The Resilient Child: Emotional Space

Daily life and emotional well-being as a space maker.

In accordance with Regulations 4(e) of the General Regulations (G.57) for dissertations and thesis, I declare that this dissertation, which I hereby submit for the degree Master Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of this dissertation has already been, or currently being, submitted for any degree, diploma or other qualification.

I further declare that this thesis is substantially my own work. Where reference is made to the work of other, the extent to which that work has been used is indicated and fully acknowledge in the text and list of references.

Michelle Mills
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Submitted in partial fulfillment of the requirements for the degree of Master of Architecture, MArch(Prof) of the Facility of Engineering, Built Environment & Information Technology

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Special Thanks to...

Neels Van Rooyen, for your patients and support
The other M's for your encouragement and laughter
David for your endless love and support
Mom for love, support and deep pockets
Christ Jesus for your faithfulness.

for my dad...

fire station

main road

taxi parkade

Abstract

This dissertation investigations the idea of using the existing energies, within the networks of survival, of Mabopane to create a community that is able to do more then simply survive but thrive in networks that are resilient and regenerative.

Using the theory of regenerative and resilient design, the investigation will focus on the potential of the energieswithin the network of survival to become resilient as it interacts with surrounding networks, forming new structures and relationships, and the potential to become a catalyst for the resilience of surrounding networks.

The architectural and spatial investigation of this dissertation is to use architecture and civic space as a catalyst for the resilience of the existing networks in the community.

Using architecture to address needs within the community by creating new connections and relationships between existing networks, and transform the surviving network into a resilient one. Civic space will be investigated as a point of connection and interaction of the survival networks.

local market

train station

shopping bulevard

STATION PARAFFIN WHOLESALERS

01_ Introduction

List of Definitions:

Survival of social systems:

Survival in the ability of systems to adapt to the influences of external forces; without considering inherent skills or previous methods of living. Surviving systems often neglect and squander creativity and former knowledge.

Survival networks:

Survival networks are the relationships developed between members of a community, through which skills and resources are shared, in order for the individual members of the community to survive.

Survival patterns and rituals:

Activities and routines that facilitate and ensure the survival of the network using them. Survival patterns or rituals influence the relationships and connections that develop within the community.

Civic space:

Civic space is the interaction of people with one another and civic place. It serves the community and addresses a need.

Resilience:

Resilience is a systems ability to prepare and plan for, absorb, recover from and adapt to adverse events. The ability of a system to bounce back after troublesome circumstances.

Regeneration:

Transforms and renews the existing systems in order to create the conditions for life to thrive. It considers the existing potentials within a system and how they can be used to bring about new life function and form. (Du Plessis, 2013.)

"...Resilience which adapts by reorganizing existing processes, structures and elements to renew and transform the system and create new ways of doing and new relationships that allow the emergence of new development pathways."
(Du Plessis, 2013. Pg 37)

Figure 1.1. Mabopane market stall

Figure 1.2. Mabopane market stalls

01_Background to African cities of Survival:

African cities are places of survival. They are filled with hundreds of activities all side by side on "stages too cramped, too deteriorated, too clogged with waste, history, disparate energy, and sweat to sustain all of them." (Simone, A, 2004:1).

Each of these activities finds survival in systems that hastily adapt as they attempt to sustain themselves and the activities relying on them. The ever-changing systems result in survival defined by the use of whatever is available at the time, and a community that has lost its inherent creativity and ability to live (Simone, A, 2004:1). The community forgets or puts aside its inherent ways of life and frantically grabs whatever it can to put food on the table.

The potential energies and inherent creativities within systems or networks of survival are lost in the ever-changing communities and cities of survival.

The potential for these energies to create resilience and life is ignored and squandered (Simone, A, 2004:1).

The African city will only be able to survive and enable the survival of a large number of networks as long as it continues to ignore its inherent ability to create life and grab at anything the western world throws at it. The African city has the potential to create resilient and regenerative communities and networks, by making use of the energies and skills it inherently possesses (Du Plessis, 2013: 37).

The African city has the potential to do more then survive it has the ability to thrive.

Figure 1.3. Mabopane market street

02_Background to Mabopane as place of Survival:

Mabopane is a typical African city of survival.

Mabopane was formed as a black-only township during Apartheid era and formed part of the independent homeland of Bophuthatswana (Ngubeni, K & Palmary, I. 2003). This separation of the black communities from the wealth and opportunities of the rest of South Africa forced Bophuthswana to become the initial source of survival Mabopane.

Mabopane was reincorporated into South Africa, in 1993, after the demise of Apartheid and in 2001 it became part of the City of Tshwane Metropolitan Municipality. (Ngubeni, K & Palmary, I. 2003).

The change of political rule allowed Mabopane's survival to become part of the wealth and opportunity of all of South Africa but its history of segregation remains the foundation for its survival patterns and networks.

Mabopane relies on energies and resources provided and supported by the large transportation hub and the surrounding precinct.

The networks surrounding the precinct have developed in the manner described by Simone as a hodgepodge of activities causing the resources and energies inherently available in each network to be scattered and unavailable to other networks. This results in existing networks adapting and changing without thought for the lasting impact and the heritage that brought them to their current state (Simone, A, 2004:1).

mabopane
surviving african city

external energies support
city's survival

local taxi rank

train station

local market

Figure 1.4. General Issue-Surviving Mabopane

03_The Issues:
General Issue

Mabopane is a city of survival.

The communities within Mabopane rely on external providers as sources of income and energy. Part of the community moves out to other parts of Tshwane for work on a daily basis and the remaining community uses the energy generated by the transport hub that dominates the fabric of Mabopane to feed a local market and light industry.

The community creates connections and networks within the physical fabric of Mabopane that ensures their survival. The networks rely on energies from elsewhere in the metro or generated by the hub. The resulting networks rely very little on the inherent energies, skills and knowledge of the local people.

The interaction of these survival networks with one another determines their strength and the stability of the community's survival. Through the interaction of the survival networks, energies and are shared to solve a particular need within the interacting networks.

The physical fabric of Mabopane neglects the interaction of the survival networks resulting in weak survival networks and consequently a weak surviving community.

The general issue observed within the fabric of Mabopane is its state of survival and its inability to draw off existing inherent energies and resources to facilitate and promote its survival
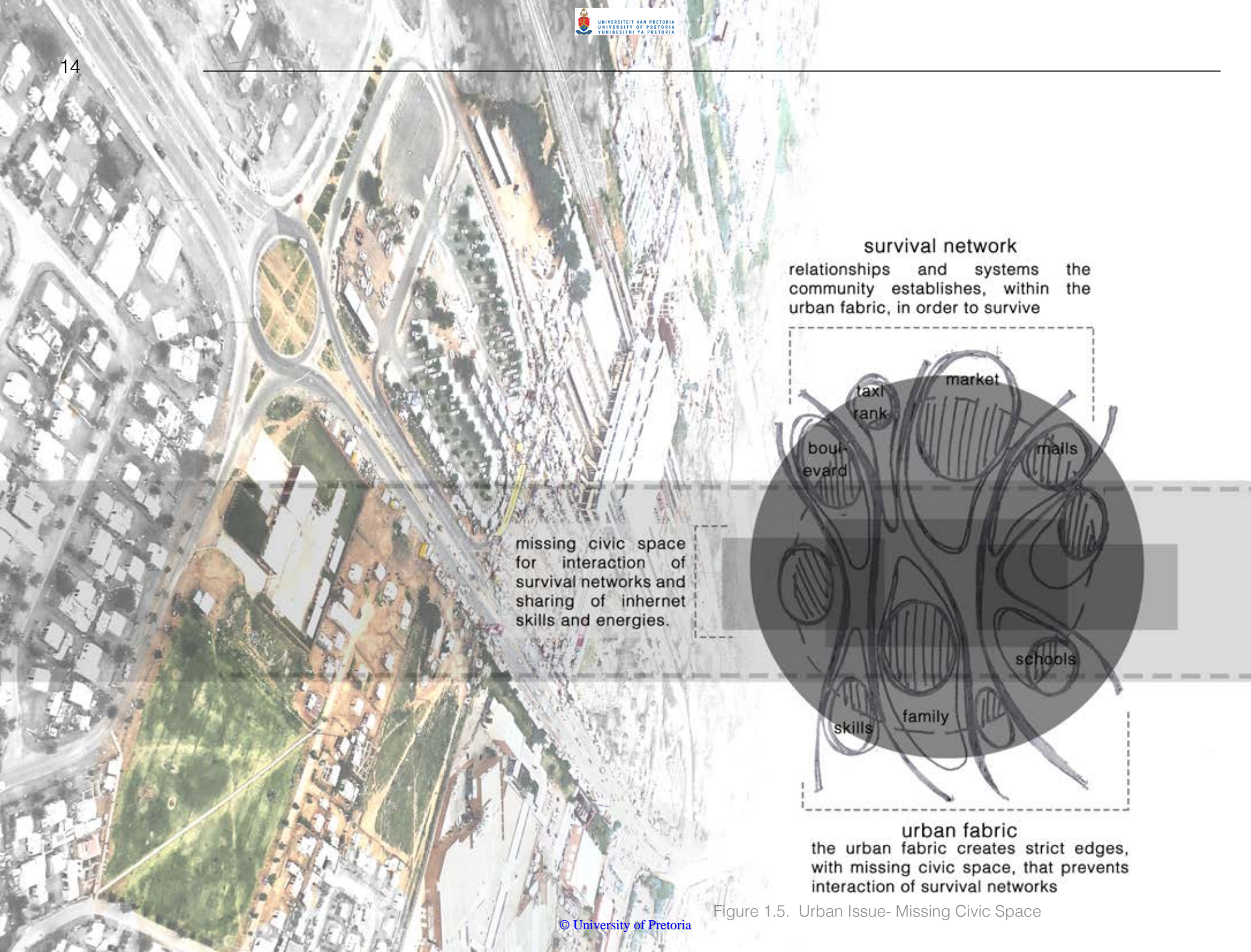
survival network

relationships and systems the community establishes, within the urban fabric, in order to survive

taxi rank

market

boul-evard

malls
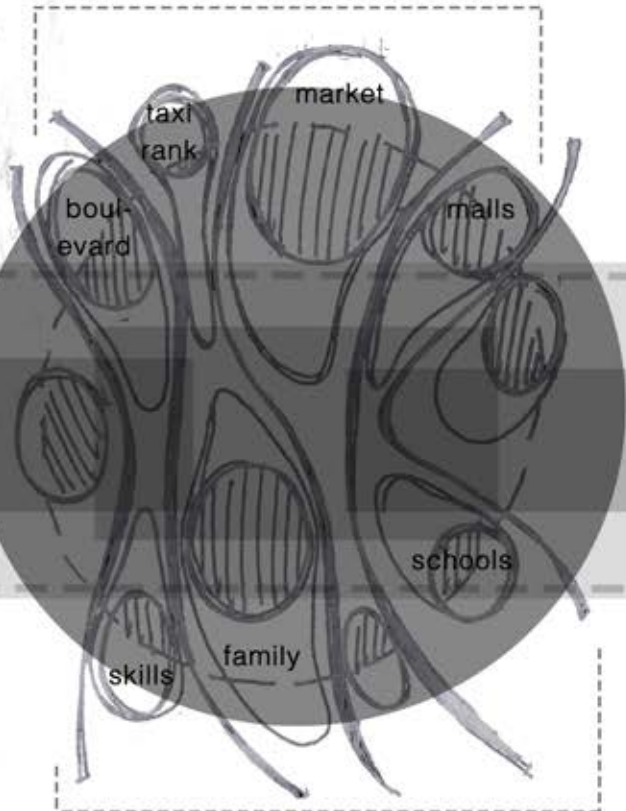
missing civic space for interaction of survival networks and sharing of inhernet skills and energies.

schools

skills

family

urban fabric

the urban fabric creates strict edges, with missing civic space, that prevents interaction of survival networks

Figure 1.5. Urban Issue- Missing Civic Space

Urban Issue

The urban fabric of Mabopane creates the environment the community and networks are expected to survive in. The transport precinct is dominated by public infrastructure; and the fabric is made up of buildings and places that attempt to aid in the survival of the community by providing external energies and forms of income.

Through the process of mapping this infrastructure, energies, activities, skills and networks in and around the transport precinct, a number of observations were made regarding the community's ability to survive and its process of survival.

The main observations made regarding the urban fabric of Mabopane are:

1. The survival networks are weak and experience a need.

2. The survival networks only have the opportunity to interact with survival networks that interact with the same elements of the urban fabric.

Therefore the survival networks of Mabopane are not given the opportunity to interact with other networks that can better aid their survival and potential resilience, resulting in weak survival networks.

This inability to interact with the appropriate survival networks and urban elements results in the following urban issue:

1. There is a lack of civic space to provide the community with an opportunity for its survival networks to interact and create relationships, and to draw off and share inherent skills and energies.

architecture addresses need experienced within the survival networks, in order to create civic space that allows for the interaction of the survival networks.
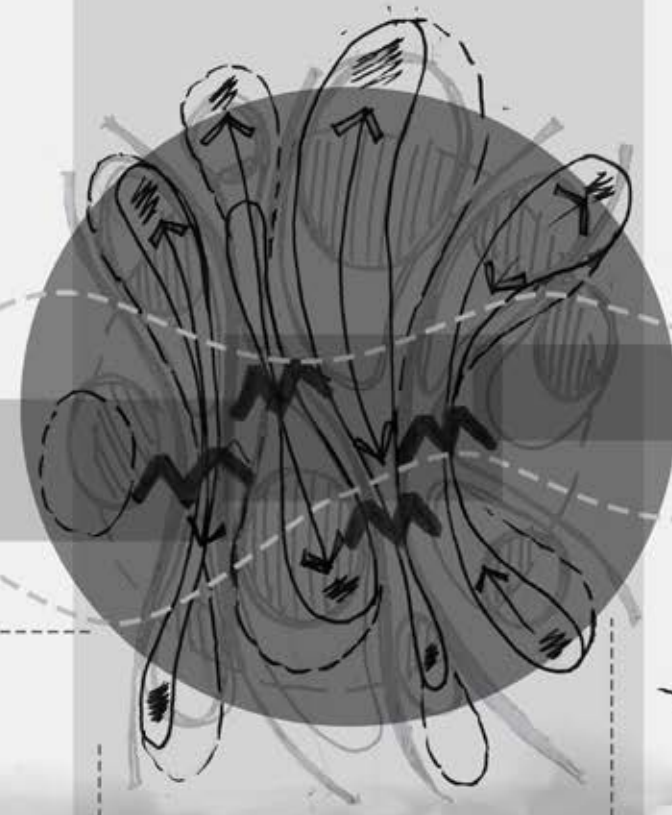
intangible edge that forms as very specific networks interact within strict edge created by the urban fabric.

Figure 1.6.   Architectural Issue

Architectural Issue

The architectural issue experienced within the community of Mabopane is a result of both the general and urban issues identified earlier in this dissertation.

Mabopane is a city surviving and enabling the survival of the communities and networks that form part of its fabric.

It enables the survival of the communities and networks that form part of its fabric through its urban fabric. Urban elements such as the transport hub and informal market supply large amounts of energies into the community, that creates opportunities for the community to survive; energies such as access to the metropole's activities, local trade and the movement of people.

Regardless of the cities abilities to supply means of survival, it is unable to provide all of community and their networks with life or opportunities for resilience.

The survival networks that rely on the energies generated by the transport hub and the activities that surround it are able to survive in spite of change and are in some situations resilient, such as the taxi system.

The networks that do not rely on the energies generated by the hub are unable to survive change as easily. This is a result of their relationship to the urban fabric (missing civic space) and the missing relationship to inherent energies within other networks.

The lack of civic space allowing for the interaction of these networks results in survival networks that are fragile.

The resulting architectural issue is: Can architecture define or facilitate civic space, by addressing spatial needs experienced by survival networks, that creates the opportunity for survival networks within the community to interact and share their inherent energies in order to fulfil a need in the interacting networks?

General Intention:

The general intention of this investigation is to facilitate the resilience of Mabopane, by strengthening the communities and networks that create the city so they can rely on inherent energies, skills and knowledge within the city.

Urban Intention:

The urban intentions for this dissertation are to create civic spaces that facilitate the interaction and connection of survival networks to share their inherent skills and energies thereby strengthening each other and creating the opportunity for resilient and regenerative networks.

Concentrating on civic space that belongs to the child and family survival networks

Architectural Intention:

The architectural intentions for this dissertation are to create an architectural intervention that acts as a catalyst for the resilience of the community of Mabopane, by tapping into the energies inherent in the daily life, and the child and family survival network in particular. Creating an architecture that is catalytic in the experience of each space and the lasting impact or lessons these spaces can potentially have.

The intention is to create specific psychological experiences that strengthens the family and children's survival networks, as they use the spaces daily, weekly or monthly.

dependance on local skills, energies and networks

using inherent energies to allow for growth and develoment
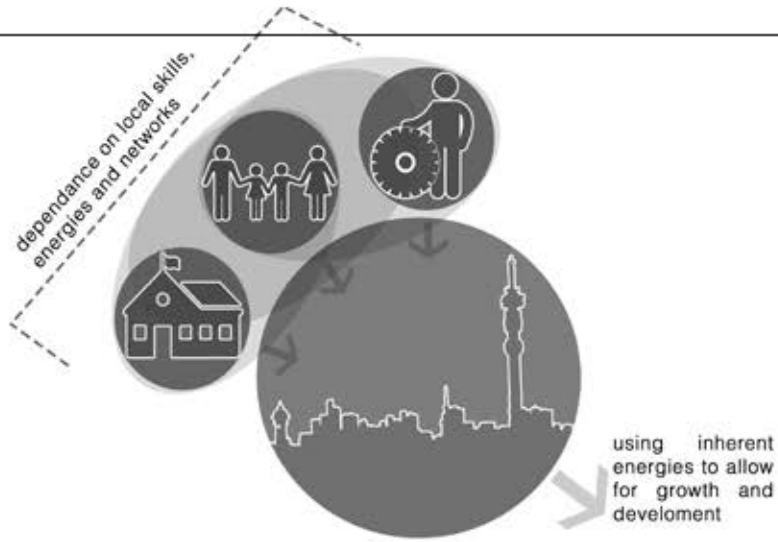
Figure 1.7. General Intention

creating points for interaction of local survival networks, in civic space

Figure 1.8. Urban Intention

using architecture to create civic space that allows for the interaction of survival networks.

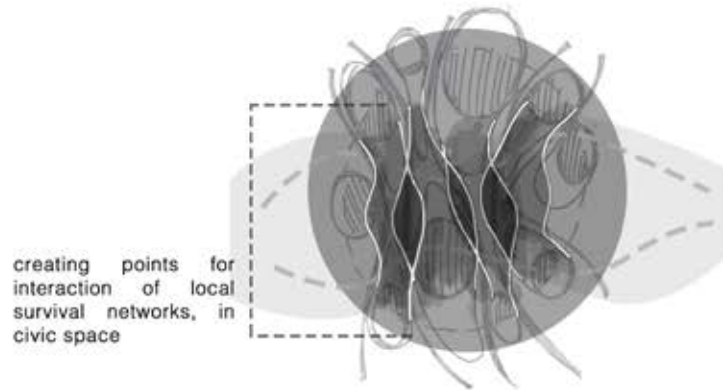the architecture is to aid in solving an issue experienced by the survival networks.
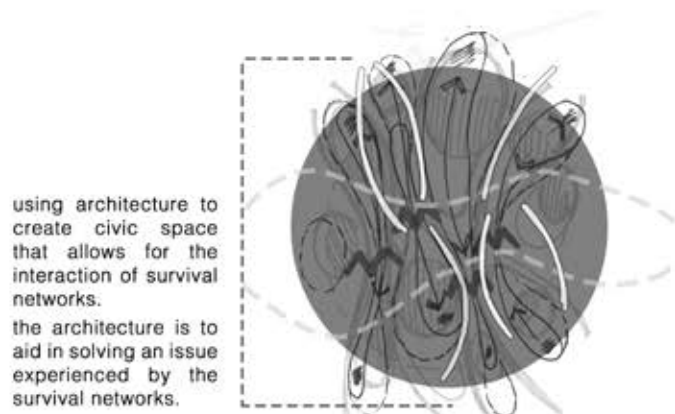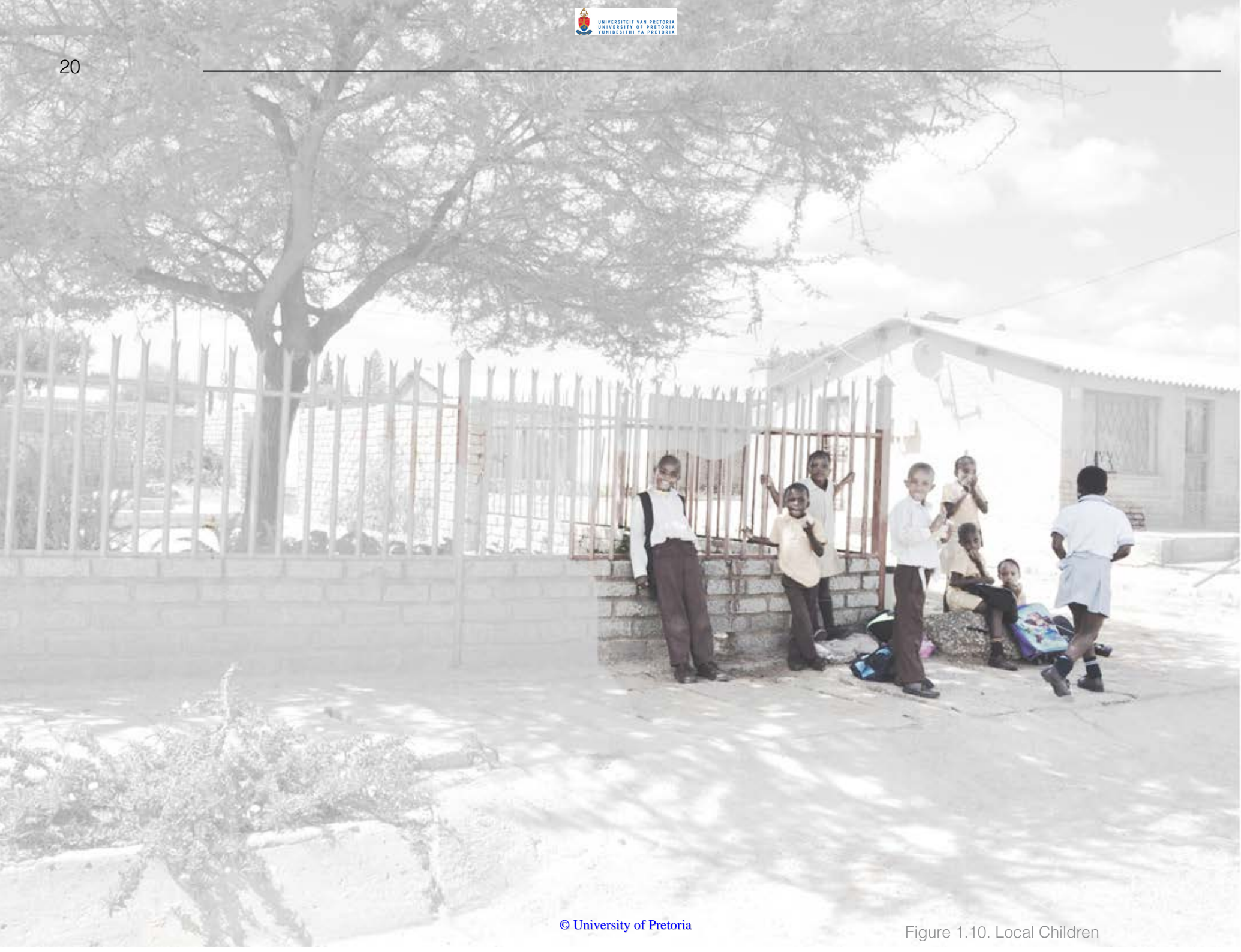
Figure 1.9. Architectural Intention

Figure 1.10. Local Children

05_Problem Statement:

Issues identified through research and site investigation:

1. Mabopane's urban fabric is missing civic space.

- The function of the missing civic space is to serve the community and allow for the interaction of and transfer of energies between the different networks within the community.

2. The missing civic space results in networks within the community that are fragile and simply surviving.

- The networks within the community not using the energies surrounding transport hub are unable to share inherent skills, knowledge and energies to solve the needs they are experiencing.

06_Hypothesis:

Creating resilient and regenerative networks within the community of Mabopane, by using architecture as a means to FACILITATE THE RELATIONSHIP BETWEEN CIVIC SPACE AND EXISTING SURVIVING NETWORKS. Using the daily life and rituals of a specific survival network to determine and define the required civic space that creates the opportunity for sharing energies and resources. Using the required civic space and needed interaction of survival network to define the appropriate architecture.

07_Research Methodology:

Type of research strategies to be applied in this dissertation:

-On site experience of networks and problems
-Research into the approach and analysis of this type of site

Data Collection:

Observation and Physical mapping_Primary Sources

Site visits to Mabopane:

-Video analysis
-Photography
-Field notes
-Journal Sketches
-Interviews with local community leaders
-Observation of daily rituals

Figure 1.11. Research Methodology

08_Research Questions:

What is the role of the relationship between civic space and existing surviving networks, in the creation of resilient networks within the community of Mabopane?

What is architectural designs role in the creation of civic space? How does the relationship of a networks problem and the architectural solution influence the creation and role of civic space?

What are the rituals and activities within the networks that influence the network's survival? What programmatic issue does the need within the network present and does it have the potential for the creation of a resilient network, through civic space?

Figure 1.12: Local Home Run Business

09_Delineations and Limitations:

- The investigation will consider in depth the rituals, survival and problems of a single network within the community.

- An overall understanding of the relationship of the single network with surrounding networks is required, in order to understand the most pressing civic need, how the surrounding networks can aid in the survival of the chosen network and how the chosen network can act as a catalyst for further resilience.

- A medium to low order civic need is to be addressed.

- A site of a manageable size within the ritual of the chosen network is to be considered.

- The site is potentially dangerous, therefore, site visits are limited and to be undertaken through a community connection.

02 _ understanding the world
mapping the survival of Mabopane

"… all human processes, needs designed structure with rules and routine that provide continuity and stability and that offer a shared context of meaning and a shared sense of purpose and justice." _ Nabeel Hamdi, Small Change.

The following mapping chapter examine and explores the rules, routines and physical and social fabric of the Mabopane township in Gauteng.

Gauteng has the smallest land area of all the provinces but is the highest populated

limpopo

north west

tshwane

jhb

mpumalanga

west rand

free state

Mabopane is located NNW of Pretoria central.The main connection between the CBD and Mabopaneis the Metro rail

temba

mabopane

soshanguve

garankuwa

wonderboom

mamelodi

centurion

Mabopane borders the well known suburb of Soshanguve. At the heart (and also dividing element) is the Mabopane train station

The Edge City

Edge cities are a common phenomenon in the South African landscape.
Once situated in the home lands enforced by the Apartheid government, they are found on the fringes of the urban core, separated by an industrial buffer zone and fostering the migratory labour system (Davies, 1981).

These areas are characterized by poor infrastructure development and informal solutions to housing, public space and transport issues.

Mabopane is one of these South African Edge cities. In the chapter that follows the Edge city of Mabopane is explored and the activities, rituals and networks that allow the people of Mabopane to survive are mapped and examined

the physical fabric of Mabopane is dominated by the large public train station and railway line that cuts the neighbouring communities in half.

The Future Edge

The most defining characteristic of the physical fabric of Mabopane is the large public train station precinct. The station and the railway lines create a divide between the suburb of Mabopane and the suburb of Soshanguve.

Metro rail's future plans for the railway line, running in Mabopane, is to extend the rail further north into the suburbs that line outside the boundaries of Mabopane.

This extension of the railway line will potentially increase the divide and separation between the communities of Mabopane and Soshanguve and suburbs that lie further north.

The existing division separates skills and resources that are inherent in each community and prevents these skills and resources from being shared and aid in the survival of each community.
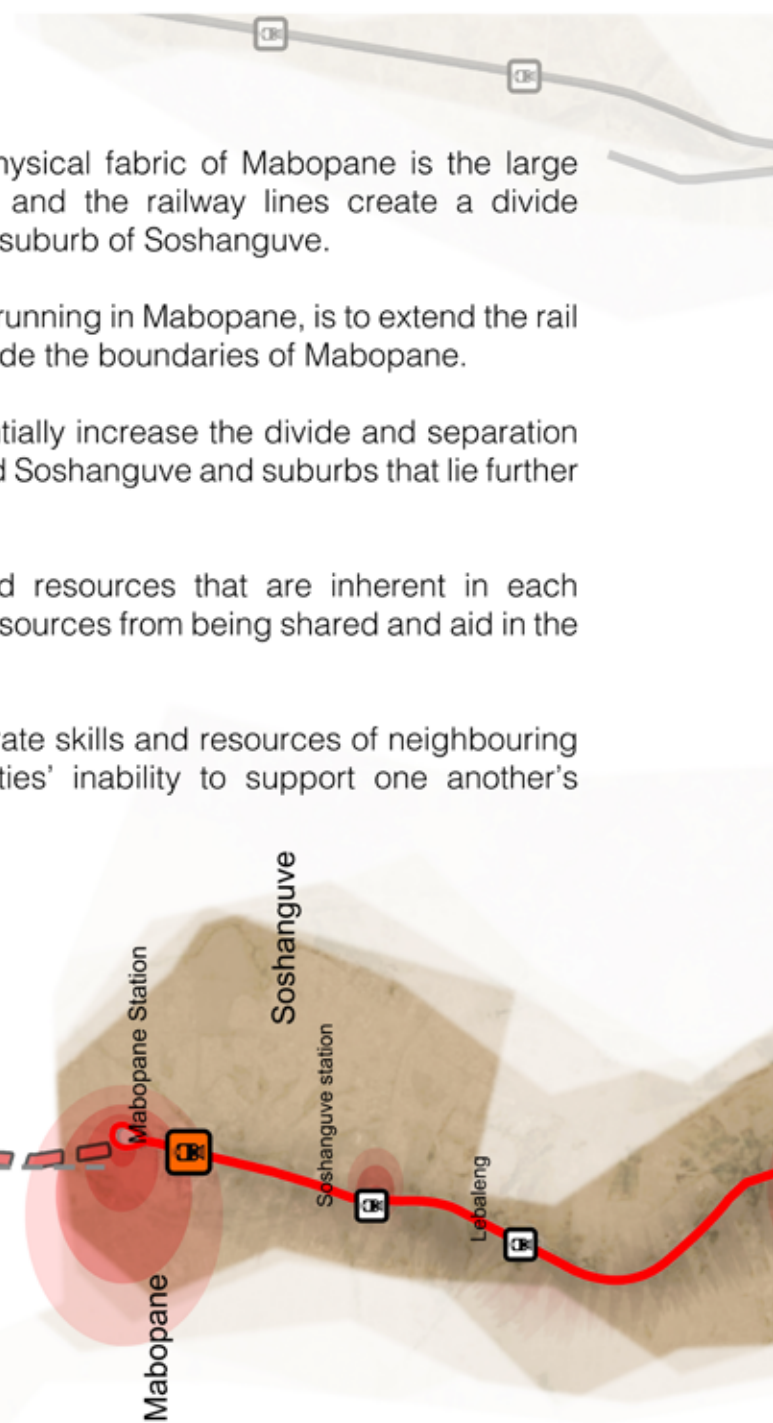
The increased separation will further separate skills and resources of neighbouring communities and increase the communities' inability to support one another's survival and potential resilience.
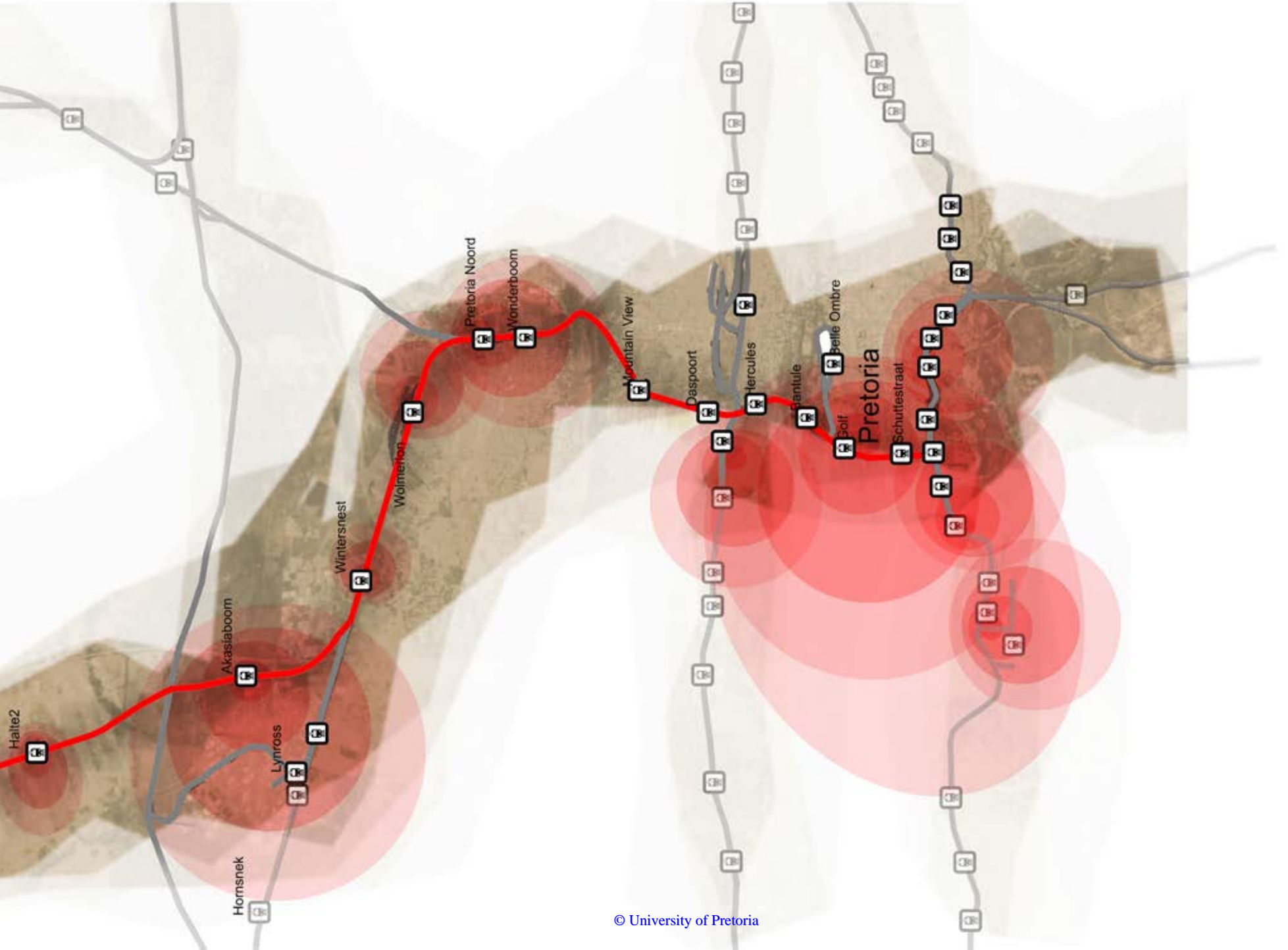
suburbs included:
soshanguve-north
ga-motle
moeka

future extension

Mabopane Station

Soshanguve

Soshanguve station

Lebaleng

Mabopane

The edge. . .

The Edge Cities are made up of a large number of smaller edges that create the conditions within which the community is expected to survive. These smaller edges are the physical fabric, the economic fabric and the social fabric of the community and the context, some of these edges are enabling and some disabling.

Humanity encounters these edges, as we explore the place, and in turn experience the spaces the edges create or require in order to survive.

As a concept for mapping the physical, economical and social fabric of Mabopane, these edges where explore and examined, in order to understand how the community survives, how the make spaces and whether or not the edge is enabling or disabling to the community of Mabopane.
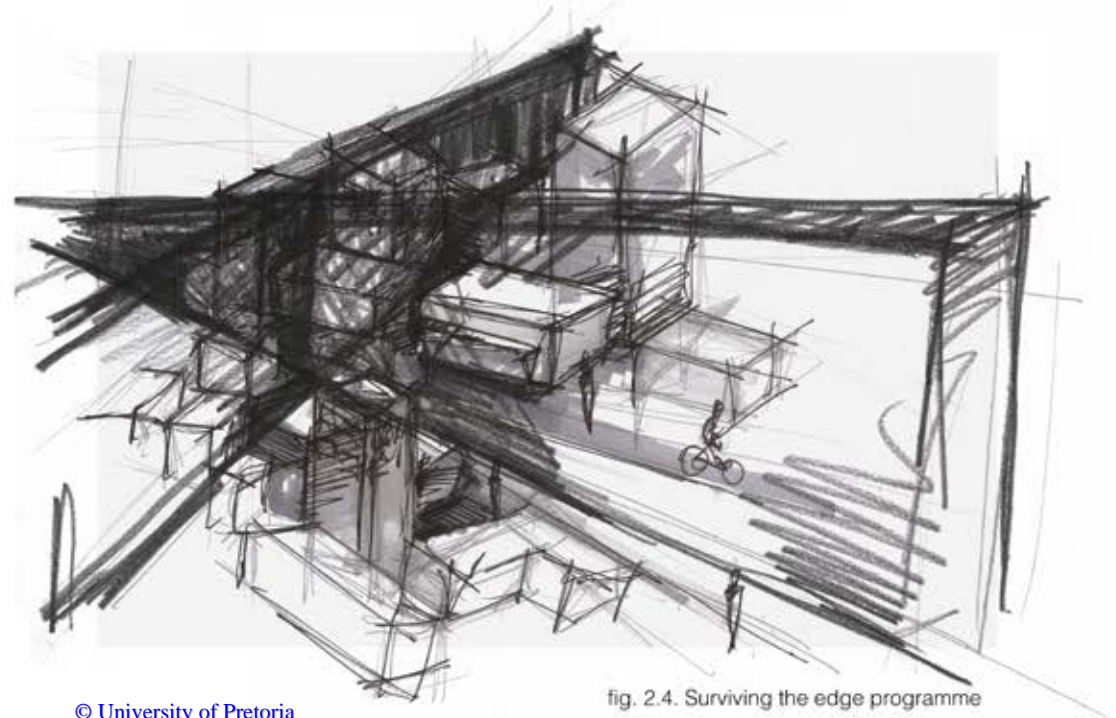

fig. 2.3.Negotiating the edge programme

fig. 2.4. Surviving the edge programme

The edge narrative
the story of place

The existing edges within the fabric of Mabopane are created by current conditions but also conditions from the past. The historical narrative of Mabopane has aided in creating the edges that are present in the fabric now.

Mabopane was established as a blacks only township early in its history, under the Transvaal rule.

Later, Mabopane fell under the rule of Bophuthatswana and once Bophuthatswana gained independence, its king moved all non-Botswana citizens into Mabopane and Soshanguve.

As the uprising against the Apartheid government grew in South Africa, in 1980, the people of Mabopane joined the fight for freedom; with a number active of ANC and PAC bases present in the community.

Mabopane has remained a black dominated community, with the majority of the population still living with a very low income, even after freedom was won in 1994.
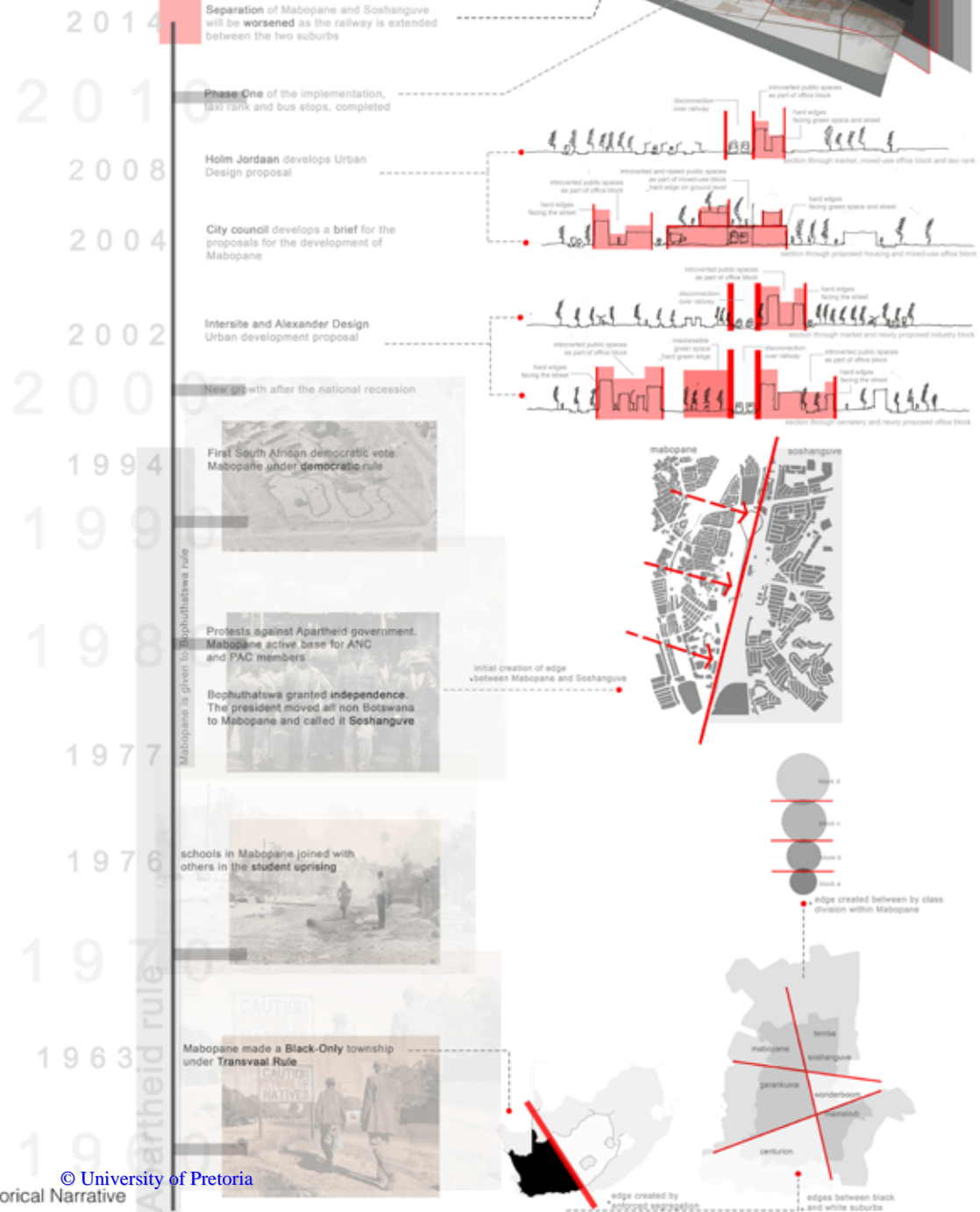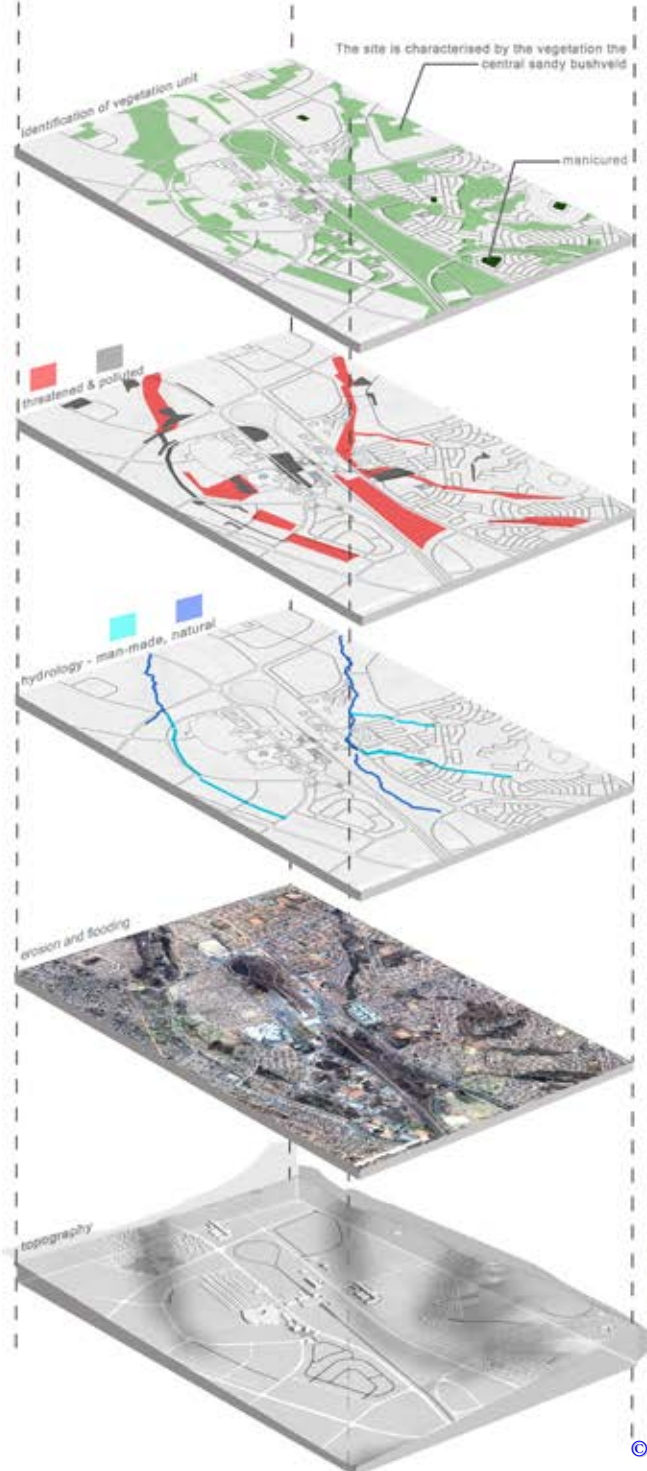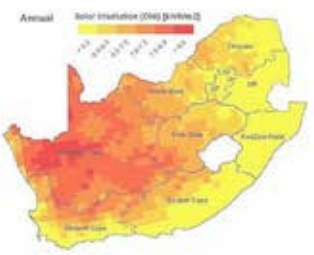

fig. 2.5. Historical Narrative

2014 — Separation of Mabopane and Soshanguve will be worsened as the railway is extended between the two suburbs

2010 — Phase One of the implementation, taxi rank and bus stops, completed

2008 — Holm Jordaan develops Urban Design proposal

2004 — City council develops a brief for the proposals for the development of Mabopane

2002 — Intersite and Alexander Design Urban development proposal

2000 — New growth after the national recession

1994 — First South African democratic vote. Mabopane under democratic rule

1990 —

1980 — Protests against Apartheid government. Mabopane active base for ANC and PAC members

Bophuthatswa granted independence. The president moved all non Botswana to Mabopane and called it Soshanguve

1977 —

1976 — schools in Mabopane joined with others in the student uprising

1970 —

1963 — Mabopane made a Black-Only township under Transvaal Rule

Mabopane is given to Bophuthatswa rule

Apartheid rule

© University of Pretoria

identification of vegetation unit

The site is characterised by the vegetation the central sandy bushveld

manicured

threatened & polluted

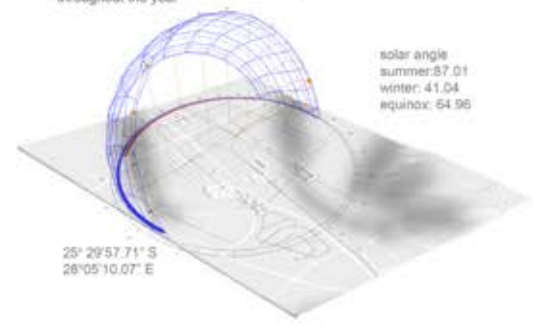hydrology - man-made, natural

erosion and flooding

topography

sun

the northern part of gauteng recieves abundant solar radiation

with the ridges running parallel to the equator, most of the site recieves sunlight throughout the year

Annual   Solar Insolation (DNI) [kWh/m2]

solar angle
summer: 87.01
winter: 41.04
equinox: 64.96

25° 29'57.71" S
26°05'10.07" E

wind

with the wind speed increasing during august, wind chill might be a problem

the possibilty of cooling using natural ventilation with a properly oriented building during the summer months is high

summer

autumn

psychrometric chart for summer, showing possible ventilation coolin

winter

spring
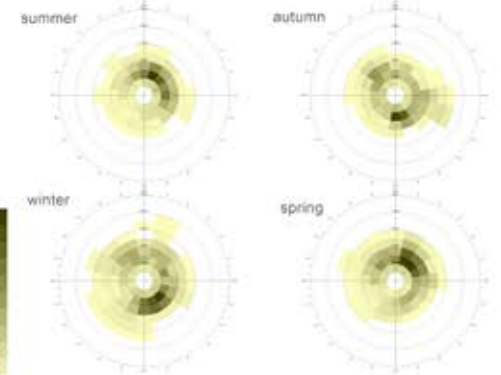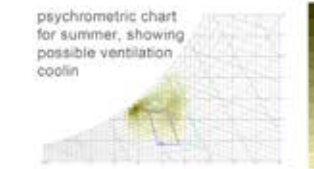
rain

summer rainfall with very dry winters
3 Seasons:
May to mid-August -> cool dry season
mid-August to October -> hot dry season
November to April -> hot wet season

due to the heavy rainfall in summer, pressure is put on the natural drainage system, resulting in flash floods (poor infiltration)
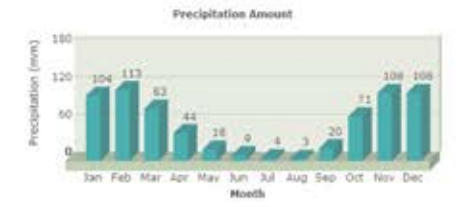
Precipitation Amount

Number of Rain/Drizzle days in month

fig. 2. 6. Climatic Data

over the (h)edge
the climatic data

The climatic and environmental context of Mabopane also creates and influences the edges created within the fabric.

Mabopane's environmental context is charaterised by a number of rivers and wetlands that act as physical barriers within the community, keeping the community away from the railway line, aiding in the separation of neighbouring communities and creating large open fields that are neglected and used as dumping grounds.

earth

shale and granite

little biodiversity
broad leaved Combretum woodland on shallow rocky soils

deforestation
deciduous Terminalia sericea and Burkea africana

species of Acacia, Ziziphus and Euclea found on flats and lower slopes on eutrophic sands

limited protection
grass dominated herbacious layer with low basal cover on dystrophic sand

poor drainage
natural river system with pockets of wetland removed, erosion risk

destruction of habitat
alternates with man made channel - low biodiversity

average gradient --> 1:14

hill area

average gradient --> 1:5

plain area

Solar and wind data: produced in Ecotect (Autodesk Ltd)
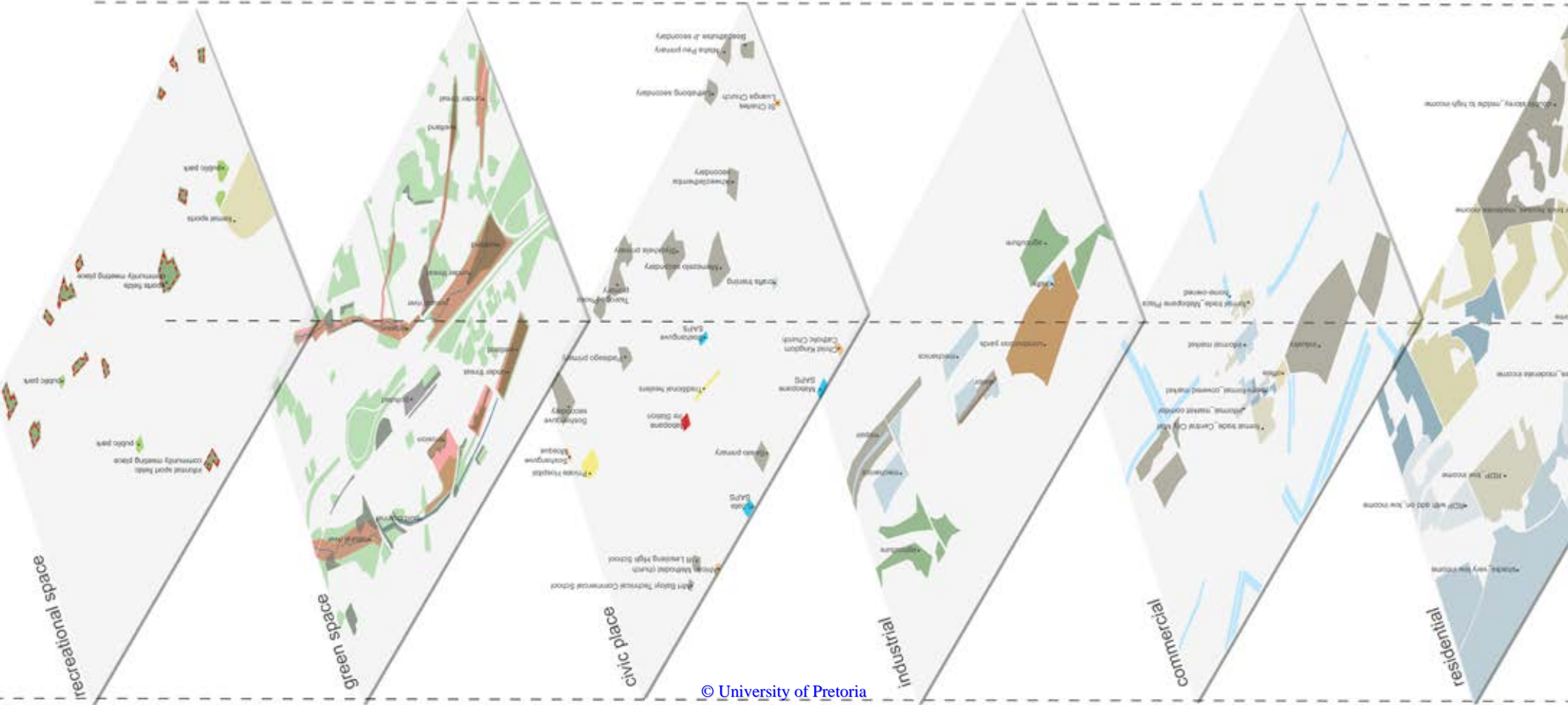
Climate data: Weather24.co.za

Vegetation info:
Mucina, L., Rutherford, M.C. (eds). 2011. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19, South African NAtional Biodiversity Institute, Pretoria

fig. 2. 7. Geographic Data

Creating the edge
understanding the physical fabric of the place

The physical fabric of Mabopane creates the physical edges the community interacts with. The physical edges are created by public transport, infrastructure, public spaces and squares, private residences and retail functions.

recreational space

green space

civic place

industrial

commercial

residential

8 market and taxi rank

7 bus station and taxi rank

6 mabopane taxi rank

mabopane train and
5 bus station

mechanics and
4 petrol station

3 soshanguve taxi rank

2 mabopane train station

mabopane and
1 soshanguve

circulation

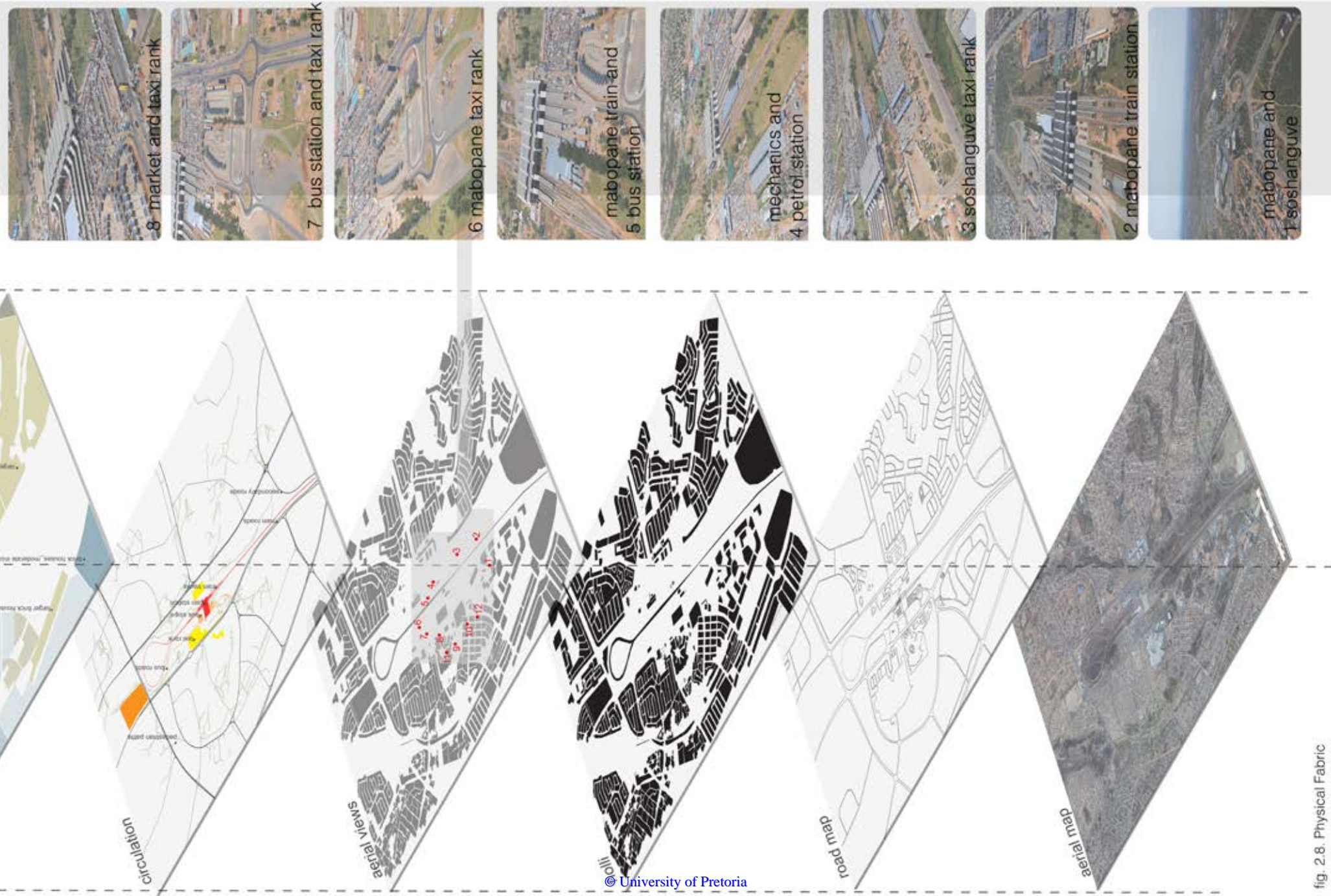aerial views

nolli

road map

aerial map

fig. 2.8. Physical Fabric

The edge condition
understanding how the edges are created

Once an understanding of what elements create the edges within Mabopane was established, how these elements create the edge condition was examine. A number of sections where drawn through different edges within the fabric in order to understand how the physical fabric and the people of Mabopane create the edges.
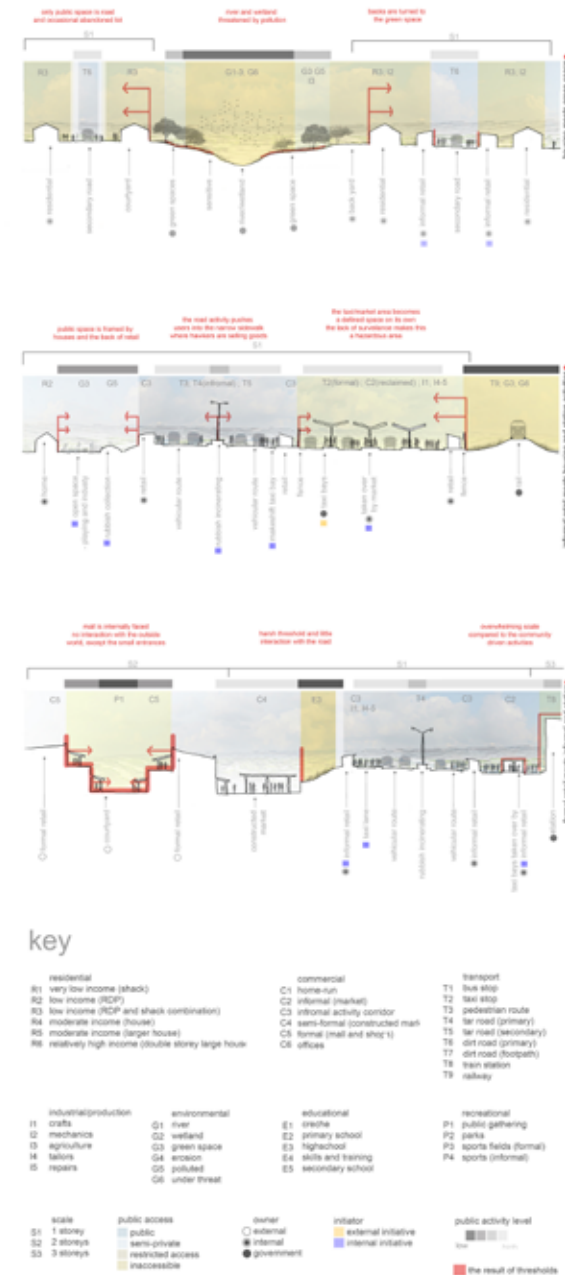
The edges within the fabric form in the following ways: (refer to figure. 2.9.)

- Along natural barriers, such as a river or natural wetland. The land along the riverbank or at the wetland edge are often neglected or used as dumping sites. The community trend is to turn their back on the natural barriers and not tap into the potential the river, wetland or open fields have.

- Edges develop in between and along roads and transport routes. Informal traders in the community have established a form of boulevard along the main transport route running into Mabopane, the traders establish stores where there are a large number of potential clients. The traders' boulevard has invaded the pedestrians' spaces along the street edge and made the traders' boulevard dangerous for the pedestrian, the traders so heavily rely on.

- A hard, inaccessible edge develops along the railway line and the huge train station. This inaccessible edge separates neighbouring communities, resources and skills from one another; making potential survival energies inaccessible to the community.

- Edges are created but large retail malls. The mall turns its back on the residential fabric of Mabopane and creates introverted, inaccessible public spaces.

key

residential		commercial	transport
R1 very low income (shack)		C1 home-run	T1 bus stop
R2 low income (RDP)		C2 informal (market)	T2 taxi stop
R3 low income (RDP and shack combination)		C3 informal activity corridor	T3 pedestrian route
R4 moderate income (house)		C4 semi-formal (constructed mall)	T4 tar road (primary)
R5 moderate income (larger house)		C5 formal (mall and shop's)	T5 tar road (secondary)
R6 relatively high income (double storey large house		C6 offices	T6 dirt road (primary)
			T7 dirt road (footpath)
			T8 train station
			T9 railway

industrial/production	environmental	educational	recreational
I1 crafts	G1 river	E1 creche	P1 public gathering
I2 mechanics	G2 wetland	E2 primary school	P2 parks
I3 agriculture	G3 green space	E3 highschool	P3 sports fields (formal)
I4 tailors	G4 erosion	E4 skills and training	P4 sports (informal)
I5 repairs	G5 polluted	E5 secondary school	
	G6 under threat		

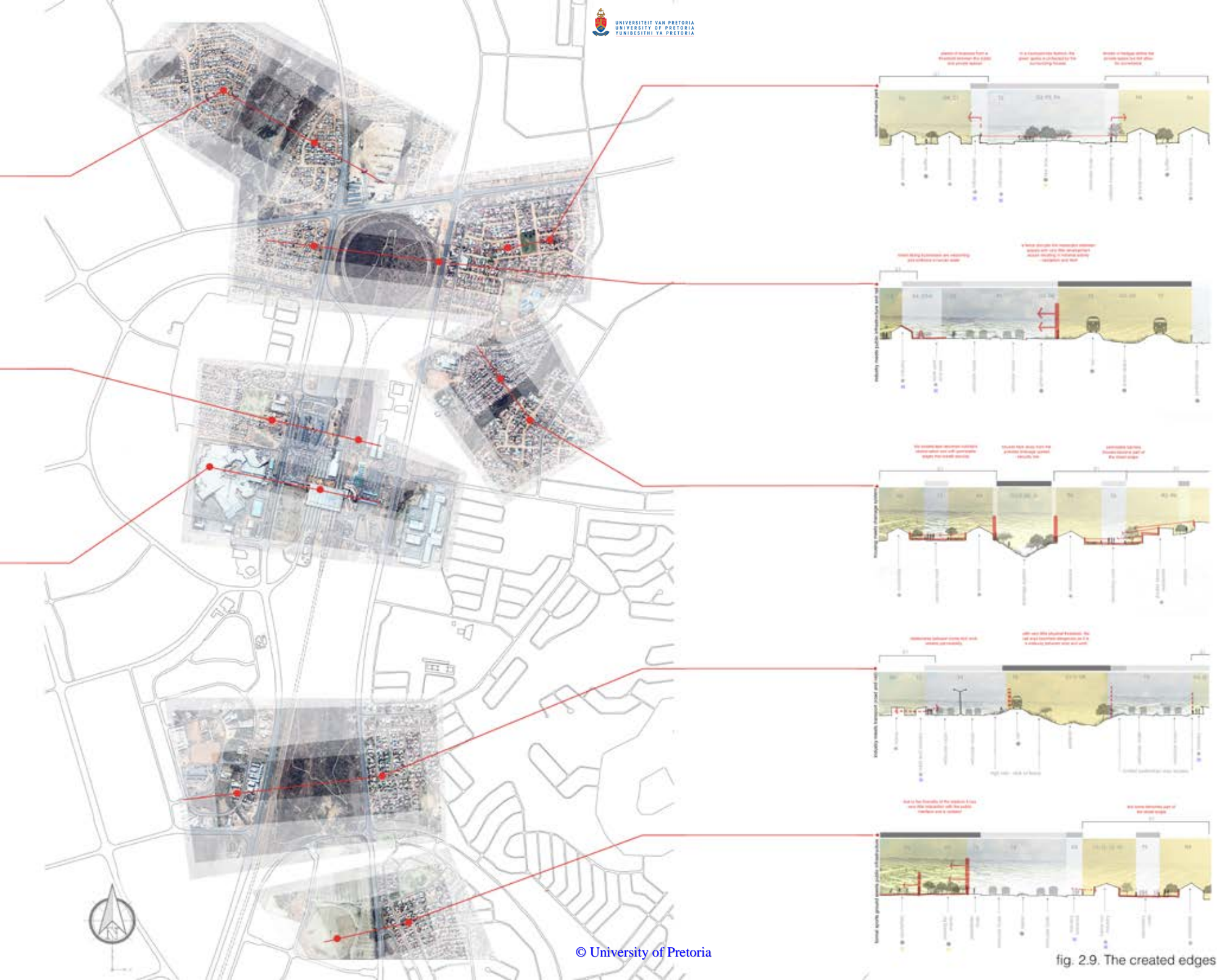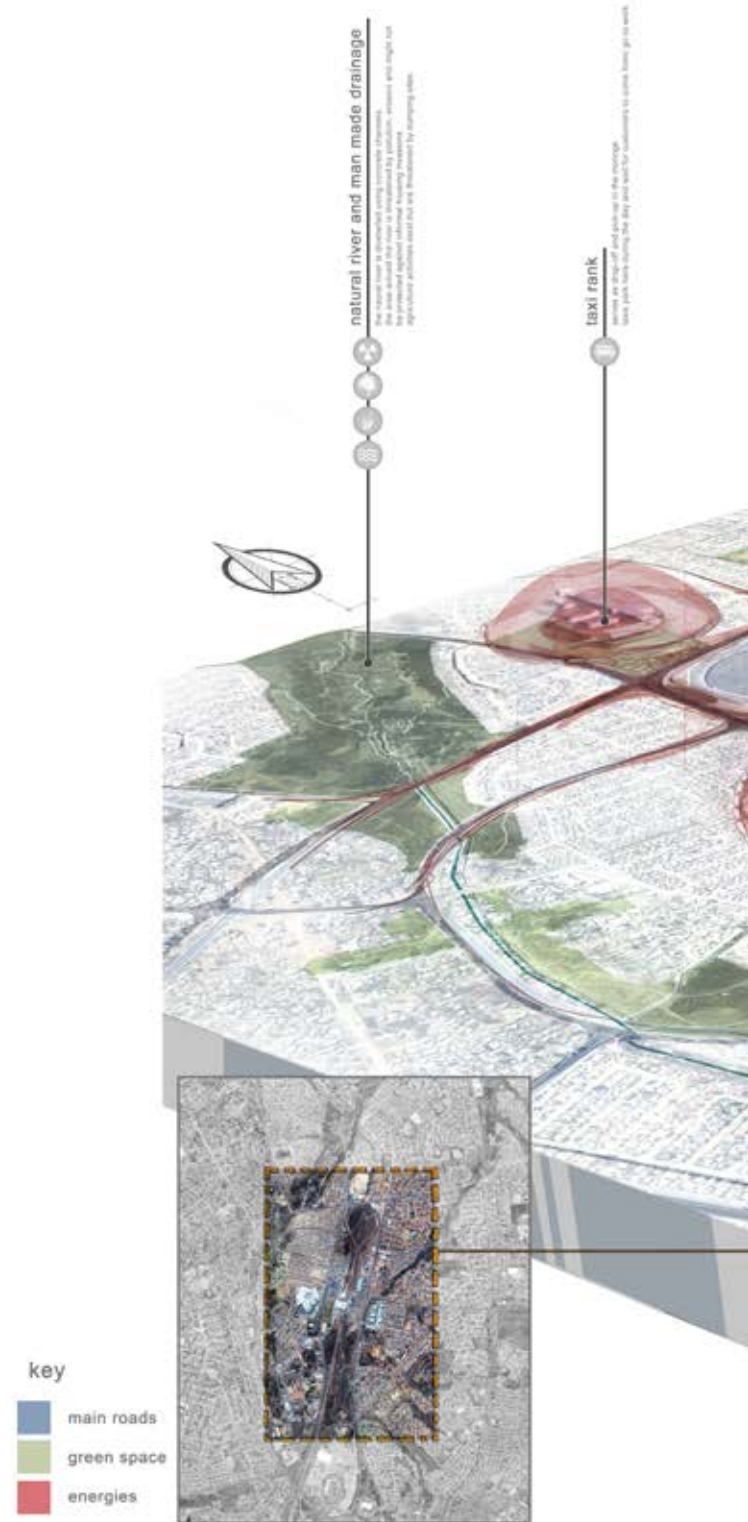| scale	public access	owner	initiator	public activity level
S1 1 storey	public	○ external	external initiative	
S2 2 storeys	semi-private	◉ internal	internal initiative	
S3 3 storeys	restricted access	● government		
	inaccessible			the result of thresholds

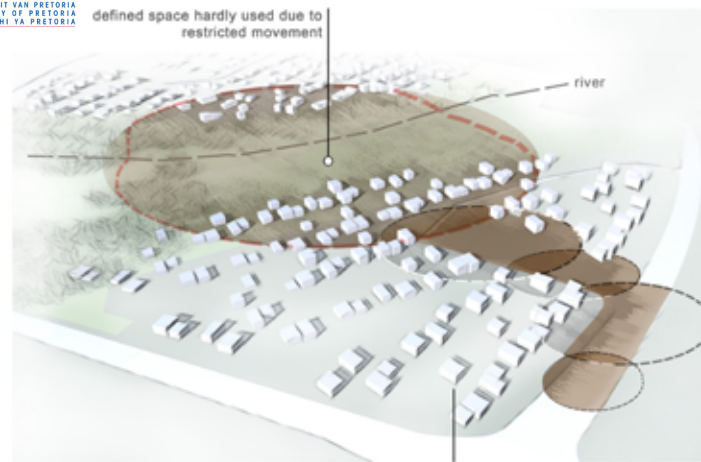fig. 2.9. The created edges

The Dynamic edge
understanding the energies generated within the created edges

After an understanding of how the edges are created was established, how energy is distributed along these edges and where the most energies accumulate.
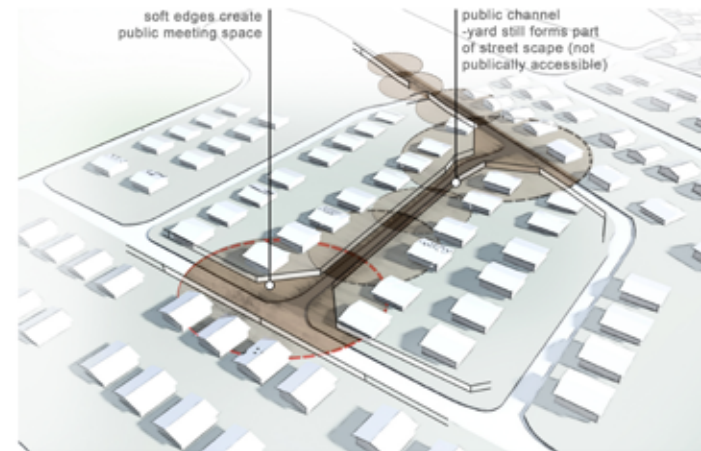
The most energy accumulates at the train station and informal market, establishing a largest node. Smaller amounts of energies accumulate at the local industry, sports fields and local schools.
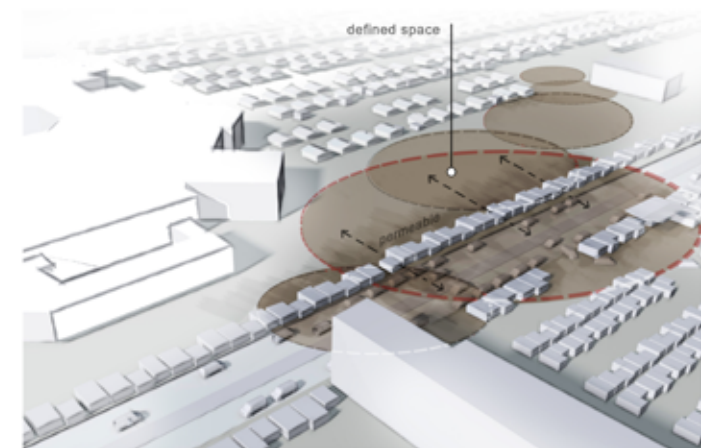

natural river and man made drainage

taxi rank

key

main roads

green space

energies

petrol station

central city mall

activity corridor

mabopane station

mabopane plaza

industrial

open green space

green belt

giant stadium

schools

fig. 2.10. Energy distribution

The civic edge
understanding how civic space is made

Within the created edges and energies along these edges civic places are established.

Civic place develops along the retail promenade and into the informal market, along the station boundary. This civic place is defined by the people using it and the rituals it houses.

Open spaces become civic place for religious rituals within the community, on a weekly basis. These open fields are neglected along their boundaries and often become dumping sites for industry or retail functions.

Parks develop between houses facing one another. The park site on the inside of the house boundaries, creating an observed and project civic open space.

School sports fields and courtyards become public meeting spaces and squares within which the community is allowed to voice their concerns and opinions. School facilities are used due to a lack of a formal public square, within the civic infrastructure surrounding the station.
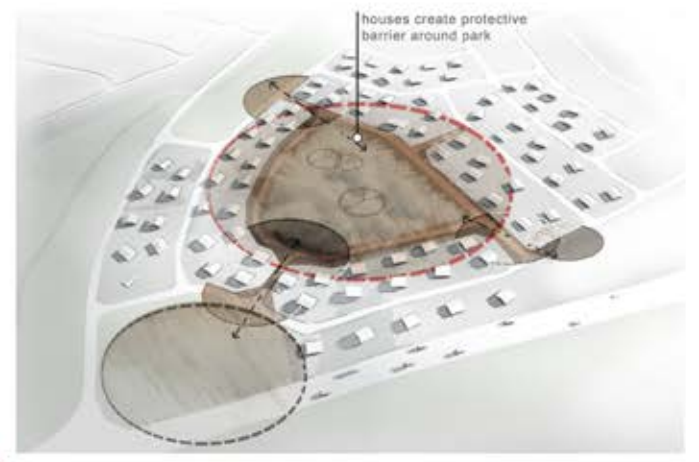

defined space hardly used due to restricted movement

river

residential and green space

soft edges create public meeting space

public channel -yard still forms part of street scape (not publically accessible)

residential (RDP)

defined space

permeable

informal trade and public space

sketch key

▪ main focus

▪ defined space

map key

☐ public space

■ not public

space defined by edges

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claimed market

main road

informal trade and the station precinct

houses set back, larger sidewalk

fenced off from green space
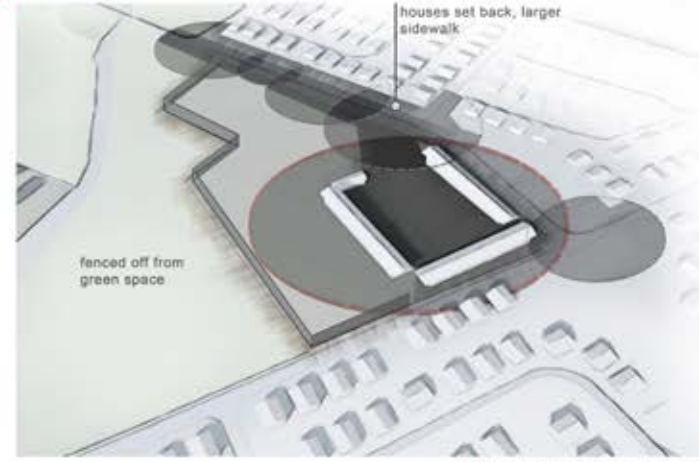
education and residential

houses create protective barrier around park

park and residential

fig. 2.11. Civic place within fabric

The systemic edge
understanding the networks and systems of survival

People create social edges within the physical edges and civic places within the community. The social edges become and establish survival networks within the community.

These networks are used to support and project the people that create them. They rely heavily on the energies in the context of Mabopane and the energies brought in and surrounding the train station.

Networks develop as part of local industry, the retail civic spaces, local public transport, education facilities and medical facilities. Figure 2.11 illustrates the networks that develop and the rituals each network defines.

Within many of the networks and rituals there are factors that prevent that network from becoming resilient and regenerative but keeps them surviving. Some of the factors that prevent resilience is a lack of connection to local knowledge and a reliance on external supporters and suppliers.
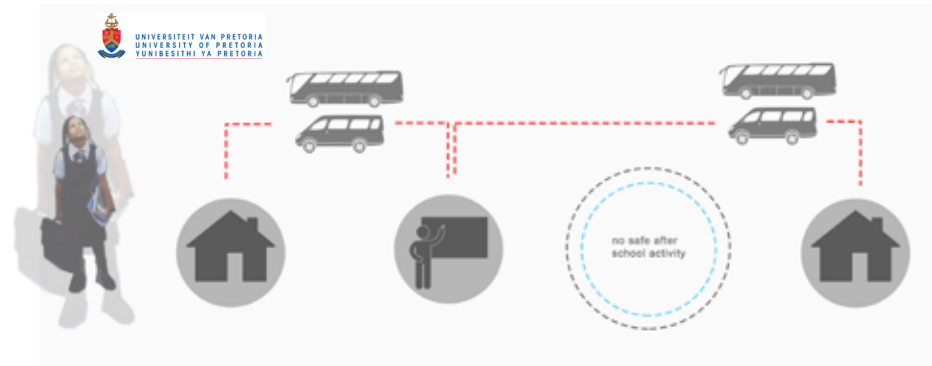
school child's survival ritual
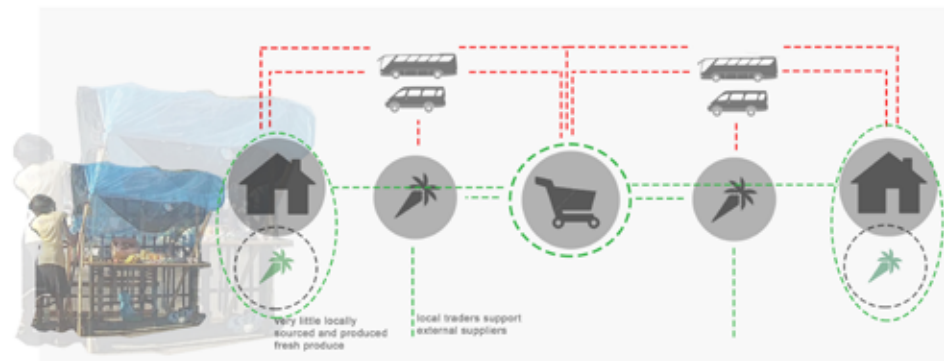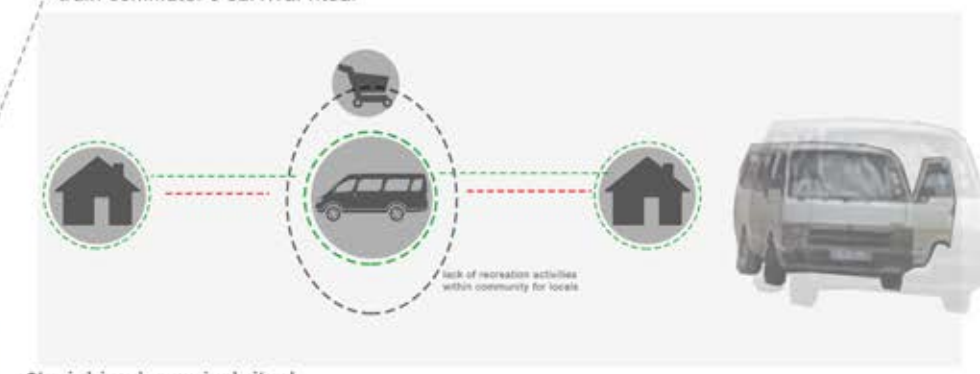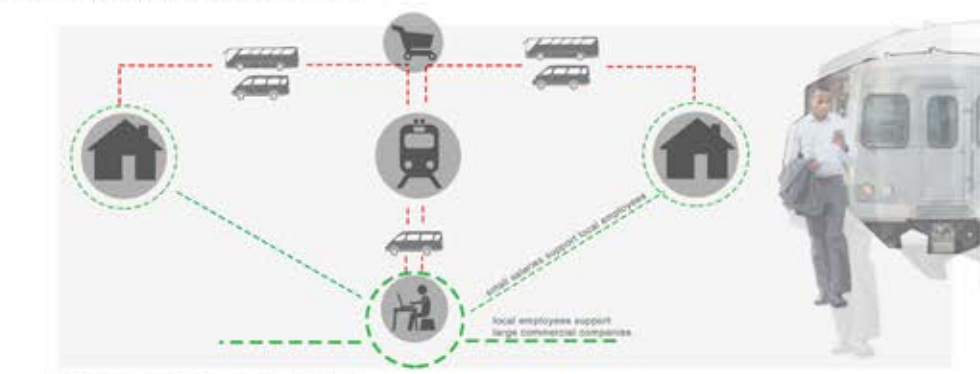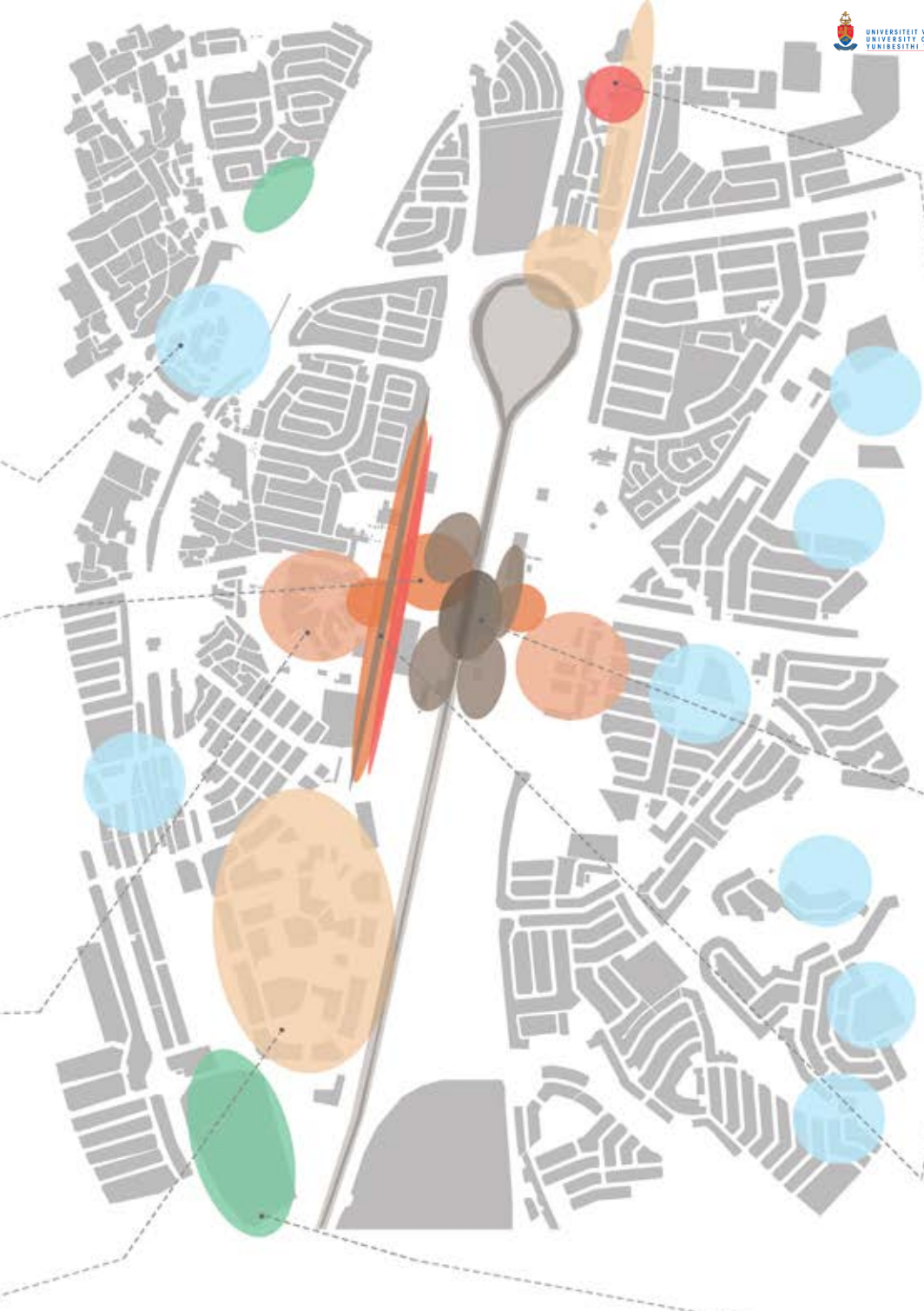
local market stall owner's survival ritual
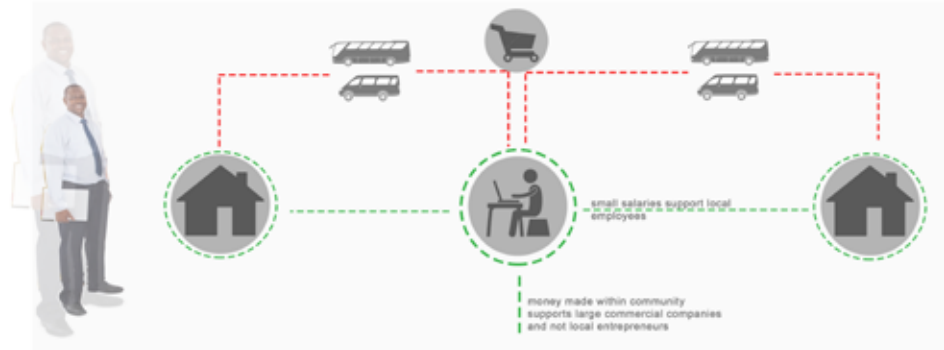
local retail worker's survival ritual

local mechanic's survival ritual

healthcare worker's survival ritual

train commuter's survival ritual

taxi driver's survival ritual

local agricultural survival

fig. 2.12. Survival networks within the community

The edge (in)tension
understanding the tangible and intangible issues

After the process of mapping the context and edges within Mabopane a number of issues where identified, both tangible and intangible.
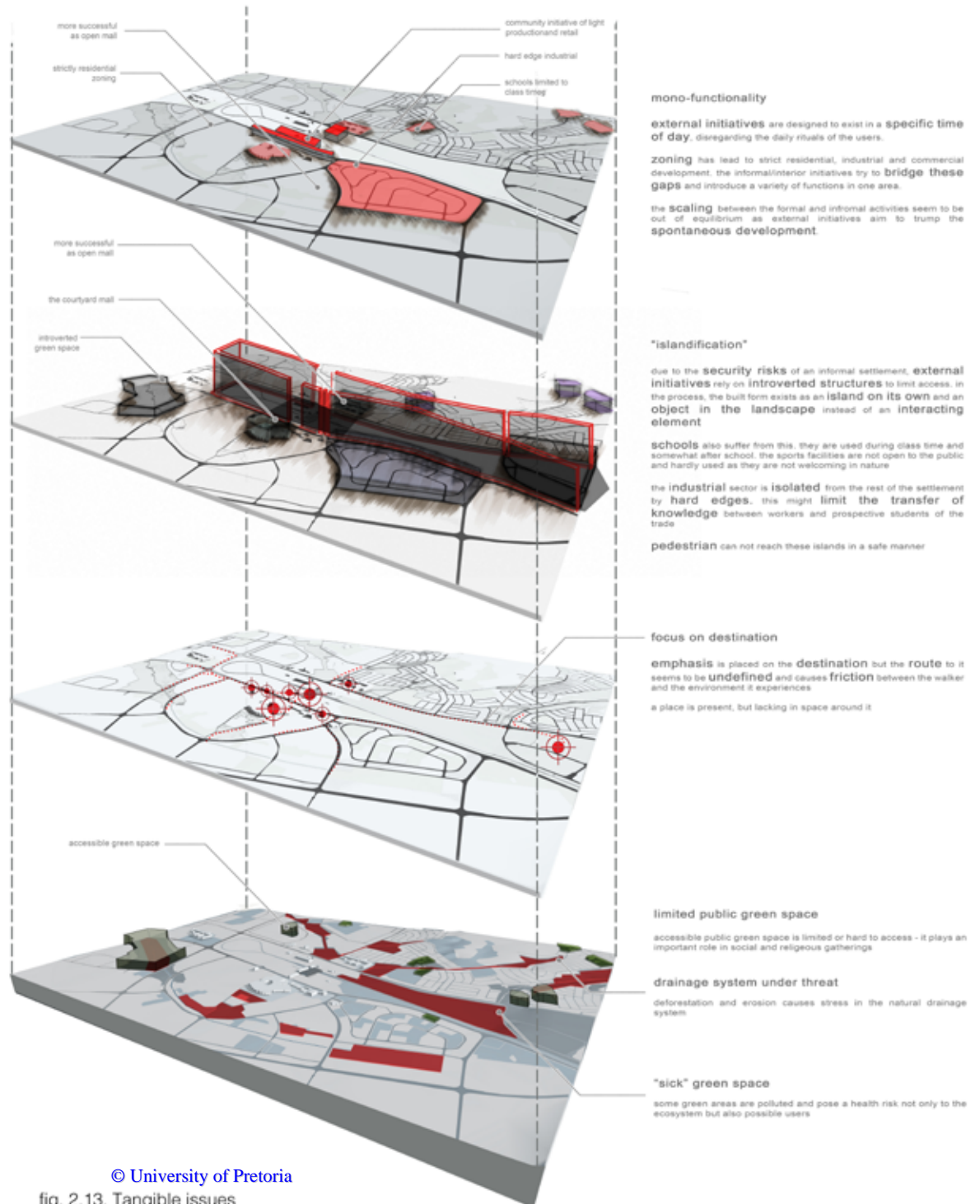
These issues are:

Tangible: (refer to figure 2.13)

- Mono-functionality of civic place and public infrastructure. The function and ritual that occurs within the created spaces and edges are finite and do not change regardless of the changing ritual and surrounding community.

- "Islandification," of public space and infrastructure. The single functions of building and spaces cause the spaces to become island within the fabric and in accessible to a large number of the community and un-adaptable within the changing context.

- Focus on single destination. All public transport accumulates and pauses at single destination, focusing all the pedestrian energies at single specific nodes and prevent.

- Lack of public green space. The community's reaction to natural water features and open spaces causes the amount of valued open space to be limited.

mono-functionality

external initiatives are designed to exist in a **specific time of day**, disregarding the daily rituals of the users.

zoning has lead to strict residential, industrial and commercial development. the informal/interior initiatives try to **bridge these gaps** and introduce a variety of functions in one area.

the **scaling** between the formal and informal activities seem to be out of equilibrium as external initiatives aim to trump the **spontaneous development**.

"islandification"

due to the **security risks** of an informal settlement, **external initiatives** rely on **introverted structures** to limit access. in the process, the built form exists as an **island on its own** and an **object in the landscape** instead of an **interacting element**

schools also suffer from this. they are used during class time and somewhat after school. the sports facilities are not open to the public and hardly used as they are not welcoming in nature

the **industrial** sector is **isolated** from the rest of the settlement by **hard edges**. this might **limit the transfer of knowledge** between workers and prospective students of the trade

pedestrian can not reach these islands in a safe manner

focus on destination

emphasis is placed on the **destination** but the **route** to it seems to be **undefined** and causes **friction** between the walker and the environment it experiences

a place is present, but lacking in space around it

limited public green space

accessible public green space is limited or hard to access - it plays an important role in social and religeous gatherings

drainage system under threat

deforestation and erosion causes stress in the natural drainage system

"sick" green space

some green areas are polluted and pose a health risk not only to the ecosystem but also possible users
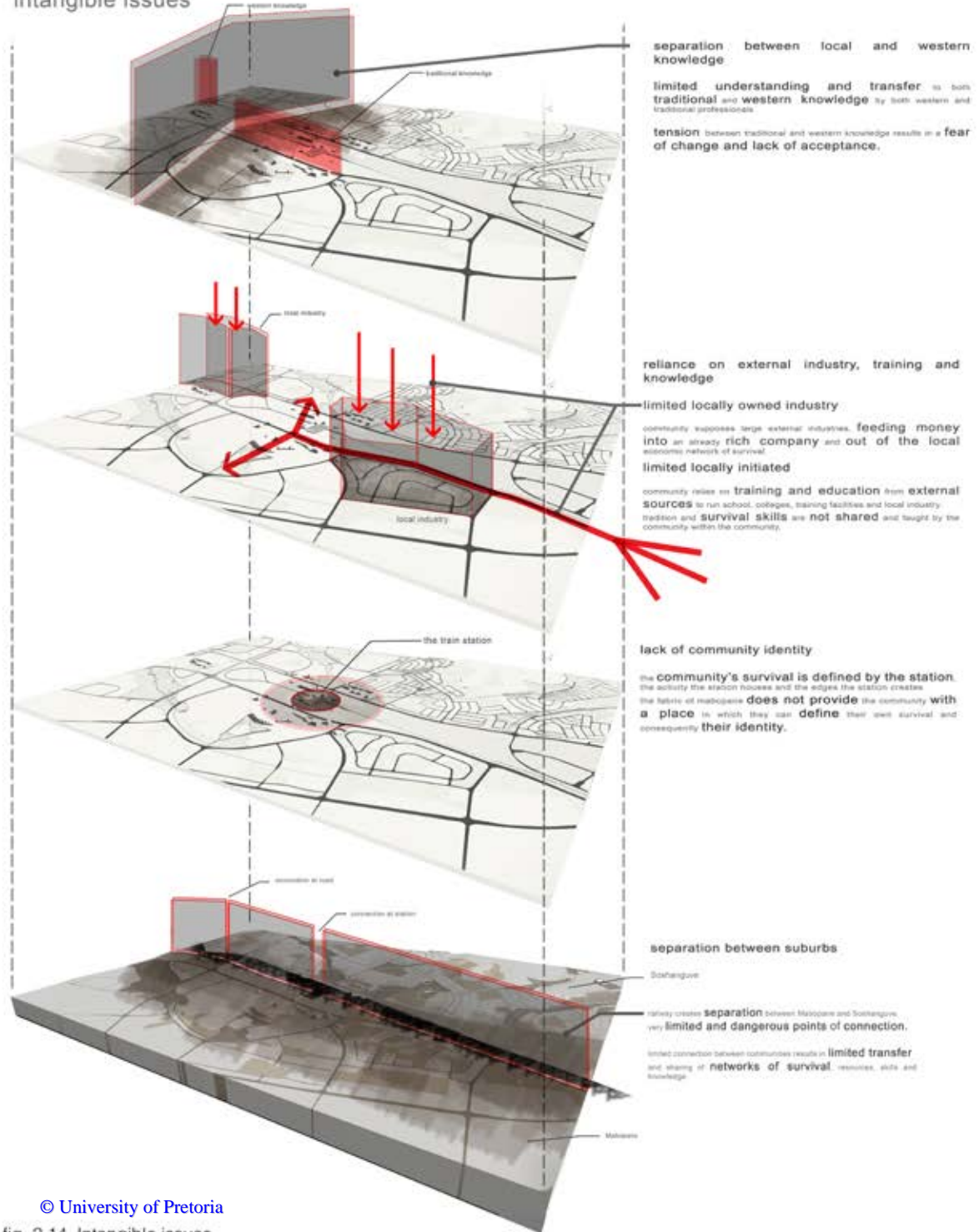
fig. 2.13. Tangible issues

Intangible: (refer to figure. 2.14)

- No connection between local and external knowledge and skills. There is a lack of sharing of skills and knowledge of the local people and the external investors. The lack of access to knowledge also extends to the people within the community.

- Reliance on external knowledge sources. The skills taught in schools and used in industry are based on skills developed outside of the community and the skills inherent in the community are neglected and ignored.

- Separation of suburbs and communities. This separation results in a division of skills, resources and potential energies that have the potential to aid in the resilience of each community.

intangible issues

separation between local and western knowledge

limited understanding and transfer in both traditional and western knowledge by both western and traditional professionals

tension between traditional and western knowledge results in a fear of change and lack of acceptance.

reliance on external industry, training and knowledge

limited locally owned industry

community supposes large external industries. feeding money into an already rich company and out of the local economic network of survival. limited locally initiated

community relies on training and education from external sources to run school, colleges, training facilities and local industry tradition and survival skills are not shared and taught by the community within the community.

lack of community identity

the community's survival is defined by the station. the activity the station houses and the edges the station creates the fabric of matjopane does not provide the community with a place in which they can define their own survival and consequently their identity.

separation between suburbs

Soshanguve

railway creates separation between Matjopane and Soshanguve. very limited and dangerous points of connection.

limited connection between communities results in limited transfer and sharing of networks of survival. resources, skills and knowledge.

Matjopane

fig. 2.14. Intangible issues

Missing civic space

The final conclusion from the mapping of the edges within Mabopane is that Mabopane is a community with a great deal of civic place and public infrastructure but little to no civic space, that serves the community.

physical location and physical fabric of the civic service

civic place without civic space

people's movement to the place and their interaction with each other and the place.

03 _ redefining the world
framework of development

"The only successful approach to designing great cities for people must have city life and city space as appoint of departure… if there is to an order, it must start at eye level and end with a birds eye view." _ Jan Gehl, Cities for People

As an approach for the development of a framework for the Mabopane Train Station precinct, making Mabopane a place for its people was the most important design factor. The intentions for the framework are to create places and spaces that serve the community and create opportunities for the communitiy's resilience.

01_ macro framework

From the mapping processes discussed in the previous chapter, the over arching issues experienced by the community of Mabopane, is:

Mabopane has civic place but has a large lack of civic spaces.

This lack of civic space results in the fabric of Mabopane, results in it being a city with people but not for people. The Mabopane has civic place, physical locations that provide a service, but has a lack of civic space, spaces that facilitates city life and serves the cities rituals. (Gehl, 2009)

physical location and
physical fabric of the
civic service

civic place without civic space

people's movement to
the place and their
interaction with each
other and the place.

Framework on site
existing and missing layers on site

The physical fabric of Mabopane is made of layers and nodes that were discovered and examined in the mapping process.

The nodes that form around the train station precinct are made up of a number of different energies and activities. The node that forms around the station precinct is thriving and alive, supporting the survival of the community using and creating the node.

Within the surrounding fabric of the train station precinct, a secondary node is developing. The city has proposed and started developing a new sports precinct. The sports activity intended to create and sustain the sports node, will potentially not be provided by the community of Mabopane. The reasons for this is that the new sports precinct is removed from the activity surrounding the station and relies on the movement of the community over the railway line and busy main transport routes.

In order for the new sports precinct to develop into a fully functional node within the community, supporting the survival and aiding in the resilience of the community, the energies from the already functioning node, at the train station, are to be tapped into and shared with the developing node.

In order for these energies to be shared between and living node and a growing node, a promenade, over the railway line, is proposed. The intention for the promenade is to create a physical connection between the two nodes and extend the retail activities along the connection.

The mabopane station edge is made up of a number of layers that provide the station edge with energy.

key: existing layers on site

resilient street market
surviving market square
pedestrian interaction
taxi
finite station fabric
formal retail
sports and recreation

fig 5.1: Existing layers on site

The existing layers creating the fabric of the station result in a number of energy nodes. The precinct is made up of larger nodes, that interact with nodes around it. The larger nodes themselves are made of smaller nodes that interact with one another.

The smaller nodes making up the larger ones, aid in the survival of the people interacting with them. The existing nodes of the mabopane precinct provide for the specific retail and transportation needs of the community but fail to provide for the civic needs of the community. The result is missing civic nodes within the precinct.

key: existing nodes

- transport and retail
- retail node
- transport node
- sports and recreation node

key: missing nodes

- civic nodes
- new public recreation
- new connection
- extended rail line

fig. 3.2. Existing nodes on site
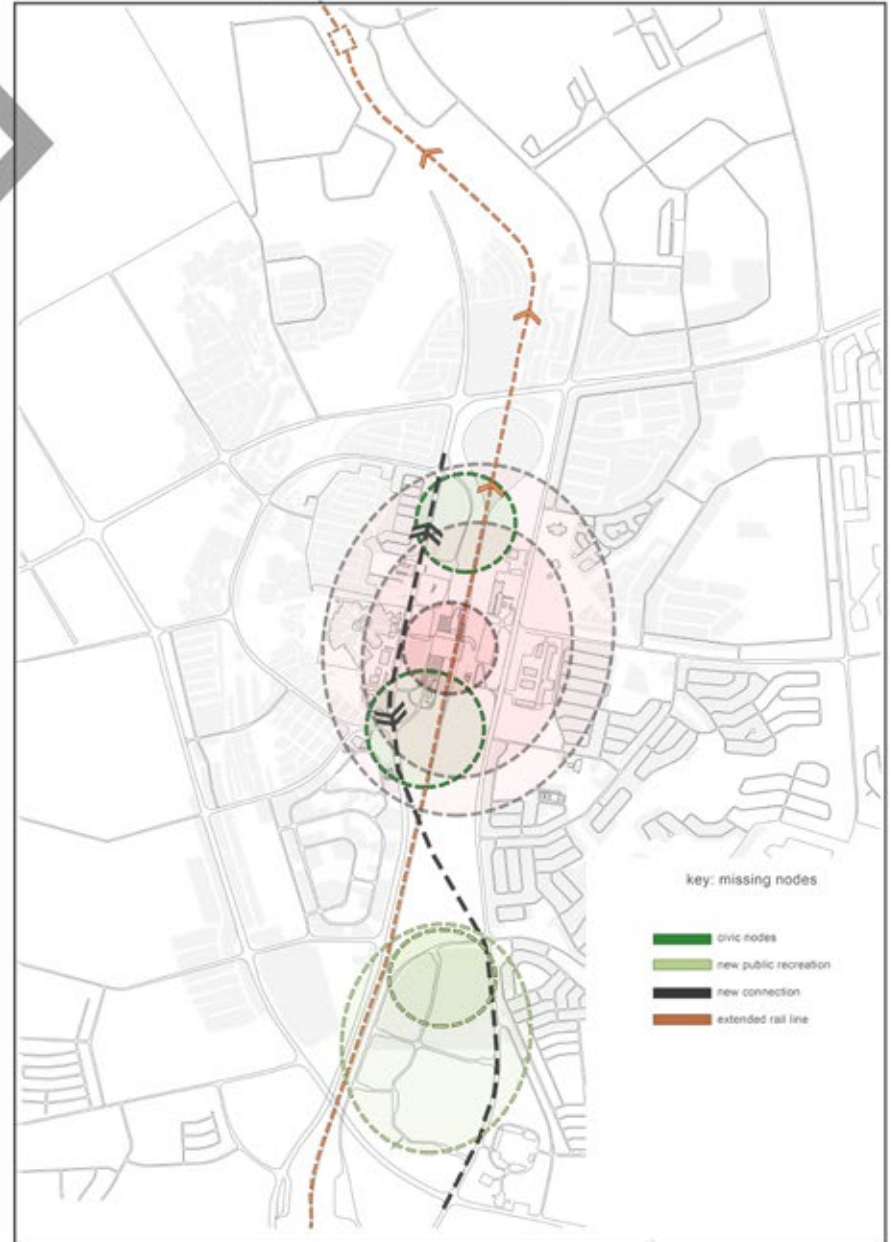
fig. 3.3. Missing nodes on site

The Framework zoned

When examining the activities within the already existing node and the growing node, the observation was made that there is missing civic activities within each node.

As previously stated, there is a lack of space that serves the community and facilitates city life and rituals.

In order to strengthen the existing and newly developing node, civic space and functions are zoned within and feeding off the existing activities and energies.

In a following chapter, the type of civic space and functions are explored and zoned in greater detail.

Phase one

Upgrade of fabric surrounding station creating space for taxi and pedestrian on the street connecting formal and informal trade

Addition of public facilities and fields at existing stadium connection between existing nodes created

Phase two

Addition of civic space around station fabric

Addition of public space at existing stadium

Phase three

Growth between two nodes facilitated

Addition of final phase civic space

fig. 3.4. Zoning phases of context
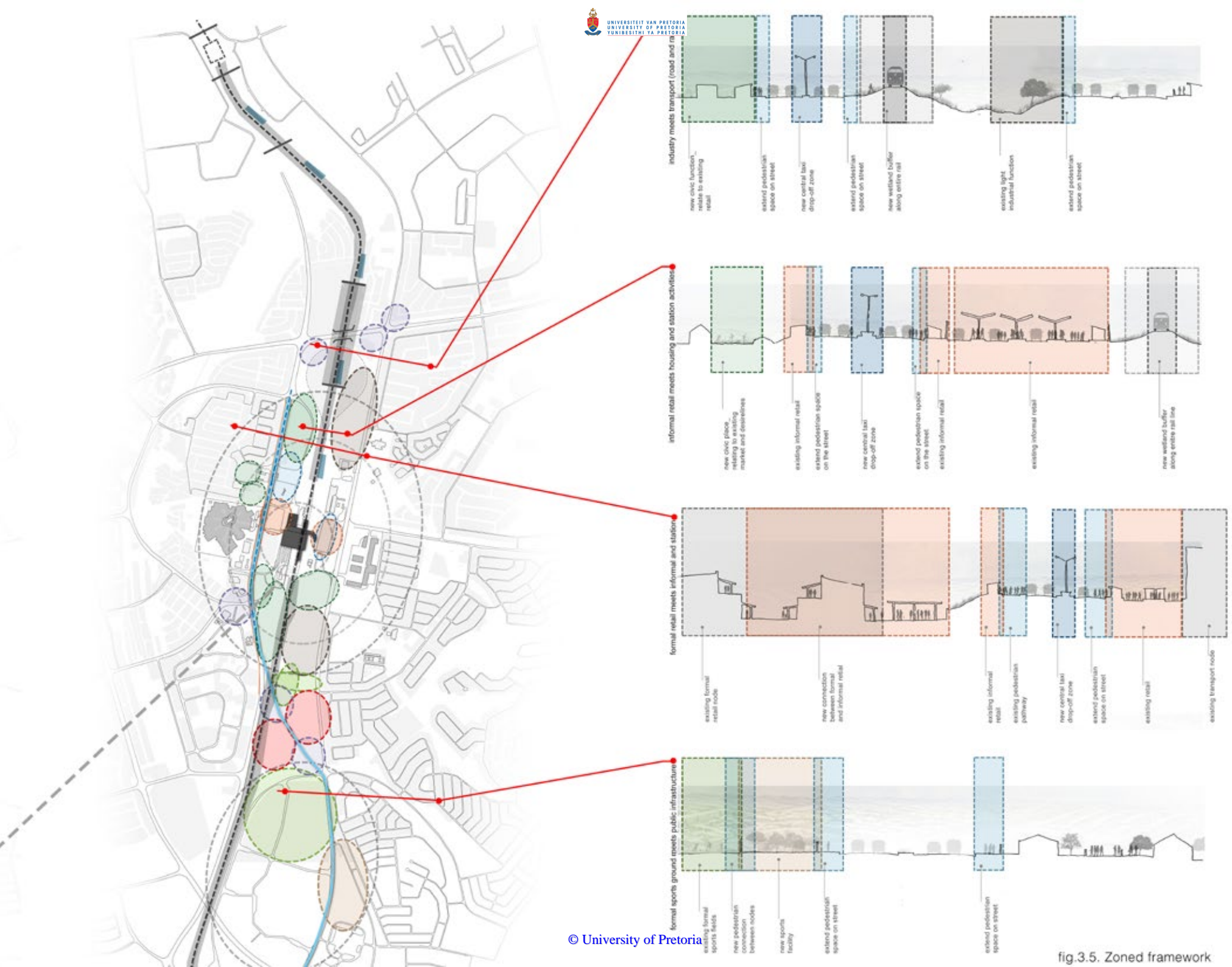
industry meets transport (road and rail)

new civic function relate to existing retail · extend pedestrian space on street · new central taxi drop-off zone · extend pedestrian space on street · new wetland buffer along entire rail · existing light industrial function · extend pedestrian space on street

informal retail meets housing and station activities

new civic place relating to existing market and dwellings · existing informal retail · extend pedestrian space on the street · new central taxi drop-off zone · extend pedestrian space on the street · existing informal retail · existing informal retail · new wetland buffer along entire rail line

formal retail meets informal and station

existing formal retail node · new connection between formal and informal retail · existing informal retail · existing pedestrian pathway · new central taxi drop-off zone · extend pedestrian space on street · existing retail · existing transport node

formal sports ground meets public infrastructure

existing formal sports fields · new pedestrian connection between nodes · new sports facility · extend pedestrian space on street · extend pedestrian space on street

fig.3.5. Zoned framework

02_ messo framework
creating the conditions for resilience

In order to facilitate the creation of civic space within Mabopane, civic place has to be established and provided. In the following chapter, the type of civic place, hierarchy of the proposed civic place and edges used to facilitate the creation of civic space will be defined.

The missing civic space

Within a city, the public, civic place and civic space have a specific function. In order to create a city that meets the needs of the public within civic place and space, the relationship between the three elements needs to be understood and a hierarchy of these elements is to be established (Gehl, 2009).

In the diagram below, the relationship between the public, civic place and civic space is explained.

People within a city experience specific civic needs, such as transportation, protection and public expression. The public civic need requires specific functions to fulfill the need. There is a need for civic place, such as a; train station and taxi rank, police and fire stations and a town hall. These civic places facilitate the need for and the creation of civic space. Civic space is created as the public meet, connect and share energies within, around or as they approach civic place.

Civic place and civic space are directly related to the needs experienced within the community.

the civic function

extension of a community
serves a community
acts as a stage for public lives
is the front porch of public institutions
contributes to community health
--> socially
--> economically
--> culturally
--> environmentally

gives the ability
to function

civic place <------> public

civic space

provides the setting
for civic place
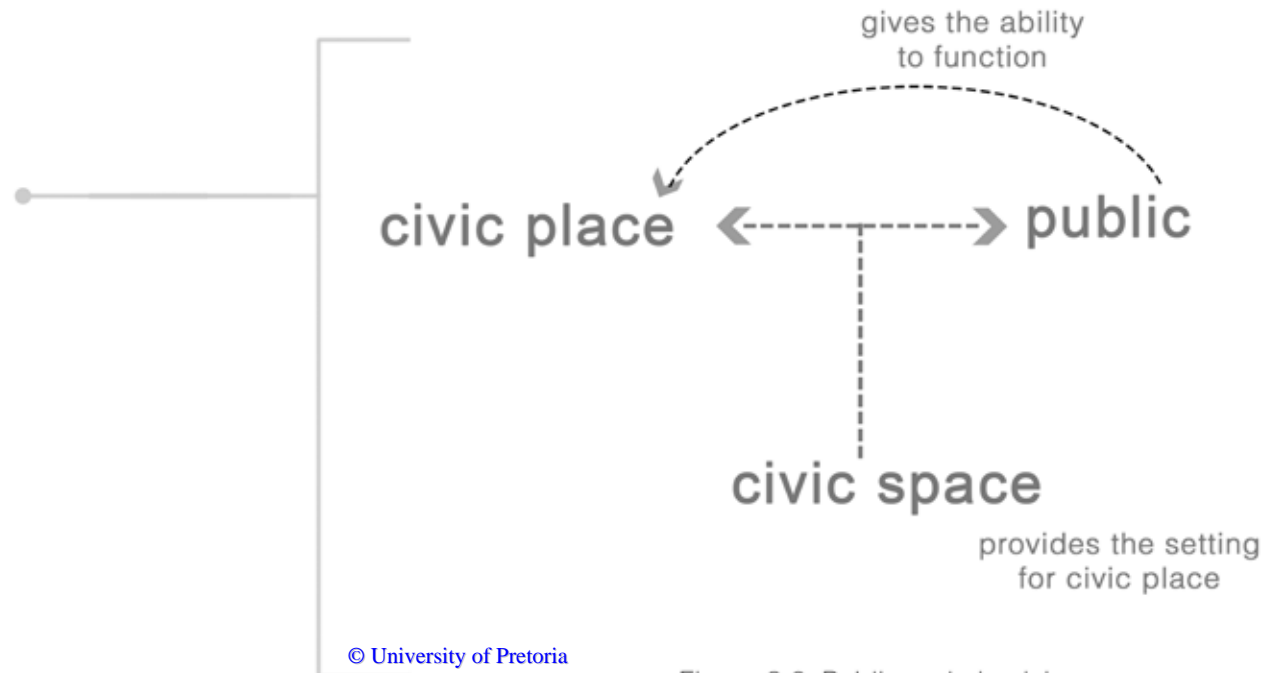
Figure 3.6. Publics role in civic space

The surviving community of Mabopane has a number of civic needs that are fulfilled within a number of civic places. The provided civic places do not provide the circumstances for the development of civic space and do not fulfill all the required needs. The lack of fulfillment for civic space prevents the connection of the public and results in a community unable to share energies and skills. This maintains the community's survival and does not facilitate its resilience.

In figure 3.7 the missing civic place and space within Mabopane are identified and organized into general civic needs. Mabopane experiences civic needs within the educational, sports and recreational and municipal general civic functions. The civic needs experienced by the community of Mabopane are a lack of local skills and knowledge training facilities (within educational civic functions), community center, parks and sports fields (within the sports and recreational functions) and a local town hall and administration facility (within the municipal function).

These identified civic needs create the opportunity for this dissertation to respond to a local civic need and use the energies of existing functions and needs to support a programme and spaces.
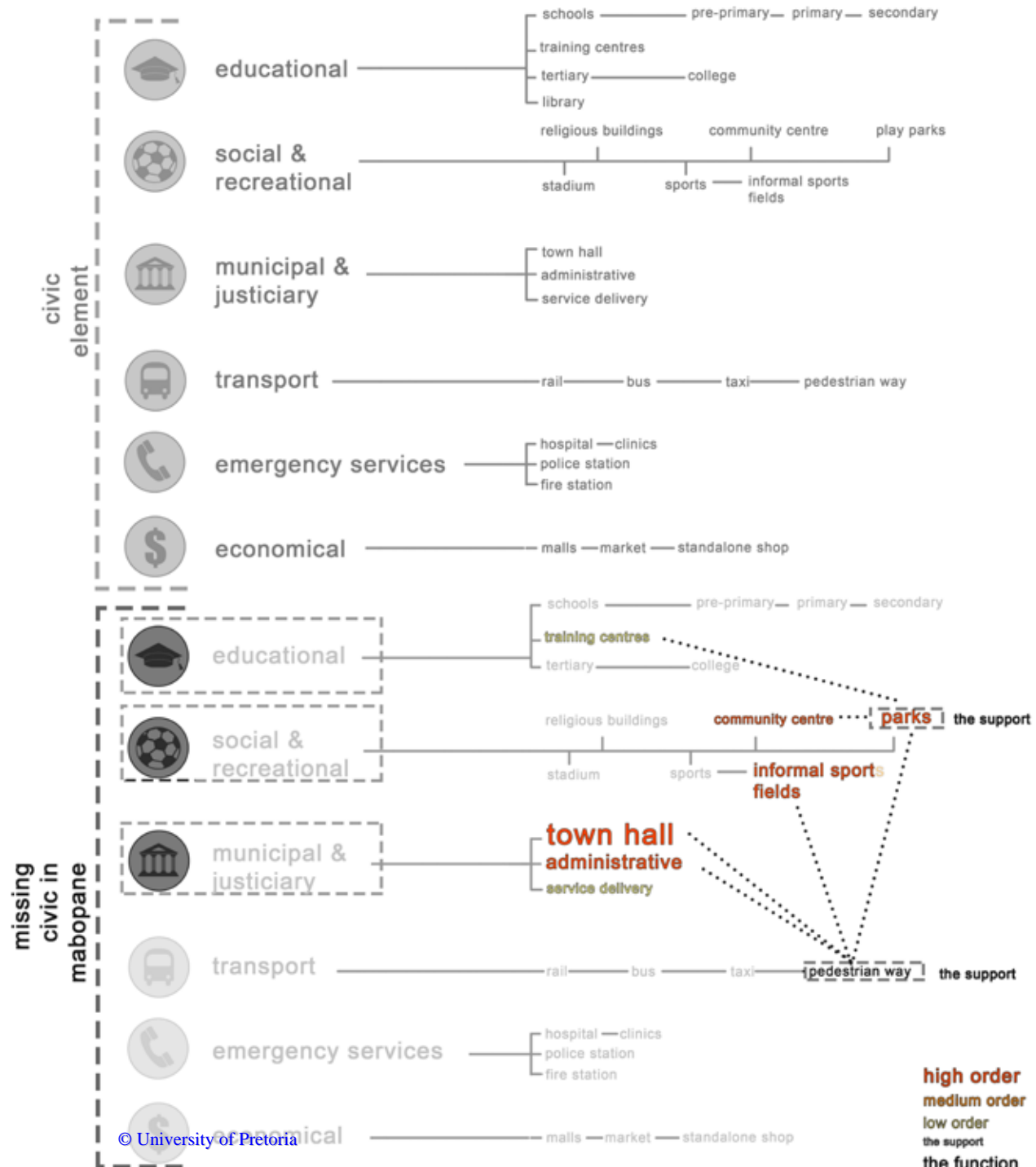
Figure 3.7. Missing Civic Space

Creating Civic Place

In order to create and share civic energies on site and create the opportunity for the development of civic space within, around and as the public approaches the civic place, the needed civic places are organized according to a hierarchy of high and low order civic functions.

Organizing Concept

In order to provide diversity to and on the site high order elements and places require lower order elements to be located near by.

Lower order elements require the energies provided in a higher order element to function effectively.
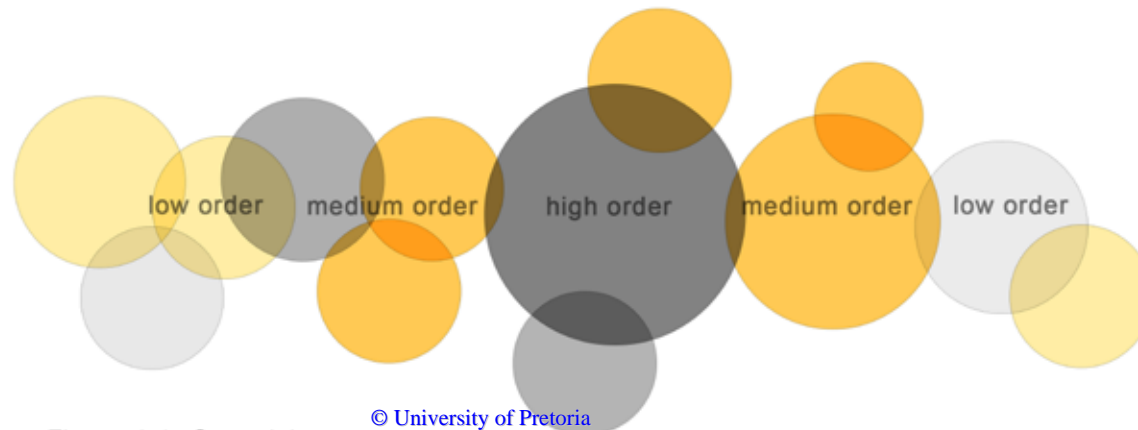
Figure 3.8. Organizing concept

Figure 3.9 describes the concept of the ordering of the civic place within the hierarchy of high and low order civic places.

High order civic places generate and require the most public and civic energies. The ordering concept places medium and low order civic place along side high order civic places. The energies generated within the high order civic place are used to support the surrounding medium and low order civic places.

When zoning the new or required civic place within the train station precinct of Mabopane, the existing civic places are considered and the energies generated by these civic places used to support the newly zoned civic places. New medium or low order civic place is zoned along side or near existing high order civic place and new high order civic place zoned near existing medium or low order civic place, as illustrated in figure…

The programme and architecture explored in this dissertation is to comply with this ordering concept and zoning of civic place when a site is selected within the fabric of the train station precinct.

community centre_ recreational activities
amphitheatre and preformance spaces
town hall
administrative buildings
public square
fire station
low order
social space
taxi park
medium order
social space
informal market
mall
cemetery
station
public square

high order
proposed
low order
high order
existing
low order
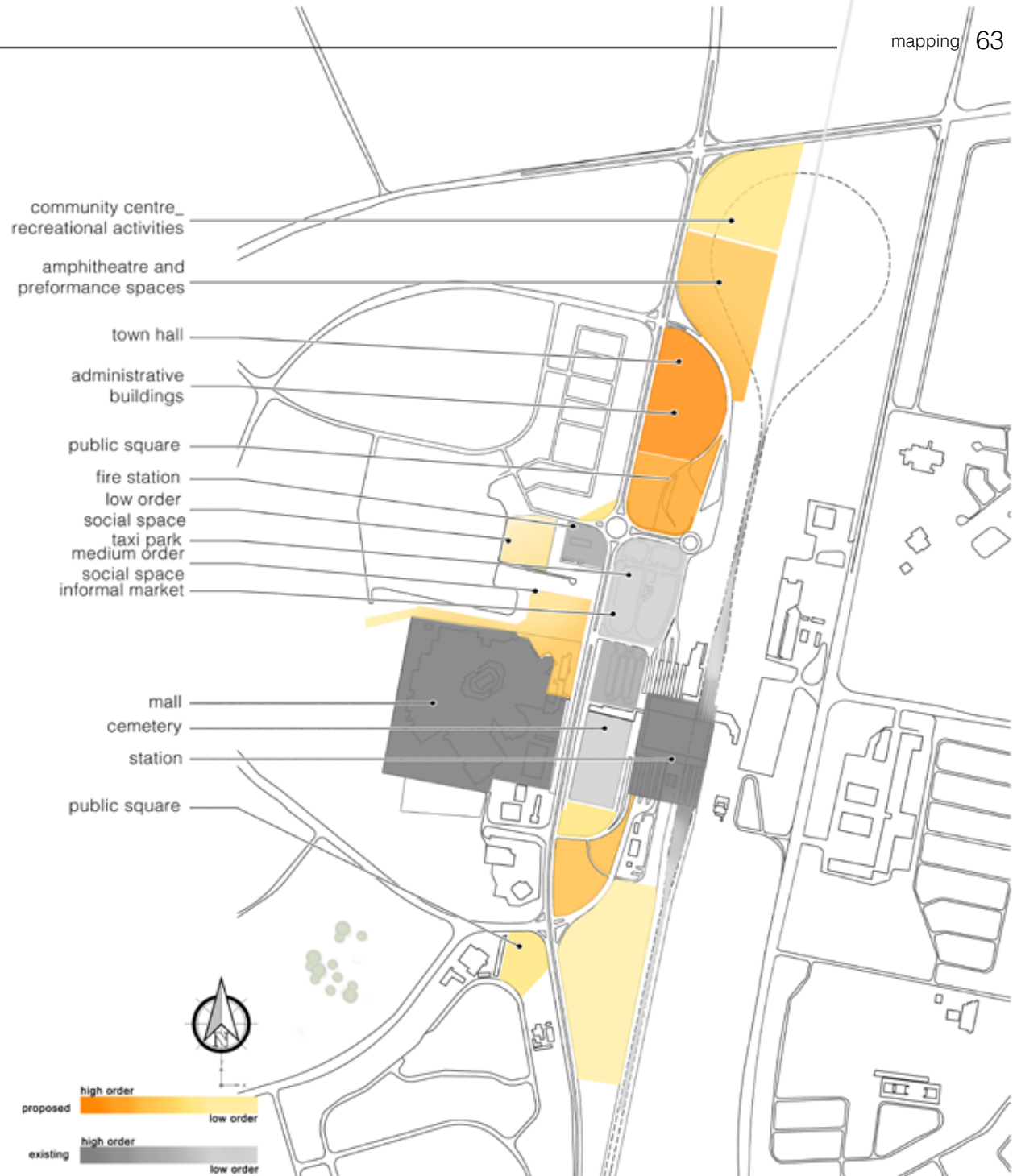
Figure 3.9. Civic Space Ordering Plan

Creating Civic Space

In order to create the opportunity for the development of civic space within, around and as you approach civic place, the conditions of the in between space and the edges that define the civic place needs to be considered.

In figure 3.12 the creation and development of the in between space and "civic edge" is illustrated.

Edges define the accessibility of the civic place and how the public will be allowed to connect and share energies as they approach and make use of the civic place.

"Soft" to "semi-soft" edges define the most accessible civic place and allow for connection and interaction within the civic place, allowing the civic space to develop within the civic place. "Semi-private" and "hard" edges define more controlled access into civic place and create the opportunity for movement along or collection within the hard edge. This creates the opportunity for connection and interaction as the public approaches or pauses before civic place. Pathways and public squares become the civic spaces approaching and before the civic place.

the "agora"

Organisation Concept

Edge can create both public and privare space. When considering civic space, private space belongs to the public, but access is restricted and less populated.
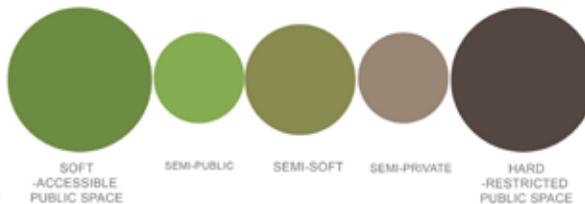
Public space is fully accessible and highly populated.
Semi-soft edges are the transitions between public and private spaces.

SOFT -ACCESSIBLE PUBLIC SPACE

SEMI-PUBLIC

SEMI-SOFT

SEMI-PRIVATE

HARD -RESTRICTED PUBLIC SPACE

SOFT EDGE

SEMI-SOFT EDGE

HARD EDGE

Figure 3.10. Civic Space Ordering Space
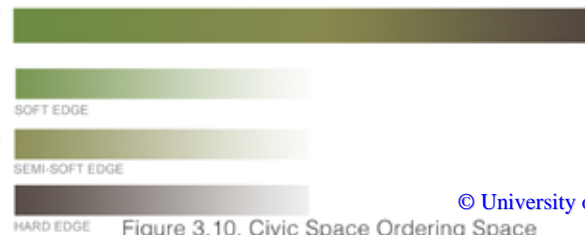
key:

semi-public service edge

buffer edge, before hard rail edge

hard rail edge

hard edge

soft edge

soft natural edge_ trees
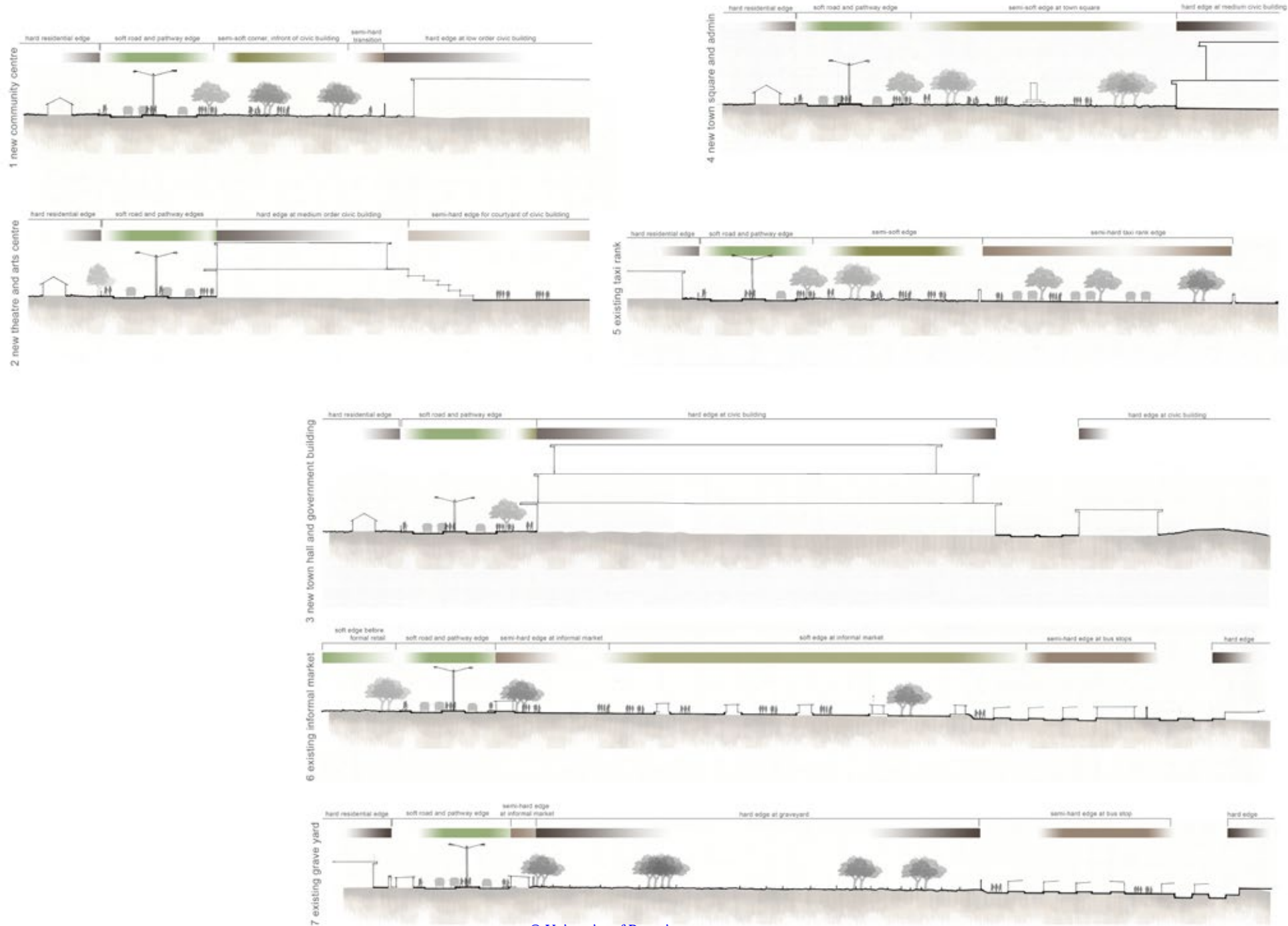
Figure 3.11. Civic Space Plan and Section

Setting the scene for new Civic Space
The Messo Framework

The figures that follow, illustrate a number of principles developed in order to solve a number of issues, identified within the physical fabric of the Mabopane train station precinct.

The dangerous walking path- The existing pedestrian pathway has been overtaken by the informal market and taxi forcing the pedestrian to walk in and amoungest the traffic.

In order to maintain the energies of the informal market, they are to be maintained and therefore, a portion of the overly wide street is to be dedicated to the pedestrian.

The new path and irregular shop pattern creates pockets of public interaction.

Existing system
No route dedicated specifically to the pedestrian to allow for movement along the street

New system
By dedicating part of the street to the pedestrian, pathways can be widened and small meeting pockets can develop.

defined public space

public space

new public space

slight permeability of the "wall" of shops
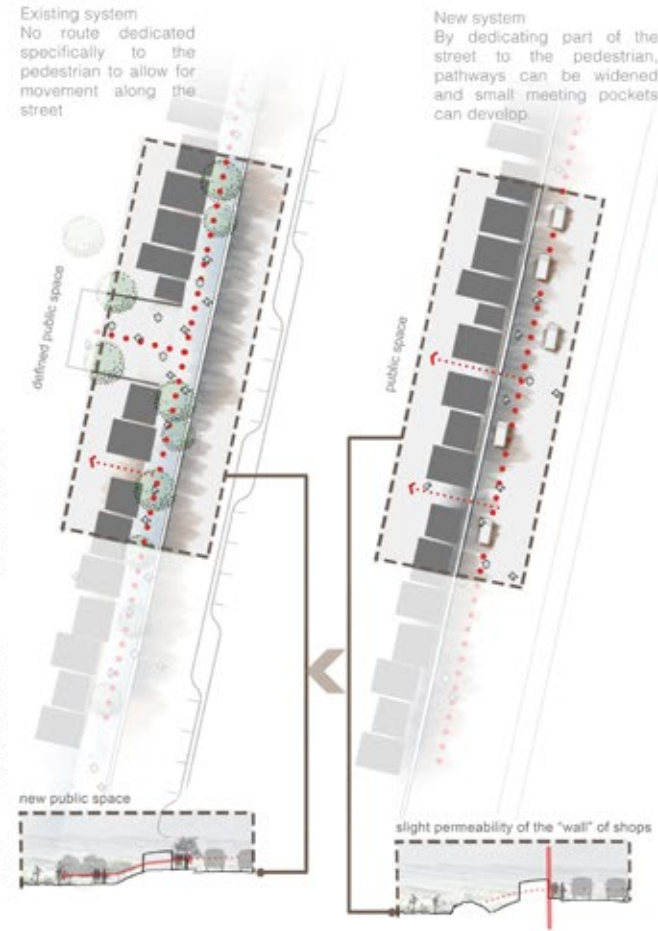
The Public Mall has become an "island" in the fabric and has gradually started privatising the area.

This introverted element becomes part of the public realm as the mall's courtyard is opened up onto the public street.

This opening onto the public street creates a receiving public space that allows the interaction of the mall with the street and allows for the development of new retail opportunities.

Existing system:
The introverted mall does not draw energy from the station and is distanced from the public

New system:
The mall is able to provide energy to the station precinct and public realm as it is opened into the public realm
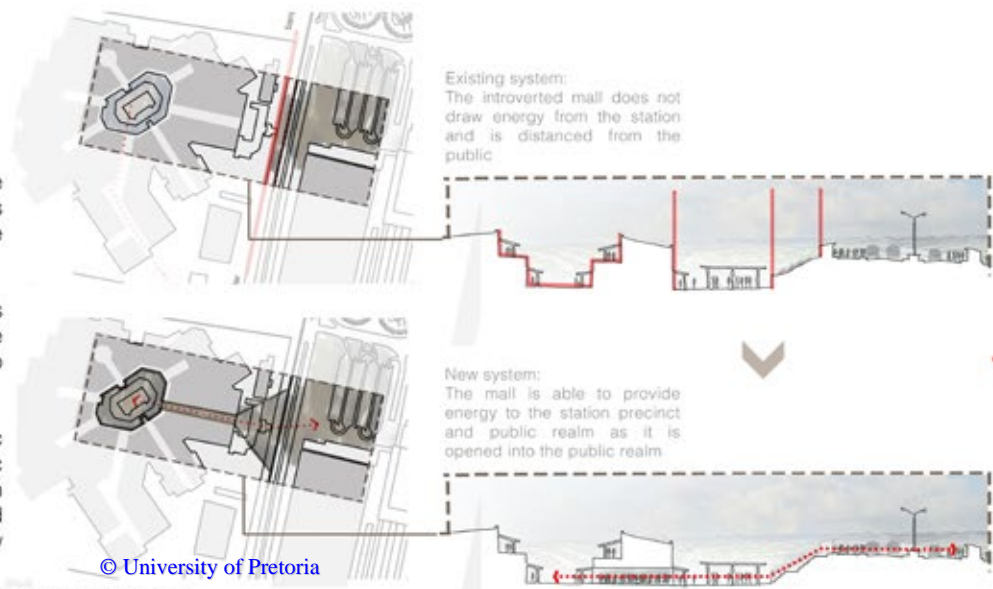
Figure 3.12. Messo Framework Interventions

the development spine

the "agora"

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...ntions for the rail is to extend it into surrounding suburbs, this will increase the division of the community and add further pressure on the sites drainage

New system
In order to prevent further division and damage to the drainage system, pedestrian crossings are suggested and the rail is to be included into the drainage system

current rail system as watershed

proposed rail as part of drainage system

Existing system
The taxi takes over all the lanes in the road and even starts taking over the sidewalk. Pedestrian movement is very dangerous as a result
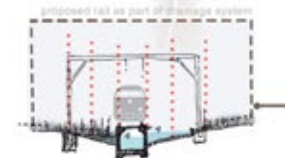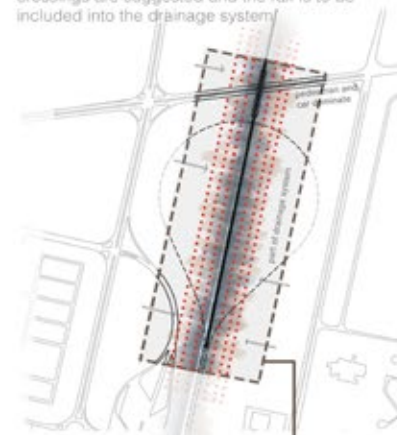
New system
By embracing the nature of the taxi, taking their passengers where they want to go, and adding a dropoff zone along the street pulls the car away from the pedestrian but keeps the taxi and the pedestrian on the same route.
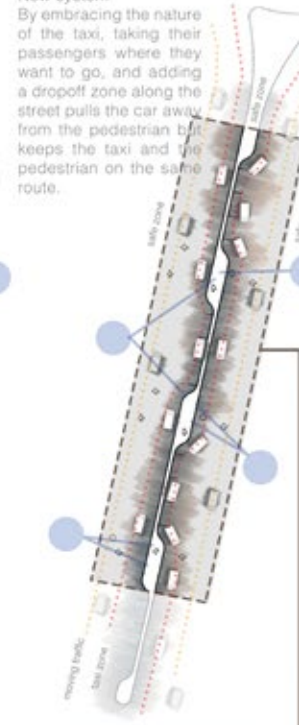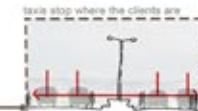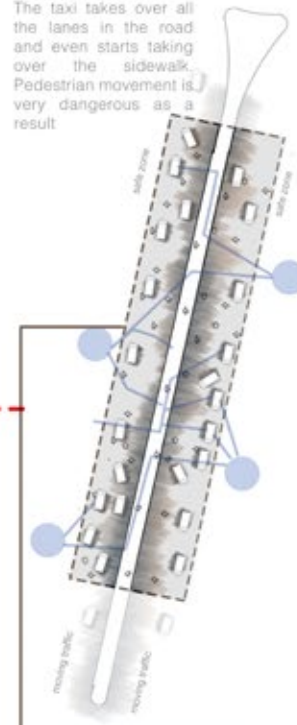
There is constant conflict between the pedestrian and the taxi for space.

Taxi are where people are and people are where taxi are. The taxi will attempt to get as close to their users drop-off zone as possible resulting in the taxi rank becoming a parking lot and the road the drop-off. This results in high levels of obstructed traffic and a unsafe environment for pedestrians.

To create a safe environment for pedestrian and car, the taxi is pulled off the road into an island,separating the two lane of traffic, this becomes the drop-off, halfway in the road and to the users destination.

The taxi user is able to orientate themselves before the cross the road and cross

taxis stop where the clients are

pedestrian is halfway there

Messo Framework Conclusion

The Messo Framework

In order to create a great city for its people, the people and their needs have to be considered, civic place, space and public life are to be a starting point (Gehl, 2009). The messo framework developed for the train station precinct of Mabopane, intended to create the civic space that facilitates the connection of the public and enhances the public life of the people of Mabopane.

The messo framework is a set of principles or rules that will be considered and responded to as the dissertation develops.

Hierarchy of Civic Space
Zoning low, medium and high order civic place

In order to determine an appropriate site, for a low to medium order programme, focused on the children's, within Mabopane, need for civic space; the civic place hierarchy zoning established within the messo framework had to be considered.

The new low to medium order children-focused programme, is to be place near or along side an existing high or medium order.

Figure 3.22 high lights a number of appropriate sites within the fabric of the Mabopane train station precinct that could accommodate the new children-focused civic space.

community centre_
recreational activities

amphitheatre and
preformance spaces

town hall

administrative
buildings

public square

fire station
low order
social space
taxi park
medium order
social space
informal market

site 1

site 2

mall

cemetery

station

public square

site 3

site 4

high order
proposed
low order

high order
existing
low order

Figure 3.22

Existing site movement and activities
Drawing of the existing energies to support the new activity

In order to understand the energies that could feed the new programme, the movement and activities within the train station precinct were examined.

The new children-focused programme is required to draw of very specific energies within the precinct. These energies and activities include, movement of parent and child to and from school, residential activities, school activities and recreational activities, such as a park.

Figure 3.23 illustrates movement within the train station precinct. The movement circles aid in identifying the nodes of energy, which develop within the precinct. Placing the new child-focused programme within an existing node, within the precinct allows the new programme to draw off existing energy.

key:
walking circles:
● 5 minutes
● 10 minutes
○ 20 minutes

walking paths:
▬ ▬ main paths
▬ ▬ secondary paths

vehicle routes:
▬ ▬ main roads
▬ ▬ secondary roads
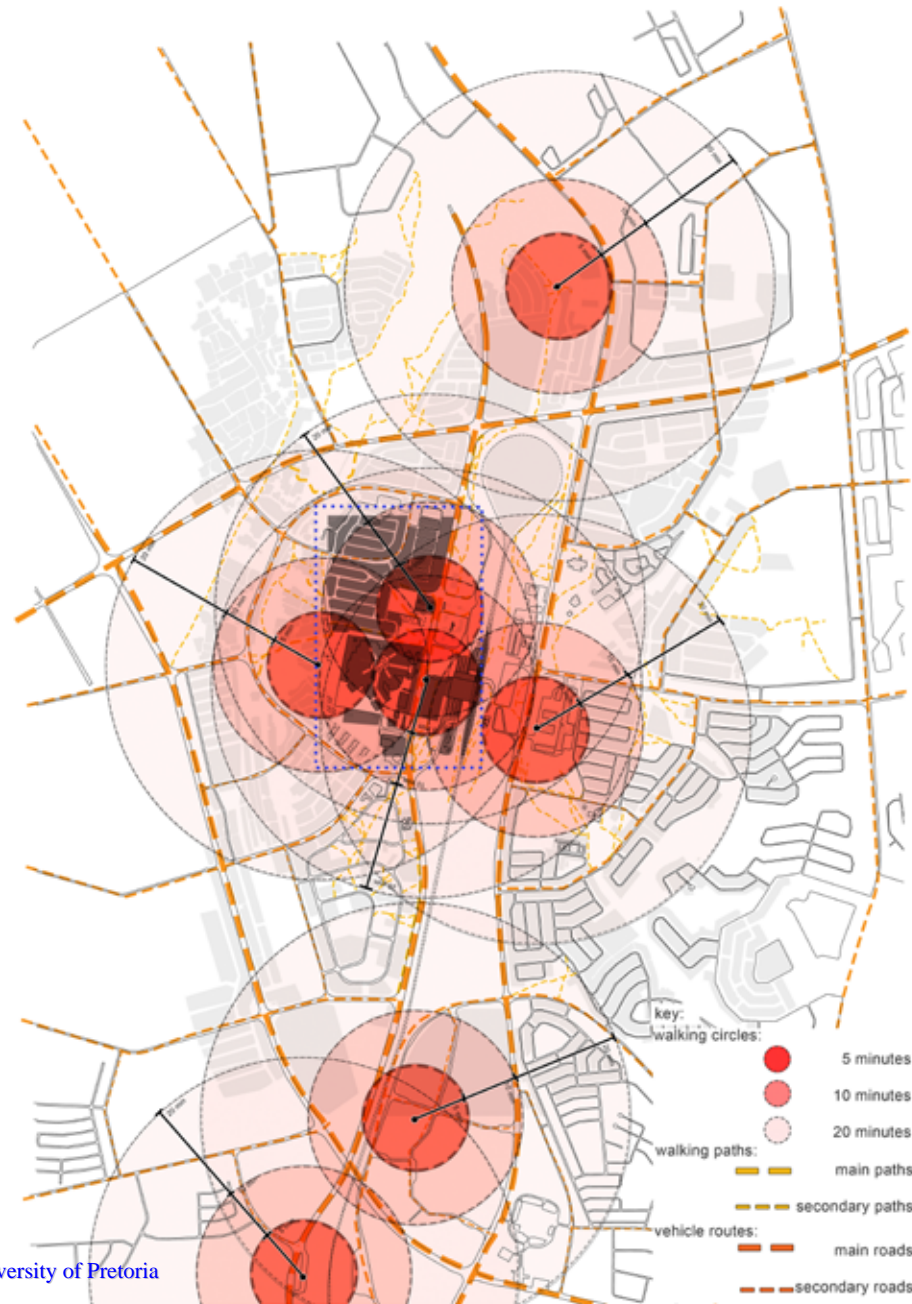
Figure 3.23. Movement
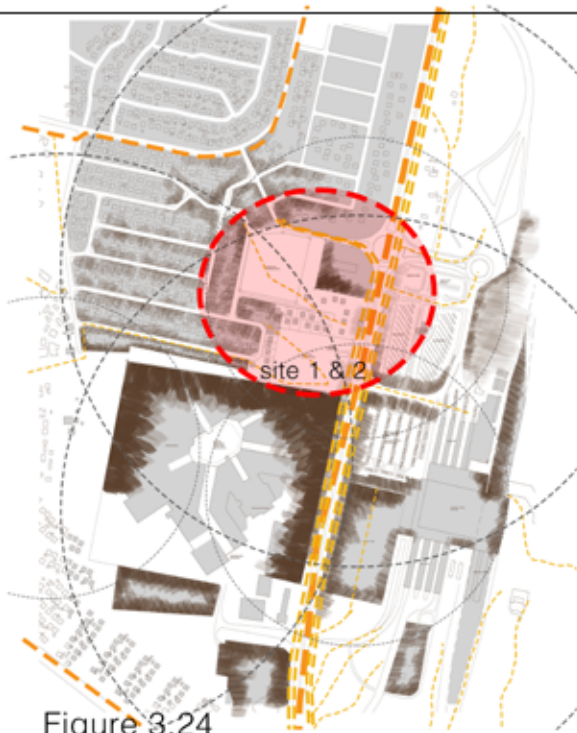
Figure 3.24

Figure 3.24 illustrates the movement routes around potential low or medium sites within the large movement node that develops around the mall, within the station precinct. A connection route has developed across both sites, connecting the residential activity to the north with the transport and retail activity on the south.
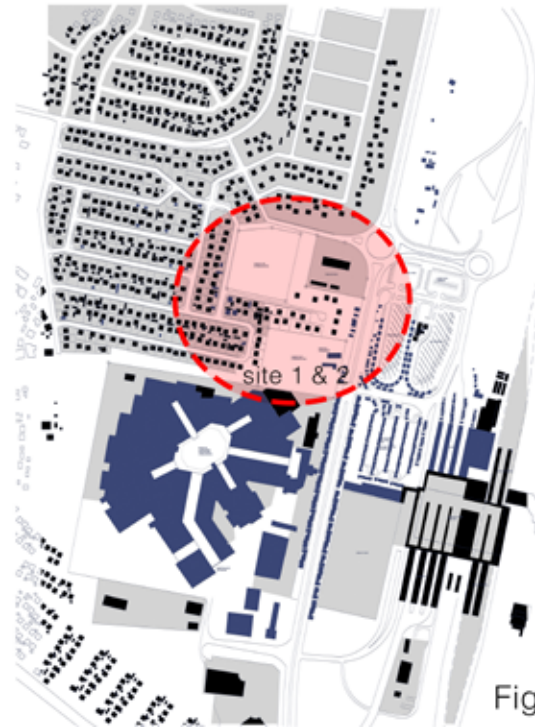
Figure 3.25

Figure 3. 25 illustrates the activities surrounding the same two sites within the large mall node. The main activity surrounding the most northern site is residential activity.

The most southern site is surrounded by a number of different more high order activities including, transportation, retail and residential activities.

The selected site

The final site (site 1) has an existing civic function, the selected site is an existing park used by local children and adults on a daily basis. The park serves as a connection between the residential activity on its northern and western boundary and the retail and transport activity on its southern boundary. On the site's eastern boundary is an existing medium order civic function, the local fire department.

The selected site meets the energy and activity requirements mentioned previously.

The selected site is able to draw from medium to low energies and activities surrounding it and is able to make use of the existing activity and energies occurring on the site in order to support the new child-focused programme.

Figure 3.26 illustrates the surrounding activities and energies mentioned above.

As illustrated in figure 3.26 energies surrounding the selected site are share with a neighbouring new civic programme. The higher order energies and activities surrounding the site will be filtered through the neighbouring civic function and will potentially be lowered as they enter the child-focused programme.

The new child-focused programme will draw from the activity and knowledge in the existing civic function housed in the fire station precinct on the adjacent site.

The selected site is houses an existing civic function and is located near and within existing civic functions within Mabopane. The selected site also sits within residential activities and along a movement route. The site was selected in order to use the existing and surrounding energies and activities to facilitate and support the development of the resilience of the child, by tapping into the potential, for resilience, they have.

existing mall

existing residential

existing residential

negotiating the edge
project site

selected site for child
focused programme

existing shopping boulevard

existing fire station

existing residential

Figure 3.26

existing trade corridor and new pedestrian ways

new park in a series of public spaces

new administrative and recreational buildings

extending rail new drainage system and natural barrier next to rail

existing market and new walkover and taxi parking

new early development centre

new apprenticeship industrial workshop

existing formal retail with new opening to public square

Figure 3.13 Framework

existing
station

new promenade
to cross rail

04_ micro framework
creating the context of the site

The Macro and Messo frameworks developed, as part of this dissertation, were established to create the opportunity for the development of resilience within the surviving fabric of Mabopane. The site for a child-focused program within Mabopane, was selected within these frameworks in order to create the civic space that facilitates and enables the resilience of the children using the architecture explored in this dissertation.

The following chapter explains the micro framework, explored and developed for the precinct and fabric surrounding the site selected for the child-focused program and the site being developed by the "Negotiating the Edge" dissertation exploration.

Micro Framework Concept
An approach to creating the context the site is located in

layering
from the front garden to
behind the front door

A layering concept of public to private civic energies was established as a means to organize and develop the movement and capturing spaces, programs and site operation times, of the two neighbouring sites.

The concept was developed around the idea of entering a house, moving from the most public space, front garden, and ending in the most private space, behind the front door.

Figure… illustrates the concept of "house entering layers" over the two site neighbouring sites.

The most public space layer, the front garden layer, develops around the most public civic function and activity around the existing mall. The next layer enters the "Negotiating the Edge" exploration and is the public-to-semi-public "front porch" layers.
The layers that form the transition space between the sites being developed are the semi-public-to-private "at the front door layers".

The micro framework intention for the "at the front door layers" is the development of a capturing square space, introducing the child-focused program on site that follows.

The conceptual layers that define the child-focused program, are the more private civic space, "the behind the front door layers".
The layering concept enable the layering of the "publicness" of the civic spaces being explored in both the "Negotiating the Edge" dissertation and this dissertation, The Resilient Child: Emotional Space.

front porch   behind front door
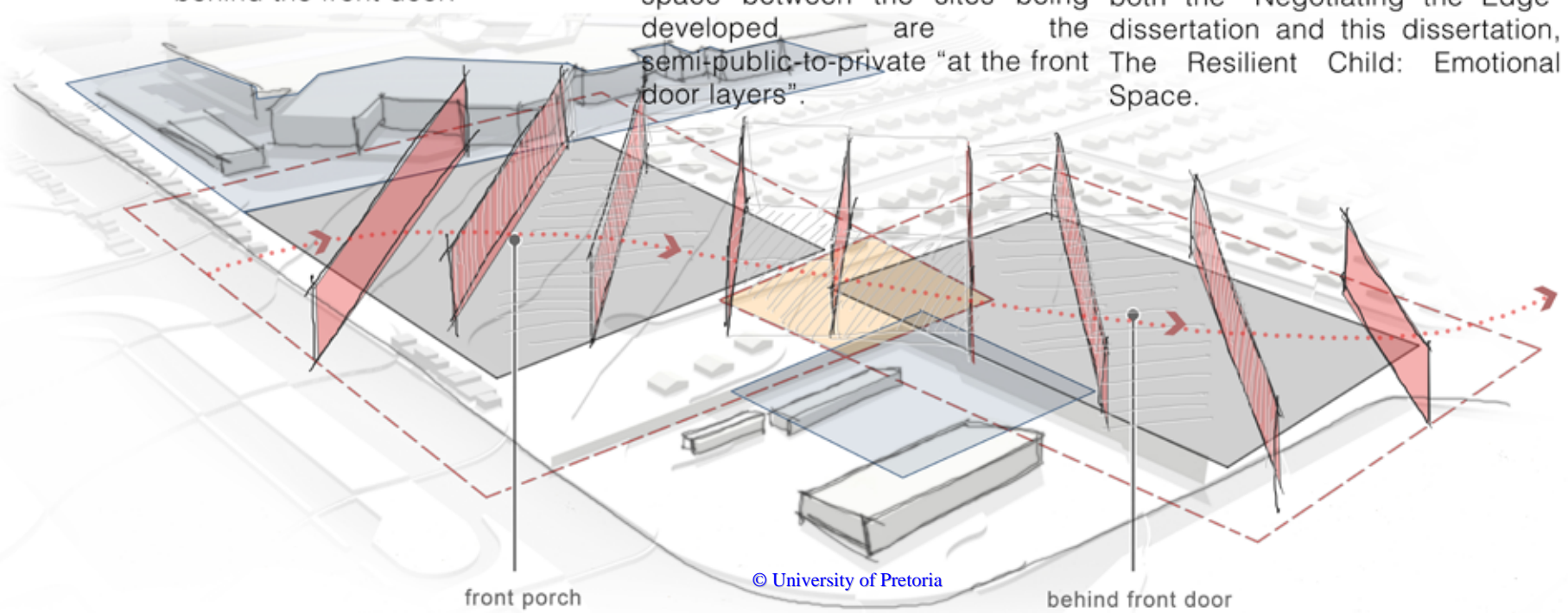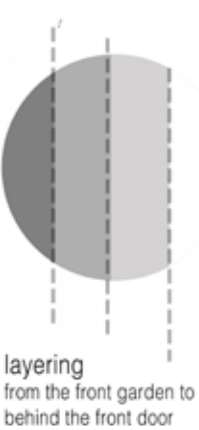
Response to Surrounding Civic Place
Exchanging resources between existing civic function and proposed civic function

The intention for the selected sites within the micro framework is; to exchange energies and resources between the existing civic functions surrounding and the sites and the newly proposed civic functions.

The figure below explains the exchanges between the existing civic functions and the newly proposed civic functions and the exchanges between the two newly proposed civic functions.

Exchange of Resources
Tangible and intangible exchanges between programmes and surrounding sites

extended setting

territories overlap

formal retail

direct physical response to sharing resources

direct sharing of people as a resource

provide social resource

social/ shared space response

fire station

territories overlap

provide physical resource to function

merging boundaries

site A
Negotiating the edge - an architecture of invitation
essence of program: skills development

response to civic space

site B
Surviving the edge
essence of program: early development centre

most public space

private civic space_
older educational space

most public space

private civic space_
children educational space

most public space

stepping thresholds up and down into and out of civic space

stepping thresholds up and down into and out of civic space

Response to time

The exchanges between the two proposed sites occur in energies and resource, time and programmatically.
The time exchanges determine the resources and programmatic activities that are exchanged at different time of the day.

Daytime activities determine the exchange of skills, from cognitive skills developed in the Resilient Child: Emotional Space dissertation to the physical skill, of building developed with the "Negotiating the Edge" (Farmer, E. 2014) dissertation.

Nighttime or early evening activities determine the exchange of recreation and social interaction, starting with family shared meals in the Resilient Child: Emotional Space dissertation and ending with larger restaurants and recreational activities in the "Negotiating the Edge" (Farmer, E. 2014) dissertation.

Figure 3.16

Programmatic response over time
The essence of each programme in the framework and the time they occupy

Figure 3.17 explains the programmatic and time exchanges across the two explored sites, in terms of the layering concept established for the development of the micro framework, the users of each proposed civic function, the skills or energies being exchanged and the time of day the exchanges occur.
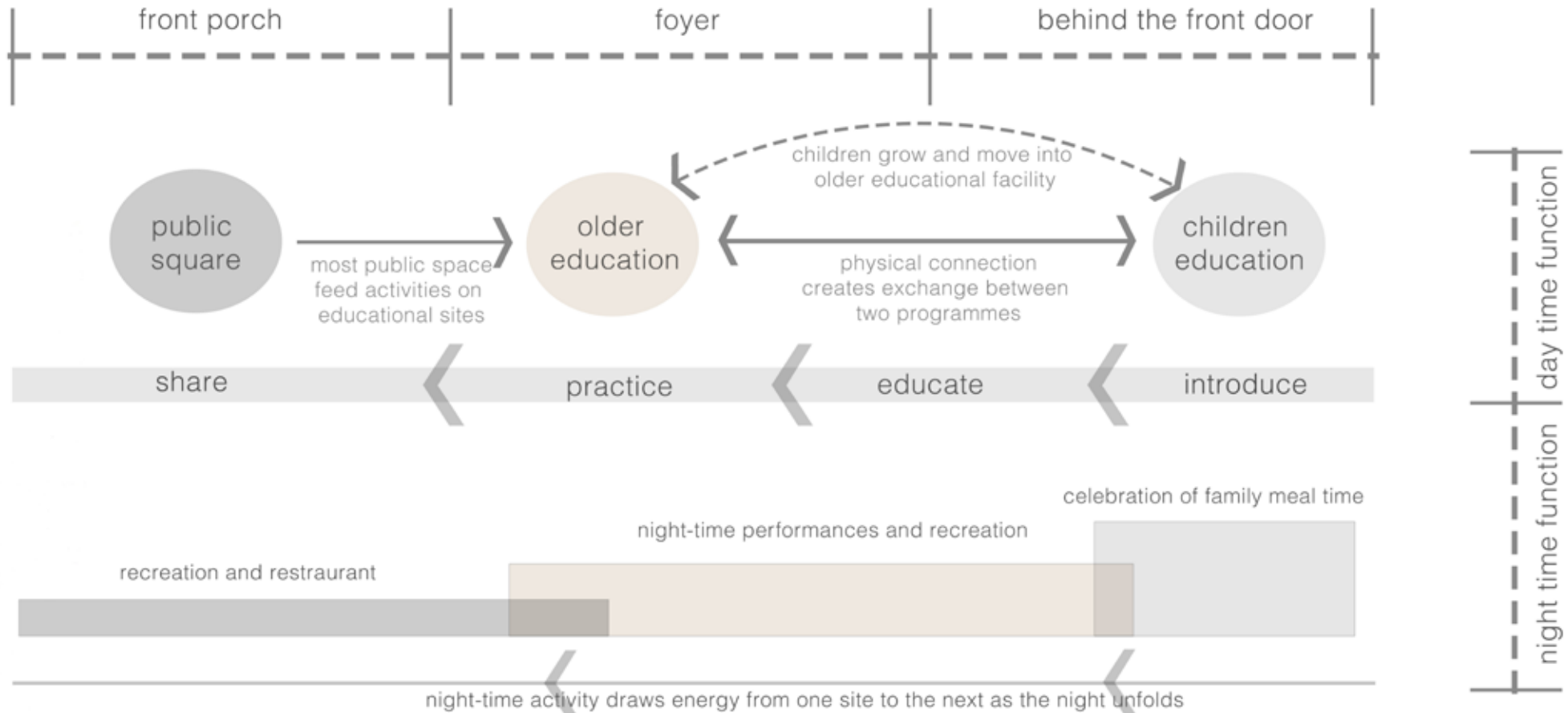
Figure 3.17

Programmatic response
What the proposed architecture does to fulfill a need on site

programmatic response
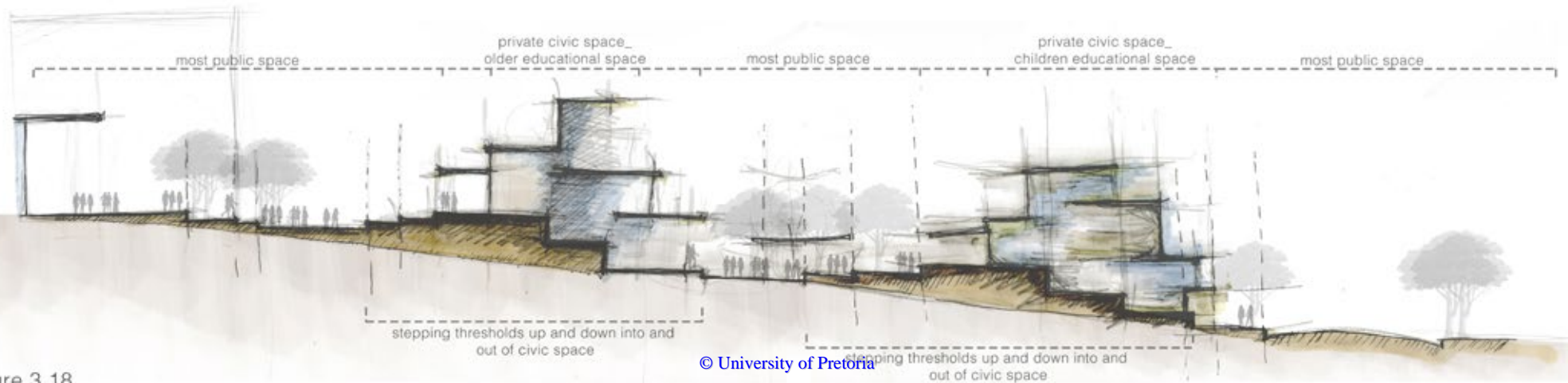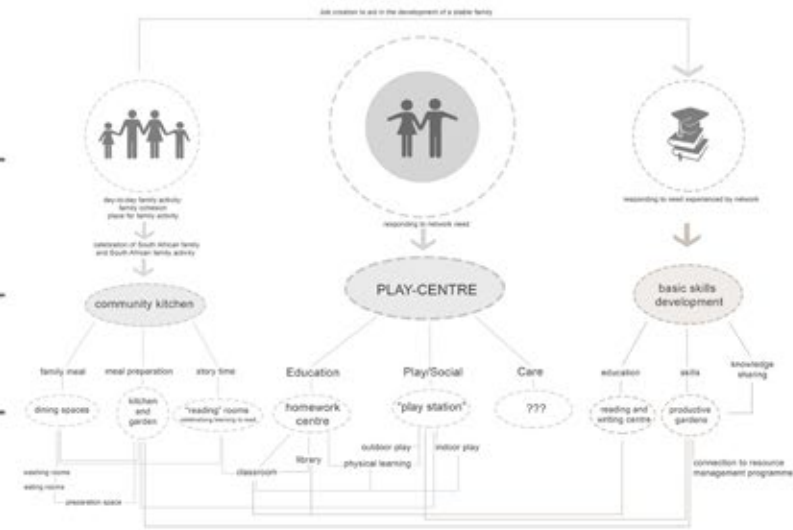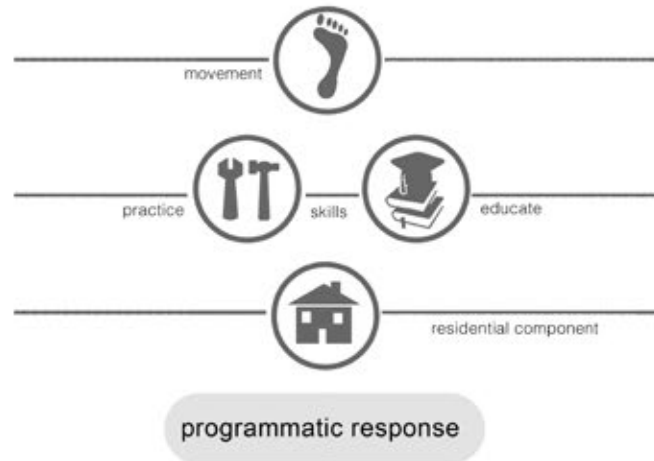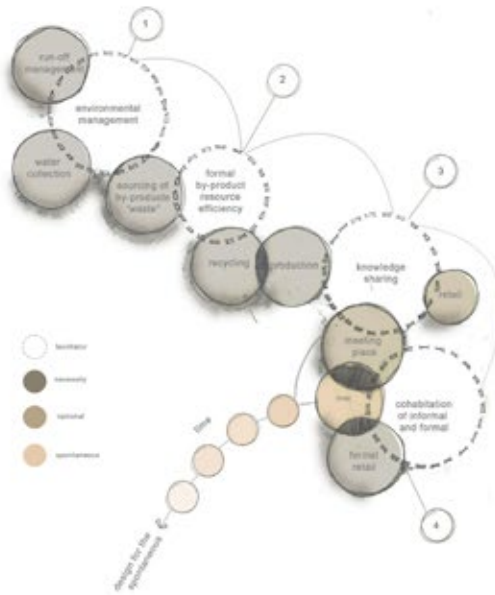
Figure 3.18

The neighbouring sites facilitate programs that address a need evident within the fabric of Mabopane and attempt to address these needs by tapping into the existing skills and energies present in the fabric.

The "Negotiating the Edge" (Farmer, E. 2014) program addresses the lack of local skills transfer within the fabric of Mabopane, from one generation to the next by, creating a facility that provides the conditions for the development of a local manufacturing skill. It also creates the opportunity for the community to learn and develop this skill within a training facility (Farmer, E. 2014).

The Resilient Child: Emotional Space dissertation addresses a need for a children focused civic spaces and facilitates the child and the family in an center focused on the early development of the child, in terms of their emotional and cognitive development. Tapping into the energies generated by the wondering child after school. (The program explore in this dissertation will be explain in further detail later in this document.)

The programs were developed in order for them to potentially support one another as the users move from one stage of life to the next. This support from one program to another was aided by the concept of layering, explored in the development of the micro framework within Mabopane. As the users of the Resilient Child: Emotional Space program grew up and moved into the early career and tertiary educational years they move out from "behind the front door" (basic cognitive skills and learning at early development years), to "on the front porch" (engaging in and developing a local skill and knowledge) in the "Negotiating the Edge" (Farmer, E. 2014) program.

Structural response
The edges and built forms defining the sites

key:

▬	new housing scheme
▬	new park and green space
▬	new roads
▬	new semi-formal market space
▬	negotiation the edge programme
▬	surviving the edge programme
▬	water management
▬	new pedestrian walkway
▭	new programme shared space
▭	new programme shared space with civic programme
▭	new water feature in public space

Figure 3.19

drop-off bay module
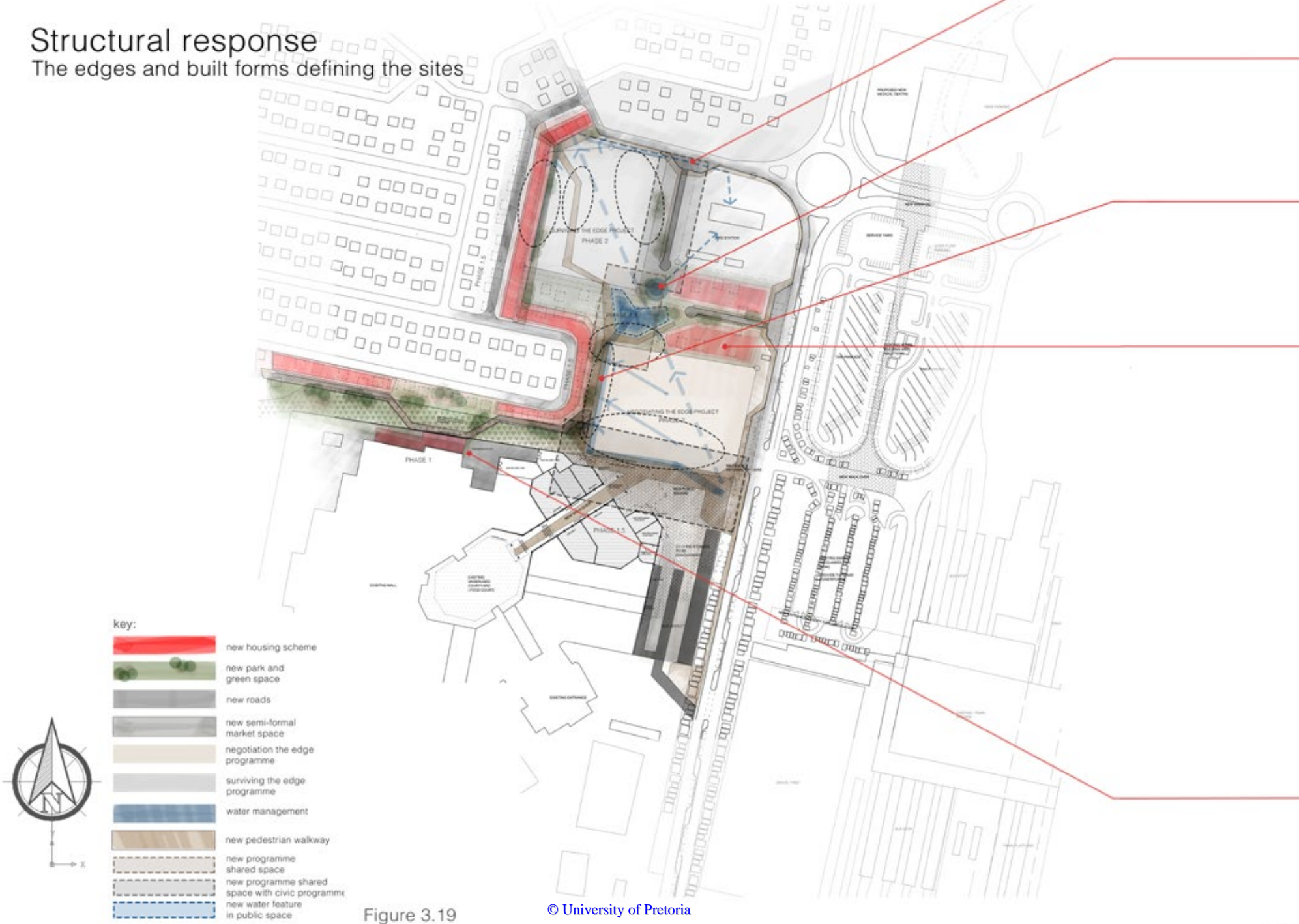
water collection
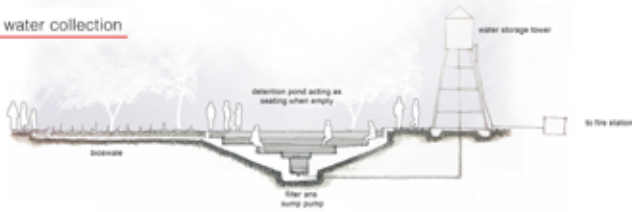
drainage module

rowhouse module
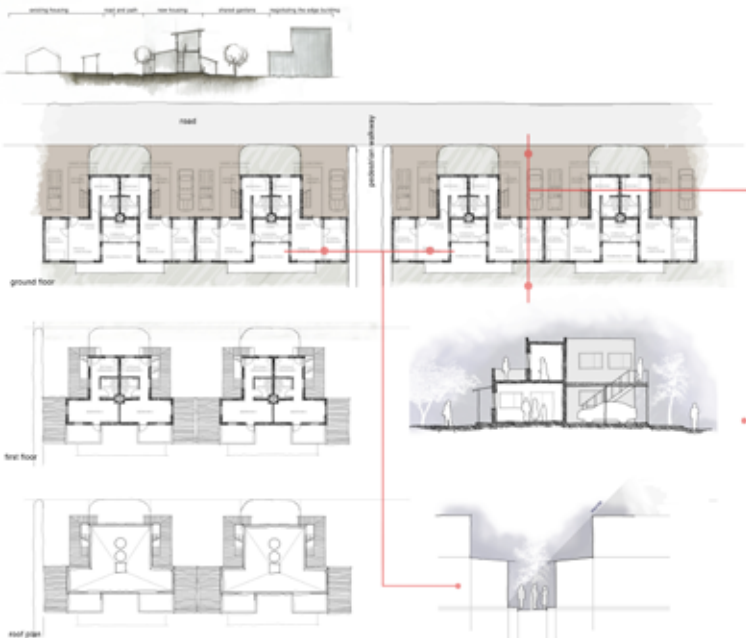
parasitic residential module
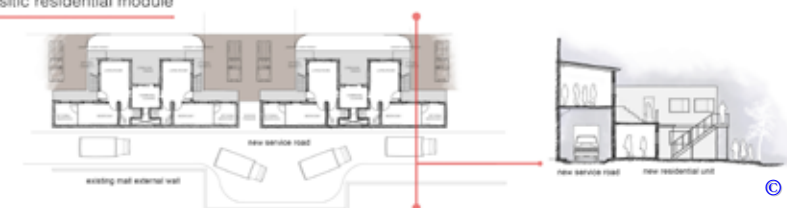
A master plan for both the "Negotiating the Edge" (Farmer, E. 2014) and the Resilient Child: Emotional Space dissertations was designed. The mater plan included civic functions such as the Central City mall and the local fire station.

The neighbouring sites are currently divided by a number of low cost government houses and are in poor condition. It was suggested that this housing is to be removed and replaced along the edges of the sites, in the form of denser row houses. The incentive in order to remove these existing house and relocate the owners in the new row house intervention is; …

The new row houses are used as a means to define the sites boundaries and a means of residential energies and activity that aid in the support of programs.

A "Parasitic" housing system was designed for the hard north facing façade of the Central City mall. The housing is takes advantage of the northern orientation. It sits above the service road, servicing the mall and will potential house mall employees.

A water management concept was established within this master plan (this concept will be further explored in the technical chapter to follow in this dissertation).

The water management concept includes a collections pond, that becomes a public meeting space, in the layers between the two sites, a number of bio-swales, that collects water off the site and transports it to the pond and water tower, that stores water, which is then used within the new interventions and the fire station. The water tower is also intended to be an orientation device within the community.

Figure 3.19 and 3.20 illustrate the intentions for the fabric surrounding the sites and the master plan designed.

Final micro framework

Figure 3.21 illustrates the micro framework developed for the "Negotiating the Edge" and Resilient Child: Emotional Space dissertations. The architectural explorations will attempt to re-enforce the "entering a house" layering concept explored in the development of the micro framework.

The decisions made within the micro framework are guidelines established to set up conditions the new architecture can respond to and will change as the architecture explored in this dissertation is developed.

new semi-formal market

new public square

new mall alterations

negotiating the edge program

new parasitic housing on northern facade of mall

new park

new housing to create site edge

public meeting space

resilient child: emotional space program

new road

new taxi stop

new service road

new water-

new water tower. creates feature. orientation point

new service road and path

Figure 3.21. MIcro Framework

04_ Theoretical Premise : Resilience and Emotion

Introduction

01
Regenerative Resilience

Resilient design and the impact resilient design has on a community.

02
Survival Patterns & Regenerative Resilience

The influence the social structure of a community has on the community's resilience and the resilience of the individual person.

03
Creating Resilience

Using the potentials within the social structure of a community and in the resilient design concept to create resilient communities and people.
-Personal Resilience vs Community Resilience.

04
Resilience and Emotion

Personal resilience and its impact on emotions and the community as a whole.
-Personal Resilience vs Community Resilience.

Developing Emotional Resilience through Architecture

Architecture's potential to influence personal resilience and emotions.

Psychological goal of spaces

Translation of theory into space types. Addressing need and creating a programme.

07
Design Principles

Conclusion and principles developed for the creation of spaces.

Conclusion

programmatic development

Figure 4.1. Theoretical Premise

List of Definitions:

Resilience:

The ability of a system to bounce back to an operational state, after being exposed to stress or change, moving forward from the change maintaining existing relationships and connections.

Regeneration:

The ability of a system to evolve and develop during change, creating new relationships, in order for the system to continue operating effective and efficiently.

Regenerative Resilience:

The ability of a complex systems to adapt, by reorganising existing processes, systems, structures and elements to renew and transform the system and create new processes of survival and relationships that ensure the networks survival.

Survival Network or Pattern:

Survival networks are the relationships developed between members of a community, through which skills and resources are shared, in order for the individual members of the community to survive.

Ritual and Routine:

Activities, determined by the designed fabric of the city, for a specific survival network that enables the survival networks sharing of energies and resources and in doing so facilitating its resilience.

Tasks:

Rituals or routine established by the design fabric of Mabopane, for a specific survival network, that aids and enables the resilience of the survival networks.

Civic Space:

Civic space is the interaction of people with one another and civic place. It serves the community and addresses a need.

Potential Energies:

Skills and resources that specific survival networks inherently possess, that can be used to aid in their own resilience and the resilience of networks that share a relationship with it.

Emotional Intelligence:

Emotional intelligence is the ability for an individual to reason and respond both cognitively and creatively and understanding when the appropriate emotional and reasonable response is necessary.

Cognitive Reasoning:

Using academic skills, such as reading and writing, to respond to and solve problems.

Creative Reasoning:

Using artistic and creative skills to respond to and solve problems.

Introduction:

In order to design effectively and with a better understanding of how design influences and is influenced by a township community, a number of architectural and design theories were investigated.

The theoretical investigation includes the concept of resilient and regenerative design and its impact on a community.

Once there is an understanding of how these principles influence a community, how resilience can be created within Mabopane will be investigated.

The link between a person or community's resilience and their emotional wellbeing will also be investigated.

And finally how emotional wellbeing can be facilitated through architecture will be explored and translated into a set of design guidelines and principles, and an architectural program, specific to Mabopane.

Figure 4.1. illustrates the breakdown for the theoretical premise explored within this dissertation.

01_Regenerative Resilience:

Resilient design and the impact resilient design have on a community.

"African cities are works in progress, at the same time exceedingly creative and extremely stalled." (Simone, A. 2004: 1)

Survival and Life:

African cities are unique and creative, easily adapting and altering lifestyles, as the environmental, economic and social fabric defining them changes. This easy adaptability allows for the SURVIVAL of the community, relying on the city for LIFE (Simone, A. 2004: 1).

Simone, in For the City Yet to Come, argues that the extreme adaptability of an African city forces its community to reinvent traditions and cultures, in order for them and it to survive. He continues by stating that the reinvented traditions are often dynamic links between past and future, but have lost, ignored or left unused an enormous amount of

creative, traditional or cultural energies (Simone, A. 2004: 1).

These lost and unused creative, cultural or traditional energies may hold the potential to move an African community from SURVIVAL to LIFE (RESILIENCE) (Simone, A. 2004: 1).

Mabopane is a typical African city, both creative and unique but also simply facilitating the survival of it community, by reinventing traditions and networks and squandering enormous amounts of creative energies.

That fabric of Mabopane is defined by what Simon describes as a "hodgepodge" of systems and activities, all adapting as things around them change in order for them to survive. This hodgepodge fabric is defined by extreme diversity and the ability to hastily assemble and demolish systems and activities, by taking from whatever is in sight.

According to Simone, an African city such as Mabopane has the appearance of vitality and life as a result of this hodgepodge fabric and their ability to reinvent traditions and systems that once defined them.

However, this vitality is not life and resilience but simply survival.

What then is a living, resilient and regenerative African city?

To understand what a resilient and regenerative city is, both concepts will be explored and related back to the existing fabric of Mabopane.

Christina Du Plessis describes resilience (in its simplest form) as a systems ability to bounce back or return, as fast as possible, to its original state.

In complex systems, such as cities, it is however not always possible for the system to return the original state, while maintaining its existing functional components. Therefore

Figure 4.2. Market stall in Mabopane_ survival resource

Figure 4.3. Local Market and owners_ survival network

Figure 4.4. Local Residence

resilience for complex systems evolves into the system's ability to absorb stress and shock without losing the functionality of the system's components and network structures (Du Plessis, C. 2013).

Mabopane, like the African city described by Simone, has the ability to absorb a certain amount of stress and shock without loosing the functionality of the majority of its functioning systems and networks, by reinventing traditions and the systems themselves. These systems and networks are adapted without regard for the importance of existing systems to the individual user and the community as a whole and a number of systems will be completely lost within the changing environment (Simone, A. 2004: 1). The loss of the existing networks leaves a number of the users without a functioning system of survival.

Du Plessis describes a third level of resilience for complex systems such as Mabopane that eliminates the

trisk of loosing a user's or the community's system of survival, to the changing environment, completely.

Du Plessis describes this third resilience as a complex system's ability to adapt, by reorganising existing processes, systems, structures and elements to renew and transform the system and create new processes of survival and relationships that allow for the development of new networks and systems within the complex system itself (Du Plessis, C. 2013).

In order for a city, such as Mabopane, to adapt as described in the third level of resilience, the city is to be able to develop in a regenerative manner. This introduces the concept of regenerative resilience.

Regenerative resilience includes the concept of regenerative development as the system absorbs stress. In essence, regenerative development is the ability for the

complex system to use existing natural, economic and social potentials to reveal and develop latent energies within the system and the networks the system is made of (Du Plessis, C. 2013).

The systems of Mabopane, as mentioned previously, have the ability to absorb stress and reinvent existing systems, but loose and ignore latent possibilities within the natural, economic and social systems within the city. The city is simply surviving.

This is where the possibility for an intervention within this complex fabric presents itself. Regenerative resilient design will allow Mabopane and its community to rely on the latent potential within its own fabric, reducing the possibility of systems and networks it is dependent on from simply dying when the surrounding environment changes.

Regenerative Resilience:
using existing natural, social and civic potentials within the networks and systems within the community to reveal latent possiblities within the networks and systems to adapt to and absorb change, in order to form new relationships or strengthen existing ones.

social potential

natural potential

potential within system used to create new relationships within larger system in order to aid in growth and change of the individual system and larger system.

potential within system used to allow and enable system to adapt and grow during change

civic potential

Figure 4.5. Regenerative Resilience Diagram
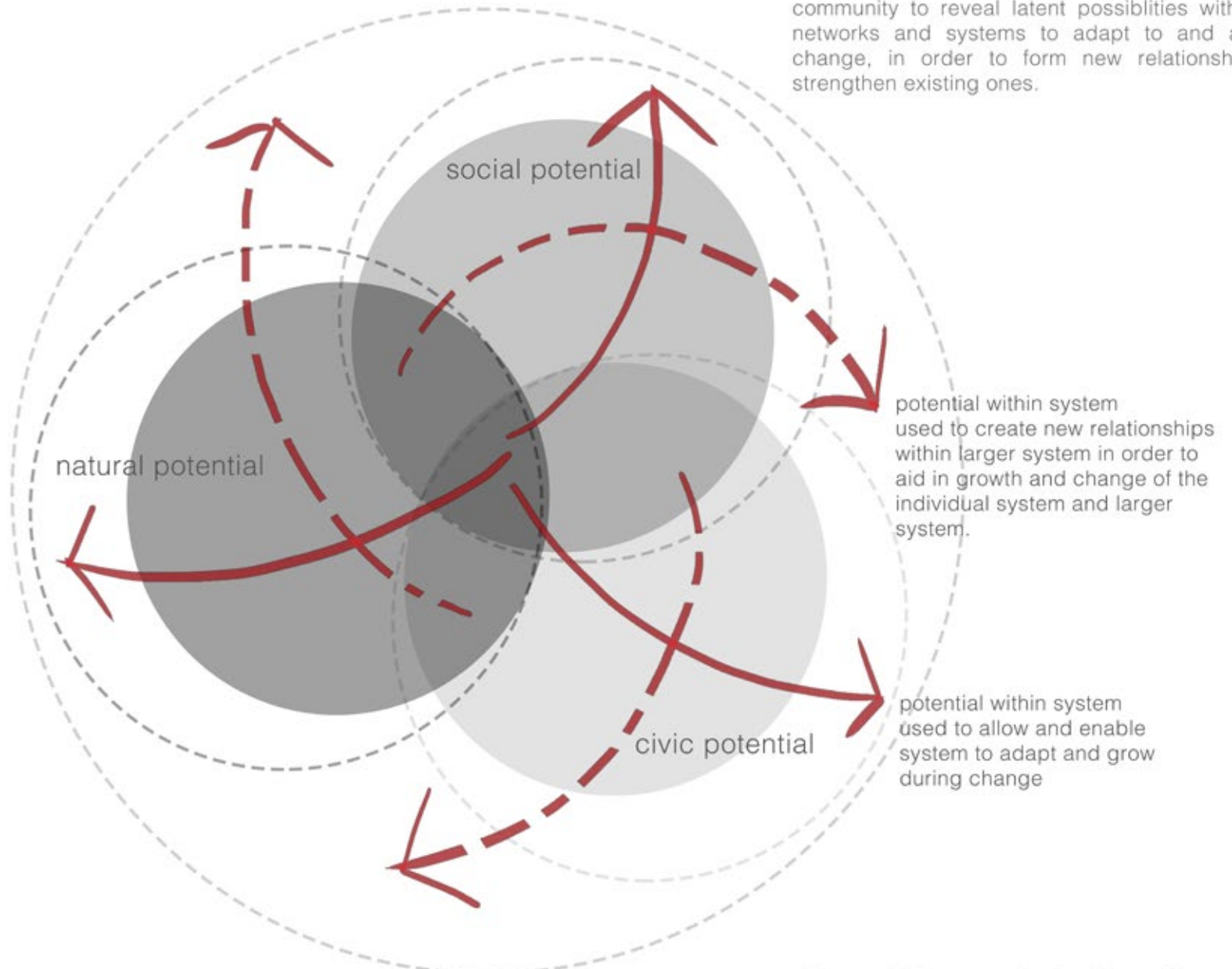
2_Survival Patterns and Regenerative Resilience:

The influence the survival patterns of a community have on the community's resilience.

In order to design for Mabopane, the latent potentials within the fabric need to be discovered and the systems and networks that hold these potentials understood.

The impact the physical fabric has on the ability for the survival networks to interact and share existing energies and resources needs to be understood, in order to understand how the design intervention can enable the city's resilience.

.

Creative Connection and Designed Stability:

"Development... happens when people, however poor in money, get together, get organised... It happens when they are savvy and able to influence or change the course of events or order of things locally, nationally and even globally...Development... is that stage you reach when you are secure enough in yourself, individually or collectively, to become interdependent; when 'I' can emerge as 'we'." (Hamdi, N. 2004: xvi)

Hamdi suggests informal cities such as Mabopane exhibit a number of patterns, networks and systems that allow for problem solving and survival within the city. The problem solving accomplished by these networks and systems is achieved by drawing on a variety of information from a number of small and simple local elements; one network or system drawing off a second network or system in order

for the user to survive. The reliance of one local system on the energy of another allows the systems to reorganise and adapt themselves in order to move from one kind of order of life to a higher order of life (Hamdi, N. 2004: xvii).

The community's ability to adapt and reorganise existing orders, patterns and systems, using existing resources and energies, allows the community to absorb stress and shock and create new relationships and systems of survival, as discussed earlier in the chapter. It allows the city to develop resilience.

Mabopane acts like the informal city described by Hamdi, displaying a number of patterns that support the community's survival, but does not facilitate the sharing of resources.

Through the process of mapping the networks and patterns within Mabopane, the lack of resource and energy sharing between these networks was evident.

Figure 4.6. Mabopane Train Station_Survival resource

Figure 4.7. Local Vender_Survival resident

Figure 4.7. Local Market Stall and Owner_Survival Network

Hamdi attributes the lack reliance and sharing of existing energy and resources between survival networks, on a lack of designed fabric that provides stability, rules and routines. The stability provided by the designed city fabric facilitates the interaction of survival patterns and therefore the opportunities for the existing patterns to share energies and resources (Hamdi, N. 2004: xvii).

Mabopane by no means has a lack of formally designed fabric, however, the sharing of energies and resources within this fabric is limited.

The formally designed fabric is defined by a large transportation precinct. The rules and routines this precinct are limited to the community's coming and going, to and from external support systems elsewhere within the Tshwane metrople.

The limited rules and routines enforced by the physical fabric of Mabopane limits the number of patterns and networks that are able to develop in order for community to survive. There is a reliance on external energies and resources limiting the community's ability to become self-reliant and resilient.

In order for the city to develop resiliently, Hamdi suggests that there is to be a balance between the creativity of the existing patterns, and the energies they embodied, and the stability of design (Hamdi, N. 2004: xviii).

The designed fabri of Mabopane is to allow for and facilitate the development of new patterns and networks within the community, as the environment around them changes, by providing the stable space and place for the connection and sharing of existing networks and energies to happen (Hamdi, N. 2004: xviii).

According to Hamdi the designed fabric is to aid in the development of patterns that "get it right for now and at the same time being tactical and strategic about later." (Hamdi, N. 2004: xix).

Designing the Rules and Routines:

Hamdi suggests the designed fabric inserted into the existing fabric can and oppose the existing rules and routines, in order to strengthen the existing patterns and networks. The disturbance can occur when the existing designed fabric does not work effectively or will become completely ineffective and harmful when faced with change (Hamdi, N. 2004: xix).

The newly designed intervention and the new rules and routines it enforces, can impose, intersect and interrupt existing habits, routines and technologies, in order to develop new patterns and networks and allow for exiting patterns and networks to share unfamiliar energies and resources, so that they are able to with stand change and develop resilient networks (Hamdi, N. 2004: xix).

" problems are solved by drawing on a variety of [resources] from a multitude of small, relatively simple and local elements"_ Nabeel Hamdi, *Small Change*

the individual fits into the larger system and lives for it.

overall surviving system

network surviving within system

the network attempting to survive within the larger network uses creative means to draw resources from surrounding networks. design creates a formal setting in which creative activity can occur.

the surviving network then uses resources to develop itself and grow the larger systems.

resources within system

Figure 4.8. Sharing Resources in order to develop Resilience Diagra

Hamdi suggests that designers should embrace three ways of thinking when designing the new rules and routines that are to be inserted into the existing fabric and aid in the problem-solving of the community: designers are to think serially, associatively and holistically (Hamdi, N. 2004: xx).

The designer thinks serially when the newly inserted designed fabric; defines goals and tasks within the fabric, that the patterns and networks reach as they interact with the newly inserted design. Thinking associatively causes the designer to find associations and connections between existing patterns, networks, people, structures and experiences. This way of thinking allows the designer to insert the intervention within existing energies and activities, ensuring its has an appropriate function within existing patterns and networks. Finally designing with a holistic way of thinking, allows for creative, imaginative and intuitive connections and networks to

develop as the existing patterns and networks use and interact with and around the designed intervention (Hamdi, N. 2004: xx).

The newly inserted designed intervention is to find a balance between the creativity of solving-problems and surviving and the stability of the existing associations and goals, while adding new tasks and goals and associations (Hamdi, N. 2004: xx).

The existing creative patterns and designed stability:

The designed physical fabric of Mabopane, as discussed previously, limits the interaction of survival patterns and prevents sharing of resources and energies between the patterns. The existing fabric of Mabopane does not effectively enable the development of new patterns.

Through the process of mapping, it was observed that the existing survival networks and patterns in

Mabopane develop as a result of the stability, rules and routines created by the transportation precinct. The precinct is defined by a large train station, bus depot and taxi rank in which the survival networks develop.
The existing fabric has elements that develop around the ways of thinking Hamdi suggests the newly designed intervention be designed around.

Thinking Serially:

Designed fabric defining goals, in order to facilitate regenerative resilience.

exisitng physical fabric, defining goals and facilitating rituals

exisitng rituals, tasks and goals.

newly design fabric defines missing goals, creates new connections and the opportunity for regenerative resilience.

Thinking Associatively:

Inserting design intervention into existing connections and relationships in order to strenthen survival and faciliate regenerative resilience.

existing physical fabric defines connections and relationships.

existing connections and relationships

new design intervention inserted into existing relationships, drawing off existing energies and strengthen existing relationship.

existing weak relationships

new design intervention inserted into weak connection, in order to facilitate stregthening of connection or create opportunity for new relationships.

Thinking Holistically:

Design fabric facilitates creative and intuitive development, over time and as change continues to occur.

potential new relationship, facilitated within designed fabric.

exisitng fabric

newly designed fabric

creative connection developed and facilitated by newly designed fabric. designed fabric adaptable according to communities need.

Figure 4.9. Serial Thinking

Figure 4.10. Associative Thinking
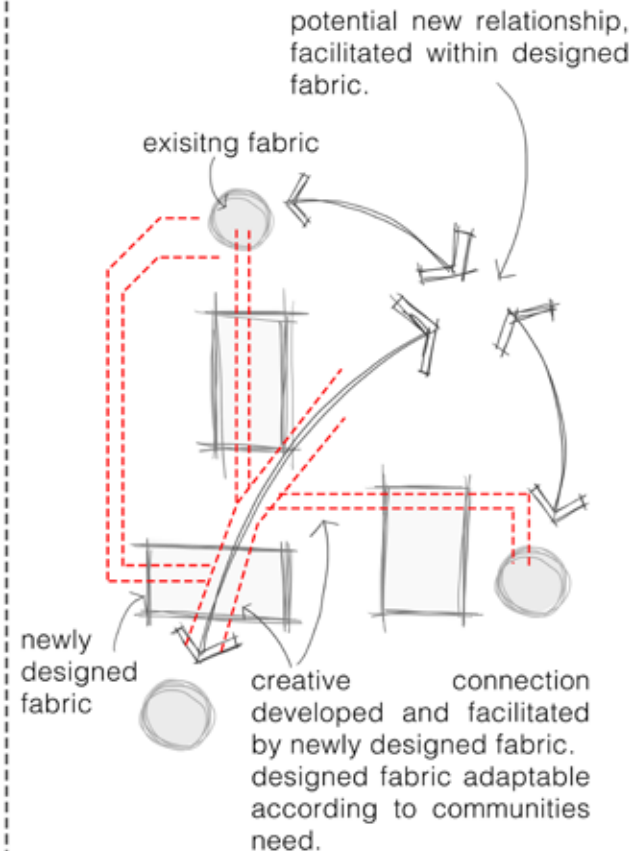
Figure 4.11. Holistic Thinking

In order to understand where the newly designed intervention should fit into the existing fabric, how the existing fabric has developed needs to be understood.

The existing goals and tasks that are defined by the transportation hub are determined by the users' routine of, going to and from work elsewhere in the metrople.

Through the mapping process, the existing goals and tasks in Mabopane where identified as the movement from home to the transport hub, dropping children at school and picking up grocery supplies at the local informal market at the hub.

Through the process of mapping it was observed that once a child is dropped off at school and the school day has ended, the tasks established by the fabric of Mabopane, for the child have ended. The child is left to wonder "taskless" through Mabopane until evening and the tasks established by the individual family.

Through the process of mapping it was observed that once a child is dropped off at school and the school day has ended, the tasks established by the fabric of Mabopane, for the child have ended. The child is left to wonder "taskless" through Mabopane until evening and the tasks established by the individual family.

The task and survival pattern of people moving to the transport hub and on to work establishes an association of user with the. Survival patterns form connections as individuals using the hub make use of the local informal market. The market is a support for the local community throughout the day as they make use of the products the market provides.

The wondering child starts associating itself with open green spaces within the fabric of Mabopane. Parks, open street corners and sports fields become the meeting place for children as they wait for dinnertime.

The connection between children is strengthened but the connection between child and parent is weakened.

Figu

Figur

Figure

Figure

ure 4.12. Local School defining part of the child's daily tasks

e 4.13. Local Taxi Rank connecting Mabopane to outside energies.

4.14. Local Market, creative intervention to support locals survival.

The community's capacity for creativity is evident in the development of the informal market within transport hub.

The market not only supports the daily exodus of community members, but also supports remaining members as it has becomes part of local entrepreneurship.

Through the process of mapping, the network that ensures the survival of the child was observed to be neglected and forgotten by the existing designed fabric of Mabopane, therefore, there is a lack of or very few rules and routines that ensure the children's survival and their ability to connect with survival patterns within the community.

The new design intervention will consider the existing goals and tasks, associations and creativities that influence the children, and address missing or neglected goals, tasks, associations and ability to be creative.

The newly designed fabric will aim to establish rules and routines that enable the children's network to connect with surrounding networks and share or draw off energies and resources within the surrounding networks.

(Further explanation for concentration on the children's survival network will be addressed later in this chapter and in the programme and concept chapter to follow.)

3_Creating Resilience:

Du Plessis describes regenerative resilience, for complicated systems, as the systems ability to make use of existing potentials, energies and resources in order for the system to absorb stress, reorganise itself and create new relationships, in order for the system to with stand current change and change guaranteed in the future (Du Plessis, C. 2013).

Hamdi describes the same concept, as a community's ability to develop creatively within the stability of design. Hamdi promotes the use and sharing of existing resources between existing survival patterns, in order for these patterns to creative new relationships and patterns that are appropriate for the current circumstances and the circumstances of the future. Hamdi starts introducing the role of architecture and space within the creative development of the community.

Architecture defines the rules and routines that create and define the patterns that aid in the survival of the community and creates the opportunity for the interaction, connection and sharing of existing patterns, resources and energies.

Creating and revealing the community's latent potential and ability to develop regenerative and resiliently (Hamdi, N. 2004).

With this understanding of regenerative resilience and architecture's basic role in creating a community that can develop regeneratively, how the architecture of the city and individual buildings are to be created, in order for the community to develop regenerative and resiliently, can be explored.

Jan Gehl describes architecture's role in the creation of a sustainable, resilient cities and how he believes the individual work of architecture can be created. He explores architectures role in the creation of great cities.

Making great cities:

"Life, space, buildings- in that order, please." (Gehl, J. 2010).

"Designing great cities for people must have city life and city space as a point of departure." (Gehl, J. 2010).

Gehl suggests that the only way to approach the design of great cities is to start by considering and understanding city life and the city space (Gehl, J. 2010).

City life, according to Gehl, is the rituals and routines that connect people (the city user) to other people, patterns and networks, places within city and spaces that serve the city. Gehl describes city spaces as the spatial programmes that result from city life (city rituals and routines). City space provides the opportunity for the connection and interaction of the routines, rituals, people, patterns and networks (Gehl, J. 2010).

The point of departure for the creation of great cities is the human. According to Gehl the creation of resilient and regenerative cities, "must start at eye level and end with a bird's-eye view". The designer must work with human dimension and city life, and evolve the rituals and routines into the required city spaces and then concentrate on the buildings that create those spaces (Gehl, J. 2010). Gehl encourages the designer to create architecture, for the resilient cities, that concentrates on eye level, the human dimension of the city. Creating cities for its people must be part of the architectural challenge a designer faces. The architecture of the city must create the city spaces that facilitate and empower the life and ritual that defies the city and the city user (Gehl, J. 2010). Eye-level cities are created by considering the rituals and patterns that allow the city user to survive and live. City spaces are created in order to facilitate and strengthen these patterns and provide the opportunity for the patterns and networks to connect and share existing resources and energies (Gehl, J. 2010).

This sharing of existing resources and energies, according to Hamdi and Du Plessis, allows the city user to reorganise and develop new relationships and patterns that allow the city and its individuals to absorb current and future change; allowing the city to develop regenerative and resiliently (Du Plessis, C. 2013 and Hamdi, N. 2004).

According to Gehl, in order to create a regenerative and resilient city, the creation of architecture for this city must start with understanding the ever-changing rituals and life that defines the city and its users. Once the city life is understood, the spaces and programs that serve and support this life can be determined and created and then finally the architecture can create the required spaces.

By understanding the ever-changing city life, then creating city space, that serves and facilitates that necessary change, and finally the require architecture, allows the city to absorb the change and move on (Gehl, J. 2010).

Figure 4.15. The city at eye level

Individual Networks in Great Cities:

Cities are made up of a number of different patterns and networks. Each of which determine the survival of a number of different city users.

The survival patterns and networks are defined and define a number of different rituals and routines resulting in different spatial and programmatic requirements. The different spaces need to serve the city user defines a number of different architectural requirements. Different survival networks have different spatial and architectural needs, that designed city is to fulfil.

Gehl, in Cities for People, identifies the importance of city space that serves its people and their daily city life and rituals. In an informal setting, such as Mabopane, the community depends on civic space to fulfil the spatial requirements of every day activities. The community depend on civic space in order for them to create new relationships and connections and shared resources,

between one another. (Gehl, J. 2010).

The space requirements define architectural requirements in order to create the civic space that will serve the community.

The civic space created within the community has to create the opportunity for the creation of connections and. The designed fabric must create civic spaces that allow for spaces to change over time as the networks' needs change.

" Life, Space, Buildings- in that order"
_ Jan Gehl *Cities for the People*

Daily rituals define required spaces in order for networks to survive.

Required spaces have specific programmatic needs and facilitate specific connections between spaces and ritual within city fabric.

The requires spaces determine the required designed fabric. The designed fabric, the building, defines and creates the requires survival spaces and facilitates the connection of spaces and rituals.

Figure 4.16. Life, Space, Building-in that order

Mabopane: Life, Space, Building- in that order:

Mabopane, has a number of different patterns and networks, each with specific daily life, spatial and architectural requirements.

A number of these networks were observed during the process of mapping.
Through this process, the daily routines and rituals defined by the different survival networks were observed and examined.

With an understanding of the existing daily rituals of a number of Mabopane's survival networks, the spaces required was observed.

Figure 4.17, illustrates the existing survival networks that were mapped in Mabopane and the spaces that form as a result.

HEALTHCARE WORKER

ARGRICULTURAL INDUSTRY
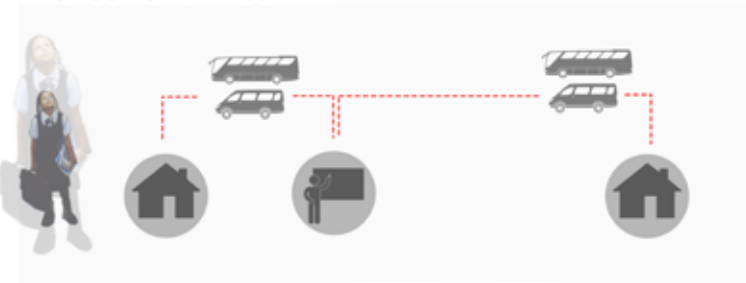
SCHOOL CHILD
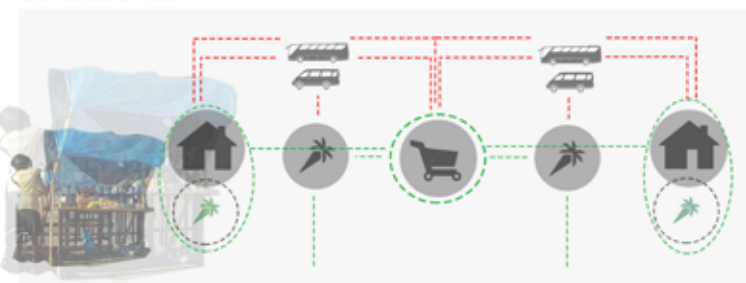
LOCAL MARKET STALL OWNER
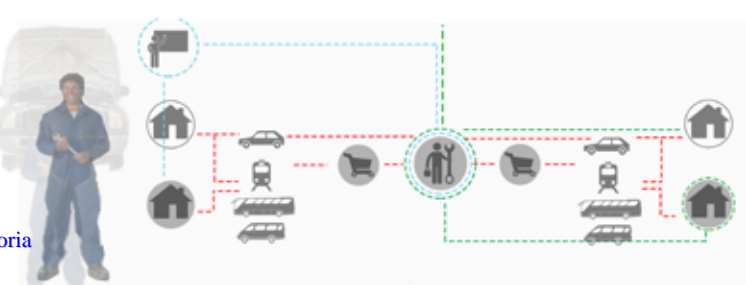
A lack of civic space, that serves the community and its networks was observed. This results in a lack of opportunity for networks to connect, interact and share energies and resources.

This missing civic space results in survival networks and patterns that are unable to develop regenerative or resiliently.

Figure 4.18, illustrates the missing connections between survival networks and the resulting missing civic or city space, within Mabopane.

The missing civic space concentrated on, for the purpose of this dissertation, is the space needed by the children.

HEALTHCARE WORKER

ARGRICULTURAL INDUSTRY

SCHOOL CHILD

LOCAL MARKET STALL OWNER
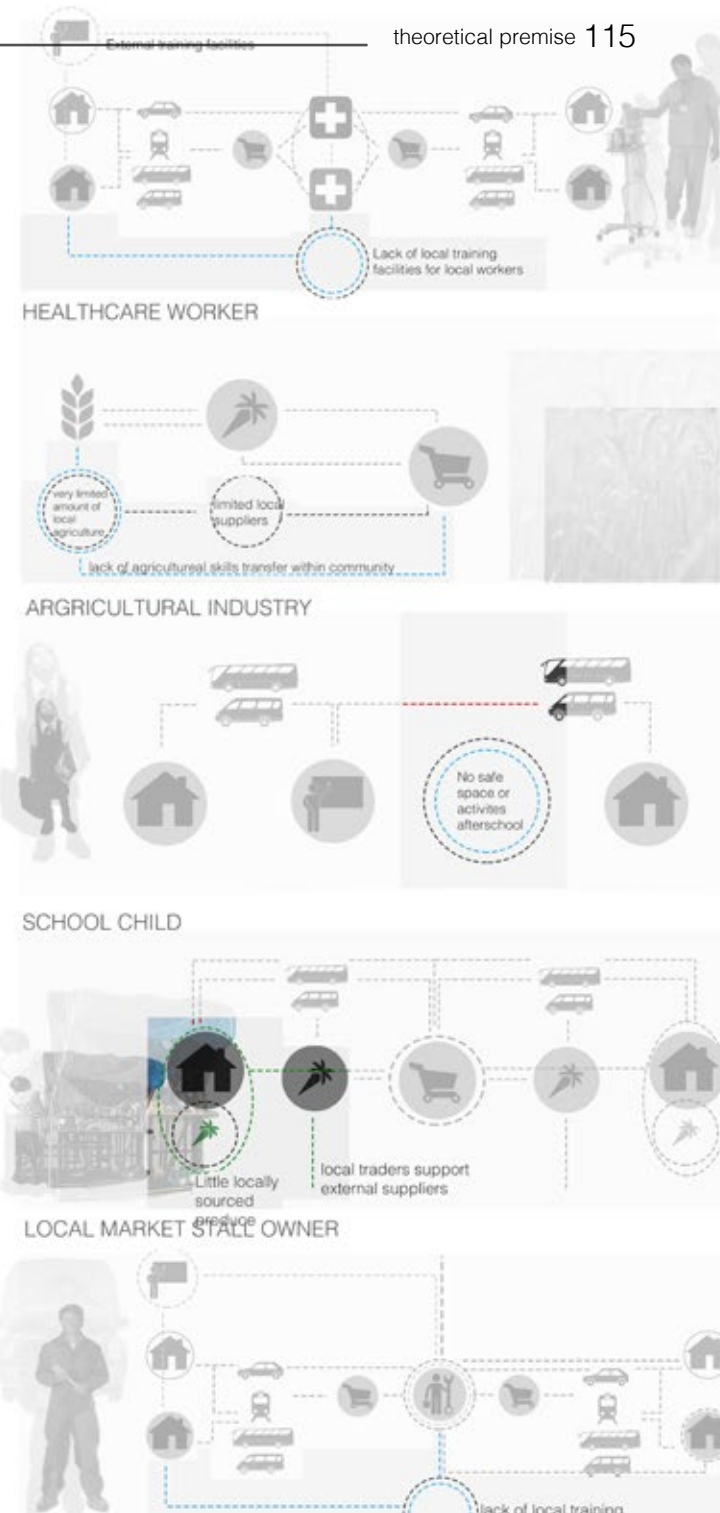
Why the children's survival network?

The survival network and pattern of Mabopane's children was selected for a number of reasons, based on observations made during the mapping process and the theoretical exploration.

1. Missing tasks, defined by the designed fabric, dedicated to the children of Mabopane:

As described by Hamdi, the designed fabric of a city defines rules, routines and tasks that allow the surviving networks to share and draw off existing energies and resources (Hamdi, N. 2004)

It was observed through the process of mapping that the designed fabric of Mabopane, does not determine daily tasks for the child and its survival network. The child's daily ritual is facilitated by the designed fabric for a portion of the day, once the child finishes school they are left to wonder through the city, without a set task or place of belonging.

2. Missing connections and interactions of the children's survival network and supporting networks:

As part of the mapping process and the theoretical exploration the result of the lack of tasks for the children of Mabopane was observed as a lack of connection, interaction and sharing of resources and energies between the children's survival network and survival networks that can support or enable the child's resilience.

Figure 4.19. Local Nursery School

Figure 4.20. Wondering Children

Figure 4.21. Wondering Children, without specfic space

3. The resulting missing civic space dedicated to the child and the required connections and interactions the children's network requires to be resilient.

As explained by Gehl, the life and rituals of a survival network and the connections and interactions this network requires determines the city space that will serve and facilitate this life and connection.The fabric of Mabopane has a lack of civic space that serves the children's survival and an opportunity for the children's network to connect with others and share and draw off existing energies and resources.

4. Mabopane does not provide the children's network with the opportunity to be resilient:

The designed fabric of Mabopane does not provide tasks and goals for the child within the community; therefore, the designed fabric does not provide a place of belonging within the community. The lack of tasks and belonging results in a lack of connection and interaction for the networks.

This prevents the network from developing, using existing potentials for resilience.

The children's survival network was selected because the opportunity to create a designed intervention that will enable the resilient and regenerative development of the child was most obvious and needed.

04_Resilience and Emotion:

The intention for the architectural intervention, within the fabric of Mabopane, is to create the opportunity and facilities for the development of resilient or regenerative networks within the community, by drawing off and sharing existing and latent potentials and energies.

In order to create the conditions for resilience, the rituals and routines that make and will potentially make the networks, within the community, resilient need to be understood.

When considering the children's survival network, within the community, the following questions arise: what makes a child resilient? What rituals and routines increase and facilitate this resilience? What potential and latent energies need to be shared between networks in order for the network's resilience to be increased?

What makes a child resilient?

The environment the children of Mabopane are expected to survive in is characterised by violence, poverty, depression and alienation. This environment threatens the survival and the physical, psychological and emotional wellbeing and development of the child and the networks it depends on (ed Camilleri, V.A. 2007:16).

As mentioned previously in this chapter, the fabric of Mabopane neglects the child and their potential to be resilient in a number of different ways:

    1. The design fabric neglects to set tasks for the child within the over survival of Mabopane.
    2. The design fabric does not provide the opportunity for the child to interact and share resources with supporting networks.
    3. Missing civic space that provides the opportunity for the needed connections and interactions

the child needs to become resilient and regenerative.

Each of these points of neglect has a lasting impact on the children of Mabopane's wellbeing, both physically and emotionally.

Figure 4.22 demonstrates the emotional and psychological impact each of the above-mentioned issues creates.

In order to facilitate the development of a resilient child, within the fabric of Mabopane, the issues faced by the child need to be solved, with a deeper understanding of lasting emotional and psychological effects these issues create. In order to develop a resilient child, how the existing and intended designed fabric impacts the child's emotional intelligence needs to be understood and addressed. A child is given the opportunity to be resilient when their emotional, psychological and physical intelligences are cared for.

A child's emotional intelligence gives them the ability to bounce back and grow after shock and trauma.

no defined tasks established for the child.

Child left without purpose and to wonder within fabric.

missing civic space dedicated to the child.

No civic space belongs to the child, therefore, the child does not belong in any space or to any specfic resources or energies.

child not given opportunity to create relationships and share resources within designed fabric

Child left to rely on limited resources in order to survive and is isolated, with out friendship, within the fabric.

Figure 4.22. Challenges experienced by child

Emotional Intelligence - The Fundamentals:

In order to understand how to create an architectural intervention that focuses on the emotional development of the children of Mabopane, the fundamentals that form part of a child's emotional intelligence needs to be understood.

Furnham explains that our traditional idea of intelligence, an individual's ability to cognitively reason, read, write and comprehend concepts is link to our ability to reason, understand and react to our physical and social environments. He explains that an individual functions with a number of intelligences, multiple intelligences (Furnham, A:5).

Multiple intelligences is divided into four categories; cognitive or educational intelligences, art intelligences, personal intelligences and spiritual intelligences (Furnham, A: 5).

Figure 4.23, illustrates the categories of multiple intelligences and the factors that influence and build them.

Cognitive intelligences are skills and resources that an individual can be taught in an educational setting. They are skills that have a definite right or wrong, can be tested, analysed or scientifically investigated (Furnham, A: 5).

Art based intelligences are an individuals ability to recognize patterns, rhythms and compositions in art, music and space. They are skills that allow individuals to perform and express themselves creatively. Art based intelligences also include an individual's ability to use their physical body to solve problems or design and create products (Furnham, A :5).

Personal intelligences include interpersonal and intrapersonal intelligences.

Interpersonal intelligence is a person's ability to understand the intentions, motives and desires of others and effectively work with them and intrapersonal intelligence is a person's ability to understand themselves and use this information to effectively regulate their life (Furnham, A:6).

Spiritual intelligence is an individual's sense of purpose and belonging, both in their immediate environment and the universe. This intelligence develops the individual's need to care for their environment and belong to a network and system surviving in that environment (Furnham, A:6).

Figure 4. 23. Multiple intelligence categories
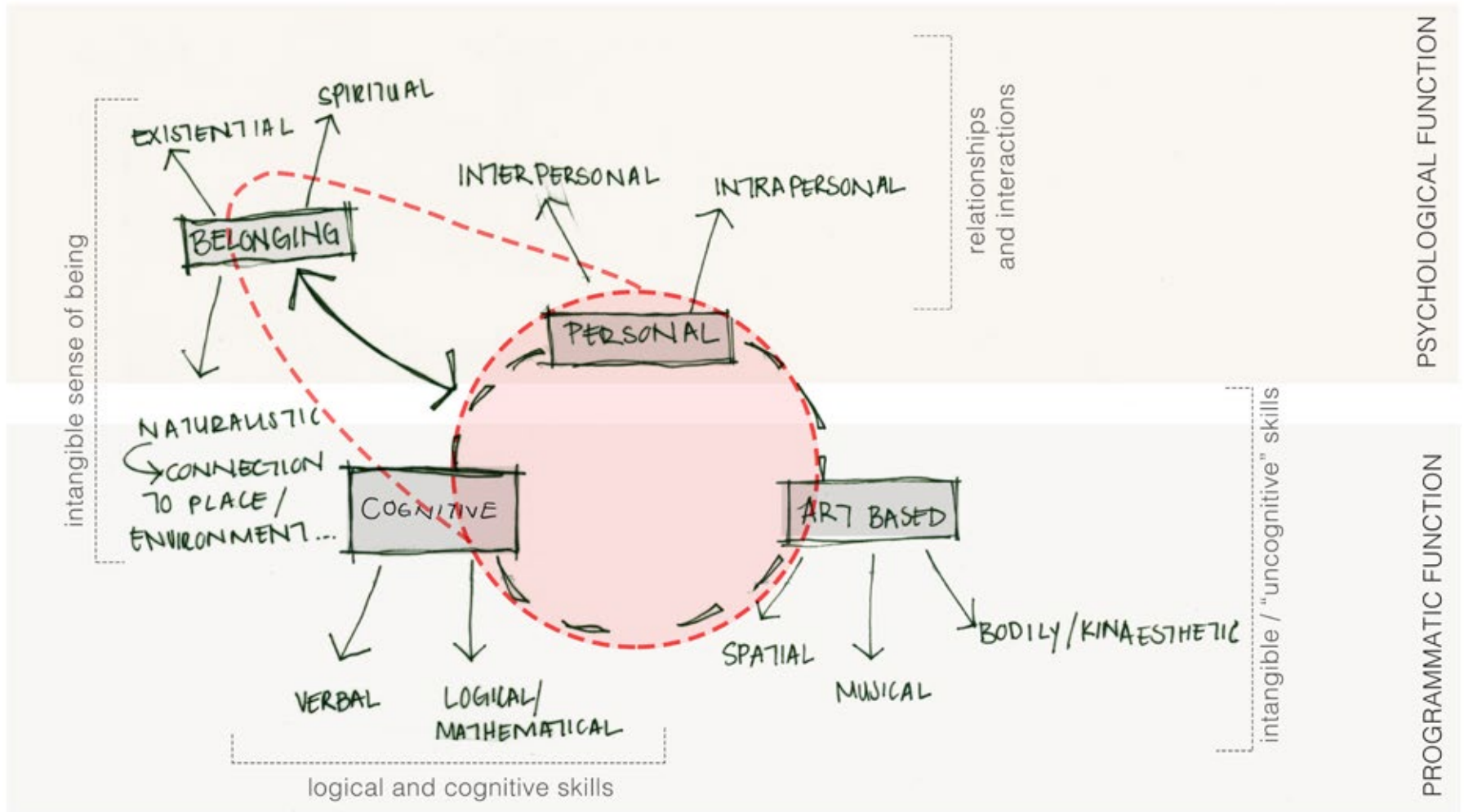
Furnham proposes that emotional intelligence is a combination of a person's ability to understand and relate to others, working with them and their ability to understand themselves and regulate their life. Understanding the patterns and rhythms that define their environment and being able to reason and solve problems logically within those patterns. Emotional intelligence is a combination of the multiple intelligences within which individuals operate (Furnham, A: 3-6).

Because emotional intelligence is a combination of intelligences a number of skills and abilities become components and measures with which an individual's emotional intelligence can be measured and understood.

Figure 4. 24, illustrates the components and skills that are part of an individual's emotional intelligence.

Table 4.1 explains the different components in further detail.
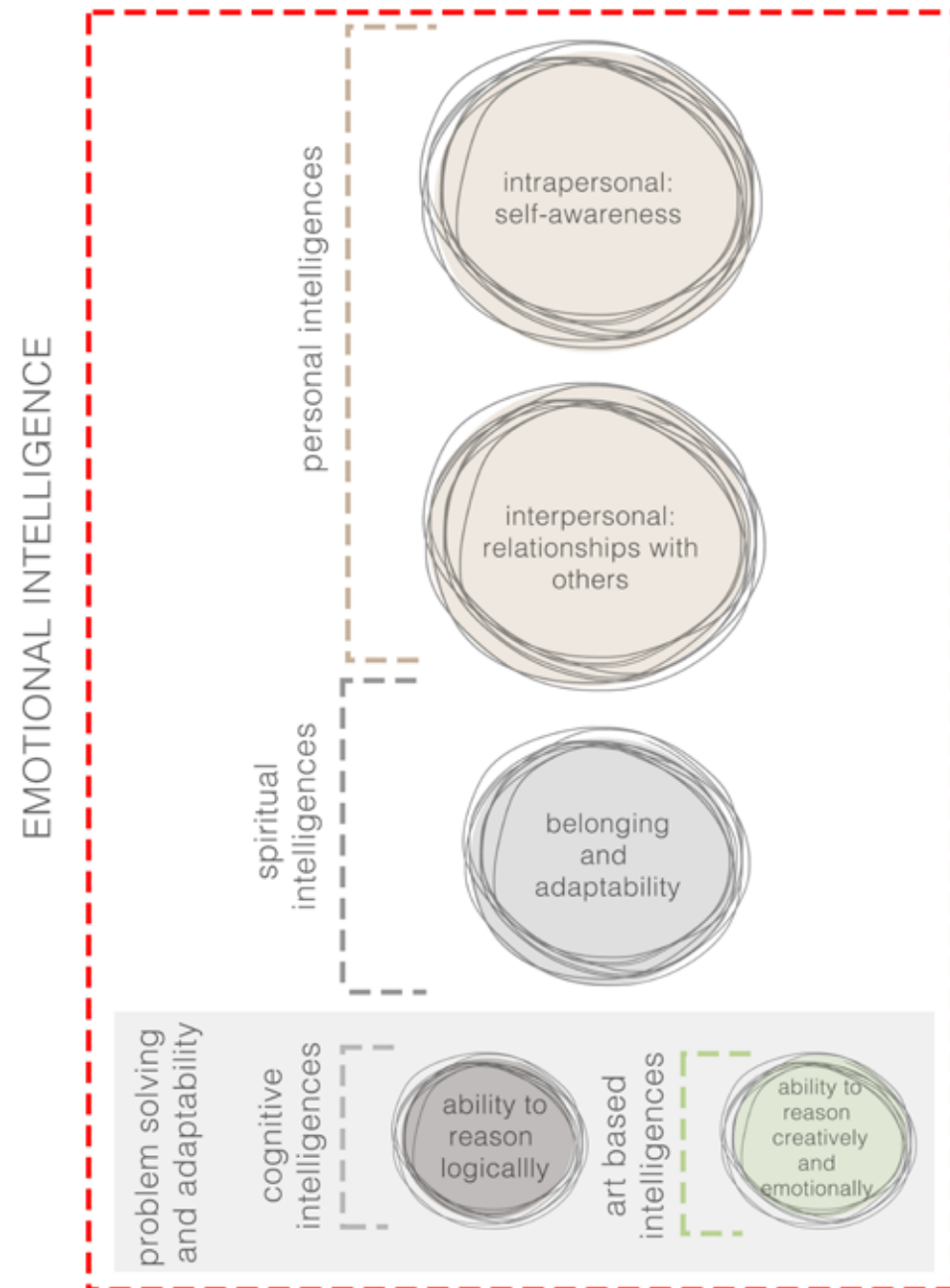
Figure 4.24. Emotional Intelligence- components and skills

		Personal Intelligences:	Spiritual Intelligences:	Cognitive Intelligences:	Art Based Intelligences:
Intrapersonal: Self-Awareness and Expression	Self-Regard	■			
	Emotional Self-Awareness	■			■
	Assertiveness	■			■
	Independence	■		■	
	Self-Actualisation	■	■		
Interpersonal: Social-Awareness and Interpersonal Relationships	Empathy	■	■		■
	Social Responsibility	■	■	■	
	Interpersonal Relationships	■			■
Stress Management: Emotional Management and Regulation	Stress Tolerance			■	
	Impulse Control			■	■
Adaptability: Ability to manage change	Reality-Testing			■	
	Flexibility			■	■
	Problem-Solving			■	■
General-mood: Self-Motivation	Optimism	■	■		■
	Happiness	■	■		■

Table 4.1. Emotional Intelligence- Components and skills

Why does emotional intelligence make a child resilient?

Emotional intelligence influences the resilience of a child because it develops a number of skills that deal with the cognitive and emotional response to solving problems as an individual and as part of the community.

Developing the different skills associated with emotional intelligence develops a child's ability to reason and respond to changing conditions and equips the child with the ability to share resources and energies that can potentially aid in their survival (Furnham, A: 7).

Through the development of a child's emotional intelligence a child is given the potential to be resilient in a number of ways:

1. The child is able to easily develop social skills and build relationships aid in their survival and potential resilience.

By developing the child's interpersonal skills, the child's ability to relate to others, identifying emotions and relating with empathy, is developed and strengthened. Strengthening this ability to relate strengthens the child's ability to build and form relationships (Parker, J.D.A. et al. 2009:240).

Increasing the child's ability to make friends and develop relationships increases the number of links and connections the child has within their own survival network and other networks within the community.

The connections the child develops within their own survival network and others, within the community, determine the energies and resources the child is able to share and draw off in order to survive. Strengthening the child's ability to

create these connections increases the resources and energies they are able to draw off and share, securing their survival and developing their resilience.

2. The child is able to adapt and allow for change, without loosing important connections or traditions.

The child is able to adapt and change existing rituals they rely on in order to support their survival. The child's ability to adapt allows them to establish and develop rituals that are able to bounce back and move forward during change, building new links and connections. The child able to adapt and change their emotional and cognitive response to their changing surroundings, ensures they are able to respond in a manner that supports their survival rather then breaks it down (Parker, J.D.A. et al. 2009: 240).

3. The child is able to recognise that different situations, people and problems require a different emotional and cognitive response and that both an emotional and cognitive response is necessary (Parker, J.D.A. et al. 2009: 240).

An holistic understanding of a challenge gives the child the ability to understand the required and necessary response for the present and the future, and preventing the same problem from re-occurring thereby strengthening the system rather then breaking it down or forgetting existing traditions and energies.

4. The child will develop an understanding of themselves and their emotions and what their role is within the community and its survival.

When the child is able to identify and determine their role within their own survival network, the survival networks that share its energies and the community as a whole, they are able to take part in a number of different rituals and tasks established by the community. The tasks and rituals belonging to the child create a sense of belonging for the child in the community (Furnham, A: 7 and Parker, J.D.A. et al. 2009: 240).

A sense of belonging and purpose within the community gives the child a sense of responsibility towards its survival network, which ensures that the child invests in, protects, builds and strengthens the networks it is a part of and the community's resilience (Furnham, A: 7 and Parker, J.D.A. et al. 2009: 240).

goal

holistic understanding and reasoning

creative (emotional) and cognitive reasoning and response

adaptable child

foundation of child's resilience

social relationships

Figure 4.25. Emotional Intelligence = Resilient Child
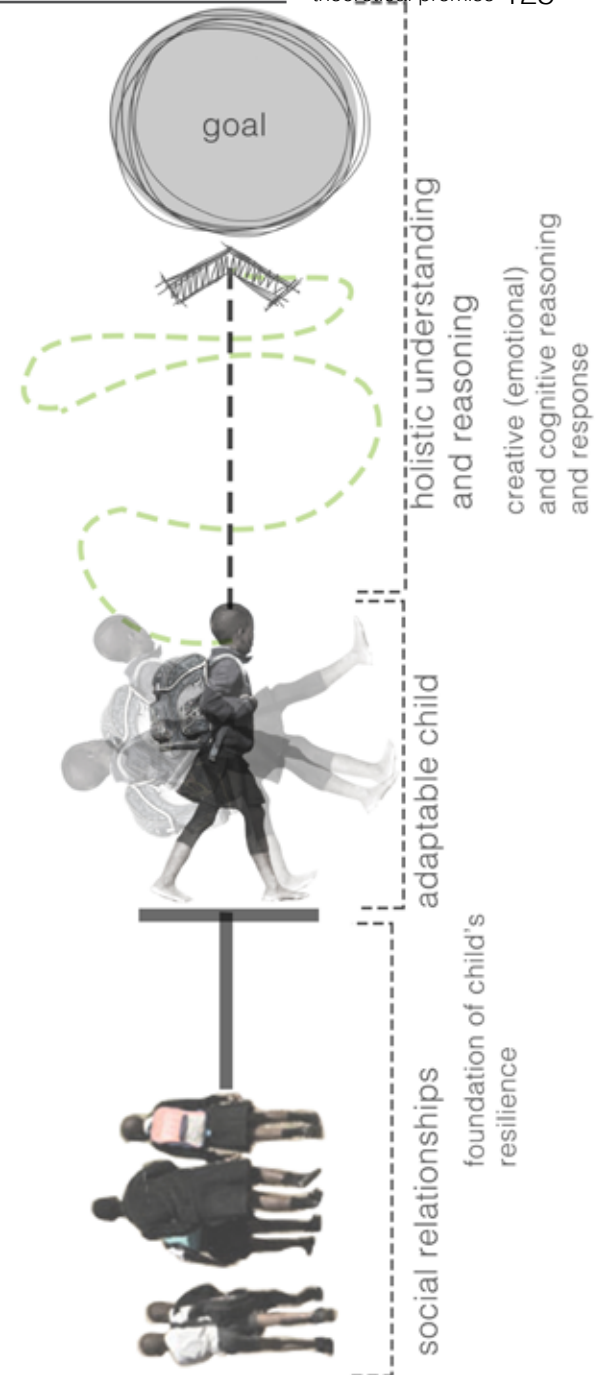
The goals established for developing a child's emotional intelligence are to strengthen and build skills that allow the child to be adaptable, manage their personal stress as well as, stress present in their environment and relationships and solve problems both cognitively and creatively (Furnham, A: 7 and Parker, J.D.A. et al. 2009: 240).

Through the development of skills that influence both emotional and cognitive reasoning and responses, the child is equipped with the ability to understand themselves, others, and their environment and the lasting impact of their response. With the development of the child's ability to understand themselves and their role within the system, the child is able to develop a sense of belonging and this belonging establishes child's responsibility towards the rituals and networks it depends on; ensuring that they will build and invest in the networks (Furnham, A: 7 and Parker, J.D.A. et al. 2009: 240).

Furnham explains that it is essential to develop emotional intelligence from childhood because these skills mold the adult. He observes that adults that experience poor emotional intelligence and emotional development are often rigid, with poor self-control and no sense of belonging or purpose and have very poor social skills, struggling to build relationships and fit into rituals and networks (Furnham, A: 8).

Therefore developing the emotional intelligence of a child makes them resilient because it influences the adult the child will become.

What rituals and routines facilitate the child's resilience and what energies are shared within the rituals, increasing the child's resilience?

The rituals and routines that develop in order to support the survival of a network of people within a community are the connections and relationships

Figure 4.26. Local Mothers. Relationships of Pare

Figure 4.27. Local friendship group

Figure 4.28. Local teacher student

the survival network creates. These connections and relationships form between people within the same network, people in surrounding networks, and between survival networks and places within the fabric of the city (Gehl, J. 2010).

The connections and relationships that develop, determine activities and tasks within the fabric that enable and support the survival of the. Rituals and routines facilitate the sharing of existing energies within the networks, allowing the networks to use energies inherent in their makeup to support their survival (Gehl, J.2010). The use of existing ensures that the network will not lose all support when the circumstances surrounding the network change. The remaining support will allow the network to bounce back and adapt, with standing change and moving forward stronger (Du Plessis, C. 2013).

According to Camilleri, the relationships and connections that

need to be developed in order to strengthen and enable the survival of a child within the city are: the relationship between parent and child, child and other children, child and education, and child with parent and teacher (ed Camilleri, V.A. 2007: 51).

The relationship developed between parent and child, within the family unit, is fundamental for the development of the child's attitude and response to the chaotic and ever-changing world outside of their family. Camilleri suggests that a family unit that is organized and predictable, with clear rules and responsibilities, within seemingly chaotic informal settlements, will act as strong protectors supporters for the child. A strong relationship with a stable, supportive and attentive adult, will allow the child to grow and learn, without fear and with a positive attitude, enjoying what they learn and the relationship in which they feel loved (ed Camilleri, V.A. 2007: 51). Stable parents and family units enable the resilience of a

child, the child is able to solve problems and recover from change within a safe, positive and nurturing environment, using both creative and cognitive skills, that are encouraged, built and supported in the stable family unit.

The freedom of the child's creative and cognitive responses and reasoning within the family unit shapes and encourages the child's responses outside this unit.

How the child reasons and reacts at home will determine their reasoning and reactions away from home. The relationship of the child with their family is the foundation for the relationships they develop away from home. Camilleri explains, that the development of peer relationships among children establishes a support network for the children in times of need and turmoil.

Friendships establish trust and loyalty allowing the children to share emotions, responsibilities and skills in order to build and strengthen their relationships and ensure their survival (ed Camilleri, V.A. 2007: 53). The friendships a child establishes enables and supports a safe and trustworthy network to rely on when the circumstances around them change. The children in the friendship network have resources, skills and energies they can rely on, ensuring the child's recovery from change and ability to adapt and move forward.

The relationship of the child with their school or educational system is unique and highly important in the support of the child's resilience. According to Camilleri, schools with positive climate and high social and academic expectations develop a sense of belonging and purpose within the child. The child is given the opportunity to establish themselves in a serious of tasks within the educational environment as well as activities afterschool. These tasks require the child to develop and invest energy and responsibility in the task, and in those participating in the task with them.

The sense of belonging and the responsibilities an educational environment establishes enables a child's resilience through the development of skills that empower the child and the sharing of these skills to achieve tasks and assignments with others within the school environment and afterschool. Teaching the child to share responsibility and skills with others in order for them to achieve goals and complete tasks develops skills that will benefit the child in the other relationships outside the school environment (ed Camilleri, V.A. 2007: 52).

The final relationship that Camilleri suggests will support and enable the survival of a child, is the relationship between the parent and child and the child's education. A parent who is able to support the educational process of the child and are able to help teach in the process, develop a relationship of sharing skills, knowledge and resources and reinforces the fact that the educational process is continuous throughout a person's life. The sharing of skills, knowledge and resources is essential in the resilience of a community and a family unit that is able to encourage and instil this skill will ensure their own resilience and the resilience of the child in other relationships (ed Camilleri, V.A. 2007: 53).

The existing child network within Mabopane relies on a number of support network, in order for them to survive. These networks will be examined later in this dissertation.

parent relationship
creates safe haven
and stablilty in
changing environment

parent relationship
with school allows
parent to get involved
in educational
process. parent and
child are able to learn
together

parent relationship
with school maintains
parent involvement in
child's life

child's network
and support
networks fit into
larger community
of networks

rituals and tasks
supported by
school, create
purpose

friendship groups create
trust network and source of
energy and resources

friendships and peer
relationships
established at school

Figure 4.29. Children relationships and connections that facilitate resilience

07_ Conclusion and Design Principles:

A number of design principles have been established after the examination of the theories of regenerative and resilient design, the influence of social structure on a community's potential to be resilient, creating resilience within an informal settlement and the influence of emotional intelligence on a child's ability to be resilient.

The intentions for these established principles is to use them as guidelines and design drivers in order to create an appropriate architectural intervention within the fabric of Mabopane.

1. Regenerative Resilience

- Make use of the latent potentials and energies within the existing survival networks of Mabopane to create an opportunity for the development of resilient networks within the community. Make use of the existing potentials to facilitate regenerative development within the existing networks (Du Plessis, C. 2013).

potential
for resilience

existing
survival
network

existing
energies

2. Survival Patterns and Regenerative Resilience:

- Define routines and tasks for existing networks within Mabopane, in order for the networks to strengthen their role in the survival of the community (Hamdi, N. 2004).

- Create civic spaces that create the opportunity for the connection and interaction of existing survival networks and the creation of new relationships, within the fabric, in order for the networks to share and draw off the appropriate existing energies and resources (Hamdi, N. 2004).

new civic space
creating connection
and defining
tasks and rituals

new rituals and tasks
creating connections

existing
network

existing
network
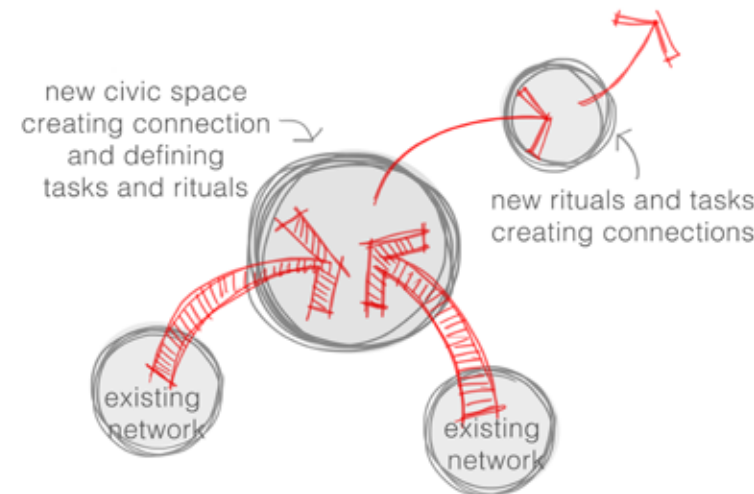
3. Creating Resilience:

-LIFE, SPACE, BUILDING-
In that order:

The newly designed intervention is to be created with an understanding of the rituals and life of the survival network and the spatial requirements required through the resulting architecture (Gehl, J. 2010).

-The new design intervention is to address the specific issues that prevent the resilience of the children's survival network within Mabopane. (Gehl, J. 2010).
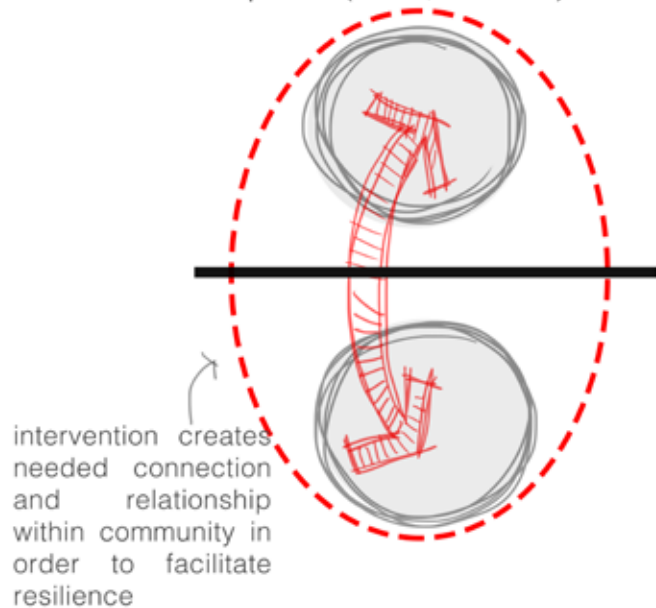
4. Resilience and Emotions:

- The newly designed intervention is to facilitate and develop the emotional intelligence of the children of Mabopane. Strengthening the child's ability to reason and respond both creative and cognitively (Furnham, A and Parker, J.D.A. et al. 2009).

- The newly designed intervention focuses on strengthening connections and relationships that impact the child's emotional intelligence and their resilience. Relationships such as: parent and child, child with other children, child with school and parent, child and school (ed Camilleri, V.A. 2007).

intervention creates needed connection and relationship within community in order to facilitate resilience

intervention strengthens connection to support systems

exisitng network and support system for children

intervention builds up child's emotional intelligence
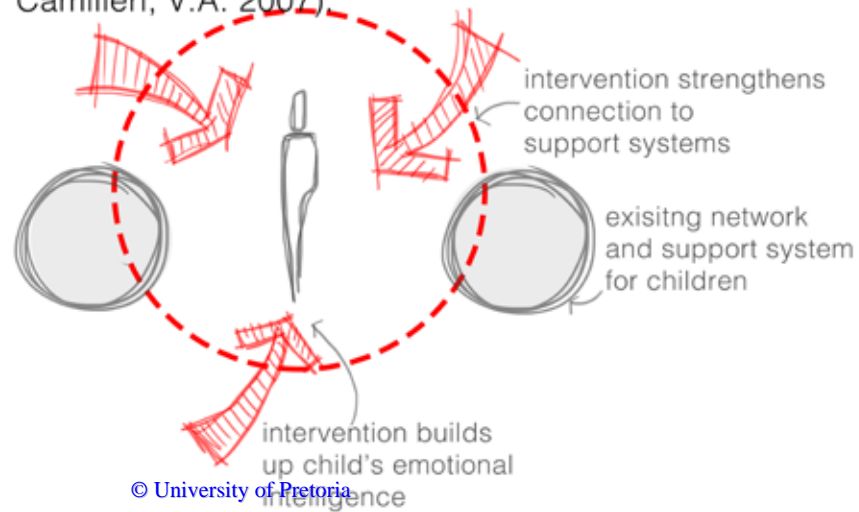
05_ Concept and Programme

01_Concept_ Life, Space, Building

According to Gehl, great resilience cities are developed and designed at "eye-level"; they are cities designed for people with the experience and the daily life of the city's people as the central most important design and development driver. Great cities are made with an understanding of the rituals and daily lives of its people (Gehl, J.2010).

As discussed in the previous chapter, Gehl, suggests that great cities be created by understanding the life and rituals of the city user first. Understanding the way the city user survives within the city fabric, on a daily basis, will provide clues and influence the city spaces that are required to facilitate and maintain the users survival and potential resilience within the city (Gehl, J. 2010).

With the understanding of the required spaces the city has to provide, in order for the survival networks to become resilient, the buildings or architectural intervention that will appropriately create these spaces can be determined and designed (Gehl, J. 2010).

If the cities we create are developed with and understanding of the life of its people, the spaces that life requires and the architecture that therefore creates the required spaces; should the individual architectural intervention then not be developed with a similar understanding of the network it intends to strengthen?

The concept for the development of the architectural intervention explore in this dissertation is therefore, LIFE, SPACE, BUILDING- in that order.

Understanding that daily rituals of a specific network within the community of Mabopane, that spatial requirements this network, then requires to develop resiliently, and the programmatic and architectural results of the city spaces required.

Figure 5.1. Relationship between Life, Space and Building.
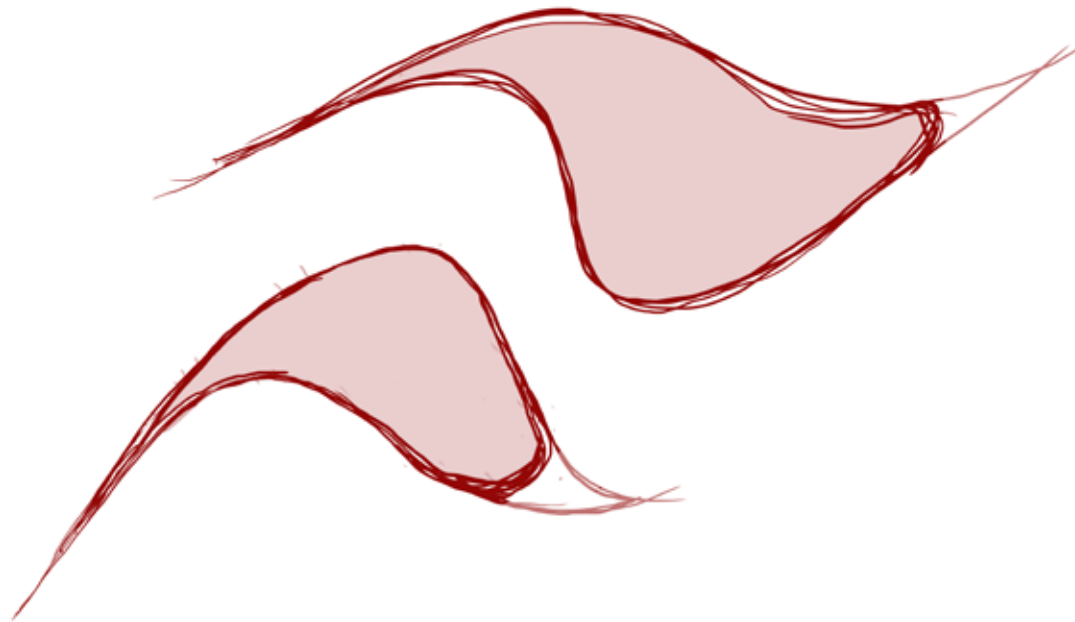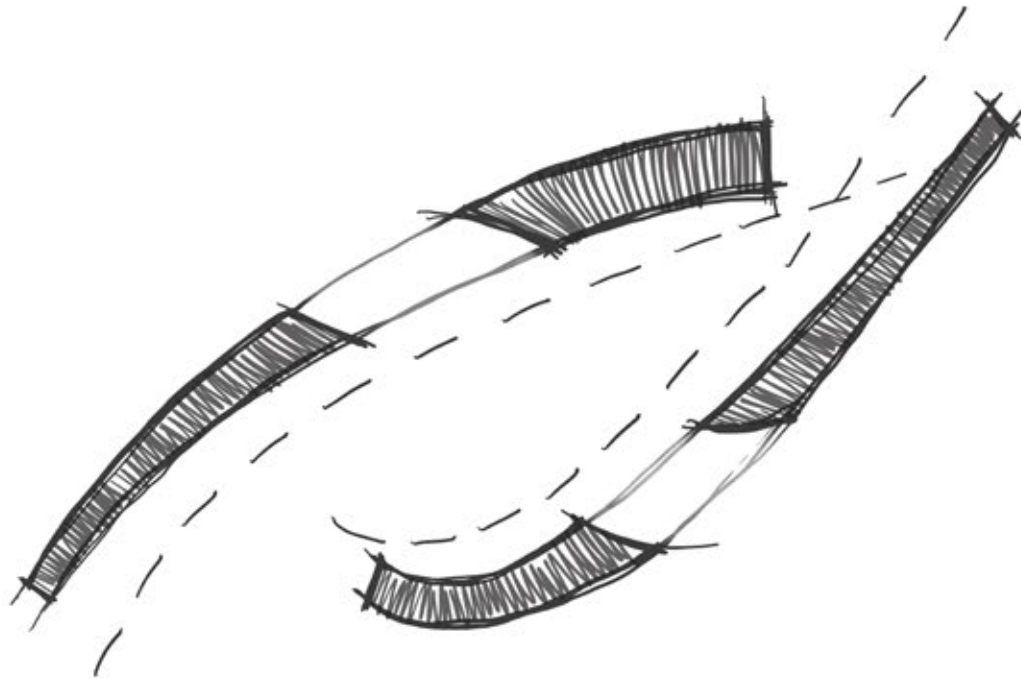
Life
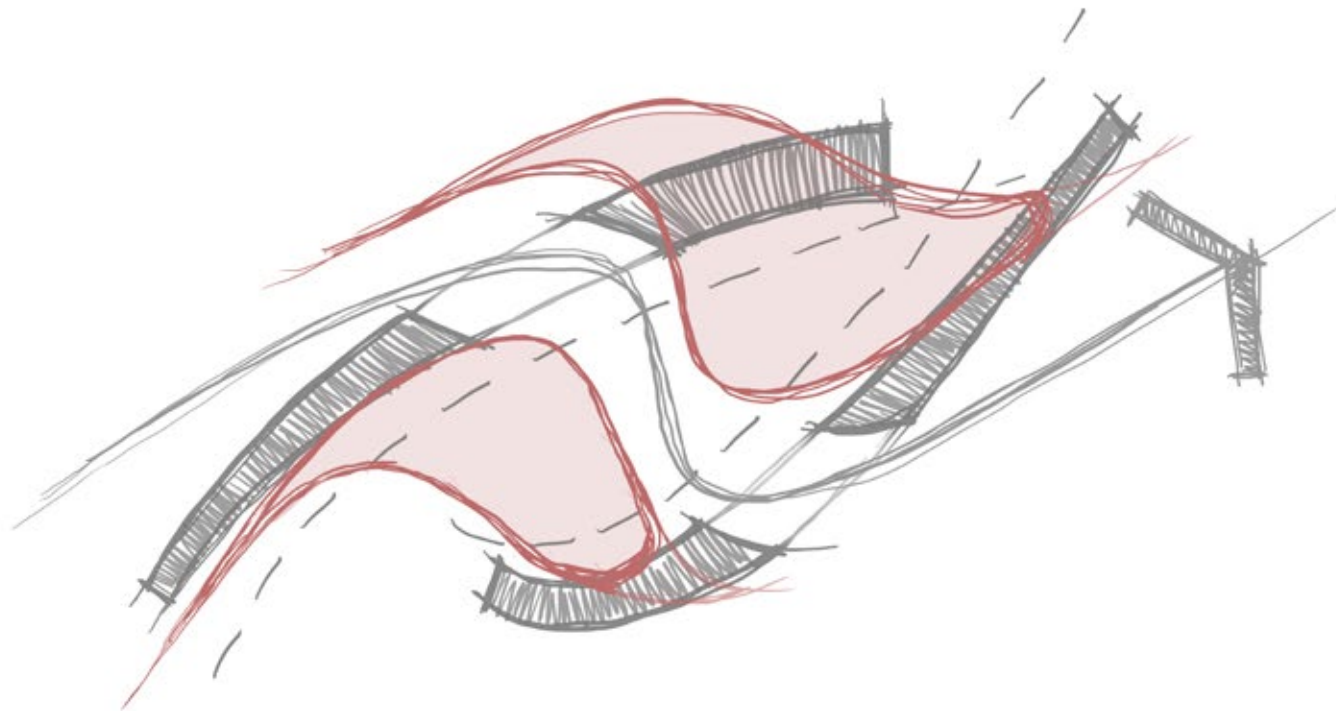
Space

Building

Life, Space, Building- in that order

Figure 5.2. Life, Space and Building- Parti Diagram.

02_ Life

As discussed as part of the theoretical premise chapter, the survival network being concentrated on for the development of an architectural intervention, for this dissertation, is the survival network developed and belonging to the children of Mabopane and the survival networks that support and have the potential to aid in the regenerative resilience of the child.

According to the conceptual approach developed for this dissertation, in order to create the appropriate architectural intervention, that will facilitate the regenerative resilience of the children's network, an understanding of the daily life and ritual the child has developed, in order to survive, has to be examined and understood.

As part of the development and through the process of mapping the daily rituals and routines of the children's network and their support networks was established. Figure 5.3, illustrates the daily rituals and routines developed by the children of Mabopane.

The physical designed fabric and supporting networks, of Mabopane, provides the child with tasks that form part of their daily routine (Hamdi, N. 2013).

The city provides the child with a place for school and the processes of daily learning. The parental support network provides the child with tasks from dinnertime, eating, bathing and sleeping.

Its support networks and the city fabric neglect the child's survival during the afternoon, between afterschool and dinnertime, when the parental support network provides the final tasks of the day.

The neglected child is left to wonder aimless and purposelessly through the city during the afternoon. The aimless wondering through the city has an impact on the child ability to be resilient. The aimless wondering has an emotional impact on the child, as discussed in the previous chapter, the emotional intelligence and stability of a child determines whether or not the child has the ability to be resilient.

The emotional impact of aimlessly wondering, on the children of Mabopane is; the child looses connections and relationships during the afternoon and is left to face the challenge of the rest of the day alone or with children their age. They are unable to rely on resources, skills and energies present in older networks to support and help face the challenges. The challenges the wondering child faces are homework and understanding the work they were presented with at school, food at lunchtime and pressure from older children to neglect responsibilities.

During the mapping process it was observed that the older children, within Mabopane, have established tasks and rituals within the fabric of the city for themselves. Younger children (grade 0- grade 7) are left to wonder and are effect greatest by the neglect of the city and their support networks.

nursery school day ends

Lack of safe facility for youngest children to play after nursery or pre-school to allow teen mothers or older siblings the opportunity to take responsibility for their school work.

Teen mothers or older siblings take responsibility of youngest children after school.

nursery school

prep for school

home

journey to school

pre-primary & primary school

homework & prep for bed

bed time

home

secondary school

school day begins

school day ends

Children wonder the streets, hang out in parks, on street corners and malls, without supervision until supper time.

Lack of safe environment for children to play, socialise, learn or do homework after school.

Lesedi la Batho

Children make use of facilities such as Lesedi la Batho. Lesedi la Batho is over crowdered and has to accomodate a huge number of the community of Mabopane

Figure 5.3. Children's daily routine

school

wonder

home

wake up

leave home

start of school

break time breakfast

break time lunch

end of school

arrive at home

supper time

bed time

00:00   04:00   06:30   07:30   14:00   15:00   18:00   20:00   00:00

sleeping   awake | Children wonder, with no supervision. No place for homework or play   awake   sleeping

time spent at home

meals shared at school food brought from home. Identify where there is potential

Point of intervention for school child

meal shared at home single meal shared with family

time spent at home

Figure 5.4. Children's daily routine timeline

Figure 5.5 and 5.6, illustrates the family structure and rituals established by the parental support network within the fabric of Mabopane.

The relationship between parent and child, as suggested by Camilleri, builds and strengthens the child's feeling of belonging to something larger and provides the child with a stable and trustworthy environment, where the child can make mistakes, learn and share their own knowledge and experiences (Camilleri, V.A. 2007).

The child and parent network, within fabric such as Mabopane, according to Camilleri aren't able to connect in such a way that the child is able to learn from the parent and the parent from the child. Often parents within poorer settings are away all day, or even week, working to provide for their family or are themselves uneducated and simply don't have the skills to aid in their child's resilience (Camilleri, V.A. 2007).

The missing connection with the parent in an emotional daily support role and as an educator prevents the child from establishing relationships and connection, in stable safe environments, where they are able to draw off energies and skills that can build their resilience or share skills they have learn that can aid in the resilience of others.

20:00-Bedtime
-Child and parent prepare for bed

Evening

18:00-20:00
Dinnertime
-remaining parent or child has prepared dinner.

HOME

17:00-19:00
Working parent returns home

SCHOOL

07:30-14:00
School time

06:00-07:00
child heads to school

Remaining parent or care-giver prepares child for school.

05:00- 06:00
Working parent leaves home

Morning
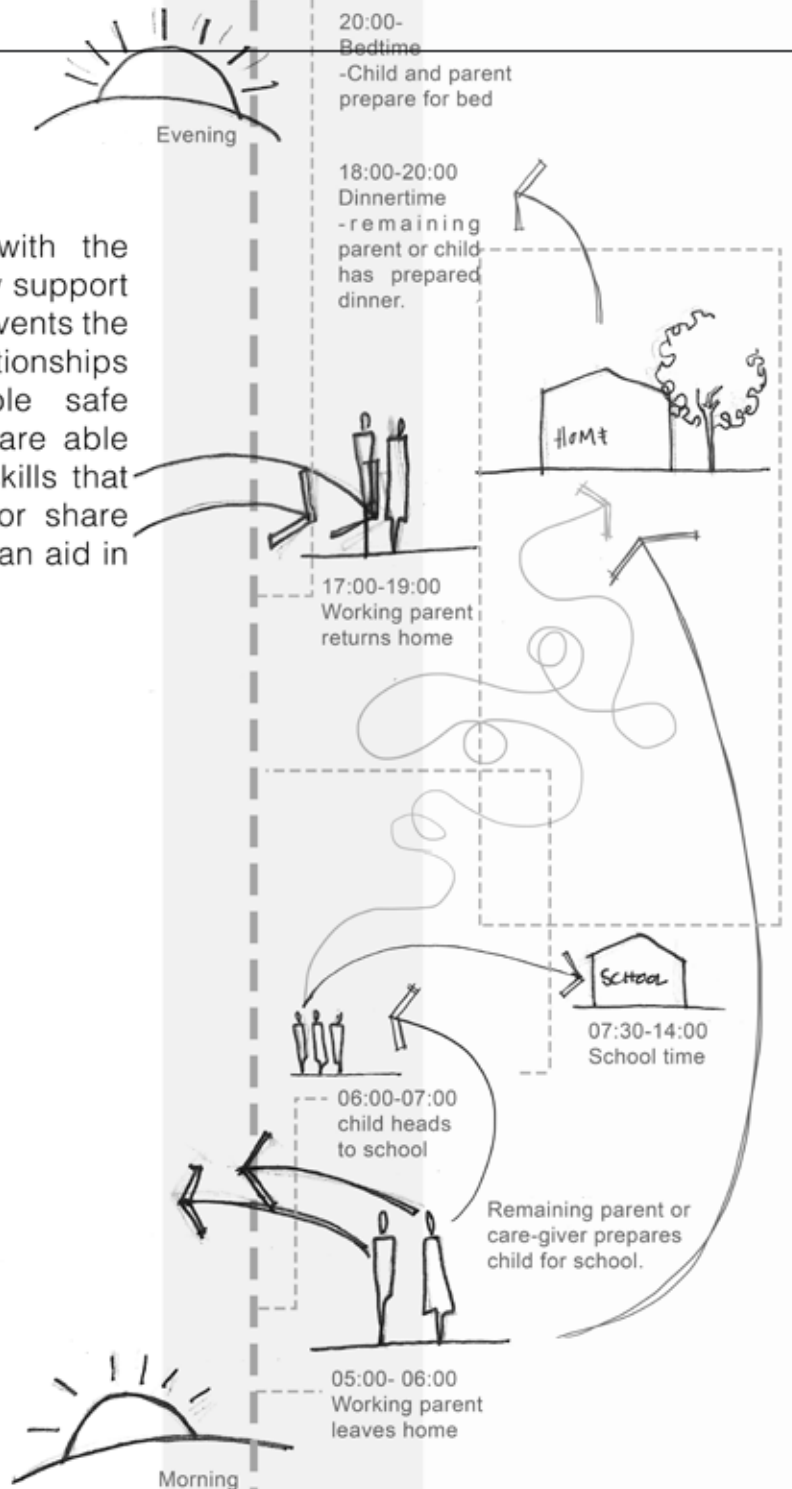
Figure 5.5. Parent daily routine
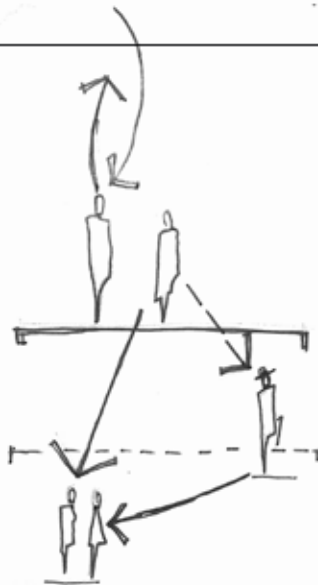
Both parents
Single bread-winner
Single parent care-giver
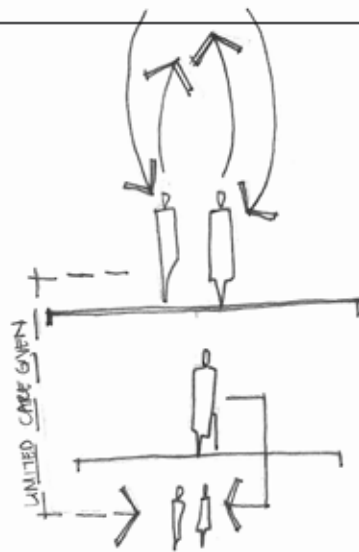
Both parents
Both bread-winner
Grandparent or older sibling care-giving
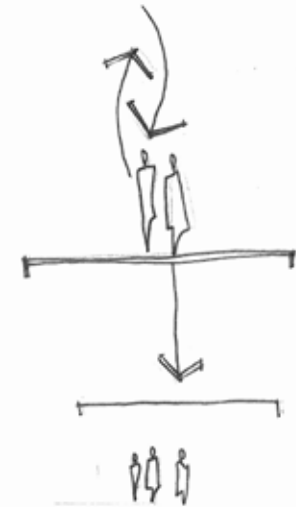
Both parents
Single bread-winner
Single parent care-giver
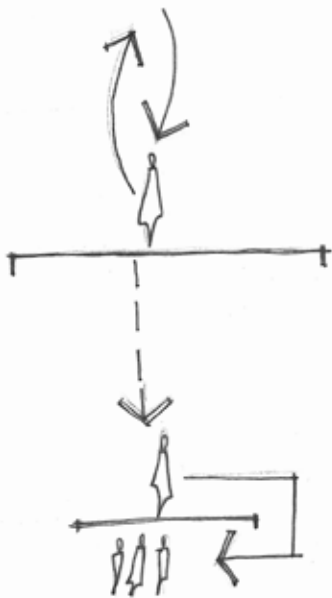
Single parents
Single bread-winner
Older sibling care-giver
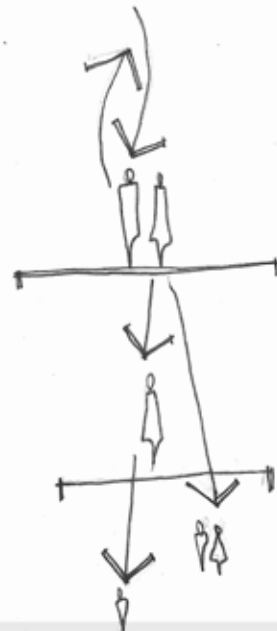
Both parents
Single bread-winner
Teen parent in family
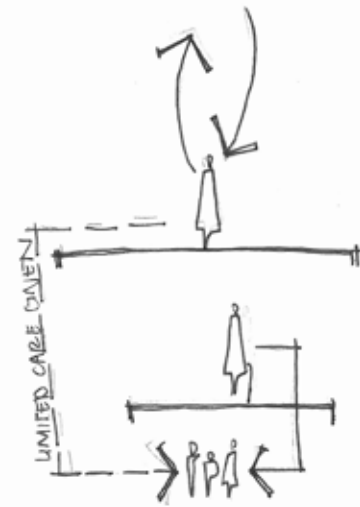
Single parents
Single bread-winner
Grandparent care-giver

Figure 5.6. Family structure.

03_ Space

As suggested by Gehl, the rituals and routines networks establish within the city fabric gives clues to the spatial requirements of that network (Gehl, J. 2010).

The rituals and routines established by the children's survival network and their support networks reveal a number spaces that the city currently does not provide for the survival of the child.

Figure 5.7, illustrates the spatial requirements experienced by the children's survival network and the networks that support and aid in it survival.

The child wondering aimlessly between the end of the school day and dinnertime reveals a need for the city to provide a city space that serves the child with tasks and rituals that give the child a role and purpose within the fabric of the city, a role that aids in their potential to be resilient and impacts the resilience of the city as a whole.

The lack of connection of the child and their parental support system reveals a need for the city to provide the children's survival network and the parental support network with city space that facilitates not only the connection of the child and the parent, in a safe and stable environment but also a space where the parent and child learn and share knowledge as individuals and with one another.

school

home

city spaces that defined rituals and tasks that serve the child and their ability to be resilient and create a sense of purpose and belonging within the community.

home
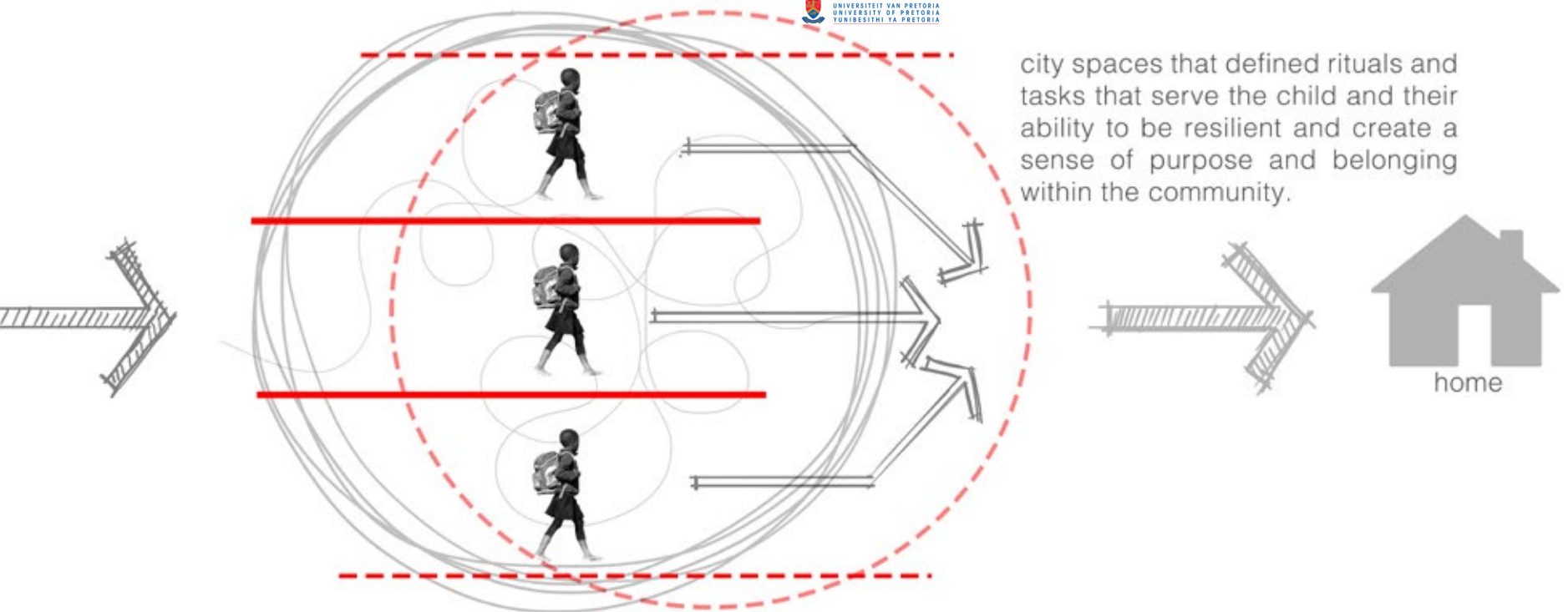
Figure 5.7.1 Wondering child spatial requirement

city spaces that create connection and enable sharing of knowledge between parent and child

home
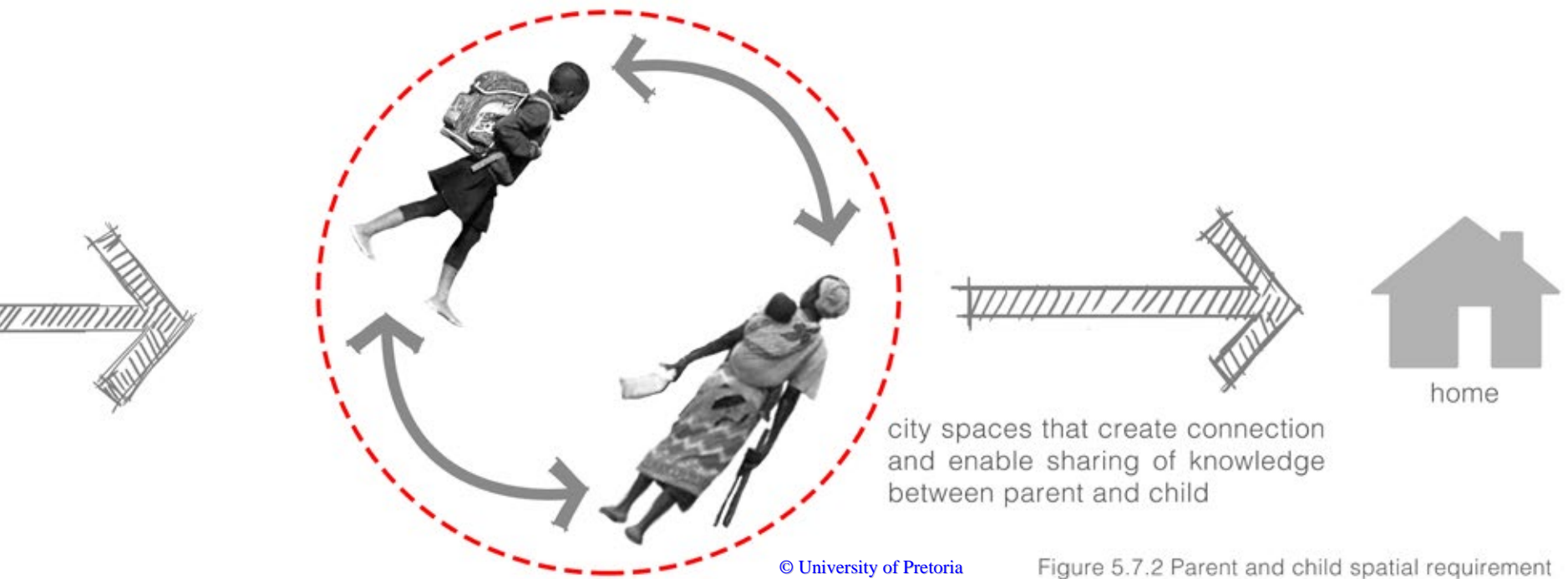
Figure 5.7.2 Parent and child spatial requirement

04_Programme

Each spatial requirement, determined by the rituals of the children's survival network, has a programmatic requirement. Each of the require spaces has to fill a specific function to fulfill the need within the survival network.

As mentioned previously, each spatial requirement has an impact on the child's emotional intelligence and their ability to be resilient. Therefore each space is to serve the child and their potential to be resilient by, fulfilling the emotional or psychological need each needed space reveals.

Figure 5... illustrates the over arching emotional requirements of the over arching spatial requirements.

afternoon

the wondering child:
no help with homework or understanding school work

missing connection to parents

parents

education

children

space that creates connection with parents

parents

space that creates tasks and rituals for the child.

education

address need for homework and sharing knowledge and skills

spiritual and personal intelligences

spaces creatng purpose and belonging

children

personal and cognitive intelligences

space that creates opportunity to share skills and knowledge and building knowledge

parents   education

figure 5. 8 . Spatial and emotional requirements

4. Emotional funciton of programmed spaces.
The emotinal impact each space is to achieve as the child and parent use spaces.

3. Resulting programmatic spatial requirements.
Developed from issues identifies within fabric and emotional requirements of the child.

2. Emotional function of required spaces.

1. Emotional impact of spatial requirements within Mabopane.
Developed according to Camilleri and Furnham's theory of child development and emotional intelligences.

Figure 5.9. Emotional impact of required spaces (Author, 2014)

educate

celebrate

connect

Figure 5.10. Emotional function (Author. 2014)

community kitchen   play-centre

kitchen   community garden

dining space

community vegetable garden

teaching gardens

children vegetable garden   wetland garden

play gardens   homework centre

play-house stage and amphitheatre   homework classrooms   library

children's library   parent library

art studios and gardens   reading gardens   reading rooms
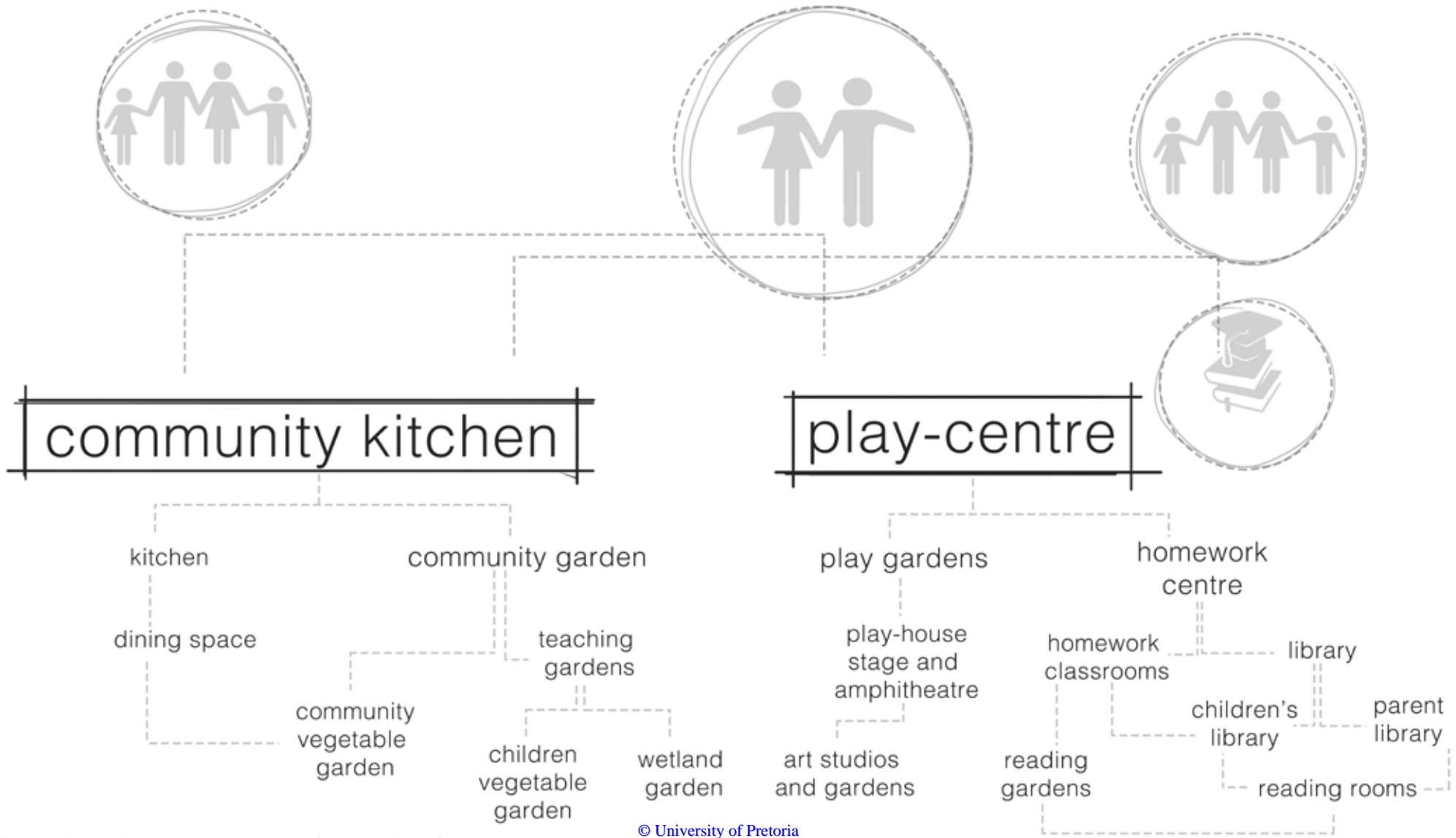
Figure 5.11. Programmed spaces (Author, 2014)

belong

play

create

strengthen

responsibility

reflect

control

community kitchen

play-centre
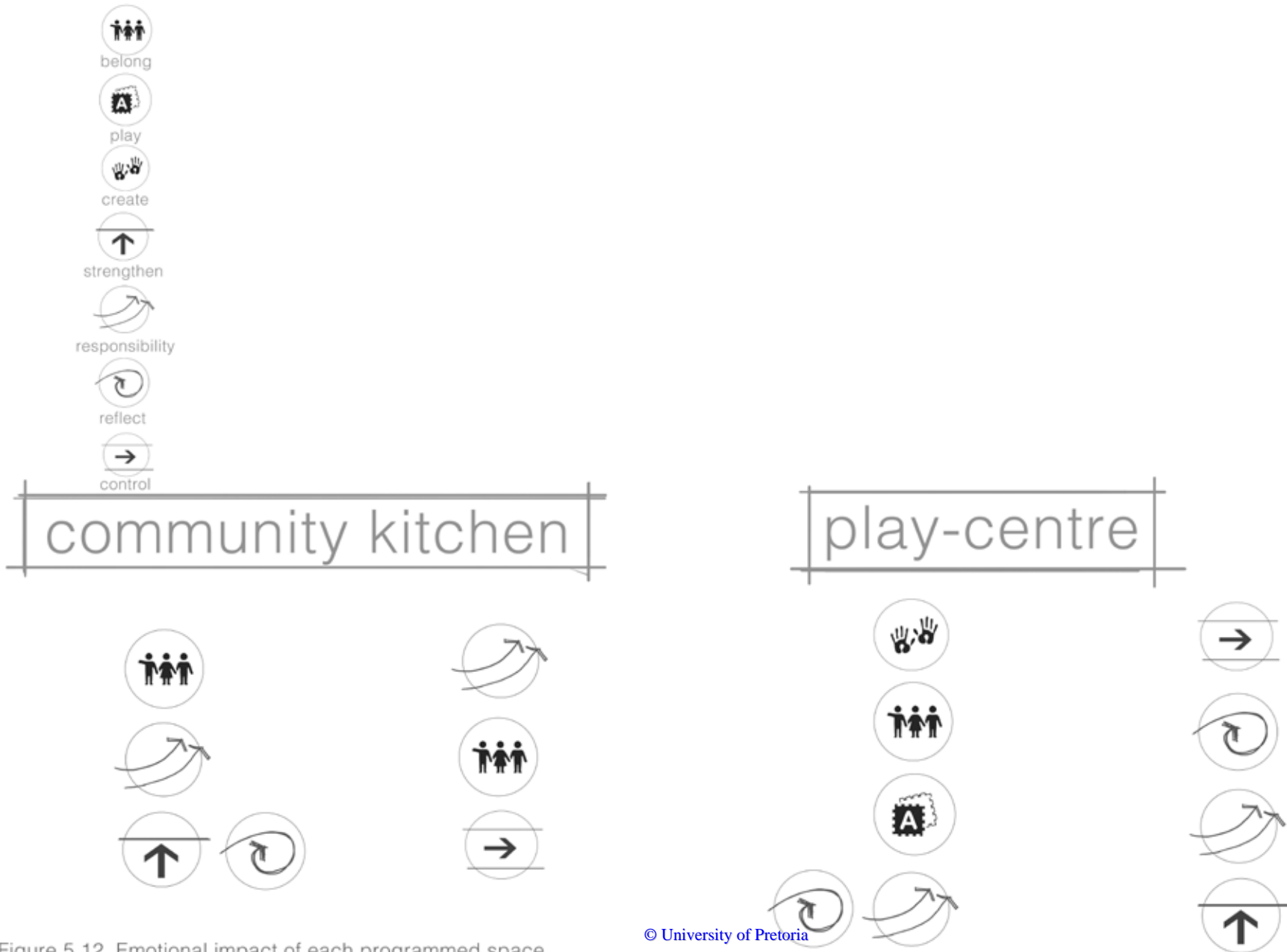
Figure 5.12. Emotional impact of each programmed space

14:00

afternoon

18:00-20:00

missing family interaction

the wondering child:
no help with homework
or understanding
school work

missing connection to parents

parents

children

parents

education

Lack of belonging and
responsibility.
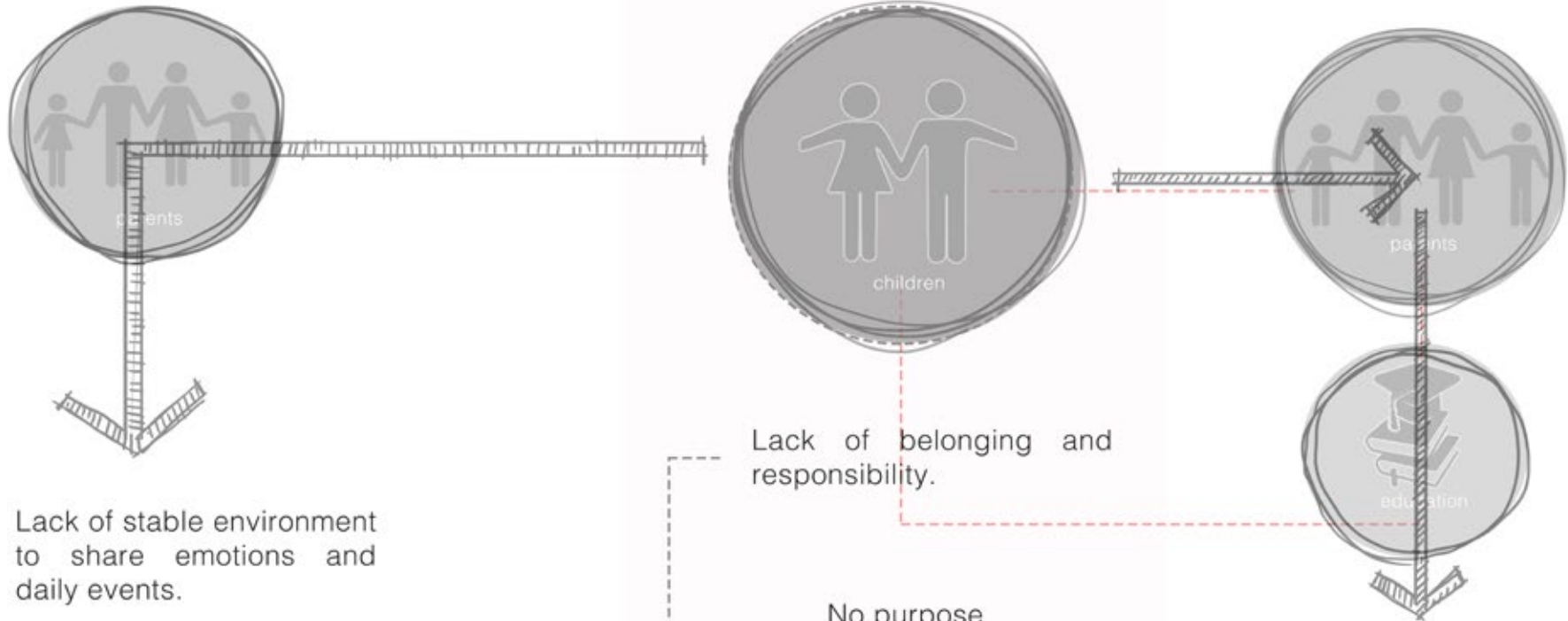
Lack of stable environment
to share emotions and
daily events.

No purpose

Stunted communication skills
Inability to deal with emotions.
Lack of sharing life skills
between child and parent.

Personal and spiritual
intelligence.

Lack of sharing skills and
knowledge between parent
and child.

Personal and spiritual
intelligences.

Lack of cognitive stimulation
between parent and child.

Personal, cognitive and art
based intelligences.

Interpersional skills,
self-awareness and stress
management.

Self-awareness and
communial responsibility

Interpersonal relationships
and cognitive reasoning.

Final Programme

The final architectural programme developed for the creation of city space, within Mabopane, for the children's survival network is a play-centre, including a homework centre, library, reading rooms and art and preformance studios, and a community kitchen, including teaching gardens and communal vegetable gardens.

The play-centre attempts to solve the issue of the wondering child and the missing cognitive connection between child and parent, by providing city spaces that serve the child by providing tasks within the city fabric and spaces that create the opportunity for the parent and child to connect and share skills and knowledge.

The community kitchen creates the opportunity for the emotional connection of parent and child, by providing spaces that allow the child and parent to serve one another, by preparing and sharing a meal together.

Lack of task and ritual belonging to the child and missing connection between child and parent.
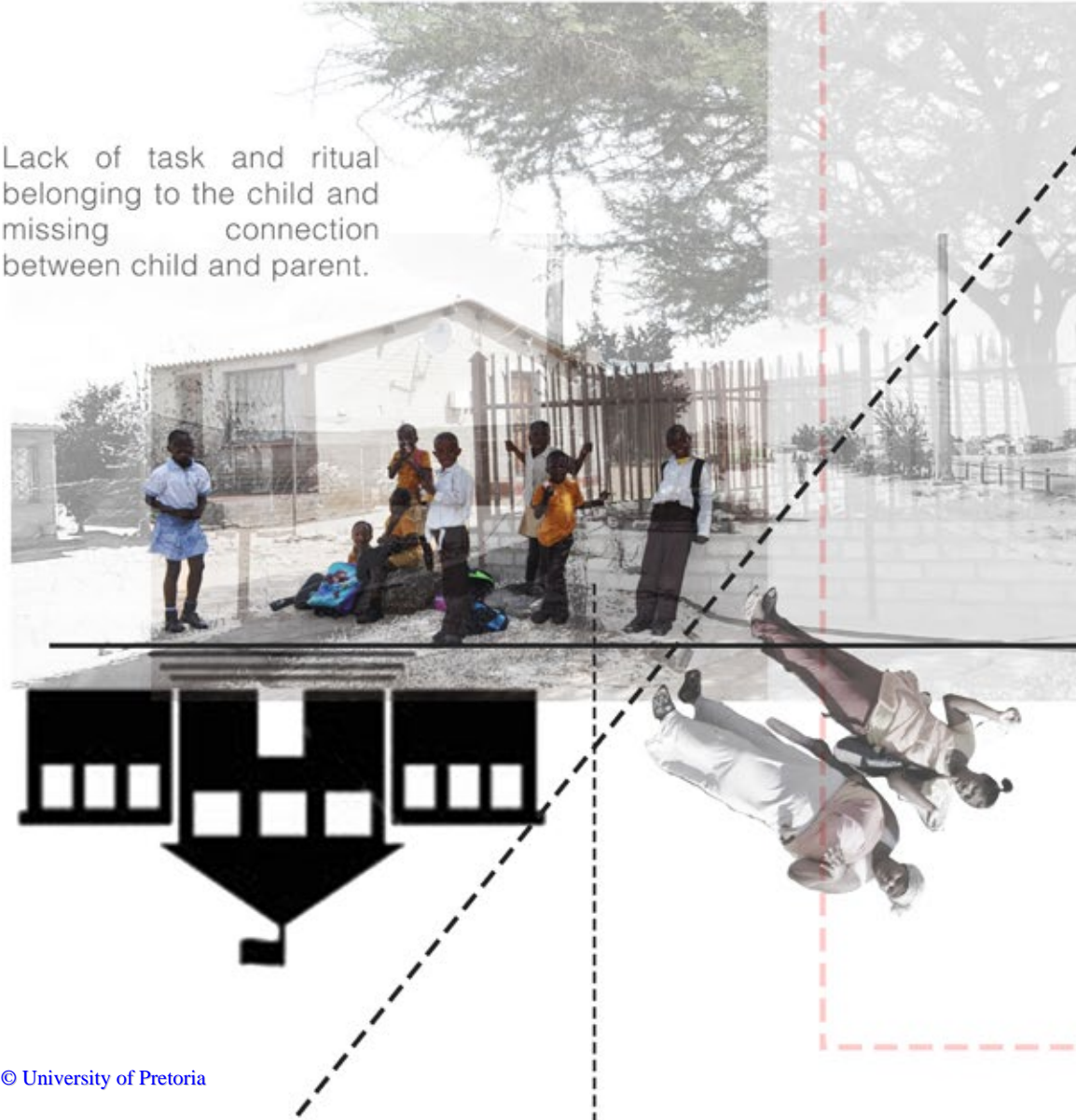
Providing spaces that define tasks and develop belonging and celebrate the child and create connections for the child and parent.
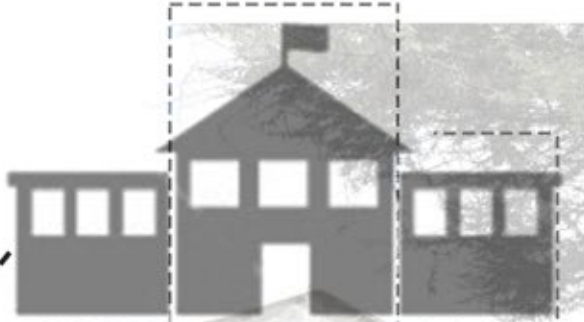
Educational setting for children, developing cognitive and creative reasoning.

Educational setting for child and parent, creating connection and sharing of skills and knowledge.

Educational setting for parent, equiping parent with skills to aid in child's cognitive development.

Figure 5.13. Final Programme Diagram

06_ Precendent Studies:

01_ Nelson Mandela Interpretation Centre
02_ Delft Day Care Centres
03_ Soweto Careers Centre
04_ Usasazo Secondary School

06_ precendent investigation
understanding how others create child spaces

Investigation of architecture that creates resilience within a community, through educational facilities, provided a practical knowledge base and examples of how the intended spaces in the community education facility, in Mabopane, could be created.

Four South African examples were investigated, in terms of how the buildings and spaces create environments that encourage interaction, celebration and education. The four examples were also examined in terms of their response to the local physical fabric and the security they provide for the users.

Nelson Mandela Interpretation Centre
_Peter Rich Architects

Delft Day Care Centres
_Noero Wolff Architects

Figure 6.1

Figure 6.2

Soweto Careers Centres
_Noero Wolff Architects
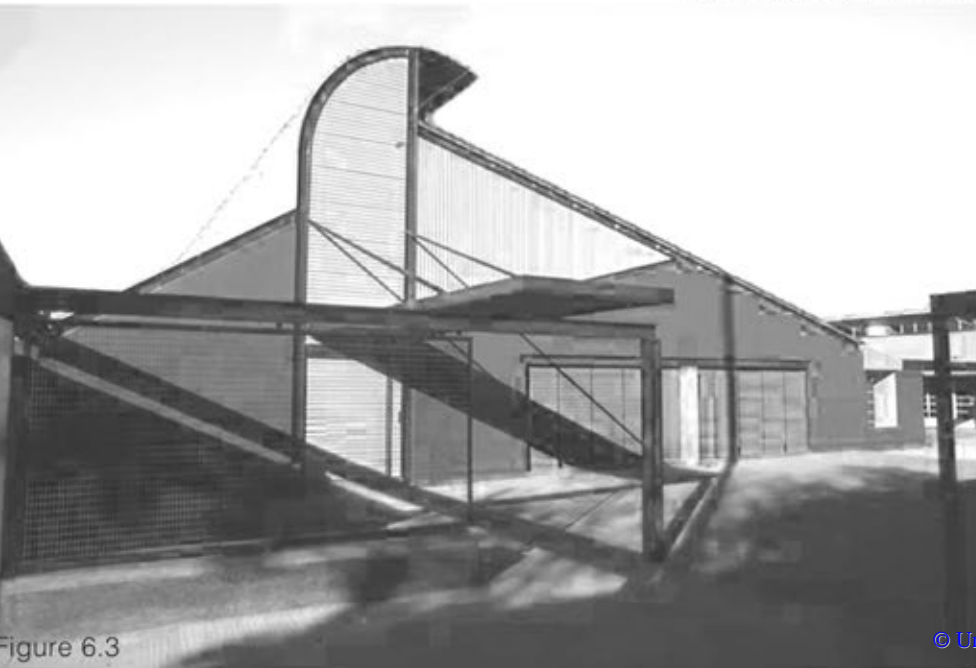
Usasazo Secondary School
_Noero Wolff Architect

Figure 6.3

01_ Nelson Mandela Interpretation Centre
_ Peter Rich Architects
_ Alexandra, Gauteng

Overview:

The Nelson Mandela Interpretation Centre located in the high-density urban fabric of Alexandra, a township in the north-east of Johannesburg. The design of both tangible and intangible character of the interpretation center is driven by both the constraints of the site and lessons learnt from the local way of making space, in the organic yards and street structure of Alexandra (Deckler, Graupner and Rasmuss, 2006, p47).

Celebration:

The intention of the Nelson Mandela Interpretation Centre is to create space that allows for the people of Alexandra to tell their stories and write their own history. The spaces created intend to celebrate the place, people, its history and the stories that are still to be told (Deckler, Graupner and Rasmuss, 2006, p49).

In an attempt to celebrate the people and their stories, the Interpretation Centre, provides a raised walk-through archive that displays the stories of ordinary Alexandra people, in the form of changing exhibitions (Deckler, Graupner and Rasmuss, 2006, p49).

Exhibition walk-through displaying stories of everyday people of Alexandra

Figure 6.5

Raised exhibition walk-through looking onto the everyday life of Alexandra

Figure 6.6

Raised exhibition walk-through becomes celebration space

Public squares sit below exhibition space.
Step into exhibition space

Figure 6.8. Section

Raised exhibition walk-through spans busy Alexandra street.
Frames and displays everyday life below.

Public spaces step into exhibition spaces from streets.
The public spaces draw in everyday life of Alexandra

Figure 6.7. Section

By raising the spaces aimed at celebrating the community of Alexandra, above the streets of Alexandra, the stories and people celebrated in the exhibitions are elevated onto a stage seen as the spaces are approached and entered. The importance of telling these stories and celebrating these people is reinforced before the people they belong to and encourages the further telling of their stories.

The raised exhibition and celebration spaces also create a number of vistas down into the fabric of Alexandra, exhibiting the everyday lives of the people of the place and exposing the potential in the stories each life holds. Looking down into everyday life of Alexandra from the exhibition walkway celebrates the everyday and exposes the stories that are to still be told.

Figure 6.8. Everyday life becomes the stories told in and around the building

Interaction:

The Nelson Mandela Interpretation Centre creates public interaction spaces in the form of two squares that are raised above street level. These public squares are used as the community of Alexandra sees fit and may house a number of different rituals and activities at a time, with the community happily sharing and interacting within the space (ArchDaily, 2010).

The public squares are fronted by a number of shops, training facilities and workshops (Deckler, Graupner and Rasmuss, 2006, p49). These activities surrounding the spontaneous activities housed in the square are owned and run by the community of Alexandra themselves. This aids in creating ownership of the public squares and gives specific spaces to the community and allows for these spaces to be easily inhabited by the community.

Education:

The program of the Nelson Mandela Interpretation Centre provides spaces that aid in teaching the community of Alexandra to tell their personal stories, in spaces such as a library and training facilities. The Interpretation Centre provides spaces that programmatically enable the community and teach them a skill that will aid in the survival of the people and their stories (ArchDaily, 2010).

Figure 6.10. Raised public squares

Figure 6.11. A number of different activities line the streets

Figure 6.12. Children learn as the observe the street from above

Security:

Giving the ground floor plane to the community creates security of and around the Nelson Mandela Interpretation Centre. The community owns and creates the activities housed in the public squares and activities that surround the squares. Creating the ownership on the ground ensures that the community themselves will protect the area and activities that occur within it.

The public squares are surrounded by a number of activities. These activities open onto the squares. By opening these activities onto the squares it allows for the owners of these stores and workshops to continuously be watching the activities on the square. This ever-watching presence prevents dangerous or mischievous activities from occurring on the square.

Reaction to existing context:

The materiality of the Nelson Mandela Interpretation Centre imitates that materials and the way in which the materials are used in the local physical fabric of Alexandra. This imitation of the physical fabric of Alexandra celebrates the resourcefulness of the community and tells part of the community's story in a visible and tangible way. (Deckler, Graupner and Rasmuss, 2006, p49).

Figure 6.13. Street observed from above aids in security

Figure 6.14. The materials used reflect the resourcefulness of the community, through the use of similar materials layered over one another
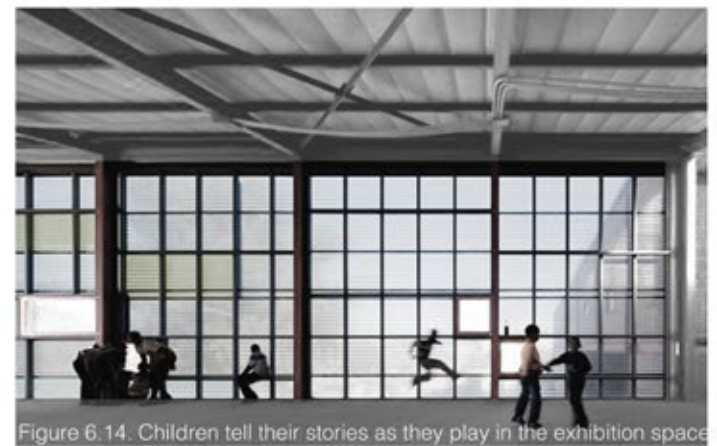
Figure 6.14. Children tell their stories as they play in the exhibition space

02_ Delft Day Care Centres
_ Noero Wolff Architects

Overview:

The Delft Day Care Centres are located in the low-lyng area of the Cape Flats. The intentions of the day cares centres in Delft are to create a connection between the buildings, the landscape, the community and the city. (Deckler, Graupner and Rasmuss, 2006, p85).

Celebration:

The presence of both day care centres, within the community, is celebrated through the use of brightly coloured pylon. These brightly coloured pylons become orientation devices within the community (Deckler, Graupner and Rasmuss, 2006, p87). These brightly coloured orientation devices, celebrate the buildings, in that the community is able to locate the buildings from a long distance away and is able to located surrounding activities in relation to the day care centres.

By celebrating the presence of the building within the community the users of the building are in turn also celebrated.

Figure 6.15. Brightly coloured entrance

Figure6.16. Brightly coloured seating and orientation pylon

Figure 6.17. Brightly coloured entrance pylon

The child and the child's need to play are celebrated within the building through the importance of a toy room and a toy storeroom. These rooms are placed in the center of the play space and are painted in a bright red (Deckler, Graupner and Rasmuss, 2006, p87). All the activities within the building surround the play and toy spaces, aiding in the celebration of these spaces and the children using them.
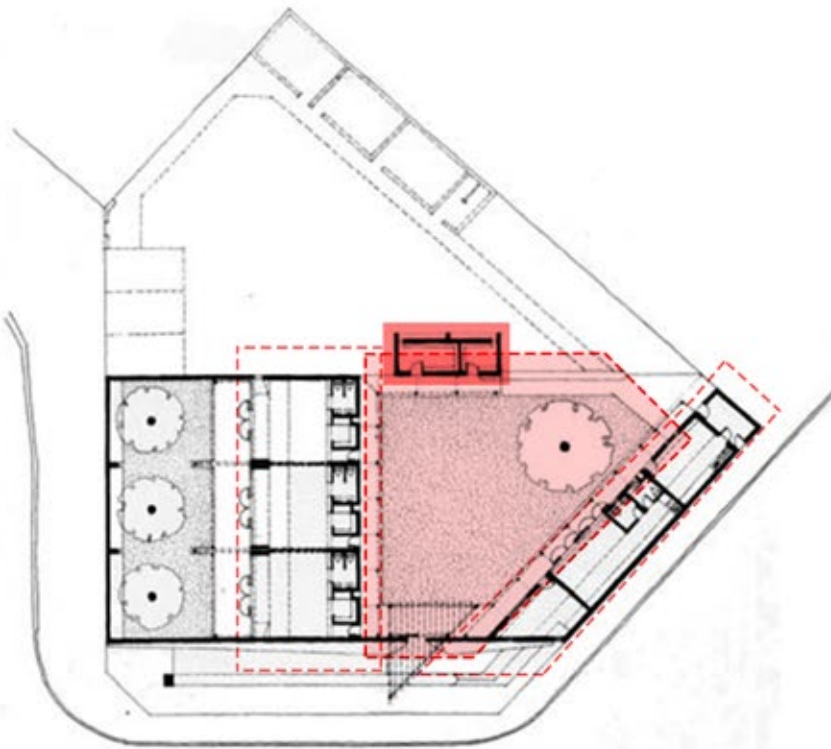
Figure 6.18. Plan 1: Central play space and toy room
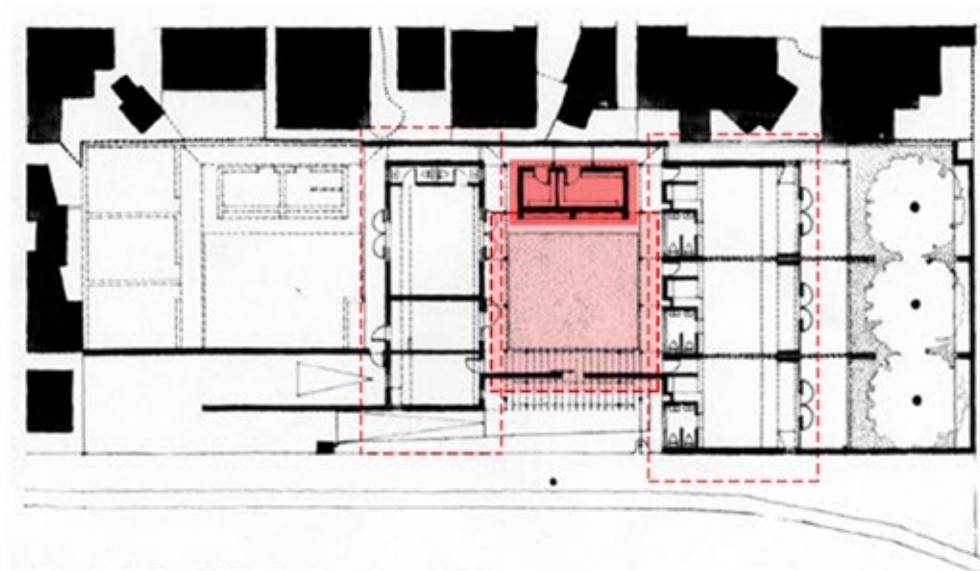
Figure 6.19. Plan 2: Central play space and toy room

Interaction:

In both day care centres the central space is a communal play or open space. Educational activities housed in the building, such as, children's classrooms and adult classrooms surround these central spaces. The classrooms open up onto the communal open space, allowing this space to be under constant observation. Both parents or adults and children use the central space, allowing the child and adult to interact in a safe and observed space. (Deckler, Graupner and Rasmuss, 2006, p85).

Figure 6.20. Section 1: Watched shared play space

Figure 6.21. Section 2: Watched shared play space

Figure 6.25. Shared children's play courtyard
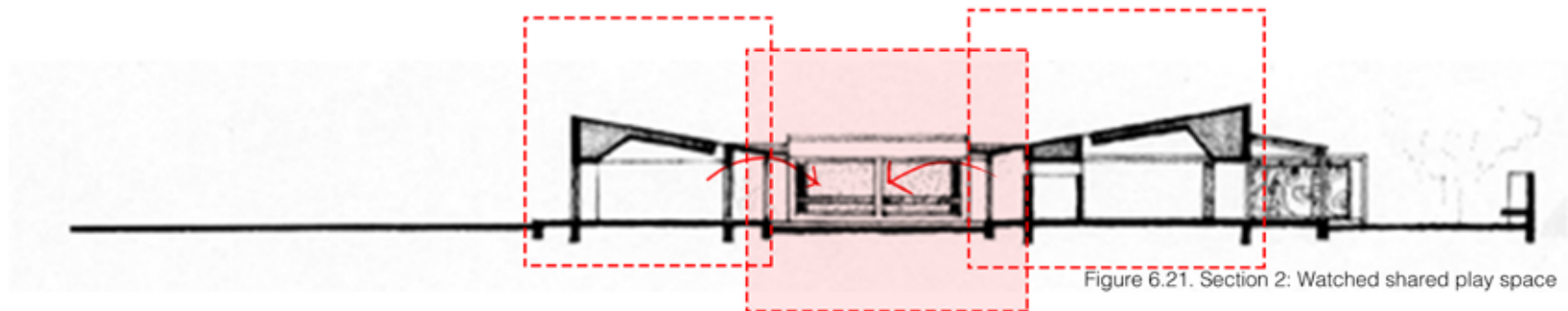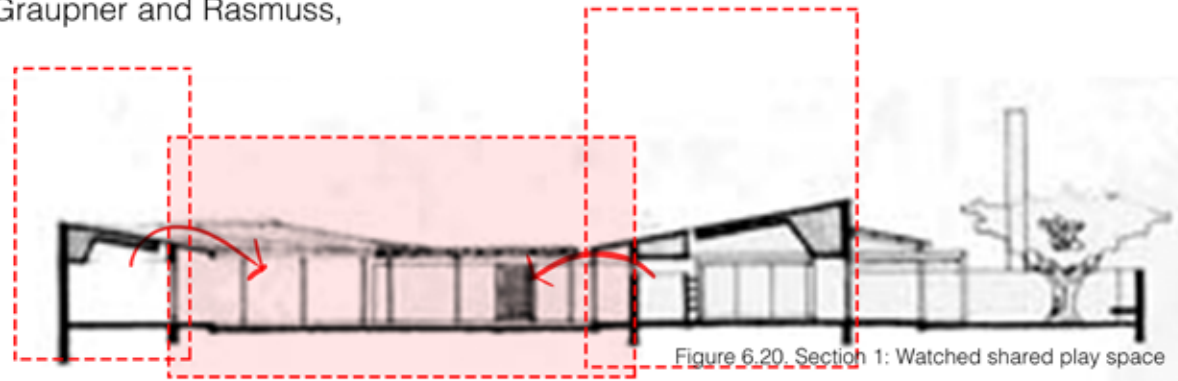
Education:

Both day care centres provide spaces of learning for not only the child but also their parents and adults within the community.

Children are allowed to interact and learn from one another in private learning gardens that sit behind the children's classrooms. The classrooms open up onto the garden spaces and the child is allowed to interact in a safe space.

Security:

The day care centres have single entrances into the central watched play spaces. These single entrances allow for monitoring of the people entering the day care facility. The single main entrance creates a safe guarded environment for the child (Deckler, Graupner and Rasmuss, 2006, p87).

The central watched play space also ensures that the child, movement through the space and who is using the space is always monitored (Deckler, Graupner and Rasmuss, 2006, p87).

Figure 6.23. Single point of entry
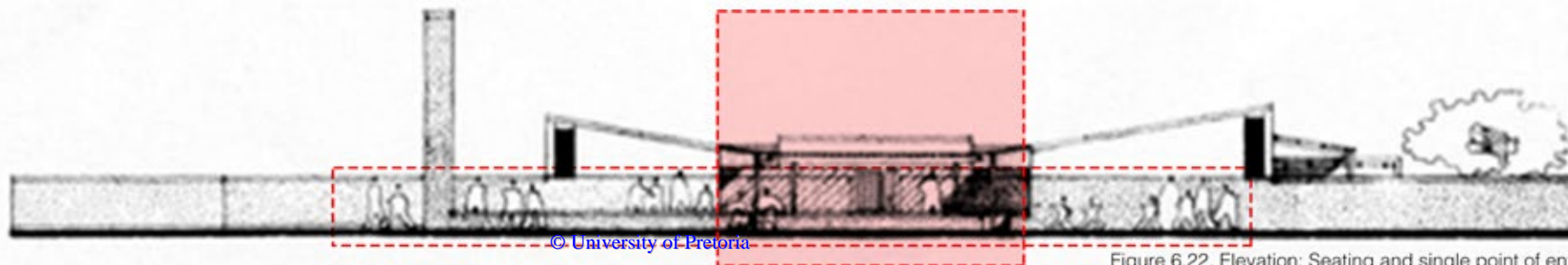
Figure 6.22. Elevation: Seating and single point of entry

03_ Soweto Careers Centres
_ Noero Wolff Architects

Overview:

The Careers Centre in Soweto was established in order to fulfill a need for within the community, for an establishment to help guide young black school children into a career in the newly established democratic South Africa (Noero Architects).

Interaction:

The Careers Centre became a place not only used by the school students but also their parents in order for the parents to understand the challenges there are undergoing (Noero Architects).

By introducing the parent to the challenges the child faces, the parent is able to support the child through the processes of learning and finding a job. With the new understanding of the child's daily and future challenges the parent is able to relate to the child's needs and interact with the child on a more meaningful level in relation to their future.
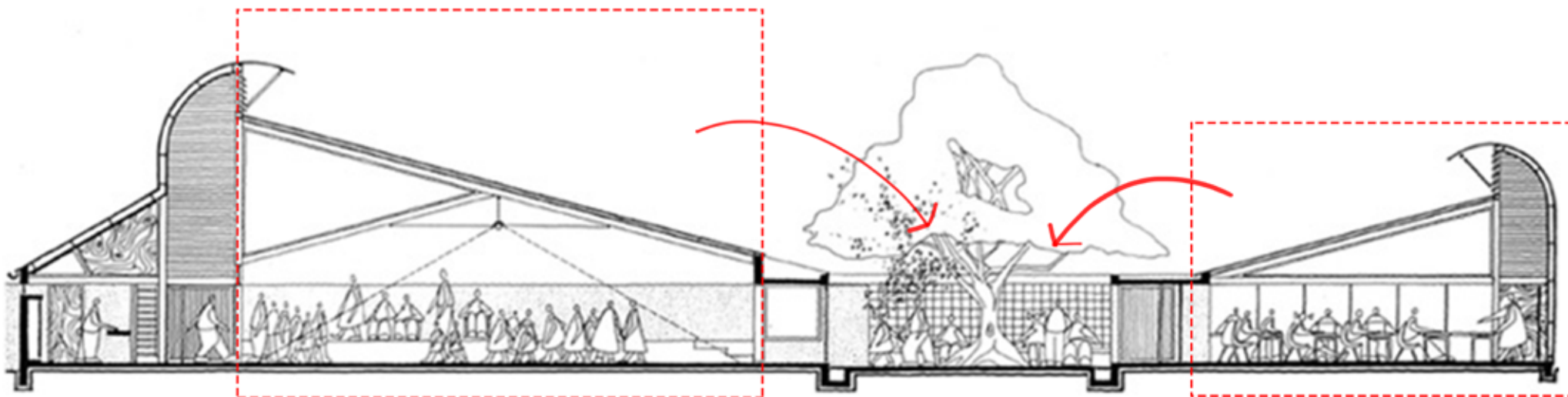
Figure 6.26. Section. Shared education spaces and central community courtyard

Figure 6.28. Ventilation stack responding to climatic environment

Figure 6.29.

Education:

The intentions of the Careers Centre are not to only prepare and educate the child but their parent too. Including both parent and child in the education process enables more of the community then just the child and enables survival of more then one age group of people in the community.

The intentions for the physical fabric of the building are to educate the user about a number of different process within the building that are used to light and ventilate the building. This tangible example of space making was used to expose the user to the careers of architecture, interior architecture, construction and engineering (Noero Architects).

Figure 6.27. Plan

04_ Usasazo Secondary School
_ Noero Wolff Architects

Overview:

Usasazo Secondary School is located in the densely populated fabric of an informal settlement in the Western Cape. The intentions of the Usasazo Secondary School is to use as little land as possible and give the majority of the land to communal activities, such as sports and agriculture. (Deckler, Graupner and Rasmuss, 2006, p89).

Celebration:

Movement through the school is used to celebrate the activities housed within the school. A single circulation spin divides the school spaces into two wings, with the classrooms or education spaces leading directly off the movement through the site. As the user moves through the site they are exposed to a number of different educational activities for a number of different age groups, from child to adult (Deckler, Graupner and Rasmuss, 2006, p89).

Figure 6.30. Usasazo Secondary school mimics the physical fabric of the informal settlement it is located in
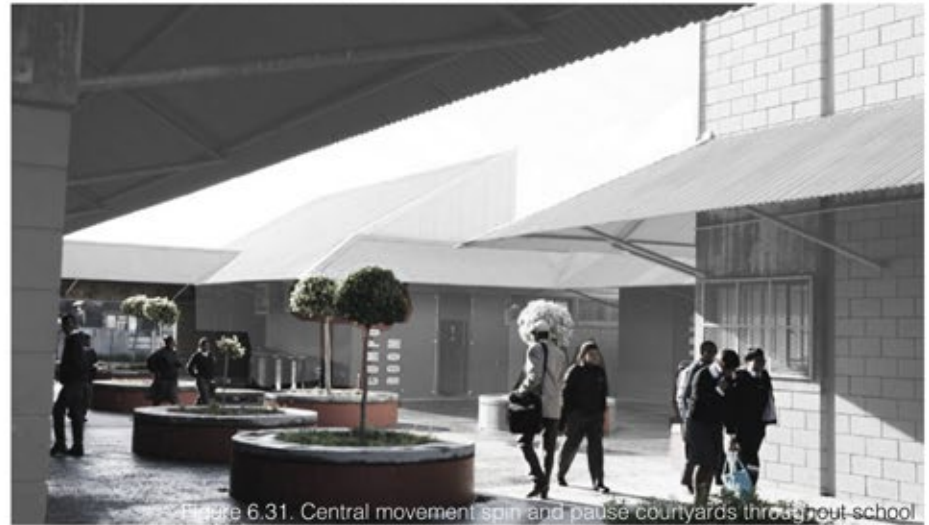
Figure 6.31. Central movement spin and pause courtyards throughout school

Figure 6.32. Pause courtyards along movement spin

Interaction:

The classrooms lining the street of the site are single story, mimicking the existing fabric of the township. These classrooms open up onto the street and become retail stores, serving the pedestrian on the street. This retail street allows for the community to interact with the educational retail stores and exposes the community to the educational activities housed in the school (Deckler, Graupner and Rasmuss, 2006, p89).

The main circulation spin within the school terminates in a communal sports field. The interaction of the community in recreational activity is celebrated and also facilitated within the school.

Along the circulation spin wider areas of pausing and interacting are created. Allowing for the user to move from one point of interaction to the next as they move through the building.

Figure 6.33. Plan of Usasazo Secondary school. Single movement spin and communal sports fields
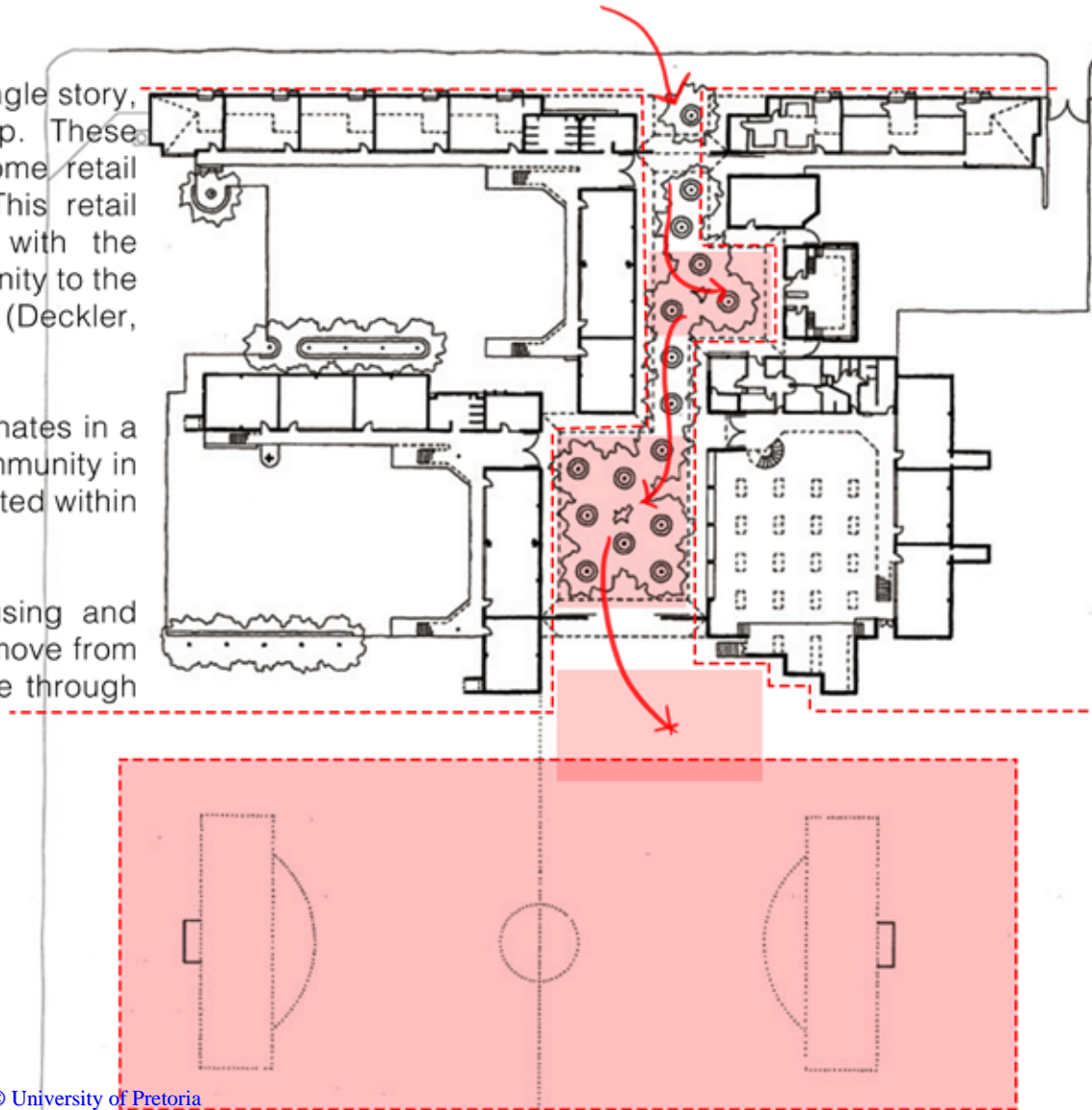
Education:

The education provided on the street edge becomes the buildings most important educational activity. The classrooms are used to teach entrepreneurial skills and open up onto the street to form stores in order for the students to practice the theoretical skills they are taught (Deckler, Graupner and Rasmuss, 2006, p89). The entrepreneurial education gives back to the community and aids in its survival.

Security:

The single main circulation spin allows for the movement of student and community member through the space to be easily monitored, ensuring that the child is safe and cared for within the space.

Figure 6.34 Street front classrooms, open onto street as store

Figure 6.35. Single Storey street front classrooms and stores

Figure 6.36. School and community hall

Reaction to existing context:

Due to the dense fabric of the informal settlement the Usasazo Secondary School is located in, the available land needed to be used as effectively and efficiently as possible. Therefore the school occupies the smallest portion of the site and the remaining land is used as communal sports fields and agricultural land. The building is used to create and define important communal spaces and respectfully gives as much as it can to the community, in order for it to survive.

The building not only responds to the contexts' intangible need for communal spaces, but also to the tangible environmental characteristics of the site.

The classrooms are formed in a L-shape in order to protect the open spaces from the strong directional winds. The building is used to not only to define the need public spaces but also responds the climate of the site in order to make the public spaces as pleasant as possible.

Figure 6.37. Sections. Public space surrounded by classrooms. Spaces watched by classrooms

07_ Design Development

01_Site
02_Zoning
03_Pschological and Emotional
    requirements created by
    architecture
04_Design Developement
05_ Final Design

01_Site

The development for the appropriate civic function that serves the children of Mabopane and their ability to be resilient went through a number of design iterations. During these iterations a number of design theories and precedents were considered and examined in order to understand how to appropriately design a facility focused on developing a child's resilience. The architecture is to be created, by considering the spaces needed to strengthen and building a child's resilience by developing their emotional intelligences.

The programmed, explained in the previous chapter, is a play-centre addressing the child's need for tasks within the community after school and a community kitchen, addressing the child and parent's need to connect, interact and share skills.

The site selected for the Play-Centre is locates adjacent to the local fire station and a new skills-development focused programme. Both the existing and

new civic functions provide energies that can be used to sustain the child and use of the site.

The boundary between the child-focused and skills-development focused programmes is to become a transition between the programmes, filtering the users onto each site and celebrating the connection and sharing of energies between the programmes.

site

mall

train station

Figure 7.1 Aerial Phot

new mall entrance

new housing

transition civic space

service road

new housing

site

Micro Framework

Transition or Share site

Mall

Residential Fabric

Negotiating the Edge Programme

Resilient Child Programme

Fire Station
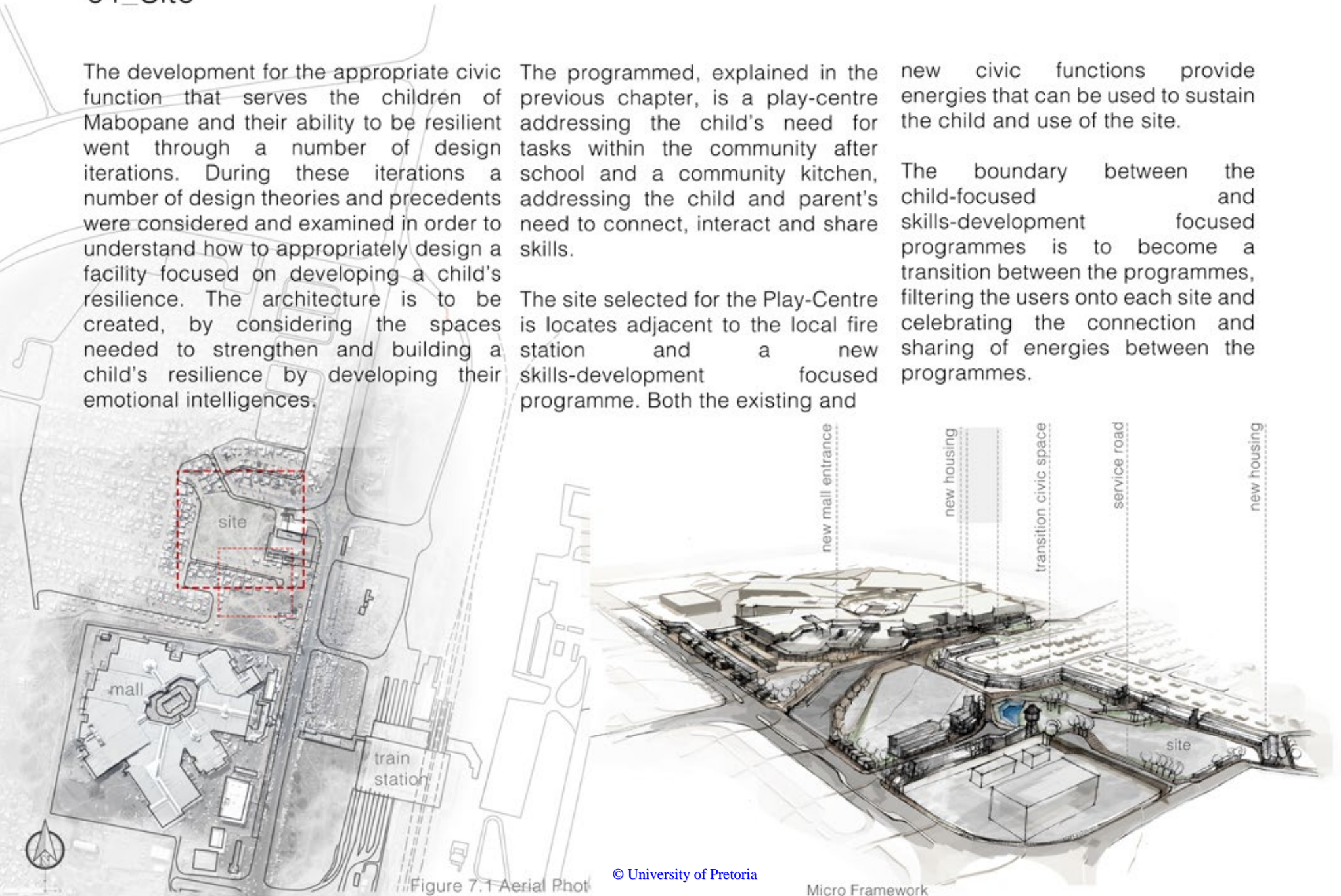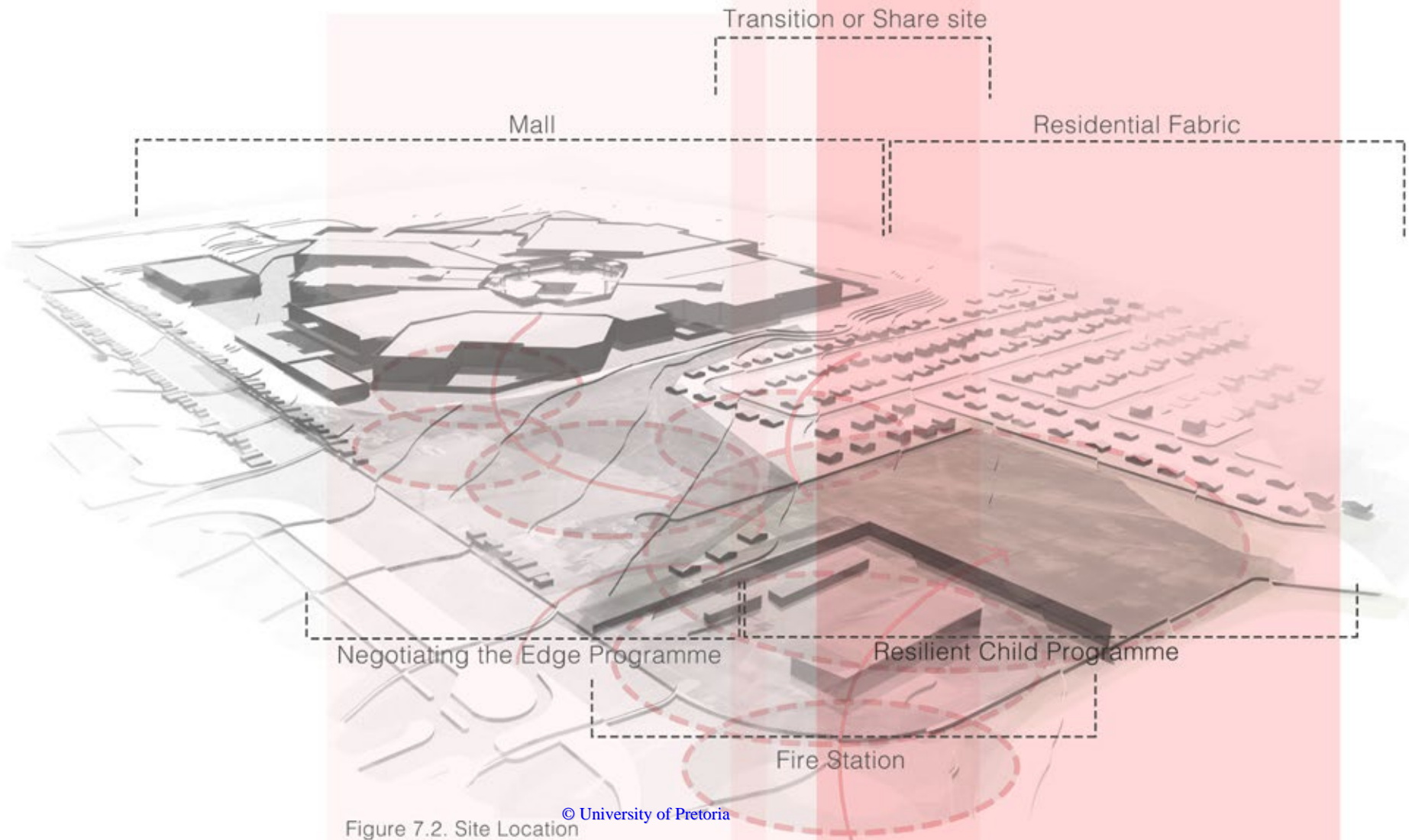
Figure 7.2. Site Location

02_Zoning
Spatial Dimension

In order to understand and divide the site up appropriately, accommodating the appropriate spaces and functions on the most reasonable boundaries of the site, Breed's interpretation of Lefebvre's dimensions of spaces was examined and interpreted according to the need of civic space that serves the community and children of Mabopane, the intention to create resilience for the children's survival network and the concept of "life, space, bulding- in that order".

Figure 7.3, illustrates Breed's interpretation of spatial dimensions. Breed, according to Lefebvre, suggests that the urban environment is made up of physical space, social space and mental space (Breed, I. 2012: 50).

Physical space (matterscape) is the element of urban space that the designer is most concerned with. It is the built fabric that creates determines space, that the urban user creates symbols from and with. The symbols and associations the built fabric forces or allows the urban user to establish, creates the mental space (mindscape) within urban space. The final spatial dimension Breed explains, is social space or the powerscape. The social powerscape is the social urban fabric; it is the social networks and and systems that develop in order for the community to survive (Breed, I. 2012: 50).

Figure 7.4 and 7.5 illustrates the spaces or experiences associated with the different dimensions of space.

Matterscape, is the physical design fabric, that creates the spaces that serve a specific function; it is the programmed spaces and functions of a design intervention. Powerscape is the social connection and interaction of the urban fabric and the matterscape; it is the civic space and functions within the urban fabric. Mindscape is the resulting associations and experiences, created by the power and matterscape. It is the symbolic, spiritual and emotional experience the design fabric and social connections create and enable (Breed, I. 2012: 50).

Creating people-centred urban settings and architecture within it, needs to create the concrete (matterscape) with and understanding of the social and civic needs (powerscape) and the emotional and symbolic effect these spatial dimensions create.
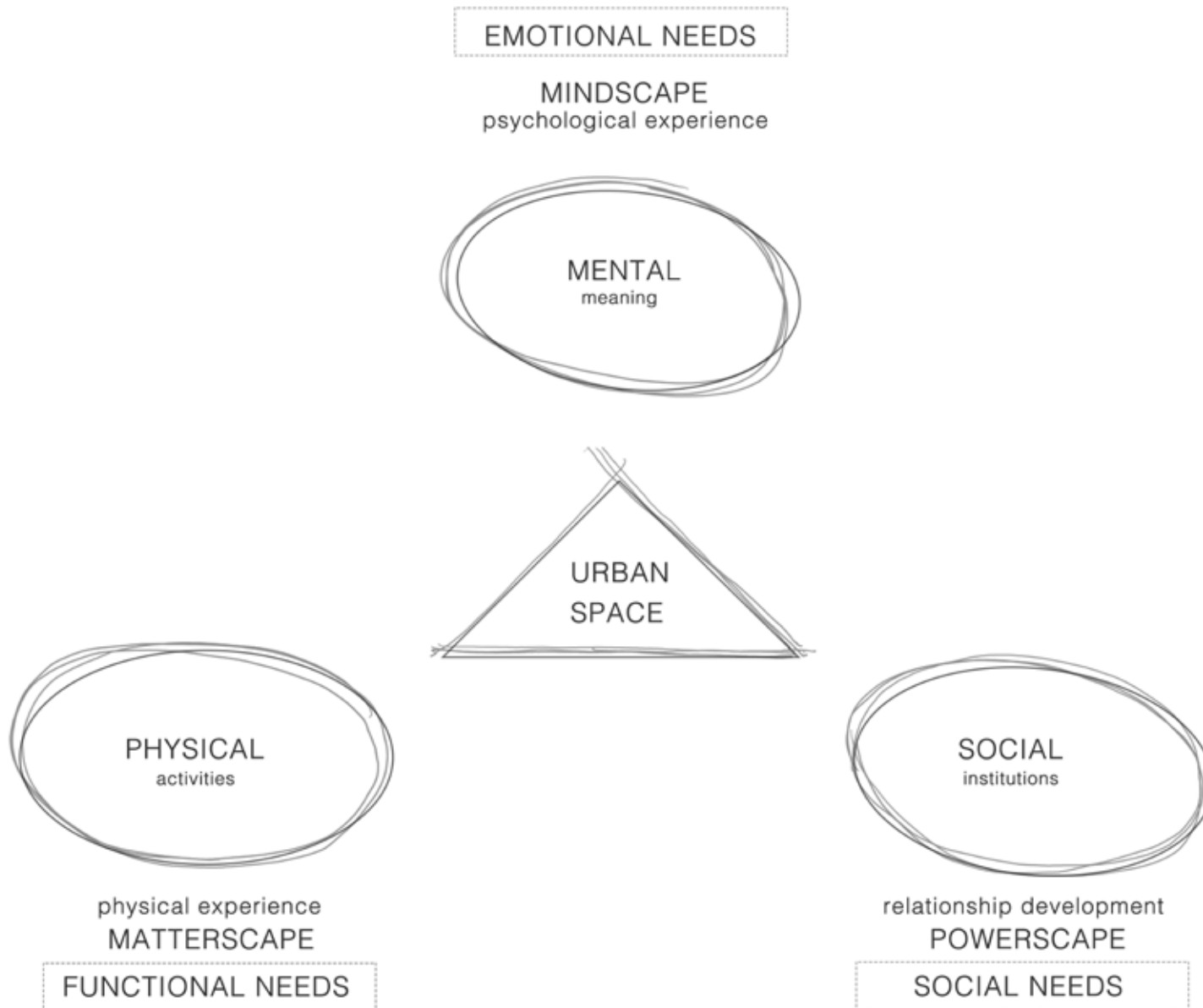
Figure 7.3. Spatial Dimensions Diagram (Breed, I.2012)

EMOTIONAL NEEDS

MINDSCAPE
psychological experience

MENTAL
meaning

EXPERIENCES AND LESSONS

URBAN
SPACE

PHYSICAL
activities

physical experience
MATTERSCAPE

FUNCTIONAL NEEDS

PROGRAMMED SPACES

SOCIAL
institutions

relationship development
POWERSCAPE

SOCIAL NEEDS

CIVIC SPACES

Space or Experience
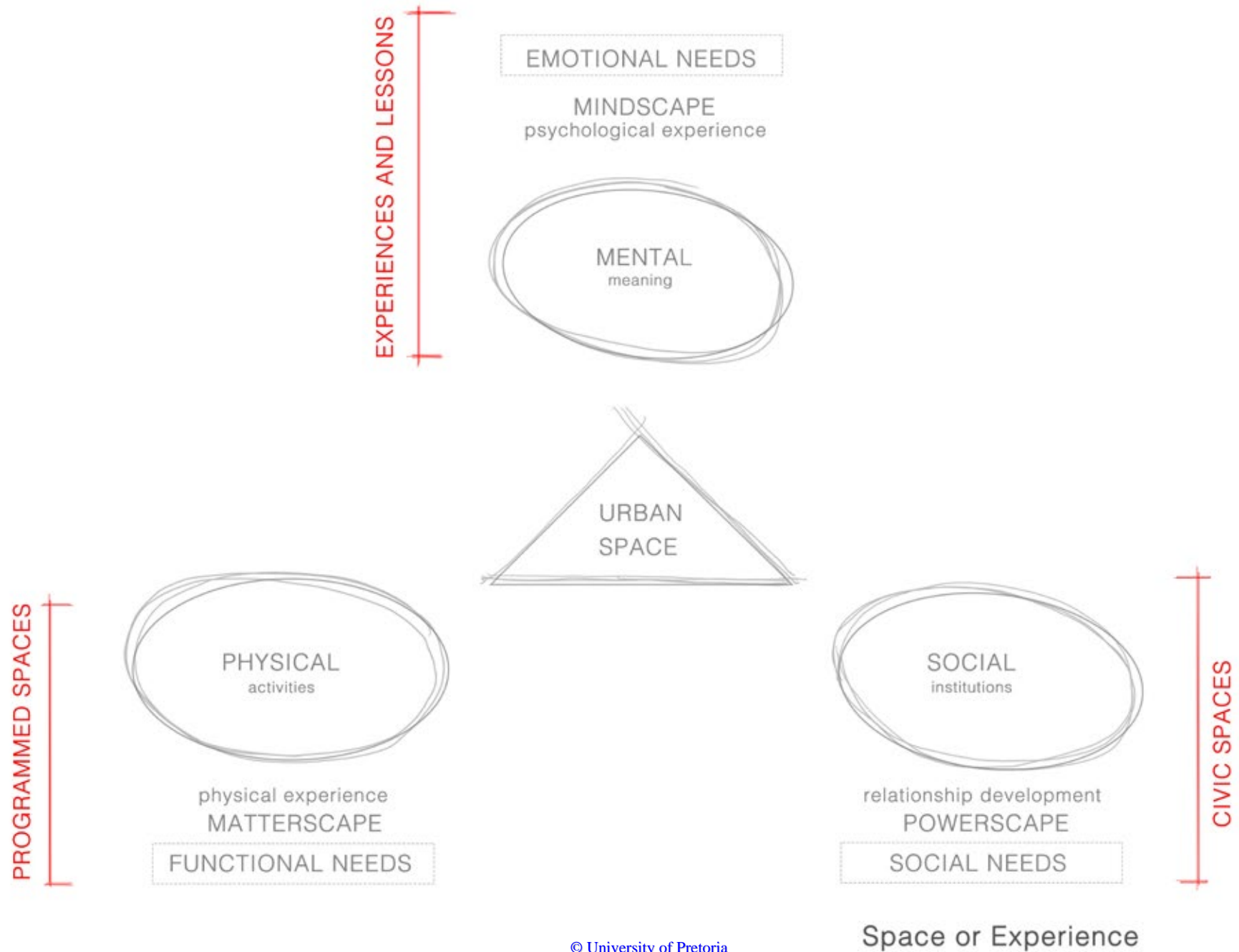
Figure 7.4. Spatial Dimensions Diagram_ Space or Experience
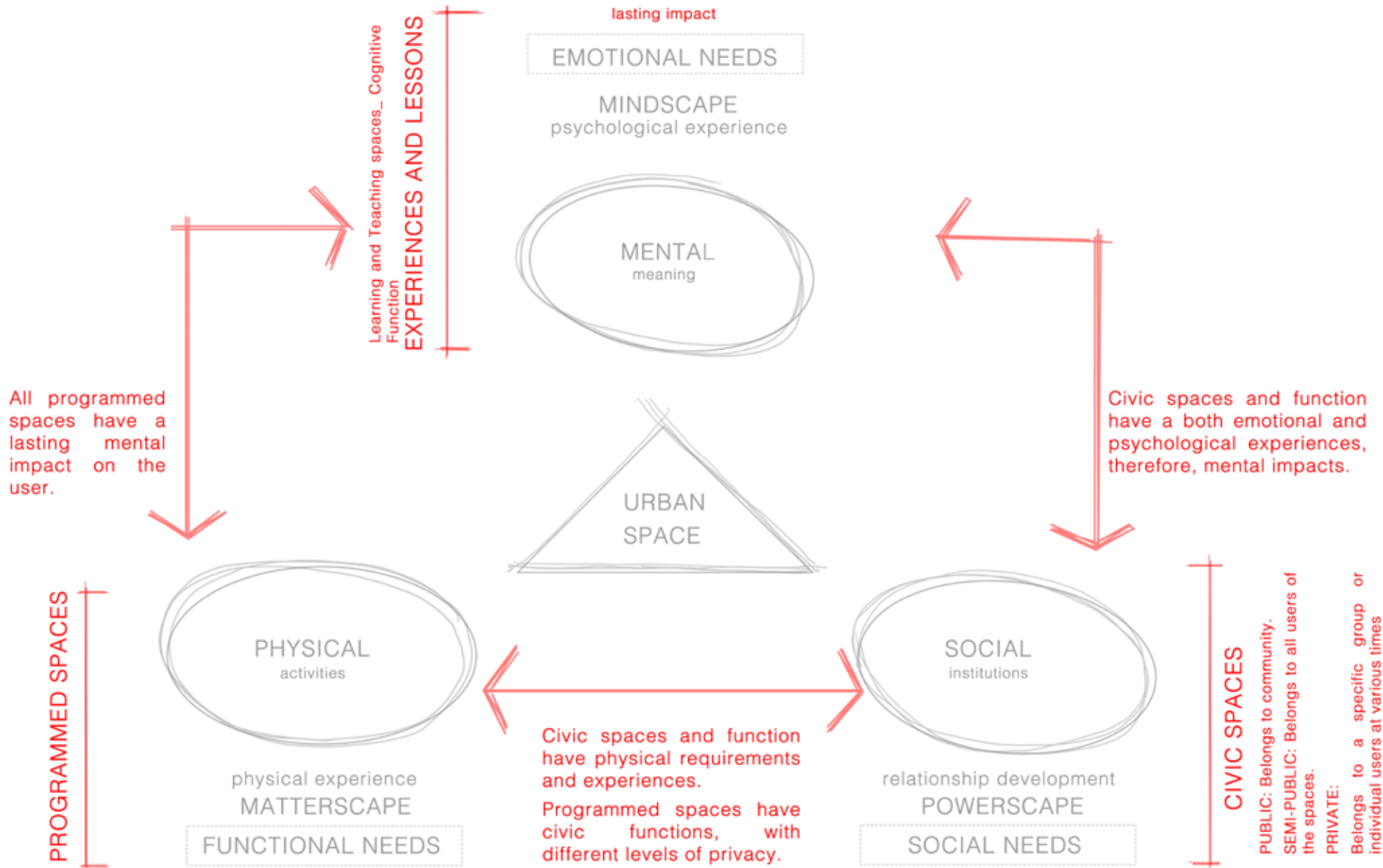
Figure 7.5. Spatial Dimensions Diagram_Civic Functions Role

Civic Space's Role

The theory of spatial dimensions, as interpreted by Breed, was used to establish the appropriate break down of the site for the civic space, intended to serve the child.

The effects of the existing and newly suggested physical and social dimensions of urban space were considered when dividing the site.

Figure 7.7, illustrates the social space (the powerscape) that is developed for the site and suggested programme.

The new children's Play-Centre and community garden programme is located north of a skills-development programme. The sites share a transition site. The intentions of this transition zone are to direct and filter public movement between the adjacent sites and act as a connection between the adjacent programmes. This celebration of movement and connection between sites causes the southeastern corner of the children's site to be public and belong to the community.

The existing movement across the site, from northwest to southeast, allows the northwestern corner to extend the public realm and the portion of the site that belongs the community.

The northeastern edge and corner become semi-public, belonging to the local family and user of the community garden, due to the existing functions of that edge. The northeastern edge is use for movement of pedestrians and a local fire station. The fire station secludes part of the edge and the existing movement allows part of the edge to belong to the public.

The most private edge is the southwest corner. The edge is used for public movement but is protected

and secluded by the newly suggested housing. This edge belongs to the user of the children's programmed alone.

Figure 7.8, illustrates the physical fabric (the matterscape) that develops as a result of the social or powerscape. The initial physical boundaries develop according to the concept: life, space, building.

The more public rituals, therefore, public spaces, open up onto the public realm and the more private rituals and spaces, turn inwards, with hard boundaries separating the private space and ritual from the public realm.
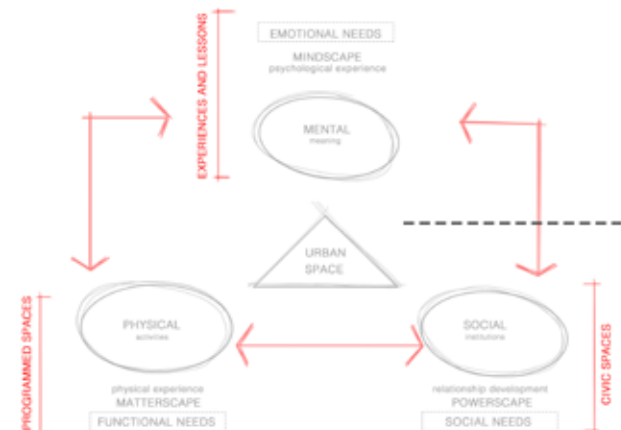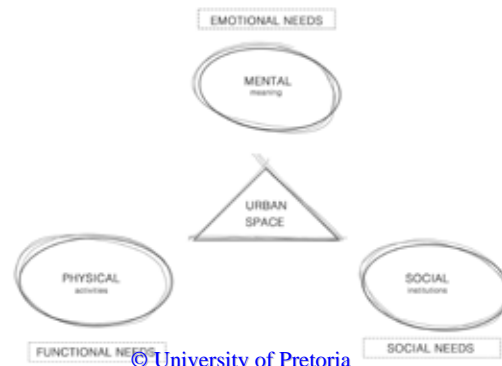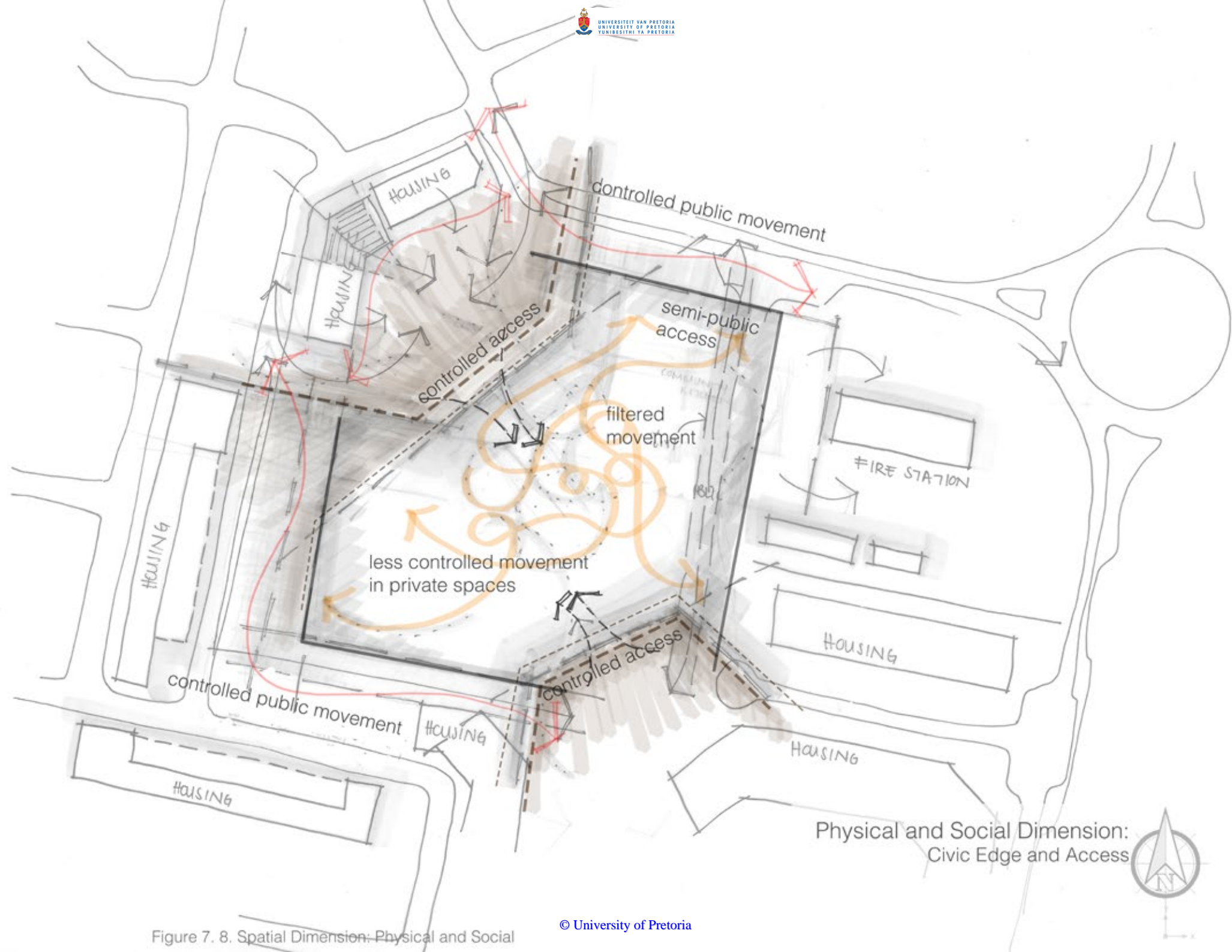
Figure 7. 8. Spatial Dimension: Physical and Social

Within the figure:
- HOUSING
- controlled public movement
- controlled access
- semi-public access
- filtered movement
- FIRE STATION
- less controlled movement in private spaces
- HOUSING
- controlled public movement
- controlled access
- HOUSING
- HOUSING
- HOUSING
- HOUSING

Physical and Social Dimension:
Civic Edge and Access

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

HOUSING

HOUSING

HOUSING

HOUSING

HOUSING

HOUSING

force movement onto edge of site

collect pedestrian

Public
Belonging to community

Semi-Public
Belonging to family

SERVICE ROAD

FIRE STATION

force movement onto edge of site

Private
Belonging to Child

Public
Belonging to Community

collect pedestrian

SERVICE ROAD

force movement
onto edge of site

Movement from
neighbouring site
and market and station

Physical and Social Dimension:
Movement and Belonging

Figure 7.7. Spatial Dimensions: Physical and Social

new housing

new housing

Resilient Child Site Boundaries

service road

new housing

new housing

new housing

service road

transition between sites

Framework Zoning
nts

Figure 7.6. Base Framework Zoning plan

Teaching Philosophy and Spatial Dimension

The emotional or mental dimensions (mindscape) of the urban space, belonging to the child, were established according to the child's need for resilience (their emotional intelligence) and a teaching philosophy established by ... in order to develop this resilience and the child's emotional skills.

The teaching philosophy identifies three ways in which a child is able to learn and create associations and rituals within the boundaries established by physical fabric (matterscape). The child can establish rituals and associations Maturationistly, cognitively and behavioristly.

Each spatial dimension can be associated with a way in which the child is able to respond and learn. Figure 7.10, illustrates these associations.

In the social dimension, where people connect, the manner in which the child learns and creates rituals is maturationist, unstructured, informal and spontaneous. The more public the space, the more free and unstructured the development of rituals and child's learning process is.

In spaces that determine a specific function and process (physical space), the child's response and learning process is behaviorist. It is structured and strict.

The associations and development of the child's emotional intelligences is developed within the mindscape (the mental space) of the urban fabric. The development of the child's emotional intelligence and the skills associated with it, occurs in both the physical and social space of the urban fabric. The sharing of skills and resources and the development of relationships occurs where the physical and social dimensions come together in civic space. The mindscape (the combination of matter and powerscape) becomes the emotional development of the child and the point at which the child's resilience is developed. The spatial dimension has cognitivist characteristcs and resonses; both structure and spontaneous.

BEHAVIORIST

Formal, Controlled and Structured spaces

Teaching and Learning spaces make use of a Behaviorist teaching philosophy, therefore, require formal and controlled spaces, with clear and specific functions.

All programmed spaces have a lasting mental impact on the user.

EXPERIENCES AND LESSONS

Learning and Teaching spaces_ Cognitive Function

lasting impact

EMOTIONAL NEEDS

MINDSCAPE
psychological experience

MENTAL
meaning

COGNITIVE

Structured and Unstructure spaces

URBAN SPACE

Spaces move from more formal, structured space, to less formal and unstructured spaces, as the privacy level and function of the space changes.

Civic spaces and function have a both emotional and psychological experiences, therefore, mental impacts.

PROGRAMMED SPACES

PHYSICAL
activities

SOCIAL
institutions

Civic spaces and function have physical requirements and experiences.

Programmed spaces have civic functions, with different levels of privacy.

relationship between

POWERSCAPE

physical experience
MATTERSCAPE

FUNCTIONAL NEEDS

SOCIAL NEEDS

Civic spaces with a public function may make use of a more Maturationist teaching philosophy and therefore, be defined by iinformal and unstructured spaces, leading to more structured spaces

CIVIC SPACES

PUBLIC: Belongs to community.
SEMI-PUBLIC: Belongs to all users of the spaces.
PRIVATE: Belongs to a specific group or individual users at various times

MATURATIONIST

Informal, Spontaneous and Unstructure Spaces

Functional needs of the space can be Behavoirist, Cognitive and Maturationist

TEACHING PHILOSOPHIES: Spatial Requirements and relationship to Spatial Dimensions

Figure 7.10. Teaching Philosophy and Spatial Dimensions

Teaching Philosophy and Spatial Dimension_ Zoning

Figure 7. 10.2, illustrates the interpretation of the teaching philosophy and spatial dimensions into a layer of zoning of the children's Play-Centre.

The most public spaces, belonging to the community, are the maturationist spaces developing the social dimension (powerscape) of the site. The most private spaces, belonging only to the user of the Play-Centre, are the behaviorist spaces and are developed and defined by the physical dimension (matterscape) of the Play-Centre. The portions of the site where the most public spaces and most private spaces (social and physical dimensions) meet become the cognitivist spaces, where the emotional intelligence of the child are strengthened.

Figure 7. 10.3, illustrates the translation of the spatial dimensions and teaching philosophy into programmed spaces (physical dimension) making up the Play-Centre.

Public movement on Site Boundaries

Community Garden

Community Kitchen

Art and Exhibition spaces

Private user movement through site

Performance spaces

Library and Homework spaces

Public movement on Site Boundaries
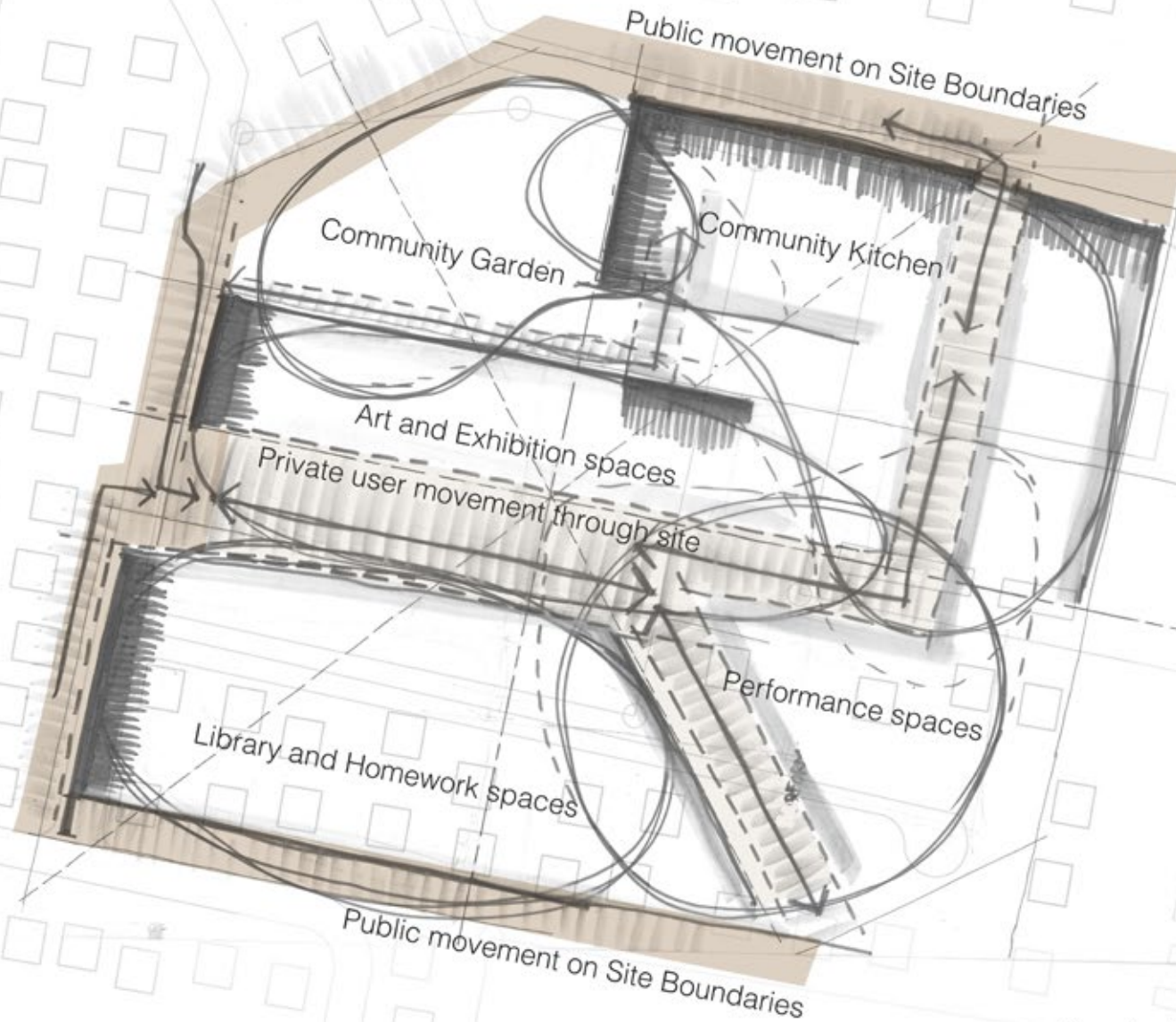
Physical Dimensions:
Programmed Spaces and Edges
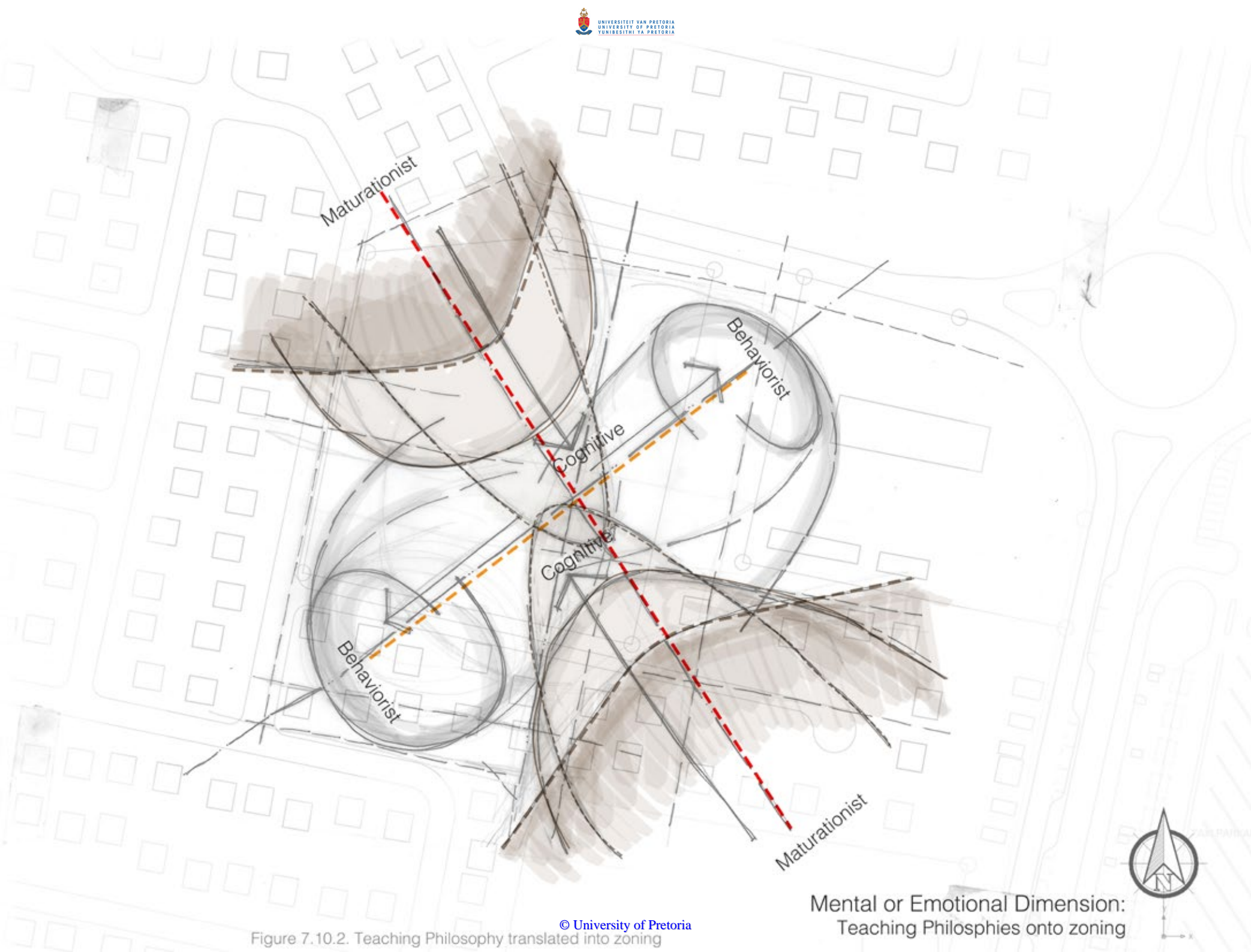
Figure 7.10.3. Specific space zoned according to teaching philosophy

Figure 7.10.2. Teaching Philosophy translated into zoning

Mental or Emotional Dimension:
Teaching Philosphies onto zoning

collect pedestrian

force movement onto edge of site

Public
Belonging to community

Semi-Public
Belonging to family

SERVICE ROAD

FIRE STATION

HOUSING

HOUSING

HOUSING

force movement onto edge of site

Resilient Child Site Boundaries

Private
Belonging to Child

Public
Belonging to Community

collect pedestrian

SERVICE ROAD

HOUSING

HOUSING

force movement onto edge of site

HOUSING

HOUSING

Movement from neighbouring site and market and station

nts

03_ Pschological and Emotional Requirements created by Architecture

The intentions of the architectural investigation is to create the physical dimension (a building) that creates the appropriate spaces, that allow for and enable the development of the child's resilience, their emotional intelligence.

As established in the programme and concept chapter, each of the programmed spaces addresses a need within the fabric of Mabopane. The programme establishes tasks for the child within the fabric and creates the opportunity for the development of relationships between different survival networks (the child, the parent and the school) allowing these networks to share resources, skills and energy in order for the networks to develop resiliently. Each space, task and relationships within the spatial programme has an emotional impact in order to develop the child's emotional intelligence.

These emotional impacts each space is to leave determines how the physical architecture is to be create, linking back to the concept; life, space, building.

community kitchen

play-centre

kitchen

community garden

play gardens

homework centre

dining space

teaching gardens

play-house stage and amphitheatre

homework classrooms

library

community vegetable garden

children vegetable garden

wetland garden

art studios and gardens

reading gardens

children's library

parent library

reading rooms
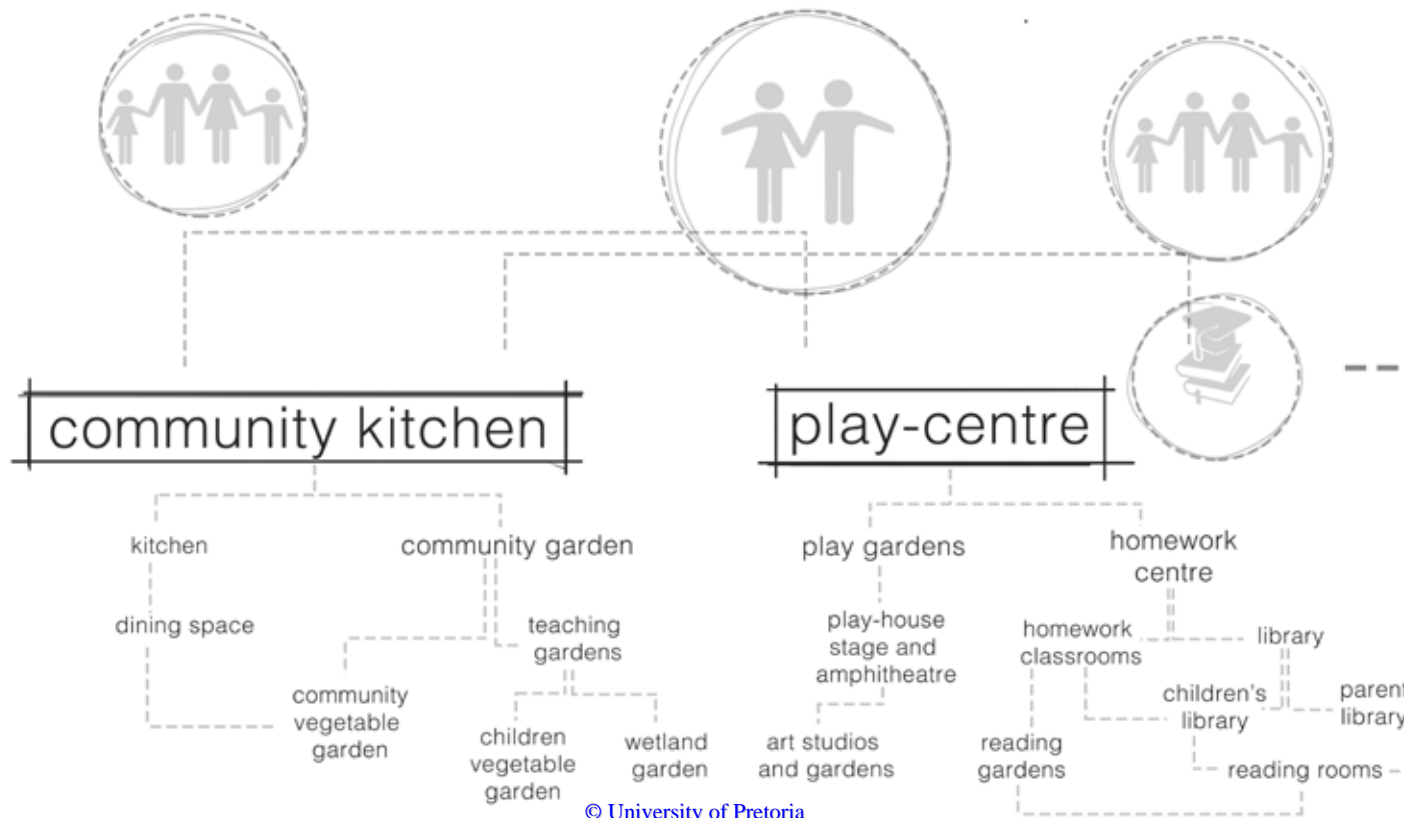
The life, the rituals and tasks defining the programme and the emotional impact each task is to leave, defines the type of spaces to be created and in turn the specific spaces determine the architecture.

The following investigation, examines the types of spaces required to have a specific emotional impact and house a specific ritual.

Each space was broken down into the emotional impact it is to have and then investigated in terms of; solid, void, volume, above and below, approach and access to spaces and finally interactive or isolates spaces

belong

play

create

strengthen

responsibility

reflect

control

community kitchen

play-centre

kitchen

community garden

play gardens

homework centre

dining space

teaching gardens

play house stage and amphitheatre

homework classrooms

library

community vegetable garden

children vegetable garden

wetland garden

art studios and gardens

reading gardens

children's library

parent library

reading rooms

Library Spaces

library

library

control

strengthen

responsibility

reading rooms
class rooms

reflect

strengthen

Figure 7.10. Library Space Emotional Impact

The rituals the library space is to facilitate are; the cognitive learning of the child, reading, writing and processing information and skills they learnt at school and the sharing of these cognitive skills with one another and their parents.

The spaces these rituals then determine are; a library facility, housing different sources of information for the child to choose from, reading spaces that remove the child from the process of selecting the required information and classroom spaces, facilitating the processing and sharing of information.

The emotional impacts each space is to achieve, in order for the spaces to aid in developing the child's resilience, are cognitive. The spaces aid in developing a child's ability to reason cognitively and process cognitive information. Figure 7.10, illustrates the required emotional impact of each space. The library and classroom spaces are to develop the child's ability to control and reflect on the cognitive information they receive on a daily basis and strengthen the child by providing a source of cognitive information.

Figure 7.11, illustrates the investigation into the creation of the emotional impact spatially.

The results from the investigation are: central library or communal spaces, stepping into the more public realm. Where the child accesses information is celebrate in spaces with the greatest volume and observed from a number of different viewpoint. The space in which information is accessed is an interactive space, creating the opportunity for the child to share cognitive skills.

The reading spaces and classrooms are more isolated, stepping away from the public realm, allowing the child to access and process information in smaller groups or individual. The volume of these spaces is decreased and these spaces look into the large library space.

The classroom is a more isolated space that includes both sharing of information and retreat and reflection of this same information.

The spaces within the library have a behaviorist and cognitive teaching philosophy driving the development of each space and courtyard.

Solid, Void, Volume, Above, Below

Library

Reading Rooms or Classrooms

plan

section

TRANSITION MOVEMENT
THROUGH CENTRAL
SPACE INTO
SURROUNDING
PRIVATE SPACES

TRANSITION PRIVATE READING
SPACE ACCESSED
THROUGH + TO
OUTDOOR READING
GARDEN

Approach and Access to Spaces
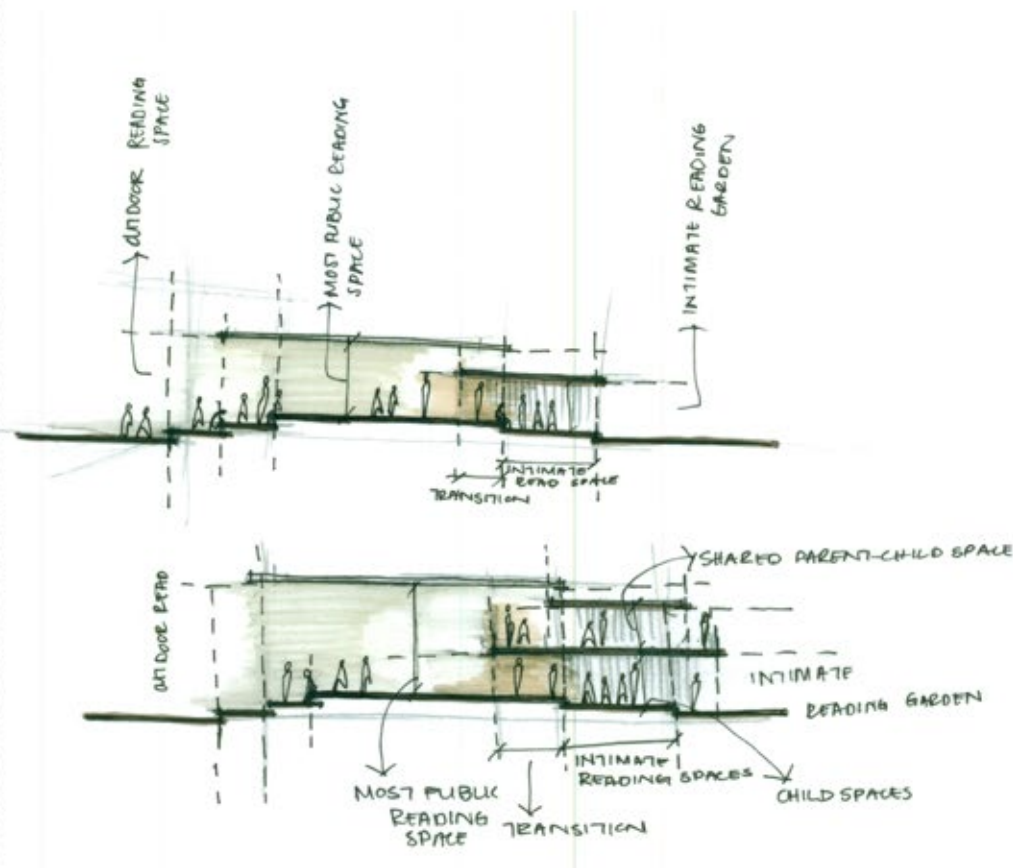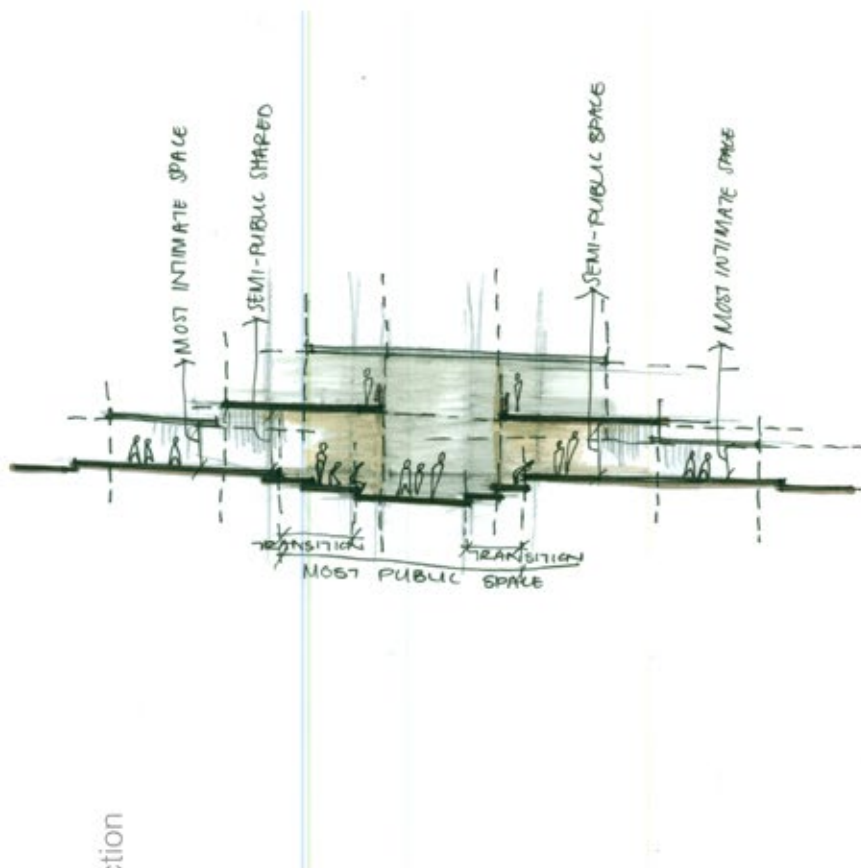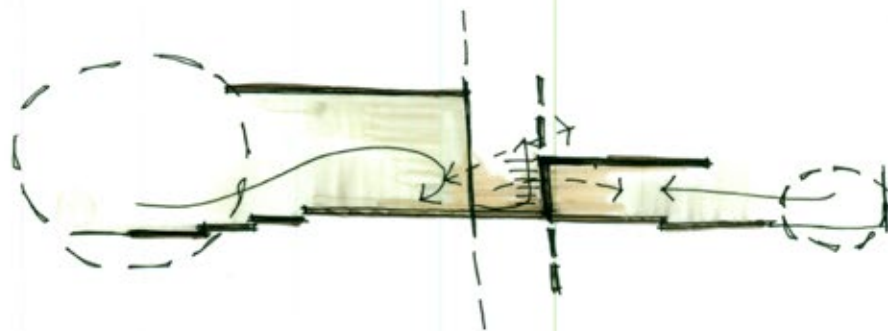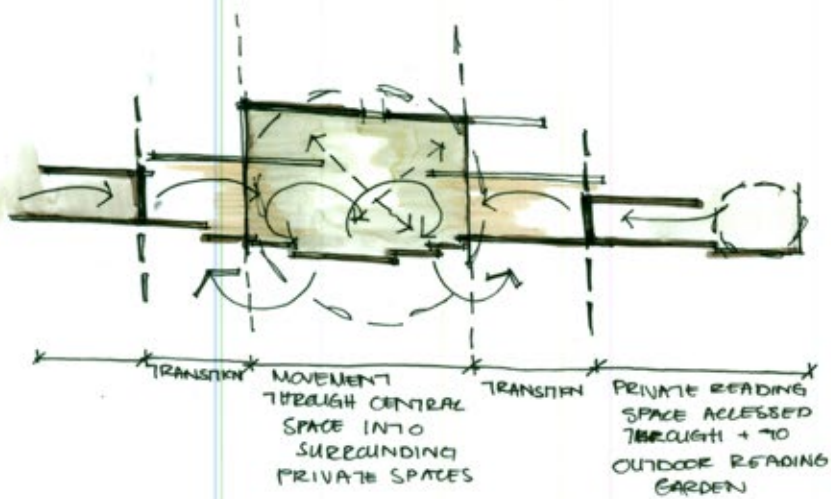
Library

Reading Rooms or Classrooms

plan

section

Interactive or Isolated spaces

Reading Rooms or Classrooms

plan

section

Figure 7.11. Set of investigative diagrams for the library spaces

Solid, Void, Volume, Above, Below

Expression Spaces

Expression spaces

Exhibition

strengthen

belong

Studios

create

reflect

Outdoor studio

play

celebrate
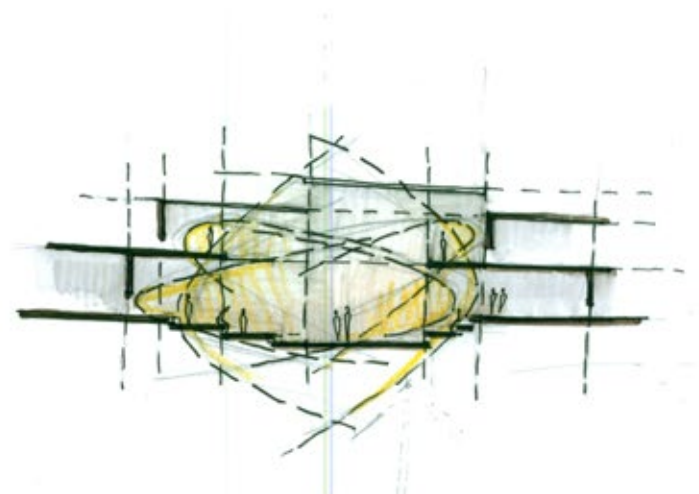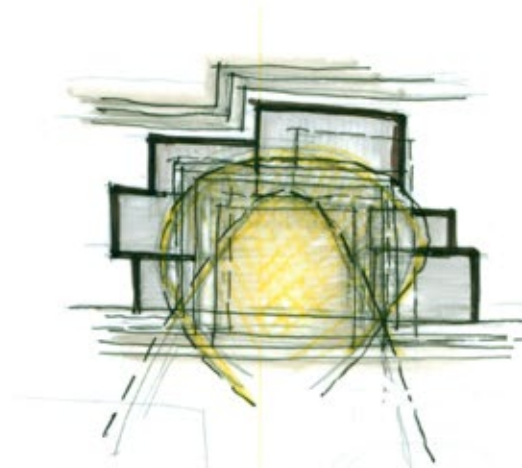
The expression spaces are to facilitate the rituals of creatively accessing, processing and sharing creative skills and abilities.

These rituals determine spaces such as exhibition spaces that display and celebrate the child's creative ability, studio spaces that facilitate the development of the child's creative reasoning and allow the child to share these skills with others and outdoor temporary canvases.

The emotional impact the expression spaces are to develop is the child's ability to reason and solve problems creatively. Figure 7.12, illustrates the emotional impact the different expression spaces are to have. The expression spaces are to create the sense of belonging within the network and community by displaying the skills of the child. The expression spaces are to create the opportunity for the child to create and play.

The diagrams that form part of Figure 7.13, illustrate how these emotional results can be achieved.

The results from the investigation are: spaces that exhibit the child's creative abilities and attempt to create belonging are attached to the more public realm, within the space. The public exhibition spaces act as a buffer zone between the more public realm and the creative spaces belonging to the child.

The spaces in which the child is given the opportunity to play and create are lowered from the exhibition spaces and removed from the more public realm. These spaces are celebrated with greater volumes and allow for the child to retreat and reflect in more intimate spaces, along the edges of the celebrated creation spaces.

A maturationist and cognitive teaching philosophy, allowing the child a degree of freedom to define the use of their spaces, drive the expression spaces.

Figure 7.12. Expressive Spaces Emtional Impact

plan

section

EXHIBITION

PUBLIC SHARED SPACE

CHILD PLAY SPACES

INTIMATE CHILD SPACES

SEMI-PUBLIC SHARED

MOST PUBLIC SPACES

INTIMATE CHILD SPACES

SEMI-PUBLIC SHARED SPACE

MOST PUBLIC

TRANSITION

TRANSITION

SHARED SEMI-PUBLIC

MOST INTIMATE CHILD SPACE

SHARED SEMI-PUBLIC

MOST INTIMATE CHILD SPACE

Solid, Void, Volume, Above, Below

plan

section

Approach and Access to Space

plan

STEP INTO PRIVATE

LARGE INTERACTION BALCONY

LARGE SCALE MEDIUM ISOLATED
INTERACTION SCALE PRIVATE
INTERACTION

PUBLIC
OUTDOOR PLAY/
PERFORMANCE

ONTO PRIVATE OUTDOOR
PLAY

OUTDOOR SPACE

STEP II

MEDIUM
INTERACTION

LARGE SCALE INTERACTION

ISOLATION LARGE SCALE MEDIUM ISOLATED
PRIVATE INTERACTION SCALE PRIVATE
SPACE INTERACTION SPACE

ONTO SEMI-PUBLIC
PLAY SPACE

ONTO PRIVATE PLAY SPACE

section

Interactive or Isolated Spaces

plan

section

Figure 7.13. Series of Investigative diagrams of Expressive Spaces

Solid, Void, Volume, Above, Below

Play-House_ Performance Spaces

Play-House

Stage- in and outdoor

play

responsibility

Music

strengthen

create

reflect

celebrate and learn
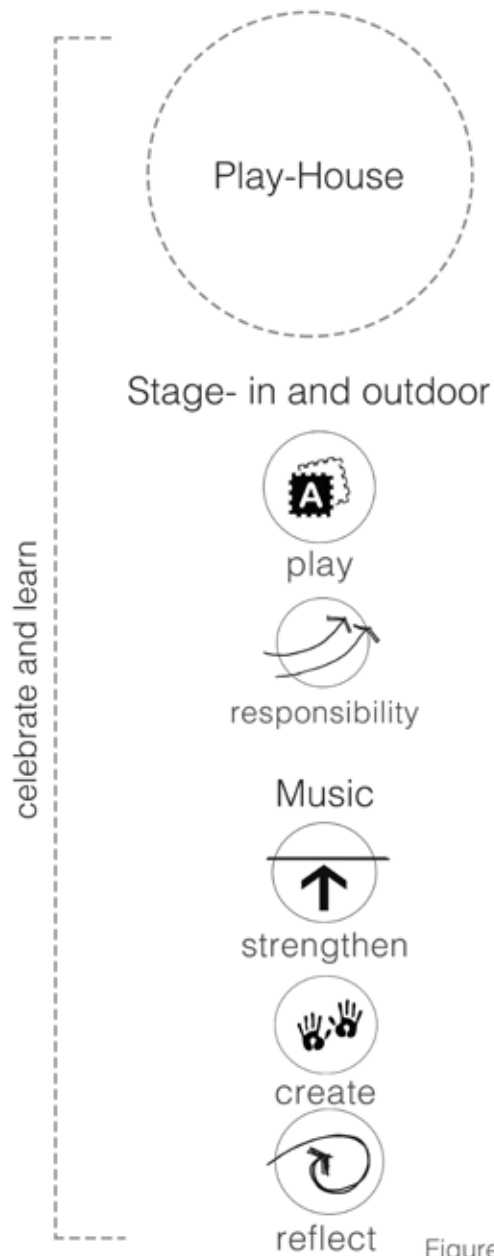
The spaces belonging to the Play-House, performance spaces, facilitate the creative reasoning and development of the child through rituals, such as public performance and the development of musical skills.
The resulting spaces are: a public stage and performance space and music classrooms and performance spaces.

The Play-House spaces are to create a sense of belonging within the community and are to celebrate the child. The spaces are to develop skills that allow the child to play and create on a more public stage.

This is achieved by stepping the performance space (the stage) into the public realm completely. Allowing the performance space to belong to both the child and the community.

The music classrooms are removed from the public realm and allowed to be more intimate, reducing the scale of each space and opening them up onto courtyards that belong only to the child.

A maturationist and cognitive teaching philosophy define the performance spaces.

Figure 7.14. Play-House Emotinal Impact

Stage

Music Spaces

plan

section

Figure 7.15. Series of investigative diagrams of Play- House spaces

Solid, Void, Volume, Above, Below

plan

section

Solid, Void, Volume, Above, Below

Stage

Music Spaces

plan

section

FILTERED ACCESS

ACCESS INTO MORE PRIVI

MOVEMENT FROM MOST
PUBLIC PLAY SPACE
INTO MORE PRIVATE
SPACE

MOVEMENT
FROM MORE PRIVATE
SPACES INTO MOST
PUBLIC

ACCESS FROM
PRIVATE PLAY
SPACE

MORE PRIVATE SPACE

ACCESS + APPROACHED
FROM PUBLIC
SPACE

TRANSITION

FILTER INTO PRIVATE

ACCESSED FROM PRIVATE PLAY
GARDEN

ACCESSED FROM
BOTH PUBLIC
+PRIVATE

Approach and Access to Space

plan

STEP INTO PRIVATE

LARGE INTERACTION MEDIUM
INTERACTION ISOLATED
PRIVATE SPACE
MEDIUM
INTERACTION
LARGE INTERACTION
STEP INTO
STORY
LARGE SCALE
INTERACTION

ONTO PRIVATE OUTDOOR SPACE

PERFORMANCE

STEP INTO PRIVATE

LARGE SCALE
INTERACTION
MEDIUM
SCALE
INTERACTION
ISOLATED
PRIVATE
SPACE

ONTO PUBLIC
PLAY SPACE

ONTO PRIVATE PLAY
SPACE

section

Interactive or Isolated Spaces

Community Kitchen and Garden

Community Kitchen

dining space

belong

responsibility

kitchen

strengthen

create

reflect

connect and learn
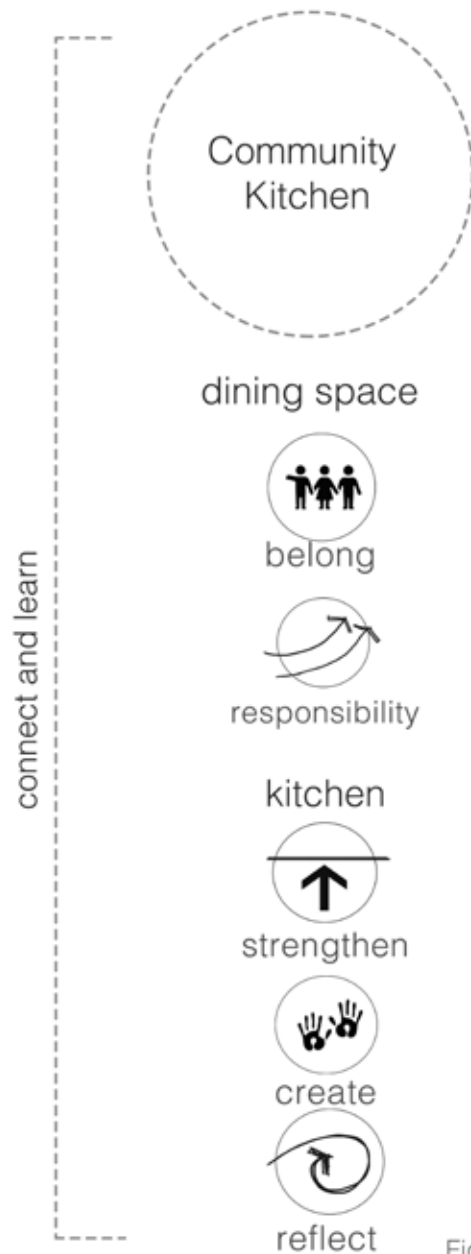
The spaces belonging to the community kitchen and garden facilitate the development and strengthening of the relationship between parent and child and the relationship between child and the environment. The rituals that these spaces facilitate are: family mealtime, preparing and sharing a meal, and the growth of the fresh produce used for these meals.

The resulting spaces are the dinning rooms that belong to the family unit, a community kitchen, within which the family a single unit or number of units can prepare a meal and a community vegetable garden.

The emotional impacts these spaces are to create are the child's sense of belonging to a specific network and unit and the child's ability to take responsibility within this unit.

Figure 7.17, illustrates how these emotional impacts can be achieved.

The spaces in which the meal is prepared are celebrated with the greatest volume. The dinning spaces are removed from the more communal kitchen and given a more intimate scale.

The community kitchen is placed in a central courtyard, celebrating the process of producing and the child and families responsibility to do so.

A behaviorist and cognitive teaching philosophy define the community kitchen.

The edge of the community kitchen that sits on the public street is given to the public and celebrates the responsibility of the child in the larger community, through the creation of a vegetable market strip. The strip facilitates the ritual of selling the excess produce grown in the community garden. The child does not sell the produce, but is given responsibility through being involved in the supplying process.

Figure 7. 16. Community Kitchen and Garden Emotional Impact

plan

MEDIUM SCALE INTERAC-TION   LARGE SCALE INTERACTION   MEDIUM SCALE INTERACTION

ONTO COMMUNITY GARDEN

ONTO COMMUNITY GARDEN

ONTO PRIVATE READING SPACE

section

Interactive or Isolated Spaces

plan

section

Approach and Access to Space
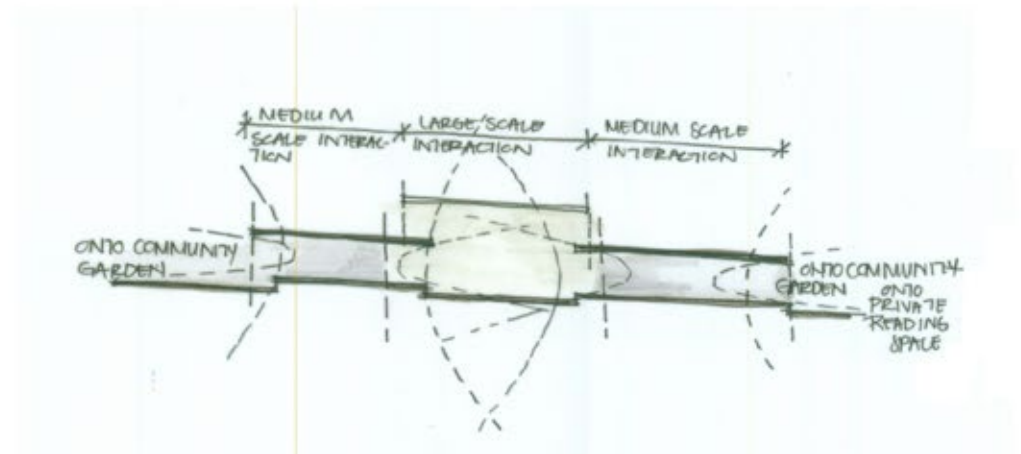
Community Kitchen

plan

section

© University of Pretoria

Solid, Void, Volume, Above, Below

plan

section
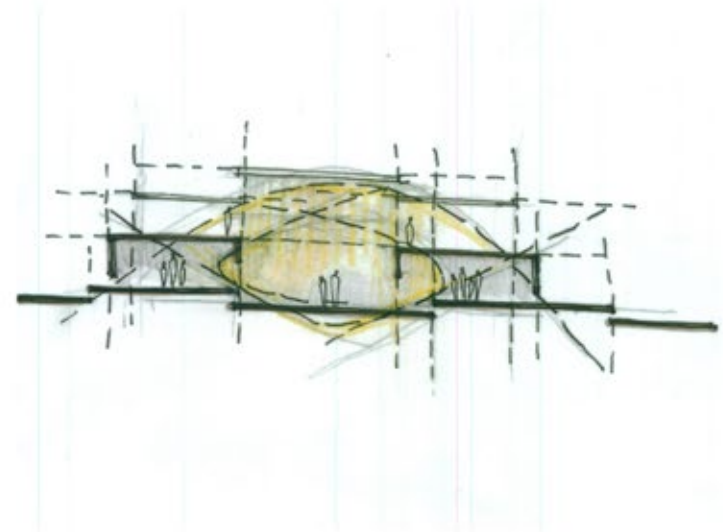
Figure 7. 17. Series of investigative diagrams of Community Kitchen

Solid, Void, Volume, Above, Below

04_Design Development

Courtyard Concept

The architecture of this investigation, according to the concept developed, is to be created with an understanding of the rituals of daily life, the spaces they require and then the architecture the spaces determine.

The rituals developed, in order to create the opportunity for the children of Mabopane to be resilient, are rituals enabling the development the of the child's emotional intelligence. The over arching rituals are ones of connection, celebration and learning.

These over arching rituals, are celebrated in the different programmed spaces; connection in the community kitchen, celebration in the performance spaces and expression spaces and learning in the library and homework spaces.

Within each programmed space, the space in which the child is able to connect and build relationships and sharing energies and resources is celebrated and becomes the most significant space.

iThese connection spaces are celebrated in the form of courtyards.

The court and the rituals it facilitates are a reflection of the rituals and spaces that define the architecture.

Each courtyard reflects the same overarching ritual as the spaces that surround it, connection in the community garden, celebration in the art courtyard and learning in the reading courtyard.

The each ritual, the different courtyard spaces facilitate, determines the relationships that develop within these courtyards. The community garden facilitates the relationship between parent and child, as they care for the garden together, and the relationship between child and it environment as the child takes responsibility within it. The expression courtyard facilitates the relationship between children on a creative and experimental level and the reading courtyards develops the cognitive relationship between children and

child and parent.

Figure 7.18, reflects the feeling and rituals to be celebrated within each courtyard.

Entrance

Community Garden
-COGNITIVE

Expression Courtyards
-SPONTANEOUS

Reading Courtyards
-COGNITIVE

Children's Vegetable Garden
-BEHAVIORIST

Free-Play Courtyards
-SPONTANEOUS

Community Performance Square
-SPONTANEOUS

Retreat Courtyards
-COGNITIVE

Figure 7.18. Courtyard Concept

COURTYARD CONCEPT

Iteration One_ April-May 2014

The initial iteration, for the development of the Play-Centre and Community Kitchen, attempts to create courtyards that reflect internal spaces and create opportunity for connection. Concentrating on where the courtyard is to draw the user in and away from the public or step the user up and put them on display within the fabric.

The reading and community garden courtyards, intended to draw the user away from the public, allowing them to retreat into the courtyard, learning in removed setting and create specific connections away from the public.

The intentions for the expression and performance courtyards were to display and celebrate the child and the relationships they form and skills they develop. Pushing the courtyards into the public realm and opening the space to public use.

Criticism:

- Building sits awkwardly on the site. Nope of the courtyards or buildings line up with existing fabric or one another.
- Movement through and around the spaces is problematic. It has no hierarchy of movement or separation of public and private movement.
- Lack of hierarchy of building and courtyards.
- No separation of space that belongs to the child and space that belongs to the public; this raises issues such as the child's security when using the facility and control of public access and who uses the spaces.
- Teaching philosophy in the creation of the different courtyards and spaces on site disregarded.
- Awkward scale of new building to the child and existing fabric of Mabopane.

Figure 7.20. Community Kitchen and Fire Station

Figure 7.21. View into Performance Space

Figure 7.22. View North onto Site

FIRE STATION
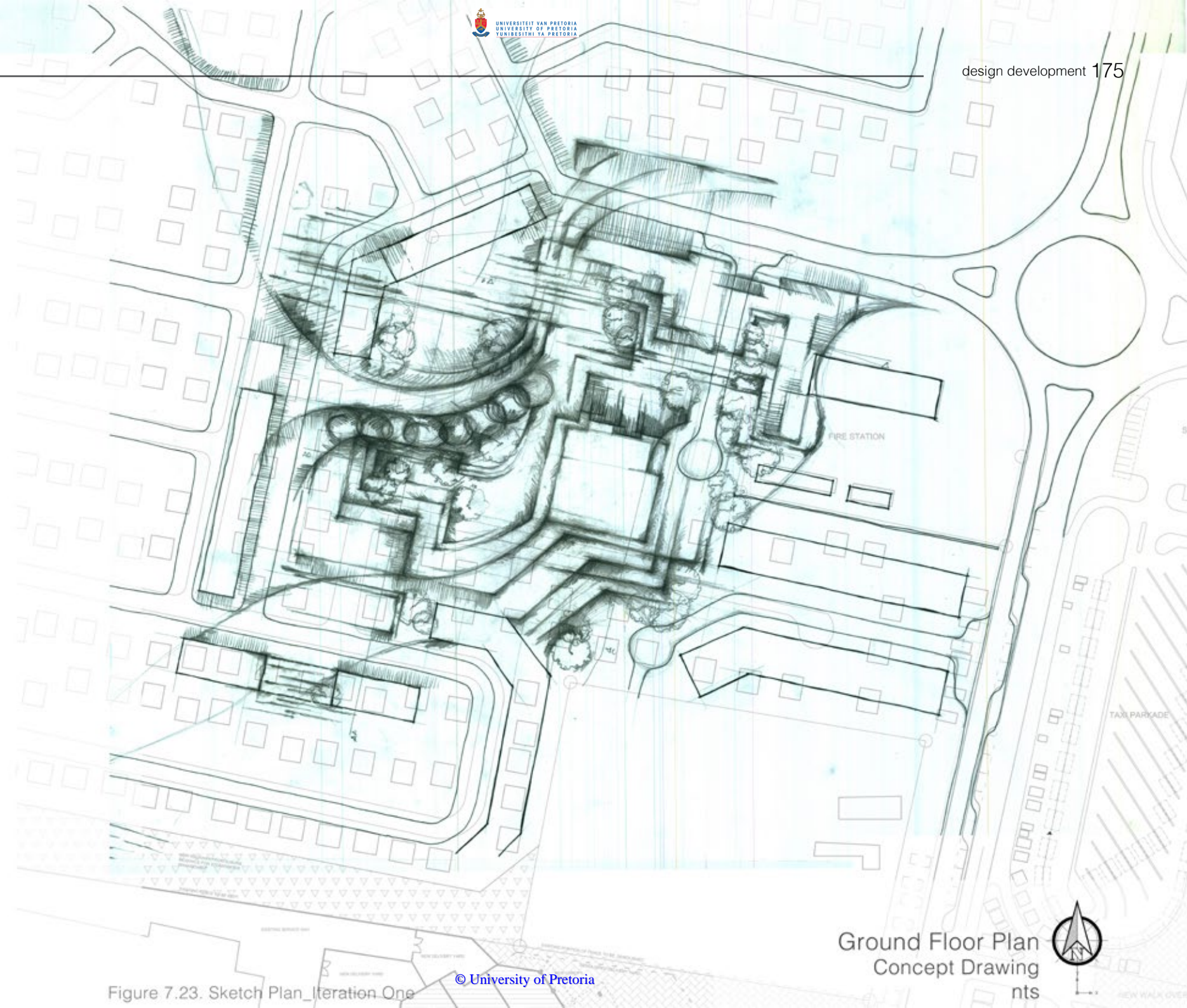
Ground Floor Plan
Concept Drawing
nts

Figure 7.23. Sketch Plan_Iteration One

Iteration Two_ June-July 2014

Iteration two attempted to address the problems identified in the initial design.

In order to understand an appropriate response to the identified issues a number of precedents were examined. The precedent studies are explained in chapter 6.

Figure 7. 24, illustrates an initial placement of mass onto the site. The initial iteration was to line up buildings with one another, surrounding urban fabric and a single movement and access route.

In order to create a secure environment a single point of access was designed, with a single movement route leading the user from one courtyard to the next, as see in the work of NoeroWolff Architects at Usasazo Secondary School and the Delft Daycare centres.

Establishing a single main point of entry into the Play-Centre allowed for the boundary between public and private spaces to be established, with public courtyard spaces, facing outward toward the public movement on the sites boundaries.

The public and private functions, within the programme, where placed along the public and private axis, established previously in the zoning. Private ad semi-private functions sit on the southwest to northeast axis and the more public functions on the southeast to northwest axis. The establishment of the public and private axis allowed for the differentiation of what belongs to the community and what belongs to the child.

Criticism:

- A lack of hierarchy of courtyard spaces and the building attached.
- The building fabric is uniform through and is not specific to the rituals and spatial requirements of individual space. The designed fabric does not reflect the intentions of the concept, of specific architecture create and determined by specific spatial and ritual requirements. The designed fabric does not reflect the spatial requirement or the rituals that determine it.
- The designed fabric is rigid, not allowing the children to have control of their own environments.
- The surrounding urban fabric, such as the drop of zone, is inappropriate for children focused civic space.
- The rituals and produce of the community garden are left unprotected and exposed.
- The double story structures are unnecessary and create issues like access of all users.
- Lack of understanding of requirements for children spaces.
- Determine spaces that belong to different age-group children.
- The public edge created by the performance space and the wetland garden awkward.
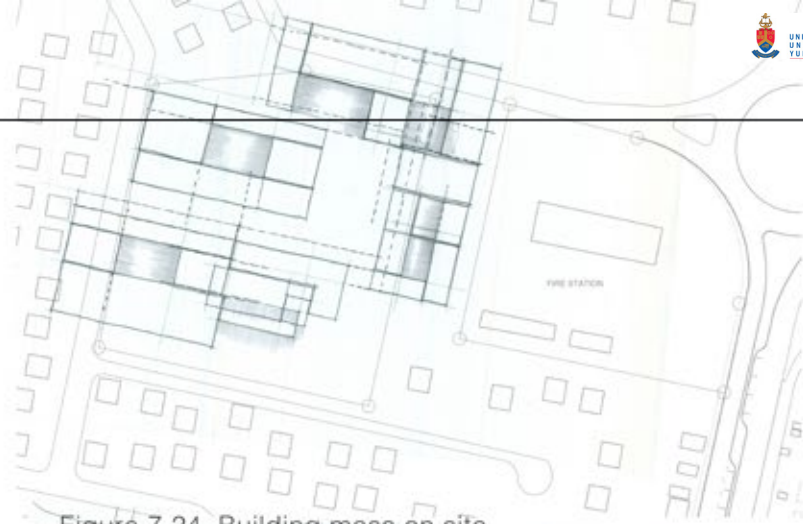
Figure 7.24. Building mass on site

Figure 7.24. Zoning
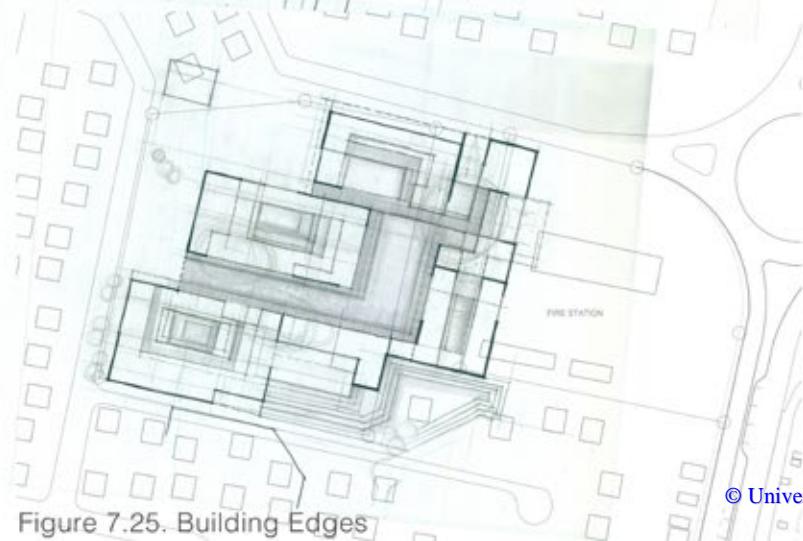
Figure 7.25. Building Edges

Upstairs
studio

Kitchen and
Dining

Gallery and
Classroom

Parent
Library

First Floor Plan
June-July
nts
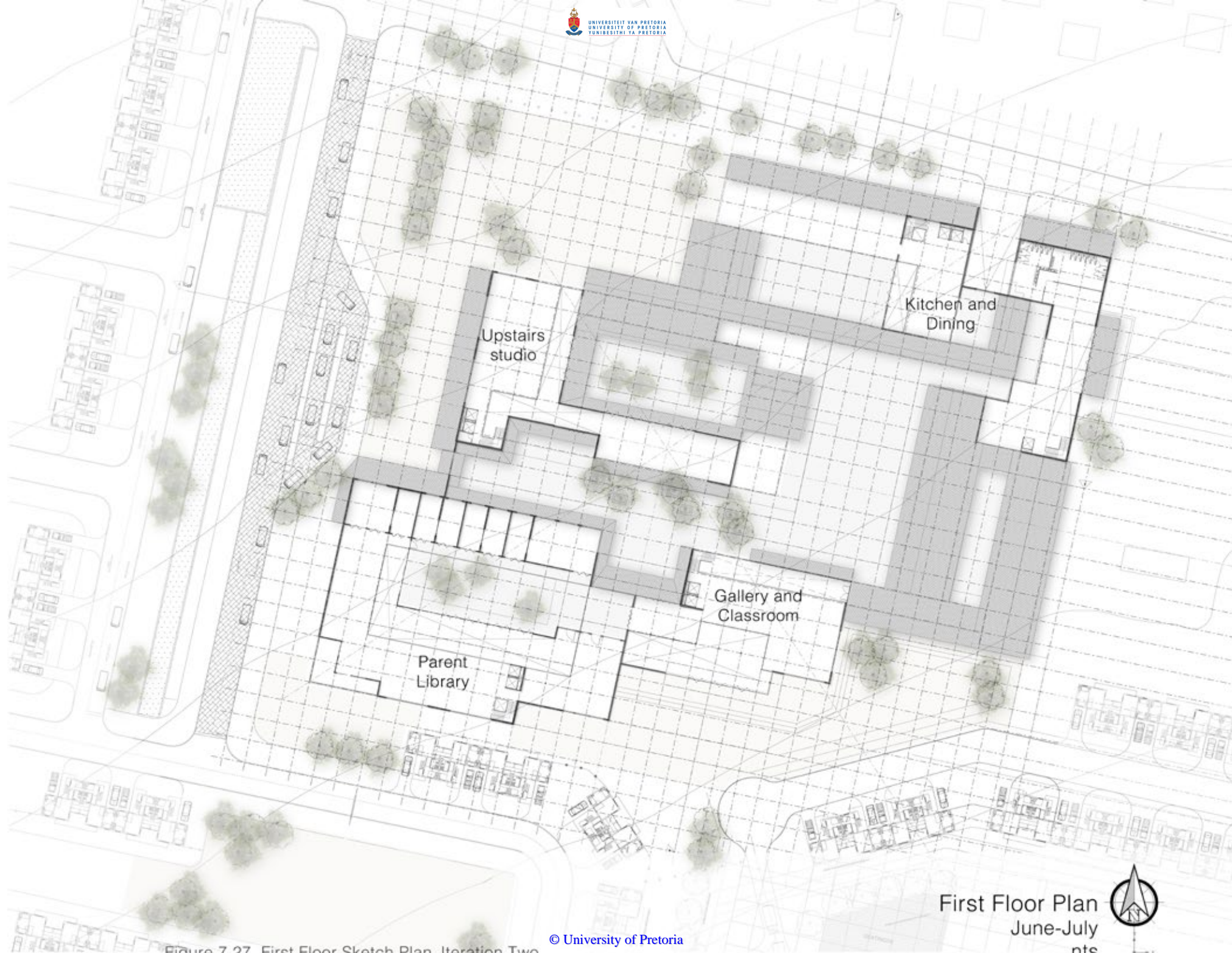
Figure 7.27. First Floor Sketch Plan_Iteration Two

Iteration Two_ June-July 2014

Community garden

Kitchen and garden

Studios

Exhibition

Free-play courtyard

Music classrooms

Library and classroom

Performance

Ground Floor Plan

June-July
nts

Figure 7.26. Ground Floor Sketch Plan_Iteration Two

Section Development : Iteration Two

The performance space and community kitchen section developed as an attempt to translate the results of the emotional impact and spatial investigation.

The performance stage is stepped out into the public realm. The stage space becomes part of the public collection point between the adjacent sites. The performance space is celebrated by allowing the space to have the greatest volume.

The community kitchen creates the intimate spaces in which the family shares a meal by, stepping the dinning spaces up off and away from the courtyard.

The building edge located on the public street, is given back to the public, in the form of the market strip. Stepping the market space down from the dinning spaces and reducing the volume of the spaces, where the public interact with the building, reduce the scale on the street edge.

Criticism:

- The scale of the building edges between courtyard and interior spaces is inconsistent and inappropriate for spaces that belong to child. The building edges do not step down into the children's spaces, but rather tower over them. Instead of celebrating the child the transition between courtyard and building rather celebrates the importance the structure and neglects the importance of the child.

Figure 7. 28. North-South Section through Performance and Community Kitchen
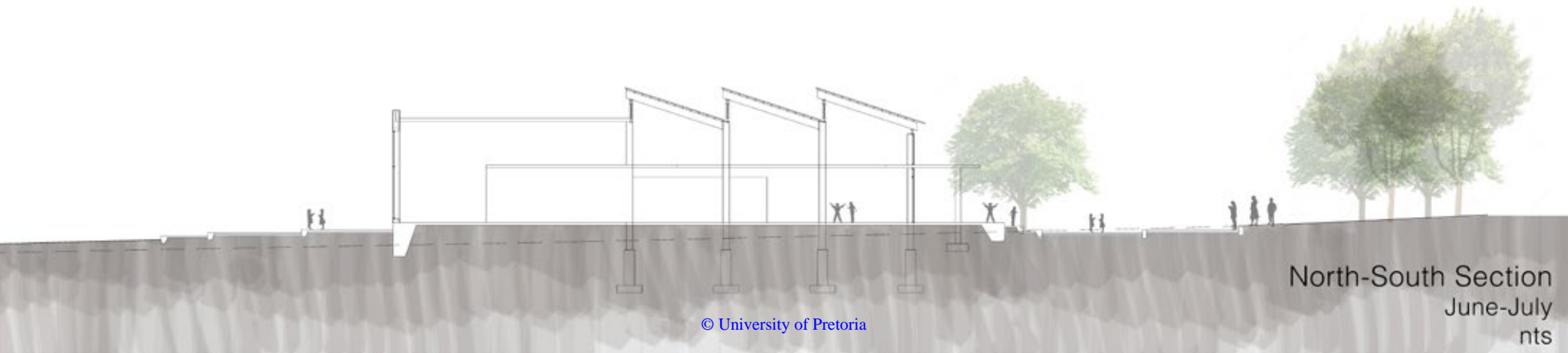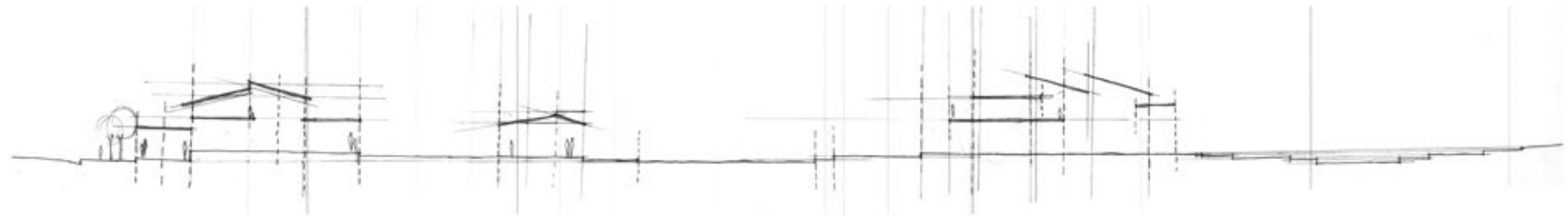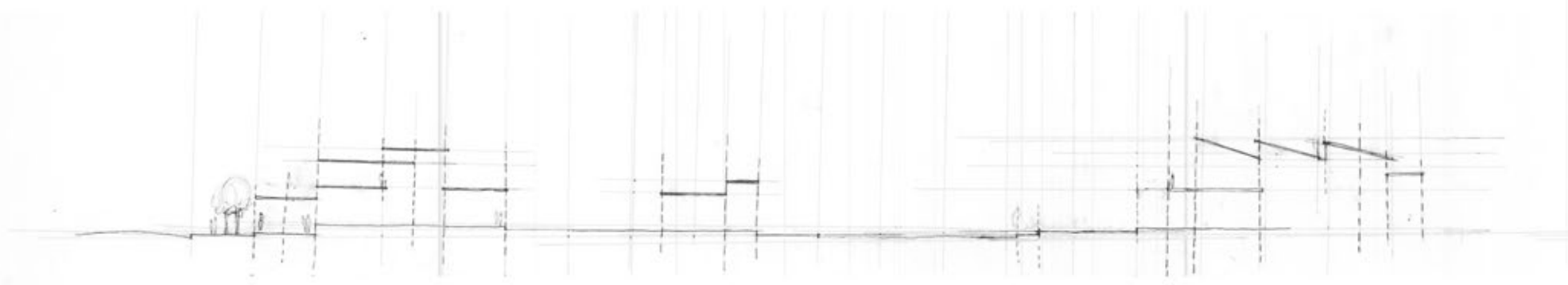
North-South Section
June-July
nts

The section through the music spaces and expression spaces also developed as an attempt to apply the results of the emotional impact and spatial investigation.

The music classrooms are removed from the public space attached to the performance spaces, and allowed to open up onto private, more intimate courtyard spaces. The scale of the classrooms is reduced, creating more intimate performance spaces.

The studio spaces that form part of the expression spaces are celebrated through the use of the greatest volume in the space. The studio spaces are directly attached to the courtyard, allowing these

spaces to become the interactive and connective spaces. The scale of the studio is reduced as the building moves towards the street and public entrance. The reduction of scale defines art spaces that facilitate the child's retreat away from the more interactive space, into a space where they are able to reflect and create in isolation.

Criticism:

- The building edge belonging to the street and the public entrance into the Play-Centre, is to hard and rigid. The public is forced away from the edge and not accommodated within the entrance square that develops.

- The scale of the various spaces displays a lack of understanding of the specific spatial requirements of classroom and teaching spaces.

Figure 7. 29. East-West Section through Music and Expression Spaces
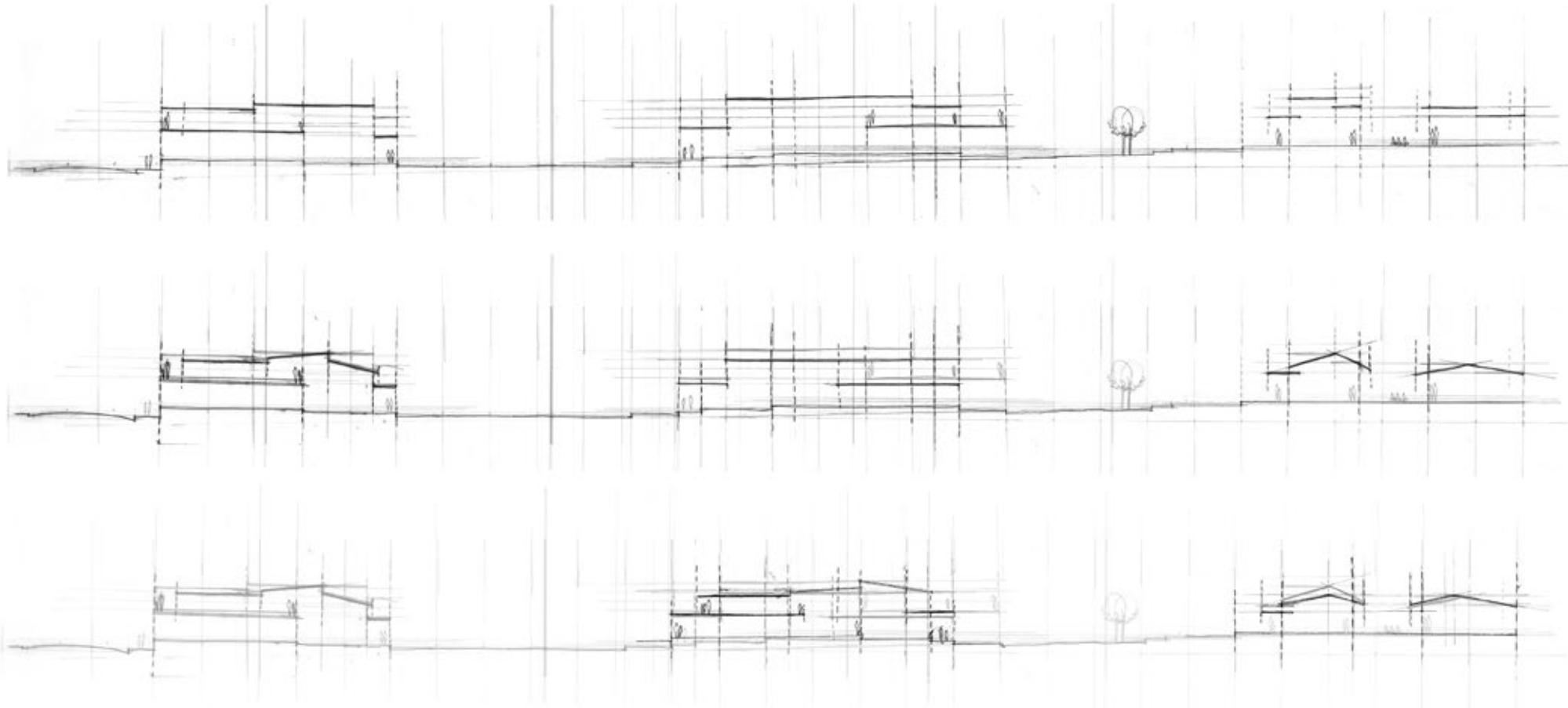
East-West Section
June-July
nts

Iteration Three: August 2014

In order to create a hierarchy of courtyards within the Play-Centre the connection to the outside and inner courtyards was strengthened. A drawing element (a specific paving pattern) from the main entrance, along the main walkway and into the main free-play courtyard was designed. Figure 7.30, illustrates the drawing movement from the urban square to the main free-play courtyard within the play-centre.

The hierarchy of the courtyards was further investigated by creating a rhythm and uniformity of the courtyards. The courtyards used within specific spatial functions, with a corresponding spatial function, are designed to have the same spatial dimensions and proportions according to the outdoor spatial requirements of a child. The more important courtyard is larger in scale and located directly on the movement route.

The hard and soft boundsaries of the spatial requirements where reconsidered. Adding harder external boundaries where child and ritual is to be protected and allowing for deeper boundary on edges where the community is to interact with the rituals and spaces created by the Play-Centre.

The wetland garden has the potential to be a form of education energy the child can draw off and use to build their resilience. The wetland is therefore pushed into the into retreat spaces courtyard from the public stage space attached to the performance and music spaces, in order for the child to start having access to the potential energies inherent in the wetland.
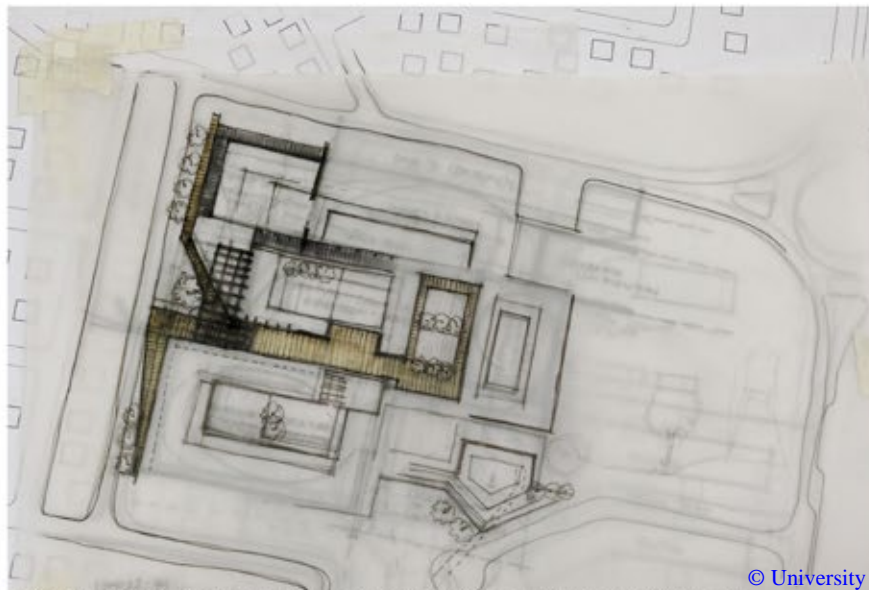
Figure 7.30. Movement from street into courtyard diagram
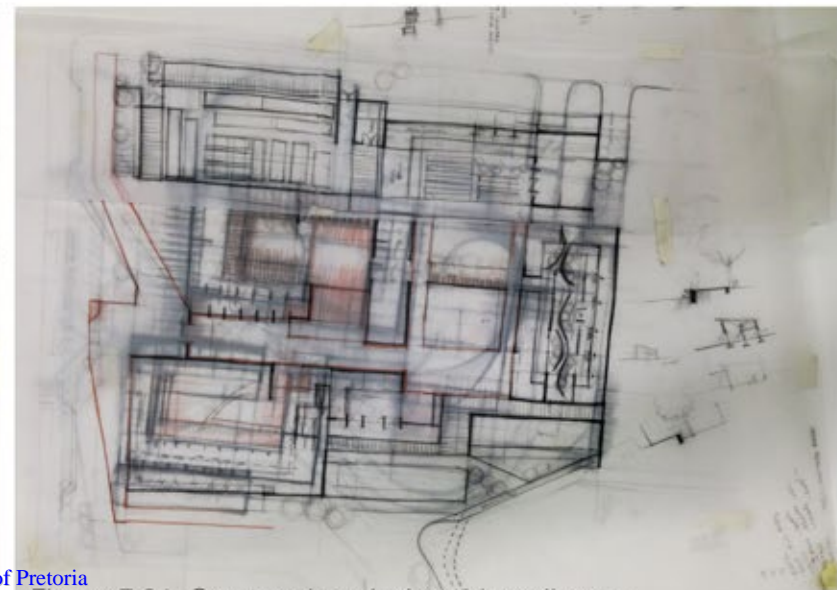
Figure 7.31. Courtyard as design driver diagram
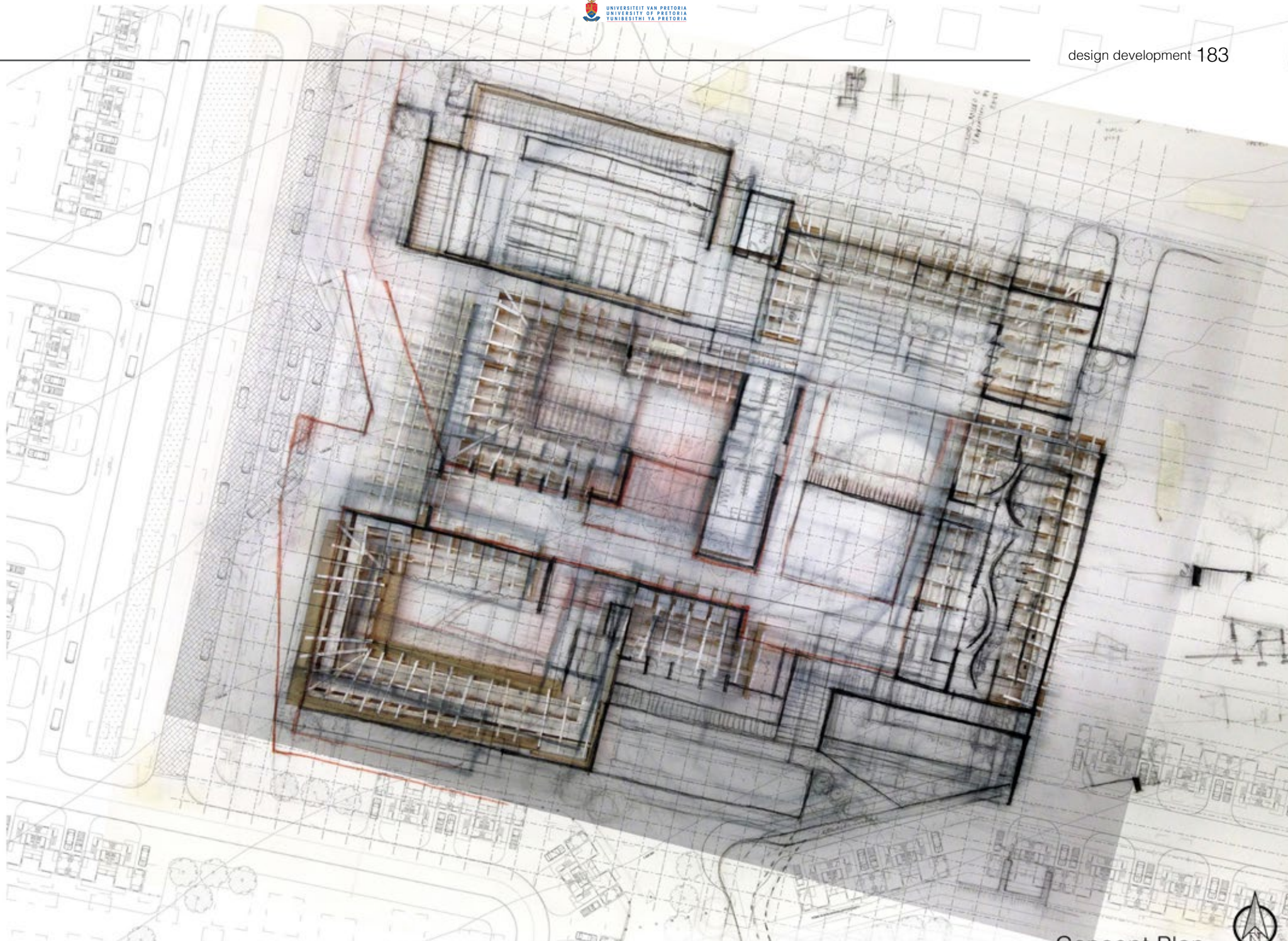
Figure 7.32. Model and courtyard concept drawing

Concept Plan
nts
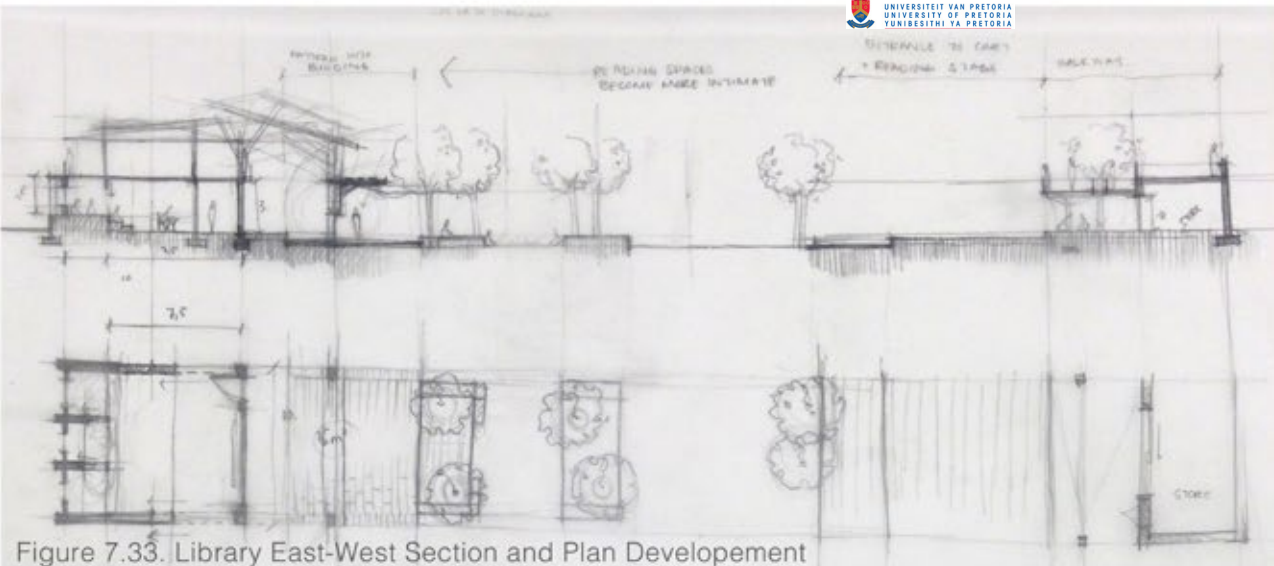
Figure 7.33. Library East-West Section and Plan Developement
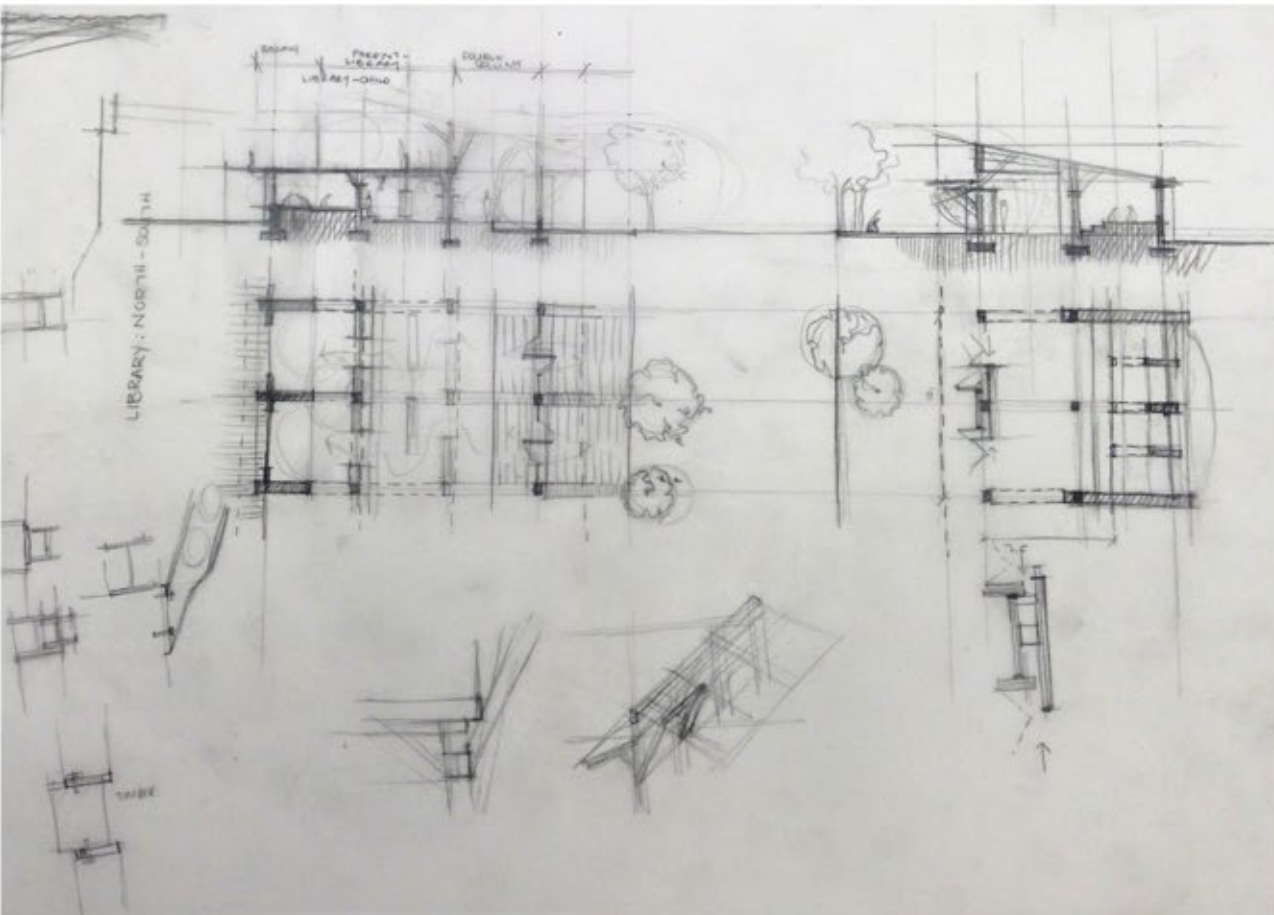
Figure 7.34. Library North-South Section and Plan Developement
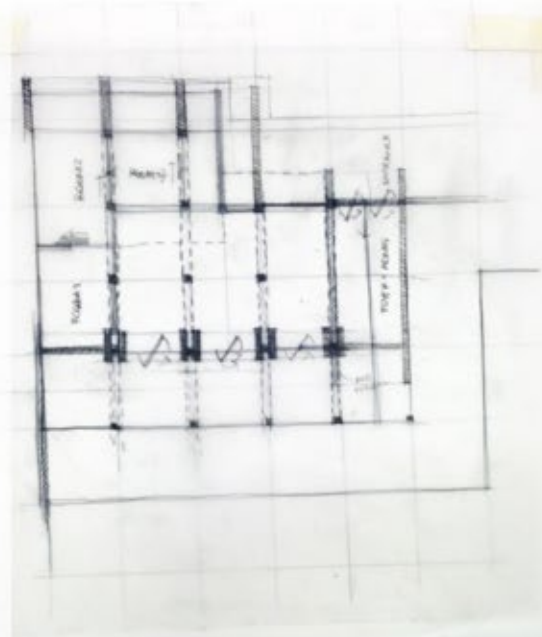
Figure 7.35. Performance Space North-South Sect
and Plan Developement

Library_ East-West section

Library_ North-South section

Performance space_ North-South section
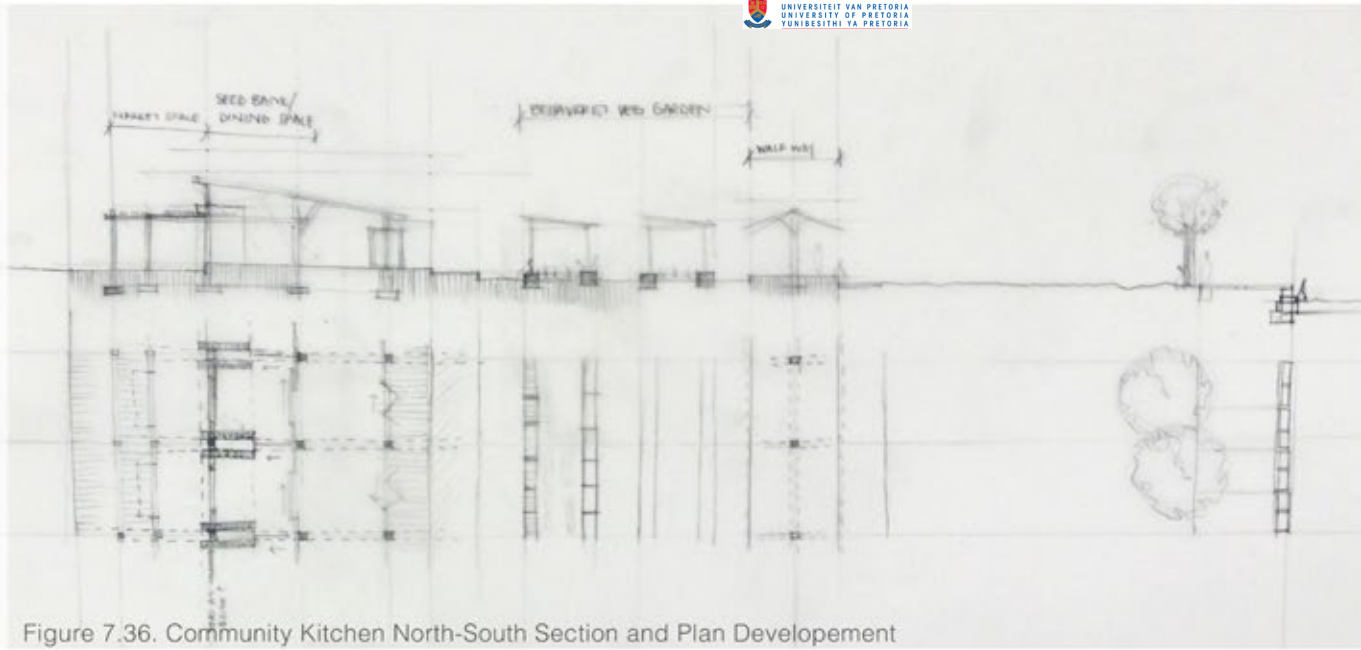
Figure 7.36. Community Kitchen North-South Section and Plan Developement

Community Kitchen_ North-South section
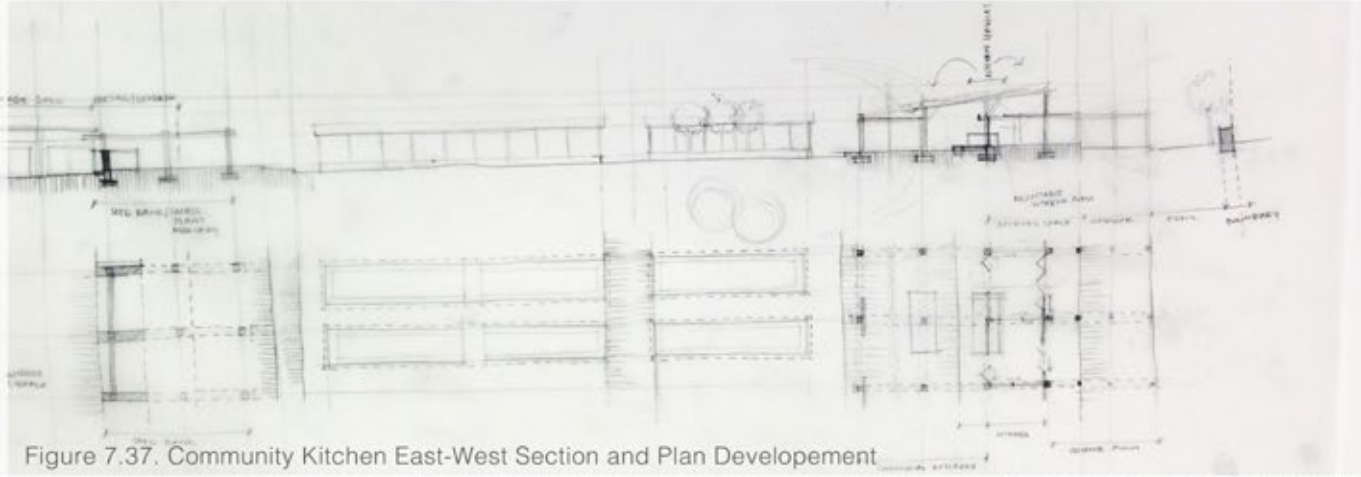
Figure 7.37. Community Kitchen East-West Section and Plan Developement

Community Kitchen_ East-West Section

Figure 7.38. Expression Space North-South Section and Plan Developement

Expression Spaces_ North-South Section
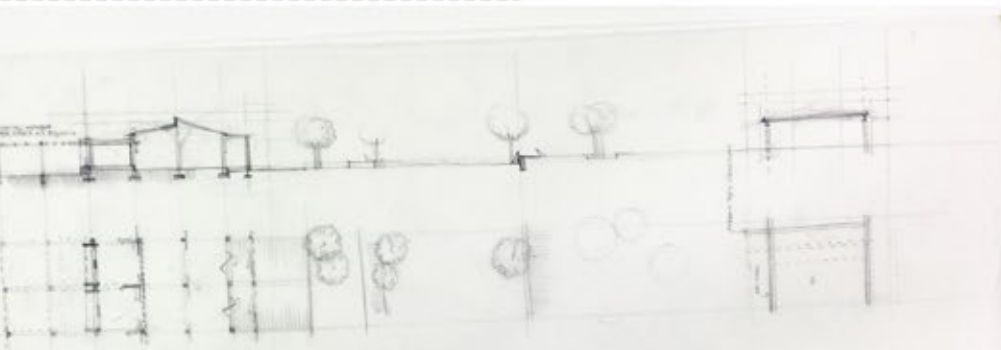
Figure 7.39. Expression Spaces East-West Section and Plan Developement

Expression Spaces_ East-West section

The built fabric of each spatial function and requirement was varied according the function of each space.

Deep walls and boundaries are designed for spaces such as the art studios and exhibition space, in order for the walls to become seats, both on the inside and outside edges of the spaces.

Hard inaccessible boundaries were added to protect the community garden and separate the ritual from the public movement and market rituals on the northern most boundary of the site. Hard boundaries are also designed for the edge of the library spaces, in order to create private and quieter spaces in which the child can read and reflect.

The most northern boundary, along the road, is deepened, with part of it given to the public in the form of market stalls. The market stall acts as a divide between the public movement and rituals on the street

and the semi-private rituals housed within the community kitchen fabric.

In order to celebrate the entrance of the Play-Centre the boundary leading into the entrance space, is deepened and given to the public in the form of an urban square, underneath a timber pergola structure.

The function along side the fire station is altered to become a retreat space, in which younger children are cared for and are allowed to rest. This boundary is inaccessible to the public but creates the opportunity for the child to visually learn from the civic energies inherent in the fire station.

The wetland in pushed further into the retreat space's courtyard allowing the child to interact more with the wetland and the energies inherent in it.

Criticism:

- The courtyards remain under designed and are missing a layer of development.
- The structural system initially cluttered the spaces and makes the internal spaces difficult to use.
- The transition between the external fabric of the courtyard and the internal fabric of each space is weak and abrupt. A level of sensitivity is to be applied to the transition between inside and outside.

Ground Floor Plan_ Iteration 3

August
nts
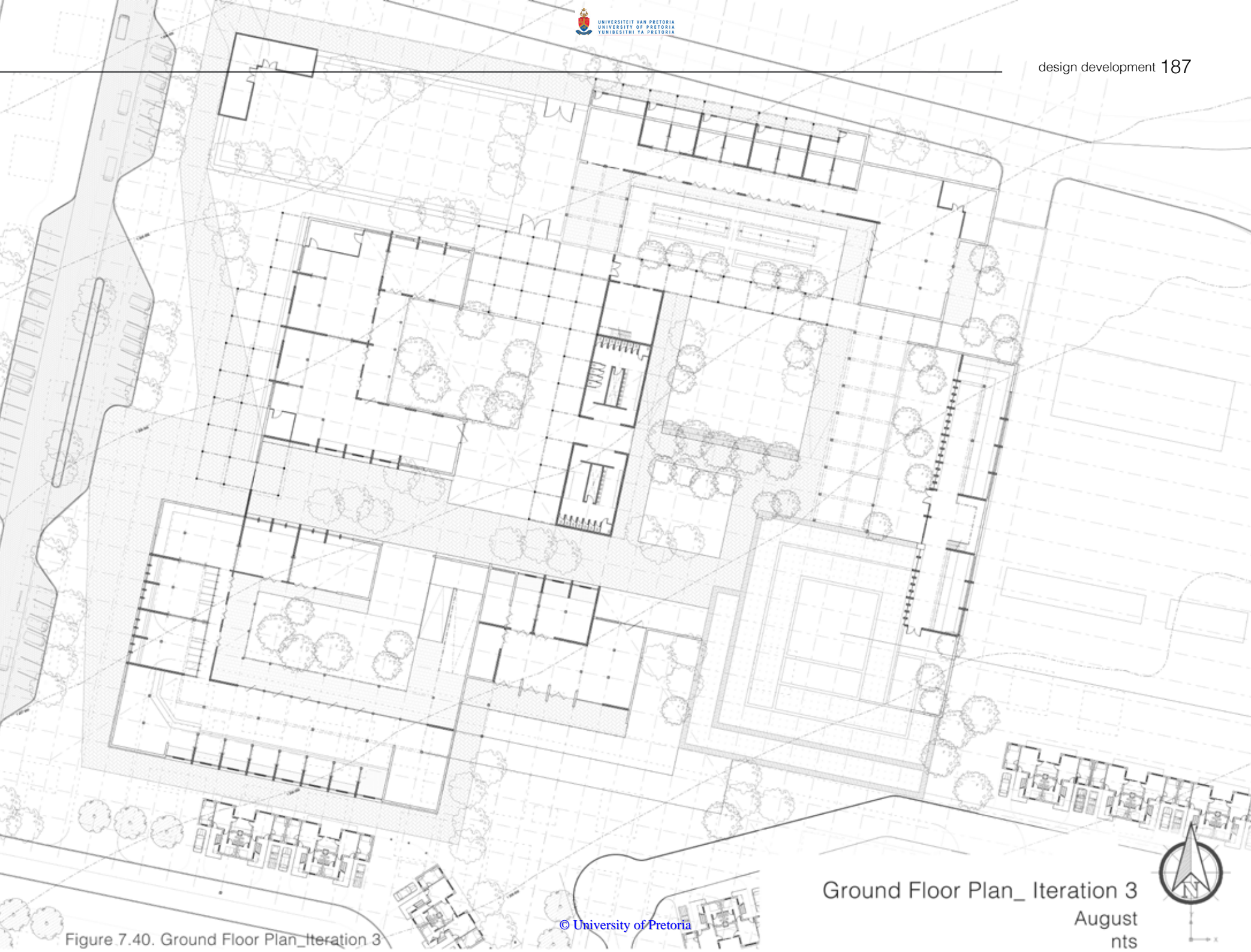
Figure 7.40. Ground Floor Plan_Iteration 3

detail 2

detail 1
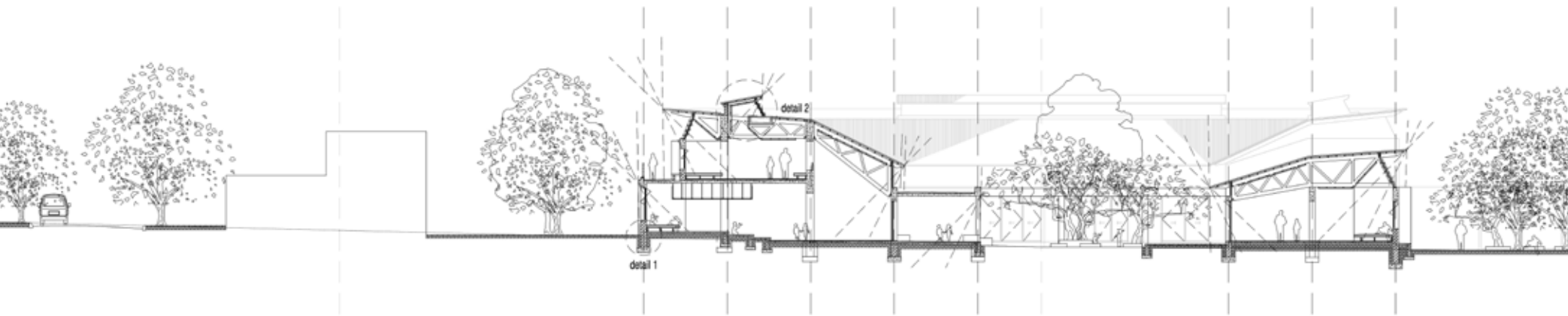
Figure 7.41.North-South Section Illustrating series of Courtyards

In order to create the appropriate scale on the edges between the courtyard space and the internal spaces, the roof edges are stepped down into the courtyards. As the user moves into the physically designed spaces, the internal scale becomes larger, celebrating internal spaces that facilitate connection of the child with other children or with their parents.

The roof structure is used to create the more celebrated and more intimate spaces within the Play-Centre.

The roof structure steps down into spaces in order to lower the internal scale of more intimate spaces. The floor level of the reflection and retreat spaces are also stepped up in order to reduce scale of these spaces.

Criticism:

- The roof's trusses are too deep and far apart to create influence the spatial qualities of the individual spaces.
- The hierarchy of spaces remains unclear and similar throughout section and the scale of the individual spaces making the section is too similar throughout section.
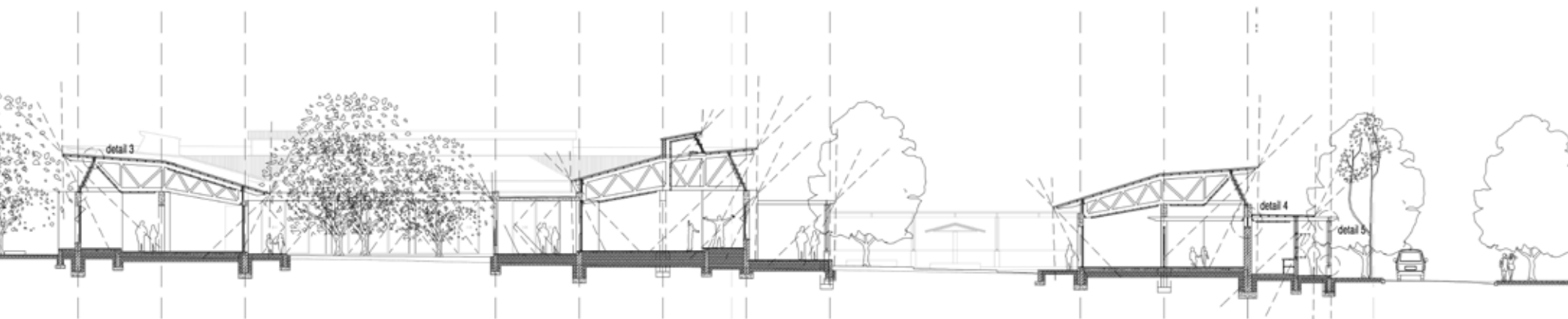
North-South Section_ Iteration 3

August nts

05_Final Design
Final Plans

GROUND FLOOR PLAN
SCALE 1:250

Service Stairs

Solar water heaters and solar pumps

Performance space

Parent Library and Reading Rooms

FIRST FLOOR PLAN
SCALE 1:500

Housing Development   Public Walkway   Library and Reading Rooms   Reading Courtyards   Homework Classrooms   Entrance and Private Walkway

Exhibition Space   Espresso Courtyard   Studio Spaces   Children's Vegetable Garden   Family Dining Spaces   Market Street Edge

North-South Section
nts

Figure 7.42. Performance_ Outdoor Stage
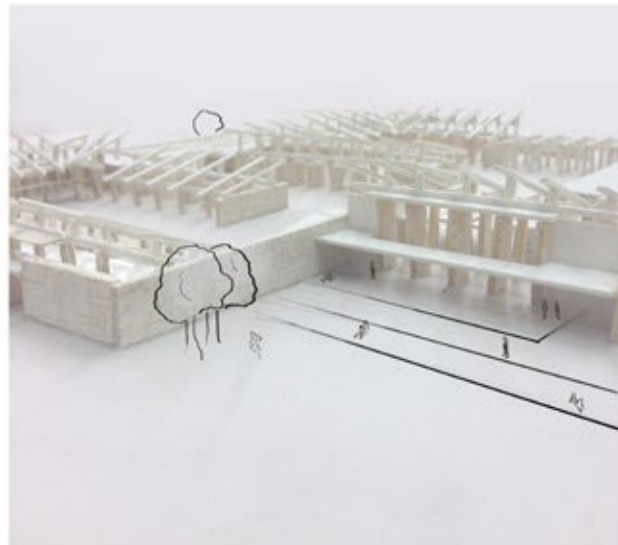
Figure 7.43. Performance_ Outdoor Stage

Figure 7.44. Expression Courtyard

The design development up to this point has been based on the creation of courtyards and the development of spaces around them. Allowing the courtyards to facilitate the development of relationships and sharing of resources.

The design up until this point is still lacking in terms of the definition of hierarchy of spaces and the transition between courtyard and interior space on the level of the plan.

The emotional impact a space has on a child and architecture's ability to develop a child's emotional intelligences and resilience is further investigated in the technical investigation. Considering how the technical and physical fabric of the designed spaces influences and strengthens the haptic qualities of the spaces.

Figure 7.45. Reading Courtyard

Figure 7.46. Entrance Pergola
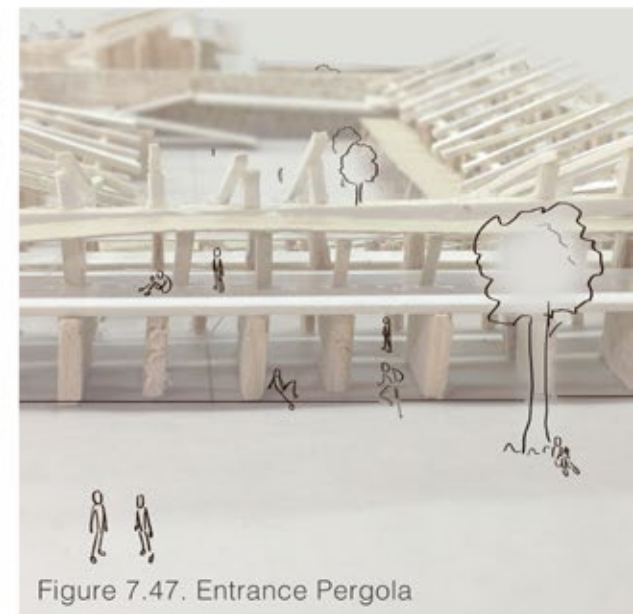
Figure 7.47. Entrance Pergola

08_ Technical Development

01_ Concept
02_ Analysis
03_ Material Palette
04_ Structural System
05_ Plan, Section and Detail
06_ Resilient Systems
         -SBAT Rating
         -Water
         -Lighting
         -Solar Heat Gain and Shading

01_Concept

Building, Space, Life_ In reverse order.

The conceptual approach to the design development of the Children's Play-Centre within Mabopane is to understand the life or rituals that define the survival of the children of Mabopane. With the understanding of these rituals, the spaces needed to enable the potential resilience of the child could be determined. This spatial need determined the appropriate architecture could be designed to create resilience(Gehl, J. 2010).

The design development of the children's Play-Centre is the investigation of the creation of appropriate spaces that create resilience within the children's survival network through, the design of an appropriate architecture. The technical development is the creation of the physical fabric that creates the spaces that serve the resilience of the child.

The technical concept for the development of the architecture is therefore, Architecture, Space, Building- in reverse order.

How the architecture is physically made, brick on brick, influences how the required spaces are defined and created. The created spaces define and influence the daily life and rituals of the user of each space (Gehl, J.2010).

If daily life and ritual is to influence space and space influence architecture, then the reverse should be true; architecture, created with an understanding of the required spaces for resilience, defines space and space created with an understanding of the daily life of a user facilitates and strengthens these rituals of survival.

Figures 8.1 to 8.3 are a series of diagrams that illustrate the technical concept developed for the purpose of this dissertation.

Building:

The intention of the physical fabric of the Play-Centre and Community Kitchen is to define and create spaces that belong to and serve the resilience of the child. This is achieved by creating spaces that protect the children of Mabopane. The physical fabric is to create spaces that belong to the child and facilitate the development of specific relationships.

Space:

The design intentions for the creation of spaces within the Play-Centre and Community Kitchen is for each space to aid in the development of the child's emotional intelligence in order to develop the child's ability to be resilient.

The physical fabric creating these emotional spaces influences the emotional impact of each space. The haptic experience of each space is influence by the texture, smell, colour and audio ambiance the physical fabric of the space creates.

The intention for the physical fabric for the creation of each emotional space is to use the sensory experience of each material and system to enhance the haptic experience of each space. Creating emotional spaces by using heavy, tactile materials at the child's interaction level in order to create the protective and emotional spaces.

Life:

The rituals facilitated in the development of the Play-Centre and Community Kitchen are rituals of creating and strengthening relationships and providing tasks for the wondering child within the community.

The intention for the physical fabric, in the facilitation of rituals within the Play-Centre, is to use the physical fabric to create dimensions and proportions within each space that are specific to the rituals the space facilitates.

architecture

Making a play-centre and community kitchen.
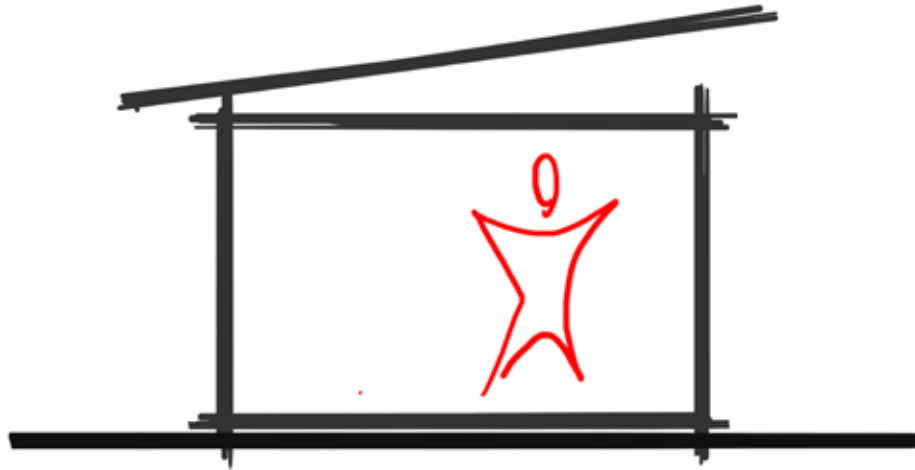
protect_ enclose and separate

Figure 8.1. Technical Concept- Architecture: Protect

space

Emotional Space

t o u c h_ heavy and tactile
at child's interaction level
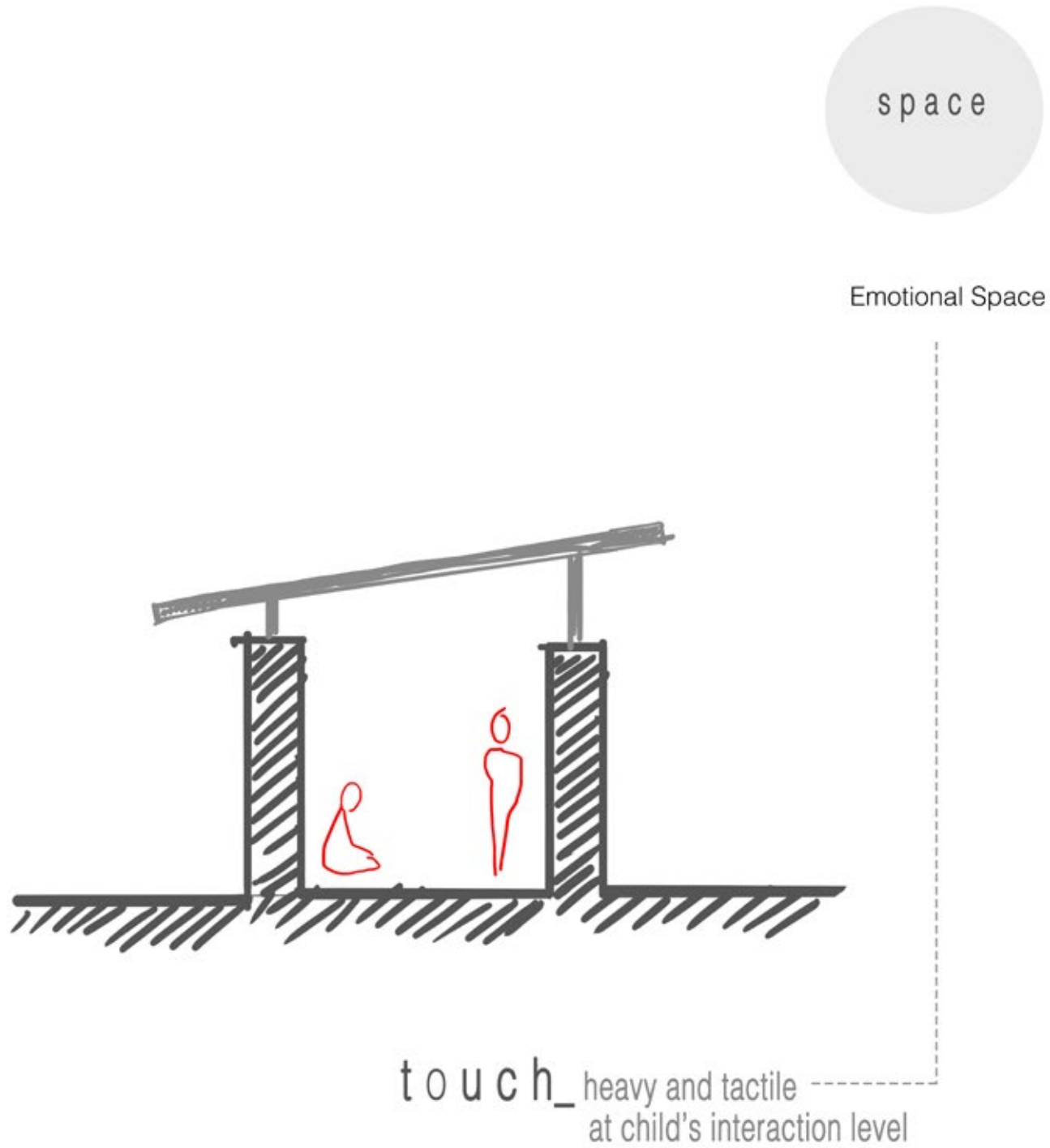
Figure 8.2. Technical Concept- Space: Touch

The wondering child and
disconnected family.
No resilient family.

l i f e
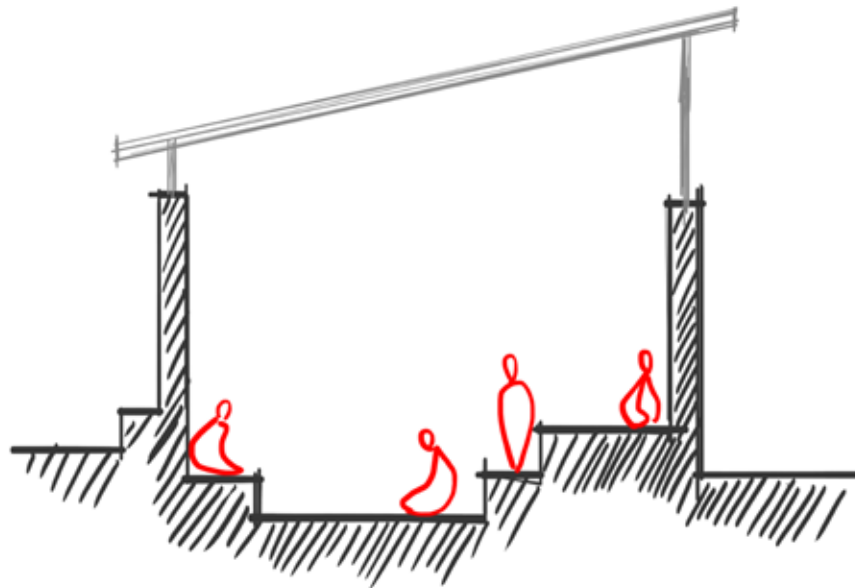
e s c a p e_ heights and proportions
belong to child

Figure 8.3. Technical Concept- Ritual: Escape

02_Site Analysis

The following site information, aids in understanding how to create appropriate environmental and construction systems for the design.

The site is located in the central sandy bushveld biome and is characterised by granite soil and geological conditions. The soil condition impacts the structural system the building will require.

The over heated and under heated periods will influence how the cooling and heating of the spaces is handled.

The sun angles and building orientation will impact the shading devices implemented on the design and the ventilation through the building.

The wind direction and orientation of the design will impact the natural ventilation of the spaces and where openable windows are placed and how they are sized.

The natural rainfall levels impact the collection and storage of rainwater, in order to sustain the building's water demands through the year.

Average Wind Directions

Summer

Autumn

Winter

Spring
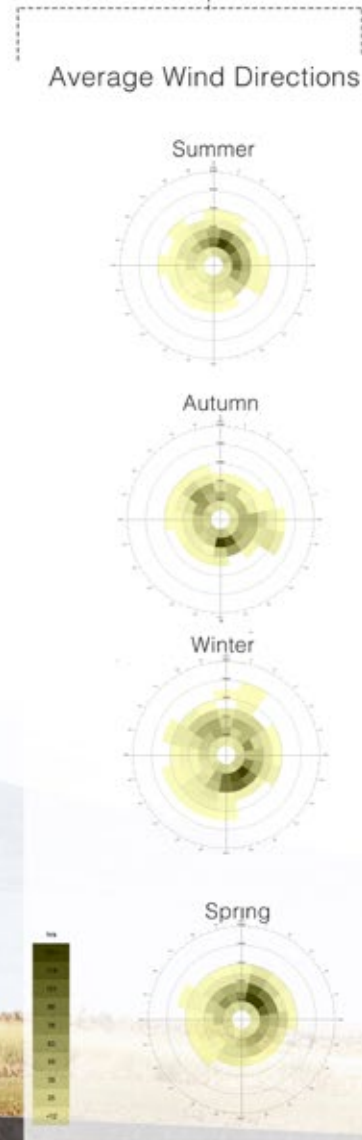
Figure 8.4. Window roses (Ecotect)

Over and Under heated period:
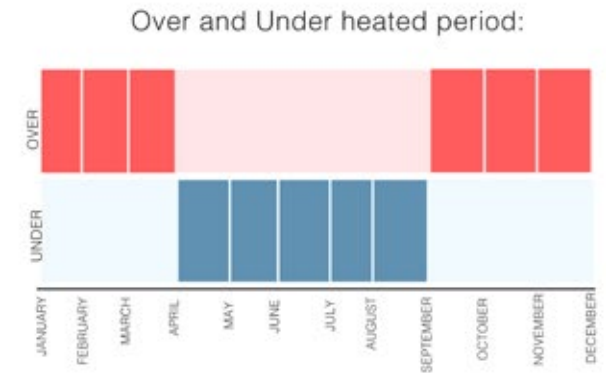
Figure 8.5 Over and under heated periods
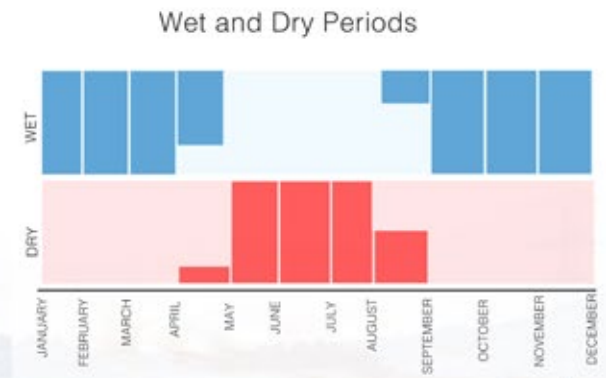
Wet and Dry Periods

Figure 8.7 Wet and dry periods

Biome: Central Sandy Bushveld
Soil and Geology: Granite soil type

Vegetation: Combretum Woodlands-Acacia and Euclea
Taller trees:Terminalia Sericea and Burkea Africana

Summer Winds-SE

NORTH

Average Maxium and Minimum Temperature:
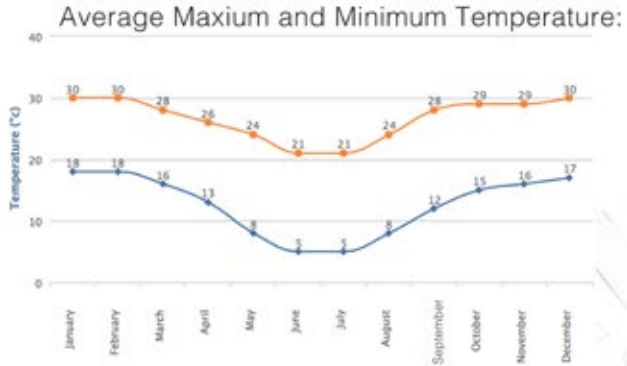
Figure 8.6 Temperature graph (World Wind Weather)

Average Rainfall
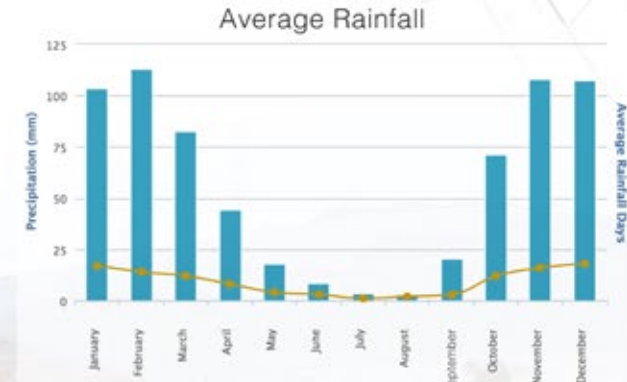
Figure 8.8 Rainfall graph (World Wind Weather)

EAST

Winter Winds-NE

WEST
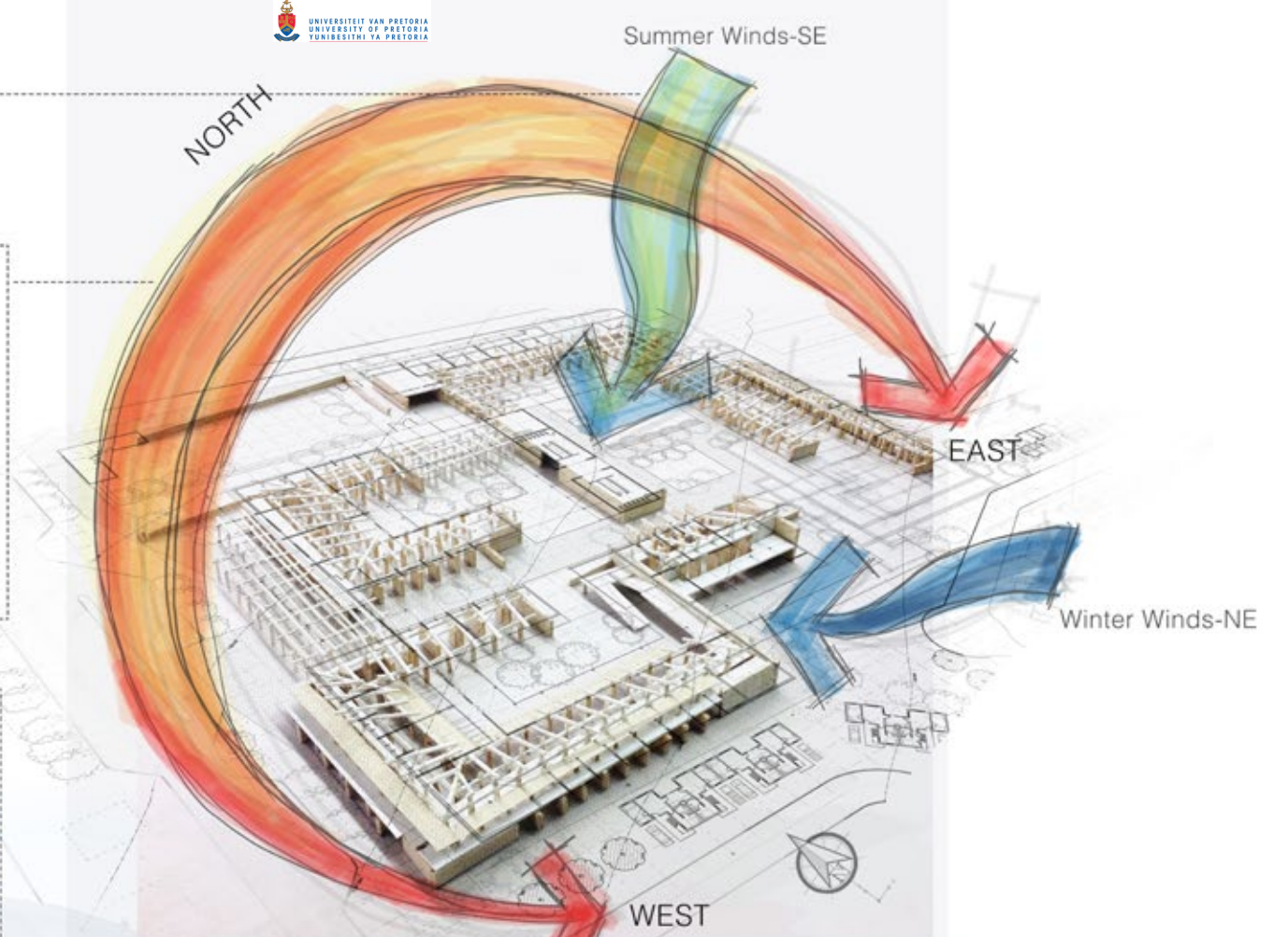
Figure 8.9. Specific to site model

Vegetation: Grassland dominated by Tortilis

Figure 8.10. Site section

03_ Material Palette

Concept

The concept developed for the use of materials within the Play-Centre and Community Kitchen relates back to the architectural and spatial intentions for the physical fabric. Making use of the sensory characteristic of materials to create the haptic quality required by each space to create a lasting emotional impact and using materials to create the boundaries and walls that provide the children with security and safety

The materials that provide the primary structure of the building and materials at the level at which the child interacts:

- Making use of heavy, mass material to create the solid and heavy boundaries that define the spaces belonging to the child and parent netorks. Using the heavy vertical boundaries to create the experience of separation of child spaces from community spaces and protection and safety within these spaces.

- Making use of various textured materials to defining the different edges and uses of spaces, creating rhythms and patterns within the children's spaces and reinforcing the haptic quality of each space.

- Using the thermal properties of the mass material to affect the internal thermal comfort levels of the different spaces.
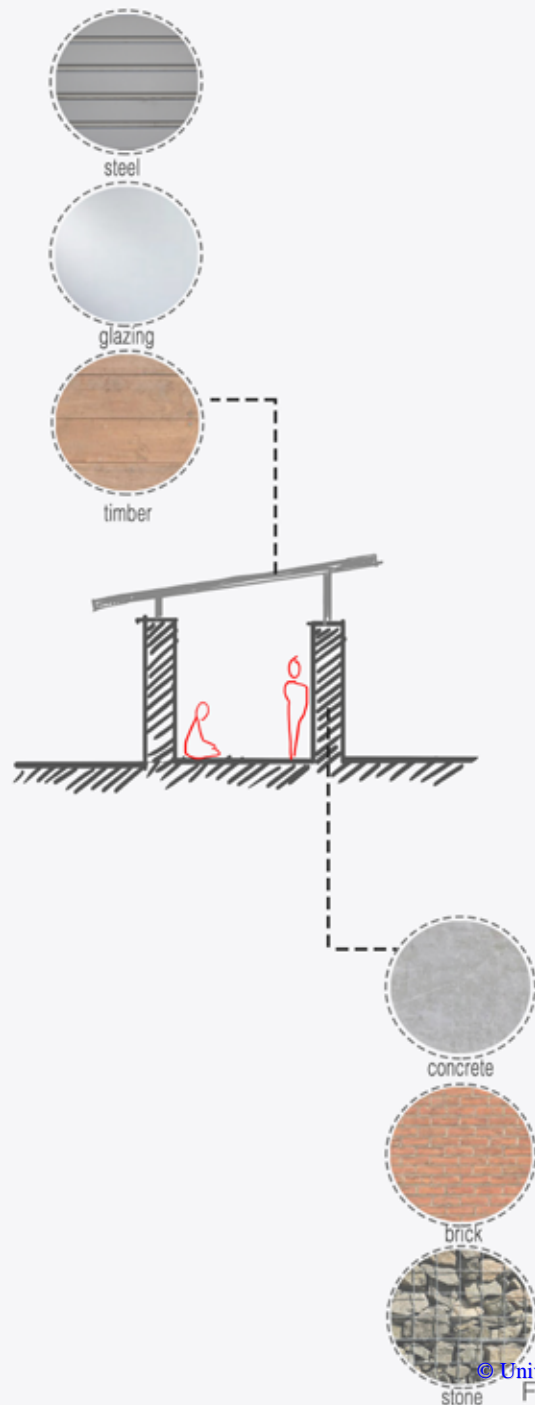
The materials used to support the roof structure of the each space and above the child's head:

- A lighter horizontal plains then vertical, lighter roof structure the wall structure.

- Allowing the surrounding fabric in at different heights and levels, creating connections to the public realm through framed lighter materials.

- Allowing natural light in at the top edge of the heavy, mass walls, in light framed clerestory windows.

steel

glazing

timber

concrete

brick

stone

Figure 8.11. Material Concept Diagram

Each programmed space has specific emotional intentions and goals therefore; each space requires a material palette specific to its emotional intention and spatial function.

In order to create rhythm and uniformity through the architecture similar materials were used throughout the design. Similar spatial functions and emotional requirement used similar or the same materials or material finishes.

The same materials were used for the structural system throughout the Play-Centre and Community Kitchen.

Structural walls on the corner boundaries of each space, defining the building edges and courtyard boundaries, are reinforced concrete construction. The materials used for the construction of the structural system throughout the Play-Centre is brickwork columns and infill walls. The brickwork columns are plastered and painted in a

number of spaces and left unplastered where appropriate.

Spaces in which the child is to sit up against the interior walls or in which the child reads or creates artwork and have to be well light are plastered and painted.

The floor finish is selected according to the function of each space. Spaces in which the child sits on the floor to read or retreat into a more private space have softer, warmer floor finishes such as carpeting or timber. Space such as the kitchen space and art studio's where the child is to feel free be expressive and make a mess, have a more durable and easily cleaned floor finish such as concrete.

A combination of lawned areas and permeable paving area is designed for the courtyard and play space, in order to prevent over heating of the play surfaces and the play areas themselves during the over heated period of the year.

lawn

painted surface

permeable concrete paving

concrete flooring

canvas partition

bag plaster brick wall

face brick wall

permeable concrete paving

Balau timber pergola

raw concrete footing

corrugated roof sheeting

timber truss roof system

glazing clerestory

face brick wall

Saligna timber flooring

carpeting

permeable concrete paving

lawn

art studios

library

permeable concrete paving

raw concrete footing

Saligna timber flooring

face brick wall

Balau timber pergola

community kitchen

free play courtyard

lawn

permeable concrete paving

retreat spaces

raw concrete wall

face brick wall

bag plaster brick wall

Balau timber pergola

carpeting

Saligna timber flooring

concrete flooring

permeable concrete paving

performance hall

raw concrete wall

face brick wall

permeable concrete paving

lawn

concrete flooring

Figure 8.12. Material Palette

04_Structural System

The physical structural systems used to create the spaces within the Play-Centre and Community kitchen are divided into three categories: Primary, Secondary and tertiary.

Primary Structure:

As part of the development of the concept for the technical development of the Play-Centre and Community Kitchen, the primary structure used to create the architecture, is associated with the heavy structure that encloses, separates and defines the spaces belonging the child. The primary structure is the elements of the building that define boundaries and create security and safety within the defined spaces.

The primary structure is the stereotomic enclosing space placed heavily on the site.

The primary structure is therefore, the mass walls designed to define and enclose the different spaces and courtyards

The intentions of the primary structure is to define boundaries and sit heavily on the site, the material used to create the heavy boundary structures, is reinforce concrete walls. The reinforced concrete walls will remain unfinished and without colour. The raw unfinished concrete will allow for the construction detail and shutter work markings to remain exposed and leave behind a reminder of the rituals that went into creating the wall. This attempts to reinforce the design concept that ritual and life creates the spaces needed to survive and therefore the physical building. The physical fabric, creating the needed spaces, acts as a daily, subconscious reminder of the rituals of making the spaces.

Secondary Structure:

The secondary structure is associated with the physical elements of the entire structure that define the individual functions within each overall space and influence the creation of the haptic qualities of each space.

The secondary structure is the tectonic (the frame) structure that defines, separates different spaces within the overall structure.

The secondary structure is therefore the internal column and roof truss system that defines the vertical and horizontal plains, respectively, within the spaces.

The materials used for the structural column system are reinforced concrete columns, with a single face brick skin, and large reinforced face brick columns.The roof structure is made up of timber rafters exposed to the internal spaces, with ceiling boards, insulation, waterproofing, timber purlin and corrugated steel roof sheeting layered above.

As with the construction of the primary structure, the elements within the secondary structure will celebrate and remember the rituals that were used to create the structure. The connections and joints where the roof structure meets the walls will be left exposed, celebrating the making of both the wall and the roof. In moments through the overall structure, the construction layers of the roof will be left exposed, revealing how the roof is made and exposing usually hidden elements to the user, acting as a reminder of the ritual that made the roof.

Tertiary Structure:

The tertiary structure is associated with the ritual element of the concept development of the design.

The tertiary structure are elements within the different spaces of the design that are adaptable and change the internal spaces.

These are elements such as adjustable wall panels that fold open and closed, altering the sizes of classroom and reading spaces, changing the intimacy of these spaces. The adjustable elements allow the internal spaces throughout the building to be adapted as the rituals of the child change from day to day. These elements celebrate the ritual of the child by allowing the child to alter their environment, as they need to.

The tertiary structure also includes, windows and door systems. These elements allow the external fabric into the internal spaces and expose the internal rituals to the external and vice versa.

05_ Plan, Section, Detail

Plan Development

The intentions for the structural system of the Play-Centre, is to place the structural columns on a grid system, that creates rhythme and pattern within each space, but not over populating the spaces with an excessive amount of columns.

The initial column grid was set up on 5 x 5m system, with a structural column on each grid point. The number of columns within each space overcrowded the space and are unnecessary for the roof system it is supporting in most spaces.

The library space, is the only space that requires the columns to support a second storey. The columns in this space are placed 5m apart in the shorter span and 10m apart along the larger span. In order to bare the large load the second storey of the library space (dead load and structural load) a reinforced concrete ring beam is added, spanning along the 10m distance between columns.

The column thickness is increased as the spacing between columns increases, in order to ensure the stability of the column. The columns spaced at 5m apart are 330 x 330mm thick and columns further then 5m increase their thickens to 440 x 440mm. The thickness of the columns used in the interior spaces are all sized at 440 x 440mm thick.

The water system implemented in order to support the water demand of the Play-Centre, requires a number of service spaces. These spaces are needed to house different elements that ensure the water system works effective and efficiently.

Pump rooms are included to house the solar pump systems that transport from the wetland system or subsurface tanks to the required use outlets.

The water system requires a set of UV filters. These filters require certain conditions in order for them to function effectively. The filters require dark spaces and a large amount of space, to allow water to flow slowly through the system for a lengthened period of time.

The UV filters are located in service cores within the ablution facilities. Each core incorporates a pump that transports the purified water to the different uses within the building.

The insulation within the wall and roof systems through the Play-Centre has been neglected in this iteration and will be considered in greater depth in the iteration to follow.

Storage

Water pump rooms

Figure 8.16. Plan indicating structural systems and services

Studio

Studio

Exhibition

Storage

Ablutions

⊲ N o r t h - S o u t h
Courtyard section

Dinning Rooms

Kitchen

Retreat

Classrooms

Classrooms

Performance
hall

Library

Wetland

Retreat section
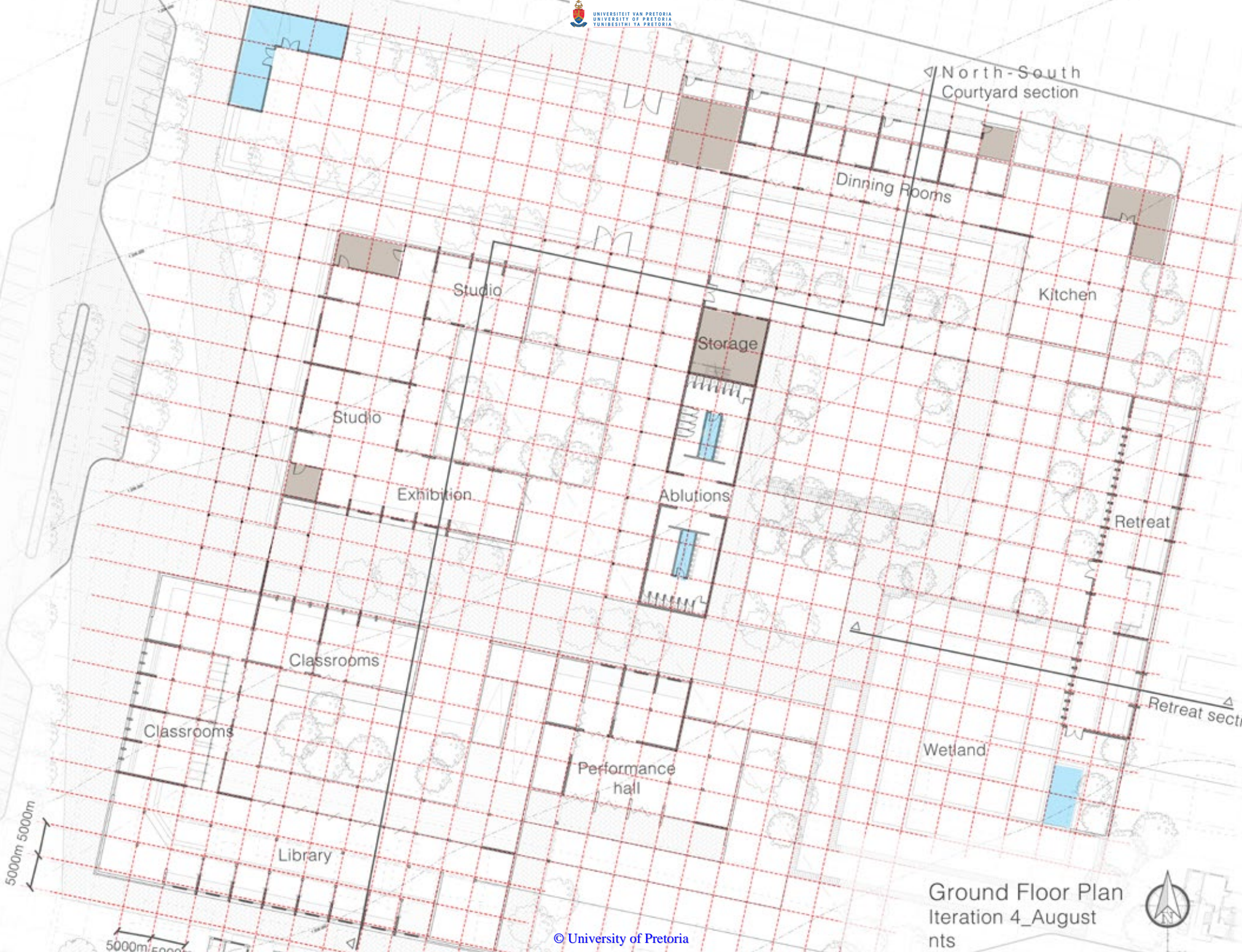
5000m 5000m

5000m 5000m

Ground Floor Plan
Iteration 4_August
nts

Section Development

The intentions for the development of the sections, throughout the design, are to define the transition from the courtyard spaces to interior, allowing the activities of courtyard to merge into the activities within the building, and to create spaces specific to the proportions and rituals of the child.
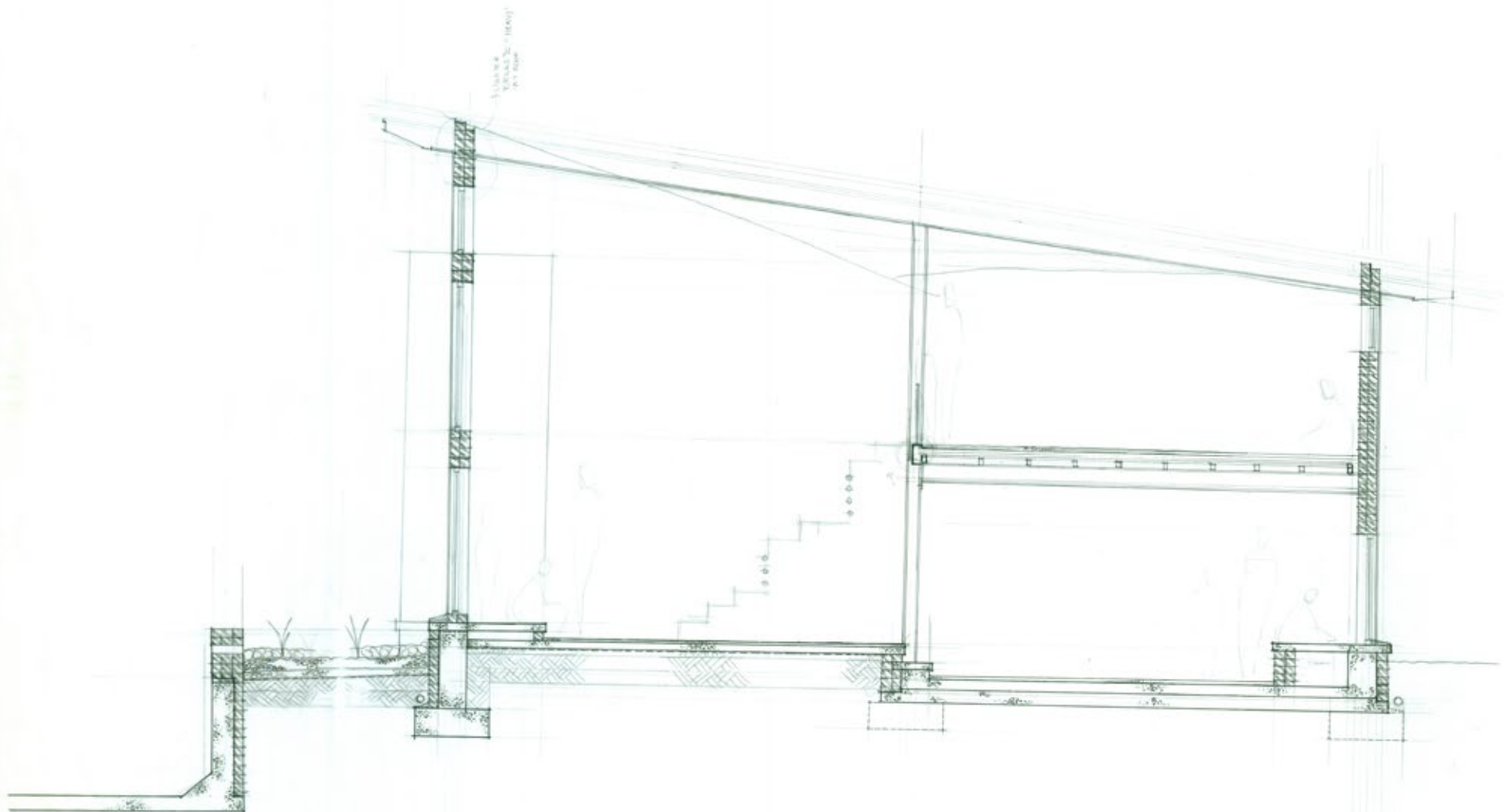
Figure 8.14. Retreat section_ Iteration One
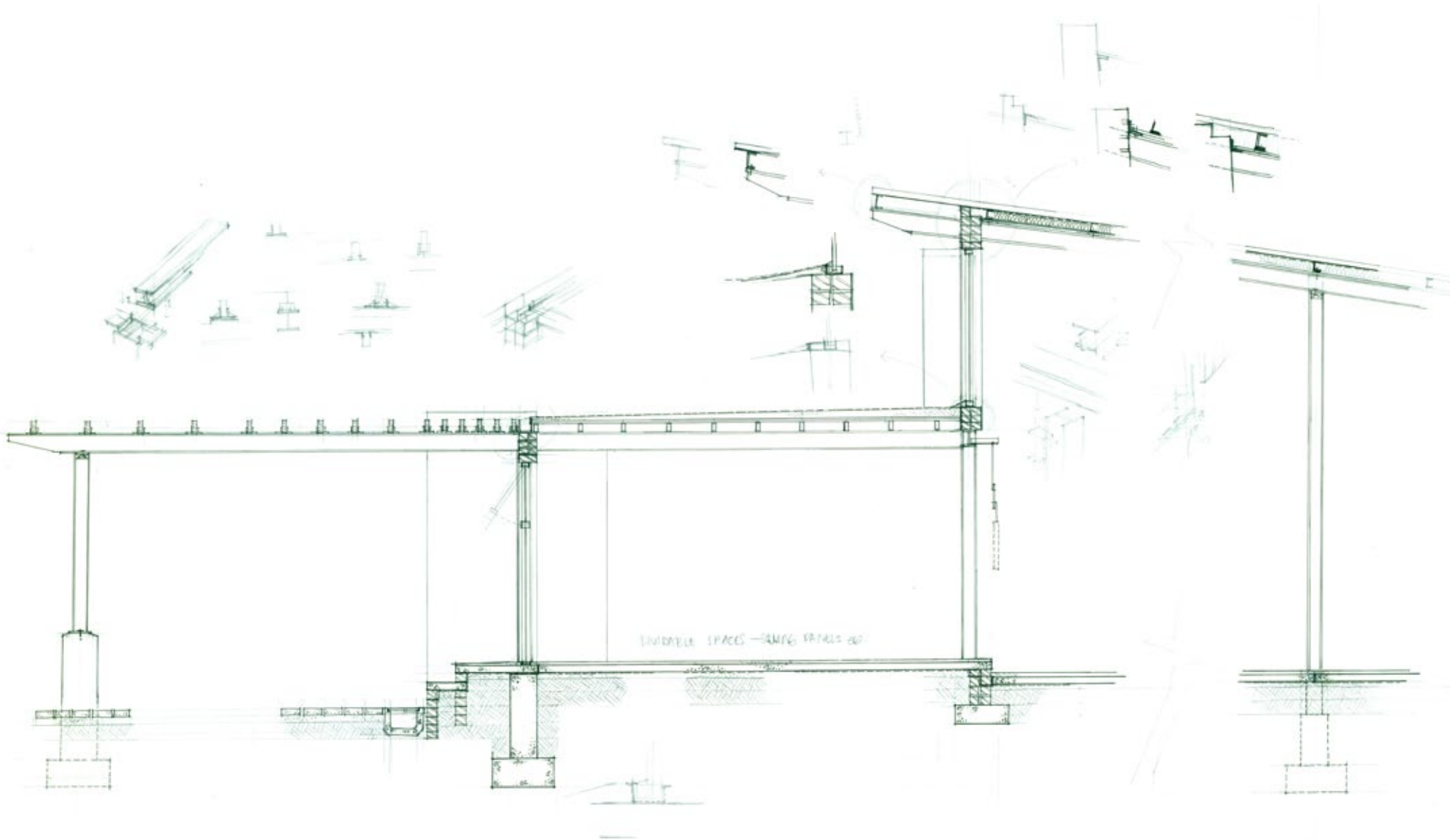
Figure 8.15. Expression spaces_ Iteration One

Iteration 2_ August: Retreat space section

The intentions for the retreat spaces, are to create spaces that belong to the youngest child facilitated within the Play-Centre and spaces in which the younger child will be allowed to reflect and rest.

The retreat space, is divided into three; play, retreat and rest.

The play space is directly linked to the play and learning space within the courtyard. The transition between the two spaces is celebrated through the creation of openings and seating at child eye level and height. These elements allow the child, whether inside or out, to visually access other children playing and learning.

The courtyard belonging to the retreat spaces, include the wetland system. The wetland system becomes a sources of energy that introduces the child to natural systems and processes, educating the child in a visual and tactile manner.

It also influences the haptic quality of the retreat spaces, when they are used for rest and retreat, The sounds and smells the wetland introduces, act as calming and soothing qualities to a spaces that is intended to facilitate the ritual of rest.

The wetland system sits directly up against the retreat spaces exterior wall. Figure 8.16, illustrates the detail explored at this connection.

The retreat and rest spaces are lifted above or dropped below the spaces in which the child plays.

Dropping the retreat spaces below the courtyard, natural ground and wetland levels dictated the development of a basement detail, to protect the interior spaces from water damage. The basement detail is explored in Figure 8.14 and 8.16.

The roof structure was lowered over the rest spaces in order to create a more intimate scale for the child's resting space. The roof structure was however criticised for having an excessive amount of structure for its short span, of 5 or 10m. Reducing the amount of roof structure will be explore in the next iteration.

Figure 8.16. Retreat space section

5000 mm | 5000 mm | 5000 mm
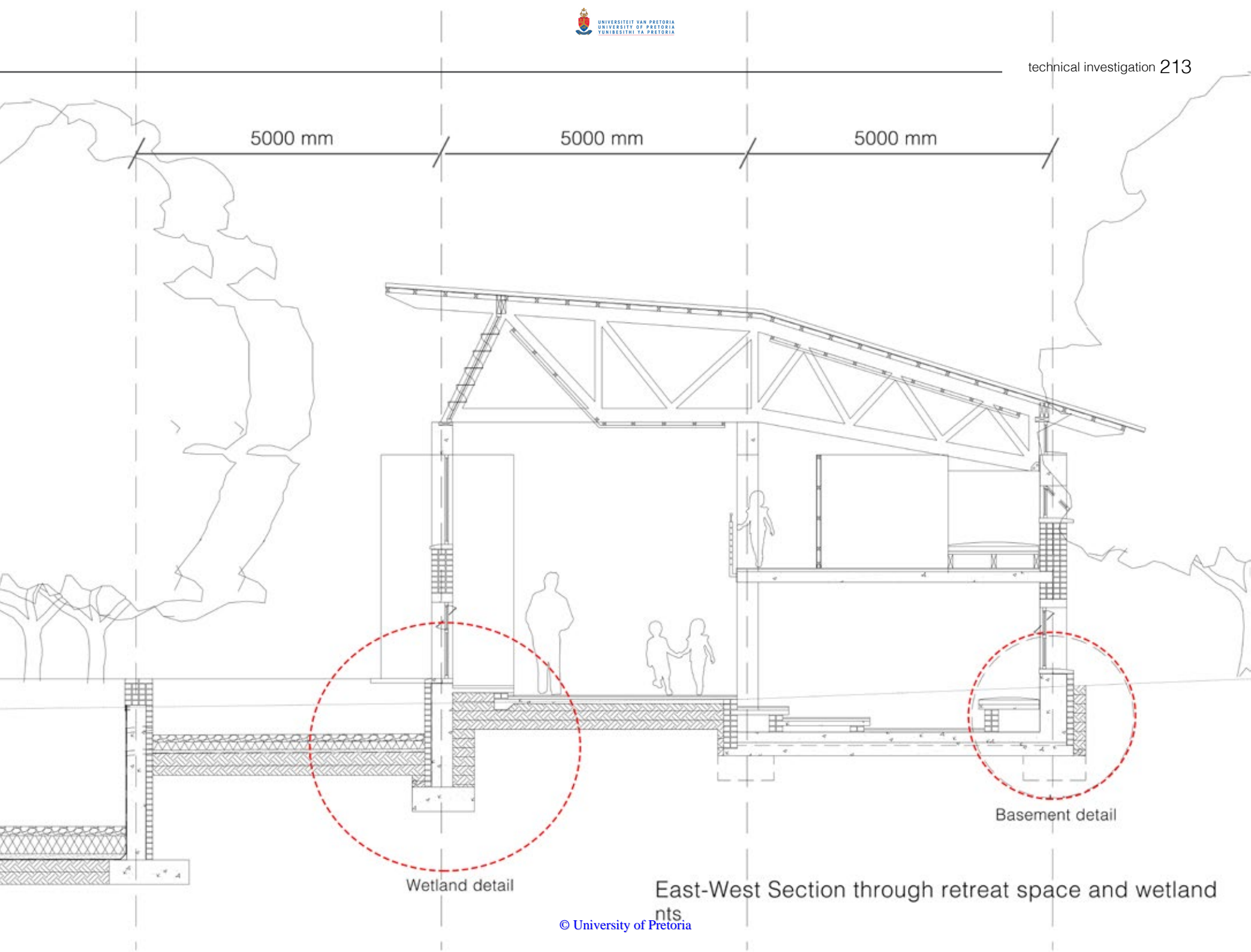
Wetland detail

Basement detail

East-West Section through retreat space and wetland
nts

Final Retreat Section

Galvanised steel plate, welded to Galvanised steel C-channel bolted to Timber trusses, with M24 Hexagon bolts

0.6 IBR Galvanised Roof Sheeting fixed to, 75 x 50 Timber purlin spaced @ 1200 c/c

Galvanised steel basset plate, fixed to timber rafters with M16 hexagon bolt.

Shading device bolted to, 75 equal steel angle, bolted to aluminium window sill

0.64 x 600 x 1200 Gypsum Ceiling board fixed to, 38 x 38 Timber battens

Fixed Balau timber shading element, treated with Creosote

225 x 75 Timber Rafters @ 1200 c/c

20 x 203 galvanised steel plate fixed to 203 x 133 x 25 I-Profile galvanised steel beam, with M24 Hexagon bolt.

Aluminum frame louvred window, operated electronically.

114 x 50 Timber Truss (H3 Hazard classification), treated with Creosote.

203 x 203 x 25 H-profile galvanised steel column, welded to Steel foot plate, fixed to 330 x 330 brick column with Hold bolt.

Face brick dividing wall

Timber Frame Lightweight Partition Wall

Face brick dividing wall

Steel Balustrade

10 carpet on, 20 screed, on 75 reinforced concrete floor slab
Retreat Resting Space
FF. Carpet

Steel balustrade welded to 20 steel plate, then bolted to concrete floor slab with hold bolts

170 Reinforced concrete floor slab

330 Brick Column

Retreat Teaching Space
FF. Carpet

10 carpet on, 20 screed, on 75 reinforced concrete floor slab

10 carpet on, 20 screed, on 75 reinforced concrete floor slab

Retreat Play Space
FF. Carpet

ced retaining wall with skin

300 x 900 Reinforced concrete foundation footing

Detail 7

Detail 8

RETREAT SPACE SECTION
SCALE 1:20

Detail Development

The intention for developing details, is to celebrate the rituals that form part of the process of making the architecture. Creating moments throughout the architecture that expose the connections and joints between elements and the celebrate the processes that allow the architecture to function.

Figure 8.17. indicates on the North-South section of the Play-centre and Community Kitchen, the location of a number of these moments.

Detail 1:
Typical Foundation

Detail 2: Light and Ventilation Shaft
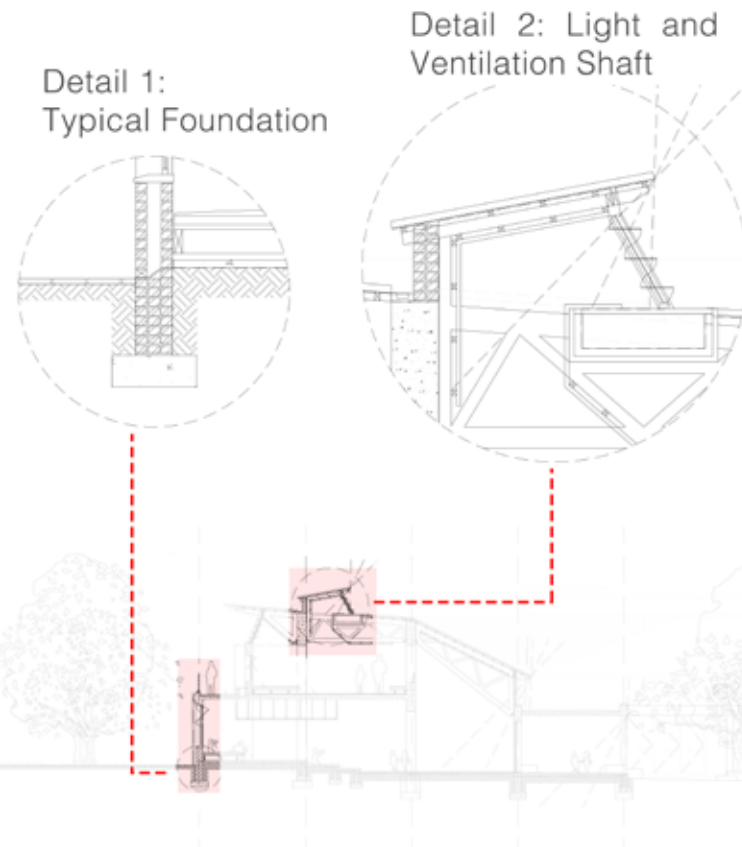
Figure 8.17. Section indicating location of series of details

Detail 3: South-Western over hang

Detail 4: Pergola meets wall
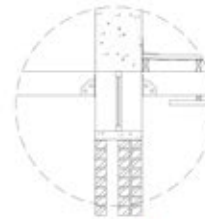
Detail 5: Pergola

Final Details

Aluminium Window Frame, with single glazing widow

75 Pre-cast concrete window sill

330 Face brick cavity wall.

100 Cavity filled with 100 thermal insulation.

Recessed Mortar joint on exterior face

Flush mortar joint on on interior face

Free standing bench:
Timber frame with cushion finish

Timber Skirting board

10 Carpet Floor Finish on,
20 Concrete screed to level floor surface

75 Reinforced concrete floor slab, on
0,25 polyolefin DPM, on 150 layers of compacted earth

0.375 Polyolefin Damp Proof Course

Mortar filling in cavity

200 x 800 Reinforced concrete foundation footing

50 Permeable concrete paving to fall away from building edge on, 50 Sand beding layer

Detail 1: Typical Foundation
nts

Thermal Insulation Requirements for wall system:
(SANS 10400 XA)

Climatic Zone: Temperate Interior
Non-Masonary walls require minimum R-Value for wall systems: 1,9
R-Value of masonry cavity wall must exceed the minimum of 0,35

Cavity wall designed:
single face brick skin, air gap, single face brick skin

R-Values:
Face bric= 0,176
Air gap= 0, 0774

Total R-value without insulation in cavity = 0.716 + 0,0774 + 0,0774
= 0,33

Therefore a layer of insulation required in the air gap to meet minimum requirement:

40mm of Isotherm has a R-value of 0.82-- new R-value of cavity wall= 0,0774 + 0,0774 + 0,82= 0,97
50mm of Isotherm has a R-value of 1.02-- new R-value of Cavity wall= 0,0774 + 0,0774 + 1,02 = 1,1748
100mm of Isotherm has a R-Value of 2.04-- New R-Value of Cavity Wall = 0,0774 +0,0774 + 2,04= 2,19

A cavity of 100mm is used and filled with insulation to counter the heat transfer through single glazing windows, and support the second storey and roof system

0.6 Galvanised steel IBR roof sheeting fixed to, 38 x 38 Timber purlins @ 1200 c/c.

Wax impregnated foam filler.

225 x 50 Timber beam

114 x 50 Timber Rafter @ 1200 c/c

Aluminum frame louvred window, operated electronically.

114 x 50 Timber Truss (H3 Hazard classification), treated with Creosote

114 x 50 Timber beams

0.6 IBR Galvanised steel roof sheeting fixed to, 75 x 50 TImber purlins @ 1200 c/c.

0.25 White Polyolefin waterproof membrane.

100mm Cellulose Thermal insulation, such as Thermguard

38 x 38 Timber ceiling battens @ 600 c/c

6,4 x 600 x 1200 gypsum ceiling board, fixed to timber pattens with 5ø round wire nail.

225 x 50 Timber Rafter @ 1200 c/c

Joist hanger fixed to Concrete beam and timber rafter.

Mortar roof filler

Brick roof filler

225 x 50 Timber wall plate

1800 x 330 Reinforced off shutter concrete beam and ventilation shaft wall, painted black on interior of ventilation shaft

Galvanised steel gutter and down pipe.

6.4 Gypsum ceiling board, fixed to 38 x 38 timber brandering, 4ø with round wire nails.

35 Isoboard thermal insulation fixed to concrete beam with, pan head screw.

Detail 2: Light and Ventilation shaft
nts

Insulation in Ceiling requirements: (SANS 10400 XA)

Appropriate Climatic Zone: No. 2 Temperate interior (Pretoria)
Resulting Required R-Value for Entire Roof System: 3.2

Insulation Thickness:

Required R-Value: 3.2
Average R-Value for Roof Structure: 0.35
Therefore Required Insulation R-Vaule= 3.2 - 0.35
$$=2,85$$
Thermal Conductivity Specific to Thermguard= 0,038

Thickness of insulation;
Required R-Value x Thermal Conductivity of specific material
= 2.85 x 0.038
= 0,108m
= 108 mm of Thermguard Cellulose Insulation

0.6 IBR Galvanised steel roof
sheeting fixed to, 75 x 50
TImber purlins @ 1200 c/c.

0.25 White Polyolefin waterproof
membrane.

100mm Cellulose Thermal insulation, such as
Thermguard

6,4 x 600 x 1200 gypsum ceiling board,
fixed to timber pattens with 5ø round
wire nail.

225 x 50 Timber Rafter @ 1200 c/c

Galvanised steel basset plate, fixed to
timber rafters with, M16 hexagon bolt.

20 x 203 galvanised steel plate, fixed to
203 x 133 x 25 I-Profile galvanised steel
beam, with M24 Hexagon bolt.

203 x 133 x 25 Galvanised steel I-Profile
column bolted to steel plate with M24
Hexagon bolt.

20 steel plate welded to the inside
flange of H-profile steel Column

203 x 203 x 25 H-profile galvanised
steel column, welded to Steel foot plate,
fixed to 330 x 330 brick column with
Hold bolt.

Detail 3: Steel Column
nts

Fire Protection for Steel Members: (SANS 10400 part K)

Stability Requirements of Structural members:

Occupancy: A3, Place of instruction
Single Story: 30 minute stability
Double Story : 30 minute Stability

In order to ensure the structural steel members used within the
design, the steel is to be covered in a protective layer of concrete,
brick work or plaster, or painted with a fire retarded paint.

In order to maintain the aesthetic appearance of the steel used within
the design , all steel is to be painted with a fire retarded paint in order
to increase its structural stability to a minimum of 30 minutes.

Wax impregnated foam filler.

225 x 50 Timber beams

Aluminum frame louvred window, operated electronically.

Galvanised steel plate, welded to Galvanised steel C-channel bolted to Timber trusses, with M24 Hexagon bolts

Fixed Balau timber shading element, treated with Creosote

114 x 50 Timber Truss (H3 Hazard classification), treated with Creosote

Shading device bolted to, 75 equal steel angle, bolted to aluminium window sill

0.6 IBR Galvanised steel roof sheeting fixed to, 75 x 50 TImber purlins @ 1200 c/c.

0.25 White Polyolefin waterproof membrane.

100mm Cellulose Thermal insulation, such as Thermguard

38 x 38 Timber ceiling battens @ 600 c/c

6,4 x 600 x 1200 gypsum ceiling board, fixed to timber pattens with 5ø round wire nail.

225 x 50 Timber Rafter @ 1200 c/c

Detail 4: South-Western over hang
nts

Final Details

330 x 500 Reinforced Concrete ring beam

Counter flashing

Flashing

0.6 Galvanised roof sheet, fixed to, 75x 50 Timber purlin

0.25 White Polyolefin waterproof membrane

6,4 x 600 x 1200 gypsum ceiling board, fixed to timber pattens with 5ø round wire nail.

38 x 38 Timber batterns

225 x 75 Balau timber rafter @ 1200 c/c

Joist hanger fixed to brick wall and Timber rafter

Aluminium window frame

Cast in-situ concrete sill

330 Face brick cavity wall

Flush mortar joint

100 Isotherm Insulation

Detail 4: Pergola meets wall
nts

225 x 75 Balau timber
pergola rafter, treated with
creosote

Top Hat profile galvanised
steel channel, welded to
20 galvanised steel plate.

Galvanised steel plate
bolted to Balau pergola
column, with Hold bolts

225 x 75 Balau Timber
Pergola column, treated
with Creasote
20 Galvanised steel sheet

20 Galvanised steel
footing plate fixed to 300 x
300 concrete footing with
hold bolts.

50 Permeable concrete
paving

50 Sand Bedding layer

150 layers of compacted
soil

Detail 5: Pergola_ Section
nts
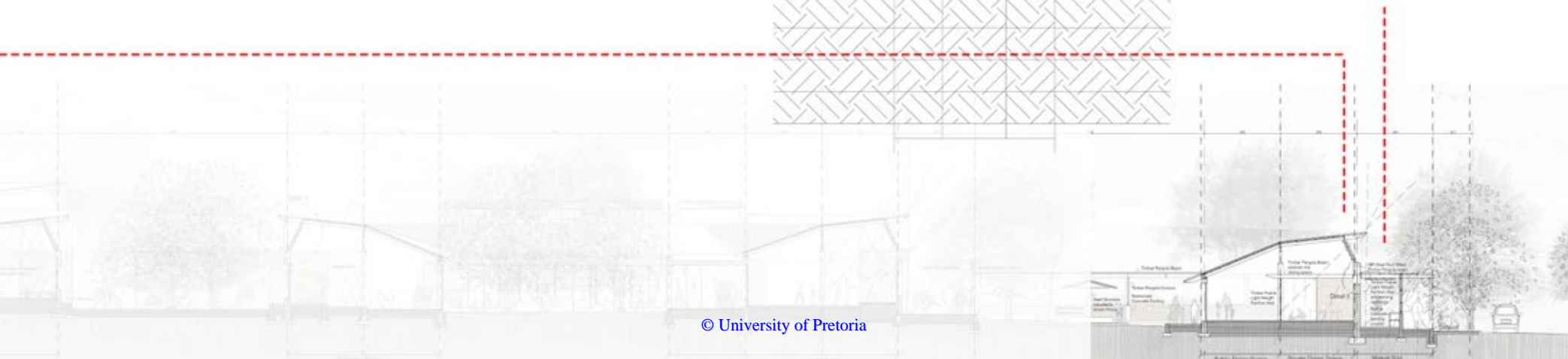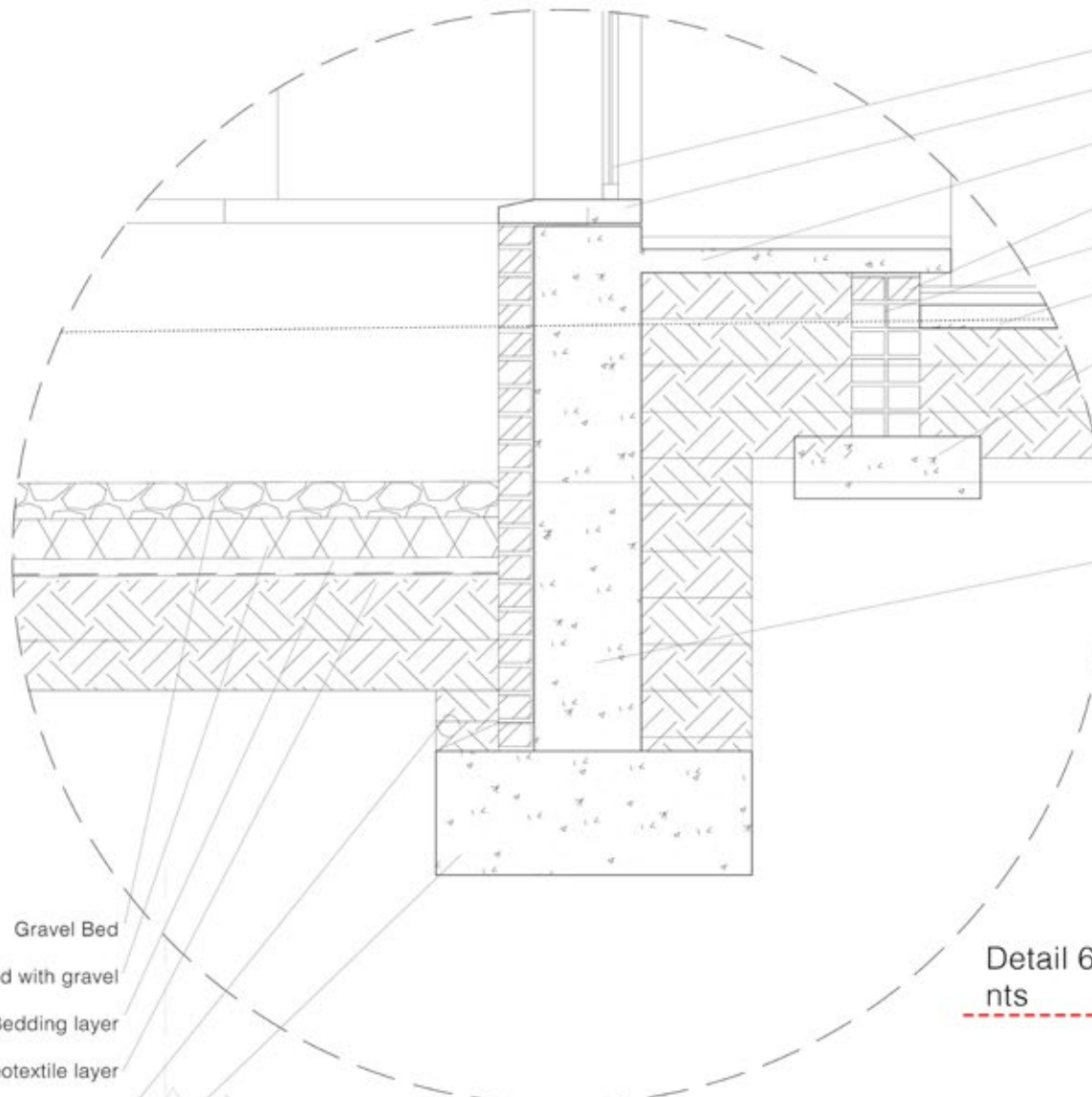
Aluminium window frame

Pre-cast concrete window sill

75 Reinforced concrete floor slab

230 Reinforced brick foundation wall

0,375 Polyolefin Damp Proof Course

0,25 Polyolefin Damp Proof membrane

200 x 600 Reinforced concrete footing

0,45 Black Polyolefin Damp Proof Membrane with single brick skin cover

330 Reinforced Concrete retaining wall on 300 x 800 reinforced concrete foundation footing

Gravel Bed

Terramesh filled with gravel

50 Sand Bedding layer

Geotextile layer

80 diameter geopipe

300 x 900 Reinforced concrete foundation footing

Detail 6: Wetland
nts

Pre-cast concrete window sill

Fix Bench

330 Reinforced concrete retaining wall

0,45 Black Polyolefin Damp Proof Membrane, with Single Brick skin cover

100 Reinforced concrete floor slab

50 Concrete binding layer

1,0 Orange Polyolefin waterproof membrane, on 100 Reinforced concrete slab

Reinforced concrete foundation footing

80 ø Geopipe
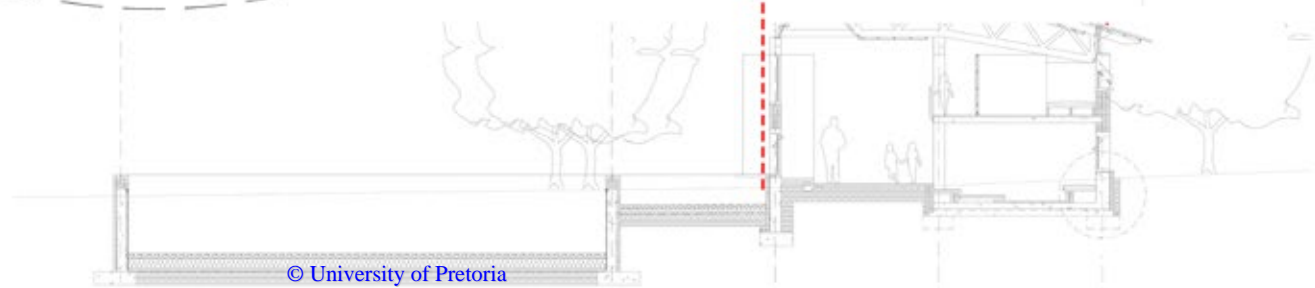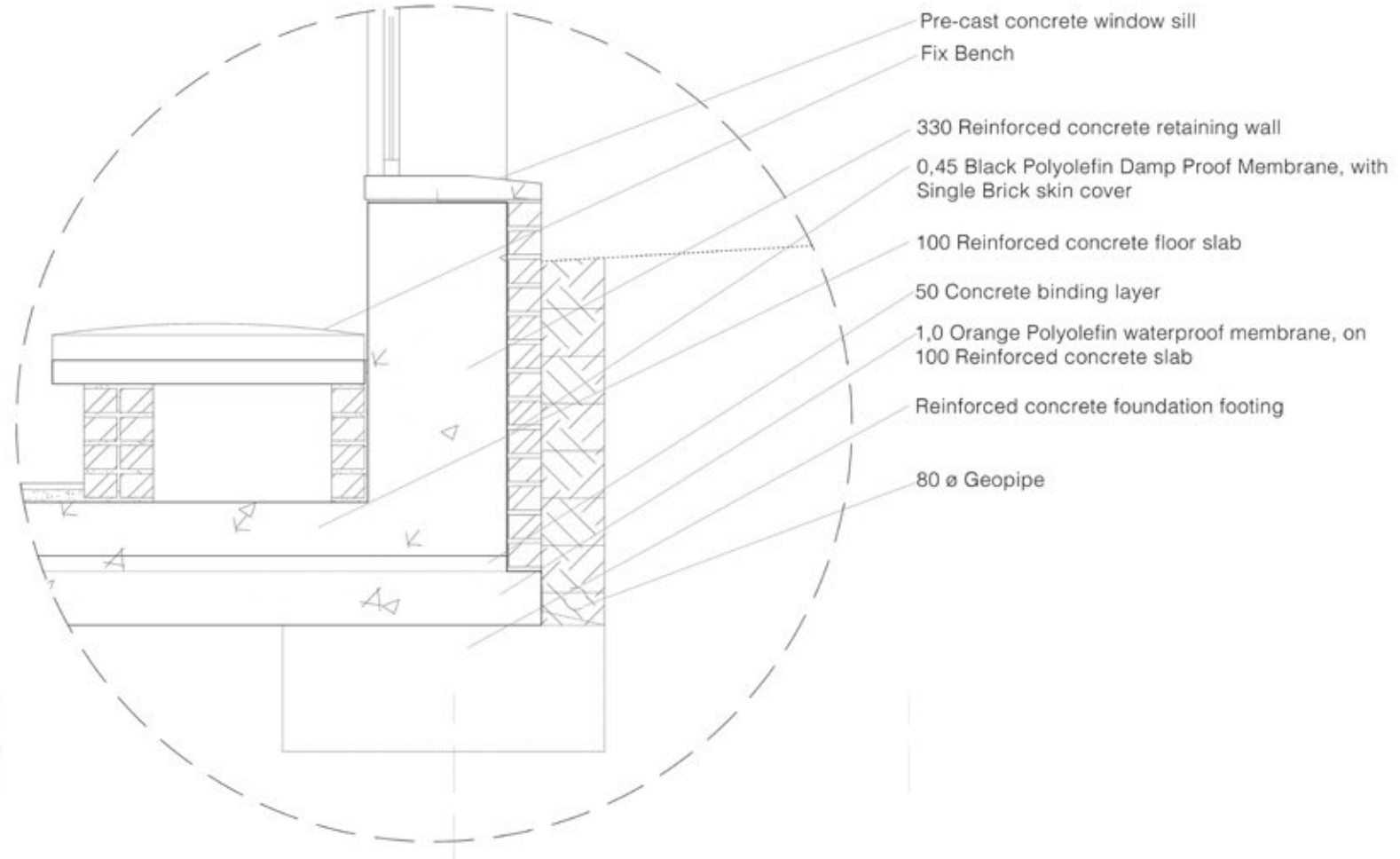
Detail 7: Basement
nts

06_ Resilient Systems

A number of systems were explored in the technical development of the Play-Centre and Community Kitchen. The systems investigated are the water harvested and used on site, how the building can be passively cooled and the lighting quality for each space.

The systems were approached, taking into consideration the local context. Mabopane is a poorer community on the outskirts of Pretoria, with physical urban fabric that is characterised by large public infrastructure buildings, without sophisticated sustainable systems, simple residential buildings and informal tin shanty houses. Introducing sophisticated and highly technical sustainable systems into a relatively simple constructed building may lead to problematic maintenance and repair issues in the future. Therefore the systems investigated for application into the Play-Centre and Community Kitchen, within Mabopane, are passively driven and easy to maintain.

SBAT Rating

In order to understand how sustainably a newly purposed design intervention will impact the environment it can be rated according to a set of guidelines and rules.

For the purpose of this dissertation the rating system used, to develop a baseline of the sustainability of the project, is the Sustainable Building Assessment Tool (SBAT).

SBAT, rating system sets up rating categories according the buildings impact on the environment, the social setting and the economic impact the design has on the local community and user of the newly designed space.

The environmental impact of the design is rated according to how water, energy, waste and building materials are treated on site, during the building process and during the buildings life span. The social impact of the design is rated according the designer's consideration of the local context, the diversity if the users and comfort of the user within the newly designed spaces. Finally the economic impact is rated according the design's consideration for the local context, the efficiency and adaptability if the design and overall cost of the design, both overhead and ongoing (SBAT).

The design proposal of this dissertation was rated according the criteria set up in the SBAT rating system, in order to understand where the design fall short in terms of its sustainability.

The proposed design scores highly in terms of the use of water on the site, the understanding and inclusion of the local context, accessibility of all users and the use of resources on site.

The areas in which the design falls short are; the economic impact the design has on the local community, in terms of it overhead and on going costs, its use of both waste and energy on site and the materiality of the design.

The design may fall short in these areas due to a lack of consideration on specific systems, such as waste and energy management and passive systems, up until this point.

In order to strengthen the areas in which the design fall shorts a number of iterations need to be considered and the design rated according the same guidelines, once change have been investigated.

These iterations will be investigated later stage in this dissertation.
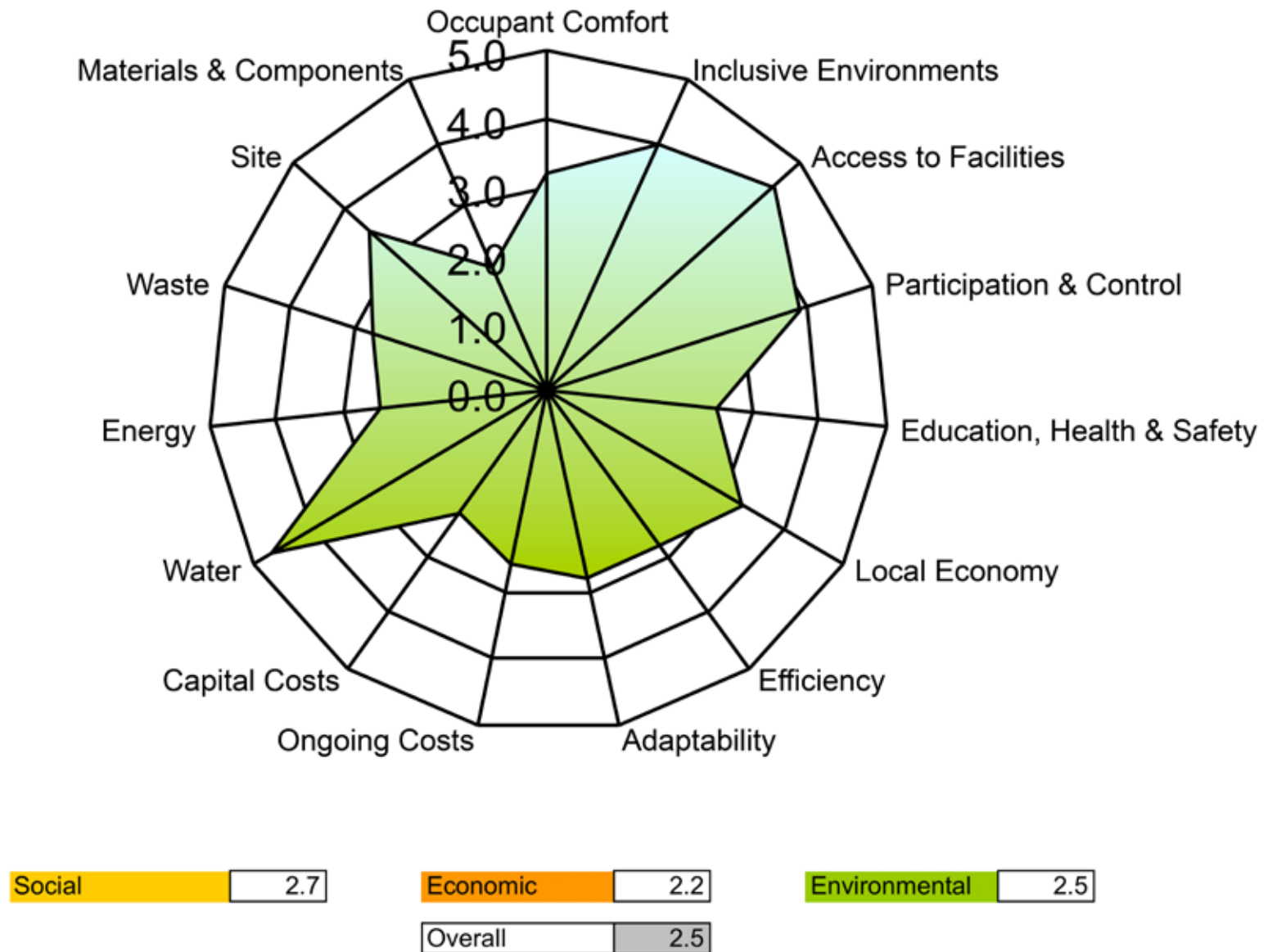
Figure 8.18. SBAT Results from test 1

Resilient Water

The natural water harvesting and usage for the Play-Centre and Community Kitchen has been divided into two water systems. The first system is use of water harvested from the surrounding of the sites that is then filtered, cleaned and stored in a wetland and finally used in the Play-Centre and Community Kitchen. The second system is the use of water to sustain the agricultural element of the community kitchen.

Water used in the Play-Centre and Community Kitchen:

The water system used to harvest and clean the water used within the building is the most complex system investigated for this dissertation.

Figure 8.19. illustrates the water harvesting system applied over the adjacent sharing sites.

high run-off coefficient surface - roads and roofs

medium run-off coefficient surface - paths

low run-off coefficient surface - soft landscaping

Catchment 1: Primary yield

Month	monthly precipitation (m)	area m squared	coefficient	NEW ROOFS m³	coefficient	PAVING m³	coefficient	ROADS m³
January	0.136	6930	0.9	848.232	0.7	630.224	0.8	272
February	0.076	6930	0.9	474.012	0.7	352.184	0.8	152
March	0.082	6930	0.9	511.434	0.7	379.968	0.8	164
April	0.051	6930	0.9	318.087	0.7	236.334	0.8	102
May	0.013	6930	0.9	81.081	0.7	60.242	0.8	26
June	0.007	6930	0.9	43.659	0.7	32.438	0.8	14
July	0.003	6930	0.9	18.711	0.7	13.902	0.8	6
August	0.006	6930	0.9	37.422	0.7	27.804	0.8	12
September	0.022	6930	0.9	137.214	0.7	101.948	0.8	44
October	0.071	6930	0.9	442.827	0.7	329.014	0.8	142
November	0.098	6930	0.9	611.226	0.7	454.132	0.8	196
December	0.11	6930	0.9	686.07	0.7	509.74	0.8	220
				4209.975		3127.95		1350

TOTAL YIELD RUNNING INTO BIOSWALES   8687.925

Catchment 1: Organic Bio-swales and Drains

hard surface

Subsurface drainage pipe

Catchment 2: Secondary yield

Month	monthly precipitation (m)	area m squared	coefficient	PAVING m³	coefficient	ROOF m³
January	0.136	672	0.7	63.9744	0.9	15.0552
February	0.076	672	0.7	35.7504	0.9	8.4132
March	0.082	672	0.7	38.5728	0.9	9.0774
April	0.051	672	0.7	23.9904	0.9	5.6457
May	0.013	672	0.7	6.1152	0.9	1.4391
June	0.007	672	0.7	3.2928	0.9	0.7749
July	0.003	672	0.7	1.4112	0.9	0.3321
August	0.006	672	0.7	2.8224	0.9	0.6642
September	0.022	672	0.7	10.3488	0.9	2.4354
October	0.071	672	0.7	33.3984	0.9	7.8597
November	0.098	672	0.7	46.0992	0.9	10.8486
December	0.11	672	0.7	51.744	0.9	12.177
				217.52		74.7225

TOTAL SECONDARY YIELD 392.2425

TOTAL RUNNING INTO WETLAND CONVEYING WATER TO THE POND
9080.1675
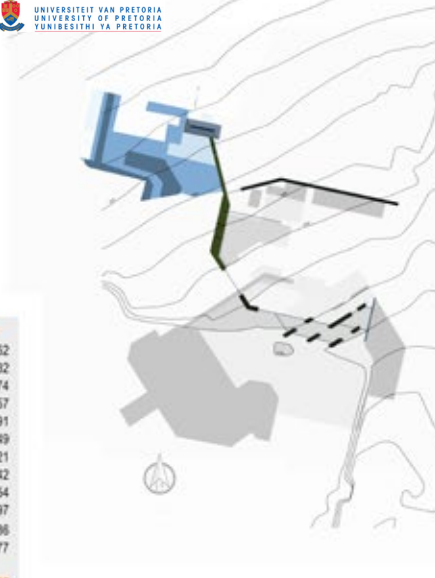
Catchment 3: Tertiary yield

Month	monthly precipitation (m)	area m squared	coefficient	PAVING m³		NEW ROOFS m³		NEW ROADS m³
January	0.136	4800	0.7	456.96	0.9	156.06	0.8	426.8088
February	0.076	4800	0.7	255.36	0.9	87.21	0.8	238.5108
March	0.082	4800	0.7	275.52	0.9	94.095	0.8	257.3406
April	0.051	4800	0.7	171.36	0.9	58.5225	0.8	160.0533
May	0.013	4800	0.7	43.68	0.9	14.9175	0.8	40.7979
June	0.007	4800	0.7	23.52	0.9	8.0325	0.8	21.9681
July	0.003	4800	0.7	10.08	0.9	3.4425	0.8	9.4149
August	0.006	4800	0.7	20.16	0.9	6.885	0.8	18.8298
September	0.022	4800	0.7	73.92	0.9	25.245	0.8	69.0426
October	0.071	4800	0.7	238.56	0.9	81.4725	0.8	222.8193
November	0.098	4800	0.7	329.28	0.9	112.455	0.8	307.5534
December	0.11	4800	0.7	369.6	0.9	126.225	0.8	345.213
				2268		774.5625		2118.3525

TOTAL TERTIARY YEILD: 5260.915

TOTAL RUNNING INTO WETLAND AND AVAILABLE FOR USE IN BUILDING
14155.02

Catchment 2: Organic Bio-swales and Retention Ponds

Catchment 3: Wetland and Detention Pond

Soft landscaping

Pump

Subsurface storage

Figure 8.19. Water System Shared between adjacent sites (Farmer, E. and Aurthor. 2014)
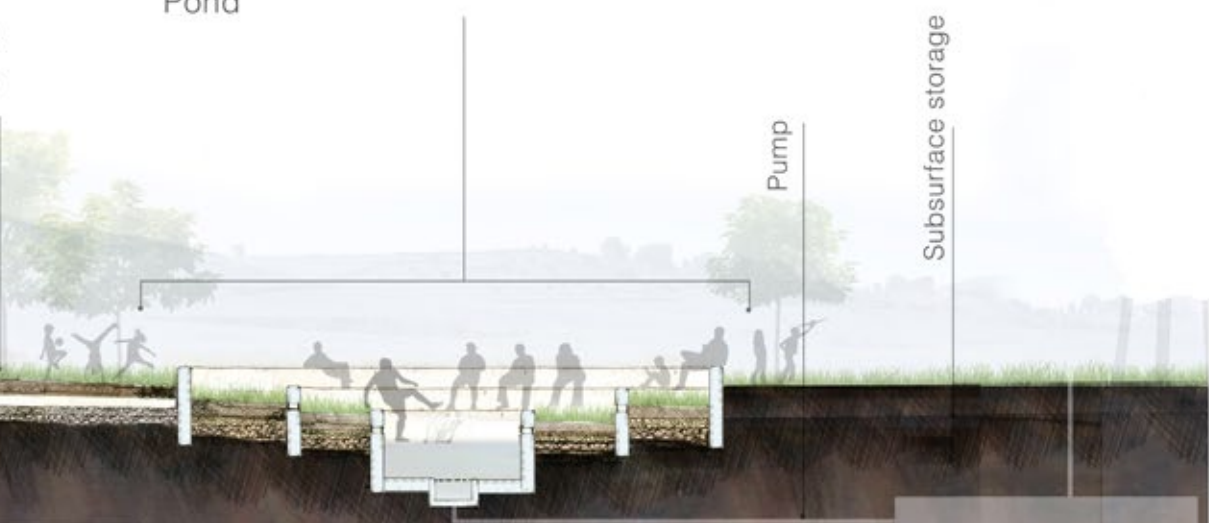
The water system is made up of a number of steps:

1. Water is harvest from the adjacent site, where it is transported in a series of organic bio-swales and detention ponds.

2. Once the harvested water is transported to the wetland site, the water is first filtered through as oil trap, where any oils and grease pollutants, collected on the pathways and road surfaces, are removed. The oil trap is to be maintained and cleaned out on a regular basis in order to ensure it correctly filters the harvested water from pollutant oils.

3. Once the water is filtered through the oil trap, it enters the wetland system.

The wetland system is a combination of subsurface and aboveground wetland filtering ponds.

The first filtering level of the wetland allows the harvested water to filter into the ground system; this allows the large sediment pollutant to settle above ground, removing them from the water. This initial filtering level will have to be cleared of larger sediment debris on a regular basis.

The water will then be filtered through a number of subsurface filters as it moves towards an aboveground storage pond. Nutrient and dissolved pollutants are removed in these subsurface filtering levels, by a number of wetland plants. These plants draw the minerals and nutrients that are potentially harmful to people, out of the water and use them to grow.

Once the water has past through the subsurface filtering levels the clean water that will be used in the building is stored in a wetland pond and excess water is pumped into a subsurface storage pond to be used by the adjacent fire station.

The new civic function belonging to the child physically shares a resource with the adjacent existing civic function.

4. Once the water is needed for use within the building, it is pumped to the required spaces using a solar pump. Before that water can be used within the building as potable water, it has to be clean and purified further. The final purification occurs in a series of UV filters.

Water is allowed to flow slowly, through the UV filter pipes, in a dark service core in the ablution facilities. The water that is required in different spaces on the site is pumped to these spaces using solar pumps. Water that is used to flush toilets, in the ablution facility is not purified through the UV filters, but comes directly from the wetland.

5. Grey water from wash hand basins, in the ablution facilities, is harvested and is used to reduce the amount of water used from the wetland to flush toilets.

Grey water from the kitchen sink and wash hand basins in the kitchen and art studios, is filtered back into the municipal system.

Black water is filtered back into the municipal system

Table 8.1. Water Calculations-shared

Month	YEILD m³	DEMAND n	water left for tank
January	2851.18	424.95	2426.23
February	1593.62	424.95	3594.9
March	1718.5	424.95	4888.45
April	1069.31	424.95	5532.81
May	272.518	424.95	5380.378
June	146.03	424.95	5101.458
July	62.591	424.95	4739.099
August	124.61	424.95	4438.759
September	461.17	424.95	4474.979
October	1183.47	424.95	5233.499
November	2055.052	424.95	6863.601
December	2306.832	424.95	8745.483

◤ 13844.883 ◤ 5099.4

(left in tank + yield) - demand= water left in reservoir

December will therefore have the most water in the reservoir at any time=8745.646
there pond size as part of a wetland system = 40 x 50 x 1.5

Total water stored in wetland pond= Building Demand * 20% safety factor

	424.95
Building Demand=	cubic meters
safety factor=	84.99 cubic meters
Total water stored in wetland=	509.95 cubic meters

therefore wetland pond size = 16 x 16 x 2

Water calculations:

1. Water Demand in Building

total wc usage:

	number of wc	number of urinals:	liter per flush	flush per day	total:	
female	15	0	5	84		6300
male	12	5	5	84		7140
						13440

totale whb

	number of whb:	liters per use:	total:
	19	4	76

total kitchen

	number of sinks	liters per cook(x2)	liters per wash (x2)	total
	15	22	12	357

total cleaning

	number out	liters out	number in	liters in	total
	5	6	5	6	60

total usage demand: liters per day=13933 liters

total water usage per month: 13933* 30.5 days= 424957.5 liters per month
424 956.5 liters =424.95 cubic meters

2. Total Water Demand in Building

Month	Demand Building	Demad FIRE STATION	TOTAL DEMAND m³
January	424.95	0	424.95
February	424.95	0	424.95
March	424.95	0	424.95
April	424.95	0	424.95
May	424.95	0	424.95
June	424.95	0	424.95
July	424.95	0	424.95
August	424.95	0	424.95
September	424.95	0	424.95
October	424.95	0	424.95
November	424.95	0	424.95
December	424.95	0	424.95
	5099.4	0	**5099.4**

4. Subsurface Tank Sizing

Month	YEILD m³	DEMAND n	Water in tank
January	2851.18	509.99	2341.19
February	1593.62	509.99	3424.82
March	1718.5	509.99	4633.33
April	1069.31	509.99	5192.65
May	272.518	509.99	4955.178
June	146.03	509.99	4591.218
July	62.591	509.99	4143.819
August	124.61	509.99	3758.439
September	461.17	509.99	3709.619
October	1183.47	509.99	4383.099
November	2055.052	509.99	5928.161
December	2306.832	509.99	7725.003

◤ 13844.883 ◤ 6119.88

	left in tank	yield	demand	in Tank
August	526	124.61	509.99	140.62
September		461.17	509.99	91.8
October		1183.47	509.99	765.28
November		2055.052	509.99	2310.342
December		2306.832	509.99	4107.184
January		2851.18	509.99	6448.374
February		1593.62	509.99	7532.004
March		1718.5	509.99	8740.514
April		1069.31	509.99	9299.834

Fire Station will use water continuously through the year, but most fires
occur in during the dry season, April to August, and during these months
all the water within the tank will be used.
The tank will always have enough water in to fill all the stations trucks and
supply the wetland used by the school with water.
Therefore the tank needs to be able to hold the amount of water harvested
each year= 9299.834
Therefore tank size = 46 x 51 x 4

UV Filters

wetland

2. Water usage within building

water into secondary storage tank

wetland

1. Water Harvested off adjacent site

existing watershed
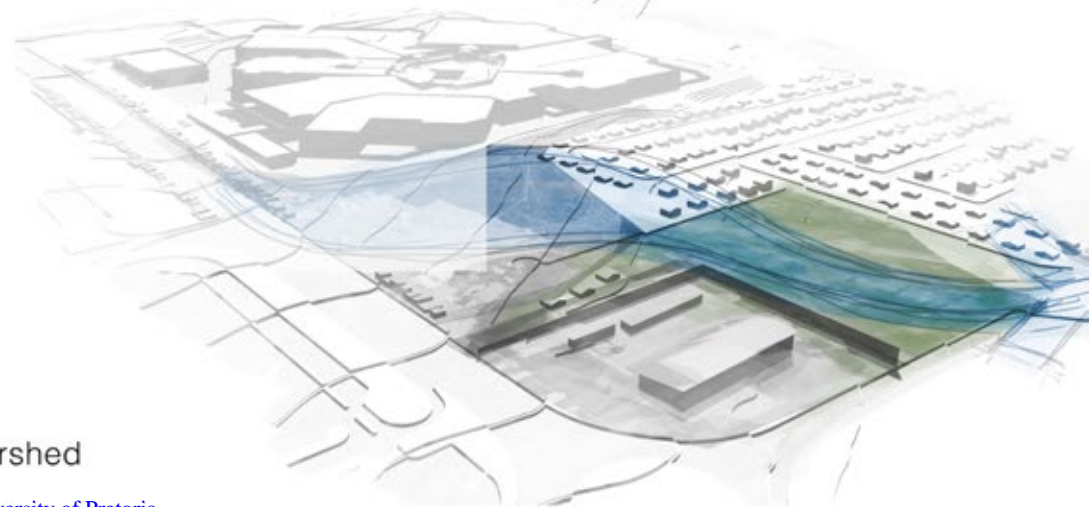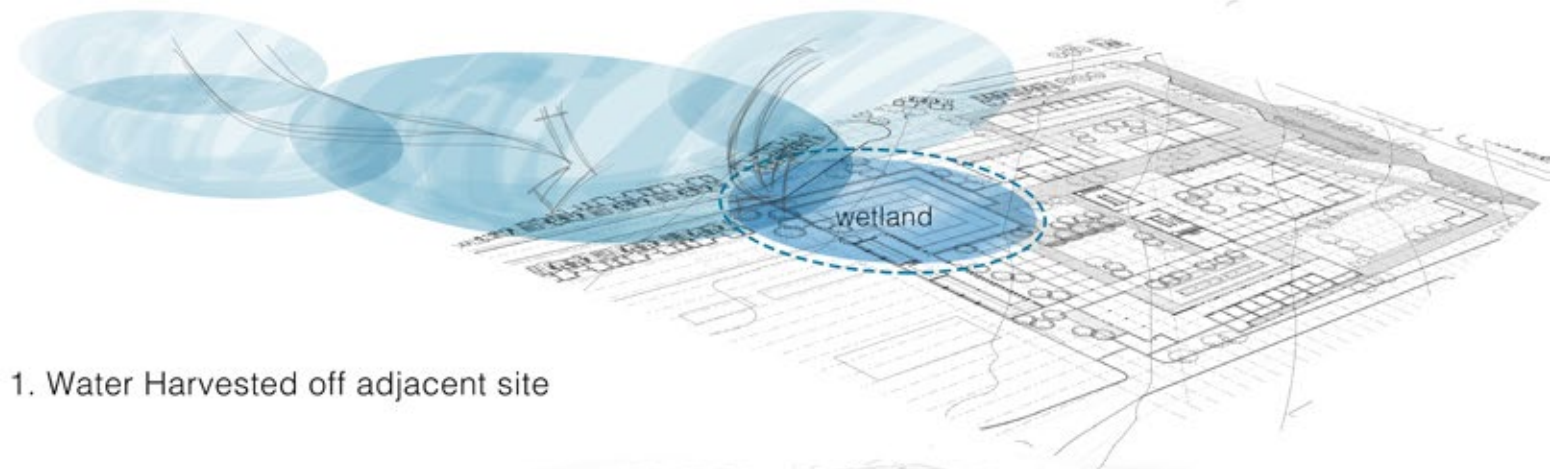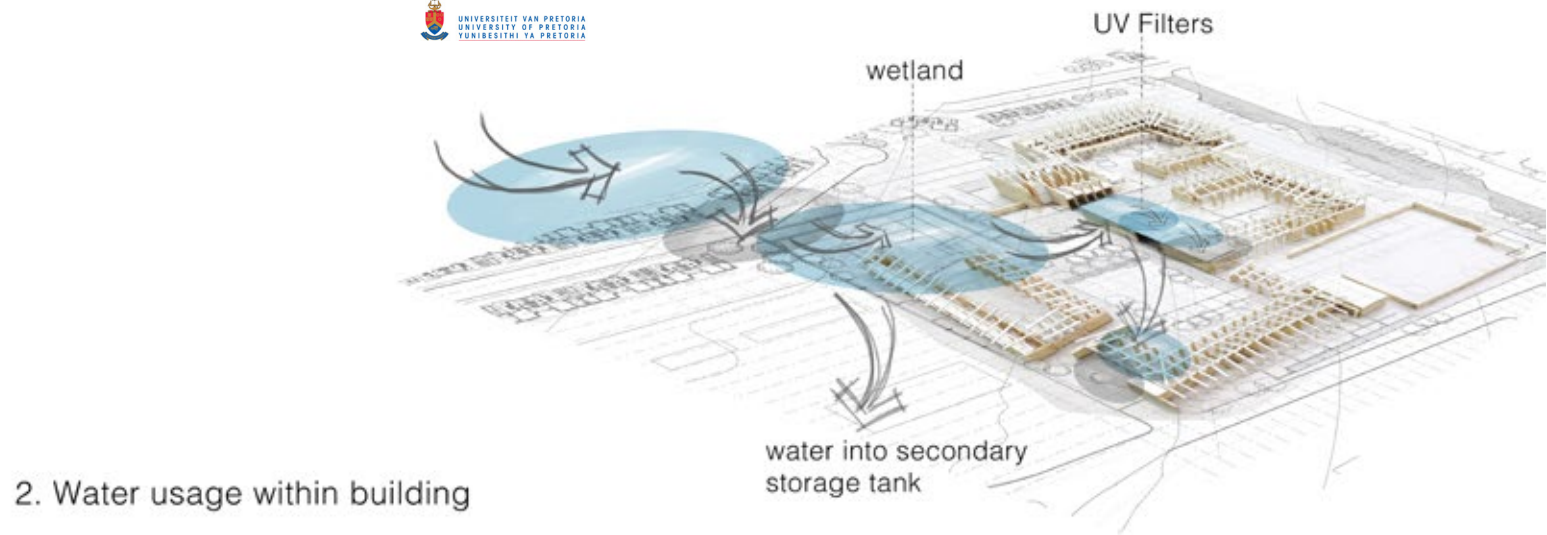
Figure 8.20. Water harvesting system diagrams

The water collected from the surrounding site, pathways and roads is filled with a large number of pollutants and is more difficult and expensive to purify and clean, for use within a building, then water that is harvested off roofs.

The water harvested from the roofs of the Play-Centre and Community Kitchen would have been a less expensive and simpler means to supply the building with potable water. This water was not used to support the building demand for a number of reasons:

1. The amount of water that is available to be harvested from the surrounding site, roads and pathways, exceeds the amount of water demanded for use within the building. This amount of potential excess harvest water is large enough to support the water demands of the fire station.

2. As part of the micro framework developed for the sites for the child-focused programme and the

skills development programme, a central water catchment and feature was suggested. This water feature within the urban framework is to be act as a civic park between the two site, collecting and filtering people through and to the individual sites.

3. Using the wetland system to purify the water that will be used in the building, allows a natural ritual to be put on display within the design that attempts to celebrate the rituals of daily life. The ritual of harvesting purifying, storing and using water, celebrates a ritual the child can be exposed to daily, allowing the wetland to become a source of educational energy that the child can draw off.

The water harvesting system used to support the irrigation demand of the agriculture in the community garden is simple system then the system investigated for water usage in the building.

The harvesting system has been divided into a number of steps:

1.Water is harvested from the roofs of the Play-Centre and Community Kitchen. The runoff from the roofs is collected in gutters and downpipes that then transport the harvested water into subsurface pipes.

2.Once the harvested water is in the subsurface pipes it is transported to a subsurface storage tank, located at the lowest point of the community garden.

3.Before the harvested water can be used to irrigate the agricultural landscape, it is filtered through a trickle filter. The trickle filter is located before the subsurface storage tank. The harvested water is transport, below the ground, into the trickle filter, where any sediment or

debris is removed. The water is then stored. The minerals and nutrients present in the harvested water are not removed because act as a fertilizer for the soil and aid in the growth of the agricultural produce.

4.When the water is needed for irrigation, the water stored in the subsurface tank is pumped to the surface using a solar pump. Runoff from the agricultural land is transported to the storage tank, in organic bioswales.

Water Calculations:

1. Monthly Yield:

Month	Average Monthly Percipitation P (M)	yield m3
Jan	0.102	530.91
Feb	0.111	577.755
Mar	0.081	421.605
Apr	0.042	218.61
May	0.016	83.28
Jun	0.007	36.435
Jul	0.004	20.82
Aug	0.003	15.615
Sept	0.02	104.1
Oct	0.069	359.145
Nov	0.106	551.73
Dec	0.106	551.73
Annual Ave	0.667	3471.735

Catchment	Area (m2)	Runoff Coeff
Roof	5350	0.9
Paving/Roads		0.8
Planted/Lawn	1950	0.2

2. Irrigation Demand:

Month	Planting Area	Weekly	Monthly	Irrigation Demand m3
Jan	1950	0.02	0.08	156
Feb	1950	0.02	0.08	156
Mar	1950	0.02	0.08	156
Apr	1950	0.02	0.08	156
May	1950	0.01	0.04	78
Jun	1950	0.01	0.04	78
Jul	1950	0.01	0.04	78
Aug	1950	0.01	0.04	78
Sept	1950	0.02	0.08	156
Oct	1950	0.02	0.08	156
Nov	1950	0.02	0.08	156
Dec	1950	0.02	0.08	156

3. Total Demand:

Month	Irrigation Dem m3	Dom Dem m3	Total m3
Jan	156	0	156
Feb	156	0	156
Mar	156	0	156
Apr	156	0	156
May	78	0	78
Jun	78	0	78
Jul	78	0	78
Aug	78	0	78
Sept	156	0	156
Oct	156	0	156
Nov	156	0	156
Dec	156	0	156

4. Sunsurface Storage Tank Sizing:

Month	Yield m3	Total Demand m3	Monthly Balance m3	Volume of water in Reservoir m3
jan	530.91	156	374.91	374.91
feb	577.755	156	421.755	796.665
mar	421.605	156	265.605	1062.27
apr	218.61	156	62.61	1124.88
may	83.28	78	5.28	1130.16
jun	36.435	78	-41.565	1088.595
jul	20.82	78	-57.18	1031.415
aug	15.615	78	-62.385	969.03
sept	104.1	156	-51.9	917.13
oct	359.145	156	203.145	1120.275
nov	551.73	156	395.73	1516.005
dec	551.73	156	395.73	1911.735

		m3	liters
Max volume of Water in tank		1911.735	1911735
Safety Factor 15%	1.15	2198.49525	2198495.25

Table 8.2. Water Calculations- agricultural system

agricultural land

subsurface tank

water harvested from roof

subsurface tank

water usage for irrigation

water catchment from roofs

existing watershed
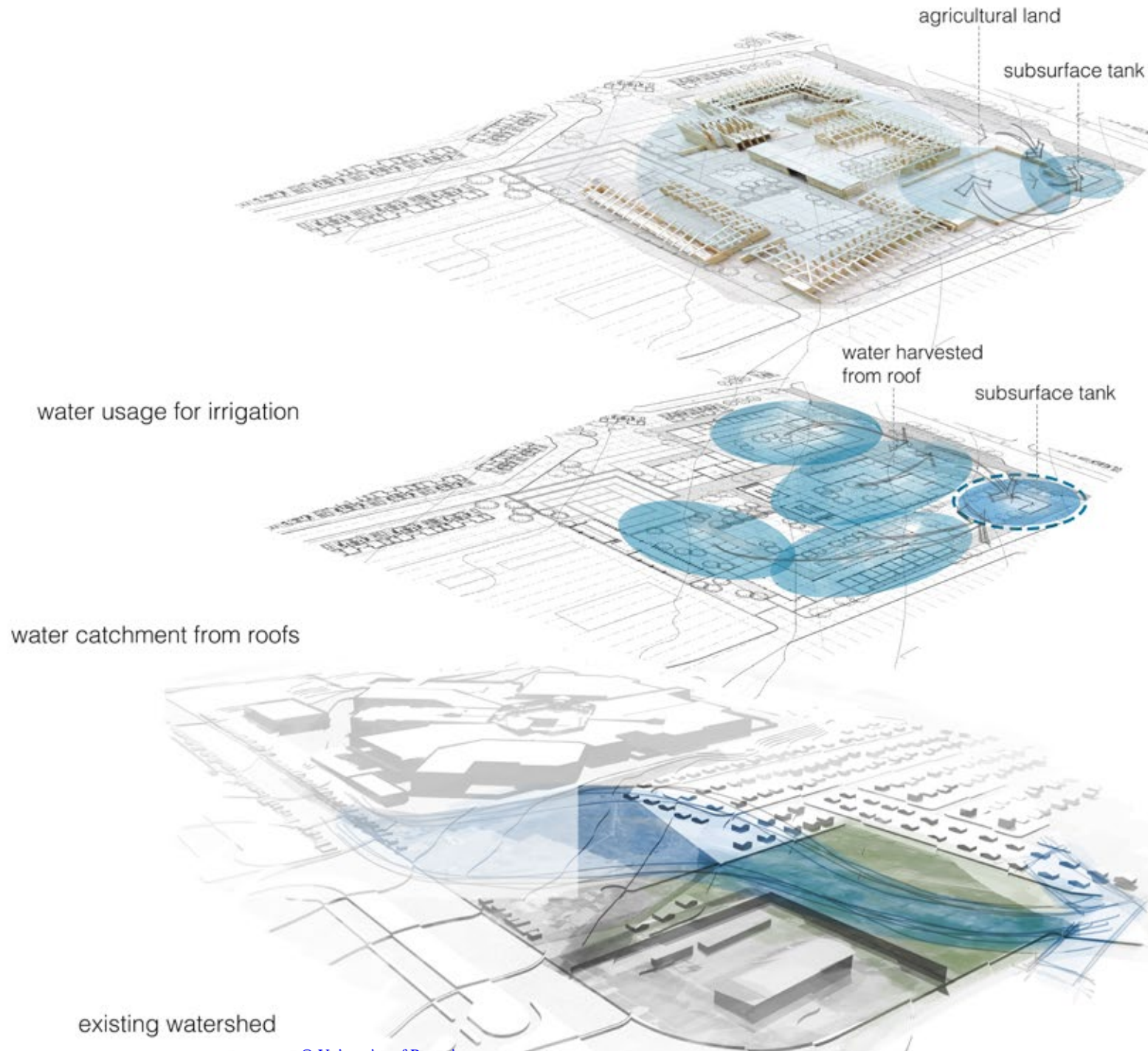
Figure 8.21. Water harvesting system for use for irrigation

Solar heat gain and shading

deciduous trees shade courtyard and cool spaces during summer

deciduous trees allow direct sunlight into courtyards and interior spaces.

Figure 8.22. Solar heat gain and shading concept sections

The courtyard spaces were the driving force during the development of the design of the Play-Centre and Community Kitchen. The intention for the design of these spaces was to act as an introduction and extension of the interior spaces and activities of the building.

The technical concept, considers how the physical fabric of architecture can facilitate the rituals and activities within each space. The intention for the investigation of the use of natural systems, to heat different spaces and provide natural light is, therefore, using the architecture to facilitate the solar heating and lighting of a space in order to influence the emotional impact and haptic quality of each space.

deciduous trees shade courtyard and cool spaces during summer

deciduous trees shade courtyard and cool spaces during summer

Summer

deciduous trees allow direct sunlight into courtyards and interior spaces.

deciduous trees allow direct sunlight into courtyards and interior spaces.

Winter

Solar heat gain and shading
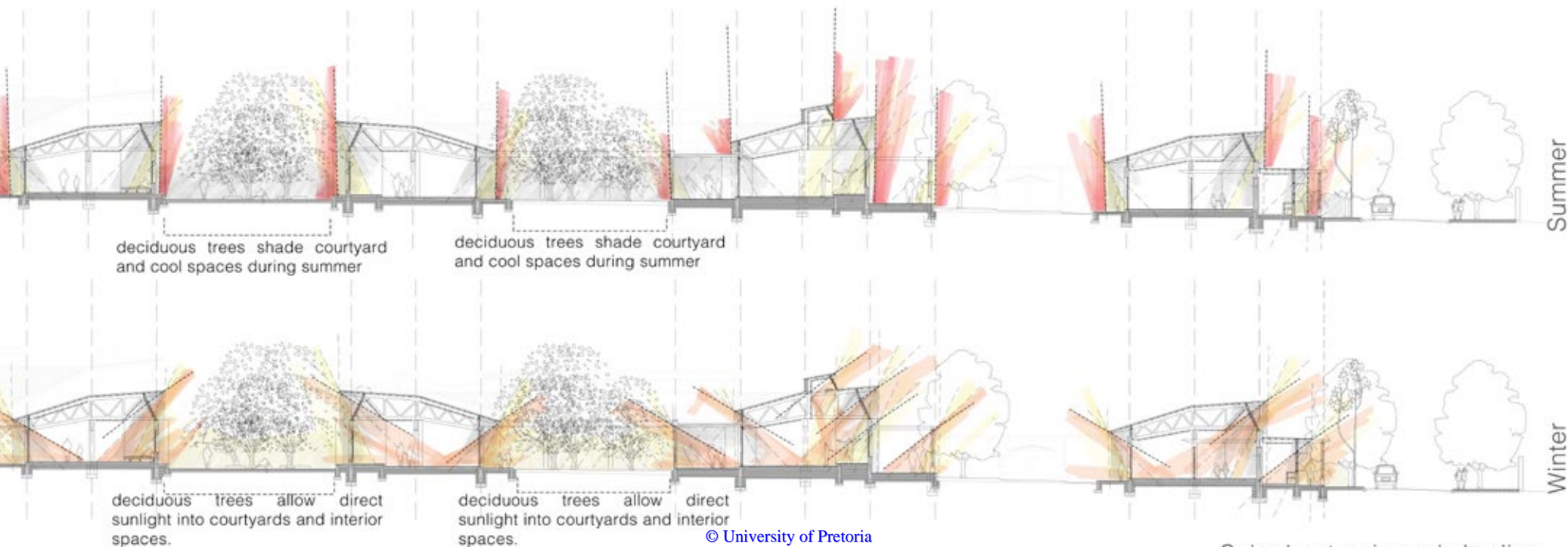
Orientation and solar study

In order to use solar radiation to effectively heat spaces, during winter, and only light space, during summer, the orientation of the design and use of appropriate shading devices is to be considered (Napier, A. 2000).

Building facades are to be shaded during summer, preventing solar radiation from over heating the interior spaces. Solar radiation is to be allowed into interior spaces, during winter, in order to passively heat the space.

The proposed design is orientated 85 degrees west of north. The slight deviation from the east-west axis (north facing building) proposed for passive design, creates difficulties in shading the interior spaces, on the south-west facing facade (Napier, A. 2000).

A solar study was conducted in order to understand, the impact of the buildings orientation on the solar inlet and shading of each facade.

The slightly NW-SE orientation of the building increases the amount of solar radiation, from the west, that falls on the south-west facing facade, during the afternoon. The increased solar radiation on this facade increases the amount of heat gained during the afternoon, in the south-western spaces of the Play-Centre. This results in the overheating of interior spaces, during the overheated period of the year. This overheating requires increased shading to prevent the excess solar inlet (Napier, A. 2000).

Test One : Base Test
Initial design proposal
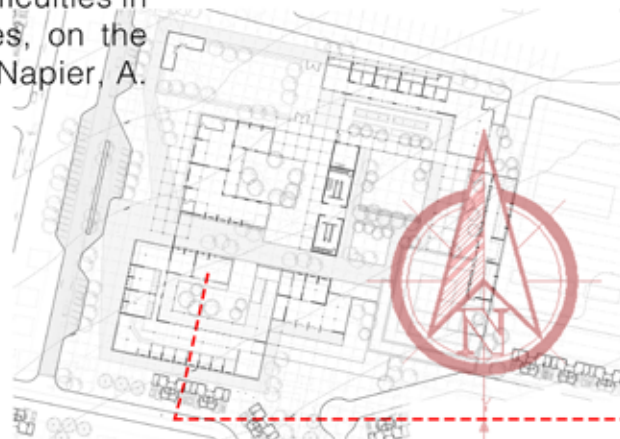
Figure 8.23. Orientation plan
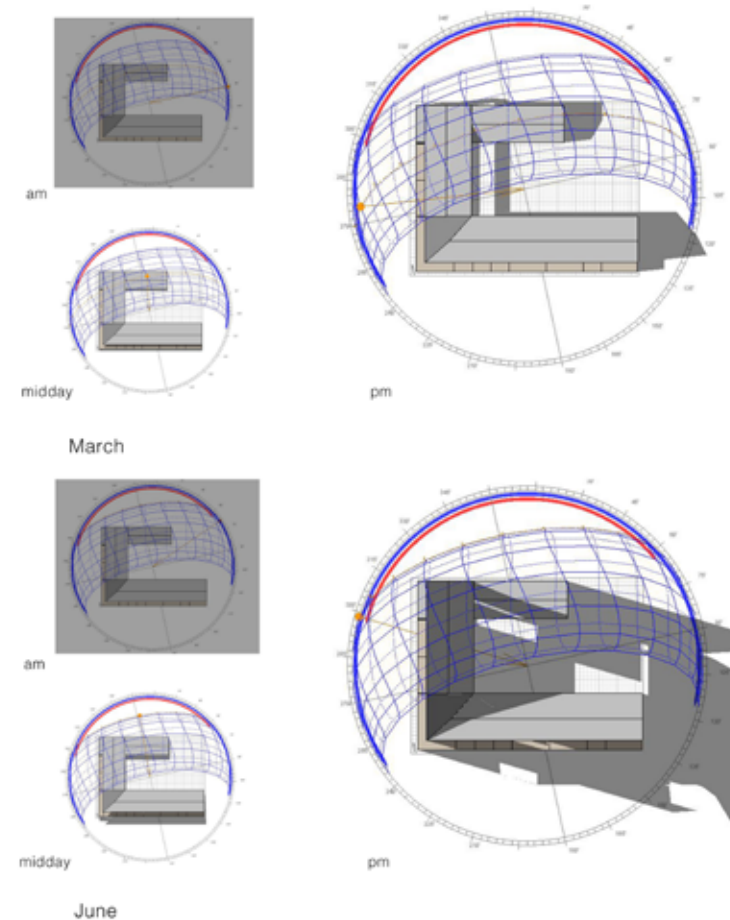
Figure 8.24. Solar study diagrams

September

December

Results One:

-   Slightly North West orientation results in extra direct solar inlet during the early mornings and late afternoons, on the Eastern and North Eastern and Western and South Western facades respectively.

-   The extra direct solar radiation results in an increase in heat gain within the interior spaces, during both summer and winter.

-The increase heat gain is encourages in winter but is to be avoided in summer.

In test two the overhangs are increased on the Western and South Western facades and additional shading devices added to the Western and South Western facades
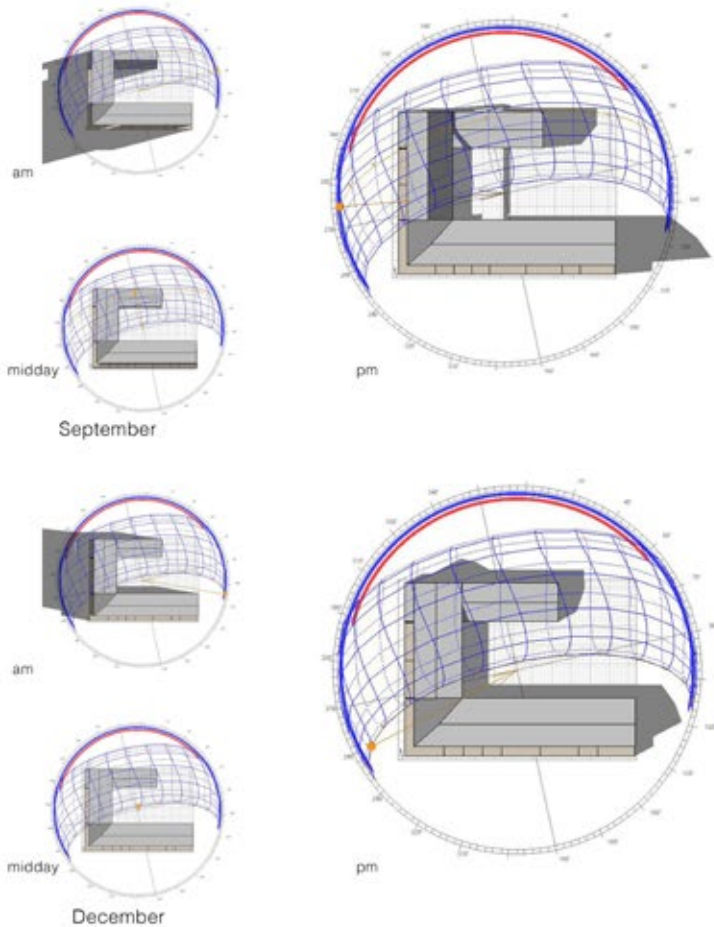
Test Two : Overhangs Extended and Device added

March

am
midday

pm

June
am
midday

pm

September

am
midday

pm

December

am
midday

pm
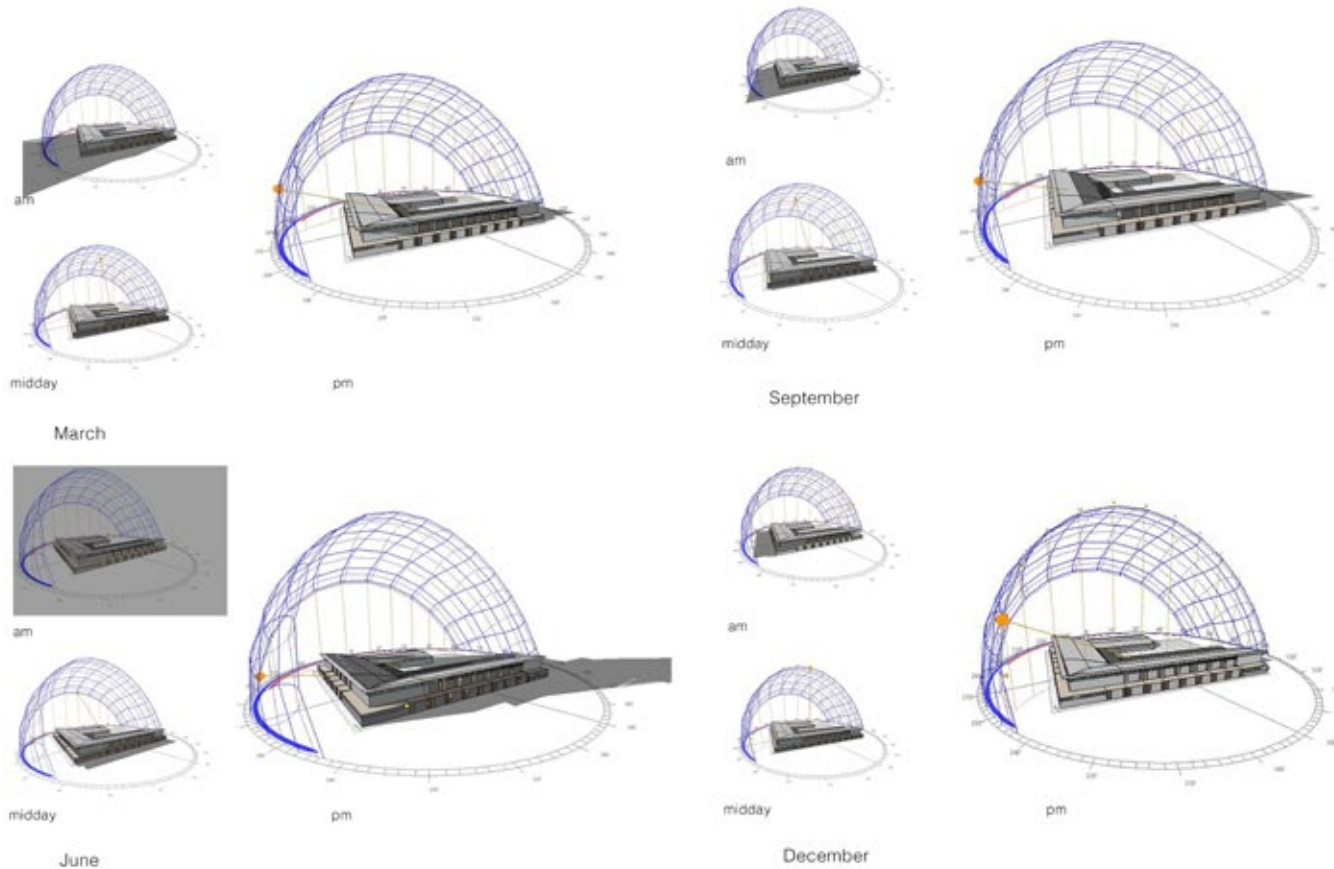
- The addition of a shading device and extended overhangs reduce the amount of direct solar radiation during the afternoons and early mornings.

- The additional shading reduces the amount of solar heat gained within the spaces during the summer months, but allows access of direct solar radiation during winter.

-The courtyard spaces remain over heated due to the excessive amount of direct solar raditaion they receive, therfore in test three trees are added in order to shade the overheated courtyards
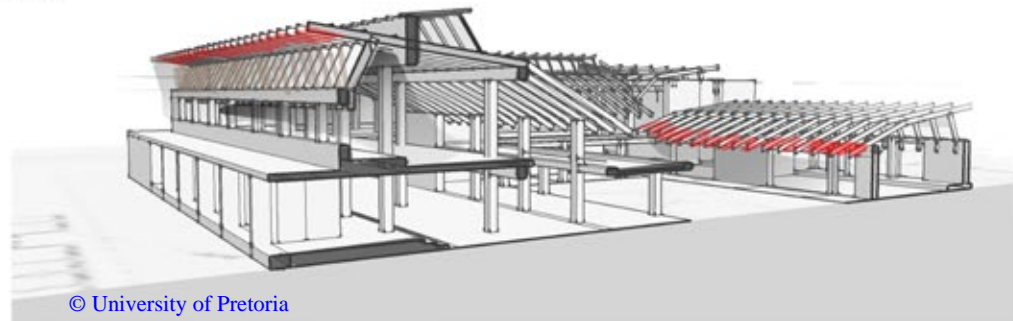
Test 3 : Courtyard Shaded and additional Shading devices added

am
midday
March

pm

am
midday
June

pm

am
midday
September

pm

am
midday
December

pm
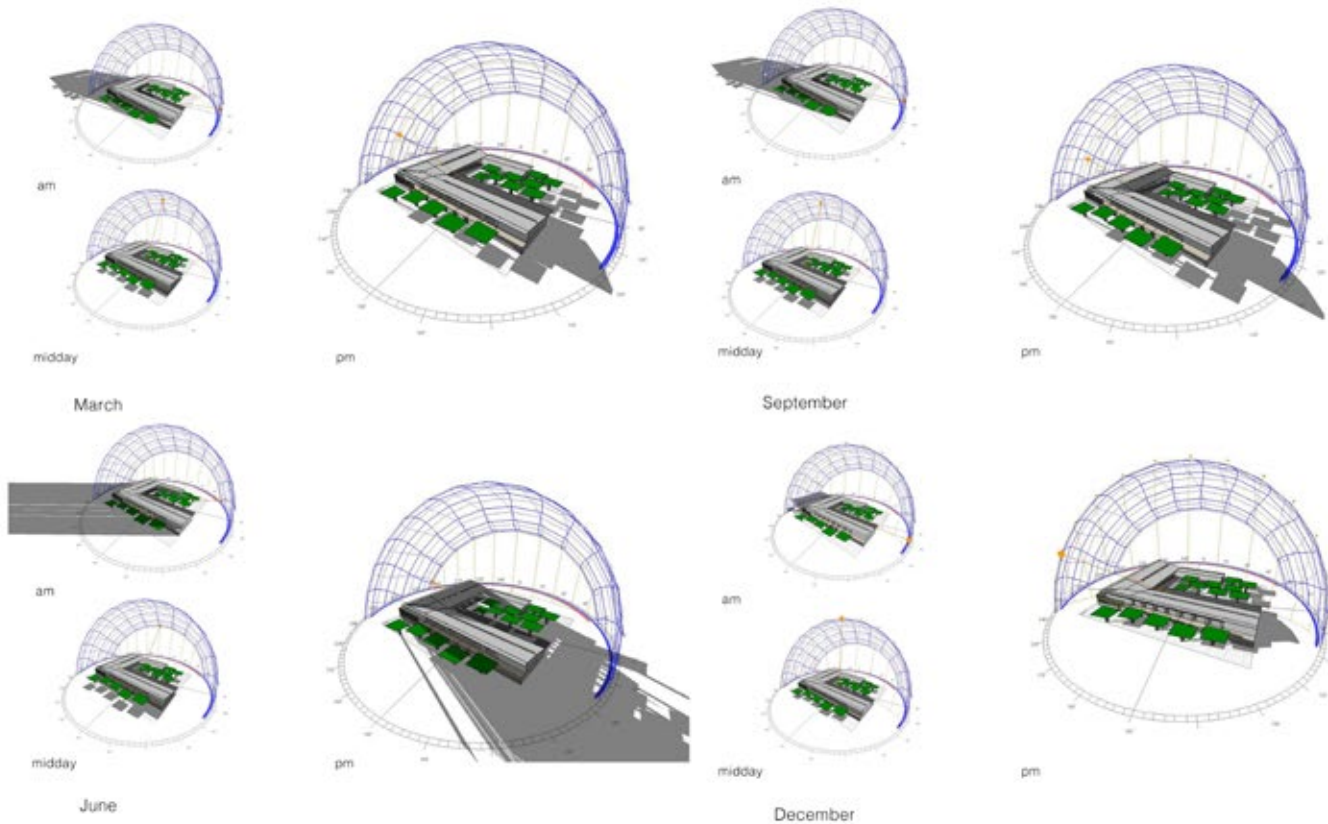
- The addition of trees reduces the amount of direct solar radiation in the courtyards and therefore creates spaces that the child is able to play in during the heat of summer.

-The shading created by the addition of trees extends into the interior spaces of the buildings and cools the air moving into the interior spaces.

Test Two:

-The additions Shading devices on the South Western and Western facades reduce the amount of direct solar radiation the interior South Western corner receives.

- This reduces the lighting levels within the space and creates a lighting quality within the space suitable for reading and teaching.

- The courtyard edges still have high lighting levels because the courtyards are receiving direct solar radiation.
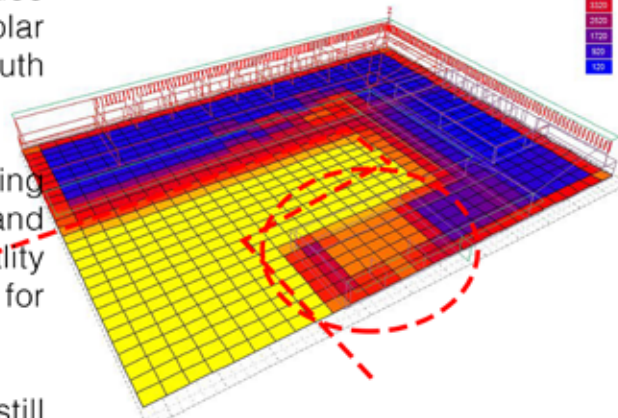
ground floor
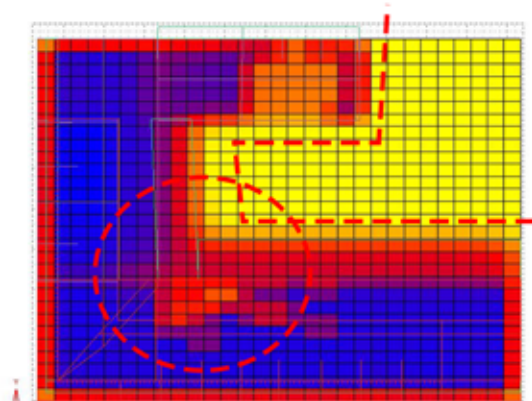
ground floor

Test Three:

- Addition of trees into the courtyards reduces the direct solar radiation on the building edges and breaks the harsh transition from exterior space to interior space.

- Areas within the plan have lower lighting levels and may become to dark for reading or teaching.

-Vertical light analysis reveals the areas within the plan that will require artificial lighting.
-The resulting areas are, over the black boards and book shelves within teaching spaces and library spaces. The lighting levels vertically within the spaces fall below the minimum of 500 lux and artificial light will need to be used in order to create the correct levels.
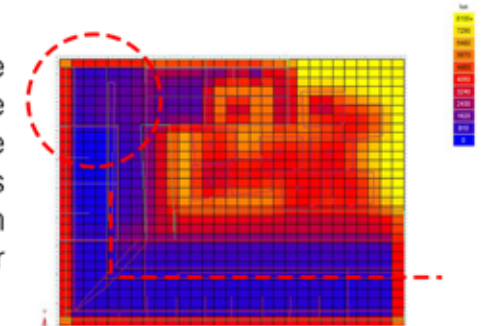
ground floor
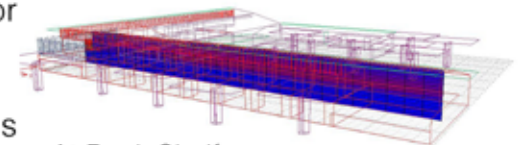
At Book Shelf
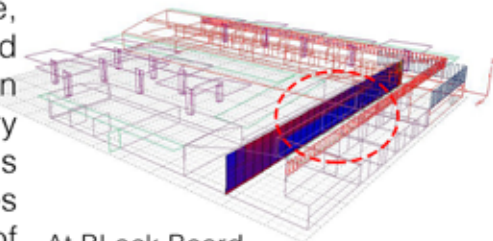
At BLack Board
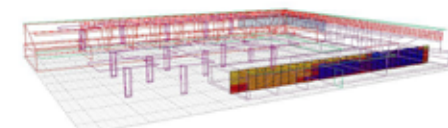
East West Classroom

Shading result

Shading devices appropriate for east and west facing facades, is vertical shading. Vertical devices block the low angled solar radiation at sunrise and sunset (Napier, A.2000).

The south-west facing facade receives a large amount of solar radiation in the late afternoon, at sunset. The solar angles at sunset are low and require vertical shading to prevent inlet.

Figure 8.25, illustrates where the vertical shading will be added to the clerestory windows on the south-west facing facade.

In order to naturally light the deep spaces within the building, a light shaft and shelf are proposed within the centre of the space.

Figure 8.25, illustrates the proposed shaft and shelf for natural lighting in the deeper spaces.

Natural light is allowed to enter the light shaft through the north facing facade. Light is reflected within the shaft and into the spaces below, off lightly painted ceiling boards and mass wall on the southern most edge of the shaft.

South-West Facing Facade

North-East Facing Facade

Added vertical shading

Ceiling and mass wall reflect sunlight

Additional light shelf
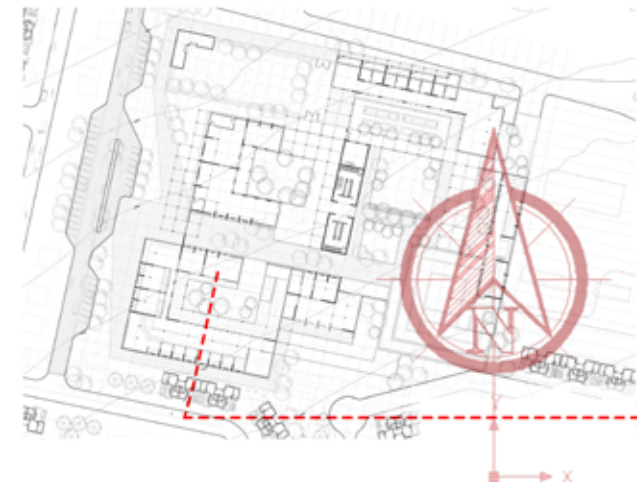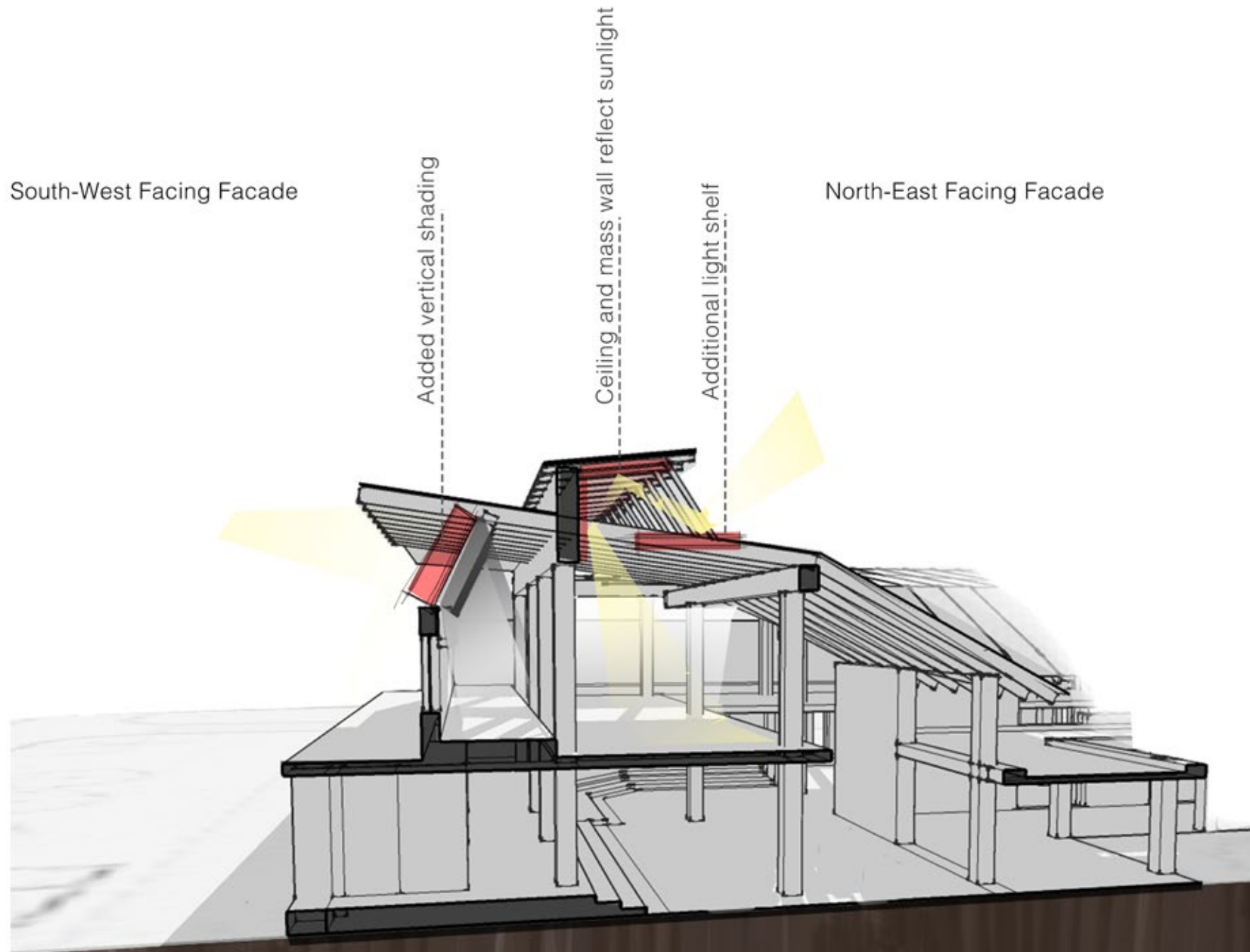
Figure 8.25. 3D Library section_shading device added

Passive heating and cooling

Passive ventilation and the heating and cooling of spaces, is driven by warm air rising to the highest point within roof system and being drawn out of the interior spaces. The upward movement of the warmer air allows for cooler air on the ground levels to be drawn into and through the interior spaces (Napier, A. 2000).

The air movement is created by a greater differentiation in hot and cooler air temperatures and with greater heights for air to move through (Napier, A. 2000). Therefore, air movement through a space is created by cooler air moving into the space on the lower, cooler facade and warmer existing the space on the higher, warmer facade. The warmer air at the highest point of the ventilation shaft, will to act as an exhaust, drawing the rising warm air out and pulling cooler air into the spaces.

This principle, in a South African context, dictates that the heights point of the ventilation stack or the exit point for warm air, within the space is to be on the warmer northern facade of the building.

The proposed light shaft acts as the ventilation stack within the designed spaces.

For a number of the designed spaces, the light shaft is located on the southern most edge of the roof structure. This placement results, in the air at the highest point of the roof structure, being to cool to adequately draw warm air out of the interior spaces.

In order to create the air condition that will allow the light shaft to act as an exhausted for the warm air, within the space, a mass element is added to the back edge and base of the light shaft (refer to Figure 8.26).

As the mass element is heated and re-radiates heat into the space above, the surrounding air will be heated. With the temperature of the air increasing at the highest point of the light shaft (ventilation stack), the stack is able to draw the rising warm air out of the interior space, and allow cooler air to move into the spaces, from the cooler facades and shaded courtyards, cooling the interior spaces, during the summer months.

In order to heat spaces, during winter, the highest point of the ventilation stack (the exhaust opening) can be closed. This allows the warm rising air to be trapped within the space and heat the cooler air and the spaces.

Figure 8.27 and 28, illustrate the passive heating and cooling system for the designed spaces.
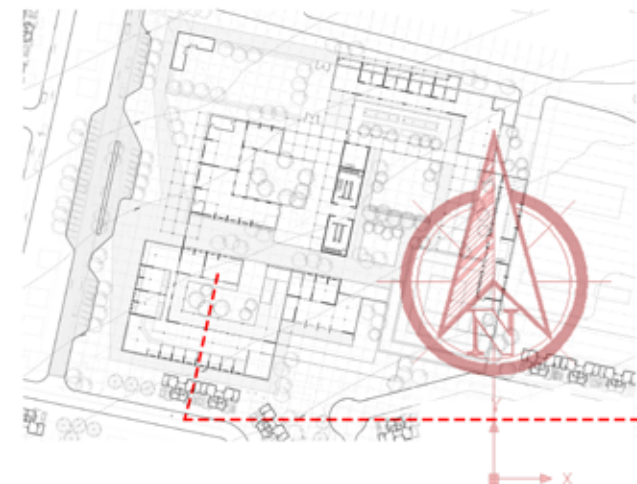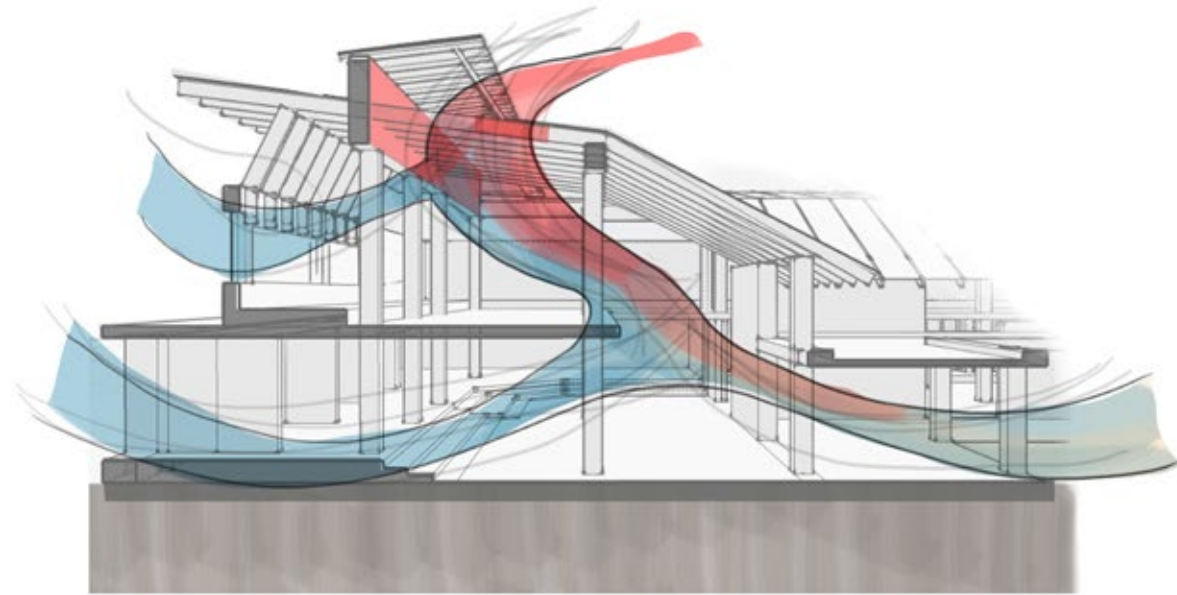
Figure 8.27. 3D Library section_Heating and cooling, Summer
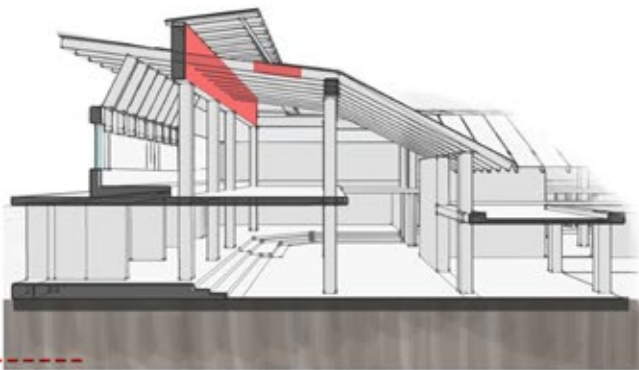
Figure 8.26. 3D Library section_Heating and cooling, mass
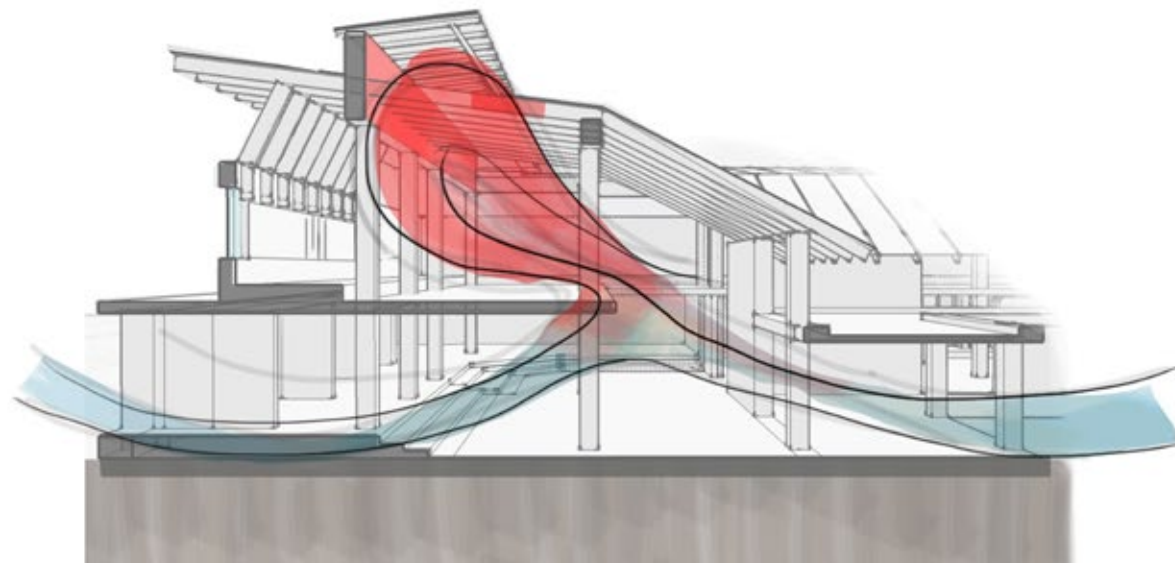
Figure 8.28. 3D Library section_Heating and cooling, Winter.

Enviroment Systems Anaysis

Direct Solar Gains_ Over heated period
Shading Devices and External Shading (trees) shade interior spaces and courtyards reducing the amount of direct solar radiation in the spaces and therefore the heat gained

Direct Solar Gains_ Under heated period
Shading Devices and External Shading Allow for an increase in direct solar heat gain and all for the interior spaces to warm up, using the sun's heat
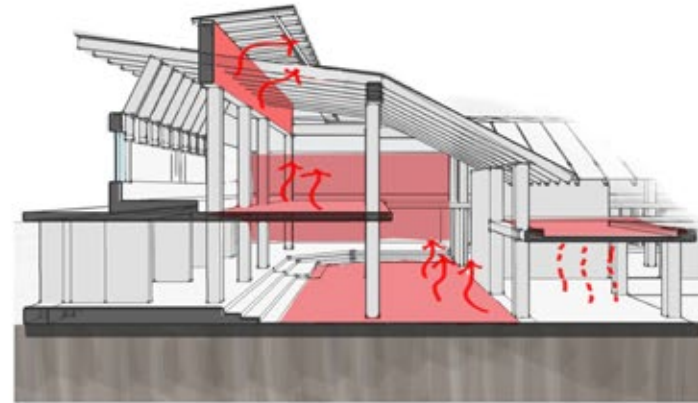
Indirect Solar Gains_ Mass Materials within the building absord and re-radiate heat into the interior spaces throughout the day, the heat radiated from the mass will heat up the interior spaces. The heat gained in the under heated period will warm the interior spaces when its cold and can be used to draw out heat during the over heated period. The Mass In the stack will heat up the air around it, acting as an exhausted pulling the warm air within the interior spaces out and drawing cooler air in.
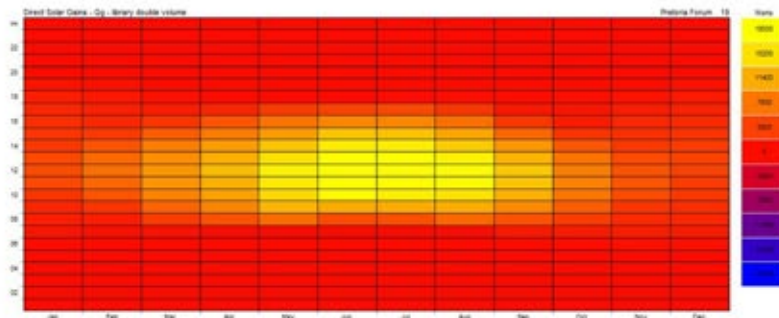
Direct Solar Gains

Indirect Solar Gains
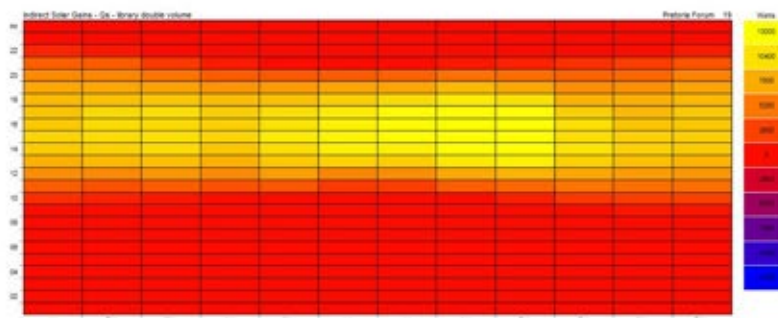
Over-heated period

Under-heated period
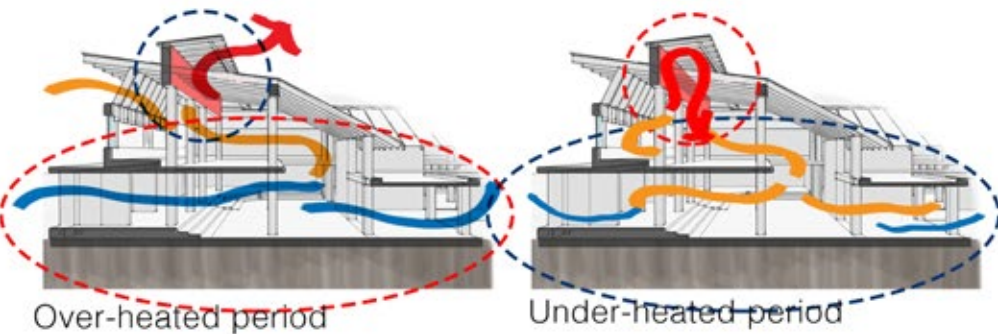
Inter-Zonal Gains desribes the heat gained and lost between zones within the interior spaces.

During the Over-Heated period the larger library zone looses heat to the ventilation stack as the warm air is pulled in to the warmer zone and out of the the interior spaces. During the Under-Heated period the Library zone gains heat from the ventilation stack as warm air in the stack is trapped and circulated into the library zone below.

Inter-Zonal Gains
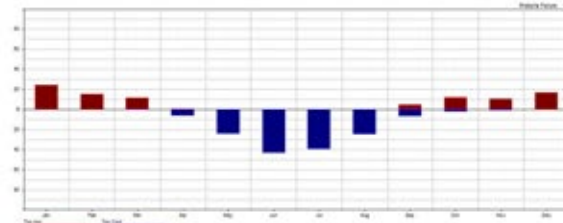
Comfort Levels: 75%

Temperature Distribution Coldest day

Temperature Distribution Hottest day

The Comfort Levels within the interior spaces, lies within the range of 75%; 5% lower then generally accepted. This comfort level was determined without taking the ventialtion stack and human factors into consideration.

The level of comfort will increase as the user adjust the number of open windows and doors or the type of clothing they are wearing.

The comfort level will also increase as the warm air in the stack is used to warm cooler spaces, in under heated periods, or is used as the exhaust for arm air in the over heated periods.
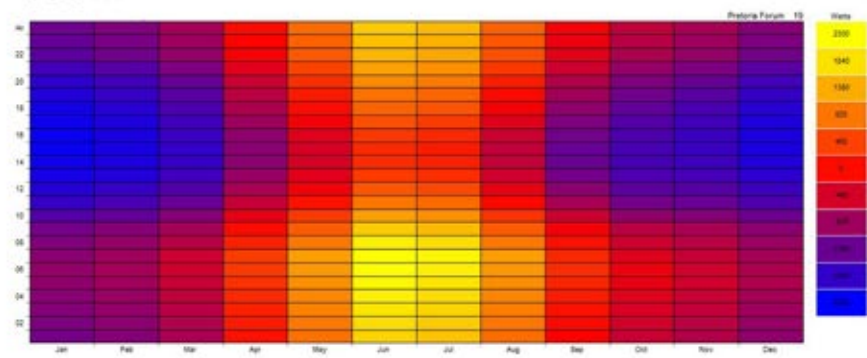
09_ Conclusion

01_Conclusion

The design developed for a child-focused civic space, within Mabopane, concentrated on developing and enabling a resilient child.

The design focused on using the energies and resources inherent to the community in order to develop this resilience. These energies and resources currently remain unused and unshared within the Mabopane, due to a lack of civic (city) space that facilitates and enable the sharing.

The creation of civic space that was determined by the daily rituals of the child allowed for the understanding that the emotional intelligence of a child influences and enables the child's resilience. This understanding lead to the investigation driven by architecture and space's ability to have a lasting emotional impact on the child. Emotional Space.

In order to understand how architecture can make emotional spaces, how the child learns and interacts was investigated. This understanding lead to the design of spaces driven by their ability to facilitate rituals that create relationship, celebrate and create belonging and teach the child.

The rituals driven by connection, celebration and learning allowed for the creation of appropriate spaces that facilitate these rituals. The understanding of the spaces that will enable the resilience of the child, determined the appropriate architecture. The architecture is not only specific to the need of the local context but to the personal needs of the user.

The spaces and resulting architecture facilitates spaces that enable rituals that have a lasting impact on the child within their local community. Strengthening the child and the future adults of the community.

The hodgepodge of energies and skills that define the fabric of an African city, hold the potential for these cities to be resilient. Creating the opportunity for these energies and resources to be shared, within civic spaces, allows for the resilient and regenerative development of these cities. The Play-Centre and Community Kitchen within Mabopane, becomes the civic space that creates the opportunity for the child network to share and draw off energies that hold the potential for their resilience.

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01_References

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