores transformations that occur in human and natural systems, and how these work interdependently to enforce change. The scholar Carl Folke also examines a general lack of recognition of the essential link between ecosystems and the human social systems that we employ and depend upon. (Folke et al., 2010)

Holling defines resilience as, the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity

and feedbacks+ (Holling, 1973). This was developed to better understand the intimate connectivity between socio-ecological systems across various scales. He described these changes as economic, ecological, social and evolutionary.

In one study, *Resilience Thinking: Integrating Resilience, Adaptability and Transformability* (Folke et al., 2010), resilience is described as an interdependent relationship between humans and nature. Stresses placed on these systems and the repercussions of change effect networks reliant upon the functions and stability of others.

Over the past 45 years, this definition has changed, as socio-ecological systems have become more complex, comprising multiple sub-systems, each with several actors. Theorists are beginning to accept the notion that resilient systems are not only capable of adapting to chronic stresses and acute shocks, but can also transform themselves into systems that have improved through adversity.

Most literature and data on the concept and theories of resilience emphasise that the principles of robustness, vulnerability and risk are fundamental to the ability of systems to adapt and move forward from change. It can be critically argued that a gap exists in resilience theories, however, in that system attributes and principles are non-specific. Scholars had once expressed conflicting ideas about how these attributes could contribute towards sustainable development.

An interpretation is given in *Resilience, Adaptability and Transformability in Social-ecological Systems* on the reflection of these concepts in the adaptive cycles of complex, multi-scalar social-ecological systems (Walker et al., 2004). In the research, Walker addresses the evolution of the theory, which now measures the resilience of a system in terms of qualities defining its flow. Resilience, adaptability and transformability are three aspects determined as future paths for the resilience of social-ecological systems (Walker et al, 2004).

Dynamics of Resilience

Walker explores the relationship between resilience and adaptability, and resilience and transformability. The distinctions between the two are as follows: resilience and adaptability pertain to the dynamics of a system or a related set of systems, while transformability seeks to alter the nature of a system when structures make the system unsupportable. Adaptability refers to the capacity of actors in the system to influence resilience and manage this.

This interpretation of social-ecological system flows changes the focus from achieving optimal states in systems to their ability in the first instance to adapt through resilience for the improvement of current system states. (Walker et al, 2004)

In *Resilience Thinking: Integrating Resilience, Adaptability and Transformability*, Folke refers to resilience as the likelihood of a Social-Ecological System (SES), exposed to stresses, remaining stable while continually changing and adapting within critical thresholds. Secondly, this adaptability enables a SES to adjust its responses by changing external actors and internal processes, thereby allowing for continual growth along its current path within an existing stability domain (Folke et al., 2010).

Transformability refers to the ability to create new stability domains for development, a new stability landscape, and cross thresholds into a new development path. When ecological, economic or social conditions cause an existing system to become unsupportable, transformability looks at a system's capacity to create a new system (Folke et al., 2010; Pisano, 2012). This evolved resilience thinking aligns with newer theories on city resilience, as a deeper understanding of the complexities of cities has been acknowledged.

This notion can be explored by employing the concept of adaptive cycles, which seeks to explain system flow processes (Walker & Salt, 2006). This cycle passes through four phases: the %growth and exploitation phase+, the %conservation phase+, the %chaotic and release phase+and, finally, the %phase of reorganisation+

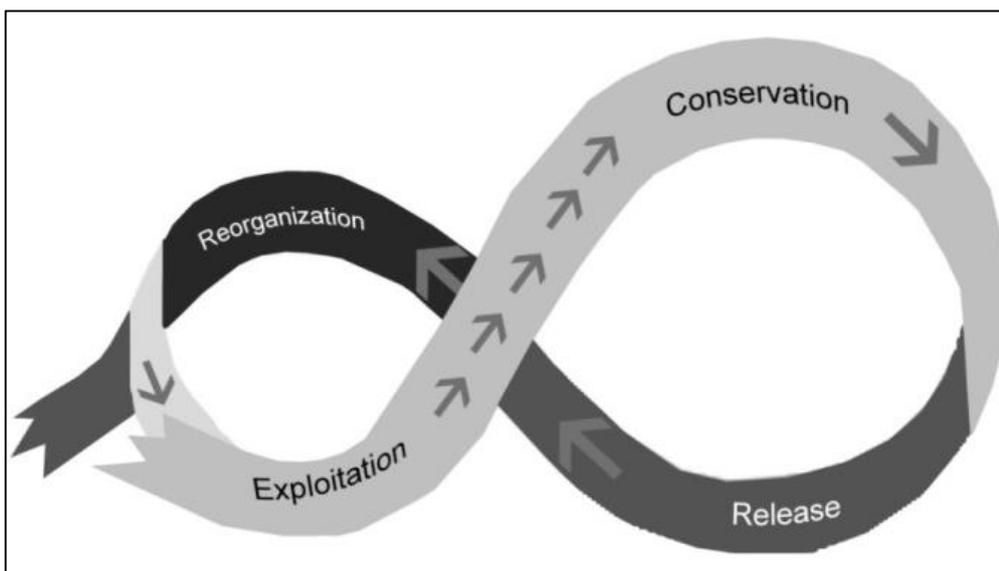


Figure 2.2: The Adaptive Cycle (Holling, 1973).

The front loop of the cycle is predictable, whereas the back loop is unpredictable. The concept of the adaptive cycle loop developed through observation and the realisation that system changes are not fixed and do not occur in regular cycles. They interact across multiple scales and these affect the dynamics of social-ecological systems. The scholar Holling concludes that the cycle is too general to be viewed as a testable hypothesis. Its value is as a metaphor to classify systems, order events and suggest specific questions and testable hypotheses that are relevant for understanding transformations in linked systems of people and nature.+(Gunderson, Lance & Holling. 2002)

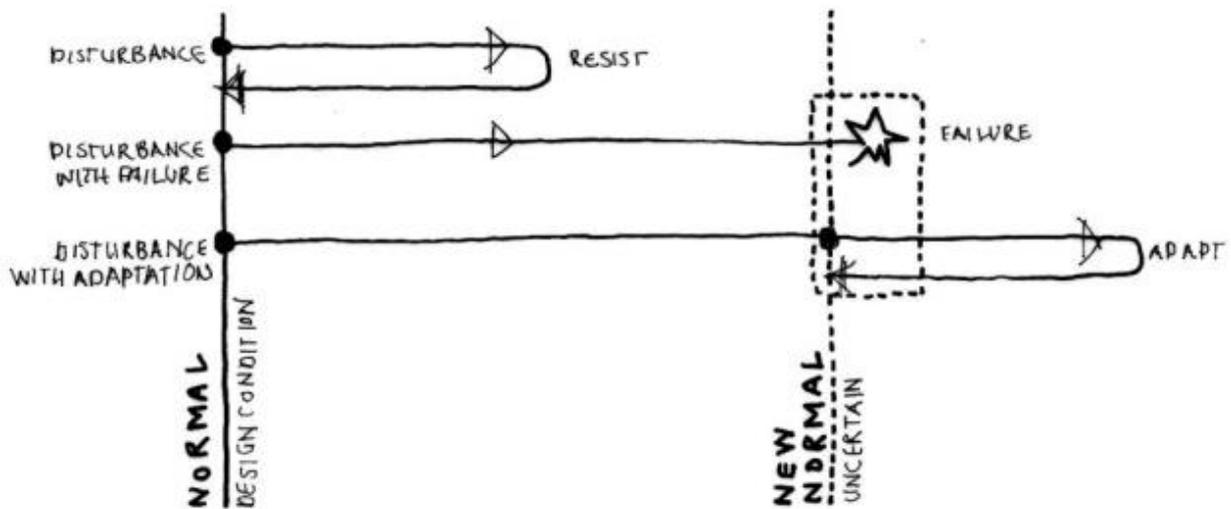


Figure 2.3 Disturbance and Resilience in engineering and ecological frameworks (Laboy & Fannon, 2016).

Alongside the most common model of socio-ecological resilience, Laboy and Fannon explore the engineering and ecological models for resilience, whereby the engineering model looks to return to its original state and, in contrast, the adaptive model establishes a new normal, which has become improved (Figure 2.3). Ecological resilience falls into four domains: technical, organisational, social and economic

Explored through the TOSE diagram in Figure 2.4, the technical domain refers to all aspects that are designed, including architecture and designed landscapes. The organisational domain concerns governing institutions and policies, as well as the frameworks developed for resilience. The social domain places the vulnerabilities, adaptive strengths of individuals and communities within a certain place, while the economic domain refers to the capacity of these economies to respond, innovate and reorganise as a result of adversity.

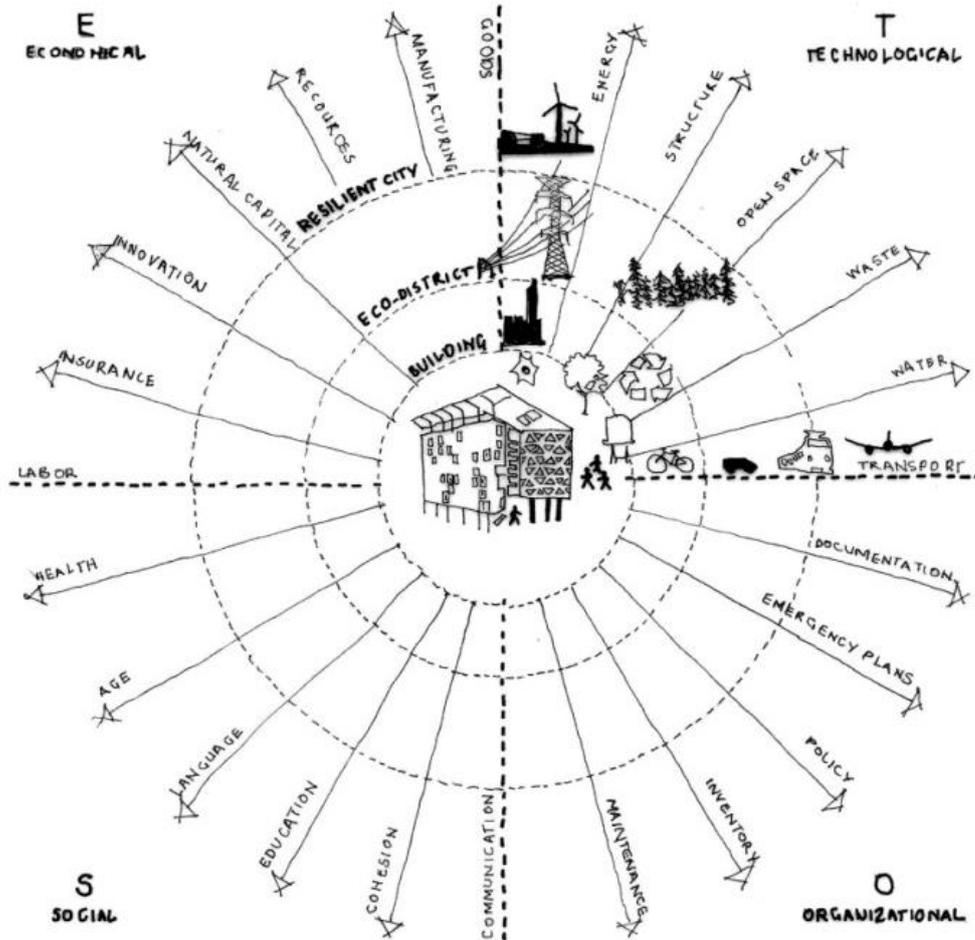


Figure 2.4: TOSE model for resilience in architecture. A model of ecological resilience suggests that buildings interact in nested scales below and above the artefact of the building in technical-ecological, economic, social and organisational domains (Laboy & Fannon, 2016)

Stephen Flynn, in Laboy and Fannon, points out that buildings are connected to systems across these dimensions in varying scales and complexities, and a focus on these domains with the use of one particular scale would be insufficient (Laboy & Fannon, 2016).

Architectural form has undergone many transformations and function and purpose have played differing roles in defining built form. The transformations have occurred due to changes in concepts, artefacts and contexts (Laboy & Fannon, 2016).

The researchers Laboy and Fannon suggest that architecture is constantly changing. Buildings and their functions are designed for a specific reason, at a particular time and within complex systems (cities), and have evolving cycles and capacities that fundamentally require variability. It is imperative, therefore, when developing an individual architecture for resilience, to acknowledge that architecture exists in a changing context. Any

conceptualisations of resilient architecture should then be based upon adapting and transforming for inevitable change.

The conceptual layers of adaptive architecture, based on resilience thinking, therefore require time and scale. In the context of this research, scale refers to the application of resilience on a small scale (individual architecture and people) and larger scale (cities and communities). Through the notion of time, the study also explores strategies for implementation in the short and long term, taking into account changes for all city systems and the impact they can have on one another.

Finally, the concept of transformational change through adaptive reuse can be examined through three significant aspects. The first is *changing concepts*. The change to cultural concepts, from perception to the materiality of permanence, provides the difference between durable and transformative architecture. Secondly *changing artifacts* refers to multiple layers and lifecycles that make up buildings (functions and systems). Lastly, *changing contexts* are external actors that include environmental and political changes. These must be taken into consideration, even in terms of individual architecture (Laboy & Fannon, 2016).

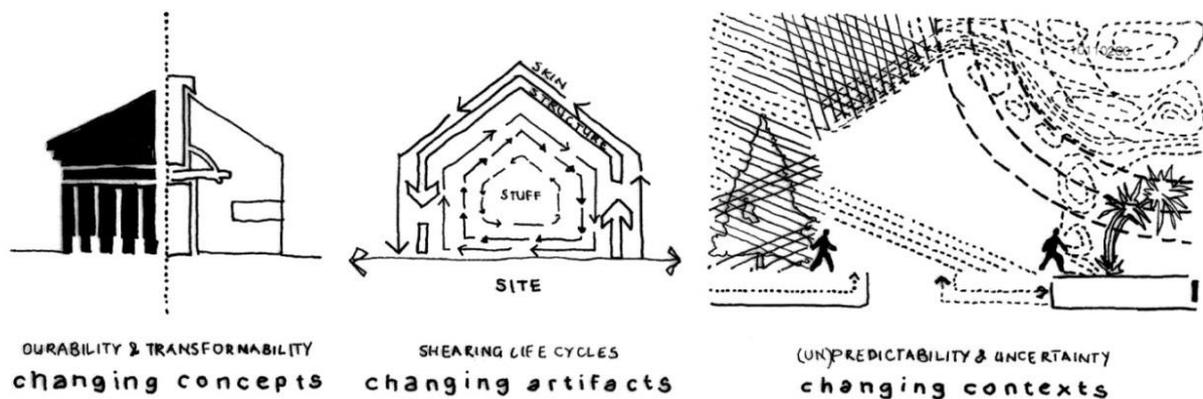


Figure 2.5: Forms of change in architecture (Laboy & Fannon, 2016)

Looking to the future of resilience, which takes on all scales of the city for which history has shown that change, is inevitable. Transformational change encompasses shifts in perception and meaning, social configuration, interaction patterns among participants . including leadership and political relations . and those of related organisations and institutions (Folke et al., 2010).

In our current society and economy, experts and professionals are engaged on specific aspects of social and ecological systems and ignore other systems. They may thus be able

to explain the components of a system, but this type of systems thinking is never cohesive or integrated (Pisano, 2012).

The study of resilience therefore exposes a strong need for both sustainable development and governance to embrace a type of resilience thinking that incorporates the dimensions of resilience, adaptability and transformation. Pisano argues that a new approach to sustainability is required in solving current problems, as addressing issues through a trans-disciplinary approach leads to the avoidance of partial and singular perspectives. This new approach would consider humans as part of the earth's ecosystems, focusing on their direct relationship to nature, thus enabling systems to adapt and change to provide a viable future (Pisano, 2012).

2.3 RESILIENCE FOR INNER-CITY DURBAN

The Comparison of Two Frameworks

The traditional theory of resilience in architectural built form looks at cities' built infrastructure with reference to its ability to withstand chronic and acute stresses. In line with the critical analysis in Brian Walker and David Salt's work, *Resilience Thinking*, it can be argued that there is a significant gap in theoretical explanations. This includes ideas for all parts of city systems, for example; social ecological structures and their connection to space in the physical environment.

An exploration of the idea of cities comprising multiple interlinking systems that relate to all organisms, including their connection with people, will be undertaken in this study when the City Resilience Framework is compared with the Resilient Cities Strategy for Durban.

The City Resilience Framework stems from cities having faced a range of struggles and challenges in the 21st century. It has aided in bridging the gap between disaster risk reduction and climate change adaptation, as it accepts the possibility and unpredictability of disruptive events. Here, resilience focuses on enhancing the performance of the systems inside cities facing multiple hazards rather than specific events (Da Silva & Moench, 2015).

As mentioned previously, these challenges are grouped for large-scale resilience, but differ from city to city. This is more noticeable in cities in the global south. Challenges occur at different levels and velocities, and are a result of various actors. Some include growing migrant populations, inadequate infrastructure and climate change, to name a few (Da Silva & Moench, 2015).

The 100 Resilient Cities network defines urban resilience as "the capacity of individuals, communities, institutions, businesses and systems within a city to adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience" (City Resilience Framework, 2015). This definition of resilience differs from those previously mentioned, as it incorporates all city systems and moves away from non-specific notions of social-ecological systems. Further, it focuses on growth, suggesting that the transformability of cities means that a city will never return to its original state of stability, but will adapt and evolve from its previous or current state.

Moreover, the City Resilience Framework highlights the importance of context and scale, unlike earlier theories of resilience, as it explores a holistic understanding of city systems and their interdependencies. A core objective for this framework is to strengthen the vital essentials of a city, in order to improve its development path and the well-being of its citizens (Da Silva and Moench, 2015).

Although there is a deeper exploration of the complexities of city systems, the framework essentially remains a systems-based approach. It divides issues of the city into chronic stresses and acute shocks. The most important, in the case of Durban, are chronic stresses. These are slow-moving disasters that weaken the fabric of the city, such as political instability, high unemployment, inefficient public transportation systems, crime and violence, and poverty. Acute shocks are unexpected and sudden, and pose a physical threat to cities . these include earthquakes, floods, disease outbreaks and terrorist attacks (Da Silva and Moench, 2015).

A gap in the City Resilience Framework, however, is the lack of a comprehensive, holistic structure combining the physical aspects of cities and those associated with human behaviour, as identified in Durban's Resilience Strategy (eThekweni Municipality, 2017).

It has been discovered that the City Resilience Framework is less adaptable in cities of the global south (Da Silva and Moench, 2015). Durban, in particular, is extremely culturally diverse. It can therefore be argued that the application of a global systems framework for resilience may not always be successful in all cities. Durban constructs a system relations approach to resilience, which critically suggests an inclusive perspective with people at the centre of change (Da Silva & Moench, 2015; eThekweni Municipality, 2017).

There are three fundamental layers to the City Resilience Framework. The first represents four essential categories: the health and well-being of individuals (people); urban systems

and services (place); economy and society (organisation); and leadership and strategy (knowledge) (Da Silva & Moench, 2015).

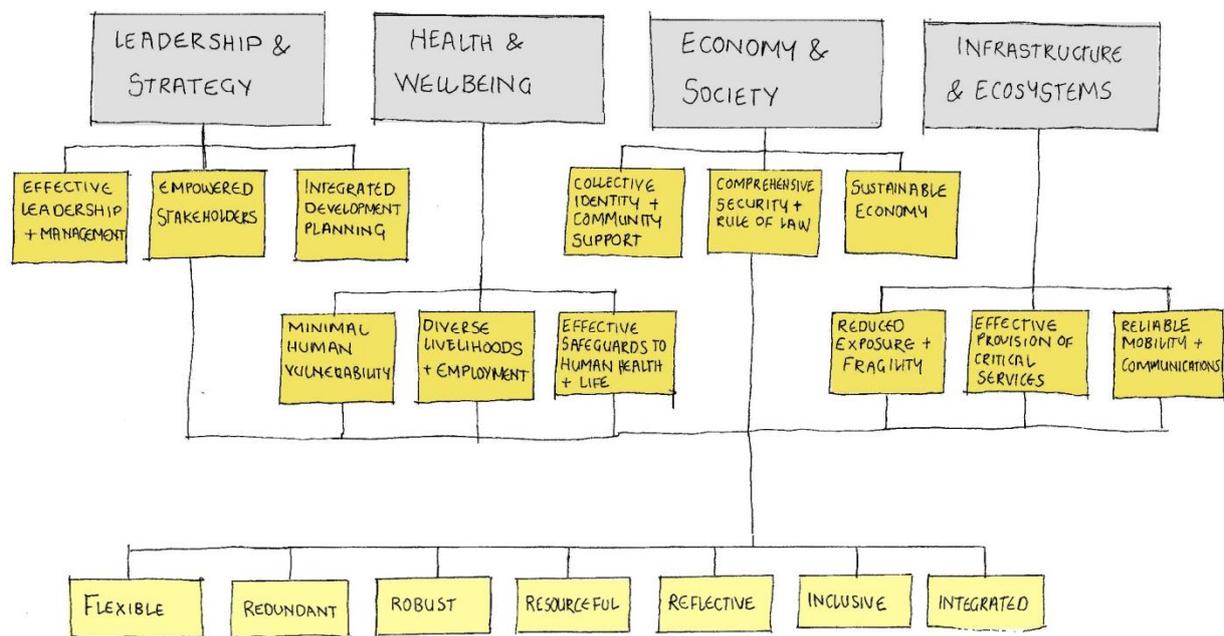


Figure 2.6: City Resilience Framework (The Rockefeller Foundation/Arup, 2015)

Within these four categories are 12 goals that represent the backbone of a resilient city and enable people to survive and thrive during adverse conditions. They provide a holistic articulation of resilience, which equates to the elements of a city's immune system. Any weakness in one area could compromise another sector, unless it derives strength from elsewhere. This places emphasis on the reality that cities are comprised of systems within systems that are all linked and interdependent.

The 12 goals are linked to qualities that define resilient cities as being liveable, sustainable or prosperous. These qualities prevent cities from failing and suggest that truly resilient cities are able to adapt to absorb the effects of chronic stresses and acute shocks (Da Silva & Moench, 2015).

In contrast, Durban's Resilience Strategy acknowledges that resilience provides an opportunity for critical engagement, negotiation and change for all people, which will lead to sustainable societies and development (Biermann et al., 2015). This system relations theory places emphasis on governance, unequal relations and politics, which, for cities like Durban, are problem areas that are in need of attention (Roberts & Douwes, 2017).

The opposite can be said to be true of the City Resilience Framework, which adopts a top-down approach, with knowledge and information being passed down to stakeholders. Durban's Resilience Strategy aims to reverse this perspective and address local issues with a bottom-up perspective. Thus, knowledge and information gained from stakeholders will help form a deep-rooted, inclusive and participatory system of knowledge that drives change for the people who are affected the most.

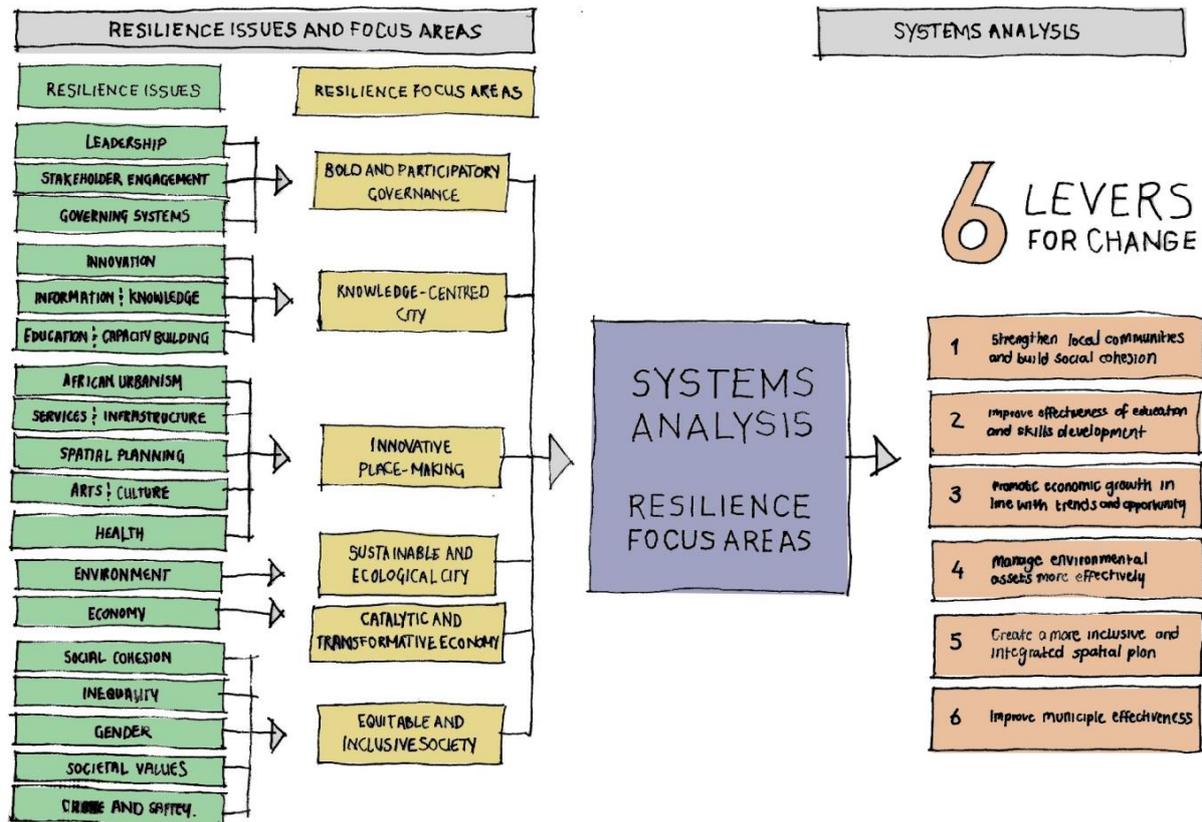


Figure 2.7: Durban's Resilience Strategy. Six Levers for Change (Roberts & Douwes, 2017)

As evident from the above, Durban's Resilience Strategy determines 18 urgent resilience issues, defined by various stakeholders from local communities and their leaders. These are narrowed down to six focus areas of resilience, determined by categorising the relevant issues. This has resulted in a plan encompassing six levers for change.

These levers represent what needs to be achieved in order for Durban to become a resilient city, according to the framework. The following chapter will examine the fundamental systems as lenses for resilience, based on the needs of the community, as stated by the Integrated Development Plan (IDP) 2016/2017 and the eThekweni Inner City Local Area Plan (eThekweni Municipality, 2017). The conceptualisation of resilience and its principles will be

explored through these three lenses, as a strategy for extracting principles as critical conclusions of this section, which will aid in the design element of this research.

2.4 CONCEPTUALIZING AN ARCHITECTURE OF RESILIENCE

Interpretation

Resilience theory is explored as a proposed method for understanding the capacity for adaptation and transformation of complex systems. Resilience theory, which has previously been *theoretically* viewed, through systems of engineering, ecology and socio-ecology, is now being *pragmatically* viewed through the resilience frameworks adapted for cities.

This ideology has become increasingly relevant, as cities have always been . and are still becoming . centres of concentrated populations and resources. Durban's Resilience Strategy focuses on people living in informal settlements at the periphery of the metropolitan area, rather than on them dwelling in inner-city urban environments. This is where the literature tends to fall short, as the framework fails to assess these issues in the context of the inner city (Figure 2.8).

In order to develop a holistic approach to resilience for architecture, it is necessary to explore a combined notion of these models (Figure 2.9). Dirk Moench argues that resilience should be built through decentralised, multi-actor governance regimes that recognise local system characteristics. Through this ideology, the relationship between the different elements of systems seeks to identify factors that contribute to emergent patterns and links between systems that relate to resilience (Moench, 2014).

Figure 2.9 explores a combination of the City Resilience framework and Durban's Resilience Strategy, as well as a theoretical approach on cities being adaptive and transformative systems. This study suggests that for a city to thrive and be sustainable, it needs an adequate population density (people); it must also provide functions for people to exist within it (systems) and infrastructure for these two aspects to exist (built form). This supports the notion of the human aspect of resilience as a catalyst for change.

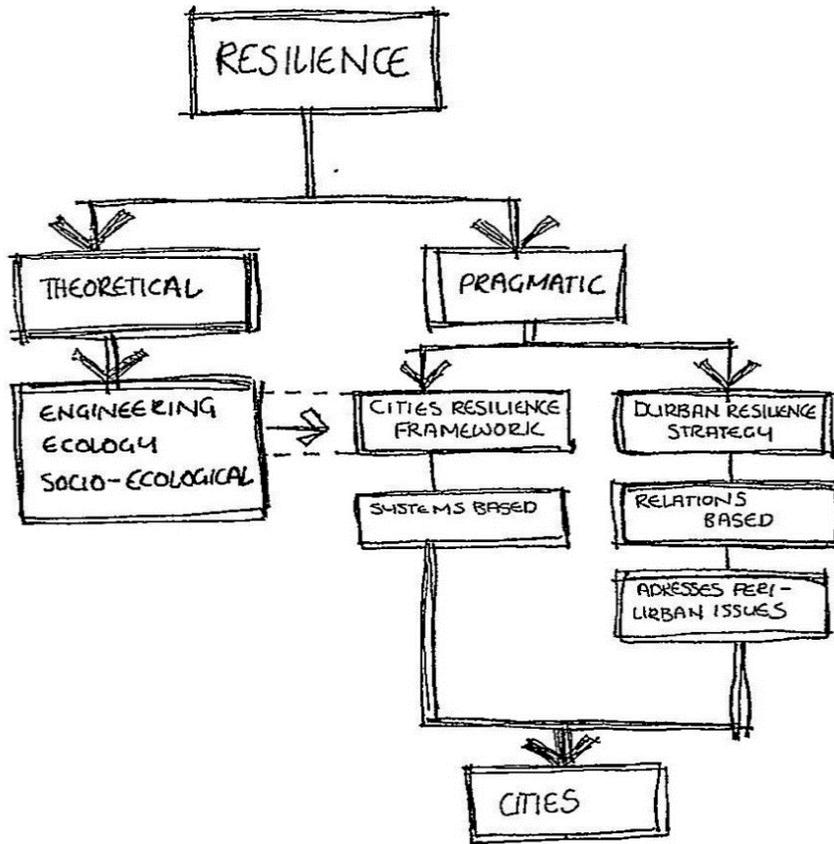


Figure 2.8: Resilience Theory Interpretation (Author, 2018)

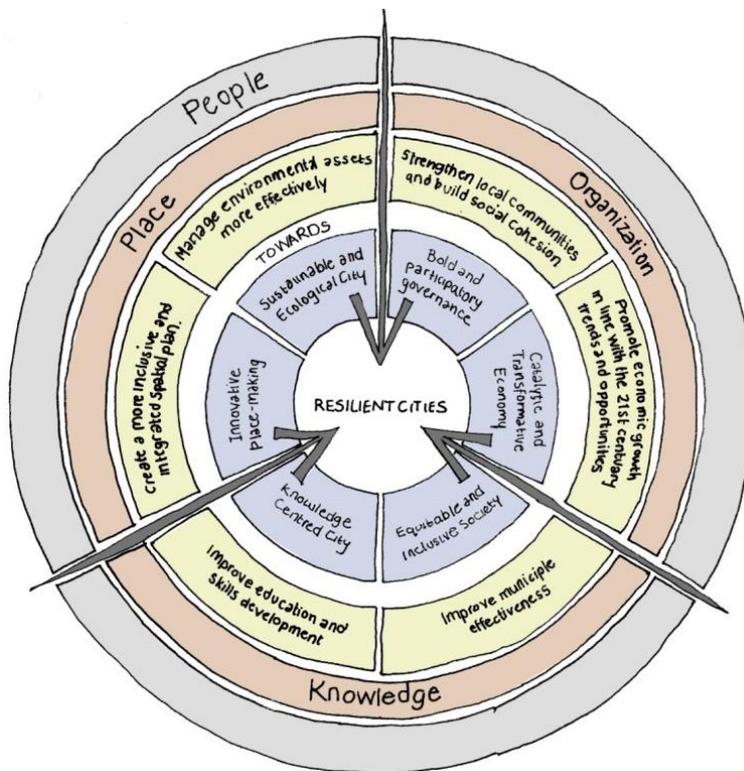


Figure 2.9: Resilience Theory Interpretation (Author, 2018)

These categories suggest that the needs of people can be addressed through the six levers for change. This is in line with the National Development Plan and frameworks for resilience. Ideas of integration and inclusivity in resilience focus areas of inner-city Durban can lead to: environmental conservation (of place); strengthened local communities, improved social cohesion and economic growth (of organisation); and better education, skills development and municipal effectiveness (knowledge).

In order to conceptualise resilience for architecture, the fundamental systems that make up a city will be utilised as lenses addressing critical issues that face the inner city. In Durban, these include the socio-economic lens, the environmental lens, and the built form.

The socio-economic lens examines all issues pertaining to the social and economic aspects of people: community development, integration, high rates of unemployment, poverty, crime, risk and low levels of skills development.

The environmental lens looks at ecological and functional systems that include governance, while built form explores infrastructure, in terms of basic services required for the above dimensions to occur.

These systems are the focal points of the IDP and the eThekweni Inner City Local Area Plan (eThekweni Municipality, 2016). By conceptualising the architecture of resilience, strategies for improving cities can be developed for socio-economic, environmental and built form opportunities.

Socio-economic Resilience

The socio-economic lens for resilience addresses socio-economic relations through principles that encourage resilience to adversity. These include: improvements to livelihood through social cohesion; economic opportunity; and improved education and skills development. In general, humans tend to consider new forms of transformation only in cases of necessity.

While resilience theory suggests that transformational events may open up opportunities for re-evaluating current situations in need of change, social movements that recombine experience and knowledge for learning can trigger novelty and innovation.

Identity, culture and belief are embedded within us and stem from events experienced over the centuries. Therefore, any transformation in the mindset of a community . even one that

may lead to new kinds of adaptability and positive growth . usually only occurs as a result of shock or perceived crisis (Folke et al., 2010). The ability of a city to be resilient is not solely dependent on built form . it also relies also on its inhabitants. It is the strength and connectedness of communities that a city is built upon.

Environmental Resilience

The environmental aspect of resilience does not only consider ecological systems, but also looks at community environments as systems built into the urban fabric of the city. Thus, environmental resilience explores strategies that address the issues of communities that have already demonstrated resilience, but may be vulnerable to future adversities.

In terms of the Warwick junction, the income of informal market traders is generally very low and this shapes their working environment and quality of life. It is crucial to understand contexts before designing processes for future adaptation and transformation (Dobson & Skinner, 2009).

This research examines activities relating to food security intervention, a strategy that empowers informal market traders. An exploration of the junction's informal trading community will create a deeper understanding of the social and cultural aspects of this area, which will in turn help to develop transformational strategies that promote urban renewal and community empowerment.

The socio-ecological relations framework of resilience is the basis for this aspect of the study, as it aims to involve issues of inequality and governance. This will promote a process through which people will be able to construct, defend and shape frameworks that inform their future quality of life (Roberts & Douwes, 2017).

Built Form Resilience

Built form is an additional lens through which to explore the theory of resilience. As mentioned previously, resilience is usually addressed on a large scale, but if individual built form is viewed through the lens of resilience, this will help to create architecture that is more closely related to individuals, family and community.

It is argued that the transformational change of entire areas would be too costly, undesirable or socially unacceptable. However, small-scale, deliberate transformational changes that are carried out in a methodical way could lead to results that positively affect an area on a larger scale (Folke et al., 2010).

Addressing resilient, adaptable and transformational change at a smaller scale reduces risk and has the possibility of being accepted and encouraged by the affected community.

2.5 CONCLUSION

This chapter on resilience has exposed the fact that cities are comprised of numerous complex systems and sub-systems that are interdependent and intrinsically linked. This has been interrogated through an analysis of the resilience of social-ecological systems, which has focused on the relationship between humans and nature, as well as the resilience of city systems, which similarly examines the relationship between humans and the environments in which they work, reside and exist.

The principles of two frameworks have been compared and found to be similar in many respects. The evolution of city resilience in the case of Durban has shifted from systems-based theory to an acknowledgement that systems are complex and that, in cities of the global south, politics and governance play a large role in adapting and transforming cities.

This has resulted in Durban adopting a relations-based theory to resilience that employs participatory governance as a starting block for city regeneration. Furthermore, the conceptualisation provides a basis for the development of strategies for transformational change. These incorporate both resilience principles from the City Resilience Framework and Durban's Resilience Strategy and put forward the concept of viewing resilient cities through three primary lenses: socio-economic (people), environmental (systems) and built form (place).

Moreover, two concepts for developing city resilience strategies, discussed through the three lenses, and the conceptualisation of resilience were considered. The first concept was food security and the development of strategies that provide solutions . through knowledge, skills development and job creation . for socio-economic aspects of resilience that include high rates of poverty, unemployment and crime. The second concept was architectural adaptive reuse as a strategy for resilience. This addresses environmental and built form issue, such as decay and the sustainable management of environmental resources.

By directing new policies and projects through the lens of resilience, multiple challenges can be addressed at the same time. This lens also links systems that are interdependent and ultimately reliant upon one another, so that services can be improved and resources saved.

CHAPTER 3

FOOD SECURITY AND THE BUILT ENVIRONMENT



Figure 3.1 Warwick Fresh Produce Trader—An Artistic Impression (Author, 2018)

FOOD SECURITY AND THE BUILT ENVIRONMENT

According to the UN's Sustainable Development Goals (Goal 2, Zero Hunger): "A profound change of the global food and agriculture system is needed if we are to nourish the 815 million people who are hungry today and the additional 2 billion people expected to be undernourished by 2050. Investments in agriculture are crucial to increasing the capacity for agricultural productivity and sustainable food production systems are necessary to help alleviate the perils of hunger." (United Nations, 2018)

3.1 INTRODUCTION

The definition of food security for the purposes of this research can be defined using Moyo's idea that food security is the, "physical, social and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preferences for an active and healthy life". (Moyo, 2007)

The term originates from a 1970s focus on national self-sufficiency, where the main goal was to produce sufficient food locally, in order to decrease reliance upon the international food market. This was based on the idea that populations would exploit food production, making supply the main area of attention. This resulted in an overall shift towards sustainable thinking for agricultural production, training and education (Devereux & Maxwell, 2001).

Furthermore, this chapter explores this notion with relation to urban food systems that are complex and composed of various linked activities. These systems are essential for urban life, as they connect to poverty, vulnerability, health, the urban environment, shelter and employment (Smith, 1998).

According to the South African Cities Network, current national food security strategies and programmes concentrate primarily on the rural areas and urban fringes (SACN, 2015) (SACN, 2015). Cecilia Tacoli acknowledges this and points out that although policies focus on rural areas, they define factors that affect food for urban populations (Tacoli, 2013). This is due to the government having no formal mandate to address the issue in South African cities, which is in conflict with the South African Constitution (article 27, section 1b, and article 28, section 1c) (1996), when it states that all people have the right to food and nutrition. Gaps in food security are the result of inadequate national surveys, which do not use large enough sample sizes to provide a clear and accurate understanding of the drivers for food insecurity in South African cities (SACN, 2015). Therefore, it is essential that the eThekweni Municipality work towards exploring and enforcing these rights in the inner city (SACN, 2015).

Historically, the measure of food security has related to quantity and production, which is still relevant on a household scale. In South Africa, small-scale agricultural production at local levels has reduced, with a decreasing engagement in the agricultural sector by the urban and rural poor (Pereira, 2014). Pressures on the agricultural sector include poor access to agricultural land and inputs (including labour), and biophysical factors, as well as a decrease in agricultural knowledge, inappropriate extension services, poor credit facilities, HIV and Aids, climate change and dwindling water resources (Pereira, 2014).

At the same time, a shift in thinking about food security has occurred, with household income seen as a major contributor. D.W. Smith suggests that the response to improving urban food security comes with the need to boost quality of life for the urban poor to ensure that urbanisation in developing countries is sustainable, adaptive and transformative for the future of cities (Smith,1998). This chapter sets out to understand the connection between food security and resilience through cultural identity and the Early Morning Market of Warwick, as well as the connection between these markets and food security.

3.2 THE ROLE OF FOOD SECURITY

Reasons for urban food insecurity

The scholar Charl van der Merwe points out that in South Africa, political instability and ineffective land reform have resulted in a reduction in the number of farms. The most recent surveys reveal that 20% of the country's commercial farmers contribute to 80% of total food production and, since 1996, the number farms has reduced by a third (Van der Merwe, 2011).

This exposes a risk for food security in the future. Furthermore, only 23% of the country's population engages in agriculture, with a decrease in agricultural production noted at all levels (Stats SA, 2012, 2013a). KwaZulu-Natal, which has the highest number of agricultural households, has also noted an overall decline of 1.9 %, from 2011 to 2016 (Stats SA, 2018).

This issue requires urgent attention, with 40% of the population indicating that agricultural activity is their main source of food and 44% stating that it is an additional source of nutrition (Stats SA, 2016). Previously, the agricultural sector had done little to improve South Africa's economic situation, but it recently became the largest contributor to growth in GDP in the fourth quarter of 2017. It increased by 37,5% and contributed 0,8 % to GDP growth (Stats SA, 2018).

Historically, there has been a general lack of support for the agricultural sector, which has therefore resulted in job losses, poor levels of education, inadequate training and skills development and a decrease in the capital made available for business start-ups (Hendriks, 2013). Moreover, the impact of numerous projects that should reflect both household and national food security remains unknown, as these programmes have not been well maintained and serviced.

In *The Political Economy of Urban Food Security in Sub-Saharan Africa*, Daniel Maxwell suggests three primary reasons for the neglect of food security at urban and national levels. Firstly, there is limited government budget and capacity to address food security, owing to other, more visible issues, such as housing and basic services. Secondly, the problem of urban food security for typical households remains hidden, when compared against the scale of an entire city. Lastly, due to historical perceptions that food security and poverty are rural problems, it is unlikely that any policies will address these issues (Maxwell, 1999).

In addition, owing to apartheid and the post-apartheid challenges of the city, such as lack of investment and general decay, as well as poor urban management, it has become more difficult to implement any new policies regarding food security (Battersby, 2012).

The South African Cities Network (SACN) argues that six focus areas determine household food insecurity in urban areas; *Household income*: A higher income empowers households to make better choices about what foods they purchase, as well as the quantity and quality, which may not be available to those with a lower income. *Stability of income*: Consistency in income allows families to plan food purchasing. *Stability of food prices and other sources of expenditure*: Increases in food market prices affect the poor, especially low-income urban residents who rely on the informal sector as a source of food and employment; wages do not increase in parallel with food prices, so they also experience reduced purchasing power. *Geographical access*: It is suggested that apartheid and post-apartheid spatial inequality, coupled with a high dependence on poorly integrated public transport, has led to lengthy commutes for the working poor, thus decreasing their ability to access affordable and nutritious food. *Household structure*: This concerns female-headed households with reduced income and households with a single monthly income that is insufficient to support an entire family. *Housing structure and assets*: It is suggested that without basic needs such as clean water, storage and refrigeration, households are less likely to buy fresh produce and large quantities of food at any one time (South African Cities Network, 2015).

Dimensions of urban food security

Current literature suggests two avenues for urban food security initially addressed in the Integrated Food Security Strategy (IFSS) of 2002. One is on a neighborhood and household scale, further discussed by Hendriks, and the other on an urban, regional and national scale, with both explored by the South African Cities Network and Moyo, among others.

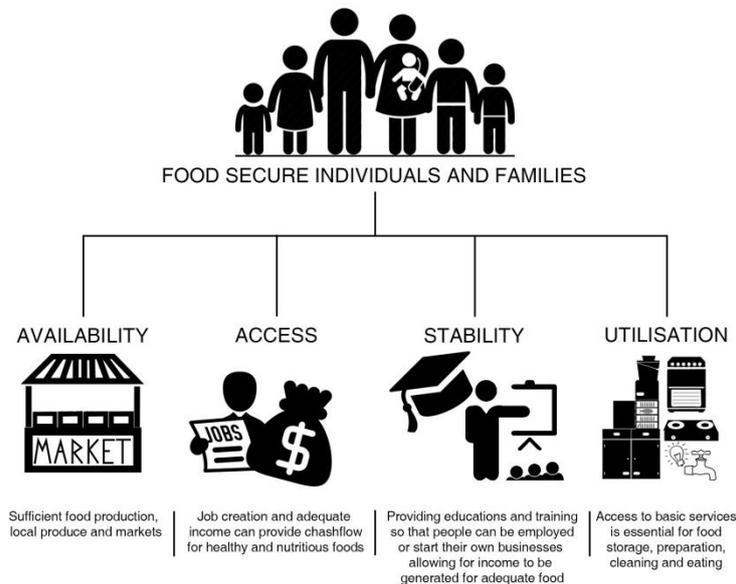


Figure 3.2 Dimensions of Food Security (Author, 2018)

It can be said that an exploration of urban food systems at both levels is important in obtaining a better understanding of the issue, as they are interlinked (IFSS, 2002; Moyo, 2007; Hendriks, 2013, South African Cities Network, 2015).

Food insecurity had previously been a priority at a national level, with the focus on the quantity and location of food production and availability. However, from 1994 onwards, the emphasis was on achieving household food security, as it was discovered that although South Africa was statistically food secure, this was not the case with individual households (Hendriks, 2013). Moyo argues that the four dimensions for food include: food availability, food access or effective demand, reliability of food and food distribution (Moyo, 2007).

Parallel to this, the more recognised conceptual framework for household food security, explored in various policies (FAO, 2008; South African Cities Network, 2015; IDUF, 2016), adopts the following four dimensions that also seek to engage with urban, regional and global scale drivers. These include: food availability, food access, utilisation and stability.

Food availability is the availability of sufficient quantities of food which are of good quality and are supplied through domestic production or imports. Food access refers to an individual's

access to adequate resources in receiving healthy and nutritious foods. Utilisation looks at the use of food for an adequate diet, access to clean water, sanitation and health care to be able to achieve a status of nutritional well-being. Stability refers to the consistency of food security and minimal risk of losing this, owing to stresses or shocks experienced by the individual or community (South African Cities Network, 2015).

The SACN suggests that although these four dimensions for food security imply a household and community scale, larger external factors do affect these dimensions. This infers the need for a shift in thinking about food security, from an individual to a city scale, where food governance is emphasised (South African Cities Network, 2015).

Furthermore, these dimensions of food security expose important questions that must be critically addressed, including: particular types of food that are more readily available than others; physical access to adequate food, which determines food security; and economic access, which addresses individual income. In the case of low household income, other expenses such as transport, electricity and water begin to take preference over food costs.

The SACN therefore suggests that, in an urban context, access to clean water, sanitation, storage and refrigeration are essential components of a household's capacity to achieve food security (South African Cities Network, 2015). On an urban and national scale, it is suggested that the activities and actors who grow, process, distribute, acquire, consume and dispose of food, and how they interact with other systems, determines the outcomes of food security.

As all factors that affect food security are linked, it cannot be viewed in isolation, with just one particular aspect interpreted. The following section seeks to understand various types of strategies for food security in order to close the gap between household and urban food security.

3.3 STRATEGIES FOR IMPROVEMENT

This section explores avenues of food security that can be applied in the context of inner-city Durban. They include: the application of food policy; the implementation of facilities for urban agriculture; and improvements to employment and income, all of which could occur through a revitalised architectural space.

Furthermore, it is argued that the transdisciplinary methodology is appropriate in addressing issues of food security. Through analysis of various literature, it is suggested that these

factors are some of the most important and influential contributions for achieving food security.

Using a Transdisciplinary Approach

The scholars Drimie and McLauchlan(2013) argue that African institutions would become more sustainable in achieving food security if they utilised a transdisciplinary and not a systems-based approach to food insecurity. A better understanding of the effects on food security can be mapped through innovative approaches to research, policy dialogue and practice, with recognised relationships and feedback in systems.

As mentioned previously, this approach takes food security beyond households and acknowledges various external issues that impact upon food security. Drimie and McLachlan (2013) argue that a transdisciplinary approach allows researchers to engage with society in order to combine learning, research and application to facilitate development to provide for a better understanding of these issues.

This means that actors who are affected by the challenges that they face can be included in the research process (Drimie & McLachlan, 2013). Therefore, clarification on issues such as conflicts of interest can be resolved and more contextualised responses explored through specific studies of particular areas. In the case of Durban, the following strategies are in improving food insecurity.

The Application of Food Policy

National and local government departments have undertaken various attempts to implement policies that include job creation, land reform and food security in the agricultural sector (Reconstruction and Development Programme, 1994; White Paper on Agriculture,1998; Integrated Food Security Strategy, 2002).

The Integrated Food Security Strategy (IFSS), implemented in 2002, is a tool for the action and coordination of food security interventions and information systems. The document explains five pillars for food security, namely: %production and trading+, %income opportunities+, %nutrition and food safety+, %safety nets and food emergency+and %information and communication+(IFSS, 2002). Furthermore, the eThekweni Integrated Development Plan (IDP) (2016/2017) has improved upon this strategy, with programmes that aim to mitigate food insecurity through support for community farms, gardens, hydroponic projects, the provision of seedlings and compost, and professional support programmes. The IDP promotes sustainable agricultural production and it has introduced initiatives, such as soup kitchens and employment that relate to food programmes (eThekweni IDP, 2016).

However, the SACN and Smith both note the lack of coordinated policies in most cities and in South Africa in general, and that the responsibilities for different components of urban food systems are divided between various city and national authorities (Smith, 1998). It therefore appears that there are two fundamental gaps in food security in Durban. Firstly, a focus on production, trade and distribution of food in rural areas has resulted in urban food policies being unfounded and non-existent (Bikombo, 2015). Secondly, urban food insecurity has increased, as there is no connection between policy and sustained implementation, suggesting that although it is, seemingly, achieved on a national scale, this is still an issue for poor urban households (Battersby, 2012). Therefore, there is the need to realise the interconnectivity of food issues, in order to develop solutions for these policies on a larger scale for cities (Battersby, 2012).

Wurwarg, in *Urbanization and Hunger: Food Policies and Programmes, Responding to Urbanization, and Benefitting the Urban Poor in Three Cities*, compares developing and developed countries in their attempts to derive workable solutions for food security. For the purposes of this dissertation, comparisons are made between Bogota and Addis Ababa, and Durban, as all three cities are located in developing countries (Wurwarg, 2014).

When comparing the results of urbanisation and food security in Bogota, Columbia, to those of Durban, many similarities are apparent in established policy and frameworks. Food security is an important issue in Bogota, as 20% of the population lives in poverty. Like Durban, the city attempted to address economic development and social safety nets regarding food security. In contrast, Bogota has implemented strategies and developed them in order to improve the city. This resulted in the establishment and upgrading of soup kitchens, organising networks of farmers' markets and food stores, establishing urban agriculture programmes and opening food banks. Further, the programme provides technical assistance to the public, teaching methods of growing food and thereby reducing spending on food. Moreover, it encourages urban agriculture in all spaces, large or small, as well as natural and sustainable methods of doing so (Wurwarg, 2014).

The difference between Durban and Bogota lies in the implementation and maintenance of projects and policies (Battersby, 2012; Hendriks, 2013). Paloquerro is one of the largest urban food markets in Bogota and, like the markets of Warwick, fresh, local produce, meats, clothing and other products are sold here (Figures 3.3 and 3.4).



Figure 3.3 Paloquerro Market in Bogotá, Columbia. (www.southamericaliving.com, Image by Southern American Living, 2015)



Figure 3.4 City of Bogota (Image by Google Earth, edited by author, 2018) Image shows the context of the market within the city

Addis Ababa, the capital city of Ethiopia, has the largest open-air public market in Africa, Addis Merkato (Figure 3.5 and 3.6; see below). It is known for its overflow of fresh produce and food products. However, like Durban, this city experiences high levels of food insecurity, owing to poverty. The UN estimates that 49% of the city's population is malnourished.

Similar to the case of Durban, many of the rural population in Ethiopia migrate to the city to escape food insecurity and poverty, but find that they are no better off. Food insecurity has increased, despite efforts to improve the situation. Although people are meeting the required daily calorie intake, the food lacks nutrition.

In response, suggestions similar to those implemented in Bogotá have been put forward. However, development is being impeded by Addis Ababa's centralised government, as it depends on national government and international organisations to implement local initiatives.

Despite this, Non-Government Organisations (NGOs) such as Welfare for the Street Mothers and Children's Organisation (WSMCO) have positively contributed to improving food insecurity in the city. The organisation developed an urban agriculture programme that utilises unused land for small-scale crop production. This project serves 800 families, with the food that is grown either consumed by them or sold in local food markets. This

contributes to improving food security, as food accessibility and household income becomes more stabilised (Wurwarg, 2014).



Figure 3.5 Vegetable and herb vendors stand in the Addis Merkato market (<https://migrationology.com/addis-mercato-market/>. Mark Wiens, 2014)

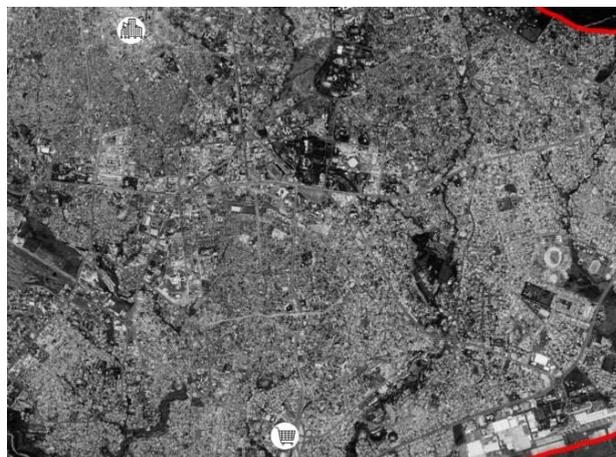


Figure 3.6 City of Addis Ababa, Ethiopia (Google Earth, edited by author, 2018) Image show the context of the market within the city

Implementation of Urban Agricultural Facilities

This section focuses on the two most universal characteristics for food security: availability and accessibility. These provide a means for improving stability and utilisation through agricultural activities such as production, education and training, as a platform to create opportunities for generating livelihood improvement for the Warwick traders.

Food availability is directly related to agricultural activity. However, few large-scale studies address food production that relates to urban agriculture in Durban. The lack of data on the amount of food produced by urban agriculture is a limiting factor when it comes to assessing urban agriculture's contribution to food security (Pereira, 2014).

There is an urgent need for the development of improved monitoring and evaluation processes. Furthermore, many case studies of urban agriculture suggest that despite the intent to reach the poorest of the poor, many of the participants in urban food production

are not considered to be urban poor (Smith, 1998). This is in part because the most vulnerable cannot afford the time between investment in production to harvest or the risk of crop failure.

Moreover, even though urban agricultural production statistics have seen little development, the act of production and education would have social and individual benefits that may outweigh the economic benefits for community building, enhancing social wealth and reclaiming a sense of place, as well as growing a sense of purpose and self-worth for the urban poor (SACN, 2015).

Bikomo suggests that agricultural production at local levels has been marginalised and, as a result of this, the urban population lacks interest in food production as, more often than not, there are too many factors that make the processes too problematic (Bikombo, 2015). Tacoli, suggests that it is these issues that have resulted in many of the urban poor being reliant upon urban food markets.



Figure 3.7 Map showing proximity of informal food trade to supermarkets in the inner city of Durban (Google Maps, 2018. Image edited by author). **Figure 3.8** Informal trade on Plowright Lane (Google Maps, 2018. Image edited by author).

Informal food vendors have become one of the main food sources for the urban poor, as their produce is fresh and cheaper, and buying cooked food is less expensive and more convenient than cooking at home (Tacoli, 2013).

With this in mind, it is argued that the viability of urban agriculture is undermined by the physical and economic accessibility of foods. Therefore, it is important to the success of urban agriculture to minimise these costs and limitations and, in so doing, allow urban food and agriculture initiatives to become a viable solution for food security in the inner city. Urban agriculture cannot be the sole solution to urban food security. Other elements, such as education, training and small business start-ups need to be implemented, in order to improve food security. Moreover, providing a platform for connecting small informal farms and businesses to formal market opens up an opportunity to contribute towards the stability of food security (IFSS, 2002).

Through this understanding, the improvement of urban food security calls for better monitoring of urban food and agriculture programmes, in terms of who is benefiting, what is being grown and who the consumers are. In addition, there is the need to understand why projects fail and how the development of municipality partnerships with NGOs, where possible, can be improved to increase the impact of projects and programmes (SACN, 2015).

Improving employment and income

Poverty levels in KZN have generally declined over the years. Since 2011, however, the declining trend has levelled and the number of people living below the Food Poverty Line was 28.9% in 2014, while the number of people living below the Lower Bound Poverty Line was 41.3 % in the same year (Socio-Economic Review and Outlook, 2015).

As previously mentioned, income and employment are crucial factors affecting food accessibility. Without sufficient income, people cannot afford fresh and healthy produce, as well as the aspects of logistics and storage associated with this. As it stands, Van der Merwe suggests that dwellers of inner-city Durban suffer from a lack of poor housing, sanitation, sewage disposal, adequate energy, and access to clean water, as well as have to cope with high rates of crime and violence (Van der Merwe, 2011). Further, it must be mentioned that many of the urban poor only attain primary and secondary education levels, and lack the education and skills required to enter the formal sector. This suggests the need for a shift in the concept of job creation for the urban poor (Stats SA, 2018).

In response to this, the informal economy provides some employment for the urban poor, as employment in this sector in South Africa averages 33%, representing about two million people, with trade being the biggest contributor at 46%. This makes informal trading the biggest component of the informal economy in this country. The average income in this sector is estimated at between R500 and R1,500 per month and the contribution to GDP is

estimated to be around 8-10% (Skinner, 2007) . It can be argued, therefore, that if income is improved, accessibility to food is more likely to be achieved and adequate %utilisation+of food can be obtained.

3.4 THE MARKETS OF WARWICK AND FOOD SECURITY



Figure 3.9 Interior of the Early Morning Market (Dobson et al., 2009)

Markets' and traders' function for food security

As previously mentioned, the informal sector remains an important daily source of food for the urban poor. Furthermore, although street traders have been viewed as nuisances and contributors to urban decay, informal trading in Warwick has been acknowledged as a part of the city's historical and cultural heritage. Therefore, it is important to consider the informal sector and street traders as a strategy to address income, education and skills development for urban agriculture, and food as a strategy for the improvement of food security and the livelihoods of informal traders in inner-city Durban (Battersby, 2012, Wurwarg, 2014).

A holistic appreciation of food security is not just about systems of food, but also a reflection of nutrient content, food safety and social and cultural acceptability. These are extremely

important for the dimension of utilisation of food (Pereira, 2014). Street traders form a vital part of urban social and economic life around the world, which is especially evident in the case of Durban (Bikombo, 2015). In addition, the sale of fresh produce and livestock in markets contributes to food security, as these are available at an affordable rate (Pereira, 2014). A 2013 survey showed that traders thought that they contributed to alleviating poverty in the city. One female vendor said: "We help fight poverty when we are selling our goods to generate income. Our families no longer suffer from hunger; we are able to provide for our families." (Mkhize, Dube & Skinner, 2013).

The importance of markets for the future of food security

The eThekweni municipality reported in 2011 that informal employment, with 262,758 jobs, comprised 24% of total employment and that more than half (131,737) of these jobs were in the trading sector (eThekweni Municipality, 2012). Warwick Junction is one of the largest transport hubs in South Africa and known for its markets and informal trading. It has secured employment for more than 5,000 people, who would otherwise be less likely to find work. It provides traders with a space to invest and grow their businesses. With more than 80,000 people moving through this area on a daily basis, the informal economy contributes to the livelihood of its residents and commuters.

These markets attract customers with limited income, who travel to and from work on a daily basis. The markets also cater for urban residents and busy commuters, as its produce is presented in small piles, for the convenience of those who do not have refrigeration at home and who must squeeze into transport that is often crowded (Dobson et al., 2009). Traders can generate between R500 to R1,500 each day, depending on the type of produce sold. Those who sell fresh produce, mostly female traders, tend to generate the least amount of income and statistically form part of the urban poor (Dobson et al., 2009). Nevertheless, the opportunity to trade affords the chance to generate income and support their families.



Figure 3.10 (left) *Fresh Produce*. **Figure 3.11** (right) *Fresh Produce Trade outside the Bovine Head Market* (Dobson, et al., 2009).

Empowerment for improving the livelihood of informal traders

This research explores the significance of improving the livelihoods for Early Morning Market traders, in terms of food security, considering the type of produce sold, the level and rates of income, as well as the extremely important cultural and historical significance of the market.

The market was formally established in 1934, after being a street market. It operated under poor conditions, so the new facility quickly became a great success. The market thrived from the 1930s to the 1970s as predominantly Indian farmers travelled here in the early hours of the morning to sell their fresh produce and livestock. By the early eighties, other markets were established around the Early Morning Market and a variety of produce, goods and services were traded here (Rosenberg, 2012).



Figure 3.12 *Scene at the Early Morning Market in the 1940s* (Rosenberg, 2012. Image sourced from Buddy Govender)

Urban trading in fresh produce, meat and livestock provides many benefits for the urban poor. These include: convenient location, fresh produce that is restocked daily, price, cultural preferences catered for, diversity of products and taste (live chickens and traditional food preparation).

However, there are also issues to be faced, such as: limited shelf life for produce, food safety, female street traders earning less than males and significant variation in income from season to season (Bikombo, 2015). Furthermore, a lack of basic needs, such as adequate storage, transport, shelter, day-care facilities and clean and safe ablutions are evident. Although many of these exist currently, there is an urgent need for their renewal and transformation. It is important, therefore, to ensure that issues facing informal traders can be solved adequately, in order to improve upon food security in the inner city (SACN, 2015).

Historically, Early Morning Market traders have suffered from regular infringement on their right to earn a living through unfair regulations, poor management, poor working conditions and corruption from officials. Although there has been some improvement, most of these infringements continue. Organisations such as iTrump and Asiye eTafuleni (AeT) understand the importance of these traders and work to integrate them into society and future city planning, as well as advocate for their rights and livelihoods.

Furthermore, KwaZulu-Natal is the only province to have established policies for the informal economy, with the aim of bringing it into the mainstream system in the hopes that the vulnerability and exclusion of those working in the sector will be reduced (KZN Provincial Government, 2011).

In conclusion, the Early Morning Market and the other markets of Warwick are unique in southern Africa. They have been through transformational changes, such as relocation and structural change. Moreover, they have endured times of political, social and environmental instability, as explored by Rosenberg (2012). As a result, this area of the inner city has developed layers of cultural and historical significance and the resilience of these markets not only lie in their geographical location, but also in the people who operate and run them on a daily basis. Providing these people, who are already involved in food and agricultural activities, with support and empowerment through education, training and local production will not only improve their quality of life, but will also contribute to the long-term sustainability of food security in the city.

3.5 THE EARLY MORNING MARKET AND CULTURAL IDENTITY

To understand the value of the Markets of Warwick for inner-city revitalisation and the improvement of food security, this section argues that the strong sense of cultural identity of the markets is the pinnacle for renewal and further inclusion of the market traders into the future planning of inner-city developments.

Resilience of Identity: Adaptation and Transformation.

Wurwarg (2014) suggests, through the exploration food security in developed and developing countries, that solutions are more successful when tailored to the specific issues and culture of a particular municipality, instead of creating a framework for an entire country (Wurwarg, 2014). Therefore, understanding the symbolism of the markets within the various cultures that make use of and operate within the Warwick Avenue Triangle is important in terms of determining social and built form strategies for food security. The markets are not only important for food security but, as previously mentioned, are a symbol of diversity of the cultural melting pot that is Warwick Junction. Keesing (1974) argues that culture can no longer be defined as "the heritage of learned symbolic behaviour that makes humans human", but that culture is the shared heritage of people in a particular society owing to individual diversity and globalization+ (Keesing, 1974). Stuart Hall, in *Cultural Identity and Diaspora*, argues that this is one of two ways to view cultural identity; the first is of shared culture, which is the reflection of common ancestry and historical experience, and the second refers to the cultural identity that belongs as much to the future as it does to the past (Hall, 1994). The Warwick markets provide a link for the various cultures and traditions of the urban poor in the inner city . based on the past experience of apartheid segregation and modernist planning . and they still cater today for an amalgamation of cultural backgrounds, and continue to cater for an interconnectivity of cultures through food and trade and will continue to do so in the future. Therefore, it can be said that the longevity of the markets is partly owed to the development of cultural identity through the symbolic meaning of these spaces to its inhabitants and their ability to share a common history and adapt in relation to the constantly changing demands of the city. This ideology understands culture in terms of adaptive systems.

Systems of cultural identity

Keesing suggests that researchers investigating cultural adaptivity have agreed on four broad assumptions. The first is that cultures are systems of socially exchanged behavioural patterns that relate to communities and their ways of life. The second is that cultural change is an inevitable process of the transformation of all contexts. The third is that technology and

elements of social organisation have the ability to impact cultural order and the fourth is that the ideational parts of cultural systems have to move towards adaptive results. Keesing describes the ideational theories of culture as %cognitive systems+, %structural systems+ and %symbolic systems+ (Keesing, 1974). For the purposes of this research, the cognitive and symbolic systems will be further explored, in terms of their relation to the Early Morning Market and architecture. The %cognitive+ system looks at the patterns of life within a community, in order to determine cultural identity. Ward Goodenough, in (Keesing, 1974) argues that culture is not defined by things, but rather by collective behaviour, emotions, people and things in people's minds, and it is perceived within their environment through personal experience. The %symbolic systems+ theory of culture, in contrast, refers to the shared symbols and meanings from engaging in symbolic action (Keesing, 1974). In simple terms, according to these ideologies of cultural identity, this means that cultural identity relies upon the relationship between people, activity and place.

3.6 AN ARCHITECTURE OF SYMBOLISM

Early Morning Market as a Symbol

Kenny states that "architecture is a manifestation of the cultural context in which it resides" (Kenny, 1994). He suggests that the relationships between form, buildings and spaces act as cultural markers that describe the way of life and the social status of the people that inhabit it. In saying this, the Markets of Warwick, as previously mentioned, represent an area of collective cultures, evident in the variety of ethnic backgrounds and, more notably, by the many goods and services found in the small buildings, pavements, streets, and bridges that comprise the markets, making them a visual symbol of cultural heritage. Furthermore, the Early Morning Market, being the oldest in Warwick, is a social and political symbol of the history of the city of Durban. Lastly, the abundant availability of fresh produce, livestock and other products sold at the Early Morning Market represents the appearance of food security in the inner city and the markets are a means for reconnecting people to their source of food through empowerment, education and training.

Furthermore, expressing the cultural identity of the market through symbolism and meaning can also be determined through semiotics, "the study of signs and signifying practises". Semiotics is concerned with how society perceives an object or thing and what it truly represents. These perceptions arise through the concepts of naturalism and realism, as explored by Curtin, who refers to the notion that images and objects can objectively depict something. Furthermore, Curtin suggests that meaning, with reference to semiotics, can connect the relationship between the form and function of building design to express

representation (Curtin, 2006). However, Jencks argues that a %multivalent+ experience is created when architecture is designed with the same concern for form, function and technic. As a result, the user is able to experience the architecture and uncover it . in terms of meaning to meaning, and justification and depth of the design (Jencks, 1969).

Cultivating Meaningful Architecture

Munro explores Scruton's work, *The Aesthetics of Architecture*, which suggests a framework for the distinction of %natural meaning+. one event as the sign of another . from non-natural or conventional meaning that refers to language. Scruton, in Munro, suggests that architecture, like language, is intentional and created through the departure of meaning to communicate an idea or theory (Munro, 1987). Charles Jenks similarly states that there is meaning in every object or activity created; whether or not meaning is determined before or after creation, it is inevitable nonetheless (Jencks, C. 1969). Munro argues that the more complex an object . for example, an architectural building . the more that the function of signifying, of the programmes it represents, gains in importance. Therefore, objects should no longer be judged solely through their aesthetics, but also through the notion of semiosis (Munro, 1987). In contrast, Hershberger argues that meaning does not lie in objects, but people bring meaning to objects, in this case, architecture (Refer to 4.13 and 4.14). Further, it is not the elements of design that contain meaning, but rather the intended meaning of the design, which can only be determined through experience. Secondly, the primary purpose of architecture is not meaning, it is shelter, protection and the accommodation of physical activities. Meaning, therefore, provides the communication of function necessary for guiding building usage and enriching user experience. Hershberger suggests that it is important for architecture to provide these functions, as well as communicate them (Hershberger, 1970). Therefore, through critical analysis of symbolism and meaning, it can be determined that the Early Morning Market is an object and activity of cultural significance and meaning, owing to the people who operate and experience these markets.

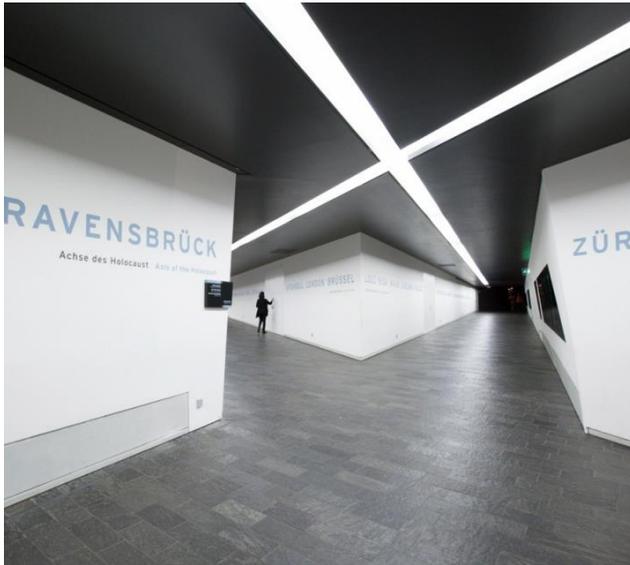


Figure 3.13 (Left) Jewish Museum in Berlin (<https://www.archdaily.com.br/br/773667/museu-judaico-em-berlim-de-daniel-libeskind-fotografado-por-laurian-ghinitoiu>). Image by Laurian Ghinitoiu, 2015) **Figure 3.14** (Right) *Fallen Leaves*, by Menashe Kadishman. (<http://form9.tumblr.com/post/37118236448/ybb55-marzena-wieczorek-fallen-leaves>. Image by Marzena Wieczorek, Tumblr, 2013)

The Jewish Museum in Berlin, Germany, was designed by architect Daniel Libeskind. Some parts of the internal design and exhibits symbolise the experiences of the Jewish people inside concentration camps, during World War II. **Figure 3.13** depicts the walkways leading to exhibits. As visitors move closer towards the exit, the floors, walls and ceilings move inwards towards the door. Understanding of the symbolism and meaning of the space lies in experiencing the space. **Figure 3.14** is an installation by Menashe Kadishman, entitled *Fallen Leaves*. The more than 10,000 metal faces that cover the floor of this memory void symbolise the silent screams of the innocent victims of war and violence. By walking over the faces, users are able to experience the eerie feeling created by the sounds of clanging metal faces.

In order to gain a better understanding of the link between cultural identity and its representation, with reference to architectural form, this segment of the literature review explores symbolism and meaning as a strategy for architectural design that represents cultural identity, by placing the people of the markets (traders and customers) at the centre. Hershberger (1970) emphasises that architects have increasingly begun to recognise the importance of symbolism and meaning in architecture, with the likes of Louis Kahn, Romaldo Giurgola, Robert Venturi, Robert Woods Kennedy and Mies van der Rohe all noting its significance for clear, rich yet complex architectural design (Hershberger, 1970).

Jaeger and Sakznick, in *A Normative Theory of Culture*, argue that culture should explore both symbolism and symbolic experience, and provide a theory that stresses two aspects: the quest for person-centred meanings and authentic experience. Similarly, Hershberger

(1970) emphasises that all responses to the environment are dependent on a person's experience, memories, purposes and values, and these come from previous activities or events (Hershberger, 1970). Secondly, symbolic elaboration drives the quest for meaning and, thirdly, aesthetic potential lies in symbolisation and any social product. Jaeger and Sakznick compare the differences between the humanistic and anthropological conceptions of culture. The humanist approach is selective and is the amalgamation of men's activities, interests and products, and designates them as cultural. In contrast, the anthropological view is non-selective and is where culture comprises an entire social heritage. It refers to speech, knowledge, beliefs, customs, arts and technologies, ideals and rules, is what we learn from others, our elders and the past, and is the way we interpret all this information, as whatever additions we make moving forward. The anthropological view is the most popular belief and approach to culture (Jaeger, & Selznick, 1964).

As a result, Hershberger formulates two types of architectural meaning: representational, which refers to external meaning, and responsive, which refers to internal meaning. Within these lie meaning that is representational, presentational and referential. Presentational architectural form does not have direct meaning and is not acting as a sign, as it does not evoke any previously experienced object or event. Referential architectural form refers to form that is important in terms of the representation it evokes. These forms act as the signs and symbols of other events. Within responsive meaning lies, firstly, affective meaning, where, once our representations are formed, we encounter further internal responses that relate to our representations, in the form of feelings and emotions. The second embedded meaning is evaluational, where, once individual's representations are formed, critical attitudes and ideas develop about architecture. Hershberger (1970) describes levels of architectural meaning based on these two types. They include recognition of form, status, use, human function, building function, and purpose and value, much of which derives from previous personal experience of form and space, and how a building typically functions and is constructed (Hershberger, 1970).

It is argued that the cultural symbolism and meaning can be recognised through architectural form and function. How external and internal dimensions of symbolism and meaning affect the user can be determined by their reaction to the architectural design and building purpose. Further, through the exploration of Rapaport, Kenny suggests that people have different needs from built form, based on cultural needs, and this in turn affects architectural space through its influence on light, sound, heat, orientation and privacy, to name but a few (Kenny, 1994). Therefore, the incorporation of the market traders and the symbolism of the markets into a design proposal would require an in-depth understanding of the various roles,

responsibilities and needs of the traders; further, it would require the participatory governance of resilience thinking to incorporate the various aspects of cultural identity into all parts of architectural design and function.

3.7 CONCLUSION

An analysis of the literature assists this study in gaining a greater understanding about the dimensions of food security and that it concerns a great deal more than just production. Furthermore, the literature has revealed that urban areas may appear to be food secure, yet . owing to the paucity of information on individual and household food security in South African cities, combined with the realities of low income and high rates of unemployment . food insecurity remains an actual but hidden threat for urban communities. Moreover, owing to the Warwick markets playing a vital role for food security through the provision of fresh, affordable and easily accessible food products, as well as being a substantial contributor to employment and income in the informal sector, they represent a viable platform for the development of strategies and initiatives for food security. Finally, the Warwick markets, especially the Early Morning Market, contain multiple layers of heritage and social and political history that contribute to cultural significance in the context of Durban. Utilising the markets as a vehicle for the preservation and transformation of cultural identity through architectural space will result in the connection of people, activity and place through symbolism and meaning.

According to Trancik: %For designers to create truly unique contextual places, they must more than superficially explore the local history, the feelings and needs of the populace, the traditions of craftsmanship and indigenous materials, and the political and economic realities of the community.+(Trancik, 1986, p.114)

CHAPTER 4

ADAPTIVE REUSE AND REVITALIZED ARCHITECTURAL SPACE



Figure 4.1: Durban Inner city – An Artistic Impression (Author, 2018)

ADAPTIVE REUSE AND REVITALISED ARCHITECTURAL SPACE

“Keeping and reusing historic buildings has long-term benefits for the communities that value them. When done well, adaptive reuse can restore and maintain the heritage significance of a building and help to ensure its survival. Rather than falling into disrepair through neglect or being rendered unrecognisable, heritage buildings that are sympathetically recycled can continue to be used and appreciated.” (Common Wealth of Australia, 2004)

4.1 INTRODUCTION

As mentioned previously, creating sustainable built environments is a focus for most countries and this can be achieved through enforcing strategies of resilience and regeneration. The starting point for this, is the city, which is a nucleus of resources containing a higher population density. However, cities are also the most vulnerable to shocks and stresses. Therefore, by exploring adaptive reuse as a paradigm for reconstructing built environments sustainably, the aim is to understand strategies that enhance resilience in the city through rapid reduction in the consumption of resources and improved livability, while conserving cultural identity through adaptive reuse in architecture.

4.2 ADAPTIVE REUSE IN ARCHITECTURE

Adaptive reuse is not a new concept. For hundreds of years, cities have been reusing buildings that have become redundant by finding new functions to suit their needs at a particular time (Plevoets & Van Cleempoel, 2012). It is suggested that the outcomes of adaptive reuse could result in change, through three factors: reuse of resources; environmental conservation, which reduces urban sprawl and promotes land conservation; and highlighting a building's social character and identity to create a sense of place and provide a platform for economic opportunity (Lewin, & Goodman, 2013; Conejos, Langston & Smith, 2012). This section investigates the role of adaptive reuse by exploring the circumstances for reuse through the viability of conversion. It is proposed that there are two primary models for the viability of conversion, namely, *building typologies and functions* (old and new) and *building obsolescence*.

Building Typologies and Functions

The scholars Plevoets and Van Cleempoel study building typology as a method for categorising reuse through its connection to the new building function (Plevoets & Van Cleempoel, 2012), while Cantacuzino also compares typology and function for reuse in

Architecture, Old Buildings/New Uses. Similarly, these authors acknowledge that there is nothing new about buildings changing their function, as their structures tend to outlive their function. Further, until the industrial revolution, it was common for buildings to be adapted to new uses. Similarly, Powell (1999) suggests that buildings exist in periods of change and outlive many civilizations. For example, Greek and Roman temples became Christian churches, English monasteries were recycled as country houses and Russian palaces became post-revolution museums of the people. More recently, mills, railway stations and industrial buildings have become malls, hotels and offices . and industrial buildings of the 1950s and 60s have been adapted for domestic and leisure use (Powell, 1999).

In contrast, during the industrial era, it became the norm to demolish and start again, and after World War II, redundancy and demolition became commonplace in urban areas. Planning policies caused the departure of industrial and commercial activities from central areas to suburban or rural zones allocated exclusively for their use, and new buildings . shopping centres and offices . took their place. Further, the emphasis on converting old buildings has shifted from adapting historic buildings and extending their longevity, to challenges concerning the use of adaptable, solidly built space . such space generally seems to have an industrial or commercial function. In building practice, this would suggest that historical meaning is no longer the only characteristic for locating buildings for adaptive reuse and, today, it is more common that building conservancy is implemented into planning policies (Cantacuzino, 1989).

Models of reuse deal with physical and practical aspects for architectural adaptive reuse. This study discusses theoretical and historical approaches, using notions of preservation, conservation and cultural and historical significance. Powell suggests that . due to necessity, invention, conversion and rehabilitation . schemes can generate the most innovative and intelligent work, and the use of old buildings not only emphasises continuity, but retains memories and transforms them. The aim of using old buildings has therefore shifted from preservation to transformation, with the idea of creating new form out of old fabric, whereas early forms of adaptive reuse tended to cover, erase or dilute the buildings' original ambience, symbolism and cultural heritage (Powell, 1999).

Building Obsolescence

The researcher Langston created a scientific algorithm that calculates a building's adaptive reuse potential. This algorithm is a percentage determined by an estimation of the building's physical life expectancy and its current age. It is the combined assessment of a building's physical, economic, functional, social, legal and political obsolescence. This is determined

through a series of questions that define a building's longevity and include environmental context, occupational profile and structural integrity (Langston, et al., 2008).

Langston argues that, for a building to be reused for a new purpose, its original function must become redundant or no longer needed in its context, and this can be referred to as obsolescence (Langston et al., 2008). Further, Langston explores the fundamental dimensions of obsolescence to better develop strategies for reuse that are not at risk. In this context, a building's physical obsolescence can be judged according to maintenance; the building is more likely to become redundant if it requires a higher level of maintenance that cannot be sustained. It is therefore imperative, in terms of adaptation of architecture, to consider low-maintenance models of building design. A building's economic obsolescence is determined through location. A building in a high-density demographic is more likely to have a longer lifespan than one in a low-density area. A building's functional obsolescence can be measured through the adaptability of its function; whether it can be easily manipulated for other uses determines a building's lifespan. This refers to architectural adaptive reuse, whether on a small or large scale, which involves the transaction of the entire building. All of the attributes listed above are of primary importance to considerations of reuse, or any new building design. A building's technological obsolescence can be measured through its energy usage; if it relies upon constant, high energy to function, it is less likely to be sustainable in the long term. A building's social obsolescence is defined by looking at the relationship between building function and the marketplace. If a building's function is reliant on external sources for income, or its function runs the risk of becoming redundant in the long term, it will significantly reduce its lifespan. A building's legal obsolescence is measured by the quality of its design and construction. This determines whether it is viable for adaptive reuse, as it must refer to the character and authenticity of the building design, which is necessary for adaptive reuse (Langston, et al., 2008)

It can be seen that architecture is affected by the factors of time, scale and change, and we inhabit a world that is constantly changing, at various intensities, and it has done so over over thousands of years. This, too, is evident in the evolution of architecture and built form. In the *Image of the City*, Lynch (1960) argues the importance of the architecture of change for future development:

"A city is a multi-purpose, shifting organization, a tent for many functions, raised by many hands and with relative speed. Complete specialization, final meshing, is improbable and undesirable. The form must be somewhat noncommittal, plastic to the purposes and perceptions of its citizens." (Lynch, 1960)

As we constantly rebuild and redesign the environments in which we live, adapting them to suit our needs, we consequently add on to the cultural and historical significance of architecture that has been said to shape the architecture of meaning and identity. Verheij suggests that this notion views architecture as if it were a palimpsest, involving an ongoing process of changing through time, which links the past with the present and future (Verheij, 2015). Bringing the term palimpsest into architecture and the built environment provides an analogy for the morphology of built form through long-term processes. In *The Architecture of the City*, Aldo Rossi comments how layers of a city, discovered by archaeologists, can determine the complexities of city systems and the information they contain (Rossi, 1984). Along with physical change of environment come the immaterial aspects of change that culture and identity are built upon: tradition and knowledge (Verheij, 2015). With the combination of these layers, a catalogue of knowledge can be utilised to inform meaningful relationships in architecture, which are modern and suited to the context of today's society in terms of creation of place.

4.3 STRATEGIES FOR ADAPTIVE REUSE

Some strategies for the adaptive reuse of architecture are important for the sustainability of building design. Langston et al. (2008) suggest that the success of sustainable adaptive reuse relies on the relationship between financial, environmental and social parameters associated with adaptive reuse (Langston et al., 2008). Moreover, these scholars discuss technical models for adaptive reuse. These examine building elements individually and look at how they contribute to the design of a new structure. This model is one of practicality and function (Langston et al., 2008). In contrast, Gewirtzman (2017) argues that the strategies of knowledge-based architectural design, which study reused buildings, should be utilised to extract the most useful principles for reuse (Gewirtzman, 2017). In addition, in Cantacuzino, Jacobs (1989) suggests that economic, social and ecological variables present an opportunity for architectural regeneration.

Jane Jacobs states in *The Death and Life of Great American Cities* that 'ordinary+buildings and landmarks need to be preserved. Cities need old buildings, she insists. %By old buildings, I mean not museum-piece old buildings ò but also a lot of plain, ordinary, low-value old buildings, including some run-down old buildings+(Jacobs 1961). This suggests that the preservation of architecture into museums and monuments should not limit the potential for a variety of functions to inhabit space.

Cantacuzino (1989) explores seven different typologies for architectural adaptive reuse, each having various functions. He argues that there are three considerations in the approach to converting buildings: visual performance in the urban context, social and cultural importance of their new use and the design quality of conversion (Cantacuzino, 1989).

The relationship between old and new

New building design strategies are typically found in the geological context of a site, structural systems, programme requirements and the ideas of the architect. However, when a building is adaptively reused, as Brooker and Stone suggest, the most important design factor becomes the original building itself, whereby an influential characteristic is the connection and linkage of the old with the new. In addition, the types of strategies for adaptive reuse are based upon the integration of old and new, or the relationship between both parties (Brooker & Stone, 2004).

Similarly, Roberts explores seven different strategies for reuse, which spring from the original building. They include: building within, building over, building around, building alongside, recycling materials or vestiges, adapting to a new function and building in the style of (Roberts, 1989). In addition, Brooker and Stone explore the types of adaptive reuse that incorporate all of the above strategies into three simple components, namely: intervention, insertion and installation. Intervention is when the original building accepts and establishes an intimate relationship with the new elements and the two designs become one, while insertion is when the original building allows and accommodates new elements that are built to fit, to be introduced in or around it but the building remains largely unchanged. Lastly, installation refers to the original building and its new parts existing together, but there is little physical connection between the two and the new parts can be removed (Brooker & Stone, 2004).

Brooker and Stone suggest that intervention is a process that transforms a building, the new and the old become intertwined and completely dependent upon each other (Brooker & Stone, 2004). Therefore, for intervention to occur, the response and modification of form must be extracted from the existing architecture, thus exposing any hidden meaning or potential. As a result, the clarification and interpretation of the story told by the building will reactivate and reveal the place. The elements of intervention are defined by the existing building. Although with typical building design, form follows function, there is the opportunity, in terms of adaptive reuse, to fit function into form, thus encouraging the activation or reactivation of place.

Further, the insertion of a new functioning element not only provides a use for an often redundant or neglected space, but also serves to enhance and intensify the building itself+ (Brooker & Stone. 2004). This approach to adaptive reuse recognises the link between the architecture of old and new, but also allows for the independent existence of both. Although the approach speaks of independent parts, the characteristics of the new form remain a derivative of the original building. Moreover, the new characteristics fit in with the existing building. This approach could be utilised where the original building is structurally strong or contains a striking character that would not be overpowered by new elements.

Moreover, installation is a process where the elements of remodelling exist independently from the building; the two simply touch each other+ (Brooker & Stone. 2004). Installation refers to the placement of related elements in the existing building, whereby the idea behind the approach of installation is to increase awareness towards the existing building.

Understanding the dimensions of historical meaning is important for reused architecture, as this provides potential for celebrating these layers of the city through architectural built form. Each of the above strategies (intervention, insertion and installation) is more suited to a particular circumstance. For this reason, it is suggested that, when it comes to determining the appropriate reuse strategy, all of the above strategies . which incorporate historical, technical, social, environmental and contextual variables . must be taken into consideration, with reference to old and new building form and function. This contributes to the creation of architecture, not as an endpoint but rather as something that can be built over time.

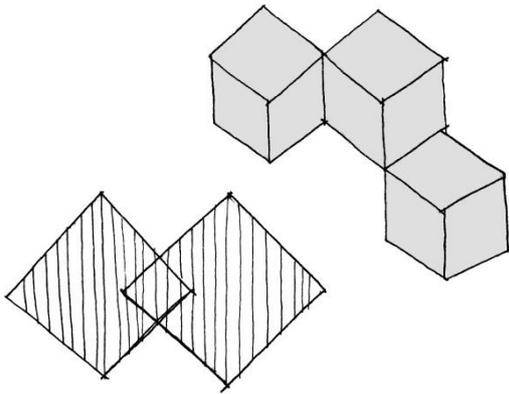


Figure 4.1 (left) *Intervention Types – Intervention*. A diagrammatic representation of the physical connection of reuse (Gewirtzman, 2017) **Figure 4.2** (right) *Danish National Maritime Museum*: An example of intervention where new inhabits old (Rasmus Hjortshøj, 2013).

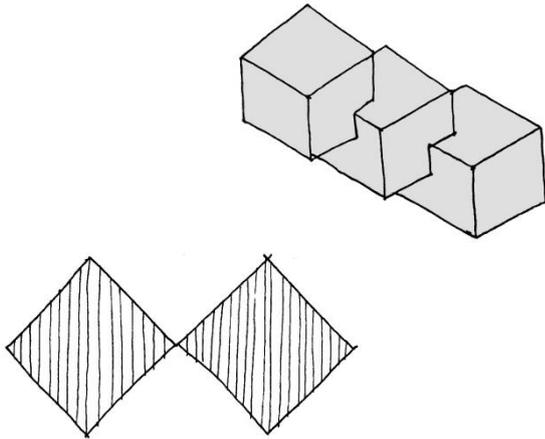


Figure 4.3 (left) *Intervention Types – Insertion*: A diagrammatic representation of the physical connection of reuse (Gewirtzman, 2017). **Figure 4.4** (right) *The Switch House* stands sympathetically alongside the original Tate Modern (Upton, 2016).

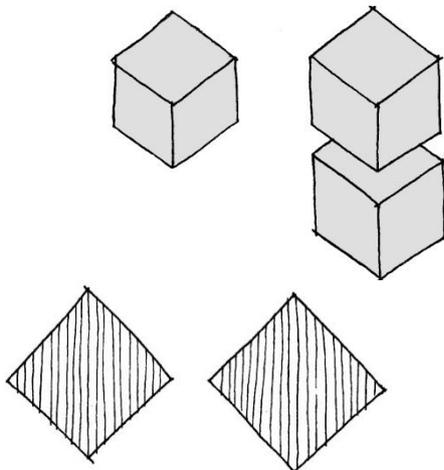


Figure 4.5 (left) *Intervention Types – Installation*: A diagrammatic representation of the physical connection of reuse (Gewirtzman, 2017). **Figure 4.6** (right) *Louvre Pyramid* (Ledyeva, 2017).

4.4 THE CONSTRUCTION OF PLACE

Architecture of the city

This section applies the ideas and complexities of city systems to individual architecture, in order to support the notion that buildings can be defined as cities within cities, as the resilience of built form should not just focus on one thing specifically, but should consider the unification of multiple components. With this in mind, this section examines the relationship between cities, architecture and people, and how these aspects are linked in order to create place. Architecture, like cities, provides a framework for unifying multiple intricate systems that create a place for its inhabitants. Maki and Goldberg (1964) argue that, in the eyes of the observer, a building is comprised of numerous parts that are linked to form a combined whole, so that the building can be read as one body. Moreover, Rossi (1982) explains that *architecture of the city* has two meanings: the first is that the city is essentially a large, man-made entity, and, secondly, that the more limited aspects of the city, the *urban artefacts*, are characterised by their own history and form.

Linkage

Although linkage theory typically applies to aspects of urban design, as it concerns collective built form, its principles can also be applied to individual architecture (Maki & Goldberg, 1964). First, linkage theory can be defined as the connection of people to their environments and the interaction with built form. Similarly, it is suggested that people feel a sense of connection to a place when they are linked to their environments. Moreover, people are so closely linked to their familiar surroundings that the feeling of being lost will inspire emotions of fear and anxiety. However, Lynch argues that cities and architecture need mystification and surprise. Therefore, clarity and legibility in the design of all aspects of place are important, as people depend on their environments for emotional security. In addition, the

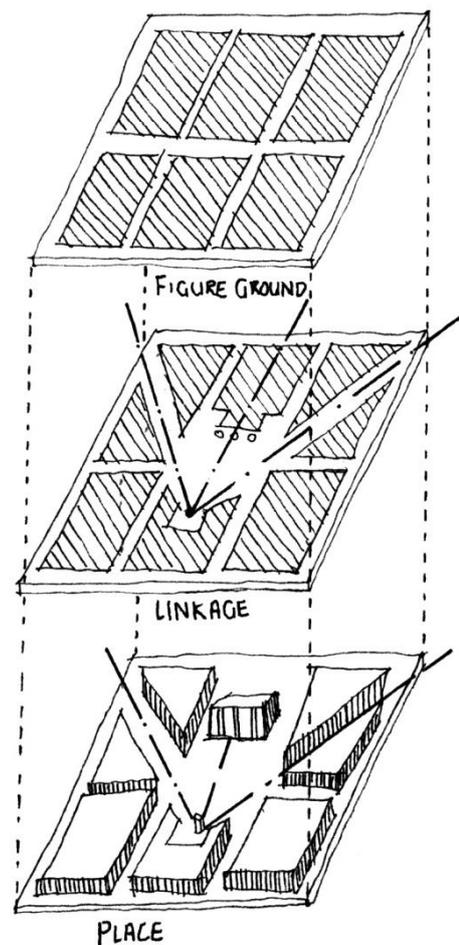


Figure 4.7 Diagram of urban design theories (Trancik, 1986)

relationship between people and built form can contribute to a deeper, heightened and more intense experience of place (Lynch, 1960). In the same manner, if people are submersed in an environment that is visibly organised and sharply identified, there is then more opportunity to inform it with their own meanings and connections, providing the user with a true sense of place that is remarkable and unmistakable (Lynch, 1960). Thus, it is therefore crucial for all urban development to establish a link between these two ideas through the eyes of the observer. Moreover, Maki and Goldberg observe that the primary motive for linkage is to make unity from diversity (Maki & Goldberg, 1964). Therefore, taking into consideration the above ideologies, linkage of people to architecture and place involves the amalgamation of a variety of diverse components through legibility and clarity, as well as whimsical and surprising design.

Roger Trancik (1986) takes a more literal approach to the components of linkage theory, as they concern the organisation of lines that connect the parts of the city and the design of a spatial datum from these lines relate buildings to spaces. These spatial data come in various forms, which include: site line, flow of movement, organisational axis and building edge. Trancik suggests that layers of connectivity make up the physical form of the city, allowing for linkages that may be obvious or discrete. Trancik focuses on movement and the spaces that are developed in between, stressing the importance of circulation and connection for understanding urban structure (Trancik, 1986). Like Trancik, Maki and Goldberg, in *Linkage of the Collective Form* (1964), suggest that the space between, or public space, should be considered before individual space. When looking at individual form in relation to its context, observation is a prime tool for design. Maki and Goldberg (1964) suggest that a combination of two elements . the observer and what exists . creates both problems and new solutions. The categories for this analysis are what create the sequence of collective form, providing a framework for phenomena in cities, suggesting that this order of city form is what allows people to experience their environment (Maki & Goldberg, 1964). In addition, if city form is composed of too many complex systems, it can become too much for an observer to digest and result in a weakened connection between the user and the environment. Thus, for architectural and urban design to fulfil its function successfully, it must recognise the meaning of the order it looks to reproduce, which is contextually relevant spatial order.

Goldberg and Maki (1964) use the analogy of a garage as the architectural stop between the moving world of the car and highway, and the static world of a town centre. Moreover, it is a suggested link between vehicular and pedestrian movement. If design is utilised with this in mind, new architectural built form can better express the linkage between the context of the city and the people who move around within it. This notion expresses idea of linkage on a

lateral level; architects, too, need to consider how this can be applied to vertical form. Consequently, this form of linkage is achievable through transparency and unique activity. As Maki and Goldberg (1964) state: "linkage is simply the glue of the city. It is the act by which we unite all the layers of activity and resulting physical form in the city." (Maki & Goldberg, 1964).

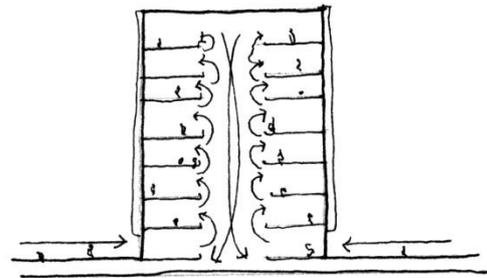
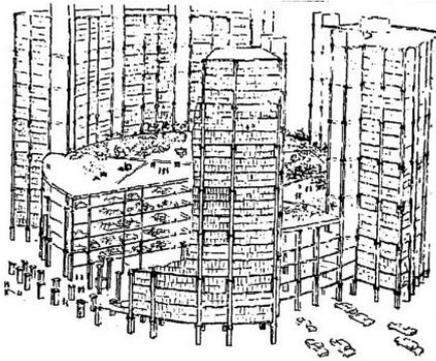


Figure 4.8 (left) Gateway Interchange (Maki & Goldberg, 1964). Figure 4.9 (right) Vertical Linkages (Author, 2018)

The adaptive reuse of architecture acknowledges expansion and change. It invites architects to consider the conservation of the past and the existing framework of built form. Furthermore, it renders the need for forward thinking. Therefore, new design should provide a platform for future development that can successfully link integral parts of a system with any new additions. Maki suggests five strategies for linkage theory in architectural design. Firstly, "mediation" is a connection with intermediate elements or an implied connection of spaces that demonstrate a link to the objects around them (for example, the entrance hallway of a house is the link between an outsider to the private parts of the house, such as the living and dining areas). Secondly, "define", to surround the site with a wall or physical barrier, setting it apart from its environment. An example of this would be ancient cities that surround themselves with high walls, in order to define themselves from the rest of the population. Similarly, in many private residential homes in Durban, a wall or fence surrounds a property to define the boundary and protect the people inside the house. The way in which these strategies are enforced defines the level of linkage between people and place. Thirdly, "repetition", the link created by introducing one common factor in part of the design, or of an existing situation; this can be formal, a material or even a functional factor. Fourthly, "making a sequential path" involves arranging parts in a sequence of building activity and aims to lead people along a certain path. Lastly, "selection" suggests the establishment of unity in advance of the design process by choice of site. The link could be in the form of a significant landmark or area of significance relating to the design (Maki & Goldberg, 1964).

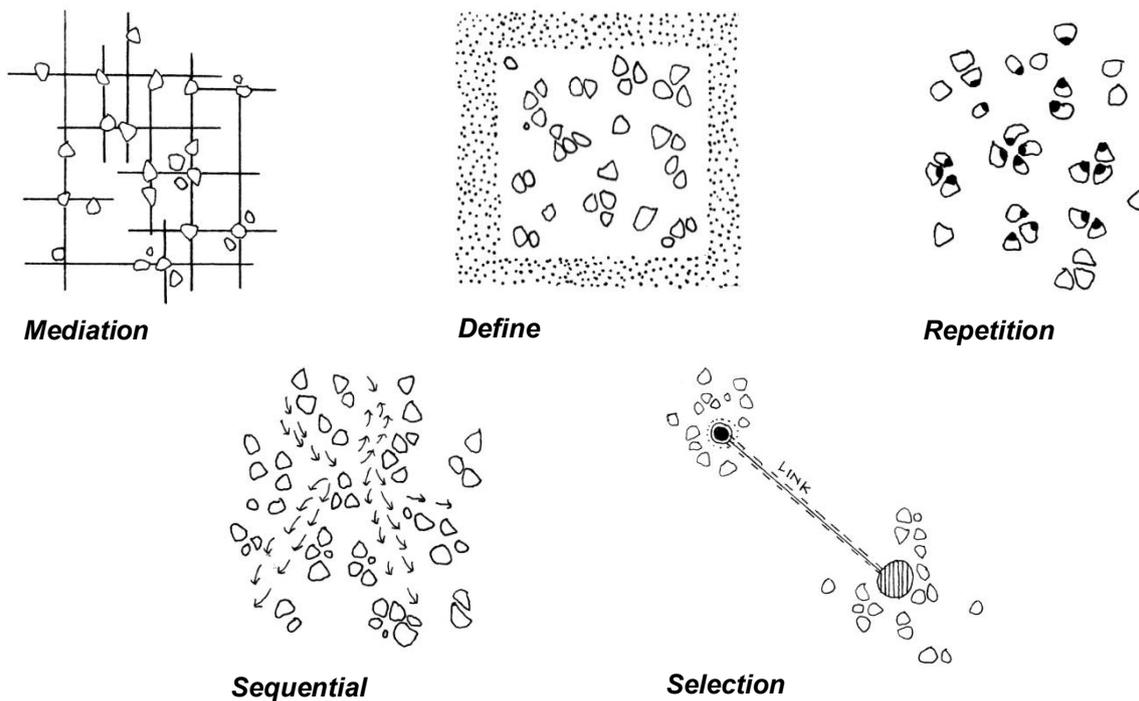


Figure 4.10 Five Basic Linking Acts (Maki & Goldberg, 1964; Author)

Therefore, it is suggested that to achieve the vital connection between people, architecture and place through adaptive reuse, all of the layers and complexities of the city must be combined to provide a unique and responsive built form with the ability to impact upon its users and the context in which it is created.

Constructing place

Lynch argues that people’s perceptions of their environment are derived from how they approach and experience place. It can be said that a lasting impression of place is fundamentally constructed by memory and meanings (Lynch, 1960). Similarly, Najafi, Kamal and Mohd (2011) explore the role of place in people’s lives as a necessity for developing and maintaining individual and collective identity. People’s sense of place varies, based on their experiences and expectations of environments. When cultural identity and the meaning of places are ignored, architectural space is compromised as placeless-ness is experienced. This dilutes the richness, authenticity and diversity of place (Najafi, Kamal & Mohd, 2011).

Place theory for spatial design involves the understanding of the cultural and human characteristics of physical spaces. Trancik looks at the transition of physical space to becoming place; he suggests that this occurs when space derives contextual meaning from cultural or regional content. Place is therefore the combination of physical elements and the

immaterial associations of culture and historical layers of human intervention over time. People rely on systems of places to develop themselves in the social and cultural aspects of their lives. Therefore, architecture fulfils the purpose of enhancing an environment's identity and sense of place (Trancik, 1986).

Through this notion, architecture of place can be defined as a combination of physical and cultural context, and the needs of its users. Trancik suggests that the most successful creation of place adopts a sensitive and minimal approach to social and physical aspects, instead of large-scale transformation. In this sense, creation of place proposes the exploration of local history and the importance of participatory governance in designing architecture of place. Furthermore, the failure to create place for renewal and new architecture lies with the mistake of trying to complete every aspect of design and leaving no room for transformation. Architecture of place should therefore create room for the user to extend the architecture itself. This allows individuals to modify the environment in which they exist, instilling their identity and culture within their space, and allowing for familiarity and continuity. The architecture of place should also be able to transform itself over time (Trancik, 1986).

A common pattern that arises in theories of linkage and place is that if physical connections are in place . in terms of built form, paths, nodes, landmarks, materials and building function . and are successful, they form a platform for establishing a deeper connection to place through the theory of linkage. Therefore, to enable cities to be adaptable and transform in the face of adversity, aspects of the city and built form must be able to accommodate the changing needs of the user.

4.5 URBAN DECAY AND REGENERATION OF INNER-CITY DURBAN

Stephanus, in *Post Democratic Urban Regeneration in South Africa* (2013), suggests that high levels of activity in cities contribute to governmental revenue and provide a source for regional growth, however, in the case of Durban, the city is known for its high levels of decline and deterioration. In this case, the validity for urban sustainability, resilience and renewal are justified, owing to their direct link for economic growth. It is suggested that by improving urban centres through reintroducing commercial, retail, cultural and residential activities, economic growth can occur (Stephanus, 2013).

In addition, many inner-city residents are poor and rely on the informal sector for their household income (Stats SA, 2018). Moreover, many of the buildings in the inner city are dilapidated and, as previously mentioned, recognised as 'bad buildings' (iTrump). There is the potential for adaptive reuse in inner-city Durban, as the high volume of abandoned buildings encourages illegal building occupants and slumlords (Stephanus, 2013). In order

for adaptation and transformation to occur, it is important to acknowledge the history of redevelopment in the city and develop appropriate strategies for adaptive reuse in specific contexts.

The history of redevelopment in South Africa has been a response to urban decay, due to modern industrialisation, apartheid policies, national unrest and world wars. In South Africa, the era of industrialisation, which began in 1870s, changed the economic order, social structures and the working life of cities. The negative impacts of industrialisation included threats to environmental systems from industrial waste and unsustainably high levels of migration into cities, owing to lack of infrastructure and financial limitations (Stephanus, 2013). In addition, many of the stresses impacting upon South Africa cities, Durban in particular, have been caused by migration, as people moved from rural areas to cities to obtain employment. When the National Party came into power in 1948, legislation guiding urban development was characterised by racial segregation, irregular settlement patterns and functional inefficiency, as stated by the Department of Provincial and Local Government (2006), in Stephanus (2013). As a result, Durban in particular was subject to spatial inequality and inaccessibility to basic goods and services.

After the ANC government came to power in 1994 and cities were no longer subject to the laws of apartheid, with the addition of rural-urban migration, their infrastructure, housing and services came under pressure. For this reason, dwellers in informal settlements now make up a third of Durban's population (Yusuf & Allopi, 2010). This resulted in the physical appearance of urban decay in the inner city, which caused wealthier inhabitants to migrate to the outer parts of the city. Thus investment in the city and the financial support needed to sustain it was greatly reduced. As a result of economic inactivity, buildings were abandoned and left derelict (Stephanus, 2013).

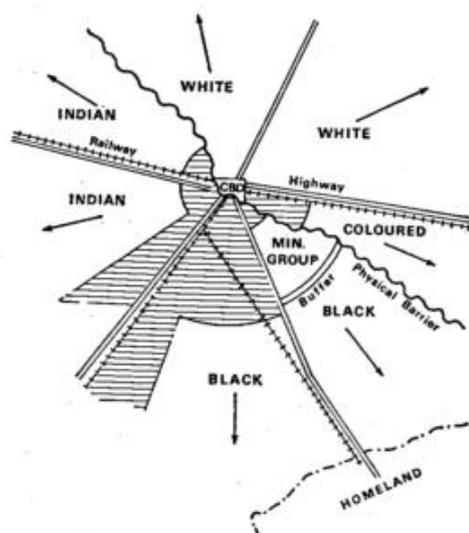


Figure 4.11 Illustration of a model of an apartheid city (McCarthy and Smit, 1984).

Owing to the factors discussed above, Durban city and its surrounding areas lack density, subject to urban sprawl, which is a major consequence of inner-city degradation (Stephanus, 2013). This has resulted in: increased dependency on the motor vehicle for transport, which has led to a higher demand for land to be utilised for the construction of roads and places of parking; a decrease in demand for improved public transportation; and an increase in low-density urban expansion (Yusuf & Allopi, 2010). There is the need to reverse the effects urban sprawl in Durban, as it has had a negative impact upon the longevity of the inner city. Indeed, the consequences of urban sprawl that are connected to the development of the inner city . reduced access to public transportation, lack of environmental sustainability, increased air, water, land and noise pollution, and higher property rates and taxes . can be rectified through its renewal (Yusuf & Allopi, 2010).

In recent years, the eThekweni municipality introduced an Integrated Development Plan (IDP) (eThekweni Municipality Department of Development Planning, 2016) to localise redevelopment, based on the current needs of the city in terms of short, medium and long term planning. Further, the municipality devised its Local Area Plan, a five-year project to redevelop each part of the city. The plan focuses on challenges specific to the city, including high rates of unemployment and low economic growth, high levels of poverty, crime and risk, low levels of skills development, infrastructure degradation and ensuring food security. eThekweni aims to addressing these issues, alongside the aims of the IDP, to create a prosperous city where all enjoy sustainable livelihoods, celebrate our cultural diversity, arts and heritage and ensure a more environmentally sustainable city. (eThekweni Municipality Department of Development Planning, 2016)

In conclusion, the provision of basic needs for citizens is an important factor for inner-city regeneration. As eThekweni's aims include improvements being made to livelihoods and infrastructure, it can therefore be suggested that the provision of a platform for economic and social upliftment, through building function and form, could have a positive impact on inner-city residents. An improved city could attract more people, due to its attractive appearance and economic and social viability.

4.6 CONCLUSION

In conclusion, industrial, religious and commercial buildings have been extensively explored for adaptive reuse, providing new functions for cultural and education programmes. There is a gap in the literature about more modern buildings with specific functions, for example, parking structures, which may be at risk of obsolescence. There are also strong strategic approaches to adaptive reuse, but very little has been investigated with regard to the theoretical approach. In terms of architecture of the city, theories for adaptive reuse are linked to other architectural ideas through strategic flows of building remaking, such as linkage and place theory. Moreover, there is a gap in the exploration of the relationship between people and adaptive reuse for specific contexts. Owing to each city being socially diverse, values are site and building specific. If not addressed thoroughly, this could have a negative impact on the preservation of historical, sociological, psychological, artistic and cultural functions associated with the buildings (Plevoets & Van Cleempoel, 2012).

Therefore, it can be said that architectural remaking should be for all buildings that are old or of historical importance in the context of place. As stated in the previous sections, focusing on both the current and future needs of inhabitants is an integral part of adaptive reuse. Therefore, the adaptive reuse of architecture does not only create an opportunity for reconstructing place for people in the city, but can also represent an iconic symbol of resilience and regeneration. The following chapters look at the precedents and case studies of adaptive reuse for functions needed by the communities and that have resulted in the presence of iconic buildings within urban centres.

OBSERVATIONS

These three chapters of the dissertation draw on the work of various authors, whose writings have helped to understand the research topics and questions of the discourse. In this literature review, the research aims to validate the dissertation topic through a breakdown of three primary concepts: %urban resilience+, %adaptive reuse+ and %food security+. Through these concepts, the dissertation's key theories of %resilience+, %linkage+ (architecture of the city, linkage and place) and %culture+ (cultural identity, symbolism and meaning) have been investigated. These theories and concepts were unified under the social and built form dimensions of resilience theory.

The aim of these findings has been to make the connection between a key theory and concept to address, through adaptive reuse, how people could benefit from an improved link

to their environments in terms of revitalisation and inner-city resilience. Through the connection of theories of linkage and place making, and architectural adaptive reuse, the findings have expressed how people have deep-rooted connections to the environments which they work, play and live. If these environments are too complex, or not complex enough, users experience a disconnect and, for this reason, environments become subject to neglect and decay. Therefore, adaptive reuse acts as a catalyst for reaffirming the connection between people and their built form environments through updated functions and intriguing design.

Studies on the connection between food security and the theory of culture through symbolism and meaning have discovered that there is symbolism and meaning in everything that humans do, create and consume. Through an analysis of symbolism and meaning, understanding is gained about the Early Morning Market and the other markets of Warwick being a platform connecting and representing the cultural identity of the community. Furthermore, the literature has explored these markets as a symbol of and contributor to food security in the inner city and suggested the development of strategies that empower the markets and their traders in terms of improved food security and livelihoods.

The theory of resilience and the concept of resilient architecture are both explored through the literature. The findings for resilience highlight the importance of aspects that include: participatory governance, people sustaining their cultural identities, linking people to place and including people in the design of spaces. These concepts and theories are utilised to develop an architecture of true meaning, with a strong sense of place, to connect people to architecture, culture and food through a unified experience.

Lastly, many considerations need to be addressed for the design of an agricultural hub in the inner city. From these findings, it can be seen that architecture should represent the people and the place in which it exists, and that meaning comes from the function of architecture in relation to its users. These considerations will be taken into account in determining relevant precedents and case studies in the following chapters.

CHAPTER 5

PRECEDENT STUDIES

5.1 INTRODUCTION

This chapter of the dissertation analyses and investigates relevant precedent studies as a guide for developing an appropriate design intervention for the city of Durban. The following precedent studies were selected for their typology for the design proposal and include: the SESC 24 de Maio, a mixed-use, multicultural facility in Sao Paulo (Brazil); Sugar Hill Social Housing in Harlem (New York) and Fiat Lingotto, a vehicle manufacturing building converted to a mixed-use building in Turin (Italy). The first two precedent studies were chosen for their urban context and comparability to Durban, as their surrounding areas have a similar social, political and architectural history. The third precedent study is relevant in terms of strategies for reuse of an iconic building. The study of these architectural typologies provides a better understanding of programmes and functions, and how users are integrated into the thought process of design. These precedent studies are critically analysed through an understanding of various theoretical components that include: the building's response to culture, symbolism and meaning; the link between people and place; and the impact of resilient design. The conclusions inform the typological development of the proposed new building.

5.2 SOCIAL SERVICE OF COMMERCE (SESC), 24 DE MAIO
Adaptive Reuse in the Inner City



Figure 5.2.1: R. 24 de Maio (Jose de Barros, 2009) Figure 5.2.2: SESC 24 de Maio (Kon, 2017)

Building Typology: Retail (department Store)

Mixed-use (recreation)

Architect: Unknown

MMBB, Paulo Mendes da Rocha

Building Location: Sao Paulo, Brazil

Sao Paulo, Brazil

Project area: 27,865m²

27,865m²

Project year: 1940

2017

5.2.1 PROJECT BACKGROUND

Sao Paulo in Brazil is the largest city in the southern hemisphere and one of the largest in the world. As one of the most populous and dynamic urban areas in the world, it has, through its history, experienced many issues that are similar to those of Durban: exclusion of urban poor from future planning and disregard about the development of the urban fabric. A lack of basic services, high rates of crime and violence, and unemployment are still major concerns for the city. Further, following the industrial boom in Brazil and Sao Paulo especially, there was an influx to the city, between 1960-70, of many of the country's impoverished people, who were in search of employment and a better quality of life. Favelas (slums) began to envelop Sao Paulo, as over 300,000 people migrated to the city. As a result of this, the mayor . instead of finding alternative ways to include these people into the urban fabric . extended services and water provision to the favelas, after relocating them to the periphery of the city. This type of planning is similar to apartheid planning, where unwanted occupants were driven out of the city after specific areas were developed to accommodate them (Minkel, Milton & Leite, 2018).

The contemporary city of Sao Paulo has not only undergone many transformations, including peripheral growth and metropolitanisation on the outskirts of the city, but also population and economic migration, which has changed the profile of the city centre. Districts are experiencing socio-economic inequalities and lack of access to basic services, and this . as in the case of Durban . has prompted many renewal programmes. A new urban agenda for Sao Paulo explores the concepts of adaptive reuse, mixed use and inclusionary zoning, taking into account the numerous criteria of its Sustainable Development Goals of 2016 (Holmes, 2016).

One of the organisations that aids city transformation, the Social Service of Commerce from Sao Paulo State (SESC), is a non-profit body that partners with international and national private sector companies to establish cultural and leisure facilities in Sao Paulo. Established in 1946, the SESC aims to improve the well-being of Brazilian trade workers and their families through cultural programmes and purpose-built venues and utilises models for creating social inclusion and a humane society in the city (Moreno, 2018). One such project is the SESC 24 de Maio, whereby MMBB Architects and Paulo Mendes da Rocha were commissioned to transform a pre-existing 1940s building in a prominent part of the city . a department store that had gone bankrupt . into a mixed-use centre.

5.2.2 URBAN CONTEXT AND SCALE

The cultural hub 24 De Maio is situated on the corner of R 24 De Maio and R Dom Jose de Barros Street, within the dense urban fabric of central Sao Paulo. The building is situated among mixed-use buildings, which Durban also has, with small businesses and retail functions on the ground floor and offices or residential apartments above. Its position between the bustling streets of commuters, residents and shoppers make it a prime location for social and cultural intervention. Dom Jose de Barros Street is pedestrianised, allowing for informal street trading and pedestrians, who create a hub of activity within the surrounding streets. A public park is also situated in the north-east, at the end of 24 De Maio, and is linked to the city through its surrounding streets and pedestrian walkways.

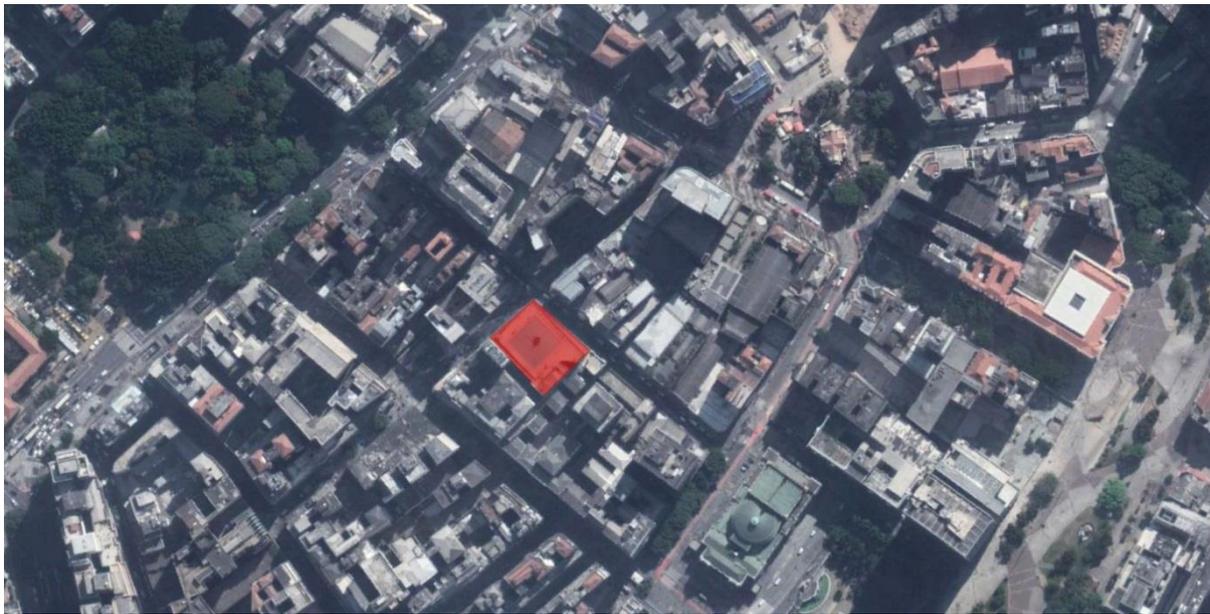


Figure 5.2.3 (top) Building location and surrounding areas (Google Earth, 2018). **Figure 5.2.4** (bottom) SESC 24 de Maio (Kon, 2017). The aerial image shows the building within the dense city context.

5.2.3 OBJECTIVES, PROGRAMME AND PLANNING

The architects MMBB and Paulo Mendes de Rocha wanted to create a multi-dimensional, cultural and recreational facility to house a variety of functions under the themes of 'co-existence, inclusion and transformation'. De Rocha believed that 'the city should be for everyone' (Carvalho & ArchDaily, 2018) and that 24 De Maio would be a model for the transformation of urban centres. The architects' conceptual core for this project was the provision of a functional system that had the ability to create intense meaning for its users by demonstrating the virtues of the future life of the city, while drawing on the cultural heritage of the existing place (Carvalho & ArchDaily, 2018). Further, it can be seen that the process of transformation and development of a city is in reality a slow adaptation to change that includes the societies that reside there (Lalueta & Metalocus, 2017).

The building comprises 13 stories, each with a different function. The design for each floor is as follows: the ground floor is completely open, allowing for an extended space to the street and pavements (Figure 5.2.5); the basement, previously used for parking, is now a 200-seat auditorium for plays, concerts and other performances; the first floor contains administrative offices, a restaurant and café; floors two and three are utilised for flexible co-working space; floor four contains cultural areas and a library (Figure 5.2.6); floors five and six have studios, places for work and research, and an exhibition space; floor seven has a government-subsidised dental practice, which breaks the building space; and the remainder of the floors (eight to 13) are used for sport and dance activities. All of the above spaces face north and have views into the street and the rest of the city.

The public circulation for the building, in the form of a continuous ramp, is adjacent to the main interior functions, with fire escape stairs and lifts on the south-east side of the building. All ancillary functions and building and maintenance services . such as electrical, mechanical, plant rooms, toilets, and changing rooms . are separate from the primary form and located on the south side of the building. Further, the existing structure of the office design had an internal atrium, which was closed to form the new structural core of the building, which is supported by four large columns that span from the ground floor to the roof level, below the new rooftop pool. Closing this atrium allowed for continuous space for further development of activities.

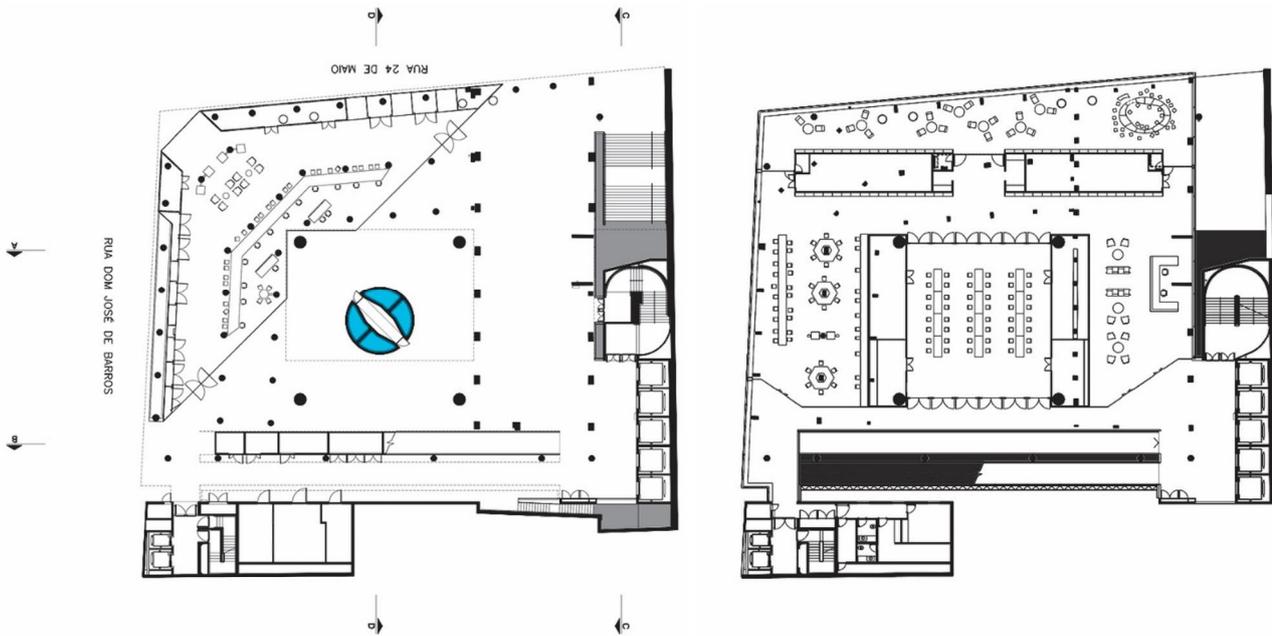


Figure 5.2.5 (left) Ground floor plan (Archdaily, 2018) Figure 5.2.6 (right) Fourth floor plan (Archdaily, 2018).

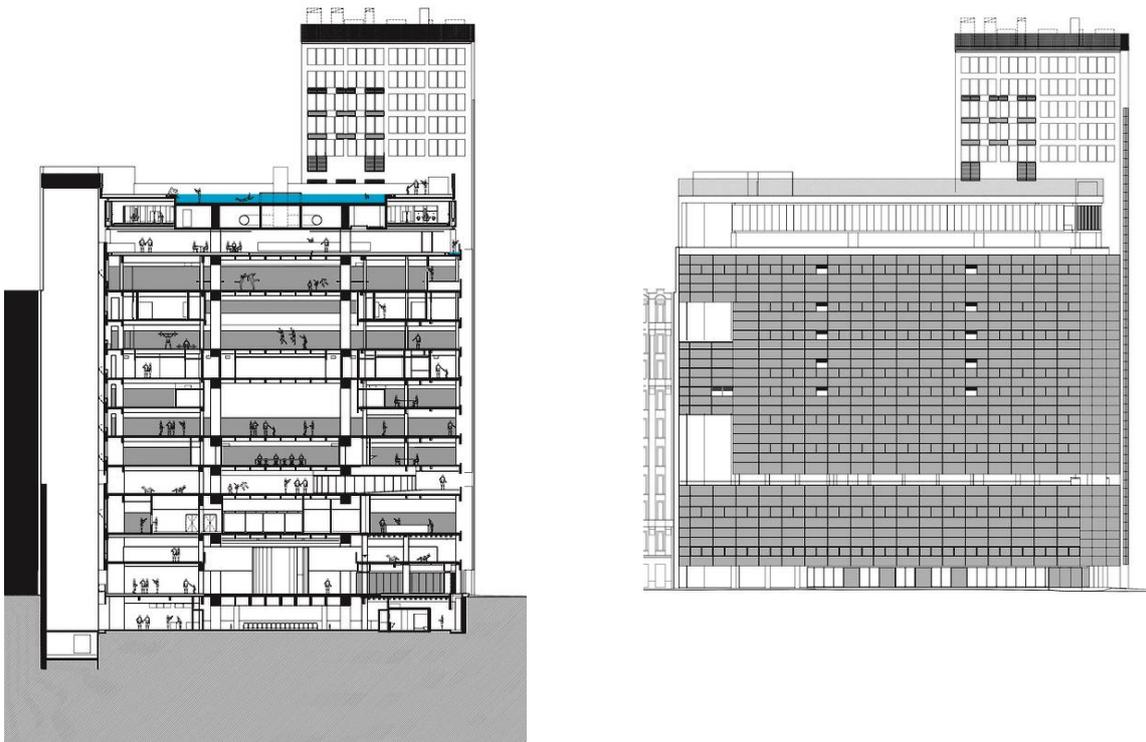


Figure 5.2.7 (left) Section A (Archdaily, 2018) Figure 5.2.8 (right) General building elevation (Archdaily, 2018).

5.2.4 DESIGN AND BUILT FORM

Design Approach

The architect's approach to the design makes the building more breathable and provides necessary functions for its intended users. This was achieved by employing four principles. The first is *openness*, with the ground floor designed as an extension of the street, open to both roads, and encouraging people to walk through the space. The second is *accessibility*, with a new vertical circulation that is clear and bold and invites people to explore all levels of the building in a playful way. Similar to the concept of a vertical promenade, the new circulation core links the various functions and activities on each level. The third principle is *transparency*, with each floor having large, open spaces and minimal enclosed spaces. This is done so that people are able to visually connect with one another, as well as with the activities being performed. Users are able to look out at the city from public spectator spaces, while others can look into the building. This level of transparency promotes safety and security. Lastly, with the principle of flexibility, many spaces are left open, to be filled with functions needed by users, as Mendes de Rocha stated that, "Architecture's purpose, after all, is nothing more than to support the unpredictability of life." (Moreno, 2018)

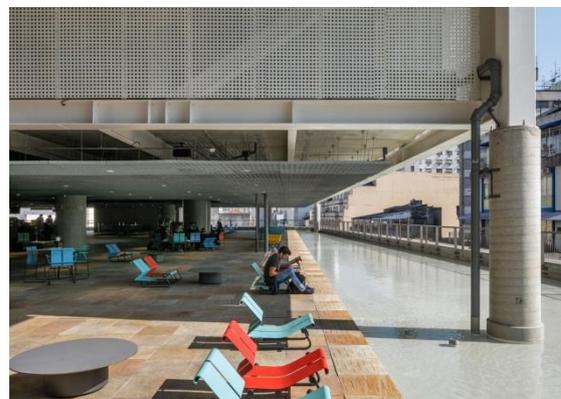
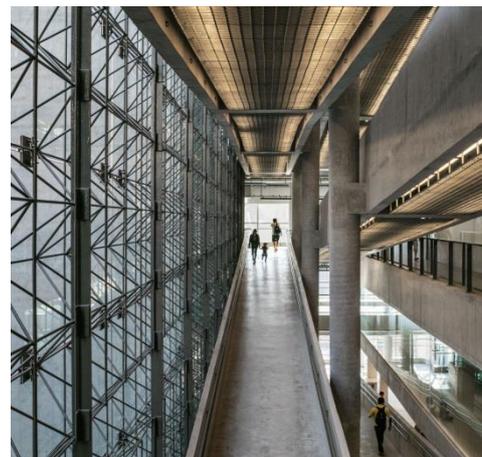
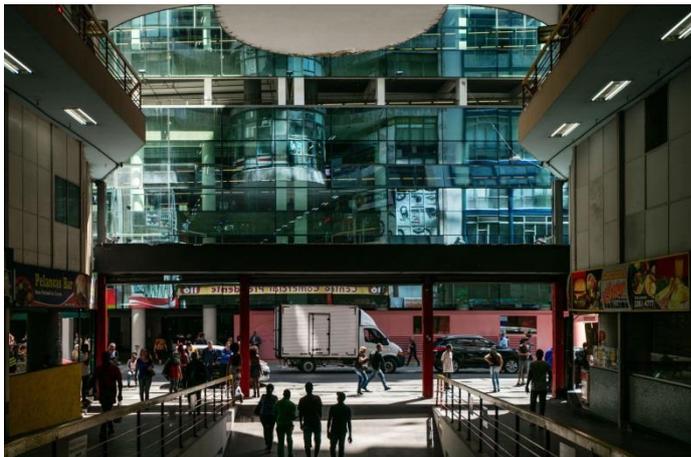


Figure 5.2.9: *Openness* – Ground floor entrance. **Figure 5.2.10:** *Accessibility* – Main pedestrian ramp throughout the building. **Figure 5.2.11:** *Transparency* – Users are able to look from one space and into others. **Figure 5.2.12:** *Flexibility* – Public space, movable furniture and adjustable space (Nelson Kon, Archdaily, 2018).

Internal and External Surfaces

Mendes de Rocha is famous for his cultural buildings in Brazil, in particular in Sao Paulo. His trademark architectural style is of a brutalist nature, as he embraces raw concrete form and minimalist detailing. In addition to this, the parameters of the existing building provide limitations for aesthetics. The architect, therefore, drew upon the clear and simple characteristics of elements to highlight the link between new materials and old building structure. This is evident in the tall, reflective glass facades that provide a window to the robust, unfinished concrete structure behind it and a reflection of the surrounding city.

The internal finishes of the building echo the principles of the exterior, whereby the concrete and steel structure is exposed and lighting, ventilation and water services are left open, instead being covered by a ceiling board. The interior walls are painted or left in their raw material state, while the floors in more trafficked areas are polished concrete and in quieter spaces are tiled. The internal furniture, designed by Mendes de Rocha, is robust and simple. It is not bolted down to the floor and therefore allows people to sit and interact with the space or one another in whichever way they please. The interior materials enhance the buildings functions, while being durable and sustainable in the long term.

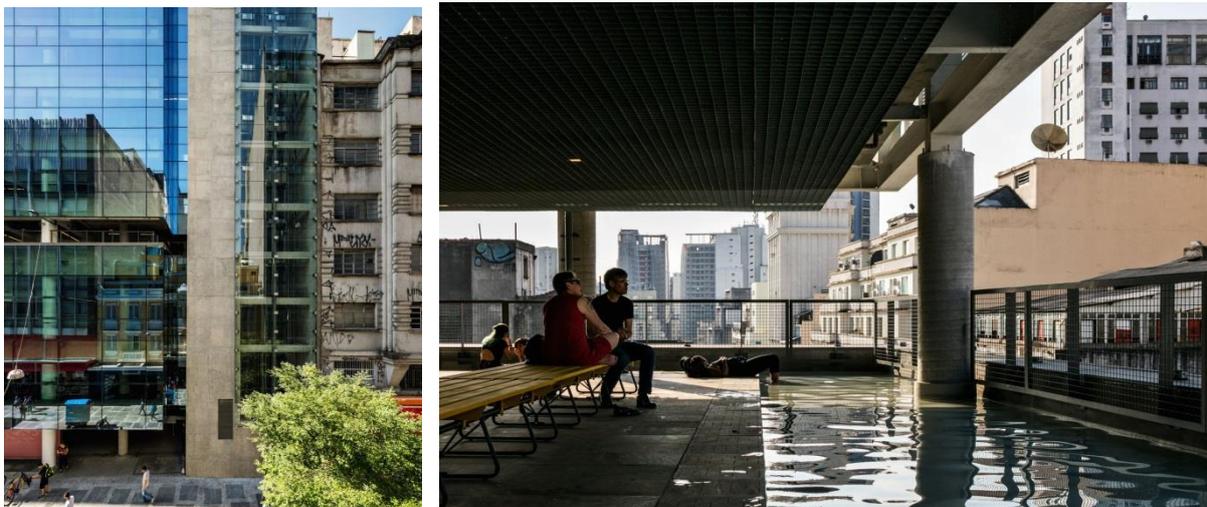


Figure 5.2.13 (left) Concrete and glass facades. **Figure 5.2.14** (right) Unfinished, robust and exposed external structure (Kon & Archdaily, 2018)

Lighting and Ventilation

One of the biggest structural changes to the building occurred in the atrium, where the light well was closed and the space converted into an independent core. With regard to lighting and ventilation, the architects have flipped this notion and opened the building up on both the north-east and north-west facades, allowing for cross-ventilation through the building. Double volumes and large glass facades allow light to penetrate deep into the building

spaces. Additional natural light enters and cross-ventilation occurs through the façade behind the circulation ramp, which is perforated and open to the elements. All of the spaces obtain adequate amounts of light, as the building is open at night for various functions. Lighting, in the case of this building, is extremely important in making users feel safe at all times when they utilise the building.



Figure 5.2.15: (left) Exposed services in exhibition space. **Figure 5.2.16:** (right) Furniture is flexible; people are able to move where they want to sit (Kon & Archdaily, 2018).

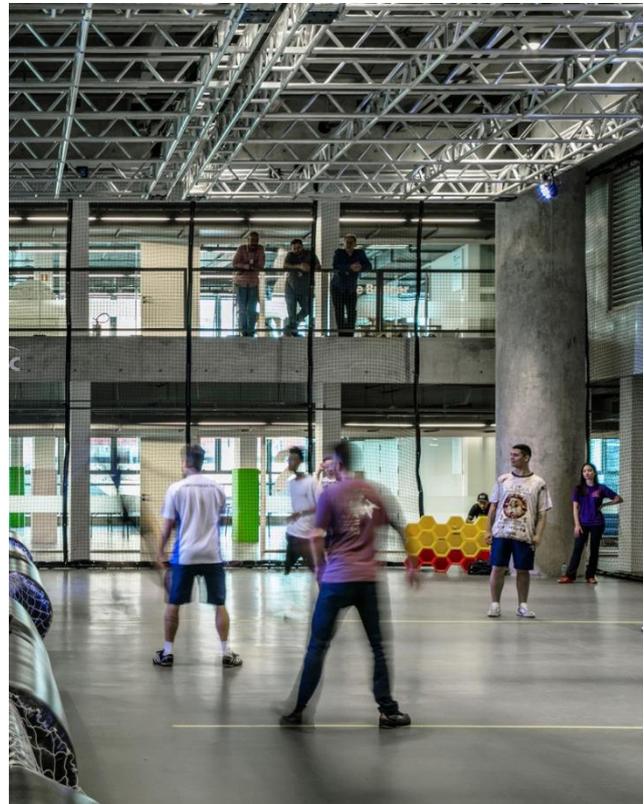


Figure 5.2.17: (left) Building is well-lit at night. **Figure 5.2.18:** (right) Double-volume spaces and netting is used to separate the space instead of a solid wall (Kon & Archdaily, 2018).

5.2.5 OBSERVATIONS

The fundamental design principles of resilience are adaptability and transformability across all scales, in the short and long term. Through the theory of resilience, analysis of the 24 De Maio building and its urban context reveals that its architectural intervention is profound in terms of the built response being sensitive to the decay of the existing building and its functional obsolescence. This is despite its external appearance contrasting to the original building, with its modern glass façade and sharply angled form and the internal spaces of the building being designed for functional flexibility and transformation, with minimal insertion of internal infrastructure, and the provision of large open spaces.

Furthermore, through the theory of culture, it is observed that the architects have provided basic, upgraded and robust infrastructure for people to use, in whichever way, to meet their needs. By doing so, they allow people to use the cultural identity and diversity to insert meaning and richness to architectural form. According to Mendes de Rocha: "The liveliness and the use of space are made by people, not architecture, we choose to add ramps that crisscross and merge floors as we understand that it is less intimidating to visitors" (Moreno, R. 2018).

Utilising the theory of linkage, by treating the upper floors of the building as an extension of the streetscape, the architects have allowed the identity of the city to extend upwards into the form, thus enhancing visual and social connections on all levels. As a result, the urban heritage of the city, by providing basic social and cultural needs, preserves the life of built form and uses people as its core, thus linking people to place through architectural space.

Lastly, through critical analysis of the building, it is observed that the internal spaces represent density and diversity, but the opposite can be said for the external appearance of the architecture, in that the architectural style still represents that of an office building. Furthermore, although Durban and Sao Paulo are both in developing countries and have a rich heritage and diverse cultures, Sao Paulo is a mega-city and its inhabitants' needs will not be the same as those of people who live in inner-city Durban. This will be taken into consideration in terms of the functions for the proposed building typology.

5.3 FIAT LINGOTTO, TURIN, ITALY

Reuse of Iconic Architecture

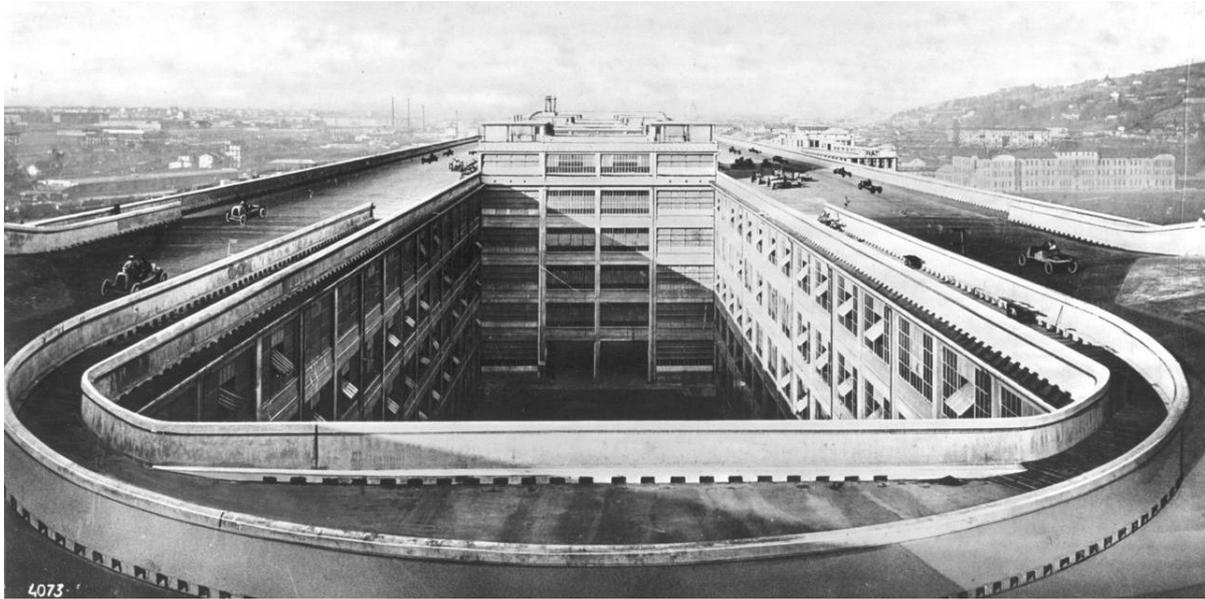


Figure 5.3.1: A racetrack in the sky (Fiat Group, 2014).

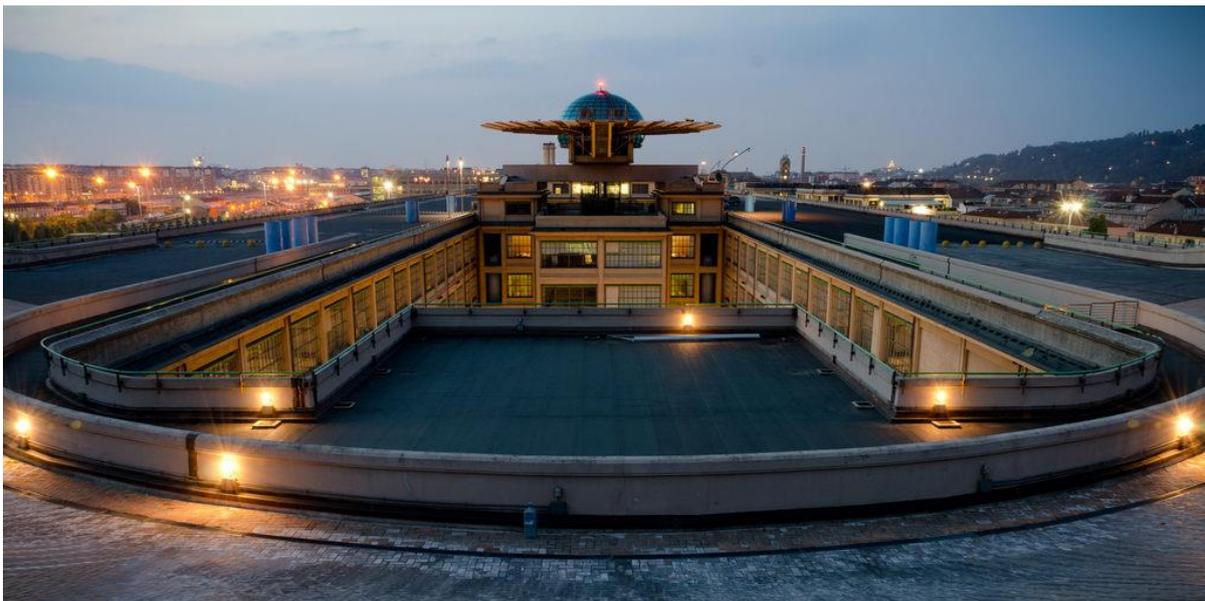


Figure 5.3.2: From the peak of the test track – The Lingotto Building (Godwin, 2012).

	OLD	NEW
Building Typology:	Fiat Lingotto, Automobile Factory	Multi-purpose Facility
Architect:	Giacomo Matte Trucco	Renzo Piano Building Workshop
Building Location:	Turin, Italy	Turin, Italy
Project area:	400 000 m ²	400 000 m ²
Project year:	1916. 1926	1991. 2003

5.3.1 PROJECT BACKGROUND

Turin, the capital of the Piedmont region in northern Italy, is surrounded by an arc of mountainous landscape. The city was Italy's first capital from 1861 to 1865. It is thus a political centre historically, but when the capital was moved to Florence, Turin lost some of its density. In 1880, the government decided to rectify this by making the city the industrial capital of Italy, due to it having a high number of skilled citizens and being accessible via the major railway that ran through it. In the late 1800s, with the phenomenon of rapid industrialisation, especially in the automotive industry, Fiat was established in Turin in 1899 and its Lingotto factory opened in 1920. During the two world wars, Italy subsidised the automotive industry, which provided vehicles, aircraft engines, machine guns, trucks and ambulances for its offensives. Many areas of Turin were destroyed during frequent bombing in World War II, but after the city began to rebuild itself, more jobs became available in the automotive industry. Many Italians moved to Turin to seek employment opportunities, resulting in the city becoming known as the 'Detroit of Italy'.

The Lingotto factory was Fiat's first large modern industrial plant; constructed between 1917 to 1930, it was the largest factory ever designed. The building was active for 59 years and produced over 80 different models. The factory design was a response to the notion of 'Americanism' and drew on the American principles of rationalised production, which respected economics of scale and linear production designs. The factory had a revolutionary production system, which worked from the bottom to the top, instead of the reverse, and utilised a race track on the roof of the building to test the newly-built vehicles. Owing to its iconic form, production technique and scale, the building became well known among architects and engineers such as Le Corbusier and Reyner Hanham, and was referred to as 'a symbol of the modernisation of Italy'. In 1982, however, Fiat closed the factory as its productivity had fallen and the building then became obsolete. Its reuse only came later, as there was much uncertainty around the future of post-industrial buildings. In 1985, however, a competition was held, calling for features for the iconic structure. Renzo Piano's proposal was the most significant, as it put forward a mixed-use public centre, with various activities to be conducted in concert halls, a theatre, convention and shopping centres, hotel, offices and a university campus (Renzo Piano Building Workshop, 2012)



Figure 5.3.3: A race track in the sky (Fiat Group, 2014). Image showing the existing Lingotto building in relation to surrounding buildings.



Figure 5.3.4 A race track in the sky (Fiat Group, 2014). The racetrack on the roof level of the existing building.

5.3.2 URBAN CONTEXT AND SCALE

The building is situated in the Lingotto district in the city of Turin, Italy. The geological context of the area is relatively flat, but it is surrounded by an arc of mountainous landscape. The building, connected to neighbouring districts via bridges and walkways, is located along the busy Via Nizza road. Its east side faces the busiest part of the district and the River Po, and its west side the railway line and train station. The building consists of five levels and, at over 500 metres in length and an estimated 80 kilometers wide, it is the largest building in Turin. Its immense structure and iconic form make it a symbol for the city, as it represents modernity and industrialisation.

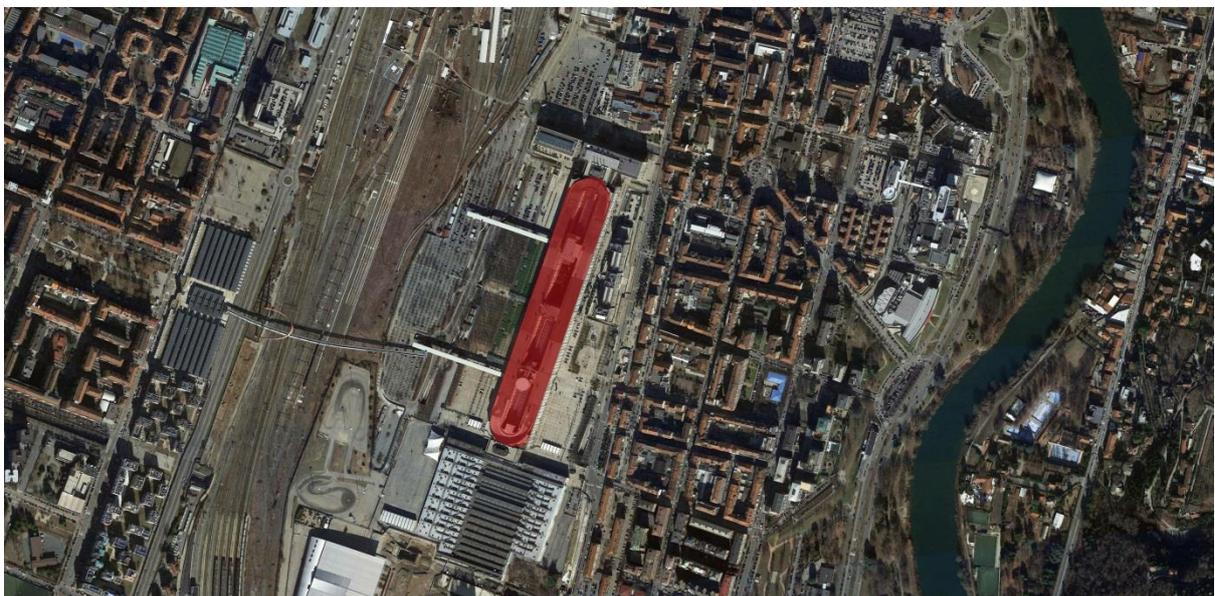


Figure 5.3.5: (top) Building within the urban context of Turin (Google Earth, 2018). **Figure 5.3.6:** (bottom) A race track in the sky (Fiat Group, 2014). Aerial view of the factory in relationship to the railway line and the River Po.

5.3.3 OBJECTIVES, PROGRAMME AND PLANNING

Renzo Piano won the competition for the reuse of the Fiat Lingotto building, based on his pragmatic response to the building's obsolescence. He had viewed the building as urban space and provided functions for cultural use that would not become obsolescent, thus creating a cultural link between the existing context and Turin's new cultural hub. Piano proposed revitalising the existing structure by protecting and enhancing the longevity of structural elements. By stripping the inside of the building to its bare form, it could be divided up to provide a range of functions that would be implemented in phases over 16 years.

Piano aimed to break up the original structure of the factory, which had been based on scientific theories of efficiency for car assembly line production, with functions for people instead of motor vehicles. The main production building was essentially a horizontal skyscraper, due to its size and scale. After the reuse phase, the original and new structures can be described as two long buildings that run parallel to each other and are joined at each end. They are linked by towers at regular intervals, with three in the middle that created four central courtyards. During the revitalisation of the building, the architect broke up this notion by creating pockets of social space that were able to interact with one another through the central courtyards (Renzo Piano Building Workshop, 2012).

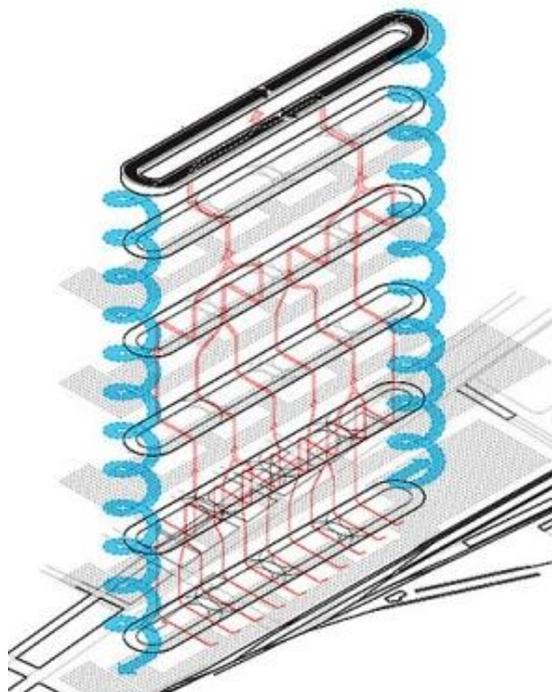


Figure 5.3.7: (left) Programmatic sketch, red being the vehicle production, black the roof race track for testing and blue the finished product leaving the building (Joslin, 2015) **Figure 5.3.8:** (right) An internal courtyard that breaks up the length of the building with its pockets of public open space (Gardin, 2003).

In 1992, the exhibition centre was built, followed by the conference centre and auditorium in 1994, a hotel in 1995, the service centre and various offices and commercial spaces in 2002, a second hotel in 2003 and a campus of the Turin polytechnic, a school offering a degree in automotive engineering. One of the building's completely new features, which adds to the iconic nature of the structure, was the bubble, an eight-metre-high conference facility constructed as a glass sphere on top of the building.

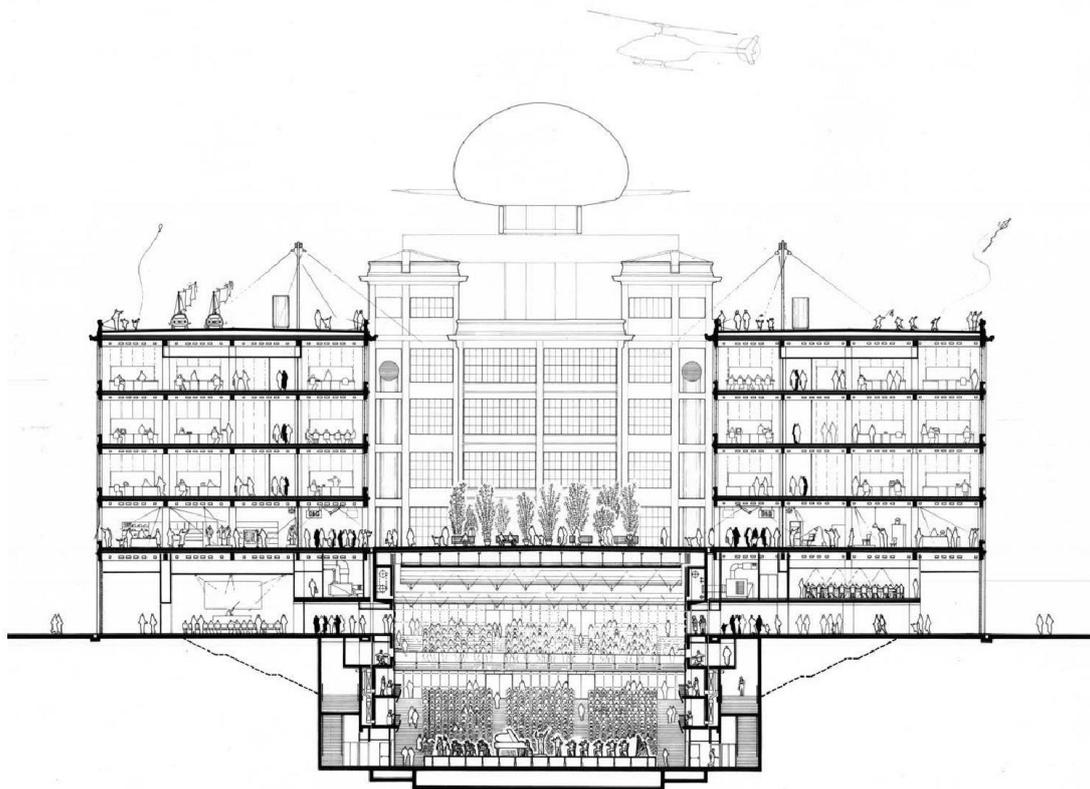


Figure 5.3.9: A section through the renovated building design showing the various functions on each level (Renzo Piano Building Workshop, 2003).

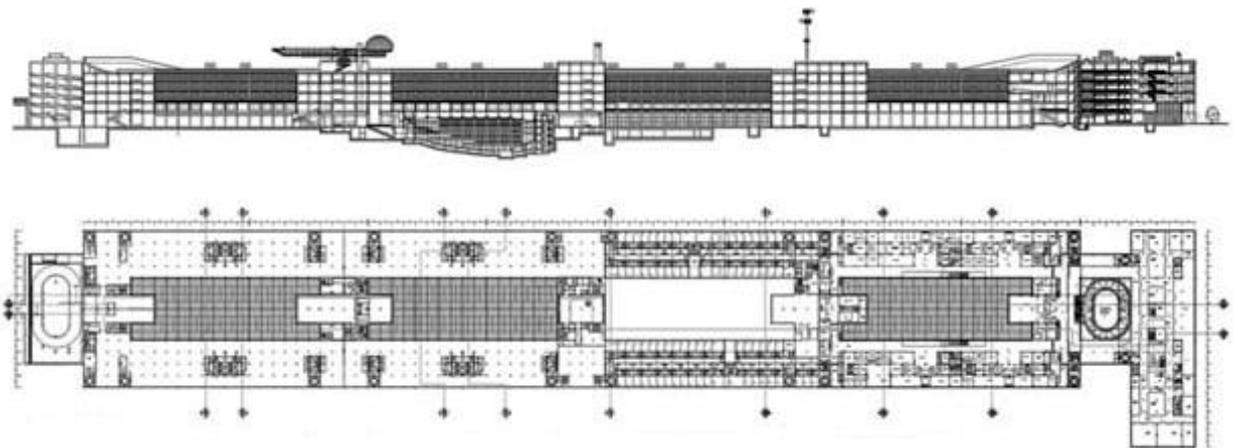


Figure 5.3.10: Plan and section through the adapted new design (Renzo Piano Building Workshop, 2003).

5.3.4 DESIGN AND BUILT FORM

Design Approach

The Fiat Lingotto factory is a symbol of the modern movement and, for this reason, the company wanted to preserve its identity and convert it into a resource that would promote life in Turin and add to cultural life in Italy. With this in mind, the architects' approach to the design was to retain as much of the architectural identity of the existing building as possible and provide socio-economic and cultural functions that would ensure the longevity of the building, so that the risk of obsolescence was minimal. In order to determine the functions for the building, various architects came up with a series of proposals that were exhibited to the people of Turin for them to vote upon, and those of the Building Workshop were selected (Buchanan, 1992). The architects aimed for a pragmatic yet holistic approach, whereby the building design would provide a mechanism for interaction and innovation for the community in which it is situated.

Internal and External Surfaces

A quote by Renzo Piano, made during his acceptance speech for the Pritzker Prize in 1998, has great significance in terms of his approach to design, especially concerning the Lingotto factory. He said: "Architecture is like an iceberg, in the seven-eighths of the iceberg that lie below the water, we find the forces that push architecture up, that allow the tip to emerge: society, science and art+(Petkanas, 2005). There is a strong contrast between interventions to the external appearance of the new design and the interior in terms of visual change, with the exterior looking almost identical to the original design, but the interior having changed dramatically, to suit new functions. The two main elements of design that are completely new and add to the grandeur of the building are the "bubble" and the helipad, which both act as icons and markers for the new design, while staying true to the original building(Renzo Piano Building Workshop, 2012).





Figure 5.3.12: *The Bubble (Gardin, RPBW. 2003). One of the iconic features of the new design includes the glass bubble conference room and helipad.*

The structural concrete was treated to protect and enhance its lifespan. More than 2,000 steel sash-awning panelled windows were replaced to ensure their safety and stability, and the racetrack on the roof of the building. The visual language of the existing building was kept intact and the lifespan of these elements was extended. As the previous building function was a factory, no internal finishes were worth retaining, so the new interior was modern. The language of the external elements was carried through to the interior finishes, for example, the grid of the panelled windows was utilised for the wooden wall cladding in the hotel's reception area (Renzo Piano Building Workshop, 2012)

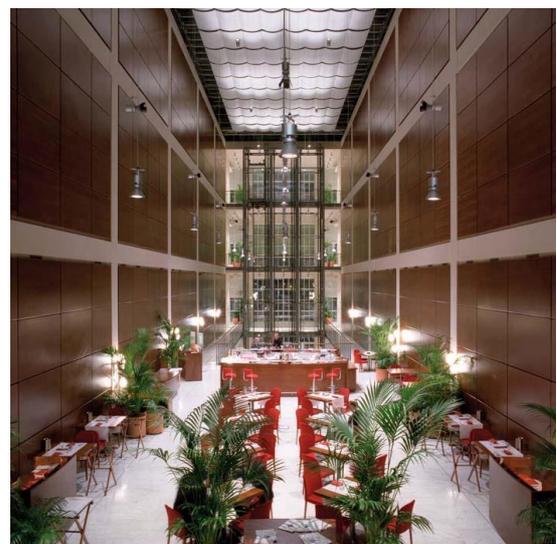


Figure 5.3.13: *(left) External façade (Gardin, RPBW. 2003). Figure 5.3.14: (right) Hotel, interior finishes (Gorgio Cravero, RPBW. 2003).*

Lighting and ventilation

The greatest challenge was bringing in natural light, so the large glass windows on the facades of the building were retained and, although the courtyards remained enclosed, the roof was fitted with glass to become like a giant skylight with moveable blinds (Petkanas, 2005). Further, double-volume spaces were created on the ground floor in both the reception and lobby areas to allow for natural light. As the building is long and narrow, with internal courtyards and large windows, this encourages cross-ventilation for spaces to be cooled. Internal arcades were created, with ample shading and plantings, emulating some of the typical public spaces enjoyed by people in Turin.

The revitalisation of the Lingotto factory has been a catalyst for the redesign of its surrounding areas. In addition, a concerted effort has been made to link these areas to the Lingotto centre, through bridges, walkways and proposed shuttle links.

5.3.5 OBSERVATIONS

By exploring the Lingotto building and the approach to adaptive reuse by the architect, it can be critically observed that although the exterior preservation of the building maintains the original iconic form and design, the interior is a complete contrast, and the history of the processes of the factory have been altered with new functions and covered interiors. The size, structure and appearance of the factory were not the only reasons that made the building so revolutionary. The production technique and unique manner of producing automotive products was also profound, however, the new design has not celebrated these.

The Lingotto building (through the theory of culture) represented the modernist movement and rapid industrialisation, and the new design has retained its iconic appearance and preserved the culture and identity of this Turin landmark. The preservation of one of the largest buildings in Turin reflects meaningful architecture, as its form and structure had symbolised the heritage of place during a certain time.

This notion of culture and identity was enhanced (through the theory of linkage), as linkage refers to the connection of people to their built environments. The revitalised building provides the historic connection with a familiar exterior, with which people feel comfortable and, in contrast, the visually appealing internal spaces and their various functions produce responses of awe and surprise. These new functions address the needs of the people and promote diversity and inclusivity through social, economic and cultural functions. It can be observed that the historic symbolism and meaning of the building attract visitors, who want

to explore its entirety. They are able to stay and experience the internal space and connect with the new functions that are provided. As a result, there has been a reactivation of place within the urban context of Lingotto and the city of Turin.

The Lingotto building (through the theory of resilience) has been adaptive and transformative through periods of obsolescence and shock. It can be seen that a holistic and sustainable intervention has been created with the redesign of Lingotto, which provides a wide range of building functions to meet the needs of Turin's communities, who were involved in the decision-making.

5.4 CONCLUSION

The fundamental conclusions, drawn after analysing these three precedent studies, can be explained in terms of culture, linkage and resilience theories. The similarities are that culture and identity, through historical heritage and symbolism, are the base for the creation of adapted architecture; they provide the fundamental base for infrastructure, which is responsive to local context and important in terms of creating a link between people and architecture and the local environment. Further, this notion may be represented through the functions of the building, the aesthetics of the design, or its connections to the urban context. Moreover, the cultural and human connection to the architecture, flexibility of space and design, and the sustainability of material and built form can be what make new or regenerated architecture resilient in the context of the city. It can be said that if a building is able to adapt and transform to the needs of the community over time and the community can connect to a particular place, then, in the future, there is less risk of decay and obsolescence for that place. The ideologies that concern the evolution of place and built form will be considered critically in the project design proposal, which looks at adapting and transforming the architecture of the city.

CHAPTER 6

STRATEGIES FOR FOOD SECURITY AND ADAPTIVE REUSE IN
DURBAN

6.1 INTRODUCTION

In order to generate an agricultural hub that addresses the dimensions of food security as a means for adaptivity of urban architectural space, this chapter will analyse two case studies for inner-city Durban. The first is The Pixley House, a department store that has been converted into a low-income residential building on Dr Pixley Kaseme Street. The second is the Early Morning Market in Warwick Junction, one of the oldest markets in Durban, which provides fresh produce to most the inner-city communities, commuters and local businesses.

The Pixley House is explored for its connection to the adaptation and transformation of existing infrastructure in the inner city; it will be critically analysed for principles that relate to the adaptive reuse of architecture and the context of the inner city in which it exists. The Early Morning Market has been selected as a case study for its link to food security in the inner city. By understanding the dynamics of the market and its influence within the dimensions for food security, strategies for integration and improvement can be observed. This chapter further highlights the way in which the city of Durban responds to urban decay through adaptive reuse, as well as to the needs of the Early Morning Market traders of Warwick, as it puts in place programmes and strategies for the preservation cultural identity and heritage, and the improvement and sustainability of the livelihoods of traders.

6.2 THE EARLY MORNING MARKET – *Integrating Informal Workers into the Inner City*

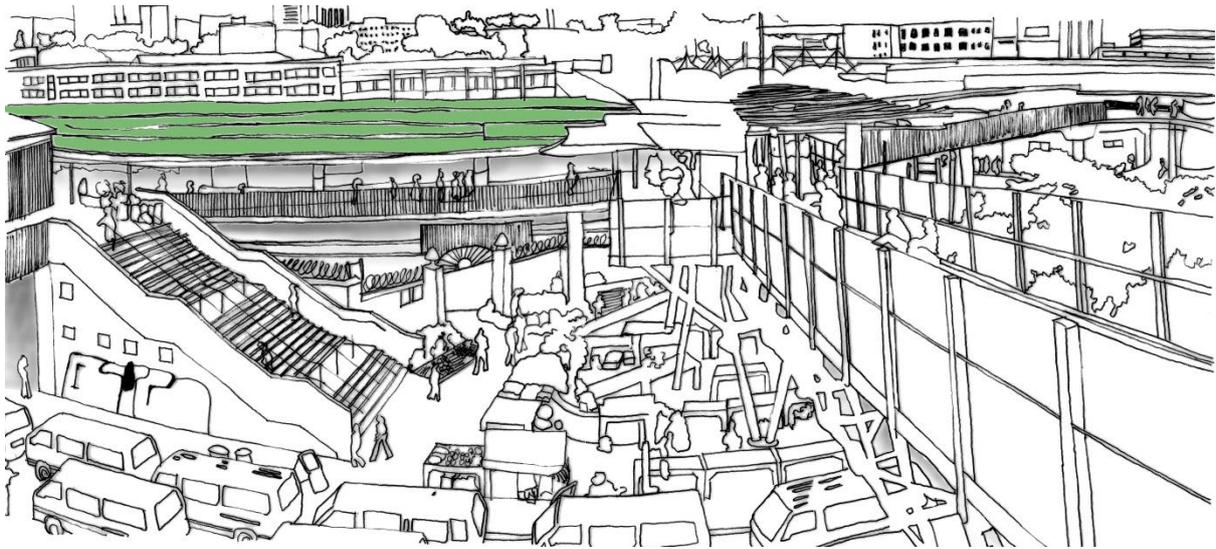


Figure 6.2.1: *Bridge from the inner city to the Early Morning Market (Author, 2018).*

6.2.2 MARKET BACKGROUND

Summarised background and justification for study

In contrast to the following case study, which looks at a particular building, this research analyses the Early Morning Market in Warwick Junction while considering the surrounding sites. It examines the trading community that operates from this market, their historical background and what the municipality has done to improve their livelihoods and integrate them into the urban fabric. Further, understanding the importance of the markets through the themes of cultural identity and food security provides justification for the preservation and sustainable improvement of the market.

The Early Morning Market, as previously mentioned, is one of the oldest markets in Durban . formally established in 1910, it still operates today. The market has become a place of historical significance and a heritage symbol, both locally and internationally (Moodley, 2014). The market in Warwick Junction unofficially began to 1870, however, when the first Indian farmers decided to settle in Durban, after living in the area for more than five years, during which time they had worked as indentured labourers. By 1884, it was estimated that over 20,000 free Indians had settled in Natal, and owing to the previous nature of their work, they turned to market gardening as a means of income. The city, therefore, provided a convenient location for them to sell their produce. It is noted, though, that the majority of traders do not currently grow their own produce.

In the early 1970s, these Indian farmers and retail traders were forced to turn to hawking and street trade as a strategy for survival. In 1876, the Durban town council provided land for trading. The original market was open to the air and located in an area surrounded by the then-named Pine (Monty Naicker Rd), Gardiner (Dorothy Nyembe St), Smith (Anton Lambede St) and Aliwal (Samora Machel St) streets. In 1910, the market in Victoria Street had become too congested and those who were trading fresh produce had to do so from the crates and carts that they used to transport the food. The council wanted to stop the trading in Victoria (Bertha Mkhize St) and Brook streets, however, in attempts to relocate Hindu traders and drive them out of the CBD. The Early Morning Market was a response to this and was officially opened on February 1, 1934. It was, from the start, a market for equal use for people of all races.

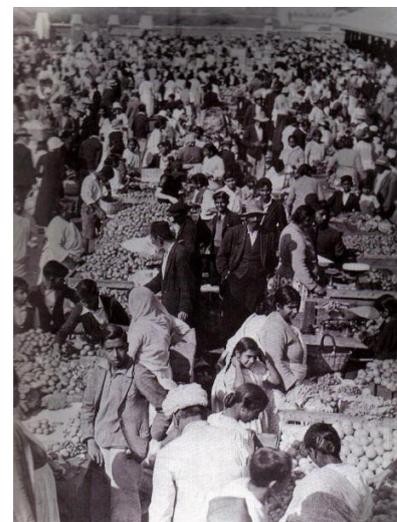
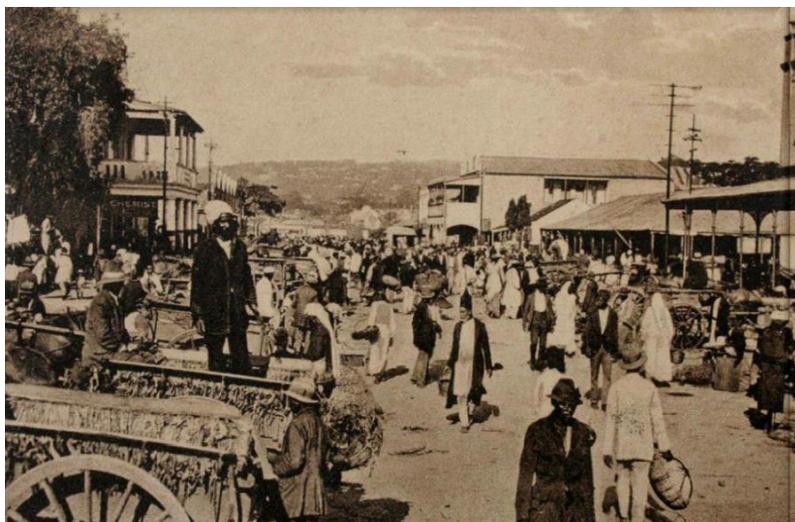


Figure 6.2.2: (left) *The Squatter's Market in Victoria Street, established in 1910 (Rosenburg, 2012).*
Figure 6.2.3 (right) *Scene at the Early Morning Market in Warwick Ave, Undated. (Rosenburg, 2012).*

Later on, apartheid planners rezoned Warwick Avenue Triangle and the nearby streets for the exclusive occupation of whites. This resulted in the removal, under protest, of market farmers who traded at Warwick, to the national fresh produce market in Clairwood. Non-farming traders were allowed to trade there with temporary permits. Thus the Early Morning Market is a symbol of the struggle of black and Indian people for economic survival and control of urban land, but, more importantly, it represents the struggle for freedom, the fight against the apartheid government and racial discrimination. Finally, in the 1980s, traders were recognised for their contribution to the economy and granted permission to remain at specific trading locations. In 1990, the early morning market building was upgraded by the municipality, which allowed more light in and ventilation to flow through the space. Since the democratic elections of 1994, trader committees have been established to work alongside

the municipality and support organisations, so as to create and maintain effective and inclusive informal trading for the thousands of people who depend upon this activity (Frescura & Rossenburg, 2010). Despite the needs of this community, the municipality proposed, in 2009, to convert the Early Morning Market into a shopping mall. After much protest, as this would have put many of these informal workers out of a work, as they rely on the market to support their families, the municipality backed down. However, this resulted in deterioration in the relationship between local officials and informal traders and their unions, so the future of the market remains unknown. However, there are a number of organisations today that provide support and advocate for the rights of the traders, as well as promote participatory governance for the inclusion of traders into the urban fabric of the city (AeT, iTrump). Despite these efforts, the Warwick Junction area has continued to suffer from neglect and marginalisation by the municipality, with traders operating under poor conditions and infrastructure, as well as with limited services (Women In Informal Employment: Globalizing and Organizing, WEIGO, 2015).



Figure 6.2.4: Street traders outside the Early Morning Market in David Webster Street (Author, 2018).

6.2.3 URBAN CONTEXT AND LOCATION

Location of the Area

The Early Morning Market is located in inner-city Durban, on the corner of Julius Nyrere and David Webster streets in Warwick Junction. The market's location is valuable, as it is at the heart of the junction, which is one of South Africa's largest trading hubs. Surrounded by bus and taxi ranks, as well as being directly in front of the Berea Train Station, the market

depends on the foot traffic of commuters and prides itself on being convenient and affordable. Although it is a prime location for buying and selling produce, Warwick is one of the outlying precincts of Durban city and the connections between the inner city and Warwick are not well pronounced.

The markets are divided into seven different types, based on the goods and services provided. They are scattered around Warwick Junction, their location derived from any available space accessible to pedestrians and commuters (Figure 6.2.4). The Early Morning Market is the largest market in Warwick, with over 670 stalls and two to three assistants per stall; it provides spaces for fresh produce, spices, flowers and livestock (Skinner, 2010). Furthermore, traders purchase their produce from the Bulk Foods Market in Clairwood, as well as from local farmers. It is delivered to the markets daily and transported to various stalls by porters.



- 1 The Project Centre
- 2 Fresh Produce
- 3 The Bovine Head Market
- 4 Mixed Trading Strip
- 5 The Early Morning Market
- 6 The Music Bridge
- 7 Traditional Medicine Market
- 8 Brook Street Market

Figure 6.2.5: (top) Map highlighting the markets of Warwick in relation to the rest of the city. Roads which link the markets to the rest of the city are dotted in black (Google Earth, 2018, image edited by author). **Figure 6.2.6:** (bottom) Map indicating the eight markets of Warwick (Google Earth, 2018, image edited by author).

6.2.4 OBJECTIVES, PROGRAMME AND PLANNING

This section examines interventions for traders through three lenses that explore resilience within city systems: Socio-economic (people), environmental (place) and built form (Infrastructure/Architecture). Through the Warwick Junction Urban Renewal Project, which has been running since 2006 with AeT, interventions and initiatives have been developed to address the needs of informal workers and integrate them into the urban context of the city. This will be compared with the current needs of traders at the Early Morning Market, which include the following:

Socio-economic View

Asiye eTafuleni (AeT) has been developed for the Markets of Warwick to advocate for the traders and provide infrastructure to improve their current situations. The organisation strives to be the voice for informal workers within urban planning and policy making agendas, as it aims to change the perception of the market and its workers through media management, public presentations, education, engagement in the private sector and promotion of worker empowerment (AeT, 2017). Furthermore, it offers education and training to people who want to learn more about the informal workers in Warwick, through the provision of tours, training programmes and research. Informal workers can benefit from basic numeracy and business training, as well as seminars that focus on health and safety, and regulations. Although these programmes have been quite successful, many traders work at the markets because they have been unable to find any other jobs in the city. For some, trading is all they have ever known. This researcher has noted that an interesting dynamic exists between stall owners and trading assistants, whereby the former employs the latter to run various stalls. The stall owners train their assistants on how to sell the fresh produce to advantage and how to make customers happy. For many of the traders in the market, though, this is their only source of income, but it is either never enough or it just provides enough income to survive on. This reality is compounded by the fact that traders have to be at the Early Morning Market between 5.30am and 6.00am every day, which means many of them have to wake up at 3.30am to prepare food for their families and do housework before they leave home. Logistics and cost of travel is an unwanted expense for informal workers.

Environmental View

The Early Morning Market, as previously mentioned, is situated in a prime location within the transport hub of Warwick Junction. The notion of place can be looked at through two themes . the physical and symbolic attributes of the environment. The physical refers to the maintenance and accessibility of space, the upkeep of stalls, storage space and walkways within the Early Morning Market and the condition of the space as a result of poor access to

water, electricity and cleaning services provided by the city, which, through observation, is lacking. Further, issues of pedestrian traffic through the market have resulted in %low+days for many traders. The historical significance of this market, in the context of place, is a crucial asset for the city, as it is a symbol of the amalgamation of people from various cultural and ethnic backgrounds, united for the sole purpose of trading and providing sufficient income for their families. Any urban regenerative interventions and initiatives therefore note that any form of intervention must be sensitive to the historical and cultural preservation of the identity of the market and surrounding areas. The following section examines how this could relate to built form interventions.

Built Form View

Since 1995, many of the surrounding markets have been allocated space and areas for trade that have been designed and completed: for example, the facility for bead sellers in 1999, the Brook Street Market upgrade in 1997-2008, and the facility for the bovine head cooks in 2003. Other than the upgrade of the Early Morning Market in 1990, little has been done to improve the infrastructure for these traders. Issues of light, ventilation, well-constructed trading space and clean, safe and accessible cold and dry storage still concern these traders. Recently, the municipality proposed to build a shopping mall on the site of the Early Morning Market. The repercussions of a mall for these traders threatened their livelihoods and have, to an extent, broken the trust developed over the years between the local municipality and traders. Further, although the markets have been recognised as being an important contributor to the economy and a symbol of the city's cultural heritage, their future remains uncertain.



Figure 6.2.7: Inside the Early Morning Market, traders display their produce outside the storage areas. The spaces are relatively dark and artificial light is required (Author, 2018).



Figure 6.2.8: (left) Some of the spaces utilised for storage and trading within the market (Author, 2018). **Figure 6.2.9:** (right) Porters move between trading corridors, carrying produce from storage to trading tables (Author, 2018).

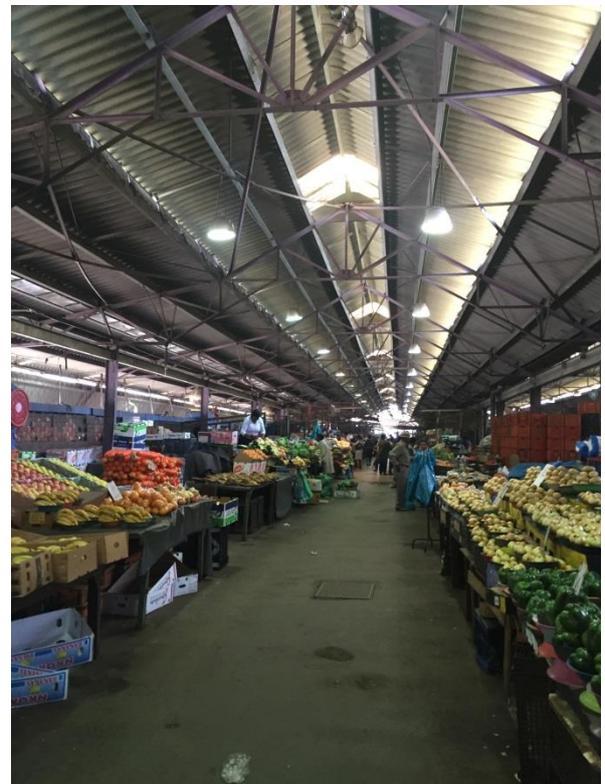


Figure 6.2.10: (left) Traders need to use artificial light to display their goods; stalls are lit up in comparison to the rest of the market (Author, 2018). **Figure 6.2.11:** (right) Produce is displayed in cardboard boxes, crates and bowls (Author, 2018).

6.2.4 OBSERVATIONS

Site visit observations

Upon approaching the Early Morning Market from Market Road, the streets are observed to be busy with fast-moving traffic and there is high pedestrian movement on the pavements, as locals and commuters move to and from their places of work. Outside the market, the permanent concrete trading stalls and pavements are packed with a variety of goods, with clothing, cosmetic products and produce arranged for sale. Porters are moving produce in large boxes and crates between markets and trading stalls. Visitors entering the market from the corner of Julius Nyerere and David Webster streets, join the bustle created by traders preparing to start their day. Their assistants

are setting up tables and porters are collecting produce from the central storage units within the market. Being the first day

of the month, the market is especially busy and customers are already about. The sounds, colours and vibrancy of the market make one feel a part of this place and the community that has become embedded in the urban fabric. The traders at the Early Morning Market are friendly and always busy, working to make sure that they are able to

display the freshest produce for their customers. Although the streets that surround this market may be unsafe, according to the traders, the market itself enjoys a tightly-knit community: some of these traders have been working in the Early Morning Market for over 40 years, and before that it



Figure 6.2.12: A woman sells tomatoes, potatoes, peppers and onions that are either displayed in bowls or are pre-packaged (Author, 2018).



Figure 6.2.12: Chicken Traders in the early morning market. The market traders have formed a close-knit community (Author, 2018).

was their parents, grandparents and great-grandparents. Even though many of the variables have changed considerably over the years, trading is in their blood and coming to this market every day to earn a living is a part of their heritage.

6.2.5 CONCLUSION

Explorations of the Early Morning Market, using it as a case study to understand how Durban has responded to the needs of informal workers in Warwick Junction, has helped this researcher to develop insight into interventions that have been either successful or not and which areas need to be improved.

This case study highlights the importance of the markets for generating income for traders; further, it explores its location as being crucial in the urban fabric and also its interdependency on other city systems. The Early Morning Market has provided an example of a resilient city system in Durban, which is apparent through its ability to function for so many years.

Although much has been done to improve the livelihoods of these traders by providing better facilities and integrating them into the urban fabric through the Warwick Junction Urban Renewal Project, they still face many challenges. From analysing the market and contracting a deeper understanding for the history, systems and people of the place, it is noted that the municipality is working with organisations to improve conditions for informal traders.

However, there is a lack of accessibility to basic amenities, moreover, what needs to be explored to a greater extent is larger-scale interventions for providing infrastructure for traders, which goes beyond their daily trading needs. From this study, it is noted that trading at the Early Morning Market is not just about selling fresh produce to customers, as it is also interlinked with many socio-economic and environmental, and built form systems. One of these is the ideology that the market contributes to food security for people in the city, as the Early Morning Market traders are responsible for providing customers with fresh, safe and healthy produce; without this, customers would not have access to such foodstuffs.

Ultimately, the Early Morning Market represents resilience of community and the spirit of place in Warwick Junction. This can be expressed through the people, the space and the built form, because despite poor conditions and years of adversity, the trading community at the market remains strong, as it strives to contribute positively to the informal economy, food security and the heritage of Durban.

6.3 THE PIXLEY HOUSE – A Response to Urban Decay



Figure 6.3.1: (left) Old department store (Image provided by Design Workshop). **Figure 6.3.2:** (right) The new Pixley House (image taken by author, 2018).

	OLD	NEW
Building Typology:	Retail (Department Store)	Residential (Ground Floor Retail)
Architect:	Unknown	Design Workshop
Building Location:	Durban CBD	Durban CBD
Project area:	4600m ²	4600m ²
Project year:	1938	2016

6.3.1 PROJECT BACKGROUND

Summarised background and justification for study

The building is analysed as a useful case study, as it is a prime example of a transformed, previously neglected and wasted building space. Furthermore, the Pixley House represents an example of Durban's response to urban decay and developing inner-city resilience. Named the Pixley House for the road in which it is built, the renewal of the building is dedicated to Dr Pixley Ka Seme, who has become a symbol in South African history, as he advocated for equality and the rights of the black majority. In 1910, he developed the *Native Union*, a document that provides strategies for African people in reaction to developments that are designed to exclude them from participating in mainstream political institutions. Seme was also the founder of the South African Native National Congress (SANNC) in 1912, which later became the African National Congress (ANC), and was said to have constructed and formed the structure of the movement (SA History, 2017).

The Pixley House was a 10-storey, classic Art Deco-style office building. Constructed in 1938 for Paynes Bros Department store and then transferred to Prefcor House in 1956, its grandeur and style was inspired by the Art Deco architectural movement during this time. However, the building became obsolete owing to post-apartheid flight in capital and investment in the inner city and vacant office tower was infested with pigeons years prior to refurbishment. Moreover, the building was deemed a health hazard in the inner city.

In 2010, Propertytuity purchased the building as a means for providing residential apartments, an idea that was viable as there was a demand for inner-city densification. Design Workshop SA was appointed to provide a scheme for the building conversion. The property developers aimed to bring people back into the city and saw the building as an opportunity to rehabilitate the architecture. The building is an example of developers leading the way in allowing architecture the agency to have the effect it always strives for, not in the utopian ideal, but in the city as it was found. Propertytuity have also been a major player in rejuvenating the Maboneng precinct in Johannesburg and the Rivertown precinct in Durban. Through adaptive reuse of architecture and integrating mixed-use building functions back into these parts of cities, they aimed to highlight the cultural history and identity, which is so abundant, through innovative design (Design Workshop SA, 2018). Today, the eight-story building provides 98 residential apartments for young people and professionals, while the ground and first floors are occupied by the retail and food store, Game, as well as other small retailers.

6.3.2 URBAN CONTEXT AND SCALE

Location of the project and the people involved

The Pixley House is located along Dr Pixley Kaseme Street, almost halfway between the Durban City Hall and the Warwick precinct. The street geographically and visually connects the popular beachfront of Durban to the bustling markets of Warwick. Therefore, the building's situation, in its context, allowed for it to become a landmark for new life in the inner city. Today the building is commonly known as *the jewel of the city*.

The Pixley House is surrounded by building with commercial functions: offices, small businesses and retail outlets, as well as residential buildings. Its proximity to city transport and amenities makes it a prime location for residential development and densification.



Figure 6.3.3: Location map, showing the building positioned in the context of the city and its precincts (Google Earth, 2018. Image edited by author).

6.3.3 OBJECTIVES, PROGRAMME AND PLANNING

Design Aims and Objectives: “The Jewel of the City”

The design of the Pixley House aimed to add to the value of other landmarks on the main streets of Durban, in order to aid the perceptual transformation of the inner-city core from downward and stagnant to upward and beautified. The primary objective of the Design Workshop was sustainability, which not only included low-cost parameters, minimal building

and very little waste, but also equally important social, cultural and economic dimensions, to provide a complete and coherent scheme. The architects suggested that addressing the needs of the urban fabric through architecture would provide a catalyst for urban renewal and upliftment. The provision of residential spaces in the city would contribute to improvements to urban density, which is so desperately needed in Durban. Without density, it is impossible for the public sector to provide viable support and infrastructure systems, and therefore impossible to expect a reduction in joblessness and poverty. Further, this approach aims to be a catalyst for social cohesion and community stability, whereby people experience a real-life, day-to-day functional sense of belonging that comes with being recognised and supported by society. These aims and objectives can be compared with Durban's Resilience Strategy, as they both explore similar themes, including %an innovative place-making+, %a sustainable and ecological city+ and %a equitable and inclusive society+ that support resilience in the inner city.

Design Drivers

During discussions that this researcher held with Carina Cloete at the Design Workshop SA, Cloete was able to give further insight into architectural strategies for reusing existing buildings. These strategies were defined by: the building function; parameters and constraints that were influenced by compliancy and regulations; and the human aspects of design that ensure a people-centred approach (Design Workshop SA, 2018).

In addition to the layers of constraints placed on reusing the existing building, the client wanted to maximise the rental potential for the building and, owing to knowledge of existing residential schemes in the Maboneng precinct, Propertuity had an idea of the ratio of unit typologies needed for the design. Even though the special capacity was limited, owing to the client's brief and budget, Design Workshop SA used issues of the people to develop strategies for design, including: safety and security, upliftment of the community and connectedness to the urban fabric of the city.

As a result, strategies were formed that addressed the original iconic nature of the building structure and its representation in the context of the city. Therefore, some strategies included: linking the city to the people of the building through symbolism and representation of Dr Pixley Kasame; re-conceptualising the traditional Art Deco style of architecture; and providing a function that is sensitively incorporated into the existing building structure. These strategies and themes will be discussed further in the analysis of the design.



Figure 6.3.4: Apartment Typologies and layouts with interior finishes (Design Workshop SA, 2018).

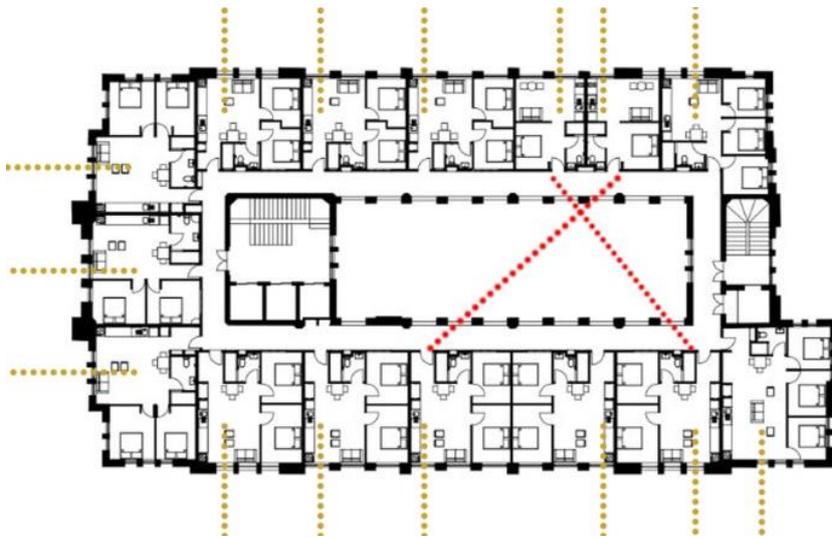


Figure 6.3.5: 03 Floor Plan. Internal surveillance with amazing views of the city for each apartment (Design Workshop SA, 2018. Edited by author).

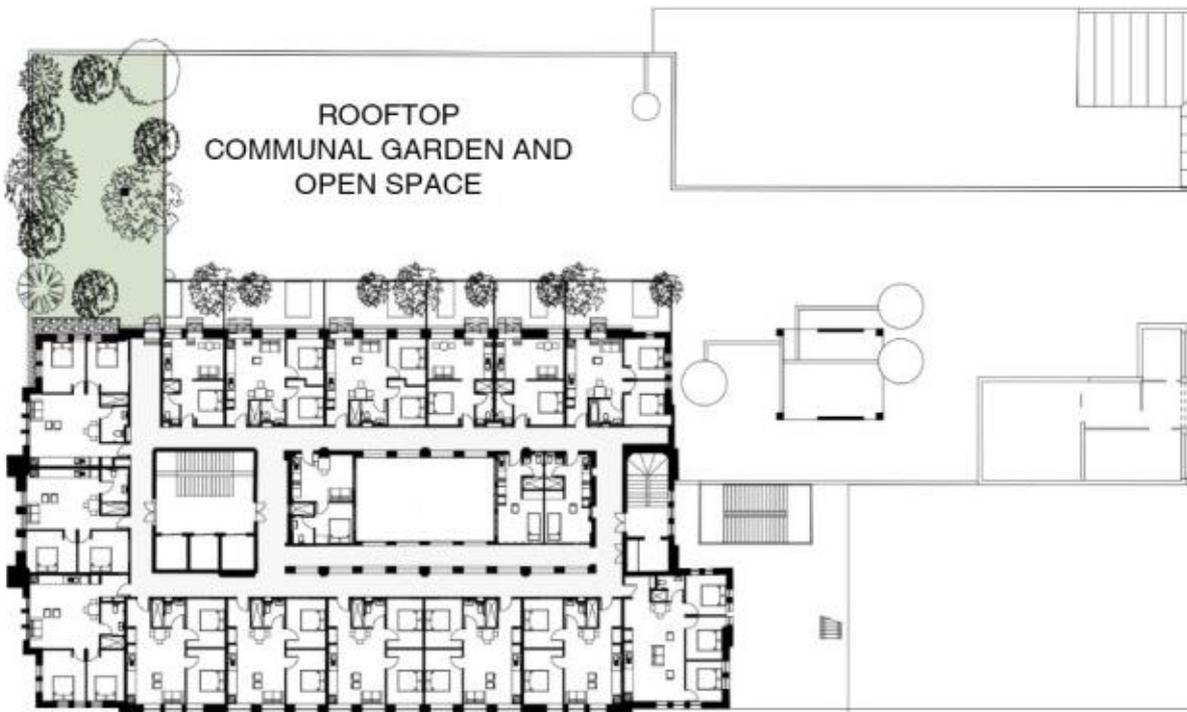


Figure 6.3.6: 04-06 Typical Floor Plans. Image shows communal garden and accessible rooftop space (Design Workshop SA, 2018. Edited by author).

6.3.3 A RESPONSE TO URBAN DECAY

The response to decay was found to be through a person-centred approach, upgrading and treating existing materials, and a focus on internal and external surfaces, lighting and ventilation.

Person-Centred Approach

Although, after entering the building and taking the lift to the rooftop, it appears that little has been done to consider the needs of the user in terms of public space and security, these have been considered by the architect and . owing to the limitations of the building and the budget . have been implemented in subtle ways that have proven successful. For example, the security and safety of the residents has been one of the main concerns, as the street has high foot traffic and the commercial spaces that surround the building attract people from all over the city. Therefore, the lobby and concierge desk provides surveillance of the entrance and a level of dignity for the residents instead of having a regular turnstile or keycard access. Further, removing the windows in the walls that face the courtyard has allowed for visual surveillance, whereby residents are able to see the apartment doors across the courtyard on their level and other levels simultaneously (Figure 6.3.5) (Design Workshop SA, 2016).

In essence, the architects have turned the typical notion of courtyard architecture on its head and, instead of having the residents look into the internal courtyard, as previously mentioned, the area has become utilised for ventilation and security. At the same time, each apartment has large windows that provide residents with beautiful views of the entire city (Figure 6.3.5 and 6.3.11).

On the fourth floor, communal garden space is provided for residents; further, accessible rooftop space can be accessed by residents. From observation of the drawings, there are plans to lay small stones on the rooftop. Currently, the residents have taken ownership of this space and utilised it for communal laundry hanging (Figures 6.3.6 and 6.3.12).

Internal and External Surfaces

The new building function aimed to express three notions through the transition between the building spaces. The first was to create an external envelope, whose character was re-represented by a replacement of the traditional pastel colours of Art Deco architecture with black, gold and silver, using this as an iconic expression for an iconic structure that the residents and the rest of the city could be proud of (Figure 6.3.2). The second was that the circulation and corridor spaces provided a raw, stripped-back concrete carcass of the original structure, exposing the building frame, columns and slabs. The third (Figure 6.3.8)

was that the latter made a transition to the apartments. The apartment walls are painted white, with simple, clean and neat interiors (Figure 6.3.4). The following subchapters express design responses to the aims and objectives set out by the architects.

Light and Ventilation

The courtyard in the original building was utilised to house pipes, ventilation units and other services; this resulted in the core part of the building being wasted space. In the Pixley House the architects viewed this space as an integral function for passive design. Opening the circulation to the central courtyard and greening the courtyard space would improve the circulation of airflow, as well as provide a visually appealing and pleasant view for residents. The new courtyard space represents sustainable design that is sensitive to the building users and the overall feel of the ancillary spaces (Figures 6.3.9 and 6.3.10). The corridors that originate at the building's main circulation core represent the original building structure, which has been taken down to its raw form. This material allows for ample natural daylight in these spaces, which not only reduces electrical demands, but also allows the user to feel connected to outdoor space within the building (Figures 6.3.7 and 6.3.8).

Design Challenges

Owing to existing structural limitations, in that the original floors slabs were not thick enough to allow any additional weight, alternative materials to brick-and-block work were needed. This resulted in further budget limitations for the building finishes, but this was resolved by the architects themselves designing the interior fittings and finishes, in order to reduce costs. This proved to be effective overall, as these exposed and enhanced the raw structure of the building. This can be seen in the apartment sketches below, where the soffit and services are exposed. Further, the kitchenette and light fittings were also designed by the architects (Figures 6.3.13 and 6.3.14).

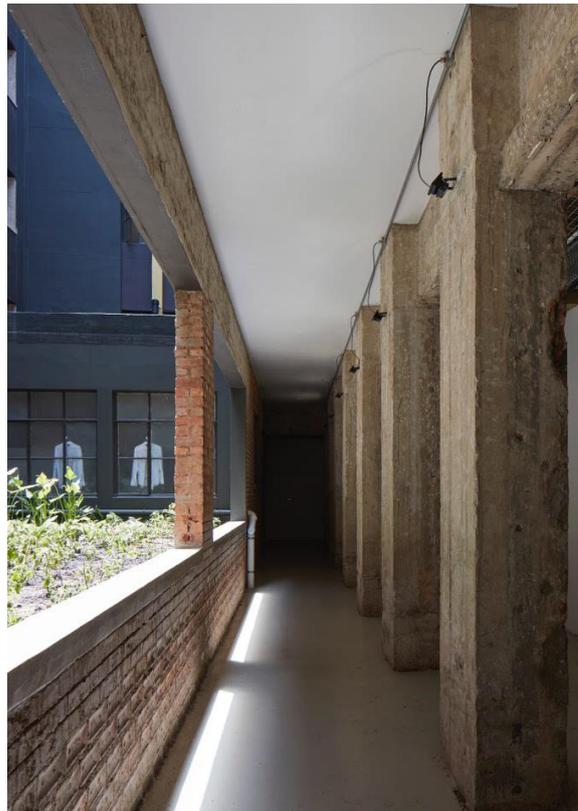


Figure 6.3.7: (left) 'Before' image of internal corridors (**Design Workshop**). **Figure 6.3.8:** (right) 'After' image of corridors (**Author, 2018**).



Figure 6.3.9: (left) 'Before' image of internal courtyard (**Design Workshop**). **Figure 6.3.10:** (right) 'After' image of internal courtyard (**Author, 2018**).

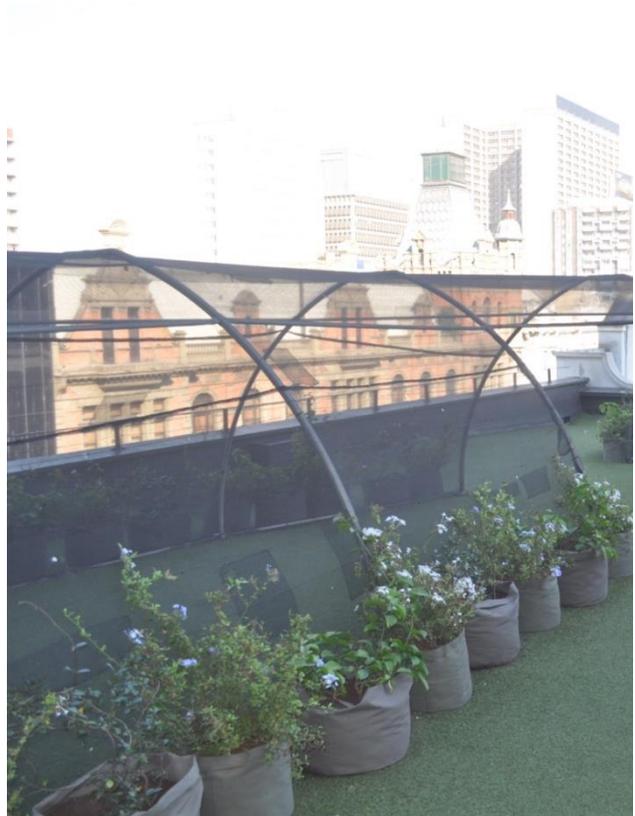


Figure 6.3.11: (left) Views of the city from each apartment (image by author, 2018). **Figure 6.3.12:** (right) Community garden space, linked to an open rooftop area (image by author, 2018).

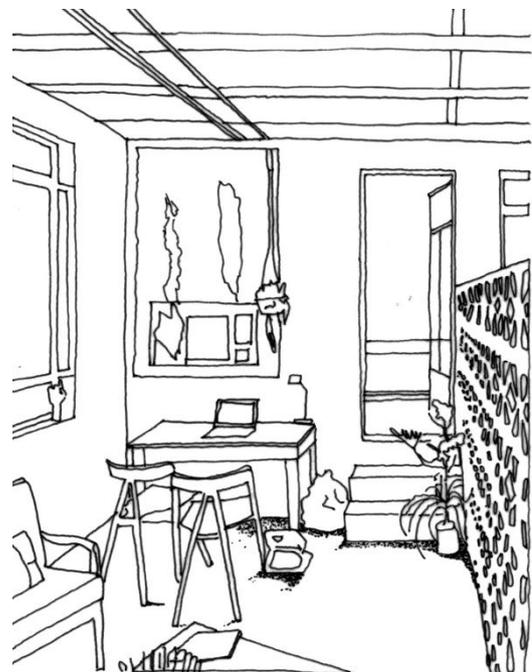
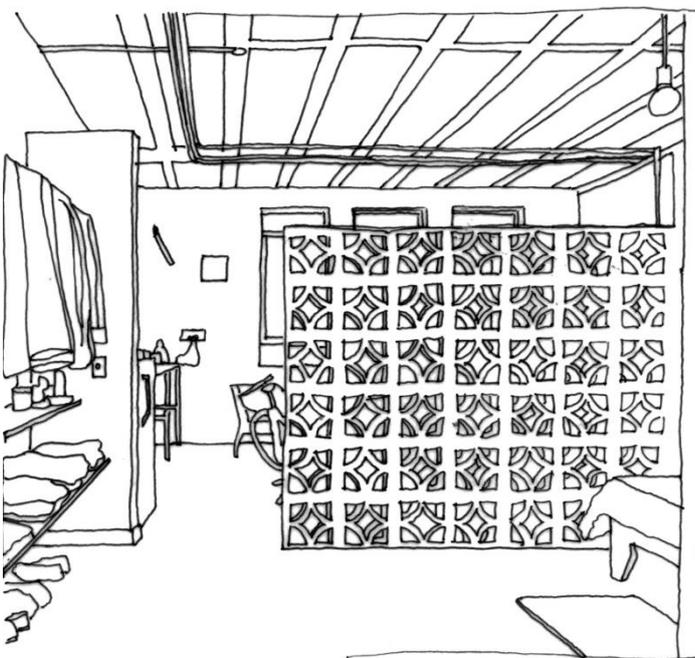


Figure 6.3.13: (left) Studio apartment interior showing perforated block partitions and exposed services and soffit (author, 2018). **Figure 6.3.14:** (right) Studio apartment interior with balcony access (author, 2018).

6.3.4 CONCLUSION

Site visit observations and conclusion

Upon visiting the building, the concierge and lobby space effectively welcome visitors into the building. The public spaces of the modern interior are clean and functional, and their theme is inspired by the Art Deco style, which is translated in subtle instances throughout the building. The transition between the busy, bustling streets and the interior of Pixley House is pleasant and the vibrancy of the urban context is not lost. The design scheme allows for harmonisation between the city and the architecture, as the building connects and contributes to inner-city density, diversity and shared space through the strengthening of city systems that fall into the definitions: natural, social, human, financial and infrastructure.

People - Through the visual power and representation of the building, as well as the quality of interior spaces within the building, the design successfully considers the dignity of the people, creating inclusive, humane, and self-sustaining architecture. Resilient design considers all these elements towards *people upliftment*. By providing these functions through architecture, the result is a catalytic structure whereby infrastructure . through the provision of services, internal and external spatial quality . is able to play a vital role in imagining the future of the city.

Place – The iconic building enhances the architectural landscape and the contextual urban environment that contributes to qualitative human experience of *place*. Through social, economic, environmental and cultural interventions, the architecture is able to symbolise recovery and new life within the city. Further, the careful consideration of the transition of public to private spaces and the treatment of interior space, with its clean, neat and simple finishes, have created a dignified place for residents to feel proud to be a part of.

Built Form . The consideration of the connection between people and infrastructure has provided the opportunity for the creation of a *landmark* example for what urban regeneration can look like for inner-city Durban. Through providing an opportunity for growth and density, there is the possibility that the market and investors will be more confident and willing to invest into city growth and development in the future, which is what Durban needs for city resilience.

The process of adaptive reuse for the Pixley House has been of a sensitive nature, in that the exterior is only slightly enhanced to highlight the history of the architectural style and its significance in Durban. Resilience is observed in the flexibility of interior space and the reversed ideologies of previous *lost* space within the existing building, such as the courtyards, corridors and roof space. Lastly, it can be concluded that the provision of a

function (housing) that is desperately needed in the city, as a catalyst for the reuse of architecture, has provided a resilient solution for urban revitalisation.



Figure 6.3.15: Street View of the Pixley House (author, 2018).

CHAPTER 7

ANALYSIS AND DISCUSSION

7.1 INTRODUCTION

This chapter will analyse and discuss interviews and observations relating to the case studies explored for this research. Data was collected from industry professionals who have experience with activities related to the themes of food security and the adaptive reuse of architecture, as well as people who contribute to or rely on food security. Part one of the data collection involves the traders of the Early Morning Market in Warwick who, if they expressed a willingness to participate, were interviewed, as well as Richard Dobson, the co-founder of Asiye eTafuleni, and the previous project director of iTRUMP. Data was collected from these interviews to obtain a better understanding of informal trade in inner-city Durban, to confirm the relationship between the market and food security, as well as clarify the existing logistics and infrastructure provided and how, in their opinion, these could be improved. Part two of the data collection pertained to the Pixley House case study. The architects, Design Workshop SA, were interviewed to shed light on the viability of adaptive reuse in Durban, which strategies were suitable in a South African city context, and the adversities faced on various fronts regarding this process. Part three of the data collection was achieved through personal observations while visiting case study areas. This chapter highlights the most significant responses from these interviews and personal observations.

7.2 ANALYSIS AND DISCUSSION OF INTERVIEWS CONDUCTED

The Early Morning Market traders

The Early Morning Market was chosen as a case study, as it is located within the greater context of the Markets of Warwick. As well as being the oldest market in Durban, it is the largest one involved in the sale of fresh produce. Therefore, its exploration is important in terms of understanding its link to food security in the inner city. Data that has been synthesised from these findings will address the dimensions of food security locally and how the resilience of these systems are important for improvement and urban regeneration.

The interview process made use of a random sampling method of traders within the Early Morning Market and therefore included men and women of all ages, races and job roles to ensure an unbiased sampling. Interviews were conducted with participants who were willing to take part and a translator proved helpful when participants could not speak English (the translator is Norma, from AeT). In saying this, it is important to note that the majority of traders at the market are women, most of whom have large families that depend on them. The aim of these interviews has been to connect with the traders beyond the formality of interviews and to understand the processes of their daily lives, in order to propose responses that will address their most valued needs.

The Early Morning Market traders were interviewed on two separate occasions. Half of these traders were stall owners and were able to point out the various stalls that they owned and which were managed by their employees. They had two primary reasons for trading within the market. The first was tradition and trading as a pastime, with 72% having traded at the Early Morning Market for more than 10 years, 45% of who were third- and fourth-generation traders. The second reason was that it was the only way to provide income to feed their families, as they were unable to find jobs elsewhere. The demographic of the market is such that 90% of people interviewed were female. Many of them wake up in the early hours of the morning, as early as 3:30am, to perform household chores and prepare meals for their children before travelling to the city to open up their stalls for trading at 6am. This journey can be up to an hour long and most of these traders rely on public transport, which can cost up to R28 a day, depending on how far away their homes are.

All of the traders in the market procure their goods from either the bulk foods market in Clairwood, south of the Durban CBD, or local farmers, as this is the most cost-effective way of purchasing fresh, safe and reliable produce. Individually, traders expressed some of their most important needs (Figure 7.2.1). In addition to this, there was general concern about the consistency of trade and daily purchasing, and, in conjunction with this, the fact that the market was poorly ventilated, with no access to cold storage. As a result, fresh produce becomes stale and over-ripe and therefore could not be sold. With reference to the market as a whole, issues of trading space and infrastructure, advertising and foot traffic, safety and accessibility were expressed as needs of the whole community of the Early Morning Market. In addition, Dobson listed five fundamental issues that traders face within the markets:

- The rigour of the work (temporary trading, often circumstances are unknown)
- Community Dynamics (neighbourhood issues)
- Exposure to the elements (bad for sales)
- Permits and paying city administration (access to permits and illegal trading)
- Corruption (police enforcement, bribes and sexual favours)

Moreover, he explains that traders often feel a sense of frustration about their working environments, arising from issues of unfair competition due to location and tense relationships between traders. In addition, there is a lack of investment in the area and, as a result, poor management of amenities and general infrastructure. Lack of investment and inconsistent trade can also be due to misconceptions about the market and informal traders. These include: the market is a front for illegal businesses and informal workers do not benefit from trade; it is a dangerous environment; and the goods sold there are stolen and counterfeit . resulting in trade with unfair advantage. Lastly, owing to a lack of urban

management and maintenance, informal trade is perceived as adding to the clutter and congestion of the inner city.

In saying this, the traders acknowledge that the Early Morning Market contributes significantly to the cultural and historical background of Durban. Dobson suggests that this happens on two levels, the first being at a macro level . as a collective, traders are able to provide for traditional African preferences that, previously, were disallowed. The second contribution is on a micro level . through individual activities that are rooted in cultural preference and practice, such as the mealie and bovine head cookers. Some traders express further that they are part of a unique community within the inner city that contributes to food security by ensuring that they only offer the most fresh and healthy produce, which is locally sourced and sold at an affordable rate. From his experience and knowledge of the markets, Dobson feels that the markets contribute to the food security of the people in the inner city, owing to the availability and price of produce, although much of the produce is over-traded and quality is therefore preferred. Further, he adds that the location is important, for people within a lower living-standards bracket view the junction and markets as essential for commuters, as they service their needs in terms of shopping patterns, for example, the scale of purchasing.

Dobson further adds that the traders are able to positively contribute to the economy and the communities of the inner city by bringing products to the market that formal businesses do not introduce, for example, the traditional produce and consumables. Dobson also states that informal trade provides a proactive response to underemployment in the inner city. Moreover, informal trade improves urban safety and security, and traders are able to develop their own organisations that are positive and committed to high levels of citizenry. Dobson stresses, however, that although there are many positives to informal trade in the inner city, traders and informal trade are not recognised by the city as being assets.

Dobson suggests three fundamental areas for the improvement of livelihoods for traders and the market. The first is making improvements to working conditions, including employer/employee relationships, and to market amenities and functions, in order to lessen the rigour of the work. The second is to improve infrastructure; the market has aged, the finishes are tired and there is a pull towards the modernisation of markets and market strategies. The third is that the latter results in improvement to market environments that are conducive to fresh produce trading, including improved ventilation and conditions.

Observations

Firstly, most of these traders have been selling fresh produce in the Early Morning Market for generations. It was observed, through the interviews, that there was a hierarchy among people in the markets and often stall owners had learnt the business of informal trade through family. This knowledge was handed on to their employees, who ran several of their employers' individual stalls within the market. Secondly, after talking with some of the traders, it was noted that there was mistrust between them and the municipality as they spoke of how it wanted to drive them out of the market; as a result trade was suspended within the market on more than one occasion. Thirdly, this market, like the other surrounding markets within Warwick Junction, have been perceived as being unsafe and dangerous and, for this reason, most people who do not live or work in the city, will not visit it. From personal experience, although the market was dark and had little natural light and ventilation, one felt safe there as there was a constant movement of customers, traders and porters.

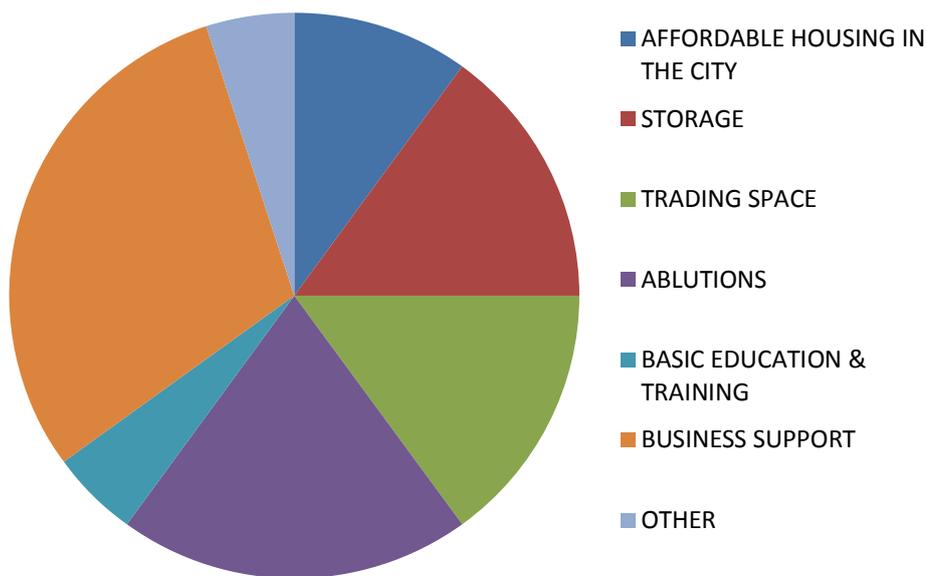


Figure 7.1: Question 15: In your opinion, what are the most important needs of the informal trading community? (Author. 2018)

In terms of the future of the Early Morning Market and informal trade, these symbolise and an urban presence and cultural expression of diversity within the city that represents the past, present and future of the growth of South African cities. As informal trade continues to grow and expand within the city, Dobson suggests it should be used a tool for urban development towards achieving quality urban environments with a high urban aesthetic.

Design Workshop

Carina Cloete was interviewed as the principal architect for the Pixley House in the Durban CBD. Design Workshop SA has worked on numerous projects in the city for adaptive reuse and interventions of urban design. The aim of this interview was to understand the implications and adversities of reusing an existing building in Durban, as the literature is able to speak to international examples of reuse; therefore, in order to close this gap between the literature and the context of Durban, it is important to understand the approach and strategies for reuse from a local perspective.

The existing building was a derelict, abandoned and run-down office block and the client brief was to provide a scheme that incorporated residential units. The client was under the impression that residential apartments would not be feasible for this building. However, owing to the price of the building being low, they would be able to achieve a profitable scheme. The architects then began to create a feasibility study by looking at apartment typologies and the structural integrity of the building as two fundamental factors for achieving this. The initial idea was to procure a sectional title scheme, whereby all of the apartments were sold within six weeks of being released, which proved the demand for low-income residential apartments. In the end, Propertuity funded the project and rented out the apartments, so this shifted the approach to the apartment typologies as rented-out studio and one-bedroom apartments that were more profitable than rented-out two-bedroom apartments. Nevertheless, the rental scheme was still favourable and the building became fully occupied within six months of completion.

Propertuity had data saved from previous adaptive reuse projects in Maboneng, Johannesburg CBD, whereby the most feasible split was 10/70/20 between two-bedroomed, bachelor and one-bedroomed apartments. The floor plans emulated the need for maximised rental potential. These parameters, driven by function and cost, began to define the direction of the scheme.

The design approach began by reimagining the existing building; firstly, it was acknowledged that the building was already powerful in its context, being a radically visible Art Deco building. The architects started exploring the presence of the building within the street and the city as a collective. Durban contains the second-largest amount of Art Deco buildings in the world, most of which have colourful schemes (Miami, California, USA). Through the concept of reimagining the building for a dignified and connected response, this ideology was reworked so as to reflect a modern, urban colour scheme. Secondly, the architects felt that it was important to examine how this building could make people feel uplifted, dignified

proud, part of something bigger and a part of the architecture. This was achieved in two ways:

1. The use, residential, satisfies human needs: to feel safe, have proper ventilation and natural light and sanitation. Therefore, the base of the scheme came about by layering these aspects of compliance that were needed for people.
2. By making this an experience and a place beyond what people can imagine, other than just a grid of systems that satisfies basic needs and connects them to the city, while making them feel safe.

The residents and the people of the area have responded well to the building and it is continually well kept and looked after by a managing agent. There is also a range of tenants . families, old and young people, and students . who ensure diversity and safety. Further, people respect the space because it is well looked after and stands out among the surrounding infrastructure, through its bold colour and preserved architectural style.

7.3 CONCLUSION

The analysis and discussion of the interviews have proven useful in that the data has confirmed some of the facts explored in the literature review. Further, where the literature does not provide a sufficient contextual base, the localised data collection has been able to close these gaps with specific reference to the principles of resilience theory, which include: participatory governance, flexibility and inclusion for determining an appropriate response related to issues of food security and adaptive reuse of architecture. Some of these include: the adversities of informal workers through individual perspectives and management organisations; and the viability of adaptive reuse and the demand for low-income/social housing in the city. These interviews have established the need for infrastructure that is able to address a variety of functions necessary for the improvement of food security in the inner city. As a result of these findings, the research can be concluded and recommendations made for a design proposal.

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS/
DESIGN DEVELOPMENT

8.1 INTRODUCTION

This research set out to explore the relationship between food security and architecture, more specifically how addressing aspects of food security could act as a catalyst for the adaptive reuse of architecture in the inner city of Durban. In order for conclusions to be made the hypothesis and the confirmation of research questions, needs to be addressed: ~~Im~~ Improving the dimensions of food security, through a resilience lens, can generate viable options for the adaptive reuse of architecture in the Durban inner city.+

From the information gathered it can be said that this research has provided a deeper understanding into the aspects of food security and the adaptive reuse of architecture through various frameworks and theoretical components for improving city resilience, which, in combination, are all imperative for understanding a way forward.

8.2 CONCLUSIONS

This research demonstrates how aspects of food security can be implemented for the regeneration of built form to provide a resilient model for improving socioeconomic, environmental and built form within the inner city of Durban.

The theoretical background for the research was based on the understanding of resilience and the connection it has to architecture on various scales. Resilience, as a concept and theory, provided an understanding for the investigation of cities as the amalgamation of various systems that are linked and interdependent on one another. It revealed that for a city to be resilient, which is necessary for sustained revitalisation, these systems need to be better connected to bounce back from all stresses and shocks. Principles of adaptation and transformation were derived from this aspect of the research, as methods for achieving resilience of architecture. In addition, the social theory of culture; which investigated the importance of shared and learnt heritage for city growth and resilience, and the architectural theory of linkage; which investigated the notion of linkage between all systems, of people to built form, and of built form to its context, are two sub theories explored in this research. They provided insight for understanding resilience theory across multiple scales, relating to food security and adaptive reuse. Resilience theory was used as a base for the remainder of the literature review, which can be broken in two parts: firstly, the exploration of issues of food security in Durban and systems of the city such as informal markets that contribute to it. Secondly, how the adaptive reuse of derelict, obsolete and underutilised buildings in the inner city can be repurposed as spaces for a variety of functions like food growth, research, skills development and living.

Each case study addressed an aspect of the research. The Early Morning Market in Warwick exposed the importance of informal fresh produce markets for food security in the inner city of Durban. At the same time, the reality of these markets exposed some of the localised issues contributing to socio-economic, environmental and built form adversities. These were made evident through conversations with Asiye eTafuleni and the traders within the Early Morning Market. These findings demonstrate a need for integration of informal workers into the urban fabric of the city, improved facilities and amenities for traders and a better connection between markets in Warwick and the rest of the city. Providing a facility that can fill these functions can empower communities involved with and vulnerable to food security. The Pixley House, provided insight into Durban's response to the adaptive reuse of architecture in the city. Interrogating this case study provided insight into localised strategies and principles for reuse with viability in Durban, one of the most important being the connection of people to their place of living whereby ownership of place and dignity though space have proved to be attributes necessary for the success of adapted infrastructure and functions in the city.

The precedent studies provided an international perspective on the adaptive reuse of architecture. Furthermore, these studies demonstrate the importance of the proposed function and its connection to the area in which it sits. Determining what allowed these interventions to be so successful provided insight into ideal building treatment and functions. In both the Fiat Lingotto and the SESC 24 de Maio, it was observed that theories of culture and linkage were used for the treatment of the external façade and internal interventions. Functions needed by existing communities in the context of the city were provided without a disconnect between the existing appearance of the building and the new. In both cases, the city needed functional aspects that could empower the local communities and social spaces that would improve residents' quality of life. This was found in the humanistic approach to spaces that were either designed for vehicle production or office space whereby the new designs place the end user at the forefront of the new designs. It was further observed that resilience theory was used as in both precedent studies multiple functions were combined into a singular building. The diversity of functions in combination with their adaptability and flexibility of space resulted in the buildings being utilised at all times and reduced the risk of future obsolescence and decay.

The result has shown that a holistic, adaptive and transformative approach to the dimensions of food security and architecture can provide a harmonious link between the two themes. By addressing the dimensions of food security, functions are developed which can be inserted into existing architecture as a means of regeneration and upliftment for city communities. The research has shown that this can only be achieved through practising and

understanding participatory governance, the inclusion of inner city communities, their diverse cultures and ways of life. By doing this, a link between the proposed intervention and people, can be established, which is important for community development.

8.3 RECOMMENDATIONS

The following are practical recommendations based on the research, which will inform the design of the mixed-use **agricultural hub in the inner city of Durban**. The literature review aimed to analyse all dimensions for food security: *availability, accessibility, stability and utilisation*. This was able to give insight into gaps in solutions for achieving food security and allowed for various avenues of food security to be explored. This revealed functions and for food security that could be addressed through architecture as well as site selection criteria suitable for an intervention in the inner city of Durban. In combination, key ideas for resilient cities developed by the municipality as well as the concepts and theories of the research related to the design, the requirements are twofold:

Urban Design

- The site should fit into the urban fabric of the city and be able to visually and symbolically link the city and the markets of Warwick effectively.
- Furthermore the site should be one that is not used to its full potential and in current and future obsolescence
- There should be a strong connection through visual links, transport routes and pedestrian connections to the markets, the port and the beach front areas, linking people to each of these precincts to promote a walkable, integrated and connected city
- The agricultural hub should be an iconic building in its shape, form and structure. Therefore, traders and people within the city can better associate it with food security activities such as food banks and soup kitchens.
- The building needs to ensure it has a direct link to the market traders as well as other informal workers selling fresh produce, accommodating them through providing trading spaces in the public zones of the building.

Architectural

- The design should incorporate all functions for food security: Markets and retail stores (Availability), business support and job opportunities (Accessibility and Stability) as well as flexible and affordable housing (Utilisation)

- The aim of this building is to become a hub of activity related to food security: adaptively reusing obsolete infrastructure for food security initiatives, provide basic services for key contributors to food security and inviting the public to learn more about the city and the systems, which function within it.
- The design should adopt a person-centred approach, to convert the existing building function to be based around individual and community growth and development related to food security
- The design should promote the diversity of cultures that will be occupying the building, through participatory and resilient design strategies, which allow for adaptability and transformability of spaces.
- The flexibility of space for business incubators, training and education facilities are important as these functions may vary in intensity.
- Taking care in the consideration for public functions by including the needs of informal traders and small businesses in combination with public open space
- In public areas, the design should allow for flow of pedestrian foot traffic to encourage constant movement through the building and the utilization of various aspects of the building. This will promote natural surveillance and aid in creating safe and secure environments.
- The integration of social housing into the design requires well . planned layouts and spaces that can improve the livelihoods of the people living there, ensuring this is a building for living, working, playing, learning and growing. Flexible and low-income housing for informal workers would be able to improve their quality of life.
- Providing architecture based on the needs of a community. In doing this, creating architectural spaces that people can utilize to improve their livelihoods through social, cultural and commercial exchanges.
- To create environments though architectural space which better integrate informal workers into the urban fabric of the city and highlight the significance and resilience of the markets of Warwick for food security.
- The building should be a platform for business start-ups, small to medium agricultural producers, informal workers retailing fresh produce to improve their livelihoods through skills development, education and training
- The building should resilient in form: to be able to be integrated within the existing context of the city, and in materials: local materials that are robust and able to withstand environmental and contextual changes.
- The building should be a landmark, which is safe, clean and transparent in its programme and accessibility.

- The architecture should be able to improve proximity, density and connectivity within its context
- The building should act as a marker that connects the people of Warwick to the inner city and beachfront area and vice versa.
- Research, education, business incubators, and other small-scale activities for food insecurity will be needed as well as social housing. The functions of the building design are two-fold, there are the functions, which are specific to the informal workers, and there are the functions that incorporate all people involved in the agricultural/food sector. It is important to address the second as a means to generate added income within the building, making it capable of being resilient despite any social, economic, political or environmental stresses.

The requirements should be able to provide functions all dimensions for food security in a holistic manner, developed on principles of resilience within the proposed facility.

PART 2

PART TWO – DESIGN DEVELOPMENT

8.4 THE NOTIONAL CLIENT

As a result of research into the existing Early Morning Market and projects for adaptive reuse in the inner city, it is acknowledged that for a project of this size and scale, it is important that there be a mix between public and private organisations to fund and maintain new projects in the inner city. Thus, eThekweni Municipality, in partnership with the Department of Agriculture, Forestry and Fisheries, UN Food and Agriculture Organisation (FAO) and First Metro Housing requires the services of an architect to identify a suitable site to fulfil these requirements. The development aims to provide a platform for the adaptive reuse of architecture through addressing the dimensions of food security. The eThekweni Municipality will fund the land purchase and the professional fees, while First Metro Housing and the FAO UN Food and Agriculture Organisation will be responsible for operations and maintenance management.

8.5 THE CLIENT'S BRIEF/ REQUIREMENTS

Based on the research, the recommendations to the client are:

- There is an opportunity to find a site in the inner-city that is equipped with existing services and infrastructure.
- There is the chance to create an example of resilient design by selecting a building that is underutilised and in a state of decay.
- A mixed-use typology is recommended, to include functions that address the dimensions of food security (accessibility, availability, stability and utilisation) in a holistic and connected manner.
- The primary purpose is to provide a range of functions for agribusiness start-ups, small to medium agricultural producers, informal fresh produce traders and people who are vulnerable to food insecurity.

To rethink the notion of food security for inner city environments through:

Formal Functions for Food Security Provide accredited education and training in agriculture, new and adapted technologies for increased and sustainable productions (Research, training, education, office space, production testing and space)

Informal Functions for Food Security Improve informal trader's livelihoods through improved basic services (Housing, storage, business support, education)

- A strong emphasis on the connection placed on the quality of public space, to ensure amenities for the building users and the public.
- The aim is to use issues pertaining to resilience in the inner city that relate to food security as a catalyst for revitalisation through the adaptive reuse of architecture.

8.6 SITE OPTIONS

Introduction

The following sites have been selected based on information obtained from the literature review and the primary research that has been conducted. The following criteria will be compared between both site options to determine which site is best suited for the project proposal.

Site Selection Guidelines

Physical Features

The site should have an existing structure that is in a visible state of decay. Further, the original building function should show signs of obsolescence, whereby the building is either deserted or added temporary functions have been attempted to replace the existing function.

For the concept of adaptive reuse, it is important that the building is in some form iconic in terms of its material or form; this is not essential for site selection, but ensures a response that can maximise the potential of the existing structure.

Location

The location of the site should be within the Warwick or CBD precincts, as well as within walking distance to the markets and the inner city areas. The aim of this location is to connect these precincts and to connect this new building to other precincts of the inner city.

The building should be within close proximity to public transport and not hidden away from the street, as it must be conducive to informal trade. It should therefore be able to make use of existing amenities within the city.

Site Area

The site area should be able to accommodate the various layers of a mixed-use typology (retail, offices, research and accommodation, as well as provide space for urban agricultural production on a small scale). The building should therefore be a minimum of six storeys high, to meet these requirements and adhere to planning for densifying the inner city.

Zoning

The building locations should ideally adhere to the projected urban planning scheme for the inner city and the proposed functions should be able to work in this context. Further, the building should either be in a state of decay or should demonstrate that its original function has become obsolete.

Access to Public Transport

The site should be within walking distance to public transport in order to make use of the Warwick Junction transport hub and promote walkability and connectedness aligned with the current Local Area Plan for Durban.

Pedestrian Access

The site should be conducive to pedestrian access from all aspects or be able to be manipulated to achieve this.

Vehicular Access

The site should have strong links to existing parking garages that are underutilised and it should be able to provide space for loading and delivery vehicles

8.6.1 OPTION 1

The chosen site is situated on the boundary between the inner city and Warwick precincts and is at the entry point into the city from the N2. This area contains a high concentration of building decay. The building is currently owned by Marshall's group LTD. The site inspection suggests that the structure is intact; however, the roof contains asbestos. In conjunction, the concrete floor slabs are spalling, consequently it is crumbling onto the street below and nets have been put here to catch falling debris. In addition, only the first, second and third floors are utilised for parking. The remaining floors are used for vehicle storage, a church and workshops. The ground-floor shops fulfil myriad existing functions in a decaying structure.

8.6.2 OPTION 2

The chosen site is located within the Warwick precinct on Julius Nyere Avenue, opposite the Warwick bus rank. Being one of the tallest buildings in the Warwick precinct, transforming this site could result in an iconic structure for this area. Surrounding this building is a high concentration of building decay. The building that is currently on site is 10 storeys high, but holds a smaller and enclosed building footprint. The site is used for retail (on the ground and first floors) and is residential above that. Upon inspection, windows appear to be broken and the building appears to be suffering from neglect.

(*Refer to figure 8.1 for site maps and images.)

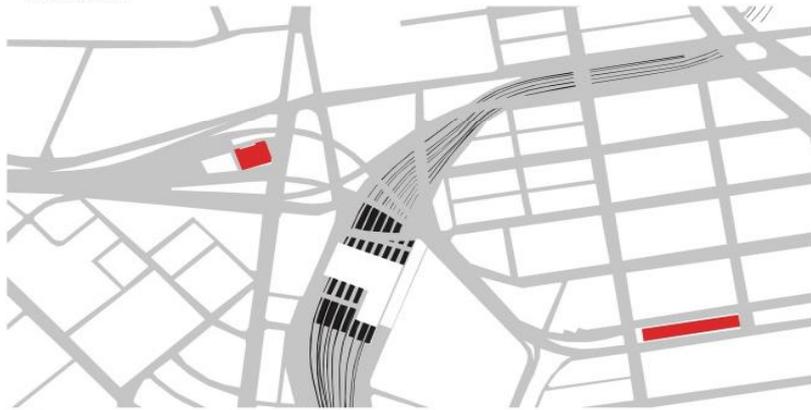
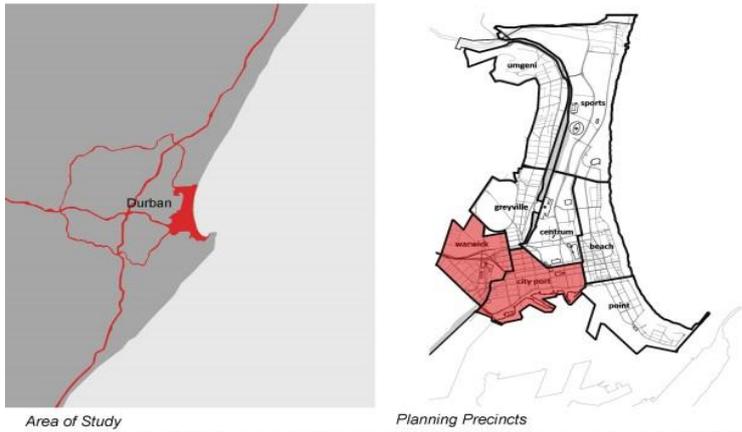
Each of these sites has been compared with the requirements of the above criteria to establish which is more suitable for the design proposal and is rated as being either poor, average or good.

	OPTION 1	OPTION 2
<i>Original Building Function</i>	Parking Garage	Retail/ Residential
<i>Physical Features</i>	Good	Poor
<i>Location</i>	Good	Good
<i>Site Area</i>	Good	Average
<i>Zoning</i>	Good	Good
<i>Access To Public Transport</i>	Good	Good
<i>Pedestrian Access</i>	Good	Average
<i>Vehicular Access</i>	Average	Average

8.6.3 SITE SELECTION

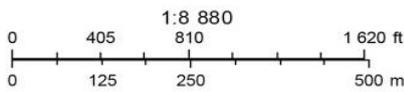
As a result of a comparison between the two sites, option one has a major advantage, owing to its geographical and symbolic location to the market and the inner city. It has an interesting and iconic form that is conducive to a potential landmark; moreover, the original function of the parkade is increasingly becoming redundant, as fewer vehicles are using this building for parking. Lastly, the existing structure and materials are not only interesting, but are also in need of restoration.

SITE SELECTION



SITE 1

Between Monty Naiker and Dr A B Xuma Street
POPULATION 25 000
est. 56 000



Option 1 - Within the Durban CBD



Option 1 - Site area, dimensions, topography and building services



Retail and Parkade



South East facade



Perforated brick facade



Building facade and aesthetic

CHARACTERISTICS

Commercial, retail and the civic heart of the city
Shopping, cultural and governmental services
Emphasis on pedestrian priority and residential density

ADVANTAGES

Strong walkable district
Within a 10min walking distance of Warwick Markets
Possible good quality of space
Has the opportunity to be an iconic landmark
Many stores and food markets around the building

DISADVANTAGES

Formal grid network may be restricting
Further away from the markets of Warwick
Access to the site
Noise pollution
Privacy and the relationship between public and private.

NEIGHBOURHOOD

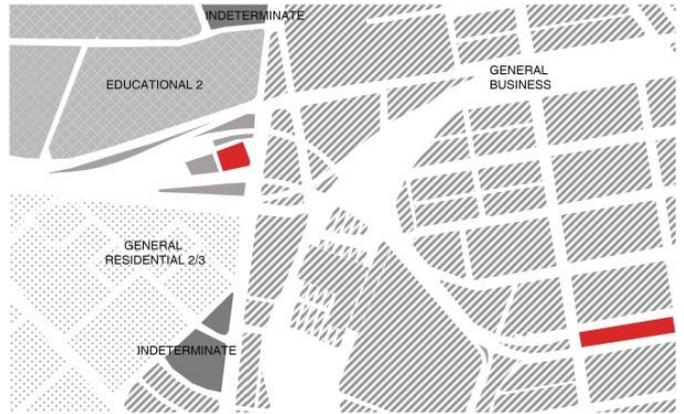
CBD- Formal, busy, shopping and formal trades and services, urban decay due to lack of investment, population density to be improved. Living conditions are poor.

Figure 8.1: Site selection comparison

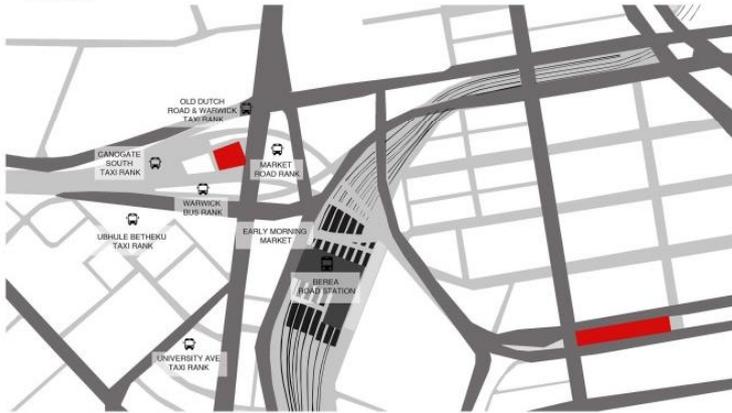
URBAN CHARACTERISTICS



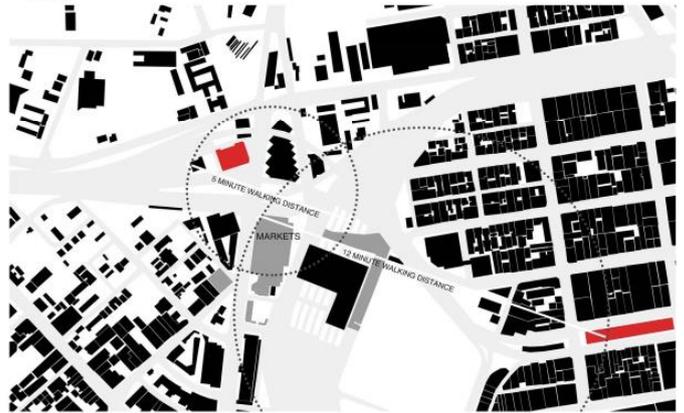
Built Form



Zoning



Vehicular Access Routes and Public Transport



Walking Proximity

- Primary Roads
- Secondary and Tertiary Roads

SITE 2

West of Julius Nyrere Avenue
POPULATION 5000
est. 41 000

Gateway to the city
Transport hub, 300 000 people travel through here each day
Informal trade thrives here
Urban Decay is rife and detracts investor confidence
Multi-cultural melting pot full of architectural and social heritage



Ground floor retail

Strong walkable district
Within a 10min walking distance of Warwick Markets
Possible good quality of space can be harvested from existing layout
Has the opportunity to be an iconic landmark
Many stores and food markets around the building



Building from bridge

Access to the site
Noise pollution
Existing building footprint may be irregular and difficult to deal with
Building character and style not substantial enough for adaptive reuse
Building function to close to the original function
All current tenants will need space in the proposed design



Building from main access road

Warwick - Vibrant, informal, busy, sense of community, urban decay due to lack of investment, community are largely unemployed



Building form and aesthetics



Option 2 - within Warwick Junction



Option 2 - Site area, dimensions, topography and building services

8.7 FINAL DESIGN REPORT

(Refer to appendix E)

8.8 FINAL DESIGN

(Refer to appendix F)

CHAPTER 9

REFERENCES

9.0 REFERENCES

BOOKS

- Brooker, G. and Stone, S.** (2004) *Interior Architecture and the Design Principles of Remodelling Existing Buildings*. In *Re-readings*. London, pp. 77. 87
- Cantacuzino, S.** (1989) *Re/ Architecture, Old Building/ New Uses*. Spain, Artes Graficas Toledo S.A.
- Cunningham, K. L.** (2013) *Resilience Theory: A framework for engaging urban design*. Resilience Theory/ a Framework for Engaging Urban Design.
- Dobson, R . Skinner, C.** (2009) *Working in Warwick*. School of Development Studies, University of KwaZulu-Natal, Howard College Campus, Durban.
- Douglas, J.** (2011) *Building Adaptation*. 2nd edn. London and New York: Spoon Press.
- Frampton, K.** (1983) *Towards a Critical Regionalism: Six Points for an Architecture of Resistance*, in Foster, H. (ed). *Postmodern Culture*. London: Pluto Press, pp. 16. 30.
- Gunderson, Lance H & Holling, C.S** (2002) *Panarchy: understanding transformations in human and natural systems*. Washington, DC, Island Press. Pp49
- Lynch, K.** (1960) *Image of the City*. 1st ed. Cambridge: The Technology Press & The Harvard University Press.
- Newman, P. and Jennings, I.** (2008) *Cities as Sustainable Ecosystems: Principles and Practices, Cities*. Washington, D.C: Island Press. doi: 10.1111/j.1467-9906.2010.00504.x.
- Norberg-Schulz, C.** (1980). *Genius loci: Towards a phenomenology of architecture*. New York: Rizzoli
- Potter, R.** (1992) *Urbanisation in the Third World*. Oxford: Oxford University Press
- Powell, K.** (1999). *Architecture reborn: Converting old buildings for new uses*. New York: Rizzoli.
- Relph, E.** (1976) *Place and Placelessness*. London: Pion Limited
- Robert, P.** (1989) *Adaptations. New Uses for Old Buildings*. Editions du Moniteur: Paris.
- Rosenberg, L.** (2012) *A City Within a City*. University of Kwa-Zulu Natal.
- Rossi, A.** (1982) *The Architecture of the City*. Opposition Books, p. 202. doi: 10.1037/022444
- Schmid, M.** (1993) *Chapter 4: The concept of Culture and Its Place Within a Theory of Social Action: A critique of Talcott Parson's Theory of Culture*, in *Theory of Culture*.

Trancik, R. (1943) *Finding Lost Space, Theories of Urban Design*. 1st Ed. New York: Van Nostrand Reinhold Company Inc.

Walker, B. and Salt, D. (2006) *Resilience Thinking: Sustaining Ecosystems and People in a Changing World*. Island Press, Washington, D.C.

JOURNAL ARTICLES

Aytac, D. O., Arslan, T. V. and Durak, S. (2016) *Adaptive Reuse as A Strategy Toward Urban Resilience*. *European Journal of Sustainable Development*, 5(4), pp. 523-532. doi: 10.14207/ejsd.2016.v5n4p523.

Beigel, F, Christou, P. (2013) *An art of Living*. *Domus* vol 273. Available at: https://www.domusweb.it/en/opinion/2014/02/27/an_art_of_living.html [Accessed 23 February 2018].

Buchanan DR. (2017) *An uneasy alliance: combining qualitative and quantitative research methods*. *Hlth Educat Q* 1992; spring: 117-35.

Curtin, B. (2007) *Semiotics and Visual Representation*, pp. 51-62.

Davis, J. (2009) *Urban catalysts in theory and practice*. *Architectural Research Quarterly*, Volume 13 / Issue 3-4, pp 295-306.

Drimie, S. and McLachlan, M. (2013) *Food security in South Africa-first steps toward a transdisciplinary approach*, *Food Security*, 5(2), pp. 217-226. doi: 10.1007/s12571-013-0241-4.

Folke, C., S. R. Carpenter, B. Walker, M. Scheffer, T. Chapin, and J. Rockström. 2010. Resilience thinking: integrating resilience, adaptability and transformability. *Ecology and Society* **15**(4): 20. [online] URL: <http://www.ecologyandsociety.org/vol15/iss4/art20/>

Folke, C. et al. (2010) *Resilience thinking: Integrating resilience, adaptability and transformability*, *Ecology and Society*. 15(4), pp. 20-28. doi: 10.5751/ES-03610-150420

Gewirtzman, D. F. (2017) *Adaptive Reuse Architecture Documentation and Analysis*. *Journal of Architectural Engineering Technology*, 05(03). doi: 10.4172/2168-9717.1000172.

Giurgola, R. (1965) *Reflections on Buildings and the City: the Realism of the Partial Vision*. *Perspecta* 9/10: the Yale architectural journal

Hendriks, S. L. (2013) *Food security in South Africa: Status quo and Policy Imperatives*, *Agrekon*, 52(October), pp. 1-22.

Hershberger, R.G. (1970) *Architecture and Meaning*, *The Journal of Aesthetic Education*, 4(4, Special Issue: The Environment and the Aesthetic Quality of Life), pp. 37-55.

- Jaeger, G and Selznick, P.** (1964) *A Normative Theory of Culture*. American Sociological Review, 29(5), pp. 653. 669.
- Jencks, C.** (1969) *Semiology and Architecture*, Theories and Manifestoes, pp. 43. 45.
- Kasavel, K. Botes, A. McKensie, M.** (2014) *Durban Climate Change Strategy: Food Security Theme Report*. Energy Office of eThekweni Municipality.
- Keesing, R** (1974) *Theories of Culture*. Annual Review of Anthropology 1974 3:1, 73-97
- Kenny, S. F.** (1994) *Cultural Influences on Architecture*. Texas Tech University. doi: 10.4018/978-1-5225-1744-3.
- Laboy, M. & Fannon, D.** (2016) *Resilience Theory and Praxis: a Critical Framework for Architecture*, *Enquiry*, 13(1), pp. 39. 52.
- Langston, C. A. et al.** (2008) *The Sustainability Implications of Building Adaptive Reuse*. Proceedings of Criocm 2008 International Research Symposium on Advances of Construction Management and Real Estate, pp. 1. 11.
- Lewin, S S and Goodman, C.** (2013) *Transformative Renewal and Urban Sustainability*. Journal of Green Building, 8(4), pp. 17. 38
- Najafi, M., Kamal, M. and Mohd, B.** (2011) *The Concept of Place and Sense of Place In Architectural Studies*. World Academy of Science, Engineering and Technology 56, 5(8), pp. 1100. 1106.
- Maharaj, B.** (1999) *The Integrated Community Apartheid Could Not Destroy: The Warwick Avenue Triangle in Durban*. Journal of Southern African Studies, Vol. 25, No. 2. pp. 249-266
- Maki, F.** (1964) *Investigations in Collective Form*. A Special Publication, No.2, p. 29.
- Munro, C.F.** (1987) *Semiotics, Aesthetics and Architecture*, The British Journal of Aesthetics, 27(2), pp. 115. 128. doi: 10.1093/bjaesthetics/27.2.115.
- Plevoets, B. and Cleempoel, K. Van** (2012) *Adaptive Reuse as a Strategy Towards Conservation of Cultural Heritage : a Literature Review*. Structural Repairs and Maintenance of Heritage Architecture XII, 118, pp. 155. 164. doi: 10.2495/STR110131.
- Redman, C., Grove, M. J. and Kuby, L.** (2004). *Integrating Social Science into the Long-Term Ecological Research (LTER) Network: Social Dimensions of Ecological Change and Ecological Dimensions of Social Change*. Ecosystems Vol.7(2), pp. 161-171.
- Sharifi, A. et al.** (2017) *Conceptualizing dimensions and characteristics of urban resilience: Insights from a co-design process, Sustainability* (Switzerland), 9(6), pp. 1. 20. doi: 10.3390/su9061032.

Simon Rojo, M. (2012) *Urban agriculture in distressed urban areas. Implications for urban regeneration policies.* In *Agriculture in an Urbanizing Society*. International Conference on Multifunctional Agriculture and Urban-Rural Relation. Wageningen, Holanda. Research Gate. pp 1-19.

Skinner, C. (2009) *Challenging city imaginaries: Street traders' struggles in Warwick Junction.* Empowering Women for Gender Equity, No. 81, Gender & Poverty Reduction. pp. 101-109

Smith, D. W. (1998) *Urban food systems and the poor in developing countries,* Transactions of the Institute of British Geographers, 23(2), pp. 207. 219.

Tacoli, C. (2013) *Urban poverty, food security and climate change,* International Institute for Environment and Development.

Verheij, R. (2015) *Palimpsest in Architecture. Six personal observations* pp. 1. 176.

Walker, B, Holling C.S, S. R. C. and A. K. (2004) *Resilience, Adaptability and Transformability in Socia-ecological Systems.* Ecology and Society. Vol 9 Issue 2 Article 5. The Resilience Alliance, pp. 1. 8.

Wurwarg, J. (2014) *Urbanization and Hunger: Food Policies and Programmes, Responding to Urbanization, and Benefiting the Urban Poor in Three Cities,* Journal of International Affairs, 67(2), pp. 75. 90.

THESIS

Bikombo, B G. (2014) *Understanding Household Food Insecurity and Coping Strategies of Street Traders in Durban.* University of South Africa.

Cunningham, K.L. (2013) *Resilience Theory / a Framework for Engaging Urban Design.* Master of Landscape Architecture. Manhattan KS: Kansas State University.

Hall, S. (1994) *"Cultural identity and diaspora"* from Williams, Patrick and Laura Chrisman, Colonial discourse and post-colonial theory: a reader pp.227-237, London: Harvester Wheatsheaf

Mthethwa, T. (2016) *Ethekwini Closes Down One of the City's Worst Derelict Buildings.* Ethekwini Municipality.

Stephanus, M. (2013) *Post Democratic Urban Regeneration in South Africa. The Case of eThekwini Municipality Inner City. Masters in Town Planning (MTRP).* Durban: University of KwaZulu-Natal (UKZN).

Pereira, L. M. (2014) *The Future of South Africa's Food System: What is research telling us ?*, Southern Africa Food Lab. South Africa

Rosenberg, L. (2012) *A City Within a City.* University of Kwa-Zulu Natal.

REPORTS

Allan, P. & Bryant, M. (2011) *Resilience as a framework for urbanism and recovery*.

Da Silva, J. and Moench, M. (2015) *City Resilience Framework*. Arup, 2014

Common Wealth of Australia (2004) *Adaptive Reuse: Preserving our Past, Building our Future*. ISBN 0 642 55030 1

EThekweni Municipality's Department of Environmental Planning and Climate Protection. (2017) *Durban Resilience Strategy*. Durban, The EThekweni Municipality Council.

eThekweni Municipality's Department of Development Planning (2016) *eThekweni Municipality Integrated Development Plan: 5 year plan: 2017/18 to 2021/22*. Available at: http://www.durban.gov.za/City_Government/City_Vision/IDP/Documents/IDP_2017_2018.PDF.

IPPU Joint Venture. (2016) *EThekweni Inner City Local Area Plan*. 6th ed. Durban: IPPU Joint Venture.

Moyo, D. (2007) *The Future of Food: Elements of Integrated Food Security Strategy for South Africa and Food Security Status in Africa*, Proceedings of the Annual Meeting, 101, pp. 103. 108.

Pisano, U. (2012) *Resilience and Sustainable Development: Theory of resilience , systems thinking and adaptive governance*. ESDN Quarterly Report, (September), p. 51. doi: 10.1017/S1355770X06003020.

Rockefeller Foundation (2018) *what is Urban Resilience?* 100 Resilient Cities, Arup <https://www.100resilientcities.org/resources/> Last Accessed 27/03/2018

United Nations, Sustainable Development Goals. (2017) *Goal 13: Take urgent action to combat climate change and its impacts*. [ONLINE] Available at: <http://www.un.org/sustainabledevelopment/climate-change-2/>. [Accessed 20 May 2017].

UNFCCC (2015). *Paris Agreement*. In *United Nations Framework Convention on Climate Change*. New York, 12 December. New York: United Nations.pp 1-25.

Yusuf, M. P. and Allopi, D. (2010) *The Impact of Urban Sprawl on the Inhabitants of the EThekweni Municipality and the Provision of Infrastructure*. 29th Southern African Transport Conference, (August), pp. 415. 424. doi: ISSN 978-1-920017-47-7.

ARTICLES

Minkel, CW, Milton, R & Leite, A (2018) *Sao Paulo*. Encyclopedia Britannica. Pg 1-5 [ONLINE] <https://www.britannica.com/place/Sao-Paulo-Brazil> [Accessed 20 September 2017].

WEBSITES

Don Johnson. (2015) *What is the definition of "urban revitalization"?* Available at: <https://www.quora.com/What-is-the-definition-of-urban-revitalization>. [accessed 25 November 2018]

Lima. (2018) *Food Security*. Available at: <http://www.lima.org.za/index.php/menu-examples/lima-community-health>. [accessed 25 November 2018]

Renzo Piano Building Workshop (2012) *Lingotto Factory Conversion*. Available at: <http://www.rpbw.com/project/lingotto-factory-conversion>. [accessed 25 November 2018]

Research Programme on Climate Change, Agriculture and Food Security. (2015) *Crops under a changing climate: what are the impacts in Africa?* Available at: <https://ccaafs.cgiar.org/blog/crops-under-changing-climate-what-are-impacts-africa#.WaqC2LjGM8>. [accessed 25 November 2018]

SACN (2015) *A study on current and future realities for urban food security in South Africa*, South African Cities Network, 27 (July 2015), pp. 0. 84. doi: 10.13140/RG.2.1.4224.6487. <http://www.sacities.net/wp-content/uploads/2015/11/Urban-Food-Security-Report.pdf>. [accessed 25 November 2018]

Socio-Economic Review and Outlook (2015) *KwaZulu-Natal Provincial Treasury*. Available at: <http://linksource.ebsco.com.ezproxy.lib.umb.edu/linking.aspx?sid=ProQ%253Aethnicnewswatch&fmt=journal&genre=article&issn=10941908&volume=21&issue=4&date=2014-01-01&spage=18&title=Network+Journal&atitle=Review+and+Outlook&au=Boyd%252C+Herb&isbn=&jtitle=Net>. [accessed 25 November 2018]

Stats SA (2011) *Ethekwini*. Available at: http://www.statssa.gov.za/?page_id=1021&id=ethekwini-municipality. [accessed 25 November 2018]

Stats SA. (2016) *Community survey 2016: Agricultural households*. Available at: http://www.statssa.gov.za/?page_id=964. [accessed 25 November 2018]

Stats SA (2018) *Statistical release P0441: Gross domestic product. Fourth quarter 2017*, (March), p. 21. Available at: <http://www.statssa.gov.za/publications/P0441/P04414thQuarter2017.pdf>. [accessed 25 November 2018]

Constitution of the Republic of South Africa (1996), available at: <https://www.refworld.org/docid/3ae6b5de4.html> [accessed 25 November 2018]

UN Habitat - For a Better Urban Future. (2012) *Youth - Strategies for integrating the youth in cities*. Available at: <https://unhabitat.org/urban-themes/youth/>. [accessed 25 November 2018]

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APPENDIX A

Below is a questionnaire with the Early Morning Market Traders in Warwick Junction. The aim of this questionnaire is to understand better, the link between the Field where produce is grown and the market of Warwick junction in the inner city where it is sold. Furthermore, this interview aims to understand the experiences and livelihoods of the Early Morning Market traders.

NB: Participation in this interview is voluntary. Participants are informed of the nature and purpose of the research and institution with which the research is associated with. All information gathered from the interview is solely for the purpose of this research study. Participants are free to withdraw from the research at any time should they wish to do so.

***not required**

Participant Name *:

Igama lomhlanganyeli

(THE FOLLOWING INFORMATION IS FOR STATISTICAL PURPOSES ONLY)

QUESTION 1:

What is your age group?

Iyini iqembu lakho leminyaka?

- 18 . 35
- 36 . 65
- 65 +

QUESTION 2:

What is your gender?

Uyini ubulili bakho?

- Male / *Owesilisa*
- Female / *Owesifazane*

QUESTION 3:

What is your marital status?

Iyini isimo sakho somshado?

- Divorced / *Kwahlukaniswa*
- Married / *Ushadile*
- Single / *Ungashadile*
- Widowed / *Ushonile*

QUESTION 4:

How many people live in your household?

Bangaki abantu abahlala ekhaya lakho?

- I live alone
- 2-4
- 5-8
- 8+

QUESTION 5:

Do you provide the main source of income for your household?

Ingabe unikeza umthombo oyinhloko wemali engenayo ekhaya lakho?

- Yes / Yebo
- No / Cha

QUESTION 6:

Does trading in the markets provide enough income for you and your family or do you have other ways of making money?

Ingabe ukuhweba ezimakethe kunikeze imali engenayo kuwe nomndeni wakho noma unayo ezinye izindlela zokwenza imali?

QUESTION 7:

What is your job title/position, if applicable?

Iyini isihloko sakho somsebenzi / isikhundla, uma kusebenza?

QUESTION 8:

How/ why did you begin trading and for how long have you been trading in Warwick?

Indlela / kungani uqala ukuhweba futhi uke wahweba isikhathi esingakanani eWarwick?

QUESTION 9:

Could you describe a typical day for you from the time you wake up to when you get home?

Ungakwazi yini ukuchaza usuku olujwayelekile kuwe kusukela ngesikhathi uvuka uze ufike ekhaya?

QUESTION 10:

What produce/goods do you sell?

Yimaphi imikhiqizo / izimpahla oyithengisayo?

QUESTION 11:

How would you classify what you sell?

Ungabeka kanjani lokho okuthengisayo?

- | | |
|--|--------------------------------------|
| <input type="checkbox"/> <i>Fresh, safe, healthy</i> | <i>/ Fresh, enempilo, okunomsoco</i> |
| <input type="checkbox"/> <i>Processed, Unhealthy</i> | <i>/ Isetshenzisiwe, ayinempila</i> |
| <input type="checkbox"/> <i>Both of the above</i> | <i>/ Kokubili okungenhla</i> |
| <input type="checkbox"/> <i>Other</i> | <i>/ Enye</i> |

QUESTION 12:

Are the produce/goods locally sourced?

Ingabe umkhiqizo / izimpahla zendawo zondliwe?

- | | |
|------------------------------|---------------|
| <input type="checkbox"/> Yes | <i>/ Yebo</i> |
| <input type="checkbox"/> No | <i>/ Cha</i> |

QUESTION 13:

Where are they sourced from and why?

Uma kunjalo, bavela kuphi futhi kungani?

QUESTION 14:

As a trader, what are the most important needs, which are lacking, for you?
Njengomhwebi, yiziphi izidingo ezibaluleke kakhulu, ezingekho, ngawe?

(Please tick)

- | | |
|--|--|
| <input type="checkbox"/> <i>Affordable housing in the city</i> | / Izindlu ezingabizi kahle edolobheni |
| <input type="checkbox"/> <i>Storage</i> | / Isitoreji |
| <input type="checkbox"/> <i>Trading space</i> | / Ukuhweba isikhala |
| <input type="checkbox"/> <i>Ablutions</i> | / Ukushiyeka |
| <input type="checkbox"/> <i>Basic education training</i> | / Ukuqeqeshwa kwezifundo eziyisisekelo |
| <input type="checkbox"/> <i>Business support</i> | / Ukusekelwa kwebhizinisi |
| <input type="checkbox"/> <i>Other</i> | / Enye |

Out of these options which is the most important to you? And why?

Kulezi zindlela okubaluleke kakhulu kuwe? Futhi ngani?

QUESTION 15:

In your opinion, what are the most important needs of the informal trading community?
Ngokombono wakho, yiziphi izidingo ezibaluleke kakhulu zomphakathi wokuhweba ongahlelekile?

QUESTION 16:

What are some of the difficulties you experience on a daily basis?
Yiziphi ezinye zezinkinga ozizwayo nsuku zonke?

QUESTION 17:

Would you agree that the markets of Warwick are made up of many cultural backgrounds and people from different parts of South Africa/ Africa?

Ungavuma yini ukuthi izimakethe zaseWarwick zakhiwe ngezizinda eziningi zamasiko nabantu abavela ezingxenyeni ezahlukene zaseNingizimu Afrika / Afrika?

QUESTION 18:

Would you say that the markets in Warwick symbolise:

Ungasho ukuthi izimakethe zaseWarwick zifanekisela:

- A. The culture of the people who work here / Isiko labantu abasebenza lapha
- B. The history of Durban Markets / Umlando wezimakethe zaseThekwini
- C. Both / Bili

QUESTION 19:

Are you familiar with the term "Food Security"?

Uyazi igama elithi "Ukuphepha kokudla"?

- Yes / Yebo
- No / Cha

If not, food security can be defined as, "the state of having reliable access to a sufficient quantity of affordable, nutritious food."

Uma kungenjalo, ukulondeka kokudla kungachazwa ngokuthi, "isimo sokufinyelela okunokwethenjelwa kokuningi okwanele kokudla okungabizi, okunomsoco."

Do you feel that by trading fresh fruits and vegetables, you contribute to food security in the inner city?

Ingabe unomuzwa wokuthi ngokudayisa izithelo nemifino ezisha, unomthelela ekuvikelekeni kokudla edolobheni elingaphakathi?

QUESTION 20:

If you could do any job other than trading fresh produce, what would you do?

Uma ungenza noma yimuphi umsebenzi ngaphandle kokuhweba umkhiqizo omusha, ubungenzenjani?

APPENDIX B

An interview with Richard Dobson, the founder of Asiye eTafuleni. This organization works to enhance the voices of the traders of Warwick; they work closely with the informal trading community creating awareness of their importance to the framework of the inner city. This interview relates to the case study of the Early Morning Markets. It is noted that Asiye eTafuleni strive to place the informal workers who drive the markets of Warwick at the centre of all design aspects in this area in order to formulate responsive solutions instead of superficial ones for inclusive urban spaces.

NB: Participation in this interview is voluntary. Participants are informed of the nature and purpose of the research and institution with which the research is associated with. All information gathered from the interview is solely for the purpose of this research study. Participants are free to withdraw from the research at any time should they wish to do so.

Participant Name *:

QUESTION 1:

What is your job title and could you give a brief overview of the roles and responsibilities of your position?

QUESTION 2:

How did you begin to start your journey with the traders and markets of Warwick?

QUESTION 3:

In your opinion, would you say that the markets of Warwick express/ contribute to cultural identity in the city?

QUESTION 4:

Would you say that the markets allow people to be more connected to and aware their food source?

QUESTION 5:

Are you familiar with the term %Food Security+?

- YES
- NO

If not, food security can be defined as, %the state of having reliable access to a sufficient quantity of affordable, nutritious food.+

In your opinion do the markets contribute to food security of the people in the inner city?

QUESTION 6:

In your opinion, what other positive contributions do the informal workers make to the inner city and its communities?

QUESTION 7:

From your experience, what are some of the greatest struggles of traders and people employed within the markets?

QUESTION 8:

The Early Morning Market is one of the oldest markets in Durban, how does it compare to some of the newer markets in terms of historical significance, infrastructure, culture and trading atmosphere?

QUESTION 9:

From your experience and connection to the markets and its traders, how do you think traders feel about the environment in which they work?

QUESTION 10:

In your opinion, what is needed most by the traders to improve their livelihoods?

QUESTION 11:

In your opinion how could architecture improve the quality of life for these traders?

QUESTION 12:

It is noted that *Asiye eTafuleni* provide some training and educational programmes. Would you be able to give some examples of how the informal workers have personally benefitted from basic numeracy and business training?

QUESTION 13:

From experience, what are some of the biggest and most frequent misconceptions of the markets of Warwick and the informal workers?

QUESTION 14:

In your opinion, how can the city better integrate these traders into the urban context which transforms their current situations for the better?

QUESTION 15:

Reflecting on how much has been achieved with integrating the markets and traders into the urban realm of the city so far, what do you see for the future of the Markets of Warwick?

APPENDIX C

Below are the general questions for an interview with Design Workshop for the Pixley House Case Study. The aim of this interview is to better understand the design processes of adaptive reuse and the challenges faced with working on existing buildings in the inner city. Furthermore this interview aims to understand deeper the design intent and solutions within the building design

NB: Participation in this interview is voluntary. Participants are informed of the nature and purpose of the research and institution with which the research is associated with. All information gathered from the interview is solely for the purpose of this research study. Participants are free to withdraw from the research at any time should they wish to do so.

Participant Name *:

QUESTION 1:

What is your job title and could you give a brief overview of the roles and responsibilities of your position?

QUESTION 2:

Could you give a brief background on how and why you were appointed to design the Pixley house?

QUESTION 3:

Could you give a brief explanation of the client brief and budget?

QUESTION 4:

What was the overall vision of the building design and function and its integration into the existing context?

QUESTION 5:

In adaptively reusing an existing building for a new function where there specific design strategies used and where did they originate from?

QUESTION 6:

What were the greatest limitations and issues with the building design and construction?

QUESTION 7:

The exterior of the building is painted and reflects the original art deco building typology and in contrast the interior walls are left unfinished and services are exposed. What is the reason for this?

QUESTION 8:

Have you experienced the building after completion? If yes, in your opinion how have the tenants and the community responded to it?

QUESTION 9:

The existing building was a department store. Could you explain how the design challenges of lighting, natural ventilation and orientation were dealt with for the change in building function?

QUESTION 10:

In your opinion is adaptive reuse of architecture a viable option for inner city revitalization in Durban?

*Other ideas or observations formulated during interview by the interviewee

APPENDIX D

ETHICS APPROVAL LETTER

1 November 2018

Ms Tegan Ashley Wright 212503292
School of Built Environment and Development Studies
Howard College Campus

Dear Ms Wright

Protocol Reference Number : HSS/1071/018M

New Project title: Exploring food security as a catalyst for the adaptive reuse of architecture. Towards an agricultural hub in the inner city of Durban.

Approval notification – Amendment Application

This letter serves to notify you that your application for an amendment dated 31 October 2018 has now been granted **Full Approval** as follows:

- **Change in Title**

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study must be reviewed and approved through an 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.

Best wishes for the successful completion of your research protocol.

Yours faithfully



pp
.....
Professor Shenuka Singh (Chair)
Humanities & Social Sciences Research Ethics Committee
/pm

Cc Supervisor: Dr Silvia Bodel
cc Academic Leader Research: Professor Oliver Mtapuri
cc School Administrators: Ms A Msomi

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 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za

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APPENDIX E
DESIGN REPORT

APPENDIX F
FINAL DESIGN DRAWINGS



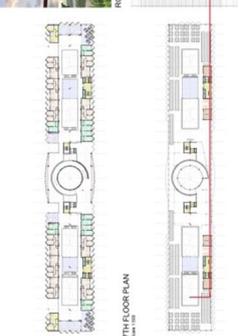
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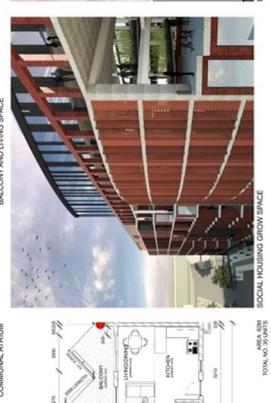
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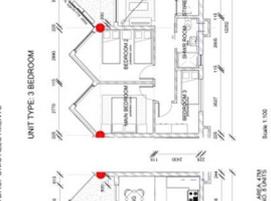
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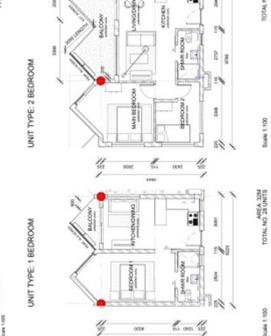
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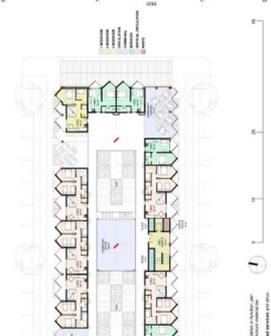
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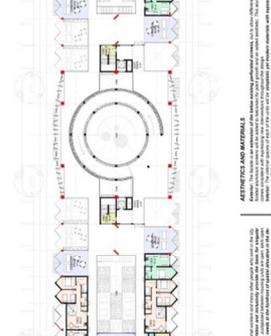
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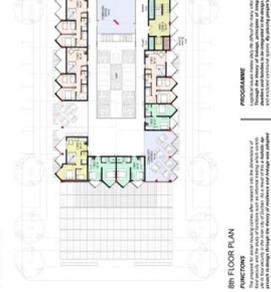
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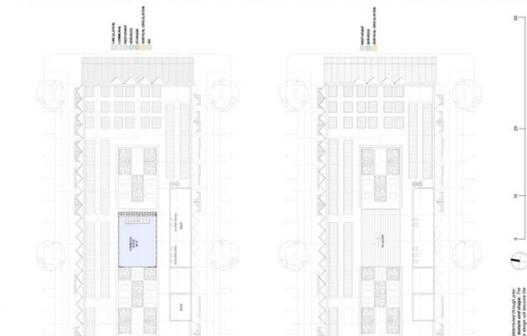
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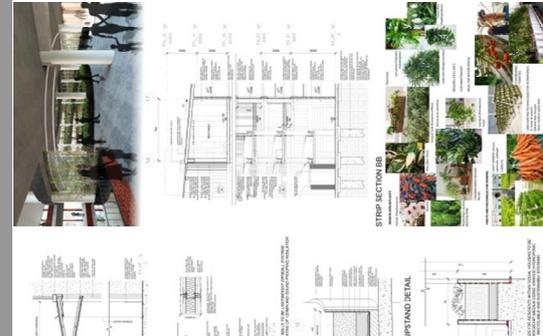
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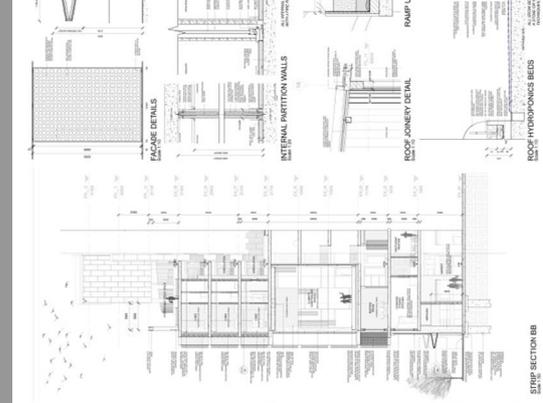
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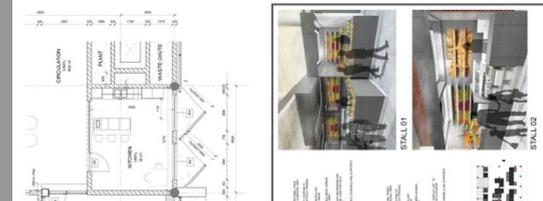
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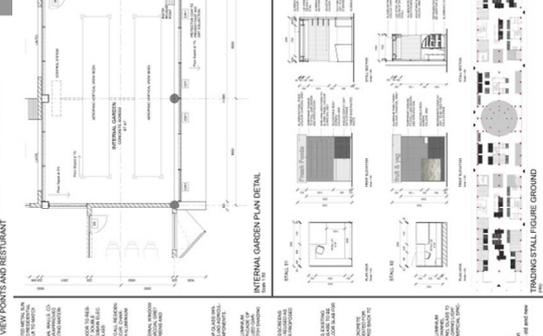
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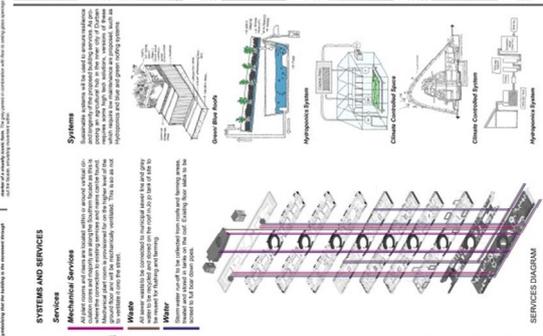
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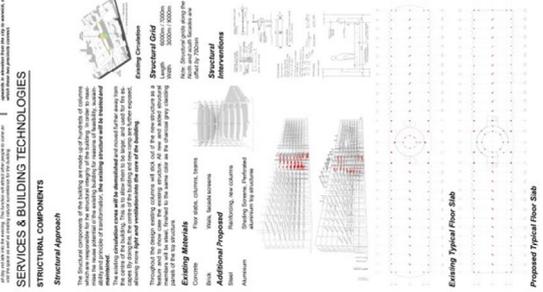
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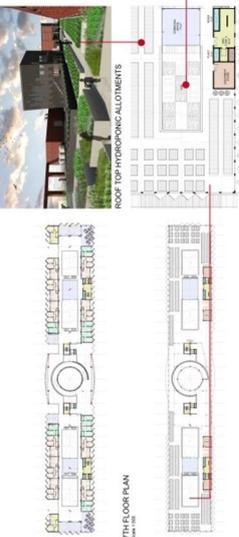
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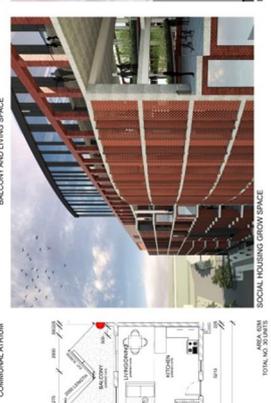
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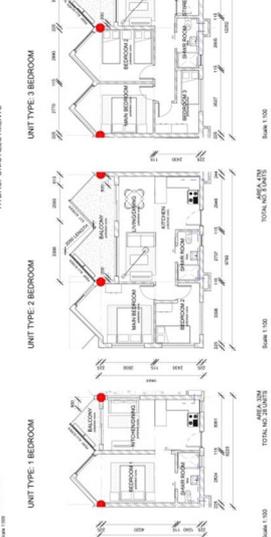
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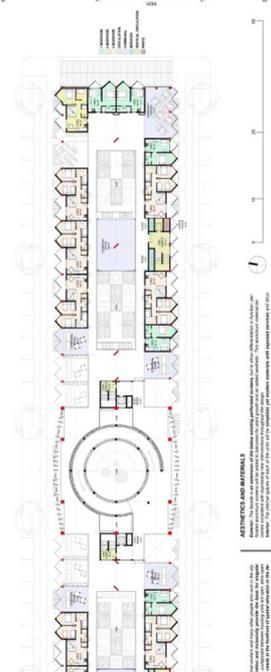
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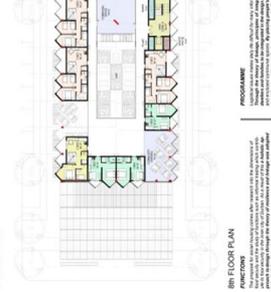
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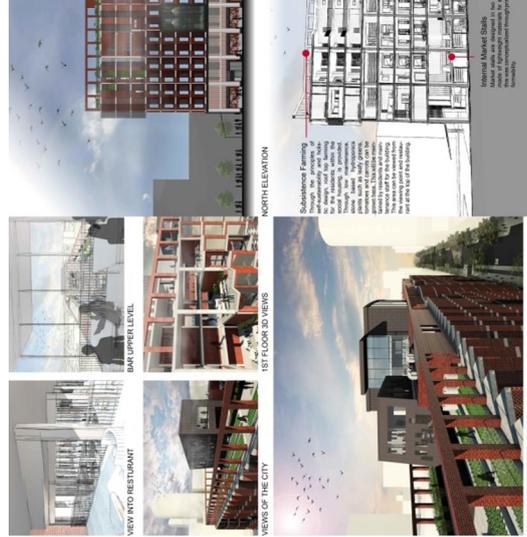
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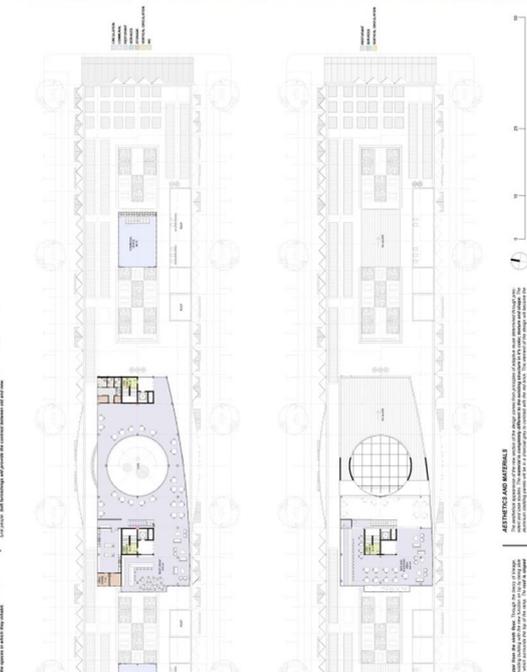
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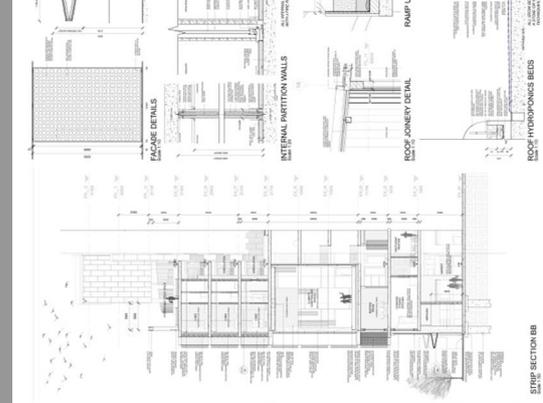
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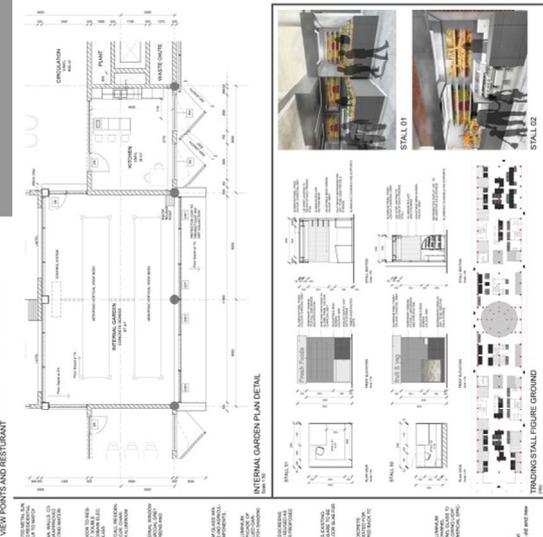
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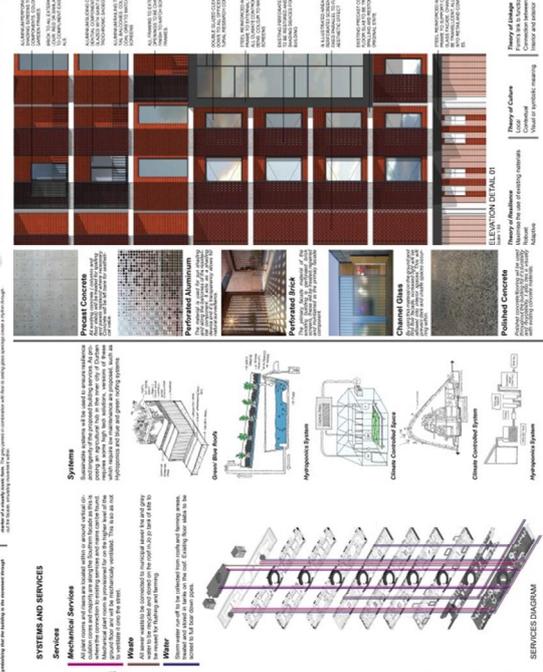
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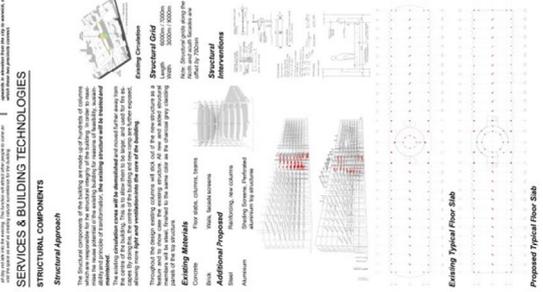
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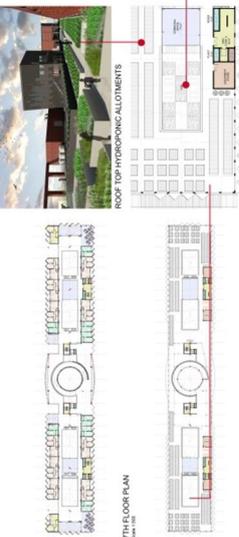
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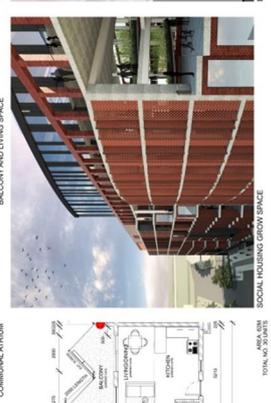
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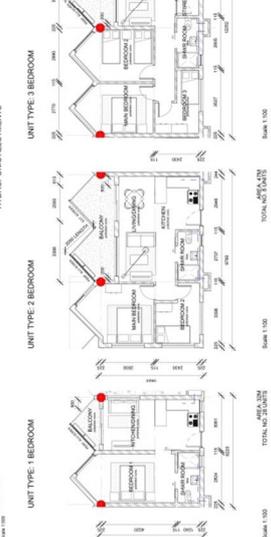
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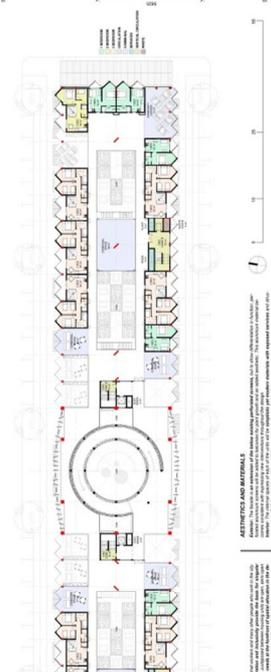
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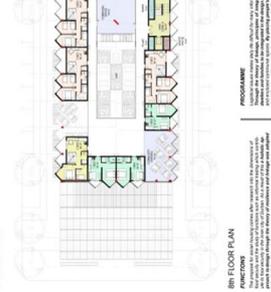
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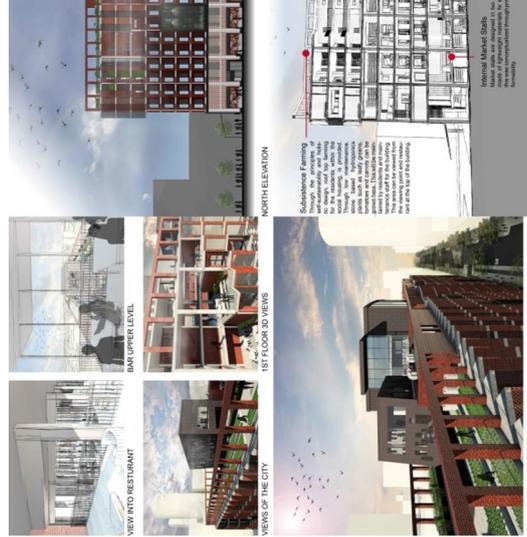
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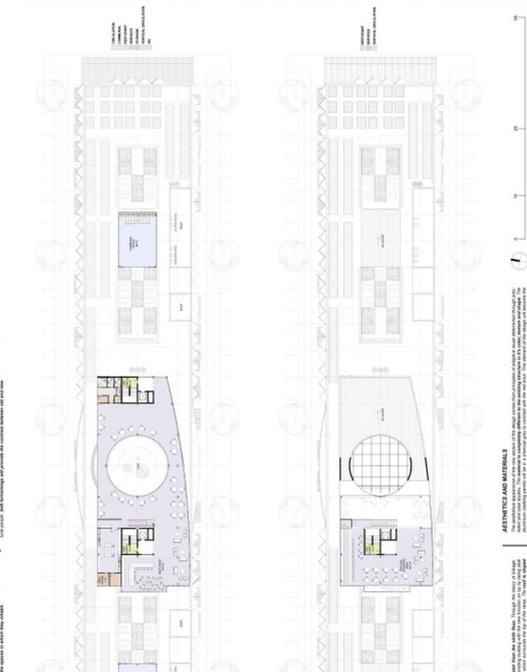
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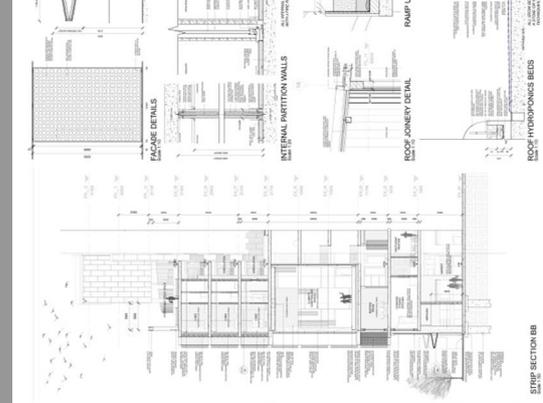
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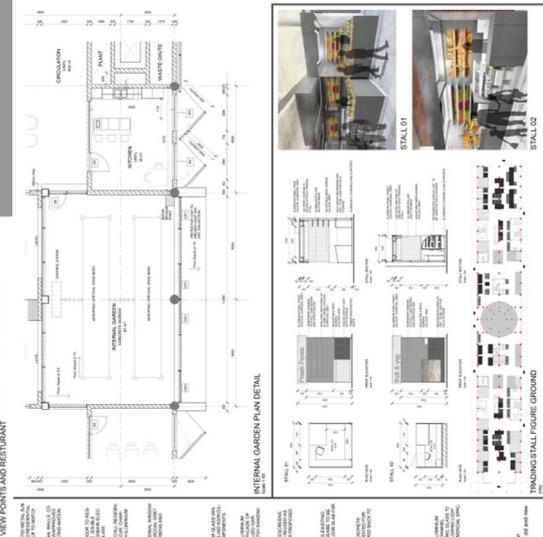
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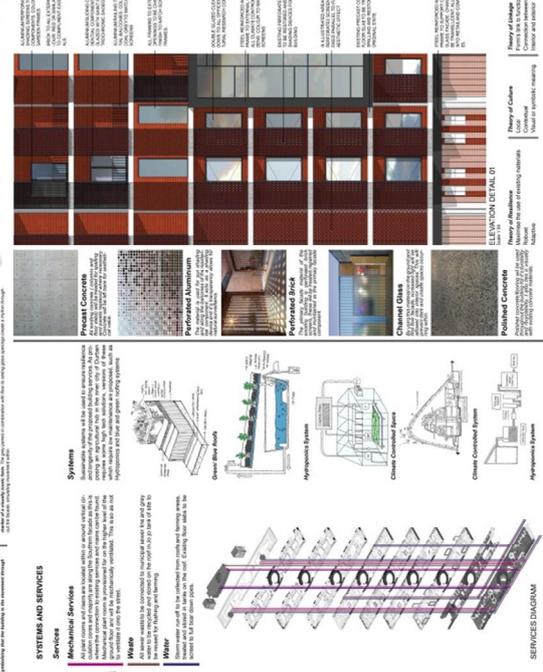
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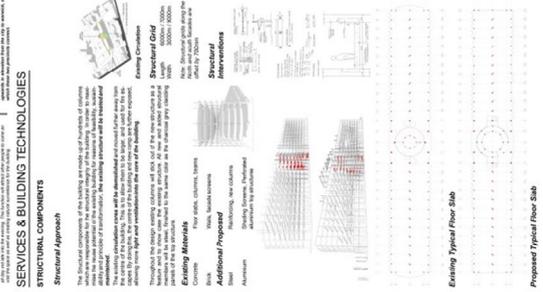
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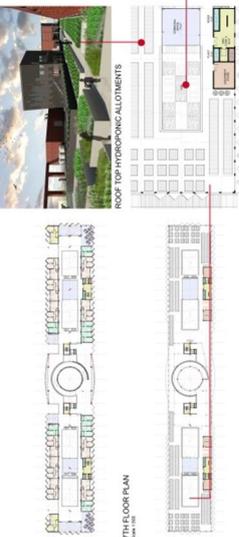
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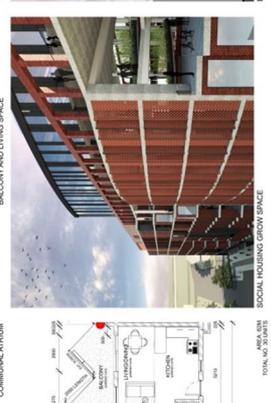
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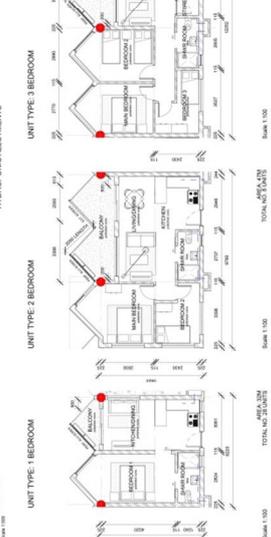
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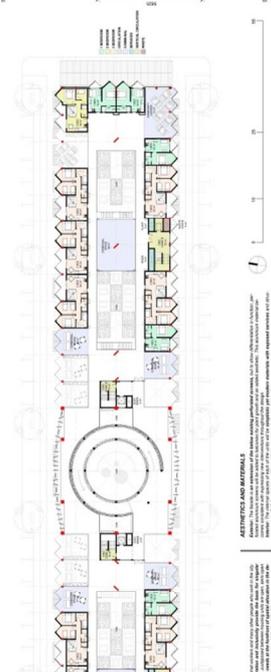
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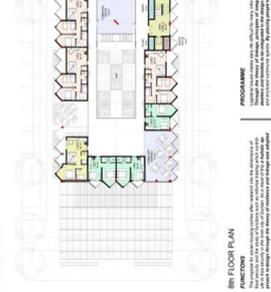
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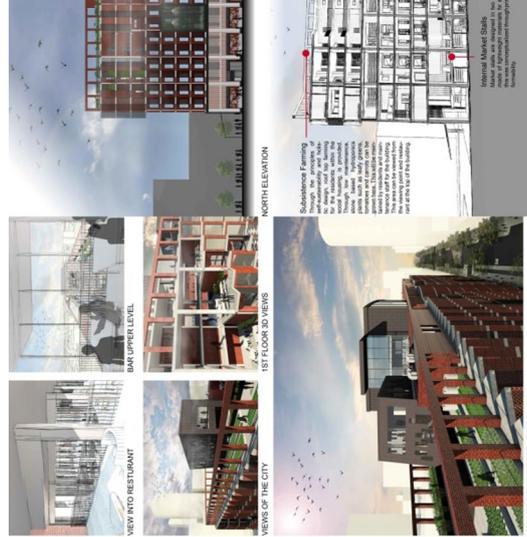
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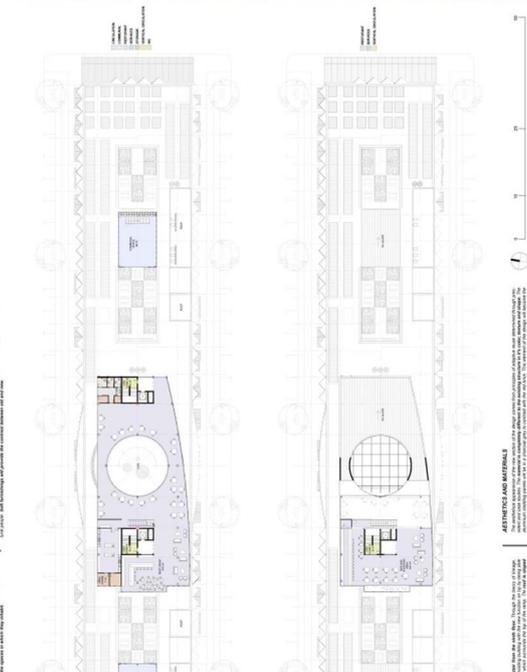
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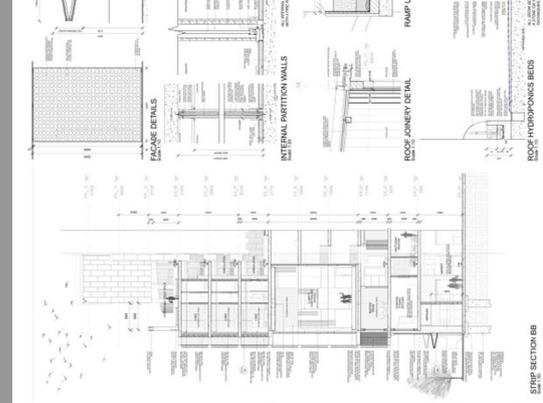
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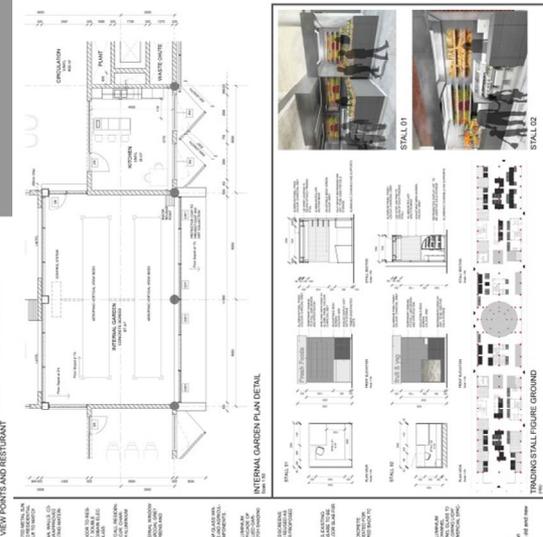
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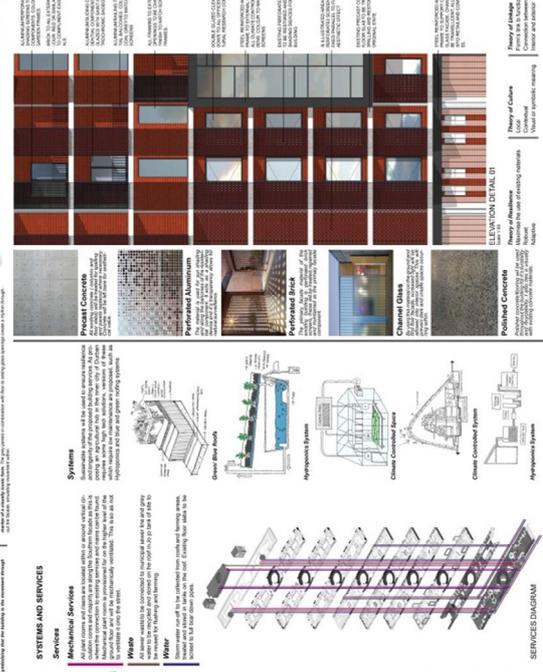
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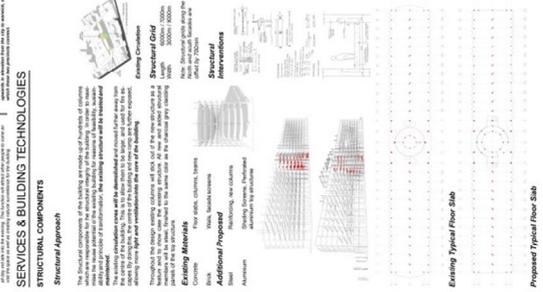
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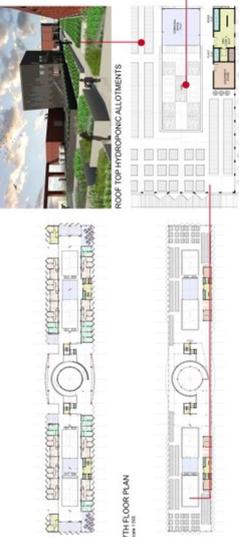
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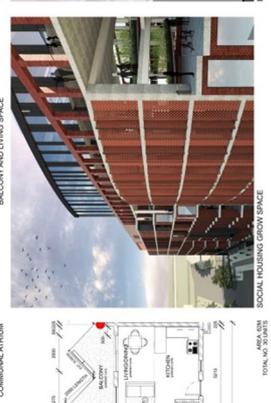
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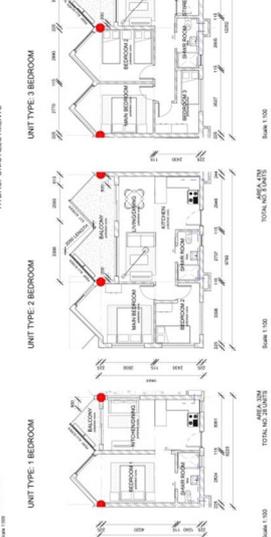
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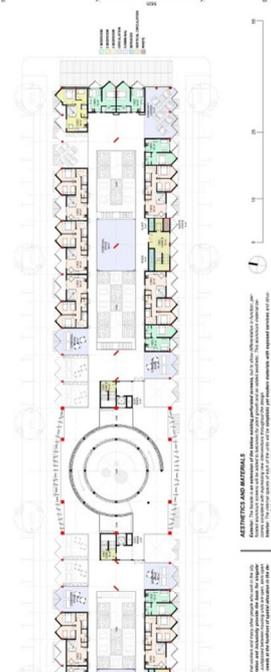
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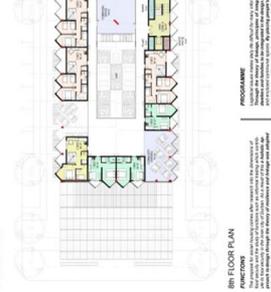
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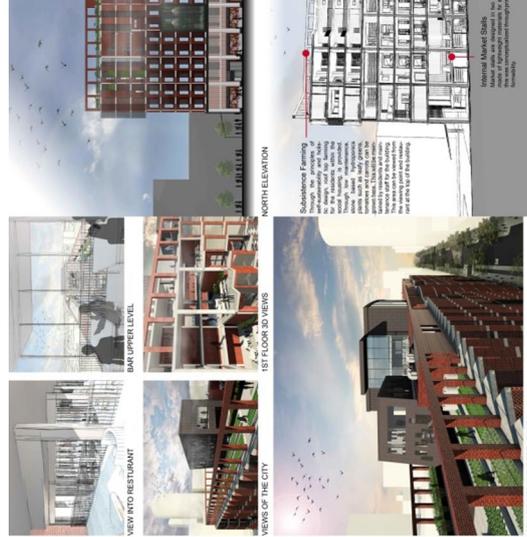
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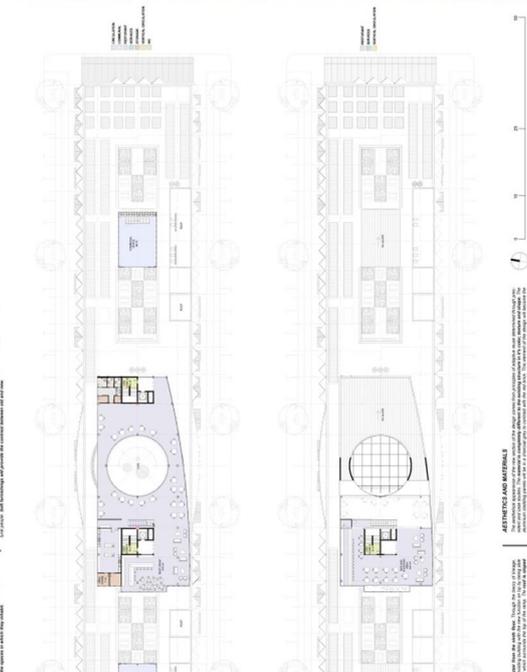
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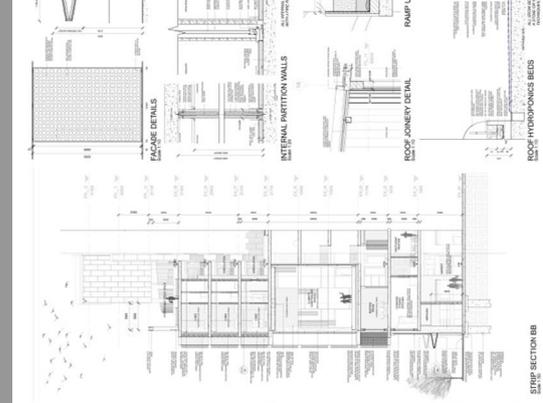
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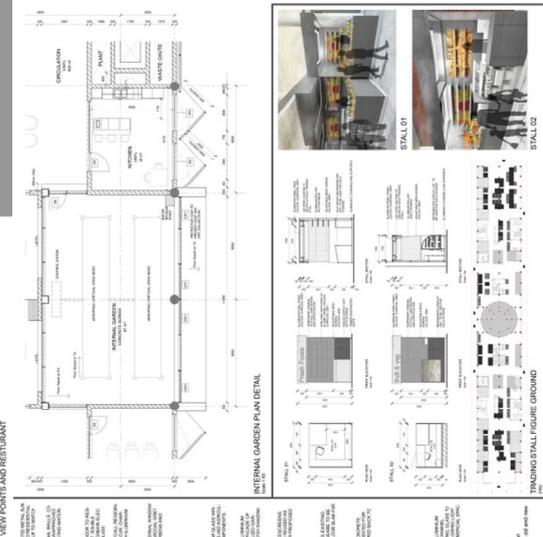
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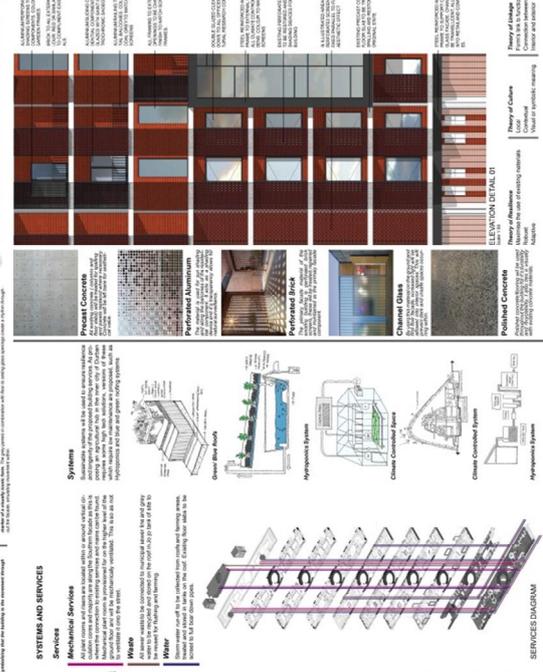
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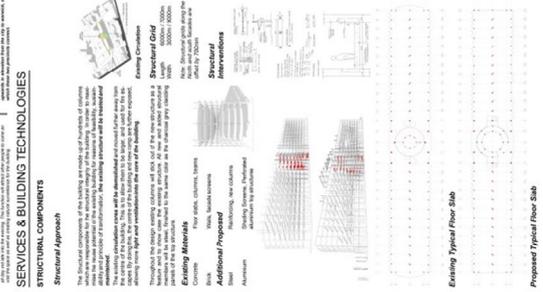
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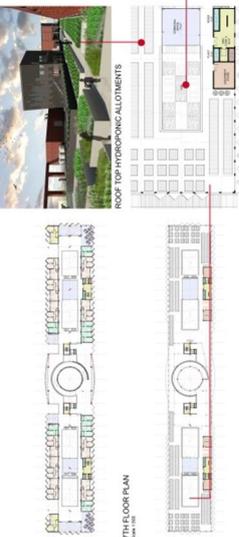
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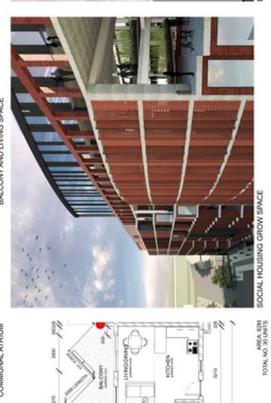
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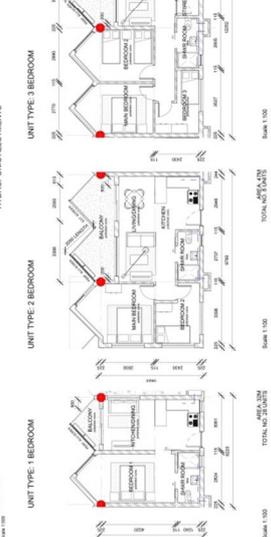
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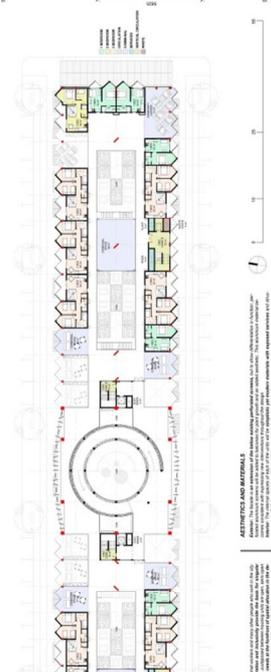
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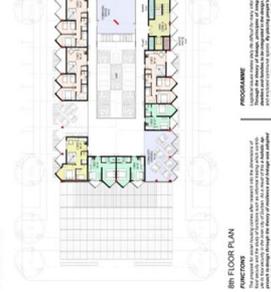
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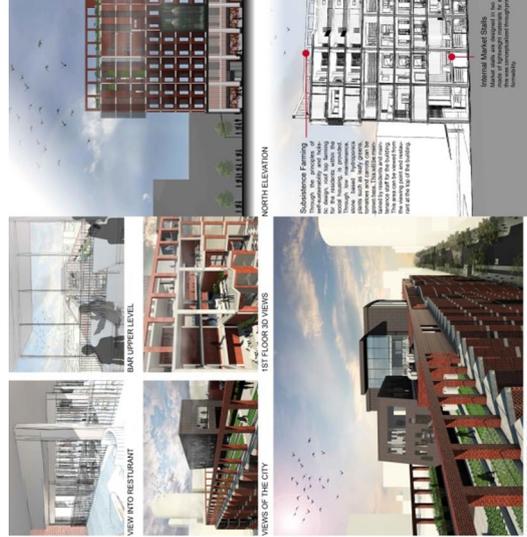
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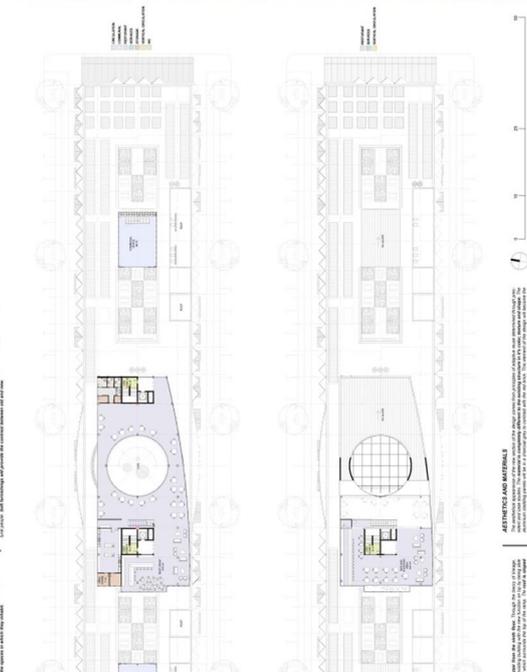
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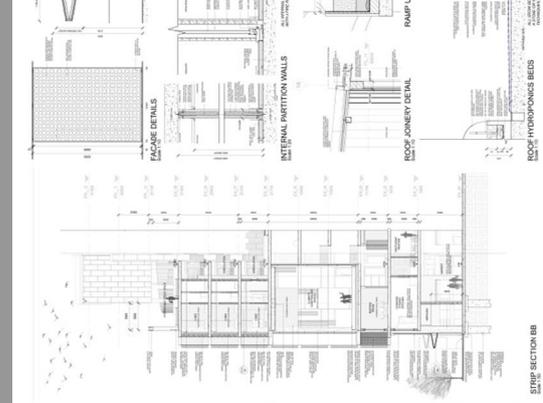
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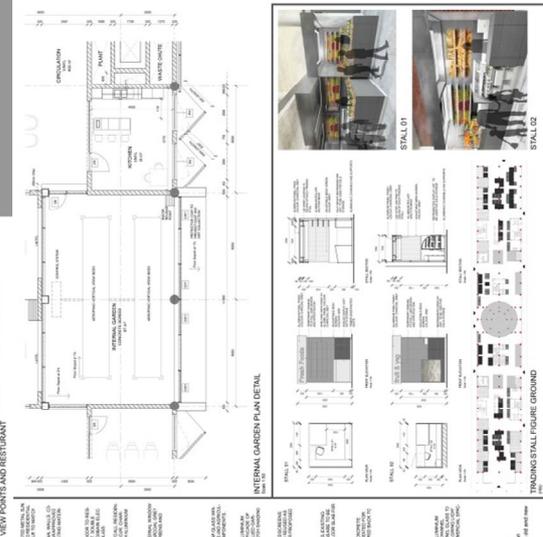
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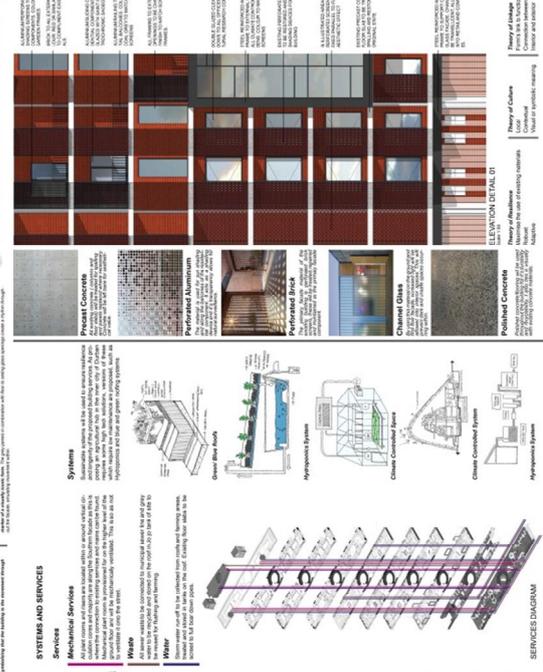
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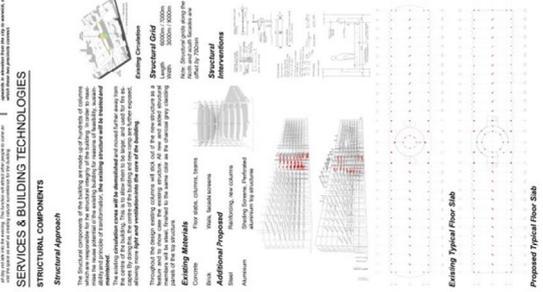
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SECTION DDDD



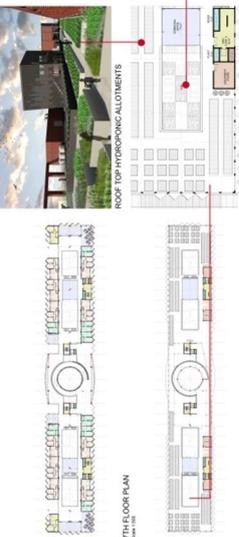
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SECTION FFFF



SECTION GGGG



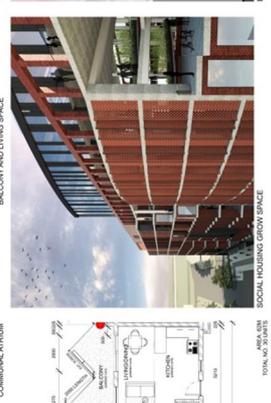
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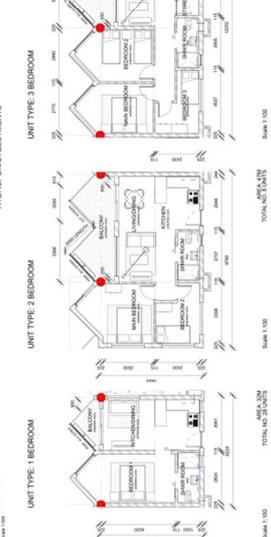
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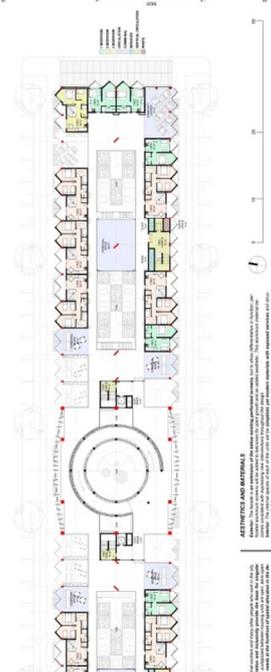
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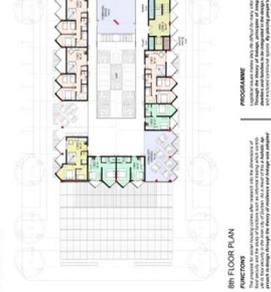
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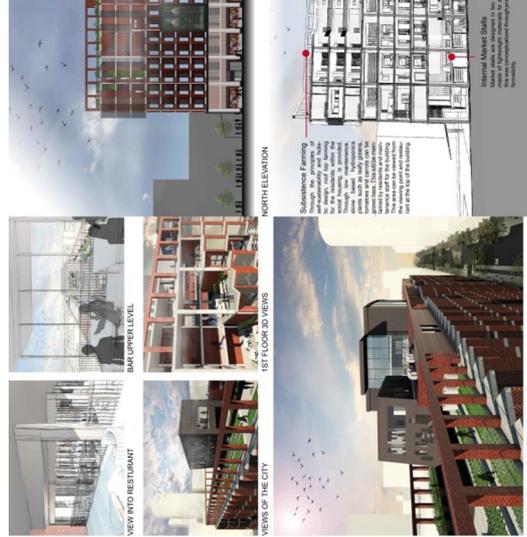
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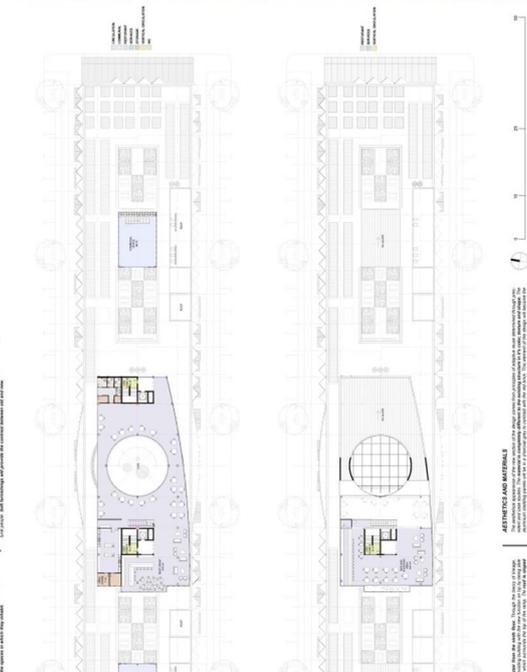
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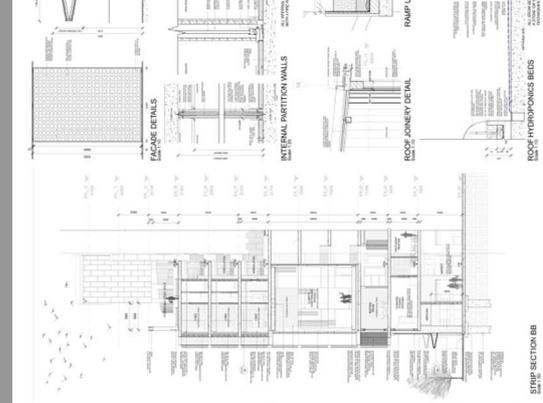
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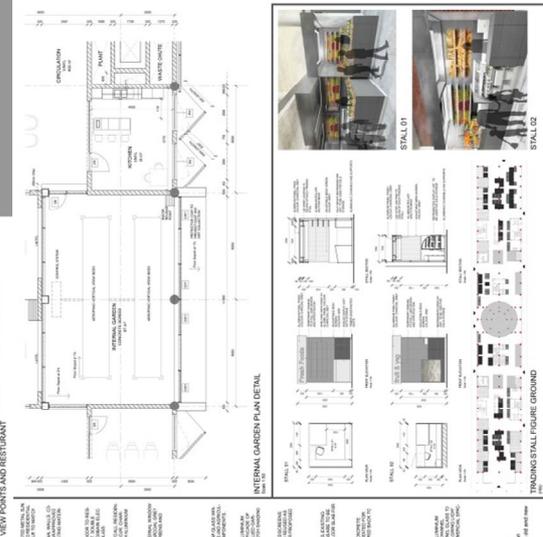
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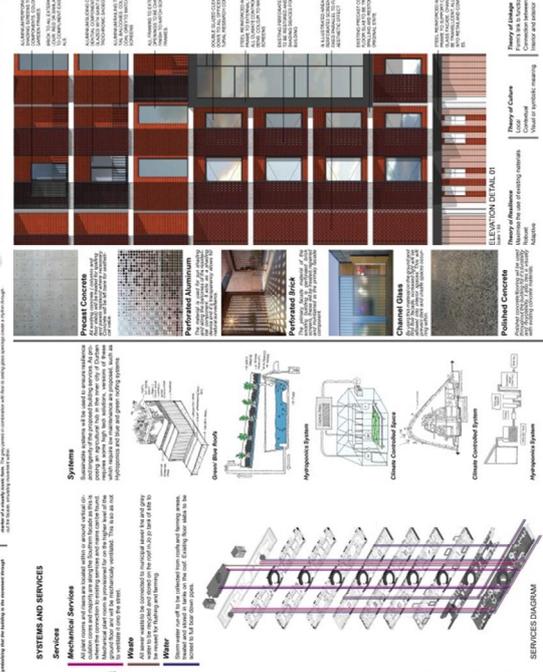
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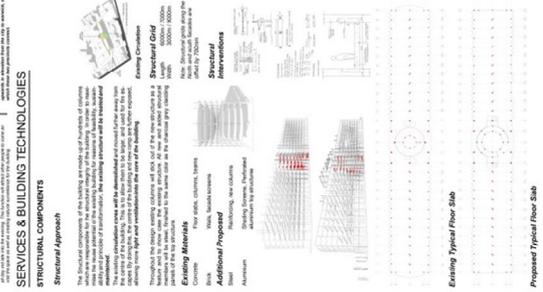
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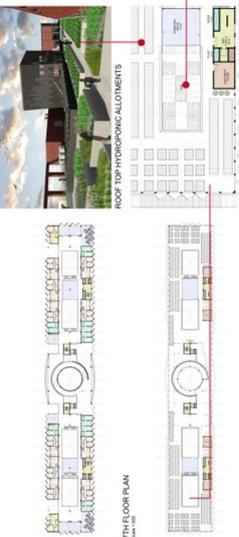
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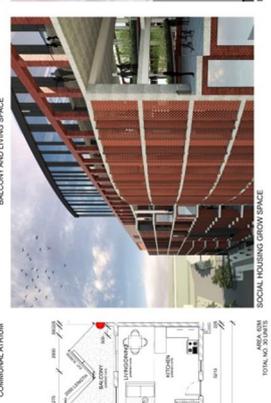
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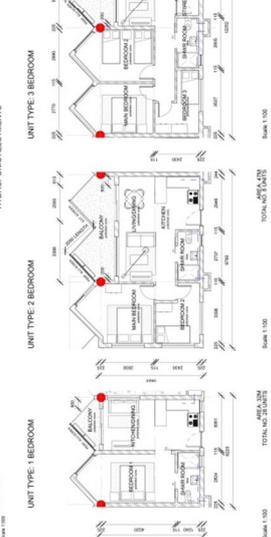
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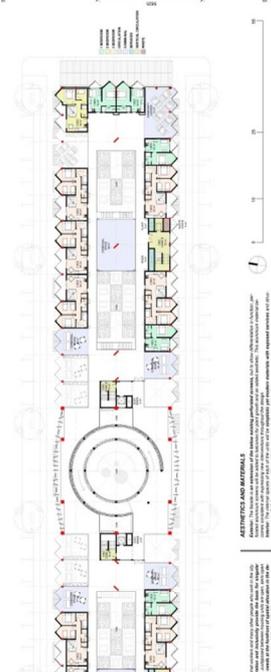
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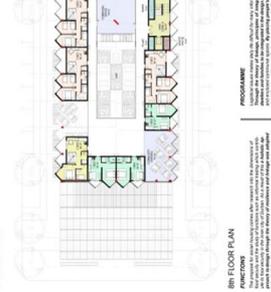
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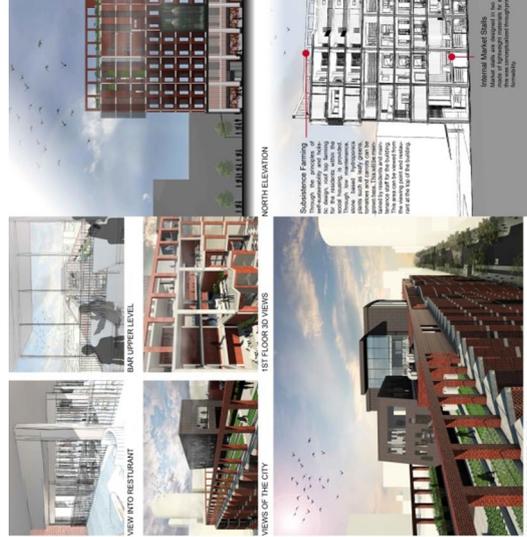
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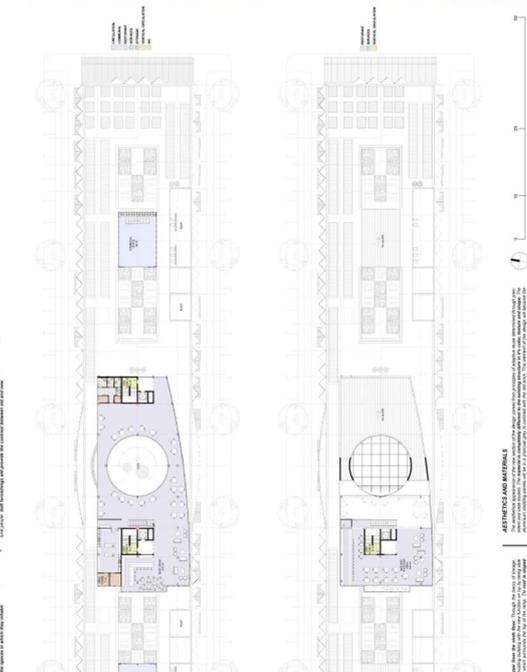
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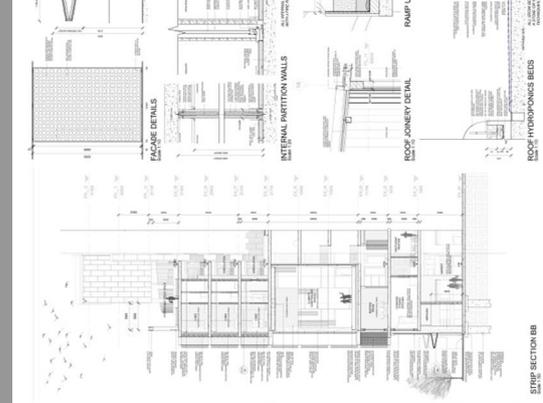
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