

**THE STUDY OF SENSORY STIMULATION AS AN
ARCHITECTURAL DESIGN TOOL: A Proposed Children's Centre
and Community Facility in Umlazi**

Sarah Carless

DECLARATION

A Dissertation submitted in partial fulfilment of the requirements for the degree of Master of Architecture.

I hereby declare that this dissertation is my own unaided work. It is being submitted to the School of Architecture, Planning and Housing, University of KwaZulu-Natal, Durban, for the degree of Master in Architecture, and has not been submitted before for any degree or examination at any other University.

Signed by me on this 27th day of May 2011.

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DEDICATION

To my parents,

Your continuous love, support and encouragement when things seemed impossible can never be fully appreciated.

ABSTRACT

Architecture is intended to house, shelter and define the framework within which human activity occurs. It is far more than purely functional and its vast impact on the physical, emotional and psychological aspects of its users should not be ignored. Unfortunately, much contemporary architecture has become driven by external appearances, pushing the boundaries of technology and engaging with the eyes. The sensory aspects of architecture that enhance the body's experience, have largely been neglected, much to the detriment of the human experience, as it is through the body that one perceives, engages and enjoys architectural spaces.

This dissertation looks into a more appropriate response to architectural design that understands the significance of the sensory experience of the human body. Benefits of such an architectural theory are considered and the practical application of this approach to architectural design is discussed.

Furthermore, this exploration is used to analyse children's experience of the built environment. Basic research recognises the importance of the environment on children's development; however, this knowledge is seldom applied to the design of children's spaces. The research undertakes to more fully examine children's development and the physical, sensory and psychological manner in which children engage with the built environment. The findings include proposed design approaches that suitably respond to this.

The research culminates in an analysis of the sensory approach to architecture in the local context of KwaZulu-Natal. Conclusions are drawn from the research carried out through interviews, a review of literature, and analysis of case studies and precedents studies. The outcome of this dissertation is a set of recommendations, principles and an understanding of the criteria necessary to inform the design of a Children's Centre and Community Facility in Umlazi.

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PART ONE

BACKGROUND RESEARCH ON ISSUES

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Space is a continuous sensory experience. The bodily experience of a space influences one's perception of that space. Humans rely on their sensory modes to better understand, identify with and engage with their surroundings.

Regrettably, many architects today view buildings as visual entities, meeting the demands of functional criteria. There is opportunity, and a need, for designers and architects to create environments that are not only purely functional and pleasing to the eye, but complete bodily experiences, converting spaces into places that are memorable and meaningful, for those that interact with them.

While one is aware that all human beings are influenced by the places they occupy, this is heightened in the lives of children. Studies show that children are acutely influenced by and sensitive to their environments. Basic research in environmental psychology confirms that *places* are fundamental to children's developing identity and perception of themselves. Their view and understanding of the world, which takes place primarily through physical experience, is moulded by the environments they occupy and exist within. Thus, the spaces children exist within are important in their health and livelihood.

Unfortunately, the importance of the environment to children's development has yet to be fully integrated into the design of children's spaces. In today's society, limited access to safe, unrestricted outdoor spaces, combined with the emergence of the media and computer focussed era, has resulted in greater time spent indoors. At best, these places where children grow up, play and learn are designed by architects with an adult orientated mentality. Sometimes, they are places simply left over from the 'adult world.' These spaces thus become the environments that greatly impact young children.

The justification for this study is discussed below:

Much literary information focuses on the visual quality of architecture. An entire book can consist of a collection of photographs that are intended to depict the total architectural experience through visual media. There is unfortunately much less emphasis in literature on the practical experience of architecture. While the sense of sight has been given preference and is extensively dealt with, there is ignorance in terms of the totality of the human body in architectural experience. Architects have a unique opportunity to alter this perception by exploring the experiential qualities of built form, as opposed to a purely visual, functional approach.

Since it is in an experiential and physical manner in which children engage with their environments, looking at sensory architecture in terms of children's spaces is appropriate. One would expect that spaces for children would be designed according to their sensory and experiential needs. However, it seems that environments for children are being designed without a thorough understanding of the physical and experiential manner with which children interact, respond to and learn from their environments. This disregard has a vast impact on the design of children's spaces and the degree to which they can benefit from them, or be stifled by them. It is understood in environmental psychology that environments for children that are void of stimuli cause perceptual and learning deficits in the developing child (Baird, Lutkus, 1982: 5). Thus, the motivation for a study such as this is evident as many children in today's society are spending much time in impoverished environments.

An understanding of the way in which children learn through hands-on, bodily experience of space, will influence and alter the way in which future children's spaces are designed. Understanding the role of sensory stimulation in architecture and its benefits to users, as well as how this can be incorporated into children's spaces, could greatly aid the developing child and ensure spaces created are well loved and used by all.

1.2 DEFINITION OF THE PROBLEM, AIMS AND OBJECTIVES

The research problem is defined as follows:

While performing many roles, one of the fundamental functions of architecture is to house, shelter and protect people from the elements. People have physical bodies, emotions and souls that are affected by the environments they occupy. Since the emergence of the modern era in architecture, designers seem to have shifted their focus on to the purely functional and visual quality of the built environment. Contemporary architecture has largely become focussed on external façades, pushing boundaries and challenging technology. Such an architectural view does little to enhance the physical, social and psychological experience of the user. While multisensory architecture is still a relatively new concept, it is beginning to be seen in a number of international examples, recently designed. Architects such as Peter Zumthor (2006), Steven Holl (2007) and Juhani Pallasmaa (1996) are a number of architects who have also published current literature on the subject. Unfortunately, this is not the case locally. The lack of both local literature on the subject and built examples of multisensory architecture in South Africa, and particularly Durban, is evidence of this.

As mentioned previously, children are widely affected by their environments. Currently less time is being spent in the naturally beneficial outdoors and more time indoors, in spaces that have not been optimally designed according to their needs, and the manner in which they experience, interpret and develop within space. This is partly due to a lack of understanding of children's engagement with spaces, and the way they develop within them. Teachers, caregivers, children's specialists and architects involved in the design of spaces for children, are unaware of the vast difference between spaces for adults and those ideal for children. There is a need for better communication between designers and those involved with children which could be beneficial in creating more appropriate environments. Often, the same principles and architectural approaches are applied to the design of environments for children and adults, even though they should be vastly disparate. The result of this is the creation of inadequate environments that do little to

improve the lives and learning opportunities of children that use them. This impacts their development into adulthood and ultimately on the future society they will be part of.

In a local context, this lack of understanding is openly evident in Umlazi. Even though numerous schools are provided to accommodate the large amount of children in the area, very few are specifically designed according to children's experience or help improve children's learning and growth. The need for facilities to accommodate children below formal schooling age is further evidence of the lack of knowledge regarding children's development, as it is in these years that children undergo much growth and maturity.

The intended aims of the research follow:

- To investigate the benefits of a more appropriate approach to the built environment that views architecture as a holistic bodily experience, stimulating multiple sensory modes simultaneously.
- The intention is to look specifically at how this approach can be applied to the design of children's spaces, thereby enhancing their experience of space and the capability to enjoy, interact with and develop within them.

The intended objectives of the research follow:

In achieving the aims defined above, the objectives of this dissertation are as follows:

- To establish the definition of multisensory architecture and its benefit to the human experience of architectural space identified.
- To study architectural theories and architects' projects which will reflect how the concept of sensory architecture has been applied and expressed in the built environment.
- To gain an understanding of children's spatial experience and the psychological impact of places is to be gained.

- To use such knowledge to enable guidelines to be established for designing spaces that incorporate the multisensory concept, specifically for children.

1.3 SETTING OUT THE SCOPE

In order to define the scope of the research problem, the argument will be limited to the following points discussed below:

Modern research has identified numerous senses in addition to those five commonly known; sight, hearing, touch, taste and smell. Examples of these are: balance and acceleration, temperature, kinaesthetic sense, emotion, pain and direction. However, for the purpose of limiting this research to enable a more thorough and accurate investigation to emerge, the study will focus predominantly on the five common senses, although, where deemed appropriate, the haptic sense and kinaesthetic sense will be considered as well. These are relevant to the sensory experience in terms of movement through architectural space.

Sensory stimulation is beneficial for all in different ways. While one could incorporate the visually impaired, deaf and mentally disabled or other sensory disabled users as well as disabled children into the discussion, this dissertation will specifically look into the role of sensory stimulation on the everyday building user, uninhibited by disability.

Multisensory architecture has an insurmountable number of benefits and can alter the human experience of space in many different ways. As it is not possible for the study of this nature to delve into each of these, six key aspects form the focus of this section of study in order to create a concise argument of depth. These are; the experience of the body, the importance of tactility, memory in architecture, identity within spaces, spirit of place and built form as a sensory stimulus.

Referring to 'children' is a very broad term and can refer to any young person, from infant to teenager. While sensory stimulation impacts all children in various ways as they age and mature, this dissertation is focussed primarily on children under twelve years of age. This age group is selected as they form the sector which engages with the environment on a primarily physical and experiential manner.

According to the expectations of society on acceptable gender role behaviour, the gender of a child influences his or her engagement with the environment. While gender may also determine certain genetic traits significant to environmental experience, for the purpose of this study, these differences are to be assumed as negligible and will not form part of the discussion. The same assumptions are to be of cultural differences. While such differences could alter the experience of a child, this dissertation assumes these differences to be minimal in order to come to a more holistic and general understanding.

Terms used within this dissertation are defined below:

Aural: Of, relating to, or perceived by the ear.

Body / Bodily Experience: The experience of a space perceived first hand through the body itself.

Gross / Fine Motor skills: The abilities required in order to control the large and small muscles of the body for physical activities.

Haptic: Of, or relating to, or proceeding from the sense of touch.

Kinaesthetic: Perception through the sense of touch and movement.

Ocular-centrism: The privileging and pre-occupation with the 'eye' or vision.

Olfactory: Of, relating to, or contributing to the sense of smell.

Senses: Any of the faculties, such as sight, hearing, smell, taste, or touch, by which humans and animals perceive stimuli originating from outside or inside the body.

Sensory impairment: Individual's inability to accurately interpret an outside source or stimuli.

Sensory stimulation: Arousal of the brain through any of the sensory modes.

Tactile: Perceptible to the sense of touch; tangible.

Visual: Of, or relating to the sense of sight.

In order to clarify and better define the research intention, a number of assumptions are to be stated.

The primary assumption to be made is that the built environment influences people. Its effects are physical, emotional and spiritual and are experienced by all building users.

One must assume that for the purpose of this study, users of the built environment studied are not inhibited in the use of any of their senses. This is to ensure an equitable basis for an accurate, comparative investigation to occur.

Those individuals upon which the study is based, or those interviewed, are in no way influenced in their perception of space through the sensory modes, by cultural, gender, economic or social differences.

The children studied are not restricted in any way. They are able to understand, learn within and experience the built environment in a typical and natural manner appropriate for their age group and maturity level. Furthermore, it is assumed that children's ability to

learn and develop the necessary perceptual, motor and cognitive skills is accelerated by enriched environments.

The key questions the research undertaken is intended to answer are expressed below:

- How is one's understanding and perception of the built environment impacted by the use of the various sensory modes and is this information being used in contemporary architecture?
- What are the primary physical and psychological benefits of multisensory architecture?
- How do children interact with, understand and how are they influenced by the built environment?
- What is the impact of sensory stimulation on children's place experiences?
- How can architects approach children's architecture in ways more appropriate for their needs, wants, and manner in which they engage with spaces?

The hypothesis can be stated as follows:

- Approaching the built environment with a focus on sensory stimulation will convert spaces into exciting places that have physical and psychological benefits to its users. These benefits can promote wellbeing and a sense of place within the user.
- Physical interaction with spaces through the use of multiple sensory modes is an important means by which children experience spaces, develop within them and establish a sense of identity with a place.

- Children's experience of space can be enhanced by incorporating sensory stimulation into the built environment, as it transforms spaces into unique places that encourage exploration, play, and physical engagement, as well as provide children with a sense of ownership and self-identity.

1.4 CONCEPTS AND THEORIES

Five concepts and theories have been identified as foundational to this research proposal. They will provide the framework for the literature review and entire research plan. These theories are discussed below:

Poststructuralism

Poststructuralism is the term for a theory, or group of theories, that concern the relationship between humans, the world and the practice of making and reproducing meanings. Poststructuralists affirm that perception is not primarily a result of the images one recognises; as much as it is the product of the meaning one learns and reproduces. Poststructuralism is closely connected to the theory of structuralism which claims that the true character of things (in this case, architecture and elements of the built environment), does not lie in these things themselves, but rather in the relationships which one builds between them and the meanings one gives them (Nessbitt, 1996: 450).

Poststructuralism furthers this idea by stating that things do not possess meaning in or of themselves. It is rather the viewer that imparts meaning to things, thus making them subjective, as each human perceives according to their own, individual position (Belsey, 2002: 7). This highlights the difference between seeing and perceiving which is relevant to consider in this dissertation where architectural perception is a focal point. It is necessary to bear this theory in mind as one progresses through the discourse as the perception of architecture and way it is experienced can vary according to each user.

Thus, each statement made, must be understood as a general supposition, rather than a finite assertion.

Phenomenology and Existential Space

The phenomenology of architecture looks at architecture from within the consciousness experiencing it, and seeks the inner language of building (Pallasmaa, 1996: 450).

Norberg-Schulz, in *Genius Loci – Towards a Phenomenology of Architecture*, deals with the fundamental need of man to be able to experience the world and environment as meaningful. For him, this theory describes a methodology for place-making, and proposes that the existential purpose of architecture is to transform a site into a place and to uncover the meaning of that place (Norberg-Schulz, 1966: 422).

Within this theory, he looks into the concept of ‘Existential Space’ which he defines as the basic relationships between man and his environment. Existential space focuses on the character of space as it exists and it is that which enables one to orientate oneself within a space and identify with it. Both orientation and identification are necessary for man to dwell within a space and experience that space as meaningful (Norberg-Schulz, 1979). Pallasmaa (1996) furthers this concept by stating that:

“Architecture strengthens the existential experience, one’s sense of being in the world, and this is essentially a strengthened experience of self”

(Pallasmaa, 1996: 41).

Perception Theory

As perception is often related to one's emotions and senses, it is difficult to determine how one will perceive the surroundings. Thus, perception is often referred to as irrational and subjective (Schaap, 2010). According to van Kreijl's thesis, sensory perception of architecture consists of three major concepts: hapticity, kinesthesia and synaesthesia (van Kreijl, 2008). For this dissertation it is important to look at all three, as together they define a more constructive view on how humans perceive architecture.

Hapticity is closely related to the sense of touch; however, the haptic refers more to a three-dimensional understanding of the environment. As Gibson (1966: 102) understands it, while the sense of touch gains knowledge regarding the two dimensionality of forms and the patterns they possess and impart on the skin, the haptic system gains information concerning all three dimensions of forms. One's sense of depth, perceived through the sense of sight, is verified by hapticity.

Kinesthesia is a concept referring to the exploration of the environment through movement, either by the eyes or body. By active exploration of the environment, a direct relationship develops between touch and movement and therefore hapticity as well. This makes kinesthesia important for architecture as moving through spaces with the body or just the eyes makes one experience architecture in a less static way. If taken into account in the design process, it is possible to generate a multi-layered architectural experience (Schaap, 2010).

Synaesthesia refers to the phenomenon that transfers sensory information from one sense to the other. It is often seen as a combination of all the input from the senses in the mind. Vodvarka and Malnar (2004) believe synaesthesia to be "the stimulation of one's sensory modality reliably caus[ing] an involuntary perception in another modality" (Vodvarka and Malnar in van Kreijl, 2008: 31). An example of this can be understood in the way one views the lines in woodwork as being warm, while steel engraving are perceived as cold lines.

Synaesthesia thus becomes an integral part to life, giving sustainable meaning to experience. Van Kreijl (2008) goes so far as to conclude that the synaesthetic characteristics of materials are of more importance in one's perception than the acts of seeing, hearing, tasting and touching.

Imageability

The writings of Kevin Lynch explore the way in which the environment is perceived by individuals moving through it. The word perception means to identify, or understand, rather than to see. In this he suggests that almost every sense is used when experiencing and moving through an environment.

The ability to navigate through spaces offers one a sense of security, identity, direction and control over a space. Lynch (1960) refers to this ease with which a place can be mentally represented as 'imageability'. He defines it as:

"...that quality in a physical object which gives it a high probability of evoking a strong image in any given observer"

(Lynch, 1960: 9).

To heighten the imageability of the urban environment is to engage in the making of vividly identified, powerfully structured and highly useful mental images of the environment. The theory of imageability is thus relevant to this study as often the most powerful or 'imageable' spaces are those that are not merely viewed, but rather holistically experienced through multiple sensory modes.

The Spirit of Place

Christopher Day, in his book 'Places of the Soul' speaks of the necessity for healing in architecture. Here he emphasizes the importance of the intangible, yet perceptible 'spirit

of place'. According to Norberg-Schulz (1979: 5), "a place is a space which has a distinct character." It is through the use of one's senses that the spirit of a place is formed in one's mind. Used simultaneously, the senses evoke a picture of reality never adequately described by an individual sense. It is this reality which is called the 'spirit of a place', and is the quality of the environment that affects one emotionally (Day, 1990: 21).

1.5 RESEARCH METHODS AND MATERIALS

There are two components that constitute the research methods and materials employed in this dissertation. Firstly, primary research is used to gather information by means of relevant interviews and case studies. Secondary research forms the second component. This involves an extensive review of literature regarding the subject matter. Due to the nature of the topic, the research is both qualitative and quantitative.

Primary Research

First hand documentation is gathered through a series of focussed interviews with practicing professionals in the field of architectural design. Their expertise, opinions and practical knowledge regarding architecture as a bodily experience involving multiple senses is required as part of a conclusive discussion. Practicing architects are to be questioned on their understanding of multisensory architecture, whether they feel much contemporary architecture lacks interest and sensory stimulus and how and if they have incorporated this concept into their current work. Due to the nature of the topic, structured interviews are to be used to enable comparisons and accurate conclusions to be drawn. Interviewees will be able to divert the discussion where deemed relevant and encouraged to elaborate. Interviews are to be particularly useful in the discussion of children's development and the importance of sensory stimulation. Occupational therapists dealing with children, teachers of young children and specialists in children's

development will provide up to date, practical insight into the importance and role of the built environment on young children's developmental growth.

Case studies form the second component of primary research undertaken for this dissertation. This involves visiting, measuring, photographing and critically assessing buildings or spaces relevant to this study. Working drawings are to be obtained and analysed with conclusions being supported by personally produced graphic and photographic data. Within these spaces, the way in which children use the built environment and preferential treatment they give to certain spaces will be observed and recorded.

Secondary Research

Secondary information forms the foundation for the research in sensory stimulation as an architectural design tool. This information is found through research obtained from a literature review of the existing body of knowledge, in the form of books, journals, articles, and electronic sources such as the internet, e-books and e-journals. The research covers the psychology of the senses and their use within the built environment, i.e. how sensory stimulation affects one's perception and its benefits to the experience of space. The research then focuses on the psychology of children and the impact of sensory stimulation on their spatial experience and developmental growth.

A critical analysis of this literature provides the framework and criteria by which case studies and precedent studies are to be analysed.

Precedent studies are a further aspect of secondary research. A number of international and some local building examples are identified as relevant to the subject matter and analysed through photographs, architectural drawings and text media. The study of various precedents is to provide practical insight into the existing theories on sensory stimulation as an architectural design tool as they are seen in the built environment.

The data obtained from this research document is intended to inform the design of a Children's Learning Centre in Umlazi. The focus of the research emerges in the building's conceptualisation as a sensory stimulating environment, its planning, material selection and detailing, as well as various other design elements informed by this study.

1.6 CONTRIBUTION TO KNOWLEDGE

The purpose of this dissertation is to contribute towards the body of literature regarding sensory stimulation as an architectural design tool. Architecture is to be explored as a sensory experience and insight is to be provided into the role of the senses in interpreting the built environment, beyond the purely visual sensory mode. A contribution is to be made regarding the benefits of multisensory architecture and how designers can address all the senses through architectural design.

The study is to further contribute towards an understanding of the manner in which children perceive and interact with their environment, and the role of sensory stimulation in their developmental growth. A new approach to the design of spaces for children is to be explored, showing how sensory stimulation can be implemented into the design process.

1.7 CONCLUSION

Architecture is the art and science of building. It is the built environment one finds oneself inhabiting daily. Its purpose is to house and enclose people, to provide shelter and a structured environment. It is that which defines and confines space for the human body to occupy. Individuals are the primary client; yet, in much of the architecture today there is a disappearance of its physical, sensual and embodied essence - those things that relate to one's humanness. The built environment has been reduced to a purely visual experience, to be seen from afar but not touched, smelt, tasted or heard.

Designers today have the responsibility to re-establish the role of architecture in society as a place for people. There is opportunity to bring ‘humanity’ back into the design of spaces for people. According to Bobrova (1990: 32), architecture can only be truly human if it is ‘of a design so as to be perceived by the whole complex of sensory organs of man.’ It is when one approaches architectural design as a full bodied, sensory experience that designers can achieve an engaging environment that is a complete, human experience. One that remains part of one’s memory long after the visual image has been forgotten.

More specifically, when one approaches the design of spaces for children with this same multi-sensory experience in mind, there is opportunity to establish a built environment that is better suited for children and the way they perceive, interact with and learn from space. It is up to designers and planners to ensure that children and their needs are not forgotten in the construction of the built environment as, ultimately, they are the leaders and society of tomorrow.

The following chapters provide a review of existing literature pertinent to the topic of sensory stimulation as an architectural design tool. The research presented here is grounded on the fundamental concepts and theories discussed, and strives to draw closer to answering the key questions stated. In doing so, it is anticipated that one will gain insight into an approach to the built environment that views architecture as a holistic bodily experience, stimulating multiple sensory modes simultaneously. Furthermore, it is expected that the following literature review will reveal how this approach can benefit the design of children’s spaces by enhancing their experience of space and ability to understand, interact with and develop within them.

The review of literature begins by looking into the psychology of the senses. In Chapter 2, contemporary architecture is revealed as predominantly visual and the course that has led to this is shown in the discussion of Modernism. Reasons are presented for the need to reinvent architecture, and the contrasting opinion that views the senses as integral to architectural perception, is discussed.

The treatise then progresses, in Chapter 3, towards looking into architecture and the senses. Highlighted in this chapter is the experience of the body, the importance of tactility, the impact of sensory architecture on memory and identity, as well as the spirit of place. The intention is to establish the importance of sensory stimulation in architectural perception and how it affects and enhances the experience of users while they are in the building, and after they have left. This chapter concludes on a more practical level by looking into built form as a sensory stimulant.

Children and their environments are subsequently discussed in Chapter 4. In order to establish a renewed approach to architecture for children, it is necessary to understand the way they interact with the built environment and how they are impacted by it. This discussion aims to do this by looking into the various developmental processes children undergo and their spatial experience in comparison to adults. The importance of play and the psychology of the place experience are further elaborated on. The physical and sensorial aspect of children's experience and development is highlighted, establishing the link between architecture for children and multisensory architecture.

The final aspect of the literature review, considered in Chapter 5, focuses on establishing new guidelines to the approach of architecture for children which reflects the significance of ensuring spaces for children are sensory stimulating. The Reggio Emilia theory of education forms the framework for this discussion. Within this theory, three major approaches are highlighted. Firstly, variety in architecture, spaces provided and elements within those spaces are found to be important. Secondly, to look at nature for inspiration in the design process, as it is a natural stimulator and place which children are drawn to, is of value. Thirdly, viewing the built environment as a teacher can assist children's development by engaging their sense of exploration and encouraging questions to be asked.

Following on from this point, the approach to architecture as a sensory stimulator is seen evident in contemporary built form, examined in chapter 6. This is done by looking at a number of building examples from across the world. These buildings are examined in

terms of the theoretical framework set in the literature review and practically reflect the importance and benefits of multisensory architecture, as well as how it can be achieved.

The discourse then concludes by focussing on the context of Kwa-Zulu Natal and illustrating the regional response to sensory stimulation as a tool in the design of children's spaces. In Chapter 7, the empirical studies conducted of two local schools demonstrate if and how the theoretical discussion is evident in the current South African context. Based on the findings, conclusions are drawn and recommendations made that would aid the future design of learning spaces for children in South Africa.

CHAPTER 2
PSYCHOLOGY OF THE SENSES

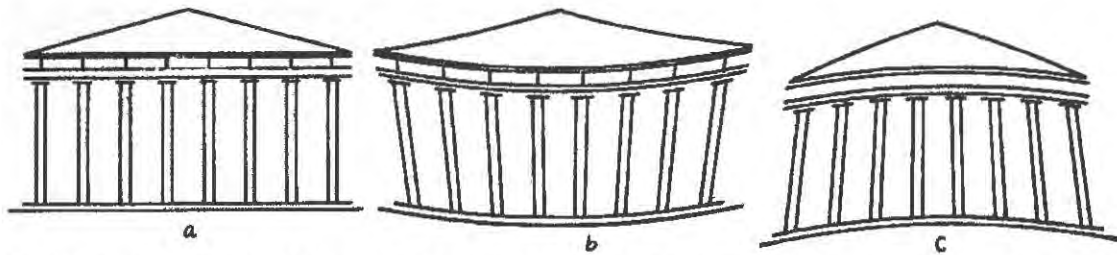
INTRODUCTION

In order for this study to be well grounded and provide genuine insight into the role of sensory stimulation in one's interpretation, understanding of spaces and its application to architectural design, it is necessary to first gain some background information regarding the aforementioned topic. Chapter two intends to do this by looking into the role of architecture in today's society as a purely visual art. A brief study of the modern movement in architecture is to provide reasoning and explanation for this new approach to architecture. This approach is then critically analysed and the study investigates the role of the various senses in one's interaction and engagement with the built world.

2.1 CONTEMPORARY ARCHITECTURE AS A VISUAL ART

Throughout much of history, seeing has been over-emphasised as the primary sensual activity in Western architecture. The outside or visual perspective in architecture has taken precedence over all other means of architectural perception. Far more importance has seemingly been given to the outward appearance, concept and intellectual aspects of architecture, rather than to the buildings' users, the way in which they occupy and live within space and its embodied experience.

Ever since the time of Classical Greece, art, architecture and aspects of culture has been based upon vision and visibility. Through a system of optical illusions, the built world was refined to visual pleasure. Plato regarded vision as humanity's greatest gift and, similarly, for Aristotle the most noble of the senses was sight.



(Fig 2.0: Illustration showing the use of optical illusions in Greek architecture. Here, *a* represents the front of a temple as it should appear; *b* represents its appearance (exaggerated) if it were actually built like *a* without compensations for optical illusions; *c* represents it as built and showing the physical corrections (exaggerated) in order that it may appear to the eye as *a* does. Source: www.visualillusion.net)

Contemporary culture has shifted towards a distancing and de-sensitization of the human experience to reality. The senses of touch, taste, hearing and smell call for closer contact or physical interaction, and as such, have been denied acknowledgment (Franck, 2007: 20-21). As noted by Pallasmaa (2005), this objectivity and limited interaction are favoured over sensuality and engagement with the world. This detached view is also evident in the loss of sensuality of contemporary art works, which has evolved in a similar manner to the architectural movements. Rather than engaging with one's sensory modes, these pieces "frequently signal a distancing rejection of sensuous curiosity and pleasure" (Pallasmaa, 2005: 34). This view is supported by Norberg-Schulz (1965) when he states that modern art and architecture are undermining humanity and destroying basic artistic principles (Norberg-Schulz, 1965: 20).



(Plate 2.0 & 2.1: The contrast between Renaissance art and Contemporary art is evident in a comparison between Rembrandt's *Bathsheba at her Bath* (right) and Andy Warhol's *Campbell's Soup Can* (left).

Source:
www.allartclassic.com;
www.artofcolour.com

As architecture has evolved from this vision-focussed society and increasingly digitalised world, instead of being a multi-faceted and layered object, it has been reduced to a single layer of vision. Even though, structures generated within this ideology have been provocative, forward-thinking and challenging the boundaries of design, it is necessary to recognise how such an architectural approach does not aid the human existential experience of the world (Pallasmaa, 2005: 19).

According to Pallasmaa:

“Instead of an existentially grounded plastic and spatial experience, architecture has adopted the psychological strategy of advertising and instant persuasion; buildings have turned into image products detached from existential depth and sincerity”

(Pallasmaa, 2005: 30).

The architectural model that has resulted from this approach is experientially imbalanced and limiting in one’s engagement with the built environment. To reduce the significance of the body’s internal values, its needs and desires, is to lessen one’s opportunity to make responses that reminds one of their sense of self (Bloomer and Moore, 1977: 49).

The efforts of Bloomer and Moore (1977) to teach architectural design to first year students at Yale University is discussed in the book *“Body, Memory and Architecture”*. In it they consider the powerful presuppositions they faced regarding the definition of architecture in the minds of their students. In discussions with the learners, seldom was reference made to “unique perceptual and emotional capacities” of the human being. The general assumption is that architecture is a specialised system with a set of prescribed technical goals rather than a ‘sensual social art, responsive to real human desires and feelings’. Two dimensional drawings are relied upon with little acknowledgement of their three dimensional qualities and architectural experience as a whole. It is characterised by its impact on the sense of sight, rather than on the holistic perception of the body (Bloomer, Moore, 1977: ix).

In more recent times, similar methods of design were found by Karen Franck in her dealings with schools of architecture. In her opinion, there is a neglect of human experiential issues and activity within spaces while formal issues are stressed and pursued. Aspects of architecture that bring life to buildings and affect the human experience, such as furniture, lighting and materials are abandoned.

“So much of the stuff of life, indeed the stuff of architecture, is given cursory attention while a more abstract approach to design is pursued and celebrated”

(Franck, 2007: 12).

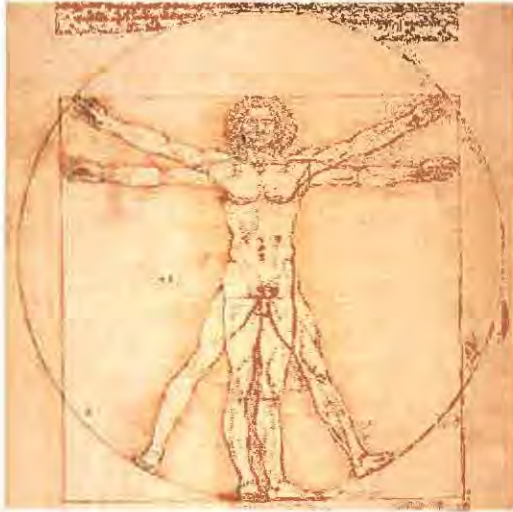
It is of little wonder that one’s experience of architecture and the built environment is so void of sensation, sentiment and true engagement. Environments have been created in the same way society today interacts with matter, people and space. One is encouraged to observe, but not to feel. Through a sensory and psychological detachment created between built environments and the human being, a sense of disconnection and isolation is produced (Pallasmaa, 2005, in Franck, 2007: 27).

In order to fully understand this loss of humanity within the built environment today, it is necessary to look to the past. To identify the path forward, an examination of events and ideals that have led to the present is an understandable first step.

2.2 THE MODERN DESIGN APPROACH

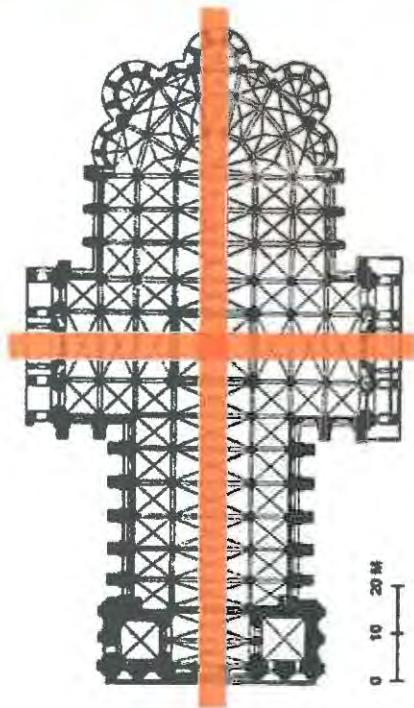
For centuries there has been an underlying conflict regarding architectural beauty. “Before Galileo, one can imagine an architecture that celebrated the human body, and gave it a sacred authority governing construction” (Bloomer, Moore, 1977: 15).

The Vitruvian man, which describes the geometric proportions of the human figure, was an inspiration for artists and architects during the fifteenth century. It was thought to



provide the source of perfect proportion and composition during the early ages, particularly during the Renaissance period. In basing architecture and art on the principles on human proportion and composition, the humanity and beauty based on human form is evident.

(Plate 2.2: Marcus Vitruvius Pollio's Vitruvian Man. Source: www.wikipedia.org)



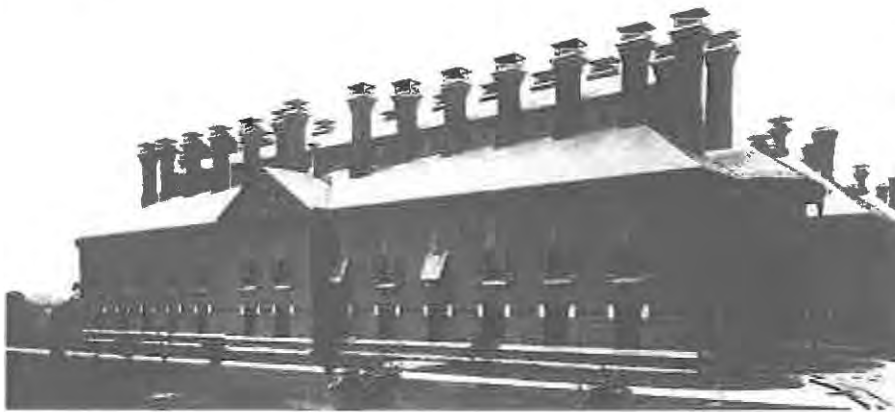
Following this principle of architecture that celebrates the human body, and is designed according to it, one can see that the floor plan of the Chartres Cathedral in France is derived from the crucifix position of the human body. Harmonious and symmetrical proportions, in keeping with the human form, were fundamental design criteria throughout.

(Fig 2.1: The crucifix is superimposed over the floor plan of the Chartres Cathedral. Source: www.sacred-destinations.com)

However, since this era, numerous debates have arisen as to whether a building is 'beautiful' because of its ornament and proportions, or because of other more functional criteria (Bloomer and Moore, 1977: 17).

With the advent of the machine age and industrialisation, theories regarding functionality, mathematical proportion and scientific rules became the basis from which architectural beauty was approached. A fundamental distinction became evident between an attitude that treats architecture as an applied science and one which treats it as a more holistic art (Bloomer and Moore, 1977: 21).

The John Hopkins Hospital designed by John Rudolph Niernsee 1885, shows evidence of how buildings were no longer designed after the human body, but rather after a machine metaphor.



(Plate 2.3: The John Hopkins Hospital.
Source: Bloomer,
Moore, 1977: 16)



(Plate 2.4: The Haviland Penitentiary in Philadelphia.
Source: Bloomer,
Moore, 1977: 16)

Similarly, the importance of functionality can be seen in the Haviland Penitentiary in Philadelphia, designed by John Haviland in 1829 [plate 2.4]. The building was designed for the sole purpose of creating effective surveillance of prisoners.

This struggle to establish new regulations and laws that would determine all elements and aspects of architecture was the generating force in the institution of modern architectural thought (Bloomer, Moore, 1977: 21). This movement in architecture saw a global uniformity, a 'pure reality' with completely new aesthetics stripped of all picturesque, associative or historicist tendencies. 'Clarity of form', 'purity of surface,' 'balanced asymmetry' and 'mass production' are all phrases commonly associated with the design of modern architecture (Gympel, 1996). Many of these can still be applied to current building practices today.

The National Museum [Plate 2.5] portrays the essence of modernism and brutalism. Designed by Denys Lasdun and opened in 1979, the raw concrete structure is harsh and severe. While being well proportioned and composed, the building is reminiscent of an industrial plant. The stark, austere finish does little to engage multiple senses or enhance the experience of the user. The focus of the architecture has, like much modern architecture, remained solely on the visual qualities, at the expense of all other means of

perception and experience.



(Plate 2.5: The National Theatre (opened in 1976) by Denys Lasdun demonstrates the principals of modern architecture. Source: glasspilgrim.blogspot.com)

The lack of human recognition in such a design approach is to be noted. In this modern movement in architecture, the process of design occurs foremost externally. Forms are composed by looking at the building from all angles, with the visual qualities and discernment of the eyes dictating the final product. Even the expression of architectural ideas comes in the form of models and drawings, which are intended to be seen but not occupied. And so the architect adopts the position of an observer, rather than occupant (Franck, 2007: 22).

In the writings of modernists, evidence of the dominance of this visual sense features strongly. Statements by Le Corbusier, such as: “I exist in life only if I can see,” and, “one needs to see clearly in order to understand,” express the hierarchy and preferential treatment given to this singular sensory mode (Le Corbusier, 1991, in Pallasmaa, 2005: 27).

While this visual quality is important, many modernist theories dictate an over-emphasis on this single building quality at the expense of all others. Buildings were designed to be viewed and appreciated by the eye, but not dwelt within. Modernist design feeds the intellect and the sense of sight but has disregarded the other senses of the human body, as well as one’s memories, dreams and imagination (Pallasmaa, 2005: 19).

Thankfully, as architecture has evolved from this modern era, so have the ideals and foundations upon which designs are generated. However, a common thread throughout the following movements can still be seen in the suppression of the humane aspect of the architecture.

2.3 THE NEED FOR REINVENTION

As previously stated, for this study to be of any relevance, the assumption must be made that the built environment influences people both physically and emotionally. As such, architects and planners illustrate their values in relation to human beings in the way they design and influence the built environment (Lepori, 2007: 5). In the industry today, the incomplete approach to design, having risen from modern ideals and an ocular-centric culture, is based on:

“market values, abstract personal criteria, technical standards and mechanical reproduction of repetitive types - an approach to design that lacks concern for human, physical and emotional values as well as

an awareness of the basic universal principles that help harmony and beauty to be defined and sustained'

(Franck and Lepori, 2007: 6).

It is necessary to challenge the abstract architectural approach dominated by the ocular-centric society today as well as the over-emphasis on the intellectual and conceptual dimensions of architecture. It is this that has led to the disappearance of architecture's material, sensual and embodied essence (Pallasmaa, 2005: 32). As human beings, we have become spectators rather than participants in our perceptions of the environments we occupy, purely looking at the visual image projected on to the retina. Consequently, this has produced a sense of detachment from one's surroundings, leading to feelings of alienation and isolation.

Alternatively, architecture is something to be experienced. According to Zumthor (2006: 58), to experience architecture in a real and meaningful way, one must touch it, see it, smell it and hear it. There is opportunity for it to be reinvented to ensure we do not grow accustomed to or become trapped within old patterns and methods of design that do little to uplift our beings. As Galen Cranz teaches, "even chairs need to be reinvented to suit our bodies. And the reinvention starts with ourselves and the way we are built" (Cranz, 1998 in Lepori, 2007: 15).

Lepori (2007: 16), in discussing an architectural approach that begins with the human body as the design generator, is of the opinion that in order to progress in architectural thought, designers need to firstly understand the human being and the needs, wants and desires they possess. It is only in doing this that architecture can transform spaces into places that fit the client, rather than forcing users to adapt to unsuitable spaces created for them.

In order to stop the alienation of architecture and reintegrate the human being into the built environment, designers ought to strive towards a higher awareness of multisensory perception in architecture today. By understanding the human being and spirit, designers

would better be able to convert the architecture of the future to something experientially complete, satisfying the needs of the users and creating places that uplift the human spirit in their experience. The use of the sensory perceptions in architectural experience is such an avenue requiring attention from architects today. This is subsequently discussed.

2.4 THE USE OF THE SENSORY SYSTEMS IN THE EXPERIENCE OF ARCHITECTURE

To move away from this predominantly vision-focussed approach to architectural design to a more body-centred, holistic approach that aims to positively contribute to the human experience of space, it is necessary to understand the way human beings interact with and experience the built environment.

According to Pallasmaa (2005), meaningful architecture engages the inhabitant on a largely physical level and employs multiple senses simultaneously.

“Every touching experience of architecture is multisensory; qualities of space, matter and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle.... Architecture involves several realms of sensory experience which interact and infuse into each other”
(Pallasmaa, 2005: 41).

Since it is evident from this theory of architecture that the built environment is perceived and evaluated through the bodily experience of it, an inquiry into the role of the individual senses within our architectural experience may provide a clearer understanding of the way in which architecture is experienced. In looking at sensory stimulation as an architectural design tool, it is necessary to take into account the use of these senses within the built environment and how they impact one’s perception of the built world. The five most common senses of sight, touch, sound, smell and taste are used in varying degrees and even subconsciously. Below, these are discussed in greater detail.

The Sense of Sight

One's eyesight is the sense most relied upon. It enables one to comprehend images near and far. "Our eyes reflect the environment back to us" (Walden, 2008: 16). It is through vision that we see the nature of objects, their form, mass, texture and colour. While the sense of sight is important in the study of sensory stimulation as an architectural design tool, the focus of this review of literature is to fall predominantly on the other sensory modes that have been neglected in our understanding of architectural experience. However, in a discussion related to the importance and use of sight within one's understanding of the built environment, one needs to note a difference between seeing and perceiving. Often one does not see what is in front of them, but rather what one expects to find there. Von Meiss (1990) believes that today's society needs these expectations because the world is in a state of constant change. Intelligence has no hold on reality and so one is continually expecting the unexpected. Thus, it is often in perception rather than vision that one's sense of sight fails. Consequently, the importance of the other, less wavering senses becomes critical in interpreting the surroundings.

The Sense of Touch

The senses of sight and touch are intrinsically connected. The sense of touch is stimulated and encouraged by one's ability to see forms and textures. Often it is not enough to look and the hand is invited to directly experience. The skin reads the texture, weight, density and temperature of matter (Pallasmaa, 2005: 56).

Pallasmaa (2005: 56) uses the touch of a door handle to illustrate the importance of personal connection with buildings. He refers to the door handle as the handshake of a building.

"The tactile sense connects us with time and tradition: through impressions of touch we shake the hands of countless generations."

Franck (2007: 59) reiterates this notion of touch in the feeling of a banister. The design of a wooden banister that fills up the grip of the hand is a completely different experience to a steel one that is cold and lifeless to the touch. The ability of the hand to move smoothly along or whether there are interruptions at certain points affects the experience of the user.



(Plate 2.6 & 2.7: The use of the sense of touch is illustrated in the difference in balustrades above.

Source: www.builderbill-diy-help.com;
www.ipmfitings.co.uk)

It is generally assumed that texture only offers information at arm's length; however, the 'feel' of a building is often seen by the eyes and yet experienced as though it has been touched first hand. In many cases, it is this unconscious tactile sensation that determines the pleasantness of the experience.

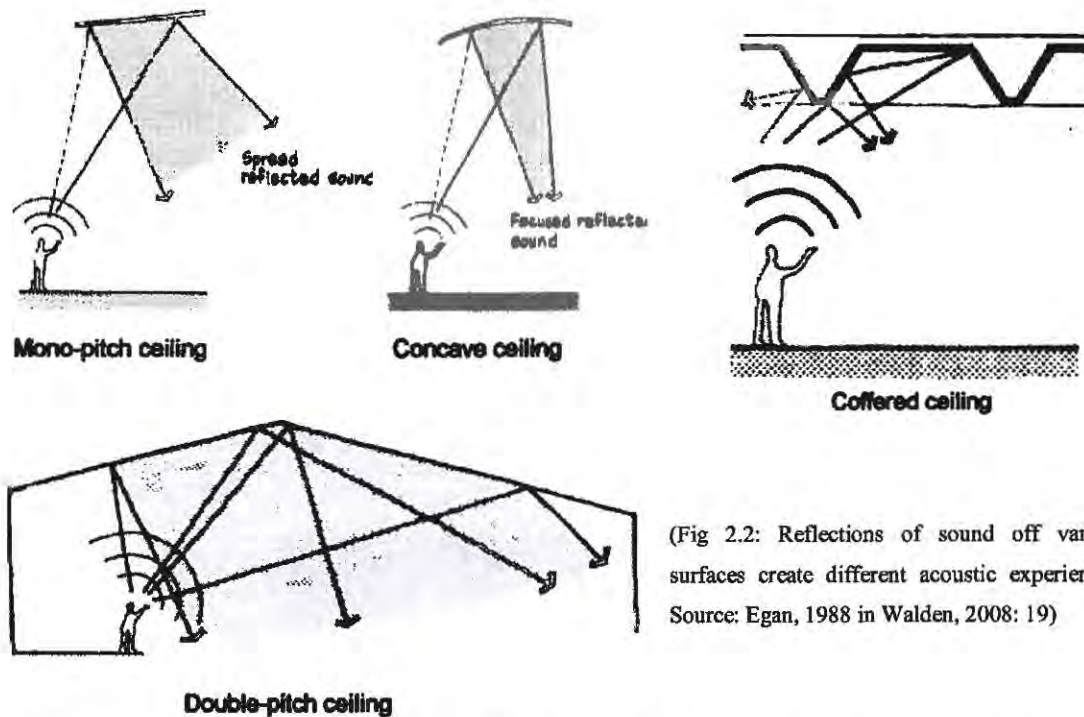
In a discussion related to the experience of touch, it is necessary to further explain the exploratory use of touch, referred to by psychologists as 'haptic perception.' In addition to the brief theoretical understanding previously discussed, the Haptic System is the sense of touch reconsidered to include the entire body, rather than just the instruments of touch, e.g. hands or feet. The haptic system includes all the sensations that constitute the sense of touch (e.g. pressure, warmth, pain etc...) and all aspects of sensual detection which involve physical contact both inside and outside the body. The haptic sense engages in sensation and action simultaneously and deals most directly with the three dimensional world (Bloomer and Moore: 1977: 35).

The Sense of Sound

Hearing is one of the most important senses, because a great deal of information about the world comes to us from sound alone. Cars approaching from behind, a ringing phone and most importantly, human speech, are all perceived through the sense of hearing. One is put in direct contact with space through sounds that reverberate from surrounding walls. "Sound measures space and makes its scale comprehensible" (Pallasmaa, 2005: 51). In the same way that light reflects off surfaces, giving one an impression of its form and substance, so too are we given an impression of the form and substance of space by the sounds it reflects. Differently shaped rooms and spaces composed of different materials reverberate differently, thus influencing the sounds generated within them (Rasmussen, 1959: 224).

The sound of a space is rarely consciously noted by building users. However, it is highly informative, offering clues to building users regarding activities near and far. The sound of a room can have a great impact on the mood of a space; and should be properly thought out as it can affect the experience had within.

For example; a busy restaurant with hard surfaces will create greater sound reflection, making conversation more difficult. If sound is completely absorbed it can feel flat and lifeless; while if sound resonates or echoes, the mood can become sharp and anxious. In Warren Brodey's experience with blind people (1965), he has found that different sound qualities can create different moods. These moods would be appreciated by the visually impaired as well as unimpaired users and is thus worthwhile to note in this study. A space with hard-plastered block walls accentuates higher tones, making users sound as though they were speaking sharply, and therefore, increasing fatigue. An acoustically considered space with soft surfaces, such as carpet, becomes what Brodey refers to as 'wet-blanketed.' This is where any noise within a space is dampened (Brodey, 1965 in Walden, 2008: 18).



(Fig 2.2: Reflections of sound off various surfaces create different acoustic experiences. Source: Egan, 1988 in Walden, 2008: 19)

While one may not view acoustic architecture as being important in our perception and experience of space because it is not consciously recognised, one must be aware that buildings return sound to us, structuring and articulating our understanding and appreciation of space. A space is understood and appreciated through the sounds it returns to us as much as through its visual form, even though the acoustic influences on one's place experience is primarily an unconscious background experience (Pallasmaa, 2005: 50).

The Sense of Smell

According to Filler (1978: 4), accommodating the sense of smell in architectural experience is possibly the most neglected of all the sensory modes of perception in today's society.

Interestingly however, humans require only a few molecules of a substance to prompt an impulse of smell in a nerve ending and have the ability to identify over ten thousand

diverse odours (Pallasmaa, 2005: 54). Even so, the olfactory sense is often paid amongst the least attention in the design of spaces as it is not as widely used as the other, more dominant senses such as touch and sight.

This is unfortunate as one of the most significant qualities regarding the sense of smell is its ability to provoke and instil memory in a space. The most persistent memory of a place one has visited is often recalled by its smell. Every dwelling has an individual smell of home and a particular smell enables one to “unknowingly re-enter a space completely forgotten by the retinal memory” (Pallasmaa, 2005: 54). While the nose makes the eyes remember visual aspects of a particular place, the eye cannot in the same way recreate the distinctive smell in an environment. It is thus apparent that reducing the importance of this sensory experience can limit one’s ability to recollect past place experiences.

The Sense of Taste

It is easy to assume that the sense of taste has little or no effect on one’s interpretation and experience of a space. However, according to Pallasmaa (2005: 59), “there is a subtle transference between tactile and taste experiences.” Vision can be transferred to taste and various details and hues have the power to induce oral sensations.

The connection between taste and smell must also be mentioned. Gibson (1966) combines the two into a single sensory system in which neither can be provoked without the other. His logic in this connection is based on the type of information they receive. Ultimately, they are both seeking the same information, one by eating solubles and the other by breathing airborne molecules of solids (Gibson, 1966 in Bloomer and Moore, 1977: 33).

2.5 CONCLUSION

Looking specifically at each sensory mode and how it is impacted by the built environment, it is evident that architecture is much more than a purely visual art. In understanding where contemporary architecture has originated from and reasons why the need to reinvent architecture is so urgent, it has become evident that grounding architectural 'success' on a purely visual level is limiting and prevents architecture from being experienced in multiple ways through the body. These imposed limitations in modern architecture thwart one's ability to truly connect with the environment on a physical and psychological level. These limitations imposed are more fully exposed as one understands the role of the various senses and their positive impacts on architectural experience, i.e. those things one has been denied within the modern movement.

While the exploration into the role of the senses in one's understanding and interaction with space is highly valued, it is important to further understand how such bodily, sensory experiences of architecture contribute to one's architectural experience; particularly in terms of personal and cultural memories and identity, as well as the spirit of place created, which influences the soul. The following chapter seeks to illustrate the impact of sensory stimulation in architecture on one's physical appreciation of spaces and its psychological benefits.

CHAPTER 3
ARCHITECTURE AND THE SENSES

INTRODUCTION

Understanding the role of sensory stimulation in the field of architecture is important as “it is through our senses that we perceive the world; it is through them that a relationship with the world is made possible” (Franck, 2007: 55).

In recent years, a select few architects and writers in the field have begun looking into a more sensory approach to architectural design. Fortunately, the Western world is slowly showing signs of rediscovery of the neglected senses. This emergent awareness expresses a revolt against the deprived sensory experience humanity has been made to endure in our technology-focused society of today (Montagu, 1986 in Pallasmaa, 2005: 37).

This chapter seeks to express the importance and benefits of architecture that is not only pleasing to the eye, but an experience of the body as well. Such benefits are illustrated in contemporary architectural examples to provide a more thorough investigation. The discussion begins by presenting a general overview of the bodily experience of architecture as it is through one’s physical being that the world is experienced and a connection is made. As Rasmussen (1959: 33) said, “it is not enough to see architecture; you must experience it.” Often this is done through the sensory mode of touch, which is discussed subsequently. Memory, identity and spirit of place are then explored to illustrate some of the psychological and less obvious contributions made by multi-sensory architecture to one’s spatial experience. The final component of this chapter briefly looks into a sensory approach to built form. It attempts to practically illustrate architecture and the senses in terms of the exterior formal qualities of architecture and how this can be achieved.

3.1 THE EXPERIENCE OF THE BODY

In today’s design process, the human body is often viewed as a source of measurement, or form to be merely accommodated. While the basic physical criteria are met, the

particular needs, desires and wants of living, by active people, are often considered a burden on design. The challenge to progress and rethink the design of objects with people's comfort in mind is seldom taken on. Forms and materials are rarely chosen to enhance the body's comfort; instead the body is forced to adapt to rigid forms created for the convenience of mass production (Franck, 2007: 27).

One of the reasons for this lack of recognition given to the human experience can be seen in society's view of the body stemming from the ocular-centric culture of today. The focus on vision and all that is outside the human body creates a distance between the user and their body; with its sensations, desires and wants. The body separates itself from other bodies and the world, and one lives as though 'outside', detached from the world. Thus, the sense that dominates is vision, since hearing, smelling, and touching requires a connection with the world; that one be 'inside' (Franck, 2007: 26). The incomplete manner in which designers create spaces and users experience them that has risen out of this view is unfortunate, as essentially it is through the body, which we have separated from the world, that one indeed perceives and truly understands the world.

The experience of space and being within a space is far more than a purely visual encounter; to be seen but not felt. Instead, it is an intricate and multi-faceted experience in which the whole of the human being is involved. Bloomer and Moore (1977: Preface) believe that it is this aspect of architecture, the bodily experience, which generates the essential and unforgettable understanding of three-dimensionality. This understanding further provides a platform for understanding one's experience of buildings in term of spatial feeling.

It is through the movements of the body, posture and activity (kinesthesia) that one constantly engages with the environment and is redefined by it (Pallasmaa, 2005: 40). It is with one's physical form that one sees, touches, smells and understands one's surroundings and through this interaction with the world, one becomes more than purely within a space, but becomes a part of that space (Franck, 2007: 55).

This approach to design is evident in The Therme Vals, which is further discussed in more detail later on. Designed by Peter Zumthor and opened in 1996, it is a hotel and spa built over the only thermal springs in the Graubünden Canton in Switzerland. From concept to final finishes, the building is designed as a complete bodily experience. The sensory aspects of the building have been considered from the onset and have informed the building's concept and design. Important to note is how the bodily experience of the space has been given preference over the visual.

The primary function of the building as a bathing area is a bodily experience in itself and the architecture reinforces and heightens the experience by appealing to all the senses and ensuring a complete and holistic experience. There has been a careful selection and use of elements such as water, light, and materials. Each has been chosen and incorporated according to the evocative, sensory qualities it holds and used in a manner that enhances the experience of these elements. The use of and variety of ways these elements are used is demonstrated in the illustrations following.



(Plate 3.0, 3.1, 3.2: The Therme Vals provides a wide range of bodily experiences. All aspects of the architecture are intended to enhance one's physical experience within the spaces. Source: www.poloralphlaurenstore.com)

Understanding the significance of the bodily experience can be summed up by looking at observations made by Geoffrey Scott (1914). He explored the distinction between the “appearance of bigness” and the “feeling of bigness” portrayed by a building. He argues that while the two may seem to be almost the same, it is only the “feeling of bigness” that has aesthetic value (Bloomer and Moore, 1977: 32). The beauty and experience a

building gives is very different when one is looking at it and when one is within it, as the whole body is involved in the experience of the space and the feelings it evokes. It is apparent that he is urging architects and building users alike to be aware that the bodily experience of architecture contributes to one's aesthetic appreciation of architecture in conjunction with the visual experience of it (Bloomer and Moore, 1977: 32).

3.2 THE IMPORTANCE OF TACTILITY

Juhani Pallasmaa's book entitled '*The Eyes of the Skin: Architecture and the Senses*,' expresses his growing concern for the dominance of vision within the realm of design at the expense and suppression of the other sensory modes. The focus of his literature centres on a single component of the bodily experience of architecture, previously discussed: The importance of the sense of touch in one's experience and understanding of the world. His further intention was to illustrate the conceptual linkages between the suppressed tactile sense and the primary visual sense. According to Pallasmaa (2005), all sensory modes are extensions of the tactile sense.

"the senses are specialisations of skin tissue, and all sensory experiences are modes of touching and thus related to tactility. [One's] contact with the world takes place at the boundary line of the self through specialised parts of our enveloping membrane"

(Pallasmaa, 2005: 10).

The fundamental significance of tactility in one's spatial experience is seen in the orienting clues it provides, and manner in which it affects the body's fit within and movement around spaces. The tactile qualities of the surfaces and edges we encounter influence one's haptic sense and initiate different movement. Rough textures and materials suggest one should move in wide radii around corners as well as more cautiously down passages. Textural variations can prompt users to hasten or slow their pace of travel or signify particular zones within buildings. According to Bloomer and

Moore (1977: 71), through the varied use of textures and tactile qualities, designers would be able to generate a complete “choreography of movement.”

This sensory system is the sense that unifies one’s experience of the world with that of themselves. While the eyes can be engaged at a distance, and are separate from that which they see, the hand necessitates nearness and entails a certain intimacy with that which it contacts (Pallasmaa, 2005: 46). This aspect of the sensory mode of touch is fundamental to the human spatial experience and has been harnessed as a powerful force in the design of the building examples that follow.

At the de Young Museum in San Francisco and the American Folk Art Museum in New York, the hand is invited to appreciate its tactile qualities. The hammered coppered panels of the de Young Museum’s façade glimmer and change texture as one passes by.



Each panel differs and engages ones tactile sense as one approaches the façade.

(Plate 3.3: The façade treatment of the de Young Museum invites the hand to touch it. Source: www.mccullagh.org)



Similarly, the façade of the American Folk Art Museum is made of angled panels of a white bronze alloy with a high copper percentage. The surface remains warm and rough, maintaining the imprints of the surfaces it was formed on. The eye is invited to study it closely and the hand to touch its rich surface (Franck, 2007: 180-181).

(Plate 3.4: The material used in the American Folk Art Museum has a rich tactile quality. Source: www.architravel.com)

In these examples we see the difference between much modern architecture with its blank, sterile façades that do not invite the eye or fingers to linger over its surface, and multi-sensory architecture, which seeks to invite the body and hands to be a part of the experience of the building. The importance of material selection in altering perception and experience is also apparent.

Franck (2007) furthers this argument by suggesting that it is primarily through building materials that the tactile quality of architecture is expressed. Through their nature, they send out messages that affect the environment and one's experience of it (Franck, 2007: 76). Thus it is the task of architects to consider how the materials chosen communicate with the building users. To illustrate this point, Franck has recognized the contrasting messages portrayed by a variety of materials, namely; timber, marble and granite, brick and glass.

She believes timber to be reassuring and calming. It speaks of perfection and naturalness, expressing evidence of age and wear with time. Similarly, marble and granite embody a sense of life. They reflect the changes the earth has endured during their formation and suggest a sense of eternity. The messages they convey are of solidarity yet constant motion and as such are often used in the design of public building and memorials. Brick is known for its sturdiness and mass, shadows and sense of enclosure. Their imperfections speak of life and they have a strong connection to the earth, unlike many other materials. Glass on the other hand is a material that does not invite touch. It is a material of distance that, while creating a connection for the eyes, also "separates what, through the eyes, it unifies" (Franck, 2007:79-80).

One can see that tactility and engaging the sense of touch has great benefits for users and engages them in the experience of a building. With such messages portrayed by different materials, the selection of finishes becomes highly significant to the designer if the intent is on creating a specific experience. However, also of due recognition, is the message that a building leaves with the user once they have left. Architecture of true value does not just impact the users while they are within a building, but also, once they have left.

3.3 RETAINING MEMORY THROUGH BODILY EXPERIENCE

It is by now evident that the visual experience of architecture is only a small component of human experiential capabilities. The experience of architecture is best generated through multiple senses as previously discussed. Through the information gained by the senses, the functional elements of architecture are communicated to the user. However, “that communication only becomes meaningful due to the social, psychological and physiological factors affecting one’s perception” (Stephens, 1978: 94). Architecture that impacts one’s memory, personal identity and soul are such factors discussed subsequently.

A psychological factor influencing one’s environmental perception is the memorability of spaces and places. Every architect desires for their creation to be remembered. The retention of memories of past place experiences implies that the individual has been impacted in some meaningful way by the experience had within it (Zumthor, 2006: 10).

As human beings, we are born with an instinctive ability to remember and recreate places in our minds (Pallasmaa, 2005: 67). Memories are retained through one’s body and the experience had, as much as through the nervous system and brain. While the sensory organs transfer information to the brain, they also spark the imagination and engage in the creation of memories (Pallasmaa, 2005: 45). It is in this sensory experience of architecture that memories and meaningful spaces are established within the human being. Memories are most often generated not by buildings, viewed from far, but by the experiences had as a result of use in them.

The importance of memory as part of an individual’s being has generally been forgotten within the current age, but memory should be understood as a component of architectural experience, gained subsequent to the actual physical encounter with space (Bloomer and Moore, 1977: 105). The importance of memory in architectural experience is evident as every place, meaningful to the user, is retained as part of one’s memory. This is most often due to the unique qualities of the place and the way it has, unknowingly, affected

one's physical body and spawned sufficient associations to be retained in one's personal being. Furthermore, the real experience of it, from which the memory is carried away, can last a lifetime (Bloomer and Moore, 1977: 107).

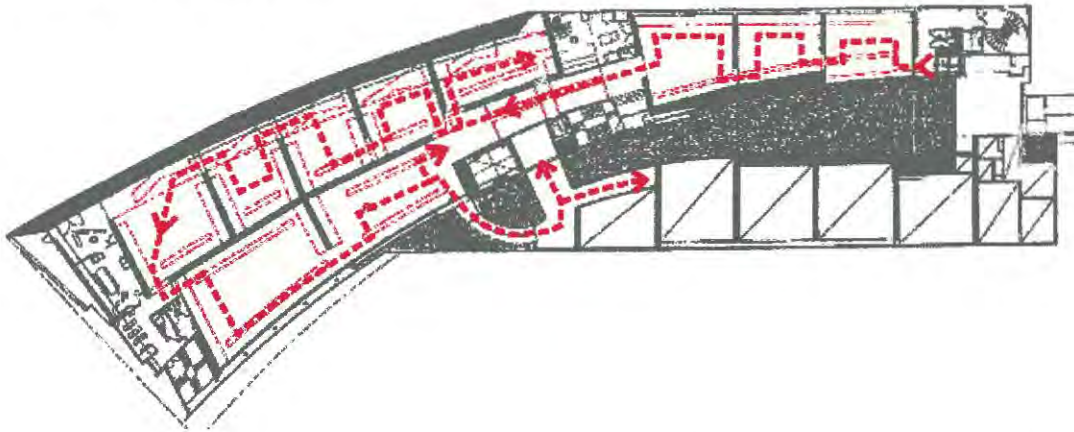
3.4 ENHANCING PERSONAL IDENTITY WITHIN SPACES

It is well known in the field of psychology that one's interaction with their environments impacts upon their self-image. Within the human mind is a panorama of experiences taken from the environment. Such experiences are imprinted into one's sense of identity that is gained over a lifetime of interaction with the world (Bloomer and Moore, 1977: 49).

In the opinion of Bloomer and Moore (1977), one of the most dangerous penalties one faces in reducing the sensory experience of architecture and of life, as society today has done, is the risk of losing part of an individual's capability to establish and maintain a sense of identity. One requires recognition of the space around one's bodies as well as a sense of the 'internal space' one carries with them to develop such an identity. In focussing on external experiences such as vision, one's primordial haptic experiences are diminished. But it is these experiences - "feelings of rhythm, of hard and soft edges, of huge and tiny elements, of openings and closures, and a myriad of landmarks and directions - that if taken together, form the core of our human identity" (Bloomer and Moore, 1977: 44). Neglecting the needs of one's physical being in the built environment ultimately leads to the loss of humanity and sense of identity within the individual.

One's environment is part of one's biography. There is no escaping the fact that the environment one surrounds themselves in, shapes who they are (Day, 2004: 28). It is significant architecture that, through sensory stimulation, reinforces one's identity in the world and enables one to experience their being as completely embodied and holistic. Such architecture increases awareness of one's sense of self and being through the experience of the physical body within the world (Pallasmaa, 2005: 11).

The Kaisma Museum of Contemporary Art in Helsinki, designed by Steven Holl Architects is a fine example of such architecture. The spatial journey, discussed in more detail later on, is based on a curved, unfolding sequence of spaces, rather than a single rigid path of movement. By enabling visitors to journey through the museum in their own time and manner, users are better able to identify with and retain memories of the building and spaces within.



(Fig 3.0: The variety of paths to follow is superimposed on the floor plan of the museum. Source: www.annakostreva.org)

Allowing visitors to impart something of themselves into each space connects them to the space, thus establishing a relationship between their physical being and the museum environment, reinforcing their identity within the space. The ‘silence’ of spaces enables



visitors to engage with the space rather than being overloaded with information. This further improves the connection between the user and environment, and hence, the memories maintained thereafter.

(Plate 3.5: Illustration reveals the spatial layout which allows users to determine their own paths of movement. Source: www.hilarypfeifer.blogspot.com)



(Plate 3.6: The 'silence' of spaces enables one to better engage with the space.
Source: www.bombsite.com)

While it is difficult to pinpoint exact architectural features, forms or spatial treatments that promote a sense of self to form due to the experience had within them, it is evident that the physical interaction between body and building plays a significant part. Engaging multiple sensory modes necessitates that the viewer be fully present within a space and completely engaged with it. These experiences, that impact the human psyche, have lasting implications that can contribute to the formation of a strengthened sense of self within the world. Furthermore, such spaces that respond to the body, not only affect one's sense of identity, but are also capable of stirring the heart and soul of the occupant.

3.5 SPIRIT OF PLACE

A further aspect of the psychological impact of architecture roused by sensory stimulation, is the intangible, spirit of place; the way in which architecture not only affects one's physical being and mentality, but also one's soul. The environment and world of architecture is not only the basis for one's physical existence, but is also the basis for one's psychological existence as well. The built environment is the source of dreams, emotions and aspirations that are fundamental to one's architectural experience.

According to Bloomer and Moore (1977: 105), architecture is the making of places. Architecture is about comprehensibly, experientially and habitably portraying the life of people into the world. It is the framework within which one resides. With a function such as this, architecture must have a profound impact on the human being. The environment one surrounds oneself with has unavoidable influences on their lives and experiences. To

recognise how society and individuals are shaped by the surroundings they exist within, one needs to only reside in a different environment for a short time (Day, 2004: 5).

Environments are not usually looked at. Rather, they are 'breathed' in (Day, 2004: 4). Much of the time, one's surroundings go unnoticed and thus are able to impact individuals without conscious resistance on their part. Since architecture has such profound influence on the human being, it also has responsibilities to those individuals that come into contact with the building. One such responsibility that goes far beyond the aesthetic appeal, Christopher Day refers to as, "spirit of place" (Day, 2004: 13). To a large degree, it is through the stimulation of multiple sensory modes that this spirit of place is evoked and preserved.

Used in conjunction with one another, the sensory modes offer an image of reality that cannot be quite sufficiently described by a single sense alone. One tends to think of the visual sense as contributing the most to this image, however, a smell can trigger memories like no image could ever do, and the sound of music can provoke instant emotion. All the senses have an intrinsic part to play, and when combined, they begin to reveal the "underlying essence of a place." It is this spirit of place that is able to move one's soul and evoke intense feeling (Day, 2004: 18-19).

The Piazza San Marco in Venice, Italy is an example of a place with a unique spirit. Here, one is able to understand how the use of the senses plays a large role in the experience of the spirit of place. The atmosphere of the square is not purely defined by the surrounding architecture, but also by the sound of tourists and birds, the feeling of worn down paving underfoot, the warmth of sunlight as one moves from the shadow into the light and the salt smell that intermittently fills the square as the wind direction changes. In the illustration following, one can understand how the spirit of place is not evident from the purely visual image of such a space.

This illustration does little to capture the sounds, smells and tactile qualities of the three



dimensional space. It is rather, through the use of the other senses that one holistically experiences the spirit of the place.

(Plate 3.7: A view from within the square does not adequately express the 'spirit of place.' Source: www.travelpod.com)

Franck (2007) rightly sums up the role of multi-sensory architecture in establishing the intangible spirit of place when she writes:

“Architecture is given life and spirit by all the qualities that touch the human senses and the human soul: by light and colour, sound and texture, by expansion and compression of space, by view and prospect. These might be considered literal qualities created by the manipulation of materials and space, but they can go beyond the literal to touch our souls... If the functional nourishes our physical needs, the poetic nourishes our soul. If the former relates to people and objects as machines, the latter relates to living human beings”

(Franck, 2007:34).

Norberg-Schulz furthers this statement by inviting architects to question themselves regarding their designs if the intention is to define the ‘atmosphere’ of a place,

“How is the ground on which we walk, how is the sky above our heads, or in general: how are the boundaries which define the place?”

(Norberg-Schultz, 1996 in Nessbit, 1995: 420)

From these questions, it is apparent that as one experiences a place in this manner, it is not only the eyes which create the experience. It is a combination of all the senses, engaged in unison, which creates the 'spirit of place.'

3.6 ENHANCING THE BODY THROUGH BUILT FORM

Much of the previous discussion has been focussed on the interior aspects of architecture, how buildings are experienced from within. However, it is also necessary to understand the role of the exterior elements of architecture and how one's sensory perception is impacted by them. Analysing built form as a sensory stimulant is intended to provide insight into architecture that not only enhances the user's experience within the building, but at a distance from it as well. How can the formal and compositional elements engage the senses? What kind of structures, shapes and arrangements invite the eyes, ears, hands, and nose to simultaneously interact with it?

One thing evident in the review of literature is that there is no simple answer to such questions. It is not possible to simply conclude that a sphere is more sensory than the square, or that transparency is more engaging than solid forms. Far more comes into play when analysing built form as a stimulator of the senses. Evidence of this is apparent when looking into the work of Frank Lloyd Wright, Alvar Aalto and Louis Kahn, three architects well renowned for their architecture directed towards the human body and sensory experience. While all create architecture appealing to the senses, the built form of Frank Lloyd Wright has kinaesthetic and textural qualities; Aalto's buildings have a muscular presence and tactility and Louis Kahn's architecture portrays geometry and strong sense of gravity (Pallasmaa, 2005: 35). A common thread evident throughout their work, however, is the reintroduction of "plasticity" which was seldom evident in the modern era. This "plasticity" opposes that which is isolated in the visual realm, void of tactile elements and details designed for the human body. These buildings have opposed those of the modern era that are two dimensional, sharply angular, void of texture and lack permanence in the world (Pallasmaa, 2005: 31). Instead, such architects have

attempted to revive the sensory elements of architectural form by enhancing the haptic, material and textural qualities of architecture, as well as focussing on the weight, spatial density and play of light on buildings (Pallasmaa, 2005: 37).

Pallasmaa (2005) associates the process of design to that of the creation of art, particularly sculpture. Instead of creating a series of visual images, a physical object is created that has mass, form and function. Such an object offers shapes and moulded surfaces for the eyes to 'touch' and senses to engage with. The important element of sculpture he highlights, similar to architecture, is the evidence of the way its form has been made. A piece of art that expresses the touch of a hand in its creation and formation, engages with the human body as it allows the viewer to trace the lines of construction and moulding. Similarly, architectural form that reveals the physical touch and hands which enabled it to come into being are far more appealing to the senses than the mass produced, machine replicas seen in the past. Pallasmaa goes further to warn architects against the dominance of the computer seen in society. He argues that the computer tends to diminish the role of the designer's hand in the creation of buildings. Instead of promoting an integrated design that is multi-sensory, multi-faceted and full of imagination, the computer narrows the design process to a passive, vision-focussed one. Such a process does not allow the designer to be haptically engaged with the structure or to gain first hand understanding of elements of scale, form, texture, weight and plasticity (Pallasmaa, 2005: 12).

In expressing the process of design through built form, construction methods and details become very important. Zumthor (2006: 11) believes that the heart of architecture lies within its construction. "Construction is the art of making a meaningful whole out of many parts." It is the details that aid the viewer in gaining an understanding of the whole composition. Furthermore, details can express and reinforce the basic design principles adhered to in the development of built form, such as weight, tension, transparency and solidity (Zumthor, 2006: 16).

Franck (2007) goes further to say that it is not merely the built form of architecture that affects the sensory modes, but also its connection to the surroundings. While it is tempting in a discussion related to built form, to view architecture as mere objects in space, it is necessary to understand the importance of the surroundings and site conditions. The ground from which the architecture emerges is as important as the forms it gives rise and substance to (Franck, 2007: 165).

Zumthor, in discussing the design process for the Therme Vals in Switzerland, recognises the importance of the site in the design process. In this project, the building form was derived from the site itself. Rather than creating preliminary ideas of what the built form should look like, they visited the site and began to question what the mountains, rock and water suggested in terms of the structure to be built. What emerged from this recognition of the site, were functions, forms, materials and spaces which Zumthor believes “possess the potential of a primordial force that reaches deeper than the mere arrangement of stylistically preconceived ideas” (Zumthor, 2006: 29).



(Plate 3.8: Exterior view of the Therme Vals shows the integration of the building and site. Source: www.archnow.com)

A prime example of architectural form that engages multiple sensory modes can be seen in Frank Lloyd Wright’s ‘Falling Waters’. This building is fitting within the context of the argument as it illustrates a built form pleasurable to all the senses, while at the same time recognising the importance of the surrounding site, method of construction and detail in the overall experience of it. In experiencing such a building, the forest, tactile surfaces, hues and spatial volumes, sounds and smells, all come together to create a holistic experience (Pallasmaa, 2005: 44).



(Plate 3.9: Exterior view of Falling Waters illustrates the sensory forms, textures, volumes, colours and the building's connection to the surroundings. Source: www.kongdoo.livejournal.com)

In aiming to understand built form as a sensory stimulant, it is evident that one cannot conclude that specific forms, arrangements, or styles of architecture are more multi-sensory than another. Rather, the evidence of the way in which a building has been composed and constructed gives built form a quality that engages the senses. When the sculptural quality of architecture and evidence of physical touch can be seen, the viewer is more likely to haptically engage with it. Furthermore, built form cannot be viewed or 'assessed' by itself. No building stands alone in space as all are grounded in a setting that impacts the perception of the built form. Thus, the site, context and built form must be viewed in unison to gain a meaningful understanding and appreciation of architecture.

3.7 CONCLUSION

In conclusion, it is clear that what architects create is not so much form or space, but rather an experience. According to Pallasmaa (2005: 72), "Architecture is the art of reconciliation between oneself and the world, and this mediation takes place through the senses." The purpose of architecture is far more than purely providing for the functional needs of its users. Rather, it is a means to unite the inhabitant with the world around them in a meaningful and positive way.

It is through the bodily experience of architecture, that qualities of the built environment which affect the senses of touch, hearing, smelling as well as seeing, are recognised. And it is in the experience of such qualities that memories are preserved and one's identity is

shaped. Furthermore, it is this physical interaction between the human body and the built environment that enables one to experience the environment's unique, underlying spirit, the essence of the place that nourishes the soul.

CHAPTER 4
CHILDREN AND THEIR ENVIRONMENTS

INTRODUCTION

Until recently, the manner in which children perceive and react to their environments has largely been overlooked by professional architects. The way in which much architecture for children is designed, is based on the presumption of adults, rather than the perception of children. The fundamental difference, upon which this research rests, is that children understand and appreciate the built environment, not on its purely aesthetic or visual qualities, but rather on its functional characteristics and opportunities it provides (Christensen, 2003 in Said, 2007: 1). This further reinforces the notion that a purely visual approach to architecture is not ideal, particularly in the context of building for children.

To begin to seek a more appropriate and beneficial approach to the design of children's spaces, it is important to first understand how children develop within, interact with, and learn from their environments. If architects and planners looked at the way children actually used the environment, one would have a better idea of the way the environment could be designed or modified to be used by children (Ward, 1978: 87). The chapter opens with a discussion regarding the cognitive, physical and social functioning of children which is impacted by the built environment. It then focuses on three aspects of children's relationship with the environment and the manner in which they engage with it. Firstly, children's spatial experience and the physical manner in which they interact with their surrounding. Secondly, the importance of play in their development and experience of space, and how the environment can encourage this. Lastly, children's experience of places through exploration and place making, and the psychological impact imposed by their surroundings, is discussed.

4.1 COGNITIVE, PHYSICAL AND SOCIAL DEVELOPMENT

A primary area of children's development occurs in the form of cognitive growth. In a general sense, cognitive development focuses on how children learn and their ability to

process information. It observes the methodical transformation in children's reasoning, concepts, memory and language. In an architectural sense, it refers to how children perceive spatial qualities and attributes of places, in addition to its inherent meaning. It is the way in which children respond to the environment and its features based on their perception of them (Said, 2007: 2). Visual, tactile and aural perceptions of the built environment i.e. sensory information, greatly advance development in this area. Important to note is that cognitive development is not an automatic process and without education, children will not reach the levels of development appropriate to their age (Edulox, 2005).

A component of cognitive development relevant to this study is that of cognitive mapping. This can be described as the way in which children use their intellect and memory to process their spatial environment and identify relative features, directions and orientation (Downs and Stea, 1973). While cognitive mapping evolves as a child matures, the predominant elements of cognitive maps originate in the form of landmarks and routes. Landmarks are noticed first and form the fundamental orienting features of space; routes that link these landmarks are then formed. Once this information is established in the memory of a child, a "configurational" understanding of the environment is obtained. Important to note is the hierarchy given to each element of the cognitive map. Landmarks are of primary importance, routes considered second and configurations are subordinate to both (Shemyakin, 1962 in Baird and Lutkus, 1982: 27).

Also relevant to note is the physical and social functioning in the development of children. Physical development refers to gross motor and fine motor skills that children gain through physical interaction with the environment, both indoors and outdoors, and the features within them. Physical functioning is closely related to cognitive development as perception is an active experience. It is through mobility that one is able to perceive and one must be able to perceive in order to travel through spaces (Kyatt, 2003 in Said, 2005: 3). It is through perceptual recognition, gained through sight, sound, touch, taste, smell and movement, that an environment reveals information to the child.

Social functioning on the other hand is the interaction of children with other children and adults which enables them to understand and accommodate others. Furthermore, it examines children's relationships with others, coping mechanisms and changes in mood and feelings. This component of a child's development, while not fundamental to this study, is important to bear in mind as it is influenced by the physical setting which enables these interactions to occur (Said, 2005: 2).

Addressing these three developmental areas in the architectural environment is important as an architectural facility that enables a child to be "cognitively alert to the external stimulus through movement and social interaction" will be catalytic in creating a bond or affiliation between the child and that environment (Chawla, 1992; Khan, 2002 in Said, 2005: 3).

4.2 CHILDREN'S SPATIAL EXPERIENCE

Children do not experience the world as adults do and the adult is generally incapable of experiencing the world as the child would. Such perception is vastly different from that of the adults that design, plan, build and use the environments children find themselves in. Furthermore, children's discernment of spaces, sounds, visual and other signals within their surroundings differ according to age and maturity (de Monchaux, 1981: 24). The differences between the spatial experience had by children and adults are numerous. A number of such differences are highlighted below.

The first major difference to be noted is that the sensory experience had by children is far more acute and detailed than that of adults. As stated by Yi-Fu Tuan (1974), children are free of worldly cares, are free of habits, negligent of time and are open to the world. Resulting from this is the capacity for vivid sensory experiences involving all sensory modes. This aspect of place experience has been dulled in the adult experience due to familiarity and an actual measurable decline in sensitivity to taste, smells, colour and sound (de Monchaux, 1981: 25).

The environment is experienced at a slower pace, enabling children to fully engage with the world around them at a very basic level (de Monchaux, 1981: 26). This experiential difference can partly be attributed to the difference in scale between children and adults. The younger the child, the closer the eye is to the floor and objects at low levels, which are often overlooked by adults. Thus, the floorscape - the texture and subdivisions of flooring as well as changes of level and curves, impact the child more.



(Plate 4.0 & 4.1: Textural variations, floor patterns and changes in levels are acutely perceived by children due to their smaller scale. Source: www.dullmensclub.com; www.hotelrome.net)

The tactile qualities of these architectural features become far more important to children's perception of them than their visual qualities (Ward, 1978: 22). While largely unnoticed by adults, the floor textures and level changes shown in the plate 4.0 and 4.1 are significant to the child.

Another primary difference is that while adults perceive spaces from a predominantly visual perspective, children perceive their surroundings through their bodily interactions with them. The experience of the environment through the sensory modes begins from birth. The baby begins by tasting things, touching them, handling them, crawling on them or toddling over them, thus learning more about them. As the child develops, the manner in which they interact with objects and the environment develops and advances; however, the need and interest of children to touch, to physically and actively engage with their environment remains important (de Monchaux, 1981: 90).

Compared with adults, children are perpetually active. They are in constant search of new stimuli, for a new experience to be had, for something to do (de Monchaux, 1981: 28). Often this involves looking beyond the intended purpose of objects in the environment

and adapting them for other uses. Such can be seen in the observations of Rasmussen (1959) at the church of S. Maria Maggiore, a tourist attraction which stands on one of Rome's seven famous hills. Here, many tourists that visit do not truly appreciate the unique character of the surroundings. However, the children he watched playing a ball game against the wall at the top of the stairs experienced the space in a unique way. While not designed as a place of play for children, they converted the space into such and in doing so, gained a true three-dimensional sense of the space which others could not by simply viewing; unaware, they haptically experienced the basic elements of the



architecture: the horizontal planes and the curved vertical walls above the slope of the stairs. It is on these elements they learned to play. Rasmussen observed that, "one could sense the three-dimensional composition as never before" (Rasmussen, 1959: 17).

(Plate 4.2: Children play on the steps of S. Maria Maggiore. Source: Rasmussen, 1959: 17)

These disparities in children's perception of the environment compared to adults are certainly not minor. Thus, one would expect children's environments to be designed accordingly. Sadly, however, there is seldom any difference between spaces designed for children, and those designed for adults, apart from the superficial façade treatments, colours used and interior design features or furniture. It is necessary to first fully understand children's spatial experience in order to make accurate design decisions and create appropriate environments for children to engage with. Understanding the value of play in the lives of children and appreciating the psychological impact of places are two of many components of children's experiences which need to be well understood.

4.3 THE IMPORTANCE OF PLAY IN DEVELOPMENT AND SPATIAL EXPERIENCE

For some time, the importance of play was not recognised in the development of children. Luckily, current research has shown that children have a naturally deep, urgent need to play (Froebel, 1973 in de Monchaux, 1981: 58). Children's free play is a complex concept without definition, but is classically pleasurable, self-motivated, imaginative, non-goal directed, spontaneous, active, and unburdened by rules imposed by adults. "Quality play involves the whole child: gross motor, fine motor, senses, emotion, intellect, individual growth and social interaction" (Stoeklin, 2000: 1). Play rouses the child's cognitive sense of sight, touch, taste, sound and smell (Yates, 2002 in Said, 2007: 2). As such, it is through play that children grasp and begin to understand the world around them (Moore and Young, 1978 in Said, 2007: 2).

Unfortunately, in present day society, children are losing the influence derived from the natural playing of games. "Crowding and lack of space, urbanization and TV addiction, and an obsession with pumping information into children have robbed many of the playfulness and essential play experiences" (Gomme, 1894 in Ward 1978: 88). This is detrimental to the development of children as free play is foundational in the training of motor skills, sensory awareness, exercise and excitement. The educationalist, Froebel, stated that "play is the highest expression of human development in childhood." Not being able to take part in games and join with peers in the exploration of the environment sets children at a clear disadvantage and limits their development (Froebel, 1973 in de Monchaux, 1981: 58).

The deep urge within children to play is evident in that all children will play everywhere and with anything. Play is a constant happening, rather than something restricted to playgrounds and school yards, as adults often assume. One can see this evident in plate 4.3 where children play on an anti-aircraft gun in Beirut, Lebanon. No matter how dire or dangerous the situation, children need to play.



(Plate 4.3: Children use all resources for play. Source: www.stevemccurry.wordpress.com)

Designers and planners should get used to the idea that, whether invited or not, children will make use of the

entire environment accessible to them. The moment the child is free to use buildings, surfaces and changes in level for his own purposes, he becomes adept in employing them for purposes of play. Taken in Cuernavaca, Mexico, this photograph [plate 4.4] shows how the built environment, such as pavements and streets and steps, provide places for free play to occur.



(Plate 4.4: Children play in the city of Cuernavaca, Mexico. Source: www.gringoespanola.com)

Playful interaction between the body and built form is evident in one's memory of childhood activities. In the simple game of stepping on slits on the street pavement,

a child plays his body, its dimensions, shapes and rhythms, against the ordered network of the paving grid. Timing and movement patterns are determined by the horizontal configuration. Similarly, the game of hopscotch implies the same playful interaction between body and built form (Bloomer and Moore, 1977: 59).

4.4 THE PSYCHOLOGY OF PLACE EXPERIENCE

The final aspect to be considered in investigating the way children perceive and interact with the environment is the psychology of place experiences. It is not enough to purely understand how children physically engage with space, it is also necessary to look into the psychological impact of their environments and what causes children to develop attachments to certain places. Place-attachment can be understood when children show signs of pleasure and enjoyment within a space and distress when leaving it. It is a space appreciated for its “intrinsic qualities” as well as its functional provisions (Chawla, 1992 in Said, 2007: 4).

Tori Derr, an environmental psychologist, has done much research exploring children’s sense of place and has recognized the numerous variations in children’s experiences in shaping their learning, social development and play. From her research and case studies of children from various areas around the world, she has recognized a number of common themes representing basic ways that children psychologically engage with and are impacted by place experiences. Children’s learning through adventure and exploration is one such theme (Derr, 2001 in Spencer, 2006: 108-119).

For children all over the world, exploration is key in expanding their world view, testing boundaries, and sometimes in incorporating these physical experiences with places, into their sense of personal identity (Spencer, 2006: 110). Children are born with a natural sense of exploration and they interpret the realities of the world through their sense of touch, sight, smell and hearing as they explore (Nicholson in Dudek, 2005: 50).

An important aspect of exploration is the freedom necessary to achieve it. Many parents place boundaries on children and limit their home range considerably. Without the freedom to wander, children have difficulty discovering new places to truly explore. This is unfortunate, as a diversity of places, and an abundance of interesting features within them, was found in many case studies conducted by Derr, to be most significant in facilitating this type of place experience. Many studies support the spontaneous aspect of

exploration; whether in places close to home or far away, in nature or in cities, as being one of the most significant for children (Derr, 2001 in Spencer, 2006: 112). Furthermore, children's participation with features of the built environment and natural environment generates a sense of satisfaction in their place experience thus keeping the experience as part of their memory. When a memory of a place remains in a child's subconscious, it is evidence that the child has formed an attachment to that place (Sebba, 1994 in Said, 2007: 4).

Through empirical studies conducted by Hazen (1979), the impact of exploration on cognitive development has become apparent. Results of her observation of children revealed that those who explored a new environment independently were better able to integrate spatial information about that environment. Such knowledge is valuable as it can lead to more efficient use of space as well as create a favourable reaction between a child and its surroundings (Hazen, 1979 in Baird and Lutkus, 1982: 61-62).

A further theme identified by Derr's (2001) research is that children experience imagination, escape, safety and creativity through active place making.

Most children have the desire to build some sort of shelter at some point in their lives. While the variety of ways and means by which they achieve this varies profoundly, common to all of them is the enclosing of space for the child's personal use (Rasmussen, 1959: 34).



(Plate 4.5: Children build shelters using materials easily available. Such a process is important for their development of identity. Source: www.mus-ic.co.uk)

Contrasting adventure, risk-taking and exploration, children use place-making as a means of

looking inward, of creatively manipulating space to produce something of their own and developing their identity. Children use such special places for a variety of needs such as 'escaping' - whereby they can get away from family and clear the mind (Derr, 2001 in Spencer, 2006: 112). In plate 4.5, children escape into self-made shelters such as the tent using resources available to them.

It is through the physical act of constructing and enclosing of space that children are able to retain stronger memories of spaces. The act of physically changing the environment for their private use allows children to impart something of themselves into a space, thereby enhancing their personal identity and sense of belonging.

In a case study performed, Rosa's (age 10) special place was of particular importance to her as it provided a quiet place of her own, to read, think, and to begin to construct her own identity apart from her family. Her appreciation for that special place also occurred through multiple sensory modes. The most noticeable attractions for her were the sounds of running water in the river, the smell of the flowers and movement of birds (Spencer 2006: 114). For children such as her, special places play a significant role in personal wellbeing. For many children, however, the places seem to be less important than the act of place-making (Derr, 2002; Hart, 1979; Lynch, 1997 in Spencer, 2006: 114).

The needs of children in terms of exploration and place-making are very different from the needs of adults regarding the psychological experience of architecture. These needs further reinforce the physical manner in which children engage with space. It is through active exploration and physically manipulating the environment for their own use that children benefit from the environments they occupy. In bearing this in mind during the design process, architects can create spaces that are not only physically challenging and engaging for the child, but also positively aid their psychological development.

4.5 CONCLUSION

Evidence shows that children's experience of the environment is vastly different to that of adults. Children tend to engage with their surroundings on a much more physical level, employing multiple senses in their place perceptions. Such development, in the form of cognitive, physical and social functioning as well as learning about the environment, occurs through play, exploration and place-making. This can be promoted and enhanced by a built environment that encourages playfulness, discovery and is accessible to be used and manipulated by children.

As shown in the growing body of literature, much is gained from children's experience of places. For example, the aforementioned place experiences are shown to help shape a child's identity and may help them form attachments to places (Derr, 2001 in Spencer, 2006: 119). However, there is still a need to further understand children's experiences from their own perspectives. Environmental planners and architects need to endeavour to ensure that the environments created meet the requirements and interests of children, so that they will be able to form attachments to places they encounter and learn within and also establish a sense of ownership over them (Derr, 2001 in Spencer, 2006: 119).

CHAPTER 5
A NEW APPROACH TO THE DESIGN OF CHILDREN'S
SPACES

INTRODUCTION

From the preceding exploration into children's place experiences and manner in which they engage with and respond to their environments, a number of key elements have been identified as being beneficial in the future design of children's spaces. The discussion begins by looking into the Reggio Emilia approach to education, to provide the framework for the discussion of more specific elements of the architectural facility. These are: the provision of variety, gaining inspiration from nature and viewing buildings as learning opportunities. This is by no means a conclusive list; however, these elements serve to practically illustrate means of including sensory stimulation within the design of children's spaces as it has been shown to be beneficial to children's development and promote enjoyment of spaces.

5.1 REGGIO EMILIA APPROACH TO THE LEARNING ENVIRONMENT

The Reggio Emilia approach to education has been identified as a suitable starting point to the discussion of appropriate design approaches to children's learning spaces. While many other models of pedagogy exist today and are beneficial in part to this discussion, this particular educational philosophy has been selected to form the framework for the following discussion as it refers most specifically to the role of the physical environment in children's learning, development and enjoyment of spaces.

The philosophy was started by parents in Reggio Emilia, a city in Italy, after World War II. In the wake of the war aftermath, parents desired to establish a new approach to the education of their children which opposed that of the Fascist dictatorship they had been subjected to. Loris Malaguzzi, a young teacher who worked with the parents during these early stages, is considered the founder of Reggio Emilia education (Gandini, 2008).

The underlying assumption of this approach is that space matters and educators are concerned about the messages their environments portray. Malaguzzi (Martin (ed), 1998: 1), stated that,

“We place enormous value on the role of the environment as a motivating and animating force in creating spaces for relations, options, and emotional and cognitive situations that produce a sense of wellbeing and security.”

This statement illustrates a fundamental factor of this theoretical model: that the school’s physical environment is viewed as the “third teacher” in conjunction with two classroom teachers. The built environments designed according to this approach do more than house the activities and people within; rather they become a functioning component of development that works with the educators.

On a general level, the theoretical framework of this approach is one in which the child is viewed as “strong, competent and active,” working in a supportive environment. The integrated architecture of such facilities reflects this view. Unique to the Reggio Emilia approach is the importance placed, not just on the child, but community and family as well. Communities are intended to support the education of its children and parents are encouraged to be involved in the child’s schooling career and incorporate principles into their parenting and home environment (Dudek, 2005: 50). This aspect of the Reggio approach is considerably relevant to many areas and cultures of South Africa where children become the responsibility of and are looked after by the community and not just their parents.

One final note added here is that in such schools, participation of the children in the design and manipulation of their environments is considered vital. The interior and exterior environments provided must allow for flexible remodelling necessitated by their activities and ideas. Furthermore, personal input into the child’s environment is an important form of expression. Enabling and encouraging children to personally invest in

their environments in this manner, builds respect and minimises occurrences of vandalism and destruction.

With the Reggio Emilia approach forming the framework for the remainder of this chapter, a discussion of more specific aspects of designing appropriate spaces for children follows. These three components examined are in keeping with the philosophy of Reggio Emilia but give evidence of support from numerous other authors.

5.2 THE PROVISION OF VARIETY

Variety in spaces designed for children is a vital component of quality environments that children enjoy and develop within. Children learn while they play and explore, and if this occurs in a varied environment which is aesthetically stimulating, there is far greater opportunity for development and growth. As Kuhnert (1977) states, “[the child] is being conditioned, and if you condition him to a boring, monotonous monochromatic environment then he accepts that” (Kuhnert, 1977 in de Monchaux, 1981: 60). It follows then that unstimulating environments tend to dull or deafen the child’s perceptions. Unfortunately, this is often the environment young children are subject to. Adult centred designs confine children indoors with predetermined allowance to the outdoors. The indoor environment is a controlled setting where temperature, lighting levels and humidity remain constant throughout the day. Similar plastic furniture and toys form the basis of their games and play opportunities. Routine experiences in a similar and restricted space forms the basis of cognitive development. Such development leads children to the unfortunate understanding of architecture as an adult-orientated element not allowing for change or manipulation (Said, 2007: 1).

To contrast this, places for children must be “capable of supporting and stimulating sensory perceptions in order to develop and refine them. This is an essential aspect of education...” (Nicholson in Dudek, 2005: 50). It is thus imperative that children be exposed to a wide and varied environment with an abundance of stimuli. This will ensure

they do not grow up to accept mediocre environments and poor quality conditions for learning, which they may have been subjected to.

Criticos and Thrulow (1987: 123) have a unique way of defining architecture for children; as “a toy, to climb in, over, through... to explore and experience... bright, carefree and cosy... with form, light, colour, shape and texture.” Such an outlook puts the provision of a variety of spaces and abundance of sensory stimuli at the centre of the design process. They further promote that children require this variety of spaces to accommodate multiple moods and activities. The range of spaces need to provide for individuals wishing for quiet activity and private concentration; others need to be able to accommodate small groups. In addition to these, large groups need to be accommodated in spaces that are extrovert and open, providing space to run, shout and have fun.

On the whole, the environments in which children form part of the users, should be designed to allow children to use the built form in a multitude of ways. Where possible, objects and features in the environment should be designed to be able to be used for multiple purposes. They should have the capacity to be transformed into objects of play and fantasy for children’s games (de Monchaux, 1981: 63). It is with this approach in mind that one will see an improvement in children’s ability to partake in a number of different play activities that will enhance their perception of the built environment, and their development within them. Furthermore, enabling children to change and manipulate the architectural facility can aid in the generation of a sense of place attachment (Said, 2007: 1). The Reggio Emilia approach to children’s educational facilities supports this theory by promoting flexible play spaces that can be adapted infinitely. Ideally, children need to be free to change the environment to make it more appropriate for themselves (Dudek, 2005: 199).

This approach is vividly evident in David Rockwell's Imagination Playground in New York, illustrated below.



(Plate 5.0: The Imagination Playground is a prime example of providing variety and multi-functional elements in the design of spaces for children. Source: Fennell, 2010: 106-107)

Imagination Playground is based on the theory of loose parts, first offered by Simon Nicholson in 1971. It was his understanding that in any environment, the number and type of variables available is proportional to the “degree of inventiveness and creativity and the possibilities of discovery” (Nicholson, 1971 in Stoeklin, 2000: 1).

This innovative play space was conceived to encourage child-directed, unstructured, sensory stimulating free play. Made up of loose parts of various shapes, sizes, textures and weights, the playground offers a constantly changing array of elements that enables children to constantly refigure their environment and to design their own course of play. This flexible environment allows for endless play possibilities rather than prescribed activities often apparent in traditional playgrounds. The total lack of structure and definition enables children to create whatever their imaginations desire (Fennell, 2010: 106). Such a space, while not an actual building, has many principles that can be applied to existing and new facilities for children. It fulfils the need for children’s senses to be stimulated, for children to be able to explore and manipulate the environment and for free, unstructured play to occur; all of which are vital in terms of environments for the developing child.

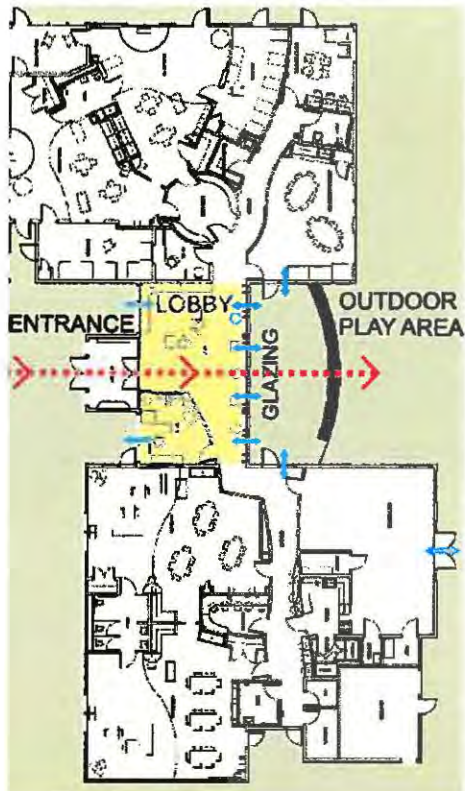
5.3 INSPIRATION FROM NATURE

Stoeklin (2000) has done extensive research on children's learning environments and outdoor play. She has found outdoor environments to be positively linked with the development of the imagination and sense of wonder, as well as stress relief in children. Furthermore, in the life of a child, nature is a space where their senses are readily stimulated (Sebba, 1991 in Stoeklin, 2000). It is the subtle variations in bodily experience, such as the feelings of a cool breeze on the skin, the smell of fragrant plants and flowers and sound of gently flowing streams that is able to ignite the imagination and enable children to "lose themselves." This, in effect, is found to lessen stress levels of children living in urban areas today (Dudek, 1996: 107).

Children experience nature not as a background for events, but rather as a stimulator and experiential component of their activities. Plants, soil, sand, and water, speak to all the senses and they provide settings that can be manipulated. Elements of the natural outdoors enables free play that focuses on unstructured, creative exploration with varied materials. Moreover, the high levels of complexity, variety and constant change in nature support longer and more complex play opportunities. Due to its interactive quality, nature stimulates discovery, dramatic pretend play, and imagination (Stoeklin, 2000). An important property of these natural places is that their access to them is not highly exposed, specifically to adults. With little structure and few restrictions, it enables children to freely and vigorously be involved in play (de Monchaux, 1981: 65).

All the manufactured equipment and indoor instructional materials produced by the best educators in the world cannot substitute for the primary experience of hands-on engagement with nature (Stoeklin, 2000). While it is impractical to expect children to spend all their free time outdoors in such environments, integration between the indoor environment and natural outdoors can be achieved. This can be done by seamlessly designing the transition area between inside and outside. Design that allows children to move freely between inside and outside encourages children to experiment with autonomy from adults, both physically and symbolically.

This understanding of the importance of nature and the creating of a clear transition space between interior and exterior space is a fundamental aspect of Reggio Emilia schools.



The Harris Family Children's Centre is one such school based on this education and design philosophy. One enters the building from a shaded porch into a central lobby filled with greenery which blurs the boundary between inside and outside. On axis with the entrance, there is a direct connection to the outdoor play area through full-height glazed sections. There is a sense that while invited to enter the school building, one is encouraged to venture outdoors as it is the most important space.

(Fig 5.0: Transparency and openness are the primary design themes. This is seen in the strong indoor / outdoor relationship. Source: www.designshare.com)



(Fig 5.1: This initial sketch site plan below shows this concept at the design stage. The entrance opens on to a lobby which is directly connected to the outdoors. Source: www.designshare.com)

To further integrate the outdoor, sensory experience into the built environment, there is opportunity to use this natural, stimulatory environment as a generating tool in the conception, development and detailing of children's spaces. Two such benefits associated with nature that can easily be applied to the design of children's spaces follow:

The first characteristic unique to the natural environment is its influence on one's creativity. In the wilderness, it is out of necessity that one thinks creatively in order to take action. This need for creativity is often lost in typical children's environments, such as schools, as they do not encourage imagination. There are no decisions to be made, as everything within the built environment is predetermined. In comparison, by incorporating this aspect of nature into the design process, the resultant spaces for children would encourage creativity and enhance the experience within. Viewing spaces for children as "interior landscapes" may also provide clues to designing spaces that encourage self-generated activities and a multi-dimensional environment (Dudek, 2005: xvi).

In The Childcare Centre designed by Ton Venhoeven in the Netherlands, the application of the natural environment into the design is evident. He deliberately incorporated ramps, terraces and level changes which encouraged children to climb and explore as they would



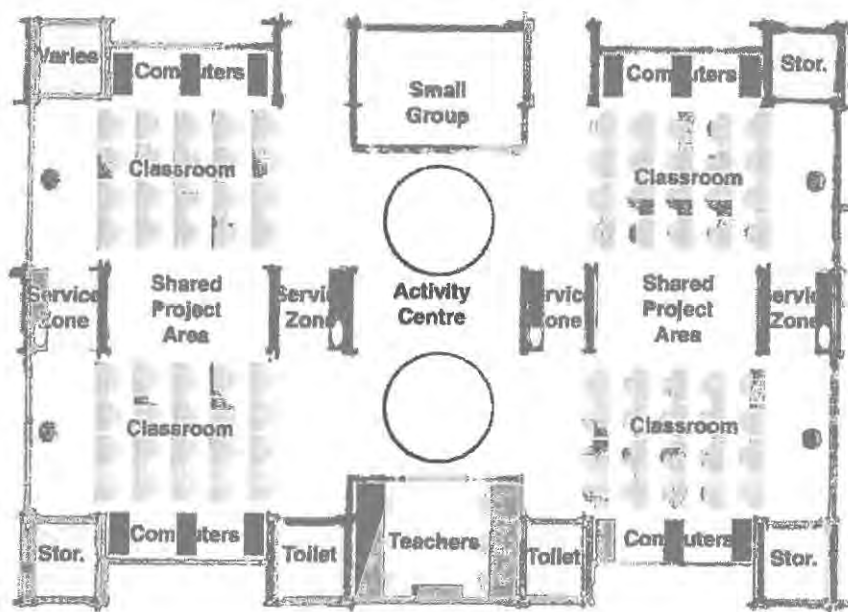
outdoors. These aspects of the design are evident in the illustration adjacent (Dudek, 2005: xvii).

(Plate 5.1: Interior view of Ton Venhoeven's Childcare Centre in Souest. Source: Dudek, 2005: xvii)

His inspiration came from his own childhood play area which was a wild, rambling garden around his house. This transfer of his childhood experience has created a rich 'interior landscape' that is attractive, stimulating and engaging for a child (Dudek, 2005: xx).

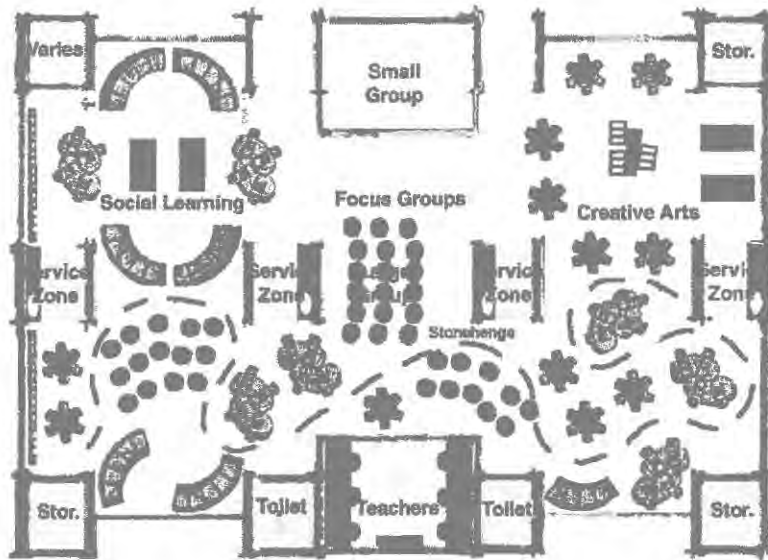
A second characteristic of the natural world that appeals to children and adults alike, is the ease with which it can be manipulated and changed according to one's desires and needs. In nature, nothing is predetermined or unchangeable and each day spent outdoors presents new experiences. This can be incorporated into the design of children's spaces by allowing children, teachers and parents to manipulate spaces and create their own environments. "Predetermining every aspect of a child's interaction with an environment limits the range of learning possibilities and development of creativity" (Dudek, 2005: 43). Thus, flexibility, movable furniture and a variety of multi-functional spaces is important.

The difference in the illustrations below shows one traditionally designed learning space



[fig 5.2], while the other [fig 5.3] shows the same space designed with a creative, user-determined layout.

(Fig 5.2: Traditional layout of a learning space. Source: Dudek, 2005:41)



(Fig 5.3: Creative, user-determined layout of a learning space. Source: Dudek, 2005:42)

In looking at the two of many possibilities mentioned above, it is evident that integrating the outdoor environment

and its associated activities and benefits within the built environment, may aid in establishing a new approach to architecture for children that is well-suited to them, providing for their needs and focusing on encouraging development through the built environment.

5.4 ARCHITECTURE AS A TEACHING OPPORTUNITY

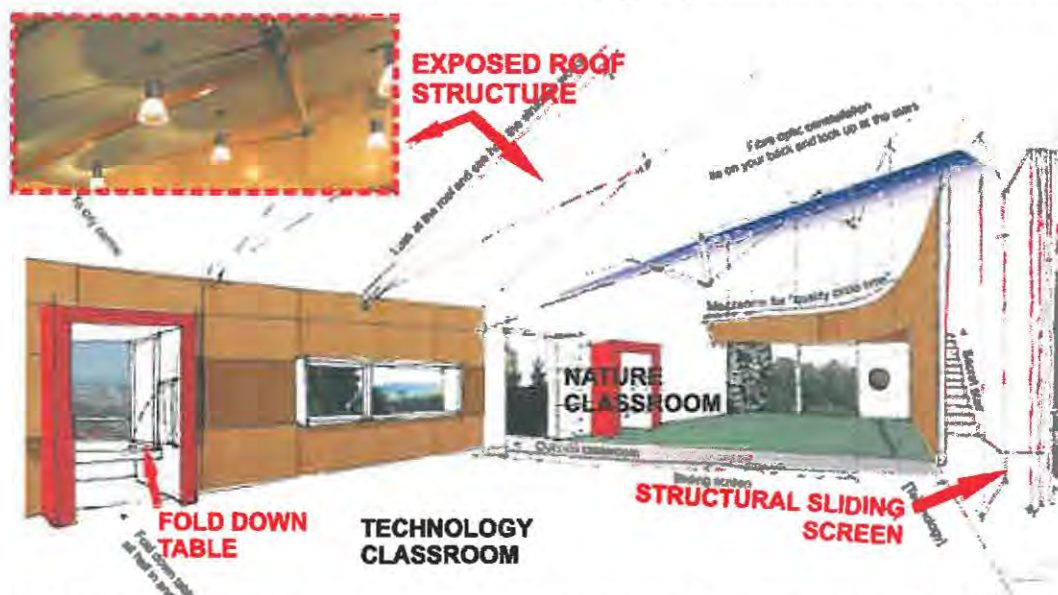
Since children are spending more time indoors in structured play areas where they can be supervised, it is in these spaces that learning and development happens. The design of these spaces thus becomes important in ensuring they are loved, enjoyed and beneficial to children, as it is evident in research that learning, which is the “process of change in patterns of thinking, valuing, feeling and acting resulting from an interaction between the child and his environment,” is more likely to happen in places designed appropriately for children (de Monchaux, 1981: 18).

From the previous statement, it is apparent that learning and development begins with the framework set by the architectural facility provided. Such environments provide the setting for children to interact in and engage with others and materials. Furthermore, it is these facilities that establish the environmental layout as well as the relationship between

spaces, the exterior environment and resources within such spaces. Basic conditions are determined, such as the way people are intended to interact, sound penetration, light emission and temperature control (Loughlin and Suina, 1982, in Spencer, 2006: 93).

With such great influence on its users, if designed appropriately, such spaces can become an active part in the developmental and learning process of children. Instead of merely functioning as a shell in which such activities occur, architecture for children can become a physical part of their education. This is the fundamental motto around which Reggio Emilia schools are designed. At Reggio, there is an understanding that architecture and education for children are mutually dependent on each other. Such schools consider the physical environment carefully to enhance their educational potential at the same time maintaining the values and goals of various cultures (Dudek, 2005: 51 and Tarr, 2001: 3).

Creating the opportunity to generate learning from architecture was fully harnessed in the Ballifield Community Primary School in Sheffield, UK. The new addition to the school, designed by Prue Chiles Architects, embraces nature and technology and aims to be part of the process of learning, by using structure and materials as learning tools. The structure of the school has been purposefully designed to encourage questions regarding structural forces. The expressed roof structure [fig 5.4] illustrates how this is achieved.



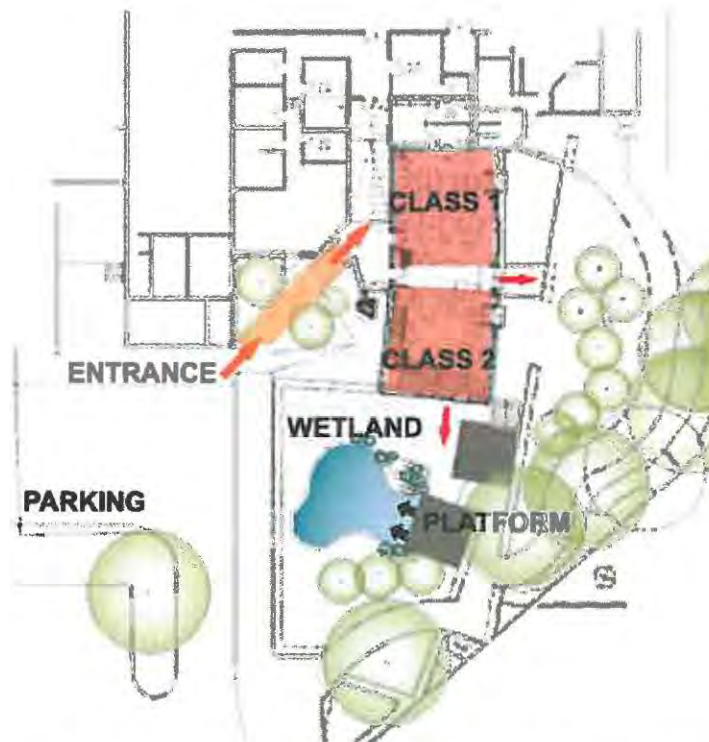
(Fig 5.4: Interior sketch showing structure performing as a teaching tool. Source: www.imagineschooldesign.org)



Recycled newspaper insulation forming the walls is exposed through observation panels when worktops are folded down.

(Fig 5.2: Fold-down worktop reveals wall structure. Source: www.pruearchitects.co.uk)

Other exposed sustainable features include green, living walls and the wetland. The surrounding landscape is also viewed as a teaching tool. A platform has been design to give children viewing access to the pond life, wetland and meadows.



(Fig 5.5: Plan shows the wetland and viewing platform as well as the school entrance, classrooms, and access to the outside environment. Source: www.imagineschooldesign.org)

In addition to this, children also learn much about society, values and ideals through the spaces they occupy (Day, 2004: 2-3). Nicholson (2005: 45) believes that a building can perpetuate ideas about

how children are taught and learn, but at the same time, the building can also indirectly communicate to children what is important and deserving of respect. Thus, she is of the opinion that spaces for children can make a considerable difference, not purely in formal education, but also in life experiences.

As one gains awareness of the great impact of the environment and the intrinsic part it plays in children's development and learning, the way in which these spaces are designed becomes of considerable importance. Environments for children should not merely be viewed as a shell in which learning occurs. Rather, they should be challenged to become an active component of the child's education, encouraging questions to be asked and thus knowledge to be gained. Furthermore, through the built environment created for them, lessons can portray to young children the importance of their self-worth and value to society. This education, which may be viewed as even more valuable than a purely knowledge-based one, is vital as it not only positively influences the child during the time spent within the environment, but also throughout their lives as they grow and mature.

5.5 CONCLUSION

Due to the evolving nature of children's culture, children are spending much of their waking lives in day care facilities, schools etc. while parents are engrossed in the workplace. This places the onus on designers to consider the needs of children in a new light. Dudek (2005) argues that the child's environment, created by architects, must be viewed as a "world within a world"; it should be a special place with all the aspects that make the environment a rich landscape for exploration, play and learning (Dudek, 2005: xx). As previously mentioned, these approaches to the design of children's spaces are only three, of a lengthy list of possible approaches within the Reggio Emilia framework that do just that. These have been specifically selected for discussion as they refer most specifically to the study of sensory stimulation as an architectural design tool.

Providing variety and flexibility within the architectural facility, incorporating the natural world into the built environment and using architecture as a teaching aid, can become the principles upon which future children's spaces are designed; but they can also be incorporated into existing facilities to improve them. It is in terms of these approaches that the building examples referring to children's spaces in the following chapter will be discussed and analysed.

CHAPTER 6
APPROACHING ARCHITECTURE AS A SENSORY
STIMULATOR IN CONTEMPORARY BUILT FORM

6.1 THE BODILY EXPERIENCE IN ARCHITECTURE: The Therme Vals, Switzerland

6.1.1 General Information

The Therme Vals is a hotel and spa designed by Peter Zumthor which opened in 1996. It was built over the only thermal springs in the Graubunden Canton in Switzerland. This building is designed to focus completely on the experience of the human body and stimulation of the senses.

6.1.2 Concept

The concept for the Therme Vals is in keeping with Zumthor's emphasis on the sensory aspects of the architectural experience. As seen in the illustration below, the idea was to create a cave-like structure set into the natural landscape. From the outside, the design is seen



less as a building, but more as an earthwork.

(Plate 6.0: General exterior view of the Therme Vals. The bathing areas lie below the grassed roof buried into the hillside. Source: www.daheenxxx.blogspot.com)



(Fig 6.0: Site plan of the Therme Vals, highlighted in red. Source: Ryan, 1997: 42)

The Therme Vals is about digging and moulding: it is primary, archaic and extremely sensuous (Ryan, 1997: 42). Working with the

natural landscape, the bathing chambers lie below the grassed roof, half buried into the hillside. This cave-like structure, already situated within the naturally sensory setting of the alpine hillside, stimulates the bodily senses even before the building is entered.

The spa is built from locally quarried, layered Valsler Quarzite slabs. The stone has become the essential driving inspiration for the design and has been widely used throughout (O'Grady, 2009: 1).

The overall aim was to create a place of quiet, to discover the primal experience of bathing, the therapeutic act of cleansing and relaxing in water, to enhance the sensation of water on



one's skin and to essentially create a place where one can experience the qualities of stone and other materials. As plate 6.1 suggests, the spa and baths were never intended to be the classic tourist experience of aqua-gadgets and water jets; but rather new spatial experiences and physical sensations.

(Plate 6.1: The spa baths are not the typical tourist attraction; but rather, the sensual essence of bathing where the tranquillity of water is explored. Source: www.architravel.com)

6.1.3 Material Palette

Since Zumthor's Therme Vals are designed to appeal to the senses, it is only fitting that the same thought be applied in the material selection process. Materials such as concrete, flamed



and polished stone, chrome, brass, leather and velvet were chosen according to their highly evocative qualities (Ryan, 1997: 42). Care has been given to the use of these materials so that they enhance the bathers' sense of embodiment, when clothed or naked.

(Plate 6.2: Close-up view of the layered Valsler Quarzite slabs. Source: www.architectsjournal.co.uk)

Layered Valsler Quarzite slabs form the core material [plate 6.2]. The stone rooms were designed not to compete with the body, but to rather flatter the human form and give it space.

The use of such materials is well demonstrated in the design of the changing booths. The horizontally-laid stone wall is broken in five places, providing openings into the changing booths.

Black leather drapes form a screen over each opening. Each changing booth has flush walls



of panelled, highly-polished, red mahogany lockers and a single leather banquette. Each material provokes a sense of warmth, inviting to the naked skin. This material selection for such an intimate space cleverly contrasts the cool concrete, stone and metals used in the more public areas.

(Plate 6.3: The changing rooms reveal the range of materials used. Mahogany wall panels and leather add a sense of warmth to the space. Source: www.archdaily.com)

The final material used is bronze. Doors, handrails, signage, light fixtures and other detail elements shown below, have been cast in bronze, adding life to a seemingly primal material palette. Its dull metallic glow was selected to contrast the stone, cave-like structure, reflect the light brought into the space by the slits in the stonework, and provide a sensory richness



to those elements touched by the human hand (Ryan, 1997: 48).

(Plate 6.4 & 6.5: Bronze is used on detail elements such as handrails and fountain heads. Source: www.jpomag.com; www.notsoso.com)

6.1.4 Multisensory Design

The material selection and their use are one of the main aspects of the sensory design approach. The touch, smell and even taste of these materials have been zealously considered. Each material has been joined and carefully crafted to enhance or suppress their apparent mass, thus enhancing their sensory qualities and impact on the human experience.

One 'material' within the Vals, often not thought of as such, is water. The experience of the bather is manipulated through water temperature and how water has been enhanced through the building design. Around the main pools, illumination comes from above [plate 6.7] thereby making the water seem much darker and cooler. In more private pools lit from below [plate 6.6] the opposite is true, making the water appear warmer. Hot and cold rooms have been lined with pink and blue terrazzo to focus the bathers' attention on the water surface, rather than the surroundings (Ryan, 1997: 48). With such a design, it is evident that the



experience of the body through the senses is of primary importance. The sensual quality of the space has been considered before the purely visual quality.

(Plate 6.6, 6.7 & 6.8: The images below and left reveal the variety of spatial experiences created in the bathing areas. Light from below [plate 6.6] and above [plate 6.7] alters the perception of the water, thereby enhancing the sensory experience. Source: www.mimoo.eu; www.architravel.com)



The aural experience of the space has been carefully considered. The Therme Vals enhance the silent, primary experience of bathing, while at the same time the

users find pleasure in the unique acoustics of bubbling water. Various bathing pools have been designed to enhance the acoustic effects of bubbling water, fountains and still water in their room proportions, material choice and their absorptive or reflective qualities (O’Grady, 2009: 1).

Within the spatial arrangement, combinations of light and shade, open and closed areas, and narrow linear elements have resulted in an experience that is restorative and sensual. Around



the massive stone shafts that form the monolithic walls, slivers of sunlight, seen in plate 6.9, are permitted to enter from above and through vertical slits in the stone (Ryan, 1997: 44).

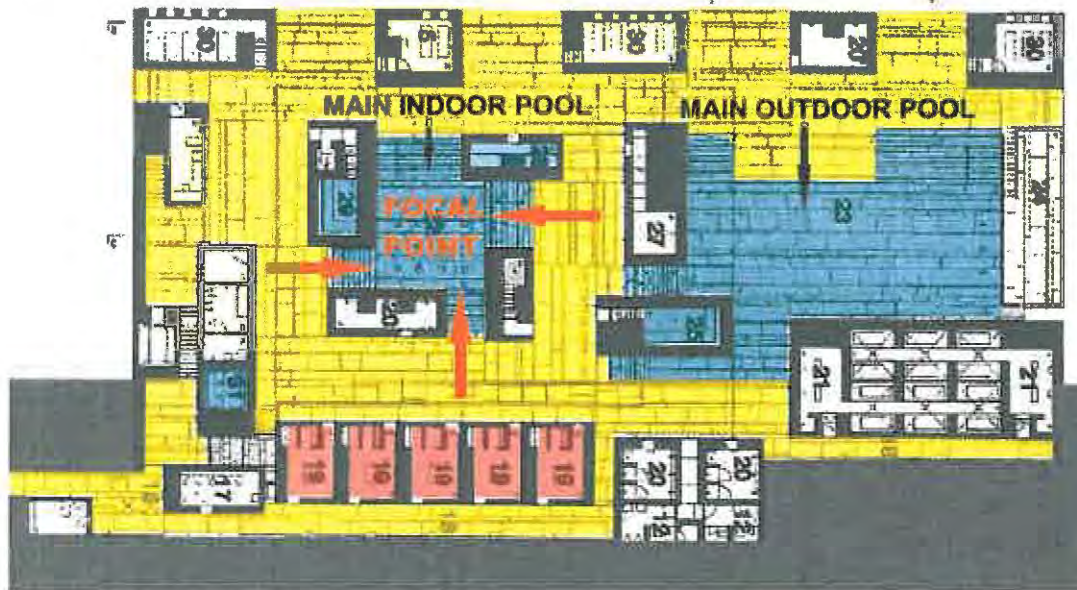
(Plate 6.9: Light and shade are combined in each space providing contrast. Slivers of light enter the pools through narrow slits in the stone walls. Source: Ryan, 1997: 44)

6.1.5 Spatial Experience

The Therme Vals is a labyrinth-like, buried world of solid and void (Ryan, 1997: 44). The main pool is a central, rotational space around which other areas are located. Such a space avoids a sense of disorientation by providing a central focal point or landmark. This is highlighted in orange on the illustrations following. The underlying informal layout of the internal space is a carefully modelled path of circulation, which leads bathers to certain predestined points, but also allows for private exploration of other areas. This circulation path, known as “The Meander”, is essentially a designed, negative space that flows throughout the entire building, connecting the bathing blocks. Throughout the circulation paths, the perspective is always controlled, either ensuring or denying a view (O’Grady, 2009: 1 of 1). In the figure 6.1 and figure 6.2 following, the yellow highlighted area shows the circulation space which is essentially negative space. The baths and usable areas are found in the positive space around which the circulation flows.

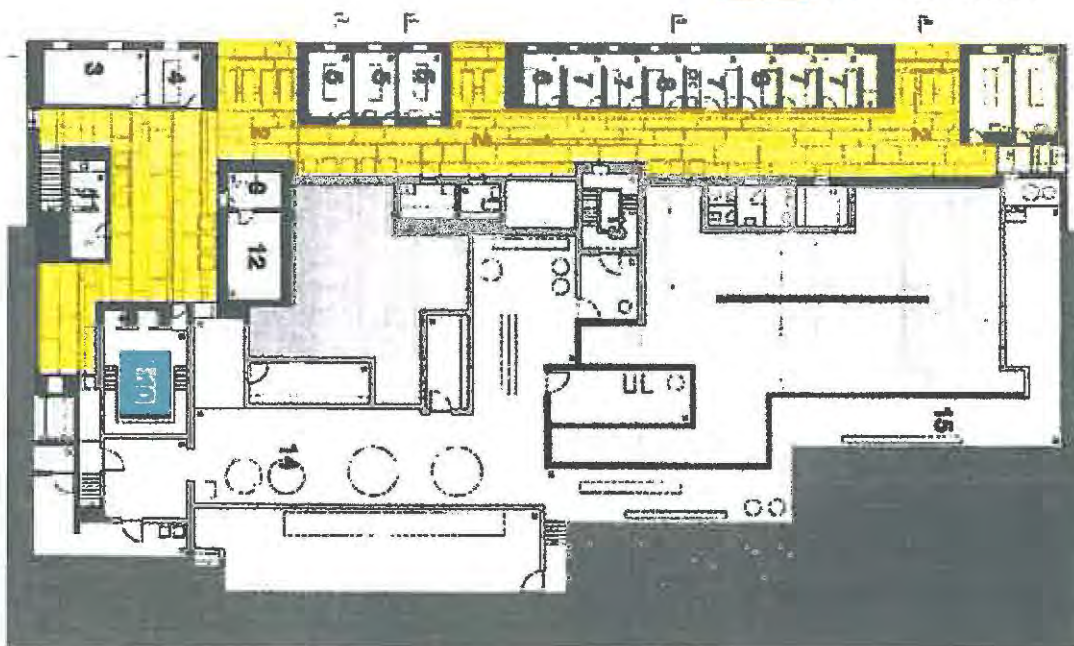
Moving through the Therme Vals becomes a journey of discovery in which users enjoy exploring the spa’s nooks and crannies. Allowing users to determine parts of their own

journey aids identification and ownership of the space; ensuring the experience is memorable and unique. Such a design reinforces the physical, bodily experience of the space. The human body is able to choose its path of movement and follow its natural instincts without being forced in any way.



FIRST FLOOR

- CIRCULATION AREA
- CHANGE BOOTHS
- BATHING POOLS



GROUND FLOOR

(Fig 6.1 & 6.2: Ground and first floor plans reflect the meandering paths of circulation where bathers are directed through the building while still being able to determine parts of their journey. Nooks and crannies to be explored are evident in the spatial layout. Source: Steiner, 1997: 28)

6.2 THE SIGNIFICANCE OF SPATIAL LAYOUT IN MULTISENSORY ARCHITECTURE: Kiasma Museum of Contemporary Art, Helsinki

6.2.1 General Information

The Kiasma Museum of Contemporary Art was design by Steven Holl Architects, in



conjunction with Juhani Pallasmaa Architects. It was completed in 1998 and has since won the 1999 National AIA Design Award.

(Plate 6.10: Image showing the general façade of the Kiasma Museum of Contemporary Art. Source: www.flickrriver.com)

6.2.2 Concept

The concept of the building involves the building's mass intertwining with the geometry of the city and landscape, which are reflected in the unusual shape of the building. In figure 6.3,



one can see how the unusual shape of the building reflects the intertwining of the geometry of the city and landscape.

(Fig 6.3: Site Plan illustrates the city geometry and its influence on the planning. Source: Lecuyer, 1998: 48)

The intersection of three lines formed within the city fabric is the generator of the architectural design (Lecuyer, 1998: 46). The connection between the museum and the water and green space shows an integration of sensory elements, not just in the building, but in its urban context as well. Significant, is that the experience of the building begins in its context, not just as one enters through the doors.

An important part of this concept was to create a building that provokes a unique experience by each visitor. There is no single, specific way the building is intended to be viewed or experienced. The most important aspect of the design is to rather offer space and possibilities for different interpretations and understanding (Kiser, 2009).

6.2.3 Variety of spaces

The Kiasma Museum of Contemporary Art provides a variety of spatial experiences. Two of such spaces can be seen in the illustrations below. One more formal, rigid space [plate 6.11] is contrasted with another more organic fluid space [plate 6.12].



(Plate 6.11 & 6.12: The interior spaces are unique, each with its own mood and character. Source: www.helsinki-traveller.info; www.wayn.com)

Exhibition spaces needed to be provided for a range of artists and their style of artwork, thus, various spaces were designed with unique spatial features, enhancing the bodily experience within. A silent, yet striking backdrop is created for the exhibition of artwork. This has been achieved through the subtle curve of one wall in predominantly rectilinear spaces (Kiser, 2009). This curved element is illustrated in the following photograph in orange.

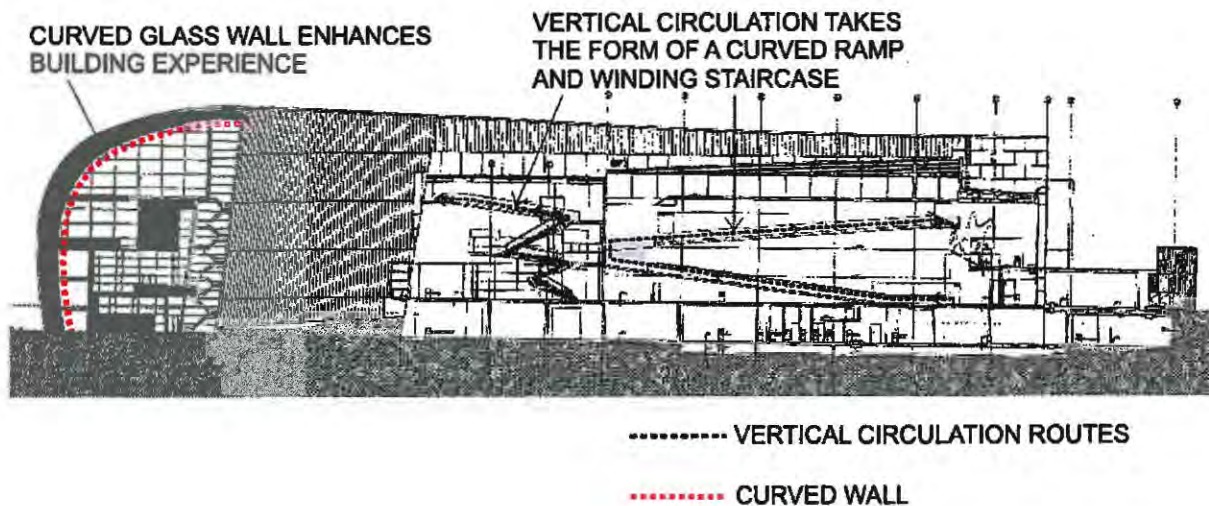


(Plate 6.13: The curved wall is a common feature of most spaces, adding character and drama to the space. Source: www.styleforum.net)

These rooms are intentionally designed to be silent, yet not static, differentiated through their irregularity and unique character. The curved wall invites the body to flow through the space with one hand trailing the textured surface.

6.2.4 Spatial Journey

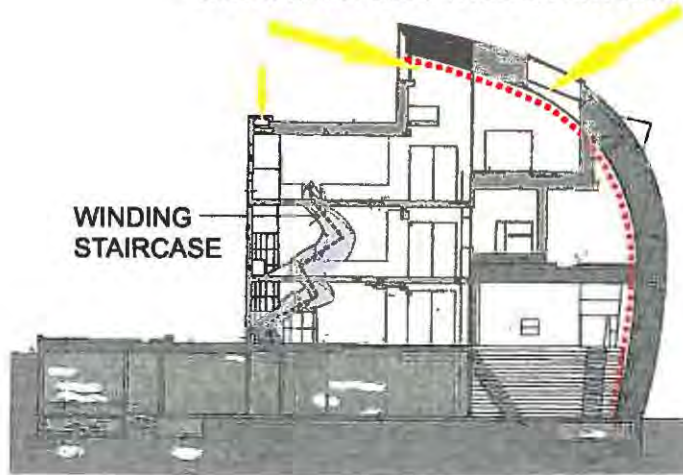
A significant feature of the Museum is the vertical circulation.



(Fig 6.4: Longitudinal cross-section. Vertical circulation is via a curved ramp. Source: Lecuyer, 1998: 49)

It has been designed as an architectural promenade that emphasizes the visit to the building. A long, curved ramp that links the different floors, allows visitors to slowly immerse themselves in the Museum's atmosphere. This is highlighted in purple in the longitudinal section above.

THE HORIZONTAL LIGHT OF THE NORTHERN LATITUDES ENTERS THE BUILDING IN MULTIPLE ANGLES THROUGH SKYLIGHTS



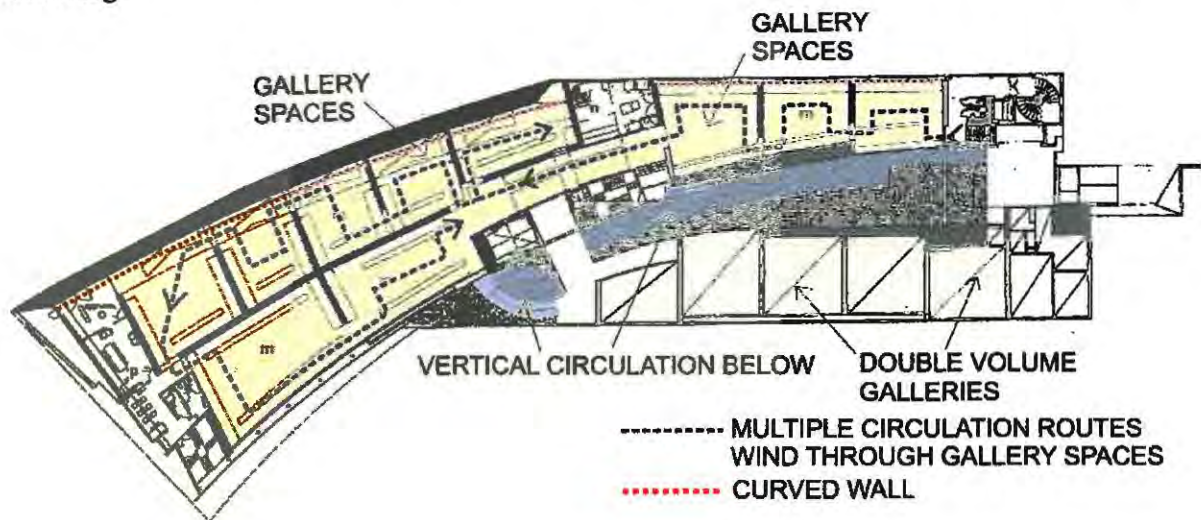
WINDING STAIRCASE

----- VERTICAL CIRCULATION ROUTE
 CURVED WALL ADDS CHARACTER AND INTEREST TO GALLERY SPACES

(Fig 6.5: Cross-section showing multiple skylights and curved wall. Source: Lecuyer, 1998: 48)

Such means of circulation enables an open, interactive viewing, inspiring the visitor to choose their own route through the galleries. This curved, unfolding sequence of spaces provides elements of mystery

and surprise and provokes moments of pause, reflection and discovery (Kiser, 2009). The multiple means of movement, and meandering path is reflected in the first floor plan following.



GALLERY SPACES

GALLERY SPACES

VERTICAL CIRCULATION BELOW DOUBLE VOLUME GALLERIES

----- MULTIPLE CIRCULATION ROUTES WIND THROUGH GALLERY SPACES
 CURVED WALL

(Fig 6.6: First floor plan of the Museum below shows the winding circulation through galleries. Source: Lecuyer, 1998: 49)

Such spatial experiences do not exist in a typical single or double-loaded, orthogonal arrangement of space. The open-ended spatial system suggests an expanse that lies beyond. The asymmetrical layout drives movement through a series of spatial sequences, each with unique bodily experiences and character (Kiser, 2009).

6.2.5 Tactility

Not just the form of the building is responsible for giving it its identity, but also the combination of colours and materials used. The exterior of the building is composed of a variety of contrasting materials whose qualities stimulate the senses. The exterior side walls are made of thick aluminium sheets which have been sanded [plate 6.14]. The light is thus reflected off the building in a multitude of ways, depending on the angle of the sun. The curved walls and roof are covered in zinc panels which will weather over time. The north and south elevations contain brass panels that have a copper-coloured finish [plate 6.15]. These materials are used for the specific purpose of engaging the senses of sight and touch. Their ever-changing qualities means the building is unique every time it is experienced.



(Plate 6.14 & 6.15: The copper panels and zinc side-cladding on the curved wall is seen above. Aluminium sanded sheets on the straight exterior side walls reflect the sunlight. Source: www.helsinkiinstyle.fi, aedesign.wordpress.com)

In creating spaces that are unobtrusive and fitting for the purpose of exhibiting art, the internal shell of the spaces has been kept neutral, predominantly made of concrete and plastered walls. Elements such as columns, window openings etc. have been intentionally left unarticulated to provide a clean canvas for showcasing art. The architecture has rather been expressed through details such as door handles, stair edges, railings and various elements that come into direct contact with the human body. Each detail has been specifically designed to create maximum impact and enhance the experience. Importance has been given to those aspects of architecture that stimulate the sense of touch, rather than purely focusing on pleasing the eye (Kiser, 2009).



(Plate 6.16: Interior images reveal the tactile qualities of those architectural elements that connect with the human body. For example: railings, wall finish and floor finish. Source: www.kiasma.fi)

The palette of finishes for the gallery has been carefully

thought out. Rough plastered and white painted walls are used to encourage touch and are animated by the unique light conditions. The floor is a black, dyed concrete which has



become a composition of muted shades of grey. Through the finishes, a sense of life is brought into the space while remaining muted and cool. Acid reddened brass is used as a marker of significant building features, such as railings, seen in plate 6.17. The brass is also cool to the touch and striking to the eye, revealing its provocative, sensory qualities (Lecuyer, 1998: 50). Here one sees the importance placed upon those aspects which come into contact with the human body.

(Plate 6.17: The use of brass on the railings contrasts the rough plaster behind. Source: www.architect.com)

6.2.6 Use of Light and Water

Natural elements such as light and water have been used to their full potential in the design of the Museum. Natural light has been introduced well into the building. Particular to Helsinki, is the horizontal natural light of the northern latitudes. The slight variation in room shape and size, due to the gently curving section of the building, allows natural light to enter in several different ways. The following illustrations show the different light conditions created in various spaces. Deep shafts carved into the curved profile bring light into the middle level galleries (Lecuyer, 1998: 48).



(Plate 6.18 & 6.19: A variety of light conditions are created due to the innovative use of skylights and exploitation of the horizontal light of northern latitudes. Source: www.hebert.kitp.ucsb.edu; www.architravel.com)

The natural illumination in each room is slightly different, enhancing the unique character of each room. The curved roof allows secondary sand-blasted skylights which provide even, filtered light into spaces. The use of natural lighting prevents the building from becoming static by enabling the interior of the building to be constantly changing with the time of day and year (Lecuyer, 1998: 48).

In the landscape plan, the Tššlš Bay has been extended up to the building. In plate 6.20, the water can be seen up against the edge of the building. The horizontal light is enhanced by the waterscape that acts as an urban mirror. The water extension intertwines with, and crosses through the body of the building, and falls to a small pool at the lower ground level. The sound of moving water can be heard when walking through the building thus engaging the auditory sensory mode. The water is allowed to freeze in the winter months further enhancing



the ever changing seasons and strengthening the connection between the building and the environment it occupies (Kiser, 2009).

(Plate 6.20: Water extends up the building edge as well as passing through the Museum. The sound of moving water can be heard within the central area. Source: www.locationguide.fi)

6.3 APPROPRIATE SPACES FOR CHILDREN: The Children's School, United States

6.3.1 General Information

The Children's School, located in Stamford, Connecticut, United States, was designed by Maryann Thompson Architects. Completed in 2007, the school has a capacity for one hundred and twenty pupils aged two to eight years.

The school's mission to "take young children seriously" has come to life in a new building,



with the architects designing a much more innovative and daring model for learning environments than the traditional "school-as-a-box" (Martin, 1998).

(Plate 6.21: Overall view of The Children's School. Source: www.imagineschooldesign.org)

This building is significant to be studied, as it shows a new approach to learning that is based on interaction with the environment and sensory stimulation. The architecture facilitates such an approach by becoming a tool through which learning is encouraged. The building also highlights an understanding of the way in which children interact and learn from the environment, through physical experience, stimulation, exploration and play.

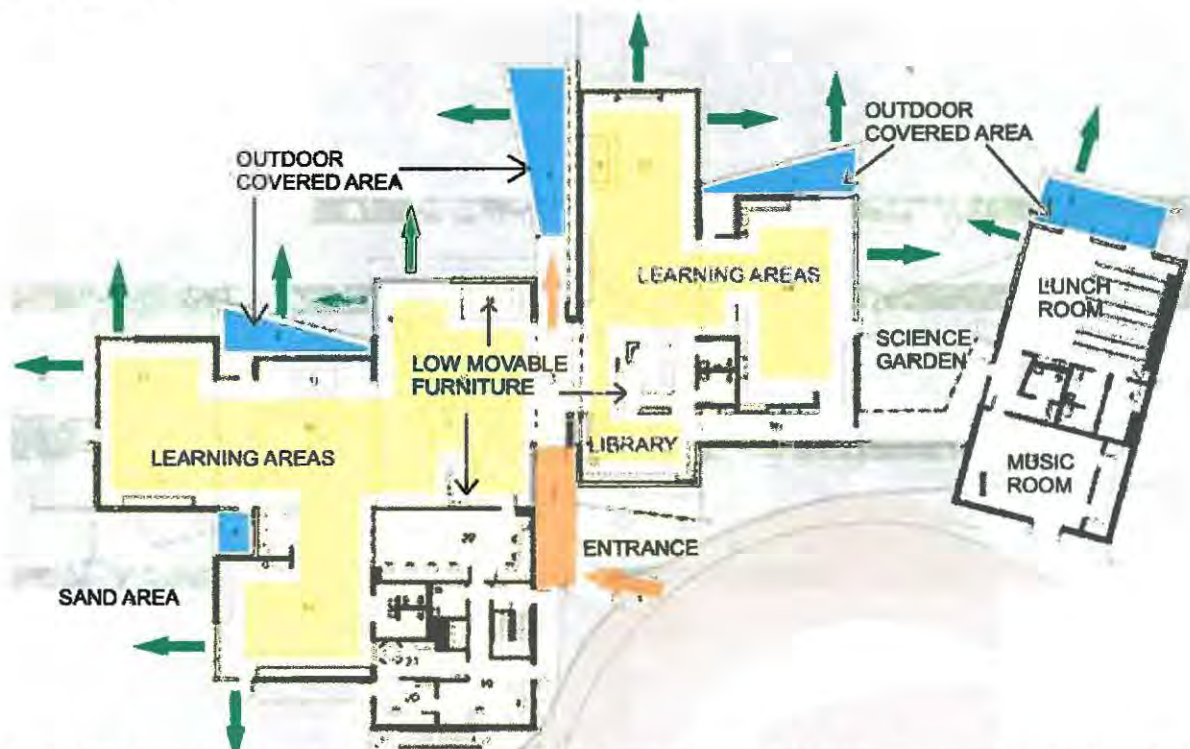
6.3.2 Concept

The school is based on the concept of a "one room schoolhouse" and has been specifically designed to support their child-centred teaching methods. The approach is based around learning in an environment which stimulates natural instincts and self-directed learning in children. The teacher becomes merely a 'guide' who can manipulate the environment to appropriately stimulate the child and encourage learning. The one room concept is a response to this, enabling different kinds of activities and renewals to occur within the space, as well as ease of observation (Martin, 1998).

The understanding that a school's 'built world' can be a powerful teaching tool in its own right is evident in the design. The essential role that the physical environment plays in heightening a child's curiosity and shaping his or her sense of well-being, is expressed in the focus on the natural landscape and its relationship to the interior of the building.

6.3.3 Flexibility of Space and Learning

Designed as one open space, the school encourages the free movement of the child through different learning areas. The main learning spaces flow as a single space but have been partly separated by unobtrusive elements such as changes in floor level, low, movable furniture and shifting roof planes. Such spaces within the building allow multiple functions to occur within and enable children to freely move through various learning areas. No space is prescribed with a set function or size. They are easily adaptable to create a variety of situations and also a variety of large or small group sessions (Martin, 1998). The ground floor plan is analysed below. The flexible learning spaces are highlighted in yellow. Blue areas show covered external spaces that can also become learning spaces. Green arrows show the connection to the outdoors.



(Fig 6.7: Ground floor plan showing school layout, flexible spaces and indoor-outdoor relationship. Source: www.imagineschooldesign.org)

The varied roof planes also help to define the classroom spaces without the use of solid walls. Changes in ceiling height between the roof levels create a sense of transition as one moves



from one space to another, even though no formal threshold is present.

(Plate 6.22: Interior view. Spaces that bleed into one another are defined by low, movable furniture. Source: www.imagineschool design.org)

The concept of flowing spaces continues into the relationship between the interior and exterior through visual and physical access. Large floor to ceiling windows and open flexible space with low furniture is evident in plate 6.22 above.

6.3.4 Indoor / Outdoor Relationship

In The Children's School, the open plan nature of the school and vast expanses of glazing in the walls and roof, allow the surrounding woodland to be visually and most often physically accessible from each space. The roof planes, opening out into the surrounding nature, maximise views and encourage movement towards the outdoor areas (Martin, 1998). The transition space has been sensitively designed with large overhangs for shading.



(Plate 6.23: The Children's School shows a strong relationship between the indoors and outside. Source: www.worldarchitecturenews.com)



The transitional space between the interior and exterior environment has been well designed with large overhangs accommodating covered outdoor lessons.

(Plate 6.24: The transition space is carefully thought out with large overhangs providing shaded space to gather. Source: www.topboxdesign.com)

6.3.5 Integrated Environmental Design

The Children's School is designed to tread lightly on the earth and is one of the first LEED Certified schools in Connecticut. Its natural setting lends itself well to a 'green' approach to building. With its varied roof planes, the way in which it seems to nestle within the forest landscape and careful orientation taking full advantage of the sun, reveals that the project has more than a purely functional purpose. The building and intrinsically connected grounds are to inspire young children to be good stewards of the earth's resources and to understand the importance and appreciate the beauty of the natural world (Martin, 1998).

The careful orientation and thought behind the planning of the school can be seen in the east-facing wing being occupied by the younger children, as they only attend school in the morning. The west-facing wing is occupied by older children, to take advantage of the western light.

The building has a passive solar design with large south-facing windows to capture views and also cross-ventilation in order to extend the seasons in which heating and cooling are not necessary. Such environmental elements are highlighted in the analysed site plan following:



(Fig 6.8: Site plan showing careful orientation and relationship with the natural setting. Source: www.imagineschool design.org)

Rainwater collection from the roof planes is used to create a waterfall in the landscape and deep roof overhangs prevent overheating in summer. It serves a dual function in providing a large, outdoor, sheltered learning area. All interior finishes are free from volatile organic compounds (VOC's) and natural, recycled or locally sourced materials have been used where possible. Such environmentally sensitive design features instil values of conservation and stewardship in the pupils (Martin, 1998).

6.3.6 Unique Design Features

The use of materials invites children and adults to participate with the building and experience it as a tactile entity. External timber cladding has been used on the wall and the



soffits of the extended roof planes. In some areas [plate 6.25] these timber soffits continue internally and further blur the distinction between interior and exterior.

(Plate 6.25: Timber cladding on the exterior soffits extends into the building reinforcing the relationship between the interior and exterior. Source: www.imagineschool design.org)



The trellis and louvers on the upper portion of glazing creates a multitude of different lighting effects and patterns on the interior floor and walls, seen in plate 6.26.

(Plate 6.26: The louvers create interesting patterns of light and skewed roof planes permit shafts of light between their forms. Source: www.imagineschooldesign.org)

The skewed roof planes that subtly tilt against one another let light in from above and between their forms, creating shafts of light at various times of the day.

The interior design is vastly different to that found in most schools today. The walls are painted brilliant white, contrasting the maintainable and practical dark carpet. The use of colour is kept to a minimum yet the space inside is far from stark or bland. The angled roofs, warm timber, reflective wall surface and patterns of light bring life into the space in a manner completely different to the multi-coloured, garish classroom interiors in most schools

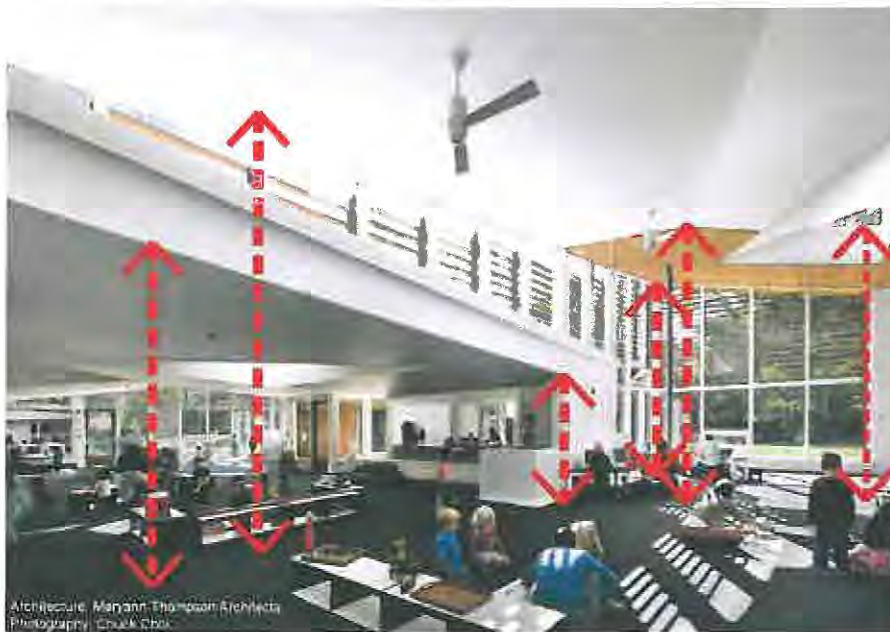


(Martin, 1998). The interior design is best observed in plate 6.27.

(Plate 6.27: Colours are muted and kept to a minimum. The use of timber, interesting lighting and the contrast between light and dark furniture adds life and interest to the space. Source: www.imagineschooldesign.org)

6.3.7 The Child's Experience

The school design has created a unique experience for the pupils it serves. The child's natural desire to wander, explore and interact with the environment has been enhanced through the innovative use of indoor and outdoor space, as well as the connection between the two. Spaces have been vertically broken down and varied, thereby reducing its apparent scale to



remain in keeping with the scale of the child. The analysed illustration shows the height variations which make the spaces usable by adults while still being 'child-orientated.'

(Plate 6.28: Changes in the vertical heights reduce the building scale making it appropriate for children and adults alike. Source: www.imagine schooldesign.org)

The stimulation of the senses through the material palette, interesting lighting, spatial volumes and focus on the natural outdoors and its interior integration, has converted what could have been a simple school building into an exciting journey that encourages learning, play and engagement with the environment. The sequence of spaces takes the child on a journey through it. During the sequential movement through the spaces, the child also experiences the unfolding of the landscape into the building.

A playful atmosphere of 'hide and seek' has been created through the design of a number of intimate spaces and details. A small library is tucked into a corner under a low roof plane, with an inbuilt window seat hidden between the bookshelves [plate 6.29]. Such spaces allow for a sense of privacy and quiet reflection.



(Plate 6.29: A corner window seat is tucked between the book shelves. Such spaces allow for a unique experience and promote exploration and identity with the space. Source: www.imagineschooldesign.org)

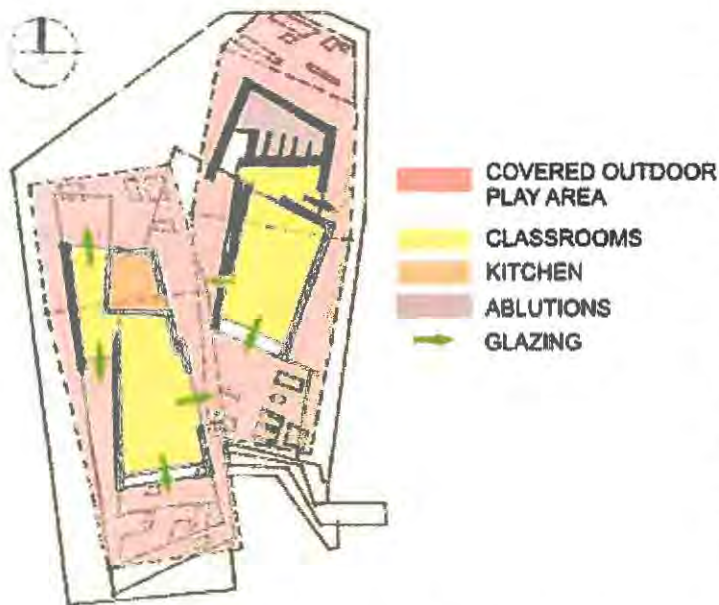
In another area, an entire wall has been converted into a whiteboard, providing a place of gathering without the white board being the focal point around which all furniture is oriented; as seen in most schools today. Through all these unique design features, the building stimulates a child's desire to wander, explore and interact with their environment. In order to fully understand it, the building must be occupied and its spaces engaged.

6.4 DESIGNING FOR CHILDREN IN THE SOUTH AFRICAN CONTEXT: Thembelihle Crèche, Montic Factory Crèche and Olifantsvlei Crèche, Johannesburg

6.4.1 General Information

Facilities for preschoolers are constantly found lacking in impoverished areas, where AIDS and unemployment rates are high. Three locations within the informal settlements around Johannesburg were identified as in need by a group of Austro-German students. Based on an experiential teaching programme, these students undertook the design and construction of three crèches, namely, Thembelihle Creche in Weilers Farm, Montic Factory Creche in Heidelberg and Olifantsvlei Creche in Olifantsvlei. Since these facilities are part of one venture and the design approach is almost identical, for the purpose of this dissertation, they will be studied as one scheme.

6.4.2 Spatial Planning Principles



(Fig 6.9: While simplistic, the floor plan above shows the abundance of outdoor play spaces and area of glazing. Source: Joubert, 2009: 163)

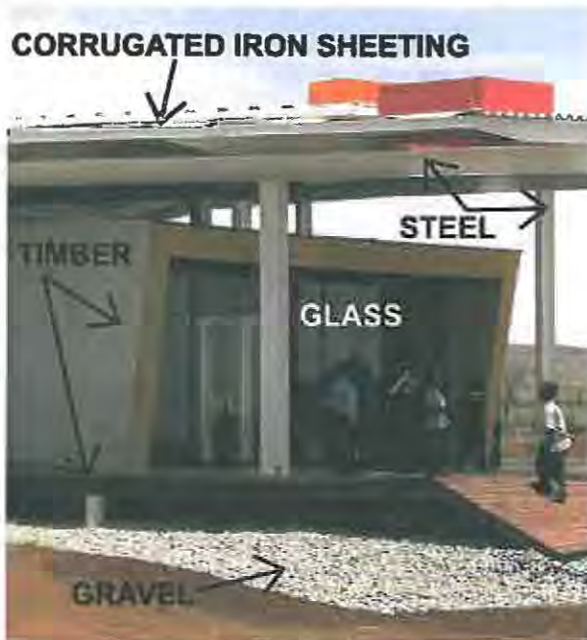
The plan of the Olifantsvlei Crèche [fig 6.9] shows the planning principles and spatial layout of the facility. While the size of the scheme is relatively small, the dynamic and flexible use of space is to be noted. The classroom spaces open out onto a well used

covered play area and divide this play area into numerous smaller areas for different types of play to occur in each. These covered outdoor spaces are essential as they enable important outdoor play in all weathers, and protect the internal spaces from inclement weather and

direct sunlight. Glazed windows open up on all sides of the building providing maximum lighting all year round and in all weather conditions, thereby reducing electricity costs.

6.4.3 Material Palette

The choice of material was primarily based on the fast-paced construction process needed. Thus, timber, steel posts and rafters and corrugated sheeting have been used as they are



lightweight and quick to erect. In contrasting these materials against one another, they are used to their full sensory potential. The inclusion of a greater variety of materials however, would improve the tactile and experiential qualities of spaces.

(Plate 6.30: Exterior photograph reflects limited material palette. The use of a greater variety of materials would enhance the tactile qualities of the building. Source: Joubert, 2009: 167)

Gravel is a material not often well recognised in terms of its many attributes. In the crèche facilities here, it has been used abundantly and performs many functions. It is used on the perimeter of the buildings to disperse rain and prevent rain splatters ruining the external walls. Gravel has a rich, aural quality underfoot, thus creating an acoustic transition between the indoors and outside spaces. The small pebbles can also be used as part of children's games.

Shade cloth in various colours has been successfully used. It provides solar shading while allowing filtered and colour light to penetrate. The coloured ground becomes part of the sensory experience. This shading method creates contrast between light and solid elements, further enhancing the experiential qualities of the space.



(Plate 6.31, 6.32: Use of coloured shade cloth provides a unique experience of contrast. Source: Joubert, 2009: 164-165)

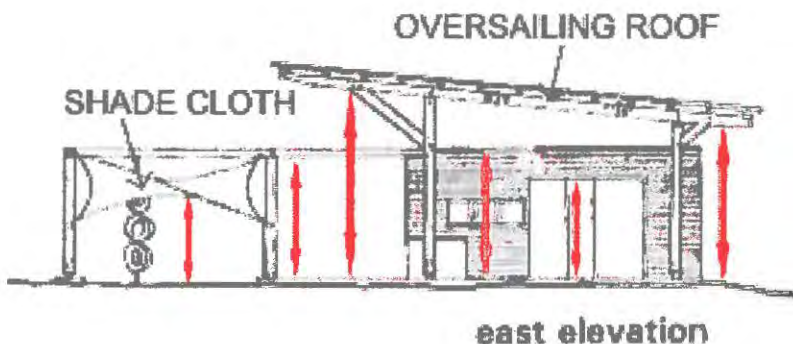
6.4.4 Recognition of the Scale of the Child

The design of this building has done well to take the scale of children into consideration. Large, oversailing roofs gives the building height and prominence, while the lower portions beneath are in keeping with the scale of the child. The variations in height and lowered, colourful windows establish the crèche as a place primarily for children and instil a sense of ownership and pride over the facility. Such a sense of belonging is imperative to children's

development and self-identity.



(Plate 6.33: The oversailing roof and lowered elements recognize the scale of the child. Source: Joubert, 2009: 166-167)



(Fig 6.10: Elevational view further reflects the vertical height variations. Source: Joubert, 2009: 163)

6.4.5 The Building as a Toy

The three facilities show how a building for children can function as a toy. Children are welcome to climb on the building, hide in the small niches provided, and use it as part of their



games. This is a significant aspect to the design of such facilities as it lowers the need for additional toys and playground equipment, which may be difficult to fund or source in poor communities such as this.

(Plate 6.34: The building is viewed as toy on which children are able to climb and play. Source: Joubert, 2009: 167)

CHAPTER 7
**REGIONAL RESPONSE TO SENSORY STIMULATION AS A
TOOL IN THE DESIGN OF CHILDREN'S SPACES**

INTRODUCTION

This empirical study of Roseway Waldorf School in Assagay, Seven Fountains School in Kokstad and Shayamoya Community Centre also in Kokstad which follows, has been selected as relevant to the topic of sensory stimulation as an architectural design generator, as each show a learning environment for children which incorporates much of the theoretical findings discussed in the preceding review of literature.

7.1 ROSEWAY WALDORF SCHOOL, ASSAGAY

7.1.1 INTRODUCTION

The Roseway Waldorf School is a learning facility based on the educational philosophy of Rudolf Steiner. Waldorf education teaches pupils to learn from life, through doing, making and interacting with the environment.

Educating learners from play school to Matric, the curriculum places emphasis on practical work, which includes activities such as handwork, woodwork, gardening, metalwork, craft and design.

Particularly in the lower classes, interaction with the environment, imaginative play, sensory stimulation and a love of nature is encouraged as a major source of learning. The building design aims to facilitate this approach to education.

7.1.2 JUSTIFICATION OF CASE STUDY

The Roseway Waldorf School provides insight into an alternative approach to education that focuses on enhancing and using the natural manner in which children learn and develop, through play, exploration and stimulation. This knowledge is reflected in the

concept, design and details of the buildings and in the layout and design of the surrounding areas. The study of such a school aids this dissertation by revealing the benefits of designing spaces for children that are based on physical interaction with the environment; an understanding of how children are impacted by their environment; and incorporating nature, a natural stimulator, into the building design. In addition to this, there are numerous other aspects of designing for children that the study of this school will bring to light.

The Roseway Waldorf School, as mentioned, focuses on integrating the natural outdoors with the learning process. It is interesting to note how the school's architecture has been designed to facilitate this approach to teaching. Not only is this to become evident in the indoor-outdoor relationship, but also in the overall spatial planning and site layout. The urban context is also to be analysed in this regard, to determine the significance of the site and its context to the learning process. The location and context of Roseway Waldorf School greatly contrasts that of the Seven Fountains School, thus allowing comparisons to be made and conclusions drawn.

The sensory approach to design justifies this case study as relevant. The importance of tactility and engaging with the child's sense of touch is evident. This is to be seen in the material choice and added tactile features. The stimulation of the other senses and how that has been incorporated into the built form, is also apparent.

One of the focuses of the school is to enhance children's sense of identity and self-image. By studying this building, it becomes evident how this can be achieved through the built form and the role that pupil participation in the creation of their environments plays in enhancing the child's sense of identity and concept of self. Through participation in the building process, one is also able to see how respect for their environment is encouraged.

The architecture of this unique school exposes how the built form and design of interior and exterior spaces can influence the 'spirit of place' and how a sensory stimulating building can beneficially impact its users, particularly children. The impact of nature

within the school and in its urban context on the creation of a 'spirit of place' will become evident.

The final aspect which justifies this study is the focus it puts on the psychology of the place experience for children. This is evident in the variety of spaces, scale of spaces and the creation of unique places for children to explore and experience. The way children are affected by their environment has been well considered in this school, and provides lessons to be learnt for the future design of children's spaces.

7.1.3 LOCATION

Roseway Waldorf School is located within a conservancy on top of Alverstone Hill, ten minutes outside Hillcrest. Surrounded by farmsteads, forested areas, green valleys and fresh air, the site for the school is perfectly suited to the educational environment that



Waldorf schools aims to create. The main access route is along Alverstone Road, which feeds off both the N3 and M13. Thus, while being situated in a seemingly remote location, it is easily accessible.

(Plate 7.0: Aerial view of Roseway Waldorf School showing location and surroundings. Source: www.googleearth.com)

7.1.4 HISTORICAL AND SOCIAL CONTEXT OF CASE STUDY

The Roseway Waldorf School in Hillcrest was founded in 1985 by a group of six families and three teachers. The school opened in February with just eight children, ranging from Grade 1 to Grade 3. Temporary premises of a small farmhouse in Alverstone had been obtained through a local businessman, Mr John Rumble. Today, these premises form the Kindergarten and staff housing.

In a short time it became evident that space was running out and a "proper" school was needed. Mr Rumble donated seven acres of land adjacent to the existing farmhouse, and plans were drawn up. A Foundation Stone-laying ceremony was held in September 1988 on the new site.

In September 1990 the refurbished school was officially opened by Elizabeth Sneddon.

The Roseway Waldorf School is primarily supported by communities within the Hillcrest and Kloof areas. However, there are a number of learners from the Westville, Pinetown and Durban areas. The school is family orientated, offering many opportunities and events for interaction with the parents throughout the year. Discounted fees are also offered for families with multiple children attending the school.

The school welcomes all students from different walks of life, and there is no discrimination on the basis of colour, national origin, race, religion, sexual orientation, age, or handicap in the admission or financial aid policies and practices.

7.1.5 EMPIRICAL DATA

7.1.5.1 Spatial Layout and Planning Principles

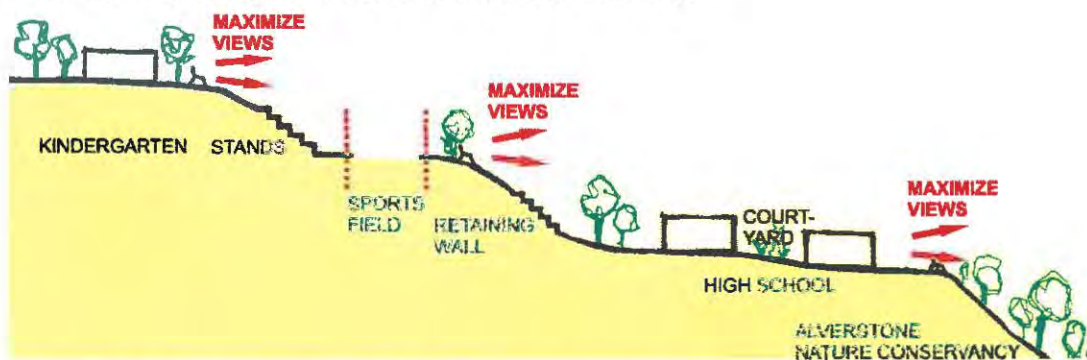
The illustration following, shows the various buildings of the school. The Kindergarten and Aftercare are housed within the old farmhouse buildings, while the High School and Primary School are in the new additions. Each age group has been separated and designed specifically according to their needs.



(Plate 7.1: Aerial view showing the overall school layout and position of various age groups. Source: www.googleearth.com)

The following site section sketch [figure 7.0] illustrates how the school sits on its relatively steep site. Buildings have been broken up and the site has been terraced to accommodate the necessary

facilities and buildings. Views over the Alverstone nature conservancy have been maximised by using the site profile as part of the design.



(Fig 7.0: Site section sketch showing the use of terracing and maximised views. Source: Author's sketch)

The Primary School and High School buildings are designed around a central, green courtyard space. This reflects the importance of nature and provides a communal gathering space.



(Plate 7.2: Aerial view shows the primary school layout. All classrooms open onto the grassed courtyard space. Source: www.googleearth.com)

The relationship between the indoors and outdoors has been enhanced through the



building layout, as each classroom has direct access to the outdoors (plate 7.2 and plate 7.3). Courtyard spaces, large verandahs outside the classrooms, and trees surrounded by benches, enable classes to take place outside [plate 7.5].

(Plate 7.3: Aerial view shows the high school layout. Direct access to the outdoor is provided in each classroom. The central courtyard space is ideal for lunch breaks. Source: www.googleearth.com)

The following illustration shows the relationship created between the indoors and outdoors. Classrooms open out on to a large shaded verandah providing covered space for outdoor lessons. Beyond this is the sunlit grassed area. The transition space between indoor and outdoor has been carefully thought out creating a pleasant transition between



the classroom space and outdoor space.

(Plate 7.4: Doors such as this connect the high school classrooms to the natural landscape outside. Large verandahs also provide outdoor teaching space. Source: Author)



(Plate 7.5: Benches surround old trees enabling lessons to take place outside. Source: Author)

Classroom layouts are unique, far from the rectangular classrooms in many schools today. No two classrooms are identical, providing a new experience of space within each. Unusually shaped rooms and angled or curved walls allow for different desk

layouts to be achieved in each classroom; fitting for the variety of subjects taught. Thus, the importance of flexibility of space and non-structured learning environments has been achieved.



(Fig 7.1: Three different classroom layouts in the same space illustrate flexibility. Source: Author's sketch)

7.1.5.2 Aspects of Environmental Sustainability

At Roseway Waldorf, children are encouraged to learn from and enjoy nature, and are unrestricted to its access. Caring for the environment is also important, and environmentally sustainable practices have been employed which the children are part of enforcing. This is done in a number of ways:

Children from kindergarten upwards are taught gardening and have responsibilities of pulling out weeds and planting. Each primary classroom has a rack of gum boots and gardening tools easily accessible outside the classroom door. This is particularly significant in the context of South Africa, as our climate allows for such activities to occur. These skills can also be brought into the children's home environment, thereby benefitting the entire community.

The kindergarten has a vegetable patch and low planter at the children's height, thus recognizing and designing according to the scale of a child. The produce is used in the making of children's lunches.



(Plate 7.7: Low planters are built at the correct height for children to access (above). Source: Author)



(Plate 7.6: Racks of gumboots sit outside each classroom (left). Source: Author)

Recycling of materials is promoted and all classroom refuse is sorted by the children. Water recycling is used in an innovative manner. In the kindergarten garden, rainwater flows from the roof and is used to fill and replenish the frog pond. This is an interactive teaching opportunity created to express the importance of saving water.



(Plate 7.8: Rainwater fills Jo-Jo tanks and is used to fill water features and water gardens. Source: Author)



(Plate 7.9: Recycling of refuse is encouraged and recycling facilities are provided on the school grounds. Source: Author)

The choice of materials is another environmentally sustainable aspect of the school. Natural materials have been selected for much of the building design as well as outdoor play equipment. Hard plastic jungle gyms are replaced by wooden, bio-degradable play equipment and toys.



(Plate 7.10: Wooden play equipment is preferred as it is environmentally sustainable and fits into the natural landscape. Source: Author)

7.1.5.3 Materials and Tactility

The Roseway Waldorf School reflects the importance of the tactile sense in its varied use



of materials. Materials chosen are primarily natural and are used to encourage the sense of touch to be engaged. Stone, brick, smooth and rough plaster and wood are used on the building façades.

(Plate 7.11: A variety of materials used on the building exterior enhances the tactile qualities of the space. Source: Author)

Floor textures consist of gravel, brick paving, tiles and screed to alter the feel underfoot, thereby differentiating between spaces. The acoustics of each material adds to the aural quality of the experience. Mosaic tiles and coloured pebbles have been inlaid into paved



areas, further highlighting the textural quality of the floorscape. It is evident that the importance of the floorscape, due to the lower eye level of children, has been recognized.

(Plate 7.12: Screed flooring is warm underfoot, adding another dimension to the tactile quality of the space. Pebbles inlaid create texture and variations in the flooring. Source: Author)



(Plate 7.13: Mosaic pavers create an interesting floor texture and highlight significant areas of the building. Source: Author)

In numerous areas, wall motifs and mosaic work adds to the tactile experience of the space. One is drawn to the undulating surface and is encouraged to not just visually experience the design, but feel to it with the hands as well. Children are urged to physically engage with the building surfaces through sight and touch.



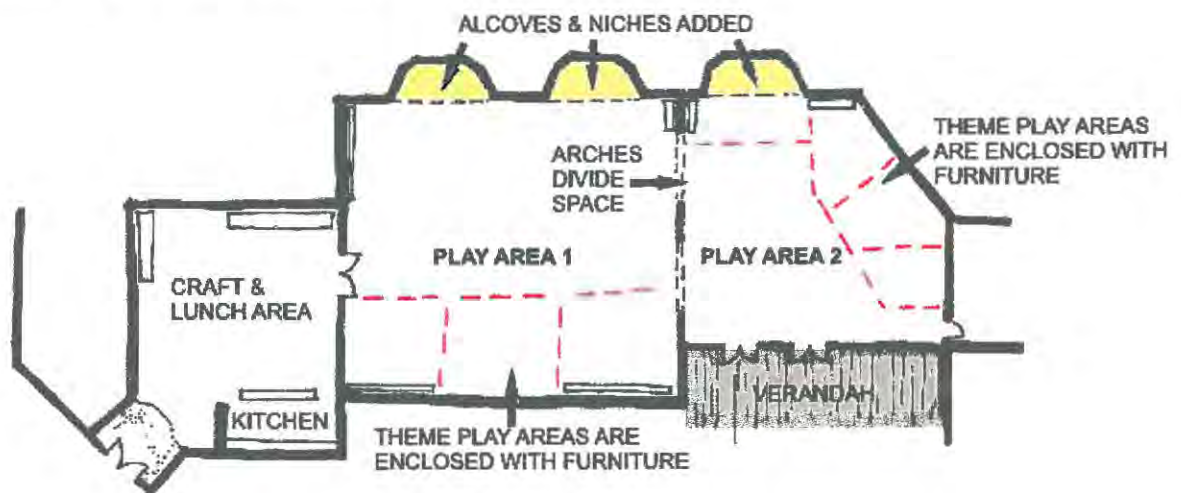
building surfaces through sight and touch.

(Plate 7.14 & 7.15: Mosaics and textured wall features invite the hands to feel the surface, rather than just see it. Source: Author)

7.1.5.4 Applied Principles of Children's Design

The Roseway Waldorf School shows evidence that it has been designed according to the way children interact with the world around them, and learn from their environments. The importance of play and using the imagination can be seen in the building and garden design. All areas are used to their full potential to stimulate the imagination and encourage free play to occur.

Large general areas are provided for group activities. Smaller, more intimate spaces are designed to encourage moments of quiet reflection and small group gatherings to occur. Smaller nooks seen in the sketch plan below have a lowered ceiling level, thus in keeping with the scale of a child. These spaces also show evidence of the recognition of the importance of personal, more private space in children's development and place experience. Having these spaces enables time for imagination, escape, safety and creativity through active place making and place attachment. These principles have been carried out into the garden design as well.



(Fig 7.2: Inside has an open plan layout. Large, general areas allow for group activities to occur. Niches, shown in yellow are more private spaces. Source: Author's sketch)

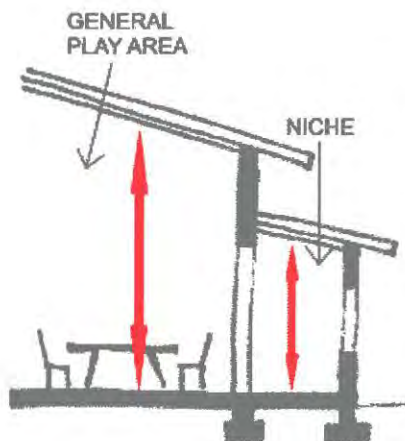


(Plate 7.16: More intimate spaces for reflection and quiet play are created in the garden spaces, where nature provides natural hiding spaces and places of refuge. Source: Author)



Alcoves and niches allow children to explore and discover new things, which are fundamental to their growth. The variety of spaces provided allow for a variety of play and learning opportunities. This is an essential component of the success of the Kindergarten.

(Plate 7.17: Additions to the original farmhouse are in the form of alcoves that are furnished with different themes. These places allow for a variety of play opportunities. Source: Author)



(Fig 7.3: Sketch section shows the difference in vertical scale. Source: Author's sketch)

The garden design is of particular significance as it is unique and different to many Kindergarten school grounds today. Rather than being an open grass area filled with play equipment, the garden rather uses nature as the play equipment. Trees are meant to be



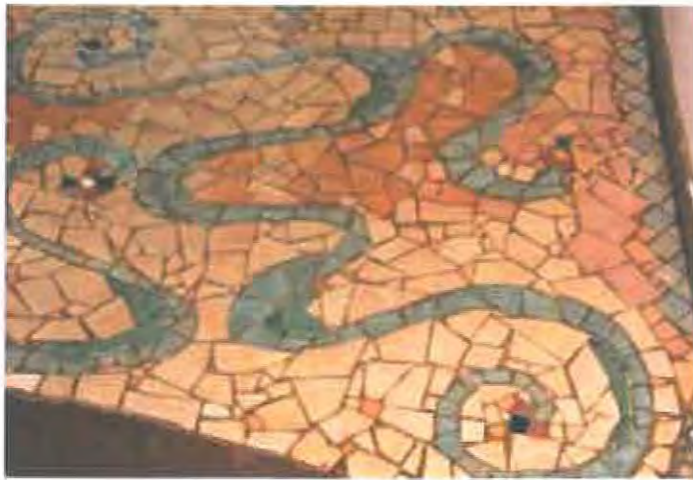
climbed, bushes are intended to be hiding places and flowers are meant to be picked.

(Plate 7.18: The garden has few structured play equipment pieces. Instead, nature is meant to be the source of stimulation and inspire new ideas for play. Source: Author)

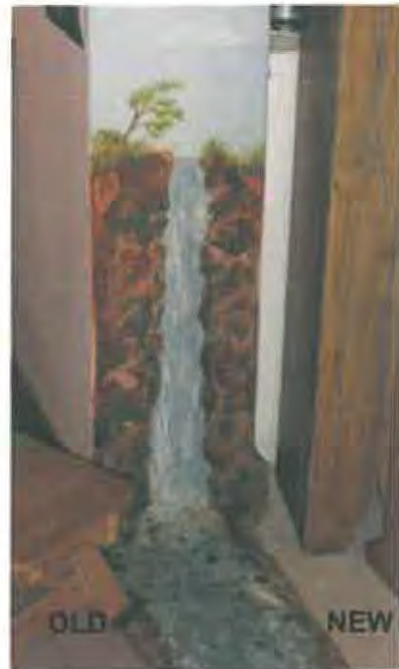
In designing spaces for children, the school has wisely employed the help and opinions of the children using the space. Learners play a part in arranging the spaces within the building, laying mosaics into the screed flooring, painting walls and floors and constructing the water features. Examples of these additions made by the pupils are seen in the photographs following. Children are eager to show the visitors what they have contributed to the school, illustrating a sense of pride and feature of the school with which they identify.



(Plate 7.19: Each class is responsible for contributing something to the school. Water features, mosaic work (seen in plate 7.19 - 7.21) and wall art are common contributions. Source: Author)



(Plate 7.20 & 7.21: A waterfall feature inlaid with pebbles is innovatively used to conceal the joint between the old and new flooring area. Source: Author)



This principle applies from Kindergarten to Matric pupils. Such a principle instils a sense of pride and ownership of the school in the children, as well as enhances their sense of personal identity and self-worth.

7.1.5.5 Application of Sensory Elements

The sense of sight has been well engaged through the subtle use of colour and contrast.



The variety of textured elements further adds to the visual quality of the space. Mobiles, windmills and detail elements added to the spaces engage the eye as they move with the breeze.

(Plate 7.22: Textured wall art stimulates the visual sense. Source: Author)



(Plate 7.23 & 7.24: Mobiles, wind-mills and other hanging elements are visually stimulating as they are constantly in motion. Source: Author)



Wind chimes, bells and the sound of running water stimulate the aural sensory mode. Music is an important part of the learning process and one finds musical instruments throughout the school. The aural sense could have been better integrated into the built environment by incorporating sound-making elements into the architecture, rather than adding them on at a later stage.



(Plate 7.25: The sound of running water adds to the aural experience of the space. Source: Author)

Children engage their sense of touch within the entire building and outdoor play garden. They are encouraged to remove their shoes, thus feeling the ground beneath their feet, and collect things such as pebbles, leaves and pine cones, discovering them with their hands rather than just their eyes. Natural stone, rough plaster and walls textured with motifs are designed to be inviting to the touch, as previously discussed.

The sense of smell has primarily been engaged through the use of nature. In the kindergarten area, a lane of lavender bushes is intended to engage the olfactory sense as one approaches the school building. Other fragrant plants [plate 7.26 - 7.27] such as garlic, pine trees and a variety of flower types awaken the sense of smell. The material choices such as wood, stone and screed, while not selected for their olfactory qualities, do engage the sense of smell in certain areas.



(Plate 7.26 & 7.27: Lavender (left) and other aromatic plants engage the sense of smell and provide orientation clues. Source: Author)

7.1.5.6 Spirit of Place

The Roseway Waldof School has a unique 'spirit of place.' Set in the natural surroundings of the Alverstone Nature Conservancy, the school environment contrasts that of the home environment of many children that attend. It provides a space of calmness, beauty and sensory stimulation, conducive to learning.



(Plate 7.28: View of the school set amongst the natural environment. A sense of calmness is created. Source: Author)



(Plate 7.29: Intimate spaces allow one to sit within the gardens and absorb the unique spirit of the school. Source: Author)

As seen in the illustrations above, the use of natural materials further integrates the built environment into the natural environment. This enhances the countryside ‘spirit’ that the school possesses. One is able to conclude that the ‘spirit of place’ is created strongly by applying the concept of the integration of the natural environment into every aspect of the built environment, from its form to spatial layout, to details and material choices.

7.1.6 CONCLUSION

While the Kindergarten, which is the original farmhouse, was not designed to be a school, the additions and alterations done have shown a strong understanding of designing spaces for children. Given an opportunity to design a completely new building for this age group, there is a certainty that the resultant structure would be perfectly suited to the needs of the children and provide an environment that is even more beneficial to them.

One becomes aware that sensory stimulation is an important educational tool utilised by the school, particularly for the younger ages. This is seen in the added elements such as water ponds, wind-chimes, mobiles, textural wall detailing and colour. However, this does not come through as strongly in the actual concept and design of the structure. There is opportunity to learn from this and, in future, integrate elements that stimulate the senses into the building design, rather than add these elements at the end of the design process.

The interior spaces of the buildings for the younger children have been given preference over the exterior façades. Some of the old buildings seem run down and in need of maintenance. These façades should be considered to be as significant as the interior and could be altered to give a new dimension to the school and provide a further means of education and play opportunities.

For the younger ages, the school relies heavily on the natural outdoors for stimulation and play opportunities. Teachers commented that on rainy days the children lacked the same enthusiasm to play and learn. The design of the interior spaces should utilise the elements of the garden that are attractive and beneficial to children. Furthermore, a greater area of undercover outdoor space is necessary to enable children to venture outdoors even in unpleasant weather.

7.2 SEVEN FOUNTAINS SCHOOL, KOKSTAD

7.2.1 INTRODUCTION

Seven Fountains Primary School is a KwaZulu-Natal Department of Education 'standard' Primary School that accommodates one thousand learners from Grade R to Grade 7. It was designed by East Coast Architects and commissioned by *Oprah's Angel Network* as part of their community involvement in South Africa. The project was completed in 2007. The team involved was encouraged to design a safe, secure and sustainable school environment. Strategies were employed towards community empowerment in the design and construction process, and to aim for a long-term social, economic and environmentally sustainable end product.

7.2.2 JUSTIFICATION OF CASE STUDY

This school is a worthwhile study as it provides up-to-date insight into a recently established learning facility. The study is important as it contrasts the Roseway Waldorf School in many ways, thus providing an alternate view on children's learning spaces and allowing a more holistic study to be undertaken. The major difference is Seven Fountains has been designed as a 'standard school.' This means that it is composed of rectilinear forms, sports fields and classrooms connected by corridors with standard materials such as facebrick and plaster. This type of school, which forms the majority learning environments for children today, is relevant as it will reflect if, and how, the theoretical discourse has been applied to its design, as well as enable recommendations to be made that could positively impact future developments of this kind.

Another difference to be noted between the previous study of Roseway Waldorf and Seven Fountains School, is the varied urban contexts. Seven Fountains School, set in the heart of the Shayamoya Township, deals with very diverse social situations and

contextual characteristics. The impact of this context on the design of the facility, its use and impact on the community is relevant and requires further investigation.

The study will also uncover the benefits of community involvement in the design, construction and future use of these facilities, and how this involvement has impacted the learner's sense of identity and pride.

A study of the spatial layout and planning of the school reveals the indoor / outdoor relationship that exists, and provides a contrast to the Roseway Waldorf School. The benefits of multipurpose spaces, the importance of flexibility in buildings that intend to be sustainable and how these aspects have been incorporated into the school, are apparent in this case study.

A fundamental principle in the school design is environmental sustainability. In addition, the importance of educating the community and children about sustainable practices is important. Thus, the building is used not just as a shelter, but also as a teacher. The buildings have become part of the actual learning process and encourage children to ask questions and stimulate discussion related to environmentally sustainable practices.

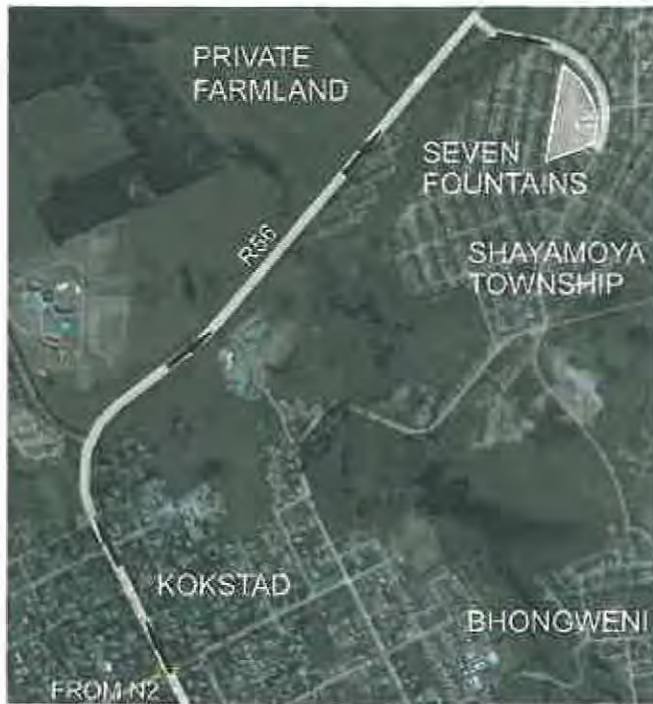
Being situated in a township area, the school is to provide insight into how the previous theoretical discussion has been applied in an area of little economic wealth and harsh living conditions. This is significant as the study shows what can be achieved despite such conditions, as well as demonstrate that wealth is not necessary to create sustainable, well-designed and beneficially stimulating environments for children.

7.2.3 LOCATION

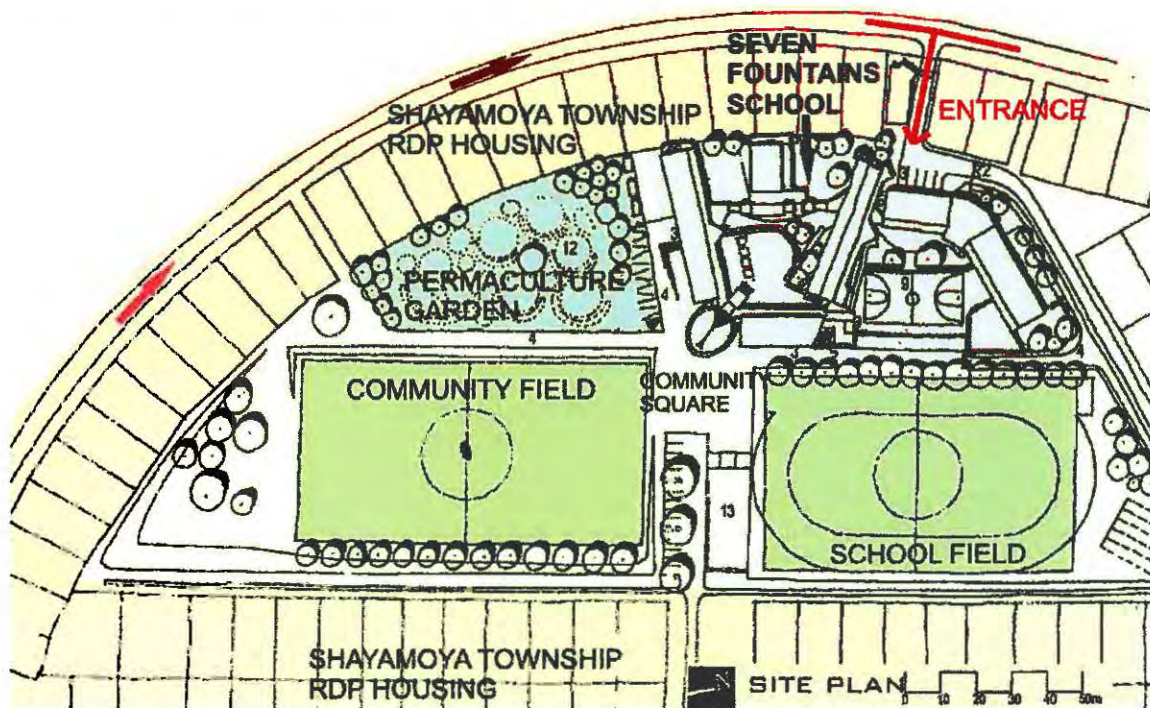
The Seven Fountains Primary School is located in the Shayamoya Township just outside Kokstad. The school buildings are located in the heart of the township and are surrounded

by RDP housing, thus enabling children in the township to walk to school. The school is

also easily accessible from Kokstad along the R56 main road



(Plate 7.30: Aerial view of Seven Fountains School showing location and surrounding areas. Source: www.googleearth.com)



(Fig 7.4: Site plan shows immediate context of RDP housing. Source: Kinsler, 2006: 10)

7.2.4 HISTORICAL AND SOCIAL CONTEXT OF CASE STUDY

In 2004, nearly 500 school children were evicted from their farmhouse school outside Kokstad. They were subsequently housed in derelict municipal workers' accommodation adjacent to the township landfill site. When East Coast Architects began plans for a new school in 2005, there were 627 children being taught in seven dilapidated classrooms with no windows, infrastructure, staff facilities or playground (Kinsler, 2006: 10).

Shayamoya is home to an impoverished community with high unemployment rates. The current desperate situation in the area is worsened by the extreme socio-economic conditions and harsh climate which makes for difficult living conditions. The majority of people living in the area reside in RDP houses with an average floor area of 25m². There are no commercial or recreational facilities in the township and municipal water supplies are unreliable (Kinsler, 2006: 10).

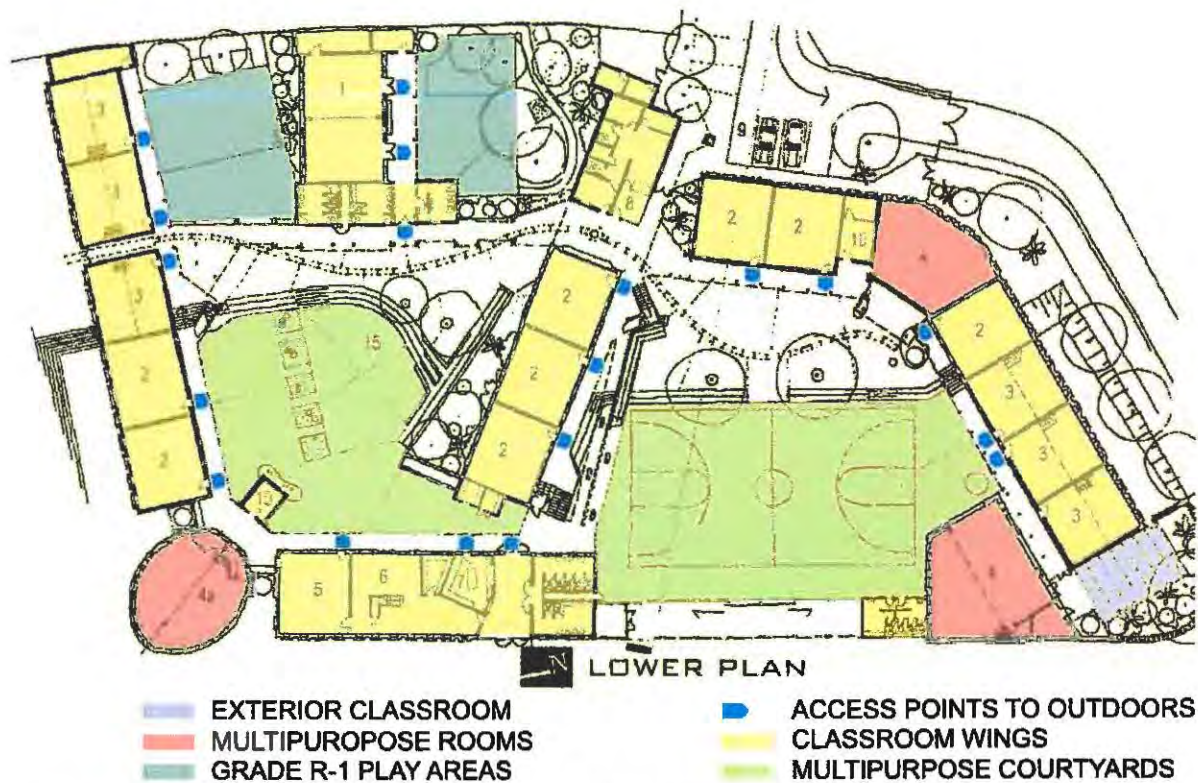
7.2.5 EMPIRICAL DATA

7.2.5.1 Spatial Layout and Planning Principles

The school is built on a gently sloping piece of land. The elevation below shows the importance of altering the landscape as little as possible in the design process. The school has been built according to the landscape with different building levels; stairs and ramps being incorporated as necessary to adhere most directly to the existing form of the landscape.



(Fig 7.5: Elevation sketch highlighting the site profile and level changes in yellow. Source: Kinsler, 2006: 10)



(Fig 7.6: General plan of the school layout. Source: Kinsler, 2006: 10)

The Seven Fountains School is organised around two courtyard playgrounds, each serving different age groups. The general layout of the school is evident in figure 7.6. The classroom wing, identified in yellow, wraps around these spaces giving a sense of enclosure, as well as ensuring they are continually supervised throughout the day. All the classrooms open out on to covered corridor areas which overlook or lead directly on to the outdoor space, thus enhancing the indoor/outdoor relationship. This indoor/outdoor



relationship is further improved by the provision of an external classroom [plate 7.31].

(Plate 7.31: View of the external classroom space. Shade is provided by an intengu timber pergola. Source: Author)

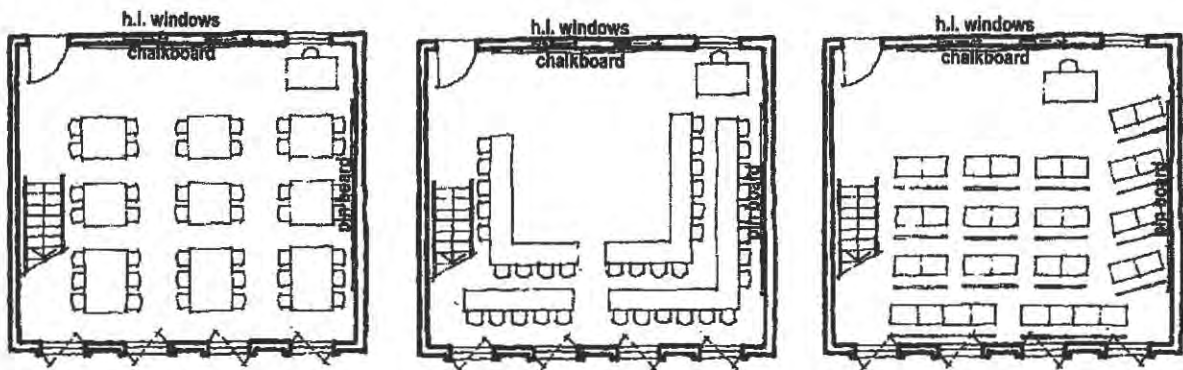
Flexibility of space was a driving force in the design layout. The courtyard spaces double up as playgrounds, theatres, sporting facilities and assembly meeting points. They can also be used for community events. A number of spaces within the school are referred to as 'special classrooms.' These spaces, highlighted in red on figure 7.6, are uniquely shaped and larger than usual

shaped and larger than usual multipurpose venues that are used for special lessons as well as by the community.

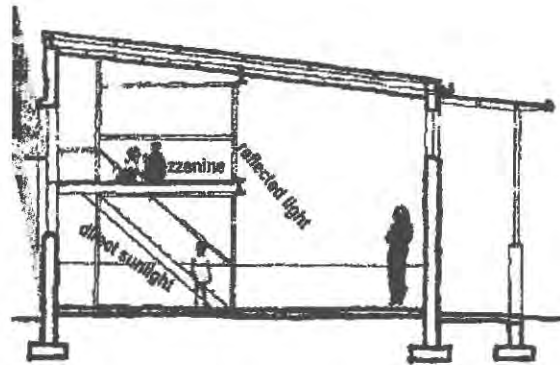


(Plate 7.32: Illustration shows one such multipurpose space. Source: Author)

The classrooms are designed to allow for flexibility. Desks can be arranged in a number of ways within the space. Some classes have a mezzanine level providing extra space to give students individual attention, as well as storage and space for the teacher's desk. The space can thus be used to benefit the individual needs of each class.



(Fig 7.7: Multiple classroom layout options are shown in diagram above. Source: Kinsler, 2006: 9)



(Plate 7.33 & Fig 7.8: Mezzanine teaching space is seen in the photograph on the left and in section below. Source: Author, Kinsler, 2006: 9)

7.2.5.2 The Building as a Teaching Opportunity.

The school has been well designed as a “third teacher.” In providing a school facility of such high quality, in an impoverished area such as Shayamoya, children are given subtle messages about their worth, the ideals of society, and what is to be valued. The evidence of this teaching can be seen in the fact that the school is kept spotlessly clean by the children and there is no litter, graffiti or vandalism. The children take pride in their environment and are eager to show it off to visitors. Through the built environment they are exposed to at Seven Fountains, children are taught lessons in respect for their own and others property as well as pride in themselves and in their school.

The building further acts as a teaching tool regarding aspects of environmental sustainability. Children are exposed to features of the building that are environmentally sustainable, thus being given the opportunity to ask questions and learn about methods of protecting the environment through firsthand experience. Plate 7.34 shows the grey-water channel snaking through the school, collecting surface runoff. The cover forms a unique paving feature that children use in their games.



(Plate 7.34: Illustration highlighting the grey-water channel covering that provides play opportunities. Source: Author)

Details, seen in the illustrations below, such as Jo-Jo tanks, solar panels, gutters and rain water downpipes are expressed in the design becoming part of the aesthetic. Playground equipment doubles up as pumps to move water from the underground reservoir. Such elements, in their prominence, provide opportunities for teachers to actively illustrate the need for environmental sustainability and how it can be achieved in a very practical way.



(Plate 7.35, 7.36 & 7.37: Photographs reveal environmentally sustainable features that form part of the building aesthetic. Source: Author)

7.2.5.3 Materials and Tactility

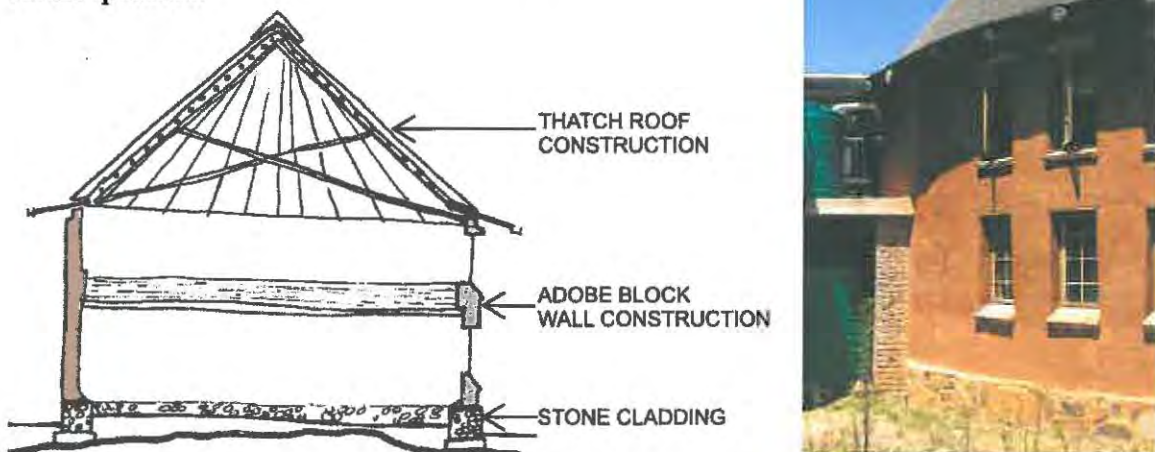
An aspect of sensory architecture, very evident in the Seven Fountains School, is the importance of tactility. The wide variety of materials chosen and the way they are contrasted against one another is evidence of this. The classroom wings consist of mainly unplastered and plastered brickwork. Practicality in this material choice is evident as exposed brickwork on the lower portion of the wall allows children to run their hands

along the surface as they travel, while not making it dirty. Materials such as natural stone, corrugated cladding, gumpole columns and intengu screens and pergolas add warmth and variety to the building façades.



(Plate 7.38, 7.39 & 7.40: Photographs above illustrate the variety of materials used throughout the school, enhancing its tactile qualities. Source: Author)

A multipurpose teaching space, [plate 7.41], which forms a feature of the school, uses local materials such as sundried adobe blocks in its wall construction, thatch in its roof construction and polished dung in its floor construction. Each of these materials encourages touch due to their warmth and tactile qualities.



(Fig 7.9 & Plate 7.41: Simple section diagram and photograph shows local materials and methods of construction used. Source: Author's sketch, Author)

7.2.5.4 Applied Principles of Children's Design

In some respects, the school has been designed in accordance with the way children interact with and perceive their surroundings. Firstly, the important difference in scale between the child and the adult has been recognised. This is evident in the changing roof



(Plate 7.42: Roof level changes break down the scale of the building.
Source: Author)

levels throughout the school. The variety of heights, [plate 7.42], breaks down the scale of the buildings, making it appear lower than it actually is, and thus in keeping with the scale of children as well as adults.

Less considered, is the way children's eyes are much closer to the ground, thus making



(Plate 7.43: Textural changes in the floorscape are lacking in the design.
Source: Author)

the floorscape significant to them. Few textural variations in the floor have resulted in a monotonous landscape at the child's eye level. The only exception is the strip of paving that snakes around the school.

The importance of play has been recognised and the school has been designed to allow play to occur on the building itself. The ramps on the south side and curved amphitheatre

seating are used as part of the play areas. Large boulders, numerous steps and level changes in the playground can be used for a number of different games and for climbing on to. The playground could have been improved by incorporating some moveable elements into the design, or providing loose equipment such as tyres, benches and wooden seating blocks that could become part of the play experience.

Overall, the sensory qualities of architecture seem to have been given less consideration in the school design. The visual sense is stimulated through the unique building forms, as well as subtle colours choices and wall art, as seen below.



(Plate 7.44 & 7.45: Colours and wall art seen above stimulates the sense of sight. Source: Author)

The sense of touch is stimulated in the various textures used on the wall surfaces. However, there seems to be a lack of recognition for the aural and olfactory senses. There is much opportunity to engage these senses through incorporating more landscaping into the school, the planting of fragrant plants, varying floor finishes according to the sounds they create underfoot, and altering the acoustic properties of spaces to alter the sound qualities generated within them.

7.2.5.5 Identity

In the previous discussion regarding identity within space, the sensory and experiential qualities of architecture were revealed to impact one's sense of identity within spaces.

While this remains true, the study of the Seven Fountains School has revealed another aspect of the built environment that relates to one's sense of identity. In speaking to children, it is evident that their community's involvement in the project has positively impacted the way they feel within the school. Here, the children and community were involved in the design process and have been able to create art work permanently on display in the school. This finding is supported by previous work on participatory design conducted by Wandersman (1979). His findings similarly revealed that user participation enhances the positive assessment of designs (Baird, and Lutkus (ed), 1982: 14).

An example of such art is seen in the figure below. A number of children said they felt at home in the school and enjoyed watching their parents and family get involved in the building process. Through the work the community undertook and their involvement, a sense of security and confidence is instilled in the children who attend the school. Their interaction and contribution to the design of the school has enabled the users of the



school to form a connection with the building and this, in turn, has resulted in a relationship of respect having formed between the building and its users.

(Plate 7.46: Art work done by children in the school during the construction process is on permanent display. Source: Author)

7.2.6 CONCLUSION

The study of Seven Fountains School in Kokstad, proves that even in an environment of little wealth, there is much opportunity and resources available to create places that are beneficial for children. It also shows the benefits of providing children with high quality

environments in such impoverished places. One such benefit that has far reaching significance is that sense of identity and pride is instilled into its users as well as the surrounding community.

The architects have achieved their aims in using this project as a means of empowering the community. The facilities are used, not just by the children, by also by the community after school hours. This has resulted in a socially sustainable and economically beneficial facility, as is it used throughout the day, for numerous purposes, and unites the community with the children it supports. This is an important factor to consider when designing spaces for children, particularly in contexts such as this, and should be considered by all architects in such a position.

In speaking to the architect, however, it has become apparent that this facility has generated some problems within the community. The school is viewed with some suspicion as it stands out of its context too much and feelings of jealousy are apparent between the old Preschool and Seven Fountains. Many parents have removed their children from the old Preschool and enrolled them into Seven Fountains, resulting in two teachers losing their jobs (Van Heerden, 2011, pers. comm., 19 May). These factors are important to bear in mind in the design of future facilities, particularly within poor communities such as Shayamoya.

This school also provides practical examples of how the building can be transformed into a “third teacher.” Learning through firsthand experience is essential for children’s development and the practical manner in which the school expressed sustainable elements and gets children to ask questions, is commendable.

There are a number of concluding recommendations that can be made to improve the school:

Firstly, the incorporation of more landscaping into the design is necessary, as currently the school seems bare and the play areas uninviting. Landscaping and the planting of



trees could transform the play areas into more usable, aesthetically pleasing spaces, as well as becoming part of children's games. Landscaping could further provide a natural means of shading a portion of the outdoor spaces, as there is insufficient shade for children to use while outdoors.

(Plate 7.47: Landscaping could transform the play area into a more stimulating environment as well as provide natural shading. Source: Author)

Secondly, a greater awareness of the importance of sensory stimulation in the design of places for children could result in a more holistic experience had by the children. While the sense of sight has been sufficiently addressed, elements that stimulate the remaining senses can be incorporated to do this. Landscaping, as discussed above, would further assist in doing this.

Thirdly, the built environment specifically designed for the Grade R to Grade 2 children has been designed in the same way as the classrooms for the older age groups. However, the needs of such an age group are vastly different from that of the older age group. Had these spaces been designed with the needs of young children in mind, it is certain it would have been designed with greater versatility and variety.

However, it is understandable that they may have been designed as they are in order to provide greater options for flexibility and to enable them to be used for other purposes if necessary.

The fourth advised recommendation to be made refers to plate 7.48. The playground for this area, seen in this photograph, is lacking in providing the stimulation and opportunities for play.



(Plate 7.48: The Grade R - Grade 2 play area is lacking in play opportunities, variety and versatility. Source: Author)

This area could vastly be improved with the inclusion of better landscaping,

elements such as trees, sand and water, as well as loose items that could be used as versatile toys. As this is an environment that children spend much time in, weather permitting, it should be treated with as much care and attention as the indoor environment.

Lastly, since the school is up and running, there is little that can be done to counteract the feelings of jealousy regarding the school. However, one could suggest that the preschool within Seven Fountains be expanded to replace the old preschool and that the teachers there be hired by Seven Fountains. Otherwise, the facility of the old preschool would need to be renovated and upgraded to improve conditions and encourage more parents to enrol their children there. For future design projects in areas such as this, this is an important aspect to consider at the onset of the design process to ensure the same problems do not arise.

7.3 SHAYAMOYA COMMUNITY CENTRE, KOKSTAD

7.3.1 INTRODUCTION

Shayamoya Community Centre is a social facility aimed at serving the needs of the community in Shayamoya Township. It is managed by *Sivile!*, a local housing association. The existing community hall and church on the site were deemed unfit to serve the population and were in a state of disrepair. Thus, a new facility was established which includes a Health Unit for ARV roll out, Pop-in Centre for the aged, Catering and Feeding Kitchen, a Pre-school (in the old Church), a new Church, Training Centre and Administration facilities. In addition to providing such facilities, environmental, social and economic sustainability were fundamental objectives of the proposal (Van Heerden, 2011, pers. comm., 19 May).

7.3.2 JUSTIFICATION OF CASE STUDY

The Shayamoya Community Centre is deemed relevant to this study as it is to illustrate the multisensory approach to architecture in a different building typology. While the previous case studies have looked specifically into facilities for children, i.e. learning environments, this case study looks at facilities for adults, as well as children. In studying this building, one will be able to see whether the multisensory approach that is applied to local environments for children is used and if it is the same approach used in environments for adults.

A community centre is intended to be a place for people to gather, to be unified and is driven, in its design and function, by people. People with physical bodies, souls and emotions that desire to exist within positive spaces that address the human senses. This case study illustrates whether this need has been addressed in such a building. As this building sits within a relatively poor community with limited funds available, the study of

Shayamoya Community Centre is to further illustrate how or whether the senses can be addressed within a tight budget.

Highlighted in the theoretical discourse, is the relationship between the community and child. As this case study houses both facilities for the community as well as a preschool and kindergarten, one will be able to better understand the social and physical relationship between the two, how they have been integrated in the design and the benefits of connecting these functions.

This case study further highlights the various functions housed within a community centre and how this building has been able to address various needs within the community. The discourse is intended to inform the future design of a Children's Centre and Community Facility; therefore, investigating the functions and relationships between spaces that make up a successful community centre will be valuable in the design component of this dissertation.

The unique design principles of this building, such as internal streets, circular forms and courtyards illustrate functional, aesthetically pleasing features that work well in this building typology. These principles are worth investigating as they may prove to be helpful in the design of a Children's Centre and Community Facility.

In light of the problems encountered subsequent to the design of the Seven Fountains School, such as jealousy, suspicion and that the building stands out of its context too much, this case study illustrates how these problems have been internalised and become part of the brief to ensure the same problems do not result from this project. On this note, it is important to recognise that this facility was provided in place of the old, thereby creating a new environment for all, rather than generating competition with the old community centre, church and crèche.

7.3.3 LOCATION



The Community Centre is situated in Shayamoya Township, North of Kokstad. The site is adjacent to the Town Landfill (which is to be rehabilitated into sports fields), and the Shayamoya High School. Located within easy walking distance to the Seven Fountains School, the two facilities are used in conjunction with one another.

(Fig 7.10: Aerial view of Shayamoya Community Centre showing location and surrounding areas. Source: www.googleearth.com)



Existing buildings that occupy the site include an old church which was also used as a preschool, and a community hall. This building remains untouched on the Western portion of the site and is still used occasionally.

(Fig 7.11: Aerial view of Shayamoya Community Centre showing the overall layout of the site and existing buildings. Source: East Coast Architects, 2011)

7.3.4 HISTORICAL AND SOCIAL CONTEXT OF CASE STUDY

The design process for the Shayamoya Community Centre began when *Respond! Housing Association* from Ireland came to South Africa with the intention of starting up housing developments to promote the foreign development of the Association. Through a connection with the Catholic Bishop in Kokstad, the Association identified this area to focus on. This town was deemed to be an ideal area to look into as housing shortages had already been identified as a major concern. However, difficulties arising from dealing with constantly changing municipalities and the logistics of setting up such vast housing intentions resulted in the project taking far longer than anticipated to get started. Thus, the team looked at beginning with “sweetener” projects to address social concerns while the legal and municipal aspects of the housing development were underway.

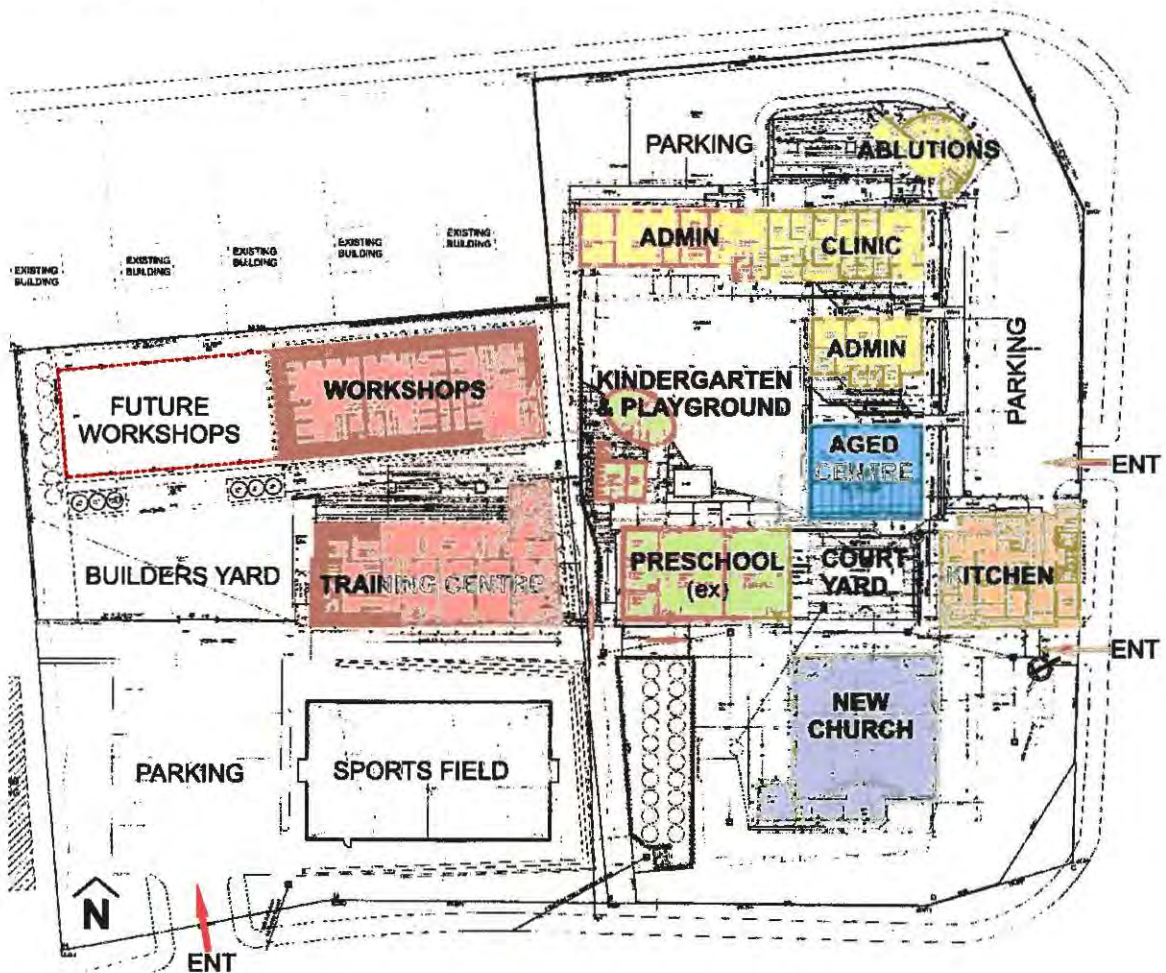
The Shayamoya Community Centre was one such project that began construction in 2008. Part of this project was to incorporate a training facility to teach builders the necessary skills for when the building of houses began. Unfortunately, the housing project has subsequently fallen through (Van Heerden, 2011, pers. comm., 19 May).

As previously mentioned, Shayamoya township is home to a poor community where unemployment, a harsh climate and lack of services are major issues. Often, water is cut off for days at a time necessitating all new projects having to generate their own water supply. Unreliable electricity and limited municipal sewer lines create difficult living conditions and also emphasise the need for clever design ideas, particularly in terms of water saving and passive, low energy design as electricity for heating is too expensive and unreliable in winter.

7.3.5 EMPIRICAL DATA

7.3.5.1 Building Functions, Spatial Layout and Planning Principles

The Shayamoya Community Centre provides six primary functions as well as the administration component necessary to run them. The building functions are highlighted in the plan following and briefly described:



(Fig 7.12: Floor plan of the Community Centre highlighting the various functions and entrance points. Source: East Coast Architects, 2011)

- The existing church in the centre of the site which was also used as a crèche has been converted into a preschool. The rectangular building was split into two

playrooms with the administrative functions positioned along the west wall. A new kindergarten and large playground are situated just north of the preschool.

- A bigger church situated on the south-east corner replaces the old church. The church has a courtyard in front for gatherings and a small office and toilet at the rear. The church building is also used for social functions and can be hired for weddings and community meetings.
- North east of the church is the substantially sized kitchen and service area. This kitchen serves all the tenants within the Centre and is used in conjunction with the church building for functions. This kitchen is also used for training purposes to teach nutrition and dietetics to the community as well as serving as the collection and packaging point for the surplus food donated from surrounding stores to be distributed to the community.
- A Pop-in Centre for the aged is provided where they can gather to socialize and receive meals to improve their nutrition.
- A Clinic and Administration facility is situated on the north eastern portion of the site. The health unit conducts voluntary counselling and testing, ARV roll outs and some general health testing.
- A Training Centre forms the final component of the project and is situated on the west of the site. The training centre comprises an administration area, classrooms and workshops for teaching bricklaying, electrical work, woodwork, carpentry, and welding.

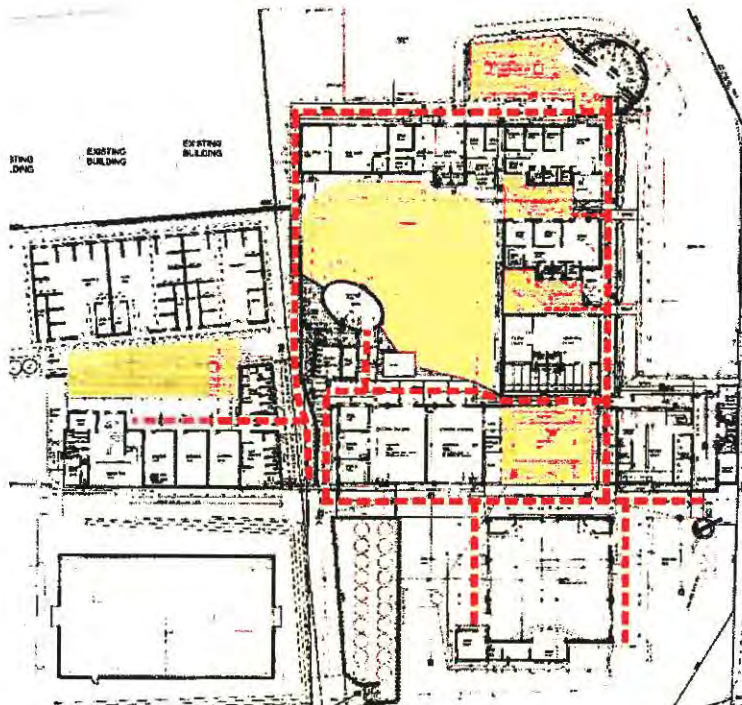
Regarding the general planning, the design was intended to be loose fitting, modular and fairly repetitive. This was deliberately done to enable the different buildings to be occupied by various tenants. It also ensures flexibility and enables spaces to be easily extended as needed. This is particularly apparent in the workshop area. The overall frame has been provided, but as the need arises, the brick infill is added to create enclosed spaces.

These individual buildings that make up the Centre are connected to each other by “internal streets” and courtyards. The courtyard design of the Shayamoya Community



(Fig 7.13: 3D model of the workshop building showing its modular design. Source: East Coast Architects, 2011)

Centre allows for social interaction and gatherings to take place by providing shared areas to be used by all. As this is a centre which focuses on uniting the community through the building and creating and improving relationships, this design principle that assists in doing that, is beneficial.



(Fig 7.14: Floor plan of the Community Centre highlighting courtyards and “internal streets.” Source: East Coast Architects, 2011)

Separating the functions into separate structures allows all building to receive north light and can be cross ventilated as the floor plates remain narrow.

In addition to this, in terms of planning the individual buildings, livable spaces are generally kept on the north side of the building to ensure they receive maximum daylight and are most habitable. Figure 7.15 shows habitable spaces such as offices, reception and waiting areas in green, while non habitable spaces such as toilets, stores and kitchens are

shown in orange. It is apparent that all habitable spaces receive north light while non habitable spaces are situated on the south side of the buildings.



(Fig 7.15: Floor plan of the clinic and administration buildings showing habitable spaces on the North. Source: East Coast Architects, 2011)

7.3.5.2 Multisensory Architecture

As this case study forms part of a discussion centred on multisensory architecture, it is necessary to determine whether this project could be deemed to be sensory stimulating. In analysing this building, it is unfortunate to conclude, that there is very little within the Community Centre that engages with the senses. It is apparent that the bodily experience of architecture was not deemed to be of great importance in the building design. Rather, providing the functions within the centre and ensuring its sustainability was given preference.

In particular, the built form gives no recognition to the human experience. Almost all the spaces created are rectilinear and of standard proportions. There are limited elements of interest that would spark the imagination. The curved wall of the external ablutions [plate 7.49] and circular kindergarten [plate 7.50] are the only aspects of the built form that begin to stimulate the senses as they are unique and unusual within the project.



(Plate 7.49: Photograph showing the curved ablution block. Source: East Coast Architects, 2011)



(Plate 7.50: Photograph showing the circular play room. Source: East Coast Architects, 2011)

While it is evident that the sensory approach to architecture was not fundamental during the design process, there are a few elements worth mentioning that do address the senses in some way. Firstly, the use of colour to highlight features of the design engages the eyes. Bursts of primary colours are seen on elements of the building as shown in figure 7.16. The church and bell tower (which has acoustic properties) are painted an earthy orange signifying importance and giving it prominence within the centre.



(Fig 7.16: 3D model demonstrates the primary colours used to highlight certain aspects of the buildings. Source: East Coast Architects, 2011)

Using internal streets and a courtyard design principle encourages building users to constantly move between inside and outside spaces. This engages with the kinaesthetic sense by directing movement through the building. In this way, the body is also stimulated through temperature changes, varying lighting levels and the feel of a breeze or sunlight on the skin. One such internal street found on the east of the site is better designed in terms of sensory experience [figure 7.17].

Here, the ceiling height varies as one moves along the gently sloping ramp. Angled,



coloured screens create a feeling of constriction and release while providing shading. Planting along the way and bursts of sunlight through the clerestory lighting add to the experience.

(Fig 7.17: 3D model shows the sensory stimulating “internal street” situated on the east part of the site. Source: East Coast Architects, 2011)

7.3.5.3 Designing for Children

Through studying the operation of this building, incorporating children’s facilities within community centres has proven to be positive, both for the young and the old. The children benefit by being close to their families and the community that uses the facility throughout the day. Therefore, they are able to build better relationships with them. As mentioned in an interview conducted with a local teacher, being able to regularly engage with the parents and family of a child ensures that the child views them as a united front, with the child’s best interests at heart. This environment, where community facilities are

combined with teaching facilities, enables this relationship to grow and thereby plays a role in promoting children's development.

By placing the preschool and kindergarten in the centre of the site, the entire building is given life and spirit. The Pop-in centre for the aged is adjacent to the preschool and visitors are able to watch the children playing as they socialise. Simultaneously, this provides maximum opportunity for surveillance and supervision of the playground.



(Fig 7.18: Floor plan of the preschool and kindergarten shows how surveillance is achieved and the relationship between the spaces. Source: East Coast Architects, 2011)

The circular kindergarten is one of the few local building examples for children that address the scale of a child through its window design. In this playroom, a double row of windows line the north face, one at the correct height for children, and the other for adults. The preschool classrooms however, have windows too high above ground level for children to see out of.

Colour has also been introduced into these areas by painting the doors and internal walls primary colours. The kitchen counters in these areas match the bright walls and create a sense of continuity around the room. Giving each room specific colour themes enables children to easily identify themselves with the room they are assigned to and creates a

sense of belonging. The three metre veranda on the north side of the classrooms allows for outdoor lessons and a shaded area for play or during inclement weather.



(Plate 7.51: Interior view of the preschool classroom showing colour themes. Source: East Coast Architects, 2011)

In the playground area, the sandpit is a positive tactile

addition that teachers consulted and specialists working with children have recommended during interviews conducted. However, this is currently the only play equipment in the playground. From the levelled ground and removal of all planting in this area, it seems that it is to become a standard playground with equipment purely accommodating gross motor activities.

7.3.5.4 Aspects of Environmental Sustainability

Environmental sustainability was a fundamental component of the design process. There were three major concerns needing to be addressed: rainwater harvesting, recycling and creating a passive, low energy design. These were deemed most important as municipal water is unreliable, and heating expensive.

In terms of water saving, all rainwater is collected and stored for reuse. A one hundred and fifty thousand litre tank farm stores water collected off all roofs. This water is used for the flushing of toilets, cleansing, washing and gardening. An eighty thousand litre tank farm stores water collected off all paved surfaces and is used only for watering the



vegetable garden, situated on the lowest part of the site. The vegetable garden, which is still being completed, is to grow produce to be used in the feeding kitchen.

(Plate 7.52: Photograph highlighting the many Jo-Jo tanks used for rain water storage and recycled tyres used for retaining walls. Source: East Coast Architects, 2011)

A passive, low energy design was created by understanding the importance of correct orientation. As previously mentioned, all habitable spaces receive north light creating optimal living conditions. Solar control and large overhangs on the north façade ensures they do not receive too much heat gain in summer. All walls have cavities with insulation between to retain heat in the winter when temperatures drop, and it ensures temperatures



remain at a comfortable level during summer.

(Fig 7.19: 3D model illustrates solar shading devices used to achieve a passive, low energy design. Source: East Coast Architects, 2011)

In addition to these, clerestory lighting in areas reduces the need for electric lights during the day, recycled tyres are used as retaining walls, local labour and materials were sourced for the project and natural, recyclable materials were chosen over non recyclable.

7.3.6 CONCLUSION

The Shayamoya Community Centre functions efficiently and provides for many of the needs within the community. The architecture has remained low key to ensure that it does not stand out in its context too much. This ‘standard’ architectural design is beneficial in this context as it can easily be extended and grown to accommodate future needs. It also minimises feelings of jealousy and suspicion that became evident in early projects.

The way in which the community facilities and preschool have been integrated has proven to be positive and a good precedent for future designs of this nature. Positioning the children’s facilities central in the design promotes a lively atmosphere throughout the centre and improves surveillance and security for the children. Creating a safe environment is not only necessary to ensure children are secure, but also to promote a psychological feeling of security which gives them more confidence to explore and learn.

The Community Centre works well in term of environmental sustainability. The main issues have been addressed and catered for to enable the centre to operate efficiently without disruption. The methods used to achieve this environmental sustainability are also able to be used as methods to teach the community about the importance of preserving the earth’s resources. The methods harnessed are made visible and have become part of the architecture of the Community Centre. This enables the community to practically see ways in which water use and electricity needs can be minimised.



(Plate 7.53: View of the numerous Jo-Jo tanks used as an architectural feature. Here, they give the building height and are a beacon in the community. Source: East Coast Architects, 2011)

While the building has not been designed with a sensory approach in mind, there are elements of the design that are interesting, aesthetically pleasing and can be applied to other projects of the same nature. These features include: contrasting circular spaces with rectilinear ones, making use of courtyards and internal streets, incorporating planting and using colour to highlight features of the building.

There are numerous positive aspects of this project, but there is also room for much improvement. A number of recommendations can be made:

Firstly, the preschool and kindergarten design displays a small understanding of the way children develop and learn. This can be seen in the circular playroom, colours used, low windows and provision of a sandpit. However, the various areas within the children's facility are not treated equally. The new playroom has been designed to be much nicer and more interesting than the others which can lead to feelings of jealousy between children. Within the built spaces, improvements could be made by incorporating different level changes, ceiling heights, and creating a variety of unique smaller spaces within the large spaces. Creating opportunities for play and exploration through the built structure would further promote children's enjoyment of the space. In the playground, it is suggested that large play equipment be combined with elements that stimulate fine motor development. This would ensure a more holistic environment is created for children to learn within. Allowing for level changes, slopes, planting, water play and textures in the natural environment would enable children to develop their own games and creates an opportunity for a wider variety of activities to occur.

While it is not possible to redesign the entire Centre in an attempt to enhance the sensory aspects of the building, by incorporating various elements, the bodily experience could be improved. While it is not ideal to try and add sensory elements after completion of the project, incorporating material textures to the walls, acoustic water features, paving variations and fragrant plants could positively benefit the building user. These elements that impact the human body are also helpful in creating a sense of place, instilling positive memories and enabling users to better identify with the Centre.

CHAPTER 8
ANALYSIS AND DISCUSSION

INTRODUCTION

The aim of this chapter is to communicate the development of the theoretical discourse in the context of the empirical data obtained through the interviews conducted and study of various local buildings: the Roseway Waldorf School in Assagay, the Seven Fountains School in Kokstad, and the Shayamoya Community Centre also in Kokstad. It is to reflect the synthesis of the theories discussed within the local context of the case studies and other empirical data collected.

It is apparent from the fieldwork findings that there is little evident integration of sensory architecture into children's environments in KwaZulu-Natal. While these case studies are only three out of possibly hundreds of examples, they were chosen as they were considered to be relevant to the findings of the theoretical discussion, and therefore be most applicable to this dissertation. In comparison, they provide insight into recently built and older learning environments in two contrasting contexts, thus resulting in findings that are less biased and cover a wider scope. There are elements of the theoretical discourse which are seen to have been well applied to the design of these buildings while other aspects appear to have been ignored or inadequately applied. These findings are analysed and discussed below.

8.1 MEMORY, IDENTITY AND SPIRIT OF PLACE

The empirical findings reflect that memory, identity and spirit of place are not deemed to be important outcomes of sensory stimulation in architecture, and thus have not been achieved through the experience of the body within the built environments examined. This is evident from the analysis of these local building examples as well as the interview responses [Appendice I]. Despite the extensive literature highlighting the role of sensory stimulation in improving the experience of buildings through memory preservation, identity enhancement and creation of a spirit of place, not a single interviewee commented on this. One may conclude that in current local practice, the connection between sensory stimulation and its psychological benefits is not

acknowledged nor understood. However, the study of local building examples has revealed that these psychological implications of architecture can be achieved in ways other than through bodily experience. The findings from the study of Roseway Waldof School and the Seven Fountains School demonstrate that being able to leave something of oneself in a space and have a physical and tangible impact on a space gives a place a unique spirit and enables one to identify with that space and retain firmer memories of it. The level of pride displayed by learners, as well as the community involved, reflects the positive influence the built environment has on its users. For future developments, by enabling users to have an impact on spaces that are sensory stimulating and experiential, one is certain that they may gain a full appreciation of such an environment, that they may gain a sense of identity and retain fond memories of that space. All of which contributes towards a meaningful and positive architectural experience.

8.2 CHILDREN'S INTERACTIONS WITH THE ENVIRONMENT

It is alarming to notice that few of the findings from current literature on children's place experience come through in conversation with teachers and those regularly dealing with children [Appendice II]. Their understanding of the issues raised regarding children's interactions with the environment are often limited and tend to be focussed on the physical interaction, while neglecting the psychological impacts of the environment. There is an urgent need for those dealing with children to be kept up to date with current information, and given the opportunity to apply this information as they practice.

A partial understanding of the way in which children interact and engage with their surroundings is reflected in the case studies examined. The scale of the child has influenced the design of some spaces, as well as the importance of play. However, in comparison to many international examples, such as the Children's School in the United States, it is evident that there is much room for improvement. Windows at children's level, utilizing the floor surface as a means of play, and creating spaces which encourage physical interaction and activity are design features that would enhance current environments for children.

The psychological impacts of children's environments have been even less considered. The importance of private exploration and place-making are insufficiently designed for, even though imaginative play and exploration were shown in interviews to be a fundamental learning component. While the Roseway Waldorf School allows for this on a small scale, standard schools, of which The Seven Fountains School is a recent example, do not cater for this aspect of children's experiences at all. There are very few intimate spaces for private play to occur, and children are not given the means by which they can alter the environment according to their wants and needs. However, one must bear in mind that site constraints, safety for large numbers of children and limited available materials, may impact the ability of designers to provide for these needs. These hindrances are widely found in less affluent communities where the supervision of many children is shared among very few teachers. Thus, in these situations, the role of the architect becomes even more critical in creating safe and beneficial spaces that can be supervised and easily managed. Shayamoya Community Centre has created this supervision well by positioning the playground in the middle of buildings. However, the playground is bare, flat and unimaginative, and insufficiently designed for children to enjoy.

8.3 THE APPLICATION OF MULTISENSORY ARCHITECTURE IN THE DESIGN OF CHILDREN'S LEARNING SPACES

The importance of sensory architecture in the development of children is just beginning to be seen in the case studies examined. However, this aspect of architecture is seen more as an interior design concern rather than a major contributor to the buildings' conception and design. In the projects analysed, it is evident that the spaces created to enclose learners are intended to purely act as a 'shell' in which activities can occur. No regard or thought was given to enable the built form to be a generator of activity and stimulation. Rather, it was intended that elements within the environment created (such as colour, toys, furniture etc.) would provide stimulation and sensory input. There is a need for future projects to look not just into the interior design and superficial embellishments to stimulate the senses, but rather to start at the buildings' conception and design as a means of creating sensory stimulation. One aspect of sensory architecture that is

evident in the buildings examined is tactility. A variety of materials and textures have been used in the Roseway Waldorf School and Seven Fountains School, to encourage exploration of the sense of touch. The same cannot be said of the other senses however. They are given far less, or even no significance to the architectural experience. This is particularly unfortunate as a number of interviewees commented on the importance of a sensory stimulating environment as it aids in the development of body awareness and proprioception (awareness of the body's position), various gross and fine motor skills, and perceptual development.

8.4 THE APPLICATION OF NEW APPROACHES TO THE DESIGN OF CHILDREN'S SPACES

The Reggio Emilia approach shows an education philosophy for children that views the environment as a vital component in children's lives and development. This model, if applied to the design principles of future schools, could benefit the places children are provided with, and ensure they have maximum opportunity to develop, enjoy and create attachments to the places they exist within. Unfortunately, spaces are usually designed according to what adults and designers believe to be appropriate environments for children. This is evident in the various case studies analysed.

The inclusion of the Roseway Waldorf School, designed according to the Waldorf education philosophy, may be viewed as contrary to this theoretical framework established. However, it has been integrated into this discussion as Waldorf education show similar characteristics with the Reggio approach in that the environment is deemed important to the lives of children. In looking at both approaches to education, one is able to see that it is necessary for children's learning environments to be designed according to principles that aim to benefit the experience of the child, whether it is Reggio Emilia, Waldorf, or other.

Similarly, the Seven Fountains School and Preschool and Kindergarten of the Shayamoya Community Centre have also not been designed according to such a philosophy. However, one

can see the importance of community and family involvement being valued and introduced into the design process; a principle significant to Reggio Emilia education. This study of these environments reveals the benefits of including community facilities with those for children. The two are proven to work well in conjunction with one another and promote good social conditions and community involvement. This is coherent with the interviews conducted in that all teachers questioned emphasised the value of parental input into the education of their children [Appendice II]. When a child is able to see unity and interaction between teachers and parents, the resultant education is more holistic and positively presented.

Applying the three approaches discussed in the review of literature to the design of spaces for children, architects in KwaZulu-Natal could greatly improve existing environments for children, as well as create unique and diverse future buildings that respond to, and cater for, the physical, sensory, intellectual and emotional needs of children. While flexibility of spaces has been achieved in some instances, there is little variety in the architectural treatment of spaces themselves or in the furniture and interior design of them. This needs improvement if designers are to cater for the dynamic needs and sensory stimulation required of children.

The importance of nature to children's place experiences is apparent in the interviews conducted [Appendice II] and the analysis of Roseway Waldorf School. Here, teachers assign great importance to play time outdoors in natural environments, and the gardens are thus designed appropriately. However, this understanding of the appeal of the natural environment has not been translated and applied to the design of the built environments as it has been in international building examples. The Seven Fountains School shows little acknowledgement of the importance of play in the natural environment as all surfaces have hard landscaping and minimal vegetation. Thankfully, this aspect of children's design can be rectified with little cost, little damage to the running of the school and, if done correctly, can require little maintenance.

The case studies analysed however, demonstrate evidence of one of the approaches discussed: the use of the building as a teaching opportunity. This has been particularly successfully achieved with regards to environmental sustainability. Through design, the environmentally

sustainable elements have been highlighted to stimulate questions and create learning opportunities. However, drawn from only three examples, this conclusion cannot be deemed as conclusive for the majority of schools in KwaZulu-Natal. It does show that there is much potential for this to be achieved in new and existing environments for children.

Overall it is evident that architects in KwaZulu-Natal are beginning to take small steps towards creating environments appropriate and beneficial for children, which highlight the importance of stimulating the senses through the built environment. However, in comparison to international examples, there is much improvement required. The primary cause for this is due to the fact that architects neglect the importance of sensory stimulation and other aspects of children's architectural experience necessary for successful spaces at a conceptual stage. Thus, these elements are often added on at a later stage, if at all, and largely fall short in their sufficiency. The most appropriate means by which such environments can be created, is for architects to recognise the importance of multisensory architecture in children's development at the initial stages of the design process and to respond accordingly. Furthermore, teachers and specialists involved in children's development need to be kept up to date with current literature and findings regarding children's place experiences. Their knowledge needs to incorporate the value of sensory stimulating environments and how this can be better achieved within learning environments. Such individuals need to be consulted as part of the design process as they would be able to communicate valuable information to architects that would assist in creating more appropriate environments for children.

CHAPTER 9
CONCLUSIONS (AND RECOMMENDATIONS)

INTRODUCTION

The purpose of this chapter is to summarize the findings of the research effort, outline the conclusions reached in terms of the intended aims of this dissertation and present problems encountered with viable recommendations. These findings are anticipated to highlight avenues of further research necessary in this field of study.

9.1 SUMMARY OF FINDINGS

This study has proven that sensory stimulation in architecture is a fundamental design tool, often not given enough recognition by architects in the context of contemporary South African architecture. The human senses have been found to be vital in one's perception and experience of the built environment. It is through the senses that one is connected to the world and enables one to experience the world as meaningful. The benefits of architecture for the senses can be seen in the physical pleasure it brings. Engaging the sense of touch, sight, hearing, taste and smell in the experience of architecture enables the body to physically interact with its surroundings, thereby creating a holistic and memorable experience. Material selection and tactility have been found fundamental to this study. It is through the recognition of the sensory mode of touch that messages can be portrayed to the user, as to what is to be touched, and the way and pace at which space is to be experienced.

However, multisensory architecture does more than this as it has far reaching psychological effects on its users. While touch may seem to be the most obviously impactful aspect of the built environment, one must not deem the sense of sound, smell and taste as being of less importance. It is through the full sensory experience of architecture that memories and meaningful spaces are established within the human being. Memories are generated not by buildings in themselves, but by the effect they have had on the human body. Often this effect originates from the stimulation of the sense of smell and sound. Similarly, architecture that focuses on the experience of the physical body, directs one's consciousness towards their sense of self and being. The human

experience, through the physical body, connects people to the places they occupy, thereby aiding in the enhancement of a sense of personal identity within the space and connection to such a space in the form of memories.

The study of sensory stimulation has proven to provide a sound theoretical base from which to look into architecture for children, as it is primarily through the physical experience of space, through heightened sensory modes that children engage with, interact with and learn from space. While adults are less sensitive to the stimulation of their senses, children are acutely aware of the world around them, its sights, sounds, smells and textures, thereby making the impacts and benefits of multisensory architecture even more applicable to children. The physical manner in which children engage with the built environment is seen in the importance of play, the need to explore and discover new places in the environment as well as establish their own private space through place-making. Literature on the subject shows that children gain much from their experience of places and so it is evident that designers and architects need to consider children's spatial experiences in order to appropriately design for this.

This dissertation has highlighted three possible approaches within the Reggio Emilia education philosophy to illustrate different means by which spaces for children can be designed to be more in keeping with children's spatial experience. While there are a multitude of possible approaches one could look into, these three form the focus as they reflect, most directly, the role of sensory stimulation in architecture for children.

Firstly, providing a variety of spaces improves the quality of the child's experience, by ensuring an abundance of stimulus is present. Flexibility of spaces improves its sustainability in enabling a variety of activities and types of play to occur within, which has been found vital to children's development. The psychological benefit of varied spaces is also evident in that they allow children to experience a range of moods, emotions, and times of quiet, reflective activity. The provision of variety further enables children to rearrange the environment according to their needs.

The second approach looks to nature for inspiration in the design of children's spaces. The sensory outdoor environment naturally draws children to it. The unique qualities of this world,

not often evident in the built environment, engage with a child's sense of wonder, adventure and fun. A number of ways to integrate this type of environment into the designs of children's spaces are discussed. Firstly, indoor spaces, designed as 'interior landscapes', create an indoor environment that is multidimensional and interactive. Secondly, enabling the manipulation of spaces and objects within the built environment, often done in the natural environments, is important. This allows children to determine their own environment and enables place-making and the construction of private spaces, significant in their psychological development, to occur.

The third approach aims at using architecture as a means of teaching. The spaces children occupy have been found to be a considerable part of their learning process. Thus, the environments created for children need to be carefully considered to ensure they optimally enhance the learning process that occurs within. These environments can become an active part of a child's education when designed to ignite interest and raise questions regarding the world around them. Furthermore, these environments can also perpetuate messages about a child's worth in society; what is to be valued and respected. With this approach in mind, the building becomes more than just an educational tool, but also a teacher on life experience.

9.2 CONCLUSIONS

The theoretical information gained supports the initial hypothesis posed. Firstly, approaching architecture with a focus on sensory stimulation is a concept not well applied in contemporary architecture. Provided that the stimulation of the senses through the built environment is considered as a design tool at conceptual stage, it can promote physical and psychological wellbeing to its users.

On a physical level, sensory architecture engages all aspects of the human body thereby generating a more holistic physical experience in comparison to a vision-centred one. Furthermore, multisensory architecture is able to generate a choreography of movement through spaces created and can convey to the user how a building is intended to be experienced and understood.

On a psychological level, architecture that appeals to all sensory modes aids in the formation and retention of memories of spaces through the physical experience of the body. It connects one's body to the environment one exists within, thereby enhancing personal identity and sense of self within a space. Through the use of the senses, a places' unique 'spirit' is brought out which can have an emotionally impact on the user.

Secondly, children experience the environments they exist within through a heightened awareness of their sensory modes. Thus, they experience spaces far more acutely than adults. It is through physical interaction with the environment and objects in the environment that children learn, develop and enjoy spaces. From this understanding of children's place experience, it is logical to conclude that the built environment plays a major role in children experience of space, their development within it and enjoyment of it. The built environment forms the framework in which play, socialising, exploration and learning happens. Viewed in this way, it is evident that the architect's role in the design of these spaces is paramount to ensure that the environments created promote positive development in these areas.

The environments children are exposed to also have psychological implications as they promote or hinder private exploration and place-making. These two aspects of children's place experience are two of many ways in which children are able to develop their personal identity and sense of self. A further means by which children's identity is able to be developed through the built environment, is by enabling them to have a tangible impact on their environments and provide opportunities for them to reorganize their environment according to their needs.

Finally, using sensory stimulation as an architectural design tool in the creation of spaces for children can greatly benefit children as multisensory architecture promotes physical engagement with spaces and encourages discovery, play and creativity, all of which create ideal conditions for learning to occur. Environments in which the senses are engaged encourage children to explore and create personal spaces, which assist in the development of their individual identity and create attachments to places.

Three ways in which this can practically be achieved is through the provision of variety within architectural space, using the natural environment as inspiration in the design of the built environment as well as creating the architectural facility to be an opportunity for teaching. These three methods, while not the only means of creating appropriate spaces for children, can be applied to current environments for children and to future design projects to help transform spaces into unique places that are beneficial and have a positive influence on the lives of children.

9.3 PROBLEMS ENCOUNTERED

The application of these conclusions is beginning to be seen in various international buildings; however, the study of local buildings shows less of an understanding of the significance of sensory stimulation in the design of children's spaces. The main problem encountered is that in the South African learning environments studied, sensory stimulation is in the form of 'add-on' elements and does not form part of the conceptual and theoretical development of the project. However, successful, multisensory architecture is far more than purely adding texture and colour to a building, as is primarily done in these examples. The most significant and influential architecture in terms of addressing the entire human being, are those that are conceptually aimed at enhancing the human experience through sensory stimulation.

The link between sensory stimulation and children's development is also not as well recognized in South Africa as one would hope. This is evident in the application of sensory elements to local built environments for children. As mentioned above, it is applied more as aesthetic elements or interesting features, rather than in response to an understanding of the need for children to be constantly inspired by their environment, and the benefits of architecture that responds to the needs of children. This problem is further evident in discussion with teachers and children's specialists. The connection between sensory stimulation and physical development is apparent to

a degree, but the psychological and personal benefits of stimulating the senses through the built environment is less recognized.

9.4 AVENUES FOR FURTHER RESEARCH

As this is a relatively new concept in architecture today, there is a great need for further research on the subject. The study has shown that although a fair understanding of human perception and cognition in architecture exists in the realm of literature, practitioners have yet to fully harness such knowledge in the design of architecture.

While architecture during the eras before the onset of Modernism could be viewed as multisensory, it would be unrealistic to conclude that architecture today needs to resort back to the design methods and intentions of those times. Rather, further research should aim at looking at the concepts and principles of those times, to reveal new ways of applying them to architecture of today. Thus, a new era is to be established that synthesizes the contemporary architecture style of today with the findings on sensory stimulation in the built environment. It is also recommended that architectural practitioners bear in mind the importance of multisensory architecture in future buildings' conception and design development rather than merely towards the end of a project. This would assist practitioners in creating more holistic environments that leave the user with a positive, memorable experience and desire to return.

Although research on children's development is abundant, there is a limit to the knowledge that directly evaluates the relationship between children's development and the built environment. Teachers and children's specialists also seem to be behind in current literature related to the topic. This needs to be addressed if their insight into the design of children's environments is to be deemed valuable to architects. Since children have little say in matters of design, their needs must be met by practitioners, sensitive to their requirements and determined to satisfy them.

This dissertation has fulfilled its aim in providing synthesizing information related to children and architecture, through the study of sensory stimulation; however, there is still need for further research in this specific field. In particular, the importance of sensory stimulation and how it can be incorporated into the design of children's spaces in an appropriate manner is a sphere of research found lacking.

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APPENDICES

APPENDICE I

INTERVIEW SCHEDULE A: Answered Example 1

What is your understanding of multisensory architecture?	Architecture that relates to and can stimulate more than one of the human senses.
What do you believe to be the most important sense / sense in architectural perception?	Vision
Do you consider the sensory experience in the design process?	To an extent I do consider it. It would be more heavily weighted towards vision, however, aural and touch would be considered at a slightly lesser priority. Smell and taste are much less considered, if at all.
Do you believe contemporary buildings today lack sensory stimulation? Is there a need for change?	There probably is a lack of overall sensory input in most contemporary buildings. By incorporating this into the design process, one can surely only improve on the environment of a space.
What do you believe are the primary physical and psychological benefits of multisensory architecture?	I would think that being surrounded by architecture that is constantly stimulating many senses simultaneously would naturally heighten one's senses, having a knock on effect where by the mind and body would be more regularly stimulated. This would improve brain activity, and increase the overall health of the body and mind.

INTERVIEW SCHEDULE A: Answered Example 2

<p>What is your understanding of multisensory architecture?</p>	<p>Architecture that respond to several senses.</p>
<p>What do you believe to be the most important sense / sense in architectural perception?</p>	<p>The visual sense and psychological impression.</p>
<p>Do you consider the sensory experience in the design process?</p>	<p>Yes. More so in habitable areas and public spaces. Not as much in commercial or industrial projects.</p>
<p>Do you believe contemporary buildings today lack sensory stimulation? Is there a need for change?</p>	<p>Yes. There is a need for architects to have a greater sensory awareness.</p>
<p>What do you believe are the primary physical and psychological benefits of multisensory architecture?</p>	<p>Architecture is principally about the creation of suitable, enjoyable spaces for a determined function. The more senses we can stimulate or consider in the design process, the better we can control the physical and psychological effect we hope our architecture will have.</p>

APPENDICE II

INTERVIEW SCHEDULE B: Answered Example 1

Do you suppose there is a correlation between children's development and their environments?	Yes. A homely, comfortable and positive environment makes children feel more secure and able to explore. This is opposed to a stark, four walled, bare environment.
What role does the environment play in children's lives? (physically, socially and psychologically)	The environment promotes the formation of relationships between peers (i.e. social implications). It defines an area for children to gather, promotes interaction. This can be either indoors or outside. Enables the development of motor skills. The most positive and diverse an environment, the more well rounded a child will be.
What is the importance of play and exploration in developmental growth?	It is the major form of learning and develops fine motor and gross motor skills. Stimulates imaginative and creative ability as well as social interactions. Playing in groups develops fundamental moral grounds and respect for peers and the environment.
How do young children benefit from sensory stimulation?	By stimulating them, children become aware of the five senses. Letting children explore their senses and get messy promotes a well rounded child and prevent them having interaction problems later in life. e.g. germaphobia (fear of germs), ataxophobia (fear of mess and dirt)
Do you believe current environments for children are suitable and well designed according to their needs?	No
What variety / types of spaces do children make most use of and enjoy?	Children enjoy climbing areas, balancing apparatus. They use the playground and natural gardens, water troughs, sand pits. Dress up and role play areas are well used and a variety of space sizes and types are used depending on the child and their needs.
How can the design of spaces for children be improved?	Smaller zones within big spaces are needed for different activities. Different levels within spaces with different means of climbing up and down. Curved wall and tight angles make furniture difficult to accommodate, however, these spaces could be good hiding spaces and add interest. Low windows in play areas would be beneficial, but they can be distracting in a classroom setting.
Do you believe that the built environment can be viewed as a "teacher", and play a role in the learning process?	Yes. Only if it caters for the various needs of children. E.g. variety of spaces, fine motor and gross motor activity, free play, imaginative and creative play.
What importance / role do the community and family play in children's development?	The family and community determine the kind of social interaction and moral basis children have. It is beneficial if the parents are involved in furthering the child's education. Teacher, parents and child must be one unit on the same page. This enables the child to see unity among those involved in their life.

INTERVIEW SCHEDULE B: Answered Example 2

Do you suppose there is a correlation between children's development and their environments?	Yes. See below
What role does the environment play in children's lives? (physically, socially and psychologically)	Environments that encourage social interaction are essential for the development of social skills. Physically, it is important that an environment has enough space, and "tools" to encourage various gross motor activities. This is essential for visual perceptual development and development of musculature, balance skills...
What is the importance of play and exploration in developmental growth?	Play and exploration are important for a young child. On a gross motor level, play is essential for the normalization of muscle tone (children who engage in limited gross motor tasks often have low muscle tone, which impacts on attention, concentration, endurance...), for balance, motor planning... Play and exploration are essential for the development of imagination, reality testing, visual perceptual skills, social skills...
How do young children benefit from sensory stimulation?	Young children require sensory stimulation to development visual perceptual skills. Sensory stimulation is also important for mood and the development of body awareness and proprioception (awareness of the body's position) – tactile input in particular is important for the development of these aspects. Children need to interact with their environment on a gross motor and fine motor level for consolidated development of these skills, amongst others.
Do you believe current environments for children are suitable and well designed according to their needs?	In school environments, classrooms seldom seem to be designed specifically to stimulate children / provide sensory input. At times even the outdoor areas are limited. Outdoor and indoor areas tend to be kept distinct and separate, and when it rains children are confined to classrooms. Most of the schools I work at have relatively small classrooms, filled with desks and toys. Often environments for children tend to be too small and cluttered, which encourages distractibility whilst limiting free, unstructured play. Sensory stimulation is provided by toys rather than the environment itself. Children love playing in areas that provide surfaces of varying heights, such as tunnels they can crawl under and large blocks and "bridges" that they can climb on. Surfaces at varying heights encourage development of spatial awareness but are limited to jungle gyms.
What variety / types of spaces do children make most use of and enjoy?	The children I work with love to play outdoors in wide, open spaces with lots of room to run and play. Many of them tend to seek tactile stimuli, choosing to play in sand pits, water or mud. Younger children like to take their shoes off to run around in the grass. Jungle gyms and large boxes, barrels etc. where they can hide in and climb over are very popular.

<p>How can the design of spaces for children be improved?</p>	<p>Spaces should include more varying surfaces, such as slopes and tunnels. Spaces could include more tactile and olfactory stimuli (e.g. more trees in playgrounds, surfaces of varying textures indoors). Children would benefit from larger indoor areas, particularly with that indoor-outdoor landscape and providing an area with enough space for a child to run and explore in a sheltered environment (particularly as outdoor play is limited by weather, particularly in winter).</p>
<p>Do you believe that the built environment can be viewed as a “teacher”, and play a role in the learning process?</p>	<p>Yes. I work with many mainstream children with gross motor, fine motor and visual perceptual problems. Much of the work I do with these children focuses on creating a play situation that provides the child with specific sensory input. If school environments were designed specifically to provide children with the required sensory stimuli, and to facilitate exploration and play using surfaces of varying heights, to encourage running, balance etc. it is likely that this would afford further development of these skills that many mainstream children currently battle with. As the child interacts with the sensory rich environment they will experience learning and development in various gross and fine motor and perceptual areas.</p>

PART TWO
DESIGN REPORT

PART TWO

DESIGN REPORT

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

From the preceding theoretical study of sensory stimulation as an architectural design tool and the examples of international buildings that express this, the importance of the senses in architectural perception for adults and particularly children is recognised. However, in studying local buildings for children, the conclusion was drawn that this approach to architecture has generally not been well applied in KwaZulu-Natal. The aim is to utilize the information obtained from the review of literature, and empirical data acquired to aid in the derivation of a design brief, selection of an appropriate site and inspire the design of a Children's Centre and Community Facility in Umlazi.

This chapter briefly describes the Client, their requirements and subsequently a brief is developed for the project, in keeping with the framework set up in the theoretical discussion. The area of Umlazi is analysed and three potential sites are selected for the project. These sites are then individually investigated to identify the most appropriate for the proposed Children's Centre.

1.2 PROJECT DESCRIPTION

A Children's Centre and Community Facility has been proposed as this building typology is well suited to express the theoretical discourse appropriately. Since the architectural facility is the beginning of the learning environment and forms the framework in which development occurs (Loughlin and Suina, 1982, in Spencer, 2006: 93), the project is to be based on the notion that the maximum learning, fun and development occur in places designed appropriately for children (de Monchaux, 1981: 18). The building is to pay cognisance to the way children experience their surrounding and are impacted by them, and use the guidelines to children's design discussed in the framework. In doing so, the project is to practically demonstrate the findings from the literature review and empirical data obtained.

The aim of the proposed Children's Centre and Community Facility is to demonstrate the relevance of a sensory approach to architecture for children and adults alike as well as the benefits of such an approach. The project is intended to provide a contrast against other built environments in KwaZulu-Natal where sensory stimulation is seen purely as an additional feature of luxury rather than necessity, applied at the end of the design. The design, from conception to completion, is to be grounded in the conceptual and theoretical framework established.

While the focus is to remain predominantly on the education and provision of various facilities for children within the community, the building is also to benefit the families of such children and the community the building encompasses, thus enhancing its social sustainability.

Overall, the project is to provide a safe and appropriate environment for children to learn within and enjoy, integrating parents and caregivers into the developmental process of their children. Furthermore, it is to uplift the community by providing valuable facilities they can utilize and creating an environment that is experientially distinct, memorable and well loved. Skills training and the creation of employment opportunities form the final component of the project, aimed at improving the economic sustainability of the proposal.

1.3 THE NOTIONAL CLIENT

1.3.1 The Client's Organisation

In 2009, the Municipality of Durban commissioned Walker Smith Architects, Ambro Afrique Consultants and BKS Consortium to generate an Urban Development Framework Plan (UDFP) to provide an integrated urban design vision for the development of KwaMnyandu Node in Umlazi. The Children's Centre is to be part of that development scheme, thus eThekweni Municipality would act as the Client.

The primary source of funding for the project would come from the Municipality. In addition to this, various charity organisations such as World Vision South Africa and CHOSA (Children of South Africa), which is an organisation that identifies and supports community projects that reach out and take care of vulnerable children, Enterprises and Commercial Financial Organisations would be approached to potentially provide additional funding towards the maintenance and management of the Centre.

1.3.2 The Client's Requirements

As part of the plan for the regeneration of the KwaMnyandu area, the eThekweni Municipality has proposed a Children's Centre and Community Facility in recognition of the need for more facilities of this nature to exist in the Umlazi area. The Client intends to establish a facility that provides for the educational needs of young children as well as benefit the community both socially and economically. Thus, training facilities, skills development and an opportunity for the Centre to generate some form of private income is necessary.

1.3.3 Detailed Client Brief

The most critical time in brain development and learning occurs during the first five years of life (Spencer, 2006). An environment which is rich in design, age-appropriate, developmentally appropriate and sensory stimulating, is required to promote the greatest learning of young minds. Possibly most importantly, a learning facility must also be an environment reflective of the child's culture, reinforcing a unique social identity and strong self-concept (Martin, 1998). The design of the facility is intended to epitomize such an environment. However, important to note is that the building, while facilitating the use of children, is not to be 'child-like' in its design and detailing. Rather, a more subtle approach is to be taken that is beneficial for children while at the same time, flexible enough to be used by adults as well. The centre is to redefine the language of architecture for children. Rather than repeating current design trends for children's buildings which are often inappropriate, inflexible in their use and reliant on primary

colours and cartoon graphics to demonstrate their function, the Centre is to focus on creating a holistic aesthetic, which is appropriate for children while still being flexible for change.

There are three aspects to the brief that are considered essential in the design of the Children's Centre and Community Facility as they are directly related to the upbringing, welfare and influence over the lives of children. These three aspects and their subsequent functions and facilities are described below:

Designing for Children

The Centre houses a pre-school and crèche service, catering for children up to six years. All necessary features such as learning spaces, play areas, quiet rooms, children's ablution facilities, kitchen and staff facilities are provided. Such spaces for children are designed in such a way as to stimulate play and learning. The building shell is intended to inform the activities and direct the behaviour within, rather than merely house learners. The outdoor environment is viewed as being as important as the indoor environment and is designed accordingly. Most spaces have either physical or visual access to the outdoor area, with the transitional space between the two being blurred and undefined. The Children's Centre also enables children to stay overnight if parents are away or unable to take care of them for a few days.

Facilities such as a children's resource centre and a study area provide space for school-going children to utilize after school and gain assistance with homework and projects in a resourceful environment, conducive to studying. These spaces are well needed in this community as often teachers responsible for large classes lack the time or capability to provide individual attention to those learners who need it. Home environments can also be an adverse environment in which to do homework resulting in children falling behind.

Designing for Families

According to the Reggio Emilia education theory and empirical data gained through interviews with teachers, providing facilities for families in conjunction with those for children is beneficial to engage parents and caregivers in the process of children's

development and ensure they play an active role in the education of their children. The facilities provided would include a resource centre, child assessment and therapy rooms as well as provide education on family planning and parenting. Administrative facilities for these functions would form part of the accommodation schedule. These aspects of the building are important as they provide parents with much needed information, often not supplied by schools. Assisting families and children with learning disabilities or other educational impediments at a young age better prepares the child for formal schooling and enables teachers, who are often not qualified to diagnose such problems, to assist these learners more effectively.

Designing for the Community

The Centre recognizes the needs that exist within the Umlazi Community and intends to provide for those through the Community Centre component of the building. Unemployment, skills training and a lack of facilities to be used by the community is to be provided for by this proposal. Also understood, is the benefits of including community facilities with those for children. The positive impacts of this, such as supervision, integration between children and their community as well as providing children with a well rounded upbringing, have been shown in the case studies examined as well as interviews with teachers.

The first component of the community centre deals with the provision of a large hall for the community to use for gatherings and meeting rooms. These facilities can be rented out to enable the Centre to generate an income.

The second component aims to address the critical need for skills training and employment opportunities. Training rooms, workshop spaces and an employment office are to be used to educate adults and provide the necessary skills training to aid income generation and entrepreneurship. An exhibition space is to exhibit work created through the Centre for purchase by the public. All ancillary functions such as administration, ablution facilities, kitchen and storage areas are to be included as necessary.

The final component provides facilities for use by the aged. Through the case study of the Shayamoya Community Centre, this aspect of the community centre is shown to be

important as it aids in the creation of an inclusive environment, where all members of the community are welcome and shown value. While the aged population is small in Umlazi, including them in the centre is important to ensure they do not feel abandoned or forgotten within society. An activity room and TV venue is provided, as well as a kitchen where they can receive nutrition. They are also able to assist in the establishment and maintenance of a permaculture garden on site.

In conjunction to these building functions, a small number of parking bays are to be provided for building users not using public transport. Service and maintenance facilities such as a meter room, refuse area and caretakers office are also to be provided.

In addition to these facilities, the centre is to serve as an oasis in the urban environment. An abundance of greenery, planting and open outdoor space is beneficial in terms of the human psyche, the human spirit, children's development and place experience, as well as providing a welcome sensory experience. Thus, landscaping, planted courtyards and outdoor spaces are viewed as having equal importance as indoor spaces and are designed accordingly.

1.3.4 Accommodation Schedule

ACCOMMODATION SCHEDULE					
DESCRIPTION	PARTICULARS	QUANTIT Y	AREA (M ²)	AREA TOTAL (M ²)	FURNITURE / FITTINGS
Entrance					
Entrance foyer/lobby	Circulation and waiting space	1	140	140	Lounge seating
Reception		1	35	35	Reception desk, chair
Ablutions	Off reception	1	40	40	F: 4WC, 2WHB M: 2WC, 2WHB, 2UR
			Subtotal	315	
Children's Centre					
Reception	Connect to central reception area	1	15	15	Desk, chair
Waiting area		1	35	35	Seating, information stand
Principal office		1	20	20	Desk, chair
Nurse / sick room		1	16	16	Desk, chair, bed, whb
Admin store		1	10	10	
Teachers work room		1	18	18	Tables, chairs, storage
Staff offices		3	9	27	Desk, chair
Meeting room		1	18	18	Boardroom, chairs
Staff room		1	35	35	Lounge furniture
Verandah	Off staff room	1	100	100	
Kitchen	Connected to staff room	1	12	12	Fridge, BIC
Ablutions		1	20	20	F: 2WC, 1WHB M: 1WC, 1WHB, 1UR
Printing room	Central corridor area	1	10	10	Printers
Classrooms	Outdoor access, mezzanine levels	4	100	400	Desks, chairs, cupboards
Children's ablutions	Shared between 2 classrooms	2	20	40	5WC, 6WHB, wall urinals
Toddlers room	Close to staff	1	50	50	Cribs, play area
Toddler change	(attached to toddlers room)	1	10	10	Changing bed, whb, wc
Aftercare room	Visible from entrance	1	70	70	
Store		1	10	10	
Multipurpose teaching	Central to classrooms and playground	1	70	70	Desks, chair, stage area
Lunch / activity room		1	60	60	Tables, chairs
laundry	Near service area.	1	10	10	
Kitchen		1	30	30	Sink, fridges, cupboards, work space
Overnight accommodation & caregivers room	Attached toilets	1	40	40	Dorms, living area, kitchen,
Outside covered play area		1	240	240	Planting, play equipment, sand etc...
			Subtotal	1356	

Outside uncovered play area		1	1000	1000	Planting, play equipment, sand etc...
			Subtotal	1356	
Aftercare Zone	First floor				
Library		1	150	150	Shelves, tables, chairs
Computer area		1	50	50	Desks, chairs, computers
IT office		1	15	15	Desk, chair
Study area		1	50	50	Tables, chairs
Multipurpose space	(extra lessons, group projects)	1	75	75	
Reading lounge		1	50	50	Lounge furniture, bean bags
Supervisor office		1	16	16	Desk, chair, cupboards
			Subtotal	406	
Family Centre	First floor				
Reception / admin office		1	30	30	Desk, chair
Store		1	12	12	
Waiting area		1	30	30	Lounge furniture
Resource centre		1	12	12	Display units, shelves
Employment office		1	24	24	Desk, chair
Antenatal support centre		1	24	24	Desk, chairs
Assessment therapy rooms		2	20	40	Desk, chairs
Meeting room		1	35	35	Board table, chairs
Kitchenette		1	16	16	Sink, fridge, cupboards
Ablutions		2	9	18	4 WC's, 2 whb's
			Subtotal	139	
Community Centre					
Multipurpose hall	Private entrance, double volume	1	300	300	Loose chairs, stage
Alternate entrance corridor		1	170	170	
Ablutions		1	50	50	F: 5WC, 4WHB M: 3WC, 4WHB, 4UR
Chair store		1	50	50	
Hall foyer		1	180	180	Seating
Retail and exhibition space		1	130	130	Display cabinets, seating
Covered spill out space		1	80	80	Lounge seating, fold down screens
Uncovered plaza		1	260	260	Water features, benches, planting
Coffee shop		1	70	70	Coffee bar
Kitchen		1	40	40	Industrial fittings

			Subtotal	150
Service area				
Caretakers office		1	25	25
Meter room		1	25	25
Refuse area		1	20	20
			Subtotal	70
			SUBTOTAL	5278 m²
Vertical circulation		3 floors	50	150
Total Approx. Circulation	12% of floor area		581	647
			TOTAL	6075m²

1.3.5 Site Selection Criteria

The site is selected based on various criteria derived from the preceding literature review.

The primary requirements the site is to fulfil are:

- The site needs to cater for the safety and protection of children and building users. As children are to be involved, it is essential they be prevented from dangers associated with the immediate environment. This includes ensuring the site is able to be enclosed to provide the psychological feeling of safety.
- It needs to be easily accessible via multiple transport modes thereby making the centre easily available to be used by those with and without private transportation. Pedestrian access is of particular relevance as the majority of children will be travelling on foot.
- The site must have linkages to the residential areas as well as schools and other amenities. This is a basic requirement as the Centre is to be utilized in conjunction with other amenities and cannot be remotely located. Children will also be travelling from schools in the area to the centre, thus, a connection must be evident.
- A key prerequisite of the site is to be in an area of prominence with street front exposure, thus creating an opportunity to give recognition to the children in the area, promote their value in society and reflect the importance of their development.
- The site must be integrated into the community it will serve. The empirical data obtained expressed the importance and benefit of community involvement in the facilities. This participation is only able to occur if the site is centrally located within the community

- The site must have connections to other sensory elements including natural features of the environment. The outdoors provides a naturally beneficial and sensory environment for all people therefore, a site that illustrates opportunities to epitomise the current environment into the design is important.
- The existing 'spirit of place' is important in site selection as environments are often unconsciously experienced, but do greatly influence the experience of spaces. Since all users approach an environment with preconceived ideas regarding the experience they expect to have, a site with an existing spirit amongst the community would enhance one's experience within the space.

1.4 CONCLUSION

The previous discussion has illustrated the importance of selecting a suitable site if the Centre is to be appropriately designed in accordance with the stipulated brief and functions it intends to provide. It has become evident that site selection is far more complex than purely identifying a site with the necessary physical characteristics. Essential, is the underlying spirit of place and abilities to connect to other sensory elements. The social characteristics and opportunities of the chosen site are also relevant in its need to be situated within an existing community in need of such a facility.

Bearing in mind the theoretical discourse, development of the brief and site selection criteria determined, the following chapter looks into Umlazi as a possible area for sites to be selected and analysed.

CHAPTER 2
SITE SELECTION, SURVEY AND ANALYSIS

2.1 INTRODUCTION

The area of Umlazi has been selected as an appropriate location for the proposed Children's Centre and Community Facility. This decision has been made for various reasons.

- With over 30 preschools in the Central Durban area that provide day care facilities to the children of different communities, one is required to look outside of this area to other areas with an obviously greater need for such a facility. Durban also has an abundance of ancillary facilities such as libraries for children, parks and playgrounds and sports clubs that are accessible for children and enhance their development and learning opportunities.
- Umlazi has a population where roughly half the residents are under the age of twenty nine (Walker Smith Architects, 2008: 5). With such a vast number of young people, one would expect there to be an abundance of facilities catering to their needs. However, sadly this is not the case. While there are many schools in the area, the quality of these facilities is lacking. There are also minimal ancillary facilities for children to make use of, particularly children below schooling age. The need for such a facility in the area is apparent.
- In terms of the provision of social facilities, Umlazi is lacking in the number of such facilities required according to the current population. From the Social Facilities Provision Table, adapted from the Umlazi Nodal Regeneration Study, Revised Draft Final Report, (KPM Consortium: 2009), it has been calculated that within a relatively developed section of Umlazi, Primary Education Facilities, Community Halls, Play lots, Neighbourhood and Community Parks are amongst the most lacking social facilities. The urgent need for the provision of these facilities is exposed further.

The following subchapter documents relevant information regarding Umlazi necessary to understand its geographical position and historical and demographic context.

Understanding of such aspects of the area will aid the design of a proposed Children's Centre in the area.

2.1.1 Geographic position

Umlazi is situated on the south-eastern coastline of KwaZulu-Natal. It lies on the southern bank of the 'Mlazi' River and stretches to the north of the Mbokodweni River. The city of Durban connects to the area on the southwest. On the east, it is bordered by Isipingo, Lamontville and Malukazi. Beyond this lie the N2 freeway and the old Durban International Airport. This eastern entrance, marked by the MegaCity Commercial Development, is regarded as the gateway into Umlazi.

The M30 Highway is the main route through Umlazi, running East-West through the area. It is about 20km in length and forms a corridor of mixed use activity, including; commercial activities, residential uses, educational facilities and sports activities. In the heart of Umlazi (Section D) is the recently upgraded King Zwelethini Stadium and regeneration of the KwaMnyandu Node (Walker Smith Architects, 2008: 3).

2.1.2 Historical Context

Umlazi was established in 1950 on the south periphery of Durban by the past apartheid regime. Created as a commuter labour supply area for the city's industrial area, it comprises of residents originally from the area as well as those forcibly relocated from Cato Manor. In the 1960's, housing development began as part of a strategy to foster an African middle class in the townships. These included formal houses, medium income housing as well as hostels, mainly in Section T. Since the 1980's, there has been an increase in informal settlements, forming an infill along major roads, on unused land and along the southern edges of Umlazi in areas such as Malukazi. Political unrest has been rife since the 1980's, with protests in 1985 prompted by the assassination of Victoria Mxenge, a human rights lawyer, outside her home in Umlazi. Umlazi was incorporated

into the KwaZulu-Natal homeland towards the end of 1986 (Walker Smith Architects, 2008: 4).

Subsequently, the KwaZulu-Natal administration and the police, together with Inkatha supporters on the one hand, and ANC supporters on the other, have maintained a tense co-existence. Some believe that the area remains one of the most violence-torn in South Africa (Walker Smith Architects, 2008: 4).

2.1.3 Demographic Context

Umlazi is the second largest township in South Africa, after Soweto (Walker Smith Architects, 2008: 5). A population estimate of 1,677,556 million inhabitants is calculated based on an average of four members per household. Data shows that ages zero to twenty-nine represent approximately fifty percent of this entire population. The most populous ages are between fifteen to twenty-nine. Approximately 28% of this overall population is employed, 38% are unemployed and 34% are not economically active (KA Economic Development Consulting and AMR Planning & Development Consultancy, 2008: 50-64).

2.1.4 KwaMnyandu Node

The KwaMnyandu Node and surrounding areas has been selected as the main region of interest. The importance of this area arises out of the M30 Highway and railway line meeting at this junction, resulting in a high concentration of people in the area who have ease of access to transportation facilities. The great potential of this junction to be developed as an economic node in terms of trading and services is currently being capitalized on. This is being done through the Urban Development Framework Plan (UDFP) which seeks to provide an integrated design vision for the KwaMnyandu Node in Umlazi. The UDFP, formulated by appointed consultant consortia, identifies key principles and outlines broader strategies to create a flexible framework within which

development can occur (Walker Smith Architects, 2008: 1). It seeks to facilitate the establishment of mixed use activities that include inter-modal transport, commercial, residential, social and sporting amenities. The upgrade of the existing King Zwelethini Stadium and establishment of a surrounding sports hub is one such project undertaken first in the KwaMnyandu area and forms the focal point around which the process of site selection occurs.

2.1.5 Education, Employment Crime and Transport

The following table, extracted from the Umlazi Local Economic Development Plan (2008: 10), briefly highlights information regarding education, employment and income, as well as crime and modes of transport used in Umlazi. This information, although a number of years out of date, records the low levels of education which has resulted in a lack of skills and therefore low earning capability in households.

SOCIOECONOMIC INDICATORS	SUMMARY PROFILE
Population	EThekweni and Umlazi population by number of persons and households has increased between 2001 and 2007 indicating an overall increasing trend
Age groups	More than 50% of the population are youths with the average age of the population is mid-twenties followed by a decline in the population age cohorts thereafter
Educational Institutional Enrolment	Data shows approximately 60% enrolled at school indicating a large youth population and may be proxied to indicate low levels of overall skills level
Educational Attainment	36% completed grade 12 and 26% have some secondary schooling compared with 7% attained higher educational levels
Employment Status	High unemployment rate at 36%;
Household Income	More than 75% report as having no income
Employability	Population not trained or skilled in areas where potential demand may arise (such as construction or manufacturing)
Labour absorption	Potential is poor; Local economy has a labour surplus with the economically inactive population engaged in informal sector activity
Wages	Employment is primarily in unskilled or semi skilled sectors with low wages and an insignificant level of output to eThekweni municipal economy
Crime	High levels of crime has the potential to dampen inward investment
Mode of Transportation	Overall, Umlazi's residents use public transportation such as train, bus and informal taxis; Census 2001 data should be observed with caution

(Source: Community Survey 2007, Statistics South Africa)

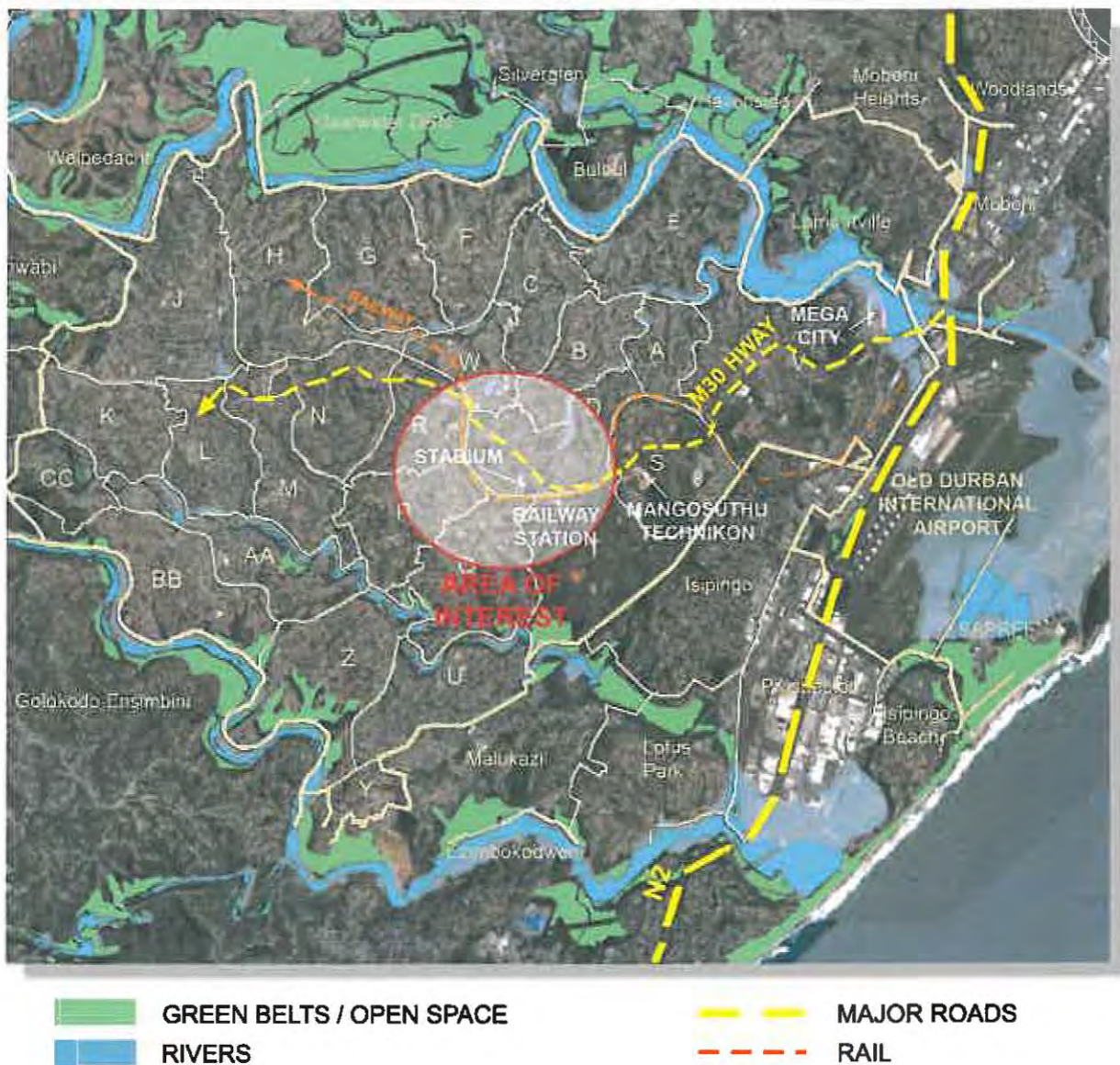
2.2 URBAN ANALYSIS OF UMLAZI

The image below shows Umlazi in relation to the greater Durban area as well as other significant surrounding areas. Major road transport leading to the area is highlighted in yellow. From this map, one is able to see that lack of development in the Umlazi area when compared to areas such as Pinetown, Durban CBD, the Bluff and Prospecton.



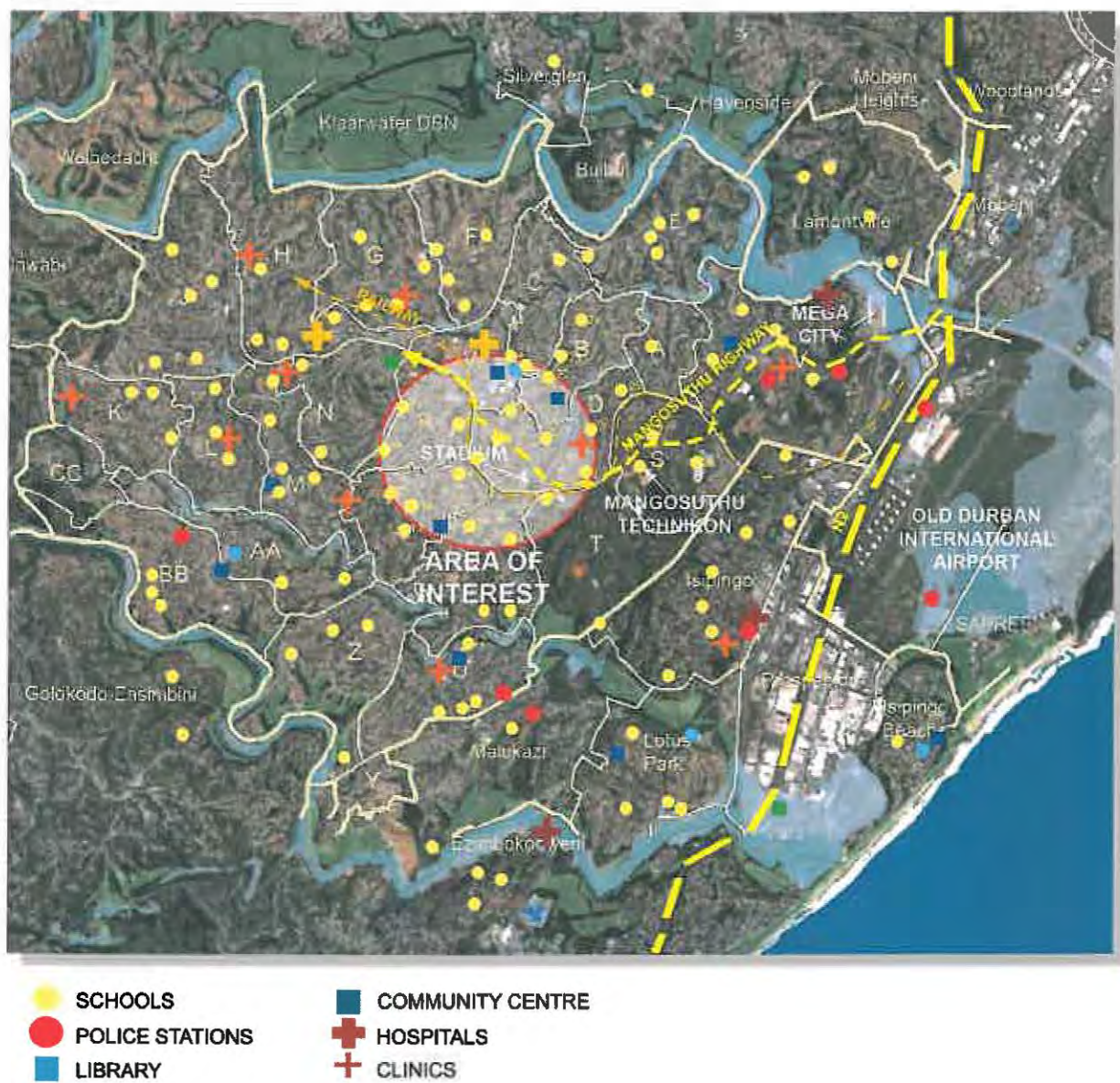
(Fig 2.0: Map of Durban and South Coastal areas with Umlazi's geographic position highlighted. Source: *Underlay*: www.googleearth.com; *Overlay*: Author)

The figure below illustrates the area of Umlazi in its more immediate context. One is able to see the area, divided into sections, is bounded by rivers on the North and South. The East boundary is formed by the N2 Freeway and the industrial area of Prospecton and Isipingo. Transport modes, highlighted in yellow and orange, run East-West in the centre of Umlazi. The area of interest, in the central ‘heart’ of Umlazi, is situated near the intersection of the two transport modes. Thus the area is one of prominence and importance.



(Fig 2.1: Map of Umlazi showing sectional divisions, major transport routes, large green areas, rivers and area of interest. Source: *Underlay*: www.googleearth.com; *Overlay*: Walker Smith Architects, 2008)

The following figure illustrates the area of Umlazi with amenities, schools and various facilities highlighted. Evidence of the vast number of schools throughout is illustrated. Within the area of interest, three community centres are situated on the periphery, one clinic is evident and one library is situated on the boundary. In light of this area being one of importance and having a high density of residents and people passing through due to the transport routes, the number of facilities is found lacking. Despite the abundance of schools, it must be noted that the quality of such facilities is unable to be expressed in this format.



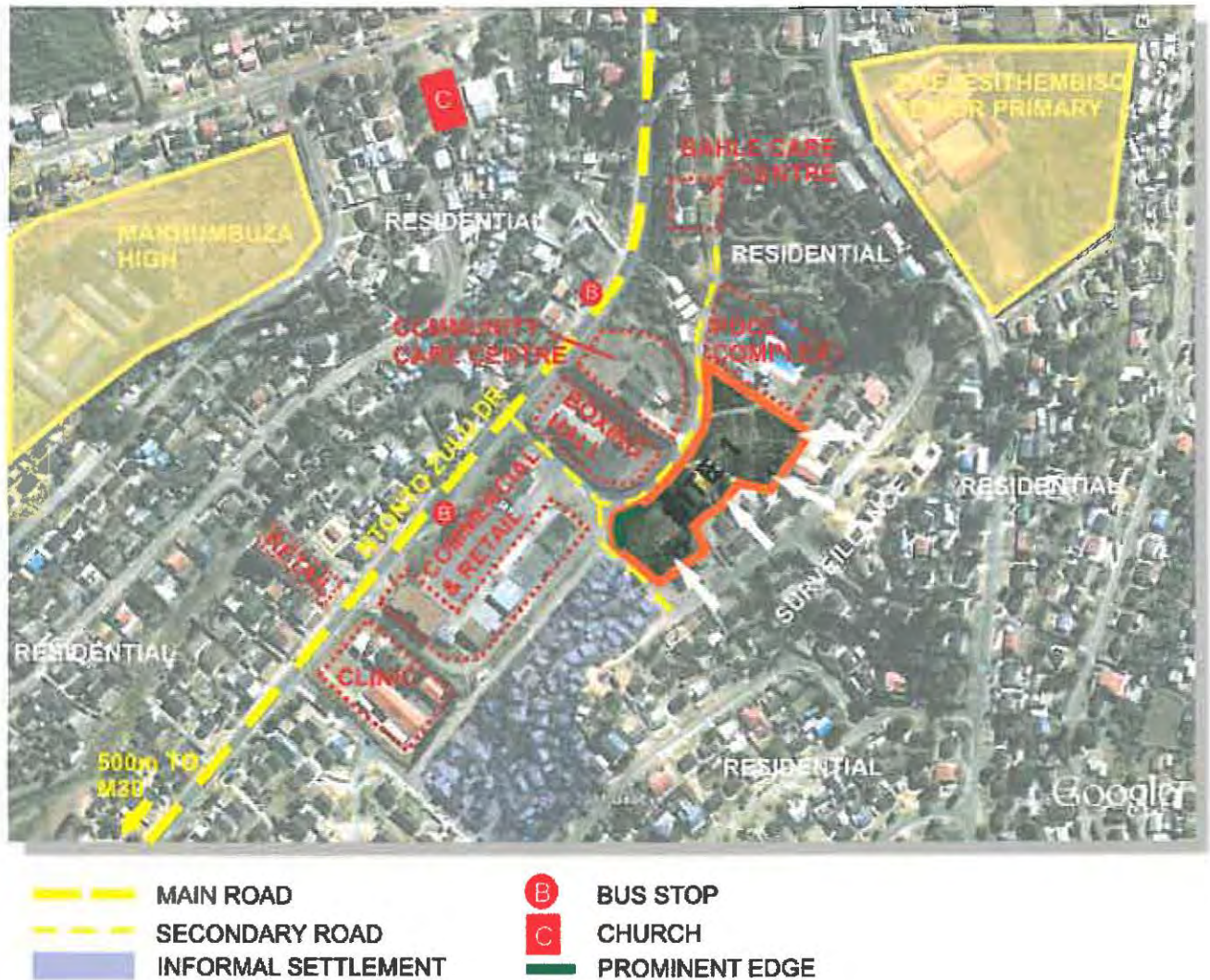
(Fig 2.2: Map of Umlazi showing the location of schools, and other amenities. Source: *Underlay*: www.googleearth.com; *Overlay*: Walker Smith Architects, 2008)

2.3 SITE SELECTION AND DISCUSSIONS



(Fig 2.3: Map of Umlazi highlighting three potential sites. Source: Underlay: www.googleearth.com; Overlay: Author)

SITE OPTION 1:



(Fig 2.4: Map showing analysis of Site 1. Source: *Underlay*: www.googleearth.com; *Overlay*: Author)

Strengths & opportunities

- Well integrated into the community and surrounded by amenities such as schools, swimming pool complex, boxing hall, clinic and retail facilities.
- Residential area overlooks the site, improving surveillance and safety.
- Accessible by bus, taxi and pedestrians.
- Site has a prominent edge with good street exposure.
- Run down care centres in the area illustrate the need for such facilities in the area.

Strengths & opportunities

- Residential area overlooks the site improving surveillance and safety.
- Easily accessible by bus, rail, taxi and pedestrians.
- Exposure to north orientation which is ideal in terms of optimizing building performance
- Corner site provides opportunity for an iconic feature to function as an entrance or gateway onto the site.
- Situated on a main road, it has good street front exposure, while simultaneously, being a corner site, it allows for access off a secondary, quieter road.
- Linkage to natural sensory elements such as a stream and vegetation.
- Public area with a high density of people results in a safer environment.
- Temporary structures attempt to house a small crèche on site currently, clearly illustrating a need for permanent and efficient children's facilities in the area.
- The development of the KwaMnyandu Node proposed in the UDFP has identified the area along Ntonto Drive being developed as Mixed Used 2- retail / residential / office. Mixed use developments provide the opportunity for families to live and work close together, thereby providing further incentive for facilities of this sort to exist in the same area.

Weaknesses and threats

- Does not have direct connection with a school.
- Pedestrians who currently walk through the site will need to be diverted.
- Busy and potentially dangerous main road will need to be made inaccessible by children within the facility.

SITE OPTION 3:



(Fig 2.6: Map showing analysis of Site 3. Source: *Underlay:* www.googleearth.com; *Overlay:* Author)

Strengths & opportunities

- Directly associated to a school, with amenities such as a church and small shops nearby.
- Well integrated into an established community.
- Residential area surrounding the site improves safety through continuous surveillance.
- Opportunity to revitalise a neglected and unused school playground area.

- An existing small crèche on the site further illustrates a need for children's facilities in the area.

Weaknesses and threats

- Situated within a completely residential area, accessibility is difficult for those that do not live in the area. Major roads are a fair distance away.
- The large number of shebeens surrounding the site reflects an unhealthy social situation, not conducive to children's services.
- The site is not situated in the immediate vicinity of the KwaMnyandu Node upgrade; therefore it would not fall under the UDFP and would require private funding.
- There are no surrounding naturally sensory areas to connect with.
- The current church on the block occupies the most prominent corner position. Thus the view from the approach to the building would be compromised.

SUMMARY OF SITE OPTIONS

SITE SELECTION CRITERIA	SITE 1	SITE 2	SITE 3
Safety and protection of children and building users	3	3	4
Easily accessible via multiple transport modes	2	4	1
Linkages to residential areas, schools and amenities	3	3	3
Prominence with street front exposure	3	4	2
Integrated into the community	4	4	4
Connections to sensory elements	3	4	1
Spirit of place	2	4	3
TOTAL	20	26	18

(4-excellent 3-good 2-fair 1-poor)

Final Site Selection

After applying the site criteria, Site 2 received the highest rating overall and has therefore been selected as the preferred site. The major advantage of this site is that it is situated in a prominent area. This means that it is easily accessible via all modes of transport and the high density of pedestrians in the area improves the safety which is important for children. The second major advantage is that the site is currently a sensory experience in itself. The above renders the site a suitable and successful choice in the context of this dissertation.

2.4 HISTORICAL BACKGROUND OF SELECTED SITE

2.4.1 History

Originally, the site was designated as formal residential and undesignated open space. A lack of sub-divisions on the site, and the stream running through the site, resulted in the land being left unoccupied until informal settlements began to appear. Up until the end of 2008, informal settlements covered the site, along with much unoccupied land alongside the Mangosuthu Highway.

As a result of the upgrade of the King Zwelethini Stadium and sports hub, as well as the regeneration of KwaMnyandu Node, these settlers were relocated to nearby RDP housing. Subsequent to this, a small bridge, parking and temporary structures housing a crèche have been established. The remainder of the site has been left open as a community park and picnic area.

2.4.2 Location

The selected site is located within the KwaMnyandu node, in the heart of Umlazi. The site is bordered by the Mangosuthu Highway and Ntonto Zulu Drive, the corner of which

is very prominent on approach. West of the site, across the Mangosuthu Highway, is the Indoor Sports Centre, King Zwelethini Stadium and sports hub. This development extends to the KwaMnyandu Station, resulting in a safe and short connection for pedestrians between the station and the site. North of the site is a public park area in need of revitalisation as it currently under-utilized. Also north is a residential area which continues to the East. South of the site across Ntonto Drive are further residential areas and green open space which connects the railway station to the site this area has much potential to become part of the urban development and regeneration of the surrounding area. The site is accessible by all relevant modes of transport with a bus and taxi stop situated on the west site boundary.

The site is currently fenced on the East, West and South boundary with pedestrian access at a number of points. The site is used as a thoroughfare between the northern residential areas and the Mangosuthu Highway. In the northern portion of the site is a stream that flows from the Mlazi River. On the southern portion of the site, temporary prefabricated structures house a crèche on site with a small, fenced playground.

An urban analysis of the area surrounding the site follows:



- MAJOR TRAFFIC ROUTE
- MINOR TRAFFIC ROUTE
- MAJOR PEDESTRIAN ROUTE
- MINOR PEDESTRIAN ROUTE
- RAIL
- KWA MNYANDU NODE BOUNDARY
- STREAM
- GREEN SPACES
- VIEWS
- PRIMARY LANDMARK FEATURES
- SECONDARY LANDMARK FEATURES

(Fig 2.7: Urban analysis of chosen site. Source: Underlay: www.googleearth.com; Overlay: Author)

2.4.3 Urban Analysis Continued

The two major problems in the Umlazi area that this project aims to address are:

Firstly, it is evident from the previous urban analysis [figure 2.8] that many schools exist within Umlazi, but there are very few facilities for children in the age group preceding formal schooling. This age group is often seen playing on the streets and in vacant spaces as they do not have facilities open to them that suitably cater for their wants and needs. Furthermore, there is very little in the way of afterschool activities for children attending school, or spaces conducive to studying and homework. Children in the surrounding informal settlements are particularly disadvantaged as their living environment makes



studying and project work very difficult outside of school hours.

(Plate 2.0: No facilities, or a single facility for after school activities, such as a rudimentary basketball court, are found in schools in Umlazi. Source: Walker Smith, 2008: 12)

The proposed Children's Centre and Community Facility aims to provide such facilities for children within the community thereby enhancing their access to education and providing a safe environment for them to take part in activities such as play, which is foundational to their development and enjoyment of life. The proposed resource centre is to be easily accessible from residential areas, unlike the current general library which is situated north, in section W, in a more commercial area.

With the inclusion of facilities for the families of the children, it is expected that the importance of education will be confirmed and practically demonstrated, thereby encouraging parents to persuade their children to remain in school for as long as possible and gain a complete education. The proposed Children's Centre and Community Facility, even on a small scale and optimistic level, aims to contribute to the economic growth of

Umlazi as it is only through education that people in Umlazi will be able to generate an income and thereby positively contribute to the wealth of the area.

The second problem to be rectified is the lack of facilities available for community use. The proposed building is intended to provide spaces large enough for community gatherings and meetings. Through the proposal and the community's involvement in the design, construction and detailing, it is anticipated that a sense of pride and identity is brought into the community. The facility is to also demonstrate the value of the society it serves, particularly the children, thereby teaching them of their importance in society and uplifting their self-concept.



(Plate 2.1: Many Community Centres in Umlazi are derelict and poor quality. Source: Author)

A multisensory architectural approach is to enhance the experience had by children and community members within the built environment. The building is to serve as an example of holistic architecture that values the experience of the human body. This example is intended to aid the design of future developments in the area by creating awareness of the neglected senses and exposing the benefits of designing with them in mind. There is further opportunity in the context of the chosen site to extend this design philosophy to the southern green open areas and create an experiential path of approach to the site for the pedestrian.



(Plate 2.2: Opportunity is present to connect the site to sensory green space such as this, thereby improving the experience of pedestrians in Umlazi. Source: Author)

This sensory approach is also intended to uplift and improve the currently public park on the site. This space is currently being used as a thoroughfare rather than a park, thus, it is not being utilized for its intended purpose. Providing ancillary functions onto the site



would help encourage greater use, thereby enhancing regeneration and improving safety.

(Plate 2.3: The current park area is unused and in need of attention. Source: Author)

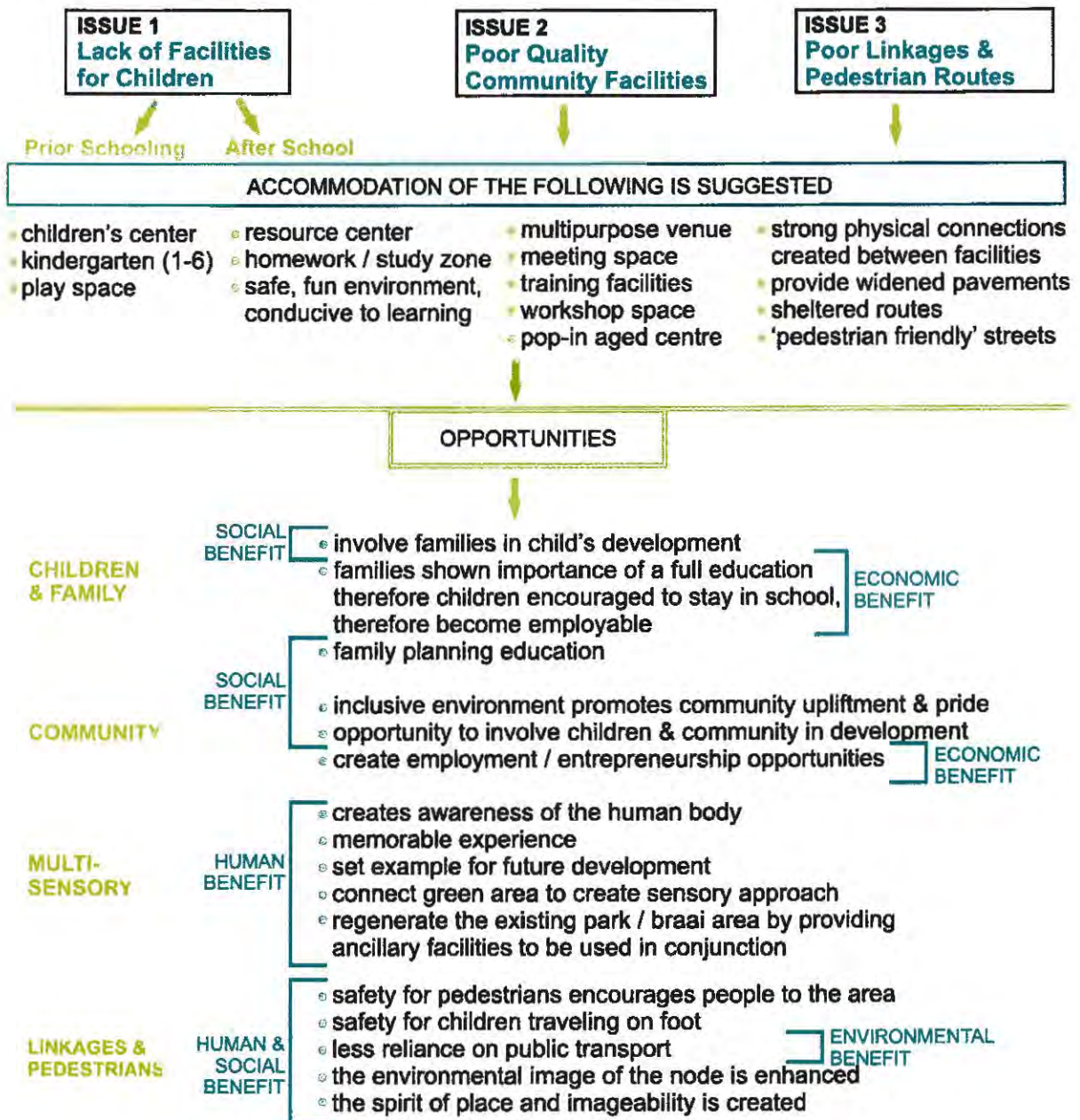
It is also to be noted early on that this proposal is to form part of a greater urban design as proposed in the UDFP (Umlazi Development Framework Plan) for the KwaMnyandu Node. The context of the site is to be developed further to become a hub of activity with a greater concentration of people. The need for such a facility will become even more evident in later years as the node is developed further. One issue to be addressed within the urban development of the proposed facility, is the need for connection linkages to exist between facilities highlighted in the urban analysis. The Mangosuthu Highway has been partially addressed in this regard, however, this needs to be improved and applied to Ntonto Zulu Drive as well. As part of this initiative, it is intended that pedestrian access to such facilities will be improved and given more authority as currently 20% of the

Umlazi population travel on foot (KA Economic Development Consulting and AMR Planning & Development Consultancy. 2008: 9).



(Fig 2.9: Full Development Plan envisioned for the KwaMnyandu Node. The selected site is highlighted in red. Source: Walker Smith, 2008: 31)

The urban analysis is summarized in the diagram following:



2.5 DESCRIPTION OF EXISTING SITE CONDITIONS

Since the redevelopment of the KwaMnyandu Node began, a revised site survey which would be issued by the town planning department has not yet been conducted. However, the as-built drawings of the site as it currently exists, conducted by the UDFP

Consortium, along with the site constraints give an accurate portrait of the existing site conditions.

Cognisance is to be given that the development control guidelines for the KwaMnyandu Node have not been revised since the initial town planning of Umlazi. The developments that have occurred were done so by application to the municipality. It is fair to assume, that application for the following guidelines pertaining to the site be reconsidered and amended according to the current development that has occurred in the area, and further developmental plans.

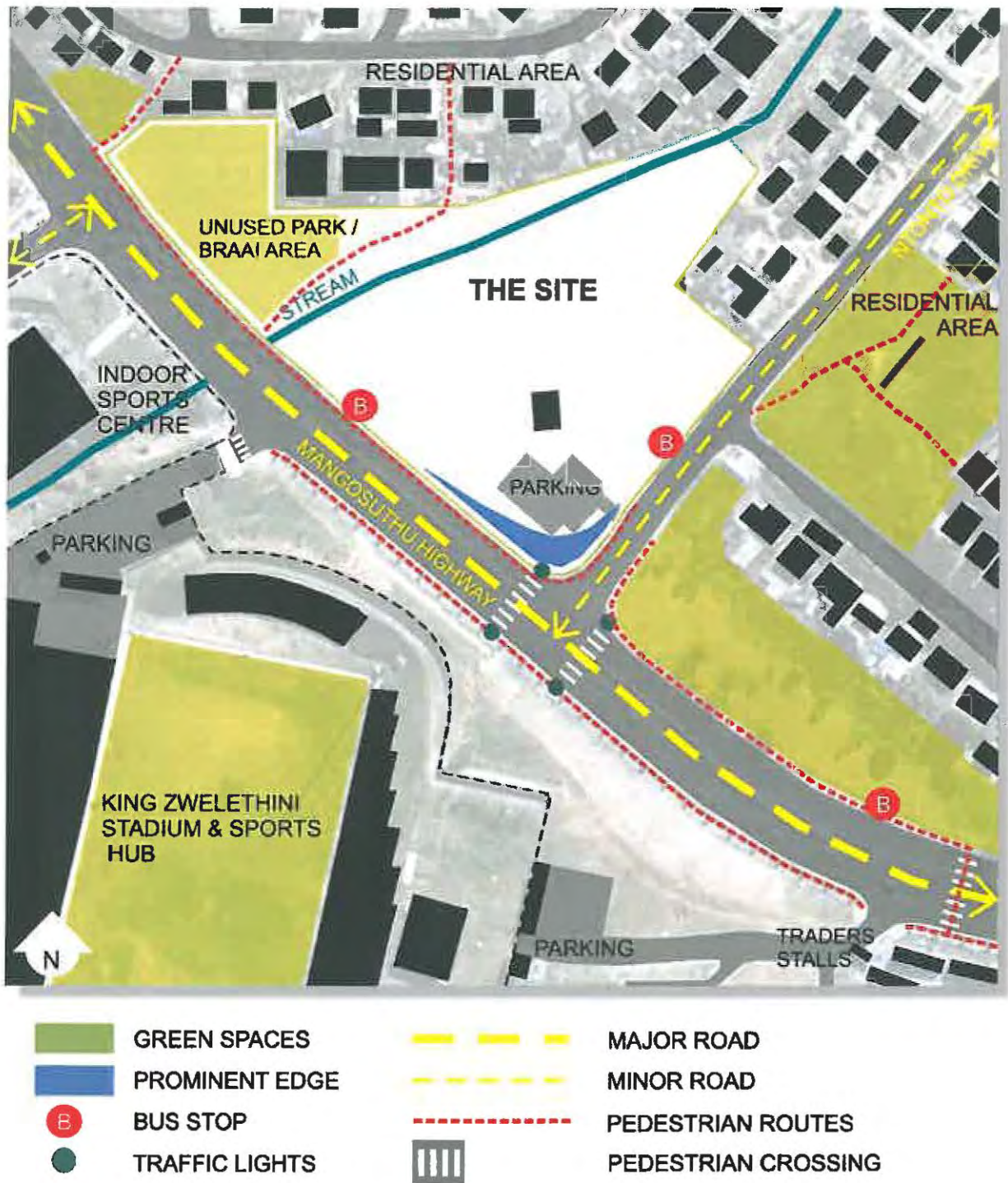
Development Control Guidelines:

- Maximum Height: 2 Storeys
- Permitted Coverage: 30%
- FAR: 0.5
- Building Lines: 7,5m on Major Roads; 5m on Minor Roads

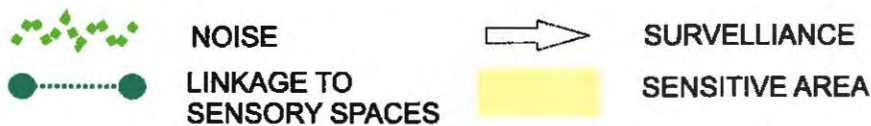
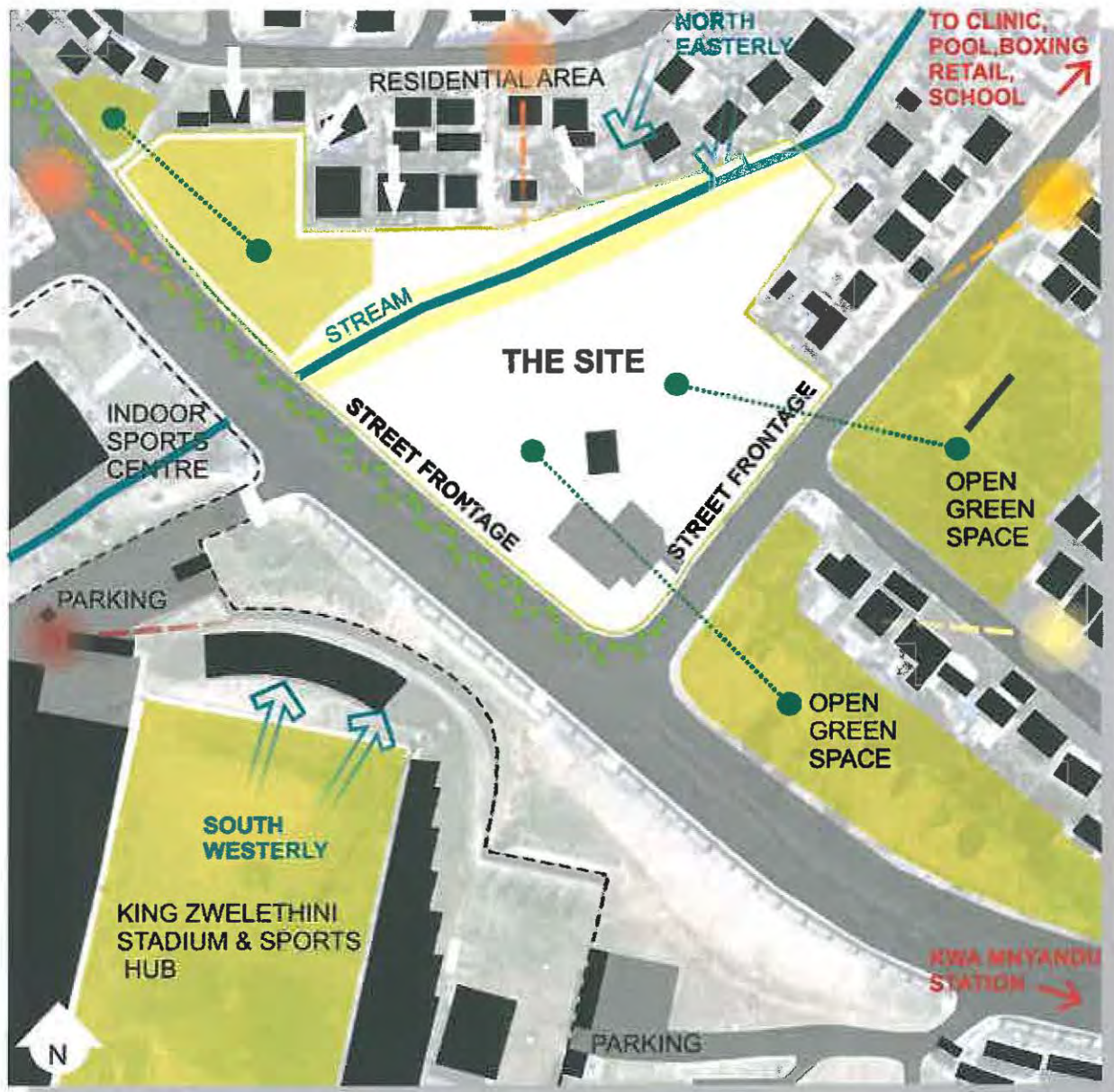


(Fig 2.10: Latest site survey drawing of the site as it currently exists. Source: Walker Smith, 2011)

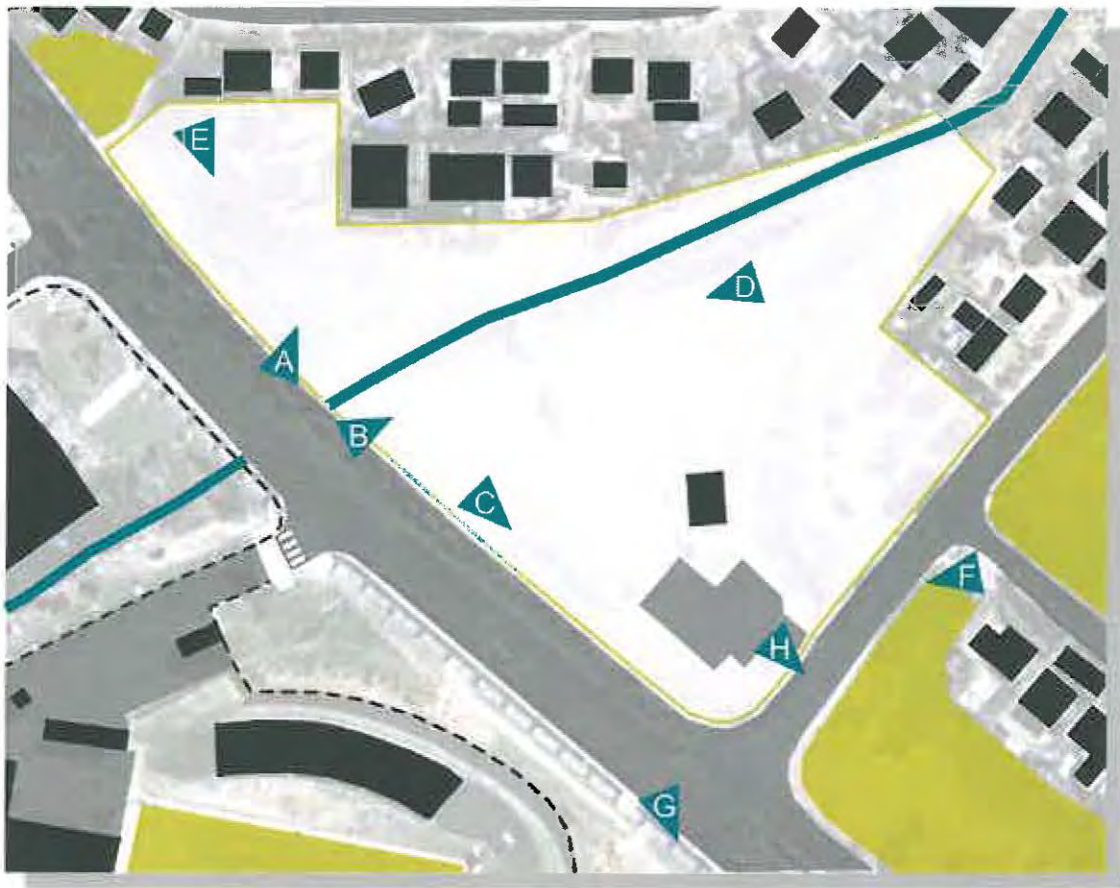
2.6 SITE ANALYSIS



(Fig 2.11: Analysis of chosen site. Source: Underlay: www.googleearth.com; Overlay: Author)



(Fig 2.12: Site analysis continued. Source: Underlay: www.googleearth.com; Overlay: Author)



(Fig 2.13: Location of photograph viewpoints. Source: *Underlay*: www.googleearth.com; *Overlay*: Author)

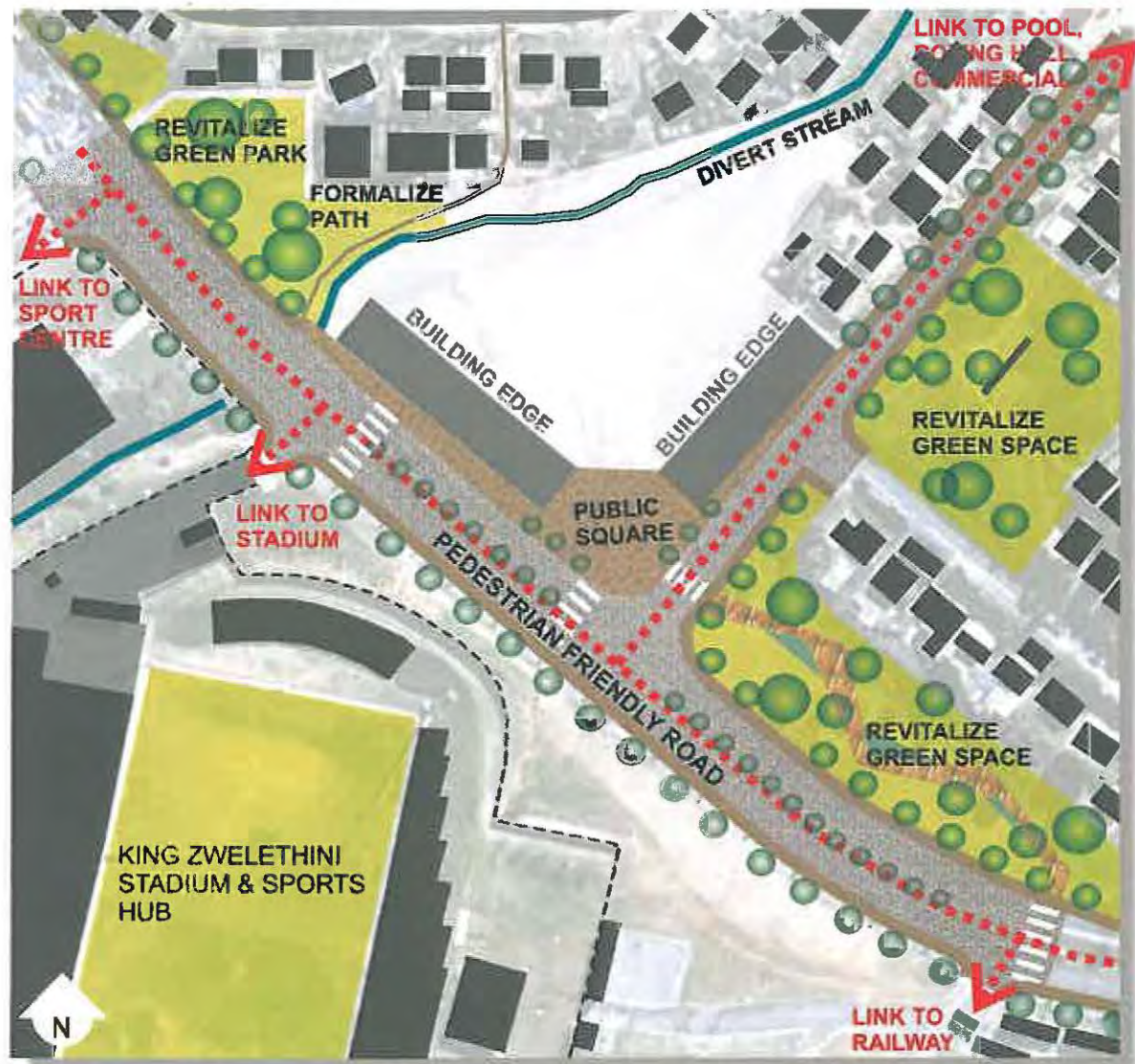


(Plate 2.4 & 2.5: Photographs reflecting current site conditions. Source: Author)



(Plate 2.6 - 2.11: Photographs reflecting current site conditions. Source: Author)

2.7 URBAN INTENTIONS



(Fig 2.14: Diagram illustrating urban design intentions. Source: *Underlay*: www.googleearth.com; *Overlay*: Author)

2.8 CONCLUSION

The theoretical study of relevant literature, its application in international and local buildings examples, as well as the analysis and conclusions drawn from the study, has provided a fitting basis for the establishment of a project description and design brief. Fundamental to this brief is that the Centre pay cognisance to the way in which children engage with their environments and learn from them. Overall, the project is intended to

provide a pleasing atmosphere for children and adults alike that illustrates the benefits of architecture designed for the senses.

By approaching architecture for children in this multisensory manner, it is anticipated that the spaces created will be well loved, well used and play a fundamental role in the developmental process of young children. The importance of involving communities and families into the developmental process of children has been acknowledged and therefore the provision of facilities for the community is included. The opportunity to enhance the social and economic sustainability of the project has been recognised and considered as essential in the context of Kwa-Zulu Natal and particularly Umlazi.

In looking at various options for the selection of a site, Umlazi was found to be relevant to the topic and a place of opportunity and necessary development of this kind. Through an analysis of the KwaMnyandu Node, numerous potential sites were identified. The site opposite the upgraded King Zwelithini Stadium was found more appropriate and most in keeping with the criteria established from the preceding theoretical discourse. Its visual prominence, accessibility and existing sensory qualities made it the most rational choice for further analysis.

The urban analysis conducted has shown the anticipated rectification of two ills in the Umlazi area. Firstly, such a facility on the chosen site would provide facilities for children who have very little space of their own to play and learn in a safe environment. This is applicable to children prior to formal schooling and those throughout their schooling career. Furthermore, accessible resources are to be made available to children in the area by the provision of a children's library.

Involving parents in the development of their children by providing services for them, one expects the importance and value of education and children's welfare to be illustrated to them. By encouraging children to remain in school and gain an education, it is hoped that the future of Umlazi's economy, in terms of employment opportunities and entrepreneurship, will improve. This will also permit the educated beneficiaries to assume leadership roles within the community.

The second ill to be changed is the lack of community facilities. The urban analysis of the greater Umlazi area has revealed the provision of facilities for the use of communities is far less than necessary. This project aims to provide such multipurpose spaces to be used by the community as needed.

The multisensory architectural approach aims at enhancing the experience had within the Centre, thereby engaging and uplifting the spirit of those who use it and ensuring it remains a part of their memories. The Centre aims to remind users of the importance of their human bodies and allow them to fully appreciate those things that engage the senses. They are to rediscover the world through the experience of the body and interact with it on a first hand level, rather than as a mere spectator.

As a final note, the Centre needs to reflect and take cognisance of the community it intended to serve. It is central that the children remain at the heart of the design process as it is essentially their development and welfare that the Centre aims to promote through multisensory architecture. Their culture, needs and way of life must be well considered to ensure the final product is socially contextual, beneficial and all-embracing.

The preceding information and conclusions drawn are intended to aid the design of an appropriate Children's Centre and Community Facility in Umlazi that is well integrated into its urban context, and economically and socially sustainable. It is to be used as a guide in the conceptual and design development of the Centre, which strives towards an appropriate response to the surrounding context, site constraints and opportunities.

CHAPTER 3
DESIGN DEVELOPMENT AND RESOLUTION

3.1 CONCEPTUAL AND THEORETICAL ISSUES

3.1.1 Introduction

The purpose of this chapter serves to illustrate how the theoretical discourse, development of a project brief and study of the urban environment has informed the design of a Children's Centre and Community Facility in Umlazi. This illustration begins with an understanding of the conceptual framework which has informed and led to the development of an actual building. The urban design scheme surrounding the proposal is illustrated and detailed design drawings follow. The technical resolution of a portion of the building as well as significant details serves to demonstrate the viability, practicality and constructability of the Centre within its urban context. The chapter concludes with a study on the environmental impact of the building and highlights the pertinent aspects of sustainable architecture considered within this urban and architectural design.

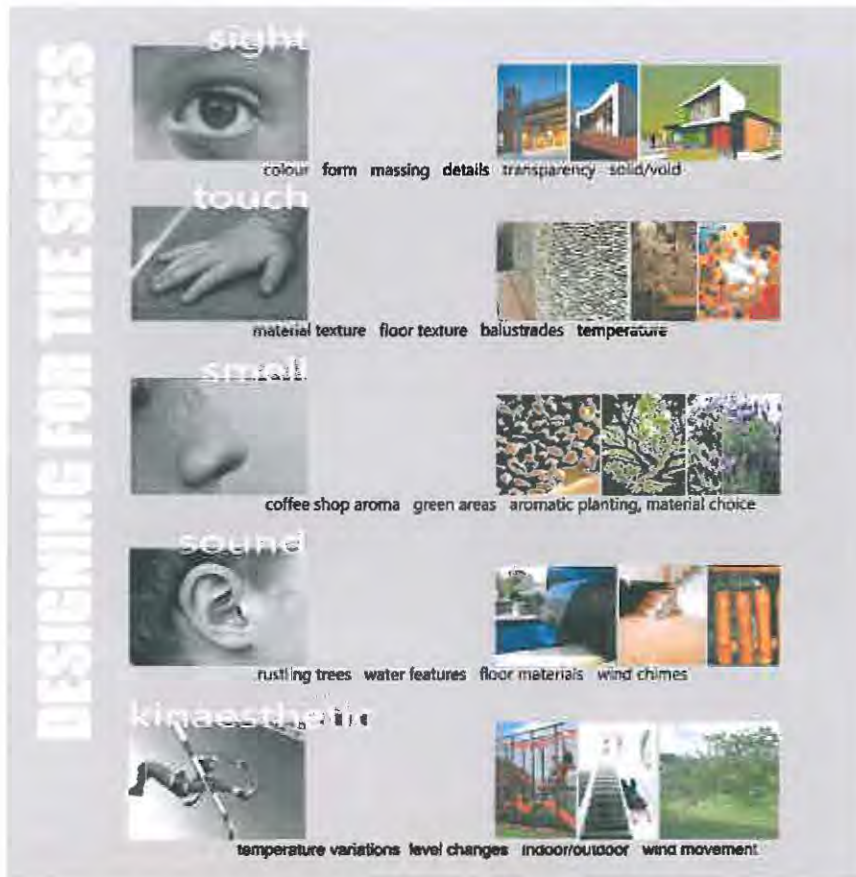
3.1.2 Concept Developments

In terms of conceptual thought, the over arching intention is for the Children's Centre and Community Facility to illustrate the research findings which suggest that sensory stimulation is an important design tool, not given enough recognition in contemporary architecture. The benefits of such sensory architecture are numerous in terms of public perception and experience and should be considered in all future design projects. This building is to demonstrate how every architect and every project can improve the human experience through architecture. The findings also suggest that the sensory experience had by children is significant in terms of their development, learning, psychology and place making. The design of this facility is to demonstrate these finding by creating not just a functional building, but also a sensory experience specifically designed to enhance the architectural experience had by all. The sensory approach further serves to create an environment beneficial and developmental appropriate for children to enjoy.



(Plate 3:1: Conceptual collage illustrating aspects of design for children and inspirational pictures. Source: Various & Author)

The concept for this building is drawn from the theoretical study undertaken of sensory architecture and its significance in terms of the human experience of space, particularly in relation to children. In all precedents, case studies and current literature, what has emerged is the finding that ‘good’ architecture that responds to the senses is not necessarily that which overloads the body through the stimulation of the senses. Rather, ‘good’ sensory architecture happens when designers pay attention to the sensory experience, empowering them to use this knowledge to intentionally invoke and direct mood, emotion and experience. The term *Oasis of Sensory Experience* is used as the intention is for the Children’s Centre and Community Facility to become a place of sanctuary and source of life within the community it serves. The building is a place designed to have a healing, uplifting and restorative effect on the people that occupy it. Much of this concept is reliant on details and texture and the design of individual spaces, thus, the thought process and detailing of certain significant areas has been shown in the architectural drawings which follow.



(Plate 3:2: Conceptual collage illustrating aspects of sensory design and inspirational pictures. Source: Various & Author)

Within this 'sensory oasis', everyday aspects of the architectural experience are made unique. That which is usually commonplace is seen in its ability to become a multifaceted, memorable and extraordinary experience. The question asked is: how can this space/wall/balustrade/corner become more than a purely functional element and impact the human experience in a positive way? In this frame of mind, a stair is no longer viewed as a purely a functional change in level; rather, it is a loose part in the environment that can assist in vertical movement while also being a unique experience that engages the sensory modes. A wall is seen not purely as a boundary of space; it as a defining element that can engage the eye, hand and kinesthetic sense.

3.2.3 Architectural Design Drawings

The following pages document the architectural design drawings of the Children's Centre and Community Facility.

Photographs of the physical model and sensory sample board constructed follow these pages along with the technical resolution and detailing of the proposed project.

A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi.

DESIGNING FOR THE SENSES

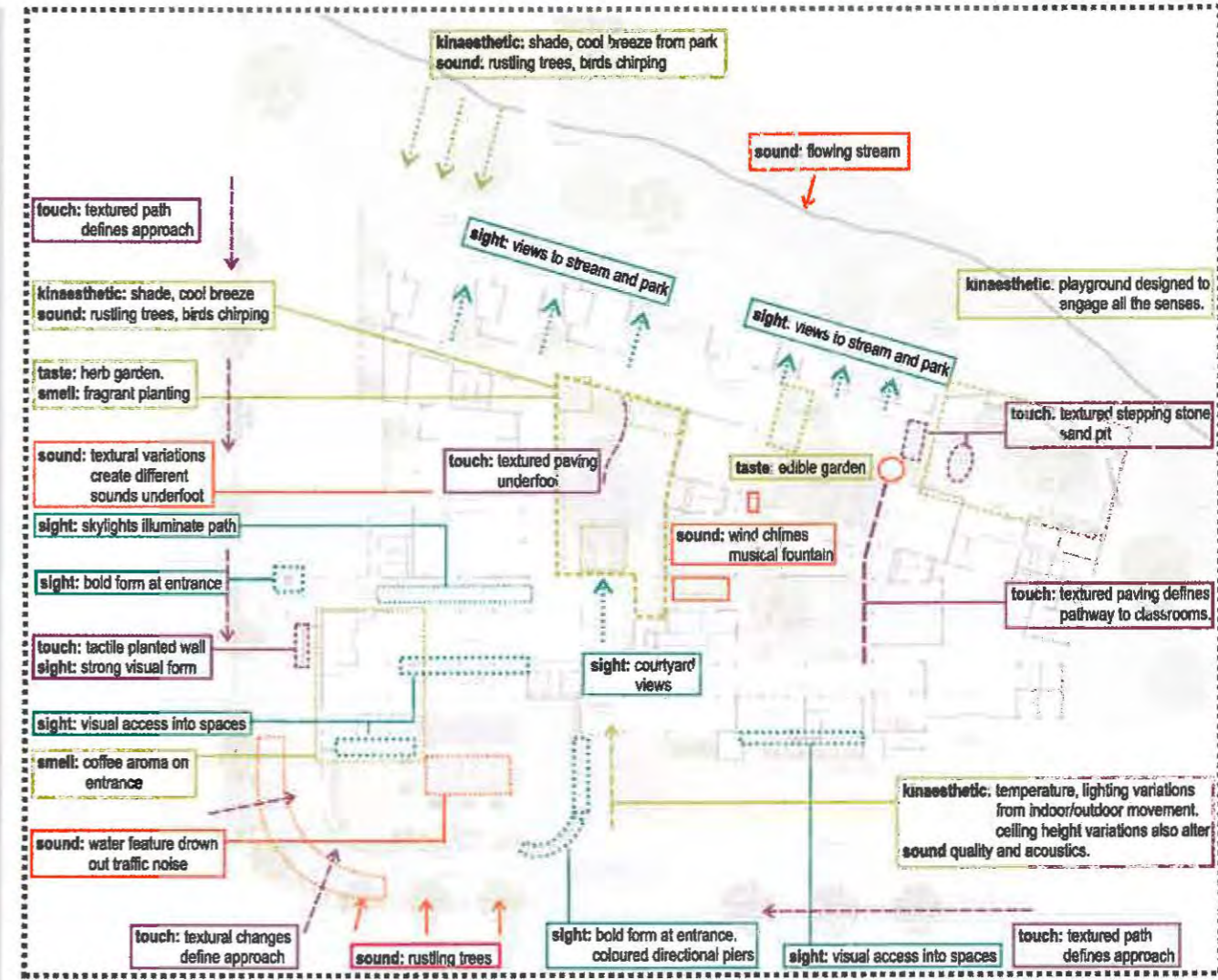
DESIGNING FOR CHILDREN



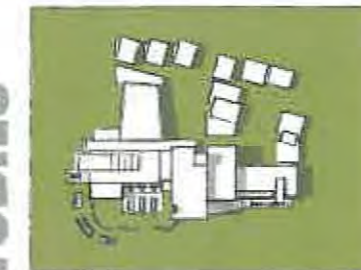
DESIGN GENERATOR SKETCHES



SENSORY ANALYSIS



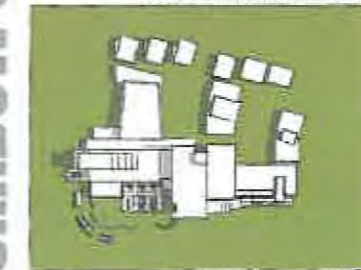
SHADOW STUDIES



SUMMER AFTERNOON



WINTER AFTERNOON



SUMMER MORNING



WINTER MORNING



The study of sensory stimulation as an architectural design generator...

A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi.

GROUND FLOOR PLAN



DETAIL PLANS

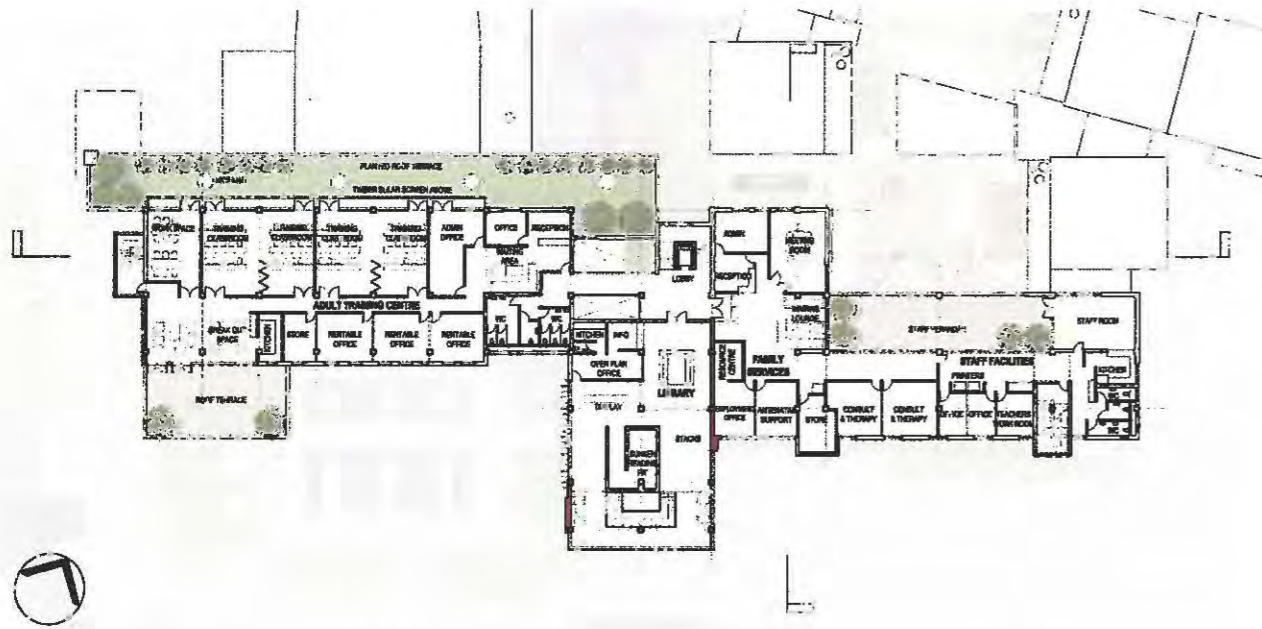


The study of sensory stimulation as an architectural design generator...

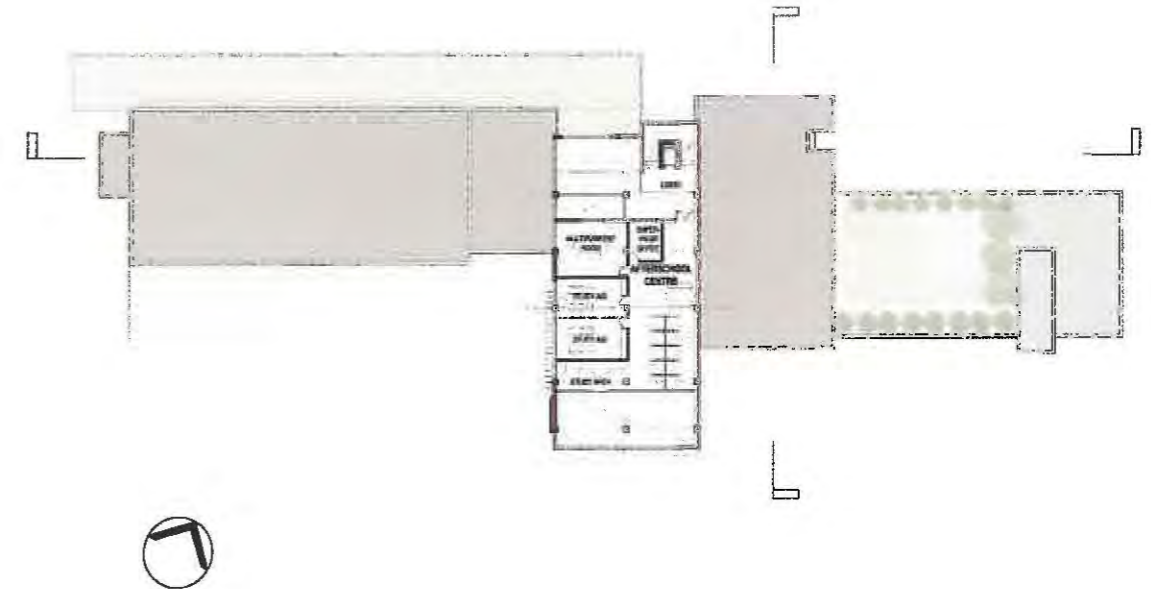
A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi

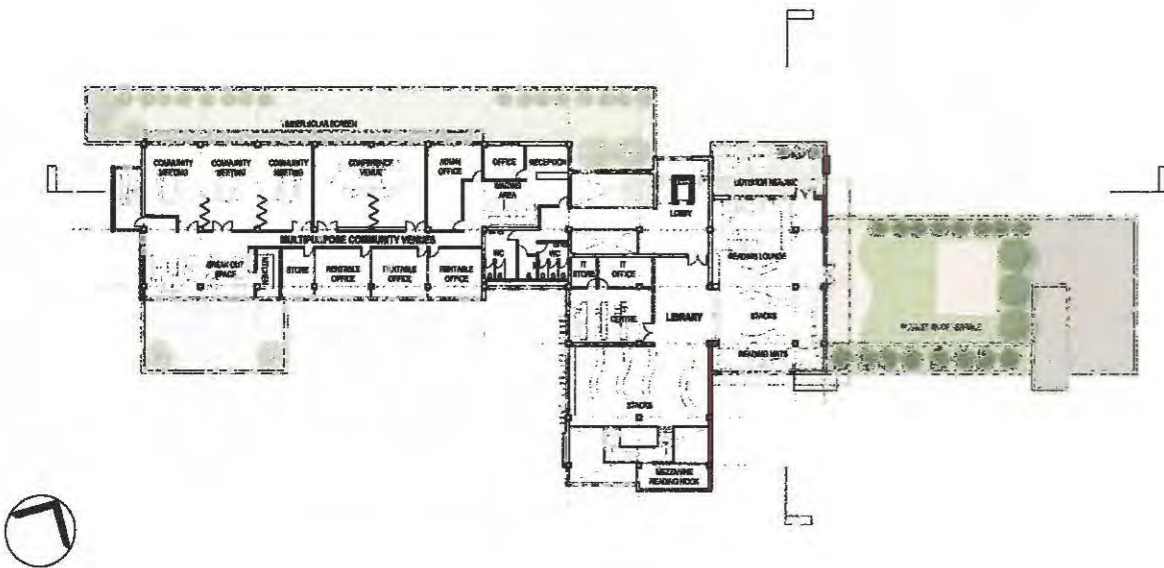
FIRST FLOOR PLAN



THIRD FLOOR PLAN



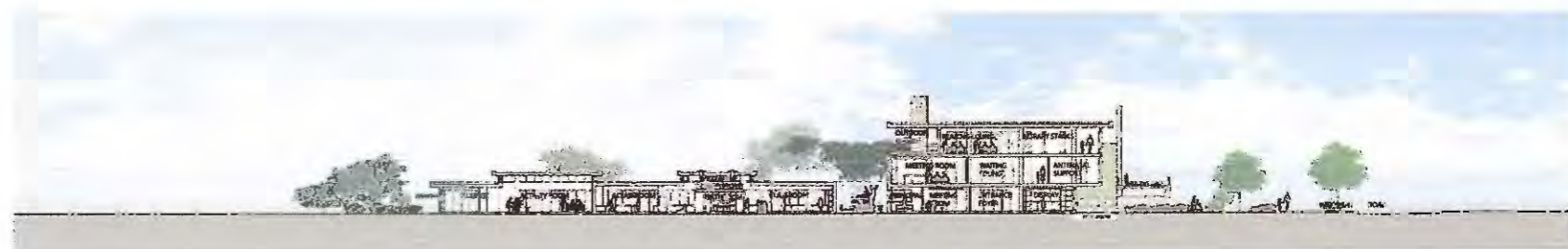
SECOND FLOOR PLAN



LONGITUDINAL SECTION



CROSS SECTION



The study of sensory stimulation as an architectural design generator...

A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi.

SOUTH ELEVATION



NORTH SECTIONAL ELEVATION



WEST ELEVATION



SOUTH ELEVATION



3D RENDERS



SOUTH EAST VIEW



COURTYARD VIEW



The study of sensory stimulation as an architectural design generator...

A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi.

3D RENDERS



SOUTH WEST VIEW



PLAYGROUND VIEW



SOUTH VIEW



INTERIOR RENDERS

CHILDREN'S BATHROOM VIEW



The study of sensory stimulation as an architectural design generator...

A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi.

INTERIOR RENDERS CONT...



CLASSROOM VIEW 1



CLASSROOM VIEW 2



COFFEESHOP VIEW 1



COFFEESHOP VIEW 2

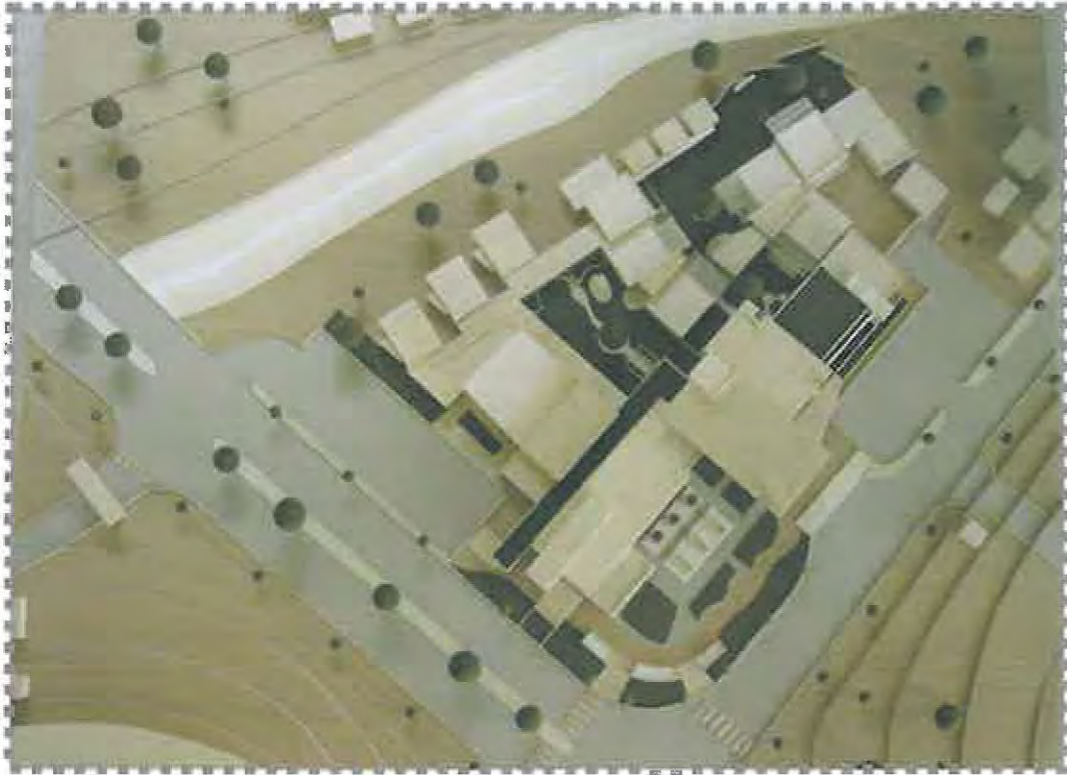


The study of sensory stimulation as an architectural design generator...

A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi.

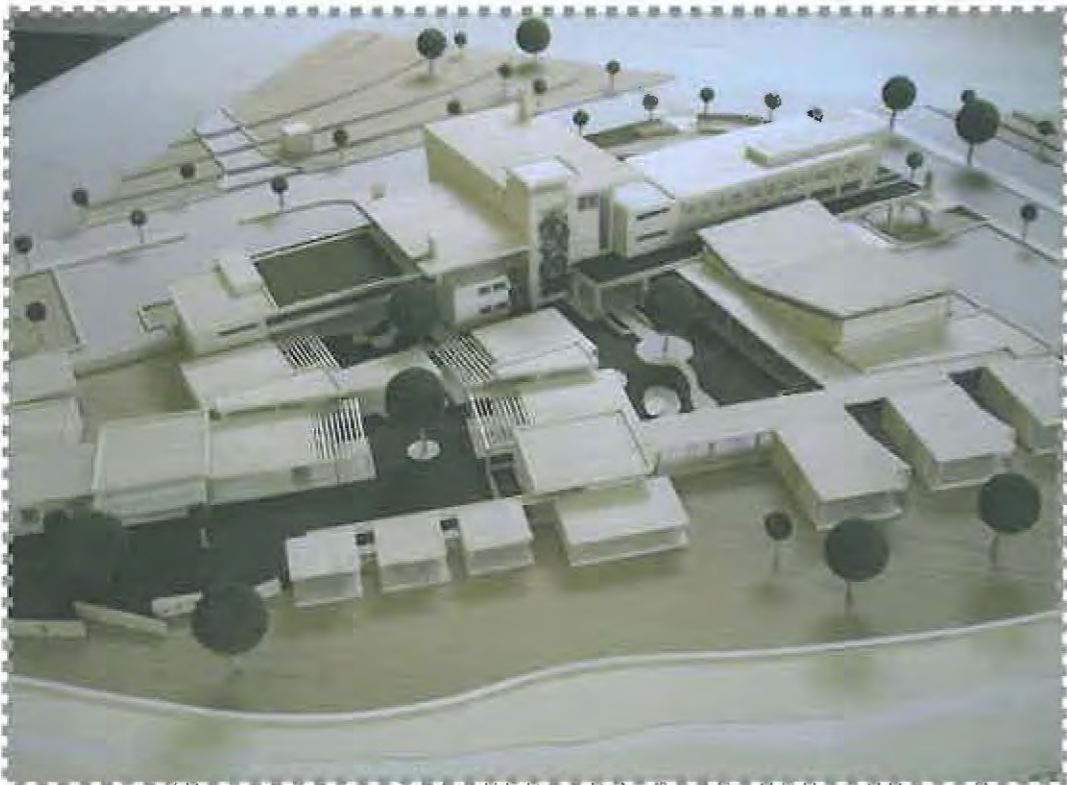
PHYSICAL MODEL



AERIAL VIEW



SOUTH WEST VIEW



OVERALL VIEW



NORTH EAST VIEW

SENSORY SAMPLE BOARD

CHILDREN'S WINTER CLASSROOM



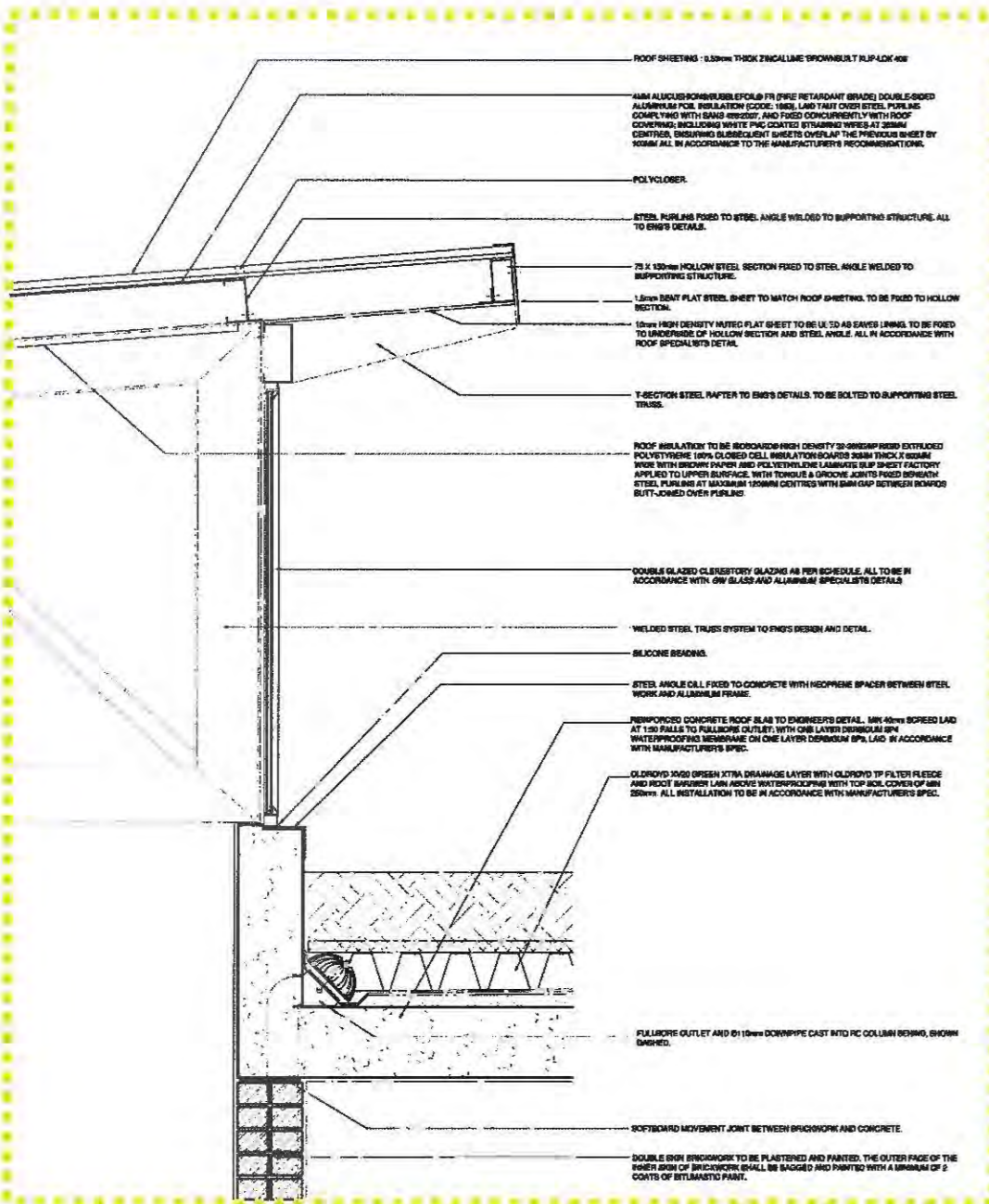
COFFESHOP AND EXHIBITION SPACE



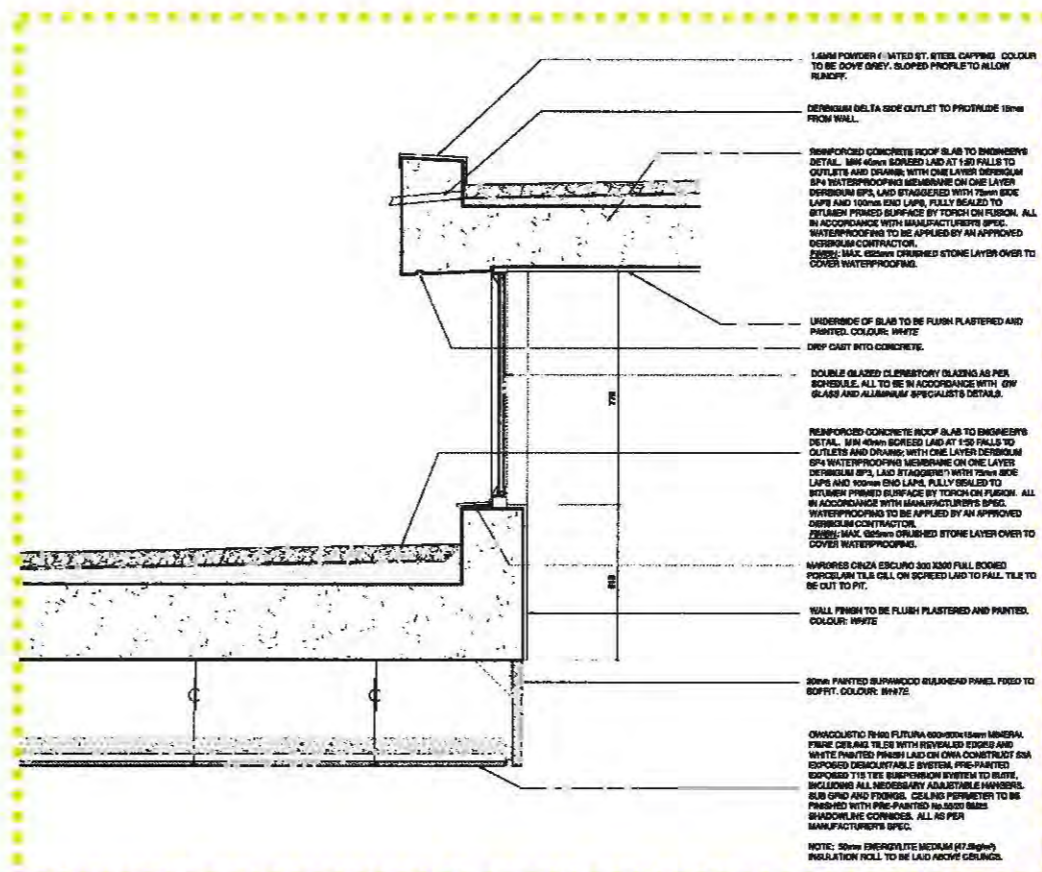
A CHILDREN'S CENTRE AND COMMUNITY FACILITY

For the KwaMnyandu Node in Umlazi.

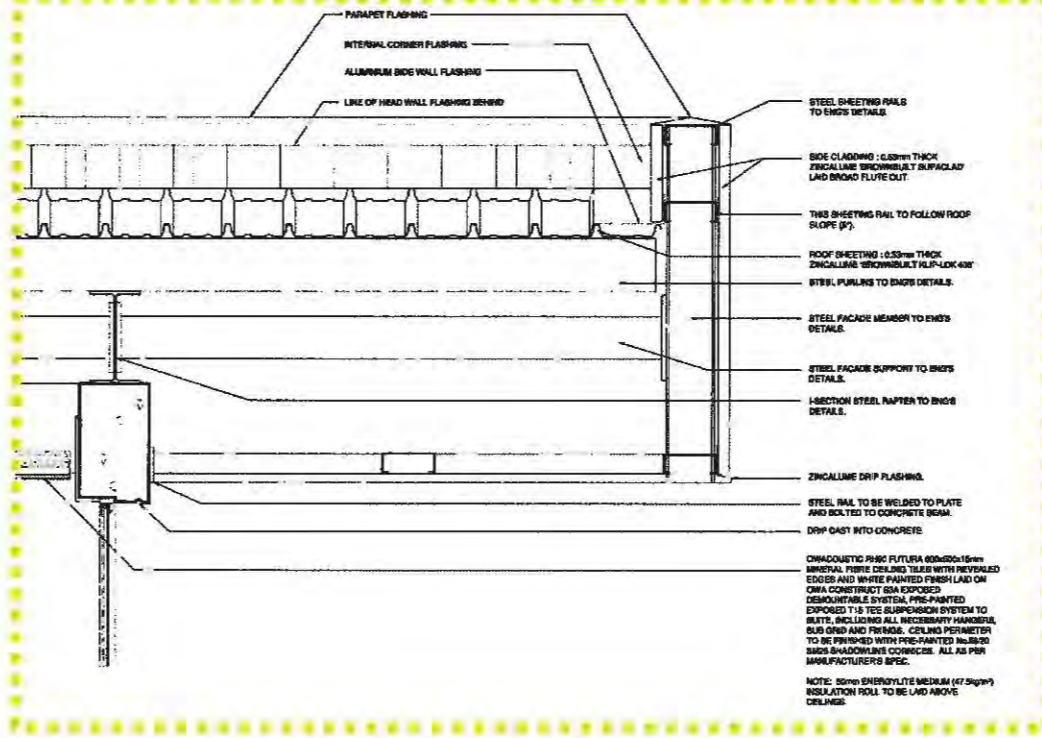
TECHNICAL DETAIL 1



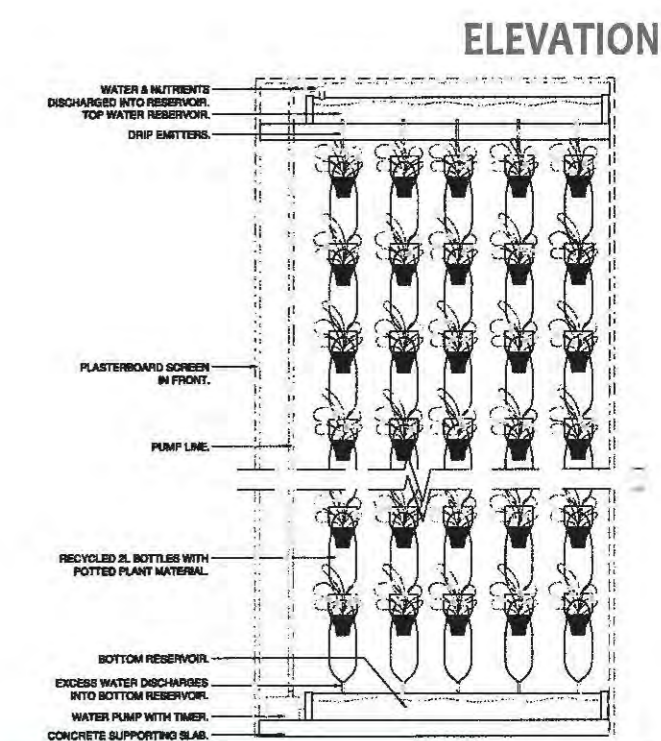
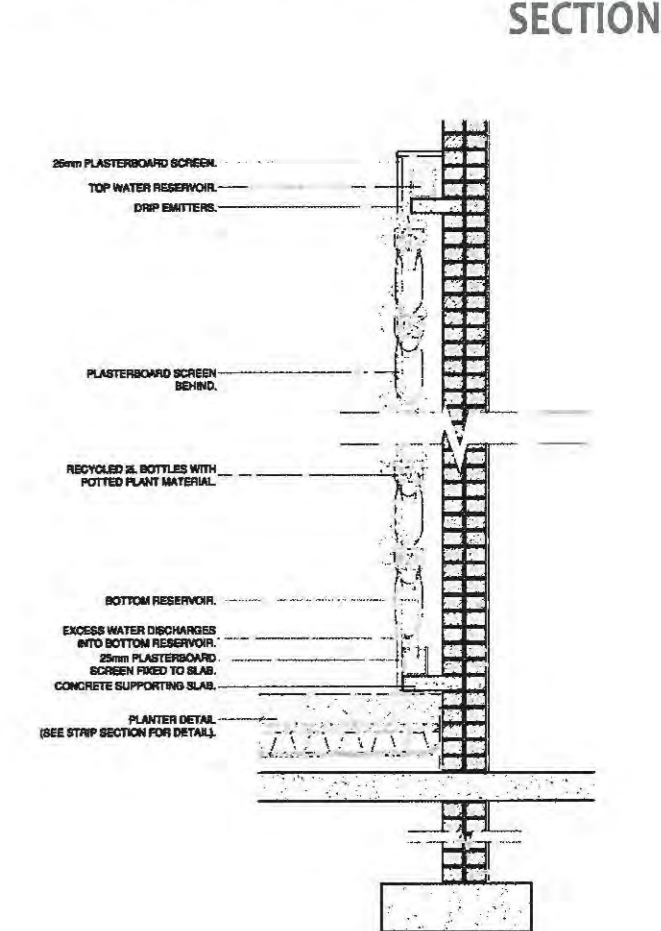
TECHNICAL DETAIL 2



TECHNICAL DETAIL 3



TECHNICAL DETAIL OF VERTICAL GARDEN



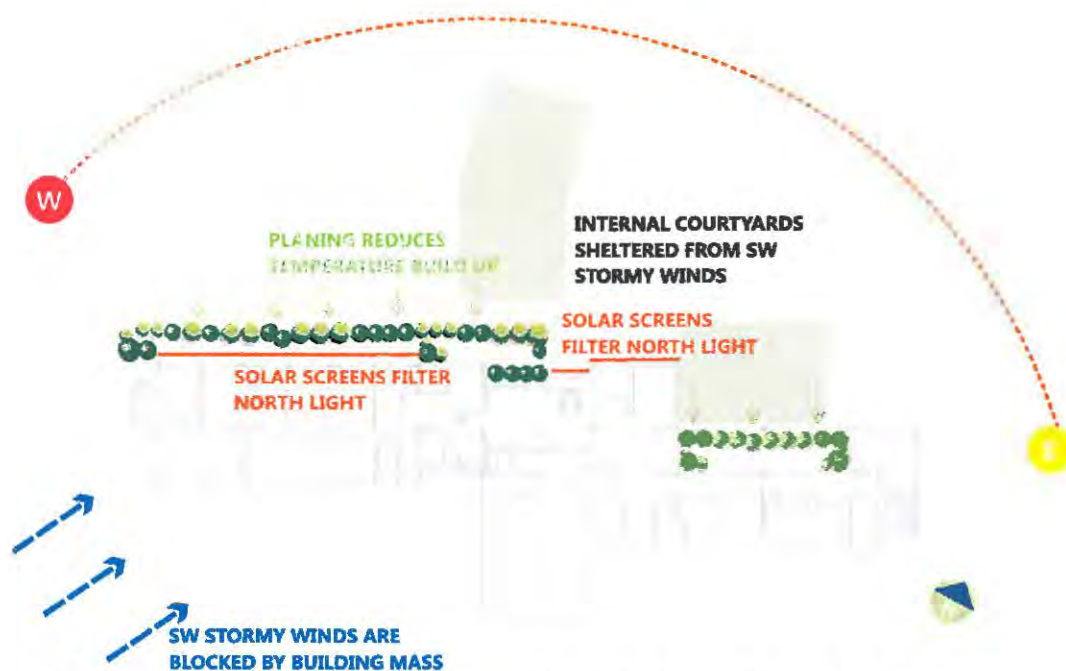
3.4 ENVIRONMENTAL STUDY

This environmental study serves to illustrate a few pertinent aspects related to sustainable architecture that have been considered within this urban and architectural design. The intention in raising attention to these issues is to achieve healthier and more environmentally friendly working and living conditions for the Umlazi community.

3.4.1 Sustainable Architecture

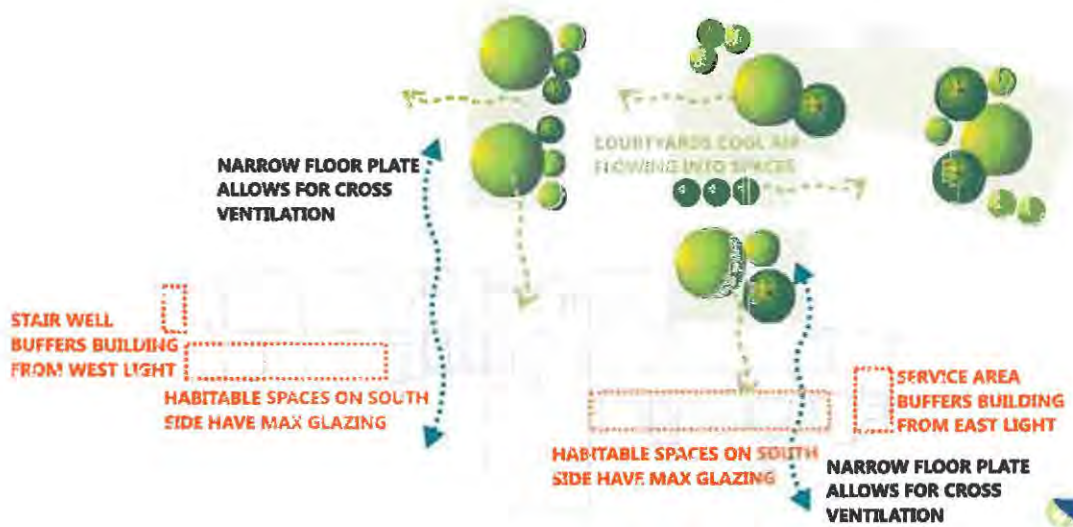
The main goal of sustainable architecture is to minimise the overall environmental impacts of a building throughout its life cycle. Within the Children's Centre and Community Facility, aspects of sustainable architecture considered are highlighted below:

Orientation: The majority of the building is orientated north where, although there is much direct sunlight, its altitude is high making it easier to shield against, and allowing more pleasant filtered light to enter. The light entering on the north side is filtered through solar screens. Planting on this side of the building also reduces temperature build-up. The main building shields the remainder of the site from intermittent SW stormy winds creating more pleasant outdoor courtyard and living spaces.



(Fig 3.2: Diagram illustrating orientation, solar screening devices and planting. Source: Author)

Planning: In terms of planning, east and west sides of the building are buffered with unconditioned spaces such as ablutions, stairwell, stores etc... Frequently used, habitable spaces are placed along the south side and are given maximum lighting through glazing. Floor plates are kept narrow to allow for natural cross ventilation. This cross ventilation often happens via surrounding courtyard spaces. These spaces create naturally cool areas which filter into the building thereby reducing the need for mechanical ventilation. The need for mechanical ventilation is further reduced by cavity walls which act as thermal insulators, keeping heat out during summer and retaining heat during winter.



(Fig 3.3: Diagram illustrating planning guidelines and cross ventilation via courtyards. Source: Author)



(Fig 3.4: Diagram illustrating insulated cavity walls used. Source: Author)

3.4.2 Sustainable Technology

Sustainable technology focuses on technologies which use less energy, minimize the use of limited resources, are conscious of the environment and do not harm it and can be re-used or recycled at the end of their functional life. The Children's Centre and Community Facility strives to use appropriate technology which is suitable for the Umlazi context and takes into account the needs of the people. The use of sustainable technology includes the following:

Water saving: Large roofed areas and paved areas provide the potential for rain water collection. Rain water is stored in underground tanks and can be used for the irrigation of courtyards and permaculture garden, as well as grey water for the flushing of toilets. To further reduce reliance on municipal water use, water saving aerated fixtures are used in all ablutions and low flush toilets are set with a flush cycle time at 6 Lt per minute.



(Fig 3.5: Diagram illustrating insulated cavity walls used. Source: www.regencyirrigation.com)

Alternative energy: Alternative energy sources include solar water heating, hydro power from the water flow in the stream and energy harnessing playground equipment. Generated energy is stored in batteries and used for the running of lights, fans and equipment with low energy consumption.



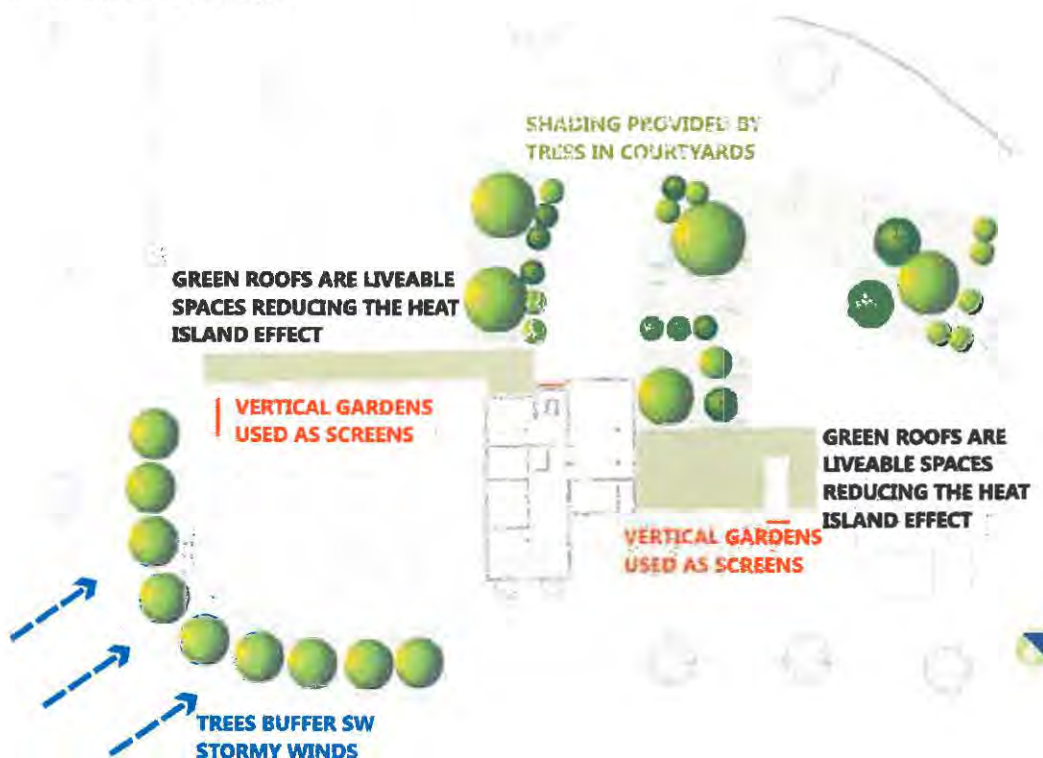
(Fig 3.6: Diagram illustrating insulated cavity walls used. Source: www.cnx.org. Plate 3.4: Photographs showing energy harnessing playground equipment. Source: www.jazmynjourneys.blogspot.com, www.inhabitots.com)

Energy use is to be reduced through the use of energy saving lighting options. These include photosensors to automatically adjust the brightness of artificial lighting as daylight levels shift. Furthermore, all external lighting is to be photosensored to minimise energy wastage during the day.

3.4.3 Sustainable Landscaping

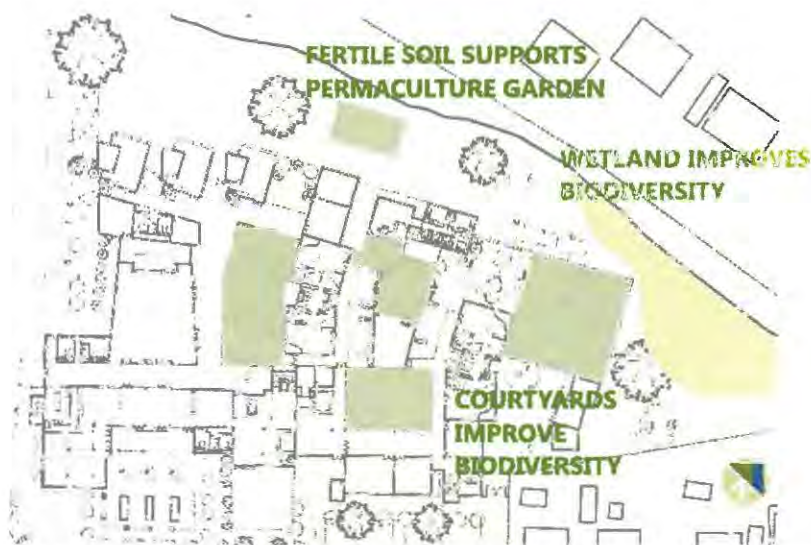
Sustainable landscaping is defined as an area of green design concerned with the planning and designing of outdoor space. Sustainable landscaping is to be considered as having the same level of important as sustainable building practice and has been incorporated into the design of this facility in the following ways:

Planting: The planting of vegetation has been considered as an effective solar shading and wind protection device. Trees planted along the South West edge of the site reduce the SW wind exposure. Trees provide natural shading in courtyard areas. Green roofs provide natural sound and temperature insulation as well as reducing the heat island effect. They provide for maximum use of the building by becoming liveable, usable spaces which convert carbon dioxide into oxygen. Vertical gardens are used as screening devices particularly useful on the north facade as they naturally cool and filter air entering the building.



(Fig 3.7: Diagram illustrating planting as effective solar shading and wind protection devices. Vertical gardens used as screens and green roofs provide liveable spaces. Source: Author)

Biodiversity: The biodiversity on site is improved by the rehabilitation of the wetland area upstream. The stream also allows for the planting of a permaculture garden along its fertile edge. The use of indigenous planting which is suited to the region, climate and orientation is considered so that little maintenance and upkeep is required.



(Fig 3.8: Diagram illustrating improvement of biodiversity through wetland revitalisation and permaculture gardening. Source: Author)

3.4.4 Social sustainability

Social sustainability refers to architectural design which has the ability to influence the way social groups interact within the environment. The Children’s Centre and Community Facility strives to create pleasant spaces which encourage interaction and social activity. This is likely to improve the social health of Umlazi. The provision of facilities for the entire community, from the very young, to very old, creates a holistic environment that is welcoming to all.

3.4.5 Economic sustainability

The final component considered within this section is economic sustainability. This refers to the preservation and enhancement of the economy for future generations. The Children’s Centre and Community Facility aims to achieve this through the creation of employment opportunities, entrepreneurship promotion, skills training and better education. It is anticipated that the provision of this facility will improve the livelihood of the community by advancing their quality of life and improving their ability to positively contribute towards economic growth in Umlazi.

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