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YUNIBESITHI YA PRETORIA

A youth centre in Pretoria

To mom and dad for all your love and support

25059794

Christiaan Liebenberg

x-i Outline

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The dissertation's aim is to highlight the presence of young people in the Central Business District of Pretoria, Tshwane. The proposal aims to provide a facility to entertain the youth in the city while waiting for transport before or after school.

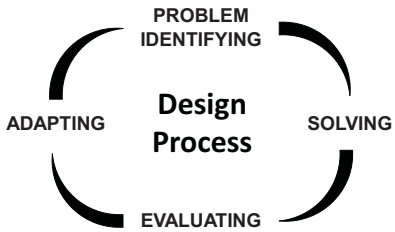
An in depth analysis done on the Central Business District (CBD) of Pretoria revealed that there are currently 13 schools, as well as, several Further Education and Training Facilities (FET) in the CBD. These children and students form a huge sector of the population that is currently not catered for in term of entertainment.

The project is located in the south eastern quadrant of the CBD, as this is where most of the schools and FET's are located.
The facility will comprise of various child and student based activities and facilities that they can engage in before and after class or school. These include indoor and outdoor activity spaces as well as commercial enterprises. All the facilities are arranged around a central courtyard space where unprogrammed activities may occur. The facility will also incorporate a small transportation node consisting of Taxi's and Municipal busses. This will reduce the need for children to walk extensive distances between their after school activities and their modes of transportation.

As the title 'Game On' suggests the dissertation aims to investigate games in both their architectural structure and narrative. Furthermore, the aim is to utilize the design principals and narrative found in games during the design process and using them to determine the hierarchal organization of spaces found at the centre.

As in a game, design is a process that follows a narrative as determined by a set of rules and limitations. The imposed restrictions on the design may result in an unsuccessful attempt to overcome it. In games this phenomenon can be seen as reaching a level of difficulty. The player then needs to start over in order re-evaluate the situation or to gain the skills necessary for advancing to the next level. The process of design should be approached in a similar way. When a problem is reached the design should be re-evaluated and the necessary exploration should be done in order to solve to problem.

Ultimately the process of design may be compared to the playing of a game, it has to adhere to rules and regulations and what is technically possible. The end product (architecture) can be engaging and may allow the user to interact with their surroundings like in a video game.



Address: - Cnr of Schoeman street and Du Toit street, Pretoria CBD
Building Description: - A Youth Centre. Day-care facility and after school care for students.
Research Field: - Urban Environments

Submitted in fulfillment of part of the requirements for the degree of

Magister of Architecture (Professional)

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Supervisor: - Arthur Barker
Study Leader - Derick de Bruyn

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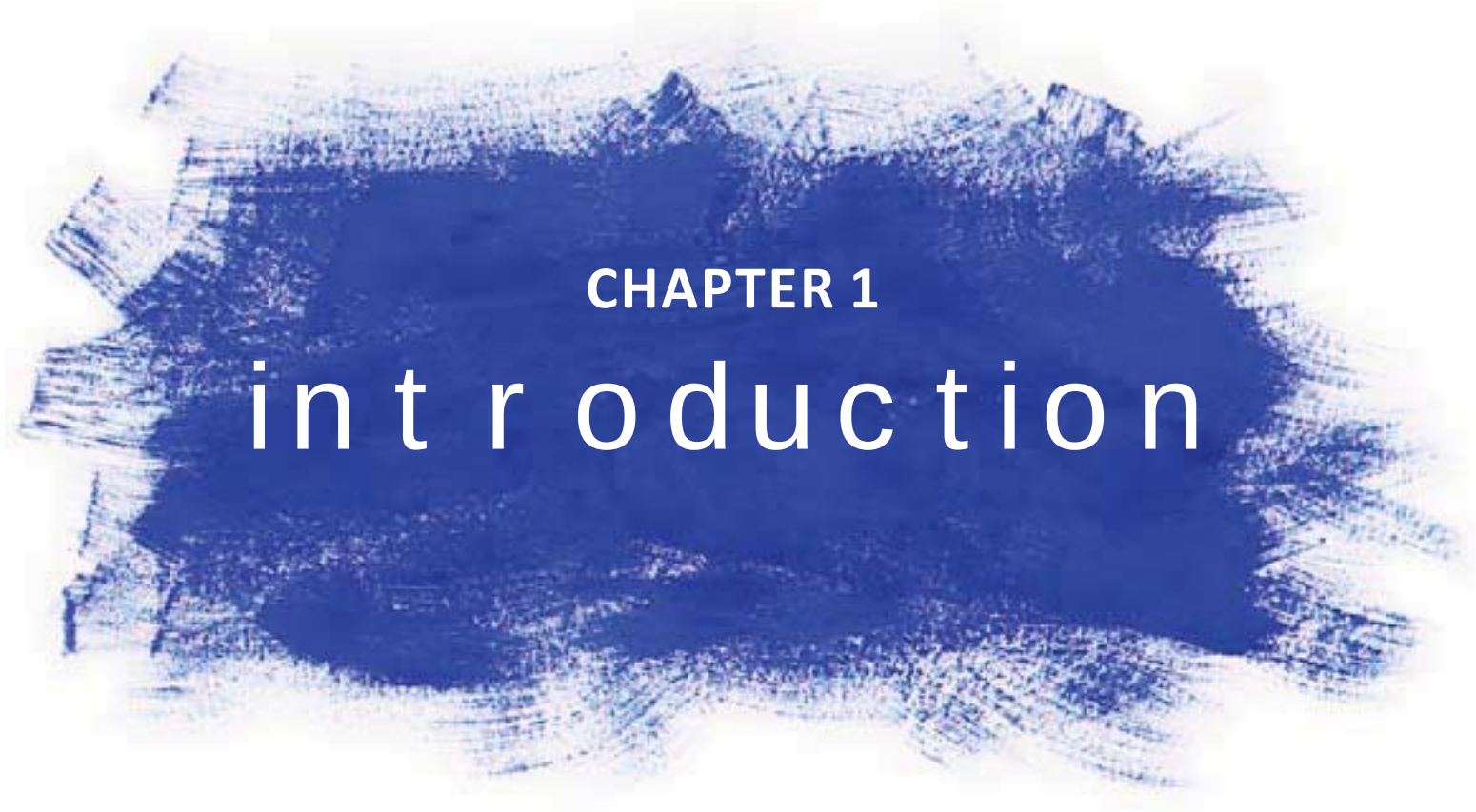
Figure 1-1. Silhouette of Children

“Suppose you could view all the photos taken by amateurs and professionals on one day anywhere in the world. What would they be of? I think: mainly children.”

Eddie Marsman
Van Eyck 2002; 103



CHAPTER 1

introduction

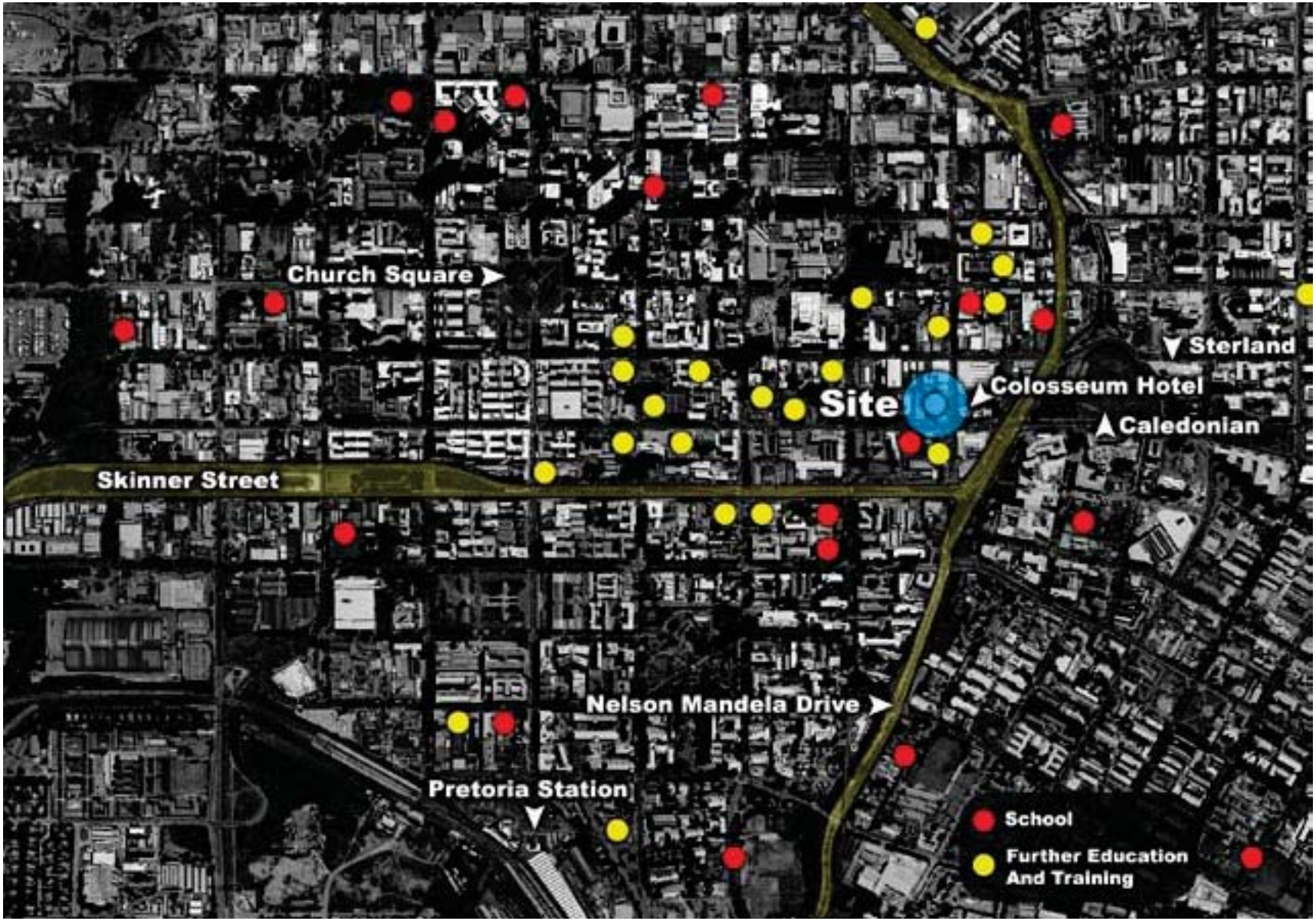


Figure 1-2. Aerial photo showing Schools and FET's in the Pretoria CBD

1-1 Background

May 23, 2007. The start of the 'Urban Millennium.'

According to United Nations research, 51.3% of all people live in urban areas. This implies that more than 3.5 billion people live in towns or cities. Humans are, therefore, currently classified as an urban species (Gizmag; 2007).

South Africa is no exception to this trend of urban densification. The population in Gauteng has grown from 8.8 million people in 2001 to 10.5 million in 2007. Currently Gauteng houses almost 20% of the total South African population. (Community Survey; 2007 and Census; 2001).

Due to the global growth in population, growing up in a city is inevitable for most children. Space is becoming scarcer and more expensive. The most obvious use of open space in built up areas are functions used by cars. The asphalted areas for roads and parking lots have multiplied over the years, forming the main competitor for outdoor areas where kids can play (Van Eyck 2002: 123).

In Gauteng, 23.6% of the population consist of children under 15 years and a further 19.6% of the population are between the ages of 15 to 24 (Community Survey; 2007). According to the census data from 2001 and 2007 there are currently more than 4.54 million people under the age of 34 living in Gauteng. The concentration of young people in the Central Business District of Pretoria may even be higher during business hours since there are currently 13 confirmed schools and more than 20 Further Education and Training facilities (FET's) in the Central Business District of Pretoria [figure 1-2].

The majority of the schools are private schools and have an average of 800 students each. The students attending the FET's vary from 300 to more than a 1000, although, some students do not attend class every day. Most of the children and students attending these facilities do not live in the city, but on the periphery in areas like Mamelodi, Atteridgeville and Soshanguve [figure 1-3].
The children and students have to commute in and out of the city for education. Public transport consisting of busses and taxies are the predominant forms of transport for longer distances. Unfortunately many of the students have to wait long periods of time after school or class for their transport back home.

If the educational facilities alone are taken into consideration it equates to a vast number of young people in the city that needs to be accommodated, but the reality, according to the 2002 UNESCO study by Chawla, is that in most western cities, spaces are normally designed for use by adults. Very few spaces are designed to accommodate children. Small children are normally catered for in crèches and day-care facilities, but children attending school have almost no place to play, wait and be safe in the city.

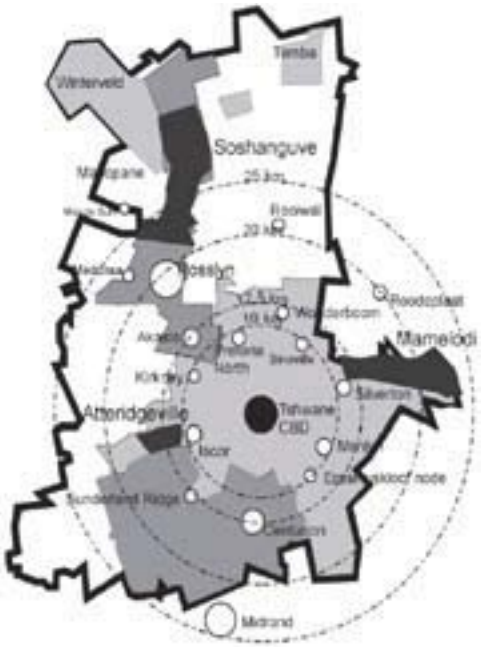


Figure 1-3. Spatial diagram of the Tswhane Municipality

Figure 1-4. Aerial photo showing Open areas in the Pretoria CBD

1-2 Current Recreation

Currently entertainment for children in the CBD is limited. The area is predominantly designed for adults, with functions like the State Theatre and adjacent hard open surfaces like Strijdom- and Sammy Marks squares.

The main spaces in the CBD that are used by children for entertainment consist of the pedestrian portion of Church Street, Sancardia shopping centre, Sterland and some smaller shopping centers, none of which were designed for children.

Because there are limited spaces designed for children they are often found roaming the streets looking for something to do or a place to entertain themselves. Add small children and busy streets together and it equates to an intimidating environment that is potentially dangerous. Children need a place to be, but the sidewalks are narrow and lined with un-recessed facades and fences. The nooks, crannies and alley ways are often occupied by informal traders or homeless people, this leave children with no place where they can feel safe (Lynch; 1977; 15).

Playgrounds are thought of [by adults] as the solution; places where kids ought to be, off the streets and out of the adults' way. Stereotypical versions of playgrounds are often seen around and normally consist of steel-pipe, wood or sculptured concrete structures. Some experts say that these playgrounds are irrelevant to children's real needs (Moore; 1986; 110).
According to Rissotto (2006; 85) children prefer green open landscapes with trees and private spaces to spend time, play and meet with friends (Lynch; 1977; 54),

Currently the city provides a few green or open areas that are used by children in the CBD. These areas are Church Square, Pretorius Square, Burgers Park and Princess Park [figure 1-4].
Of these green or open spaces only Burgers Park has facilities or the infrastructure to entertain small children, although, limited.

All of the above mentioned spaces have problems. The spaces are too hot due to an abundance of hard surfaces and a lack of shading; alternatively the spaces are overcrowded by people. Unfortunately, planners and investors think of parks as green havens of adult leisure, as places to 'get away from it all. The spaces are, therefore, designed according to the requirements of Adults not children. The most predominant problem of the open areas are that most are situated towards the southern and western part of the CBD and the schools are too far away from them.

The fact remains that spaces for children in the city are diminishing.

The superficial needs of children have changed in the past, and will continue to evolve. But their basic intrinsic needs have remained constant. The following 7 needs should be met in order for a child to develop into a competent adult:

Children have a need for:
- ongoing nurturing relationships;
- physical protection, safety, and regulation;
- experiences tailored to individual differences;
- developmentally appropriate experiences;
- limit setting, structure, and expectations;
- stable, supportive communities and cultural continuity;
- protection of the future (Brazelton 2000).

The need to have a space allocated where children may run and play filter into several of the above criteria. Aldo van Eyck (2002; 15) concede that spaces for children to play should be created in cities from the planning phase and that cities should not just convert open spaces into parking lots and roads to cater for cars.

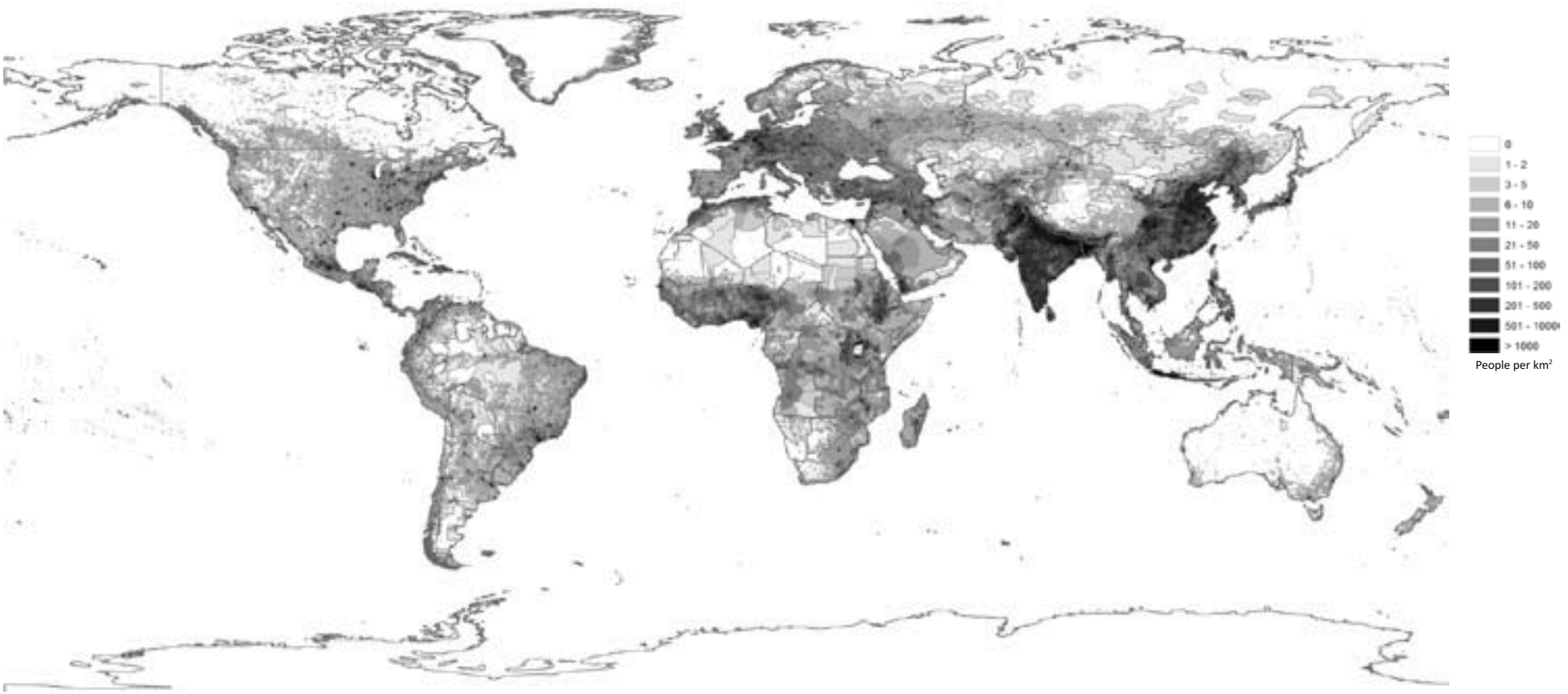


Figure 1-5. Map of projected population in 2015

The problems faced by the youth is not only evident in South Africa, but it is an increasing global problem.

1-3 Problem

Safety is one of the biggest concerns facing parents and children in South Africa (Osofsky; 1997; 3). The unsafe social environment we are confronted with is a reality that is not going to disappear soon.

Open public spaces lose some of their attractiveness amongst children and parents, due to this lack of safety and the inability to control the immediate environment around oneself (Van Eyck; 2002: 123).

According to Robin Moore (1986; 230) the two most important aspects of a child's environment is that it must provide both security and serendipity to stimulate both predictable and unpredictable consequences. Opportunities to interact playfully with the environment are a critical factor in the development of human competence (Moore; 1986; 15).

The root of the problem is a lack of facilities for young people in the city. Projects aimed at young people are normally not considered economically viable.

The base of the problem is enlarged by the layout of Pretoria and the resulting way of life. The city is segregated. Based on Apartheid planning principles the commercial, residential, work and recreation is separated into different zones [figure 1-7]. As a result many people including children have to travel vast distances to get to work or school and back.

This lifestyle of spending hours waiting for public transport enlarges the security problem faced by children. Because there are limited spaces with sufficient supervision where they can wait after school for their transport back home, children either don't do their homework or they do it without the proper resources surrounding them.

Figure 1-6. Barbed wire
Barbed wire fences are a symbol of the need to protect oneself against the dangers of society.

"Fairy tales telling of dark woods, witches and wolves have been updated as urban myths telling of bad neighbourhood, strangers and mean dogs" (Bell; 2006: 37).

Social threats like the fear of strangers and 'bullies' are among the most prominent fears of children. Parents also fear strangers near their children. (Moore, 1986: 207).

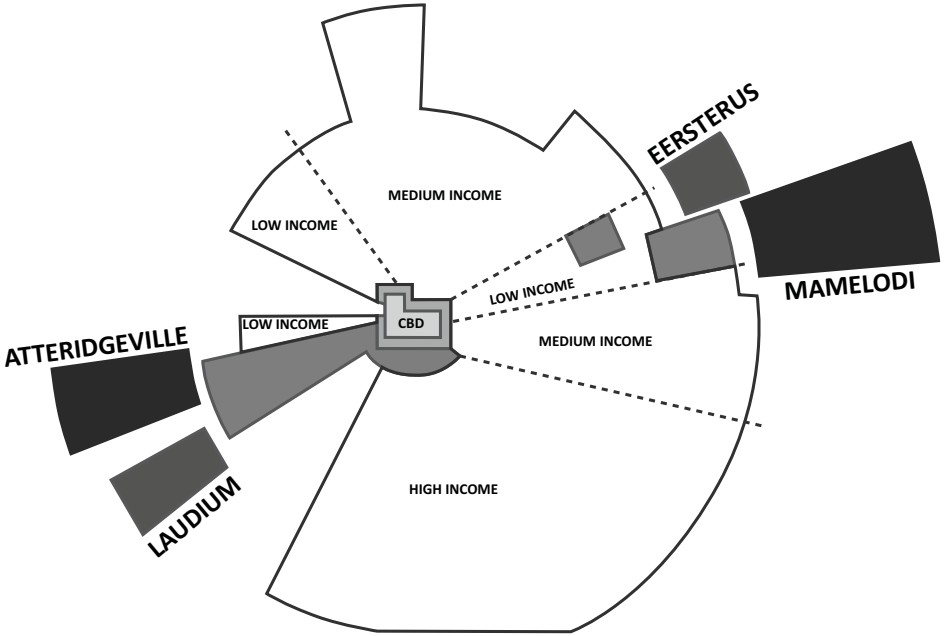


Figure 1-7. Apartheid city planning for Pretoria 1970

1-4 Brief and Goal

The solution could be found in providing a facility in the Central Business District of Pretoria that is designed for these children.
Ideally such a facility would cater for a variety of different age groups and provide spaces where the children can do their homework while the work is still fresh in their memory. The facility should provide areas where the children can be entertained and/or play.
Additional facilities like a cafeteria and commercial enterprises would greatly increase the success of such a facility.

The main purpose would be to provide a safe environment in the city.
A Youth Centre will comply with all the above requirements.

The intention of the project is to highlight the presence of children in the city. An expansion of this is to highlight the need to design spaces for children, because they interact with the world differently than adults. Ways must be found to accommodate the necessity for children to physically manipulate their environment to suit their needs (Moore; 1986; 237).
The focus falls on Space, both real and virtual (video games and imagination) the challenge lies in possible merging of the two realms into one.

The results form studying of the existing environment will be used to design a multipurpose building that will primarily focus on accommodating facilities for children and young adults. The ground floor will be used to generate a commercial income in order to sustain the non-profit part of the building.

All of the built environment aimed for use by children should comply to certain criteria in respect with children's development:
Firstly the building should attempt to foster personal identity;
Secondly it should attempt to encourage the development of competence.
Thirdly the building should provide opportunities for growth and it should promote a sense of security and trust.
Lastly the building should allow both social interaction and privacy. (Weinstein; 1987; 92)

Ideally such a facility should be located close to existing venues in the city that children use like schools, parks and transportation nodes.

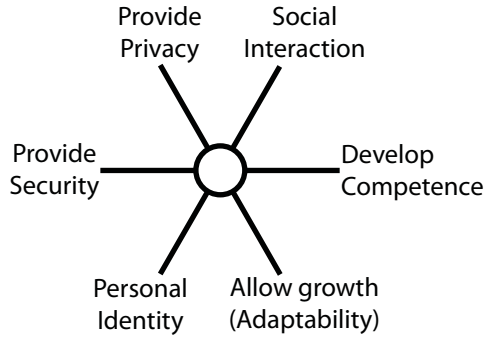


Figure 1-8. Diagram illustrating principals for spaces designed for childhood development.

1-5 User

Child / (plural children):
A young person from the time they are born until they are about 14 years old (Macmillan; 2002: 235).

The above definition is a broad description of the user group which will utilize the different facilities in the building. The definition implies that no age group may be discriminated against. In providing a variety of facilities the building aims not to discriminate. The age group in the facility is not restricted to 14 years but extends also to early adulthood.

Infants and Toddlers:

0-2 years - Infant

2-6 years - Toddler

Generally babies and toddlers are housed at a day-care facility near the parent's resident or at a grandparent. The growing number of young parents living in, or near the Central Business District of Pretoria requires a proper day-care facility in the area. The facility will cater for infants and toddlers. This facility may also be used by visitors to the hospitals and conference venues in the immediate area.

Primary school children:

7 - 12 years

These children are the most affected by the lack of facilities in the CBD. They require constant supervision and assistance with homework. Furthermore, they require space to play and explore, both indoors and outdoors.

High school children:

13 - 18 years

Most High school children are able to take responsibility for them self, but they do need a safe place to wait in the city. Their requirements differ from the younger children and are more focused on indoor activities. Outdoor spaces are mainly used for sport.

Students:

19 - 25 years:

Activities do not differ too much from high school children, although the time of day they will be using the facility may differ from school children.

Adult:

Staff, Parents and Pedestrians in the area:

The facility will contain staff rooms and offices for administrative purposes. The sidewalk on ground floor should contain commercial facilities aimed at the pedestrians in the area.

Figure 1-9. User group

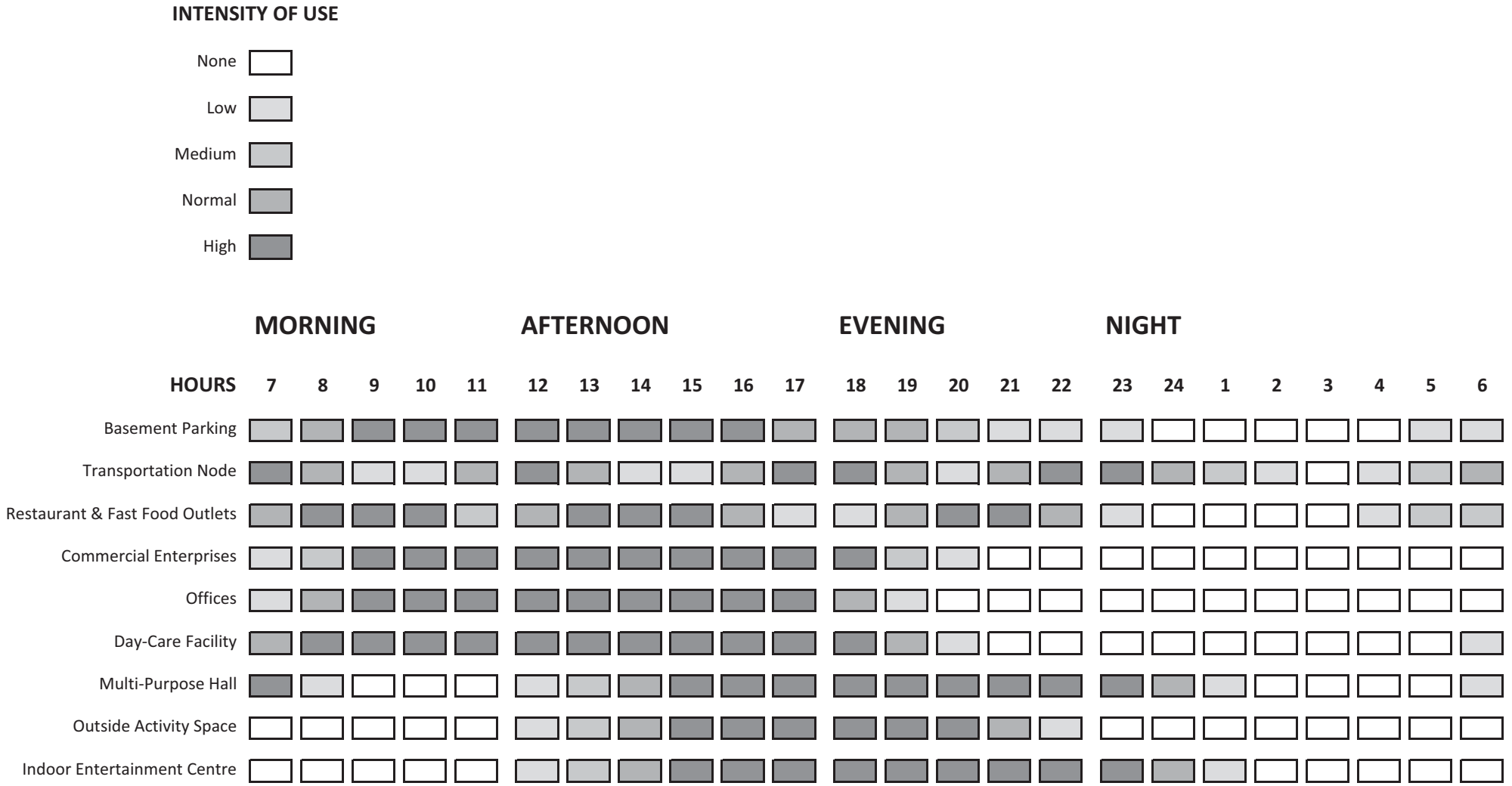


Figure 1-10. Table illustrating the intensity of use of the various functions during the day.

1-6 Programme

The different facilities of the building are defined by the users.

Common facilities everybody will be allowed to use are:

Transportation Node
Commercial enterprises
Restaurants

Infants and Toddlers:

The day-care facility consists of 7 classrooms for ages 1 to 7. The classrooms open up to the outside play spaces. The facility houses indoor play areas, offices and a Baby ward. The indoor play areas would be able to accommodate midday sleeping.

Primary school children:

The children need a place to store their personal items. This will take place in the locker rooms. They also need a place to do their homework. The multi-purpose hall can be divided into smaller zones to house, amongst other functions, completion of the homework. Recreation is an important part of their requirements. The outdoor spaces and indoor entertainment spaces are there to accommodate them.

High school children:

Similar to the Primary school children, with more focus on the indoor entertainment facilities.

Students and Adults:

The students will use the facility for a wider period of time during the day. Their requirements are similar to the older high school children.

The Adults are either employees that need offices, or customers that either uses some of the facilities, (like the parking) or walking through.

Accommodation Schedule

Parking / Transportation Node:
- Basement for cars
- Wider on street parking for Taxi's
- Bus Stop

Commercial on ground floor:
- Retail shops
- Restaurants

Offices:
- Administrative offices

Day-Care Facility:
- Creche
- Class Rooms
- Sleeping Hall
- Indoor and Outdoor play area

Multi-Purpose Hall:
- Cafeteria / restaurant for the children
- After school study aid centre

Outdoor Activity Area:
- Basketball Court
- Landscape
- Skate Park
- Climbing Wall

Indoor Entertainment Areas
- Lounges
- Pool Tables
- Video Game facilities
- Bars / restaurant
- Clubs

Locker rooms
- Changing Rooms
- Bath Rooms
- Lounges

1-7 Client

South African Governmental Departments

Figure 1-11. Logo of the Department of Social Development

Figure 1-12. Logo of the National Development Agency

Figure 1-13. Logo of the National Youth Development Agency

Non Governmental Organizations

Figure 1-14. Logo of the IT Schools Africa

Figure 1-15. Logo of New Day Church

Client:
Someone who pays for the services of a professional person such as a Doctor, Lawyer or Architect. In the case of Architecture this includes the person or institution that will fund the construction of the project. (Macmillan; 2002: 252).

According to a study done in 1994 by John Spink (1994; 46) there is a general principle that applies to most new recreational developments all over the world.
"Planning Gain."
The principal relies on a commercial developer that is eager to construct a profitable facility, the local council or government then partner up with the developer. The developer benefit by not having to pay for re-zoning or bulk services. Some of the construction costs are also carried by the government. The municipal council benefit by having a larger complex that help with generating the critical mass required and not having to purchase new land to provide facilities.

There are various departments located in the South African government that might find it beneficial to help fund the project:

Department: Social Development.
The Department of Social Development is committed to social transformation that is embodied in the principle of social justice and the Bill of Rights contained in the Constitution. They are required to create a better life for the poor, vulnerable and excluded people in society.

The department normally work in partnership with non-governmental organizations, faith-based communities, the business sector, organized labour, and other role players. (www.dsd.gov.za)

National Development Agency.
The National Development Agency's primary mandate is to eradicate poverty by granting funds to civil society organizations that implement developmental projects in poor communities. (http://www.nda.org.za/)

National Youth Development Agency.
The NYDA aims to mainstream and integrate youth development for sustainable livelihoods. They initiate, facilitate, implement, coordinate and monitor youth development interventions aimed at reducing violence and promote social cohesion The NYDA's primary target group is young people aged between 14 and 35 years. (www.nyda.gov.za) (http://www.nda.org.za/)

Similar project contracted by the Department of Social Services:
Bosasa Dyambu Youth Centre
The centre is designed to admit Five hundred (500) boys who are in conflict with the law. The centre offers various programmes including education, religion, health, arts and culture. The centre also offer Entertainment and after school care which are aimed at breaking the cycle of crime.
(www.gautengonline.gov.za)

There are several non governmental agencies that also provide funding for uplifting in the community:

Religious institutions like New Day Church.
The New Day Religious community has funded several youth based activities centers in the past. They consist of members of the community that make private donations to fund the construction of youth facilities. Generally their facilities have an admission fee to cover maintenance and staff salaries.

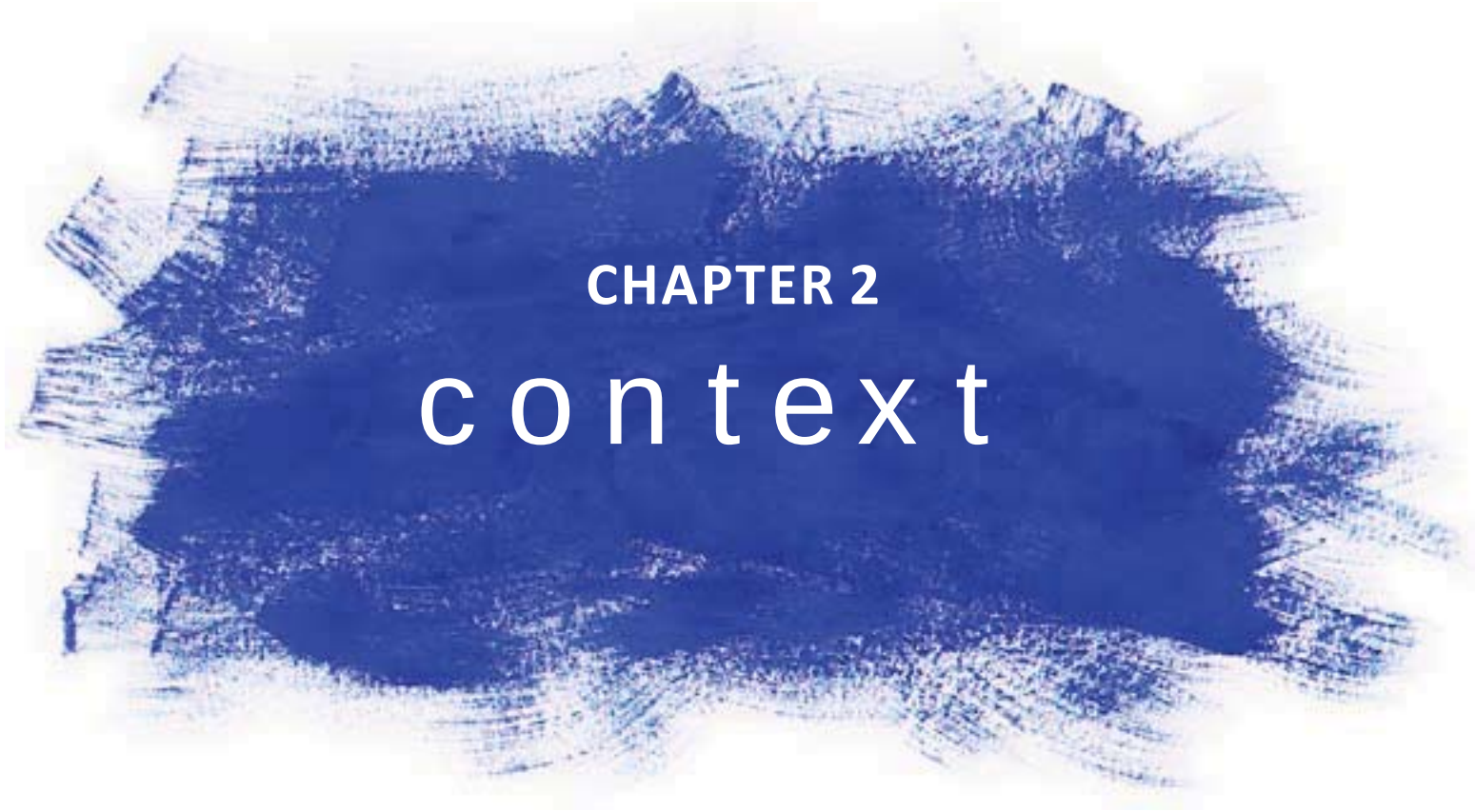
Private companies may also contribute to the centre by utilizing the opportunity as advertising. By sponsoring equipment they will benefit from having people use their product and ultimately acquire their own. Alternatively they benefit from advertisements that will be erected on the outside of the structure.

The IT School of Africa is one such an organization that sponsors computer equipment to disadvantaged communities.
ITSA works with distribution partners in several African countries, who are responsible for selecting schools, distributing computers, training teachers and providing ongoing support. The partners are typically charities or NGOs with specialist knowledge of IT and education. They also receive shipments, test equipment and carry out any necessary repairs.

ITSA's work in Africa is divided between its collaborative Country Programmes with partner charity CFAS (Computers for African Schools) and Other Projects which it runs independently.

One example for a more direct connection is the way we read large-scale environments no matter whether it is real world like my hometown or a virtual one like an online world. We gradually form a cognitive map based on certain key features and navigate through the world based on this map. Architectural theorists like Alexander on Lynch have done extremely valuable work in precisely this area and a range of research projects has shown that the same ideas apply to virtual environments.

Jenkins; 2009



CHAPTER 2

context

Figure 2-1. Map of the world at night.
The map clearly indicated the concentrations of economic activities all around the world. Gauteng forms a hub in the African context.

2 Physical Context

Where the context of people is concerned, the edges are hard to define. They are only limited by their means of transportation, a barrier that is becoming easier to breach with projects like the Gautrain and the Rapid Bus Transportation system.

The 21st century can be viewed as the century of the city (Landry 2000: xiii).
The centre point of civilization has always been cities. They offer the most productive centers in the economy.
Because of the number of people in cities they have become places where local and global cultures meet. Cities continue to grow because people are drawn to them for work, pleasure, politics and conquests.

African, particularly, South African cities face unique challenges, due to their history and layout. The cities are required to compete with global cities with regards to service delivery, but they are held back by problems of inadequate infrastructure, as well as economic and social problems, ie. unemployment and poverty [figure 2-1].

Children are at the heart of the problem. They cannot contribute enough to the economy of a city to be regarded as a resource. Neither do they benefit from the evolving economy around them.

“The urban site is not a stable place, but instead a transitory and multivalued space - an aggregation of ever shifting scales, programmes and actors, all set within a temporal framework that holds both prior traces and future modifications” (Kahn 1995:199). Cities need to adapt and change constantly to increase their efficiency, and to provide the people with the necessary resources to accomplish their individual goals.

“All cities are places of multiple intensities and layers. The intersection of intensities is not that of fixed objects and identities with clear boundaries. Rather, it is an intersection that ‘frees’ pieces of objects and identities from specific constructive enclosures to new layers and formations” (Simone 2005: 9)

Sites are located in urban contexts that should be analyzed on different scales:

2-1. Global
2-2. Regional
2-3. Metropolitan
2-4. Local
2-5. Direct

Africa _ **Global**
Gauteng _ **Regional**
Tshwane _ **Metropolitan**
Urban Framework _ **Local**
Site _ **Direct**

Figure 2-2. World - South Africa

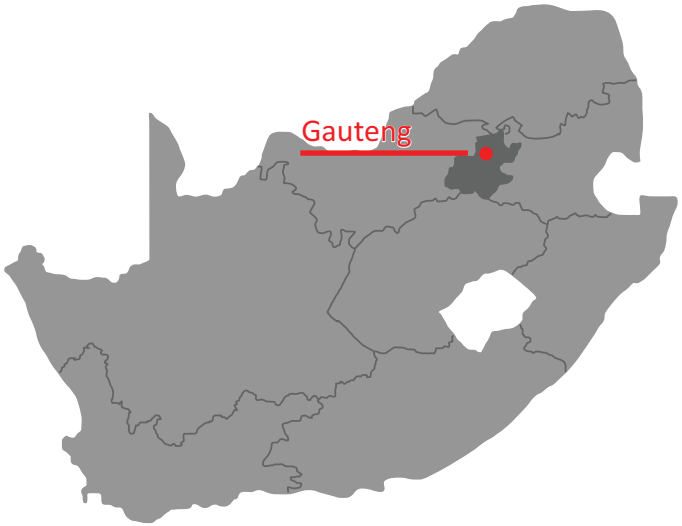


Figure 2-3. South Africa - Gauteng

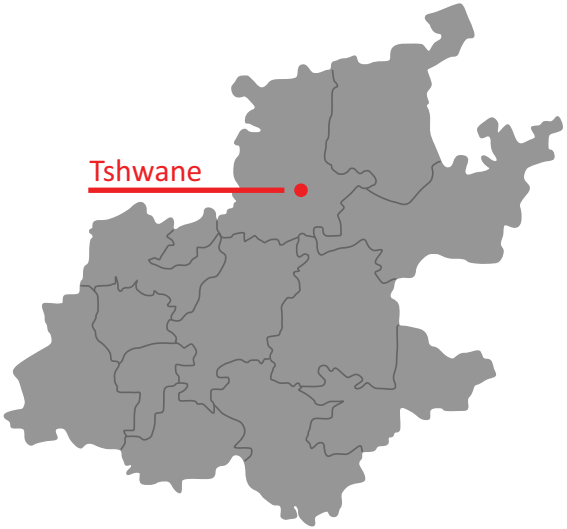


Figure 2-4. Gauteng - Tshwane

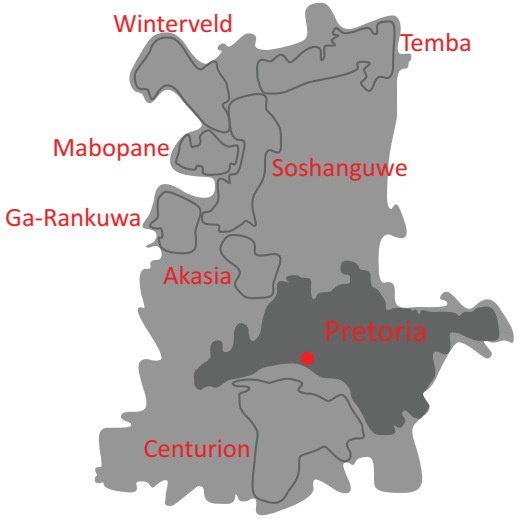


Figure 2-5. Tshwane - Pretoria

2-1 Global Scale

Africa in Context:

Africa is the world's second-largest continent. At an estimated 30.2 million km² it covers 6% of the Earth's total surface area and 20.4% of the total land area. The continent is surrounded by the Mediterranean Sea to the north, both the Suez Canal and the Red Sea along the northeast, the Indian Ocean to the southeast, and the Atlantic Ocean to the west.
The continent has 54 states, including Madagascar and various other island groups. As of 2009 the continent was home to a billion people. This accounts for about 14.72% of the World's total human population.
The climate of Africa varies widely. The northern half is primarily desert, while its central areas contain both savanna plains and very dense rainforest regions. The southern areas contain arid regions like the Namib Desert, as well as more topical areas. (Wikipedia; 2010)

South Africa:

At the tip is the Republic of South Africa with 2,798 km of coastline.
Bordering countries include:
Namibia, Botswana, Zimbabwe, Mozambique, Swaziland and Lesotho.
South Africa is classified as semi-arid but the general climate is temperate, because it is situated in the milder southern hemisphere. The fact that the country is bordered by the Atlantic and Indian Oceans on three sides, also stabilize the climate.
From the east the land quickly rises over a mountainous escarpment to a plateau known as the Highveld.

In the African context, South Africa is regarded as a capital State. South Africa has the biggest economy and forms a precedent for other African Nations to follow or aspire to. The heart of the South African Economy is located in Gauteng [fig 2-1].

2-2 Regional Scale

South African Provinces and Population:

Gauteng	**10 451 713**	Mpumalanga	3 643 435
Kwazulu-natal	10 259 230	North West	3 271 948
Eastern Cape	6 527 747	Free State	2 773 059
Western Cape	5 278 585	Northern Cape	1 058 060
Limpopo	5 238 286	(Wikipedia; 2010)	

Gauteng in Context of South Africa:

Gauteng is by far the smallest province but houses the largest number of people. The Province forms the economic hub of the country with well established connections to the neighboring countries in the north through the Platinum Corridor. It also has major transport links with the harbours on the east coast, as well as the rest of the country to the south-west.
Predominantly the province consists of two Metropolitan cities: Johannesburg and Tshwane. Together with Ekurhuleni they form part of the Gauteng Conurbation (City of Tshwane 2007:10)
Surrounding them are several smaller council districts.
The phenomena of urbanization and sprawl, is most visible in Gauteng with an influx of people from the northern countries looking for employment.

A social upliftment project in this region would benefit a wider group of people.

Figure 2-6. Figure Ground Study of Tshwane around Pretoria

2-3 Metropolitan Scale

The City of Tshwane Metropolitan Municipality was established on 5 December 2000 and is made up of 13 former city and town councils. The Municipality covers an area of 2,198 square kilometers and consists of the following areas:

- Akasia
- Atteridgeville
- Centurion
- Crocodile River
- Eersterust
- Ga-Rankuwa
- Hammanskraal
- Laudium
- Mabopane
- Mamelodi
- Pienaarsrivier
- **Pretoria**
- Soshanguve
- Temba
- Winterveld

There are around 2,200,000 people living within the borders of Tshwane; 72.65% black, 23.84% white, 1.99% coloured and 1.52% Indian or Asian. Tshwane has an average density of 1,000.9 people per square kilometer. (Wikipedia; 2010)

Originally the city consisted only of the area now known as Pretoria. The area between the Apies river and Steenhoven spruit was laid out according to an ancient Roman grid system. The city layout is characterized by an orthogonal street layout. There are two main axes namely; the *Cardo et Decumanus*. The axes normally cross in a geographical important place that became a spiritual centre. In Pretoria, Church Square is the centre point where Paul Kruger street, the North-South *Cardo*, crosses Church street, the East-West *Decumanus* (Pienaar 2009) [figure 2-6].

The urban development predominantly spread in an east and west direction. With 40% of the population living in the central urban areas. The majority of residents in the city live on the outskirts and relies on public transportation (Appelyard 1983:11).

Within this context the problems the city centre has are clear:

- The shortage of usable open land. Currently the open spaces are inaccessible.
- Parks and Green Spaces are spread out over the city with no coherent link.
- There is a definite lack of public facilities and amenities.
- Transport is dominated by streets designed for cars and not pedestrians.

CITY OF TSHWANE

"we are the same"

Figure 2-7. Logo of City of Tshwane

2-3-1 Bus Routes

Figure 2-8. Figure ground study is of the CBD of Pretoria, Tshwane. Bus Routes

The figure shows the predominant bus routes through the CBD.
The municipal bus system consist of several busses that start or end close to Church Square. The largest amount of busses that depart from Church Square leave in a eastern direction and then split north and south. Almost all the east and south bound busses move through Du Toit street and then Schoeman street.
The same number of busses move through Prinsloo Street towards Church Square.

2-3-2 Pedestrian Movement

Figure 2-9. Figure ground study is of the CBD of Pretoria, Tshwane. Pedestrian Movement.

The figure shows the most predominant pedestrian movement through the Central Business District of Pretoria.
Most movement is towards or away from Predominant public transportation nodes.
- Church Square is where the municipal bus routes begin and end.
- The Train Station towards the south of the CBD.
- The Taxi Rank in Boom Street.

The secondary movement is in the pedestrian portion of Church street and the commercial activity in Eselen street.

It is clear that the most pedestrian activity is taking place towards the South-eastern portion of the CBD, where the largest concentration of young people are.

2-3-3 Vehicular Movement

Figure 2-10. Figure ground study is of the CBD of Pretoria, Tshwane. Vehicular Movement

The figure shows the Vehicular movement routes through the CBD.
The main East - West movement happens along Skinner street and portions of Church street.
Schoeman street only handles east bound traffic, and Pretorius street handles west bound traffic.

North and South bound traffic is accommodated by Nelson Mandela Drive, Prinsloo Street and Paul Kruger street.

2-3-4 Prominent Landmarks

Figure 2-11. Figure ground study is of the CBD of Pretoria, Tshwane. Prominent Landmarks

The figure shows links between the most predominant landmarks building in Pretoria namely the Union Buildings, the Train Station, City Hall and the Zoo.
The figure also indicates the position of Green open space in relation to one another in the south eastern portion of the CBD.

2-4 Local Scale

2-4-1 Site Choice

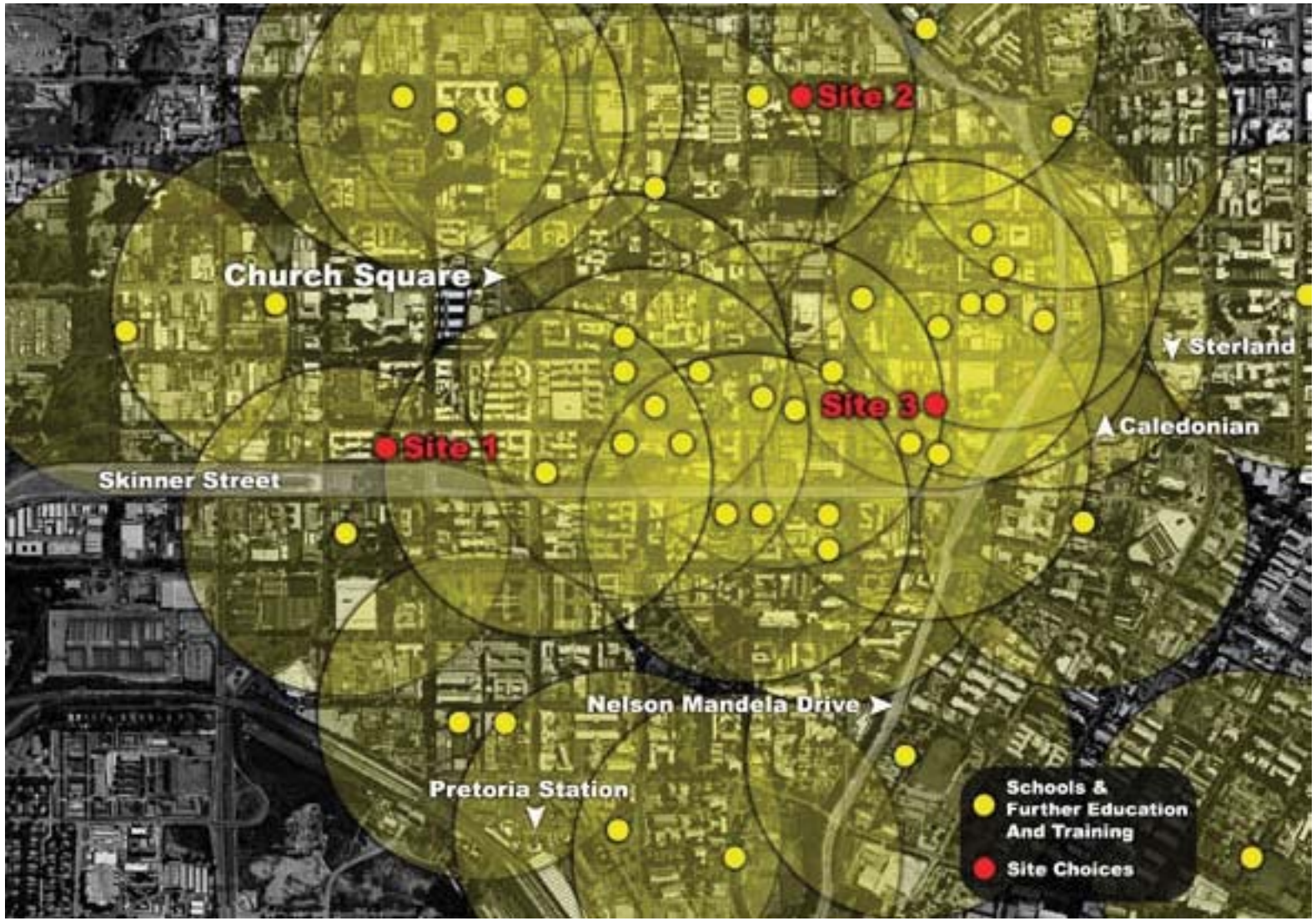


Figure 2-12. Aerial photo showing possible site locations in relation to Schools and FET's in the Pretoria CBD

Site 1

Located on Struben Street between Bosman and Schubart street.

- Strengths

The site connects Schoeman street to Skinner street.

The site is located close to an existing taxi rank on the Skinner street traffic island.

There is reasonable pedestrian traffic in the area.

- Weaknesses

The current building on the site is very dilapidated and needs to be demolished.

There is little commercial activity in the area.

- **Opportunities**

Currently the site is used for parking. This can serve as income if the programme is formally structured.

A formal link to the taxi rank over Skinner street could be used for commercial purposes.

- **Threats**

There is not enough young people in the area to facilitate the critical mass to make the program viable.

Figure 2-13. Aerial photo of site option 1. ◄

Site 2

Located on Schoeman Street between Prinsloo and Van der Walt street.

- Strengths

The site has already been cleared for a discontinued governmental project.

The site is located next to a school that has plans for future expansion.

- Weaknesses

The site is located too far away front green open spaces

The area has very little commercial enterprises. They are not economically viable

- **Opportunities**

The proposed government taxi rank could serve as general income to fund the building.

- **Threats**

There is not enough young people in the area to facilitate the critical mass to make the program viable.

Figure 2-14. Aerial photo of site option 2. ►

Site 3

Located on the corner of Schoeman street and Du Toit street

- Strengths
The site is located near most of the schools and Further education and training facilities.
The site is located central to several green open spaces.
The Caledonian sports grounds, Burgers park and Church square.
The buildings on site have little historical significance.
The municipal bus route pass by the site.

- Weaknesses
Schoeman street is busy and makes access to the site difficult.
The sidewalks are narrow.
Far away from any taxi rank.

- **Opportunities**
There is an open corridor behind the Louis Pasteur hospital that can be transformed into an east-west pedestrian corridor.

- **Threats**

Figure 2- 15. Site location in context.


Figure 2-16. Aerial photo of site option 3

2-4-2 Urban Framework

Figure 2- 17. Aerial photo showing framework boundaries.

Figure 2-18. Typical street section of Graduation City Urban framework proposal.

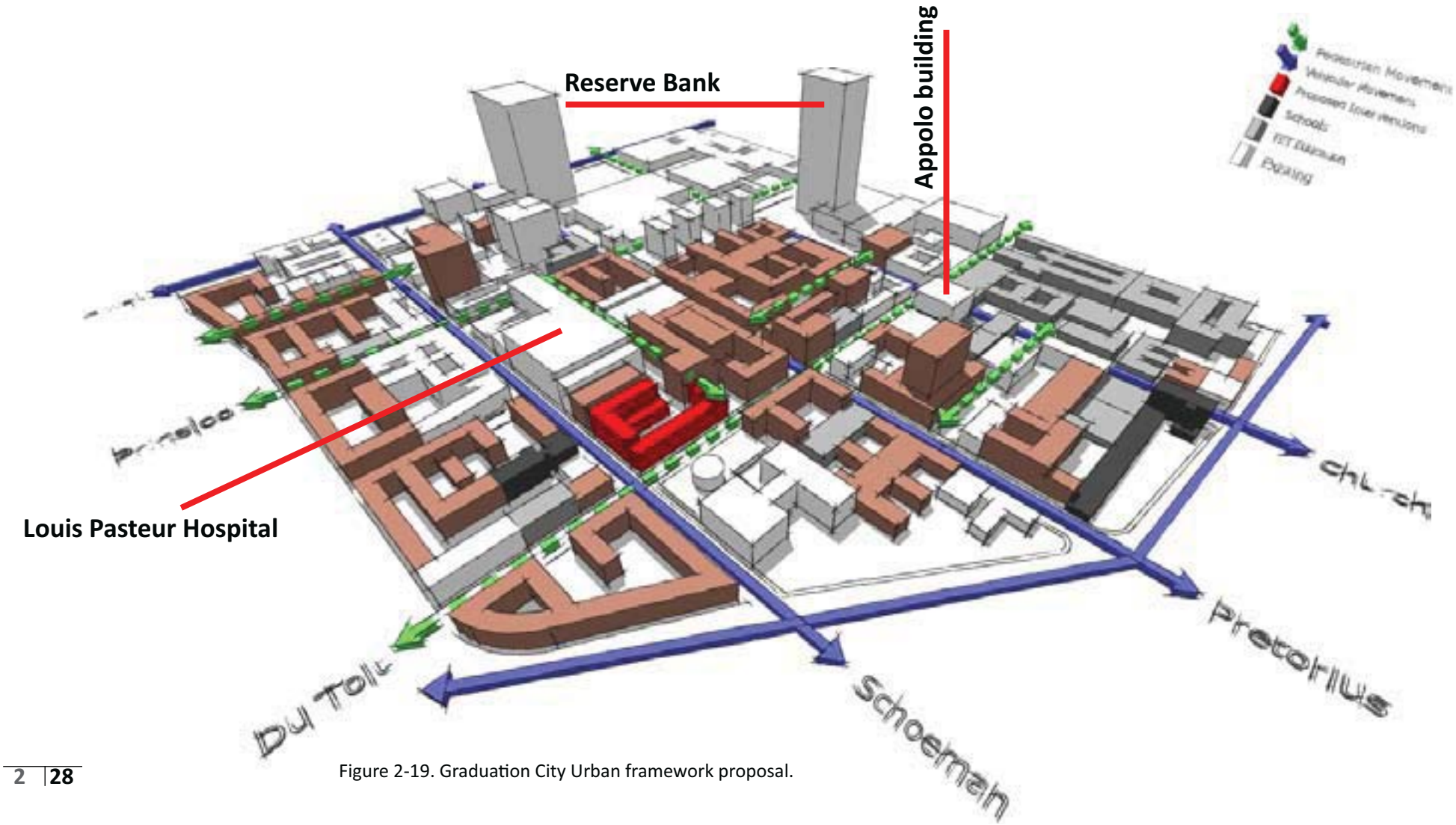


Figure 2-19. Graduation City Urban framework proposal.

Graduation City

Graduation City as an Urban Framework proposal is based around the existing education institutions in and around the CBD of Pretoria.
The framework is based on the principal that educational institutions share infrastructures and facilities in order to provide a higher level of education, but reducing the cost.

The framework is focusing on the area between Van der Walt Street; Nelson Mandela Drive; Skinner Street and Vermeulen Street, the eastern portion of the CBD. This region currently has the highest number of educational institutions.
The framework relies on the existing institutions to remain in the precinct. New institutions are encouraged to locate themselves in this region. Additional infrastructures catering for a younger demographic are also encouraged to locate themselves in this region.

Currently the area consists of a large number of low density industrial style buildings. These buildings typology is to be replaced by mixed use buildings of a higher density. All new developments should respond to, or try to enhance the existing buildings.

Movement:
The main North/South vehicular movement should happen along Nelson Mandela drive on the eastern edge of the precinct and along Van der Walt Street on the western edge.
East/West movement is already articulated by Pretorius and Schoeman streets. This is to remain the predominant movement routes.
Pedestrian Movement through the precinct is encouraged. The main routes currently consist of Du Toit and Prinsloo Streets. These movement corridors are to be upgraded with better street crossings and sidewalks, but pedestrian arcades through city blocks should be introduced where possible.
Pedestrian crossings are to be upgraded. Pedestrian movement should be enhanced by regulating traffic flow at the new arcade and street intersections.

Street edges and sidewalks:
The existing system of parallel and perpendicular parking on street edges are to remain, but off-street parking is to be provided in new developments where possible.
All sidewalks in the precinct are to be upgraded using inclusive design principals, where there are no steps or bumps.
All sidewalks are to be a minimum of 3m wide. Green Structure including trees and planters should be introduced along the pedestrian circulation routes, existing and new.
Street furniture including dust bins, benches and lighting are to be provided along pedestrian routes. The street lighting to be provided should be on a pedestrian scale where possible.
Sidewalks should be covered by canopies protruding a minimum of 1,5m out of the adjacent buildings.
Different textures can be introduces to define spaces on the sidewalks.
Excessive signage along pedestrian routes for information and orientation should be introduced.

Buildings:
The Ground Floor of buildings should be designed for Commercial purposes that respond to the pedestrians on the sidewalk. The floors above may be used for offices or residential.
Buildings placed adjacent to one another should form continuous street facades, but the corners at traffic intersections should step back to provide a better visual line and create spaces for vendors, and pedestrians to wait.
All buildings are to be a minimum height of 3 stories. Buildings lower than 6 stories may have a flush façade. Buildings higher than 6 stories should incorporate a step back of 1,5m minimum from the 4th floor upward.
In General a courtyard typology is encouraged.
An Upgrade of the Caledonian Sports grounds is proposed. The facility should be semi-public in order to allow the educational institutions to gain access.

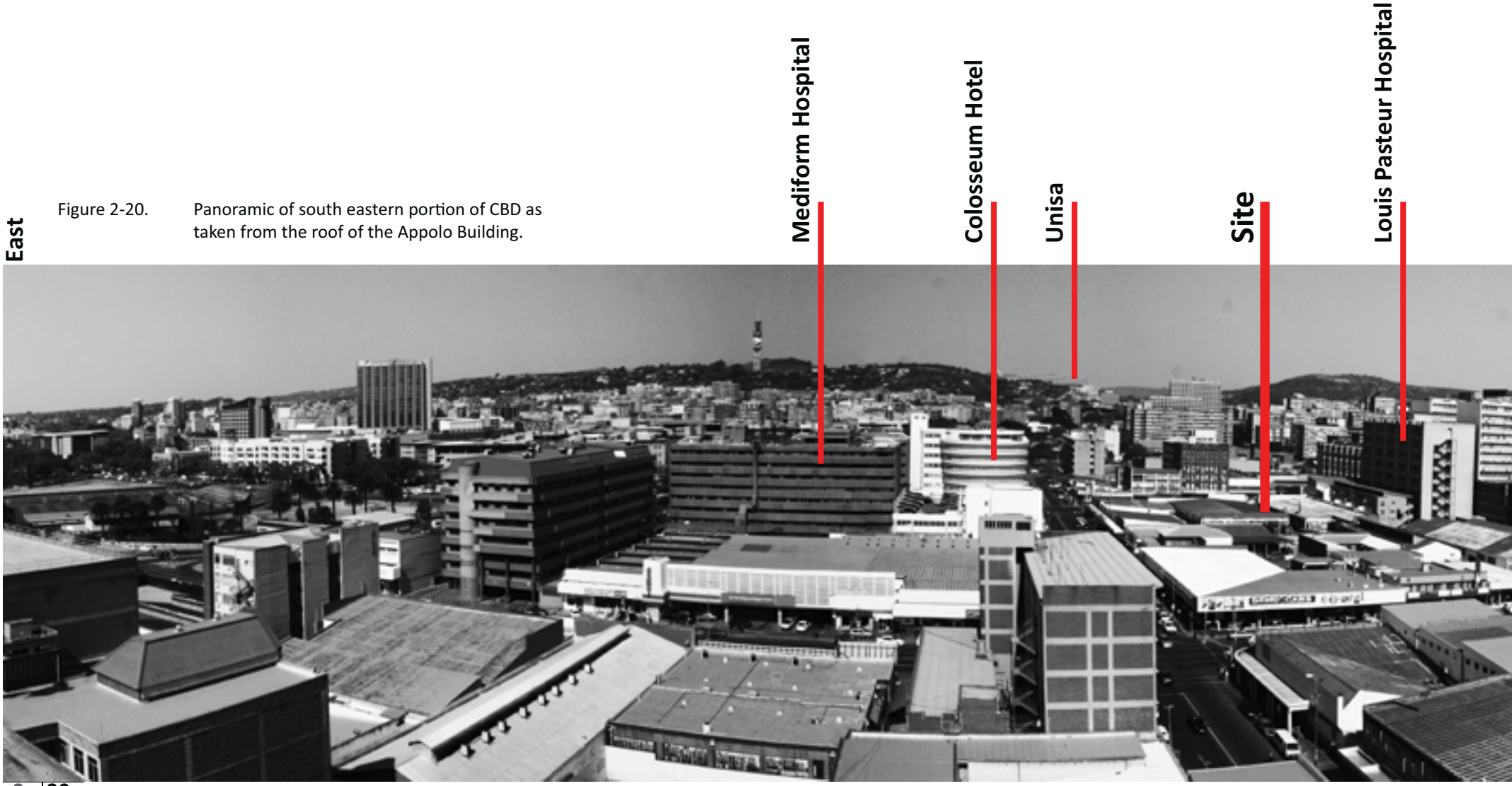


Figure 2-20. Panoramic of south eastern portion of CBD as taken from the roof of the Appolo Building.

2-5 Direct Scale

Latitude:	22° 44’ 50.3” South
Longitude:	28° 11’ 53.3” East
Height Above Sea Level:	1335m

(Handheld Global Positioning System Device)

The proposed site for the Youth Centre is located on the corner of Schoeman Street and Du Toit Street. The site is to the east of the Pretoria CBD near the Apies River channel.

Currently the site is built up with low scale single story industrial type buildings. The surrounding buildings include the Louis Pasteur Hospital at 10 floors and the Tshwane Municipal Department of Finance at 8 floors. Across the road the Colosseum Hotel and the Mediforum Hospital frames the site again with a height of 8 floors.

The low scale of the site forms a hole in the skyline of the city.

Existing infrastructure

The existing Municipal Bus routes use Du Toit Street and Schoeman Street to move through the precinct.

Currently the North South Pedestrian movement happens along Prinsloo and Du Toit Street [figure 2-19], with a noteworthy amount of pedestrians at Church Street and at the crossing of Skinner Street and Nelson Mandela Drive.

There are 16 educational institutions within a five minute walk of the site [figure 2-12].

Implications of Urban Framework

There is a pedestrian arcade running through the site in an east-west direction behind the Louis Pasteur hospital [figure 2-19]. The sidewalk on the street need to be upgraded since it forms a major pedestrian route.

The buildings on the northern and eastern side are to be built up as well.

2-5-1 Site Context

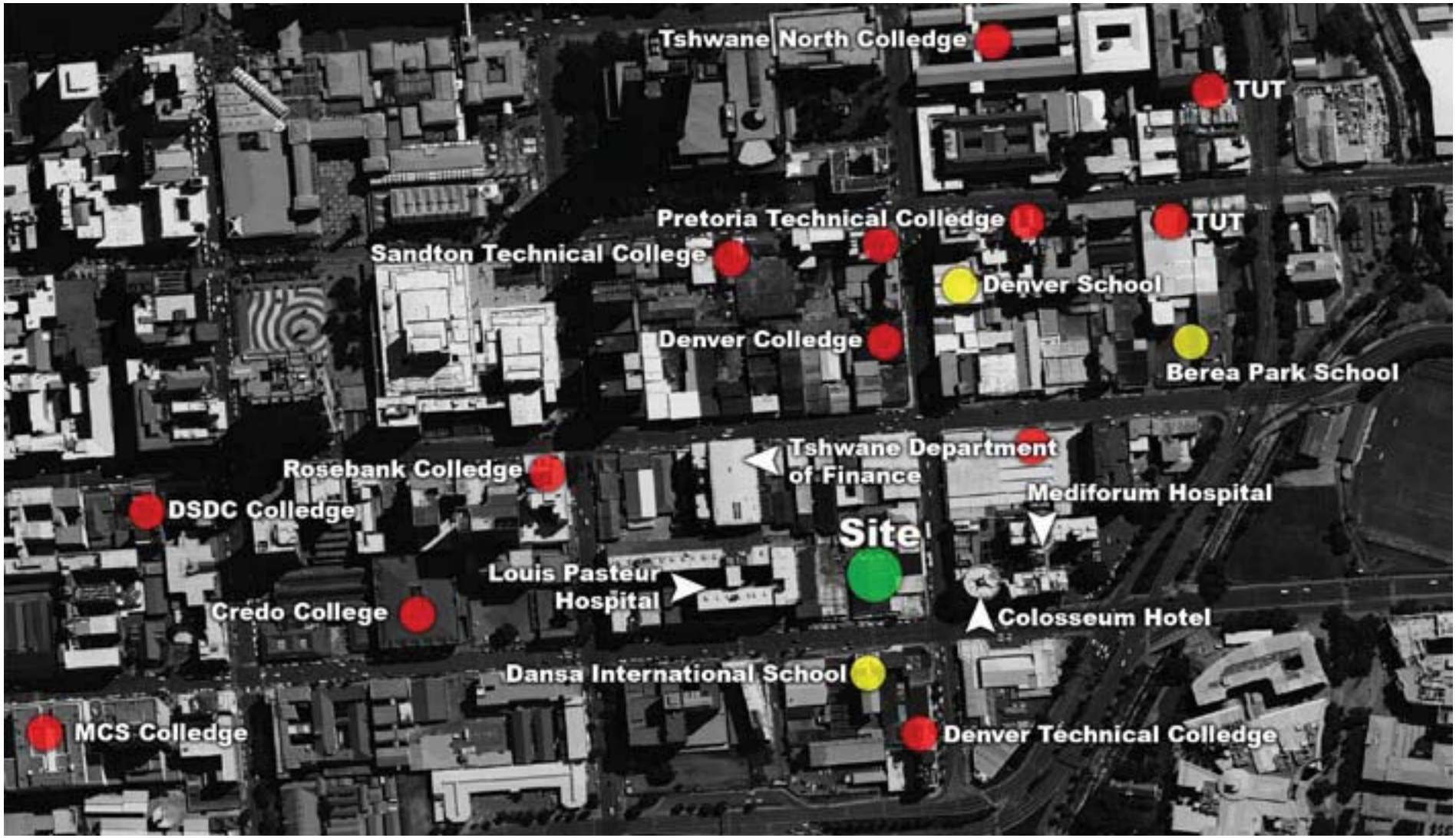


Figure 2-21. Aerial view of site and context.

2-5-2 Climate of Site

Tshwane is located in north eastern portion of South Africa in the transitional area between the Highveld and the Bushveld.
The entire CBD of Pretoria is located between 2 ridges; the Magaliesberg to the north and Muckleneuk/Salvo kop to the south. The ridges protects the City from extreme temperatures and excessive winds.

Daylighting:
During January and December the sun rises at around 5:00 am and sets at around 6:00 pm.
During March and August sunrise happens at around 6:00 am and sets at around 5:00pm.
May to August the sun rises at around 6:30 am and sets at around 4:30 pm.

Temperatures:

Winter minimum:	4 C°
Winter maximum	22 C°
Summer maximum	32 C°
Summer minimum	18 C°

Humidity:

Winter minimum:	29% (Midday)
Winter maximum :	57% (Morning)
Summer minimum:	48% (Midday)
Summer average:	75% (Morning)

Rainfall:
Between 494mm per year and 1069mm per year. With an average of 686 per year consisting mostly of summer thunder storms. Hail storms are possible.

Cloud Cover:
Range from 13% in July to 54% in December
Average of 33%

Wind:
The prevailing wind is calm and blows mostly in an east- west direction because of the ridges framing the city.
Cold winter winds are from the south.

Radiation:
89 giga watt solar radiation per year

Sun Angles:

Winter Solstice:	40°
Summer Solstice:	88°
Equinox:	65°

(Napier A 2000:9 & SA Weather Service 2010)

	Rainfall		Temperatures	
Month	Average Monthly (mm)	Average number of days >= 1mm	Average daily maximum	Average daily minimum
January	136	14	29	18
February	75	11	28	17
March	82	10	27	16
April	51	7	24	12
May	13	3	22	8
June	7	1	19	5
July	3	1	20	5
August	6	2	22	8
September	22	3	26	12
October	71	9	27	14
November	98	12	27	16
December	110	15	28	17
Year	674	88	25	12

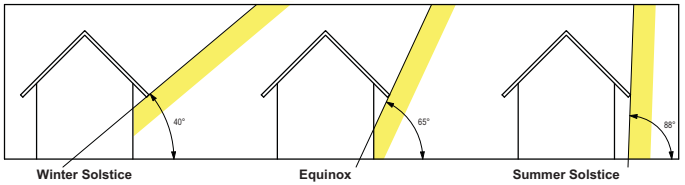
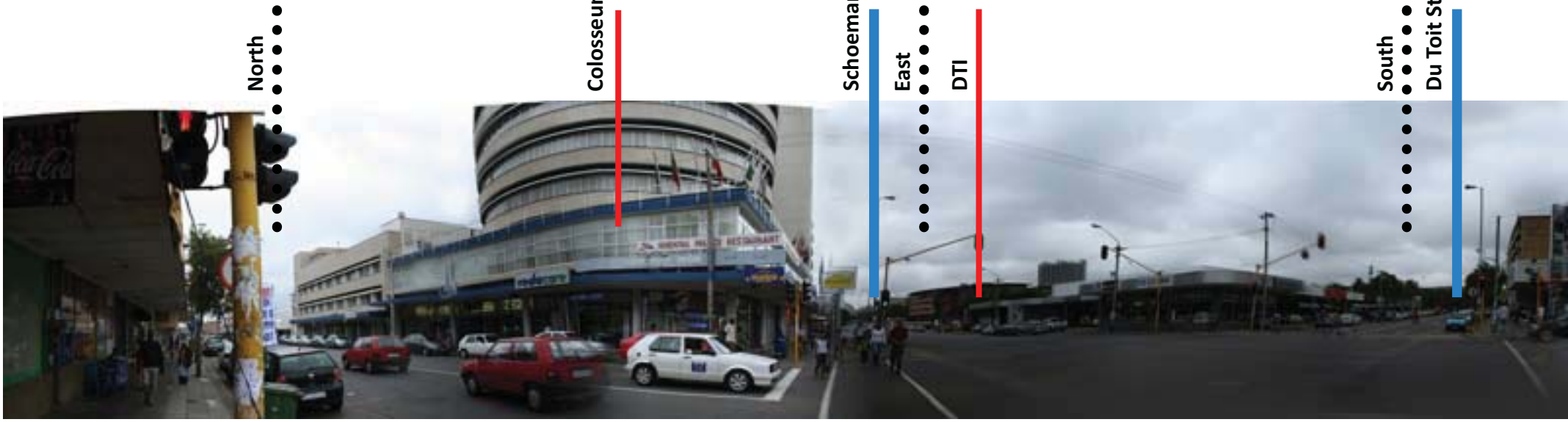


Figure 2-22. Sun Angels

2-5-3 Visual Context



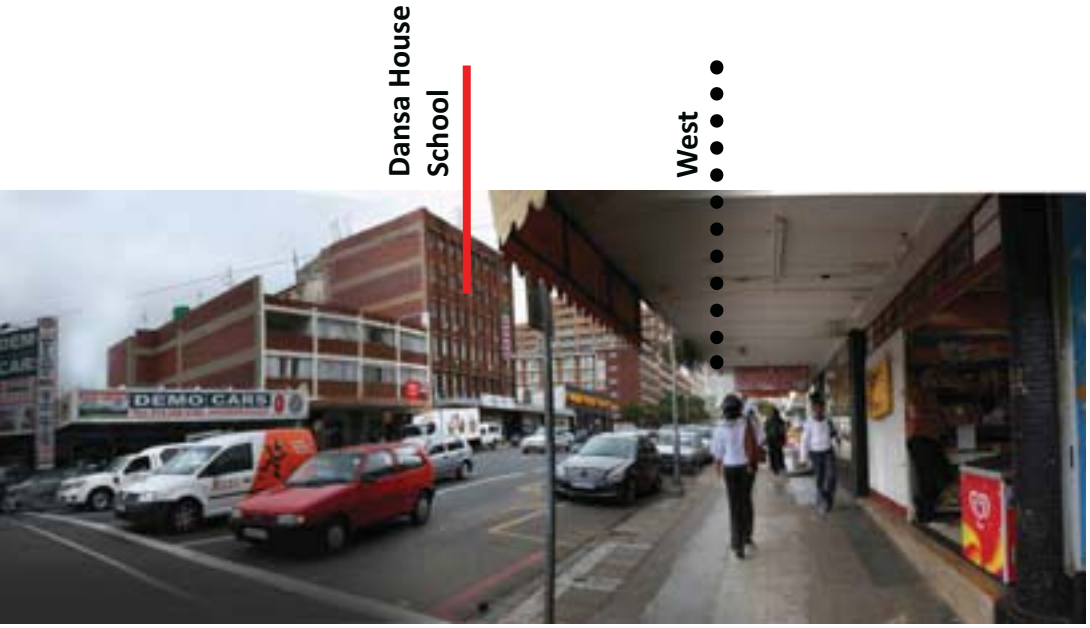


Figure 2-23. Panoramic photo away from the site on the corner of Du Toit street and Schoeman street. Photo is taken through 270 degrees from North to West.

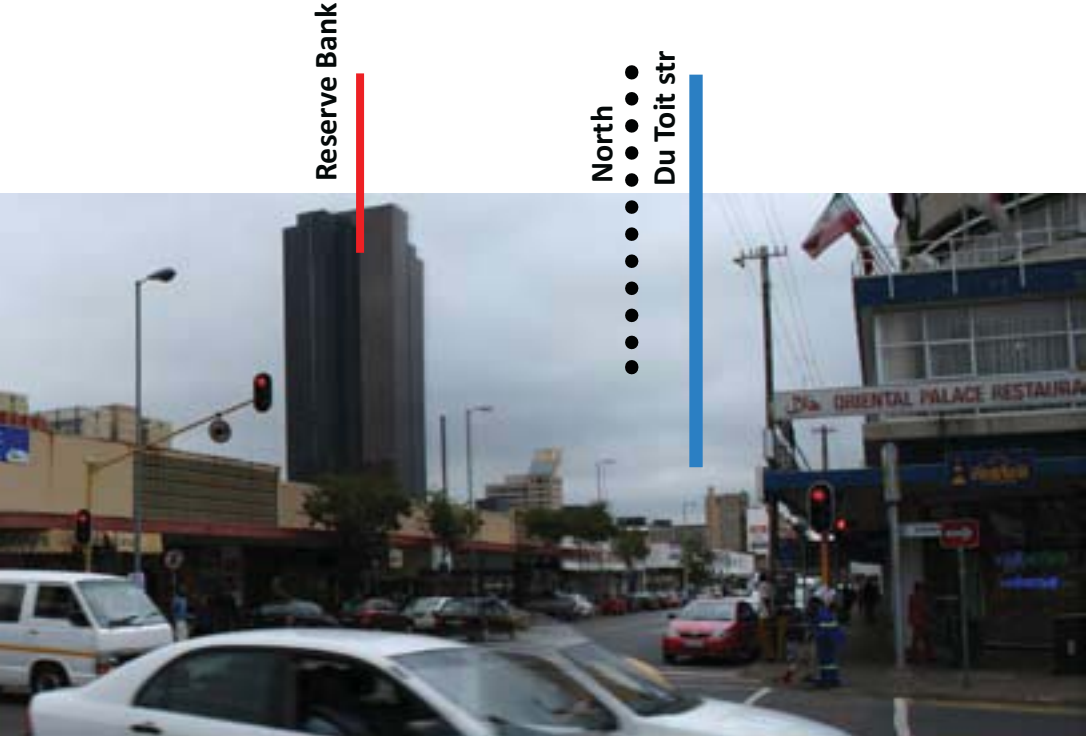


Figure 2-24. Panoramic photo towards the site on the corner of Du Toit street and Schoeman street. Photo is taken through 120 degrees from South-West to North-East.

North

Single story industrial bui

Colosseum Conference Centre

East

Residential Building

Dansa House School

Single story industrial building

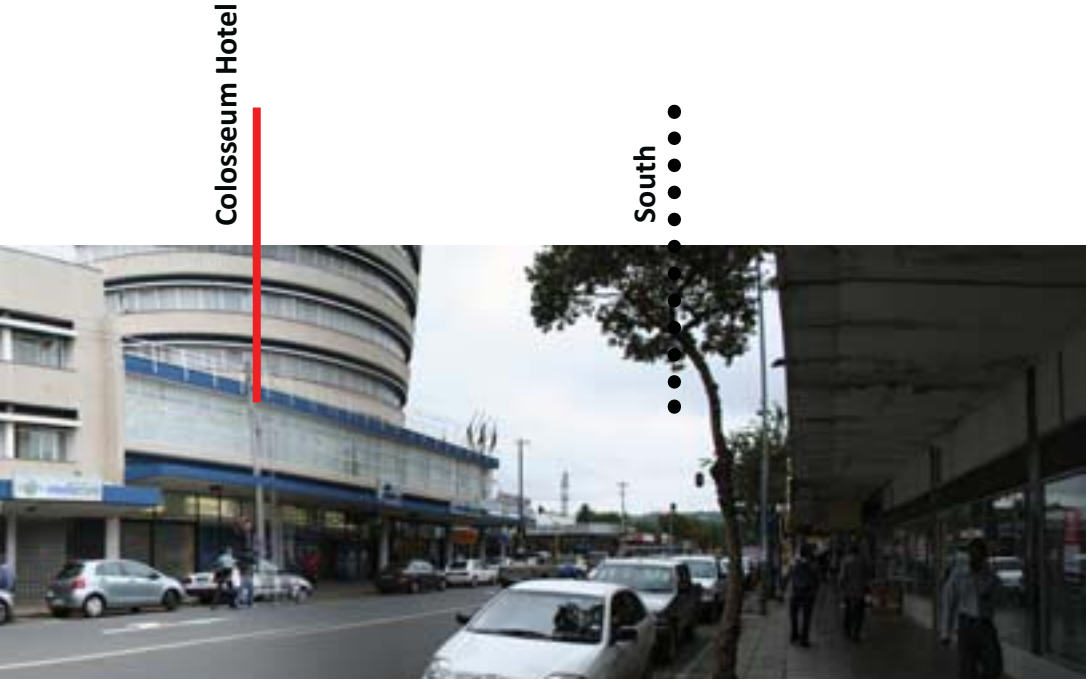


Figure 2-25. Panoramic photo away from the site. Taken from the centre of the block in Du Toit street. Photo is taken through 180 degrees from North to South.

Figure 2-26. Panoramic photo away from the site. Taken from the centre of the block in Schoeman street. Photo is taken through 180 degrees from East to West.

"When you ask me what makes something a church I might say the steeple, cross, altar, priest, or grave yard beside it. None of these things individually are a church but instead are parts of a whole. Everyone perceives this combination of symbols differently, 'there is no objectively correct data of a thing's appearance, only an infinite number of subjective impressions of it."
Jeffries 2010

CHAPTER 3

design discourse

3-1 Theory

Architecture as Play.

Architecture as Play.

According to Rem Koolhaas (Content; 2004), architecture is a fuzzy amalgamation of ancient knowledge and contemporary practice. It is an awkward way to look at the world and an inadequate medium to operate on it. He however acknowledges that the term 'architecture' still carry some respect and admiration. The concept of architecture represents hope, because of what has been achieved through architecture in the past. It has the ability to unravel and understand the wealth of information we are confronted with everyday, it then attempts to shape and form it into buildings (Core 2010).

Rem Koolhaas; core 2010

> **"Architects have always built and will always build, but the survival of the discipline depends on whether the awareness of the invisible knowledge is brought forward to bare responsibility of being publicly intellectual and therefore redefining what others expect of the profession.**

Modernism, according to Koolhaas, was the last dominant system of ideas and ideals to guide designers and give them a platform for legitimizing their designs and give the profession of architecture a perceived value. He also made the statement that in the current climate designs have to be accepted by the mass market. This has changed or rather replaced the concept of ideologies of humanism and totality with market hype. Architects can no longer justify their intentions, because buildings need to be marketable. (Core 2010)

Architecture has reached its endgame. What is desperately needed is the invention of new rules in order to play a new game." (Rem Koolhaas; core 2010)

In order to define new rules, the practice and purpose of architecture needs to be re-investigated.

According to Ernest Adams in his article 'The role of architecture in Video Games' (Gamasutra; 2002) the main reasons humans construct buildings are:

- To protect people, goods and animals from weather.
- To organize human activity efficiently - Factories, Theatres, Offices and Sports.
- To conceal and protect goods and animals from theft - Warehouses and Shops.
- To offer personal privacy - Private houses and Public amenities.
- To protect people from danger or other people - Fortifications and Prisons.
- To impress, commemorate or decorate - Monuments and religious buildings.

New rules could be found in the programme that is to be housed rather than a broad ideology that needs to be applied across all architectural designs. In the case of a youth centre aimed to house facilities for children, the idea of play may serve as inspiration for an ideology.

"Play is older than civilization." Johan Huizinga
"You can learn more about a person in an hour of play, than in a year of conversation." Plato

Architecture has always formed the stage or backdrop for playing. Architecture has been the inspiration or concepts for playing in the past. The most successful computer game of all time (The Sims) was influenced and partly based on the work of an architect, Christopher Alexander and his book: A Pattern Language. (Gamasutra; 2010).

Currently Architecture's main purpose is to define space, inside or outside. Visual qualities are added to provide the required atmosphere (Gamasutra; 2010).
A paradigm shift is needed to where the occupants of a building are encouraged to interact with the architecture. According to Jeffries in his article 'My Own Private Architecture' (2010), enabling a person to actively and personally change their environment is the strongest way to engage them in their surroundings.

The best examples of engaging people in their environment, is found in the virtual world of Video Games. By interacting with the content and the design simultaneously the player is unknowingly actively engaged with, and changing their environment. To an observer a game my seem pointless and boring, but the penny drops when the player has to explain all the levels of inter activity involved with the game. From choosing the correct avatar1 to executing strategic moves in a challenge.
There is still only one field of study outside the virtual world of games that gives people the same opportunities to interact with their surroundings; Architecture (Jeffries; 2010).

The world is evolving. The youth is at the forefront of the wave with their ability to grasp technology and the accompanied user interfaces with relative ease. At the heart of this change lies the Video Game. With the audio-visual language and interactive processes associated with Video Games they have worked their way into societies everyday lives, from cell phone games to more advanced home theatre systems, we enjoy escaping to a virtual reality. (Borries 2007)

Borries (2007) goes on and raises the following question: What do we stand to gain from using games for architectural purposes?

1. Avatar - An avatar is a computer user's representation of himself/herself or alter ego whether in the form of a three-dimensional model used in computer games, a two-dimensional icon or a one-dimensional username (Avatar 2010)

Furthermore, he describes the current architectural profession, which is based on an obsolete concept of technological realities. According to Borries in the current architectural climate, designers are increasingly faced with problems such as: economics, technology and ecological aspects. Add this to the usual problems like the layout and aesthetic challenges and the pressure is on.
In his view architecture still has a predominant mechanistic view of technology. This despite the innovative opportunities architecture can provide the formal and theoretical realms. Architects should therefore develop contemporary interactive schemes. The designs should aim to be more organic and sustainable, but with comparable technological embedding in every respect.
(Borries 2007)

The investigation into the spaces and construction of video games can serve as a paradigm for designing buildings.

Figure 3-1. Collage of principal that video games serve as inspiration for architecture
Source - Author

Architecture as a Game.

Game:

1. An activity that you do for fun, that has rules, and that you can win or lose.
2. An activity or type of work that is like a game, for example: it has rules that you must follow. (Macmillian: 582)

According to Elliot Avedon (1971) all games have four common key components. These components are also evident in architecture.
Key Components: **Goals - Rules - Challenges - Interaction.**

Goals can be defined as what we wish to achieve.
In terms of games this is the accumulation of points. In architectural terms the goal can be defined as the main purpose of the structure being designed.

In both Games and Architecture, rules define the parameters that guide the progression. **Rules** are statements explaining what actions are allowed and which are not, they may dictate the order of progression, as well as the rights and responsibilities bestowed upon the parties involved.

Challenges. In games, the challenge normally consists of the desire to beat an opponent, by using tactical moves. Architects face a variety of challenges that need to be addressed and overcome while designing buildings.

Games rely on **interaction** between players and opponents to facilitate the playing of a game, whether the interaction is physical or just social. A game normally consists of Pawns or Avatars that can be moved about with a set of defined rules.
All games require a stage or space to be played upon. Architecture forms the stage where interaction can take place. The programme housed, and the arrangement of different types of spaces, guide the kind of interaction that will take place.

Space as defined by Video Games:

The development of Video Games are centered around the representation of space, whether, one, two or three dimensional

The development of three dimensional graphics represents a revolution in artistic and technical development with regards to the history of the video game. It is possible that this development started the overall transformation of games as meaningless entertainment into the media we are used to today.

The experience of space has become a key element of how we understand games and how we play them. (Nitsche 2009)

Video games range form one dimensional text based games like Zork, and the modern day MixIT, to the first visual representations of two dimensional worlds like the mazes found in Ping Pong and Pacman.
The biggest development in game design was the virtual representation of three dimensional space. Today this extends to the fourth dimension consisting of online social communities and the new ways of interaction between the virtual space and physical space. (Borries 2007: 11)

The virtual spaces that are visited by gamers have changed and are changing our understanding of space and time at an ever increasing rate, taking over form the work done by the film and television industry in early parts of the 20th century. (Borries 2007: 11)

Yet our concept of space is grounded in architectural terms. If there was none, there would be no place at which, in which or even based on which a game can take place. (Borries 2007: 11)

According to Ernest Adams all games that attempt to create a sense of community and belonging, uses architecture to define how the environment will be perceived. (Gamasutra; 2010)

Ernest Adams:

> "Architecture is what turns the bare grid of the chessboard into the living world of the computer game. Character design tells you who you are; architecture tells you where you are. But more than that, it also tells you what might happen to you there, and even sometimes what you ought to be doing." (Gamasutra)

The Primary functions of Architecture in Games are the following:

- Constraint

Architecture establishes boundaries that limit the freedom of movement of avatars, or units

- Concealment

Architecture is used to hide valuable objects from the player; it's also used to conceal players from one another or their enemies.

- Obstacle

Buildings or structures are used as obstacles to test the skill of the player and their ability to master the challenge.

- Exploration

Challenges the player to understand the shape of the space he's moving through, to know what leads where. (Gamasutra)

"An adaptable building is a magical stage that would allow dramatically different activities to occur within the same, but changing space". Kronenburg 2007: 14

The creation of interesting and interactive spaces are certainly not the single answer to the problems we face, but it provides a departure point from where architects and designers can start. Even in the virtual world spacial design precedes the narrative of a story as well as the actual playing.
When playing a game the gamer learns how to deal with the space around him before he is introduced to the stories or the actual game. (Jenkins 2009)

Pioneering games like Super Mario Brothers developed space from something that only passed by while playing into an entity that needed to be understood in order to control it and ultimately to be defeated (Laurie; 2001)
The idea that virtual spaces can be more than just mere images to be observed like the ones found in films, paintings and photography, but spaces to be experienced was a revelation in the world of video games and architecture (Laurie; 2001).

Since architecture was, and still is, the only tangible precedent of space that can be experienced, it was quickly adapted as the template and backdrop to support game-play. If spatial arrangements are the only requirement architecture needs to fulfill in games, as well as, reality, all structures could be replaced by bare grey concrete walls and floors. Architecture however performs other functions while establishing space. It needs to inform and entertain people in it own right.
It does this in the following ways:

- Familiarity

Locations offer clues to the functions and actions that needs to be performed there

- Allusion

Reference to real buildings to get their emotions

- New design

New virtual worlds and new technology needs new architecture.

- Surrealism

Lateral thinking

- Atmosphere
Dangerous
Light hearted
- Architectural clichés
Stereotypical representations of buildings and spaces to create the desired responses.
(Gamasutra; 2010)

"Abstraction and Perfection transport us into the world of ideas, whereas; matter, weathering and decay strengthen the experience of time and reality." (Pallasma 2000: 79)

The original issue still remains. How do we define new rules for Architects?

The challenge lies in approaching the architectural problem from a new perspective. Much like a tactical decision in a game of chess.
In games of perfect information like chess a strategic move of performance is made by rearranging the given data in a new way. The new insight is usually achieved by combining collections of data that was previously independent (Core 2010).

Game developers are constantly struggling with the same problem and have done a lot of studies. Currently they are on the cutting edge of creating new ideas. In the process they have opened up a wide range of different approaches to address the issue of creating space in a virtual world. By combining different fields such as Architecture, film, drama and literature studies, the information can be transplanted across the disciplines (Jenkins 2009).

In Video Games space are experienced in three basic ways:
- As part of the game design
The fictional virtual architecture and mediated spaces created by game, as well as the imagination of the player.
- As part of the personal space
The physical space the gamer occupies while playing the game.
- As a hybrid of the two.
Outside influences can alter the gaming experience, and a gamer immersed in the narrative may experience his physical environment differently.
(Jeffries 2010 and Jenkins 2009)

The Gaming experiences are becoming about more than just the virtual spaces. The places where games are played are becoming more important. This space varies form very private in front of a personal computer to semi-private in the living room in front of a television, as well as, public spaces like a game centre (Borries 2007: 12).

Video Game rules are evolving and extending form the original 'rules of play' to the 'rules of place.' (Borries 2007: 12). Because Video Game players experience space differently, both virtual and physical, they are starting to use it differently. Newer input possibilities like gesture and substantial physical movement, found in interfaces such as the Wii remote and the X-box 360's project Natal, are making this hybridization of virtual and real space available for the mass market.
(Borries 2007: 12).

This new type of interface places more emphasis on the physical world in front of the screen (Jenkins 2009). The change of physical location may even influence the difficulty level and perception of the game in future, migrating the real world into the virtual one (Borries 2007: 13).

According to an article on Wikia Science (2010) there are 3 ways of merging the real world with the virtual one.

1. The player see only a simulated world, while being in the virtual world.
   - This is achieved by replacing all the senses with inputs from the virtual world. The most popular method is using virtual reality goggles and movement tracking sensors.
2. The player stay in the real world, but see simulated objects.
   - Currently this is achieved by viewing simulated objects on screens and receiving feedback via the input controls.
   - It is used by film makers in the use of green/blue screens where the backdrop can be replaced with a digital image.
   - Future developments, as seen in video games, involve holograms of elements created by the virtual world
3. The player stay in real world, but experience the virtual world.
   - The virtual world have control over elements in the real world. The lights, movement of air and sound. It may even involve the use of robotics.

The influence the two realms impose on one another leads to another question asked by Borries (2007: 13): What is the 'next level' of architecture and game design?

Perhaps the solution could be found in the result from super imposing the spaces and social interaction of computer games over the physical space. Both these creative worlds could benefit from a mutual exchange. The merging should consist of the strongest elements of both realms. Architecture should contribute its complexity and realism of space, as well as, design opportunities. Games should extend to provide their modeling expertise and their social interaction studies. The ability to immerse oneself in a game and the sense of fun should be incorporated (Borries 2007: 13).

This intervention opens the possibility where Architects and game designers can determine and create the future of recreational play space as a new form of interactive space. The possibilities extent to both the virtual play space and the real world environment - Could this be the next set of rules to guide design through the future? (Borries 2007: 13).

The attempt to merge the two realms of Video Games and Architecture has been touched on in the past, but was dismissed by many architects as amateur, because the benefits were not properly presented. Yet through these games, palpably effective methods and technologies for more complex and dynamic systems of modelling, control and interaction were developed; these can achieve far more than what is currently possible in architectural practice.

The interesting study lies not in the discourse of thrilling phenomenon, but in the search for mutually beneficial interfaces through which fundamental architectural structures can be linked to a game's modelling, production and interaction patterns. Unlike the focus of the majority of the discourse, these interfaces are geared towards everyday usage and do not demand an unusual amount of labour and practice to be understood.

Figure 3-2. Virtual Reality Goggles. (thewanderlust; 2010)

Figure 3-3. Image of movie Avatar, where the principal of merging the virtual and real world applies. (avatar; 2009)

3-2 Design Approach

The majority of users in the building are in a constant state of change. They are children growing up. The facility needs be adaptable to meet the current, as well as, the future requirements they may have.

According to Kronenburg (2007: 7) flexible architecture consist of buildings that are designed to respond easily to change throughout their lifetime. Buildings should adapt to their changing environments in terms of their use, operation or location.

"Flexible Architecture is a design form that is, by its very essence, cross-disciplinary and multi-functional; consequently it is frequently innovative and expressive of contemporary design issues" (Kronenburg 2007: 11)

Designing a building for change, clearly pose benefits in the life cycle of architecture:
- The building will remains in use longer;
- It will fit its purpose better because it can adapt;
- The building allows the users to intervene and develop their own experience of the spaces
- Flexible design normally makes better use of new technical developments more often;
- In the life cycle of the building it is economically and ecologically more viable to design for adaptability. (Kronenburg 2007: 7)

By adding transformable elements in the building's design, it allows the user to adapt the spaces for it to be used by a variety of facilities. Ceilings can be lowered to give different acoustic conditions and define different spaces. Platforms can be extended to form stages or broken up to become seating. The seating itself can be removed or rearranged and the user should have control over the amount of natural lighting and ventilation (Smook 2007:29/3).

The design should focus on the aesthetic component very strongly, creating interest for the users as well as the passer-by.

The Architecture should actively encourage people to have a look, perhaps even make the effort to go in and see what is happening. Once inside the building the occupant should be encouraged to use the facility in many different ways (Kronenburg 2007: 87)

Element of admiration should be placed strategically throughout the movement routes. By controlling the moment what is revealed and when it is revealed becomes important. This can be done in a variety of simple ways.
- Distracting the observer's attention
- Obscuring the view until the last moment
- Manipulating the movement patterns through the structure.

All these principles have been utilized successfully in Video Games, and may serve as precedent (Jeffries 2010).

Using Video Games as inspiration for spatial design, they have to be analyzed. Most Video Games have a problem portraying outside spaces. The visual limitation of looking at a monitor prevent game designers from the evoking the same feeling as looking at a sweeping vista or panoramic. The same problem can be found in a city context. The feeling of being 8 stories up have no meaning if the buildings around you are the same height and block the view. (Gamasutra; 2010)

Certain design principals apply to designing space in Video Games. As a general rule in three dimensional games, designs that contain only straight lines are cheaper and easier to create, while the use of curves are considered expensive. The result is that designers tend to avoid curves. Resulting in three dimensional spaces that can feel rather sparse and sterile (Gamasutra; 2010)

Buildings designed for use in Video Games normally consist of main spaces that need to be explored. These spaces are designed with great attention to detail, but the remainder of the building is almost undefined. The buildings may be compared to a movie set. Architecture forms a false front that acts as a container tor the main programme. (Gamasutra; 2010)
Game type design of architecture is predominantly designed to be experienced and explored, not necessarily used. The facilities inside are there, primarily to support the narrative (Gamasutra; 2010)

Creating a huge variety of unique spaces and elements in video games are expensive
and places a lot of strain on the game console's resources. The repetition of stages and design elements with only minor changes was developed by game designers to save resources and give the player a sense of familiarity (Laurie 2001).
The same principal could be applied in the design of real world architecture. The developing of certain key elements that are repeated-, could ease the construction process as well as contribute to lower construction costs.

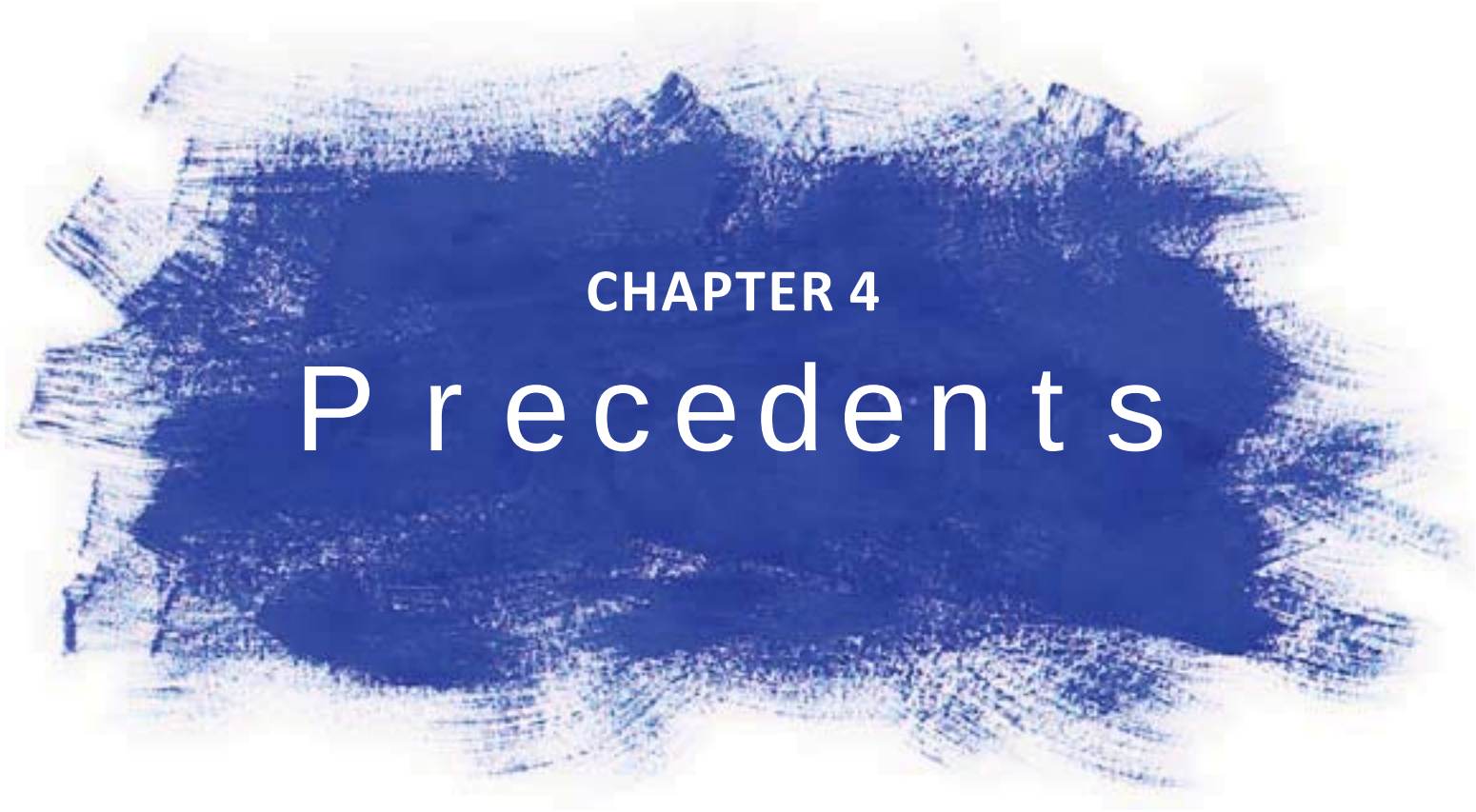
The development of games, also lead to the assignment of hierarchy to spaces or levels in the narrative of the game. In most games there are three levels of developing one's skill and then a fourth where a big challenge needs to be faced. In the physical space, level one could be interpreted as public space where a person may use the spaces freely and becomes accustomed to the building with little obstruction. As the person moves higher up into the building towards the more private portion, the building changes and provides more resistance in the form of security to protect the core. In the case of the youth centre the indoor entertainment area would be considered the private area, where security is paramount.

This prohibition of movement can help with the experience of the building to a visitor. The principal is based on a useful design aspect encountered in Game Architecture. The phenomenon is known as the 'closed chest' conundrum. It is based on the general psychological theme, that there will always be more things in a closed box or closet, than in an open box or closet. This phenomenon explains why places that we never go to, or can't enter seem larger than ones that we do visit. (Jeffries; 2010)

Other techniques could be employed to enhance the experience of the building. The principal of 'deprivation is what gives meaning to abundance' could be employed, by small gestures, like not providing seating throughout the design, but providing plenty of seating only in a few select places of interest that may offer a view or something of interest to observe. (Jeffries; 2010)

Lastly the structure and construction of the building should be utilized. The materials and surfaces of a building have a rich and complex language that evolve and change over time together with the programme.

Caution should be taken to design flat surfaces, like concrete roofs and gutters, properly. If these surfaces are badly detailed they are incapable of dealing with time and weather like several examples of the modern movement (Pallasmaa J. 2000).



CHAPTER 4

Precedents

4-1 Building Precedents

Plexus Architecture
Museu Exploratorio de Ciencias
Campinas, São Paulo, Brazil

The relationships between different surfaces are investigated. Spaces are created where elements intersect.
The relationship between the street and the building entrance is also investigated. The building is lower at the entrance with a high visual backdrop behind it. The scale on the sidewalk is on a pedestrian level and does not overwhelm the visitor.

The design consists of several linear elements that interact with one another. The elements are broken up into smaller elements with holes and extruded portions. The various parts reads as a continuous whole (Plexus 2010).

Figure 4-1. Model of the Museu Exploratorio de Ciencias.

Figure 4-2. Exterior rendering of the Museu Exploratorio de Ciencias.

Figure 4-3. Night rendering of the Museu Exploratorio de Ciencias.

Figure 4-4. Exterior rendering of the Museu Exploratorio de Ciencias.

Figure 4-5. Interior rendering of the Museu Exploratorio de Ciencias.

Plexus Architecture
LaVilla Medical Office Building
Jacksonville, Florida, USA

The interaction of different planes are investigated to generate space.
The skin over the building forms a new layer of space that envelops the internal functions.
The apparent random holes punched into the skin are investigated in order to replicate.
The material characteristic of copper is analyzed.

▼

Figure 4-5. Photo of LaVilla Medical Office Building.

Figure 4-6. Photo of LaVilla Medical Office Building.

Plexus Architecture
Zhongguancun Life Science Centre
Beijing, China

The interaction of morphic forms and more rigid building elements in Architecture is investigated.
The building illustrates that only portions of the building needs to be morphic. The key is merging the morphic and the ridged elements.
The building consist of linear elements that are broken up. The gaps are connected by planes on the outside to make the building read as one element.

▼

Figure 4-7. Exterior rendering of the Zhongguancun Life Science Centre.

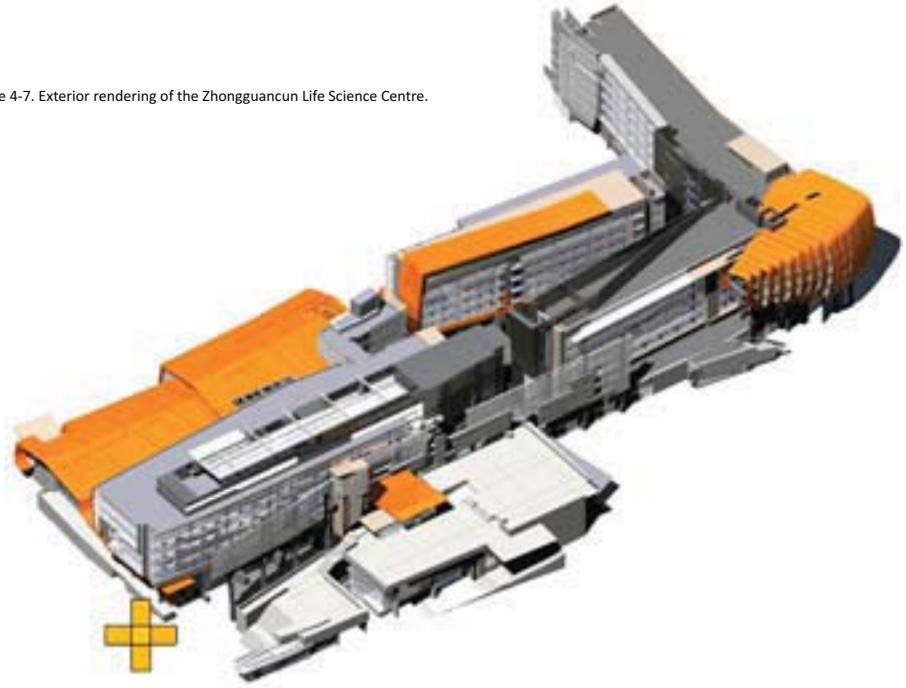


Figure 4-8. Exterior rendering of the Zhongguancun Life Science Centre.

German De Sol
Hotel Atacama Oasis
San Pedro, Atacama Desert

The relationship between an internal courtyard and the building. The placing of vegetation in such an enclosed space with seating around to maximise the use of shading.
The linking of spaces with ramps in stead of stairs.

Erratic pathways prolongs the experience of the space. In a public building this element could lead to socializing between users.

Figure 4-10. Photo of the Hotel Atacama Oasis.

Figure 4-11. Photo of the Hotel Atacama Oasis.

Figure 4-9. Photo of the Hotel Atacama Oasis.

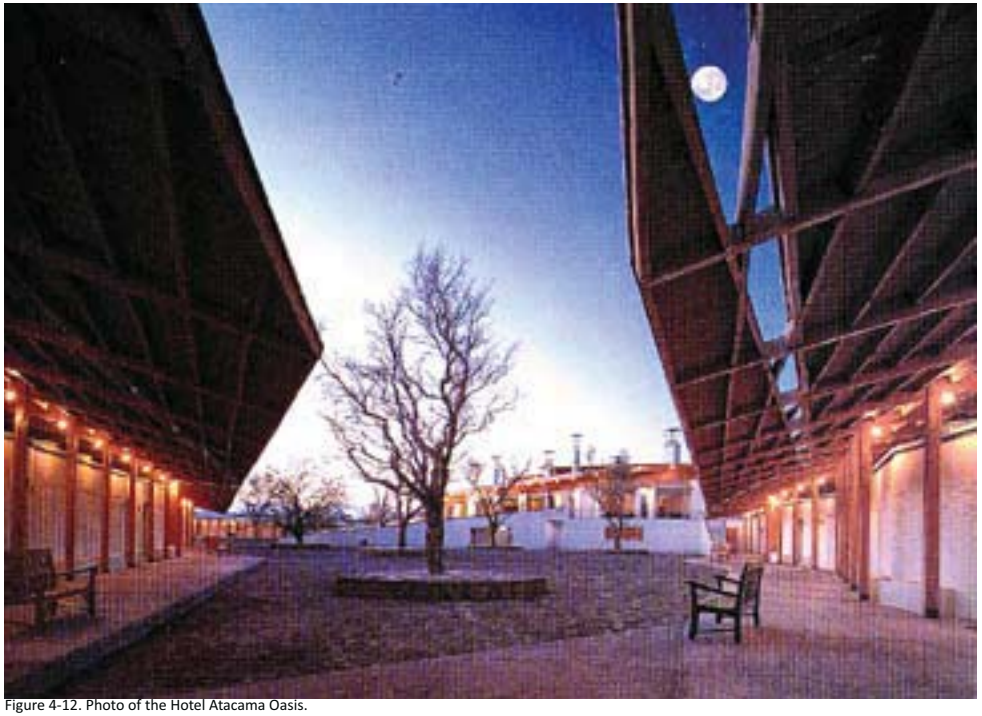


Figure 4-12. Photo of the Hotel Atacama Oasis.

New Headquarters Central Chinese Television CCTV
Beijing, China
OMA Architects

The new CCTV headquarters, at a height of 230 meter and a floor area of about 400,000 square meters, combines administration with news, broadcasting, studios and program production. Although the building is 230 meter tall it is not a traditional tower, but a continuous loop of horizontal and vertical sections that establish an urban site rather than point to the sky. The irregular grid on the building's facades started as an expression of the forces traveling throughout its structure.
(archspace 2002)

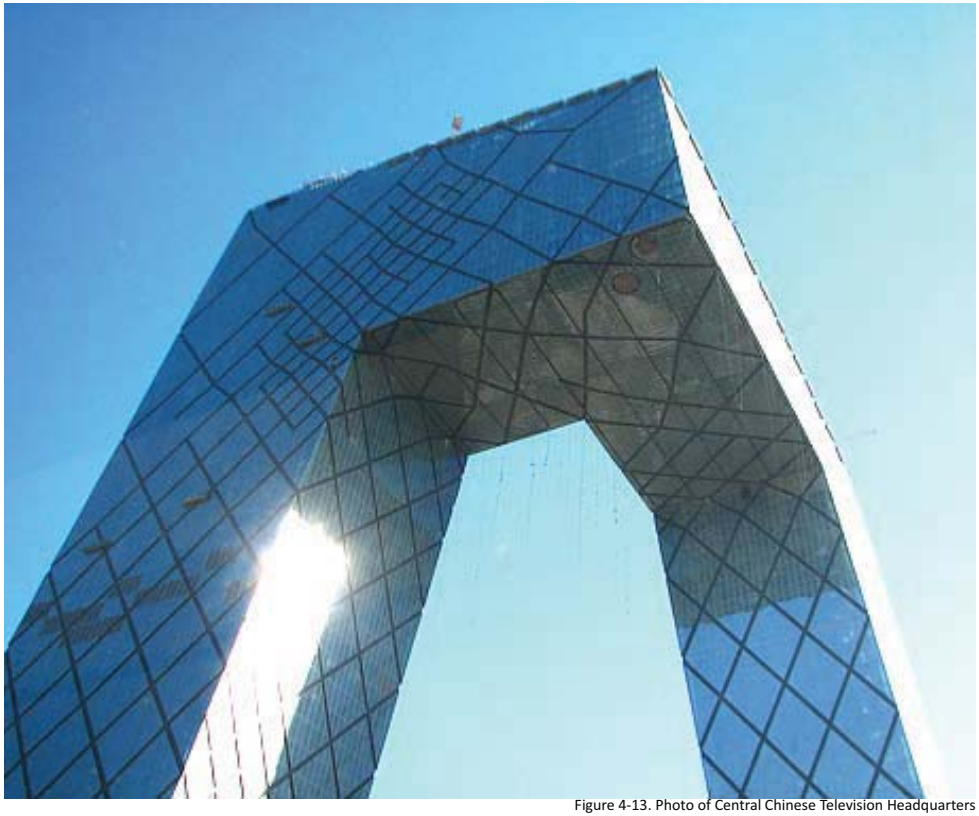


Figure 4-13. Photo of Central Chinese Television Headquarters

The idea of a contemporary bridge structure is investigated to add to the surrealism of video game architecture.

The structure consist mainly of steel that is cladded with glass and titanium.

Figure 4-14. Photo of Central Chinese Television Headquarters

Figure 4-15. Photo of Central Chinese Television Headquarters

Hepburn Springs Bathhouse
COX Architects

Building consisting of plains that is separated by light.
Light is either from artificial sources or glazing.
The structure consists of a square steel portal frame that has been placed at an angle.
Portions of the building is buried under ground with skylights that protrude out through the landscape.

(Cox 2010)

Figure 4-17. Photo of the Hepburn Springs Bathhouse

Figure 4-16. Photo of the Hepburn Springs Bathhouse

Figure 4-18. Photo of the Hepburn Springs Bathhouse

Figure 4-19. Photo of the Sports Hall Sveti Martin

Figure 4-20. Photo of the Sports Hall Sveti Martin

Figure 4-21. Photo of the Sports Hall Sveti Martin

Figure 4-22. Photo of the Sports Hall Sveti Martin

Sports Hall Sveti Martin / Sangrad
Croatia
Architect: Sangrad d.o.o.
Constructed Area: 1,328 sqm

The Project consist of a two-part sports arena that is located close to the outer sporting courts (tennis, football, basketball, table tennis, volleyball). The sports facility is named Spa and Golf resort Saint Martin.

The lightweight steel structure is investigated. The building is constructed of steel portal frames claded with large sheets of copper. The different surfaces is separated by glass.
The hall itself contain tracks on the ceiling to accommodate different functions in the hall.

(Martin S. 2008)

Figure 4-23. Photo of the Sports Hall Sveti Martin

Figure 4-24. Photo of the Circle Bath Hospital

Figure 4-25. Photo of the Circle Bath Hospital

Figure 4-26. Photo of the Circle Bath Hospital

◀ **Circle Bath Hospital, Bath**
Foster & Partners
Design aspects that are investigated are the use of metal for the external walls. The choice of metal and colour was determined by the surroundings, with the base in contrasting black giving the building the appearance of floating.

The deep recessed windows accommodate balconies inside the building.
(Foster 2010)

▼ **Blessings Golf Clubhouse Luxury Club House**
Marlon Blackwell Architect
Linear box building that has a broken up facade. The building is places on a stone plinth and constructed of lightweight copper cladding and glass.
(Blackwell M; 2010)

Figure 4-27. Photo of the Blessings Golf Clubhouse

Roy McMurtry Youth Centre
Kleinfeldt
Mychajlowycz Architects

The project is constructed of an array of complex of buildings designed around an old women's prison. Most of it was demolished to make way for the new youth centre.
The Building is made up of different boxes intersecting one another. The building is arranged over different levels each reading different.

(Roy McMurtry 2009)

Figure 4-28. Photo of the Roy McMurtry Youth Centre

Figure 4-29. Photo of the Roy McMurtry Youth Centre

Figure 4-30. Photo of the Roy McMurtry Youth Centre

Figure 4-31. Photo of the Roy McMurtry Youth Centre

Figure 4-32. Photo of the Cantilevering tower Building

◀ **Cantilevering tower Building**

The building consist of a strong circulation and service core. The bulk of the building cantilevers out of the core in four directions
(Cantilevering 2010)

▼ **MVRDV**
Villa VPRO - Broadcasting Company
Hilversum, Holland

A building consisting of folded floors layered on top of one another. The building is a good example of merging plains and surfaces in a building.
(Siebe Swart 2010)

Figure 4-33. Photo of Villa VPRO

Buildings of a giant Ninteno's DS and a PlayStation 3
Architect: Joseph Ford

Previous attempts to use video games as inspiration for architecture.
The function of the building does not necessarily reflect the form of the building.

The use of video game consoles pose an interesting challenge to the architect to make the building functional.

http://www.techeblog.com/index.php/tech-gadget/geeky-video-game-console-buildings

Figure 4-36. Photo of the Nintendo DS building

Figure 4-37. Photo of the PlayStation 3 building

4-2 Interior Precedents

Montessori College Oost
Netherland

Movement corridors serve a double function. The vertical circulation forms seating and stages where students can sit and socialize as well as study.

(Montissori. 2009)

Figure 4-36. Photo of the Montessori College Oost

Montessori School
Berkeley California
Pfau Architecture

Outside movement spaces are also designed to function as more. Built in seating and shading make spaces usable even during bad weather

(Pfau. 2009)

Figure 4-37. Photo of the Montessori School Berkeley

Northside Youth Centre

Example of a multipurpose hall. The facility is big enough to accommodate a variety of functions

(Fredericton 2010)

Figure 4-38. Photo of the Northside Youth Centre

Makkuttukkuvik Youth Centre

Activities housed in a youth centre's indoor entertainment hall.
Pool Table
Table Tennis
Fooseball
Computers
Vending Machines

(Iqaluit. 2010)

Figure 4-39. Photo of the Makkuttukkuvik Youth Centre

4-3 Landscape Precedents

Figure 4-40. Photo of the Los Silos Youth Centre

Figure 4-41. Photo of the Los Silos Youth Centre

Los Silos Youth Centre
Lavin Architects

Green landscape on rooftop.
The building consist of a linear landscape element that flows from ground level up to roof with stairs and a ramp. The building is constructed of concrete with glass inserts.
(archdaily 2010)
http://www.archdaily.com/9345/los-silos-youth-centre-lavin-arquitectos/

Civic Youth Centre
COX Architects

A skate park situated between two buildings. The skate park offer a variety possibilities to skaters. The park is made up from concrete ramps and stairs with steel handrails and surface edgings to provide durability.
(Cox 2010)

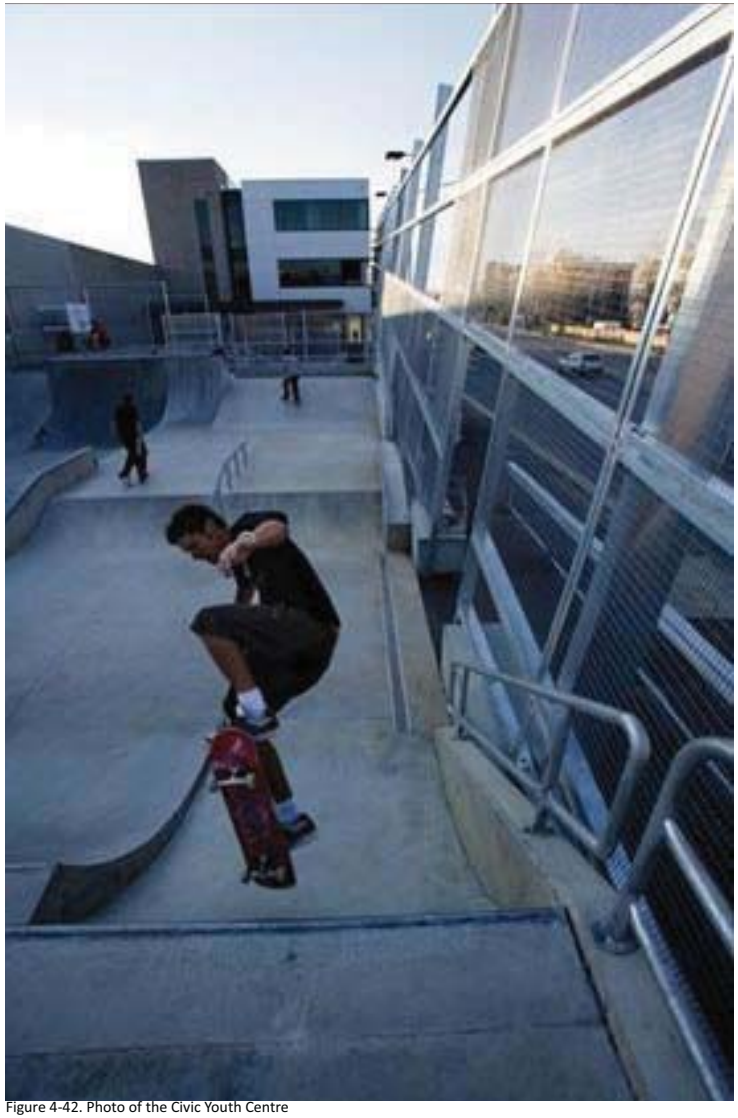


Figure 4-42. Photo of the Civic Youth Centre

Figure 4-43. Photo of the New Day Skate Park

Figure 4-44. Photo of the New Day Skate Park

New Day Skate Park
Menlyn, Pretoria

A skate park consist of metal ramps and half pipes placed on concrete surfaces. The ramps can be moved around to alter the possibilities. The concrete surface is utilized as an event space as well.
(Author)

Figure 4-45. Photo of the New Day Skate Park

Figure 4-46. Photo of the New Day Skate Park

Figure 4-47. Photo of the New Day Skate Park

4-4 Video Game Space Precedents

Mass Effect 2

Outside maps consist open landscapes with tall elements in the distance to guide the player to where he is suppose to go. The building itself should guide what is suppose to happen. The pathway to the building is not straight but force the player to experience the space.
(Mass Effect 2010)

Figure 4-48. Screen shot of Mass Effect 2

Mass Effect 2

This is a typical interior space found in the game of Mass Effect.
Architecture is used to portray a technologically advanced planet. The spaces are mostly well lit with big openings to the view. Buildings are designed as linear elements to facilitate a narrative. The spaces are to be explored, understood and conquered before the game can be completed.
(Mass Effect 2010)

Figure 4-49. Screen shot of Mass Effect 2

Civilization

Aerial view of a map in the game Civilization. The map shows key elements that are more prominent than others. The player of the game can orientate himself according to these elements.
It is clear that these elements are more important and the player have to visit them.
(Civilization IV. The 2005)

Figure 4-50. Screen shot of Civilization

Journey

The map is sparsely vegetated and consist of a desert landscape. The player is guided through the landscape by tall tower and elements on the horizon.
(Journey. 2010)

Figure 4-51. Screen shot of Journey

Deus Ex 3

The map depicted in the battle below consist of a square where the action is taking place. The square is framed by tall buildings to create a sense of place as well as a backdrop for the activity to take place. Lower elements in the space provide hiding place that may be interpreted as more private spaces.
All spaces are well lit.

(System Link 2010)

Figure 4-52. Screen shot of Deus Ex 3

Figure 4-53. Screen shot of Deus Ex 3

Prince of Persia 4

Tall elements throughout the map guide the player and the unrealistic depiction of buildings add an element of surrealism to the stage.

(Techarena 2010)

Figure 4-54. Screen shot of Prince of Persia 4

Quake

The building is designed from the inside out. The building's map shows that the building is clearly designed for exploration

(Aardappel; 2000)

http://strlen.com/maps/

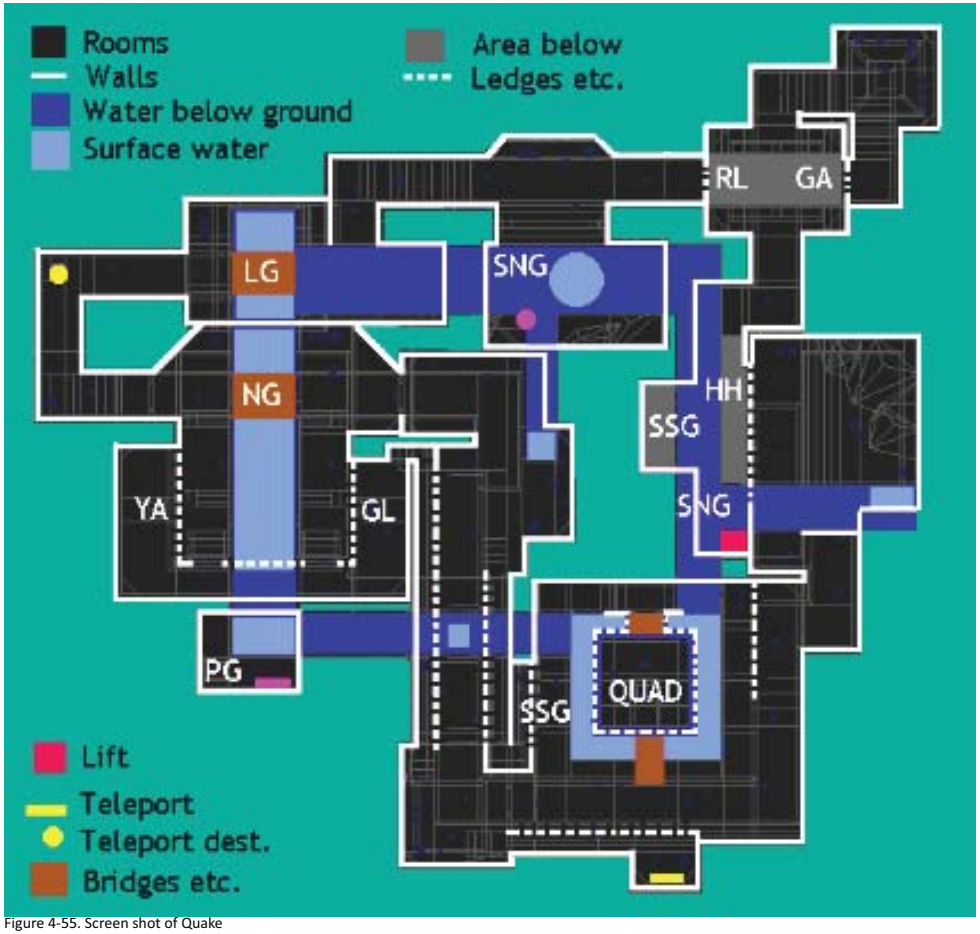


Figure 4-55. Screen shot of Quake

PlayStation Home

Digital representation of an indoor Spaces. This game is already an attempt to merge the virtual and the real world. Spaces vary from homes and private spaces to more public spaces like malls and indoor entertainment spaces

(Playstation. 2010)

Figure 4-56. Screen shot of PlayStation Home

Figure 4-57. Screen shot of PlayStation Home

Figure 4-58. Screen shot of PlayStation Home

CHAPTER 5

design Process

Figure 5-1. Aerial view of site as form generator
Aerial photo - Geography Department UP; 2010

5-1 Site as Form Generator

The Louis Pasteur hospital frames the site on the western edge, providing protection from the western sun.
The curved corner of the new additions to the Louis Pasteur Hospital draws the viewer into the site over the existing 3 story building next to the hospital.

The Colosseum Hotel across the road is a prominent landmark in Schoeman Street. Currently the low buildings on the street allow the observer to view the hotel from a fair distance down Schoeman Street. The new building should respect this lack of intrusion and be stepped back from the street or remain low on the street facade.

By connecting these curved structures a twisted geometry is generated at approximately 10 degrees. As seen in figure 5-1.

The proposed pedestrian corridor behind Louis Pasteur hospital, as discussed in the urban framework divides the site into a small northern and a large southern portion. This partition corresponds well with the ideal location to enter the basement parking from Du Toit Street.

The existing buildings consist of commercial activity on ground floor. There is very limited vegetation on the site. By connecting the existing trees on site, a division is created isolating the south western corner.

These divisions create different zones on the site and the appropriate facilities should be located in these zones.

Louis Pasteur Hospital **Colosseum Hotel**

Figure 5-2. Photos of New Additions to the Louis Pasteur Hospital and the Colosseum hotel accross the road. Source - Author

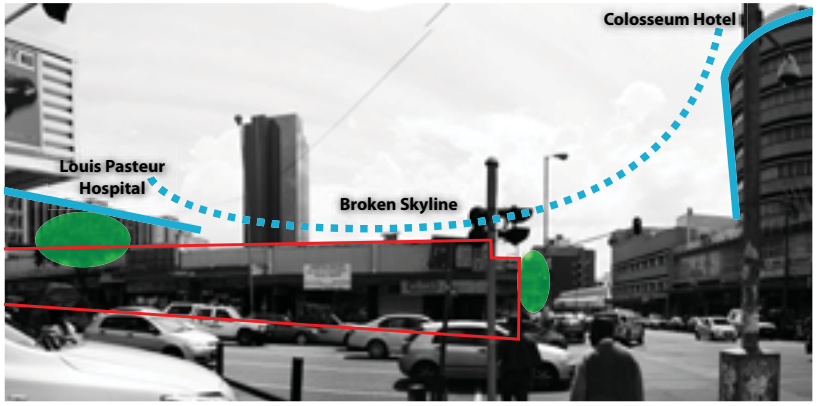


Figure 5-3. Photo of Southern facade of site illustrating the hole in the city skyline
Source - Author

5-2 Site Zoning

Due to the proposed function of the building, the building is divided into different zones. Each zone contains a different facility and has a different purpose. The users may move about across the various zones.
The users can be differentiated on age as discussed earlier and their required needs. Different age groups have unique times during the day when they will be using the building.

Zone 1 - Transport
The basement consists of parking and various auxiliary facilities. The parking should be enough to accommodate not only the vehicles of the people working in the building, but also to alleviate some of the parking problems found in the area. The eastern street edge integrates with the existing municipal bus routes moving through Du Toit Street by adding bus-stops on the street. The existing on-street parking is enlarged to be utilized by mini bus taxi as a drop-off and collection transportation node.

Zone 2 - Commercial
The most important zone of the building for a pedestrian would be the ground floor and street interface. The ground floor should therefore consist of commercial enterprises. These facilities are to replace the existing commercial street edge that is found on site. This commercial zone moves through the site along the newly introduced pedestrian corridors of the urban framework.
The service infrastructure should be adaptable to enable the occupant to change the spaces in order for it to be used as retail shops or restaurants.

Zone 3 - Day-care
The Northern edge is framed by a Day-care facility. The building forms a barrier that protects the open space on the northern edge. This forms a safe and open courtyard for the small children to play. This space will not be accessible to all visitors on the site. The building itself is accessible from the parking facility and the public transportation nodes to aid parents with dropping off their children.
Furthermore, the building houses classrooms, play spaces and the basic amenities required by a day-care facility.

Zone 4 - Multi-purpose space
On top of the commercial zone found on the southern and eastern edges are the communal spaces. The bulk consists of a multi-purpose hall, that can be divided to accommodate classrooms for tutoring, dining facilities, as well as, an indoor basketball court.
The outdoor area consists of hard and soft landscape that accommodates both sporting activity and relaxation. At the heart is a basketball court and a landscaped ramp leading up to the basketball court with the secondary hall entrance.

Zone 5 - Entertainment
The highest level is of the greatest importance. The indoor activities are housed in this zone. The structure consists of spaces ideal for social interaction. The internal spaces should be adaptable to house new and current equipment, as required by the users. Facilities include a computer laboratory, arcade or video games, pool tables and lounges.

5-3 Concept Development

The development of the building was done through an exploration of physical models and computer generated models. The zones as discussed earlier were analyzed and then placed at optimum location on the site. The building form developed through a process of trial and error until a satisfactory layout was achieved.

Model 1 & 2

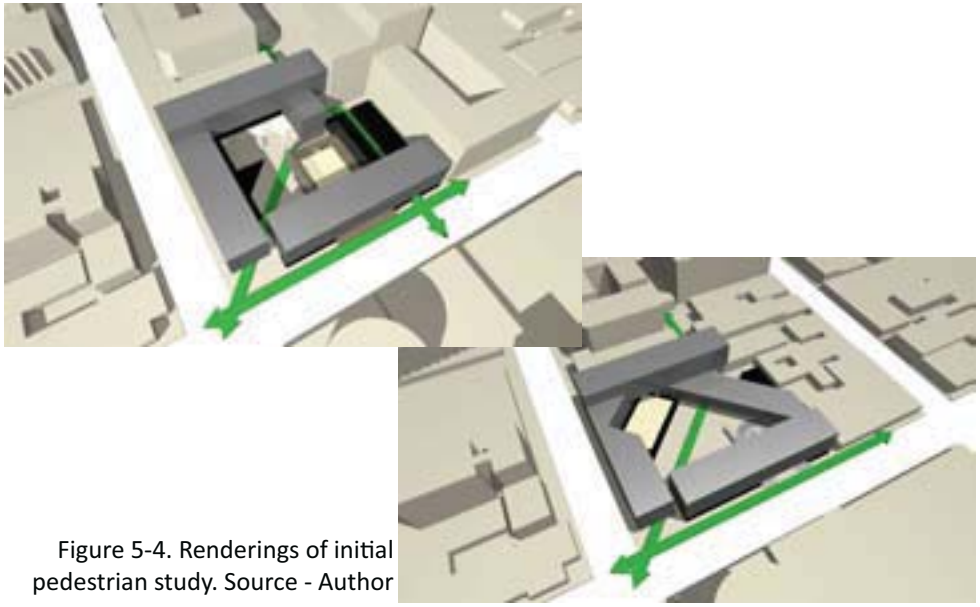


Figure 5-4. Renderings of initial pedestrian study. Source - Author

The first concept development was based around the pedestrian routes. The pedestrians move throughout and around the site. The building zones were arranged accordingly. The transportation node added to the complexity of the spacial layout.

Model 3

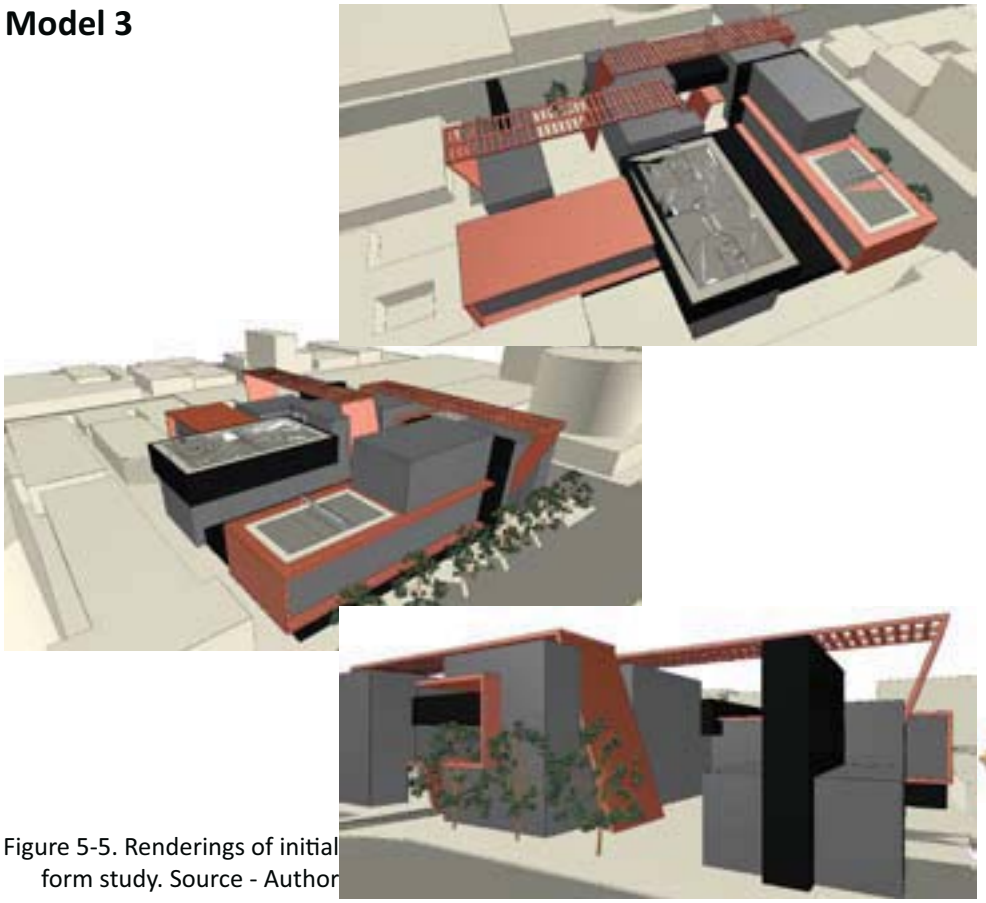


Figure 5-5. Renderings of initial form study. Source - Author

A form study was done based on vertical circulation. The different zones intersect one another creating intermediate zones. The roof top spaces were designed as out door activity spaces.

Model 4

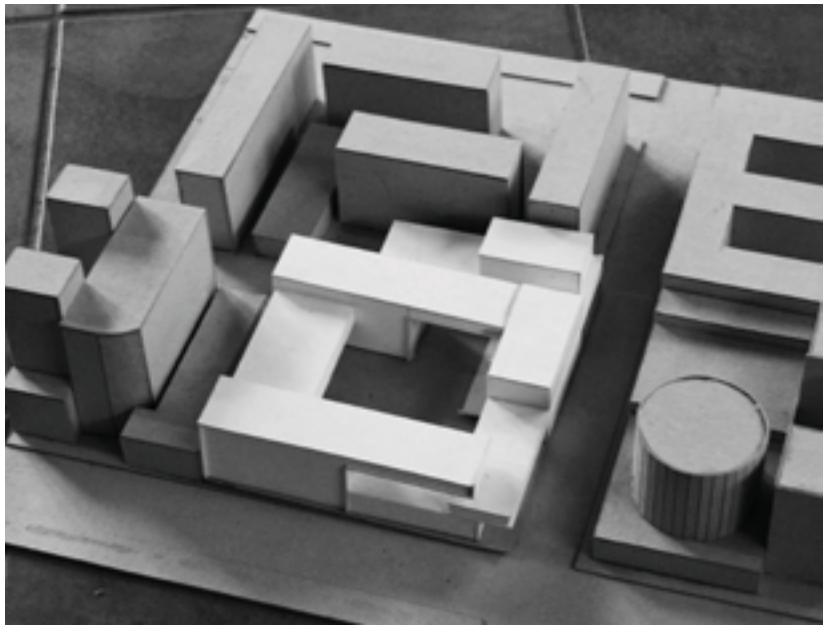


Figure 5-6. Photo of Model 4
Source - Author

The building is arranged around a private courtyard. The most predominant outdoor activities are to take place in this area.
The different buildings on site intersect on another to create balconies and usable rooftops.
The pedestrian corridor divides the building, creating a smaller building on the northern side of the site.
The main entrance to the building is located on the corner.

Model 5

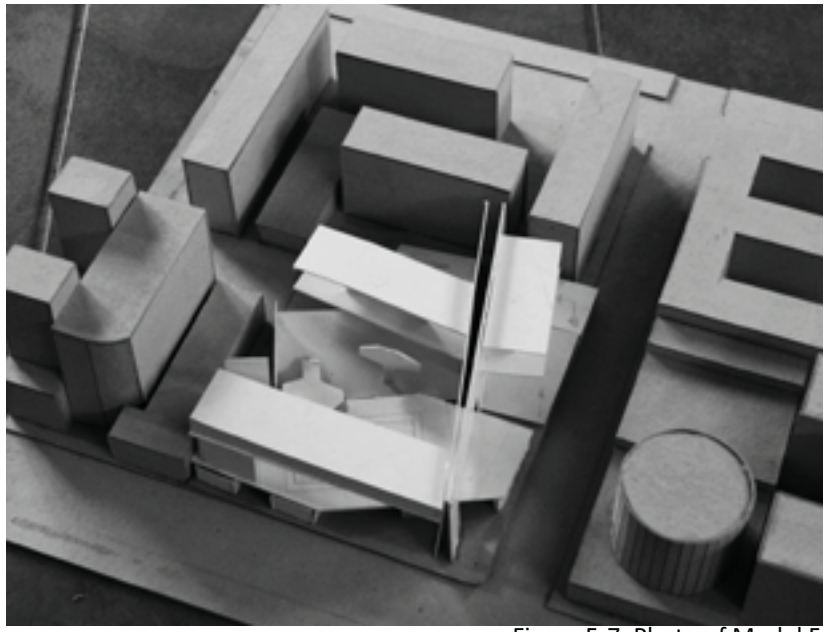


Figure 5-7. Photo of Model 5
Source - Author

A wall is built perpendicular to the twisted geometry. The wall accentuates the difference between the busy Schoeman street and the quieter Du Toit street.
The pedestrian corridor moves up a ramp and trough the building and down the other side of the wall.
The landscape consist of a ramp that forms a pavilion for viewing the activities on the basketball court.
The main entrance is on the corner with a secondary entrance on Du Toit street.

Model 6

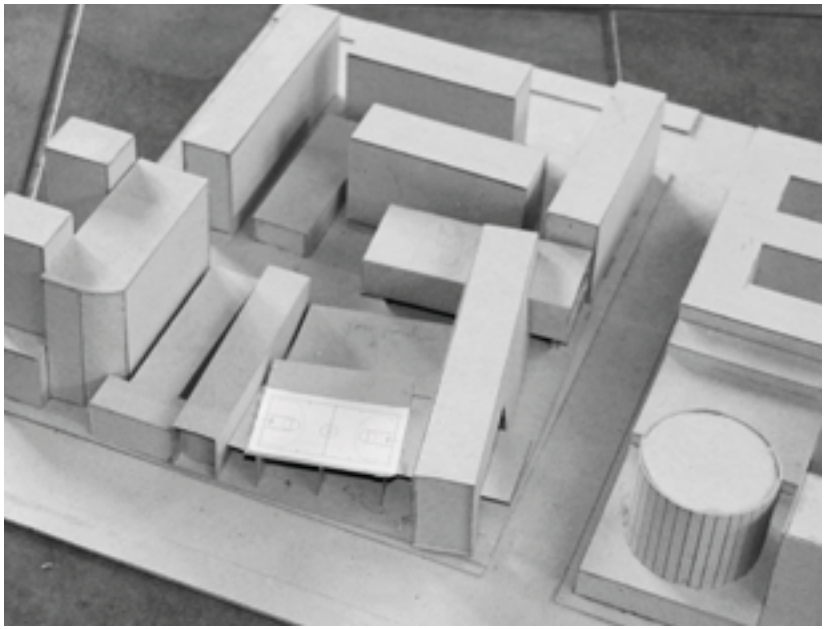


Figure 5-8. Photo of Model 6
Source - Author

Model 7

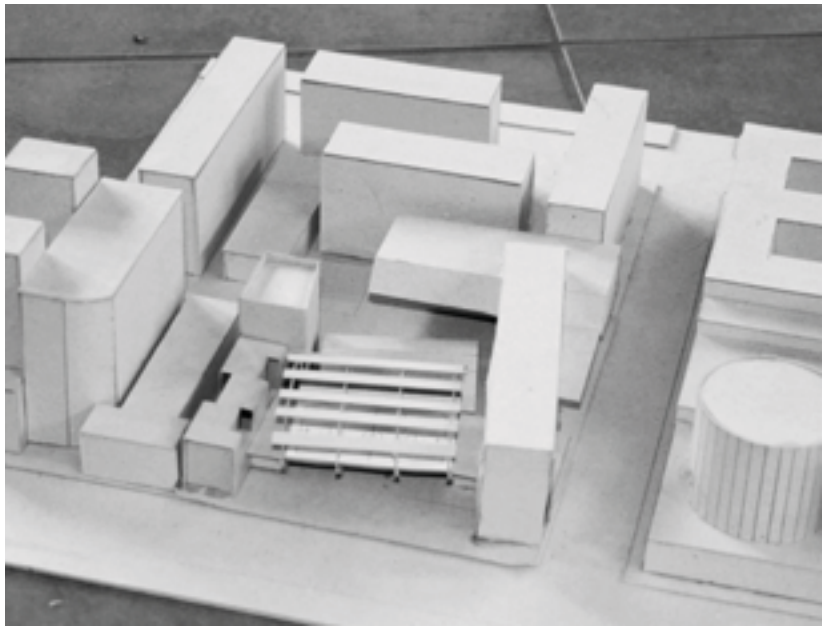


Figure 5-9. Photo of Model 7
Source - Author

The previous model is developed. The wall structure is transformed into a building. The model explores the relationship between the lower building on the western edge.
The outdoor spaces incorporate a basketball court above the commercial zone. The surface of the court punches through the eastern building. Creating a visual link through the wall.
The multipurpose hall is located on the northern edge of the site. The buildings intersect one another.

On the eastern edge the entrance to the pedestrian corridor and basement parking is enhanced by a canopy. The canopy is an extension of the interior spaces from the hall and wall building.
The outdoor spaces are adapted to be permeable and provide shading.
The western edge building incorporates courtyard spaces.

Model 8

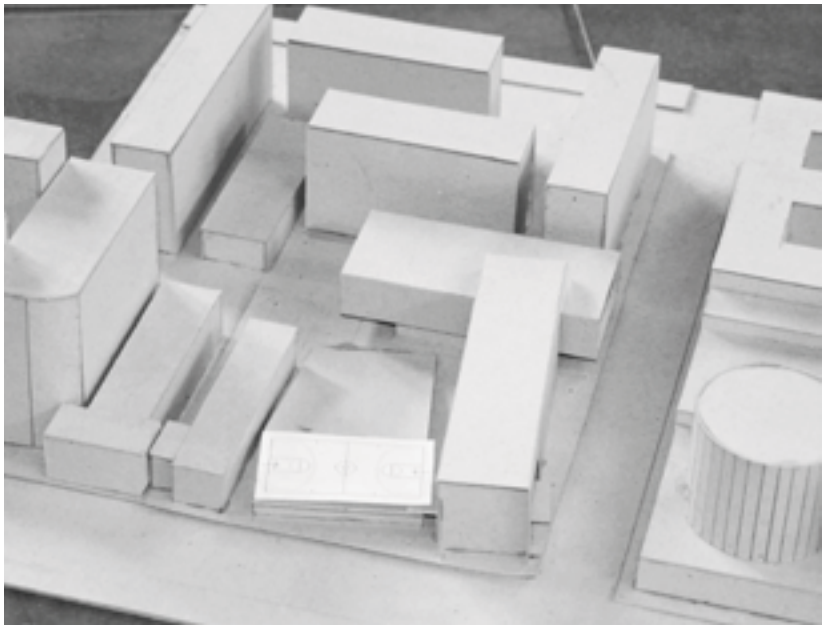


Figure 5-10. Photo of Model 8
Source - Author

Figure 5-11. Rendering of the southern edge. Source - Author

Figure 5-12. Rendering from north west. Source - Author

Figure 5-13. Rendering of eastern edge. Source - Author

June exam concept exam.

Building is centered around a central courtyard. The courtyard consist of a land-scaped ramp leading up to the basketball court on the southern edge of the site.

The 3 story building on the western edge is an office building. The roof consist of a Skate park and solar panels. The indoor entertainment building frames the building on the east and links with the multi-purpose hall on the northern side of building.

Model 9

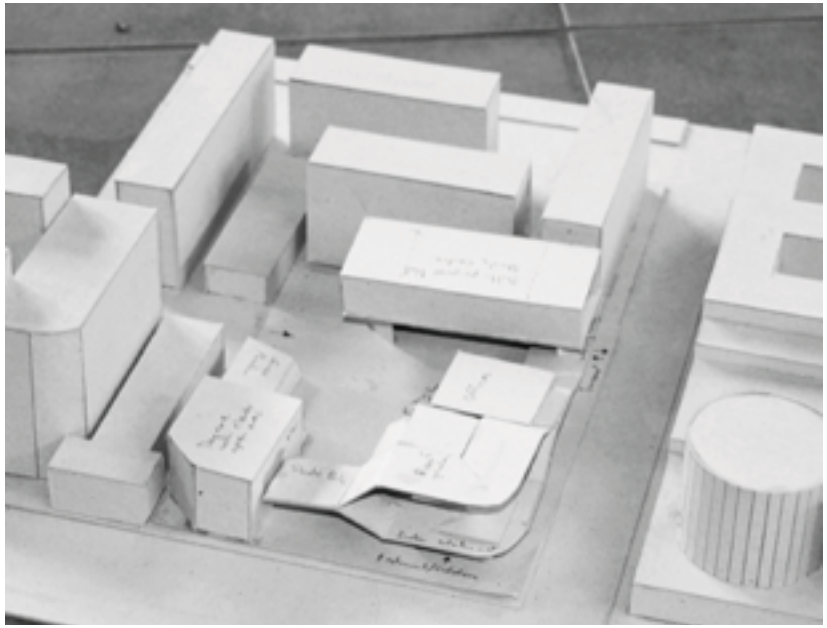


Figure 5-14. Photo of Model 9Source - Author

Model 10

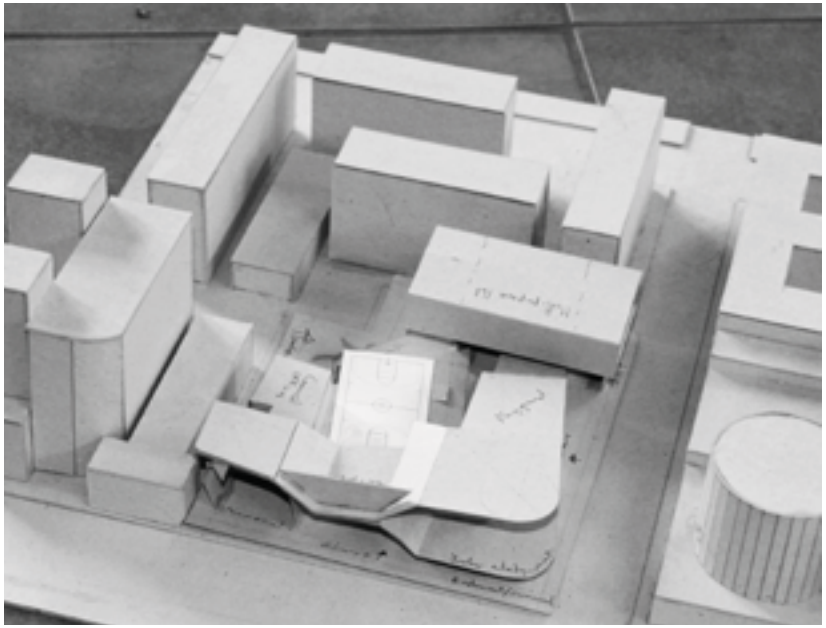


Figure 5-15. Photo of Model 10 Source - Author

The importance of corner is reinvestigate.
The design consist of the indoor entertainment area on the corner. The shape draws the observer around the corner. The facade is ideal to accommodate a digital screen.
The multi-purpose hall remains on the northern edge. The buildings are integrated by extending the surfaces of the indoor entertainment area to wrap over and underneath the other buildings.

Model 10 is a development of Model 9.

The twisted geometry is reintroduced by extending the corner past 90 degrees. The roof surfaces is adapted to form part of the landscape by accommodating a Skate park.
The central Basketball court is raised to create access to the basement parking and link with the internal spaces of the building.

Model 11

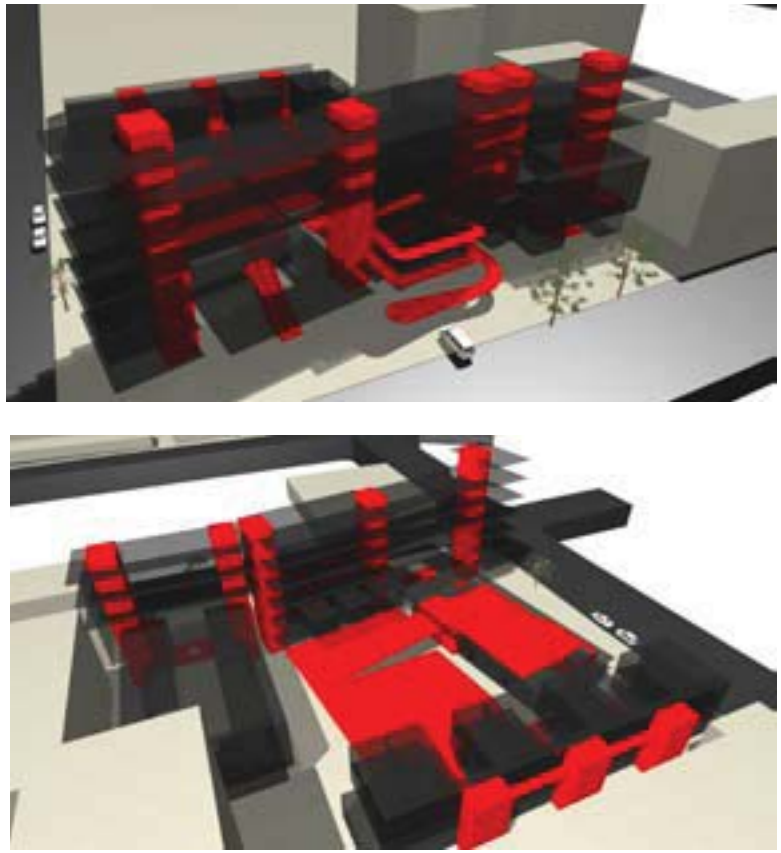


Figure 5-16. Renderings of Model 11
Source - Author

The main video game design principal is based around exploration and movement.
The movement and circulation routes are highlighted in red. The central courtyard ramps consists of several ramps linking the ground floor commercial with the upper floor open spaces.

Model 12

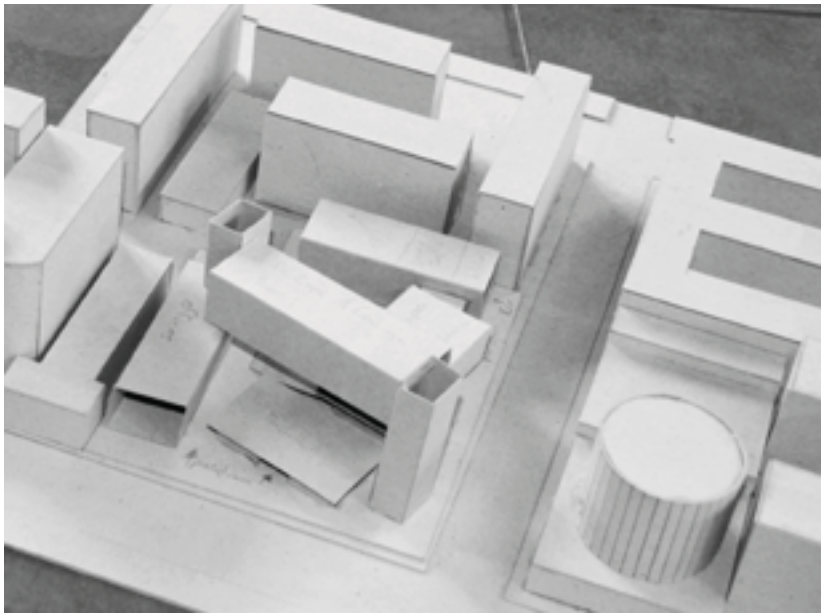


Figure 5-17. Photo of Model 12
Source - Author

The direction of the twisted geometry is challenged.
The building is arranged over the four levels as found in video game design (p51).

Ground level	- Commercial level.
Outdoor	- The public spaces like the landscape ramp and basketball court.
Indoor	- Multi-purpose hall and day-care facility.
Fourth level	- Indoor entertainment area

The building consist of a bridge that fills the hole in the skyline, while maintaining a low level ground floor interface.
The twisted geometry accentuated the corner element, challenging the importance of the colosseum hotel.

Model 13

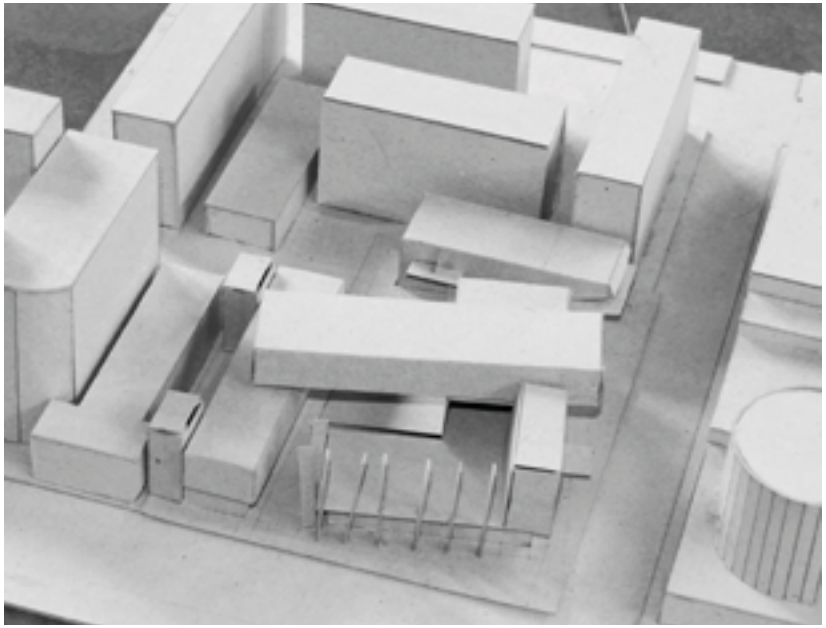


Figure 5-18. Photo of Model 13
Source - Author

The twisted geometry is restored in order to accentuate the Colosseum hotel as prominent landmark.
The bridge structure fills the gap in the skyline.
The basketball court links directly with the multi-purpose hall in order to create a bigger public space.
The basketball court screen is highlighted as being important.
The day-care facility at the north of the site incorporates a ramp that highlights the entrance to the basement parking while linking the pedestrian corridor with the multi-purpose hall.

Model 14

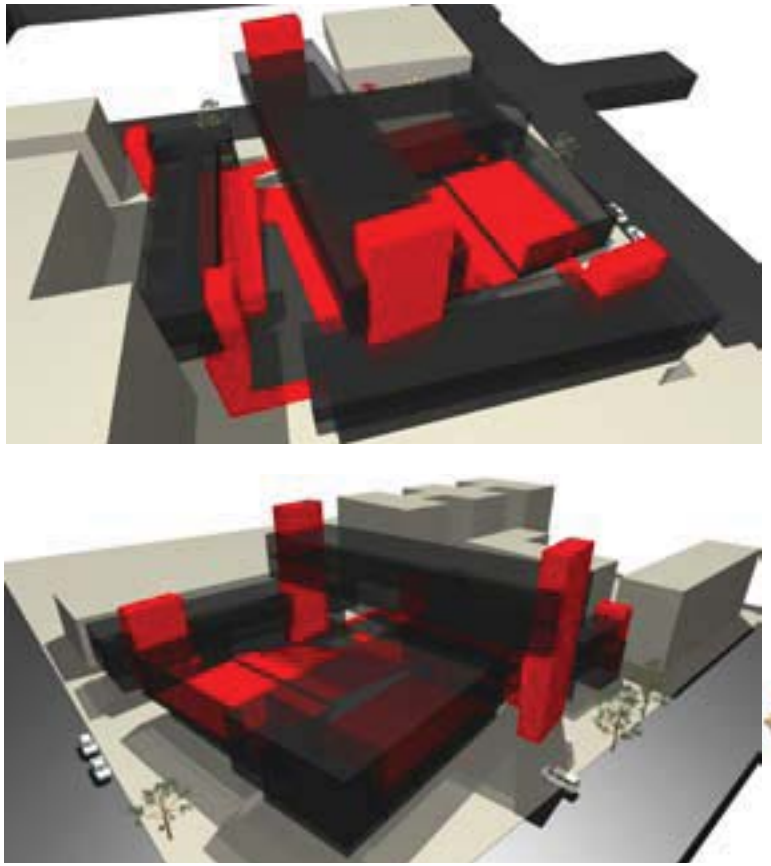
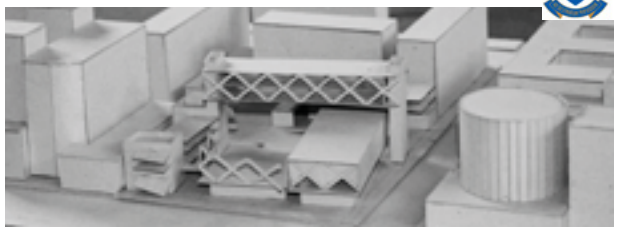


Figure 5-19. Renderings of Model 14
Source - Author

The movement routes of model 13 is defined and articulated in model 14.

The high movement towers holding the bridge structure guide the visitor to where the entrance to the building are. In addition the towers highlight the top level, guiding the visitor to the place where they would like to go.



Model 15

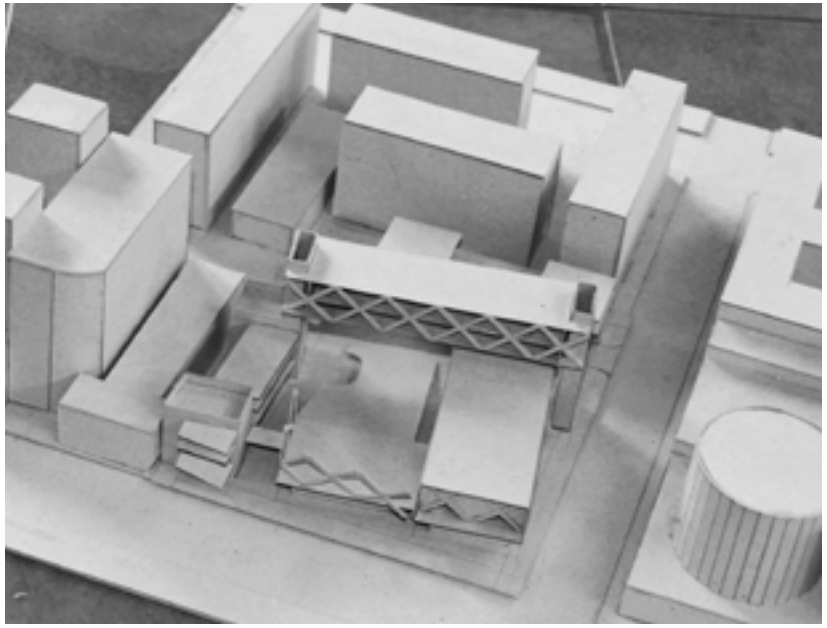


Figure 5-20. Photo of Model 15
Source - Author

The structure is explored.
The bridge structure consists of two concrete towers providing circulation and services. The bridge span approximately 50m with a steel girder truss forming the walls of the structure. The floors are constructed of steel frame with lightweight infill structure

The multi-purpose hall consist of a portal frame structure with brick infill walls on the side.
The ramp and skate park is constructed of moulded concrete.

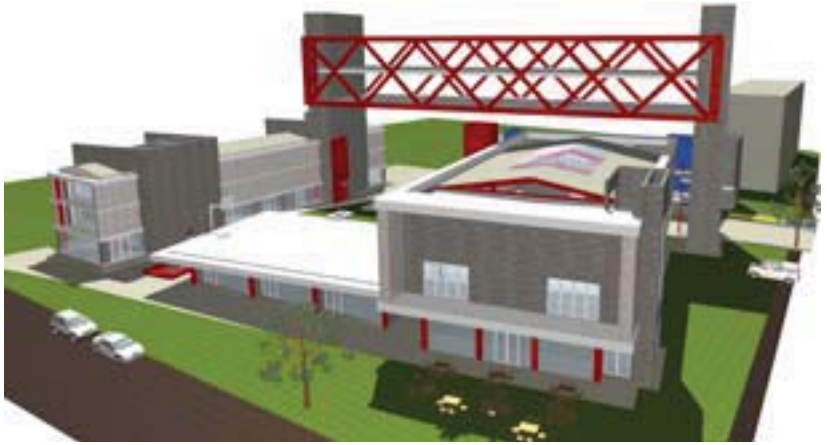


Figure 5-21. Rendering of the southern edge. Source - Author

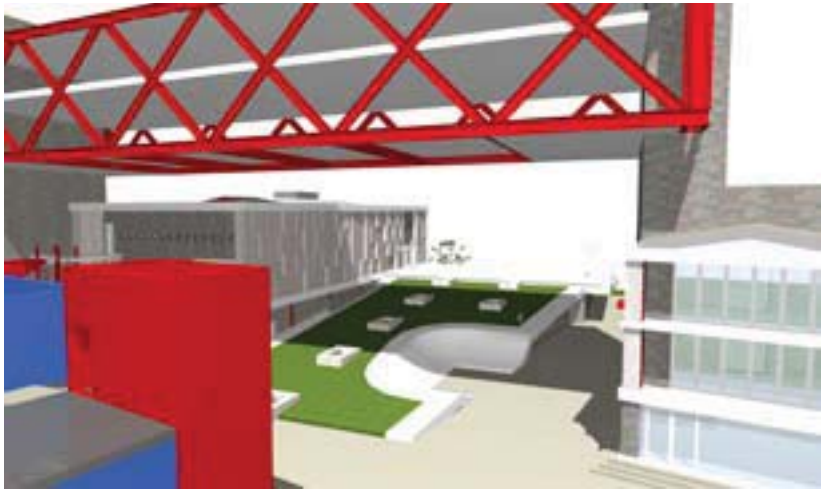


Figure 5-22. Rendering of the central courtyard as seen from the north.
Source - Author

Model 16

Figure 5-23. Rendering of the centre as seen from the south - Birds eye view. Source - Author

Figure 5-24. Rendering of the centre as seen from the south - Street level. Source - Author

The bridge structure is changed to a vierendeel truss. The structure consist of large steel square tubes that are welded in place with ridged joints.

The screen surrounding the basketball court is designed to accommodate creeping plant to cover it and create a green wall between the busy street and the activities in the courtyard.

The core structure of the day-care centre was investigated with the use of load bearing brick work and floors spanning in between.

Figure 5-25. Rendering of the central courtyard as seen from the north. Source - Author

Figure 5-26. Rendering of the centre as seen from the south east. Source - Author

Figure 5-27. Rendering of the centre as seen from the north. Source - Author

Model 17 - Technical review - September

Figure 5-28. Rendering of central courtyard as seen from the North.
Source - Author

Figure 5-29. Rendering of building as seen from south east
Source - Author

Figure 5-30. Rendering of Multi-purpose hall interior.
Source - Author

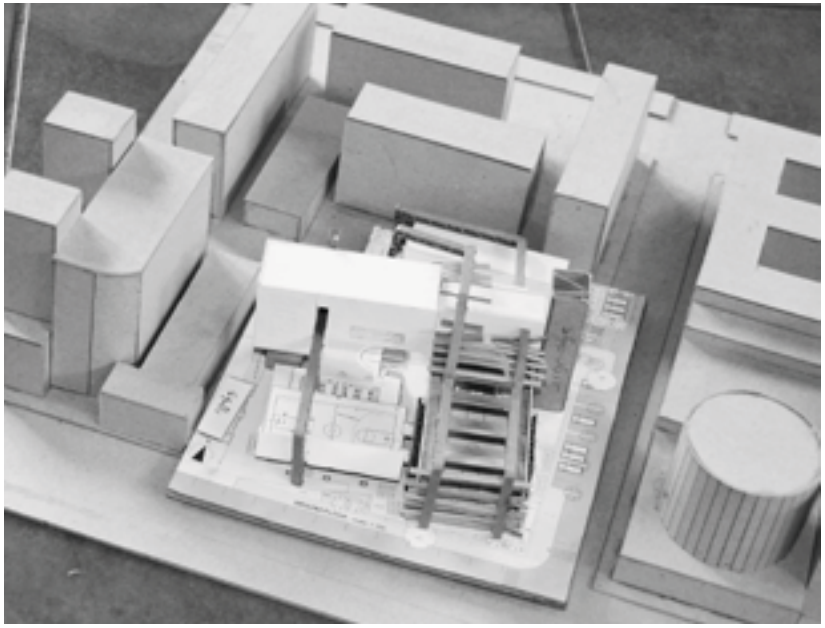
The bridge's structure is sorted with a square, fixed hinge truss and cladding.
The truss is set between the two tower structures. The truss is therefore offset from the side of the building.
The buildings are predominantly constructed of a lightweight material. The outside cladding is done with copper to blend in with the dark brown brick buildings that surround the site.

Figure 5-31. Rendering of the courtyard as seen from the western pedestrian corridor.
Source - Author

Figure 5-32. Rendering of the Youth Centre as seen from the east
Source - Author

Figure 5-33. Rendering of the Youth Centre as seen from south east.
Source - Author

Model 18



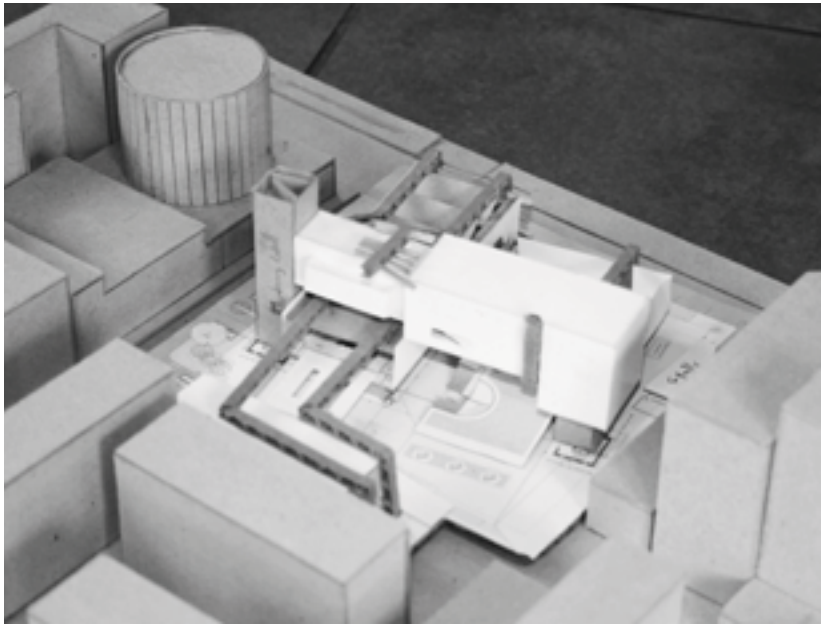
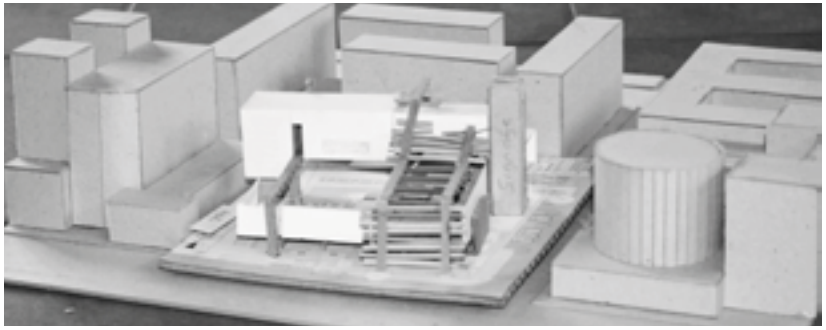
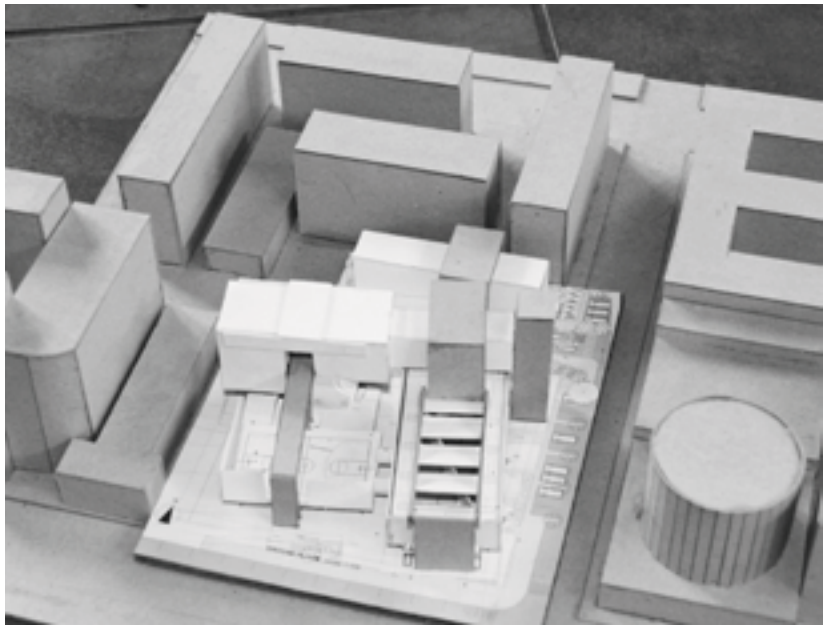


Figure 5-34. Photos of Model 18
Source - Author



An attempt to integrate the different forms of the different buildings.
The hall's roof is changed to a sawtooth structure to provide soft southern light inside.
The bridge structure is changed to wrap over one of the concrete shafts. The relationship between the hall and the bridge structure is also investigated.
The indoor entertainment area is now able to spill out onto the roof of the hall.
A secondary movement path is introduced over the outdoor basketball court and into the bridge structure.
The office building on the eastern edge is discarded.

Model 19



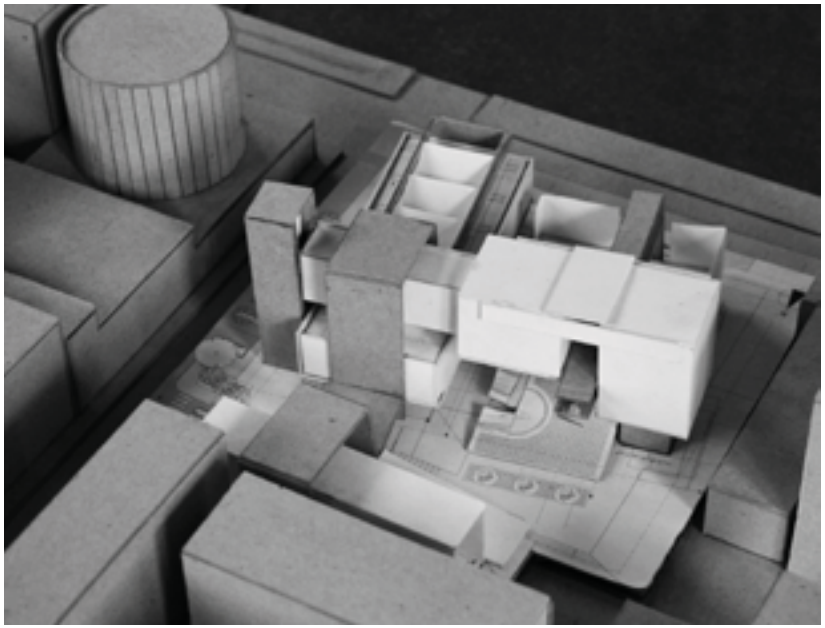
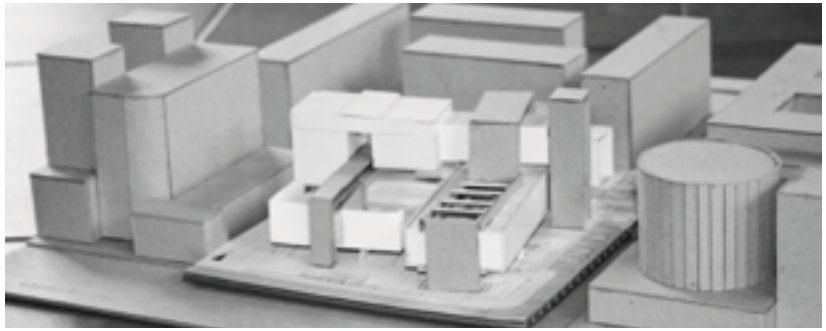


Figure 5-35. Photos of Model 19
Source - Author



Model 19 simplifies the roof structure of the hall. The double volume activity space in the indoor entertainment centre is expressed on the outside by adding a secondary structure that wraps over and under the other structures.

The day-care facility has been changed to have a central office building and circulation with classrooms on either side.

Model 20

Figure 5-36. Rendering from the south east
Source - Author

Figure 5-37. Rendering from the west
Source - Author

Figure 5-38. Rendering from the south west
Source - Author

Model 20 is a computer development of model 19.

The structure, material and floor plans have been updated.

As you approach the building, you slowly observe these details, first the building's overall structure in the distance, then things like construction material and other details.
Jeffries 2010

CHAPTER 6

design intervention

Figure 6-1. Rendering from south east at night

6-1 Summary of Design Principles and Functions

The design principals incorporated through the building was defined by the programme and the theoretical investigations.

The users (Children) of the building defined the programme of the building. The needs children impose on a building are very broad and change constantly. Their requirements will continue to evolve over time. Therefore, the building needs to be adaptable in order to respond to the current and future needs children may pose.

When the design principals of video games are analyzed it is clear that spaces are designed to be explored. Furthermore building elements are designed using square or flat surfaces rather than curves. In designing video game spaces curves are considered difficult and expensive.

The physical context of the centre imposes certain restrictions and requirements on the design. The view of the Colosseum Hotel down Schoeman street needs to remain while the density has to increase in order for the skyline to form a continuous height through from the Louis Pasteur Hospital to the Hotel.

The hierarchal spacial layout of the building is based on the levels found in video games. Game play levels start out as easy and become harder by offering resistance to movement and abilities.
The ground floor commercial offers little resistance to the visitor and is therefore level 1. The second level would be the outdoor activity spaces. These spaces may be used by all, and offer direct connections with the next level of interior spaces. The locker rooms and multi-purpose hall form the third level, where security offer some resistance to use of the spaces. The fourth and most prominent level would be the indoor entertainment centre spanning across the site. The building forms the focus of attention for the passerby and the backdrop for activities happening in the outdoor spaces.

The Youth Centre will house the following spaces and Activities:

Parking / Transportation Node:
- Basement for cars
- Wider on street parking for Taxi's
- Bus Stop

Commercial on ground floor:
- Retail shops
- Restaurants

Day-Care Facility:
- Creche
- Class Rooms
- Sleeping Hall
- Indoor and Outdoor play area

Multi-Purpose Hall:
- Cafeteria / restaurant for the children
- After school study aid centre

Outdoor Activity Area:
- Basketball Court
- Landscape
- Skate Park
- Climbing Wall

Indoor Entertainment Areas
- Lounges
- Pool Tables
- Video Game facilities
- Bars / restaurant
- Clubs

Locker rooms
- Changing Rooms
- Bath Rooms
- Lounges

6-2 Scale of building

The scale of the building guided the form of the proposed building. Currently the site consist of low scale industrial type buildings. This low scale was determined to be inappropriate and needed to be increased.

An unrestricted increase of the density and scale displayed several problems as investigated with the conceptual models.
By creating a continuous facade on the street edge the street becomes dark and the southern sidewalk becomes an unpleasant place to be. Currently the sidewalk is on a pedestrian scale with the low building forming a backdrop without infringing.

Furthermore, if the scale is increased on the street facade emphasis is detracted from the landmark building down the road (Colosseum Hotel).

To prevent the new building from infringing the perceived scale had to be lowered. This was achieved by stepping the facade further back from the street than is legally required. By doing this the sidewalk becomes wider allowing more pedestrian scale activities to fill the space in front of the building. The height of the building was also reduced to 3 stories in order to create a visual link between the new building and the existing 3 story building on the western side.

On the northern side the Day-care Centre is also lower consisting of 3 stories in general. This is done to lower the scale next to the courtyard north of the building. The lower scale is also more appropriate along the pedestrian corridor located south of the Day-care centre.

The Hall is a larger building, but it is stepped back from the street edge on the eastern side. This creates a larger sidewalk were people may wait or gather before the use the taxi's. The space may also be used for unprogrammed informal activities.

The hall itself is placed on a commercial plinth of glass. The result is a building that appears to be a box, reducing the scale of the 9m high building.

The indoor entertainment centre is of the largest scale. The building is raised to tower over the rest. The building is always visible from the site. It is also the first building the observer will notice when viewing the development. The building frames the space below it, consisting of the landscaped ramp. The building forms a backdrop for activities to occur in the central courtyard.
From a distance the building will appear to be one continuous form, but the facades are broken up into smaller ribbons and larger blocks to reduce the scale close up.

The landscape and pedestrian corridors are all large open spaces. The generous dimensions will allow a variety of informal activities to be possible in the spaces.

Figure 6-2. Rendering from south west

6-3 Site Plan

The site plan is orientated with north at the top.

The building on the northern edge is the Day-care centre. The location was chosen because the pedestrian corridor and basement entrance separated the portion of the site.

The eastern edge is framed by the commercial space on ground floor and the multi-purpose hall above it. The foyer for the hall is located just south of the pedestrian corridor.

The south western building consists of locker rooms, lounges and commercial enterprises on ground floor. The first floor is an open basketball court.

The circulation towers on either side of the site is the support structure for the tower building spanning across the site.

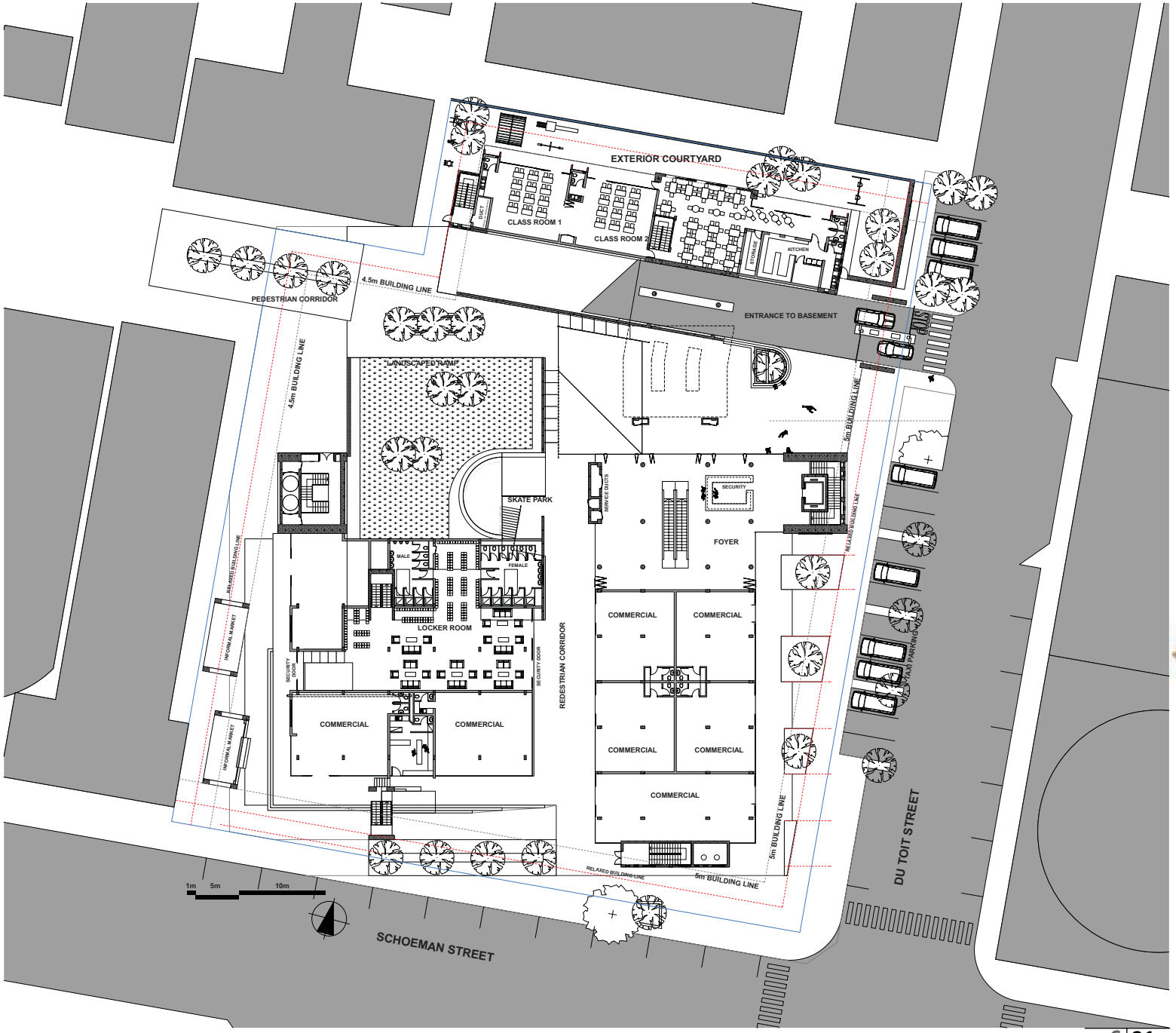


Figure 6-3. Site Plan

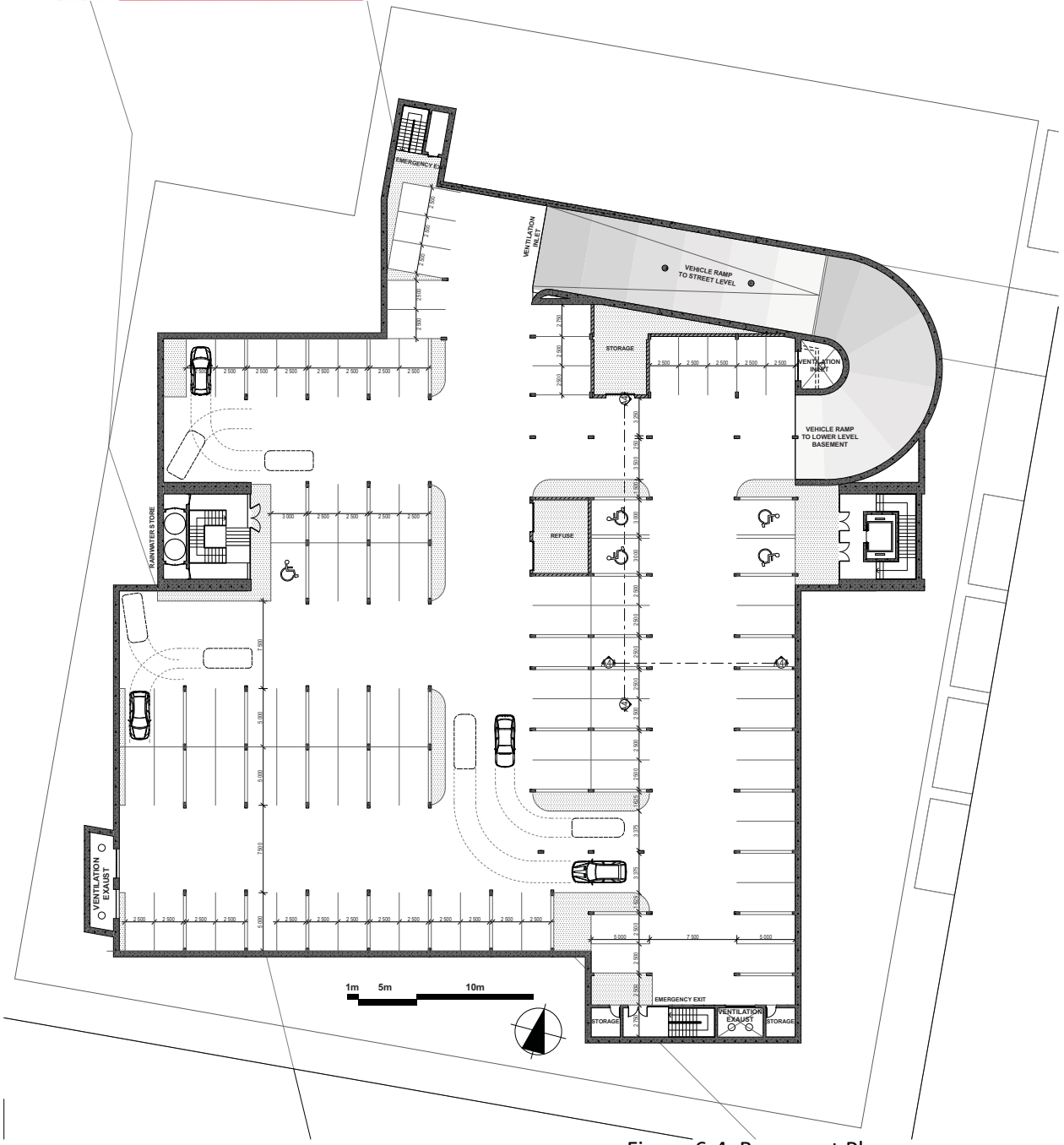


Figure 6-4. Basement Plan

6-4 Basement

Due to the Parking requirements posed by the Tshwane town planning scheme on the functions housed in the building a large basement would be required.
The Basement is arranged over 2 floor making it a super basement.
The basement provide both public and private parking with a total of 200 parking bays. The structure also houses storage facilities and a refuse collection area.
Mechanical ventilation plant rooms and water storage areas are also located in the basement.

Vehicular access is gained from Du Toit street. Schoeman street is subject to heavy traffic flow and it is not ideal to slow down traffic for access to the basement. Therefore, Du Toit street was chosen because of the lower traffic volume passing the site and the fact that the street provide two way traffic flow allowing access from either side.

The entrance to the basement is located in the northern portion of the site to allow sufficient space between it and the traffic intersection at Schoeman street.
Access will be monitored and controlled with a security boom gate.

All parking bays are a minimum with of 2500mm with no intrusions of columns.
Bays are 5000mm deep with a 7500mm driveway between perpendicular parking bays. There are a total of 15 parking bays for the disabled. These bays are a minimum width of 3000mm and are located close to the circulation towers.

Figure 6-5. Basement Entrance


Figure 6-6. Basement Internal

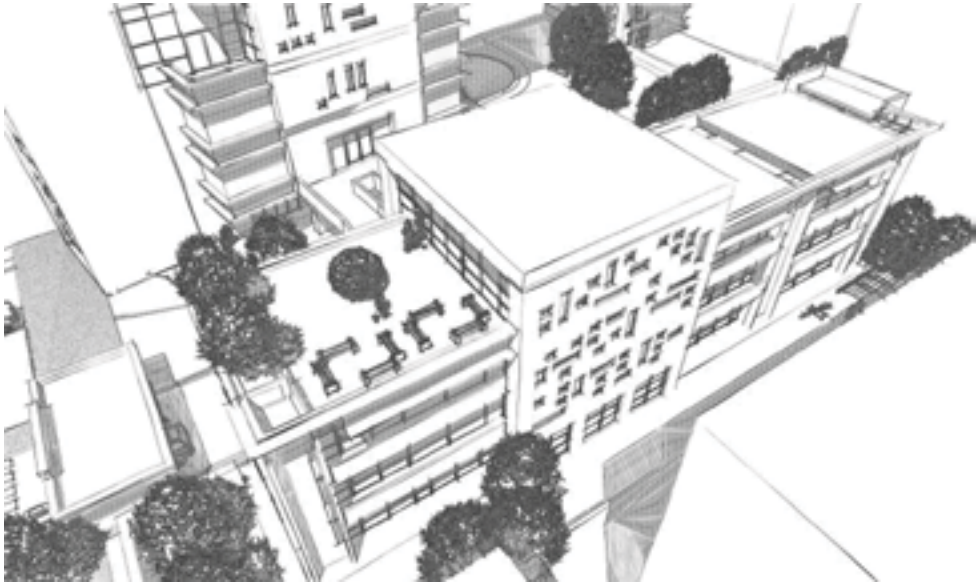


Figure 6-7. Sketch rendering of Day-Care Centre

Figure 6-8. Floor Plans of Day-Care Centre

6-5 Day-Care Centre

The Day-Care centre is located along the northern edge of the site. The building is stepped away from the boundary by 5,5m to create a courtyard play space north of the building.
The building forms part of the pedestrian corridor running east-west through the site. The pedestrians are led up a ramp that is placed on top of the vehicular ramp leading down to the basement. The pedestrian ramp moves toward the entrance of the Day care centre on the first floor and continues upward toward the entrance of the Hall.

The centre consist of 7 classroom each capable of accommodating between 25 and 30 children. On ground floor is a Dining hall and kitchen with storage facilities if the children's parents prefer to supply their own food. The dining hall opens up the exterior courtyard.

The first floor houses the reception area and administrative offices. Easy access to the Baby Hall makes it easy for parents to drop off or collect their children. The Baby hall is isolated from the other class rooms to avoid crying babies from disturbing class, or playing children from waking sleeping babies.
The two classrooms on the first floor open up to the southern side of the building into a open play space that is fenced off. The play spaces on first and ground floor are separated to avoid conflict between different age groups.

The second floor has three classrooms. The central circulation opens to an indoor play/sleeping hall with storage cupboards. The play/sleeping hall continues on the third floor. The third floor opens up on the eastern side to a rooftop garden.

Each classroom is equipped with a toilet and kitchen sink located in a service core between the class rooms.

Figure 6-9. Rendering of Day-Care from south west

Figure 6-10. Rendering of Day-Care from north east

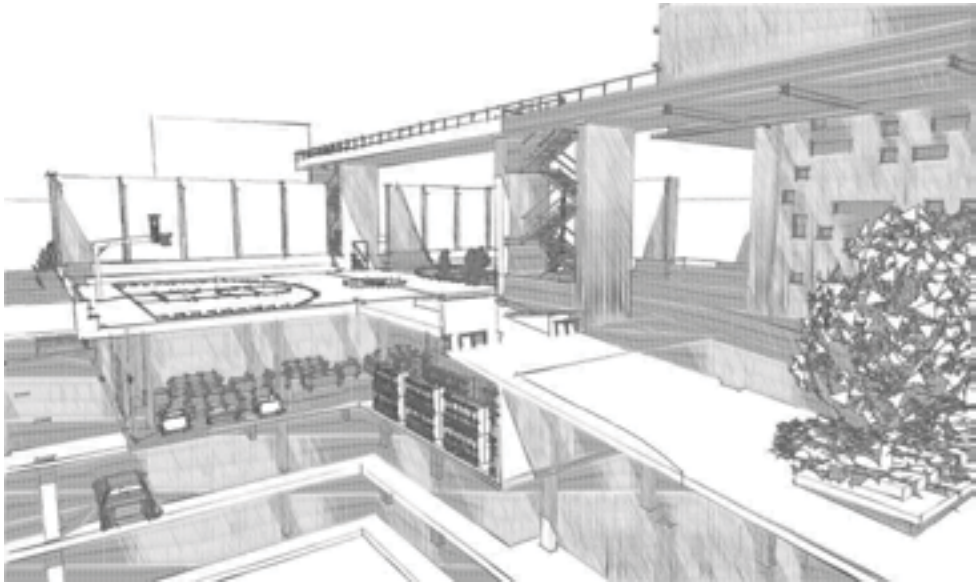
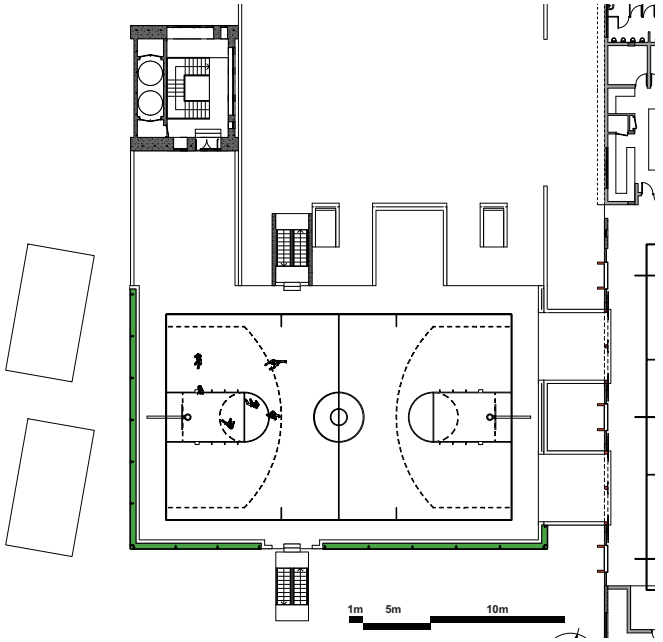


Figure 6-11. Rendering of Basketball court



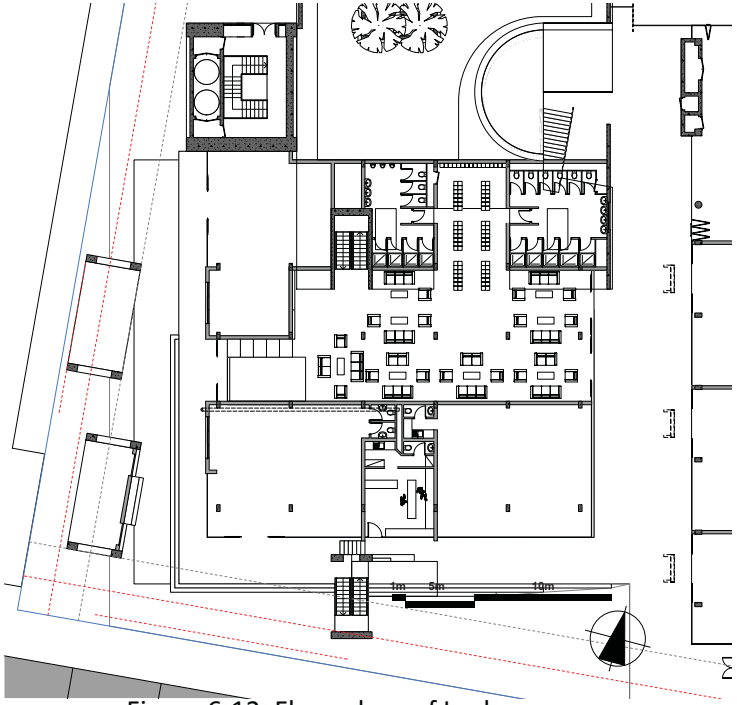


Figure 6-12. Floor plans of Locker room

6-6 Locker Rooms & Basketball Court

The current buildings on site consist of commercial enterprises on the street facade. This street interface is to remain and therefore the ground floor consists of commercial enterprises.

Behind the commercial enterprises are the locker rooms. This facility consist of male and female bathrooms with showers, toilets and basins. The communal space contain several lockers that can be rented. As well as several couches for relaxation and social interaction.

The locker rooms would be the first place most of the school children would visit on a daily basis. Therefore the space needs to allow for personalization. The furniture may be moved around and the amount of locker increased if the need arises.

The communal space has a generous ceiling height and is accessible from the eastern and western sides. A staircase connects the basketball court on top with the space below.

The locker room is lit and ventilated with a skylight placed in the slope of the landscaped ramp. Windows providing light to bathrooms are to be frosted to prevent spying.

The basketball court consist of a flat hard surface covered with tartan. A planted screen, constructed of steel columns and wire fence in between, surrounds the court to prevent players from disrupting traffic flow of Schoeman street.

A walkway over the court provides a viewing platform and connects the indoor entertainment centre directly with the basketball court and the sidewalk on Schoeman street.

Figure 6-13. Rendering of Locker room

Figure 6-14 . Rendering of Locker room

Figure 6-15. Rendering of Hall

6-7 Multi-Purpose Hall

The Multi-Purpose hall was conceived a large indoor area that may be sub divided as is necessary.
The building is placed along the eastern edge of the site to minimise the exposure to the noise from Schoeman street. The southern facade of the building is constructed of a concrete wall to reduce noise penetration into the space.
This concrete structure is a service duct that runs into the basement. It houses the emergency exit from the basement and the upper floors of the hall. It also contains the vent pipes of the basement's ventilation system.

The ground floor commercial spaces are arranged to service either side of the building. The internal wall layout may be altered since that are not load bearing.

The northern part of the ground floor commercial houses the reception and foyer space for the hall and indoor entertainment centre above. The space opens up to the outside allowing the free flow of pedestrian through the building. The hall above is accessed via the escalators or the lift and stair case located next to it.

First floor foyer space of the hall consist of a large open are that connects with a door to the ramp on the northern side of the building. The ramp leads directly to the Day-care centre and continues down towards the pedestrian corridor behind the Louis Pasteur hospital.
The first floor also houses a kitchen and the male toilets. The kitchen is large enough to cater for at least 200 people.

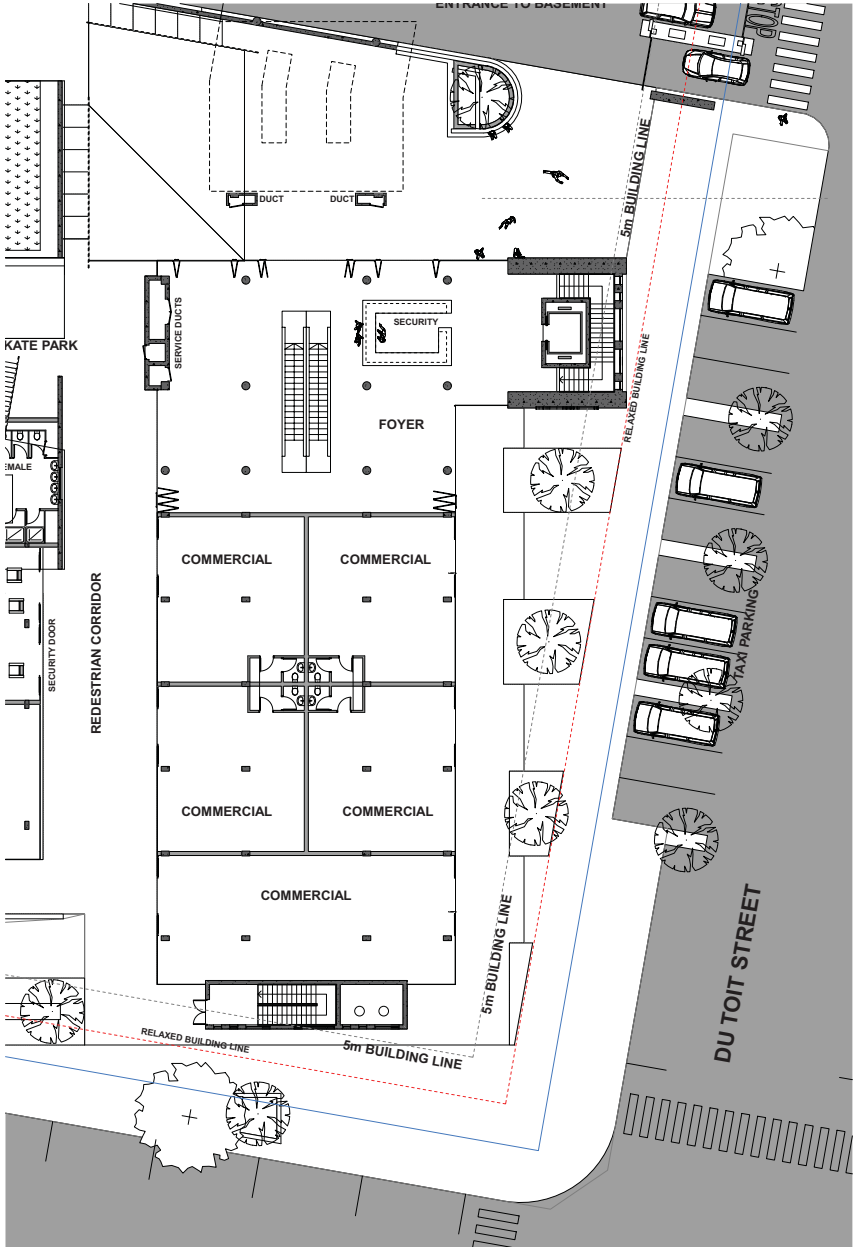
The hall space itself is a large double volume space that is able to house a full size basketball court. The floor surface needs to be a smooth continuous material. Laminated timber decking was chosen.

On the eastern side are recesses in wall containing moveable partition walls. These walls are constructed of a hollow honeycomb timber product filled with sound absorbing insulation to reduce reverberation in the space.
The partitions are suspended from rails mounted to the bottom of the concrete gutters spanning across the hall space. The walls divide the space into four smaller zones. Each zone can accommodate a different activity, for example the hall my be divided into to portion to accommodate two table tennis courts if a tournament is staged. The space can also accommodate temporary class rooms for after school tutoring. Each class would be separated from the other reducing disturbance.

The second floor of the hall consists of built-in seating that is stepped down to the lower floor. The foyer space is occupied with a library that will house reading and research material for the children to use. The books are not allowed to leave the premises, therefore the additional space will accommodate working stations where the books may be used.

The female toilets are also housed on this level, together with a large storage facility to store among other things tables and chairs used in the hall space.

The roof space consist of concrete gutters that span the width of the hall. Along side these are usable concrete roofs that are linked to the indoor entertainment centre with a lounge and staircase on the northern part of the building.
The roof has a 1,2m high parapet wall to prevent children form climbing over and falling.



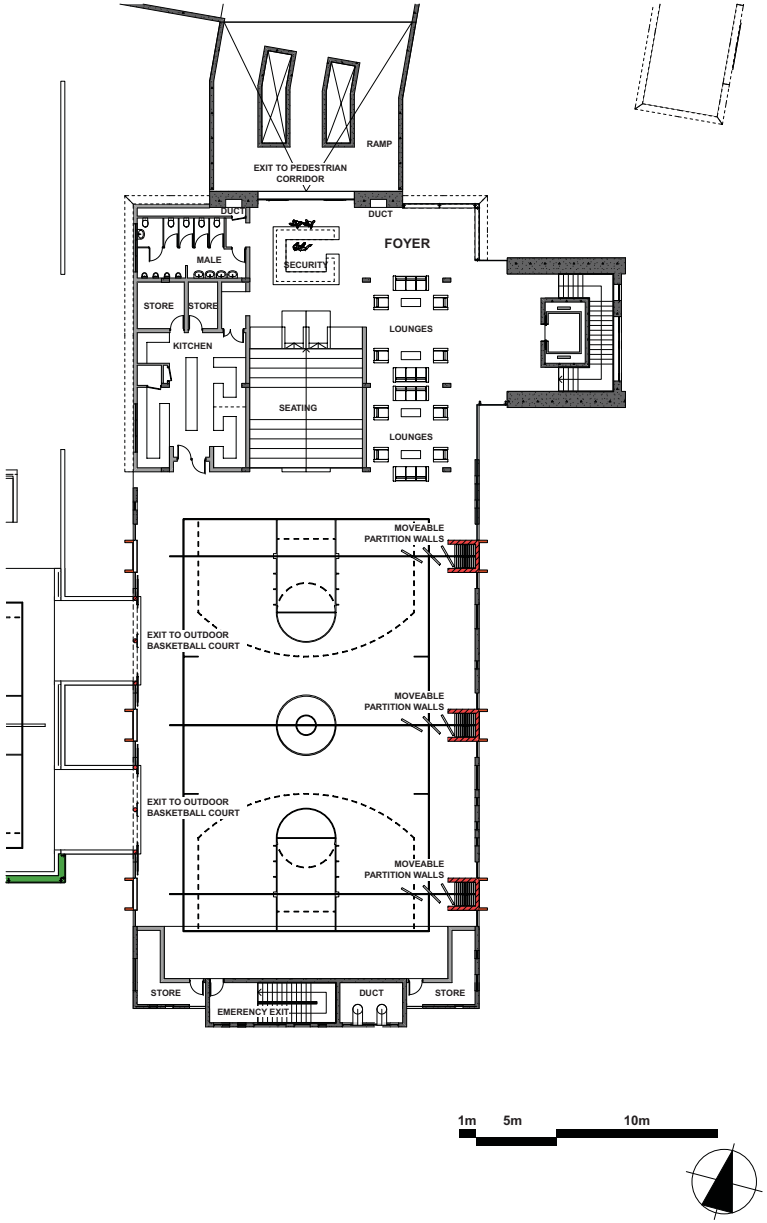


Figure 6-16. Floor Plan of Multi-purpose Hall

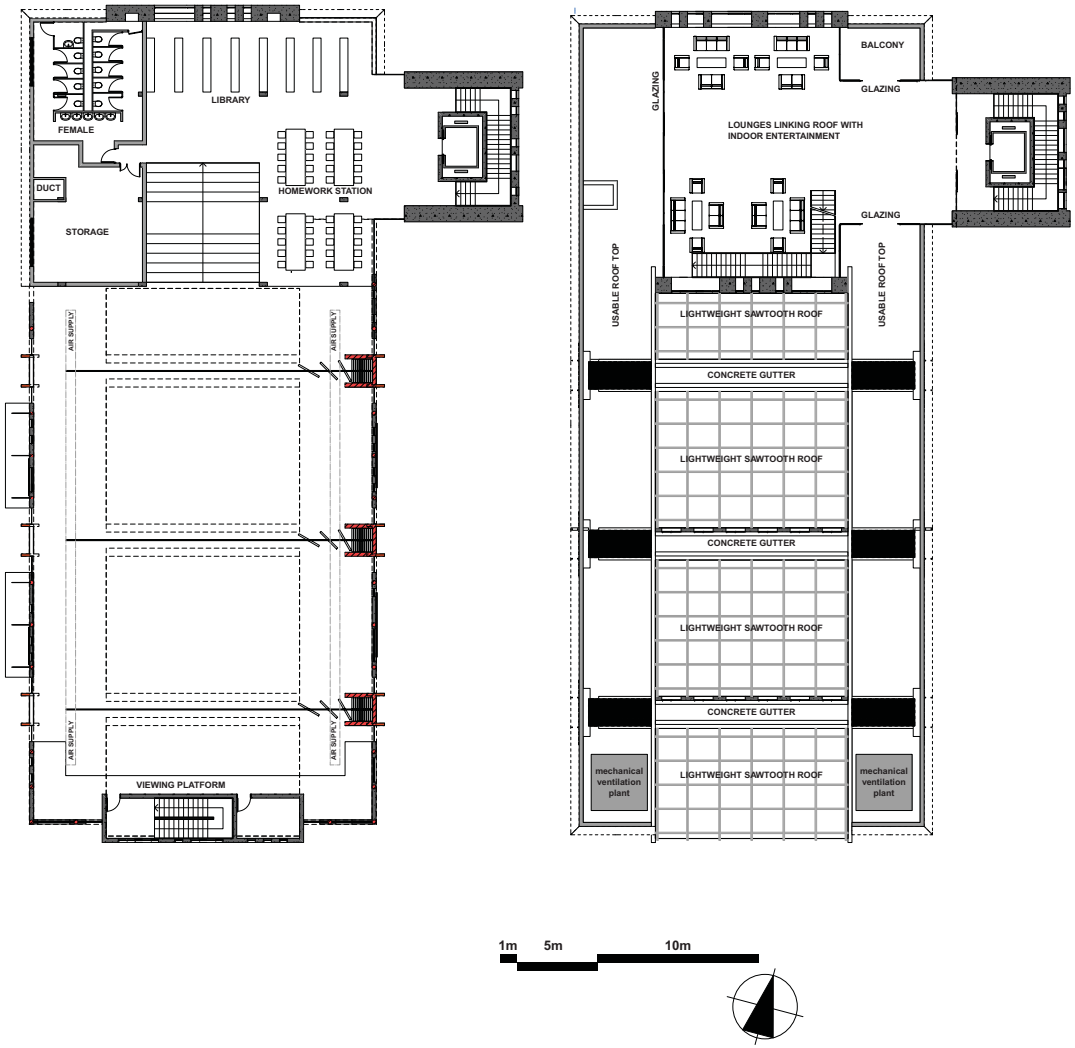


Figure 6-17. Floor Plan of Multi-purpose Hall

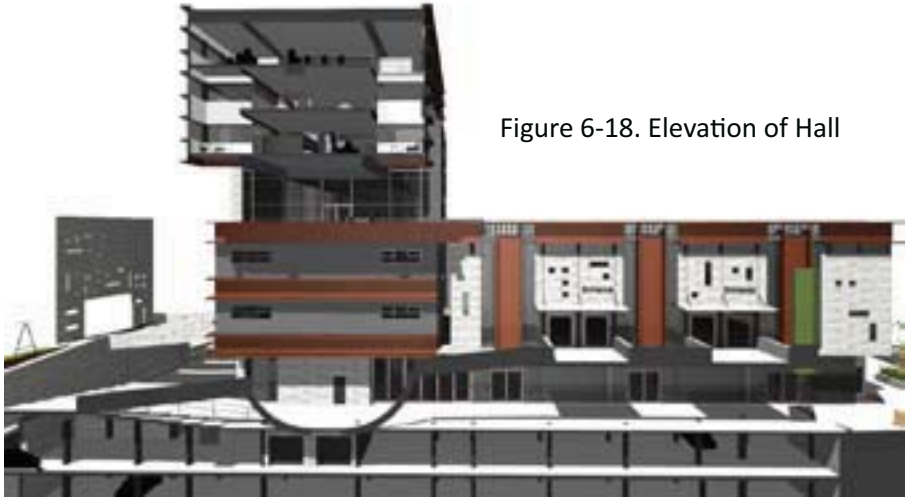


Figure 6-18. Elevation of Hall

Figure 6-19. Internal rendering of hall

Figure 6-20. South Elevation of Indoor Entertainment

6-8 Indoor Entertainment Centre

The building was conceived as a structure on its own. It forms the focal point of the Entire youth centre. The building form consists of a concrete circulation tower on the eastern edge. The building itself wraps around the internal steel structure and continues to wrap around the secondary circulation tower on the western edge. The building is constructed of lightweight materials as far as possible.

The internal spaces are arranged according to function and the need for services. The services run up and down the western circulation core.

The lowest floor that is wrapped around the western tower houses facilities for the staff in the center. It consists of toilets with lockers and administrative offices.

The staff rooms continue through on the next level with more offices arranged around the central stair case. The offices my be converted to private rooms for use by the children. For example, sound proof music practice rooms.

The third level is the first level that runs through the entire length of the building. Around the service core on the western side is the public toilets. These do not have showers.
This can be seen as the base level for the indoor entertainment centre. The functions on this level include Table tennis, Pool tables and lounges for socializing and recreation. There are also several video game consoles distributed throughout. These consist mainly of arcade games.
The area directly above the Hall has a stair case leading down to the roof of the hall. The floor space itself is the central entertainment space. This is where tournaments or special events will be hosted.
Directly adjacent to the eastern circulation tower is the reception/help desk. Manned by technical staff and security.

Moving up one level the space is confined to the width of the steel bridge structure. A thick wall is placed across from the big opening in the northern facade. This wall is to absorb solar radiation and radiate it in the space.
The wall forms a backdrop for a bar. The rest of the floor is occupied with tables and chairs to form a restaurant. The occupants will be able to view the activities happening in the courtyard below through large openings on the south side.
The eastern circulation tower is surrounded by a kitchen that will serve the restaurant. The kitchen is split into 3 portions: Storage and cleaning; Reception; and preparation.

The highest level will be connected with the lower floors by an extra staircase on the southern side of the building. The top floor will contain lounges with Television sets for the purpose of playing Video games. The floor will also have several computer stations. These are to facilitate the need young people have to complete projects on computers. They will also be able to connect to the internet and play games on these computers.
Again there are more private rooms surrounding the eastern circulation.

Figure 6-21.North Elevation of Indoor Entertainment

Figure 6-22. Interior rendering of Indoor Entertainment

Figure 6-23. Interior rendering of Indoor Entertainment

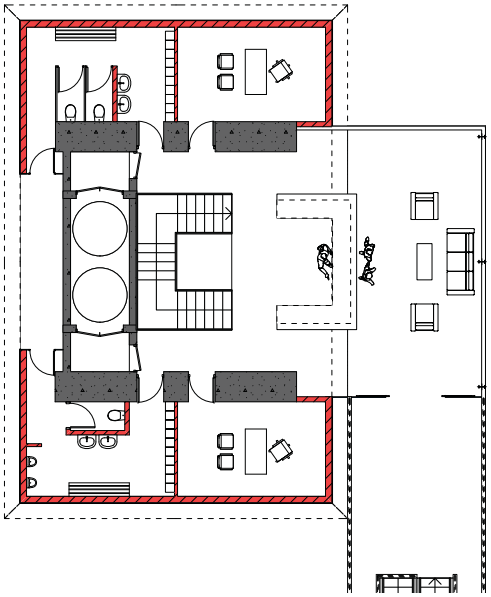


Figure 6-24. Lowest floor plan of Indoor entertainment.
Foyer links directly with walkway across the basketball court

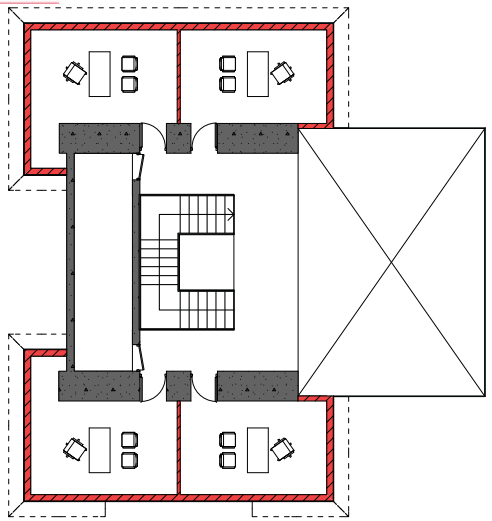


Figure 6-25. Second floor plan of Indoor entertainment.
Private Offices

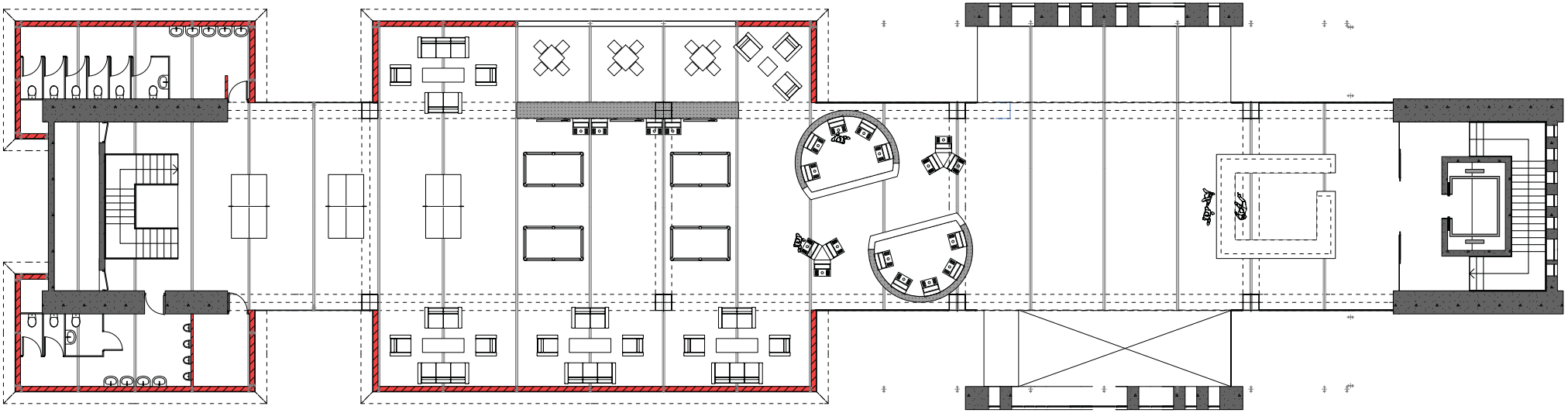


Figure 6-26. Main Activity Floor.
Lounges, Pool tables, Table tennis and arcade games

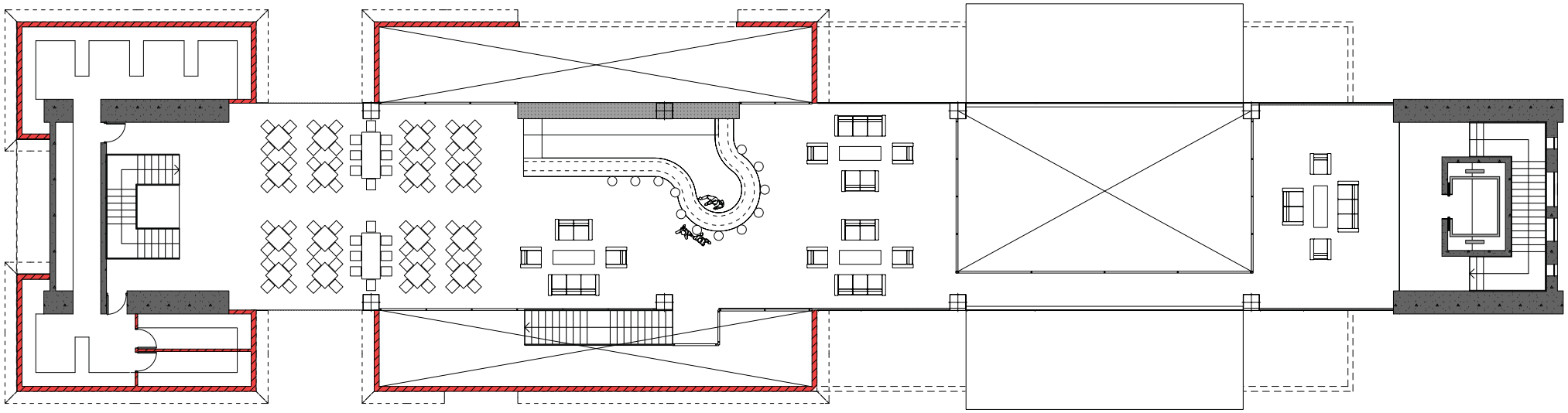


Figure 6-27. Restaurant Floor.

Kitchen, Restaurant and bar with a few informal couches for socializing

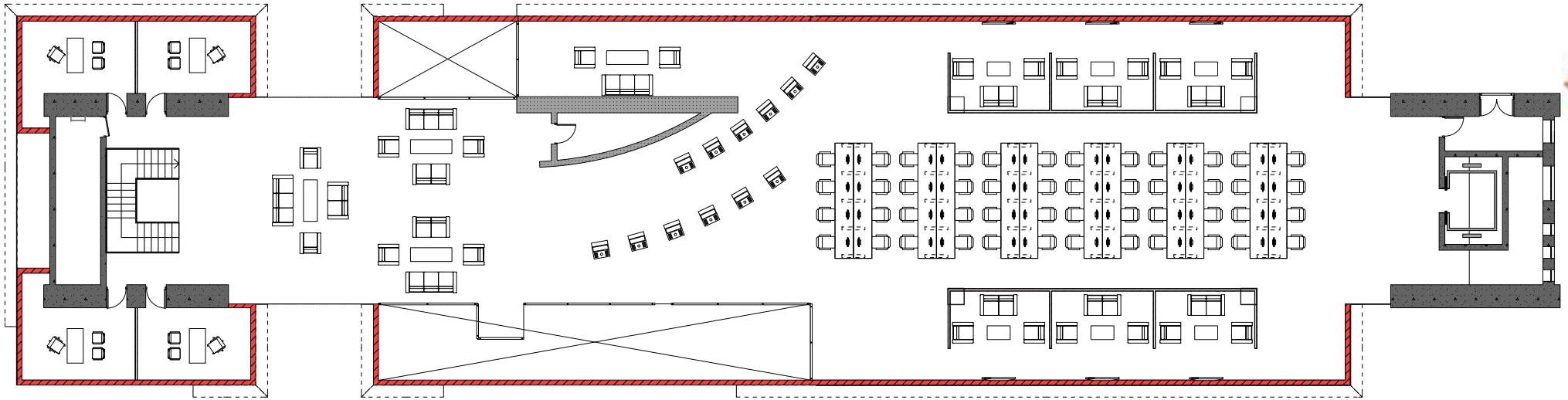


Figure 6-28. Highest Floor.

Open Floor plan with lounges and computer work stations

6-9 Elevations

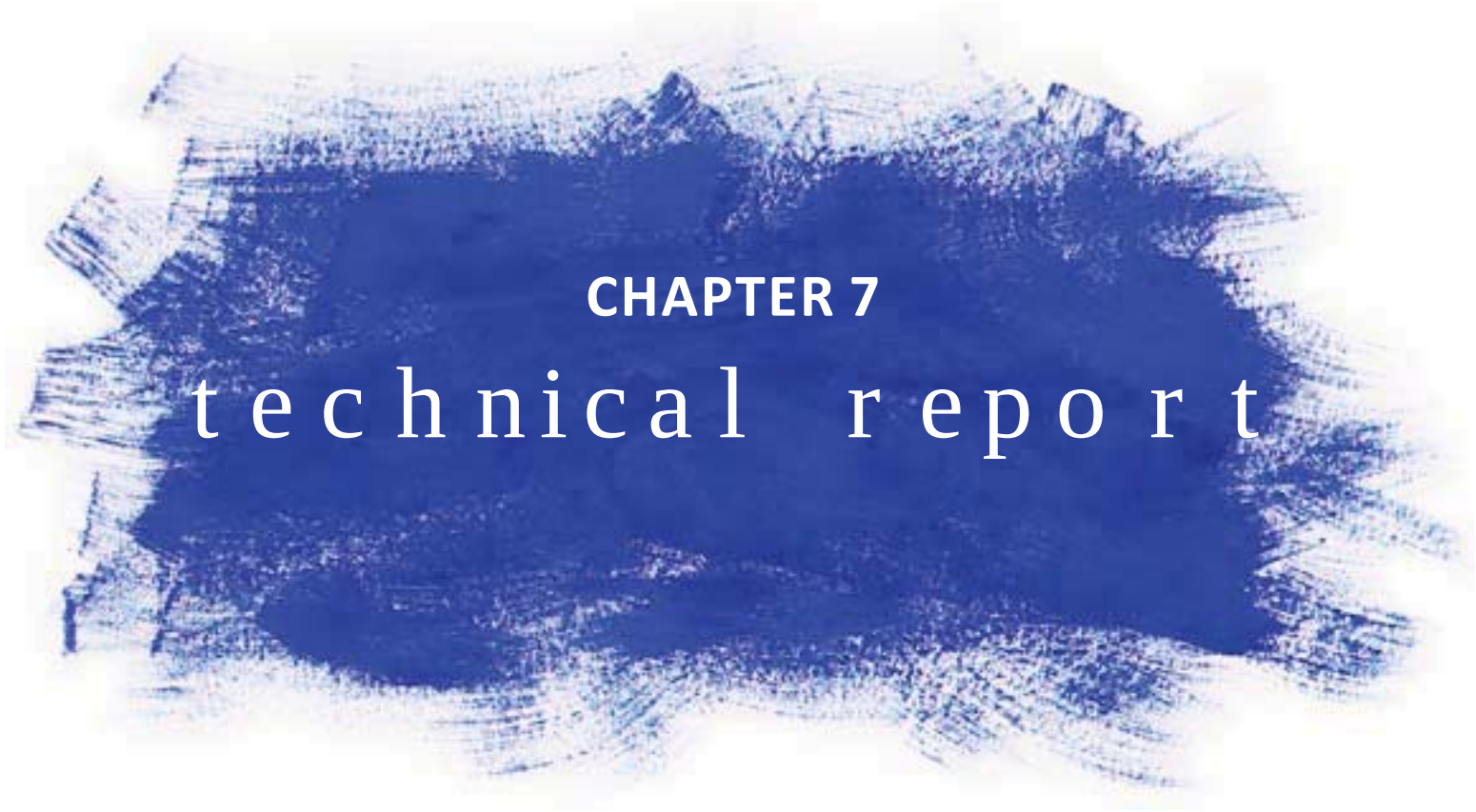
Figure 6-29. East Elevation

Figure 6-30. North Elevation

Figure 6-31. West Elevation

Figure 6-32. South Elevation

6-10 Renderings



CHAPTER 7

technical report

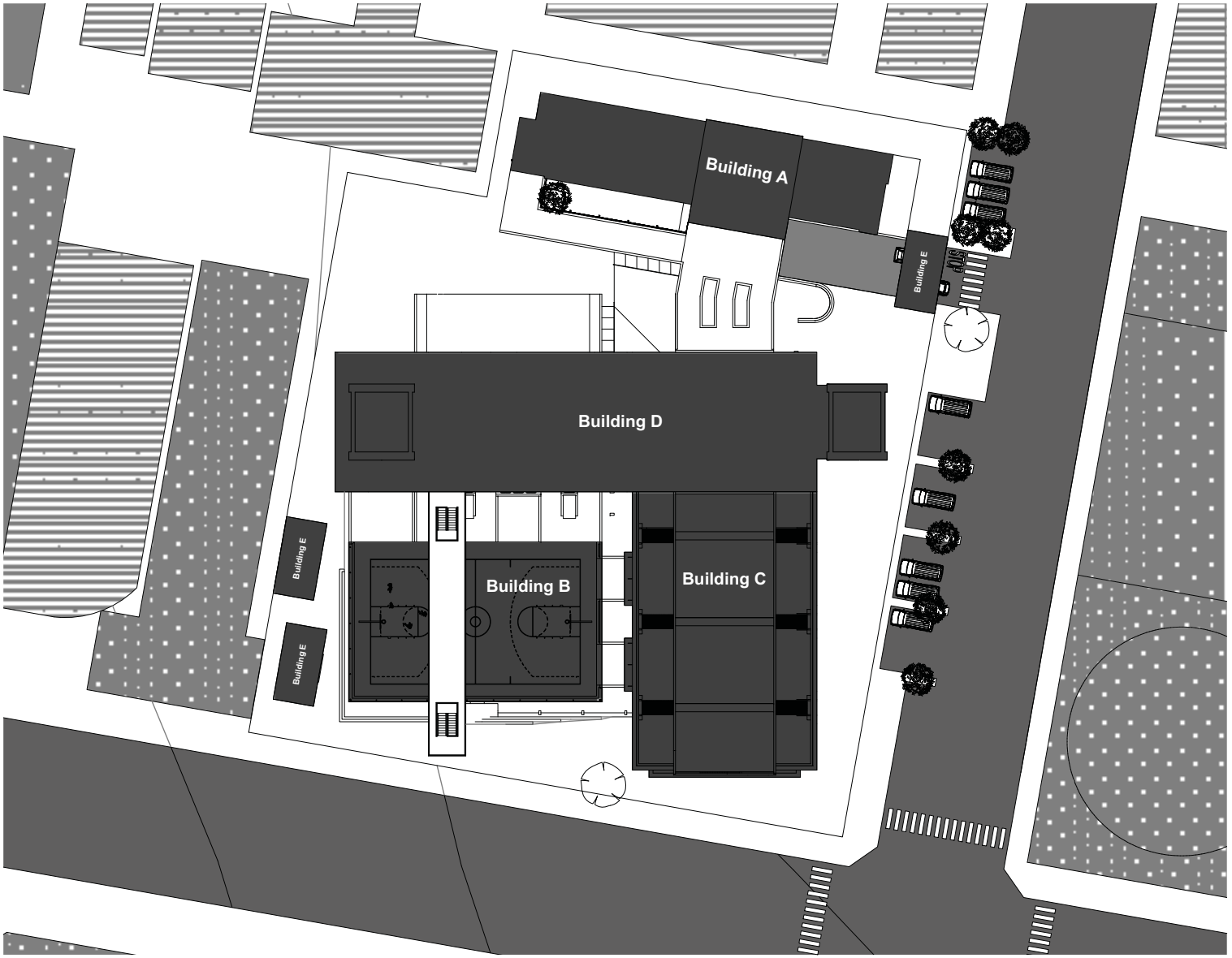


Figure7-1 . Simplified Site Plan

7-1 Report

In order to explain the various structural systems found in the centre, the buildings are broken up into their various entities and explained individually.

A structural overview can be summarized as follows:

- Basement - Reinforced concrete retaining walls, columns and slabs.
- Building A - Load bearing brick walls and reinforced concrete columns and slabs with lightweight cladding and glass infill.
- Building B - Reinforced Concrete columns and roof with brick interior walls and glazed shop fronts.
- Building C - Reinforced concrete columns and slabs with lightweight walls. Roof consists of Sawtooth structure.
- Building D - Reinforced concrete tower structures with Vierendeel Truss in between (Ching 2001; 2.16). The structure is filled in with lightweight walls and floors.

For the tectonic development of the Youth Centre to form an extension of the design the technical aspects were approached with the same principals as the design. The visible structure helps to establish a sense of reality to the otherwise surreal elements of the building.

A continuous structural grid was established by the position of the circulation tower structures of building D, the column grid of the basement and the access to the basement. The column spacing determine the structure for the rest of the buildings.

Cost, thermal and construction methods are factors that were also taken into account while choices were made regarding construction.

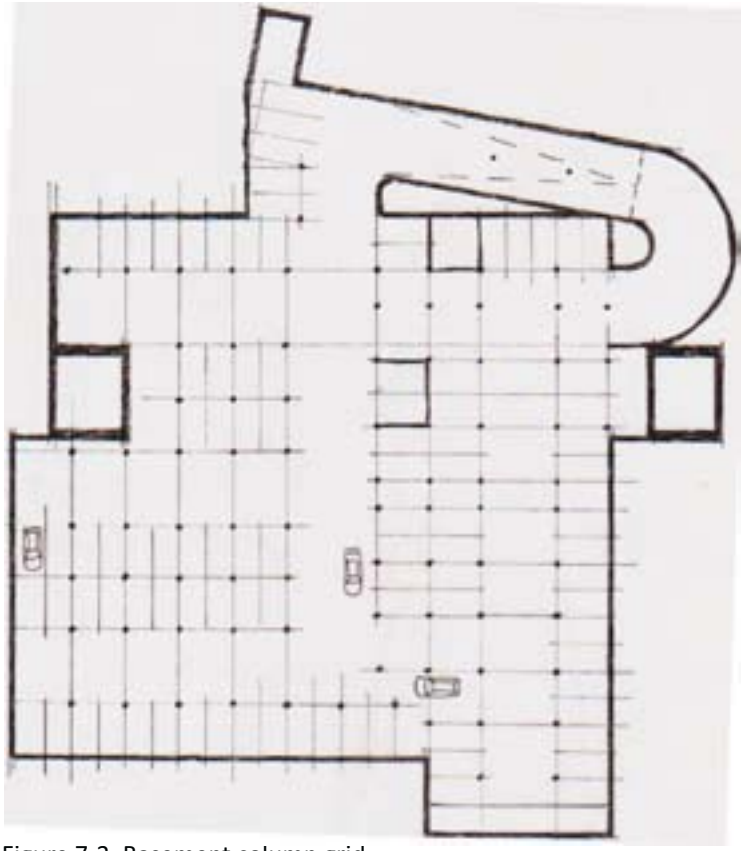


Figure 7-2. Basement column grid

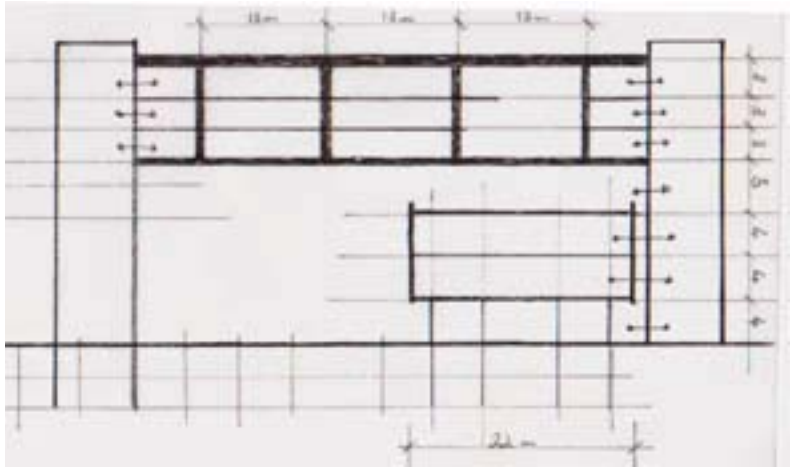


Figure 7-3. Conceptual section

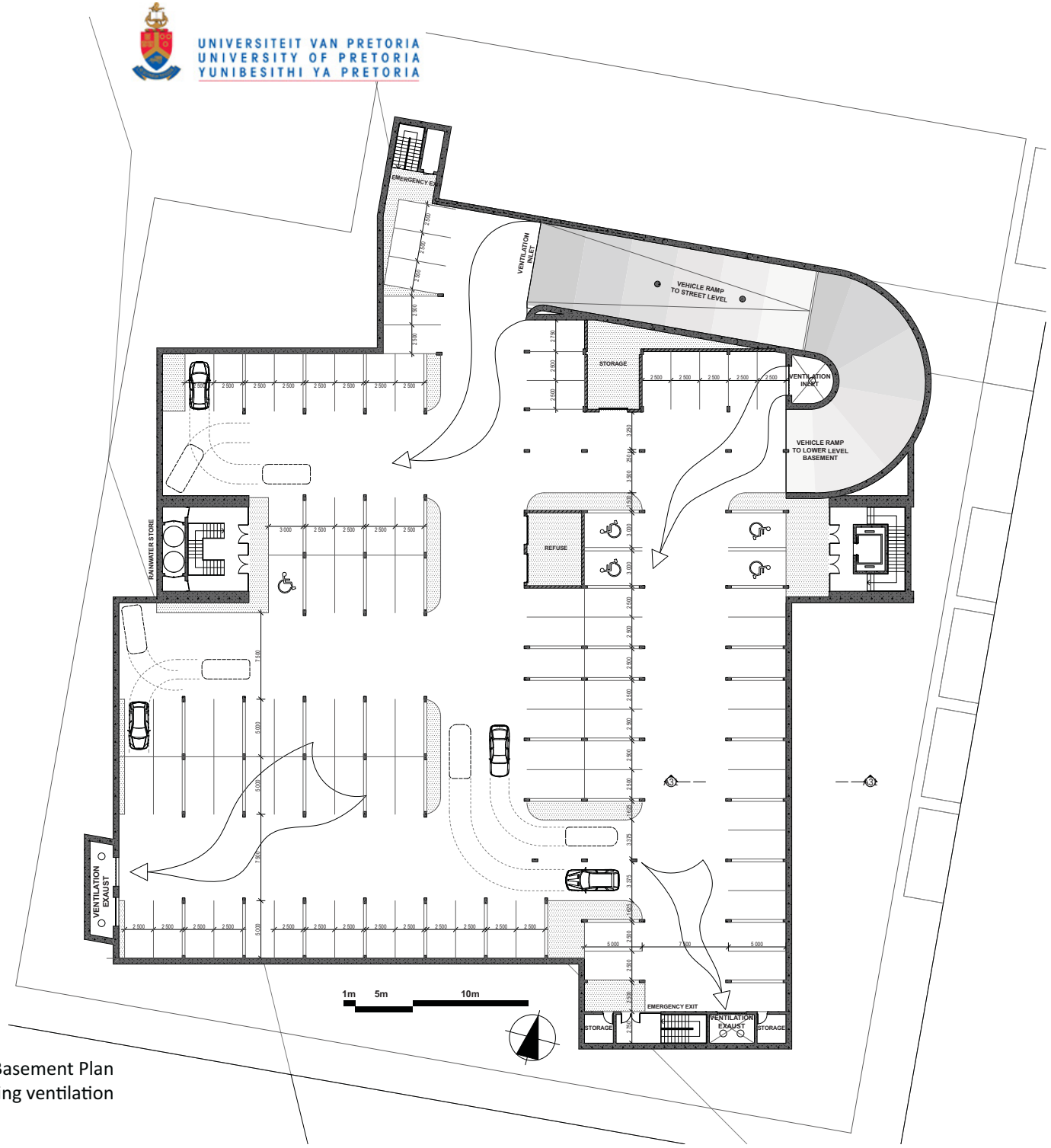


Figure 7-4. Basement Plan showing ventilation

7-2 Basement

The basement is arranged over two levels making it a super basement.
The total depth is 6,5m.

The vehicle access ramp has a gradient of 1:10 making it possible for pedestrians to walk up and down the ramp as well.

The predominant pedestrian circulation happens through the main tower structures of building D. The basement has two additional emergency exits. One in the north-western corner connecting the basement with the day-care facility and one in the south-eastern corner linking the basement with the sidewalk on Schoeman street.

Because of the depth of the structure it will have to be mechanically ventilated. Two exhaust ducts are placed in the southern half of the basement drawing in clean air through the ramp opening and the intake duct located in the northern half of the structure.

The structure of the basement consist of reinforced concrete columns arranged and distributed according to parking bay sizes.
The columns are connected with 550mm deep reinforced concrete beams that are integrated with the floor slabs. The beams reduce the span of the slabs to 5m.

Size of columns and slabs:

Column width = Height / slenderness ratio
= 3000mm / 15
= 200mm minimum

A nominal size of 250 x 500 mm is used.

Slab thickness = Span / slenderness ratio
= 5000mm / 30 (span between beams)
= 166

A nominal depth of 200 mm is used.

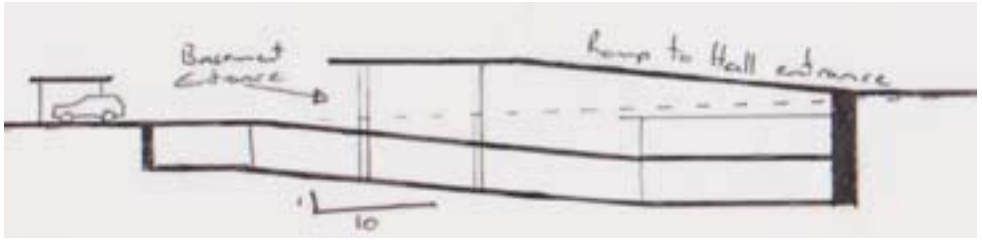


Figure 7-5. Section through vehicular access ramp

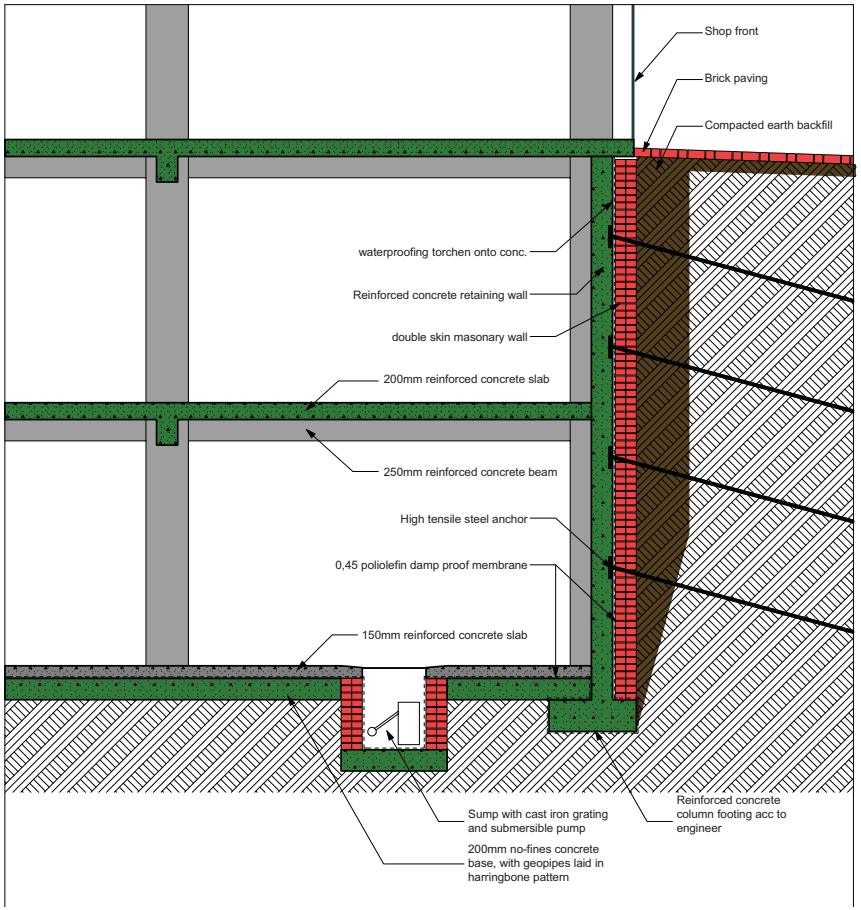


Figure 7-6. Section through basement retaining wall

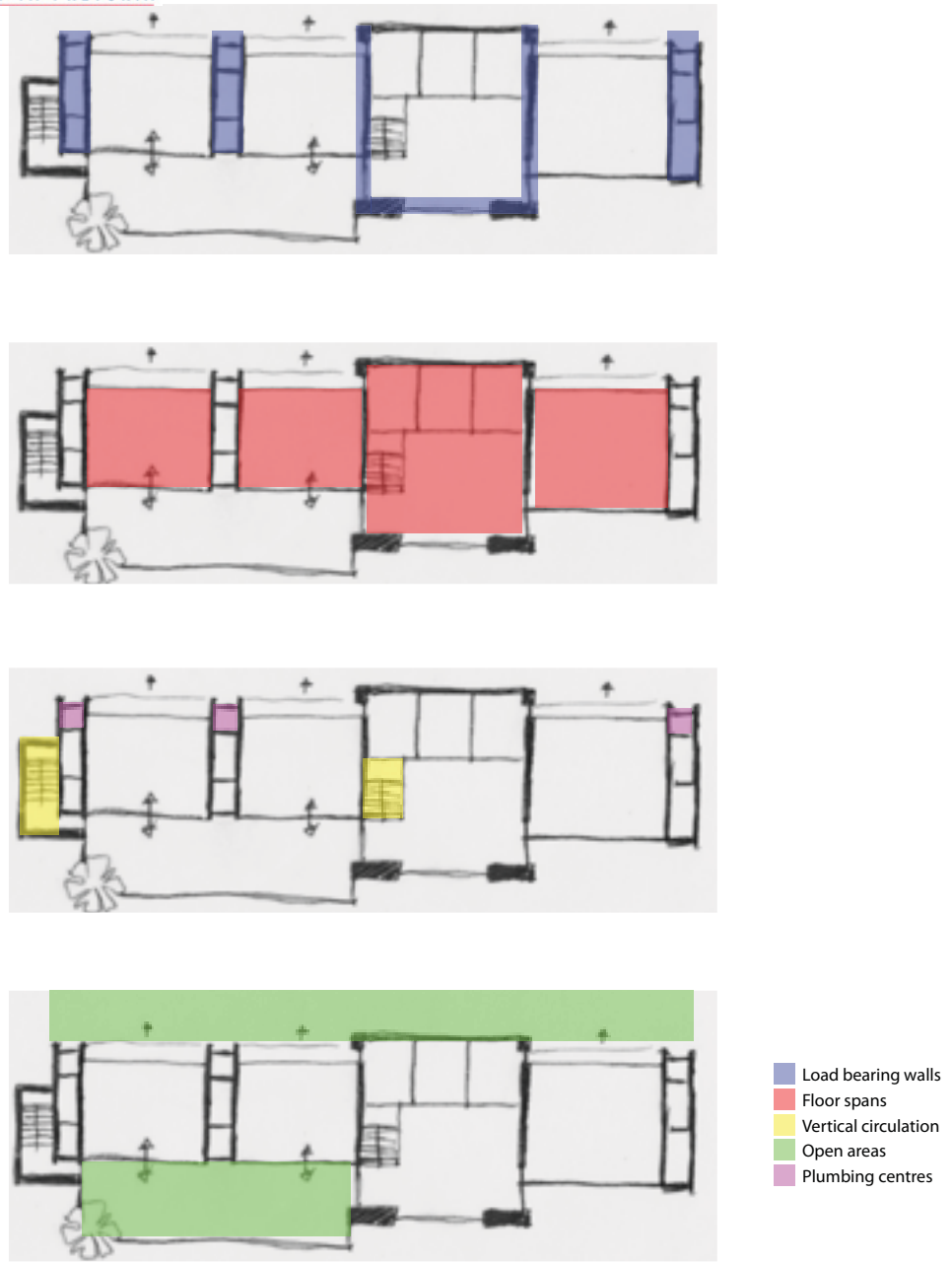


Figure 7-7. Floor diagram of Building A.

7-3 Building A Day-care

The building is predominantly arranged over 3 floors. Load bearing brickwork constructed of double skin brick would be used to support the floors. The floors are constructed of in situ cast reinforced concrete slabs.

Where the span is too wide or the height increases, concrete columns and beams are added for support.

The width and properties of the brick walls will provide enough acoustic insulation between the classrooms.

Interior walls are plastered and painted. The wall exposed to the outside are cladded with either copper or siding.
The exposed concrete structural walls are to be left as untreated off shutter concrete.

The building is naturally ventilated with windows on the northern and southern side of the building creating adequate cross ventilation.

Passive solar heating through the northern glass facades will heat the spaces in cold winter months.

The roof construction is a combination of usable concrete roof gardens and low pitch lightweight steel roofs with chromadeck sheeting.

Size of columns and slabs:

Column width = Height / slenderness ratio
= 3000mm / 15
= 200mm minimum

A nominal size of 250 x 500 mm is used.

Slab thickness = Span / slenderness ratio
= 7000mm / 30 (max. span)
= 233mm minimum

A nominal depth of 250 mm is used.

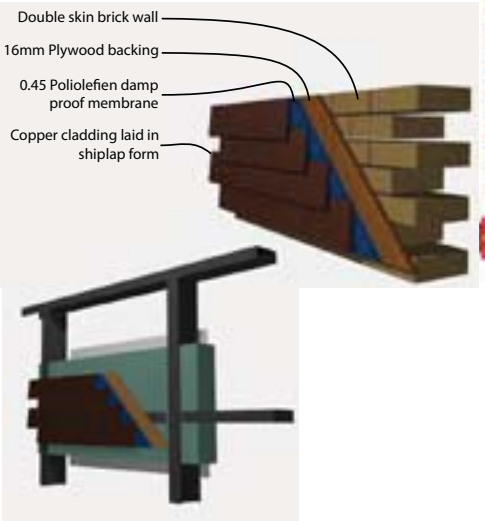


Figure 7-8. Wall construction 3d's

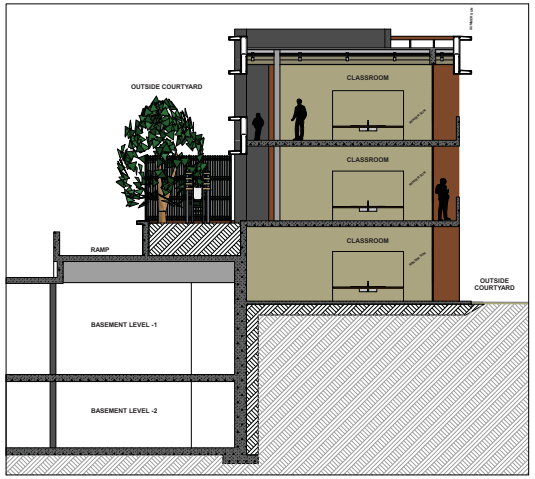


Figure 7-9. Section through day-care facility

Figure 7-10. Plan of Locker rooms

7-4 Building B Commercial / Basketball Court

The building was conceived as a concrete roof with a basketball court on top. The Roof is supported by columns offset from the centre creating a plinth on which the court is placed. A vegetated screen surrounds the basketball court to prevent balls from disturbing traffic on Schoeman street.
A landscaped ramp connects the pedestrian corridor on the northern portion of the site with the basketball court. The Ramp is also constructed of concrete. Corresponding with the columns in the basement for support, planters for trees are added to the ramp.
The mouldable characteristic of concrete made it the ideal material choice for the construction of a practice skate park's half pipe within the sloped ramp.

Ventilation of the commercial spaces may are predominantly natural, with mechanical extraction in kitchens and bathrooms.

Size of columns and slabs:

Column width = Height / slenderness ratio
= 4200mm / 17 (small load capacity)
= 250mm minimum

A nominal size of 250 x 500 mm is used.

Slab thickness = Span / slenderness ratio
= 7000mm / 30 (max. span)
= 233mm minimum

A nominal depth of 250 mm is used.
The exterior screed, waterproofing and floor finishes increases the floor thickness to 350mm.

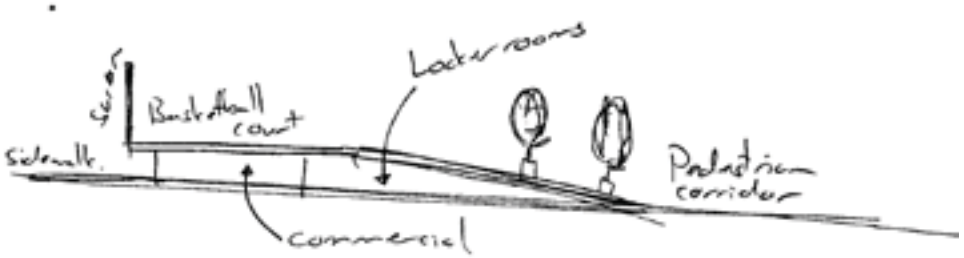


Figure 7-11. Concept Section

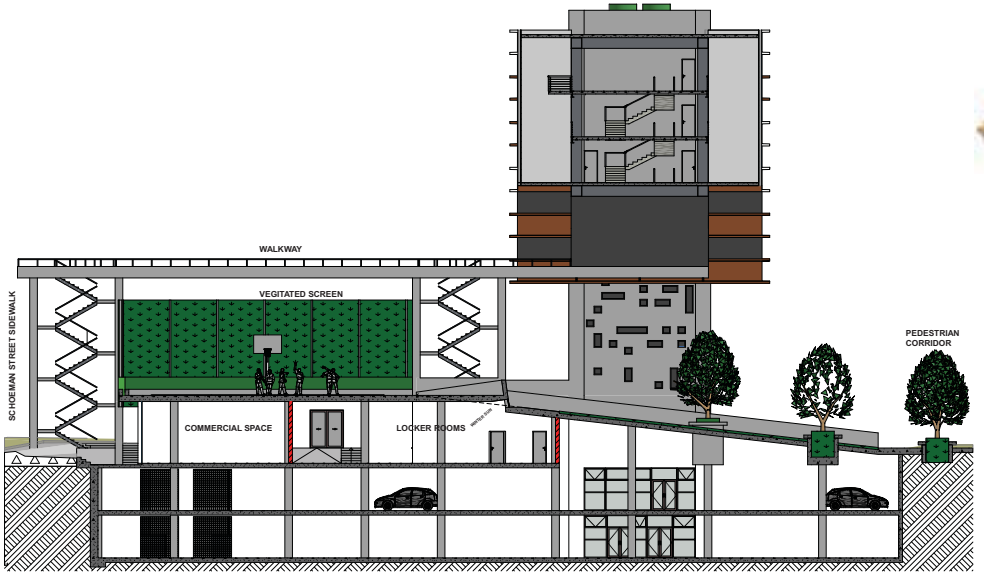


Figure 7-12. Section

7-5 Building C Multipurpose Hall

Centered around the main space on the first floor the structure differ from one level to the next.

The ground floor commercial is constructed of concrete columns with double skin brick infill and glazed shop fronts.
The wall layout and structural grid is imposed by the column grid of the basement and the floor layout above.

The Hall space on top of the commercial consist of a laminated timber floor on top of the concrete structure. The walls are constructed of reinforced concrete with glazed infill panels.
The movable interior partition walls are constructed of a lightweight honeycomb structural timber product. The walls are suspended from rails fixed to the roof structure.

The roof consist of usable concrete surfaces and lightweight sloped roofs that provide ventilation and light to penetrate the space from above.

A system of concrete box gutters span the width of the hall space. These gutters form the support structure of the lightweight roof structure as well as the partition walls in the hall.

Size of columns and slabs:

Column width = Height / slenderness ratio
= 4200mm / 15 (small load capacity)
= 280mm minimum

A nominal size of 300 x 500 mm is used.

Slab thickness = Span / slenderness ratio
= 7000mm / 30 (max. span)
= 233mm minimum

A nominal depth of 250 mm is used.
The interior floor finishes increases the floor thickness to 450mm.

7-6 Building D Indoor entertainment

The Building is constructed with a fixed hinde vierendeel truss. The structure of the building span 52m and is bolted to the concrete towers. The sections consist of 700x700 square tubes manufactured to a length of 13m. The different sections are welded in place on site.

The floor is constructed of 250 I-sections that span across the width of the building. Lightweight Q-deck concrete floors are placed between the I beams to create a level floor.

The roof is also constructed of Q-deck concrete. There are water tanks placed on the building to provide the building with enough water pressure. There are also solar water heaters placed on the roof the minimise the need for electricity to heat water.

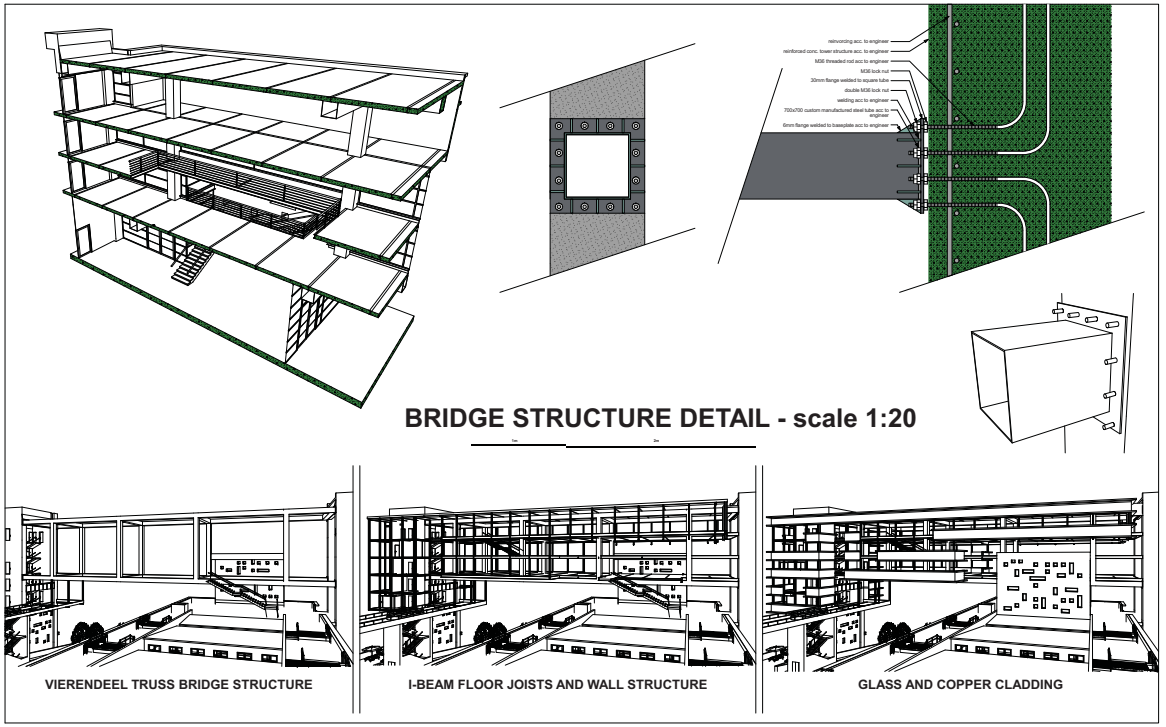


Figure 7-13. Structural system of indoor entertainment

7-7 Materiality

Reinforced Concrete:

Reinforced concrete will be the predominant structural material for the majority of the building. Only the bridge structure (building D) is not constructed of concrete.

Off-shutter concrete is a robust material that requires little to no maintenance, therefore, the visible concrete surfaces like the balustrades, walls and columns will be left unfinished off shutter concrete.
Concrete has the ability to portray the construction process. The use of timber shuttering will give the concrete a distinctive texture, providing a tactile human quality to the otherwise sterile and mundane surfaces.
The plasticity of concrete makes it the ideal material choice to construct the complex forms of the pedestrian ramps and skate park found in the exterior spaces.

Figure 7-14. Example of concrete constructed in timber casting shutters.
http://fazyluckers.com/

Steel:

Steel is used throughout the complex as support structures for skins and walls.

The steel elements found inside the structure consist mainly of the lightweight infill walls. The walls consist of a cladding system comprising of either an I-beam substructure with lipped channel infill panels or a complete lipped channel sub-structure, depending on the application.
The substructure is cladded on the inside with gypsum dry walling, and copper plate on the outside. The internal cavity is filled with fibre wool insulation.

The lightweight roof found on the hall and day-care centre is also constructed of a steel substructure

The characteristic of steel structural design makes it possible to adjust the structure on site if necessary. The steel portions may even be disassembled and re-configuerd in the future if the building needs to adapt.

Figure 7-15. Tree House by Architects Van Der Merwe-Miszewski Architects.
Showing Qualities and properties of steel.
http://cybercapetown.com/TreeHouse/

Copper:

Copper has been used in the construction industry for centuries. The material require very little maintenance and it is vey durable. The design and installation need to be verified by a specialist to ensure high quality, durability and a long lasting installation.

The copper is fixed to a 16mm plywood timber backing by either cleating, nailing or screwing. The timber panels are fixed to the substructure. Copper panels can be pre-manufactured on the timber panels with minor adjustments and alterations done on site to construct the building.

All fasteners like screws and nails should be constructed of copper, a copper alloy or another neutral metal alloy to prevent chemical reactions.

The majority of buildings surrounding the youth centre consist of dark brown face brick. The colour and weathering characteristic of copper fits in with this context. Initially the copper will appear to be shiny, therefore large surfaces of cladded copper was avoided. If left unprotected the metal will oxidize to create a dark brown colour blending in with the context nicely.
The Pretoria climate is ideal for copper since copper will weather slowly and keep its dark brown color for decades to come. When the copper starts to turn green the decision should be reviewed to leave the copper unprotected or to cover it with a protective coating.

Copper is mined relatively close to the site. Phalaborwa, reducing transportation costs, making a suitable sustainable material when compared to stainless steel and aluminum wall cladding.

Figure 7-16. Aged dark brown Copper cladding.
http://www.roofer.co.nz/photos_-_architectural.html

Figure 7-17. Newly installed shiny copper. h
ttp://www.socketsite.com/17th_and_clayton.html

Figure 7-18. Photo's of dark concrete buildings surrounding the site.
Source Author

Glass, glazing and frames:

When the choice of glass was made the context was considered.
The most prominent use of glass in Pretoria is probably the Reserve bank with its black glass facade

The private spaces of the Youth centre is glazed with a dark tint glass. The dark glass aids in the reduction of glare on electronic devices used in the internal spaces. The characteristic of dark glass to be translucent only from the inside during the day provides privacy for the internal spaces.

The expansive use of glass creates visual connections that merges the inside of the building with the outside. When outside the building forms a backdrop for activities to occur.

The ground floor commercial will use fully translucent glass panes for visibility into the spaces. The lack of a visual barrier aids in the attempt to make the building float or hover above the ground.

New technologies in glass manufacturing has produced new high performance glass products that aid in the energy efficiency of a building.
Glass still needs to be protected form harsh sunlight conditions.

Aluminum window frames will be used throughout the scheme. The material has a long life span and requires a lot less maintenance that other window frame material options. The design options when using aluminum are wider than when using steel. Doors, could be hinged, sliding or sliding stacking depending on the application. Aluminum frames and mullions are easy to manufacture in custom sizes and can be fitted on site to ensure accurate installations.

Figure 7-19. Photo of Reserve Bank. Prominent glass structure close to the site.
Source Author

Floor finishes:

Throughout the project different floor surfaces are used. The materials create separate spaces and define the difference between movement routes and interior spaces.

The commercial spaces on ground floor are to be tiled according the tenant's specifications.
The public areas leading to the commercial are subject to heavy foot traffic and needs to be robust.
The exterior pathways are finished with a combination between a 50mm power floated in situ casted concrete screed and brick pavers. The concrete finish may be pigmented in certain areas.

The Hall needs to have a seamless floor surface that provides enough friction to be used for sporting activities. The surface needs to be robust to withstand the wear and tear of furniture being moved around on the surface. A laminated timber floor placed on the concrete slab was chosen. The final specifications and installation needs to be done by a specialist.
The indoor entertainment centre require a lightweight floor finish, ruling out concrete or tiles. A combination between a laminated timber floor and carpets are used to reduce noise reverberation in the space.

Figure 7-20. Examples of concrete paving bricks

Figure 7-21. Example of colour stained concrete.

Brick:

Brick is one of the most used materials in the South African building industry. The construction process does not require high skilled labour making it an ideal choice for a building in the South African context.
It is a relatively sustainable material manufactured locally with a low embodied energy and long lifespan. Brick provides good thermal massing ideal for the South African Climate.
The brick walls used throughout the scheme are to be plastered and painted.

Sound Proofing:

Where nessasery Sonex sound proofing foam will be installed. This is a high density foam that both dissipates and absorbs sound energy. The lightweight walls in the hall will be filled with the foam. the spaces below the floor board are also to be filles with the foam to reduce sound transmition between the hall and the commercial spaces below.

The walls of the indoor entertainment centre may also be filled with a layer od Sonex foam.

7-8 Security

Security is one of the biggest concerns faced in a building of this type. The central courtyard is surveilled by people in all the surrounding buildings. Although direct access in case of emergency is not always possible a visual connection prevents unwanted behavior.

Fencing off the entire complex would prove difficult and impractical since there is a pedestrian corridor running through the site.

The smaller children housed in the day-care centre are the most vulnerable to security treats. Therefore the day-care centre's courtyards are to be fenced off. These courtyards are also surveilled by teachers in the adjacent class rooms.

The commercial spaces on ground floor is open to the public. The security of these enterprises are to be handled privately. The more private interior spaces of the youth centre would be accessed by passing a reception desk or an electronic access door. The security guard manning the desk is responsible for preventing uninvited attendants.

7-9 Fire Strategy

As the Youth center is a open public building, a fire strategy needs to be implemented. In the case of a fire all occupants need to exit the building easily, and if possible the fire should not spread throughout the building.

A fire strategy specialist will have to be appointed to ensure that an adequate fire plan is developed and implemented.

The National Building Regulations (NBR) contains guidelines on how to design a building for fire safety. These regulations were analyzed and implemented, but the fire strategy specialist needs to confirm that these principals are adequate.

Travel distances to escape doors are to be less then 45m. The portions of the complex that is more than 3 floors high must have at least 2 emergency escape routes. The materials framing the escape routes are to have a fire resistance rating of more than 120 minutes.

The bulk of the structure is constructed of reinforced concrete and steel. Concrete has an adequate fire rating, but the steel element will have to be covered with a coat of intumescent base paint.

The basement has four emergency exits as well as the vehicular ramp. The fire extinguishing system will make use of a water sprinkler system. The water tanks located in the western tower of building D (figure---) will provide enough water and water pressure. A minimum amount of water will always be required for the functions in the facility therefore water will always be available.

The hall space also has 4 emergency exits. A sprinkler system should be adequate to extinguish a fire. The addition of dry chemical and fire hose reels should prevent fires form burning out of control.

The day-care centre has 2 escape routes. In addition most of the classrooms and indoor spaces have direct access to an open courtyard, where the children may gather safely.

The indoor entertainment center contains a lot of electronic equipment like computers and video game consoles. The use of sprinkles are not ideal, as this may cause electrical shortages and damage to property.
A carbon dioxide system will be used. The system flushes out the oxygen in a room extinguishing a fire without the need to clean up water, foam or dry chemicals afterwards. The size of tank required needs to be calculated by a specialist.

While the system is deployed people in the space my experience shortness of breath. The rooms need to be well ventilated before they may be used again.

Figure 7-22 - Sprinkler

Figure 7-23- Fire Hose Reel

Figure 7-24- Fire extinguisher

Figure 7-25- CO2 fire extinguisher

7-10 Water Usage

Water requirement within centre.

Catchment:
Roof area of Indoor Entertainment: 850m2
Precipitation average annual in PTA: 674mm
Run off Coefficient: 85%

Calculation:
Harvest Area x Monthly rainfall x run off coefficient = harvested water per month.

Fixture	Amount	Use (L)	Avg. Usage	Total
Toilet	51	9	5.5	2524.5
Urinal	11	3	6	198
Wash basin	44	3	10	1320
Shower	9	40	10	3600
Cleaning	-	5	20	100
				7742.5

850	catchment
365	days per year
30.4	avg days per month
7750	L per day required
235600	L per avg month

	Rain (mm)	Harvested water (L)	Requirement	Difference
Jan	136	115600	235600	-120000
Feb	75	63750	235600	-171850
Mar	82	69700	235600	-165900
Apr	51	43350	235600	-192250
May	13	11050	235600	-224550
Jun	7	5950	235600	-229650
Jul	3	2550	235600	-233050
Aug	6	5100	235600	-230500
Sep	22	18700	235600	-216900
Oct	71	60350	235600	-175250
Nov	98	83300	235600	-152300
Dec	110	93500	235600	-142100

Supply for all the plumbing fixtures in the centre

The conclusion can be drawn that the centre will not be able to supply its own water. The rain water is not suitable for consumption if left untreated.
The harvested water may be filtered and used for flushing the toilets. The building should be able to provide enough water for the summer months, but the system will need to be filled with municipal water during winter months.
This is not the ideal but it will reduce the pressure on the municipal system.

Jan	136	115600	76760	38840
Feb	75	63750	76760	-13010
Mar	82	69700	76760	-7060
Apr	51	43350	76760	-33410
May	13	11050	76760	-65710
Jun	7	5950	76760	-70810
Jul	3	2550	76760	-74210
Aug	6	5100	76760	-71660
Sep	22	18700	76760	-58060
Oct	71	60350	76760	-16410
Nov	98	83300	76760	6540
Dec	110	93500	76760	16740

Supply for all the toilets in the centre

7-11 Solar Gain and Incidence

Solar radiation consists of short wave or high frequency energy. When this energy hits a surface the properties of the material will determine if the radiation is absorbed or reflected. When the energy is absorbed it needs to re-radiate after a while. The thermal mass and density properties of the material determine how long after absorption occurred, re-radiation occurs. (Givoni 1969:208)

New and shiny copper cladding will reflect a great portion of the energy radiated on it, but as copper weather and becomes darker and matte the material will absorb most of the energy radiated on it. The thickness or mass of the material cause it to radiate energy outward almost immediately.

Concrete absorbs a lot of the energy radiated on to it. The mass cause the material to retain the energy for a fairly long period and then radiate it. This is called thermal lag. As a general rule the heat gained during the day would be radiated during the colder temperatures found at night.

Glass is a unique material, it reflective, transparent , but it also has mass. When the above mentioned high frequency energy hits a glass surface, some of the radiation is reflected. The mass absorbs some energy, while the most energy travels through the glass and is transformed form short wave to long wave energy.

Long wave or low frequency energy can not pass through glass. The energy is trapped inside the space resulting in the 'green house effect'. Different glass types has different properties regarding reflection and transparency, but as a general rule it is important that the glass should be protected from direct sunlight.

There are three simple techniques for reducing heat gain on surfaces. They all relay on the idea that the surface should be shaded during the critical parts of the day:

1. Building or roof overhang
2. Placement of horizontal louvers on the northern facade.
3. Placement of vertical louvers on the eastern and western facades.

The building predominantly makes use of overhangs created by the wall structure. There is situations where vertical louvers are necessary to protect the glass.

7-12 Orientation

The proposed site for the Youth Centre is not ideal when solar orientation is concerned. The site is predominantly in a north-south direction creating large east and west facades.
The building is designed to minimise the east and wet facades, by breaking the building up into different elements.

The Day-care centre is orientated correctly with large openings on the northern side and concrete walls on the eastern and western sides to absorb the unwanted morning and afternoon sun.

The Multi-purpose Hall is orientated wrong, therefore the building has small openings on the eastern and western sides. The building will also benefit form the built up form surrounding the site. The low morning and afternoon sun will be obscured for large portions of the morning and afternoon by adjacent buildings.
The roof of the building opens up to the south with a sawtooth roof structure.

The indoor entertainment centre is placed in a predominant east west direction. The cladding structure of the building provides shading on the facade for the greater portion of the day. The ends of the building is characterized by structural concrete towers. This mass of these towers will absorb the energy and radiate it to the inside during the cooler temperatures.

The outdoor basketball court receives solar radiation from above since it is in the shadow of the indoor entertainment centre.

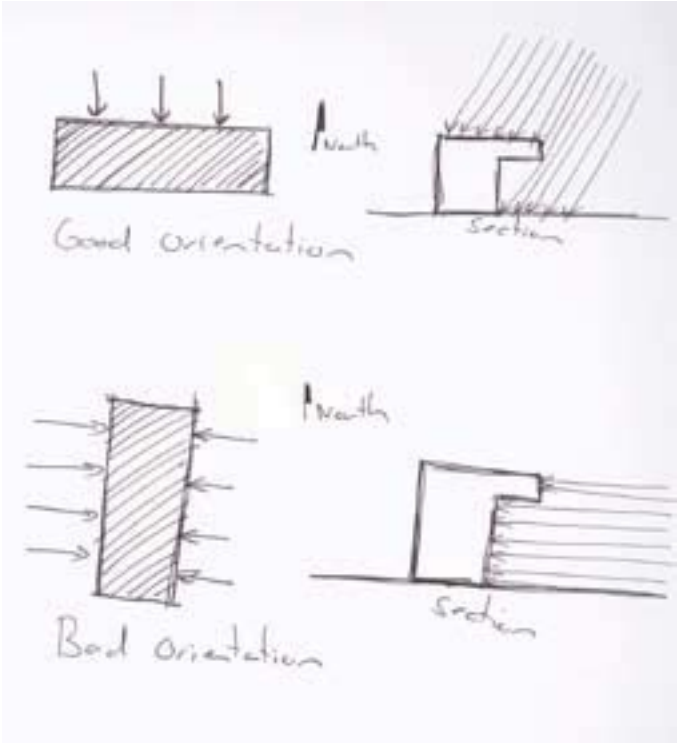


Figure 7-26 Good vs. Bad Orientation

7-13 Ventilation

The centre consists of a combination of different buildings, each with its own function and different ventilation requirements. Therefore each space would be heated or cooled in a manner that is best suited to create an optimal indoor micro-climate for each particular space. This should reduce the energy consumption of the building.

The basement as discussed earlier will be using mechanical ventilation pumps to ventilate the air. The pumps are there primarily to ventilate exhaust gasses out of the space and to draw in fresh air. The temperature in the space do not need regulation as this is not a habitable space. If extremely high temperatures do occur the intake ventilation pumps may use evaporative cooling radiators to cool the incoming air.

The Day-care centre will not be using mechanical ventilation. The spaces are only 7,5m deep at most. The space will be cross ventilated and large windows on the northern side should provide enough solar heat gain during winter months.

A mechanical ventilation system will be installed in the ceiling space of the commercial spaces on ground floor. These will consist of split air conditioning systems to control the spaces individually. However, the spaces should have enough natural ventilation to minimise the use of the air conditioners.

The Locker rooms and bathrooms will need mechanical ventilation. The spaces will be ventilated by extracting the hot air. The skylights that protrude the concrete ramp will accumulate the hot air naturally. An extraction fan inserted in the glass will provide sufficient extraction. This induced stack effect will lower the pressure inside the space encouraging fresh air to enter the space. During colder months the extraction may be halted for portions of the day to allow the spaces to heat up naturally.

The function of the Hall will lead to a large number of people to gather in the space during different times of the day. The space is quite large will not heat up easily, but the size and volume justifies the use of a mechanical ventilation system.

The system will be housed on the roof of the hall and feed the conditioned air into the space through vents placed in the roof space. The intake vents should be positioned to prevent the accidental intake from the basement's exhaust ducts. The air conditioning units must be isolated from the concrete roof structure to prevent the vibration and sound resonance from penetrating the space.

For safety reasons it has been decided that the Indoor entertainment centre will be mechanically ventilated. The space have openable windows, but these are only to manipulate the air movement in extreme circumstances. The ventilation plants are situated on the roof and provide ventilation directly to the space below. Due to the use of several electronic devices in the space, evaporative cooling could not be used. The humidity has to be controlled and kept at a minimum to prevent damage to equipment.

7-14 Sustainability

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The building was design and evaluated repeatedly. The standard against which the building was measured is based on the Sustainable Building Assessment Tool (SBAT) rating system.
The assessment tool was developed by the CSIR and it relates very well to the South African context and promote or encourage issues of sustainability.

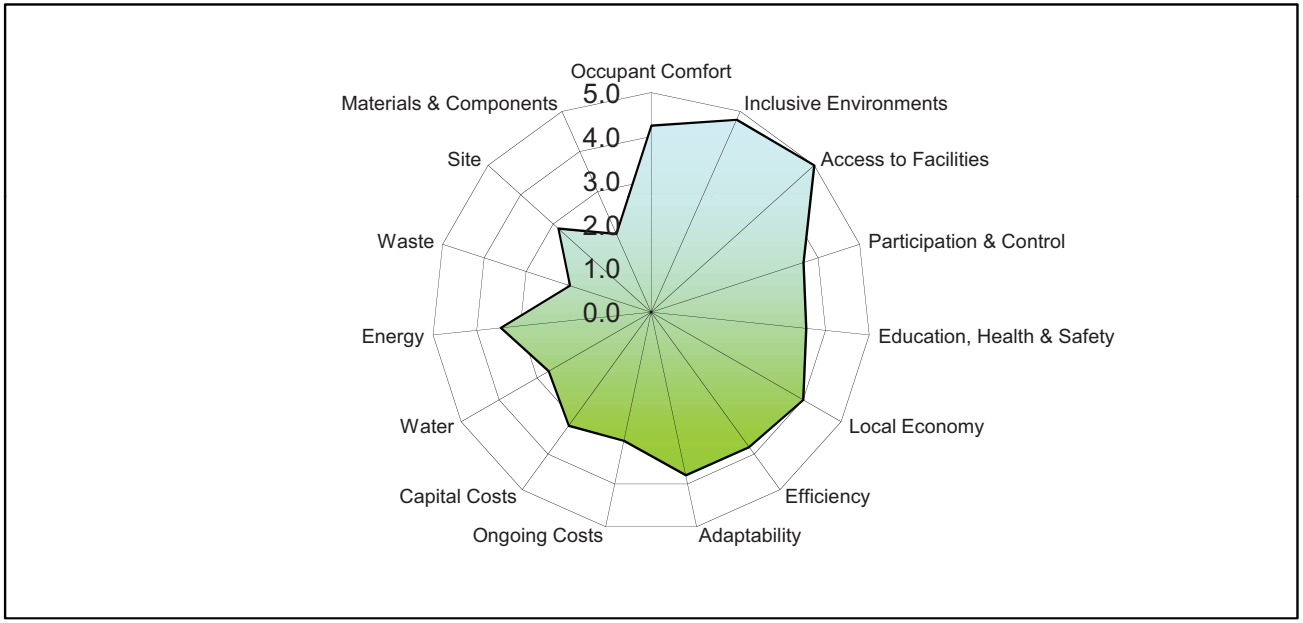
The system is based in 15 sets of objectives under the main themes of sustainability: Economy; Environmental and Social.
The system works by evaluating the successfulness of each category with a percentage or relative value scale and displayed on a chart (figure__).

Economic:
Local Economy; Efficiency of use; Adaptability and Flexibility; Ongoing cost, Capital cost.
Environmental:
Water; Energy; Waste; Site; Materials and components.
Social:
Occupant comfort, inclusive environments; access to facilities, Participation and control; Education, Health and safety.

The building achieved a rating of 3.5. It is considered good if a building achieve more than 3.
The social and economic objectives are easily met, but the environmental rating is less than satisfactory. This is because the objectives like renewable resources and sewerage treatment is very costly and space consuming.

SUSTAINABLE BUILDING ASSESSMENT TOOL (SBAT- P) V1

PROJECT		ASSESSMENT	
Project title:	Game On Youth Centre	Date:	25-Oct-10
Location:	Pretoria CBD		
Building type (specify):	Community/Commercial		
Internal area (m2):	6500		
Number of users:	1500		
Building life cycle stage (specify):	Design		



Social	4.3	Economic	3.6	Environmental	2.6

Overall	3.5

Figure 7-27 SBAT graph

Building Performance - Social

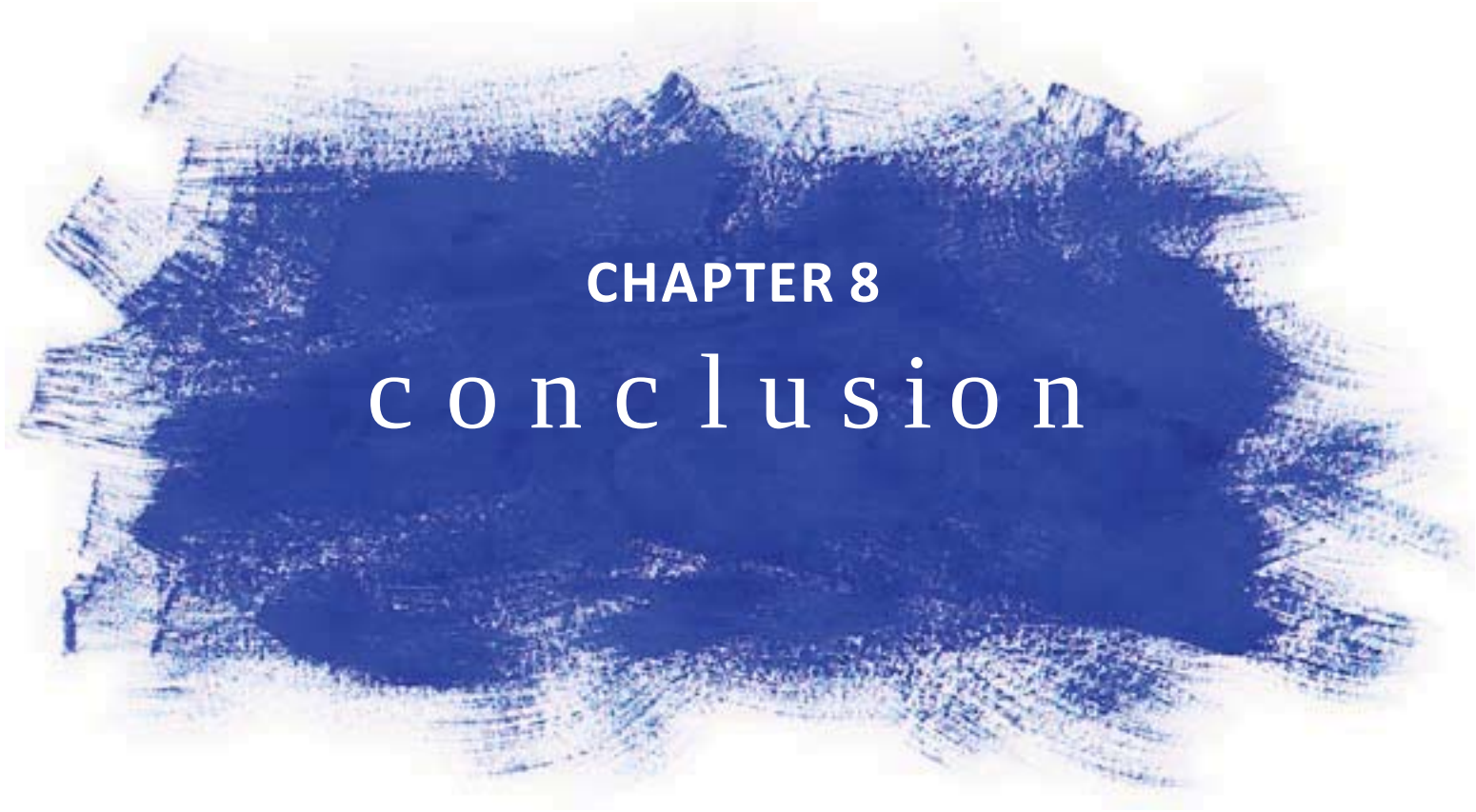
	Criteria	Indicative performance measure	Measured	Points
SO 1	**Occupant Comfort**	Explanatory notes		4.3
SO 1.1	Daylighting	% of occupied spaces that are within distance 2H from window, where H is the height of the window or where there is good daylight from skylights	80	0.8
SO 1.2	Ventilation	% of occupied spaces have equivalent of opening window area equivalent to 10% of floor area or adequate mechanical system, with upolluted air source	90	0.9
SO 1.3	Noise	% of occupied spaces where external/internal/reverberation noise does not impinge on normal conversation (50dbA)	80	0.8
SO 1.5	Thermal comfort	Tempreture of occupied space does not exceed 28 or go below 19oC for less than 5 days per year (100%)	75	0.8
SO 1.5	Views	% of occupied space that is 6m from an external window (not a skylight) with a view	100	1.0
SO 2	**Inclusive Environments**	Explanatory notes		4.8
SO 2.1	Public Transport	% of building (s) within 400m of disabled accessible (20%) and affordable (80%) public transport	100	1.0
SO 2.2	Information	Comprehensive signage provided (50%), Signage high contrast, clear print signage in appropriate locations and language(s) / use of understandable symbols / manned reception at all entrances (50%)	100	1.0
SO 2.3	Space	% of occupied spaces that are accessible to ambulant disabled / wheelchair users	80	0.8
SO 2.4	Toilets	% of occupied space with fully accessible toilets within 50m along easily accessible route	100	1.0
SO 2.5	Fittings & Furniture	% of commonly used furniture and fittings (reception desk, kitchenette, auditorium) fully accessible	100	1.0
SO 3	**Access to Facilities**	Explanatory notes		5.0
SO 3.1	Children	All users can walk (100%) / use public transport (50%) to get to their childrens' schools and creches	100	1.0
SO 3.2	Banking	All users can walk (100%) / use public transport (50%) to get to banking facilities	100	1.0
SO 3.3	Retail	All users can walk (100%) / use public transport (50%) to get to food retail	100	1.0
SO 3.4	Communication	All users can walk (100%) / use public transport (50%) to get to communication facilities (post/telephone/internet)	100	1.0
SO 3.5	Exercise	All users can walk (100%) / use public transport (50%) to get to recreation/excercise facilities	100	1.0
SO 4	**Participation & Control**	Explanatory notes		3.7
SO 4.1	Environmental control	% of occupied space able to control their thermal environment (adjacent to openable windows/thermal controls)	75	0.8
SO 4.2	Lighting control	% of occupied space able to control their light (adjacent to controllable blinds etc/local lighting control)	50	0.5
SO 4.3	Social spaces	Social informal meeting spaces (parks / staff canteens / cafes) provided locally (within 400m) (100%)	100	1.0
SO 4.4	Sharing facilties	5% or more of facilities shared with other users / organisations on a weekly basis (100%)	90	0.9
SO 4.5	User group	Users actively involved in the design process (50%) / Active and representative management user group (50%)	50	0.5
SO 5	**Education, Health & Safety**	Explanatory notes		3.6
SO 5.1	Education	Two percent or more space/facilities available for education (seminar rooms / reading / libraries) per occupied space (75%). Construction training provided on site (25%)	75	0.8
SO 5.2	Safety	All well used routes in and around building well lit (25%), all routes in and around buildings visually supervised (25%), secure perimeter and access control (50%), No crime (100%)	50	0.5
SO 5.3	Awareness	% of users who can access information on health & safety issues (ie HIV/AIDS), training and employment opportunities easily (posters/personnel/intranet site)	100	1.0
SO 5.4	Materials	All materials/components used have no negative effects on indoor air quality (100%)	80	0.8
SO 5.5	Accidents	Process in place for recording all occupational accidents and diseases and addressing these	50	0.5

Building Performance - Economic

	Criteria	Indicative performance measure	Measured	Points
EC 1	**Local economy**	Explanatory notes		4.0
EC 1.1	Local contractors	% value of the building constructed by local (within 50km) small (employees<20) contractors	25	0.3
EC 1.2	Local materials	% of materials (sand, bricks, blocks, roofing material) sourced from within 50km	100	1.0
EC 1.3	Local components	% of components (windows, doors etc) made locally (in the country)	100	1.0
EC 1.4	Local furniture/fittings	% of furniture and fittings made locally (in the country)	75	0.8
EC 1.5	Maintenance	% of maintenance and repairs by value that can, and are undertaken, by local contractors (within 50km)	100	1.0
EC 2	**Efficiency**	Explanatory notes		3.8
EC 2.1	Capacity	% capacity of building used on a daily basis (actual number of users / number of users at full capacity*100)	80	0.8
EC 2.2	Occupancy	% of time building is occupied and used (actual average number of hours used / all potential hours building could be used (24) *100)	75	0.8
EC 2.3	Space per occupant	Space provision per user not more than 10% above national average for building type (100%)	50	0.5
EC 2.4	Communication	Site/building has access to internet and telephone (100%), telephone only (50%)	100	1.0
EC 2.5	Material & Components	Building design coordinated with material / component sizes in order to minimise wastage. Walls (50%), Roof and floors (50%)	75	0.8
EC 3	**Adaptability**	Explanatory notes		2.9
EC 3.1	Vertical heights	% of spaces that have a floor to ceiling height of 3000mm or more	85	0.9
EC 3.2	External space	Design facilitates flexible external space use (100%)	30	0.3
EC 3.3	Internal partition	Non loadbearing internal partitions that can be easily adapted (loose partioning (100%), studwall (50%), masonary (25%)	50	0.5
EC 3.4	Modular planning	Building with modular stucture, envelope (fenestration) & services allowing easly internal adaptaptation (100%)	70	0.7
EC 3.5	Furniture	Modular, limited variety furniture - can be easily configured for different uses (100%)	50	0.5
EC 4	**Ongoing costs**	Explanatory notes		3.0
EC 4.1	Induction	All new users receive induction training on building systems (50%), Detailed building user manual (50%	0	0.0
EC4.2	Consumption & waste	% of users exposed on a monthly basis to building performance figures (water (25%), electricity (25%), waste (25%), accidents (25%)	25	0.3
EC 4.2	Metering	Easily monitored localised metering system for water (50%) and energy (50%)	100	1.0
EC4.3	Maintenance & Cleaning	% of building that can be cleaned and maintained easily and safely using simple equipment and local non-hazardous materials	100	1.0
SO 4.5	Procurement	% of value of all materials/equipment used in the building on a daily basis supplied by local (within the country) manufacturers	75	0.8
EC 5	**Capital Costs**	Explanatory notes		3.2
EC 5.1	Local need	Five percent capital cost allocated to address urgent local issues (employment, training etc) during construction process (100%)	90	0.9
EC5.2	Procurement	Tender / construction packaged to ensure involvement of small local contractors/manufacturers (100%)	75	0.8
EC 5.3	Building costs	Capital cost not more than fifteen % above national average building costs for the building type (100%)	75	0.8
EC5.4	Technology	3% or more of capital costs allocated to new sustainable/indigenous technology (100%)	80	0.8
EC 5.5	Existing Buildings	Existing buildings reused (100%)	0	0.0

Building Performance - Environmental

	Criteria	Indicative performance measure	Measured	Points
EN 1	**Water**	Explanatory notes		2.7
EN 1.1	Rainwater	% of water consumed sourced from rainwater harvested on site	50	0.5
EN 1.2	Water use	% of equipment (taps, washing machines, urinals showerheads) that are water efficient	100	1.0
EN 1.3	Runoff	% of carparking, paths, roads and roofs that have absorbant/semi absorbant/permeable surfaces (grassed/thatched/looselaid paving/ absorbant materials)	15	0.2
EN 1.4	Greywater	% of water from washing/relatively clean processes recycled and reused	25	0.3
EN 1.5	Planting	% of planting (other than food gardens) on site with low / appropriate water requirements	80	0.8
EN 2	**Energy**	Explanatory notes		3.5
EN 2.1	Location	% of users who walk / cycle / use public transport to commute to the building	95	1.0
EN 2.2	Ventilation	% of building ventilation requirements met through natural / passive ventilation	85	0.9
EN 2.3	Heating & Cooling	% of occupied space which relies solely on passive environmental control (no or minimal energy consumption)	60	0.6
EN 2.4	Appliances & fittings	% of appliances / lighting fixtures that are classed as highly energy efficient (ie energy star rating)	85	0.9
EN 2.5	Renewable energy	% of building energy requirements met from renewable sources	20	0.2
EN 3	**Waste**	Explanatory notes		2.0
EN 3.1	Toxic waste	% of toxic waste (batteries, ink cartridges, flourescent lamps) recycled	100	1.0
EN 3.2	Organic waste	% of organic waste recycled	20	0.2
EN 3.3	Inorganic waste	% of inorganic waste recycled.	75	0.8
EN 3.4	Sewerage	% of sewerage recycled on site	0	0.0
EN 3.5	Construction waste	% of damaged building materials / waste developed in construction recycled on site	0	0.0
EN 4	**Site**	Explanatory notes		2.9
EN 4.1	Brownfield site	% of proposed site already disturbed / brownfield (previously developed)	100	1.0
EN 4.2	Neighbouring buildings	No neighbouring buildings negatively affected (access to sunlight, daylight, ventilation) (100%)	100	1.0
EN 4.3	Vegetation	% of area of area covered in vegetation (include green roofs, internal planting) relative to whole site	35	0.4
EN 4.4	Food gardens	Food gardens on site (100%)	0	0.0
EN 4.5	Landscape inputs	% of landscape that does not require mechanical equipment (ie lawn cutting) and or artificial inputs such as weed killers and pesticides	50	0.5
EN 5	**Materials & Components**	Explanatory notes		2.0
EN 5.1	Embodied energy	Materials with high embodied energy (aluminium,plastics) make up less than 1% of weight of building (100%)	50	0.5
EN 5.2	Material sources	% of materials and components by volume from grown sources (animal/plant)	10	0.1
EN 5.3	Ozone depletion	No materials and components used requiring ozone depleting processes (100%)	50	0.5
EN 5.4	Recyled / reuse	% of materials and components (by weight) reused / from recycled sources	10	0.1
EN 5.5	Construction process	Volume / area of site disturbed during construction less than 2X volume/area of new building (100%)	75	0.8



CHAPTER 8

conclusion

Architecture is more than a Game

This dissertation started out as a medium to highlight the presence of young people in the city, and the need to design spaces for them. It has been determined that a Youth Centre in the Central Business District of Pretoria is necessary.

The above mentioned goal can be seen as a problem that had to be overcome by solving a series of smaller problems. These included the site location, legal constrains, as well as, design challenges.

Similarly, during the playing of a game, the player is confronted with new problems and challenges to overcome when progressing through the levels. The design process itself may be compared to playing a game since it also consists of levels:
Concept, Design, Development and Technical Resolution.
Each level had to be completed in order to move on to the next. If a problem was encountered a revisit to the previous levels often revealed an answer.

Through this new adopted process of design it can be concluded that architecture Itself consist of a process, guided by its own narrative. That narrative determines the function and layout of a building, but since a narrative can change during the design process or over a period of time the design needs to change accordingly. Therefore, it is an interactive process that has shown to incorporate a variety of different aspects.

The process followed in this dissertation was as follows:
A problem was identified and then addressed in a design solution. The solution was then tested to determine its validity and successfulness. If a certain aspect of the design had passed the scrutiny it was carried over into the next "level" as it may. During the testing phase new problems were identified that needed to be addressed. A new design solution was then generated and evaluated until a satisfactory solution was achieved.
The conclusion can be drawn that space for interaction is the base for all design interventions, real or virtual. Architecture forms a backdrop for this interaction to take place.
However, through the process of designing it was determined that the difference between the real world and the virtual one is very wide. Designing a purely virtual world would result in failure since virtual worlds are cold and sterile. The vibrant energy that humans bring to a space are necessary in order to make any design intervention successful.

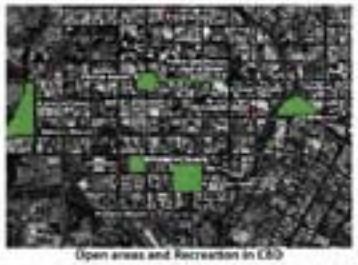
Therefore, architecture is more than a game. It cannot be reduced to a checklist were problems are determined and ticked off when they are addressed. It is a tangible interface between the real world and that of the designer's imagination. Future research may be done to determine how the human qualities of architecture may be introduced to the sterile environment found in the virtual world. The virtual world, however, may serve as inspiration for designing in the real world, but it cannot replace it.

Architecture is not all about the design of the building and nothing else, it is also about the cultural setting and the ambience, the whole affair.
(Michael Graves)

CHAPTER 9

final presentaion & technical drawings

Schools and Further Training and Education Facilities



Open areas and Recreation in CBD

Movement through CBD

Site Choice

Background

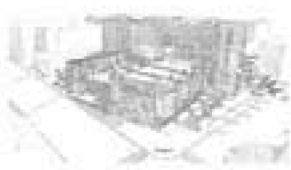
Current Recreation

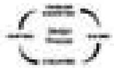
Users

Client

Accommodation Schedule

Climate of Site





GAME ON!

A youth Centre in Pretoria

Abstract

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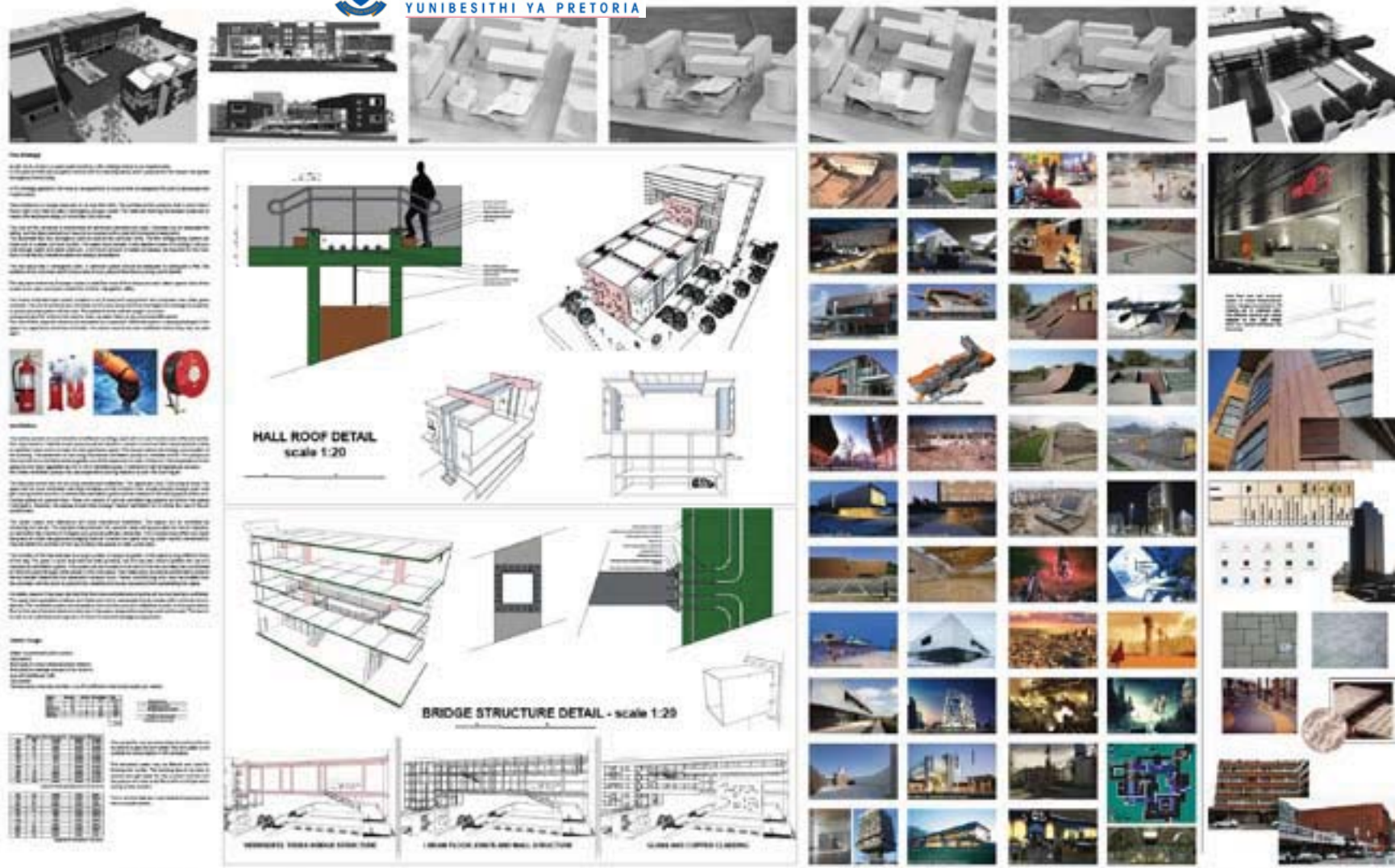
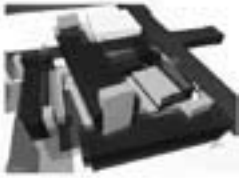
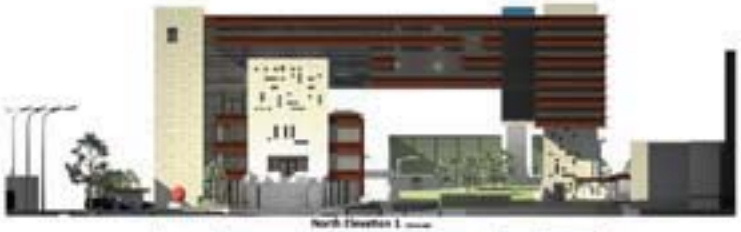

HALL ROOF DETAIL
scale 1:20
BRIDGE STRUCTURE DETAIL - scale 1:20





East Elevation

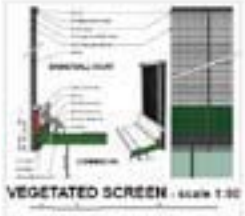
South Elevation

North Elevation 1

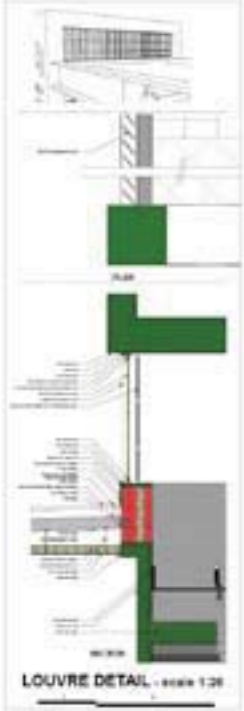
West Elevation

North Elevation 2

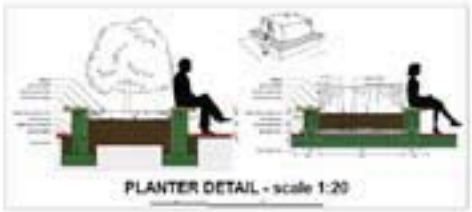



DUCT VENTILATION - scale 1:50

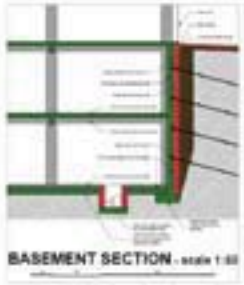

VEGETATED SCREEN - scale 1:50


LOUVRE DETAIL - scale 1:20

SECTION A-A - scale 1:50


PLANTER DETAIL - scale 1:20


HALL BALUSTRADE DETAIL - scale 1:20


BASEMENT SECTION - scale 1:50


WALL CONSTRUCTION- scale 1:10

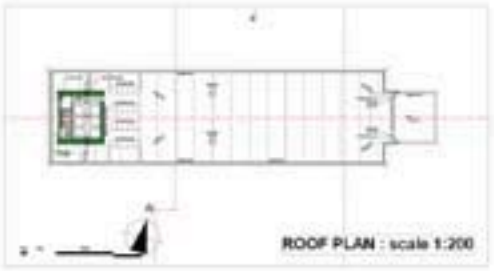

SITE PLAN - scale 1:500


BASEMENT LEVEL -1 : scale 1:200


BASEMENT LEVEL -2 : scale 1:200


FIRST FLOOR PLAN : scale 1:200


THIRD FLOOR PLAN : scale 1:200

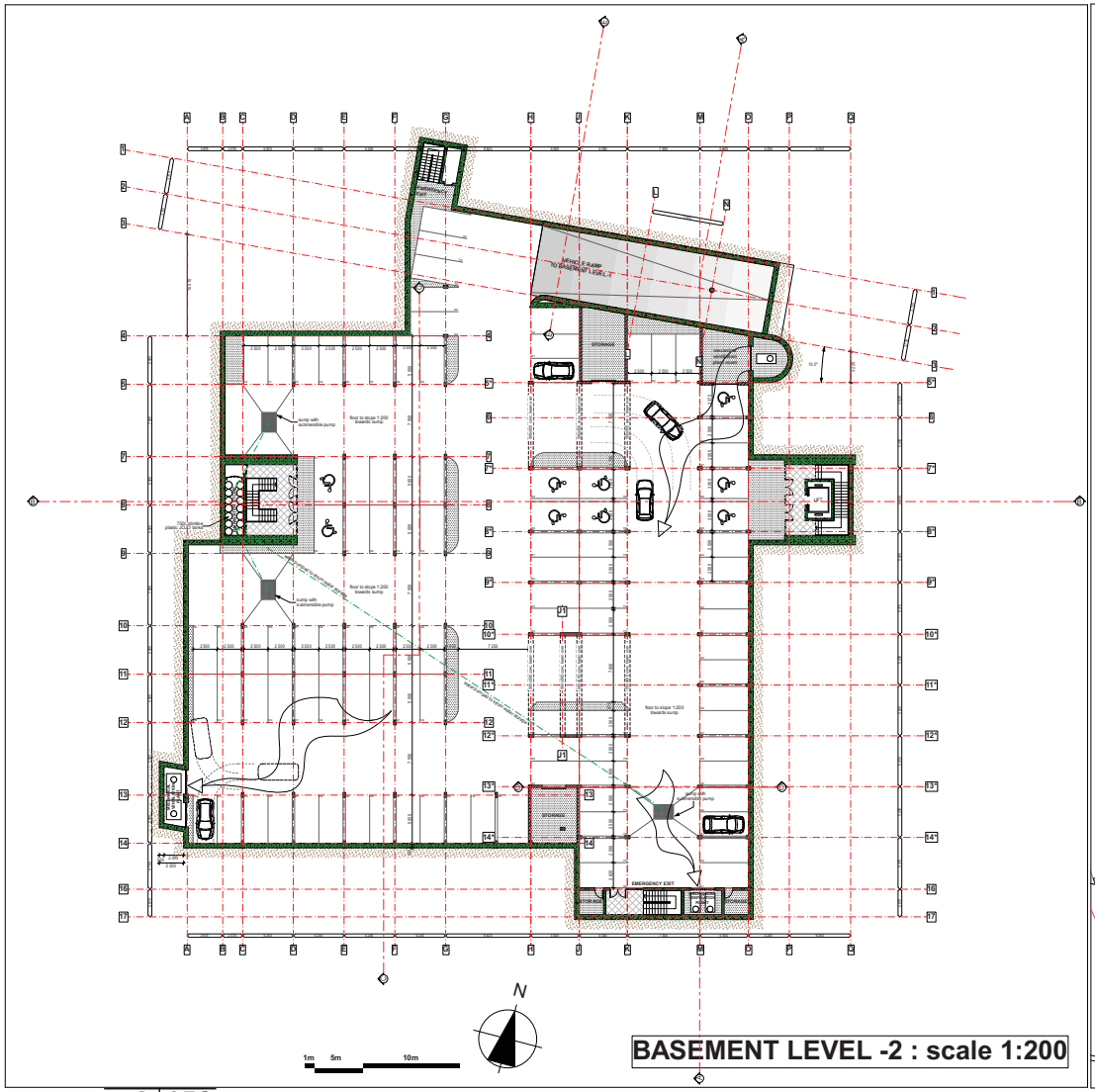

ROOF PLAN : scale 1:200


SIXTH FLOOR PLAN : scale 1:200

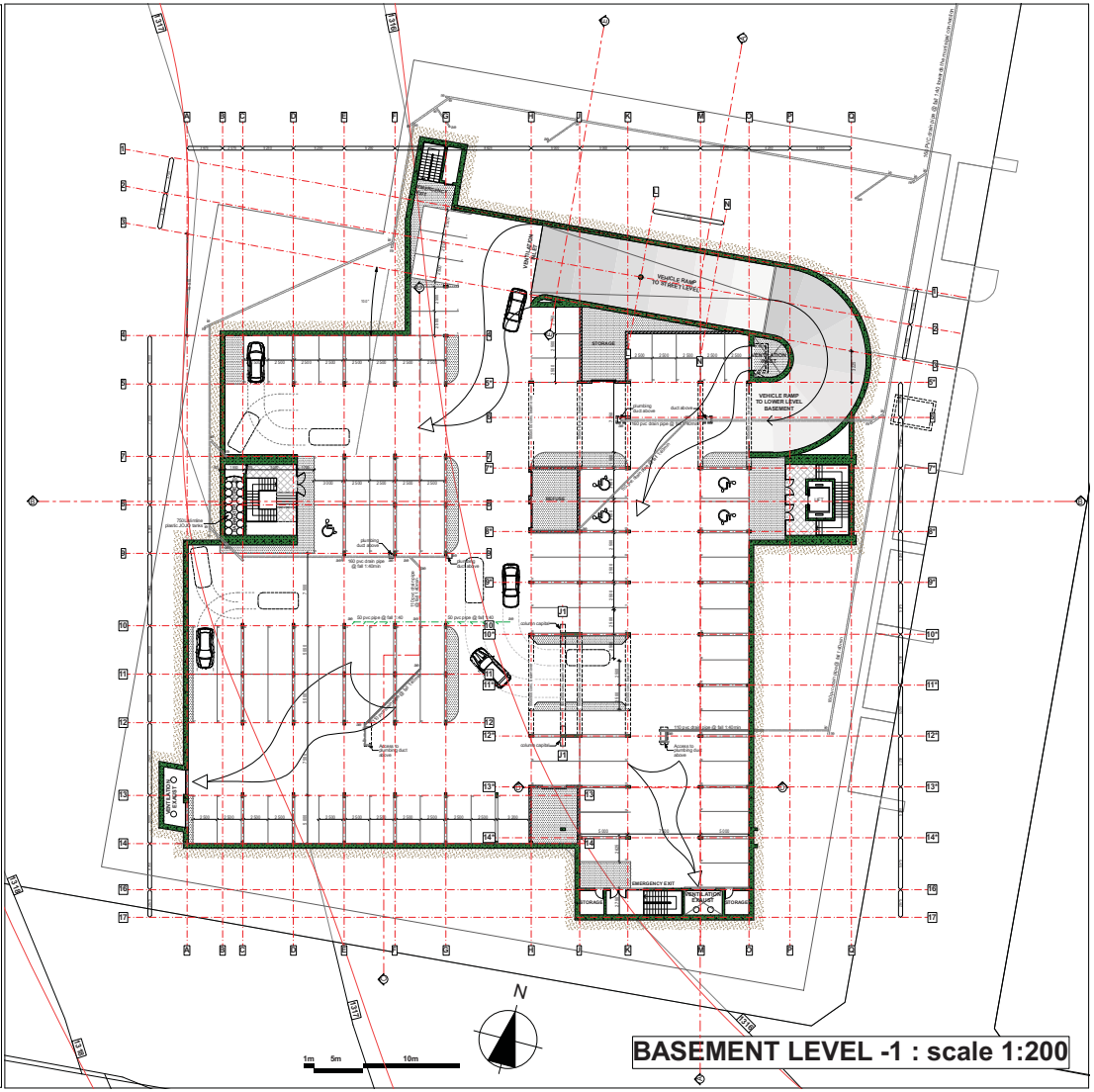

FIFTH FLOOR PLAN : scale 1:200


FOURTH FLOOR PLAN : scale 1:200

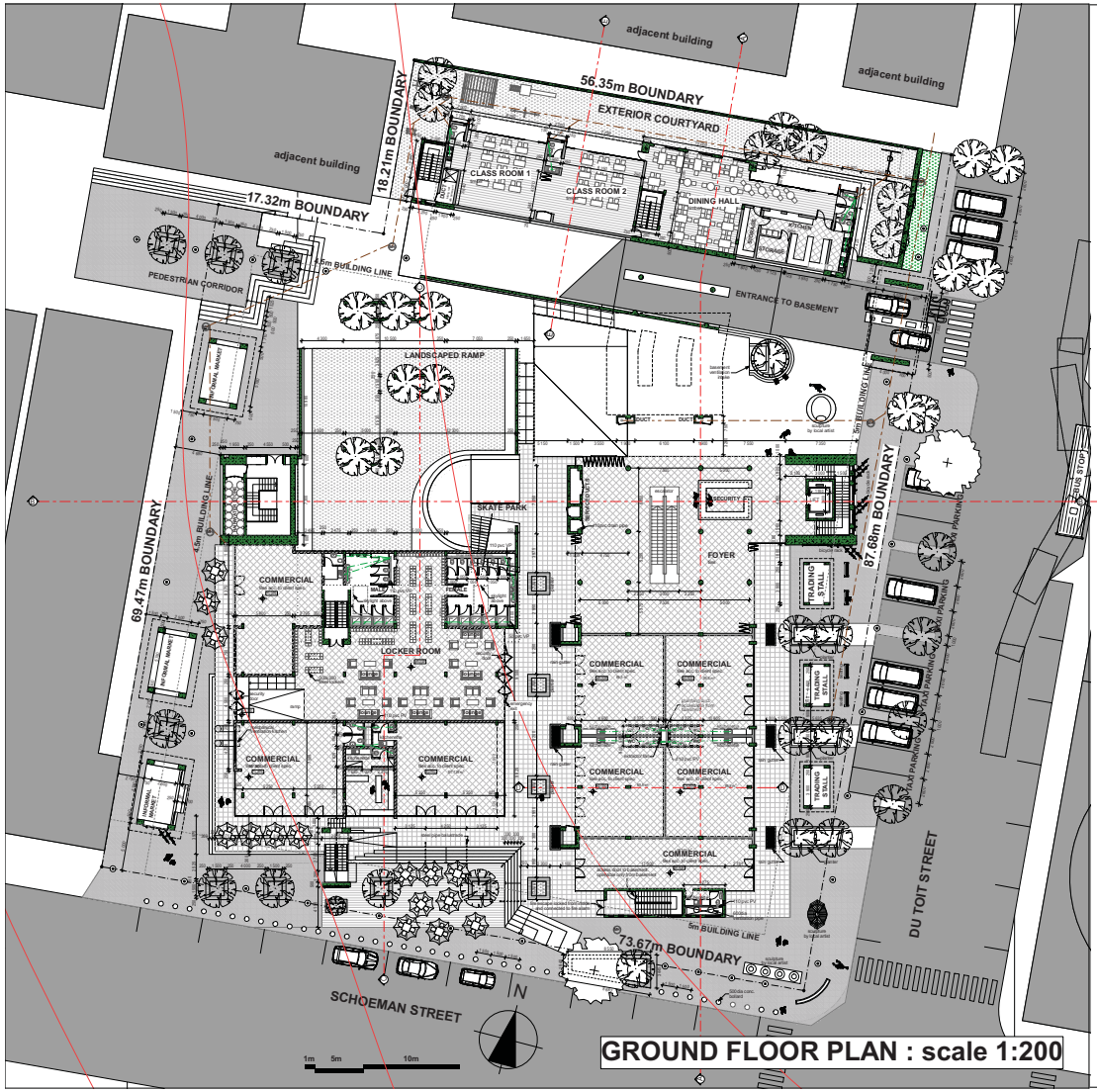
Conclusion



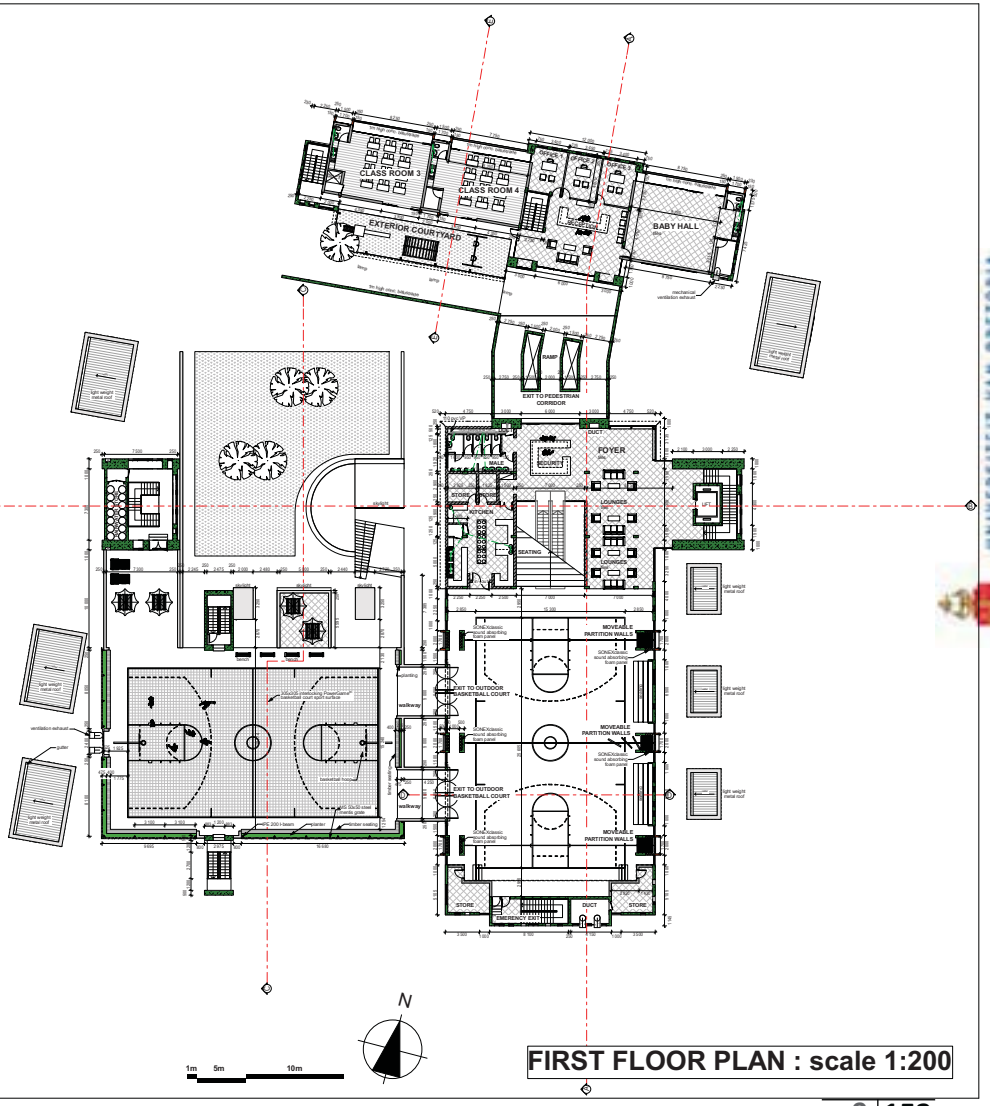
BASEMENT LEVEL -2 : scale 1:200



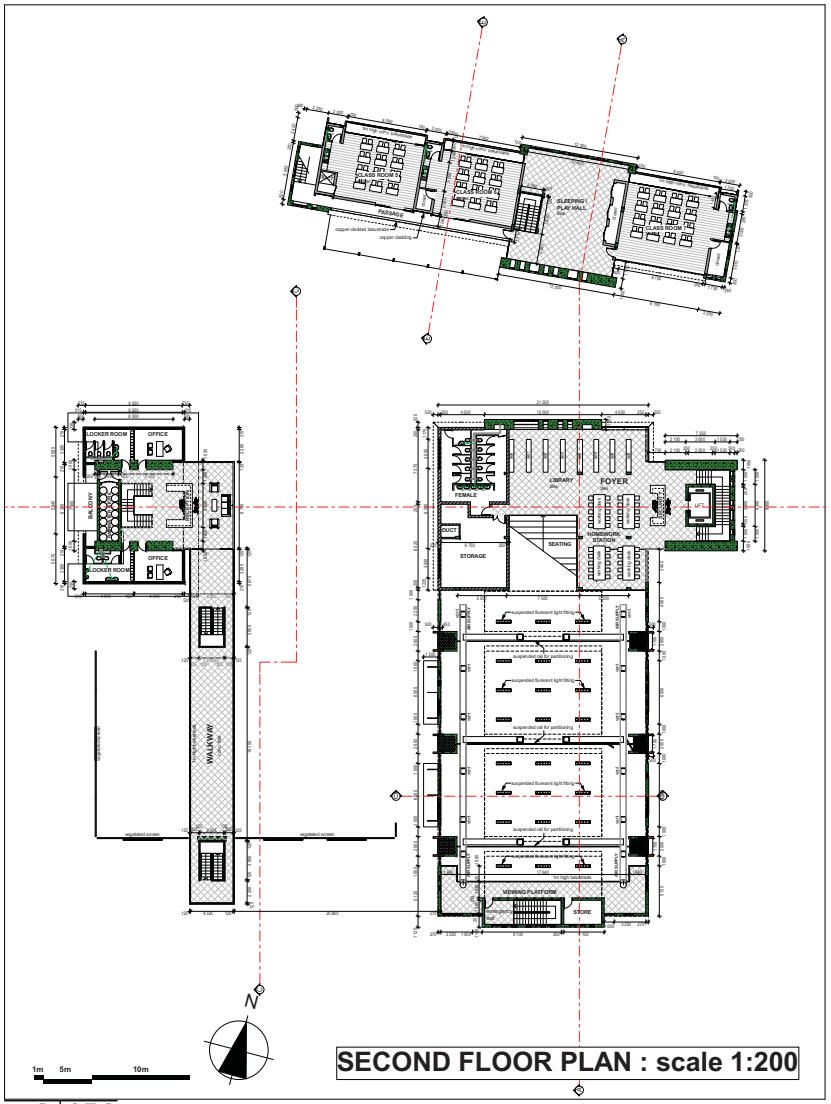
BASEMENT LEVEL -1 : scale 1:200



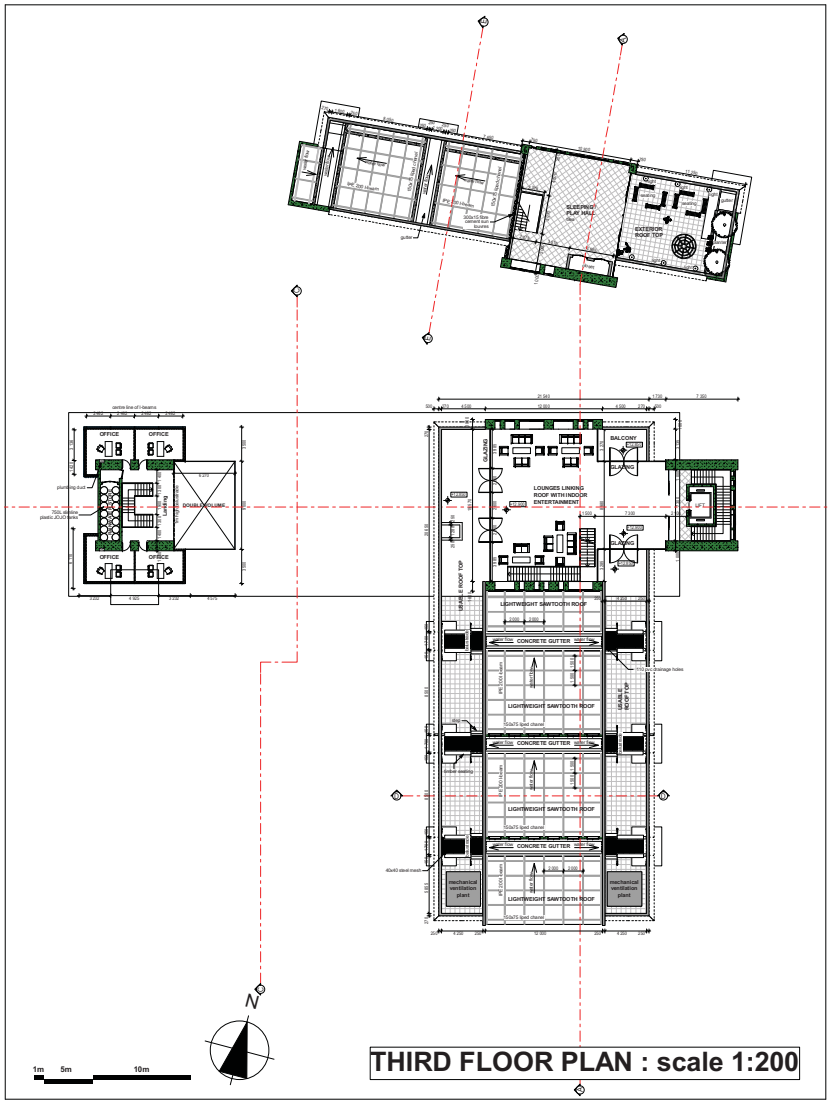
GROUND FLOOR PLAN : scale 1:200



FIRST FLOOR PLAN : scale 1:200



SECOND FLOOR PLAN : scale 1:200



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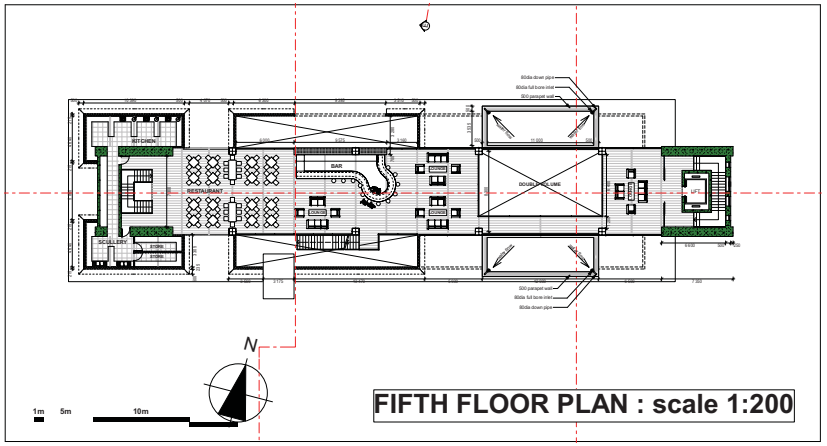
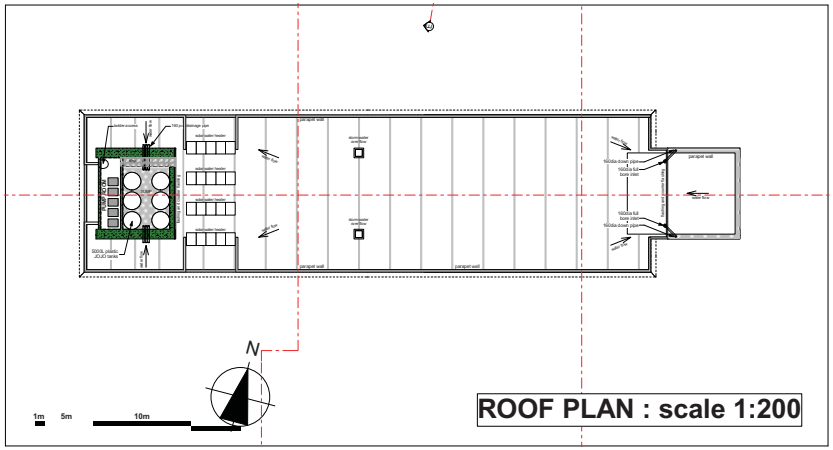
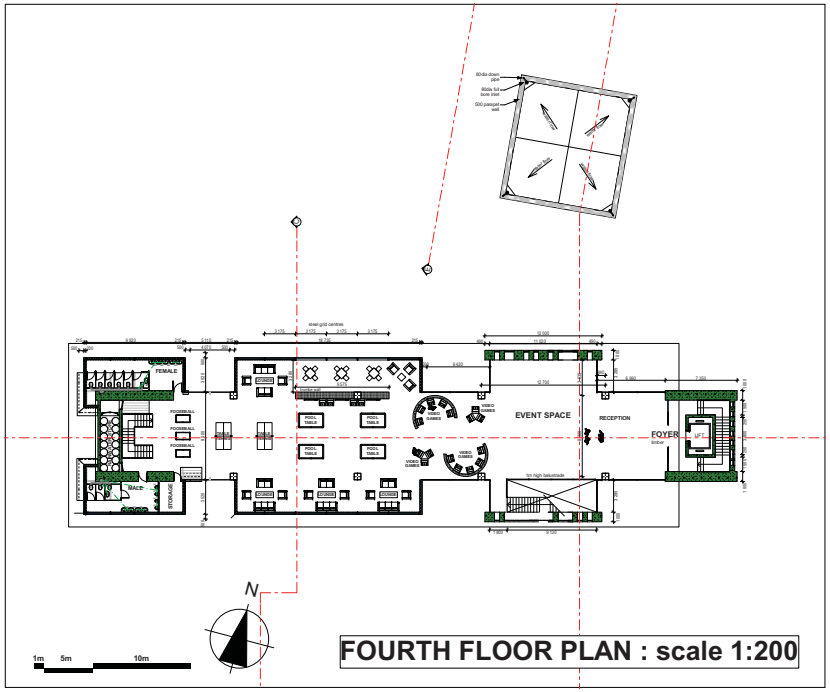


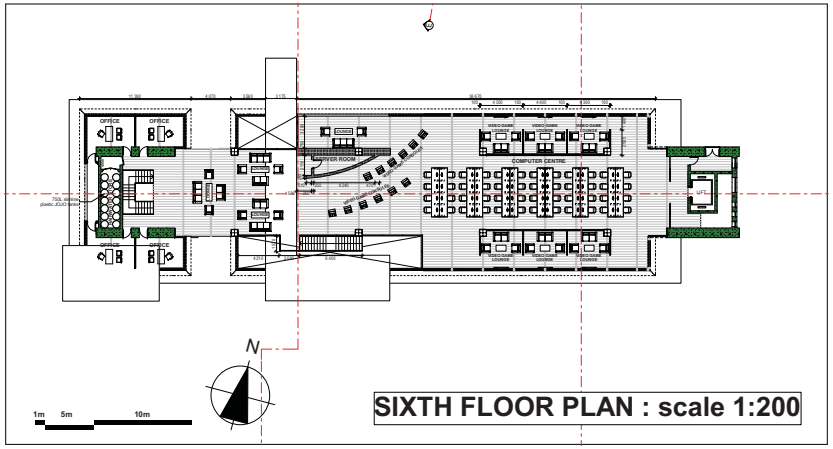
FIFTH FLOOR PLAN : scale 1:200



ROOF PLAN : scale 1:200



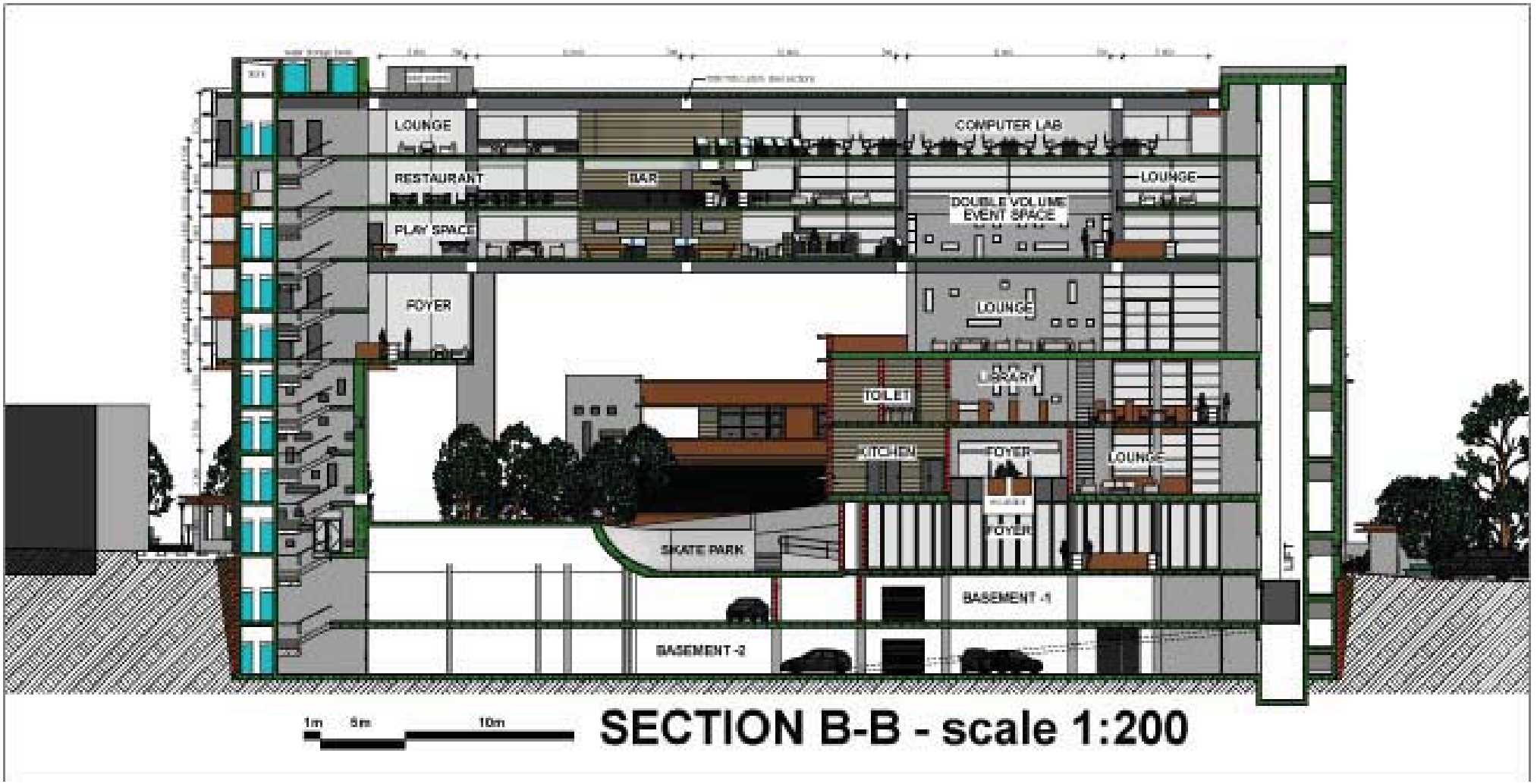
FOURTH FLOOR PLAN : scale 1:200

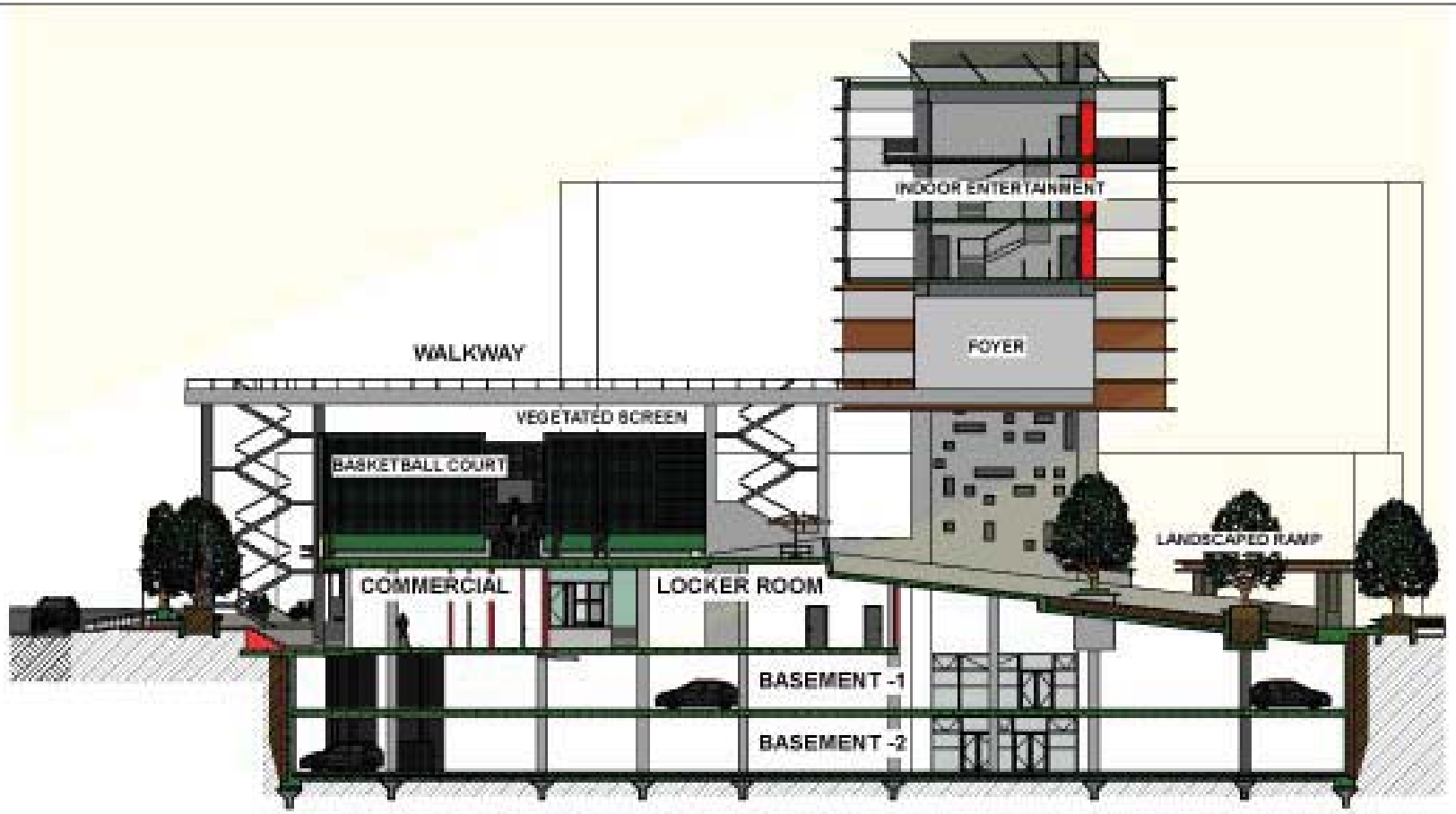


SIXTH FLOOR PLAN : scale 1:200

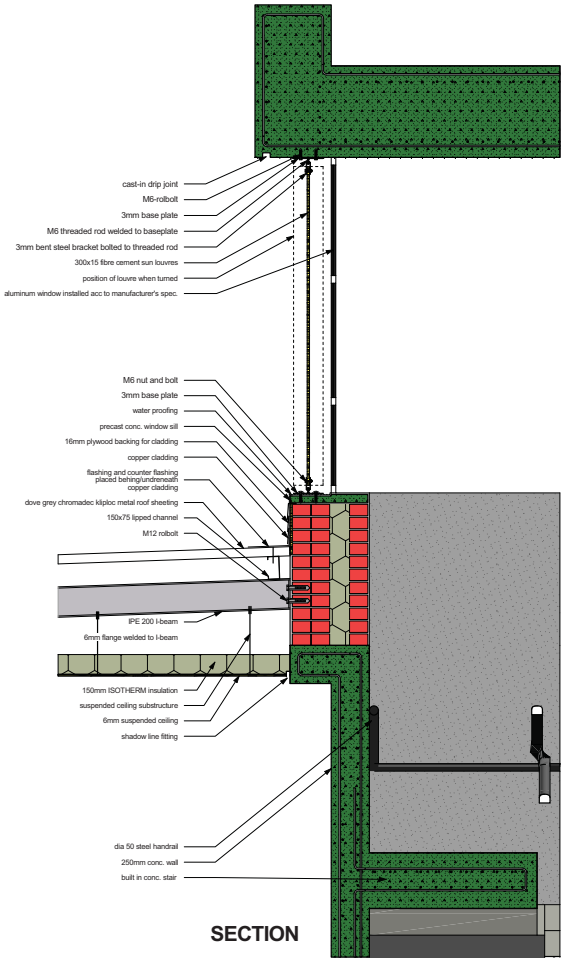
SITE PLAN - scale 1:500

SECTION A-A - scale 1:50


LOUNGE
RESTAURANT
PLAY SPACE
BAR
COMPUTER LAB
DOUBLE VOLUME EVENT SPACE
LOUNGE
FOYER
LOUNGE
TOILET
LIBRARY
KITCHEN
FOYER
LOUNGE
FOYER
SKATE PARK
BASEMENT -1
BASEMENT -2
LIFT
1m
5m
10m
SECTION B-B - scale 1:200



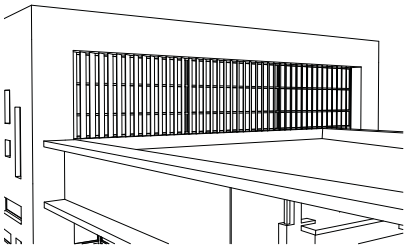
SECTION C-C - scale 1:200

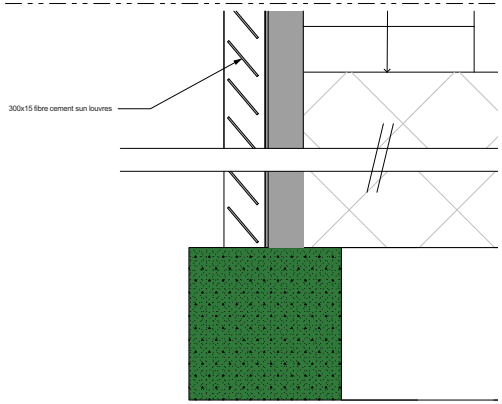


SECTION

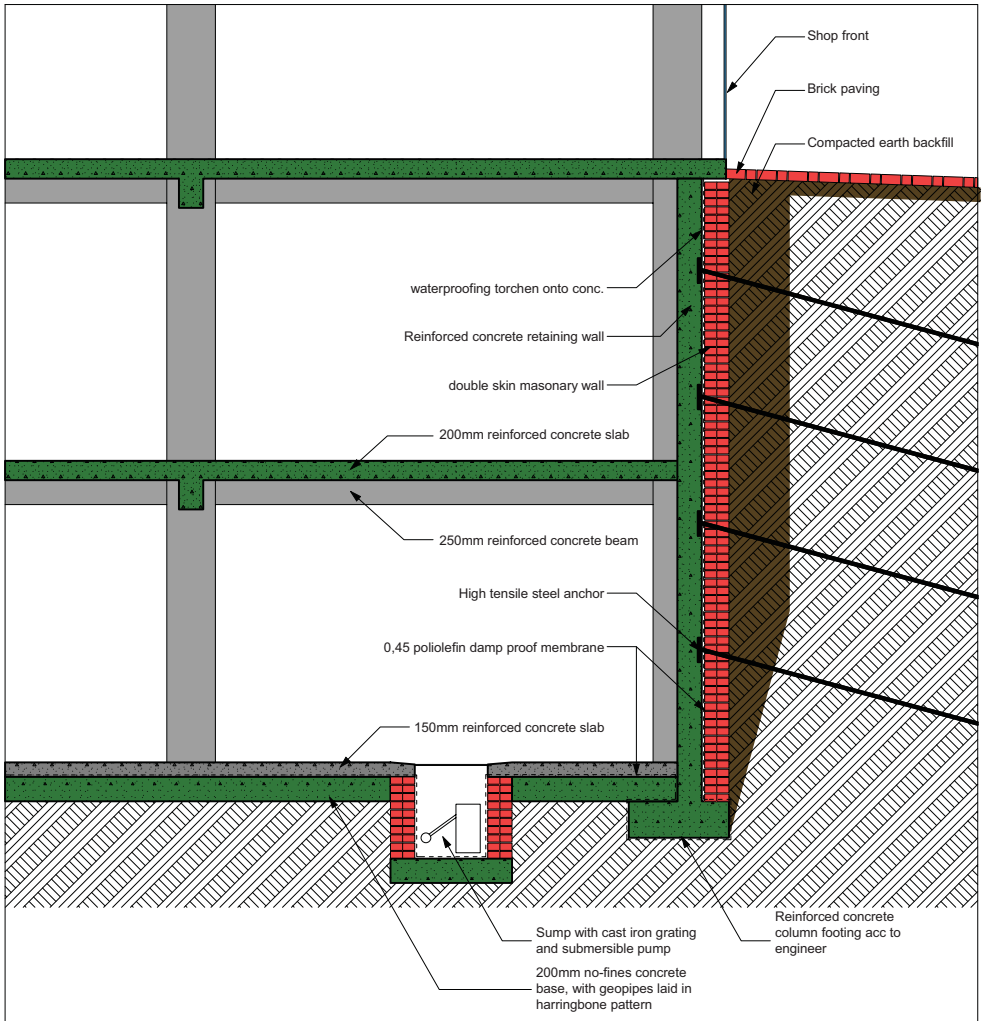
LOUVRE DETAIL - scale 1:20

1m 2m

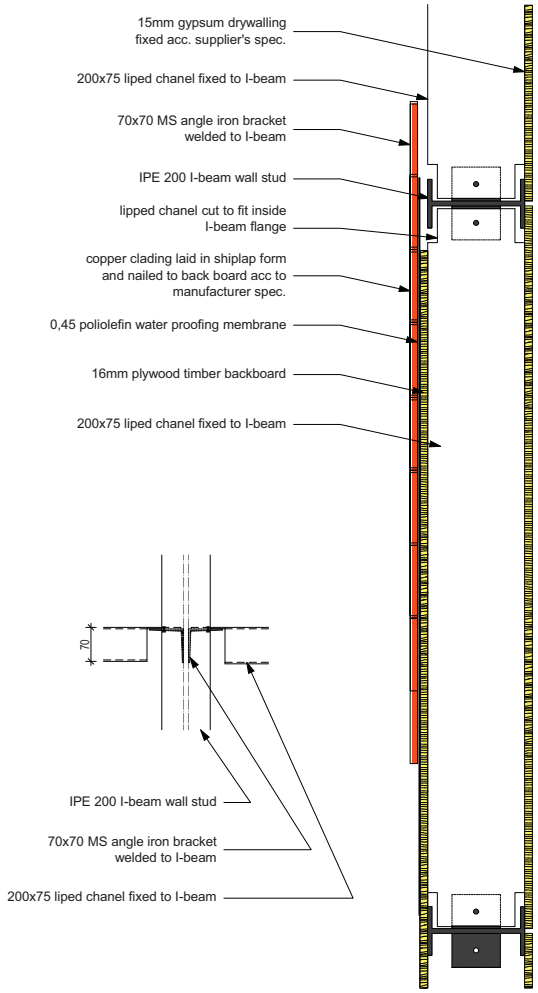


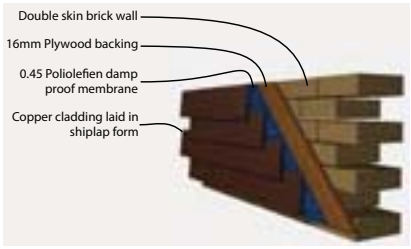


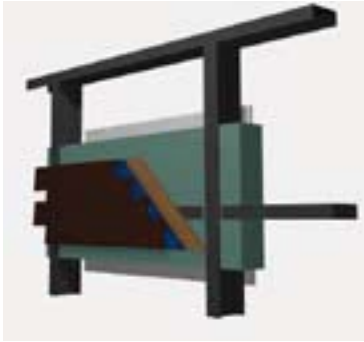
PLAN



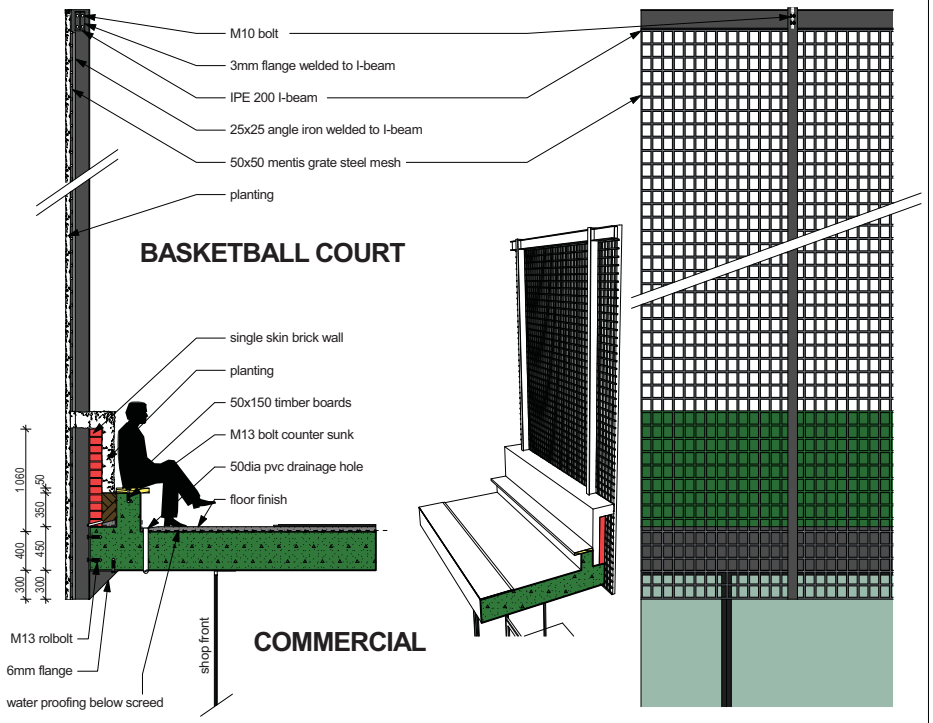
BASEMENT SECTION - scale 1:50





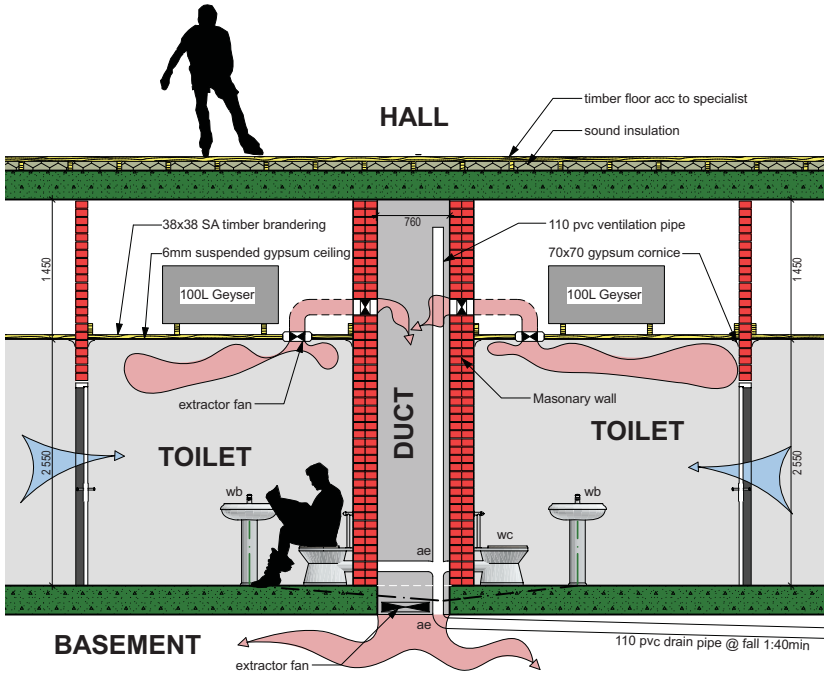


WALL CONSTRUCTION- scale 1:10



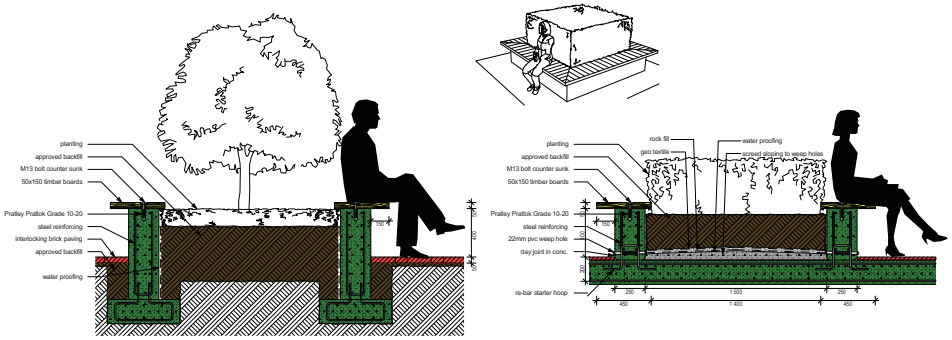
VEGETATED SCREEN - scale 1:50

1m 2m 5m

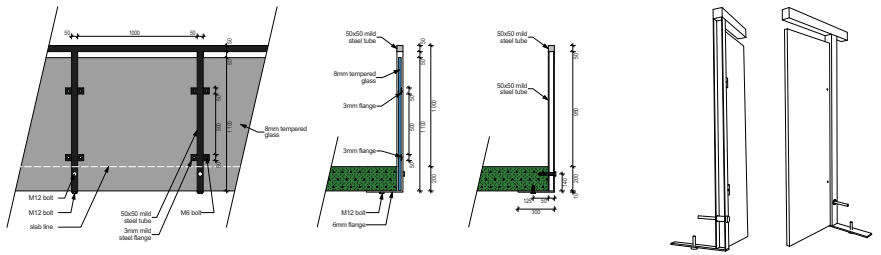


DUCT VENTILATION - scale 1:50

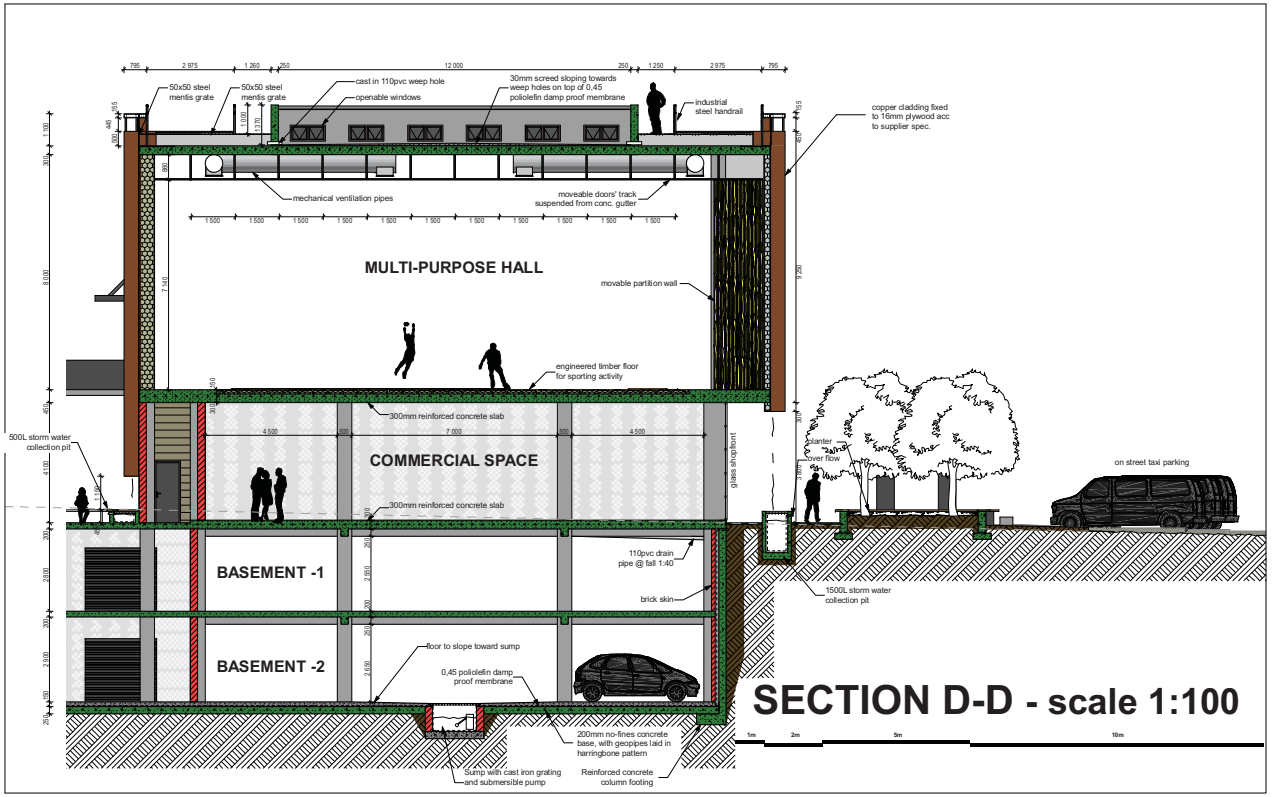
1m 2m 5m



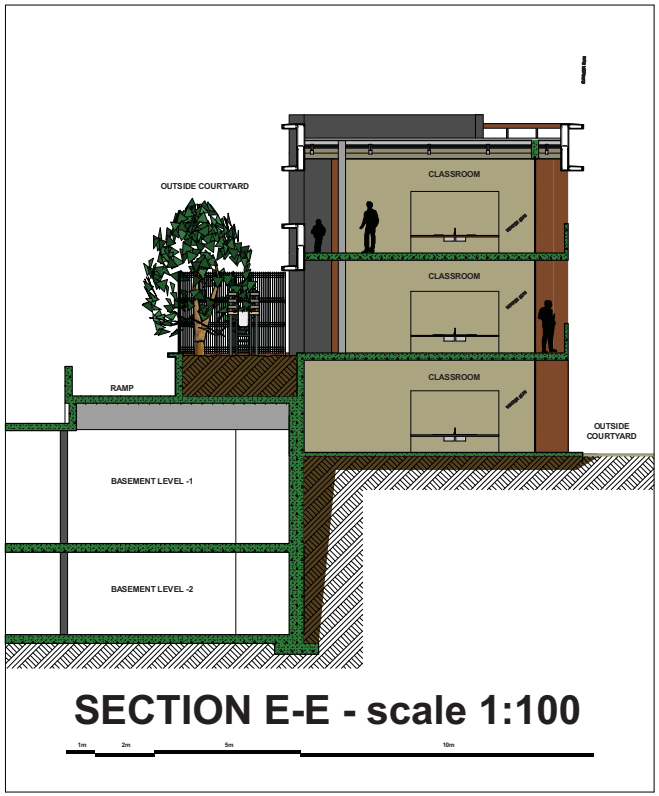
PLANTER DETAIL - scale 1:20



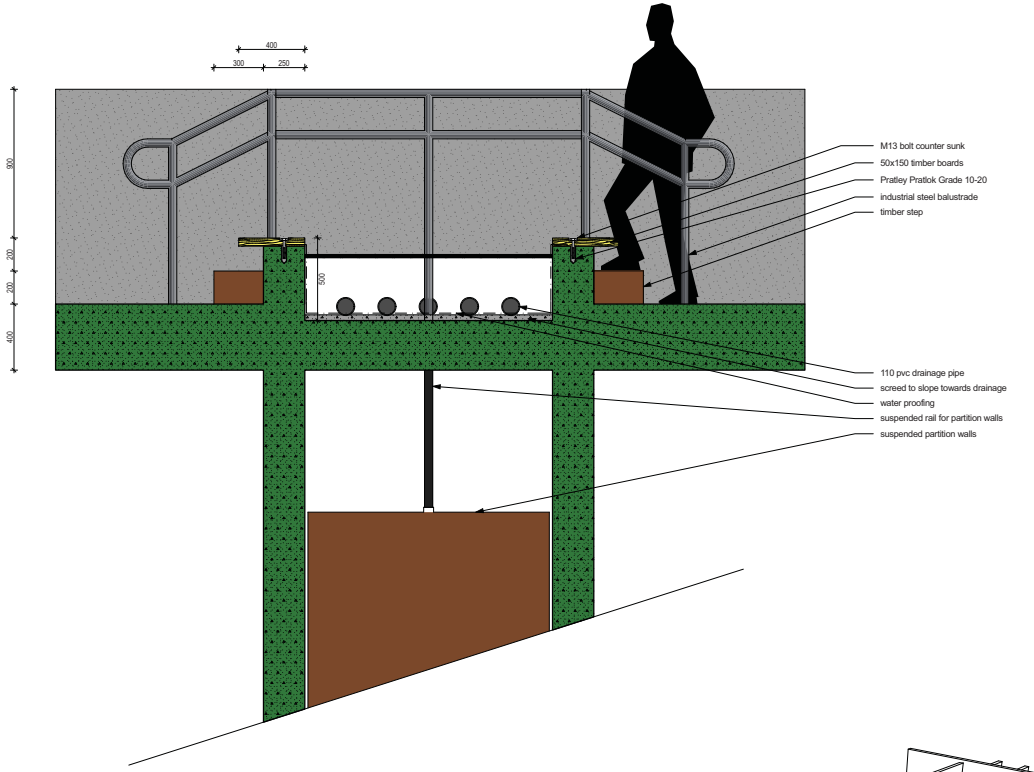
HALL BALUSTRADE DETAIL - scale 1:20

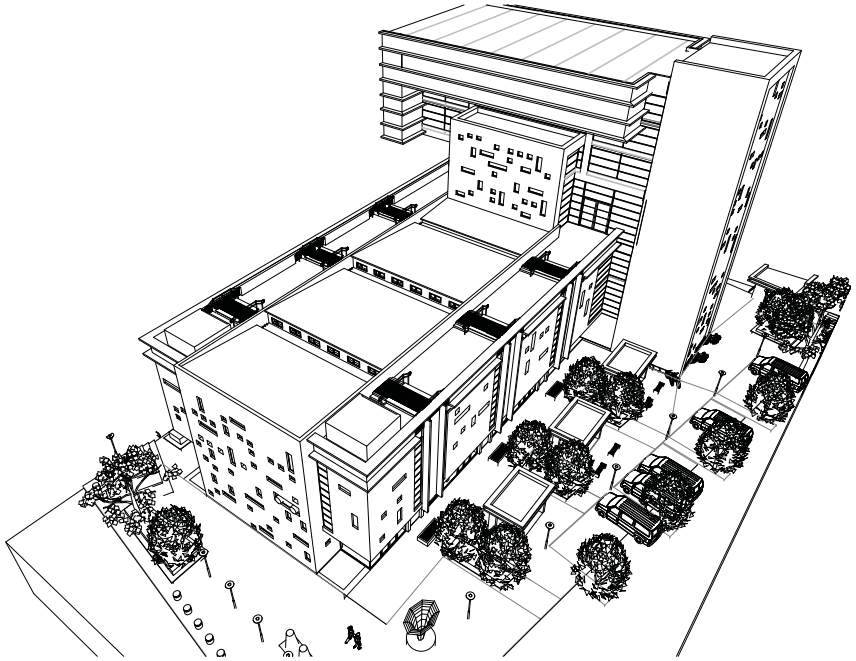


SECTION D-D - scale 1:100



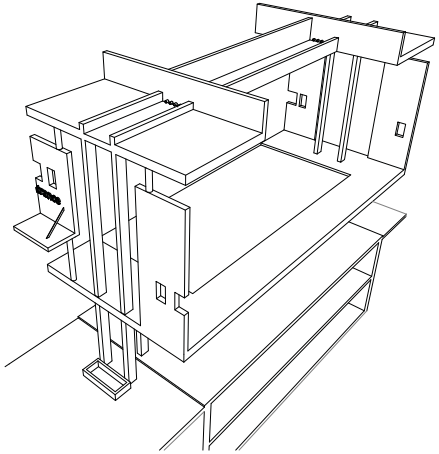
SECTION E-E - scale 1:100

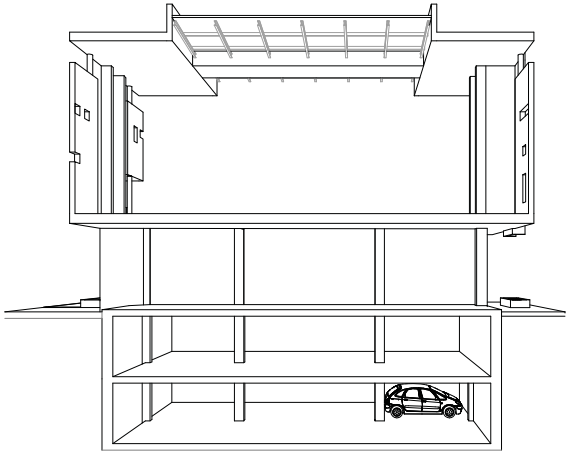


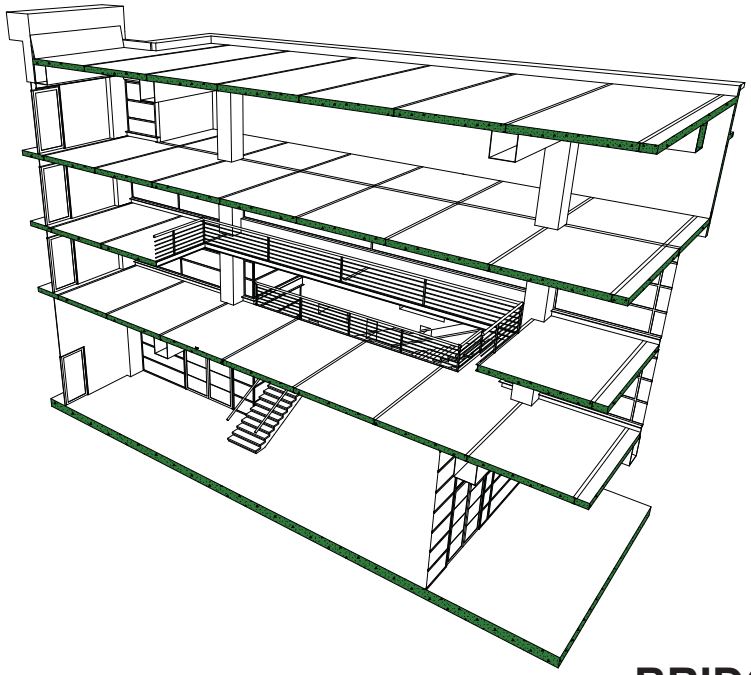


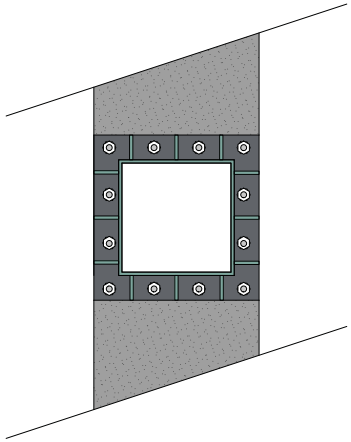
HALL ROOF DETAIL
scale 1:20

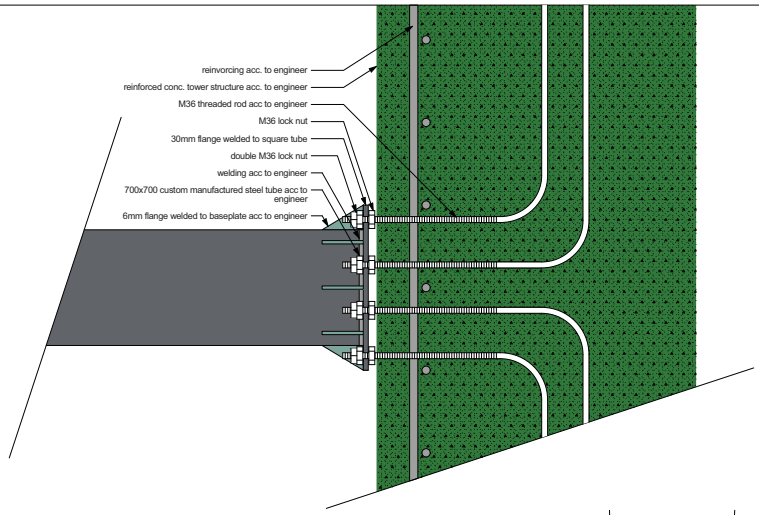
1m 2m

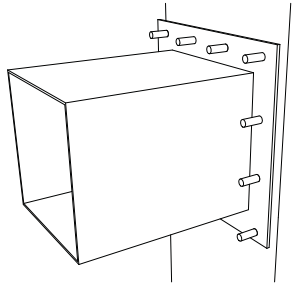






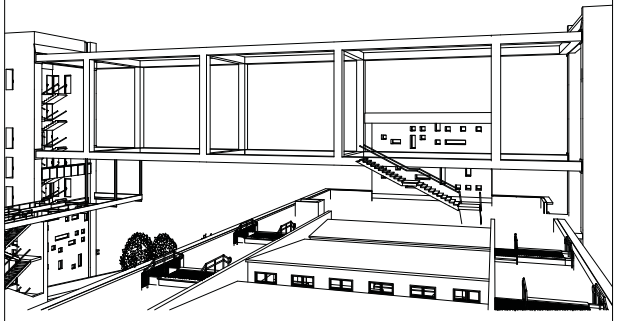




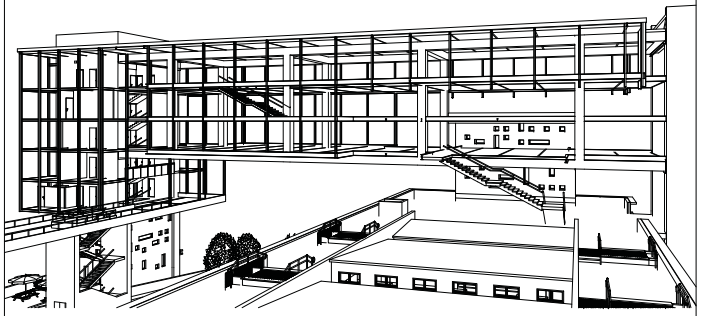


BRIDGE STRUCTURE DETAIL - scale 1:20

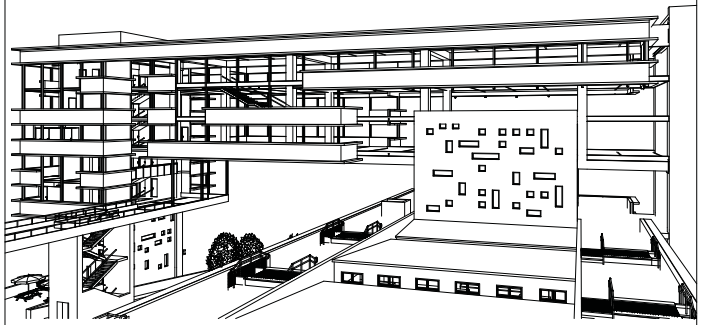
1m 2m



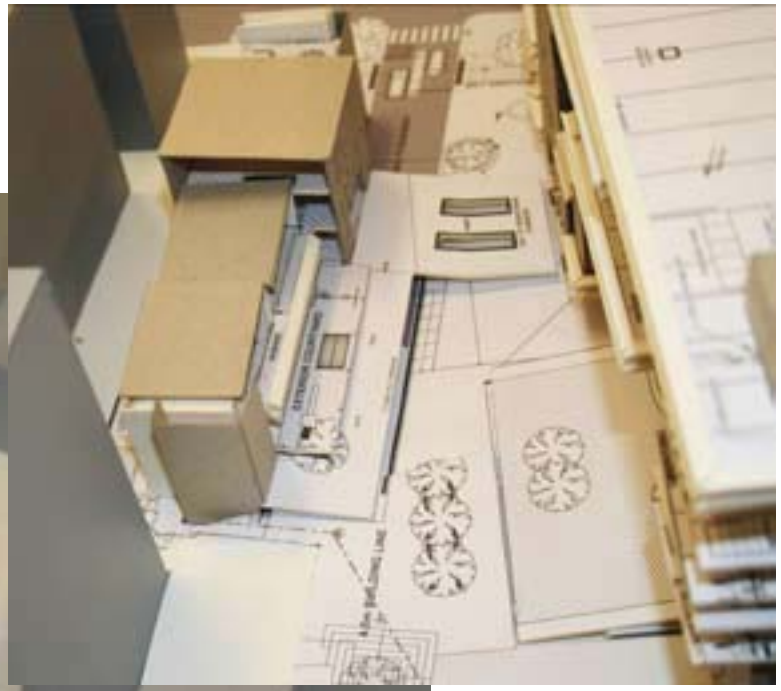
VIERENDEEL TRUSS BRIDGE STRUCTURE

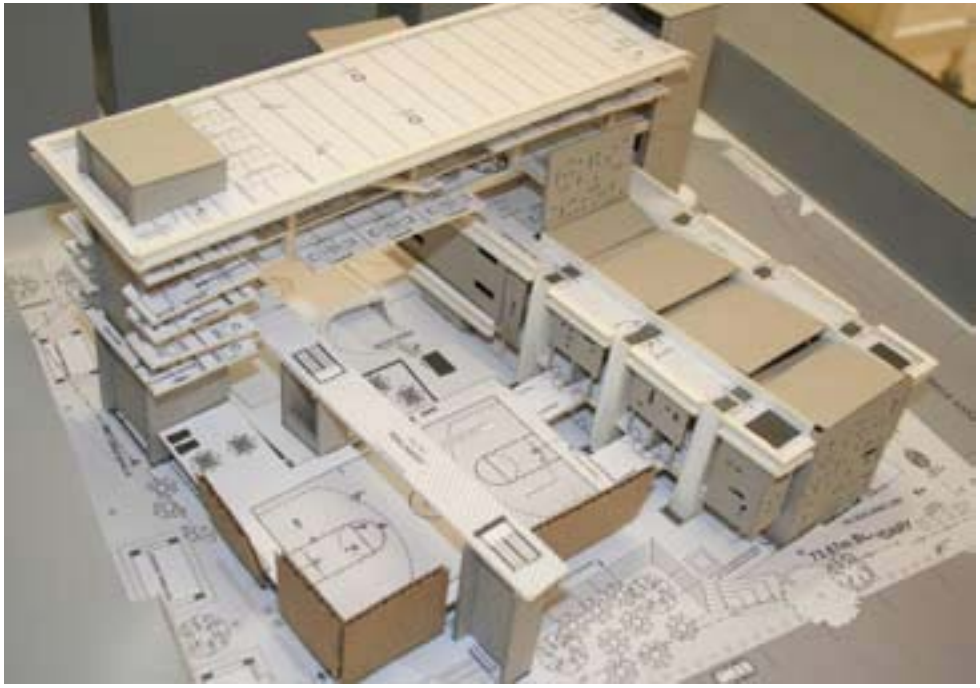


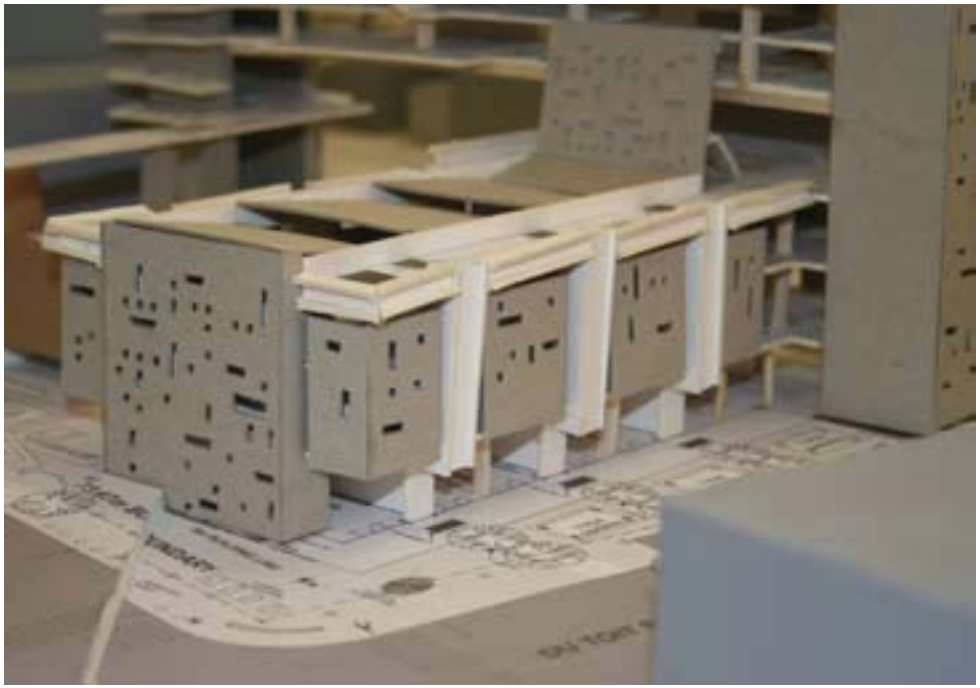
I-BEAM FLOOR JOISTS AND WALL STRUCTURE

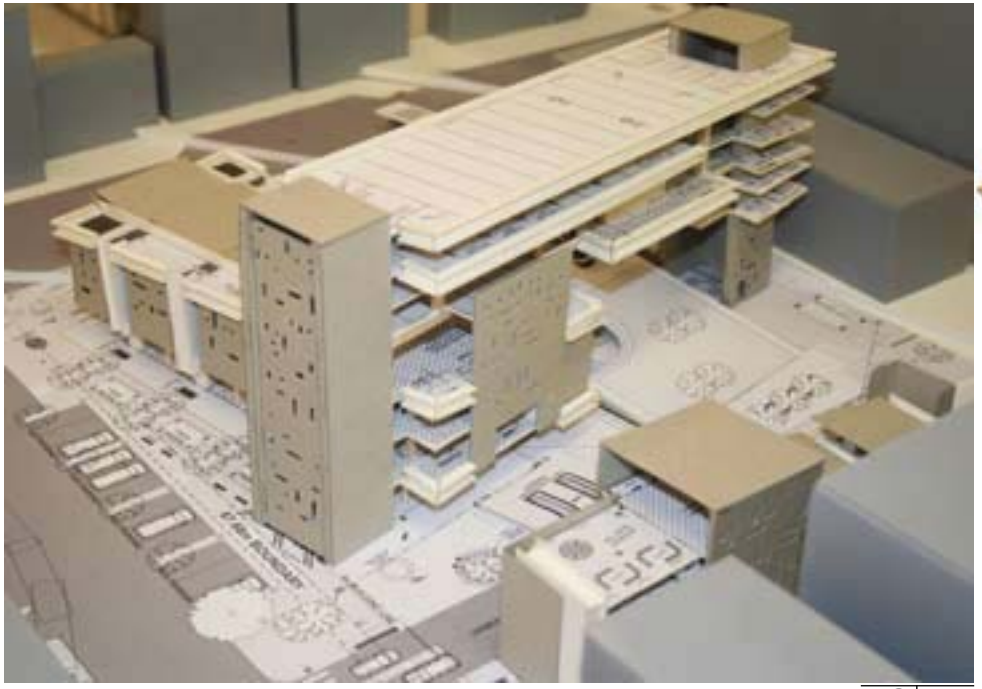


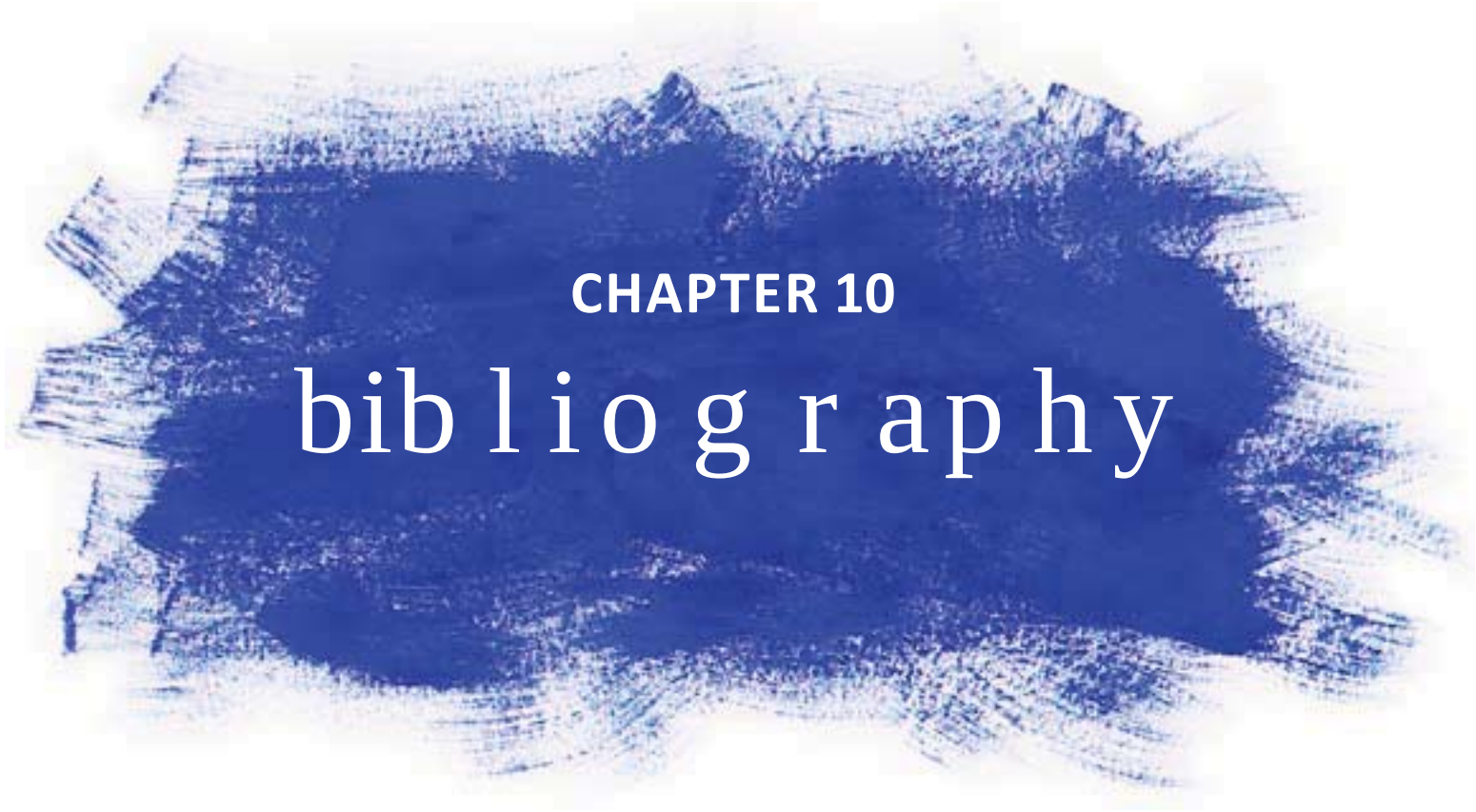
GLASS AND COPPER CLADDING











CHAPTER 10

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