feel + learn + heal

A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC

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abstract

Although human beings continuously learn through their experiences and impressions, the most important years in determining all the actions and decisions which will be made in life, are during childhood.

In designing spaces for children, their perception of the built environment and interaction with their surroundings needs to be understood in terms of the influence that elements of architecture and the landscape have on their sensorial and motoric actions as well as social activities.

FEEL + LEARN + HEAL, the subject of this dissertation, is a centre for childhood development and an ambulatory clinic, which will demonstrate how built environmnets enhance perceptual experience by means of sensory stimulation and healing environments. The study area is located on the urban edge, north east of Pretoria's Central Business District and forms a gateway into the city at a large intersection, where Boom, Southpansberg, Dr. Savage and du Toit Street intersect.

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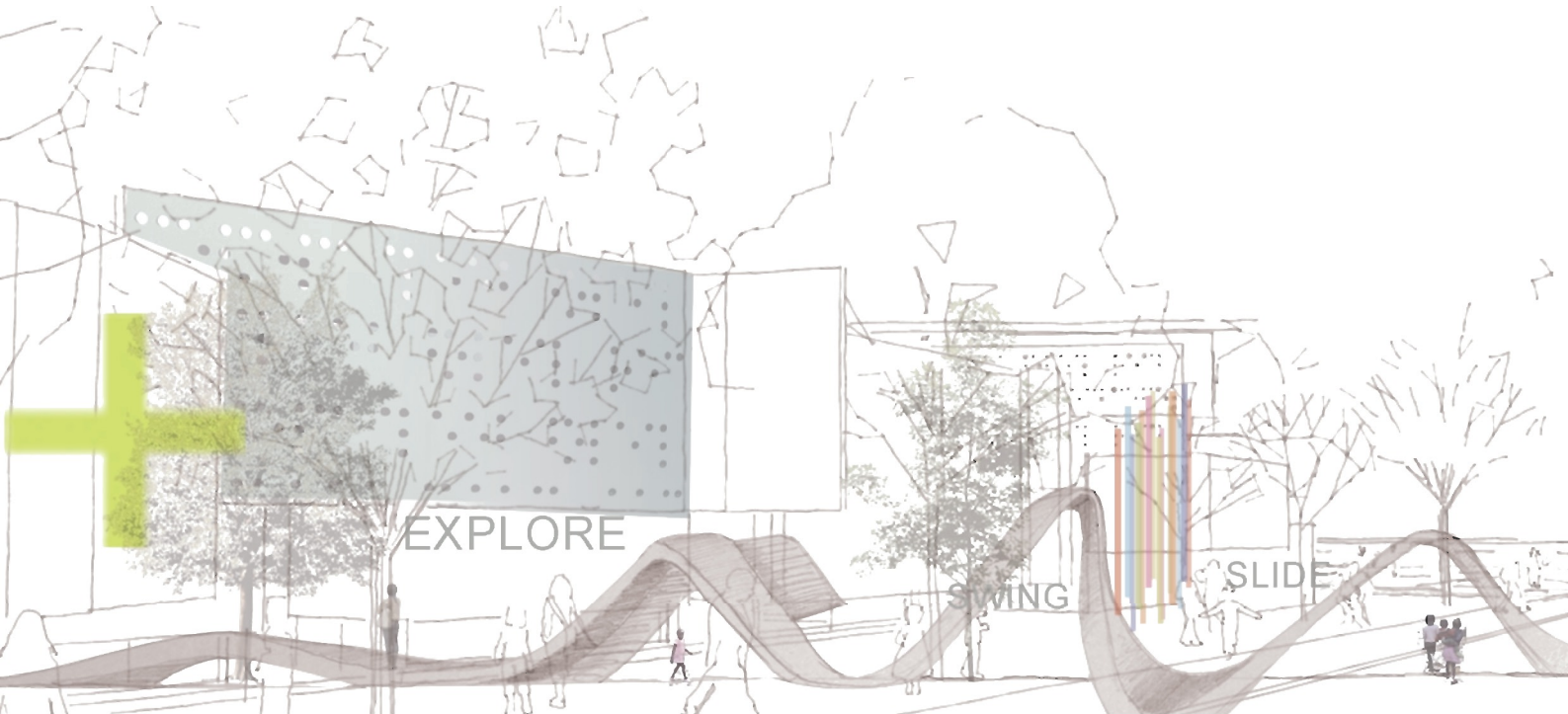
To God, the architect of my life, for this opportunity and inspiration in everything I do. My mother, for all the love and encouragement, I dedicate this in your loving memory. To my father, for being my voice of reason, my steadfast support and for always believing in me. To Gary and Jacques, for the endless guidance and understanding. Thank you to all my family and friends, for the love and loyal support.

introduction



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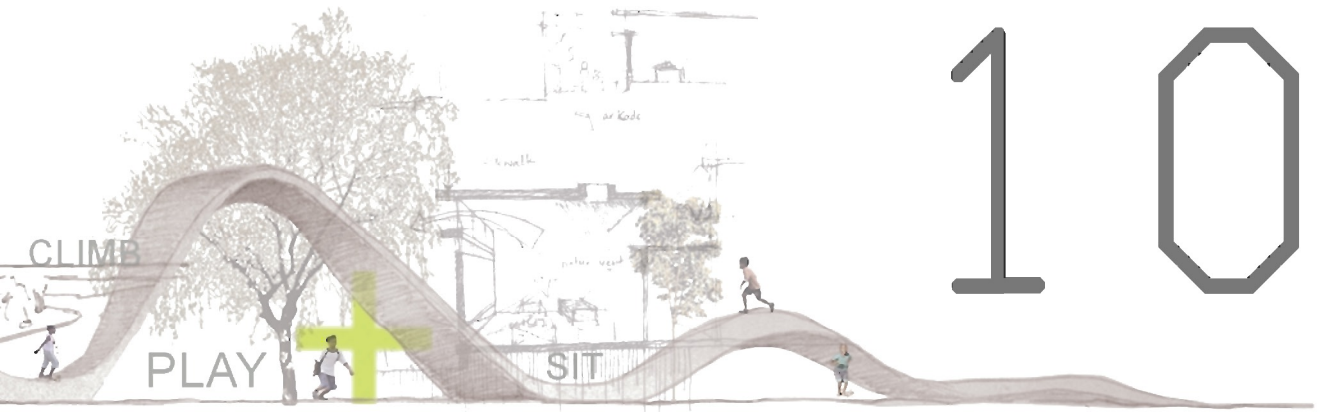
feel + learn + heal

A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC

BACKGROUND AND CONTEXT
REAL-WORLD PROBLEM
PROJECT SIGNIFICANCE
SITE & SPECIFIC PROBLEM
RESEARCH QUESTION OF PROJECT
AIMS OF THE DESIGN
INFORMATION NEEDED
DESIGN PROBLEM
RESEARCH METHODOLOGY
LIMITATIONS TO THE PROJECT
THE CLIENT
USER PROFILE



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introduction

THIS DISSERTATION WILL INVESTIGATE THE REQUIREMENTS AND DESIGN OF A NEW CHILDREN'S AND YOUNG PEOPLE'S CENTRE AND DAY CLINIC IN THE PRETORIA INNER CITY.

background and context

Environmental and architectural psychology that influence design thinking will be investigated, looking at the physical and behavioural effects that environments have on children and applying it to the design of a centre where this knowledge can be disseminated.

Spatial and material quality of the design proposal and the affect of spaces on children, is investigated to discover which spaces enhance the sense of place and well being in built environments.

Other fields that will also be explored include educational aspects and sustainability issues . A trans-disciplinary approach is used, integrating the knowledge of childhood development, architecture, interior and landscape architecture.

illus 1.1

Real-world problem to be addressed

This dissertation will look at the problems faced in the public health care sector in South Africa, primarily focusing on the inadequacy and poor conditions of current state facilities and thus looking at possible integrated solutions that will contribute to the civic character of the city.

"Hospitals and other healthcare buildings are a textbook opportunity to define what a healthy building is. As the civic institutions that not only treat illness but also restore health, they are exemplars for reframing conventional assumptions that determine not what buildings are, but what buildings could and should be" (Guenther &Vittori, 2007: [17]).

A shortage of competent and qualified health personnel contributes to inadequate health care. The South African Human Rights Commission's (SAHRC) public hearing indicated that health institutions are severely understaffed and experience difficulties retaining existing staff members. The Department of Health should focus on retention strategies that include improving working conditions for health personnel, especially safety and security highlighting the non-monetary incentives that the department provides (SA, 2009: 35-39).

"In South Africa child survival warrants urgent attention because children continue to die at an unacceptably high rate from largely preventable causes" (Proudcock, 2007: 49).

project significance

Health care facilities for children in South Africa very often lack the understanding of children's perception of the built environment, and this study wishes to create greater awareness around design mechanisms that can be put into practice to positively affect children's cognitive development, social cohesion and health. A paediatric health care facility that can cater for the developmental needs of children is seen as the basis of this field of study, and a place where significant changes can be made.

Access to health care services, especially to the poor, is severely constrained by expensive, inadequate or non-existent transport and long waiting times at clinics and other health care service providers. These constraints amount to a denial to access health care for some of the poorest and acerbate existing vulnerabilities of marginalised groups and individuals within our country (SA, 2009: 56).

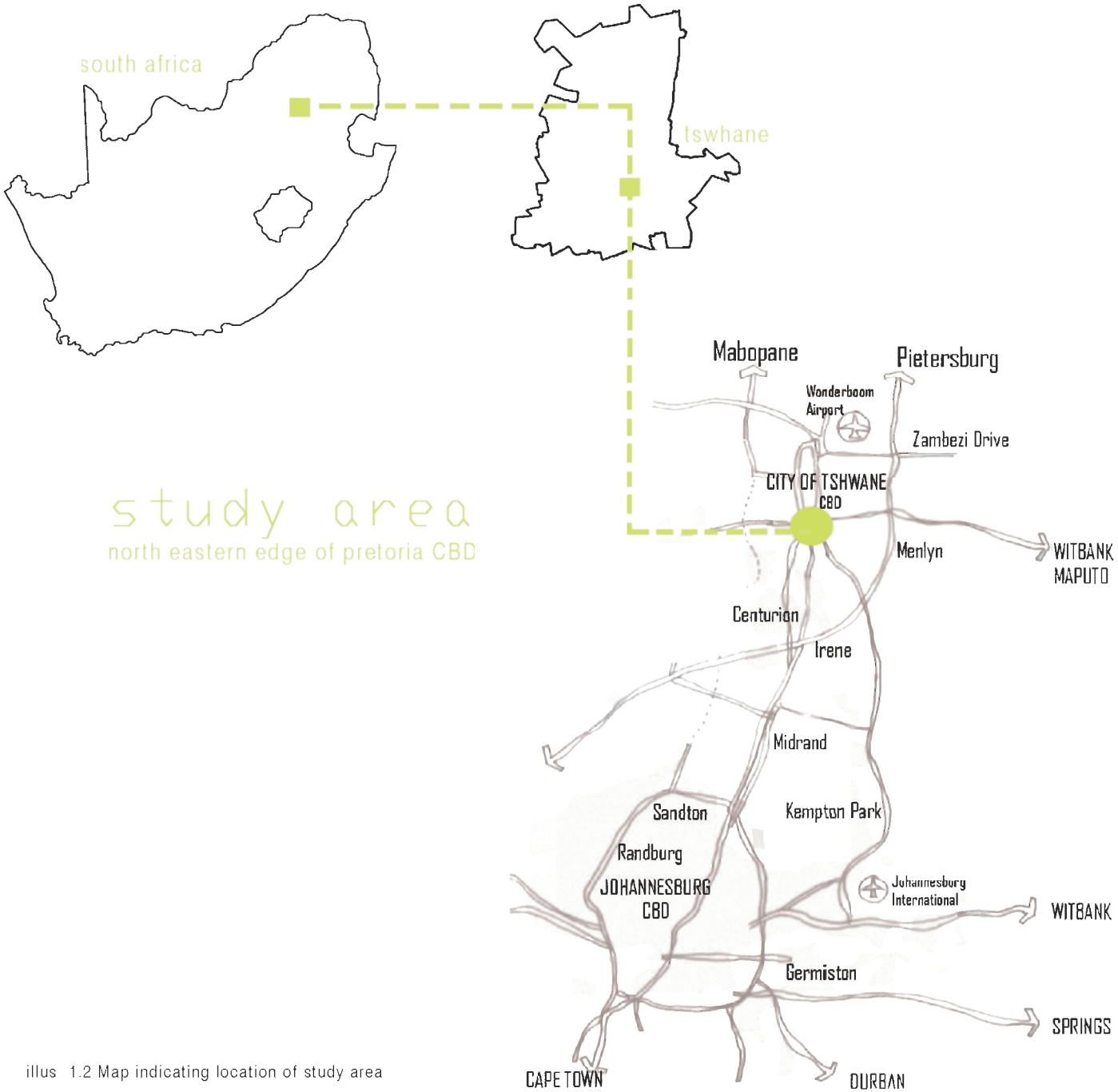
site specific problem

This project will be an exploration and investigation into the way that architecture is experienced; the effect, subconsciously and consciously, that architecture can and should have on the everyday user in enhancing perceptual experience by means of sensory stimulation.

The study area is located on the urban edge, north east of Pretoria's Central Business District and forms a gateway into the city at a large intersection, where Boom, Southpansberg, Dr. Savage and du Toit Street intersect. Traffic flow is heavy in this area, with routes going to and from the northern suburbs of Pretoria and Mamelodi Township.

The study area has become defragmented from the CBD, and an opportunity to re-connect this site with the dense urban fabric of the city through an architectural intervention will improve the experience of the public domain and quality of life within the inner city of Pretoria. Architecture forms part of the city and should thus be approved by the public and form a shared vision. Public awareness of architecture and the spaces that shape our lives should be aimed at.

The Dr. Savage Taxi Rank as well as the Blood Street Taxi Rank create high accessibility to the site, and encourage heavy pedestrian movement in this area. Accessibility is key to the success of the project and will encourage the everyday user to become involved in the activities at the centre.



illus 1.2 Map indicating location of study area

research questions

• How do spaces children inhabit, influence or affect how they experience the built environment and more specifically; how can our surroundings be improved in order to aid in mental and physical stimulation or recovery?

• What is the current approach to designing spaces for children and should it perhaps be re-evaluated?

• Can children's cognitive development be improved or enhanced through their surroundings, natural or man-made, and if so, are there specific systems that can be introduced for a range of building programmes?

The Theoretical Discourse will thus focus on the intangible dimensions related to architecture such as experiential psychology, and look at ways to respond to the outcomes with tangible proportions.

aims of the design

This project aims at creating awareness around designing spaces for children, targeting their senses, intellect and creativity.

It also aims at providing an architectural response which supports development and perceptual development in early childhood.

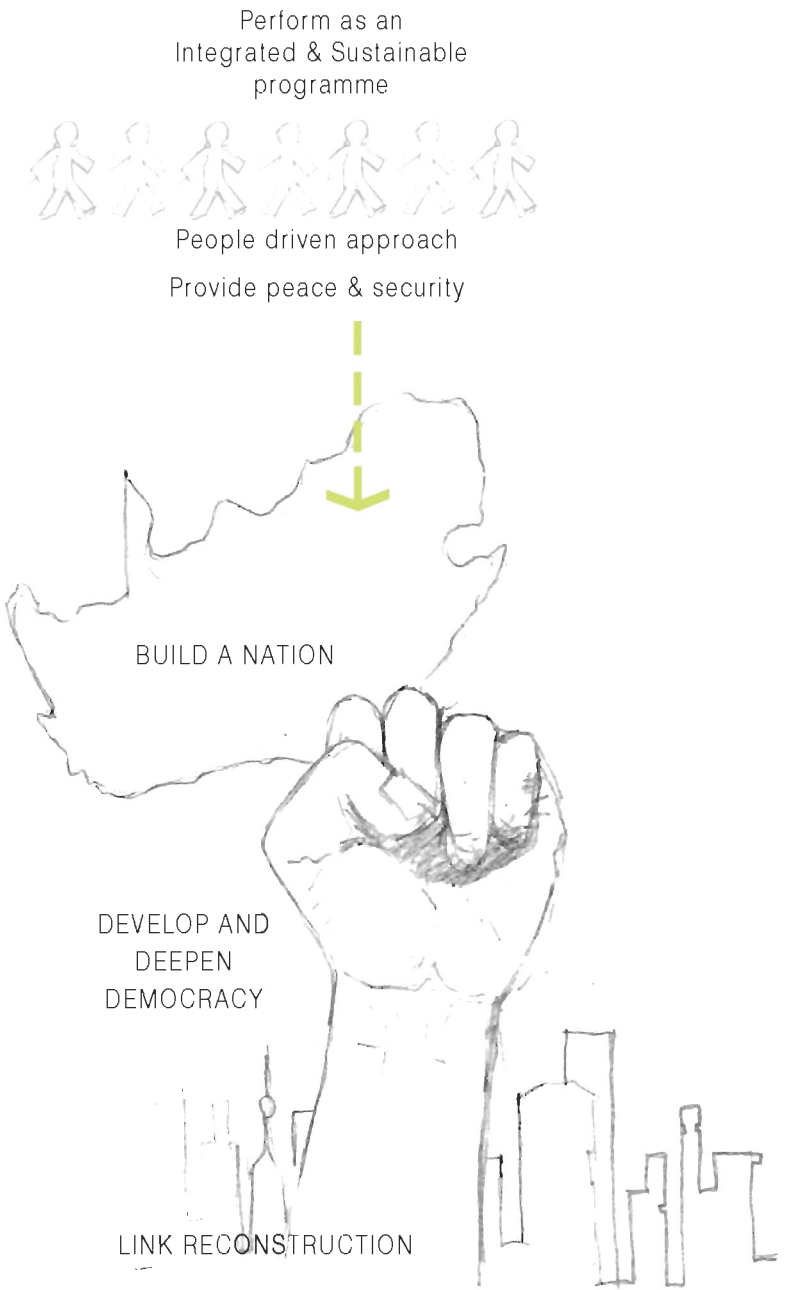
information required

Technical information regarding the design of an ambulatory clinic is of crucial importance and the expertise of various health care practitioners as well as specialists in the design field of health care facilities will be employed.

"Our surroundings influence not only the way we think but our intellectual development" (Salingaros, 1999).

design problem

Designers have the ability to influence the community by manipulating the space experienced by a person. The act of creating, manipulating or destroying form, can alter the human psyche. The world is shaped by thoughts and aspirations of architects, using their own thoughts, experiences and opinions. The six basic principles set out by the Reconstruction and Development Programme of the South African Government are: to perform as an integrated and sustainable programme, a people driven approach that aims to provide peace and security for all, to build the nation, link reconstruction and development, as well as ultimately deepen democracy in the fabric of our society (Munslow & Fitzgerald, 1995: 42). The responsibility lies with the architect to not only reflect on an existing society, but to propose a vision for a new society. A clear understanding of the current user needs to be established, keeping the needs of this society in mind, in order to design spaces that provide tangible solutions to intangible problems.



illus 1.3 The six basic principles set out by the Reconstruction and Development Programme of the S.A. Government

research methodology

The proposed research methodology to be followed is the analytical survey method that will attempt to describe and explain why certain situations exist. In this approach two or more variables are usually examined to test the research hypotheses. The survey will be conducted to establish the patient's sensory experience of current health care facilities and how this spatial experience can be improved through humanistic design approach.

The system approach illustrated below will be used as part of the research and design development strategy.

The design methodology will proceed to:

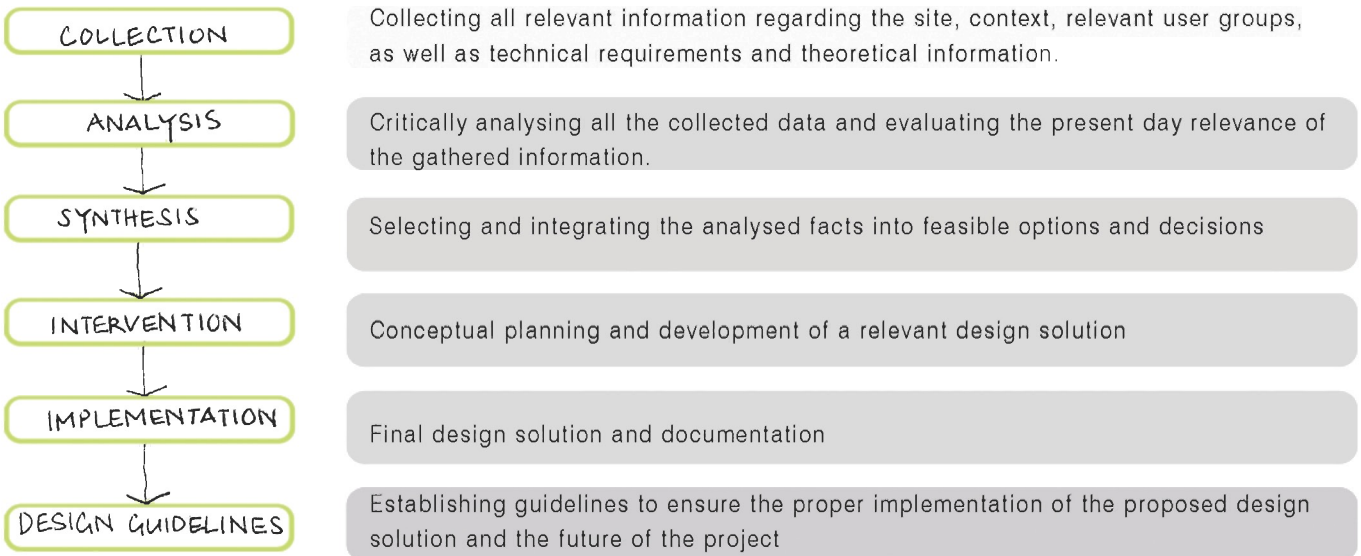
-Identify the functions/activities relating to humans

-Analyze the experiences relating to humans

-Translate these into architectural form

limitations to the project

The extent of design and programme of the building and its technical nature will be limited by the time constraint placed on this project, and is narrowed down to an ambulatory or day clinic with provision for outpatient wards and allied services centre. Therefore the study will include services only necessary to facilitate procedures carried out at such a clinic and will not include inpatient and intensive care wards. Patients treated at this clinic will be discharged on the same day of surgery or consultation. This clinic hopes to relieve day-patient numbers at the Steve Biko Academic Hospital, where patients can only be seen on a referral basis.



illus 1.3 Proposed research methodology

user profile

The user profile consists of an infant or young patient and parent/guardian supporting the child, administrative and medical staff members that are employed by the Department of Health.

the client

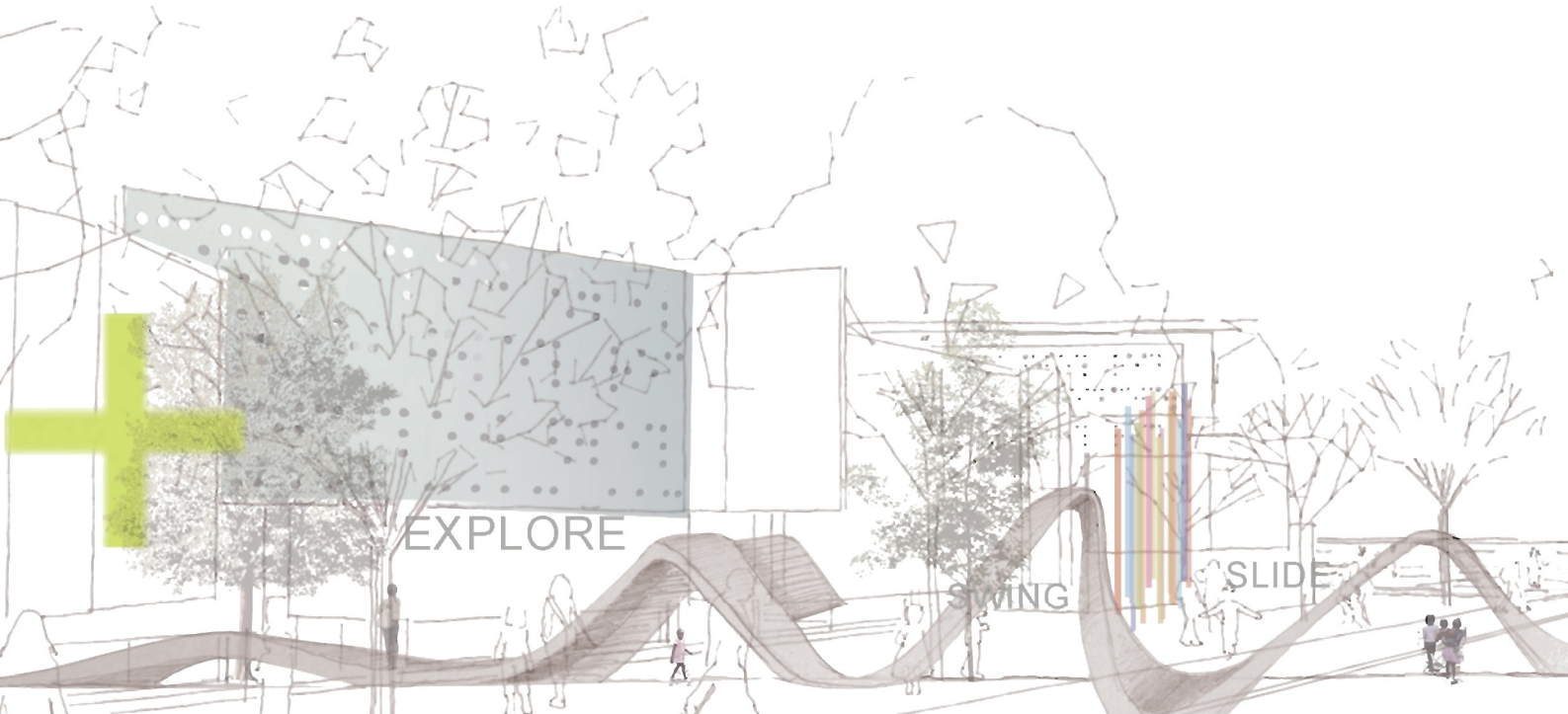
The centre's functions will include a full paediatric clinic and allied services centre. The Department of Health has, as one of its main aims, the encouragement of preventative and health promotive approach (SA (b), 2004).

According to the South African Department of Health areas to be targeted include:

- Free health care for children under six and for all homeless children at public clinics and health centres;
- A programme to improve maternal and child health through access to quality antenatal, delivery and postnatal services for all women to be implemented free at the point of delivery;
- Preventive and promotive health programme for children must be improved including a more effective, expanded programme of immunisation with 90% coverage in three years.

illus 1.4
Potential user profile of services offered at clinic

urban context



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CITY WIDE CONTEXT

STUDY AREA

GROUP STUDY AREA FRAMEWORK

Nodes

Landmarks

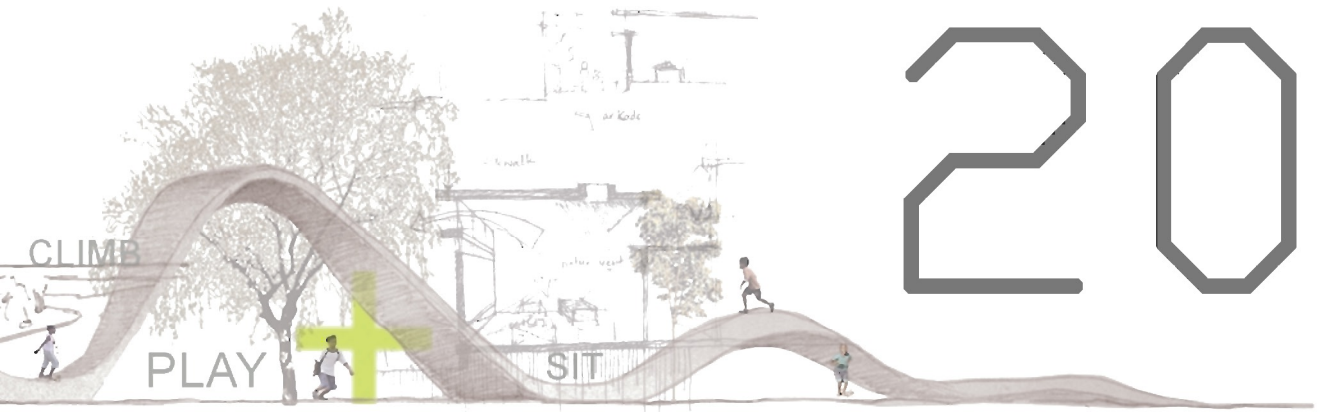
Edges

Districts

Paths

feel + learn + heal

A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC



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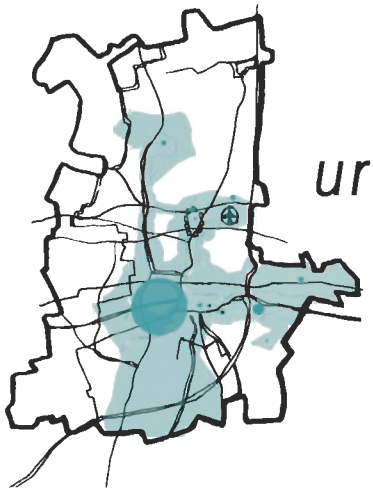
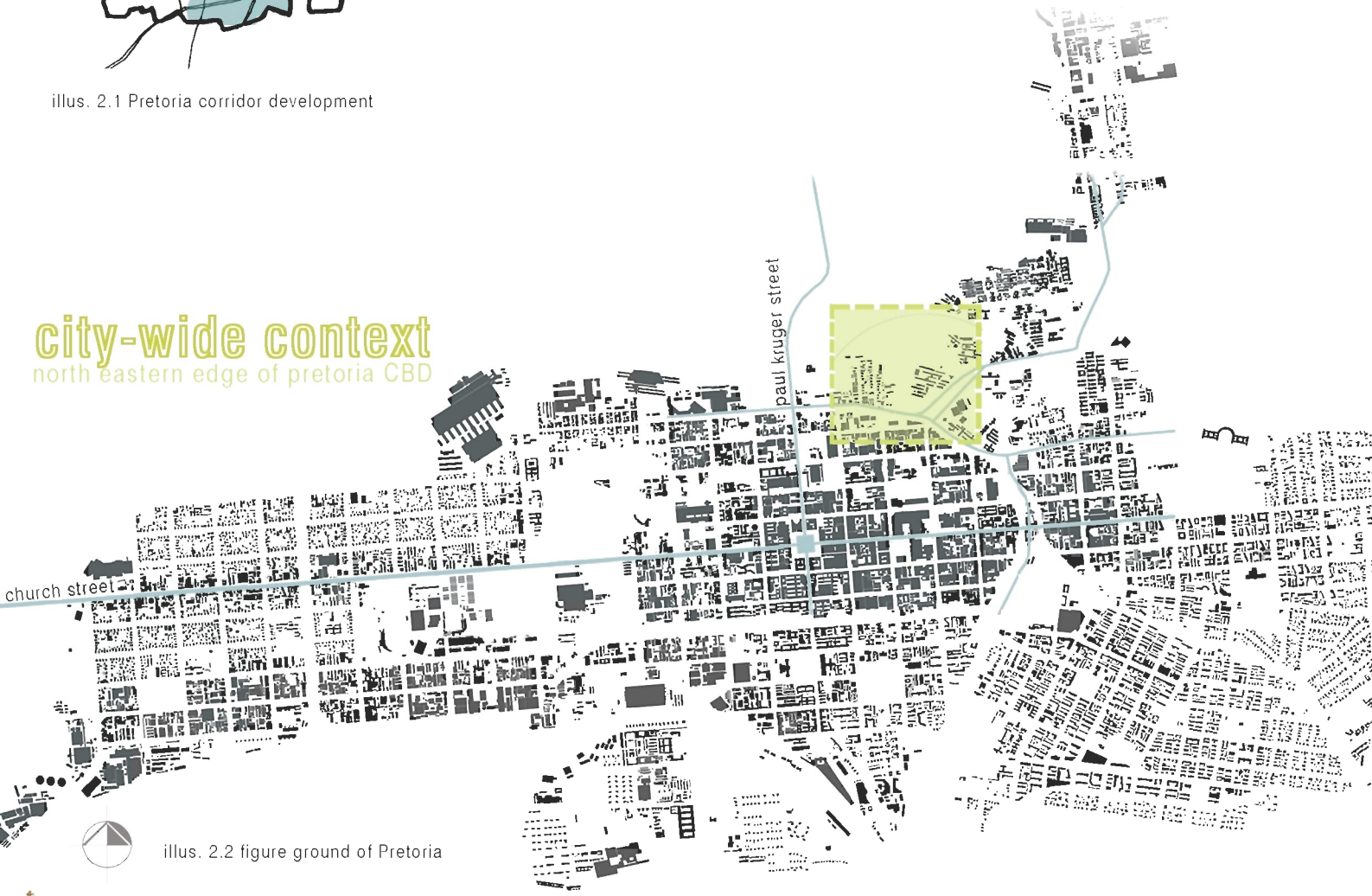


urban context

illus. 2.1 Pretoria corridor development

city-wide context

The proposed study area to be investigated for this urban framework is located in the South African Province of Gauteng. Tshwane, a municipal ward of this province has as its Central Business District (CBD), the city of Pretoria. It is within this context and including the north eastern edge of the city, that the subject under investigation will be modelled.



illus. 2.2 figure ground of Pretoria

study area

The precinct under investigation is bounded by Church Street in the South, the Pretoria Academic Hospital complex to the North, Andries Street to the West and Hamilton Street to the East. This area displays a wide variety of uses, differing greatly in urban character from the rest of the city. The form, organisation and general use, displays a disintegration of the urban fabric. This lends a sense of detachment from the urban environment.

Interventions proposed are to reconnect this part of the city and should rejuvenate public life in order to optimise the urban character of this area.

illus. 2.3 defragmentation of urban fabric

REASONS FOR SITE SELECTION

The site was identified for the following reasons:

- It is within walking distance of high density residential buildings
- It is in close proximity of educational facilities
- It is easily accessible by public transport
- It lies central to work environments
- It will allow landscapes to be created to accommodate healing environments
- It has urban regeneration potential

(Moore, 1987: 42)

urban context

group nodal framework

janes botha + neda samimi

In his book 'The Image of the City', Kevin Lynch classifies five physical elements which contribute to the environmental image of a city (1982 46-49)

In order for the user to establish a clear city image five elements are indentified and improved on. Users comprehend their surroundings in consistent and predictable manners, creating mental maps wth five elements:

node

illus. 2.4

landmark

illus. 2.5

environmental image

NODES
a focal point within an area that usually is a hub of activity. These concentrations of activities can range from transportation to commercial nodes.

LANDMARKS
a physical object within the urban context that allows for referencing of geographical position within an area. Often describes identity and structure to the environment.

DISTRICTS
areas within the city which demarcate the essence of the vicinity. Different districts have a different 'feel'.

EDGES
boundaries that prevent movement or accessibility to a certain area. They can also be channels of social activity. It allows the user to define and arrange the area they interacted with.

PATHS
a corridor of movement that is inter-operated on different scales and importance. They may be walkways, streets, roads, highways, railroads, etc.

district

illus. 2.6

edge

illus. 2.7

path

illus. 2.8

national
zoological gardens

union buildings

church square

strijdom square

loftus stadium

city hall

burgers park

train station

berea park

unisa building complex

illus. 2.9 landmarks within pretoria

landmarks

landmarks

Buildings, statues, parks and stadiums are amongst other objects in the urban landscape that act as landmarks within the city. The user uses these objects to orientate and locate themselves within the city. Landmarks are associated with familiar markers that give importance to an area and enriches the users experience.

illus. 2.10 voortrekker monument

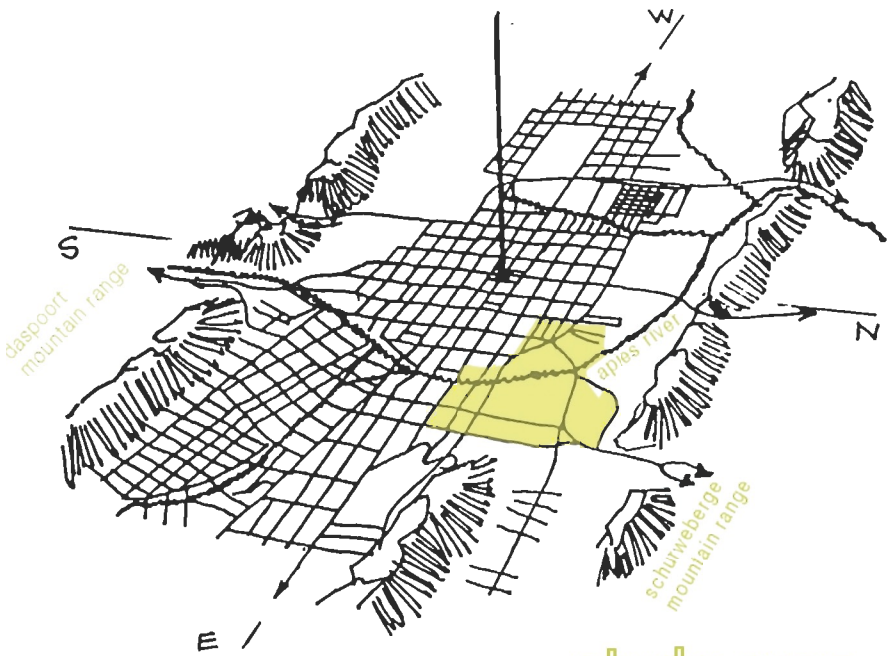
illus. 2.11 city hall

illus. 2.12 loftus stadium

illus. 2.13 union buildings

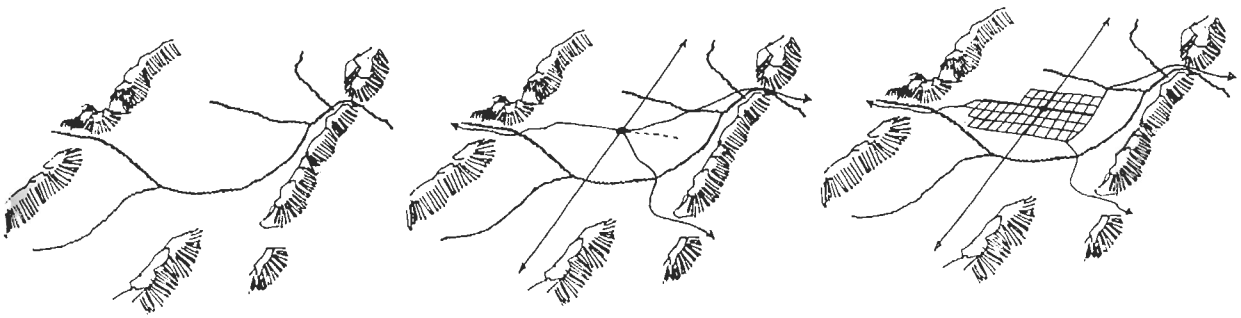
edges

the natural environment forming boundaries to the North and South of the city include the Daspoort and Schurweberge mountain range. The Apies River and Steenhoven Spruit define the city edge to the East and West. A low-lying plain is formed between these natural barriers, which the city was built upon. The topography of the urban edge defines it as the meeting point between natural and urban.

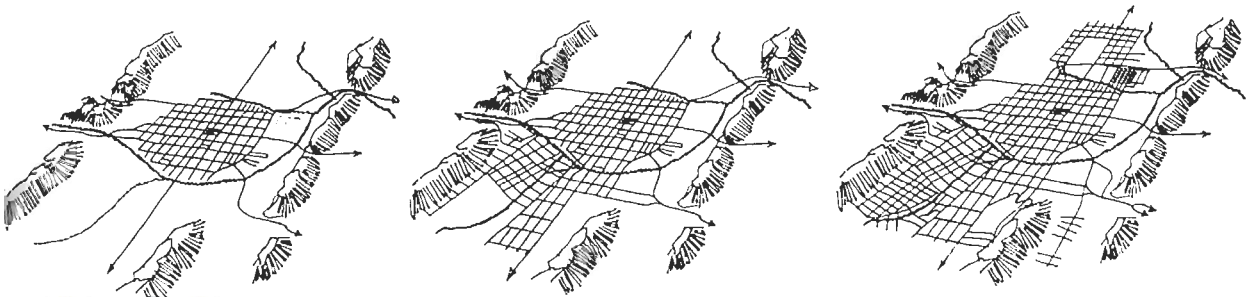


illus. 2.14

illus. 2.15
development of
Pretoria within
natural edges



illus. 2.16
district within urban context



public space

illus. 2.17 pretoria public space network

nodes

Nodes are located at spaces with intensified use: for transport, civic or retail purposes. Public squares and places of intensified public gathering, reinforce their importance and encourage further development. A direct correlation exists between urban quality and public life. Public spaces encourage a variety of public activities. A diagram depicting designed open public spaces in Pretoria, reveals a lack of such urban elements in the north eastern urban edge. The may contribute the visible disjointed urban fabric, and an introduction of such spaces could reconquer the city and inspire urban regeneration.

The three nodes identified in the study area, will specifically indicate access into and through the proposed study area. The transportation routes within this context define the urban landscape. The connection between these access routes have been identified as nodes and were defined as:

Gateway node
Transport node
Places of arrival and departure

illus. 2.18
Dr. Savage road long-haul taxi interchange as transport and gateway node

illus 2.19
main vehicular pathways in Pretoria CBD

paths

Church street and Paul Kruger street are two of the major axis that intersect at Church Square, the historical civic centre of the City of Pretoria. They divide the city into four quadrants with a grid pattern layout of city blocks with the church as its heart. (Holm, 1998: 62)

proposal

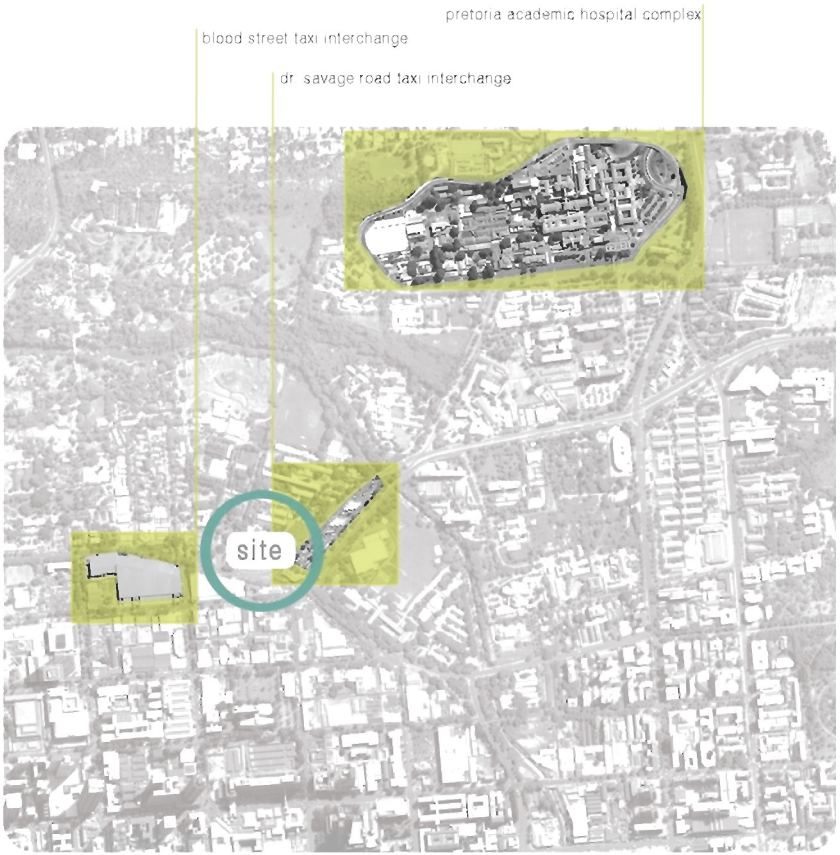
Nodal Framework

1. Transportation Hub

The study area is located on the urban edge, north east of Pretoria's Central Business District and forms a transport node at a large intersection, where Boom, Southpansberg, Dr. Savage and du Toit Street intersect.

2. Relation to site

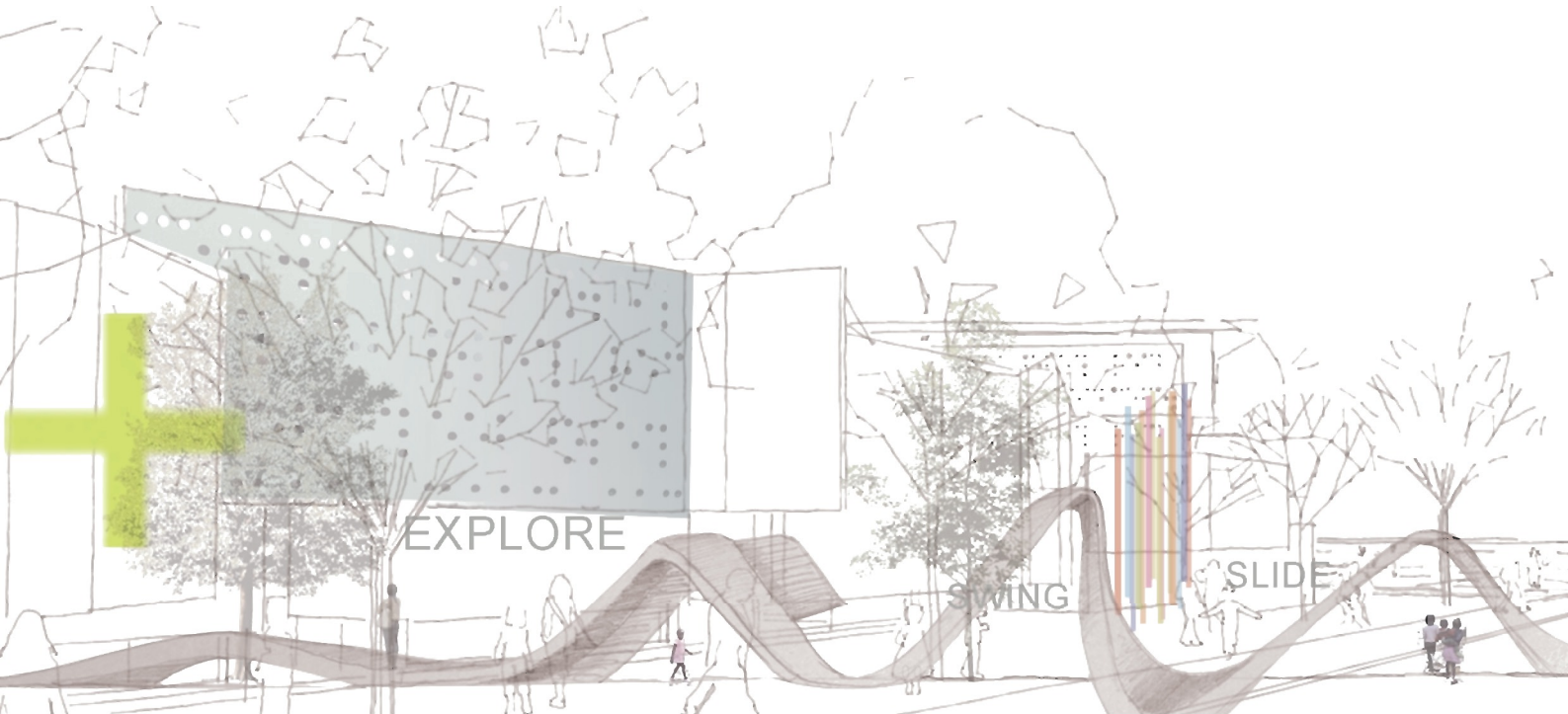
The Dr. Savage Taxi Rank as well as the Blood Street Taxi Rank create high accessibility to the site, and encourage heavy pedestrian movement in this area. The Children's Development Centre and Clinic will be located at the centre of this transport node in order to improve accessibility and strengthen the educational and health identity of the precinct. Traffic flow is heavy in this area, with routes going to and from the northern suburbs of Pretoria and Mamelodi Township, linking the site to residential areas. The study area has become defragmented from the CBD, and an opportunity to re-connect this site with the dense urban fabric of the city has arisen.



existing nodes

illus 2.20
showing existing nodes
in the study area

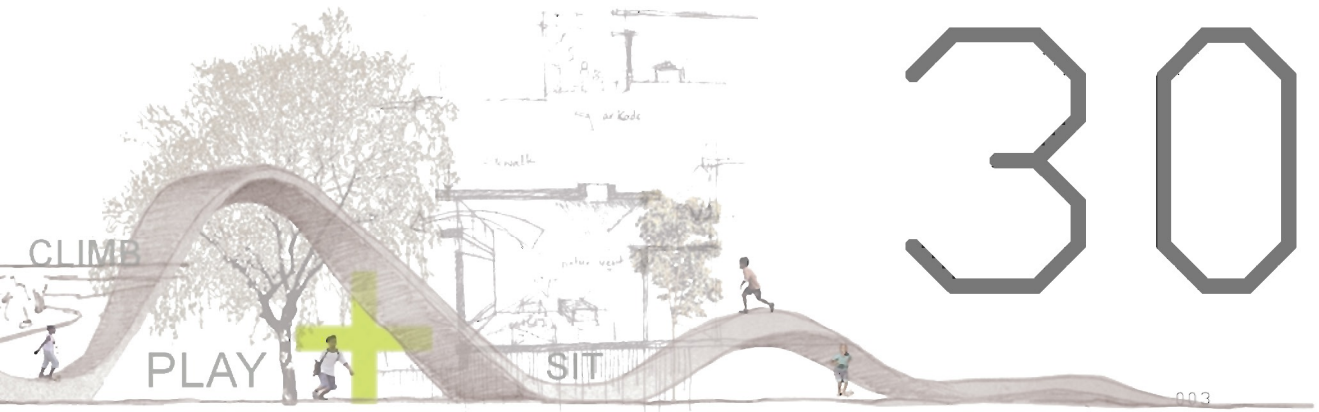
the site



SITE PROPOSAL
SITE ANALYSIS
BIO-PHYSICAL CONTEXT
SENSORY CONTEXT
MEDICAL AND EDUCATIONAL CONTEXT
LEGISLATION

feel + learn + heal

A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC



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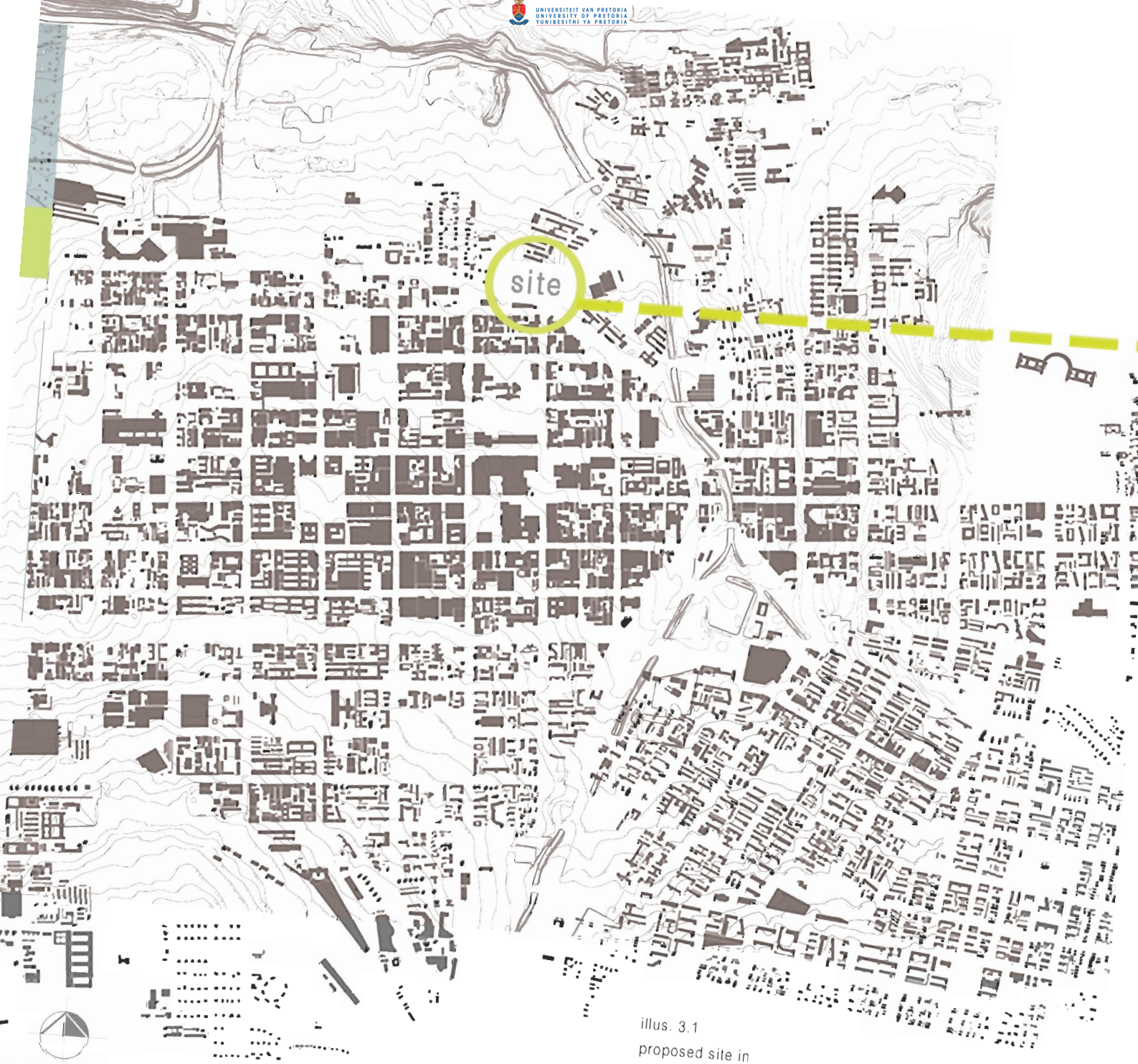


illus. 3.1
proposed site in
city wide context

site proposal

illus. 3.2 proposed site in local context

the site

micro scale context
SITE SWOT ANALYSIS

STRENGTHS	- Vacant land (no demolition required) - Site accessibility in terms of location: transport nodes - Heavy pedestrian flow
WEAKNESSES	- Position of vehicular entrance - Lack of urban identity in area
OPPORTUNITIES	- Gateway site - Proximity of referring hospital, Steve Biko - Opportunity to define the urban edge of city - Defragmented portion of urban fabric - High heritage value buildings in close proximity - Introduction of traffic calming mechanisms at intersection - Possible link with "island"
THREATS	- Heavy traffic flow - High noise levels


Prinshof School
margaret street
lewis street
prinshof street
Waste yard
Women's Clinic
Dentist
deteriorated building fabric
edge of CBD
boom street
transport node
bloed street mall and taxi interchange
bloed street mall
selected site
heavy traffic flow
high noise levels
soutpansberg road
long-haul taxi interchange
transport node
dr. savage road
carbonatta building
residential
retail
deteriorated building fabric
bloed street
andries street
retail
light industrial
retail
light industrial
du toit street
deteriorated building fabric
rinsloo street

illus. 3.4

illus. 3.5

bio-physical context

CLIMATE:

Pretoria is situated in the Northern Transvaal climatic region. Both the diurnal cycle and the passage of seasons result in large climatic variation. Humidity in the area is moderate while solar radiation is strong.

The total annual rainfall is 674mm. The maximum monthly rainfall is in January 136mm and the minimum in July 3mm. (Holm, 1996: 69)

TEMPERATURES:
Summer 20-38 degree Celsius
Winter 10-27 degree Celsius
Average relative humidity: 59%
Sunshine: 60-80%

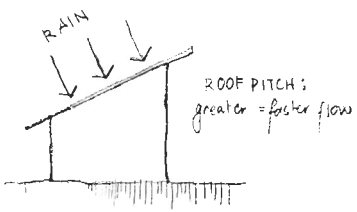
PREVAILING WINDS IN SUMMER: North easterly and south easterly

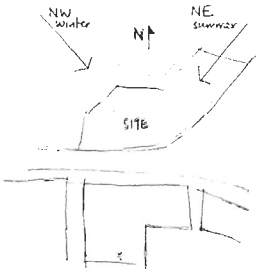
PREVAILING WINDS IN WINTER: South westerly and north easterly
(SA Weather Bureau)

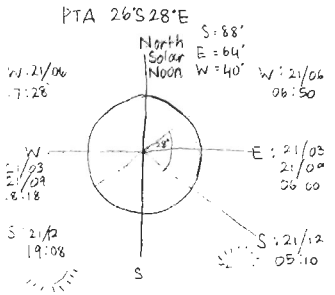
SUMMERS: hot and thunderstorms generated by thermal air movement

GEOLOGY:
Soil conditions
Assumed acceptable due to the nature of surrounding structures.

NOISE:
Very high noise level occur on the south eastern edge of the site, radiating from Boom and Soutpansberg Street.







illus 3.6
Sketches showing climatic conditions and the influences that they will have on the building design

sensory context

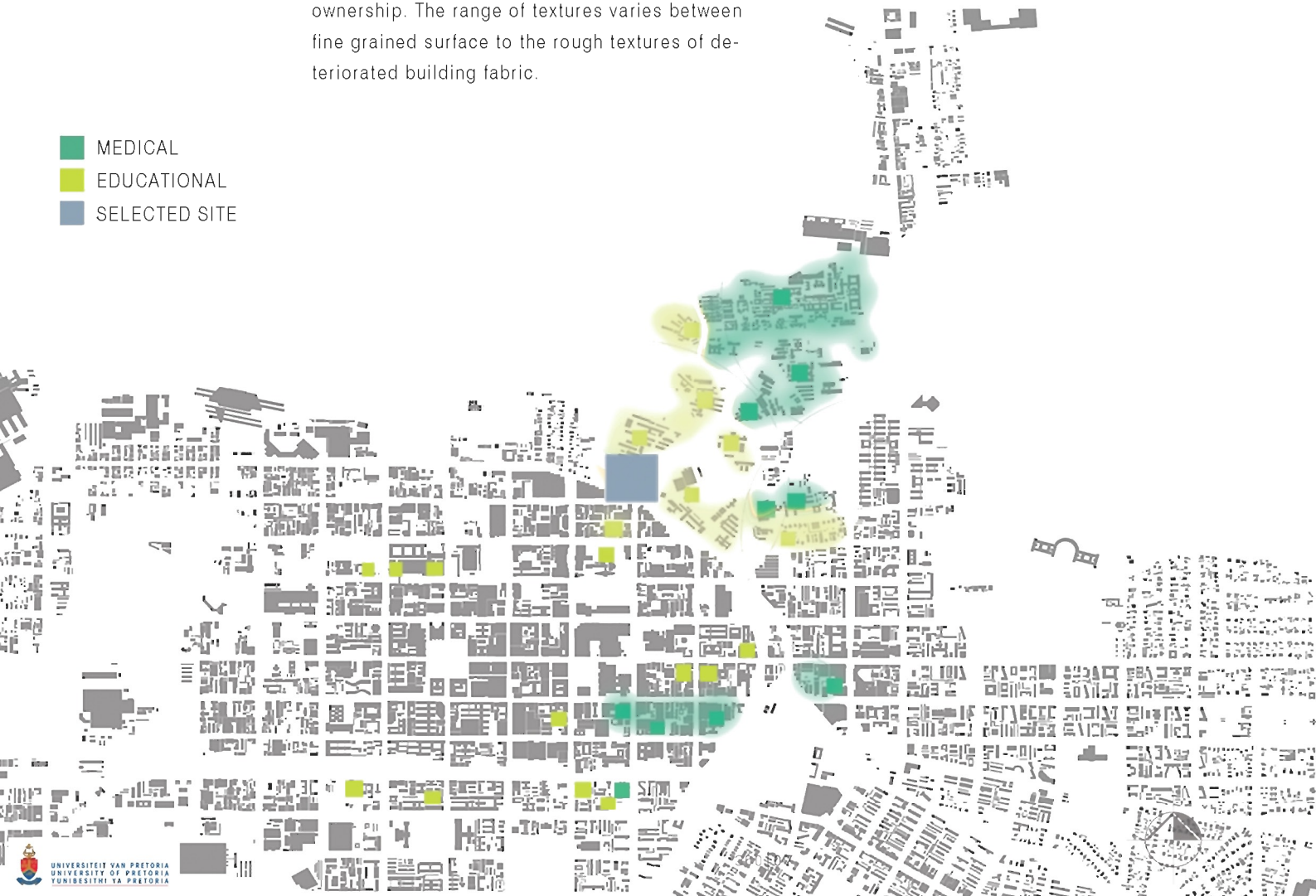
Various senses are triggered when experiencing the energy intensity of this intersection. The Boom Street Taxi Rank and Dr. Savage Taxi Rank generates background noise, through music being played, informal trade and vehicular noise. An array of smells, ranging from light industrial work accross the road to informal food stalls on the site, creates a typical local urban atmosphere on street edges. Neglected natural environments create an unsafe feeling and lack of ownership. The range of textures varies between fine grained surface to the rough textures of deteriorated building fabric.

medical + educational

The Children's Development Centre and Clinic will be situated amidst various medical and educational facilities, and hopes to strengthen and create awareness around this identity of the precinct.

Schools, specialised schools, hospitals and clinics are all located within a 3km radius of the site.

MEDICAL
EDUCATIONAL
SELECTED SITE



legislation

RIGHT	ACT	DETAILS
The right to health care services	National Health Act 61 of 2003	Free primary health for everyone Free health care for pregnant women and children under six years Free health care for social grant recipients Integrated management of childhood illnesses
The right to social services and protection	Children's Act 38 of 2005	Early childhood development Parenting skills training Child and family counselling Protection services Child and youth care centres

THE CONVENTION ON THE RIGHTS OF THE CHILD (1989) GENEVA, UN

According to article 24(1) "State parties recognise the right of the child to the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health." Article 24(2) provides that State Parties must take appropriate measures to ensure full implementation of this right, and specifies the following:

1. To diminish infant and child mortality
2. To ensure the provision of necessary medical assistance and health care to all children with emphasis on the development of primary health care
3. To ensure that all segments of society, in particular parents and children, are informed, have access to education and are supported in the use of basic knowledge of child health and nutrition, the advantages of breastfeeding, hygiene and environmental sanitation and the prevention of accidents
4. To develop preventive health care, guidance for parents and family planning education and services.(UN, 1989)

illus 3.7
Map indicating position of medical and educational facilities near site

informal trading along andries street

women's clinic in boom street

fuel station at bloed and boom street intersection
illus 3.8

surrounding urban context

URBAN FORM

the new urban form is derived from the surrounding context and site allocations

SCALE

A suitable scale is established through sensitivity of surrounding residential and light commercial buildings, and will contribute to the quality of buildings on the urban edge.

PROGRAMME

The Children's Development Centre and Clinic will be situated amidst various medical and educational facilities, and hopes to strengthen and create awareness around this identity of the precinct.

The programme of the building will specifically respond to the existing Prinshof School for the blind to the north of the site, by incorporating a multi-senory impaired therapy centre.

informal trading along boom street

commercial activity along bloed street

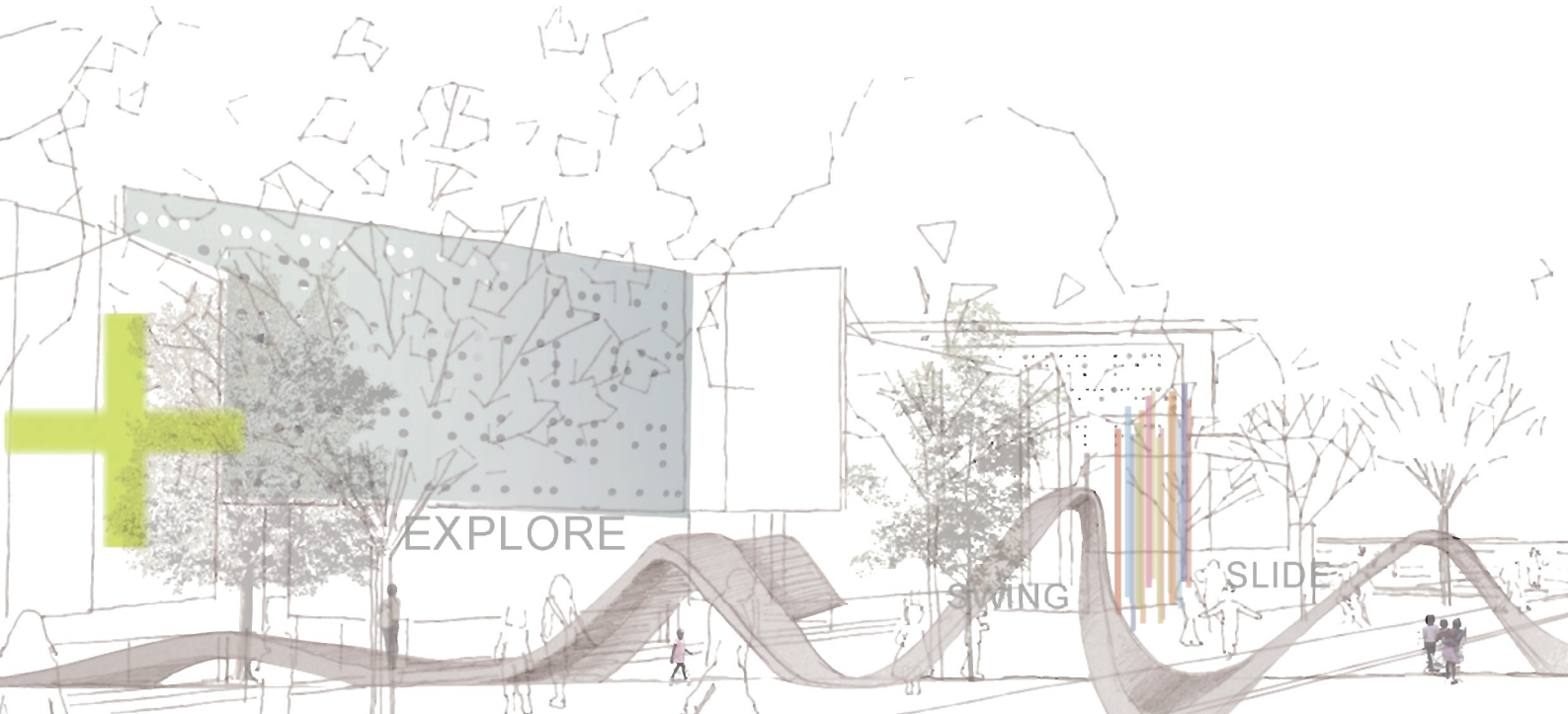
residential building along boom street view from site

residential building along boom street view from site

commercial building on the corner of bloed and prinsloo street

carbonatto building at dr. savage and boom street intersection

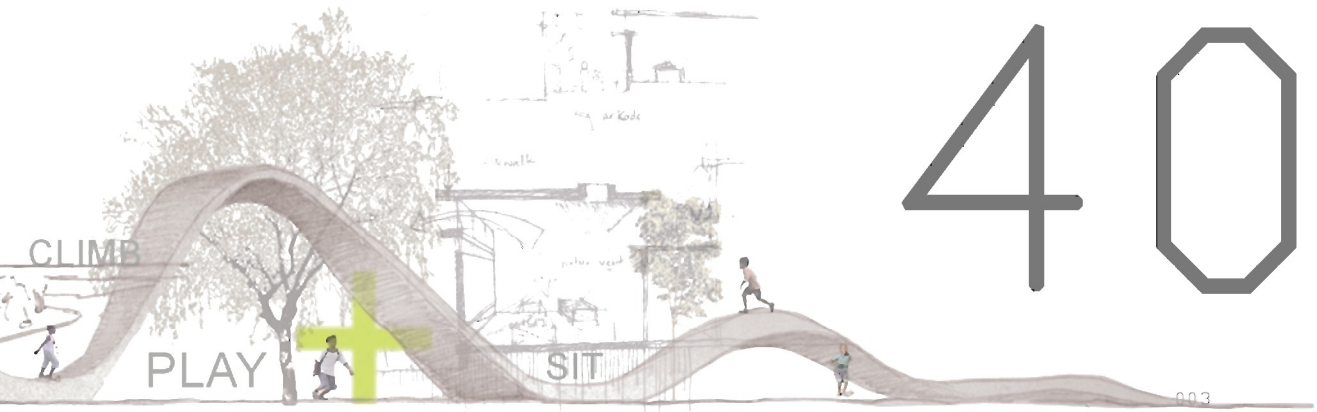
theoretical discourse



feel + learn + heal

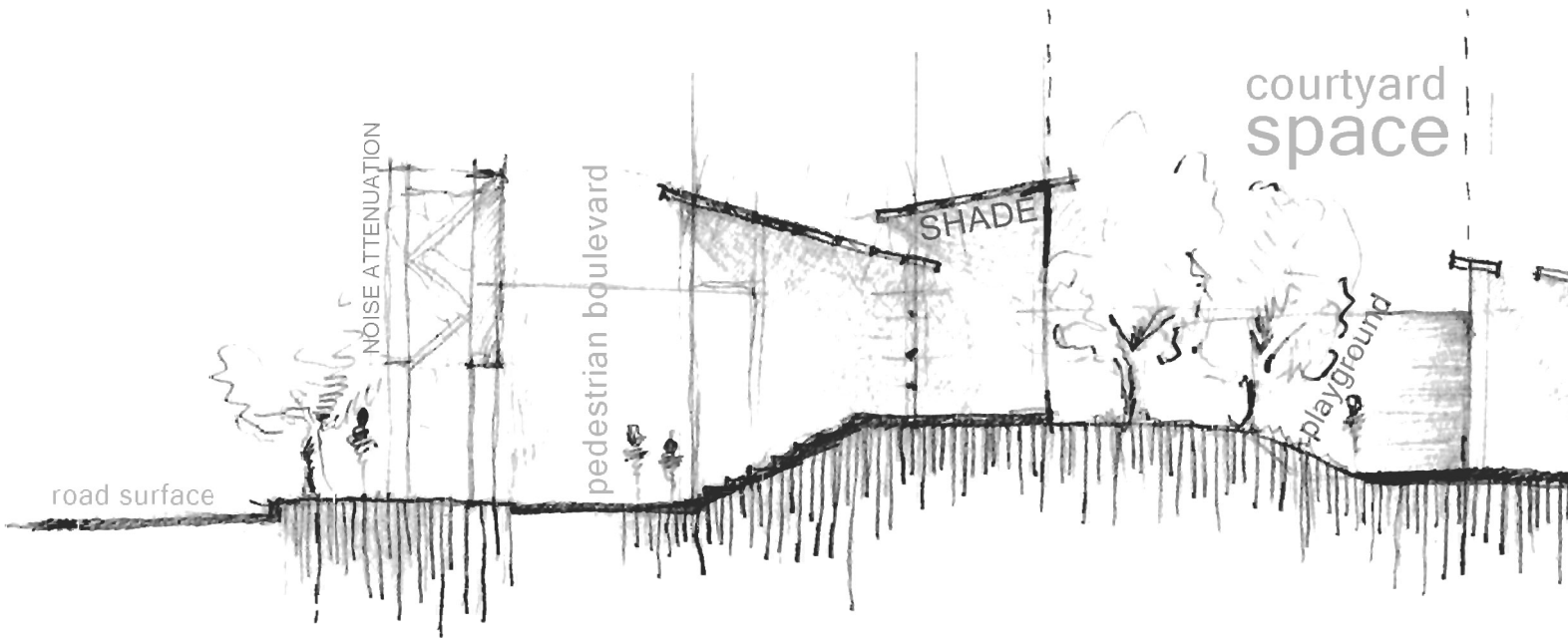
A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC

PROBLEM STATEMENT
THEORETICAL DISCOURSE
The Human Experience
Architecture for Children
Healing Environments
DESIGN
Precedent study
Objectives of design
Key issues to be looked at
Schedule of accommodation



400

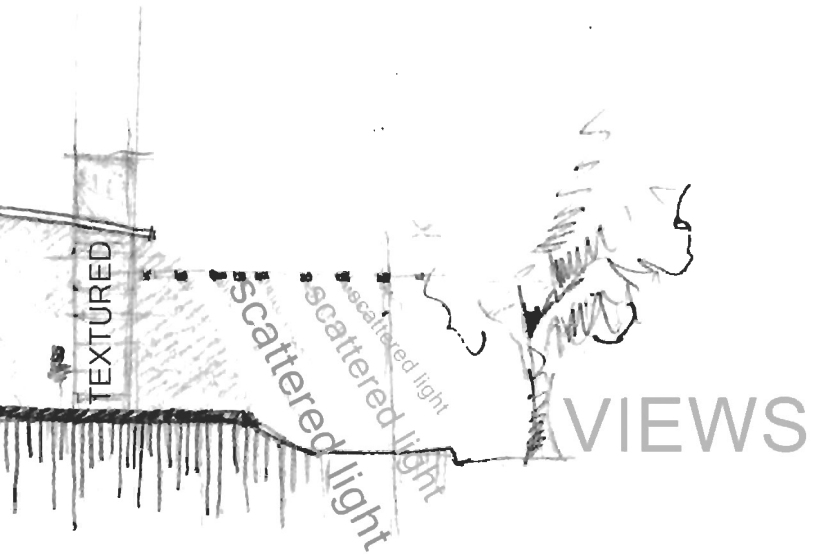
theoretical discourse



problem statement

"When an occupant experiences a building, they immediately become involved in an array of overlapping processes that all contribute to their experience" (Lehman, [2008]). It is therefore of fundamental importance to comprehend the influence that architecture has on the user.

In designing spaces for children, their perception of the built environment and interaction with their surroundings needs to be understood in terms of the influence that elements of architecture and the landscape have on their sensorial and motoric actions as well as social activities. Children develop a sense of place attachment through the ability to change and manipulate their environment, and architecture should become a tool in childhood development and stimulation of their cognitive functioning. It is through active experience and direct contact with the environment, that cognitive faculties of sight, touch, taste, audio and olfactory are stimulated (Said, 2000).



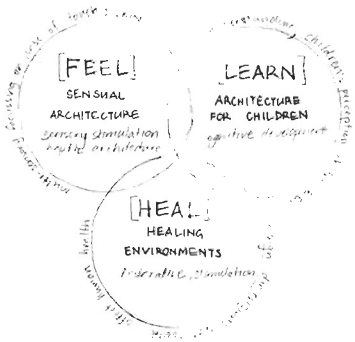
illus 4.1
Sketch indicating conceptual ideas around theoretical discourse

the human experience – sensual architecture

Through a movement away from the retinality of the Modern Movement, towards a multi-sensory engagement with the environment, a fragile architecture can be created (Pallasmaa, 2000: 1). Sensory impoverishment is caused by the tendency of our technological culture to standardize environmental conditions and make them entirely predictable. Architecture can either be viewed as a visual encounter with an image of conceptual idealism, or truly understood through an experiential reality and authentic architectural encounters.

In his paper titled *Hapticity and Time*, Juhani Pallasmaa, explains that all our senses are an extension of tactility or the sense of touch: the senses are specializations of the skin and that touch is therefore the unconsciousness of vision. "Our culture of control and speed has favoured architecture of the eye, with its instantaneous imagery and distant impact, whereas haptic architecture promotes slowness and intimacy, appreciated and comprehended gradually as images of the body and the skin" (Pallasmaa, 2000: 2). Architecture should create a dialogue between concept and making, visuality and tactility, for without the one, the other cannot exist. Architecture should always revolve around the relationship between the human body and its environment, and the way the individual subject experiences very specific situations.

Early exposure to sensory experiences greatly increases the ability to synthesize multisensory information. Children should be exposed to a very rich sensory environment from a very young age (Wallace & Stein, 2006)



illus. 4.2
Diagrammatic sketch indicating theoretical integration

precedent



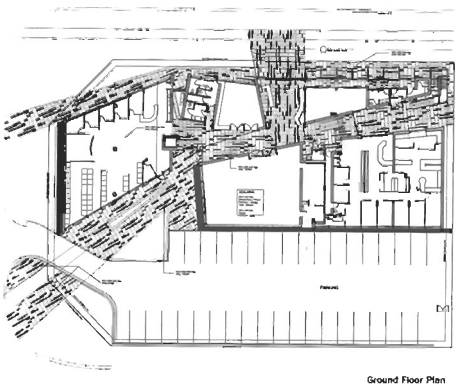

illus. 4.3
Interior views of
the Ubuntu
Centre

UBUNTU CENTRE ZWIDE, PORT ELIZABETH

ARCHITECT: FIELD ARCHITECTURE IN ASSOCIATION WITH NOH ARCHITECTS AND JOHN BLAIR ARCHITECTS

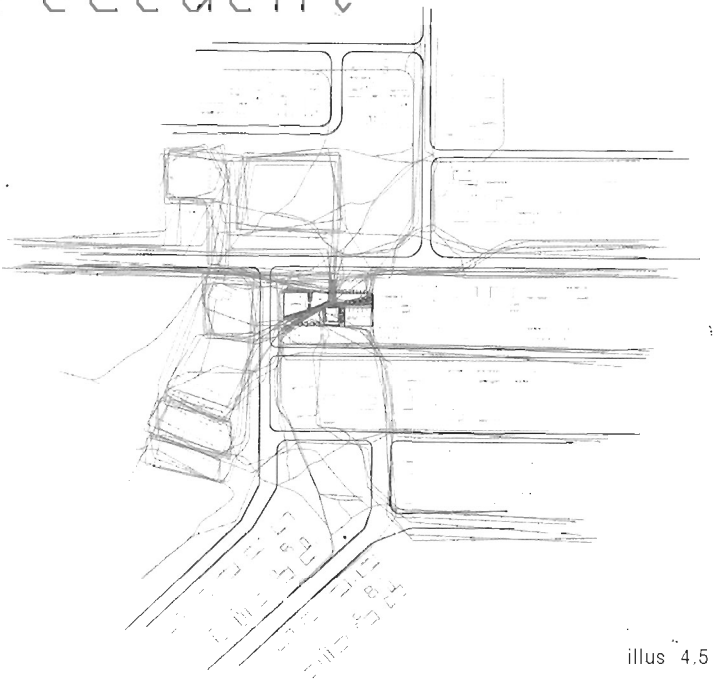
Situated in a city where more than forty percent of its inhabitants are infected with HIV, the Ubuntu Centre focuses on getting children access to higher education and employment. The buiding programme includes prenatal and child healthcare, HIV testing, counseling, and treatment for mothers.

One of the co-founders of the Ubuntu Fund was asked in an interview, why spend so many resources on a building, by which he responded "buildings are symbolic, and this building shows the children of Zwide that they are worthy of everything the world has to offer"—including ambitious architecture.



illus. 4.4
Plan of the
Ubuntu Centre

precedent



illus 4.5
Zwide Pathways

illus 4.6

LESSONS LEARNED

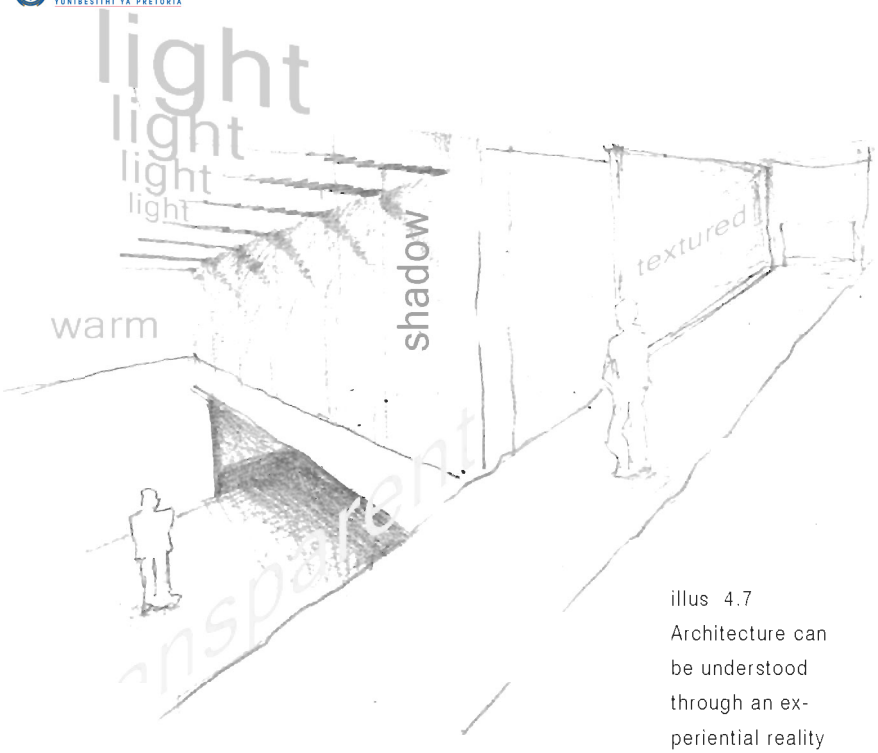
Health and educational functions in a South African context

Concrete as a building material, creating a sense of permanence and safety

Natural materials and concrete forming a dialogue between modern and ancient

Skills training to local unskilled labourers

Rooftop garden for vegetable soup kitchen



illus 4.7
Architecture can be understood through an experiential reality

STIMULATING ENVIRONMENTS

The behaviourial effects of the environment when individuals adapt to stress does not ameliorate the stress. In toxic stress environments such as those with high noise pollution levels, a decrease in productivity, sociability and concentration is noted. These effects have to be considered not only in response to the stimulation provided, but also what it means to the person experiencing them. Genetic, cultural and experiential backgrounds and their differences also contribute to the effects. For example, in modern societies which are made up of many diverse cultures, it is often difficult to merge ideas of personal place and territoriality. It becomes increasingly difficult to adapt to differnt cultures, so that it is often better to support them within less defined spaces which provide multiple opportunities for interaction (Gallagher, 1993: 159-161)

When we are able to perform activities that we enjoy, whether playing the piano or running, our actions merge with our awareness and we stop being the self-conscious spectators of our experience. This is often described as feeling as one with something that is greater than the self (*ibid.*: 172). When this occurs, the built environment supports human activity in the best possible way. It provides comfortable places for humans to be in.

designing spaces for children

COGNITIVE DEVELOPMENT

Although human beings continuously learn through their experiences and impressions, the most important years in determining all the actions and decisions which will be made in life, are during childhood. In Prof. Ismail Said's research paper on Architecture for Children, he explains that children's functioning and development is shaped by interaction with their surroundings and spaces designed for them and must conform to their physical, cognitive and social needs. In a hospital environement where it is necessary for children to feel at ease with their surroundings, place attachment can be achieved through the ability to change or manipulate the environment (Said, 2000).

Urban environments require spaces which support development through balanced neural input such as audio, tactile and motor activities. This development derived from exploration, forms the basis for learning.

touch

light

smells

illus 4.8
Sensory stimulation required for children's spaces to maximise development

illus 4.9

CHILDREN'S SPACES

Young children continuously experiment, feasting upon nuances of colour, light, sound, odour, and touch, unfettered by goals, times and expectations. Of the five senses, touch is said to be the most important, because it improves the child's perception of form and space. (Olds, 1987: 117).

An ideal enviroment for young children offers opportunities to learn by moving and stimulating the whole body. Bodily movement extends to the inner states of sensory awareness. The outdoors, with its wide variety of stimuli in natural elements is the ideal playscape for developing sensory awareness in children (Old, 1987: 120)

Play areas should support different functions, and foster many types of interaction desired by children. By using low levels of imagery, spaces allow various types of play within the same area and can accommodate broader cultural variety of users (Olds, 1987: 123-130). The diversity and compexity of experience and the child's ability to interpret and grow with their playground features are fundamental to their physical development (Fjortoft, 2004).

ST. CYPRIAN'S SCHOOL MOLTENO HOUSE EXTENSION ORANJEZICHT, CAPE TOWN

ARCHITECT: NOERO ARCHITECTS

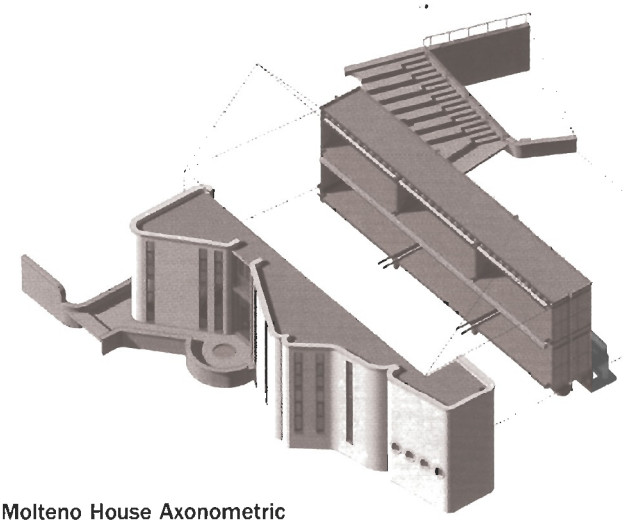
precedent

The St. Cyprian's School is a well-established Anglican school in Cape Town. Both the setting of the school and the original buildings, which were designed by the office of Herbert Baker, Kendall and Morris, are very special.

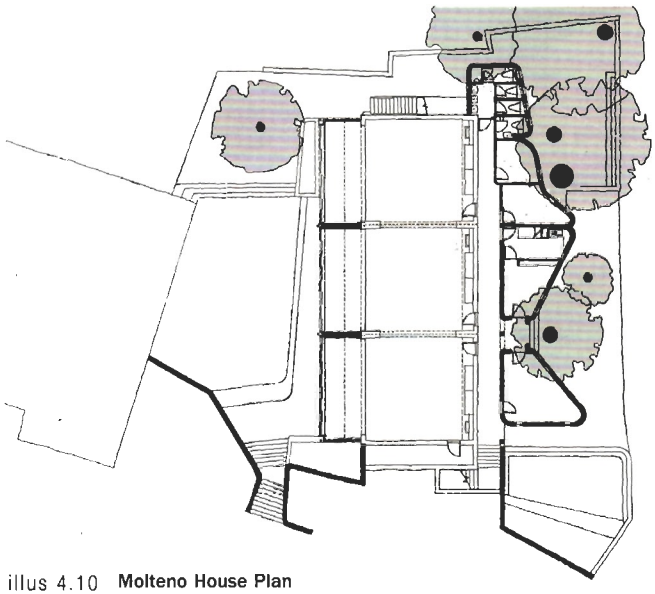
Although the school has developed over the last hundred years into a rich mosaic of various building styles and histories, it has resisted the temptation to re-organize the spaces in a rational, utilitarian modern manner. This has given rise to a set of spaces similar to those found in a city, where chance encounters can and do occur. This crisscrossing paths of the pupils everyday to and from classrooms, creates a non-hierarchic network of spaces and movement routes, that allow the youngest and oldest girls' paths to cross over one another.

The concept of the 'Third Space' was introduced to allow users the creativity of programming space for themselves. This way of designing space goes against the traditional way of thinking and designing with only utilitarian functions in mind, which often has the following consequences:

- the spaces exclude the creative involvement of children in the use of the spaces, due to the singularity of use
- it follows that the spaces don't allow for mul tiple or other uses

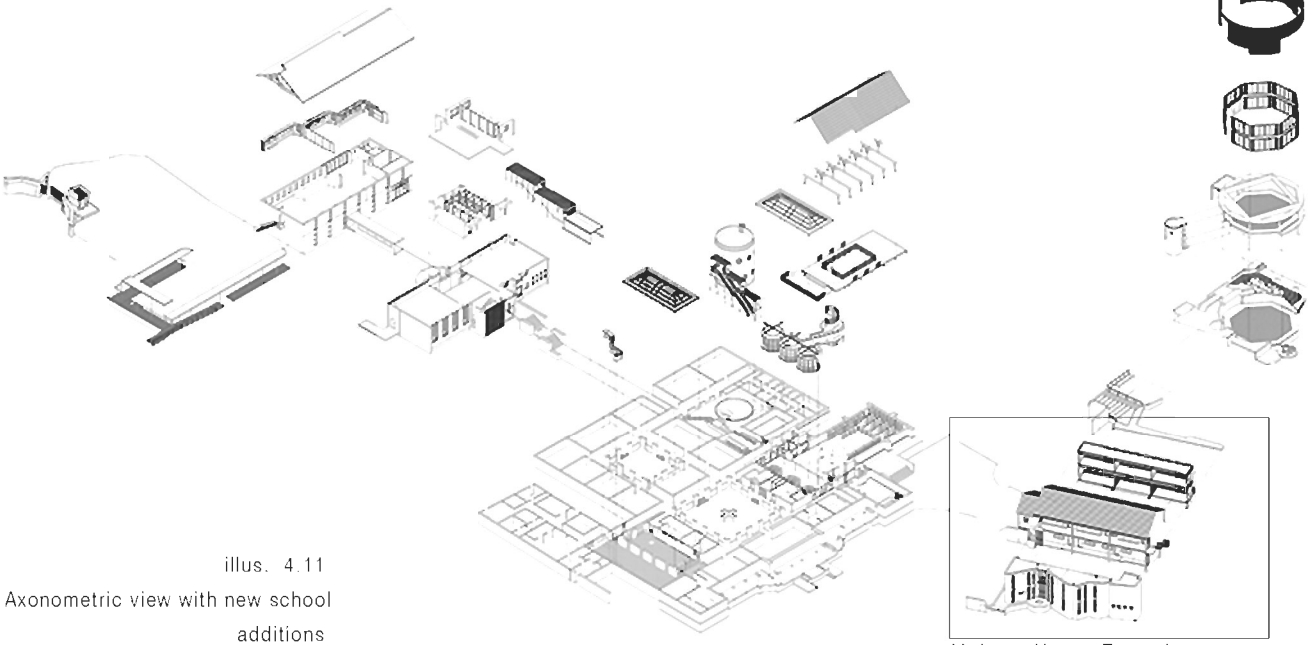


Molteno House Axonometric



illus 4.10 **Molteno House Plan**

precedent



illus. 4.11
Axonometric view with new school additions

Molteno House Extensions

LESSONS LEARNED

Concept of the 'Third Space'
- that offer children a chance to invent their own ways of occupying space
- through ambiguous spaces similar to those found in a city, where chance encounters can occur.

DESIGN GUIDELINE FOR PLAYSCAPES:

SENSE OF PLACE

Spatial configurations, such as complex activities around a foyer, improve the sense of place and connectedness to other spaces.
Open-plan design allows each activity to flow into the other, promoting smooth transitions during play.

VARIETY OF SPACES

A variety of juxtaposed and contrasting spatial situations is necessary to support rich possibilities for play. Adult supervision should be intregrated into the surroundings, such a providing seating on the actual play forms within the environment.

THREE-DIMENSIONAL SPACE

Three-dimensional juxtaposition of levels offers a matrix of spaces, platforms, and pathways creating maximum potential for physical, verbal and visual interaction. Behaviours promoted in these spaces include hide, reveal, looping, overlooking and observing others from a position of safety, ground hogging and verbal communication between children.

NON-OBJECTIVE ENVIRONMENTS

Non-objective environments and loos, interlocking objects provide no imageable or realistic representations and allow children to indulge in fantasy games.

VARIETY OF SURFACE FINISHES

A variety of surface finishes such as concrete, timber, carpet, rubber, bricks, steel and plastic offer children a variety of tactile experiences on vertical, horizontal and inclined surfaces through which bodily contact can occur.

KEY PLACES

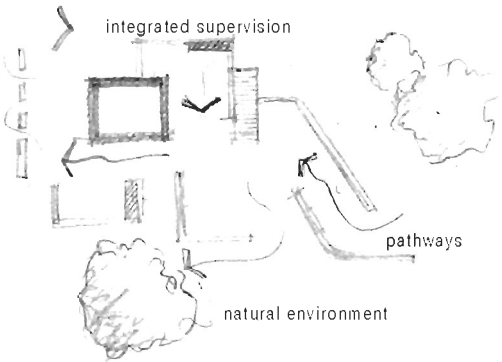
Key places are dominated by one major element which supports bodily movement such as a falling pad or a slide which promotes solitary play or group interaction. The spaces surrounding these elements should consist of complex juxtaposition of levels and pathways.

SYSTEM OF PATHWAYS

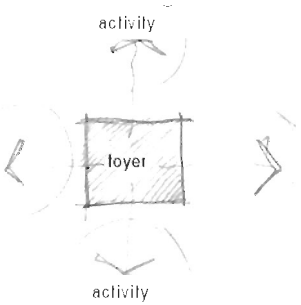
Paths infer movement which is synonymous with play. Paths could intersect so that various choices are available. Dead ends should be avoided and temporary slides or tunnels can be incorporated into pathways, offering children a different perspective over the environment.

STRUCTURAL INTEGRATION

Play and sitting surfaces use floors, walls and ceilings and horizontal or vertical supports. Residual spaces, such as those under staircases, become private spaces within which children may retreat and release emotional anxieties such as fear, anger or frustration (Olds, 1987: 133)



illus. 4.12
Variety and contrasting spatial situations that support rich possibilities for play



illus. 4.13
Diagrammatic sketch showing spatial configurations that create a sense of place

healing environments

Human health depends heavily upon the individual coping resources, which can be challenged by the taxonomy of design characteristics and interaction with our surroundings. The design dimension linked to stress explained by Evans and McCoy, in an article on environmental psychology, are: stimulation, coherence, affordances, control and restorative dimensions. These dimensions directly correlate with the idea of multi-sensory architecture and should be used as an instrument to design spaces that stimulate sensorial development. A brief summary of each design dimension adapted from *When Buildings Don't Work* is given below:

STIMULATION:
- Amount of information in a setting
- Moderate levels are optimal
- Too much stimulation: cognitive processes demand concentration
- Too little stimulation: causes sensory deprivation

COHERENCE:
- Clarity or comprehension of building elements and form
- Impediments thereof include: ambiguity, disorganization and disorientation
- Enables user to make deductions about identity, meaning and location
- Stress occurs when predictions are hard to make
- Key issue: legibility

AFFORDANCES:
- Are marked disorientation as a result of optical illusions
- For example: change in texture in change in level

CONTROL
The ability to alter one's physical environment or regulate exposure to surroundings
can be achieved through:
- Hierarchy of spaces
- Defensible space
- Flexibility
- Visual exposure
- Openness of perimeter

RESTORATIVE
- The potential of design elements to function therapeutically and reduce cognitive fatigue
- Promotes healing through: retreat, fascination and exposure to nature
- Reflective activities: minimum distraction, degree of isolation through views of nature

(Evans & McCoy, 1998)

Natural environments greatly impact the health of humans. Access to views of the natural environment can improve cognitive functioning and improve recovery from surgery or illness. It has also been shown that nature buffers stress in rural children (Wells, [2010]).

illus 4.14

The burden of illness is greatest in lower socio-economic groups. Urbanization and industrialization have decreased the likelihood that supportive social relationships can exist, even though they have created the conditions for a higher standard of living in material good and improved sanitation.

precedent

PUBLIC TRANSPORT SHARED SERVICES CENTRE BRIDGETOWN, CAPE TOWN

ARCHITECT: MAKEKA DESIGN LAB

The Public Transport Shared Services Center, in Cape Town, is the new regional headquarters for public transport in the Athlone, N2 area. The site is located on a piece of land resonates historic racial, ethnic and class divisions. The building hopes to be a catalyst for integration of the divided taxi industry. The programme includes office space, a bus testing facility and a public/customer care interface.

The primary design focus is that of sustainability, and the building makes use of natural light, ventilation, water recycling systems and enery strategies. Materials are predominantly local, non-toxic, and from renewable sources whilst the embodied energy of each material was considered in order to minimize the impacts to this end. The construction process focussed on empowerment of women, youth, semi and unskilled labour from local communities within a 5km radius.

illus. 4.15

precedent study

Local and international precedent studies that will be investigated in order to inform design decisions will look at the following aspects of architecture:

- The human experience – Sensual architecture
- Spaces for children
- Healing environments
- Accommodation and functional layout of pae diatric ambulatory clinics
- Greening strategies in health care buildings

objectives of design

The main design objective is to create a community upliftment platform within the context of a healthcare environment that focuses on a multi-sensorial healing and development environment for children and youths. Emphasis will be placed on sustainability issues that are the forefront of the built environment.

key issues to be looked at

Design philosophy – Multi-sensorial spaces for children, for cognitive functioning and development. A multisensory space aims at stimulating all of the senses.

Technical development – Information on the technical specifications for medical facilities, such as operating theatres and intensive services to such facilities

LESSONS LEARNED

Greening strategies employed in this building are commendable, and has the highest energy effiency to date for this building type.

Water strategies - recycled greywater system
- water harvesting

Energy strategies - solar water heaters
- hybrid passive ventilation system

Empowerment targets

Natural light optimisation strategies

precedent

MOSES KOTANE REGIONAL HOSPITAL LEDIG, NORTHERN PROVINCE

ARCHITECT: SHARP SHOP ARCHITECTS
ARTICLE WRITTEN BY: JENINE HUGO

healthcare architecture

illus. 4.16

The sprawling single building complex, rather modest in its material usage and appropriate use of contextual scale, sets the scene for the new Moses Kotane Regional Hospital, in its markedly rural location. The diminutive village of Ledig in the Northern Province, situated at the foot of the Pilansberg Mountains, is hardly a nascent community, embraced by unassuming single storey buildings. This unpretentious structure contributes to the unimposing civic character of the environment and serves as the new referral hospital to all 45 surrounding clinics and four health centres in the Moses Kotane sub-district, with a full capacity of 200 patients. The recently completed hospital has however not yet reached its prospective of treating the amount of patients it initially set out to handle although several of the wards will become operational in the second phase of construction. This project, the winner of a national competition hosted by the Department of Health in 2004, has stepped up the level of proficiency in the design and practice of public healthcare facilities in South Africa.

THE DESIGN

The atrium provides an open concourse to the public realm and emphasizes the transparency that the local government sets out to achieve. Public spaces are spacious, uncluttered and filled with natural light.

Circulation routes were sensitively designed to form connections between main spaces, and allow for natural lighting and ventilation through skylights and operable louvres. The building layout and movement throughout the hospital is logical and navigation effortless, due to excellent signage, a crucial aspect in any medical facility. Integrated vertical structures, which serve as double-volume light wells to public waiting areas, in addition act as way finding elements throughout the building. The administration functions of the building complex are allocated in the private zone on the first floor, with ample natural lighting permitted by clerestory windows along the passage and also allow a degree of transparency through glass facade offices.

Allied services, including speech and hearing, occupational and physical therapy, enable patients a view to the landscaped courtyards and natural lighting and ventilation. Additional overhangs on the northern facades and operable windows allow occupants to control the internal environmental conditions.

Additional greening strategies employed in this building include northern and western cavity walls with thermal barriers, sunscreens in front of northern and western fenestration, and provision of on-site accommodation for staff members, reducing travelling distances to and from the work place. Accessibility to the site through public transport nodes at the entrance furthermore contributes to the green approach taken towards reduced carbon footprints. Local skills were employed in the construction phase, where 100 young workers were given the opportunity to develop skills and gain knowledge through the construction process. In keeping with current hospital design practice, outpatient treatment rooms are largely kept generic and un-programmed, allowing greater flexibility for future modifications.

The structure consists of a reinforced concrete frame in the double storey administration zone, covered by profiled iron sheeting, and solid walling, internally and externally, all synonymous with the local building knowledge and appropriately robust.

POST OCCUPANCY CONCERNS

As a result of the extensive planning, design and construction process and a constant flux in staff requirements, current concerns faced at this facility do not necessarily reflect an inadequacy of the original intent of the building design. For instance, the outpatient ward is currently functionally ineffective, and although a decision on rather focussing on efficiency was made right at the beginning of the planning phase, the reasoning behind it is not always communicated properly to staff. Consulting rooms are laid out along a lengthy, narrow, uncomfortable passage, incapable of isolating patients with transmittable conditions, awaiting

illus. 4.17

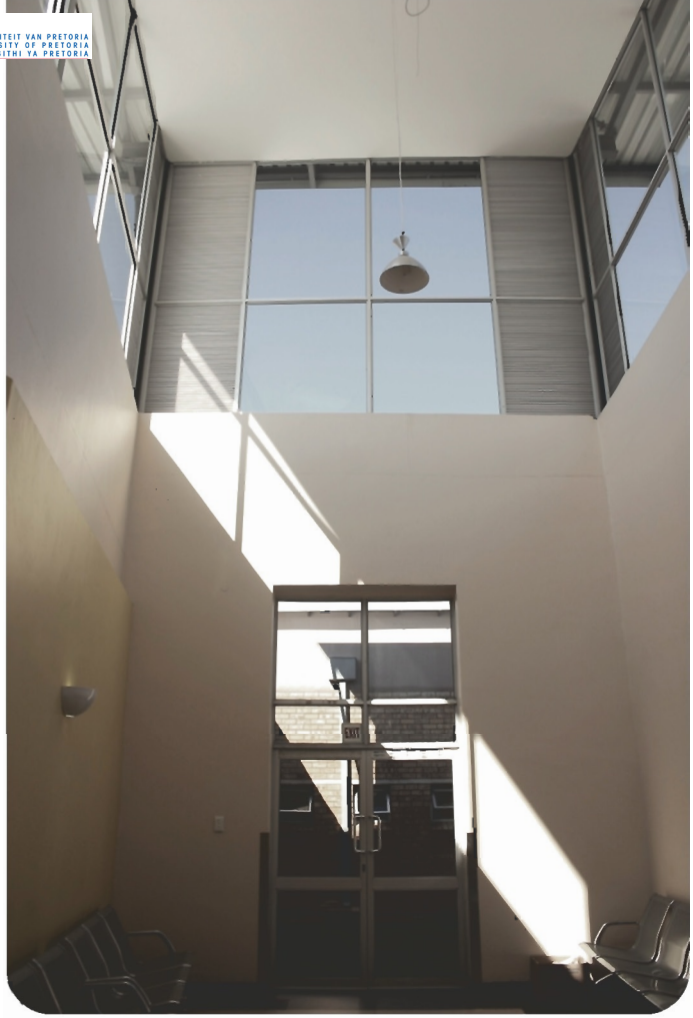
Vertical wayfinding elements

illus. 4.18

Natural lighting along passages

precedent

healthcare architecture



illus. 4.19 Public waiting areas allowing for natural light and ventilation

medical screening tests. It is however contested that emotional harm resulting from the social stigma attached to a patient that requires such treatment, would be greater than the risk of physical transmittance.

Landscaped courtyards are designed to accommodate patients and family members, although a lack of maintenance has resulted in over grown weed gardens and are mostly inaccessible to the public due to stringent security requirements. Intolerable glare, from the light coloured crusher-rock, results in predominantly closed blinds during daytime hours.

CONCLUSION

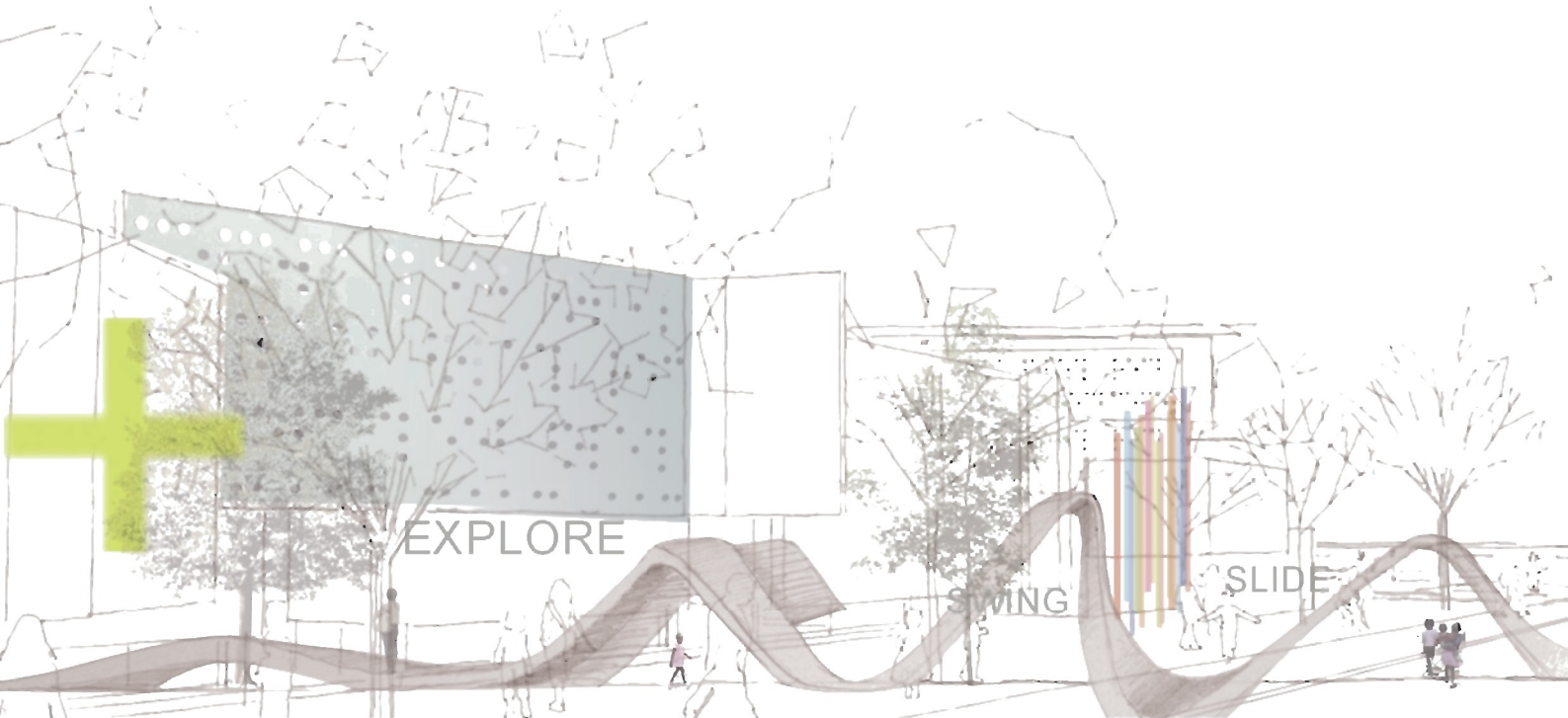
The main building and its ancillary outbuildings, which accommodate staff housing units, takes full advantage of this area's crisp daylight, sporadic cool breezes and astonishing panoramic views. The dichotomy of technology within, and rural surrounds, is integrated into an appropriate typology through the economic use of scale and sensitivity towards the natural environment. This project has certainly stepped up the level of proficiency in the design and practice of public healthcare facilities in South Africa.

illus. 4.20 Panoramic view of main waiting area

illus. 4.21 Main circulation route with natural lighting and access to the natural environment

illus. 4.22 Clerestory windows with louvres in passage of the administration zone

design develoment



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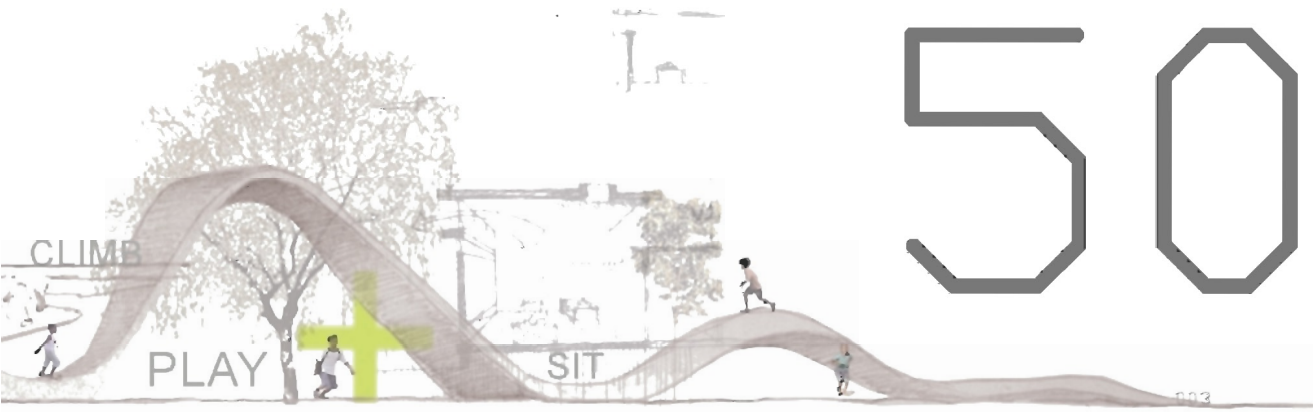
AIMS OF THE DESIGN
INITIAL CONCEPT DEVELOPMENT
SITE IMPLICATIONS
PRINCIPLES
CLUSTER ORGANIZATION
MOVEMENT
BUILDING RESPONSE

feel + learn + heal

A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC



500

design development

As Wittgenstein points out '(t)oday the difference between a good and a poor architect is that the poor architect succumbs to every temptation and the good one resists is'. (Perkins, 1995: 220)

aims of the design

This project aims at creating awareness around designing spaces for children, targeting their senses, intellect and creativity.

It also aims at providing an architectural response which supports development and perceptual development in early childhood.

inititial concept development

The purpose of the design development is to illustrate the design process and thinking behind major decisions as clear as possible. The design process consisted of a vast amount of decisions and potential resolutions that argued out throughout the course of the study.

response to context

The figure-ground of the study area indicates an undefined and illegible urban fabric, where a definite need for intervention on this north eastern edge of the city is necessary. As already mentioned, this area is characterized by major road networks which connect ar a very important gateway intersection of the city of Pretoria. Due to the vacant land that the proposed building will be situated on, an opportunity is created to connect the site with the rest of the urban grid, which will hopefully be the start of an activity corridor connecting the rest of Pretoria North and surrounding Townships to Pretoria CBD. This need gave rise to the programme, which identified the elements from which the project took its form.

The proposed site, which sits on the corner of busy incoming and outgoing routes, is in close proximity to the TUT Art Campus, the Prinshof Primary School and the Steve Biko Academic Hospital.

Dewar and Uytenbogaardt see pedestrian movement as the primary definition of scale of urban development. Distance is the primary physical barrier to ease of access and therefore, the best situation are when people gain access to their daily activities by foot (Dewar, 1991: 17).

As the proposed site sits within five walking minutes from both the Bloed Street Taxi Rank and Dr. Savage Taxi rank, the site is easily accessible.

Workers and staff for the proposed development that have to travel into the city, therefore have direct access to the proposed site, as it is within walking distance of the taxi ranks. Money and time would thus not be wasted on further vehicular transport to their daily amenities. Dewar et al states that exposure and interaction is the beginning of urban development. It is at this point that the places of greatest opportunity arise in the city. The two lines of movement (vehicular and pedestrian) on and around the site create ample exposure as well as interaction amongst the city imhabitants through the proposed development.

missing part of the urban fabric

illus 5.1 Figure-ground sketch of the study area and site, showing the missing pieces of the urban fabric

site implications

SLOPE

The site has a slope of approximately 1:20 causing a linear axis along the fall.

ACCESS

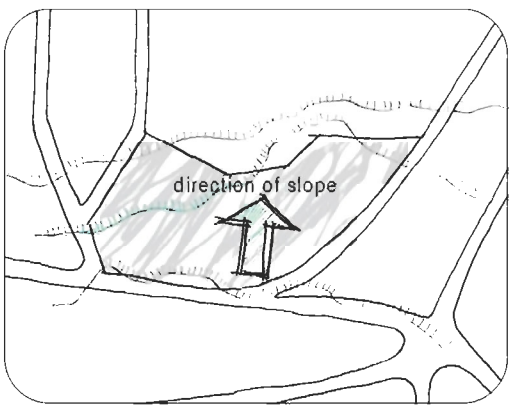
Primary access and secondary access is as conceptualized on the diagram.

VIEWS

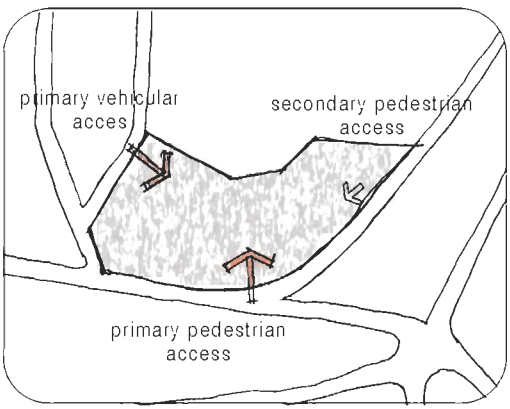
The site has landscape views towards the north and will influence the orientation of the buildings.

MOVEMENT

The pedestrian desire lines and movement from the street edge towards the building break up the building footprint.

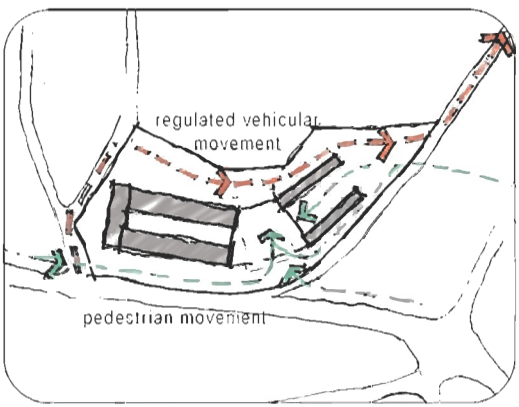


illus 5.2 Site topography

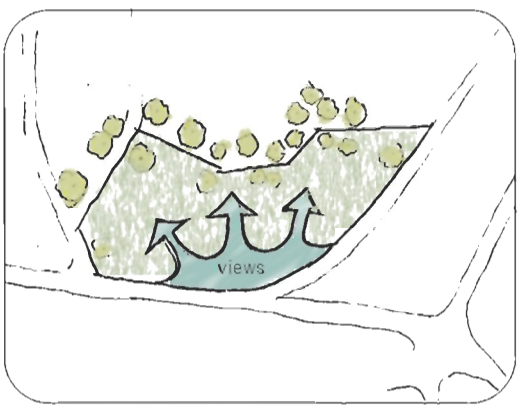


illus 5.3 Site access points

illus 5.6 Section through the site



illus 5.4 Movement routes around and through site



illus 5.5 Views of natural environment

principles

INTEGRATION WITH THE LANDSCAPE

The project achieves complete integration with the landscape through:

- creating a complex of buildings linked through permanent walkways
- the restructuring of open space through place-making
- a building focussed on vistas

SCALE

The architect has an understanding of human scale which was very appropriately used in this project, with specific focus on the scale of a child. Of a form or space's three dimensions, its height has a greater effect on its scale. While the walls of a room provide enclosure, the height of the ceiling plane overhead determines its qualities of shelter and intimacy.

LAYERING

Layering is used to mark a transition between a boundary or edge. Public functions filter outward from the centre of the site into more private functions through the building form and use of materials. Walkways create an intermediate semi-public or semi-private space and interacts with the public square. The opacity or transparency of facades denotes the nature of interaction.

The south eastern facade of the building facing onto the street, is reacting the the fast-paced vehicular-dominated environment, however for pedestrians the interaction should be finer grained, with elements which promote lingering and social activities, such as public seating opportunities.

The site has landscape views towards the north and will influence the orientation of the buildings.

COMPLEXITY AND SIMPLICITY

The buildings and configuration of spaces and elements have a complex, yet simple quality that puts the user at ease, while still capturing his interest. This is due to the use of simple elements, configured in a complex layering with deep meaning and symbolism.

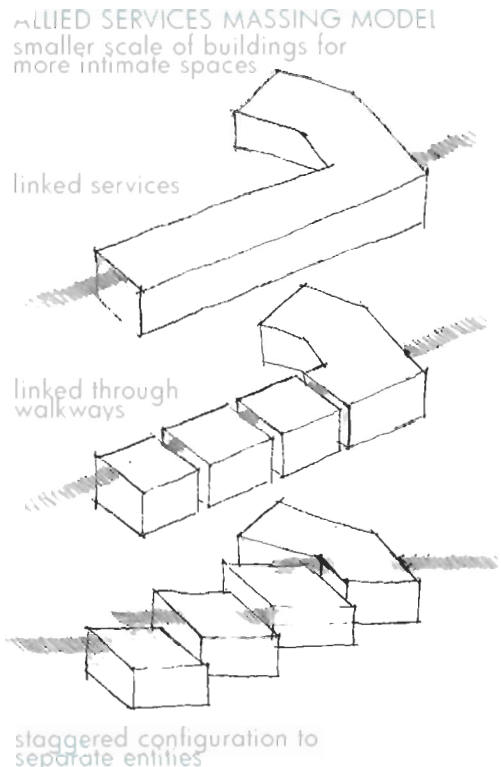
PROPORTION

Proportion of the buildings and spaces is derived from mainly two sources:

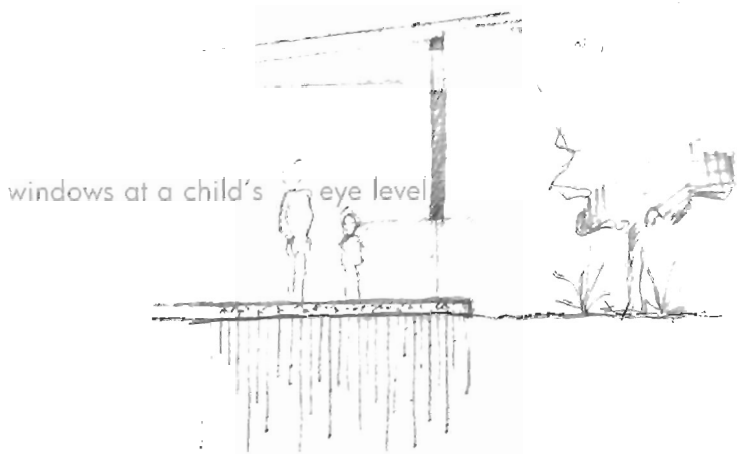
- Material proportion: materials are used in a rational and honest fashion that is reflected in the proportions
- Structural proportion: the size and proportion of elements are directly related to the structure

ATTENTION TO DETAIL

The attention to detail lends a superior quality to the design of the buildings. This conveys the noble and honest intesion. It expresses thoughtfulness and care towards the user.



illus 5.7 Scale of the building proportions



illus 5.8 Focus on child's scale

cluster organization

SPATIAL ORGANIZATION

The building complex is organized as a cluster of forms and spaces. This is due to three main considerations:

01 - To allow movement through the complex

The traditional insitutional building is one that is enclosed and unaccessible. This is the cause for great speculation as to what is happening inside the building. The stigma around institutional buildings can be contributed partly due to this. Throughthe design of permeable structures arranged in an accessible configuration, a transparent process is communicated.

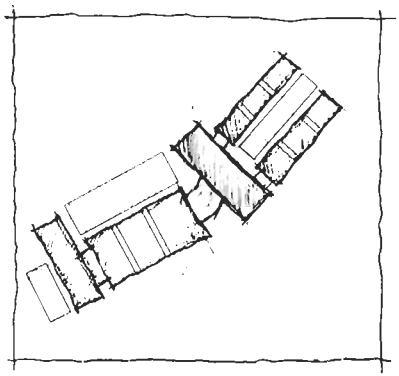
02 - To allow a range of users to utilize the facilities

Visitors will utilize the facilities in a number of ways that might not include necessarily all the functions of the centre. Through grouping suitable accommodations together, the visitor can use spaces without disrupting others.

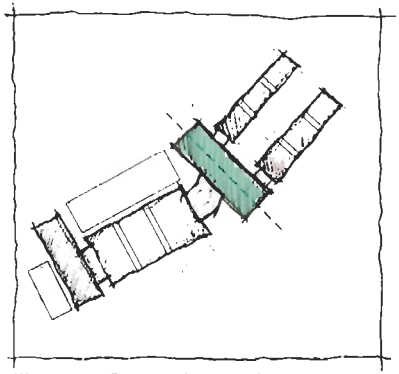
03 - To create different types of spaces with varying levels of publicness

The site is so vast that it became necessary to distinguish smaller spaces in order to allow the patient to choose a setting in which he/she would be comfortable in.

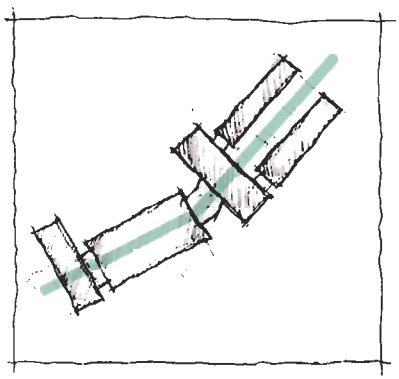
characteristics of cluster organizations



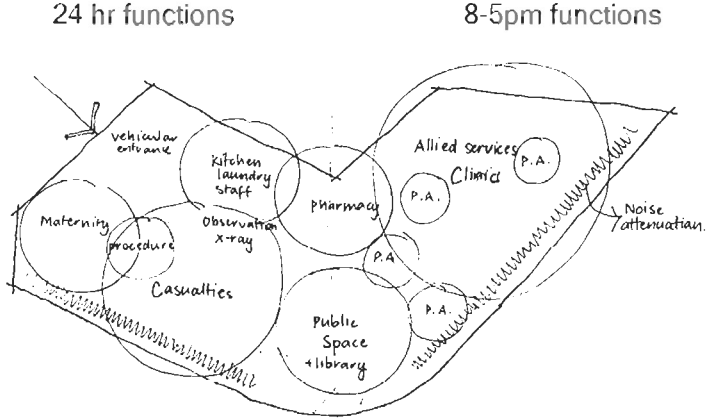
illus 5.9 Clustered pattern



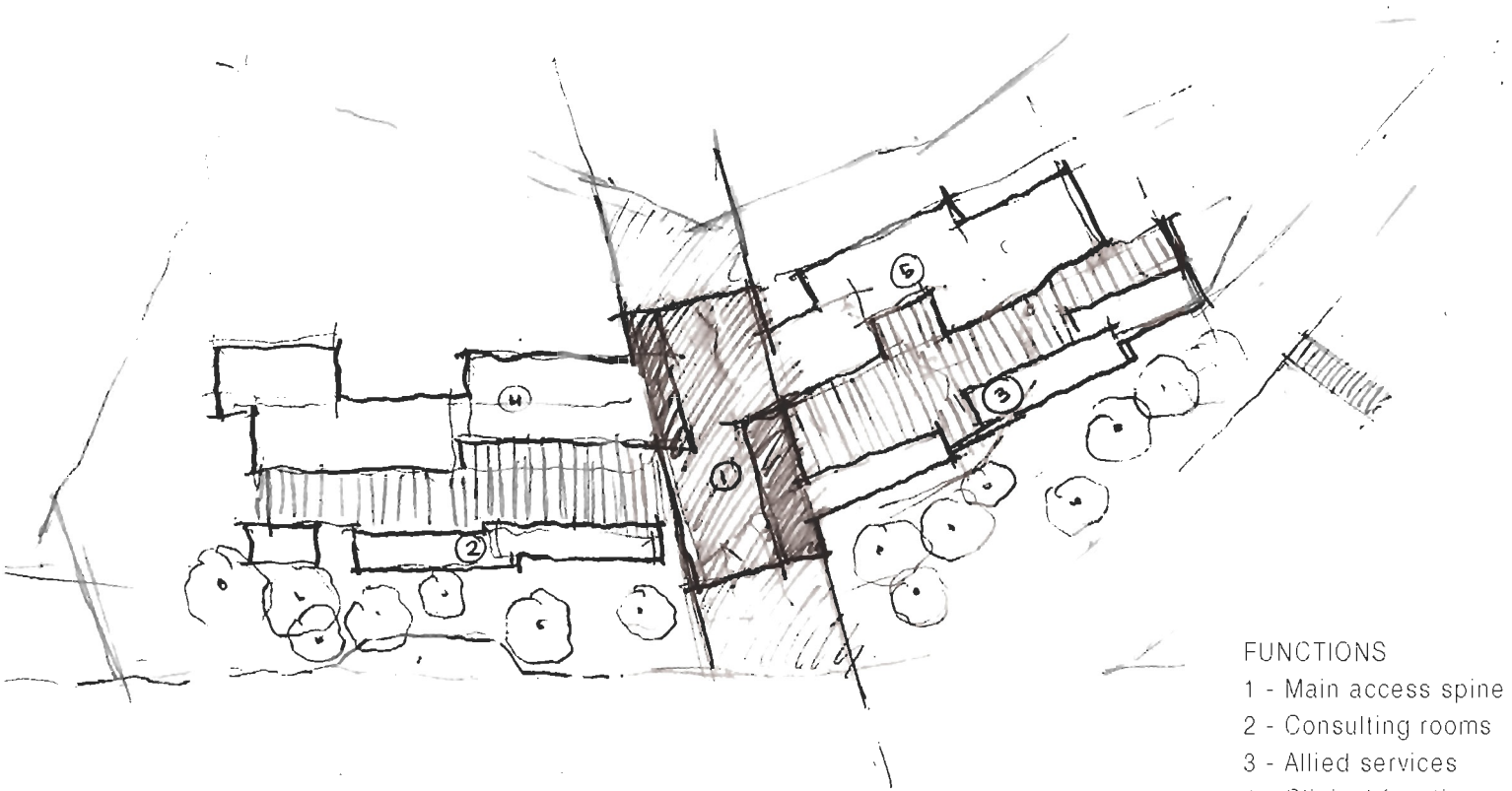
illus 5.10 Grouped around an entry



illus 5.11 Clustered along a path

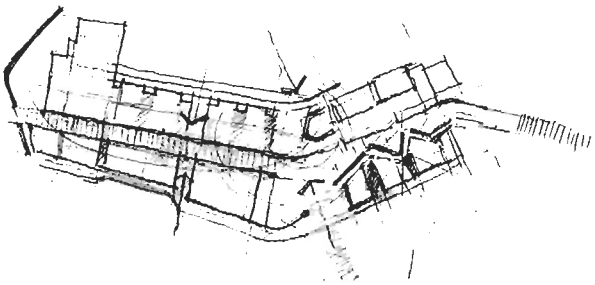


illus 5.12 Sketch showing the zoning plan

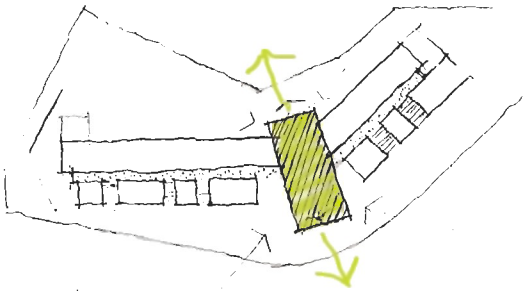


illus 5.13 Sketch showing the initial design layout of building programme

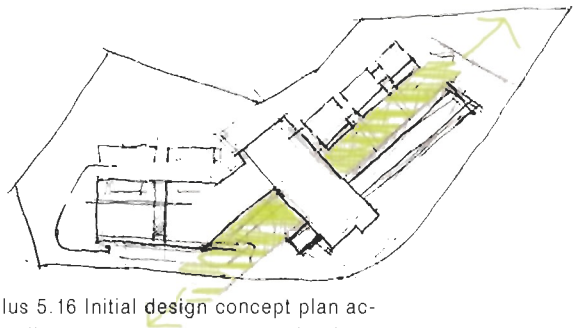
FUNCTIONS
1 - Main access spine
2 - Consulting rooms
3 - Allied services
4 - Clinical functions
5 - Clinical functions



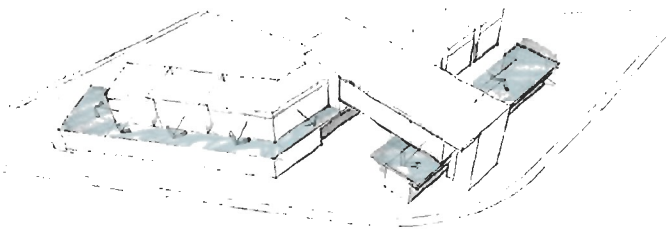
illus 5.14 Plan development according to movement routes



illus 5.15 Primary path and entrance



illus 5.16 Initial design concept plan according to movement routes and points of access



illus 5.17 Legibility and views of the proposed building

movement

BUILDING APPROACH

The primary approach is spiral which prolongs the sequence of the path and emphasizes the three-dimensional form of the building parameter.

The secondary approach, which is slightly more oblique, enhances the effect of perspective on the building. Since the path is re-directed two times, the sequence of the path is also delayed.

ENTRANCES

The primary entrance and foyer is open, legible and articulated. It has landmark qualities and thereby orientates users towards the access and information points.

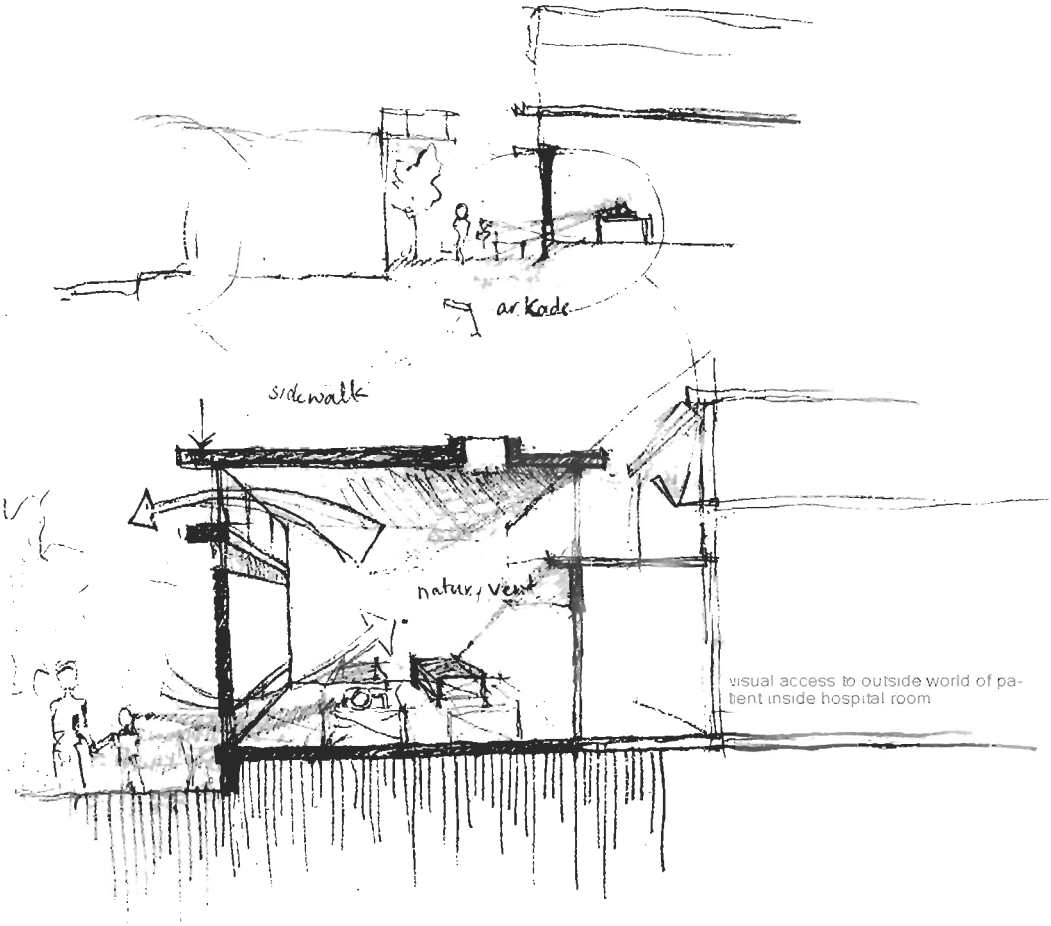
CONFIGURATION OF PATH

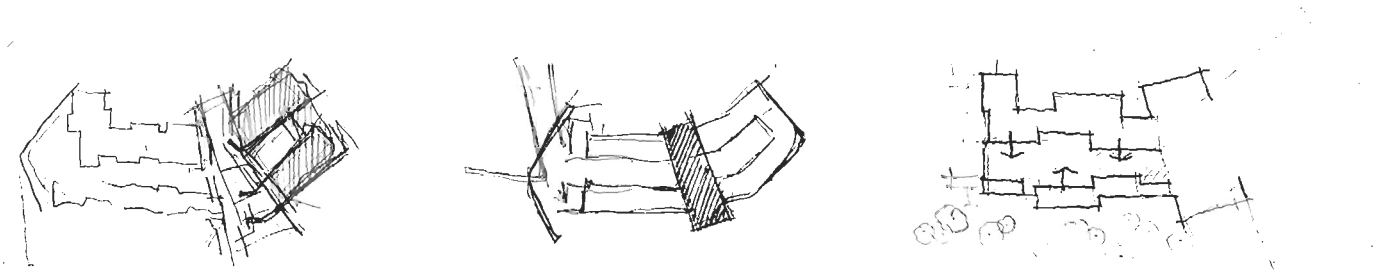
Both the primary and secondary paths are linear and organize a series of spaces.

LEGIBILITY

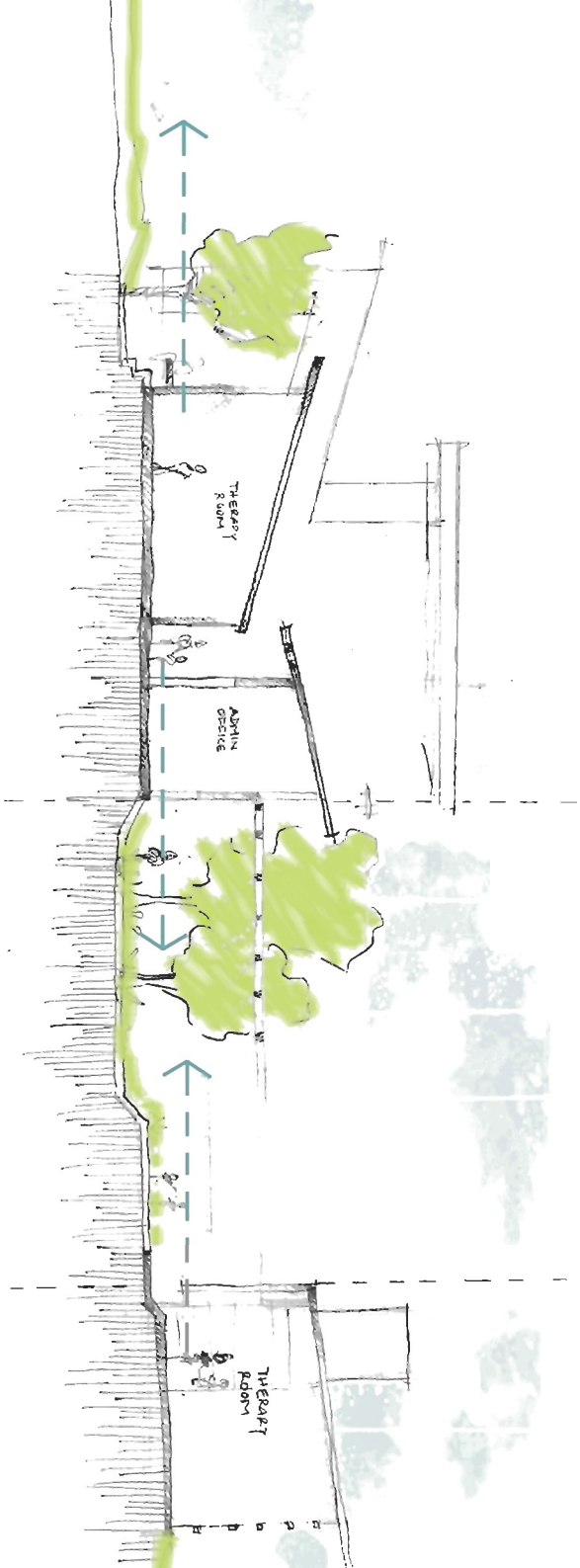
Visual legibility strongly influences the ease with which unfamiliar visitors may navigate the building. Legibility is strengthened through vertical movement or central staircase that act as a visual point of reference from the square and various parts of the building, facades that are transparent allow a certain degree of visibility, and walkways that contribute to rational understanding of movement along building.

illus 5.18 Sketch showing visual access between interior and exterior spaces





illus 5.19 Sketches showing plan development



SOUTPANSBERG ROAD

NOISE ATTENUATION BY NATURAL PLANTING

PUBLIC SEATING

MAIN CLINIC BUILDING

PASSAGE WITH NATURAL LIGHT AND VENTILATION

VERTICAL CIRCULATION

COUR¯YARD SPACE

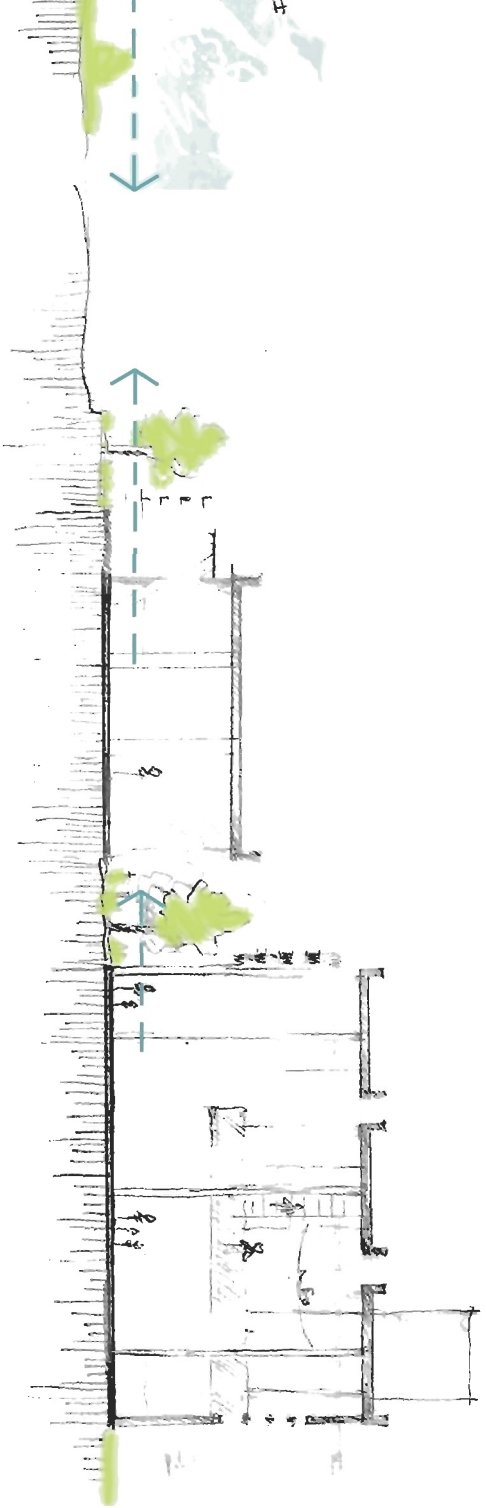
CHILDREN'S PLAY AREA

WALKWAY

VERTICAL ELEMEN¯

VIEWS TO EXTERIOR LANDSCAPING CREATES A SENSE OF PLACE

illus 5.20 The complex reaching into the landscape (integration of building and landscape)



SOUTPANSBERG ROAD

CONSULTATION ROOM

PASSAGE WITH NATURAL LIGHT AND VENTILATION

VIEWS TO LANDSCAPING CREATES A SENSE OF PLACE

ATRIUM, RECEPTION AND PUBLIC WAITING AREA

CHILDREN'S INFORMAL L BRARY

VERTICAL CIRCULATION

EMERGENCY VEHICLE PARKING

building response

1 ENTRANCE FOYER AND RESTAURANT

The information desk acts as a reception for the whole complex and is centrally located at the foyer. The entrance foyer is a public space situated at the primary entrance from where people disperse to seperate buildings. The waiting area and public ablutions are also situated here.

The restaurant sits at the most public edge of the building, which will allow a variety of users to occupy this space.

2 CLINIC AND CONSULTATION AREA

The primary clinic is situated in a more private area to ensure privacy and a connection with the natural environment. Consultation rooms are on the street edge, protected from noise levels by vegetation and screen walls - that also create a comfort area.

3 TRAUMA UNIT AND PHARMACY

The trauma unit is located adjacent to the main entrance, with ease of access for emergency vehicles as well as the general public. The pharmacy is located at the street edge, containing more public functions.

4 ALLIED SERVICES

The two allied services buildings are situated around a mobius playstrip, ensuring access to nature and activities.

5 CLINICAL SERVICES AND STAFF AREAS

The majority of clinical and staff areas are set on the western side of the site, with access controlled entries. The staff dining area and kitchen opens up onto a private green space - extending the building into the landscape.

illus 5.21
Building response

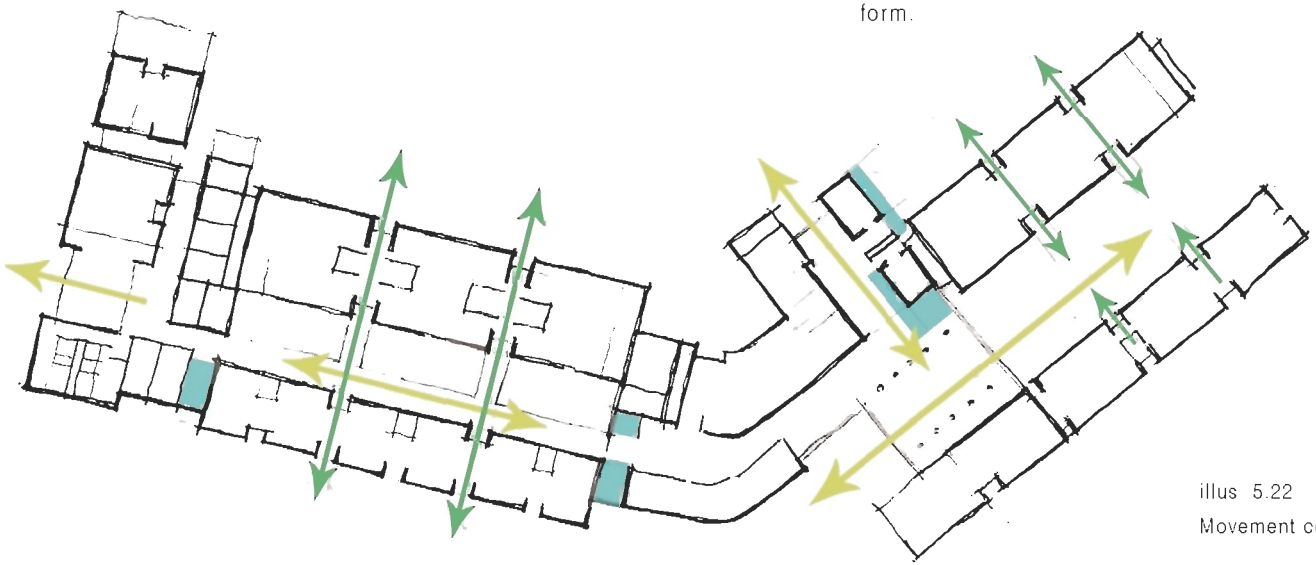

primary entrance
secondary entrance
2
3
1
4
4
primary entrance

ONE DOES NOT PHYSICALLY EXPERIENCE SPACE SIMPLY BY GLAZING AT BUILDINGS OR LOOKING AT THEM FROM ABOVE. SPACE IS EXPERIENCES ONLY THROUGH SEQUENTIAL MOVEMENT. - FUMIHIKO MAKI

movement

The movement system becomes part of the buildings and is defined by spatial elements. These elements are dynamic and enhance the notion of movement through their rhythmic configuration.

Where there exist no movement the buildings become enclosed, indicating a grounded, static form.



illus 5.22
Movement concept

illus 5.23
Connections and contact

connections and contact

VISUAL CONTACT

Visual connectivity allows a transparent process to be maintained. This facilitates awareness, stimulation and wayfinding within the complex.

SCALE

The impression of a space often dictates or accommodates the type of contact we make. An important factor in the perception of a space is scale. Different scales will be used for different types of spaces.

In this project, the general interior scale of the buildings is of a residential nature. This gives a human and intimate quality. It is important that the user feels at ease and not challenged by his surroundings.

Where the nature of the spaces change from more public, to more private, the scale has been adapted to imply the use of the space.

space definition

DESIGN PHILOSOPHY

Two systems are used in the space forming of the project, space defining and space enclosing systems. This is due to the nature of the accommodation. The amount of privacy is controlled through the amount of enclosure. The amount of accessibility and permeability is allowed through space definition.

The two systems are expressed architecturally through the structure, form, openings and detailing of the buildings.

It is essential that the buildings communicate private and public functions in this manner as these systems replace traditional institutional systems of high walls and bars in front of windows. The inclusive quality of the buildings is not influenced by the structures, but allow for informed choices to be executed by the user.

For the space defining system a steel structure and roof is used that integrates with a space enclosing system that is expressed mainly through concrete walls and roofs.

ENCLOSED SPACE

Enclosed spaces mainly consist of the service and the private spaces where access is controlled and users feel secure.

The plan form of enclosed spaces indicated 'here' and 'there' as two distinct realms.

Space enclosing systems separate inside from outside and establish differences between different space types.

DEFINED SPACE

Defined spaces are the served and the public spaces that are permeable and where occupants and activities are visible.

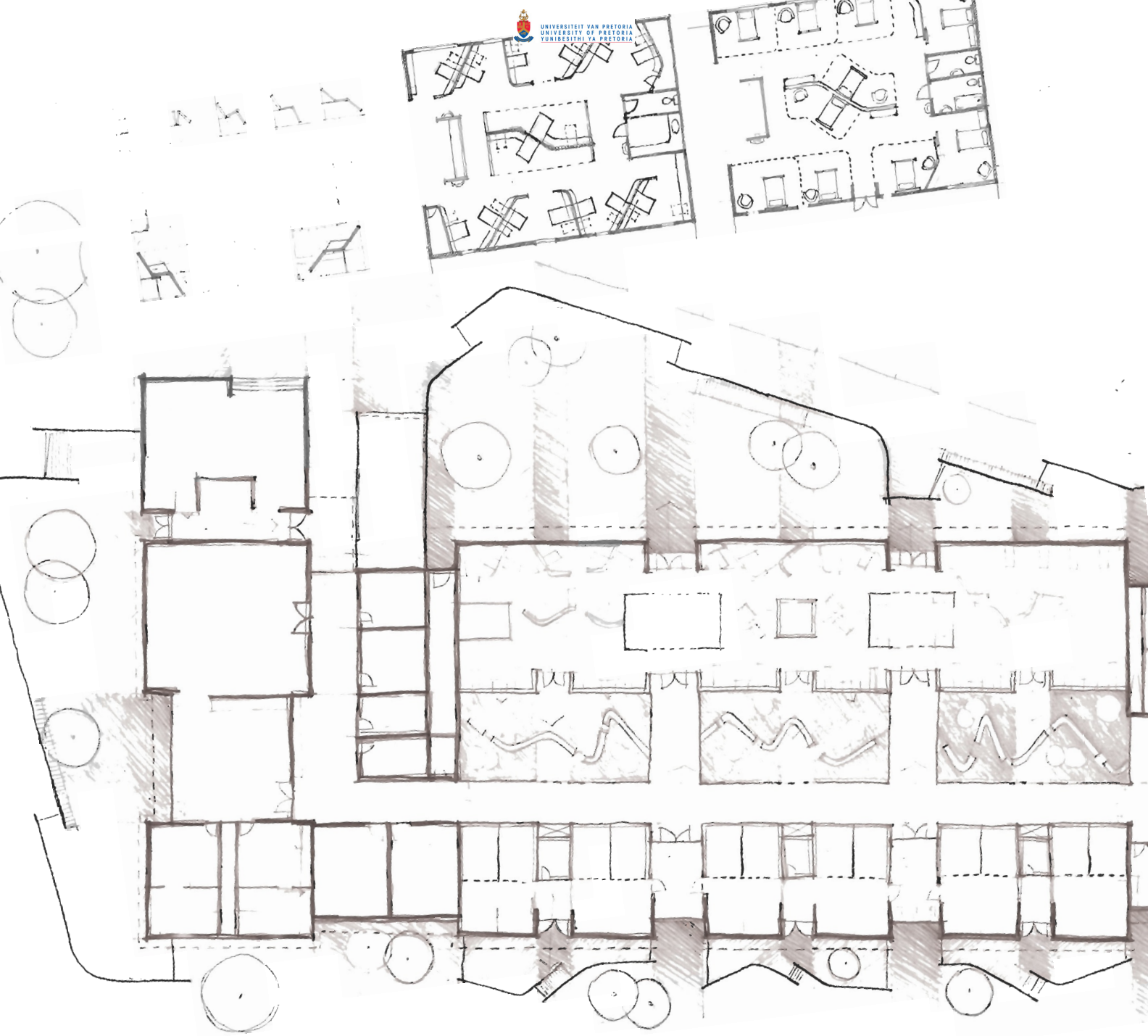
On plan, defined spaces have a loose spatial quality, its dominant feature is to 'connect' and maintain spatial continuity between building and landscape spaces.

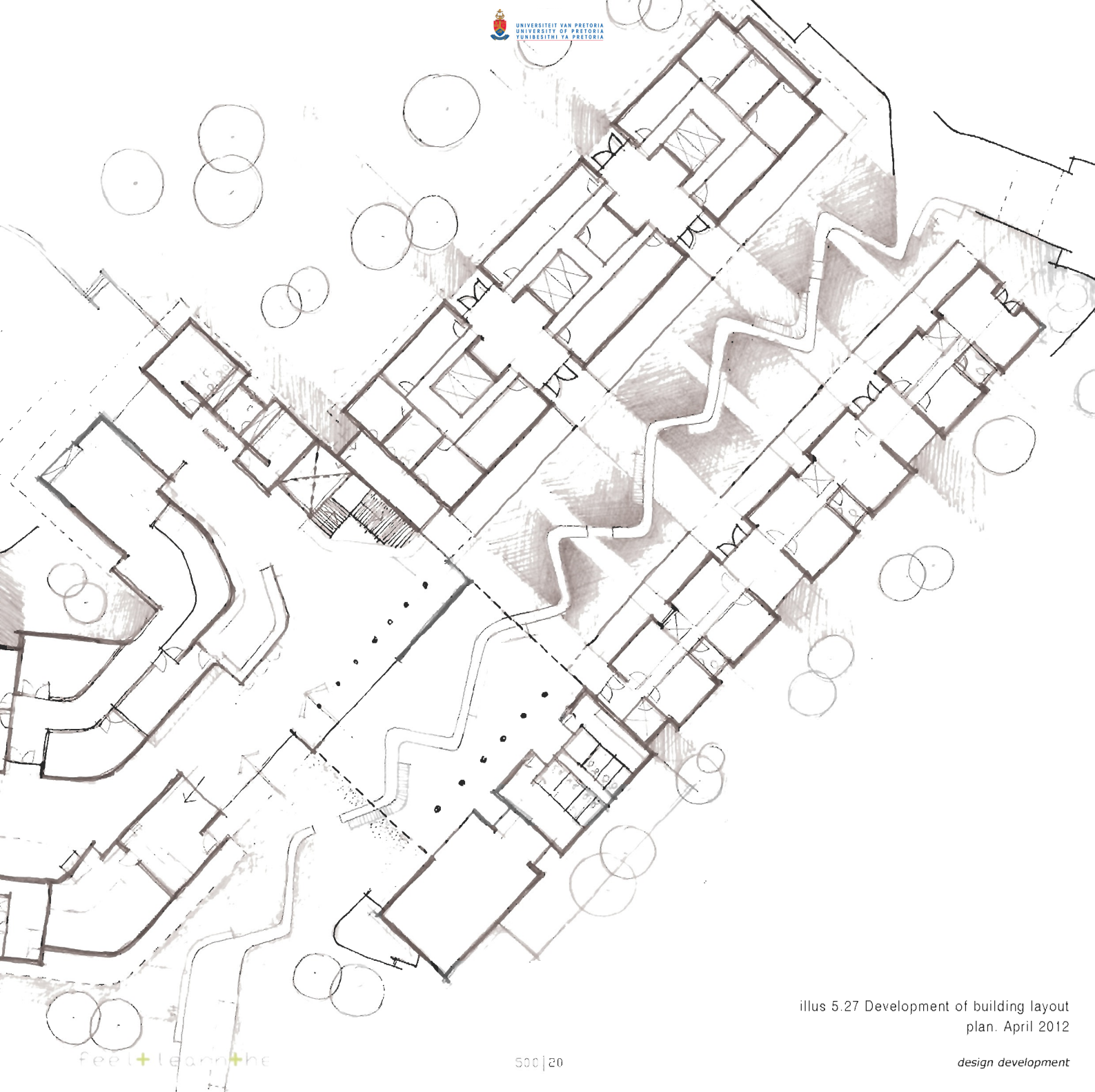
Space enclosing systems are subject to gravity, while space defining systems appear not to be responsive to gravity.

illus 5.24
Space definition

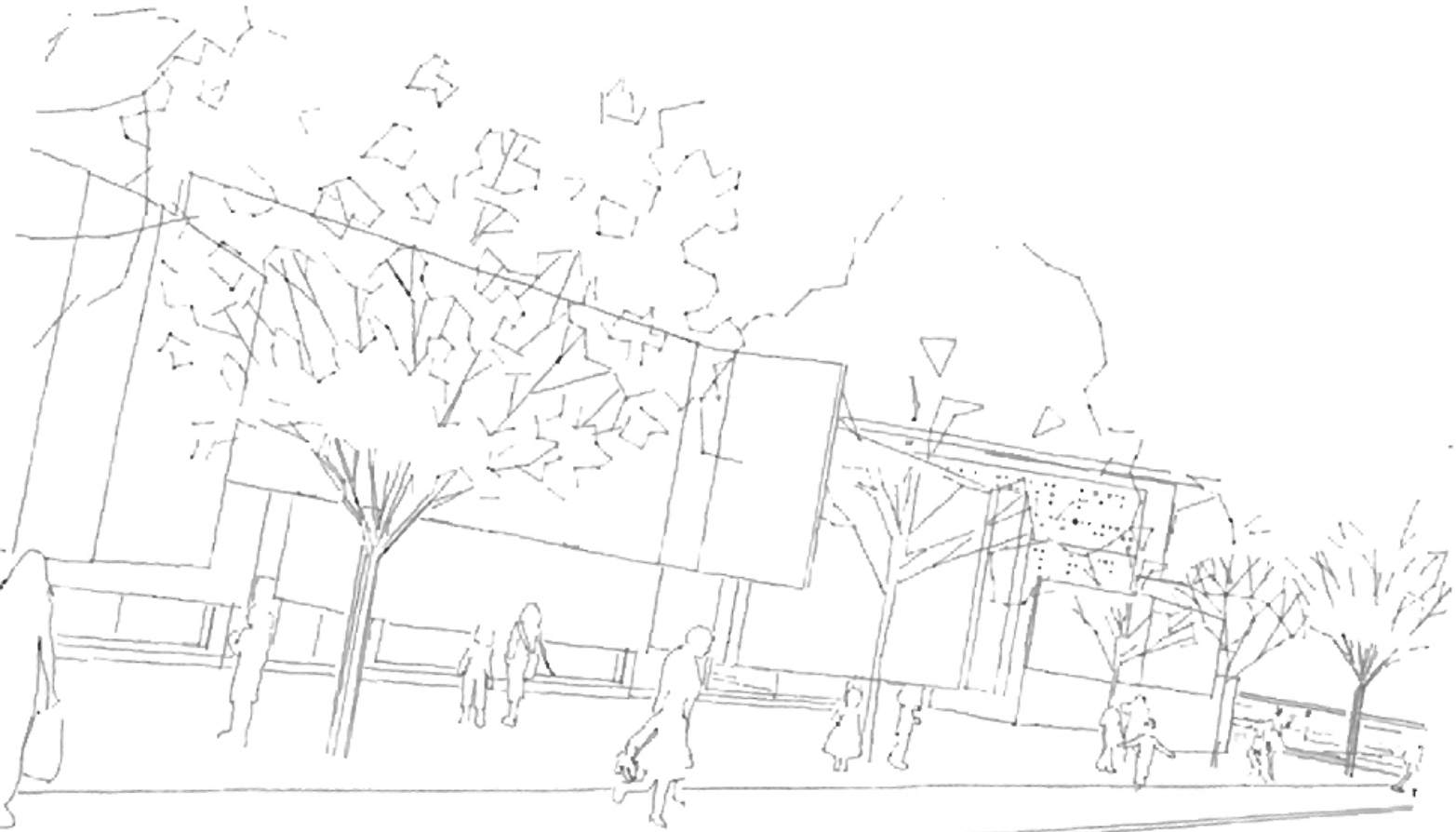
illus 5.25 Defined space

illus 5.26 Defined space

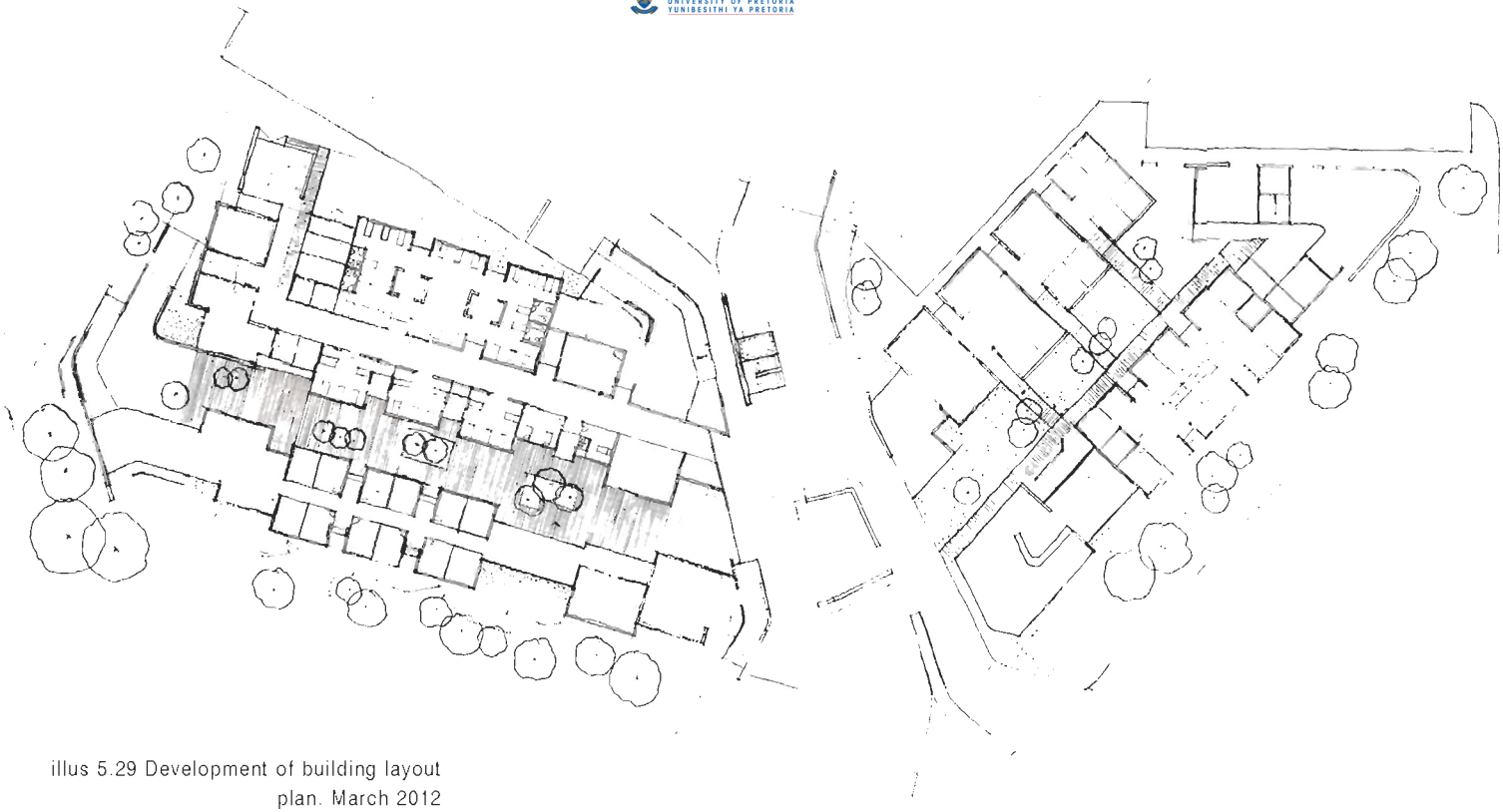




illus 5.27 Development of building layout plan. April 2012



28 Sketch showing the concept of layering to be
to building



illus 5.29 Development of building layout plan. March 2012

illus 5.30 Sketches showing legibility and views of the proposed building

building programme

functions

GROUND FLOOR

Semi-private indoor spaces for play, education and interaction of children in a safe environment

Private spaces for soothing, nurturing and comforting of ill or distressed children

Welcoming and inviting public healthcare facilities, that provide a variety of basic healthcare needs

Semi-public Outdoor play area for interaction of children

Public Outdoor play area for interaction of children

Lettable restaurant as interactive social platform and generator of income

FIRST FLOOR

A semi-public indoor space for play, education and interaction of children in a safe environment

A daycare centre that provides short term care of children while parents visit healthcare practioners

A research laboratory for education and clinical services

Offices space for administrative functions
Storage space for medical files

accommodation

GROUND FLOOR
Atrium and Waiting area
Restaurant and Kitchen
Trauma Unit - Examination Rooms
- Procedures
- Trauma and Triage Room
- X-Rays
- Stores
- Unit Manager Office

Rape Crisis Centre
Pharmacy and Pharmacy Store
24hr Paediatric Clinic
Doctor's and Nurse's Consultation Rooms
Public Ablutions
Allied Services - Social Services
- Physiotherpay
- Dietician
- Eye-testing Facility
- Occupational Therapy
- Speech and Hearing Therapy

Staff Ablutions
Staff Dining Room
Kitchen
Laundry
Services - Holding Area
- Cleaner's Room
- Sluice
- Milk Kitchen
- Sterilization
- Linen Store
- Equipment Store

Doctor's Rest Room

accommodation

FIRST FLOOR
Laboratory - Serology
- Clinical
- Bacteriology

Offices - Housekeeping and Maintenance
- Administrative
- HR Manager
- Hospital Manager
- Secretary

Medical Files Vault Store
Library - Reading Spaces
- Administrative Offices

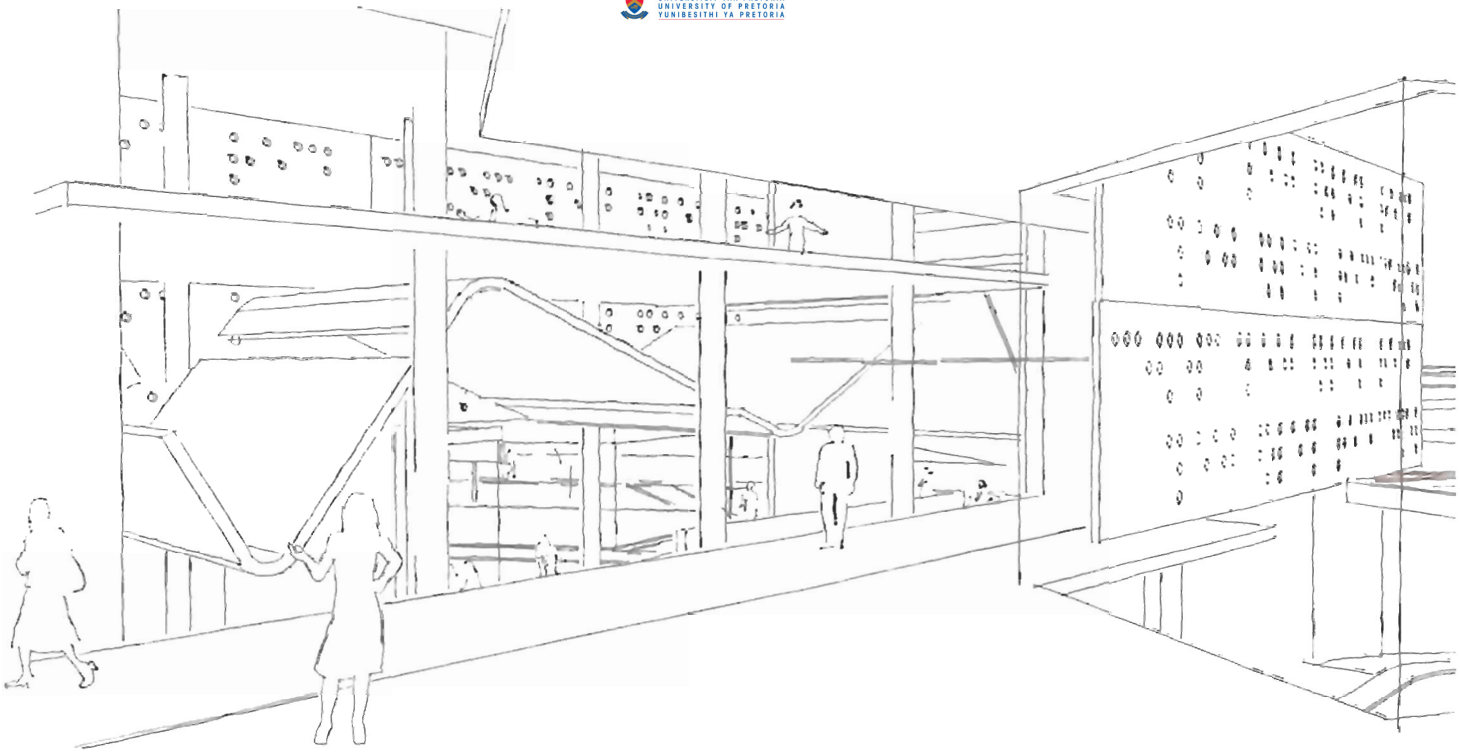
Media Library
Child Care Centre

building occupancy

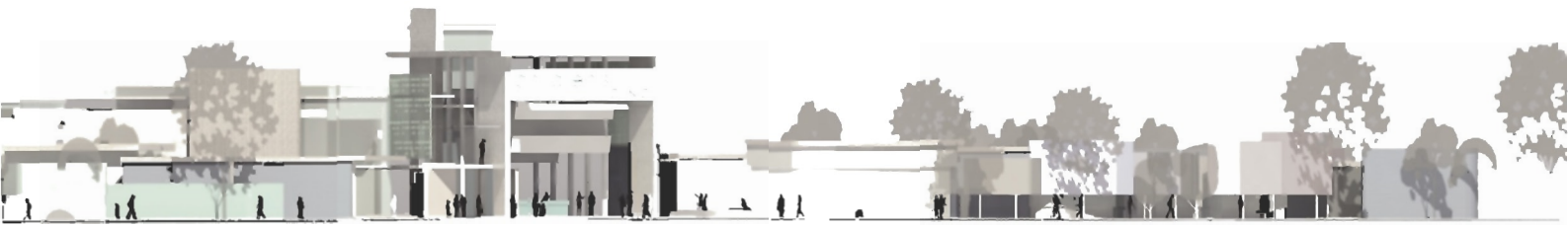
	STAFF	
RESTAURANT		8
LIBRARY		3
CLINIC	Head Nurse	1
	Nursing Staff	15
	Doctor on duty	4
	Trauma	3
	Kitchen	5
	Laundry	3
	Cleaning	3
	Maintenance	1
	Psychologist	1
	Secretary	2
	Receptionist	3
	Pharmacy	2
	Laboratory	4
	Files Stores	1
	Administration	2
	Hospital Manager	1
ALLIED SERVICES	Therapist/Specialist	8
	Assitant	8
	Cleaners	2
	Security	4
		84

	PATIENTS/PARENTS	
RESTAURANT		
LIBRARY		
CLINIC	Wards	20
	Procedures/Trauma	20
	Consulting	36
	Parents	12
	Waiting	12
		8
ALLIED SERVICES	Patients	18
	Parents	18
		150

TOTAL 234 users

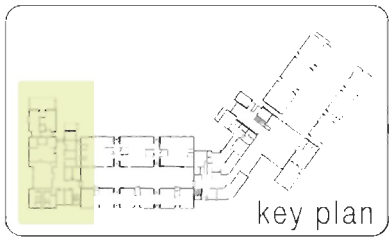


illus 5.31
view from administration offices on the first floor towards atrium and reading space for children



illus 5.32 Northern elevation

clinical services and staff areas



ENTIRE AREA = SERVICE

accommodation

GROUND FLOOR
Staff Ablutions
Staff Dining Room
Kitchen
Laundry
Services - Holding Area
- Cleaner's Room
- Sluice
- Milk Kitchen
- Sterilization
- Linen Store
- Equipment Store

guidelines

LAUNDRY
0,8 - 3,0kg/bed/day

SEQUENCE OF WORK:

Receipt Sorting Weighing	15sqm
Washing Spinning Beating out	wet 30sqm
Mangling/Drying Pressing Ironing	dry 60sqm

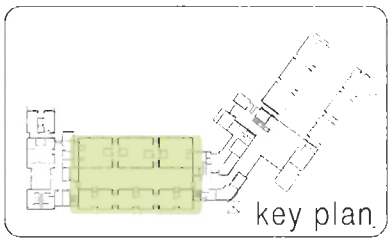
Sewing
Storage
Issue

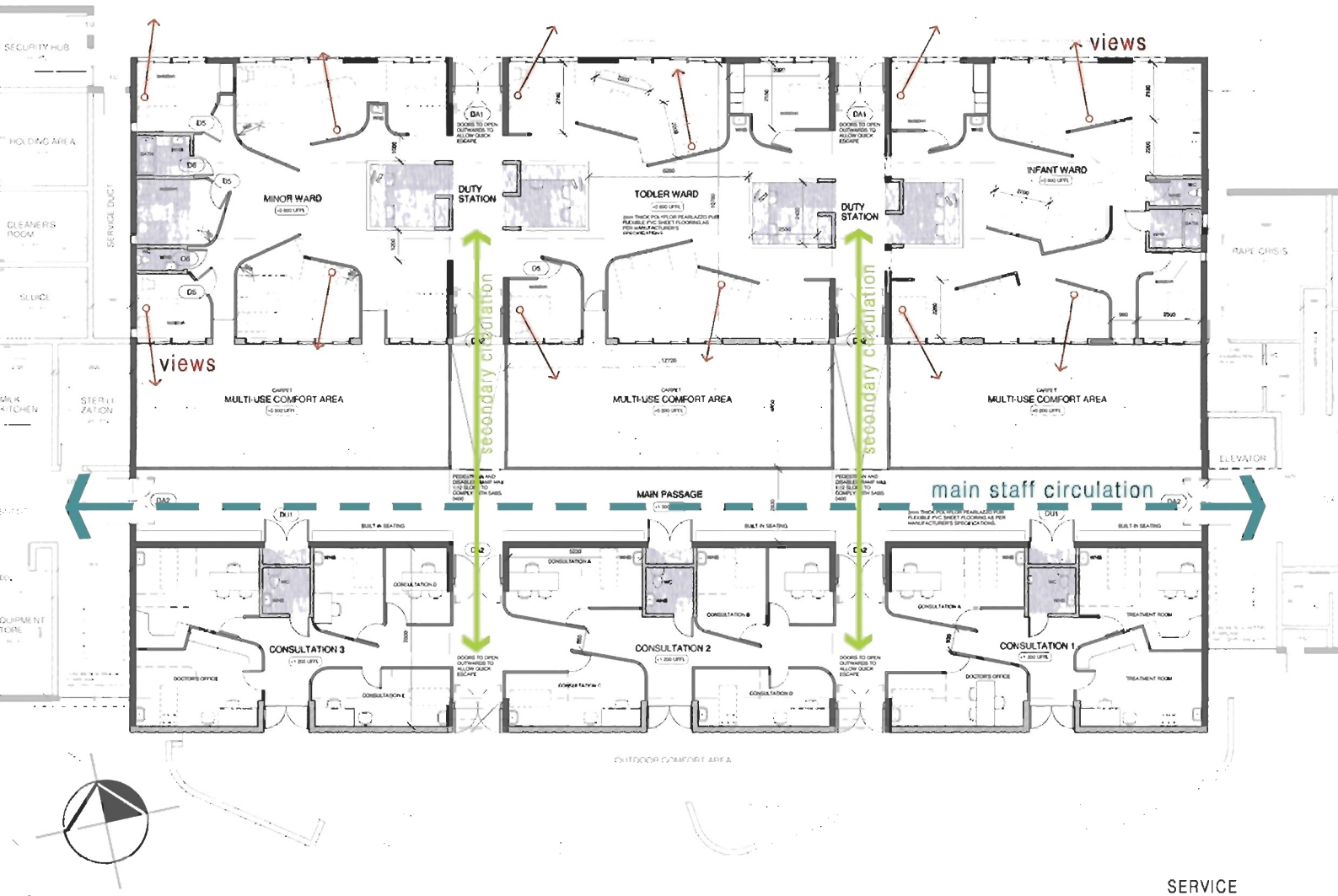
SERVICE YARD
A hospital/clinic service yard requires the following basic functions:
GOODS YARD FOR DELIVERIES
DISPOSAL OF THE FOLLOWING:
- Kitchen
- Septic
- Metal
- Glass
- Paper
- Chemical

PLANT ROOM CONTAINING:
- Generator
- Sprinkler control
- Oxygen distribution

illus 5.33 Detailed plan of service core of building

clinic and consultation rooms





accommodation

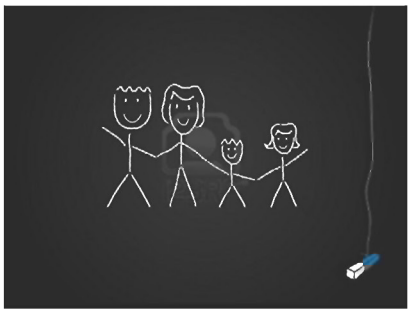
GROUND FLOOR

24hr Paediatric Clinic

Doctor's and Nurse's Consultation Rooms

precedents

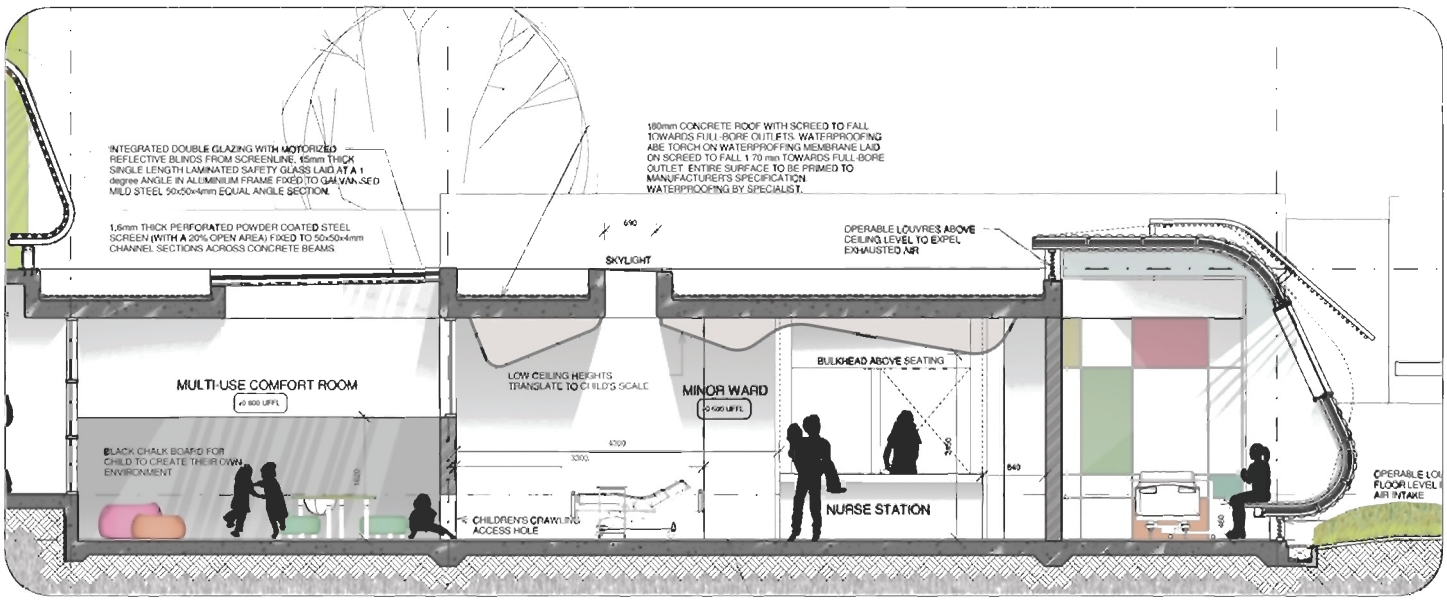
illus 5.35 Use of integrated service bed panel



illus 5.36 Blackboard wall in comfort area for expression of creativity

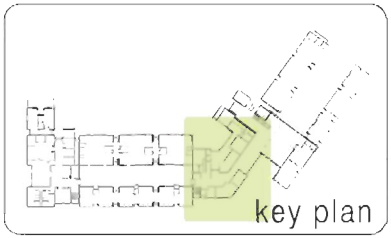
OVERHEAD PLANES

The ceiling plane, inside the consultation areas, defines the space and articulates zones within the room. The height and scale creates a child-friendly environment and is manipulated to improve acoustical qualities and reflectiion of natural light.



illus 5.34 Detailed plan of clinic and consultation rooms

illus 5.37 Detailed section through minor ward



trauma unit and pharmacy

accommodation

GROUND FLOOR

Trauma Unit - Examination Rooms
- Procedures
- Trauma and Triage Room
- X-Rays
- Stores
- Unit Manager Office

Rape Crisis Centre

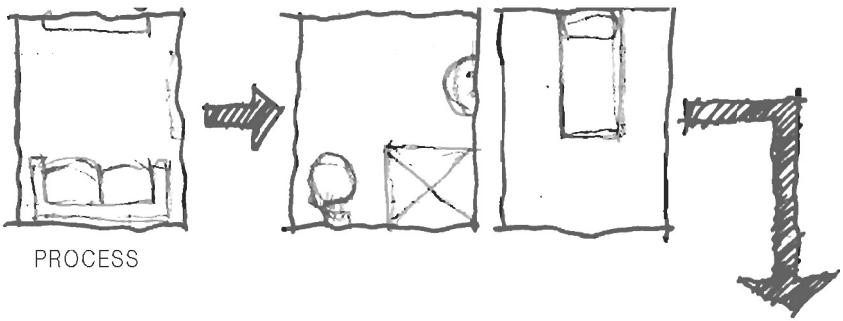
Pharmacy and Pharmacy Store

Doctor's Rest Room

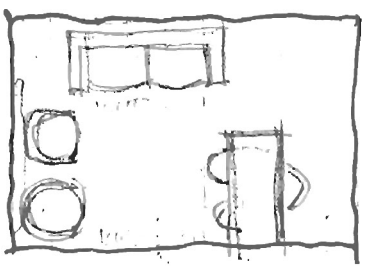
RAPE CRISIS CENTRE

The rape crisis centre is situated in a private part of the clinic, accessible from a less visual part of the building in order to protect the identity of rape victims and to lessen the psychological stress. The patient will firstly require medical attention, in a doctor's office and thereafter participate in a police investigation. Psychological therapy will follow once these processes are completed.

The space requires a typical home approach, to ensure the patient feels comforted, this will be achieved by using warm materials, soft lighting and high levels of natural light and privacy.



PROCESS



illus 5.38 Detailed plan of trauma unit and pharmacy

illus 5.39 Rape crisis centre process

public entrance, reception and restaurant

illus 5.40 Detailed plan of main entrance and restaurant area

accommodation

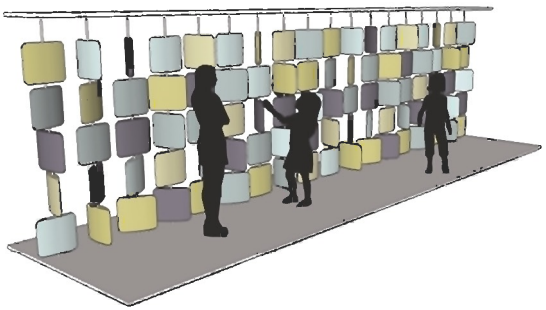
GROUND FLOOR

Atrium and Waiting area

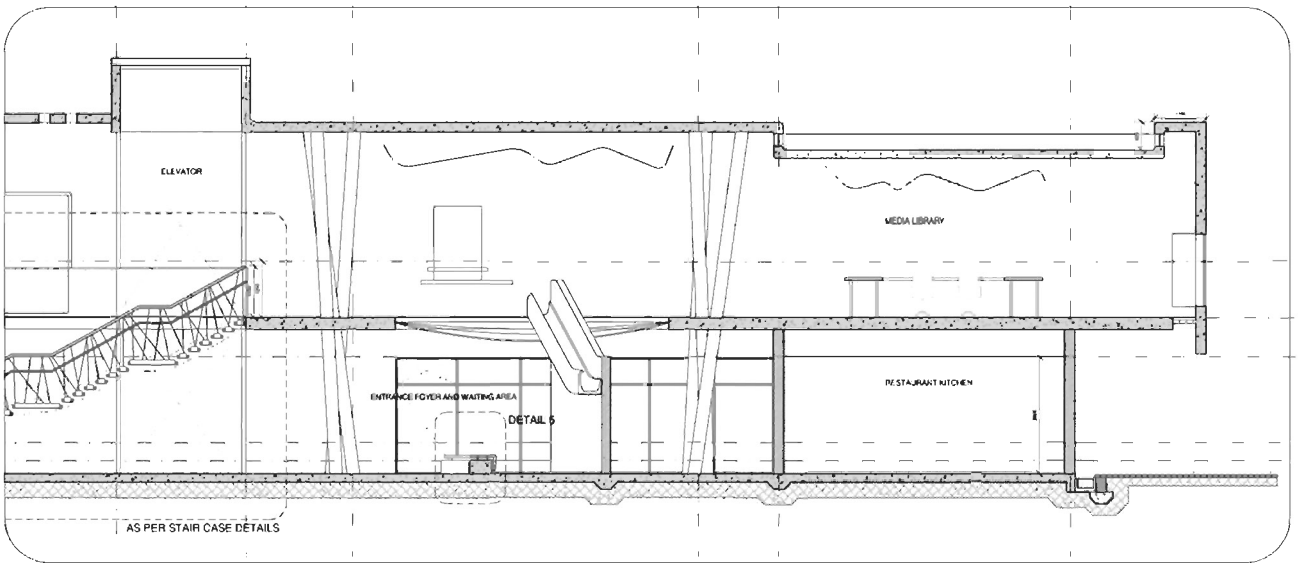
Restaurant and Kitchen

Public Ablutions

illus 5.41 Climbing wall in atrium space

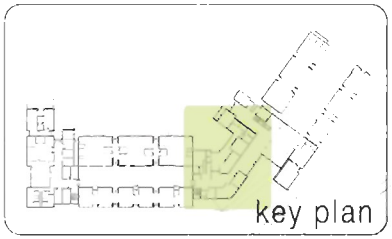


illus 5.42 Interactive mobile solar screen



illus 5.43 Detailed section reception area and library

allied services and mobius play



illus 5.44 Detailed plan of allied services buildings

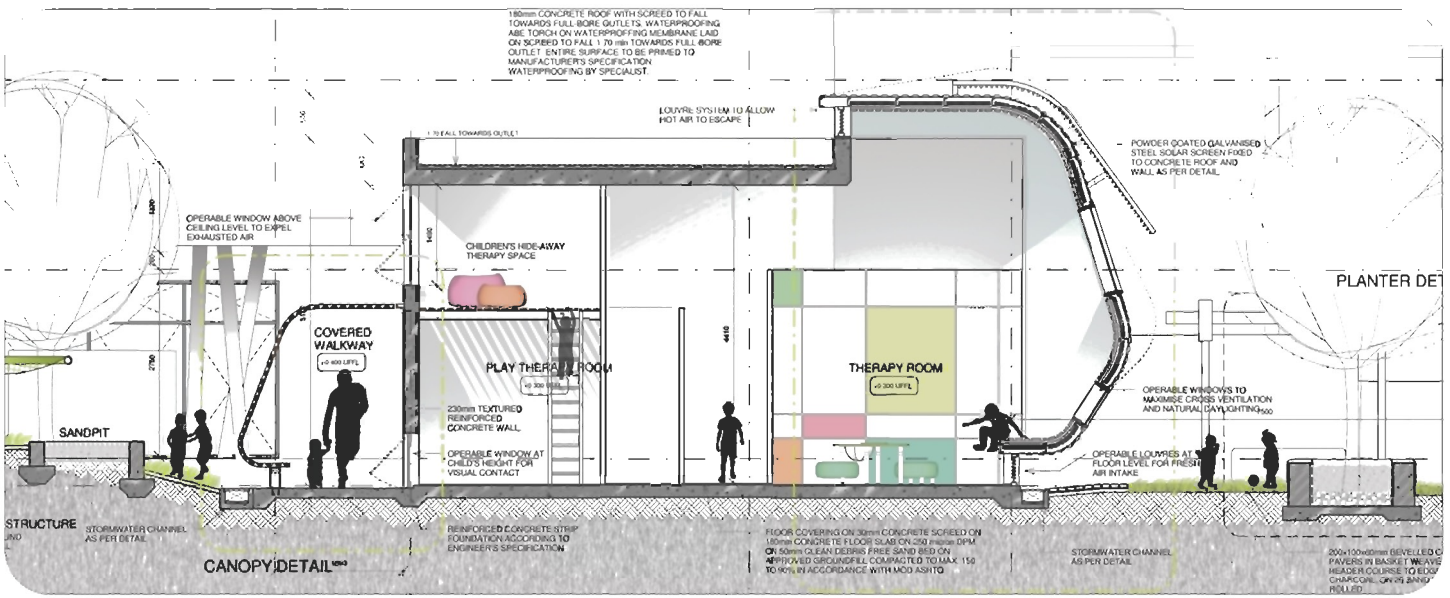
accommodation

GROUND FLOOR

Allied Services - Social Services
- Physiotherpay
- Dietician
- Eye-testing Facility
- Occupational THerapy
- Speech and Hearing Therapy

illus 5.45 Perspective view of mobius playscape

illus 5.46 Detailed section through alled services buildings



building users

Hypothetical building users were created to illustrate the facilities visitied and developmental stimulation that applies.

USER PROFILE	MEDICAL REQUIREMENTS & FACILITIES USED	DEVELOPMENTAL EXPERIENCE & ACTIVITIES
	GASTROENTIRITIS RECEPTION INFANT WARD - ISOLATION OVERNIGHT FACILITIES RESTAURANT PHARMACY OUTDOOR COMFORT GARDEN INDOOR COMFORT AREA	VISUAL STIMULATION through sight COGNITIVE DEVELOPMENT physical stimulation
AGE 1 year old TRAVELLED FROM: PRETORIA CBD MODE OF TRANSPORT: PEDESTRIAN ACCOMPANIED BY: MOTHER	TREAT LOOK EAT	
	VACCINE RECEPTION WAITING ROOM DOCTOR'S CONSULTING ROOM HER BROTHER GOES TO MEDIA LIBRARY MOBIUS PLAY STRIP OUTDOOR COMFORT AREA	CO-ORDINATION DEVELOPMENT mobius strip BALANCE SKILLS mobius strip COGNITIVE DEVELOPMENT media library
AGE 4 years old TRAVELLED FROM: MAMELODI MODE OF TRANSPORT: TAXI ACCOMPANIED BY: GRANDMOTHER AND BROTHER	RUN LISTEN TOUCH	

USER PROFILE

AGE 6 years old
TRAVELLED FROM: SOSHANGUWE
MODE OF TRANSPORT: BUS
ACCOMPANIED BY: OLDER BROTHER

MEDICAL REQUIREMENTS & FACILITIES USED

SPEECH & HEARING THERAPY

SPEECH AND HEARING WAITING AREA
MOBIUS PLAY
THERAPY ROOM

RESTAURANT
MOBIUS PLAY

CLIMB
SING

DEVELOPMENTAL EXPERIENCE & ACTIVITIES

AGILITY mobius strip
HAND-EYE CO-ORDINATION mobius strip
COGNITIVE DEVELOPMENT therapy

AGE 12 years old
TRAVELLED FROM: PRETORIA CBD
MODE OF TRANSPORT: PEDESTRIAN
ACCOMPANIED BY: NONE

SEXUAL ABUSE

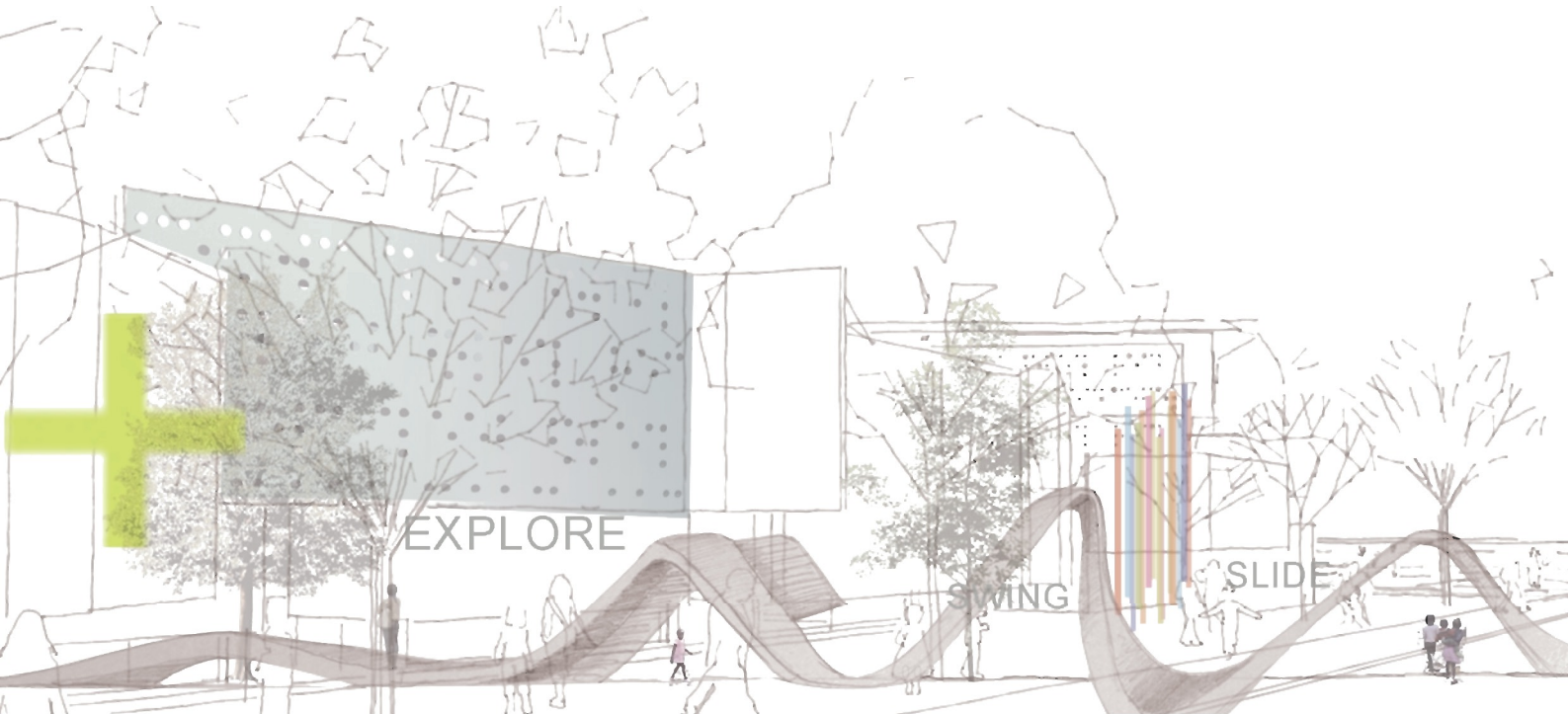
RAPE CRISIS CENTRE
OCCUPATIONAL THERAPY

PHARMACY
OUTDOOR COMFORT GARDEN

SHOOTER EXAMINE
CONFIDE IN SHARE
QUIET MOMENTS
THERAPY

COGNITIVE DEVELOPMENT therapy

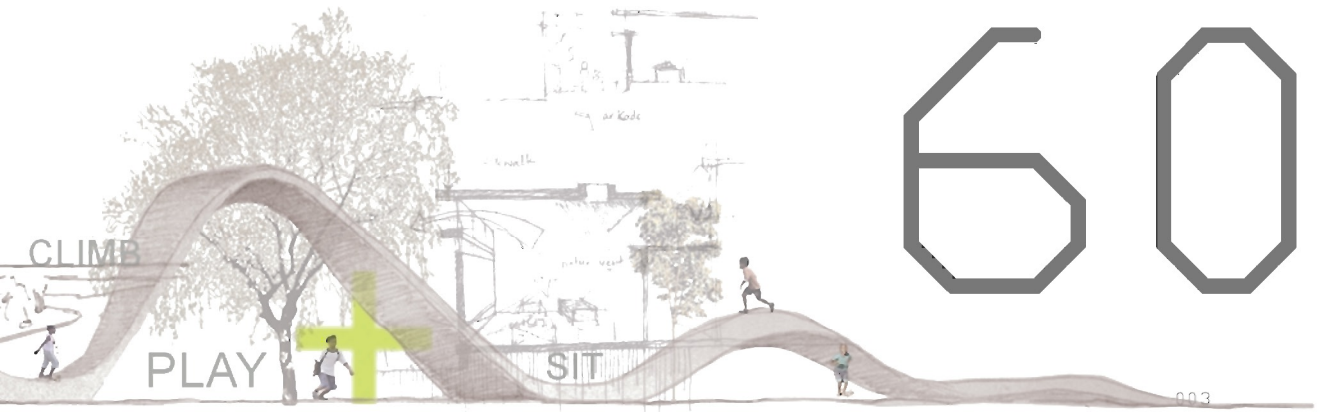
technical investigation



feel + learn + heal

A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC

STRUCTURAL COMPOSTITION
FLOORS
OUTER MEMBRANE
INTERNAL MEMBRANE
ENVIRONMENTAL CONSIDERATIONS
Occupant Comfort
Thermal Comfort
Visual Comfort
Ventilation
Acoustic Comfort
Views
Inclusive Environments
Public Transport and Routes
Parking
Building Entrance
Circulation
Ablution Facilities
Greening Strategies
Fire Control



600

structural composition

CAST IN SITU CONCRETE STRUCTURE

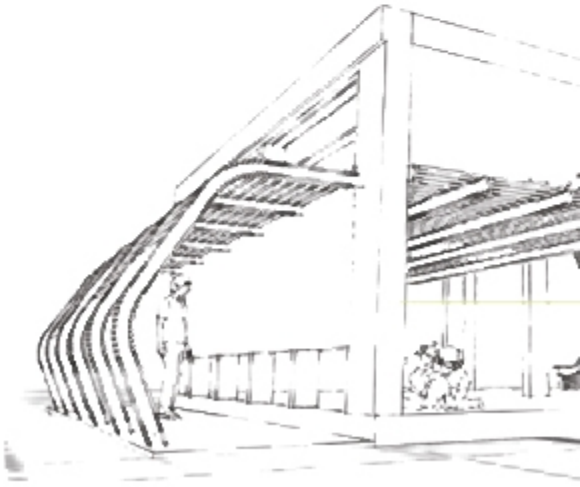
Load-bearing walls and columns (at 4000 centres), with masonry infill in certain sections which support the remaining structure

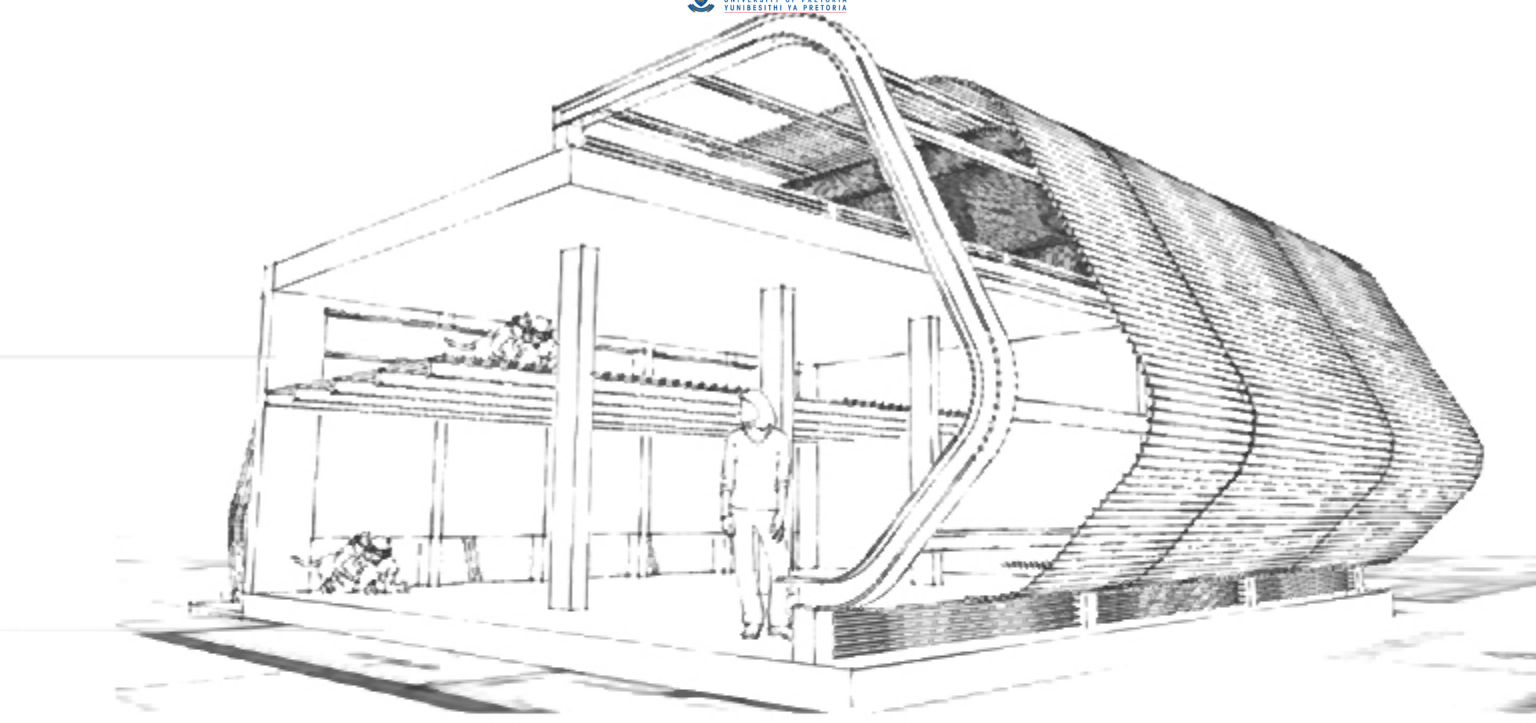
The primary structural system employed in the new design consists of reinforced concrete walls, structural brickwork and reinforced concrete roofs. The design also took advantage of the thermal mass and structural integrity of concrete as construction material The material palette selected for this semi public building was selected to create and emphasise the effect of the tactile human sense, using colour, texture and light as inspiration. Other aspects addressed through the selection of materials include the effect of the threshold. while complimenting the existing city fabric and almost industrial textures, seen in this part of the city. Material consideration further included solar heat gain, durability and sustainability. Plastic and metals are recycled, while glass products are strong and reusable.

CAST IN SITU CONCRETE FLOOR SLAB

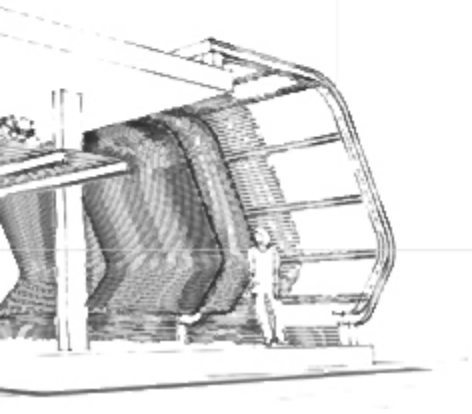
CALCULATIONS
Reinforced solid concrete slab
L = typical span (2000-7000)
d = typical depth (100-250)
L/d = Typical [22-32]
7000/255 = 27,45

Applied depth of 255mm over typical span of 7000mm. (Orton, 1994:34)





illus. 6.1 Structural composition of building



STRUCTURAL STEEL COLUMNS WITH BEAM OVERHEAD

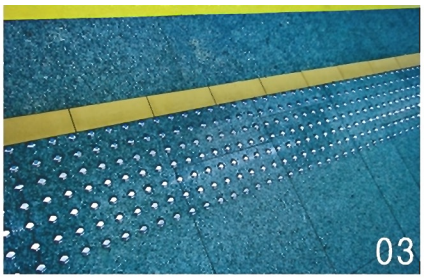
Custom made structural steel columns clad with aluminum infill panels and timber interior

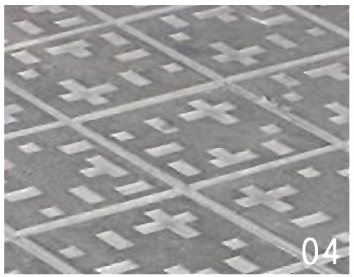
LOAD-BEARING STRUCTURAL MASONRY WALLS

CAST IN SITU CONCRETE STRUCTURE

Load-bearing walls and columns (at 4000 centres), with masonry infill in certain sections which support the remaining structure

floors

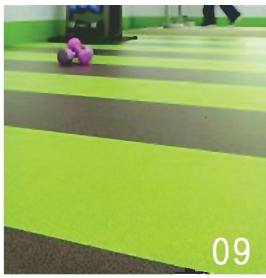




EXTERNAL

Navigation around the building complex is made accessible to children and the handicapped through a variety of different surface finishes. External landscape areas which mark different movement routes within the landscape consist s of 600 x 2000 concrete blocks [02] that emphasise the edges of the site. Within these concrete blocks are braille tiles (bumpy extruted tiles) [05] that make it easy for the visually impaired users to navigate their way [06]. Main movement routes are covered with a 5mm stone aggregate bound by a macadamised asphalt base. Surfaces will be pigmented in certain areas to demarcate certain activity spaces. Surrounding movement routes consist of fine-aggregate cast in situ blocks of 600 x 1500 mm. These blocks will be cast with patterns in certain areas [04], demarcating transition areas. Parking and service areas are covered with permeable interlocking paving. External decked areas (restaurant and staff dining areas) consist of a mentis grid and marine grade timber surface [07]. Saligna, is used in all vertical ciculation routes, and encourages the idea of a temporary versus permanent structure. Saligna is also used in the allied services building, where a 'nestled' loft space is created for children, here, views through the floor plane challenges the idea that floor should be solid, and allows natural light to filter into the space bellow.

illus. 6.2 Floor coverings



INTERNAL

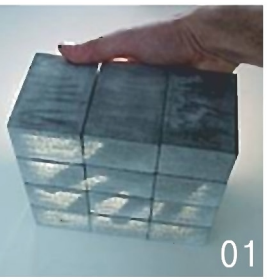
On ground floor the concrete surfaces are finished in a variety of ways. All areas on the ground floor will experience heavy traffic flow and will therefore need to be robust. The concrete surface beds within the allied services buildings are finished with a mechanical floor grinder after construction is complete. The surface finish is given a smooth polished look and the aggregate used in the concrete mix is slightly exposed after 2mm of the surface has been removed. In large areas where cracking may occur, the concrete is cast in one session and movement joints are later cut into the surface using a grinder. In play areas and internal comfort areas, smooth rubber tiles [01] are placed over the floor to prevent injury and to provide shock absorption.

In the entrance foyer and restaurant, the concrete surface bed is finished with a layer of epoxy resin. All clinic functions, which includes consultation rooms, wards and services, will receive a compact PVC floorcovering [09], that will provide heavy loads resistance, acoustic efficiency, and micro-organism protection. 2.6mm thick Sarlon tech sparkling sheeting is applied to concrete surface bed using an acrylic adhesive, joints must be butted, grooved and heat welded to ensure that the welding rod bonds to more than 70% of the sheet thickness.

Ablutions are finished with tiles as indicated. The concrete slabs on the first floor of the the administration area is finished with epoxy resin and the laboratory with compact PVC floorcovering.

outer membrane

illus. 6.3 Wall surface and glazing materials



WALL SYSTEMS

The wall system consists of two parts, a cast in situ concrete (enclosing) system and a composite clad (space defining) system.

CONCRETE

The building consists of various concrete products used in the construction of concrete columns with masonry infill, load bearing walls and floor and roof slabs. Concrete was chosen for its high mass that attributes to good thermal insulation and sound isolation necessary for the auditorium. Although it is perceived as a heavy, cold material, this view is challenged by using different off-shutter methods [03]. These methods include horizontal timber panels and smooth steel panels.

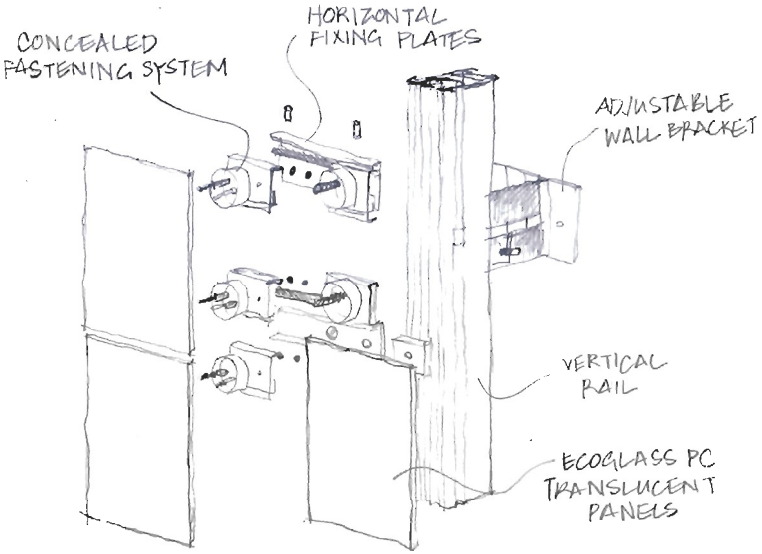
Pigments used in the concrete work are mainly applied to ensure that the colour remains consistent despite the aggregate used. Two neutral hues are used in the design, namely off white and light grey. These hues have been chosen to ensure that the interior spaces seem light and airy. This is enhanced by the application of a light-transmitting concrete in the communal waiting area [01]&[02].

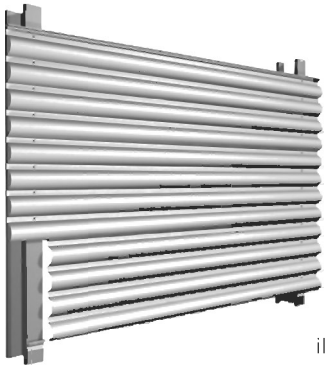
COMPOSITE CLADDING

A structural steel frame that defines that outer skin of the building consists of two cladding materials. Custom made structual steel columns form the base of the skin. The majority of the building is clad in 25mm Softwave aluminum panel, fixed to the outside of the steel frame.

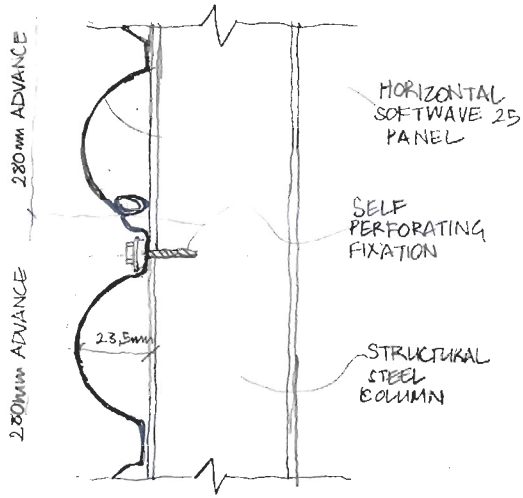
Aluminum was chosen as cladding material due to it's compelling argument to be regarded as a green material - it's recyclable, lightweight, versatile and highly durable - and one of the most

illus. 6.4 ecoglass fixing detail





illus. 6.5 Softwave panel

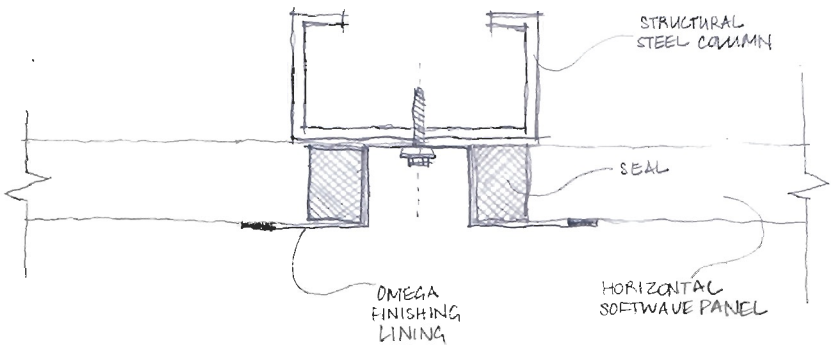


TYPICAL FIXING DETAIL SECTION

abundant materials in the earth's crust. Aluminum has an embodied energy of 8.24kg/CO2/kg, which is high compared to other construction materials, but possesses many other attributes, such as safety factors and recycling ability that makes it a suitable material for this application.

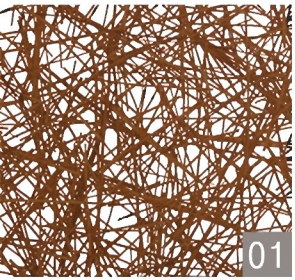
Advancing technologies has also meant that mines have reduced energy required to make bauxite into aluminum by almost 70%, with over 50% of that energy from renewable resources - largely hydro-electric (Hunter, 2012:35).

Below the aluminum cladding is a operable louvre system to allow for fresh air intake. Another louvre system is located at the roof level, where the steel frame connects to the concrete beam, which extracts exhaust air from the room and therefore enhances the natural ventilation of the spaces.



illus. 6.6 Softwave panel detail

internal membrane



A range of surface finishes and textures are used in the interior spaces to emphasize the tactile qualities of materials and to stimulate the sensorial experience of the user.

TIMBER

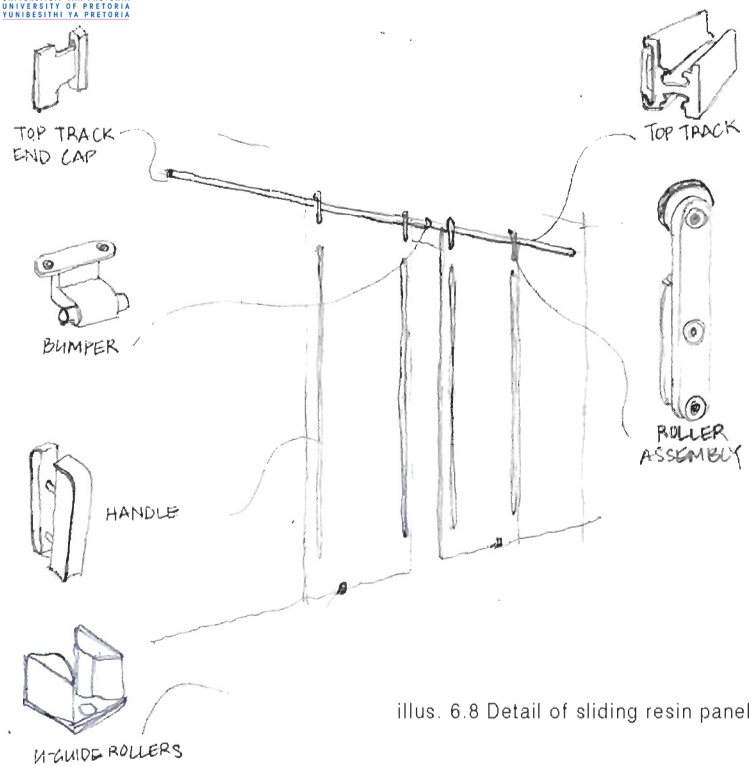
The timber used in the design, represents the warm natural building materials. Withing the structure of the building, curved timber panels create an extension of the roof into the wall skin and extend into the horizontal plane to form seating [05]. In most instances, the timber improves accoustic qualities of the space and softens the interior.

TImber in this application, is reminiscent of the vegetation on site, and brings these warm qualities into the interiors. The impermanence of wood strongly contrasts that of the concrete and masonry and allows for change of the spaces as the needs of the users evolve.

MASONRY

Brickwork will be used as a reminder of conventional building methods, requiring little maintenance and less skilled labour, as opposed to concrete work. It also provides textured surfaces and load-bearing support.

illus. 6.7 Internal membrane



illus. 6.8 Detail of sliding resin panel doors

RESIN PANELS

Resin panels in various natural elements [01]&[02] bring the landscape into the interior spaces and transmits coloured light into the interiors. The resin panels are made from 40% recycled materials and are used for partitioning and sliding doors.

BRAILLE PATTERNS

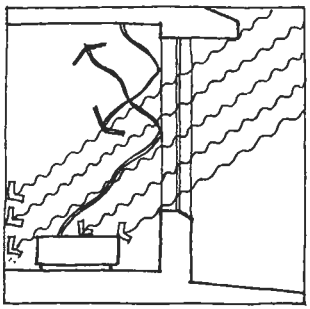
Braille patterns on handrails [03] and on wall surfaces [04] react to the visually impaired and is used to orientate them in the building environment.

LIGHT & COLOUR

Light plays with the illusion and perception of space by creating a unique and qualitative experience. Man's psychological reactions and physical well-being is influenced by light (Gallagher, 1999: 75). Lighting merges qualites of space: sound, texture, colour and movement, beyond its physical attributes. These qualities of light are specifically important in the design of the clinic, which should promote psychological development. Light is emphasized by the use of colour, in roof light glazing and ceramic tiles.

environmental considerations

illus. 6.9 Sketch showing the greenhouse effect



Occupant Comfort

The objective is to create light and airy spaces reminiscent of exterior spaces. The spatial understanding of the project is intended to be in contrast to crowded, gloomy clinical conditions within the city context of Pretoria CBD.

For user quality people must feel physically comfortable; the building must not be too cold, too hot, dirty, dark or noisy. The building must be sufficiently in harmony with the human perceptions (the way it looks, smells, sounds and feels).

01 - THERMAL COMFORT

Maximum use is to be made of passive systems to eliminate the need for mechanical ventilation systems where possible, thereby cutting on costs, maintenance and carbon footprint. Exaggerated vertical dimensions improve thermal comfort by means of the stack effect's removing excessive heat from the spaces.

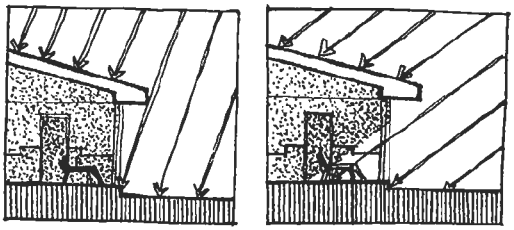
The greenhouse effect, illustrated in the figure above, is the phenomenon where shortwave radiation (sunlight) penetrates glass and heats up interior spaces and objects, which, in turn, radiate long-wave radiation, most of which cannot pass through glass, leading to a heating effect (Marshall, 2000: 78).

Marshall explains that this can be prevented by means of large overhangs to north-facing structures. This allows for sun protection in summer and penetration in winter.

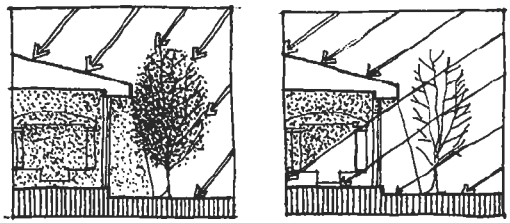
Fig. 05.03 illustrates how trees and plants may be used selectively to provide shade in summer and to permit sunlight in winter.

The thermal flywheel effect, as illustrated in fig 05.04 will be incorporated in the design, therefore the buildings are intended to have thick, well-insulated walls with high thermal mass. Thermal mass, which slows the transmission of heat, creates a thermal flywheel effect in the buildings. Roof overhangs should allow radiation to reach the walls during winter months and protect the walls during summer months. In winter, the heating of the walls takes place during the day, after sunset, the wall continues to loose radiation both inward and outwards, offsetting a drop in night ambient temperature.

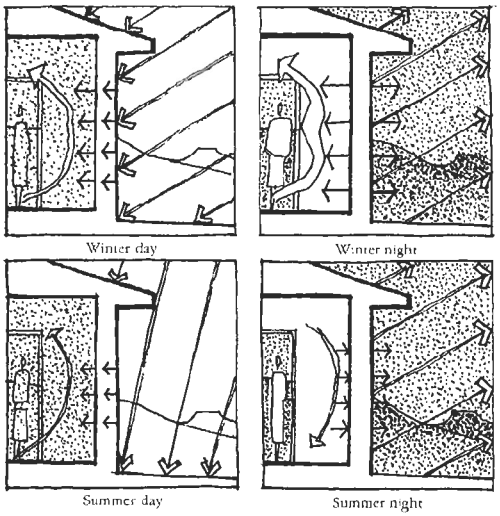
In summer, the same process takes place, but nor the inward radiation may be problematic if the ambient temperature does not drop substantially, therefore roof overhangs should protect walls from excessive heat gain (Marshall, 2000:80).



illus. 6.10 Sketch showing advantages of large overhangs



illus. 6.11 Sketch showing shading of decidious vegetation



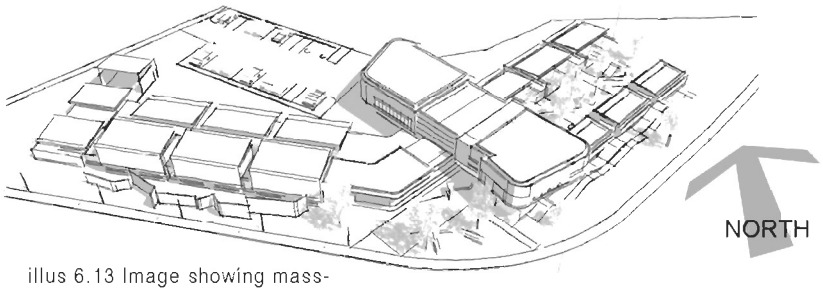
illus. 6.12 Sketches showing the thermal flywheel effect

MASSING

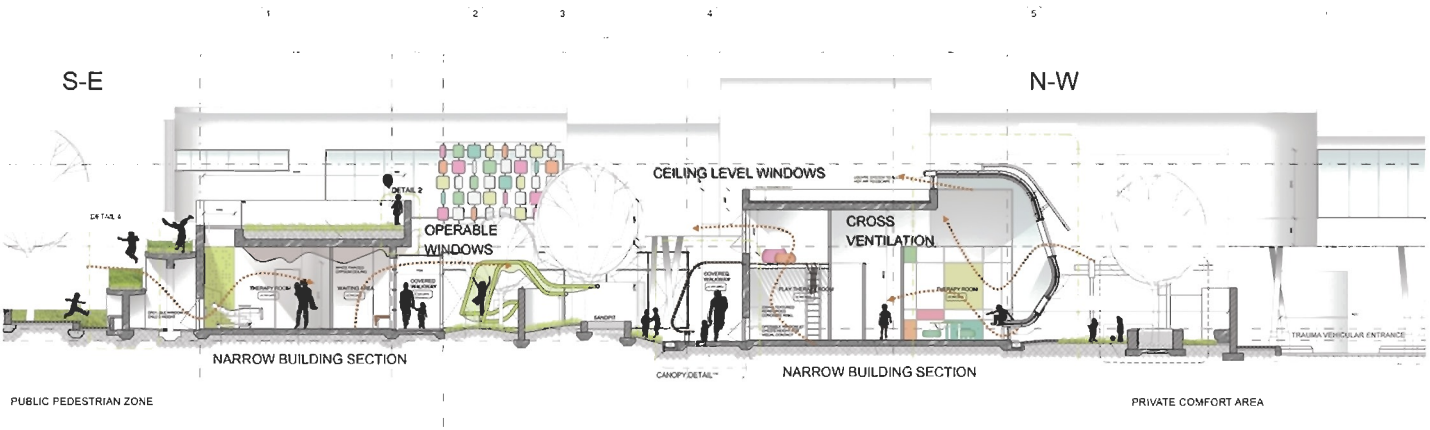
The thermal mass required is achieved by concrete work absorbing direct solar radiation during the day, and releasing the accumulated heat into the interior spaces after a certain time delay. This delay is determined by the density and thickness of the absorbent surface. A slab depth between 230mm and 500mm is usually sufficient to produce an adequate time delay so that day and night temperatures even out.

ORIENTATION

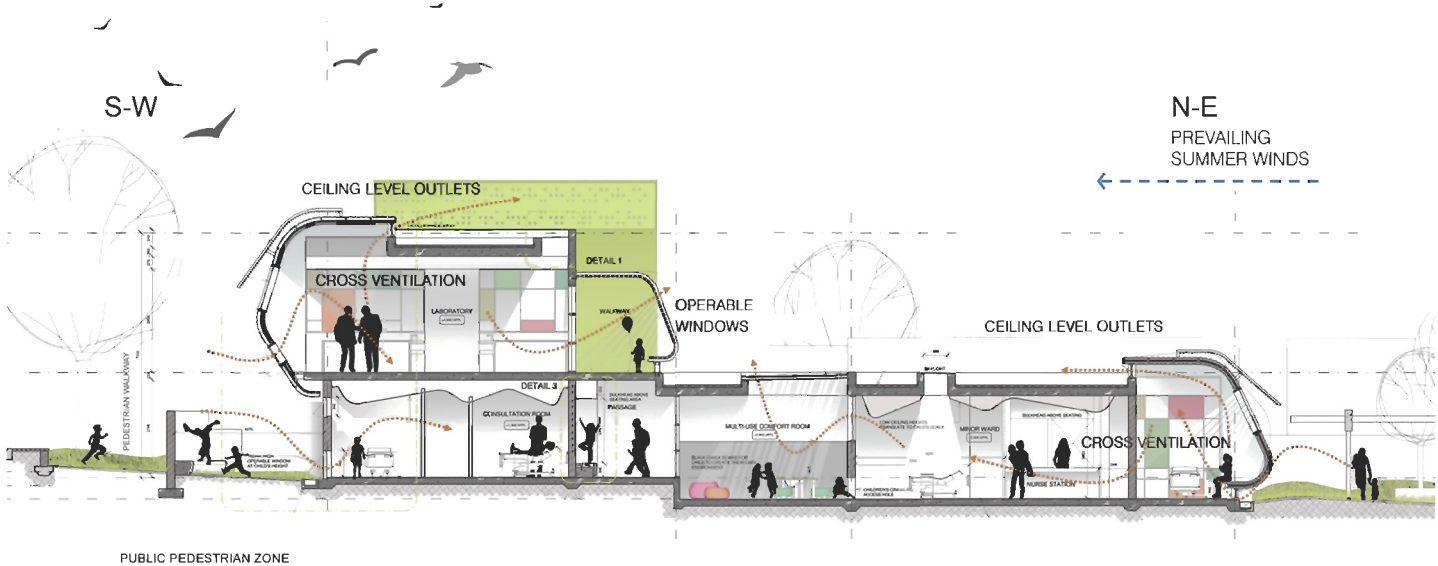
The building mass sits along a east-west axis which enables proper north orientation of most of the building. Facades facing east or west are limited in size and where they are glazed, they are screened from direct sunlight. The subsidiary wings of the building is divided into two sections, by pulling these apart, the spaces within sections are exposed more effectively to the benefits of passive systems. Also, as a result, various micro-climates, such as shading and cooling from existing trees, develop between the built forms.



illus 6.13 Image showing massing development



illus 6.14 Natural ventilation through the building



illus 6.15 Natural ventilation through the building

VENTILATION

Building placement and orientation will be according to the prevailing wind direction for optimal natural ventilation. Maximum building width will not exceed 12m for ventilation. The stack effect is to be implemented for enhance air movement throughout the building. The amount of ventilation is user- adaptable by means of operable windows.

The nature of the building does not lend itself to rely solely on passive ventilation systems. The formal parts of the building (trauma unit, laboratory and kitchen) need mechanical ventilation to achieve optimum human comfort levels. A deliberate attempt was made to reduce the demand on the mechanical ventilation system and to save energy. Principles that are applied include: high thermal mass provided by the concrete roof and walls – taking advantage of the fly wheel effect, using a light colour concrete of the exterior walls of the building.

The light colour of the concrete will also reflect solar heat instead of gaining heat through absorption. The prevailing summer wind direction is from the north-east. The glazed openings at the end points of the building open up and thereby promote cross ventilation. Since cross ventilation can only occur when there is enough difference in temperatures between indoor and outdoor areas, the building increases their interior skin by layering the north elevation, thereby protecting the interior core of the building from direct heat gain from the hot afternoon sun.

The main design features that will be incorporated in the design, which will affect the indoor ventilation conditions are:

- Narrow building section to allow easy cross ventilation
- Windows at ceiling level for the escape of hot air
- Total area of openings
- Operable windows
- Use of casement windows, as they offer better air flow
- Minimizing interior obstruction
- Slightly larger wind outlets

02 - VISUAL COMFORT

Visual comfort depends on sufficient light, avoidance of glare and visual contact with the exterior.

The building's northern orientation will maximize the use of day lighting. Adequate screening and roof overhangs will prevent unwanted heat gain and glare. To maximize the use of natural day lighting, direct lighting will be supported by diffused and reflected light to illuminate the entire space.

GLAZING AND LIGHTING

Most glazing is fixed to the building structure by aluminium frames. The life span benefit of using aluminium in the building outweigh the initial costs, the recycling potential of aluminum members and their clean finish will ensure the consistent appearance of the building façade. Areas with fixed programmes such as the allied services facilities and the treatment rooms will use aluminium-framed glazing sections.

Because of the public nature of the building, the installation of many low-level windows and the potential for spontaneous, informal activities, glass panes used mostly 9mm laminated safety glass. Panel sizes do not exceed 6m^2. All glass panels, which might not be obvious in their position and may cause injury, will be marked appropriately.

The curtain wall used in the main atrium and restaurant has a clean finish achieved by using fins and fixing the glass to the bottom using the appropriate structural members.

Glazing is used in the design with the purpose of linking the exterior and interior spaces, to expose part of the structure, and to create illusions as to how the building works. It is for these reasons that most external doors are glazed. Most glazed areas are on the southern and northern edges of the building to maximize natural light and to limit heat gain.

Where glazing has been used on the eastern and western edges, overheating has been controlled by using walls, overhangs or vegetation to block the amount of direct sunlight entering the building.

LIGHTING REQUIREMENTS

During the day, indoor activities are to be naturally lit, as far as possible. Direct light into the interior cavity space is not recommended as it often causes glare and increases the internal air temperature. It is for this reason that the building employs a layered façade.

The following lighting requirements have been established and the building facades have been designed in response to these:

Ablutions:	50 lux
Kitchens:	100 lux
Library and computer areas:	150-200 lux
Allied services facilities:	250 lux
Pharmacy and Treatment rooms:	300 lux
Truama areas:	350 lux
Laboratory and offices:	500 lux
Foyers:	200 lux
Restaurant:	200 lux
Laundries:	300 lux

LIGHTING SYSTEMS

Restaurant, library and atrium spaces

low voltage pendant light with GY 4 Halogen bi-pin 12V 20W lamp in satin chrome finish, complete with 3 metre cabtyre and 6A plug top, bearing the SABS 1464 safety mark.

Allied services consultation rooms

low voltage pendant light with GY 6.35 Halogen bi-pin 12V 50W lamp in satin chrome finish, complete with 3 metre cabtyre and 6A plug top, bearing the SABS 1464 safety mark.

Ablution and Changerooms

low voltage 12V 50 W down light luminaire in die cast aluminium ceramic lamp holder and teflon wiring.

Clinical Treatment and consultation rooms

compact fluorescent suspended lights with 12V 100W lamps. satin chrome finish body with silver reflectors, complete with 3 metre cabtyre and 6A plug top, bearing the SABS 1464 Safety mark.

SITE LIGHTING

The playground and surrounding exterior spaces will be lit with BEKA BT 400W HPS Luminaires in single arrangement as indicated on image. Features of this light include a 10m steel pole with high performance ip66 Sealsafe reflector system and removeable control gear, complete with surface mounted base plate.

The interior information counters as per detail will be lit with BEKA LEDral 630mm accent lighting with 2x15 Power OSRAM LED's per 630mm length. Drawings indicating wall mounting bracket are illustrated in the drawing above.

figure 1

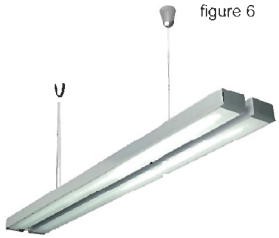
figure 2

figure 3

figure 4

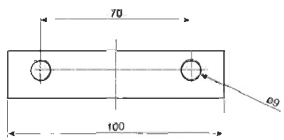
figure 5

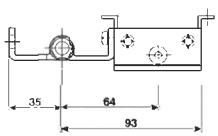
figure 6



BEKA LEDrail

BEKA street lighting





illus. 6.16 lighting systems

inclusive environment

A democratic approach to the building is followed, and therefore the structure aims at being open and inviting.

01 - PUBLIC TRANSPORTATION AND ROUTES

Boom Street and Soutpansberg Road are well-used public transportation routes. This intersection creates a gateway site from Petoria north into the CBD of Pretoria, from where users can easily move across the proposed pedestrian crossing to the clinic.

02 - PARKING

Most of the time, a vast number of parking bays are not required, because the user base will mostly be using public transportation or arriving on foot or by bicycle. The majority of parking spaces will be occupied by staff use.

03 - BUILDING ENTRANCE

The building entrance and foyer should be open, legible and articulated. The entrance should have landmark qualities and thereby orientate users towards the access and information points.

04 - ROUTES

All routes in and around buildings should have smooth surfaces and be handicapped friendly. Level changes are important considerations.

05 - CIRCULATION ZONES

Circulation zones within the building will be visually and physically well connected with different functions for legibility.

06 - ABLUTION FACILITIES

Ablution facilities are placed centrally to achieve maximum usage. This imlies that the facilities are placed in circulation zones to maximise usage and monitoring of the spaces. Ablution facilities will be placed within or near circulation zones to increase the numbers of the user group. The prominent position will ensure passive monitoring of the facility.

accessibility and circulation

The building should appear accessible and inviting to the public. The entrance should be easily identifiable and accessible. Quick and easy exit is required in case of emergency. People must be able to see how parts of the building fit together and be able to find their way around psychological needs to be met: Need for privacy
Social contact
Freedom of choice
Autonomy

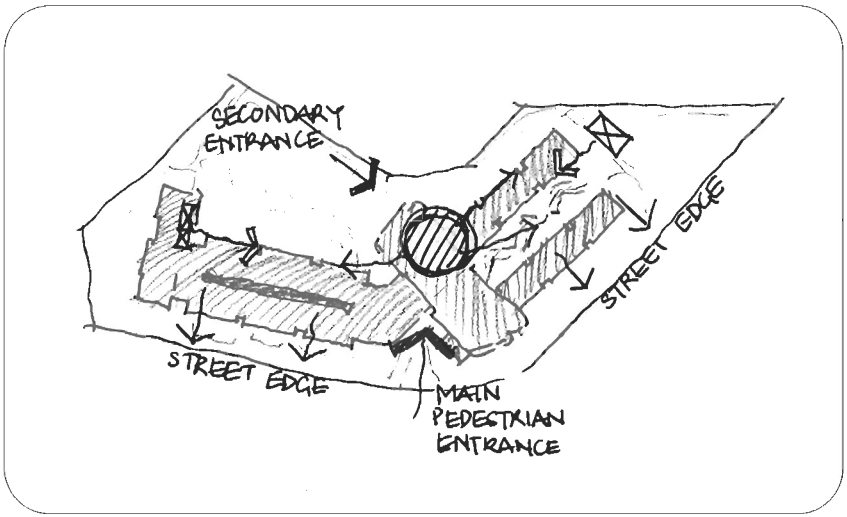
MOVEMENT AND ACCESS

The building, explodes itself into the site, forming an architectural extension of the natural landscape and of the new proposed framework for the north eastern border of the CBD. Most of the pedestrian movement on the site occurs on the street edge and will be strenghtened through landscaping and pedestrian orientated design. The choice to create a movement route rather than a square or a piazza follows from the desire to create an area rich in opportunities for accidental meeting and spontaneous activities. In Tshwane, most activity takes place informally along building edges and street fronts. Most open public squares are not utilized to the same extent as the sidewalks are. These factors influenced the design of movement routes versus courtyards in the proposed building.

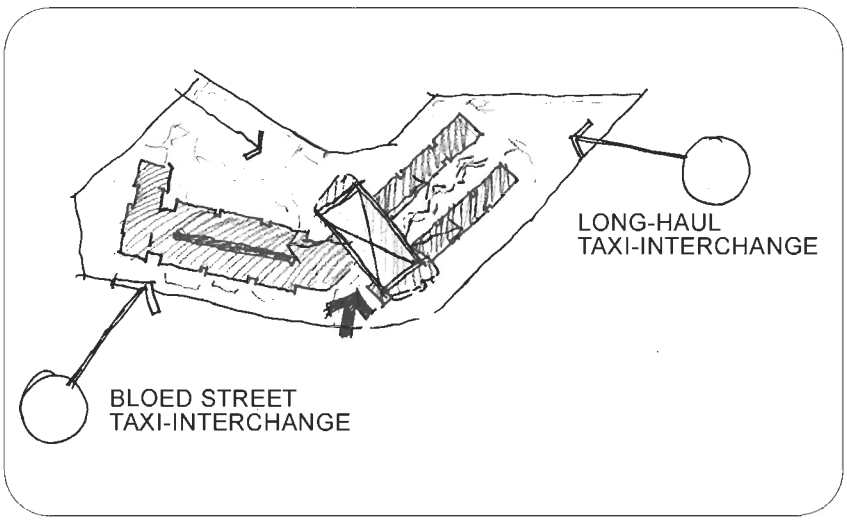
SAFETY

The spaces concerned will, however have to provide adequate safety, so apart from being properly lit at night; they will also be observed through passive surveillance during the day. Where buildings have views onto these spaces, a relative degree of control is established. The openness of the design on plan is extended into the vertical plane by creating openings which promote views into and out of the building.

illus. 6.17 Sketches showing movement and access points



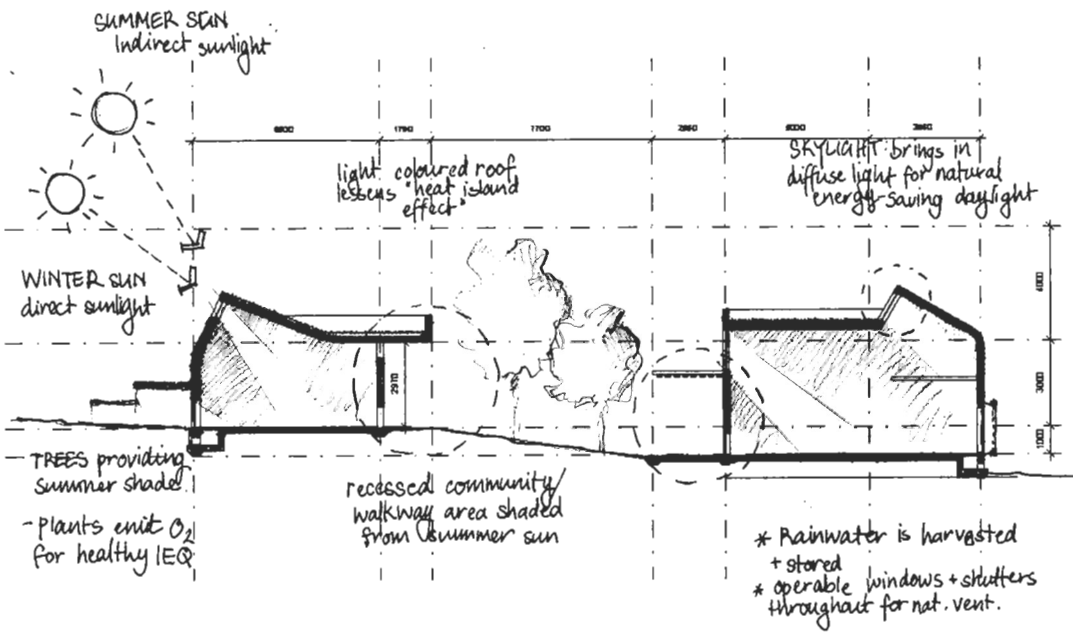
illus. 6.18 Sketches showing building approach and points of arrival



greening strategies

The greening strategies employed in the building that will minimise the energy consumption include:

- Building orientation allows for natural cross ventilation and natural daylighting
- Rainwater harvesting, storage and use for irri gation purposes
- Operable windows and shutters throughout the building to promote natural ventilation
- Recessed walkway areas shaded from exces sive direct sunlight
- Light coloured roof lessens heat island effect
- Natural vegetation providing shading from direct sunlight
- Overhangs are provided on northern facades
- Water efficient toilets and fixtures
- Permeable paving materials are used to allow stormwater to drain into soil



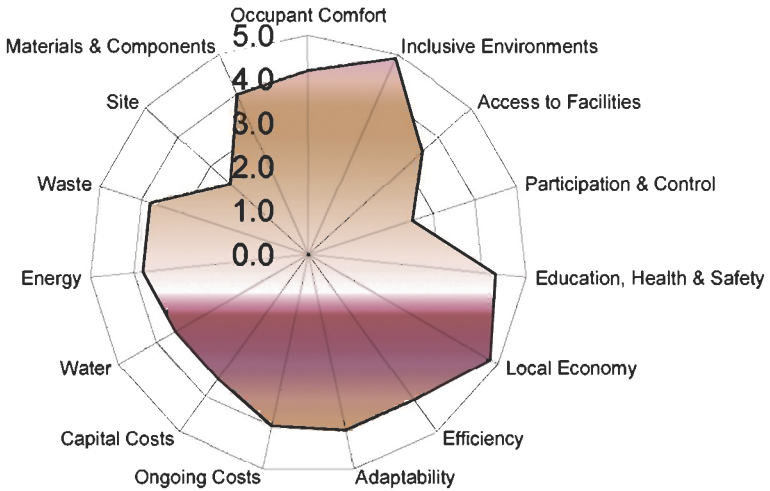
illus. 6.19 Sketch showing greening strategies employed in building

SBAT rating

The SBAT rating tool was used to evaluate the design. The Sustainable Building Assessment Tool provides an indication of the performance of a building or the design in terms of sustainability. Although the tool is ideally used on a building that has recently been completed, it can be used on other stages as well, but may not be relevant.

The tool was used with the assumption that all the requirements would be met once the building is completed, even though many factors such as local workmanship cannot be determined at this point. The rating tool is divided into three components namely, environmental, social and economic.

The environmental component deals with recycling of waste, water consumption and reuse, greening of site and the percentage of users who make use of public transport systems, etc. The social component deals with the social performance of the building in terms of sustainability, including aspects such as access to public transport, disabled access to functions, noise and air pollution. The economic component provides an indication of the economical performance including cost of constuction and materialm locally sourced materials and the use of local labour instead of specialized labour.



RESULTS

SOCIAL:	3.9
ECONOMIC:	4.1
ENVIRONMENTAL:	3.5
OVERALL:	3.8

CLASSIFICATION : GOOD

WATER HEATING CALCULATIONS

Thermosiphon close-coupled solar geysers will be used to supply hot water to staff change rooms and patient ablutions. A 250L storage tank with 1 collector (2sqm) allows for 5 showers/ 3 hours.

Calculations are based on figures made available from SolarTech, a South African solar water geyser supplier.

The K250i indirect SolarTech water heating system is a close-coupled system (tank higher than collectors) using a natural thermosiphon method of water circulation. The average water consumption per shower is 30-50L. With the use of low-flow shower heads, shower water may be reduced by 50-75%, thus reducing the shower water to approximately 15-25L.

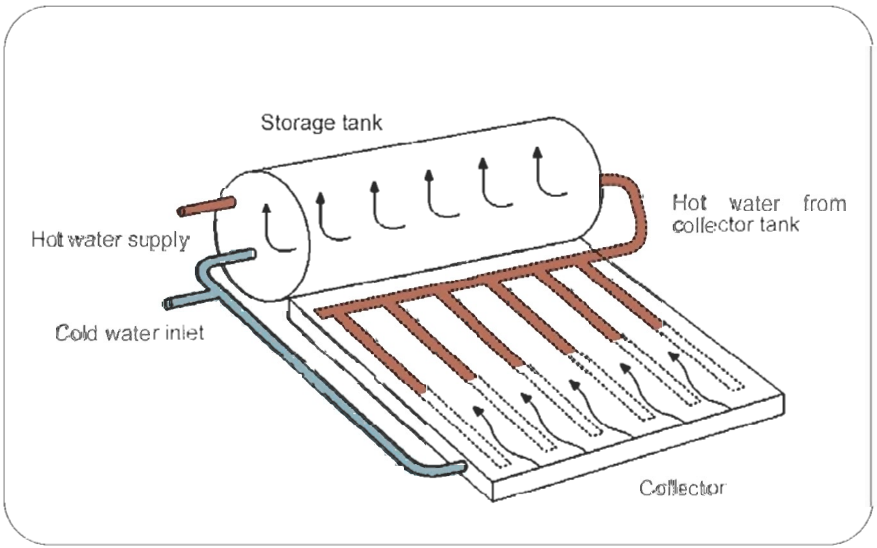
Hot water from a geyser is usually mixed with cold water to bring the shower water to an ambient temperature of between 30-40 degrees celsius.

Thus not all 250L of hot water in the geyser is used directly for shower water. Temperature within a solar tank may typically be 80 degrees celsius. Assuming ambient shower temperature is 37 degrees celsius, the ratio of hot water to cold water is 1:3. Assuming average water consumption per shower is 20L (12-25L), 5 of which is made up of hot water. Thus a 250L solar tank (at 80 degrees celsius) can supply hot water for 50 showers.

Assuming all showers are utilised in the building, there will be 84 staff occupants (of which half will use showers) and 36 patients, totalling 78 users all together.

The amount of water needed for showers will approximately be 78 people x 20L = 1560L

Hot water needed (1:3) = 390L
78 people/50 showers per 250L tank = 1.56, which equates to 2 units, allowing for other requirements



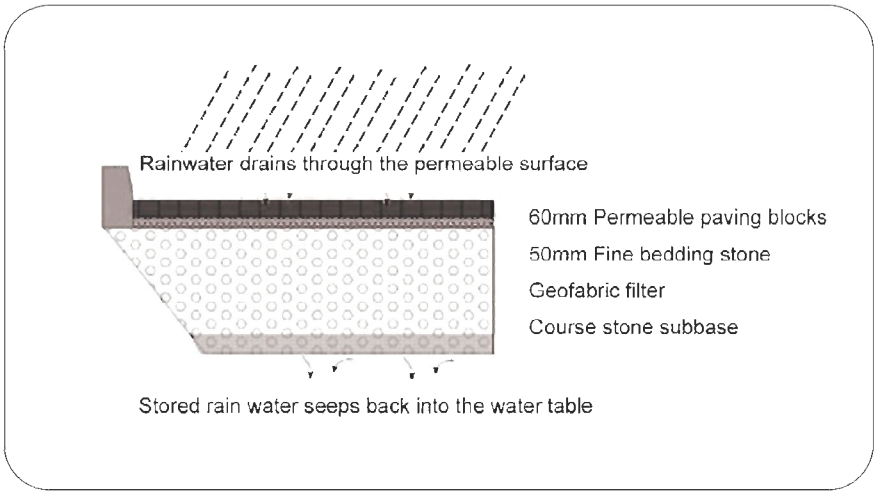
illus. 6.20 Diagram illustrating thermosiphon flow

RAINWATER HARVESTING

Rainwater on the roof is collected through down-pipes and stored in water storage tanks located underground. From here, it is used for irrigation purposes.

According to Weather SA, the average annual rainfall in Pretoria is 647mm. Total roof area to be used for rainwater harvesting is 2981sqm.

2981sqm X 0.647 = 1928 kL water, available for harvesting. Only 73% of this water will be used due to evaporation. This result may not be accurate as numbers used in calculations are estimates.



illus. 6.21 Diagram illustrating typical permeable paving section

WATER RUN-OFF

Permeable paving is an effective method of managing runo-off from paved surfaces and is used for the many paved surfaces around the buildings. Permeable paving surfaces keep pollutants in place in the soil or underlying roadway materials and allow rainwater to naturally infiltrate and recharge groundwater. Water which seeps through the porous surface can also be directed to underground tanks for subsequant re-use, reducing the capacity requirements of stormwater attenuation systems and providing a low cost store of harvested rainwater.

The drawing above shows the construction process. The 32mm stone base gives the layer beneath both structural integrity and storage space, while the intebex green geofabric seperates the coarse stone from the fine bedding stone and has fibres which are cupped to host "good bacteria" which feeds off pathogens and microbes. Above that is the 2-6mm bedding sand which filters the water and beds the blocks, and finally the permeable pavers which have exaggerated gaps in the sides for rainwater collection. The blocks are then locked into place using 1-2mm crushed stone in the joints which give an incredibly strong bond while still allowing rain filtration.

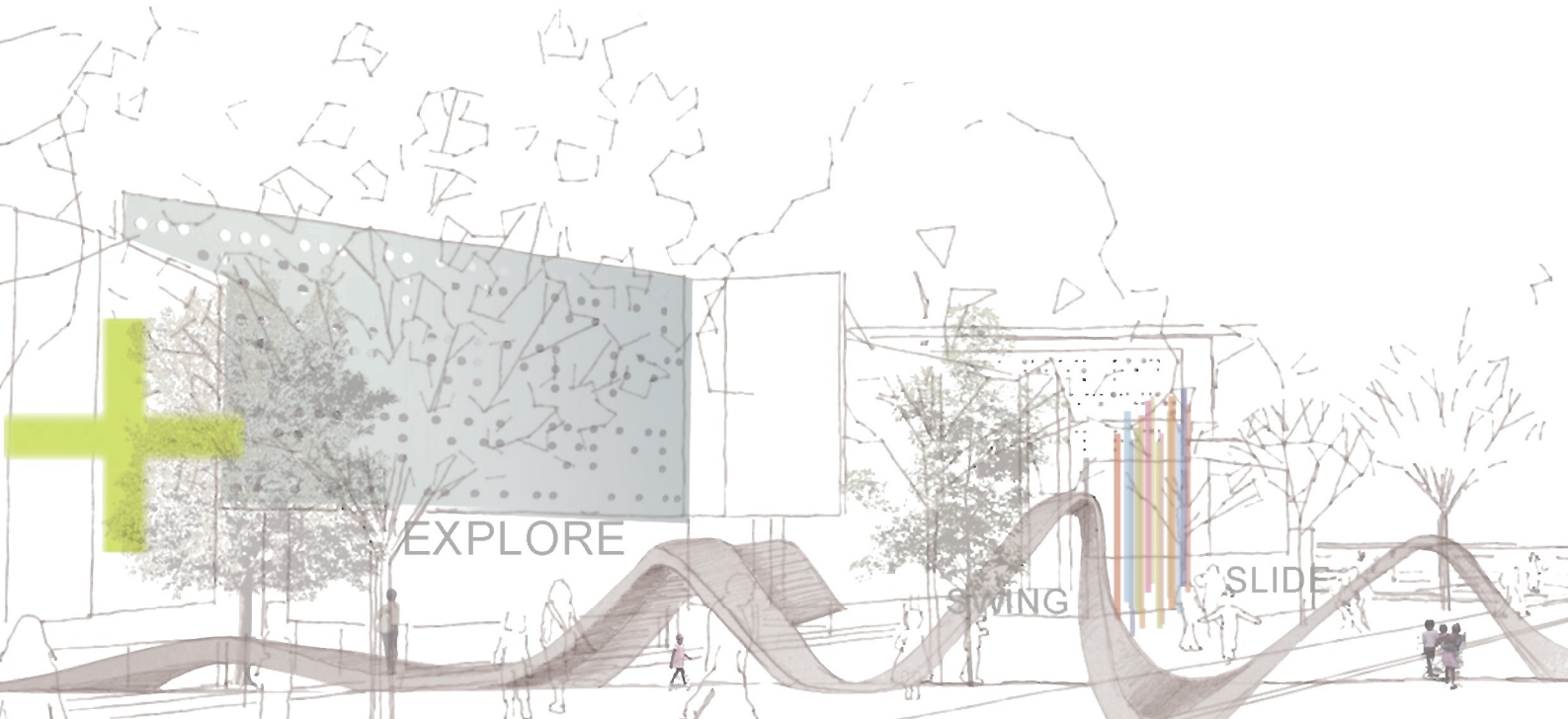
fire control

The public and communal nature of the building calls for a high degree of safety in the event of a fire. The specifications set by the NBR TT have been followed. Communal areas require a 120 minute fire resistance rating and offices need 60 minutes. Therefore, the concrete work will satisfy this rating, and steel members will be coated and thickened to accommodate the safety requirements.

Because the building is spread across the site, the actual design areas and dimensions allow for a higher degree of control over spaces. An escape route is located every 25m on straight movement routes and where a change of direction occurs, this distance will not be more than 15m. Escape routes are clearly indicated and in most cases, because in essence the building only rises two storeys, most escape routes exit onto the ground floor.

All structural steel components will be coated in a thin-film mastic intumescent coating which will provide adequate protection in the event of a fire. The steel members in the design are mostly located on the ground floor, which ensures that appropriate escape routes are available within the required time limits. Further design measures include increasing the size of the structural memebers to improve their fire resistance.

product drawings



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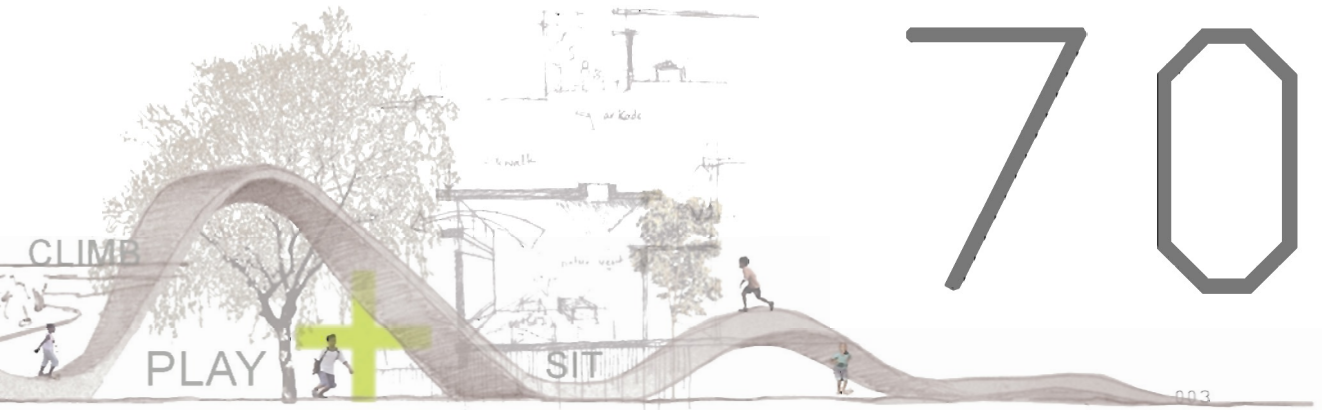
YUNIBESITHI YA PRETORIA

SITE PLAN
GROUND FLOOR PLAN
FIRST FLOOR PLAN
SECTION AA
SECTION BB
DETAILS

feel + learn + heal

A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC



700

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site plan

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UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
LONG-HAUL TAXI
INTERCHANGE
PRINSHOF SCHOOL
BRICK YARD
SOUTPANSBERG ROAD
DR. SAVAGE ROAD
TUT DRAMA AND ARTS
BUILDING COMPLEX
CARBONATTA
BUILDING
LIGHT INDUSTRIAL
RETAIL
PRINSLOO STREET
LIGHT INDUSTRIAL
DU TOIT STREET

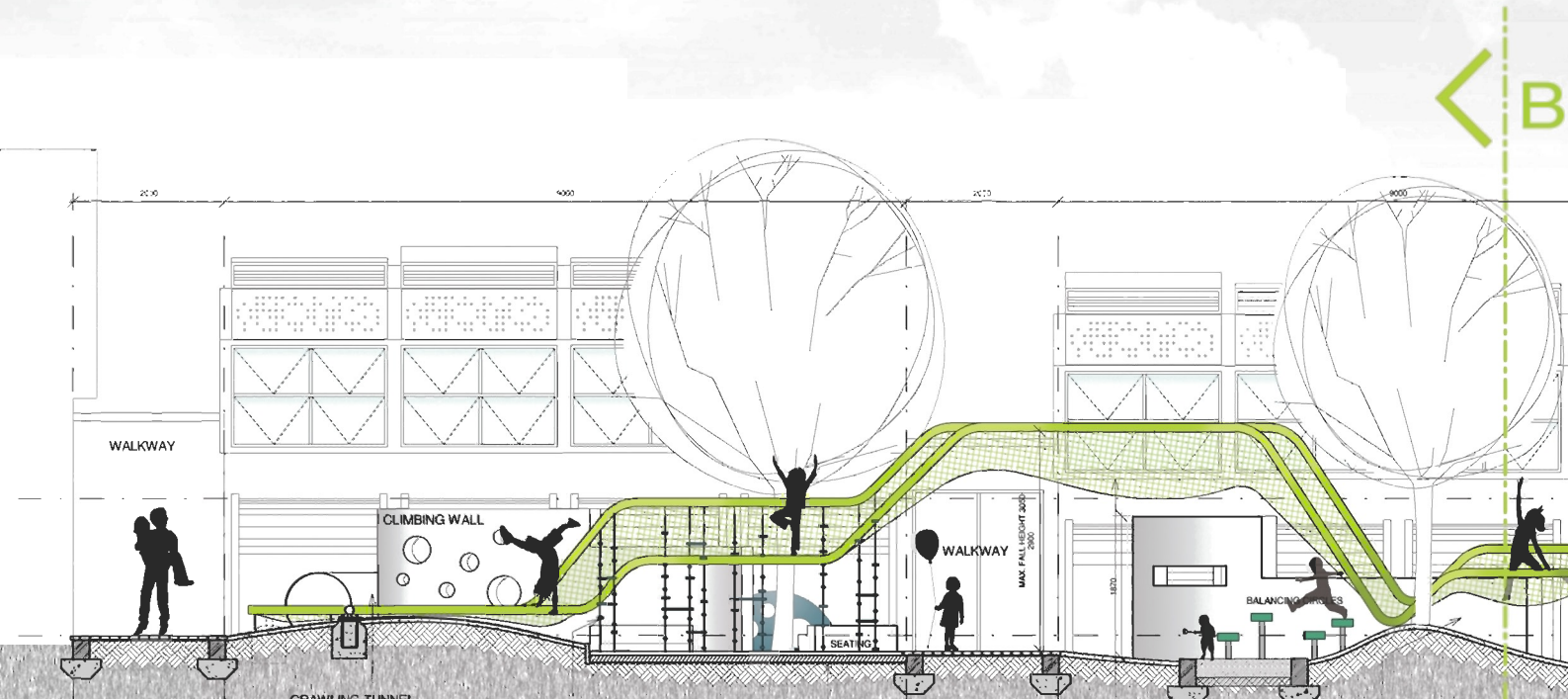
ground floor plan


B
C
D
9
10
11
12
13
14
15
16
17
18
19
20
21
EXPANSION JOINT
TRAUMA ENTRANCE
TRAUMA & TRIAGE
LADIES
GENTS
LINEN STORE
STORE
CLADDING WALL
ELEVATOR
FOYER
RECEPTION
PROCEDURES
EXAMINATION ROOMS
TRAUMA
UNIT MANAGER
WAITING AREA
PHARMACY
PHARMACY STORE
DOCTOR'S REST ROOM
MAIN PASSAGE
MAIN ENTRANCE
OUTSIDE SEATING AREA
RESTAURANT
SNACK BAR
KITCHEN
WAITING AREA
PUBLIC OPEN SPACE
EYE TESTING
SPEECH & HEARING
COVERED WALKWAY
MOBIUS PLAY STRIP
DIETICIAN
OUTDOOR REST AREA
OUTDOOR COMFORT AND PLAY AREA
PHYSIOTHERAPY
OCCUPATIONAL THERAPY
SOCIAL SERVICES
OFFICE
MOVEMENT JOINT WITH 20mm THICK COMPRESSIBLE BITUMEN IMPREGNATED SOFTBOARD

first floor plan


A
B
B No
C
C No
D
9
10
11
12
13
14
15
16
17
18
19
20
21
EXPANSION JOINT
LIBRARY
ATRIUM
MEDIA LIBRARY
MAIN ENTRANCE
PUBLIC OPEN SPACE
OUTDOOR STUDY AREA
MOVEMENT JOINT WITH 20mm THICK COMPRESSIBLE BITUMEN IMPREGNATED SOFTBOARD

mobius playstrip



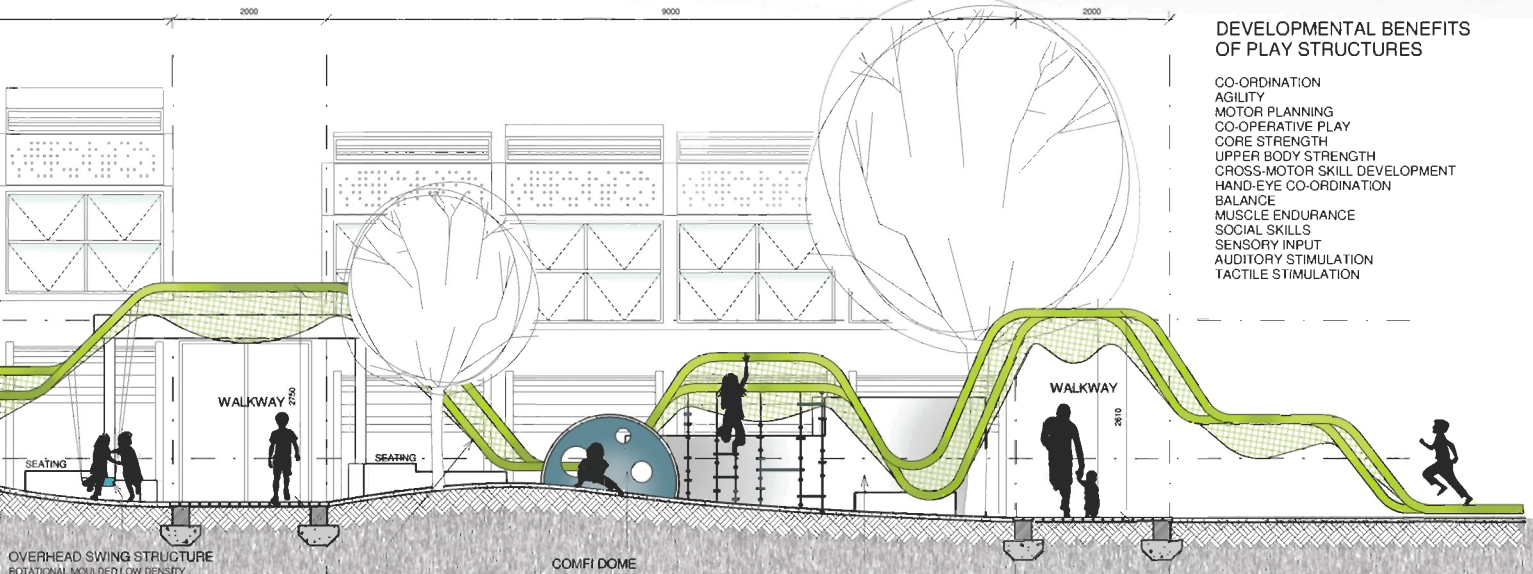
CRAWLING TUNNEL
ROTATIONAL MOULDED LOW DENSITY POLYETHYLENE TUBE WITH A 9.5mm WALL THICKNESS. COLOURS VARY AS SPECIFIED.

CLIMBING CIRCLES
50mm THICK ROTATIONAL MOULDED LOW DENSITY POLYETHYLENE DISKS CONNECTED TO VERTICAL TENSILE NETFORM WIRES. COLOURS VARY AS SPECIFIED.

SURFACING
PEBBLEFLEX TWO-COMPONENT POLYURETHANE PRIMER ON ALIPHATIC THERMOPLASTIC POLYURETHANE PEBBLES AND BINDER. IMACT LAYER CONSISTS OF HEAT SEALED 100% RECYCLED CROSS-LINKED CLOSED CELL POLYETHYLENE FOAM ON SBR RUBBER STRANDS LAID ON 50mm CLEAN DEBRIS FREE SAND BED ON APPROVED GROUNDFILL COMPACTED TO MAX. 150 TO 90% IN ACCORDANCE WITH MOD ASHTO

CARGO CLIMBING NET
WIRE CORE NETFORM NET, CONSISTING OF 3 STRAND FIBRE CORE, SURROUNDED BY 5 STRAND STEEL WIRE, COVERED WITH POLYESTER FIBRE POCKET. HDP KNOT-CONNECTORS.

CORE WALL STRUCTURE
230mm REINFORCED CONCRETE WALL WITH HORIZONTAL TIMBER OFF-SHUTTER FINISH



DEVELOPMENTAL BENEFITS OF PLAY STRUCTURES

CO-ORDINATION
AGILITY
MOTOR PLANNING
CO-OPERATIVE PLAY
CORE STRENGTH
UPPER BODY STRENGTH
CROSS-MOTOR SKILL DEVELOPMENT
HAND-EYE CO-ORDINATION
BALANCE
MUSCLE ENDURANCE
SOCIAL SKILLS
SENSORY INPUT
AUDITORY STIMULATION
TACTILE STIMULATION

OVERHEAD SWING STRUCTURE
ROTATIONAL MOULDED LOW DENSITY POLYETHYLENE HALF BUCKET SEAT WITH FRONT SAFETY CHAIN.

OVERHEAD CLIMBING STRUCTURE
PURPOSE MADE 150mm d.ø ROUND POWDER COATED STRUCTURAL OVERHEAD STEEL STRUCTURE.

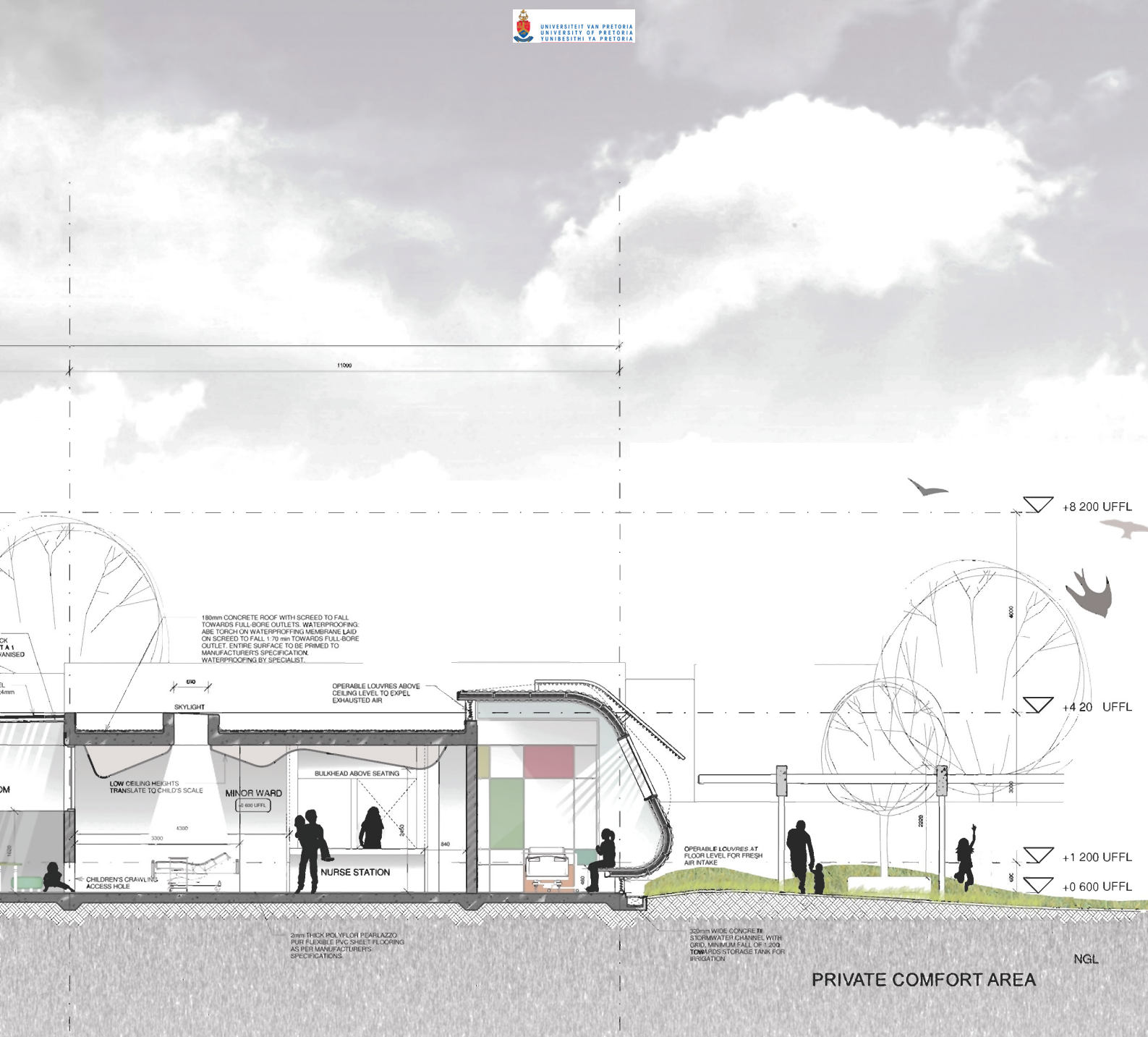
COMFI DOME
ROTATIONAL MOULDED LOW DENSITY POLYETHYLENE DOME WITH A 9.5mm WALL THICKNESS. PEEPING HOLES AND COLOURS AS SPECIFIED.

CORE WALL STRUCTURE
230mm REINFORCED CONCRETE WALL WITH LEAF IMPRINT FINISH.

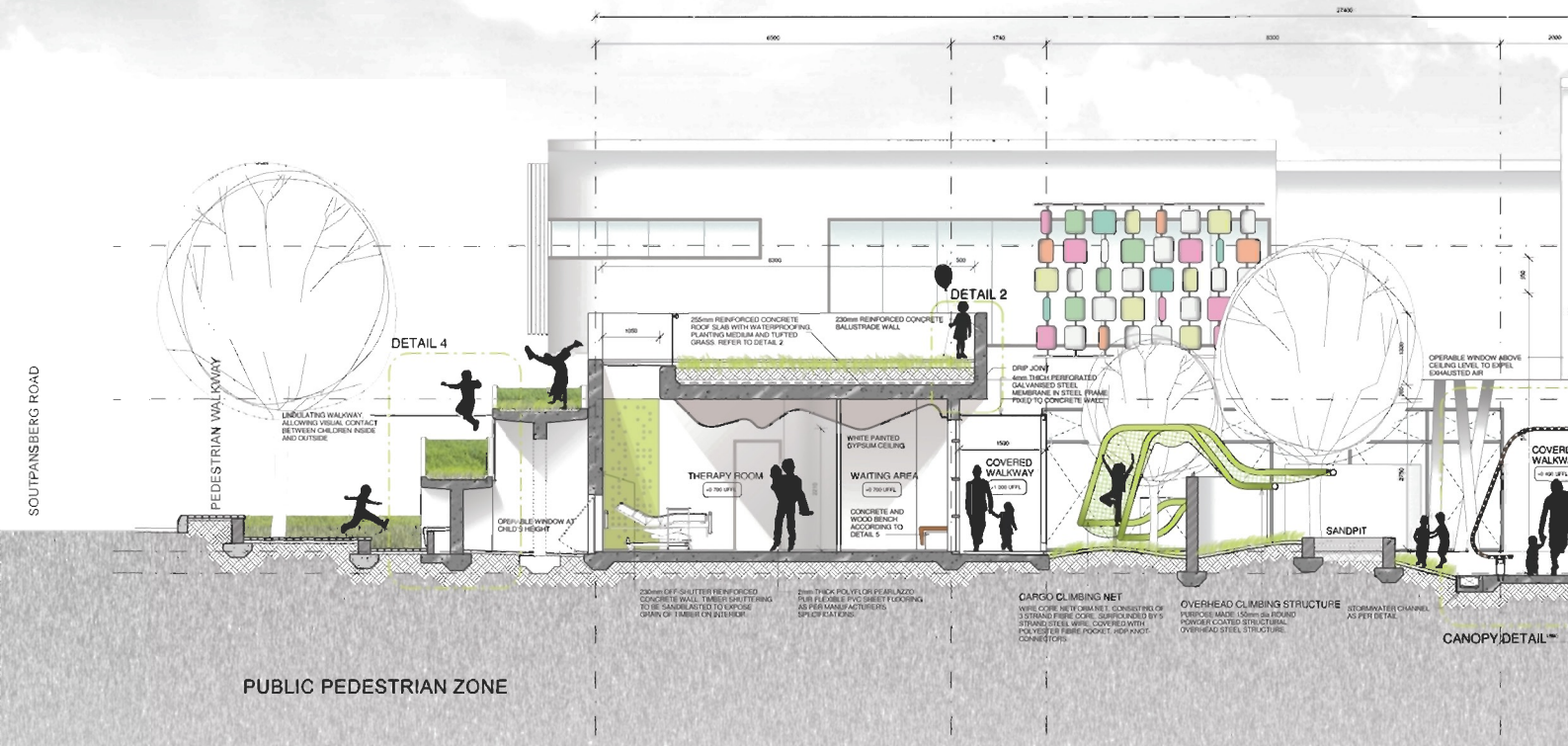
3 No

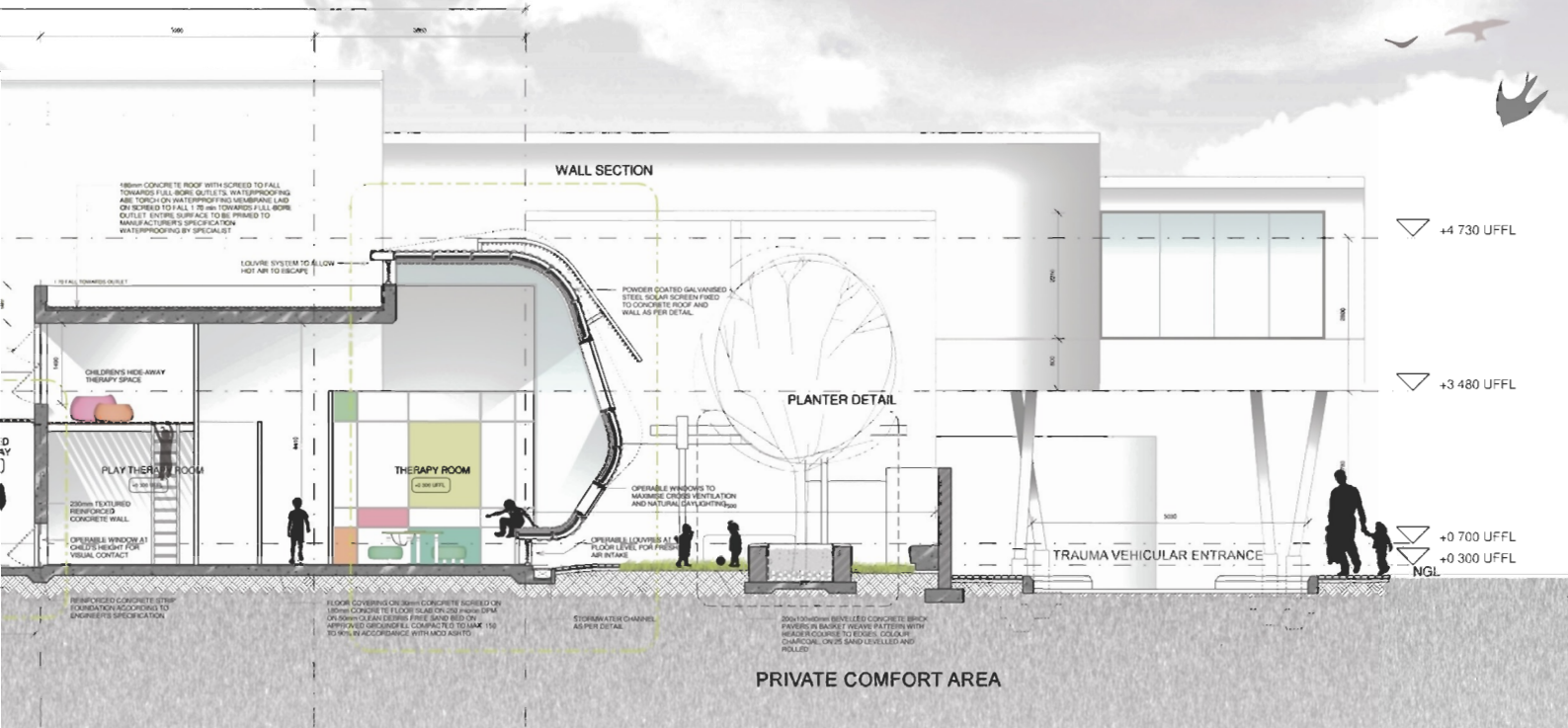
section AA


WALL SECTION
75x50x5mm PAINTED MILD STEEL ANGLE WELDED 200x75mm PARALLEL FLANGE AS SLAB EDGING BOLTED TO FLOOR AND WELDED TO STRUCTURAL STEEL FRAME
POWDER COATED GALVANISED STEEL SOLAR SCREEN FIXED TO CONCRETE ROOF AND WALL AS PER DETAIL
ALUMINIUM WINDOW FRAME
430mm WIDE FRESH AIR INTAKE, DISPENSED THROUGH FLOOR VENTS
1:70 FALL TOWARDS OUTLET
DETAIL 1
LABORATORY
+4 200 UFFL
WALKWAY
INTEGRATED DOUBLE GLAZING WITH MOTORIZED REFLECTIVE BLINDS FROM SCREENLINE, 15mm THI
SINGLE LENGTH LAMINATED SAFETY GLASS LAID A
degree ANGLE IN ALUMINIUM FRAME FIXED TO GALV
MILD STEEL 50x50x4mm EQUAL ANGLE SECTION.
1.6mm THICK PERFORATED POWDER COATED STE
SCREEN (WITH A 20% OPEN AREA) FIXED TO 50x50
CHANNEL SECTIONS ACROSS CONCRETE BEAMS.
DETAIL 3
BULKHEAD ABOVE SEATING AREA
PASSAGE
CONSULTATION ROOM
+1 200 UFFL
LOW CEILING HEIGHTS TRANSLATE TO CHILD'S SCALE
MULTI-USE COMFORT ROO
+0 600 UFFL
BLACK CHALK BOARD FOR CHILD TO CREATE THEIR OWN ENVIRONMENT
SOUTPANSBERG ROAD
PEDESTRIAN WALKWAY
4270
760mm HIGH OPERABLE WINDOW AT CHILD'S HEIGHT
340mm WIDE CONCRETE STORMWATER CHANNEL WITH GRID, MINIMUM FALL OF 1:200 TOWARDS SUMP
FLOOR COVERING ON 30mm CONCRETE SCREED ON 100mm CONCRETE FLOOR SLAB ON 250 micron DPM ON 50mm CLEAN DEBRIS-FREE SAND BED ON APPROVED GROUNDFILL COMPACTED TO MAX. 150 TO 90% IN ACCORDANCE WITH MOD.AASHTO
PUBLIC PEDESTRIAN ZONE

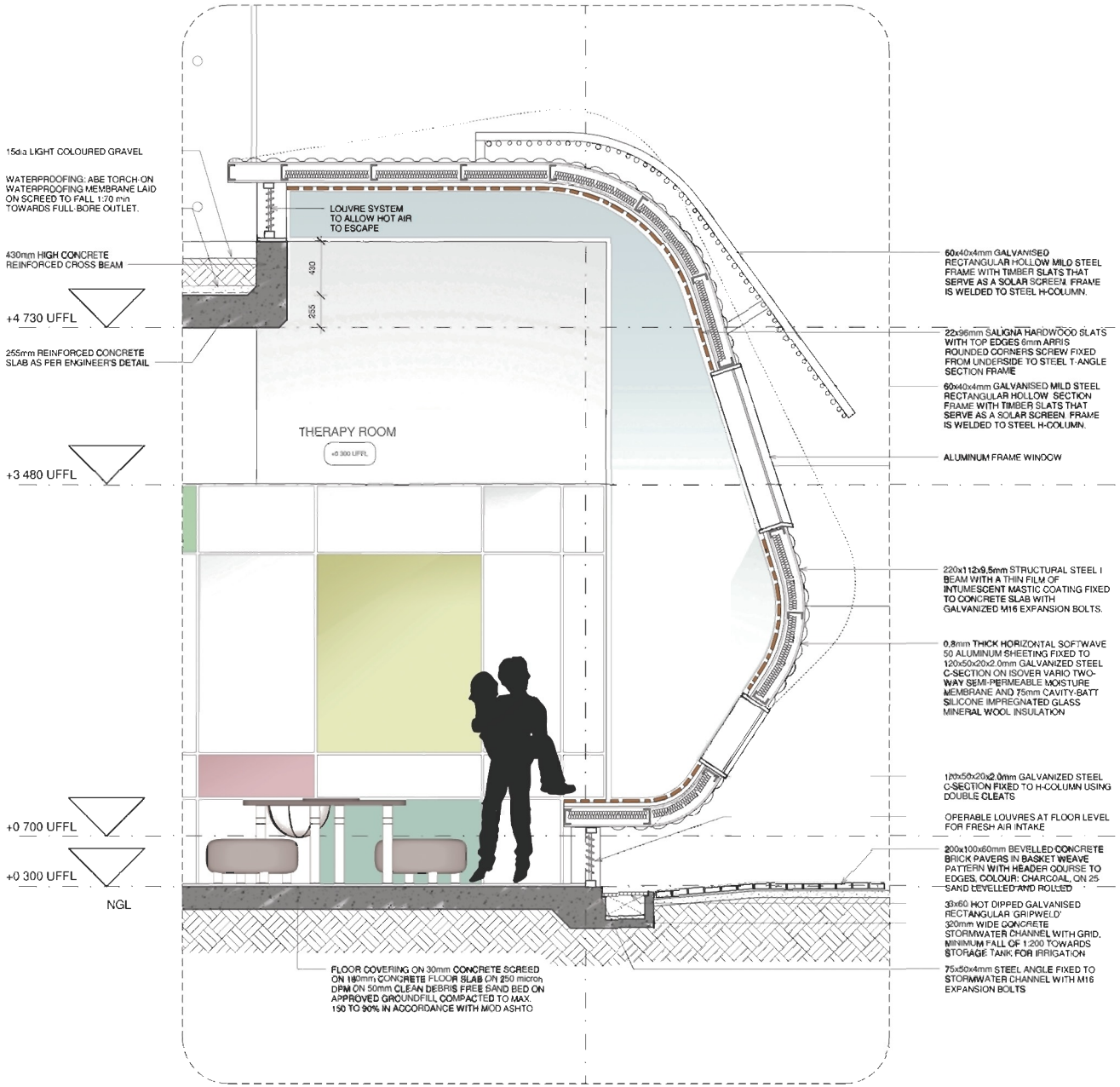

11000
+8 200 UFFL
+4 20 UFFL
+1 200 UFFL
+0 600 UFFL
NGL
180mm CONCRETE ROOF WITH SCREED TO FALL TOWARDS FULL-BORE OUTLETS. WATERPROOFING: ABE TORCH ON WATERPROFFING MEMBRANE LAID ON SCREED TO FALL 1:70 min TOWARDS FULL-BORE OUTLET. ENTIRE SURFACE TO BE PRIMED TO MANUFACTURER'S SPECIFICATION. WATERPROOFING BY SPECIALIST.
SKYLIGHT
OPERABLE LOUVRES ABOVE CEILING LEVEL TO EXPEL EXHAUSTED AIR
LOW CEILING HEIGHTS TRANSLATE TO CHILD'S SCALE
MINOR WARD
+0 600 UFFL
BULKHEAD ABOVE SEATING
NURSE STATION
CHILDREN'S CRAWLING ACCESS HOLE
OPERABLE LOUVRES AT FLOOR LEVEL FOR FRESH AIR INTAKE
2mm THICK POLYFLOR PEARLAZZO PUR FLEXIBLE PVC SHEET FLOORING AS PER MANUFACTURERS' SPECIFICATIONS.
320mm WIDE CONCRETE STORMWATER CHANNEL WITH GRID. MINIMUM FALL OF 1:200 TOWARDS STORAGE TANK FOR IRRIGATION
PRIVATE COMFORT AREA

section BB

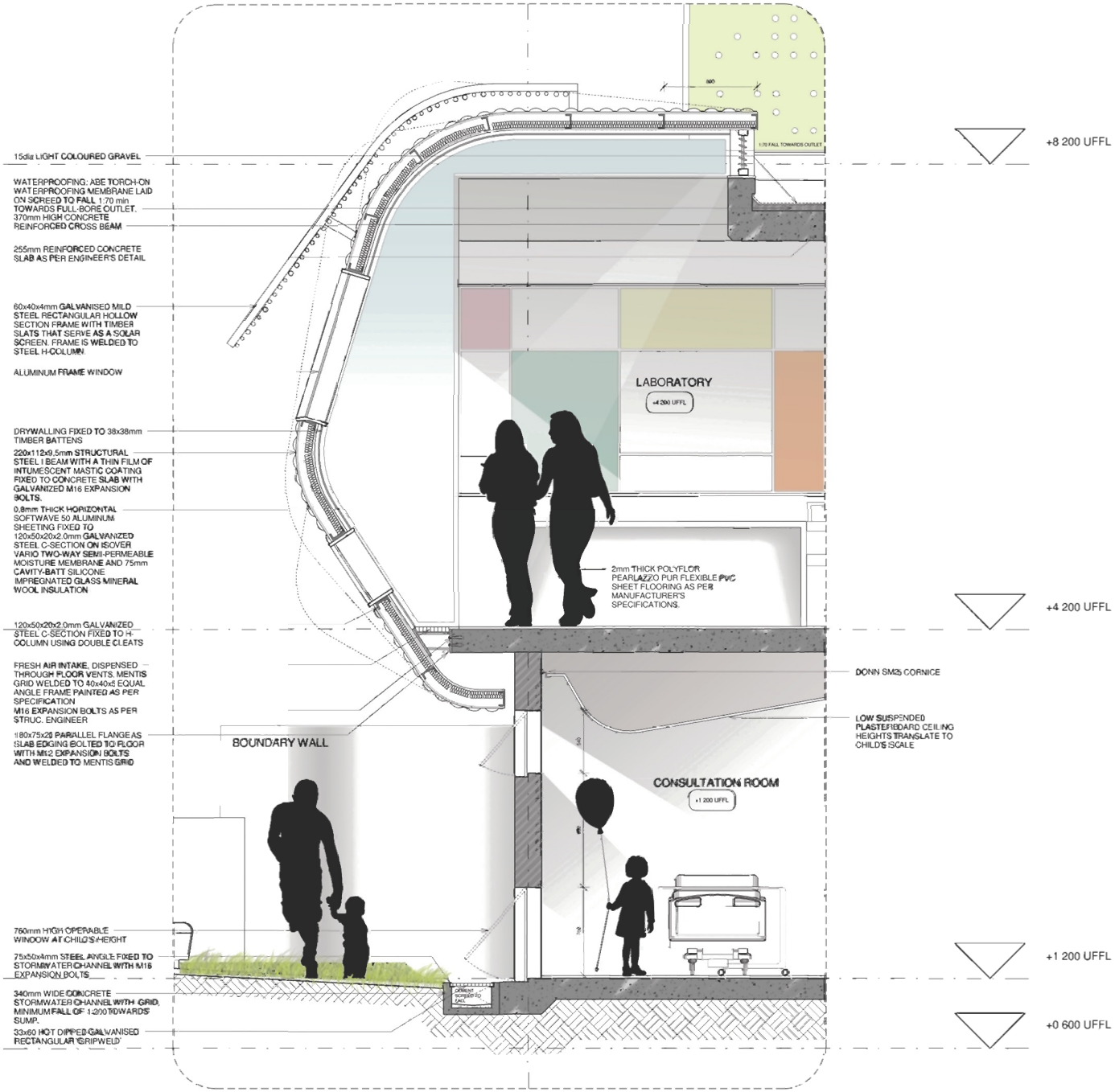

SOUTPANSBERG ROAD
PEDESTRIAN WALKWAY
UNDULATING WALKWAY, ALLOWING VISUAL CONTACT BETWEEN CHILDREN INSIDE AND OUTSIDE
DETAIL 4
OPERABLE WINDOW AT CHILD'S HEIGHT
255mm REINFORCED CONCRETE ROOF SLAB WITH WATERPROOFING, PLANTING MEDIUM AND TUFTED GRASS. REFER TO DETAIL 2
230mm REINFORCED CONCRETE BALUSTRADE WALL
DETAIL 2
DRIP JOINT
4mm THICK PERFORATED GALVANISED STEEL MEMBRANE IN STEEL FRAME "FIXED" TO CONCRETE WALL
WHITE PAINTED GYPSUM CEILING
THERAPY ROOM
WAITING AREA
CONCRETE AND WOOD BENCH ACCORDING TO DETAIL 5
COVERED WALKWAY
OPERABLE WINDOW ABOVE CEILING LEVEL TO EXPEL EXHAUSTED AIR
SANDPIT
230mm DEF. SHUTTER REINFORCED CONCRETE WALL. TIMBER SHUTTERING TO BE SANDBLASTED TO EXPOSE GRAIN OF TIMBER ON INTERIOR
2mm THICK POLYFLOR PEARLAZZO PUR FLEXIBLE PVC SHEET FLOORING AS PER MANUFACTURERS SPECIFICATIONS
CARGO CLIMBING NET
WIRE CORE NETFORM NET, CONSISTING OF 3 STRAND FIBRE CORE, SURROUNDED BY 5 STRAND STEEL WIRE, COVERED WITH POLYESTER FIBRE POCKET. HDP KNOT CONNECTORS
OVERHEAD CLIMBING STRUCTURE
PURPOSE MADE 150mm dia ROUND POWDER COATED STRUCTURAL OVERHEAD STEEL STRUCTURE
STORMWATER CHANNEL AS PER DETAIL
CANOPY DETAIL
PUBLIC PEDESTRIAN ZONE


WALL SECTION
180mm CONCRETE ROOF WITH SCREED TO FALL TOWARDS FULL-BORE OUTLETS. WATERPROOFING ABE TORCH ON WATERPROOFING MEMBRANE LAID ON SCREED TO FALL 1:75 min TOWARDS FULL-BORE OUTLET. ENTIRE SURFACE TO BE PRIMED TO MANUFACTURER'S SPECIFICATION WATERPROOFING BY SPECIALIST
LOUVRE SYSTEM TO ALLOW HOT AIR TO ESCAPE
POWDER COATED GALVANISED STEEL SOLAR SCREEN FIXED TO CONCRETE ROOF AND WALL AS PER DETAIL
CHILDREN'S HIDE-AWAY THERAPY SPACE
PLAY THERAPY ROOM
THERAPY ROOM
230mm TEXTURED REINFORCED CONCRETE WALL
OPERABLE WINDOW AT CHILD'S HEIGHT FOR VISUAL CONTACT
OPERABLE WINDOWS TO MAXIMISE CROSS VENTILATION AND NATURAL DAYLIGHTING
OPERABLE LOUVRES AT FLOOR LEVEL FOR FRESH AIR INTAKE
PLANTER DETAIL
+4 730 UFFL
+3 480 UFFL
+0 700 UFFL
+0 300 UFFL
NGL
TRAUMA VEHICULAR ENTRANCE
REINFORCED CONCRETE STRIP FOUNDATION ACCORDING TO ENGINEER'S SPECIFICATION
FLOOR COVERING ON 30mm CONCRETE SCREED ON 100mm CONCRETE FLOOR SLAB ON 250 micron DPM ON 50mm CLEAN DEBRIS FREE SAND BED ON APPROVED GROUNDFILL COMPACTED TO MAKE 150 KPa IN ACCORDANCE WITH MOD AASHTO
STORMWATER CHANNEL AS PER DETAIL
200x100x60mm BEVELLED CONCRETE BRICK PAVERS IN BASKET WEAVE PATTERN WITH HEADER COURSE TO EDGES. COLOUR: CHARCOAL ON 25 SAND LEVELLED AND ROLLED
PRIVATE COMFORT AREA

wall details

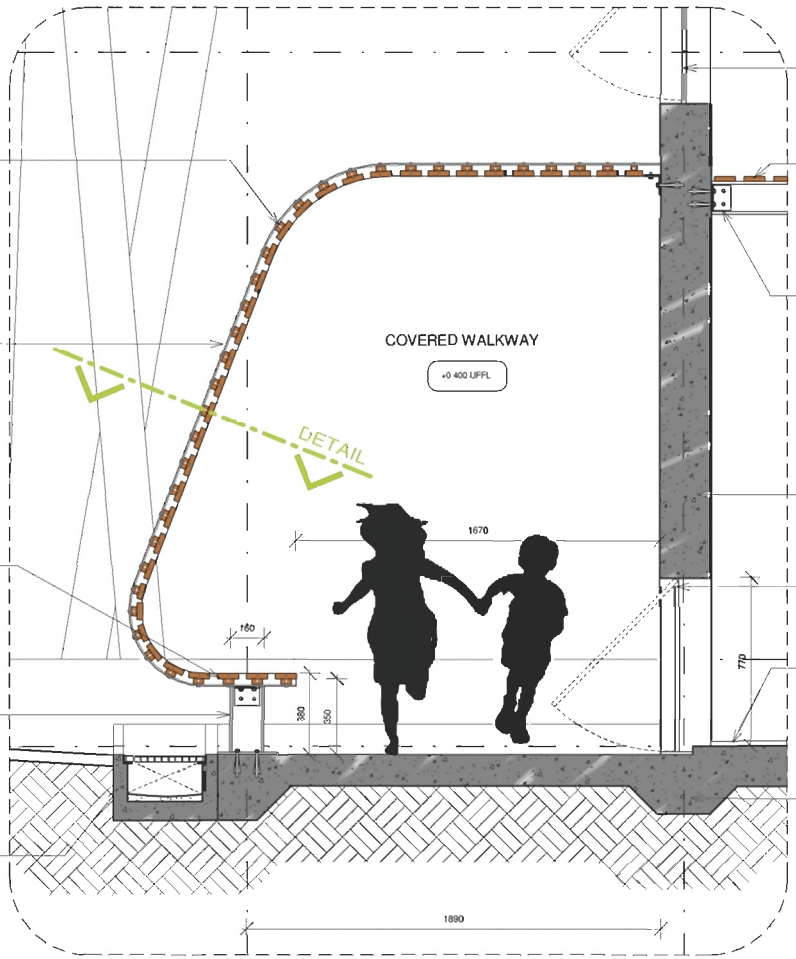


DETAIL WALL SECTION 2
SCALE 1:20



DETAIL WALL SECTION 1
SCALE 1:20

details



22x96mm SALIGNA HARDWOOD SLATS WITH TOP EDGES 6mm ARRIS ROUNDED CORNERS SCREW FIXED WITH SALIGNA SPACER IN-BETWEEN, FROM OUTSIDE TO STEEL T SECTION FRAME

PAINTED STEEL CANOPY SUPPORT FROM 2No. 50x50x6mm MILD STEEL EQUAL ANGLE SECTIONS WELDED TOGETHER, BENDED TO DIMENSIONS SHOWN. FIXED TO WALL WITH 50x50x4mm PAINTED MILD STEEL ANGLE FIXED TO WALL WITH 2No 8mm DIA EXPANSION BOLTS.

SEATING SPACE CREATED BY EXTENDING CANOPY ONTO A HORIZONTAL LEVEL. SEATING IS LOW ENOUGH FOR CHILDREN TO OCCUPY.

PAINTED STEEL CANOPY SUPPORT FROM DI80x80x5mm MILD STEEL T-ANGLE SECTION, FOLDED TO DIMENSIONS SHOWN. WELDED TO 230mm HIGH I-SECTION AND FACTORY WELDED TO 12mm THICK BASEPLATE WITH PRE DRILLED HOLES FOR FIXING.

320mm WIDE CONCRETE STORMWATER CHANNEL WITH GRID, MINIMUM FALL OF 1:200 TOWARDS STORAGE TANK FOR IRRIGATION

OPERABLE WINDOW ABOVE CEILING LEVEL TO EXPEL EXHAUSTED AIR

TIMBER DECK LOFT SPACE FOR CHILDREN. 22x96mm SALIGNA HARDWOOD SLATS WITH TOP EDGES 6mm ARRIS ROUNDED CORNERS SCREW FIXED FROM UNDERSIDE TO STEEL 150x75x18mm GALVANIZED MILD STEEL PARALLEL FLANGE FRAME.

DOUBLE CLEAT

230mm TEXTURED REINFORCED CONCRETE WALL

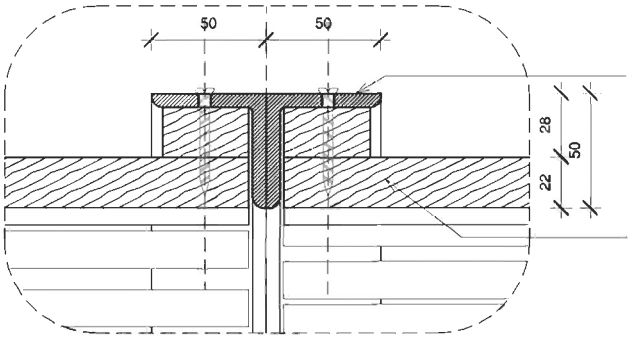
OPERABLE ALUMINUM FRAME WINDOW AT CHILD'S HEIGHT FOR VISUAL CONTACT

FLOOR COVERING ON 30mm CONCRETE SCREED ON 180mm CONCRETE FLOOR SLAB ON 250 micron DPM ON 50mm CLEAN DEBRIS FREE SAND BED ON APPROVED GROUNDFILL COMPACTED TO MAX. 150 TO 90% IN ACCORDANCE WITH MOD ASHTO

REINFORCED CONCRETE STRIP FOUNDATION ACCORDING TO ENGINEER'S SPECIFICATION

DETAIL WALL SECTION 1

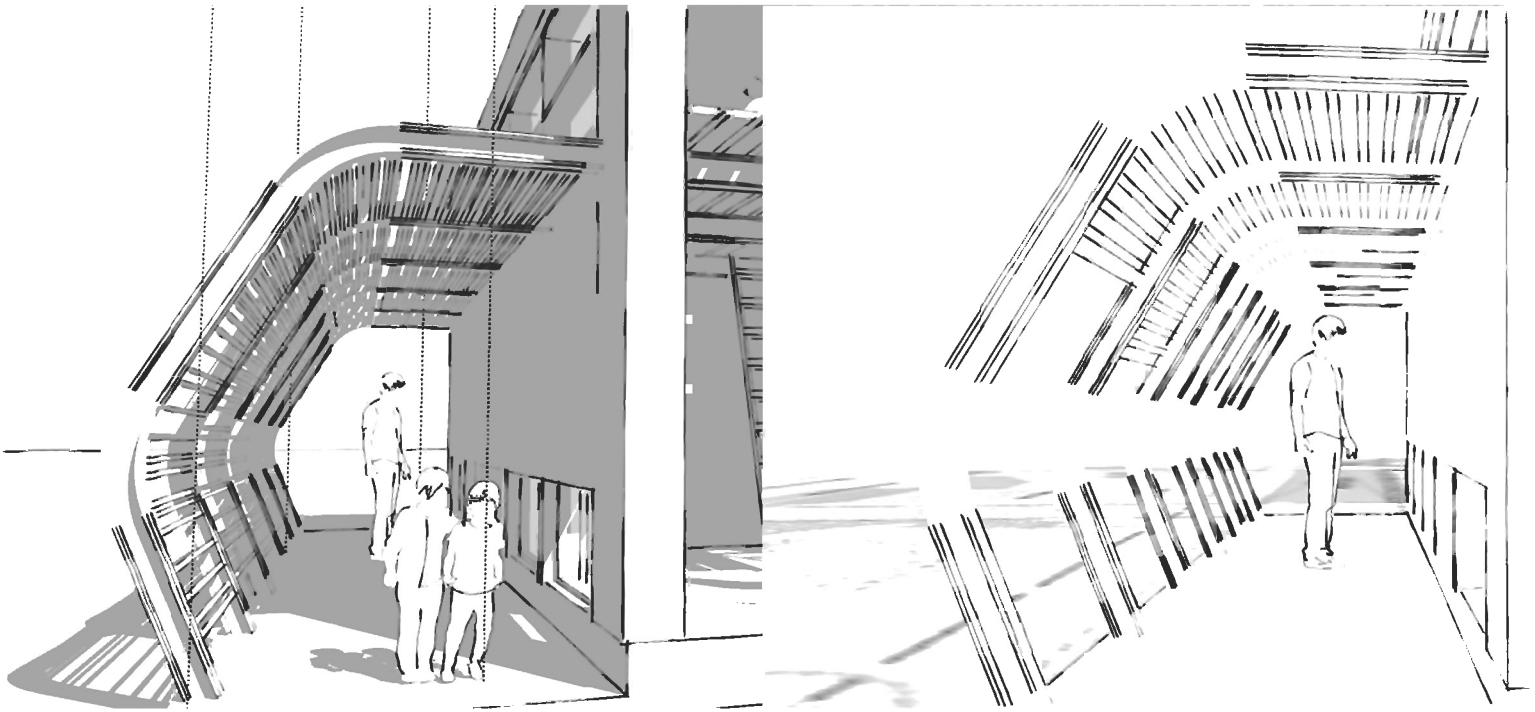
SCALE 1:20



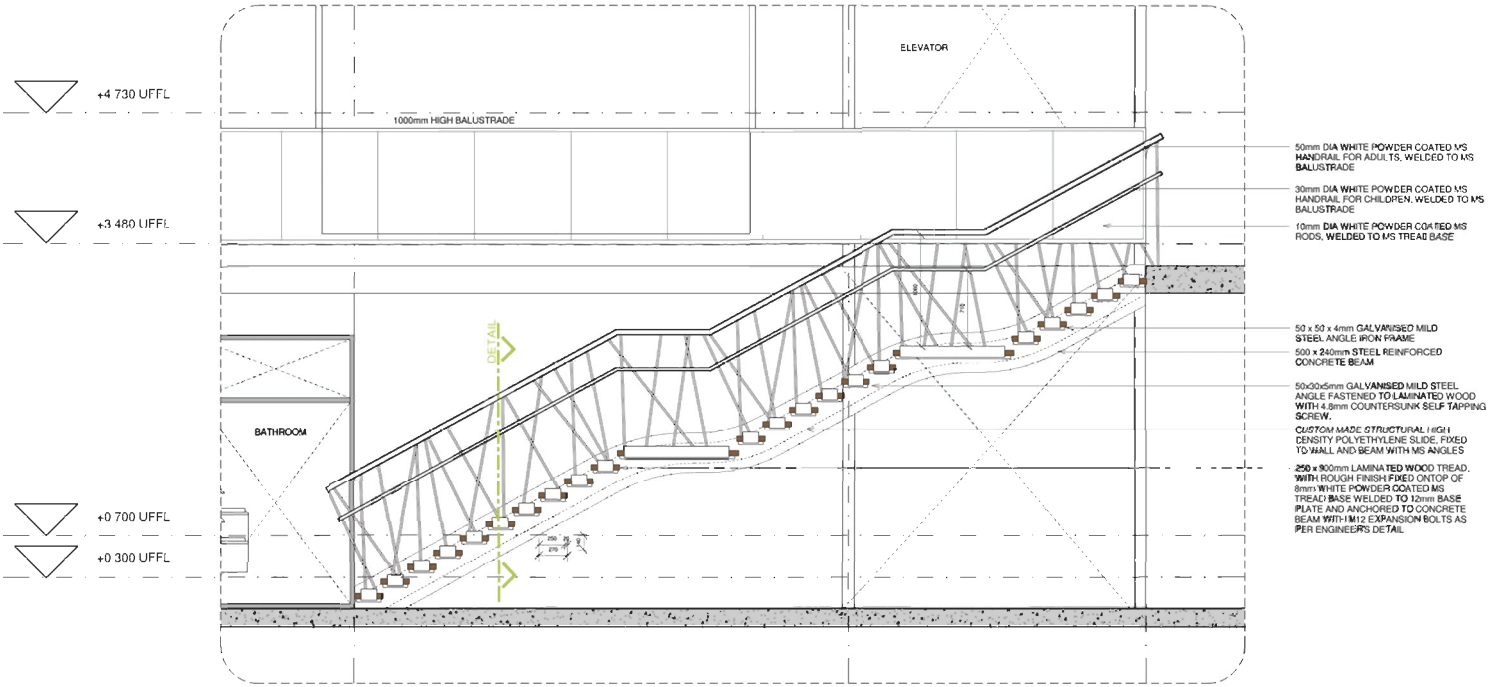
PAINTED STEEL CANOPY SUPPORT FROM 2No. 50x50x6mm MILD STEEL EQUAL ANGLE SECTIONS WELDED TOGETHER, BENDED TO DIMENSIONS SHOWN. FIXED TO WALL WITH 50x50x4mm PAINTED MILD STEEL ANGLE FIXED TO WALL WITH 2No 8mm DIA EXPANSION BOLTS.

22x96mm SALIGNA HARDWOOD SLATS WITH TOP EDGES 6mm ARRIS ROUNDED CORNERS SCREW FIXED WITH SALIGNA SPACER IN-BETWEEN, FROM OUTSIDE TO STEEL T SECTION FRAME

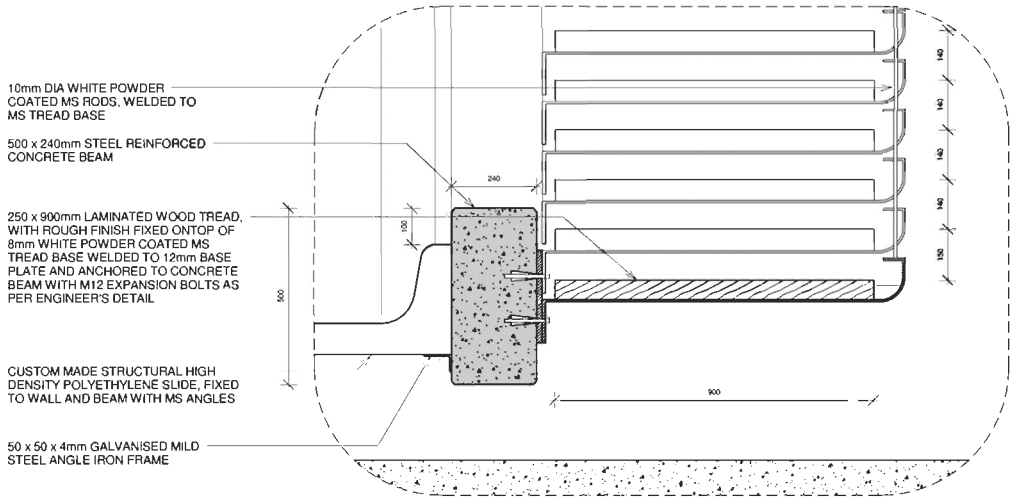
DETAIL OF CANOPY CONNECTION
Scale 1:2



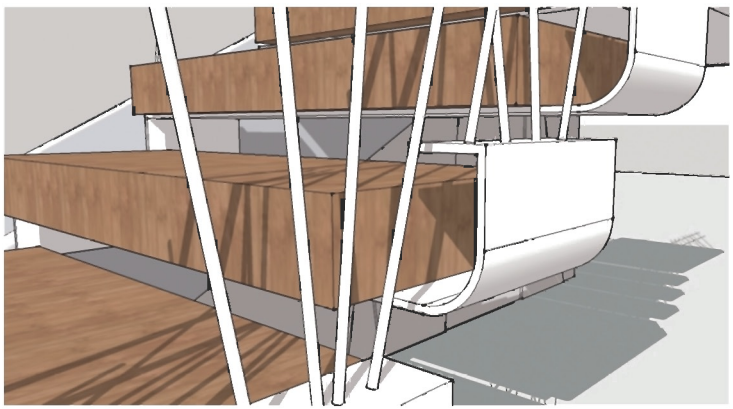
details

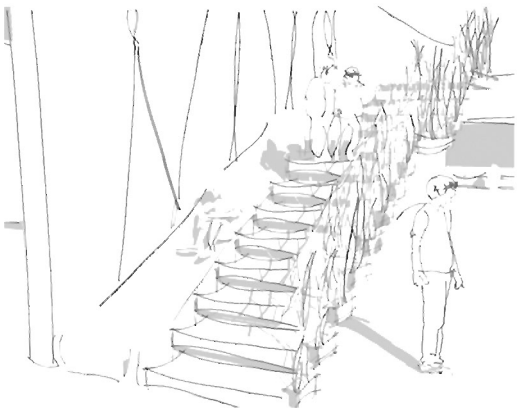


STAIRCASE DETAIL
SCALE 1:20

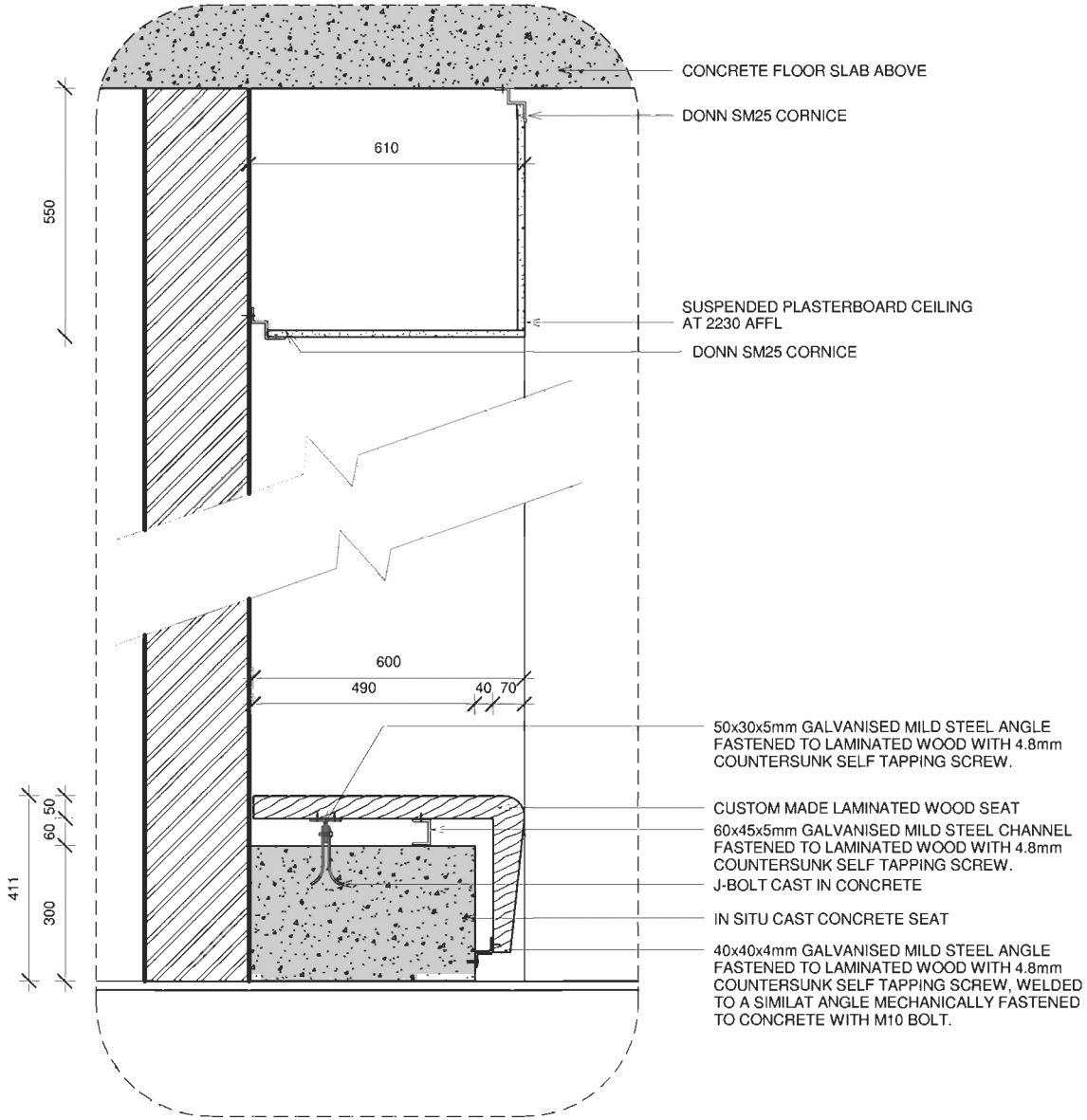


DETAIL STAIR TREAD
SCALE 1:10



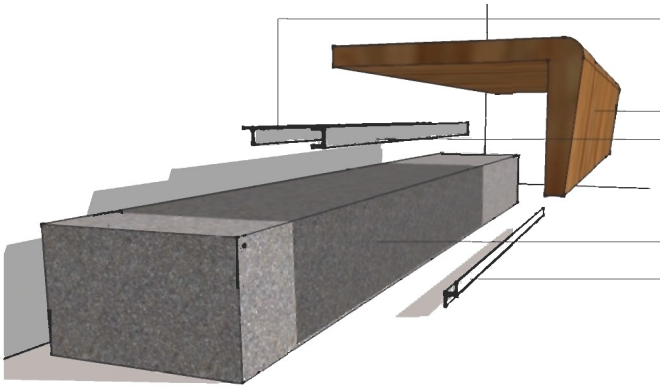


details



DETAIL 3: WAITING BENCH AND BULKHEAD

SCALE 1:10



50x30x5mm GALVANISED MILD STEEL ANGLE FASTENED TO LAMINATED WOOD WITH 4.8mm COUNTERSUNK SELF TAPPING SCREW.

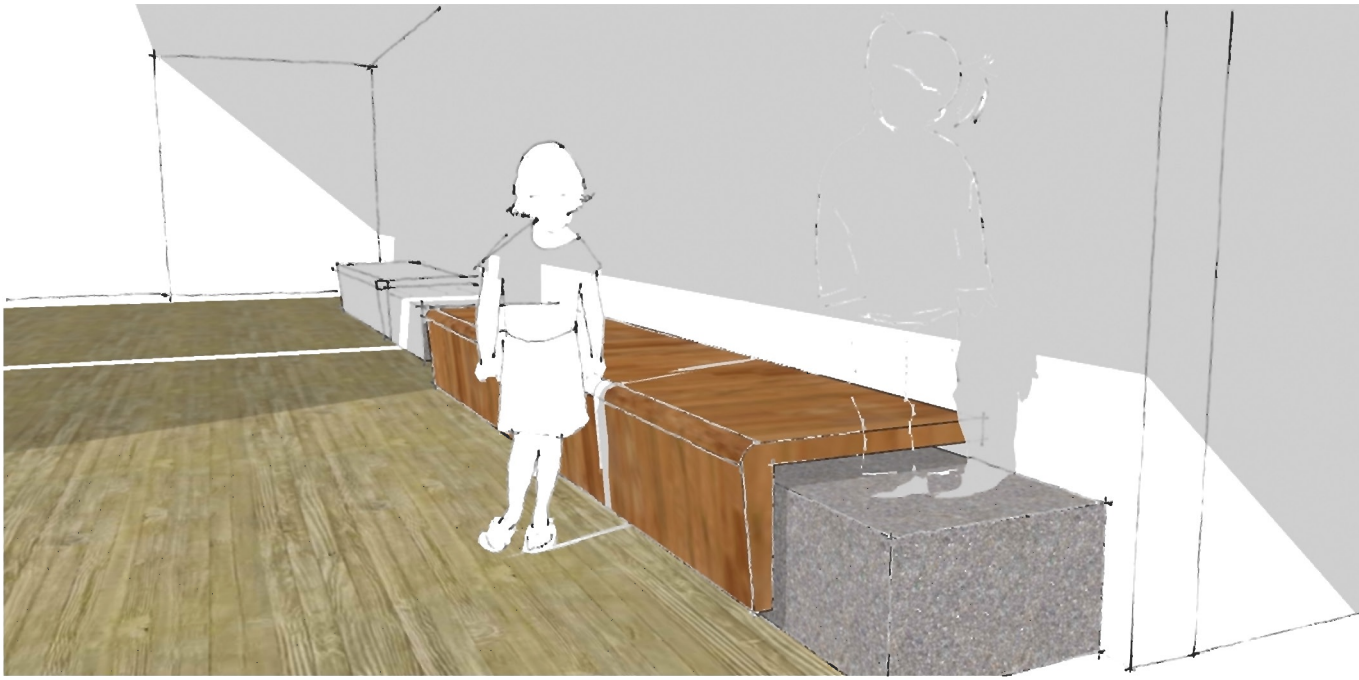
CUSTOM MADE LAMINATED WOOD SEAT

60x45x5mm GALVANISED MILD STEEL CHANNEL FASTENED TO LAMINATED WOOD WITH 4.8mm COUNTERSUNK SELF TAPPING SCREW.

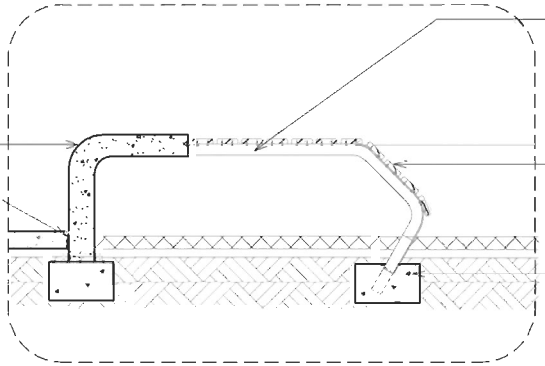
J-BOLT CAST IN CONCRETE

IN SITU CAST CONCRETE SEAT

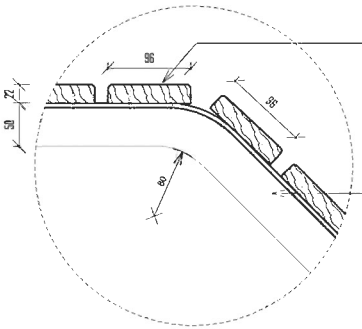
40x40x4mm GALVANISED MILD STEEL ANGLE FASTENED TO LAMINATED WOOD WITH 4.8mm COUNTERSUNK SELF TAPPING SCREW, WELDED TO A SIMILAT ANGLE MECHANICALLY FASTENED TO CONCRETE WITH M10 BOLT.



details



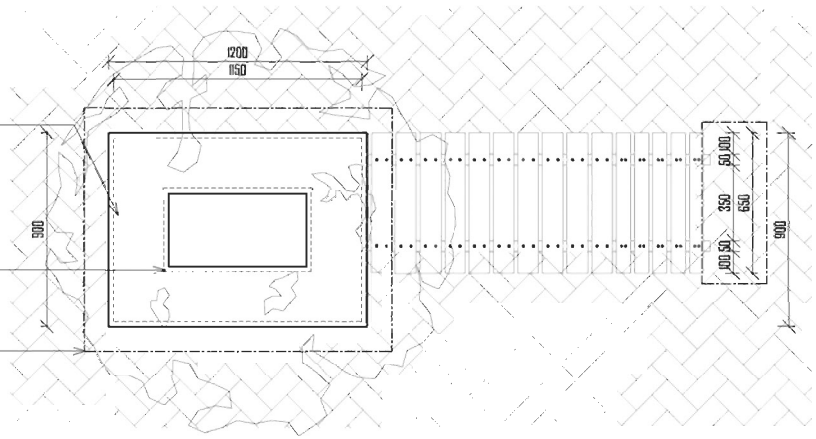
SECTION OF EXTERNAL COMPOSITE BENCH
Scale 1:20



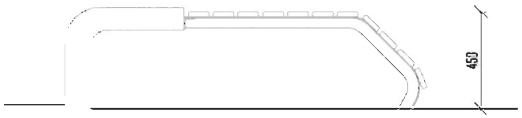
22x96mm SALIGNA HARDWOOD SLATS WITH TOP EDGES 6mm ARRIS ROUNDED CORNERS SCREW FIXED FROM UNDERSIDE TO STEEL RECTANGULAR FRAME

PAINTED STEEL BENCH SUPPORT FROM 50x50x4mm MILD STEEL ANGLES SECTIONS, FOLDED TO DIMENSIONS SHOWN. CAST INTO CONCRETE SURFACE BED AND FIXED TO WALL WITH 50x50x4mm PAINTED MILD STEEL ANGLE FIXED TO WALL WITH 2No 8mm DIA EXPANSION BOLTS.

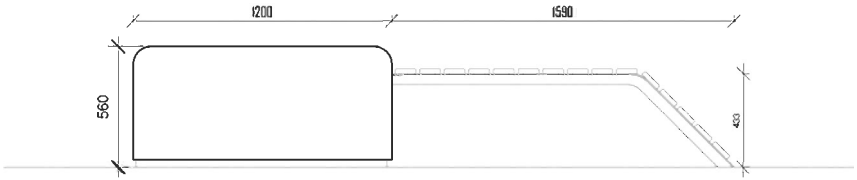
DETAIL OF EXTERNAL TIMBER BENCH
Scale 1:5



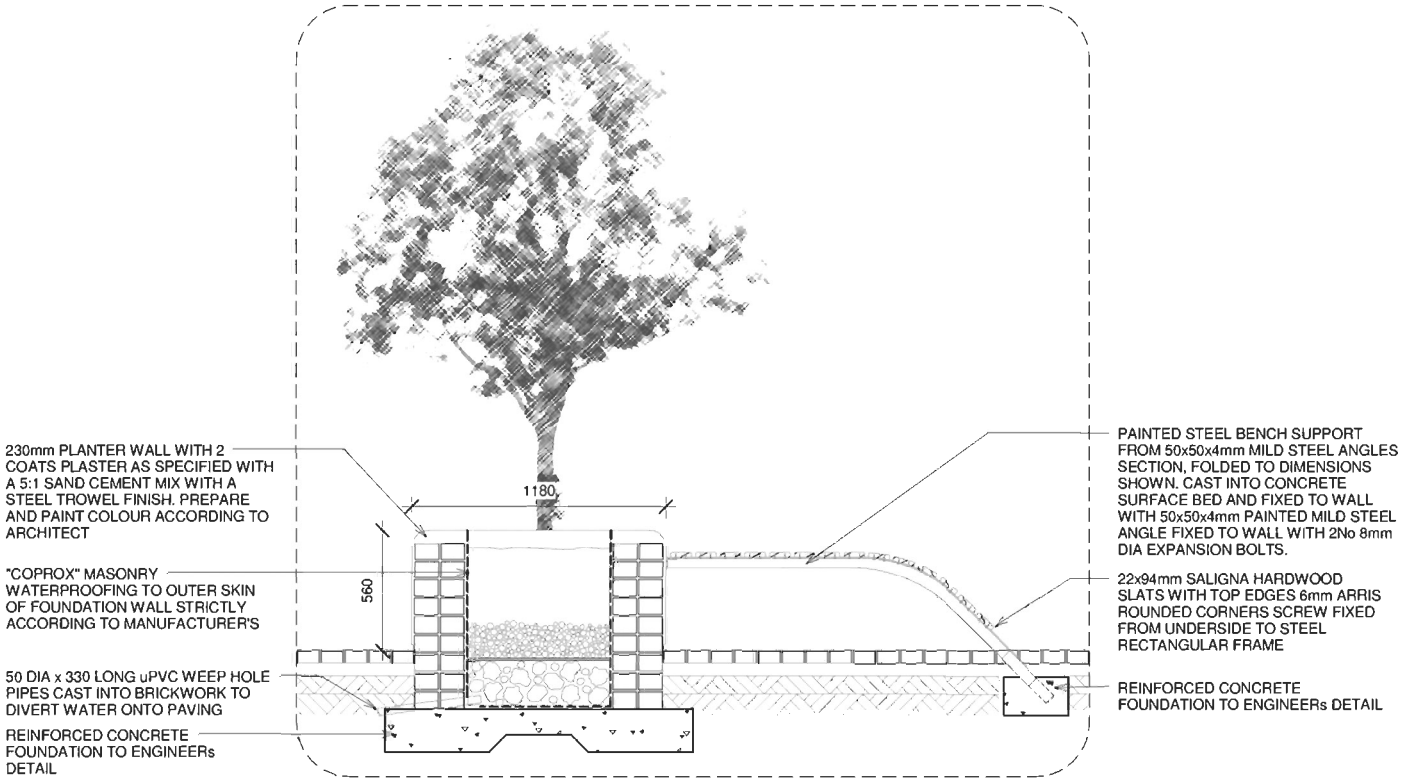
PLAN OF EXTERNAL TIMBER BENCH AND PLANTER
Scale 1:20



ELEVATION OF EXTERNAL COMPOSITE BENCH
Scale 1:20

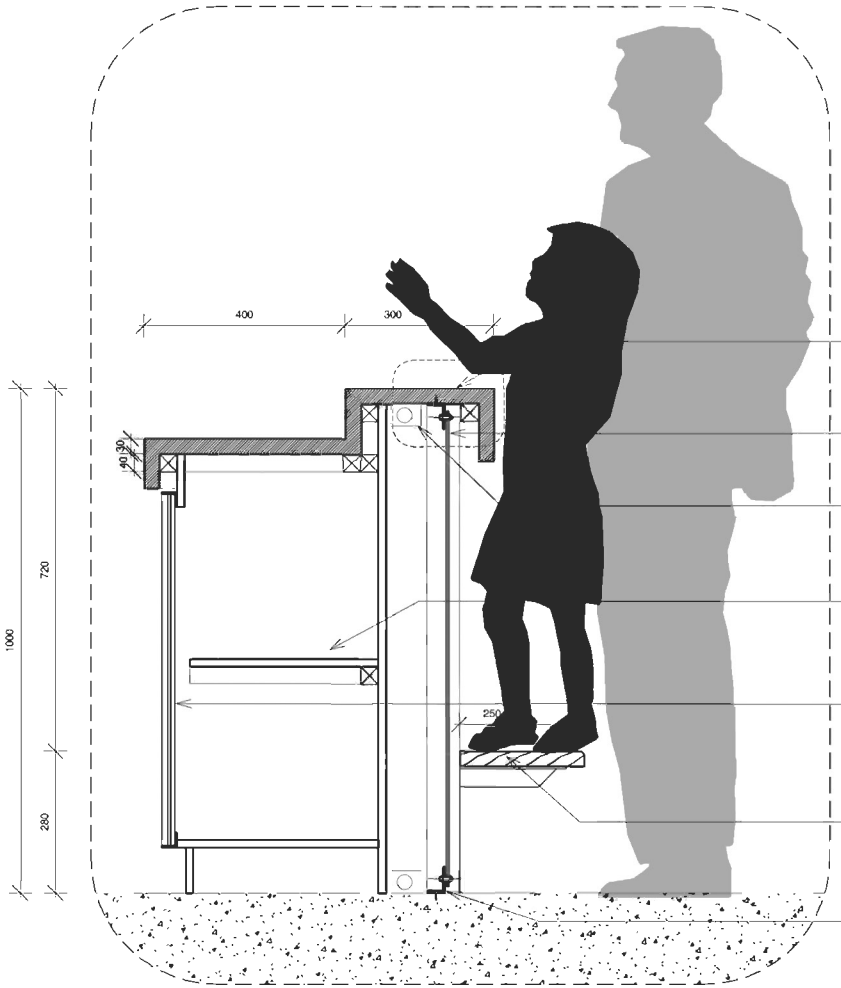


FRONT ELEVATION OF EXTERNAL TIMBER BENCH AND PLANTER
Scale 1:20



SECTION OF EXTERNAL TIMBER BENCH AND PLANTER
Scale 1:20

details



30mm CEASARSTONE BAR COUNTER WITH SQUARED EDGES ON TOP OF 38x38 TIMBER FRAME SCREWED TO CUPBOARD CARCASS WITH COUNTERSUNK WOOD SCREWS

TEAL PLEXIGLASS PANEL IN CUSTOM MADE 40x40x3 MILD STEEL ANGLE IRON FRAME WITH 200mm STAINLESS STEEL KICKPLATE. COLOUR AS PER ARCHITECT'S SPECIFICATION

FLUORESCENT LIGHT TUBE AS PER ELECTRICIAN'S SPECIFICATION INSTALLED AGAINST FLOOR AND UNDERSIDE OF COUNTER

16 SUPAWOOD CUPBOARD CARCASS WITH DUCO FINISH. COLOUR TO BE SPECIFIED BY ARCHITECT. ALL HINGES SHALL BE OF THE CONCEALED TYPE.

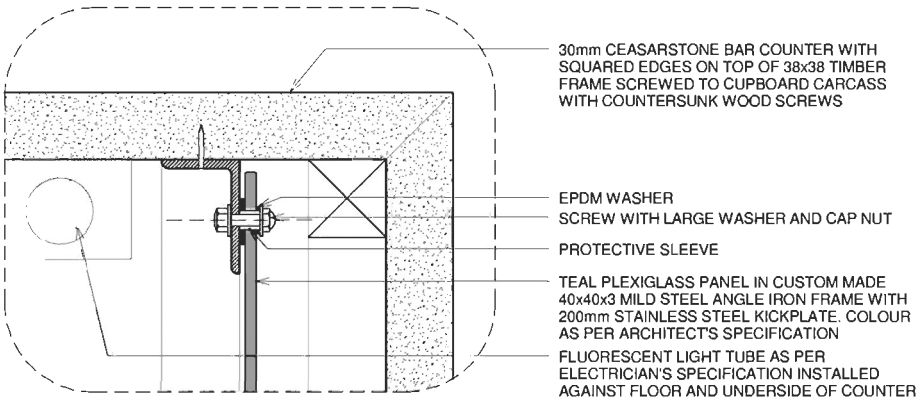
CUPBOARD DOOR. PLEXIGLASS PANEL IN ARCTIC SNOW WHITE COLOUR IN CUSTOM MADE 25x25x3 MILD STEEL ANGLE IRON FRAME PAINTED AS PER ARCHITECT'S SPECIFICATION

30mm TIMBER CHILD STAND FIXED TO CUSTOM MADE 40x40x3 MILD STEEL ANGLE IRON ELBOWS WELDED TO FRAME WITH 200mm STAINLESS STEEL KICKPLATE. COLOUR AS PER ARCHITECT'S SPECIFICATION

50x50x3 MILD STEEL ANGLE IRON SCREWED TO FLOOR AND UNDERSIDE OF COUNTER

CROSS SECTION THROUGH RECEPTION COUNTER

Scale 1:10



CROSS SECTION THROUGH RECEPTION COUNTER

Scale 1:2

details

TIMBER DECK LOFT SPACE FOR CHILDREN: 22x96mm SALIGNA HARDWOOD SLATS WITH TOP EDGES 6mm ARRIS ROUNDED CORNERS SCREW FIXED FROM UNDERSIDE TO STEEL 150x75x18mm GALVANIZED MILD STEEL PARALLEL FLANGE FRAME.

22x96mm SALIGNA HARDWOOD SLATS WITH TOP EDGES 6mm ARRIS ROUNDED CORNERS SCREW FIXED WITH SALIGNA SPACER IN-BETWEEN. FROM OUTSIDE TO STEEL T SECTION FRAME

PAINTED STEEL CANOPY SUPPORT FROM 2No. 50x50x6mm MILD STEEL EQUAL ANGLE SECTIONS WELDED TOGETHER, BENDED TO DIMENSIONS SHOWN. FIXED TO WALL WITH 50x50x4mm PAINTED MILD STEEL ANGLE FIXED TO WALL WITH 2No 8mm DIA EXPANSION BOLTS.

PAINTED STEEL CANOPY SUPPORT FROM D80x80x5mm MILD STEEL T-ANGLE SECTION, FOLDED TO DIMENSIONS SHOWN. WELDED TO 230mm HIGH I-SECTION AND FACTORY WELDED TO 12mm THICK BASEPLATE WITH PRE DRILLED HOLES FOR FIXING.

15da LIGHT COLOURED GRAVEL

255mm REINFORCED CONCRETE SLAB AS PER ENGINEER'S DETAIL WATERPROOFING: ABE TORCH-ON WATERPROOFING MEMBRANE LAID ON SCREED TO FALL 1:70 mm TOWARDS FULL-BORE OUTLET.

OPERABLE WINDOW ABOVE CEILING LEVEL TO EXPEL EXHAUSTED AIR

430mm HIGH CONCRETE REINFORCED CROSS BEAM

60x40x4mm GALVANISED RECTANGULAR HOLLOW MILD STEEL FRAME WITH TIMBER SLATS THAT SERVE AS A SOLAR SCREEN. FRAME IS WELDED TO STEEL H-COLUMN.

22x96mm SALIGNA HARDWOOD SLATS WITH TOP EDGES 6mm ARRIS ROUNDED CORNERS SCREW FIXED FROM UNDERSIDE TO STEEL T-ANGLE SECTION FRAME

0,8mm THICK HORIZONTAL SOFTWAVE 50 ALUMINIUM SHEETING FIXED TO 120x50x20x2,0mm GALVANIZED STEEL C-SECTION ON ISOVER VARIO TWO-WAY SEMI-PERMEABLE MOISTURE MEMBRANE AND 75mm GAVITY-BATT SILICONE IMPREGNATED GLASS MINERAL WOOL INSULATION

ALUMINIUM FRAME WINDOW

120x50x20x2,0mm GALVANIZED STEEL C-SECTION FIXED TO H-COLUMN USING DOUBLE CLEATS

220x112x9,5mm STRUCTURAL STEEL I BEAM WITH A THIN FILM OF INTUMESCENT MASTIC COATING FIXED TO CONCRETE SLAB WITH GALVANIZED M16 EXPANSION BOLTS

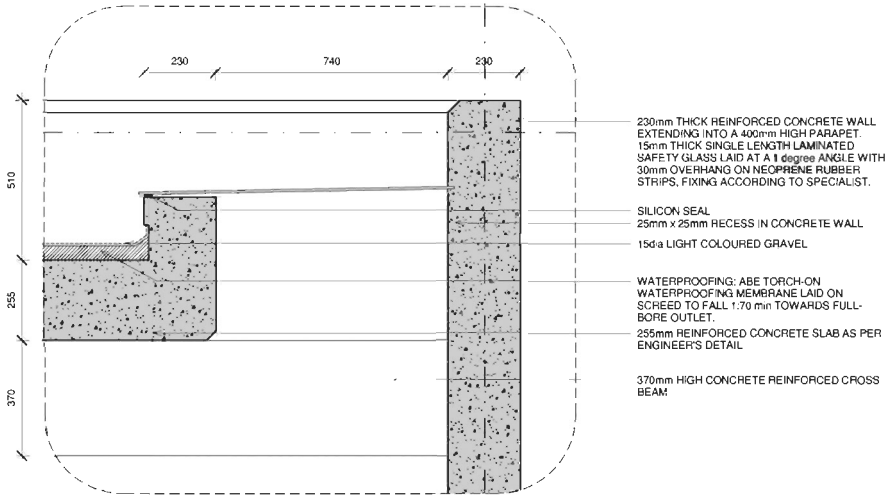
OPERABLE LOUVRES AT FLOOR LEVEL FOR FRESH AIR INTAKE

200x100x60mm BEVELLED CONCRETE BRICK PAVERS IN BASKET WEAVE PATTERN WITH HEADER COURSE TO EDGES, COLOUR: CHARCOAL, ON 25 SAND LEVELLED AND ROLLED

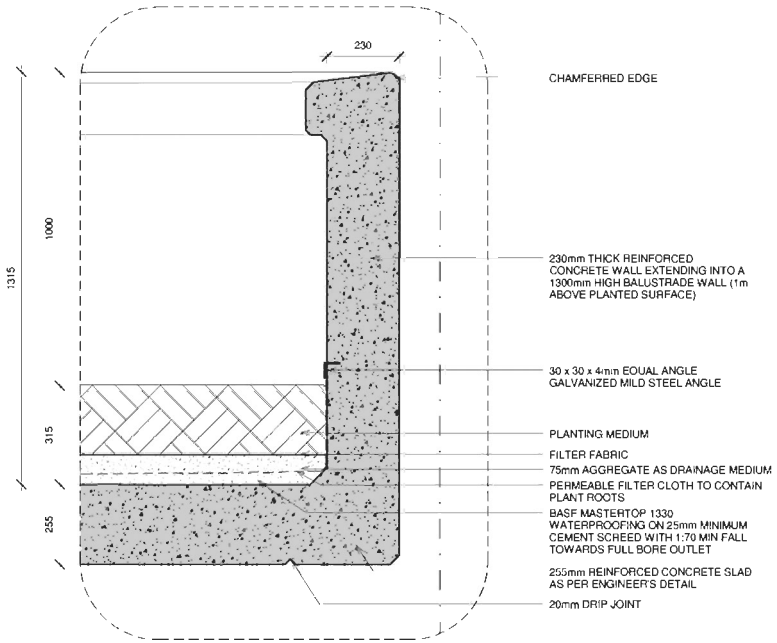
33x60 HOT DIPPED GALVANISED RECTANGULAR GRIPWELD

320mm WIDE CONCRETE STORMWATER CHANNEL WITH GRID, MINIMUM FALL OF 1:200 TOWARDS STORAGE TANK FOR IRRIGATION

75x50x4mm STEEL ANGLE FIXED TO STORMWATER CHANNEL WITH M16 EXPANSION BOLTS



DETAIL 1: SKYLIGHT
SCALE 1:10



DETAIL 2: GREEN ROOF
SCALE 1:10

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feel+


+heal

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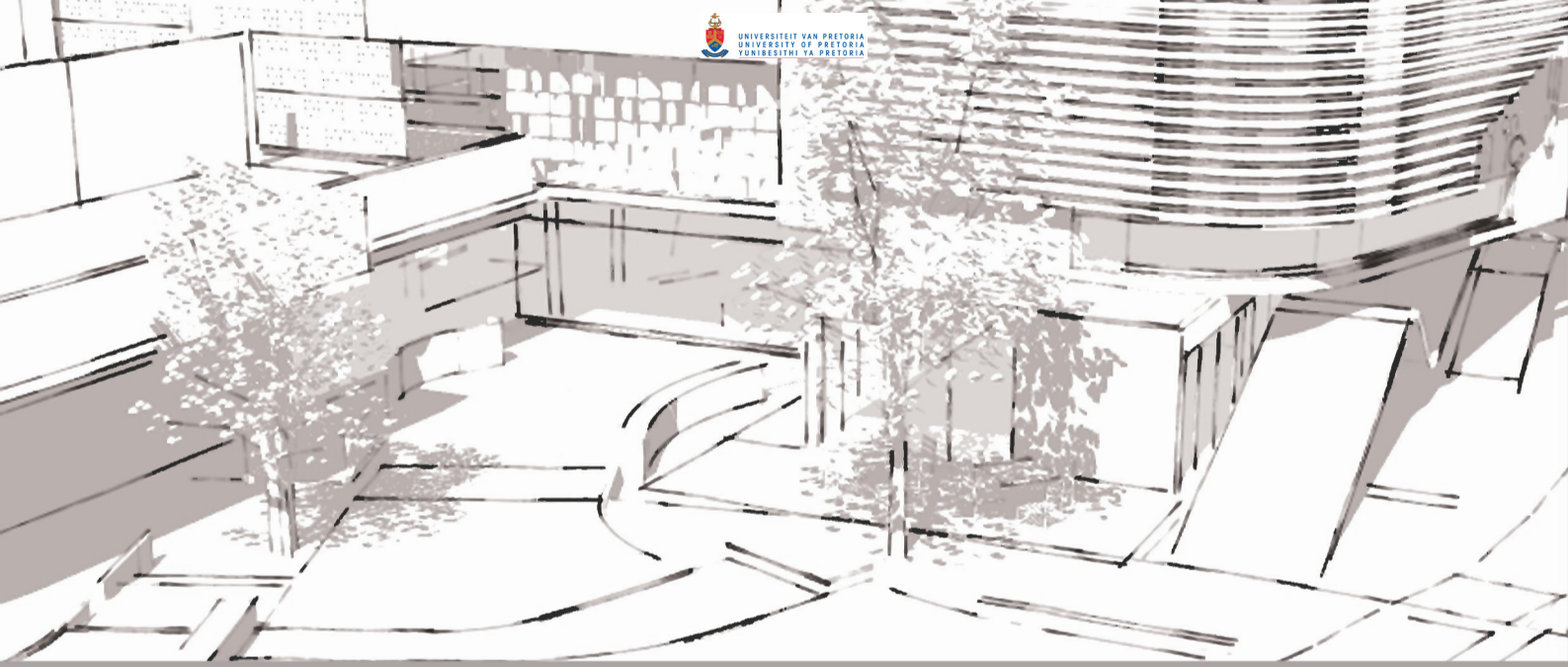
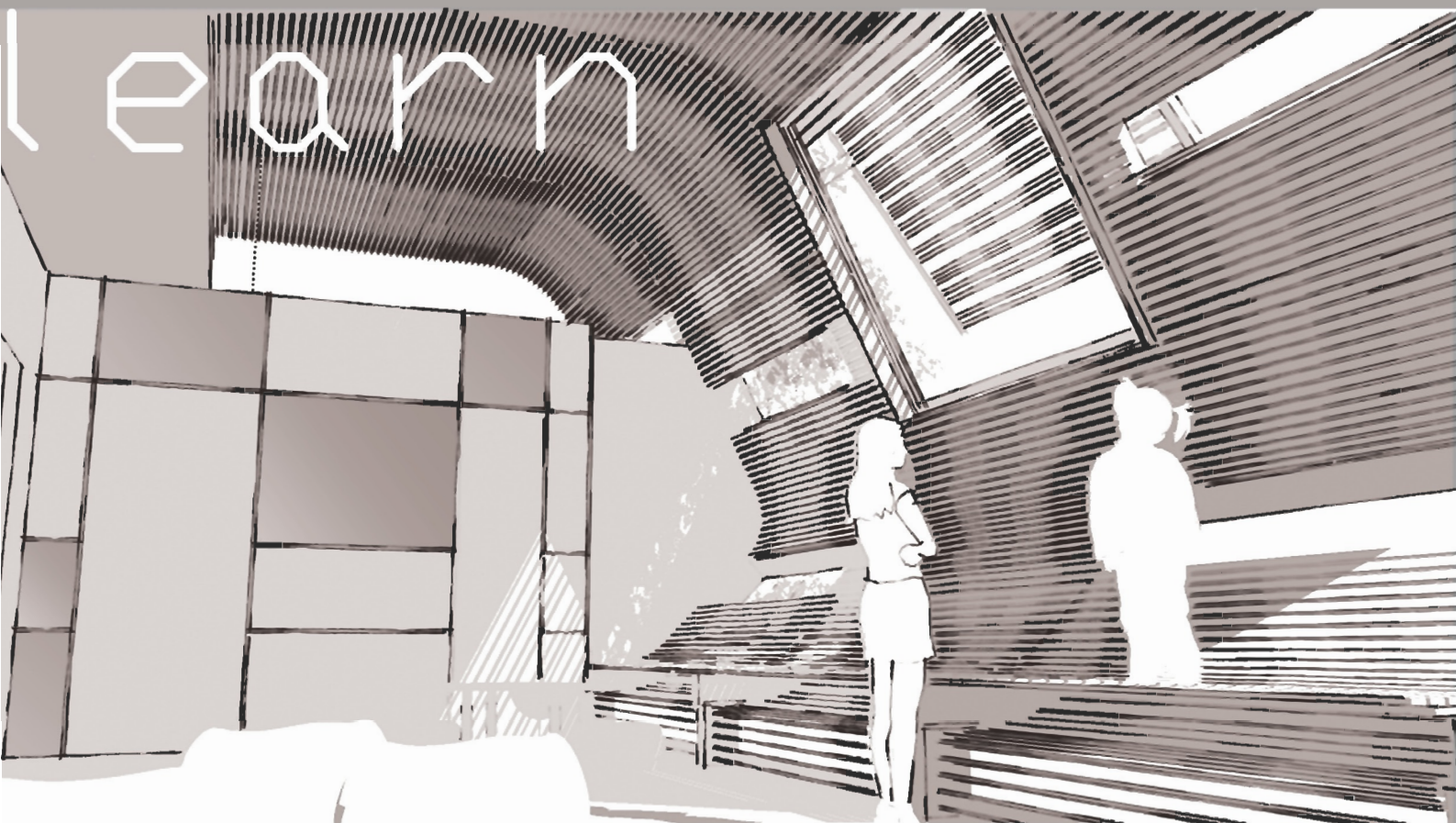
learn

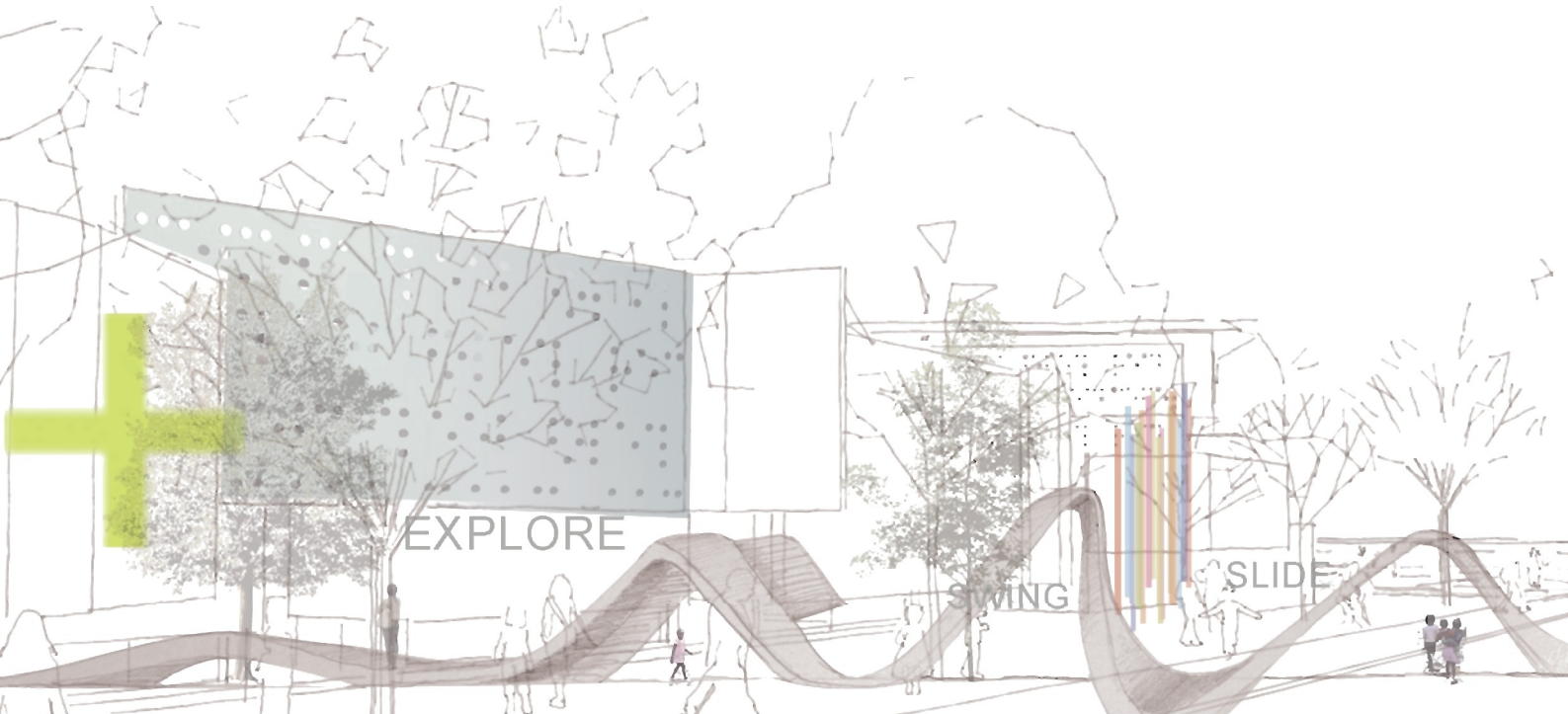
+heal

feel+



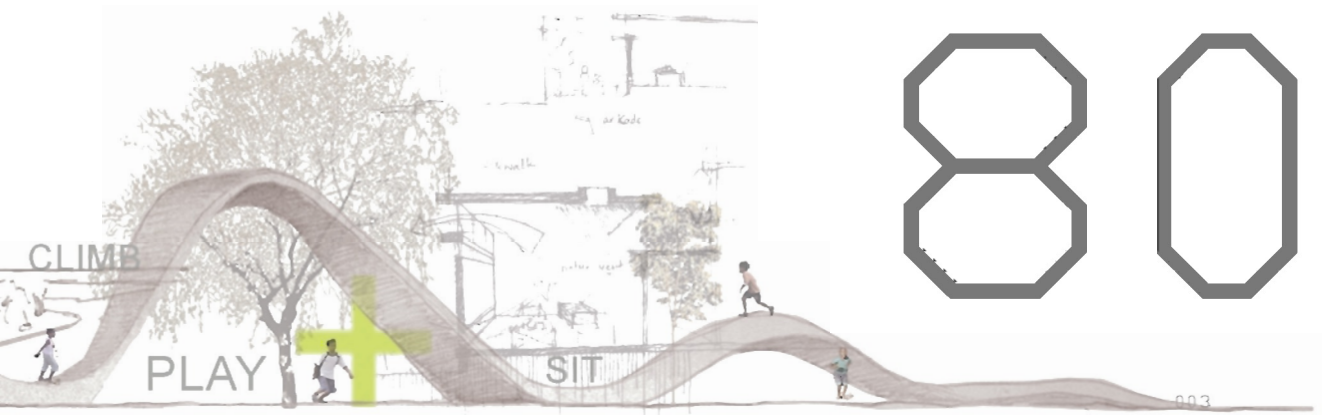


conclusion



CONCLUSION
LIST OF ILLUSTRATIONS
REFERENCES
ADDENDUM
ACKNOWLEDGEMENTS

feel + learn + heal
A CHILDREN'S DEVELOPMENT CENTRE AND CLINIC



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conclusion

Our experience in this world, from a very young age, is formulated by the amalgamation of the senses. To experience something one should be able to touch, see, taste, hear and smell it. Therefore, architecture, to truly engage the minds of the user, should be designed with intangible sensuous aspects in mind. The sensory realm of architecture goes further than appearances. What a building looks like becomes less significant, but how it feels and stimulates our minds are essential.

Children's functioning and development is shaped by interaction with their surroundings and spaces designed for them must conform to their physical, cognitive and social needs. The design proposal is based on a search for an architectural solution which offers exploration and stimulation to children. Through the design of multi-sensory environments, people's well-being can be improved.

Life materializes within buildings and it has been demonstrated that buildings can significantly affect people. Architecture is far more than just a building, its influential effect on humans, makes it an essential part of shaping lives.

acknowledgements

To God, the architect of my life, for this opportunity and inspiration in everything I do. My mother, for all the love and encouragement, I dedicate this in your loving memory. To my father, for being my voice of reason, my steadfast support and for always believing in me. To Gary and Jacques, for the endless guidance and understanding. Thank you to all my family and friends, for the love and loyal support.