

# STEENOVENSPRUIT

agrarian conservancy

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<b>Dissertation Title:</b>	The Steenovenspruit Agrarian Conservancy, A new typology for urban living
<b>Framework Title:</b>	The ConservanCITY
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<b>Project Summary:</b>	
<b>Site Location:</b>	Old Pretoria Townlands on the western boundary of Pretoria CBD. Located between Proes and Struben streets to the north and south and Cowie Street to the east. The site is south of the historical area of Marabastad
<b>Site Description:</b>	Wasted landscape on the city boundary, abandoned and neglected. Highly compromised in terms of ecological functioning. However, still home to Pretoria's marginalised urban poor.
<b>Client:</b>	Urban Poor in the Marabastad Precinct initially supported by an NGO
<b>Users:</b>	Urban poor in the area, the everyday temporary users and the greater Pretoria general public
<b>Site Significance:</b>	A heritage and cultural landscape, bearing evidence of past uses in the form of traces across site. The site has both cultural significance and ecological significance both of which need to be uncovered and enhanced.
<b>Project Significance:</b>	The project aims to investigate a new typology for urban living, promoting the sustainable development of landscapes as a valuable urban resource.
<b>Theoretical Approach:</b>	The dissertation challenges the rational application of solutions to landscape architectural problems, such as urban agriculture. Landscapes have layers of past use and meaning which cannot simply be erased if 'place-making' is to be viewed as a process. Thus an approach of 'Re-founding' is proposed as a method for re-starting the process of place in wasted landscapes throughout the city, where traces of past use are utilised to inform the implementation of past uses. Development is viewed as an enriching of the landscape, as opposed to resource use. Thus the dissertation subscribes to the approach that social and ecological aspects of design should go hand in hand, and that the cultural landscape is essentially the basis for design of place as an inherently man-centred process. However, respect of the ecological aspects of the landscape are crucial to creating sustainable places.



University of Pretoria

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

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

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

Dayle Lesley Shand



## Abstract

Many urban poor are living lifestyles prescient of a future with little to no accessible fossil fuels, a future lacking easy access to electricity, flowing water, and food security. Scientists such as David Holmgren warn that the rest of society may face a similar scenario.

According to the Association for the Study of Peak Oil and Gas (ASPO 2008), the peak of oil discovery happened in the 1960's. In 1981 the world started using more than what was found in new fields and since then the gap between discovery and production has been ever widening, many countries have already passed their peak, which indicates that a global peak is imminent.

This dissertation investigates a new typology for urban living. An area south of Marabastad, in the north-western quadrant of the city of Pretoria is selected as the wasted landscape for testing the hypothesis that a drosscape has the potential to be designed and developed into an agrarian conservancy to support a society in need of sustainable, innovative places.

Part One of the dissertation investigates agriculture as a method for returning the site to some utilitarian efficiency. However, landscapes contain the potential to be more than functional tracts of land with no meaning.

Thus Part Two of the dissertation investigates the fact that a creative approach to the implementation of city farming in the Steenovenspruit drosscape can ingrain in the modern industrial city a place with which the inhabitants can identify, where form does not only follow function but also enhances and expresses the celebration of man's working relationship with the land, as well as celebrating the historic traces evident on the landscape.

A palimpsest emerges out of the faint residue of past uses, displaying traces of the character the site once had. The dissertation proposes that by capturing the essence of these past layers of productive use and further enriching the palimpsest by introducing traces of farming and gardens, meaning and experiential use of the land will be returned to the people of Marabastad. The dissertation also proposes that through this experiential use the community is once again able to leave traces on the landscape and lift the site out of limbo and once again into the process of place-making, or refounding.

A conservancy is proposed for the Steenovenspruit drosscape which combines the concept of palimpsest and the poetic nature of farming across a number of city blocks, connecting Marabastad and the CBD. The conservancy encapsulates a variety of land uses including residential and gathering traces, however the core of the conservancy centres around a historical city block which formed part of the old Pretoria townlands and which morphs once again into productive landscape.

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## Definitions :

1. *“Peak oil - Peak oil is the concept that since oil is non-renewable, there will be a point in the future at which the rate of extraction will hit a peak and thereafter will decline. The model and term, peak oil was first introduced by M. King Hubbert in 1965. This term should not be interchanged with oil depletion, as that is the period where oil reserves become depleted, whereas peak oil describes the point at which we will hit maximum production, the peak of oil production.”*  
< <http://www.ecolife.com/define/peak-oil.html> >

2. Drosscapes - Alan Berger (2006) defines drosscapes as those landscapes which *“accumulate in the wake of the socio- and spatio-economic processes of deindustrialization, post-Fordism, and technological innovation”*.

3. Waste landscapes – this term does not refer to landscapes which are disposal sites for various kinds of wastes although these may form one category of waste landscapes. Waste landscapes are rather those landscapes which are not used to their maximum potential, they are wasted by not being used efficiently. Similar to drosscapes.

4. Urban poor  
The term urban poor is used in this dissertation to refer to the marginalised communities of people living below the poverty line in our cities. The urban poor refers most specifically to the homeless people living in the Steenovenspruit drosscape, but also includes the rest of Pretoria’s homeless community as well as people living in substandard housing conditions. The urban poor also face food security issues.

5. Palimpsest - 1: writing material (as a parchment or tablet) used one or more times after earlier writing has been erased , 2: something having usually diverse layers or aspects apparent beneath the surface (Merriam Webster: online)

# 2050

## Description of future scenario:

(adapted from David  
Holmgren's 'Four Scenarios' 2008)

**The year is 2050. Sixty one percent of the world's population live in an urban environment. Quality fossil fuel resources have gone into a rapid decline causing negative impacts on the global economy. Global warming is accelerating, causing many environmental, climatic and social crises.**

Previously affluent, urbanized areas which relied heavily on vast mechanised productive landscapes for food and other necessities such as coal, oil and other allied fossil fuels, which were predominantly transported over long distances by fuel powered vehicles, are worst affected by the decline in accessible fossil fuel resources.

This, as opposed to communities that took the initiative to save and record knowledge and cultural values, which are more able to support themselves and thus have a better chance of attaining a stabilised existence, than communities that did not take the initiative.

Progressive collapse is happening on a global scale, where small crises have a knock on effect with increasingly detrimental effects to economic and social structures. Local wars in highly populated areas contribute to an accelerated rate of social and economic collapse with warrior and gang cults having escalating influence over social organisation. Many areas are experiencing waves of famine and disease. Chaotic seasons negatively affect industrial

agricultural systems. Decreased food resources cannot be transported via road freight and many urban areas suffer from lack of food security.

Despite the fact that urban centres have been abandoned and have become dangerous, they are valuable resources of salvageable materials. On the outskirts of cities, areas that were previously suburban "havens" become clusters of villages.

Similar to historical civilisations; regions which have favourable access to energy and agricultural resources are able to support communities, reminiscent of the monasteries of the early Medieval period, which provided basic knowledge and skills to surrounding communities.

Communities capable of survival are developed when the retention of cultural knowledge of the past is combined with a moderately habitable environment. These modern day monasterial typologies are creating the opportunity for new civilisations to begin to emerge and build on at least some of the knowledge and lessons from previous civilisations.

*"If the knowledge of ecological processes and their creative manipulation using minimal resources are retained and developed in these Lifeboat communities, then survival and resurgence of a more than minimalist culture may allow global human population to be sustained at perhaps half, rather than one tenth, of current levels. More importantly it may be possible to embed the wisdom of the lessons learnt so that unconstrained human growth does not repeat such an intense cycle" (Holmgren 2008).*



# 2012

## Description of Current Scenario:

The year is 2012. Over 50 percent of the world's population live in urban environments. Although there are uncertainties about the specific details, it is evident that the world is facing the beginning of the 'Second Half of the Age of Oil'. Oil, as a critical commodity and fundamental resource in the modern economy, is heading into a decline. The scientific, academic and political communities are all discussing and advocating solutions to the impending crises of rapid climate change. However, while the world debates the precise date of peak oil and whether climate change is a reality, it is the urban poor of most cities who are living lifestyles prescient of a catastrophic oil poor future.

The urban poor do not rely on oil and electricity in the same way that the rest of urban society does, journeying most often by foot and building fires for warmth and cooking. They do not have access to clean, running water and many of the urban poor do not have any form of stable food resources. These marginalised communities are often exposed to the worst of the season's elements. There are large parts of urbanised areas that have been abandoned by the residents for which they were originally designed and are now home to marginalised peoples.

According to the Association for the Study of Peak Oil and Gas (ASPO 2008), the peak of oil discovery happened in the 1960's. In 1981 the world started using more than what was found in new fields and since then the gap between discovery and production has been ever widening, many countries have already passed their peak, which indicates that a global peak is imminent.

An equally serious issue to that of peaking oil production and its ramifications is the continuing expansion of urban areas. Open land, critical for agricultural expansion in order to support the growing urban population, is being devoured by the lateral expansion of the monster of suburbia. While the city as a whole expands into the 'productive landscape', the old city in many cases is becoming forgotten and run down and increasingly becoming severed from the newer, vast expanses of suburban land.

Most urban areas are fed by vast agricultural lands often situated far from the centres they support. Since the industrial revolution, farming has become mechanised and industrialised, relying almost completely on critical fuel resources.

Urban areas in many countries experience extreme levels of crime and are ruled by fear implemented by violent gangs.

In the forward of the Urban Development Series Knowledge Papers published by the World Bank (2010:v), the following is stated:

*"Climate change is affecting cities and their residents, especially the poor, and more severe impacts are expected as climate extremes and variability increase. Cities are often already overwhelmed by the number and complexity of services they need to provide. Adding climate change mitigation and adaptation to the other challenges facing cities is an enormous burden; and at the same time cities must accommodate another three million new residents every week."*

Climate change alone is causing major concern for the future of urban communities, the addition of peak oil and other complexities paint a dire picture of tense and inadequate living conditions for that future.



**Figure 1: Peak Oil Future.**

Depicting the scenario outlined in 2050, which is much like the one lived by Pretoria's urban poor. (Author:2012)

*For a full understanding of the dissertation and the theory surrounding the proposal, both Part One and Part Two need to be read in conjunction as Part One highlights the increasing rationalisation of landscape approaches to place, while Part Two reveals a process of place which celebrates the emergence of places through human interaction as a more poetic response to the landscapes against which our everyday lives play out.*

**Figure 2: Initial drawing of the Conservancy.**

Depicting a return to agrarian land use with clear movement patterns and places of significance at their intersections.  
(Author:2012)

# Vision

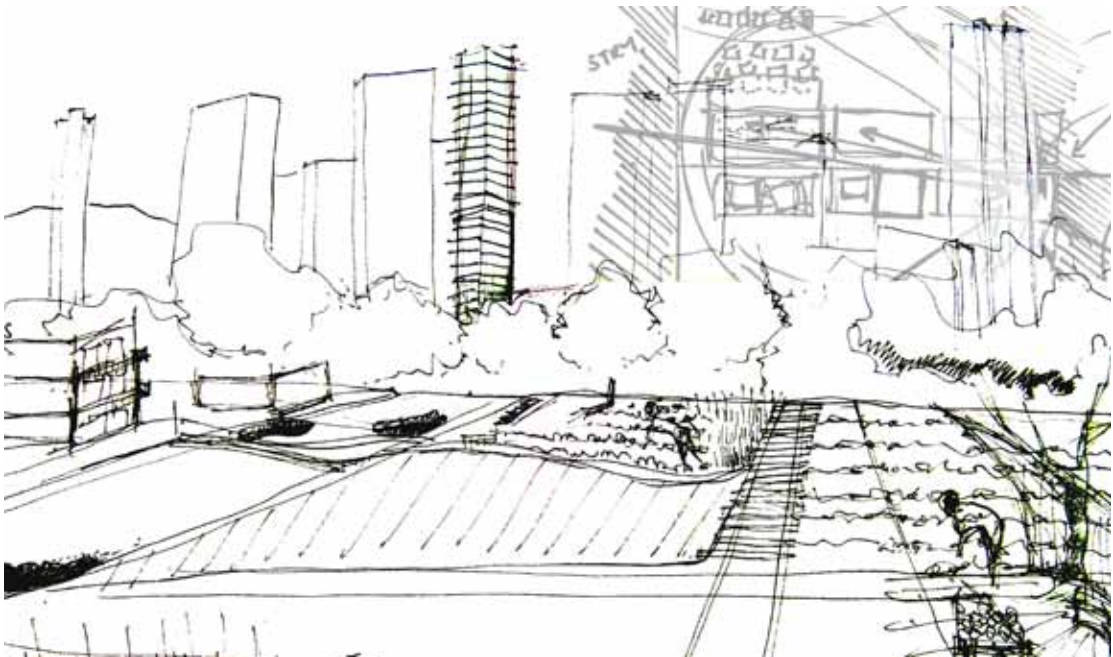
**Many urban poor are already living lifestyles prescient of the future described by Holmgren (2008) and other scientists.**

The cities of Johannesburg and Pretoria are merging into one immense urban area connected by intricate yet heavily congested vehicular networks which much like the vast industrial-agricultural lands on the cities boundaries, rely heavily on oil resources. The growing population, unsustainable development and vehicular roads puts an increasing strain on the city's ability to sustain its residents as well as nature's ability to sustain human beings as a species.

**Thus it is the aim of this dissertation to propose a new typology for urban living. An area south**

can ingrain in the modern industrial city a place with which the inhabitants can identify, where form does not only follow function but also enhances and expresses the celebration of man's working relationship with the land, as well as celebrating the historic traces evident on the landscape.

A palimpsest emerges out of the faint residue of past uses, displaying traces of the character the site once had. The dissertation proposes that by capturing the essence of these past layers of productive use and further enriching the palimpsest by introducing traces of farming and gardens, meaning and experiential use of the land will be returned to the people of Marabastad.



**of Marabastad, in the north-western quadrant of the city of Pretoria is selected as the wasted landscape for testing the hypothesis that a drosscape has the potential to be designed and developed into an agrarian conservancy to support a society in need of sustainable, innovative places.**

*Part One* of the dissertation investigates agriculture as a method for returning the site to some utilitarian efficiency. However, landscapes are more than functioning tracts of land with no meaning.

Thus *Part Two* of the dissertation investigates the fact that a creative approach to the implementation of city farming in the Steenovenspruit drosscape

A conservancy is proposed for the Steenovenspruit drosscape which combines the concept of palimpsest and the poetic nature of farming across a number of city blocks, connecting Marabastad and the CBD. The conservancy encapsulates a variety of land uses including residential and gathering traces, however the core of the conservancy centres around a historical city block which formed part of the old Pretoria townlands and which morphs once again into productive landscape.



**Figure 3: North western quadrant, Pretoria.**

Degraded landscape, home to many urban poor, which is the study area for the dissertation.

(Author: 2012)

5

**Figure 4: Vision**

Initial sketch of the ConservanCITY concept.

(Author: 2012)



*The ConservanCITY*

*investigated in the*



*Steenovenspruit drosscape*

*Theory*

*The working landscape* required an investigation of

*Typologies and traces*

*Place as process*

*Emergence of palimpsest*

*Palimpsest of traces*

*City Farming as new trace*

*Refounding*

*Steenovenspruit Agrarian Conservancy*

*Rational agriculture*

*Farming strategies*

*However*

*Place remains in limbo*

*Farming expressed in the working landscape*

**Figure 5: Methodology**

The parallel responses of both the rational and poetic approaches to the Steenovenspruit Agrarian Conservancy. (Author: 2012)

**Figure 6: Initial collage of the Conservancy.**

Depicting a return to agrarian land use..

(Author: 2012)







# Part One: Taking Root



# Chapter 1

## 1.1 Introduction

Much like the dire living conditions described in a future of peak oil and rapid climate change, where fossil fuels, running water and readily available food resources are scarce, the urban poor in the city of Pretoria are already experiencing many difficulties. Pretoria is not designed in such a way that it can support a lifestyle contrary to the current “modern”, fossil fuel based way of life, and the plight of the current urban poor, in the existing urban environment, is not being addressed adequately.

An alternative approach to living in the modern era is becoming increasingly necessary in light of the burgeoning crises of diminished resources of oil and water, and the rapidly increasing global warming phenomenon.

Individuals across the globe have made a decision to adopt an earth stewardship attitude, designing their homes to be more environmentally sound, growing their own vegetables and recycling their urban waste as much as possible. However, while these initiatives are positive in order for this movement to have a meaningful effect, it needs considerably more buy-in and understanding to happen on a viable scale. In many parts of the world agricultural communities such as the ‘kibbutz’ in Israel have a smaller carbon foot print and environmental impact than cities. Positive advancements have been made in implementing these kinds of communal, agrarian solutions in cities. However, it is imperative that the urban agriculture movement gains momentum in order to have a noticeable effect on people’s lives.

## 1.2 Problem Identification

On a global scale, man is heavily reliant on mechanised, industrial systems, such as industrial-agriculture which is successful at present, but may spell imminent danger in a future that includes heavily diminished oil resources. A loss of mechanised systems would result in a lack of food and running water as well as impact on other basic services and infrastructure in which the urban dweller so eagerly puts his trust.

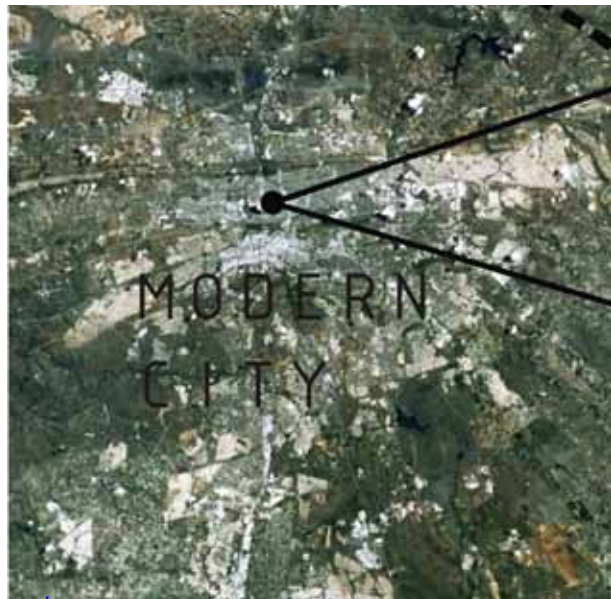
While industrial agriculture and suburban development wage war over open, sometimes pristine land, parts of the existing city are abandoned and left to decay, transforming them into urban wastelands which no longer meet man's needs and become progressively alien to the surrounding urban context. These pieces of land are underutilised and contribute little to the urban or ecological context.

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### Figure 7: Kibbutz Samar

Experimental solar turbine focuser. The kibbutz experiments with alternative ways of generating energy.

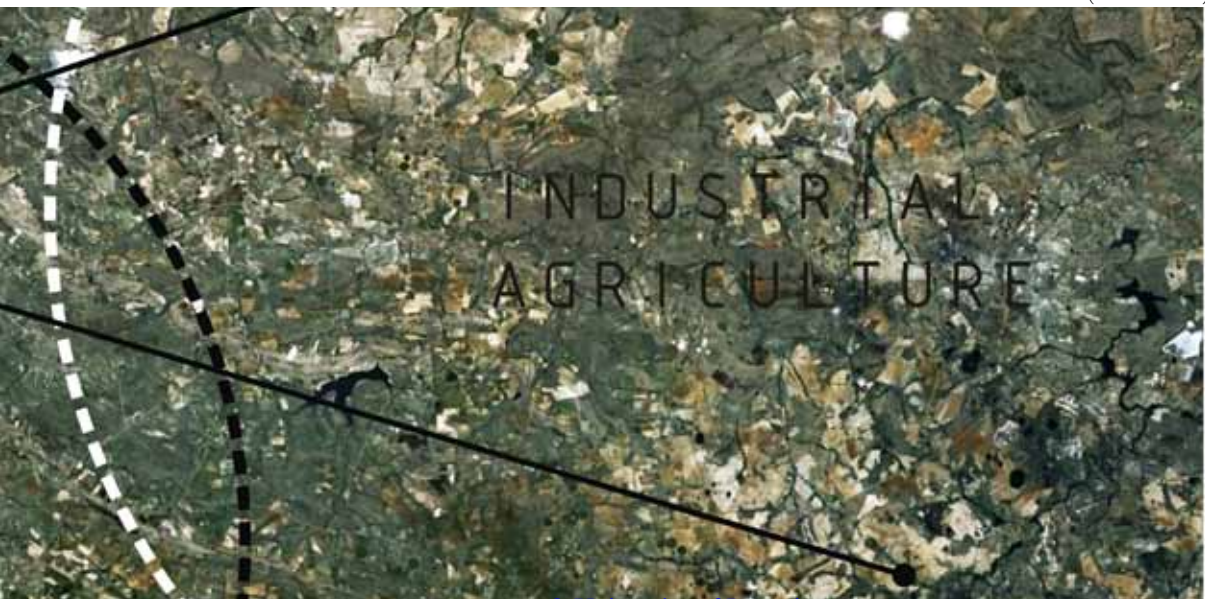
(Bang: 2005)





**Figure 8: Home(less)**  
Marginalised Urban Poor make their homes in the old entrance to Kruger Park residential high-rise  
(Author: 2012)

**Figure 9: Dichotomy**  
The modern city and industrial lands which support it are no longer integrated. Fresh produce is transported over vast distances to feed urban dwellers.  
(Author: 2012)



## 1.3 Hypothesis

Urban wastelands on the periphery of the Pretoria CBD have the potential to be designed and developed into agrarian conservancies to support a society in need of sustainable, innovative places that will withstand a peak oil crisis resulting in diminished oil resources and other fossil fuels.

Emerging throughout the city is a relationship between the forgotten people of the city and the forgotten landscapes. These wastelands on the periphery of the CBD of Pretoria attract the marginalised urban poor because they do not have to battle with the rest of society over space.

It is in this relationship that the inklings of a solution begin to occur where the needs of the urban poor can be met so that they are no longer reliant on an oil-driven, mechanistic, materialistic environment, but rather within a forgotten urban wasteland, already alienated in the modern context, but which is ripe for redevelopment.

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Although these wastelands contribute nothing, or very little to their urban context, it is imperative that they are conserved as land for a truly post-modern, sustainable way of life.

## 1.4 Design Question

An exploration of agriculture in an urban context will establish which elements of urban agriculture require a design response.

## 1.5 Technical Question

Does the chosen site possess the environmental potential to support sustainable farming and food production in an urban environment? *This question refers most specifically to the availability and requirements pertaining to water.*

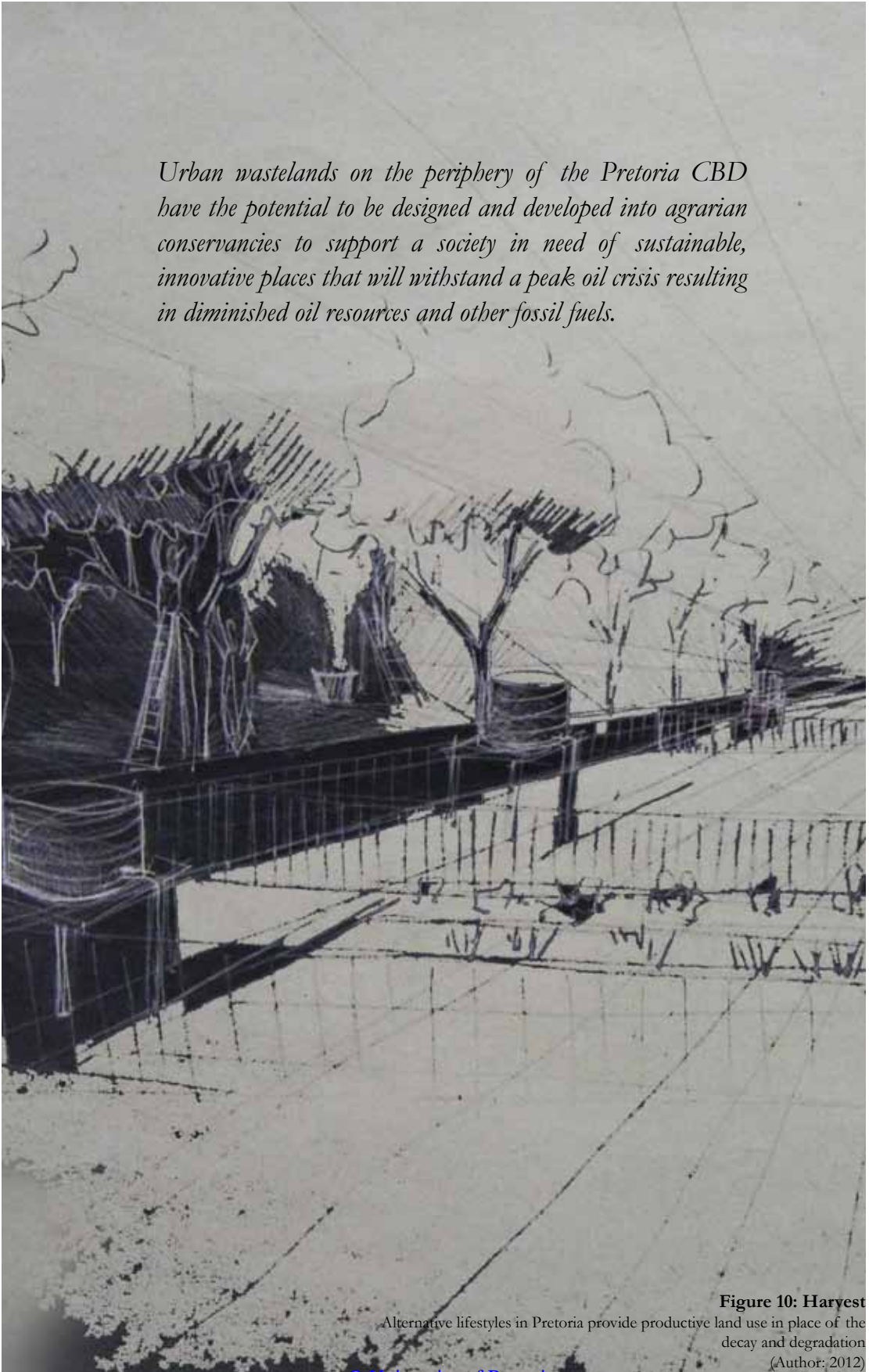
## 1.6 Client and User Identification

The development of the urban agrarian conservancy is aimed at the current urban poor, until such time that it becomes necessary to support a greater number of Pretoria residents in a future of peak oil and rapid climate change. The intervention will impact on, and improve, the urban environment for the current users, which are comprised of the

marginalised urban poor, the inner city residents and temporary users.

The client for this project is a farming co-operative, formed by the current urban poor, supported initially by an NGO which aims to improve the lifestyles of the urban poor in the City of Pretoria.

*Urban wastelands on the periphery of the Pretoria CBD have the potential to be designed and developed into agrarian conservancies to support a society in need of sustainable, innovative places that will withstand a peak oil crisis resulting in diminished oil resources and other fossil fuels.*



**Figure 10: Harvest**

Alternative lifestyles in Pretoria provide productive land use in place of the decay and degradation  
(Author; 2012)

## 1.7 Site Selection

There are many underutilised open spaces throughout the city of Pretoria that have the potential to become agrarian conservancies. In order to select a site to further investigate the concept of agrarian conservancies within the city a set of criteria was selected. Although these criteria are not exhaustive, they cover some of the most basic necessities for setting up an agricultural project within the city. Space and water supply are two of the most important criterions that need to be taken into consideration. An area of 2.5 hectares or more, allows for a large enough study area, and enough land to be cultivated in order to make a positive impact on a community. Water is essential to any agricultural endeavour. While it is possible to harvest water in various ways, the watercourses of Pretoria transport a great deal of storm water run-off that no longer seeps into the ground due to impermeable surfaces and therefore presents opportunities for water harvesting.

An urban conservancy within close proximity to a water course would be able to make use of this resource. Residential areas in close proximity to urban agriculture ensure a safer environment, with passive surveillance happening naturally. A residential area also ensures direct beneficiaries of a food production scheme.

Most of the vacant land outside of conservation areas does not contribute positively to the social or ecological functioning of the city, but presents a major opportunity for landscape intervention. Surrounding infrastructure such as markets and experimental farms add a supportive layer to the establishment of farming initiatives in the city with economic and educational benefits. Having a labour force is just as important as the large open areas and water resources, and although the residential component would be expected to be a source of potential labour, where this is lacking, other sources of labour would be necessary. Although urban agriculture can work in more affluent areas, the scope of this project encompasses Pretoria's current urban poor, because their lifestyles are most prescient of what society's future might be like in a truly post-industrial world no longer reliant on oil. The scope of this project also necessitates an inner city type urban environment; the closer an open space is to the CBD, the more thoroughly the hypothesis can be tested to understand whether urban agriculture can be integrated into an urban context.

- A* Annlin Drosscape
- B* Rietondale  
Experimental Farm
- C* N4 / N1 Interchange  
wastelands
- D* Groenkloof 358 - JR
- E* Groenkloof 358 - JR
- F* Salvokop Drosscape
- G* Steenovenspruit Dross-  
cape
- H* Skinnerspruit  
Drosscape East
- I* Pretoria North Dross-  
cape
- J* Skinnerspruit  
Drosscape West
- K* Kirkney Drosscape East
- L* Kirkney Drosscape  
West
- M* Kirkney Drosscape  
North

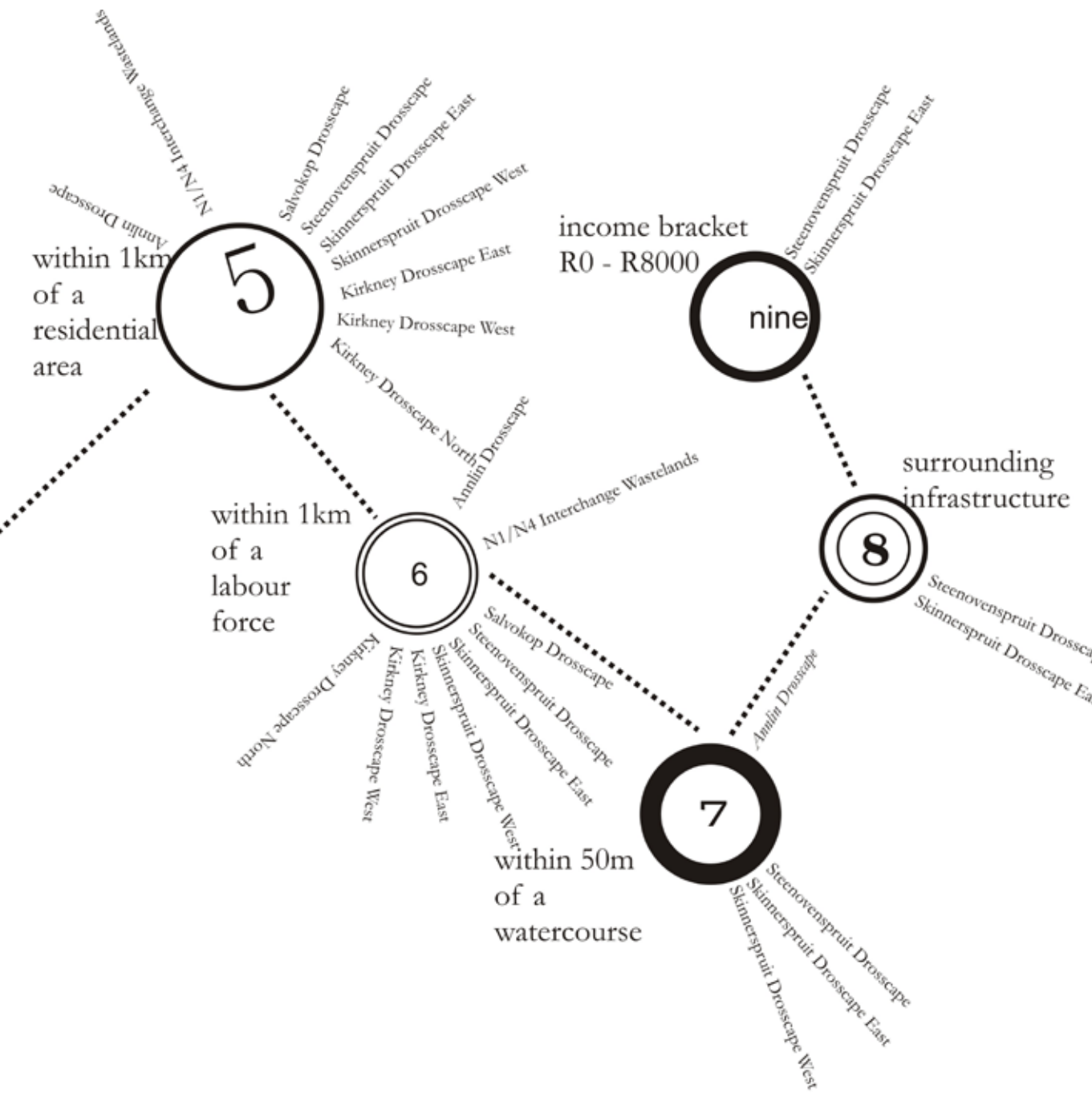
**Figure 11: Wasted landscape**

Sites occur throughout the city that are laying waste, but which have potential to become urban conservancies.  
(Author: 2012)





**Figure 12: Site Selection**  
Sites are selected according to a set of 9 criteria  
(Author: 2012)



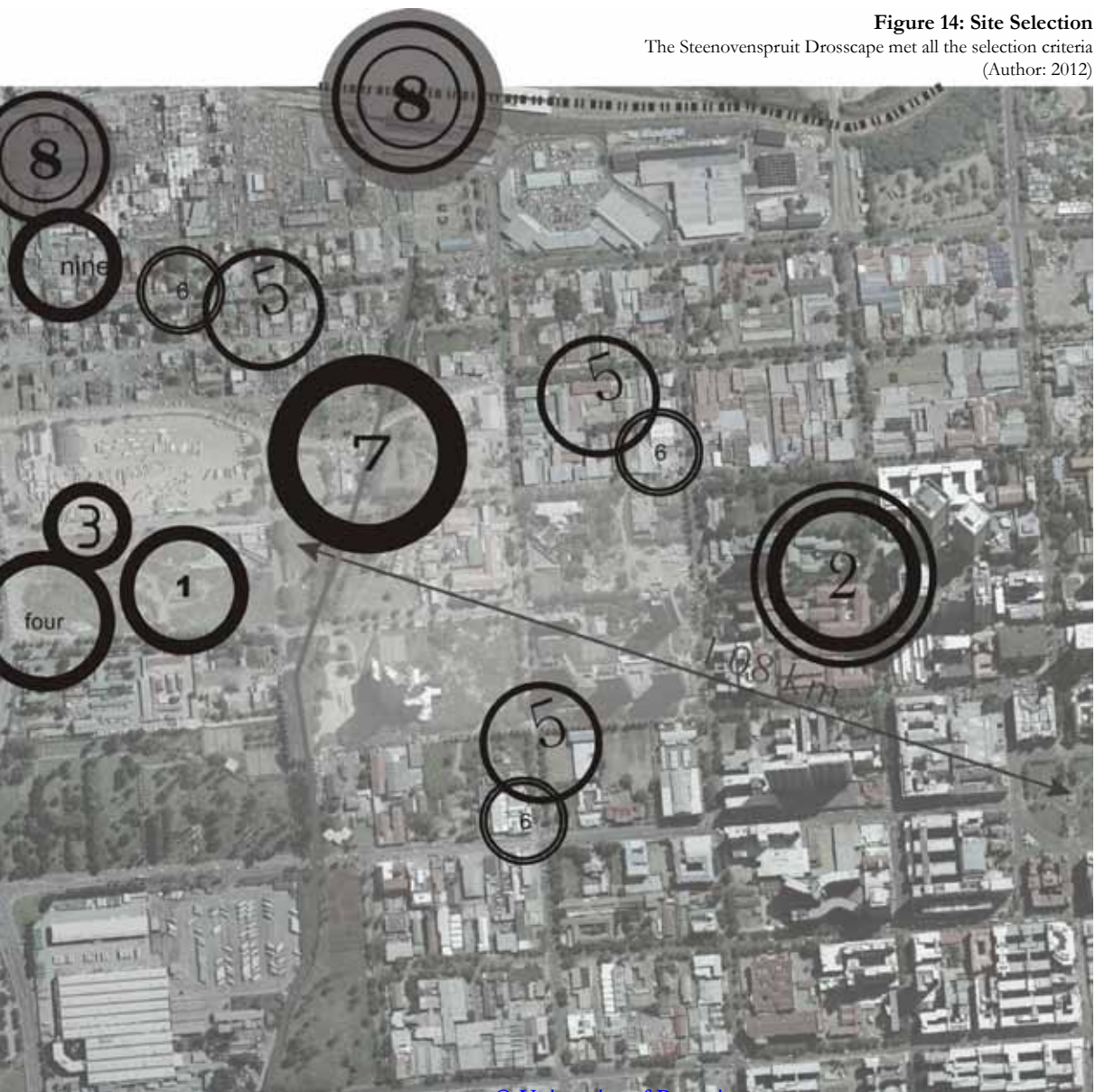
All of the identified “vacant” landscapes except for those identified in Groenkloof, within a conservation area, have the potential to become agrarian conservancies. However sites G and H, the Steenovenspruit Drosscape and Skinnerspruit east Drosscape respectively, fulfil all the requirements. They therefore present an ideal opportunity for testing the hypothesis. The Steenovenspruit was selected due to its proximity to the CBD as a means of fully testing the relationship between a dense urban environment and an agricultural intervention. A large number of urban poor were also observed in the Steenovenspruit drosscape strengthening the argument for an alternative development in the area, as these men and women’s lifestyles most clearly depict the worst case scenario of a lifestyle where little to no fossil fuel resources are available.

**Figure 13: Existing Agriculture Practices**

A vegetable tunnel was noted on the western edge of the self help centre on the corner of Proes and DF Malan Streets

(Author: 2012)





**Figure 14: Site Selection**  
The Steenovenspruit Drosscape met all the selection criteria  
(Author: 2012)



The CBD to the east of the site forms a backdrop of high rise buildings.

Kruger Park and Schubart Park occur on the CBD boundary, both are empty and falling into decay

Ruins occur on the north eastern corner of the site.

Driving schools occur on the eastern edge of the site and cause further compaction of the soils



The site is bordered by Jacaranda trees. No pavement occurs on the edges

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**Figure 15: Steenovenspruit drosscape, view across site**  
Panoramic view of the central vacant block within the drosscape  
(Author: 2012)

**Figure 16: Steenovenspruit drosscape**  
View from central block towards Marabastad  
(Author: 2012)



**Figure 17: Steenovenspruit drosscape, view towards the city**

Many high rise buildings form the backdrop of the city. The site lies bare after a proposal for more high rise residential buildings was never realised. (Author: 2012)

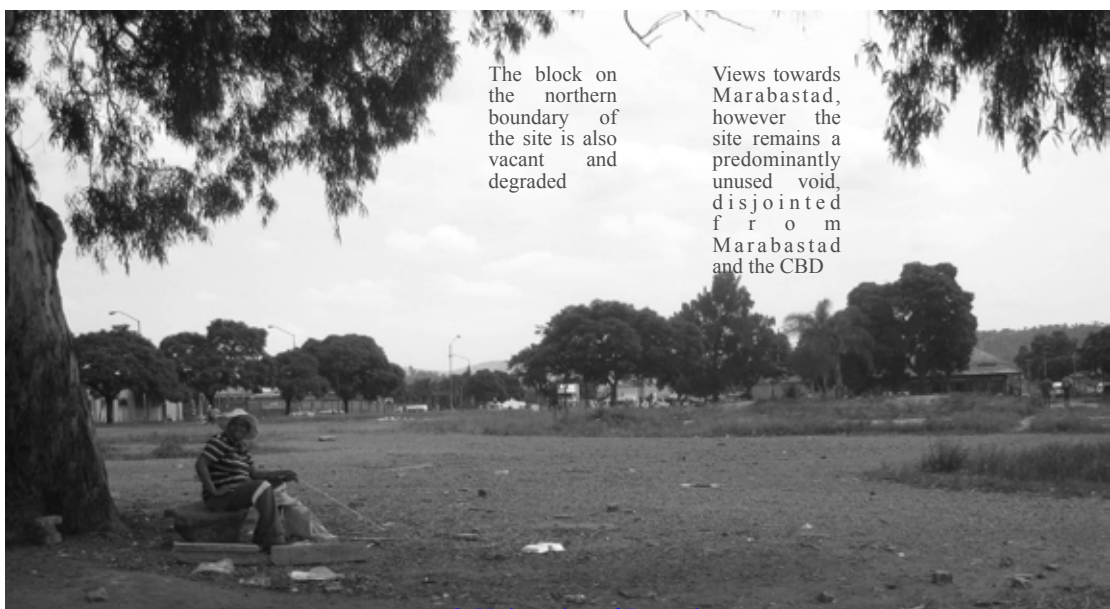


Compacted earth covers the site upon which the old town workshops, stables and compounds used to occur

Pretoria is transected by ridges to both the north and the south of the CBD

Pretoria's old jailhouse which has been transformed into a skill's training centre. The old brick building is indicative of the building materials used in the area.

The department of Home Affairs attracts many people to the western corner of the site during the week.



The block on the northern boundary of the site is also vacant and degraded

Views towards Marabastad, however the site remains a predominantly unused void, disjointed from Marabastad and the CBD



# Chapter 2 : Analysis

## 2.1 Introduction

The Steenovenspruit Drosscape is in close proximity to the Central Business District of Pretoria and the transport hub of Belle Ombre Station in Marabastad. This proximity provides an opportunity for effecting a positive change in the lives of the urban poor living west of the CBD, and creating greater potential for exposure so that even those who do not engage directly with the conservancy, but simply travel through the precinct will still experience an alternative way of life and an improved urban environment.

The Steenovenspruit drosscape falls within a network of open spaces which are currently degraded, but have the potential to provide ecological functions necessary in any environment.

Fresh produce vendors in the city of Pretoria strengthen the demand for fresh produce in the city. Both the Tshwane Fresh Produce Market (hereafter referred to as the Tshwane Market) and the surrounding vendors could support and benefit from an agricultural intervention in the city. In a meeting with Mr. Tinus Dodds from the market it was indicated that the market takes a keen interest in supporting small and upcoming farmers and farming initiatives.

## 2.2 Social Potential for an Agricultural Intervention

Agriculture is an inherently tellurian product. Social potential has a parallel significance to environmental potential, and must be analysed in order to determine the possibility of establishing agriculture in any locale. As such, the area west of the CBD was analysed in terms of its social potential. The informal interviews summarised below were undertaken with vendors and Mr. Dodds of the market in order to identify patterns, trends and networks taking place in the precinct. While these interviews are by no means conclusive, they help to establish assumptions and parameters for testing the hypothesis that urban agriculture can be successful in an urban context.

### 2.2.1 Interviews with vendors along Proes street

Please refer to Appendix A for the tabulated results of the interviews.

A number of the vendors interviewed along Proes Street confirmed that they share transport and storage facilities with other vendors, indicating an informal trader network within the city. The network supports and interacts with other networks, such as the cardboard and paper collectors who traverse the city collecting materials for recycling.

The fresh fruit and vegetable vendors of the inner city have created a niche for themselves, where they have cultivated a mutual relationship with corner supermarkets. Vendors on the pavement sell fresh produce while the supermarkets along Proes Street all sell the basic staples and meat. Vendors cause pedestrians to pause along the pavement, often outside of supermarkets which creates an economic microcosm between the vendors and the more formal retailers.

The wasted/expired fresh produce poses a problem for vendors who do not have the correct facilities to dispose of this organic waste. A valuable economic and sustainable asset for composting is also lost via the current practices of throwing waste away.

One of the vendors was very forthcoming about his attempts to make a better life in Gauteng. Tsepo is a 25 year old African male currently living in Soshanguve where he pays R350 rent per month. He travels into the CBD daily at a cost of R600 per month. The combined cost is still less than R1200

monthly rental cost that he would be expected to pay if he were living in the CBD of Pretoria. Despite having studied subjects including agriculture, life sciences and geography at school in Mpumalanga, he has had no opportunity to use these skills in the place he came to seek opportunity. Tsepo expressed his frustration at not being able to use his skills in order to better his own quality of life as well as the lives of his dependants.

### 2.2.2 Tshwane Fresh Produce Market

The Tshwane Market was visited in order to better understand the context of the Steenovenspruit drosscape.

The Tshwane Market supports small and upcoming farmers and is also the main proponent of the Rooiwal Farming urban agriculture scheme which consists of 4Ha of land farmed by a consortium of people.

Informal Trade is extremely important to the Fresh Produce Market as 35 % of the market's turn over comes from Traders.

Both large scale and small scale clients purchase produce daily, with peak numbers averaging at 6500 buyers on Tuesday and Thursdays. Approximately 1000 of these buyers are informal traders.

Taxies and bakkies transport to the city, townships and stations. Local vendors transport the fresh produce with private trollies or boxes and buckets into the city.

The Tshwane Market receives seasonal produce from thousands suppliers of which nearly 30% are small and upcoming businesses. Most of these suppliers grow their produce in other provinces, including KZN, Mpumalanga and the Free State. Other produce comes from all over the country.

International suppliers include: Mozambique and Israel which supply Bananas; and New Zealand and China which supply kiwis and garlic respectively. Buyers that purchase from the Market transport the produce as far as Limpopo within the country, still more buyers are involved in exporting their purchases to other SADC countries.

All of the above information indicates a large network centred around fresh produce, on a local, national and international scale. Along with farming practices, the networks of production and produce are integral to the functioning of a healthy global and local community.



**Figure 18: Tshwane market**

Vendors purchase produce for the day before moving into the city to sell (Author: 2012).



**Figure 19: Transport**

Vegetables are transported by vendors on trolleys adapted for this use (Author: 2012)



**Figure 20: Transport** Vegetables are transported by vendors on trolleys adapted for this use (Author: 2012)



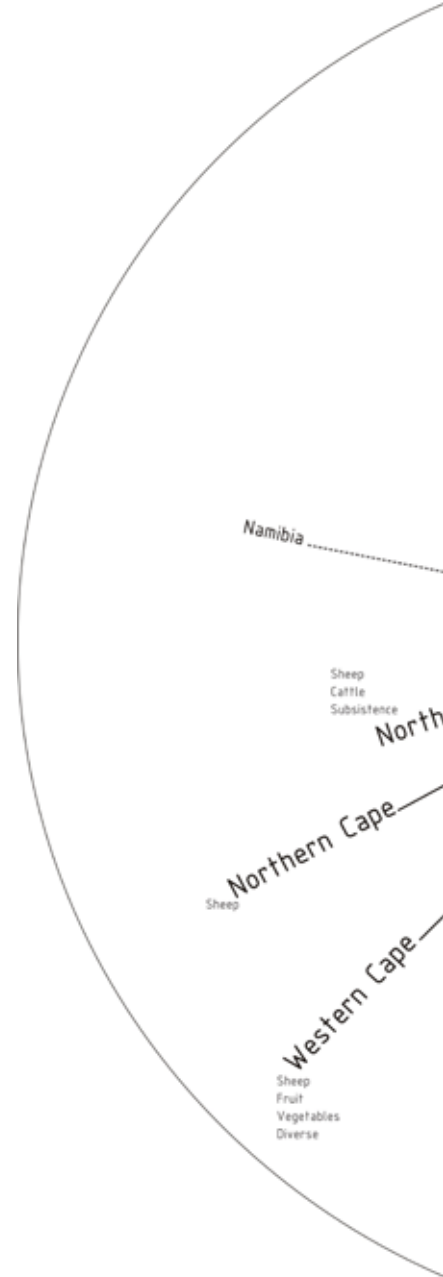
**Figure 21: Retail corner**

Retail corners, especially supermarkets form a mutual relationship with vendors (Author: 2012)

### 2.2.3 Conclusions

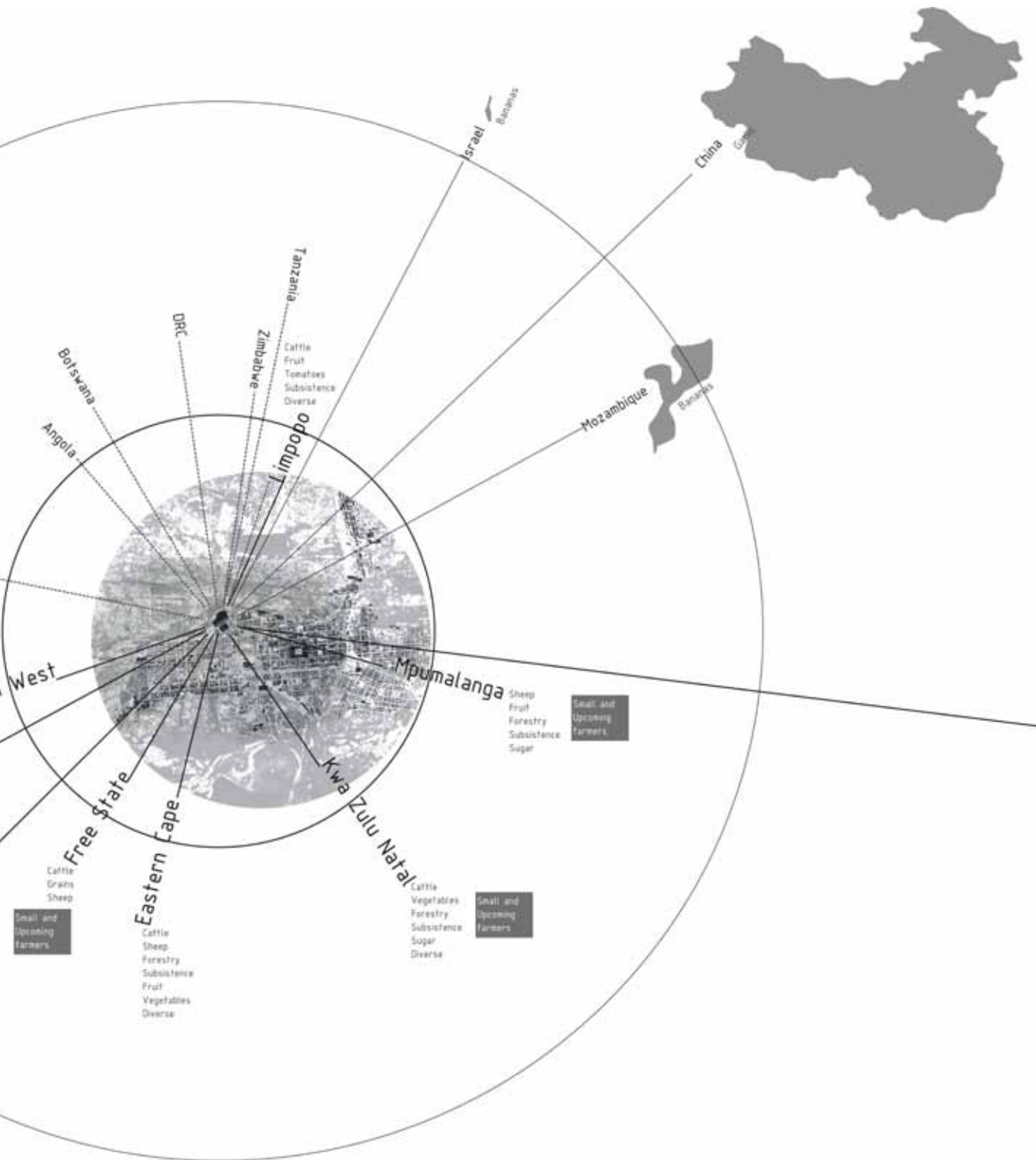
The informal interviews conducted above indicate a wide network of interaction around agriculture and fresh produce, including interactions with the recycling networks. Opportunities for recycling arise out of the current practices of throwing away organic waste when it no longer has value for consumption. This waste is a valuable resource for making compost.

While the dissertation explores ways to improve the lives of the urban poor *in* the Steenovenspruit drosscape, men and woman living outside the CBD, such as Tsepo, may also begin to benefit from an alternative lifestyle in the future.



**Figure 22: Networks**

The Tshwane Fresh Produce Market is part of a global network. Agriculture forms important social bonds (Author: 2012)



## 2.3 Environmental and Agricultural Potential:

Agriculture and the success thereof is fundamentally reliant on a few vital elements. Agriculture can either fail or thrive depending on the climate, soils, terrain, vegetation and the availability of water. As such, it is necessary to gain a comprehensive understanding of an area in order to establish the potential that the environment has for the cultivation of produce for human consumption.

### 2.3.1 Ideal requirements for farming

#### 2.3.1.1 Soils and Terrain

The best soils for agriculture are loamy soils with a 15–35% clay content, which allows for good water infiltration rates. A high organic content is desirable as this affects the fertility of the soils, and a neutral pH is generally most acceptable. However specific vegetables have various pH requirements. According to the Farming Handbook (2006:130) the effective depth of the soil is the depth to which roots can penetrate the soil, the minimum soil depths for irrigated crops is 450mm, provided that the water table is below 1m.

The ideal terrain for agriculture is gently sloping land with enough fall for irrigation to take place. However, if the slope is too steep soil and nutrients will be lost in flood situations. A steep slope is considered to be greater than 12%, a moderate slope falls within the range of 5–12% and a gentle slope is less than 5%.

#### 2.3.1.2 Rainfall and Climate

According to the Farming Handbook (2006:5) a minimum of 500mm rainfall per annum is required for crop production. However high rainfall areas where floods are prevalent pose their own problems, as diseases and physical damage to crops can occur. The ideal climatic conditions for farming include low frost conditions and gradual temperature extremes. Cool season crops can deal with an average minimum of between 6 and 7 °C and a maximum of 25 °C. Warm season crops vary between minimum temperatures of 10 to 18°C and maximum temperatures of between 27 and 35°C. Most vegetables need an average of 6 hours of daylight per day.

#### 2.3.1.3 Biodiversity

Biodiversity refers to all species of plants animals and micro-organisms existing and interacting within an ecosystem (Vandemeer & Perfecto 1995). In

order for organic agriculture to be successful, a holistic view of the context within which agriculture takes place needs to be adopted. An increased biodiversity index contributes towards: nutrient and waste recycling, pollination by insects, sediment control, purifying water, natural regulation of pests by birds and other insects, and more fertile soils.

## 2.4 Broad Scale Characteristics

According to the AGIS Comprehensive Atlas Gauteng is mapped as a diverse agricultural region. It is thus assumed that if there was no urban development the region would be able to support a variety of farming types due to its climate, soils and terrain. The area has a land capability of Moderate Potential Arable Land.

Pretoria falls within a summer rainfall region which has a mean annual precipitation of 600–800mm, 75 –100% of this rainfall occurs between October and March (Smith 2006:5). Frost occurs within Pretoria on 61 to 90 days of the year and hail occurs between 3 and 5 times in a year. The mean annual evaporation for the region varies between 1600mm and 1800mm per year. The region receives up to 80 % of the average 12 hours of daylight per day, which may be as much as 9.6 hours.

Pretoria is built on a landscape of level plains with some relief in the form of parallel ridges. The Generalised Soil Patterns of the area are Pt1, Red, Yellow and or greyish soils with high base status. Natural soil pH is supposed to fall between 5.5–6.4. The soils have structure somewhat favourable to arable land use if climate permits.

In the Environmental Potential Atlas for Gauteng (2000), the area has a clay content of between 15% and 35%, which gives it a loamy texture and along with slope affects the infiltration of water on the site. Pretoria has a soil depth of between 450mm and 750mm.

As an environment Pretoria has been highly modified over time, streams have been channelised and vegetation has been removed. Geographically speaking, the area is located within the Acock's Veld Type Group of False Grassveld and the Mucina and Rutherford classification of Marikana Thornveld. However there is very little evidence of either vegetation type across the city.

In order to establish whether farming can take place in the Steenovenspruit drosscape the elements of water and climate, soils and terrain, and biodiversity, need to be considered in more detail.



## 2.5 Site Specific Characteristics

### 2.5.1 Water availability and climate

The Farming Handbook (2006:129) states that supplementary irrigation has an important role to play in agriculture, even in extremely humid areas.

The site falls within a relatively good rainfall area, however due to the urban condition within which the site exists most of this water is channelled into the the Steenovenspruit stormwater system. According to the Roads and Storm water Division of the City of Tshwane Municipality the Steenovenspruit area has a catchment of 4.22km<sup>2</sup>. A great portion of this land is covered in impermeable materials, which creates a large amount of stormwater run off. An average run off co-efficient of 0.85 was used to calculate the amount of stormwater. A total area of 4220000m<sup>2</sup> generates an approximate 3587000m<sup>3</sup> of stormwater runoff a year. However, all of this water is transported into the stormwater system and is nearly impossible to tap into in an urban environment. This condition is made worse by the position of the site on the very edge of the catchment, on a gentle “ridge” which makes it even more difficult to tap into the stormwater runoff. Capturing water higher in the catchment, storing and transporting this water is almost impossible due to the current urban layout and the cemetery south of the site.

3 3

#### Monthly Precipitation in m

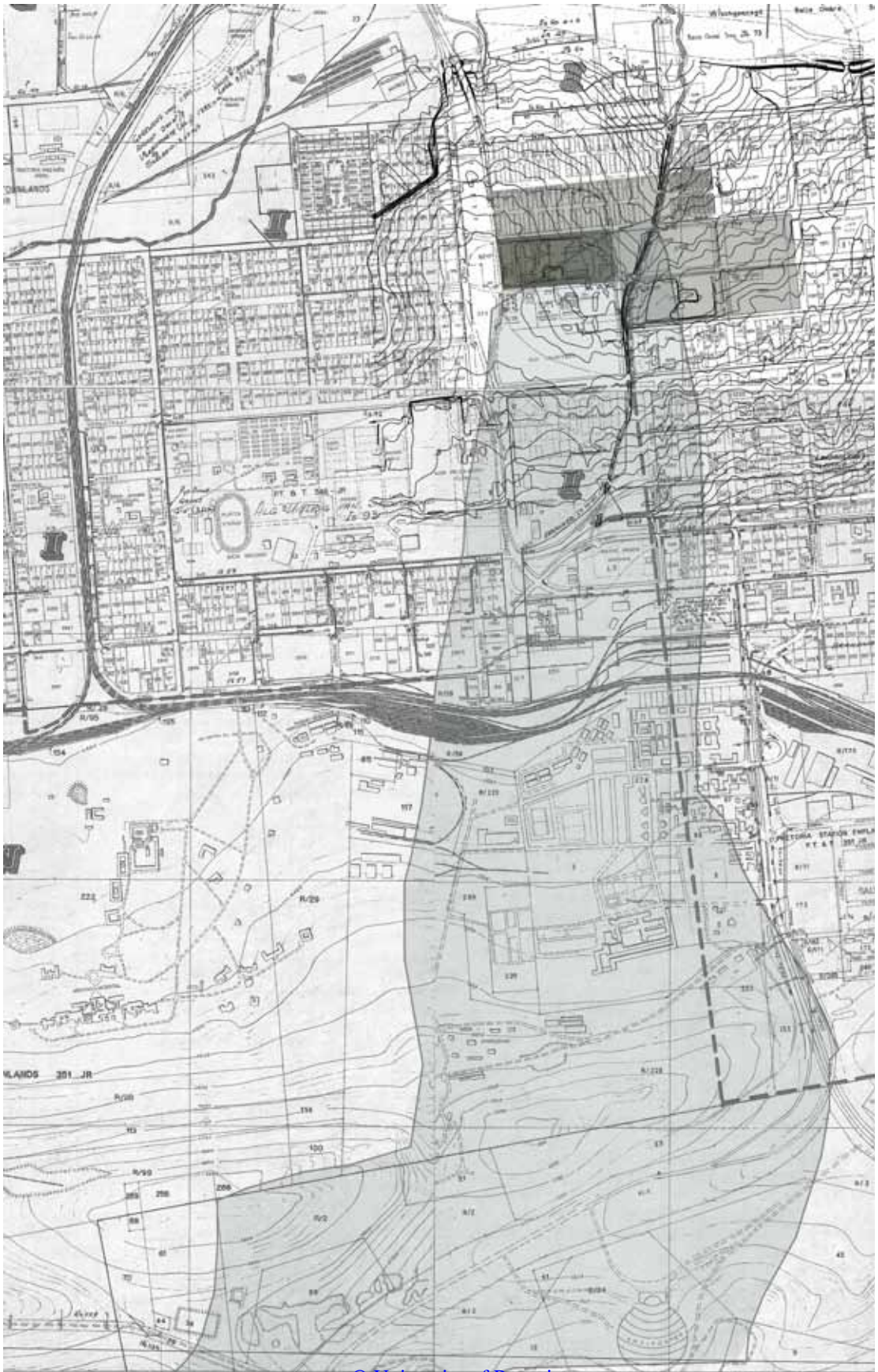
January	0.136	July	0.003
February	0.075	August	0.006
March	0.082	September	0.022
April	0.051	October	0.071
May	0.013	November	0.098
June	0.007	December	0.11

The Steenovenspruit that runs through the site has a potential constant resource of 0.264m<sup>3</sup>/s that can be tapped into (this base flow increases considerably during periods of rainfall). A pumping system will allow for a percentage of this water to be transported uphill into a storage facility to support an irrigation system.

Storm water in an urban environment is compromised in terms of water quality and should not be used directly for human consumption or irrigation. Solid as well as chemical pollution would be a problem in an urban environment such as this one.

#### Figure 27: Catchment

The Steenovenspruit has a large catchment area, however all stormwater is channelled into an engineered stormwater system (Roads and Stormwater Division, City of Tshwane)



35





**Figure 28: Watercourses in the CBD of Pretoria**  
The Steenovenspruit occurs on the west of the CBD and is a tributary of the Apes River (Author: 2012. Figure ground background: Pienaar 2007)

## 2.5.2 Soils and Terrain

The red and yellow soils evident on the site would normally indicate well drained to moderately drained soils, which are ideal for farming (refer to figure 33 below). However, after analysis of the site it is apparent that the deserted blocks are so compacted and degraded that the soils have very little potential for the cultivation of vegetable crops.

The terrain of the site is more conducive to agriculture with an average slope across the site of 1.5% which makes it a gentle slope.

## 2.5.3 Biodiversity

The site currently has no indigenous vegetation besides some veld grass and is covered for the most part by weeds and exotic plant species planted in years past. The vegetation is low growing with very few trees besides the street trees. The only fauna visible on site is avi-fauna, including hadedas and pigeons. Although not visible at the time of the site visits, the amount of litter pollution and human waste on site indicates the possibility of rats and other scavengers. Thus it can be concluded that there is little to no value in the current biodiversity of the site.

From figure 32 below it is apparent that the combined open spaces within the CBD of Pretoria, along with an agrarian conservancy would contribute to a healthy open space framework providing ecological and social benefits for the surrounding communities.



**Figure 29: Soil quality**

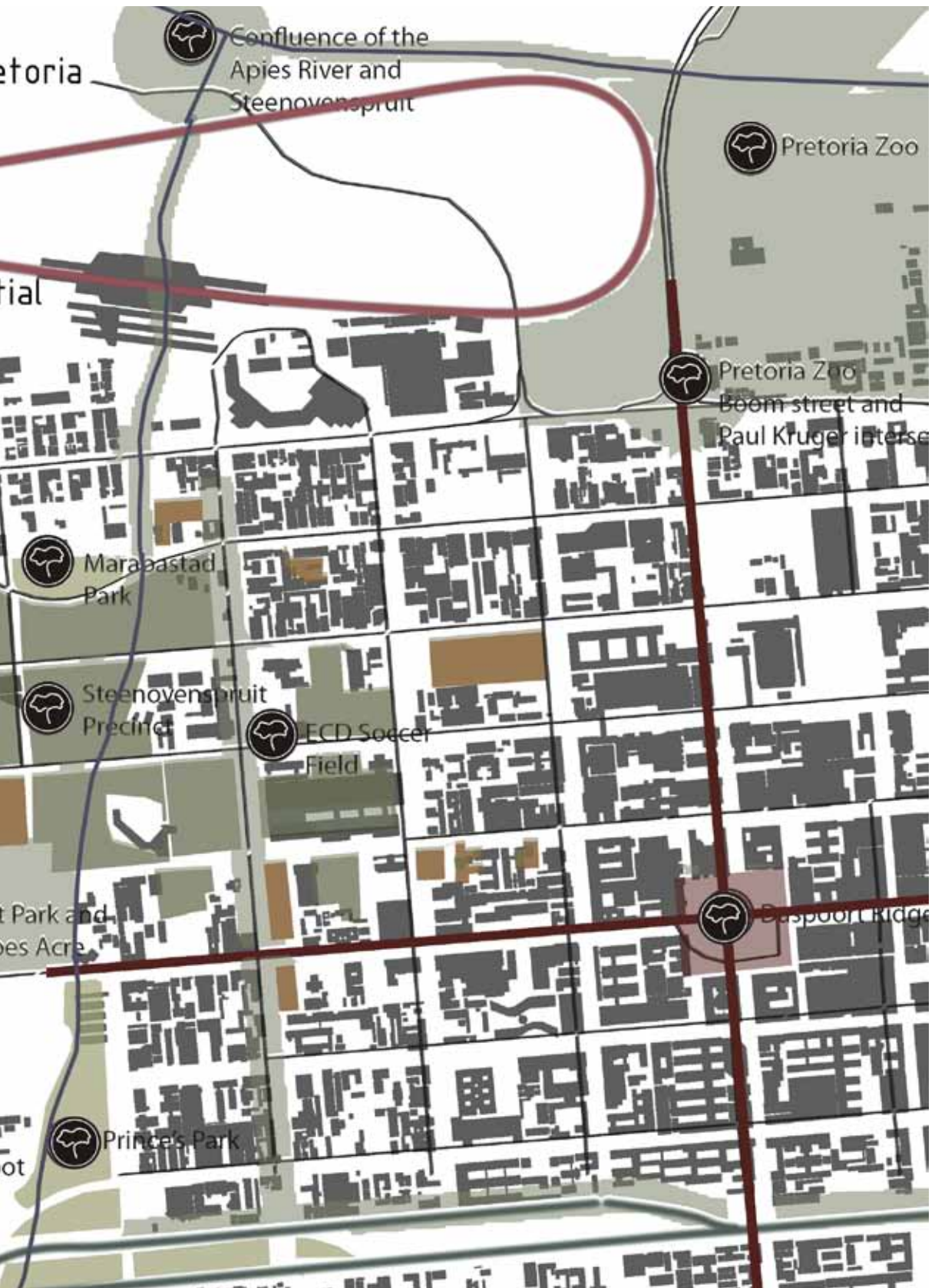
The soils in the area are highly compacted and compromised with pollution and hydro-carbon infiltration (Author: 2012)

**Figure 30: Fauna**

Only avi-fauna was noted on site. Species included pigeons and hadedas (Author: 2012)











**Figure 31: Open Space Network**

The open space network for the west of Pretoria includes degraded sites with potential, existing parks and hard open spaces (Author: 2012. Figure ground background: Pienaar 2007)

SOILS AND  
TERRAIN

WATER AND  
CLIMATE







loamy 15 - 35%		minimum 500mm
high organic content		low levels of frost
neutral pH		gradual temperature changes
soil depth minimum 450mm		average of 6hrs sunlight per day
gently sloping <5%		water source in close proximity

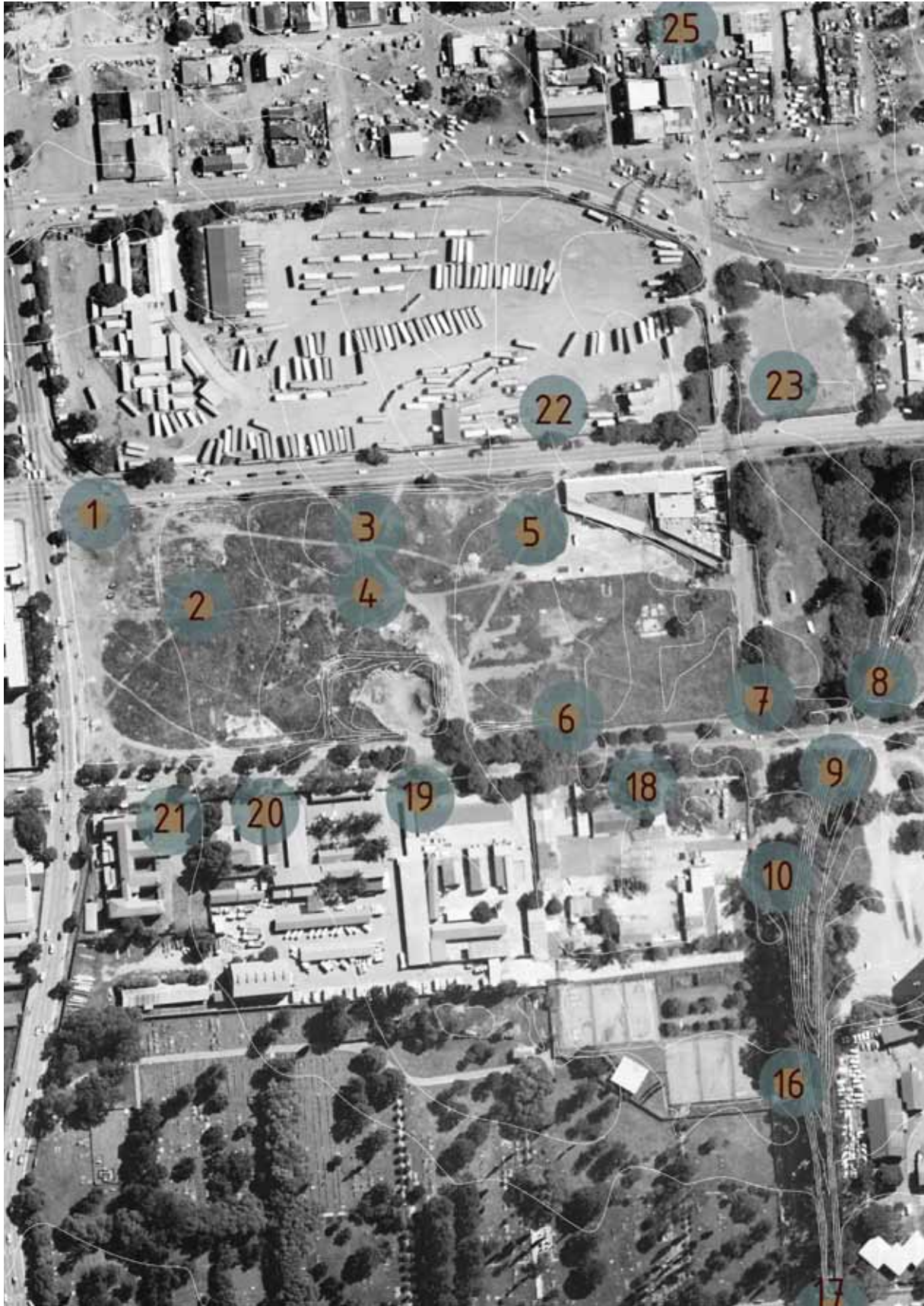
4 1

4/5

**Figure 32: Ideal Farming Requirements**  
Pretoria meets some of the ideal conditions for farming  
(Author: 2012)

## BIODIVERSITY

	indigenous vegetation	
	minimum of weeds	
	fauna	
	avi-fauna	
		
5/5		1/4



43



Figure 33: Photograph positions. The following map indicates the positions of site photos taken (Author: 2012)  
© University of Pretoria

**Figure 34: Site Photographs**

The character of the site is conveyed by the following photographs (Author, unless otherwise indicated)



4 5





6



Photograph by Duane Comins

1



12



7



10

Figure 35: Site Photographs

The character of the site is conveyed by the following photographs (Author: 2012)



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# Chapter 3 : Introduction to Urban Agriculture

## 3.1 Introduction

Due to the complexities of implementing agriculture in an urban context, a greater understanding of the urban agriculture concept needs to be understood. Thus a definition for urban agriculture is provided below. Also adding to the complexity of urban agriculture is government policy, strategies for implementation in ecologically compromised areas and economic issues. Thus a policy which supports urban agriculture in the City of Tshwane is briefly outlined and discussed below, as is a case study on the economic sustainability implications of urban agriculture projects. Permaculture and the Siyakhana Food Garden are investigated as precedents for implementing sustainable agriculture in an urban environment.

## 3.2 Definition of Urban Agriculture

Over time, city formation has isolated farming practices from the urban environment, resulting in economically, socially, and environmentally unsustainable agriculture, that relies on fossil fueled vehicles for transport. Imminent oil-based energy shortages will force cities to densify and become more self-sufficient, causing smaller transport circles and a need for sustainable food production.

Urban agriculture is integrated into and interacts with the urban, economic and ecological system. This form of agriculture relies on urban resources such as city-based labour, organic waste as compost and urban wastewater for irrigation. Those that benefit are the labourers themselves as well as urban consumers. Urban ecology, policies and plans all affect and are affected by urban agriculture as it competes for land with other urban functions.

Urban agriculture should provide recreation and leisure opportunities and contribute to resource efficiency and urban recycling management. However, it should also be a closed waste system, dealing with its own waste.

Various agriculture approaches and models exist, some of which are;

- Home gardening
- Community-project gardening
- Urban open space gardening
- Permaculture
- Incremental/staged development
- Container gardening
- Edible landscaping
- Multi-functional landscapes
- Vertical urban agriculture systems

## 3.3 Government Policy

As mentioned above urban agriculture should influence and be influenced by city policy. Although no large scale attempts at urban agriculture are evident in Pretoria, the council is discussing and debating urban agriculture as a viable option for land use and poverty alleviation in the city of Pretoria.

On the 26th of February 2009, the Agriculture and Environmental Management Department of the City of Tshwane Council compiled a report to request approval for the 'Integrated Food Security Policy'.

The report addresses the following strategic objectives; to accelerate higher and shared economic growth and development and; to fight poverty, build clean, healthy safe and sustainable communities.



According to this report *“The soaring food prices are furiously eroding the capacity of households to acquire sufficient food to meet their dietary requirements for a healthy lifestyle. People everywhere are affected and the poorest are hit hardest”* (Agriculture and Environmental Management Department 2009: 1).

The report also includes comments from other council members, most of whom support the initiative. The Strategic Executive Director of Economic Development supplied the following (unaltered) comment:

*“Poverty is intimately related to the access to land. Agricultural productivity plays an increasingly important role in improving food supplies and food security. As urban areas grow, land that once grew food disappears under concrete. This means the remaining land has to produce more food to support even more people. Urban land need to be utilised more efficiently and thereby make a greater contribution to food security. The contents of the proposed food security policy are supported.”* (Agriculture and Environmental Management Department 2009: 5).

The goal of the Integrated Food Security Policy is that the numbers of undernourished people, which was approximately 213 563 in 2005 when the report was drafted, should be reduced by half, to approximately 106 782 by 2015. However, large scale urban programs have not yet been implemented on an urban scale.

The more specific policies outlined to meet the overarching goals are as follows:

- Enhancing urban food security;
- Creating urban job opportunities and generation of income especially for urban poverty groups and provision of a social safety net for these groups;
- Contributing to increased recycling of nutrients (turning urban organic wastes into a resource);
- Facilitating the development of agricultural cooperatives and;
- Urban greening through establishment of food gardens including planting fruit trees.

(Agriculture and Environmental Management Department 2009: 14).

Wastewater is an urban resource which can be used for agricultural production in the city, and as such is an important strategy for initiating urban agriculture projects, *“Wastewater can be used for crop production, which includes fodder grasses, vegetables, cereals, ornamental plants, trees and flowers and fruit trees. Its use for irrigation has the potential to generate livelihoods for majority of households”*

(Agriculture and Environmental Management Department 2009: 16).

Another important strategy for supporting urban agriculture is the implementation of infrastructure. *“Infrastructure is a crucial element of agrarian production and marketing systems. Developing an effective agricultural infrastructure focusing on on-farm and communal land infrastructure such as fencing, boreholes, irrigation system, production tunnels, dipping tanks, replacement and upgrading of existing structures are key to facilitating economic growth...”* (Agriculture and Environmental Management Department 2009: 18).

### 3.4 Case Study:

The study by Elizabeth Kirkland titled ‘Harvest of Hope, A Case Study: the Sustainable Development of Urban Agriculture Projects in Cape Town, South Africa’. Investigates ways to improve the sustainability of urban agriculture initiatives.

*“The urban poor are often food and income insecure, particularly in less developed countries. Sustainable development that enables the poor to improve their vulnerability context and that does not degrade the environment is required. Small scale community Urban Agriculture Projects (UAPs) have been developed to address the problem at the local level by enabling food to be grown for own consumption and the possibility for earning income from the sale of surpluses”* (Kirkland 2008: Abstract).

In order to ensure that these projects are successful once government or NGO support is withdrawn the assets of a UAP need to be strengthened. These 5 capitals or assets of sustainable development are; Human Capital, Social Capital, Natural, Physical and Financial capital.

The case study goes on to say that alternative food networks can be influential in the support and success of small scale agriculture projects. In order for urban farmers to develop they need to find/develop new formal markets which are neither conventional systems nor less formal systems. A market helps to establish an alternative food network, which in turn helps to solve the problem of urban agriculture becoming financially unstable and unsustainable when formal support is withdrawn and the project is supposed to function on its own.

**Figure 36: (left) International Urban Agriculture**  
Presentation Images for the Shelby Farms Park competitions, submitted by Field Operations (Field Operations: <http://pruned.blogspot.com/2008/03/agro-park.html>)

## 3.5 Principles of Community and Urban Agriculture:

### 3.5.1 Permaculture

The aim of permaculture is to create sustainable human settlements which are designed in such a way as to have the diversity, stability and resilience of natural ecosystems. Permaculture also aims to regenerate damaged land. This approach is both practical and philosophical, it is an approach to land-use planning which integrates micro-climate, functional plants, animals, soils, water management and human needs. Permaculture is supposed to create highly productive closed systems.

*“Permaculture means thinking carefully about our environment, our use of resources and how we supply our needs. It aims to create systems that will sustain not only for the present, but also for future generations”* (Bang 2005:49).

Jan Martin Bang in his book *Ecovillages: A Practical Guide to Sustainable Communities* (2005) outlines the following principles for developing an Ecovillage, or for the purposes of this dissertation sustainable conservancy;

The development should be human scale, between 50 and 500 people, in which the major functions of life – food provision, manufacture, leisure, social life and commerce – should be balanced but not isolated from their surroundings. Human activities should be integrated with the natural world. A cyclic approach to resource use should be the aim, as opposed to the linear, throw-away lifestyle of western society. Finally the “ecovillage” should be supportive of healthy human development and able to continue into the indefinite future.

Three key areas make up a sustainable development; the bio-system which ensures low-impact development on the natural environment, the built environment which ensures a holistic approach to building technology, materials and design and, the economic system where fairness and non-exploitation are integral. (Bang 2005:27)

### 3.5.2 Permaculture principles applicable to urban agriculture:

- Zones. Although all aspects of urban agriculture should be integrated, specific activities take place in specific areas
- Compost. Create compost using urban organic waste efficiently
- Diversity. Use a wide variety of plants
- Restore damaged and natural environments and features
- Biological insect and weed control
- Use well aerated soils, containing nitrogen (proteins), phosphorous (stimulates root formation) and, potassium (forms and transports starch sugars and other carbohydrates)
- Mulch with compost
- Use water as many times as possible as it passes through the system
- Slow down water flow
- Use gravity to move water around
- Solve the problem of contaminated water as close to the source as possible
- Ensure that water leaving your property is clean
- Water bodies must have multi-purpose use
- Use windbreaks and screens to prevent evaporation and to provide privacy



**Figure 37: Siyakhana Food Garden**

Experimental farming practices alongside traditional methods occur throughout the urban agriculture example (Groenewald/Rossi: 2011)

**Figure 38: Siyakhana Food Garden**

Experimental farming practices alongside traditional methods occur throughout the urban agriculture example (Groenewald/Rossi: 2011)



### 3.6 Precedent Study Siyakhana Food Garden

An example of urban food production in the South African context is the Siyakhna Food Garden. The Siyakhana Initiative for Ecological Food and Health Security developed a model food garden to feed hundreds of inner-city beneficiaries. The food garden is designed using the permaculture model. The project aims to achieve a closed loop system. Buildings on site are built out of natural and sustainable materials to showcase alternative ways of living. Skills transfer is an important part of the project.

The project which was designed, maintained and managed by the Siyakhana Trust is located on a 2 ha plot of land within Bezhuidenhout Park in Johannesburg.

The workers employed by the Siyakhana Trust are full time employees who gain valuable experience and skills from working in the garden. The project is also viewed by its proponents as a laboratory or testing ground for sustainable building practices, boasting both mud constructed buildings and composting toilets.

Accessibility to the site is an issue as one can only access the project via prior arrangement with the Siyakhana Initiative, and the project is tucked away from general access and the public in the centre of a huge park. There are not large numbers of pedestrians being passively exposed to the project.

The model food garden explores ways of alternative living. All food is propagated according to the permaculture model. Compost is made on site and all buildings are made out of wooden frames with adobe infill. Solar power is used on site for cooking which makes the project sustainable in terms of energy use.

Vegetables and other useful plants on site are planted in a manner that best captures water on site. Raised semi-circular rings are placed on the downslope of the site to capture excess water and allow for slow infiltration into the roots. The raised rings are made of earth and mulch and in some cases act as beds for companion planting. Seeds are harvested on site and plants are propagated in small makeshift green houses on site.

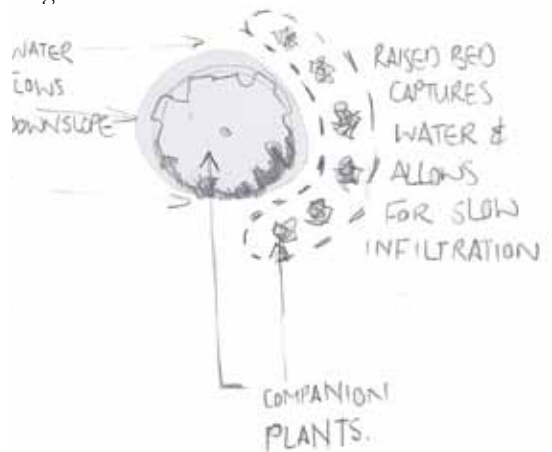
One of the downfalls to the project is the fact that



**Figure 39: Informal Seed Bank**

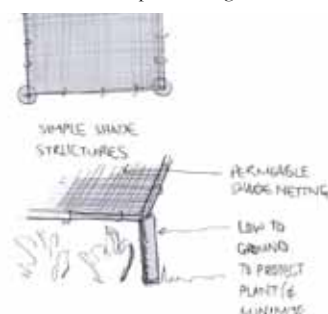
The Siyakhana Food Garden collects, stores and prepares seeds as part of their permaculture practices (Groenewald: 2011)

the garden is irrigated from municipal water. There is a small dam on site which captures and stores rainwater, but has not successfully been used for irrigation.



**Figure 40: Permaculture diagram one**

Raised bed planters capture water for fruit trees and themselves on the downslope, much like furrow irrigation, the water is able to seep into the ground slowly (Author: 2012)

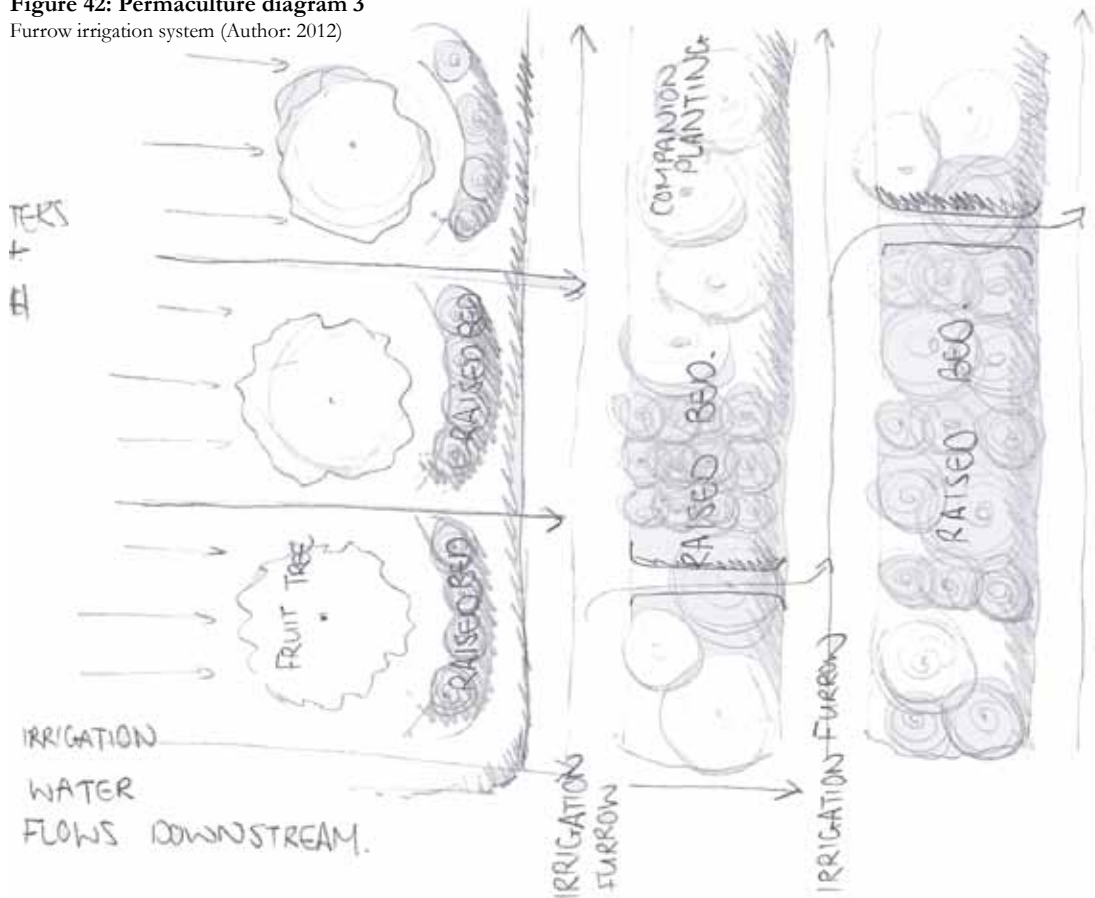


**Figure 41: Permaculture diagram two** Simple,

protective shade structures for plants (Author: 2012)

Figure 42: Permaculture diagram 3

Furrow irrigation system (Author: 2012)



WATER DAMS UP ON THE UP-SLOPE OF THE RAISED BEDS & INALTRATES OVER TIME.

COMPANION PLANTING ON RAISED BEDS

Figure 43: Permaculture diagram four

Planters out of recycled materials such as tyres (Author: 2012)

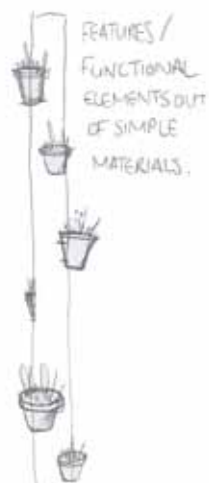
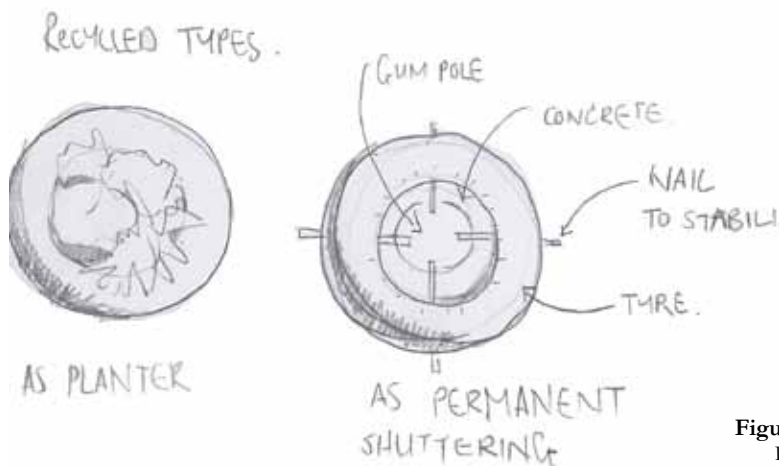


Figure 44: Permaculture diagram five

Pots nailed to poles, making use of every available surface for farming (Author: 2012)



# Chapter 4 : Design Framework

## 4.1 Introduction

The proposal for the Steenovenspruit drosscape is best described as a conservancy. A conservancy is a ‘body concerned with the preservation of nature, specific species, or natural resources’ (Merriam-Webster Dictionary Online). In this case the aim is to conserve the natural resource of land and water in an urban context. Conservation differs from preservation. On the one hand, preservation aims to retain something in its found state without allowing for change over time; conservation, on the other hand, allows for maintenance and use, while respectfully retaining the significance of the object, resource or place. A conservancy of land and water in an urban environment would thus allow for the protection and maintenance of the resources while simultaneously allowing sustainable use. The conservancy will allow for a “reserve” of resources for future generations. Conservancies are community-based conservation projects that can occur anywhere irrespective of size. They can be formed on land with various uses, including farms, industrial plots and natural areas, as long as the land is maintained in an environmentally sensitive manner.

The concept of the **ConservanCITY Framework** is a large scale intervention in Pretoria. All vacant and derelict sites are identified and analysed. Suitable ones are selected from this number and are consequently established as productive communities, while retaining links to similar projects around the city. The Steenovenspruit drosscape is proposed as the site for the hypothetical testing of this concept, which proposes that the derelict precinct can be transformed into the Steenovenspruit Agrarian Conservancy.

The Steenovenspruit Agrarian Conservancy will simultaneously conserve the natural resources of water and land while establishing a vegetable farming community that is made up of the current urban poor living in the area. The conservancy is designed, not only with the present scenario in mind, but also for a future in the post peak oil period. The current situation and users are prescient of a future with little or no fossil fueled power resources, and as such present an ideal opportunity to establish and test a new and alternative model for urban agriculture. This typology would benefit the current users in the present, as well as conserve and establish a sustainable and alternative way of life from which the greater urban community of Pretoria can benefit in a critical future.

The new land use model proposes that a reservoir be built as an initial catalyst to allow for farming to be established in the precinct. Although the area only has moderate environmental potential, it does meet some of the criteria for farming, namely good climate and terrain. The problem posed by the infertile, compacted soils can be solved relatively easily. Thus, the biggest obstacle to the establishment of an agrarian conservancy is the lack of easily accessible water, which is solved by a pump and reservoir system and illustrated below.

An agrarian conservancy should not be isolated from its context and as such a framework proposal is outlined below, before zooming in on the conservancy itself.

## 4.2 Urban Design

### Principles:

#### The ConservanCITY

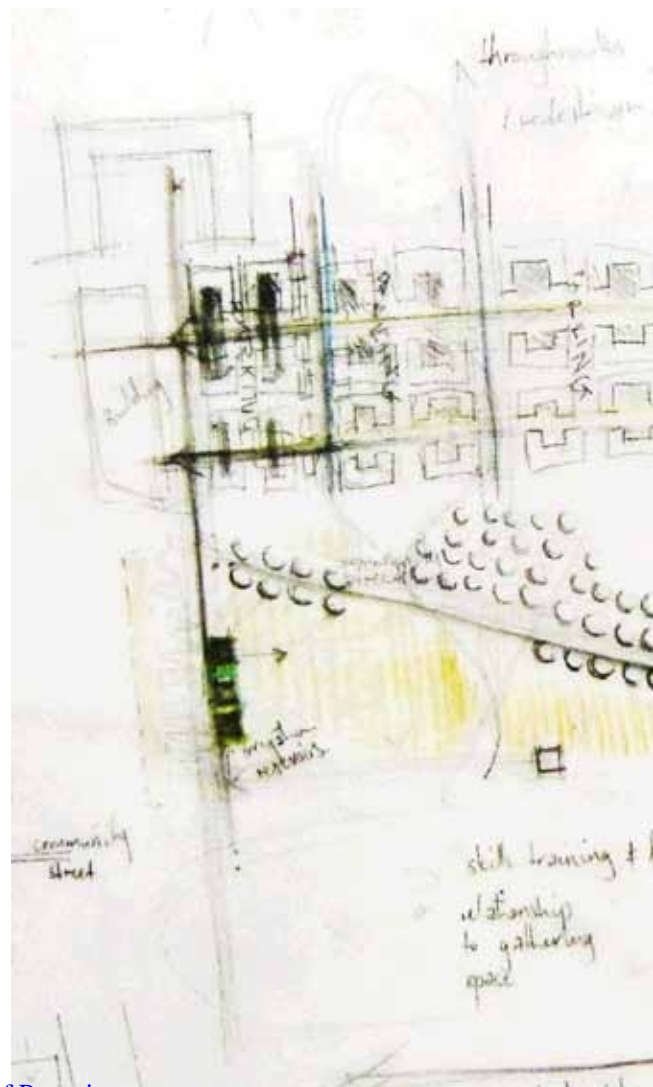
The establishment of a conservancy goes hand in hand with the improvement of the urban environment. A successful urban agriculture project cannot happen in isolation and needs to be integrated into a mixed-use neighbourhood that encompasses residential, retail, light industrial and ecological land uses.

While the vegetable gardens and reservoir will be established before many of the other land uses, a vision for the future is necessary, especially if the conservancy is to be designed to withstand a crisis of peak oil. Spaces in the city are underutilised formally, but contain the potential to yield public spaces which are in themselves supportive and productive, enhancing social, economic and environmental

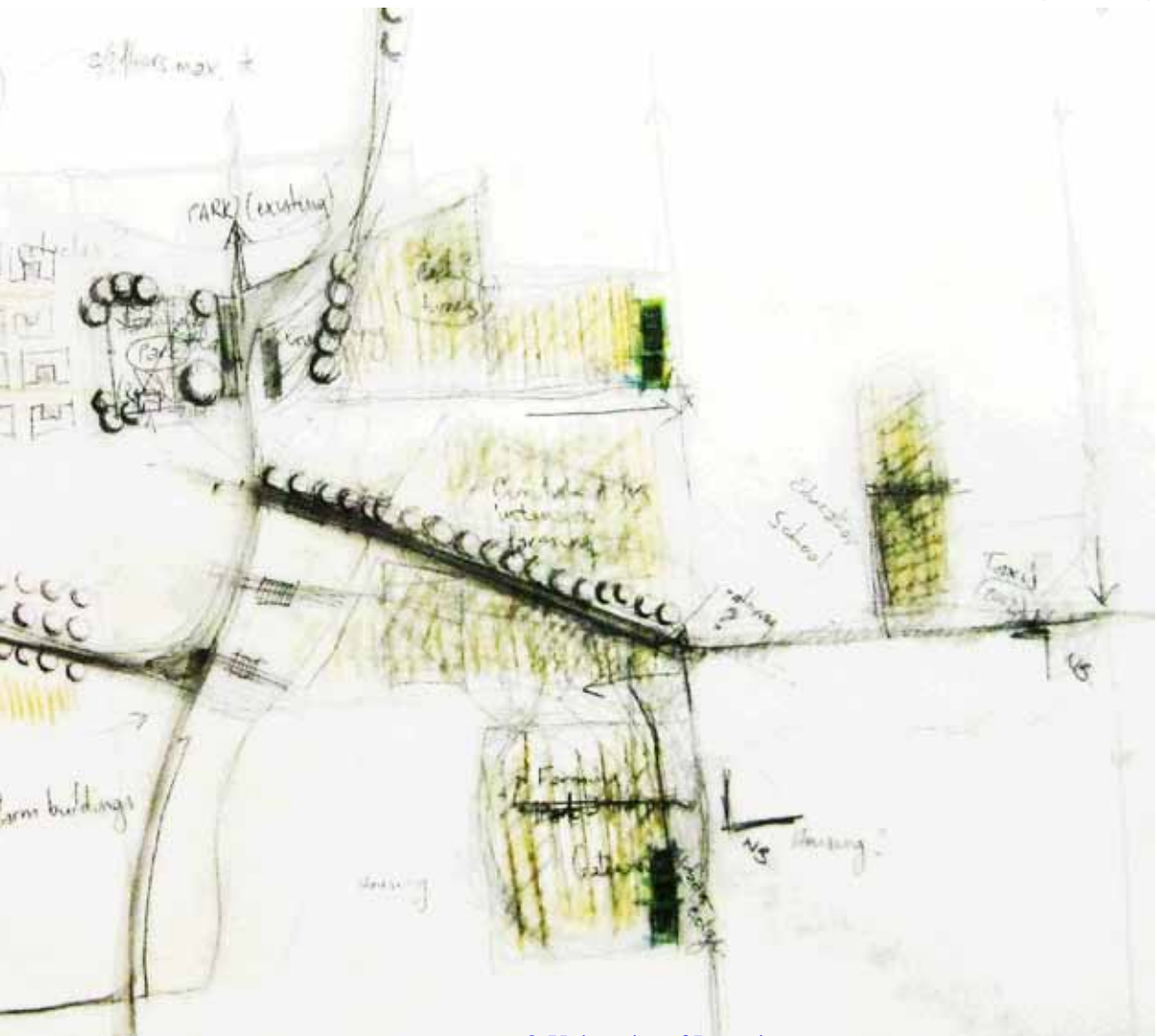
upliftment. By capturing the essence of the existing quotidian activities and spatial responses arising in the spaces a bottom up approach will be developed containing guidelines for the development of new typologies that will result in the capacity of effective interventions to have a large-scale effects over time within the in-between and leftover spaces.

Urban design principles summarized from the 'Draft Urban Design Strategy, "Towards a better Public Melbourne"' (Melbourne City Council: 2006) are accepted as the baseline for a successful urban environment. These principles were used to summarise an existing urban framework for the Marabastad precinct, in order to provide a set of guiding principles and contextual information for the Steenovenspruit Agrarian Conservancy. (Please refer to Appendix B for the summarised principles).

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**Figure 45: Initial framework drawing**  
Sketch indicating strong movement patterns and land uses  
(Author: 2012)



## 4.3 The Aziz Tayoba Urban Design Framework for Marabastad

The Aziz Tayoba UDF proposes a return to the original fine-grained urban fabric of Marabastad by re-instating the historical urban grid which generates intimacy within the community and contributes to a clearly-structured, safe and healthy community at a more human scale, which is flexible enough to accommodate all civic, cultural, religious and other community facilities that may in future be required – this allows for diversity to be maintained in the area. Marabastad is a transport hub and should be maintained as such in order to cater to the current trade routes which are based on movement in and out of Marabastad. A housing belt is proposed in line with the Schubart and Kruger park developments to serve as a transition zone from the CBD to the finer-grained area of Marabastad. In order to animate the precinct the floodplains around the Steenovenspruit are proposed as an urban green corridor, improving the recreational spaces to the west of the city and creating comfortable micro-climates to attract people. Public squares are introduced and celebrated to allow for more social cohesion and interaction. Structures such as the Belle Ombre Station and the Maraba shopping complex are accepted and given fixtures. At least parts of the original building fabric have been retained over time, and as such, a historical conservation core has been proposed for the site. Marabastad has also retained a living history in the vibrancy of its trading culture which should be maintained and catered for. The needs of the current users must be respected and buildings, although conserved, can be adaptively re-used. The historical single storey construction within Marabstad is retained, moving up to a maximum of six stories towards the boundary with the city. Designs for street furniture ought to serve as a reflection of our time but should aim to enhance the particular character that is unique to Marabastad. The planning and redevelopments for the precinct must be just at all times, and achieve an environment to be enjoyed by all the groupings of the historical and present Marabastad communities on an equitable, non-discriminatory and sustainable basis. Hawkers and informal traders are encouraged to trade in a more structured way through various support programmes and support infrastructure such as stalls with refuse bins.



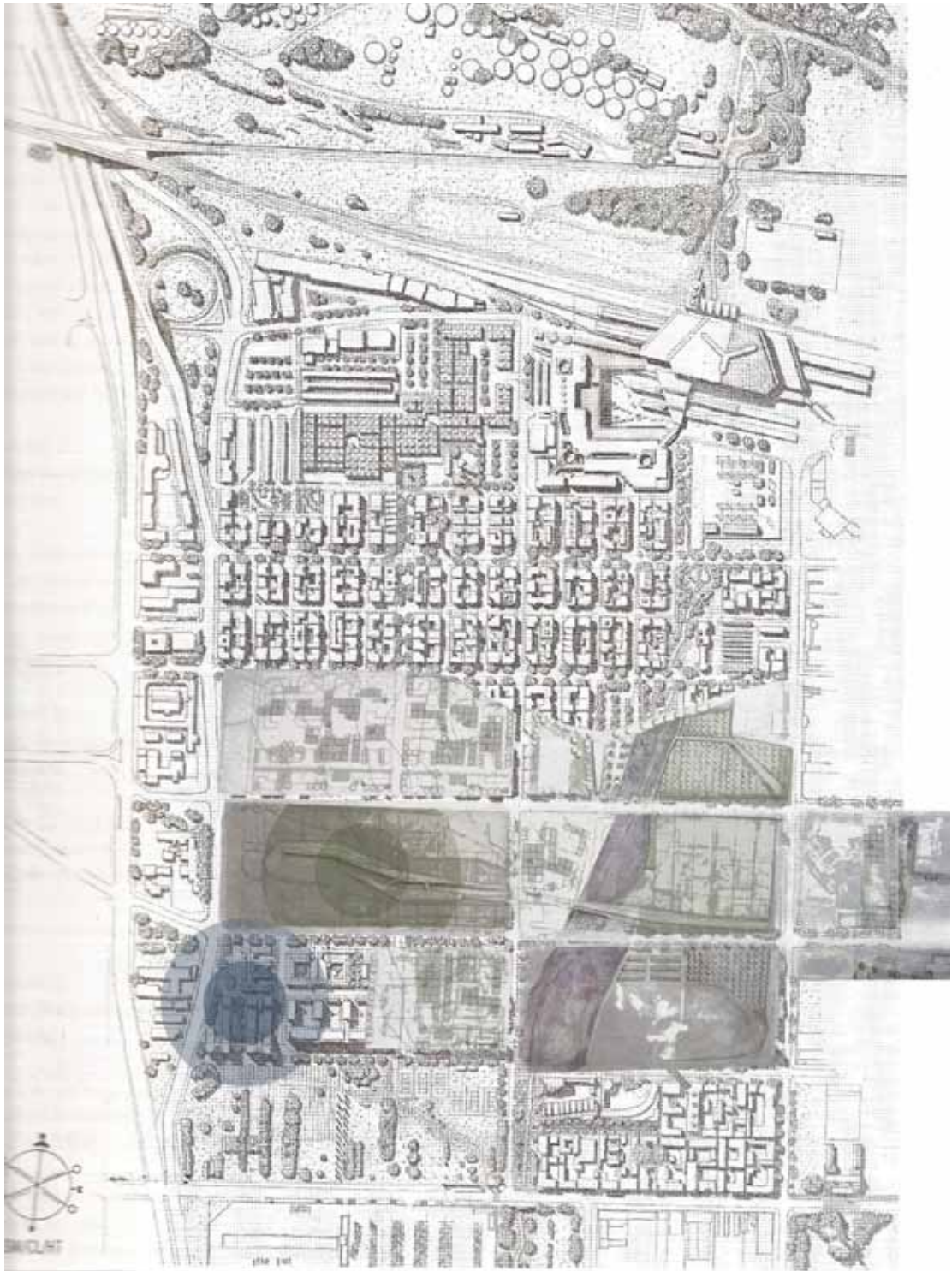
**Integrated Urban Design Framework for MARABASTAD**  
Aziz Tayob Architects - Meyer Pienaar Tayob

**THE INTEGRATED URBAN DESIGN FRAMEWORK**

**Figure 9.9**

## 4.4 Critique of the Aziz Tayob Integrated Urban Design Framework for Marabastad.

No innovative new typologies are introduced into the area. Squatters are relocated and accommodated but their needs are not met. These urban poor should also be provided with opportunities to uplift themselves. The Steenovenspruit Conservancy incorporates the basic strategies outlined in the Aziz Tayob framework for the establishment of a green corridor along the water course, a strong residential component and the celebration of the historical significance of the area and the return to the fine-grained urban fabric of Marabastad. However, the southern section of the site used to be a productive space for the city of Pretoria and this element of the area is not celebrated in the current proposed development framework. There is an opportunity to introduce a new typology into the city that is both productive and uplifting to the currently marginalised urban poor of the area. Portions of the land can be dedicated to urban agriculture which will provide economic and educational opportunities for the marginalised poor and the rest of Pretoria's residents while still allowing for a residential component to develop around this agrarian core. The proposal to the north and the strategies developed for the actual Marabastad centre are accepted as a sensitive and positive approach. The southern section is modified to include a new typology for urban agriculture. The conservancy also allows for light industrial development south of the agrarian core, as opposed to the purely residential and civic spaces introduced in the IUDF. This will further enhance a mixed use typology and provide for better economic, social and education opportunities and a more vibrant edge to the area than what pure residential developments would by drawing more people into the area and encouraging 24 hour use of the spaces.



**Integrated Urban Design Framework for  
MARABASTAD**  
Aziz Tayob Architects · Meyer Pienaar Tayob

THE INTEGRATED URBAN DESIGN FRAMEWORK

Figure 9.9

Figure 47: Aziz Tayob Framework, Revised  
Masterplan of the Marabastad precinct with site identified  
(Aziz Tayob: 1998)

## 4.5 Proposed large scale interventions

### 4.5.1 Residential

Schubart Park and Kruger Park are proposed as high density, mixed-use developments. Further high density housing schemes are proposed on the periphery of the urban agriculture core. Each one of these housing developments centres around a small scale private agrarian core.

### 4.5.2 Urban Spaces and Retail

Urban spaces allow for both the spontaneous gathering and everyday meetings involving everyday interactions. These urban spaces support the development of informal trade and cater to pedestrian movement to and from key transport nodes.

From analysis undertaken in the city it is apparent that retail supermarkets and informal traders on the street have a mutually beneficial relationship. While the supermarkets stock all supplies besides fresh produce, the street vendors supply nothing besides fresh produce. The vendors provide islands of activity which cause a pause in the flow of pedestrian traffic and so create social spaces outside of supermarkets which allows for economic benefits for the supermarkets to develop. Patrons of the supermarkets are encouraged to buy from the vendors. As such it is proposed that similar relationships are catered for in the conservancy.

### 4.5.3 Water Use and Stream Restoration

The area falls within a large catchment, with more than sufficient water for irrigation. However this water is all directed towards the Steenovenspruit and it is impossible to capture a large enough volume of water on site in order to irrigate the vegetable plots. This results in a proposal for a pump and reservoir system to be introduced into the area to efficiently utilise the water in the Steenovenspruit. A very small percentage of the overall water volume would be needed. However, in order to ensure that the unused water is conserved and that the conservancy adds positively to water quality and quantity issues in the city, a wetland system and restoration of the Steenovenspruit is proposed.

The Steenovenspruit provides a flow of water into the site which can be exploited for agriculture and recreational uses. The stream itself also provides the potential for enhancing the quality of water. A wetland detention facility is proposed for Prince's

Park, providing passive recreational opportunities, enhancing views and treating stormwater run-off from the greater precinct.



**Figure 48: Retail edges**

Social spaces and vendor activities are noted outside of retail spaces throughout the CBD of Pretoria (Author: 2012)

6 5

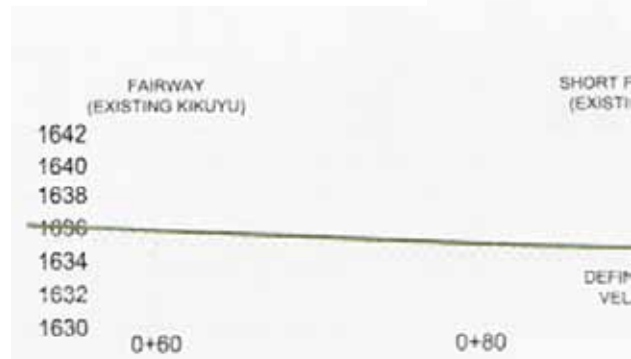


Figure 50: Sustainable City Living Ecovillages in Europe incorporate high density living and agricultural land uses (Bang: 2005)

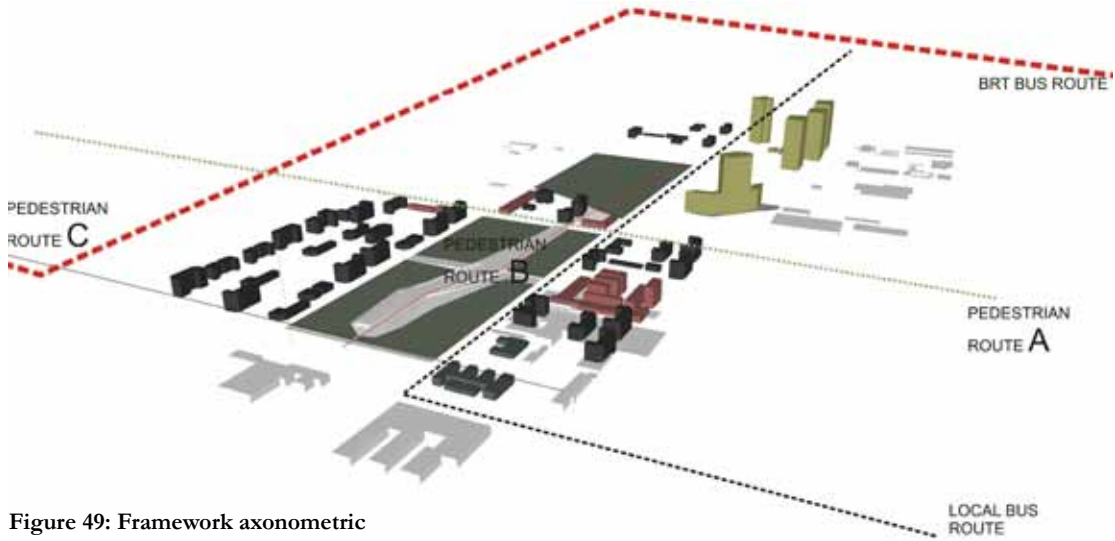


Figure 49: Framework axonometric

Colours indicate the various large scale interventions that form part of the Steenovenspruit Agrarian Conservancy Framework (Author: 2012)

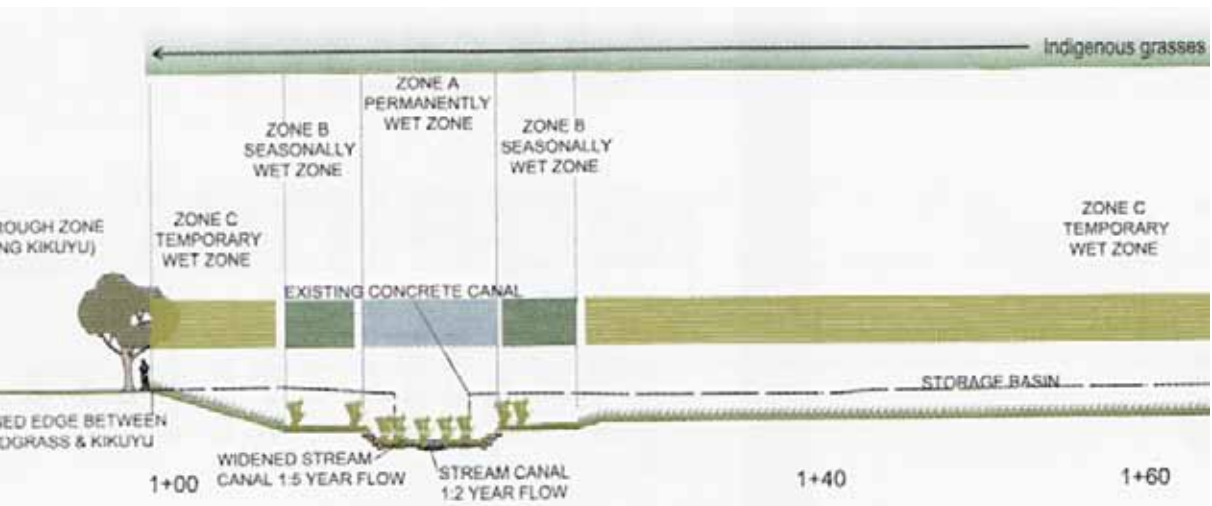


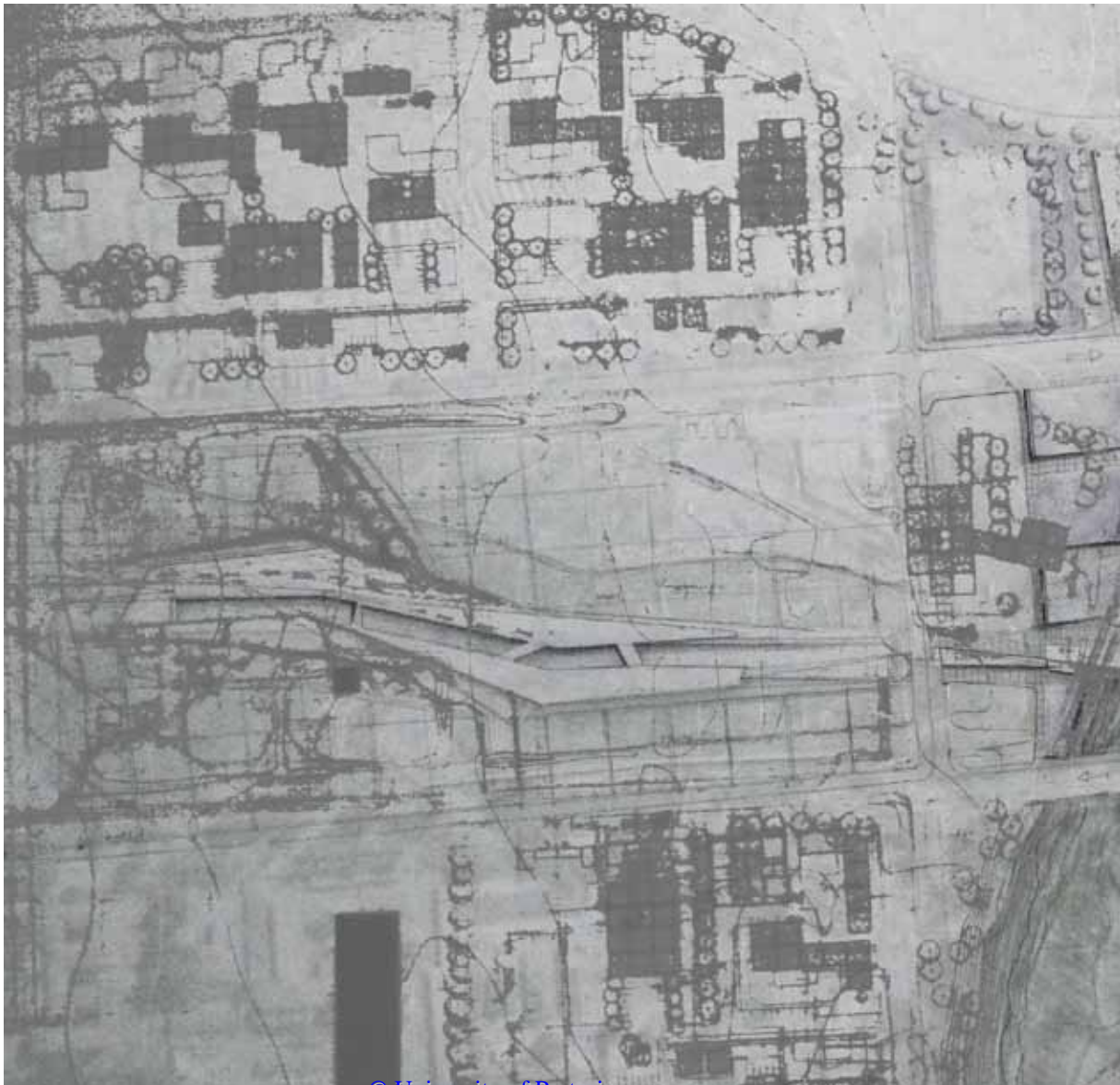
Figure 51: Stream rehabilitation

Schematic image of stream restoration (Urban Green File: 2011)



# Chapter 5 : Development of the Steenovenspruit Agrarian Conservancy

The development of the conservancy concept began with a basic outlining of the area to be included in the conservancy and an allocation of land use to various zones. Movement patterns were identified and enhanced with the predominant focus being on the movement of pedestrians from the Belle Ombre station into the CBD and the movement of fresh produce vendors from the Tshwane Fresh Produce Market into the city centre. The strong movement line thus became a diagonal east-west line. Areas of high social activity were identified and remained as such in the land-use allocation exercise. The highest social activity was identified within the original border of the city and tapered out towards the west. However, constant activity was noted on Proes Street. A large vacant block in the centre of the identified conservancy boundaries was selected as the major test area for the hypothesis.



**Figure 52: Initial conservancy drawing**  
Sketch indicating the refinement of the Steenovenspruit Agrarian  
Conservancy Framework (Author: 2012)



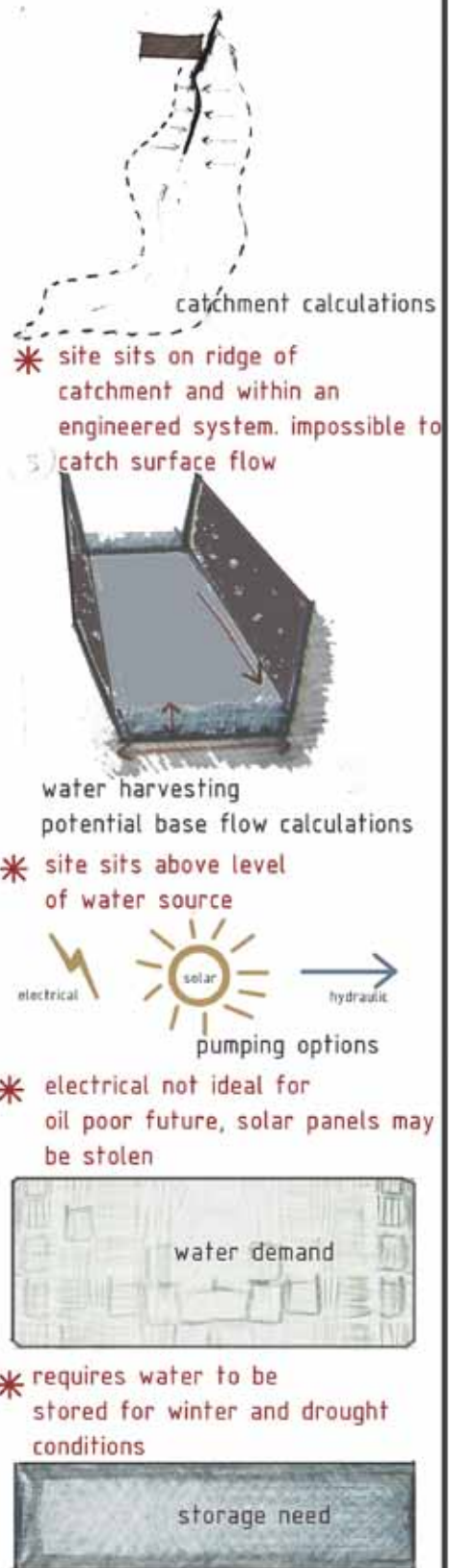
## 5.1 Rational Decision Methodology

A rational design decision process was followed. Opportunities and constraints were considered for each decision, and each decision led to the next area of investigation. The process was initiated by considering water availability for urban agriculture. The site falls within a large water catchment. However it falls on a ridge which makes it impossible to catch water at the highest point of the site. All stormwater is directed to the watercourse running through the site.

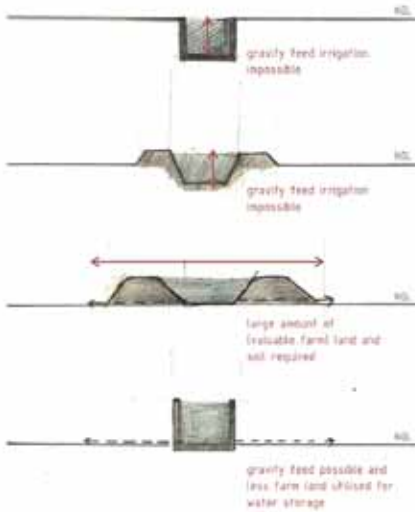
Water harvesting was investigated as an option. In order to harvest the water available in the stream a pump and reservoir system became necessary. In order for this option to be fully analysed, base flow, total irrigation demand, storage demand and plot calculations were completed.

All calculations formed part of an iterative process which can be viewed in Appendix C of the book. Calculations included in the main body of the book illustrate and highlight the rational process that was followed, and the final calculations which were applied to the masterplan and sketchplan detail development.

7 1



**Figure 53: Rational Design Methodology**  
Diagrammatic illustration of the process followed in designing the Steeovenspruit Agrarian conservancy  
(Author: 2012)



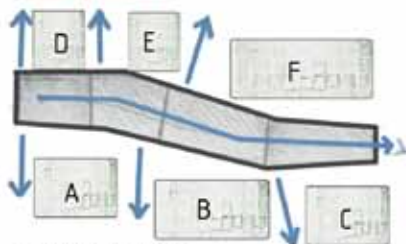
reservoir design principles

- \* sunken reservoirs pose problems for an oil poor future. earth construction dams take too much space.



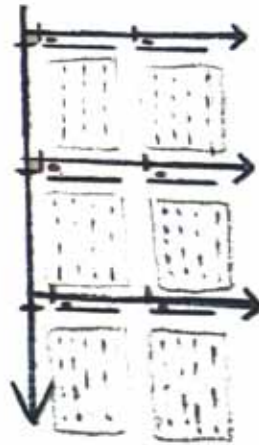
plot size calculations + irrigation strategies = more realistic water demand

- \* plots and slope of site require a stepped reservoir made up of four tanks



actual demand

- \* actual demand less than original water demand calculations. oil poor future requires gravity feed irrigation strategies



irrigation strategies

- \* furrow irrigation strategies require constant flow of water.. however, this is less than initially calculated



hydraulic ram selected and calculated

- \* hydraulic ram is re-considered. water must be further treated coming from stream



wetland for water polishing hydraulic retention time calculated

- \* water polishing wetlands require space and slow flow of water down, thus extra size is required



planting, security and movement considerations

- \* final conservancy design requires various space and strategic requirements

The major issue on site is that of water availability. A pump and reservoir system was developed for the site. A hydraulic ram pump was selected and tested within the Steenovenspruit watercourse. A hydraulic ram was selected from the three options of; electrical, which is unsustainable in a diminished fossil fuel future; solar power which poses problems of theft, and days of no pumping due to overcast weather; and the hydraulic ram pump. A hydraulic ram pump is a self-acting device, it uses the momentum of the water in a stream, falling a small distance to pump water to a greater distance (Smith 2006:124).

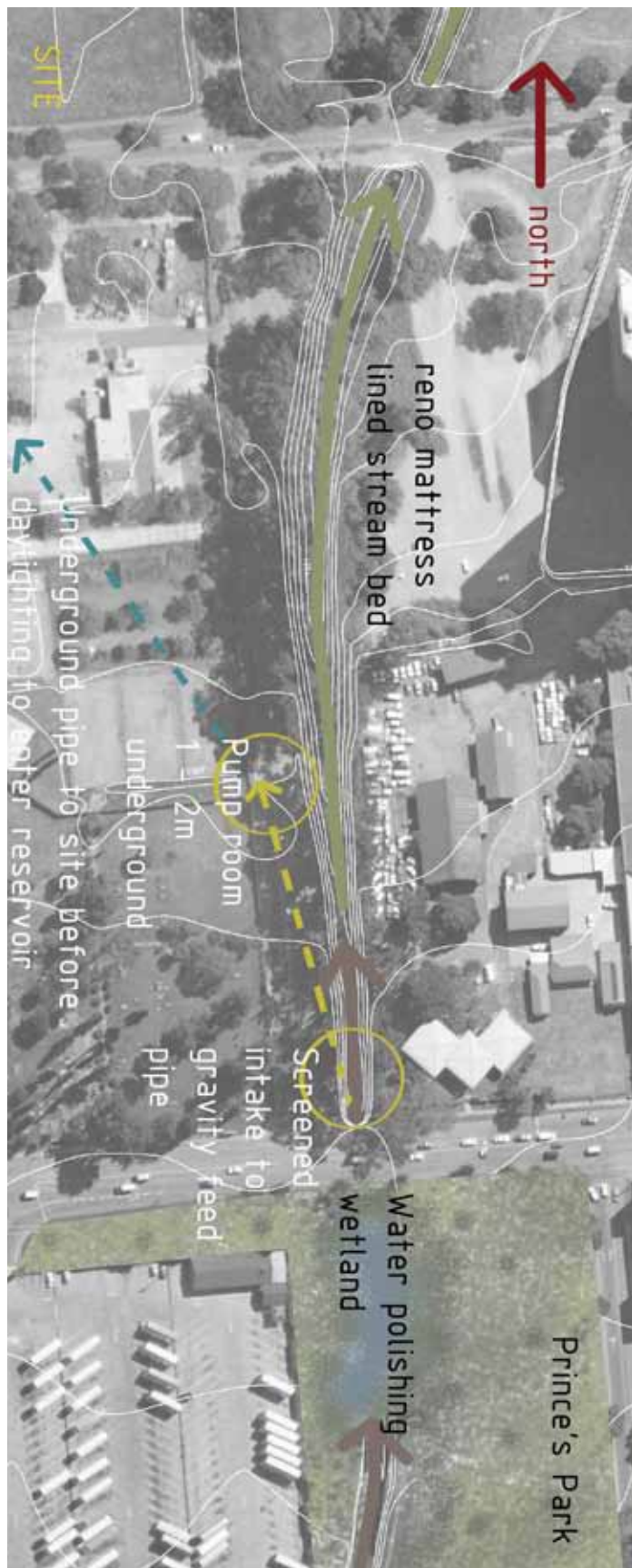
On a framework level stormwater is directed into the Steenovenspruit. The watercourse is retained as an engineered system, with concrete lining upstream. A constructed water polishing wetland is proposed for Prince's Park as a passive recreational element and a functional water treatment facility. Once the water leaves the constructed wetland it follows its engineered course until a volume of water is captured through a screened intake and directed to the hydraulic ram pump room. The greater volume of stream water, not captured by the gravity feed pipe, continues downstream along a concrete lined channel which transitions into a slightly more natural looking reno-mattress lined stream bed, in a passive recreational eco-corridor. Figure 53 right indicates the proposed strategy. Figure 54 - 56 below illustrate guidelines and materials for stream bed restoration.

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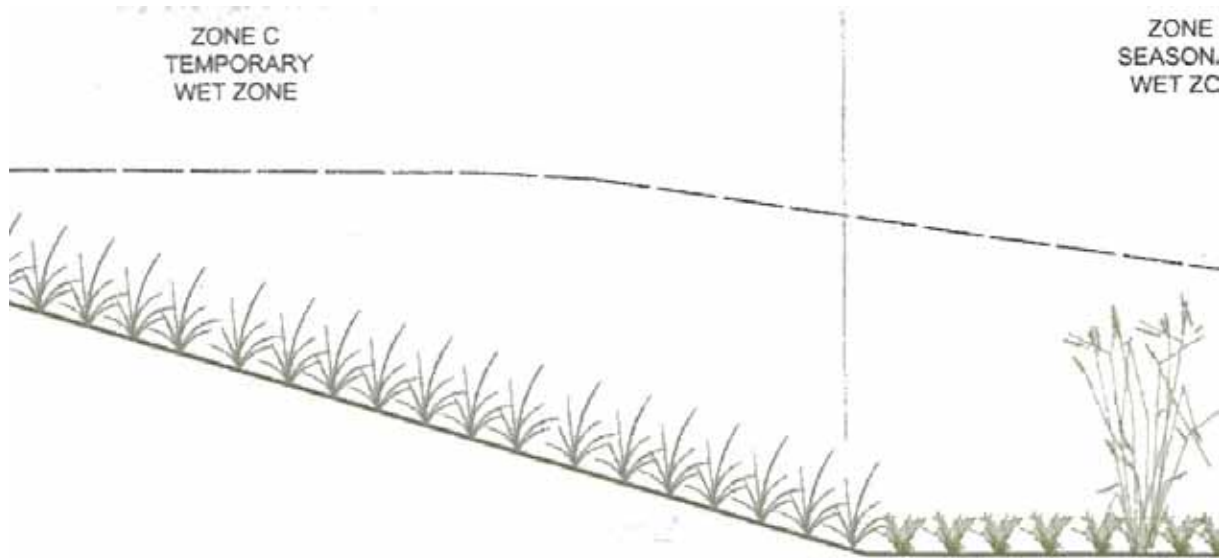
Once water is captured by the gravity feed pipe it is directed along a path to maximise the highest possible fall. Depending on the length of pipe and fall, friction losses may occur. In order to gain an idea of how these losses impact on the total volume of water harvested, please refer to Appendix C.

Water leaves the hydraulic ram in a delivery pipe which can reach a height of between five and fifteen metres with a usable volume of water, and up to 80 metres with a fall between one and three metres. Please refer to figure 59 for a pumping capacity table.

Water is pumped into a water tower at the highest point of the site before being released into the reservoir wetland. The water tower doubles as an oil separator to ensure the removal of hydro-carbons.



**Figure 54: Framework Water Strategy**  
Illustration of the framework principles for dealing with water in the conservancy  
(Author: 2012)



## 7 5 Base flow calculation

area\_0.135m

slope\_0.029

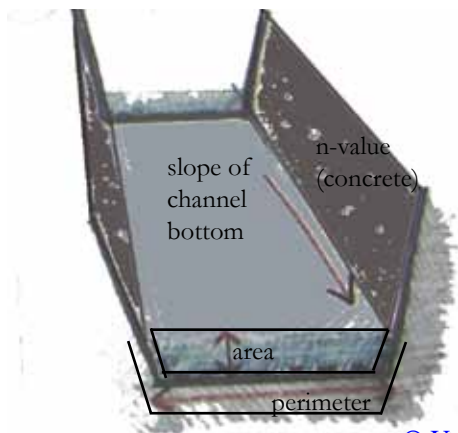
n-value\_0.016  
(concrete)

perimeter\_1.76

$r = a/p_0.077$

Q (m<sup>3</sup>/s)

formula\_  $Q = A * (1/n) * (r^{2/3}) * (s^{1/2})$

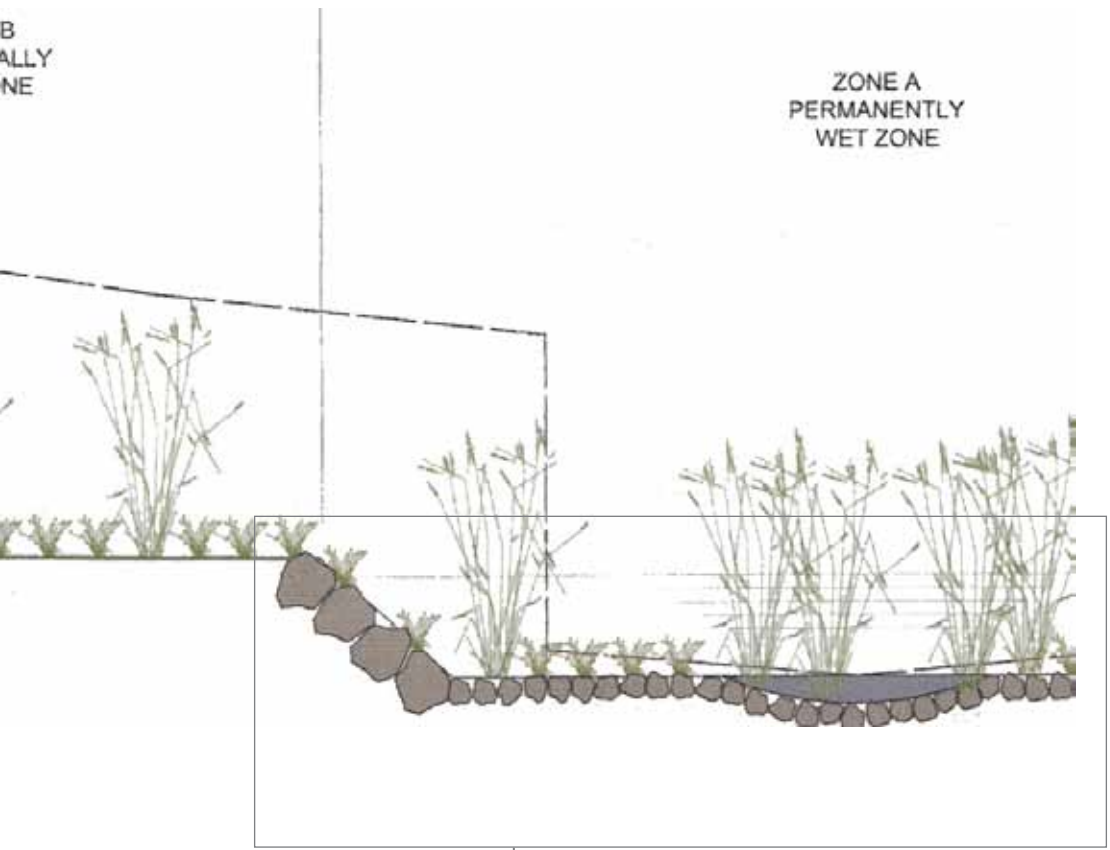


$$Q = 0.263873 \text{ m}^3/\text{s}$$

$$= 263.873 \text{ litres/s}$$

**Figure 55: Baseflow calculations**

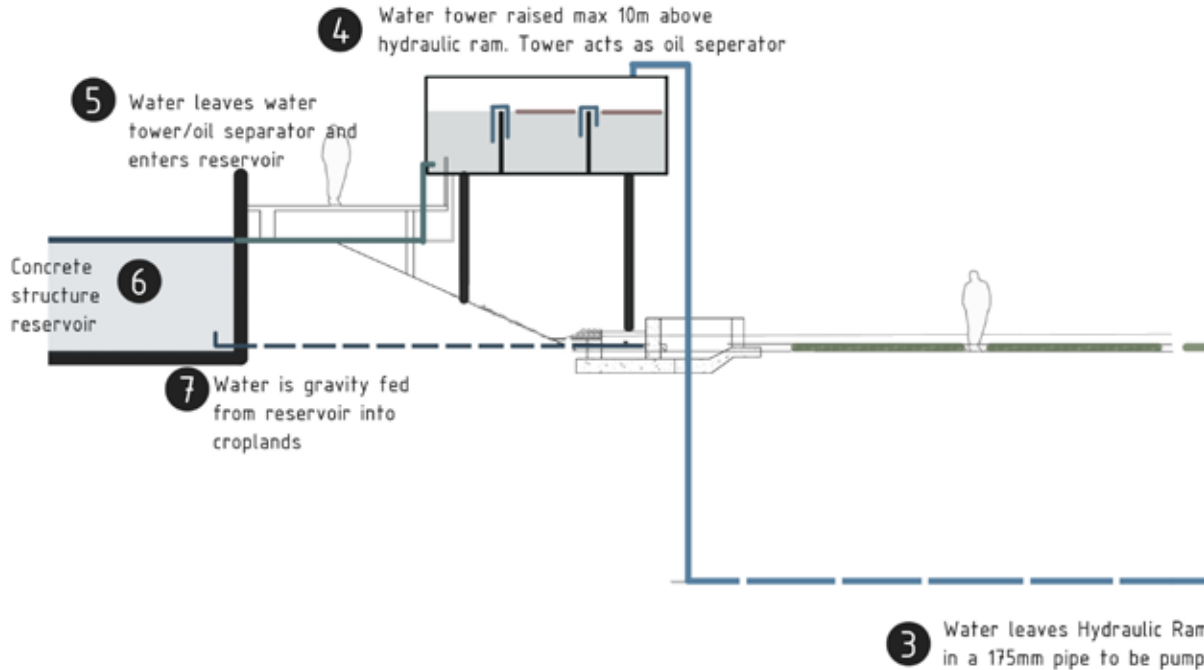
Baseflow calculations are based on the Steenovenspruit area, perimeter and slope, measured on site (Author: 2012)



**Figure 56: Stream rehabilitation**  
Schematic section of stream rehabilitation  
(Urban Green File: 2011)

**Figure 57: Reno Mattress Stream Rehabilitation**  
Rock packed reno mattresses are used to line stormwater channels ([www.koboxvizpartvedelem.hu](http://www.koboxvizpartvedelem.hu))



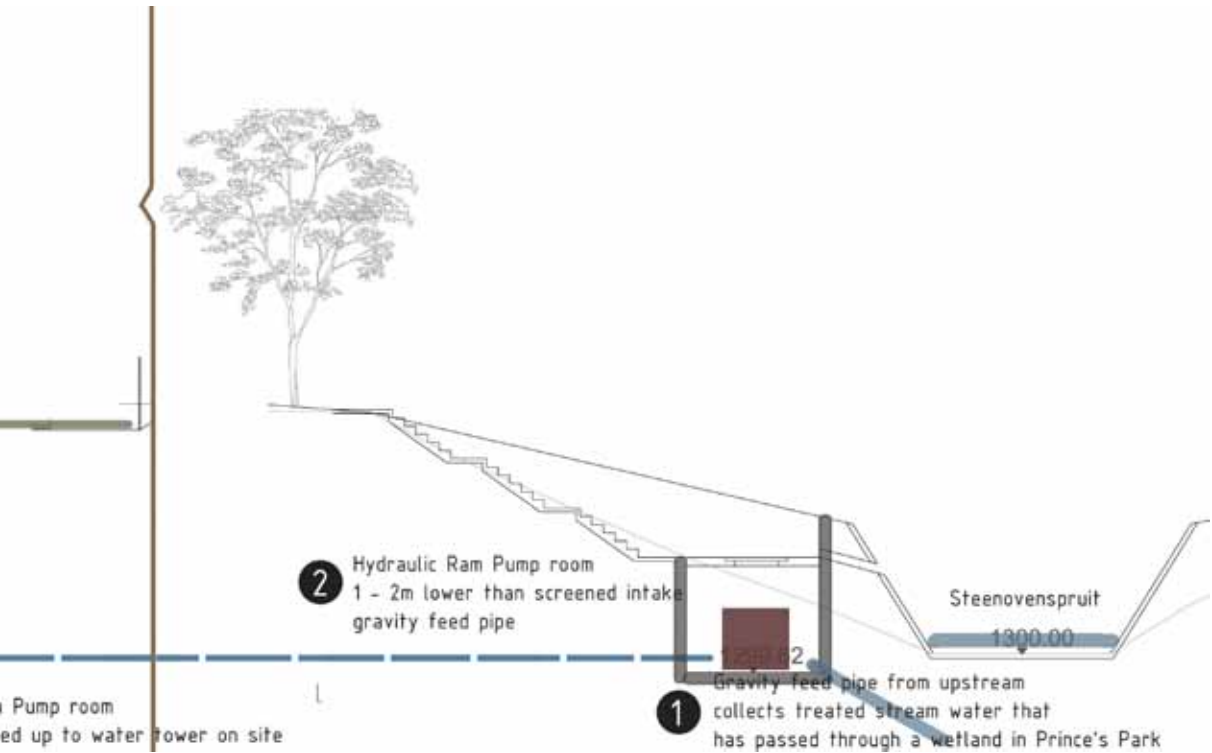


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## Hydraulic Ram Possibilities

Pumping capacity		Vertical Height that water is raised above ram (m)										
Working fall (m)	5	10	15	20	30	40	50	60	80	100	120	
1	144	65	33	29	19	12						
2		156	105	79	53	33	25	19	12			
3		260	180	130	87	65	51	40	27	18	12	
4			255	173	115	86	69	53	36	23	16	
5			310	236	155	118	94	72	50	36	23	
6				282	185	140	109	94	65	48	35	
7					216	163	125	109	82	60	48	
8						187	140	125	94	69	55	
9							225	156	140	105	84	62
10							265	187	156	117	93	69
12								225	187	140	113	83
14								265	218	167	132	97
16									250	187	150	110
18									280	210	169	124
20										237	188	140

litres pumped in 24 hours per litre/min of river water



**Figure 58: Hydraulic ram operation**

Schematic image depicting the functioning of the hydraulic ram system proposed for the site (Author: 2012)

**Figure 59: Hydraulic ram**  
Functioning hydraulic ram  
on Schutte Farm (Author: 2012)



**Figure 60: Pumping capacity table**  
Minimum working falls and the vertical height to  
which water can be pumped (Smith: 2006)



## 5.3 Reservoir Design

It is accepted as standard farming practice to ensure a contingency of water supply in the event of a drought or inability to access water for a period, for example if an irrigation pump malfunctions and needs to be repaired. Pretoria receives the majority of its rainfall in summer, with three relatively dry winter months mid year. Although it appears that there is a small volume of constant base flow in the stream up until mid June, it cannot be fully ascertained whether the Steenovenspruit has a permanent baseflow throughout winter.

In the event that there is a small volume of water permanently flowing in the stream it must still be considered a) that the water has an impact downstream as it runs into the Apies river, and must therefore be able to flow unhindered when the water level of the base flow is very low; and b) that if a stream restoration is proposed downstream as per the framework illustrated above a constant flow of water is necessary to maintain some level of vegetation in the stream bed. Thus, even if there is a constant flow of water in the stream, the conservancy is designed based on a two month dry period, so as to lessen the impact on the ecological status desired in the stream.

The iterative design calculations for the reservoir thus consider a 20% contingency when sizing the reservoir, this is a 2 month dry period / no pump period. A constructed surface flow wetland is proposed in the first tank of the reservoir to treat incoming water, thus a further contingency is allowed for the hydraulic retention time of the wetland. An extra month's worth of surplus water to allow for the time it will take to fill up the reservoir to irrigation capacity if it is critically depleted in the case of an extreme drought. Thus a total contingency of 27% is used for all calculations.

The initial design of the reservoir was an earthen structure reservoir in the centre of the site. The reservoir was aligned along a major movement route across the site in order to establish form. Initial calculations based on a three month contingency, and using the the entire site as planting area indicated a massive area necessary for storage. The area lost for cultivation would be increased by the amount of space needed for earth dam construction (please see appendix C for all calculations completed).

Once the irrigation strategies and actual plot sizes

were designed the size of the reservoir became more realistic. Refer to sections 5.5 and 5.6 below.

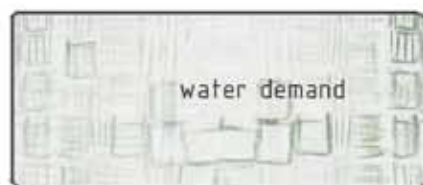
A final reservoir size of 7172m<sup>3</sup> is based on a total contingency of 27% (20% dry period, 1% Hydraulic Retention time and 8% filling up time)

Although the structure takes up an area between 4000 and 5000 square metres, with walls 1.8m high, it meets standard practice requirements for storage (minimum 20%) and allows for an unstable future by creating a robust, yet flexible, system to support productive use of the landscape. These figures are based on a concrete structure which allows for less valuable planting area to be covered by a water storage structure.

Reservoirs which were sunken into the ground were only briefly considered as they do not allow for gravity feed irrigation and would therefore require extra pumps and engineering.

The structure is also designed to double as a water treatment facility, further filtering and aerating the water for use downstream. Downstream uses of the reservoir water may include bathing (an activity already practiced in the Steenovenspruit), water collection for drinking (if the municipal system fails in an uncertain future, further home based treatment may be necessary) and vegetable washing.

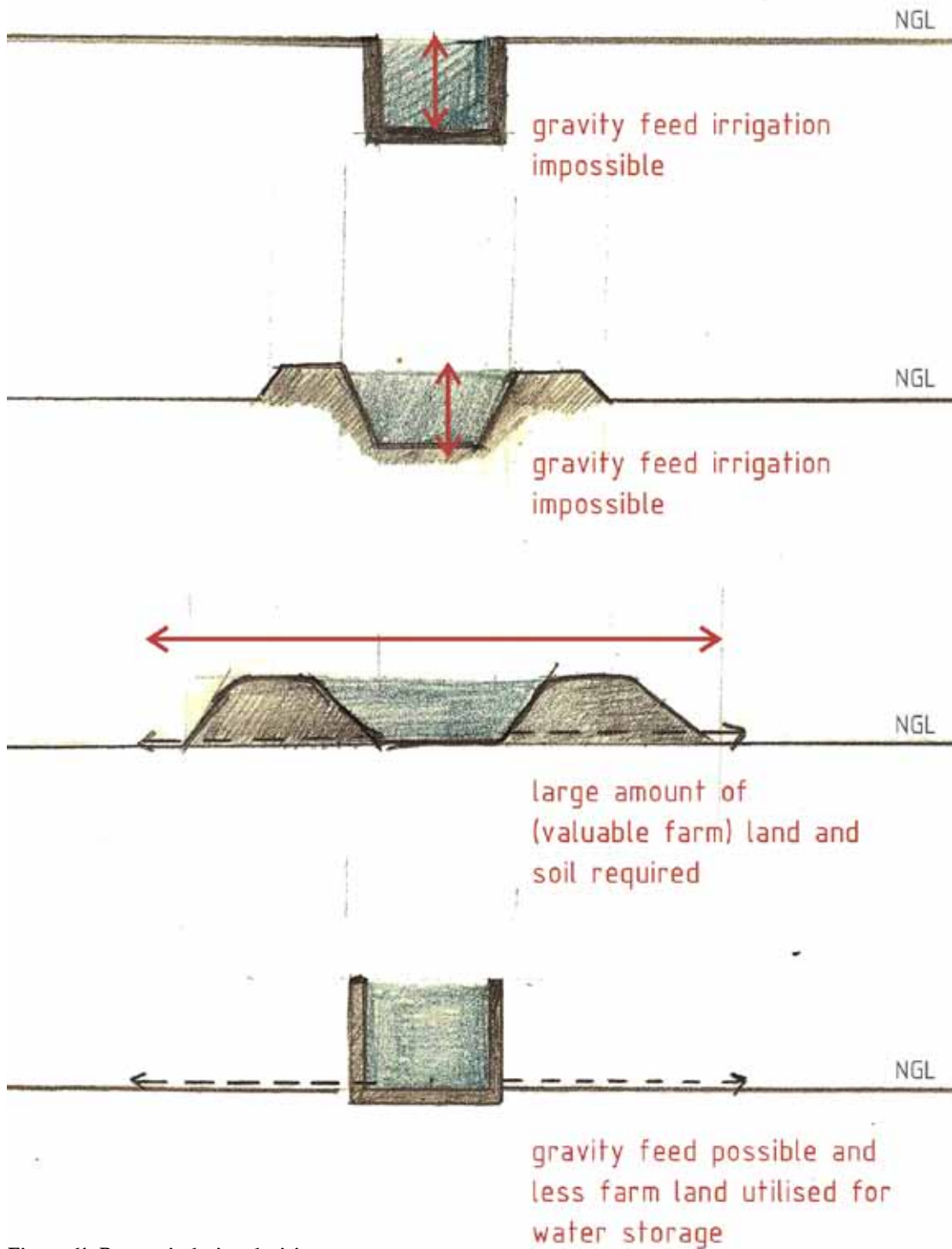
79



Total water demand per plot, per week is 2.77m<sup>3</sup>  
Total number of plots 186 \* 2.77m<sup>3</sup> = 515.22m<sup>3</sup> per week  
Total average monthly demand 515.22 \* 4 = 2060.88



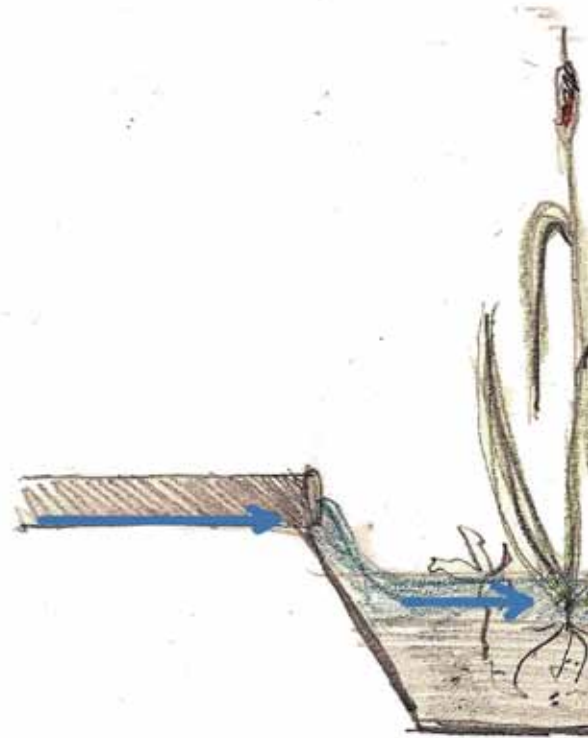
Monthly water demand = 2060.88 m<sup>3</sup>  
Total annual demand = 24730.56 m<sup>3</sup>  
Storage contingency = 29% of total annual demand  
Reservoir size = 7171.862



**Figure 61: Reservoir design decisions**  
Various scenarios were explored for the design of the reservoir (Author: 2012)

## 5.4 Wetland for water polishing

A wetland is proposed as part of the reservoir. This constructed wetland occurs at the highest point of the reservoir on the eastern edge of the site, before the actual first reservoir tank. Water from the water tower is released into the wetland which has a hydraulic retention time of 3.5 days before the water is released into the reservoir itself. The wetland alone will not be able to treat all the water, however a supporting water filtration system, of rock packed gabions, with finer grained gravel on the inside will supplement the water treatment of the wetland and improve the overall quality of water.



8 1

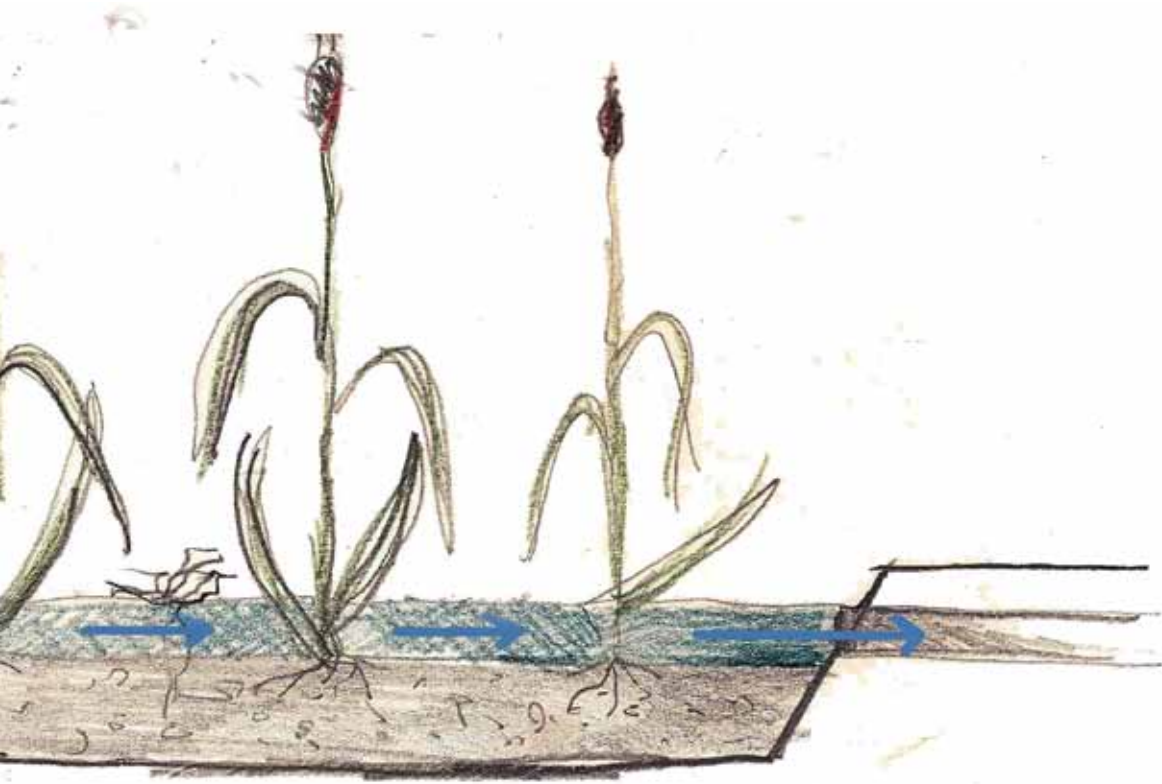
### Hydraulic retention time

water inflow	$Q_0$	$0.0014 \text{ m}^3/\text{s}$
water outflow	$Q_e$	$0.001 \text{ m}^3/\text{s}$
average flow	$Q_{avg}$	$0.0012 \text{ m}^3/\text{s}$
evapotranspiration	$e_t$	$5 \text{ mm}$
wetland volume	$V_w$	$409.95 \text{ m}^3$
constant (void fraction)	$E$	$0.875$

$$t = (V)(E) / Q_{avg}$$

$$t = 298921.875 \text{ seconds}$$

$$t = 3.5 \text{ days}$$



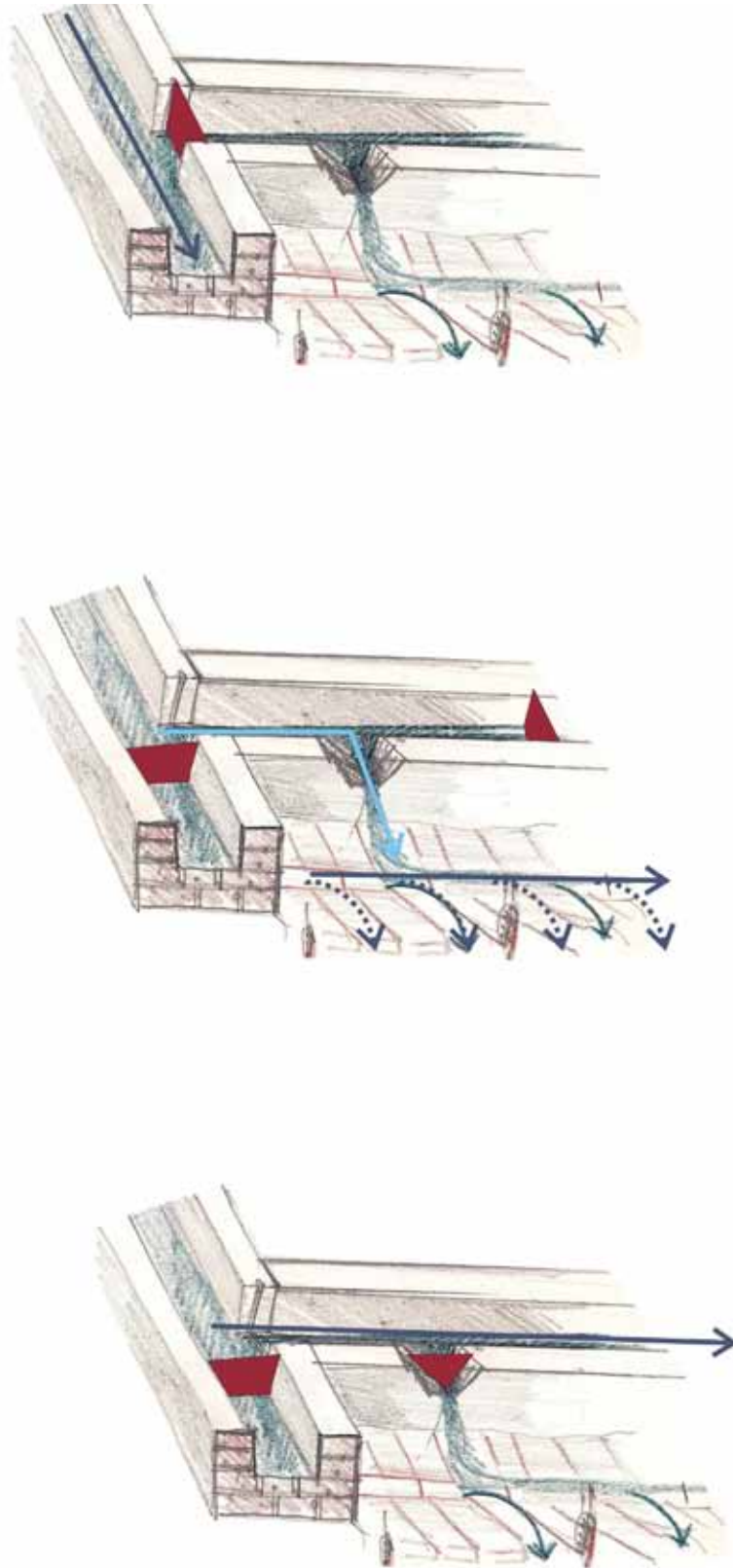
**Figure 62: Surface flow constructed wetland**  
A constructed wetland is proposed for the eastern high point of the reservoir to improve water quality (Author: 2012)

## 5.5 Irrigation Strategies

Ridge and furrow irrigation was selected due to its suitability for irrigating crops which can be damaged if water covers the crowns or stems of the plant. The furrow system directs water along small channels, which carry the water down or across the slope of the field. Water is released into the furrows with raised vegetable beds on either side, slowly enough to seep into the bottom and sides of the earthen furrows which in turn provides the desired moisture levels for the soil. The site has a fairly gentle uniform slope which makes this an ideal irrigation method. The primary channels are designed to run in the same direction and gradient as the actual irrigation furrows. The secondary and tertiary channels pose the greatest problem in terms of gradient as some of these channels have a gradient of 1:50, which is far steeper than the minimum of 1:100 that is allowed for the furrows. However, by controlling the channel gates efficiently, the flow of water can be controlled. Once the secondary and tertiary channels have filled up, the gate can be closed to allow the small outlet pipes to siphon the water out at the required rate so as not to cause erosion. The gates can be opened and closed at required intervals until each plot has been irrigated with the required amount per plot. The furrows that have been aligned with the primary channels are designed to have a maximum slope gradient of 1:100. In the Farming Handbook by Barry Smith, it is stated that light soils can have a maximum gradient of 1:100 and a minimum gradient of 1:300. Heavy soils have a maximum gradient of 1:300 and a minimum gradient of 1:600. The no till system more closely resembles light soils, as the beds are not highly compacted and will allow for easy infiltration.

Vegetables are planted in double rows on each raised bed with a spacing of 400mm between the plants and 600mm between the beds, this creating 1000mm furrow spacing.

Channels are constructed out of bricks. The primary and secondary channels for each planting area at the same level, 150mm or two bricks above the natural ground line. The tertiary channel is also made of bricks and is 75mm or one brick height above natural ground level.



**Figure 63: Water supply channels**  
Primary, secondary and tertiary channels transport water from the reservoir to the irrigation furrows in the farmlands (Author: 2012)

## 5.5 Planting and food security strategies

The joint FAO/WHO expert consultation on diet, nutrition and the prevention of chronic diseases (2004: 7), recommended the minimum daily intake of 400g of fruit and vegetables per day for the prevention of chronic diseases such as heart disease, cancer, diabetes and obesity, as well as for the prevention and alleviation of several micronutrient deficiencies, especially in less developed countries. This equals a total of 146 kg of fresh produce per year per person. Initial planning of the urban agriculture intervention allowed for 64m<sup>2</sup> plots, which could be maintained by one person. These plots would feed a minimum of one person at 146kg of fresh produce per year, but if farmed efficiently would be able to provide three people with fresh produce at 146kg/a/person. Economic possibilities arise if farming is done efficiently and the farmer needs only to support himself. Strategies such as employing raised beds, the use of products such as bokashi-assisted compost and tunnels for growing vegetables in controlled micro-climates would increase the yield of the plots. Yield can be increased to nearly 780kg per person, which would feed five people at an intake of 146kg/a/person and would greatly increase the economic possibilities for individuals. A few common vegetables were selected for the testing of these scenarios.

Further research established that according to the World Health Organisation and the Scientific Research Institute, 88kg of fresh vegetables would be an acceptable annual intake per person. Thus the plot sizes were modified to 36m<sup>2</sup>, which would be able to feed 3 people at 88kg/a/person. If 255 plots are utilised, 765 people could be supported. Tunnels, bokashi-assisted compost and companion planting would also further increase the yield of the smaller plots, possibly feeding more people or providing greater economic income. For the scope of this project only vegetable plots are investigated. Due to the South African trend of one man or woman working to support a family of 6, adjoining plots can be farmed by one person in order to feed more people.

The block has a hard, compacted infertile soil base, which is covered in weeds and veld grass where it hasn't been exposed by constant pedestrian and vehicular movement. This base is highly impermeable and infertile due to the compacted soils and low organic content. However, this agricultural issue can

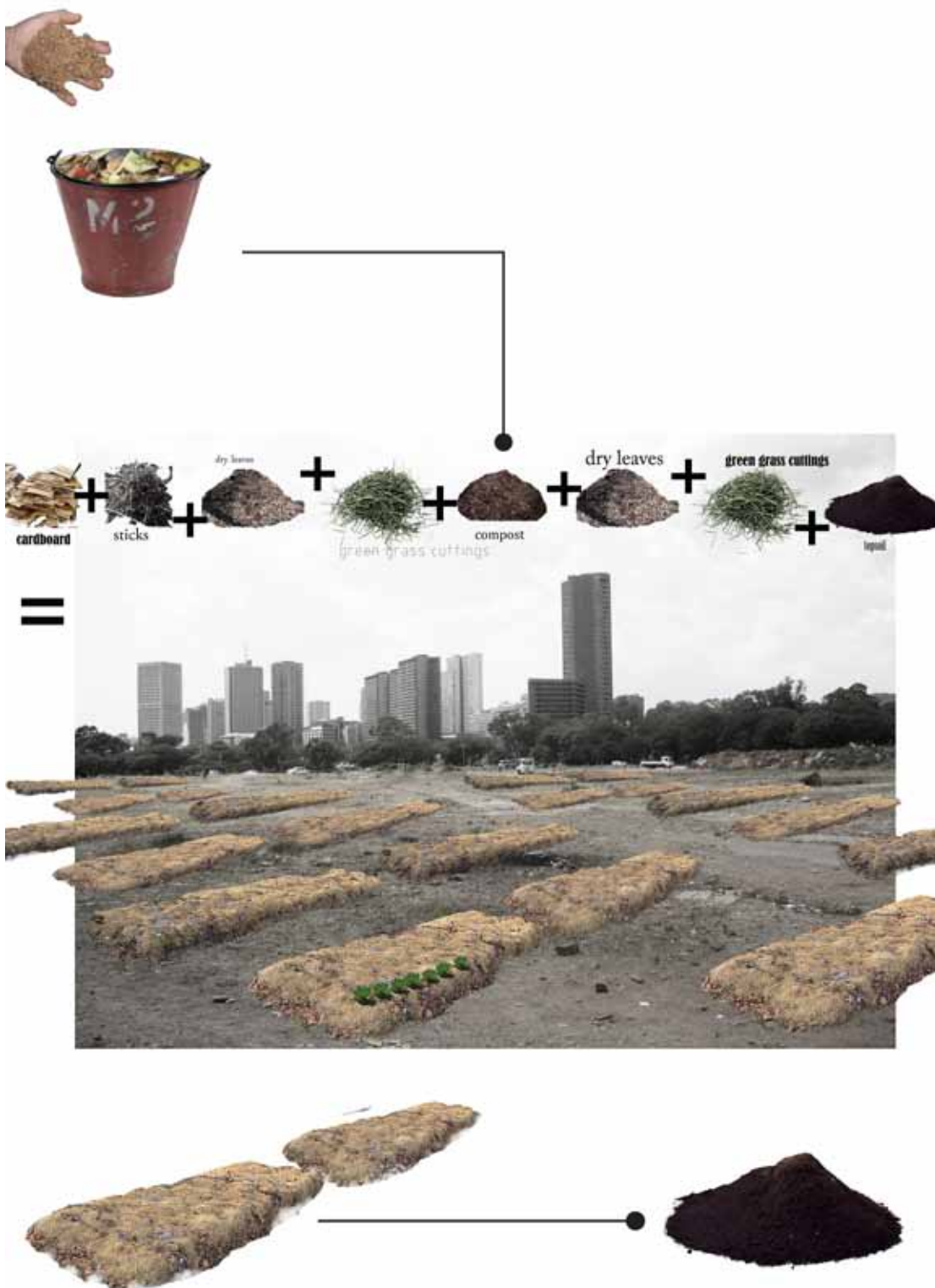
be overcome by using a no-till method of creating vegetable beds.

No-till vegetable beds or 'lasagne beds' are built up of the following layers. A cardboard base is covered by sticks, dry leaves, green grass cuttings, compost, another layer of dry leaves and green grass cuttings and a thin top layer of topsoil. In order to improve the yield, bokashi is added to the compost used in the lasagne bed. Vegetables are then planted into these beds. In the next season the composted beds are moved to one side and then re-used in the new layers. Over time this method will create a new topsoil layer for the entire site improving the quality of the soil layers.

Companion planting would further enhance the productivity of the vegetable plots by allowing plants to establish mutually beneficial relationships. Companion planting helps to control pests. Some of the principles of companion planting are as follows. Rotating crops and planting specific plants next to each other allows the plants to benefit from each other's properties. Planting legumes for a season feeds nitrogen into the soil. Tall growing, sun loving plants can create shade for low-growing shade tolerant species; this is referred to as spatial interaction. By planting plants which are not necessarily productive, but which attract birds and insects will benefit some plants by increasing pollination.

Crop rotation employs the following principles. Permanent crops which are made up of plants that take a long time to establish are kept in place. Root crops (beetroots, carrots etc) are planted in an area after brassicas (broccoli, cabbages, cauliflower etc.). Heavy-feeders are in turn planted in an area after root crops have been there for a season.

The precedent of the Babylonstoren (Appendix D) food gardens is a prime example of how an increased biodiversity palette improves the efficiency and yield potentials of an integrated food garden.



**Figure 64: Planting Strategies**  
Various strategies are employed to enhance the yield of vegetable crops (Author: 2012)

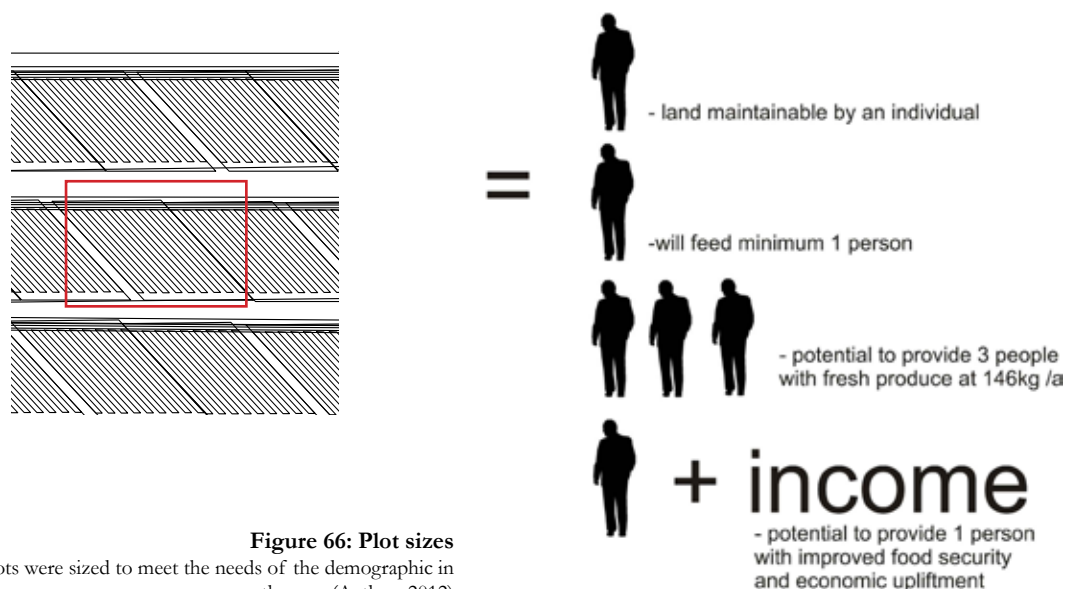
## 5.6 Plot sizes

Each plot needs to allow for a planting area of 36m<sup>2</sup>, sufficient space for irrigation furrows at the correct spacing and pathways which allow easy movement around the plots. A 90m<sup>2</sup> plot allows for all the requirements and still provides for 255 plots to be delineated across the site.

**Figure 65: Yield table**

The table below indicates the yield per square meter for each vegetable (Author: 2012)

					SANSOR poster	post	
		Planting Times (The Farming Handbook)		Months to Maturity	Harvesting Time (period of Harvest) months	Total time from sowing / transplanting to harvest (end of harvest ?)	Plan
Beetroot	planted from seeds	July - Dec, Feb - Apr (all year)	9	2 months	1	3 months	1700
Brinjals	grown in seedboxes/beds first for 7 weeks before being transplanted	Aug - Oct	3	3 months after transplanting	1	4 months	2200
Cabbages	can be sown directly, preferable to transplant, after 4 - 5 weeks after sowing into seedboxes	Jan - Mar, Aug - Sept	5	3 - 4 months	1	5 months	3000
Carrots	planted directly in permanent quarters from seeds	Feb - May, Aug - Oct	7	3 - 4 months	3 - 4 months	7 months	1500
Butternut	direct seeded	Sept - Nov	3	3 - 3.5 months	1	4.5	
Green beans	directly drilled	Sept - Oct, Jan - Feb	4	2 - 3 months	0.5 months	3.5	6000
Lettuces	can be planted directly, but normally transplanted	Feb - Apr, Jul - Sept	6	2 - 3 months after transplanting	0.5 months	3.5	5500
Onions	seed beds and then transplanted, after 7 - 8 weeks, or directly	Feb - Mar	2	2 months			5000
Paprika	seedlings and then transplanted	Aug - Sept	2	3 months	8 - 9 m (?)		3000
Pumpkins	directly planted	Sept - Nov	3	4 - 4.5 months	1	5.5	3000
Sweet Peppers	seedbeds for 6 weeks	Aug - Oct	3	2 - 3 months before picking can commence	1 - 2 months		4 2000
Sweet Potatoes	directly - ridges	Nov - Dec	2	4 - 5 months			
Swiss Chard	seeded directly	Jul - Nov, Feb - Mar	7	2 months (for 2/3 months)	4 - 5 m (?)		5 1500
Tomatoes	seed trays/beds or direct	Sept - Nov	3	3 months to first pick (for 80 days)	2 - 4 months		6 1000

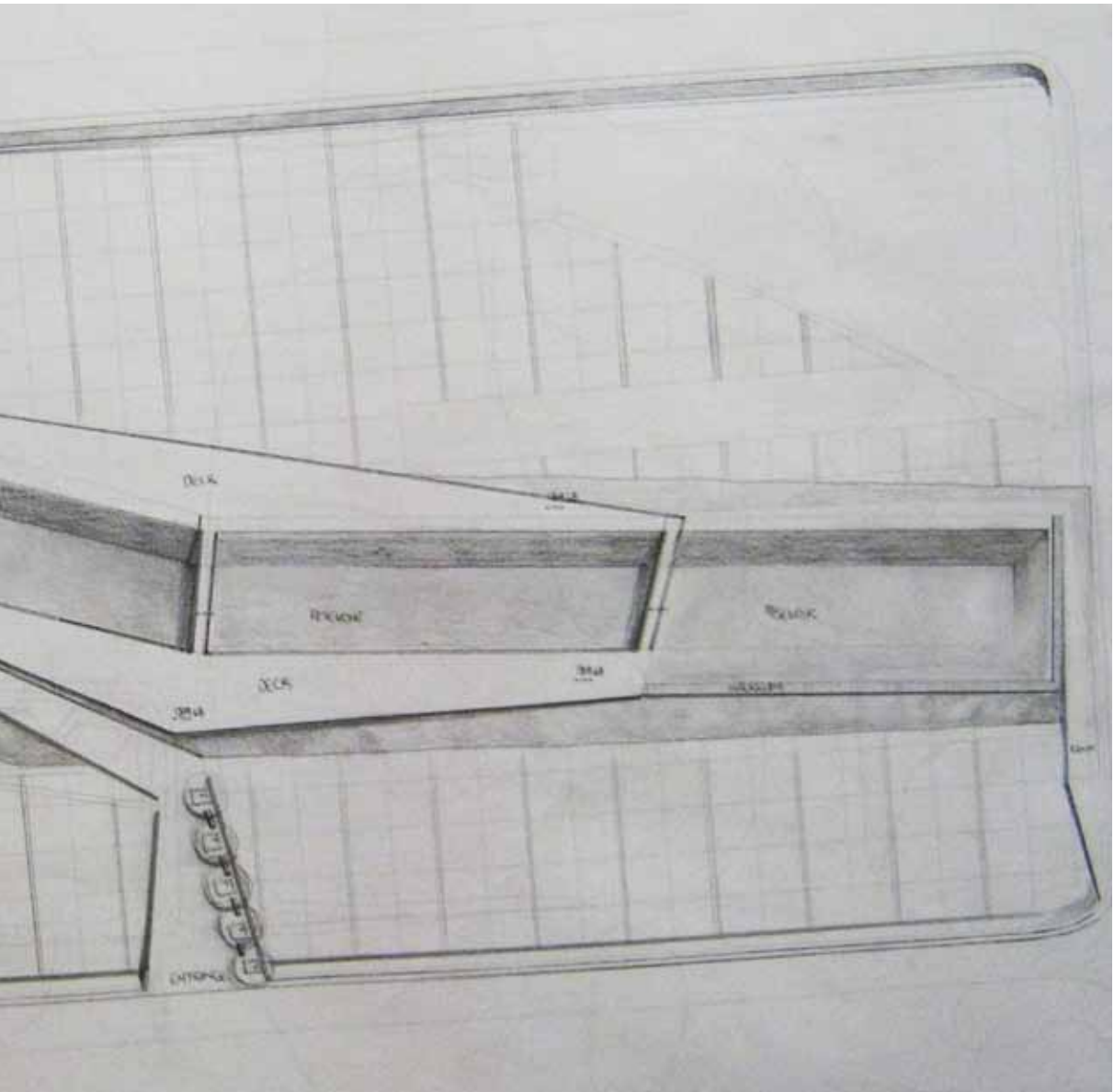


**Figure 66: Plot sizes**

Plots were sized to meet the needs of the demographic in the area (Author: 2012)

Plot size (m <sup>2</sup> )	plants per m <sup>2</sup>	interval between planting (weeks) (different areas, to ensure successive crops for the year)	Yield (farming handbook) tons / ha	yield kg /ha	yield kg /m <sup>2</sup>	no. of crops (harvests per year)	yield per year per vegetable type / 1m <sup>2</sup>
000 - 350000		2	18	16329	1.6329	4	6.5316
00 - 35000		8	20	18143	1.8143	1	1.8143
00 - 40000		3	60	54431	5.4431	2	10.8862
00000 - 2500000		3	30	27215	2.7215	2	5.443
			20	18143	1.8143	1	1.8143
00 - 120000			8	7257	0.7257	2	1.4514
00 - 100000		2	25	22679	2.2679	3	6.8037
000 - 800000		2 - 3 weeks	30	27215	2.7215	1	2.7215
00 - 55000			2.5	2267	0.2267	1	0.2267
0 - 10000			20	18143	1.8143	1	1.8143
00 - 55000			25	22679	2.2679	1	2.2679
			20	18143	1.8143	1	1.8143
000 - 340000			20	18143	1.8143	3	5.4429
00 - 20000		2	50	45359	4.5359	3	13.6077





**Figure 67: Plot sizes**  
Initial design of urban agriculture in the Steenovenspruit precinct (Author: 2012)



# Chapter 6 : Critique and Conclusions

## 6.1 Critique

The modern city has developed into a highly planned and controlled environment where land has become a commodity. A perpetual cycle of buying, developing and re-selling has emerged. This cycle reduces land to yet another product or commodity. The social geographer Peter F. Cannavo (2007) proposes that there is a global 'crisis of place', arising from a constant battle between development and defence of the landscape, which is having a negative impact on place and man's relationship to it.

*“An overbalance of founding embodied in state building and capitalism is opposed by overly preservationist movements in defense of place.” (Cannavo 2007:217)*

Initially man’s relationship with his natural environment was based in the working landscape. Man worked the land from which he gained his existence, he settled along rivers where land was fertile and water was plentiful. While settlements may have been fortified or enclosed, the wilderness or natural environment was dominant. Man’s impact was minimal and the relationship between man and his environment was harmonious. Man existed within nature and recognised his reliance on nature for water, food and other resources. Although many incremental changes to man’s way of life took place over time, fundamental changes were made in agriculture, textile and metal manufacturing processes during the Industrial Revolution. Advanced manufacturing techniques in industry led to increased supplies in all commodities. Gone were the time-consuming methods of construction, agriculture and manufacture, leaving man reeling with all the possibilities for perpetual advances in technology.

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Towns began to grow into large cities and large numbers of people settled in close proximity to working opportunities. With the increased concentrations of people in urban environments no longer cultivating their own land for subsistence, possibilities for large scale “industrial” agriculture opened up. Agriculture became mechanised and the close relationship that man once had to the land began to diminish. Nature no longer appeared to surround man, but rather existed within his constructed environment.

Cannavo draws a parallel between Scientific Agriculture and Modern “Mechanistic” cities. Where scientific agriculture simplified and rationalised the landscape, cities became laid out on a grid system. Farming became characterised by larger fields, uniform farming practices and mono-cropping and the standardisation of crops much like the city became characterised by its rigorous separation of districts and contemporary single use zoning. The agricultural landscape became easily mechanised for harvesting practices in order that produce be quickly sent to and sold in supermarkets. In the same way, cities became more efficient and rational and easier to monitor. Inhabitants now existed within their physical environments, which were standardised and normalised and the “street” died. The land use map of Pretoria CBD indicates the contemporary land use zoning of the modern age. Here entire city

blocks and precincts have a mono-use zoning, much like the mono-crops of scientific agriculture.

Sprawl and linear developments are results of the globalised, Information Age city, where communities no longer have the significance that they used to, because they have been replaced by a homogenous global culture. Places are no longer developed organically over time to suit a community’s needs but are rather conceptualised and implemented according to specific political, legislative and/or financial channels. Current day cities are even further removed from the natural environment. Most landscapes are no longer pristine and only occur within secluded, or inaccessible, places. Suburbia and industrial precincts stretch into seeming infinity, removing the cultivated landscape even further from the communities it supports. As previously used and industrialised, modernised urban areas fall into disuse, vast areas within the city are left vacant, having no ecological, social or economic use. Society is pre-occupied with consumption, even as far as the landscape is concerned.

Urban agriculture presents itself as an ideal landscape architectural response to the problems of the Steenovenspruit drosscape. However, landscape architecture is an on-going process. It encompasses more than just the real world solution by attempting to employ imagination and an understanding of the cultural world to create not only beautiful spaces, but also to enhance the *genus loci* of a place. Landscape architecture should not stop short at simply making a place functional, environmentally sensitive and sanitary to the human eye but should instead adopt a far more poetic, adventurous and even quixotic approach to the places we live in. If, as James Corner states, “landscape architecture is not simply a reflection of culture but more an active instrument in the shaping of modern culture” (Corner 2009:1) then landscape architects cannot simply be satisfied with supplying a diagnostic solution to a human problem. Humans are far more than their physical beings and so to should landscapes be more than their physical properties. Landscapes have the capacity to contain and express ideas and in doing so, engage the mind (Corner 2009:1).

*It is imperative that urban agriculture does not simply become another step towards commodifying the landscape.*



**Figure 68: Traces of Production**

A tunnel and water storage tank noted on the corner of Proes and DF Malan, does not meet its full potential as a landscape element (Author: 2012)

## 6.1 Conclusions

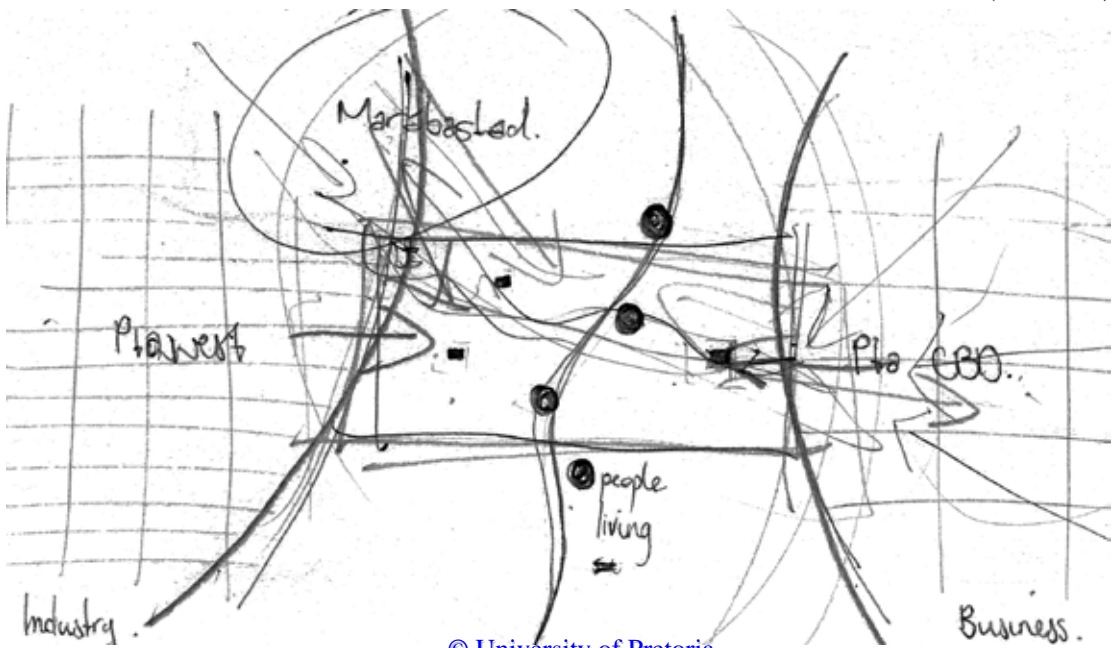
The initial intention of the dissertation was to investigate whether urban wastelands on the periphery of the Pretoria CBD have potential to be designed and developed into agrarian conservancies.

The Steenovenspruit precinct meets a number of requirements which are necessary for agriculture. With the implementation of water harvesting strategies, such as a hydraulic ram, the area becomes a feasible site for the implementation of urban agriculture.

However, it is suggested that urban agriculture should not be the sole focus of any landscape architecture intervention. Agriculture should be a medium for expression in the landscape but should not be the final objective, due to the danger of it becoming yet another rationalist land use activity, applied without consideration of the *genus loci* of a place.

**Figure 69: Agriculture as connective tissue**

The conservancy should link the two alienated nodes of Pretoria West and the CBD, as opposed to becoming a buffer zone  
(Author: 2012)





# PART TWO: Cultivating Place





# Chapter 7

## 7.1 Introduction

Urban agriculture as a response to the problems of the modern city is a plausible approach to remediating the wasted landscapes of the city. However, it poses the problem of becoming yet another attempt at solving problems from a purely rationalist position, without considering the human element. James Corner states this problem in the following way, "...the culturally innovative aspects of landscape architecture are often overlooked or even suppressed as emphasis is placed on more technical procedures aimed at the restoration of an essentially cultureless natural world" (Corner 2009:3). But what of the *allure* of the natural world, the relationship of man to the land he lives on, the ritual of cultivating the landscape and the celebration of the evanescent moments of the ever changing place in which we live? Man's relationship to the landscape has altered significantly over time. Land became accepted as a commodity, transforming from its celebrated natural state expressed as art, to the currently prevalent culture of property use which caused it to lose its artistic and moral force. Landscape became a scientifically defined object.

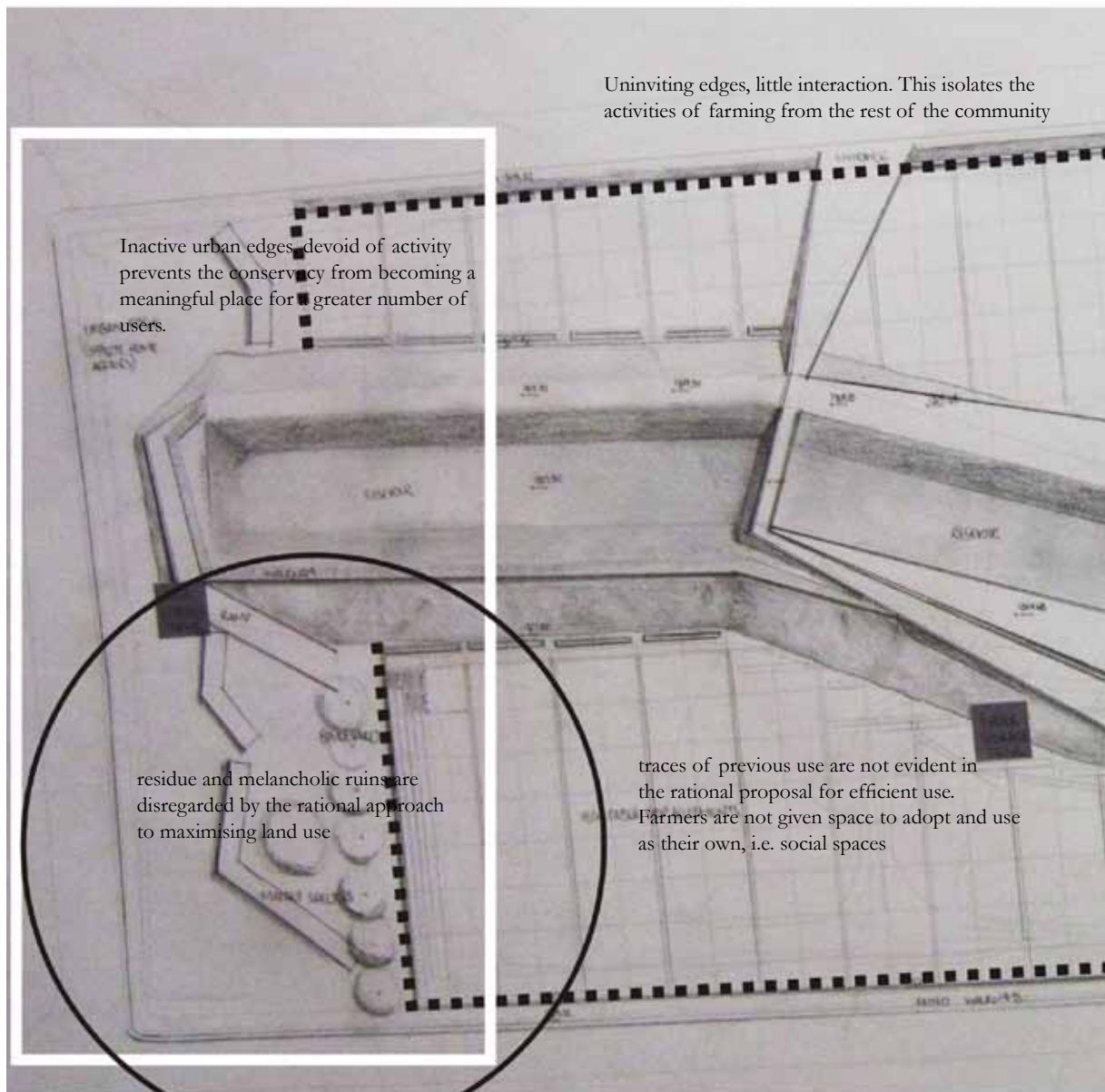
According to Jan Martin Bang, author of the book 'Ecovillages', human beings are defined by their identity as opposed to their purely physical needs of food, clothes, shelter and work. Identity gives rise to other phenomena such as the ability of humans to achieve self-realisation, democracy, sustainable development and creativity. He goes on to say that creativity is the ultimate expression for individual identity. This can also apply to a larger community of people who exercise creativity and together achieve a group identity (Bang 2005 :229). Part two of the dissertation aligns itself with the view that human environments should be more than just functional, but also culturally expressive places.

Even purely functional land use such as agriculture in an urban context, which provides man with the fundamental human needs of food, work, and opportunities for economic upliftment, shelter and the ability to clothe himself can give rise to a culturally significant place with a *genus loci* and spatially enticing spaces.

## 7.2 Problem Identification

The rational application of urban agriculture to the Steenovenspruit drosscape does not remediate the perception of land as a commodity; instead, it perpetuates the cycle of dismissive land use by only temporarily solving the problems of human need. The residual meaning within the drosscape which alludes to the significance the site once had is not celebrated in the impartial implementation of urban agriculture. By failing to take the past into consideration, the intervention will further contribute to the modernist tabula rasa approach which creates a sterile environment and isolates the new intervention from the city, despite its proximity.

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Uninviting edges, little interaction. This isolates the activities of farming from the rest of the community

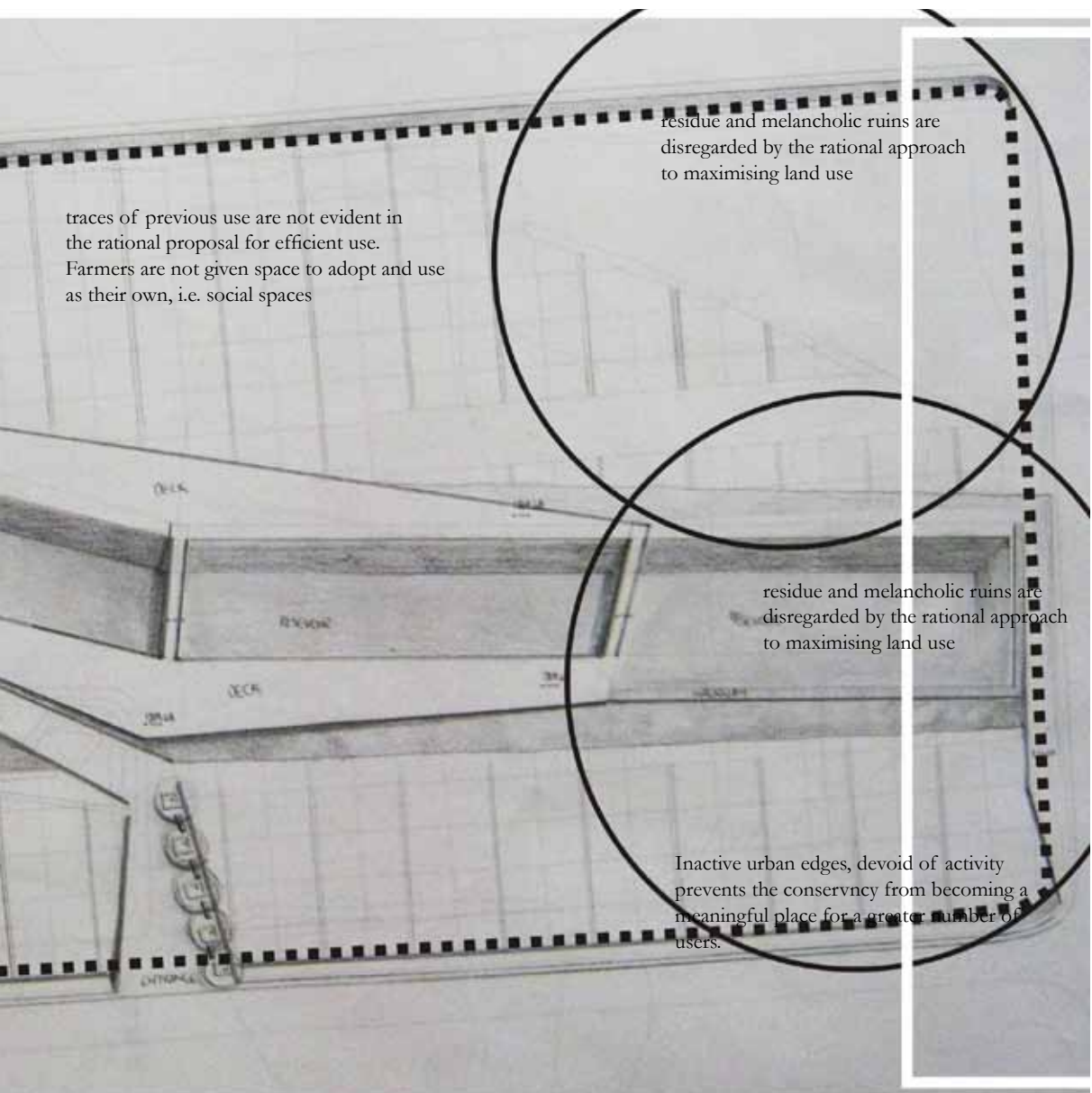
Inactive urban edges, devoid of activity prevents the conservancy from becoming a meaningful place for a greater number of users.

residue and melancholic ruins are disregarded by the rational approach to maximising land use

traces of previous use are not evident in the rational proposal for efficient use. Farmers are not given space to adopt and use as their own, i.e. social spaces

**Figure 70: Rational plan**

The rational plan developed in Part one is critiqued below, highlight major problems to be addressed in Part two (Author: 2012)



## 7.3 Hypothesis

**A palimpsest emerges out of the faint residue of past uses, displaying traces of the character the site once had. The dissertation proposes that by capturing the essence of these past layers of productive use and further enriching the palimpsest with new traces of both farming and garden spaces, meaning and experiential use of the land will be returned to the site.**

Functional landscapes can be poetic, delightful spaces which entice people and enhance their quality of life. A sensitive and creative approach to the implementation of city farming in the Steenovenspruit drosscape can transform the modern industrial city into a place with which the inhabitants can identify. Form will not only follow function, but will also enhance and express the celebration of man's working relationship with the land that sustains him. Evidence of a sensitive approach towards the past, the present and the future of the site will enhance the expressive nature of the farming landscape.

Through the cultivation of an inhospitable urban landscape the current users will establish a vital relationship to their environment that though it may change over time, will do so because of their cultivation of the area as a *place*.

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## 7.4 Design Question

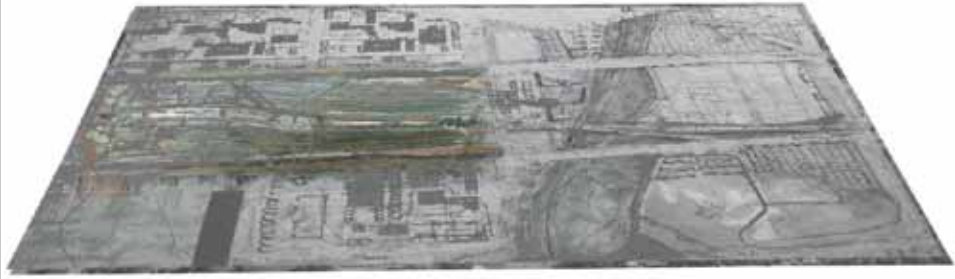
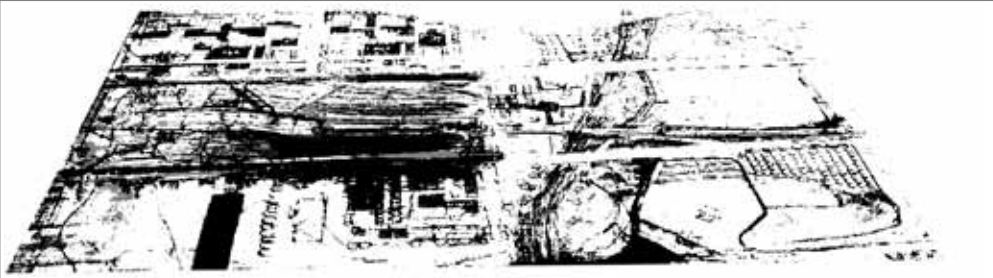
Can an inherently functional element and consequent surrounding land use become an expressive feature that will have an enduring impact on the surrounding landscape? By enhancing the spatial quality of the urban agriculture intervention will people be able to inhabit the space, and cultivate relationships with the landscape as a place and with each other through common participation and experience?

## 7.5 Technical Question

How can materials, varying construction methods, and technical farming aspects denote spatial character to a place? What technical aspects of the site should be designed as permanent, fixed elements and which should be designed as flexible or temporal elements, in view of a future with diminished oil resources?

### Figure 71: Essence

Each development of the area leaves traces and residue on the landscape creating an accumulated palimpsest of layers on the cultural landscape (Author: 2012)





# Chapter 8 : Theory

## 8.1 Introduction

Drosscapes and wasted landscapes occur in cities and urban environments throughout the world. Alan Berger (2006) defines drosscapes as those landscapes which “*accumulate in the wake of the socio- and spatio-economic processes of deindustrialization, post-Fordism, and technological innovation*”. For the purposes of the dissertation the term drosscape incorporates the left over, unused, derelict and discarded pieces of land deemed unsafe by the general public, avoided by the government, developers and the majority of urban dwellers alike. These are often deserted brown-field sites, contaminated former industrial sites, waste disposal sites and storage areas among other things. In the planning of the apartheid city these areas were often used as buffer zones between black and white communities, affluent and poor communities. Due to the current consumerist nature of society, the spaces are often abandoned in the name of technological advancement, and left to decay, with little or no worth attributed to them besides that of monetary value. This leaves gaping holes of unused space within the urban fabric of many cities.

The Steenovenspruit Drosscape, west of the Pretoria CBD is identified as a wasted landscape. Originally a residential area for “non-whites” and the Pretoria Townlands, which included workshops, compounds and stables, the precinct is now an abandoned light industrial site. It is currently a transitional area between the city, Pretoria West and Marabastad. Landscapes which reveal layers of previous use and meaning are analogous of the Medieval parchments which were used multiple times to convey various messages. Both the landscape and the parchment are scraped clean for re-use, but when carefully examined reveal residue, faint legible remains of what once was. This concept is termed palimpsest.

A palimpsest made up of layers of use and significance is apparent below the degraded, dusty surface of the current drosscape, revealing evidence of the meaning the site once had. The site also contains traces of current activity and is appropriated informally by vendors and the urban poor, rubbish, burnt areas, shelters and vendor stalls are scattered across the site. The site holds specific meaning to many individuals and a great deal of untapped potential.

However, for all its potential, the identified site does not currently contribute positively to urban society’s quality of life. It could be said that the Steenovenspruit drosscape is a place in limbo, currently unstable and inefficiently used, but on the brink of change. Thus the Steenovenspruit drosscape is part of the global phenomena described by Cannavo as a ‘crisis of place’.

## 8.2 Place and the Balance of Founding and Preservation

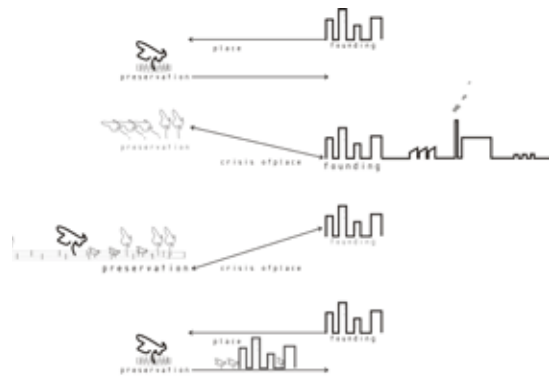
Place in its simplest form is described as space which is occupied by anything. In the design realm place is described as having a “genus loci” – a specific character which, according to Edward Relph in his article titled ‘Place Reclamation’ (Relph 1993: 102) “has to evolve, to be allowed to happen, to grow and change from the direct efforts of those who live and work in places and care about them”.

Place is described as being inhabited and as having a “character” or spirit which renders it an inherently cultural construct. Only human beings are able to perceive a place as having a genus loci or distinctive atmosphere. Thus place exists because people experience it and interact with it.

A crisis of place suggests that these “places” are suffering an almost human phenomenon, facing an

impending abrupt turning point. By attributing these human qualities to place it strengthens the view that people are able to relate to places because of the specific “character” of the site.

Cannavo attributes the crisis of place to the unbalanced relationship between founding and preservation. Founding is the development of place and preservation is the defence of both place and untouched nature.



**Figure 72: Balance of founding and preservation**  
Place occurs when neither founding nor preservation takes precedence (Author: 2012)

The simple naming of a place upon discovery, is an example of founding. The introduction of a shelter, a pathway, farmlands, meeting places, gardens and entire urban areas are all examples of founding. Founding can happen in one’s imagination in which case it is a very personal experience, or in a physical sense when something is added to an existing place or a previously “untouched” wilderness. Physical founding of place permanently alters it for a greater number of people. Founding becomes negative when it disregards history and the natural environment and can be aligned with the current land use tendencies evident in Pretoria.

Some examples of preservation in Pretoria include old buildings such as those around Church Square, and in a natural sense the ridges throughout the city which are reserved as ecological corridors. Preservation becomes negative when it retards necessary founding.

While both founding and preservation are necessary in order to combat environmental degradation, sprawl and authoritarian urban development, it might become necessary to lean more towards the one than the other for a time. “In practice, one generally preserves some aspects of a place while changing others” (Cannavo 2007: 43). The two *should* be intricately linked, and it is only when the two are torn asunder that a crisis begins to take place. A balanced integrated

relationship between founding and preservation leads to the creation of healthy places.

The crisis of place experienced in the Steenovenspruit drosscape began with the development of the segregated, colonial city but became aggravated by the founding ideals of the Modern approach to city design, an ideological approach to developing living environments for vast numbers of people which often disregards history. Logical grid like layouts, mono-use areas, engineered spaces and the death of public spaces lead to the disintegration of community and the significance of place. Nowadays, the Steenovenspruit drosscape is neither being founded nor preserved; instead, it is left to decay with time and neglect.

While the City of Tshwane attempts to re-develop the area by proposing a residential development for students and young people they display a pre-occupation with founding and do not take preservation into account, creating the ideal environment for a crisis of place to begin yet another cycle.

### 8.3 The Interpretation of founding, preservation, conservation and erasure

Founding of place is also described by landscape architect Christophe Girot in his article 'Four Trace Concepts in Landscape Architecture'. Girot describes founding as "bringing something new to a place, something that may change and redirect a particular site." Founding can be either conservative or innovative. Conservative founding refers to some past event or circumstance. Innovative founding concerns itself with bringing something completely new to a place. Founding is always a reaction to something that already occurred in the space and inevitably happens when something new is introduced (Girot 1999 : 64).

It is thus proposed that (innovative) founding as both Cannavo and Girot describe it is ultimately an **origination of something new** within an existing context. What Girot refers to as conservative founding, may be aligned with the concept of preservation as Cannavo describes it. Girot describes conservative founding as referring to **"some past event or circumstance"** that **Cannavo might describe as worthy of "maintaining or physically caring for"**.

According to the Australian ICOMOS Charter for Places of Cultural Significance, titled the Burra Charter, conservation and preservation have the following definitions: (Australia ICOMOS 1999: 2)

"Conservation means all the processes of looking after a place so as to *retain its cultural significance...* for past, present or future generations".

"Preservation means maintaining the fabric of place in its *existing state and retarding deterioration*".

While preservation and conservation have different definitions according to heritage standards both are ultimately concerned with *retaining something of value*.

The dissertation challenges the idea that preservation should be linked to founding, and suggests that preservation can cause a place to become static by maintaining an existing state, and as such should be replaced by the ideals of conservation which retains the cultural significance of a place while allowing it to be used. Preservation of the limited resource of natural/pristine land is integral. However, conservation is seen as more appropriate in the urban environment. It is important to the dissertation that historical significance is retained. However, it is also necessary to restart the evolutionary process of place through founding which may be termed as the constant 'refounding' of place.

What both Cannavo and Girot fail to discuss in detail is the concept of "erasure", assuming perhaps that as part of founding certain elements are erased or removed in order to accommodate the new. However "erasure" needs to be incorporated in an approach to places where it is necessary to remove before founding can occur, or in order to preserve a place.

### 8.4 Refounding:: a conservation centred approach to place-making

Places are continually experienced by their users, and incrementally refounded through these experiences. One of the key characteristics of place is that it is a process, and not a static concept. Place is thus constantly in flux, due to social and ecological influences. People constantly respond to places and as a result alter them to better suit their needs, causing place to be constantly "refounded" and "unfinished".

Re-founding incorporates both the initial founding and origination of something new as well as the preservation of that thing in the case of future introductions.

Conservation can be aligned with the concept of

refounding. Refounding becomes a constant cycle of place-making. Although changes might occur over time, the place is ultimately conserved as a significant place for its inhabitants. Thus it becomes key to the success of the conservancy as a place that the inhabitants play a role in the founding, erasure and preservation activities of a place. The direct efforts of those who live in and care for the place, will allow for a constant evolution of place and identity to suit the needs of these users. Constant refounding will enrich the underlying palimpsest with new layers of use and significance.

Constant transformation or re-founding is evident in a place which can be read as a palimpsest, where new use, development and experience are continually added but places of significance are retained or preserved over time. Transformed landscapes are continually traced on, perpetuating the on-going process of place-making through man's interaction with it. Designers should always consider the user's needs when transforming a place.

## 8.5 Traces and Participation

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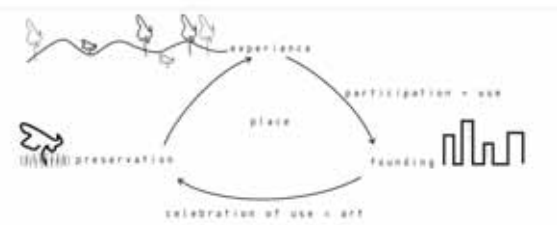
Refounding occurs because of people's interactions with place. These interactions or activities leave evidence in the form of traces on the landscape. John Zeisel in his book 'Inquiry by Design' discusses traces as a means to understand what people do in and to settings. By understanding traces designers are better able to design places more suited to what people actually do" (Zeisel 2006: 169).

The crisis of place experienced in the Steenovenspruit drosscape leads to problems of lack of ownership and identity. While the site is home to the marginalised urban poor of the city, they have not fully asserted ownership over this site, and cannot draw identity from the site because while they live in the area they do not directly participate with it as a whole. Thus they do not permanently effect large scale changes in their environment which would result in a constant evolution of place and the reassertion of its *genus loci*.

Zeisel's idea of traces is interpreted into two specific categories for the Steenovenspruit Drosscape, namely Erosion and Residue. A place is personalised by constant use or removal of objects which results in erosion. Residue is evident in additions to places, or those objects which are left behind as a result of use. Essentially traces are evidence of people's activities on site and can occur on a large or small

scale and help one to read the landscape as place.

What becomes clear from John Zeisel's work is that people will always redesign a place to suit their specific needs. This theory is echoed in the book 'Urban Flotsam', "*We scratch, mark or otherwise articulate the surface of the ground, to place and orientate ourselves.*" Human beings are most likely to identify with an environment that they have a "personal attachment" to (Bunschoten 2001: 21), through participation with that environment, which they have played a role in creating, shaping and moulding.



**Figure 73: Experience, founding and preservation**  
experience leads to founding, founded places are very often preserved due to their cultural meaning (Author: 2012)

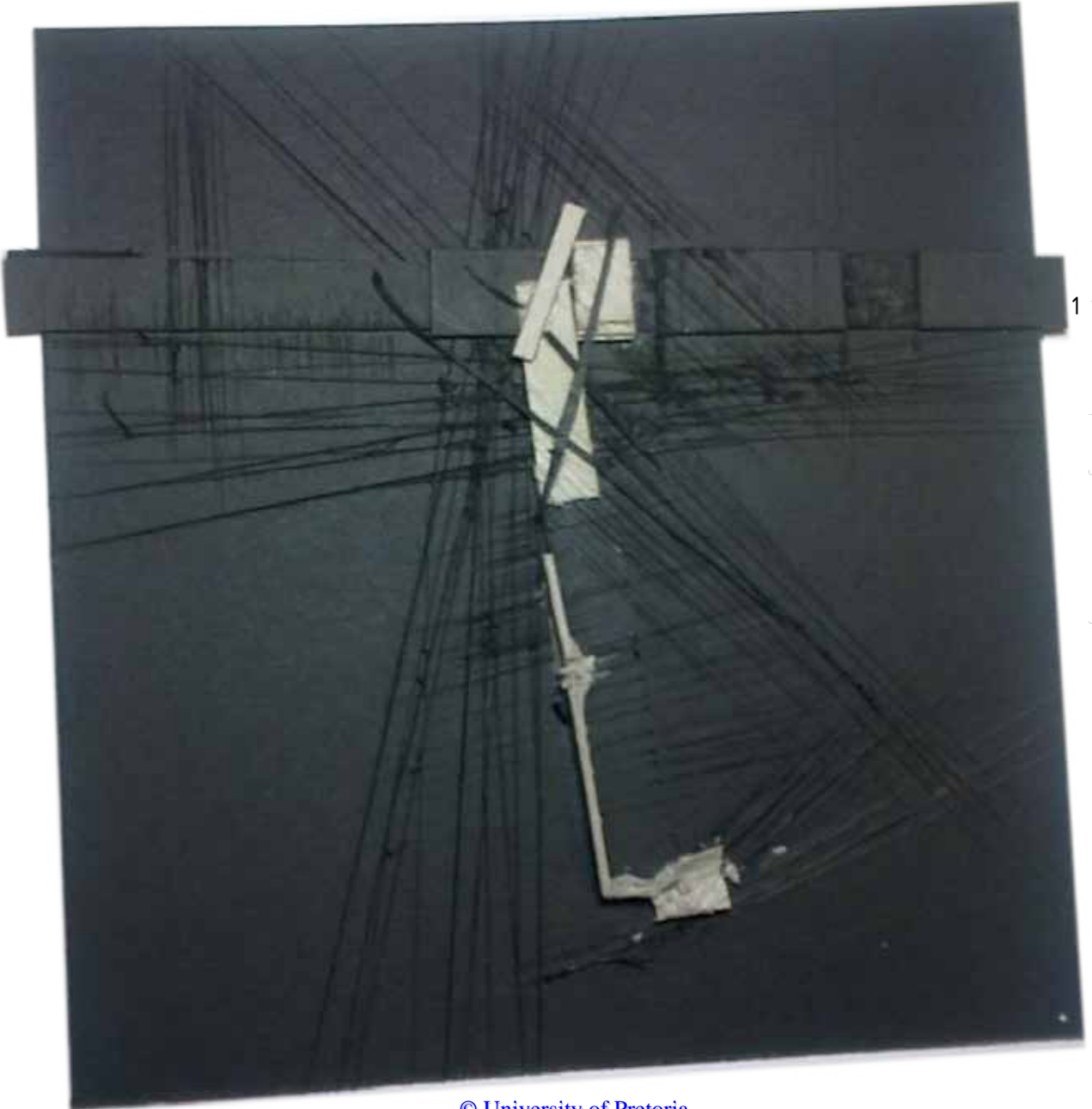
Essentially man gains knowledge of place by experiencing it. The word 'experience' originates from the word "*experientia*" which means "*knowledge gained by repeated trials*". Thus, when man participates with his surroundings, for instance in the repeated trials of agriculture, he gains direct knowledge of the place. A landscape becomes meaningful to a person, when it is perceived and experienced by him or her. It becomes **founded** as a place of significance when it is participated with. Participation necessitates that one becomes actively involved in something. Thus through the *collective*, communal experience of a place through participation with it, it becomes founded and celebrated for its significance. Over time, the community's needs alter making the refounding and conservation of place necessary - to retain significance yet enhance the evolutionary process of place. Traces allow the landscape to be read and remain authentic in their transformation.

This body of theory is integrated into the idea of refounding to create a comprehensive theoretical standpoint for the development of the Steenovenspruit Agrarian Conservancy over time.



**Figure 74: Traces**

Landscapes are traced on. Once a landscape has been experienced and founded it is constantly refounded. This is evident in the traces of residue and erosion left behind by users (Author: 2012)



## 8.6 The Working Landscape

The term “working landscape” may generally refer to agricultural lands which are characterised by a long standing, balanced relationship between human and natural forces and is not a mechanised, chemically intensive, agricultural countryside aligned with industrial agriculture. A working landscape is formed through ongoing human activities as well as by time and natural processes and can more accurately be described as having intricate patterns of cultivated lands and natural habitats.

**These working landscapes have a distinctive character, which continually change to meet the needs of the people who live and work in the landscape.** A working landscape does not only have to be applied to the rural landscape, but can be applied as a concept for urban centres as well. Working landscapes are ongoing projects formed by the collective activities of many individuals and generations over time.

The paintings by Peter Breughel (right) depict a working relationship where man’s life revolved around the land he cultivated. **Life was ordered according to the seasons and farming activities that took place in a cyclical fashion. Celebrations took place when the land gave plenty and hardships were suffered when the land withheld her bounty.**

1 1 1

### 8.6.1 The development and subsequent decay of the working landscape

Over time the Medieval Manor came to exist within an enclosed environment with the wilderness on the outside. Within the manorial settlement was an enclosed productive landscape. Villages were fine grained and developed organically. There was an equal balance of buildings and productive gardens. Hedges separated the patchwork of gardens and homes, and roads created a network of movement among the homes. The village had a very human scale. As settlements and communities became more established settlements became larger and more defined. The affluent lived in fortified or enclosed spaces on large pieces of land and had an influential role in the development of the cultural landscape, especially in the Renaissance era. Gardens were designed for aesthetics and pleasure. **The agrarian, working landscape became secondary to the experiential gardens of the affluent. The wilderness still had a powerful character outside of the walls. Agriculture was imperative to staying alive but was not celebrated in the same**

**way as it had been during medieval times.**

Towns began to grow into large cities and nature within the city was altered. Man became more attuned to his constructed environment and was removed from close proximity to nature by the urban environment and the expanding agricultural lands. Parks were designed within the city fabric. Although a patchwork or mosaic is still evident in old cities with parks, industrial areas and residential areas, newer urban development has taken on an homogeneity that is the direct antithesis of the working landscape.



**Figure 75: Monastery as working landscape**

Life in a monastery played out in the working landscape. Activities were influenced by the seasons (Landsberg: 1998)

In order to transform the Steenovenspruit drosscape into a conservancy and successfully oppose the growing ‘crisis of place’ designers need to move away from both scientific agriculture and modernist cities.

The design for more sustainable landscapes must allow for a future where cities that have been developed according to modern ideologies may fail, and the infrastructure built to sustain these cities will no longer be functional. A project such as the Steenovenspruit Conservancy should accommodate and encourage community interaction once again. The working landscape promotes a more compact, complex tapestry of human habitation that preserves larger pieces of land for necessary food production. This concept needs to be cultivated among people in cities in preparation for a period when food security requirements need to again be locally produced as in pre-industrial times.

The proposed Steenovenspruit Agrarian Conservancy is a working landscape which will take existing traces and refound a place around them. Infrastructural, functional elements will be



Figure 76: Pieter Bruegel the Elder: Haymaking  
(Wikipainting)

Figure 77: Pieter Bruegel the Elder: The Harvesters (19.164)  
(Metropolitan Museum of Art)



introduced to the site. New opportunities will arise for the public to mould and trace onto the landscape, in order to enrich the palimpsest and allow for a dynamic, constantly re-founded place to emerge out of the direct participation of its users.

## 8.6.2 Examples of the working landscape

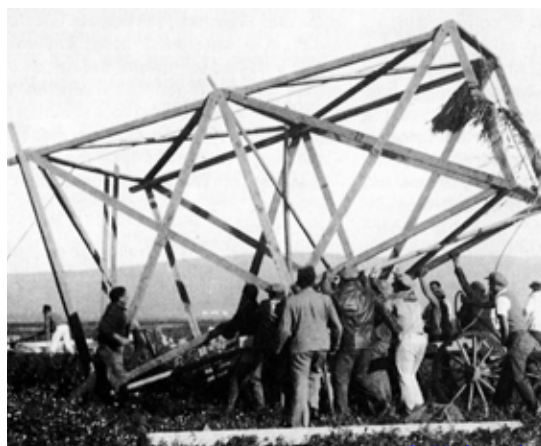
Working landscapes which also acted as conservancies are the kibbutz and the monastery. Monasteries were central to working landscapes and even within their walls were structured along productive lines. Every area had a function, and while form followed function the constructed elements were incredibly beautiful in their own way.

A kibbutz is a more modern example which is also an example of how various activities all contribute to make a working landscape, while kibbutz are often designed as utilitarian developments, there is an emergent beauty in the day to day rituals of farming and the celebrations which are often directly linked to the land.



**Figure 78: Kibbutz as working landscape**  
Photos from Ariah Sharon's website about the kibbutz and architecture (Sharon)

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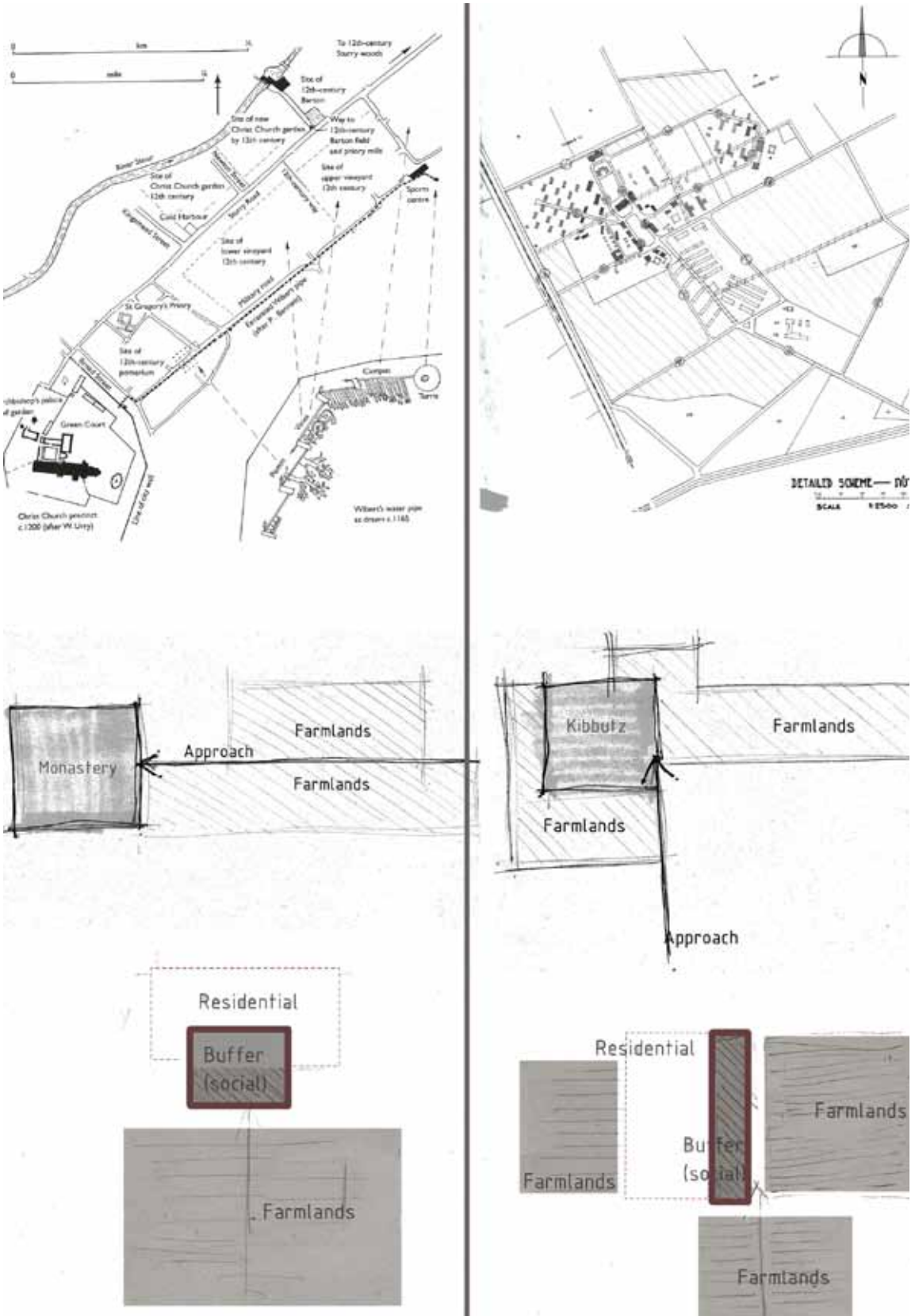


Figure 79: Kibbutz and Monastery comparison  
Parallels are drawn between the Kibbutz and the Monastery as typologies for agrarian living (Author: 2012)  
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## 8.7 Summary of the Theoretical Investigation

Essentially place develops over time through constant use by a community. This results in both founding and preservation evident in the working landscape which is made up of traces of past *and* current use.

### 8.7.1 Place in limbo

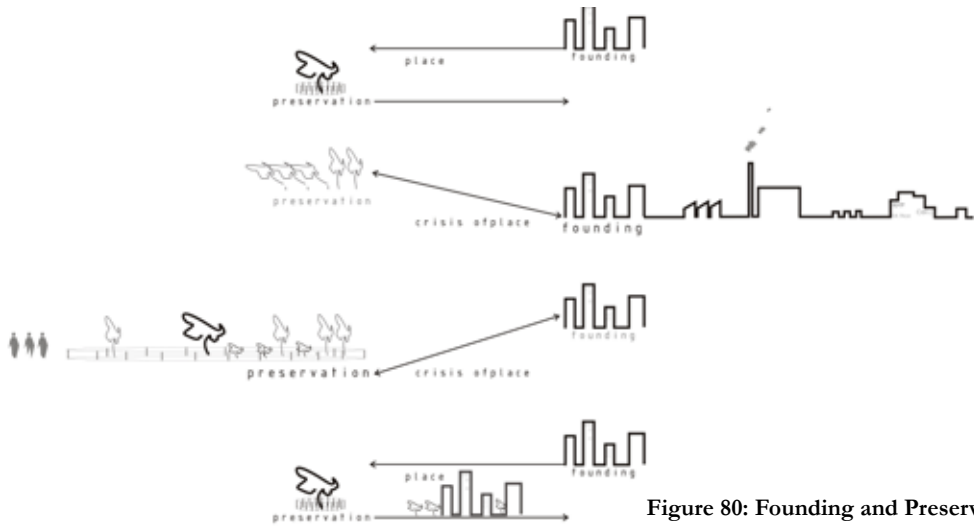
The Steenovenspruit drosscape is a place in limbo,

man of experience.

late 14c., from O.Fr. *experientia* “knowledge gained by repeated trials,” from *experientem* (nom. *experiens*), prp. of *experiri* “to try, test,” from *ex-* “out of” + *peritus* “experienced, tested.” The *v.* (1530s) first meant “to test, try;” sense of “feel, undergo” first recorded 1580s.

### 8.7.3 The working landscape

The term “working landscape” may generally refer to agricultural lands which are characterised by a long standing, balanced relationship between human



**Figure 80: Founding and Preservation**

A place in crisis is much like a place in limbo (Author: 2012)

similar to Cannavo’s concept of the ‘crisis of place’ as an unbalanced relationship between founding and preservation. The Steenovenspruit is experiencing a crisis due to the constant intention of founding (development) with little consideration given to the preservation of past significance.

and natural forces and is not a mechanised, chemically intensive, agricultural countryside aligned with industrial agriculture. A working landscape is formed through ongoing human activities as well as by time and natural processes and can more accurately be described as having intricate patterns of cultivated lands and natural habitats.

### 8.7.2 Experience:

Knowledge or practical wisdom gained from what one has observed, encountered, or undergone: a

**These working landscapes have a distinctive character, which continually change to meet the needs of the people who live and work in**



**Figure 81: Experience**

The process of place occurs because of how people experience their surroundings (Author: 2012)

**the landscape.** A working landscape does not only have to be applied to the rural landscape, but can be applied as a concept for urban centres as well. Working landscapes are ongoing projects formed by the collective activities of many individuals and generations over time.

### 8.7.4 Traces

Refounding occurs because of people's interactions with place. These interactions or activities leave evidence in the form of traces on the landscape. John Zeisel in his book 'Inquiry by Design' discusses traces as a means to understand what people do in and to settings. By understanding traces designers are better able to design places more suited to what people actually do" (Zeisel 2006: 169).

**Figure 82: Traces**

Traces are evident in historical working landscapes (Author: 2012)



- Traces:
- settlement
  - journey
  - gathering and business
  - gardens / ritual spaces
  - interaction with water



**Figure 83: Founding and preservation in the working landscape**

The kibbutz as an example of the development of a working landscape through the processes of founding, preservation and experience (Sharon)





# Design development

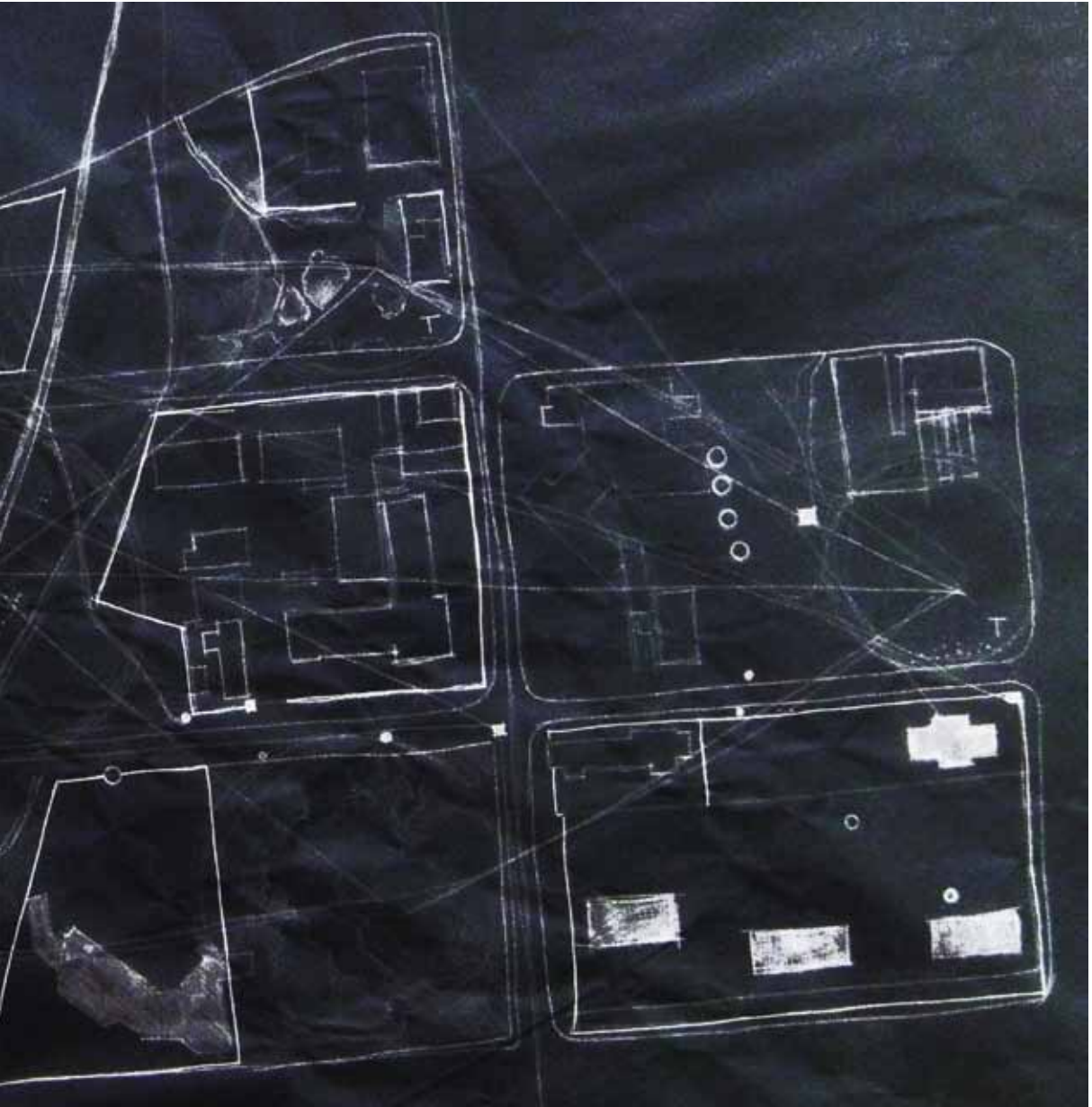
## 9.1 Steenovenspruit Drosscape as Palimpsest

The city of Pretoria evolved over time from its original founding as the farm Elandspoort, into its modern day status as the administrative capital of South Africa. The Steenovenspruit Drosscape emerges from the urban fabric of Pretoria as a palimpsest of place. Although this site has been identified as a waste landscape there is still evidence of its previous use and significance.

In landscape architecture the term palimpsest is used to denote a place in which the previous layers of use are faintly evident, despite being developed, perhaps many times over. Although previous use may have been “erased” the essence of the place remains in clues or traces of erosion and residue, scattered throughout the landscape.

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**Figure 84: Palimpsest**  
Constant refoounding of the site has led to the development of a palimpsest. However, the site now exists as a decaying wasteland in the city (Author: 2012)  
© University of Pretoria

Over time Pretoria developed from a small town into a large modern city. Agricultural land was swallowed up by suburban settlements and an industrial sector was established in the west, beyond the Steenovenspruit. The area between the Pretoria CBD and the industrial sector of Pretoria West, through which the Steenovenspruit runs, was developed for specific use as a light industrial area named the Pretoria townlands. The original buildings were demolished to make space for proposed developments which never materialised and as a result the area was left to fall into a state of decay...a ‘place in limbo’.

Traces are dotted throughout the study area and initially appear to be unrelated. After exploring the site in more detail it becomes apparent that the traces are interlinked to form a greater whole: a light industrial drosscape in the form of a palimpsest of hidden layers of significance and potential.

The oldest trace of the palimpsest, the “Steenovenspruit” watercourse occurred to the west of the original Pretoria town boundaries and would only have been channelled in later years. Originally the stream would have flowed through an indigenous

67 erfes were laid out to the west of Schoolplaats, the original mission church land which housed black people outside the city boundaries. The area was named after Chief Maraba who had served as the translator for the landdrost (magistrate) of Pretoria. The Asiatic Bazaar was established for the growing Indian population of Pretoria and in the 1890s an area south of the Asiatic Bazaar was set aside as the Cape Location. Houses were built out of **burnt brick and corrugated iron**. It was a vibrant, social community with “Tea meetings, dances and illicit beer brewing...(which) provided new comers with mechanisms to cope...” (Freidman 1994: 74)

The Pretoria Townlands existed between the Asiatic Bazaar erfes to the north and De Kerkhof (later to become known as Hero’s Acre Cemetery) to the south. These townlands consisted of the municipal stables, workshops, “native” compounds and hostels as well as a detention facility.

The Steenovenspruit became channelled, and although it follows the original stream bed, for the most part it has been altered from its natural form into an engineered, functional conduit for stormwater removal.

A large number of residential stands were destroyed and removed in order to make way for a proposed highway and modernist housing scheme. The highway was never built and the only existing modernist residential buildings in the area



**Figure 85: Historical approach**  
 Painting of the original access into Pretoria from the west. Agricultural lands appear to be depicted on the left of the painting by hedges and a small herd of animals (Engelbrecht 1952)

natural grassland and savanna mix landscape. There are paintings and sketches which suggest the land surrounding the stream was used as grazing lands.

The image above shows the original Church street (Stanza Bopape) crossing over the Steenovenspruit. Pretoria can be seen in the background of the image, while the foreground is a predominantly agrarian scene, with the land divided by hedgerows and livestock visible in one of the encampments, either grazing, or being used to plough the lands.

In August 1888 Marabastad came into existence after



**Figure 86: Historical layout of Marabastad**  
 Image appears to be taken from the northern boundary of Marabstad, looking towards the south-east. Small brick houses with corrugated iron roofs (Van der Waal collection)

are Kruger Park and Schubart Park, which in recent years have become vacant, melancholic ruins of the modernist ideal, echoing the abandoned and underutilised nature of the surrounding landscape, which forms a part of the Steenovenspruit drosscape.

The areas originally covered in residential erfes and utilised for the activities associated with the running of the city were razed to the ground and left to



**Figure 87: Historical city boundary**

The western boundary of the city stopped just short of the Steenovenspruit. Thus the site would have fallen in natural vegetation / grazing lands before becoming re-founded as the Pretoria Townlands (De Klerk)



**Figure 88: Urban development of the site**

In later years the area to the west of the original boundary was developed along a fine grained grid system, with a central large open area centering on the site. A workshop and stables occurred on site, indicating a trace of productivity on site of which there are very few identifiable traces (De Klerk)



**Figure 89: Decaying wasted land**

The site now lies abandoned and decaying. Traces of the buildings that once existed on site are evident, however very little physical evidence speaks of what the original programme of the buildings once was (Author: 2012)

decay. However, evidence of their existence is still visible across the site. The native compound was replaced by the municipal waterworks administration blocks and the detention facility has since become a skills training centre.

Evidence of nature “fighting” to regain a foothold in the Steenovensruit Drosscape, is visible in the patchwork of green scattered throughout the site.

These areas are predominantly covered in weeds and scattered grassland species, and lawns are maintained in some areas. The spaces do not currently contribute to the biodiversity status of the city. However, they do illustrate the resilience of nature and her ability to heal the landscape despite man’s attempts to control it.

The emerging palimpsest records the activities which took place across this landscape over the years.

A patchwork of materials, vegetation, engineering feats, human movement patterns and activities animates an otherwise seemingly dead and decaying urban space. A melancholic, poetic essence pervades the Steenovensruit drosscape, but is hidden from visitors who perceive the site as predominantly impenetrable and unsafe.

1 2 3

## 9.2 Site context and significance

Although a thorough environmental potential analysis was completed in Part one, little attention was given to the hidden beauty of the site or its significance to the urban poor currently living in the area.

The water on site has meaning beyond its environmental potential as a resource. Activities taking place on the banks of the Steenovensruit include bathing and washing clothes. Evidence of “settlement” is also evident in the small, roughly constructed shelters and burnt out “fireplaces” across site.

It is also evident in the clearings of vegetation across the site where people journey most often. Intersections appear to be wider at some areas than others, especially along major routes, indicating where social interaction may occur.

There are ruins and structures on site, left over from previous layers of use. Evidence of current use is evident in some of these areas as well.





Figure 90: Site photographs  
(Author: 2012)

## 9.3 Concept Development

Out of the palimpsest emerges a series of traces, aligned with the current activities taking place in the Steenovenspruit drosscape as well as being evidence of past activities which took place in the spaces.

The four main traces that emerge are:  
water;  
journey;  
settlement and;  
gathering.

Many other traces exist and influence the final design, however the four main traces are used as a basis from which to begin.

Urban agriculture was discussed in Part 1 as a solution to the large abandoned space surrounding the Steenovenspruit. The dissertation argues that urban agriculture as a purely rational response will not restore the process of place to the Steenovenspruit drosscape. However, when the poetic nature of cultivation is discovered once again and celebrated in the functional landscape of production a place begins to emerge through participation, experience and interaction. City farming is thus proposed as a 5th trace in order to return the Steenovenspruit drosscape as a place with a productive *genus loci*, that is both functional and expressive and in which its users can cultivate identity and relationships.

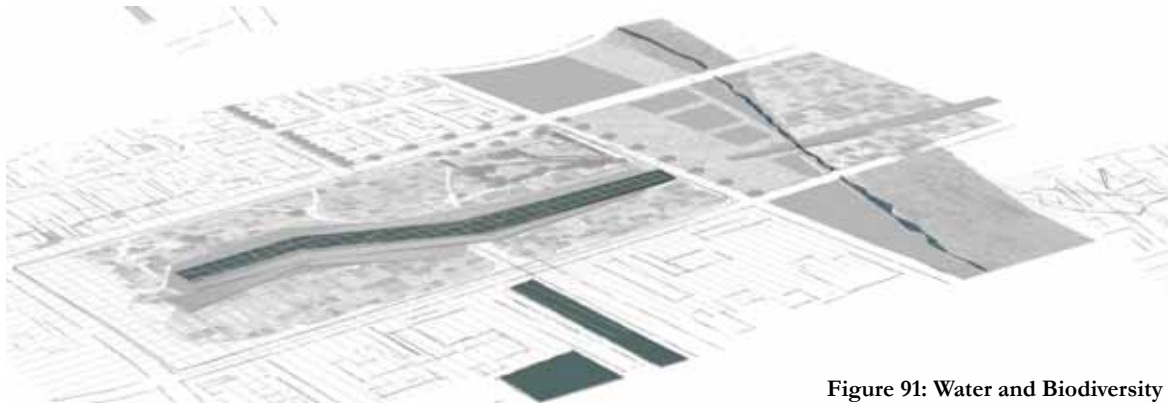
The dissertation proposes that a shift take place in the perception of urban agriculture, and that a new typology of city farming should emerge as a holistic, alternative approach to land use patterns in the city. This 5th trace allows the users of the proposed urban agrarian conservancy to participate with their surroundings and mould their environment, within a transformed landscape.

The existing traces will be re-interpreted and celebrated in order to give structure to the agrarian conservancy while respecting the history of the place and the palimpsest that has emerged over time. The original framework which proposed the reservoir as a central element can also be deconstructed and described in terms of the traces, and thus becomes the basis for the Steenovenspruit farming scheme.

The settlement trace is celebrated by the introduction of high density housing schemes with an agrarian core that doubles as public space and productive landscapes. These smaller farmlands radiate out from the main farm and will be utilised by those living in

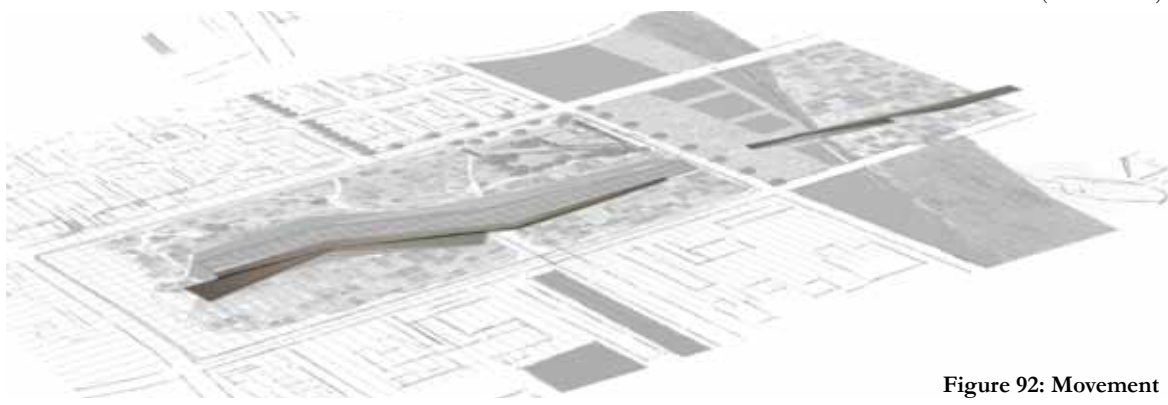
the residential buildings surrounding the site, further enhancing the conservancy as a “knowledge store” much like a Medieval monastery, from which the surrounding communities can learn.

The strong axis created by the reservoir is extended into the city to the east by a bridge which crosses the Steenovenspruit. The bridge allows for movement between the farm on the west of the stream and the farm on the east proposed in the framework. An ecological corridor is proposed along the stream, allowing for passive recreation activities as well as linking into more active recreational areas such as sports areas and Prince’s Park. The natural vegetation palette used throughout the site and its greater context will create a layer of connection between the ecological corridor and the conservancy. Water is removed from the stream, transported up to the reservoir by a hydraulic ram pump, from which point it flows through a series of water polishing wetlands, irrigation reservoirs, water “features” and then back into the stream.



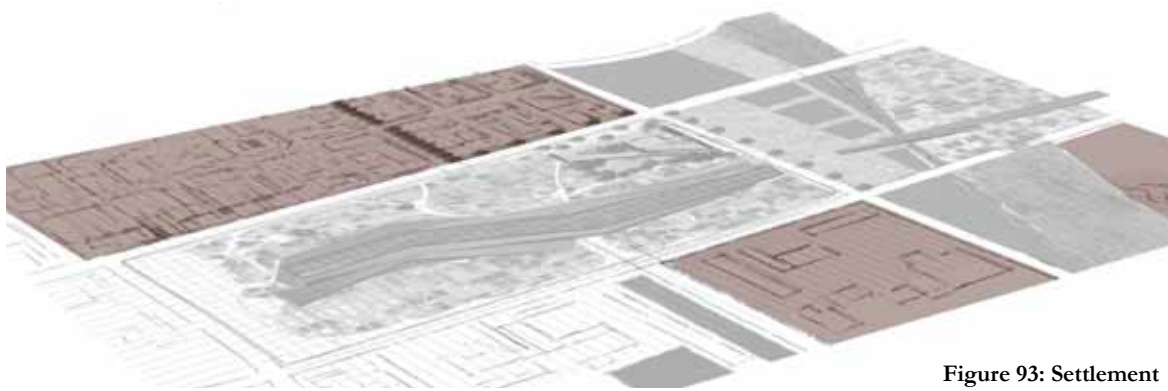
**Figure 91: Water and Biodiversity**

Water and biodiversity will aid in the establishment of an urban conservancy and provide a better living environment for the current residents. (Author: 2012)



**Figure 92: Movement**

East-west movement is very strong across the site and should be maintained in order to ensure critical mass within the conservancy (Author: 2012)



**Figure 93: Settlement**

Residential development on the periphery of the urban conservancy allow for passive surveillance and further opportunities for the urban poor to improve their lifestyles. (Author: 2012)



**Figure 94: Gathering**

Gathering spaces allow for social interaction and economic upliftment through the encouragement and support of informal trade, which will benefit the farmers as they will have to travel shorter distances to trade. (Author: 2012)

## 9.4 Farming as New Trace in city context

A context proposal was investigated for the original urban agriculture scheme in the Steenovenspruit drosscape. At first the context proposal was very pragmatic, looking simply at human needs and urban solutions. However, the proposal is built onto in the chapters to follow to enhance the character of the place.

Pretoria city should become structured around identified wasted landscapes as places which can become the impetus for an alternative modern lifestyle. Conservancies are developed in these wasted landscapes as nodes providing an alternative lifestyle which is adapted to a future of peak oil and rapid climate change.

At a micro scale building and plant materials as well as the proposed land uses will create recognisable patterns. Farming and high density housing proposals with agricultural cores will become a new land use introduced into the existing fabric to rejuvenate forgotten spaces or abandoned blocks.

The conservancy is designed as a public space. Although some spaces are fenced off for private use, clear visual connections and controlled access should be allowed so that the public can enjoy the open space and gain educational benefits from their interaction with the farmlands. The conservancy is connected to the CBD and while it forms a “neighbourhood” it also functions as a major movement zone, attracting pedestrians through ease of use, safety elements such as lighting and uncluttered pathways, universal access, desire lines connecting popular nodes and choice.

Although the conservancy is designed as a primarily agrarian zone the existing traces are re-interpreted and celebrated in the various gathering (informal business) and residential areas which are connected through clear movement patterns and enhance the social, cultural aspect of the project. The conservancy will provide a variety of spaces from actively productive spaces providing opportunities for marginalised peoples; to quiet contemplative spaces with a variety of atmospheres, views, levels of noise, vegetation and material textures.

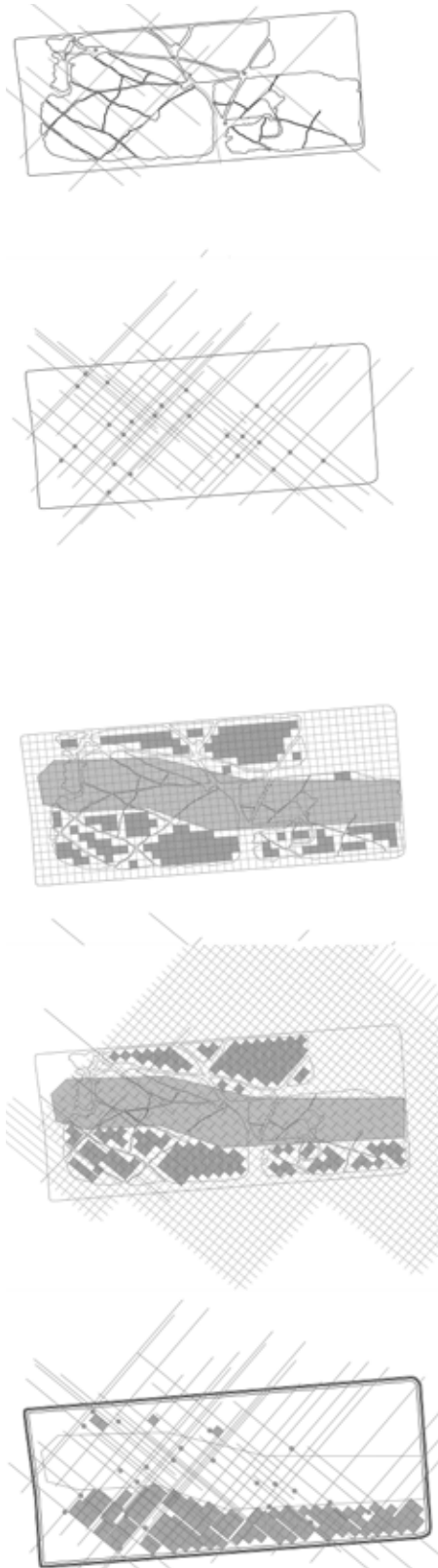
The conservancy is designed as a farm to meet the needs of its people, the productive elements of harvesting, irrigating, and weeding will animate the space throughout the year and for great portions of the day.

Shade and movement patterns create the type of micro-climates that invite people in, and promote enclaves of comfortable micro-climates that will encourage people to pause for a time. Fresh produce can be sold to passing traffic in these areas. Underlying patterns of movement and spaces used for informal activity will also be enhanced and celebrated without creating too much of a formalised environment that may cause the informal to disappear

The conservancy celebrates the original character of the site as a historically productive light industrial space by retaining the productive character of the site. The new typology for an alternative modern way of life is not reliant on oil and other resources but rather on the natural elements on site and man’s ingenuity and ability to support himself within a designed environment.

The river running through the site adds vital character to the place and should be celebrated and experienced in a variety of ways. Opportunities are provided for environmental upliftment. The general public are invited into the conservancy to enhance social ties and links in a variety of spaces for all urban users. While the productive element of agriculture caters specifically to a community of marginalised peoples at first, residential developments, gathering spaces and movement patterns are introduced in order to cater to a wider variety of people so that social integration can be fostered over time. The more affluent people can learn from the previously marginalised individuals who have learned to adapt and survive, and who have become much like modern day monks storing and perpetuating important agrarian information and ways of life for surviving in a world that is facing the impending crisis of peak oil and its repercussions.

The conservancy is designed in such a way that the users can appropriate the spaces and use them as they would prefer. While the overall intent of the conservancy is to cater to farming, the idea is that the users will appropriate the spaces and overall framework and manipulate them to their specific needs while celebrating the historical uses and spaces of the site.



**Figure 95: Intersection of new and old traces**

Existing traces of movement, water, and gathering intersect with the new city farming layer. A sensitive approach was applied to the farming layers in order to celebrate existing layers. The dialogue between movement, gathering and farming is celebrated at the intersections.

When one looks at agricultural lands and typologies there are often patterns that form a uniform surface overlaid on the landscape. These surfaces are interrupted by unique landmarks, walls, windmills, barns and clusters of trees to name but a few. In the case of the Steenovenspruit Conservancy a reservoir is proposed as a central infrastructural element to the conservancy, that becomes the origin for the refounding of the Steenovenspruit drosscape. The reservoir is both a landmark and a functional catalyst for city farming which combines three of the existing traces namely, water, journey and gathering in order to support farming activities which will provide opportunities for the current urban poor and instigate a renewed settling of the Steenovenspruit drosscape.

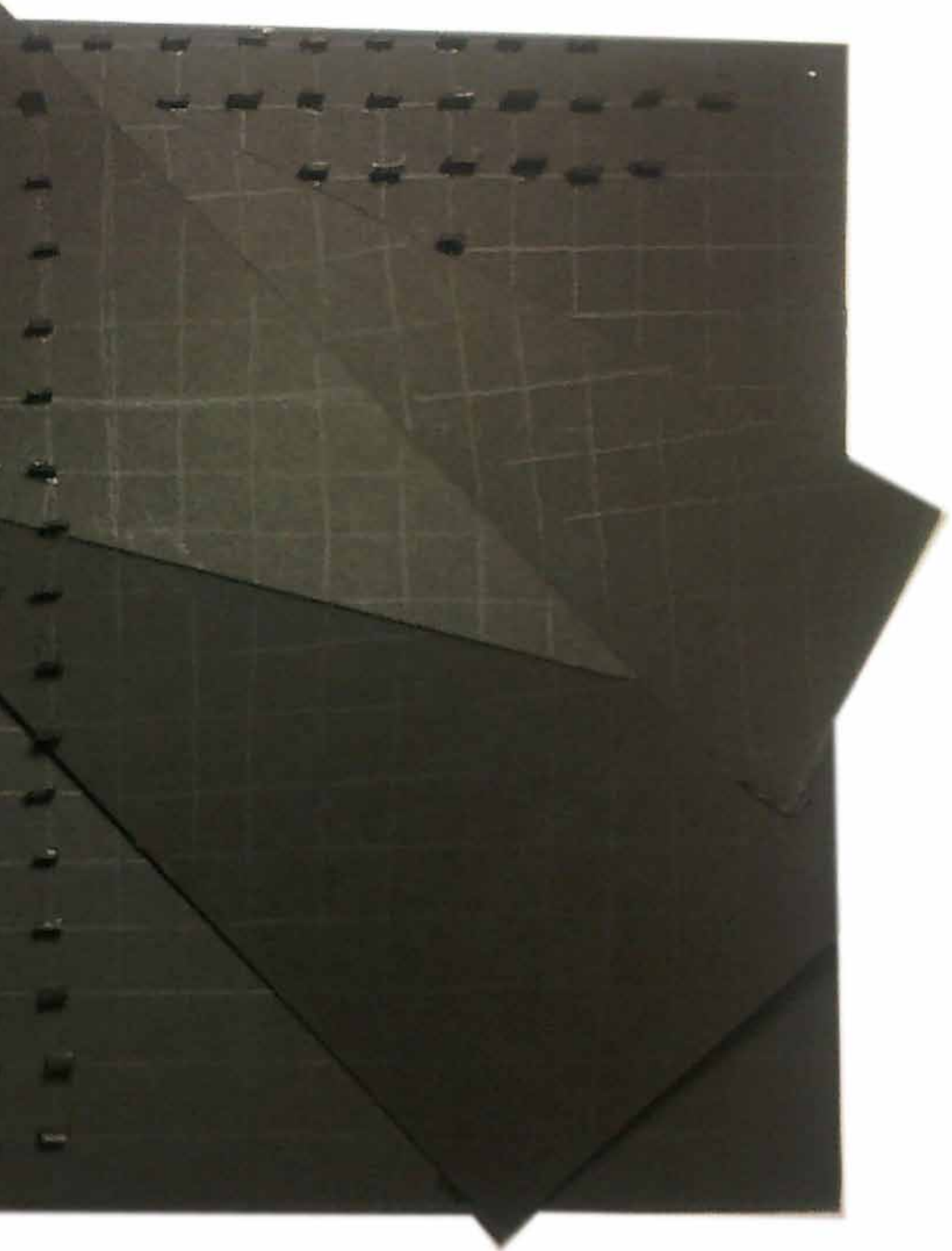
## 9. 5 Development of Masterplan

The masterplan was developed around the central reservoir designed in the initial urban agriculture phase of the project discussed in Part One. Irrigation and planting strategies were tested rationally and in many different layouts, until it became apparent that in order to have a cohesive landscape reminiscent of farmlands some level of repetition had to be maintained. The planting areas therefore became structured around the reservoir, taking on its form and radiating outwards expressing the repetitive nature of crops, but also celebrating the form of the reservoir as a trace.

The original movement traces across site were identified and highlighted. However the pattern that emerged became impossible to incorporate into the rational farming scheme, and as such a compromise needed to be made. A decision was taken that the existing traces although beautiful as a pattern in their own way, do not have the same significance as their intersections where cultural identity would have developed due to chance encounters and shared experiences. The existing traces would also have little meaning when overlaid with a new land use. Thus the intersections were highlighted and developed as small public spaces within the farmlands, in which trees would be planted and benches introduced, as smaller nodes of significance within the farm.

Irrigation lines were designed according to technical requirements and acted as an additional form giver. Each of these design informants was layered onto a series of drawings and eventually a canvas in order to understand the enriching of the palimpsest that would take place on site. (fig. 93, 94 & 95)





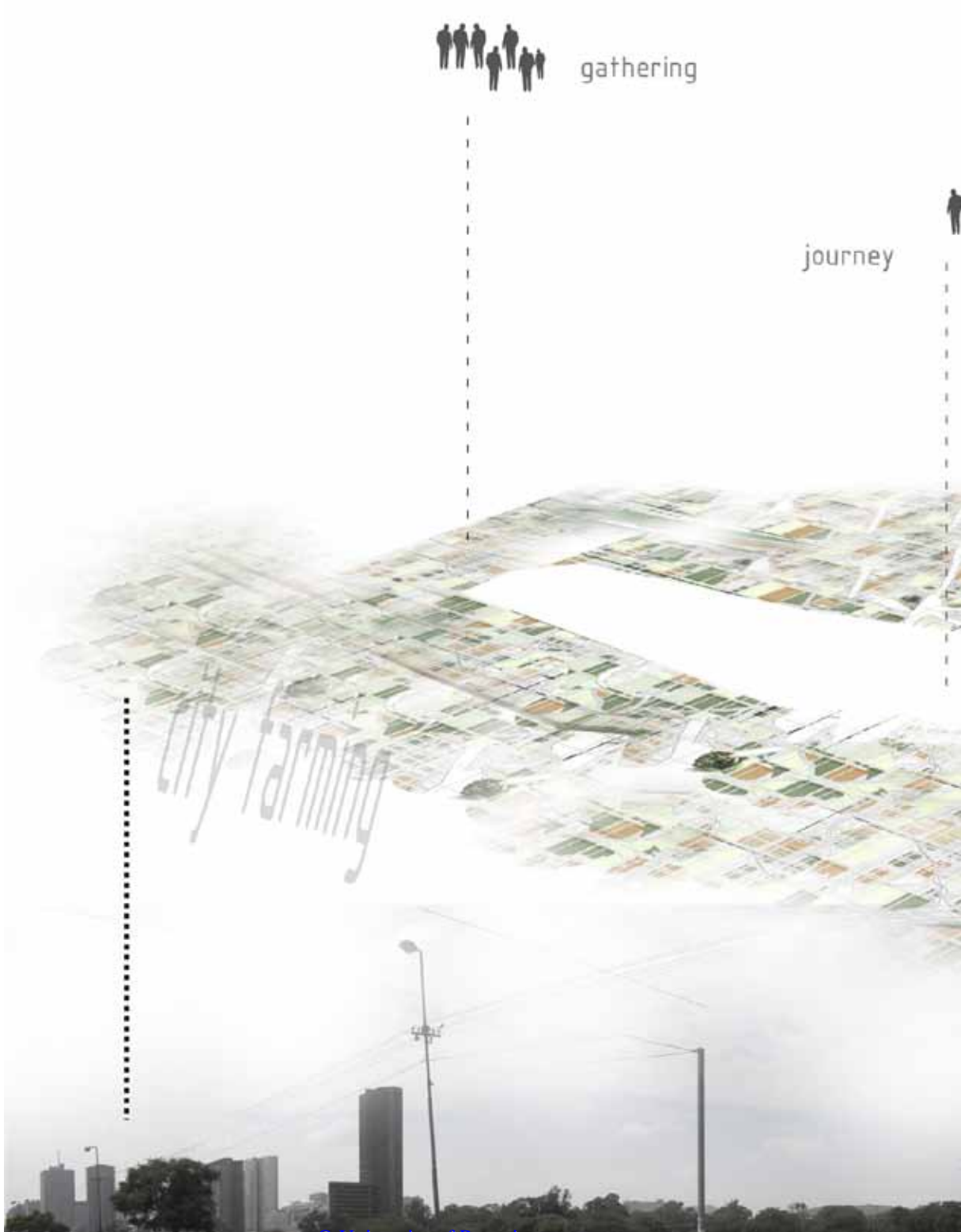
**Figure 96: Concept model**  
Patterns and landmarks are evident in the landscape, especially in agricultural areas (Author: 2012)  
© University of Pretoria



gathering

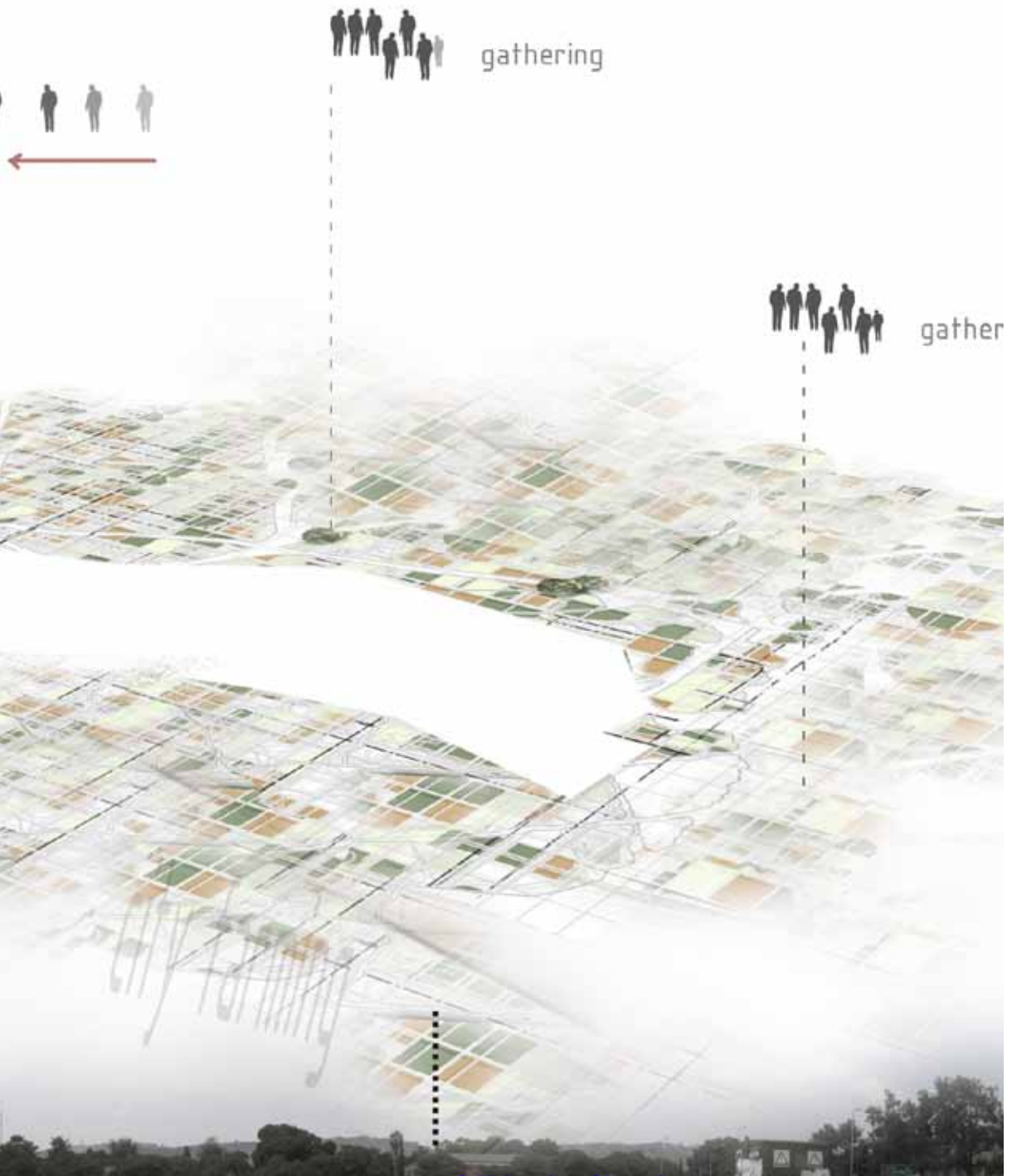
journey

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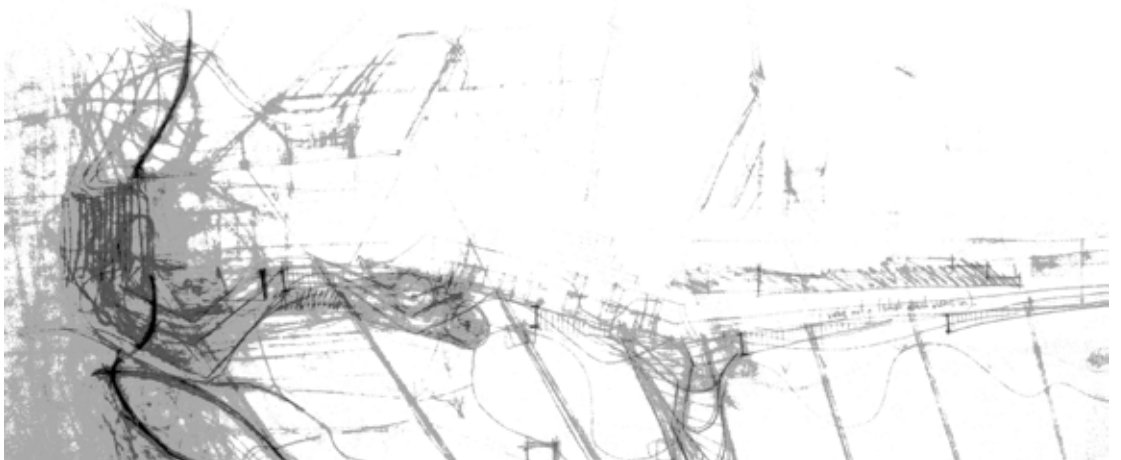
**Figure 97: Introduction of city farming**

While the city farming layer is preceded by existing traces it also enriches the landscape in order that existing activities can continue, and creates the potential for new activities and traces to emerge through the experience and participation of the users thus conserving the land not only as a ecological resources but also as a social resource  
(Author: 2012)



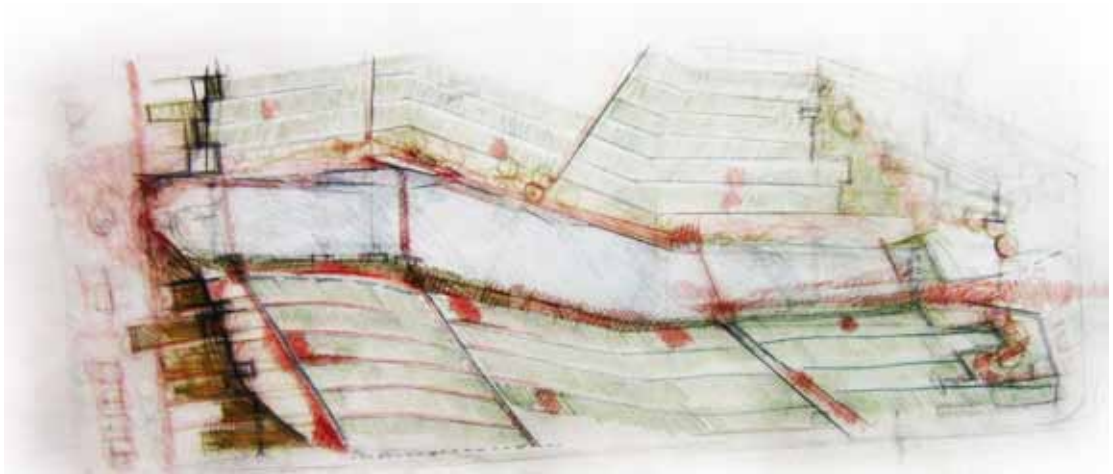


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**Figure 98: Tracing as a design method**

The following diagrams indicate traces which were created in response to existing residues and erosions. The essence of each iteration is translated in those which follow, emulating the real-world process of place in a landscape where neither development (founding) or preservation takes precedence, but rather where experience and participation with ones surrounds is key  
(Author: 2012)

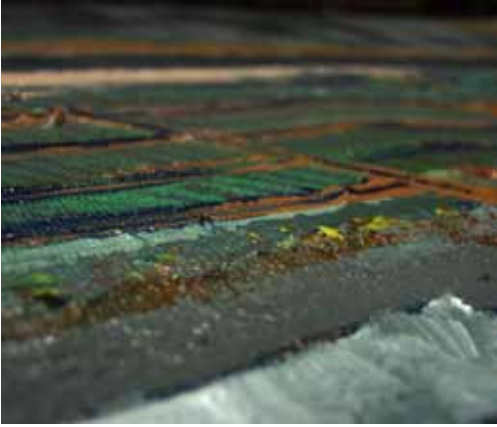


**Figure 99: Enriching the palimpsest**

Each iteration of the masterplan enriches the design process. The master plan begins to emerge as a place founded in existing traces. Materials and vegetation become integral for expressing the concept of the enriched palimpsest in the urban squares. (Author: 2012)

By exploring the conservancy as a painting, the author was given freedom to explore the layering process. The layers of the palimpsest became most visible in the eastern and western portions of the square. Although only the western portion of the site was originally designed as a public square, it became evident that the eastern square needed to support the economic activity that would establish around a farm, and to act as arrival platform for people crossing over the Steenovenspruit stream into the farming precinct.

In order to express the palimpsest concept in the squares, a series of terraces was designed stepping down away from the reservoir towards the most public edge. Where ruins were identified on site they were designed into the terraces as the lowest point surrounded by natural vegetation in order to express the initial layer that would have covered the landscape. Different materials and a variety of straight and organic edges were used in order to further express the idea of different layers of use accumulating over time.





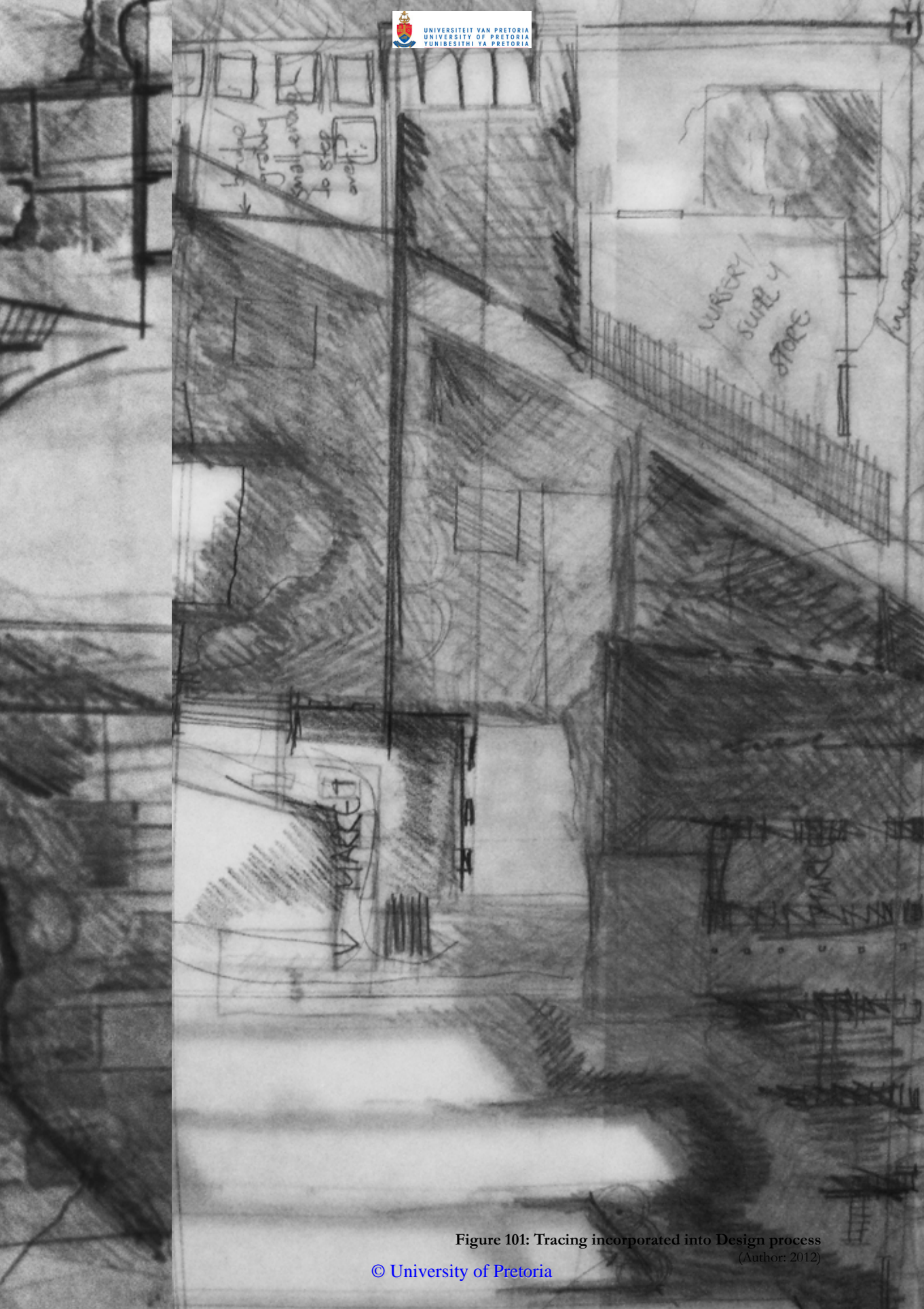
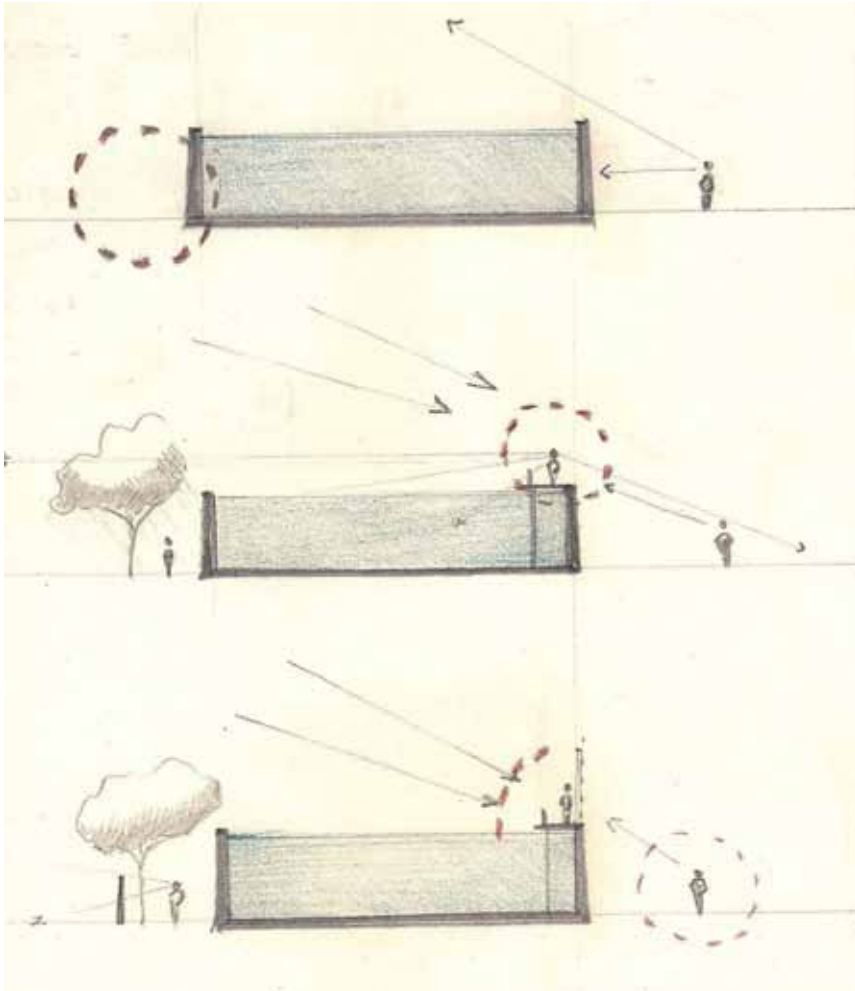
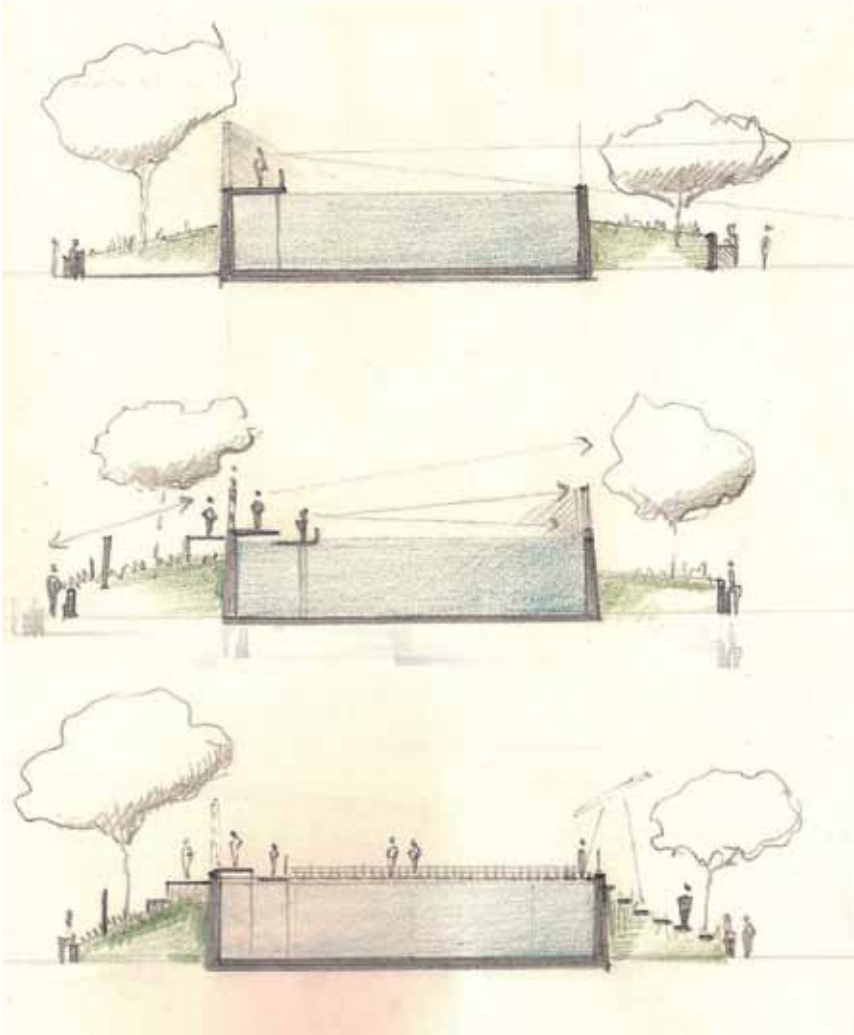


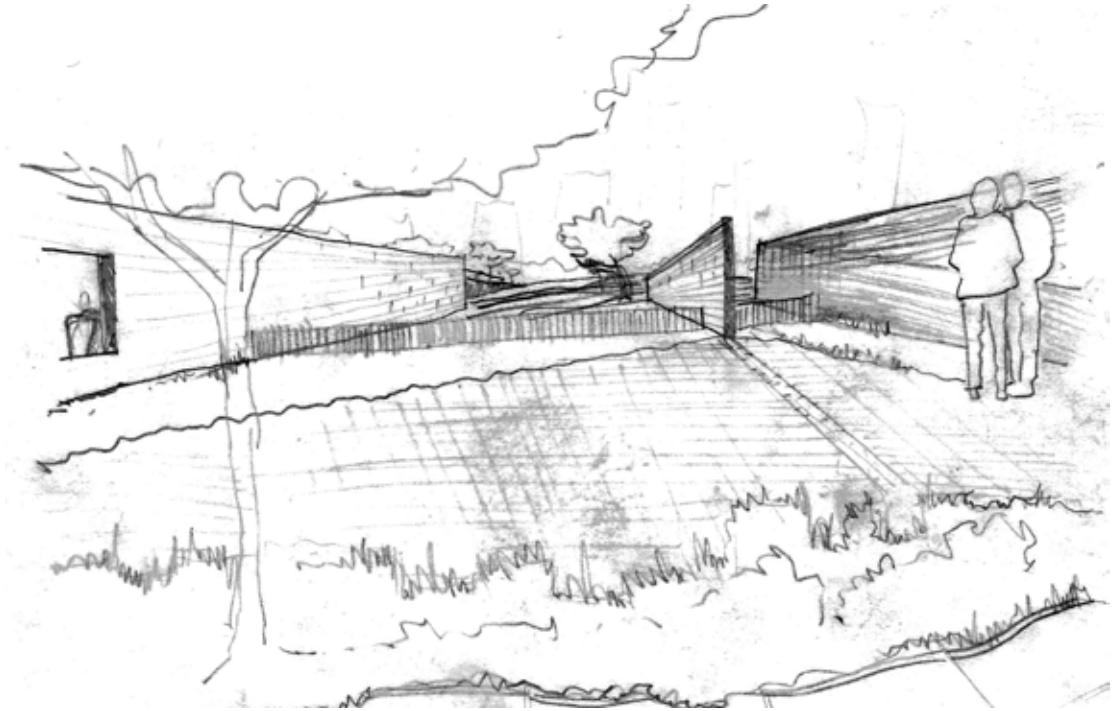
Figure 101: Tracing incorporated into Design process  
(Author: 2012)

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**Figure 102: Infrastructure as Public Space**  
Functional elements in the landscape, such as the reservoir is refounded as a public park (Author: 2012)



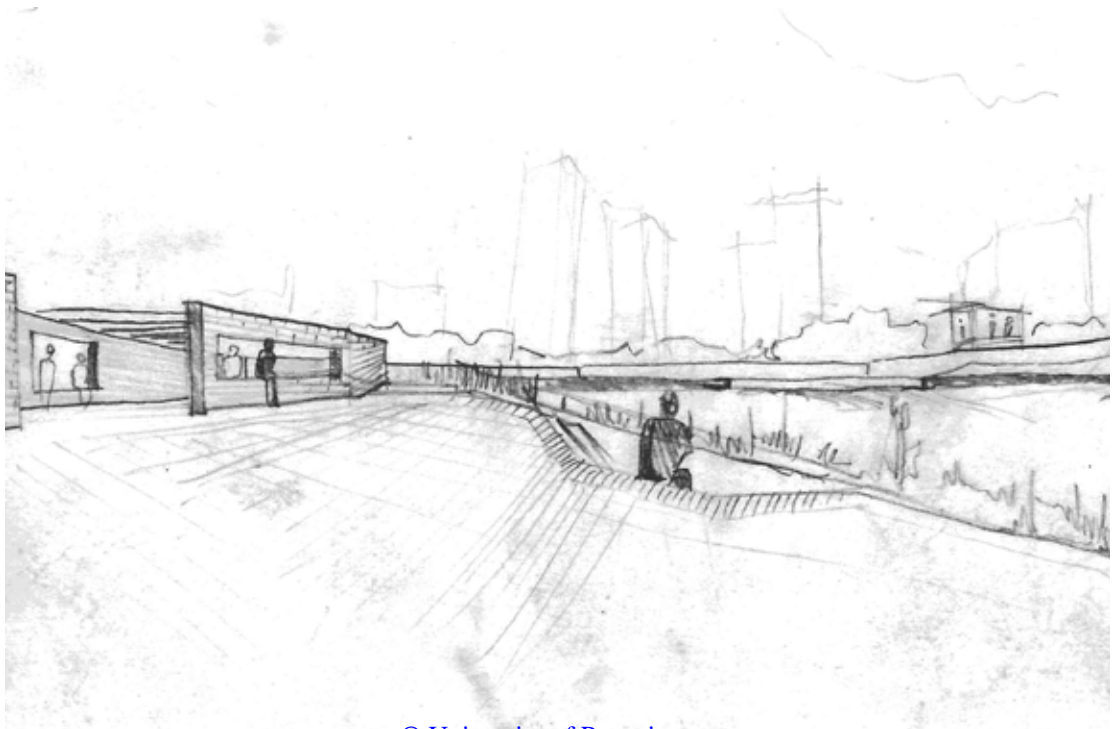
**Figure 103: Masterplan perspectives**

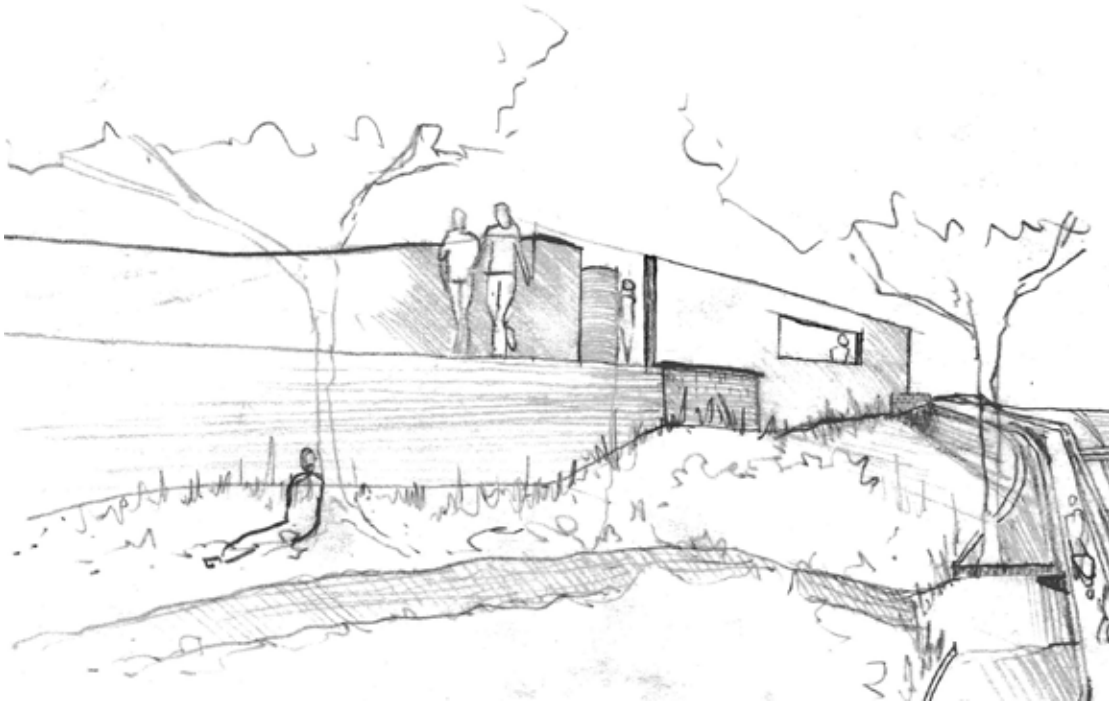
View from eastern square towards the farmlands. Views are framed by brick walls which create niche spaces and support a lower ha-ha fence (Author: 2012)

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**Figure 104: Masterplan perspectives**

Conceptual sketch from the linear park which runs along the inside and outside of the reservoir. Brick walls are used to frame views and provide seating surfaces (Author: 2012)



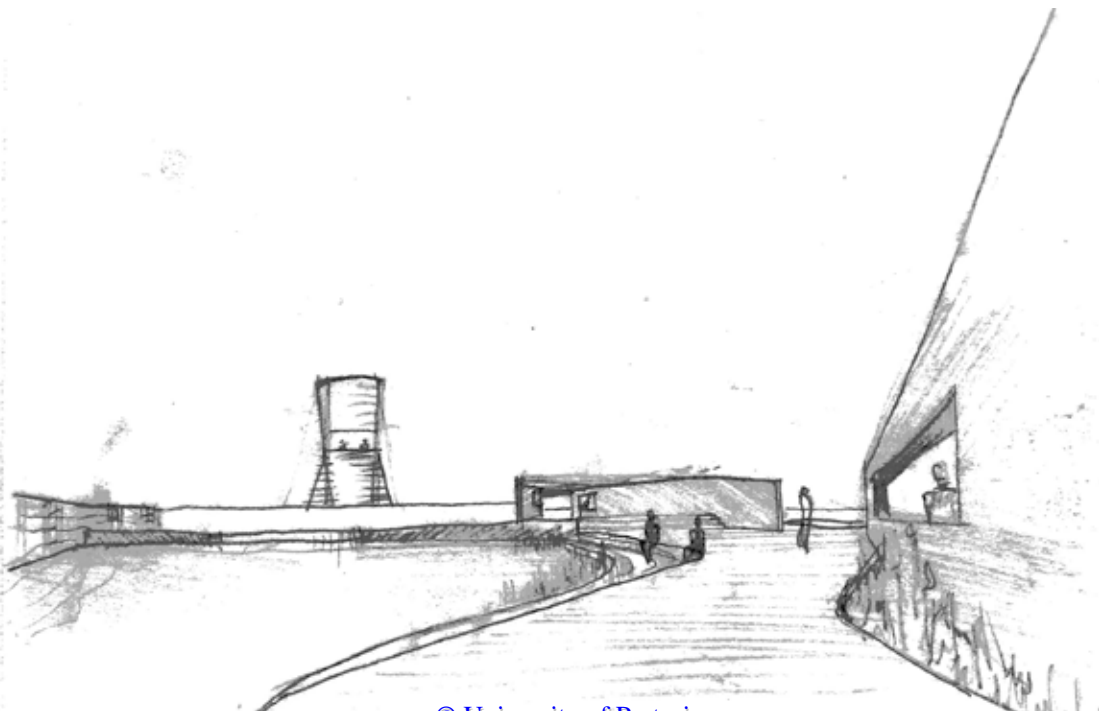


**Figure 105: Masterplan perspectives**

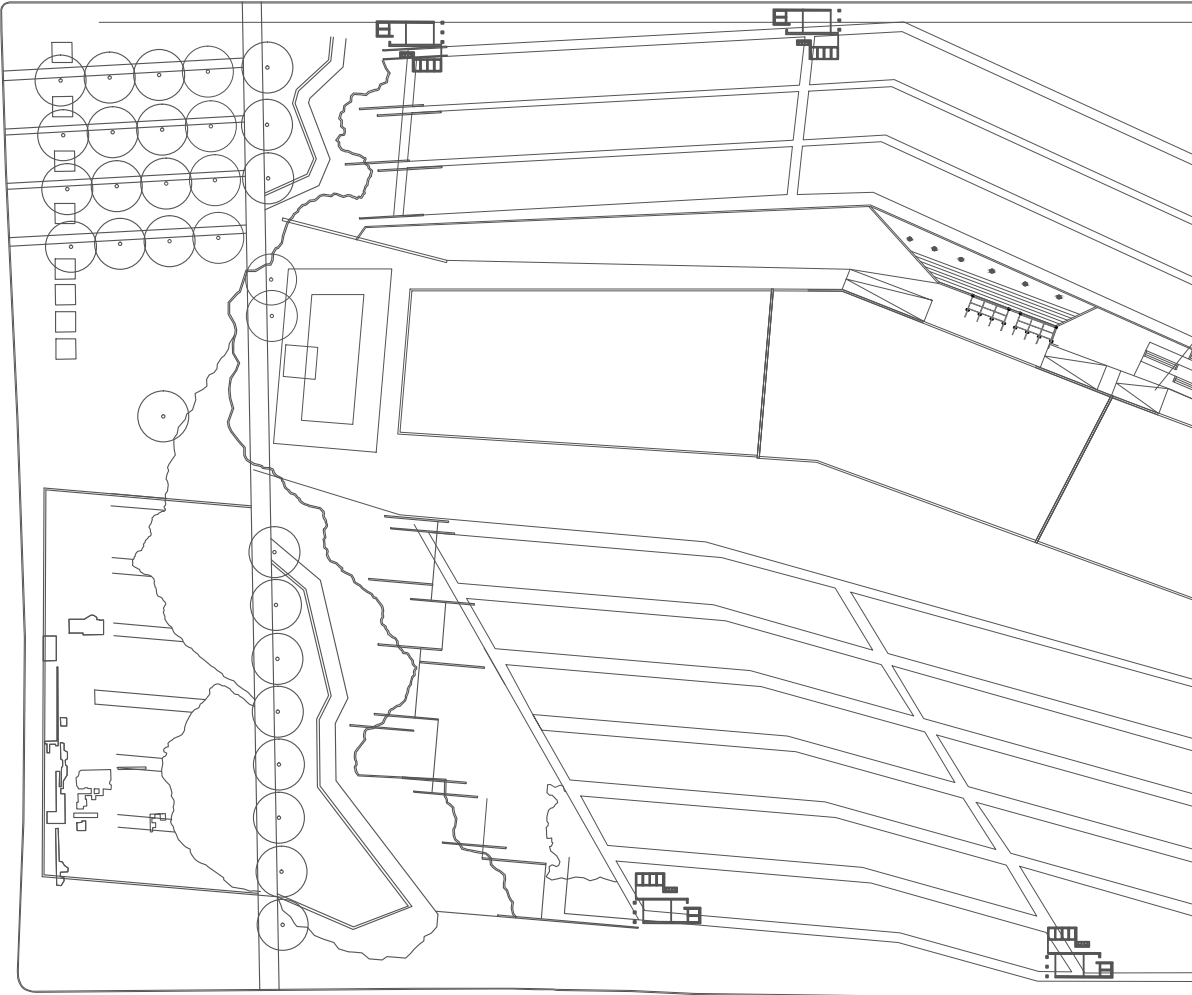
A vegetated berm runs the length of the reservoir enhancing the movement route as a linear park. (Author: 2012)

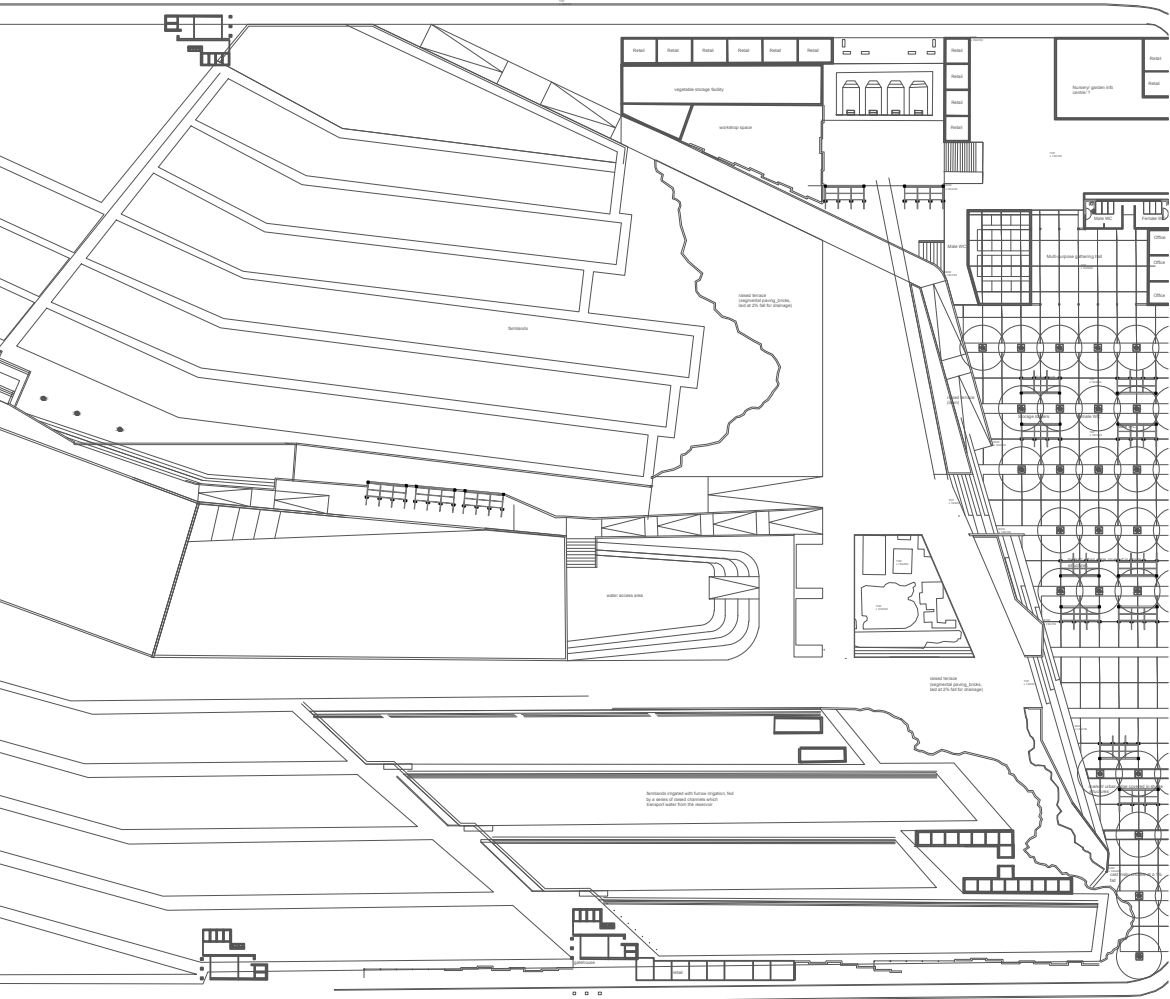
**Figure 106: Masterplan perspectives**

Inner view of the reservoir towards the water tower (Author: 2012)



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**Figure 107: Masterplan**

The reservoir forms the center of the conservancy with the farmlands radiating outwards from the water source. Urban edges are designed on the eastern and western boundaries of the site (Author: 2012)

## 9. 6 Site elements / design decisions

The reservoir is constructed not only as a functional element for storing water on site but it also acts as a representation of man's relationship with his environment. Man is able to construct vast structures to capture and using nature's resources, however, the relationship is based in nature's ability to provide resources to be utilised.

The hard structural surfaces are used to express and convey the functional, infrastructural character of the reservoir. When viewed from a distance the reservoir acts as a landmark. Although the reservoir is functional, by constructing it from concrete in enticing forms, it conveys to people that it is a structure to be explored, through the various openings and towering shade structures at some entrances. Thus people are invited to explore the functional landmark and appreciate the elements of man-crafted (techne) and nature working together to allow man to sustain himself.

The reservoir was initially designed as a further functional element for transporting people on a raised surface across the site, to keep the public out of direct contact with the lands and to allow for uninterrupted movement across the surface. However over the course of the design development this functional element became more of an experiential journey, celebrating the original strong movement pattern across site. The pathway is situated on the northern edge of the reservoir in order to free up the opposite wall as a sculptural element, running the length of the reservoir, interrupted only by the entrances and connective bridges running north-south at three positions. Further softening and "humanising" happens along the bottom edge of the reservoir. A grass berm is built up along the edge of the reservoir as a buffer between the farmers and the hard edge of the reservoir. This berm also acts as a pause / relief space for the farmers, acting much like the shaded natural areas surrounding farmlands where labour were allowed to relax during farming activities for refreshment.

The elevated brick pathway which meanders alongside, and in some instances inside the reservoir serves to further humanise the reservoir once people have attempted to participate with their surroundings. The entrances to the reservoir are expressed as sculptural incisions into the wall, inviting people into the reservoir at certain moments to experience the juxtaposition of the hard functional element of the

reservoir and the softer nature of the water running through it and the mutual relationship they both have in supporting farming activities. By moving through the reservoir for a time, views are framed back towards the farming, which can be appreciated from the elevated position of the raised walkways.

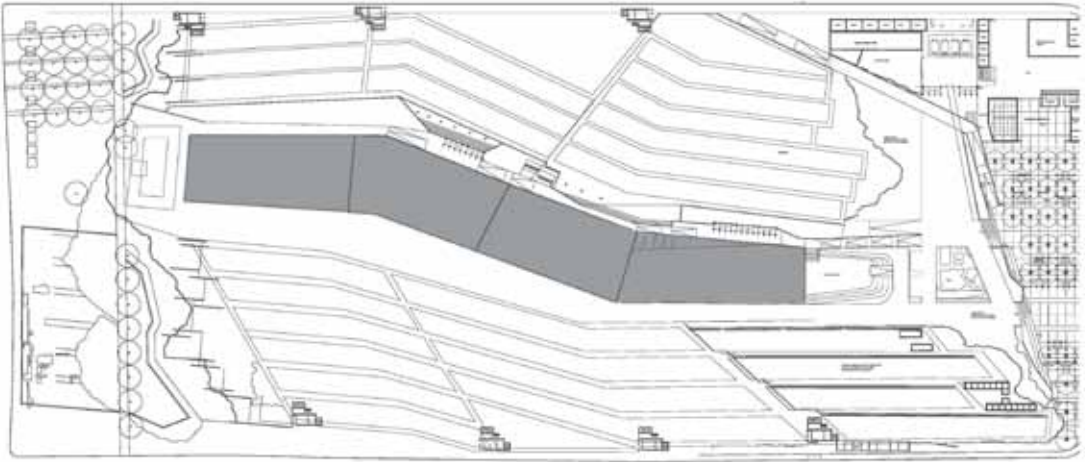
The farmlands gain form from the reservoir. Picking up the subtle changes in direction of the reservoir walls, the farm lands are offset from the reservoir edge and extend in an east-west direction, interrupted only by irrigation channels.

Originally, pathways were designed simply as functional movement patterns for farmers to get to their crops and move between areas with a wheelbarrow. In order to ensure a more experiential, participatory relationship with the landscape, so that the place's *genus loci* may remain significant, the pathways were opened up and widened slightly. The public is allowed in along 6 major routes, which coincide with the caretaker's cottage and the towers on the southern edge. These pathways can be locked at night at the caretaker's cottage, which adds further surveillance with a raised viewing platform. The pathways are lined with trellised fences and hedges with shade trees and structures creating a comfortable micro-climate for the farmers and the public alike, fostering community interaction and allowing for the landscape to both cultivate relationships and be further moulded by these relationships.

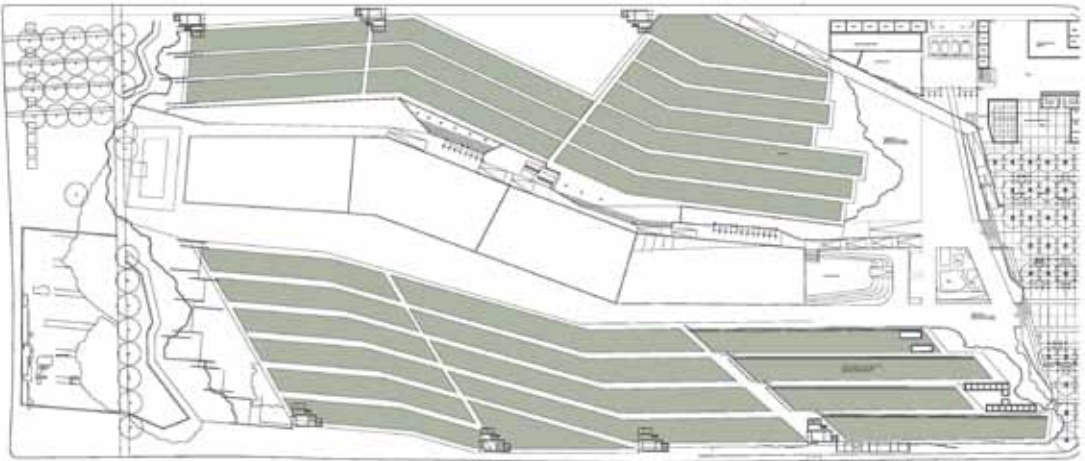
Where original traces on site intersect, trees have been planted. These trees provide shade and a softened micro-climate enticing people under the branches. When people gather under a tree, a place becomes founded. Thus the original traces which would have allowed for chance encounters and spontaneous place-making at their points of intersections, remain celebrated spaces in the city farm. Benches, trellises and bins are introduced into these spaces to further enhance social interaction.

Brick walls were introduced as framing features in the landscape, while they are purely aesthetic functioning only to frame the farming scenes and break up the ha-ha fence, it is hoped that these are the types of elements, introduced as new traces, that will be appropriated by the farmers in order to make storages areas at some points.

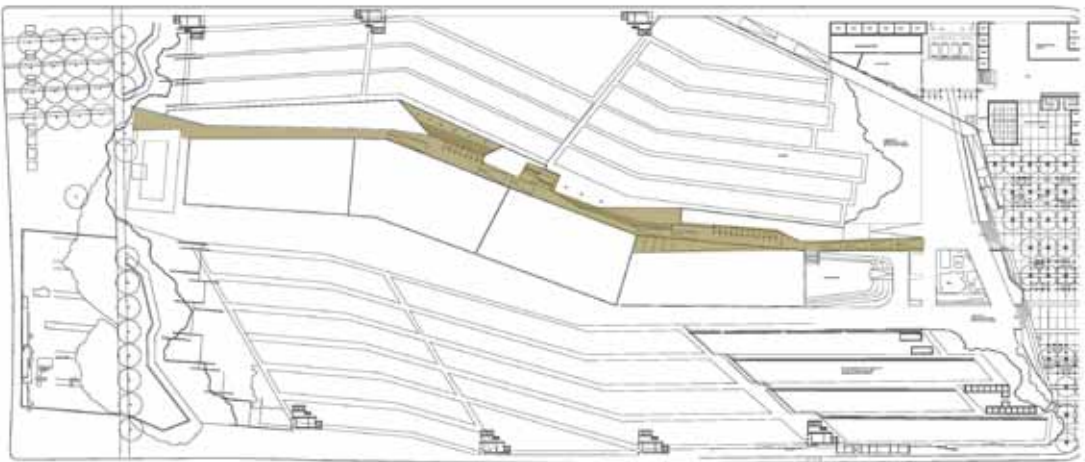
The fences along the edges of the conservancy's agrarian core are designed as visually and socially permeable elements. Concrete piers are used as structural elements, between which run trellises and shaded seating areas provide a spatial edge to the farm, inviting the public and informal vendors to use the spaces and interact socially with the farmers



**Figure 108: Masterplan, diagram one**  
Reservoir (Author: 2012)



**Figure 109: Masterplan, diagram three**  
Farmlands (Author: 2012)



**Figure 110: Masterplan, diagram one**  
Linear Park (Author: 2012)

on the other side. Ha ha fences are utilised on the western and eastern edge of the farm to create visual connections between the public pathways and squares while still creating an inaccessible physical barrier.

The public squares on both the west and east of the farm are designed to enhance the ideals of the palimpsest and to mediate the relationship between the old and new traces on site. Terraces and subtle level changes as well as the changes in surface materials and the introduction of natural vegetation allow for layers of varying uses to emerge. Each one of these layers signifies a layer of the palimpsest and relates to one or more of the broad scale traces. Although the levels and each change in level may not directly, chronologically relate to the development of the site, the levels attempt to make the users aware that the site has developed from old traces and that it celebrates the new traces.

The western square is currently used as a gathering area for the people queuing outside the Department of Home Affairs. In order to improve their environment surfaces have been levelled and shading in the form of a bosque of trees has been introduced. Vendors are encouraged to set up on the western edge to create a small economic hub which benefits both the farmers selling their produce from the city farm, vendors selling cooked food and those waiting to be helped by providing them with nourishment. Waiting walls are introduced as opposed to seating to facilitate waiting.

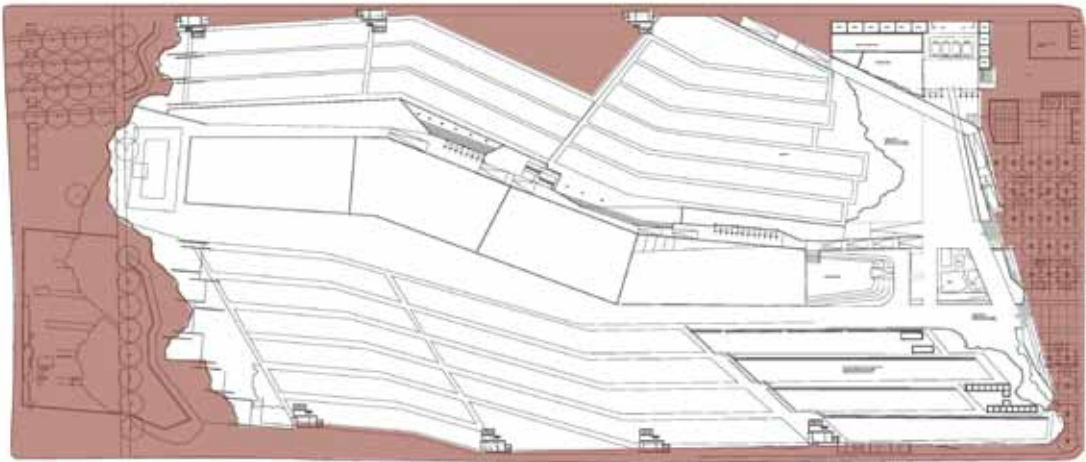
The western and eastern squares act as transition spaces between the farm and the urban edge. The palimpsest is terraced in such a way that a variety of spaces occur between the farms and the housing, retail and governmental buildings on the western and eastern squares.

Foundation ruins on site are evident on the terrace directly preceding the reservoir entrance, a small square of paving is cut out around these ruins to allow a buffer area to make visitors aware of the old and new. The building footprints lend an otherworldly or mystical quality to the site. The ruins give little indication of what their purpose as buildings were. The way the vegetation on site has begun to grow over and around them symbolises the cyclical relationship between man's attempts at domination and nature's ability to re-establish itself. It is evident from maps of the site that the western square was once residential compound space and that the eastern edge was built as stables. However, not

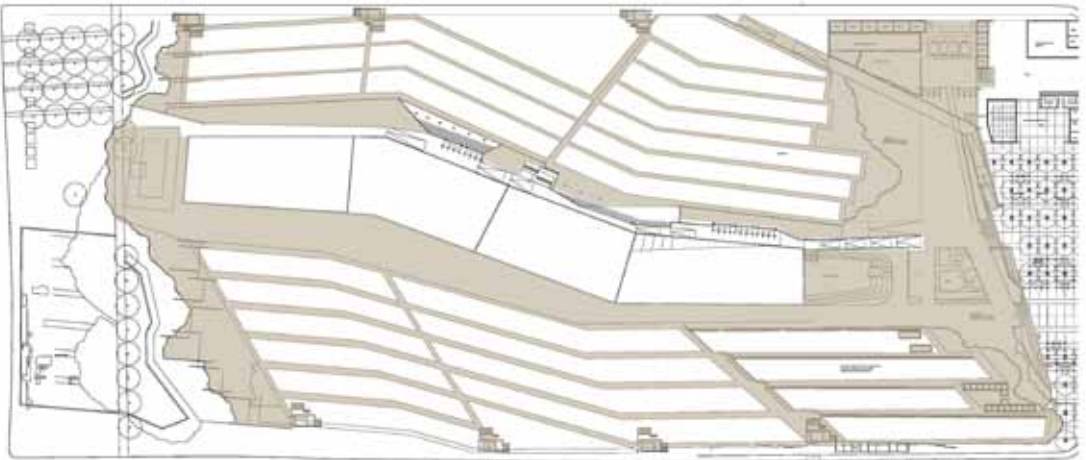
enough information is available of the exact layout of the buildings, and the remaining foundations provide little information themselves. Thus what is taken from this historical significance is simply that the site was a working landscape, and should be returned as such to the people of Marabastad.

The oldest trace of natural vegetation is celebrated by introducing plants indigenous to the area into some of the terraces. The paving surrounding these planted areas is finished in such a way that it is evident that they do not merge into each other but rather overlap each other. Shrubs, grasses and trees are all used in a naturalised planting palette which celebrates the "wild" nature of the little remaining vegetation on Pretoria's ridges.

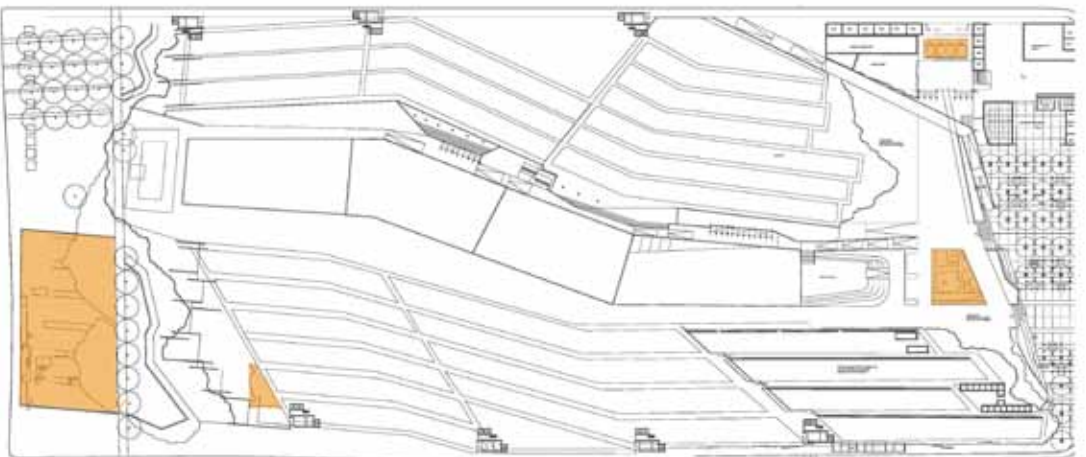
The current gathering spaces are retained and enhanced by the introduction of paving materials and shade structures. Infrastructural elements such as bins, bollards and benches support gathering and vending in this space and retain the cultural vibrancy along the edges of the site.



**Figure 111: Masterplan, diagram four**  
Urban edges (Author: 2012)



**Figure 112: Masterplan, diagram five**  
Transition spaces between the farming community and the public (Author: 2012)



**Figure 113: Masterplan, diagram four**  
Transition spaces between the farming community and the public (Author: 2012)

## 9. 7 Material Guidelines

The concept of palimpsest and traces should be evident on all scales of the intervention. At a micro-scale elements such as fittings and furniture should be an illustration of the approach to landscape design proposed in the dissertation.

A simple material palette was selected in keeping with the unelaborated nature of farming. While functional, all of the materials have the potential to become expressive and beautiful. Each material was selected for specific characteristics or to play a particular role in the landscape.

Steel and concrete were chosen to express infrastructural and supportive elements. Both steel and concrete are man-made materials and are thus used to express the predominantly functional, sturdy and robust elements that allow specific activities to take place on site.

Brick was selected for four reasons. The predominant reason being the fact that brick was used to construct the original Marabastad houses and buildings on site. The current skills training centre on the corner of Proes and DF Malan streets, is an example of brick construction in the area. Evidence of brick work is visible in a pathway on the eastern edge of the site. Another reason for selecting brick is for its ability to humanise a space. Bricks are small and easily moulded into various human scale features in the landscape.

Both brick and wood were selected for their properties, or characteristics which allow for the traces of time and use to become evident. Exposed clay bricks are weathered by plant material, human use and climate, as is wood.

As mentioned before, palimpsests retain evidence of past use or meaning. Wood and exposed clay bricks in the case of the conservancy retain links to their original state. Clay bricks are used for paving but are reminiscent of the earth beneath ones feet, in both colour and texture. Where the bricks are used to create vertical elements they frame views in the same way geological features in the landscape frame scenes and views. Wood is used on site as a shading material, reminiscent of nature, and specifically trees provision of shade and shelter in the landscape.

Features that would be constructed out of concrete include the reservoir which is an infrastructural element transporting and storing water on site, bollards which act as functional elements that prevent vehicles onto site, provide light and can be used as seating. Bins support the vendors and temporary users that interact on site.

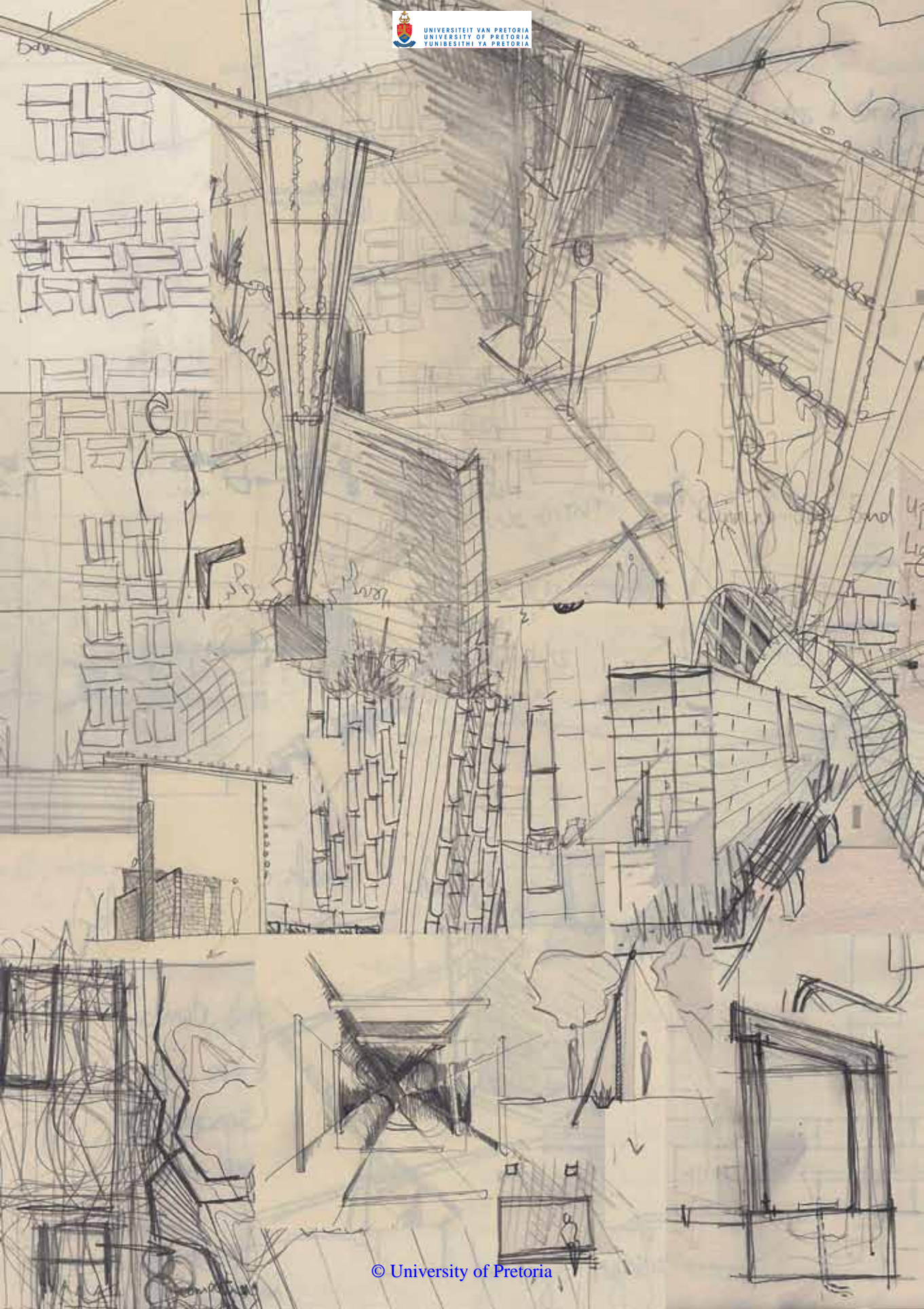
Steel is used in the construction of the pergola structures which provides shade and lighting

infrastructure. Steel is further used as an aesthetic inset in the bins and bollards to trace weathering of various materials and layers on site.

Brick is used for paving and framing walls in the landscape. Concrete is used to pave the hard urban edge, while brick indicates the smaller, contemplative, “softer” spaces for pause and contemplation. Some brick walls are also constructed in the reservoir to juxtapose the functional element of water and its container as well as the aesthetic, passive recreational value of water as a feature for appreciation.

Wood is predominantly used for shading as it is hard to steal wood for burning as fuel when it is out of reach, but it is also proposed as seating material, to soften and humanise the vendor pergolas.

Another advantage of using wood and brick as expressive materials on site, is the “indication” (?) of using these materials in a future of peak oil where the use of concrete and steel may no longer be feasible. Wood is a renewable resource and can be sustainably cultivated for construction. While clay is not a renewable resource, clay bricks can be reclaimed and re-used and are also easily made locally and with little skill or infrastructure requirements. Additional layers of use may see these traces of wood and brick and the residue that will give rise to a new material typology for future construction. (check facts and whether this fits in with concept).



## 9.8 Development of Sketchplan

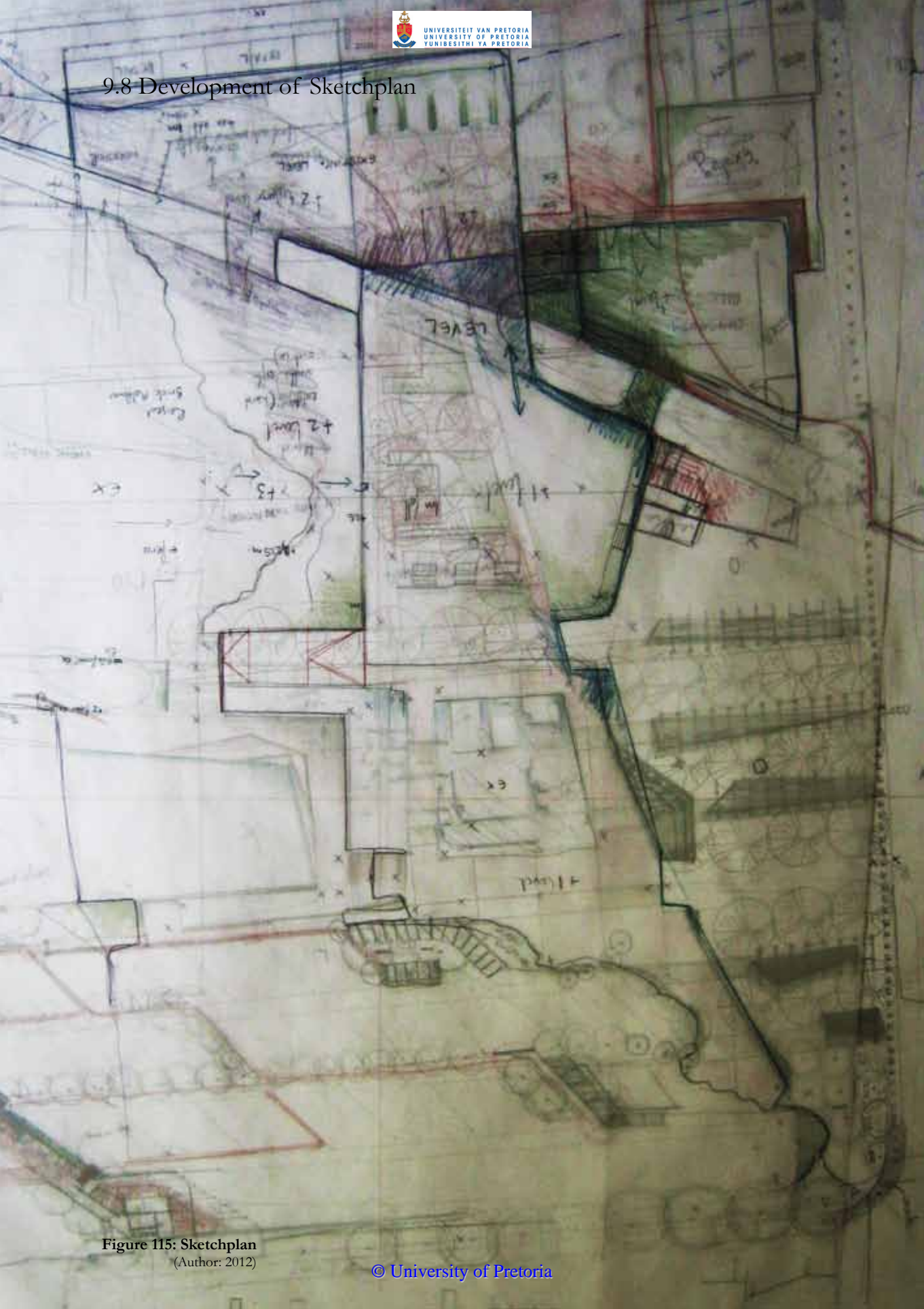


Figure 115: Sketchplan  
(Author: 2012)

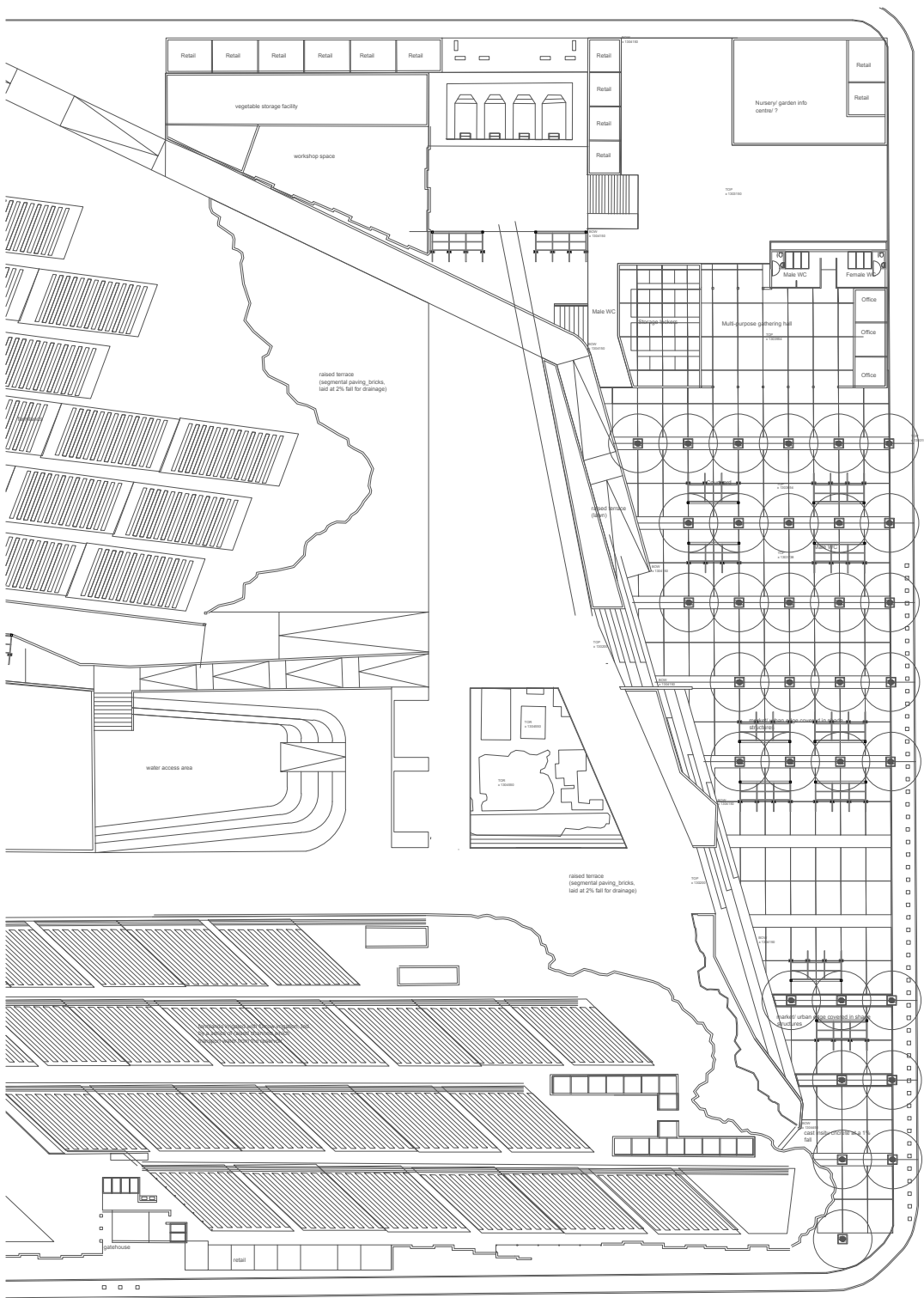


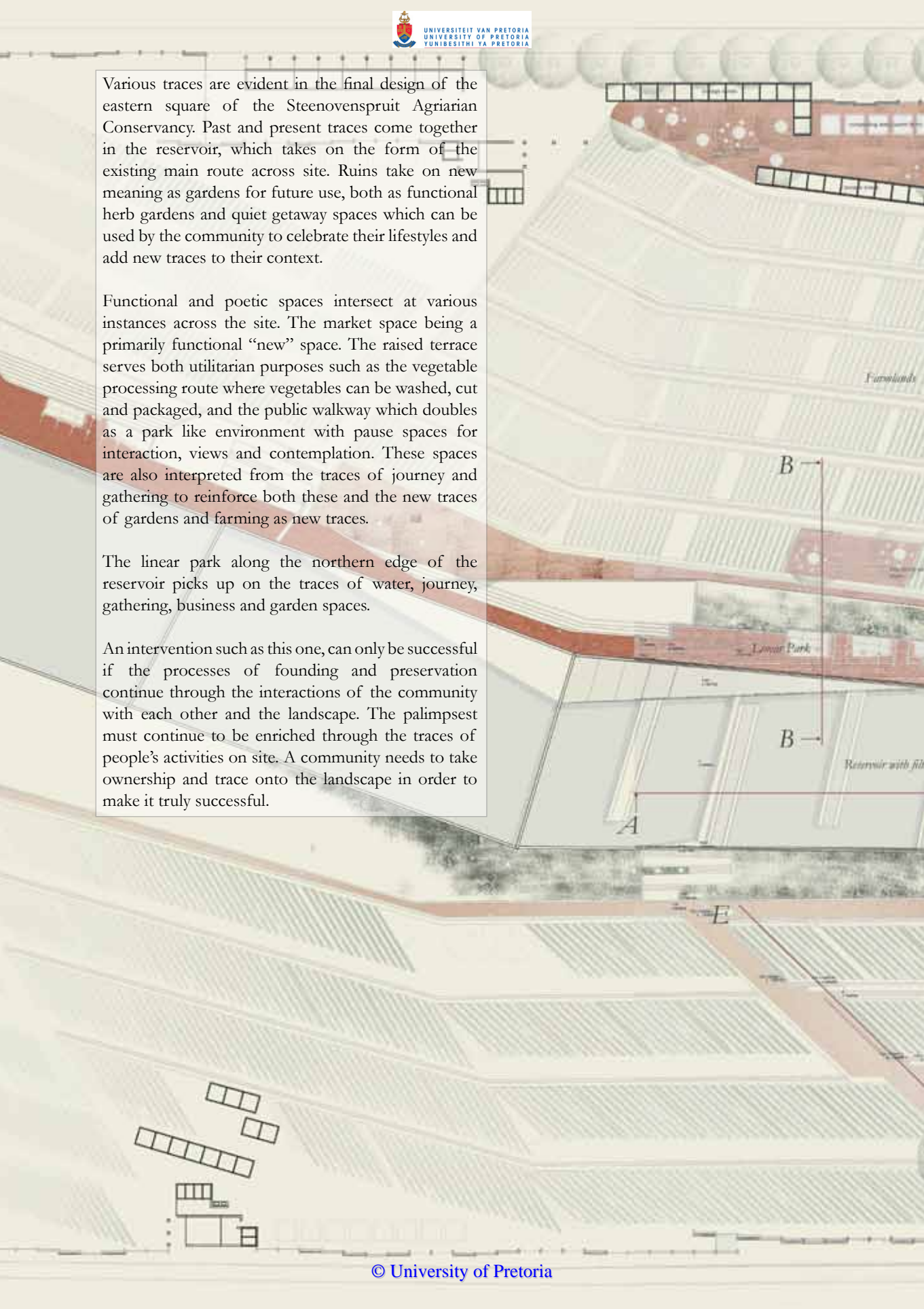
Figure 116: Sketchplan  
(Author: 2012)

Various traces are evident in the final design of the eastern square of the Steenovenspruit Agrarian Conservancy. Past and present traces come together in the reservoir, which takes on the form of the existing main route across site. Ruins take on new meaning as gardens for future use, both as functional herb gardens and quiet getaway spaces which can be used by the community to celebrate their lifestyles and add new traces to their context.

Functional and poetic spaces intersect at various instances across the site. The market space being a primarily functional “new” space. The raised terrace serves both utilitarian purposes such as the vegetable processing route where vegetables can be washed, cut and packaged, and the public walkway which doubles as a park like environment with pause spaces for interaction, views and contemplation. These spaces are also interpreted from the traces of journey and gathering to reinforce both these and the new traces of gardens and farming as new traces.

The linear park along the northern edge of the reservoir picks up on the traces of water, journey, gathering, business and garden spaces.

An intervention such as this one, can only be successful if the processes of founding and preservation continue through the interactions of the community with each other and the landscape. The palimpsest must continue to be enriched through the traces of people’s activities on site. A community needs to take ownership and trace onto the landscape in order to make it truly successful.



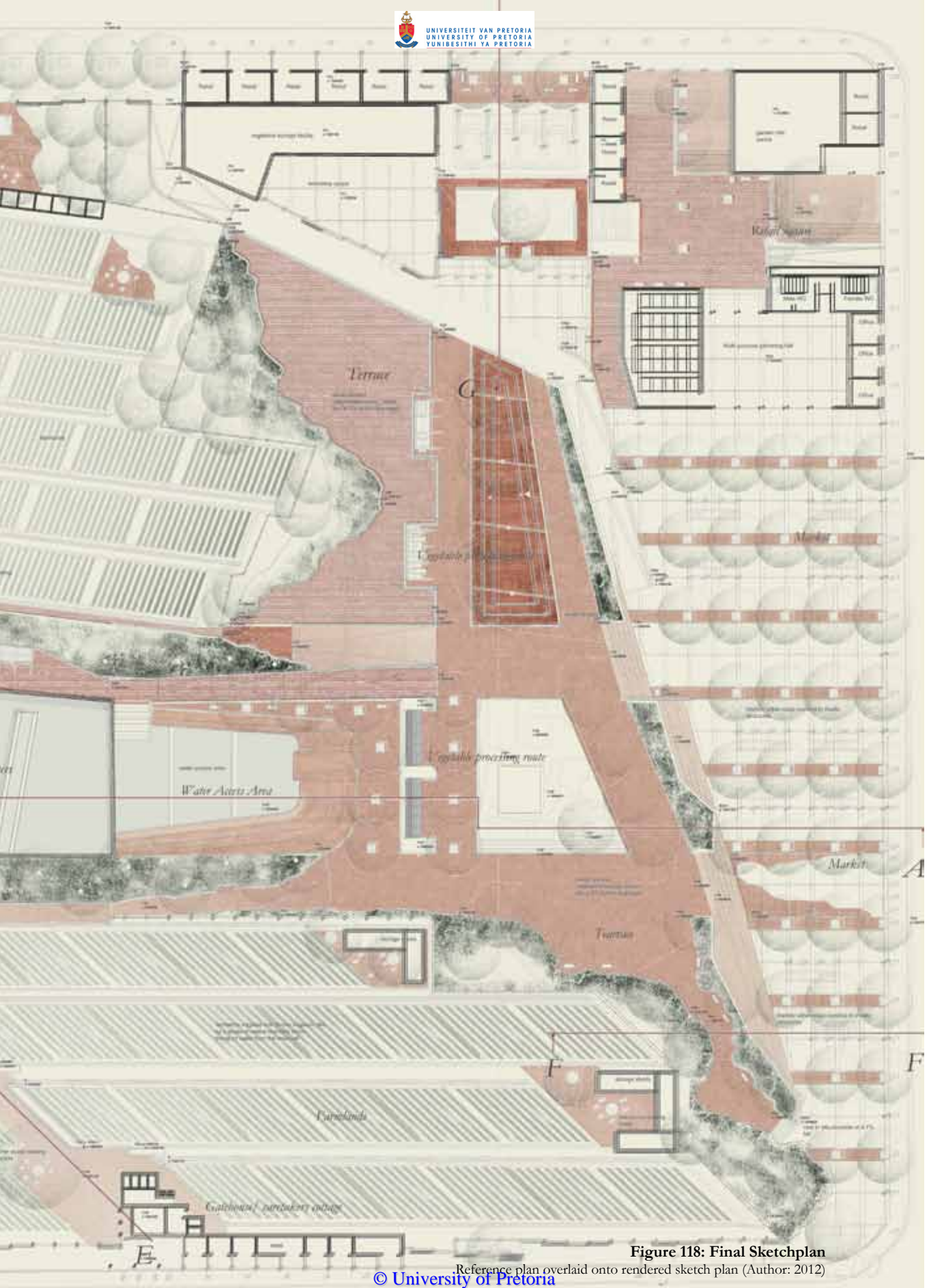
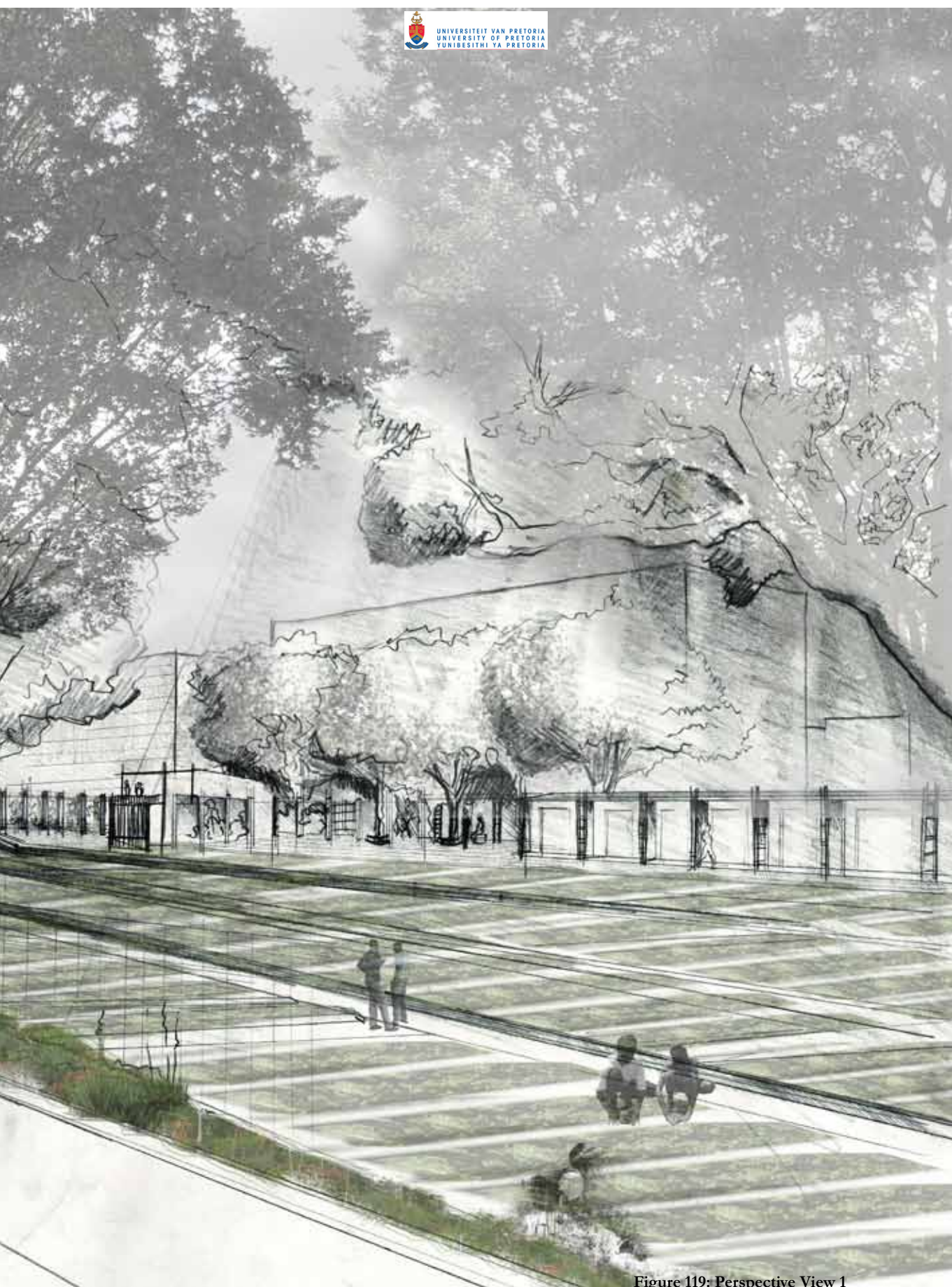


Figure 118: Final Sketchplan

Reference plan overlaid onto rendered sketch plan (Author: 2012)





**Figure 119: Perspective View 1**

View across the farmlands from the linear park (looking west) (Author: 2012)

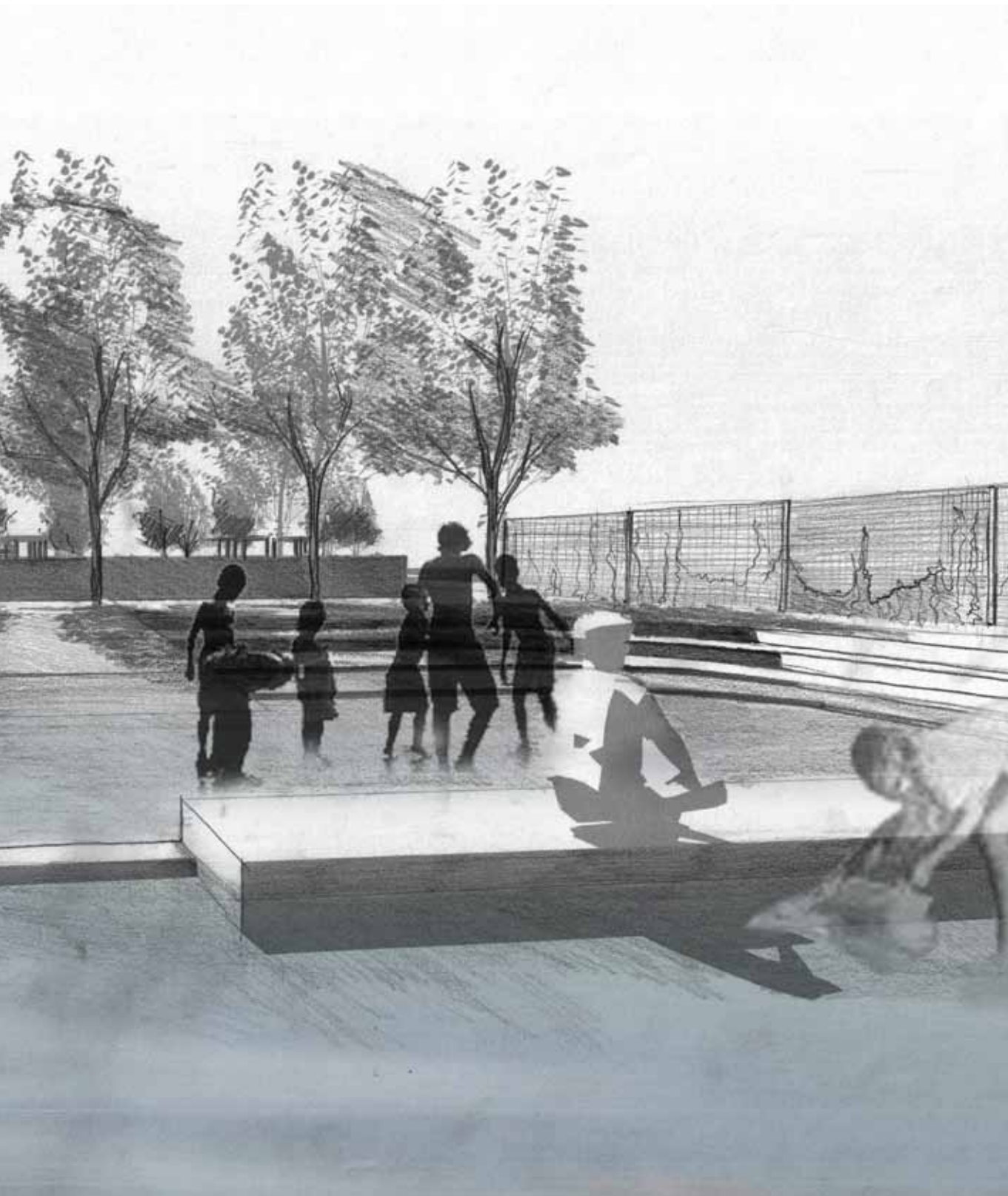




**Figure 120: Perspective View 2**

View across the farmlands from the linear park (looking east) (Author: 2012)





**Figure 121: Perspective View 3**  
View of the water access area (Author: 2012)





**Figure 122: Perspective View 4**  
View of the market area (Author: 2012)





Figure 123: Photograph of rendered Sketch plan

Final sketchplan as presented in exam (Author: 2012)



# Chapter 10 : Technical Development

Technical Strategies are developed to give expression to the concept of palimpsest on site. Various methods of construction and material use are used to interpret the palimpsest, as well as the poetic yet inelaborate character of farming.

## 10.1. Planting Strategies

Various planting palettes are used across the site in order to reinforce the idea that while the conservancy is a whole, there are subtle variances in each area according to the land uses. Planting is also used as a strategy to enhance certain elements on site and impress upon the visitors and everyday users the different character that each space has, thus the introduced planting becomes a trace which enriches the palimpsest and enhances everyday use of the site.

The planting strategy for the Steenovenspruit Agrarian Conservancy is robust and for the most part indigenous, diminishing irrigation need.

The plots discussed in part one are designed for vegetable farming. Thus a large portion of the site will be planted in seasonal vegetables which will vary throughout the year.

Fruit trees are used in the farmlands to provide shade and enhance the productive character of the farmlands as a place. Celtis trees are planted at the intersections of old traces to allow for gathering and chance meetings to continue.

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Indigenous vegetation is used throughout the rest of the site. *Celtis africana* and *Acacia sieberiana* are the predominant shade trees used in the market space and along movement avenues. Smaller trees and shrubs such as *Euclea crispa*, *dombeya rotundifolia* and *Ehretia rigida* are used on the berms and vegetated buffer zones between public urban spaces and the farmlands. *Buddleja* species are proposed as shrubs which can be trained into hedges between the farmlands and the public.

Hardy plants such as *Aloe greatheadii* var. *daveyana*, *Bulbine frutescens* and *Sanseveria trifasciata* are used in planters in the urban squares as a trace to enhance the palimpsest.

Climbers are further used to enhance both the agrarian character of the site, as well as the layering approach of the palimpsest concept. The predominant climber used on site is *Jasminum multipartitum*, however *Clematis brachiata* and *Aloe ciliaris* are also used in select focal areas.

Wetland plants are planted in pots supported by gabion filtering systems in the reservoirs.

A rich planting palette is proposed for the berm that runs alongside the reservoir, enriching the linear park as a place of beauty from which to view the everyday.



Figure 124: Planting Palette

Aside from the vegetable plots indigenous vegetation is proposed for use across the site (Author: 2012)

Shrubs:

*Barleria obtusa*  
*Felicia filifolia*  
*Pelargonium graveolens*  
*Diospyros austro-africanus*  
*Grewia flava*  
*Pavetta gardenifolia var gardenifolia*  
*Polygala virgata*  
*Buddleja salviafolia*  
*Diospyros lycioides*  
*Ehretia rigida*  
*Grewia occidentalis*  
*Protea roupelliae*  
*Rhamnus prionoides*

Climbers:

*Aloe ciliaris*  
*Clematis brachiata*  
*Jasminum multipartitum*

Water:

*Crinum bulbispermum*  
*Crinum macowanii*  
*Gomphostigma virgatum*  
*Nymphaea nouchali*  
*Nymphoides thunbergiana*  
*Typha capensis*

Herbaceous perennials, groundcover and shrubs:

*Aloe greatheadii var. daveyana*  
*Cotyledon orbiculata*  
*Scadoxus puniceus*  
*Bulbine capitata*  
*Bulbine frutescens*  
*Eucomis autumnalis*  
*Delosperma herbeum*  
*Asparagus asparagoides*  
*Asparagus densiflorous 'sprengeri'*



*Euclea crispa*  
evergreen, compact tree

*Dombeya Rotundifolia*  
masses of white flowers

*Felicia amelloides*  
fast growing and long lived

*Aloe greatheadii var. daveyana* + *Bulbine frutescens*

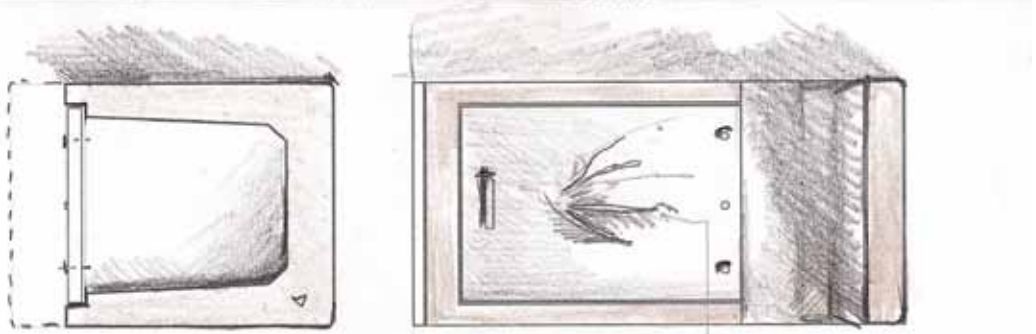
*Sanseveria trifasciata*

## 10.2 Furniture Palette

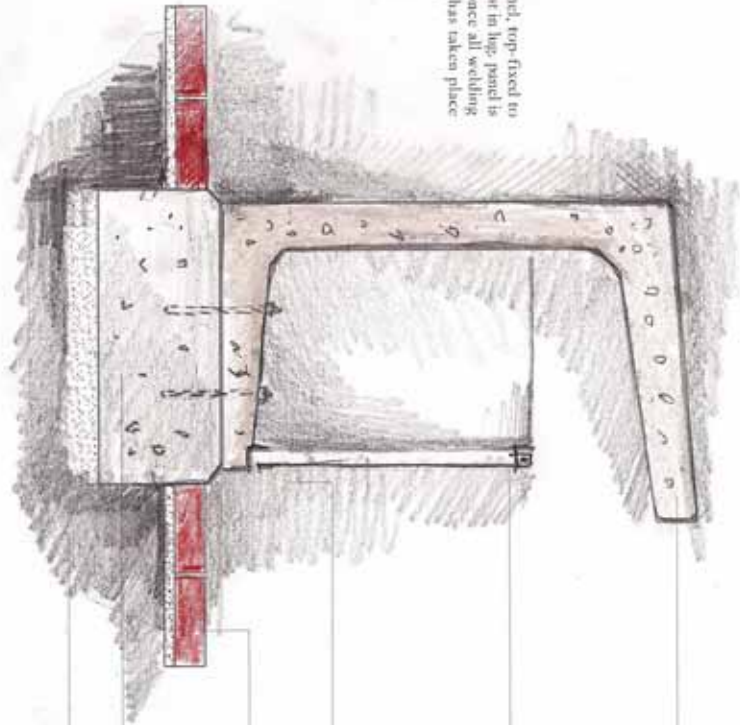
Much like the planting strategies above, various furniture palettes are used throughout the site.

The furniture palette in the farming area comprises mostly of low seating walls, trellised fences and shade structures for creating private niches. Trees provide shade. Furniture is placed around trees which are planted at the intersection created by historical traces. Gum trees that run along the Steenovenspruit will be cut down and sawn into seating logs and stumps to be used in the farm lands. Materials in the farming areas need to be robust, while still maintaining a slightly rustic, inelaborate character. Materials such as clay bricks and wood are used to further enhance the concept of palimpsest and traces which will become evident on the materials over time.

The furniture palette used in the urban square has a more robust nature and was discussed in depth in the material guidelines above.



laser cut thin panel, top fixed to  
 screw around a cast in bag; panel is  
 powder coated, once all welding  
 and laser cutting has taken place



purpose made precast, a  
 concrete rubbish bin  
 exposed grain SA pure 1

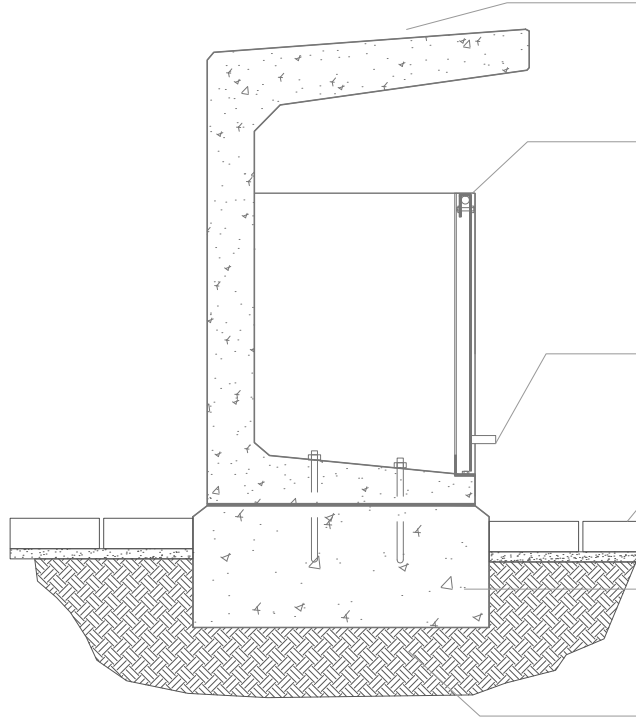
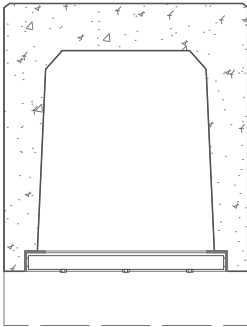
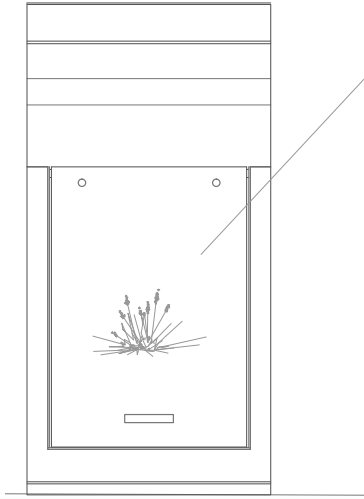
thin powder coated steel  
 panel bent to fit and screw  
 a cast in bag and fixed with  
 and top welded nut, panel  
 cut with an artistic detail  
 re-inforce the concept of

handle welded to steel plate  
 to powder coating

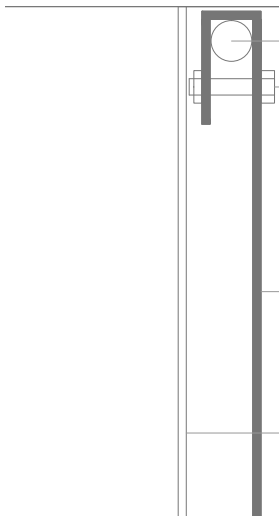
segmental brick pattern  
 slope on a prepared sand

cast in situ concrete fitting  
 a hole for fixing the piece  
 site.

compacted earth layers



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20mm dia. galvanised steel lug pre-welded onto steel angle iron frame

m6 bolt tap welded and painted with non-corrosive paint to ensure that steel plate remains connected to bin

4mm, pre-drilled powder coated steel plate bent to fit around steel lug

50 x 50 x 3 angle iron frame bolted to precast concrete bin

4mm powder coated steel, panel top-fixed to swivel around cast in lug, laser cut

purpose made precast, reinforced concrete rubbish bin, cast in exposed grain SA pine shuttering

4mm powder coated steel plate panel bent to fit and swivel around a cast in lug and fixed with a bolt and tap welded nut. panel is laser cut with an artistic detail to re-inforce the concept of traces.

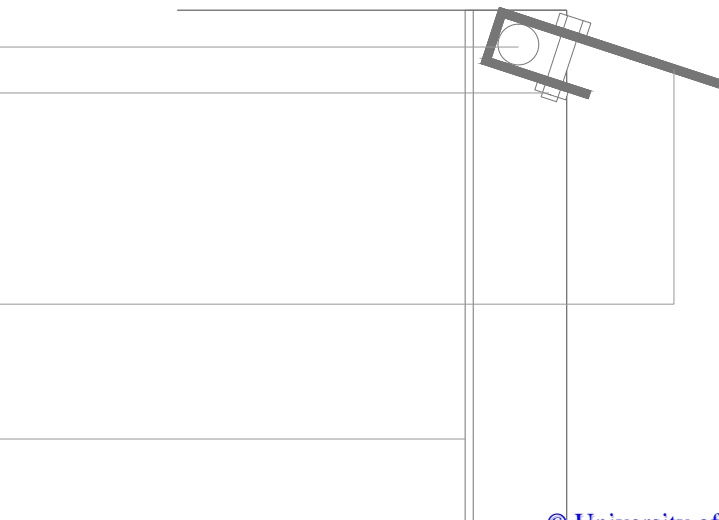
handle welded to steel plate prior to powder coating

segmental brick pavers laid at 2% slope on a prepared sand layer.

cast in situ concrete footing with cast in u-bolts for fixing the precast bin on site.

compacted earth layers

## Detail 12 Scale 1:10



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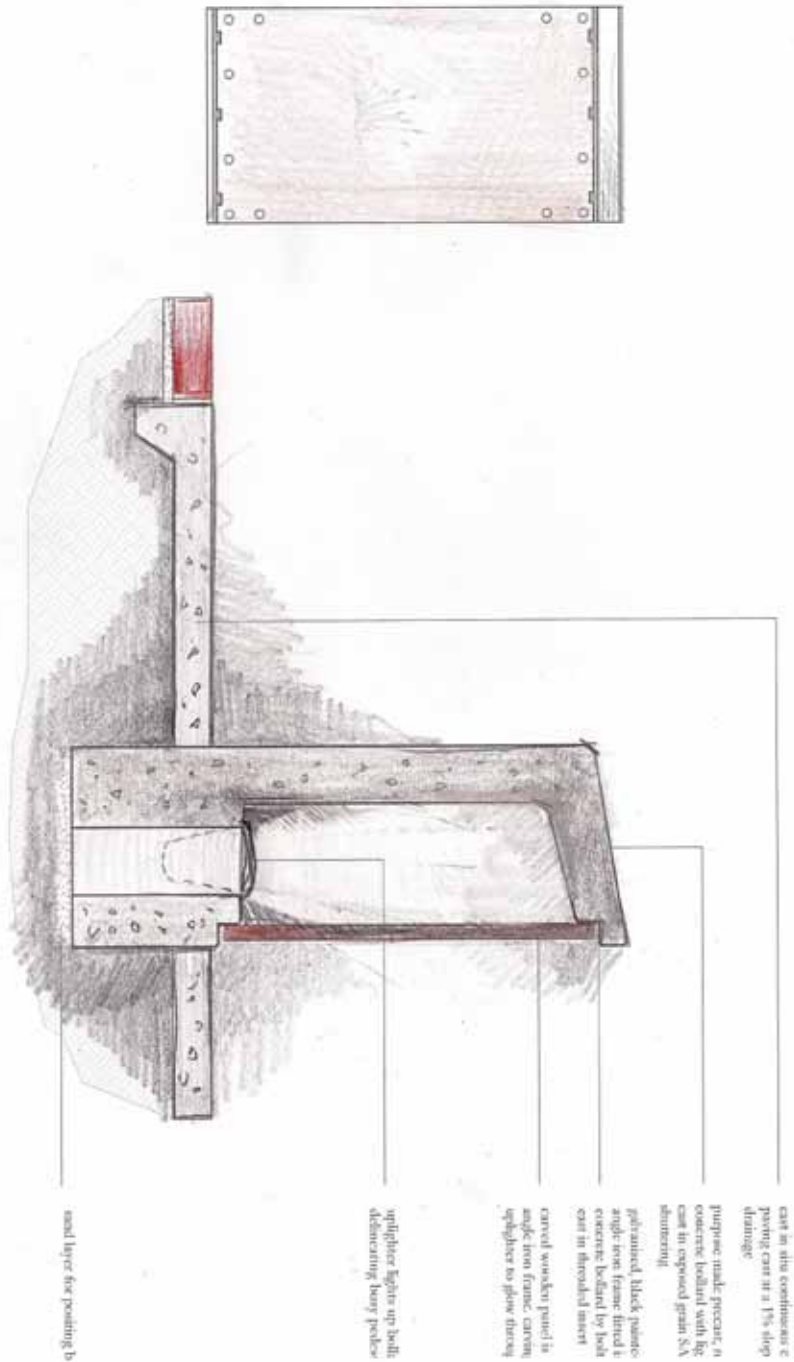


Figure 127: Street furniture palette  
 (Author: 2012)

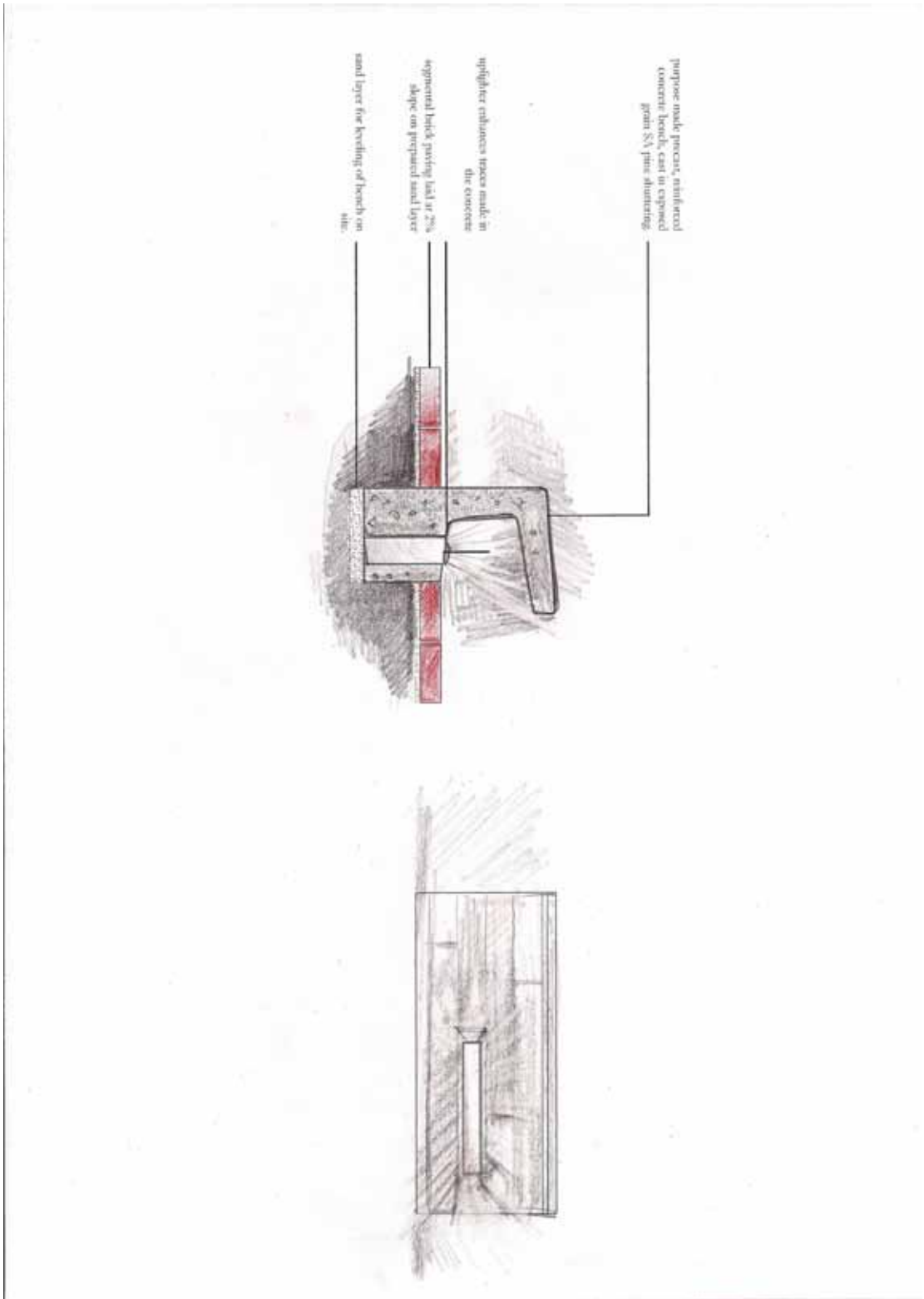
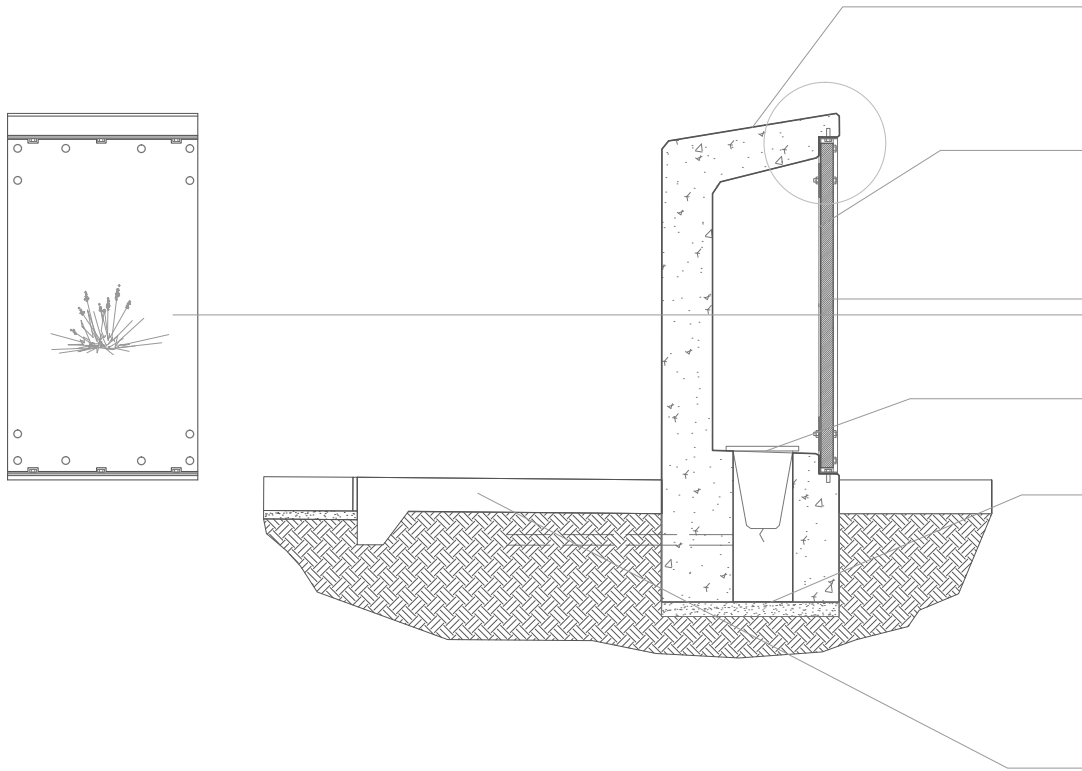
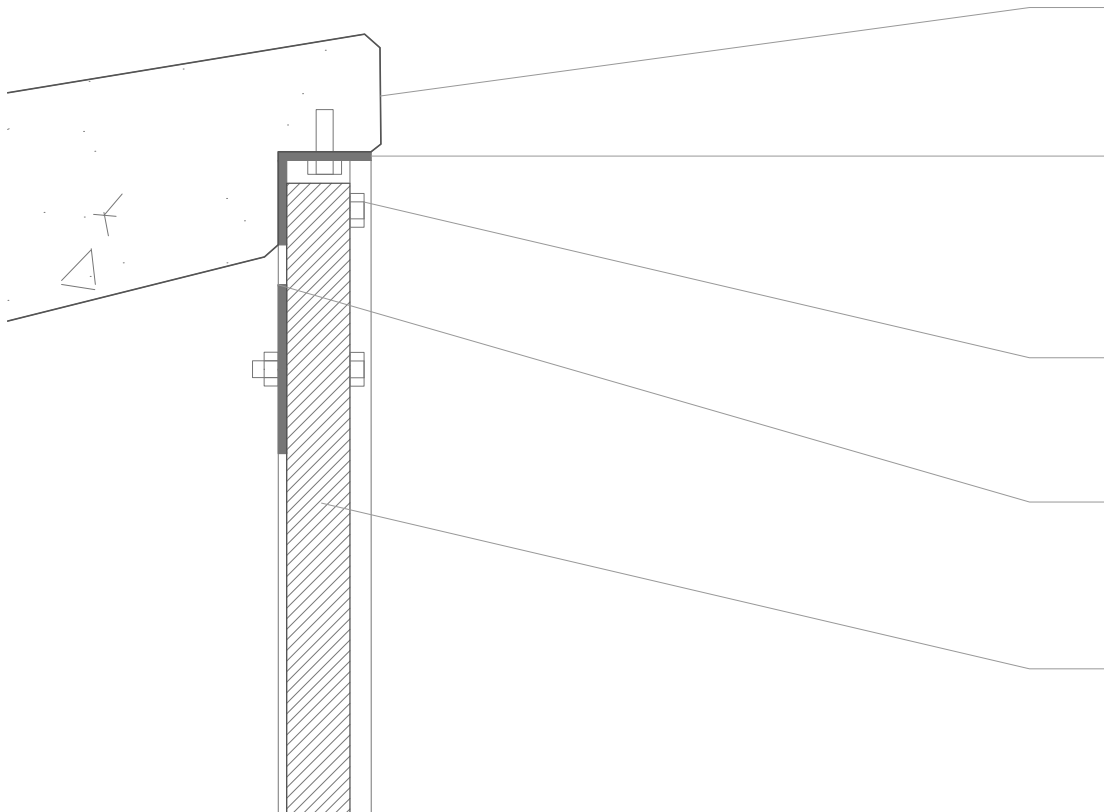


Figure 128: Street furniture palette  
(Author: 2012)



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*Detail 14 Scale 1:10*



purpose made precast, reinforced concrete bollard with Bekaspik light fitting. cast in exposed grain SA pine shuttering

galvanised, black painted steel angle iron frame fitted into precast concrete bollard by bolting into a cast in threaded insert

carved wooden panel is bolted to angle iron frame. carving allows uplighter to glow through the trace.

uplighter lights up bollard at night, delineating busy pedestrian routes

sand layer for positing bollard

cast in situ continuous concrete paving cast @ a 1% slope for drainage

purpose made precast, reinforced concrete bollard with light fitting. cast in exposed grain SA pine shuttering

galvanised, black painted steel angle iron frame fitted into precast concrete bollard by bolting into a cast-in threaded insert

m6 galvanised steel thread welded to angle iron frame wooden panel fixed in place with a tap welded nut

galvanised, black painted steel flat bar welded to steel equal angle frame to allow wooden panel to be bolted in place

carved wooden panel bolted to angle iron frame. carving allows uplighter to glow through the trace.

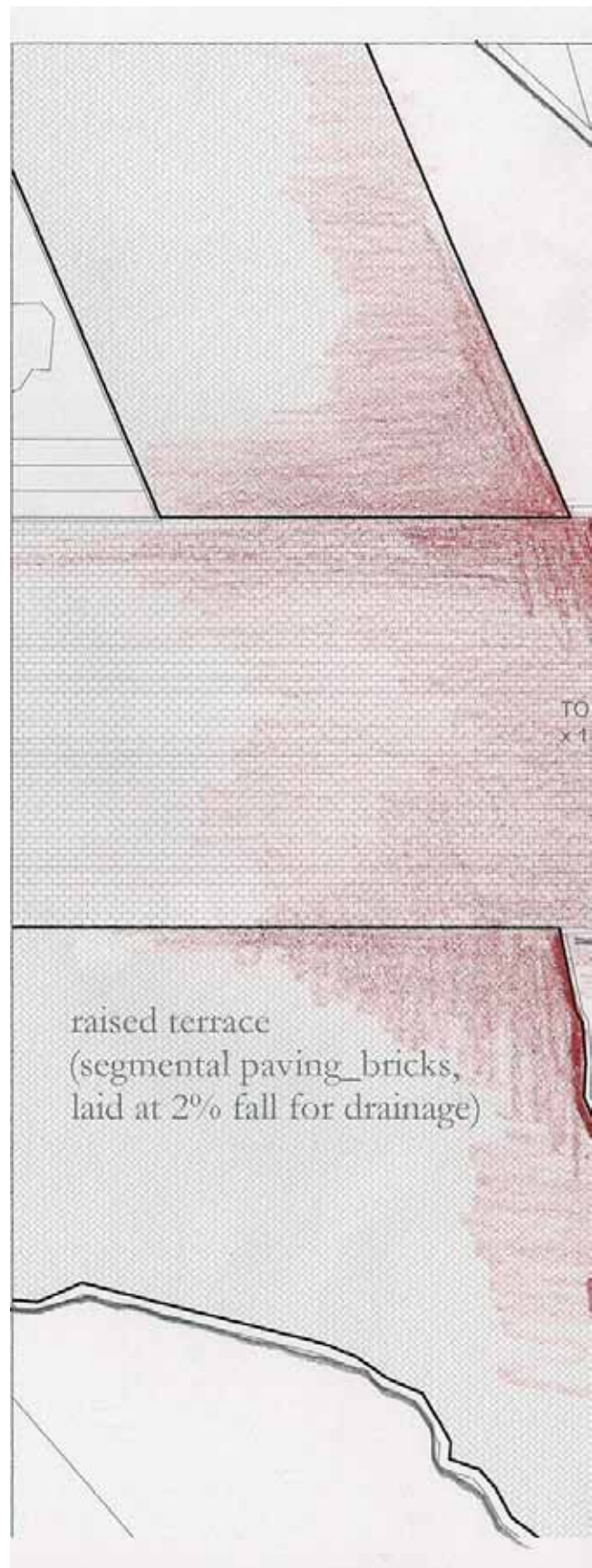
### 10.3 Paving Strategies

Two major paving materials are used in the Steenovenspruit Agrarian Conservancy. Continuous concrete paving, as a robust material, is applied in the urban squares. In order to break up the monotony of the concrete, clay brick pavers are used as an accent material coinciding with the tree grid on site.

Bricks, according to the material guidelines in section 10.7 above, are used to humanise spaces. Thus brick is used on the raised terrace to bring the space back down to a human scale. The brick paving is laid in varying patterns in order to break up the monotony of continuous lines.

Both the tree layouts and paving grids were designed to line up with the planting sections in the farmlands. The repetitive patterns and variety in materials reinforce the expressive nature of farming in its ordered, yet varying nature.

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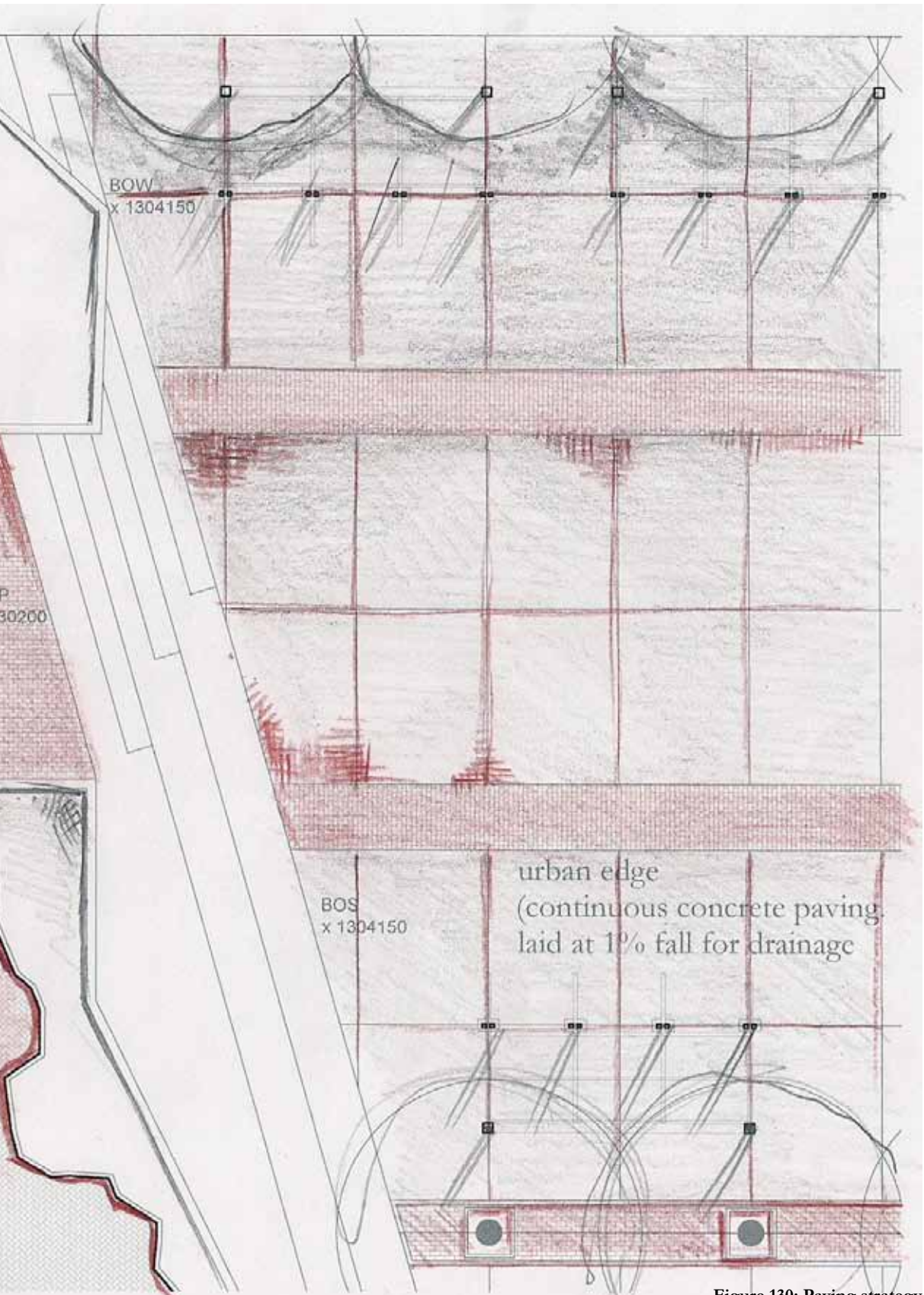


Figure 130: Paving strategy

A combination of segmental brick paving and continuous concrete paving is used (Author: 2012)

## 10.5 Strategies Plan

### Planting Strategy



*Garden Planting* wild indigenous plants that give a lush, soft feel



*Urban Edge Planting* hardy indigenous shrubs and small feature plants to soften edges and indicate a change in levels



*Indigenous screening planting* shrubs and grasses with small indigenous trees

### Water Strategy



*Stormwater* flow



*Reservoir water*



*Gabion filter structures* sculptural elements that improve water quality

### Lighting Strategy



BEKA Ledpace



BEKA Ledtwin



BEKA Spike

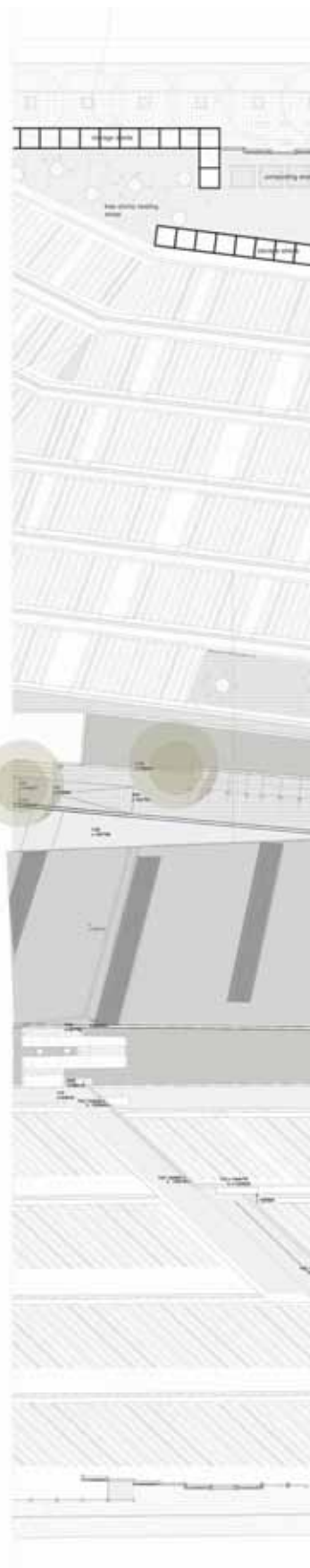
### Materials Strategy

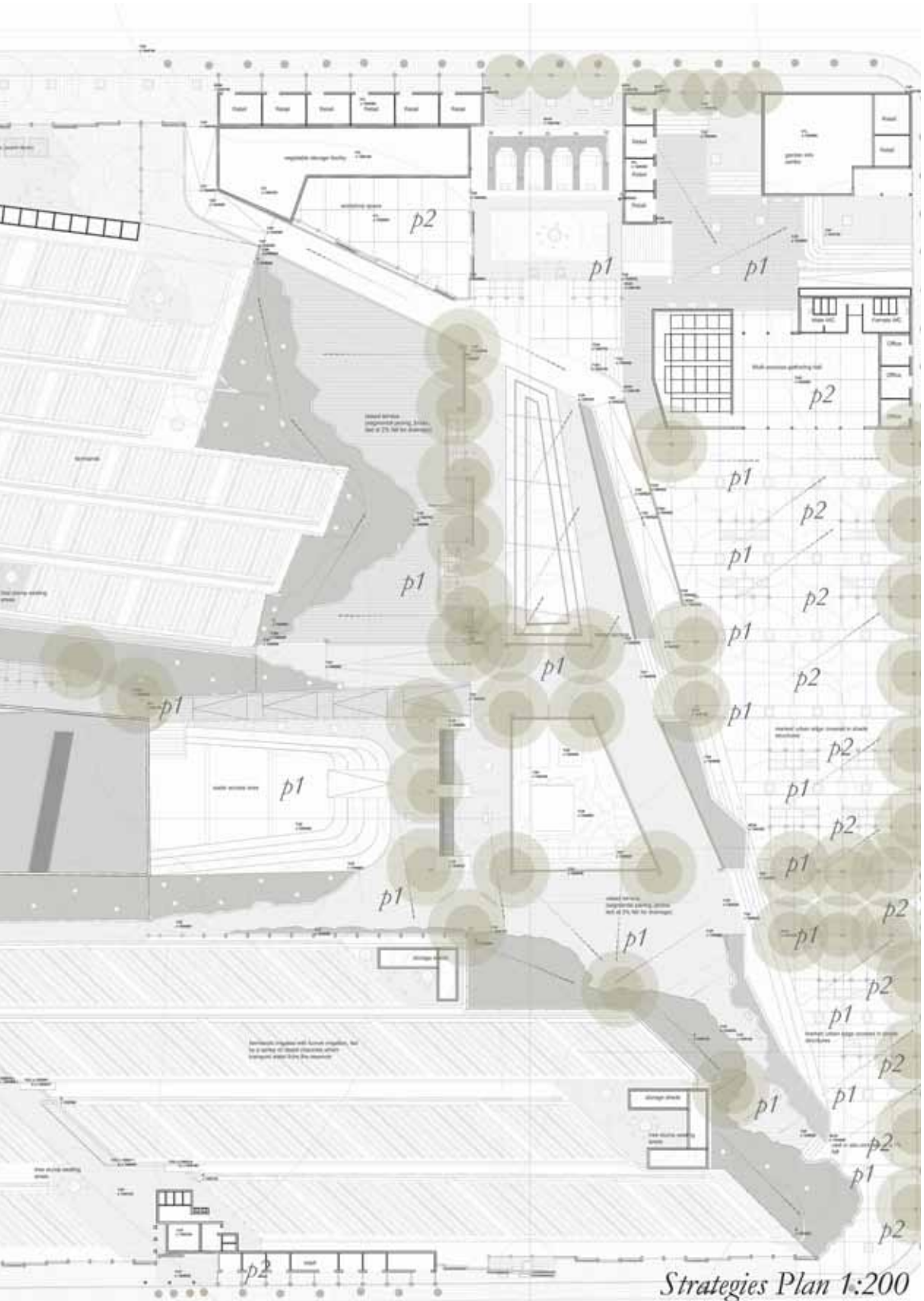
*Infrastructural and supporting elements: concrete and steel*

*Human scale elements: wood and brick*

01 - brick work

02 - concrete



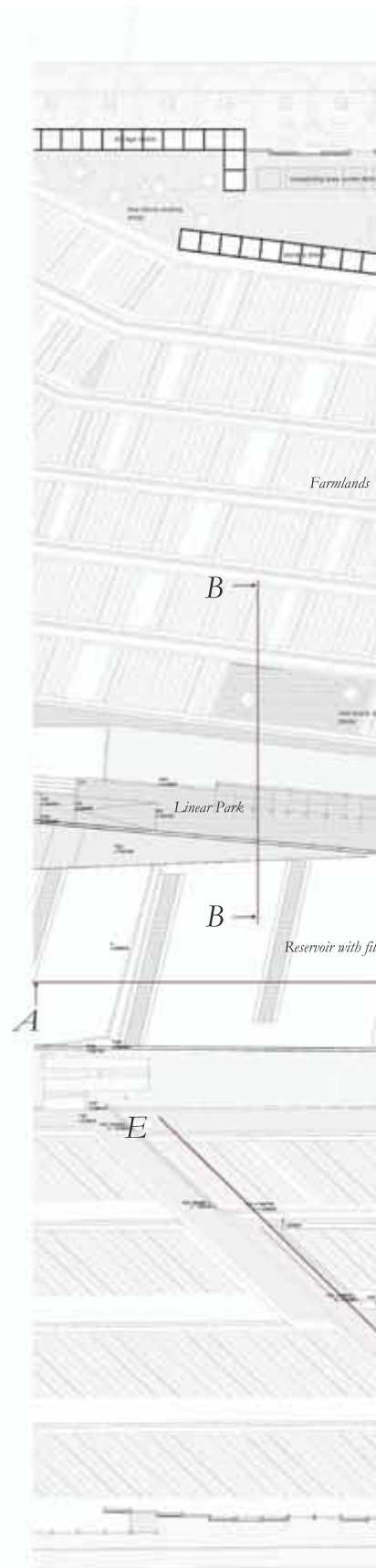


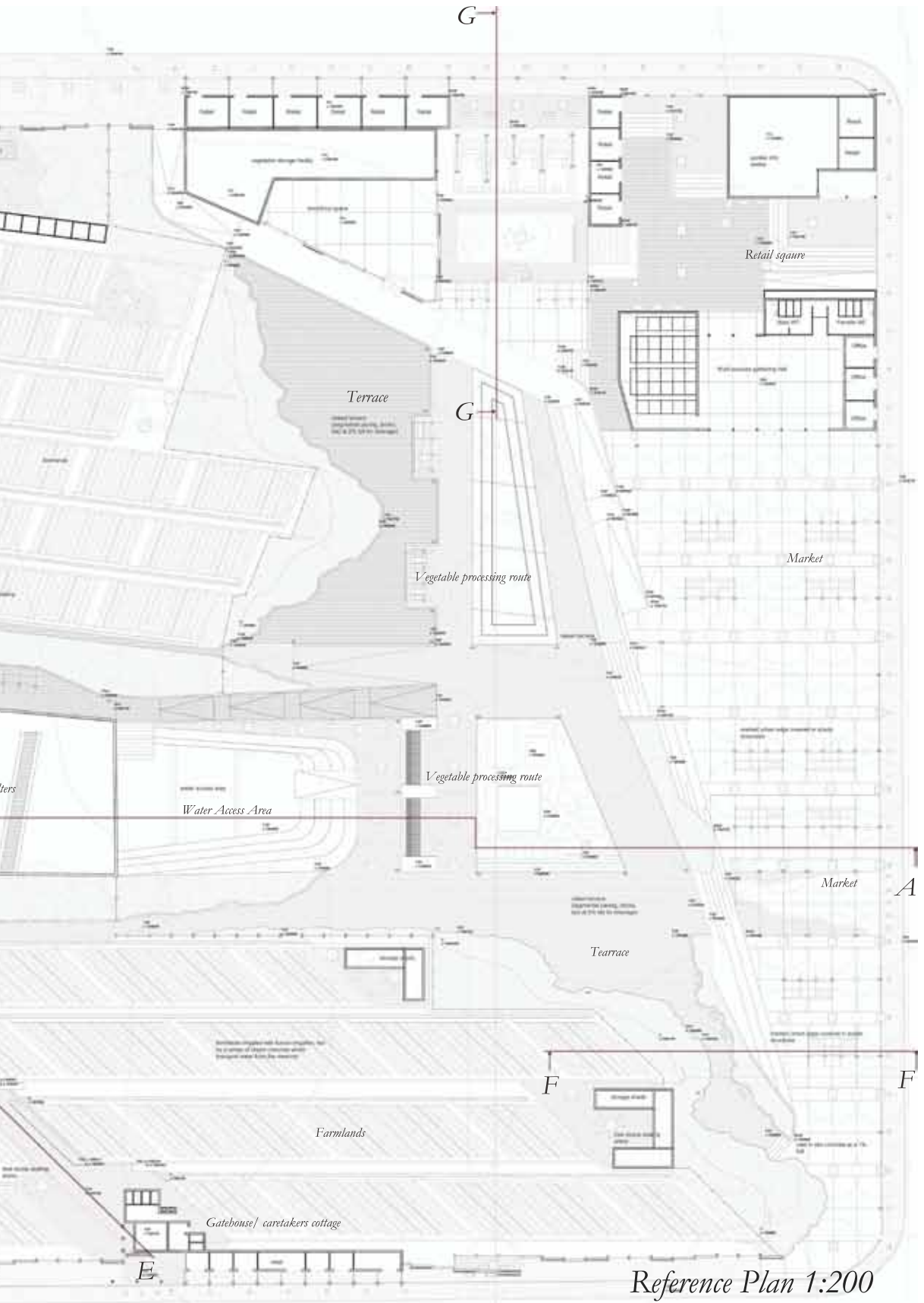
Strategies Plan 1:200

Figure 131: Strategies Plan  
Not to scale(Author: 2012)

## 10.6 Technical Documentation of design

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Reference Plan 1:200

Figure 132: Reference Plan  
Not to scale(Author: 2012)

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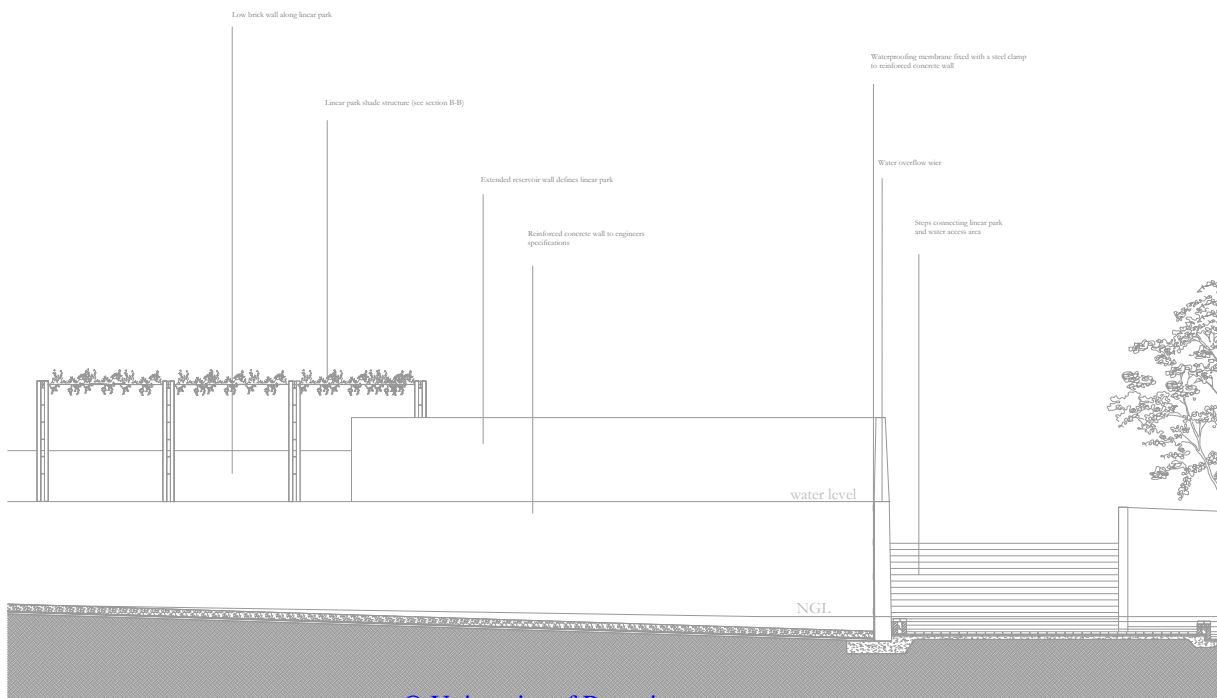




Figure 133: Section AA  
Not to scale (Author: 2012)

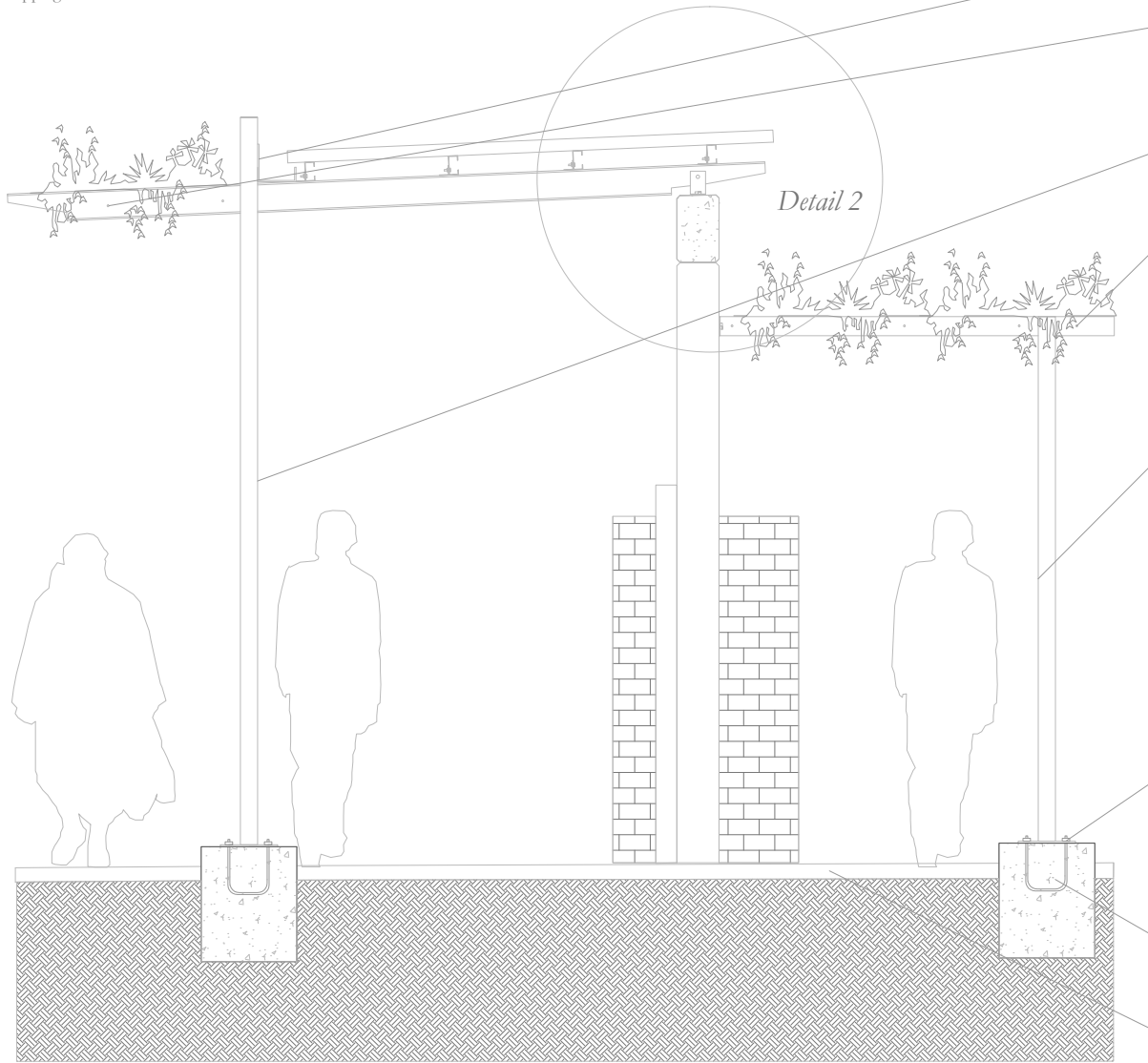


Trellis shade structures screen contemplation garden from public avenue

Existing building floor adapted into herb garden to enhance the idea of rebranding through the use of existing palmpest layers

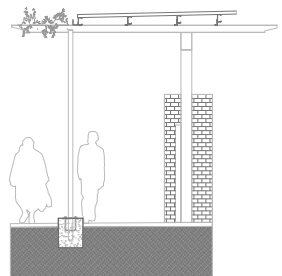
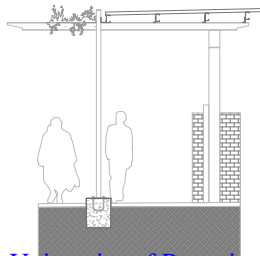
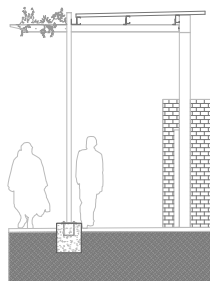


lf-tapping



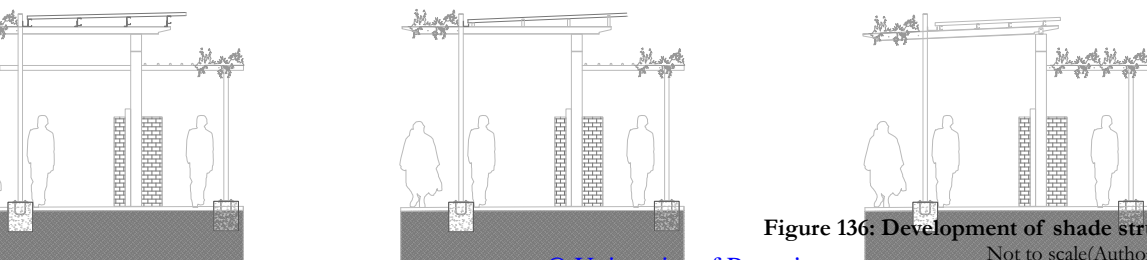
187

*Detail 1 Scale 1:20*



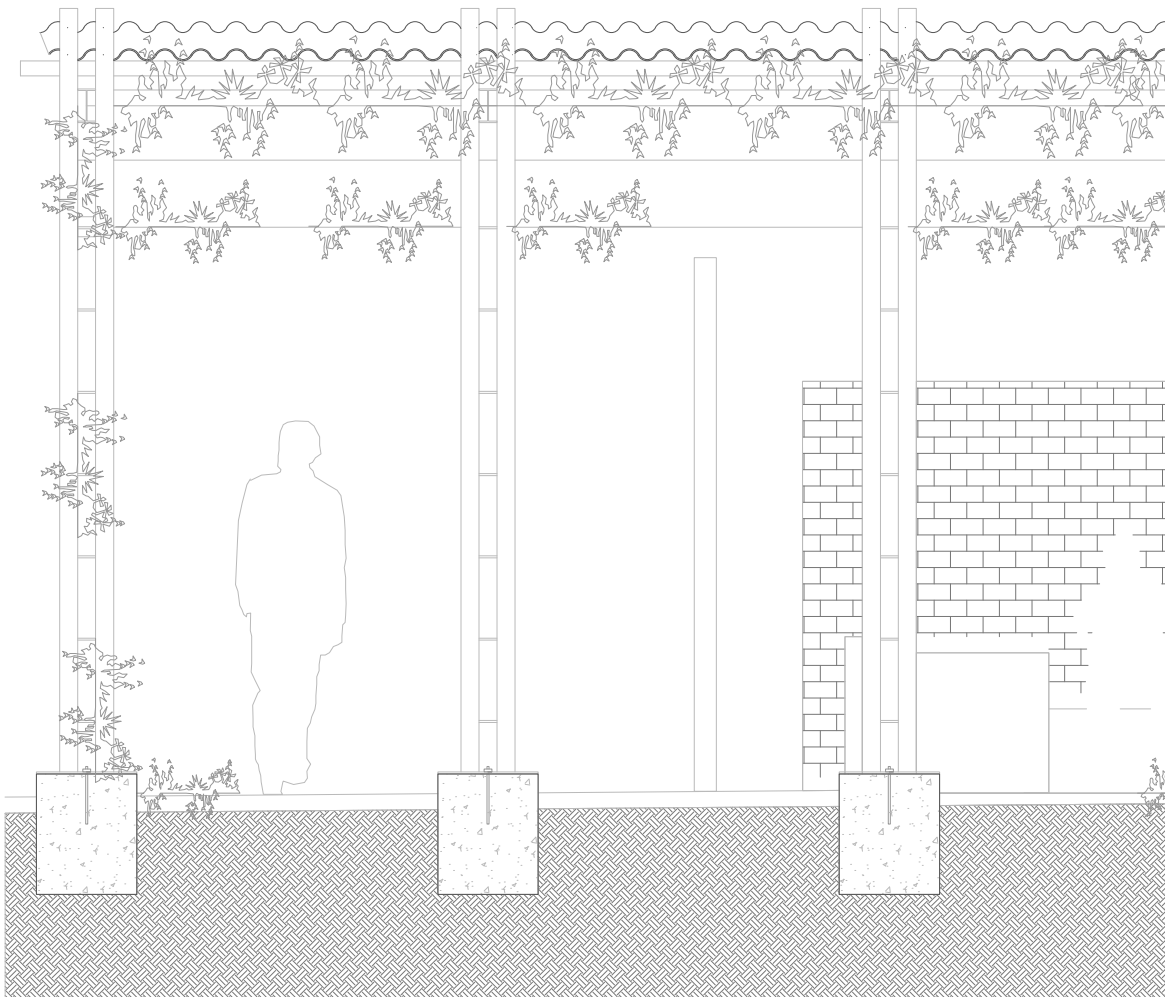


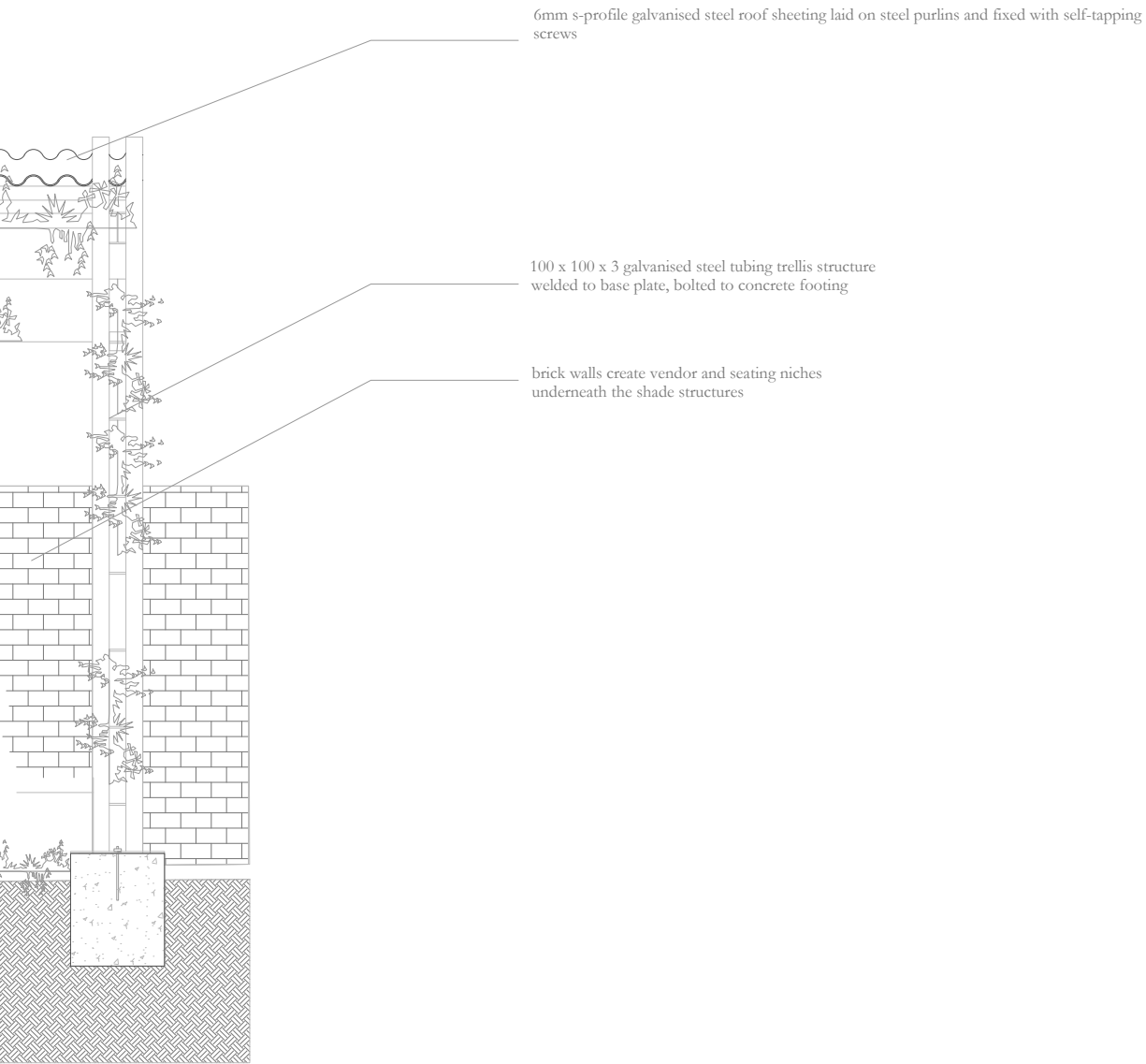
**Figure 135: Detail 1**  
Not to scale(Author: 2012)



**Figure 136: Development of shade structure**  
Not to scale(Author: 2012)

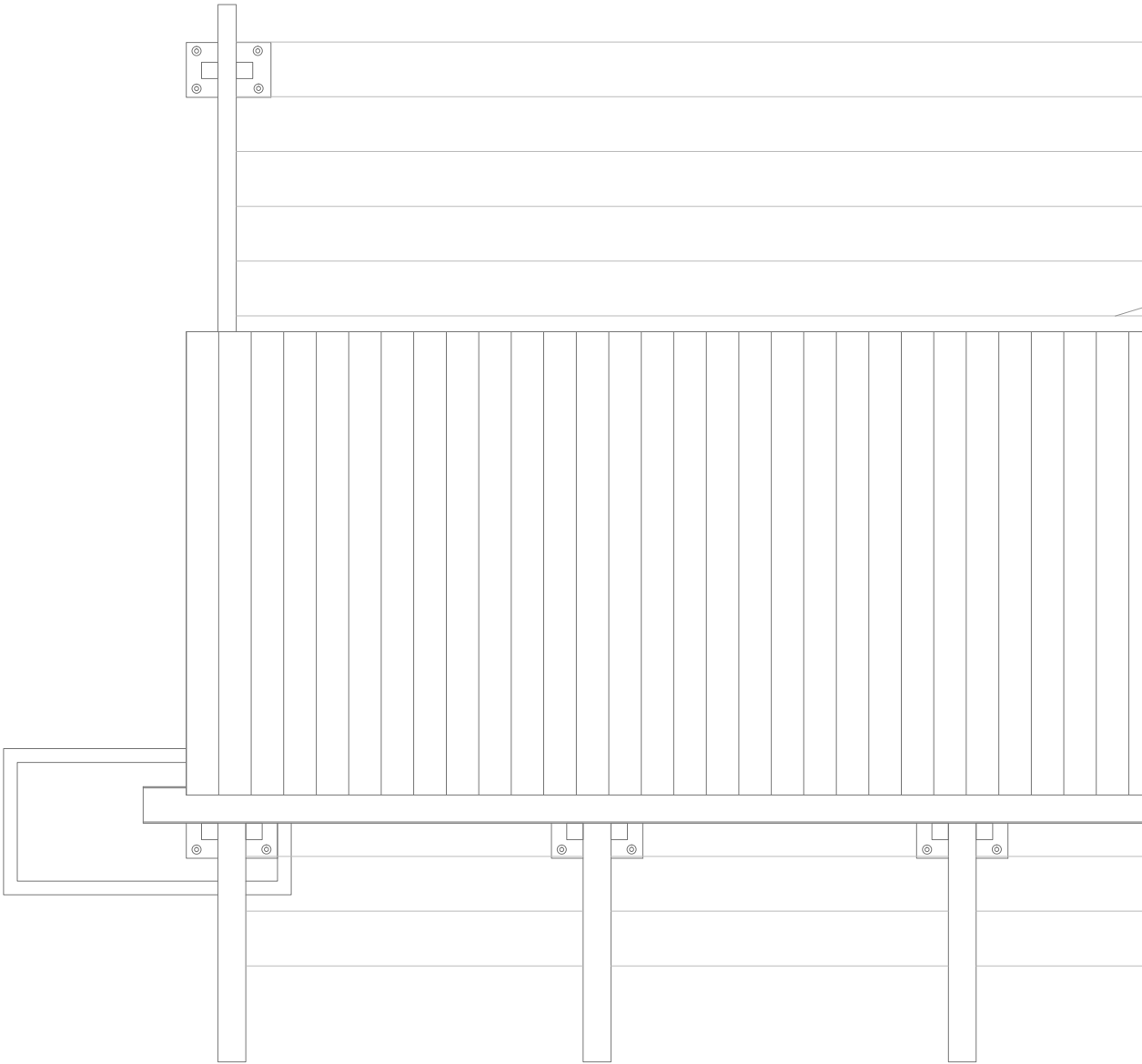
189

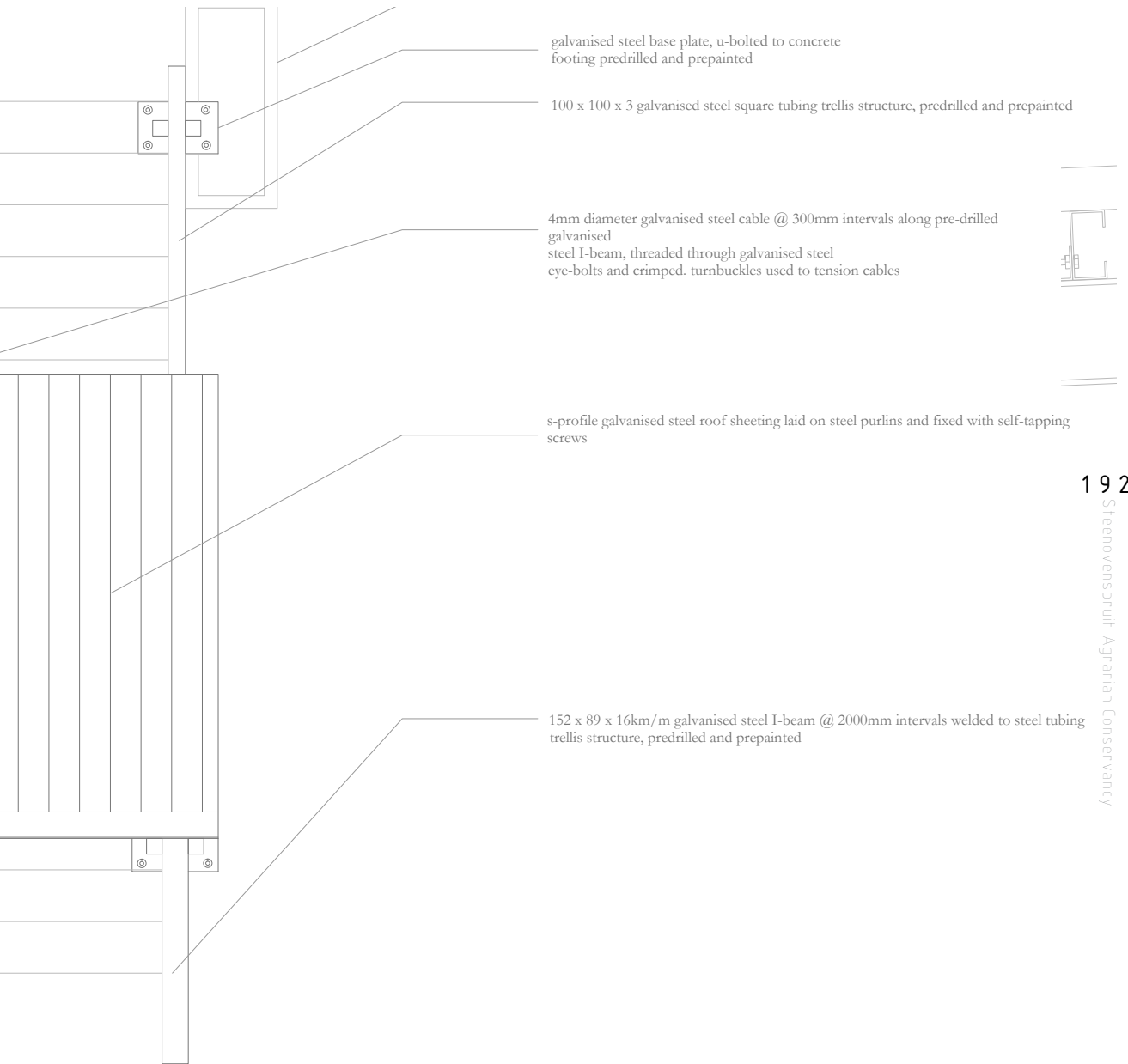




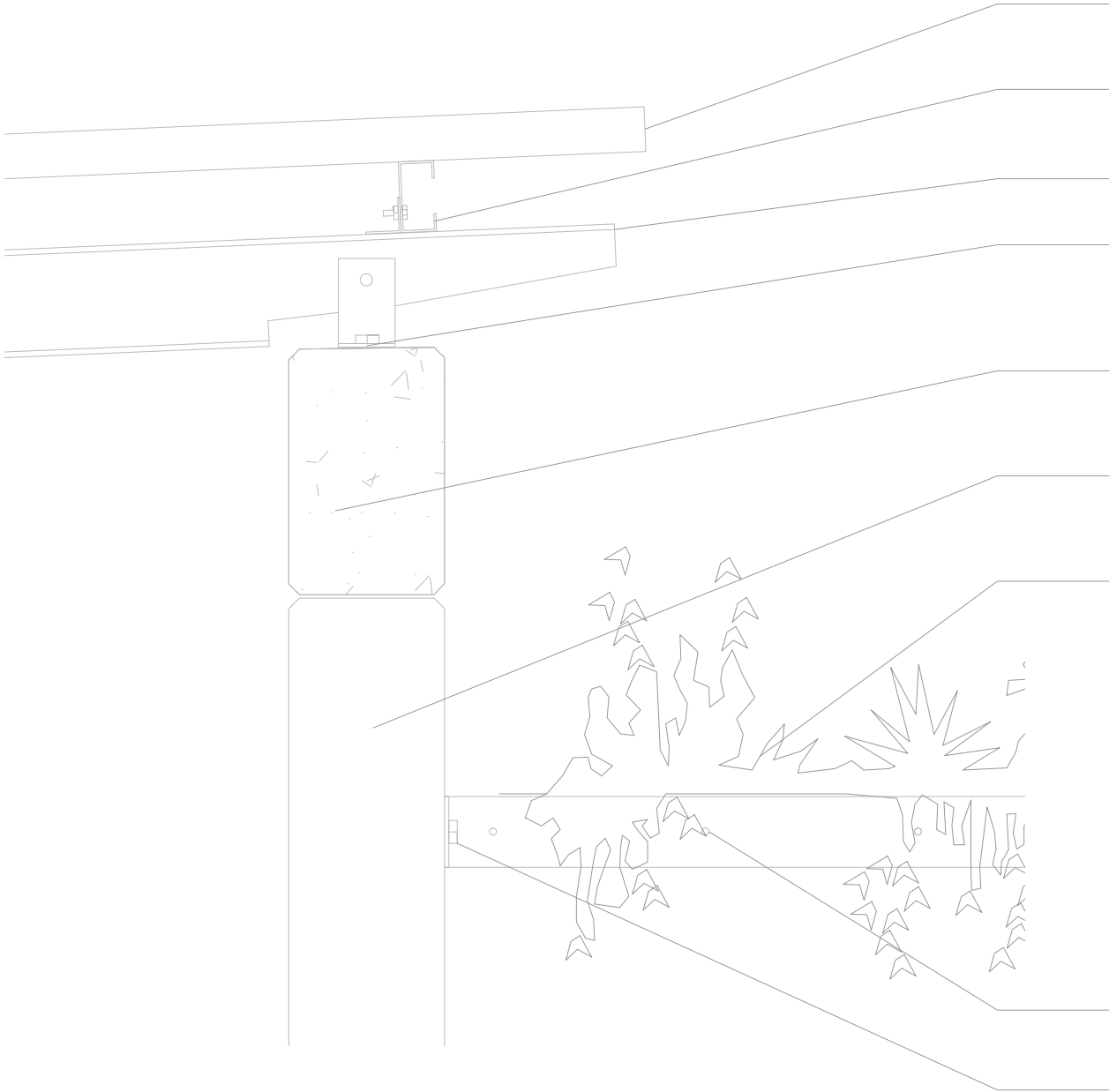
**Figure 137: Detail 1**  
Not to scale(Author: 2012)

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193



*Detail 2 Scale 1:5*

6mm s-profile galvanised steel roof sheeting laid on steel purlins and fixed with self-tapping screws

100 x 50 x 20 x 3 galvanised lipped channel purlins @ 700mm intervals fixed to steel I-beam

152 x 89 x 16mm/m galvanised steel I-beam @ 2000mm intervals bolted to equal angle predrilled and prepainted

pre-drilled galvanised steel equal angle support structure bolted to concrete beam

220 x 350 x 6000mm cast in situ re-inforced concrete beam

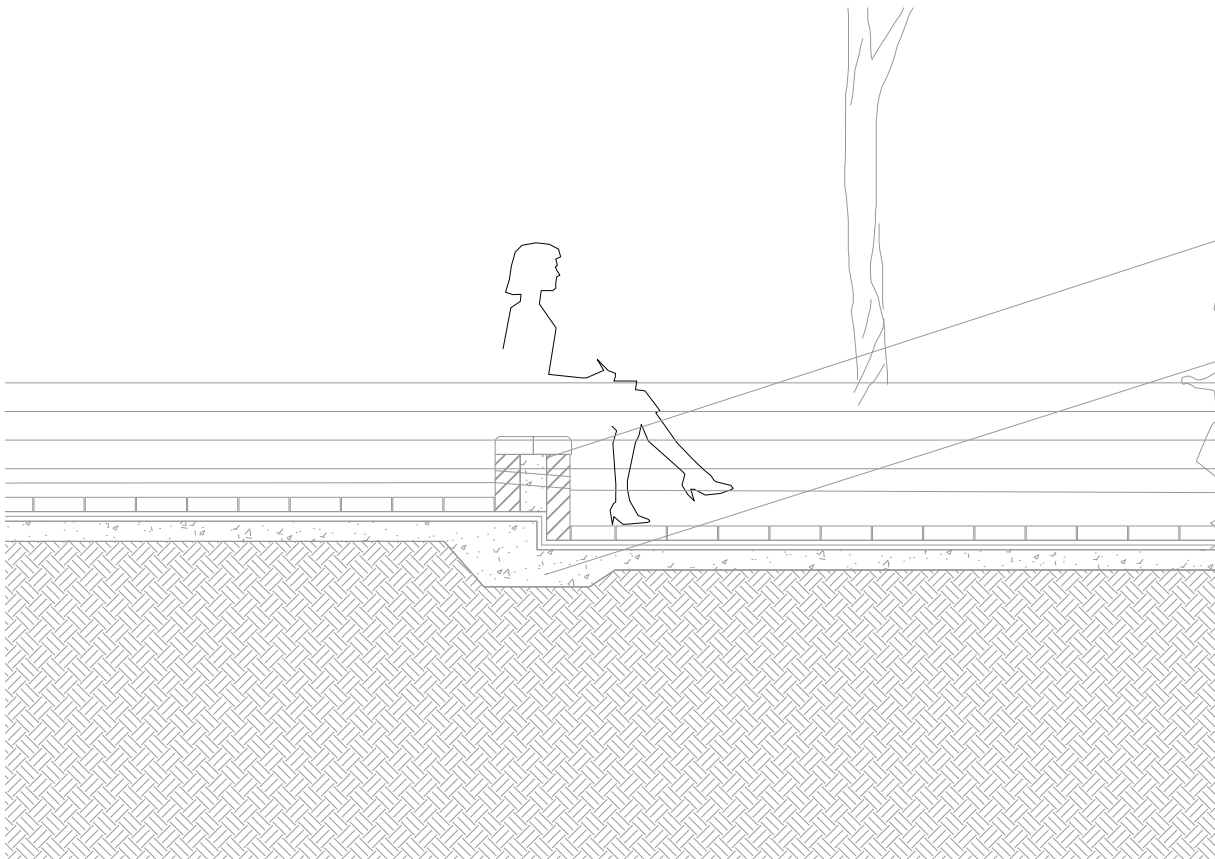
220 x 220 x 3200mm reinforced cast in situ re-inforced concrete beam

combination of *Jasminum multipartitum* and *Clematis brachiata* creeper species trained to grow up trellis structure

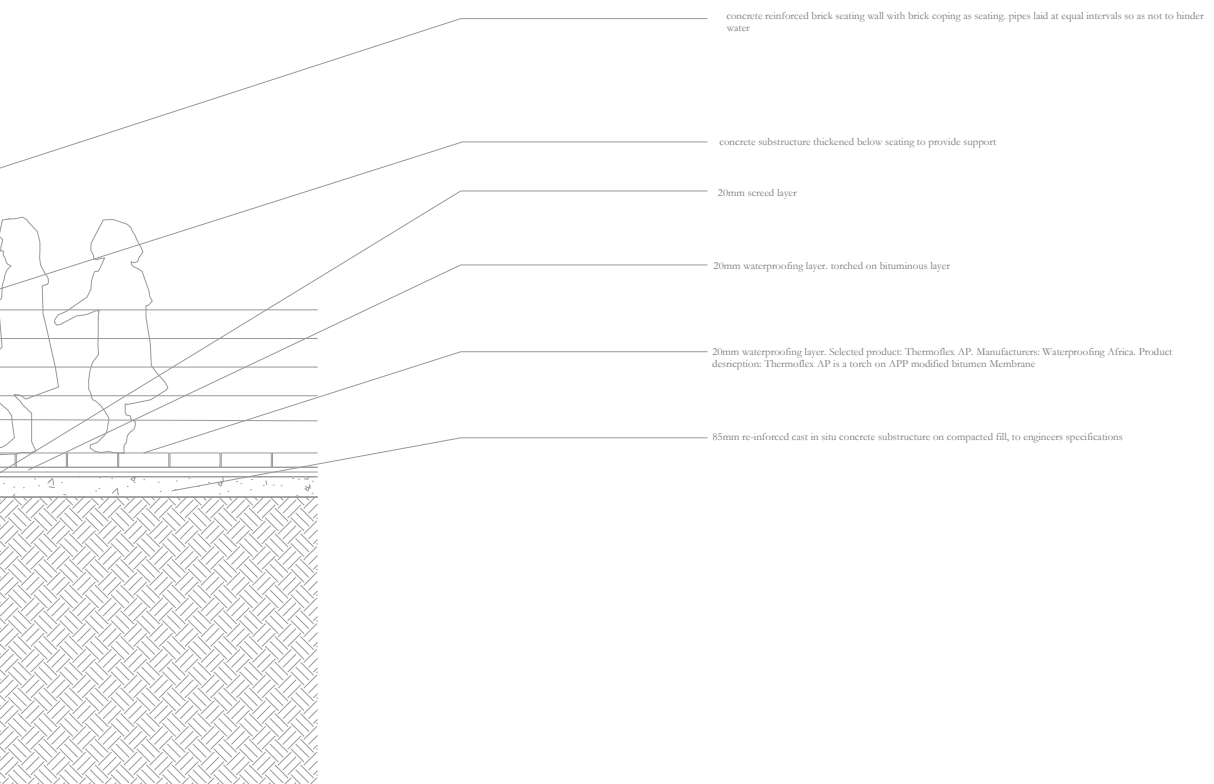
100 x 100 x 3 galvanised steel square tubing welded to end plate, predrilled and prepainted

galvanised steel end-plate bolted to concrete column

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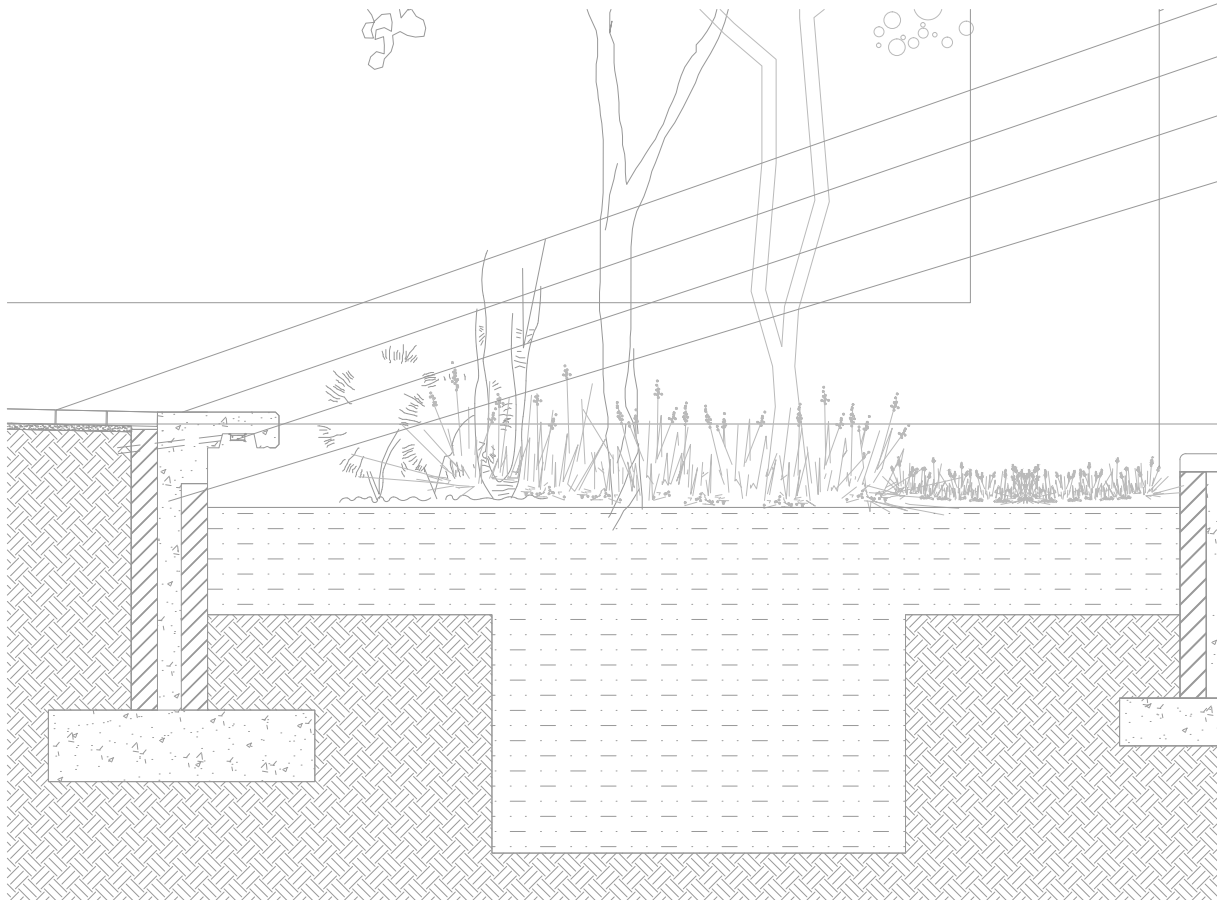


*Detail 3 Scale 1:10*

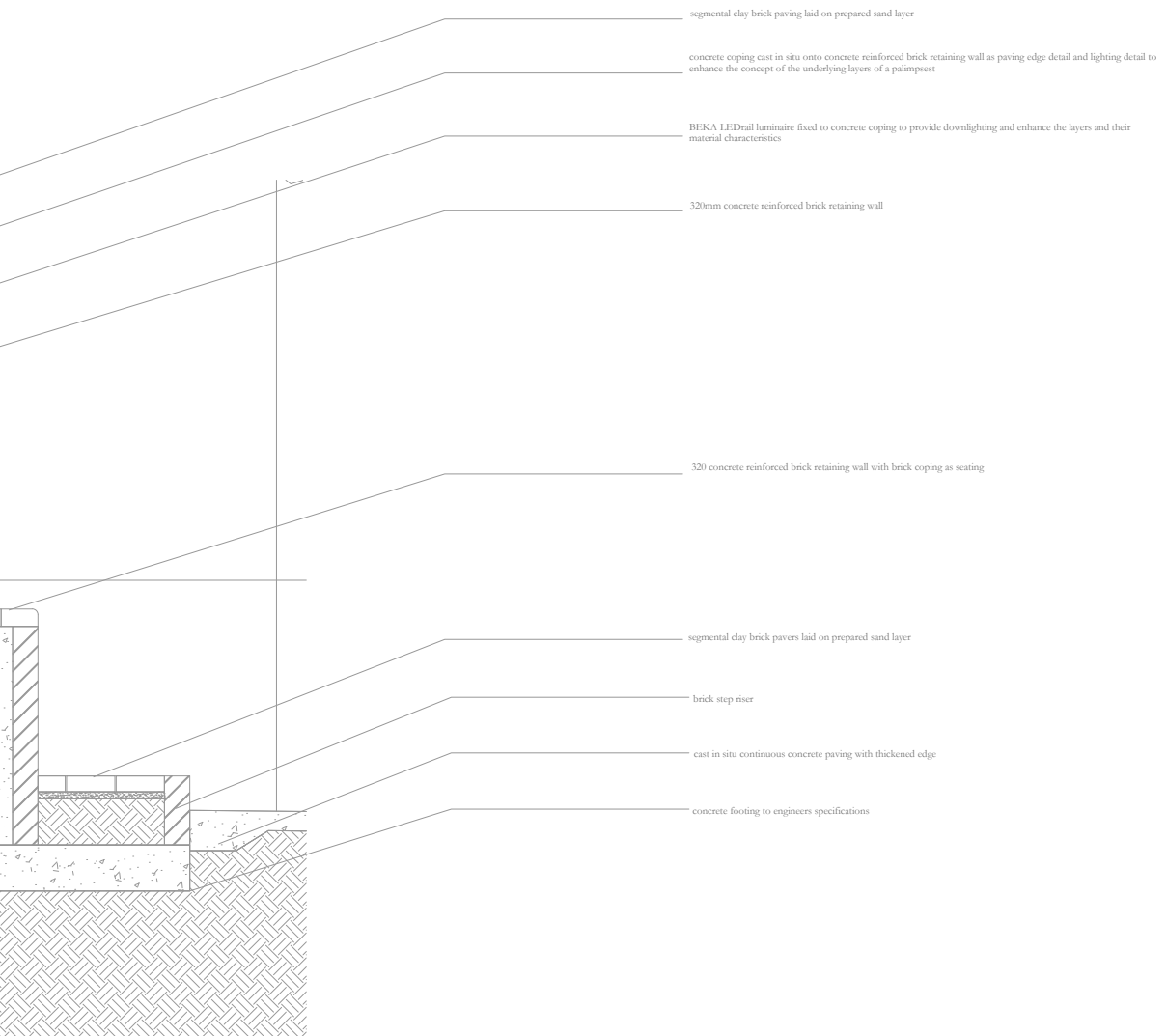


**Figure 140: Detail 3**  
Not to scale(Author: 2012)

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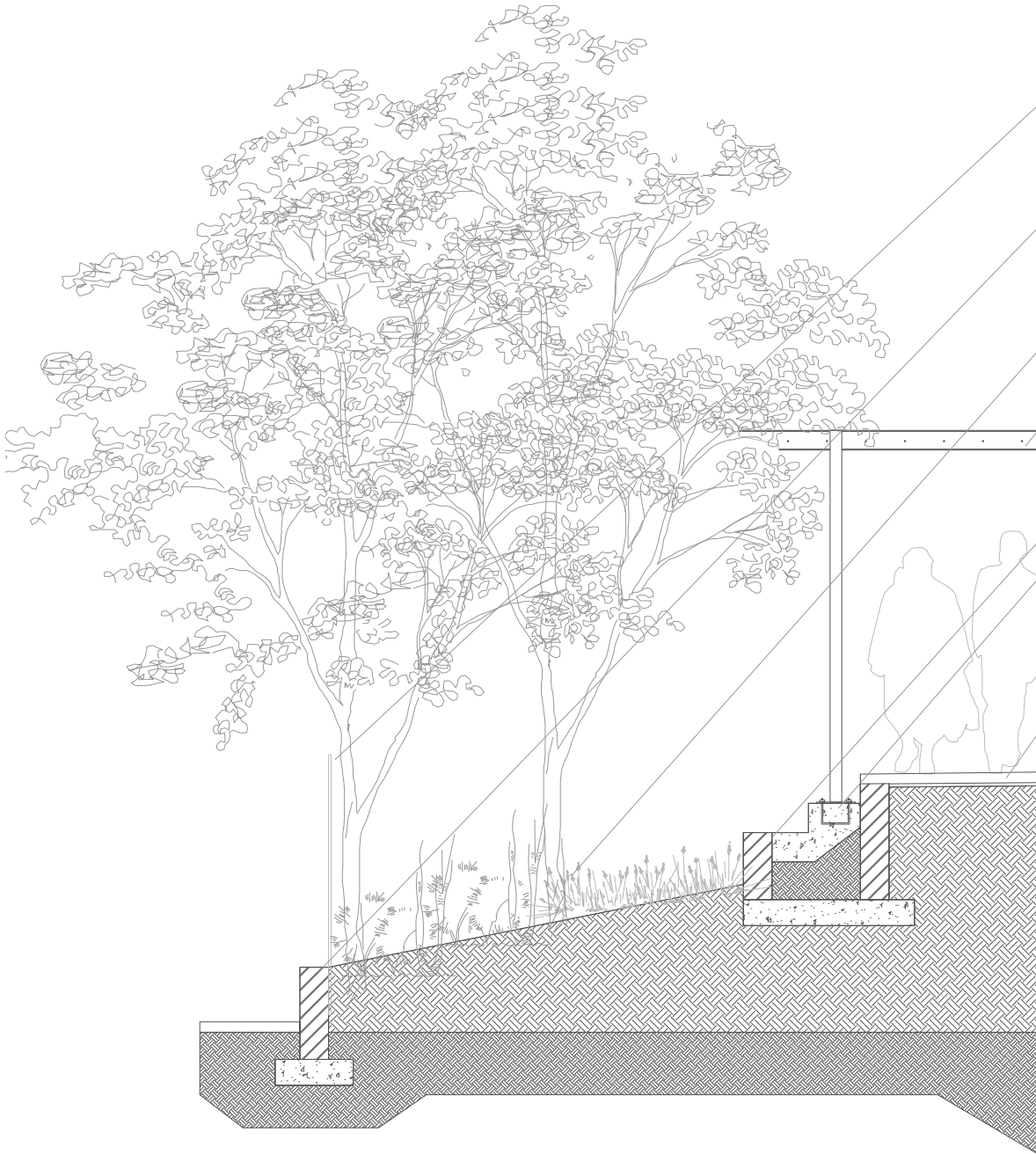


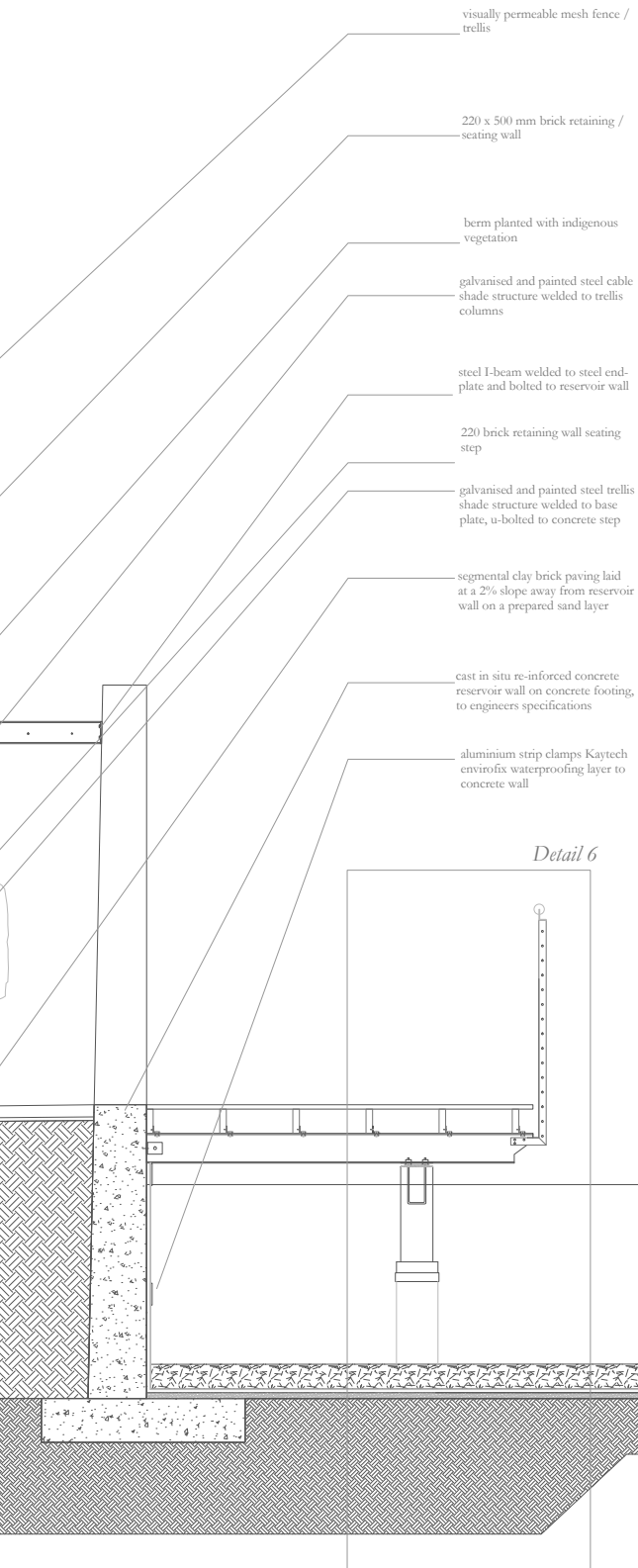
*Detail 4 Scale 1:10*



**Figure 141: Detail 4**  
 Not to scale(Author: 2012)

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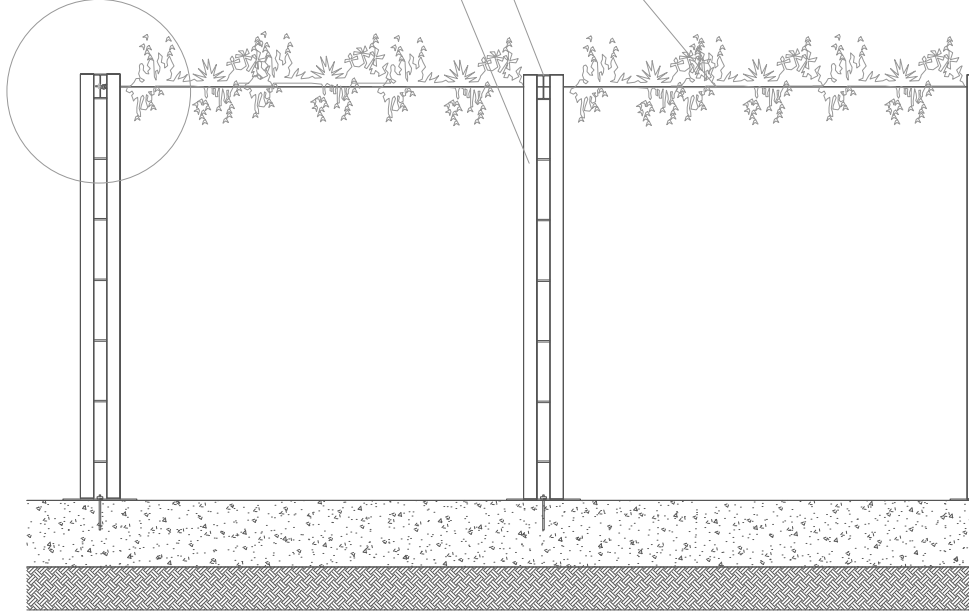
*Section B-B Scale 1:20*

combination of *Jasminum multipartitum*  
 and *Clematis brachylata* creeper species trained to grow  
 up trellis structure

52 x 89 x 16mm galvanised steel I-beam @ 2000mm intervals bolted to equal angle,  
 predrilled  
 and prepaainted

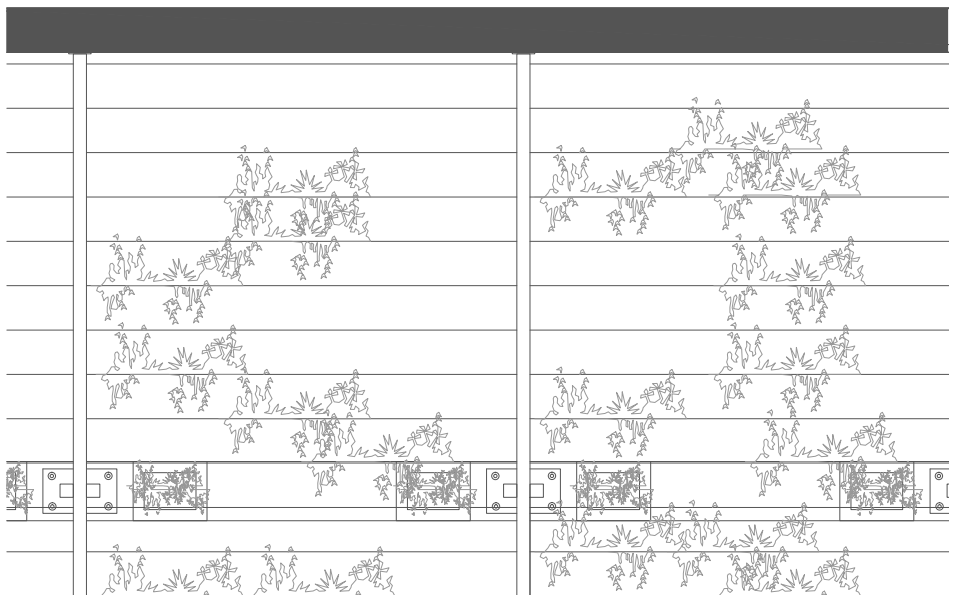
100 x 100 x 3 galvanised steel tubing trellis structure  
 welded to base plate, u-bolted to concrete footing

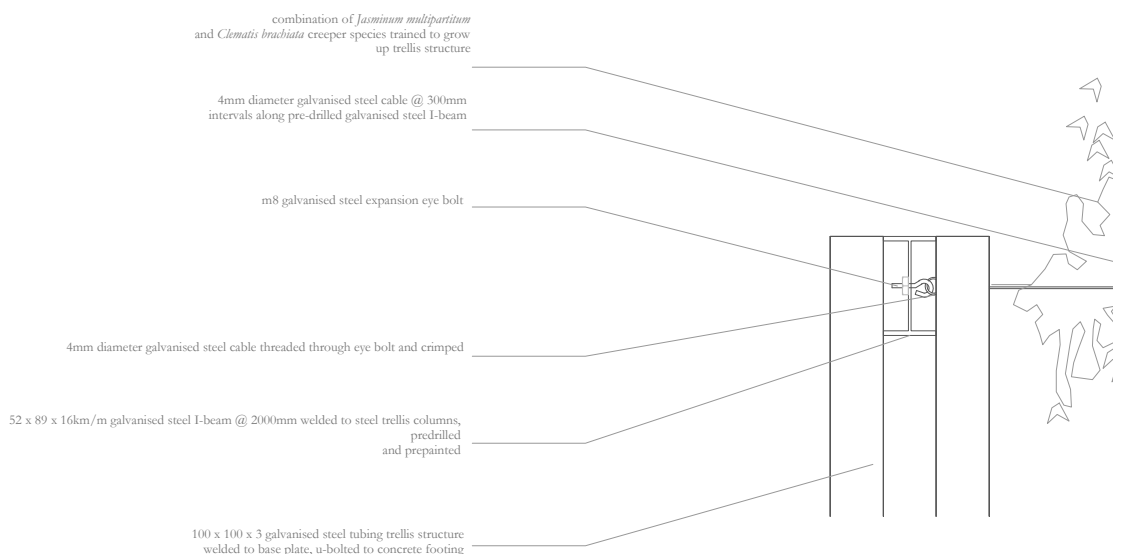
Detail 5



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Detail 5 Scale 1:20

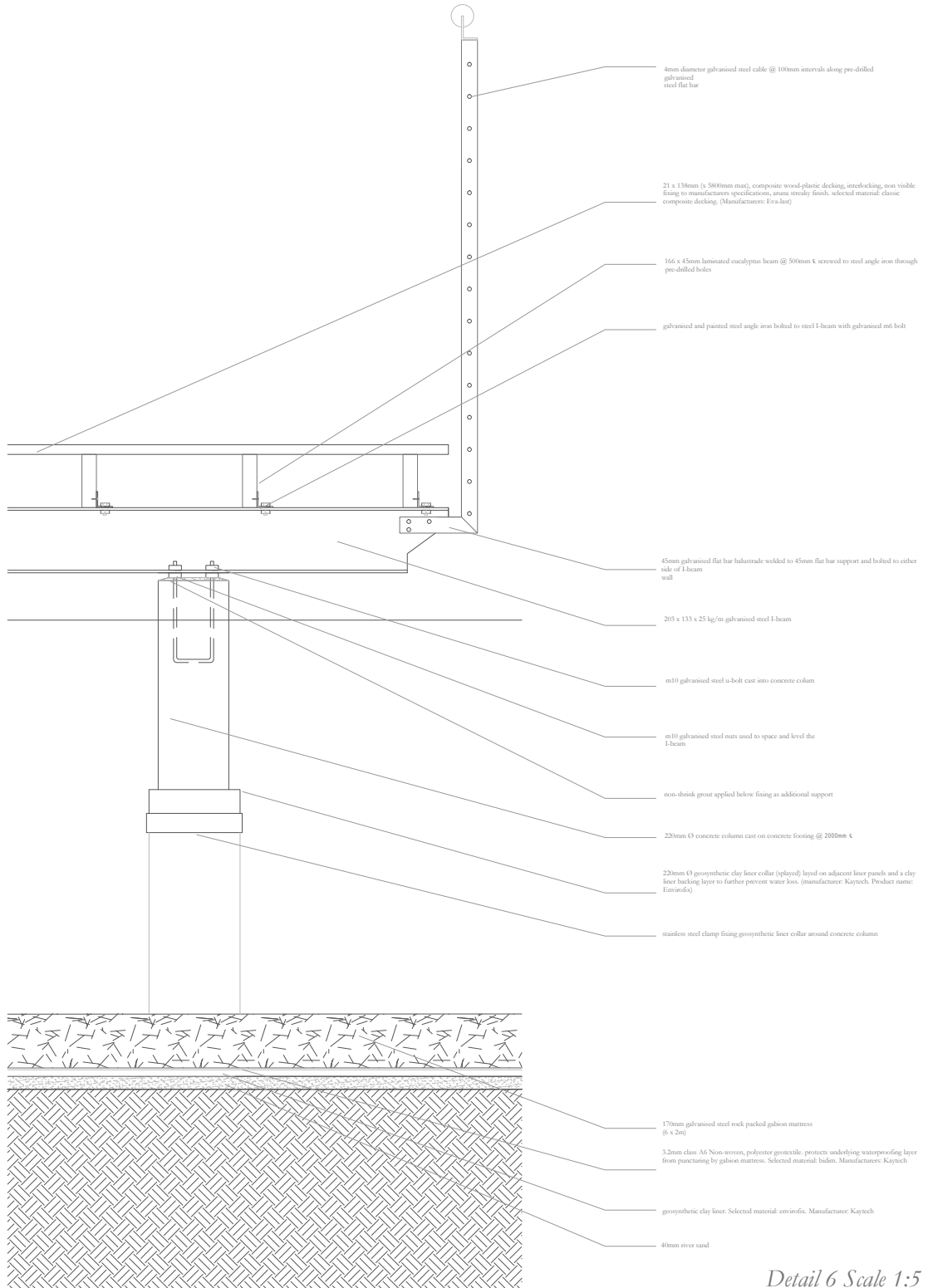




Detail 5 Scale 1:5

Figure 143: Detail 5  
Not to scale(Author: 2012)

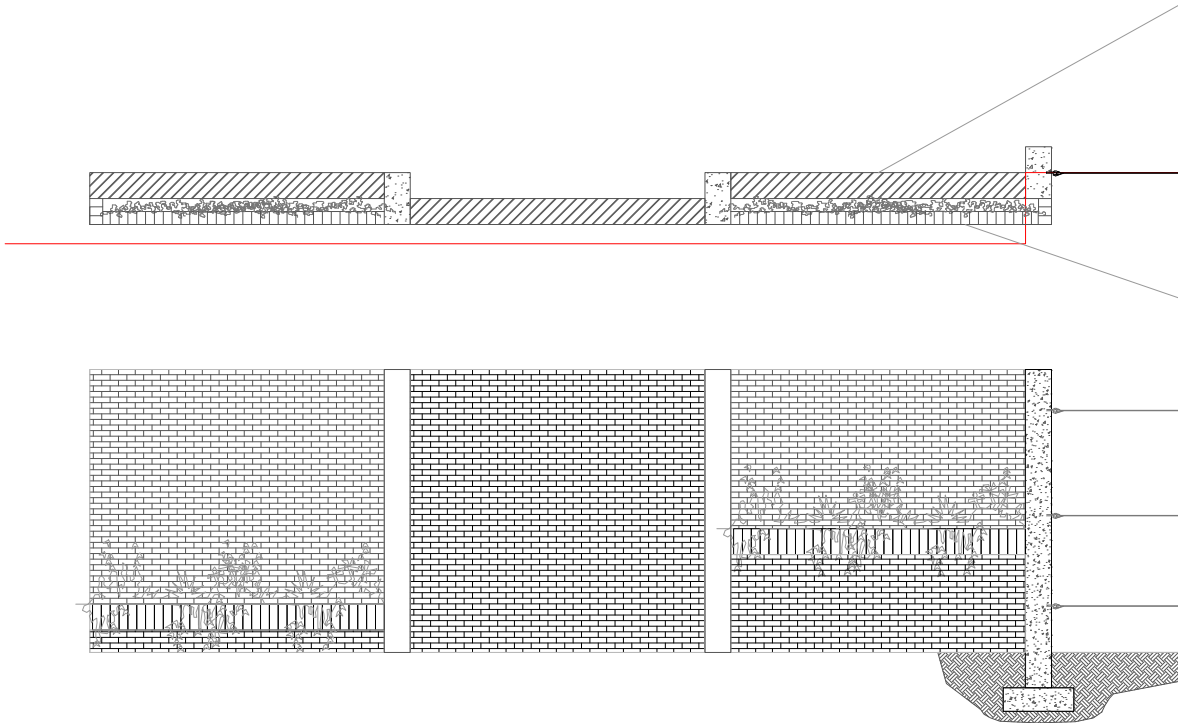
203

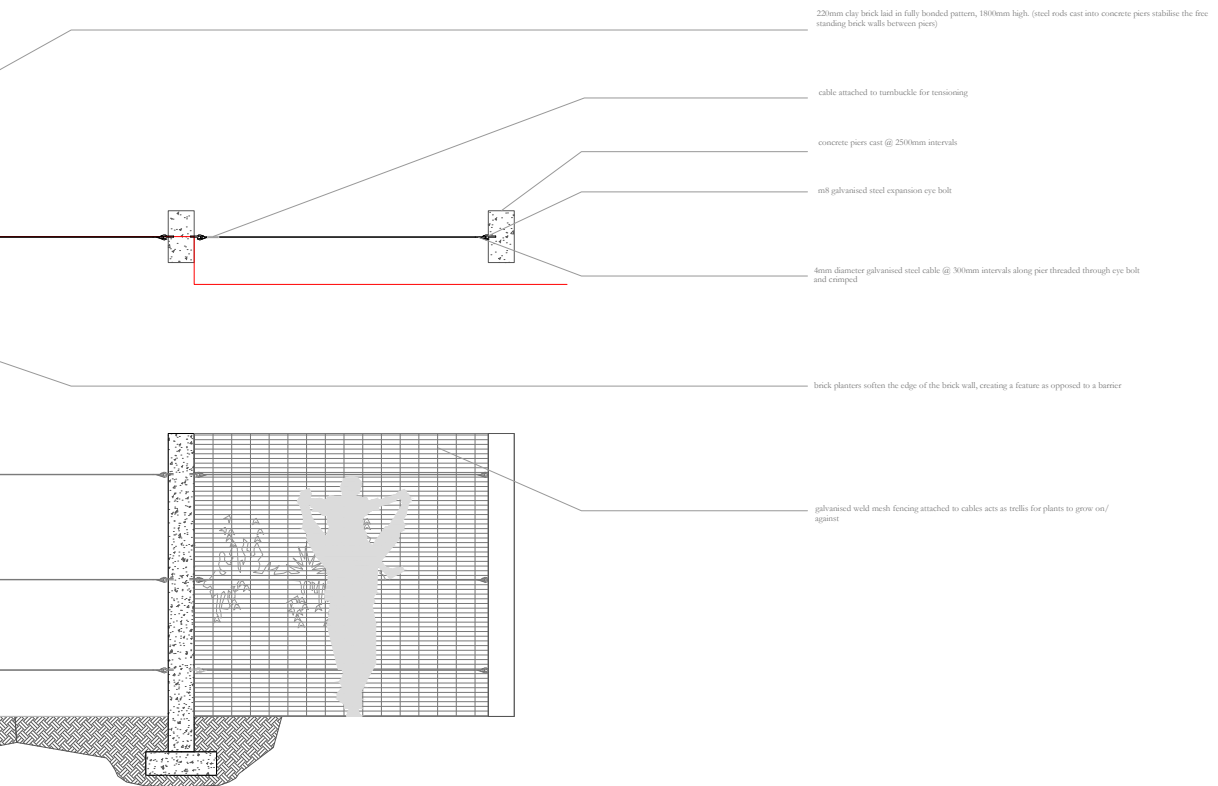


Detail 6 Scale 1:5



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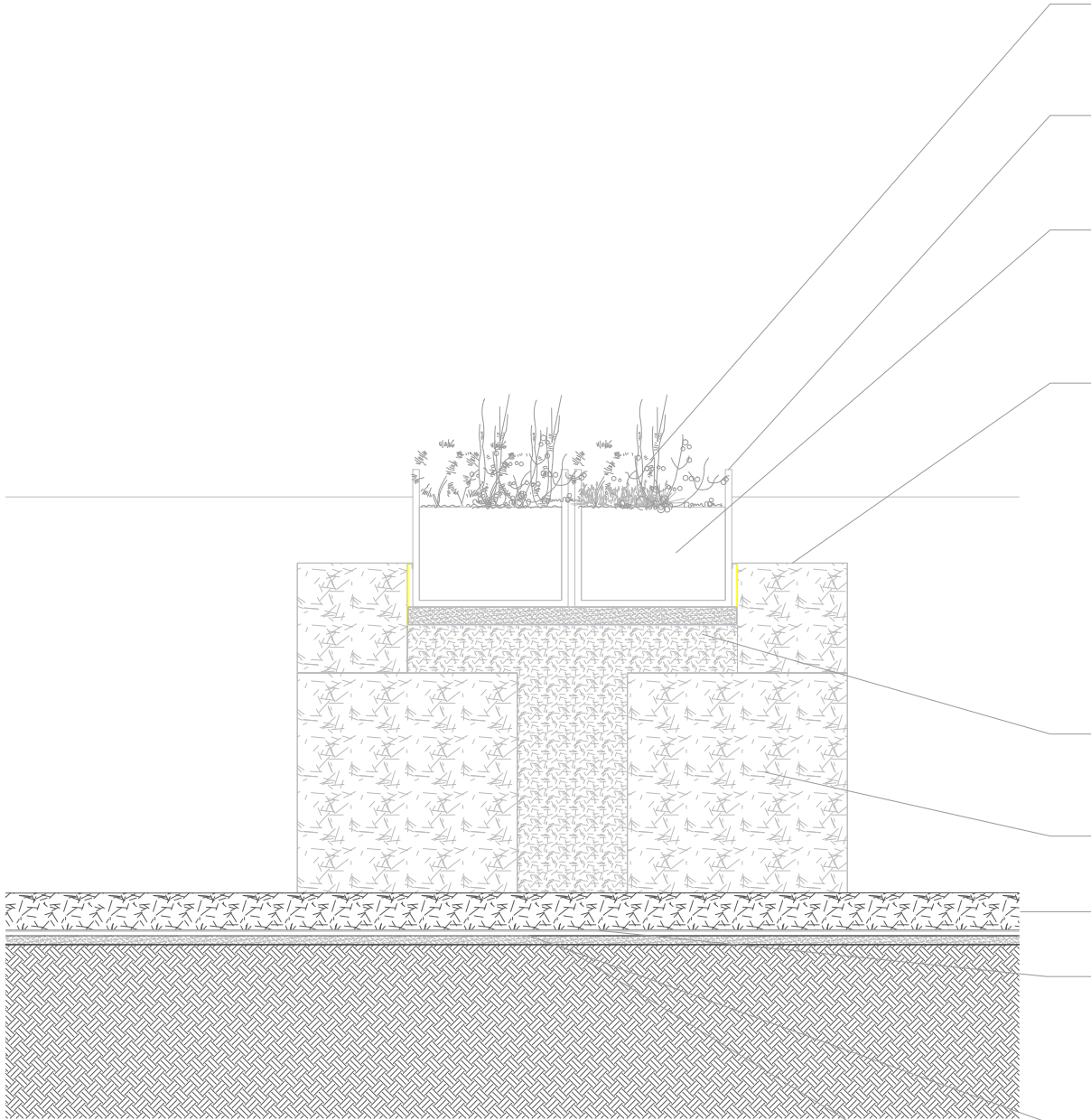




*Detail 7 Scale 1:20*

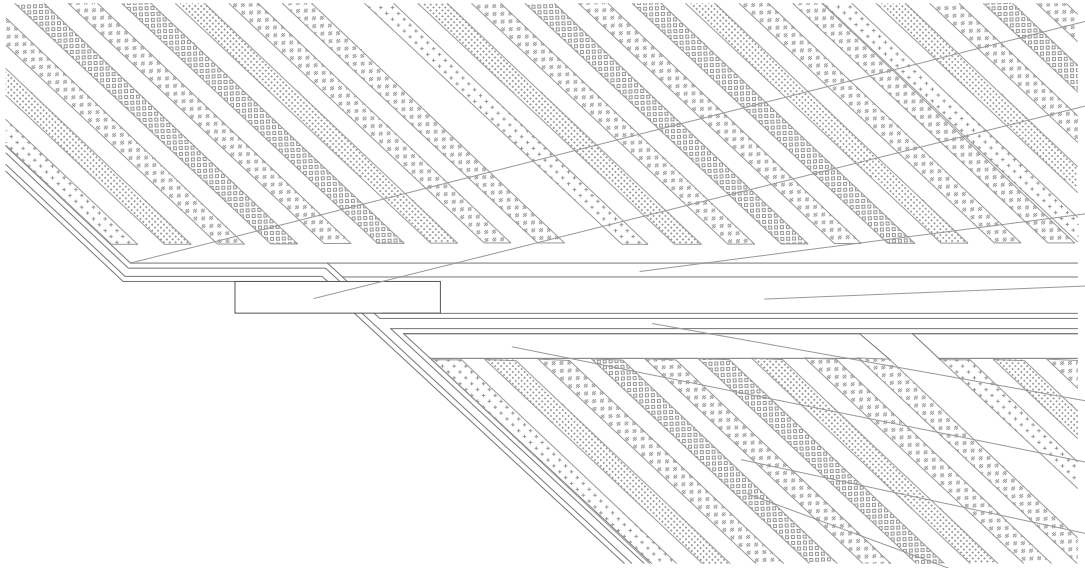
**Figure 145: Detail 7**  
 Not to scale(Author: 2012)

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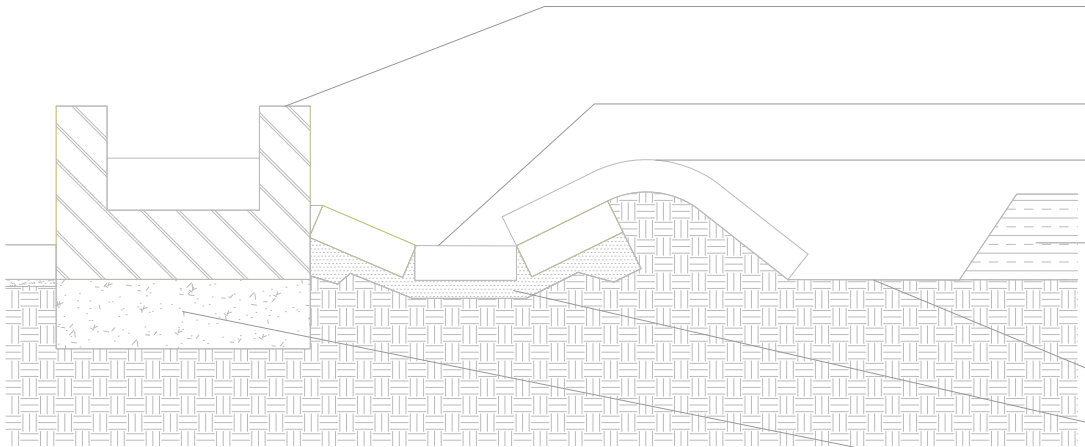
*Detail 8 Scale 1:20*





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*Detail 9 Scale 1:100*



*Detail 10 Scale 1:10*

primary channel transports water from the reservoir

low brick bridge across primary channel

return swale, transports excess irrigation water to stormwater swale, which transports it in turn to a treatment wetland and eventually the Steenovenspruit

compacted earthen or brick pathway, levelled for wheelbarrows, stormwater is directed towards the return swale @ a 2% slope

secondary channels transport water to plots

tertiary channels store water temporarily while it is siphoned out, before the gate is opened to allow more water in

600 mm furrows fill up via siphons placed @ equal 1000mm intervals in the tertiary channels

400mm wide raised vegetable beds made up of various layers of cardboard, sticks, leaves/dry grass cuttings compost and top soil

built up brick primary channel transports water from the reservoir

brick tertiary channels store water temporarily while it is siphoned out, before the gate is opened to allow more water in

70mm dia. siphons placed @ 1000mm intervals siphon water into the irrigation furrows

400mm wide raised vegetable beds made up of various layers of cardboard, sticks, leaves/dry grass cuttings compost and top soil

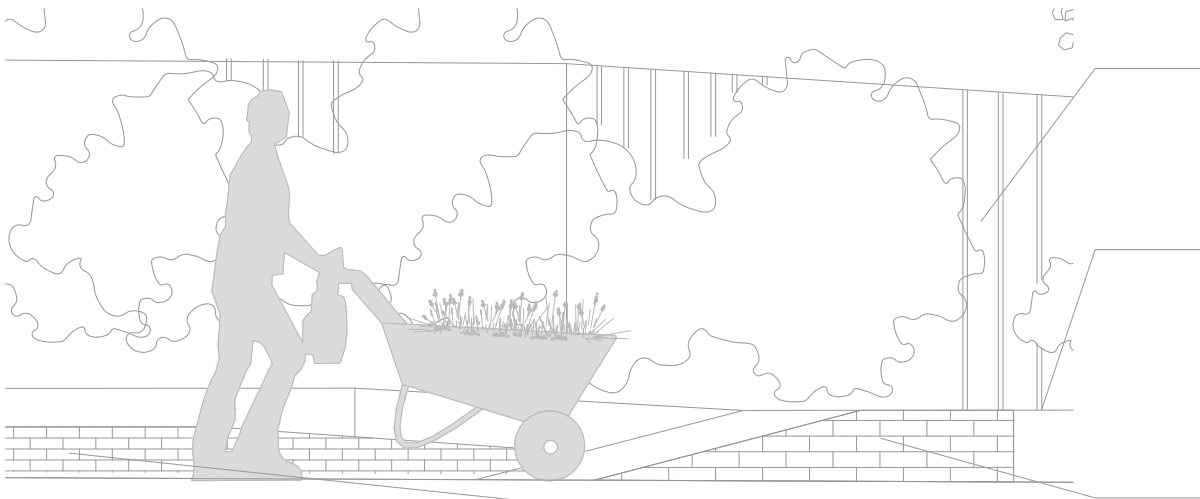
compacted earth pathways double as irrigation furrows

compacted sand cement mix base for brick channel

concrete footing

**Figure 147: Detail 9 and 10**  
Not to scale(Author: 2012)

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*Detail 11 Scale 1:20*

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trellis fences in the farmlands separate plots and soften barriers

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primary water channels run along public pathways

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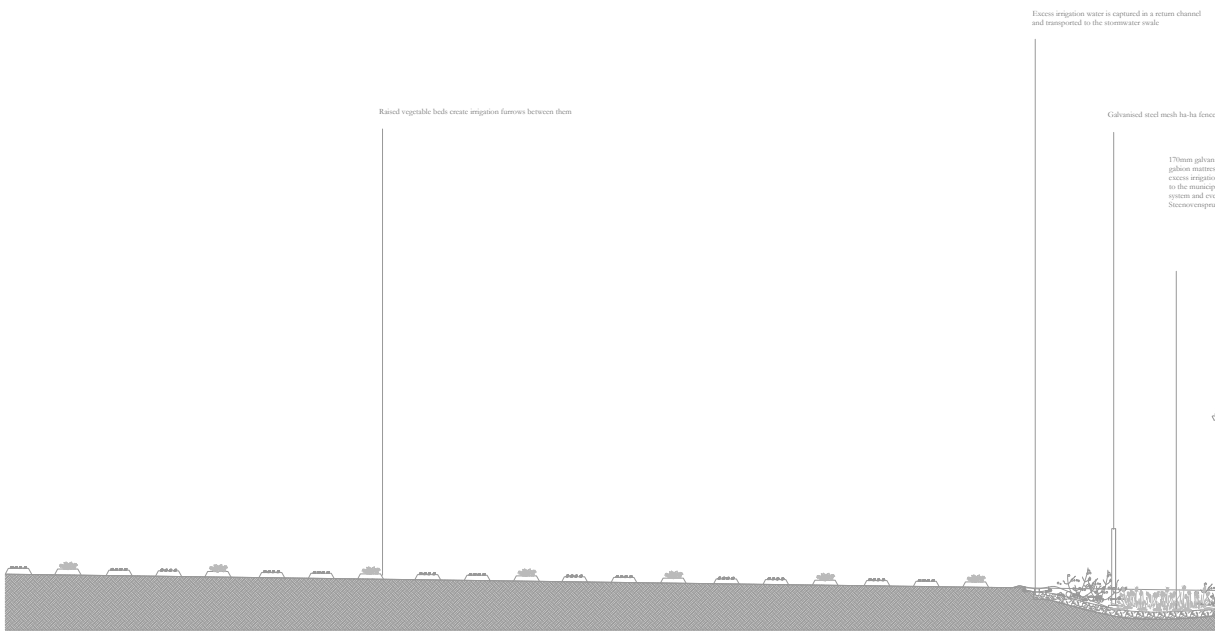
low brick bridges cross channels between the public pathway and the farmlands, and the plots and various farm pathways

---

low brick planters soften edges



2 1 3



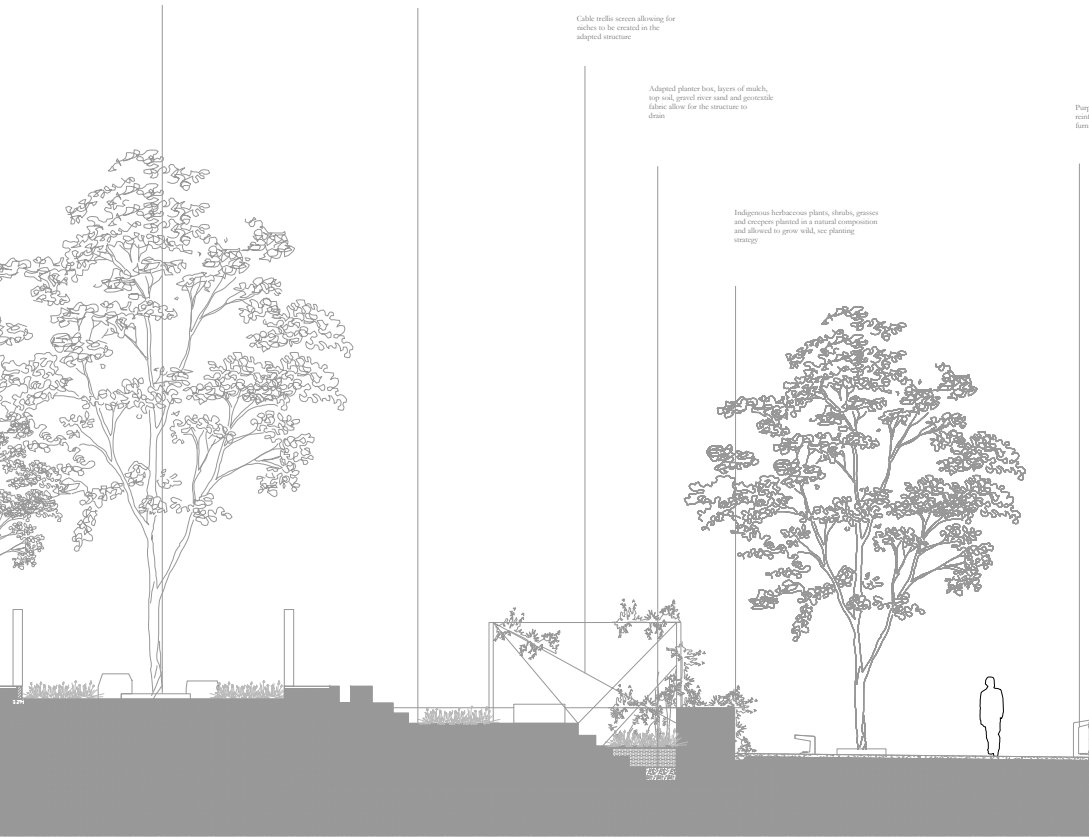
community garden celebrates the  
sense of interaction around which  
community and a sense of genus  
has been formed

Existing structure, originally  
an automobile servicing bay

Cable trellis screen allowing for  
miches to be created on the  
adapted structure

Adapted planter box, layers of mulch,  
top soil, gravel river sand and geotextile  
fabric allow for the structure to  
drain

Purpose made  
reinforced concrete street  
furniture see details 4 - 7



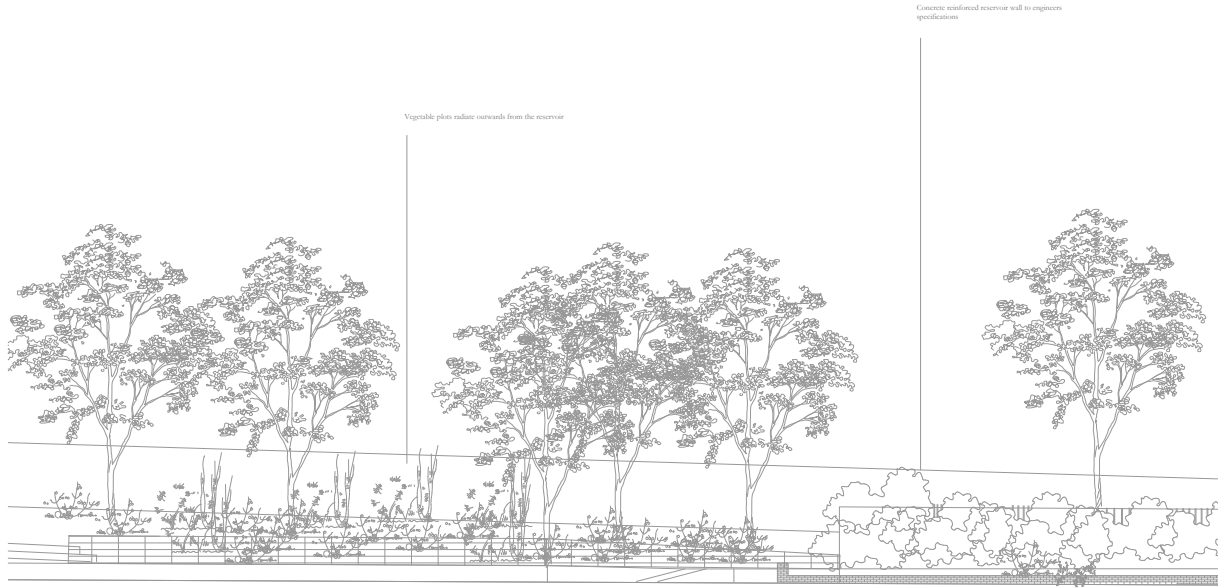
Section E-E Scale 1:50



Section F-F Scale 1:50

Figure 149: Section E-E and Section F-F

Not to scale (Author: 2012)



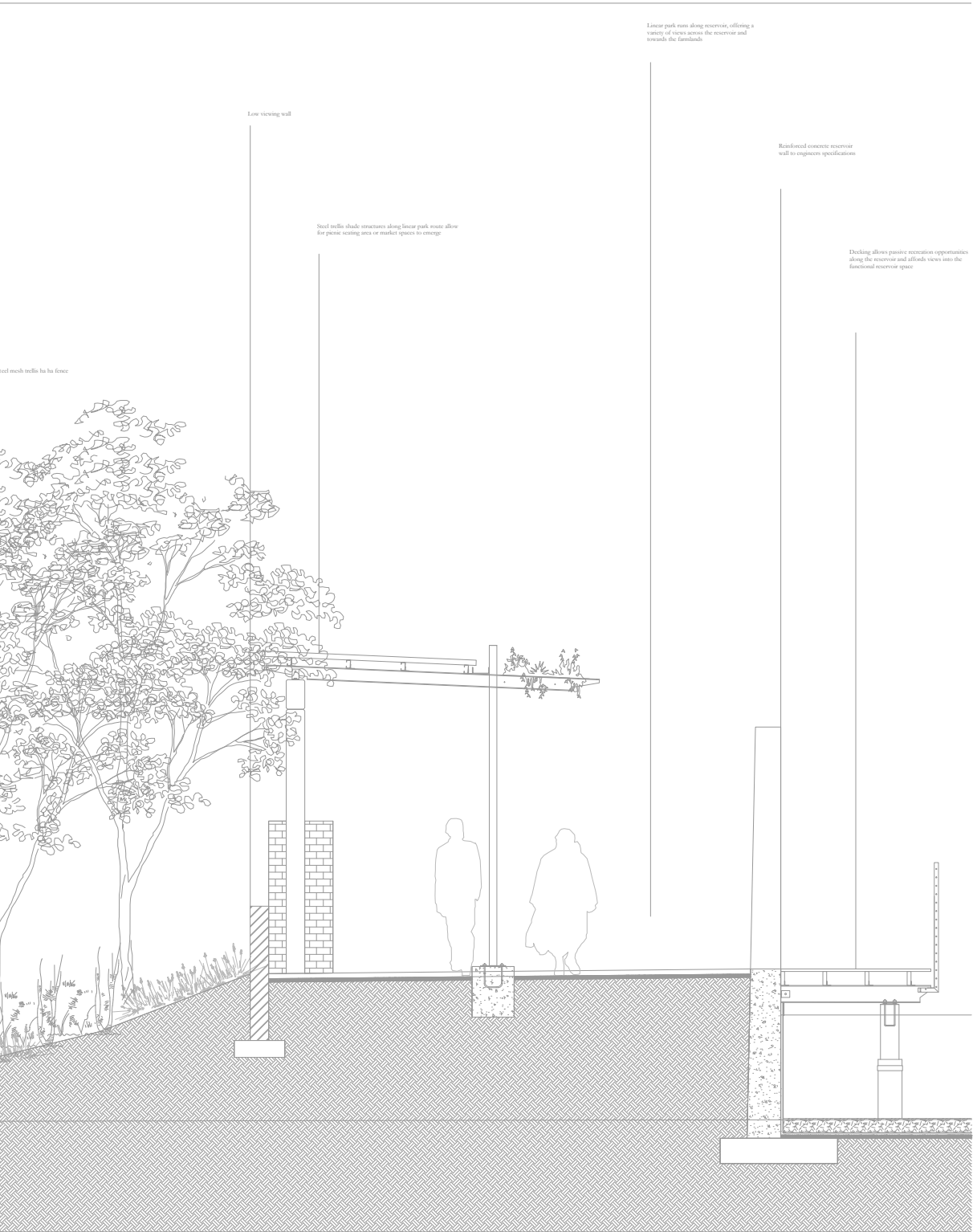
2 1 5



*Elevation E-E Scale 1:50*

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Section B-B Scale 1:20

Figure 151: Section B-B  
Not to scale(Author: 2012)



## Chapter 12 : Conclusions

It is evident from the explorations undertaken in Part two, that place is made up of many layers of previous use. These were investigated and responded to throughout the design process in order to design a place of value for the existing *and* future users of the conservancy.

The layers of farming introduced into the Steenovenspruit Conservancy enrich the landscape as a canvas for the community to trace their everyday activities onto. This productive layer of use will also benefit the users in terms of food security.

Conservation, in the form of refounding occurs on multiple levels, including layers of social, historical, spatial and ecological significance.

2 2 1

# Chapter 13: Presentation photos



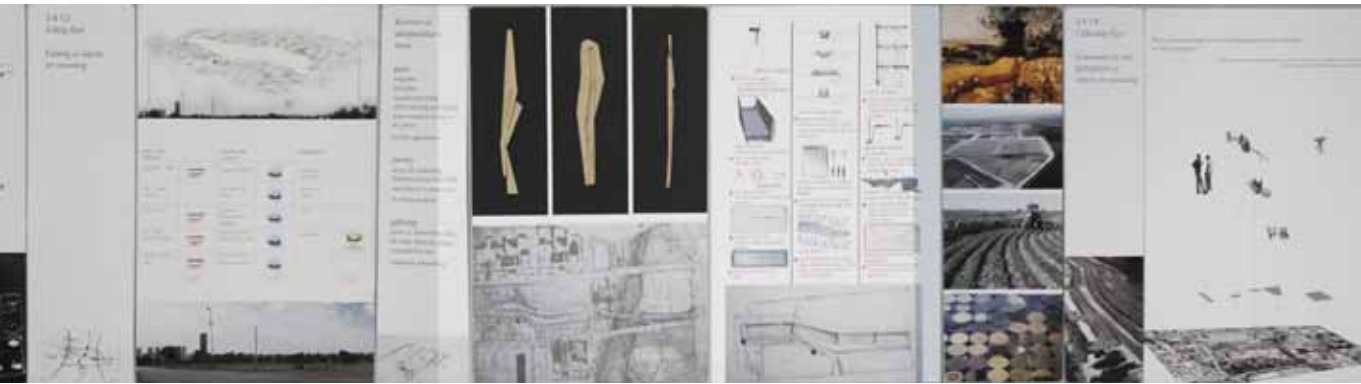


Figure 152: Presentation Panorama  
(Author: 2012)



Figure 153: Presentation Panorama  
(Author: 2012)

Renovensip



Figure 154: Presentation Panorama  
(Author: 2012)



2 2 5

Figure 156: Presentation Photograph  
(Author: 2012)

Figure 157: Presentation Photograph  
(Author: 2012)





Figure 158: Presentation Photograph  
(Author: 2012)

Figure 159: Presentation Photograph  
(Author: 2012)

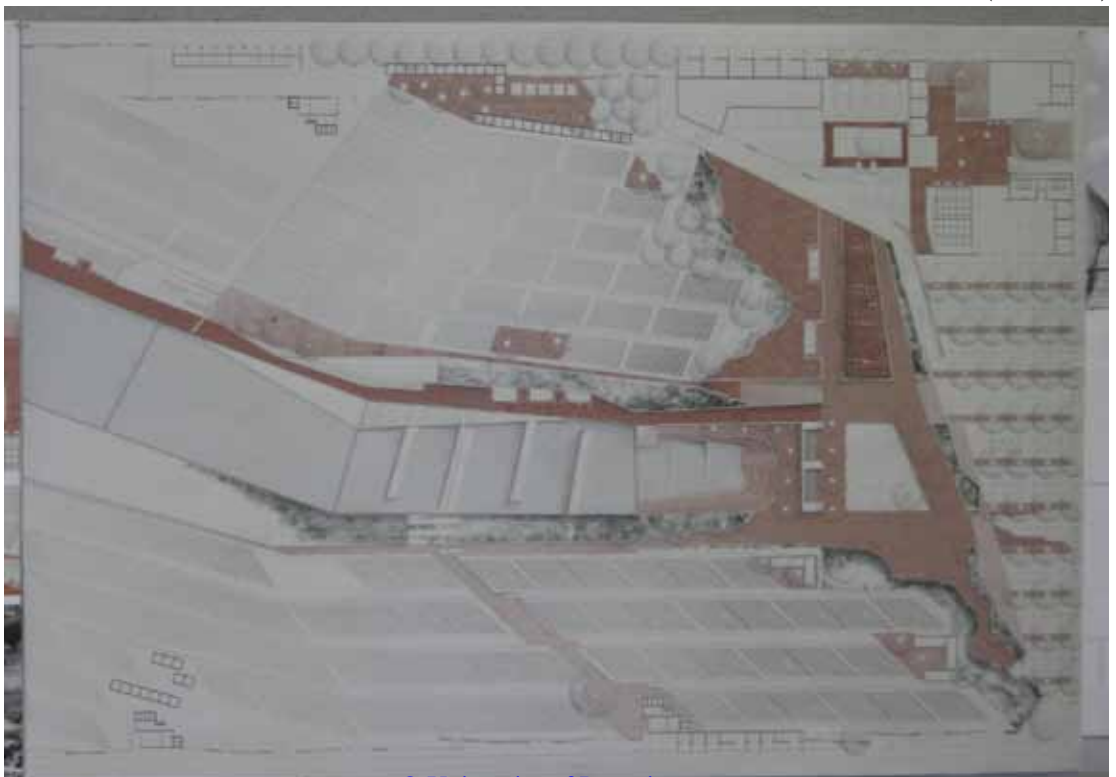




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**Figure 160: Presentation Photograph**  
(Author: 2012)

**Figure 161: Presentation Photograph**  
(Author: 2012)

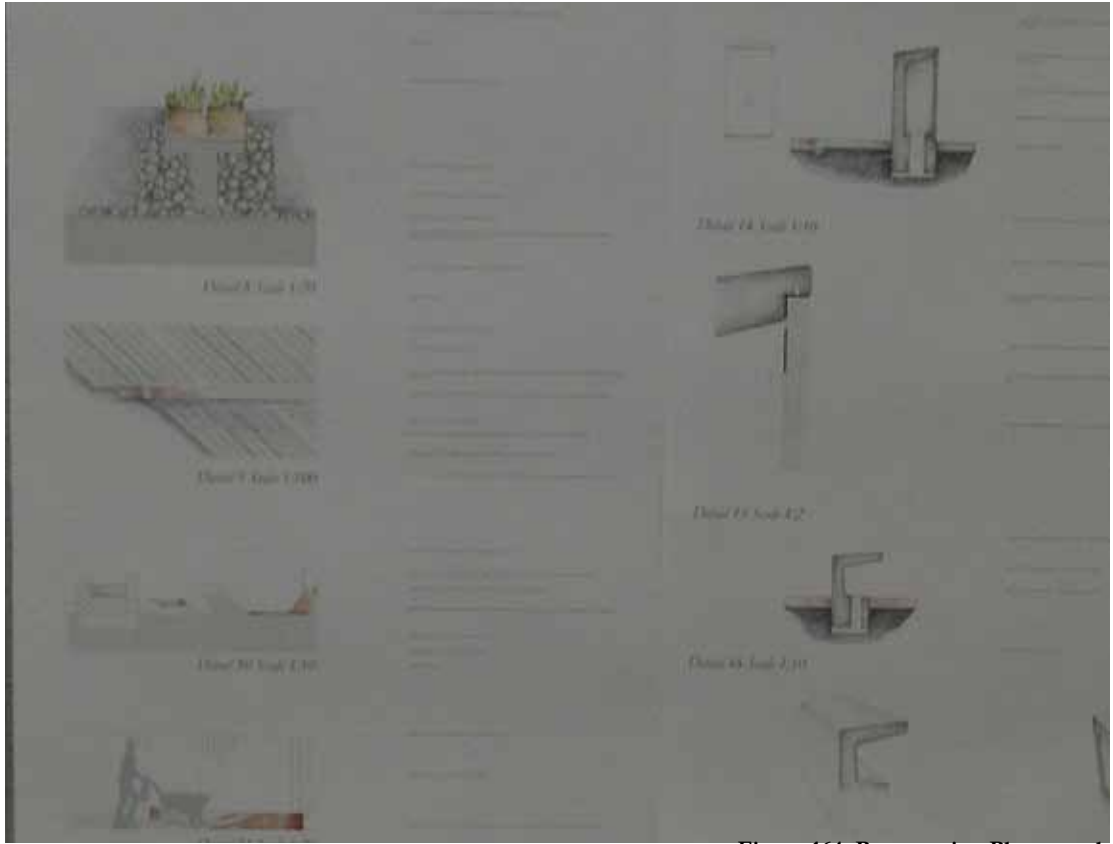




**Figure 162: Presentation Photograph**  
(Author: 2012)

**Figure 163: Presentation Photograph**  
(Author: 2012)





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Figure 164: Presentation Photograph  
(Author: 2012)

Figure 165: Presentation Photograph  
(Author: 2012)





**Figure 166: Presentation Photograph**  
(Author: 2012)

**Figure 167: Presentation Photograph**  
(Author: 2012)



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# Chapter 14 :

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Zoltan K. Photograph: Putting up the watchtower at the Kibbutzim Sha'ar Hagolan and Massada. Internet: viewed May 2012. <<http://www.ariesharon.org/>>

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# Appendices



# Appendix A: Interview Summaries

	Brenda	George	Sipho	Maxwell	Sello	Edmond	Joseph
Where do you buy your fruit and vegetables from?	The Fresh Fruit and Vegetable market in Marabastad	The fresh fruit and vegetable market in Marabastad. I buy new fruits every morning	The fresh fruit and vegetable market in Marabastad	The market in Marabastad, I spend R1000 - R1200 every two days	Fresh fruit and veg market (Spends R2000 approximately every 2 days)	The fresh fruit and vegetable market in Marabastad	Marabastad
How do you get it from Marabastad to your location?	I load it into a cart and push it from the market	There is a van that drops me off	A van drops me off	I have transport that helps me	A bakkie	I carry it in bags and on my trolley	Bakkie
Do you share transport with other vendors?		Yes, it drops a lot of us off at the corner (Cnr of Proes and Andries)	Yes	No, just me			Yes
What do you do with the surplus of items at the end of the day?	I store it in a container	I store it in a container	I throw it away and buy new every morning. I spend R1000 every morning	I take it home with me		I take it home with me	I take it home with me
Where do you store the surplus?	At the market in Marabastad	In a warehouse on Andries street			In Andries street		
Where do you live?	Soshanguve	Soshanguve	I live in Mildred Park	I live just past Paul Kruger	Mildred Park	In Pretoria West	Soshanguve
What do you do with food that has expired?	Throw it into the empty boxes	Throw it away	Throw it away	Throw it out	Throw it into the empty boxes	Throw it away	Throw it out
Why did you choose this location to sell?	It is busy, lots of activity and people	I like the lots of activity	Lots of activity	I give them to the people that collect them everyday	Its where people walk past	Its nice, I like the people	I like the lots of activity, its busy with plenty people and space
Do you always set up in this location?	Yes, this is my spot nobody else uses it.	Yes, everyday	yes	I have an agreement with the owner of the building to sell outside	Yes, people know it is my spot. I set up my tent everyday	Yes	yes
What do you do with the empty cardboard boxes at the end of the day?			People collect them at the end of the day		I give it to the people that collect it in the street	People collect them	People ask me for them so I give it to them for free



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# Appendix B: Urban Design Strategies

The following urban design principles are accepted as the basic framework for a successful urban environment. They have been summarised and applied to an existing urban framework for the greater context as well as for the conservancy in order to provide a set of guiding principles and contextual information for the Steenovenpsruut Agrarian Conservancy:

#### 1. Clear Structure

The City is structured at many different scales. At a macro scale the city is structured around landscape elements. Individual streets and sites should display recognizable patterns at a micro scale. Cities should be compact with higher densities and finer grained mix of uses.

#### 2. Connectedness

Public spaces in cities should be accessible to everyone. Connectedness is established through ease of mobility and 'visual access' with direct lines of sight and visually enticing spaces. Well-connected neighbourhoods and city facilities are integral. Universal access with clear paths and easily traversable level changes provide better connection.

#### 3. Diversity

The urban spaces designed in cities should have a variety of uses, a mixture of activities. Visual and social variety as well as a truly engaging public environment includes the exploitation of all the senses; the soundscape, visual access, textures and even smells add to a greater sense of place. Convenience, choice and opportunities lead to a sense of well-being, personal safety and enhanced social equity.

#### 4. Animation

The social life of spaces animates the city. People attract people. Some spaces need as little as a suitable micro-climate while others need invitations to attract people into spaces. Informal activity should be supported.

#### 5. Continuity and change

The public environment should contain some constants. This includes sites, artefacts (from street furniture to buildings and natural elements) that remind us where we came from and can be recognised from one generation to the next. New prototypes and concepts should also be introduced into the public realm. Creativity and economic opportunities should be celebrated in the public realm.

#### 6. Authenticity

Underlying landform, variety of natural systems, ongoing interaction as man modifies his environment, culture and spirit of a place all contribute to a place's authenticity. Good urban design seeks to uncover, articulate and strengthen the organic character of a site. New developments should not directly imitate or replicate its surroundings but should rather rely on underlying patterns which might include; recurring dimensions, orientation, scale, vital textures, local culture and distribution of activities

#### 7. Equity

Everyone has the right to use and enjoy public space regardless of physical abilities, age, permanence or transience or socio-economic status. An appropriate balance is required between recognised contribution that commercial activity brings to life in public spaces and the invitation to linger without feeling obligated to spend

#### 8. Good fit with people's intentions

'Fit' describes the extent to which a physical setting helps people to feel comfortable and safe, and allows them to achieve their objectives. Spaces need to accommodate a wide variety of uses. If spaces are to be sustainable and remain viable over time they also need to be flexible enough to attract new uses or be available for adaptive re-use as social needs or cultural values change over time.

Site specific guidelines:

#### 1. Clear Structure

The UDF proposes a return to the original fine grained urban fabric of Marabastad by re-instating the historical urban grid which generates intimacy within the community contributing to a safe and healthy community.

Pretoria city should become re-structured around the identified dross capes which will be developed to become the impetus for an alternative modern lifestyle where conservancies become the centre for new ways of living to adapt to a future of peak oil and rapid climate change. At a micro scale building materials and plant material as well as the land uses introduced into the areas will create recognizable patterns. Urban agriculture and high density housing proposals with agricultural cores will become a new land use introduced into the existing fabric to rejuvenate forgotten spaces

#### 2. Connectedness

The Marabastad Framework proposes that the smaller grid is a sympathetic human scale, perfect

for pedestrian movement. Marabastad is a transport hub and should be maintained as such in order to provide people with current opportunities for movement throughout the city.

The conservancy is designed as a public space. Although some spaces are fenced off for private use to, clear visual connections and controlled access should be allowed so that the public can enjoy the open space and gain educational benefits from their interaction with the space. The conservancy is connected to the CBD and while it forms a “neighbourhood” it also functions as a major movement zone that should attract movement through it. Universal access is provided into most spaces

### 3. Diversity

The smaller urban grid permits optimum flexibility to accommodate all civic, cultural, religious and other community facilities that may in future be required. A housing belt is proposed in line with the Schubart and Kruger park developments in order to act as a transition zone from the CBD to the finer grained area of Marabastad.

Although the conservancy is designed as a primarily agricultural zone, gathering (informal business) areas, residential areas and clear movement patterns are designed into the conservancy to enhance it as a social space. The conservancy will provide a variety of spaces from actively productive spaces providing opportunities for marginalised peoples; to quiet contemplative spaces with a variety of atmosphere’s views, levels of noise and vegetation and material textures

### 4. Animation

The floodplains around the Steenovenspruit are proposed as an urban green corridor improving the recreational spaces of the west of the city and creating comfortable micro-climates to attract people. Public squares are introduced and celebrated to allow for more social cohesion and interaction.

The conservancy is designed to meet the needs of its people, the productive elements of harvesting, irrigating, and weeding will animate the space throughout the year and for great portions of the day.

Fresh produce can be sold to passing traffic in settings that allow for informal trade to be established. Shade and movement patterns create the type of micro-climates that invite the general public and promote enclaves of comfortable micro-climates that will encourage people to pause for a time

### 5. Continuity and change

Structures such as the Belle Ombre Station and the

Maraba shopping complex are accepted and given fixtures. At least parts of the original building fabric has been retained and a historical conservation area / core has been proposed for the site. Marabastad should remain as a transport node as much of the current trade routes are based on movement in and out of Marabastad.

The conservancy celebrates the original character of the site as a productive space as well as the smaller scale, “open feel” of the site. The site continues to be a movement and transition space. The conservancy and idea of urban agriculture is introduced as a new typology of an alternative modern way of life, not reliant on oil and other resources but rather on the natural elements on site and man’s ingenuity and ability to support himself within a designed environment

### 6. Authenticity

Marabastad has retained a living history in the vibrancy of its trading culture. The vibrancy of the current culture should be maintained as well as the historical buildings without the area becoming a museum town or theme park. The current users and their needs must be respected and buildings although conserved can be adaptively re-used. Tourists are to invited into the spaces without overtaking the feel of the place as an original organic space. Single story construction within Marabastad is retained, moving up to a maximum of six stories towards the boundary with the city. Designs for street furniture should be of our time but should aim to enhance the particular character that is unique to Marabastad. The river running through site adds vital character to the place and should be celebrated and experienced in a variety of ways. Underlying patterns of movement and spaces used for informal activity will also be enhanced and celebrated without creating too much of a formalised environment that may cause the informal to disappear

### 7. Equity

The planning of redevelopments for Marabastad must at all times be just, and achieve an environment to be enjoyed by all the groupings of the historical and present Marabastad communities on an equitable, non-discriminatory and sustainable basis. Squatters must be relocated in a respectful and appropriate way to spaces that are serviced. Hawkers and informal traders are still encouraged however in a more structured way with support programmes and support infrastructure such as stalls with refuse bins. Traders are not permitted to trade in front of shop fronts. Social initiatives supported.

The conservancy must be designed in such a way to uplift the current marginalised community living within the spaces. Opportunities are provided for self-upliftment and environmental upliftment. The general public must also be invited into the conservancy to foster better social ties and links and a better variety of spaces for all urban users. While the productive element of agriculture caters specifically to a community of marginalised peoples, residential developments, gathering spaces and movement patterns are introduced to cater to a wider variety of people

8. Good fit with people's intentions  
Safety and security needs to be addressed in order to attract people into spaces it is proposed that the SAPS facilities in Marabastad become upgraded. Public squares provide for flexible activities  
The conservancy is designed in such a way that the users can appropriate the spaces and use them as they would prefer. While the overall intent of the conservancy is to cater to urban agriculture, the idea is that the users will appropriate the spaces and overall framework and manipulate them to their specific needs will celebrating the historical uses and spaces of the site.



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# Appendix C: Water Calculations

**Base flow calculations: Steenovenspruit**

Methodology: The formula  $m^2 \times m/s = m^3/s$  was used.

In order to measure the area, the depth of the flowing water was measured and multiplied by the width it flowed through.

Metres per second was measured by dropping a cork into the stream and timing its movement from point A to point B.

**Area:**

depth: 0.09 m  
width: 1.5 m

$m^2 = m \times m$

$m^2$  0.135

**m/s**

distance 10 m  
seconds 9.3 s

A	B
8.3	9.85
9.19	9.17
11.11	7.63
12.06	8.07
10.05	7.9

9.333 Average

$m/s = m \text{ div seconds}$

m/s 1.075268817

2 4 9

**Baseflow in channel**

area: 0.135  $m^2$   
m/s: 1.075268817 m/s

$m^3/s = m^2 \times m/s$

$m^3/s$  0.14516129 Basic

A 0.135  
P 1.76  
S 0.029  
n 0.016  
R 0.076705 (A/P)

$Q = A \times 1/N \times R^{2/3} \times S^{1/2}$   
Q (m<sup>3</sup>/s) **0.263873** Actual

l/s 263.8728521  
l/min 15832.37113 available

Pumping capacity

Working fall (m)	Vertical Height that water is raised above ram (m)										
	5	10	15	20	30	40	50	60	80	100	120
1	144	65	33	29	19	12	25	19	12	18	
2		156	105	79	53	33	51	40	27	23	
3		260	180	130	87	65	69	53	36	23	
4			255	173	115	86	94	72	50	36	
5			310	236	155	118	109	94	65	48	
6				282	185	140	125	109	82	60	
7					216	163	140	125	94	69	
8						187	140	125	94	69	
9						225	156	140	105	84	
10						265	187	156	117	93	
12							225	187	140	113	
14							265	218	167	132	
16								250	187	150	
18								280	210	169	
20									237	188	

litres pumped in 24 hours  
per litre/min of river water

Volume of driving water	Size of ram										
	from	1	2	3	3.5	4	5	6	7	8	10
to	16	25	55	96	137	270	410	750	1136	1545	
Dia. Of drive pipe	bore (mm)	32	40	50	65	80	100	125	150	175	200
Max. height water pumped	metres	150	150	120	120	120	105	105	105	105	105

Summarised decisions regarding the Hydraulic Ram

156 litres pumped per 24 hours per litre/min of river water available

A minimum of 100m<sup>3</sup> is needed per day. Thus 100000l/day is needed.

100000/156 will determine the amount of river water required in l/m

thus 641 l/m of river water is needed\*

A 175mm diameter pipe and a Ram pump size 8 will pump min 100m<sup>3</sup> water per day to the  
**120m<sup>3</sup>** will be pumped to compensate for variations

\* 641l/m is 4.05% of the total 15832.4l/m available in the Steenovenspruit

2 5 1

Demand					
Planting Area	Total Planting Area (m2)	Irrigation Depth / Month (m/month)	Evaporation (m/month)	Irrigation depth + Evaporation (m/ month)	Total water demand (m3)
	6048	0.21	0.03	0.23	1391.04
		0.16	0.03	0.19	0

Water Balance

Month	Yield (m3)	Total water demand	Monthly Balance
January	3720	1391.04	2328.96
February	3360	1391.04	1968.96
March	3720	1391.04	2328.96
April	3600	1391.04	2208.96
May	3720	1391.04	2328.96
June	3600	1391.04	2208.96
July	0	1391.04	-1391.04
August	0	1391.04	-1391.04
September	0	1391.04	-1391.04
October	3720	1391.04	2328.96
November	3600	1391.04	2208.96
December	3720	1391.04	2328.96
Annual Average	40080	16692.48	

Jan	120	3
Feb	120	2
Mar	120	3
Apr	120	3
May	120	3
Jun	120	3
Jul	120	3
Aug	120	3
Sep	120	3
Oct	120	3
Nov	120	3
Dec	120	3
Year		

3 months of no rain =25% of t

100.5106849 cubic meters per day

Friction loss calculations

total losses worked out from the following equation. this affects the heights pumped from and to.	
$\Delta H = hf + h_l$	
$\Delta H = (\lambda L v^2 / 2gD) + ((Kv^2) / 2g)$	
total losses weir to hydram - 0.133m therefore compensation of 0.133m in design	
total losses hydram to reservoir - 0.0006m therefore pumping height is reduced	
where:	
$\Delta H = 3$ (fall / height difference)	
$\lambda = 0.012$ (friction of plastic pipe)	
$L = 130m$ (length of pipe)	
$V = Q/A$ ( $v = m/s$ ) ( $q = m^3/s$ ) ( $a = m^2$ )	
$g = 9.81m^2/s$ (gravitational acceleration)	
$D = ?$ (diameter of pipe)	
$k = 1.5$ (secondary loss co-efficient entrance and exit losses)	
	Hf is the friction head loss (the loss which occurs along the length of the pipe) Hl is the secondary energy losses (which occurs at specific points on the line)
	(concrete pipe = 0.02)

31	3720
28	3360
31	3720
30	3600
31	3720
30	3600
31	3720
31	3720
30	3600
31	3720
30	3600
31	3720
	40080

the year

Actual Demand calculations, Planting areas and the total number of Plots

**A**

Planting area	Total Plots	m <sup>3</sup> water demand per plot per week	Weekly Total water demand (m <sup>3</sup> )
Section 1	5	2.31	12.39
Section 2	5	2.31	11.80
Section 3	5	2.31	11.83
Section 4	5	2.31	11.83
Section 5	5	2.31	11.98
Section 6	5	2.31	11.98

2 5 3

**C**

Planting area	Total Plots	m <sup>3</sup> water demand per plot per week	Weekly Total water demand (m <sup>3</sup> )
Section 1	7	2.31	15.54
Section 2	7	2.31	17.16
Section 3	5	2.31	12.31
Section 4	7	2.31	16.32

**B**

Planting area	Total Plots	m <sup>3</sup> water demand per plot per week	Weekly Total water demand (m <sup>3</sup> )
Section 1	9	2.31	20.28
Section 2	8	2.31	19.57
Section 3	9	2.31	20.74
Section 4	9	2.31	21.78
Section 5	4	2.31	10.00

**D**

Planting area	Total Plots	m <sup>3</sup> water demand per plot per week	Weekly Total water demand (m <sup>3</sup> )
Section 1	5	2.31	11.55
Section 2	5	2.31	11.55
Section 3	5	2.31	11.42

**E**

<b>Planting area</b>	<b>Total Plots</b>	<b>m<sup>3</sup> water demand per plot per week</b>	<b>Weekly Total water demand (m<sup>3</sup>)</b>
Section 1	6	2.31	14.85
Section 2	6	2.31	13.86
Section 3	6	2.31	13.30

2 5 5

<b>Actual Demand</b>
----------------------

A plot of 91m<sup>2</sup> has a planted area of 36m<sup>2</sup>  
 10 furrows @ 5.4m<sup>2</sup> each

Using an average of 50mm per week, 0.05m

1 plot would need 1.8m<sup>3</sup> to irrigate 36m<sup>2</sup>

An additional 0.27m<sup>3</sup> per week is added to compensate for evaporation

However furrow irrigation is only 65% efficient, thus an additional 35% of the 2.07m<sup>3</sup> is added per week

Total water demand per plot, per week is 2.77m<sup>3</sup>

Total number of plots 186 \* 2.77m<sup>3</sup> = 515.22m<sup>3</sup> per week

Total average monthly demand 515.22 \* 4 = 2060.88

**F**

<b>Planting area</b>	<b>Total Plots</b>	<b>m<sup>3</sup> water demand per plot per week</b>	<b>Weekly Total water demand (m<sup>3</sup>)</b>
Section 1	7	2.31	16.88
Section 2	7	2.31	16.53
Section 3	7	2.31	16.14
Section 4	5	2.31	12.41
Section 5	5	2.31	12.69
Section 6	5	2.31	12.69

Total number of plots = 168

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per week to compensate for losses, this is an additional 0.7m<sup>3</sup> per

## Reservoir Size Calculations

### Reservoir size

monthly water demand	total annual demand	Contingency %	Reservoir size
2060.88	24730.56	20%	4946

### Hydraulic retention time Wetland

water inflow	Q <sub>o</sub>	0.0014 m <sup>3</sup> /s
water outflow	Q <sub>e</sub>	0.001 m <sup>3</sup> /s
average flow	Q <sub>avg</sub>	0.0012 m <sup>3</sup> /s
evapotranspiration	e <sub>t</sub>	5 mm
wetland volume	V <sub>w</sub>	409.95 m <sup>3</sup>
constant (void fraction)	E	0.875

$$257 \quad t = (V)(E)/Q_{avg}$$

$$t = 298921.875$$

seconds

$$t = 3.5 \text{ days}$$

### Reservoir size

monthly water demand	total annual demand	Contingency %	Hydraulic Retention Time %	Total %	Reservoir size
2060.88	24730.56	20%	1%	21 %	5193.5

### Reservoir size

monthly water demand	total annual demand	Contingency %	Hydraulic loading rate	one month to fill up from empty	Total %	Reservoir size
2060.88	24730.56	20%	1%	8%	29%	7171.862

## Channel and Irrigation size calculations

$$Q = A * 1/N * R^{2/3} * S^{1/2}$$

	A	P	S	Q (m <sup>3</sup> /s)	n		
	channel area	channel perimeter	slope	Q (m <sup>3</sup> /s)			
Primary Canal							
A	0.045	0.6	0.01010101	0.049839	0.016	R	0.075
Secondary Canal							
1	0.045	0.657	0.02	0.070391	0.015	R	0.068493
2							
3							
4							
5							
Tertiary Canal							
1.1	0.059	0.657	0.01010101	0.07864	0.015	R	0.089802
1.2			0.01010101				
1.3			0.01010101				
1.4			0.01010101				
1.5			0.01010101				
LITRES PER SECOND		A	49.83861677				
		1	70.3914383				
		1.1	78.64030795				

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### Average irrigation time per plot

Channel 1.1                      78l/s

 Head                                230mm  
 Desired water supply        7l/s  
 Siphons @ 70mm dia        11 siphons  
 need per plot                    2770l  
 need per furrow                252l

 rounded up  
 to 1 minute  
 per plot for  
 any  
 variations in    10 minutes per  
 flow                    plot

$$252 \text{ l} / 7 \text{ l/s} = 36 \text{ seconds}$$

### Average irrigation time per farm as a whole

 168 plots \* 10  
 minutes = 1670  
 minutes

hours = 28

allowing for 6 hrs

days = 5    © University of Pretoria    per day



# Appendix D: Precedents



### Babylonstoren

Site Visit: December 2011  
 Designer: Babylonstoren staff  
 Program: Historical Farm, Food Gardens, Wine Farm, Guest Accommodation and Restaurant, Outdoor activities.  
 Location: Farmland outside of Paarl  
 Size: 200 Ha Farm

The historical farm of Babylonstoren is still functioning farm. The food garden was designed to support the Babel restaurant, and as such is a functioning food garden. Visitors are welcomed to walk through the experiential interactive garden and to take part in the harvesting and maintenance of the garden. The gardens provide spaces where visitors can experience both nature and farm and the poeticism thereof.



### Green Point Urban Park

Site Visit: December 2011  
 Designer: OvP Associates  
 Program: Urban public recreational park / commons. Strong educational component.  
 Location: Green Point, Cape Town

The Green Point Commonage was historically used for grazing, horse races and winter sailing regattas, and as a concentration camp during the Anglo-Boer war. Recently the area was established as a sports precinct but fell into disrepair and was fenced off, no longer fulfilling its significance as a commonage. The recent upgrade has breathed new life into the precinct and returned the land to the city dwellers of Cape Town.



### Siyakhana Food Garden

Site Visit: August 2011  
 Designer: Siyakhana Trust  
 Program: Urban Food Garden. Skills training.  
 Location: Bezhuidenhout Park, Johannesburg  
 Size: 2 Ha

The Siyakhana Initiative for Ecological Food and Health Security developed a model food garden to feed hundreds of inner-city beneficiaries. The food garden is designed using the permaculture model. The project aims to achieve a closed loop system. Buildings on site are built out of natural and sustainable materials to showcase alternative ways of living. Skills transfer is an important part of the project.



### Traditional Farm

Site Visit: August 2011  
 Designer: Rural Farmer  
 Program: Subsistence food production  
 Location: Farm on the outskirts of Piet Retief  
 Size: 500m<sup>2</sup>

The rural farm outside of Piet Retief is a classic example of subsistence farming. The small vegetable patch draws water from the stream that runs through the farm. Although small, the garden feeds a farm compound of family labourers. The vegetables are fenced off with wooden laths and wire. Vegetables are laid out in neat rows and it is evident that a continuous crop rotation takes place.

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Figure 168: Various precedents  
 (Author: 2012)

# Green Point Urban Park



Figure 169: Greenpoint Urban Park  
(Author: 2012)

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# Traditional Farm



(Author: 2012)

# Babylonstoren\_Food Gardens



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Wooden stepping stones through the vegetable gardens create opportunities for visitors to move through the planter beds.

Life sized Weaver's Nests, designed by Porky Hefer, add a playful and experiential nature to the food gardens.

"Dis die tuin wat my in die oggend wakker maak..." - Piet, a Babylonstoren farm worker. (It's this garden that I get up for in the mornings...)

**Figure 171: Babylonstoren**  
(Author: 2012)

# Babylonstoren



<b>Comparative Criteria:</b>	<b>Siyakhana Food Garden_Johannesburg</b>	<b>Babylonstoren_Historical Wine Farm_Paarl</b>	
<b>Social Significance</b>	The project feeds hundreds of inner city beneficiaries in a sustainable manner. Skills are transferred to workers at the garden, who are employed full time.	Tourist farm providing employment to local individuals, and an educational element to visitors. Visitors are reminded of the beauty that arises from a harmonious relationship with the natural environment.	
<b>Activities</b>	Sustainable food propagation and skills transfer. The site is also a laboratory or testing ground for sustainable building practices	Guided and unguided walks, variety of spaces to visit (formal and informal). Restaurant. Wilderness walks up the koppie and Interactive spaces	
<b>Accessibility</b>	The project can only be accessed via prior arrangement with the Siyakhana Initiative	Visitors have to drive to the farm. An entrance fee of R10 is required	
<b>Ecological Significance / Sustainability practices</b>	The model food garden explores ways of alternative living. All food is propagated according to the permaculture model. Compost is made on site. All buildings are constructed out of wooden frames and adobe infill. Solar power is used on site for cooking.	Farming is done organically. The farm has met criteria for "sensitive" farming as set out by GLOBAL GAP. There are many indigenous components of the garden. The garden has a policy of no wastage, and all organic waste is recycled into compost on site. The garden presents a sustainable, earth-stewardship way of living. Birds, butterflies and a tortoise were noted on site.	
<b>Planting</b>	Vegetables and useful plants are planted so as to maximise water use, with rings of raised earth and mulch on the downslope of the plants to capture and temporarily drain water. Companion planting is forms the layout of the plants.	Functional, edible planting across site. Formal planting layout hails from the company gardens established in 1652. Elements of wilderness within the overall formal design. A varied planting palette is used which attracts butterflies and birds to site.	
<b>Designed elements</b>	The only architectural structures on site are the adobe office structures and the composting toilets, however these are very simple, compact and elegant structures. There is a poetical beauty that surrounds the park as all functional elements have a rustic yet useful elements.	Structures are rustic, to compliment the setting and farm atmosphere of Babylonstoren. Wood and low walls are the predominant structural element of the site, much of the site and the movement patterns are created by the planted areas. Avenues and axes are created throughout site, and intersections of pathways are celebrated with structures and seating around trees.	
<b>Water Use</b>	The garden is irrigated from municipal water, however there is a small dam on site with possibilities for water storage and irrigation.	Although a canal system was designed for the site, it is currently only a design feature. In the meantime various forms of irrigation are used for the different areas.	
<b>Energy Use</b>	Solar power is used on site		
<b>Successes</b>	The garden successfully feeds hundreds of inner city beneficiaries and employs full time staff. Many farming techniques are tested on site.	Babylonstoren is a successful combination of earth-stewardship and sustainable resource use. Visitors are offered an experience that strengthens their respect of nature and all that it has to offer, as well as memories of the experiential elements of the site such as the barefoot thyme garden and the human sized weaver's nests. Contemplative / secretive spaces were also designed into the formal fabric of the food garden.	
<b>Critique</b>	The model food garden is isolated and does not educate the general public on ways of alternative food production unless an appointment is made. The non-functioning dam on site should be made functional in order to add to the projects sustainability status.	Although the farm is open to the public, it does have an element of elitism - catering generally to the middle to upper class individual. The gardens were sustainable in terms of ecological principles. The only social responsibility is employing local labour and passing on skills. Water canals do not work, and should be improved to make the project truly sustainable.	
<b>Relevance to Project / lessons learnt</b>	Permaculture explored as a way of undertaking farming in an urban context.	The food garden at Babylonstoren is a successful food garden with over 300 edible or useful species, however this garden is not purely functional as it is a destination within itself. The functional landscape creates spaces out of the natural elements on site which provides both social and individual contemplative spaces. A variety of uses and activities take place side by side on the farm.	

<b>Traditional Farm_Piet Retief</b>	<b>Green Point Urban Park_Cape Town</b>
Subsistence farming for a small rural community	Returned public open space to the residents of Cape Town. The park caters to city residents providing them with a safe environment in which to exercise and relax. There is a wide diversity of users and activities.
Subsistence farming	Passive and active recreation - picnic facilities, childrens play areas and an outside gym. Events stage and lawn. Educational gardens - historical, food and biodiversity being some of the features.
The small vegetable patch is private and fenced off.	The park is open to the public with no entrance fee The park has closing and opening times, which prevents the park from being used at night, except for events.
Vegetables are grown within walking distance from the farmers home. Low tech yet successful farming techniques are used to keep the vegetable patch continuously productive.	The Green Point Urban Park is an open piece of land which combines ecological and social significance and activities. Although there are vast areas of open lawn the planting on site is naturalistic and indigenous, contributing to the biodiversity status of the City. The park has many educational elements from recycling to sustainable gardening practices.
Planting is purely functional. Crop rotation takes place on site	The planting is predominantly naturalistic fynbos. An abundant number of trees have been planted across site to afford shade to visitors and increase the biodiversity status of the park.
The crude wooden lath fence and functional layout of vegetables nestled in the grassland slopes of a small hill, alongside a running stream provide a very picturesque image of an african landscape.	The design is tactile and hardy - able to withstand rigorous and repeated use. Children's Play areas are made of recycled materials. A coherent theme runs through the site in terms of the designed elements, stone walls and wooden elements form the main palette of materials used in the hard elements of the project.
Water is collected from the running stream on site.	
Low to no energy use.	Hydro-power provides electricity for the park
The vegetable garden is well maintained indicating its successes in feeding the small rural community.	Green Point commons returned to a place of recreation and meaning in the urban landscape. Inviting educational elements. Recycling across site. The event space used informally by the visitors to the park. A diversity of users were able to use the park for a variety of uses due to the elegant demarcations of spaces for public and more private use. Contemplative spaces and very active spaces were designed to cater to a variety of users.
Water should be capture uphill of the vegetble garden during the rainy season to prevent taking water unnecessarily out of the stream.	Although a variety of users and demographics were noted on site, the park has security guards at all entrances, which will positively deter vandalism and negative and criminal behaviour it has a negative element to it, in that it might deter people of a lower income bracket. The park is closed at night except for when events take place, this creates a negative void at night.
Sustainable, low tech and successful vegetable garden which is purely functional and yet very beautiful.	The Green Point Urban Park is an elegant and vibrant park which caters to the recreational needs of the city residents of Cape Town. Wide walkways allow for joggers, cyclists and meandering walkers to take in a biodiversity rich landscape which has both educational and aesthetic value. Materials are durable and simple however they are still very attractive in the setting.