# A BREWERY IN MARABASTAD

ML Cronjé

Opgedra aan Pieter Cronjé

Dankie aan Jan, Arthur, Edna en my ouers.

**THE LIQUID NETWORK**

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Study field: Regenerative Architecture

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# PROJECT SUMMARY

**Programme:** A brewery with a closed-loop production system that supports secondary social and retail functions such as a bar, bakery and facilities for informal trade
**Site:** The edge of Marabastad, at the crossing of Boom Street and Steenhovenspruit
25° 44'24"S 28° 10'43"E
**Research field:** Human settlements and urbanism
**Client:** Craft brewers of Marabastad
**Theoretical premises:** Regenerative design, Systems Theory and the Non-modern Thesis
**Main research question:** Can one integrate the opportunistic culture in Marabastad with existing natural and socio-economic systems to create opportunities for economic empowerment through trade and production, as well as for social cohesion through public engagement and interaction
**Architectural issue:** Architecture is treated as a systemic tool in an urban context to facilitate regeneration in economic, social and ecological systems.
**Key words:** Regenerative architecture, systems theory, resilience, Marabastad

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# SAMEVATTING

Hoe kan argitektuur ‘n positiewe invloed hê op die ontwikkeling van geïntegreerde ekonomiese, sosiale en ekologiese sisteme in ‘n stedelike omgewing? Hierdie dissertasie ondersoek die rol wat argitektuur as ‘n sistemiese instrument (in die vorm van ‘n brouery) kan speel om herlewing te bewerkstellig in die stedelike konteks van Marabastad. Deur gebruik te maak van die teorieë van herskeppende ontwerp, sistemiese teorie en die nie-moderne tesis word ‘n argitektuur van deelname tussen verskillende bestaande netwerke op die terrein genereer, wat inwoners bemagtig terwyl dit nuwe geleenthede skep vir produksie, handel en sosiale interaksie. Hierdie aktiwiteite is geanker in die konteks en natuurlike siklusse en sisteme.

# ABSTRACT

How can architecture have a positive impact on the development of integrated economic, social and ecological systems in an urban precinct? This dissertation investigates the role that architecture can play as a systemic tool (in the form of a brewery) to facilitate regeneration in the urban context of Marabastad. Through the theories of regenerative design, systems theory and the non-modern thesis, an architecture of collaboration between various existing networks on site is established, that empowers resident traders while creating new opportunities for production, retail and social interaction. These activities are rooted in their context and interact with natural cycles and systems.

Figure 1.1: Billboard on entry of Marabastad
*(Source: Author)*

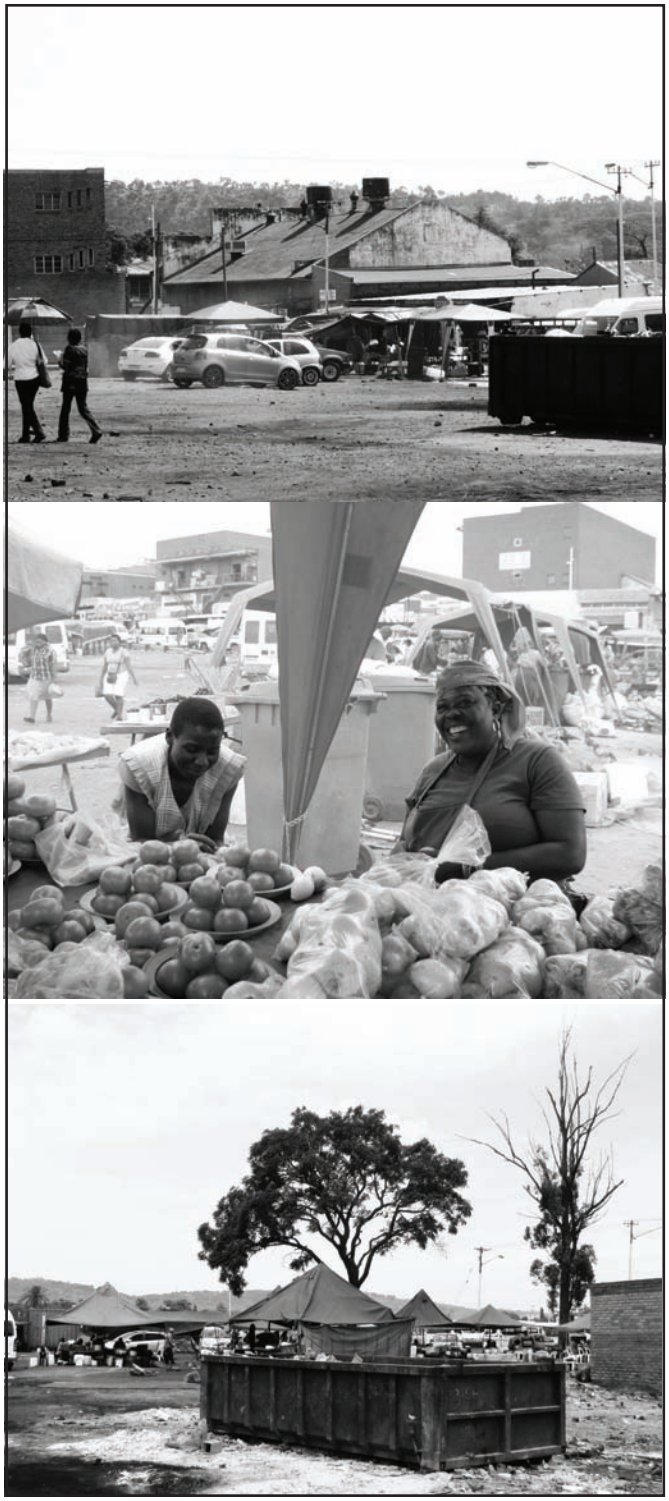


Figure 1.2: Spaces of production and trade
*(Source: Author)*

# 1. INTRODUCTION

We live in a changing world, where the population increases at an alarming rate, while access to resources becomes ever more limited because of overuse and depletion. The practice of "sustainable" development, where the status quo is merely maintained, is not enough to create a world where people can live in abundance. In the words of Professor Peter Marcuse of the University of Colombia:

> "To think that their present circumstances and their present societal arrangements might be sustained; that is an unsustainable thought for the majority of the world's people" (Marcuse, 1998:103).

Therefore, we do not need merely sustainable human settlements; we need communities that can actively participate in the regeneration of their environments and so enhance their own quality of life as well as their environments. We need to establish communities that are adaptable enough to not only survive, but also thrive under unstable conditions, who can look on their circumstances with an optimistic and opportunistic eye and see possibilities for growth and regeneration.

This dissertation explores the role that architecture, as a systemic intervention in the resilient community of Marabastad, can play to enhance the relationship between natural systems and human settlements so as to improve integration of economic, social and environmental networks.

# 1.1. BACKGROUND

## *1.1.1. Regenerative Architecture*

1. John T. Lyle (1934–1998) was a professor of landscape architecture at the California State Polytechnic University, Pomona.

The theory of Regenerative Architecture was originally a concept developed in landscape architecture. The term was first coined in 1996 by John Tillman Lyle[1] in his book *Regenerative Design for Sustainable Development*, to describe a system that "provides for the continuous replacement, through its own functional processes, of the energy and materials used in its operation" (Moore, 2001:138). The approach is concerned with design that is place-specific (regionalist, but more so, with regards to using local technology and building techniques), and which draws from existing systems (ecological, social, political, etc.) inherent in a place. This makes use of the "story of place" as not only a design generator, but also a way of establishing the vocation or "job" of a site and retaining that as a way of protecting and enhancing existing natural systems. This has seen practical application in the work of the Regenesis Group[2], examples of which are usually located in a natural environment and try to preserve and enhance existing natural systems.

2. The Regenesis Group specializes in a living systems, place-based approach to planning, design, development, and education. Regenesis was founded in 1995 and is based in Santa Fe, NM. *(www.regenesisgroup.com)*

According to David Littlefield (senior lecturer in architecture at the University of the West of England), in an urban environment the term "regeneration" appears to be more appropriate to describe the changes and fixes applied to the urban form when trying to halt decay or generate further value from already exploited land, but the term is definitely more suggestive of organic renewal (2012:8-9). Here, it is important to understand the city cannot actually heal or renew itself; it is dependent on active agents within the environment (such as the community) to incite change (*ibid.*, 8-9).

In the context of this thesis, the aim of regeneration is to serve as an approach to design, in an urban environment, that makes full use of existing possibilities within the community to enhance economic opportunity and social cohesion, in a way that reverses the decline of natural systems and creates a healthy, regenerative system of economic, social and natural abundance.


Figure 1.3: Building in Marabastad
*(Source: Francois Swanepoel)*

## 1.2. THE RESILIENCE OF MARABASTAD

> "More people poured into Pretoria from the north and the east. The more insecure people felt, the more permanent they looked, as they burrowed into location life, putting up tin shacks on the small plots allowed to the residents. Perpetual refugees seeking life and safety in Jim Crow Town" (Mphahlele, 1959:105-106).

Marabastad is a settlement within the city of Tshwane Metropolitan Municipality. Ever since its formation, the residents of Marabastad have been reliant on opportunism to survive. The very location of the precinct speaks of the hope of deriving benefit from its proximity to the city with its promise of employment and progress. Ever since, the story of Marabastad has been that of a group of marginalised communities struggling against practices and policies that "in ever new ways undermined and destroyed their attempts to establish legal tenure within the city as a safeguard for a sustainable community life" (Aziz Tayob Partnership, 2002:145).


Figure 1.4: Travellers
*(Source: David Goldblatt)*

Figure 1.5: Violence in Marabastad 2012
*(Source: Independent Online )*

During the nineteenth and twentieth centuries, both local and national governments implemented various laws and regulations to curb the development of and remove inner city black suburbs like Marabastad. Since the City Council of Pretoria refused to acknowledge the permanence of the African population in the city, an attitude of indifference towards maintenance of the area was fostered (Friedman, 1994:123). This made it easy to proclaim the area a slum and forcibly remove people from as early as 1912, even more so since people couldn't own the land they were living on.

The haphazard construction and informal cultural responses to restrictive legislation of the inhabitants of Marabastad were thorns in the City Council's side, because of their vision of Pretoria as a well-organised and ordered urban environment.


Figure 1.6: Production of food *(Source: Author)*

Figure 1.7: Violence in Marabastad 2012 *(Source: Independent Online)*

A measure of self-organisation is required for a community to be resilient, and conditions of freedom, experimentation and a certain amount of disorder (the most prevalent in the environment of Marabastad) encourage self-organization (Meadows, 2008:81). These conditions can be threatening to authorities, because they cannot be controlled or predicted, as is clearly seen in the example of Marabastad. However, they provide opportunities for communities to create ever more resilient and adaptive systems.

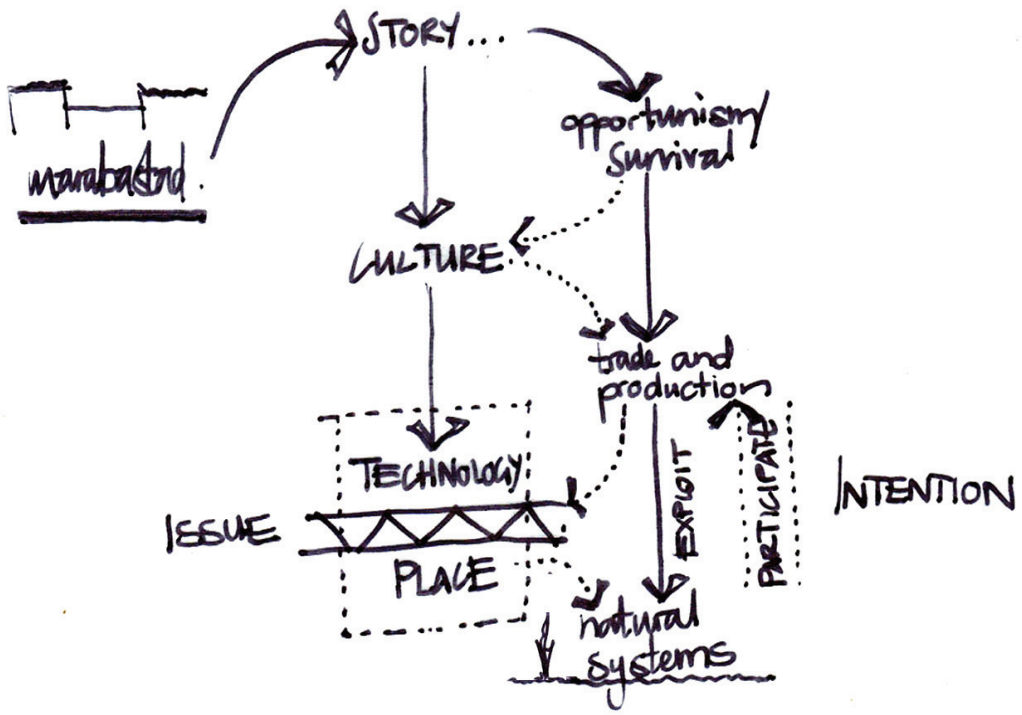
# 1.3. PROBLEM STATEMENT

## *1.3.1. The general issue*

The heritage of the community of Marabastad is one of resilience in the face of adversity, mainly because an opportunistic culture (necessary for survival) has been established. Even though this culture allows people to survive, they cannot thrive, because they are still plagued by economic restrictions.

Their exploitation of their immediate environment through illegal production and the appropriation of any available open space has caused the degeneration of natural systems, such as the Steenhovenspruit, and aspects of the urban environment that could have sustained them. By integrating this opportunistic culture with existing natural and socio-economic systems, various opportunities for economic empowerment through trade and production, as well as through social cohesion through public interaction, can be created.

Figure 1.8: Diagram of problem statement
*(Source: Author)*



### *1.3.2. The urban issue*

The degeneration and dislocation of the urban and natural environment has created a perception of Marabastad as a slum that is ridden with crime and decay. Even though this may be partly true, the precinct still holds value and opportunity in its heritage, location and function as a trade centre. Proposed new developments in the area, suggested by the municipality in 2013[3], are a threat to the existing essence and character of historical Marabastad, and do not take into account the value of the historical centre as a unique destination rooted in history and culture.

3. Tshwane Vision 2055 (http://www.tshwane2055.gov.za)

### *1.3.3. The architectural issue*

Focus is placed on the role that architecture can play as a systemic tool to allow for participation of human institutions in natural cycles, in order to create a holistic and regenerative system that can improve economic, social and environmental networks, and so induce regeneration in Marabastad.

### *1.3.4. Sub-problems*

When approaching architectural design as an initiator of a system, the impact that an architectural intervention would have within a specific context needs to be understood.

The sub-problems are:
_ How do the existing social, economic and ecological systems in Marabastad function?
_ What functions within the intervention will offer the best leverage points to improve existing systems and integrate them with ecological systems?
_ What role does the tangible and intangible heritage of Marabastad play in its functioning, and how is that best addressed through architecture?
_ How can architecture be used to facilitate a closed-loop production system?

# 1.4. AIMS AND OBJECTIVES

## *1.4.1. The general intention*

The participation of human centred socio-economic networks in the cycles of natural systems will be encouraged, to reverse the decline of the natural and urban environment in Marabastad, and regenerate social, economic and ecological systems.

## *1.4.2. The urban intention*

The existing essence and character of Marabastad will be retained, protected and enhanced while reconnecting the area to the rest of the city. The aim is to draw from existing heritage and resilient systems of trade and production to establish the precinct as a unique cultural destination that will regenerate the area economically, socially and environmentally.

## *1.4.3. The architectural intentions*

Existing cultural opportunities in Marabastad will be used to implement an architectural intervention that will act as a systemic tool to feed into the existing systems at work in Marabastad, by allowing the various networks to not only exploit, but also participate in, different social, economic and ecological systems. The architecture will make possible the integration of various networks to facilitate productive work that will create social, economic and environmental abundance.

# 1.5. DELIMITATIONS AND ASSUMPTIONS

_ The Arup Tshwane Metropolitan Framework[4] has been adopted, with a few alterations to the specific site surroundings (see Chapter 3).

_ Site visits and observations have been used to gather data about informal traders and shop owners in Marabastad that can be regarded as accurate and trustworthy.

_ The purpose of this dissertation is to propose a design solution. The time

4. An urban framework proposed by international company ARUP with the intention of improving public transport, residential opportunity and pedestrian access in the inner city

constraint therefore does not allow an in-depth study of existing systems in Marabastad, and assumptions derived from visits to the site and conversations with residents are regarded as hermeneutically correct.

_ It is assumed that resources that are provided in the design of the building will be used in the same way that resources are currently exploited in Marabastad. The success of the building will therefore rely on the culture in and level of participation of the community.

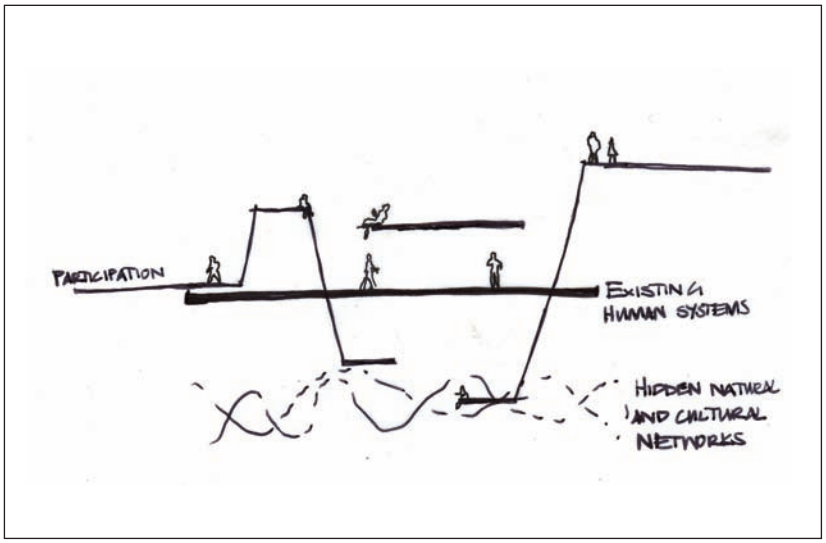



Figure 1.9: Diagram of architectural intent
*(Source: Author)*

# 1.6. RESEARCH METHODOLOGY

## *1.6.1. Quantitative and qualitative field research*

Research is conducted through site visits and observations, as well as the interpretation of artefacts, historical events, and the current operation of inhabitants, in order to establish a stance on the existing conditions within Marabastad with regards to how space is used, what the necessities are for positive networks to continue functioning, and why certain systems are exploited.

## *1.6.2. Historical and physical studies of the context*

Historical and physical analyses aided by literature and academic writing on the history of Marabastad, as well as mapping of the area, are undertaken. The aim is to:

_ Help identify current and future possibilities inherent in Marabastad.

_ Create a better understanding of the development and culture prevalent in Marabastad.

_ Better substantiate any systemic intervention within existing conditions.

_ Support the arguments derived from theoretical inquiry.

_ Establish a baseline knowledge of the precinct with the reader.

_ Inform the eventual architectural intervention.

Figure 1.10: Spaces of opportunism
*(Source: Author)*

### *1.6.3. Literature study*

With regards to a design approach, sources from the following fields are studied:

_ Regenerative architecture

To understand how architecture can play a role in the regeneration of an urban environment through its function and morphology.

_ Resilience theory

To gain an understanding of what makes a community resilient, and how factors that promote regenerative resilience can be designed into a system.

_ Cities as social–ecological systems

The functioning of cities as integrated systems of ecological, social and intangible aspects, and how architecture contributes to the integration of these aspects. In this dissertation, in the context of Marabastad, focus is placed on the informal trading system and natural system of Steenhovenspruit, as well as social interaction that occurs in well-functioning public spaces.

_ Non-modern theory

Important because of its focus on collaboration between humans and non-humans, instead of the domination and human centred focus of modern and post-modern theory. The functioning and awareness of natural systems are therefore considered just as important as human systems, and the industrial processes are supplemented by human interactions.

### *1.6.4. Evaluative analysis of precedents*

Precedent and case studies are conducted through diagrammatic analysis with regards to:

_ Context:

Architectural interventions are studied that are inserted in a slum as a tool for regeneration and that respect and enhance the existing urban fabric.

_ Function:

Analysis of small-scale breweries is done to assist with establishing the physical requirements of a craft brewery and to create well-functioning social spaces where spontaneous interaction can occur.

_ Form:

Examples of interventions that create public spaces and allow for participation in social and economic systems are studied.

_ Materials and technology:

Research is done on construction techniques that use an appropriate palette of materials that respond to the existing context.

## 1.7. AN ENDING AND A BEGINNING

The importance of place and the rootedness of the project are clear from the intentions and approach to the design problem. A thorough understanding of the story of the precinct is the first step in the process of attempting to grasp the complexity of the way that the people of Marabastad live and have managed to survive in a context where power was exploited by the authorities for a long period of time.

"Howzit, Boet? Can you pass me a Black Label there?"

"Ai man. You don't know this place, do you? Have you been here before?"

"Some. Why?"

"That fancy cellphone there, put it away. Your wallet too. Don't worry, we'll look after you. We'll look nicely. Here. I'm Zakes."

"Nice to meet you, man."

"Welcome to Marabi."


Figure 2.1: Location of Pretoria CBD and Daspoort
*(Source: Author)*

Figure 2.2: Study area
*(Source: Author)*

# 2. "WELCOME TO MARABI!"

## 2.1. STUDY AREA

Marabastad falls within the north-western quadrant of the Central Business District of Pretoria in the municipal district of Tshwane. It lies at the confluence of two rivers, the Apies River and the Steenhovenspruit, where the first native labourers settled at a place originally named Maraba's Kraal. Today Marabastad acts as a portal to Pretoria for the thousands of migrant workers who travel daily from outlying townships to work in the city. The legacy of years of restrictive legislation and policies during apartheid still affects the community of Marabastad, which cannot thrive in an environment that is not maintained and is rife with criminal activity.

The defined boundaries of Marabastad indicated on Figure 2.2, are the Metrorail to the north (1), the channelled Steenhovenspruit to the east (2), Es'kia Mphahlele Drive to the west (3) and Struben Street to the south (4). These large servitudes were established to physically disconnect an unwanted Black, Indian and Coloured settlement from the rest of the city.

## 2.2. THE STORY OF MARABASTAD

On a visit to Marabastad, the first thing that hits one is the smell. It is a dusty place, with an oily undertone of magwinya frying away in a drum. The inhabitants make and sell consumables in every imaginable place: in an oil drum, inside a ruin covered loosely with some corrugated sheeting, and next to the channel that provides water for a wash. This is how the people survive; they use what is available. And it works, like it has for a very long time.

### *2.2.1. Action: a history of oppression*

> "A pilgrimage at a communal water tap. It was like this in Second Avenue, you knew it must be like that at every other communal tap in Marabastad. Sometimes the people quarrelled, then they laughed, then they eavesdropped and they gossiped. Some sat on their tins. One or two suckled their babies while they waited. The tins filled up at their own good time." (Mphahlele, 1959:29)

The city of Pretoria was established in 1855 and ever since, migrant workers have been seeking refuge and opportunity in this economic centre. Initially, many were after things that all human beings aspire to: an opportunity to earn an income, and a place to call home. As one of the locations prescribed for the settlement of "black" communities, the story of Marabastad has always been that of a group of marginalised communities who struggled against the power of authorities to implement policies that destroyed and undermined their efforts to gain rightful ownership within the city (Aziz Tayob Partnership, 2002:145).

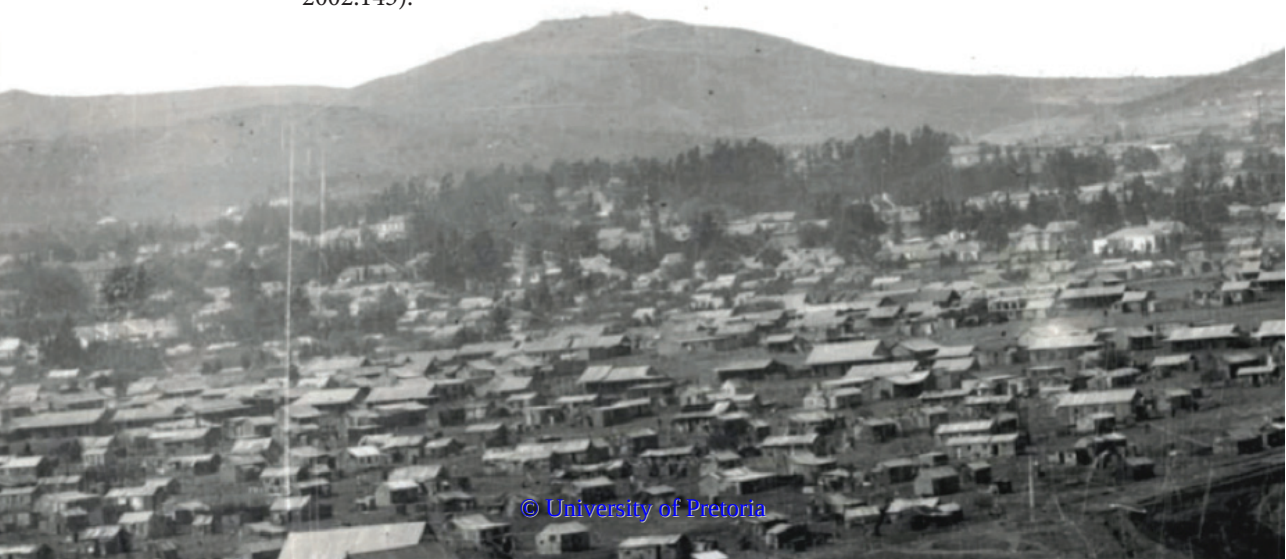


Figure 2.3: 1905 image of Marabastad taken from Daspoortrand towards the southwest
*(Source: Aziz Tayob Parnership)*

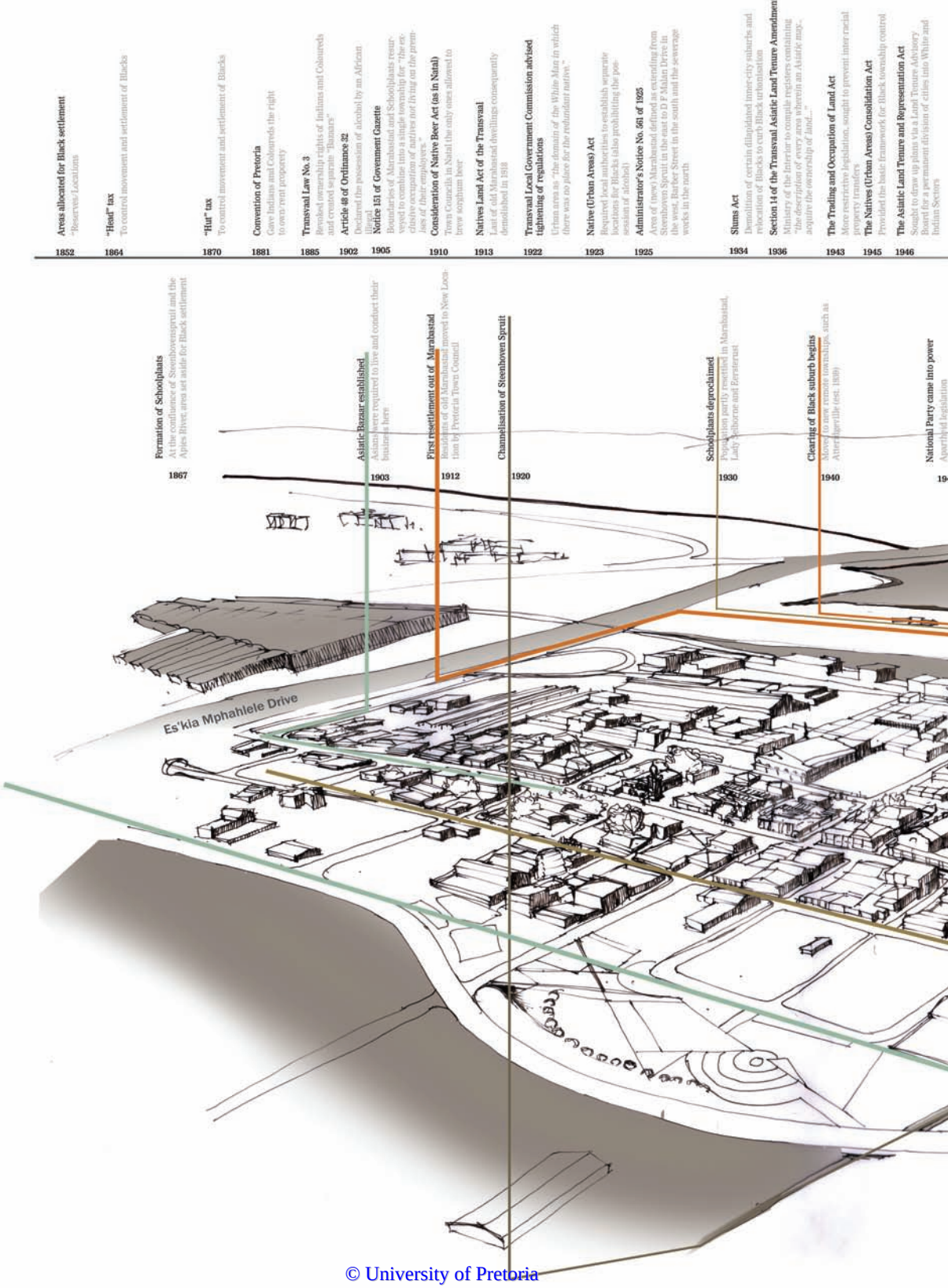
As early as 1852, before the official foundation of the town of Pretoria, specific areas had been reserved for black citizens (*ibid.*, 2002:146). As a result of this and other attempts by various authorities to control its movements and settlement, the African community of Pretoria was never allowed to develop freely (Friedman, 1994:9). During the nineteenth and twentieth century, local and national governments implemented various laws and regulations to try to curb the development of and remove black inner city suburbs like Marabastad to the distant periphery of white city centres and suburbs.

Residents were not allowed to build permanent brick buildings in Marabastad, only timber shanties, and were further prohibited to construct, alter or renew their homes in any way (*ibid.*, 1994:129). There was no water supply and the area lacked hygienic standards and thus was characterised by poverty, squalor and promiscuity (Aziz Tayob Partnership, 2002:150). This made it easy to proclaim the area a slum and forcibly remove people from as early as 1912.

Natural elements with potential beauty were used as barriers to restrict the growth of Marabastad and disconnect it from the inner city: Steenhovenspruit was channelized in 1920 (Grobbelaar, 2011:37-38), and the natural exit of the Apies River through Daspoort was considered an ideal location for the municipal sewage works that eventually replaced the oldest section of Marabastad. Ironically, the old Marabastad "slum" was supposedly cleared because of health and safety reasons, only to be replaced by an effluent treatment plant.

Restrictive legislation was not limited to ownership and tenure. The black population was subject to laws prohibiting trade in white areas and the consumption of alcohol, and even the purchase of certain ingredients like maize or sorghum malt. Combined with the pass laws that prescribed and controlled the movement of the Black man, the authorities managed to turn almost every African into a criminal.

Figure 2.4: Timeline of legislation and spatial impact
*(Source: Author)*



**The Population Registration Act**
Led to growing of Black Population in homelands lying closest to metropolitan areas
1950

**The Group Areas Act**
Administered by the Group Areas Board, targeted primarily at Indian and Coloured groupings
1950

**Natives Resettlement Act**
Opened the way for forced removals of Blacks from urban areas and eradication of entire suburbs such as Sophiatown
1954

**Group Area Development Act**
To provide a mechanism for expropriation and development
1955

**Proclamation of Laudium and Eersterust**
Indians and Coloured resettled
1958

**Bantu Self-government Act**
Led to growing of Black Population in homelands lying closest to metropolitan areas
1959

**Community Development Act**
Community Development Board expropriated the City Council of Pretoria as the owner of the Stands in the Asiatic Bazaar, placing it under the control of National Government
1967

**New Constitution of South Africa**
re-enfranchised the Coloured population (women as well as men), and enfranchised the Indian population. Blacks continued to be excluded.
1984

**Free Settlement Areas Act**
Indians allowed to trade freely in the CBD
1988

**Interim Constitution of South Africa**
ANC-led government elected
1994

**The Restitution of Land Rights Act**
Land returned to those forcibly removed
1994

**Final Constitution of South Africa (Act 108 of 1996)**
Equal rights for all South Africans
1996

**Housing Act (107 of 1997)**
National Housing Board abolished, changed status of land ownership in Marabastad
1997

**National Heritage Resources Act (25 of 1999)**
Equal rights for all South Africans
1999

**Tshwane 2055**
Vision of a "city of excellence"
2012

48

**Last Blacks resettled**
From Marabastad and Bantule
1953

**Formation of Cape Boys Location**
1963

**Belle Ombre Station proposed**
Creation of barrier
1965

**Freeway Scheme**
Areas of Asiatic Bazaar demolished to make way for extensive freeway system
1967

**Belle Ombre Station completed**
Creation of barrier
1981

**New Municipality of City of Tshwane**
2000

**Squatters in Marabastad relocated to Mamelodi**
2002

**Hawkers forcibly removed from city and Marabastad**
2012

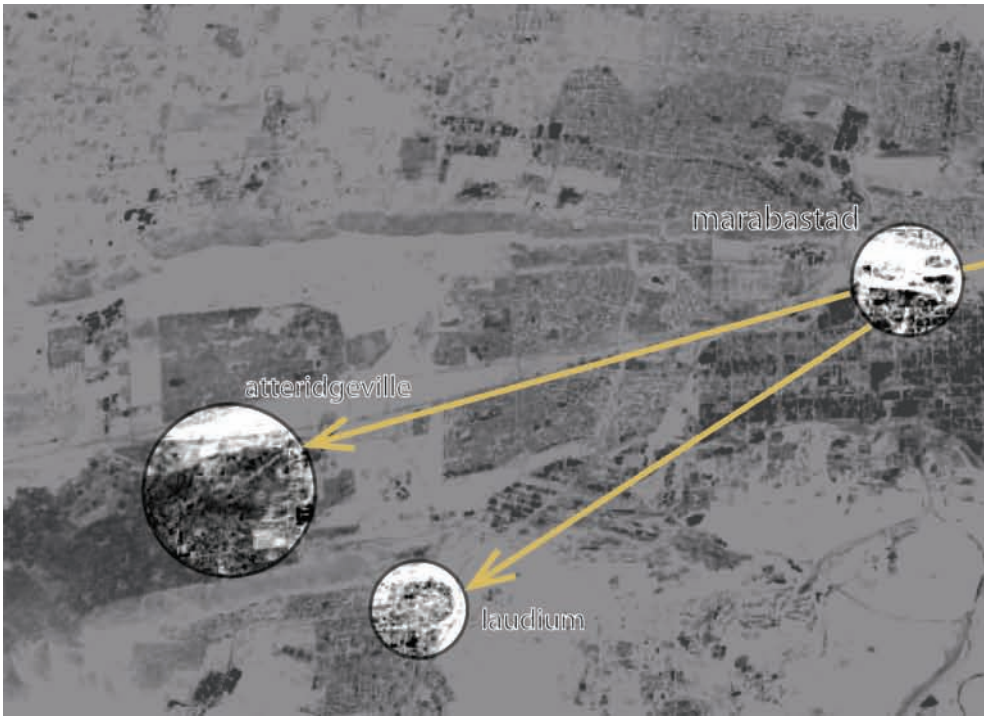
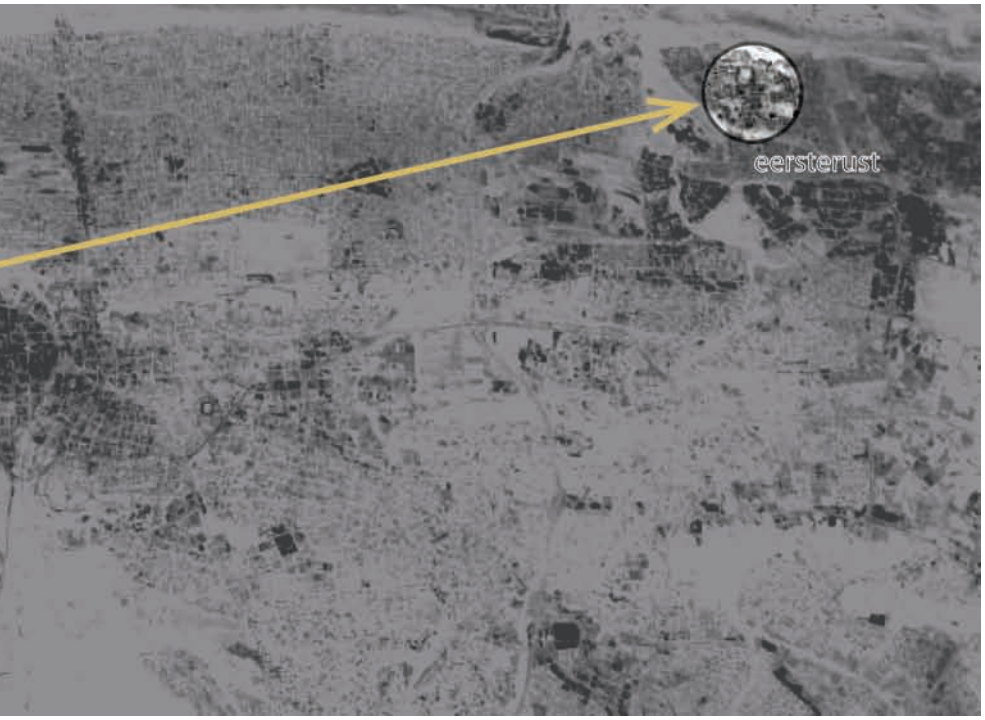



Figure 2.5: Map of relocation
*(Source: Author)*

In 1950, the Group Areas Act and ensuing Group Areas Development Act of 1955 swept residents away to newly established locations far removed from the city and its opportunities, and also effectively halted development in Marabastad for decades. The construction of Belle Ombre Station and its railway tracks created yet another barrier between Marabastad and the surrounding natural environment, while the new Asiatic Bazaar trading complex was built to create an alternative for Indian traders in the city and so assist their removal from the Central Business District (Aziz Tayob Partnership, 2002:163).

The end of the Apartheid government ushered in legislation trying to right the wrongs of many years, including the Restitution of Land Rights Act of 1994. Since then, various frameworks for Marabastad have been proposed, including one by the Aziz Tayob Partnership in 1999 and one by Arup in 2012, but new sustainable development in the area is yet to be seen.




## *2.2.2. Reaction: A history of opportunism*

To create the intended ordered, well-organised urban environment envisioned during its early years, the City Council of Pretoria was reliant on a compliant and ordered workforce. Since its formation, Marabastad's jumbled housing, its existing culture and its informal cultural responses in the form of tea parties, beer brewing, opportunistic squatting and illegal subletting of land challenged the vision of the authorities of a structured city. In this way, the city was formed as much by the underclasses as by the authorities (Friedman, 1994:11), as they carved a life for themselves under harsh and unjust circumstances .

Because of the division of black settlements into different jurisdictions, the attempts to geographically contain the black population was haphazard at best, a situation the population exploited to define their own spatial boundaries (ibid., 1994:122). They simply moved from one area to another, subletting in the Asiatic Bazaar where it was tolerated, and so negated the regulations that intended to segregate racial groups.

## 2.2.3. *Beer brewing and related activities*

Informal cultural reactions to the control that local and national government exerted over Marabastad were mainly defensive strategies that revolved to a large extent around beer brewing and the related cultural environment.

> "Drinking culture fostered compliance as well as resistance, passive acceptance as well as indignant action, hopelessness as well as a sense of empowerment" (as stated by C. Ambler and J. Crush cited by Friedman, 1994:150).

Many women turned to brewing and selling beer as a source of income, and such participation in the informal trade sector highlights the economic resilience and independence of urban African women, who were considered the most economically vulnerable (Friedman, 1994:155). Ezekiel Mphahlele (1959:44) effectively describes the role that beer played in the economic empowerment of women:

> "That's right – that's how a woman does it; look at us, we do not sit and look up to our husbands or fathers to work alone; we have sent our children to school with the money from beer selling."

Figure 2.6: Traditional beer brewing *(Source: sahistory.org)*

Like beer brewing, most informal cultural responses centred on earning an additional income; hawking was common, and it was possible for an entire family to be sustained by the income from informal trade. The Chetty family, who started out as a family of informal traders, ended up owning the Orient Bioscope and a host of commercial enterprises (Naidoo, 2008) (see Figure 2.6 for a depiction of the Orient Theatre today). Informal trading not only provided a source of income, but also formed a significant part of the character of black townships, as described in the creative writing of people who lived in Marabastad, Sophiatown and District Six during the early to mid-90s (Deborah Hart, 1991:70). Subletting, especially to people who were not legally allowed to rent rooms, was also an important source of income for many Indians, who sometimes even exploited the presence of prostitution in Marabastad by letting rooms to prostitutes for a sixpence (Friedman, 1994:163).

Marabastad has a history of illicit behaviour that took place behind closed doors, false panels and under floorboards, a natural response of exploitation in a restricted environment by a resilient community. After the Group Areas Act of 1950, many families continued to live illegally in the precinct, hiding in attics to escape arrest. Beer that had been brewed illegally was traditionally hidden under the floor or in holes in the ground during nightly inspections.


Figure 2.7: The Orient Theatre
*(Source: author)*

### *2.2.4. The ongoing story of neglect and opportunism*

Today, Marabastad continuously faces challenges of lack of maintenance, urban decay and crime, but is also still home to a large number of informal traders and micro-enterprises (Aziz Tayob Partnership, 2002:225). The proximity of the fresh produce market (or "big market" as the locals call it) creates economic opportunities for informal traders, who contribute R600 million of the market's annual turnover of R2 billion (Maromo, 2012), and the presence of Belle Ombre Station creates opportunity for further informal trade with thousands of pedestrians who pass through the area on a daily basis. Despite the value they add to the local economy, the presence of informal traders fails to correspond with the vision of the local government to make the City of Tshwane "A Capital of Excellence", and so they recently again sought the removal of traders under the pretence of "cleaning up the city" (Anonymous, 2012).

Since the establishment of democracy in 1994, the Restitution of Land Rights Act has been passed, which gives previous owners or tenants the right to reclaim land from authorities. Squatters have since appeared on empty plots in Marabastad, and were removed and resettled in Mamelodi in April 2002 (Anonymous, 2002). However, opportunistic land invasion still occurs, especially by informal traders around resources such as Steenhovenspruit and the busier pedestrian routes.

Land reclamation claims have been lagging for eight to ten years, compounded by continued lack of support from local authorities, resulting in the community of Marabastad still being reliant on a culture of opportunism to survive.

The working class in Marabastad has played as big a role in the formation of the city as the urban authorities, as they created a life for themselves despite many hardships, and have emerged as a community that has displayed resilience and a capacity for survival, largely because of their ability to recognise and exploit opportunity.

Figure 2.8: Informal traders outside Belle Ombre station
*(Source: Author)*


Figure 2.9: Printing shop in Marabastad
*(Source: Author)*


Figure 2.10: Hawkers and Tshwane bosses make peace
*(Source: Eye Witness News)*

## 2.3. THE STATUS QUO

### *2.3.1. Physical Boundaries*

Marabastad is bounded by Steenhovenspruit to the east, the railway lines and ridge to the north, Es'kia Mphahlele Drive to the west and Struben Street to the south. These physical boundaries function more as barriers, showing the lengths authorities were prepared to go to separate the black location from the city. Using natural assets such as the spruit as barriers not only isolated Marabastad, but it inadvertently resulted in the disconnection of the people of Marabastad from their natural environment.

### *2.3.2. Steenhovenspruit*

Steenhovenspruit remains Marabastad's predominant natural feature, even though it has been canalised since 1920. It currently functions as a storm water channel and serves a catchment area of 42km$^2$ (Shand, 2012: 33).

Pedestrians and traders freely dump all kinds of waste in the spruit and on its banks, as its channelled condition mostly conceals it from view. It also provides a private, hidden space where people clean themselves, their clothing, and other articles.

The presence of water and its embodied kinetic energy provide many unutilised opportunities within the precinct, such as a place to interact and relax around a source of water. It is an important natural system currently disregarded by many and exploited by the community of Marabastad.

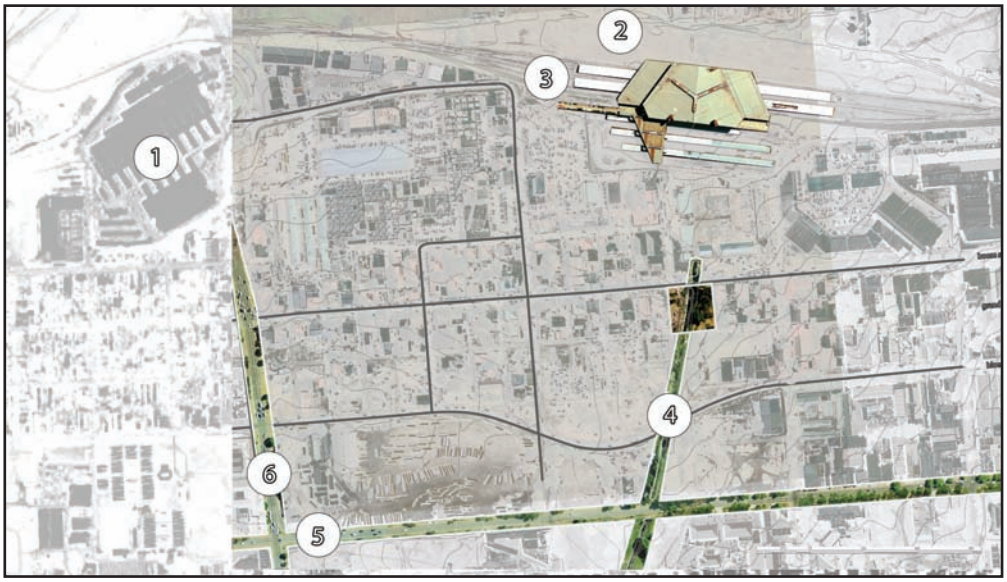



Figure 2.11: Map of infrastructural barriers around Marabastad.
1. Fresh produce market
2. Daspoort sewage treatment plant
3. Metrorail railway
4. Steenhovenspruit
5. Struben Street
6. Es'kia Mphahlele Street
*(Source: Author)*

Figure 2.12: View of Steenhovenspruit from Boom Street looking south
*(Source: Author)*

Figure 2.13: View of Steenhovenspruit from Bloed Street looking west
*(Source: Author)*

## 2.3.3. *Character and urban fabric*

The urban fabric of Marabastad (see Figure 2.16) consists of a very fine typological grain that has been retained in most areas between Bloed and Mogul Streets. The large city blocks to the south were previously built up with the same complex fabric, but were demolished to create vast open areas that form yet another barrier between Marabastad and the rest of the city. To the north, the grain is interrupted by newer large-scale developments like the new Asiatic Bazaar, which further dominate the existing buildings.

The remaining fabric is in varying states of decay, but is continuous enough to provide the precinct with a very distinct character and sense of place. The fine grain aids in creating a very pedestrian-friendly precinct. Vehicular traffic is interrupted by robots at every intersection on Boom Street, making it very easy for pedestrians to traverse the road, even though it is a one-way into the city. This very busy pedestrian route creates a desirable area for trade, and so any available spaces between buildings and in alleys have been mostly filled (illegally) with small shops.

Figure 2.14: Elevation of Seventh Street
*(Source: Fellow student)*

Figure 2.15: Elevation of Boom Street
*(Source: Fellow student)*

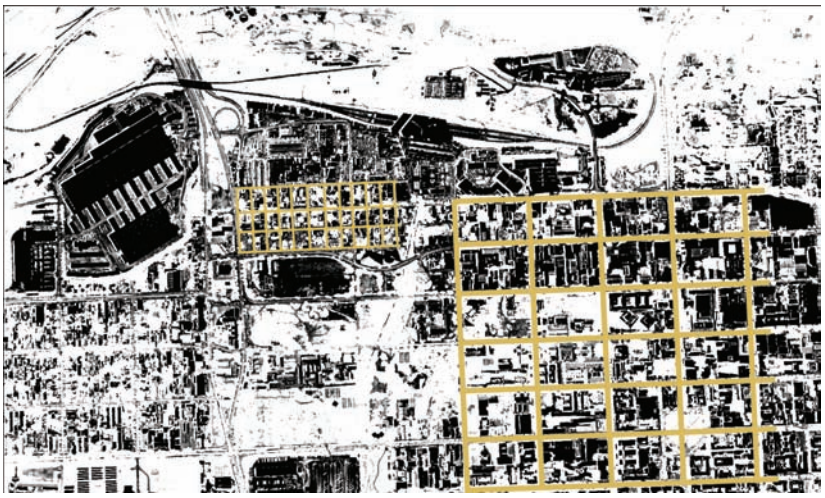


Figure 2.16: Figure ground showing difference urban fabric *(Source: Author)*

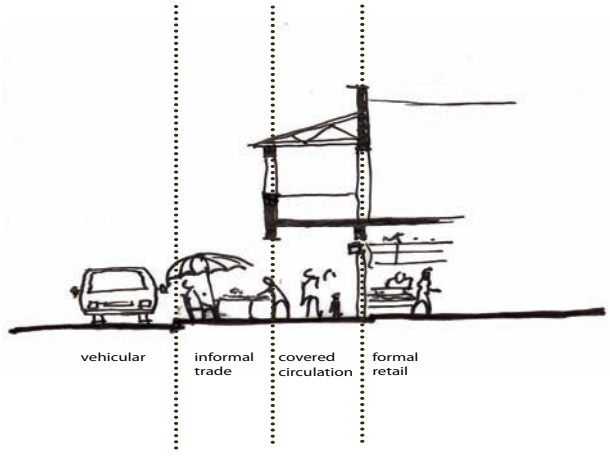



Figure 2.17: Cross section through Boom street showing pedestrian character
*(Source: Author, along with fellow student)*

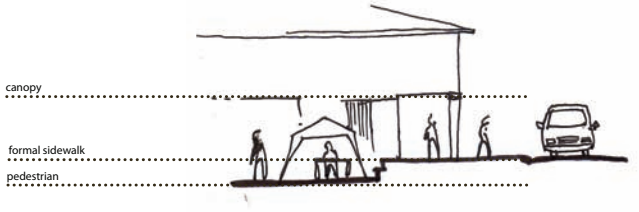



Figure 2.18: Cross section through Boom street showing pedestrian character
*(Source: Author, along with fellow student)*

## 2.3.4. *Public transport and related activities*

Marabastad functions as a modal transport interchange due to the presence of Belle Ombre Station, which also acts as an economic driver. Thousands of commuters flood Marabastad on a daily basis, arriving from surrounding townships on the train to take buses and taxis to outlying suburbs early in the morning and back after their working day. The large numbers of pedestrians in the streets of the precinct represent economic opportunity.

The following list denotes the number of people that travel through the area daily by way of public transport (Aziz Tayob Partnership, 2002:138) (see Figure 2.18).

| | |
|---|---|
| 1. Putco Bus Station | 12 000 persons/day |
| 2. 7th Street Informal Taxi Rank | 500 persons/day |
| 3. Bazaar Street Informal Taxi Rank | 3500 persons/day |
| 4. Belle Ombre Station | 24 000 persons/day |
| 5. Belle Ombre Bus Stop | 9 000 persons/day |
| 6. Belle Ombre Informal Taxi Rank | 700 persons/day |
| 7. Proposed BRT Terminal | 11 150 persons/day |
| 8. Proposed BRT Stop | 11 150 persons/day |
| 9. Jerusalem Street Informal Taxi Rank | 3 500 persons/day |
| *Total in Marabastad* | 75 500 persons/day |

Many informal traders take advantage of the large numbers of pedestrians who pass through Marabastad, and the precinct is also home to various active religious bodies along with numerous shebeens and socializing spots. These combined elements create an area with many pedestrians, diverse activities and valuable economic opportunities during the entire weekday and over weekends. Night time activity remains low because of the lack of residential areas surrounding Marabastad, but there are numerous shebeens and taverns that come alive at night.


Figure 2.19: Transport and related activity: Green dots showing informal traders and white pedestrian activity
*(Source: author)*

Figure 2.20:
Production and waste
*(Source: author)*

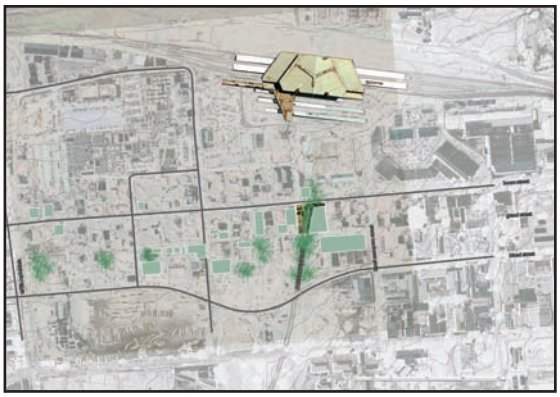


Figure 2.21:
Appropriation of space
*(Source: author)*

## 2.4. A VISION FOR THE FUTURE

The people who trade in Marabastad currently successfully exploit the bustling activity generated by the transport nodes, the proximity of the fresh produce market and the slack law enforcement with regards to land use. Traders abound in the street and some formal retail outlets have been doing business in the same buildings for decades. Yet it seems that the high adaptability of the trading system fails to recognise resources in the natural and urban environment and its rich cultural and political history.

The tree-lined streets and colonnaded shop fronts speak of a community who has always met and interacted on the street, who used it to trade and barter and gossip, but the almost haphazardly constructed interior courtyards housed private, sometimes much more sinister, transactions. The maze-like alleys and openings offered a quick escape from the police, and also created a series of thresholds that no stranger dared to cross. Within these places, cast in shadow, lie stories of extortion, abuse, discrimination, disease and danger. But there are also stories of ingenuity, opportunism and the clever outwitting of the police; stories of lively nights at the beer halls, of lights and music and laughter. The story of Marabastad is multi-layered and important, because it shows us how resilient a community can be amidst the direst of circumstances.

With so many unique characteristics, the area begs for a much more significant role in its greater context. The aim of this dissertation is the design of a building that acknowledges the important existing characteristics and networks: the street character and trade, the history of beer brewing, the sociability of the community and more. By integrating these with the functioning of the ecological systems and cycles of nature, more potential can be created for the community in the future.

"That's heavy, Zakes. They took all of it?"

"All the produce, all my tools, everything. This Metro police, they are not here to help the people. They take all of our things, confiscate them and we have to pay a fine to get it back. They say the hawkers make the streets look ugly."

"Jis Boet, that's bullshit. I had the best lunch this afternoon from that Mama on the corner of Grand Street and Cowie. Magwinya and chicken giblets and sauce..."

"Yes, Mabali Baloi. She knows how to make food, that one. You know she used to have so many pots and stoves, she stored it at Lolly's in the evenings. But then the Metro police came and took all of it. Now she has the two pots she carries home every day. It's safer that way."

"That's bloody frustrating."

"Yes brother, we dream that it could be different."


Figure 3.1: Fight for peace
*(Source: Jason Nel)*


Figure 3.2: We won't move: Image ftrom Sophiatown

*(Source: Jurgen Shadeberg)*


Figure 3.3: Images from District Six

*(Source: Graham Serretta)*

# 3. "WE DREAM THAT IT COULD BE DIFFERENT"

## 3.1. INTRODUCTION

Sophiatown is lost. District Six is lost[5]. Marabastad remains as one of the only enduring examples of a culturally diverse township where the Apartheid government forcibly removed the inhabitants and demolished large parts of the urban fabric.

5. Relocated townships in Johannesburg and Cape Town, demolished during the Apartheid era.

This historically significant precinct should be retained, protected and its character enhanced to establish it as a unique cultural destination for trade and production.

Marabastad currently functions as a portal into and out of the Pretoria CBD and surrounding suburbs, with people flooding the area for a short period of time in the mornings en route to places of employment, and late in the afternoons on their way home. By establishing the precinct as a destination, the intention is to create pause within the precinct and encourage people to spend more time there, opening up new economic possibilities for the community to sustain activity in and interaction with the city.

## 3.2. THE ARUP FRAMEWORK FOR THE CITY OF TSHWANE

Arup[6] has developed an extensive framework for the entire Central Business District of Pretoria. Their aim is to focus development in certain areas and rely on its ripple effects to positively influence development in surrounding areas. They have identified Marabastad as one of these development precincts.

6. Arup is an independent group of architects, engineers, consultants and planners who have branches all over the globe *(www.arup.com)*

The Arup framework focuses on large-scale development and "slum-clearance" by establishing large arterials around and through Marabastad as well as zoning for high-density residential development around historical Marabastad. The Arup framework is not focused on the enhancement of the existing historical centre of Marabastad, but instead focuses on new, much denser development around its edges, which would perpetuate the existing scenario of decay.

The proposed vision of the design group of 2013 differs significantly from that of Arup, in that development around Marabastad should be more sensitive to heritage fabric, and that the historical centre of Marabastad should be enhanced and renovated to become a cultural destination, while still retaining its identity as a hub of trade and support to marginalised communities.

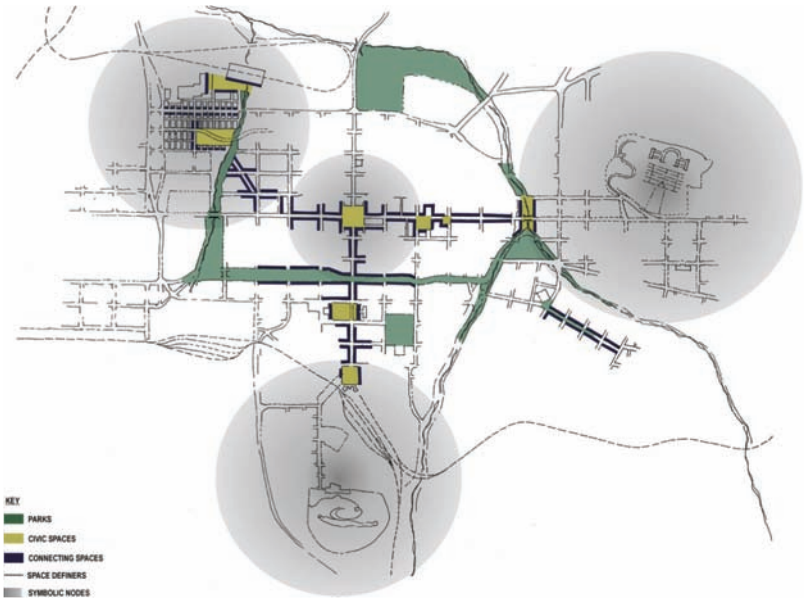



Figure 3.4: Arup framework for Tshwane showing development nodes

*(Source: Arup)*

There are elements in the Arup framework that are in line with the group's vision and were adopted (see Figure 3.5):

_ Establishment of a green belt along Steenhovenspruit with a series of connecting parks (no 24).
_ Proposed residential and mixed-use zoning (no's 25 and 28).
_ New BRT stop on Boom Street (no 5).
_ Retention of a pedestrian-friendly character in any newly developed areas.
_ Establishment of a medium grain urban fabric to provide a transitional zone from the fine grain of Marabastad to the coarser grain of the CBD.

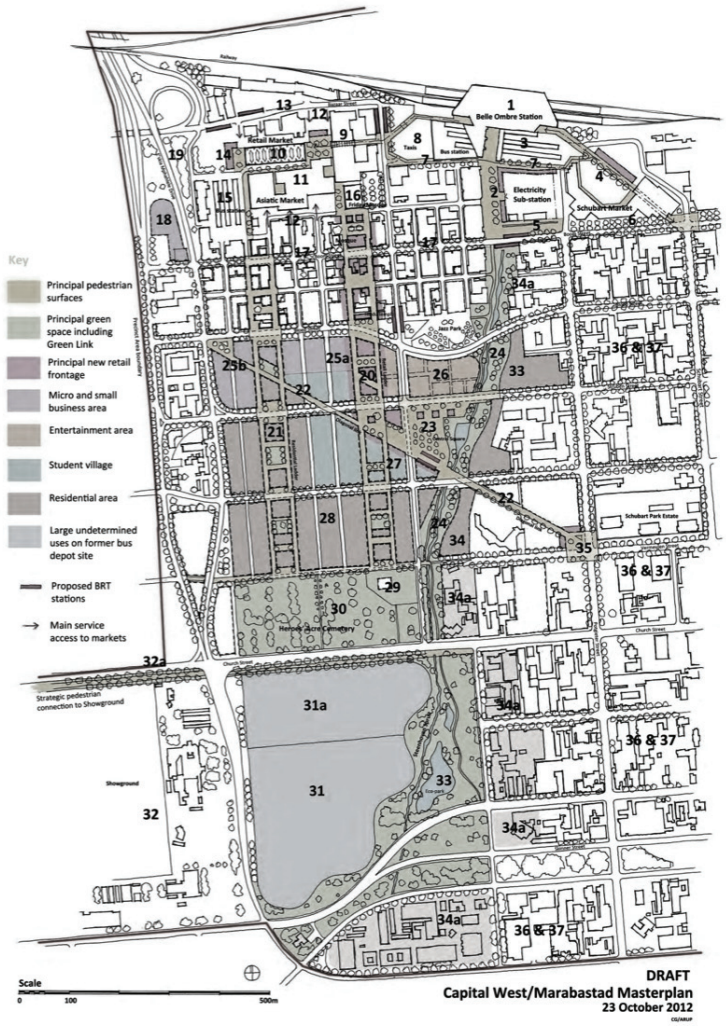



Figure 3.5: Detail of Arup framework for Marabastad *(Source: Arup)*

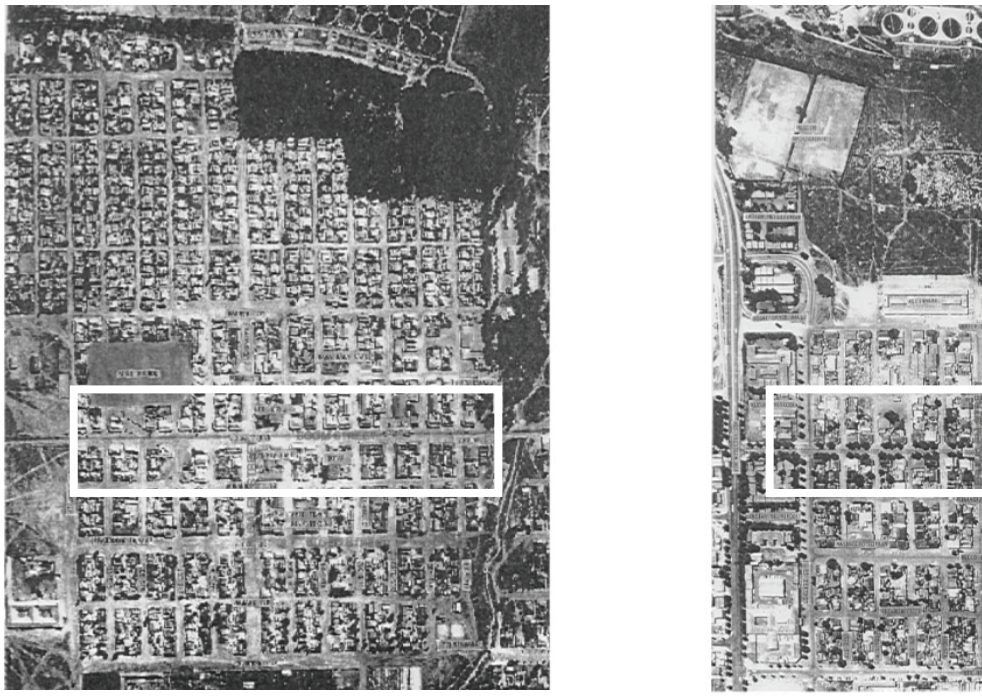


Figure 3.6: Aerial photograps of Marabastad showing Boom Street precinct: 1938, 1965 and 1998 *(Source: ARUP, edited by author)*

## 3.3. STATEMENT OF HERITAGE SIGNIFICANCE

### *3.3.1. Demolitions and the Boom Street precinct*

A dramatic rendition of the loss of urban fabric in Marabastad since 1938 is shown in Figure 3.6, which highlights the Boom Street fabric as the only remaining original fabric that was retained in the precinct, making it the salient feature in Marabastad. The buildings on Boom Street do not have individual architectural significance, but the character of the street needs to be retained to protect the heritage of the precinct as an example of a culturally diverse township developed in the first half of the twentieth century.

While Boom Street has always had a commercial aspect, most of the demolished fabric was residential, and the proposal to reintroduce residential and mixed-use zoning does not only make sense in terms of new development, but also recognizes and reinstates historical aspects of the place.

### *3.3.2. The character of Boom Street and its cultural history*

The building typology and street character of Boom Street is historically and culturally significant because, collectively, they represent some of the only remaining examples of a culturally diverse township that was largely demolished during the Apartheid regime. Important architectural elements include the continuous colonnades on the street edge that house informal traders, as well as the scale of the buildings. Marabastad was made up of a very finely grained urban fabric, and it was very rare to see one building taking up an entire block. Along Boom Street this fine grain has been largely retained. The Asiatic Bazaar (and Boom Street) has always had a strong trading presence in the precinct and boasted various bioscopes and theatres that became the centre of social gatherings from the 1930s to the 1950s. The culture of trade and opportunism is still prevalent in the area, but much of the cultural history relating to production and trade is not accessible to the visitor, due to the lack of museums, exhibitions, information centres and buildings that still function as originally intended.

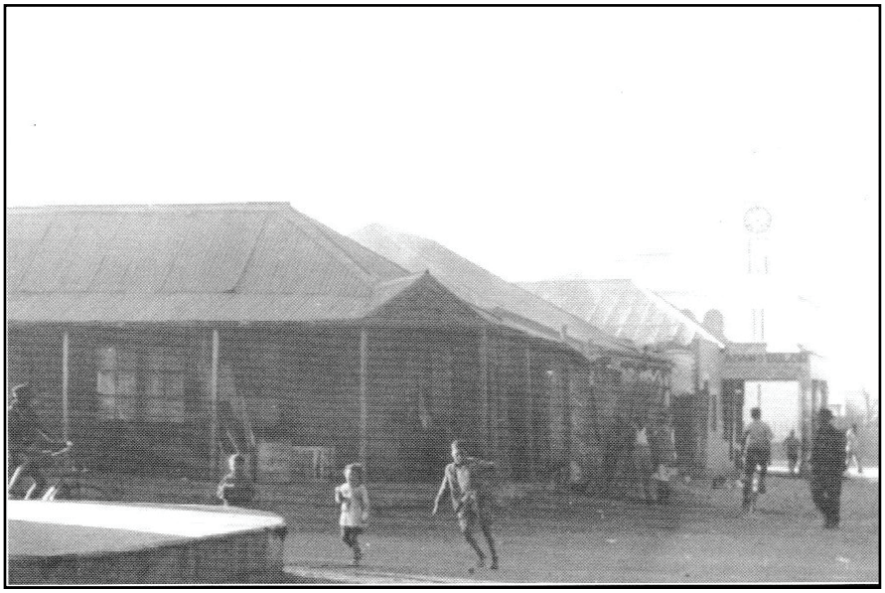


Figure 3.7: Marabastad 1950
*(Source: Good Shepherd, Eersterust)*

### *3.3.3. The heritage approach*

The heritage value of Marabastad lies less in specific individual artefacts, and more in the collective character of the place and its unique history and culture. This provides ample opportunity for tourism, which will inject much needed funds into the area and set it apart as a unique cultural destination, giving it an edge on other ordinary shopping destinations.

The heritage approach is therefore informed by the International Cultural Tourism Charter (ICOMOS, 1999), which advocates the importance of "the protection, conservation, interpretation and presentation of the heritage and cultural diversity of any particular place or region". The guidelines that need to be adhered to according to the charter are:

_ Since tourism is among the most powerful tools for cultural exchange, conservation should provide responsible and well managed opportunities for

Figure 3.8: Travelling out of Pretoria on the 7 pm Marabastad - Wolwerkraal Bus
*(Source: David Goldblatt)*

members of the host community and visitors to experience and understand that community's heritage and culture first hand. Architecturally, this entails the protection and enhancement of the traditional street character (important elements discussed in the coding section).

_ Conservation and Tourism Planning for Heritage Places should ensure that the experience of the visitor will be satisfying and enjoyable. The nature of the programmes will have to be carefully considered to ensure a visit that will prove worthwhile.

_ Host communities and indigenous peoples should be involved in planning for conservation and tourism, and activities should benefit the host community. Proposals therefore need to be rooted in the history and culture of the place.

_ Tourism promotion programmes should protect and enhance Natural and Cultural Heritage characteristics (see coding).

(ICOMOS, 1999)

Figure 3.9: Coding Plan
*(Source: GWA, edited by fellow student)*

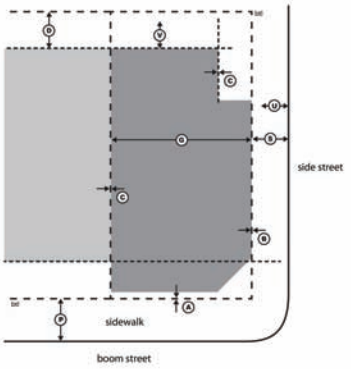
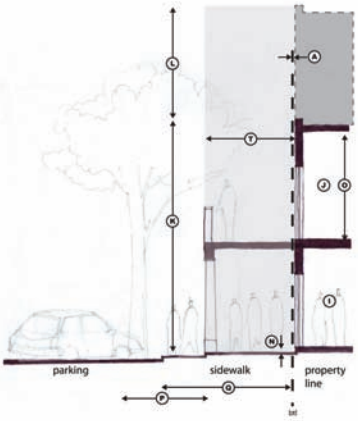



Figure 3.10: Boom Street South
*(Source: GWA, edited by fellow student)*




| Building placement | | |
|---|---|---|
| **Build to line (Distance from property line** | | |
| Front | 0m | A |
| Side street | 0m | B |
| **Setback (distance from property line)** | | |
| Side | 1,5, | C |
| Rear | 2m | D |
| **Building form** | | |
| Primary street facade built to BTL | 50% | E |
| Side street facade built to BLT | | F |
| Erf width - existing TPS | | G |
| Erf Depth - existing TPS | | H |
| *Street facade must be built 30% from the corner, remaining 70% on building line, 20% on 1,5m setback line | | |
| Use | | |
| Ground floor commercial, retail, recreation and offices | | I |
| Upper floors redisidential, commercial | | J |
| Height | | |
| Building min 2 storeys/7,5m | | K |
| Building max 3 storeys/11,25m | | L |
| Building max 4 storeys/15m | | M |

| | | |
|---|---|---|
| Finished ground floor level 170mm | | N |
| Fubusged floor ceiling height 7m | | |
| Upper floor ceiling height 7m | | O |
| (Allowance for lofts) | | |
| Vegetation | | |
| **Existing planting** | | |
| Indigenous plants to be retained | | P |
| Alien plants to be removed | | P |
| **Proposed planting** | | |
| Planting should be concentrated within zone | | P |
| Indigenous species to be selected | | |
| **Notes** | | |
| All building shoud have ground floor entrance that faces primary street | | |
| Loading docks, overhead doors and other services prohibited on street facing facades | | |
| Any building facade greater than 40m must be broken to reas as aseries of buildings of 13,3m each | | |

## *3.3.4. Coding*

The traditional methods of zoning are not sufficient to guide development that would retain the character of Boom Street or the precinct, therefore a formal code was developed by Gary White Architects and Urban Designers (GWA Studio)[7] for the Marabastad precinct to ensure that new development is sensitive to existing fabric. New buildings and alterations in and around Boom Street and the original precinct of Marabastad will comply with the urban coding requirements and be adapted to the urban vision (see Figures 3.7-10). This is to ensure the character of Marabastad will be retained and respected.

7. GWA Studio is a design firm that offers services in Architecture, Urban Design, Interior Design, Project Management, located in Muckleneuk, Pretoria


Figure 3.11: Boom Street North
*(Source: GWA, edited by fellow student*

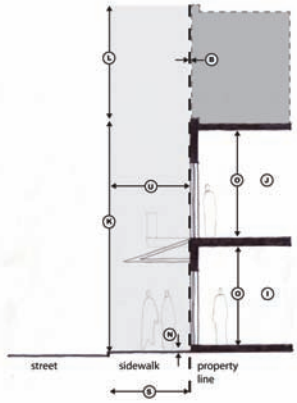



Figure 3.12: Side street
*(Source: GWA, edited by fellow student)*

| Parking | | |
|---|---|---|
| **Location (Distance from property line)** | | |
| Front setback | 3m | Q |
| Side setback | 0m | R |
| Side street setback | 2,5m | S |
| Rear setback | | NA |
| **Required parking spaces** | | |
| Ground floor | | |
| Light industry/business - 1 private space/100sq | | |
| Retail - 0,5 public space/100sq | | |
| Government - 1,5 private space/100sq<br>0,5 public space/100sq | | |
| Upper floor | | |
| Residential uses - 0,5 space/unit | | |
| Other uses - 1 space/100sq | | |
| Encroachments | | |
| **Locations** | | |
| Front | min 1500; max 2500 | T |
| Side street | min 1500; max 2500 | U |
| Rear | 1m (not ground floor) | V |

| Allowable frontage type | | |
|---|---|---|
| **Collonade Stoep** | | |
| Clearance | 3500 min, allowing for max steps of 500mm to adjacent buildings | |
| Height | 4500 min, allowing for max step of 500mm to adjacent buildings | |
| Informal trade promotion zone | | |
| **Location (distance from property line)** | | |
| Front setback | 2m | W |
| Side setback | 0m | X |
| Notes | | |
| No parking access from Boom Street | | |
| Parking entrance width NA | | |
| On corner erven parking drives shall not be located on primary street | | |
| Bicycle parking must be provided in a secure environment | | |
| Parking may be provided off site within 400m or as shared parking | | |
| Canopies, awnings and balconies may encroach over the BTL on the street sides, as shown in the section | | |
| Upper storey galleries facing the street must not be used to meet primary circulation requirements | | |

Important elements include:

_Pedestrian character of the street

_Encroachment with a colonnade on Boom Street

_Scale of buildings on Boom Street

_Setback from building lines

_On-street parking

# 3.4. VISION FOR URBAN DEVELOPMENT IN MARABASTAD

The general aims and objectives of the urban vision are centred on reconnecting Marabastad with the city while retaining and using its unique character to activate the area as a centre for trade, production and cultural activity.

## *3.4.1. General aims and objectives*

Marabastad has suffered many demolitions. The remaining fabric, particularly on Boom Street, will be treated as heritage fabric.

The currently vacant land to the south of Marabastad will be rezoned to include mixed-use medium-density housing, replacing previously demolished housing (see Figure 3.11).

The newly developed 3-4 storey housing will increase incrementally further south to 6-7 storeys. This housing will serve as the medium grained fabric that transitions from Marabastad back into the CBD.

The physical connections between Marabastad, the new housing and the CBD will be attained via a series of pedestrian corridors; these corridors will link public spaces and create breaks in the fabric.

The Steenhovenspruit forms part of the green belt that circles around Pretoria; the edges of the spruit will be activated through pedestrian use and by connecting a series of parks. New buildings will actively engage with the spruit's edge. As part of a flooding strategy, the spruit will be widened and terraced where space allows, slowing the water down and also retaining and slowly releasing it (see Figure 3.11).

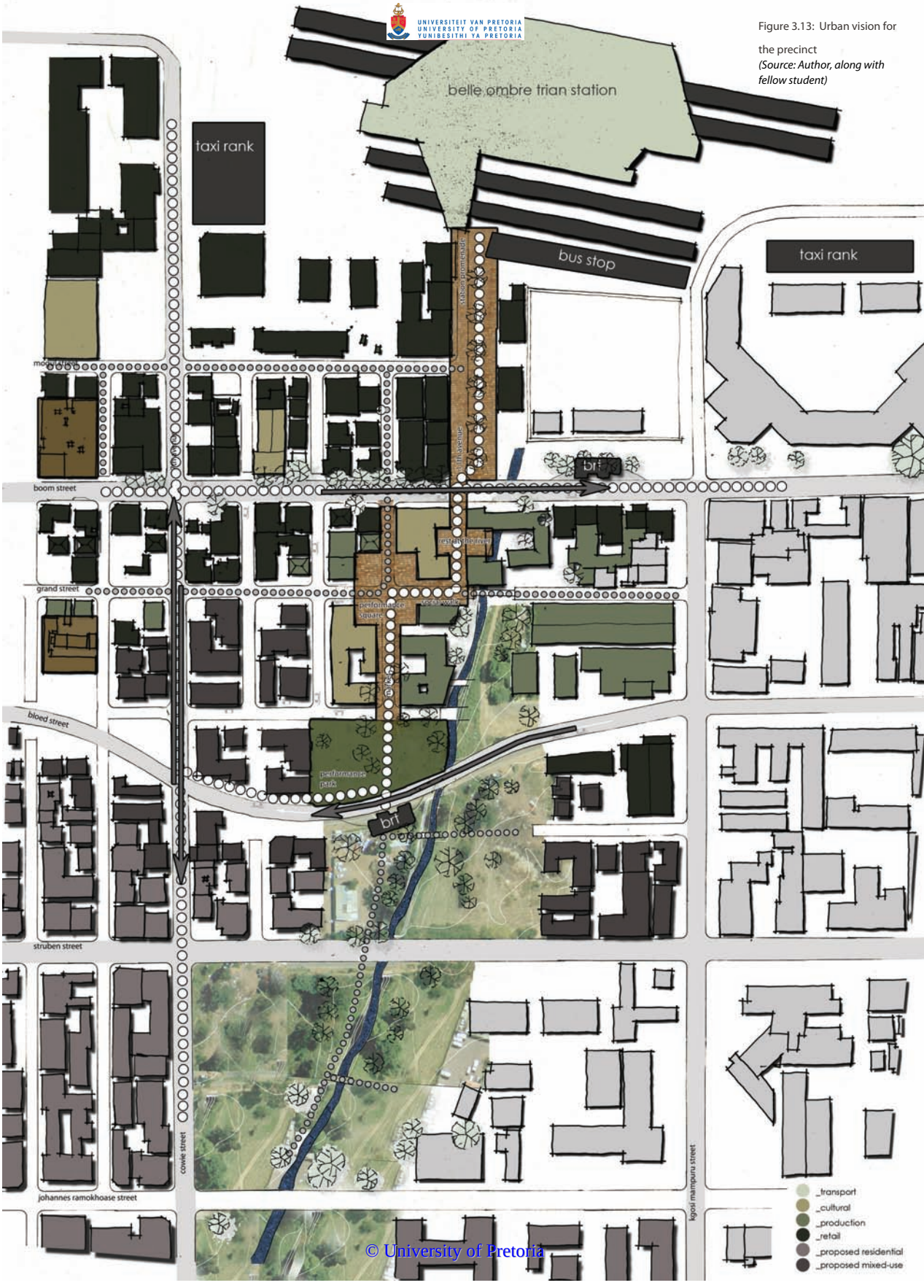



Figure 3.13: Urban vision for the precinct
*(Source: Author, along with fellow student)*

# 3.5. FOCUS AREA

The focus area is located between the two proposed Bus Rapid Transit (BRT) stations next to Steenhovenspruit, on a proposed route from the Belle Ombre Station towards the proposed residential area (see Figure 3.12). The space acts as a landing into and out of the precinct, and so can become a portal between Marabastad and the rest of the city.

## *3.5.1. Spatial development plan for the focus area*

The route between the Belle Ombre Station and the proposed BRT stations on Boom Street and Bloed Street acts as a spine, with proposed development taking place around it. The framework will activate the edges of the Steenhovenspruit and reconnect inhabitants to existing natural systems. The site is positioned in such a way that it acts as both a welcoming platform and a point of departure in and out of Marabastad. A series of public spaces that create a safe, prominent route have been designed to facilitate entry into and exit from the area:

_ River Square (1), midway down 11th Street towards Grand Street, will provide a public space with shading, links to the river, seating and an opportunity for trade.

_ Performance Square (2) will be completely pedestrianised to serve the purposes of performances as well as a market space.

_ Pedestrian activity will be promoted around Performance Square by cordoning off vehicles during weekends, when 10th Street will function as a market.

_ The site will become a cultural precinct of experience and production; the various interventions will be connected through public space, programme and movement.

Widening and terracing of the channel wall are proposed just north of Bloed Street to mitigate the risk of future flooding. Not only would this slow the water down, but in the case of flooding it would retain some water and then slowly release it back into the stream.


Figure 3.14: Joint site plans of four projects
*(Source: Author)*

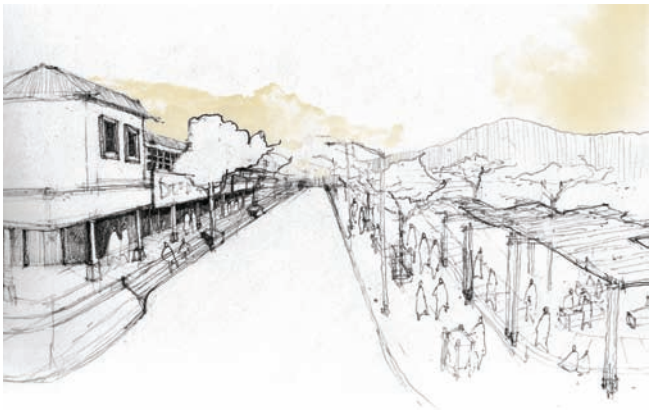


Figure 3.15: Vision of 11th Street Character, March
*(Source: Fellow student, edited by author)*

Figure 3.16: Vision of Boom Street Character, March
*(Source: Fellow student, edited by author)*

Figure 3.17: Vision of Bloed Street Character, March
*(Source: Fellow student, edited by author)*

Figure 3.18: Section of River Square, October
*(Source: Fellow student, edited by author)*

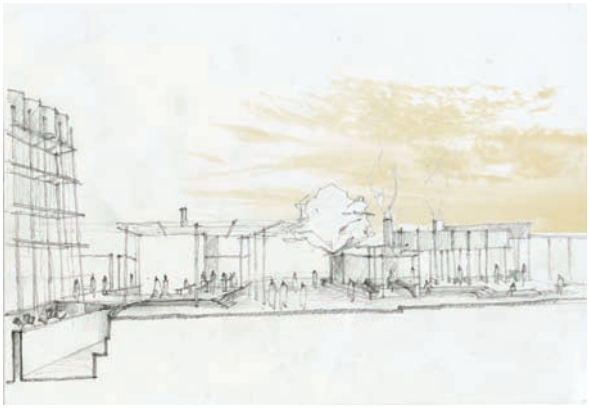


Figure 3.19: Section of social walk, October
*(Source: Fellow student, edited by author)*

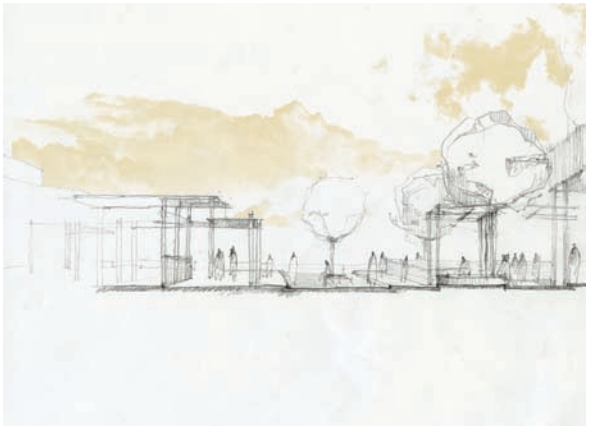
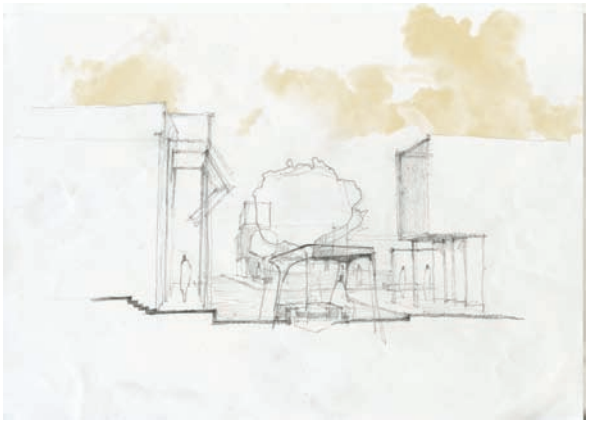


Figure 3.20: Section of market space, October
*(Source: Fellow student, edited by author)*



# 3.6. SITE SELECTION

## *3.6.1. Site location and analysis*

The site under investigation is located on the eastern boundary of Marabastad in Boom Street, straddling Steenhovenspruit. This site forms an important link for pedestrians moving from Belle Ombre Station southwards, to what is proposed to be a green corridor all along the spruit.

> "This space attains a potentially charming character through the stream crossing it and the large established trees in the space. Until the area was cleaned up, this was a favoured hawking spot, given the large volumes of pedestrian traffic crossing the space from the station en route to the city centre" (Aziz Tayob Partnership, 2002:244).

The site holds great potential as it sits on the cusp of various natural, economic, social and institutional networks in Marabastad. This potential offers scope for the regeneration of the social–ecological systems of Marabastad.

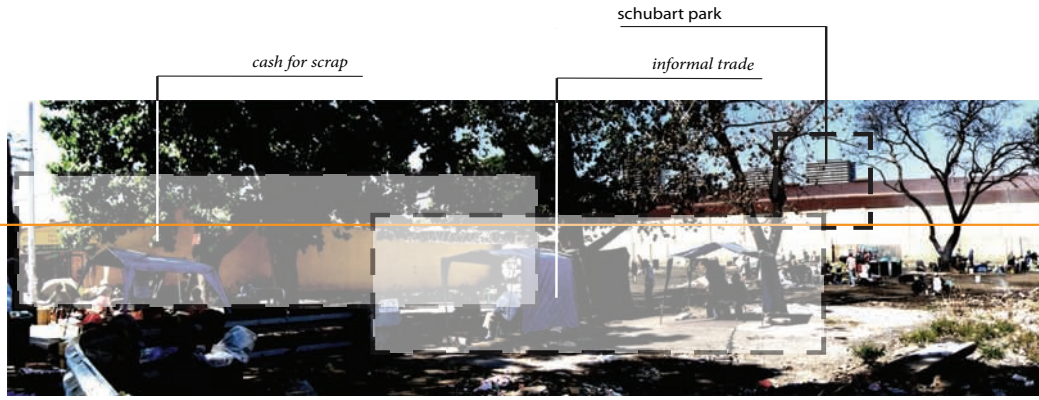



Figure 3.21: View from Boom Street towards south *(Source: Author)*

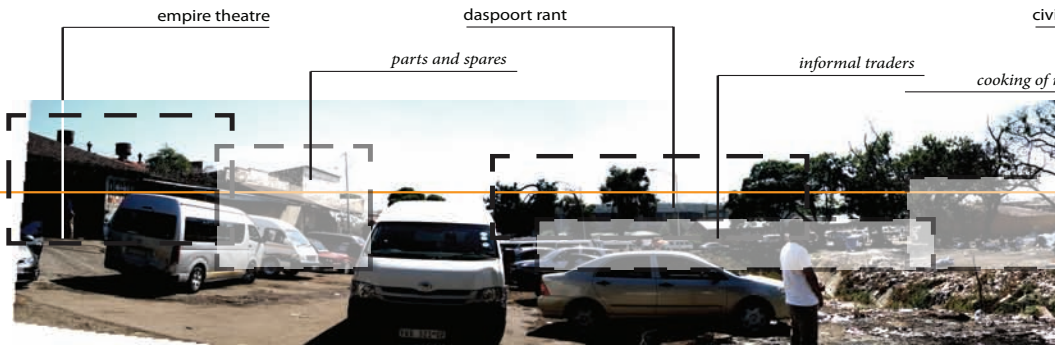



Figure 3.22: View from Grand Street towards east *(Source: Author)*

## 3.6.2. *The natural network*

> "The Earth does not belong to man; Man belongs to the Earth. This we know. All things are connected like the blood which unites one family. Whatever befalls the Earth befalls the sons of the Earth. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself" (Chief Seattle in Rao, 2013:1).

Steenhovenspruit remains the most important natural element in Marabastad. The geometry of the channel and the surrounding vegetation provide a hiding place and opportunity for people to wash themselves, articles of clothing and other objects. This activity, and the dumping of waste materials in the spruit by informal traders and producers, has created a very polluted local environment and affects the broader river system downstream. The stream provides services that should be provided by the local municipality, but its inherent qualities of energy and sustenance cannot be developed because the pollution has made the water unsafe to drink.

### *3.6.3. The social network*

> "[The shebeen's] recreational role remained vital. In the absence of any other sources of popular recreation, shebeens relieved something of the gloom of everyday life in the regimented locations... In most literature, shebeen life is associated with noise, warmth and vitality, factors that were essential to the survival of this informal-sector niche over nearly a century" (Hart, 1991:78-79).

The presence of water and established trees on the site gives it a potentially pleasant character, and large groups of people choose it as a place of business. The interaction between and interdependence of these groups are important to note: people cook meals that are then sold on the street edge, the proximity of the Zion Christian Church (ZCC) ensures a degree of safety, and traders frequently watch each other's stalls and administer each other's businesses.

This conviviality and trust is rooted in a long history of oppression by authorities. Miriam Tlali depicts a scene:

> "[The police] used to give us a lot of trouble so we thought of a good plan. We got empty tomato boxes and out of them Tallboy made a frame shaped exactly like a coffin, and patched it with pieces of cardboard. Then we covered it nicely with a black cloth and it looked just like a coffin. It had a nice lid on top and we kept some of the beer there. So when it was 'clear' some people sat on it and they drank happily and we used to sing" (Tlali, 1989:96).

People, and this culture of opportunism and cooperation, are as important an element in the social-ecological system of Marabastad as the natural or economic systems. The social conflict between foreigners and South Africans causes distrust and disharmony that has an adverse impact on the natural environment and economic opportunities as well, as crime abounds and the area is considered dangerous.

In Figure 3.24 different social networks on and around the site are depicted, showing the interdependence of the traders, producers and members of the ZCC.

## 3.6.4. *The economic network*

> "The green apple pyramids don't wobble
> in the tomato box cradle
> he rocks it gently tight black fingers curled
> around the wood
> buying one you think of cool succulence
> and how you'll drown
> the sun with your mouth
> but the apple becomes drier than dust
> when you see the vastness of the thirst that
> cracks between his eyes"
> (Johanesse, "The fruitseller at the Bus Stop", 1979:88)

While informal trade contributes significantly to the character and ambience of a precinct, it is important to remember that it is also sometimes the only way for the urban poor to earn a livelihood.

Traders around the site obtain their produce from either the fresh produce market, various wholesale distributors in Marabastad, or local producers such as those surrounding the Steenhovenspruit. The produce is sold during the day and leftover fresh produce is either given away or thrown in various dumpsters or in the river.


Figure 3.23: Existing movement and activity on site
*(Source: Author)*


Figure 3.24: Social network: interaction
*(Source: Author)*


Figure 3.25: Economic network: flow of produce and currency
*(Source: Author)*


Figure 3.26: Natural network: Input and output of Steenhovenspruit
*(Source: Author)*

Marabastad offers economic opportunity for traders because of the many pedestrians who need to pass through the area on a daily basis, and because appropriation of space and tenure is relatively uncontrolled.

Economic systems in Marabastad function interdependently. There are many examples where retailers sell produce to informal trade who then resell on the retailer's verandah. Both benefit, and there is an understanding that they function in a symbiotic relationship.

Overnight storage of their produce is problematic for the informal traders, as the vast majority of them live in surrounding townships and have to travel to Marabastad on a daily basis with public transport. While there have been agreements between traders and shopkeepers (or even squatters) to look after their wares, lately the Metro police either take or damage goods that they find in Marabastad at night.

Several important spatial possibilities come to the fore when studying current networks on and around the site:

_ Safe overnight storage for informal traders.
_ Waste removal or a place for the dumping of waste.
_ Pedestrian-friendly streets and ensuing space and resources for trade.
_ Resources for the preparation of food.
_ Reconnection to the river as a source of sustenance.
_ Rehabilitation of the surrounding soil to allow for the growth of greenery.
_ Public space and seating, and space for unhindered social interaction.
_ Possibilities for the adaptation of space (flexibility).

### *3.6.5. Integrated systems [social–ecological systems]*

When a study of social, economic and natural systems in an urban environment is done in isolation, an incomplete picture is formed that does not lead to sustainable development. It quickly becomes apparent that, in order to meaningfully intervene in these systems, they must be seen to function as integrated and interdependent social–ecological systems, a term that will be explained in more detail in Chapter 4.

Natural systems in Marabastad have been exploited and used as barriers to separate the community from the rest of the city, impacting on the functioning of the river as a system and also on the different uses on and around the site. The presence of trade in the area adds to the pollution of the river and the selected site, as does the lack of service delivery by the municipality. To have a truly sustainable impact on Marabastad, an intervention in the area needs and approach that does not disregard any of these participants.

"Are you from Marabastad, Zakes?"
"How do you mean? Yes, I'm from Marabi. I'm here every day."
"I know man, but did you grow up here?"
"I'm too young, my friend. When I was born, everyone had been moved already. Long ago. I grew up in Atteridgeville, and I still live there."
"So why do you do business here?"
"In Marabi... Aish. It's busy here. People come with the train every day. And the big market is close, so you can buy vegetables and fruit. But it's dirty. And the nayope is everywhere. Here, it is safe, because we are close to the church. But there at the taxi rank... The people need help."

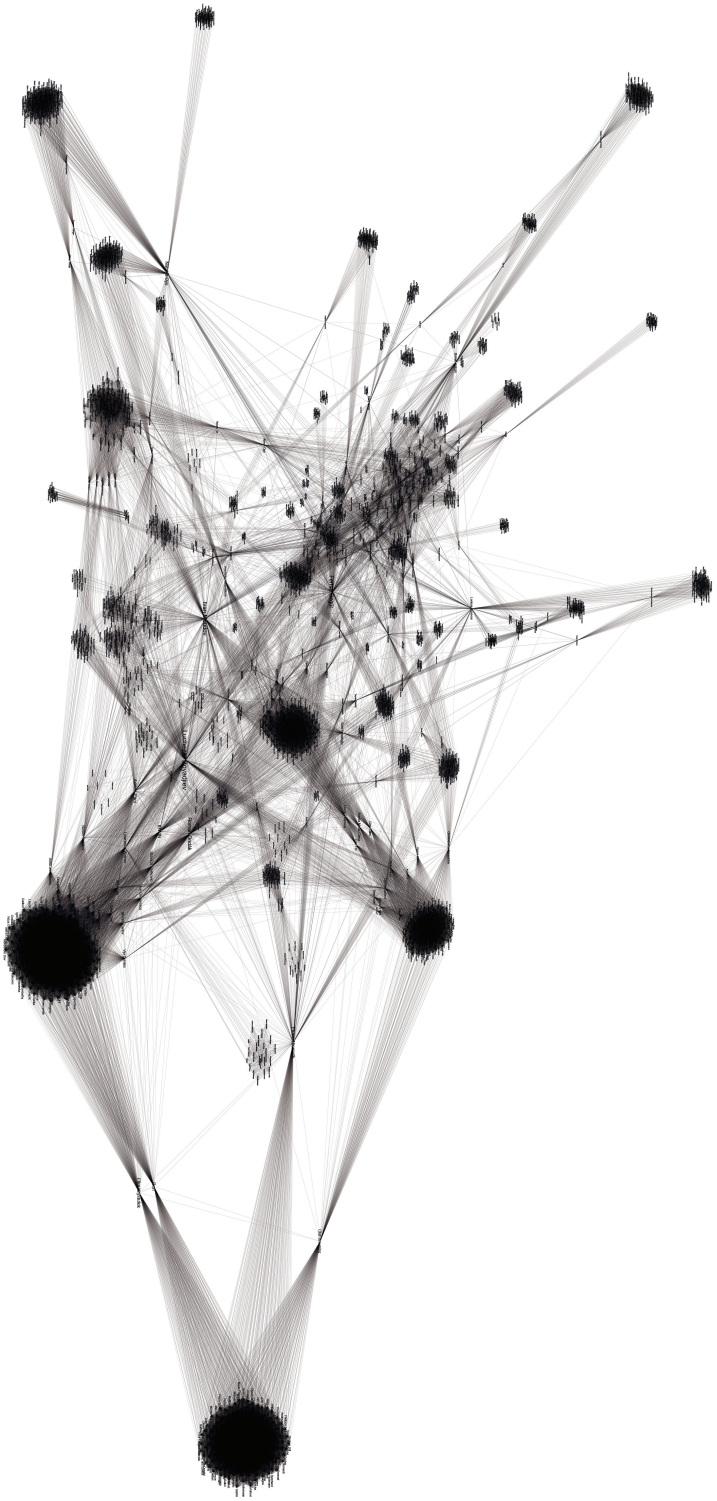


Figure 4.2: Artist's network, illustrating the complexity of a living system *(Source: Burak Arikan)*

# 4. “THE PEOPLE NEED HELP”

## 4.1. INTRODUCTION

This chapter investigates the theories of Regenerative Architecture, Non-modern Theory and Systems Theory in the exploration of architecture as a spatial tool to initiate positive change in an urban context. The community of Marabastad has adopted a culture of exploitation to survive. This has aided their economic resilience, but has also led to a dominance of economic and social systems over the immediate natural and urban environment.

To help address these issues, these theories respectively:

_ explore how development in the built environment can help to regenerate environments ecologically, socially and economically;

_ explain the non-dominance between subject and object or human and environment;

_ explain the connected and interdependent nature of urban environments and how single change agents can have an impact on systems across various scales and time frames.

## 4.2. WHAT IS REGENERATIVE ARCHITECTURE?

The difference between regenerative architecture and design and sustainable design lies in the ability of a regenerative intervention to not only protect and sustain existing resources, but to positively contribute to its environment. The original definition implied that regenerative architecture contributes more energy and resources in its operation than are required for it to function (Lyle as quoted by Moore, 2001:136). A regenerative approach is one that acknowledges the necessity for resources, but aims to use them in a way that unlocks more resources as it consumes them. Architecturally speaking, regenerative architecture uses resources sparingly and in such a way as to create more positive social–ecological conditions than existed before.

Architecture therefore is not only about physical resources, but also about human well-being and intangible qualities. Architecture can influence the way people perceive and interact with their environment and each other, and so have an impact on the way that integrated systems function.

Stephen Moore (lecturer in Architecture at the University of Texas, Austin) looks at regenerative architecture through the lens of shifting attitudes towards technology and place (Moore, 2001:130) (See Figure 4.2).

Place is defined as a combination of the objective geographical area defined by politics and economy, and the subjective experience of the place (the sense of place described in works of authors on phenomenology); i.e. the middle ground or locale. Here the dynamic processes that link various networks (natural, social, economic, political, etc.) across various scales are the important defining elements of a place.

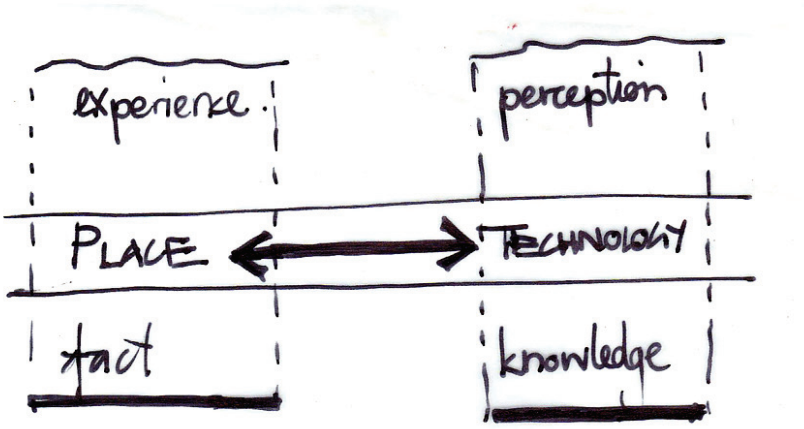



Figure 4.3: Diagrammatic explanation of place and technology *(Source: Author)*

Moore defines technology as lying between human knowledge on the one hand and a set of objects on the other. It is the defined by the way we apply the knowledge to technological objects, i.e. human practices or the way we use things. The importance of place immediately becomes apparent as not only the source of these technological objects, but also in how the place influences the way these objects are used. Furthermore, technology is a spatial concept because its functioning depends on the mobilization of human and non-human resources that exist in different places (Moore, 2001:134).

Therefore, place and technology continuously influence and shape each other **spatially**. The exchange and dialogue between these two aspects have been dealt with in different ways over the course of history. In the following section, four paradigms will explore concepts of place and technology in order to explain the evolution of ideas.

Figure 4.4: Le Corbusier, Villa Savoye, Poissy, France, 1931 *(Source: Boston College website)*

Figure 4.5: Robert Venturi, Vanna Venturi House, Chestnut Hill, Philidelphia, 1964 *(Source: About Architecture website)*

## 4.3. THE HUMAN-CENTRED VIEW

### *4.3.1. Modernism*

In its preoccupation with fast-developing technology and new opportunities created by developments in new building materials and prefabrication, universal Modern Movement architecture (see Figure 4.3) ignored the importance of place to a large extent. This disconnect from natural and cultural networks was exacerbated by the need to control and order chaos in cities and architectural design. This attitude towards place was also negatively impacted by the belief that the social hierarchies connected to specific places constrained human freedom (Moore, 2001:135).

### *4.3.2. Post-modernism*

In reaction, the historicist Post-Modernists (see Figure 4.4) merely inverted these relationships, valuing place and its history and attached symbolism above all else. They cultivated scepticism towards the value of technology in the wake of the impacts that its disciples had had on the **human** environment, but did not show much regard for its impact on natural habitats and integrated ecosystems. The positive psychological impact of a healthy and functional environment was not regarded as of the same importance as symbolism and architectural tradition.

### *4.3.3. Critical regionalism*

While critical regionalism seeks to address the importance of both place and technology (specifically that which is inherent in a place), it continues to speak about its importance solely from a human perspective, because it still relies, in its philosophical discourse, on modern and post-modern sources (Moore, 2001:135). To truly represent the place and its technology, a place-

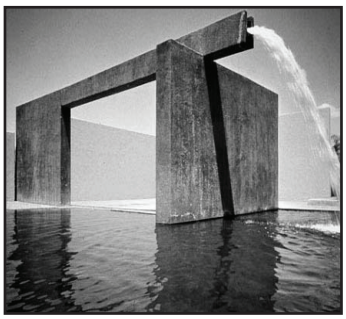


Figure 4.6: Luis Barragan, Fuente de Los Amantes, Los Clubes, 1966 *(Source: Design Museum)*

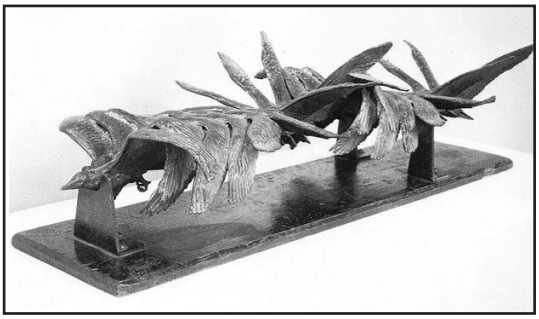


Figure 4.7: Ettiene Jules Marey, Birds in flight, c 1886 *(Source: The telegraph)*

based philosophy needs to acknowledge not only the human perspective, but also the perspective of all the players that participate to create a certain place.

## 4.4. THE HYBRID

### *4.4.1. The non-modern thesis*

In his book *We have never been modern* (2012:51-55), Bruno Latour argues that we have been modern in theory but never modern in practice. The Cartesian distinction between humans and non-humans (be that natural environments, other living organisms or objects) has provided humans with a license to dominate and exploit resources, because the modern, westernised world has tried to separate and purify networks, creating a clear distinction between natural and social systems.

The non-modern thesis argues that there are no subjects or objects, only quasi-objects where the dominance shifts according to changing power relations (see Figure 4. 6. The sculpture is not only of a bird, but of the bird in relation to space and time). Therefore no clear distinction exists between society and nature (or humans and non-humans); there are only shifting combinations of the two.

Through this lens, the current ecological 'crisis' that challenges the way that we live in this world becomes an opportunity for humans to start participating in the cycles of existing systems, because we are not in a position to control or 'fix' the situation. We are merely in a position to participate as players in the functioning, changing world.

## *4.4.2. Regenerative architecture*

> Regenerative architecture will seek to engage human institutions in the democratic reproduction of life enhancing places (Moore, 2001:137).

The application of non-modern theory to architecture lies in the way that participation between humans and non-humans occurs within the spatial reality of place and technology. Regenerative architecture takes account of the existing interdependent systems on site from the beginning, and aims to integrate the architectural intervention with these systems to assist in the production of natural, social and economic resources.

Therefore, an architecture that allows for this participation will use tools (technology) to harvest resources from its environment (place), while these tools also enhance and help regenerate that environment. For instance, kinetic energy can be harvested from flowing water, and that process can filter and clean the water, which will improve conditions downstream. This also allows

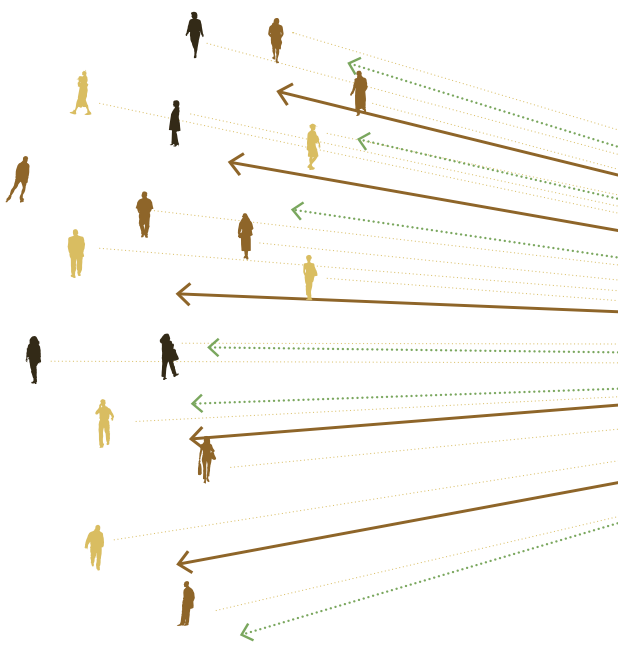
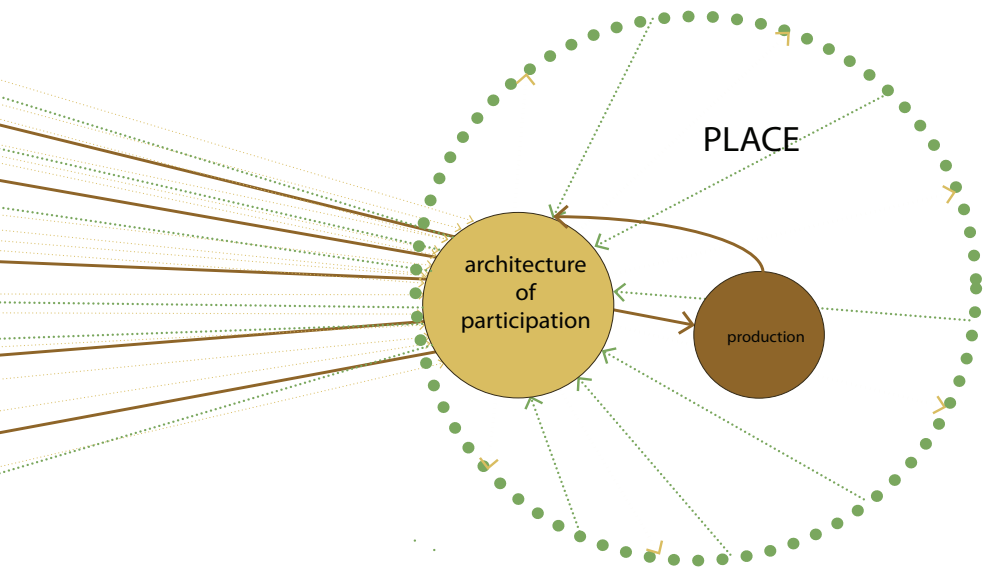


Figure 4.8: An architecture of participation bridging the gap between networks
*(Source: Author)*

for a direct experience of and connection to the natural cycles of a specific environment (place).

The direct dependence on natural resources and cycles will lead to a more responsible use of these resources. If this use of natural resources is successful, the human activity on site will positively influence natural systems (place) through the way the building is used (technology). This requires the building to function in such a way that the participation of its users will result in a positive feedback loop that will unlock resources that, in turn, will make participation easier. An example in Marabastad is the informal trade system: if there is a system that generates energy in the form of gas or electricity from the waste of informal traders and makes it available to the traders themselves, they will be more inclined to deliver their waste to a collection point than discard it in the spruit. This will lead to a less polluted water course and fewer problems with contamination downstream. It will also foster the recognition that cities and their components function in a systemic, ever-adapting way.



# 4.5. THE CITY AS A SYSTEM

Cities are self-organising, ever changing entities with all the characteristics of complex systems. In the light of more frequent natural disasters and population growth, cities need to not only be sustainable, but also more adaptive and diverse to become more resilient in the face of new challenges.

## *4.5.1. Resilient systems*

At the World Sustainable Buildings Conference in Melbourne in 2008, Professor Chrisna du Plessis defined resilience as the ability of a system to absorb or recover from disturbances without losing its functional identity (2011:57) in her talk titled *Understanding Cities as Social-Ecological Systems*. The term was initially used to describe ecological systems, but has since been adopted in the description of any complex adaptive system, such as a city. A combination of factors can contribute to the resilience and adaptive capacity of a system:

_ The level of connection between different players, as well as networks.

_ The tightness of feedback, or how fast and with what impact the consequences of any disturbance on the system can be felt.

_ Diversity in responses, formed when individuals in the same functional group (like traders) have different responses to disturbances (Du Plessis, 2011:58).

Systems undergo cycles of change (see Figure 4.8). A new system initially grows until it reaches a point where its critical functions are conserved, but because the system is not static, there is a point where the functioning of the system collapses and creates new potential. The system then goes through a phase of reorganization before a new growth phase is started. Understanding these phases in the adaptive cycle provides clues as to when to intervene in a system to make it more adaptable.

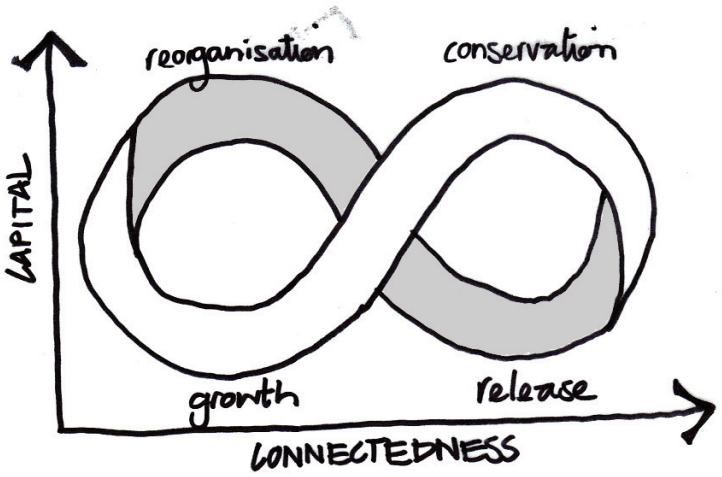



Figure 4.9: The adaptive cycle *(Source: Gary Peterson, adapted by author)*

The importance of the resilience of communities and cities has come to the fore as a reaction to natural disasters, and how simply being sustainable is not helpful in a world that is already showing signs of climate, social and economic change. Communities need to be geared for change and be able to adapt, as stability under current conditions of global change is not possible.

The problem with the use of the term "resilient system" is that it can also mean a perverse and corrupt system, as in the case of crime-ridden precincts where criminal syndicates are so adaptable and well-connected that they can withstand many instances of pressure from police and other authorities. "Resilience" needs to be accompanied by growth and positive feedback, creating not only a resilient system, but also a regenerative one.

### *4.5.2. Cities as complex social–ecological systems*

> Cities are part of complex, integrated systems where human well-being is closely related to ecosystemic integrity, making it necessary to not only take the well-being of urban users into account in planning and development, but also the environments and natural systems of which they are a part (Du Plessis, 2008:1).

Thinking of cities as social–ecological systems is not the same as merely applying ecological thinking to cities. Social–ecological systems thinking is concerned with more than the way that natural systems function to produce energy or maintain equilibrium. It acknowledges the important role that change and adaptability plays in an unpredictable and ever-changing larger context, and includes humans as important role-players in these systems (McDonnell & Pickett, 1993; Alberti *et al.*, 2003 as quoted by Du Plessis, 2008:2). Because of human beings' inherent adaptability and diversity in function and response, it seems obvious that their part in any system should be seen as an advantage where the degree of resilience of the system is concerned.

When looking at four propositions about the characteristics of social–ecological systems identified by Du Plessis (2008:4), the importance of seeing humans as an integrated part of natural systems becomes apparent:

Proposition 1: A social–ecological system (SES) is one integrated system that spans across matter, life and human social and cultural phenomena (or mind).
Proposition 2: An SES consists of relationships between elements at a number of scales and within nested systems.
Proposition 3: SES's are systems that are complex and adaptive, with properties of self-organization and emergence.
Proposition 4: What differentiates SES's from other systems is the introduction of abstract thought and symbolic construction.

## 4.6. REGENERATIVE ARCHITECTURE, NON-MODERN THEORY, AND SOCIAL–ECOLOGICAL SYSTEMS

A joint understanding of non-modern theory, regenerative architecture and cities as social–ecological systems aids the understanding of how an architectural intervention can have a spatial impact on not only the focal system, but also on all the non-spatial nested systems across various scales and also across different time frames that comprise a city and its society.

The interdependence of technology and place, described in Moore's explanation of regenerative architecture, is supported by the necessity to create and foster diverse and adaptable functions and spaces in cities. It highlights the importance of the participation of humans in natural networks to create life-enhancing places that leapfrog the usual sustainability approach embedded in the modern perception.

The understanding of regenerative architecture from a non-modern perspective allows for the importance of ALL elements in functioning social–ecological systems to become apparent as informants for an architectural response or design. The flourishing of one group of players cannot be at the cost of the deterioration of another, because the well-being of participants is also dependent on the well-being of the whole system. Therefore, it is not so much the separate elements that make up the whole that should be considered, but the relationships and interconnections that hold them together (Meadows, 2008:13). It must be recognized that these elements are not separable into subjects and objects, but are interconnected and function as quasi-objects (Latour, 2012:55).

## 4.7. SO WHAT?

Why is this important? Marabastad is already a resilient community because of its opportunistic culture. The oppression by the Apartheid government (and even before) had created a story of place that was and still is about always being on the lookout for new opportunity, of using any resource available and reorganising as the need arises.

The importance of the theory chapter lies in the understanding that this resilient system is in many ways perverse, but not all bad. There are existing practices that can, if approached in the right way, aid in the regeneration of the natural environment, social cohesion and economic abundance, but then all elements in Marabastad (natural, human and technological) need to be regarded as equally important, and the impacts of one on the other should be taken into account. The spruit, the traders, the colourful history, the culture of beer brewing and the amicable atmosphere are all elements that should, jointly, be able to create a place that is a pleasure to be in.

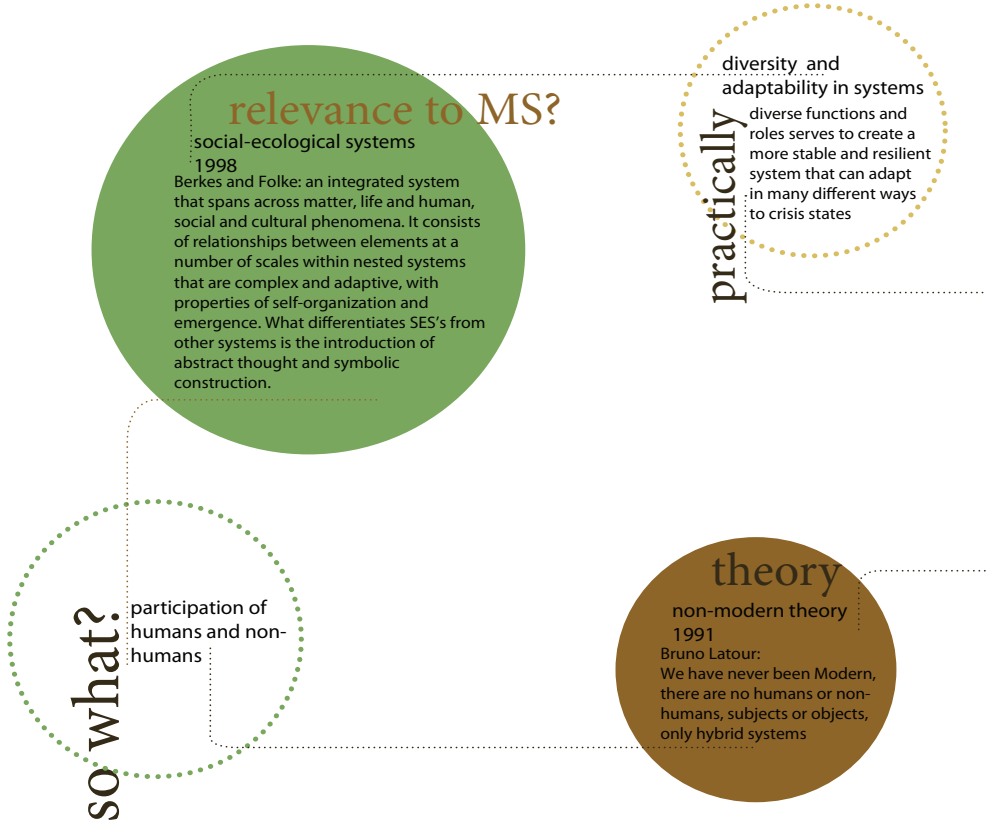



Figure 4.10: Relation of theories
*(Source: Author)*

"Hey, do you want to taste some unqombothi?"
"Sorry, what?"
"Unqombothi. Some Skokiaan. It'll grow hair on your chest, very fast!"
"Sure, gimme a taste man."
"You'll like it, you'll see.."
"Ag nee, sis man! It tastes like battery acid and vrot milk."
"That's because it probably is."
"Who makes this shit?"
"Don't worry, it gets better the more you drink it. This is from Mama Mavis. She makes the best beer in Marabi."

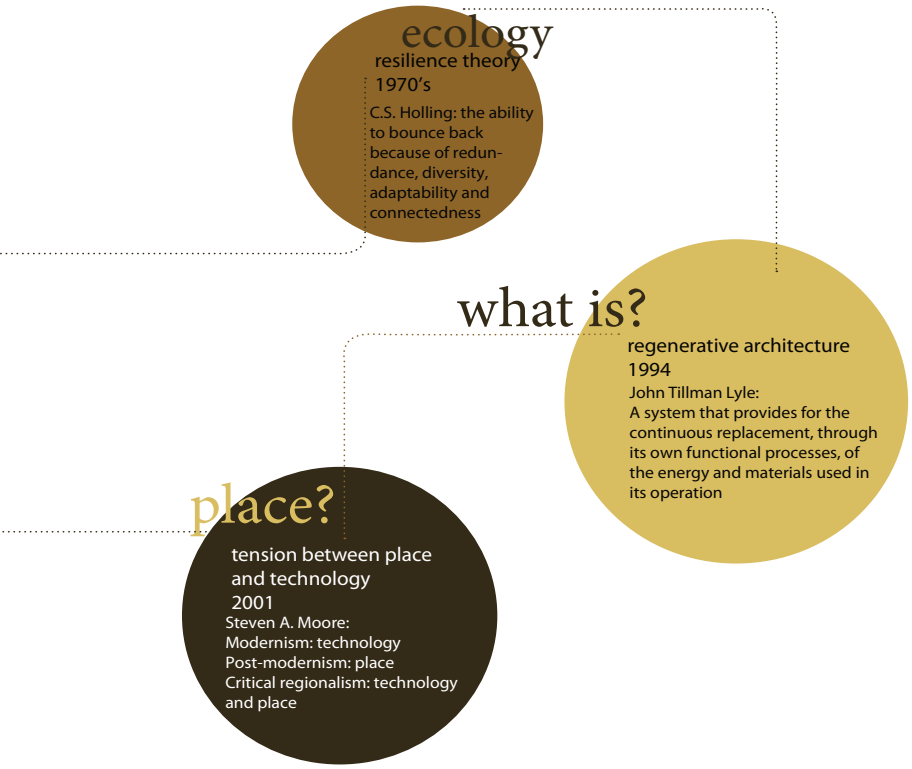


Figure 5.1: Beer and sunlight
*(Source: Tamás Kandákor)*

Figure 5.2: Traditional beer brewing and selling
*(Source: Manfred's travel pictures)*

Figure 5.3: Woman brewing beer
*(Source: Travel blog.org)*

Figure 5.4: Socializing with beer
*(Source: Tyler Dolan)*

# 5. "THE BEST BEER IN MARABI"

## 5.1. NON-MODERN THEORY WHILE DRINKING BEER

> "The disinhibition associated with alcohol is socially as well as chemically generated. [...] The very context of beer is conviviality; voices soon rise, and even the taciturn may become voluble. The noise generated by a beer drink is not a good measure of the amount being drunk, although it is likely to determine whether outsiders consider the drinking to be out-of-hand" (Colson and Scudder, as quoted by Van Wolputte, 2010:11-12).

The production and consumption of beer creates a lack of distinction between stuff and people, and humans and non-humans, as power relations shift and the one in turn empowers and influences the other. The health and wellbeing of the beer-drinking scene ensures the prosperity of the industry, and vice versa.

The social interface of beer and society that is embedded in the story of place of Marabastad forms the most important part of the proposed programme, where the consumption of beer creates wealth for the producers, but also activates social interaction.

Here is the perfect example of the hybridity of society and nature, human and non-human. Is it the human that produces the beer, or the beer that introduces the humans to each other? Is it the alcohol that inebriates or the place that intoxicates the senses? It is a lively participation of humans in their world.

## 5.2. THE HISTORY OF BEER BREWING IN MARABASTAD

Beer brewing played a significant role in the resilience of the community of Marabastad. It has provided its residents with an alternative source of income, as well as a way to rebel against a domineering government.

Although it is recognized that intoxicating substances can have a deleterious effect on a community; the aim of this project is to find the social, economic and ecological value that beer brewing and consumption and all related activities can add or change in the resilient but perverse social–ecological system of Marabastad.

### *5.2.1. Economic upliftment of women*

Up until the 1950s many women from Marabastad supplemented their income with beer brewing. Employment opportunities for non-whites were limited in general, but even more so for women. Most worked as domestic servants but turned to beer brewing, which they sold illegally from their homes at night and over weekends to supplement their meagre incomes. Traditionally, the brewing of beer is an empowering act, not only in a monetary sense, but also in having control of a very precious social resource (Van Wolputte, 2010:22). The drinking of beer is culturally significant, as described by Mokgatle (1971:23)

> "Every African man is expected to be a beer drinker. It sounds odd when a man declines beer that is offered to him... Close friends always invite each other to their homes for beer drinking... No function can be praised and regarded as dignified if there is no beer for men to drink."

Women, as the traditional beer brewers, are in control of the provision of beer at social gatherings, and in township shebeen culture the conviviality of the place was highly dependent on the character and personality of the shebeen queen (Hart, 1991:79). This created a unique economic opportunity for women.

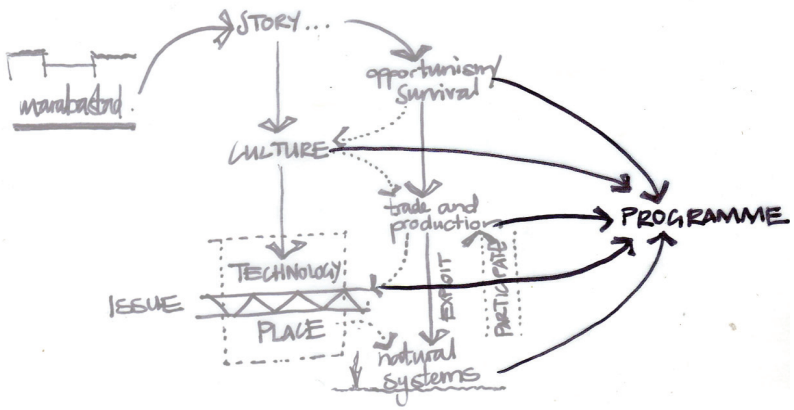



Figure 5.5: Programme generation
*(Source: author)*

## *5.2.2. Rebellion of the working class*

Even though Article 48 of Ordinance 32 of 1902[6] prohibited Africans to possess intoxicating liquor, the use of alcohol could not be eradicated. Illicit brewing and consumption became a way for the working class to subtly rebel against the state, and manifested in various ways (Friedman, 1994:150). Attempts at curbing the use of alcohol became "a fragmented and ineffectual prohibition amongst a thriving liquor trade" (J. Baker, quoted by Friedman, 1994:151). Social gatherings that centred on drink and wild dancing occurred frequently. These meetings, called Timiti's, originated as church gatherings where people paid a small entrance fee and received in return some cake, tea and entertainment in the form of a choir performance. These meetings were appropriated by the newly urbanised working class to suit their own social requirements (Friedman, 1994:153), and instead turned into the infamous nights of drink, dancing and general raucousness.

6. Early oppressive legislation passed by the British authorities

When authorities banned and tried to eradicate the Timiti, gatherings simply moved to the Asiatic Bazaar that functioned under a different jurisdiction. Well-known gathering spaces like the Columbia Dance Hall and Orient and Empire Theatres were all located in the Indian precinct. Indian retailers illegally provided black brewers with sorghum malt (Naidoo, 2008), exploiting the legislation that tried to prevent the brewing of beer by Africans. Raids and inspections were frequent, and brewers and traders responded by hiding the illegal products in holes in the floors of their houses.

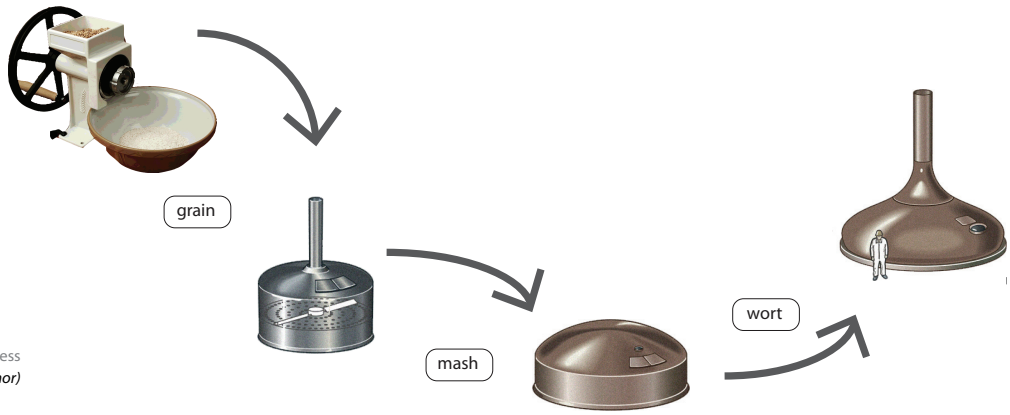


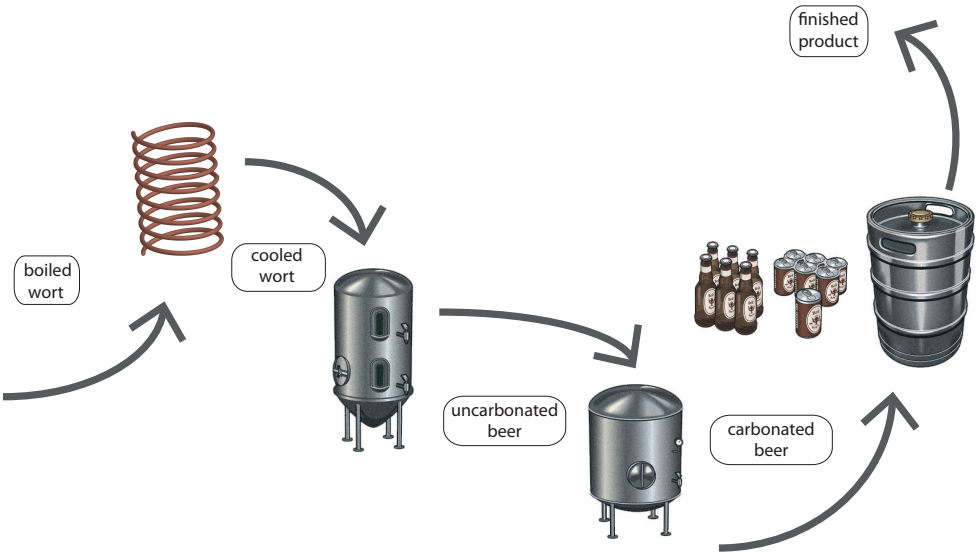

Figure 5.6: Beer brewing process
*(Source: Author)*

The production and consumption of beer in Marabastad is an example of how individuals improved their economic conditions through the development of an alternative income, based on a community's increased networking and cohesion derived from regular meetings and shared responses to authority within a highly resilient and well-connected network.

## 5.3. THE BEER BREWING PROCESS

Beer brewing has developed many guises and variations in production over the globe, but the basic process consists of the fermentation of sugars that are extracted from malted grain.

Malted grain (usually barley) is added to warm water (normally at around 70 degrees Celsius) in a vessel called the mash tun. Here, the starch in the grain is converted into sugar by the enzymes present in the malted grain. The sugary water (called wort) is then extracted through a process called lautering. In this process, the wort seeps through the bed of spent grain that acts as a filter, and added water washes the remaining sugar from the grain in a process called sparging.




The wort is then moved to the boiler, where hops and other flavouring (fruit or extra sugar) are added. The wort is boiled for about an hour, after which the sterilized, flavoured wort is filtered, cooled and pumped to the fermentation tanks. It is into these tanks that the yeast that will convert the sugar in the wort into alcohol is pitched.

After fermentation (ranging from 4 to 14 days, depending on the type of beer being brewed), the beer is filtered again and pumped into bright beer tanks, where it is carbonated and matured for another couple of weeks. Bottling, kegging and labelling are the last steps in the process.

In Africa, sorghum malt is traditionally used to brew an opaque, milky beer that has a sour taste. The reason why the beer is not clear is that the enzymes in sorghum are not strong enough to convert all of the starch in the malted grain into sugar. The leftover starch gives the beer a milky colour and higher viscosity. The beer is also left to ferment in the container from which it is served, which gives it a much shorter shelf life than clear beer and is the reason why it is usually consumed at the place of production and has not become commercially available on a large scale.

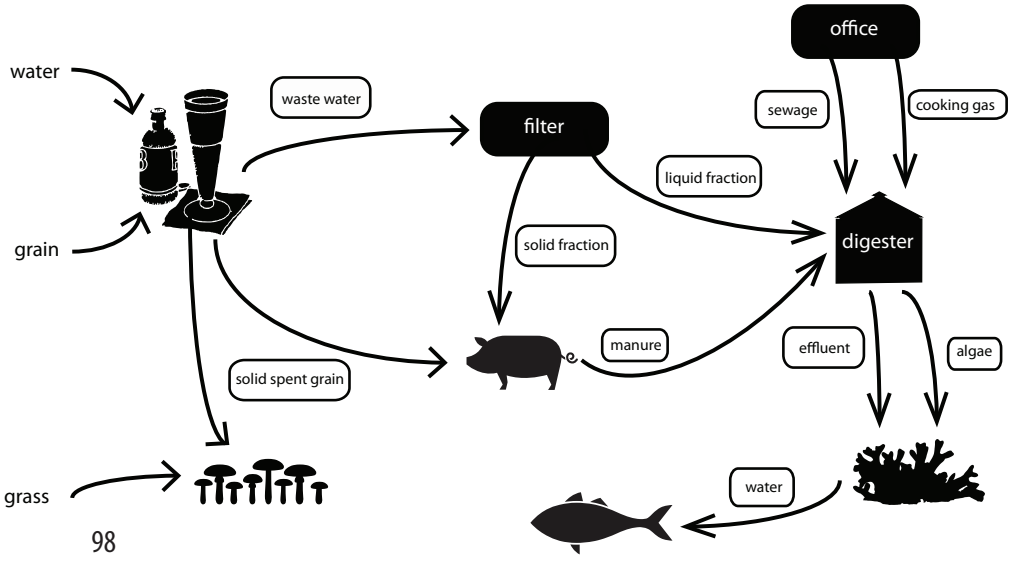
# 5.4. FINDING OPPORTUNITY IN WASTE

## *5.4.1. The brewing process*

Breweries are infamous for being wasteful, especially with the valuable resource of water. Water is used in almost every step of the beer brewing process, not only for the actual brew, but also for cleaning and cooling. On estimation, 3 – 10 litres of effluent is generated on average for every 1 litre of beer that is produced (Olajire, 2012:4). This water is not toxic and is easily biodegradable, which means there is an opportunity for reuse.

Other waste products that are generated through the beer brewing process are spent grain and yeast. The former is sold as animal feed as it is high in protein, but is hard for the animals to digest, resulting in high methane emissions. Some of the spent yeast can be used as new production yeast, and the rest can also be used as an animal feed supplement on account of its high vitamin B and protein content (Olajire, 2012:5).

Figure 5.7: Tunweni beer brewing process
*(Source: Author)*



### *5.4.2. Tunweni Brewery in Tsumeb, Namibia*

The Tunweni Brewery, located about 16km from Tsumeb (a town in the north of Namibia) produces mushrooms, bread, chickens, algae and fish in addition to sorghum beer in a barren desert climate. With the help of Zero Emissions Research and Initiatives (ZERI), the management developed ways to utilise all the waste produced in the beer brewing process as food in another production process (Mshigeni, 2001).

While conventional breweries produce beer along a linear process, the Tsumeb Brewery tried to establish a closed-loop system where all the waste is used in a productive way. Spent grain, which is high in protein and fibre, provides a substitute for flour in bread when dried and milled. Spent grain is also an excellent substrate for growing mushrooms, which in turn heightens the protein content in the grain and makes it easier for livestock to digest. The waste from the livestock, along with the wastewater from the brewery, is fed into an anaerobic digester where biogas is produced. The gas is then used in the brewery to fuel the boiling process. Nutrient rich water from the digester is used to grow spirulina algae, a protein supplement in a country where many children are malnourished. The algae is also used as fish feed, and fed into fish ponds that act as small ecosystems to purify the water before it seeps back into the ground.

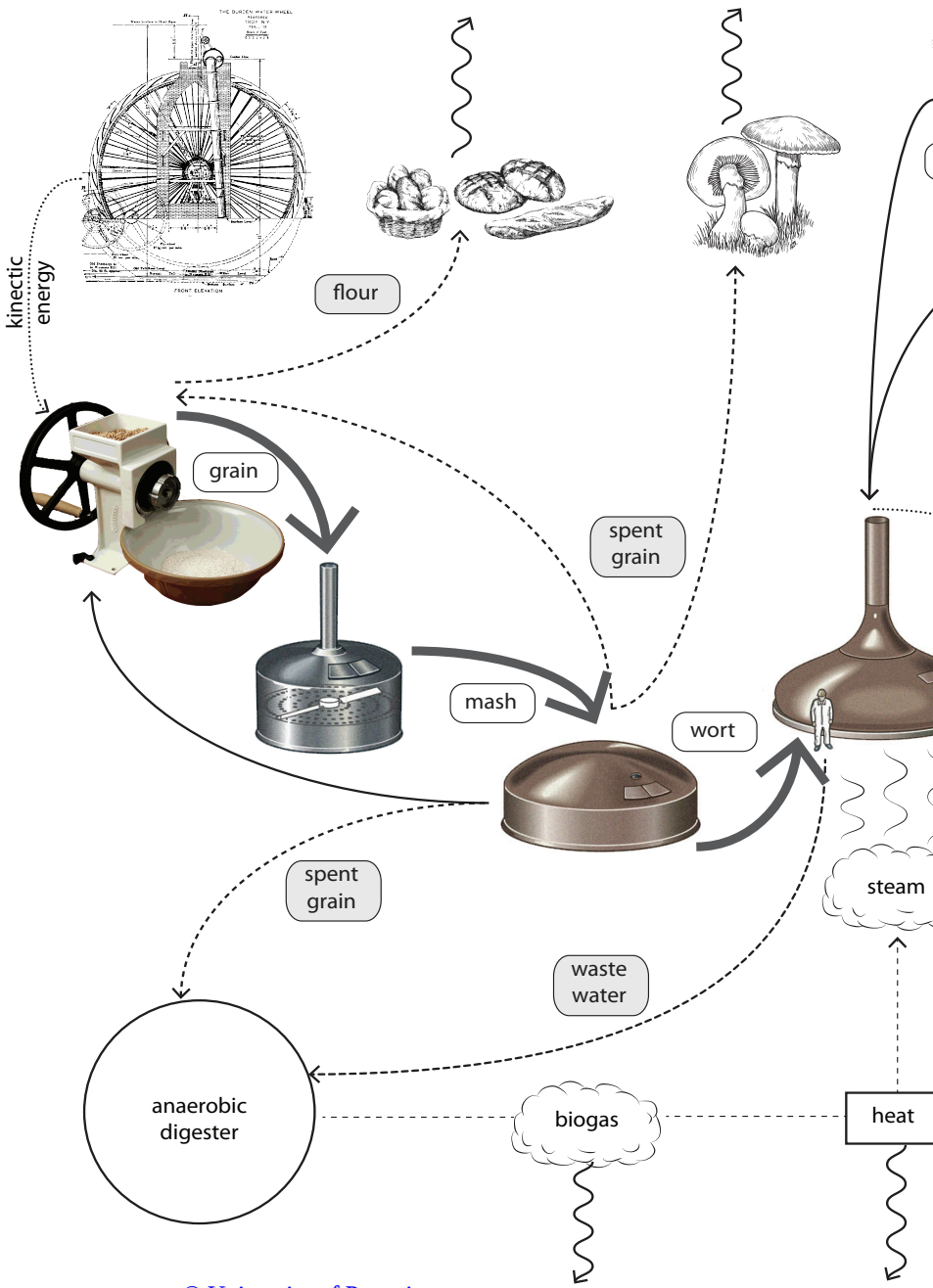
### *5.4.3. Waste in Marabastad*

As explained in Chapter 2, the proximity of the fresh produce market to Marabastad and the profusion of pedestrian traffic in the area support abundant trade in fresh produce in the precinct. As there is a lack of storage space for vendors, unsold produce is either given or thrown away at the end of the working day. Much of this waste finds its way into the Steenhovenspruit, also because refuse removal service delivery from the municipality is continuously poor for this high level of trade and intense use of public space.

According to vendors, most of this produce is still edible at the time it is thrown away, and so represents a loss of money, nutrients and energy.

### *5.4.4. A closed-loop brewing system in Marabastad*

A similar closed-loop production system is proposed in Marabastad, which would also utilise opportunities inherent in the precinct. The following resources will be used in the closed-loop system designed for the brewery (see Figure 5.7):



_ The Steenhovenspruit provides a steady stream of kinetic energy that increases significantly during the rainy season. This energy can be stored in the form of potential energy to drive the milling of the grain at the start of the brewing process.

_ The same mill can be used to mill the spent grain to supply a proposed bakery on site with flour.

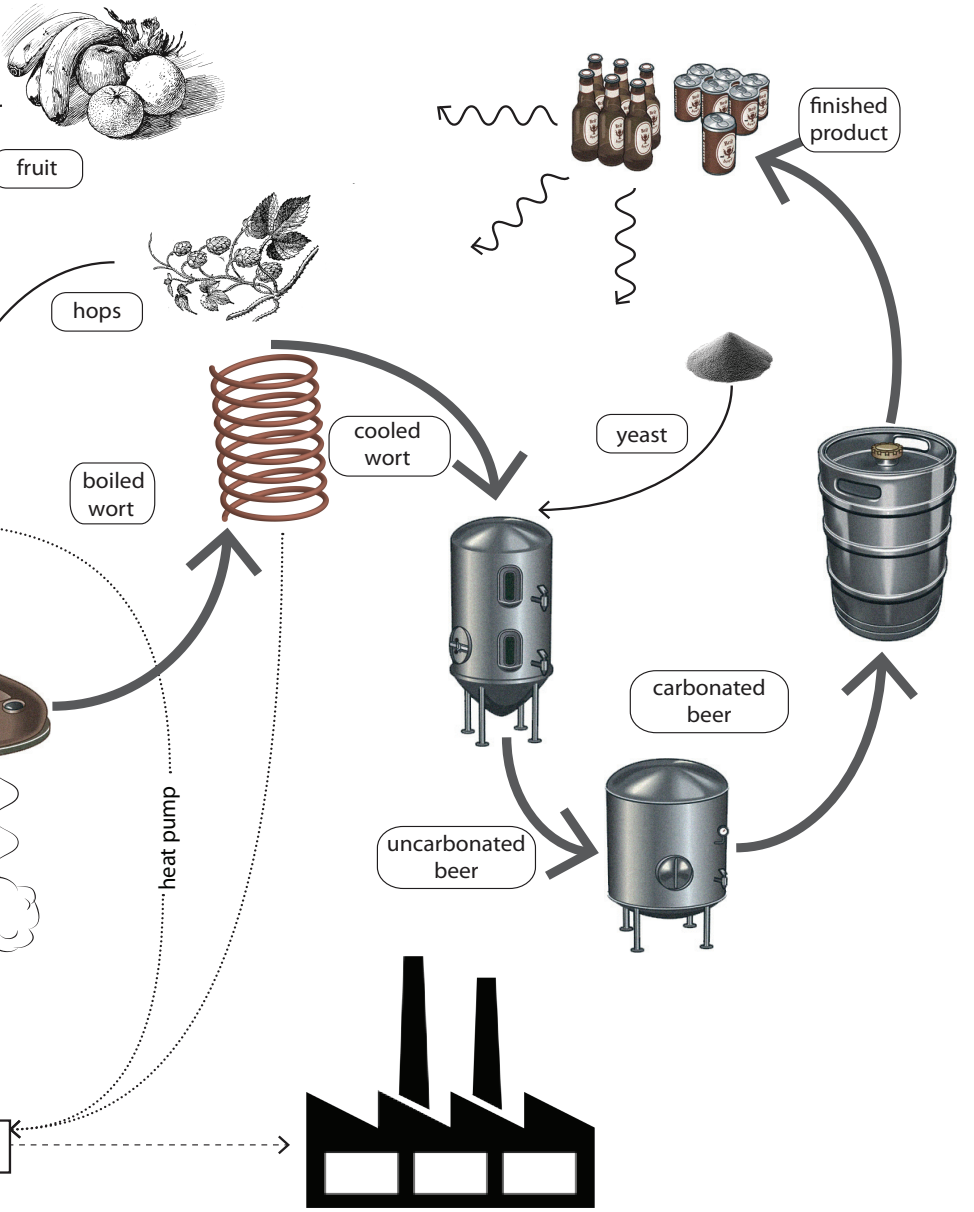



Figure 5.8: Proposed beer brewing system in Marabastad *(Source: Author)*

_ Growing mushrooms will aid in the rehabilitation of the distressed soil on site, while enriching spent grain with protein before it is either sold as animal feed or moved to the anaerobic digester that will also be fed by waste collected from informal traders.
_ Gas that is produced by the digester can be used as an energy source in the brewery, by informal traders in the production of food, and as an energy source to heat the building in winter.
_ The utilisation of a heat pump will increase the energy efficiency of the boiler, while polluted condensate can also be fed into the anaerobic digester.
_ Edible and usable fruit can be bought from traders at below cost price, reducing their losses and providing a cheap source of sugar and flavourings for the brewery. The fruit can either be used in the boil to add extra sugar, or fermented directly to produce fruit cider.
_ By using the spruit's water in a counter-flow chiller to cool the wort before it is fermented (where it never comes into contact with consumables), the use of potable tap water is reduced, and the heated water can also aid in the heating and cooling of the building.

The aim is to provide the building with as many resources as possible and share these freely to support workers, users and traders in the area.
The building will function in synergy with the natural systems on site as well as the surrounding social and economic networks by:
_ providing public space;
_ providing an important social resource in the form of beer; and
_ making the resources that are produced in the building readily available: waste collection, gas, heat and ingredients for beer brewing, to name but a few.

"It does get somewhat better. Still tastes a bit like vrot milk, but I kinda like it."

"I told you. Lekker unqombothi. Ma trek my broek af!"

"What goes in here?"

"Ag, a little bit of everything. A little sorghum, a little spirits, a little battery acid..."

"Zakes, I'm hungry. What's there to eat around here?"

"Ag, we have a little bit of everything. A little bit of magwinya, a little bit of mopanie worm, bread and mushroom sauce. It's all just around the corner."

Figure 6.1: Natural resilience
*(Source: Leslie Tucker Jenison)*

Figure 6.2: Golden liquid
*(Source: Vulk)*

# 6. "JUST AROUND THE CORNER"

## 6.1. CONCEPT: SYNTHESIS

The concept has to successfully synthesize all the informants and provide a framework for design decisions to be made so that all the project intentions can be met. This section therefore aims to integrate all the informants of the previous five chapters:

_Issues and project intent
_Urban intent and site analysis
_Historic and cultural informants
_Theoretical premise
_Programmatic requirements

The opportunistic culture in Marabastad, which has aided its resilience over the years, is used as informant to develop a regenerative system that can sustain and enhance the lives of all the inhabitants of the precinct and has a character of liquidity to adapt to changes over time.

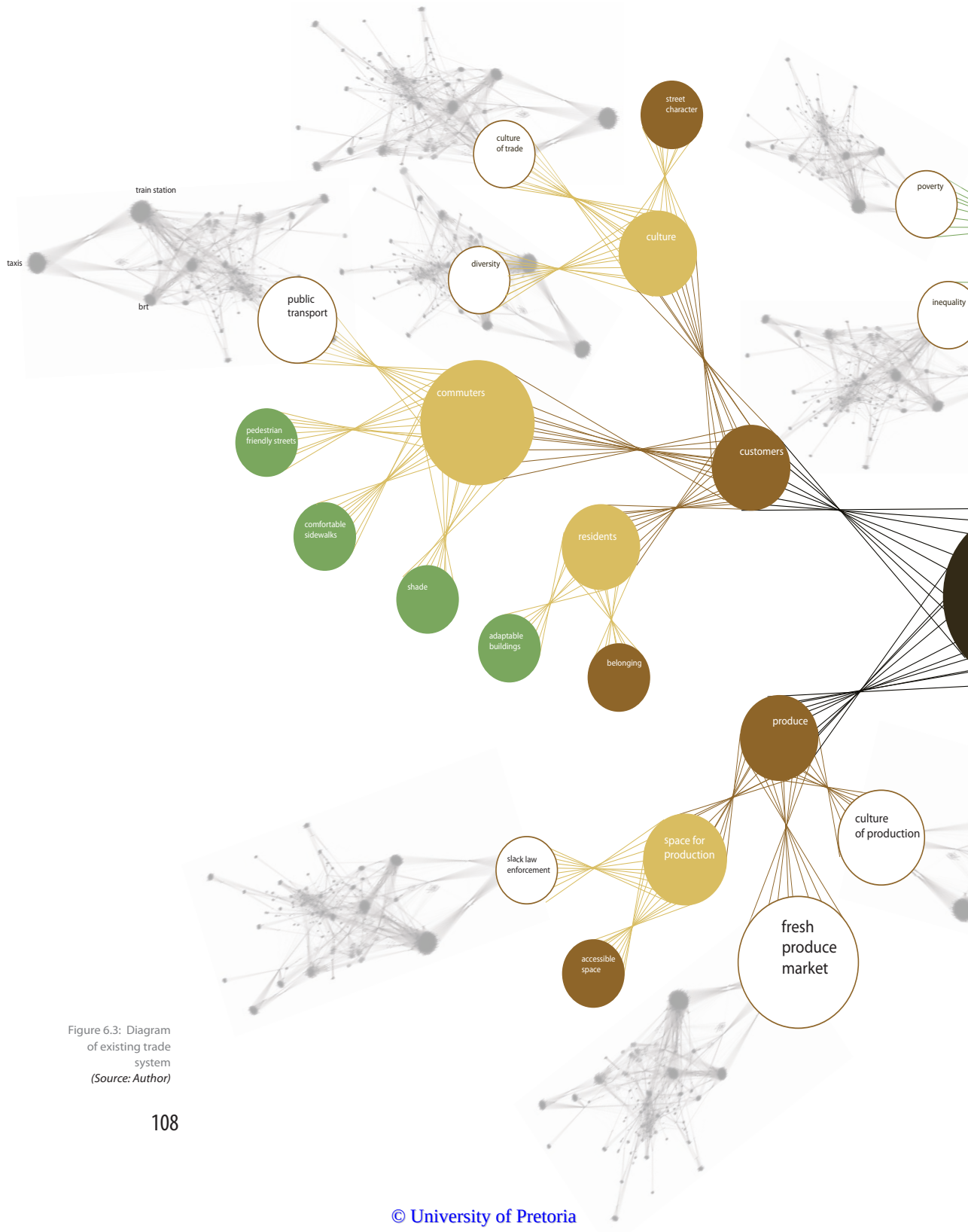
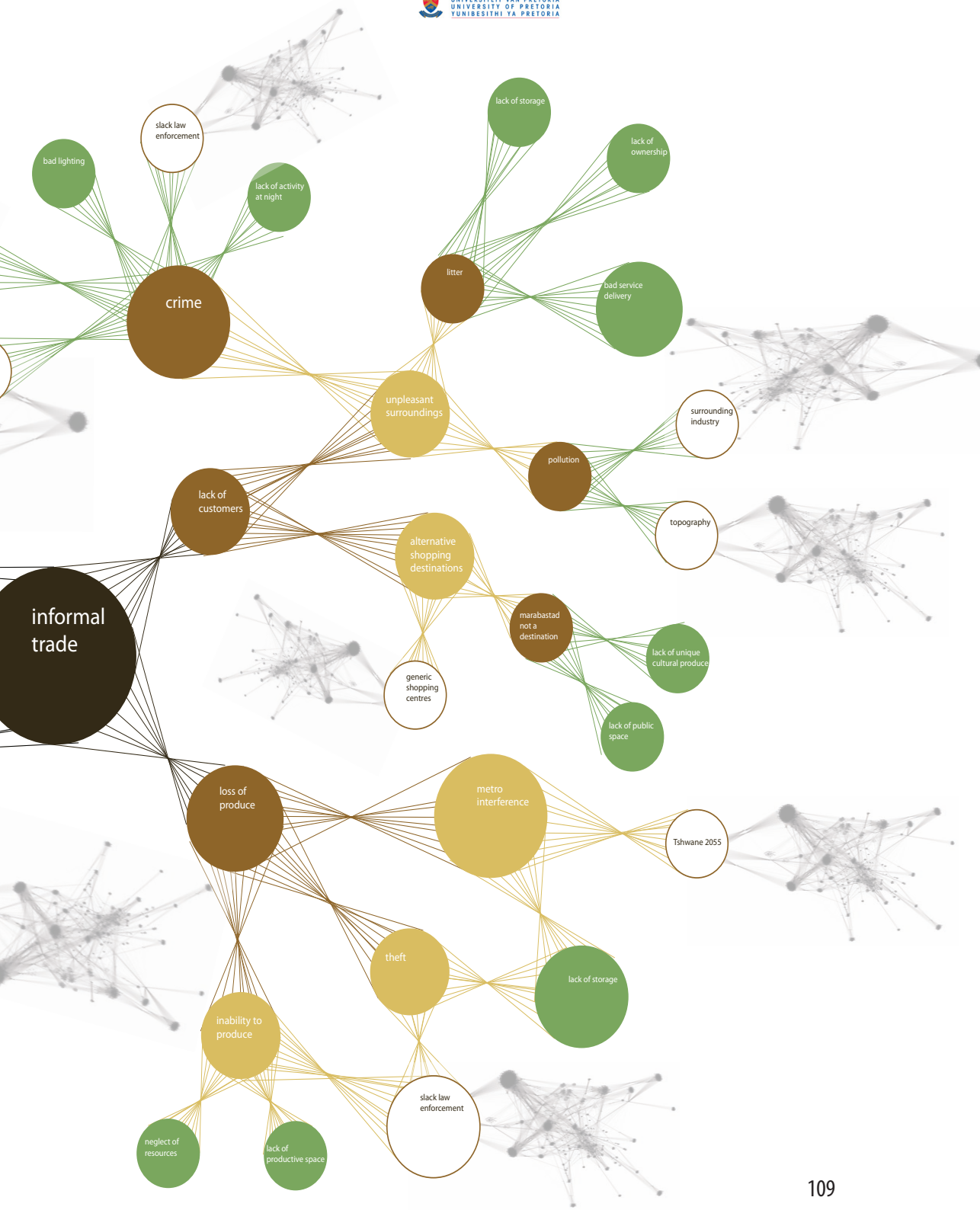



Figure 6.3: Diagram of existing trade system
*(Source: Author)*

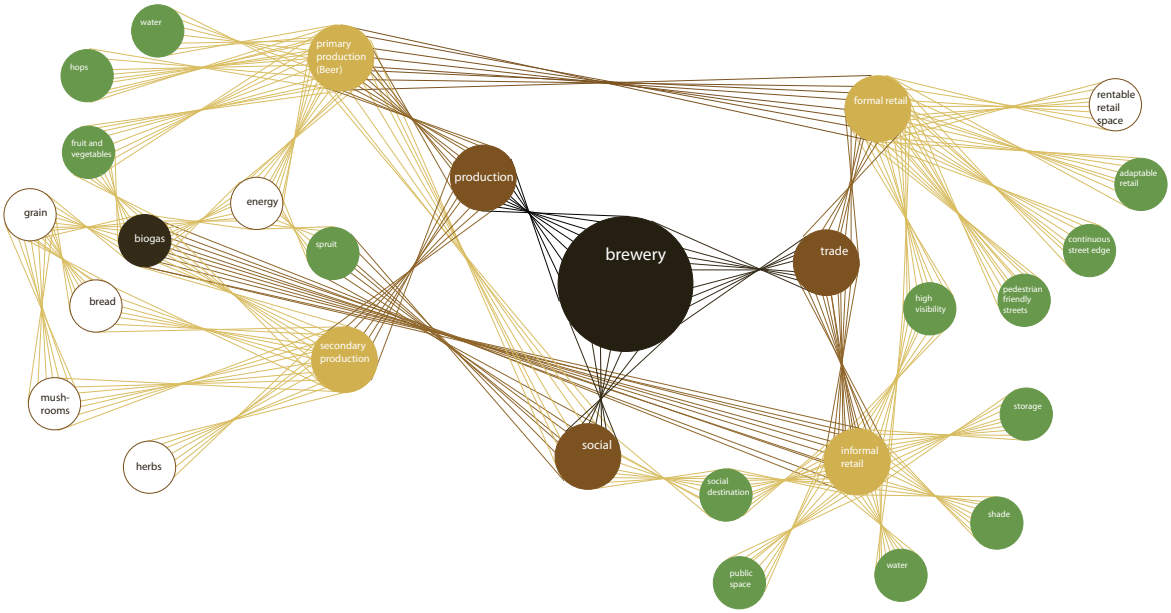


## 6.1.1. Intentions

### *Project intentions*

The intention of the project is to design an architectural intervention that:
_ Facilitates interaction and exchange between social, economic and ecological networks in Marabastad.
_ Creates a closer connection between human experience and natural processes.
_ Is in keeping with a history of opportunism and will exploit a rich history in illegal brewing as well as opportunities to be found in existing waste and water systems, to create new opportunities in beer brewing and related activities for the community of Marabastad.
_ Responds to the existing typology and adaptable nature of the urban precinct of Marabastad.
_ Provides public space that is currently lacking in Marabastad.

Figure 6.4: Diagram of brewery network
*(Source: Author)*



*Functional and systemic intentions*

> In systems language, the 'stock' of the system is "the elements of the system that you can see, feel, count, or measure at any given time. A system stock is just what it sounds like: a store, a quantity, an accumulation of material or information that has built up over time" (Meadows, 2008:16-18).

In this dissertation, the focal system will be the integrated trading system in Marabastad, with special focus on informal trade. The 'stock' in this scenario is the ability of Marabastad to sustain a healthy trade network and system. The inflows that aid a trade-friendly environment and the outflows that hinder it are illustrated in Figure 6.3. Architectural elements that can be controlled through design are shown in green.

The intervention aims to provide users in Marabastad with elements that will aid not only the healthy functioning of the economic trade system, but also the integration of this system with natural and social systems.

The building therefore functions on three levels: industry, retail and social. The aim of the industrial programme is to function with the community to close the loop of waste: waste is collected to power the production process, and waste from the production process generates energy that is used by the community (see Figure 6.4). Elements that can be influenced through architecture are shown in green.

The retail components form the interface between the industry and the public. Products (and therefore resources) change hands and are distributed amongst the community. These retail areas mediate between the public space and the productive space. With any kind of transaction, there is a level of social interaction (in this case aided by the consumption of alcohol). The production and sale of beer is integral to all three functions mentioned above, and is especially noticeable throughout the history of Marabastad.

*Urban/physical informants*

_ The energy available in the spruit needs to be harnessed to drive part of the brewing process, while creating an awareness of the rhythm and cyclical nature of the spruit itself (see Figure 6.4).

_ The strong pedestrian movement along the northern and western edges between nodes of transport inform the placement of public edges (see Figure 6.5).

_ The existing edge condition along Boom Street has a porous quality that allows the spontaneous use of the shaded edges by traders and the public. This same quality needs to be continued in the new intervention, especially on Boom Street (see Figure 6.6).

_ Marabastad has a distinct block typology (see Figure 6.7) consisting of permanent edges that define the street edge, and private courtyards edged with more adaptable structures. Where the colonnades and public edges mostly house shops, the more adaptable interior of the courtyards can house a myriad of functions, from workshops to housing to shebeens.

_ There are two predominant geometries on site: that of the city block (which is almost exactly orientated north/south) and the geometry of the Steenhovenspruit (see Figure 6.8). The street and channel are theoretically regarded as equally important, and so the different geometries need to be mediated.

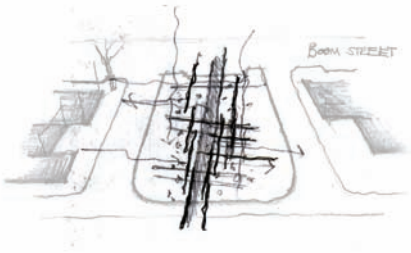



Figure 6.5: Spruit as energy source
*(Source: Author)*

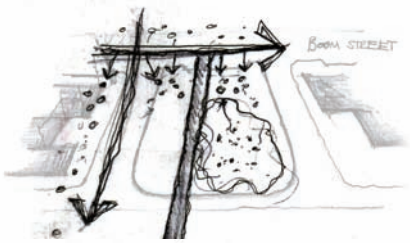



Figure 6.6: Pedestrian movement
*(Source: Author)*

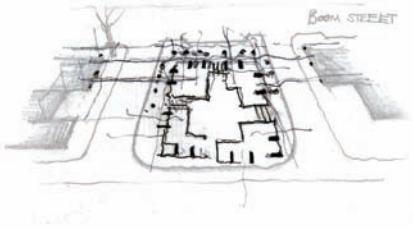



Figure 6.7: Edge condition
*(Source: Author)*

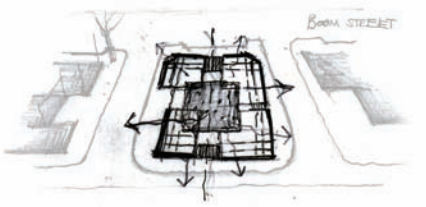



Figure 6.8: Block typology
*(Source: Author)*

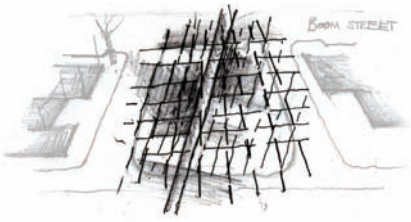



Figure 6.9: Different geometries on site
*(Source: Author)*

Figure 6.10: Coding Plan
*(Source: GWA, edited by fellow student)*

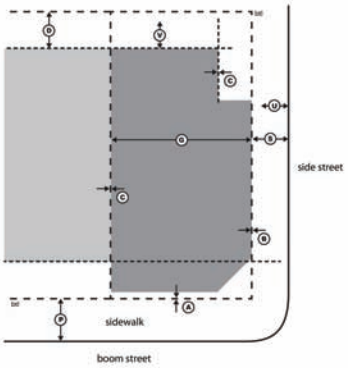
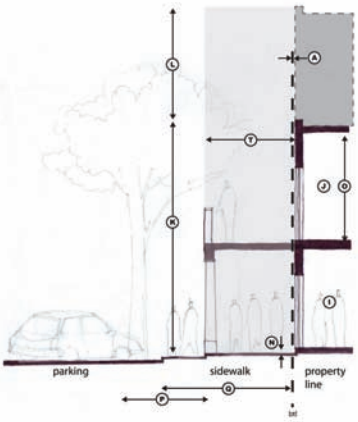



Figure 6.11: Boom Street South
*(Source: GWA, edited by fellow student)*




## *Historical and cultural informants*

_ The heritage fabric along Boom Street needs to be reinterpreted in scale and character. To assist with this process, the urban coding developed by Gary White Architects and Urban Designers (mentioned in Chapter 3, see Figure 6.10-13) is utilised. This will ensure the continuation of the Boom Street aesthetic and an appropriate scale to edge the most important street in Marabastad.

_ The architecture needs to allow the culture of opportunism that is prevalent in the precinct to continue to be practised. It should provide spaces that can be appropriated, and access to services as well as opportunities for trade and interaction.

_ The history of beer brewing in Marabastad as an illegal, underground activity that was an important source of income is an important design informant. The nature and position of storage and production spaces are partly influenced by the way that illegal production and storage of products in Marabastad occurred.

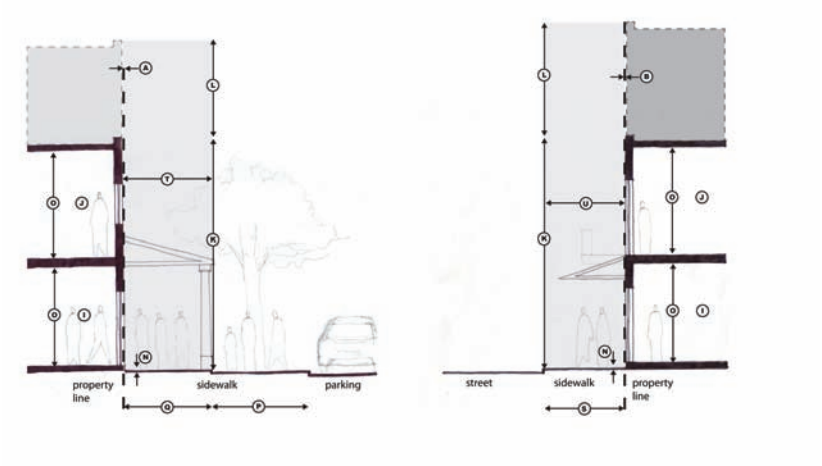



Figure 6.12: Boom Street North
*(Source: GWA, edited by fellow student)*

Figure 6.13: Side street
*(Source: GWA, edited by fellow student)*

## *Theoretical premise*

Informants derived from theory determine the way that all resources are used: social, economic and ecological. Energy is harvested from the spruit to run the milling process, and rainwater is harvested for non-potable water uses. Participation in the production process of the building will generate resources for the informal traders and so will enhance engagement with the functions of the building. These functions rely in part on natural cycles and so also create awareness of the rhythms of natural resources.

All of these would aid the regeneration of the social-economic system of Marabastad and would improve resilience in diversity of function and response dynamics.

### *6.1.2. Programmatic requirements*

| FUNCTION | DESCRIPTION |
|---|---|
| **BREWERY** | |
| PUBLIC | All functions that accommodate public visitors |
| Reception | Reception, waiting area and foyer |
| W/C | Public ablutions: 1 male w/c, 2 female w/c and 1 disabled w/c |
| OPERATIONAL | Functions required for the employees |
| Tea room | Lunch room with kitchenette and seating for employees |
| W/C | Private ablutions: 2 female w/c, 1 male w/c, 2 urinals and 1 disabled w/t |
| Showers | Showers for employees: 2 per gender and 1 w/c |
| Offices and meeting room | Meeting and office space for managers |
| CORE FUNCTIONS | All functions necessary for the production of beer |
| Mill | Crushing of grain before mashing |
| Mushroom propagation | Mushrooms are grown from spent grain substrate |
| Fruit collection | Collection point of fruit from informal traders |
| Fruit preparation | Where fruit is washed and prepared for use in brewing |
| Brewing area | Where equipment used in brewing is housed |
| Boiler room | Boiling process of wort where hops and flavourants are added |
| Fermentation area | Fermentation of beer for 1-2 weeks |
| Maturation and bottling area | Maturation of beer and bottling and kegging |
| SERVICES | Supporting functions, wet and dry services |
| Cold storage | For the storage of grain and hops before brewing |
| Water treatment | For the treatment of rainwater and municipal water for brewing |
| Pump room | To circulate water through the building |
| Storage of bottling equipment | For storage of bottles, kegs and crates |
| **RETAIL** | |
| PUBLIC | All functions that accommodate public visitors |
| Liquor store shop area | Sales of beers produced on site as well as other forms of liquor |
| Rentable retail | 3 Retail units for local traders |
| Bakery retail | Sales of baked goods produced from spent grain from brewery |

| REQUIREMENT | SIZE |
|---|---|
| | |
| Industry partly visible, natural light, comfortable seating, close to public w/c | 30 m2 |
| Close to entrance, easily cleaned, easily serviced, ventilated | 25 m2 |
| | |
| Naturally lighted with direct link to private courtyard | 60 m2 |
| Central to activity, easily cleaned, easily serviced, ventilated | 25 m2 |
| | |
| Close to entrance, easily cleaned, easily serviced, ventilated | 30 m2 |
| Central to activity, natural light | 55 m2 |
| | |
| Creates dust, removed from brewing area, easily cleaned and serviced | 30 $m^2$ |
| Dark and humid environment | 50 $m^2$ |
| Direct ling to outside, easily used by traders, cold storage | 35 $m^2$ |
| Wet services, storage space, close to brewing area | 15 $m^2$ |
| Wet services, floor easily drained and washed, ventilation | 45 $m^2$ |
| Fire proof, well ventilated | 12 $m^2$ |
| Temperature controlled, easily serviced, easily drained and cleaned floor | 40 $m^2$ |
| Visible to foyer and reception, floor easily drained and cleaned, easily serviced, well lit, reachable by truck | 65 $m^2$ |
| | |
| Temperature controlled, well insulated | 25 $m^2$ |
| Central location | 20 $m^2$ |
| | |
| Central location | 10 $m^2$ |
| Close to bottling area | 20 $m^2$ |
| | |
| Corner shop for high visibility, easily accessible, high ceiling, good security | 120 $m^2$ |
| Easily accessible, high ceiling, good security | 90 $m^2$ |
| Well lit, accessible, close to mill and bar | 25 $m^2$ |

| | |
|---|---|
| OPERATIONAL | Functions required for the employees |
| Liquor store office | Management and meeting area with w/c and kitchenette |
| W/C | 1 w/c for the use of liquor store employees |
| CORE FUNCTIONS | All functions necessary for production of sellable goods |
| Production space for retail | 3 first floor adaptable production areas |
| Bakery | Area for the production of baked goods |
| SERVICES | Supporting functions, wet and dry services |
| Cold storage | Storage of alcohol in liquor store |
| General storage | Liquor store storage |
| Wet service cores | Housing water treatment and plumbing |

# SOCIAL

| | |
|---|---|
| PUBLIC | All functions that accommodate public visitors |
| Seating - bar area | Downstairs and upstairs seating for visitors to the bar |
| Seating - bar area | Outside seating for visitors to the bar |
| Seating - bakery | Outside seating for visitors to the bakery |
| Tasting area in liquor store | Seating area for tasting of locally produced beer |
| Public W/C | Public ablutions including disabled toilet |
| CORE FUNCTIONS | All functions necessary for the production of beer |
| Service area- bar | Bar counter, fridges and sink |
| Service area - tasting | Bar counter, fridges and sink |
| SERVICES | Supporting functions, wet and dry services |
| Back of house | Area for washing up, refrigerators, freezers and preparation if necessary |
| Storage | Storage of stock, tables, chairs, filing etc |

| | |
|---|---|
| Supervision of store, lower (more intimate) ceiling, natural light | 40 $m^2$ |
| Easily accessible, ventilated | 5 $m^2$ |
| Strong floor to carry possible heavy machinery, serviced with water and electricity | 25 $m^2$ |
| Close to mill, floor easily drained and cleaned, fire proof oven | 25 $m^2$ |
| Temperature controlled, well insulated | 20 $m^2$ |
| Strong floor structure, easily accessible | 50 $m^2$ |
| Easily accessible | 25 $m^2$ |
| Views, well lit and ventilate, more and less intimate spaces | 295 $m^2$ |
| Rain protected, view to public activity | 50 $m^2$ |
| View of public space, portion protected from rain | 25 $m^2$ |
| Protected from rain, well lit, view of public space | 50 $m^2$ |
| Easily cleaned, ventilated, accessible | 35 $m^2$ |
| Water and good lighting, central to activity | 20 $m^2$ |
| Water and good lighting, central to activity | 15 $m^2$ |
| Well lit, ventilated,easily cleaned | 15 $m^2$ |
| Reachable by truck, well lit, shelving | 25 $m^2$ |

## *6.1.3. Requirements of the concept*

In order to achieve the aims set out in the previous section, the concept should first of all be rooted in the place of Marabastad and its existing networks. The story of place becomes very important in order for the concept to draw from the history and heritage of beer brewing, opportunism, trade and sociability of the community.

The concept should allow for the interaction of different networks while being adaptable to accommodate diverse functions and responses to aid resilience. This interaction of networks will reconnect human activity with natural processes and help regenerate ecological, social and economic systems (see Figure 6.9).

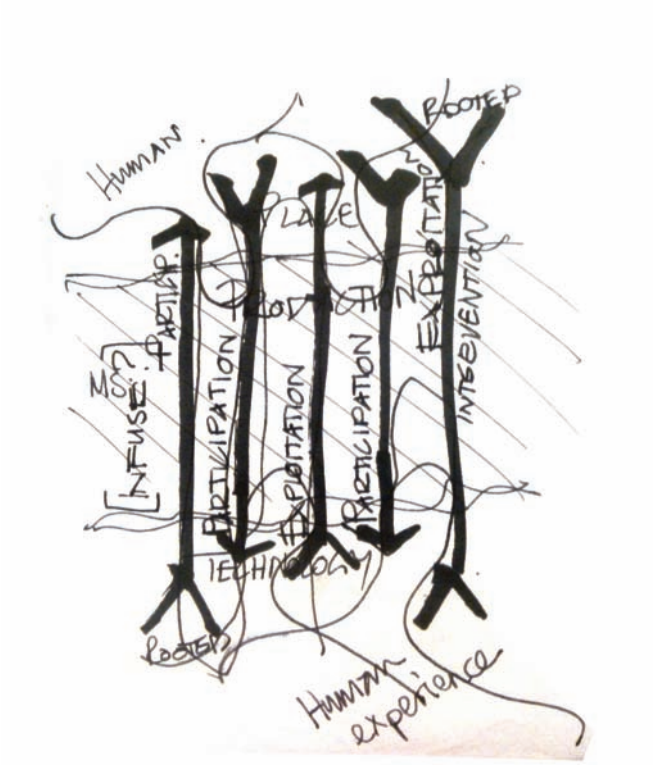



Figure 6.14: Diagram of requirements of concept *(Source: Author)*

How can this be achieved? The concept needs to be informed by existing natural systems and use these to reconnect and heal the environment (Figure 6.10). It should be sensitive to existing cultural practices and the history of oppression and opportunism that created them and, like the inhabitants of Marabastad, it should exploit opportunity for production and trade.

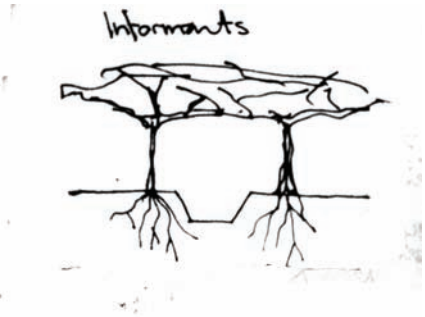



Figure 6.15: Rooted in place and growing from existing conditions
*(Source: Author)*

The rich heritage of beer brewing needs to be uncovered and reinstated as an important cultural practice (Figure 6.11). This forms part of the approach to heritage based on the International Cultural Tourism Charter.

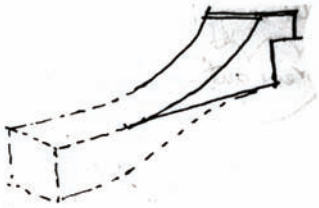


Figure 6.16: Uncovering heritage and making it accessible
*(Source: Author)*

The concept should be able to integrate natural cycles with the functions of the building, to bring the rhythms of nature closer to human experience (Figure 6.12) and at the same time adapt over time to users and external stresses.

Figure 6.17: Natural cycles part of human experience
*(Source: Author)*

From opportunism to participation (Figure 6.13). The intervention must draw on the existing culture of opportunism and use it to create synergy between existing networks (economic, social and ecological).

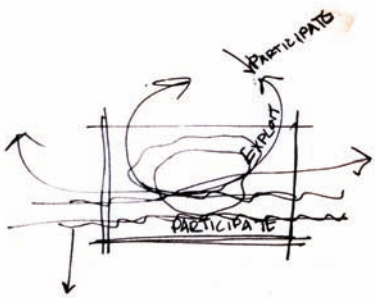



Figure 6.18: From exploitation to participation
*(Source: Author)*

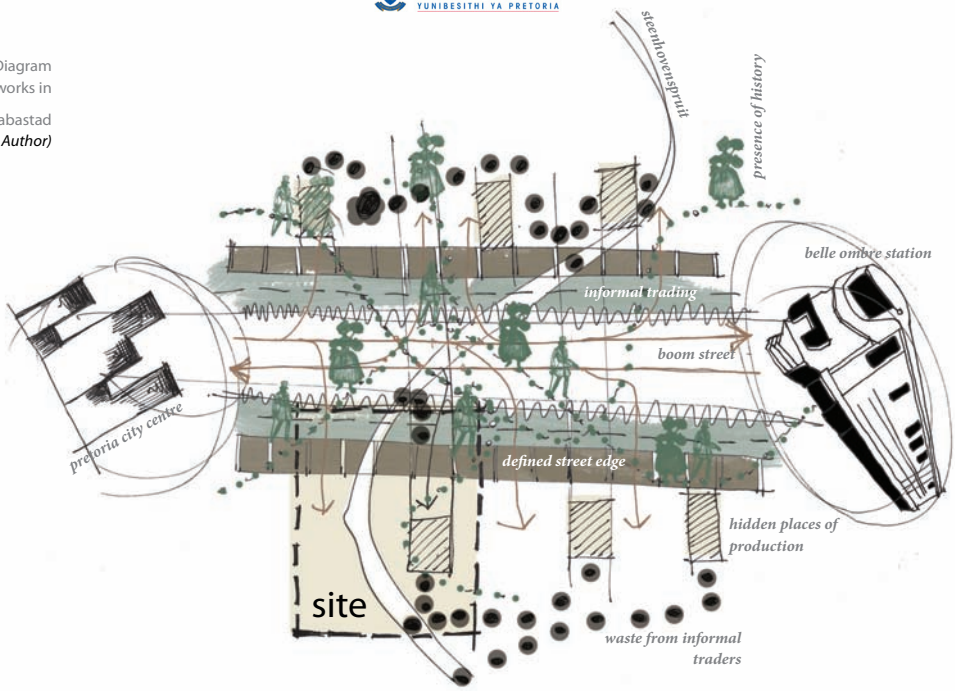



Figure 6.19: Diagram of different networks in Marabastad *(Source: Author)*

## *6.1.4. Mapping existing networks*

The various networks active in Marabastad that have bearing on an architectural intervention are depicted in Figure 6.14. When working with ever-changing social-ecological systems, quantitative information cannot be accurately portrayed as it requires a static representation of a dynamic system. There are long-term constants that affect the functioning of the precinct (such as Belle Ombre Station and its location with regards to the city, indicated by the anchors on the diagram). There are also temporal elements such as production and waste from the informal traders and the unseen presence of stories of oppression and survival. These elements continuously impact on and adapt according to a changing context, lending liquidity to the functioning of the precinct.

This liquidity, like the culture of opportunism, has added to the economic and social resilience of the area, and will become the characteristic that an architectural intervention can draw on for a conceptual approach that is adaptable, informed by the context, and able to influence the current conditions on site.

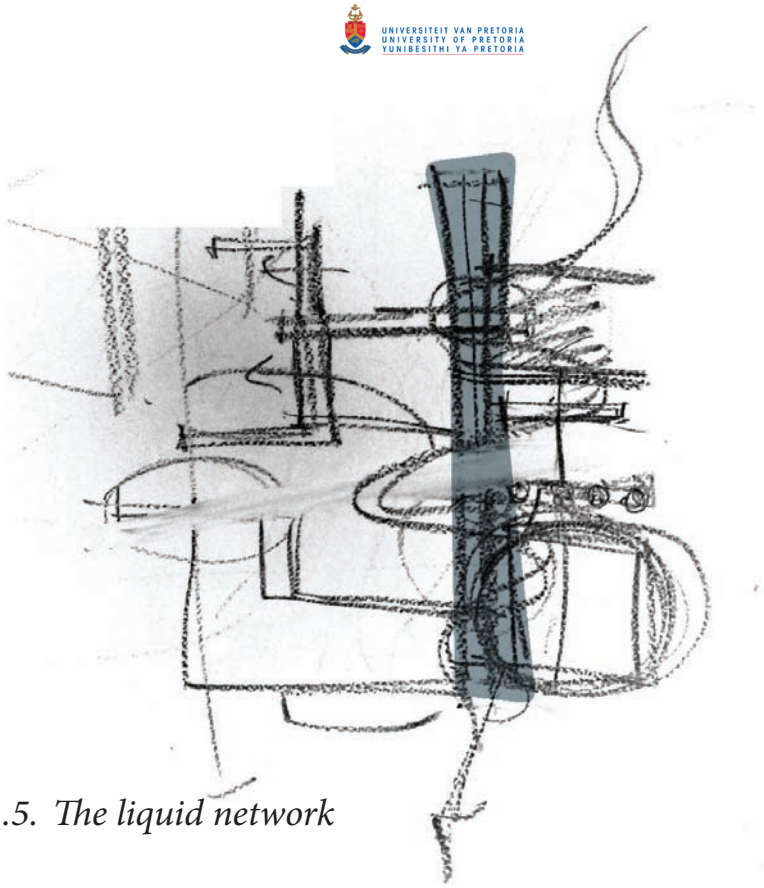


Figure 6.20: Conceptual diagram
*(Source: Author)*

## 6.1.5. *The liquid network*

The liquid network[7] is about liquefying resources, making them more accessible, but also allowing various and diverse interactions between different actors within existing systems.

The architectural implication of a liquid network is that of an intervention that is not at all rigid, but that is adaptable and allows for ever new and unique interaction and participation. An intervention that functions as a liquid network is influenced by existing conditions to create something new. In order to house a liquid network, an architectural intervention functions as a porous container, allowing for the infiltration of the various role players in the liquid network. It is therefore not exclusive, but promotes the systemic interaction between the various networks in Marabastad. An initial concept sketch is shown in Figure 6.15, indicating the prominence of the spruit in a proposed intervention and a porous edge that allows for the flow of activity and functions.

7. *The liquid network* is the name of a book by Steven Johnson about the network of ideas (see stevenberlinjohnson.com), but this dissertation has no relation in content and only uses the term as a conceptual design informant.


Figure 6.21: Initial concept diagram in context
*(Source: Author)*

# 6.2. TRANSLATING CONCEPT INTO DESIGN

## *6.2.1. Layering of networks*

An initial concept sketch is shown in Figure 6.16 and indicates the placement of a liquid network on the site and how it would draw from existing networks in the immediate context:

_Heritage fabric and street character
_Culture of opportunism
_Beer brewing
_Edge condition
_Block typology
_Pedestrian movement
_Energy available in the spruit

A layering of the different networks that need to be housed within the intervention was explored:

_ the continuation of the street edge on Boom Street and the public space it provides (Figure 6.17);

_ the brewing process (suggested by the equipment necessary) (Figure 6.18);

_ covered walkways connecting the different programmes (Figure 6.19);

_ the natural systems that form the foundation of the intervention; and

_ the courtyard typology (Figure 6.20).

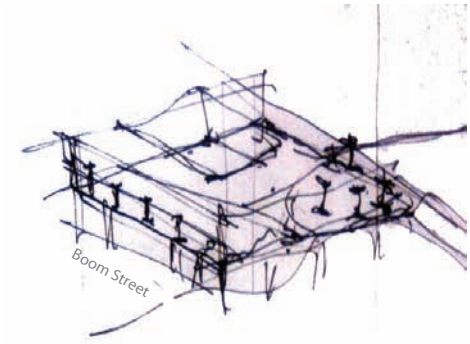



Figure 6.22: First layering of networks on site: the continuation of Boom Street colonnade *(Source: Author)*

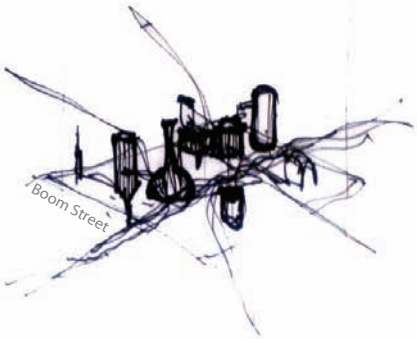



Figure 6.23: The industrial process *(Source: Author)*

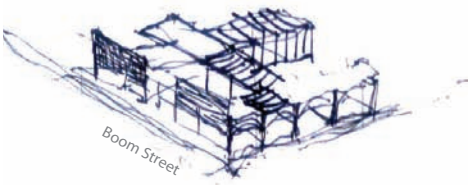



Figure 6.24: Walkways connecting different functions and mediating public and industry *(Source: Author)*

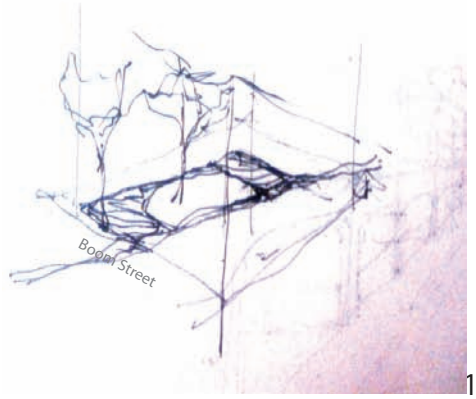



Figure 6.25: The courtyard typology and use of the spruit to define space *(Source: Author)*

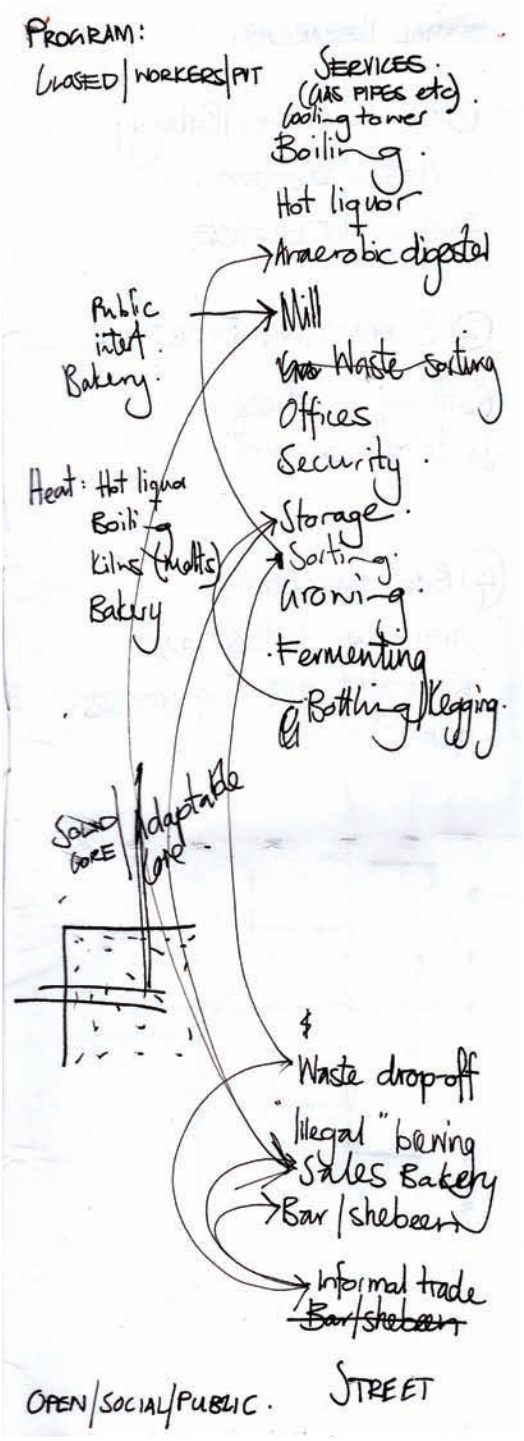



Figure 6.26: Relationship of different functions on site *(Source: Author)*

## *6.2.2. Organisation of the plan*

The first concern, as an urban and programmatic response, was to determine the location of activities on site and to retain a courtyard typology while introducing public access to the spruit.

The integrated programmatic system discussed in Chapter 5 comprises functions that range from public to private, the most private being the industrial areas, with the social areas being the most public. These programmes had to be organised on site, with the most public functions aligned with the most active pedestrian edges, so that the proposed courtyards could contain private activities.

By locating the industrial, more private, functions on the south-eastern side of the site, the northern and western edges are freed up for more public functions. The north-western corner of the site (where two main pedestrian axes intersect) provides the ideal location for the distribution of products

(the liquor store) (See Figure 6.22). Because the street edge and the spruit edge are regarded as equally important (according to the theory of participation of natural and social systems), two edges were effectively created: one on the street, and one on the spruit. To solve this problem of not having a "back" to the building, it was decided to pull a part of the courtyard across the spruit to form a public square (see Figure 6.23). This created a public edge on the spruit, retained the courtyard typology, and freed up space for service areas.

In the end, it was decided to place all the public orientated programmes (retail and social spaces) on the northern and western edges, with the bar and bakery functioning as a bridge across the spruit, as indicated in Figure 6.24. The industrial programmes were located to the east of the spruit, where production currently takes place. This is also the place on site where people tend to linger, and is more private than the edges that are currently used by informal traders and pedestrians.

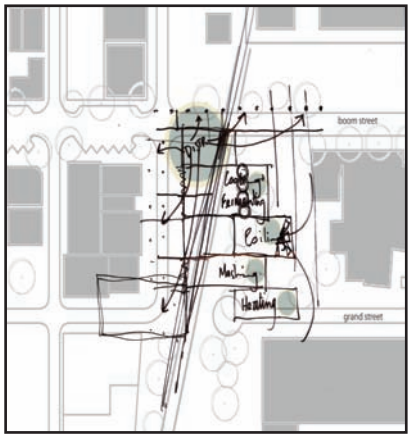



Figure 6.27: Programmatic layout on site
*(Source: Author)*

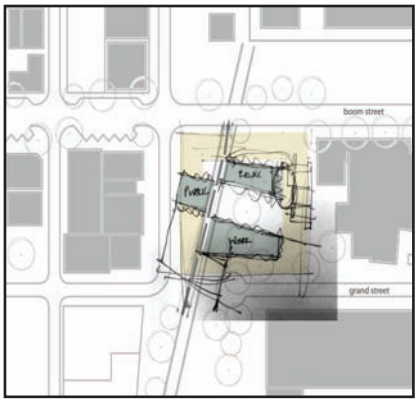



Figure 6.28: Use of courtyards
*(Source: Author)*

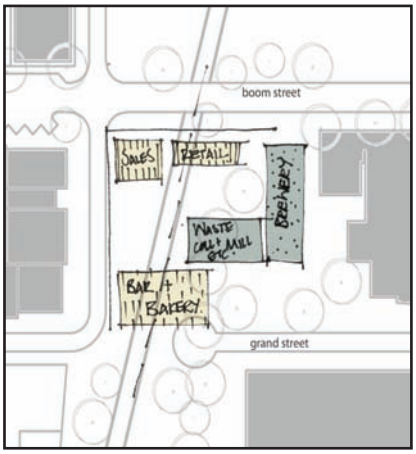



Figure 6.29: Organisation of programme on site
*(Source: Author)*

### *6.2.3. Spatial characteristics*

An exploration of spatial characteristics that aid the interaction of natural, industrial and social systems is illustrated in Figure 6.25-26. The visibility of industrial equipment, as well as the presence of natural elements (the spruit, trees and greenery) on the street and in the courtyard spaces, were deemed important.

Deep edges that allow for storage and trade and also provide shade were explored as a way to allow for trade to be included in the social spaces of the building. Light adaptable enclosures define spaces and help regulate the microclimate through shading and enclosure.


Figure 6.30:
First conceptual perspectives, public edge, April 2013
*(Source: Author)*


Figure 6.31:
First conceptual perspectives, private courtyard, April 2013
*(Source: Author)*

### *6.2.4. Three-dimensional exploration*

An exploration of varying permeability of edges – solid walls, columns and woven elements that lightly enclose – are shown in Figure 6.27. At this point, important explorations were vertical scale and the size of courtyards, and the crossing of the spruit and ways of interacting with it. Problems that were identified were the overwhelming linear nature of the surfaces that overpowered the geometry and presence of the spruit.

The next exploration was influenced more by the geometry of the spruit and the use of the energy of the spruit to power parts of the industrial process. The idea was to utilise the existing kinetic energy of the spruit to power the mechanically driven mill. This could create a feature on the western edge of the public space that would also communicate seasonal cycles and changes in rainfall. Challenges that arose were how to create several separate interventions while retaining a unifying language, as well as the vertical scale of the different elements in the intervention.


Figure 6.32: Plan, April 2013
*(Source: Author)*

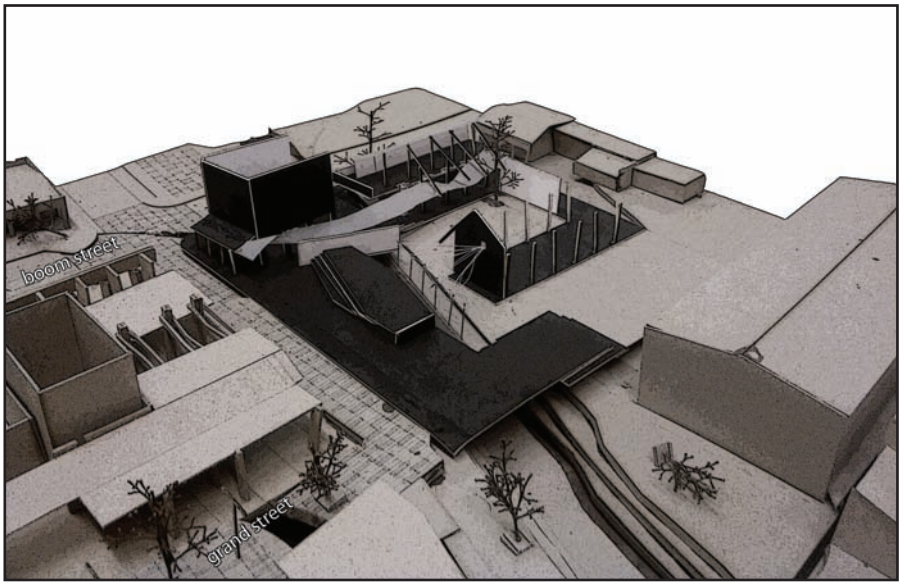



Figure 6.33: Section, April 2013
*(Source: Author)*

### *6.2.5. Exploration through plan and section*

Important factors that had to be considered included the integration of the spruit with the public space, the continuation of public space from outside to inside the retail areas, and the interaction of the industry with the spruit.

Issues identified were the geometrical issues of combining the geometry of the street with that of the spruit and the tightness of spaces.
Important ideas generated on section were (from left to right):
_the definition of the street edge
_a comfortable, shaded public space
_the expansion of the channel
_the prominence of the industry

Early sections lacked variation in height and hierarchy, and the programme was not legible. Figures 6.31 to 6.33 on the following page were drawn to better understand the relationships between different spaces that are necessary for interaction to occur between natural systems, industry and people.

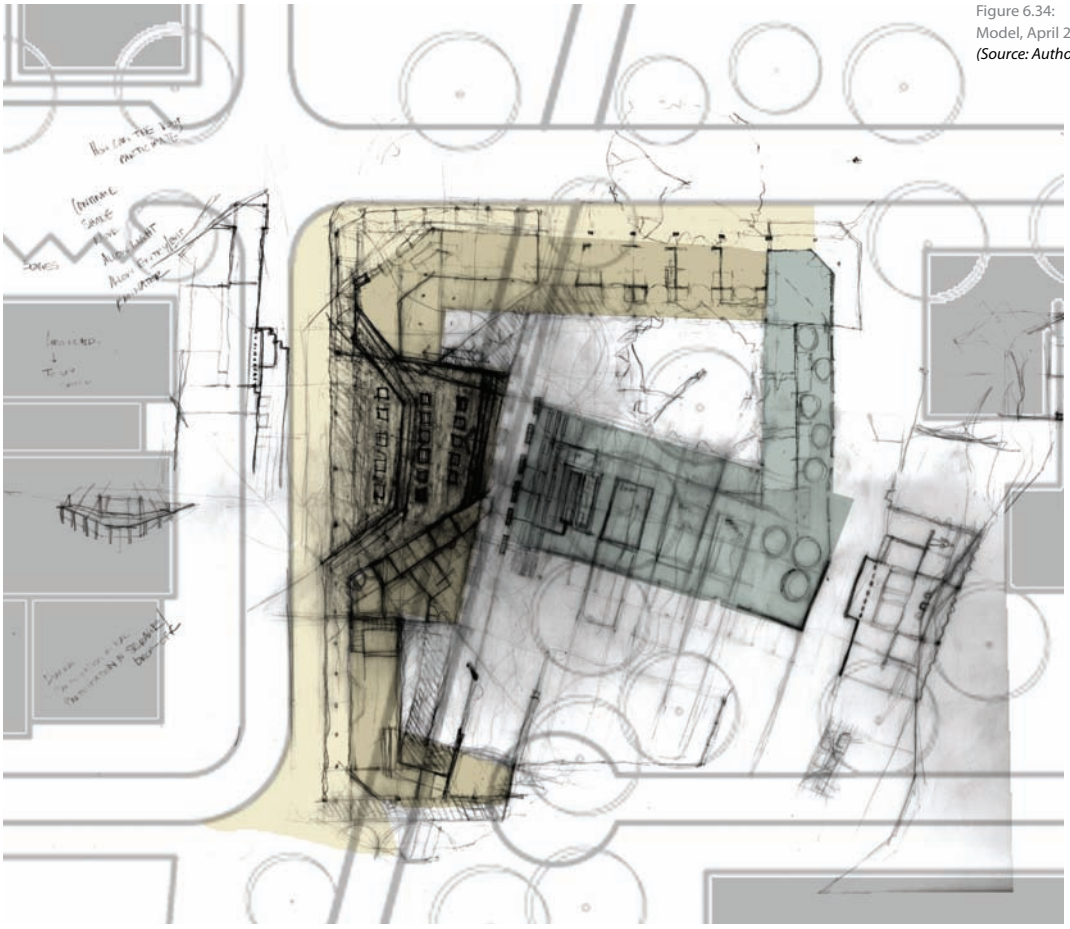


Figure 6.34:
Model, April 2013
*(Source: Author)*

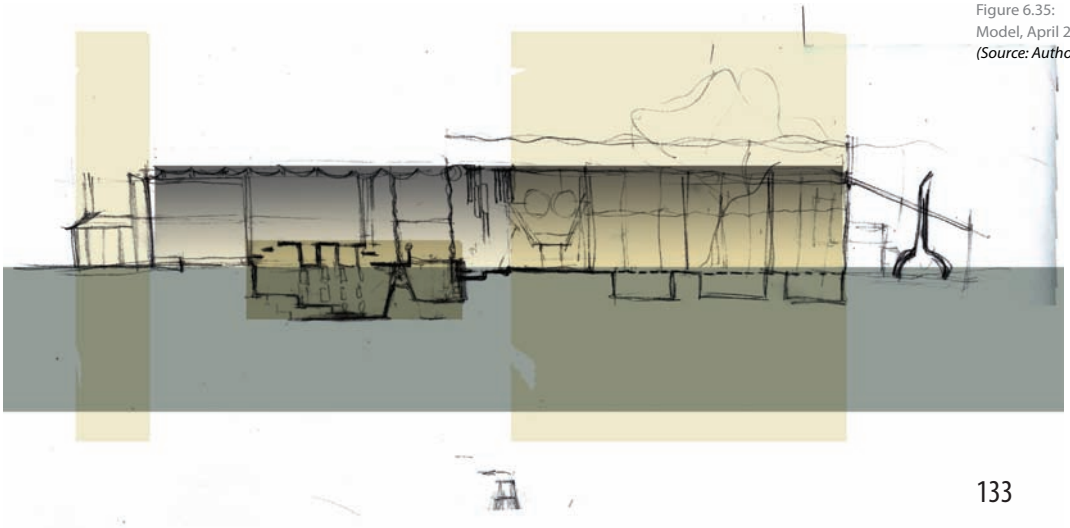


Figure 6.35:
Model, April 2013
*(Source: Author)*

Figure 6.36: Participation of Steenhovenspruit, April 2013 *(Source: Author)*

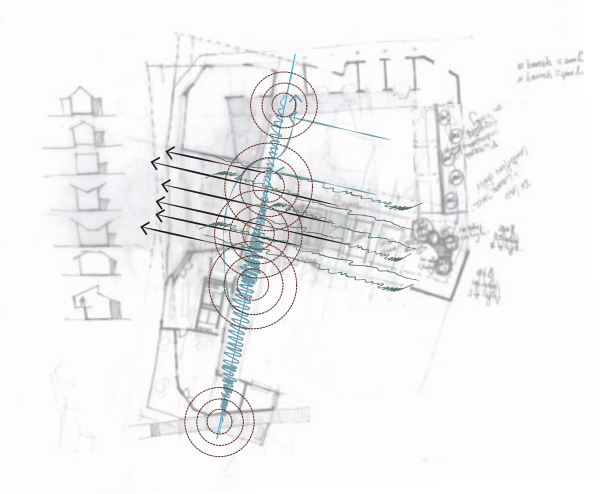


Figure 6.37: Participation of people, April 2013 *(Source: Author)*

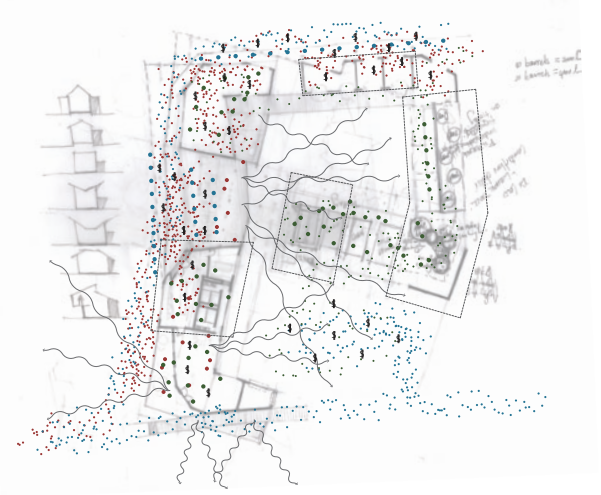
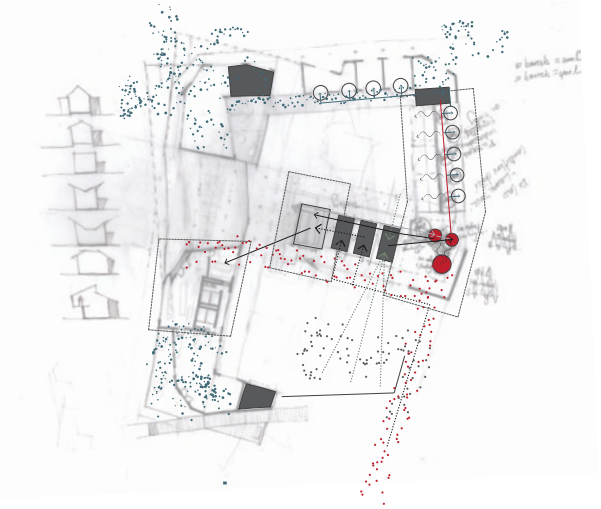


Figure 6.38: Participation of Industry, April 2013 *(Source: Author)*



# 6.3. PARTICIPATION

## *6.3.1. Participation of the Steenhovenspruit in the industrial process and human experience*

By using the spruit as a source of energy to run the mill and provide moisture for the plants grown on site, the industrial processes of the brewery become dependent on the health and functioning of the spruit, which in turn creates awareness of natural processes. By also creating a visible feature around the change of seasons and behaviour of the spruit, it becomes harder to disregard the water as an important resource. The sound of flowing water with every crossing of the spruit creates further awareness and lends a sense of place.

## *6.3.2. Participation of people in industrial processes and social interaction*

Different groups of people use the building at different times (Figure 6.32). The general public mainly use the northern and western edges that house the retail and social functions. Employees use the whole site, and are the only people allowed in the industrial areas, but many of the industrial processes are visible from the public edges. Informal traders use the edges that provide them with the most opportunity for business, but also use the service entrance to the south-east to deliver their goods to the brewery., Money is exchanged here as well as all along the western and northern edges of the building.

## *6.3.3. Participation of industry in natural and social networks*

The participation of the industrial processes inside the brewery in the natural systems is an important regenerative tool, and is therefore also highly visible. The design of the public spaces of the building should acknowledge this fact. Energy to run the processes, as mentioned, is sourced from the spruit as well as from waste created by the brewery itself and the informal traders. Most of that energy is shared with the traders, creating a system that is interdependent. The products from the brewery are sold on site and aid further interaction (Figure 6.33).

The public spaces and places that allow for social interaction are considered as (if not more) important than the spaces of production and sale, because for a design to be truly regenerative, the human element needs to function in a healthy, sustainable way as well. The concept of a liquid network needs manifestation to allow for these interactions. Functional, urban and formal precedents were investigated to understand how a liquid network could be manifested.

## 6.4. PRECEDENT: FUNCTION

### *6.4.1. Olbia Social Centre*

The Olbia Social Centre was designed by Cengiz Bekta for the Akdeniz University in Antalya, Turkey, to knit together isolated buildings on the campus and create spaces for social and cultural interaction. The complex comprises various separate programmes such as a library, auditorium and cafeteria, that are linked by covered walkways and water features (El Kerdany , 2001:4). These create opportunities for people to meet and interact comfortably, stroll together for a while and part a little better acquainted.

### *6.4.2. Guiding design principles*

For an architectural intervention to allow for spontaneous and effortless interaction, socially but also between nature, industry and people, it should offer public space that is easily accessible, comfortable and programmable in various different ways. By providing comfortable, deep edges the building allows for appropriation, trade at various scales, and a porosity that invites the visitor inside. The ideal is not to isolate natural systems and rhythms, but to make interaction and spectacle and participation visible to users.

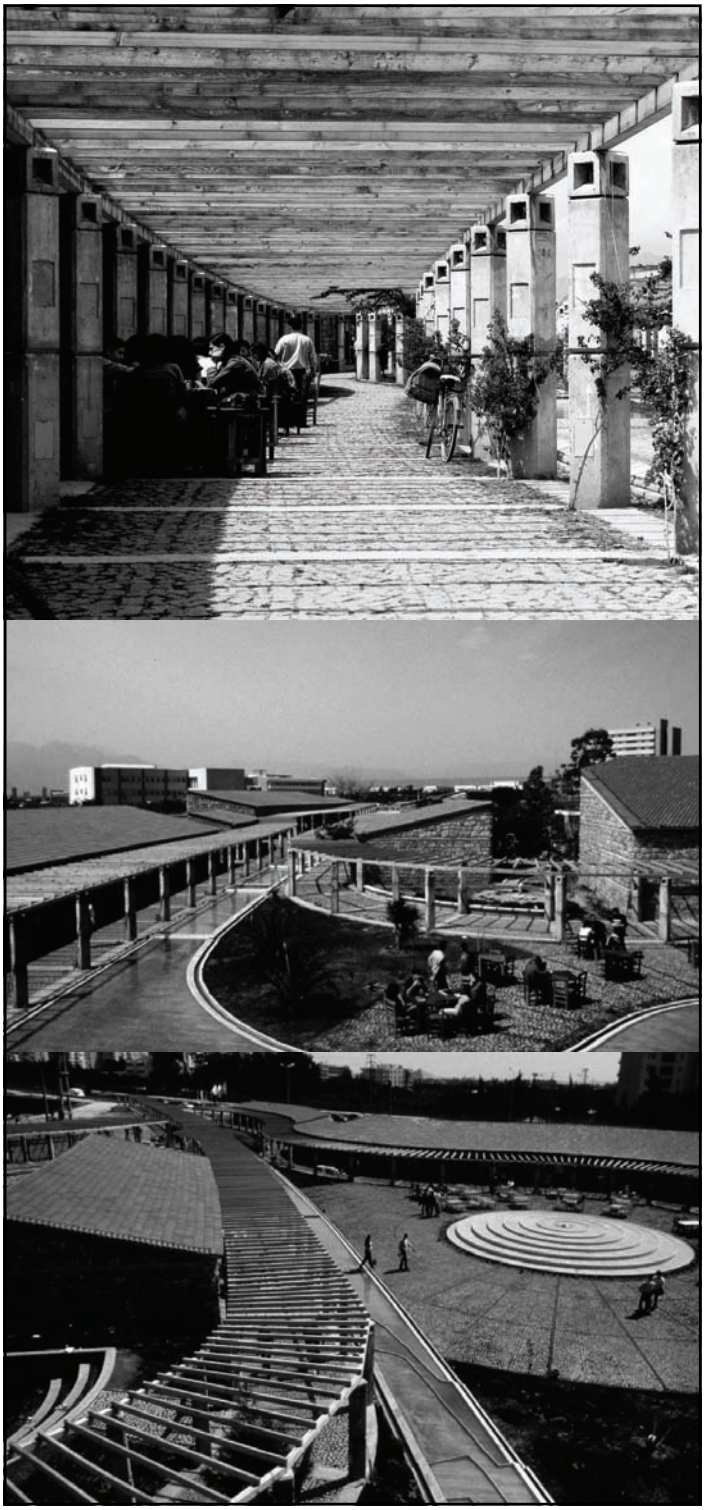


Figure 6.39: Olbia Social Centre, Cengiz Bekta, Antaly, Turkey, 1999 *(Source: Cengiz Bekta)*

# 6.5. PRECEDENT: URBAN AND CONTEXT

## *6.5.1. The Red Location Precinct*

The Red Location Precinct in New Brighton, Port Elizabeth, was designed by Noero Wolff Architects and selected as the winning entry in a competition organised by the Nelson Mandela Bay Metropolitan Municipality, focusing on the memorialising and depiction of the Apartheid narrative, while creating educational opportunities in a township precinct. The precinct comprises separate interventions (a museum, a library and an art gallery) that are clustered to form an urban precinct.

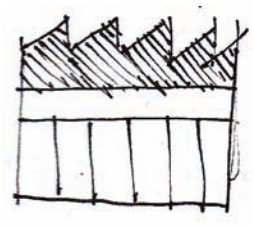


Figure 6.40: Response to context: Repetition as scaleing device *(Source: Noero-Wolff Architects, adapted by author)*

This precedent was chosen as a good example of the insertion of a large scale building in a South African fine-grained urban context. It also serves as an example of how a layered street edge can generate activity and accommodate many different functions.

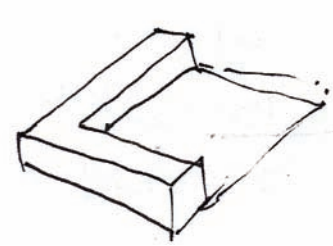


Figure 6.41: Response to context: Edge building *(Source: Noero-Wolff Architects, adapted by author)*

## *6.5.2. Guiding design principles*

It is important for an intervention to be sensitive and suitably scaled. An additive typology would be appropriate in the fine-grained city blocks of Marabastad. Scaling devices include the separation of different functional elements linked by exterior routes. An edge building is created that defines the street edge and allows for higher-density occupation in a lower-scale building. The repetition of structural elements and the breaking up of the façade also allows the building to read as a smaller building in a small-scale context.

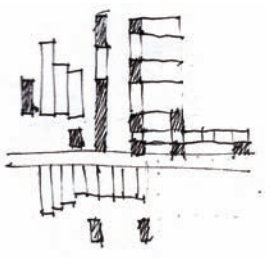


Figure 6.42: Response to context: Insertion into urban fabric *(Source: Noero-Wolff Architects, adapted by author)*

Figure 6.43: Entrance of Red Location Museum, New Brighton *(Source: Noero-Wolff Architects)*

# 6.6. PRECEDENT: FORM

## *6.6.1. Olbia Social Centre and Red Location Precinct*

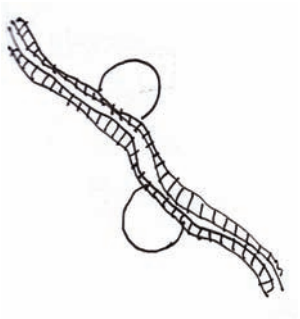


Figure 6.44: Oblia Social Centre: Meeting places connected with arcaded route *(Source: Author)*

Both of these projects allow for participation by the public in the functioning of the building, while also providing comfortable spaces for appropriation.

In the Olbia Social Centre, arcades are used to link meeting places and create comfortable walking spaces between more fixed functions (see Figure 6.39). Water is also used as an always-present linking element, and the arcades provide a threshold between inside and outside (Figure 6.40).

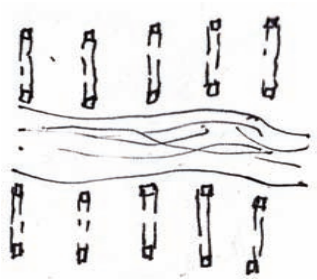


Figure 6.45: Oblia Social Centre: Water as ordering element and arcade as link from outside to inside *(Source: Author)*

In the Red Location Precinct, a pergola is used as an element to link the interior to the outside, and also as a means to communicate the layering of the street edge from completely public to more private (Figure 6.41).

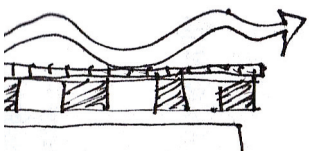


Figure 6.46: Red Location Museum: Pergola as linking element and programme layering of edge *(Source: Author)*

## *6.6.2. Guiding design principles*

Two formal characteristics are derived from the concept: a liquid network (liquidity of space and function), and a porous container (providing shelter and accessibility). These qualities can be achieved by firstly, creating textured and deep skins on the street edge that not only enclose space, but provide for different functions on the exterior as well; and secondly, by providing a linking element in the form of a pergola that changes to connect to the separated functional elements. Unobstructed access and entrances that allow for easy flow from public to controlled environments enforces the idea of liquidity, as does an adaptable outside environment that can be influenced by users and natural cycles.

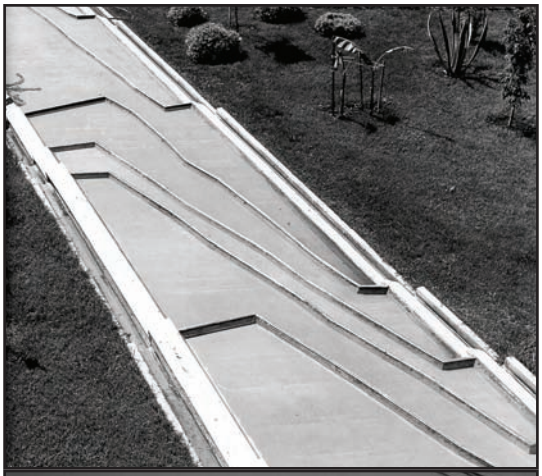


Figure 6.47: Connecting water channels at the Olbia Social centre, Antalya *(Source: Cengiz Bekta)*

Figure 6.48: Layering of outside to inside space *(Source: Noero-Wolff Architects)*

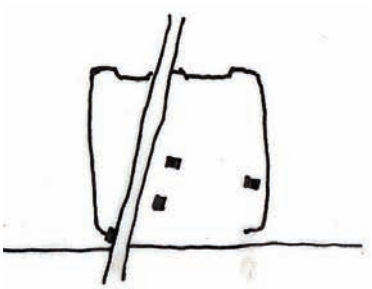


Figure 6.49: Organisation fo chimneys *(Source: Author)*

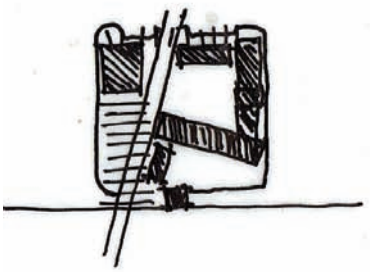


Figure 6.50: Separate buildings linked by pergola structure *(Source: Author)*

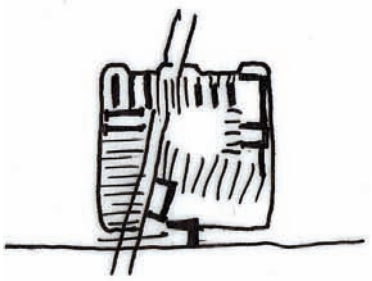


Figure 6.51: Stereotomic and tectonic elements *(Source: Author)*

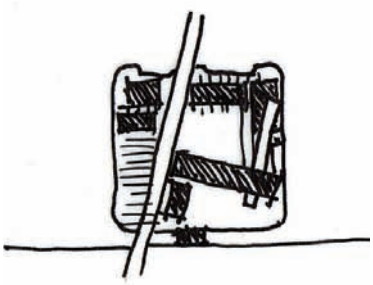


Figure 6.52: Organization of roofs *(Source: Author)*

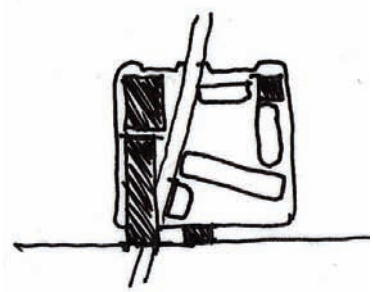


Figure 6.53: Production and consumption *(Source: Author)*

# 6.7. CREATING A LIQUID NETWORK

## *6.7.1. Understanding the different elements in a network*

Through previous explorations and precedent studies, it has become clear that an intervention in the context of Marabastad that aims to function as a liquid network would have to have an additive nature, with different programmes hosted in different buildings, linked by a connecting element that maps the public spaces it connects.

Different diagrams in Figure 6. 44-48 explain the elements that informed the design at this point. Chimneys indicating industrial processes were organised according to the geometry of the spruit. Stereotomic elements in the form of thick brick walls housed the services and more permanent functions, while tectonic structures housed the industrial and public functions.

The complexity of the roof plan presented problems at this point, as did the vertical scale of the project in its context.

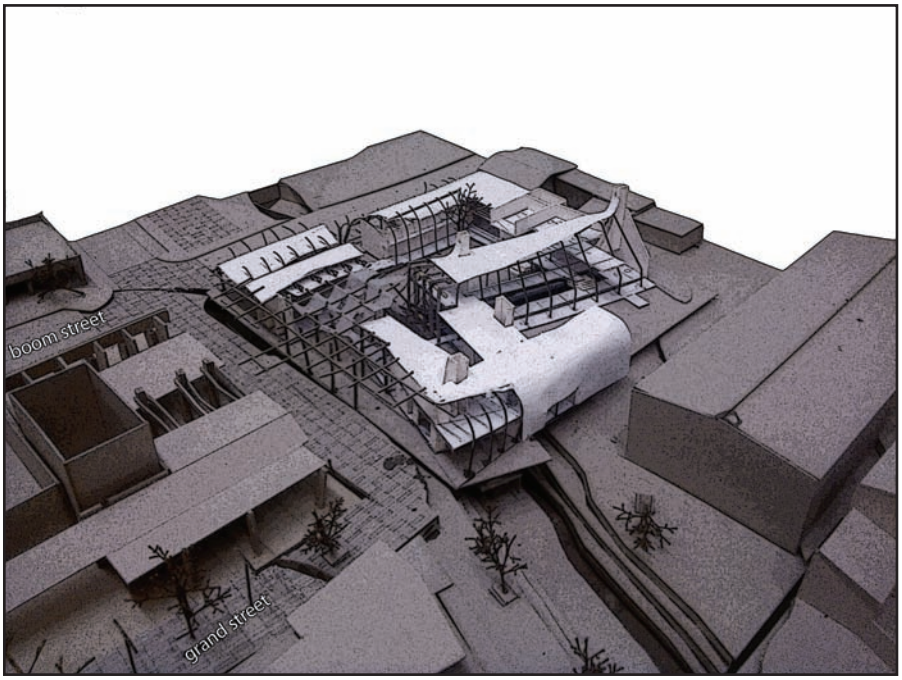


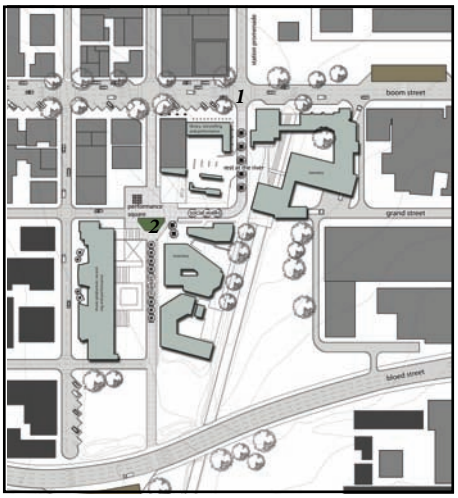

Figure 6.54:
Model, June 2013
*(Source: Author)*

## *6.7.2. Three-dimensional exploration*

The model illustrated in Figure 6.31 shows the relationship between the separate elements and the connecting pergola structure that indicates public space. A decision was made that the form of the roofs had to communicate the harvesting of rainwater and also open towards the public edges, but it was decided that the design was not contextually responsive.

Seeing the model in context made it clear that spaces were vertically too tight and that the site could accommodate more vertical generosity. Too many crossings over the spruit seemed to dominate the natural system, and the mechanical system that harvested energy from the spruit did not enjoy enough prominence.

Figure 6.55: Combined site plans, June 2013
*(Source: Author)*




## 6.7.3. *Exploration through plans and section*

The combined site plans of all the projects involved in the particular urban vision is shown in Figure 6.50, which depicts a progression of public spaces from Boom Street (1) to Performance Square (2). The ground floor plan raised concerns about the meeting of geometries and the relationship of the building to its surroundings. Spaces were not generous enough, especially the social spaces in the south-western corner.

In the sections shown in Figure 6.53-6.55, it is clear that the vertical scale of interior spaces can be more generous, especially on the urban edge toward Boom Street. The roofs, as mentioned earlier, are much too complicated for a low-tech building that should be easy to construct.

Figure 6.56: Ground floor plan, June 2013
*(Source: Author)*

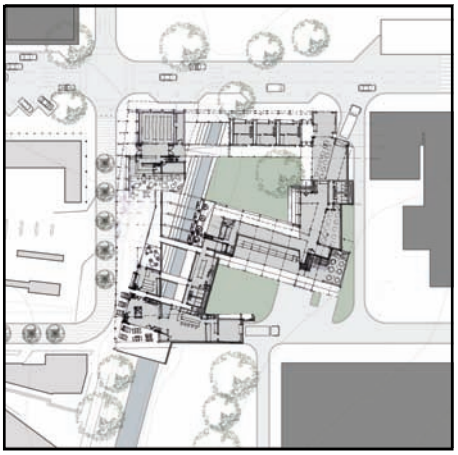
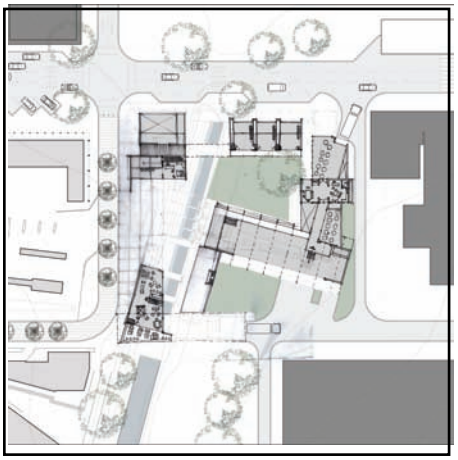


Figure 6.57: First floor plan, June 2013
*(Source: Author)*



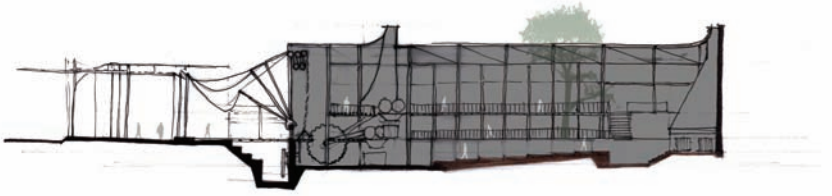


Figure 6.58: Section through spruit and brewery, June 2013 *(Source: Author)*

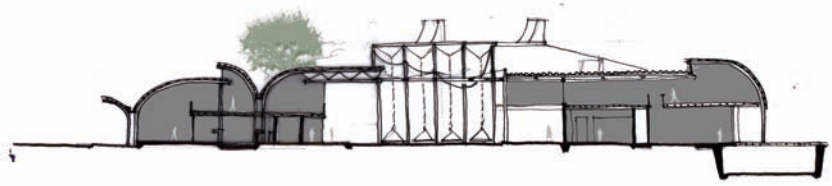


Figure 6.59: Section through liquor store and public space, June 2013 *(Source: Author)*

Figure 6.60: Section through private courtyard and brewery, June 2013 *(Source: Author)*

# 6.8. PRECEDENT: TYPOLOGY

## *6.8.1. Chinese Bridge School*

The bridge school was designed by Li Xiaodong (Atelier) and was constructed in 2008 in the Xiashi Village in Fujian Province, China. It was chosen as a bridge typology and spans a creek in the small village of Xiashi, connecting two parts of the town and providing a central social space. A suspended bridge underneath the structure allows villagers to cross the stream while the classrooms are being used. Even though the materials and technology do not refer to the surrounding buildings, the small intervention is a sensitive addition to its environment and has become the physical and spiritual centre of the previously declining village (Xiaodong, 2010:1). The building is highly adaptable: a library separates the classrooms, and the two ends of the school can be opened completely to form two stages.

## *6.8.2. Guiding design principles*

When thoughtfully crossing a natural watercourse, a bridging structure should be set apart from the edges and not hide the water. The choice of materials is important to create a feeling of lightness and conscious movement, while allowing the stream and the building to exist as two separate entities.

Figure 6.61: View of entrance
*(Source: Aga Kahn Award for Architecture)*

Figure 6.62: Access stairs to the hanging bridge over the river, from the west bank *(Source: Aga Kahn Award for Architecture)*

Figure 6.63: Night view
*(Source: Aga Kahn Award for Architecture)*

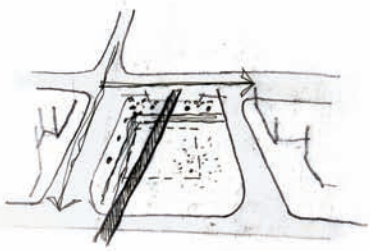


Figure 6.64: Parti diagram: existing condition (activity, edges and block typology), August 2013 *(Source: Author)*

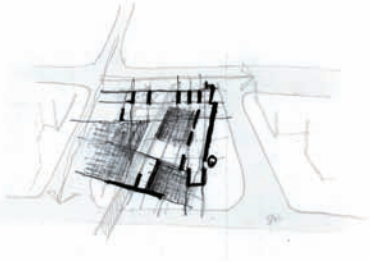


Figure 6.65: Parti diagram: stereotomic anchors, August 2013 *(Source: Author)*

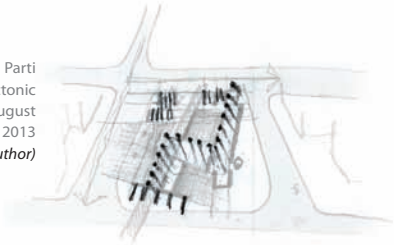


Figure 6.66: Parti diagram: Tectonic vertical screen, August 2013 *(Source: Author)*

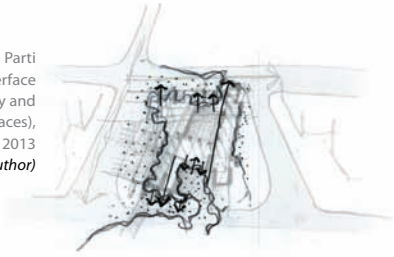


Figure 6.67: Parti diagram: Interface of industry and public (retail spaces), August 2013 *(Source: Author)*

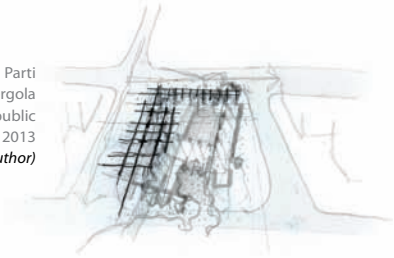


Figure 6.68: Parti diagram: Pergola mapping public space, August 2013 *(Source: Author)*

# 6.9. CONCEPTUAL, CONTEXTUAL AND FUNCTIONAL RESPONSES

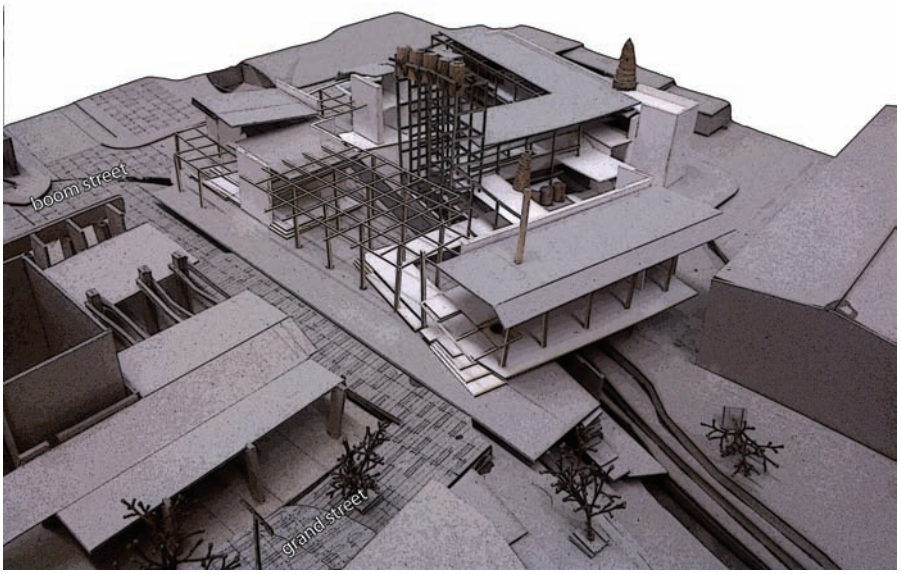
## *6.9.1. Response to the liquid network*

The near-final design solution is firmly rooted in the existing conditions on and around the site. Stereotomic anchors (Figure 6.60) define the street edge and courtyards and house important services such as water, gas, ablutions and storage. These are the amenities that local informal traders cannot easily provide for themselves.

A vertical tectonic screen (Figure 6.61) separates the public and industrial spaces, creating shade and providing a growing surface for hops. This screen almost reads as free of the stereotomic and becomes a lightweight roof over the industrial building.

The interface between the industry and the public is the retail and social spaces (Figure 6.62), and this is where the exchange between humans and non-humans (or all quasi-objects) becomes most visible. The continuation of public space from outside to inside is mapped with the continuation of the pergola (Figure 6.63) that becomes the support structure for the first floors and roofs. A continuous floor finish from outside to inside is also used to map this continuation of public space.

Figure 6.69: Model, August 2013 *(Source: Author)*

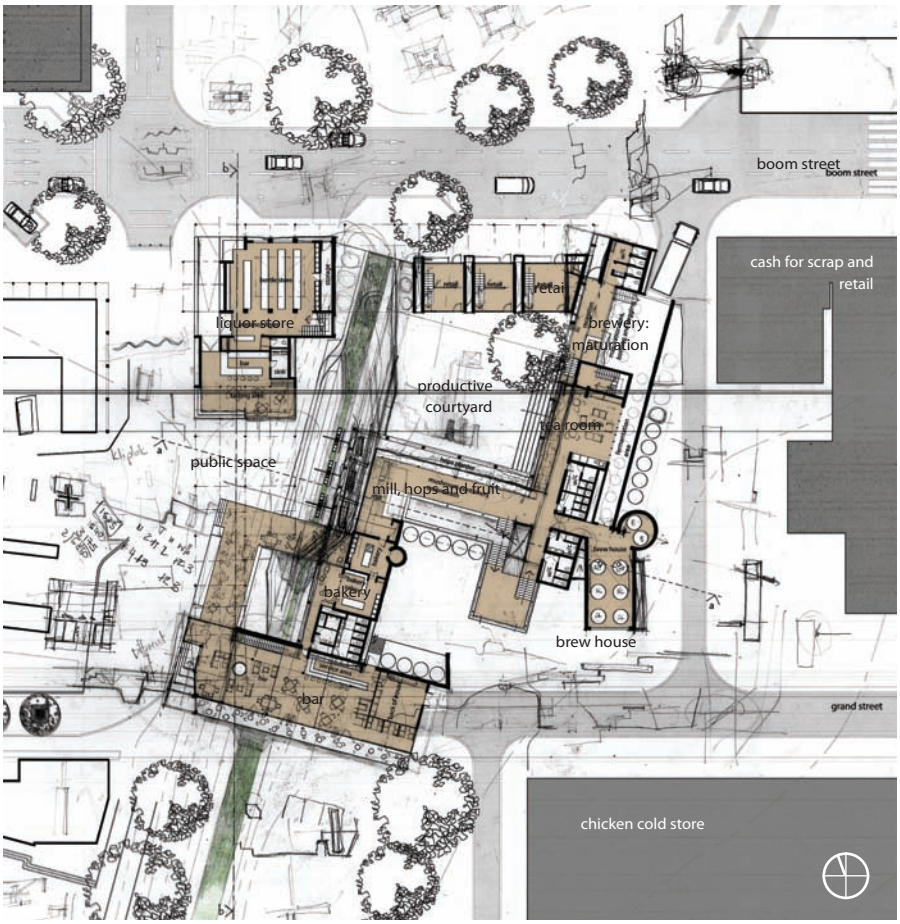



## *6.9.2. Three-dimensional exploration*

A building structure that describes the programme and functions can often be read from the scale and character of its spaces. The model was used as a design tool to help make decisions about the scale of elements that would define public space; the pergola had to change in scale from the northern edge to the public square. The mechanical system of spiral pumps to pump water high enough to be used to drive the mill determined the height of the tower next to the spruit, but this also aided in defining the western edge of the public square.

The articulation of the roofs had yet to be completely resolved. The roofs on the northern edge had to read as a continuation of the character of Boom Street, while the industrial roofs had to catch rainwater and read as part of the structure. The roof of the bar attempted to combine the shape of the roofs on the north with the rainwater system of the industrial roof. The three remaining chimneys still acted as features, but the articulation was different for the ones used for the production processes (in the brewery and bakery) and the one used in the social space of the bar.

Figure 6.70:
Ground floor plan,
August 2013
*(Source: Author)*




## 6.9.3. *Articulation of plan and elevation*

The spaces were more generous vertically and not only created better definition of the street edge, but also provided more space for services overhead. The eastern edge did not contribute as much to the making of outside space as it should, and was further explored.

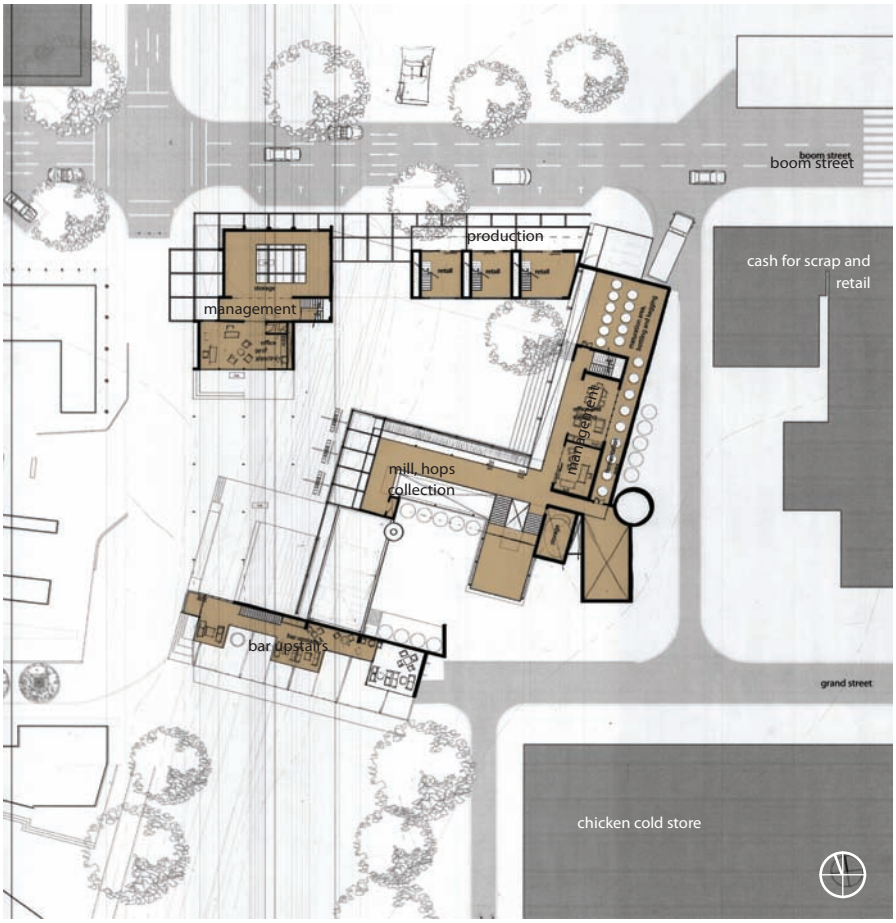



Figure 6.71: First floor plan, August 2013
*(Source: Author)*

The plan has developed to a point where it navigated the change in geometry of the street edge and spruit, but the area where it merged in the north-eastern corner still presented a challenge.

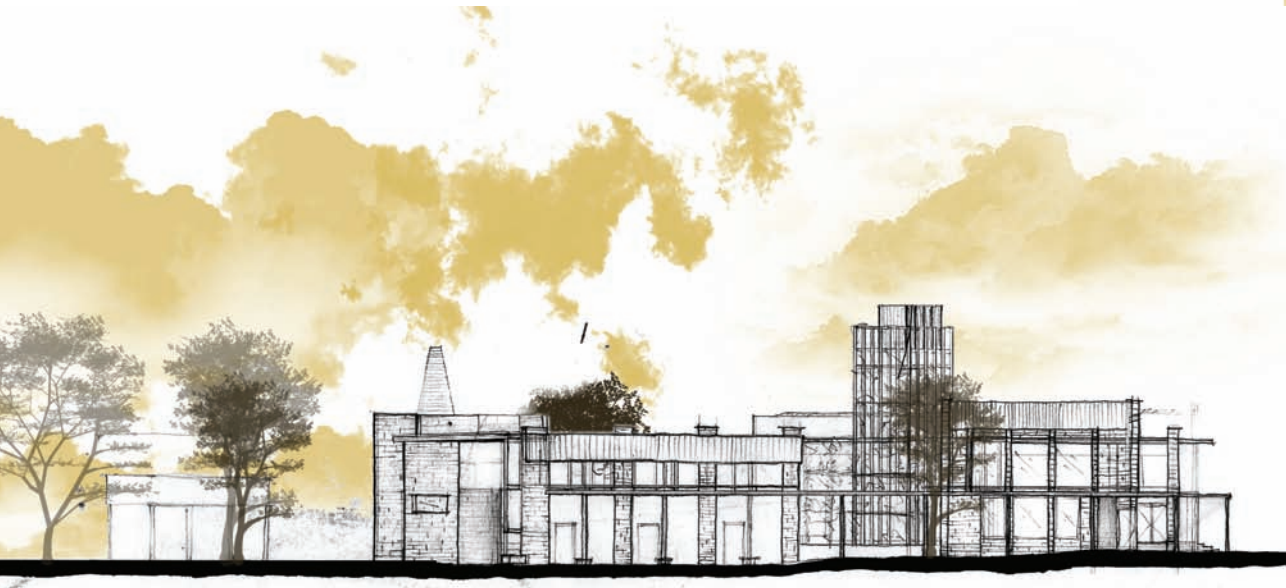
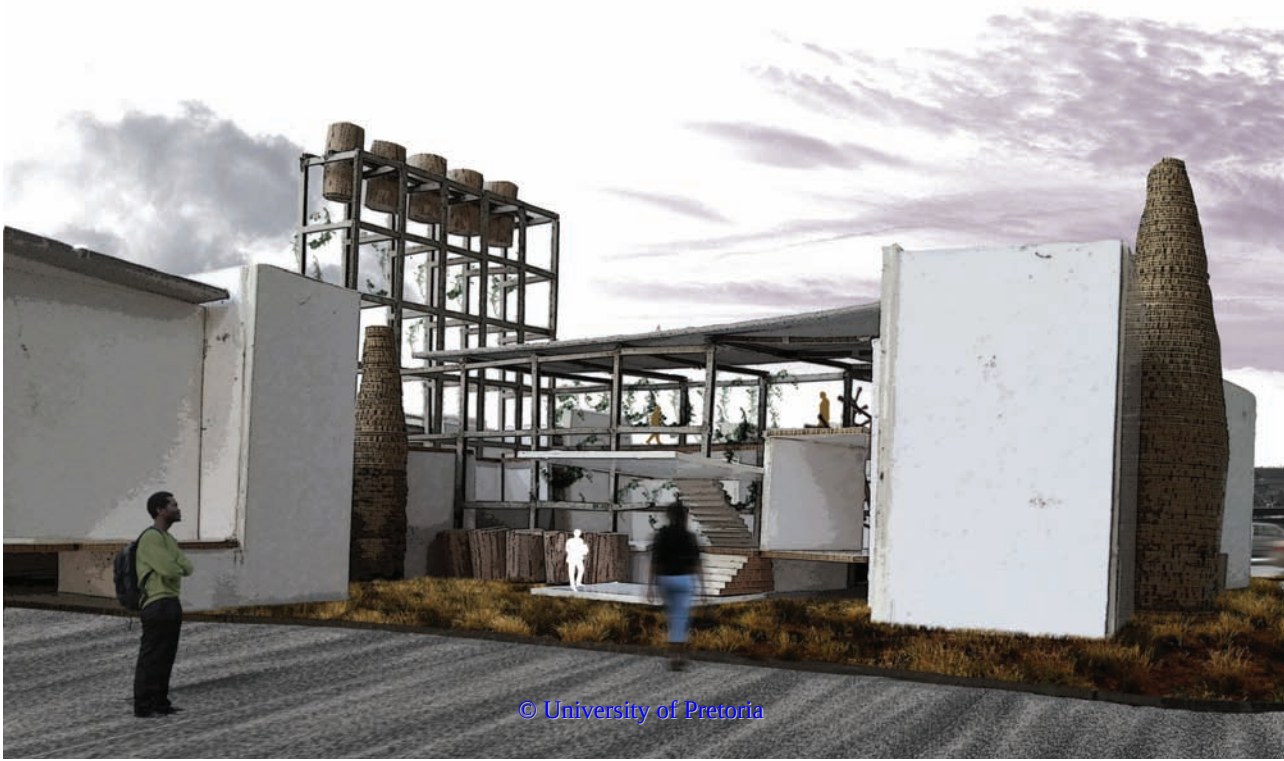


Figure 6.72: Northern elevation, August
*(Source: Author)*

Figure 6.73: Southern elevation, August
*(Source: Author)*

Figure 6.74: View from southwest, August
*(Source: Author)*

Figure 6.75: View from southeast, August
*(Source: Author)*



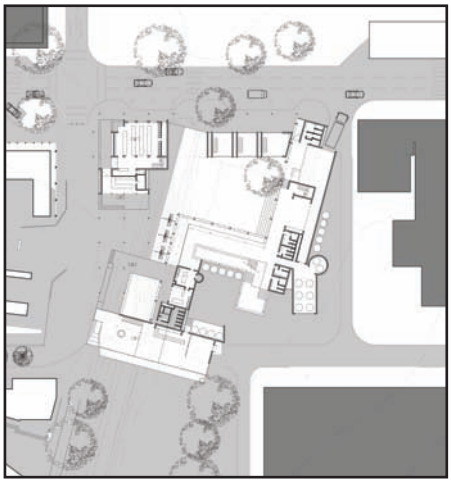


Figure 6.76: Public space, August 2013
*(Source: Author)*

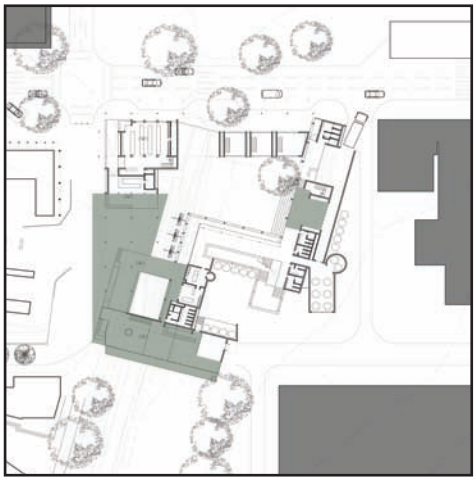


Figure 6.77: Social space, August 2013
*(Source: Author)*

Figure 6.78: Production, August 2013
*(Source: Author)*

## *6.9.4. The relationship of public to private space*

The distribution of public and private spaces is illustrated in Figures 6.76-6.80. The private courtyard typology that has been reinterpreted becomes clear from the diagram showing public space. Public activity happens along the edge, which is defined by permanent stereotomic elements that house services for informal traders. Social gathering occurs on the south-western corner, which connects to the performance square suggested in Chapter 3.

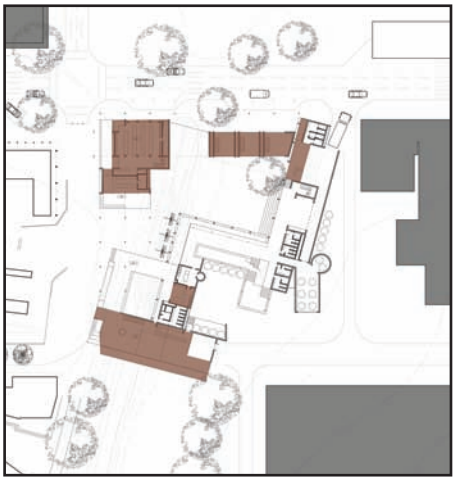


Figure 6.79: Retail, August 2013
*(Source: Author)*

Figure 6.80: Circulation, August 2013
*(Source: Author)*

The private spaces for production are mainly placed on the eastern side of the spruit, while retail and social spaces are located closer to the street edge and public access.

Figure 6.81: Collection of ingredients and energy *(Source: Author)*

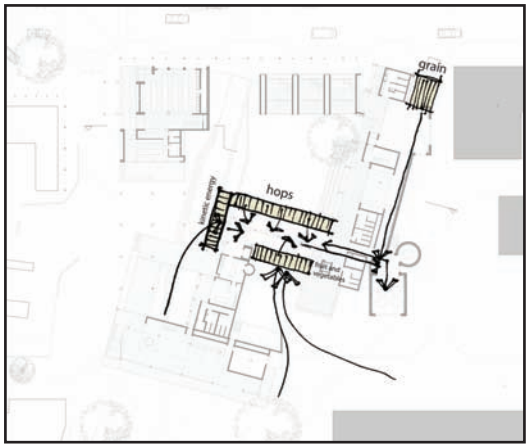



Figure 6.82: Brewing process and use of waste products *(Source: Author)*

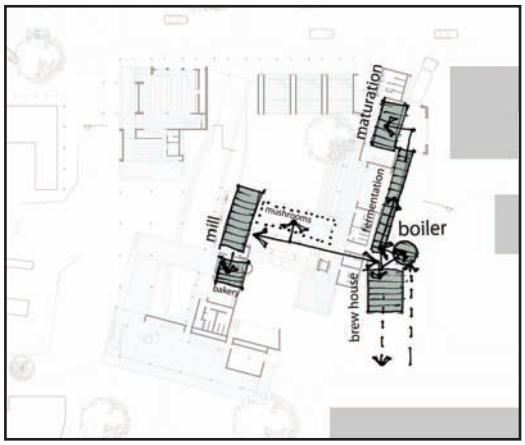
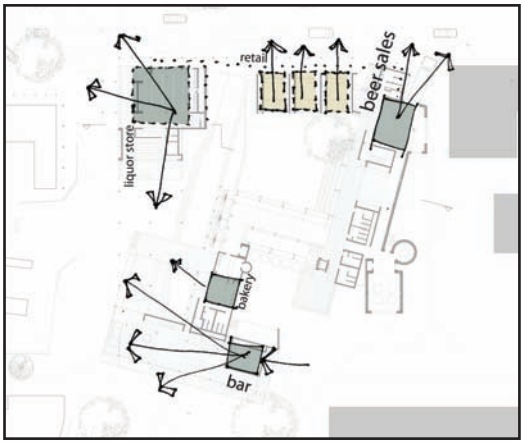



Figure 6.83: Distribution of products *(Source: Author)*



## 6.9.5. *The functioning of the building*

The brewery's functions of collecting material, the different stages of the beer brewing process, the milling process, and the points of distribution to the public are shown in Figure 6.81-83. Again, production processes are clustered on the eastern edge, with trade and the public interface occurring on the north and western edges.

## 6.9.6. *Introduction to the technical investigation*

The technical response will follow the same conceptual, contextual and functional response as the design development. The further integration of natural, social and economic systems remains important, as does an intervention that is rooted in place and responsive to its context and functional requirements.

> "You're just solving the whole world's problems, aren't you?"
> "Well, look how well it's done by itself. It's all a bloody mess."
> "And what a beautiful mess it its."
> "Messes are just... messy. Not beautiful."
> "Not true, my brother. You know how many things go right accidentally in the middle of a big, bloody mess? Just look at Marabi. Look at the unqombothi! Now that's a great big mess inside that drum. But it's fucking beautiful."
> "And you're drunk."
> "So what if I am? Then I'm a beautiful mess just waiting to happen."

Figure 7.1: Harvesting the energy of water *(Source: AK John Gomes)*

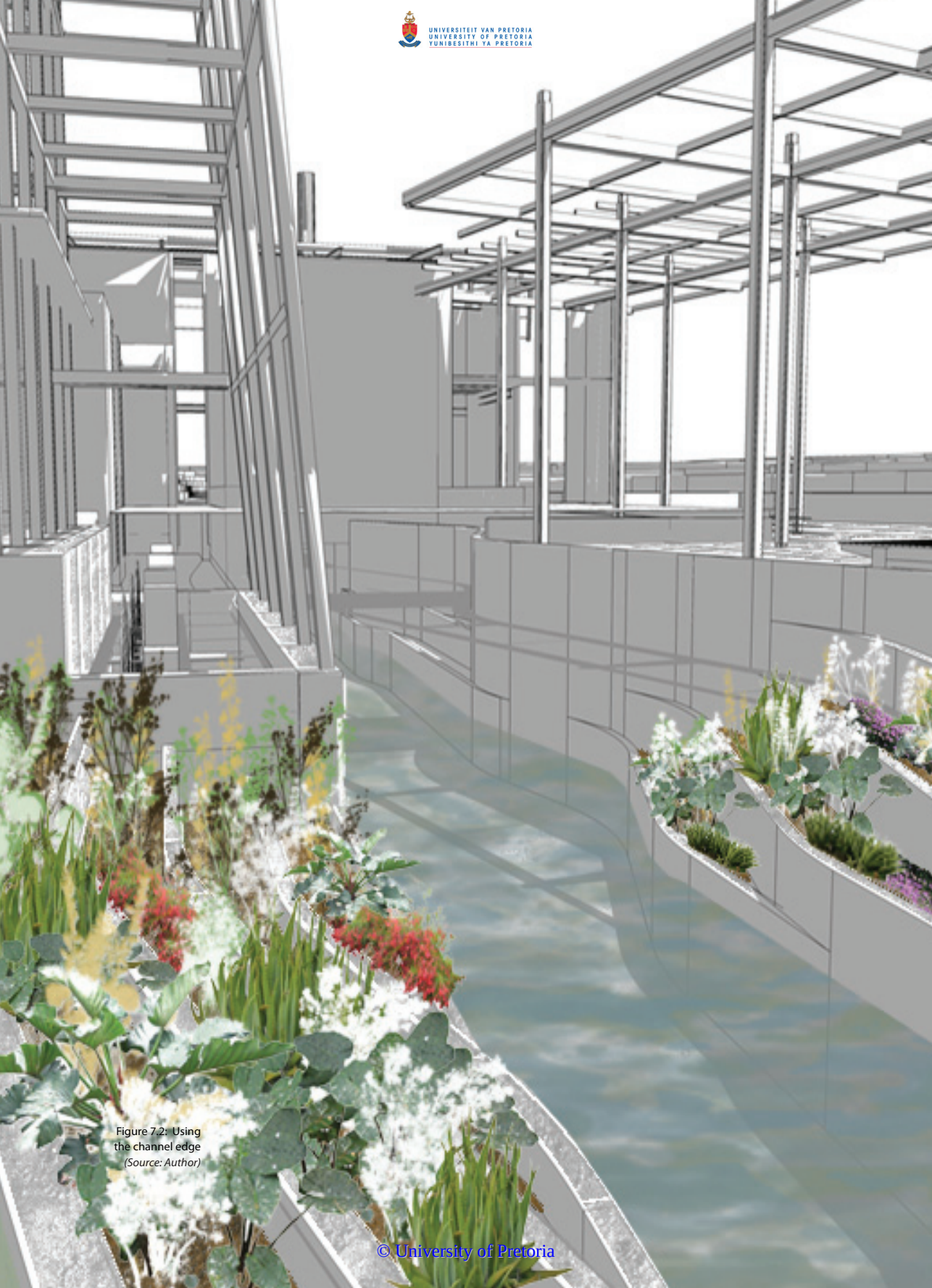


Figure 7.2: Using the channel edge
*(Source: Author)*

# 7. "A BEAUTIFUL MESS JUST WAITING TO HAPPEN"

## 7.1. INTRODUCTION

This chapter investigates the making of a liquid network, an intervention that allows social, economic and ecological systems to engage with each other. The making of the building needs to communicate and aid the function of a liquid network, and therefore the technical investigation will consist of the development of a technological approach that will continue the conceptual idea. To choose materials that are both contextually and functionally responsive is of the utmost importance to achieve an intervention that is rooted in its context, and is also adaptable. This also calls for the design of a structural system that is both robust and adaptable.

# 7.2. INFORMANTS

## *7.2.1. Theory and informants*

The making of a building is essentially the fitting together of various parts to create a functional whole. This is an issue relevant to buildings that has been grappled with for centuries. Ways to achieve harmony between the conflicting demands of the parts that make up a building have been considered since the earliest European writings on architecture (Groák, 1992:3). Naturally, we imagine these parts to be the building modules, the nuts and bolts that the building is made up of, but even before going into such detail there are the three main elements that define space and provide a comfortable habitat for human beings: the floor, the walls and the roof. Not disregarding the volume itself that is enclosed, the aim is to focus on the construction of the elements that delimit space and to lend a certain character to those elements and so also to the enclosed space (Thiis-Evensen, Waaler & Campbell, 1987:17-19). The technological concept has to inform the character and construction of these separate elements to create a whole that translates the concept of a liquid network.

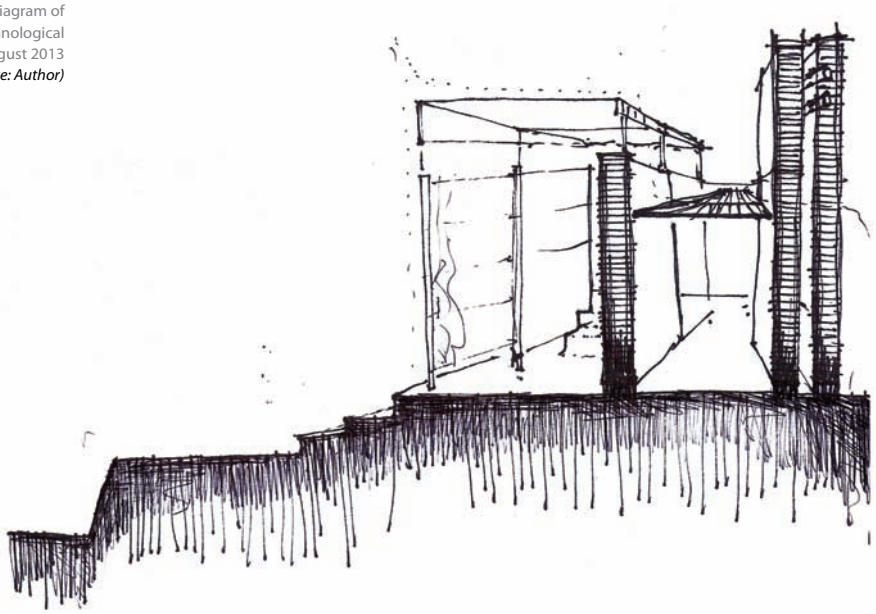


Figure 7.3: Early diagram of technological concept, August 2013 *(Source: Author)*

The street edge of Boom Street is defined by stereotomic elements that are quite robust while also being highly adaptable in use. Lightweight structures that are changed frequently are found in the private courtyards and contain many different functions, from housing to production. The most common roofing material in the area is corrugated sheeting, often used abutting masonry parapet walls.

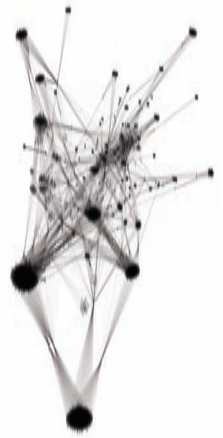


Figure 7.4: A liquid network *(Source: Author)*

Functional requirements in the brewery further inform construction and material choices. Floors need to be easily drained and cleaned. Planting on the facades has to be easily maintained, and centralised water services need to satisfy the requirements of irrigation, ablution, cleaning and brewing. Cold storage is required for hops, grain, fruit, vegetables and mushrooms.

Figure 7.5: Contextual informants *(Source: Author)*

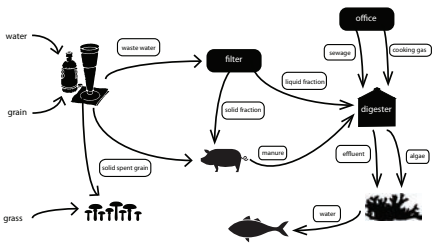



Figure 7.6: A closed loop beer brewing process *(Source: Author)*

## 7.3. THE TECHNOLOGICAL CONCEPT

The concept of a liquid network consists of two identifiable elements: the liquid and the (porous) container.

The existing conditions on site present the example of the channelled spruit as the container. The ground plane morphs to contain the water from the spruit. In the same way, the ground (a heavy, rooted element) morphs, steps up and in some instances forms the masonry walls that define the street edge and house services. The ground plane, in all its forms, provides the resources that the building requires to function within the system of Marabastad.

The roof cladding is described as the sky that is removed from the ground and provides water, another essential resource. The roof plane is a light element that is separated from the heavy elements.

Figure 7.7: The technological concept
*(Source: Author)*

The steel structure that is anchored to the ground and supports the roof is the framework that enables the human user to access the resources provided and inhabit the space between the ground and the sky.

A steel mesh element emerges from between the sky and the framework, enveloping the facade and covering areas of the ground that provide storage and other services. The mesh functions as a cascading, 'liquid' element that guides water, provides support for the growth of plants, and screens interiors from the sun. It is the final layer between built fabric and natural elements and is the most 'liquid' built element.

The pergola structure and water tower function as part of the framework that makes services accessible to users.

# 7.4. PRECEDENT FOR TECHNOLOGY AND MATERIAL: WAKKERSTROOM MUSIC HALL

The small, intimate venue in the town of Wakkerstroom in Mpumalanga, South Africa, was designed and built by the owner . The palette of unfinished materials blends beautifully with the landscape, and the timber frame construction with cladding is both affordable and adaptable. A timber frame poses risks with regards to fire, but a lightweight steel structure is equally adaptable and easy to construct. A central fireplace warms the space in winter and the hearth is filled with water in the summer to cool the interior.

The use of steel sheeting is prevalent in Marabastad and provides a contextually responsive wall cladding.

## *7.4.1. Guiding design principles*

In terms of fluidity, actual adaptability is as important as the appearance of fluidity in construction. The typology of the Marabastad city block with its permanent edges and more adaptable courtyards needs to be followed in principle. A heavy street edge to provide a more permanent character is utilised while steel portal frames in industrial areas allow for adaptability. A lightweight steel structure clad with corrugated sheeting and timber, both as a contextual response and a more adaptable building method, is used for infill, while a light steel and timber bridging structure to respect the fluid nature of the spruit also achieves an awareness of crossing the water. Transparent and accessible facades around the production process allow it to be visible to the public and invite them to participate.

Figure 7.8: Central fireplace that also acts as cooling pond in summer *(Source: Author)*

Figure 7.9: View from southwest *(Source: Author)*

Figure 7.10: Entrance from the west *(Source: Author)*

# 7.5. MATERIAL SELECTION

## *7.5.1. A taste of Marabastad*

The historical Boom Street precinct boasts permanent, stereotomic facades. The colonnades vary between heavy masonry elements and lighter steel structures, with walls built of plastered and painted clay bricks. Timber frames were used for doors and windows, some of which were replaced with steel frames at a later stage. More recent additions to historical buildings show the use of prefabricated concrete panels and steel cladding to allow for a cost- and time-efficient construction that is also easily adaptable. A selection of materials from Marabastad (shown in Figure 7.11) communicates a warm and textured ground plane with an unpretentious use of technology that is mostly aimed at a functional response and economical use of materials.

Figure 7.11: Material palette from Marabastad *(Source: Images from Jason Nel, compiled by author)*

## *7.5.2. A conceptual, contextual and functional response*

A material palette is shown in Figure 7.12. The gradation of heavy to light elements is shown from the ground upwards, with the architectural mesh the final threshold between built fabric and natural elements. A green facade is proposed on the western face of the tower, with species and description shown below.

Figure 7.12: Material palette of building showing wat is separated and what is closely connected *(Source: Author)*

## 7.6. A SERIES OF EDGES

A series of spaces and the character of each is described in Figure 7.13. A suggestion of construction techniques and the materiality is also indicated. The service core acts as grounding element with the more private functions (industry and management) to the left, and the more public functions (production, retail and social) to the right.

The steel-framed structure that houses the industrial processes was chosen for the ease of its construction, its adaptability, and its ability to carry heavy loads. The floors need to be easily drained and cleaned, which means the floor surface needs to be impermeable and smooth. The facades are kept open in the part of the building where cultivation and the handling of fruit occurs.

Bagged and painted brickwork was chosen for the service cores as a contextual response. The brickwork visible through the bagged and painted finish communicates the wall as an extension of the paved ground surface.

Production and retail spaces are housed in a steel structure clad with steel sheeting. This structure is very adaptable and sits between the sky above and the heavy, grounded elements.

The pergola structure and finish of the outside ground plane are continued into the social and retail spaces to communicate the extension of public space into programmed areas. The pergola structure consists of a steel frame to house the services (such as water and gas) provided to informal traders.

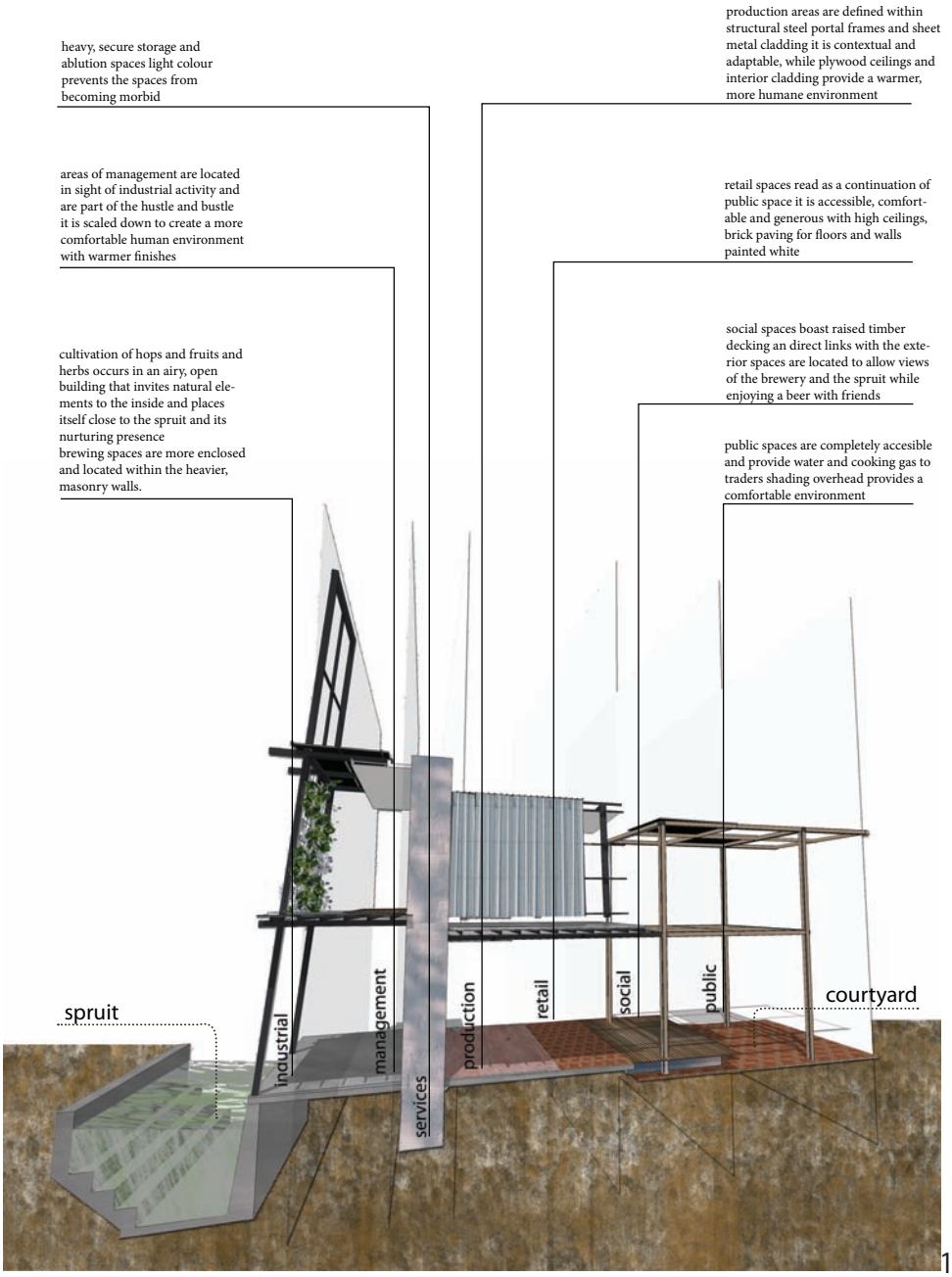



Figure 7.13: A series of edges, material and construction *(Source: Author)*

# 7.7. THE STRUCTURAL SYSTEM

## *7.7.1. Substructure*

In keeping with the technological concept, the substructure is an extension of the manipulated ground plane. It includes the manipulation of the edge of the channelled spruit to allow for storm water retention as well as flood mitigation. To allow access to the water wheels and machinery, a half-level basement is excavated. This space is well-insulated and is therefore used for all the cold storage and the cultivation of mushrooms. The excavated ground is used as fill under the raised ground floor of the eastern side of the brewery, where earth tubes are inserted to help regulate the air temperature in the brewery.

## *7.7.2. Primary structure*

As an extension of the ground plane, the primary structure is made of clay bricks. The walls, as mentioned previously, house services, define the street edge, and also provide thermal mass. The two chimneys of the boiler room and the bakery are constructed of unfinished face brick and, along with the water tower, function as landmarks.

## *7.7.3. Secondary structure*

The secondary structure consists of a steel portal frame structure connected to the primary structure so that it reads as a separate element. The secondary structure functions as the framework that makes the resources provided by the primary structure and the skin accessible. It is the more adaptable structure.

## *7.7.4. Skin*

The skin is formed by the steel sheet cladding on the roof and the walls (the sky) and the steel mesh elements that form the last interface between the building and the natural elements. These are the screens that support the growth of plants and the roofs that wrap and collect rain water.

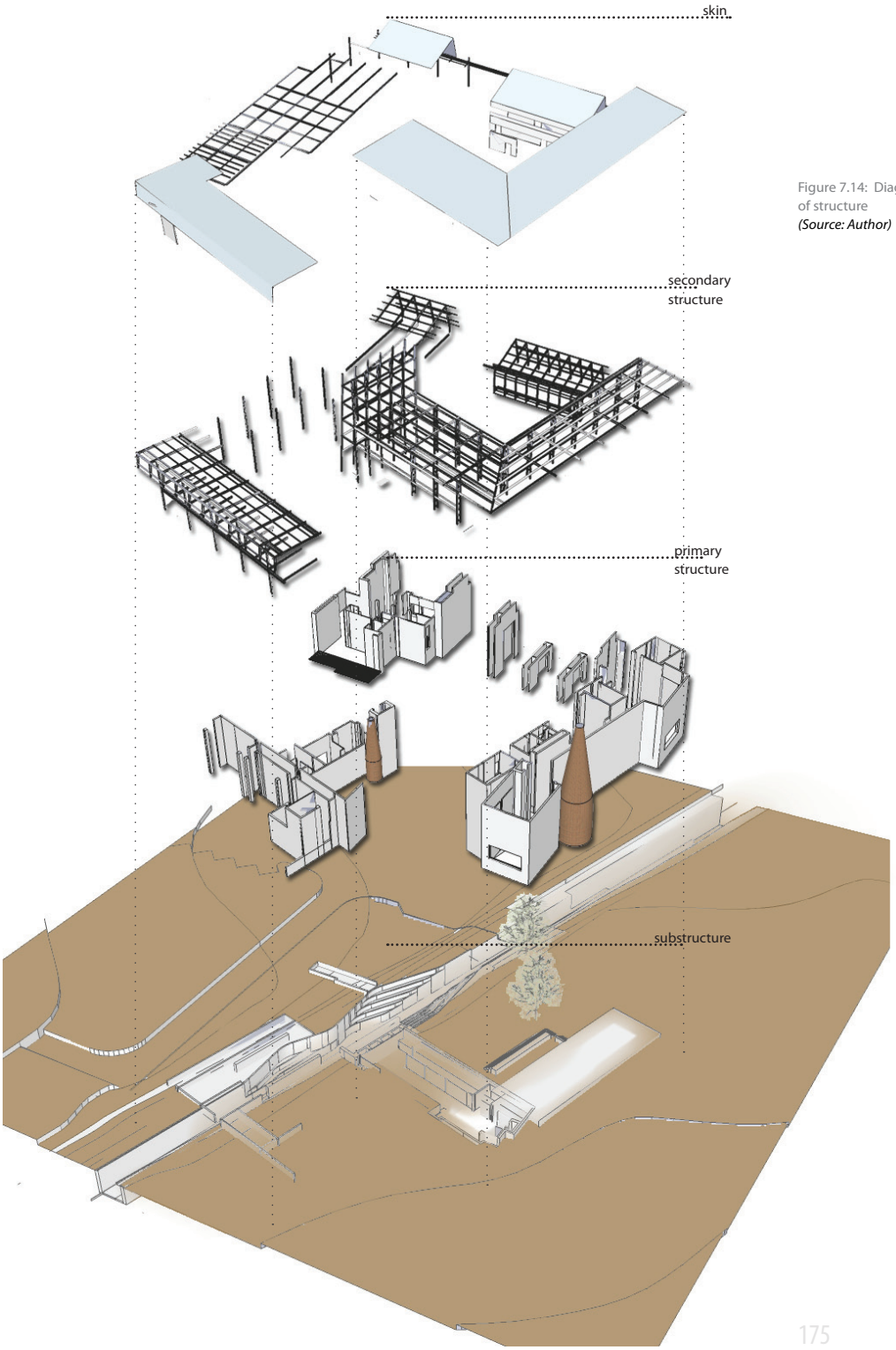


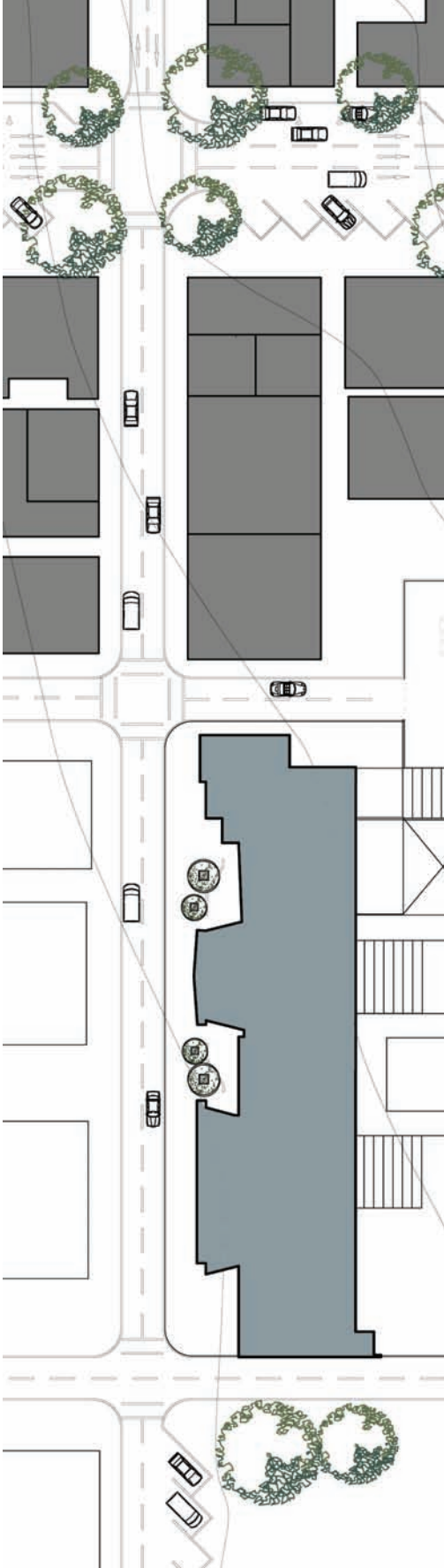

Figure 7.14: Diagram of structure
*(Source: Author)*

Figure 7.15: Site Plan, October 2013, NTS
*(Source: Author)*

## 7.8. FINAL DRAWINGS

Connections between the heavy, grounded elements and the framework are designed to assist the reading of the elements as separate entities.

The facades comprise a layering and combination of the five elements: the ground, the sky, the framework, the liquid (mesh) and the organic.



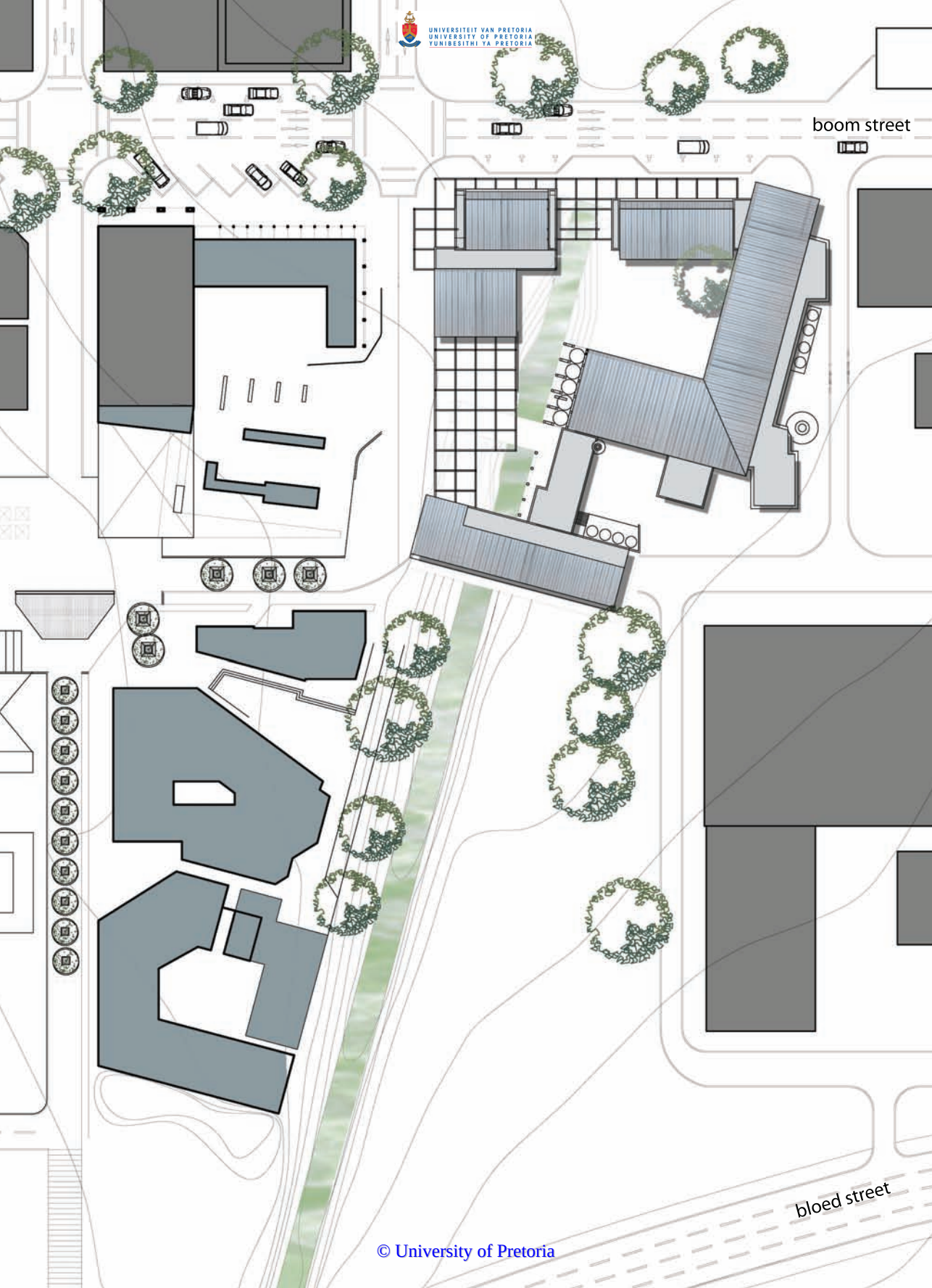


Figure 7.16:
Basement Plan,
October 2013, NTS
*(Source: Author)*

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ter system
*hor)*

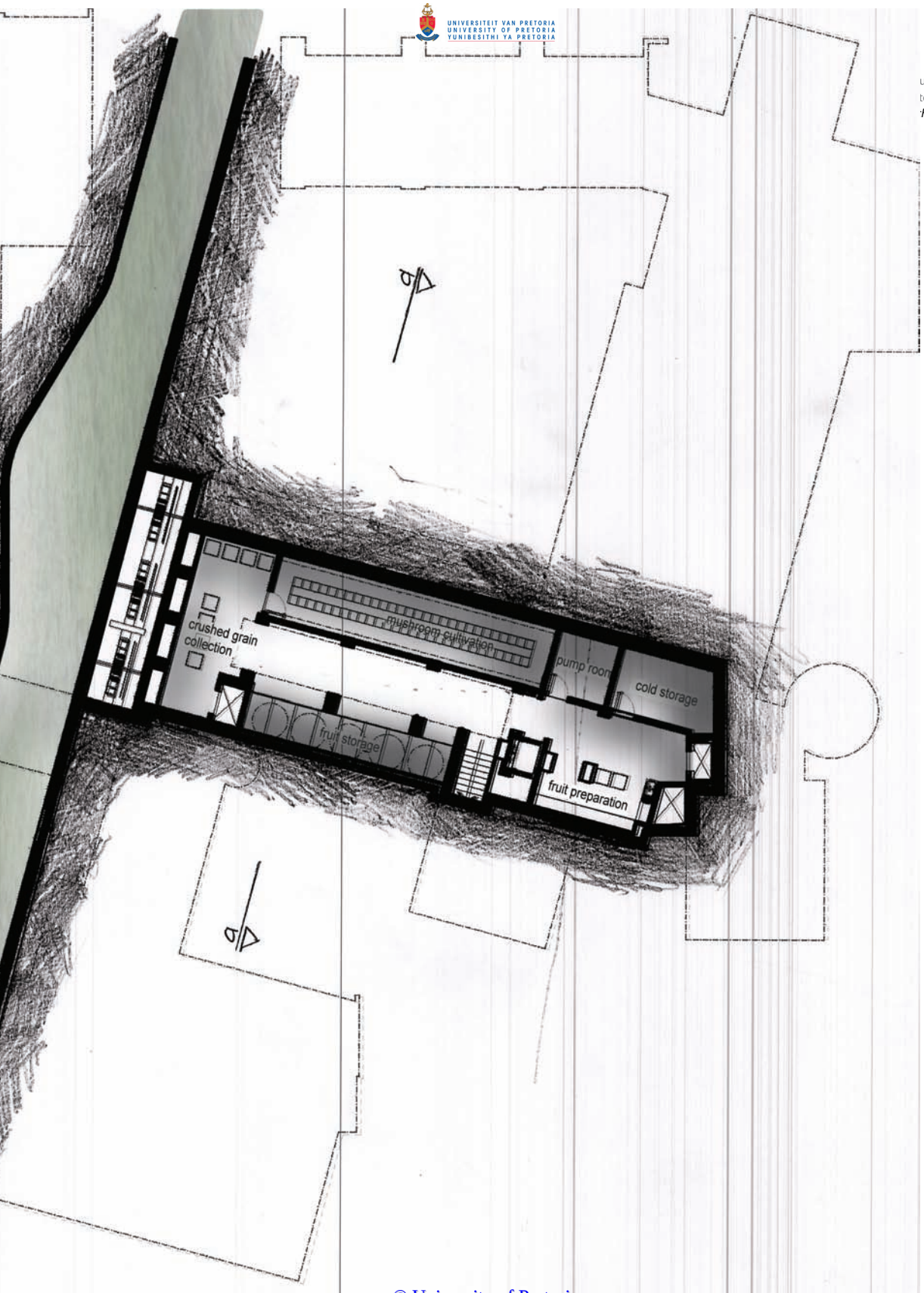
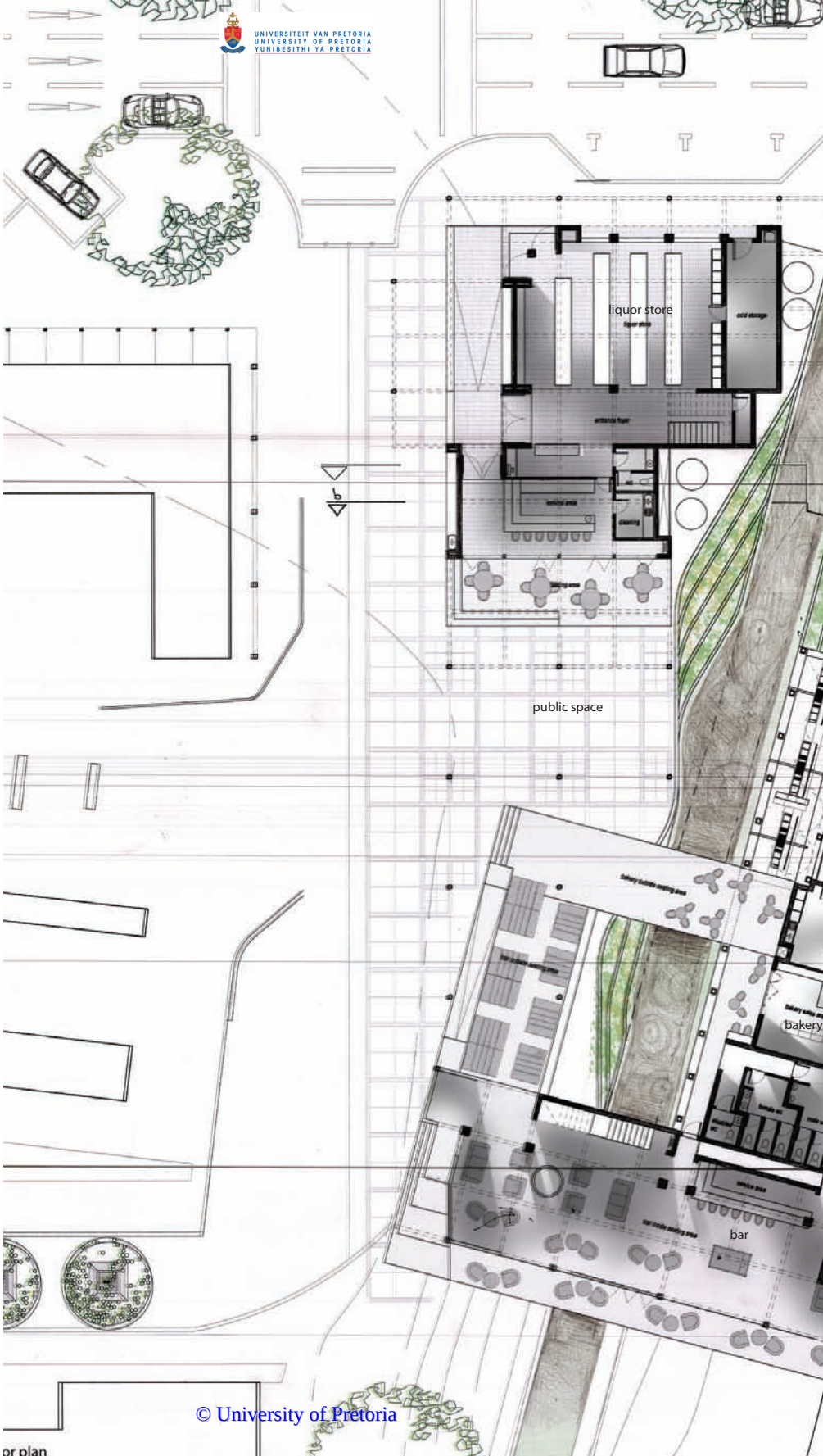


Figure 7.18: Ground floor plan, October 2013, NTS *(Source: Author)*



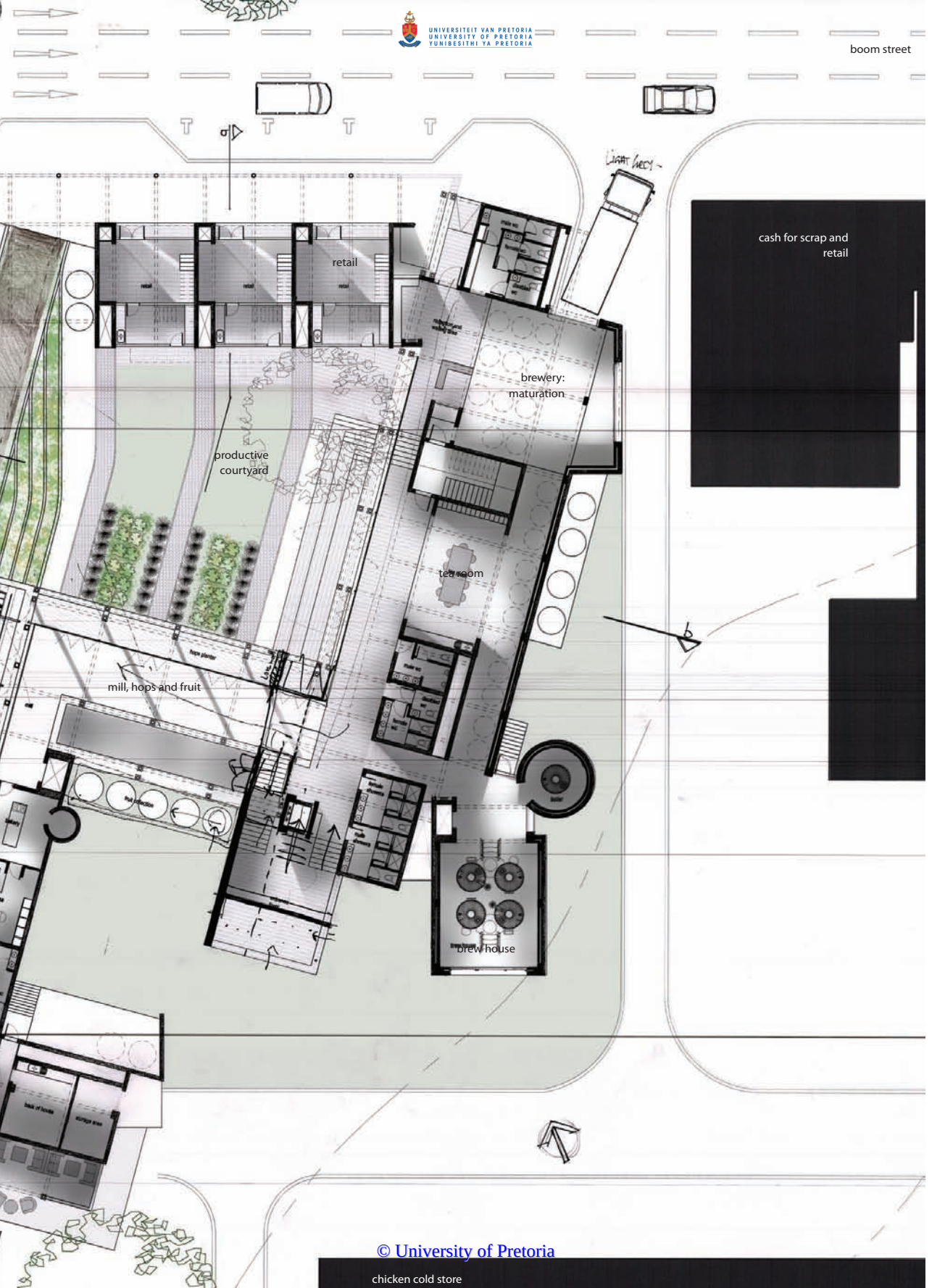
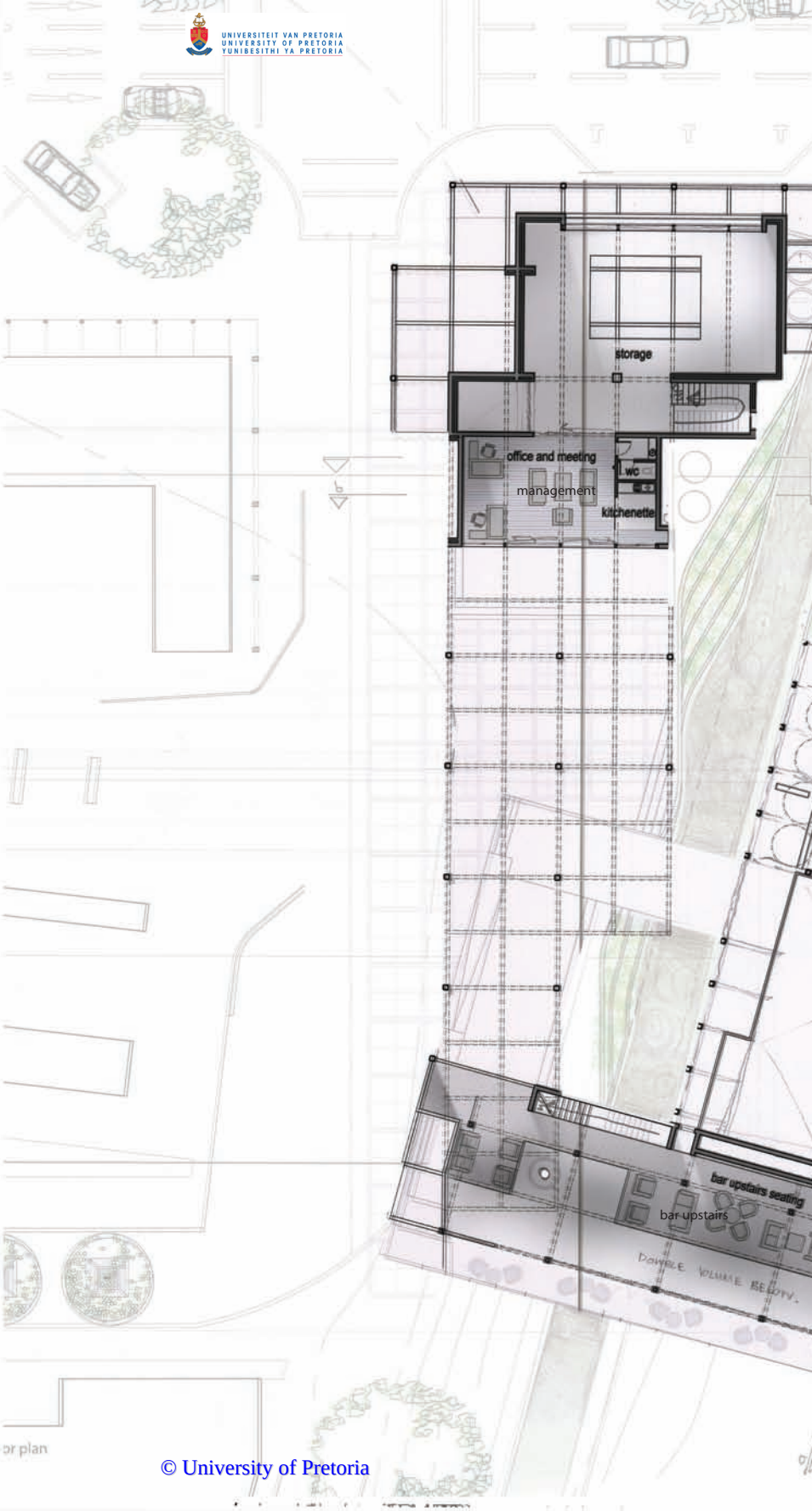


Figure 7.19: First floor plan, October 2013, NTS *(Source: Author)*



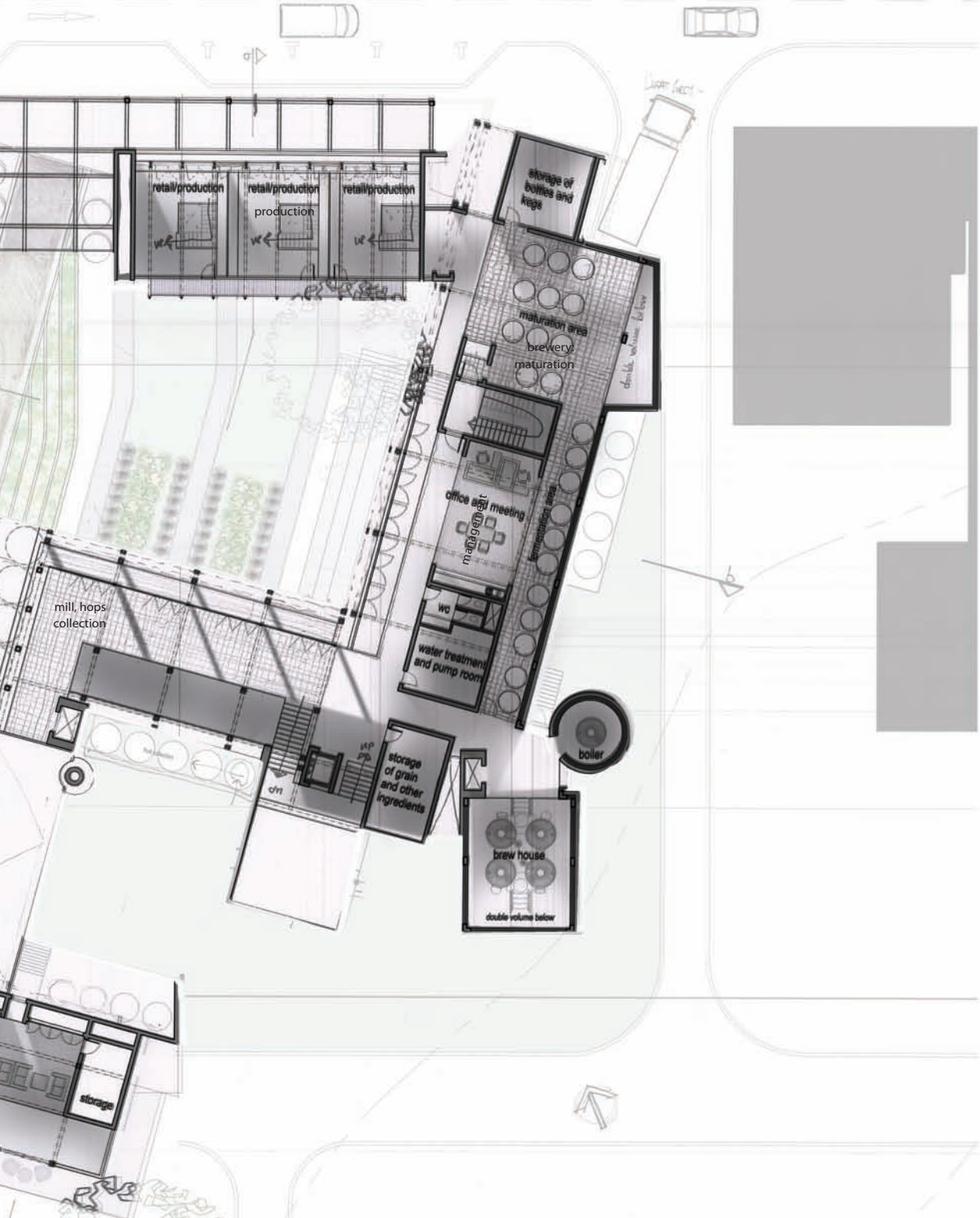


Figure 7.20:
Section a-a,
October 2013,NTS
*(Source: Author)*

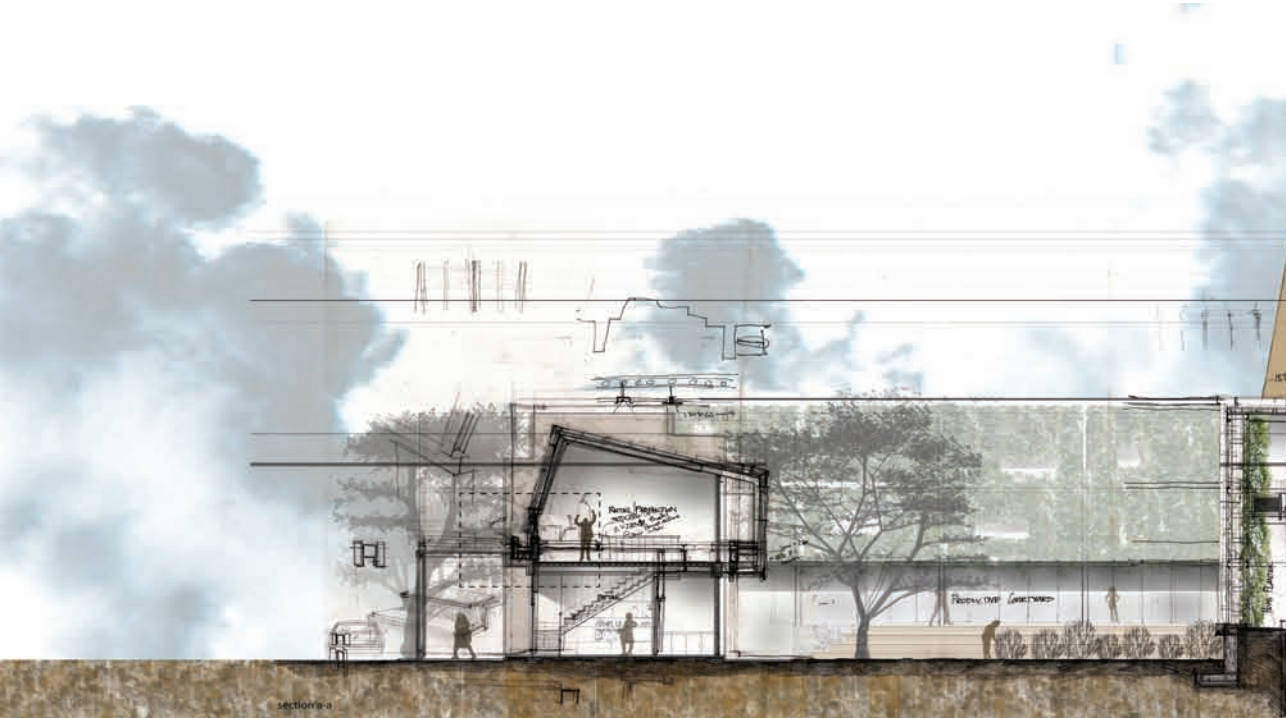


Figure 7.21:
Section b-b,
October 2013,NTS
*(Source: Author)*

## 7.9. WATER SYSTEMS

Water (and the analogy of water) is used in several ways. The spruit is used as energy source to power the mill, and the water tower that is used to store the water as potential energy also becomes a spectacle of the change of the seasons.

Rainwater is harvested for non-potable uses such as the flushing of toilets and irrigation. Water in the brewery is conserved by various managerial means: using dry milling to crush grains, installing water meters at various stages of the brewing process, using rinse water more than once; and using cleaning equipment with low-pressure nozzles etc. All waste water is sent to the anaerobic digester biogas is produced, and the fertilised waste water that is generated as a by-product from the digester is used for the cultivation of hops and herbs on site.

### *7.9.1. Risk of flooding*

Because of an increasingly impervious catchment area, the risk of flooding around a storm water channel is a realistic concern. In order to minimise flooding and damage to mechanisms, the urban framework proposes a widening of the channel about 200m upstream. Not only would this slow water down, but it would also retain some water that is then released slowly after the flooding has decreased. Storm water from the site is passed through a series of detention ponds, were some of the water is returned to the ground after being filtered by wetland plants (see Figure 7.22). This system also helps to mitigate flooding by retaining some water and increasing the cross section of the channel.

Preventative measures to protect the water wheels include the widening of the channel on site, and the diversion of base flow with the water wheels located off-stream. Pipes that divert water from the channel allow a maximum flow that would not damage the wheels, and allows the pumps to function continuously. The brewery ground floor is raised on a plinth of almost 1,5m above the natural ground level, also to minimise the risk of the building being flooded.

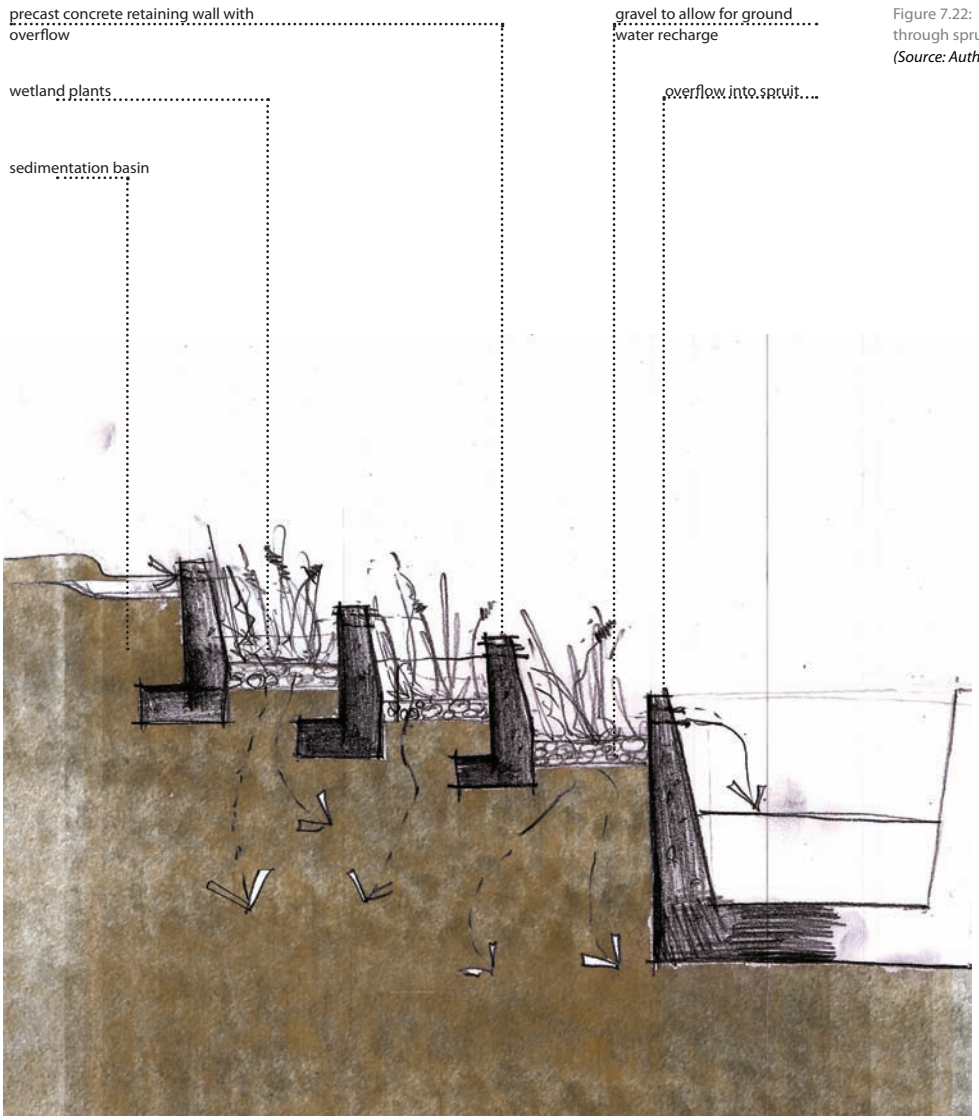



Figure 7.22: Section through spruit
*(Source: Author)*

## *7.9.2. Using the spruit as energy source*

Marabastad was initially established at the confluence of the Steenhovenspruit and the Apies River. Even though the spruit was canalised in 1920, it is still a natural water body and provides a base flow of 0,264 $m^3/s$ (Shand, 2012:33). This constant flow of water can be manipulated by creating a 500mm wide diversion channel, creating enough torque to turn three water wheels with a diameter of 4m. These wheels are attached to three spiral water pumps, each with a pipe diameter of 35mm, that pump water to a height of 18m to be stored in tanks with a combined volume of $50m^3$ (see Figure 7.24). The water is fed through a separate channel that only diverts the base flow of the spruit, so in times of flooding the bulk of the water will remain in the existing channel.

Water is fed down a pipe with a nozzle at the end that feeds a Pelton wheel turbine horizontally, creating enough torque to start and run the mill that has to crush the grain for the beer brewing process. The mill needs to crush 645kg of grain in an hour. This whole system is run with kinetic energy from the stream, requiring no additional energy from exterior sources.

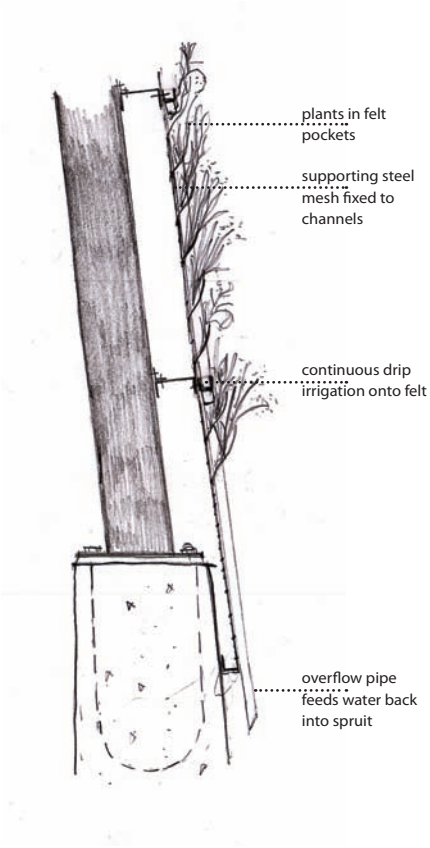



Figure 7.23: Section through western tower facade, NTS *(Source: Author)*

The system fills the water tanks in just under 7 hours and grain is crushed only three times a week, which means that there will be an almost constant overflow from the water tanks. The overflow will be guided back to the channel with a series of chains that read as a mesh facade (see Figure 7.23), forming another interface between built form and natural elements.

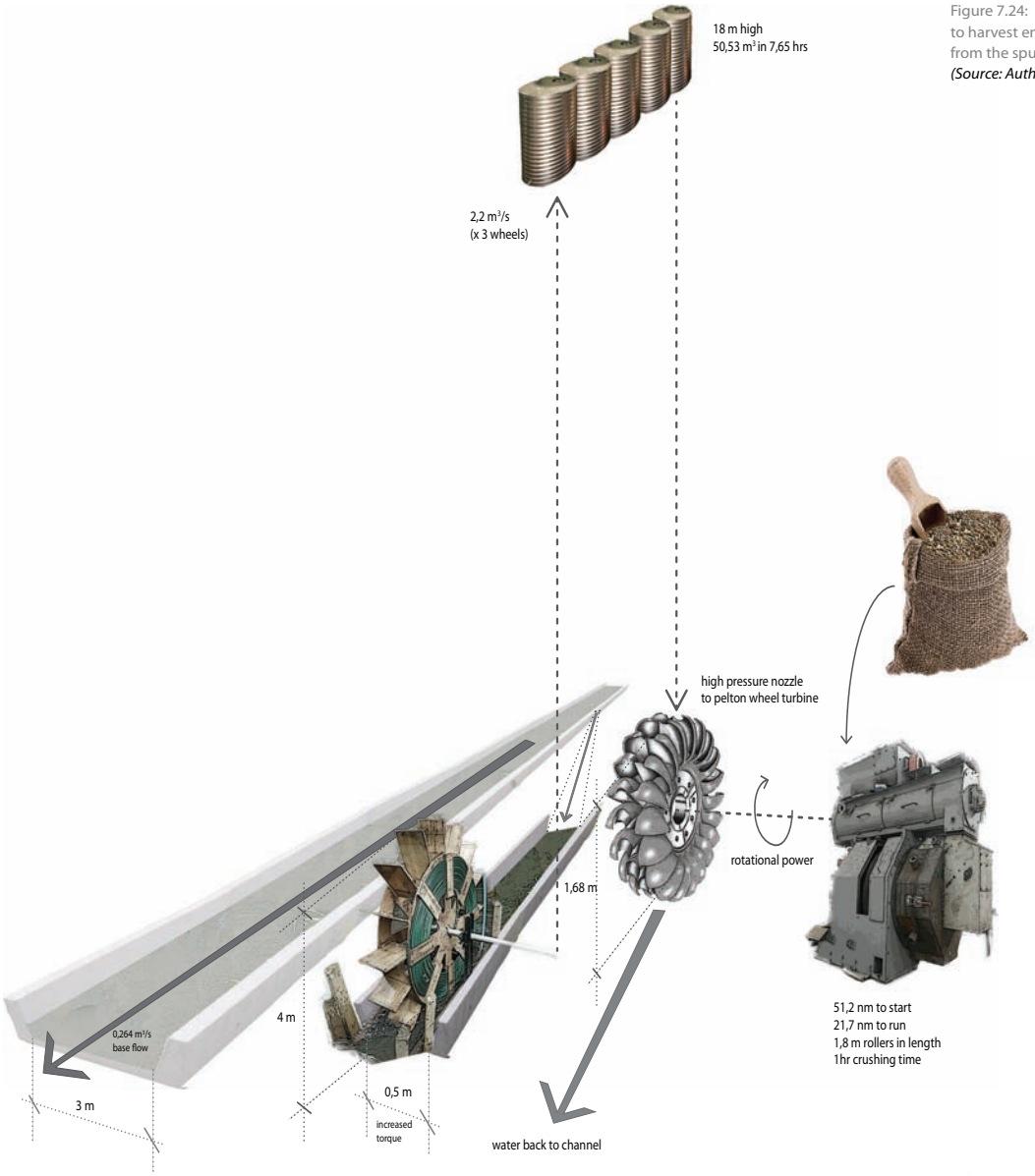



Figure 7.24: System to harvest energy from the spuit *(Source: Author)*

## *7.9.3. Rainwater harvesting and treatment*

The yield of each roof is indicated in Figure 7.26, along with the volume of storage space needed in each instance. The rainwater only supplements municipal water when it is available, and is used for non-potable purposes such as flushing and irrigation. This means that the rainwater doesn't have to go through an intensive cleaning process before it is used, and the consumption of potable water is more than halved. The brewery, as the heaviest consumer of water, has a centralised water treatment area where sediment is removed and the water filtered to allow it to be used in the showers, after which it will be filtered again and used for flushing and irrigation. Municipal water is sent through a carbon filter to acquire the level of purity and flavour that is needed to brew beer. Rainwater is not used for brewing as it will have to be stored for long periods of time and this would mean an increase in the use of potable municipal water for other uses such as cleaning.

From the centralised water treatment area, water is fed to the service cores to supply wet services in the brewery.

Water usage in the bakery, bar, liquor store and retail areas is not nearly as intensive as in the brewery. Rainwater harvested from the roofs of these areas will be used mainly for flushing and irrigation of the productive courtyard. The required tank sizes are all indicated in Figure 7.26. The movement and flow of water is an important aesthetic element and therefore the down pipes that fill the tanks are articulated (See Figure 7.25).

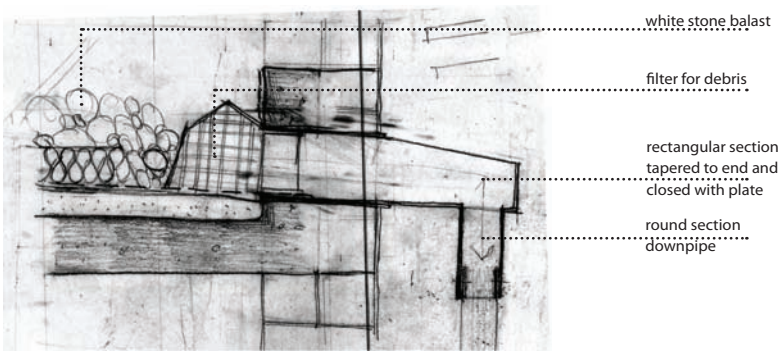
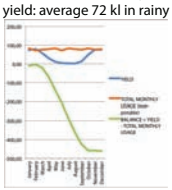



Figure 7.25:
Downpipe detail, NTS
*(Source: Author)*

area: 796 m²
use: showering, average 80 kl/month (grey water used for flushing and irrigation)
yield: average 72 kl in rainy season



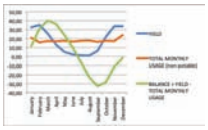
tank size: no surplus from graph
average rainfall during highveld thunderstorm is 10mm
796 x 0,9 x 0,01 = 7,196 kl/thunderstorm

Usage/day: 120l x 30 people = 3,6 kl

For 3 days of consecutive rain:
(7,196 x 3) - (3,6 x 3) = 10, 788 kl

One rainwater tank of 11,5 kl is sufficient

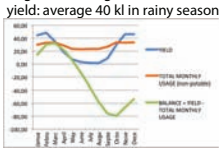
area: 354 m²
use: flushing, average 20 kl/month
yield: average 32 kl in rainy season



tank size: from graph, biggest surplus is 40 kl during march

4 x 10kl tanks are sufficient

area: 484 m²
use: flushing, average 1,25 kl/month, irrigation, average 12 kl/month
yield: average 40 kl in rainy season



tank size: from graph, biggest surplus is 32 kl during march

3 x 10kl tanks are sufficient

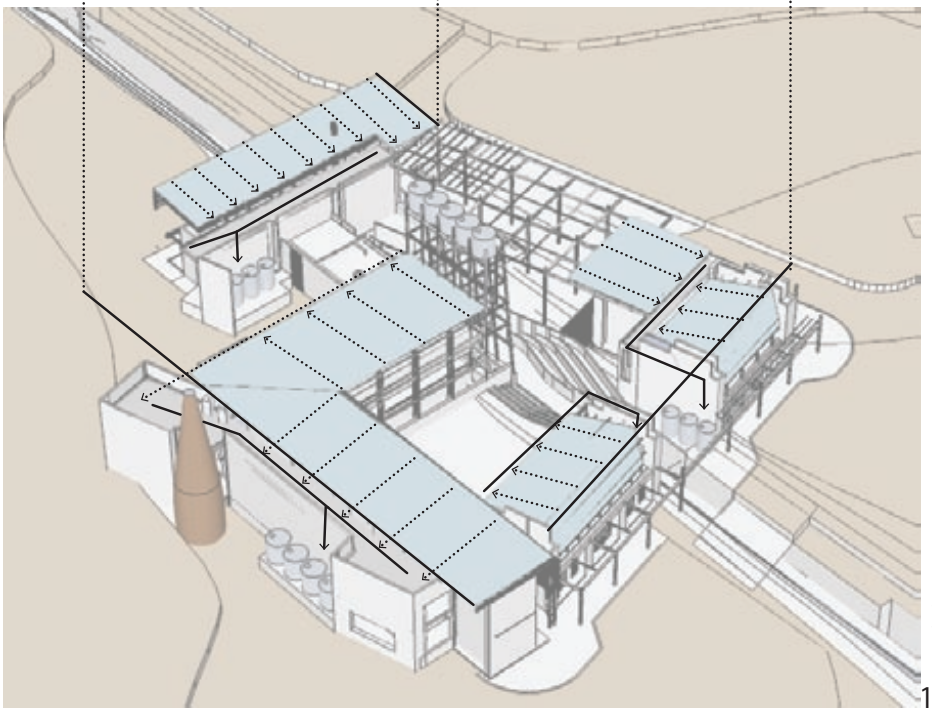


Figure 7.26: System to harvest energy from the spuit *(Source: Author)*

## 7.10. WASTE TO POWER

The flow of resources through the whole brewing process and through the functions of the building is important to make sure that as little as possible is wasted. Water that is harvested from the roof is filtered and used for the shower facilities in the building. Afterwards, some of the grey water is used for flushing and the rest is used for on-site irrigation of hops and herbs that are used to flavour the beer. Waste products such as spent grain, waste from the informal traders and food waste from a neighbouring restaurant) is diverted to the anaerobic digester where biogas is generated (see Figure 7.29).

A breakdown of available waste and ensuing biogas production:
_ 3 875 kg of grain/week (1 000 kg goes to mushroom cultivation and the bakery), waterlogged, weighing in at 14, 5 tonnes.
_ 1 000 kg waste from 200 informal traders leaving 1kg of waste each a day.
_ 1 000 kg food waste from the neighbouring restaurant.

This waste requires an anaerobic digester consisting of two tanks with a volume of 85m$^3$ each. Optimal dimensions are two tanks with a 7m diameter and a height of 2,3m. Temporary storage for the gas needs a volume of 100m$^3$. The digester is capable of producing 235m$^3$ biogas per day, which consists of 60% methane and 40% carbon dioxide. This provides a total gas energy of 1400 kWh/day. Converting the gas into electricity can be done with a 34 kW generator, but 70% energy will be lost resulting in 390 kWh/day. Therefore, the gas will rather be used directly for heating requirements (Steyn, 2013).

The brewery uses 628 kWh/day in gas energy, which leaves 872 kWh/day for the use of informal traders. This translates to 348 cooking hours, providing 43 traders with 8 hours worth of cooking time per day, made available through the pergola structure in the public space (see Figure 7.30).

The digester provides 2 kl of fertilised water used for irrigation every week, and remaining sludge is dried and worked into the soil as additional compost.

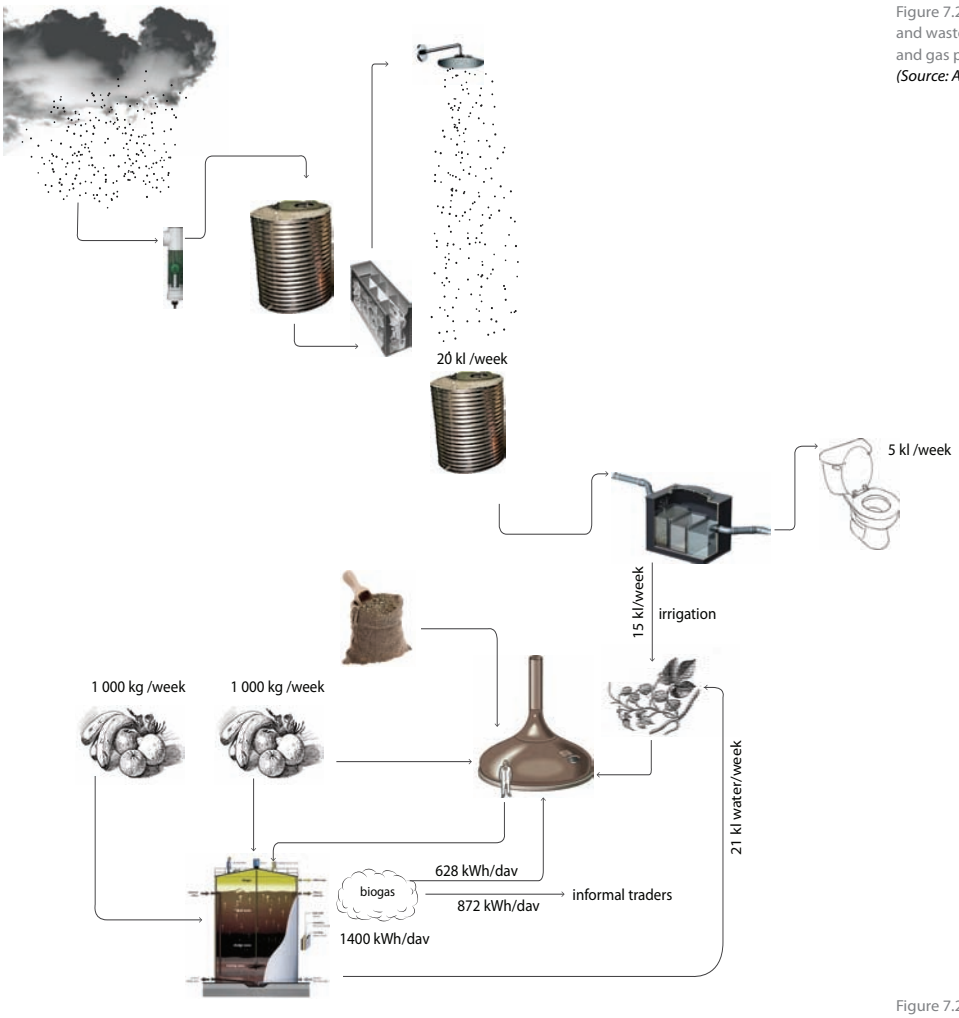



Figure 7.27: Water and waste usage and gas production
*(Source: Author)*

Figure 7.28: Column detail exploration, NTS
*(Source: Author)*

# 7.11. INDOOR COMFORT

The biggest challenges where indoor comfort is concerned are sufficient ventilation, high levels of sun penetration on western edges, and cooling of the air entering the building in summer.

## *7.11.1. Passive ventilation systems*

The depth of the building never exceeds 12m to facilitate natural ventilation and lighting. For internalised spaces (such as the staff toilets in the brewery), high openings are provided in the service ducts to aid natural convection and ventilate the rooms below. Fresh, cooled air is provided by the outlets of the earth tubes located underneath the building. A length of 7,29 m pipe with a 500mm diameter is necessary to transfer sufficient heat to cool or heat the air to a constant 18 degrees. Inlets are located in the plinth on the southern edge of the building, and outlets are located in the floor close to the eastern edge of the building, encouraging air to cross ventilate through openings in the western facade.

In winter, the bar area is heated by a fire pit, and in summer the pit is filled with water to aid in cooling the area. The bar needs the most air changes per minute (20-30) and therefore it is provided with large openings on the ground floor of the southern facade and high windows on the northern edge.

## *7.11.2. Screening and shading devices*

The tectonic screen that separates the industry from the public spaces has a dual function: during the summer months it functions as a support to grow hops to be used in the brewery. It also acts as a shading device to create a more comfortable interior by supporting the wild jasmine (*Jasminum multipartitum,* indigenous to South Africa) grown on the western facades (see Figure 7.31). A mesh screen behind the plants provides shading until the plants become established. Supports are designed in such a way so as to encourage the growth of hops while allowing strategic openings to let in light. Hops is an annual plant and leaves the northern facade open in the winter to allow for sunlight to enter the building during the colder months.

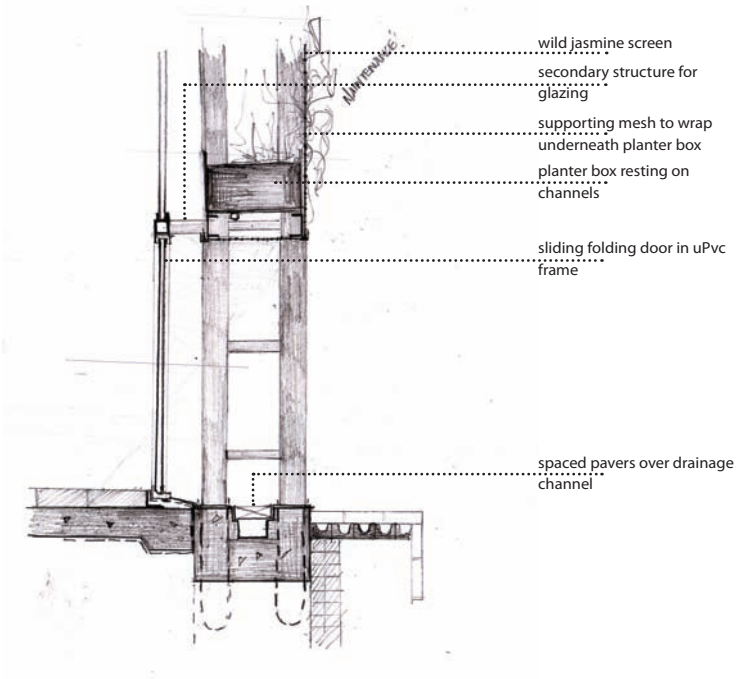



Figure 7.29: Section through western facade, NTS
*(Source: Author)*

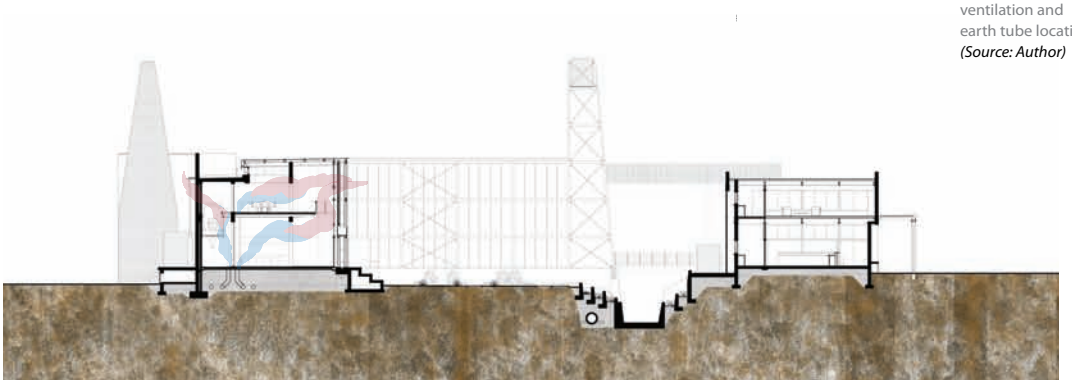
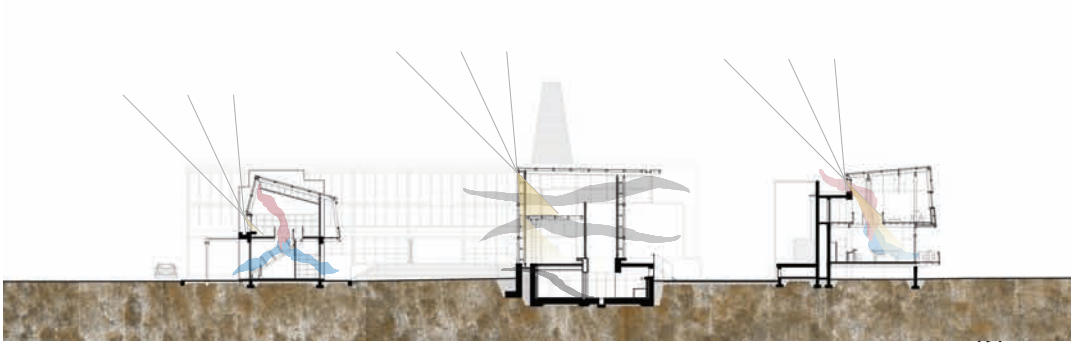


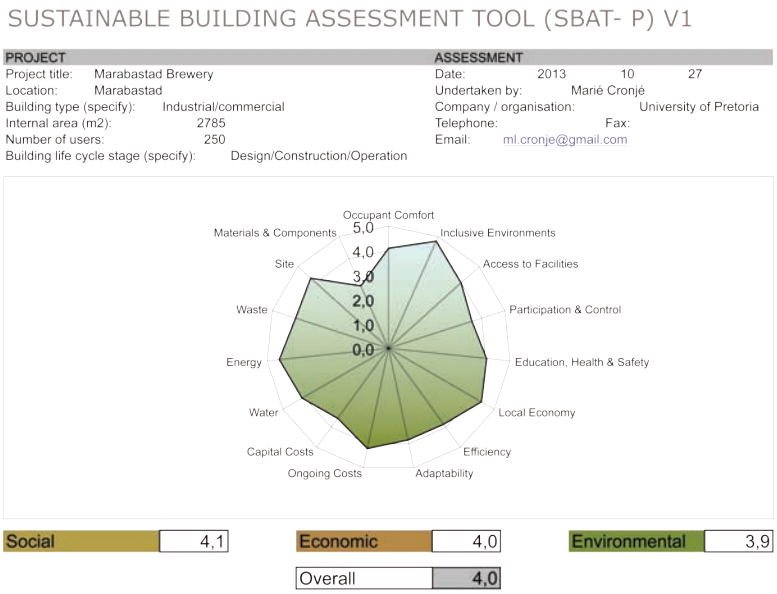
Figure 7.30: Passive ventilation and earth tube location
*(Source: Author)*



## 7.12. SBAT ANALYSIS

An SBAT analysis was undertaken to determine the social, economic and environmental impact of the building in its context. The building scored an average of 4 out of a possible 5 points in all areas except material use (see Figure 7.33), mainly because no existing building was reused.

Figure 7.31: SBAT analysis graph
*(Source: Author)*




## 7.13. THE BUILDING AS A SYSTEM

It is important to remember that the building functions as a system not only on an ecological and functional level, but also by providing spatial currency to its users. The detail design of the building needs to communicate the ideas of liquidity, accessibility and adaptability that would create a place that users can appropriate in different ways for years to come.

"So do you think it will work?"
"Probably not, brother. People have a way of doing just what they want."
"And even if you make it easy for them? And make sure they get something out of it?"
"Aish, brother. I don't know. People have a way to always surprise you. Sometimes they're stupid, sometimes they're lazy, sometimes just plain hardegat."
"How about you? Will you do it differently, Zakes?"
"Maybe. Maybe I will."
"Why? Because you're smarter than other people? Because you understand the sense of it?"
"No brother. Because I know you, and you're my friend."
"That's it?"

Figure 8.1: At the end of a long day *(Source: Brummie and Wurzel)*

# 8. “THAT’S IT.”

## 8.1. CONCLUSION

This dissertation explored the role of architecture as a powerful generator of positive and regenerative practices in the resilient community of historic Marabastad. It demonstrated how this can be achieved by integrating existing practices, natural cycles and social interaction.

The context explored in Chapter 2 revealed a place that has a long history of opportunistic practices that helped the community to survive in abject circumstances. The project aimed to reinforce these practices in a way that would positively impact on the immediate natural and urban environment.

A regenerative approach advocates an intervention that is rooted firmly in the story of place and doesn't regard any one participant in a system (human or not) as more important than another. Only when the important role that every element plays in a system is recognised and facilitated can a network function in a way that has a positive impact on all the participants.

Through architectural design, one can synthesize all the above concerns and create a place for people to participate in the various (liquid) networks: social, economic and ecological. Through spatial means and urban morphology, certain practices can be made possible and can also be enhanced, such as informal trade and social interaction. The intervention can be designed to allow the health of the surrounding natural systems to impact on its efficiency, to create awareness and concern for the wellbeing of the context in which it is located, and conversely positively impact the functioning of the natural environment. If all buildings in a city were designed to actively engage with their surroundings (urban, natural, social and economic), life-enhancing places could be created.

It must also be remembered that because the city functions as a social–ecological system that is constantly in flux and adapts to different pressures, the real and prolonged impact of an architectural intervention cannot be predicted, only anticipated. A deeper and more thorough understanding of the changes that a place undergoes over time than could be gained through this study, can lead to integrated design processes that would include community initiatives and economically viable business plans.

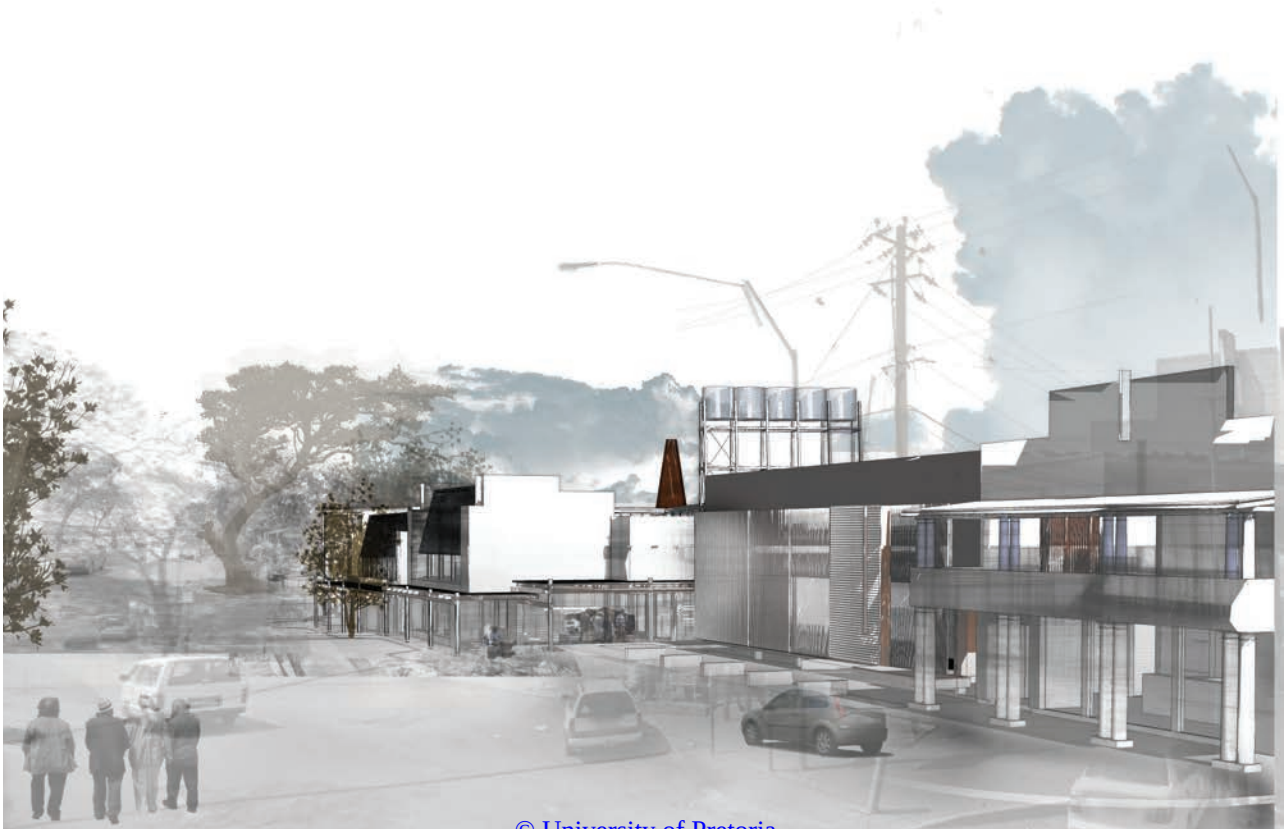
In a system, we all have a responsibility to one another, humans and non-humans alike. It is only when we realise this responsibility and interdependence that we can create places that benefit all the participants alike, creating a truly regenerative system.

"I am a firm believer in the people. If given the truth, they can be depended upon to meet any national crisis. The great point is to bring them the real facts, and beer."

Abraham Lincoln

Figure 9.1: View of public space *(Source: Author)*

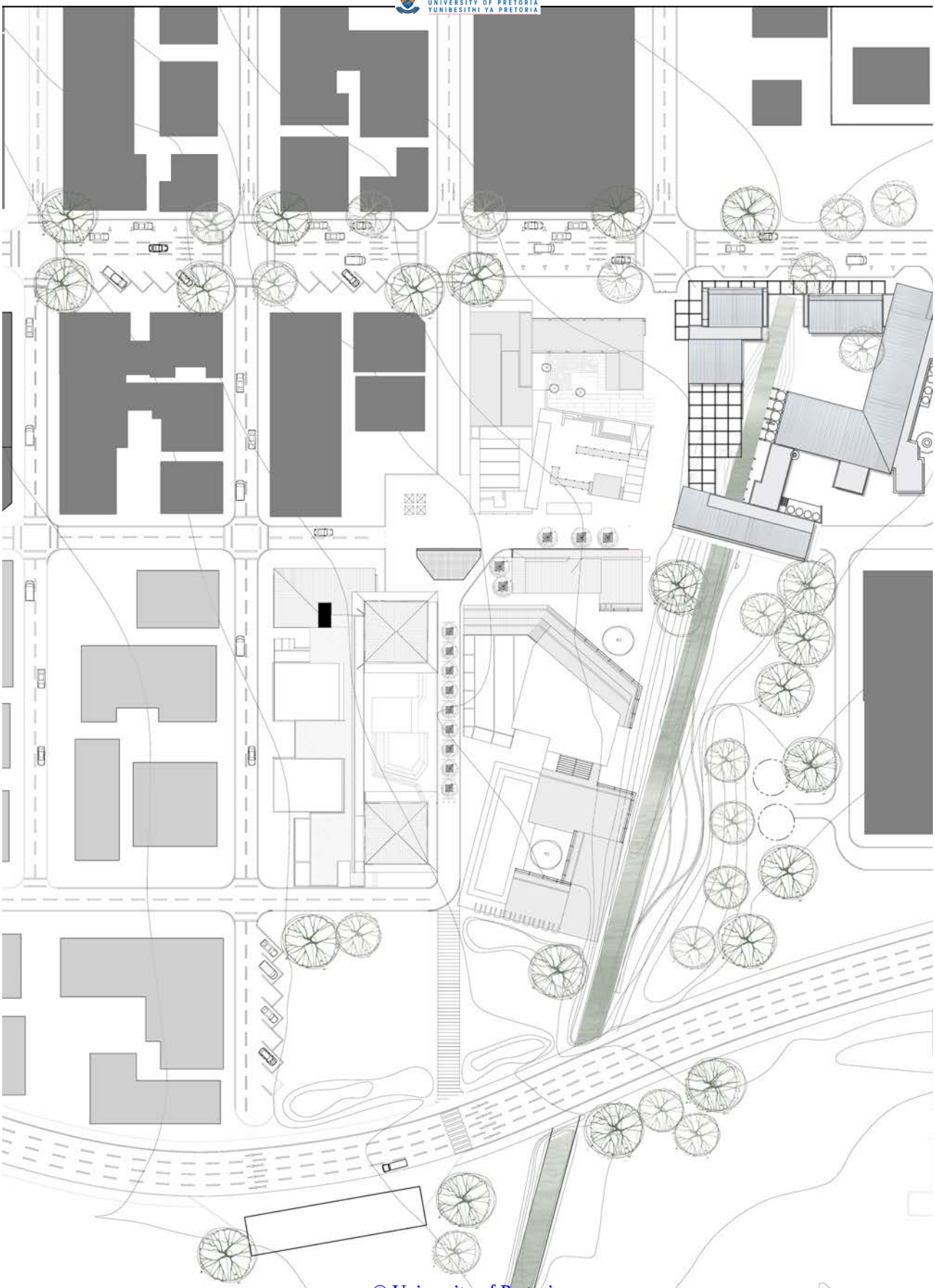
Figure 9.2: View down Boom Street
*(Source: Author)*



# 9. FINAL DESIGN REVIEW

## 9.1. PRESENTATION DRAWINGS

Examples of the final drawings that were presented at the final design review on November 29, 2013 at the Department of Architecture, University of Pretoria.



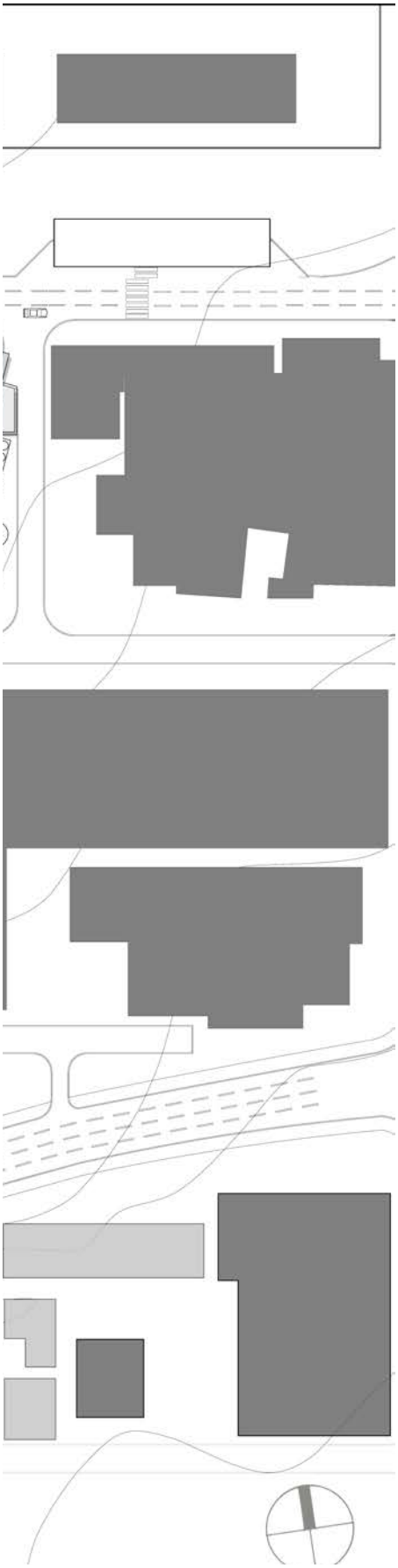


Figure 9.3: Site Plan, NTS
*(Source: Author)*

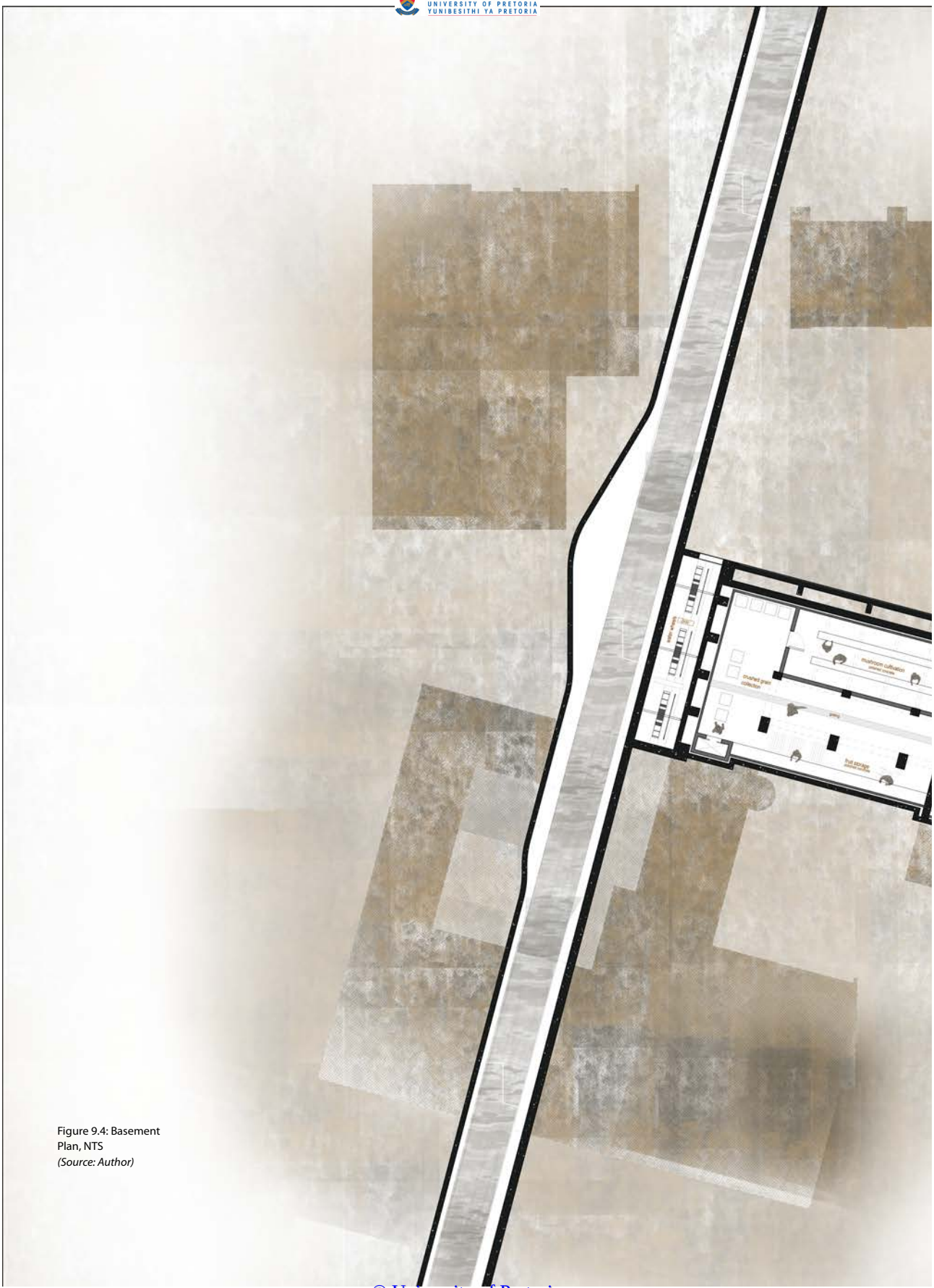



Figure 9.4: Basement Plan, NTS
*(Source: Author)*

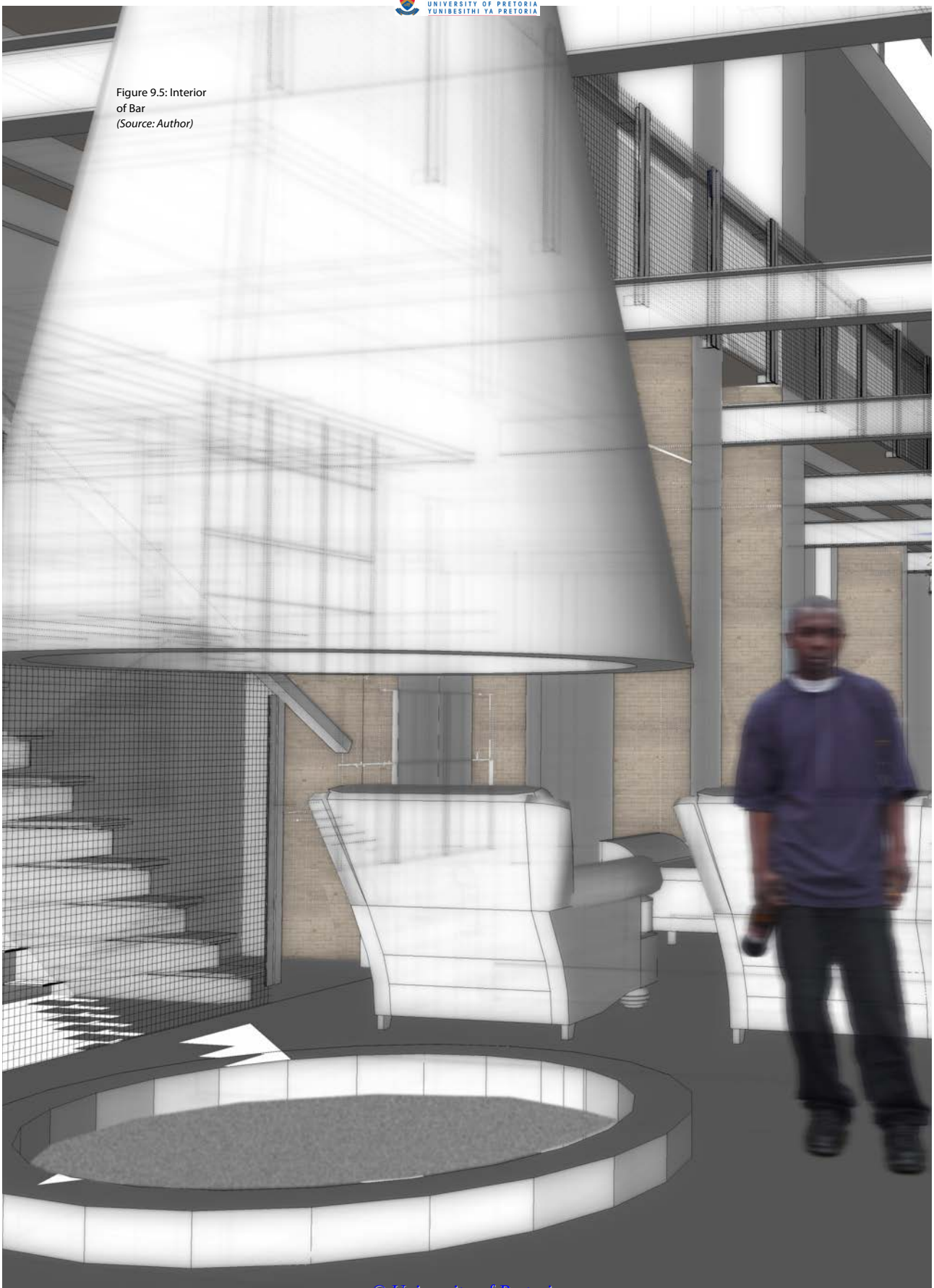


Figure 9.5: Interior of Bar
*(Source: Author)*

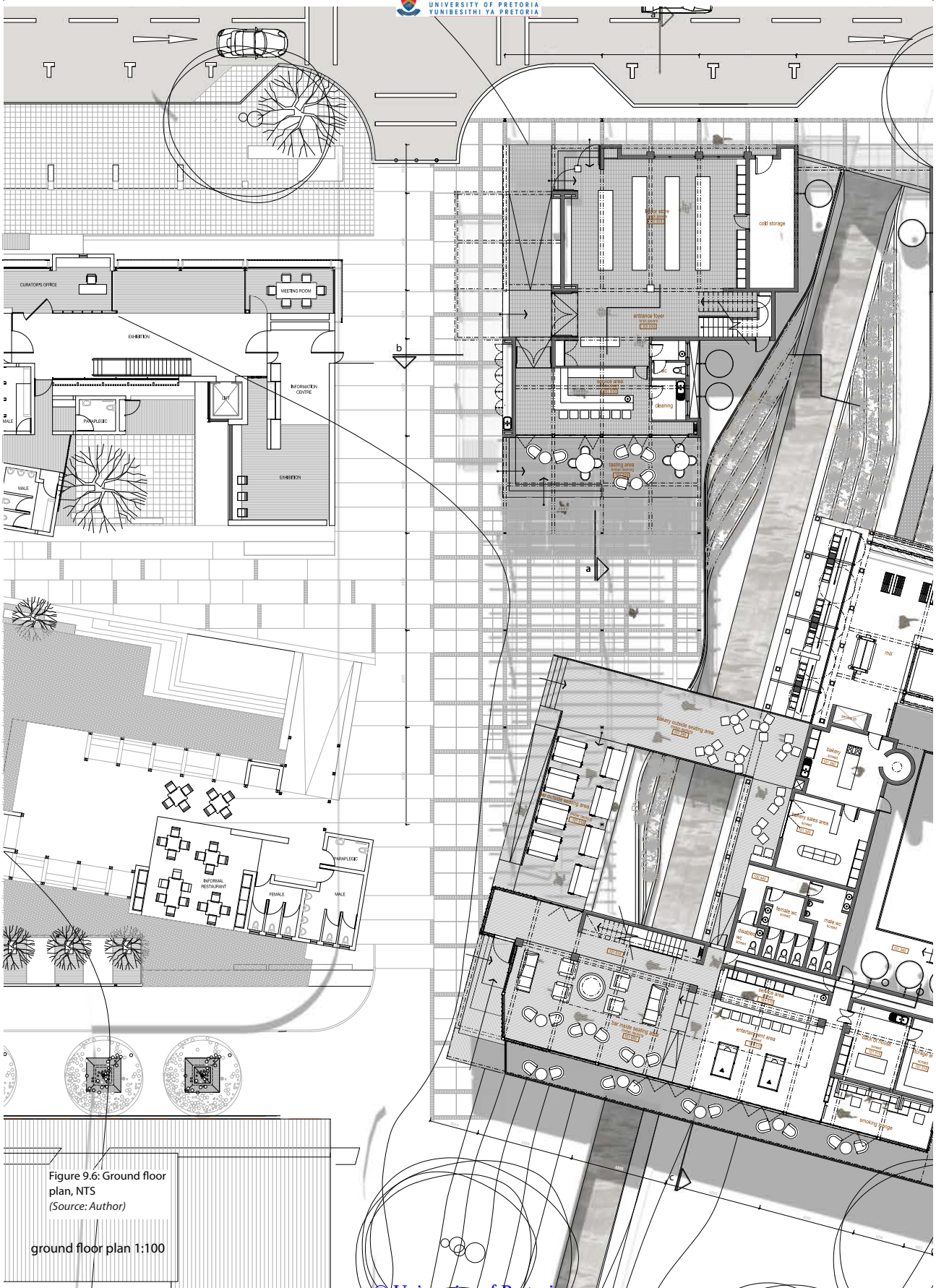



Figure 9.6: Ground floor plan, NTS
*(Source: Author)*

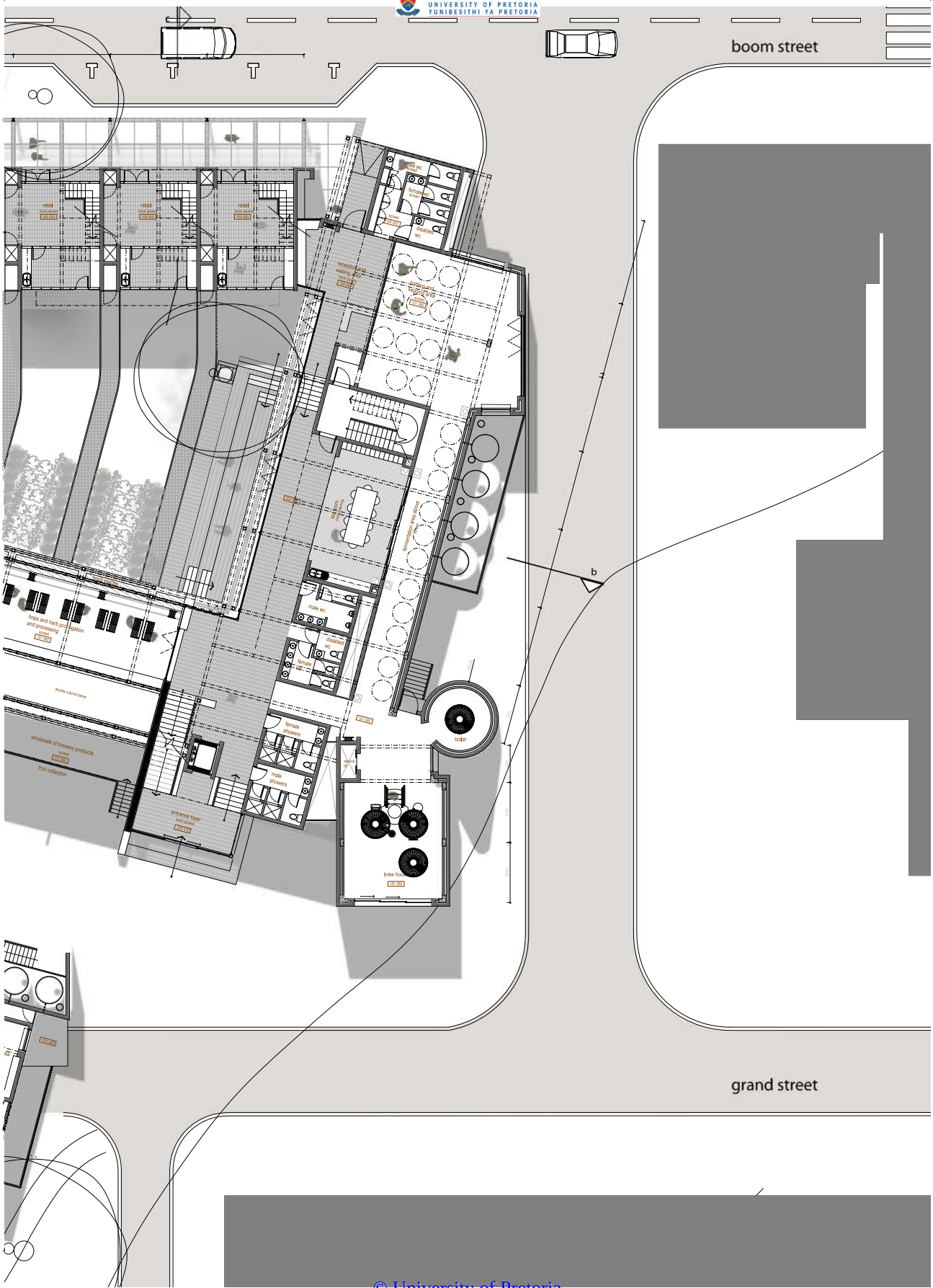
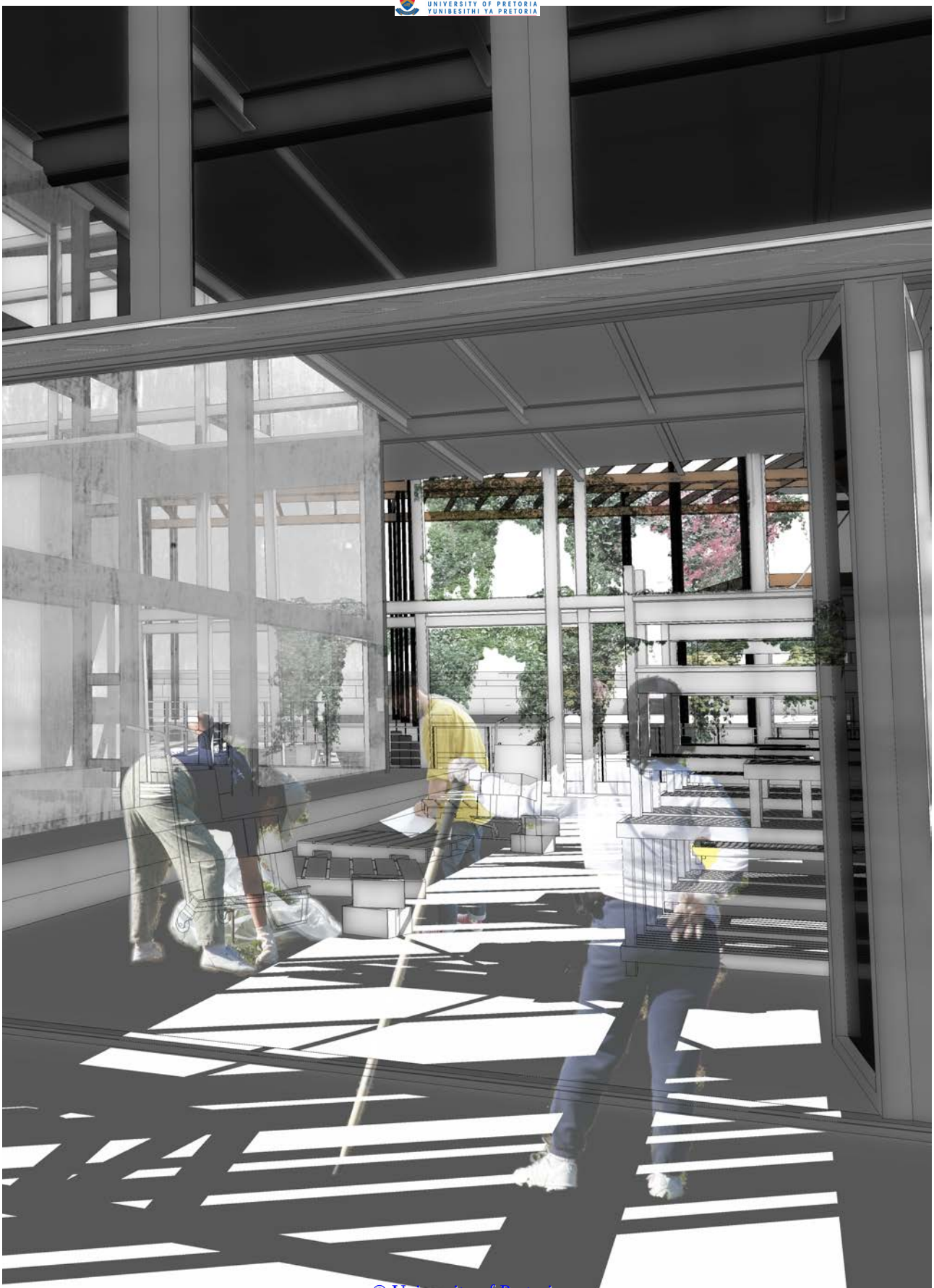



Figure 9.7: View inside brewery foyer
*(Source: Author)*



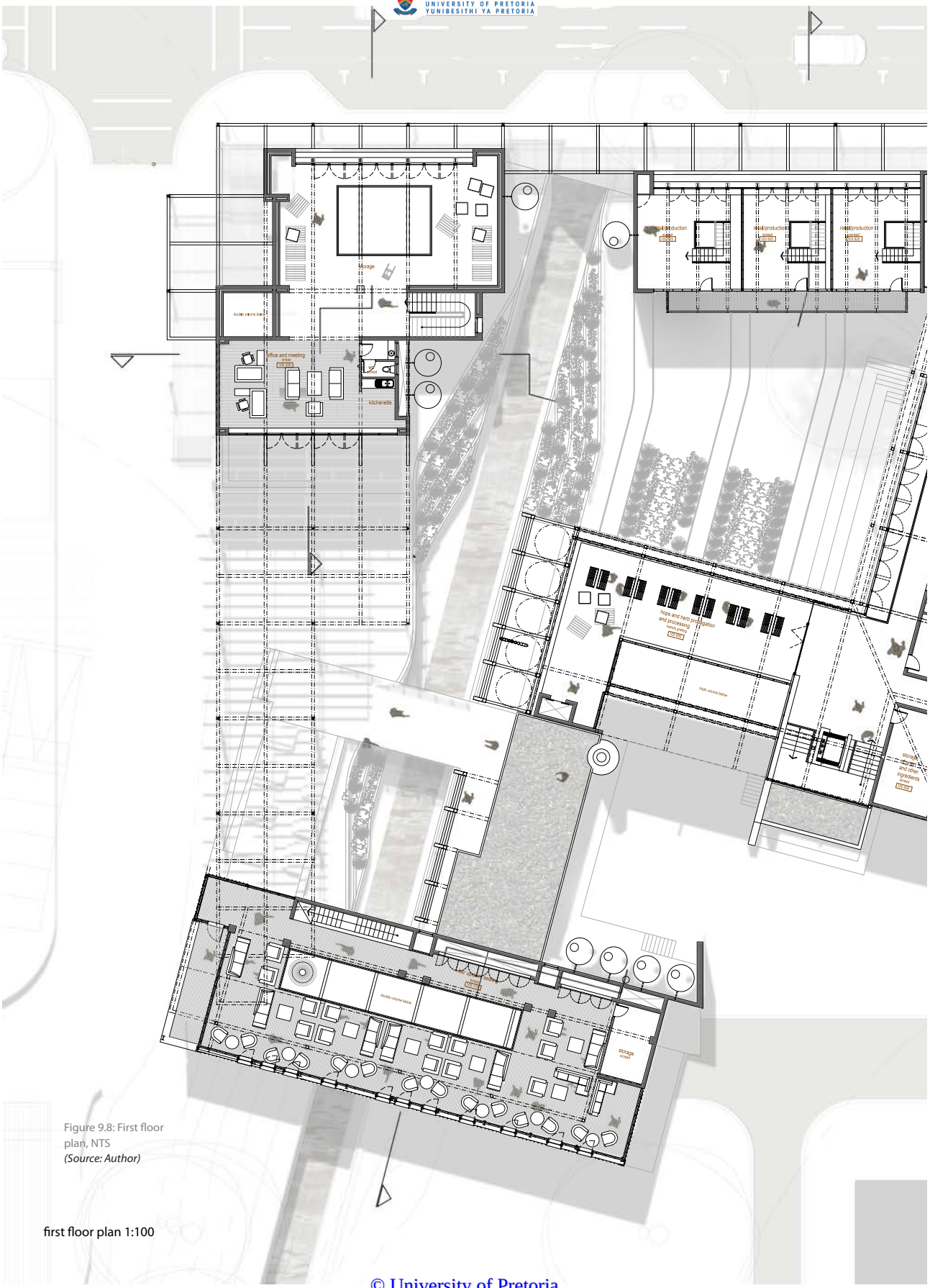



Figure 9.8: First floor plan, NTS
*(Source: Author)*

first floor plan 1:100

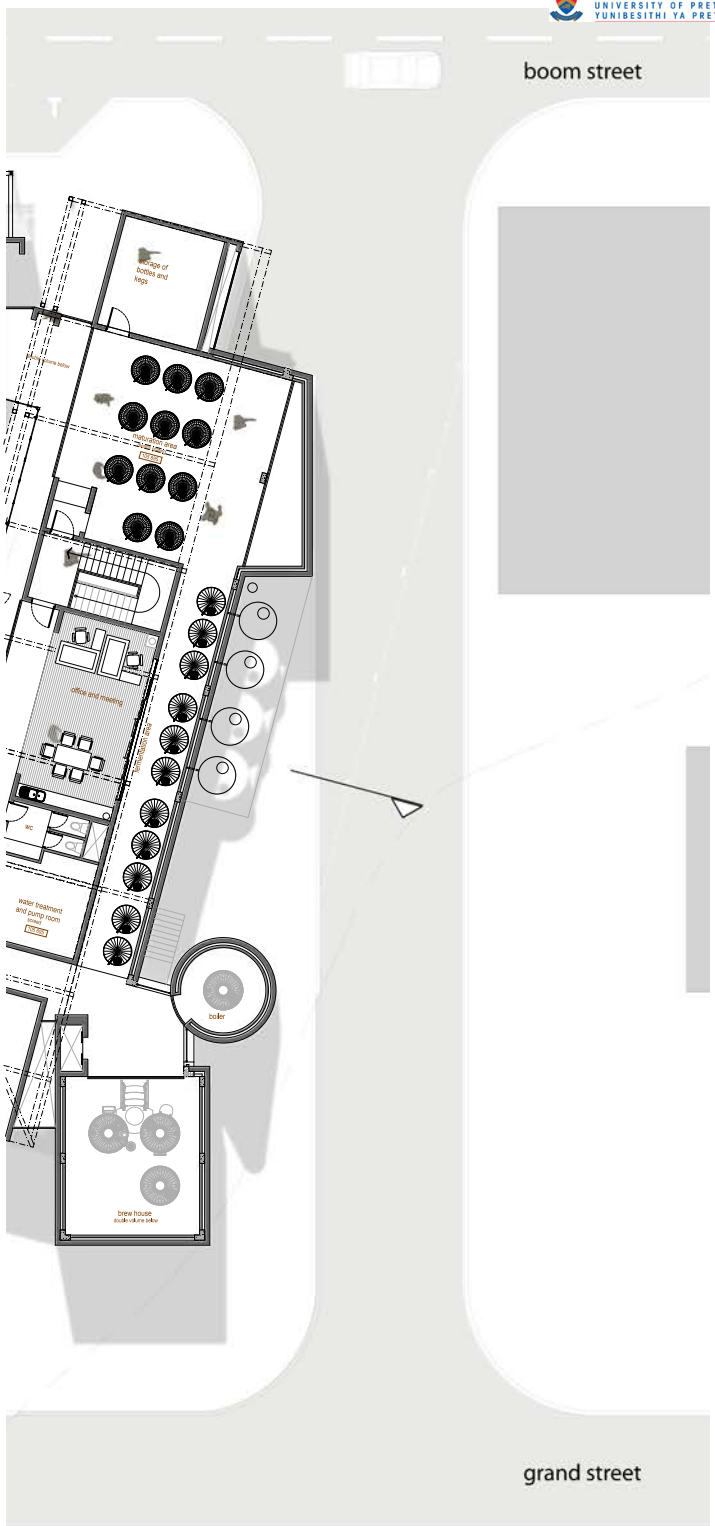


Figure 9.9: Eastern elevation
*(Source: Author)*

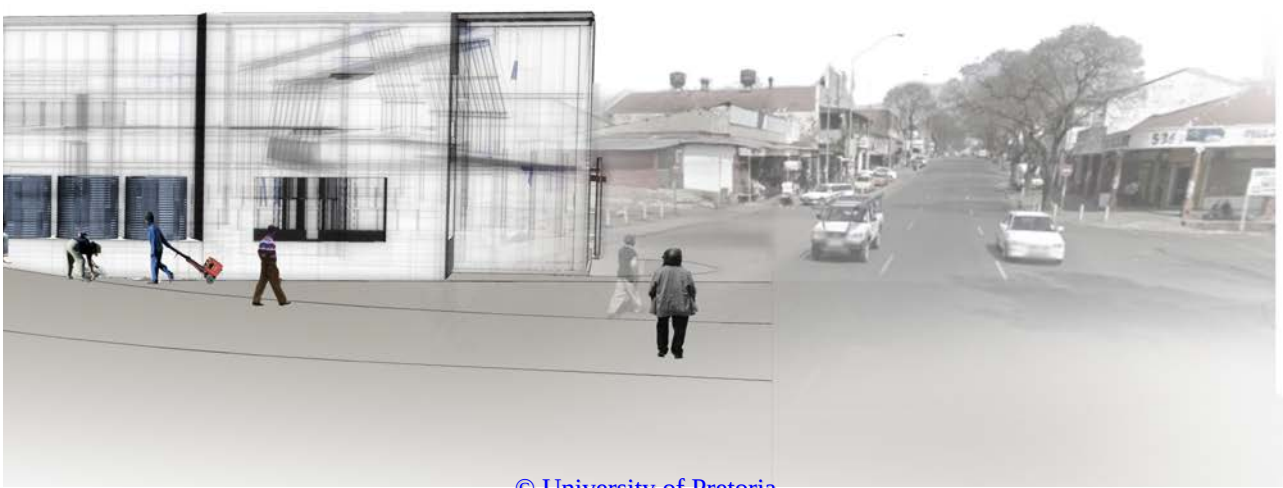


Figure 9.10:
Northern Elevation
*(Source: Author)*

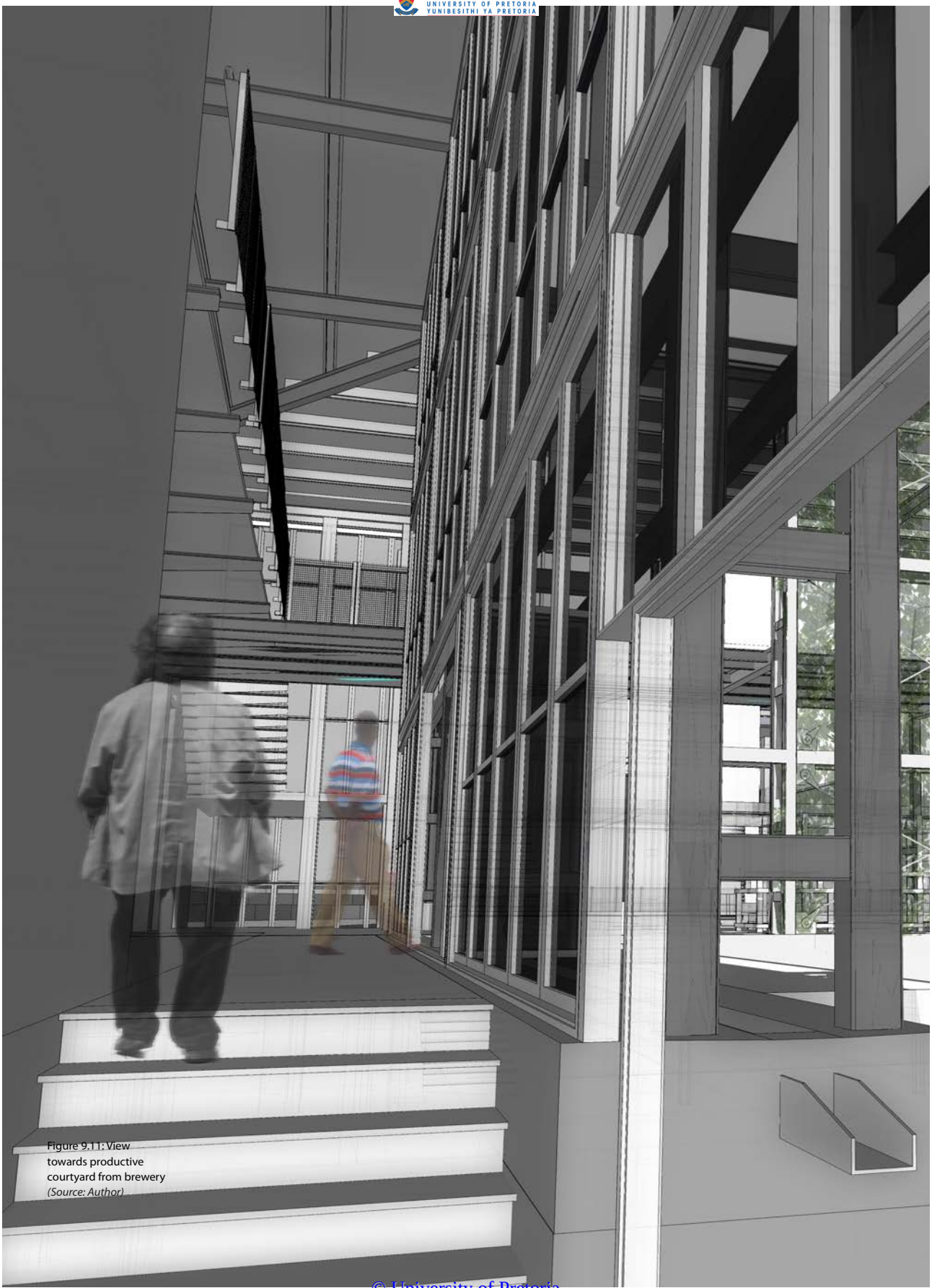


Figure 9.11: View towards productive courtyard from brewery *(Source: Author)*


section c-c 1:50

Figure 9.12: Section a-a, NTS *(Source: Author)*

Figure 9.13:
Section b-b
*(Source: Author)*

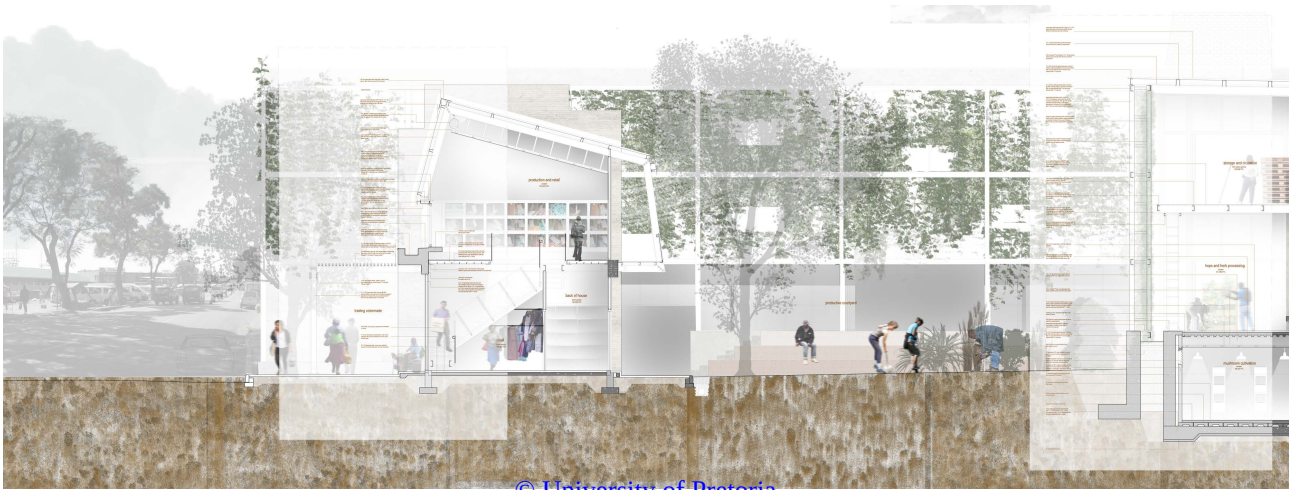


Figure 9.14:
Section c-c
*(Source: Author)*


Figure 9.15: Section c-c detail through retail
*(Source: Author)*


Figure 9.16: Section c-c detail through brewery
*(Source: Author)*


Figure 9.17: Section c-c detail through bar
*(Source: Author)*

Figure 9.18: Detail 1 through shop
*(Source: Author)*

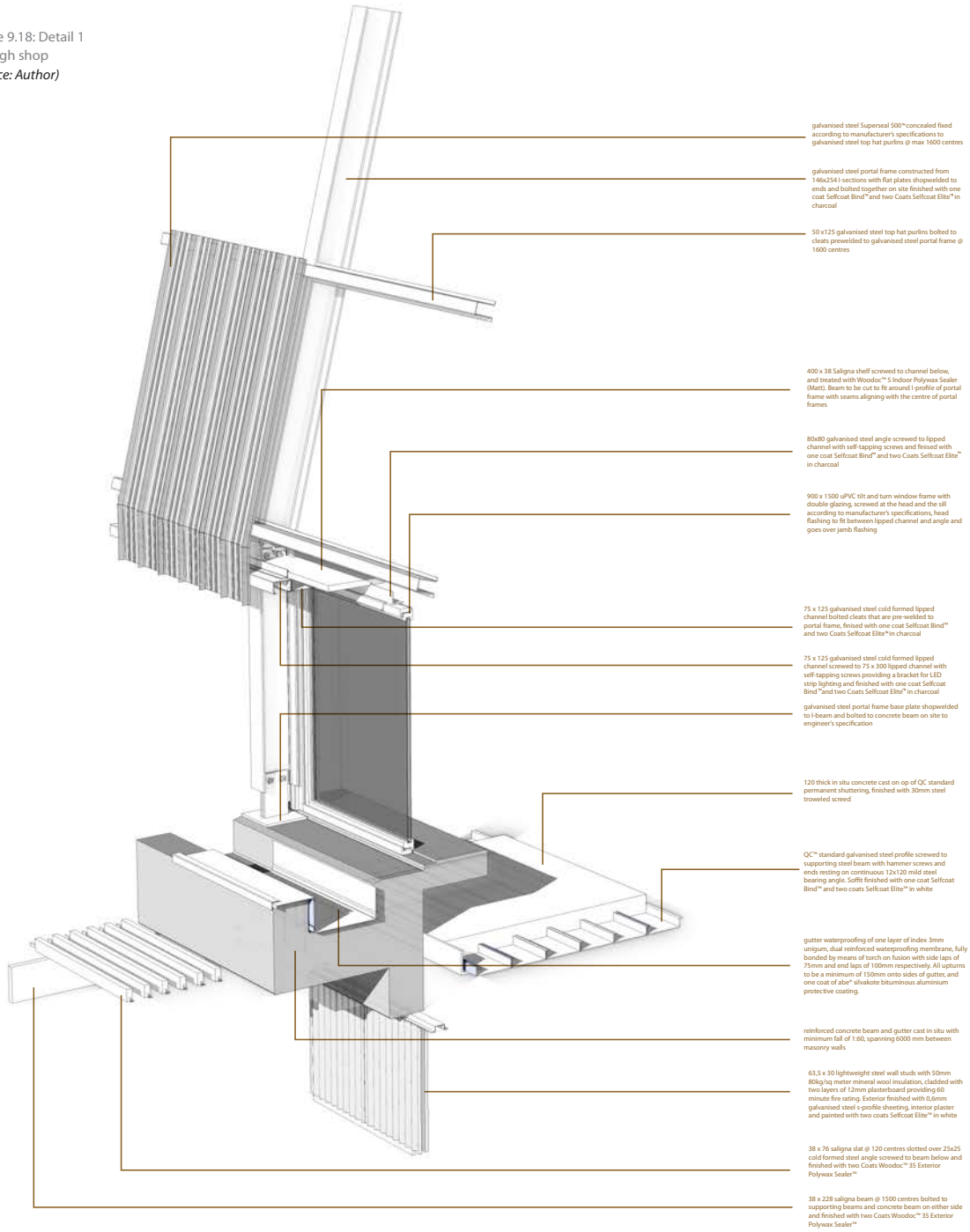


Figure 9.19: Detail 2 through basement
*(Source: Author)*

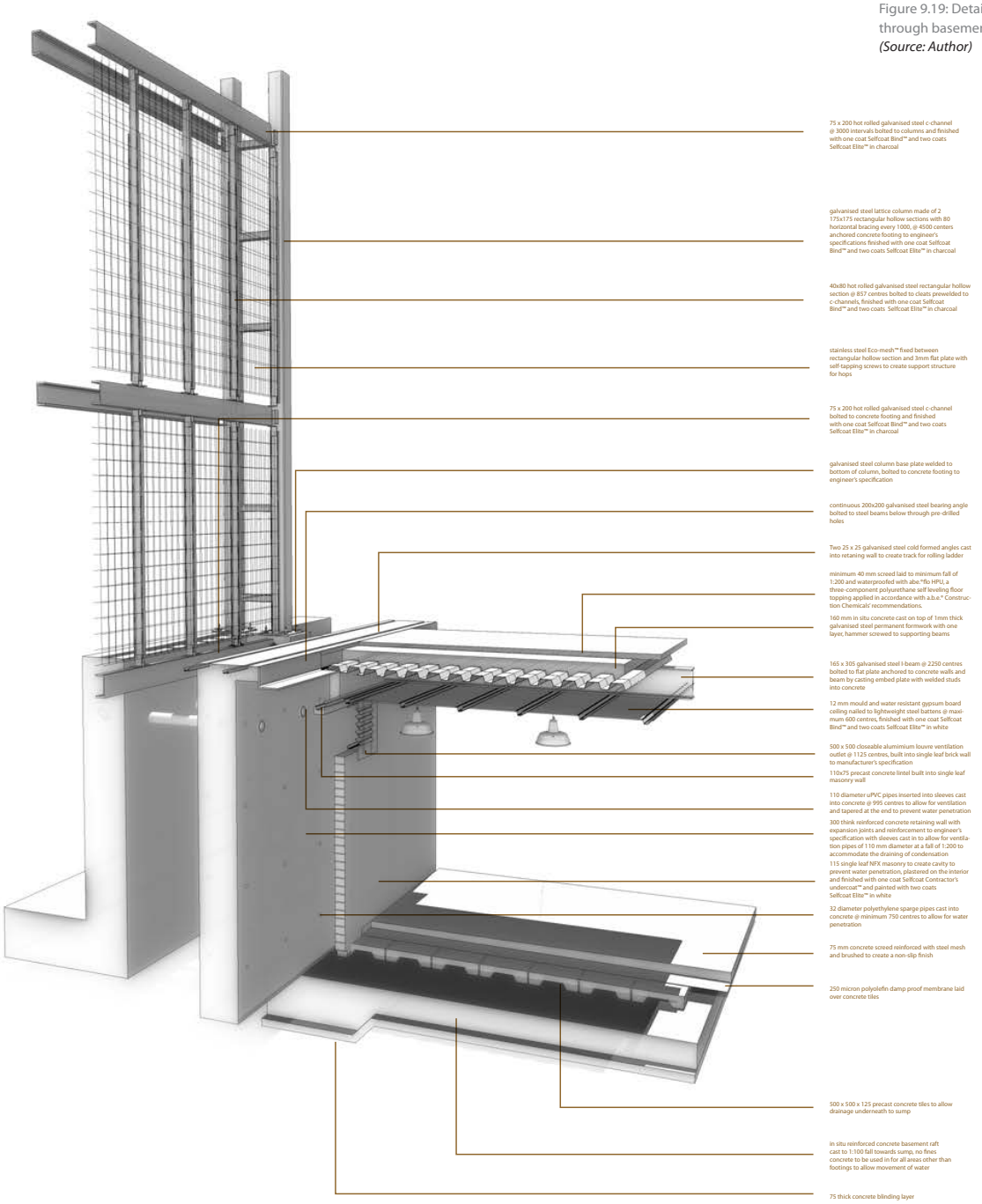


Figure 9.20: Detail 3 through roof
*(Source: Author)*

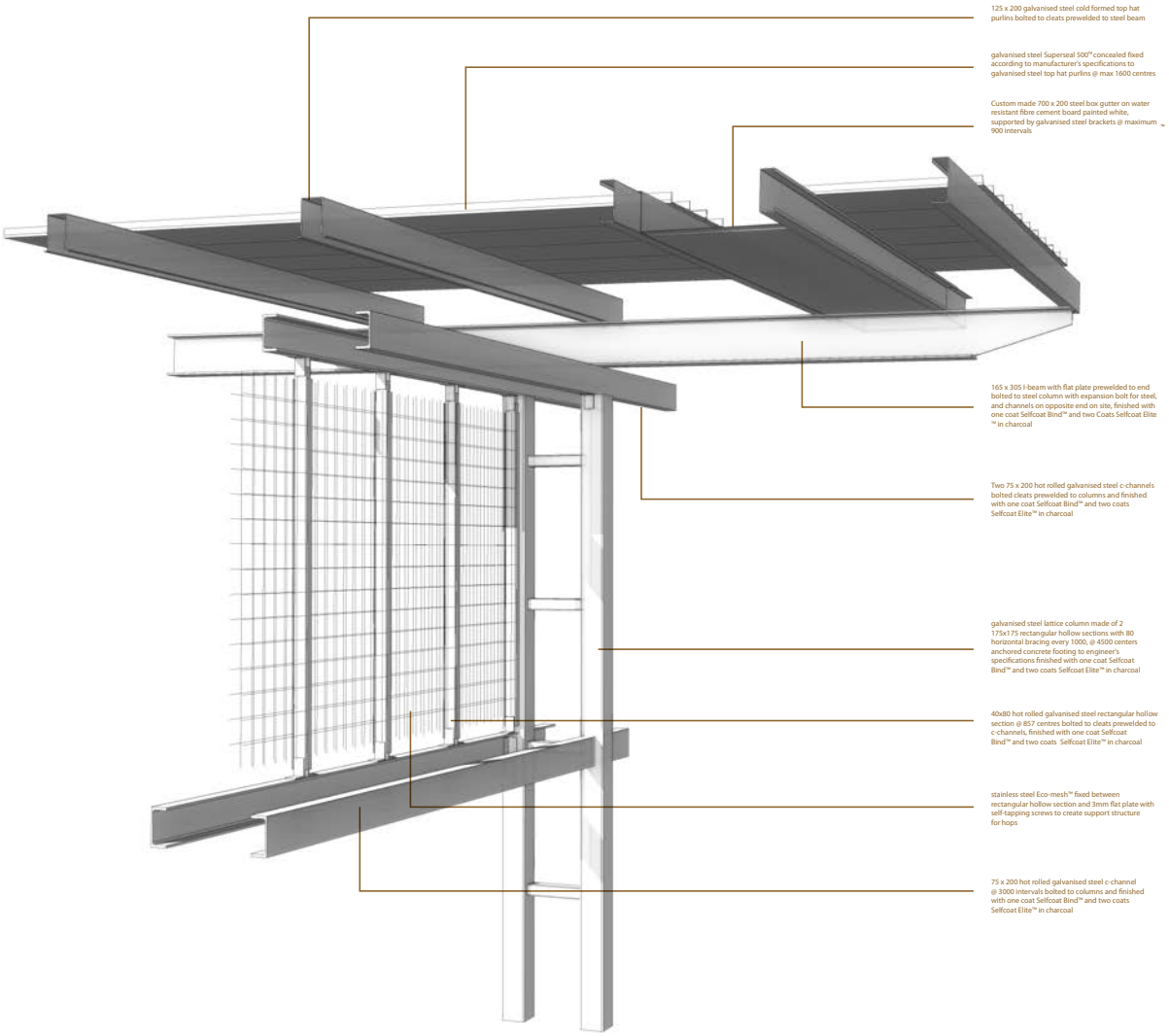


Figure 9.21: Detail 4 through bar balcony
*(Source: Author)*

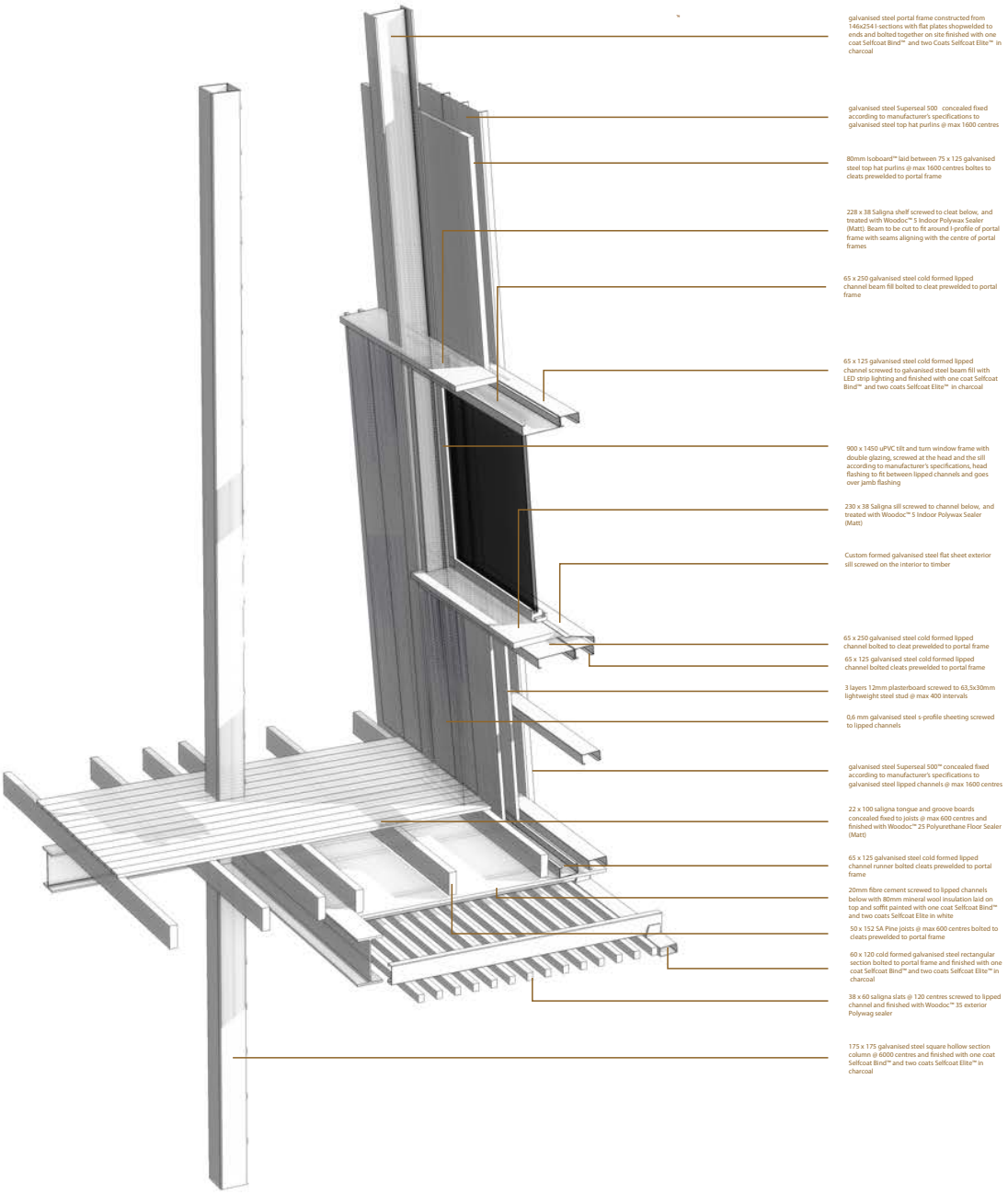


Figure 9.22: Presentation on 29 November 2013
*(Source: Author)*

Figure 9.23: Group mode
*(Source: Author)*

# 10. BIBLIOGRAPHY

## 10.1. LIST OF FIGURES

## 10.2. REFERENCES

Anonymous 2012, 16 July 2012-last update, *Cleaning up Pretoria painful - mayor* [Homepage of South African Press Association], [Online]. Available: http://www.news24.com/SouthAfrica/Politics/Cleaning-up-Pretoria-painful-mayor-20120716 [Accessed: 28 March 2013]

Anonymous 2002, August 13-last update, *Marabastad squatters moved to Mamelodi* [Homepage of SAPA], [Online]. Available: http://www.news24.com/xArchive/Archive/Marabastad-squatters-move-to-Mamelodi-20020813 [Accessed: 12 May 2013]

Aziz Tayob Partnership 2002, *Integrated spatial urban development plan for Marabastad, Urban Framework*, City of Tshwane Council, Tshwane

Du Plessis, C. 2011, "Chaos and Resilience: The Johannesburg Experience" *in The EcoEdge: Urgent Design Challenges in Building Sustainable Cities* , Editors E. Charlesworth & R. Adams, 1st edition, Routledge, London, pp 55-59

Du Plessis, C. 2008, "Understanding Cities as Social-ecological Systems", *World Sustainable Building Conference – SB'08Melbourne,* Australia, 21-25 September 2008

Friedman, M. 1994, *A History of Africans in Pretoria with Special Reference to Marabastad*, University of Pretoria

Groák, S. 1992, *The idea of building: thought and action in the design and production of buildings,* 1st edition, Taylor & Francis, London

Grobbelaar, L. 2011, *New Royal Theatre : the Marabi Theatre as locus for cultural reproduction*, University of Pretoria

Hart, D. 1991, "The Informal Sector in South African Literature" *in South Africa's Informal Economy*, eds. E. Preston Whyte & C. Rogerson, 1st edition, Oxford University, Oxford OX2 6DP, United Kingdom, pp 68-86

ICOMOS 1999, *International Cultural Tourism Charter Managing Tourism at Places of Heritage Significance,* ICOMOS, Mexico, October 1999

Johanesse, F. 1979, *The Rainmaker*, 1st edition, Ravan, Johannesburg

Latour, B. 2012, *We have never been modern*, Harvard University, Cambridge, Massachusetts

Littlefield, D. 2012, "(Re)generation: Place, Memory, Identity", *Architectural Design*, vol. 82, no. 1, pp 8-13

Malan, C. 2013, *Approaches to Urban Design: City of Tshwane Urban Renewal Project, Powerpoint Presentation*, Arup, Pretoria, South Africa

Marcuse, P. 1998, "Sustainability is not enough", *Environment and Urbanization*, vol. 10, no. 2, pp. 103-112

Maromo, J. 2012, *Move to appease Tshwane hawkers* [Homepage of South African Press Association], [Online]. Available: http://www.iol.co.za/news/south-africa/gauteng/move-to-appease-tshwane-hawkers-1.1387690#.UVQrAhnNfC5 [Accessed: 28 March 2013]

Meadows, D.H. 2008, *Thinking in Systems*, 1st edition, Chelsea Green Publishing Company, United States of America

Mokgatle, N. 1971, *The Autobiography of an Unknown South African*, 1st edition, Hurst, London

Moore, S.A. 2001, "Technology, Place, and the Nonmodern Thesis", *Journal of Architectural Education* (1984-), vol. 54, no. 3, pp. 130-139

Mphahlele, E. 1959, *Down Second Avenue*, 1st edition, Faber and Faber, London

Mshigeni, K. 2001, *Brewing a Future* [Homepage of San Diego Earth Times], [Online]. Available: http://www.sdearthtimes.com/et0101/et0101s7.html [Accessed: 26 May 2013]

Naidoo, M. 2008, *Bioscopes and Atchaar.* Available: http://www.muthalnaidoo.co.za/stories-from-the-asiatic-bazaar-othermenu-96/126-bioscopes-and-achaar [Accessed: 26 March 2013]

Olajire, A.A. 2012, "The brewing industry and environmental challenges", *Journal of Cleaner Production*, [Online], , pp. 1-21. Available from: http://cmbe.engr.uga.edu/bche4920/2013/Brewing/Olajire%202012%20J%20Cleaner%20Prod.pdf [Accessed: 26 May 2013]

Rao, P. 2013, "Climate Chaos is Responsibility for One and All" in *Climate Controversy 2013*, editors J.P. Abraham, M.C. MacCracken, G.M. Woodwell & P.S. Ellis, 1st edition, AuthorHouse, Bloomington, pp. 1-2

Thiis-Evensen, T., Waaler, R. & Campbell, S. 1987, *Archetypes in architecture*, 1st edition, Norwegian University, Oslo

Tlali, M. 1989, *Footprints in the Quaig*, 1st edition, David Philip, Cape Town

Van Wolputte, S. 2010, "Beer and the making of boundaries: An introduction" in *Beer in Africa: Drinking Spaces, States and Selves*, editors S. Van Wolputte & M. Fumanti, 1st edition, Lit Verlag, Zurich, pp. 1-25

Xiaodong, L. 2010, *Bridge School* [Homepage of Aga Kahn Award for Architecture], [Online]. Available: http://www.akdn.org/architecture/pdf/Bridge%20School.pdf; [Accessed: 27 July 2013]