INDAWO YAMI

A catalyst for quality open space in a low cost housing community

Saidi (2012:75) highlights the fact that government policy has, in the last decade, focused on delivering public infrastructure to the less affluent sections of society, which saw landscape architects produce designs for public open space in townships and low cost housing communities at important transit points.

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A catalyst for quality open space in low cost housing communities

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ABSTRACT

In South African Townships, socio economic activities of the second economy such as informal trading typically manifest themselves in low quality, left over open spaces along roadsides and transport interchanges. These left over spaces are characteristic of townships and especially low cost housing and Reconstruction and Development Programme (RDP) communities, due to the emphasis placed on the dwelling units with little regard for the quality of open space. These environments are, over-scaled and not suited to human scale and although used for informal trading, they are not conducive to human or environmental well-being.

An entrance precinct with such left over spaces in Olievenhoubosch Township, Centurion, is selected to test the hypothesis of an informal market as a catalyst for quality open space that considers human scale and enables the socio-economic functions of the community. The research starts off by establishing guidelines firstly for quality open space; secondly for human scale and thirdly for socio economic functions. These guidelines are applied at framework level looking at the entire precinct, including an informal market, stream corridor and taxi rank.

At masterplan level, the focus is on the informal market. To avoid a merely functional response, the market approach is divided into two aspects, the market development and the spatial or experiential development aspect. These are informed by the established theoretical guidelines, case studies and existing activities and uses onsite. An overarching concept “Indawo Yami” meaning “my place”, ties the two aspects together while expressing the unique character of the community. The concept is born out of the vision of the market as a multifunctional community space that expresses the unique character of the community. The sketchplan proposal suggests that human and environmental well-being could be prime objectives of open spaces in townships all over South Africa.

University of Pretoria
October 2014

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 of 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.

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1. INTRODUCTION

Figure 1 – Illustration of various working sectors in the economy (Author 2014)

Job losses continued during the first quarter of 2010, despite the accelerating momentum of the recovery in economic activity that had commenced in the third quarter of 2009. The reduction in job opportunities in the first quarter of 2010 was the sixth consecutive quarterly decrease in employment (SA year book 2010/2011: 125).
SA Quarterly Employment Stats continued to show job reductions in various sectors of the economy between 2012 and 2013.

The department of Economic Development has identified a number of areas with the potential for new jobs. An important policy focus for the department will be the creation of sustainable livelihoods and addressing the challenges of enterprises in the second economy (SA year book 2010/2011:131).

The following sector investment strategies form part of the specific interventions identified by the Presidency in the second economy (The Presidency 2006:5).

- Specific interventions in sectors that lend themselves readily to participation by disadvantaged communities such as crafts, fresh produce and waste collection
- Building partnerships with the private sector in areas such as timber, supplies for bio fuels, sub-contracting in clothing and textiles and catering
- Creating a conducive regulatory environment for operations in specific areas such as traditional medicines and street trading

Figure 2 – Examples of sectors in second economy (Author 2014)

The term “second economy” was defined in governments’ “Towards a ten year review” as follows:
“The second (economy) is a mainly informal, marginalised, unskilled economy, populated by the unemployed and those unemployable in the formal economy” (Frye 2006:04).

This part of the economy manifests itself in small, often survivalist businesses established as kerb-side traders, traders at transport interchanges and small home-based businesses such as tuck or spaza shops. Informal businesses in the second economy often originate from the lack of alternative income possibilities of owners (Ligthelm) 2006:35). Ligthelm (2006:32) explains that research on quantifying the contribution of the informal economy to the gross domestic product (GDP) is limited and focused on point estimates. These point estimates range from 6.7% to 12.6%.

1. FOCUS AREA

Emerging data indicates that townships are largely – but not exclusively – an urban challenge. A quarter (24, 4 percent or about 11, 6 million) of South Africa’s population of 47, 8 million people live in the country’s 76 largest townships. Townships are also likely to be home to the highest concentrations of poverty (SACN 2009:7).

Thus the predominant focus of informal sector studies in South Africa is on the nature and the characteristics of informal business operated primarily in township areas (Ligthelm 2006:32). Ligthelm’s (2006:44-45) research estimated 749 500 informal businesses located in townships in 2004, providing work for some 1.6 million people (Ligthelm, 2006, (refer figures 3 and 4).

Type of outlet	Total household expenditure (a) (Rm)	Estimated average turnover (2004) (b) (R)	Estimated number of outlets (a ÷ b)
Hawker	10 439	40 000	261 000
Spaza shop	8 930	70 000	127 600
Shebeen	4 219	105 000	40 100

Figure 3 -Estimated number of informal retail outlets in 2004 (Ligthelm 2006:44)

Type of outlet	No. of outlets	Estimated average employment	Estimated total employment
Hawkers	261 000	1.59	415 000
Spaza shops	127 600	2.51	320 300
Shebeens	40 100	2.41	96 600
Other informal outlets[2]	320 800	2.46	789 000
Total	**749 500**	**2.29**	**1 620 900**

Figure 4 - Estimated total employment by the informal sector of the second economy in 2004 (Ligthelm 2006:45)

The focus for this study is, therefore, on the township. Particularly the low cost housing communities developed by the Reconstruction and Development Programme (RDP). According to the National Department of Human Settlements, the total number of houses built through the RDP programme between 1 April 1994 and 31 March 2010 is 2,376,675

Figure 5 - Example of Low cost housing community (Rhodes University, 22 July 2002)

As Kruger highlights (in Loew 2012: 179), these communities that result from providing informal settlements with services and gradually transforming them, are one of the most significant factors in urban growth in South Africa.

2. PROBLEM

The authoritarian emphasis on low cost housing has been related to the quantity of houses delivered as opposed to the quality of urban environments created (Ewing 2005:1). This focus on the dwelling unit as primary issue, with a consequent lesser concern for the nature of the linking spaces, is evident in most existing low-cost housing settlements (Palframan 2005:1). The existing open space systems are poorly developed and maintained resulting in undefined spaces and misrepresented tracks of land (Ewing 2005:3).

SACN (2009:55) also highlights the fact that townships are commonly over-scaled and designed to favour mobility (vehicles) over accessibility (pedestrians).
The wide spaces frequently kept open alongside township roads were built into planning – the roads were 'over-scaled' to accommodate future growth.
This extra space, however, is rarely developed (whether at all or for decades of period spans between development), and contributes to low quality space making (SACN 2009:56).

Such public open space and vacant land offer an opportunity to create dignified urban spaces as key components to the local environment, increasing accessibility and establishing a framework to enable socio-economic development (Ewing 2005:3).

3. PROBLEM STATEMENT

The focus of this research is on how to create quality open space in low cost housing communities that considers human scale and enables socio economic functions.

4. HYPOTHESIS:

Through landscape design, an urban market can become a catalyst in creating quality open space in low cost housing communities.

5. SUB QUESTIONS:

What is quality open space in low cost housing communities and how can it be realised?
How is open space made to suit to human scale?
How can open space address socio economic functions?

6. RESEARCH METHODS & METHODOLOGY

The research methodology followed includes:

- A desktop study consisting of:
  - Literature review on guidelines for quality open space, human scale and socio economic functions in township/ urban environments
  - Case studies of relevant public space designs in similar contexts.

- This is combined with spatial analysis by means of mapping, photographs and interviews as qualitative research methods.

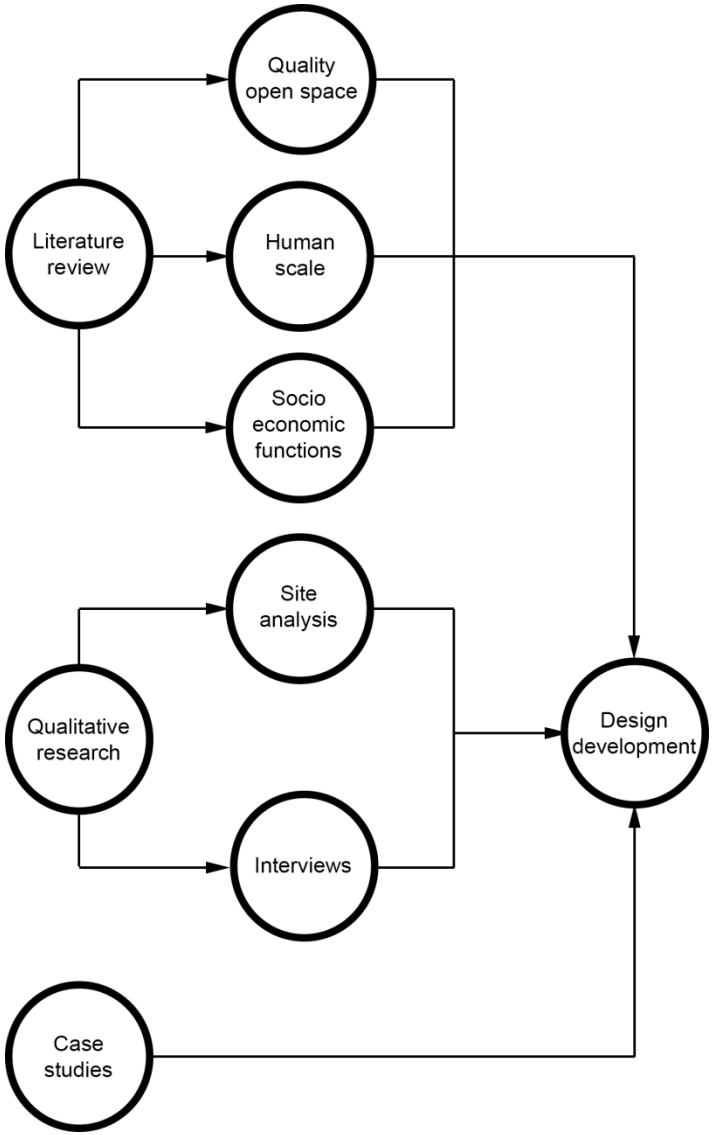

Figure 6 - Methodology diagram (Author 2014)

7. AIM

The aim of this research is to explore ways of addressing the issues of negative space making in low cost housing communities and more specifically informal market spaces.
The solutions must improve the quality of open spaces; introduce human scale while improving the socio-economic functions of the community.

8. DELIMITATION

The proposal does not seek to probe into the details of job creation in the informal sector but rather to research how a design intervention can become a catalyst that enables/enhances existing socio-economic functions.

9. ASSUMPTIONS

The proposal is based on the assumption that the Olievenhoutbosch Urban Development Framework (UDF) projects including, the recycling plant and collection points; as well as the formalized taxi rank will be implemented.

10. POTENTIAL CLIENT PROFILE

City of Tshwane Metropolitan Municipality (CTMM) is proposed as the primary client.
Other parties that may contribute to the project would be the Training for Township Renewal (TTRI) initiative by South African Cities Network (SACN) in conjunction with National Treasury.

TRAINING FOR TOWNSHIP RENEWAL INITIATIVE
South African CitiesNetwork
national treasury
Department: National Treasury
REPUBLIC OF SOUTH AFRICA
CITY OF TSHWANE

Figure 7 - Potential client profile (Author 2014)

11. PROPOSED SITE LOCATION

Figure 8 - Context map (Author 2014)

The proposed site is located in Olievenhoutbosch Township in Centurion. The site forms part of an important entrance precinct with a channelized stream and civic amenities including a community centre, two local schools and two informal taxi ranks. The site is flanged by roads on the south, east and west and is partly zoned for informal trading and partly as a road servitude along the south road edge (refer to image 9). It is currently used for informal trading, a lot of which occurs along the within the road servitude.

Figure 9 - Precinct in township context (Author 2014)

Figure 10 - Illustration of site in precinct context (Author 2014)

12. REFERENCES

- Dewar, D. Uytenbogaart, RS. 1991. *South African Cities: A Manifesto for Change*. Mills Litho (Pty) Ltd: Cape Town

- Erwing, K.2005. *Primary investment in public space is crucial in areas that have minimal access to valuable outdoor space and create highly valued human assets*.
  Available online at;
  http://repository.up.ac.za/bitstream/handle/2263/10416/The%20design%20of%20positive%20public%20space.pdf?sequence=1
  Accessed 15 May 2014

- Frye, I. 2006. *The "Second Economy"; Short hand, underhand or sleight of hand?*
  Available online at;
  http://146.230.128.54/ccs/files/Frye%20second%20economy.pdf
  Accessed 30 March 2014

- Government Communication and Information System 2011. *South African Year Book 2010/2011*. GCIS: Pretoria

- Leow S. 2012 *Urban Design Practice: An International Review*. Riba publishing: London

- Ligthelm, A.A 2006. *Size estimate of the informal sector in South Africa*.UNISA press. Pretoria
  Available online at;
  http://reference.sabinet.co.za/webx/access/electronic_journals/sabr/sabr_v10_n2_a3.pdf
  Accessed 30 March 2014

- Mcleod, S. 2012. *List of Socio-Economic Factors*
  Available online at;
  http://www.ehow.com/info_8245697_list-socioeconomic-factors.html
  Accessed 03 March 2014

- Parliament. 2010. *2,4m RDP houses built since 1994 – Minister*
  Available online at;
  http://www.politicsweb.co.za/politicsweb/view/politicsweb/en/page71654?oid=204713&sn=Detail&pid=71654
  Accessed 03 March 2014

- Palframan, A. 2005. *A syntactical analysis of settlement form – an investigation of socio-spatial characteristics in low-income housing settlements, in Port Elizabeth, South Africa.*
  Available online at;
  http://repository.up.ac.za/bitstream/handle/2263/10300/A%20syntactical%20analysis%20of%20settlement%20form.pdf?sequence=1

- *Quarterly Employment Statistics (QES) September 2013*
  Available online at;
  http://www.statssa.gov.za/publications/P0277/P0277September2013.pdf

- Saidi F. 2012. *Rethinking the role of Landscape Architecture in Urban Cape Town* in;
  Stoffberg, H. Hindes, C. and Muller, L. *South African Landscape Architecture: A Reader*. UNISA press: Pretoria

- South African Cities Network. 2009. *Township Renewal Handbook*. Formerset: Cape Town

- The Presidency. 2006. *Clarifying the second economy concept*
Available online at;
http://www.thepresidency.gov.za/docs/pcsa/social/briefsynopsis.pdf
Accessed 30 March 2014

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- Figure 4 - Estimated total employment by the informal sector of the second economy in 2004 (Ligthelm 2006:45)
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Accessed 30 March 2014

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Available online at;
http://www.ru.ac.za/static/departments/geography2/courses/africacourse/
Accessed 3 March 2014

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Available online at;
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Figure 11 - RDP housing settlement (Trek Earth 2011)

A wealth of knowledge on housing has not influenced actual implementation and housing environments remain untransformed. Housing landscapes in South Africa evolved into sterile, regimented and inefficient settlement patterns; the massive machine of the state continues to dominate housing delivery, in the process limiting interventions by other potential role-players (Osman and Hindes 2005:1).

1. INTRODUCTION

This chapter investigates how, through landscape design, quality open space in a low cost housing community can be realized and how an informal market can act as a catalyst in achieving this.
The three areas of focus discussed are the meaning of quality open space for low cost housing communities; introducing human scale; as well as addressing socio economic functions as set out in the research questions.
The discussion is done in consultation with the Urban Development Framework (UDF) for Olievenhoutbosch Township where the study area is located.

2. THE ROLE OF LANDSCAPE ARCHITECTURE

As custodians and designers of open spaces, Landscape Architects carry the task of designing the outdoor experience of communities for the better. This is equally applicable in the less affluent, informal parts of society where it is much needed. As Saidi highlights (2012:76) whether in formal or informal housing, the bland urban landscape experience is very characteristic for most contemporary African city dwellers (refer to figure 12).

However it is important to note that the need for open space in these communities includes but is not only limited to recreation and beautification, but also human scale spaces that further enhance and enable socio economic functions as well as help alleviate environmental challenges.

Open spaces, in these communities have potential to become locations where social and economic functions are played out and to become in the process, extensions of the individual dwelling unit which is in many instances very modest space. Richness and multi-functionality of such open spaces can create positive environments even where the quality of individual dwelling spaces are poor (Saidi2012:80).

Figure 12 - Aerial views of typical bland urban landscape experience i.e. vast and vacant open spaces and repetitive housing patterns in Olievenhoutbosch Township (Google Earth 2014)

3. QUALITY OPEN SPACE FOR LOW COST HOUSING COMMUNITIES

"Quality open space is an essential part of the quality of life for people everywhere: in urban areas and in the country side, in degraded areas as well as in areas of high quality, in areas recognised as being of outstanding beauty as well as everyday areas. The enjoyment of public open spaces contributes to the legitimate aspirations of inhabitants for an improvement in their quality of life, as well as to increase social cohesion, feelings of security and supports in this way

the protection of the right of man in his environment" (Déjeant-Pons 2012:5).

Sadly however, in low cost housing communities, projects related to open space amenity remain of least priority when it comes to public investment programmes. The spatial structure mainly consists of residual, ill-defined and fragmented spaces as a result of over scaled future based planning along road reserves, power line servitudes and along channelized river corridors (refer to figures 13-14).Consequently, the spaces are prone to flooding, erosion, pollution etc. while communities also ascribe functions such as informal trading to some of these spaces for which they are not necessarily zoned (refer to figure 15).

Ewing (2005:1) argues, and rightly so, that the primary spatial structure in low cost housing communities, should equally consist of positive public spaces with community amenities, green systems and human-scale local interventions for informal and formal economic and social activities, where there is potential for mixed-use opportunities.

Figure 13 - Residual space along a channelized stream in Olievenhoutbosch Township (Google Earth 2014)
Figure 14 - Residual space along road in Olievenhoutbosch Township (Google Earth 2014)
Figure 15 - Ascribed informal trading in road reserve in Ivory Park Township (CoJ 2014)

The identified principles/ guidelines deemed most relevant for informed decision making in realising quality open space are those pertaining to Urban Renewal with a focus on townships and Urban Ecosystem Services with a focus on urban agriculture, waste treatment and runoff mitigation.

3.1 URBAN RENEWAL

"Urban renewal programmes are concerned with developing multifunctional landscapes that stimulate the informal business sector of townships as well as people's daily lives. This involves the redesign of public space and socio-economic facilities such as markets, taxi ranks, bus stations, community parks, play grounds and pedestrian walkways" (Saidi 2012:80).

The Training for Township Renewal Initiative(TTRI),developed by The South African Cities Network (SACN), in conjunction with National Treasury, outlines a number of guidelines that are crucial for quality open space development in townships(SACN 2009:58-59):

- Establishing more integrated open space systems:

This speaks of the importance of linking open spaces rather than creating isolated pockets.

- Establishing a hierarchy of spaces:

This is about public spaces forming part of the city wide and or township spatial development framework.

- Applying key design principles:

This emphasises the application of the principles of scale to the size of space in relation to its use and surroundings.

Another aspect highlighted by the initiative is the opportunity for socio-economic development along the vacant spaces found along road reserves that are hardly developed, whether at all or for long period spans (refer introduction Chapter 1).

3.2 URBAN ECOSYSTEM SERVICES

Open space systems in urban environments serve functions that alleviate environmental challenges and in so doing improve the quality of urban environments and community well-being. Environmental challenges such as flooding, pollution, food and water shortages are a major concern in less affluent areas and thus open spaces are necessary to help alleviate these problems. Gómez-Baggethun and Barton (2013) refer to these spaces as urban ecosystems and the functions they serve as ecosystem services.

According to Gómez-Baggethun and Barton (2013:236) urban ecosystems include all 'green and blue spaces' in urban areas, including parks, cemeteries, yards and gardens, urban allotments, urban forests, wetlands, rivers, lakes, and ponds.
They define ecosystem services as benefits that humans obtain from ecosystem functions or as direct and indirect contributions from ecosystems to human well-being. Urban ecosystem services then are those provided by urban ecosystems and their components.

Which ecosystem services are most relevant, varies greatly depending on the environmental and socio-economic characteristics of each site (Gómez-Baggethun and Barton 2013:236).

Discussed ecosystems services deemed relevant to low-cost housing communities and especially Olievenhoutbosch Township where the study area is located are those of urban agriculture/food supply, waste treatment and runoff mitigation. Urban Agriculture forms a crucial part of the Olievenhoutbosch UDF while waste and flooding impacts are some of the greatest open space challenges faced by the community

3.3 URBAN AGRICULTURE/ FOOD SUPPLY

Figure 16–Urban agriculture (Avlonitis2008)

Urban agriculture can be a means of transforming under-utilized or neglected space into a public resource, providing opportunities for social interaction, greater community cohesion and self-sufficiency as well as engagement for youth in underserved communities.(Columbia University 2012:2).

According to Columbia University (2012:2), urban agriculture can play a critical role in community development. Its benefits are not only limited to the provision of food but community empowerment, environmental justice, education and training are also cited. Urban Agriculture forms part of the vision of the Olievenhoutbosch Township Urban Development Framework (UDF) public open space guidelines. Thus urban agriculture is proposed as part of the proposed design framework (refer chapter 4).

3.4 WASTE WATER TREATMENT

Waste is perhaps one of the major issues that affect the quality of the environment in low cost housing communities; this is mainly due to inadequate or a lack of waste management systems. As a result vacant open spaces and river corridors are used for dumping.

Ecosystems filter out, retain and decompose nutrients and organic wastes from urban effluents through dilution, assimilation and chemical re-composition. Ponds, for example, filter wastes from human activities reducing the level of pollution in urban waste water and urban streams retain and fix nutrients from organic waste (Gómez-Baggethun and Barton 2013:236).

It is therefore crucial to have litter traps and naturalized streams with accompanying ponds or wetlands to help filter waste unlike the common channelization of drainage canals or streams commonly seen in low cost housing communities.

3.5 RUNOFF MITIGATION

Gómez-Baggethun and Barton (2013:236) discuss the problem with Impermeable surfaces in that they decrease the ability of water to infiltrate into the soil, which increases the volume of surface runoff and consequently the vulnerability to flooding.
Interception of rainfall by tree canopies slows down flooding effects and green pavements or soft surfaces reduce the pressure on urban drainage systems by infiltrating water (Gómez-Baggethun and Barton 2013:236).

Impermeable concrete surfaces are typical of storm water drainage systems in low cost housing communities and with this, the consequences of flooding and erosion of adjacent open space or downstream. It is therefore crucial that the proposed intervention incorporates the use of soft surface and permeable paving.

3.6 SYNTHESIS: QAULITY OPEN SPACE

Multi-functionality must be catered for. The spatial structure should consist of positive public open space with community amenities, green systems and human scale local interventions for informal/ formal economic and social activities.

- Urban Renewal – application means integrating the redesign of public space and socio-economic facilities such as markets; transport facilities such as taxi ranks & bus stations; recreation facilities such as community parks & play grounds; pedestrian priority through walkways and connection to the greater spatial framework hierarchy.
- Urban Ecosystem services –application means open space must emphasise functions that alleviate environmental challenges. Especially crucial to low cost housing communities are urban agriculture, waste treatment and runoff mitigation. The use of planting is crucial for air purification and temperature regulation.

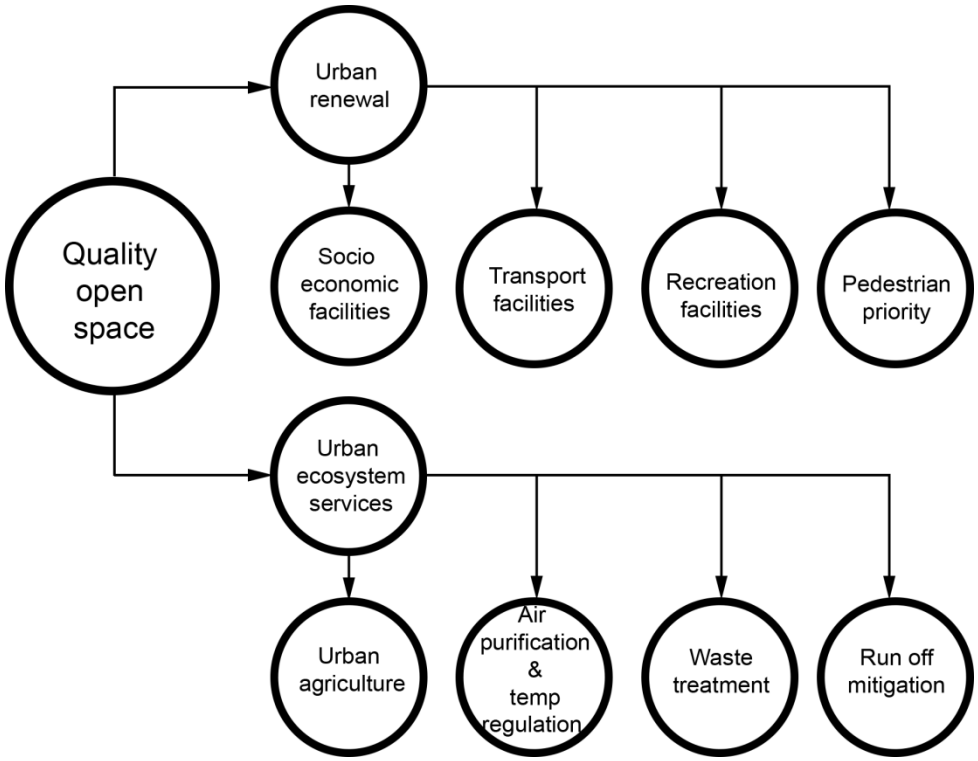

Figure 17 - Quality open space synthesis diagram (Author 2014)

4. HUMAN SCALE

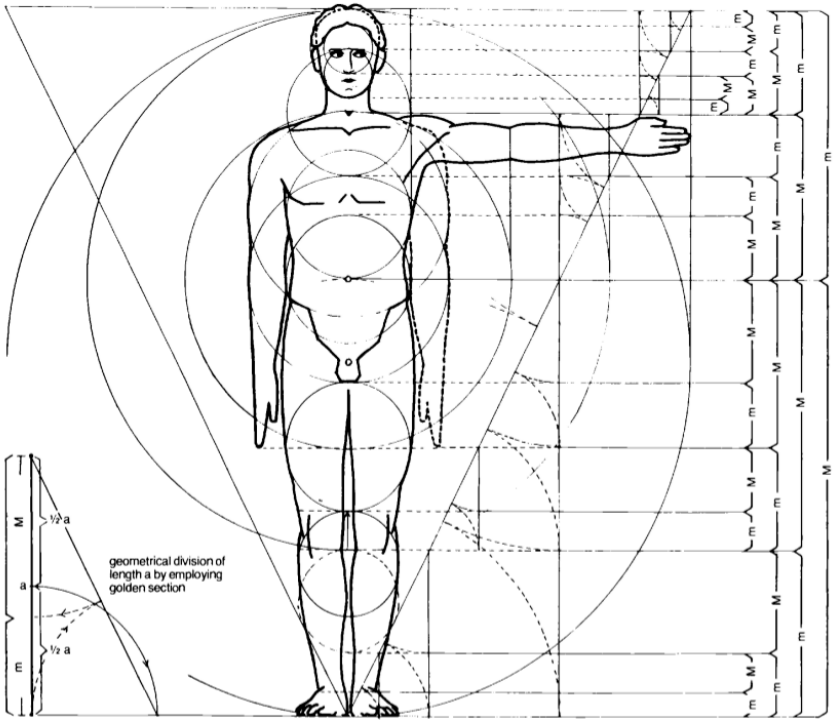

Figure 18 - Human scale (Timeless house 2013)

The preoccupation of planning with the challenges of traffic and providing housing in low cost housing communities has inevitably resulted in over-scaled streets and open space. This has had a negative effect on human scale.
Iniguez (cited in Lucic 1993:3) identifies 2 problems of over-scaled open spaces in urban areas, firstly the loss for a sense of security to their users, and secondly the fact that the spaces do not encourage people to meet and socialize.

Physical, mental and cultural activities of human beings require amongst other things spaces for breathing and be inspired, spaces to linger, to amble, to dream, to meet by intention or by chance (Beriatos 2012:3).The question that then arises is how can human scale be introduced?

4.1 SPACE DIVIDING ELEMENTS

Human scale is not only determined by the relation between buildings and the intervening spaces, but any element within that space can modify scale. Such elements are referred to as space-dividing elements and they represent any component part that is of a size that can affect the scale of space, such as street furniture, columns, lamp posts, monuments and fountains (Lucic 1995:24).

The way the ground is treated, its pattern, colour or texture of material and a change of level may also suggest an organisation and division of space that will affect scale. The use of trees is a very important element in the creation and subdivision of space. Trees are primarily used to provide a transition from the huge size of open spaces to a comfortable human size (Lucic 1995:24-25).

4.2 STREET SCALE

With regard to streets, Lucic (1995:12) states that wide streets suggest the dominance of vehicular traffic; but sidewalks with additional elements such as trees and street furniture create a more intimate scale indicative of slower movement and are conducive to social activities.
In the case of a long street Lucic (1995) suggests that the length be broken to avoid monotony. This can be achieved through a change in the cross section of the street, the insertion of squares as well as the accentuation of street corners to give the street rhythm.

5. SYNTHESIS: HUMAN SCALE

In summary the following synthesis can be made with regard to the introduction of human scale:

Space Dividing Elements – In addition to the relation between buildings and intervening spaces, human scale is also introduced through space dividing elements such as:

- Street furniture, columns, monuments and fountains,
- Ground texture, pattern and colour treatment of materials and level change
- The use of trees.

Street scale – The following are crucial to bring human scale along streets:

- Space dividing elements and trees
- Sidewalks, squares and accentuated street corners

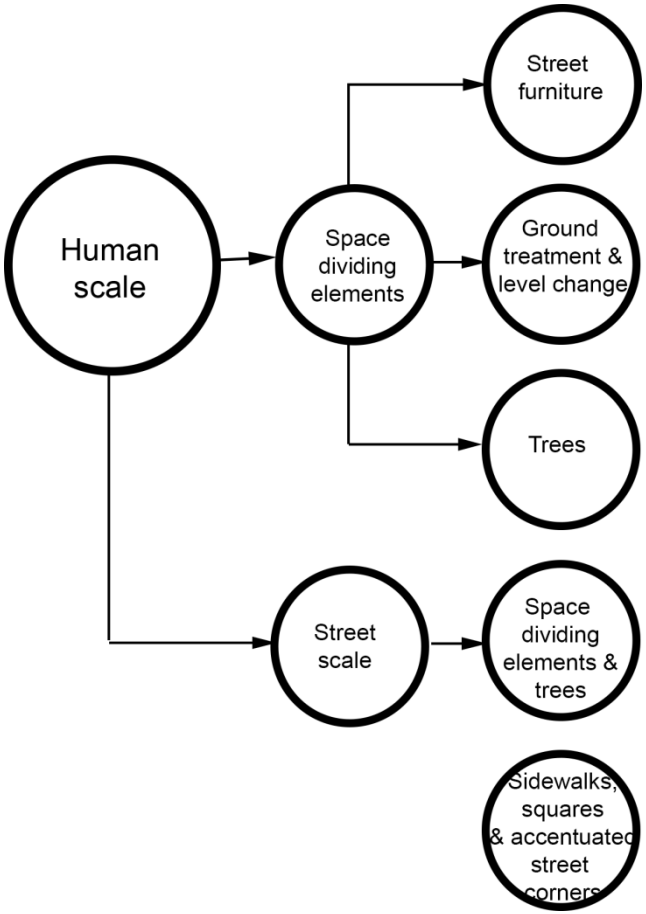

Figure 19 - Human scale synthesis diagram (Author 2014)

6. SOCIO ECONOMIC FUNCTIONS

As mentioned under the aspect of quality open space for low cost housing communities, human-scale local interventions for informal and formal economic and social activities are crucial for the primary spatial structure; and especially to support a range of trading opportunities of a formal and mainly informal nature (Ewing 2005).

Ewing (2005) argues that the potential of such income-generating activities is also a possible poverty alleviation strategy. Quality settlements enrich the living conditions of all people, both rich and poor. They are rooted in a basic understanding of human activity and human need (Dewar andUytenbogaart1991:13).

6.1 INFORMAL TRADING/ MARKET INFRASTRUCTURE

Figure 20- Informal trading or market (Avlonitis2008)

In low cost housing communities, there is a need to create opportunities to manufacture and trade at very low overheads in the most viable locations. The provision of appropriate spaces and infrastructure for these activities is crucial (Dewar and Uytenbogaart 1991:108).

Informal trading usually exists within numerous spaces and settings available and in favourable locations attracting high pedestrian thoroughfare, and hence creating multidimensional and diverse urban systems (Ewing 2005:2).

A number of factors that contribute to the success of the trading activities are outlined below. These are seen as important design guidelines for the proposed market and are emphasised as a point of departure in the design development. They include the following:

6.1.1 FUNCTIONAL MIX

According to Dewar and Watson (1990) two things that make a market more multifunctional are having recreational components and Internal/ product specialization:

- Recreational component

Recreational components include places for sitting and relaxed gathering; play facilities etc. being prominent enough to attract consumers.
In low-income communities particularly, the success of markets is strongly related to the degree to which they become a social focus (Dewar and Watson 1990:34).

- Product/ internal specialization

Similar goods (e.g. fruit and vegetables, fish, meat and poultry, clothing and ornamentation, household goods etc.) need to be organized into functionally identifiable and discrete zones within the market (Dewar and Watson 1990:34).

Dewar and Watson (1990:34-36) discuss a number of reasons why this differentiation is important:

- Different types of goods have different requirements (such as loading) and sometimes require specialist services (e.g. washing and drainage facilities).
- Different goods have different externality effects (e.g. smell and visual impacts) and these are not always compatible with other goods and services.
- Different goods have different environmental requirements to optimize selling, e.g. the light and other display requirements for clothing are totally different from those for selling meat. Internal specialization enables the creation of different retailing environments which suit the need of particular products.

The main implication of specialization with regard to design is the need is to minimize negative externalities, through the physical definition of the relationships between compatible and potentially incompatible uses (Dewar and Watson 1990:37).

For instance unpleasant washing and drainage or manufacturing facilities/ space can be focused in one specialization area of the market and therefore be easily removed from view. This would be especially applicable for brick manufacturing areas, car wash and car spares.

6.1.2 INFRASTRUCTURE

A key challenge in low cost housing communities lies in the ability to provide a venue for economic opportunities where there are limited resources and a desperate need for relevant scale and form of space(Ewing2005:2).

Thus, it is crucial that the infrastructure provided is contextually appropriate; it must also give spatial definition and thereby creating a sense of public place.
From Dewar and Watson's research (1990), the most crucial amenities for informal markets are shelter, waste collection facilities as well as water and sanitation.

6.1.3 RECYCLE AND REUSE

- Water as a resource

As water is increasingly being regarded as a scarce resource, it is important that rainwater be captured and reused and thus becoming a resource that further enables the functions of the informal markets.

Methods of capturing rainwater outlined by Columbia University (2012) include increasing permeable surface areas, thus storm-water retention and detention, and rooftop rainwater harvesting. The harvested storm-water can be used for irrigation, ablution facilities and market area, thus becoming a resource for functions of the market.

- Waste as resource

The current culture of waste disposal is characterised by municipalities needing to meet high standards in service delivery of waste collection with limited financial resources (Matete and Trois cited in Werner de Vos 2011:4).

Informal markets are one of the biggest producers of litter in urban environments and mostly with little to no waste disposal systems in place; for this reason they are considered as negative spaces by many; however if recycling systems are put in place, the produced waste can then become a resource.

A recycling centre forms part of the Olievenhoutbosch Township UDF, thus this study proposes two methods of dealing with waste.

- The first is recycling collection points managed by informal waste collectors working with the community recycling centre. A partnership between the Ronni Recycler Company and the recycling centre is proposed. According to Werner de Vos (2011:4), Ronni Recycler

encourages informal sector waste collectors by providing trolleys as well as financial compensation.

- It is also proposed that organic waste from the informal markets be composted and used for urban agriculture. In so doing, a closed cycle can be formed as the urban agriculture in turn can supply the informal with fresh produce.

7. SYNTHESIS:SOCIO-ECONOMIC FUNCTIONS

Important factors that contribute to the success of informal markets that must be taken into consideration are:

- Functional mix – incorporation of recreation components such as places for sitting and relaxed gathering, play facilities etc. as well as internal/product specialization in the market area is crucial.
  Product specialization, which is about the differentiation of similar goods into discrete zones, is important due to the unique service requirements, externalities and environmental requirements.
  Infrastructure –The most crucial amenities for informal markets are shelter, waste collection facilities as well as water and sanitation.
- Recycle and reuse –Water can become a resource when it is captured through permeable surface areas, storm-water retention and detention and roof top rainwater harvesting
  Waste can become a resource through recycling and composting.

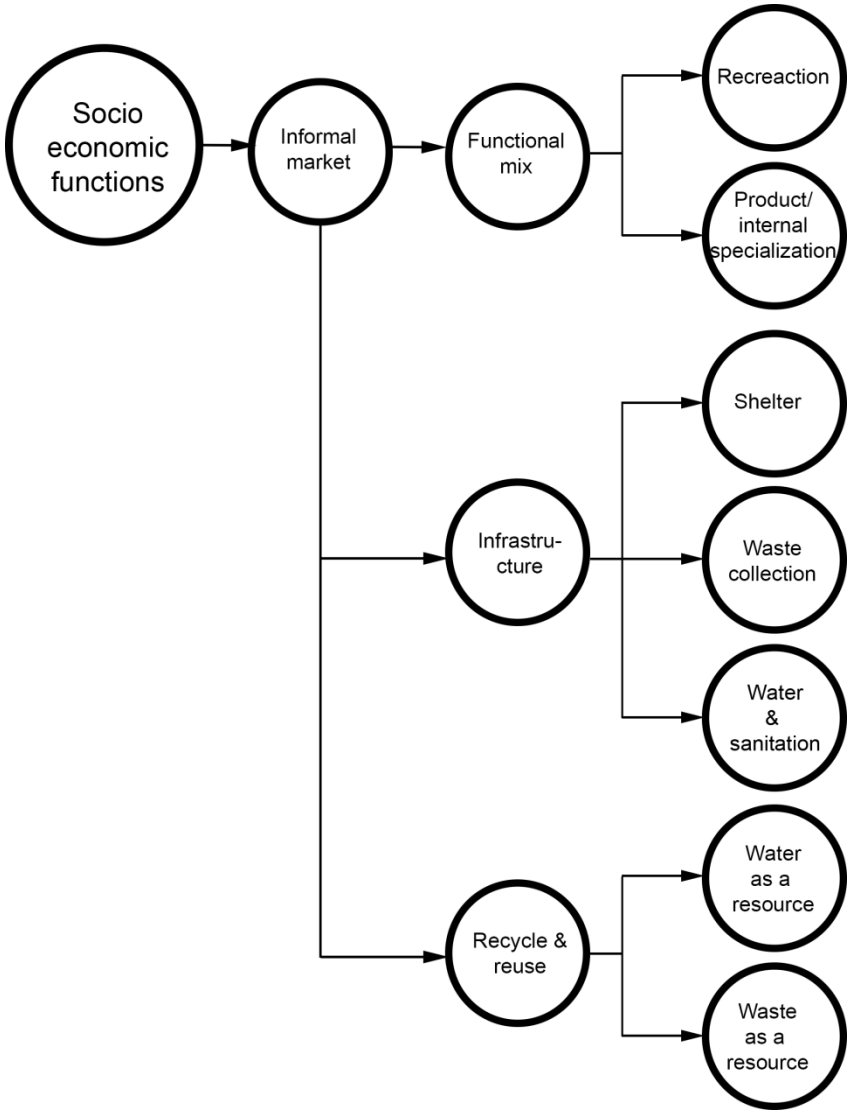

Figure 21 - Socio economic functions synthesis diagram (Author 2014)

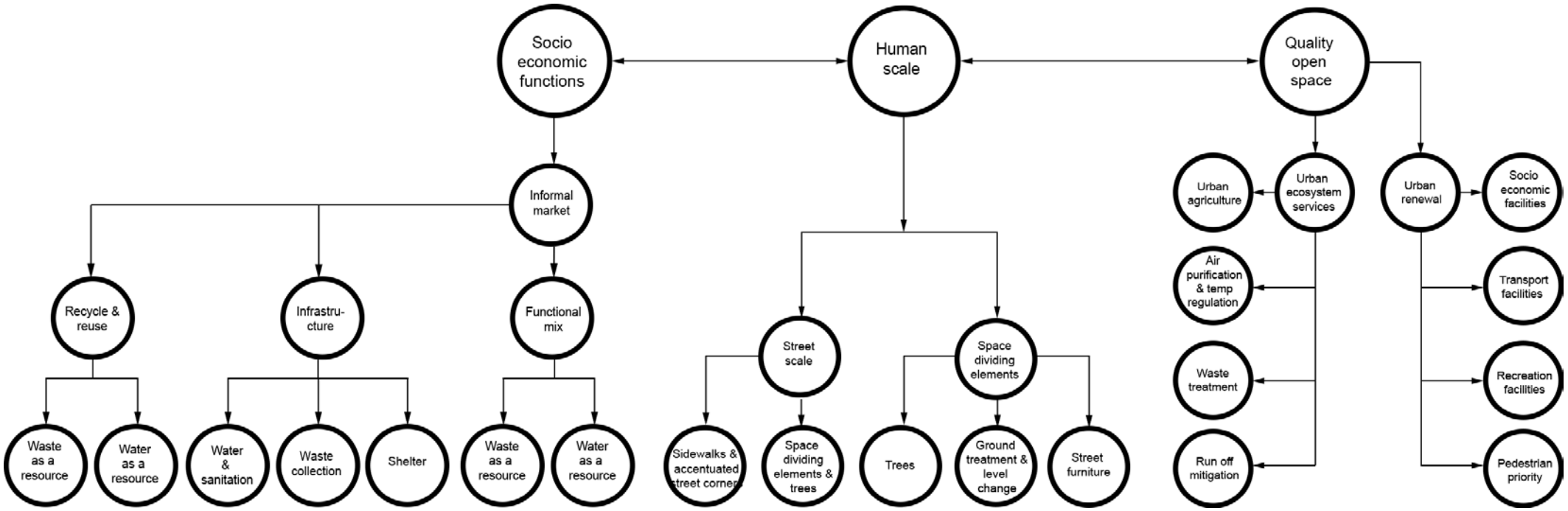

Figure 22 - Overall theory synthesis diagram (Author 2014)

8. REFERENCE

- Beriatos, E. 2012 *Public spaces and 'glocalised' landscapes* in Palmer, R. and Therond D. *Futuropa: For a new vision of landscape and territory.* Council of Europe. Belgium
- Columbia University.2012. *The potential for Urban Agriculture in New York City*
  *Available online at;*http://www.urbandesignlab.columbia.edu/sitefiles/file/urban_agriculture_nyc.pdf
  Accessed 24 July 2014
- Déjeant-Pons, M. 2012. *The Human Scale* in Palmer, R. and Therond D. *Futuropa: For a new vision of landscape and territory.* Council of Europe.Belgium
  https://www.google.co.za/url?sa=tandrct=jandq=andesrc=sandsource=webanddcd=1andcad=rjaanduact=8andved=0CB0QFjAAandurl=http%3A%2F%2F128.121.10.98%2Fcoe%2Fpdfopener%3Fsmd%3D1%26md%3D1%26did%3D985536andei=-YDPU9vMIMHb0QWZv4HgDwandusg=AFQjCNE9lE0ZHdgD4jbFmwnsNYxV4XTEhwandsig2=LP9sXaMoLF619AbQLMWFyA
  Accessed 22July 2014
- Dewar, D. Watson, V. 1990.*Urban Markets: Developing Informal Retailing*. Routledge: London
- Dewar, D. Uytenbogaart, R.S. 1991. *South African Cities: A Manifesto for Change.* Mills Litho (Pty) Ltd: Cape Town
- Ewing, K.2005. *Primary investment in public space is crucial in areas that have minimal access to valuable outdoor space and create highly valued human assets.*
  Available online at;
  http://repository.up.ac.za/bitstream/handle/2263/10416/The%20design%20of%20positive%20public%20space.pdf?sequence=1
  Accessed 15 May 2014
- Gómez-Baggethun, E. and Barton, D.2013.*Classifying and valuing ecosystem services for urban planning*
  Available online at;
  http://0-ac.els-cdn.com.innopac.up.ac.za/S092180091200362X/1-s2.0-S092180091200362X-main.pdf?_tid=81fb2a46-20f2-11e4-97fb-00000aacb35eandacdnat=1407718846_bd8b3eb738bb1e7e6c58ce4ad45d2e46
  Accessed 10 August 2014
- Hindes C. and Osman S. 2005. *Housing design, urban design and multi-layered environments*
  Available online at;
  http://repository.up.ac.za/bitstream/handle/2263/4599/HOUSING%20DESIGN%2c%20URBAN%20DESIGN%20AND%20MULTI-LAYERED%20ENVIRONMENTS%20Architecture%20SA.pdf?sequence=1
  Accessed 21 July 2014
- Lucic, K. 1995. *Human scale in the urban design of Montreal residential developments*
  Available online at;
  http://digitool.library.mcgill.ca/view/action/singleViewer.do?dvs=1406112256321~107andlocale=en_USandshow_metadata=falseandVIEWER_URL=/view/action/singleViewer.do?andDELIVERY_RULE_ID=6andadjacency=Nandapplication=DIGITOOL-3andframeId=1andusePid1=trueandusePid2=true
  Accessed 23July 2014
- Plan Associates. 2010. *Olievenhoutbosch Urban Development Framework.* COT. Pretoria
- Saidi, F.2012. Rethinking the role of Landscape Architecture in Urban Cape Town in Stoffberg, H. Hindes, C. and Muller, L.*South African Landscape Architecture: A Reade*r. UNISA press: Pretoria
- Werner de Vos, H. 2011. *Residential Recycling: An Industrial Engineering Approach to Strategic Waste Collection*
  Available online at;

http://repository.up.ac.za/bitstream/handle/2263/17952/DeVos_Waste%282011%29.pdf?sequence=1
Accessed 14 August 2014

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  Available online at;
  http://www.trekearth.com/gallery/Africa/South_Africa/West/Eastern_Cape/Alice/photo1282522.htm
  Accessed 20 August 2014

- Figure 12 - Aerial views of typical bland urban landscape experience i.e. vast and vacant open spaces and repetitive housing patterns in Olievenhoutbosch Township (Google Earth 2014)
- Figure 13 - Residual space along a channelized stream in Olievenhoutbosch Township
- Figure 14 - Residual space along road in Olievenhoutbosch Township (Google Earth 2014)
- Figure 15 - Ascribed informal trading in road reserve in Ivory Park Township (CoJ 2014)

Available online at;
http://joburg.org.za/index.php?option=com_content&view=article&id=5793:ubuntu-and-hope-in-ivory-park&catid=106&Itemid=188
Accessed 20 August 2014

- Figure 16–Urban agriculture (Avlonitis2008)
  Available online at;
  www.archdaily.com/99684/bronx-public-farm-orchard-alexandros-avlonitis/
  Accessed 20 August 2014

- Figure 17 - Quality open space synthesis diagram (Author 2014)
- Figure 18 - Human scale (Timeless house 2013)

Available online at;
http://thetimelesshouse.com/2013/02/
Accessed 20 August 2014

- Figure 19 - Human scale synthesis diagram (Author 2014)
- Figure 20- Informal trading or market (Avlonitis2008)

Available online at;
www.archdaily.com/99684/bronx-public-farm-orchard-alexandros-avlonitis/
Accessed 20 August 2014

- Figure 21 - Socio economic functions synthesis diagram (Author 2014)
- Figure 22 - Overall theory synthesis diagram (Author 2014)

1. INTRODUCTION

The study area is located in the Olievenhoutbosch Township which is located on the southern border of the City of Tshwane Metropolitan Municipality. It is situated at the intersection of the N14 highway and the R55. The N14 stretches eastward to Centurion and Pretoria east and westward to Diepsloot and Krugersdorp; while the R55 stretches northward to Laudium and Pretoria West and southward to Sandton, Johannesburg (refer to figure 26).

The township is characterized by various housing typologies and is divided into extensions.
The area chosen to test the research hypothesis is an entrance precinct in Olievenhoutbosch Extension 13 which consists of a single unit RDP housing typology. It is located along a major entrance route from the R55 named Osaka Drive and is intercepted by a channelized stream known as the Riet Spruit which forms part of the neighbourhood's drainage system.

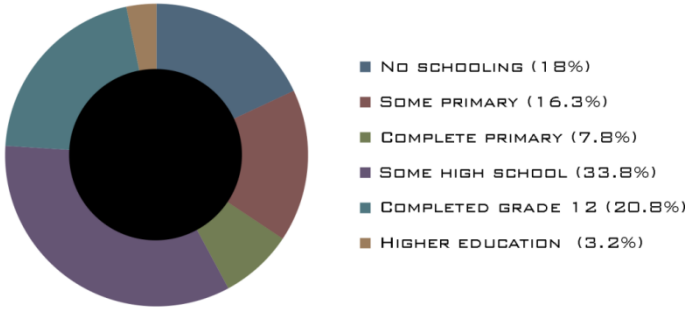
This chapter begins with a brief outline of the overall status quo information including demographics, historical background, context and locality as well as the existing open space system and activities. This is followed by the focus area precinct with its spatial opportunities and constraints, and the chapter culminates with a field research summary from interviews conducted onsite.

2. STATUS QUO

2.1 OLIEVENHOUTBOSCH POPULATION DYNAMICS (2011)

People	29923
Households	11103
Average people/ household	2.7

2.2 EDUCATIONAL ATTAINMENT



2.3 EMPLOYMENT/UNEMPLOYMENT

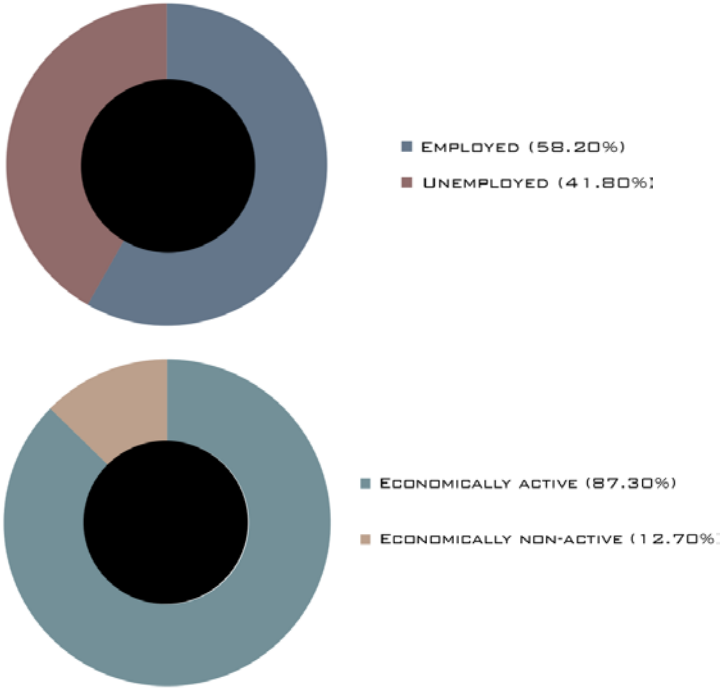


Figure 23 – Olievenhoutbosch Township Demographics (Author 2014)

2.4 HISTORICAL BACKGROUND

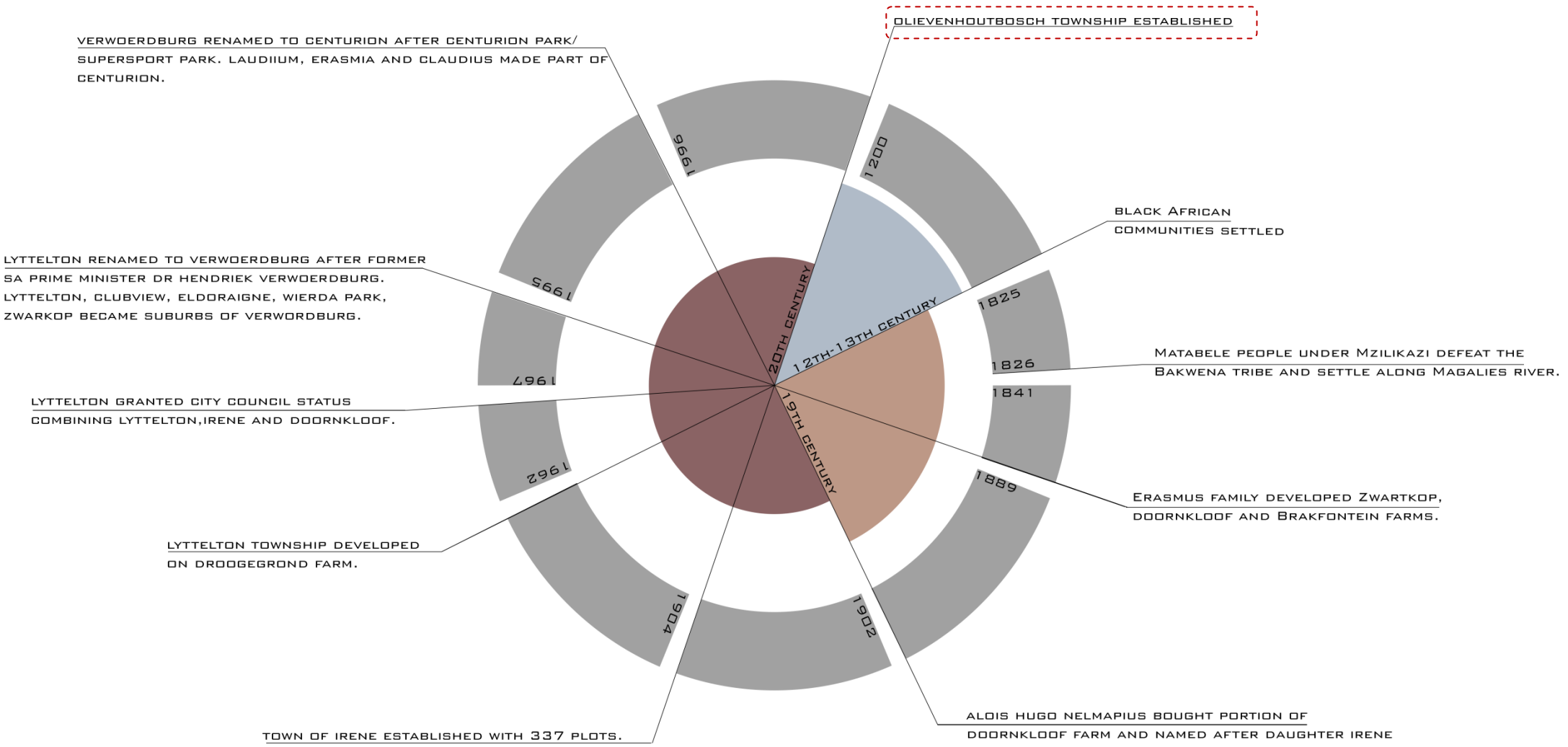


Figure 24 – Olievenhoutbosch historical background timeline (Author 2014)

2.5 CONTEXT AND LOCALITY

Figure 25 - Context and locality maps (Author 2014)

2.6 EXISTING OPEN SPACE SYSTEM AND ACTIVITIES

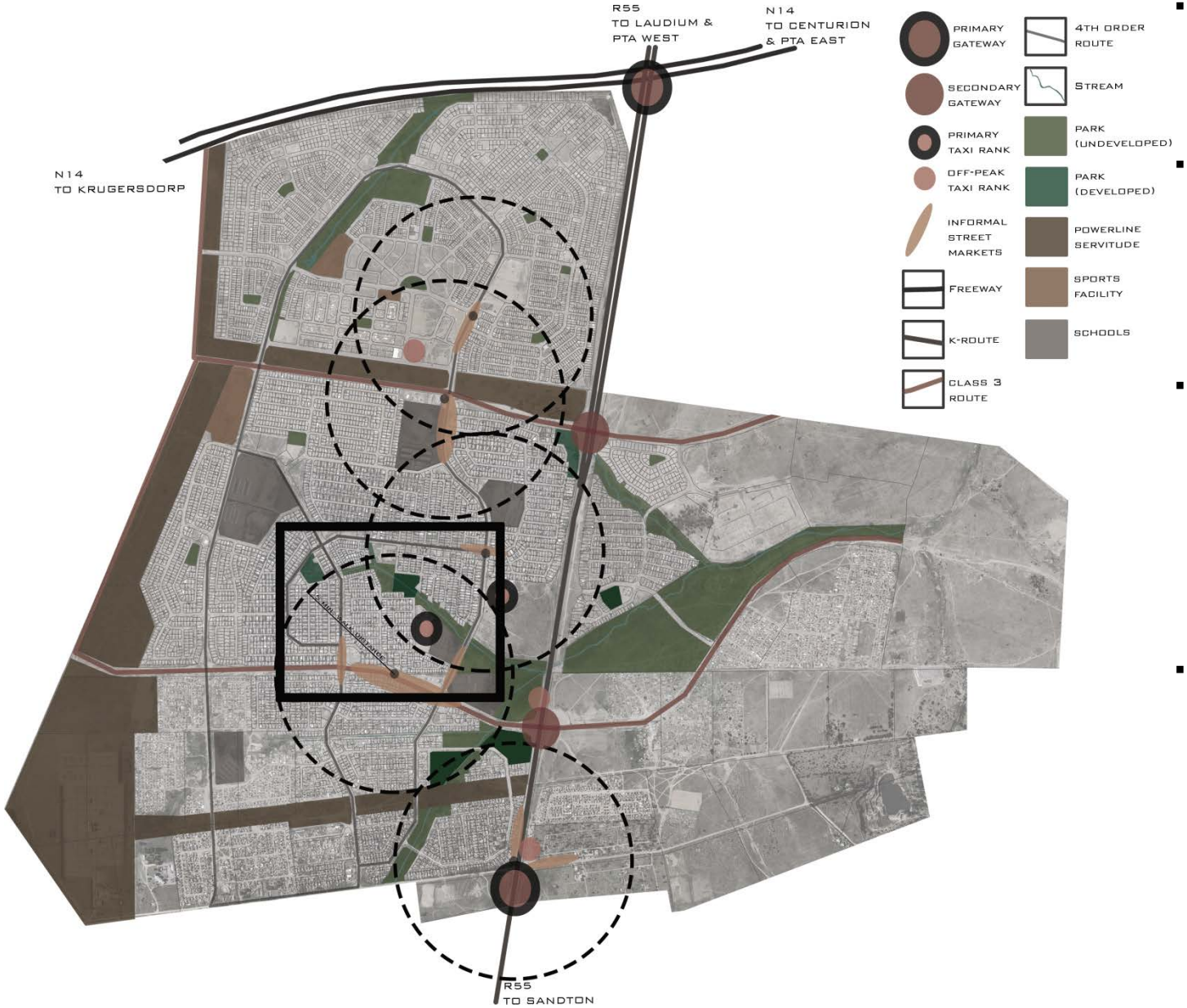


Figure 26 – Existing open space system and activities (Author 2014)

- The existing open space system (highlighted in green in figure 26) constitutes the spaces along the partly channelized drainage system known as the Riet Spruit as well as smaller erven zoned as park spaces distributed throughout the community.

- Powerline servitude spaces (indicated in dark brown) make up a greater percentage of the open spaces dissecting the community into 3 portions.
  The spaces are vacant with unsightly powerline distribution structures and contribute to negative space making in the township.

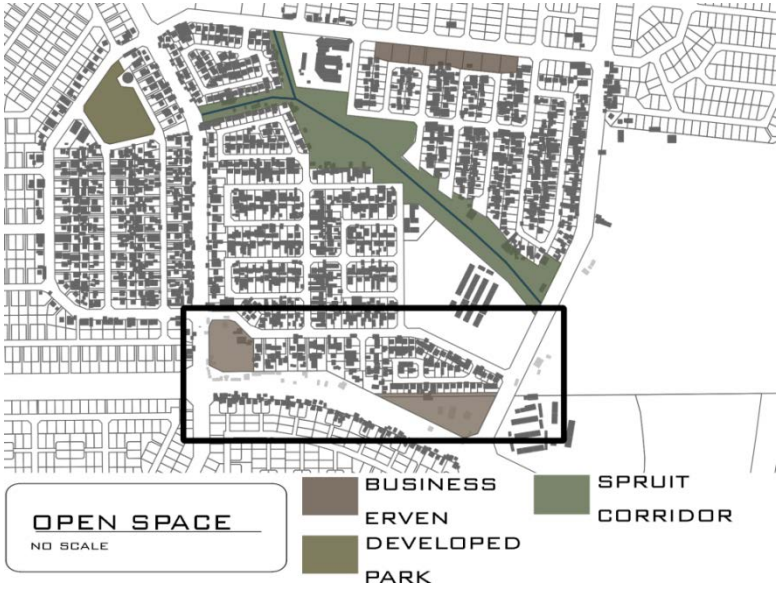
- Leftover spaces are especially found along the road network and especially along the class 3 routes which are the entrance routes into the neighbourhood from the R55 K-route. The class 3 route to the north is Waterberg road and the one to the south, along which the study area is located, is Osaka drive.
  40 meter wide servitudes are reserved for the class 3 routes; however they are currently developed as 10 metre wide single carriageway roads.

- Informal trading is concentrated along these spaces and especially Osaka drive but it is also found along the 4th order neighbourhood routes and to the south of the R55 adjacent an off-peak time taxi rank.
  Although still undeveloped, two primary taxi ranks are located adjacent the space along Osaka drive which gives the advantage of high pedestrian traffic.

  The dotted circles indicate 5 meter walking distances from the informal trading areas in relation to taxi ranks and surrounding houses.

3. PRECINCT ANALYSIS

3.1 OPEN SPACE, ZONING, SLOPE & RUNOFF



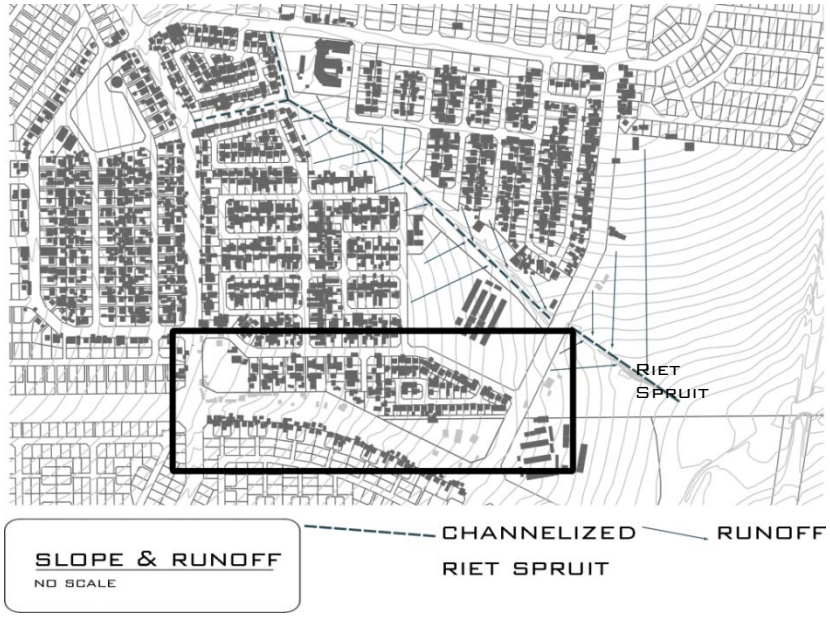


Figure 27 – Precinct open spaces, zoning, slope and runoff (Author 2014)

3.1 OPPORTUNITIES

- The advantage along Osaka drive is the bigger space afforded by the adjoining erven especially zoned for business/ informal trading.
- In addition to the mentioned primary taxi ranks, social and civic amenity including two schools and community centre are located within the study area precinct.
- Together with the open space along the Riet Spruit, the social and civic amenity offer the opportunity for urban renewal principles of connectivity between socio economic, transportation, recreation amenities.

3.2 CONSTRAINTS

- The road servitude space along Osaka road creates limitation in terms of continuity in the development of the informal market.
- These residual spaces that are between 8.7 and 9 metres wide currently contribute to low quality space making. However, adaptive design can be applied such that the space is used temporarily and then later adapted to suit future road developments. Also keeping in mind that spaces that are 5.5 and 5.2 metres wide will remain post road development to accommodate underground services (refer to figure 28).

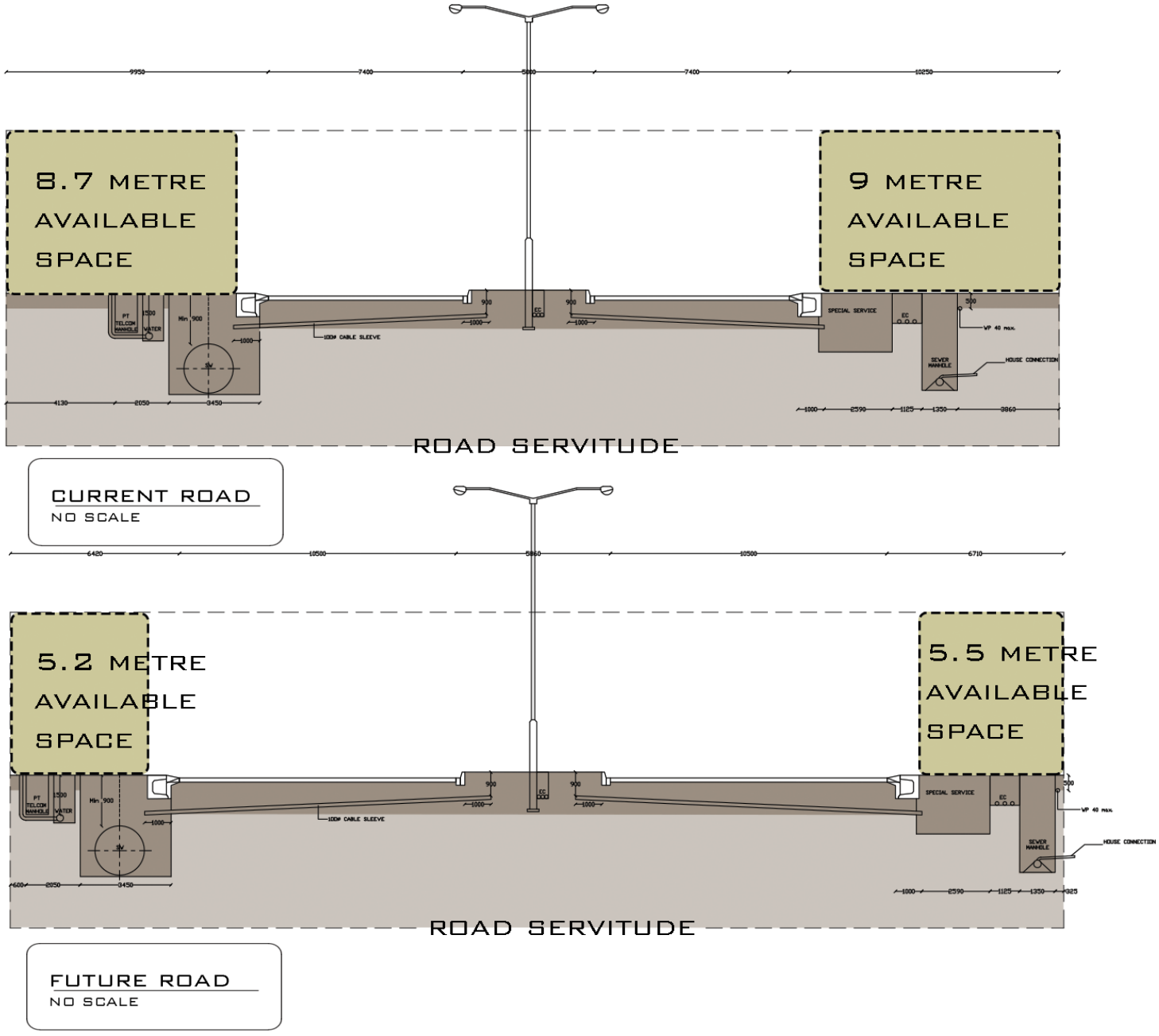


Figure 28 – Current and future spatial implications along Osaka drive road servitude (Author 2014)

3.2 PEDESTRIAN & VEHICULAR MOVEMENT, TRANSPORT & PEDESTRIAN NODES AND INFORMAL TRADING ACTIVITIES

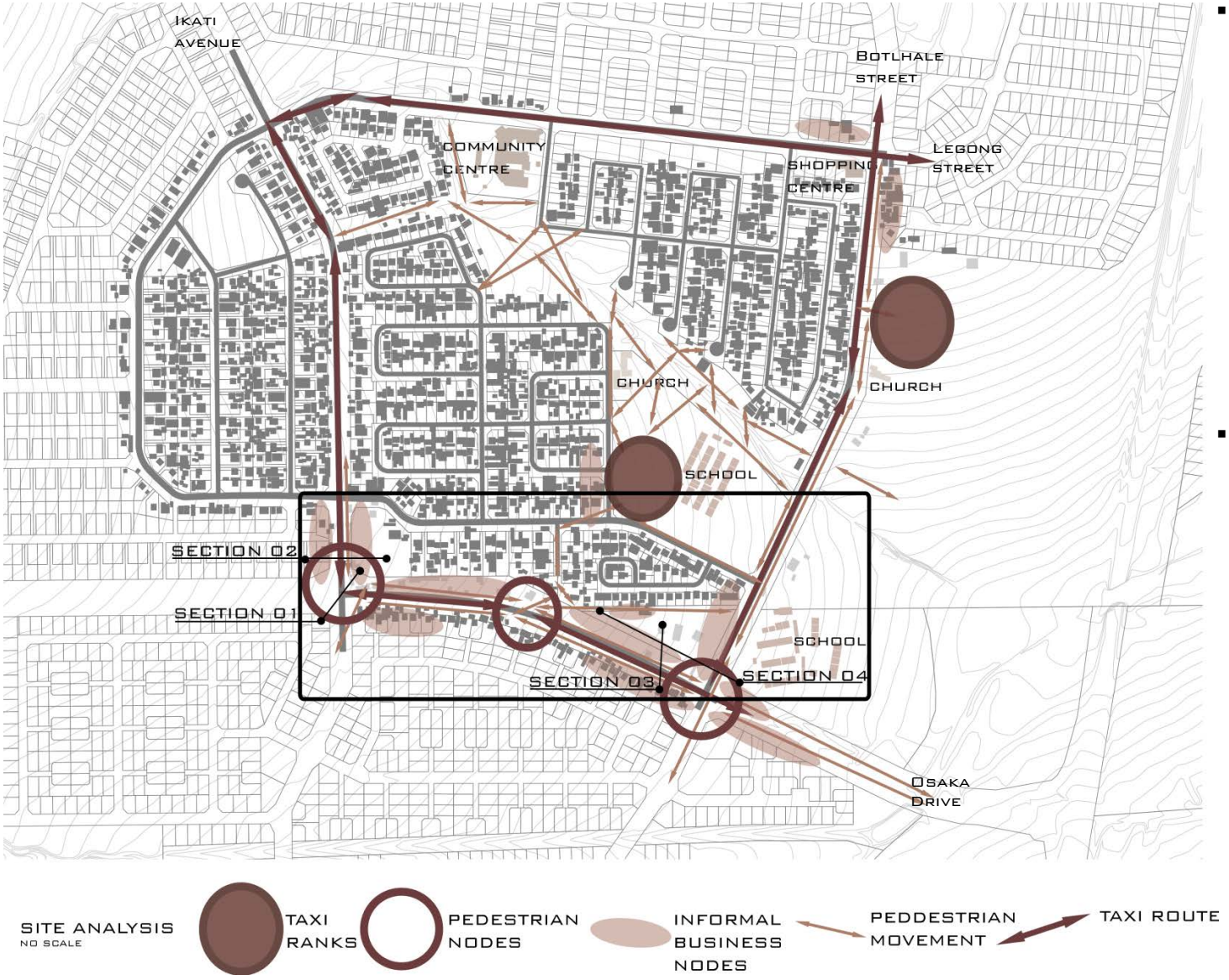


Figure 29 – Pedestrian & vehicular movement, transport & pedestrian nodes and informal trading activities (Author 2014)

- East – west pedestrian movement is concentrated along Osaka Drive with pedestrians moving to primary taxi ranks during peak hours and to the off-peak taxi ranks during off-peak hours.
  Osaka drive also acts as a pick-up and drop-off route during off- peak hours. Thus pedestrian nodes are formed close to the road intersections where passengers are dropped off or await to be picked up (refer to figures 29 and 30).
  Various movement patterns are also apparent across the Riet Spruit to the taxi ranks, schools and existing play equipment distributed along the northern part of the stream corridor open spaces.

- Informal trading is especially located within the road servitude along the existing road and road intersections (refer to figures 29 and 30).

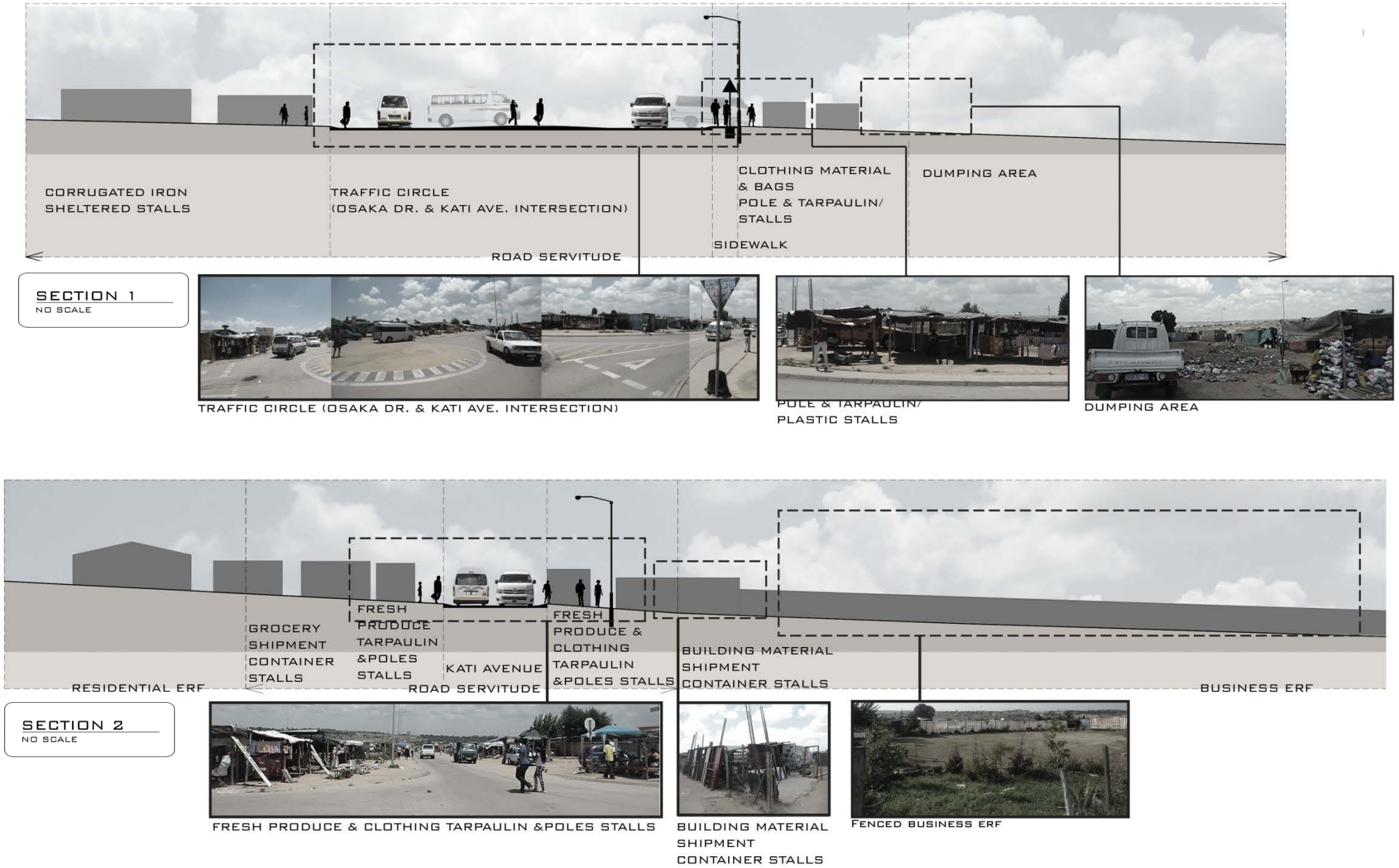
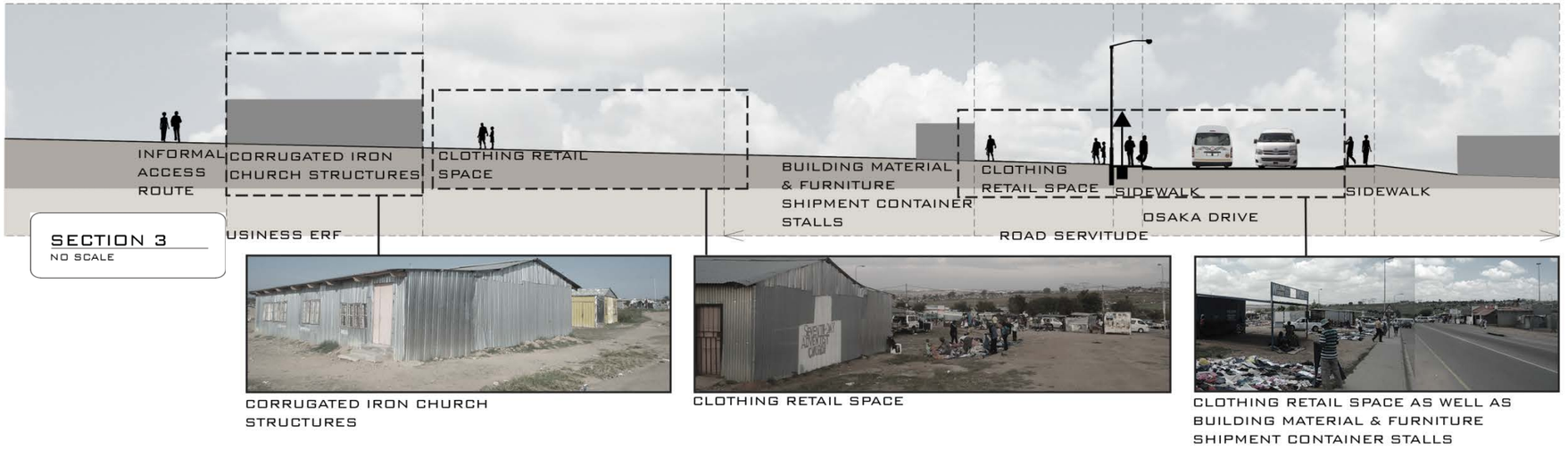


Figure 30–Analysis Section 1& 2 (Author 2014)



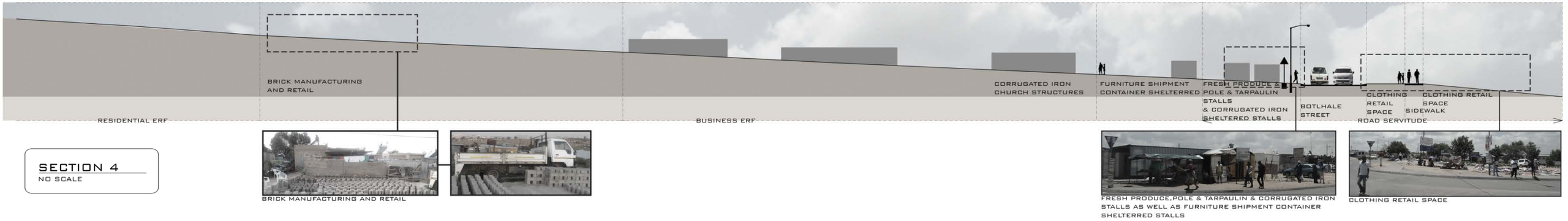


Figure 31 - Analysis sections 3 & 4 (Author 2014)

4. FIELD RESEARCH INTERVIEWS

BUSINESS TYPOLOGY	STRUCTURE	STORAGE	TRANSPORTING OF GOODS	OPERATION TIMES
FRESH PRODUCE	POLE & TARPAULIN/ CORRUGATED IRON	RETAILER'S HOME	LOCALLY VIA TROLLEY/ BARROW	FULL DAY ON WEEKENDS (50-75% LESS BUSINESSES OPERATE DURING WEEKDAYS)
CLOTHING RETAIL	OPEN SPACE ON PLASTIC SHEET	RETAILER'S HOME	TRASPORTED FROM THEMBISA VIA BAKKIES (25 KM)	FULL DAY 7 DAYS A WEEK
CAR SERVICES 1.TYRES 2.CAR WASHING)	POLE & TARPAULIN/ CORRUGATED IRON	1.RETAILERS HOME	OPERATES ADJACENT HOME	FULL DAY 7 DAYS A WEEK
BUILDING MATERIAL 1.WELDING WORKS 2.BRICK MANUFACTURING	1.SHIPPING CONTAINERS 2.OPEN SPACE	1.SHIPPING CONTAINERS 2.RETAILER'S HOME	OPERATES ADJACENT HOME	FULL DAY 7 DAYS A WEEK
FURNITURE RETAIL	SHIPPING CONTAINERS	SHIPPING CONTAINERS	STORAGE IN CONTAINERS	FULL DAY 7 DAYS A WEEK

Figure 32 - Field research summary table (Author 2014)

Informal, Interviews were conducted with some of the retailers/ owners of the different business typologies. The following important clues regarding spatial needs of the community were established during field interviews:

- Site choice

There is common consensus on the suitability of the site because of its busyness, both because it is the main entry and exit point for pedestrians and vehicles for the southern half of Olievenhoutbosch; as well as its proximity to the community's taxi ranks.

- Facilities

The interviewed retailers expressed the need for improved shelter as well as water, ablution and storage facilities.
Although in need of shelter, clothing retailers expressed scepticism With regard to the provision of shelter for their business because of "unnecessary" costs.

- Operation times

The best time of the month, to do business is, according to the interviewed retailers, the last week of the month while the other weeks are relatively slower in comparison.
The best time of the week to do business is the weekend, when the working group is at home.

5. REFERENCES

- NLA, BCKSA, Metro GIS, Urban Design Studio. 2012. *Olievenhoutbosch Local Open Space Framework Implementation Framework*

- City of Tshwane. 2012. *Olievenhoutbosch NDPG Business Plan*

- http://www.erfenis.co.za/
  <Accessed 28 APRIL 2014>

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- Figure 31 - Analysis sections 3 & 4 (Author 2014)
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1. INTRODUCTION

The discussed guidelines in the literature review for quality open space, human scale and socio economic functions are applied here at framework level such that the proposed intervention is connected with the activities/ amenities of the greater community precinct. This is done with reference to the principles of the Urban Development Framework (UDF) by Plan Associates which will also be discussed.

2. QUALITY OPEN SPACE

With regard to the principles of urban renewal, the proposed framework integrates informal markets with taxi ranks, play parks through a system of pedestrian walkways and sidewalks informed as much as possible by existing pedestrian patterns.

Urban ecosystem services applied at framework level include urban agriculture as well as waste water treatment in the water drainage system.

Runoff mitigation and air purification are discussed and applied at design development stage (refer to design development chapter 6).

3. HUMAN SCALE

Space dividing guidelines applied at framework level include the use of trees proposed public spaces as well as accentuation of intersections and sidewalks with street trees along the roads.

4. SOCIO ECONOMIC FUNCTIONS

Play areas form part of the market spaces to act as recreational components for the market and thus the idea of functional mix. This idea is discussed in more detail in the design development stage with regard to other recreational components as well as product specialization within the market (refer to design development chapter 6).

Recycle and reuse strategies as pertains to water and waste are applied between the market spaces and the proposed urban agriculture along the stream corridor.

5. OLIEHOUTBOSCH URBAN DEVELOPMENT FRAMEWORK (UDF) PRINCIPLES

The Plan Associates UDF for Olievenhoutbosch (refer figure 33) centres on the following principles (Plan Associates 2010).

5.1 OPEN SPACE

In terms of open space, the following principles are proposed:

- A regional open space system along the drainage system is proposed. Together with the power-line servitudes, the drainage system must be incorporated into the urban fabric to represent a functional regional open space system.
- The open space system must create the opportunity to elevate urban agriculture in the area.
- The pedestrian movement network must be designed to follow the alignment of the open space system to enhance the utilisation of the open space system and provide a link between commercial nodes and community facilities.

5.2 ACTIVITY NODES

A number of commercial nodes are planned within the area, the important one to be noted being the one directly east of the focus precinct. The node is earmarked to accommodate a shopping centre, taxi rank and residential development.

5.3 INFORMAL TRADE

According to the UDF, informal trading is to be accommodated in the short term where it is currently prevalent. The UDF proposes that in the long term, it must be

consolidated along Legong Street where future economic and social activities are proposed.
The proposed precinct framework on the contrary proposes that the long term consolidation should be along Osaka Drive which is a major entrance route into Olievenhoutbosch. Also market infrastructure currently installed along Legong Street has already proven unsuccessful.

Figure 33 - Urban Development Framework (Plan Associates 2010)

6. PROPOSED FRAMEWORK

Considering the discussed guidelines from the literature review as well as the UDF principles, the following interventions are proposed at the precinct with regard to the framework.
Firstly the stream corridor is discussed and then the informal market and taxi rank with respective diagrams and plan layouts.
This is followed by an overall layout of the framework at the end of the chapter.

6.1 STREAM CORRIDOR

- It is proposed that the stream which is currently channelized along this particular area of the community be naturalized.
  An attenuation dam is proposed at the upper area of the stream for irrigation water extraction. Thus applying the socio economic guidelines of recycle and reuse by using stormwater as a resource.
  Access water flowing through the attenuation dam is treated through a series of wetlands before it continues into the natural stream (refer figure 34).

- As part of creating the opportunity for urban agriculture, Terraced food gardens are proposed. These occur adjacent the community centre which will be responsible for the management (refer figure 34).
- Sport facilities, recreational areas, pedestrian bridges and pathways are proposed to enhance the use of the space as well as link community facilities.

Figure 34 - Proposed interventions along the stream corridor

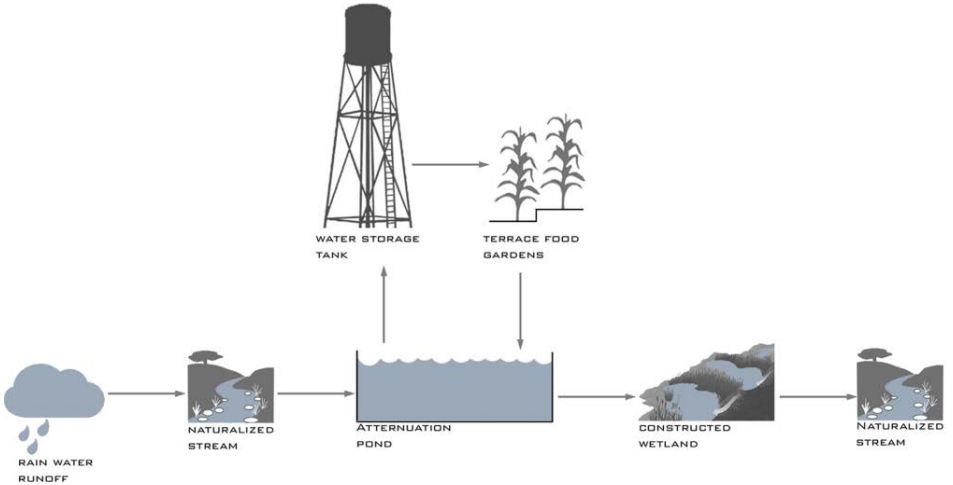

Figure 35 - Waste water treatment and irrigation water extraction along the naturalized stream (Author2014)

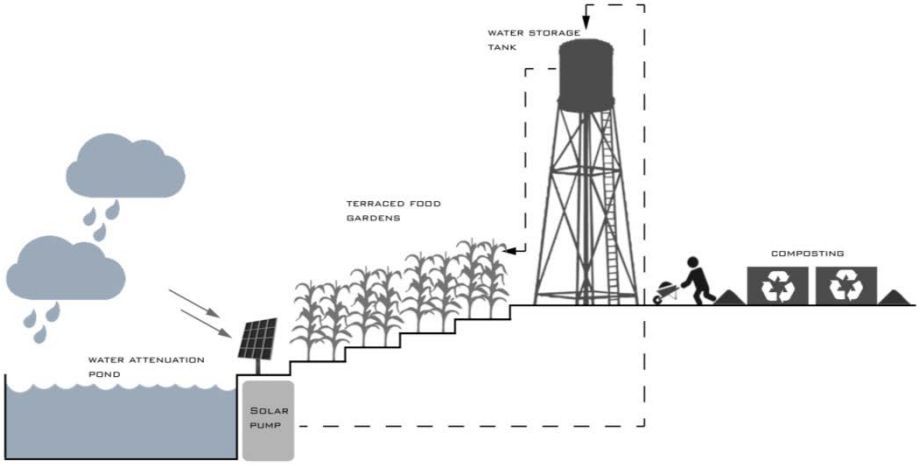

Figure 36 - Terraced food gardens and irrigation strategy (Author 2014)

6.2 INFORMAL MARKET AND TAXI RANK

It is proposed that, in future, the residential edge that acts as a backdrop to the market area be rezoned to high density residential and commercial development to further activate the public open space. This multifunctional and mixed use is in line with the principles of urban renewal.

As the road acts as an off peak taxi pick up zone, taxi stops form part of the market programme.

It is proposed that the informal taxi rank adjacent the school in the heart of the precinct be developed independent of the UDF taxi rank as the two taxi ranks currently serve different areas (i.e. The one serves Pretoria and centurion suburbs while the other serves Johannesburg and Midrand/ Sandton areas).

It is proposed that the taxi rank be developed in a pedestrian friendly manner such that linkage and continuity between community facilities and public open space is maintained.

Water is collected from the roofs of market structures and paved surfaces into storage tanks where it is reused for market cleaning facility, ablutions and irrigation (refer figure 38).
Organic waste from the market provides compost for the food gardens which in turn produces fresh produce for the market (refer figure 39).

Figure 37 - Proposed informal market and taxi rank development (Author 2014)

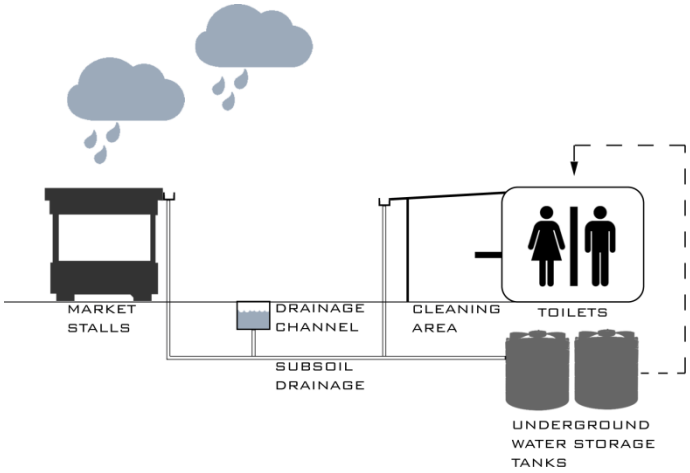

Figure 38 - Water is collected from the roofs of market structures and paved surfaces into storage tanks where it is reused for market cleaning facility, ablutions and irrigation (Author 2014)

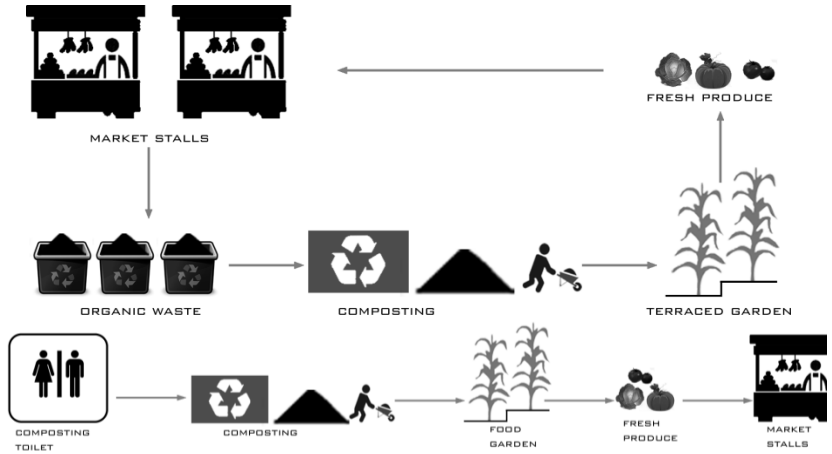

Figure 39 - Organic waste from the market provides compost for the food gardens which in turn produces fresh produce for the market (Author 2014)

The overall program for the proposed framework as informed by the established guidelines for quality open space; human scale and socio economic functions as well as the Olievenhoutbosch UDF includes the following (refer to figure 40):

1. Play areas
2. Market structures
3. Church structure
4. Ablutions
5. Water storage tanks
6. Cleaning and litter facility
7. Taxi stops
8. Arrival wall with community garden
9. Taxi rank
10. Multipurpose sport concrete courts
11. Soccer fields
12. Terraced food gardens
13. Attenuation pond
14. Constructed wetlands
15. Pedestrian bridges

1. PLAY AREA 2. MARKET STRUCTURES 3. CHURCH STRUCTURE 4. ABLUTIONS 5. WATER STORAGE TANK 6. CLEANING & LITTER FACILITY
7. TAXI STOP 8. ARRIVAL WALL WITH COMMUNITY GARDEN 9. TAXI RANK 10. CONCRETE COURT
11. SOCCER FIELD 12. TERRACED FOOD GARDENS 13. ATTENUATION POND 14. CONSTRUCTED WETLAND 15. PEDESTRIAN BRIDGE

Figure 40 - Overall precinct framework (Author 2014)

6.3 REFERENCES

- Plan Associates. 2010. *Olievenhoutbosch Urban Development Framework*

6.4 LIST OF FIGURES

- Figure 33 - Urban Development Framework (Plan Associates 2010)
- Figure 34 - Proposed interventions along the stream corridor
- Figure 35 - Waste water treatment and irrigation water extraction along the naturalized stream (Author2014)
- Figure 36 - Terraced food gardens and irrigation strategy (Author 2014)
- Figure 37 - Proposed informal market and taxi rank development (Author 2014)
- Figure 38 - Water is collected from the roofs of market structures and paved surfaces into storage tanks where it is reused for market cleaning facility, ablutions and irrigation (Author 2014)
- Figure 39 - Organic waste from the market provides compost for the food gardens which in turn produces fresh produce for the market (Author 2014)
- Figure 40 - Overall precinct framework (Author 2014)

1. INTRODUCTION

The first two case studies discussed hereunder are local urban renewal projects while the latter two are international urban markets that also act as multifunctional community spaces. These are evaluated according to the guidelines set out in the preceding literature review.

2. BARA CENTRAL PRECINCT

DESIGNED BY: Newtown Landscape Architects
CLIENT: Johannesburg Property Company

DESCRIPTION

Bara Central Precinct forms an entrance gateway into Soweto Township south of Johannesburg. It is an urban renewal project that includes a public square, socio economic facilities, community park and upgrades along adjacent feeder roads. The project is located at a multi nodal transfer point and facilitates pedestrian inflows, by pedestrian bridge, from the upgraded taxi rank and Bus Rapid Transit (BRT) station.

Surrounding development includes Chris Hani Baragwanath Hospital, the mentioned taxi rank and BRT station.
The intervention makes provision of vending stalls to accommodate the estimated 1200 informal traders that were operating at the site prior to development due to its proximity to the public transport node.

CRITIQUE

Multi-functionality is evident with the integration of public transport amenities.
The proposed public square mainly has hard surfaces meaning an increase in surface runoff and thus a strain on the drainage system. There is lost opportunity with regard to rainwater harvesting for irrigation or alternatively permeable paving would have helped mitigate runoff by allowing rainwater to percolate into the ground.
Spatial definition through the use of trees, furniture, art features, vendor stalls and surface texture and levels is successful and gives a good sense of place and human scale, particularly in the public square and along the feeder roads.
The use of art features and water feature bring in an aesthetic layer and thus contributing to the quality of the created spaces.

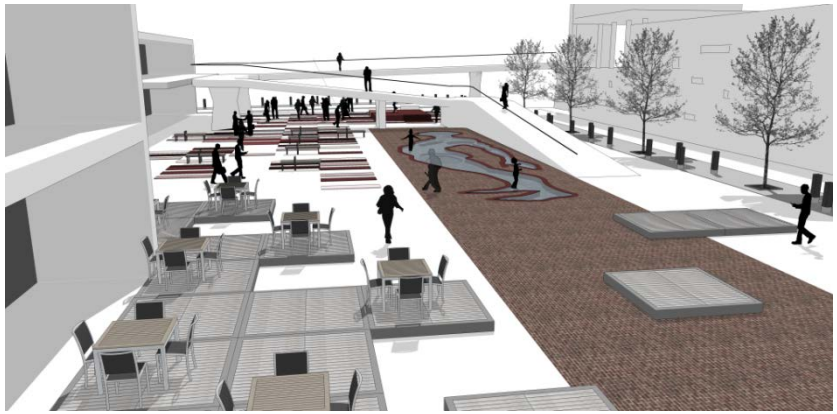

Figure 41–Spatial definition through surface material treatment of Public Square (NLA 2013)

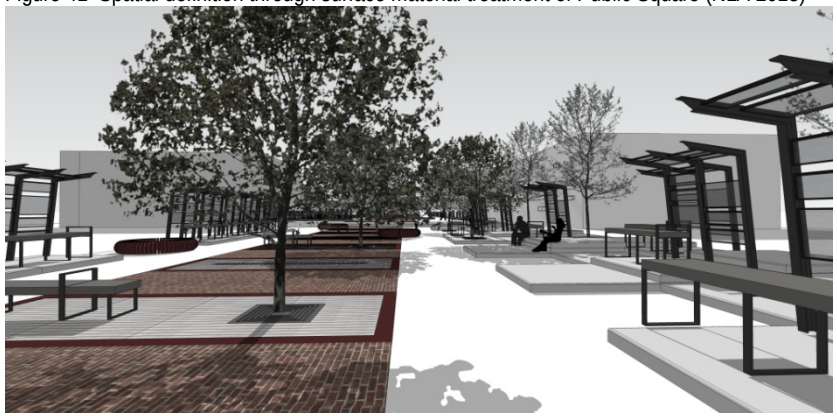

Figure 42 - Spatial definition through vendor stalls, trees, furniture and surface treatment (NLA 2013)

Figure 43 - Spatial definition and human scale is introduced along the feeder roads through trees and art features (NLA 2013)

Figure 44 - View of incorporated community park (NLA 2013)

3. GERMISTON FIRE PRECINCT PARK

DESIGNED BY: Newtown Landscape Architects
CLIENT: Ekurhuleni Metropolitan Municipality

DESCRIPTION
The park is one of the key nodes identified to kick start urban renewal in the southern part of Germiston CBD.

The project includes trading kiosks and multifunctional spaces that cater for a market area to address socio-economic needs of the area while drawing people away from other over-utilized public spaces.

Surrounding development includes a historic fire station building and church, thus the park is envisioned to cater for the needs of the CBD and surrounding church and fire station workers as well as future recreational needs for social housing proposed in the area.

CRITIQUE
A good percentage of soft lawn areas help with runoff mitigation although the opportunity to harvest rainwater for reuse onsite was not taken.

The project also serves as a successful example in the use of space dividing elements to create definition and accentuation, this while making provision for recreational and socio economic needs through trading kiosks and multifunctional market space.
Elements include an iconic water feature and sculptures, feature walls the use of trees, furniture and surface treatment. Landform is also manipulated to further give a sense of enclosure while creating seating pockets.

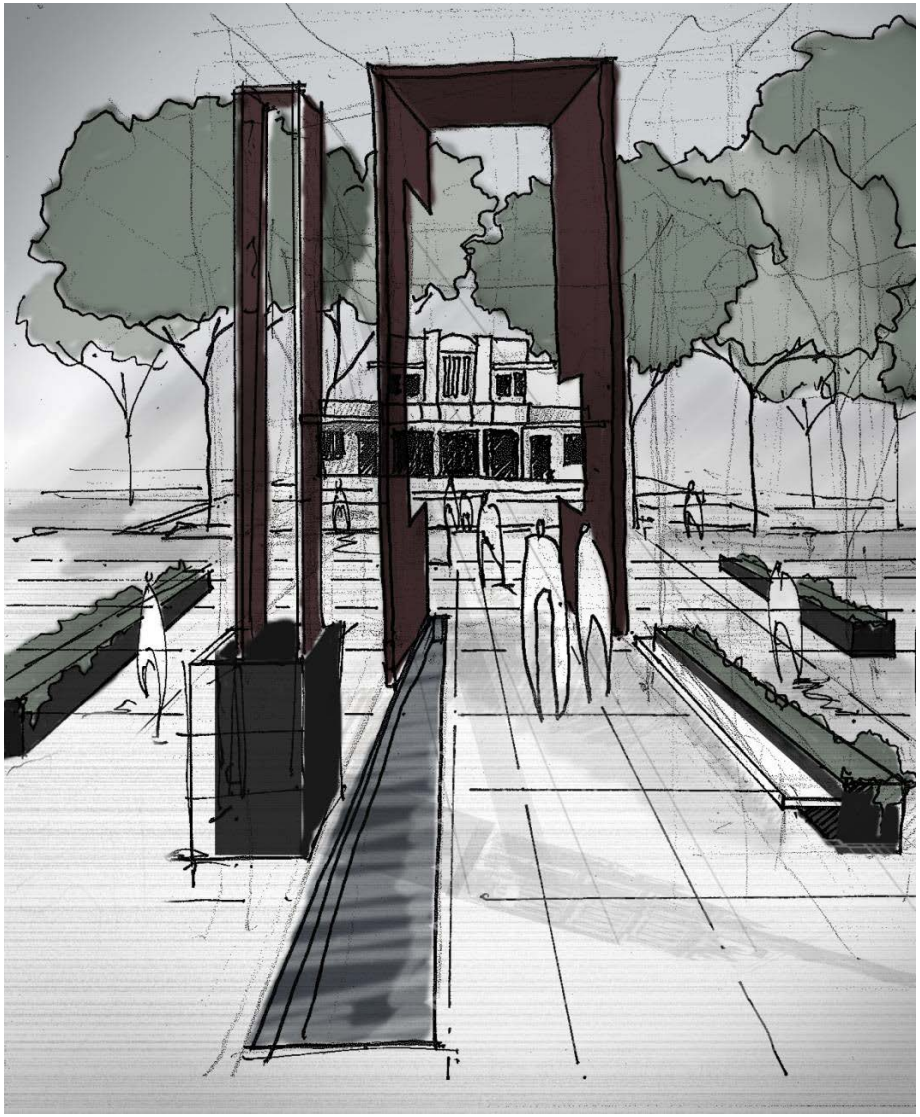

Figure 45 - View of iconic sculpture, trees and furniture as defining elements (NLA 2013)

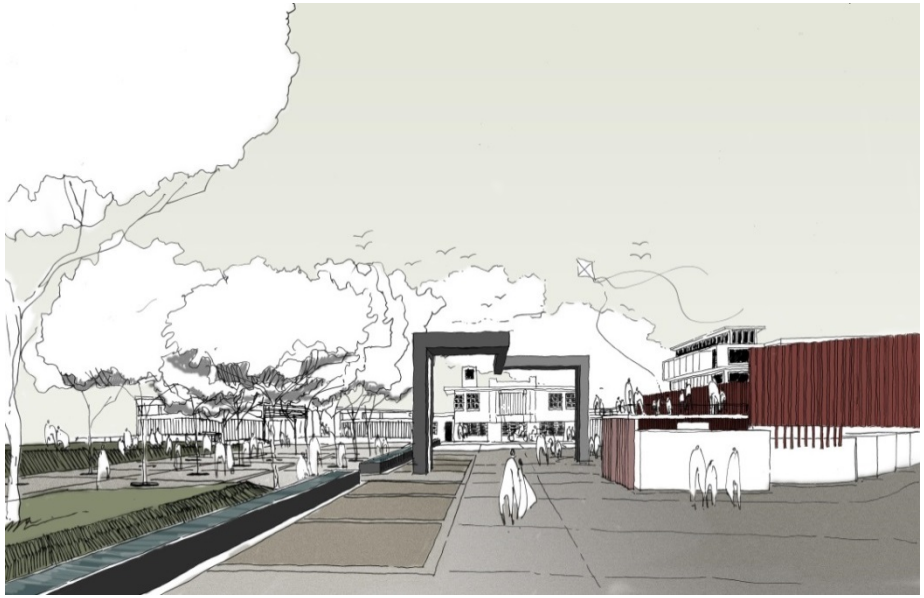

Figure 46 - View of trees, surface treatment with iconic sculpture and water feature (NLA 2013)

Figure 47 - Surface material treatment, feature walls and manipulated landforms contribute to space defining elements (NLA 2013)

4. MELBOURNE POP-UP MARKET

DESIGNED BY: Steven Vidovic and Kristina Taranto
CLIENT: Melbourne People's Flea Market Competition

DESCRIPTION

The project won first place in a People Flea Market Competition with a "green theme" in Melbourne Australia. The brief required that the site that previously served as a car lot, be transformed into a market and multifunctional community space using sustainable material and greenery.

Thus the designers' vision for the project was to create a "recycled garden" that combines recycled material with a living garden. This was interpreted through the incorporation of green roofs, use of trees, vertical gardens, including a vertical vegetable community garden along the site perimeter, and rainwater harvesting. Recycled material as market infrastructure and furniture include shipping containers, barrels/ drums, tyres and wire spools and milk crates.

The design caters for the market, live bands well as open air cinema. Lighting installations make the site usable both day and night.

CRITIQUE

The consideration for urban ecosystem services comes out strongly in the project with respect to water harvesting from green roofs etc. and therefore runoff mitigation as well as food supply through vegetable community gardens.The sense of impermanence and mobility, especially of shipping containers, adds resilience to the design making it adaptable over time with changing community needs. Good sense of human scale is given by the shipping containers as well as trees, furniture and art features in the space.

Figure 48 - Innovative use of shipping containers as space defining and accentuation elements (Habitat 2014)

Figure 49 - Recycled material such as barrels, tyres and wire spools used as furniture (Habitat 2014)

5. NIMA MARKET INCUBATOR OF CHANGE (MIC)

DESIGNED BY: Anna Gabriela Callejas, Racha Daher, Alexander Gonzalez, Nisha Mary Prasad.
CLIENT: Accra Metropolitan Assembly

DESCRIPTION
The aim of the project is to address the lack of amenities in the existing Nima Market in Accra, Ghana. This is achieved while simultaneously redefining the idea of a market as a place where goods are exchanged but also as a place where ideas pertaining to education, information and awareness for change, are exchanged.

The project takes on an incremental strategy starting with the insertion of what the design team termed infrastructural sanitation pockets throughout the market. These pockets each provide sanitation, water, waste collection as well as an information centre. The pockets are followed by a paved service route to service these pockets. The market shelters are then upgraded to be more responsive to the regions climatic conditions.

Subsequent to these are the revitalization of the square and the introduction of new programs including a community owned credit bank, children's day care, training centres, clinic, a technology and computer centre, a "growing green" initiative and a housing development office.

CRITIQUE
What makes the project rather unique is the innovative rainwater harvesting and runoff mitigation strategy. The increased runoff from the introduced hard surfaces is mitigated by channelling it to underground storage tanks. From here it is pumped with manual roundabout pumps to raised storage tanks for reuse. Rainwater is also collected from the market structures.
The raised tank towers become in the process, space defining elements that are used for public art and awareness messages. The project is rather successful in that the existing market needs are first addressed, while new programs become anchors that support the existing socio-economic activities.

Figure 50- View of proposed infrastructure sanitation pockets (Archinect 2011)

6. SYNTHESIS

- The preceding case studies are successful with regard to integrating economic functions with quality open space that caters for everyday social community functions.

- Integrating these functions is crucial to make the spaces versatile and therefore maintaining continuity in terms of usage.

- An important lesson from all these case studies, with the exception of the Melbourne Pop-market, are the need to incorporate socio economic/ informal trading facilities in their original location rather than ignoring and or attempting to relocate them elsewhere. This is important for their success.

- The urban renewal case studies give creative ways of especially dealing with the aspect of human scale, ranging from art and water features, vegetation, landform and furniture.

  What can also be learned from these case studies is the importance of identifying and facilitating linkage to surrounding land uses and or community amenities. This is crucial for ensuring continual activity in the spaces and the success of the socio economic functions.

  However, apparent in both the case studies are lost opportunities with regard to urban ecosystem services with the exception of the benefit of trees and lawn areas.

- The urban market examples on the other hand, model creative strategies with regard to urban ecosystem services, particularly runoff mitigation and rainwater harvesting as well as food supply.

7. REFERENCES

- Archinect. 2011. Market Incubator of Change ll Nima Market. Accra, Ghana
  Available online at:
  http://archinect.com/people/project/13381948/market-incubator-of-change-ll-nima-market-accra-ghana/14187629
  Accessed 5 May 2014

- Habitat. 2014. *Melbourne pop-up market*
  Available online at:
  http://architectureau.com/articles/melbourne-pop-up-market/
  Accessed 2 May 2014

- NLA. 2013. *Bara Central Precinct*
  Available online at:
  http://www.newla.co.za/LandscapeDesign/UrbanParks/BaraCentralPrecinct/tabid/214/Default.aspx
  Accessed 8 September 2014

- NLA. 2014. *GEAR 2030: Germiston Fire Station Precinct Upgrade. NLA. Johannesburg*

8. LIST OF FIGURES

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- Figure 42 - Spatial definition through vendor stalls, trees, furniture and surface treatment (NLA 2013)
- Figure 43 - Spatial definition and human scale is introduced along the feeder roads through trees and art features (NLA 2013)
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- Figure 47 - Surface material treatment, feature walls and manipulated landforms contribute to space defining elements (NLA 2013)
- Figure 48 - Innovative use of shipping containers as space defining and accentuation elements (Habitat 2014)
- Figure 49 - Recycled material such as barrels, tyres and wire spools used as furniture (Habitat 2014)
- Figure 50- View of proposed infrastructure sanitation pockets (Archinect 2011)

1. INTRODUCTION

To test the hypothesis of an informal market as a catalyst for quality open space, the proposed masterplan was divided into two aspects, firstly the informal market development aspect and secondly the spatial and experiential development aspect.

The informal market development aspect deals with the more rational factors of the market and is informed by the socio economic guidelines outlined in the literature review, urban market case studies as well as the findings from existing informal trading activities onsite.
The spatial and experiential aspect deals with the factors of place making and is informed by the quality open space and human scale guidelines, urban renewal case studies as well as the existing spatial uses.

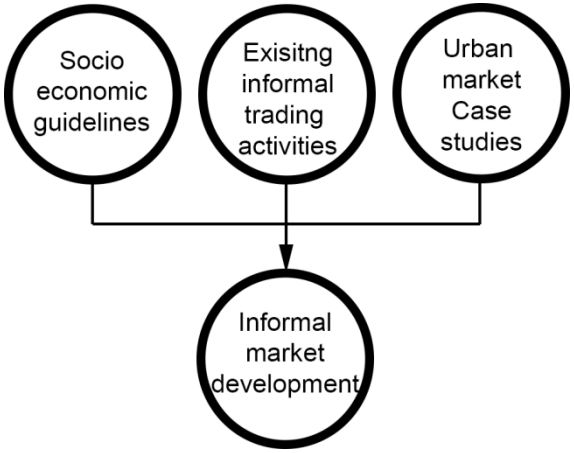


Figure 51 - Informal market development informants (Author 2014)

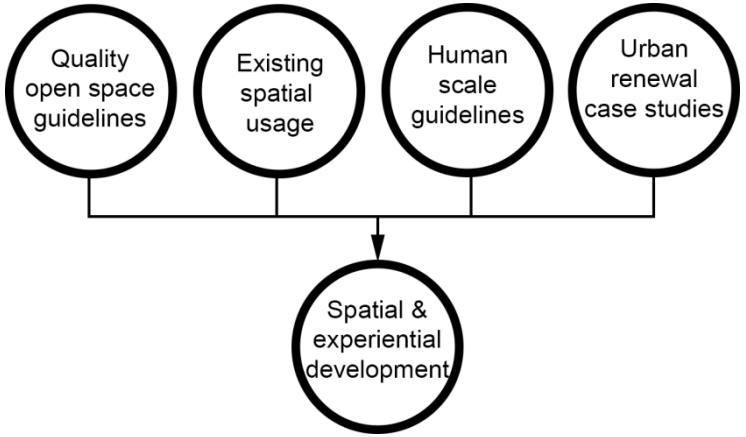


Figure 52 - Spatial & experiential development informants (Author 2014)

The two aspects are tied together by an overarching concept which seeks to give expression to the unique character of the surrounding community and thus making the proposed intervention unique to its context. The overarching concept is discussed first.

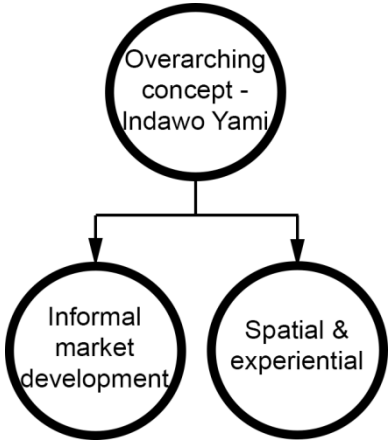


Figure 53 - Overarching concept ties the two design development aspects together (Author 2014)

Figure 54 - Depiction of literal idea of the overarching concept (Author 2014)

2. CONCEPT – INDAWO YAMI

The concept is birthed out of the vision of a market as a multifunctional community space that caters for the various needs of the community while reflecting its unique character. The phrase “indawo yami” derives from the Zulu language, meaning “my place” and it carries both a literal and abstract idea.

2.1 LITERAL IDEA

The literal idea (refer to figure 54) of the phrase is conveyed in the translation and expresses a sense of familiarity and pride about one’s environment. An informal market space is, in itself, characteristic of the community, thus the proposed material and or structures for the market seek to maintain the existing character of the informal markets.
The concept is further expressed spatially by incorporating a shisa nyama (township version of a restaurant), taxi/ car wash, open braai spaces and play area which are also characteristic of Olievenhoutbosch Township.

Adrianfrith’s 2011 census for Olievenhoutbosch Township indicates that all the official languages or ethnic groups of South Africa are present in the population of Olievenhoutbosch Township. This includes the Nguni languages (i.e. Zulu, Swazi, Ndebele, Xhosa) the Sotho languages (i.e. Setswana, Sepedi, Sesotho), Tsonga, Venda, Afrikaans and English.
Proposed feature elements and medicinal plants associated with the various ethnic groups are incorporated to reinforce this familiarity and pride.

2.2 THE ABSTRACT IDEA

The abstract idea (refer to figure 55) refers to the concept of a place of opportunity. This is associated with the economic aspect of the intervention and thus the idea of empowerment and enabling the community towards self-empowerment.

Figure 55 - Depiction of abstract idea of the overarching concept (Author 2014)

2.3 INFORMAL MARKET DEVELOPMENT

2.4 FUNCTIONAL MIX

With regard to the idea of functional mix, the program of the market is divided into product/ internal specialization and a recreation component.
In accordance with Dewar and Watson's (1990) research on the physical layout of urban markets, product/internal specialization is subdivided further into interceptor/ minor stalls as well as major stalls.

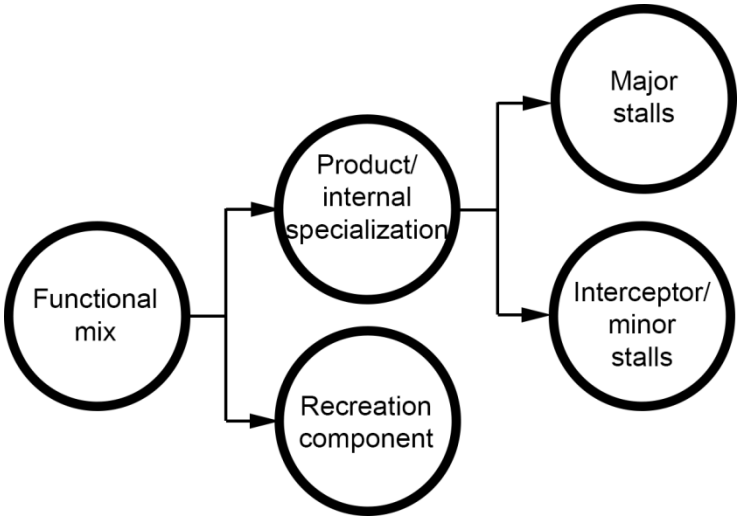


Figure 56 - Division of the program of the market (Author 2014)

The interceptor/ minor stalls refers to retailers of small everyday goods that typically depend on and locate themselves directly along pedestrian and vehicular traffic routes, with regard to the findings onsite, these include clothing retailers; fresh produce retailers; car spares and car wash.
Major stalls on the other hand refer to goods of a bigger scale. These typically have drawing power and do not necessarily depend on location directly along pedestrian and vehicular traffic; they include brick manufacturing, welding and building material retailers, and furniture retailers.

The rational organisation of the masterplan (refer to figure 57) is informed by this in that the interceptor/ minor stalls are located along the edges of the site where pedestrian/ vehicular traffic is concentrated while the major stalls and recreation components are located in the centre with infrastructure (discussed below) located along the back.

2.5 INFRASTRUCTURE

In addition to the infrastructure indicated in the literature review (i.e. shelter, waste collection, water and sanitation), welding workshops as well as a church structure that can also be used as sewing facilities for women, are proposed.
This idea of redefining the market as a place where goods are exchanged but also where ideas and skills are exchanged is adapted from the Nima (MIC) case study.

Shipping containers are proposed as shelter structures for the market stalls, church structure, welding workshops, ablutions etc. (refer to figure 58).
This is informed by the Melbourne pop-market case study's idea of recycled material as market infrastructure.

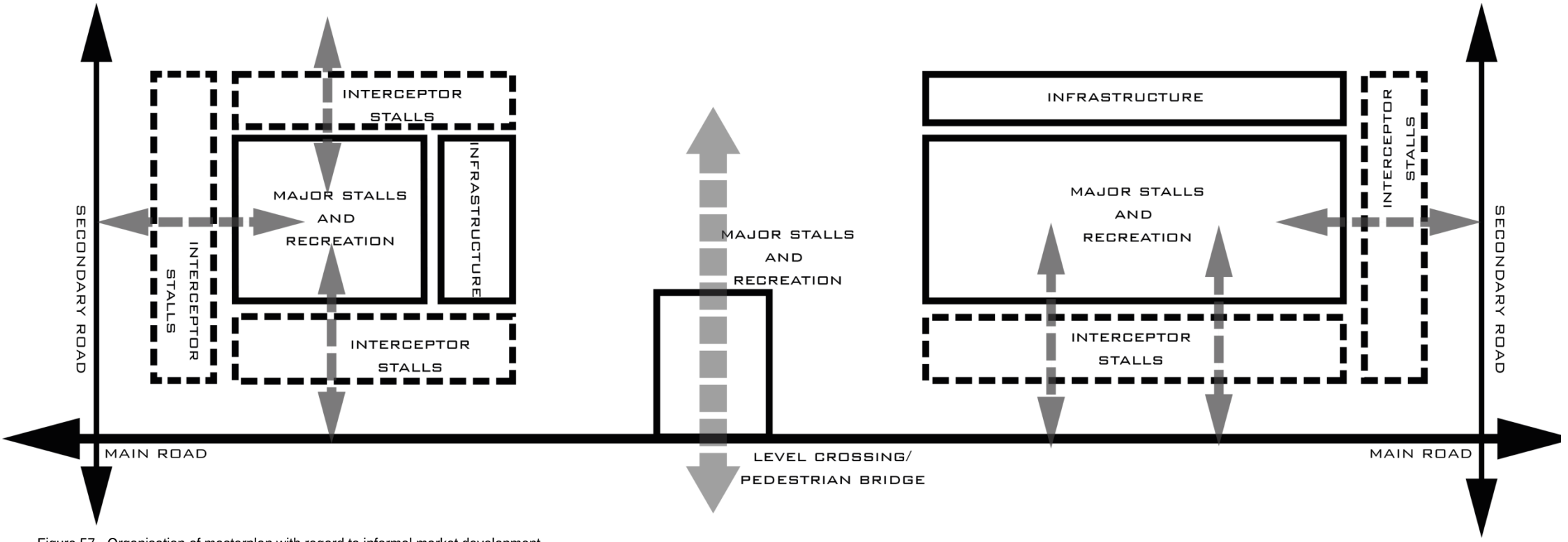


Figure 57 - Organisation of masterplan with regard to informal market development.
The placement of major versus interceptor stalls with regards to roads and infrastructure is critical. (Author 2014)

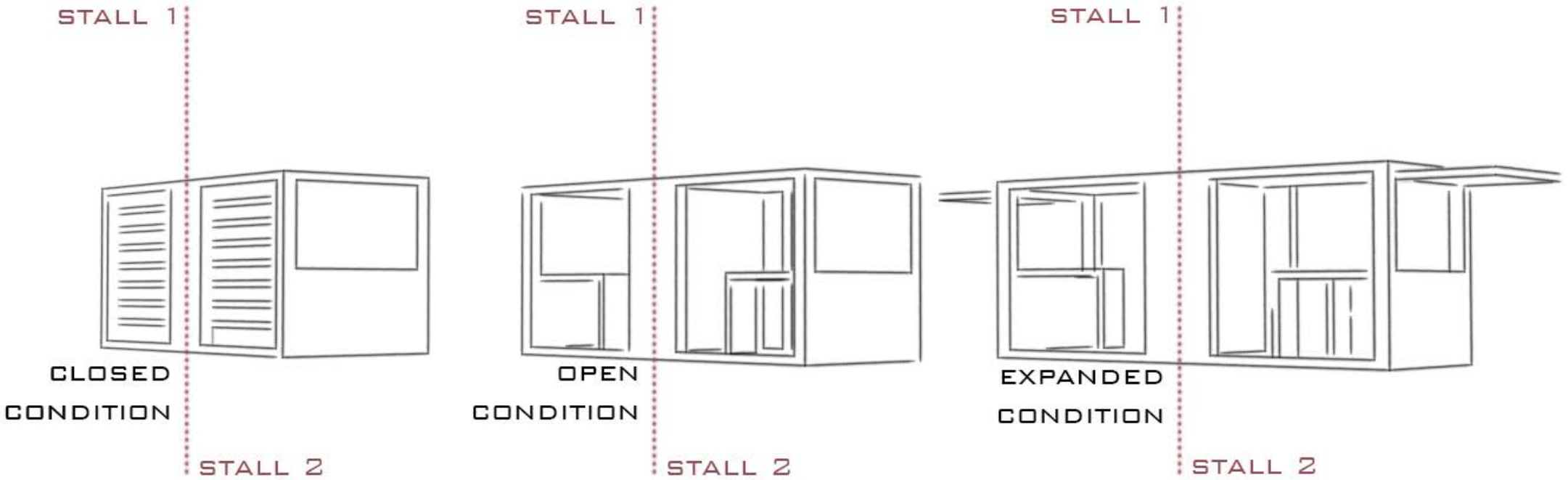


Figure 58 - Shipping containers as shelter structures.
The closed, open and expanded conditions of the containers enable adaptive use and spatial definition (Author 2014)

2.6 RECYCLE AND REUSE

In using waste as a resource barrels/ galvanized drums are proposed for waste collection points. Waste is collected from litter bins around the site and sorted at these collection points. These are located adjacent service roads for easy management and collection. From here the litter is sent to the recycling centre that forms part of the Olievenhoutbosch UDF, while the organic waste goes to the existing community centre where it is composted for urban agriculture (refer to theory chapter 2 and framework chapter 4).

With regard to rainwater harvesting and reuse, the site is divided into through catchment areas, each with storage tanks where runoff is collected, stored and reused for irrigation on site (refer to figure 59).

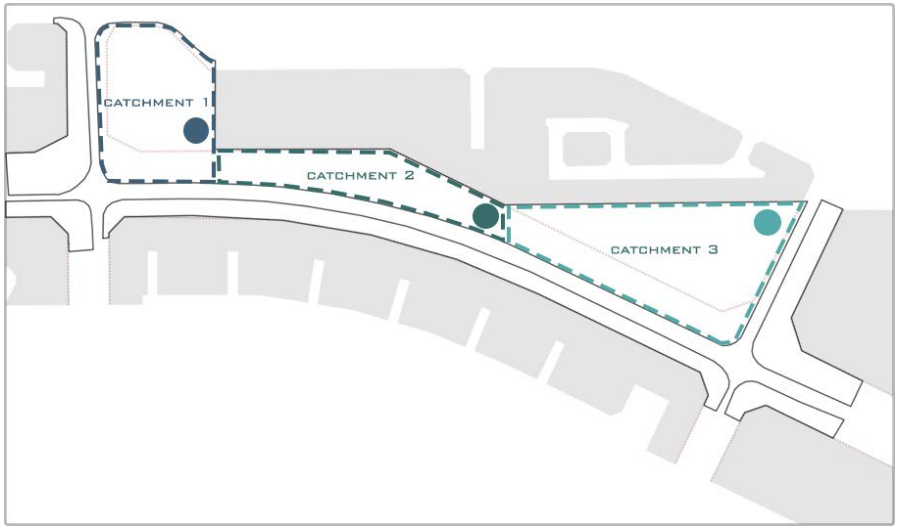


Figure 59 - Water catchment areas (Author 2014)

2.7 SPATIAL AND EXPERIENTIAL DEVELOPMENT

2.8 QUALITY OPEN SPACE

The principles of urban renewal are applied at framework (refer chapter 4) as well as masterplan level, by integrating the informal market with a taxi rank as well as taxi/bus stops; pedestrian walkways connecting to the greater framework and community/ play parks.

With regard to urban ecosystem services, runoff is attenuated by incorporating soft lawn/ planting as well as grass block surfaces. Waste treatment is applied at framework level (refer chapter 4) by introducing artificial wetlands in the existing drainage/ river corridor, urban agriculture is also applied along the stream corridor open spaces.

2.9 HUMAN SCALE

Space dividing elements as outlined in the human scale guidelines are applied in the masterplan development to alleviate the negative impact of overscaled space. This is coupled with the innovative application of these elements in the case studies.
Ground level change is applied by sub-dividing the vast site into terraces upon which the informal market and recreational community functions play out (refer to figure 60).

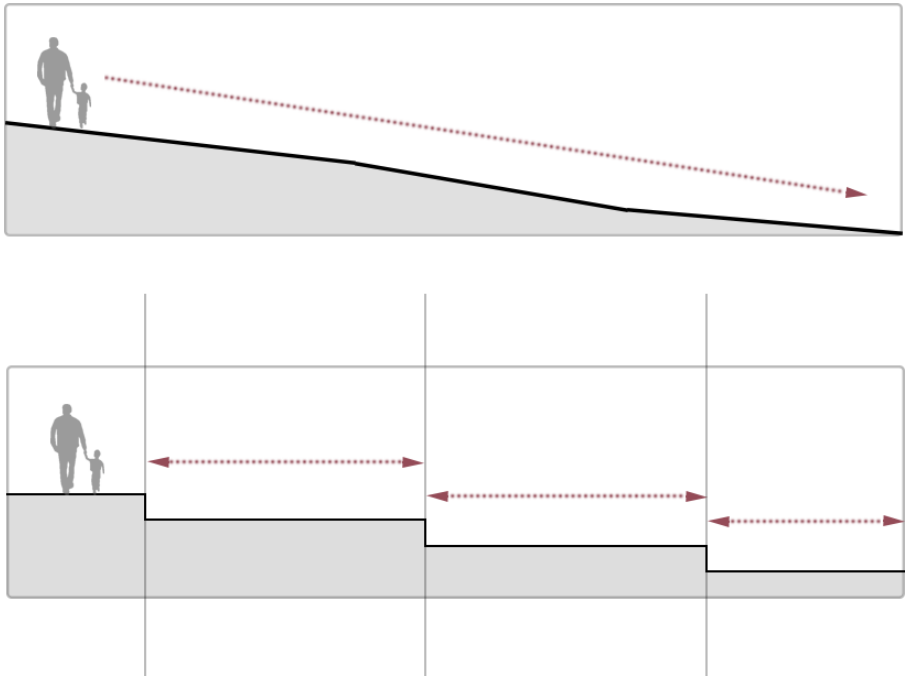


Figure 60 - Subdivision of open space into intimate terraces (Author 2014)

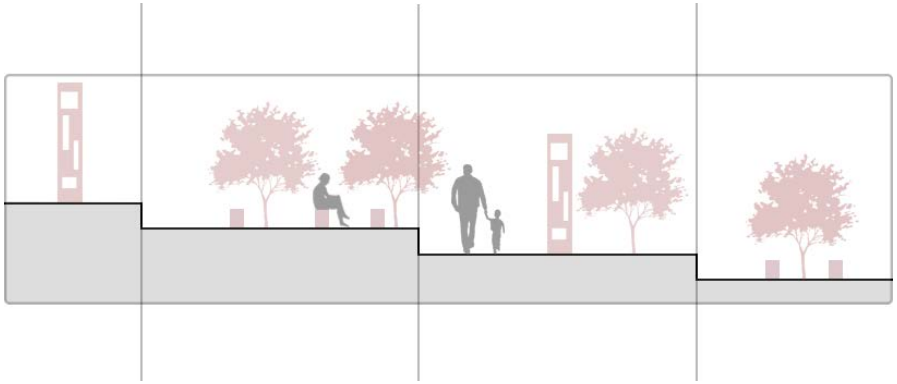
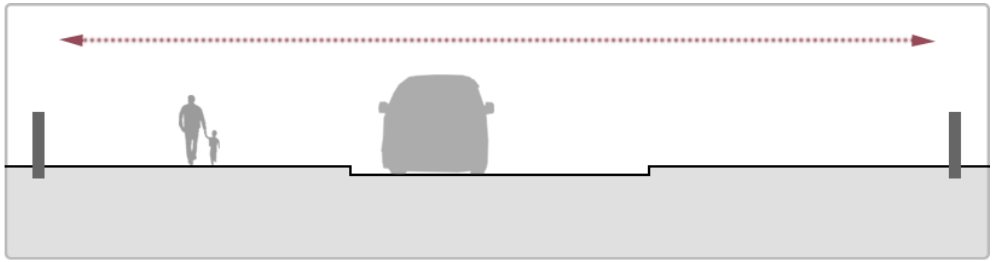


Figure 61 - Trees, street furniture and feature elements used to modify spaces (Author 2014)



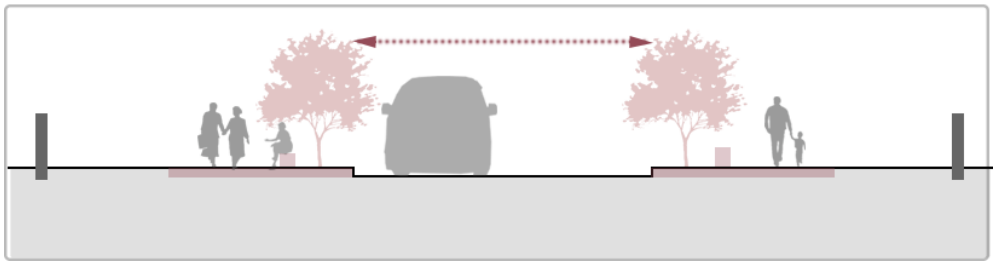


Figure 62 - Sidewalks, trees and street furniture define spaces along wide roads (Author 2014)

In addition to ground levels; trees, street furniture and feature elements as discussed under the concept are used to further modify spaces, making them more comfortable and intimate for the user (refer to figure 61).
To define space and make the wide roads more conducive for social interaction, sidewalks are proposed with trees, street furniture (refer to figure 62).
In addition, feature elements are used to accentuate the intersections (refer to figure 63).

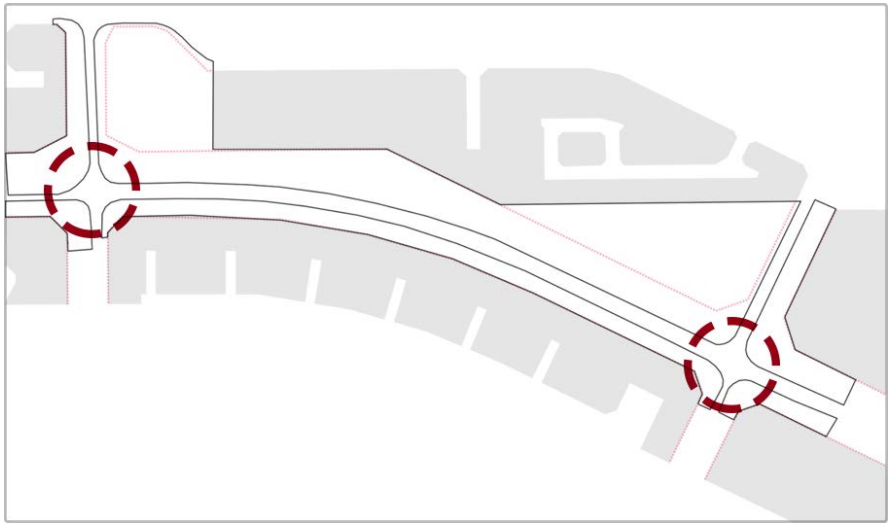


Figure 63 - Feature elements are used to accentuate road intersections (Author 2014)

3. DEVELOPING THE MASTERPLAN

The two underlying aspects and overarching concept layers discussed above are further combined with site implications that had to be taken into consideration in the proposed masterplan:

The site implications include:

- Pedestrian movement and vehicular access
- Phasing and edges

Thus all these considerations together, help to inform the masterplan program.

3.1 PEDESTRIAN MOVEMENT AND VEHICULAR ACCESS

The proposed east -west and north-south movement (refer to figure 64) responds to existing movement patterns connecting pedestrians to the taxi ranks, and school (refer to site analysis chapter 3). This is crucial to maintain critical mass through the informal market.

A proposed service road allows periodic vehicular access for litter collection; infrastructure maintenance; as well as brick manufacturing deliveries and collection. Road intersections and junctions are preferred drop on/ off points for passengers, thus taxi/ bus stops are proposed adjacent these. Where applicable, these are located at the acceptable distance of 30 metres from the intersections so as to not interfere with visibility.

3.2 PHASING AND EDGES

As a good portion of the site falls within a reserve for a future road (refer to figure 66-67), part of the masterplan proposal is to phase development such that the spaces falling within the road reserve are developed temporarily until the road is implemented. As discussed earlier, if left open, such residual spaces have a negative impact on the quality of open space. All permanent infrastructure is located outside the reserve in space/ erven that is already zone for informal trading. To define the edges of the site, boundary walls are proposed along the surrounding erven. The walls will be short in height to maintain openness and encourage social interaction and surveillance on the site.

3.3 PROGRAM

- Major stalls including:
  - Brick manufacturing area
  - Furniture retailers
  - Building materials
- Interceptor/ Minor stalls including:
  - Clothing retailers
  - Fresh produce retailers
  - Car wash & spares area

- Ablutions & cleaning facility
- Water storage tanks
- Litter collection points
- Welding workshops
- Church structure
- Bus/ taxi stops
- Play area
- Amphitheatre
- Braai areas
- Shisa nyama

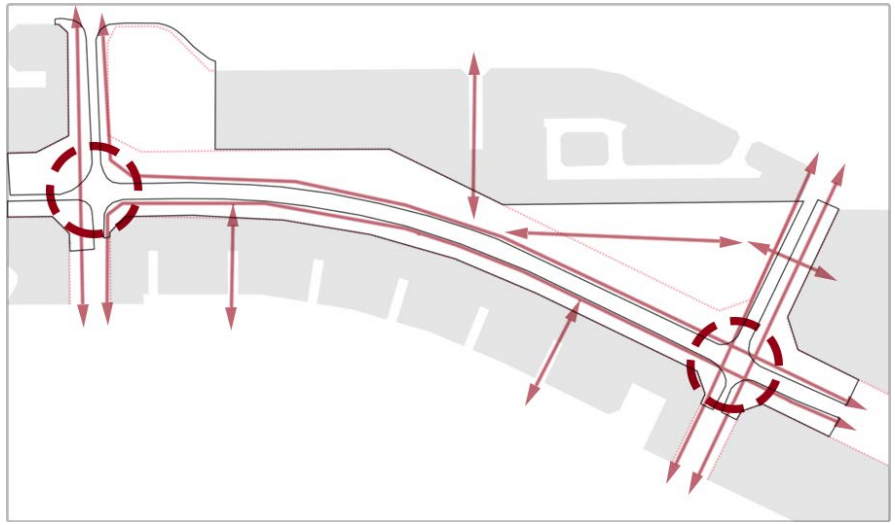


Figure 64 - Proposed movement patterns & accentuated intersections (Author 2014)

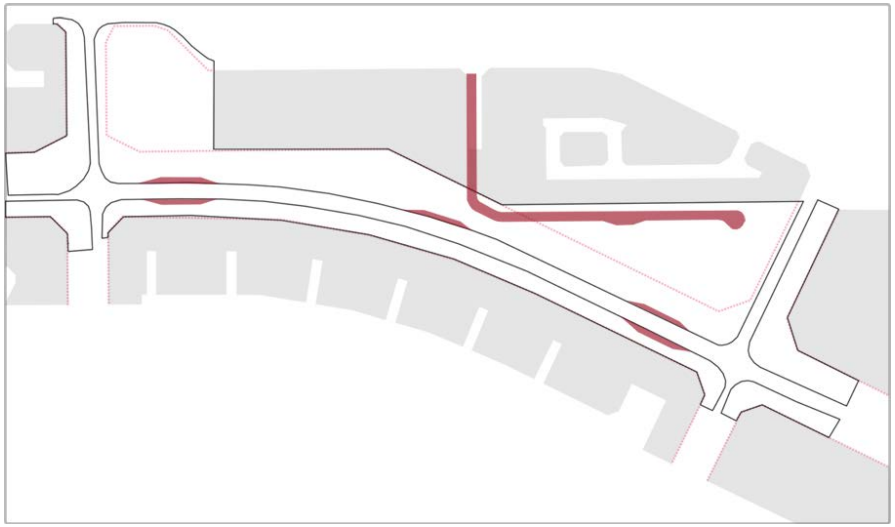


Figure 65 - Proposed service road and taxi/bus stops (Author 2014)

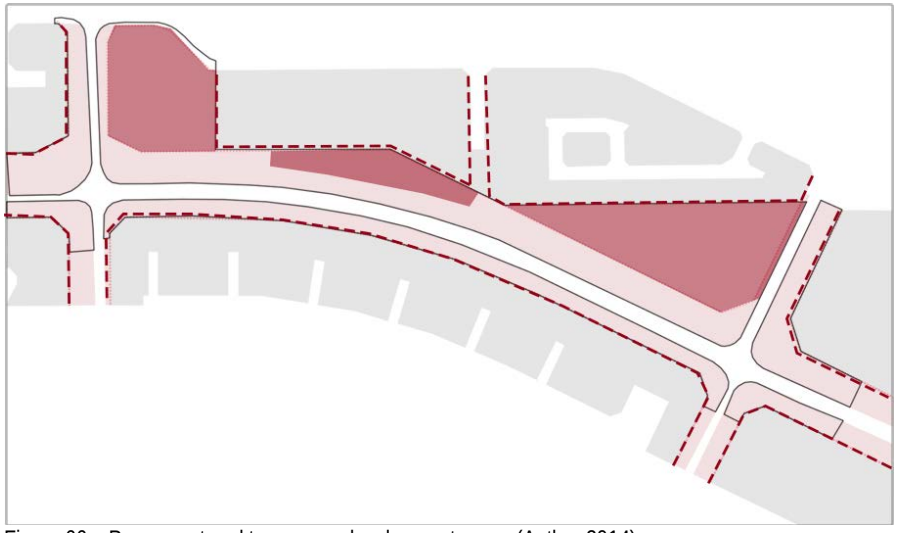


Figure 66 – Permanent and temporary development areas (Author 2014)

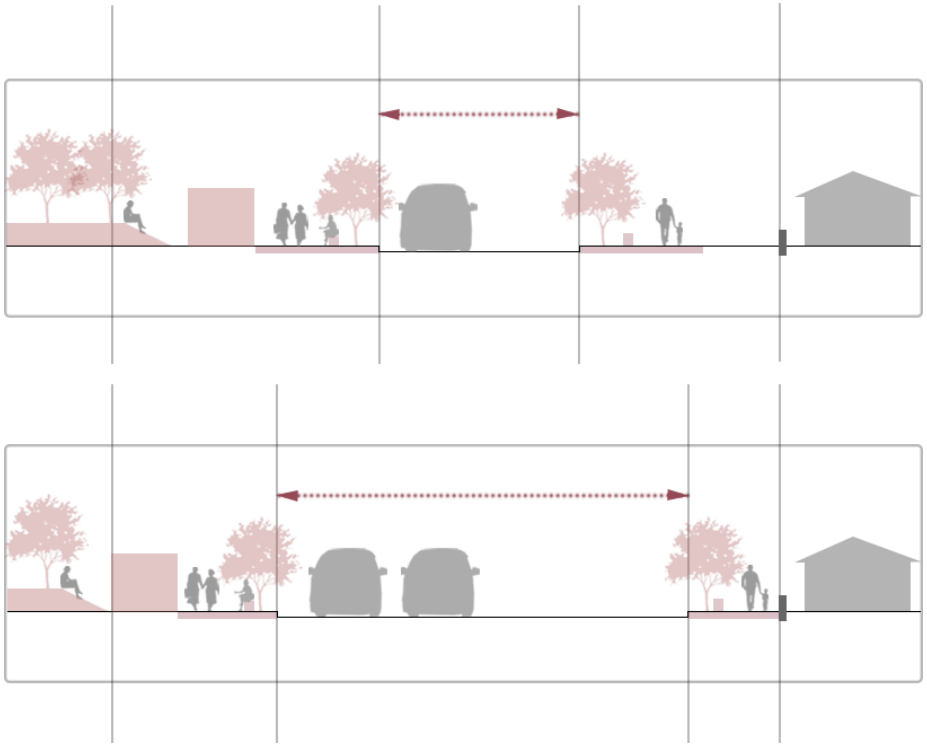
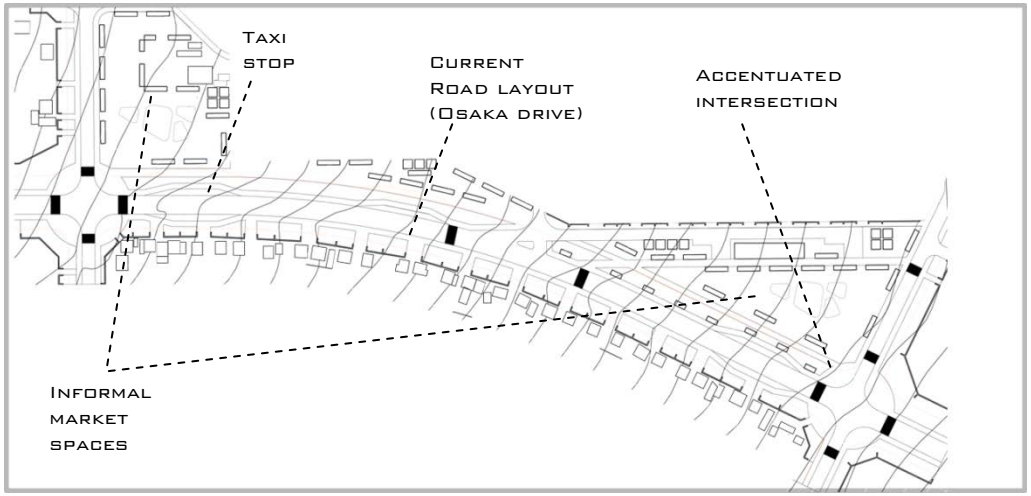


Figure 67 - Phased development along road servitude for current and future spatial scenario (Author 2014)



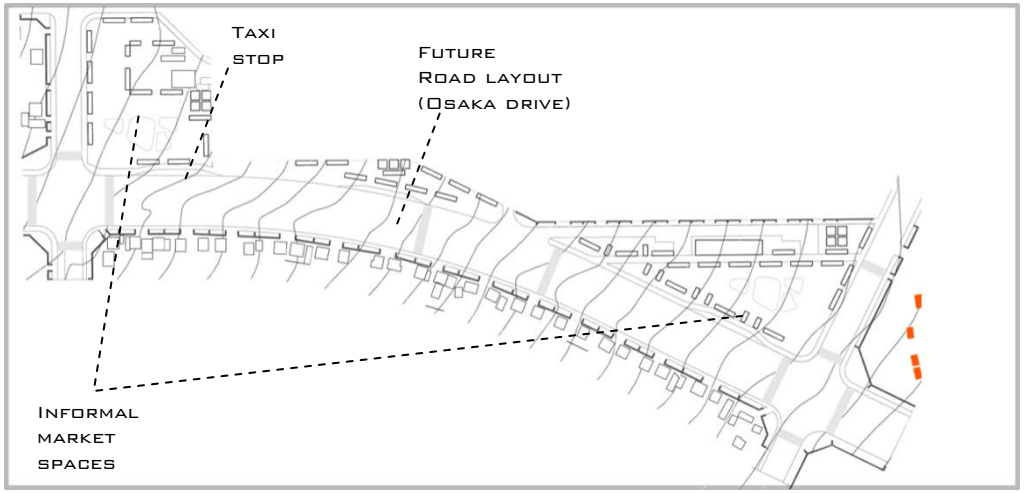


Figure 68 - Initial diagrams of the masterplan mainly informed by the rational informal market development organisation and site implications (Author 2014)

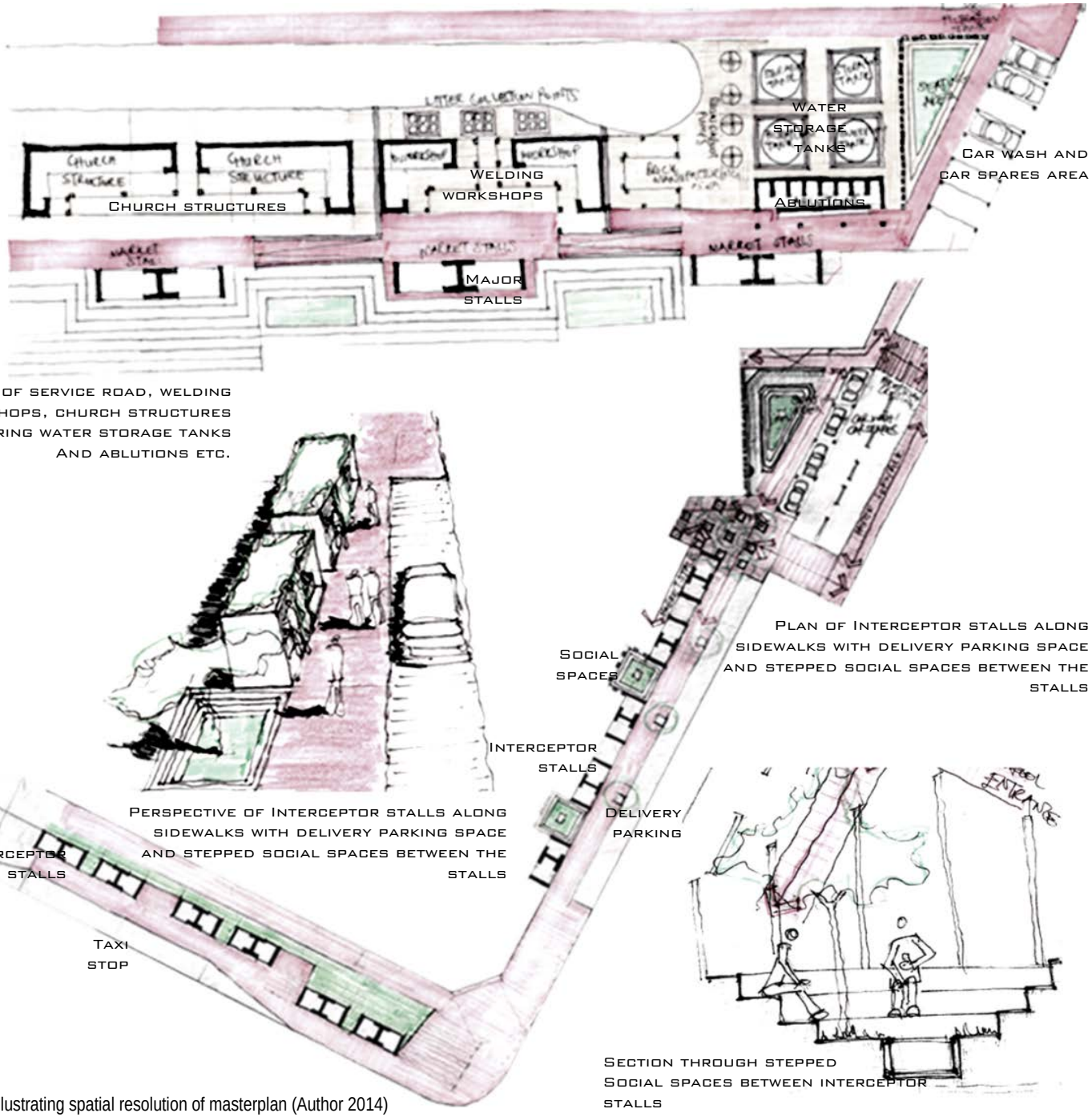


Figure 69 - Diagram illustrating spatial resolution of masterplan (Author 2014)

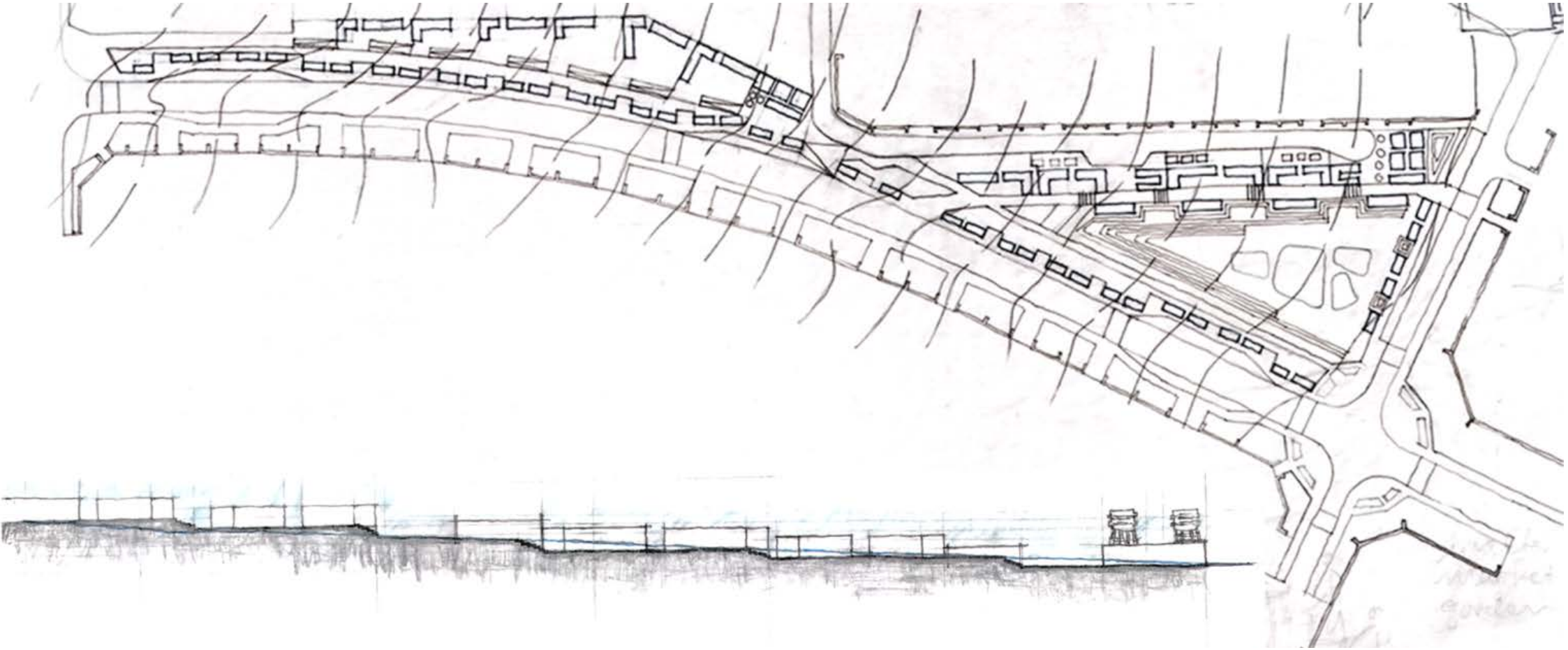


Figure 70 - Masterplan development diagram with consideration for spatial/ experiential development aspect (Author 2014)

Figure 71 –Preliminary masterplan (Author 2014)

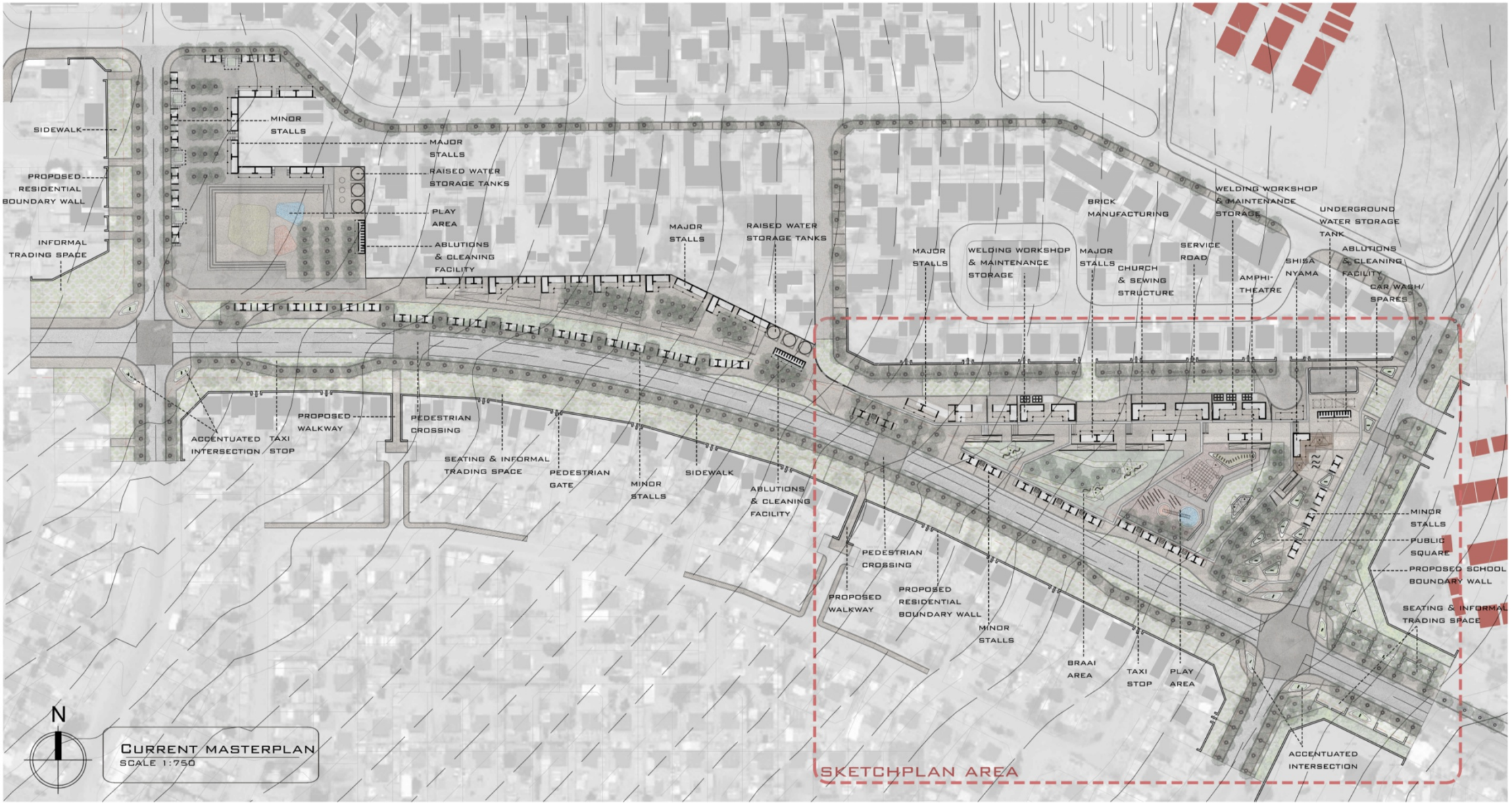


Figure 72 - Final masterplan showing current road scenario (Author 2014)

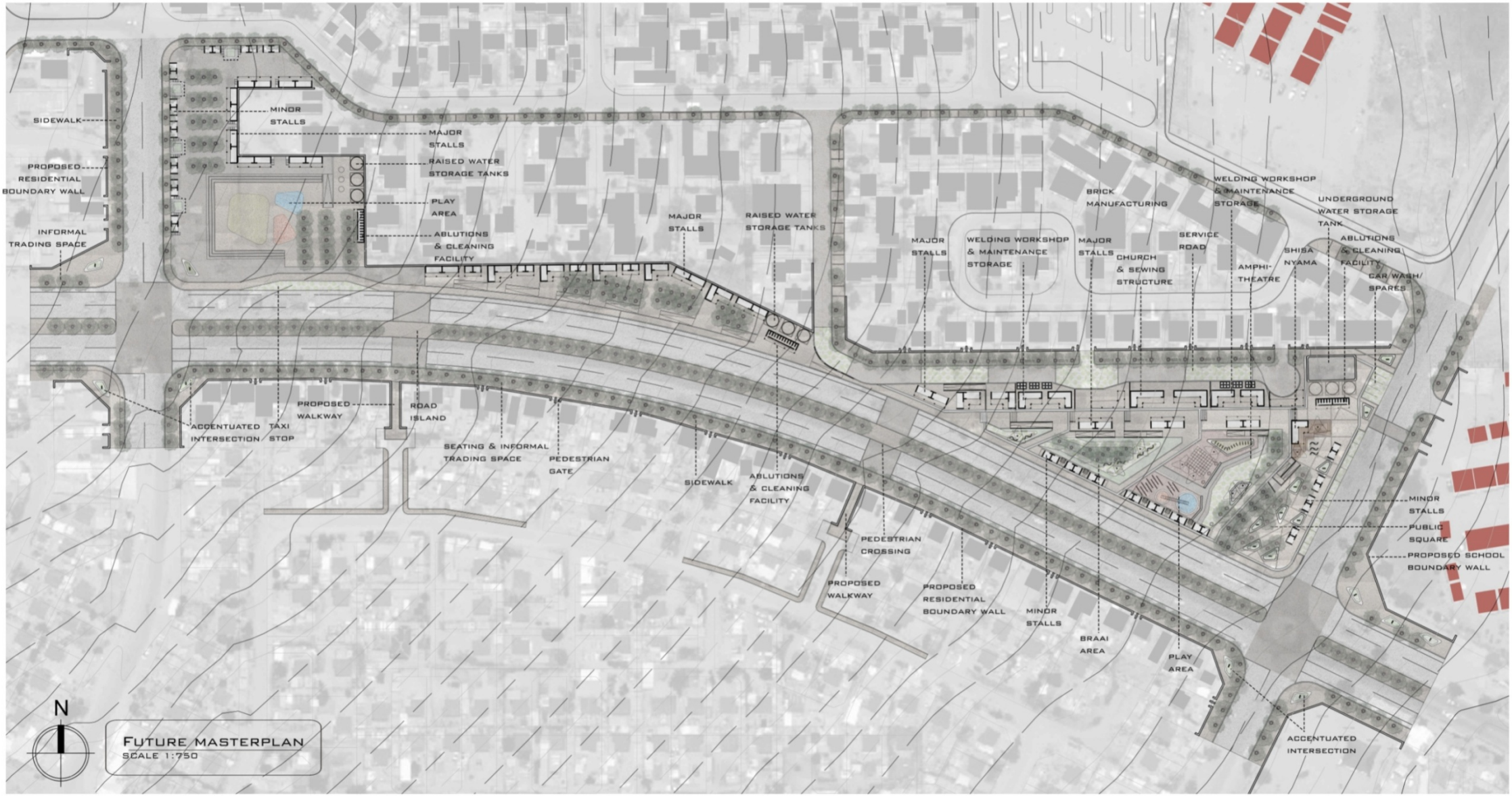


Figure 73 - Final masterplan showing future road scenario (Author 2014)

4. DEVELOPING THE SKETCHPLAN

With regard to space the various activities proposed in the program are explored over a number of terraces (refer to figure 74).
The informal market infrastructure for the most part however remains intact. The idea with the terraces is also to enable cross movement and access for pedestrians at various points of the site to encourage social interaction and maintain critical mass. Although the primary movement patterns, as discussed above, also remain intact. The proposed terraces can be divided into public square, active recreation space and passive recreation space.

The public square facilitates the shisa nyama, car wash and some intercepting/ minor stalls. The cultural feature elements blend into the square from the arrival intersection where they are constructed in raised planters which also act as seating. An amphitheatre for events and a play area make up the active recreation space while the open braai spaces make up the passive recreation space. The braai areas are located on top of grassed mounds which become look out points over the site.

With regard to material, shipping containers and steel shade structures and feature elements are used to reflect and celebrate the character of existing structures and skills on site.

In terms of paving surfaces (refer to figure 75), each of the proposed terraces seeks to maintain a balance in terms of soft and hard surface such that runoff mitigation is maintained.

Raised planters break the hardness of the public square, and grass blocks help achieve this on the active recreation space and along the front spaces of the surrounding erven. Exposed aggregate concrete is the dominant paving material and it is reminiscent of the existing rough surfaces of the site.

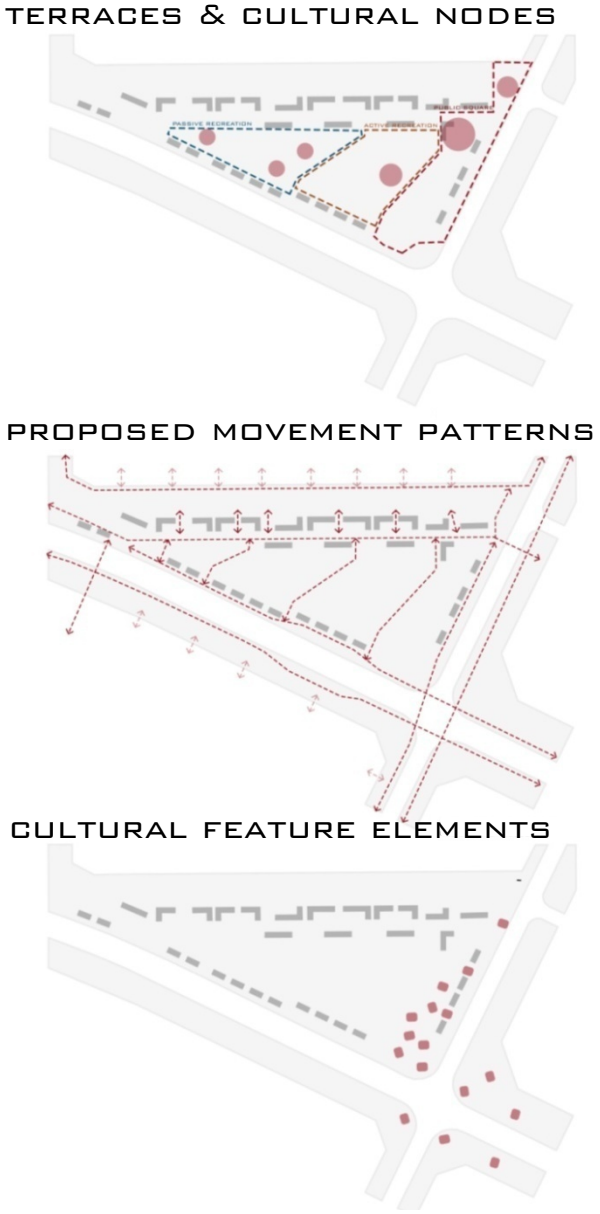


Figure 74 - Diagrams illustrating sketchplan terraces and cultural nodes; proposed movement patterns and feature elements (Author 2014)

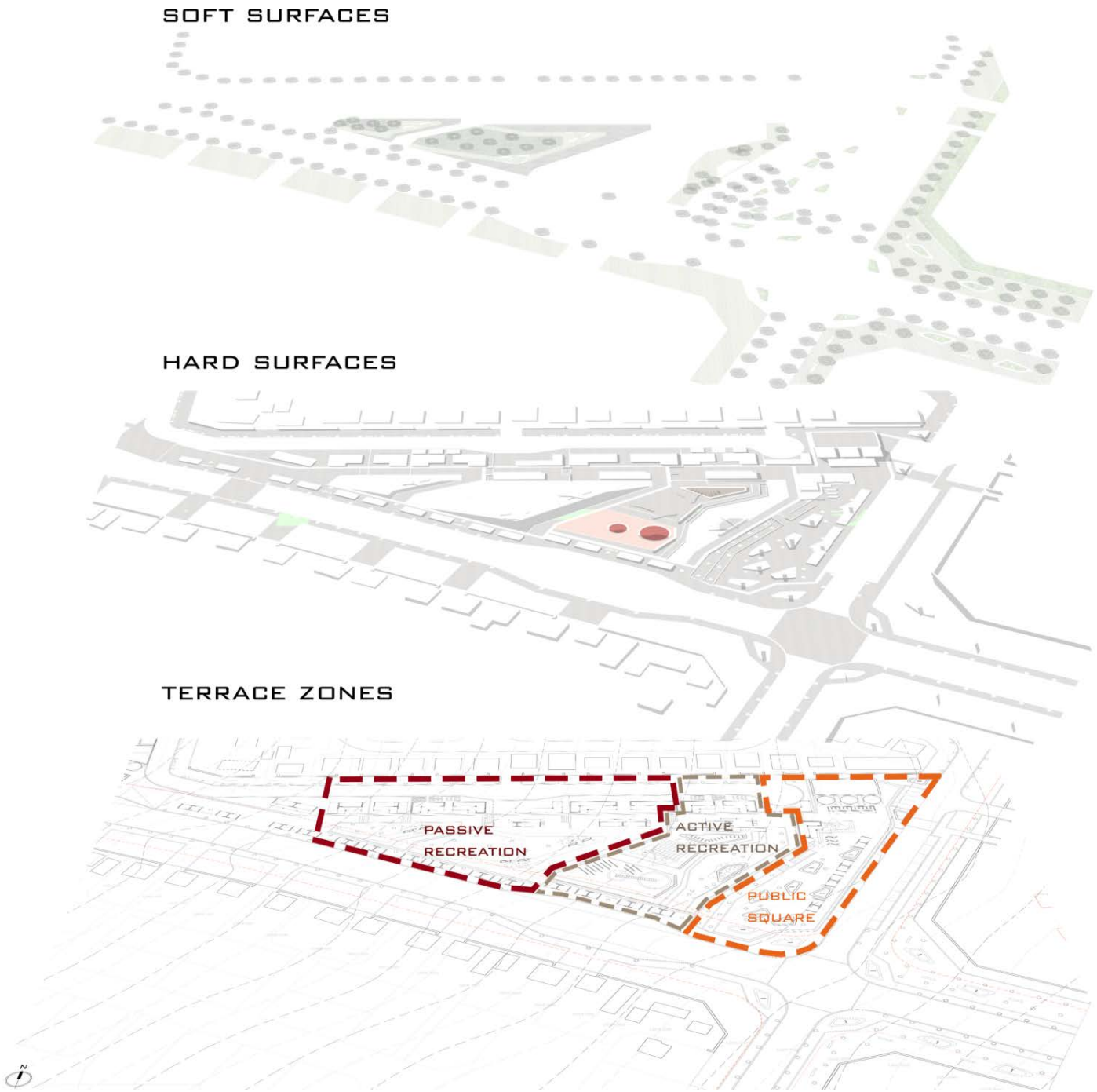


Figure 75 - Layers of proposed sketchplan (Author 2014)

Figure 76 – Preliminary sketchplan (Author 2014)

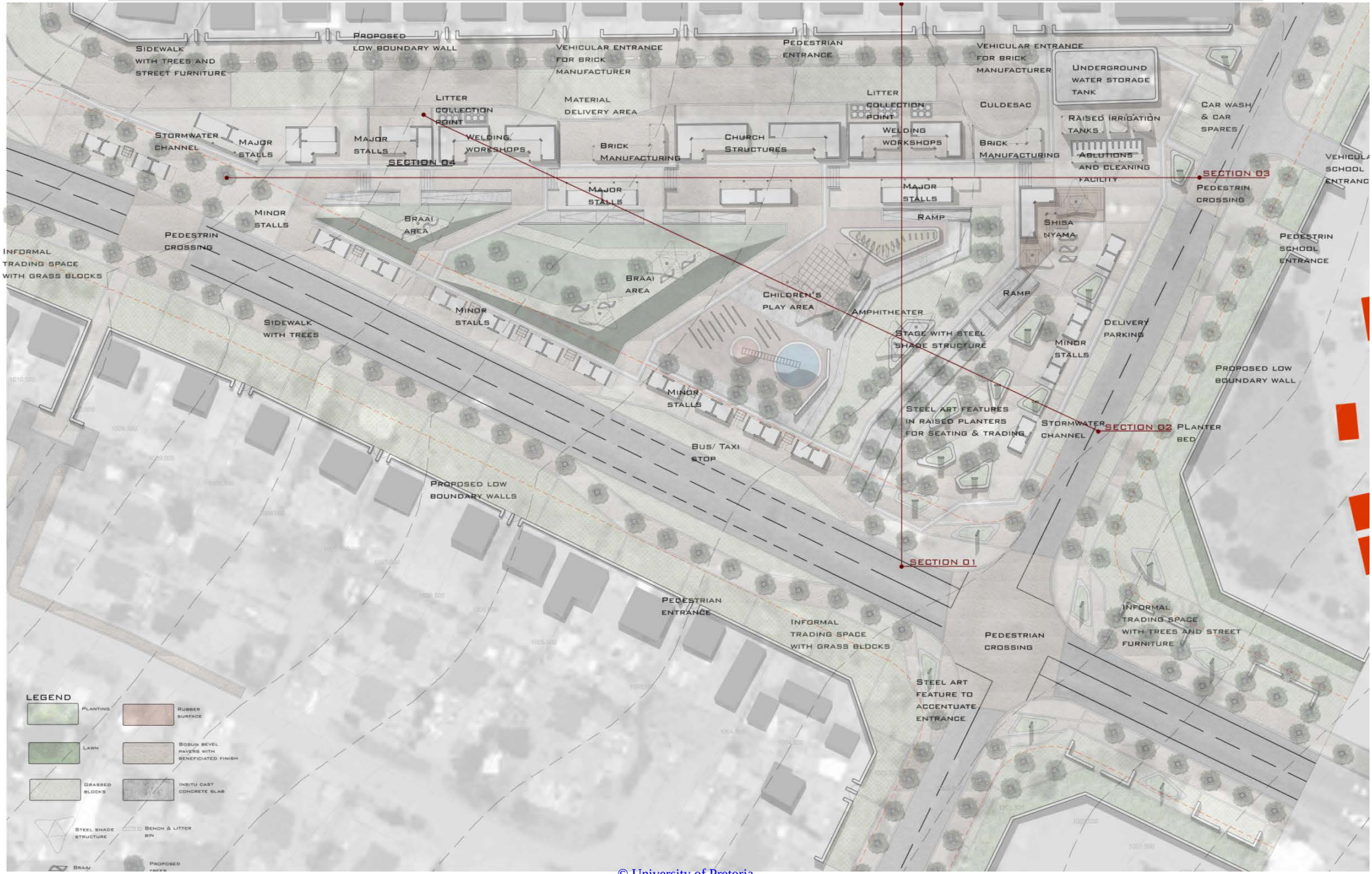
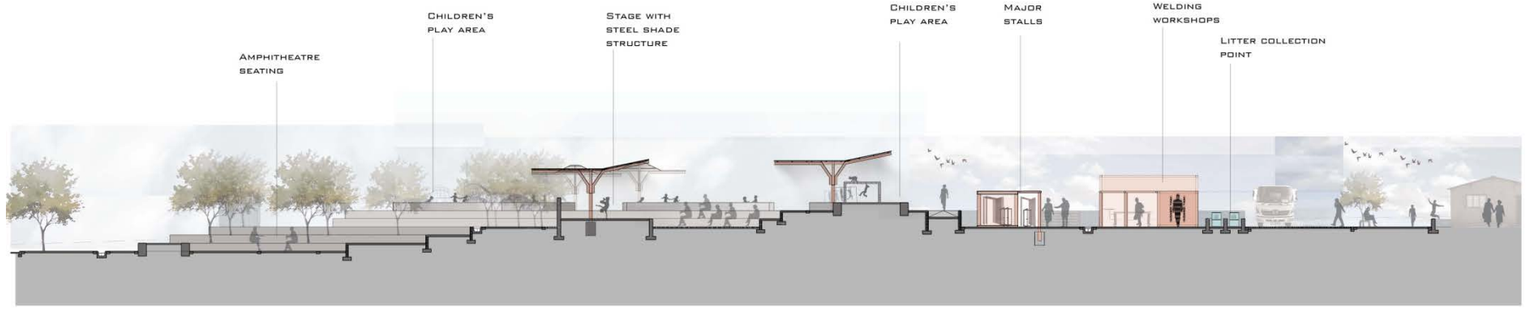
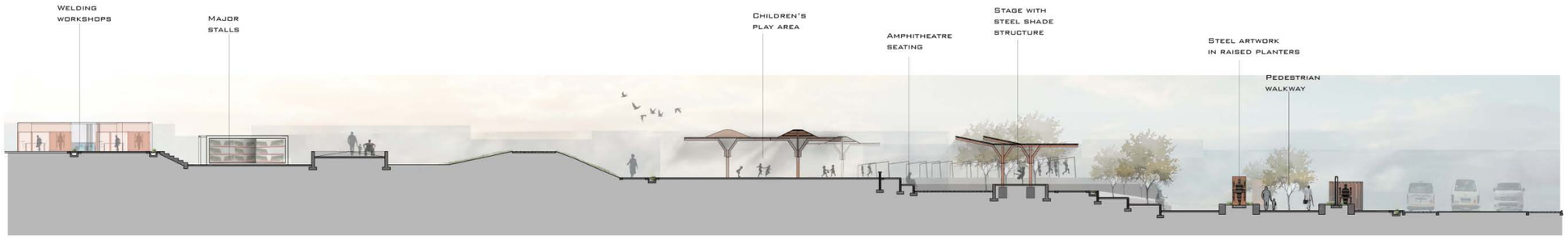


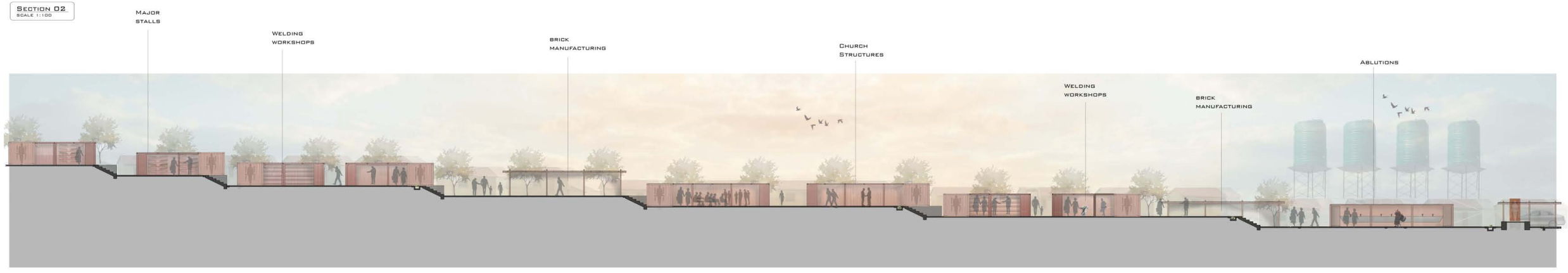
Figure 77 - Final sketchplan (Author 2014)



SECTION 01
SCALE 1:100



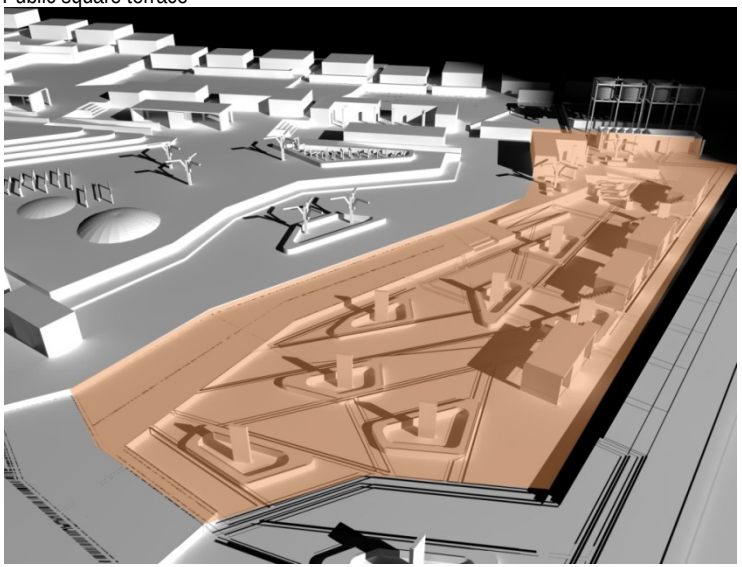
SECTION 02
SCALE 1:100



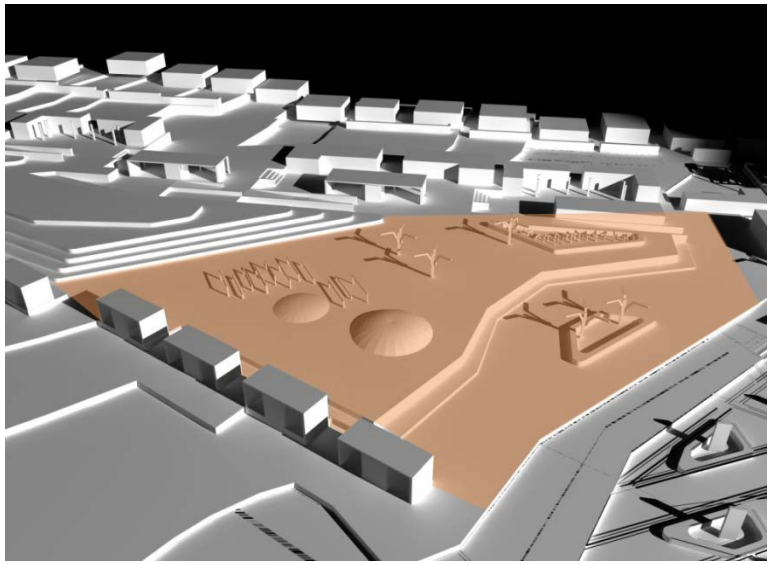
SECTION 03
SCALE 1:100

Figure 78 – Section 01, 02 and 03 (Author 2014)

Public square terrace



Active recreation terrace



Passive recreation terrace

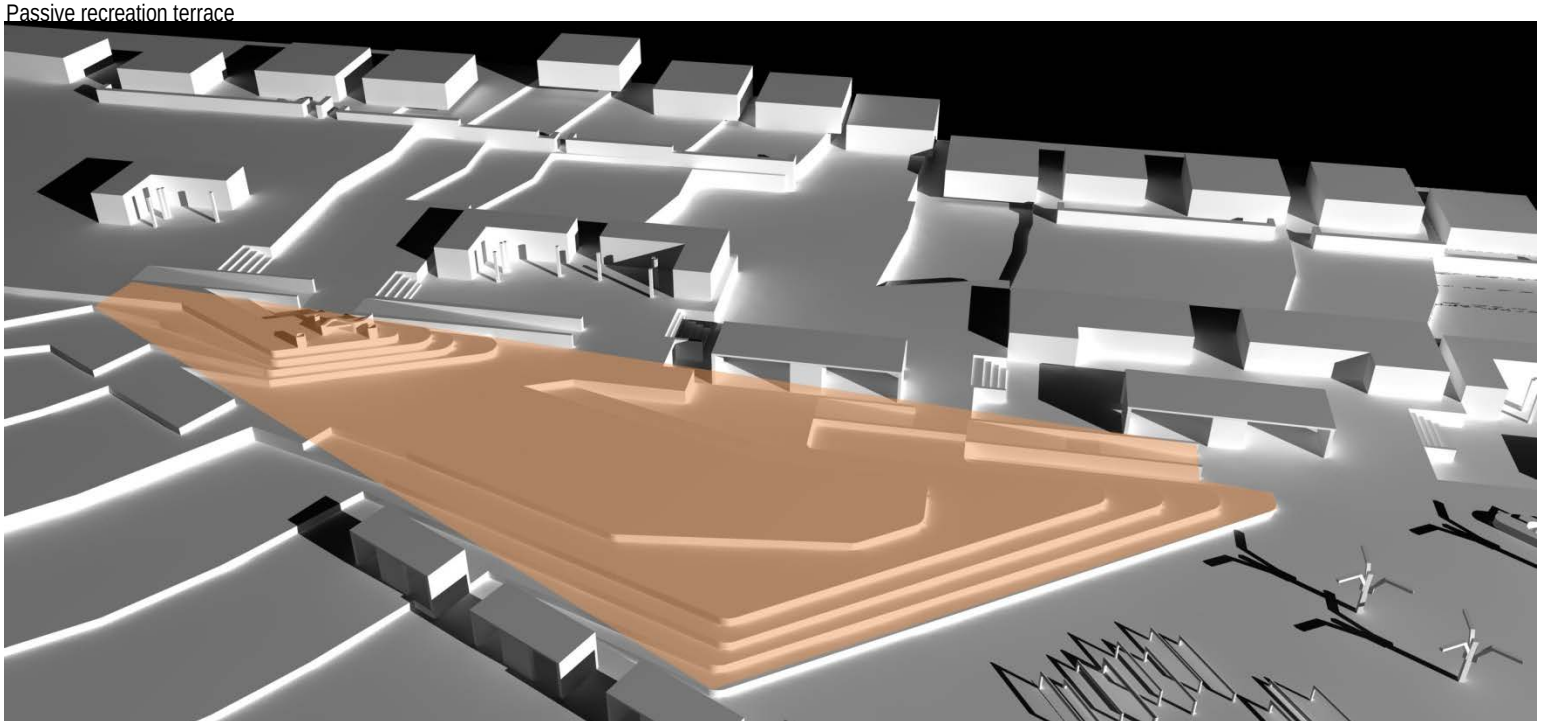


Figure 79 - 3D views of public square terrace, active recreation terrace and passive recreation terrace (Author 2014)

5. REFERENCES

- Adrianfrith. 2011 *Olievenhoutbosch census 2011 Available online at, https://census2011.adrianfrith.com/place/799078 Accessed 20 June 2014*
- Dewar, D. Watson, V. 1990.*Urban Markets: Developing Informal Retailing.* Routledge. London
- Plan Associates. 2010. *Olievenhoutbosch Urban Development Framework*

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- Figure 53 - Overarching concept ties the two design development aspects together (Author 2014)
- Figure 54 - Depiction of literal idea of the overarching concept (Author 2014)
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- Figure 56 - Division of the program of the market (Author 2014)
- Figure 57 - Organisation of masterplan with regard to informal market development.
  The placement of major versus interceptor stalls with regards to roads and infrastructure is critical. (Author 2014)
- Figure 58 - Shipping containers as shelter structures.
  The closed, open and expanded conditions of the containers enable adaptive use and spatial definition (Author 2014)
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- Figure 60 - Subdivision of open space into intimate terraces (Author 2014)
- Figure 61 - Trees, street furniture and feature elements used to modify spaces (Author 2014)
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- Figure 78 – Section 01, 02 and 03 (Author 2014)

1. INTRODUCTION

Materials and strategies already discussed briefly in the preceding design development chapter are explored more in detail hereunder at sketchplan level.

The overarching project concept, informal market and spatial/ experiential development aspects that drive the design are given expression here through these materials and strategies.

The proposed material palette (refer to figure 75) used in the design can be divided into 3 categories including the following:

- Market infrastructure material

These include recycled material such as shipping containers, barrels/ galvanized drums.

- Feature elements material

These include mild steel elements with a rusted finish.

- Paving surfaces material

This mainly consists of exposed aggregate concrete with clay brick edging, and grass blocks. Precast concrete culverts are use as stormwater channels.

The strategies employed in the proposed design intervention include water strategy, vegetation strategy and paving strategy. These strategies are discussed separately below.

Figure 80 - Material palette (Author 2014)

2. WATER STRATEGY

Water as resource is one of the crucial socio economic guidelines of the proposed intervention. Thus rainwater harvesting is adopted to capture and reuse stormwater on the site.
The benefit of stormwater harvesting on the site is twofold; firstly, storage for irrigation and secondly the mitigation of runoff impacts such as flooding.

1. Water is collected from market infrastructure roofs; hard as well as soft surfaces through intercepting stormwater channels The channels have debris filters that remove solid waste from the collected water (refer to figure 76). Where applicable, the channels are planted with water treating plants, here the channels are lined with bio-cells to retain soil medium (refer to figure 87).

2. The stormwater channels convey the stormwater to an underground storage tank located at the lowest point of the site. The underground storage tank also acts as an oil trap. The storm water calculation, indicate that the tank capacity must be minimum of 1642m3 of water (refer to figure 78).

3. From the underground storage tank, the water is pumped up to raised irrigation tanks through solar pumps. From the raised tanks, the water used to irrigate landscaped areas. The low lying areas are gravity fed, while a second solar pump is used to irrigate the upper areas (refer to figure 77)..

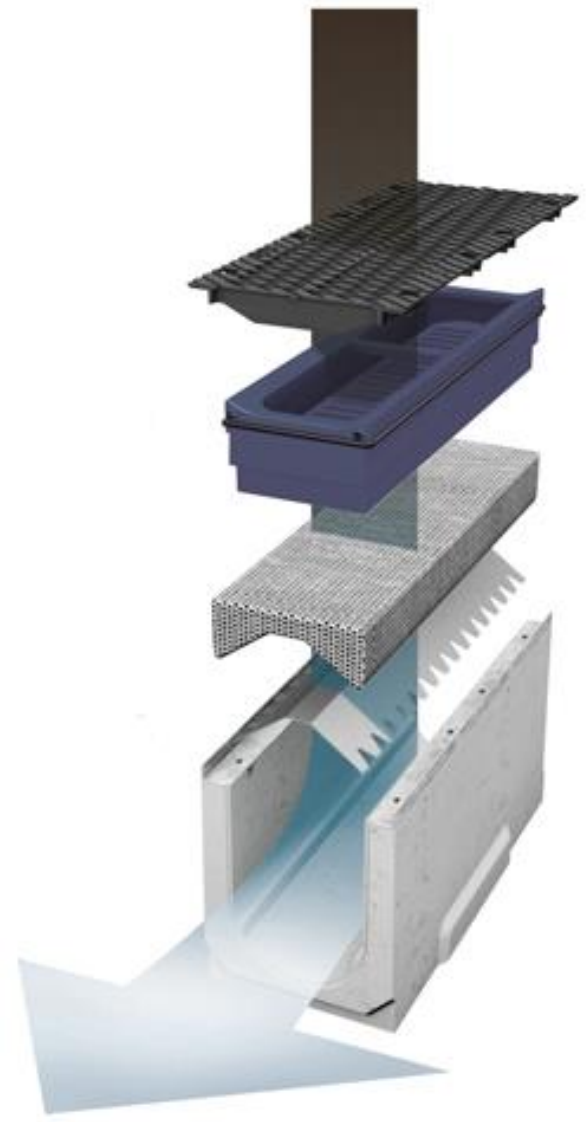


Figure 81 - Diagram illustrating stormwater channel debris filtering system (Birco 2014)

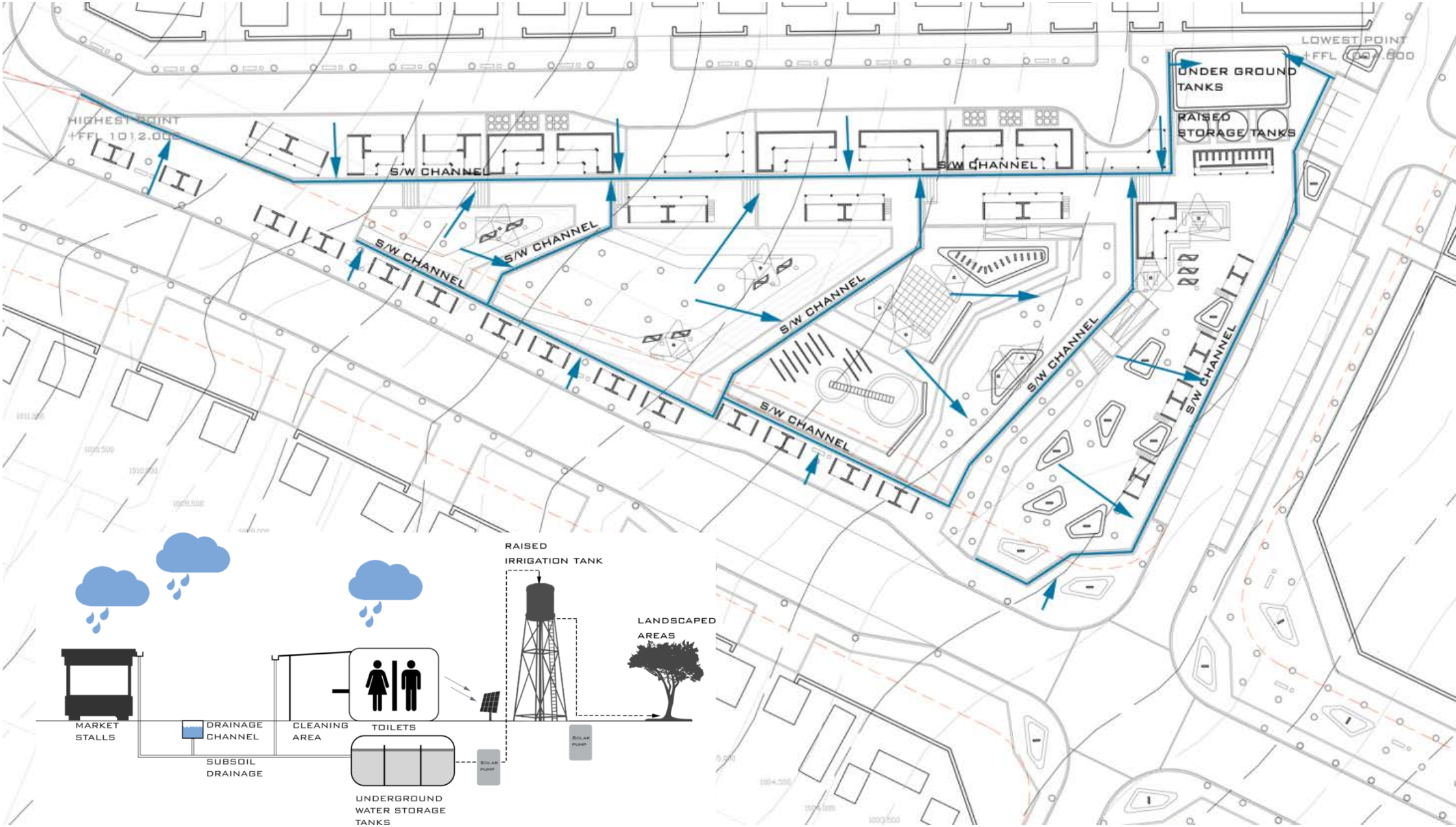


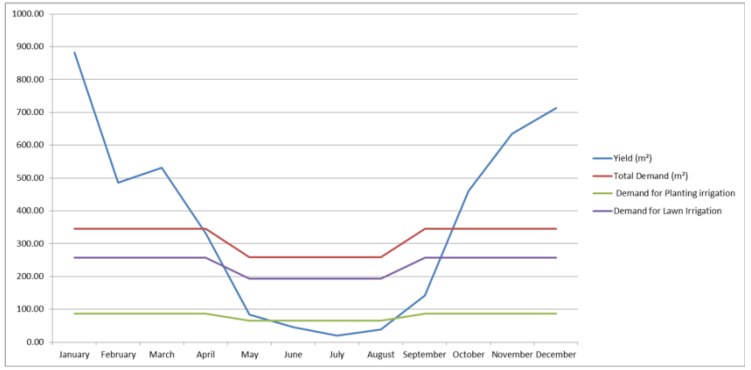
Figure 82 –Stormwater plan with diagram illustrating rainwater harvesting strategy (Author 2014)

YIELD
Yield (m³) = P x A x C
(Where P=Precipitation (m), A = Area (m²), C=Run-off Coefficient

Per Surface	Catchment area(m²)	Runoff co-effecient
Soft surfaces	1757	0.35
Hard surfaces	6194	0.8
Roof surfaces	1018	0.9

PRECIPITATION DATA

Month	Average monthly precipitation(m)
January	0.136
February	0.075
March	0.082
April	0.051
May	0.013
June	0.007
July	0.003
August	0.006
September	0.022
October	0.071
November	0.098
December	0.11



Soft surfaces

Month	Average Monthly Precipitation (m)	Soft surface area(m²)	Coefficient	Yield (m³)
January	0.136	1 757	0.35	83.63
February	0.075	1 757	0.35	46.12
March	0.082	1 757	0.35	50.43
April	0.051	1 757	0.35	31.36
May	0.013	1 757	0.35	7.99
June	0.007	1 757	0.35	4.30
July	0.003	1 757	0.35	1.84
August	0.006	1 757	0.35	3.69
September	0.022	1 757	0.35	13.53
October	0.071	1 757	0.35	43.66
November	0.098	1 757	0.35	60.27
December	0.11	1 757	0.35	67.64

Hard surfaces

Month	Average Monthly Precipitation (m)	Hard surface area(m²)	Coefficient	Yield (m³)
January	0.136	6 194	0.8	673.91
February	0.075	6 194	0.8	371.64
March	0.082	6 194	0.8	406.33
April	0.051	6 194	0.8	252.72
May	0.013	6 194	0.8	64.42
June	0.007	6 194	0.8	34.69
July	0.003	6 194	0.8	14.87
August	0.006	6 194	0.8	29.73
September	0.022	6 194	0.8	109.01
October	0.071	6 194	0.8	351.82
November	0.098	6 194	0.8	485.61
December	0.11	6 194	0.8	545.07

Roof surfaces

Month	Average Monthly Precipitation (m)	Roof surface area(m²)	Coefficient	Yield (m³)
January	0.136	1 018	0.9	124.60
February	0.075	1 018	0.9	68.72
March	0.082	1 018	0.9	75.13
April	0.051	1 018	0.9	46.73
May	0.013	1 018	0.9	11.91
June	0.007	1 018	0.9	6.41
July	0.003	1 018	0.9	2.75
August	0.006	1 018	0.9	5.50
September	0.022	1 018	0.9	20.16
October	0.071	1 018	0.9	65.05
November	0.098	1 018	0.9	89.79
December	0.11	1 018	0.9	100.78

IRRIGATION DEMAND

Demand for Planting irrigation

Month	Planting Area (m²)	Irrigation Depth/ week (m)	Irrigation Depth/ month (m)	Total Demand (m³)
January	545	0.04	0.16	87.2
February	545	0.04	0.16	87.2
March	545	0.04	0.16	87.2
April	545	0.04	0.16	87.2
May	545	0.03	0.12	65.4
June	545	0.03	0.12	65.4
July	545	0.03	0.12	65.4
August	545	0.03	0.12	65.4
September	545	0.04	0.16	87.2
October	545	0.04	0.16	87.2
November	545	0.04	0.16	87.2
December	545	0.04	0.16	87.2

Demand for Lawn Irrigation

Month	Lawn Area (m²)	Irrigation Depth/ week (m)	Irrigation Depth/ month (m)	Total Demand (m³)
January	1609	0.04	0.16	257.44
February	1609	0.04	0.16	257.44
March	1609	0.04	0.16	257.44
April	1609	0.04	0.16	257.44
May	1609	0.03	0.12	193.08
June	1609	0.03	0.12	193.08
July	1609	0.03	0.12	193.08
August	1609	0.03	0.12	193.08
September	1609	0.04	0.16	257.44
October	1609	0.04	0.16	257.44
November	1609	0.04	0.16	257.44
December	1609	0.04	0.16	257.44

Total demand

Month	Yield (m³)	Total Demand (m³)	Monthly Balance	Water inTank/ Resevoir (m³)
January	882.14	344.64	537.50	1313.28
February	486.48	344.64	141.84	1455.11
March	531.88	344.64	187.24	1642.35
April	330.80	344.64	-13.84	1628.52
May	84.32	258.48	-174.16	1454.36
June	45.40	258.48	-213.08	1241.28
July	19.46	258.48	-239.02	1002.26
August	38.92	258.48	-219.56	782.70
September	142.70	344.64	-201.94	0
October	460.53	344.64	115.89	115.89
November	635.66	344.64	291.02	406.91
December	713.50	344.64	368.86	775.77

Greatest volume of water in tank/ resevoir at any time is the minimum capacity of the tank(m³)	1642.35

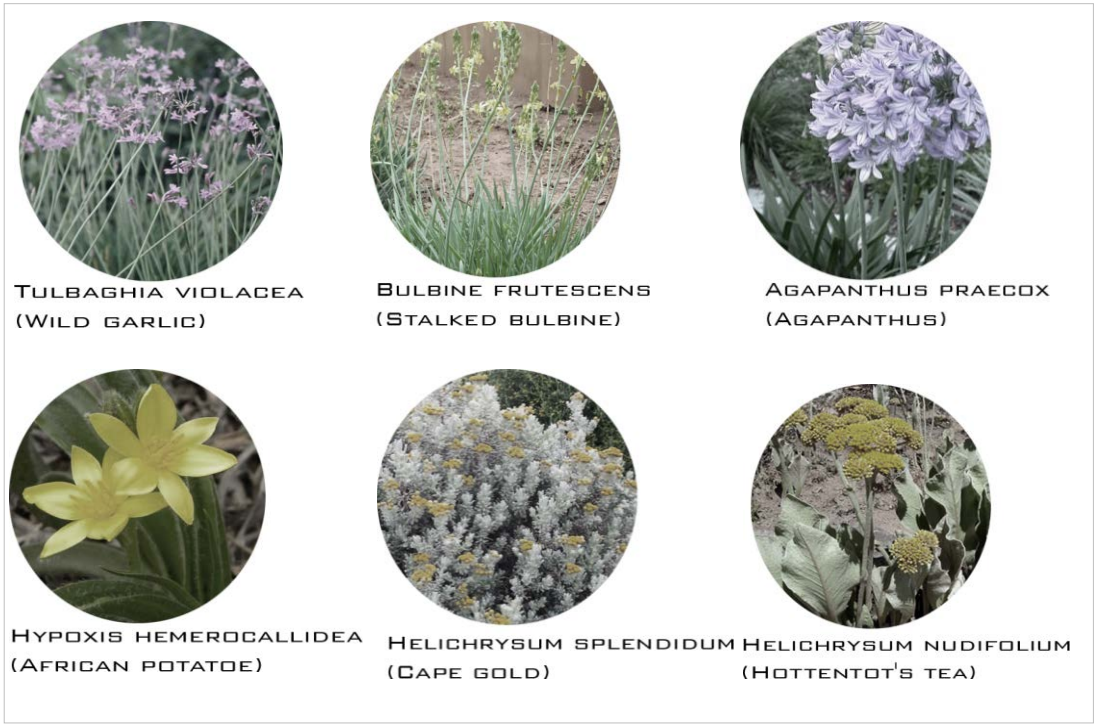
Figure 83 - Water budget calculations (Author 2014)

3. VEGETATION STRATEGY

The proposed vegetation strategy is both for functional reasons as well as the expression of the overarching project concept.

3.1 MEDICINAL PLANTING

In expressing the concept of “indawo yami” medicinal plants associated with the various ethnic groups (refer to figure 85) in the Olievenhoutbosch community are used as part of the gateway garden into the community and the public square . The plant species consist of indigenous plant species that are familiar to the community ethnic groups, although not necessarily local to the regional vegetation.



3.2 LAWN AND GRASS BLOCK PAVED AREAS

Lawn and grass block paved areas help create a balance between hard and soft surfaces throughout the sketchplan area. These areas allow for stormwater infiltration and thus help reduce runoff. The grass species used (*Cynodon Dactylon*) in the areas is local to the regional vegetation of the area.

3.3 WATER PLANTS

The water plant species consists of plants that have water treatment qualities. These are planted in the channels of the proposed stormwater system to treat/ purify water before it reaches the storage tanksfrom where it is used for irrigation.

CYPERUS SEXANGULARIS

JUNCUS GLAUCUS
(BLUE RUSH)

GOMPHOSTIGMA VIRGATUM
(RIVER STARS)

3.4 TREES

In accordance with the established project guidelines, trees are crucial with respect to introducing human scale to open spaces and streets. The chosen tree species are local to the regional vegetation.
The application of trees is divided into street trees and shade trees:

3.4.1 SHADE TREES

The shade trees are proposed in the public square and recreation terraces where there is provision for sitting and play play or braai amenities.

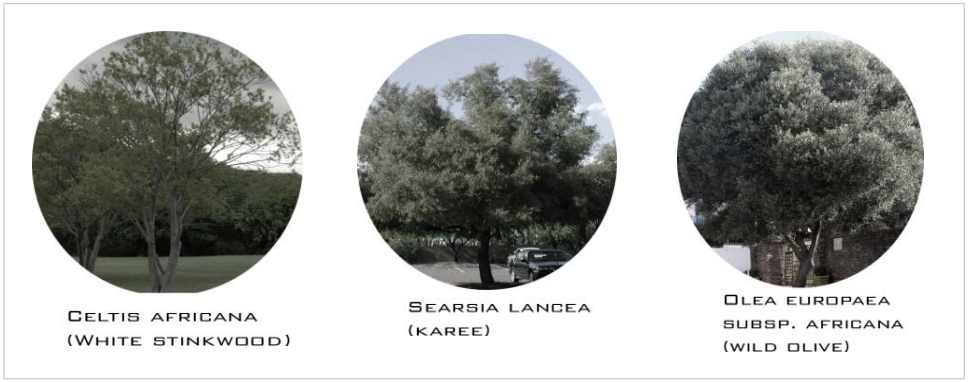
ACACIA CAFFRA
(COMMON HOOK THORN)

SEARSIA LEPTODICTYA
(MOUNTAIN KAREE)

ZIZIPHUS MUCRONATA
(BUFFALO THORN)

3.4.2 STREET TREES

Street trees occur in sidewalks along the streets to define the streets as spaces and providing shade for social interaction and informal trading.



CELTIS AFRICANA
(WHITE STINKWOOD)

SEARSIA LANCEA
(KAREE)

OLEA EUROPAEA
SUBSP. AFRICANA
(WILD OLIVE)

Scientific name	Common name	Traditional name(s)	Medicinal uses
Agapanthus praecox	Blue lily	Xhosa: Isicakathi Zulu: Ubani	Agapanthus is considered to be both a magical and a medicinal plant, and the plant of fertility and pregnancy. Xhosa women use the roots to make antenatal medicine, and they make a necklace using the roots that they wear as a charm to bring healthy, strong babies. The Zulu use agapanthus to treat heart disease, paralysis, coughs, colds, chest pains and tightness.
Artemis afra	Wild wormwood	Zulu: Mhlonyane Xhosa: Umhlonyane Tswana/Sotho: Lengana Pedi: Zengana	Traditionally it is used for a wide range of ailments from coughs, colds, fever, loss of appetite, colic, headache, earache, intestinal worms to malaria, respiratory tract infections, influenza, sore throats, asthma, pneumonia, gastritis, indigestion, flatulence, constipation, gout and measles. The roots, stems and leaves are taken as enemas for febrile complaints, poultices, infusions, body washes, lotions, smoked, snuffed or drunk as a tea.
Bulbine frutescens	Cat's tail	Sotho: Khomo-ya-Ntsukammele, Xhosa: Intelezi, ingelwane Zulu: Ibhucu, intelezi	Externally the freshly squeezed juice, frequently applied, is amazingly effective to take care of a wide range of skin conditions and wounds. It's also very effective for treating wounds, sores and rashes on animals. You can also make a warm poultice and apply it to the affected area to treat any of the above as well as eczema and arthritis. Internally an infusion (sometimes a brandy tincture) of a few fresh leaves in a cup of boiling water is taken for coughs, colds and arthritis.
Eucomis autumnalis	Pineapple flower	Umathunga (isiZulu)	The bulb can be used for back-ache, to assist in post-operative recovery and to assist in healing fractures. They are traditionally used to treat fever, hang-over, urinary complaints, stomach ache, colic, flatulence and syphilis.
Helichrysum splendidum	Cape gold	Pedi: Phefo-ea-loti Zulu: Impepho	*Helichrysum splendidum* has been used to treat rheumatism and that it is a good fuel plant in the mountains.
Helichrysum nudifolium	Hottentot's tea	Pedi: Letapiso Swazi: Ludvutfane Xhosa, Zulu: Icholocholo Zulu: Isidwaba-somkhovu	It is traditionally used for food, the leaves are cooked and eaten. Leaves are burned as incense and used in ritual ceremonial occasions to summon the good spirits of the ancestors. Medicinally the roots and leaves are used as traditional medicine for chest complaints, colic in children, coughs, colds, internal sores, fever, headaches, and for dressing wounds.
Helichrysum odoratissimum	Everlasting	Zulu/ Xhosa: Impepho	The leaves can be used for treatment of anxiety and depression.
Lessertia frutescens	Cancer bush	Xhosa/ Zulu: Umnwele	Leaves have been traditionally used to treat fever, poor appetite, indigestion, gastritis, peptic ulcer, dysentery, cancer, diabetes, colds and flu, cough, asthma, chronic bronchitis, kidney and liver conditions, rheumatism, heart failure, urinary tract infections as well as stress and anxiety.
Pelargonium sidoides	Rabassam	Zulu: Umckaloabo	It is traditionally used for coughs and chest troubles and is effective for bronchitis in children. It can be used for the treatment of infections such as cough, fever, sore throat, as well as fatigue and weakness. Infusions of the tuber are used to treat dysentery and diarrhoea.
Tulbaghia violacea	Wild garlic	Zulu: Isweli-lezinyoka/isihaqa	The rhizomes and leaves are used for the treatment of fever, rheumatism, asthma and constipation. The fresh bulbs are boiled in water and the decoctions are taken orally to clear up coughs and colds and they can be used as a remedy for pulmonary tuberculosis and to destroy intestinal worms. The leaves are used to treat cancer of the oesophagus.

Figure 84 - Medicinal plants schedule with medinicinal uses (Author 2014)

Figure 88 - Medicinal planting areas (Author 2014)

Figure 87 – Lawn and grass block paved areas (Author 2014)

Figure 86 - Water planting areas (Author 2014)

Figure 85 - Shade and street trees (Author 2014)

4. PAVING STRATEGY

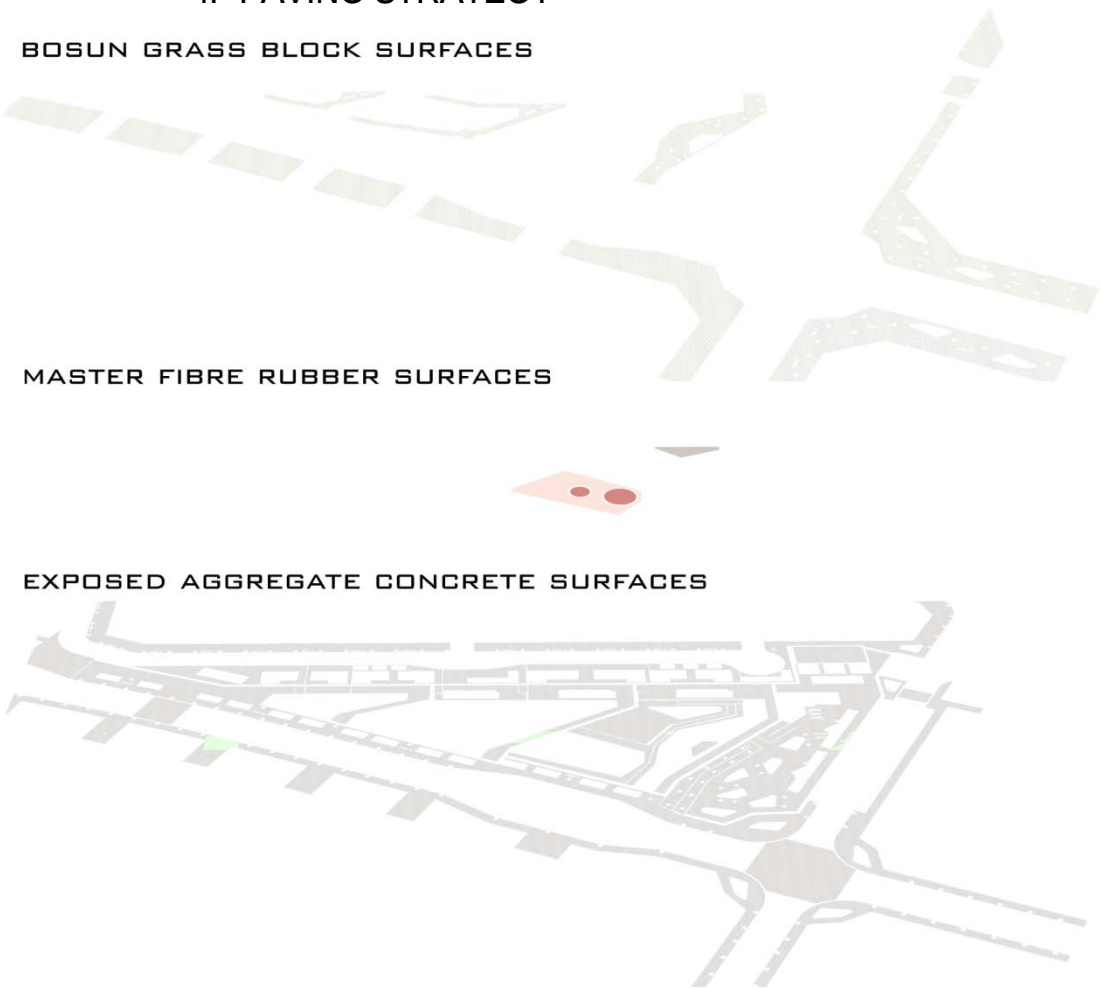


Figure 89 - Diagrams illustrating paving strategy (Author 2014)

The predominant paving material is exposed aggregate concrete which emulates the existing character of the informal market area.
Red clay brick paving is used as edging and breaker/ transition material between the concrete paving and the lawn areas, raised planters or walls as well as concrete channels.

Figure 90- Exposed aggregate concrete & clay brick pavers (Author 2014)

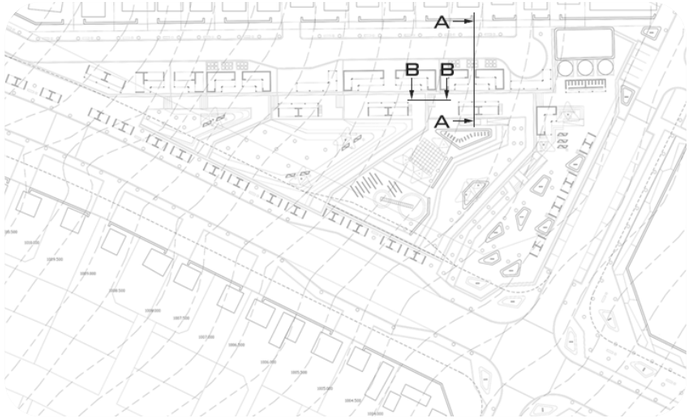
Masterfibre rubber seamless matting is proposed for the play area as it is a soft and safe alternative material that can withstand high traffic with minimal maintenance required. Masterfibre rubber flooring also comes in various pigments which is desirable for children's play areas.

Figure 91 - Masterfibre rubber seamless matting (Masterfibre 2014)

Bosun grass blocks are used to create a balance between hard and soft and to mitigate runoff onsite. The grass blocks are used in front of surrounding erven,event space/ amphitheatre as well as outdoor braai areas.

Figure 92 - Bosun grass blocks (Bosun 2014)

5. TECHNICAL DOCUMENTATION OF DESIGN



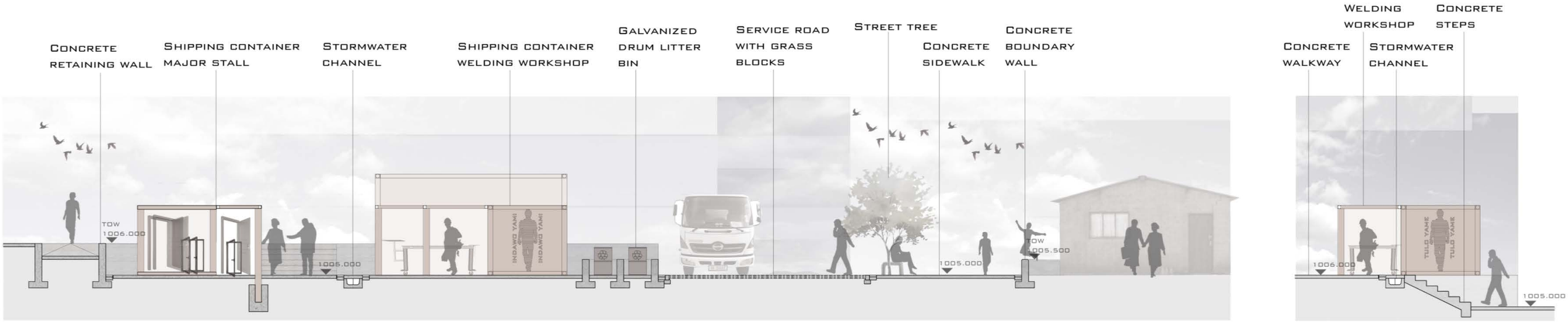
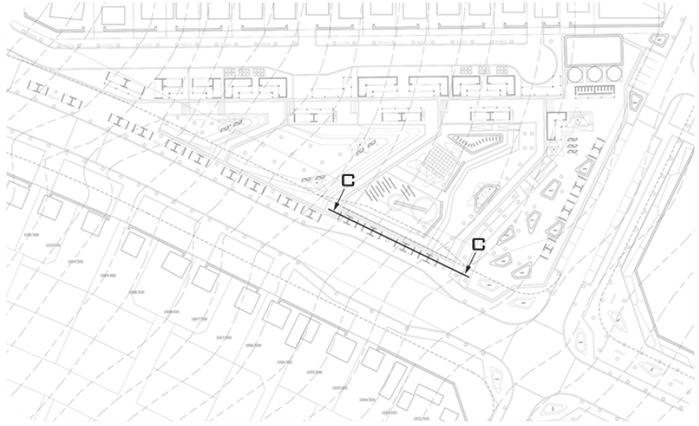


Figure 93 - Section A-A & Section B-B (Author 2014)



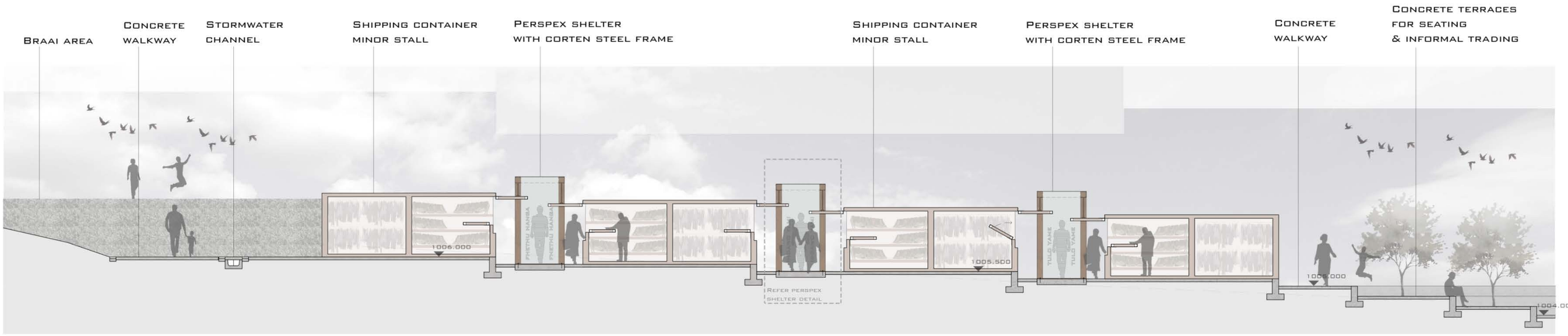


Figure 94 - Section C-C (Author 2014)

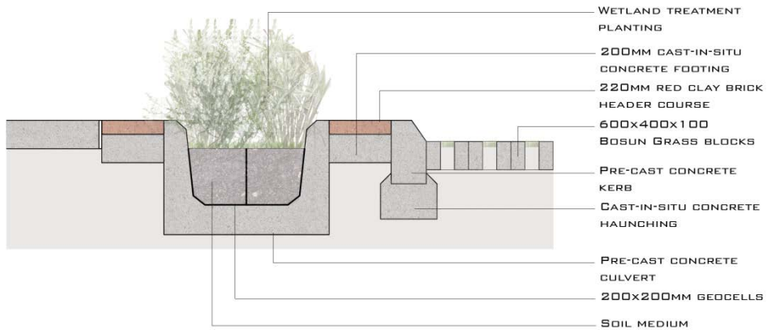
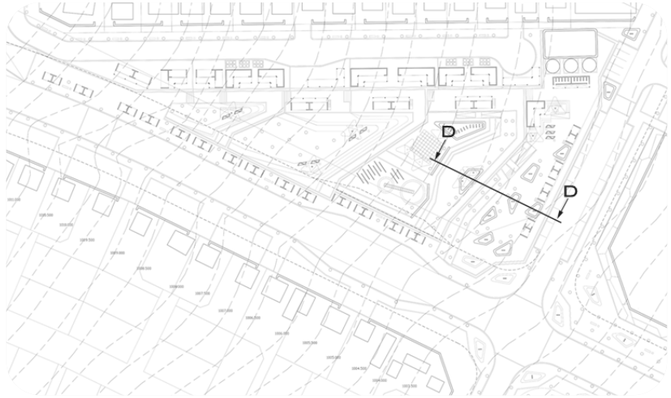


Figure 95 - Detail 01 (Author 2014)



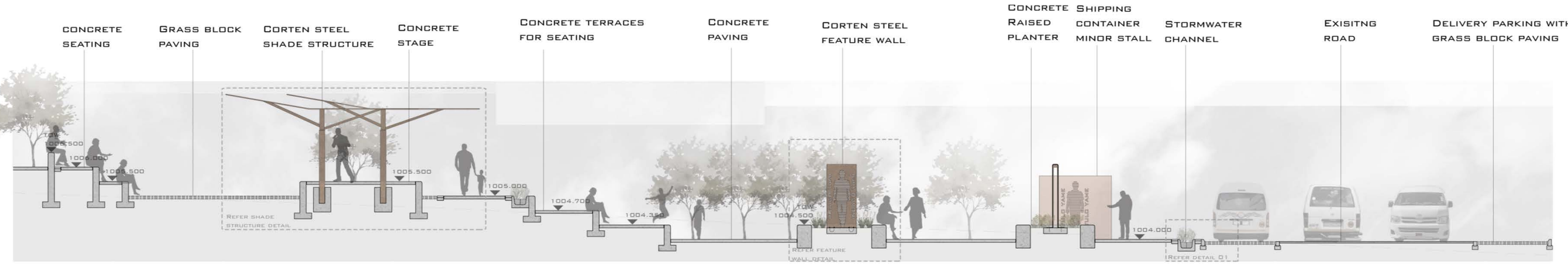


Figure 96 - Section D-D (Author 2014)

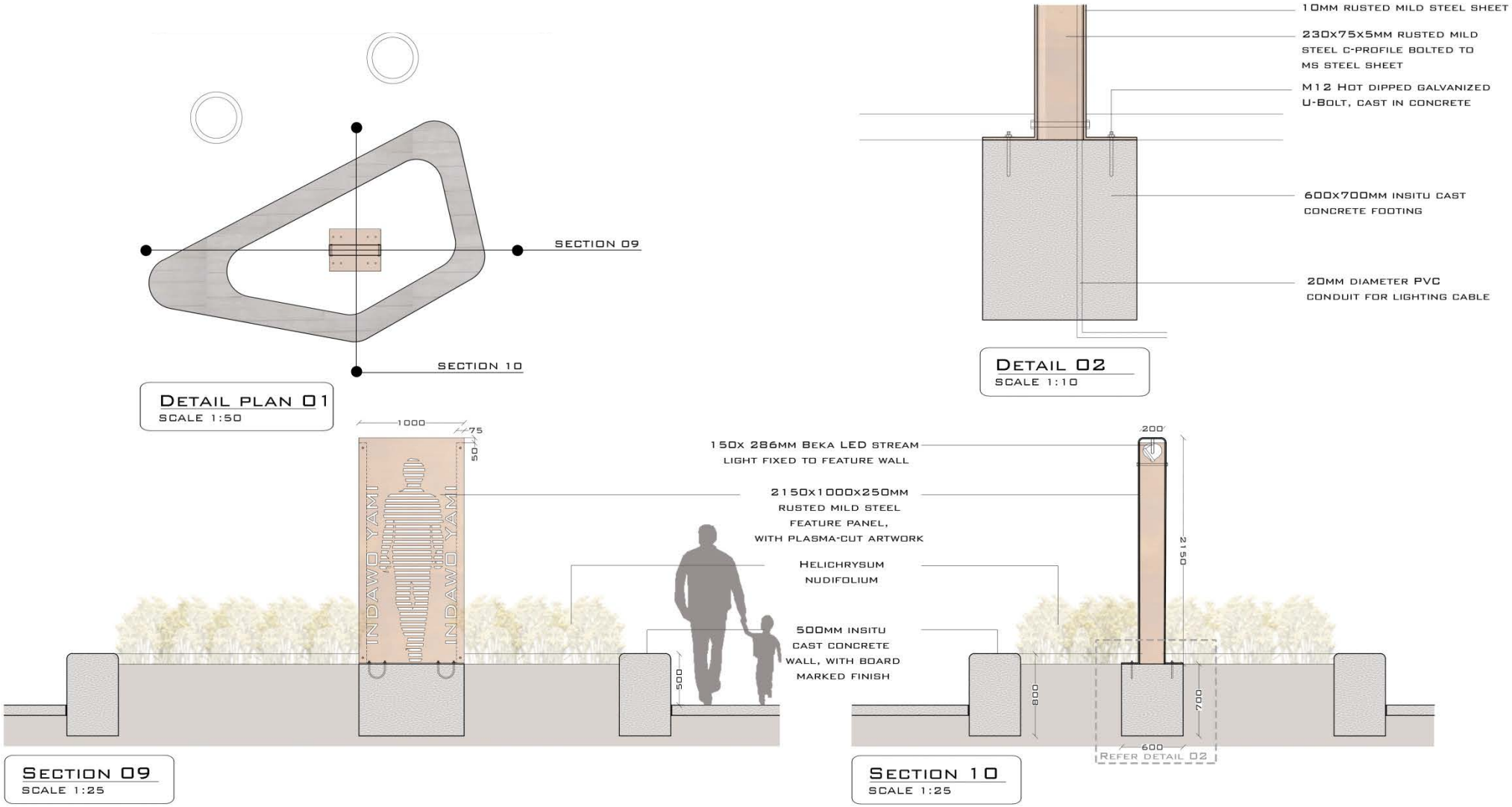


Figure 97 - Feature wall preliminary detail (Author 2014)

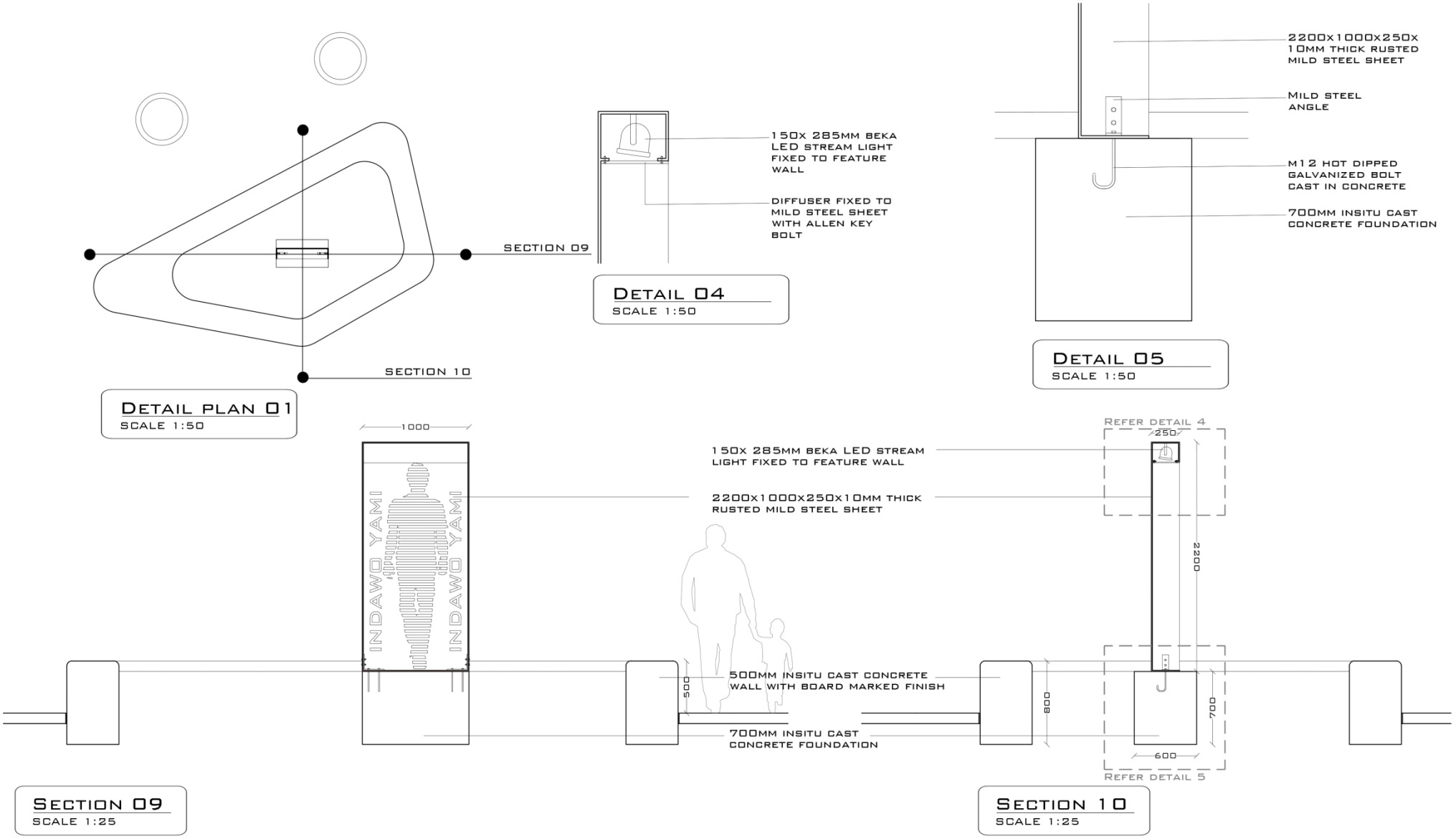


Figure 98 - Feature wall final detail (Author 2014)

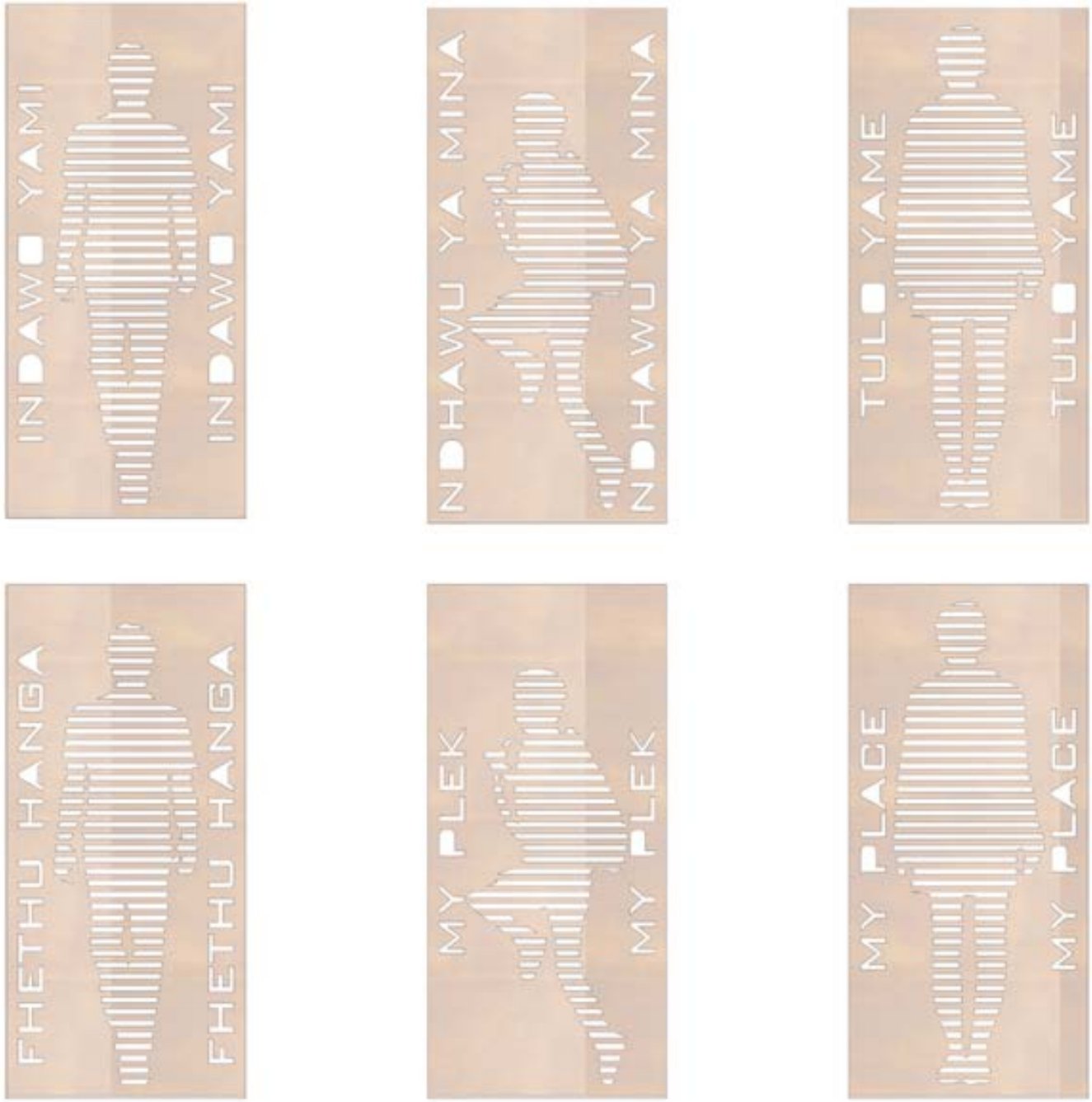
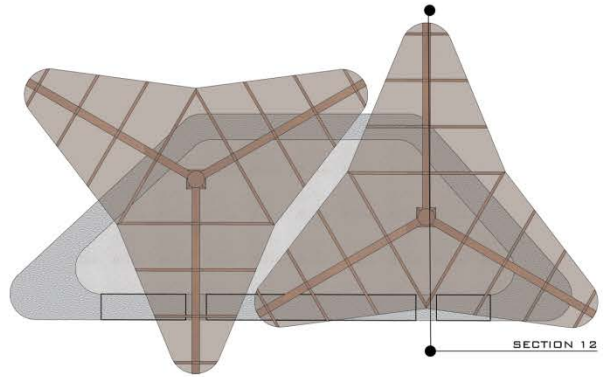
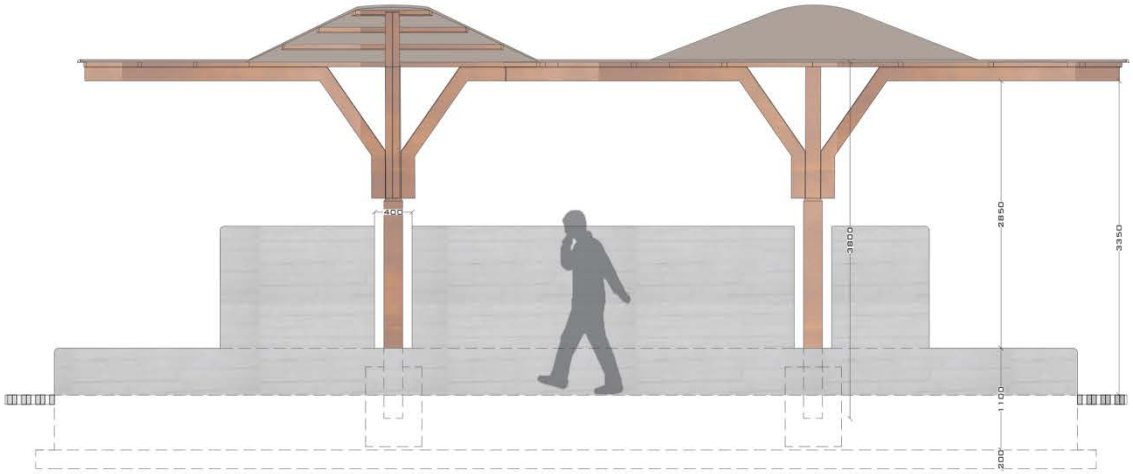


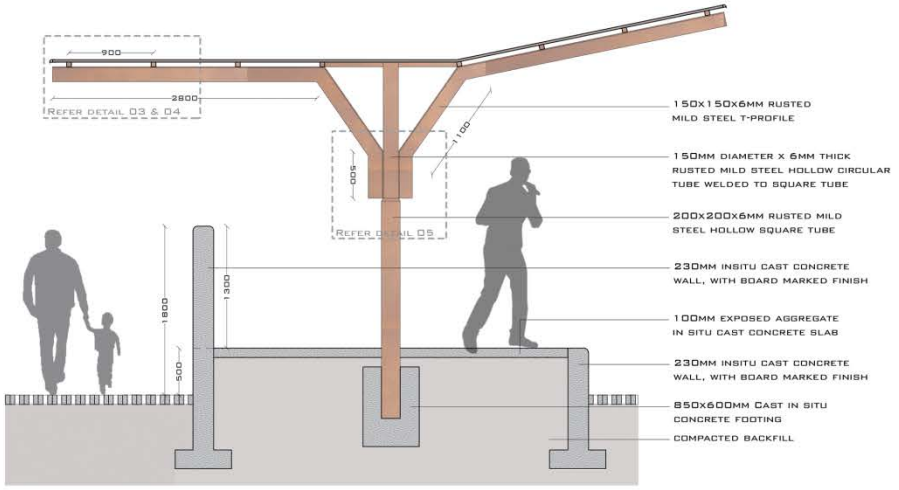
Figure 99 - Feature wall Plasmacut artworks (Author 2014)



DETAIL PLAN 02
SCALE 1:50



ELEVATION 01
SCALE 1:25



SECTION 12
SCALE 1:25

Figure 100 - Polycarbonate shade structure preliminary detail (Author 2014)

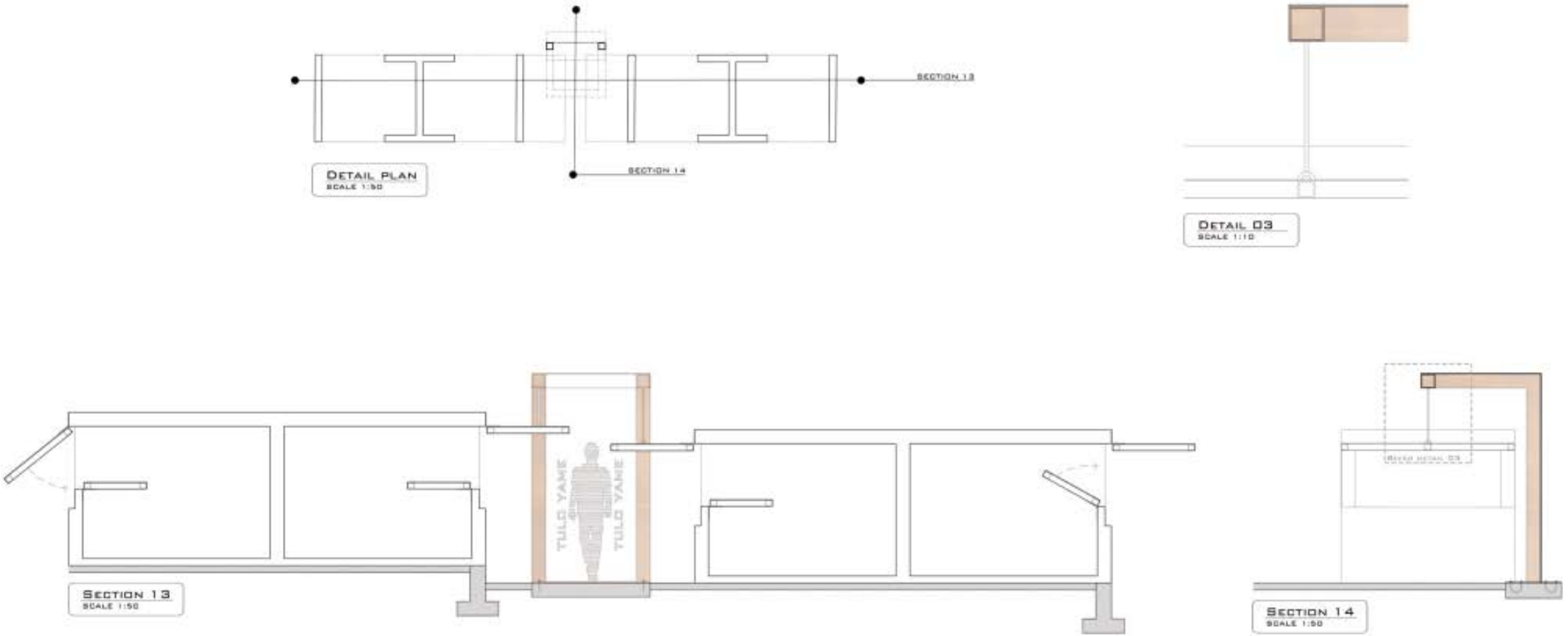


Figure 101 - Perspex shelter structure (Author 2014)

6. CONCLUSION

The relationship between socio economic activities with the low quality spaces in low cost housing communities is implicit. And thus the hypothesis of an informal market as a catalyst for improving the quality of these open spaces in such a communities is fitting. The informal market presents many opportunities of addressing the issue of poor space making while simultaneously creating a platform for economic empowerment.

However, the informal market cannot be a stand-alone intervention and needs to be interlinked with other community facilities such as transport, social and recreational amenities. To be successful, it requires more than just a functional response with vendor stalls as is commonly the case in practice. The socio economic functions of it need to be interwoven with elements that help introduce human scale, encourage social interaction while improving environmental quality and community well-being.

7. LIST OF FIGURES

- Figure 80 - Material palette (Author 2014)
- Figure 81 - Diagram illustrating stormwater channel debris filtering system (Birco 2014)
  Available online at,
  www.birco.com/BIRCOpur.6742.0.html
  Accessed 15 October 2014

- Figure 82 –Stormwater plan with diagram illustrating rainwater harvesting strategy (Author 2014)
- Figure 83 - Water budget calculations (Author 2014)
- Figure 84 - Medicinal plants schedule with medinicinal uses (Author 2014)
- Figure 86 – Lawn and grass block paved areas (Author 2014)
- Figure 89 - Diagrams illustrating paving strategy (Author 2014)
- Figure 90- Exposed aggregate concrete & clay brick pavers (Author 2014)
- Figure 91 - Masterfibre rubber seamless matting (Masterfibre 2014)
  Available online at,
  http://www.masterfibre.co.za/?controller=pages&view=load&id=info
  Accessed 16 October 2014

- Figure 92 - Bosun grass blocks (Bosun 2014)
- Figure 93 - Section A-A & Section B-B (Author 2014)
- Figure 94 - Section C-C (Author 2014)
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- Figure 96 - Section D-D (Author 2014)
- Figure 97 - Feature wall preliminary detail (Author 2014)
- Figure 99 - Feature wall Plasmacut artworks (Author 2014)
- Figure 100 - Polycarbonate shade structure preliminary detail (Author 2014)
- Figure 101 - Perspex shelter structure (Author 2014)
- Figure 98 - Feature wall final detail (Author 2014)
- Figure 99 - Feature wall Plasmacut artworks (Author 2014)
- Figure 100 - Polycarbonate shade structure preliminary detail (Author 2014)

8. APPENDIX A – SUSTAINABLE SITES INITIATIVE SITES V2 RATING SYSTEM

Project Name: Indawo Yami - A catalyst for quality open space in a low cost housing community

Project ID#: 26508223 Date: 29 October 2014

SITES v2 Scorecard Summary

YES	?	NO			
10	0	0	**1: SITE CONTEXT**	**Possible Points:**	**13**
Y			**CONTEXT P1.1**	Limit development on farmland	
Y			**CONTEXT P1.2**	Protect floodplain functions	
Y			**CONTEXT P1.3**	Conserve aquatic ecosystems	
Y			**CONTEXT P1.4**	Conserve habitats for threatened and endangered species	
3			**CONTEXT C1.5**	Redevelop degraded sites	**3 to 6**
4			**CONTEXT C1.6**	Locate projects within existing developed areas	**4**
3			**CONTEXT C1.7**	Connect to multi-modal transit networks	**2 to 3**
3	0	0	**2: PRE-DESIGN ASSESSMENT + PLANNING**	**Possible Points:**	**3**
Y			**PRE-DESIGN P2.1**	Use an integrative design process	
Y			**PRE-DESIGN P2.2**	Conduct a pre-design site assessment	
Y			**PRE-DESIGN P2.3**	Designate and communicate VSPZs	
3			**PRE-DESIGN C2.4**	Engage users and stakeholders	**3**
21	0	0	**3: SITE DESIGN - WATER**	**Possible Points:**	**23**
Y			**WATER P3.1**	Manage precipitation on site	
Y			**WATER P3.2**	Reduce water use for landscape irrigation	
5			**WATER C3.3**	Manage precipitation beyond baseline	**4 to 6**
5			**WATER C3.4**	Reduce outdoor water use	**4 to 6**
5			**WATER C3.5**	Design functional stormwater features as amenities	**4 to 5**
6			**WATER C3.6**	Restore aquatic ecosystems	**4 to 6**
21	14	0	**4: SITE DESIGN - SOIL + VEGETATION**	**Possible Points:**	**40**
Y			**SOIL+VEG P4.1**	Create and communicate a soil management plan	
Y			**SOIL+VEG P4.2**	Control and manage invasive plants	
Y			**SOIL+VEG P4.3**	Use appropriate plants	
	6		**SOIL+VEG C4.4**	Conserve healthy soils and appropriate vegetation	**4 to 6**
	4		**SOIL+VEG C4.5**	Conserve special status vegetation	**4**
6			**SOIL+VEG C4.6**	Conserve and use native plants	**3 to 6**
	4		**SOIL+VEG C4.7**	Conserve and restore native plant communities	**4 to 6**
5			**SOIL+VEG C4.8**	Optimize biomass	**1 to 6**
4			**SOIL+VEG C4.9**	Reduce urban heat island effects	**4**
2			**SOIL+VEG C4.10**	Use vegetation to minimize building energy use	**1 to 4**
4			**SOIL+VEG C4.11**	Reduce the risk of catastrophic wildfire	**4**
32	0	0	**5: SITE DESIGN - MATERIALS SELECTION**	**Possible Points:**	**41**
Y			**MATERIALS P5.1**	Eliminate the use of wood from threatened tree species	
2			**MATERIALS C5.2**	Maintain on-site structures and paving	**2 to 4**
4			**MATERIALS C5.3**	Design for adaptability and disassembly	**3 to 4**
3			**MATERIALS C5.4**	Use salvaged materials and plants	**3 to 4**
4			**MATERIALS C5.5**	Use recycled content materials	**3 to 4**
5			**MATERIALS C5.6**	Use regional materials	**3 to 5**

YES	?	NO			
21	5	0	**6: SITE DESIGN - HUMAN HEALTH + WELL-BEING**	**Possible Points:**	**30**
	2		**HHWB C6.1**	Protect and maintain cultural and historic places	**2 to 3**
2			**HHWB C6.2**	Provide optimum site accessibility, safety, and wayfinding	**2**
2			**HHWB C6.3**	Promote equitable site use	**2**
2			**HHWB C6.4**	Support mental restoration	**2**
2			**HHWB C6.5**	Support physical activity	**2**
2			**HHWB C6.6**	Support social connection	**2**
4			**HHWB C6.7**	Provide on-site food production	**3 to 4**
	2		**HHWB C6.8**	Reduce light pollution	**4**
4			**HHWB C6.9**	Encourage fuel efficient and multi-modal transportation	**4**
	1		**HHWB C6.10**	Minimize exposure to environmental tobacco smoke	**1 to 2**
3			**HHWB C6.11**	Support local economy	**3**
6	6	0	**7: CONSTRUCTION**	**Possible Points:**	**17**
Y			**CONSTRUCTION P7.1**	Communicate and verify sustainable construction practices	
Y			**CONSTRUCTION P7.2**	Control and retain construction pollutants	
Y			**CONSTRUCTION P7.3**	Restore soils disturbed during construction	
4			**CONSTRUCTION C7.4**	Restore soils disturbed by previous development	**3 to 5**
	3		**CONSTRUCTION C7.5**	Divert construction and demolition materials from disposal	**3 to 4**
	3		**CONSTRUCTION C7.6**	Divert reusable vegetation, rocks, and soil from disposal	**3 to 4**
2			**CONSTRUCTION C7.7**	Protect air quality during construction	**2 to 4**
14	5	0	**8. OPERATIONS + MAINTENANCE**	**Possible Points:**	**22**
Y			**O+M P8.1**	Plan for sustainable site maintenance	
Y			**O+M P8.2**	Provide for storage and collection of recyclables	
5			**O+M C8.3**	Recycle organic matter	**3 to 5**
5			**O+M C8.4**	Minimize pesticide and fertilizer use	**4 to 5**
	2		**O+M C8.5**	Reduce outdoor energy consumption	**2 to 4**
	3		**O+M C8.6**	Use renewable sources for landscape electricity needs	**3 to 4**
4			**O+M C8.7**	Protect air quality during landscape maintenance	**2 to 4**
3	6	0	**9. EDUCATION + PERFORMANCE MONITORING**	**Possible Points:**	**11**
3			**EDUCATION C9.1**	Promote sustainability awareness and education	**3 to 4**
	3		**EDUCATION C9.2**	Develop and communicate a case study	**3**
	3		**EDUCATION C9.3**	Plan to monitor and report site performance	**4**
5	0	0	**10. INNOVATION OR EXEMPLARY PERFORMANCE**	**Bonus Points:**	**9**
5			**INNOVATION C10.1**	Innovation or exemplary performance	**3 to 9**

YES	?	NO		
136	36	0	**TOTAL ESTIMATED POINTS**	**Total Possible Points: 200**

KEY	SITES Certification levels	Points