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ADDRESSING ADOLESCENT HEALTHCARE ENVIRONMENTS THROUGH RESPONSIVE ARCHITECTURE:

A Youth and Community Health Centre for Durban.

By

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DECLARATION

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

…….…. Aadila Kajee

……day of……year……

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DEDICATION

To my parents, Haroun and Rehana Kajee, for your continued love, support and the countless sacrifices you've had to make along the way.

ABSTRACT

Architecture has the capacity to have either a positive or negative impact on its users. Designing architecture which is responsive to the needs of its users is therefore of import and is particularly relevant to healthcare environments which rely on the built environment to provide spaces which promote healing and foster spaces which cater for patients' physical, psychological and social health needs. However, the importance which architecture holds beyond facilitating functional spaces is often overlooked which has implications on the patients who tend to feel more miserable and uncomfortable in these environments, thereby affecting their healing processes. This is of particular concern to adolescent patients as they fall into a transitional stage of development during which, they experience biological, psychological and social changes which impact their development, decision making and life trajectory. As adolescents may present needs which differ from the child or adult patient, providing healthcare environments which are responsive to their specific needs is therefore necessary to maximize healing and ensure quality healthcare.

The purpose of this study is therefore to explore how architecture which is responsive to the adolescent patient can be fully utilised towards creating a healthcare environment which promotes holistic wellbeing.

The theoretical framework is made up of socio-developmental theories, environmental psychology theories and place theories, which together with the literature, relevant precedents and case studies highlight the connection between the physical, spatial, social and personal environments of the adolescent patient and healing.

A qualitative research methodology approach is taken from a phenomenological perspective, as the research focuses on the experiences and interpretations of participants. Participants include built environment professionals experienced in designing healthcare facilities, healthcare professionals who have provided care to adolescents and young adults and adolescents who have utilised healthcare facilities during their adolescence. Research instruments include interviews which use imagery to convey ideas and which allows for the adolescents to express their own ideas through illustrations.

The analysis of research findings further cement ideas brought forward in the theoretical frameworks, literature, precedents and case studies, using the concept of healing and sub-concepts of symbiotic architecture, responsive architecture and generative architecture, as means to connect these aspects. Cumulatively, these inform design guidelines which present ways in which healthcare environments can consider the physical, social and psychological needs of the adolescent patient, towards a youth and community health centre.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1 | RESEARCH BACKGROUND AND METHODOLOGY

1.1 INTRODUCTION

1.1.1 Background

Over the last few decades, architecture has shifted towards an occupant-centred design approach which focuses on the occupant, their experience through and within the building and their level of satisfaction (Kim, 2011). This approach hones in on the psychological effects of one's environment and the impacts which it can have on the way in which ones' behaviour, moods, and experiences are influenced or determined (Bell, Greene, Fisher and Baum, 1978).

This design approach, also referred to as responsive architecture (Cloete, 2016), has been largely taken up in the design of healthcare environments, with the aim of improving the quality of healthcare services provided by facilities. With design being driven by the patients' needs rather than purely functional requirements, healthcare facilities have begun presenting a newer image, one which shies away from the austere and daunting impressions of its predecessors (Kim, 2011).

Patient-centred design has been rooted by research produced, evidencing the positive effects which well-designed healing environments can have on a patient's recovery and quality of life (Ulrich, 1984).

Over the years, research and healthcare facilities have placed focus on studying and designing for the healthcare requirements of mainly children and geriatrics, often overlooking the healthcare needs of patients who are experiencing an important human developmental stage; adolescence.

Adolescence refers to the transitional stage following the onset of puberty, during which a child matures into an adult. Occurring between the ages of 10-24, this period brings about major biological, psychological and social development (Larson and Wilson, 2004). As these changes occur, adolescents are at risk of harmful changes developing. Biological issues include an increased risk of developing serious health problems, such as HIV and AIDS, complications during teenage pregnancy and birth, sexual and reproductive health problems, injury and other infectious diseases (World Health Organization, 2013). Psychological and social issues include issues regarding self-identity, self-consciousness and confidence, self-image, low self-worth, mental illness, suicidal thoughts, eating disorder, self-harm and mutilation and deep-rooted behavioural issues (Kim, 2011). These issues often reflect the biological and psychological changes which occur during puberty as well as the social and environmental context which adolescents grow up in. Many negative health impacting behaviours which arise during adolescence hold life-long implications for both present and future health and development (World Health Organization, 2013).

While physical changes during puberty are mainly biologically determined, the larger part of psychological and social development depends on socio-cultural and environmental influences (Christie and Viner, 2005). According to Steinberg (2001), an adolescent's environment plays a major role in the development of self-identity and affects decision making processes, affecting not only their teenage years but also their lives as adults. The experience of receiving healthcare services should therefore include considered environments which are aware of the impact which they can have on adolescent patients.

According to Cooper, Goswami and Sahakian (2009), the built environment plays a major role in contributing to mental capacity, well-being and overall health as, well-being strongly relates to sensory stimuli. As the built environment, according to Pallasmaa (2012), has the capacity to stimulate sensory systems, the aim of this dissertation is therefore to further study how adolescent healthcare environments which are responsive to the needs of the adolescent patient can create an environment which promotes and nurtures healing and holistic wellbeing.

Despite evidence that one's environment can contribute positively to well-being and overall health (Cooper, Goswami and Sahakian, 2009), many of Durban's public hospitals are in a poor physical state owing to a lack of maintenance, poor lighting and ventilation, and an inadequate provision of ablution facilities. Furthermore, facilities are overcrowded and patients have a lack of privacy (IOL, 2017). With quality healthcare not being prioritized in general public healthcare facilities, it is clear that specialized groups which have specific requirements are even more unlikely to be provided with the healthcare environments needed for healing. Furthermore, healthcare environments present themselves as facilities of reactive care rather than pre-emptive and preventative care.

To conclude, the aim of this study is to highlight and explore the important role which responsive architecture plays in creating healing environments. Focus will be placed on providing research on healing environment interventions for adolescent patients who have needs which may differ or be differently focused than that of the child and adult patient (World Health Organization, 2013).

1.1.2 Motivation

Architecture has the capacity to have either a positive or negative impact on its users. Designing architecture which is responsive to the needs of its users is therefore imperative to ensuring that a positive user experience is achieved. This is relevant to healthcare environments in particular, which rely on the built environment to provide spaces which promote healing and foster spaces which cater for patients' physical, psychological and social health needs.

However, the importance which architecture holds beyond facilitating functional spaces is often overlooked and has resulted in many of Durban's healthcare facilities falling short in their ability to promote healing through the healthcare environment. The implications of this is that patients tend to feel more miserable and uncomfortable in these environments, and as a result hinder their healing processes (Bell, Greene, Fisher and Baum, 1978).

This is of particular concern to adolescent patients as they fall into a transitional stage of development between that of a child and an adult. During this period adolescents experience biological, psychological and social issues which impact their development, decision making and overall trajectory of their lives. According to the National Department of Health (2010/11), adolescence is when childhood and present issues should be ironed out in order for adolescents to develop into physically, emotionally and mentally healthy individuals. As adolescents are in a stage of development where their needs may differ from the needs of a child or adult patient, providing healthcare environments which are responsive to their specific needs is therefore necessary to maximize healing and ensure quality healthcare.

The study is motivated by the need to explore how architecture can be fully utilised towards creating healthcare environments which promote healing. It is also motivated by the need for healing environments focused on the needs of adolescent patients as the period of adolescence is one of great importance which can serve as a stepping stone for children to become healthy adults.

1.2 DEFINITION OF THE PROBLEM AND OBJECTIVES

1.2.1 Definition of the Problem

Using responsive design, architecture can be used as a tool to create healthcare environments which promote healing. However, many of Durban's healthcare facilities focus on the functional requirements of the building, over-looking the needs and concerns of the patient. While this is of concern to all patients, it is particularly prevalent to adolescents, who have needs which are specific to their stage of development; often differing from the needs of child or adult patients. Not only are there a lack of facilities geared towards adolescent health in Durban, but facilities which do aim to address this important transitional stage of development often fail to provide environments tailored to the specific needs of adolescent patients, resulting in healthcare environments which do not optimally promote healing.

1.2.2 Aim of the study

The aim of the study is to explore how responsive architecture can promote healing environments for adolescent patients.

1.2.3 Objectives of the study

The objectives of this study are:

1. To understand healing environments.
2. To understand the relationship between the architecture and healing.
3. To understand how the architecture can respond to the needs of adolescent patients.
4. To develop an architecture which will promote healing environments.
5. To develop a framework for the design of adolescent healthcare environments.

1.3 SETTING OUT THE SCOPE

1.3.1 Delimitation of the Research Parameters

This dissertation does not propose that architectural environments and spatial properties can cure adolescent illnesses nor replace or negate conventional medical practices. Rather this study aims to put across that the built environment can play a positive role towards basic human health and well-being and furthermore to establish what the specific architectural design principles and strategies that can be applied are.

While the process of adolescence will be briefly examined as a basis for the study, it will not be an in-depth investigation into all facets of the topic. Similarly, subsequent adolescent illnesses which are discussed will provide only a basic understanding and not a comprehensive investigation into these health issues. For the purpose of this paper, adolescents will be specifically focused on. Additionally, during primary data collection, all questions asked will be in relation to the study and will not enquire into specificities of patient's conditions.

1.3.2 Definition of Terms

- Adolescence - the period following the onset of puberty during which a young person develops from a child into an adult.
- Adolescent: - (of a young person) in the process of developing from a child into an adult.
- Biological – referring to living organisms, including their structure, functioning, evolution, distribution, and interrelationships.
- Development - a specified state of growth or advancement.
- Environment - the surroundings or conditions in which a person, animal, or plant lives or operates.
- Healing – growing sound; getting well, mending.
- Holistic - characterized by the treatment of the whole person, considering mental and social factors, rather than just the symptoms of a disease.
- Psychological - of, affecting, or arising in the mind; related to the mental and emotional state of a person.
- Puberty - the period during which adolescents reach sexual maturity and become capable of reproduction.
- Social – living or disposed to live in companionship with others or in a community, rather than in isolation.
- Transition - the process or a period of changing from one state or condition to another.
- Well-being - the state of being comfortable, healthy, or happy.

1.3.3 Stating the Assumptions

The primary assumption made is that architectural design can play a role in promoting healing environments for adolescent patients by providing for their physical, psychological and social needs. If addressed, it would provide a valuable contribution to healthcare architecture research, which is lacking in the exploration of architecture's responsiveness to the needs of adolescent patients. Additionally, it is assumed that there is a lack of facilities geared towards adolescent health in Durban, South Africa and that facilities which are available, do not adequately utilise the design of healthcare environments to address the psychological, social and mental requirements of the patients.

1.3.4 Key Questions

Primary question: How can architecture be responsive to the adolescent patient in order to generate a healing healthcare environment?

Secondary questions:

1. What are healing environments?
2. What is the relationship between architecture and healing?
3. How can architecture respond to the needs of adolescent patients?
4. How can architecture be conceived so that it may promote healing environments?

1.4 CONCEPTS AND THEORIES

1.4.1 Introduction

With the aim of addressing adolescent healthcare environments through responsive architecture, theories used to build the theoretical framework include socio-developmental theories, environmental psychology theories and built environment theories. These will be linked to the overall concept of healing architecture through three concepts; symbiotic architecture, responsive architecture and generative architecture.

1.4.2 Healing Architecture

The overall concept of 'healing architecture' will be used to explore how adolescent healthcare environments can be improved through architecture which is responsive to the needs of the occupants. Through healing architecture, the study aims to create a framework towards designing adolescent healthcare environments which are responsive to the specific needs of the adolescent patients. In relation to the concept of 'healing architecture', three sub-concepts will be discussed. These are; symbiotic architecture, responsive architecture and generative architecture. The three sub-concepts will work in connecting the literature to the theoretical framework.

1.4.3 Socio-Developmental Theory

In order to first understand the adolescent patient and their relationships to their physical, social and personal environments, socio-developmental theories will be discussed. These include Erikson and Erikson's (1994), theory of Psychosocial Development and Bronfenbrenner's (2009), Ecology of Human Development theory. Through understanding the adolescent and their specific stage of development, their relationship to their physical environment should become implicit allowing for further study into the details of this relationship.

1.4.4 Environmental Psychology Theory

Having understood the relationships between the adolescent and their many environments and influencers, environmental psychology theory will be explored to understand how the environment can be manipulated to improve and maintain positive relations between the adolescent patient and their physical environment, in order to promote health and well-being. Theories discussed include Nightingale's Environmental theory (Medeiros, Enders and Lira, 2015), as well as Therapeutic and Supportive Environment theory (Ulrich; 1984, 1981).

1.4.5 Place Theory

Lastly, place theory will discuss the users' architectural experience including the benefits of a considered architecture. Particular focus will be placed on sense of place and sensory design as a tool to aid in the rehabilitation and healing of adolescent patients. Theorists referred to include Christian Norberg-Schulz (1980), Juhani Pallasmaa (2012) and Christopher Day (2002).

1.5 RESEARCH METHODS AND MATERIALS

1.5.1 Approach

For the purposes of conducting this study, a qualitative approach has been taken, from a phenomenological perspective, as the research focuses on the experiences and interpretations of adolescent patients.

1.5.2 Unit of Analysis

This research primarily focuses on adolescent patients, ranging between the ages of 10 – 19, who have spent more than a week in a healthcare facility for their health conditions.

1.5.3 Primary Data Collection: Interviews and Case Studies

Primary data collection and analysis has been approached using both built environment and environmental psychology research methods as the study is deeply rooted in both disciplines and therefore requires varying methods of data collection. The built environment research method adopted is in the form of case studies while the environmental psychology research methods include experimental and descriptive research collection through interviews. Self-report measures have been used as a technique to gain information in both methodologies. This will be further discussed below.

1.5.3.1. Sampling

Quota sampling has been adopted as the sampling method as I have identified multiple samples which are of value to the study. These include the expertise of built environment professionals who have experience in designing healthcare facilities as well as experience in designing for children and adolescents, healthcare professionals; specifically nurses who work one on one with adolescent patients on a daily basis, young adults ranging between the ages of 20 – 24 who utilised a healthcare facility during their adolescence, and adolescent ranging between the ages of 10-19, who have spent more than a week in a healthcare facility. Sample sizes are as follows; two built environmental professionals to allow for differing approaches to design to be studied, four healthcare professionals, four young adult participants and four adolescent participants.

Young adult and adolescent participants have been selected randomly over social media and affiliated connections with some adolescent participants having been selected through the healthcare facilities used as case studies.

1.5.3.2. Interviews

Data collection from the four different sample categories differ in both format and approach. Built environment professions have been emailed interview schedules which are formal but structured to allow for easy expression of thought, while healthcare professionals have been interviewed in person, in a respectful yet approachable manner in order to allow for a free flow of conversation. This has allowed for the interviewee to feel comfortable enough to detour from the interview schedule, bringing up valuable information which had not been considered previously.

Young adults were emailed interview schedules while adolescents were met in person so that any queries could be immediately answered. While action research was first considered as a method of observation in order to receive unfiltered data, it was ultimately decided against in order to prevent an invasion of privacy as well as to prevent human error with regards to misinterpretation of observations. Furthermore, it would be a highly time consuming to conduct and would not fit in the research schedule. Therefore, self-report measures have been adopted. Young adults and adolescents were required to answer a short interview schedules which includes the use of imagery as a data collection tool. Through images, adolescents chose which architectural spaces and materials photographed they prefered and for what reasons. Additionally, adolescents were required to use drawing as a tool to illustrate their wants and needs for a healthcare facility which they would feel comfortable in.

The use of interviews falls under descriptive environmental psychology research methods, as environmental quality assessment and user satisfaction studies have been used as tools to gather information. The use of photography and adolescent participants partaking falls under experimental environmental psychology research as data is collected casually while also determining “why” with regards to patients’ environmental preferences.

1.5.3.3. Case Studies

The use of case studies were selected as a primary data collection tool as the study takes a phenomenological approach. Aspects discussed within the study consider how environments affect ones experience; how one feels, thinks and reacts in a space. It was therefore imperative, that case studies be conducted so that I could experience the effects of the selected healthcare environments first hand, rather than relying solely on secondary data collection. Additionally, by using case studies as a method, not only could I draw on my own experience, but I could observe how others reacted to and moved through spaces as well as critically analyse the literature discussed by noting what aspects were implemented in the case study and what weren't and whether they created environments that were expected or not.

Two case studies have been analysed through the lens of sub-concepts; symbiotic, responsive and generative architecture. The case studies, which were analysed using built environment research methods such as photographs, sketches and written analyses, were selected in order to comparatively study the environmental quality of both a private and public institute. The public institute, the KwaZulu-Natal Children's Hospital, was selected due to it being a facility which specialises in child and adolescent care. The facility would therefore be directly related to the purpose of the research as the relationship between children and adolescents and their environments could be studied. Furthermore, interviews with patients and nursing staff in the facility would also be directly related to the research topic. The Private Facility, which has been asked not to be named and is therefore referred to as 'The Private Facility', was selected as, while it was a general facility, it provides a local example of a facility which strives to create a healing environment through a built environment response.

1.5.4 Secondary Data Collection: Literature and Precedent Studies

Secondary data has been collected in the form of literature and analysis of precedent studies. The review of literature focused on the ability of architectural and natural environments to promote healing by being responsive to the physical, psychological and social needs of adolescent patients, while the precedent studies served as examples of architecture of similar intent, purpose, concepts and themes to that surrounding the research topic. Secondary data has been collected from books, journals, articles, reports, academic papers, theses and credible online sources.

1.5.4.1. Literature Review

The aim of the literature is to explore how architectural responsiveness can generate healing healthcare environments for the adolescent patient. The literature has be broken down into concepts and theories which work to guide the narrative. Concepts and theories utilised originate from various relevant disciplines so as to adequately investigate the key influencers of the research area.

Headed by the key concept of Responsive Healing Healthcare Architecture, the theories and paradigms used fall into three categories. These are:

1. Social-Developmental Theory
2. Environmental Psychology Theory
3. Place Theory

Socio-Developmental theories have been discussed in order to explore the social development, contexts and environments of adolescents as well as the relationships between these components. The developmental theory discussed is Erikson and Erikson's (1994), theory of psychosocial development and the social theory is, Bronfenbrenner's (2009), ecology of human development theory.

The investigation into Environmental Psychology theory with regards to the psychological relationship between the built environment and healing processes has been discussed through Florence Nightingale's Environmental Theory (Alligood and Tomey, 2017), as well as through the works of Dr. Roger Ulrich (1979, 1984, 1991, 2006), a professor of architecture whose research focuses on evidence-based healthcare design. Focus has also been placed on therapeutic and supportive environmental theories. The foundational research into environmental psychology has be supported by the expansive overview given in the works of Bell, Fischer, Baum and Greene (1978).

Place Theory focuses on the relationship between the user and place and their experience and interpretations of architectural spaces. Theorists within this field include, Christian Norberg Schulz (1980), and his works on phenomenological theory, Christopher Day (2002) and his works on spirit and place, and Juhani Pallasmaa (2012) and his focus on sensory design.

The above investigation into theory is be preceded by an introduction to adolescence, the importance of this transitional stage and the health issues which can possibly arise during this period. Major contributors to the literature include the World Health Organization (2013) and the South African National Adolescent and Youth Health Policies (2010/11). Throughout the research, reference is made to healing architecture and adolescent patients. This is where the gap in research lies: while studies have been done into healing architecture, focus has not been placed specifically on adolescents and the particular needs which they have.

1.5.5 Analysis of Research Findings

Research findings have been analysed and discussed with the overall concept of Healing Architecture and sub-concepts of Symbiotic Architecture, Responsive Architecture and Generative Architecture kept it mind. Furthermore, findings from the four samples have been cross-checked for common threads and similarities.

1.6 CONCLUSION

To conclude, this chapter highlighted the need for a responsive approach to the architectural design of adolescent healthcare environments rather than approaches driven purely by functional requirements. Through responsive architecture, healthcare facilities can provide healthcare experiences wholly driven by the purpose of healing and holistic wellbeing.

It was established that focus has been placed on the healthcare environments of adolescent patients, as they have specific healthcare needs, different to that of children or adult patients. These requirements are often overlooked, resulting in environments which do not entirely promote healing, thus affecting patients' healing processes and development.

The conceptual and theoretical frameworks along with the research methodology and research, form the parameters and guidelines of the study. The conceptual and theoretical frameworks have been established in Chapter 1 and will be further discussed in Chapter 2. Chapter 3 will delve into the relationship between adolescents and healing environments. Chapter 4 will explore relevant precedent studies while Chapter 5 will focus on relevant case studies.

Thereafter, Chapter 6 will present and discuss primary research findings after which a conclusion will be made in Chapter 7, with recommendations of design guidelines upon which the Youth and Community Health Centre will be based, in order to promote responsive healthcare architecture.

CHAPTER 2 | THEORETICAL FRAMEWORK

2.1 INTRODUCTION

In order to generate an architecture which promotes healing for the adolescent patient, it is imperative to first understand the relationship between the patient and the built environment, and their connection to healing. Healing Architecture will therefore serve as a concept for discussion, which will be further analysed through three sub-concepts; Symbiotic Architecture, Responsive Architecture and Generative Architecture.

Using these sub-concepts, three theories will be explored, as seen in Figure 1. These are Socio-Developmental theory applied to the concept of Symbiotic Architecture, Environmental Psychology theory applied to the concept of Responsive Architecture and Place theory applied to the concept of Generative Architecture.

Through the exploration and connection of these theories and concepts, a framework for the design of adolescent healthcare environments will be achieved.

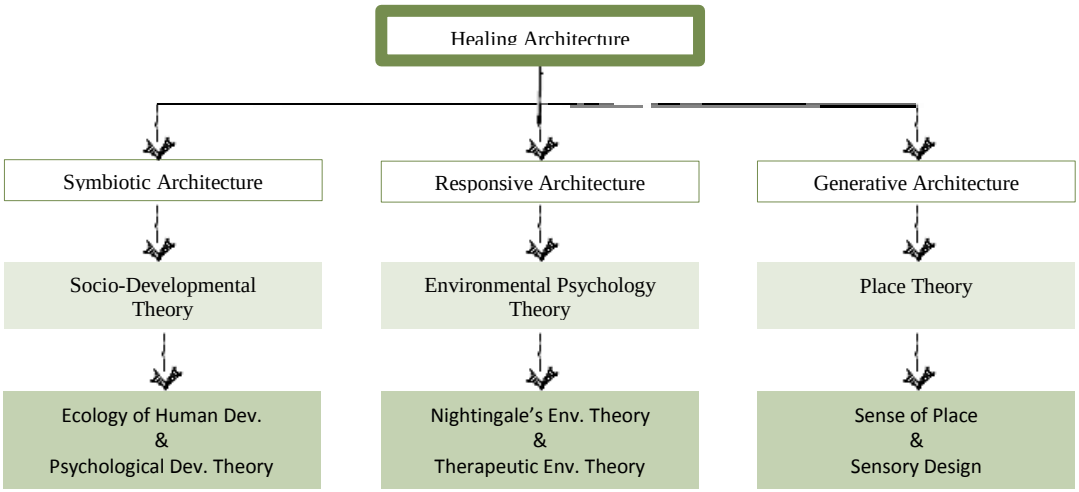

Figure 1: Connection between concepts and theories (source: author)

2.2 HEALING ARCHITECTURE

Healing Architecture, with regards to healthcare buildings, could be described as an environment which supports the needs of patients, their families, and staff through the anxieties and stresses which develop due to illness, healthcare procedures, hospitalisation and the healing process (Chrysikou, 2014). Ulrich (1984) argues that by meeting the needs of the patient, physical environments can have positive effects on patients' psychological and physiological states, in order to reduce recovery and adaptation times.

Healing Architecture can also be health-giving, serving to promote and maintain a healthy state of being for those who inhabit it. Day (2002) concludes that healing environments have a positive interdependent relationship with its occupants, as the effort put into the care and maintenance of environments, is ultimately the care and maintenance of the effects which they have on the occupant.

The aim of healing environments as defined by Schaller (2012), is to allow patients to engage in the processes of self-healing and rehabilitation. Furthermore, healing architecture should therefore be de-stressing and therapeutic to provide an environment which nurtures the mind, body and soul.

We can conclude, that in order to achieve an architecture of healing, focus should therefore be placed on the concept of symbiosis, responsivity and generation.

2.2.1 Symbiotic Architecture

The concept of 'Symbiotic' in the context of this research suggests the interdependent relationship between the patients, the environment; be it physical, social or personal, and healing (Day, 2002). Through studying the issues and opportunities which patients encounter as they interact with their environments, it will be better understood how more compatible relationships may be developed, allowing for an architecture which is connective. In understanding and securing these relationships, focus can thereafter be placed on responsivity to more comprehensive requirements of a Healing Architecture.

2.2.2 Responsive Architecture

'Responsive' is a concept that refers to the design of environments which are receptive and sensitive to not only its topographical and environmental contexts but to the people whom the environment is designed for (Cloete, 2016). While all users of the built environment benefit from architecture which is responsive, users of healthcare architecture, and in particular patients, reap more benefits from such environments. As patients are physically, emotionally and psychologically vulnerable, environmental aspects have greater influences upon them. Therefore, in order to fully understanding the patient's relationship to the environment, and as a result then being receptive to the needs which are born from this connection, the potential is established for an architecture of healing to be realised.

2.2.3 Generative Architecture

In a process where relationships have been established, and principles identified, a healing architecture can be generated. The concept of 'Generative' suggests that the building is formed through the incorporation of design principles which interact with each other and amalgamate into the 'spirit' or 'essence' of the true purpose of the building, in this case 'healing'. According to Day (2002) architecture thereafter serves to facilitate this interaction, producing a building which is well-rounded and balanced.

2.3 SOCIO-DEVELOPMENTAL THEORY

As mentioned previously, theories will be applied to a relevant sub-concept, in order to tie the theories to the concept of Healing Architecture. Socio-developmental theory can be applied to the sub-concept of "symbiosis", with the notion that the 'Ecology of Human Development Theory' and the 'Psychosocial Development Theory' forms a basis for understanding the adolescent patient; their role in society, their position of development, and ultimately, their relationship to their physical, social and personal environments.

2.3.1 Ecology of Human Development Theory

Ecology of human development theory first developed by Urie Bronfenbrenner (2009), also referred to as ecological systems theory, focuses on how human development is shaped by varying environmental systems as well as by the interrelationships between these system (Abrahamson, 2017; Krishnan, 2010). According to Derksen (2010), the theory is conceptualized as a set of nested systems, focused around the developing individual, in this case, the adolescent. As seen in Figure 2, there are five structures which form the nested system. These are the; microsystem, mesosystem, exosystem, macrosystem and chronosystem (Ryan, 2001).

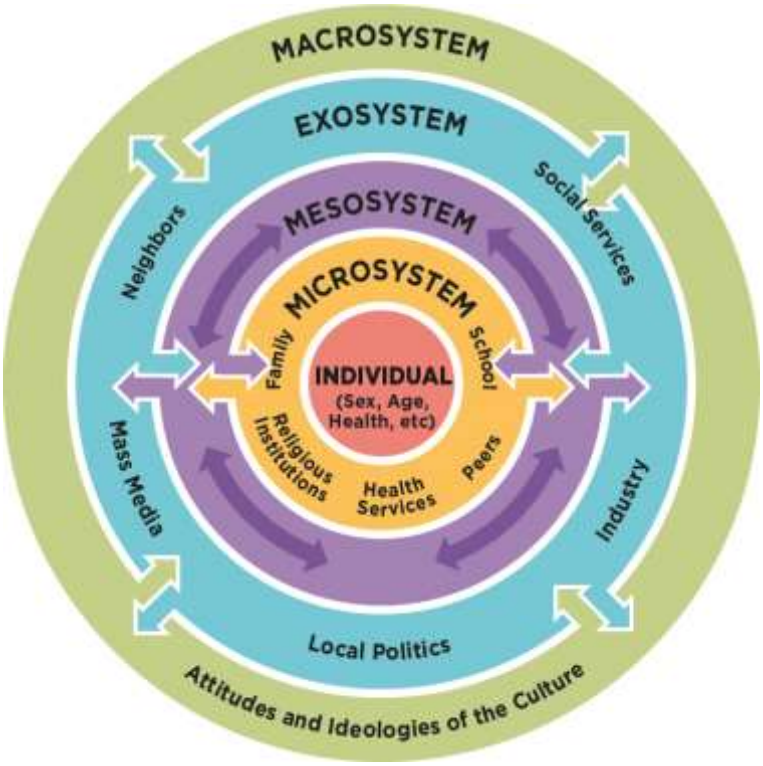

Figure 2: System of nested structure of systems (source: National Academies of Sciences, Engineering, and Medicine, 2016)

The microsystem, is the system which is closest to the adolescent and is made up of the structures which the adolescent has direct contact with. These include the relationships and interactions which the adolescent has with their family, school and neighbourhood as well as their immediate, physical environment. In the microsystem, relationships are bi-directionally influenced where the adolescent effects and is affected by those around them. While interactions at outer systems have a ripple effect and have an impact on inner systems, the interactions between structures within the microsystem are the most impactful on the adolescent (Ryan, 2001). Additionally, the microsystem is phenomenological in nature as the effect which the social and physical environments have on the adolescent is dependent on their perception of it. This perception of the environment affects the individual's development and behaviour. Therefore, change goes beyond the individual, as systemic change needs to occur so that a change of perception in individuals is supported and sustained (Derksen, 2010).

As seen in the set of nested systems in Figure 2; people, in particular children and adolescents, cannot develop in isolation. Rather, humans develop within a system of environments and relationships which include social support structures, such as family, friends, community and society as well as the physical environment. It is then evident that the relationship between the individual and the environment is one which is reciprocal and interdependent as the environment has an impact on the individual and the individual has an impact on the environment (Krishnan, 2010).

Just as the process of development is a complex one, similarly, the process of healing relies on many factors which need to correlate and work together to ensure that recovery takes place. Some elements such as the quality of health care, the physical environment and, social interaction and support, create inner systems, which interacts directly with the adolescent patient and therefore have the largest impact on the adolescent.

Other elements such as the larger physical environment, support and acceptance from the community etc., create outer systems which make an impact but not one as large as those of the inner system. In order for healing to occur, balance and harmony needs to exist within and between systems to ensure that the adolescent patient has a healthy relationship with all spheres of the system. Like development, healing is not a solitary act, and relies both on internal effort as well as support from external factors (Trauma Recovery, n.d.). Additionally, by inner and outer systems working together, the patient will more quickly adapt to the healing environment as well as transition from the healthcare facility to a home environment more seamlessly. By creating interactions between systems, healthcare does not become something which is apart from daily life and apart from the people who you interact with. Rather, healing becomes a collective effort of the involved systems which exist in the developing adolescent's life.

Day (2002) argues that reciprocity is important to promote healing. The relationship which the patient has with the physical environment goes beyond something which you exist in. Much like social relationships, the patient and the physical environment should have a give-and-take relationship, as in order for the patient to benefit from the physical environment's ability to heal, the patient needs to show care to the environment too. Through caring and maintaining for your environment, it allows for a distraction as well as provides a therapeutic experience. This is relevant in the case of having natural vegetation indoors in healing environments. Patients can take care of the plants, and in return have a therapeutic experience, have a natural air filtration system and have something of visual interest in their wards. Therefore, the patient and the environment are interdependent.

2.3.2 Psychosocial Development Theory

The theory of psychosocial development, established by Erik Erikson (1994), is an eight-stage theory outlining varying stages of development across one's lifespan. It is assumed that during these development stages, a crisis or dilemma occurs which the individual has to overcome in order for positive growth and development to take place. By successfully completing a stage, a healthy mind set develops where the individual learns crisis management, improves social relations and develops a healthy sense of identity, allowing for the individual to then move on to the next stage of development. According to McLeod (2013) in the case that a stage is not completed successfully, there is a likelihood of a lowered ability to complete further stages, the development or sustaining of relationships which are not positive or meaningful as well as an unhealthy sense of self.

The argument is furthered by Dayzie (2016) who claims that the theory supports the notion that psychosocial issues which occur during childhood or adolescence has a lifelong effect on a person's development, affecting the adults they become. For this reason, according to McLeod (2013), Erikson placed emphasis on the period of adolescence as it is a critical stage of development, particularly regarding a person's identity.

Adolescence is a vital transition period, where children become more independent and start considering their future and where they fit into society. It is also a period where adolescents begin to reflect and examine their personal identities (McLeod, 2013).

The period of adolescence presents the crisis of finding one's own identity, whilst being confused about one's role in society. Additionally, the adolescent will be experiencing a change of perception of sensory, logical and aesthetic factors as well as beginning to reflect and sense the complexities of life (Dayzie, 2016). Successful completion of this development stage should develop a renewed sense of self, confidence or direction in their future role in society as well as being able to commit to and accept others regardless of differences.

Unsuccessful completion of this development stage can lead to insecurities and role confusion as the individual will not have formed their personal identity nor their identity within society (McLeod, 2013).

Considering research by Erikson (1994), McLeod (2013) and Dayzie (2016), it can be deduced that while adolescence is a period to explore one's independence and develop a sense of self, it is also a very sensitive and insecure period of development. Through the process of developing their personal environments, adolescents need extra support from social and physical environments. Through encouragement and reinforcement from social support structures such as family, friends and teachers and psychological and spatial provisions of positive physical environments, positive growth and development can be achieved.

Bearing in mind the importance of support structures for healthy adolescents, it is clear that having strong social and support structures would be ever more important for adolescents who are ill. Not only are they experiencing physiological, psychological and social changes which occur during adolescence, but they have the added stress and anxiety of illness to come to terms with. Ensuring that adolescent patients complete their development stage is of the utmost importance as in doing so, they will learn how to manage crises and have resolve in the face of stressors and therefore, will be better equipped to mentally and emotionally accept and fight their illness. Effort should therefore be placed in nurturing relationships with social and physical environments, so that in turn these structures can provide necessary support (Erikson, 1994; Derksen, 2010).

Having discussed socio-developmental theories in relation to the adolescent patient the following section will discuss environmental psychology theories which outline how healthcare environments can have psychological effects on patients.

2.4. ENVIRONMENTAL PSYCHOLOGY THEORY

Environmental psychology studies the reciprocal relations between people and the built and natural environment. Focus is placed on the environment as a determinant on behaviour, mood and healing as well as being concerned with the consequences of human behaviour on the environment (Bell, Greene, Fisher and Baum, 1978).

Environmental psychology theory can be applied to the concept of "responsivity", with the notion that 'Nightingale's Environmental Theory', 'Therapeutic Environment Theory' and 'Theory of Supportive Design' gives insight into how the built environment can have a positive, healing effect on adolescent patients through being responsive to their physiological, psychological and social health needs.

2.4.1 Nightingale's Environmental Theory

Nightingale's Environmental Theory was established in England, during the nineteenth century by Florence Nightingale, who was known as the founder of modern nursing. The theory was developed during a time when the importance of clean, restorative environmental conditions had not yet been realised in healthcare environments (Awalkhan, 2016).

The theory focuses predominantly on the environment, understood as all external conditions and influences that affect the life and development of an organism, that are able to prevent, suppress or contribute to disease and death (Medeiros and Lira, 2015). What was found was that often symptoms or sufferings of the ill patient, were not truly symptoms of the disease but rather a want for a healthy environment. Nightingale defined these essential elements which were lacking in nursing and healthcare environments as, fresh air, clean water, natural light, comfortable room temperatures, a lack of noise, pleasant views, positive distractions, human contact, cleanliness, and care in dietary management (Awalkhan, 2016; Lundin, 2015).

Nightingale considered illness as an imbalance in these essential elements and suggested that by manipulating the environment and bringing patients into harmony with nature, the healing and health of patients could be improved naturally (Awalkhan, 2016). According to Medeiros and Lira (2015), Nightingale believed that health went beyond the absence of disease. Rather health meant, to be well and to be kept in the best possible condition for nature to preserve, restore, prevent or cure disease or injury.

While Nightingale's essential elements might seem obvious in modern healthcare, it is surprising how few healthcare environments heed these advices. Many healthcare environments are not designed with these elements in mind, and many do not allow for the opportunity, for the healthcare professional or patient to manipulate or control the environment to provide an optimal healing environment.

In this sense, by not being sensitive to the patient's needs; need for quality healthcare environments which they can adapt to their specific needs, healthcare environments prolong the patients' illness and does not allow nature to preserve, restore, prevent or heal from ill health.

2.4.2 Therapeutic Environment Theory and Supportive Design Theory

Responsivity goes beyond providing for the basic needs of patients, as it encompasses environments which are therapeutic and psycho-socially supportive. This suggests that not only the patient, but the family and caregivers of patients should be considered in the design of physical environments as the environment in which the patient receives care, has an effect on patient outcomes, satisfaction and safety as well as staff efficiency, satisfaction and organization outcomes.

Accordingly, therapeutic environments can then be defined as environments which produce measurable effects on patient's clinical outcomes and staff effectiveness, by having a positive influence and by supporting psycho-social and spiritual needs of the patient, family and staff (Whole Building Design Guide, 2016).

According to Schaller (2012), therapeutic environments should encourage positive self-awareness, enhance one's connection to nature and people, offer varying meaningful stimuli, encourage relaxation time and should be aesthetically agreeable.

Therapeutic Environment theory focuses on the psycho-social and clinical effects which the environment has on the patient as well as how the patient perceives the environment. During the process of receiving healthcare, patients often face many fears and discomforts about their health, safety, being away from home and isolation from their social support structures. The intimidating and confusing design of typical healthcare facilities further adds to the stressful circumstances. Negative stress, can have a detrimental impact on one's immune system and can weather the patients' psychological, emotional and spiritual energies, thereby hindering the healing process (Whole Building Design Guide, 2016).

Therapeutic Environment theory therefore places great emphasis on addressing negative stressors in the physical environments as well as on dealing with the effects of these factors. The theory of Supportive Design can therefore be seen as a sub-theory of Therapeutic Environment theory. Where Therapeutic Environment theory focuses on creating an environment which promotes recovery and is stress-reducing, Supportive Design theory delves deeper into how physical environments can be both psychologically and socially supportive.

According to Ulrich (1991), wellness can be promoted by creating physical healthcare environments which are psychologically supportive. Supportive environments assist the patient in coping with the stressors which are associated with illness and healthcare interventions. Through supportive design, the process of recovery and healing can be fostered. Creating supportive, therapeutic environments are vital to promoting healing, as stress presents itself as a major obstacle to healing.

Stress can be defined as the body's reaction to the physical, psychological and emotional strain which environments place on us. Stress can be either positive or negative; it can enable us to push ourselves to be productive or after extended exposure to stress, it can be harmful and impact health negatively. The way people live, think and perceive therefore directly influences their health (Lundin, 2015).

Both Therapeutic Environment theory and theory of Supportive Design suggest that therapeutic, supportive environments should allow the patient a sense of control regarding physical and social surroundings, provide the patient with access to social support, provide positive distractions in the physical surroundings and consider patients, their families and staff in the design of the healthcare environment (Ulrich, 1991). Additionally, noise reduction, access to daylight, appropriate internal lighting, same-handed patient rooms, recreational and respite areas and well-designed nursing stations can contribute to the satisfaction and effectiveness of staff. In turn these impacts positively on the quality of care which the patient receives. The above suggestions work to reduce or eliminate environmental stressors for the patient and staff member and thereby promotes wellness (Whole Building Design Guide, 2016).

Having understood that the environment can determine one's behaviour and mood and effect one's processes of healing, the following section will discuss place theory.

2.5. PLACE THEORY

Place theory can be applied to the concept of "generation", with the notion that both a "Sense of Place" and "Sensory Design" can provide guidelines for the architectural design of healing spaces, through a phenomenological lens.

2.5.1 Sense of Place

In his seminal work, *Genius loci: Towards a phenomenology of architecture,* Norberg-Schulz (1980) defines 'place' as a space, with a distinct character, where life unfolds. The distinct character of place, creates a strong connection with the users of the space and affords the user, a particular experience which is specific to that place (Sime, 1986). As place focuses on the user and their experience, it is imbued with human values and principles, and therefore holds meaning.

Rapoport (1990) suggests the meanings and messages which a place holds, are perceived and deciphered differently by different people, based on their experiences, motivations and expectations. Therefore, experiences within places are not only specific to that particular setting, but are also specific to the person experiencing it. This can be referred to as 'sense of place' (Najafi and Sariff, 2011).

The connection between the environment and the user, is vital as it impacts the way in which people live, learn and heal within buildings (Najafi and Sariff, 2011). Najafi and Sariff (2011), suggests that the importance of place lies in the opportunities it provides for developing and maintaining one's self-identity, and aiding in the development of social connections as well as the affects which positive experiences have on emotional and psychological health.

It is for these reasons that Norberg-Schulz (1980), believes that it is the role of the architect to pay attention to the design implications of the physical environment as well as to create meaningful places, where users feel like they belong – so that people may dwell harmoniously in their environments. Similarly, Relph (1976), suggests that to achieve a sense of place, focus is to be placed on the interactions between three important elements, which are; the physical setting, activity and meaning. Ultimately, the aim of creating a sense of place should be to make an environment psychologically comfortable (Najafi and Sariff, 2011).

'Sense of place', is often referred to as 'spirit of place, with more focus placed on the existential qualities of a place rather than purely the feeling which it exudes. According to Day (2002), it is not possible to design buildings of good spirit, but rather, buildings can be designed well in order to invite 'spirit' to the building. Since place has an impact on the user's experience and therefore on their behaviour and the way they interact with each other, the attitude, mood and spirit which users conduct themselves in the space, imprints an echo of spirit on the place. Day (2002) suggests that in order to design an architecture which welcomes spirit of place, security, tranquillity, balance and simplicity should be considered.

In relation to healing, Day (2002), suggests that it is when a place has 'spirit' that it feeds the soul as well as contributes and nourishes one's health. By creating places which the patient can connect to and dwell in harmony with, tranquillity can be achieved allowing for the patient to de-stress as well as to be positively distracted from their illness by being captivated by the sense of place. Well-developed place also encourages social interaction and exploration and development of self; factors which are vital to the adolescent patient. Additionally, Day (2002) states that health is dependent on wholeness and balance, and often has varying levels of causes. Medical interventions alone are therefore not able to contribute to lasting healing; spirit, motivation, a healthy diet as well as exercise and the environment are also crucial to lasting health.

2.5.2 Sensory Design

While 'sense of place' relates to the experience of existing within a place, it is the senses with which the experience is felt through. According to Pallasmaa (2012), in order to have an authentic architectural experience, all five senses should be played on so that users of place can experience it through different mediums. However, this is something which many architects do not take heed of, with most architectural works being formed under the consideration of only the sense of sight. By designing architecture to be an occularcentric experience, the other senses are supressed and has therefore led to an impoverishment of our physical environments, triggering feelings of detachment and hostility. This is known as placelessness (Pallasmaa, 2012).

Pallasmaa (2012) emphasizes the importance of involving the senses in the ones experience of the built environment, stating that one perceives and experiences space and place in reference to himself, through senses and proportion of spaces. It is therefore imperative to design places which excite and captivate the senses, and take proportion into consideration so that one can experience the built environment in all of its entirety. Involving the senses in a positive experience of place also de-stresses oneself as it affects one's mood and has direct physiological effects. Places which inspire, motivate, give meaning and fulfilment to oneself are places of transformative beauty and are therefore spirit nurturing. Additionally, through more attentive consideration of the materials used in the built environment, buildings can become full of life and provide a rich sensory experience. The use of natural materials connects the user with life, and promotes a stimulating environment. Environments can therefore be healthy at a physical level but also be healthy for the spirit and soul of a person and place (Day, 2002).

The infusion of life and elements into environments is vital in creating healing places, as these connect the user with the rhythms and processes of nature and allows it to nourish and create balance within the user. Day (2002:181) describes health as 'a state of renewal, balance and development.' Through a positive sensory experience, health can be renewed, kept in balance and development promoted.

2.6 CONCLUSION

Chapter 2 has set up the theoretical framework, comprising of socio-developmental theories, environmental psychology theories and place theories, which has been connected to the concept of healing architecture, through the use of three sub-concepts; symbiotic architecture, responsive architecture and generative architecture. The theoretical framework has outlined the social, developmental, psychological and experiential needs of the adolescent patient and established the roots of these needs so that together with further secondary and primary research, a guideline towards designing adolescent healthcare environments can be achieved. The three sub-concepts previously mentioned will be further discussed in the subsequent chapters in order to tie the theoretical framework to the review of literature.

The ensuing chapter will focus on addressing ways in which to improve adolescent healthcare environments through patient and staff responsivity.

CHAPTER 3 | ADDRESSING ADOLESCENT HEALTHCARE ENVIRONMENTS THROUGH RESPONSIVE ARCHITECTURE

3.1 INTRODUCTION

This chapter seeks to delve further into the sub-concepts of symbiotic architecture, responsive architecture and generative architecture, in order to address the social, psychological and experiential needs of the adolescent patient, towards creating an environment of healing and holistic wellbeing. With Chapter 2 having answered what healing environments are, the following chapter seeks to answer what the relationship between architecture and healing is and will discuss ways in which architecture can respond to the needs of the adolescent patient as well as suggest how architecture can be conceived so that it may promote healing environments.

The period of adolescence is one which is fraught with self-consciousness, stress and anxiety as well as major physical, cognitive and emotional changes. The hospitalisation and treatment of ill adolescents therefore comes with specific difficulties for adolescents as well as the healthcare professionals who treat them. It is for this reason which healthcare facilities need to cater for the adolescent patients' social and emotional needs, such as privacy, independence, freedom of movement, interaction with and support of peers and a stable education (Hutton, 2005).

3.2 SYMBIOTIC ARCHITECTURE: Adolescents, their environments and healing.

3.2.1 Introduction

As previously mentioned, the promotion of healing environments relies on reciprocity. In order for an environment to be healing, and for the user to take advantage of the benefits which an environment has to offer, environments are to be nurtured and maintained (Day, 2002). The concept of reciprocity can be applied to the differing environments which has an impact on the adolescent patients, and which the adolescent patient has an impact on. This includes the physical and spatial environments, social environment, personal environment and the environment of healthcare professionals who care for adolescent patients. Through understanding how the adolescent patient navigates these environments, it can be understood how to nurture these relationships and how to ensure that these environments promote healing.

3.2.2 Adolescents' connection to their built and spatial environments

Environments can be seen from two different perspectives; as the context of behaviour, where ones actions and moods have meaning only when understood through ones context, and as something which is influenced by behaviour, where the environment, its condition, the way it functions and its spirit, can be better analysed and understood by the context of the actions and moods of its users who constantly shape and reshape the environment (Bell, Greene, Fisher and Baum, 1978). Understanding the connection between the adolescent and their built and spatial environments therefore requires that both perspectives are discussed.

Mazuch and Stephen (2005) proposes that environments can have positive healing and therapeutic benefits for its users when designed to have natural lighting, ventilation, views, pleasant aromas, plant-scapes, well considered colours and materials, and are designed and arranged proportionately, allowing for comfortable movement through space. Environments which are lacking in these aspects, can have adverse effects on users, such as, poor health, aggression, depression, anxiety and poor social interaction to name a few (Dahl, Thomas and Holmes, 2013). While this is found across all ages, adolescents in particular are affected by their environments with regards to privacy and self-consciousness; particularly in healthcare settings. According to Hutton (2005), adolescents staying in healthcare facilities prefer having toilets in their rooms, rather than having shared toilets in the ward as they are embarrassed to use the shared toilets and therefore avoid using it. Having to walk down a corridor in view of the staff and their peers makes adolescents feel self-conscious as everyone becomes aware of their intent to relieve themselves. Additionally, at night adolescents are embarrassed to walk down the corridor in their pyjamas as they feel as if their attire is being scrutinized. In this instance, adolescents' feelings of embarrassment, and behaviour of avoiding using the toilets, can be understood through the context of their environment which in this case involves architectural planning which considers privacy and dignity.

In in-patient healthcare environments, adolescents often feel uncomfortable and stressed. According to Hutton (2010), stress and difficulty in sleeping can be reduced by creating a sense of comfort, independence and belonging. This can be done by allowing adolescent patients to alter and influence their environments to make the healthcare environment more home-like. In the adolescents' room in the healthcare setting, this is done through the use of magazines, posters and other personal possessions. By designing rooms to include shelves, bulletin boards and lockable storage spaces, the adolescent patient can further personalise their spaces (Blumberg and Devlin, 2006). This argument is furthered by MacAllister, Bellanti and Sakallaris (2016), stating that by visually associating the healthcare environment with home environments, inpatients are provided with physical, spiritual and cognitive support. Other ways of creating home-like atmospheres includes comfortable furniture, space that allows for social interaction between patients, family and staff, and comforting distractions.

In agreement Hutton (2010), suggests that spaces of independence, where adolescents can use and shape their environment as they see fit, can provide meaning to their time in the healthcare environment and can provide a necessary distraction from their illnesses. The value of such a space was seen in a study done by Hutton (2010), where a patient was given a space to complete a sculpture for her school art project. This created an opportunity for the patient to keep up with her school work and prevented her from feeling as if her life was set back due to illness. The patient was also able to have a purpose in this new environment, and was able to use it as an outlet thus reducing her stress levels.

Adolescents therefore influence and are influenced by their physical and spatial environments. Creating comfort, familiarity and independence as well as being at ease in existing environments seem to be of priority to the adolescent patient. By reducing stress, anxiety and self-consciousness in the adolescent healthcare environment, a major obstacle in the way of healing will be resolved (Ulrich, 1991).

3.2.3 Adolescents' connection to their social environments

The relationship between adolescents and their social environments is one which is constantly changing and evolving and is vital to their development. The experience of being hospitalized can create a host of difficulties for adolescents due to the separation from their friends, school and family. Being separated from peer groups can lead to a loss of status within the group or even a rejection from the peer group; something which adolescents are particularly anxious about. Absence from school can lead to falling behind with school work, sometimes resulting in the adolescent having to attend extra classes once they are well or having to repeat the year. This causes a great deal of embarrassment and anxiety, as the adolescent would be separated from their friends and would need to make new friends, as well as anxiety regarding their future (Hutton, 2005). Being separated from their parents is also difficult as adolescents, like younger children, are still in need of parental support but often find it difficult to admit that that is the case (Ulrich, 2001).

Social interaction and connectedness are of particular import to adolescents. The need for social interaction can be defined as a need to belong. Research indicates that this need to belong is heightened during periods of receiving healthcare due to the adaptation required by being in a new environment and by having to interact with new people. Furthermore, patients have to deal with the anxiety of being away from the people and environments which they are comfortable in and in which they feel a sense of belonging (Kaplan and Peterson, 1993). Being away from home and isolated in a space where they have little to no control, social interaction becomes that much more vital to adolescents. Woo and Lin (2016), stress that face-to-face social interaction has the ability to enhance healing. Peer interaction in the healthcare setting between patients is therefore imperative. Through the use of both indoor and outdoor activities, such as watching television, playing games, table tennis, etc., patients are able to get to know each other and are able to connect with others who are in the same position (Hutton, 2003).

Not only is face-to-face interaction important, but in the age of social networking, staying connected to one's family, friends and peers, via social media is also significant. According to Ulrich (1991), having strong social support systems can lead to less stress and increased levels of wellness. During adolescence, friends are seen as a support network, whose opinion is valued above all others. By engaging in social interaction with friends, the adolescent's feelings of self-worth are elevated and daily stressors are reduced (Hutton, 2002). Furthermore, social networking can be used in healthcare as a support system through which patients can connect to other patients who are experiencing the same thing as they are. Research suggests that being able to connect to others as a means to seek support and comfort, alleviates anxiety, stress and depression in patients, making them feel less isolated and thereby having a positive effect on one's health (Gamache-OLeary and Grant, 2017). To foster interaction between the patient and his/her peer groups and family, Hutton (2002) suggests providing telephones in spaces which feel private and intimate rather than placing telephones in corridors or at nurses' stations as they do not afford the patient privacy or comfort. Other interventions towards ensuring patients are able to stay connected would include access to plug points and charging stations, the provision of Wi-Fi networks and even internet cafes and lounges. Ensuring that patients are able to connect with those who they hold dear can be a great source of comfort during a time when one might otherwise feel lonely and isolated.

As mentioned previously, adolescents often tend to have high conflict relationship with their parents. However, parents are seen as important sources of affection, instrumental aid and reliable alliances. Blumberg and Devlin (2006) justifies this need in their statement that adolescents often push their parents away but still need familial care. It is therefore necessary to provide comfortable and enabling environments for the families of patients, so that they are able to support the patients. This includes the provision of comfortable waiting rooms with moveable furniture, overnight accommodation for family in the patient's room or separate from the patients' room, outdoor gardens or seating areas that foster social interaction between the patient and visitor, nearby bathrooms, accessible telephones and the availability of food around the clock (Husiman, Morales, Van Hoof and Kort, 2012; Ulrich, 1991).

The interaction between the adolescent patient and the healthcare staff, is an aspect of socialization which is often overlooked. Through interaction staff can learn about the patient and therefore are able to surmise how to deliver care to that specific patient (Hutton, 2010). Similarly, adolescents would be more comfortable and open to receiving care if they are treated by staff whom they have respect for and whom they have a relationship with. Adolescent patients would also be more forth coming in providing staff with necessary information about how they are feeling.

According to Dahl, Thomas and Holmes (2013), poor quality patient-staff interaction may increase chances of violence and aggression. In order to assist patient-staff interaction, porch like areas directly outside a patients' room, as seen in Figure 3, can be implemented to allow staff to interact with each patient in a manner that gradually transitions and balances the act of socialization, into a comfortable relationship (Dahl, Thomas and Holmes, 2013).

Figure 3: Indoor porch areas off-passageway (source: Dahl, Thomas and Holmes, 2013)

As discussed, adolescents are extremely dependent on their social environments, with their relationships with friends, family and healthcare staff providing them with varying benefits of interaction. Considering the value which adolescent patients can gain from social interaction, healthcare environments should consider ways to foster and strengthen these relationships.

3.2.4 Adolescents' connection to their personal environments

The personal environment or internal environment, is one's innermost level, comprising of one's mind, emotions, wishes and intentions. While physical and social environments can contribute to creating healing environments, healing is also dependent on one's strength of mind and the balance between one's mind, body and spirit (Tully, 2014).

As adolescents are still developing their identity, finding balance and resolve can sometimes be difficult. Tully (2014) suggests interventions such as meditation, yoga, art, journaling and spending time in nature; all activities which encourage reflection, promoting good mental health and recovery in adolescents.

It is important to note that the physical, social and personal environments are all interwoven, with one having an effect on the others. Having a strong social support system for example can foster a healthy development of one's personal environment (Erikson, 1994). Research indicates that, a physical environment which is calming, well-lit and designed so that spaces consider ergonomics, and human movement and comfort, works in providing an environment which puts one's personal environment at ease (Woo and Lin, 2016).

This research therefore establishes that since adolescents are still growing and developing, emphasis in the healthcare environment should be placed on creating physical, spatial and social environments which promote healthy personal environments. Healthcare facilities should strive to not only treat adolescents for their illnesses, but to also strive to heal patients in a long-term sense, through providing positive environments which will allow adolescents to develop into adults of healthy mind, body and soul.

3.2.5 Adolescent healthcare staff and their working environments

Ulrich (1991) furthers the argument concluding that the working environment of healthcare staff has an effect on not only the staff, but the patients as well. Poor quality staff spaces make the jobs of staff more difficult and increases stress, which shows in the care which patients receive. In later research Ulrich (2001; 2006), identifies floor layouts, organisation and functionality as major components which can improve the working environment of staff. Nursing stations close to patients' rooms, and not at the end of a long corridor, allows staff better access to patients without having to spend time and energy walking up and down long corridors. This also affords the patient increased observation and care time. Having localised nursing stations also gives the staff visual access to patients. Hutton (2005) further identifies that, having patient rooms with identical layouts helps staff in providing care as there is less room for confusion and error.

Apart from nursing stations and room layouts, comprehensible wayfinding leads to a better work experience as staff can easily make their way around the facility, reducing time and energy wasted on navigation. Proper wayfinding cues can be done using different colours, lighting, clear and understandable maps, directional signs before major intersections and environmental cues such as a change in floor material which suggests that the individual is moving from one area to another as well as landmarks in the form of art and plant life installations as seen in Figure 4 (Ulrich, 2001).

Figure 4: Wayfinding: Through art, wall murals, sculptures, atriums and courtyards. (source: author)

Additionally, the placement of wash hand basins also impacts the productivity and cleanliness of staff as well as the care of patients. Wash basins should be in areas close to staff work paths, in visually prominent areas near patients' rooms. This will lead to better care for the patient as staff are more likely to wash their hands, as well as making it easier for staff to do so, as that they do not need to walk a distance to wash their hands (Ulrich, 2006).

Lastly, providing staff with comfortable break rooms, as seen in Figure 5, and staff outdoor spaces, allows staff to unwind and take full advantage of their breaks, so that they are rejuvenated and are able to provide quality care to their patients thereafter.

Figure 5: Showing staff breakroom with varied seating, natural lighting and indoor plants – Jemena Workplace Melbourne (source: Idea Awards, 2016)

3.2.6 Conclusion

By understanding the inherent connection between adolescents and their physical, spatial, social and personal environments as well as considering the working environment of adolescent healthcare staff, it is understood that the nurturing of these important relationships can improve adolescent healthcare environments and promote lasting healing. It is also understood how these environments influence each other, showing that not only does the adolescent patient have a symbiotic relationship with their environments, but the different environments have symbiotic relationships as well.

3.3 RESPONSIVE ARCHITECTURE

3.3.1 Introduction

In order to create a healing environment, the physical, emotional and psychological needs of the patient need to be met. As mentioned in Chapter 1, the adolescent patient presents a unique set of needs, which include a sensitivity towards privacy as well as the need improved opportunities for social interaction.

Various disciplines present the argument that a range of environmental characteristics can have powerful healing and therapeutic benefits for patients. These characteristics include a manipulation of scale and proportion, organization of space, natural lighting, good ventilation, thermal comfort, therapeutic colours, materials and textures, the use of art, nature and healing gardens, pleasant views and aromas, privacy, social spaces and the provision of entertainment, all of which cater for the physical, emotional or psychological needs of an adolescent patient (Mazuch and Stephen, 2005).

3.3.2 De-stressors

According to Lundin (2015), stress can be defined as the body's response to both physical and mental strain which surroundings exert on us. Stress can be either positive or negative, with prolonged negative stress having the ability to negatively impact a person's health. Negative stress is recognised as a primary trigger of illness and accidents and is a major contributor to heart related diseases. This is due to the fact that stress affects one's psychological state, which has an influence on one's hormonal balance, thereby weakening the immune system (Day, 2002). Not only is negative stress a contributor to ill-health, but it presents itself as an obstacle to healing as well.

Ulrich (2001) states that stress is a documented issue for many patients and their friends and families as well as healthcare staff. The reduction of stress is a major clinical goal as stress is a negative health outcome in and of itself as well as having damaging physical, psychological and behavioural effects which worsen patient conditions (Ulrich, 2001).

In healthcare settings, the environment plays a significant role in either creating stress or promoting tranquillity. The physical environment has an effect on one's state of mind, affecting the way one behaves in the space and the way in which one interacts with others (Day, 2002). It is therefore imperative to take measures to counter stress in order to prevent illness, reduce possibilities of aggression and restore health (Bell, Greene, Fisher and Baum, 1978).

Day (2002) advocates that countering stress involves creating environments which renew one's psychological and emotional states through a play on senses. Aspects such as light, colour, sound and smell are closely related to one's mood and have direct psychological effects.

Additionally, using positive distractions in the physical environment can aid in reducing patient, visitor and staff stress levels. Ulrich (1991) identifies elements which hold interest such as nature, water, art, etc., as de-stressors that can be used to reduce or halt troublesome thoughts. Day (2002), reiterates that in circumstances of acute stress, the ultimate therapeutic influence is nature and vegetation as it is infused with colour, creates shadows, filters light, is ever moving and changing and supports bird life, all of which holds the minds attention and plays on one's senses. Similarly, artwork depicting scenes of nature or people with positive facial expressions soothes stress and provides distraction from pain. However, not all art is therapeutic, with emotionally negative, abstract or surreal artwork causing aggravation in some patients (Ulrich, 1991).

3.3.3 Organisation, Proportion, Perception

The organisation of space is defined by Kaplan and Peterson (1993; 17) as "a process of arranging human activities in the interest of human well-being." Planning should therefore encompass the physical, spatial, social, psychological and functional needs of its users to ensure user welfare. The organisation of a space has an ability to lead you comfortably through a building, presenting cues of way finding and logical formations of activities so the user is at ease within the physical environment. In contrast, poor organisation of space has the ability to present a harrowing experience, ripe with confusion and discomfort. Just as organisation and planning have a major influence in one's experience of space, so too does the proportions of a space.

The way in which one experiences a space is through proportions, bodily scale and spatial gestures. These elements can therefore influence ones physical and mental state as they are capable of inducing feelings in those who exist within or around it. These feelings include those of comfort, welcoming and safety but also of instability, repression, self-consciousness, and even amazement.

Proportions influence our actions within a space; some spaces invite one to stop or linger while others are only to pass through (Day, 2002).

The feelings which one obtains from a space can be referred to as one's perception (Schaller, 2012). The language of forms works in tandem with the organisation and proportions of a space to direct a user through space and to induce impressions in the user.

3.3.4 Colour, Materials and Mood

Colour can enhance light by subduing or brightening spaces and providing sensory stimulation, can be used to give directional information, and can change the perception of a room's proportions. According to Day (2002), the eye first sees movement, colour and tone. An inadequate use of colour and tone leads to visual monotony, therefore contributing to physiological, psychological and emotional stress.

Colour in healthcare settings can affect the moods of patients as well as the way staff members perform tasks, for better or for worse. In the healthcare environment, walls which are skin-toned should be avoided as healthcare professionals often judge a patient's condition through their skin tone. Colours such as pale blues and greens are calming, unlike reds which induce aggression. In long corridors which are dark, lighter paint colours which reflect light better can be used to make the space appear brighter, as seen in Figure 6 (Mazuch and Stephen, 2005). It is important to note that adolescent's prefer colourful spaces rather than neutrally toned ones (Hutton, 2005).

Like colour, materials have mood affecting abilities. Materials which are sterile and cold makes one feel uncomfortable, while materials which have a positive impact on the senses such as having an agreeable texture, emitting a pleasant smell, reducing glare, and being of a comfortable temperature, puts one at ease. Materials therefore have the capacity to manipulate a person's senses and are able to create either a positive or negative sensory experience (Pallasmaa, 2012). Mazuch and Stephen (2005) suggest that materials in healthcare setting should be homely, not as noisy and easy to clean. According to Day (2002), buildings which are full of life are also full of living materials which are rich to the senses and that potentially invigorate and strengthen one's natural immunity. Through promoting a building of *life*, an environment which energizes and nourishes the soul and spirit can be created.

Materials also have an impact on health and recovery on a physical level. Certain materials emit airborne toxins which are unhealthy for the human body. In order to avoid making the air toxic, materials should be chosen carefully, with materials such as wood as seen in Figure 6, lime, peat and silk having the ability to absorb airborne toxins. Vegetation and water can also be used to absorb airborne toxins (Day, 2002).

Figure 6: Showing passageway with colours of blue and green, natural lighting, timber floor and roof materials and indoor plants – Randall Children's Hospital (source: The Oregonian, 2012)

3.3.5 Lighting

Daylight has both psychological and physiological effects on people and therefore is a key component in creating healing environments. Natural light is vital for calcium assimilation, vitamin D absorption, liver processes and hormone regulation, many of which prevent a host of health problems such as poor immune system health, fatigue, depression, anxiety, poor bone density and hair loss to name a few (Holick, 2008; Mead, 2008). Light therefore affects our state of mind, moods and the way in which we interact with people, thus having an impact on not only one's physical and psychological health but on one's social health as well. As adolescents are in a transitional stage in their development, they are prone to depression and anxiety; especially adolescents who are ill and ill at ease. Daylight can therefore aid in their recovery from depression, stress and anxiety (Day, 2002; Holick, 2008; Mead, 2008).

Apart from directly having an effect on one's health, sunlight also has disinfecting and prophylactic effects therefore helping to keep the physical environment clean, thus inadvertently preventing patients from getting sicker and aiding in the healing process (Day, 2002). Well-lit rooms can also decrease risks of staff making errors regarding medication doses and ensures faster recovery rates and shorter hospital stays for patients in rooms which have morning light (Huisman, Morales, Van Hoof, Kort, 2012).

Natural lighting can be used for different purpose in different ways, through the use of reflection, texture and rooms colours. Reflective surfaces such as walls, floors and ceilings can be used to brighten up rooms which do not have ideal orientations. The mood of the light can be modified using colour and texture to soften and warm rooms which are too cool and subdue and cool rooms which are too warm (Day, 2002). It is important to note that matte materials are preferable as they reduce or eliminate glare (Huisman, Morales, Van Hoof, Kort, 2012). Texture can further enliven a space, for example, dappled light spilling through the foliage of trees, as seen in Figure 7 and dancing light reflected on the surface of water. Furthermore, through precise window placement, interactive daylight can be created. Ultimately, the use of living light as described above can make a space comes to life (Day, 2002).

Figure 7: Santa Rita Geriatric Centre showing dappled sunlight. (source: ArchDaily, 2009)

Artificial lighting also has the ability to effect one's mood and should thus be selected in consideration with the functions of space. Social rooms, for example require warm lighting, whilst rooms for contemplation require cooler lighting with gentler mood fluctuations. Additionally, rooms which host activities that require users to be intellectually alert require lots of light (Day, 2002).

3.3.6 Temperature

According to Florence Nightingale, in order for patients to recover quickly and comfortable, patients should be kept thermally comfortable (Medeiros, Enders and Lira, 2015). Similarly, Day (2002) states that warmth is a basic human need which promotes relaxed well-being. It is important for the temperature in a room to be kept at a level which is not too warm or too cold.

Being too warm can be fatiguing, whilst being too cold can drain one's will, with both extremes being able to contribute to adverse effects such as increased heart rates, higher blood pressure and increased healing times for wounds. The right room temperature, approximately 20º to 23º ambient temperature, can be comfortable and energizing (Day, 2002).

3.3.7 Air Quality and Ventilation

As with temperature control, good ventilation and air quality are aspects which Florence Nightingale placed emphasis on in order to create an effective healing environment (Medeiros, Enders and Lira, 2015). Without proper ventilation, air becomes stagnant and can make one ill or more ill as stagnant air contains pollutants such as pollen, dusts, cleaning solvents, fungi, viruses and toxins. This can cause headaches, fatigue and allergic reactions as well as affect the room's humidity thereby affecting the patients' thermal comfort. Proper ventilation and air filtration can be implemented to reduce airborne transmission of infections and pollutants as well as aiding in a quicker recovery of patients. Additionally, indoor vegetation can be used to purify air as well as providing visual interest (Ulrich, 2006).

3.3.8 Noise Control

Noise can be defined as sound that is unwanted (Bell, Greene, Fisher and Baum, 1978). Healthcare environments can be particularly noisy with the sounds of bedrails being moved, overhead paging, trolleys and staff shift changes. These noises are made worse by poor spatial quality and hard, sound-reflecting floor and ceiling surfaces and materials (Ulrich, 2006).

Constant noise increases stress, blood pressure and heart rates, affects the quality of patients' sleep, can exacerbate some illnesses and can increase chances of aggression as well as increases fatigue in staff increasing the risk of error (Bell, Greene, Fisher and Baum, 1978; Day, 2002; Ulrich, 2006; Huisman, Morales, Van Hoof and Kort, 2012).

Design measures which can be taken to reduce noise include, the use of high performing sound-absorbing floor and ceiling materials, the use of wanted sounds, such as splashing water from a water fountain, sounds of birdlife and the rustling of trees to mask noise, and using the buildings form, walls, landforms, plants and soft surfaces to shield and absorb external noises (Day, 2002; Ulrich, 2006).

3.3.9 Nature and Healing Gardens

Nature presents itself as a contributor to well-being through its promotion of contemplation and reflection. Wilson (1984) suggest that humans have an affinity with nature; an inherent need to be in and connect to it, which he defines in his theory of biophilia. Nature allows for one to employ one's mental faculties effectively, as it creates an environment where one can comfortably, without negative distractions, contemplate, reflect, focus and organise one's thoughts. Through organising one's thoughts, situations can be made sense of and plans and decisions regarding important life issues can be made. Nature improves one's cognitive functioning thereby strengthening one's personal environment. Cognitive clarity and control play an important role in healing as it leads to patients being able to mentally cope with and accept their ill-health and to strengthen their resolve to wholly heal (Kaplan and Peterson, 1993; Berman, Jonides and Kaplan, 2008).

Reflection and contemplation are promoted through nature's therapeutic abilities. According to Day (2002), nature is therapeutic as it connects people with the energies of life. He defines this as aspects which include the cycles of nature; seasonal and diurnal rhythms of light, movement, sounds, aromas, the processes of growth and decay.

Natural environments with trees, flowers and water also improves one's mood and effectively promotes restoration from stress as well as prompting beneficial physiological changes such as lower blood pressure and a reduced heart rate (Ulrich, 2001). Furthermore, nature, green vegetation and gardens can alleviate pain, improve the body's immune system and enhance human resiliency (Woo and Lin, 2016). According to Schaller (2012) research presents that if one feels comfortable and relaxed, it is easier to rest and one heals faster. Feelings of comfort and relaxation can be achieved through nature by presenting the patient with an environment where they do not feel as if they are being viewed bur rather where they have something to view.

For adolescent patients in particular, nature and the outdoors can be of great benefit as they work towards physically, psychologically and cognitively developing adolescents. Furthermore, nature can aid in reducing aggression, with elements such as water, providing a positive distraction, helping children and adolescents find a sense of calm (Dahl, Thomas and Holmes, 2013).

Ulrich (2006) suggests that not only is access to nature important but having views of nature is equally as important. Views of nature prompt positive feelings, reduces and blocks stress and holds one's interest. Having views of nature, rather than urban views, from a patient's window have proven to shorten post-operative hospital stays, ease recovery in patients where fewer complaints and fewer needs for painkillers are reported, additionally it reduces chances of post-operative complications and overall reduces recovery times.

In the healthcare environment, nature can be made present in both the indoors and outdoors. Ulrich (2001) and Smith (2007), suggests that windows from patient rooms, waiting areas and staff spaces should have natural views, while aquariums, terrariums and atriums with greenery and water fountains can be used in waiting rooms and general areas. Atriums, light wells and skylights also bring natural light into the interiors. Additionally, calming art depicting nature can be used in patient's rooms.

Landscaping and green-screening can be provided along the entrance of the site, from the boundary of the property, to the gateway, to the parking space, to the front door, all of which ensures that every aspects of the health environment is therapeutic in some way (Smith, 2007).

Through the use of different gardens, different experiences can be created according to the patient's needs. Depending on the patient's condition, accessibility to nature and mobility of the patient, the experience through the outdoors can be active, passive or sensual. Gardens can provide mild exercise through walking paths, designated trails and meandering layouts; which can encourage patients, visitors and staff to exercise and relieve stress. Gardens can also be used for outdoor physical therapy and rehabilitation opportunities as well as for interpersonal interactions, such as mediation, reflection, observation of natural systems and emotional healing (Smith, 2007).

Gardens which can be used and are effective in healing environments are healing gardens; designed as outdoor rooms used to regain wellness of physical, psychological and spiritual ailments, enabling gardens; used to maintain and enhance patient's physiological needs, meditative gardens; gardens designed specifically for reflection and spiritual and psychological well-being, rehabilitative gardens; gardens designed specifically for physical rehabilitation towards a desired medical outcome and restorative gardens; gardens designed for the purpose of regaining balance (Smith, 2007).

Additionally, gardens can hold smaller spaces to provide pocket gardens or semi-private spaces of respite to allow for contemplation and viewing. Design elements which stimulate the senses and create peaceful atmospheres should be implemented, such as reflection pools, mazes, plants and vegetation which are seasonal and attract birds, objects of art as well as elements of surprise and delight (Smith, 2007; Day, 2002).

Furthermore, elements in nature can also serve as landmarks and aid with wayfinding. Nature can also be used to facilitate social interaction through landscaping and seating and can support a sense of community through a provision of activity (Smith, 2007).

Figure 8: Showing patient enjoying the outdoors (source: Johnson, 2017)

3.3.10 Personal Space and Privacy

An overlooked aspect of healing is one's spiritual, psychological and cognitive development. Hutton (2005) considers that being of strong mind can aid patients in healing faster with lasting health. While social interaction has many benefits to healing, similarly, having personal space and privacy also serves in contributing to well-being, as it allows one space to reflect. Hutton (2005) furthers the argument to adolescents who are experiencing a period of transition, in which they are self-conscious, emphasising the need for personal space and privacy ensure that patients feel comfortable in the healthcare environment.

Personal space and privacy are of particular import in patient rooms. While, according to Huisman, Morales, Van Hoof and Kort (2012), single-patient rooms allows patients more privacy, they can create feelings of isolation and loneliness. Patient rooms should therefore be designed in a way that each patient has a defined space to call their own while still allowing the patient the company of another patient. Additionally, much like a bedroom at home, the adolescent patient would use their room as a quiet space for reading or homework. Furthermore, research suggest that adolescent patients would prefer phones in their rooms to maintain privacy and intimacy when speaking to family and friends as well as bed curtains to create boundaries and control space. Other aspects which can contribute to the patient having adequate privacy include, bathrooms in the ward with separate toilets and showers, shower curtains for privacy and locks on bathroom doors (Hutton, 2002; Hutton, 2005; Blumberg and Devlin, 2006).

While social spaces in the healthcare environment are important for social interaction, it is also important to provide areas of respite and privacy in these public spaces, as often adolescent patients might not want to directly interact with their peers, but might still want to be around people. Dahl, Thomas and Holmes (2013) suggest alcoves, window seats as seen in Figure 9, and reading nooks as areas where adolescents can use to withdraw from busy and loud surroundings. However, these areas of retreat should not become areas of seclusion.

Privacy for staff should also be considered with the provision of break spaces for staff to have a moment of respite. Additionally, nurses' stations should be designed so that staff are not frequently and unnecessarily interrupted by visitors (Ulrich, 1991).

Figure 9: Showing window seat (source: pinterest)

3.3.11 Control and Individuality

To older adolescents who are becoming more independent, healthcare environments can often be restrictive due to routines and surroundings which they do not have any control over (Hutton, 2005). According to Ulrich (1991), a lack of control can lead to depression, passivity, elevated blood pressure, stress and reduction of immune system functioning. Having the opportunity to make one's own choice and not feel dependent on staff for help is therefore important to the adolescent patient (Schaller, 2012).

Control can be given back to the adolescent patient by providing spaces in which patients can carry out personal interests and hobbies and in which a sense of privacy is felt. Proper wayfinding and access to the outdoors also creates a sense of independence as patients are able to find their way easily and have the option of exploration through healthcare environments which usually come across as being confining. Additionally, a sense of control can be created by allowing patients to control aspects such as television channels, room temperature, lighting, bed positions and bedroom curtains (Ulrich, 1991; Ulrich, 2001; Hutton, 2005; Huisman, Morales, Van Hoof and Kort, 2012).

3.3.12 Social Spaces

As was previously established social interaction is vital to adolescent growth, development and to healing. Both the inward, personal and the outward, social interaction is needed for improved physical, psychological and emotional health (Day, 2002). The provision of social spaces should therefore be well considered to ensure that adolescent patients have a comfortable environment to interact with others and to relieve themselves from the monotony and boredom which comes with being a patient.

Social spaces should provide activities for the adolescent patient as activities provide patients with the opportunity to interact with other patients as well as serving as an ice breaker. Interaction between patients can drastically improve one's stay in the healthcare setting as well as increase the patient's self-worth (Hutton, 2005). Indoor activities can include gaming, table tennis, air hockey, television rooms with DVD players, comfortable seating and popcorn machines, fitness rooms and accessible kitchens (Hutton, 2003; Hutton, 2005; Blumberg and Devlin, 2006). Hutton (2005) suggests that noisy activity rooms should be sound proofed and should be located away from the ward entrance, treatment areas and nurses' stations and away from general ward movement. Outdoor activities can include a range of sporting activities. According to Rush (2017), playing sports has many benefits such as developing adolescents' motor and cognitive skills as well aiding in hormone regulation and strengthens the immune system. Therefore, not only are recreational activities key to encouraging social interaction, but it can be used as a form of therapy, known as recreational therapy, to maintain and improve the physical, psychological and cognitive health of adolescents (NCTRC).

The introduction of recreational therapy into healthcare is responsive to the needs of the adolescent patient as it provides an outlet through which patients can interact with each other, be entertained and feel as if they are participating in life rather than feeling as if life is passing them by during their stay in the healthcare facility. It is also beneficial and responsive to out-patients and youth in general, as it provides a space within the facility within which they will feel comfortable in and which they will look forward to going to. Providing these spaces, such as swimming pools for aquatic therapy and sporting facilities as seen in Figures 9B and 9C, allows for adolescents to channel their energy into physical activities and skill building activities, rather than channelling their energies in to negatively impacting activities. Not only does this then provide a means to improving physical and psychological recovery, health and well-being, but facilities become spaces of gathering rather than spaces which one just passes through (CTRS).

Figure 9B Left: Adolescents participating in aquatic therapy. (source: Cleveland Clinic)

Figure 9C Right: Young adolescent boy during sporting recreational therapy. (source: Ability360)

Indoor communal spaces should have a level of complexity including, doors, windows, spatial gestures, interactive space and interweaving activities instead of being a single, vast space, (Day, 2002). Seating patterns and furniture arrangements should promote social interaction rather than inhibit it. Furniture should be moveable and arranged in circular formations or around a central point in small clusters rather than chairs been pushed up against walls (Ulrich, 2001; Huisman, Morales, Van Hoof and Kort, 2012).

Waiting areas and staff areas are also considered as social spaces. Waiting rooms should be comfortable with moveable seating, should have convenient access to food, available telephone and rest rooms, overnight accommodation and pleasant gardens or courtyards which facilitate interaction between patients and visitors. Similarly, staff areas should have flexible moveable furniture as well as an outdoor space for staff to relax and to facilitate interaction (Ulrich, 2001).

3.3.13 Conclusion

It is evident that through the consideration of the environmental aspects discussed above, that the healthcare environment can be an environment of healing; working to meet the needs of the patient and ensuring that patients wholly recover. In addition, it has become apparent that adolescent patients require a healthcare environment tailored to their psychological, emotional and social needs, which differ at times from the needs of adult and child patients. Through catering for these needs, the relationships between the adolescent and their physical, spatial, social and personal environments can be strengthened, leading to a healthcare experience which is comfortable and beneficial to not only curing or stabilising their illnesses but beneficial to their growth and development as individuals as well.

3.4 GENERATIVE ARCHITECTURE

3.4.1 Introduction

Having identified and understood the relationships which adolescents have with their various environments as well as the way in which these relationships can be strengthened, the issues of adolescent healthcare environments can begin to be addressed, allowing for the generation of an architecture of healing. After understanding these relationships and considering individual pragmatic design aspects, it is imperative to see and experience the environment as a whole to ensure that the architecture generated is one which invites a spirit of place, life and healing and develops into an architectural environment which is greater than the sum of its parts.

3.4.2 Sensory Healthcare Design and Place

Sensory design considerations have been previously touched on with aspects such as lighting, noise, ventilation and natural environments having been discussed, with regards to creating an environment where healing is promoted. While these aspects have been specifically considered, the abilities of the senses to influence healing and to create a sense of place have yet to be discussed.

Day (2002, pg214) defines the senses as a gateway between one's inner experience and the outer world. The quality of a space is experienced either involuntarily or voluntarily through the stimulus of one's senses, be it for better or worse. Providing a positive sensory experience to users of space is therefore imperative to ensuring a positive spatial experience. According to Day (2002), it is when sensory elements interact with each other that a place which cultivates spirit is created. Designing architecture which invites spirit of place to exist within it is therefore completely reliant on the sensory experience which is created.

By focusing on creating a positive sensory experience, allowing for more than one sensory element to interact, and nurturing spirit of place, a balanced experience is created allowing for a healthy and balanced mind, body and soul (Day, 2002).

Similarly, Mazuch and Stephen (2005), view the senses as a tool through which one's environment is assessed. By understanding the effects and limits of the senses, an environment which is responsive to the needs of its users can be achieved.

Since an emphasis has been placed on ocularcentrism in recent decades (Pallasmaa, 2012), the importance of touch, sound and smell will be discussed. According to Schonberg (1985), touch creates a stronger, more lasting experience, than verbal or emotional contact. Touch requires one's effort and therefore provokes feelings of interest and inclusion (Day, 2002).

Through the use of textures which are touchable, patients with mental health or personal environment problems can begin to recover through learning to re-engage with the materiality of their surroundings (Mazuch and Stephen, 2005).

As was previously discussed, sound perceived as unwanted is considered as noise, and have implications on one's heart rate, blood pressure, respiratory system and cholesterol levels. Sound which is not perceived as unwanted, can enhance one's sensory experience. Sounds of nature can aid in promoting reflection, providing positive distractions and indicating the passing of time (Day, 2002; Mazuch and Stephen, 2005).

Lastly, the sense of smell provides opportunity to influence mood, perception and motivation, with the sense of smell being able to evoke strong emotional responses, in comparison to the other sense. Unpleasant smells or odours, such as body odour, chemicals, urine, and other such smells which are present in hospital environments, can increase the heart rate and create feelings of fear and trepidation. Pleasant smells or fragrances, can relax muscles, improve concentration and produce endorphins which are the body's' 'feel good' hormone. Through the use of ventilation systems, unpleasant smells can be removed and pleasant smells can be dispersed (Mazuch and Stephen, 2005).

3.4.3 Materiality and Place

Materiality of a building plays an important role in creating place by playing on the senses of users as well as addressing the way the building is perceived within its context. With respect to the experience within and through a place, the use of natural materials which are rich to the senses connects the user to his or her surroundings, creating an invigorating experience. Through materials which are; non-toxic, which smell pleasant, are pleasing or intriguing to touch, are visually agreeable and which do not create noise, healing can begin to take place at a physical and spiritual level (Day, 2002).

According to Day (2002), a building is seldom experienced as an object in space. Rather, there exists the inside of a building, the outside of the building, and the barrier which connects the two. This barrier which connects the two is made up of various materials, such as timber, glass, concrete, steel and so on, working to concretize form and nurture place through a sense of materiality. Since this barrier of materials connects the inside to the outside, it provides an opportunity to root the building to its context, be it a context of nature or built forms, by taking note of the surroundings and the characteristics which it presents. Through rooting a building in its context, a sense of belonging and hence place is created (Dahl, 2016).

3.4.4 Enlivening Surroundings and Place

While material choices and design which stimulates the senses contribute to generating an architecture which invites a sense of place, one's surroundings play an equally important role in framing place.

Surroundings can be understood as that which creates space, of varying characteristics and qualities, and that which controls movement through that space. The form of a building, the surrounding, and its walls within, affects the way in which one moves through it and should therefore be life giving. Rather than creating spaces to merely pass through, enlivened surroundings create a journey through that space, allowing for a captivating experience through the building which uplifts the mind, body and soul. This is done through the rhythm and fluidity of the surroundings, allowing for accelerating and decelerating spaces, spaces of expansion and contraction, spaces which are varied in light and darkness, spaces which alternate spatial openings, present views and interesting activities and which change axis when appropriate. During this enlivening journey through space, opportunities to breathe, see, listen, touch and smell are created, contributing to the cultivation of place. This journey through the physical environment begins to nourish oneself emotionally, psychologically and spiritually, all of which contribute to the process of healing (Day, 2002).

3.4.5 Conclusion

It is evident that in order to generate an architecture which has a sense of place, and therefore provide a positive healing environment, the senses, materiality and the design of surroundings should be taken into consideration. These three aspects, working in tandem and intertwining with each other create a place full of life, spirit, balance and healing. Through the use of the physical and natural environment, a place which heals the mind, body and soul can be developed.

3.5 CONCLUSION

Chapter 3 has discussed the sub-concepts of symbiotic architecture, responsive architecture and generative architecture in order to deduce ways in which to improve adolescent healthcare environments through patient and staff responsivity. To conclude, it can be deduced that the needs of the adolescent patient are primarily social and psychological in nature. In order to accommodate these social and psychological needs, it can be understood that healthcare environments need to focus on nurturing the relationship between patients and their physical, spatial, social and personal environments. Furthermore, in addressing these needs it has become evident that healthcare environments should encompass much more than space for treatment but also facilities for the maintenance and promotion of long-lasting health and holistic wellbeing should be provided.

The following chapter, Chapter 4, will investigate relevant precedent studies which will provide built examples of healthcare environments which are responsive to its users with the aim of answering research questions of how healthcare architecture can respond to its patients and how healthcare environments can be conceived so that it may promote healing.

CHAPTER 4 | PRECEDENT STUDIES

4.1 INTRODUCTION

In order to understand how the theoretical framework and literature could be realised into architecture, precedent studies which answer the research questions of how healthcare architecture can respond to its patients and how healthcare environments can be conceived so that it may promote healing, have been analysed. The precedent studies analysed below were selected as a result of being healthcare facilities which are responsive to the physical, psychological and social needs of its intended users. The precedents have been analysed using the sub-concepts established in chapter 2 and 3 namely symbiotic architecture, responsive architecture and generative architecture. Through using these principles as a lens, it is anticipated that the precedents will suggest how responsive architecture can lead to the provision of healing healthcare environments for adolescents. The precedents which have been studied include the Trillium Secure Adolescent Inpatient Facility in the United States of America, the Nelson Mandela Children's Hospital in South Africa and the Ballarat Community Health Primary Care Centre in Australia.

4.2 TRILLIUM SECURE ADOLESCENT INPATIENT FACILITY

Figure 10: Location of Trillium Secure Adolescent Inpatient Facility (source: Google Earth)

4.2.1 Motivation

Built in 2015 and located in Corvallis, Oregon in the United States of America, as seen in Figure 10, by TVA Architects, the Trillium Secure Adolescent Inpatient Facility, as seen in Figure 11, is an adolescent inpatient clinic which treats acute behavioural and mental health issues.

The facility provides private inpatient rooms, classrooms, social spaces and therapy rooms. The brief for the facility was to create an environment which was not only safe and secure but also friendly, healing and specific to the needs of its adolescent patients (ArchDaily, 2017b).

Figure 11: Showing Trillium Secure Adolescent Inpatient Facility (source: ArchDaily, 2017b)

4.2.2 Symbiotic Architecture

In the case of this specific facility, the relationship between the adolescent patient and their physical environment is one of a complex nature. As patients are being treated for behavioural issues and mental illnesses which result in aggressive behaviour, the physical environment needed to be one which was secure in order to ensure the safety of both the patients and staff, while still allowing for an unoppressive environment. This was done through architectural details, such as skylights and clerestory windows which afforded patients views of the trees and sky, rather than the use of windows at lower levels which could present potential safety risks. A safe but pleasant environment was also created through the selection of furniture. Whilst furniture needs to be bolted down or too heavy to lift, the austerity of such pieces was offset with furniture of different colours. As depicted in Figure 12 and 13 indicate these aspects were decided on through the consultation and participation of staff and patients in the design process to ensure that the users of the space were able to mould it into an environment which would heal them (ArchDaily, 2017b).

Figure 12: Showing colourful furniture (source: ArchDaily, 2017b)

Figure 13: Showing use of natural lighting and furniture design (source: ArchDaily, 2017b)

The relationship between patients and their social environments is also one which was well considered as the facility includes a family therapy room as well as common spaces for patients to interact with each other and with the staff. Common spaces include day rooms, lounges, a basketball court and outdoor seating, as seen in Figure 14. Furthermore, the layout, as shown in Figure 15 below, which positions the sleeping pods and admin spaces around the common spaces, promotes patient/staff interactions in order to strengthen these relations (ArchDaily, 2017b).

Figure 14: Left - Showing basketball court and outdoor seating. (source: ArchDaily, 2017b)

Figure 15: Right - Showing arrangement sleeping pods and admin spaces around common space (source: ArchDaily, 2017b)

4.2.3 Responsive Architecture

As discussed above, the facility is responsive to the safety, psychological comfort and social needs of its patients and staff. However it is also responsive to other needs of the adolescent patient such as; the proportion of space is comfortable and not too large, the use of accent colours and natural lighting serves to improve patients and staffs' moods, access to the outdoors allows for a change of scenery and single patient rooms allow patients privacy and more importantly safety while the provision of a living room in each sleep pod, as seen in Figure 16, allows for social interaction with others when it is wanted. By being responsive to these needs of the patient, the facility respects the dignity of the patient in what could otherwise be an unpleasant and undignified experience (ArchDaily, 2017b).

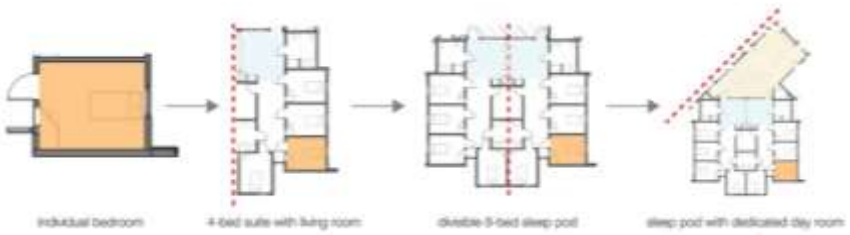

Figure 16: Showing patient room with lounge and day room (source: ArchDaily, 2017b)

4.2.4 Generative Architecture

In order to move away from the idea of a mental health facility being one which is large, bleak and daunting, the facility, as seen in Figures 17 and 18, uses low-scale, vernacular forms; a response to its rural and residential location. With patients having access to the outdoors, and through the use of natural lighting, wood finishes, woody tones and fun colours, the interiors are neither cold nor bleak. The exterior depicted in fig x and y, once again acknowledging its location, uses cedar sidings, metallic cladding and bright colours to appear welcoming and reflective of its youthful patients. The materials used as well as the green, leafy site, allows for a sense of place to be created which is welcoming (ArchDaily, 2017b).

Figure 17: Left - Showing external materials - cedar siding, metal cladding and bright colours (source: ArchDaily, 2017b)

Figure 18: Right - Showing external materials - cedar siding, metal cladding and bright colours (source: ArchDaily, 2017b)

4.2.5 Summary

TVA Architects managed to successfully challenge the stereotype of mental health facility typologies by designing a facility which considered the dignity and needs of its patients in order to realise a healing environment, despite design restraints relating to safety and security.

4.3 THE NELSON MANDELA CHILDREN'S HOSPITAL

Figure 19: Locality map of The Nelson Mandela Children's Hospital (source: Google Earth).

4.3.1 Motivation

Built in 2016, in Parktown, Johannesburg, South Africa, as located in Figure 19, the Nelson Mandela Children's Hospital was designed by UK architecture firms, Sheppard Robson and John Cooper Architecture in collaboration with South African architecture firms, Ruben Reddy Architects and GAPP. The hospital, as seen in Figure 20, provides 200 beds and eight theatre facilities and includes specialist facilities for the treatment of a wide range of diseases. The facility is also a teaching hospital and supports paediatric academic research (ArchDaily, 2017a).

The brief for the project stipulated that high-quality child healthcare was to be provided through connecting the healthcare environment to a natural healing environment (ArchDaily, 2017a).

Figure 20: Showing the Nelson Mandela Children's Hospital (source: ArchDaily, 2017a).

4.3.2 Symbiotic Architecture

Healthcare examinations and treatments as well as healthcare environments often come across as overwhelming and frightening to children. As the examination and treatment process is something which cannot be changed, it is the role of the physical environment to distract and comfort child patients to reduce their fear and anxiety. The Nelson Mandela Children's Hospital does this in a number of ways. These include caricatures which are painted on the walls and machinery of the hospital as seen in Figure 21, murals of stories and a number of easily accessible and fun indoor and outdoor play areas, as seen in Figure 23. In this case, the facility has been designed so that the relationship between the child patient and the physical environment is symbiotic. Through drawings which child patients have drawn, as seen in Figure 22, and through stories which are relevant to the South African child, the facility becomes more than just walls and floors and ceilings but rather becomes a story book to the patient where characters accompany and give support to patients with encouraging words. Through interacting with children and allowing them to be a part of the design process, meaning and identity is given to the facility which in turn provides support and healing to the patients (ArchDaily, 2017a).

Figure 21: Left - Showing wall murals and characters in radiography department. (source: ArchDaily, 2017a).

Figure 22: Right - Showing character drawn by child patient on the wall of a patient room (source: ArchDaily, 2017a)

Figure 23: Showing children's outdoor play area (source: ArchDaily, 2017a)

A child's social environment in a healthcare facility is heavily dependent on their parents or guardians. For the child, rooms with four to six patients are provided as well as play rooms so that patients have other patients to interact with. For the parents/guardians who provide a vital support system to patients, accommodation with a kitchen and comfortable lounge spaces are provided to ensure that guardians are able to stay nearby and are well rested, so that they may provide the necessary support. Additionally, staff play a big role in making child patients feel comfortable in the healthcare setting. Through the provision of staff rest lounges in each wing of the building therefore provides a space for the staff to recharge when need be so that they may provide both quality care and comfort for their patients (ArchDaily, 2017a).

4.3.3 Responsive Architecture

As discussed above, the facility has taken into consideration the psychological and social needs of the child patient. Additionally, children have specific physical needs which differ from adults. Primarily, this refers to scale and proportion of space, furniture and fittings. The facility has responded to the physical needs of the child patient by designing bathrooms with smaller bath tubs, as seen in Figure 24, which is more size appropriate and which also allows for a helper to sit and bathe the child, sinks which are lower, window ledges in patients' rooms which are lower so that children can sit on them and look outside and furniture which is small and moveable in the entrance foyer, as seen in Figure 25. Furthermore, the facility is split into six wings, as seen in Figure 26, with each specializing in a particular field. Rather than having a tall single mass, the form is separated into six elements which allows for a more human scale which serves to be reassuring and familiar to the child patient. Each of these wings have been assigned a colour, which is reflected on the exterior through the use of vibrantly coloured solar shading devices, to make the facility more attractive to its young patients (ArchDaily, 2017a).

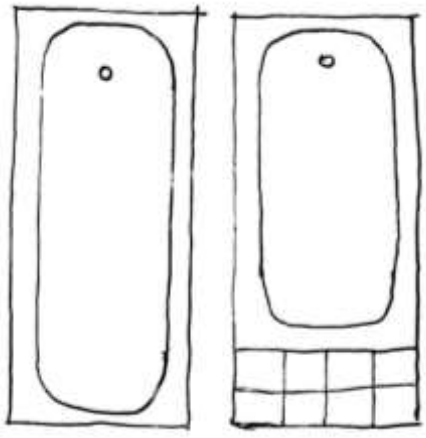

Figure 24: Left - Showing standard bathtub left and children's bathtub on the right, with tiled ledge for helper to sit on (source: author)

Figure 25: Right - Showing entrance foyer with colourful, appropriately scaled furniture (source: ArchDaily, 2017a).

Figure 26: Floor plan showing six wings of the hospital (source: ArchDaily 2017a, sketched over by author)

4.3.4 Generative Architecture

The generation of place is done so using shallow floorplates, as seen in Figure 27, which allow for an abundance of natural lighting, views of the surrounding landscape, five, therapeutic internal courtyards, as seen in Figure 28, and three exterior gardens which were designed with occupational therapy and play in mind. Furthermore, the exterior of the building, as seen in Figure 29 is designed using exposed earthen looking brick and concrete details, softened with wooden pergolas, colourful solar shading devices, yellow benches, wall art and trees and vegetation. Through the connection between the healthcare environment and the natural environment, healing is promoted (ArchDaily, 2017a).

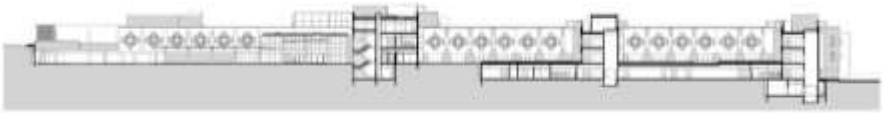

Figure 27: Section showing shallow floor plates (source: ArchDaily, 2017a)

Figure 28: Left - Showing therapeutic courtyard (source: ArchDaily, 2017a)

Figure 29: Above - Showing exterior of the building (source: ArchDaily, 2017a)

4.3.5 Summary

Through the use of courtyards, gardens, natural elements such lighting and views, and by being responsive to the specific needs of the child patient, the Nelson Mandela Children's Hospital has come together as a facility which takes into consideration the journey of the patient and their parent through the healthcare facility with the aim of creating a pleasant and healing experience.

4.4 BALLARAT COMMUNITY HEALTH PRIMARY CARE CENTRE

Figure 30: Showing location of Ballarat Community Health Primary Care Centre (source: Google Earth)

4.4.1 Motivation

Designed by architecture firm, DesignInc, in 2014, the Ballarat Community Health Primary Care Centre situated in Lucas, Victoria, Australia, aims to create an improved approach to the delivery of quality and affordable community healthcare. The facility includes a range of services, as seen in Figure 31, including general health practice, sexual and podiatry health, consultation rooms, a gym as well as conference, meeting rooms and office facilities (ArchDaily, 2015). The brief aimed to provide a healthcare environment which was both healing and stimulating, through honing in on the benefits of connecting to nature and community interaction. Design strategies taken were done so in order to promote both mental and physical health as well as sustainable design (ArchDaily, 2015).

Figure 31: Showing ground floor plan of facility which includes but is not limited to consulting rooms, gym, conference room, multi-purpose rooms and a cafe. (source: ArchDaily, 2015)

4.4.2 Symbiotic Architecture

A major design focus was placed on social environments in the healthcare setting since the facility is a community based one. A central double-volume atrium which runs through the centre of the building, serves as the spine of the facility allowing for easy way-finding whilst providing a bright and airy space enhanced by natural vegetation. This spine serves as the heart of the building, as it encourages social interaction through housing a café and eating area as seen in Figure 32, performance stairs and a play area. The space also allows for flexibility as adjacent multi-purpose rooms can open up, granting the option of a larger community space as need be. Through these social spaces, the facility goes beyond existing as just a healthcare destination, but rather becomes a community space as well (ArchDaily, 2015).

Figure 32: Showing double-volume community space (source: ArchDaily, 2015)

4.4.3 Responsive Architecture

As the facility is one which caters to a wide range of users, of different age groups, races and cultural backgrounds, meeting the needs of the user centres more on creating a space which is welcoming and promotes belonging. The architects, having interacted with the community, identified that nature was a common thread between the diverse user groups prompting the integration of natural elements throughout the building. This includes internal gardens and timber pergolas as well as natural materials such as timber and brick which add a sense of warmth to the facility, as seen in Figure 33. The connection to nature was further emphasized through the use of natural lighting and natural ventilation as seen in Figure 34 (ArchDaily, 2015).

Figure 33: Showing light, vegetation and material usage (source: ArchDaily, 2015)

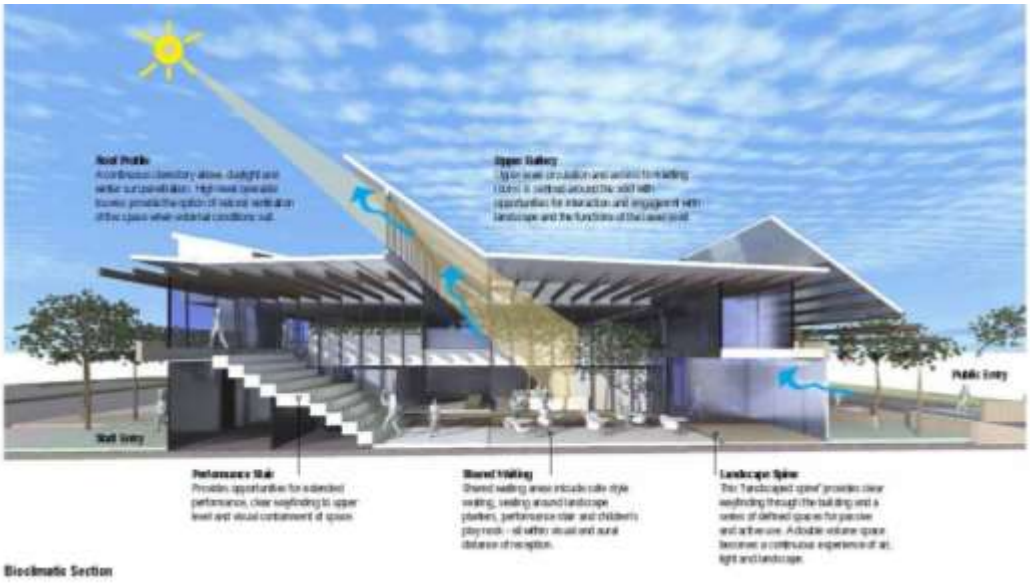

Figure 34: Section showing elements of light, ventilation and vegetation in the building. (source: ArchDaily,2015)

4.4.4 Generative Architecture

The building creates a sensory experience and sense of place through the use of sunlight, natural ventilation, vegetation with warm and tactile materials such as timber and brick, as seen in Figure 35. The exterior of the building, as seen in Figure 36, aims to integrate place and community by using roof silhouettes which meet the surrounding landscapes and echo contextual forms. Materials used on the exterior include brick, metal cladding and polycarbonate sheeting, giving the facility a contemporary rather than institutional feel (ArchDaily, 2015).

Figure 35: Above - Showing exterior of the building (source: ArchDaily, 2015)

Figure 36: Left - Showing use of timber and brick (source: ArchDaily, 2015)

4.4.5 Summary

Through placing focus on social interaction and a connection to nature, the Ballarat Community Health Primary Care Centre is able transform the healthcare environment from one of pure function into one which begins to physically, psychologically and socially heal a community.

4.5 CONCLUSION

It can be concluded, after analysing the relevant precedent, that architecture which is responsive, results in an architecture which is sensitive, healing and relevant. To summarise, the Trillium Secure Adolescent Inpatient Facility, expressed the importance of knowing and interacting with the user of your building, the importance of providing space for patient/staff interaction, the value in having access to the outdoors and how scale, colour and material could change perceptions of healthcare facilities. The Ballarat Community Health Primary Care Centre, emphasised the importance of connecting to the surrounding community, the benefits in creating an environment where healing is not a solitude act and the sensory experience provided through the use of vegetation. And lastly, The Nelson Mandela Children's Hospital, presented the importance of using positive distraction to reduce patients fear and anxiety, ways in which architecture could strengthen social support systems and how good lighting, ventilation and views provided positive user experience.

The subsequent chapter, Chapter 5, will investigate relevant case studies which will provide a look into healthcare facilities in Durban, with the aim of answering the primary research question: "How can architecture be responsive to the adolescent patient in order to generate a healing healthcare environment?"

CHAPTER 5 | CASE STUDIES

5.1 INTRODUCTION

The theoretical frameworks and literature have established that the needs of the adolescent patient are primarily social and psychological, while precedent studies have presented ways in which healthcare environments can be healing and responsive to its user. The following case studies, therefore aim to answer the primary research question which inquires how architecture can be responsive to the adolescent patient in order to generate a healing healthcare environment.

The case studies studied in the following chapter include the KwaZulu-Natal Children's Hospital in Addington, Durban and a general private hospital, to be referred to as The Private Hospital, which wishes to remain anonymous, situated in Durban.

The KwaZulu-Natal Children's Hospital was selected as it is a public facility which caters for children and adolescents. The aim was to study how the design of the facility has considered or overlooked the needs of the child/adolescent patient as well as the needs of the healthcare staff and to ascertain if positive aspects resulted in an environment of healing.

While the initial aim was to study facilities already catering for adolescents to ascertain if research found in the literature had been implemented and how successfully it had been done so, a lack of child and adolescent facilities in Durban meant having to study a general healthcare facility. The Private Hospital was selected as it promotes itself as being a facility which provides both health and healing through its tranquil environment. The aim was to study how the design of the facility was focused towards creating a healing environment and whether the facility is responsive to its community and patients. The case study has been analysed using the aforementioned principles of symbiotic architecture, responsive architecture and generative architecture.

Both case studies were carried out, with the aid of a member of the nursing staff who provided a tour of the facility. This allowed for the opportunity to conduct unstructured interviews about the general layout and running of the facility. Research instruments used to gather information include interviews with healthcare professionals working in the facilities studied as case studies as well as interview schedules filled out by built environment professionals, young adults and adolescents. While the findings from the interviews with healthcare professionals will be discussed with their corresponding facility, the findings from interview schedules filled out by built environment professionals, young adults and adolescents will be discussed in the ensuing chapter. It was initially intended that adolescent participants would be patients of the case studies, but at the time which the study was conducted, there were no adolescent patients available to participate in the study. Adolescent participants were therefore randomly selected over social media and through affiliated connections.

5.2 KWA-ZULU NATAL CHILDREN'S HOSPITAL

Figure 37: Location of KZNCH (source: Google Maps)

5.2.1 Motivation

Built in 2015, in Addington, Durban, South Africa, by Ruben Reddy Architects, the KwaZulu-Natal Children's Hospital (KZNCH) is a child and adolescent outpatient clinic which treats patients with autism, cerebral palsy, hearing and learning disabilities as well as hyperactive disorders**.** The facility provides examination rooms, an outdoor play area, doctor's offices, administration facilities and hosts the Maternal Adolescent and Child Health (MatCH) research and health systems unit**,** on the first floor of the building. The facility is located on the site of what was previously known as the Addington Children's Hospital which was the first hospital built for African children in the 1928. The facility has replaced the old outpatient's department and is the first of the buildings on the site to be completed and fully operational (KwaZulu-Natal Children's Hospital).

5.2.2 Symbiotic Architecture

As the patients treated at the KZNCH are patients who are autistic, have learning disabilities, cerebral palsy and have hyperactive disorders, their relationship to the physical environment is one of great import. The physical environment can impact the emotions and behaviour of patients by stimulating or calming them. The connection between the patients and the physical environment in this case, is one which has not been taken advantage of. The waiting area, as seen in Figure 38 is laid out with moveable chairs forming a square with a more or less empty, central space where child patients tend to play and run around in. The layout encourages patients to move about as there is not much else to do, thus contributing to patients being over-stimulated and hyperactive, with some patients often showing signs of aggression towards each other and their parents. Directly outside the waiting area is the outdoor play area, seen in Figure 38, which is clearly visible for parents to watch their children and is easily accessible. However, as it is a high-stimulus play area, some parents try and prevent children from going outside to play so that they are not hyperactive during their check-ups. This presents an issue as child patients then throw tantrums as they want to go outside to play. For patients with disabilities of these kinds, waiting and play areas should be lower-stimulus areas which work to calm patients down.

Since the interior of facility is low-scaled and not daunting in volume, there is a level of comfort provided to patients, where they seemed comfortable in going up to the nurses at the nurses' station, seen in Figure 39, and engaging with them. Having a supportive social environment is important as many patients are treated over a long period of time and being familiar and comfortable with staff aids in making visits to the outpatient facility less frightening.

Figure 38: Left - Showing waiting room and outdoor play area. (source: author)

Figure 39: Right - Showing comfortable ceiling heights and nurse's station (source: author)

5.2.3 Responsive Architecture

The facility is responsive to its patients through scale and proportion. The facility is a 2-storey building with comfortable ceiling heights. The waiting room includes child sized tables and chairs and the reception and nurse's stations, as seen in Figure 40, are designed so that children, wheelchair users and seated parents can communicate effectively with staff over the counter.

In some ways, the facility is unresponsive to its users as walls and ceilings, as seen in Figure 41, are generally bare and somewhat dreary, serving no comfort for patients, parents or staff. In certain areas, however, colour is brought in through the floor surface as seen in Figure 42.

Figure 42: Left - Showing design of reception desk. (source: author)

Figure 40: Middle - Showing bare and dreary finishes. (source: author)

Figure 41: Right - Showing an area with colourful floor surface. (source: author)

Additionally, staff spaces which include a staff break room, as seen in Figure 43, equipped with a kitchen, dining table and lockers comes across as dull and purely functional. There is also a staff foyer, seen in Figures 44 and 45, which holds a well-lit lounge which has art works and mosaic walls, pendant ceiling lights and colourful furniture and is the only space in the building which is eye-catching.

Figure 45: Left - Showing staff break room. (source: author)

Figure 44: Middle - Showing staff foyer (source: author)

Figure 43: Showing mosaic in staff foyer (source: author)

5.2.4 Generative Architecture

The exterior of the building and its context does not exude an atmosphere of healing. The concrete floor surrounding the building is harsh and is lacking in natural vegetation. The exterior of the building, made up of plaster and painted walls with steel screens and window frames as seen in Figure 46, is plain and does not reflect its function of a children's hospital. The entrance, as seen in Figure 46, is also not easily visible with one needing direction from the security guard to find it. Additionally, the children's play area, as seen in Figure 47, enclosed in a metal fence creates a harsh visual and does not provide a play area which invokes spirit of place. The interior of the building presents bare off-white walls, fluorescent lighting, and a cold waiting room. However, the waiting room is well lit with natural lighting, floors are easy to clean and as mentioned previously, certain floor areas bring in a bit of colour into the space. The facility comes across as a place where you go to for a purpose and then leave, with no opportunity to linger and with no focus placed on a sensory experience.

Figure 47: Showing exterior of the building and patient entrance which is difficult to notice. (source: author)

Figure 46: Showing exterior of the building and caged children's play area. (source: author)

5.2.5 Interviews

The following interviews were conducted with two healthcare professionals who work at the KwaZulu-Natal Children's Hospital (KZNCH). Both the healthcare professionals interviewed were qualified nurses with experience ranging from as little as two years to over 25 years of experience. Both nurses interviewed work with children and adolescents on a daily basis. Please refer to Appendix B for interview schedule.

What are your opinions on the spaces which the patients occupy, and do you think they are conducive to healing?

Participants felt that the environment was not bad as it was a new facility. However, it was expressed that spaces such as the waiting and examination rooms were too small and that more examination rooms were needed. As spaces such as the waiting room are too small, children running around create noise, thereby producing an environment not very conducive to healing.

Do you believe that the quality of space of a healthcare institute plays a role in aiding healing and well-being?

Nurses expressed that they believed that the quality of space of a healthcare facility plays a role in aiding healing and well-being. It was conveyed that medication can be administered but if it is done so in an unsanitary environment, healing will not take place.

Are there any spaces which stand out to you as spaces of quality and if so, why?

Participants felt that the facility was generally designed well but could not identify a specific space which stood out as a space of quality. It was conveyed that the facility was still developing so it was a work in progress.

What are your opinions on the spaces in which you work in, and do you think they are conducive to productivity?

Participants expressed that the facility was too small and needed more consulting rooms and an isolation room. Being short of these rooms made their jobs more difficult as they had to adjust spaces for functions which they were not originally intended.

Are there any spaces for healthcare professionals which stand out to you as a well-designed space and if so, why?

One participant expressed that the staff foyer with seating was well designed as it had colourful mosaics and artworks while the other participant could not think of any staff spaces which they felt were well designed.

How do you think these spaces, which patients and staff occupy, can or should be improved?

Nurses communicated that the waiting rooms could be improved by having comfortable couches instead of hard chairs, as well as by being designed to be more calming than inciting. It was also suggested that the facility be more appealing to children with more colours and wall murals. With regards to staff spaces, it was suggested that a separate kitchen be provided for parents so that they would not use the staff kitchen. It was also suggested that the break room have a lounge and that provisions be made for a change room so that staff could change their clothes when need be. This is needed as staff work with children and their clothes sometimes get messed.

What is the overall opinion of the building in which you work?

One participant stated that the facility was *okay* but too small, while the other said that she felt the building could be maintained better as the facility was built in 2013 but had cracking and peeling walls and other repairs which needed to be done.

5.2.6 Summary

The facility in general portrays an image of functionality, with its exterior and interior not reflecting the playfulness of its young patients. While the facility in certain aspects such as scale and proportion is responsive to its patients, it is unresponsive to other aspects such as the nature of the patients' disabilities, the need for appropriate recreational spaces and the need for well-designed social spaces for patients, staff and family interaction. Interviews with staff members shows that the staff have also noticed and identified that the facility is unresponsive to the needs of the patients and staff. Furthermore, staff have recognised a lack of space and underdeveloped patient and staff spaces as issues within the facility. Additionally, the fact that the compound is still being developed is seen by staff as a viable reason for the facility being *okay* and not optimally designed, despite staff not knowing whether future plans include an upgrade of the outpatient's clinic.

5.3 THE PRIVATE HOSPITAL

5.3.1 Motivation

The Private Hospital located in Durban, South Africa, is a 2-storey private hospital equipped with 200 beds, eight theatre facilities as well as a day clinic and a fully equipped radiography department. The design approach taken, was to create an environment of health and healing with focus placed on customer-centric design. The goal was to create a hospitable atmosphere rather than a hospital-like atmosphere.

5.3.2 Symbiotic Architecture

Great efforts were made to ensure that the patients' relationship with the physical, social and psychological environments were positive ones as the hospital was welcoming and not clinical. The double volume entrance foyer, presents a resort-like atmosphere through the use of stone cladded columns, warm toned interior finishes, natural lighting and indoor vegetation, as seen in Figure 48. Waiting areas, as seen in Figure 49, are intimate lounges of comfortable brown, leather couches situated around fire places, made cosier by ambient lighting throughout the space. Spaces are demarcated using ceramic floor tiles and the walls hold one's attention with botanical artwork and wood panelling. Wood finished pendant lights are hung from the double volume space drawing the eye up to the pitched skylight and clerestory windows which let in natural light, as seen in Figure 50. As the hospital is a general hospital and cannot respond to particular illnesses, the entrance foyer works in creating an environment which embraces a wide range of users. Additionally, the foyer serves as a social space with waiting areas placed centrally, allowing users to linger and engage with one another.

Figure 49: Showing foyer (source: the private facility)

Figure 48: Showing lounge area (source: the private facility)

Figure 50: Showing double-volume space (source: the private facility)

The connection between the staff and their environment is adequate and include staff break rooms, a staff canteen and staff smoking balcony. Breakrooms are well-lit and equipped with a kitchen and a dining space. Although there are no lounges, colourful furniture give character to the breakrooms. Apart from the smoking balcony, the staff do not have access to any outdoor space.

5.3.3 Responsive Architecture

Catering to its affluent community, the large foyer is luxurious and comfortable and promotes interaction and socializing in its design of seating areas as well as its café which is accessible from the foyer, as seen in Figure 51. The space is legible and easy to manoeuvre as the foyer serves as the centre of the facility which all wings are accessible from.

The facility is responsive to its community as many residents settled in the area due to the suburbs natural and scenic landscapes. Through the use of materials such as; stone, timber, ceramic, brick, and the incorporation of natural elements such as vegetation, natural lighting and a water fountain, The Private Hospital creates a place which is neither clinical nor cold, reflecting its surroundings, as seen in Figure 52, thereby creating an environment which users connect with.

Figure 51: Showing lounge space looking out to natural landscape (source: the private facility)

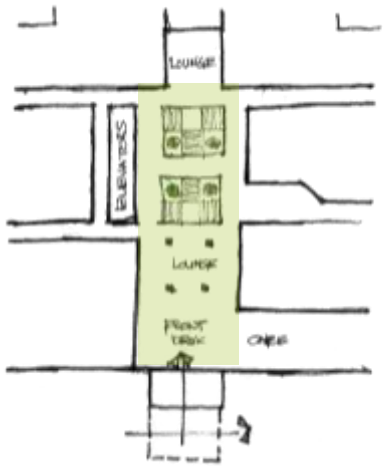

Figure 52: Showing layout of foyer and circulation. (source: author)

5.3.4 Generative Architecture

The exterior of the building, as seen in Figure 53, is plastered and painted with stone cladding and brick details, and timber screens. The exterior materials and entrance emphasized by a large porte cochère, further exude a resort-like atmosphere, changing the perception that healthcare facilities are clinical. Through materials, the use of indoor vegetation, good lighting and ventilation, a sense of place is created.

Figure 53: Showing exterior of building (source: author)

However, the atmosphere captured in the foyer of the building and circulation is not entirely captured throughout the facility, with medical and surgical wings coming across as more clinical. Efforts are however made to incorporate natural lighting in passages and pocket lounges/rest stops outside of wards are well placed. While some wards, such as the rehabilitation ward, are quite spacious and nurses' stations are ideally located in viewing distance of patients, other wards such as the medical ward are not optimally set out with rooms not being viewable from the nurse's station.

5.3.5 Interviews

The following interviews were conducted with two healthcare professionals who work at The Private Hospital. Both the healthcare professionals interviewed were qualified nurses with experience ranging from two years to five years of experience. Of the nurses interviewed, one nurse cared for children and adolescents while the other cared for patients of all ages. Please refer to Appendix B for interview schedule.

What are your opinions on the spaces which the patients occupy, and do you think they are conducive to healing?

Participants expressed that the spaces were generally well designed and were conducive to healing. However, it was felt that spaces between beds were too small, as patients bring in a lot of luggage and

belongings and keep it around the bed, thereby making it difficult for nurses to manoeuvre around beds to provide care to patients

Do you believe that the quality of space of a healthcare institute plays a role in aiding healing and well-being?

Both nurses expressed that they believed that the quality of space of a healthcare facility plays a role in aiding healing and well-being, with one nurse referring to the teachings of Florence Nightingale as discussed in Chapter 2.

Are there any spaces which stand out to you as spaces of quality and if so, why?

Spaces such as the resuscitation bay in the trauma unit, the mum's lounge for new mothers and the main foyer were identified as spaces of quality. The resuscitation bay was identified as a space of quality as it doesn't have a lot of cords, etc. and is easy to move around in, while the mum's lounge was selected as it was comfortable and calming.

What are your opinions on the spaces in which you work in, and do you think they are conducive to productivity?

Nurses articulated that they were *fine* with the spaces which they worked in and for that the number of staff members which they had, spaces were comfortable and not overcrowded. This refers to spaces such as the nurses' stations and break rooms.

Are there any spaces for healthcare professionals which stand out to you as a well-designed space and if so, why?

Participants stated that each ward having a staff break room was convenient and therefore was well designed in its context of the ward.

How do you think these spaces, which patients and staff occupy, can or should be improved?

It was expressed that the facility could be improved by providing storage lockers for patients to keep their belongings so that the belongings would not get in the way of staff and by providing a place to relax, possibly an outdoor or lounge space, to spend time in as constantly engaging with people all day long was tiring. Additionally, single patient rooms were suggested as it would provide a better experience for patients.

What is the overall opinion of the building in which you work?

One participant expressed that the facility was much better than any other healthcare facility he had worked at, while the other participant said that she thought the facility was *fantastic* as it was much better than anywhere else she had worked as it was clean and not overcrowded, despite any minor shortcomings.

5.3.6 Summary

As it intends to, The Private Hospital presents an atmosphere which is hospitable rather than one which is sterile and uncomfortable. Through the use of materials, natural and man-made lighting, ventilation, the incorporation of vegetation in interior spaces and proper way-finding a welcoming and healing environment is created. Additionally, like the Ballarat Community Health Primary Care Centre discussed in Chapter 4, the facility uses nature and spaces of socializing to connect to its diverse range of users. From the interviews discussed above, it is evident that healthcare professionals who participated in the study enjoy working in their environments and have not identified many issues apart from a lack of storage, the need for a staff lounge space and access to an outdoor space.

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5.4 CONCLUSION

Chapter 5 has provided a look at two facilities in Durban which present very different healthcare environment. It is evident that healthcare architecture which takes into consideration the physical, social and psychological environments of its users, presents itself as an environment of healing. Architecture which overlooks the needs of its users, creates an environment which the user is disconnected from and which loses its power to positively affect users.

While the KZNCH did not put forth many solutions to the needs of adolescents, what was overlooked stood out as a lesson to be learnt. The value of responsive architecture was seen through the facilities unresponsiveness to its patient's conditions, creating a waiting room environment which prompted hyperactivity, rather than presenting a therapeutic and calming environment. The result of unresponsiveness is seen directly in the patients' hyperactive and at times aggressive behaviour. The KZNCH can be compared to the Trillium Secure Adolescent Inpatient Facility (TSAIF), discussed in Chapter 4, whose patients also present similar disorders. However, whereas the designers of TSAIF consulted with healthcare professionals and adolescents to achieve an environment which responded not only to the patients' and staff but to their disabilities as well, the KZNCH has not.

Additionally, although The Private Hospital is not a facility solely focused on adolescents, its design which emphasizes the creation of place provides valuable insight into creating a warm and welcoming atmosphere in a healthcare setting. Much like the Ballarat Community Health Primary Care Centre discussed in Chapter 4, The Private Hospital has focused on creating an environment which a diverse user group would feel welcomed and comfortable in. Both facilities have focused on inclusion and social interaction in the design of their foyer and circulation spaces, an aspect which is relevant to the adolescents' need for interaction. Furthermore, these facilities prove that aspects such as proper lighting and ventilation, natural materials, sensory experiences through material and nature, discussed in the literature do create positive user experiences.

Chapter 6 which follows will give further insight into the perspective of other key players of the healthcare environment; designers of healthcare environments and patients of healthcare environments.

CHAPTER 6 | RESEARCH FINDINGS

6.1 INTRODUCTION

After having referred to secondary sources of information as well as having analysed precedents, case studies and interviews, primary interviews were conducted with those who could provide information relating to the design of and the experience of being in healthcare facilities. Interview schedules were carried out across three categories. These are; built environment professionals who have designed healthcare facilities, young adults who have required medical attention during their adolescent years and adolescents who have stayed overnight at a healthcare facility. The aim is to understand different viewpoints and experiences with regards to the healthcare environment, in order to identify problem areas as well as to identify aspects which function successfully in order to answer the research questions put forth in Chapter 1.

6.2 FINDINGS

6.2.1 Evaluation of Built Environment Professionals Interviews

The following analysis and discussion are based on an interview conducted with an architect who has over 15 years of experience and who has contributed to the design of many healthcare facilities. Two built environment professionals were originally intended to be interviewed but due to unforeseen circumstances only one complete interview was completed. The architect interviewed contributed to the design of the Nelson Mandela Children's Hospital, a precedent analysed in Chapter 4.

Please refer to Appendix A for interview schedule.

Provide a brief background on the project.

I.e. General client request, concepts, themes, theories important to the project, etc.

The client requested a facility which could be compared to international facilities but which was still authentic to South African culture and relatable to South Africans. A theme for the project was the connection to natural elements such as the sky, the earth and nature. This led to the use of blues, yellows and greens in the facility as representatives of these natural elements. Another theme was South African culture and its connection to storytelling. Using African stories as wall murals as well as creating a diverse range of characters to serves as positive distraction for young patients, the facility was given an identity with the characters creating becoming part of the logo of the facility.

Were there any innovative design solutions geared towards meeting patients' physical, psychological or social needs, in order to provide a pleasant user experience?

If so, please expand.

The design of the facility was one which involved the users of the facility in the process of design. Design workshops were held where children were given the theme of sky, earth and nature and were asked to draw what came to mind. The drawings done were used as art works in the facility and served as inspiration for designers in the implementation of the theme.

The physical needs of the child patient were met through small but important details such as lowered handles, smaller and safer bath tubs, lower sinks and the likes, which made manoeuvring through the space easier for patients.

The psychological needs of the patient were met through indoor and outdoor play areas provided as well as space for children to partake in arts and crafts and to do their homework.

Do you think architectural design plays a vital role in aiding healing processes and providing positive user-experiences?

If so, please expand.

The interviewee responded in the affirmative, expressing that cold or busy environments didn't give one peace of mind, comfort or the stability needed to heal. Environments should therefore be softened to creating relaxing spaces where healing can take place. The importance of colour was expressed as colours can contribute to the atmosphere of the environment. That is, colours chosen in healthcare environments should not be too bright or too dull but should strike a gentle balance.

Do you have any advice for the researcher on designing a healthcare facility for adolescents?

The interviewee's primary advice was to *research, research and research.* It was conveyed that healthcare environments are ever changing with new technological advancements and so researching and being aware of change would allow for one to design a facility which was not outdated. Additionally, it was stated that great importance lies in understanding the use of the spaces one is designing for as well as understanding the user one is designing for.

It can be surmised from the results of the interview discussed above, that practicing architects involved in the design of healthcare environments see the value in engaging with the users of facilities to ensure that the design produced is one which meets not only their physical needs but also their psychological needs. Additionally, connecting to the community one is designing for as well as the importance of research has been brought to the forefront.

6.2.2 Evaluation of Young Adult and Adolescent Interviews

The following analysis and discussion are based on interview schedules filled by four young adults ranging between the ages of 20 and 24 who required medical attention at a healthcare facility during their adolescent years and four adolescents ranging between the ages of 10 and 17 who have either had to stay overnight at a healthcare facility or who have frequented a healthcare institute during their adolescence. The young adult interviews comprise of four parts, while the adolescent interviews comprise of five parts. Parts 1 to 3 are standard questions, part 4 provides different design options for participants to choose from through the use of images and part 5 allows for adolescents to illustrate a space which they think is healing. Participants have been given pseudonyms, to easily differentiate between participants while still maintaining their anonymity. Young adult participants have been named as follows; Sophie, John, Ross and Becca, while adolescent patients have been named as; Josh, Gabby, Mary and Emma. Please refer to Appendix C for interview schedule.

PART 2

Have you ever stayed overnight at a healthcare facility? (If yes, please answer the following questions.)

Young Adults: All participants have stayed overnight at a healthcare facility.

Adolescents: All adolescents have stayed overnight at a healthcare facility.

Did you feel safe during your stay at the healthcare facility?

Young Adults: All participants generally felt safe during their stay at the healthcare facility.

Adolescents: All participants generally felt safe during their stay at the healthcare facility.

Did you feel as if you had privacy?

Young Adults: Of the participants, Ross felt as if he had privacy while Sophie, John and Becca felt that they did not always have privacy.

Adolescents: A mixed response was given as Emma and Josh, felt as if they did have privacy while Gabby and Mary felt as if they didn't.

Did you feel like the ward/communal spaces were sometimes over-crowded?

Young Adults: Ross and John did not feel like the ward was over-crowded while Becca and Sophie did.

Adolescents: Participants with the exception of Gabby felt as if the facility was not overcrowded.

Did you have a window in your ward that you could see out of?

Young Adults: None of the participants had windows that they could see out of from their beds.

Adolescents: Josh and Mary stated that they did have windows which they could see out of while Gabby and Emma did not.

If so did your window have a pleasant view?

Young Adults: N/A

Adolescents: Participants who could see out of a window stated that their views were not particularly pleasant.

Did you have access to a garden from the inside space?

Young Adults: None of the participants had access to any outdoor space.

Adolescents: None of the participants had access to any outdoor space.

PART 3

What did you think of the physical environment which you were in? Did you feel comfortable/at ease?

Young Adults: Ross did not feel comfortable as he felt trapped inside as there was no connection to nature and due to artificial lighting and mechanical ventilation, felt as if he could not tell what time of day it was. Becca did not feel comfortable as she felt that she had little privacy as she was often disturbed by other patients' visitors since the proximity between patients' beds were very close. John stated that the environment made him feel cold and depressed and Sophie expressed that the environment was cramped and dim.

Adolescents: Participants felt like the physical environment was generally comfortable however Emma commented that the environment felt impersonal and Gabby expressed that at times she felt uncomfortable due to the lack of privacy.

Was there anything about the spaces provided in the facility which you liked? What were they?

Young Adults: Ross liked that it was easy to orientate himself upon entering the building and felt that the foyer was pleasant as it combined the reception, pharmacy, eating and waiting places in one. Becca and John enjoyed having a television above their beds to keep them occupied and Sophie thought the entrance hall was open and bright but didn't really see much of the facility apart from her room which was not like the bright and open entrance hall.

Adolescents: Josh liked the play area in the facility, Gabby liked having her own television above her bed so that she wasn't bored, Mary liked that the facility was clean and that her bed had a curtain as well as a cupboard for her belongings, while Emma appreciated the calming colours which the facility was painted in.

Was there anything about the spaces provided in the facility which you disliked? What were they?

Young Adults: Ross disliked that part of his physiotherapy included walking around public spaces like the waiting room and stairwell and wished that it could have been conducted in a more private space. Becca disliked that the facility was very dull, small and overcrowded and that the bathrooms were badly designed and difficult to manoeuvre in when one had an IV attached to oneself. She also felt that the spacing between beds was too small, the walls and furniture were colourless and dull, that the artificial lighting was harsh, that there was a lack of entertainment for patients and that the facility could've done with a garden for patients to dwell or walk in. John also disliked the dull, artificial lighting. Sophie disliked that the passages were clinical, stark and smelled strange.

Adolescents: Josh disliked that there was no access to an outdoor play area, Gabby disliked that the ward felt cramped when other patients had visitors, Mary couldn't identify anything which she disliked and Emma disliked that people walking past her room could see her.

How do you think the spaces which you occupied in the facility could be improved?

Young Adults: Ross wished that patients could access the outdoors and suggested the more vibrant colours and materials be used to soften the otherwise dreary aesthetic the facility presented. Like Ross, Becca, John and Sophie suggested that the facility could be improved by using colour to uplift the environment and through the incorporation of nature and natural lighting. Becca also suggested increasing the proximity between the beds as well as partitions of some sort in communal wards to allow for a semblance of privacy.

Adolescents: Gabby suggested that spaces between patients' beds be increased, bathrooms be designed so that they are closer to the ward, and that having a window would be *nice*. Mary suggested that the facility could be improved with more vibrant colours and a more comfortable bed and Emma suggested that the facility changed its looks so that it would not come across as clinical or impersonal. Josh could not think of anything which could be improved.

Are there any spaces/provisions you wish the facility had?

Young Adults: Ross suggested that the facility had gardens, courtyards and outdoor seating spaces for patients. Becca wished for a space which catered for social interaction, while John wished the facility had a shower for each room so that many patients did not have to share one bathroom. Sophie stated she would have liked the facility to have more spaces of activity, even if it was a garden or even a space where one could use free Wi-Fi.

Adolescents: Josh could not think of spaces he wished the facility would have while Gabby suggested a bookshelf with books to help pass the time as well as access to the outdoors to get some fresh air. Mary suggested a space where patients could socialize with each other and which presented activities for patients to engage in. Emma expressed that she wished the cupboards in the wards were closer to the patients' bed so that one could reach it easily.

From Parts 2 and 3 it can be deduced that the young adult and adolescent participants place value in healthcare environments which provide a connection, access and view of nature, spaces for interaction and entertainment, opportunity to personalise space so that it does not come across as impersonal, privacy in spaces such as patient rooms and during treatment such as physiotherapy as well as an environment which is colourful and bright with natural light.

PART 4

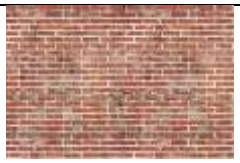
Room Design: The following room design was one which 5 out of 8 participants chose for its use of subtle colours, large windows and for the design of the built-in desk and seat.

Figure 54: Patient room design (source: C.F.Møller Architects)

Patient Lounge: The following patient lounge was one which 6 out of 8 participants chose for its use of colour, its *homey* feeling, its natural lighting and its comfortable seating which would allow patients to either sit by themselves or with others as well as would allow for patients to either sit or recline depending on their illness/disability.

Figure 55: Patient lounge design (source: PBTeen)

Material Palette: The materials below have been numbered according to the participants' preference with 1 being what participants preferred the most.

1		Wood
2		Wall Mural
3		Stone
4		Concrete
5		Brick
6		Steel sheeting
7		Black Brick
8		Rammed Earth

Furniture and Interior Colour Palette: The colours below have been numbered according to the participants' preference with 1 being what participants preferred the most.

1		Green
2		Blue
3		Orange
4		Grey
5		Yellow

Sporting Activities: The sporting activities below have been numbered according to the participants' preference with 1 being what participants preferred the most.

1	Swimming Pool
2	Mini Soccer Field
3	Netball Court/Volleyball Court
4	Cricket Pitch

Recreational Therapy Activities: The recreational therapy activities below have been numbered according to the participants' preference with 1 being what participants preferred the most.

1	Art Classes (Painting and drawing)
2	Relaxing exercise classes: Tai Chi, Yoga, etc.
3	Cat Cafe
4	Gardening
5	Dog Cafe
6	DIY Furniture/Crafts
7	Ceramics/Pottery Classes
8	Dance Classes/Facilities

PART 5

The following illustrations were done by adolescent patients Josh, Gabby, Mary and Emma.

Figure 56: Drawn by participant Josh

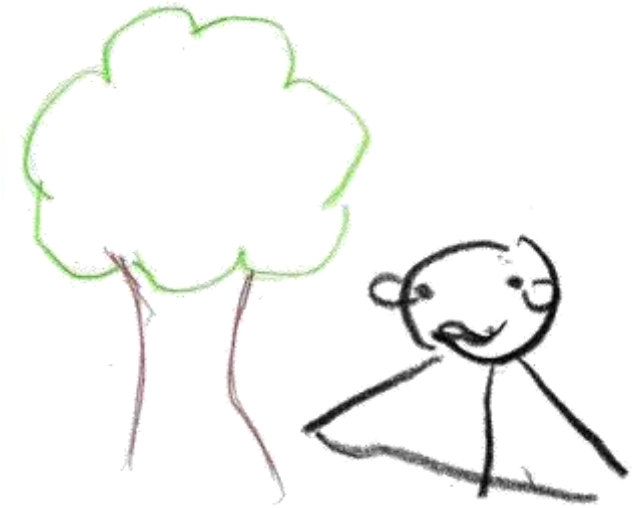


Figure 57: Drawn by participant Gabby

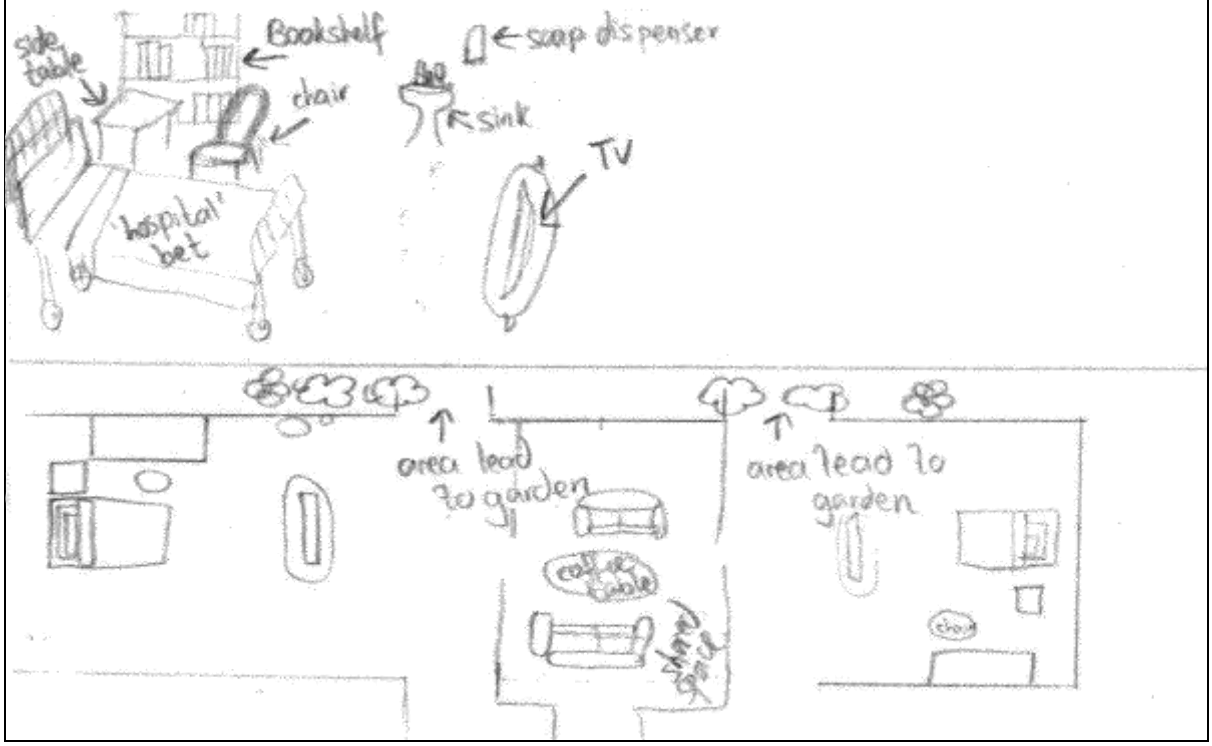
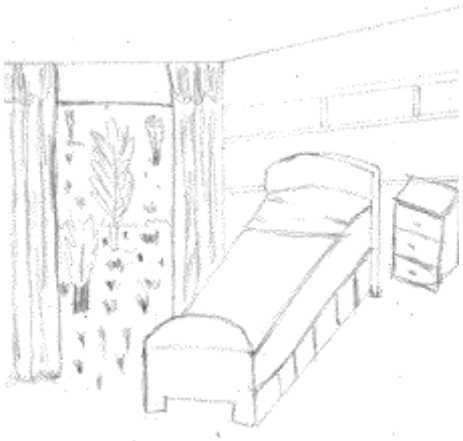


Figure 58: Drawn by participant Mary

Figure 59: Drawn by participant Emma



From the above illustrations, it can be deduced that the adolescent participants imagine healthcare environments to include the following aspects: a connection, access and view of nature, spaces for patients to interact with each other in the form of lounge spaces and the provision of space for entertainment for activities such as arts and crafts, dance and reading.

6.3 DISCUSSION AND THEORETICAL IMPLICATIONS

Throughout the research, the sub-concepts of symbiotic architecture, responsive architecture and generative architecture, under the umbrella of the over-arching concept of healing architecture, has been discussed. These concepts were used to link the theoretical framework to the literature, the literature to the precedents and case studies and the case studies to the findings.

This section will therefore, discuss findings from the young adult and adolescent interviews under these sub-concepts. Since the participants were at different healthcare facilities, the discussion should therefore be viewed as a general view of hospitals in Durban.

6.3.1 Symbiotic Architecture

It can be gathered from the response during the interviews that the adolescents who participated in the study did not have positive relationships with their physical, social or personal environments. The physical environment, induced feelings of being trapped due to a lack of connection to diurnal and nocturnal rhythms, feelings of being cold and depressed due to the dull and lifeless environment and feelings of being cramped and uncomfortable, due to confined spaces and a lack of privacy. The social environment was one which was not cultivated in the least as participants expressed being bored or wanting a space to socialize with others. Additionally, as public hospitals in Durban have general wards, some patients would not have been in the same wards as other patient who were their age. Furthermore, as participants expressed that the spaces between the beds in the wards was too small, it can be assumed that the environment was not one which accommodated well for the interaction between patients and their visitors, as there would not be space for a couch for a parent or guardian to spend the night if need be. Lastly, due to physical environment, the participants connection to their personal environments were not nurtured, as generally the environment did not make the participants feel relaxed or put their minds at ease.

6.3.2 Responsive Architecture

From the discussion above it can established that the relationship between the adolescent and existing healthcare environments was not a positive one as the environment ignored the physical, social and personal needs of the adolescence. The physical environment attributes such as artificial lighting, dreary colours, unpleasant smells and over-crowding, can be referred to as ambient stressors, which can create feelings of frustration, anger and the inability to relax (Bell, Greene, Fisher and Baum, 1978). Other aspects such as a lack of; privacy, access to the outdoors and space for social interaction and impersonal spaces create an environment where the adolescent patient is uncomfortable and anxious and thus unable to fully focus on healing (Day, 2002).

Aspects which did meet the needs of the adolescents include, proper way-finding, televisions above beds as a means of entertainment, curtains for privacy, cupboards for storage of personal belongings and certain spaces which were bright, and calming.

6.3.3 Generative Architecture

After having analysed the relationship between participants' and their environments and considering how unresponsiveness to the needs of the patient can have psychological effects, the environment collectively should be looked at. This would be to consider the sensory design of the facility, the materiality and the movement through space. However, participants have not made much mention of these aspects. In terms of sensory design, only negative elements were described such as the environment making the participant feel *cold*. While a participant mentioned that they liked that the building was easy to navigate, thus describing movement through the building. It can be deduced however, through descriptions of dreary and clinical environments and a lack of indoor vegetation and a connection to the outdoors that a positive sensory experience was not a priority in these healthcare environments.

6.4 CONCLUSION

Through the analysis and discussion of interview response from built environment professionals, healthcare professionals, young adults and adolescents, it can be gathered that all healthcare environments need to be more than just utilitarian environments where one receives treatment to symptoms of illness but rather, healthcare environments should be responsive to the needs of patients, their families and friends and the staff so that environments become health-giving (Day, 2002;182). It can also be deduced that adolescent healthcare environments are ones where the social and psychological environments are particularly important as adolescents depend heavily on social interaction as well as yearn for independence, the ability to move around and to not be confined to one space. Privacy and its role in creating an environment which made one feel comfortable also came to the forefront as well as the need for entertainment, with suggestions ranging from sedentary activities, like a Wi-Fi-lounge to more athletic and vigorous activities, such as dance classes, to keep boredom at bay thereby providing a more pleasant experience. A strong desire for colourful and lively environments were expressed, from the perspective of both patient and staff, displaying a need for environments which are therapeutic and supportive. Similarly, a need for a connection with nature and the outdoors through larger windows, windows with pleasant views and access to the outdoors was expressed, indicating a further need for calming and therapeutic environments. To conclude, the findings indicate what factors in the healthcare environment are valuable to the adolescent patient, thus specifying how architecture can be responsive to the adolescent patient in order to address adolescent healthcare environments.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The study which has been conducted through the means of primary and secondary sources has been carried out with the aim of addressing the problem statement at hand which states that:

Using responsive design, architecture can be used as a tool to create healthcare environments which promote healing. However, many of Durban's healthcare facilities focus on the functional requirements of the building, over-looking the needs and concerns of the patient. While this is of concern to all patients, it is particularly prevalent to adolescents, who have needs which are specific to their stage of development; and are often differently focused to that of child or adult patients. Not only are there a lack of facilities geared towards adolescent health in Durban, but facilities which do aim to address this important transitional stage of development often fail to provide environments tailored to the specific needs of adolescent patients, resulting in healthcare environments which do not optimally promote healing.

The problem statement has been addressed with the purpose of coming to conclusions and recommendations which realise the aim of the study which was to explore how responsive architecture can address adolescent healthcare environments to produce environments of healing and holistic wellbeing for the adolescent patient.

The following conclusions and recommendations will therefore extract and highlight design guidelines from the preceding research towards the design of a healthcare facility geared towards adolescents.

7.2 CONCLUSIONS

The research has established that architecture which is responsive is vital in creating healthcare environments which are relevant to its users. Through studying the needs of the adolescent patient and the response to these needs, the link between architecture and healing has been better understood.

The theoretical framework has been framed around the needs of the adolescent patient which research suggests, are primarily social and psychological. Socio-developmental theories have been used to better understand adolescence as a transitional period during which adolescents are fraught with many insecurities. Bronfenbrenner's (2009) ecology of human development theory illustrates the connections between the adolescent and his/her inner and outer environments/systems and the ripple effects which these have on the adolescent.

Erikson's (1994) psychosocial development theory expands on the period of adolescence and the importance of development during this stage as well as the crises and insecurities of the adolescent in having to fit themselves into society. Environmental psychology theories have been studied to stress and further uncover the effects which the environment has one one's psyche and in turn one's healing processes. This is relevant to the adolescent patient whose issues and concerns as discussed in the socio-developmental theories are not only social, but psychological too. Knowing how the environment can improve not only physical but mental health is therefore of great import. And lastly, place theories have been explored which focuses on the importance of spirit of place and sensory design, in presenting positive experiences through healthcare environments as well as showing how the environment can play a role in calming down the adolescents' physiological responses to strong emotions felt during adolescence.

The literature has been discussed through the lens of the sub-concepts of symbiotic architecture, responsive architecture and generative architecture, all of which fall under the overall concept of healing. Using these concepts, the literature has been connected to the theoretical framework as well as to the precedent and case studies. The literature has focused in detail on the built, spatial, social and personal environments of the adolescent as well as the relationship between healthcare staff and their environments. Thereafter environmental aspects which contribute to creating healing environments have been discussed with focus placed on the adolescent patient. These include aspects such as colour, materials, lighting, ventilation, social spaces and private spaces. And lastly, a sense of place, the importance of materiality and balance have been discussed towards realising an environment which heals the mind, body and soul.

The precedents discussed demonstrates how responsivity creates environments of holistic wellbeing, while the case studies present two environments which are different from each other, providing valuable insight into design characteristics which work and which don't work in achieving healing healthcare environments.

And lastly, interviews carried out with built environments professionals, healthcare professionals, young adults and adolescents provides a look into different perspectives of the healthcare environment; that of the designer, the administrator and the user of the healthcare environment. Through field research, points discussed in the theoretical framework, literature, precedent and case studies were confirmed and additional details were made apparent.

In conclusion, the research, analysis and discussion have further emphasized the importance of responsive architecture as well as presenting the need for healthcare facilities geared towards adolescents and youth, designed around prevention, maintenance and treatment so that holistic wellbeing can be achieved and so that adolescents are able to develop and grow into adults who are physically, spiritually and mentally healthy.

7.3 DESIGN RECOMMENDATIONS

The following design recommendations have been deduced from the preceding theoretical framework, literature, precedents, case studies and field research, towards the design of healthcare environments for adolescents. It is important to note that the recommendations given are general recommendations and are not specific to a certain type of illness, condition or disability and therefore, if utilised should be viewed case specifically.

- Patient-Centred Design Approach: the physical, social and psychological needs of the patient should me met in order to provide an environment which is responsive, relevant and healing. These needs should be considered during the design process of a facility but also while the facility is running. As society changes and develops, the needs of adolescents change and facilities should therefore be able to accommodate changing needs. For example, in the age of technology an important part of an adolescent's life is access to computers, cell phones and the internet.
- Community focused: the facility should connect to and include the community in its design to root the facility in its context and to strengthen community engagement and acceptance. Additionally, it will create an environment where adolescent patients feel comfortable and welcome in and will prompt friends and family of patients to provide social support systems if they feel welcome and involved too. This can be done so through the provision of a community hall, internet and resources facilities, cafes, outdoor public space or even a community healthcare component.
- Education and prevention: Facilities should seek to not only provide treatment but also work to educate communities and adolescents on health risks in order to prevent illnesses from being contracted in the first place. The facility should therefore provide seminar and workshop spaces. These spaces can also be used to develop skills such as holding CPR courses, etc.
- Health maintenance: Facilities should invest in spaces which maintain the health of adolescents such as sporting facilities, gardens, gyms and other recreational therapy facilities such as art classes, dance classes, music therapy, etc.
- Strengthen social support systems: Facilities should include lodgings for family and friends who will be visiting or bringing patients in from great distances. This will make family and friends feel welcome and reduce stress and anxiety in the process of a child/friend being checked in. From the patient's perspective, having loved ones nearby will provide a sense of comfort and support. In some cases, family will need to be part of the treatment such as family therapy and will need to be close by to partake in the treatment.

- Social and recreation provisions: To respond to the adolescent patients' need for interaction and recreation the following spaces can be provided – a patient lounge where patient can interact with each other, their families and staff, a games room, library, activity room, sporting facilities, workshop spaces and shared patient rooms.
- Allow for privacy: The facility should provide spaces of different levels of interaction and privacy. In social and public spaces such as the patient lounge, there should be spaces of respite such as nooks or window seats. These should not however be spaces of isolation. Patient rooms should have space for privacy such as a bench or desk in an alcove as well as its own bathroom and a shower curtain.
- Allow for personalisation: Patient rooms should allow for patients to personalise their environment with shelves which they can fill. Patients should also be allowed to bring in their own linen if they desire. Personalisation or ownership can also be provided through select art/mural walls which patients can draw or doodle on.
- Aesthetics, Environment and Furnishings: Facilities should be colourful, well-lit with natural lighting and should utilise tactile materials and textiles. In spaces which require patients to be calm and relaxed, calming blues and greens can be used while spaces such as communal spaces can be more vibrant in colour. Art should also be utilised to provide visual interest and character. Colour and character can also be expressed with choice furniture to present a youthful environment.
- Connection to nature: Nature can be used to reduce stress and anxiety, provide positive distractions, purify air and to serve as a way-finding indicator. This can be done by incorporating vegetation indoors, having large windows where appropriate to create a visual connection to nature and to provide garden spaces where patients, staff and family can relax in, play in and meditate in.
- Staff considerations: Staff spaces should also be considered so that staff are well rested and therefore are able to provide high quality care. This includes comfortable staff lounges with couches, access to the outdoors, staff accommodation and rest rooms and favourable environmental conditions such as natural lighting and ventilation.
- Site considerations: A site chosen for a facility involving adolescents should be near senior primary and high schools as well as near public spaces which adolescents frequent. Additionally, it should be in walking radius of public transport nodes so that it is easily accessible to adolescents who do not live or school in the area. The site should allow for the incorporation of garden spaces and depending on its function, should be close to general hospitals in case of emergency. If the facility has sporting facilities it could be in a sporting district and can provide a facility which is missing in the area or it can be located in an area which is not a sporting district but which needs sporting facilities.

7.4 CONCLUSION

The above recommendations, as deduced from the research, are design guidelines towards the design of a healing healthcare environment for adolescents, and should be considered with one's own context, constraints and research findings in mind. To conclude, four major themes can be identified in the research. These are:

- The importance of creating opportunities for social interaction between the patient and their family, friends, staff and other patients.
- The need for privacy, independence and a sense of belonging, in the healthcare environment.
- The need for and benefits of recreational activities which aid physical, psychological, social and cognitive development.
- The adolescents' affinity to nature and need to be able to access and connect to nature, to maintain and improve mental health.

While recommendations have been made towards the design of a youth and community health centre, it is vital to consider how these guidelines can be used in existing healthcare environments. The specific needs for the adolescent justifies the need for a specific adolescent ward in hospitals, so that patients are provided with privacy, independence, freedom of movement within the ward and space for interaction with peers, family and staff. The implementation of adolescent specific wards grants the opportunity for the themes outlined above to be interpreted into the confines of existing healthcare environments. This could be done by providing lounge spaces as areas for interaction and for the facilitation of recreation, the incorporation of indoor vegetation into these spaces and through the provisions of a quality environment considering environmental aspects discussed in Chapter 3.3. Furthermore, the framework developed from the research has been done from an architectural perspective. Further research could be carried out from a medical perspective to study the medical impacts of responsive architecture with respect to the four themes mentioned above.

BIBLIOGRAPHY

ACADEMIC PAPERS

- Abrahamson, D., 2017. The SAGE Encyclopaedia of Out-of-School Learning.
- Dayzie,R., 2016. *Erik Erikson's Eight-Stage Theory on Psychosocial Development*. Penn State University.
- Lundin, S., 2015. Healing architecture: Evidence, intuition, dialogue.
- McLeod, S., 2013. Erik Erikson. *Retrieved August*, *9*, p.2013.
- Relph, E. (1976). Place and placelessness. London: Pion.
- Ryan, D.P.J., 2001. Bronfenbrenner's ecological systems theory. *Retrieved January*, *9*, p.2012.
- Tully, K., 2014. Optimal Healing Environments: A Key Component of Your Personal Resiliency Plan

BOOKS

- Bell, P.A., Greene, T.C., Fisher, J.D. and Baum, A. (1978) *Environmental psychology*. 4th Edition. Harcourt.
- Berk, L.E., 2000. Child development.
- Chrysikou, E., 2014. *Architecture for psychiatric environments and therapeutic spaces*. Ios Press.
- Cooper, C.L., Goswami, U. and Sahakian, B.J., (2009). *Mental capital and wellbeing*. John Wiley & Sons.
- Day, C., 2002. *Spirit & place: healing our environment, healing environment*. Routledge.
- Erikson, E.H., 1994. *Identity and the life cycle*. WW Norton & Company.
- Hart, R. and Rollins, J., 2011. *Therapeutic activities for children and teens coping with health issues*. John Wiley & Sons.

- National Academies of Sciences, Engineering, and Medicine, 2016. *Preventing bullying through science, policy, and practice*. National Academies Press.
- Norberg-Schulz, C., (1980). *Genius loci: Towards a phenomenology of architecture*. Rizzoli.
- Pallasmaa, J., 2012. *The eyes of the skin: architecture and the senses*. John Wiley & Sons
- Rapoport, A. (1990). The meaning of the built environment: a nonverbal communication approach: The University of Arizona Press, Tucson.
- Schonberg, H.C., 1985. *Facing the music*. Summit Books.
- Wilson, E.O., 1984. Biophilia. Harvard. *Press, Cambridge (Mass.)*.

CONFERENCE PAPERS

- Gamache-OLeary, V. and Grant, G., 2017, January. Social media in healthcare. In *Proceedings of the 50th Hawaii International Conference on System Sciences*.
- Krishnan, V., 2010, May. Early child development: A conceptual model. In *Early Childhood Council Annual Conference, Christchurch, New Zealand*.
- Ulrich, R.S., 2001. Effects of healthcare environmental design on medical outcomes. In *Design and Health: Proceedings of the Second International Conference on Health and Design. Stockholm, Sweden: Svensk Byggtjanst* (pp. 49-59).

GOVERNMENT AND ORGANIZATION PUBLICATIONS

- The National Department of Health (2010/11) *Youth and Adolescent Health Programme*
- World Health Organization, (2013). Adolescent health. *Geneva: World Health Organization*.
- World Health Organization, 2012. Making health services adolescent friendly: Developing national quality standards for adolescent friendly health services.

JOURNALS

- Arnett, J.J., (2007). Emerging adulthood: What is it, and what is it good for? *Child development perspectives*, *1*(2), pp.68-73.
- Awalkhan, A., 2016. Application of Nightingale Nursing Theory to the Care of Patient with Colostomy. *European Journal of Clinical and Biomedical Sciences*, *2*(6), pp.97-101
- Berman, M.G., Jonides, J. and Kaplan, S., 2008. The cognitive benefits of interacting with nature. *Psychological science*, *19*(12), pp.1207-1212.
- Blumberg, R. and Devlin, A.S., 2006. Design issues in hospitals: The adolescent client. *Environment and Behavior*, *38*(3), pp.293-317.
- Christie, D. and Viner, R., (2005). ABC of adolescence: Adolescent development. *BMJ: British Medical Journal*, *330*(7486), p.301.
- Dahl. R, Thomas. D, Holmes. S. 2013. *Child-Adolescent Mental Health: Using Sensory Environments to Help Patients Discover a New Reality*
- Derksen, T., 2010. The influence of ecological theory in child and youth care: A review of the literature. *International Journal of Child, Youth & Family Studies*, *1*(3/4), p.326.
- Dick, B. and Ferguson, B.J., 2015. Health for the world's adolescents: a second chance in the second decade. *Journal of Adolescent Health*, *56*(1), pp.3-6.
- Holick, M.F., 2008. Vitamin D and sunlight: strategies for cancer prevention and other health benefits. *Clinical Journal of the American Society of Nephrology*, *3*(5), pp.1548-1554.
- Huisman, E.R.C.M., Morales, E., Van Hoof, J. and Kort, H.S.M., 2012. Healing environment: A review of the impact of physical environmental factors on users. *Building and environment*, *58*, pp.70-80.
- Hutton, A., 2002. The private adolescent: privacy needs of adolescents in hospitals. *Journal of pediatric nursing*, *17*(1), pp.67-72
- Hutton, A., 2003. Activities in the adolescent ward environment. *Contemporary nurse*, *14*(3), pp.312-319.
- Hutton, A., 2005. Consumer perspectives in adolescent ward design. *Journal of Clinical Nursing*, *14*(5), pp.537-545.

- Hutton, A., 2010. How adolescent patients use ward space. *Journal of advanced nursing*, *66*(8), pp.1802-1809.
- Kaplan, S. and Peterson, C., 1993. Health and environment: A psychological analysis. *Landscape and Urban Planning*, *26*(1-4), pp.17-23.
- Kaplan, S., 1995. The restorative benefits of nature: Toward an integrative framework. *Journal of environmental psychology*, *15*(3), pp.169-182.
- Larson, R. and Wilson, S., (2004). Adolescence across place and time. *Globalization and the changing pathways to adulthood. În R. M. Lerner, L. Steinberg (Editors). Handbook of Adolescent Psychology*, pp.299-330.
- MacAllister, L., Bellanti, D. and Sakallaris, B.R., 2016. Exploring Inpatients' Experiences of Healing and Healing Spaces: A Mixed Methods Study. *Journal of patient experience*, *3*(4), pp.119-130.
- Mazuch, R. and Stephen, R., 2005. Creating healing environments: Humanistic architecture and therapeutic design. *Journal of Public Mental Health*, *4*(4), pp.48-52.
- Mead, M.N., 2008. Benefits of sunlight: a bright spot for human health. *Environmental health perspectives*, *116*(4), p.A160.
- Medeiros, A.B.D.A., Enders, B.C. and Lira, A.L.B.D.C., (2015). The Florence nightingale's environmental theory: A Critical Analysis. *Escola Anna Nery*, *19*(3), pp.518-524.
- Najafi, M. and Shariff, M.K.B.M., 2011. The concept of place and sense of place in architectural studies. *International Journal of Human and Social Sciences*, *6*(3), pp.187-193.
- Sime, J. D. (1986). Creating places or designing spaces? Journal of Environmental Psychology, 6, 49-63.
- Smith, J., 2007. Health and nature: The influence of nature on design of the environment of care. *The Center for Health Design*, pp.1-19.
- Steinberg, L. and Morris, A.S., (2001). Adolescent development. *Annual review of psychology*, *52*(1), pp.83-110.
- Ulrich, R.S., 1984. *View through a window may influence recovery from surgery*. Science, 224(4647), pp.420-421.
- Ulrich, R.S., 1991. Effects of interior design on wellness: Theory and recent scientific research. *Journal of health care interior design*, *3*(1), pp.97-109.

- Ulrich, R.S., 2006. Essay: Evidence-based health-care architecture. *The Lancet*, *368*, pp.S38-S39.
- Woo, J.C. and Lin, Y.L., 2016. Kids' Perceptions toward Children's Ward Healing Environments: A Case Study of Taiwan University Children's Hospital. *Journal of healthcare engineering*, *2016*.

ONLINE SOURCES

- Ability 360. *Recreation Therapy*, [Online]. Available: https://ability360.org/sports/recreation-therapy/ [Accessed: 10 March 2019].
- ArchDaily. 2009. Santa Rita Geriatric Center/Manuel Ocana, [Online]. Available: https://www.archdaily.com/24725/santa-rita-geriatric-center-manuel-ocana [Accessed: 2 December 2018]
- ArchDaily. 2015. Ballarat Community Health Primary Care Centre/DesignInc., [Online]. Available: https://www.archdaily.com/632489/ballarat-community-health-primary-care-centre-designinc [Accessed: 19 September 2018]
- ArchDaily. 2017a. Nelson Mandela Children's Hospital/Sheppard Robson + John Cooper Architecture + GAPP + Ruben Reddy Architects, [Online]. Available: https://www.archdaily.com/870774/nelson-mandela-childrens-hospital-sheppard-robson-plus-john-cooper-architecture-plus-gapp-plus-ruben?ad_medium=gallery [Accessed: 19 September 2018]
- ArchDaily. 2017b. Trillium Secure Adolescent Inpatient Facility/TVA Architects, [Online]. Available: https://www.archdaily.com/803705/trillium-secure-adolescent-inpatient-facility-tva-architects [Accessed: 19 September 2018]
- C.F. Møller Architects. Vendsyssel Hospital Extension and Refurbishment, [Online]. Available: https://www.cfmoller.com/p/vendsyssel-hospital-extension-and-refurbishment-i3134.html [Accessed: 29 November 2018]
- Google Maps [Online]. Available: https://www.google.co.za/maps/place/Kwazulu-Natal+Children's+Hospital/ [Accessed: 24 November 2018]
- Idea Awards. 2016., Jemena Workplace Melbourne. [Online] Available: https://www.idea-awards.com.au/2016/jemena-workplace-melbourne/?cat=workplace-over-1000-sqm&stnd=shortlist [Accessed: 2 December 2018]

- Independent Online (2017) *Durban hospitals are a shambles: Report*. [Online] Available: https://www.iol.co.za/dailynews/news/kwazulu-natal/durban-hospitals-are-a-shambles-report-12166427 [Accessed: 18 March 2018]
- Johnson. 2017., Spring Activities for Horticulture Therapy, [Online] Available: http://my.chicagobotanic.org/category/education/therapy/ [Accessed: 2 December 2018]
- KwaZulu-Natal Children's' Hospital. [Online]. Available: http://www.kznchildrenshospital.org/about-us/ [Accessed: 24 November 2018].
- National Council for Therapeutic Recreation Certification. About Recreational Therapy. [Online] Available: https://nctrc.org/about-ncrtc/about-recreational-therapy/ [Accessed: 1 December 2018]
- PBteen. [Online]. Available: https://za.pinterest.com/pin/513128951289242852/?lp=true [Accessed: 29 November 2018]
- Pinterest. Window seat [Online] Available: https://za.pinterest.com/pin/310678074292309703/ [Accessed: 2 December 2018]
- Rush. M., 2017. Importance of Sports to Health, [Online] Available: https://www.livestrong.com/article/133041-importance-sports-health/ [Accessed: 1 December 2018]
- South African History. 2012., Curries Fountain Sports Ground. [Online]. Available: https://www.sahistory.org.za/topic/curries-fountain-sport-ground [Accessed: 4 December 2018]
- The Oregonian. 2012., Randall Children's Hospital gets a stylish new home in Portland. [Online]. Available: https://www.oregonlive.com/health/index.ssf/2012/02/a_crowded_childrens_hospital_g.html [Accessed: 2 December]
- Trauma Recovery. n.d. Building a Support System, [Online]. Available: http://trauma-recovery.ca/recovery/building-a-support-system/ [Accessed: 28 November 2018].
- Whole Building Design Guide, 2016. Therapeutic Environments, [Online] Available: https://www.wbdg.org/resources/therapeutic-environments [Accessed: 3 May 2018]

THESES

- Breetzke, L.N.C., 2010. *A Study of the Relationships Between Architectural Environments and Human Wellbeing: A Proposed Health and Healing Centre for Durban*. University of KwaZulu-Natal.
- Cloete, M., 2016. *Architecture and Childhood Development: Towards establishing architectural design guidelines for children's environments in South Africa.* University of KwaZulu-Natal.
- Dahl, J.P, 2016. *The role of the built environment in the conservation of natural eco-systems: a centre for biodiversity preservation on the banks of Umgeni River, Molweni*. University of KwaZulu-Natal.
- Kim, E.Y., 2011. Healing healthcare design for adolescent patients: promoting holistic quality of life. University of Kentucky.
- Mngoma, T.K., 2014. *Processes of promotion of well-being as a generator of built environments: the design of a community healthcare facility for Durban*. University of KwaZulu-Natal.
- Schaller, B., 2012. *Architectural Healing Environments*. Architecture Senior Theses. Paper 62.

APPENDICES

APPENDIX A

BUILT ENVIRONMENT PROFESSIONAL'S INTERVIEW SCHEDULE

Please answer all questions honestly, in full to the best of your ability. The reviewer will base their analysis and conclusions on the information provided on this interview schedules. Incomplete schedules cannot be evaluated fairly. All answers should be typed. Please do not write your name on the schedule.

PART 1				
Profession				
Qualifications				
Experience	0-5 years ☐	5-15 years ☐	15-25 years ☐	25+ years ☐
PART 2				
1. Which project did you work on?				
2. Provide a brief background on the project. I.e. General client request, concepts, themes, theories important to the project, etc.				
3. Were there any innovative design solutions geared towards meeting adolescent patients' physical, psychological or social needs, in order to provide a pleasant user experience? If so, please expand.				
4. Do you think architectural design plays a vital role in aiding healing processes and providing positive user-experiences? If so, please expand.				
5. Do you have any advice for the researcher on designing a healthcare facility for adolescents?				

APPENDIX B

HEALTHCARE PROFESSIONALS' INTERVIEW SCHEDULE

The following questions will be used to interview healthcare professionals who work at the chosen case studies. The researcher will make note of answers and discussions on the form below.

PART 1				
Profession				
Qualifications				
Experience	0-5 years ☐	5-15 years ☐	15-25 years ☐	25+ years ☐
PART 2				
1. What are the age ranges of the patients which you aid?				
2. What are your opinions on the spaces which the patients occupy, and do you think they are conducive to healing?				
3. Do you believe that the quality of space of a healthcare institute plays a role in aiding healing and well-being?				
4. Are there any spaces which stand out to you as spaces of quality and if so, why? This applies to the building you currently work in but to other facilities you have worked in as well.				
5. What are your opinions on the spaces in which you work in, and do you think they are conducive to productivity?				
6. Are there any spaces for healthcare professionals which stand out to you as a well-designed space and if so, why?				
7. How do you think these spaces, which patients and professionals occupy, can or should be improved?				
8. What is the overall opinion of the building in which you work?				

APPENDIX C

YOUNG ADULT INTERVIEW SCHEDULE

Please answer all questions honestly in full to the best of your ability. Don't worry, there is no right or wrong answer! ☺

PART 1			
Gender:	□ Male	□ Female	□ Other
Age:			

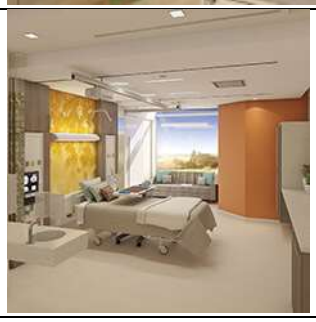
PART 2					
Question	No	I guess not	I don't know	I guess so	Yes
1. Have you ever stayed overnight at a healthcare facility?					
2. Did you feel safe during your stay at the healthcare facility?					
3. Did you feel as if you had privacy?					
4. Did you feel like the ward/communal spaces were sometimes over-crowded?					
5. Did you have a window in your ward that you could see out of?					
6. If so did your window have a pleasant view?					
8. Did you have access to a garden from the inside space?					

PART 3
1. What did you think of the physical environment which you were in? Did you feel comfortable?
2. Was there anything about the spaces provided in the facility which you liked? What were they?
3. Was there anything about the spaces provided in the facility which you disliked? What were they?
4. How do you think the spaces which you occupied in the facility could be improved?
5. Are there any spaces/provisions you wish the facility had?

PART 4
Please indicate which option you would want to see in an Adolescent Healthcare Facility.

Room Design:

Please indicate with a tick, which option you prefer and state why:

Why?

Patient Lounge

Why?

Please number the options below in order of what you prefer the most to what you prefer the least, with 1 being what you would prefer the most.

Material Palette: Materials for the building exterior

		Wood
		Concrete
		Stone
		Rammed Earth
		Steel Sheeting
		Brick
		Black Brick
		Wall Mural

Furniture and Interior Colour Palette

		Orange
		Yellow
		Green
		Blue
		Grey

Sporting Activities

	Swimming Pool
	Mini Soccer Field
	Netball Court/Volleyball Court
	Cricket Pitch

Recreational Therapy Activities

	Dog Cafe
	Cat Cafe
	Art Classes (Painting and drawing)
	Ceramics/Pottery Classes
	DIY Furniture/Crafts Classes
	Dance Classes/Facilities
	Gardening
	Relaxing exercise classes: Tai Chi, Yoga, etc.
	Other: Please state other suggestions which you may have:

PART 4

By now you've begun thinking about the spaces in which you are staying and how you would like it to be. Through the use of drawing and sketches, please illustrate a space you would love to be in, in a healthcare facility. This can be your ward, the communal spaces, the garden, consultation rooms, etc. Feel free to have fun with! Don't worry about producing a perfect drawing but rather focus on getting your point across ☺

PART TWO

DESIGN REPORT

CHAPTER 1 | INTRODUCTION

1.1 INTRODUCTION

The dissertation document aimed to describe the benefits of responsive architecture through focusing on the physical, social and psychological needs of the adolescent patient and thereby, how healthcare environments could be responsive to these needs in order to create an architecture of healing. The outcome of the study described how a built environment response to the adolescents' primarily social and psychological needs has the potential to create a healthcare environment which could be healing beyond that of reactive healthcare. By responding to the patients' needs, opportunity was presented for a healthcare environment which also provided preventative and preservational healthcare. This design report therefore aims to continue this line of research, by applying the recommended design guidelines set out in Chapter 7 of Part 1, towards the design of a Youth and Community Health Centre for Durban.

1.2 PROJECT DESCRIPTION

The typology selected emerged from the outcomes of the research which suggested that adolescents have a desire for social interaction, recreation and the need to connect to nature. The low-scaled 2-storey, Durban Youth and Community Health Centre was therefore shaped to be rooted in the community so that it would be perceived by adolescents as an approachable and welcoming place which provided healthcare at different levels. Designed around the aforementioned needs of the adolescent, the facility provides spaces for social interaction and recreation such as sporting facilities, art classes, a gym, a library and so on as well as therapeutic gardens where adolescents can meditate, picnic, and relax in to respond to their need to connect to nature. These facilities are available to both outpatients and inpatients, with the aim of providing a facility which provides a healing environment where adolescents can both receive treatment for their ailments, through the community health clinic or the inpatient mental health treatment facility, but also maintain their health by being active and engaging in activities which have positive impacts on their minds, bodies and souls.

1.3 THE NOTIONAL CLIENT

The notional client for the project is the Department of Health in conjunction with UNICEF.

The Department of Health (DoH) is the executive department of the South African government that is assigned to health matters. The DoH has recognised adolescents as a vulnerable group which have specific needs and see it as their duty to respond to these needs.

As the DoH is assigned to all health matters, the department has begun to look at the health systems responsiveness to the non-health needs of patients as an important aspect as it is seen as being intrinsically linked to the health needs of the patient.

UNICEF, which stands for *The United Nations International Children's Emergency Fund,* is an organisation which seeks to "save children's lives, to defend their rights, and to help them fulfil their potential, from early childhood through adolescence" (UNICEF). UNICEF has developed a programme focusing on the health of adolescents and youths and seeks to invest in adolescent healthcare treatment, education and development, as the next phase in the programme. The programme focuses on treatment for sexual and reproductive health issues and HIV and AIDS testing as well as using sports for development as evidence shows that regular physical activity is essential for the physical, mental, psychological and social development of children and adolescents (UNICEF).

1.3.1 The Client's Requirements

The client requires a healthcare centre that provides basic healthcare, healthcare education and recreational therapy for adolescents and youth. The facility should also provide facilities which will service the community at large.

The objectives of the client are therefore:

- To promote a patient-centred design approach in order to provide a healing healthcare environment.
- To cultivate a sense of community and provide opportunity for social interaction within the healthcare environment towards holistic healing.
- To create a therapeutic and supportive environment which reduces stress and anxiety of the adolescent patient.
- To provide facilities which present opportunity for the adolescent patient to engage in physical and other recreational activities

- To provide facilities for activities which the adolescent may engage in that are considered as enjoyable but still provide physical, psychological and social benefits. These include sporting facilities, facilities for the arts, etc.
- Providing a space where youth and communities can come together to share and learn about illness prevention and health promotion.
- Promoting the balancing of mind, body and spirit through the physical environment.
- And lastly, to provide healthcare facilities relevant to the adolescent patient, such as: consulting and examination rooms for sexual and reproductive health check-ups (i.e. abortions, STIs, antenatal check-ups, HIV testing, etc.), growth and development monitoring and assessment, facilities for speech and hearing therapy, physical therapy, occupational therapy, dermatology, dietetics, audiology, individual and family counselling and social services.

The client's vision for the facility is therefore to improve the health status of adolescents through the prevention of illness, the promotion of healthy lifestyles, the provision of easily accessible healthcare and the improvement of the health care environment by focusing on the social, emotional, psychological and environmental needs of the patient.

1.3.2 Detailed Client Brief

	Description	Quantity	Area (M²)	Total Area (M²)	Notes
A	Main Entrance			201	
1	Entrance foyer	1	30	30	
2	Waiting area	1	50	50	To have comfortable furniture arranged in a lounge layout. To include play area for children.
3	Reception	1	14	14	For 2 staff.
4	Gift store	1	9	9	Local arts and crafts goods such as beadwork, etc.
5	Café	1	40	40	Incl. kitchen, storage and seating.
6	Public telephone	1	2	2	
7	Ablutions	2	20	40	Male and female provisions including universally friendly wc.
8	Nappy change room	1	6	6	Separate from ablutions to be accessible to both fathers and mothers.
9	Infant feeding room	1	6	6	Including milk warmer
B	Administration			250	
1	Management and administration office	4	10	40	
2	Archives	1	12	12	
5	Staff break room	1	40	40	With access to staff outdoor area.
6	Staff changing room and ablutions	2	35	70	To include wc, whb, sh, changing area and lockers. Separate rooms for males and females.
7	Seminar and training room	1	42	42	
8	Interview/meeting room	1	16	16	
9	Staff library	1	30	30	
C	Educational			210	
1	Library and Resource Space	1	100	100	
2	Multi-Purpose Room	2	55	110	Antenatal classes, support groups, etc.

	Description	Quantity	Area (M^2)	Total Area (M^2)	Notes
D	Out-patient Facility			439	
1	Waiting area	1	16	16	
2	Check-in desk	1	9	9	Registration/admissions and payment made.
3	Attending Office	1	10	10	Includes records room.
4	Nurses station	1	10	10	For 2 nurses.
5	Consulting, Examination and Treatment room	6	18	108	Sexual and Reproductive Health (Abortions, STIs, antenatal check-ups, HIV Testing and treatment) Growth and development monitoring/assessment
6	Counselling Rooms	4	30	120	
7	Family Counselling Room	1	35	35	
8	Pharmacy	1	45	45	
9	Clean utility room	1	14	14	Incl. storage of medication.
10	Dirty utility room	1	19	19	Urine tests, sputum samples, etc.
11	Patient/Visitor Ablutions	2	3.5	7	Male and female provisions. To be universally friendly.
12	Interview and Meeting room	1	12	12	
13	Staff break room	1	15	15	
14	Storage room: bulk supplies, medical and surgical	1	12	12	
15	Speech and Hearing Therapy Room	1	30	30	
16	Audiology Room	1	30	30	
17	Physical Therapy Room	1	65	65	
18	Occupational Therapy Room	1	50	50	
19	Dermatology Room	1	30	30	
20	Dietician Room	1	30	30	
21	Dental Therapy Room	1	30	30	

	Description	Quantity	Area (M²)	Total Area (M²)	Notes
22	Social Services	1	15	15	
23	Child Psychologist	1	20	20	
E	Recreation Therapy Spaces			2,360	
1	Cat Café	1	50	50	Café with dogs for pet therapy.
2	Multi-Sport Court: Football Astroturf Field	1	465	465	5 aside soccer mini soccer field, netball, tennis and volleyball.
3	Sporting: Swimming Pool	1	900	900	25m swimming pool with 6 lanes. Incl change rooms, ablutions and seating/stands.
4	Yoga and Dance Studio	1	80	80	
5	PC Games Room	1	80	80	
6	Indoor/Outdoor Gym	1	80	80	
7	Workshops	2	80	80	Workshops for gardening and diy/craft classes.
8	Art Room	1	80	80	
F	Inpatient Care			484	484
1	Waiting area	1	16	16	
2	Reception	1	9	9	
3	Refreshment: Drinking water dispenser	1	1	1	
4	Refreshment: Vending machine	1	3	3	
5	Ablutions	2	20	40	Male and female provisions including universally friendly wc.
6	Office	1	12	12	
7	Double patient room with bathroom	12	24	288	For adolescents with mild anxiety, depression and eating disorders.
8	Game and Activity Room	1	50	50	
9	Patient Library	1	50	50	

	Description	Quantity	Area (M²)	Total Area (M²)	Notes
G	Parent And Staff Accommodation			133	
1	Entrance lobby	1	6	6	
2	Waiting area	1	10	10	
3	Reception	1	6	6	
4	Office	1	10	10	
5	Ablutions	2	3.5	7	Male and female provisions. To be universally friendly.
7	Double person accommodation with bathroom	5	17	85	
8	Storage room: linen, towels, furniture, soap, etc.	1	9	9	
H	Facility Management And Maintenance			130	
1	Laundry	1	20	20	For the washing and drying of linen, clothing and towels. Includes store room for linen, etc.
2	Environment services store room	1	14	23	Room to store sanitation supplies and trolleys to clean the facility.
3	Garden maintenance store room	1	14	20	Machinery and tools for garden maintenance.
4	Electrical distribution (DB) room	1	40	40	Includes switchboards, distribution boards, circuit breakers and disconnects, electricity metre, transformers, etc.
5	Uninterrupted power supply (UPS) room	1	10	10	Holds back-up batteries in case of power outages. Battery room separate from DB room to prevent fire hazards.
6	Waste management and disposal room	1	14	17	Includes medical waste and general waste and recycling. To have vehicular access.
I	Public Spaces			400	
1	Trading facilities	1	200	200	
2	Internet Cafe	1	200	200	To relate to street edge. Flexible space – can be hired out. Opens up to garden.
	TOTAL			4,987	Incl. Sporting courts/fields, etc.

1.4 CONCLUSION

In conclusion, the facility will present itself as the first healthcare facility in Durban, which not only provides healthcare but also provides education and activities to prevent ill-health and to preserve health. By focusing on the adolescent's physical, social and psychological needs, health, education and protection will be linked while inviting families, communities and the wider society to be active participants in the drive to provide Durban's adolescents and youth with a quality environment in which to develop. The provision of such a space would not only be health-giving but would also have positive social impacts on adolescents which would break cycles of violence and abuse.

CHAPTER 2 | SITE SELECTION, SURVEY AND ANALYSIS

2.1 INTRODUCTION

The major criterion used for the selection of a site for the Durban Youth and Community Health Centre was as follows:

- Location: The facility needed to be in close proximity to a hospital, transport node and schools or places where adolescents frequent.
- Site Area: The site needed to be large enough to accommodate the detailed client brief which includes sporting facilities as well as the ground space for a garden or park like atmosphere.
- Accessibility: The site needed to be easily accessible by both pedestrians and by vehicle.

2.2 SITE OPTIONS

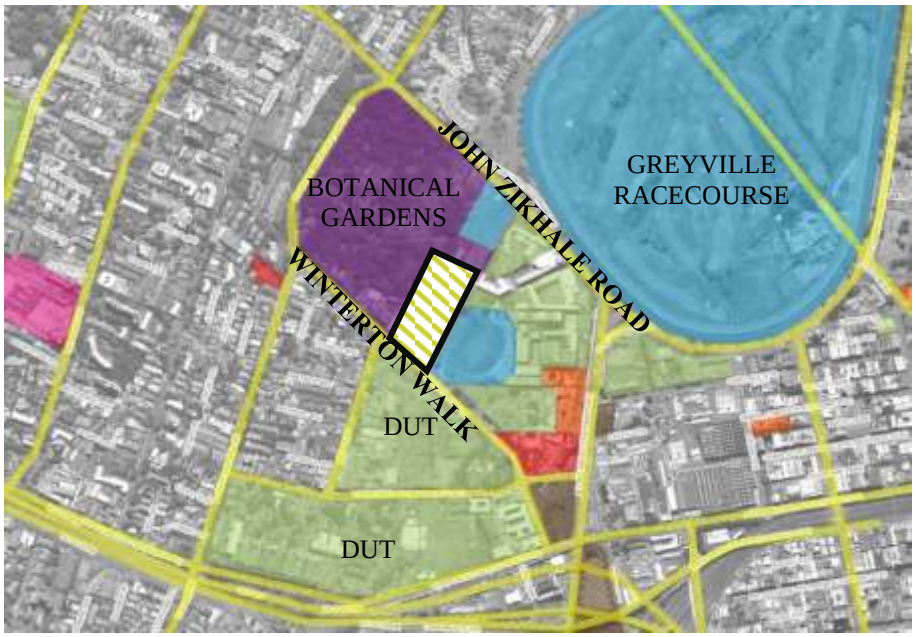
The following sites were the two options considered for the location of the project. Each site includes a description of the site and its surroundings, a brief macro and micro analysis of the site and pros and cons for each site.

The two sites considered were:

- Site 1 – Greyville
- Site 2 – Overport

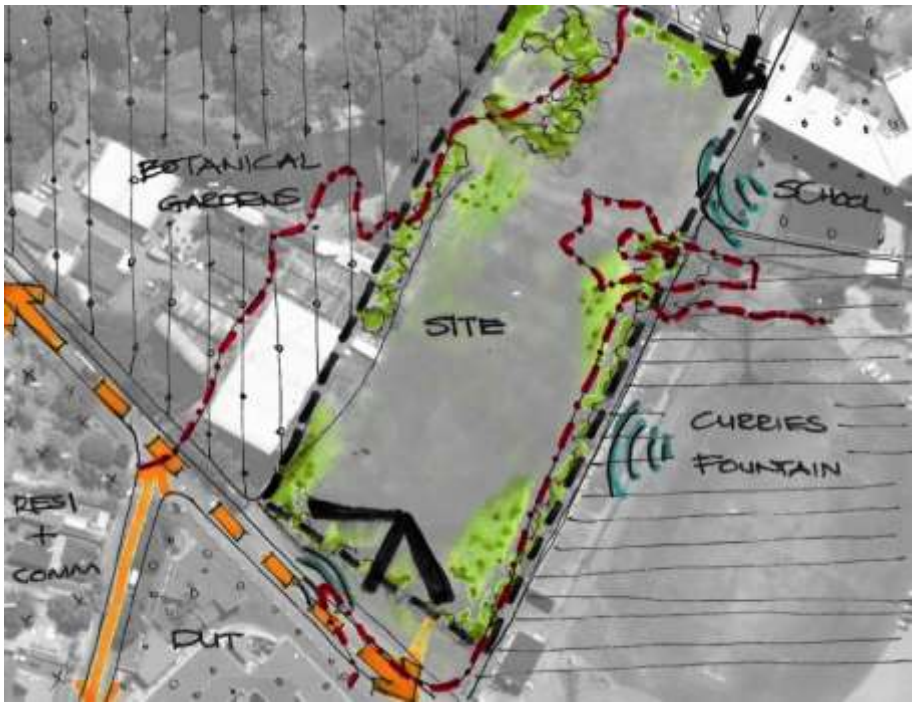
SITE 1 - GREYVILLE

Figure 60: Site 1 Macro Zoning (source: Google Maps and author)



BUS AND TAXI STATIONS
CIVIL SERVICES
EDUCATIONAL
HEALTHCARE
OUTDOOR PUBLIC SPACE
SHOPPING CENTRE
SPORTING
TRANSPORT ROUTES

Figure 61: Site 1 Micro Zoning (source: Google Maps and author)



VEGETATION
ROADS
NOISE
CONTOURS

SITE 1 - GREYVILLE	
ADDRESS	9 John Zikhale Road, Greyville, Durban.
ERF	3176
ZONING	Public Open Space
SITE AREA	18 000 m²
SITE DESCRIPTION	
• LOCATION	Located in Greyville, an area of great historical significance, between the CBD and residential areas such as Musgrave. The area is one of mixed functions as it includes religious buildings, schools, healthcare facilities and many sporting facilities. Situated between the Curries Fountain Sporting Grounds and Durban's Botanical Gardens. In close proximity to public hospitals – St. Aidan's Hospital and City Hospital - and many high schools and a university – Sastri College, Orient Islamic School, Durban Girls Secondary School and Durban University of Technology.
• ORIENTATION	The site is a linear, rectangle shaped site with its longest sides facing North west and South East.
• TOPOGRAPHY	The site is green field, rectilinear site and which is generally flat with small mounds along the edges of the back of the site.
• ACCESSIBILITY	Accessible easily by both vehicle and pedestrians. Public transport is in walking distance of the site.
• NATURAL SURROUNDINGS	There is low shrubbery and a few trees on the outskirts of the site while the rest of the site is grassy – size of site allows for the potential of healing natural landscape design.
URBAN CHARACTERISTICS	While near urban landscapes, the site is away from dense urban forms as it is located between the gardens and a field. Potential for urban design of Winterton Walk to improve urban characteristics and make it more pedestrian friendly and safe.
CONTEXT	Site located between urban and residential areas. Mixed-use area.
PROS	
1. Large site: enough space for design to be deconstructed and to allow for landscape/park design.	
2. Greenfield site – existing natural landscape.	
3. Site allows for future expansion.	
4. Site allows for privacy	
5. More or less flat site - universally friendly	
6. Close proximity to a general public hospital – St Aidan's Hospital	
7. Close proximity to high schools and universities i.e. Accessible to adolescents	
8. Near botanical gardens – one of Durban's lungs	
9. Public transport in a 10 minute walking radius of the site - near Warwick	
10. Falls between the city and residential.	
11. No orientation restrictions	
12. Not on a main road – away from noise pollution from traffic – allows for a more therapeutic environment.	
13. Existing sport district to tap into.	
CONS	
1. Noise: Occasional noise from Curries Fountain.	

SITE 2 - OVERPORT

Figure 62: Site 2 Macro Zoning (source: Google Maps and author)

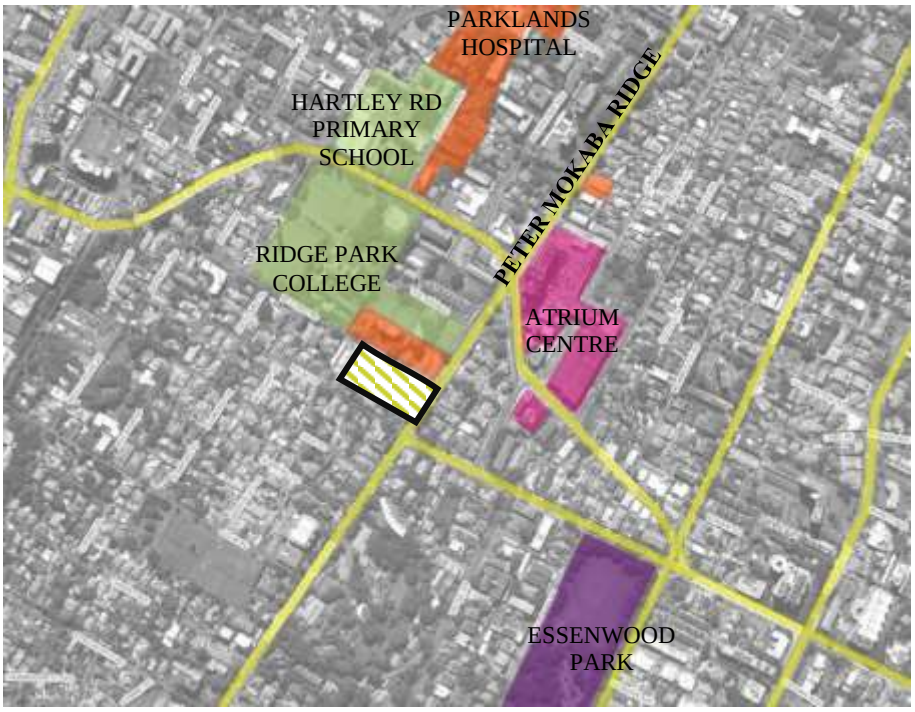


Figure 63: Site 2 Micro Zoning (source: Google Maps and author)

SITE 2 - OVERPORT	
ADDRESS	369 Peter Mokaba Ridge, Musgrave, Durban
ERF	4/508
ZONING	Place of Worship and Institutional 2
SITE AREA	4500 m²
SITE DESCRIPTION	
• LOCATION	Located on Durban's ridge in an area which is mixed-use and bustling. Situated off Peter Mokaba Road, in close proximity to high schools – Ridge Park College - and hospitals, McCord's Eye Hospital, Life Entabeni Hospital and Parklands Hospital. It is also in walking distance from popular Atrium Shopping Centre. The site houses what was once a Synagogue and annex buildings.
• ORIENTATION	Length of the site faces North East.
• TOPOGRAPHY	The site is a rectilinear site which is gently sloped and has many trees of varying sizes.
• EXISTING	There is a small synagogue and annex buildings on site. It was recently for sale. To be confirmed as to whether it still runs as a synagogue. Front building can be renovated and included in the design, back buildings would need to be demolished.
• ACCESSIBILITY	The site is accessible by both vehicles and pedestrians with public transport being in close proximity. The site has two access points – one from Peter Mokaba Road and one from McCord Road.
• NATURAL SURROUNDINGS	There is existing vegetation on site – trees of varying sizes. The trees create a sense of privacy for the site.
URBAN CHARACTERISTICS	The area would need to be improved to provide a more walkable area. Peter Mokaba Road is a busy road with not many pedestrian crossings or speed reduction methods in place. Not many street furniture or places of rest. The surrounding buildings are a mix of styles and react to the road differently. Residential buildings tend to be set back while buildings of commercial nature open up directly to the street.
CONTEXT	As the site falls in a residential area there are not many high-rise buildings around. Buildings are generally low-scaled with the exception of a few – The Atrium Shopping Centre and the Coastlands Hotel.
PROS	
1. Existing natural landscape.	
2. Site allows for privacy – site is atmospheric.	
3. Gently sloped site allows for interest design solutions.	
4. Close proximity to hospitals – Entabeni, Parklands, and Mccords.	
5. Close proximity to high schools i.e. Accessible to adolescents	
6. Close to public transport.	
7. Situated on a main road – exposure for the facility.	
8. The site allows for a quiet, therapeutic environment.	
9. Length of site is North East orientated.	
CONS	
1. Hospitals in close range are private hospitals.	
2. Area would need to be redesigned to allow for a more pedestrian friendly space.	
3. Medium size site – could restrict design or provision of green spaces.	

2.3 SELECTED SITE

Having weighed the pros and cons, *Site 1 – Greyville* was selected as the site for the Durban Youth and Community Health Centre, as it is in close proximity to many high schools and a university, it is in a ten-minute walking distance of bus and taxi rank and is near two public hospitals. Additionally site conditions and the connection to the existing fabric were more favourable than *Site 2 – Overport*.

2.3.1 Historical Background

The site chosen is located in Greyville; an area of great historical significance, dating back to the 1800s. Greyville, which sits on Durban's Western Vlei, was once a vibrant, multi-racial community in Apartheid South Africa which prompted the building of a rich mix of facilities such as schools, temples, churches, mosques, houses, bus and taxi ranks as well as sporting facilities. The site is situated next to one of Durban's most well know historical sites; Currie's Fountain, which was originally one of Durban's first reliable water sources and thereafter served as a gathering space for non-racial sports, entertainment and more importantly political events. One the other side of the site lies the Botanical Gardens which was established in 1849 (SAHistory, 2012).

Site Context

Figure 64: Botanical Gardens (source: Google Maps)

Figure 65: Currie's Fountain (source: Google Maps)

Figure 66: DUT (source: Google Maps)

Figure 67: DUT (source: Google Maps)

2.3.2 Description of existing site conditions and use

The existing site is an unoccupied, green field site, which is generally flat with small banks along the sides of the site. There is low shrubbery and a few trees on the outskirts of the site while the rest of the site is grassy. The site is a linear, rectangle shaped site with its longest sides facing North West and South East. The site has two access points, one from Winterton Walk and one from John Zikhale Road and is accessible both by vehicle and pedestrians. It is also easily accessible by pedestrian as it is close to taxi and bus ranks. As Winterton Walk is a street busy with pedestrians and visitors to the Currie's Fountain Sports Ground, the area in front of the site is active – an aspect which can be taken advantage of in the design of the facility. Additionally, the site is located between urban and residential areas and therefore would require a built form response which is responsive to its mixed surroundings. While it is located on the edge of the CBD, the surround built form are mostly low-scale and are not dense urban forms.

Site Pictures

Figure 68: Showing site (source: author)

Figure 69: Showing site (source: author)

2.3.3 Site Analysis

Macro Analysis

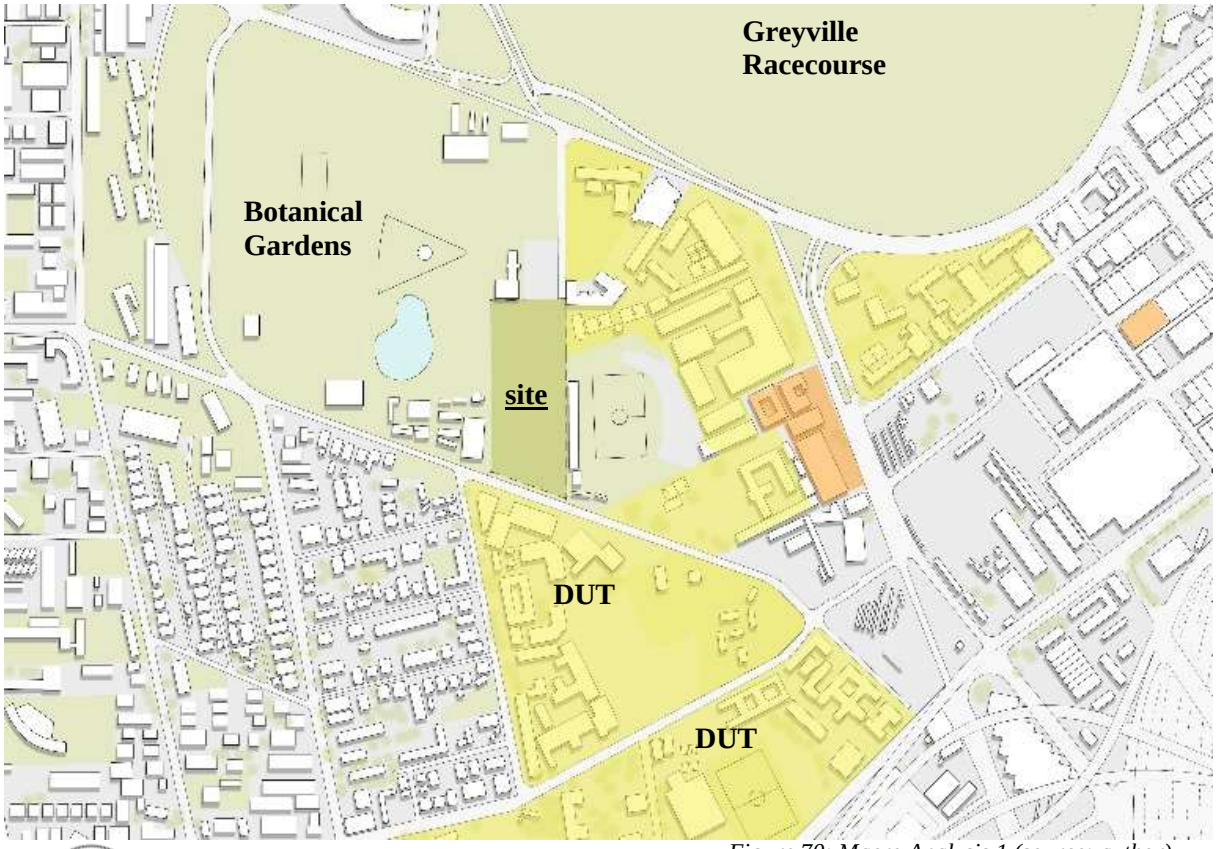


Figure 70: Macro Analysis 1 (source: author)

Educational Facilities
Healthcare Facilities

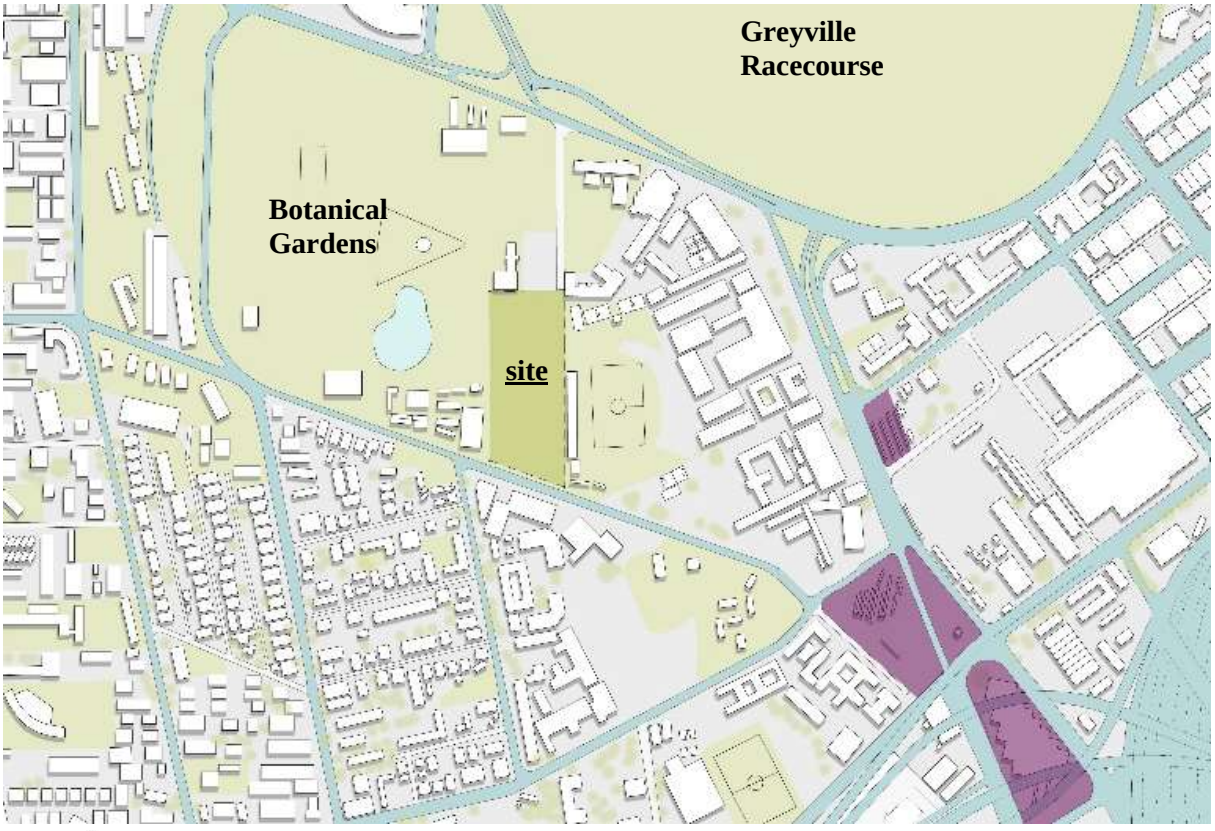
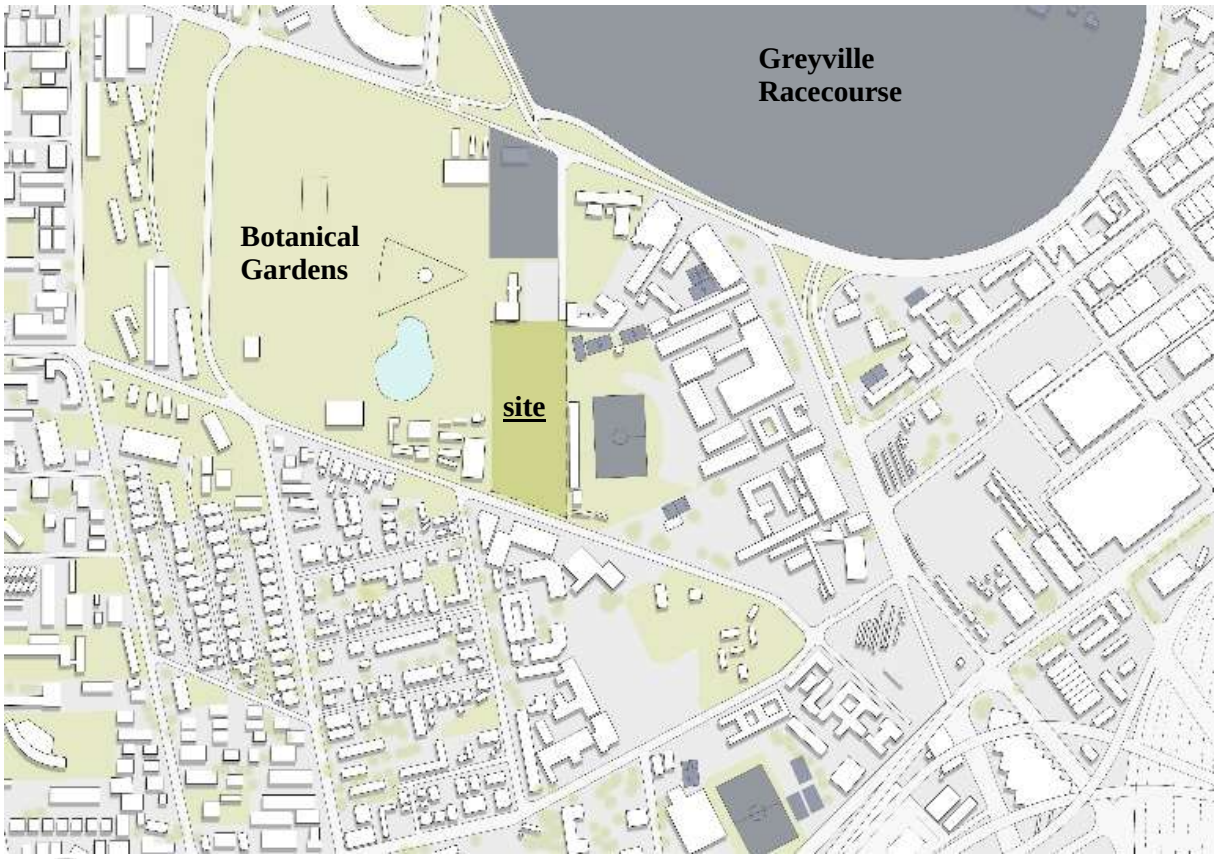


Figure 71: Macro Analysis 2 (source: author)

Bus and Taxi Ranks
Major Transport Routes



Sporting Facilities

Figure 72: Macro Analysis 3 (source: author)

Micro Analysis

Figure 73: Micro Analysis (source: author)

2.4 CONCLUSION

In conclusion, the site chosen on Winterton Walk in Greyville provided great opportunity for the architectural exploration of a youth and community health centre. In the following chapter, the design process will be explained from conception till the realisation of the final design.

CHAPTER 3 | DESIGN DEVELOPMENT AND RESOLUTION

3.1 DESIGN PRINCIPLES

Meet social needs through…

↓

Socio-Developmental Theory

↓

- Ecology of Human Dev.
- Psychological Dev. Theory

↓

- Importance of social relationships on healing
- Healing is not solitary
- Social interaction
- Connectivity
- Community
- Support

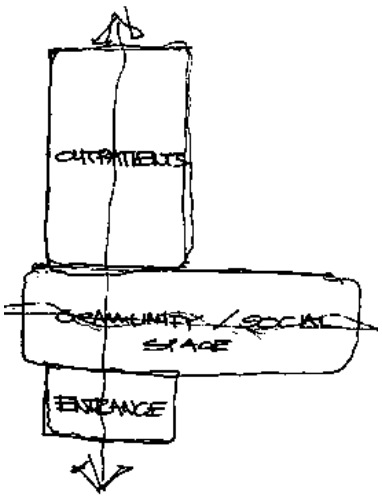


Figure 77: Social and community space as the core of the building (source: author)

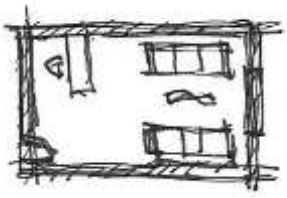


Figure 79: Support: Family therapy

Figure 74: Allowing for interaction and privacy (source: author)

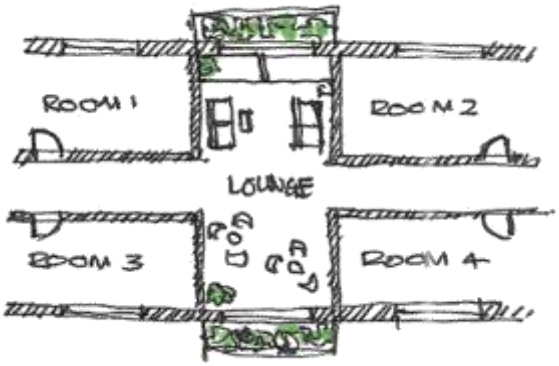


Figure 75: Patient lounges for interaction, support and community development (source: author)

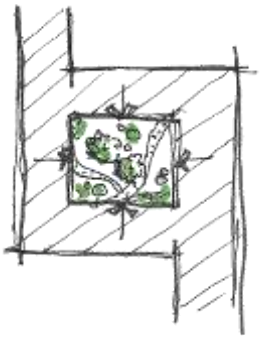


Figure 76: Courtyards as spaces of connectivity and interaction (source: author)

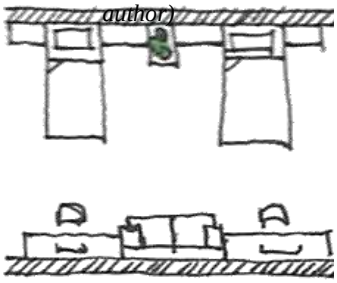


Figure 78: Social interaction: Double patient room (source: author)

Meet psychological needs through…

↓

Environmental Psychology Theory

↓

- Nightingale's Env. Theory
- Therapeutic Env. Theory

↓

- The effects of the env. On one's mind, well-being and healing.
- Destress
- Belonging
- Safety & Comfort
- Privacy
- Reflection and Positive Distraction

Figure 80: Quality Environment: Cross ventilation and plants which clean the air. (source: author)

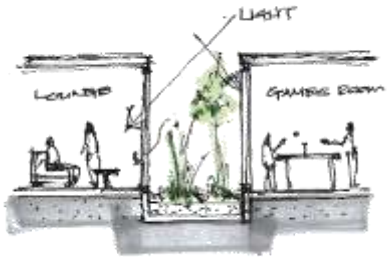


Figure 83: Quality Environment: Maximise natural lighting (source: author)

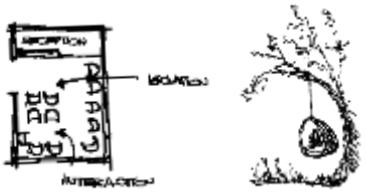


Figure 84: Allowing for interaction and privacy (source: author)

Figure 85: Protective spaces = safety + comfort (source: author)

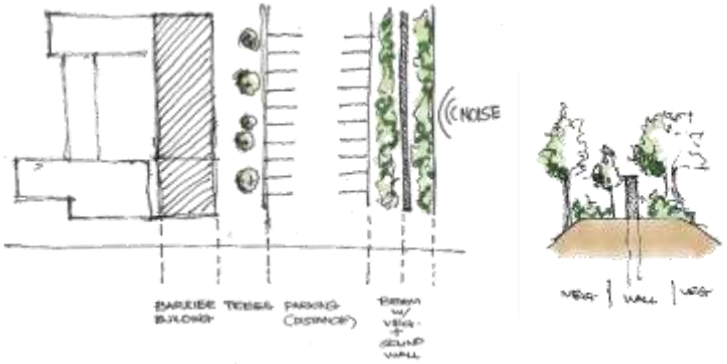


Figure 86: Noise buffering for a therapeutic environment (source: author)

Figure 82: Wayfinding: Through art, wall murals, sculptures, atriums and courtyards. Proper wayfinding = un-stressful & comfortable experience (source: author)

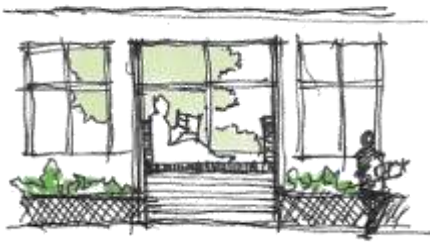


Figure 81: Privacy: Reading nooks Opportunity to be a part of but apart (source: author)

Meet experiential needs through…

↓

Place Theory

↓

- Sense of Place
- Sensory Design

↓

- Experience and journey through space
- Meaningful place
- Connection to nature
- Tactile materials
- Balance
- Place-making
- Sensory experience

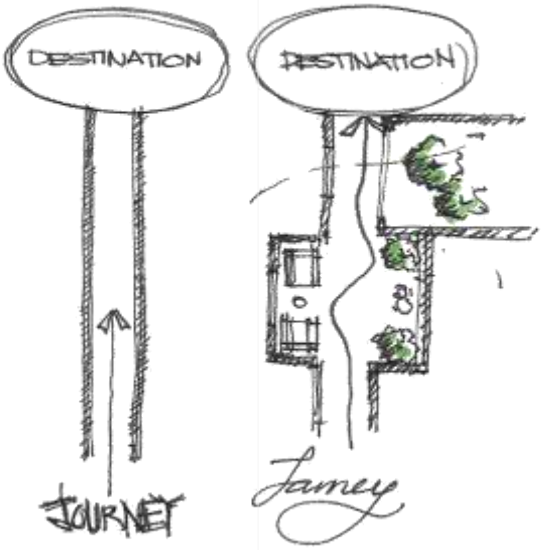


Figure 92: Journey through space (source: author)

Figure 89: Healing gardens (source: author)

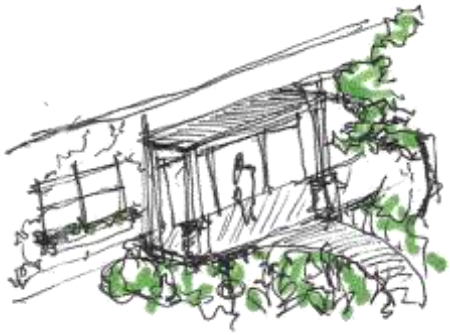


Figure 90: Connection to nature (source: author)

Figure 91: Hierarchy and Contrast: Varying building heights + Differing textures and colours + Asymmetry and Balance (source: author)

Figure 88: Sensory experience + Connection to nature (source: author)

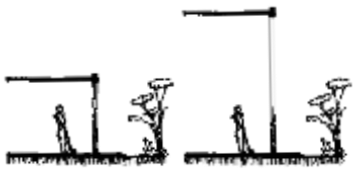


Figure 87: Considering scale and proportion & comfort + place (source: author)

3.2 CONCEPTUAL SPATIAL DIAGRAM

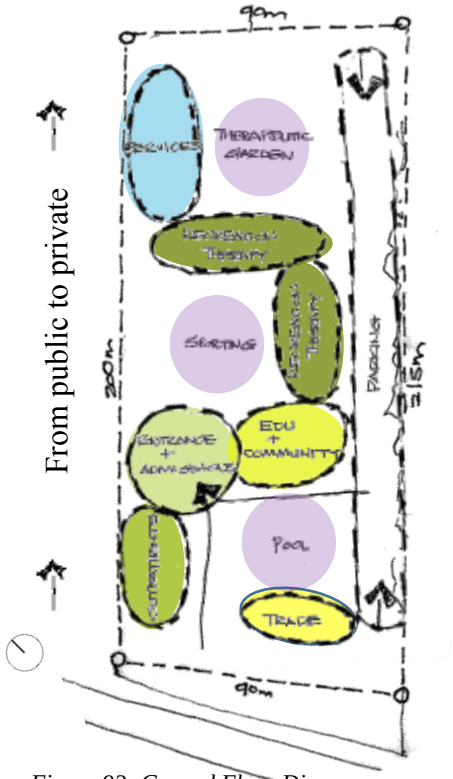


Figure 93: Ground Floor Diagram (Not to scale) (source: author)

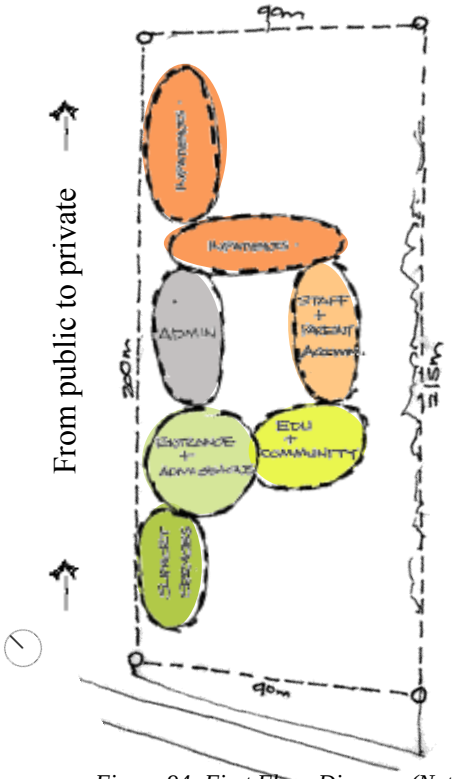


Figure 94: First Floor Diagram (Not to scale) (source: author)

3.3 CONCEPTUAL BUILDING LAYOUTS

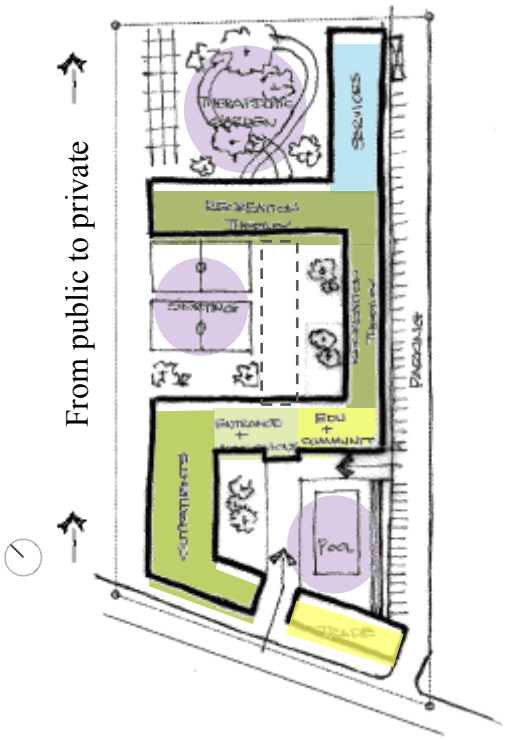


Figure 95: Ground Floor Diagram (not to scale) (source: author)

Figure 96: First Floor Diagram (Not to scale) (source: author)

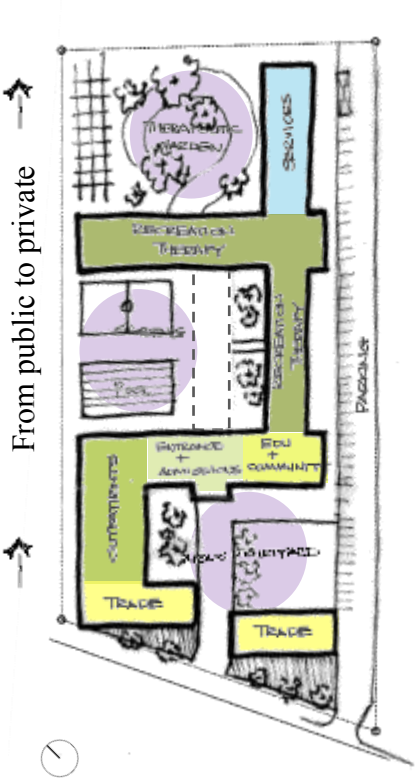


Figure 98: Ground Floor Layout (not to scale) (source: author)

Figure 97: First Floor Layout (not to scale) (source: author)

Figure 99: First Floor Layout (not to scale) (source: author)

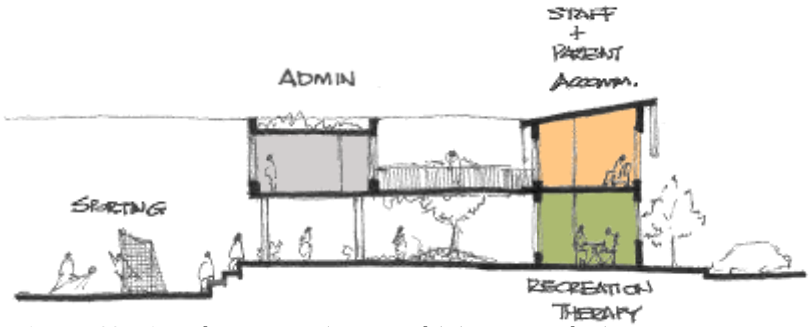
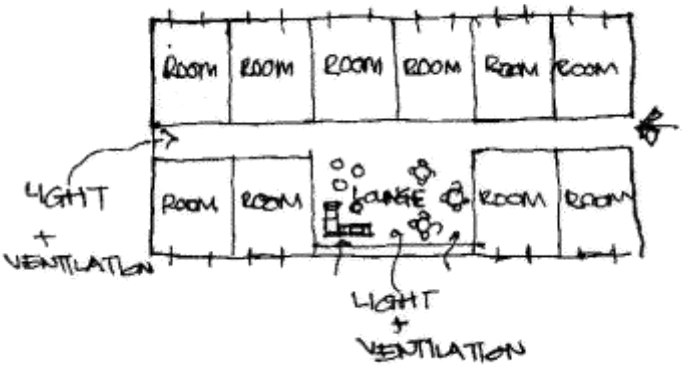
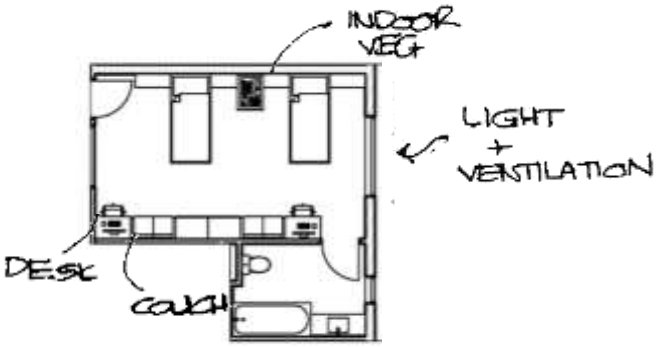


Figure 100: First Floor Layout (not to scale) (source: author)

3.4 CONCEPTUAL DESIGN IDEAS



Social needs:
Layout of inpatients with lounge and dining space centrally located. Lounge serves as a space for patients to interact with each other, staff and their families.
Figure 101: Social needs (source: author)



Social and psychological needs:
2 Bed inpatients room: the room is separated using indoor vegetation to keep the room feeling open and bright but to divide the space so that each patient has a space of their own. Each patient has a desk, cupboard, 2 pedestals and couch. The room is also well lit and ventilated.
Figure 102: Social and psychological needs (source: author)

Figure 103: Above: Courtyard which recreational therapy and educational spaces open up to. (source: author)

Figure 104: Above: Walkway under elevated admin block. (source: author)

3.5 FINAL DESIGN

- THE ADOLESCENT'S SOCIAL NEEDS have been met through the strong focus on community and interaction within the facility. The health centre provides more than just treatment by providing spaces for interaction and engagement. The educational facilities allow for lectures, workshops, etc. to take place thereby promoting awareness and prevention with respect to lifestyle illnesses. Recreational therapy which is a form of treatment provides for opportunity to interact with others who are afflicted with similar issues or whom hold similar interests. Patient's accommodations have lounge spaces and activity rooms where patients can interact with each other and with staff as well as entertain their guests in and shared rooms so that patients are not lonely. And the staff and parent lounges ensure that staff and parents are well rested and are at ease so that they may provide the support needed by the adolescent patient.
- THE ADOLESCENT'S PSYCHOLOGICAL NEEDS have been met through the low scale facility which is not overbearing, use of calming interior colours of blues and greens and natural materials such as wood. Needs have also been met through the incorporation of nature and vegetation indoors as well as through the therapeutic garden which allows for meandering, reflection, and positive distractions. In the patient's accommodation, patients are able to maintain independence by moving around as will, through spaces which allow for one to either interact with others or to have time to yourself but still be a part of things, and through rooms which patients can make their own providing a sense of identity and belonging.
- SENSE OF PLACE has been created through the journey of the adolescent patient from their arrival to their admission from either entrance. As well as through materials and textures and through the gardens and indoor vegetation. Gardens provide tantalize the senses as they are visually pleasing, long grasses ask to be touch, flowers give of pleasant aromas, leaves rustle in the breeze and some plants as well as vegetables are edible.

ADDRESSING ADOLESCENT HEALTHCARE ENVIRONMENTS THROUGH RESPONSIVE ARCHITECTURE
A Youth and Community Health Centre for Durban

Problem Statement

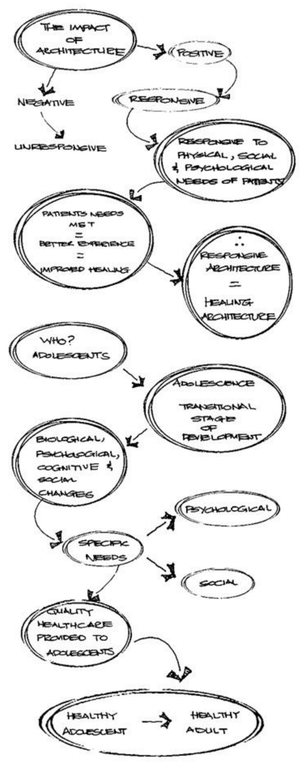
Healthcare environments are not responsive to the social and psychological needs of the adolescent patient.

Using responsive design, architecture can be used as a tool to create healthcare environments which promote healing. However, many of Durban's healthcare facilities focus on the functional requirements of the building, over-looking the needs and concerns of the patient. While this is of concern to all patients, it is particularly prevalent to adolescents, who have needs which are specific to their stage of development; often differing from the needs of child or adult patients. Not only are there a lack of facilities geared towards adolescent health in Durban, but facilities which do aim to address this important transitional stage of development often fail to provide environments tailored to the specific needs of adolescent patients, resulting in healthcare environments which do not optimally promote healing.

Primary Question

How can responsive architecture generate healing healthcare environments for the adolescent patient?

Who	Adolescents: Aged 10 - 19
What	Adolescent Healthcare Centre
Why	• During adolescence, adolescents are at risk of many illnesses. • KwaZulu-Natal has a high adolescent mortality rate. • Hospitals provide reactive healthcare – not preventive healthcare – and do not focus on holistic well-being. • Lack of adolescent healthcare facilities in Durban. • Adolescents present specific social and psychological needs.



Conceptual and Theoretical Framework

Healing Architecture, with regards to healthcare buildings, could be described as an **environment which supports the needs of patients, their families, and staff** through the anxieties and stresses which develop due to illness, healthcare procedures, hospitalization and the healing process (Chrysikou, 2014). The concept suggests that by **meeting the needs of the patient**, physical environments can **have positive effects on patients' psychological and physiological states**, in order to **reduce recovery and adaptation times** (Ulrich, 1984).

Healing Architecture can also be **health-giving**, serving to promote and **maintain a healthy state** of being for those who inhabit it. This implies that healing environments have a positive interdependent relationship with its occupants, as the effort put into the care and maintenance of environments, is ultimately the care and maintenance of the effects which they have on the occupant (Day, 2002).
The aim of healing environments is to allow patients to engage in the processes of **self-healing and rehabilitation**.
Healing Architecture should therefore be **de-stressing and therapeutic** to provide an environment which **nurtures the mind, body and soul** (Schaller, 2012).

PATIENT-CENTRED DESIGN APPROACH TO CREATING A HEALING HEALTHCARE ENVIRONMENT FOR ADOLESCENTS

Meet social needs through…	Meet psychological needs through…	Meet experiential needs through…
Socio-Developmental Theory	Environmental Psychology Theory	Place Theory
• Ecology of Human Dev. • Psychological Dev. Theory	• Nightingale's Env. Theory • Therapeutic Env. Theory	• Sense of Place • Sensory Design
• Importance of social relationships on healing • Healing is not solitary • Social interaction • Connectivity • Community • Support	• The effects of the env. On ones mind, well-being and healing. • Destress • Belonging • Safety & Comfort • Privacy	• Experience and journey through space • Meaningful place • Connection to nature • Tactile materials • Balance • Place-making

Precedent and Case Studies

Trillium Secure Adolescent Inpatient Facility (source: Archdaily, 2017b)

Location	Corvallis, Oregon, USA.
Function	Adolescent inpatient clinic - Acute behavioural and mental health issues.
No. of storeys	1 storey
Design approach	Safe, secure, friendly, healing environment which is responsive to the needs of the adolescent patient.
Spatial functions	Inpatient, classrooms, social and therapy spaces.
Materials used	Timber, concrete and metal cladding and sheeting.


Trillium Secure Adolescent Inpatient Facility

Responsivity: A safe environment

Physical environment needed to be safe and secure but also unoppressive. Done so through skylights and clerestory windows instead of low windows as well as heavy but colourful furniture.


Showing use of natural lighting and furniture design

Responsivity: The need for social interaction

Family therapy rooms and common spaces: day rooms, lounges, a basketball court and outdoor seating, for patients to interact with each other and the staff was provided, as well as common spaces to facilitate **patient/staff interactions.**

Responsivity: Needs of the patient

The **proportion of space** is comfortable and not too large, the use of **accent colours** and **natural lighting** serves to **improve patients and staffs' moods**, access to the **outdoors** allows for a change of scenery and single patient rooms allow patients **privacy** and more importantly **safety** while the provision of a living room in each sleep pod allows for social **interaction** with others when it is wanted. By being responsive to these needs of the patient, the facility respects the **dignity of the patient** in what could otherwise be an unpleasant and undignified experience.


Showing external materials.

Place and Change of Perceptions

The facility challenges mental health facility stereotypes by using **low-scale, vernacular forms;** a response to its rural and residential location. With patients having **access to the outdoors**, and through the use of **natural lighting, wood finishes, woody tones and fun colours**, the interiors are neither cold nor bleak. The exterior, once again acknowledging its location, uses **cedar sidings, metallic cladding and bright colours** to appear **welcoming** and reflective of its youthful patients. The materials used as well as the green, leafy site, allows for a **sense of place** to be created which is welcoming

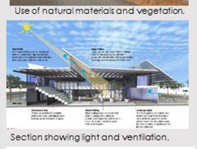
Ballarat Community Health Primary Care Centre (Source: Archdaily, 2015)

Location	Victoria, Australia
Area	2850m²
No. of storeys	2 storeys
Design approach	To provide a healthy, stimulating environment by taking advantage of the benefits of contact with nature and community.
Spatial functions	Therapy rooms, gym, multi-purpose rooms, café, admin, community space, children's play area.
Materials used	Brick, recycled timber, metal deck cladding.


Use of natural materials and vegetation.

Responsivity: Connection to the community

Nature was identified as a common thread between the **diverse user group**, of different ages, races and cultural backgrounds, prompting the integration of natural elements throughout the building to create a **sense of belonging**. This includes **internal gardens** and **timber pergolas and natural materials** such as timber and brick which add a sense of warmth to the facility. The connection to nature was further emphasized through the use of **natural lighting and natural ventilation.**


Section showing light and ventilation.

Responsivity: Destressing environment

Through the use of vegetation and natural elements, a supportive, **familiar and comforting environments** has been created for users of the facility. This together with the **low-scale** building makes way for an experience which is anything but daunting.


Showing social atrium space

Responsivity: The need for interactive spaces

Focus placed on social-environment through a central double-volume atrium which serves as a spine of the facility allowing for easy way-finding whilst providing a bright and airy space enhanced by natural vegetation. This spine serves as the heart of the building, encouraging **social interaction** through housing a café, eating area, performance stairs and a play area. The space allows for **flexibility** as adjacent multi-purpose rooms can open up, increasing the central space. Through these social spaces, a **healthcare facility** becomes a **community space** as well.


Exterior materials and form

Place-making

The building creates a **sensory experience** and sense of place through the use of sunlight, natural ventilation, vegetation and with **warm and tactile materials** such as timber and brick. The exterior of the building aims to **integrate place and community** by using roof silhouettes which meet the surrounding landscapes and echo contextual forms. Materials used on the exterior include brick, metal cladding and polycarbonate sheeting, giving the facility a **contemporary** rather than institutional feel.

The Nelson Mandela Children's Hospital Source: Archdaily, 2017a)

Location	Parktown, Johannesburg, South Africa
Area	29 900m²
No. of storeys	3 storeys above ground (1 storey below ground)
Design approach	High-quality child healthcare provided through connecting the healthcare environment to a natural healing environment.
Spatial functions	200 Beds, eight theatres and specialist facilities for the treatment of a wide range of diseases. The facility is also a teaching hospital and supports paediatric academic research.
Materials used	Brick, timber, steel and concrete.


Child-scaled furniture in foyer.

Responsivity: A comforting environment

Healthcare can be overwhelming and frightening to children. **The physical environment can be used to distract and comfort patients to reduce their fear and anxiety.** This is done through caricatures painted on the walls and machinery of the hospital, murals of stories and easily accessible and fun indoor and outdoor play areas. Through drawings which patients have drawn and stories which are relevant to the South African child, the facility becomes a story book to the patient where characters accompany and give support to patients with encouraging words.

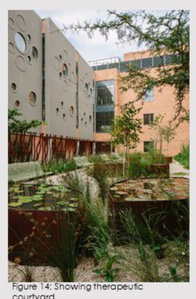


Figure 14: Showing therapeutic courtyard.

Responsivity: Social Support

Social support systems are extremely important for children. Rooms with 4 to 6 patients and play rooms are provided so that patients can interact with each other. For the parents/guardians who provide vital support to patients; **accommodation** with a kitchen and comfortable lounges are provided. Staff also play a role in making patients feel comfortable. **Staff rest lounges** are situated in each wing of the building, so that staff are able to recharge, and provide quality care and comfort for their patients.

Responsivity: Child-scale

Children have specific physical needs which differ from adults. This refers to **scale and proportion of space**, **furniture and fittings.** The facility has responded to these needs through bathrooms with smaller bath tubs which are size appropriate and which allows for a helper to sit and bathe the child, lower sinks, low window ledges in patients' rooms so that children can sit on them and look outside and small, moveable furniture.

Place-making

The generation of place is done so using **shallow floorplates** which allow for **natural lighting, views of the surrounding landscape, therapeutic internal courtyards and exterior gardens** for occupational therapy and play. The exterior is designed using exposed earthen looking brick and concrete details, softened with **wooden pergolas, colourful solar shading devices, yellow benches, wall art and trees and vegetation.**

The Private Hospital – Name to be kept confidential

Location	Durban, South Africa
No. of storeys	2 storeys (2 sub-floors)
Design approach	The approach was to create an environment of health and healing with focus placed on customer-centric design. The goal was to create a hospitable atmosphere rather than a hospital-like atmosphere.
Spatial functions	The hospital is equipped with 200 beds, eight theatre facilities as well as a day clinic and a fully equipped radiography department.
Materials used	Stone cladding, plaster and paint, ceramic tiles and timber screens.

Responsivity: A welcoming environment

Great efforts were made to ensure that the hospital was **welcoming and not clinical**. The exterior of the building is stone clad with brick details, boasting an entrance which is emphasized by a large porte cochère. The double volume entrance foyer presents a **resort-like atmosphere** through the use of stone **cladded columns, warm toned interior finishes, natural lighting and indoor vegetation**. Waiting areas are **intimate lounges** of comfortable brown, leather couches situated around fire places, made cosier by ambient lighting through out the space. Spaces are demarcated is using ceramic floor tiles and the walls hold ones attention with botanical artwork and wood panelling. Wood finished pendant lights are hung from the double volume space drawing the eye up to the pitched skylight and clerestory windows which let in natural light.

Responsivity: Place-making

Through the use of different **materials** such as: stone, timber, ceramic, brick, steel, and the incorporation of **natural elements** such as vegetation, natural lighting and a water fountain. The Private Hospital creates a place which is not clinical or cold. Catering to its affluent community, the large foyer is **luxurious and comfortable** and **promotes interaction and socializing** in its design of seating areas as well as its café which is accessible from the foyer. The **space is legible** and easy to manoeuvre as the foyer serves as the centre of the facility which all wings are accessible from.

Staff Environment

Staff spaces include staff break rooms, staff canteen and staff smoking balcony. Breakrooms are **adequate** with well equipped kitchens and a dining space, but no lounge space. Apart from the smoking balcony, the staff do not have access to any outdoor space. Despite minor short comings, staff expressed that the environments was better than any other healthcare environment they had previously worked in.

Observations

The atmosphere captured in the foyer of the building and circulation is not entirely captured throughout the facility, with medical and surgical wings coming across as more clinical. Efforts are however made to incorporate **natural lighting** in passages and pocket lounges/rest stops outside of wards are well placed. While some wards, such as the rehabilitation ward, are quite **spacious** and nurses stations are ideally located in viewing distance of patients, other wards such as the medical ward are **not optimally set out** with rooms not being viewable from the nurse's station.

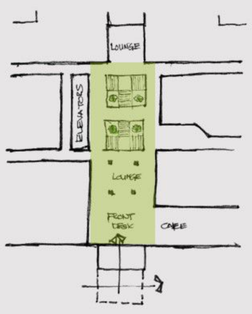
Findings: Interviews

When asked what they would improve in the facility, staff said that **storage** was an issue. This was prevalent in the service spaces such as the maintenance department as well as in the paediatric ward where patients belongings/bags are kept around alongside the bed, thus hindering the staff from carrying out their tasks. Staff suggested a locker area in each ward for patients to store their belongings.


Showing the lounge waiting area (source: provided by the facility)

Showing the exterior of the building (source: author.)


Showing the double volume circulation with vegetation, pendant lighting and natural lighting.

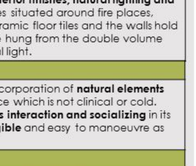


Showing the central foyer and circulation (source: author)


Showing interior finishes (source: provided by the facility.)

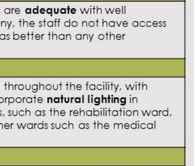
The KwaZulu-Natal Children's Hospital

Location	Addington, Durban, South Africa
No. of storeys	2 storeys
Design approach	The facility is located on the site of what was previously known as the Addington Children's Hospital which was the first hospital built for African children in the 1928. The facility has replaced the old outpatients department. The approach was to create a facility which was not overbearing and which would blend with existing structures on site.
Spatial functions	Outpatients Clinic - Examination rooms, waiting room, play area, staff and admin space and research office.
Materials used	Plaster and painted walls and steel/aluminium screens and windows frames.


Showing lower counter at reception area (source: author).

Responsivity: Child-scale

The facility is responsive to its patients through **scale and proportion.** The facility is a 2 storey building with **comfortable ceiling heights.** The waiting room includes **child sized tables and chairs** and the reception and nurse's stations are designed so that children, wheelchair users and seated parents can communicate effectively with staff over the counter.


Showing staff break room. (source: author).

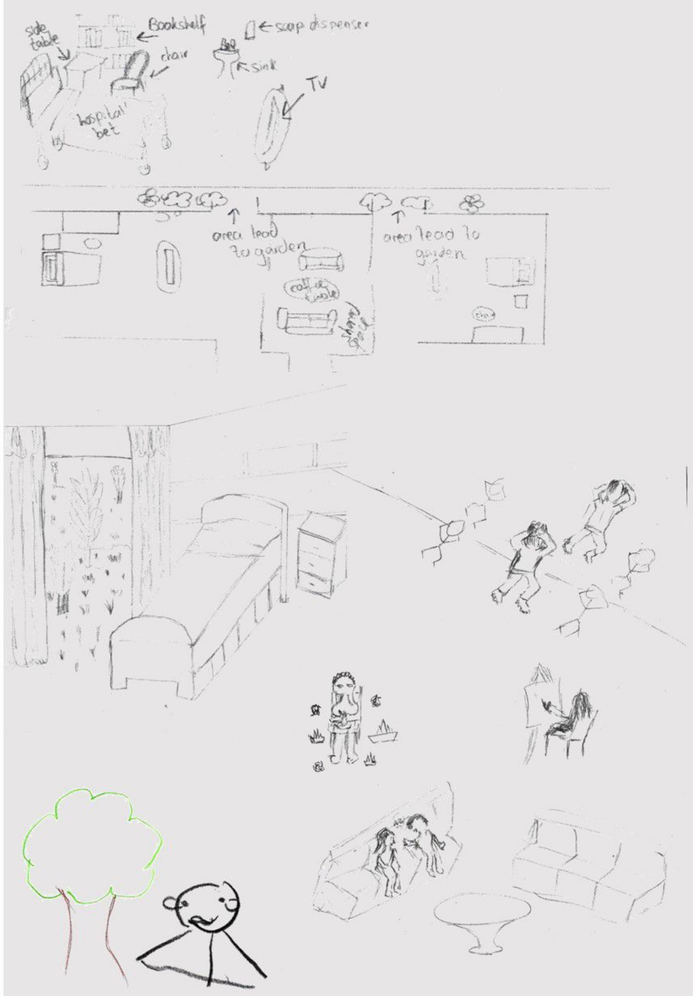
Staff Environment

Staff spaces include a staff break room which is equipped with a kitchen, dining table and lockers. The break room comes across as **dull and purely functional.** There is also a staff foyer with a lounge which is well lit, has art works and mosaic walls, pendant ceiling lights and colourful furniture. The foyer is the only space in the building which is eye-catching.

Showing staff lounge. (source: author).

Sketches done by adolescents

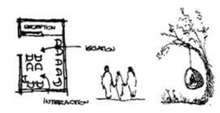
The following sketches, done by adolescents, depict spaces they would like to see in a healthcare environment.

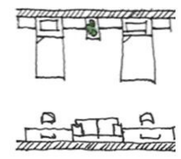


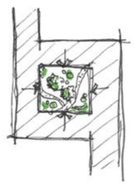
Design Principles

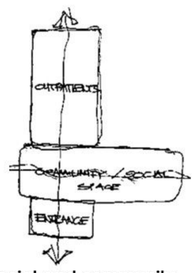
The following design principles and conceptual sketches were developed based on the aforementioned concept of healing, theories of socio-development, environmental psychology, place-making and their derivatives as well as aspects learnt through analysing the precedents and case studies.

Meet social needs through… → Socio-Developmental Theory → • Ecology of Human Dev. • Psychological Dev. Theory → • Importance of social relationships on healing • Healing is not solitary • Social interaction • Connectivity • Community • Support

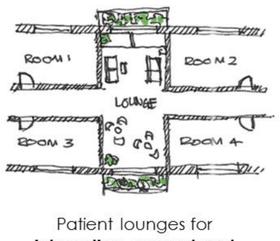

Allowing for **interaction** and **privacy**


Social interaction: Double patient room

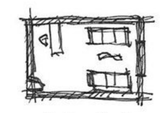

Courtyards as spaces of **connectivity and interaction**



Social and community space as the core of the building

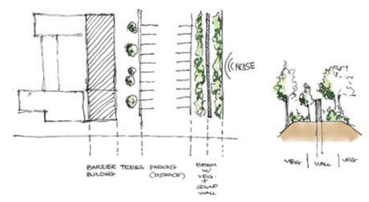


Patient lounges for **interaction, support and community development**

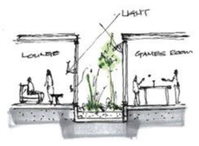

Support: Family therapy spaces

Meet psychological needs through… → Environmental Psychology Theory → • Nightingale's Env. Theory • Therapeutic Env. Theory → • The effects of the env. On ones mind, well-being and healing. • Destress • Belonging • Safety & Comfort • Privacy • Reflection and Positive Distraction

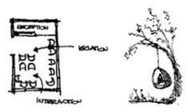

Quality Environment: Cross ventilation and plants which clean the air.



Noise buffering for a therapeutic environment

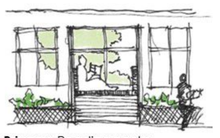


Quality Environment: Maximise natural lighting



Allowing for **interaction** and **privacy**

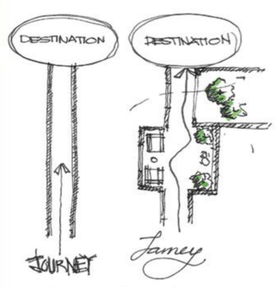

Protective spaces = safety + comfort


Privacy: Reading nooks Opportunity to be a part of but apart


Wayfinding: Through art, wall murals, sculptures, atriums and courtyards.
Proper wayfinding = un-stressful & comfortable experience

Meet experiential needs through… → Place Theory → • Sense of Place • Sensory Design → • Experience and journey through space • Meaningful place • Connection to nature • Tactile materials • Balance • Place-making • Sensory experience

Connection to nature



Journey through space


Hierarchy and **Contrast**: Varying building **heights** Differing **textures** and **colours**
Asymmetry and **Balance**


Healing Gardens

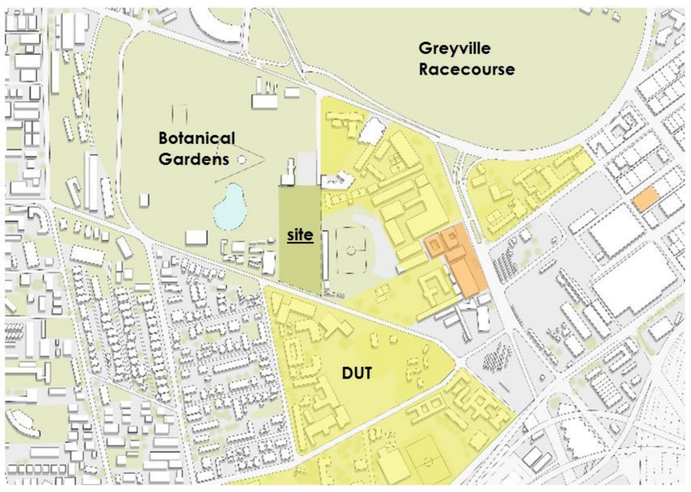

Considering **scale** and **proportion – comfort + place**


Sensory experience + Connection to nature

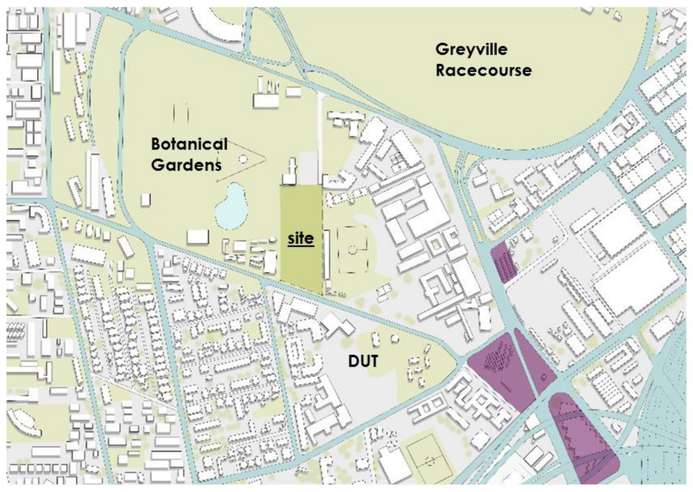
Contextual and Site Analysis

The site selected is located in Greyville, Durban, next to the Botanical Gardens and the Currie's Fountain Sports Ground. The site was selected as it is in close proximity to schools, hospitals and major bus and taxi ranks.

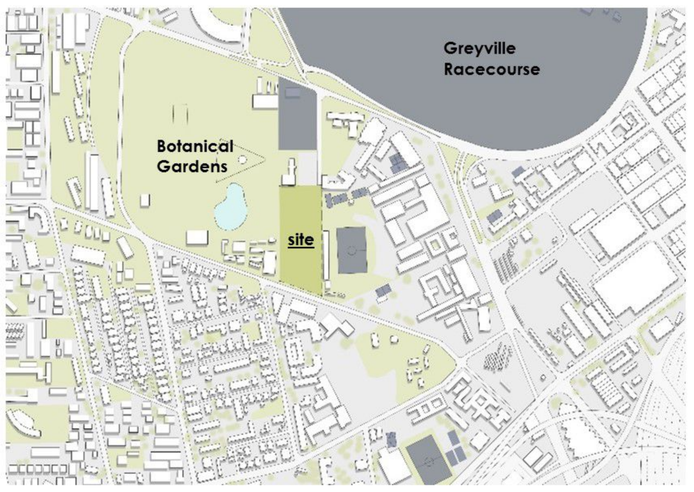
Macro Analysis



Educational Facilities
Healthcare Facilities

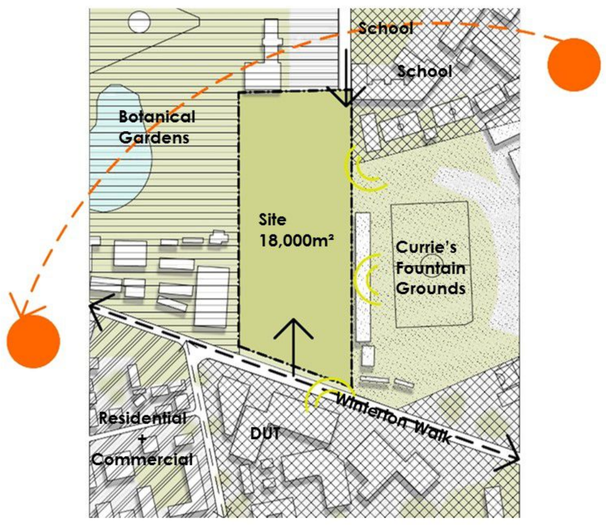


Bus and Taxi Ranks
Major Transport Routes



Sporting Facilities

Micro Analysis



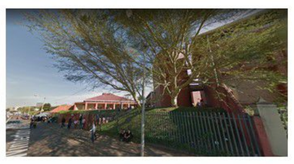
Contextual and Site Pictures


Botanical Gardens


Curries Fountain


DUT


Site


DUT


Site

ADDRESS	9 John Zikhale Road, Greyville, Durban.
ERF	3176
ZONING	Public Open Space
SITE AREA	18 000 m²
SITE DESCRIPTION	
• LOCATION	Located between to Curries Fountain and Botanical Gardens. In close proximity to a public hospital and many high schools.
• ORIENTATION	Opportunity for North East light to be taken advantage of.
• TOPOGRAPHY	Generally flat green field site.
• ACCESSIBILITY	Accessible easily by both vehicle and pedestrians. Public transport is in walking distance of the site.
• NATURAL SURROUNDINGS	Vegetation on the outskirts of the site – size of site allows for the potential of healing natural landscape design.
URBAN CHARACTERISTICS	Site is away from dense urban forms as it is located between the gardens and a field.
CONTEXT	Site located between urban and residential areas. Mixed-use area.
PROS	
Large site: enough space for design to be deconstructed and to allow for landscape/park design.	
Greenfield site – existing natural landscape.	
Site allows for future expansion.	
Site allows for privacy	
More or less flat site - universally friendly	
Close proximity to a general public hospital – St Aidan's Hospital	
Close proximity to high schools and universities i.e. Accessible to adolescents	
Near botanical gardens – one of Durban's lungs	
Public transport in a 10 minute walking radius of the site - near Warwick	
Falls between the city and residential.	
Not on a main road – away from noise pollution from traffic – allows for a more therapeutic environment.	

Condensed Accommodation Schedule and Spatial Relations

The following accommodation schedule was developed through the analysis of precedent and case studies as well as through interviews done with adolescent patients, healthcare professionals and built environmental professionals. In addition, the context of the site also informed amenities provided. This is a condensed version with ancillary spaces such as offices, ablutions, etc., having been left out.

ENTRANCE & ADMISSIONS
- Entrance foyer
- Waiting
- Reception
- Gift Store
- Café

COMMUNITY & EDUCATIONAL
- Library and resource space
- Multi-purpose rooms

ADMINISTRATION & STAFF
- Admin Offices
- Staff break room and lounge
- Staff change rooms
- Seminar and training room
- Interview/Meeting rooms
- Staff library
- Kitchen and dining

PARENT AND STAFF ACCOMMODATION
- Double person accommodation with bathroom
- Four person accommodation with bathroom
- Lounge
- Kitchenette

RECREATIONAL THERAPY SERVICES
- Cat café
- Yoga and dance studio
- Gaming arcade
- Indoor/outdoor gym
- Gardening and farming workshop
- Art room
- Mini-football
- Netball
- Volleyball
- Swimming pool

OUT-PATIENT FACILITY 900m²
- Consultation, examination and treatment rooms
- Individual and family counselling rooms
- Pharmacy
- Speech and hearing therapy room
- Audiology room
- Physical therapy room
- Occupational therapy room
- Dermatology room
- Dietician room
- Social services
- Child psychologist

PATIENT ACCOMMODATION– mild anxiety/depression, etc.
- Double patient room with bathroom
- Patient lounge and dining
- Patient games and activity room
- Patient library

MANAGEMENT AND MAINTENANCE
- Laundry
- Environmental services store
- Garden maintenance store
- DB and UPS room
- Waste management and disposal

Aesthetic and Design Considerations

Materials


Timber
- Natural material
- Visually interesting
- Tactile


Concrete
- Low maintenance
- Durable
- Tactile


Steel
- Reflective
- Cool to the touch - tactile


Brick
- Tactile
- Temperature control
- Noise absorption
- Natural material
- Low maintenanc


Wall Mural
- Way-finding
- Expression
- Positive Distraction
- Identity


Glass
- Visual
- connection

Vegetation


Indoor vegetation: air purification


Connection to the outside – window seats

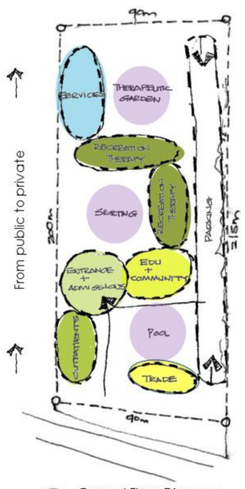

Terrarium Spaces


Blurring the lines Between the indoors and outdoors

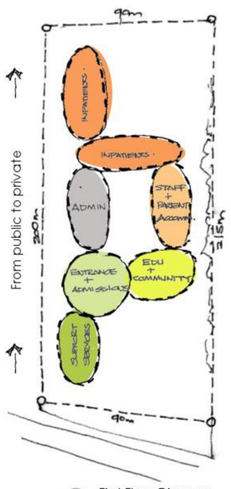

Framing views/veg with windows


Shading and Tactility - Vegetation as Part of the building

Conceptual Spatial Diagram

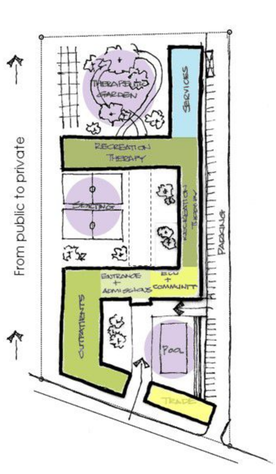


Ground Floor Diagram (Not to scale)

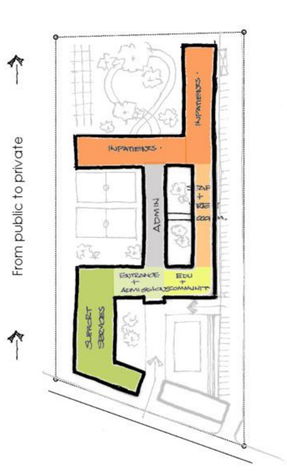


First Floor Diagram (Not to scale)

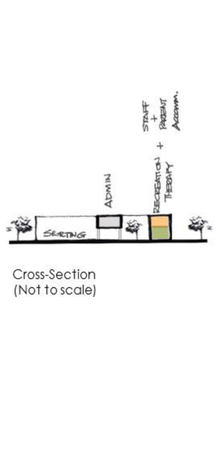
Conceptual Building Layout



Ground Floor Layout (Not to scale)

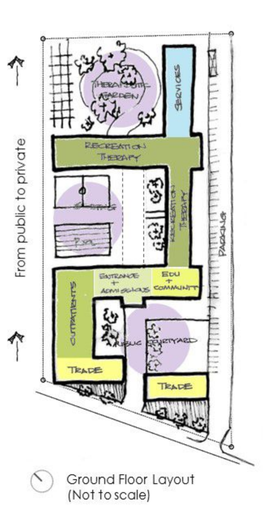


First Floor Layout (Not to scale)



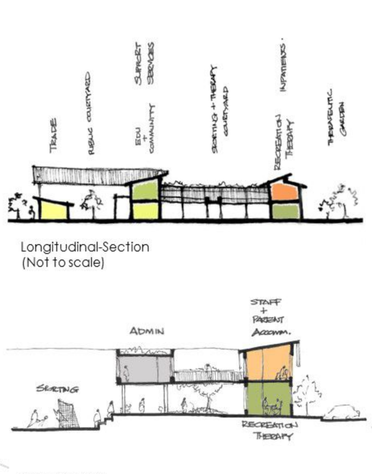
Cross-Section (Not to scale)

Conceptual Building Layout – Further Developed



Ground Floor Layout (Not to scale)

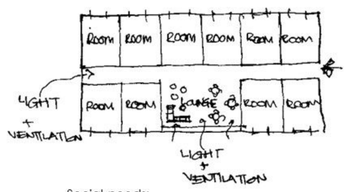
First Floor Layout (Not to scale)



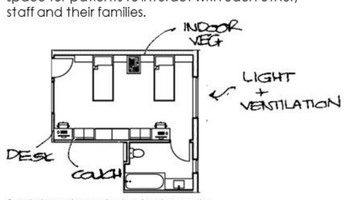
Longitudinal-Section (Not to scale)

Cross-Section (Not to scale)

Conceptual Design Ideas



Social needs:
Layout of inpatients with lounge and dining space centrally located. Lounge serves as a space for patients to interact with each other, staff and their families.



Social and psychological needs:
2 Bed inpatients room: the room is separated using indoor vegetation to keep the room feeling open and bright but to divide the space so that each patient has a space of their own. Each patient has a desk, cupboard, 2 pedestals and couch. The room is also well lit and ventilated.

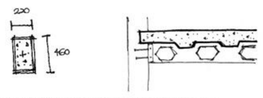
Above: Courtyard which recreational therapy and educational spaces open up to.

Right: Walkway under elevated admin block.

Structural Systems

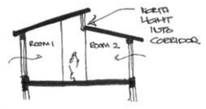
Introduction
- The structure of the facility is made up of columns and slabs with non-load bearing and curtain walls capped off with a combination of pitched and flat roofs. The structural aim was to create a building which on the exterior gave an impression of rootedness as the building is to serve as to serve as not only a healthcare centre but a community nucleus as well.
- An additional aim is to have wide spans between columns so that the facility feels spacious and facilities such as the recreational therapy spaces can be flexible, evolving according to the needs of the community.

Columns & Foundation	Reinforced concrete columns which are 220mm x 460mm wide are set 10 and 15m apart and are secured to the ground using reinforced concrete pile foundations. Columns have been sized to slot into walls where need be.
Slabs & Beams	Precast concrete slab decking floor with castellated steel beams has been used. Castellated beams have been used in order to span 10 – 15m. Castellated beams to be stiffened to prevent buckling.
Walls	The walls of the building are brick infill with exterior walls being 220mm thick while interior walls are 110mm thick. Walls are plastered and painted using non-hazardous eco-friendly paints. Curtain walls used are aluminium framed with thermal breakers and double glazed low-e glass infills. The utmost efforts have been taken in order to reduce or prevent radiation and heat transfer into the building.

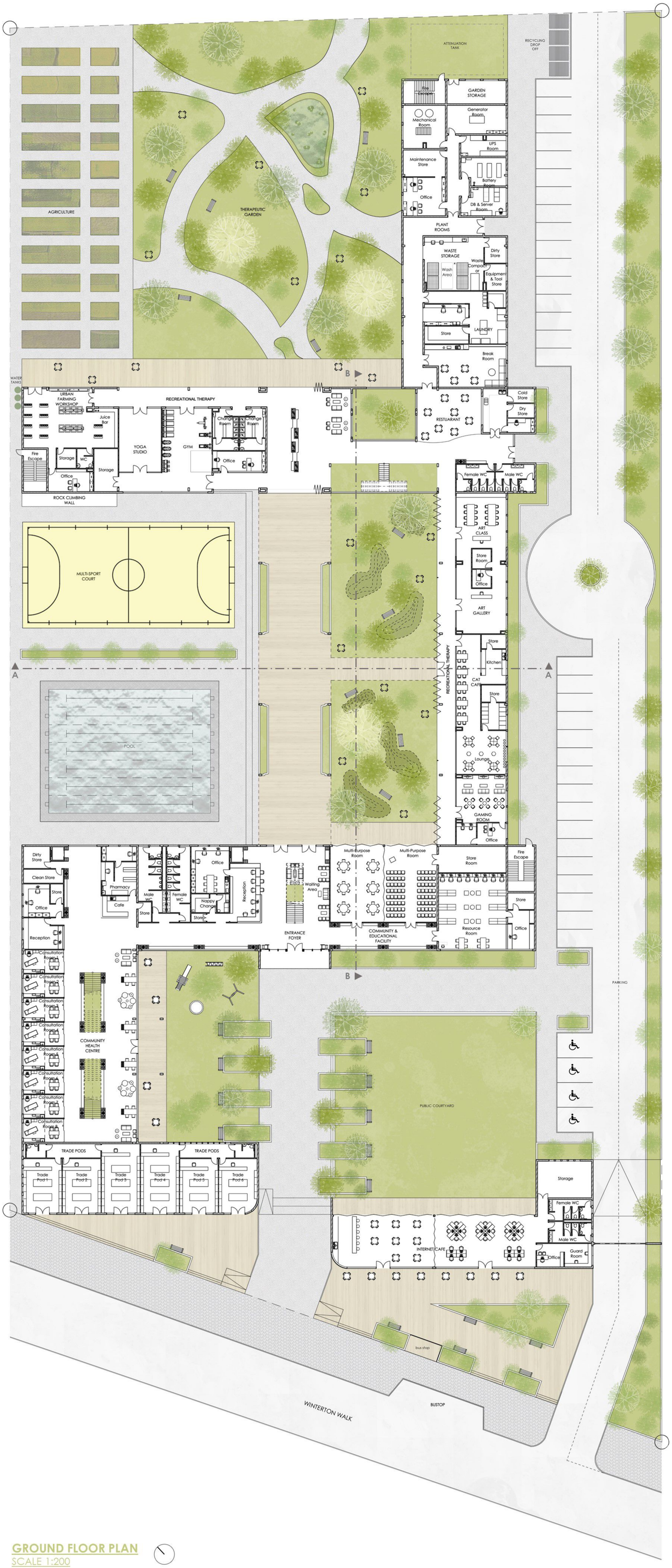


Column and Composite Slab and Beam

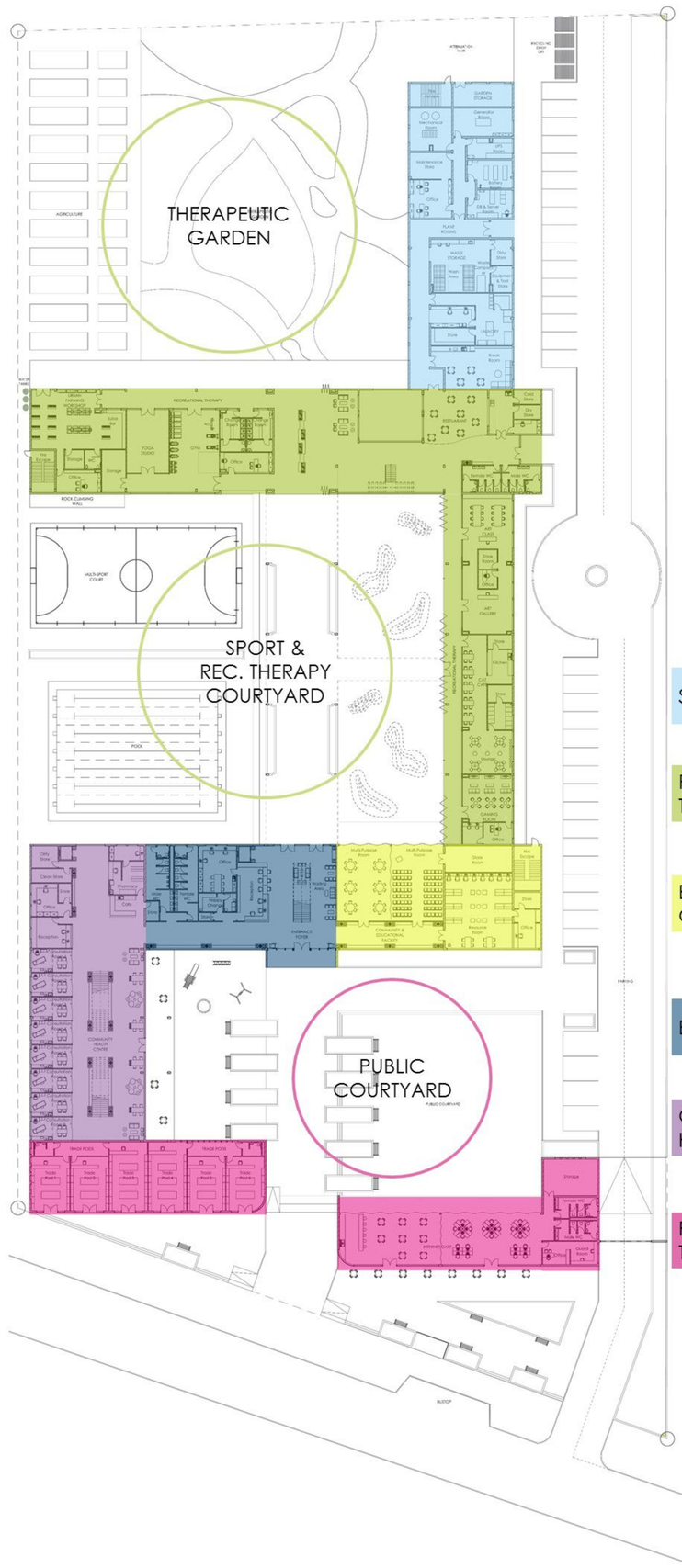
Solar Shading
Due to the long side of the site facing North West, vertical recycled wood-plastic composite shading devices will be used as seen above.



Roof Types
Pitched and flat roofs. Pitched roofs to serve as rainwater collection devices.
Above: Light and ventilation is let into the double loaded inpatient corridor using clerestory windows or skylights.



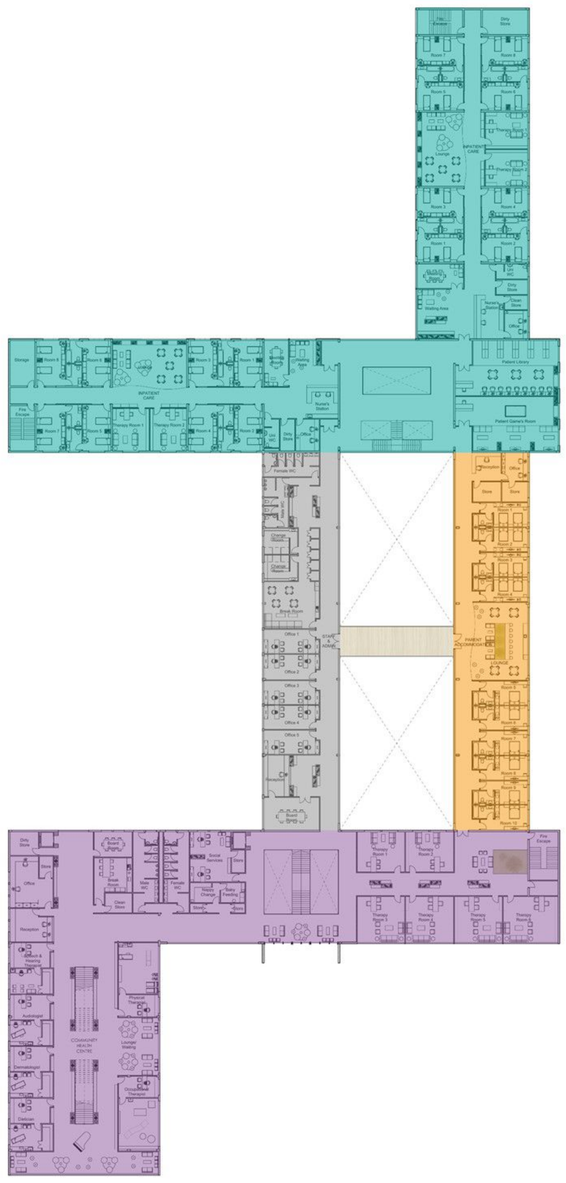
GROUND FLOOR PLAN
SCALE 1:200



GROUND FLOOR NAVIGATION PLAN
SCALE 1:400

3D RENDER
STREET VIEW – TRADING AND CAFÉ SPACES

3D RENDER
FRONT ENTRANCE AND PUBLIC COURTYARD



PATIENTS' ACCOMMODATION

STAFF & PARENT ACCOMMODATION

STAFF AND ADMIN OFFICES

COMMUNITY HEALTH CENTRE

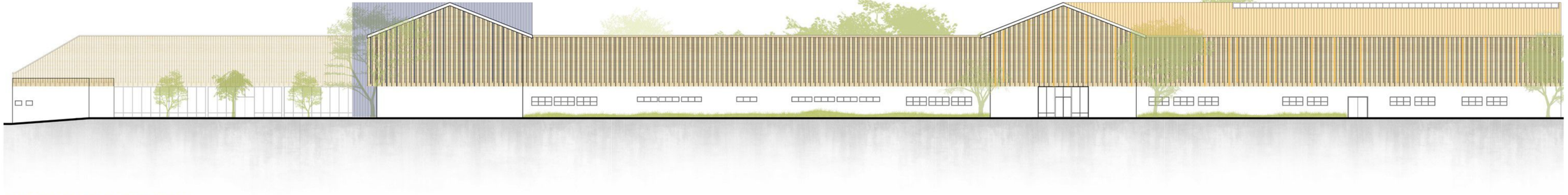
FIRST FLOOR NAVIGATION PLAN
SCALE 1:400

FIRST FLOOR PLAN
SCALE 1:200

ROOF PLAN
SCALE 1:1000

SOUTH WEST ELEVATION
SCALE 1:200

3D RENDER
PUBLIC COURTYARD



SOUTH EAST ELEVATION
SCALE 1:200

3D RENDER
SPORTS COURTYARD

3D RENDER
HORTICULTURE WORKSHOP

3D RENDER
YOGA STUDIO

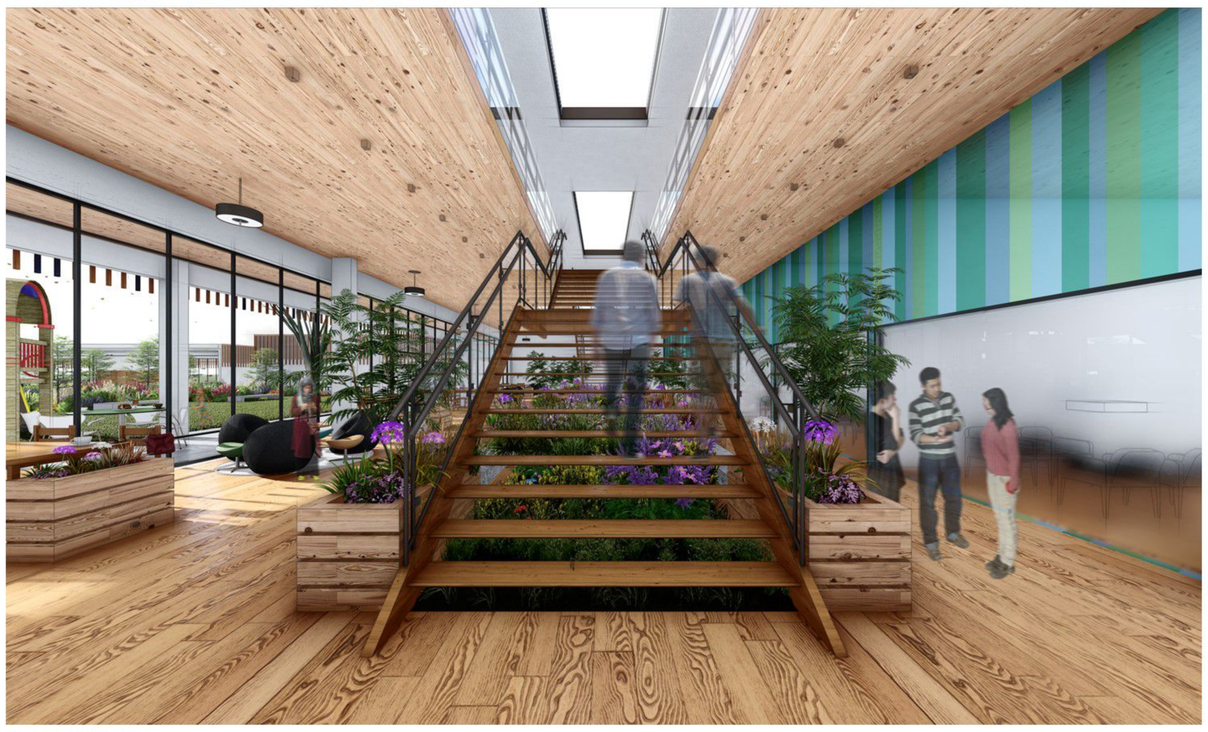
3D RENDER
RECREATIONAL THERAPY GARDEN

3D RENDER
THERAPEUTIC GARDEN

SECTION A-A
SCALE 1:100

3D RENDER
ENTRANCE FOYER

3D RENDER
RESTAURANT & ACCESS TO ACCOMMODATION

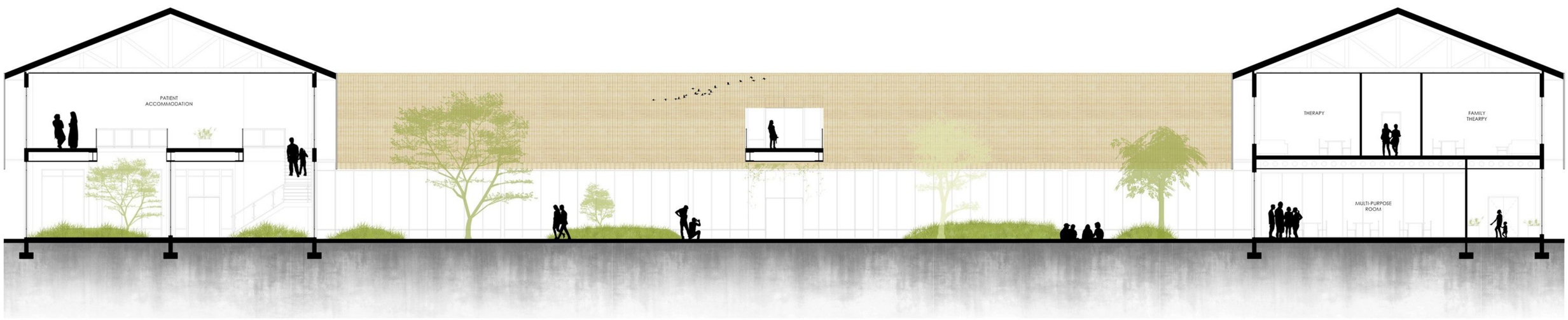


3D RENDER
COMMUNITY HEALTH CENTRE

3D RENDER
COMMUNITY HEALTH CENTRE

3D RENDER
PATIENT LOUNGE

3D RENDER
PATIENT ROOM



SECTION B-B
SCALE 1:100