ARCHITECTURE OF PARTICIPATION

CENTRE FOR RURAL DEVELOPMENT, CARNARVON, NORTHERN CAPE

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A Design Study for a Centre For Rural Development and Social Upliftment.

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Study Leader: Mr. Jan Ras

Summary

I. Project background

The design is a centre for rural development to incorporate the different sectors of the community in Carnarvon in the Northern Cape, specifically focusing on the poorer areas. The complex has three main sections, namely commercial, educational and production. The client is Kareeberg municipality and the Heritage committee of the town that forms the link with the inhabitants. The commercial section of this project will be the generator of income where space can be rented for other businesses consisting of formal and informal areas. The program arose from the needs of the community. Square Kilometre Array (SKA) will provide funding for the project as part of their community projects.

The project originated from an interest in the social impact of architecture. Carnarvon was considered as a possible area after an introduction to Miss. Anita Venter. Miss. Venter is a researcher at the faculty of Economic and Management sciences' Centre for Developmental Support, at the University of the Free State. She is currently busy with her PHD in social housing. The project developed in the Karoo, after a visit to Carnarvon and interviews with Mr. Heinrich Jansen and the community. Mr. H. Jansen is the Chairman of the Heritage Committee.

II. Broad overview of the current situation

The town of Carnarvon consists of people from mixed cultural groups. It has limited natural resources, stunted development over time, and a slow economic growth rate. The main characteristic is the marked socio-economic deprivation, and the visible effects thereof, such as dilapidated houses, limited job opportunities, severe poverty, and alcohol abuse. The town carries the developmental layout of so many segregated towns from the apartheid era, where there is a definite separation between the poorer and wealthier areas. The typology in the area is typical Karoo vernacular. The locally available building materials are earth bricks, fired bricks, stone, and reeds.

It is quite clear that the historical development, both from an architectural and socio-economical point of view, determined the current situation in Carnarvon and that outside influences played a minor role.

III. Research progress

Through conversations with Miss. A. Venter and Mr. H. Jansen, the need for a community development centre was identified.

Carnarvon was visited and interviews with the community were conducted. The purpose was to discuss the availability of a suitable site. As such, a site was identified, and further interviews were conducted in order to gather relevant information pertaining to the design of the centre. The process ran over a period of one week and the following was documented:

- The socio-economic status,
- The architectural character,
- Traditional building methods concerning earth construction.

During a second visit, significant results were obtained from an informal study conducted with the help of some of the children in the town to better understand the spatial perceptions of the people of Carnarvon. An investigation was also conducted into the surrounding areas, including the town Williston and settlement, Van Wyks Vlei, to investigate building materials and skills availability.

A final visit was conducted in order to take further site measurements and to take part in the Williston's winter festival helping with the game stand as most of the population of Williston participated.

Through the design process, concept sketches were sent to the Heritage committee of the town for feedback on the design. Conceptual drawings and models were developed. The theory is integrated with the practical applications throughout the design process.

The process was duly documented, resulting in this document.

This document has been submitted as partial fulfilment of the requirements of the degree Master of Architecture (Professional) at the University of the Free State.

The research in this document is entirely my own, unless otherwise stated

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My mother for all the motivation, love and belief.
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The community of Carnarvon as a whole and specifically:

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Table of Contents

Chapter 1 15
1. Theoretical argument 15
1.1. Problem statement 15
1.2. Architecture of participation 16
1.2.1. Children's models 22
1.2.2. Precedent studies 28
1.2.2.1. Nieuwoudtville Caravan site upgrade 28
1.2.2.2. Art Therapy Centre in Soweto 29
1.2.2.3. Nianing, Senegal. 29
1.2.2.4. Mexicali Project, Mexico 30
1.2.2.5. Woman's Centre, Rufisque, Senegal.

1995-2001 31

Chapter 2 33
2. Town Study 33

2.1. Introduction 33
2.2.1. Typical Karoo Town 34
2.2.2. History of Carnarvon 36
2.2.3. Entrances to Town 38
2.2.4. Town Siting and Layout 38
2.2.5. Topography 38
2.2.6. Geology 39
2.3. Urban 40
2.3.1. Town block analysis 41
2.3.2. Landscaping 42
2.3.2.1. Streets of Carnarvon 42
2.3.3. Townscapes 43
2.3.4. Town centre 44
2.3.5. Streetscapes 45
2.4. Institutions 47
2.4.1. Church building 47
2.5. House 47
2.5.1.Public/private transitions 48
2.5.2. Proportion 50
2.5.3. Solid void 51
2.5.4.Typologies of area 52

Chapter 3 55
3. Site analysis 55
3.1. Noise 56
3.2. Vehicles 56
3.3. Surrounding areas 56
3.4. Plant growth of area and site 57
3.5. Cultural 59
3.6. Pedestrians 59
3.7. Typology 60
3.8. Public /private 60
3.9. Climate 60
3.10. Soil types 61
3.11. Water sources 61

Chapter 4 63
4. Buildings in semi arid-arid regions 63
4.1. Local environment and adaptations 64
4.3. Controlling sun exposure 64
4.3.1. Screens 64
4.3.2. Vegetation 64
4.5. Walls 65
4.6. Roof systems 65

4.7. Orientation 66
4.8. Courtyard spaces 66

Chapter 5 69
5. Precedent studies 69
5.1. Historical precedents 70
5.1.1. Karoo Houses 70
5.2. Context and typology 73
5.2.1. Sally house 73
5.2.3. Carnarvon 74

Chapter 6 77
6. Accommodation list 77

Chapter 7 81
7. Material study 81
7.1. General 82
7.1.1. Stabilizers 82
7.1.2. Characteristics of soil 82
7.1.3. Straw clay for roof insulation 82
7.1.4. Poured earth for paving 83
7.1.4.1. Paving 83
7.1.5. Design guidelines 83
7.1.5.1. Base course 83
7.1.6. Adobe 84
7.1.6.1. Multiple mould method. 84
7.1.7. Walls 84
7.1.8. Ring beams 85
7.1.9. Openings 85
7.1.10. Roof 85

Chapter 8 93

8. Touchstone 93
8.1. Touchstone 94
8.2. Paradigm shift. 96

Chapter 9 99
9. Design Process 99
9.1. Planning 100
8.1. Introduction 100

Chapter 10 151
10. Design synthesis 151
10.1. Introduction 152
10.2. Site 154
10.3. Layout 155
10.4. Streetscapes 156
10.5. Centre 157
10.5.1. Climatic considerations 158
10.5.1.1. Screens (Passive Ventilation) 158
10.1.5.2. Courtyard spaces 160
10.1.5.3. Openings 162
10.5.1.4. Walls 162
10.5.1.5. Roof 162
10.5.2. Material use 168
10.5.3. Typology, proportion and solid/void ratio. 168
10.5.4. Pedestrian walkways 169
10.5.5. Water sources 170
10.5.6. Transformation 170
10.6. Commercial 171
10.6.1. Placement on site 171
10.6.2. Building heights 174
10.6.3. Plan form 174
10.6.4. Vegetation 174

10.6.5. Public/private 174
10.7. Education 176
10.7.1. Placement on site 176
10.7.2. Building heights 178
10.7.3. Plan form 178
10.7.4. Public /private 178
10.7.5. Vegetation 180
10.8. Production 182
9.8.1. Placement on site 182
10.8.2. Plan form 184
10.8.3. Vegetation 184
10.8.4. Public /private 184
10.9. Conclusion 189

I. Introduction

Architecture is the expression of our inner structure, our interpretation of the world manifested. Once expressed, it creates a place where man is able to dwell. Architecture is the backdrop against which our lives unravel and becomes an expression of the social condition.

Our interpretation of the world in terms of architecture is grounded in three main categories, namely context, program and precedents. Considering these categories creates a design that is in harmony with the entirety of its environment. Once we start interpreting the world around us, our perception thereof changes; we become aware in our understanding. In order for an appropriate design solution to emerge, we undergo a process of insight that is slowly unveiled through the course of systematic analysis.

The methods applied to define the design parameters are: architecture of participation, town analysis, precedent studies, and material study. The design is a sensitive response to the local environment, promoting the public realm and addressing social needs.

The centre is divided into three sectors, namely commercial, educational and production. Each of these divisions are interrelated and integrated, forming a cyclical process of development. Locally available materials and labour are used, reinstating traditional building methods for skills development and transfer of knowledge. The project commences in phases, as funding becomes available. The buildings are multi-functional and can accommodate a variety of functions.

There is a desperate need in Carnarvon for development, especially on a social and economic level. Poverty, alcoholism, unemployment and lack of sufficient housing are some of the main areas of concern. The project aims to alleviate the dependency on economical and political situations, enabling the people to become self-sufficient.

i. Brief outline

This thesis presents the design for a Centre for rural development in Carnarvon, Northern Cape. The project responds to the need for social upliftment and skills development within the town and explores three specific issues:

- Participatory architecture as a means to stimulate community development
- The town fabric
- Town grid and densification



ii. Argument

The inherent understanding of the way space is perceived and interpreted by the community is important, in order to propose a design that responds to the prevailing social conditions. A need exists to reconcile the existing town order on site while responding to the town fabric in an appropriately sensitive way.

Chapter 1

1. Theoretical argument

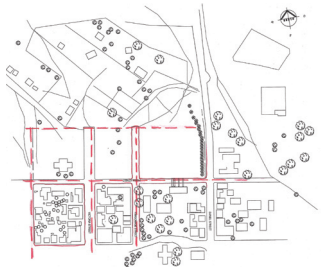
1.1. Problem statement

An investigation into participatory architecture is performed, reconciling the need for urban order and contributing to the emergence of a sound urban grain.

Architecture of Participation



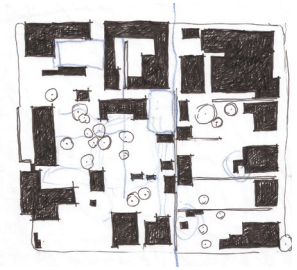
Urban order

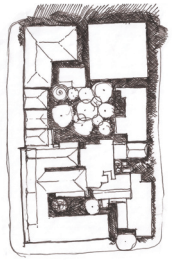


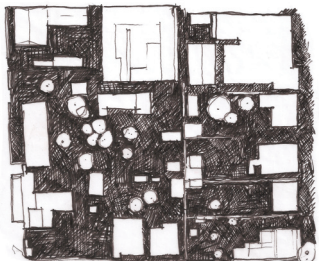


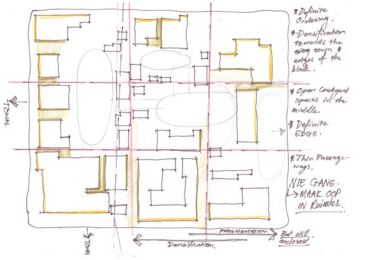
1.1. Redrawn by Author. Illustration of map by F.D.J. du Toit

Urban Grain











1.2. Man in doorway. Photo by: A. Venter

1.2. Architecture of participation

Many public buildings today are difficult to access and convey a message of isolation and fear, destroying civic space. The public, for whom the buildings are built, have little or no say in the processes involved. The inherent meaning that links architecture and people are lost. Public buildings need to create a place that is made safe through social interaction, creating places that are vibrant with life, engaging people rather than alienating them through a process of community involvement. [1]When places come into being through a process of community involvement it increases the sense of empowerment rather than stimulating a lifestyle of dependency in the community (Day, 2002: 151).

Can a building process not be one of community involvement, where community participation becomes the method for the design process? [2]The process of community participation considers the people's opinions, needs and experiences and how the community can become involved in the building process to benefit from the end product. The decision making process is not solely based on philosophical, intellectual or individual decision making, but takes the people, the social aspects of the area into consideration. (Nicholson, 1975: 5) Carnarvon is a small town and the community was approached as a whole, widening the scope of involvement. The town still carries scars of the apartheid era and therefore

1 Philip Bess expresses two world views – Communitarianism and Emotivism. The two ideologies are derived from Nietzsche and Aristotle. Aristotilean ideals focus on the virtue of the individual to strive towards a communal goal whereas Nietzschean ideals are more focused on the individual that is governed by rules rather than virtue (Bess cited in Nesbitt, 1996:372). Bess speaks of a revival of civic life and the way in which public buildings become backdrops that cause alienation rather than engagement. Bess poses the question: is virtuous civic architecture capable of inspiring virtuous behaviour? (Bess cited in Nesbitt, 1996:380)

2 Giving more attention to the intangible factors of design, making use of a mobile studio, where the design process does not necessarily play out in a studio or office. The idea of the mobile studio is one where a team of designers physically interact with the community to stimulate community participation. Also not simply trying to involve the community only after the project is done, but making the community an integral part of the whole design process (Schaug, 2008: 64-65).

it is important to involve the community as whole. [1] This way a connection can start to develop between the different sectors of the town and the whole community, contributing to the decision making process of the project (Nicholson, 1975: 11).

The town is divided into four sectors: Bonteheuwel, De Bult, Bo-dorp and Onder-Dorp, three of which are inhabited by the coloured communities of the town. The people from the different sectors were informally interviewed, walking from house to house. The aim of the interviews was to obtain information concerning the people's way of life, trying to understand what they wanted and needed and how they perceived space. The design program should originate from the community's needs (Day, 2002: 151).

1Creating a socially responsible project, by not excluding a certain part of the community that may further the inherent problems in the town. Addressing the social issues before the damage becomes irreversible. (Ghirardo, 1984: 110-115)



1.3. Two women sitting. Photo by: A. Venter



1.4. Donkey at brickworks. Photo by: A. Venter



1.5. Street play. Photo by: A. Venter

During the interviews, it became evident that there are different skills located in the different town sectors. Integration of these sectors is required for skills transfer and further development. [1]Construction experience, brick making, needlework, indigenous knowledge of the area and vegetation are some of the skills located within these sectors. During the interviews an official of the municipality explained that the indigenous knowledge on corbel hut building methods are lost; no one knows how to build one anymore and this becomes an important consideration for the design. The different parts though are more integrated than they believe. In a city, such as Bloemfontein, a language barrier exists between the different cultural groups. In Carnarvon, everyone speaks Afrikaans. In bigger cities, crime is rampant, while in Carnarvon it is almost non-existent. This in itself is very significant and should not be taken for granted.

The people working at the informal brickyard near Bonteheuwel have an acute knowledge pertaining to the different types of soil, and where to obtain the materials. The brick makers use ash for firing their bricks. The ash though is gathered at the garbage heaps, the same place where the abattoir dumps biological waste matter. Obviously, there are health risks involved, considering the decomposition and flies.

If the tradition of building with earth could be re-introduced, eliminating the firing process, their quality of life will be improved.









1.6. Donkey and men at brickyard. Photo by: A. Venter



1.7. Men at work. Photo by: A. Venter



1.8. Brickyard at work. Photo by: A. Venter

4. Hillier and Hanson (1984: 28) speak of a 'designed environment that does not 'work' socially and even generates the social problems such as isolation, physical danger, community decay and ghettoisation. The fault comes in, in the basic assumption that separation was good for the community; that hierarchisation of space was good for relations between groups and the notion that society by its very virtue should be classified into groups to keep out any strangers.

The Mayor of the town was consulted on the availability of land for the development of the centre. A viable site was identified. The community was also consulted on the location of the site and consensus was reached. The site is centrally located, accessible and becomes a point of convergence between the different sectors. Space needs to be understood in the social and contextual sense of the word for a responsive design solution to emerge. “We read space and interpret a lifestyle” (Hanson, 1984: 27).
The interview process proved unsuccessful regarding the spatial and aesthetic quality of the building. It was explained that the interviews were for research purposes only. No suggestions regarding the aesthetics of the building were given. When asked, most did not know, while others became self-conscious.

When asked their opinion on Earth construction, the people knew that most of the buildings in the town were built with clay and some remembered living in Van Wyks Vlei, having to knead clay with their feet. There were very few negative responses to the material and the people who are still living in Van Wyks Vlei in the mud houses were very satisfied and had few complaints pertaining to the type of material used.















The main problems identified within the town were alcoholism and unemployment. Alcoholism is a very serious problem, especially in the poorer areas of the town. This furthers the rifts that already exist within the community. There is a misconception that all the people in the poorer areas are alcoholics. This is not the case. There are alcoholics, but there are also those struggling to keep their families together and transcend their circumstances.

On interviewing the people who live at the foot of Bonteheuwel, early in the morning, some of them were already intoxicated. The area though was well kept with beautiful flower gardens and numbering on all the informal dwellings. The dwellings were meticulously kept on the inside and one woman asked for a photo with a gum pole. She salvaged it for the house she wanted to build for herself. During the interview process, the people were asked how they felt about building their own homes. They felt that they would build their own homes as long as it meant having a house to call their own. Many of the people in the poorer areas of the town had problems with their roofs that leaked and the houses were in desperate need of repair and maintenance. This was not the case in Williston, a neighbouring town. Within the poorer community of Williston, a carpenter and builder were found. The houses are in a better condition and very few of the roofs leaked. The houses also have less partition extensions as is found in Carnarvon. If there are skills within a community, the community as a whole benefits from it.

















1.9. Ladies from Carnarvon. Photo by: A. Venter



1.10. Street play. Photo by: A. Venter



1.11. Informal brick yard. Photo by: A. Venter



















1.12. Informal brickyard. Photo by: A. Venter







1.2.1. Children's models

Alternative methods were used to try to understand how the people relate to their environment and how they perceive space.

A member of the heritage committee who is involved in community projects began 'Rommel Toerisme' (Garbage Tourism). Groups of children around the town are asked to help keep their part of town clean and afterwards they are provided with a well-balanced meal.

'Rommel Toerisme'



1.13. Photos by: A. Venter

A group of children involved in the 'Rommel Toerisme' program were asked to assist in better understanding the way in which the people perceive space. On site, the children were asked to build clay models of how they think the project should look. The children were asked to build a building that they thought would help solve the problems in the town. Soil from site was mixed with water to form mud. The children were then asked to gather materials on site for model building. Most of the children though, built houses rather than public buildings. The children were very enthusiastic and had no trouble building the models. They were very comfortable with the material and decorated the models with flowers and small stones. The children were very proud of their work and enjoyed being photographed with their models.

Process

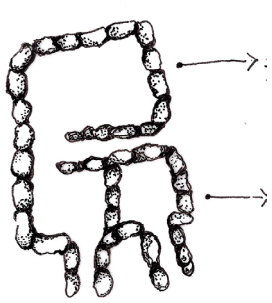


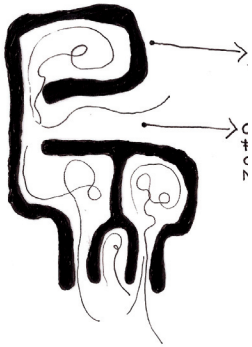
1.1.4. Process of Participation. Photo by: C. Moretti.

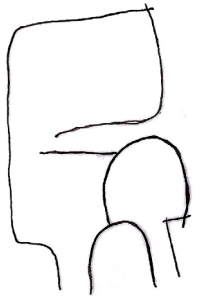
A very clear indication on how space is perceived was made evident through the models. The models were very organic, and such organic forms were in contrast to the context of the town. It was decided that the organic forms could have originated from the type of building material given. The models were then redrawn, as though, built with blocks, rather than mud and the results were astounding.

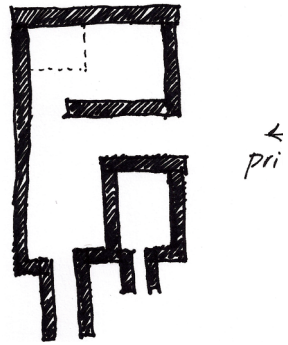












Children Model Sketch Organic Line Formalised

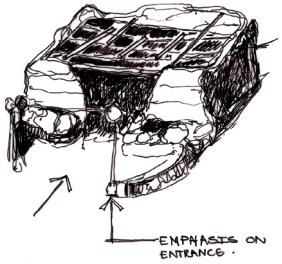
Christopher Day uses a similar technique of participatory design where he takes adults to the site and gives them clay or plasticine to build what they think their houses should look like. The results were very unrealistic and the buildings resembled fantasy buildings (Day, 2002: 153). In the case of the children, after formalising the models, their buildings were very realistic, mimicking typical Karoo house layouts. Boundaries and thresholds were conveyed and a transition from public to private. The entrance was very important and most had outside spaces for gardens. One of the children even built an area for his sheep and his dog.
The author have visited and kept in touched with the Carnarvon community. This was necessary to determine site specifications, to facilitate community involvement and provide feedback on progress. See Appendix A.



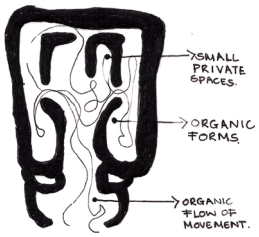
Children



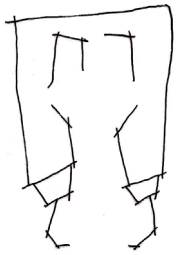
Model



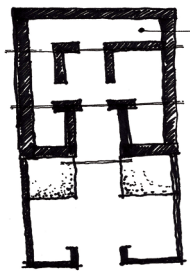
Sketch



Organic



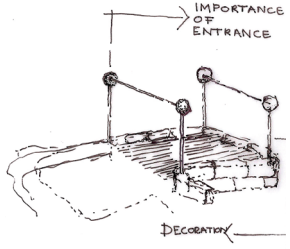
Line

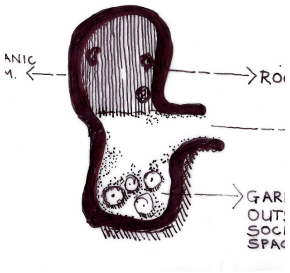


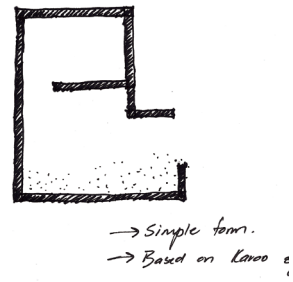
Formalised





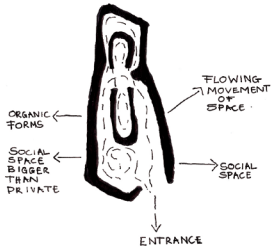


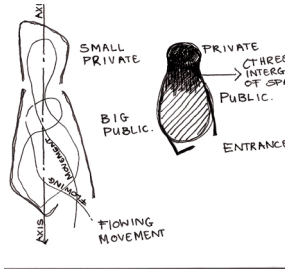


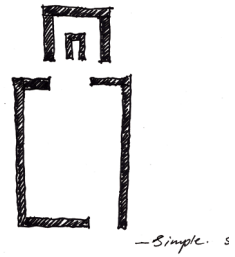






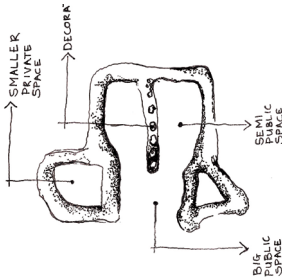


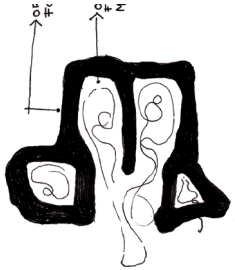


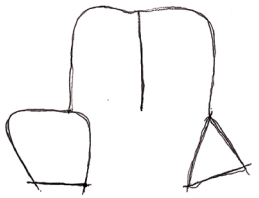


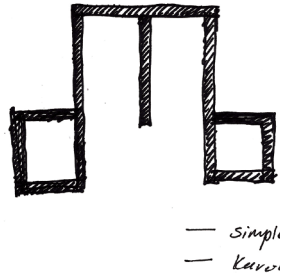












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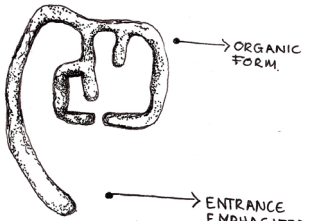

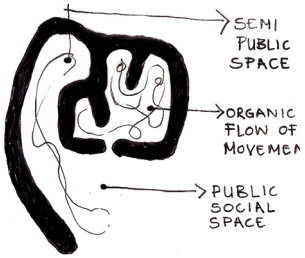



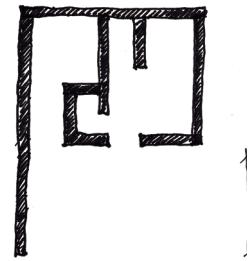





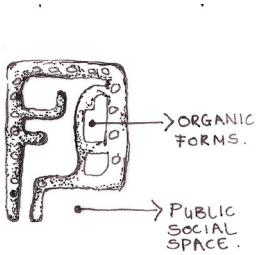

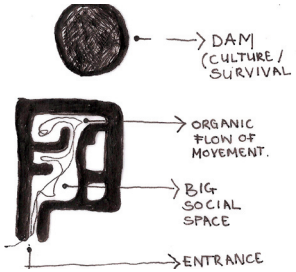

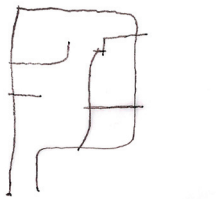

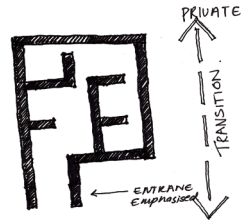





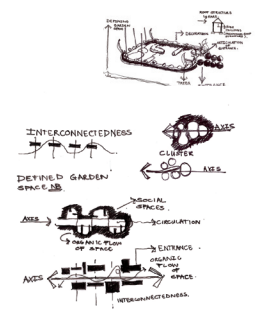

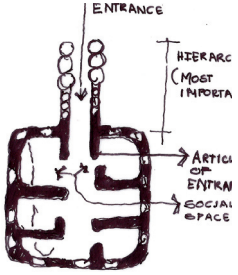

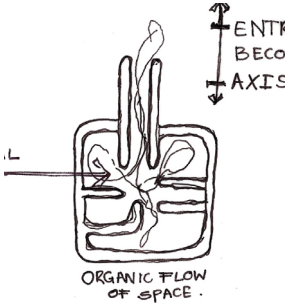

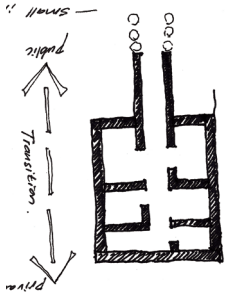

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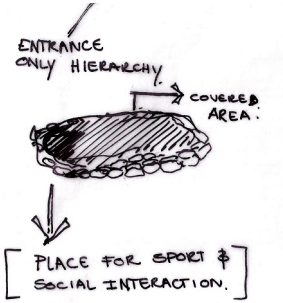

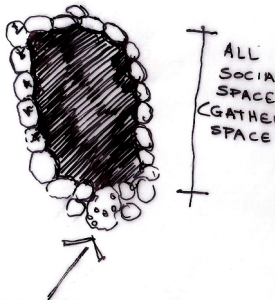

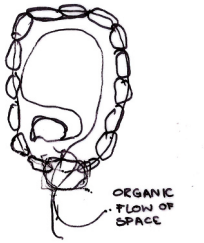

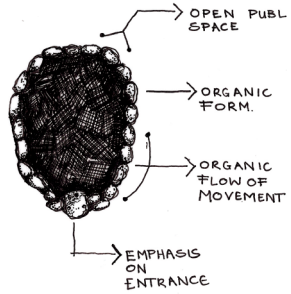





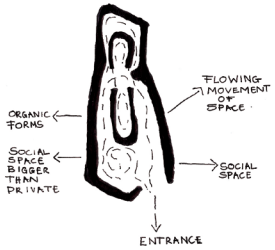

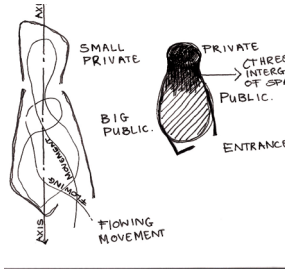

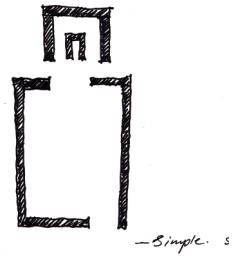





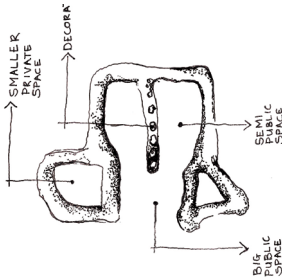

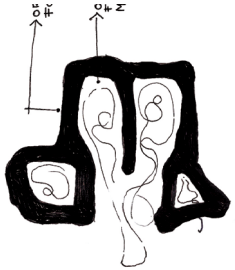

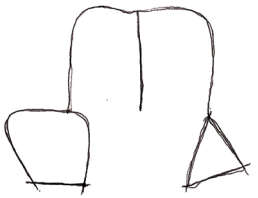

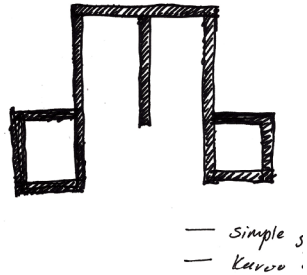

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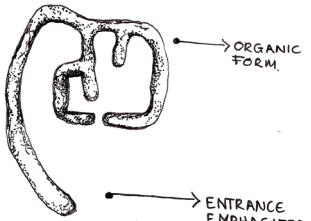
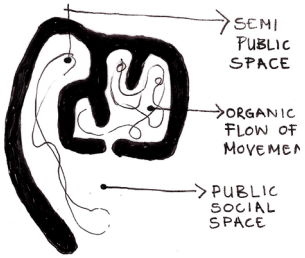
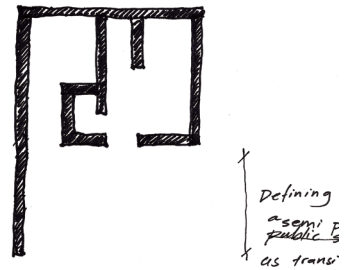








1.2.2. Precedent studies

1.2.2.1. Nieuwoudtville Caravan site upgrade

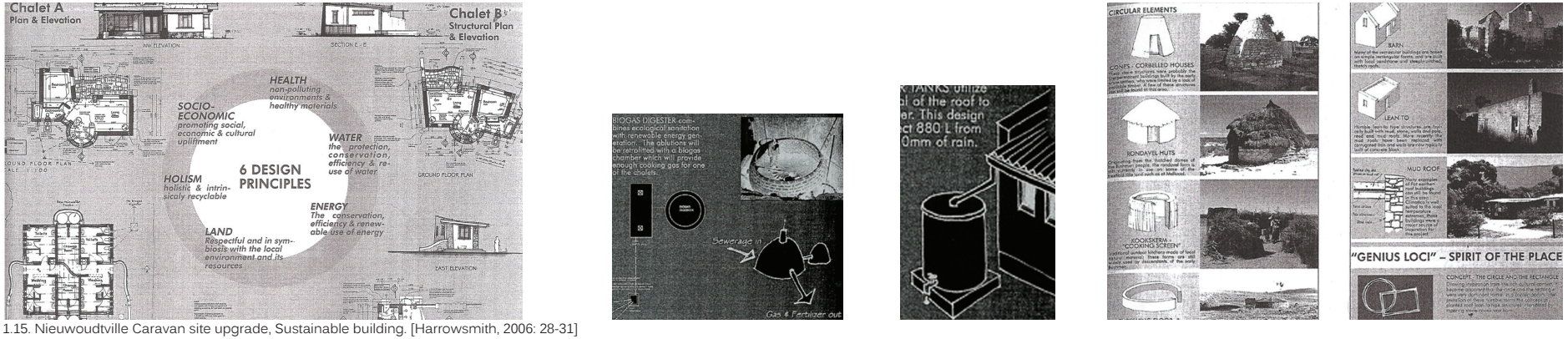
Architects: Eco Design Architects

A regional tourism strategy was developed to form a partnership with the local community in a five-day design gathering held by Convention International.The design gathering ensured that the community was involved in the first stages of the design and had an asset in the project. The architects used local labour, products and materials.

One of the projects' main aims was to focus on high community involvement throughout the project and how to incorporate community participation in the long term as well as the short term. The project required tenders; mostly local people took part. The Development Bank of Southern Africa Knowledge Management Division's Construction Specialist, Glenn Havemann made recommendations that would involve the community in the decision making processes as well as the processes that followed. He suggested a community–based procurement process be implemented. The process allowed for a very high level of community involvement, skills transfer, as well as economic development. The money used for the construction of the building was filtered back into the community (Harrowsmith, 2006: 28-31).

Conclusion

Community involvement creates a meaningful relationship between the people and the project. The people who live in the area, who understand the way the area functions, manage the project. Skills development takes place, strengthening the community. The typologies in the area were incorporated into the design, sensitively integrating the design into its surroundings.



1.15. Nieuwoudtville Caravan site upgrade, Sustainable building. [Harrowsmith, 2006: 28-31]

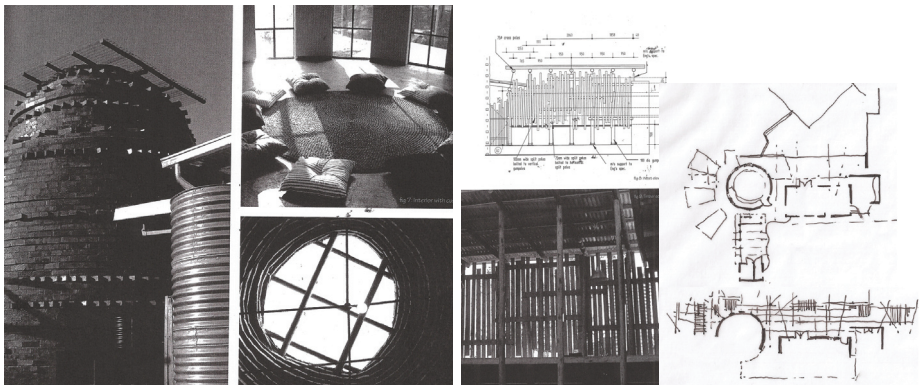
1.2.2.2. Art Therapy Centre in Soweto

Architect: Kate Otten Architects

Within this project, Kate Otten designed certain details in the building that gave the builder freedom to be creative and thus become a part of the design process. The detailing was still structured in line with the inherent design intention, but with detailing such as the fixing of the columns and secondary elements, the contractor was given a choice. The dome's height, entrance, and exact placing were specified, but the texture and brickwork patterns were rough sketches, photographs, and demonstrations developed by the architect. First, the builders would have produced a demonstration, but after a week, the dome was built and presented with enthusiasm. The dome has a human quality to it that is difficult to find in a finely planned design (Wolff, 2008: 22-25).

Conclusion

Some form of freedom needs to be given to the community, the people who build the project. This gives the design a sense of meaning, even to the people who build it.



1.16. Kate Otten's working method. [Wolff, 2008: 23-25]

1.2.2.3. Nianing, Senegal.

Architects: UNESCO/BREDA (Kamal El Jack, Pierre Bussat, Oswald Dellicour, Sjoerd Nienhuys, Christophorus Posma and Paul de Wallik), Dakar, Senegal
Client: Ministry of Education, Dakar, Senegal
Sponsor: CARITAS (Frère Romuald Picard), Dakar, Senegal
Completed in 1977

The people who are currently using the facilities, derived from a prototype developed by UNESCO, developed this project. The prototype was applied and they were able to build the building themselves. Soil-cement was used in the construction with beautiful arches that span the width between the walls defining the interior spaces. A local craftsman was trained in the construction techniques employed in the project and he in turn trained others.

Conclusion

The project made use of skills development and simple construction methods that involved the community and created employment opportunities (Agricultural training centre, Nianing, Senegal,[s.a.]: online).



1.17. Agricultural training centre,Nianing, Senegal [Online]

1.2.2.4. Mexicali Project, Mexico

Architect: Christopher Alexander.,1975-1976,Housing
Materials: Soil-cement; lightweight concrete roofs
Climate: arid region
Context: rural

Sponsorship was given by the governor of Baja California. The project focused mainly on housing and community buildings. The Mexicali project commenced with the community building. The community building laid the groundwork for the housing scheme and was used for material experimentation and training. During the building process the community building became the place where equipment was stored and where the community gathered after a long day's work. The families were intensely involved and their individual needs looked after. The families built their own houses. The methods employed were simple, adaptable, and highly understandable causing variations in the design, but still reading as a cohesive unity.

A small brickyard was formed on site; a method using vaults was developed. The vaults were woven baskets and lattice strips in congruence with burlap and chicken mesh stapled to it and then plastered.

The project identifies problems and found solutions. Intense community involvement proved very successful in this project and the community involvement became the generator of the design, creating a meaningful relationship between the community and their architecture. (Mexicali project, [s.a.]: online).

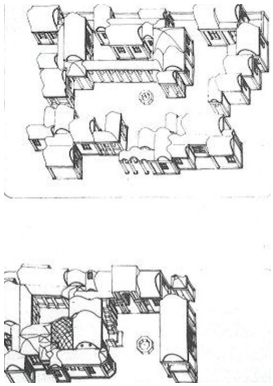


1.18. Mexical project [Online].









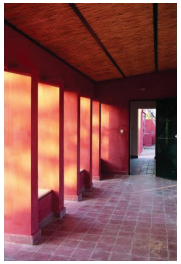
1.19. Mexicali, Mexico [Online].

1.2.2.5. Woman's Centre, Rufisque, Senegal. 1995-2001

Architects: Hosllmén Reuter Sandman Architect.
The building was carried out as an NGO project through 'Tekniska Föreningen i Finland' and was financed by the Finnish Foreign Ministry, the Senegalese-Finnish Association ARC. The project was managed by Hollmén Reuter Sandman

The concept and spatial program of the buildings was developed with the local woman's groups. The centre is used to create a safe social space for the woman. There are also literacy courses and the woman do needlework and make homemade foods that are sold for income. The plot was donated by the city. The building was built according to West African tradition, this being the way in which the women perceive space and in which they feel safe. The buildings form an internal courtyard space that filter public and private areas. The facades are simple, yet the colour brings it to life. The project emphasises how the inherent way in which the people experience space is manifested in architecture (Hollmén, 2008: 14-17).






1.20. Women's Centre, Rufisque, Senegal [Online].

Conclusion
What was gathered from the whole process of interacting with the community was that there are inherent problems that need solving, problems such as alcoholism, unemployment, low standard living conditions, and a sense of powerlessness. From the models were found that the people living in Carnarvon have a very good understanding of the vernacular architecture found in the town and that it forms part of their identity. This in turn informs the design. The people in the town identify with a specific type of architecture, an architecture that is very specific to the area that they live in. The community needs to be involved from the beginning to the end of the project for the project to have social meaning, and to create an environment that the people can relate to as well as understand
.
The design asks for a place where the people can gather, an oasis, where people can sit, talk, and interact. It is such a beautiful town with a rich historical background, but people stand around the church square intoxicated and some passed out, lying on the pavement, empty bottles lying everywhere. The people do not have anything to do. They have no-where to go where they are in a positive reinforcing environment, where they can socially interact and do something constructive that will empower them to improve their living conditions, relieving the constant image of intoxicated people on the side walk.

Chapter 2

2. Town Study

2.1. Introduction

Christian Norberg-Shultz in his Concept of dwelling, on the way to figurative architecture, (1985: 12) defines four modes of dwelling, namely settlement, urban space, institution and house.

“To dwell implies the establishment of a meaningful relationship between man and a given environment. In the introduction, it has been suggested that this relationship consists of an act of identification, that is, in a sense of belonging to a certain place. Man, thus finds himself when he settles, and his being-in-the-world is thereby determined. On the other hand, man is also a wanderer. As homo viator, he is always on the way, which implies a possibility of choice. He chooses his place, and hence a certain kind of fellowship with other men. This dialectic of departure and return, of path and goal, is the essence of that existential “spatiality” which is set into work by architecture” (Norberg-Shultz, 1985: 12).

The town Carnarvon will be analysed according to these four modes, as it can serve as a workable model for the current project.



2.1. Street view. Photo by: A. Venter

2.2. Settlement

Understanding settlement, according to Norberg-Shultz is the study of the natural environment,"since a settlement can only be understood in relation to its surroundings." (Norberg-Shultz, 1985: 12) ".. but an already existing place also has to be understood as a settlement, that is, as an answer to the original problem of finding a foothold in a given world" (Norberg-Shultz, 1985: 12). The function of a settlement is one of place encounter and the exchange of products, ideas, and sentiments (Norberg-Shultz, 1985: 12).

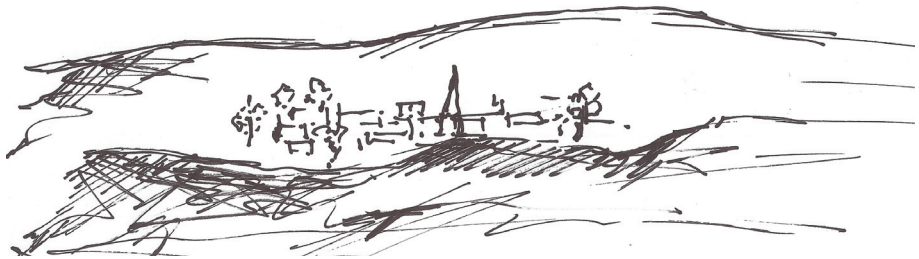


2. Photo by: A. Venter

2.2.1. Typical Karoo Town

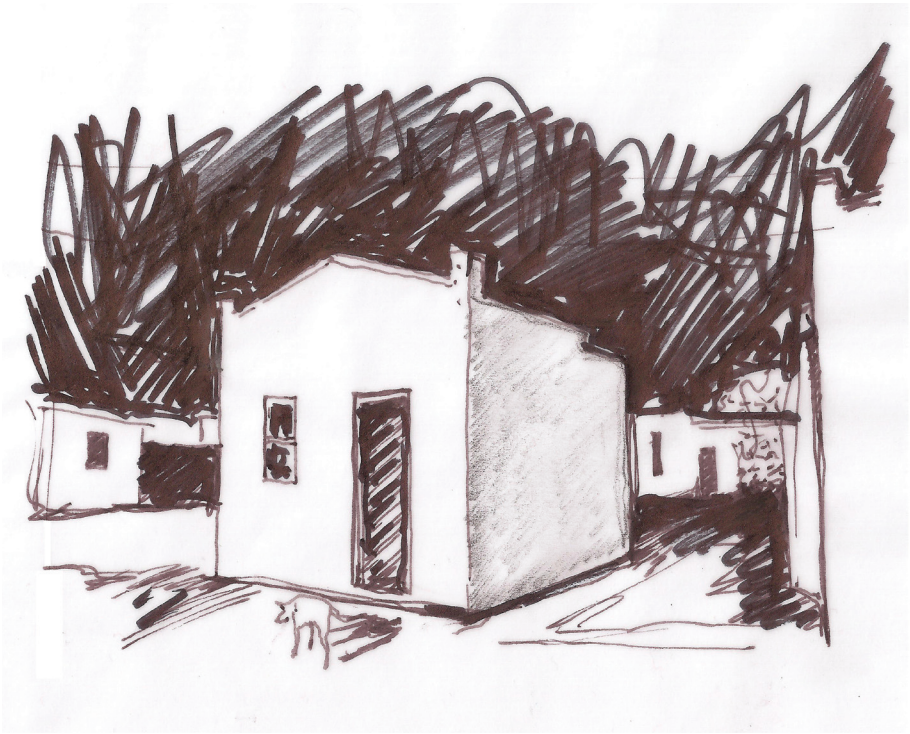
Cities today are conglomerates of many different styles and ideas, bombarding the visual experience of the city with an overlay of different compositions and technologies. There is no space to breathe. Human contact becomes diluted to a formal politeness where people are unconcerned with one another.

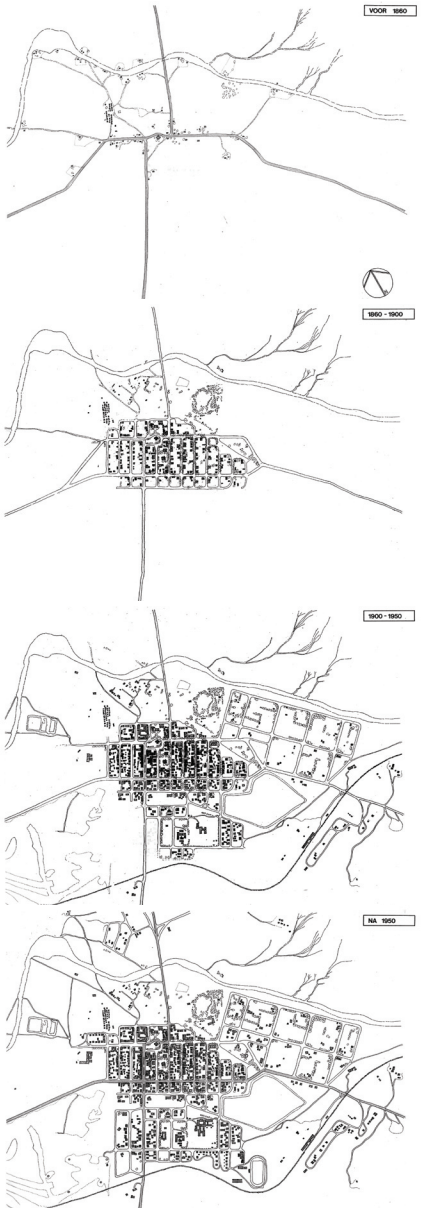
A Karoo town stands in stark contrast to this. Life is simplified, filtered to its essence. Resources are scarce and perhaps that is why the town does not overindulge, the town is stripped from pretence, developing out of necessity and in balance with the environment. Time slows down and the presence of place is evident. There is a sense of community, a sense of place that gives the impression that everything belongs. There is also a deep connection between the built environment and the inhabitants (Theron, 1973: 5). It is the way space is perceived, where privacy still has meaning and is understood, boundary and threshold form a continuous layer of public, semi-public, semi-private and private space. The traditional Karoo vernacular architecture is startling in its simplicity. The soul is able to expand with the untold stories that the buildings hold. The buildings are lime washed with mono-pitch or flat roofs with reed ceilings. The front facade is symmetrical, sometimes with a veranda, a stoep area, and a small garden in front.



The garden area becomes a threshold/ boundary between the house and the street. The only decorations used are the play of form with the parapet on the front facade and the band of plaster around the doors and windows (Theron, 1973: 6). When looking at a Karoo town as a whole it is easily found in the landscape and becomes a landmark in the vast expanses of grey landscape with its green trees and towering church building. The church becomes the vertical element that binds the town together as a whole, a point of orientation and hierarchy (Theron, 1973: 7). Danie Theron (1973: 11) in his article on Karoo towns also writes that a typical Karoo town is bound by four main elements: the church, church square, main road and the business complex. The church is the dominant element. The streetscapes vary in width, but mostly consist of well-proportioned buildings with thresholds and boundaries. The street becomes a community space, especially at noon when the sun is setting and the air is cooler.

The people in the town contribute to the character of the town; the one is not without the other. There still exists a sense of community and openness seldom experienced in larger cities. Overall, the character of the Karoo is unique in essence and speaks of a time long forgotten.





2.6. Carnavon: "n opname van historiese geboue. [Van Wyk Argitekte, 1981: 7-10]

2.2.2. History of Carnarvon

Carnarvon came to be between 1839 and 1850 when a people of mixed cultural groups moved from the southwestern corner of the Kareeberge and Amandelboom (later known as Williston, to a Xhosa settlement occupying two farms, Schietfontein and Harmfontein. Revd Zahn established a Rhenish Missionary station on the farms after a visit in 1842 (Steynberg, 1952: 7).

The first official buildings to be set up in the area later known as Carnarvon, was a small church built from wood, reeds and clay. The structure was built in an area called De Bult and was operated by C. W. Alheit, who was the first missionary to be stationed at that location. A second church was later erected adjacent to the first one due to a lack of sufficient space. As a result of population growth a third church was erected; this is still intact



2.7. Carnavon: "n opname van historiese geboue. [Van Wyk Argitekte, 1981: 11]



2.8. Carnavon: "n opname van historiese geboue. [Van Wyk Argitekte, 1981: 6]



2.9. Google Earth Image. [Online]



today and is known as the Mission Church. The structure started out as a simple cruciform building without the traditional church tower and was completed in 1857. The first school was build two years later (Steynberg, 1952: 9-11) (Peters, 1991a: 9).

The Rhenish Mission Society claimed that the Carnarvon mission settlement was the most successful that they worked in. "The work of the mission had a great impact on the lives of the community..." (Peters, 1991a: 9). Alcoholism decreased, they were taught how to run their own market gardens, and their dress mode changed. The Rhenish Mission finally closed down in 1943 and was taken over by the N. G. Sendingkerk (Rudner 1987: 3).

Sir George Grey was the first to proclaim that a town should be laid out in the area in 1860. During that time, the population of the town changed due to white people

buying the town plots from the settlers during times of hardship (Peters, 1991a: 9).

The area was named Carnarvon in 1874 after Lord Carnarvon, who was the British Colonial Secretary. At that time, the town was declared a magisterial district. The declaration to become a municipality was only granted in 1876 (Rudner, 1987: 3).

The first houses in Carnarvon were built around the first little church on De Bult. The houses were built in the traditional Karoo style with reeds and clay lying on beams for the walls and with flat roofs. Some of these houses can still be seen today at Schietfontein and may have been built as early as 1839.

Early pictures of the area show that Cape Dutch style houses were also present during that time. These houses were thatched saddle-roofed with triangular end-gables and chimneys.

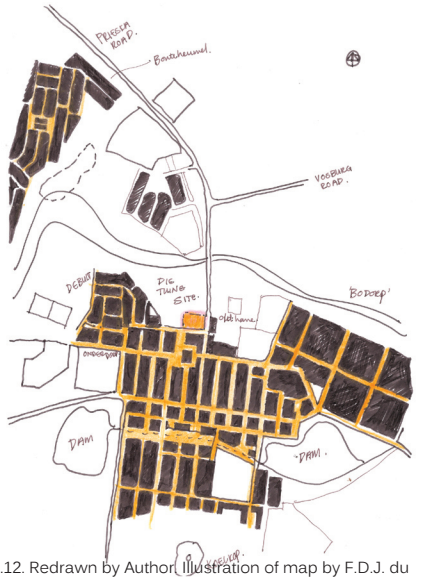


2.10. Street view. Photo by: A. Venter



2.11. De Zaal. Photo by: A. Venter

They were probably the property of the more well off citizens (Rudner, 1987: 4).



2.12. Redrawn by Author. Illustration of map by F.D.J. du Toit.



2.13. Sunset at the church. Photo by: A. Venter



2.14. Monument. Photo by: A. Venter

2.2.3. Entrances to Town

There are five access roads into Carnavon: Main roads connecting to Station road, Williston, Van Wyksvlei, Vosburg and the last from Loxton diverging to Fraserburg.



2.15. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 35] by S. Olivier

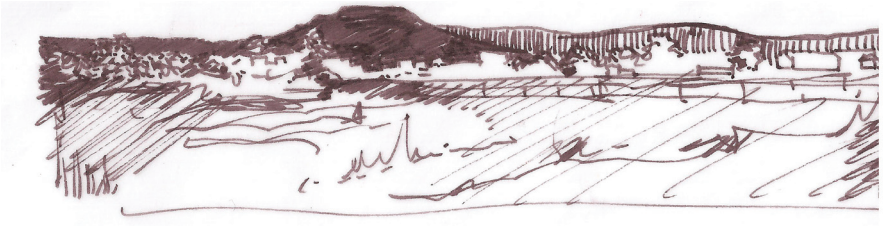
2.2.4. Town Siting and Layout

Karoo towns are normally located near a riverbank or water source, such as a well or river, because of the scarcity of water in this semi-arid region (Peters, 1991b: 4). The towns are laid out according to the gridiron fashion with the preferred orientation being an axis, though topographical features may inhibit this strategy. The grid becomes a practical way of regulating the division of land. The grid has the advantage of controlled growth and easy water distribution. The most important space within the town being the church and Church Square, with the cemetery located at the fringes of the town



2.16. View of town 2. Photo by: A. Venter.

Normally the houses are located at street level, marking the boundary with trees and water furrows, creating a boundary to the street. The streets are quite wide, determined by the turning circle of an ox wagon (Peters, 1991b: 4). The street names were determined by topographical features, common Afrikaans street names, notable people, and the function of the street, e.g. Lord Carnarvon, Hospital Street, or Church Street (Peters, 1991b: 4). The city blocks were divided into lots forming rectangular blocks. The larger lots were mostly used in front for housing and in the back for vegetable and fruit. Drinking water though came from below ground being pumped by wind pumps to the surface (Peters, 1991b: 4).



2.2.5. Topography

Carnarvon is surrounded by a vast flat landscape interrupted by flat-topped hills strongly associated with the Karoo. Carnarvon has the makings of a typical Karoo town, laid out across the landscape flanking the dry riverbed of the “Carnarvon leegte”/ “Carnarvon emptiness”. The landmarks within the town are the two church towers and the natural landmark, Koelkop hill (Peters, 1991a: 33). Carnarvon has two man-made dams that form part of the town’s water resources. The town can also be divided into four distinct areas called Bo-dorp (up-town), Onder-dorp (downtown), Bonteheuwel and De Bult. The town

becomes a green island within the vast landscape (Peters, 1991a: 34)

The town is located alongside the southeastern part of the Karee mountain range on the Karoo plateau at 30˚58 S.B. and 22˚08 O.L. in the northwestern part of the Cape Province. The amount of flat hill in the area, with and without ironstone cladding forms the topography that is a characteristic of the area. Some of these stone configurations have broken into boulders and cliffs, but the typifying mesas or 'tafelkoppies' are found throughout the entire region (Steynberg, 1952: 1).



The vast Karoo landscape is interrupted by flat topped hills, and covered with Karoo bush, "Kriedoring" (Lyceum Areni. spp), and wild pomegranates. The Karee tree and the Blue bush are found in the dry riverbeds, but with very few of the larger tree types. There are different types of grass and Bushman grass on the outer regions. In years of rain, flowers can also be found; these include "Doringvyebos" (Eberlanzia spp), Rain daisy, Buttercup (Sparaxis spp), and the fragrant Evening flower (Steynberg, 1952: 1). These topographical considerations give to the Karoo its wide-open spaces that so many have written about.

Op 'n koppie in die kaalte met die vlaktes wyd omheen

(A koppie surrounded by a barren landscape)

(Dr. D.F. Malherbe, Headmaster, Carnarvon 1907-1909)

(Steynberg, 1952: 1)



2.2.6. Geology

Underlying the whole region of the great northern Karoo, is sedimentary rocks of the Karoo super group. Dolerite dykes and sills give rise to the flat-topped hills associated with the Karoo (Watkeys, 1999: 23). Carnarvon is located in the intermediary zone situated between the Beauford groups and the Ecca that form the layers in the Karoo geological structure and is also characterised by the same dolerite intrusions (Watkeys, 1999: 23).



2.3. Urban

"Urban space, is essentially a place of discovery, a "milieu of possibilities". In urban space, man "dwells" in the sense of experiencing the richness of a world. We may call this mode collective dwelling, using the word "collective" in the original sense of gathering or assembly. When choices are made within the milieu of possibilities, patterns of agreement are established which represent a more structured kind of togetherness than mere meeting" (Norberg-Shultz, 1985: 12).

Concerning the urban fabric of Carnavon, extensive referencing will be drawn from the document compiled by Dr. Walter Peters and his students, as it is a very accurate analysis and of high quality pertaining to the town Carnarvon and specifically De Bult.

The urban space forms the manner in which the people relate to their town. It is thus of utmost importance to understand the urban fabric and how to incorporate it into the design.

The urban fabric becomes the embodiment of human society.[1] The existing town fabric is relatively dense, building to the edge of the street with inner garden and courtyard spaces. For the specific site, it is also important to widen the scope of design, being aware of the surrounding buildings and open spaces, and their relation to one another. "It is thus concerned with the ensemble of buildings that make up this environment" (Senior, 2008: 8).

The way space is handled is very important, noting scale and public space. "Design of the local environment is the major contribution of urban design wherein one designs the local environment desired before establishing the guidelines/ design, directives/controls, necessary for achieving this environment" (Senior, 2008: 9). Firstly, it is necessary to understand the urban fabric in terms of the mass, volume, and proximity necessary to create a comfortable environment for people.

1 The city also has to cater for the needs of the community, and is thus subject to change and growth (Senior, 2008, p. 8).





2.17. Three buildings. Photo by: A. Venter



2.18. Pienk house. Photo by: A. Venter

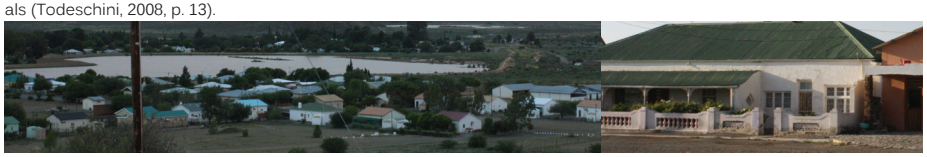
The town needs a place where the community can come together and interact. It is important to understand how the public areas of the building relate to the rest of the town, creating understandable integrated spaces where people feel comfortable and safe rather than alienated. The public spaces of a building become meaningful places that develop into structures within themselves; or rather, become the places where structures and frameworks are formed.[1]

1 "...the primary resource for creating enabling structures and frameworks for guiding growth and eliciting the desired development responses" (Senior, 2008: 8).

The context informs the design problems.[1] These include the segregation of the town, urban growth, town expansion and green and public spaces. The idea is to integrate the project rather than impose alien ideals that could have a negative impact.

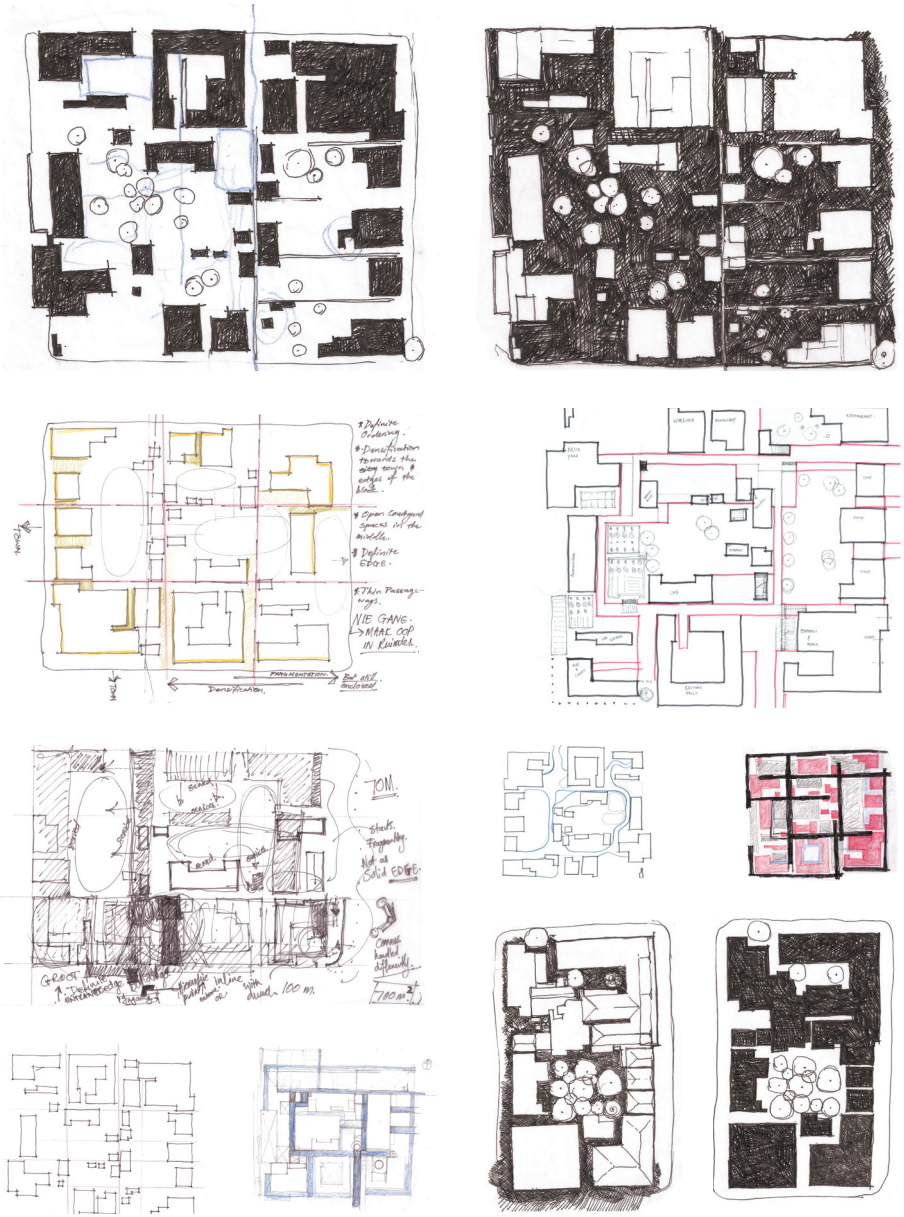
Dewar en Louw (2008: 19) list some design intentions when looking at the urban fabric. These intentions include perceiving public space as the highest order of social institutions, street, rather than road. Their philosophy also involves relying on the ability to look beyond and link the different scales. Louw puts it as follows: "...to reverse the structural characteristics of the modernist and apartheid informed city: promoting compaction, rather than sprawl; integration as opposed to fragmentation; mixed-use, as opposed to mono-functionality; sustainability rather than waste; non-motorized transport and public transport dominance, as opposed to the dominance of the private vehicle" (Louw, 2008: 19-20).

1 Four questions for settlement making in South Africa identified by Todeschini: What are the contextual realities, what are the dominant spatial implications, what is the appropriate nature of the plan, what are the roles of the different professionals (Todeschini, 2008, p. 13).



2.3.1. Town block analysis

- Densification towards town and at the edges of the town block.
- Cohesion between the different parts
- Definite ordering
- Thin passageways that end in courtyard spaces
- Transition of spaces
- Imperfect grid
- More fragmented further from town towards De Bult.



2.3.2. Landscaping

2.3.2.1. Streets of Carnarvon

The streets in Carnarvon are noticeably wide with trees and electricity poles planted in the centre of the street. Van Riebeeck, Alheit and Victoria streets are the widest and are characterised by large trees, mostly ending in a focal point, except for Victoria street (Peters, 1991a: 29).

2.3.2.2. Streets of Carnarvon as described by A. Stokes (Peters, 1991a: 29-30)

Van Riebeeck Street: Width of street broken down by trees along the pavements and central island planting.

Alheit Street: Flanked by large eucalyptus and Karee trees of considerable age, emphasis of axis, which focuses onto the church spire.





2.19. Photos by: A. Venter



2.20.



2.20. Conservation study Carnarvon. [Peters, 1991: 29]

Rivier Street: Trees give intimate quality although street width remains constant (Peters, 1991a: 29).

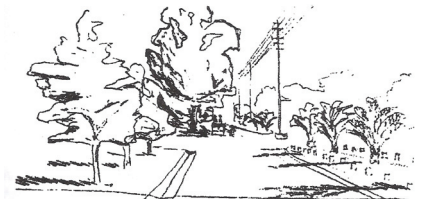
Secondary streets each have their own unique character:
Grey Street: Karee trees define scale and sense of enclosure

Daniel Street: absence of trees increases width of street, which is dominated by the church spire. This quality is carried through all the streets in the Onderdorp where each street is different and imparts a definite mental image on ones memory.

Nuwe Street: completely unplanted thus emphasising the width of the street

Sterrenberg Street: The intimate quality of trees and gardens breaking down the width of the street and introducing a recognizable human scale.





2.21. Conservation study Carnarvon. [Peters, 1991: 30]



2.22. Photo by: A. Venter

Market Street: absence of planting and narrow pavements expands street width and imparts definite Karoo character of openness emphasised by view to landscape beyond (Peters, 1991a: 30)



2.3.3. Townscapes

2.3.3.1. Approaches described by A. Stokes (Peters, 1991a: 35).

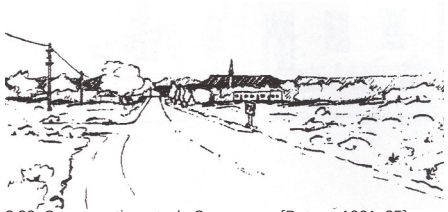
Situated in the middle of a wide flat plain, Carnarvon is visible from quite a distance, whatever the direction of entry. Dense, green vegetation marks the spot.



2.23.

Prieska Road

Details of the town begin to emerge the vertical element of the church towers – the new Dutch Reformed Church dominating the original "Volkskerk". The defining edge of the restored pre-primary school and the distinct line of buildings on De Bult.



2.23. Conservation study Carnarvon. [Peters, 1991: 35]



Loxton Road

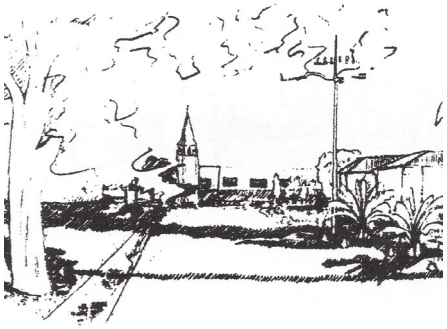
Position of the road shifted unfavourably from the original axis with the church. Approach into town collides at right angles with Onderdorp and then proceeds, through semi-industry and another turn, into town.



2.24.

Victoria West (Dust road)

Leisured approach through the "new" town and along a tree-lined avenue culminating on the 'Volkskerk' and Markstraat.



2.24. Conservation study Carnarvon. [Peters, 1991: 36]



2.3.4. Town centre

Town Centre described by A. Stokes (Peters, 1991a: 36).

Church square

Important central position-potential for developing open communal space in front and the Pastorie with associated buildings

The Church Square also features the old well and a small-corbelled hut as memorial where the local people gather under the surrounding trees.

Pastoriestraat

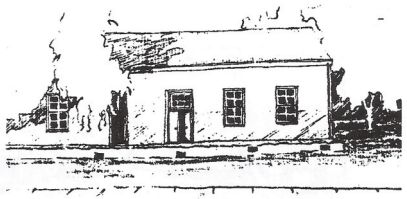
Original school building fronted by magnificent mature Pepper trees, creates a pleasant, shaded environment, a place to sit and talk and watch the world go by.





2.25. Conservation study Carnarvon. [Peters, 1991: 36]





2.26. Conservation study Carnarvon. [Peters, 1991: 36]





Markstraat

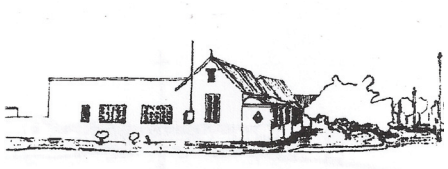
A street wide enough for ox-wagons with central street lighting particular to Carnarvon and well defined by typical Karoohuisies. There is a unity of scale even with the addition of new buildings.

Panosstraat

Definite "edge" to town. Interesting single-loaded streetscape drawing the eye towards the raised skyline of "De Bult".

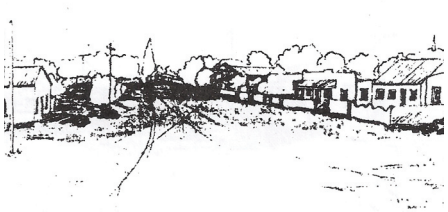
Panos Street is a dust road. On the one side, one finds the pre-school and on the corner, the old school building. On its other side one finds the old show grounds, a flat piece of land that stretches on towards some plots that are known as the Gardens, a place where the community used to grow vegetables and fruits.





2.27. Conservation study Carnarvon. [Peters, 1991: 36]





2.28. Conservation study Carnarvon. [Peters, 1991: 36]



2.3.5. Streetscapes

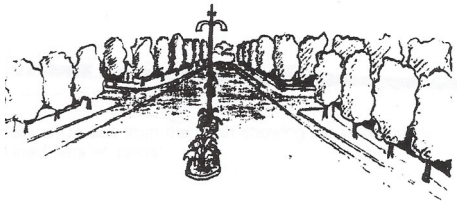
Streetscapes described by A. Stokes (Peters, 1991a: 37,39,40).

Bo-Dorp
Van Riebeeckstraat
Double–loaded, wide avenue. Central planting and street lighting and large trees lining the edge decreased the scale to a more human level.

Rivierstraat
Residential Street, central street lighting. Large trees define the street edge and provide a shaded environment for the semi private front stoeps.

Onderdorp
Nuwestraat
Very open, wide street. Lack of planting leads to a loss of intimacy. No spatial definition. Very fine groups of houses.

Sterrenbergstraat
A far more urbane, intimate street created using garden and stoep walls and planting.



2.29.



2.29.



2.29.



2.29. Conservation study Carnarvon. [Peters, 1991:37]

The vista terminates on a small church thereby creating a feeling of spatial enclosure (Peters, 1991a: 37)

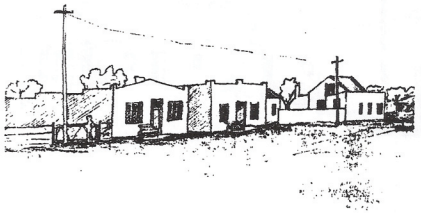
De Bult-Serial vision
The line of the buildings on Sterrenberg Straat defines the north west edge of town.

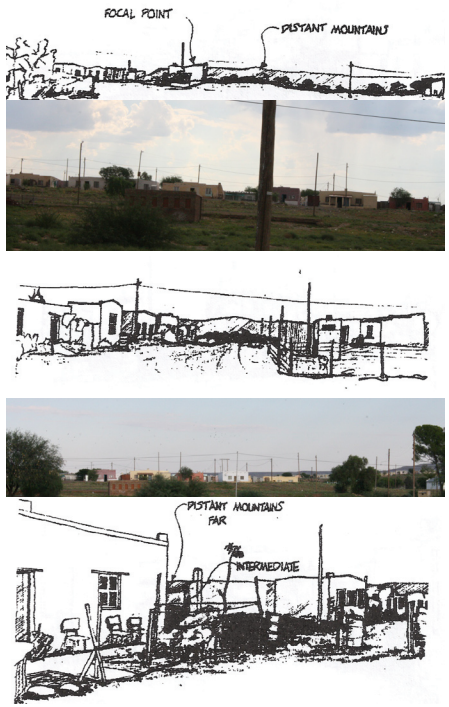
These buildings and the corner house on the western side of the road, frame the first view of De Bult, slightly raised in outline against the distant Vaalberge.

The change in direction draws the eye further and, rounding the corner, there is a sense of "arrival" and the character changes from open, undifferentiated space to a sense of "place".

The details of the settlement begin to emerge
-the vernacular Karoohuisies
-the vestiges of stoep and property definition
-the unity of scale
-the ubiquitous 44 gallon drum used to store wastewater.

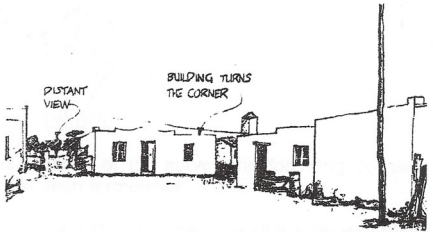
A break in the streetscape and glimpse of around the corner catches the interest (Peters, 1991a: 39).





2.30. Conservation study Carnarvon. [Peters, 1991: 39]

The facade of the building dominates the scene and defines the nature and scale of the space about to be entered. This entry space should be preserved and enhanced by greenery to give definition.



3.31.

Unity of scale and the enclosure of the buildings create a strong feeling of intimate shared space, which is focused around the area of shade cast by the single tree.

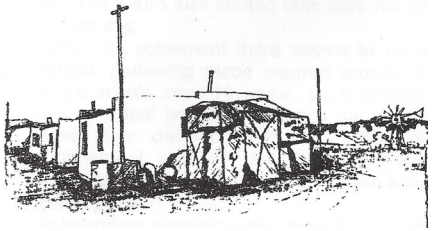


The back of the buildings are often in poor condition due to the crumbling of the bricks along the base of the walls.



3.31.

View through another gap in the front row of buildings offers visual relief from the "close" intimate nature of the settlement, and links back to the context of the "outer" world, and one of the few windmills on this part of town.



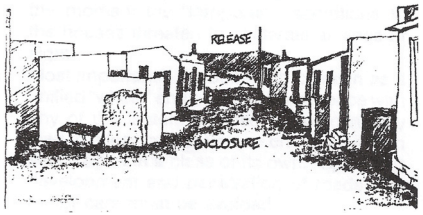
3.31.



An example of the trend to increase living space by adding "temporary" accommodation whose inconsistent materials and form detract from the pure Karoohuisie "style" of monopitch and stepped side and/or front parapets. Not to be encouraged.

The intimate social nature of the narrow streets is contrasted by the vastness of the surrounding landscape. There are doors opening onto the street from both sides, creating an atmosphere of neighbourliness. There are communal toilets scattered throughout the settlement (Peters, 1991a: 40).





3.31. Conservation study Carnarvon. [Peters, 1991: 40]







2.4. Institutions

".. ***institution*** or public building, and the mode of dwelling it serves we may call ***public dwelling*** , using the word "public" denote what is shared by the community. Since the public building embodies a set of beliefs and values, it ought to appear as an "explanation," which makes the common world visible" (Norberg-Shultz, 1985: 12).







2.32. White building. Photo by: A. Venter



2.33. Medisynekas. Photo by: A. Venter



2.34. Carnarvon Supermarket. Photo by: A. Venter



2.35. Church 2. Photo by: A. Venter

2.4.1. Church building

The church square has a central position within the town, standing on its own street block with an open square surrounding it.

The church forms the point of hierarchy and orientation within the town, the vertical element of the tower suggesting a place of significance. The characteristics of public buildings or buildings of importance are firstly established with use of verticality and secondly by creating a public space that surrounds the building.





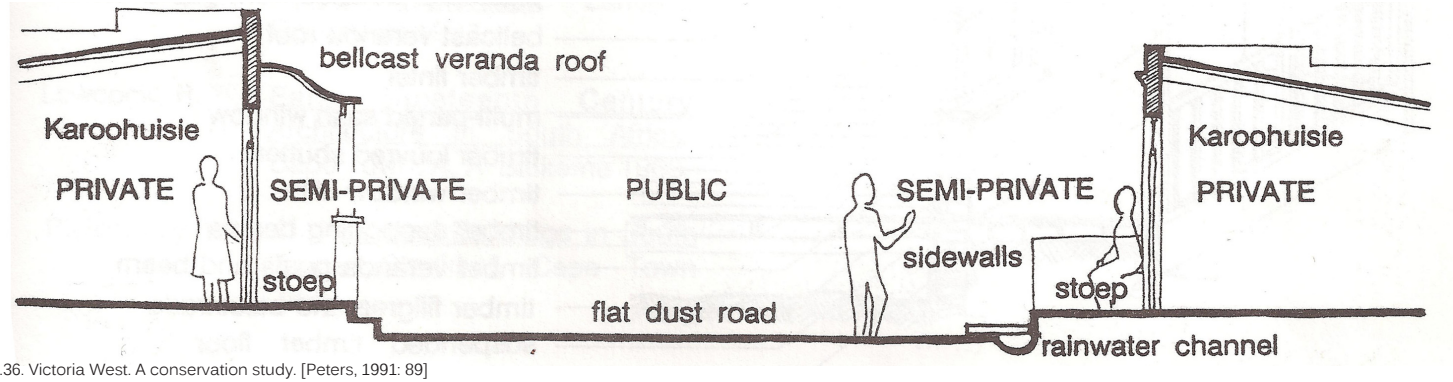
2.5. House

"The stage where private dwelling takes place, is the **house** or home, which can be characterized as a "refuge" where man gathers and expresses the memories which make up his personal world" (Norberg-Shultz, 1985: 12).

2.5.1.Public/private transitions

Public/private transitions are a characteristic inherent to a Karoo town. This aspect gives privacy to the inhabitants without losing the social interaction of the street. The trees on the sidewalk form the first threshold, followed by a low garden fence that surrounds the stoep covered by a veranda. The windows are small with wooden shutters. This is a climatic consideration, but also helps with privacy.

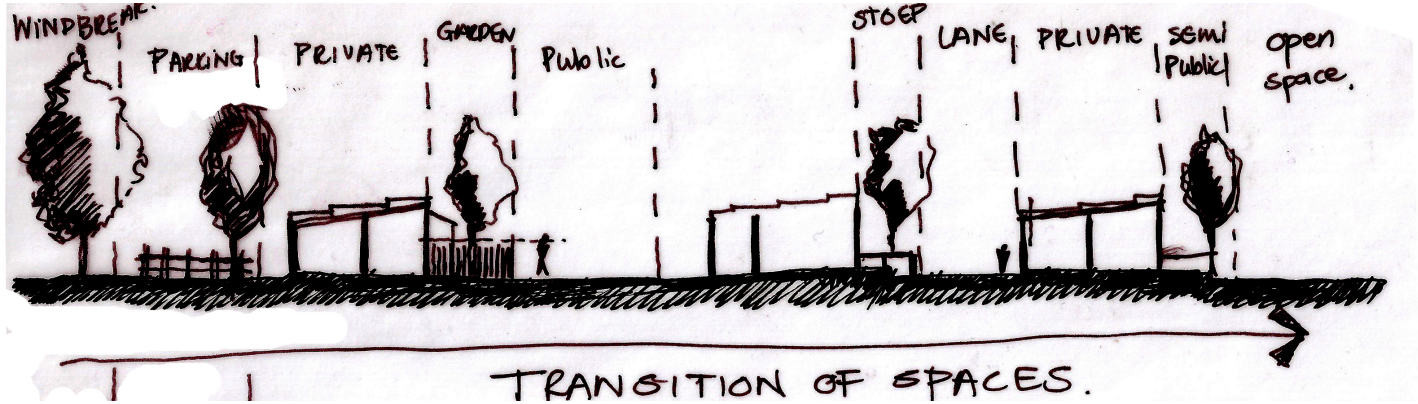
The inner house links to the street in the following manner according to Danie Theron (1973: 11) in his article on Karoo towns: The private domain of the house links to the public domain of the street, the stoep becomes part of the sidewalk, with big trees giving shade. The private domain connects to the street with a veranda or small garden in front.



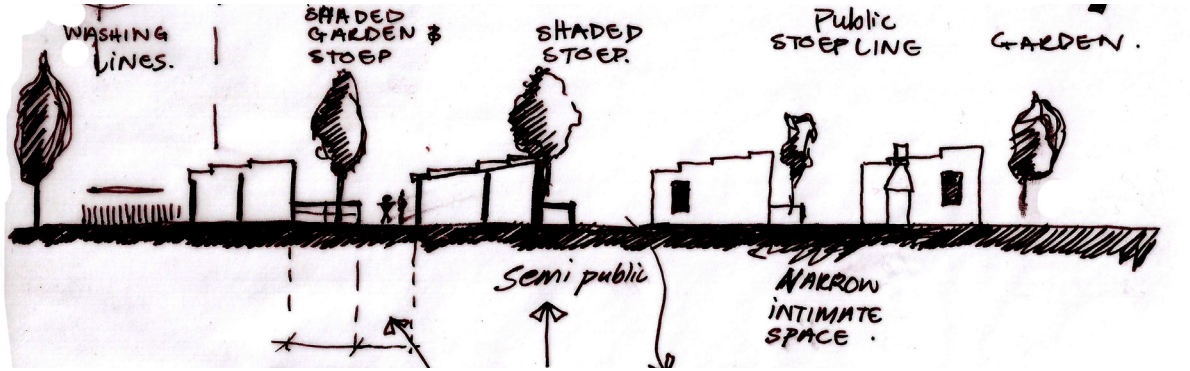
2.36. Victoria West. A conservation study. [Peters, 1991: 89]



2.37. Photo by: A. Venter



2.38. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 123] by S. Olivier



2.39. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 123] by S. Olivier





2.40. House 1. Photo by: A. Venter



2.41. House 2. Photo by: A. Venter



2.42. House 3. Photo by: A. Venter





2.43. House 4. Photo by: A. Venter

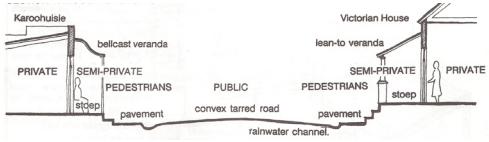




3.44. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 124] by S. Olivier



2.45. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 124] by S. Olivier

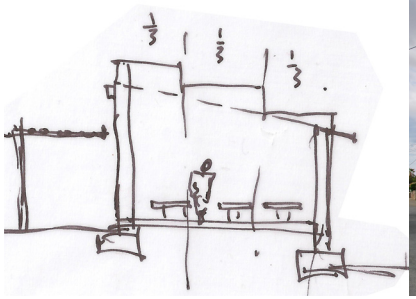


2.46. Victoria West a Conservation study, [Peters, 1991: 89] by S. Olivier



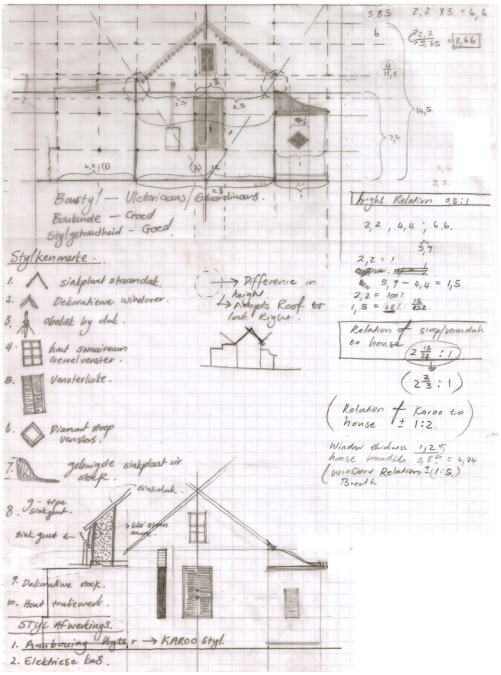
2.5.2. Proportion

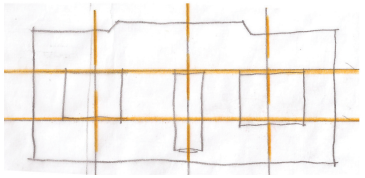
Understanding the Karoo proportions is a very important consideration for any project in the town. Many additions to the town neglect to consider these proportioning systems and this dramatically alters the image and feel of the town. The facade is divided into four segments, the door and windows are spaced accordingly and are lined-up at the top. In many cases, the lowest part of the window is the same distance from the ground floor level as the windows top is from the lowest point of the roof on the front facade.

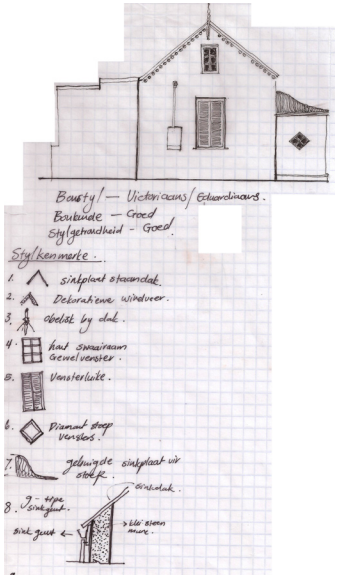




2.47. Blou huis (Photo by Venter, A: 2010)









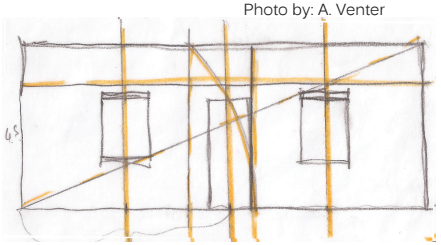
2.48. White house. Photo by: A. Venter

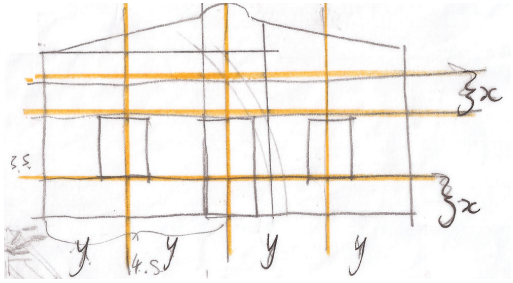


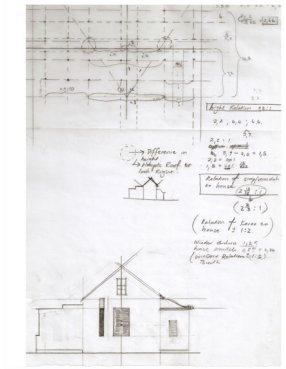
2.49. Blue house. Photo by: A. Venter

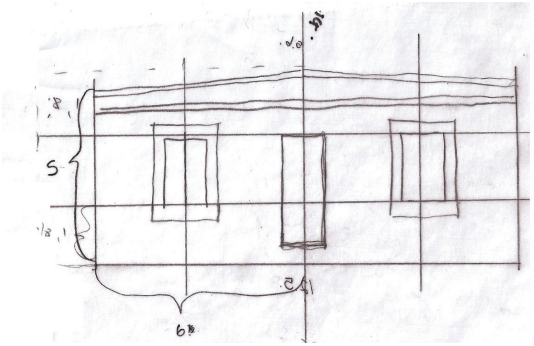


2.50. House with orange door. Photo by: A. Venter





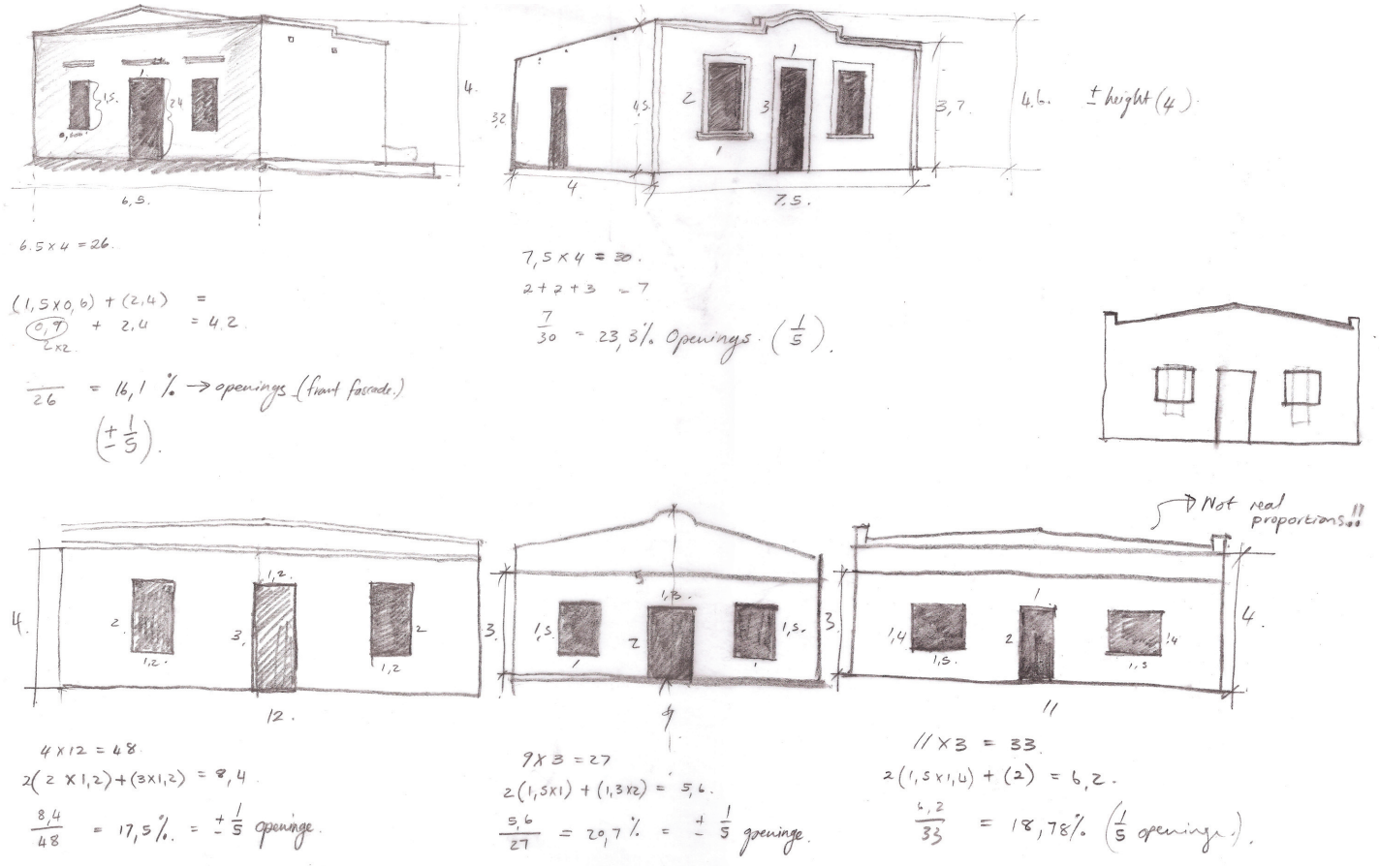




2.5.3. Solid void

An analysis was done to determine the solid void ratio of the Karoo houses. The ratio of void to solid is 1:5 keeping the openings to a minimum.







2.51. House 2. Photo by: A. Venter



2.52. House 3. Photo by: A. Venter

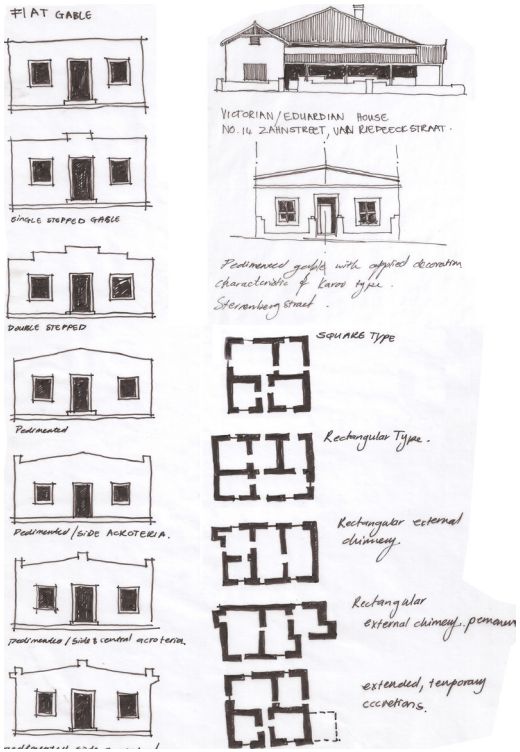




2.5.4.Typologies of area

The main typologies in the area are vernacular Karoohouses,Victorian/ Edwardian styles and the veranda style.

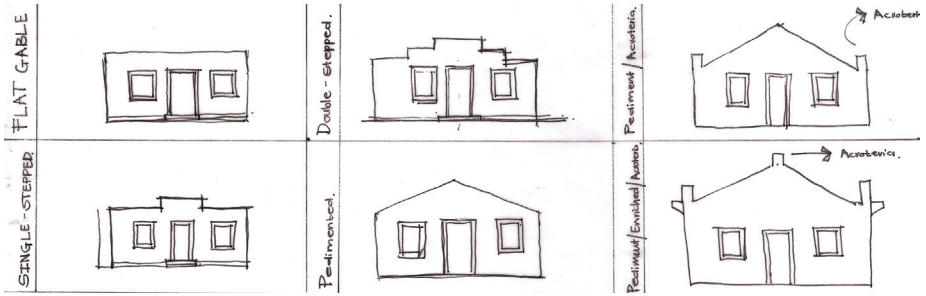
The corbel hut forms part of the particular character of the Karoo. The huts were built by early trekkers and became an integrated part of the landscape. The thick walls help regulate the inner climate (Peters, 1991a: 26).



2.53. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 46-49] by S. Olivier



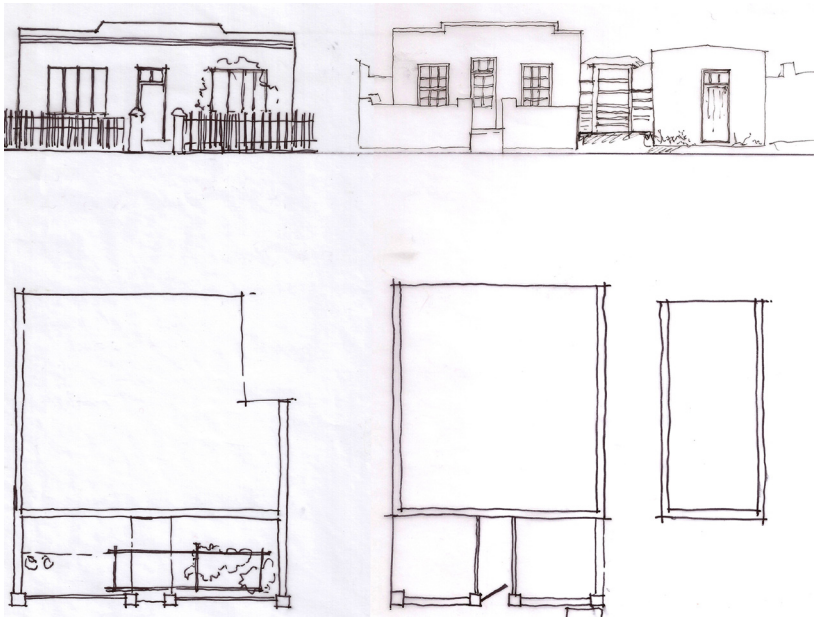
2.55. Yellow house. Photo by: A. Venter



2.54. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 48] by S. Olivier

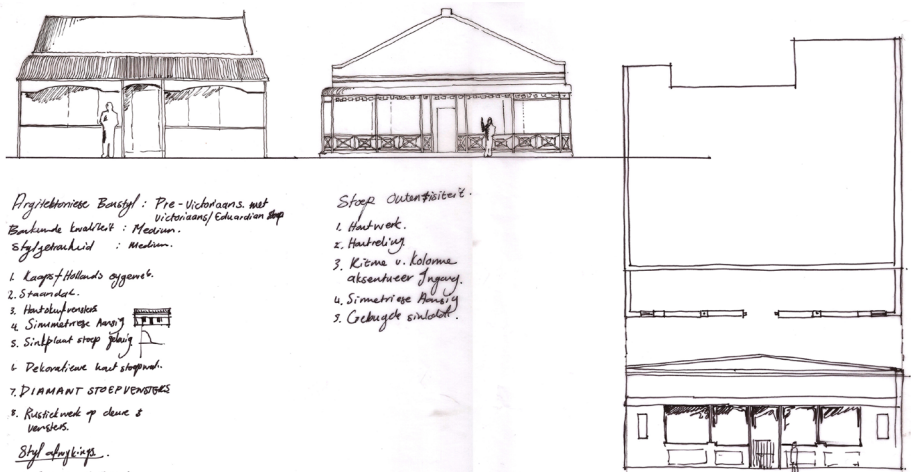


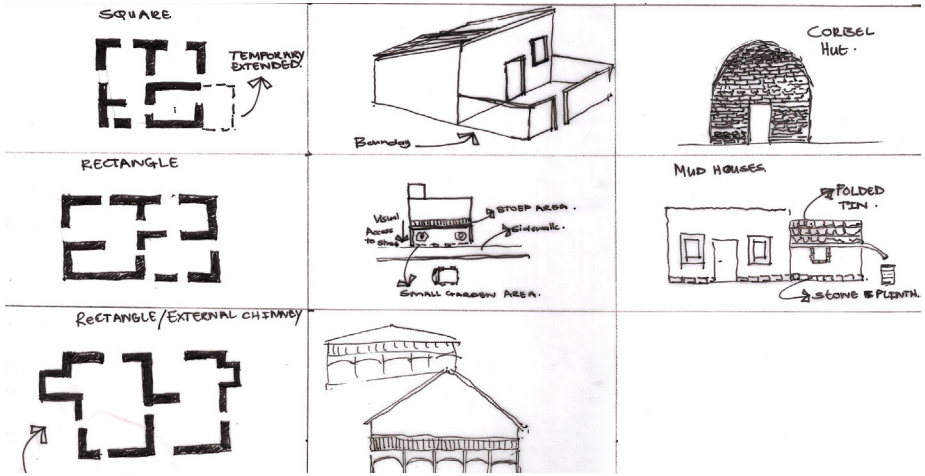
2.56. White house. Photo by: A. Venter



2.57. Redrawn illustrations from Carnavon: "n opname van historiese geboue. [Van Wyk Argitekte, 1981: 33] by S. Olivier

"Settlement, urban space, institution, and house constitute the total environment, where natural, collective, public and private dwelling take place" (Norberg-Shultz, 1985: 12).





2.58. Redrawn illustrations from Carnavon: "n opname van historiese geboue. [Van Wyk Argitekte, 1981: 28-32] by S. Olivier

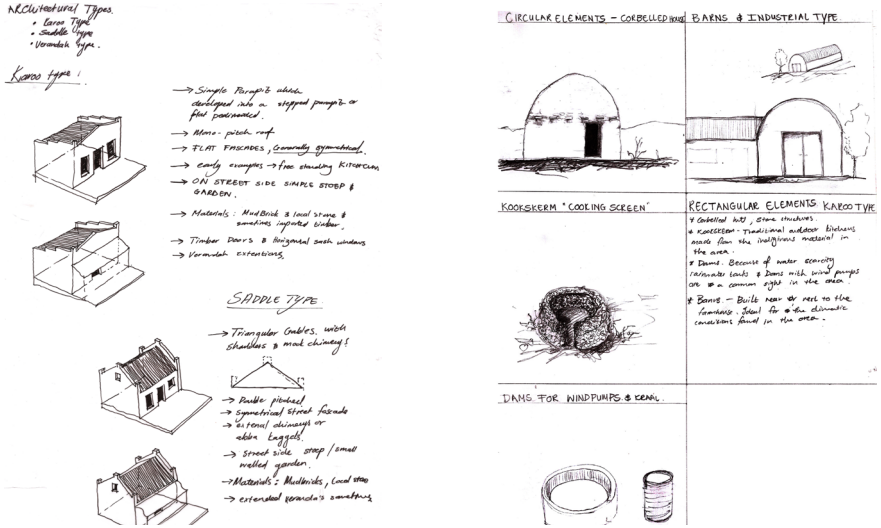


2.59. Corbel hut. Photo by: A. Venter

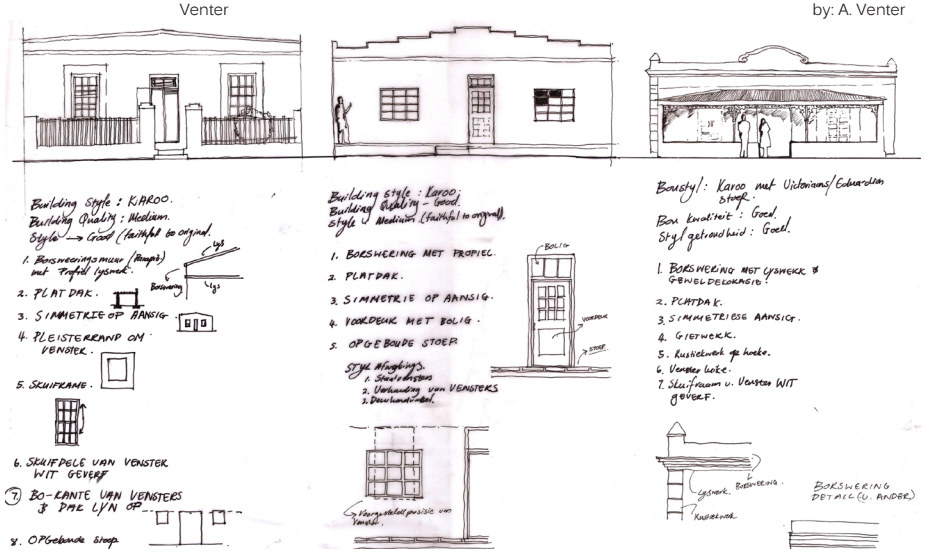
2.60. Yellow house. Photo by: A. Venter

2.61. Photo by: A. Venter

2.62. Photo by: A. Venter



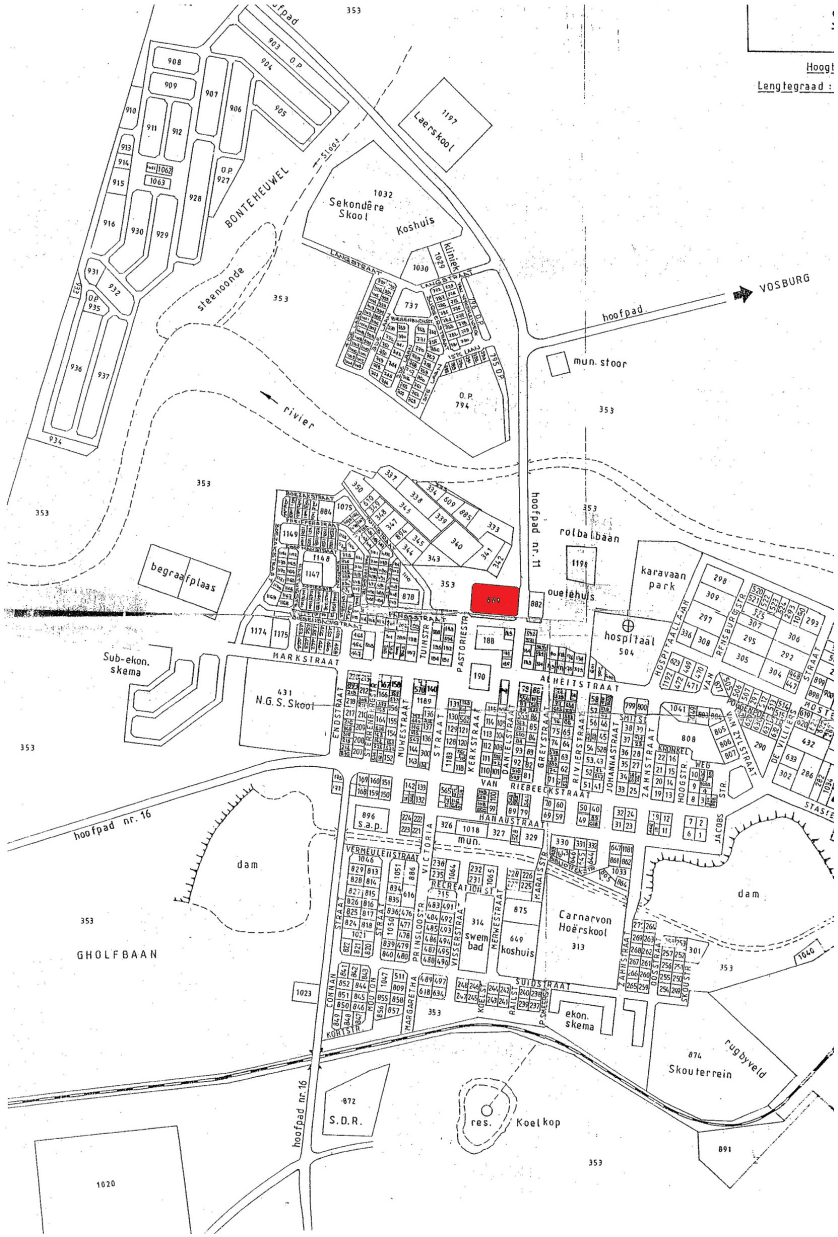
2.63. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 44-45] by S. Olivier



2.64. Redrawn illustrations from Carnavon: 'n opname van historiese geboue. [Van Wyk Argitekte, 1981: 25, 27] by S. Olivier

Chapter 3

3. Site analysis



3.1. Carnarvon map 1:5000. [du Toit, (s.a.)]

3.1. Noise

The site is relatively quiet with some noise from the cars and pedestrians



3.2. Vehicles

Daniel Street- highest number of vehicles

Panos Street – few vehicles, almost none

Parsonage Street - moderate traffic

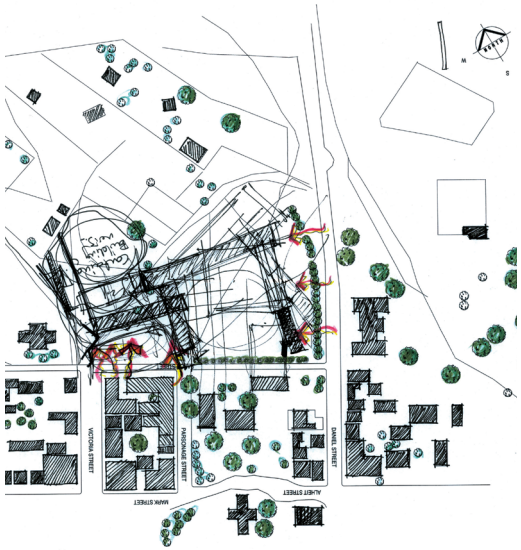
Victoria Street – moderate traffic

Future:

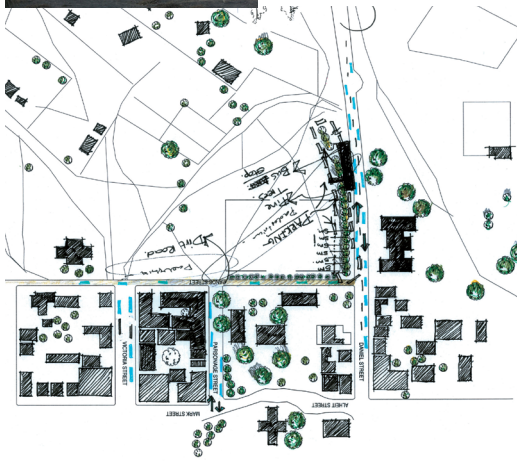
- Parking under pine trees

- Create safe pedestrian crossings and walkways

- Specific zone for cars







3.3. Surrounding areas

On the southern part, there is a restaurant, small kindergarten, and the old school building. Across from the old school building there are two taverns. On the eastern side of the site is the old age home and on the western side, there are lots called ‘the gardens’ where they used to plant vegetables and fruit for the community. These gardens will eventually be integrated into the project.









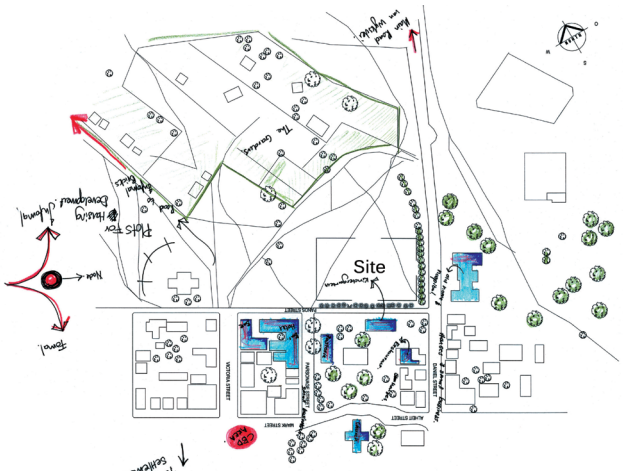








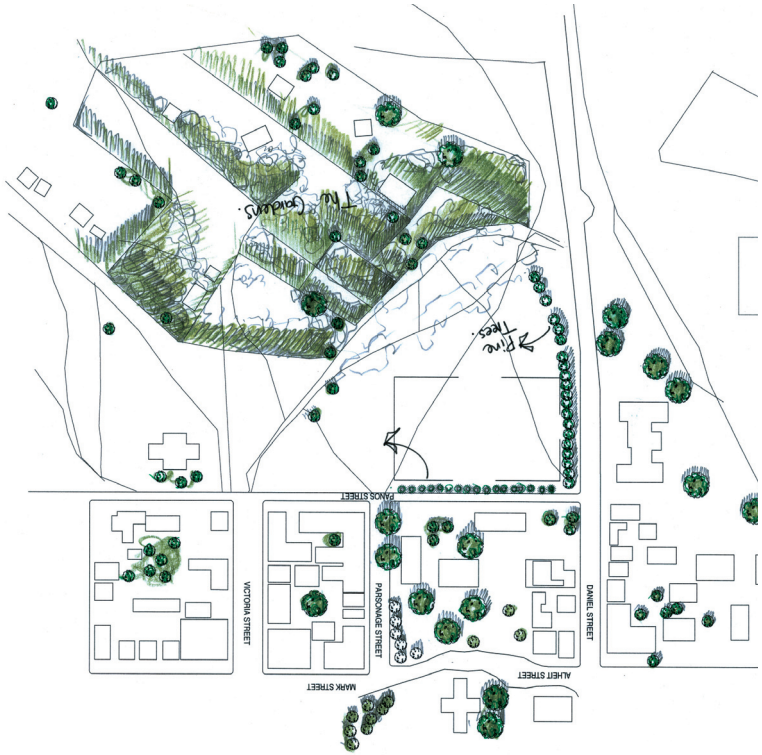




3.4. Plant growth of area and site

The Karoo was once a grassland, but with the coming of the white settlers the grassland has been diminished to its current state of dwarf scrublands, the main reason being overgrazing by livestock (Peters, 1991a:26). “The Karoo veld consists of a wide variety of plants, such as annuals, geophytes, grasses, both dwarf and low deciduous and evergreen scrubs, dwarf and low succulent shrubs, mid-high (1-2M) and tall (>2M) deciduous, evergreen and succulent shrubs” (Peters, 1991a: 26).

The harsh climatic conditions in the Karoo, semi-arid result in plants that have to adapt due to lack of moisture and the extreme climatic variation. To survive these extreme conditions the plants have adapted to the climate. Tolerance to drought is found mainly in the perennial plants. The second is drought avoidance and is found in annual plants (van Rooyen, 1999: 107). Growth phases are mostly in autumn and spring, because of the extreme temperatures during summer and winter. The growth phases are mostly in the autumn and spring to avoid the extreme temperatures during summer and winter.



Characteristics of Karoo plants include leaf thickening, thickening of surface skin, succulence, and development of underground moisture storage (Peters, 1991a: 26).







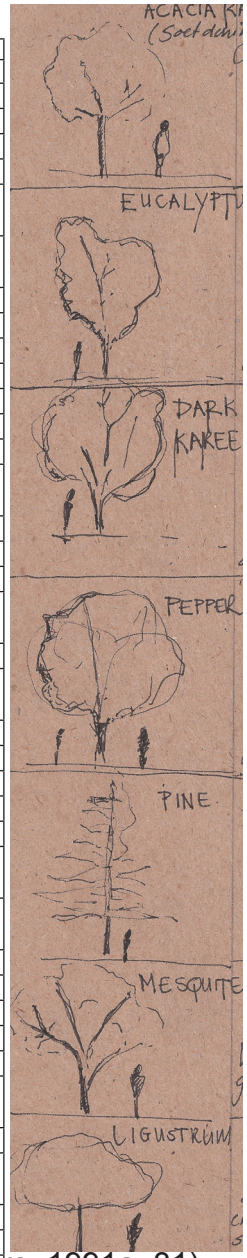


Within the town itself, there is a lack of indigenous flora to provide protection against the extreme climate. The exotic plant types also grow faster given enough water, as they have not yet adapted over many years to the extreme environment (Peters, 1991a: 26).

Table 1. Trees and plants seen in Carnarvon

COMMON	LATIN	COMMON	DISPERSEMENT DISPERSED	RARE
Acacia Karoo	Acacia thorn	*		
American ash	Fraxinus Americana		*	
Apricot	Prunus armeniaca		*	
Bay leaf				*
Beefwood	Casuarinas cunninghamania		*	
Bottle bush	Callistemon viminalis		*	
Cape willow	Salix mucronata		*	
Carob	Ceratonia siliqua		*	
Cedar			*	
Cypruss			*	
Dark Karee	Rhus lancea	*		
Date palm		*		
Elm	Ulmus parvivolia			*
Eucalyptus	Eucalyptus camaldulensis	*		
Eunymus	Euonymus Japonica	*		
Fan palms	Borassus aethiopica		*	
Fig tree	Ficus burtt-davyi		*	
Kurrajong	Brachychiton populneum		*	
Gooseberry			*	
Hawthorn	Crataegus pubescens		*	
Ligustrum	Ligustrum lucidum	*		
Liquid amber				*
Mesquite	Prosopes juliflora	*		
Mophead				*
Mulberry			*	
Parkinsonia	Parkinsonia aculeate			*
Pearl acacia	Acacia podalyraiefolia		*	
Pepper tree	Schinus molle	*		
Pine tree	Pinus halepensis	*		
Pomegranate			*	
Poplar	Populous Lombardy		*	
Prickly pear	Opuntia vulgaris		*	
Pride of india	Lagerstroemia indica			*
Purple prunis			*	
Queensland pyramid	Lagunaria patersonii			*
Quince			*	
Swarthout	Acacia melanoxyn		*	
Saltbush	Oxygonum alatum		*	





3.3. (Peters, 1991a: 31)

COMMON	LATIN		DISPERSEMENT	
		COMMON	DISPERSED	RARE
Silver oak	grevillea robusta		*	
Stinkwood				*
Syringa	Melia azendarach	*		
Tamarix	Tamarix aphylla	*		
Tree of heaven	Ailanthus altissima			*
Vygie	Carpabrotus acanicaformis	*		
Weeping mulberry			*	
White karee	Rhus leptodictya		*	
Wild olive	Olea Africana			*
Wild pear	Dombeya rotundifolia		*	

Carnarvon a conservation study (Peters, 1991a: 31)

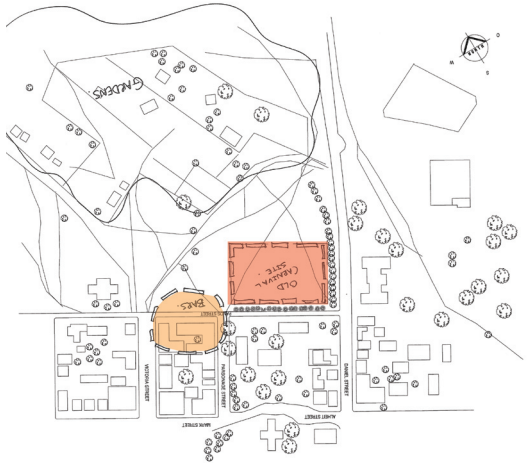
3.5. Cultural

The site was the carnival site, and at present it is an open lot through which the people who live in Bonteheuwel walk on their way to town.

Future

- There is a need for a community space.

- Reviving the site as a place where the community gathers





3.6. Pedestrians

- Pathways through the site are used mainly as access to the town and tavern areas.

Future

-New movement patterns are introduced.

-Giving exposure to the activities on site

-Padestrians still filtering through the site

-Creating safe walkways for the children in the kindergarten.

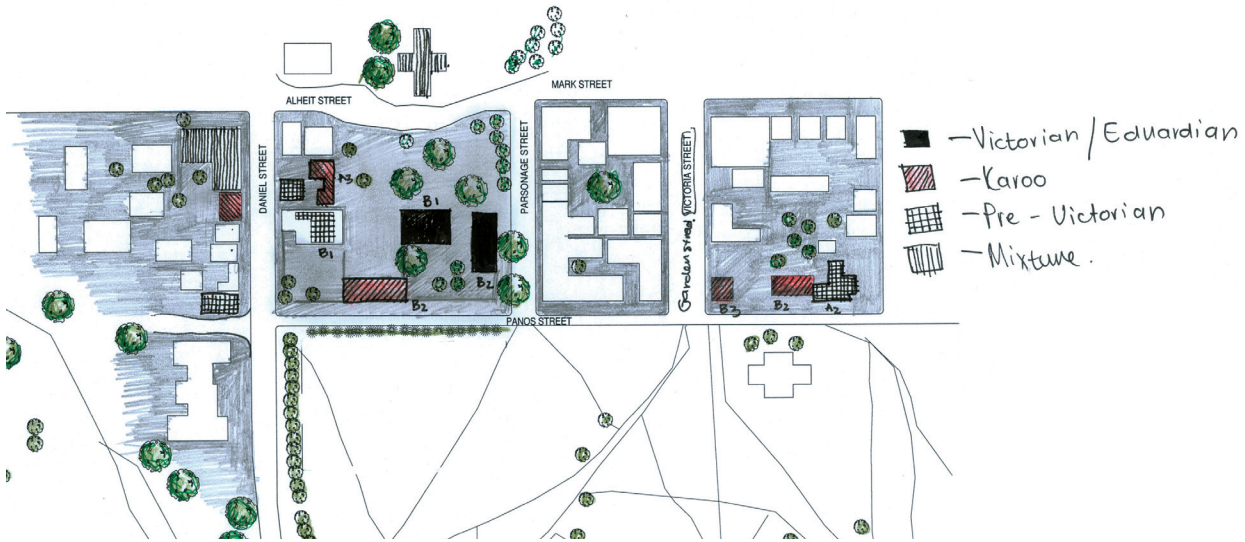


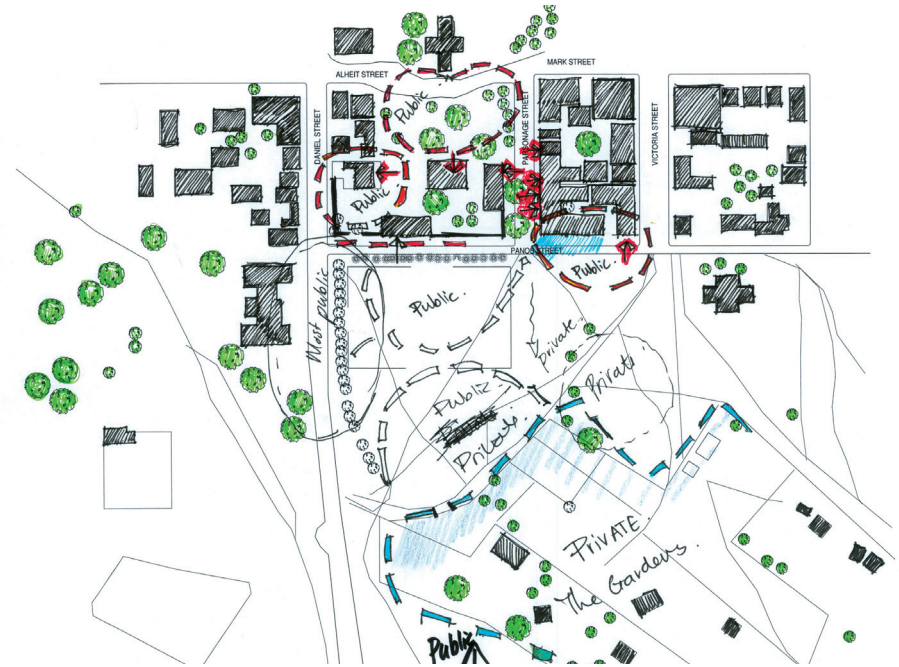


3.7. Typology
See typology sketch.

3.8. Public /private
The most public areas of the site are located next to the main road and Panos Street. The more private areas are located towards 'the gardens.'

3.9. Climate
The climate in Carnarvon is one with open skies and summer days can last up to thirteen hours and in the winter almost eleven. There are great temperature differences with a maximum of ± 108˚F in the summer and 10˚C below freezing point in the winter. The dominating wind in Carnarvon is the west-south-west wind although the southeastern wind can also be quite strong, depending on the yearly sea tides.





Rain can be expected after the eastern wind is followed by a northwestern wind. Rainfall mostly occurs in February and March although there are heavy rains in the winter months (Steynberg, 1952: 4).
The influences on the climate:
The degrees of latitudinal distance from the sea, height, and topography influence the climate of the Karoo (Peters, 1991a: 24). Dry upper airflow is a characteristic of the sub-tropical high-pressure belt of which the Carnarvon region is a part. The humidity levels are quite low, because there is no influence from the sea. From east to west, the rainfall decreases from 500mm to 100mm. Rainfalls during autumn with no rain during November to January. During the winter months, frost occurs and the average rainfall is 241mm per year. The average daily temperature is 16˚C with temperatures of 32˚C during January. Frost occurs during the winter months (Peters, 1991a: 25).

3.10. Soil types

Freely draining soils are present and are characterised by large amounts of $CaCo_3$. The soils are normally medium textured (Sandy-loam to sandy clay-loam) and calcarous through the whole structure. Large flat stones that are ideally used as building material cover the surface layer. This surface layer of stones or desert pavement is clasts weathered out of dwyka diamictite (tillite) (Watkeys, 1999, p. 23). The dolerites are responsible for medium textured (sandy-clay loam) soils. These soils contain high levels of calcrete and calcarous horisons throughout the whole profile (Watkeys, 1999: 23).

3.11. Water sources

In 1839 the river bed on to the northern side of Carnarvon (Steynberg, 1952: 36), between the town and Bonteheuwel today, was overgrown with plants growing along the river bank.Unfortunately with time these have disappeared and with them the waterholes. The first water point was located in the western corner of the park and some of the stone remains can still be seen (Steynberg, 1952, p. 37). Before the settlement of the white community, the government dug a well in the market square with a bucket system. The well still stands today and is built up with stones

The owners of ervin started to dig wells on their plots and many of these still exist. The first wind pumps were erected in 1899, and with it, the people started to bore for water. Town dams were built to help strengthen the town's water resources. In 1910, the municipality began a water scheme. The hard iron rock layer that varies in thickness, made boring very difficult. Eventually haelbores were used and a consistent water source was found in 1946. The water is pumped electrically to the various locations in the town at present (Steynberg, 1952: 27).

Chapter 4

4. Buildings in semi-arid regions

Buildings in semi-arid regions need to be adapted to control heat transfer and radiation, because there is extreme heat in the summer and extreme cold in the winter. The buildings protect the inhabitants from the severe climatic conditions.



4.1. Local environment and adaptations

Carnarvon has a very severe light intensity caused by direct radiation from the sun that reflects off the the earth's surface.

Extreme seasonal temperature changes also occur.

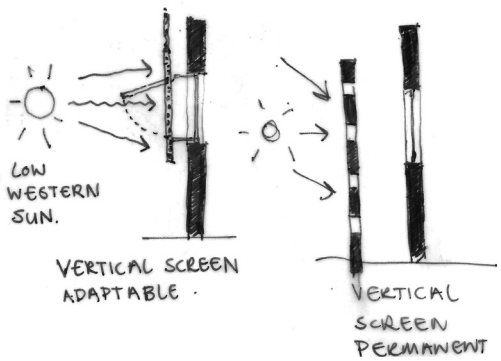
Water is scarce and there is very little moisture in the air to help regulate temperature.

4.3. Controlling sun exposure

There are various methods of controlling sun exposure. The methods discussed are:

- Horizontal and vertical screens
- Vegetation



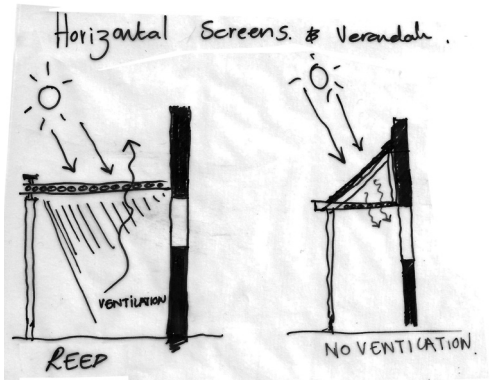




4.3.1. Screens

The eastern and western sun's angles are quite low; vertical screens are used to protect the building from direct sunlight.

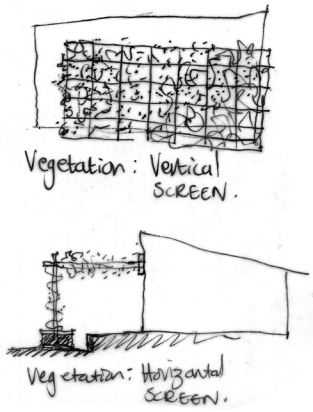
Horizontal screens, depending on size, provide shade around the building. This prevents the surface areas surrounding the building from absorbing heat that is radiated into the building. This is even more effective if there are plants between the paving's that surround the building.



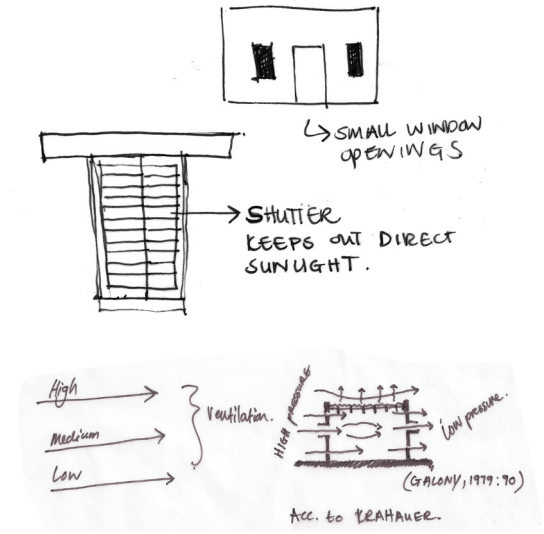


4.3.2. Vegetation

Deciduous trees planted next to a building provide shade in summer and sun in the winter. Creepers and vines can be used as horizontal or vertical screens, given a framework against which to grow







4.1. Redrawn illustration (Wilkinson, 1991: 35)



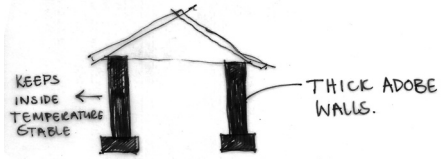
4.5. Walls

Thick earth construction walls are more appropriate for climatic considerations in an arid-region. “With its low diffusion, soil has the advantage of possessing a significant ability to damp and delay thermal variations and external thermal inflows. This property is particularly valuable in regions characterized by highly variable climatic and atmospheric conditions” (Houben, 1994, p. 157).

4.6. Roof systems

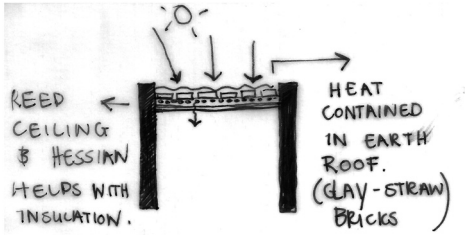
Roof systems need to be well insulated. Ventilation in the roof does not help with cooling a building; the heat is transferred through radiation (Wilkinson, 1991, pp. 36-37). Earth construction is not a particularly good insulating material (Houben, 1994, p. 156), but because roof systems are affected mostly by radiation, earth can be used as a roof insulator because of the earth that delays thermal variations (Houben, 1994, p. 157).

Earthen roofs use reeds that can be used with a layer of hessian that support the earth blocks. The reeds and hessian have insulating properties.





4.2. Photo by A. Venter



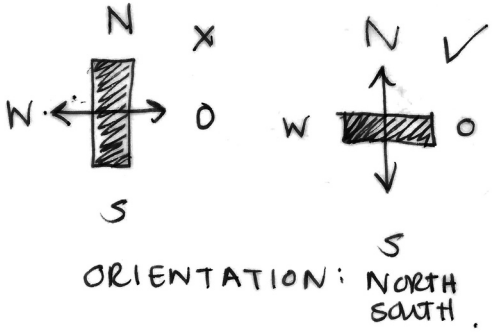


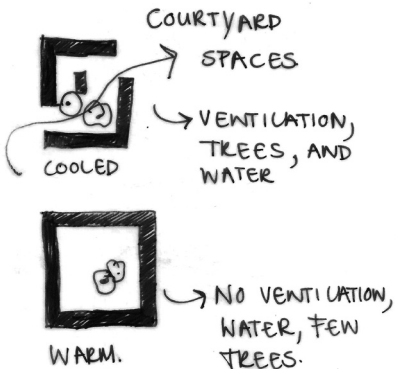
4.7. Orientation

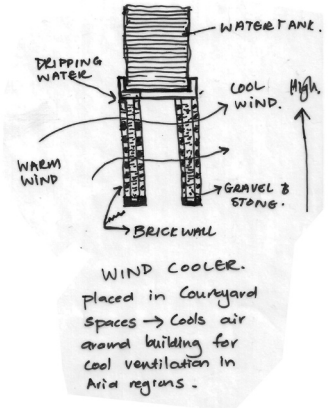
Buildings need to be orientated north to south as far as possible, because the sun-angle in the southern hemisphere to the east and the west is very low, letting radiation into the building (Wilkinson, 1991, p. 37).

4.8. Courtyard spaces

Courtyard spaces need to be well ventilated and have a source of water for evaporative cooling to take place. Wind catchers can also be placed within these spaces. This technique cools the air surrounding the building. This means that buildings in semi-arid regions could make use of ventilation as a means to control the climate within the building.















4.3. House with water drums. Photo by A. Venter



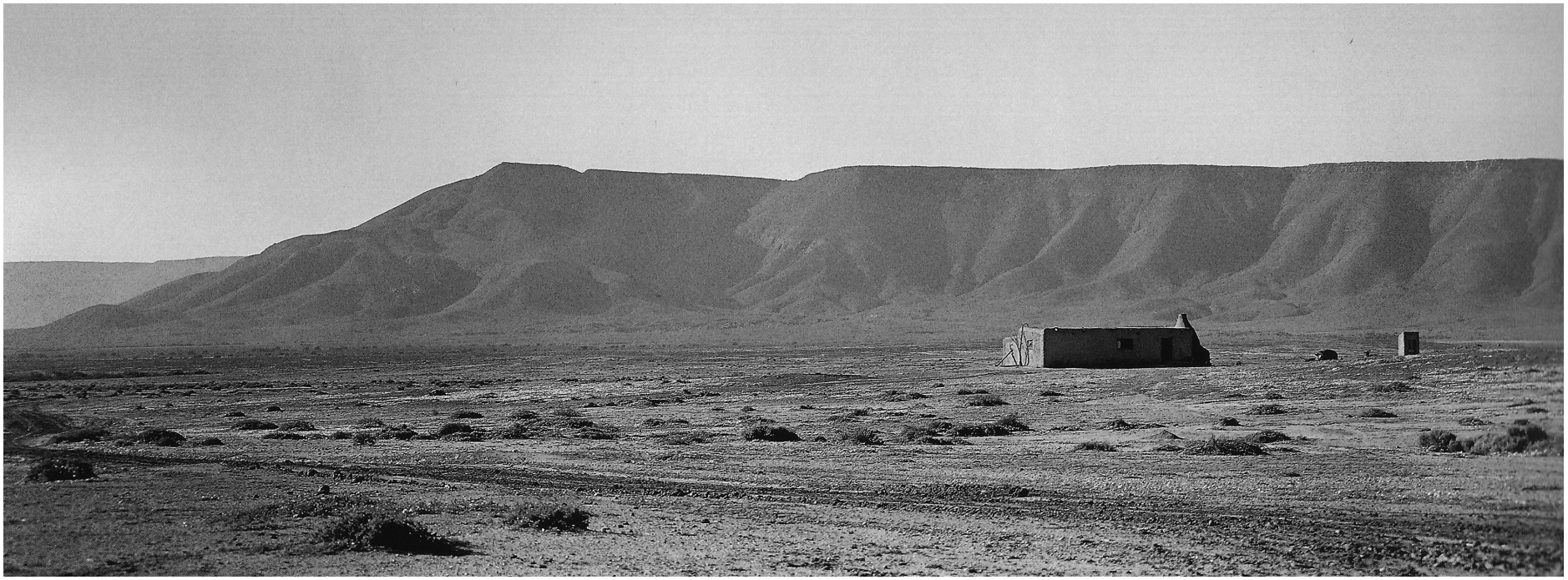
4.4. House with a water tank. Photo by A. Venter



4.5. Vegetation Photo by A. Venter

Chapter 5

5. Precedent studies

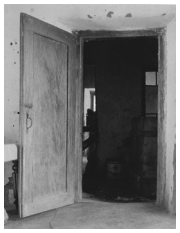


5.1. Deserted dwelling on the Knersvlakte. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 109]

5.1. Historical precedents

5.1.1. Karoo Houses

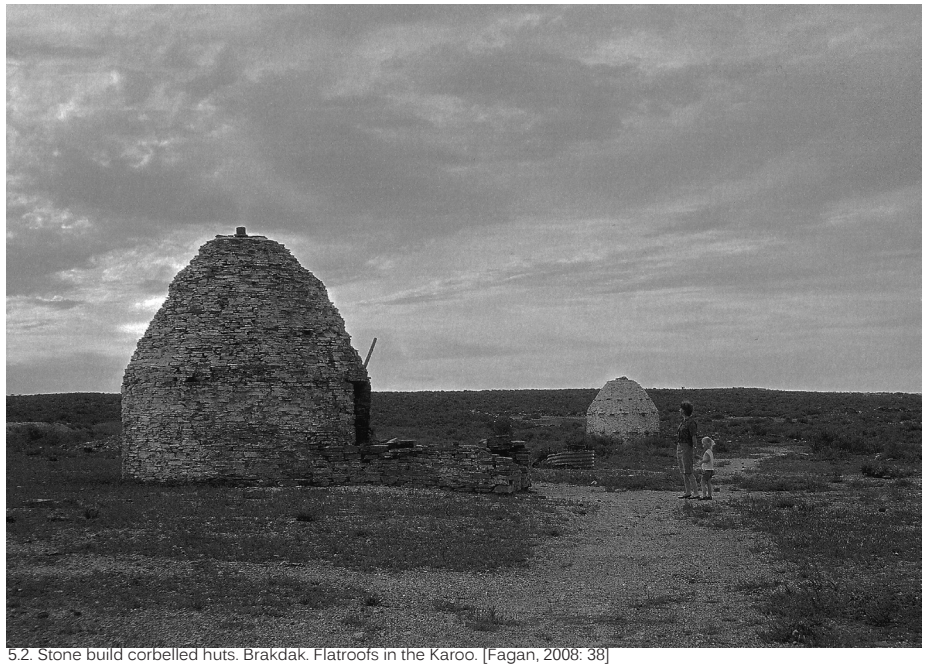
Vernacular Karoo houses were analysed to better understand the building style. Photographs taken by Gabriel Fagan in his book *Brakdak* were also used as references.



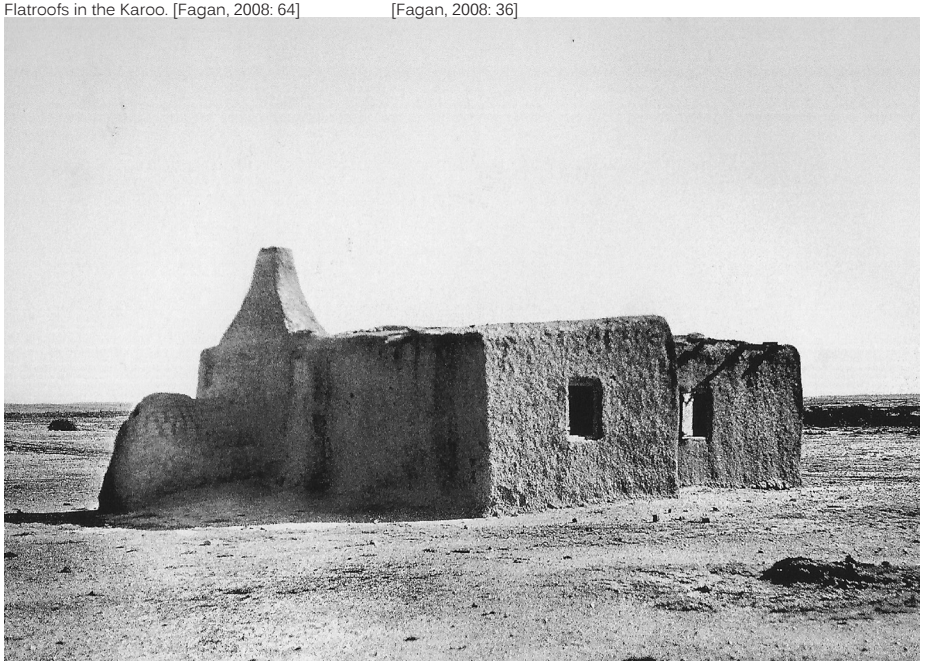
5.6. Front door. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 64]



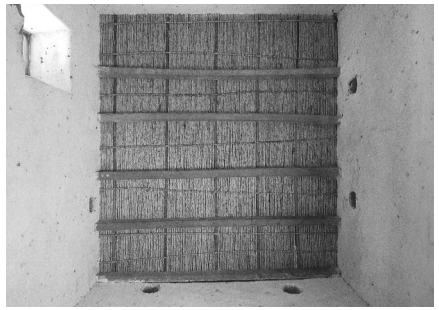
5.7. Corbelled huts. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 36]



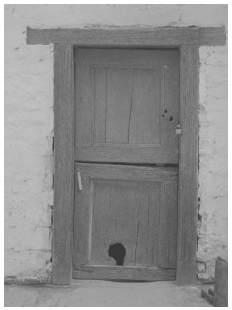
5.2. Stone build corbelled huts. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 38]



5.8. Deserted dwelling from the outside. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 108]



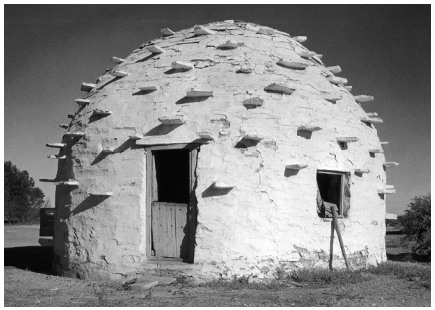
5.3. Reeds used in roof. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 64]



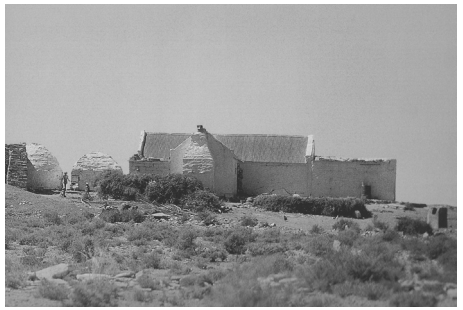
5.4. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 64]



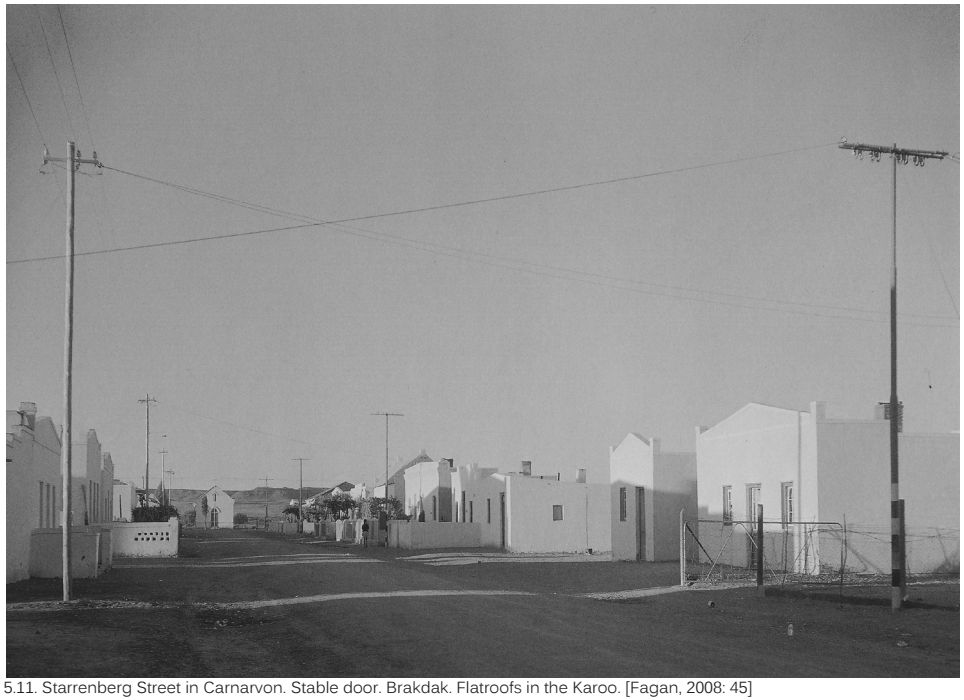
5.5. Deserted Knerslaagte. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 108]



5.9. Lime washed corbel hut. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 37]



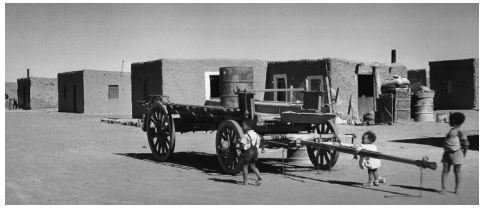
5.10. Farmyard in Loxton. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 138]



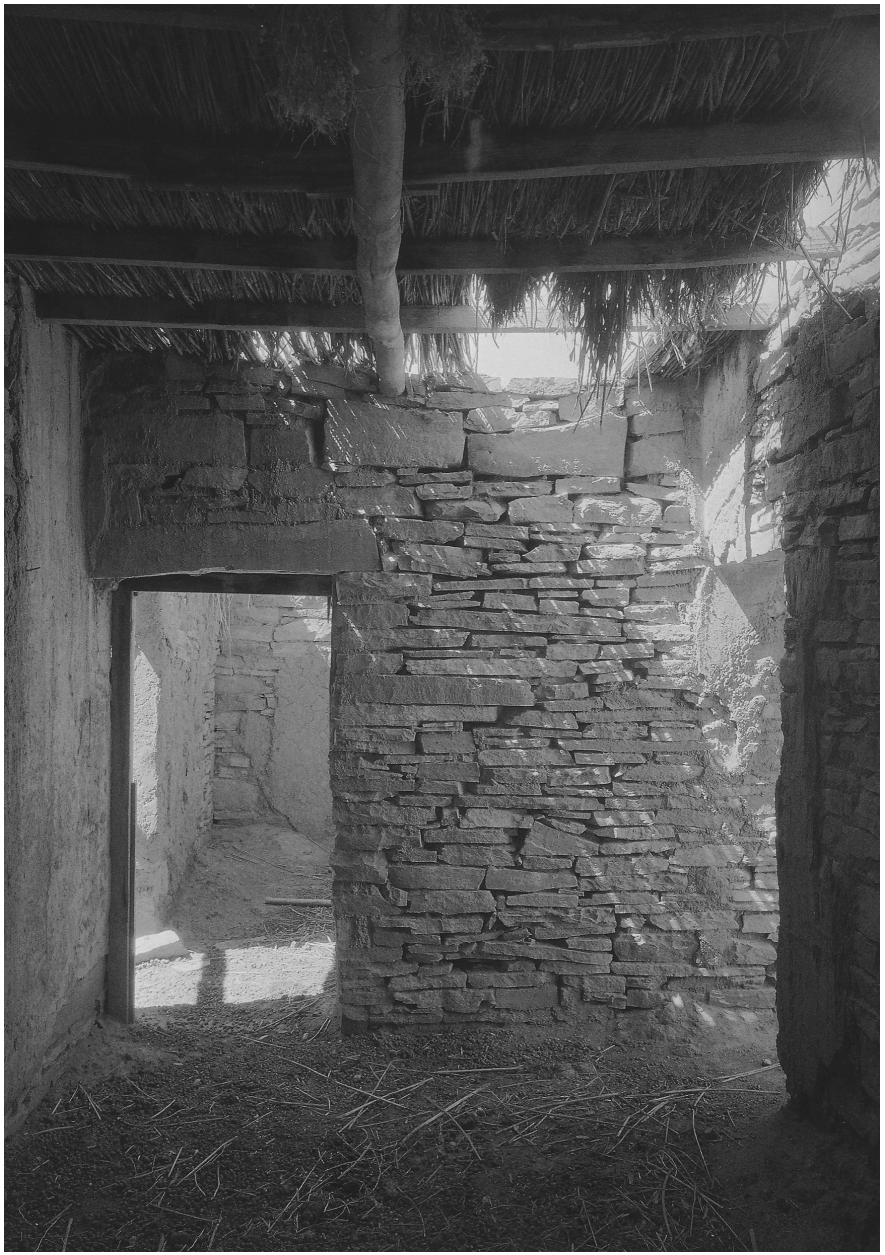
5.11. Starrenberg Street in Carnarvon. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 45]



5.12. Square windows at loft level. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 87]



5.13. Brak-roofed houses. Stable door. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 25]



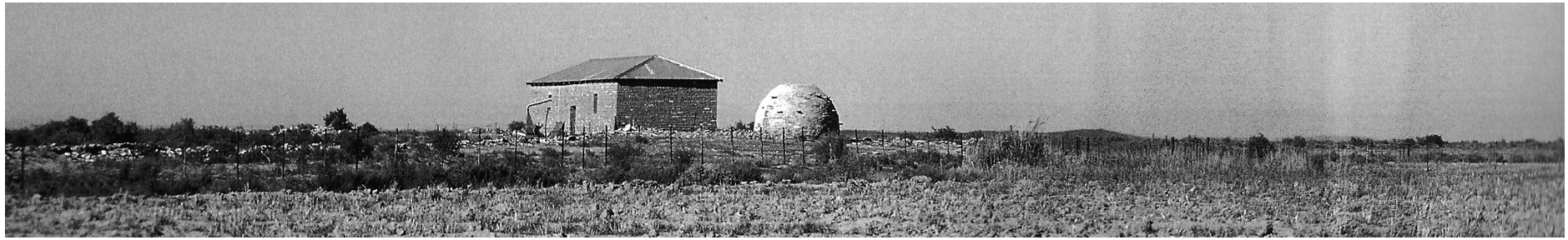
5.14. Ruin along Carnarvon-Fraserburg road. Stable door dry stacked slate. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 43]



5.15. Brandvlei townscapes. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 25]



5.16. Carnarvon district carbelled huts. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 36]

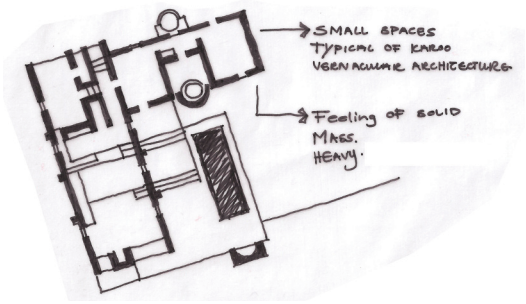


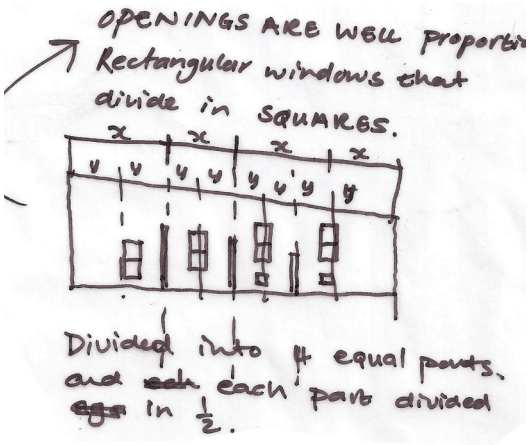
5.17. Hip-roofed barn next to corbelled hut. Brakdak. Flatroofs in the Karoo. [Fagan, 2008: 36].

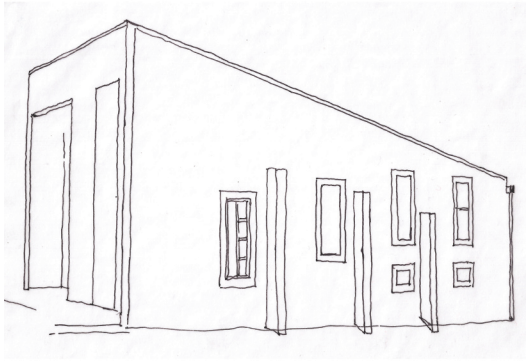
5.2. Context and typology

5.2.1. Sally house

Architects: Derick de Bruyn Architects
Location: Prince Albert
The house is located in Prins Albert, a Karoo town. The typologies of the area are Cape Dutch, Karoo vernacular and Victorian veranda houses, and called for a design that respects the sensitive context. Discretion and restraint were important design considerations (Joubert, 2009, p. 250).The building is a painter's studio and forms an extension to a traditional Karoo house. The scaling and massing of the building responded to the existing context, yet "with a modern spatial sensibility" (Joubert, 2009, p. 250).





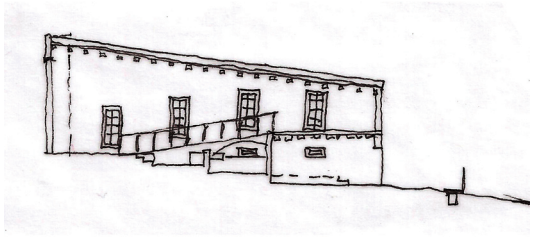


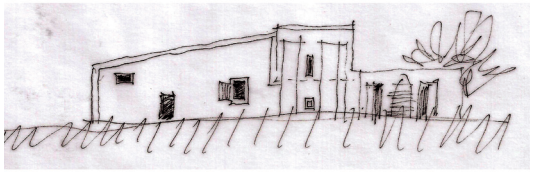
"Volumetric resolution and whitewashed facades are appropriately simple, accentuated only by blue timber shutters of (correct) vertical proportion (Joubert, 2009, p. 250).



Conclusion

Sally House demonstrates the transformation of a typical Karoo house into a building that stays true to the original proportions and feel, yet appears very modern. Transformation creates a heightened sense of awareness for the existing context and typologies.

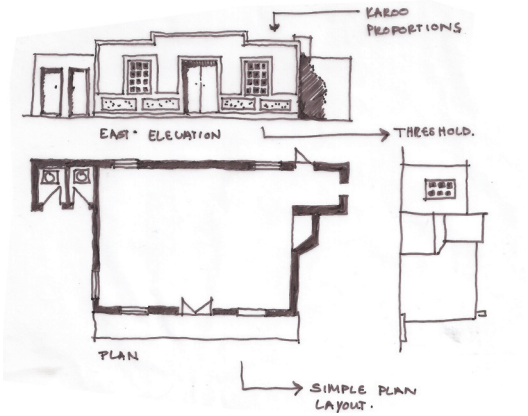




5.18. Redrawn illustrations from 10 years + 100 buildings. Architecture in a Democratic South Africa. [Joubert, 2009: 250-252]

5.2.3. Carnarvon

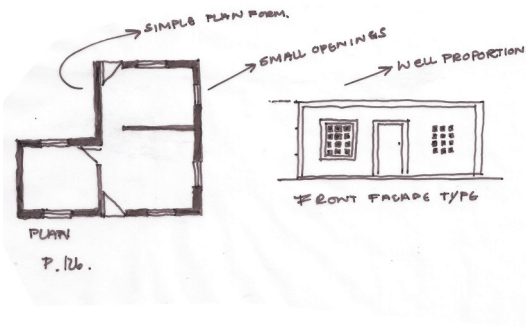
Dr. Walter Peters and a group of students did a conservation study in DeBult, Carnarvon in 1991 (Peters W. , Carnarvon, A Conservation Study, 1991a). They also proposed an upgrading of the environment and designed a housing layout. The existing typologies of the area are taken into consideration. The buildings resemble the typical Karoo vernacular architecture that sensitively integrates the buildings into the existing context. Proportion and scale were taken into consideration as well as boundary and threshold.



5.19. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991:113] by S. Olivier



5.20 Karoo house 1. Photo by: A. Venter



5.21. Redrawn illustrations from Conservation study Carnarvon. [Peters, 1991: 126] by S. Olivier



5.22. Karoo house 2. Photo by: A. Venter



5.23. Karoo house 3. Photo by: A. Venter



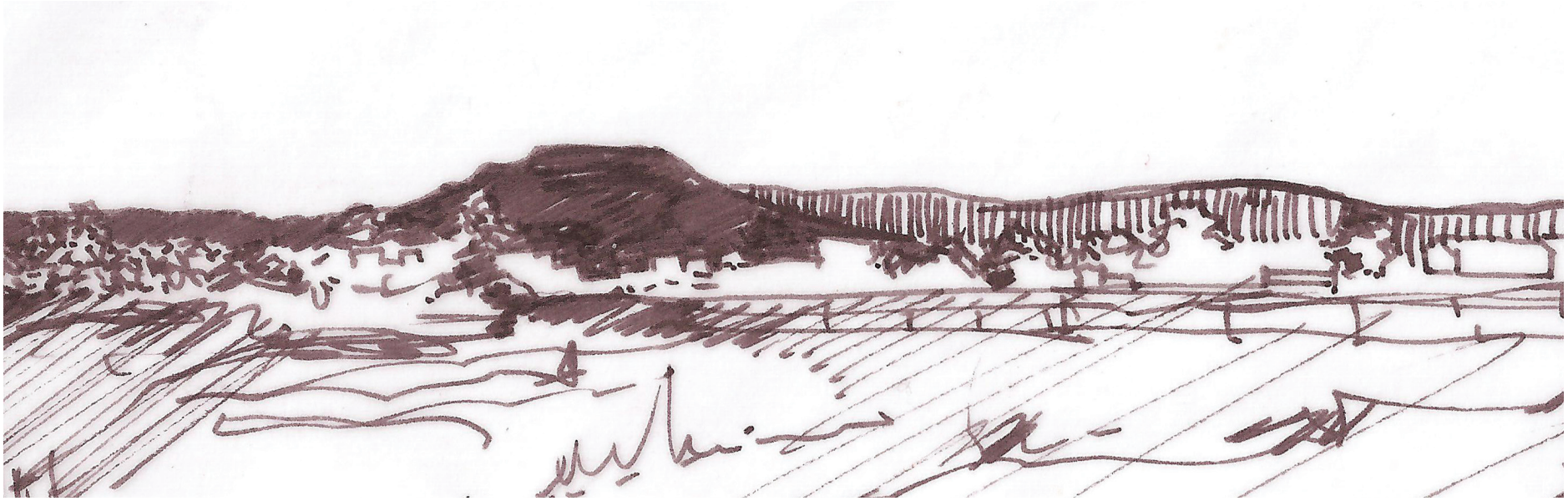
5.24. Karoo house 4. Photo by: A. Venter



5.25. Karoo house 5. Photo by: A. Venter

Chapter 6

6. Accommodation list



Entrance

Reception

Offices

Boardroom

M/F toilets

Kitchenette

Commercial area

M/F toilets

Seating areas

Public square

Restaurant

Kitchen

Storage

Inside seating

Outside seating

Outside braai area

Outside storage

Kafe

Kitchen

Stoep

Inside seating

Back seating

Storage

Bakery and Dairy products

Oven

Cold store

Dry store

Kitchen

Front store area

Hair salon

Storage

Waiting area

Hair wash

Seating

Educational Laboratory

Storage

x 2 workrooms

Class rooms

x 4 class rooms

Personnel room

Kitchenette

Male/Female toilets

Office

Courtyard

Production

Craft Centre

Stoep

Storage

Courtyard

Craft areas

Permaculture

Vegetable and fruit gardens

Crop gardens

Herb gardens

Production

Washing area

Sorting area

Weighing area

Packaging

Cold store

Brickyard

Covered mixing area

Wet curing

Dry curing

Locker rooms

Office

Washing area

Storage

Deliveries

Workshop

Storage

Chapter 7

7. Material study



7.1. Photo by A. Venter

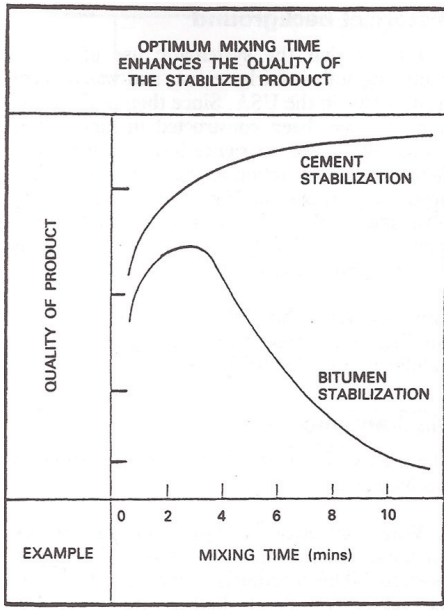
7.1. General

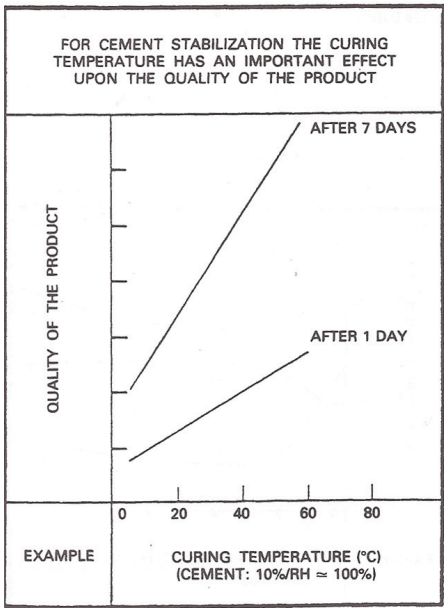
7.1.1. Stabilizers

“Nearly all soils can be cement stabilized. The best results are obtained with sandy soils” (Houben, 1994, p. 85). Stabilizing with cement increases the compressive strength of the brick, with better protection against soil erosion (Houben, 1994, p. 85). High and low strength cement’s impact on the soil is very similar. Classes 250-350, Portland cement is therefore recommended.

Water sensitivity can be reduced by adding organic (amine acetate, melamine, aniline) and inorganic (ferrous chloride) to the mixture.

For waterproofing soil-cement, 2-4% bitumen emulsion can be added. For enhanced soil plasticity 2% lime can be added (Houben, 1994, p. 86).





7.2. Cement. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 87]

7.1.2. Characteristics of soil

Contrary to popular belief, earth is not an excellent insulator and has a lower thermal capacity than that of concrete. The thermal capacity for concrete, rammed earth and adobe are as follows: Concrete: 590 (Wh/m³°C), rammed earth: 510 (Wh/m³°C), and adobe: 380 (Wh/m³°C) (Houben, 1994, p. 156)

7.1.3. Straw clay for roof insulation

The earth becomes the glue that binds the fibres together. The preferred lengths of the fibres are 15-40cm in length. According to Hugo Houben and Hubert Guillaud after removing larger grains from the clayey, it is mixed with water in drums with the use of a paddle or screw. This is done until the mixture becomes a greasy slurry (Houben, 1994, p. 186).

The conventional formula for mixing straw clay:

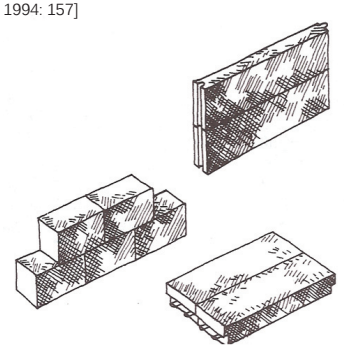
- 70kg straw to 600kg earth for an average density of 700kg/m3 - 1200kg/m3 (Houben, 1994, p. 186).

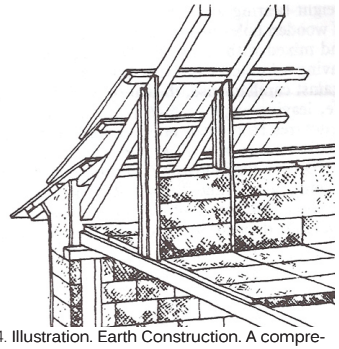
This method is very simple and can be executed by unskilled labour (Houben, 1994, p. 186).

WALL THICKNESS NEEDED TO OBTAIN A DAMPING EFFECT EQUAL TO THAT OF A 36.5cm BURNED BRICK WALL (COOLING TIME 82 HOURS)

UNRENDERED MATERIAL	DRY WEIGHT (kg/m³)	WALL THICKNESS (cm)
CLAY-STRAW	300	28
CLAY-STRAW	400	27
WOOD-FIBRE CEMENT	400	17
CLAY-STRAW	600	28
CELLULAR CONCRETE	600	30
FIBRE PANELS	600	17
CLAY-STRAW	800	29
HOLLOW BRICK	800	35
CLAY-STRAW	1000	31
CLAY-STRAW	1200	35
ADOBE	1400	35
ADOBE	1600	36
BURNED BRICK	1800	36.5
RAMMED EARTH	1800	39
HEAVY CONCRETE	2400	52

7.3. Wall thickness. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 157]





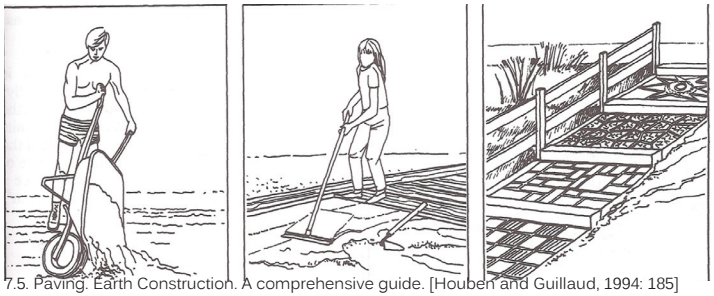
7.4. Illustration. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 187]

7.1.4. Poured earth for paving

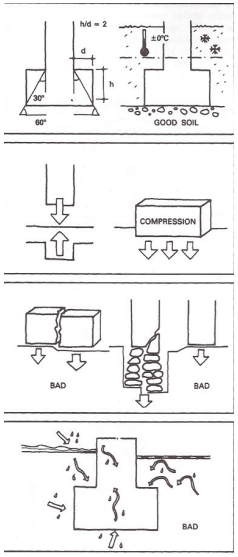
Poured earth starts out as a liquid mud; aggregates are sandy, almost gravelly. Lean concrete can be compared to poured earth. This is a very simple method of earth construction and according to Hugo Houben and Hubert Guillaud (1994, p. 184) the method has very low energy requirements (Houben, 1994, p. 184). This method is excellent for the making of paving. Problems that might occur are shrinkage (Houben, 1994, p. 185). Stabilizer can be added or making smaller units or sealing the cracks afterwards to counter the effects of shrinkage (Houben, 1994, p. 185).

7.1.4.1. Paving

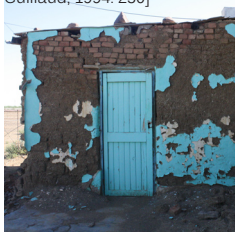
According to Hugo Houben and Hubert Guillaud (1994, p. 184), experimentation with this method is needed to acquire a knowledge of this method. The supporting soil needs to be prepared with a layer of sand or stone that forms a type of foundation.
The slabs can be decorated with small stones, nuts, or lime-washed to prevent heat absorption (Houben, 1994, p. 184).
Surface hardeners, such as linseed oil can be added. The method, when cement is added, is known as plastic soil-cement, and is excellent for pathways, irrigation, and drainage channels (Houben, 1994, p. 185).

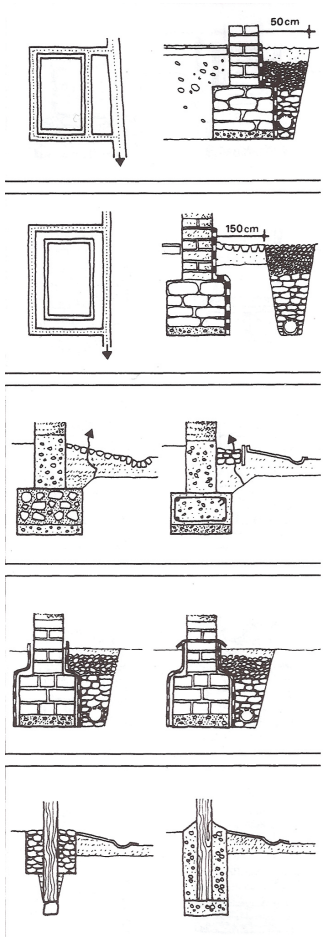


7.5. Paving. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 185]



7.6. Foundation Principles. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 250]





7.7. Foundation Principles. Earth Construction. A compre-

7.1.5. Design guidelines

According to Hugo Houben and Hubert Guillaud (1994, p. 246), the most fragile parts of an earth construction structure are the bottom and top of wall.

Foundation principles are:
- Draining area around foundation (1.5m) (Houben, 1994, p. 252)
- Surface water needs to be drained
- Prevention of water penetration
- Moisture must be able to evaporate (Houben, 1994, pp. 250-252)

7.1.5.1. Base course

According to Hugo Houben and Hubert Guillaud (Houben, 1994, p. 247), this part of the wall needs to be protected from water penetration, erosion, and friction. Many ways of handling the problem exists; one is using fired brick. For dry regions with average rainfall, the base needs to be between 0.2-0.4m in height (Houben, 1994, p. 255)

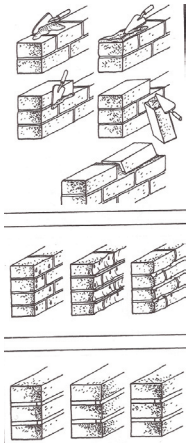
7.1.6. Adobe

According to Hugo Houben and Hubert Guillaud adobe bricks are very versatile and there are a number of different construction methods. The brick making process is varied and relatively simple (Houben, 1994, p. 212).

The production process is also quite simple, especially the un-mechanized process. A large area is needed for the bricks to dry, as each needs to dry separately. Adobe bricks are found in all shapes and sizes differing from place to place (Houben, 1994, p. 212). Clayey or soil with a silty texture are recommended for adobe bricks (Houben, 1994, p. 214).

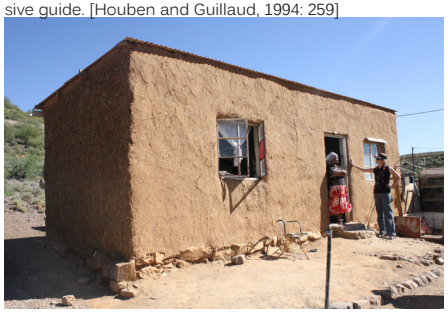
7.1.6.1. Multiple mould method.

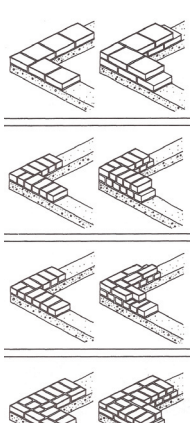
According to Hugo Houben and Hubert Guillaud (1994, p. 217), the mould is a ladder like structure, placed on a prepared area, to produce 10-15 adobe bricks per session if all the moulds are filled.





7.8. Mortar. Principles. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 259]





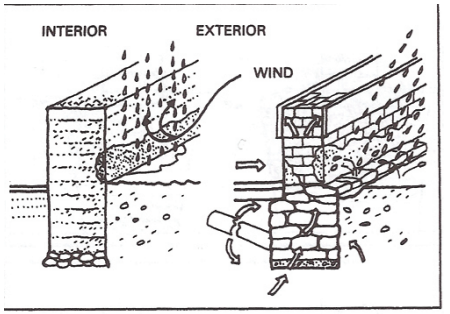


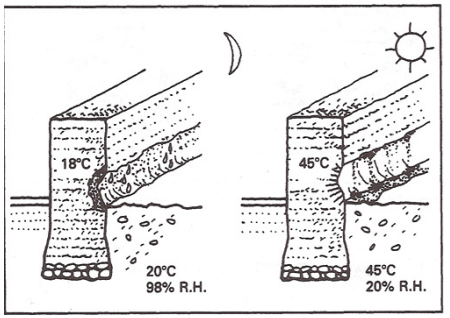
7.9. Corners. Principles. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 261]

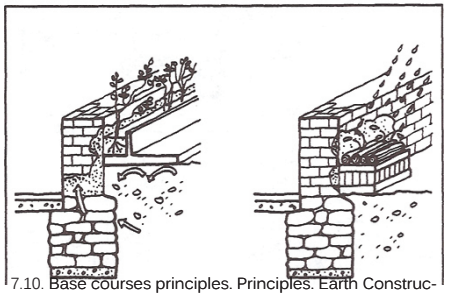
The soil, mixed in a mixer, is poured, either directly from the mixer or from a wheelbarrow into the moulds. The mixture is then spread evenly into the moulds; the mould can then be removed. Wooden or plastic moulds are recommended as the moulds can become quite heavy. Rot and warping may occur and therefore the wood needs to be treated. It is very important to keep the mould clean and if not in use, it should be stored (Houben, 1994, p. 217).

7.1.7. Walls

Earth construction walls have low tensile and shear strength, but work well under compression. Off-centre loads, point loads, bending and building loads should be avoided. Bonds, size and stability of the main walls, dividing walls, frames and enclosures need special attention (Houben, 1994, p. 258).







7.10. Base courses principles. Principles. Earth Construction. A comprehensive guide. [Houben and Guillaud, 1994: 254]



The compressive strength of an adobe wall is increased by stabilizing the soil mortar with cement; also, the sheer strength is doubled (Houben, 1994, p. 259).

7.1.8. Ring beams

Ring beams evenly spread the load of the roof onto the walls. The ring beam should be unyielding and the loads upon it should be evenly spread as far as possible. Ring beams act as a girdle that ties the walls together, resisting external forces such as lateral wind pressure. Ring beams can also function as wind bracing, a continuous lintel, anchorage for floors, roofs and an intermediate tie system for sills and lintels for openings. Mainly wood, steel and concrete are used for ring beams (Houben, 1994, p. 265).

7.1.9. Openings

Openings should not be too large, too many or too near a corner and should have a drip under the lintel and waterproofing under all the sills (Houben, 1994, p. 266). Lintels need to cover the opening plus about 25cm or more on either side. (Houben, 1994, p. 267)



7.11. Small barn. Photo by A. Venter





7.12. Window. Photo by A. Venter



7.1.10. Roof

When building with earth for the roof, it is important to keep the spans between the roof beams small as these roofs can become very heavy. Adequate waterproofing is a necessity (Houben, 1994, p. 280).

“Because of the immense thermal inertia, these roofs are suitable for hot, dry climates. If the roof requires insulation, stretched matting, loose straws, clay straw, or seaweed can be used. Lime washing increases solar reflection: 90% compared to 20% for roofs left bare” (Houben, 1994, p. 280). Waterproofing can be done with bitumen felt, layers of clayey earth, or stabilized earth. A well-compacted lime screed with bitumen also works well; the bitumen however, needs to be covered with soil for ultraviolet protection (Houben, 1994, p. 281).





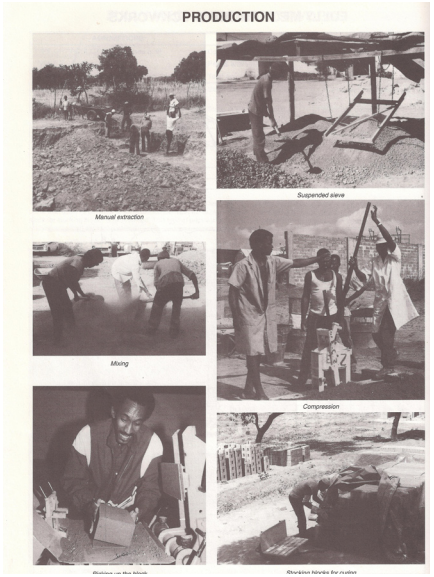




7.1.11. Brick yard and production

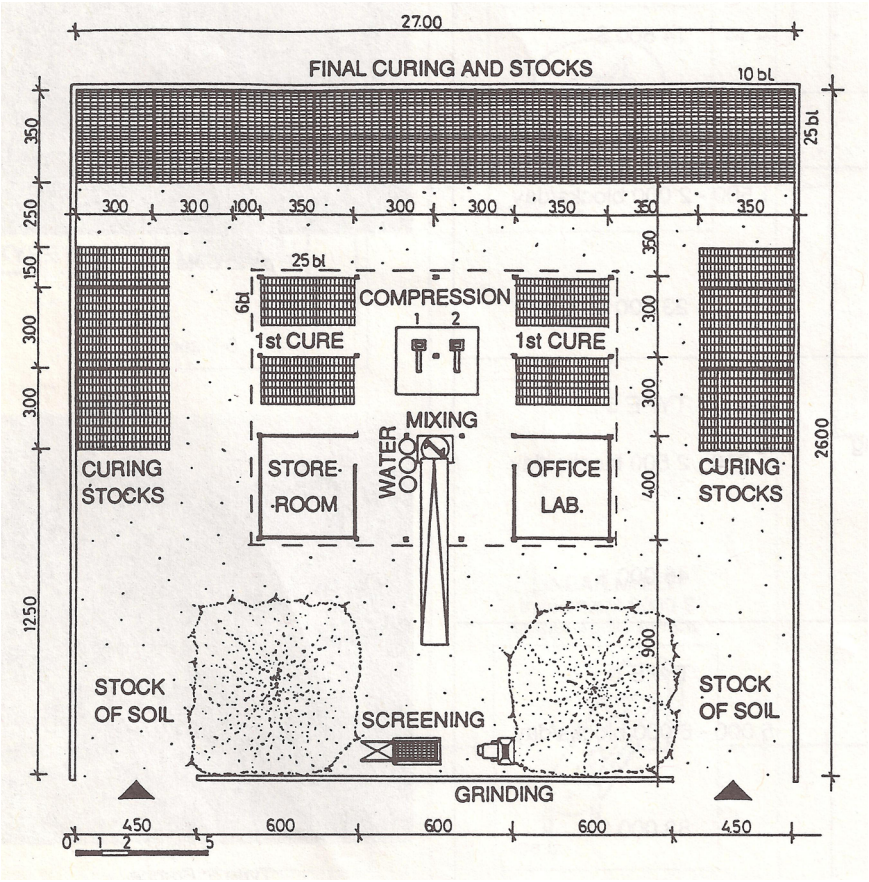
The brickyard is flexible and can be used for manuel preparation of the adobe block.

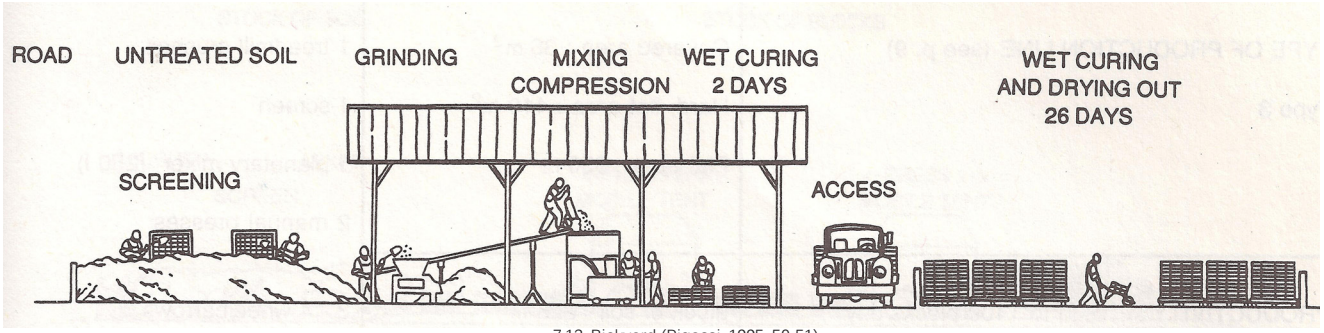
There are two to three manual presses. Preparation include: screening, grinding, mixing and making of the bricks. (Rigassi, 1995: 50)



Production

7.14. Production (Rigassi, 1995: 56)





Semi-mechanized brickworks

7.13. Bickyard (Rigassi, 1995: 50-51)

7.1.10. Soil testing.

Soil samples were gathered in Carnarvon from the site. The people working at the informal brickyard was asked for soil samples found in the town itself.

The samples were tested for gravel/sand, clay and silt content.

(Rigassi, 1995: 28-29)



Sand from brickyard



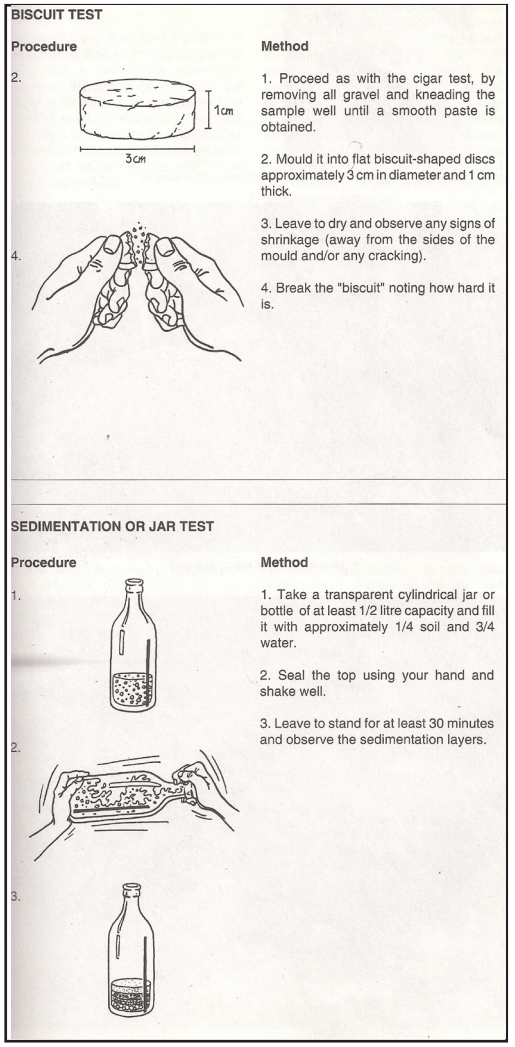
Clay from brickyard



Ash from brickyard



Soil from site



BISCUIT TEST

Procedure

2.

4.

Method

1. Proceed as with the cigar test, by removing all gravel and kneading the sample well until a smooth paste is obtained.

2. Mould it into flat biscuit-shaped discs approximately 3 cm in diameter and 1 cm thick.

3. Leave to dry and observe any signs of shrinkage (away from the sides of the mould and/or any cracking).

4. Break the "biscuit" noting how hard it is.

SEDIMENTATION OR JAR TEST

Procedure

1.

2.

3.

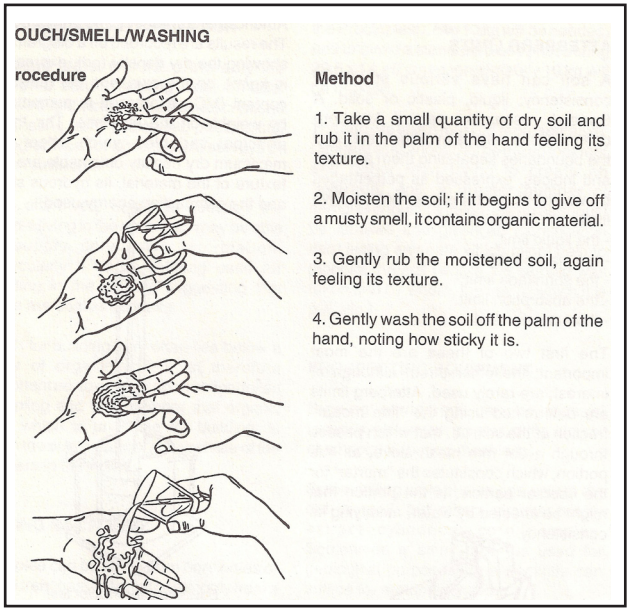
Method

1. Take a transparent cylindrical jar or bottle of at least 1/2 litre capacity and fill it with approximately 1/4 soil and 3/4 water.

2. Seal the top using your hand and shake well.

3. Leave to stand for at least 30 minutes and observe the sedimentation layers.

7.16. Testing (Rigassi, 1995: 29)



OUCH/SMELL/WASHING

rocedure

Method

1. Take a small quantity of dry soil and rub it in the palm of the hand feeling its texture.

2. Moisten the soil; if it begins to give off a musty smell, it contains organic material.

3. Gently rub the moistened soil, again feeling its texture.

4. Gently wash the soil off the palm of the hand, noting how sticky it is.

7.15. Testing (Rigassi, 1995: 28)



Sand from brickyard



Clay from brickyard



Ash from brickyard



Soil from site

Table 2. Soil Sample analysis

Methods	Sand	Clay	Ash	Site
Touch/smell/ washtest				
Texture	Gritty	Course, smoothwhen moistened	Gritty, fine, sandy	Gritty, sandy with gravel
Smell	Earth smell	Earth smell	Earth smell	Slightly musky
Washing	Washes off easily	Sticky with gravel content. Harder to wash off.	Sandy and sticky. Washes off fairly easy.	Smooth washes off easy.
Interpretation	Sand with gravel content	Clay with gravel content.	Sand	High sand and gravel content with some clay traces.
Sedimentation test.	Almost no clay layer, gravel at bottom with finer grain at the top.	Very little gravel, solid clay layer.	Clay and gravel content. More gravel than clay.	Almost even distribution of gravel, sand and clay
Biscuit test.	No shrinkage, no cracks visible. Broke easily.	Some shrinkage, no cracks visible.Very difficult to break. Broke with audible crack.	No shrinkage, no cracks. Very unstable.	Slight shrinkage, no cracks. Breaks easily and crumbles
Interpretation	Mixture between sandy-clayey soil and silt.	High clay content.	High sand or silt content.	Good sandy-clayey soil.



Sand from brickyard



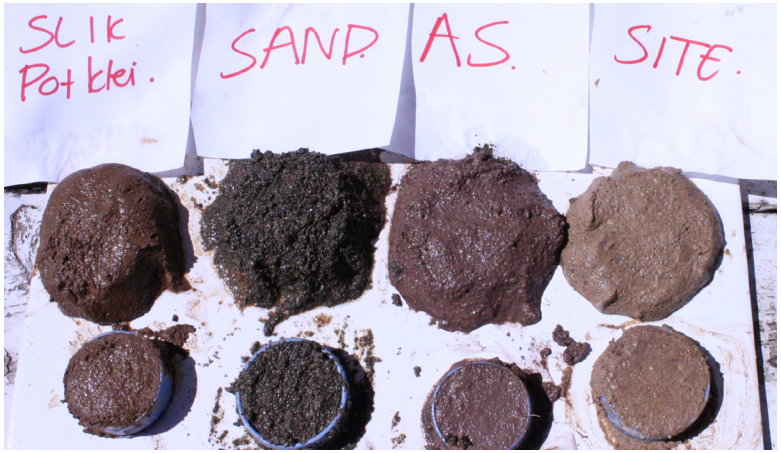
Clay from brickyard



Ash from brickyard



Soil from site





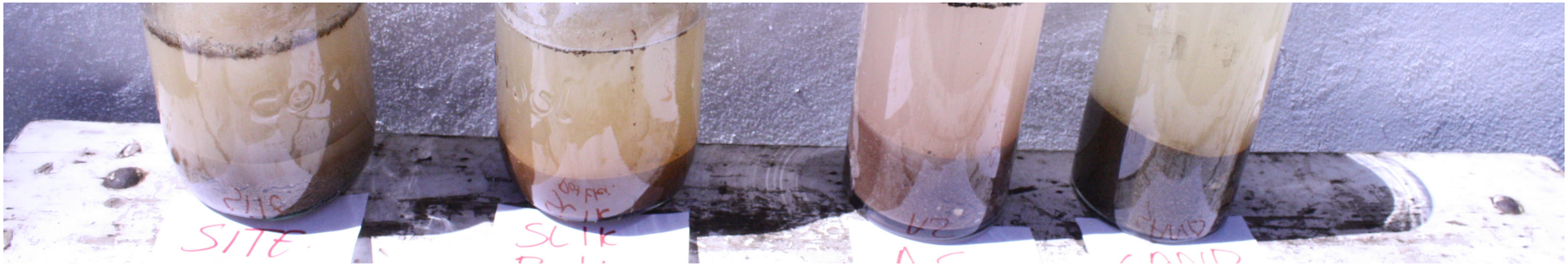
Dry biscuit test.



Clay from brickyard



Soil from site



Sedimantation test



Sand from brickyard





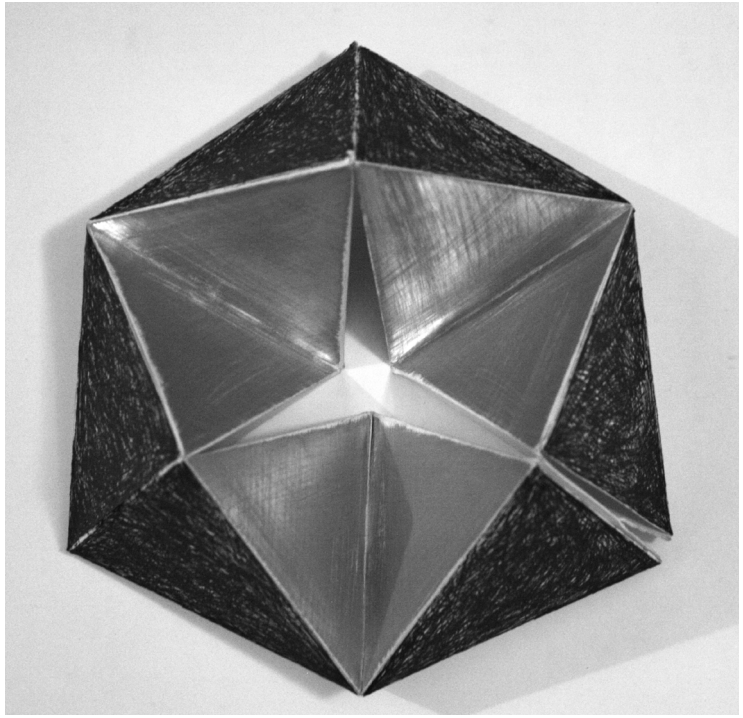
Ash from brickyard



Biscuit test

Chapter 8

8. Touchstone

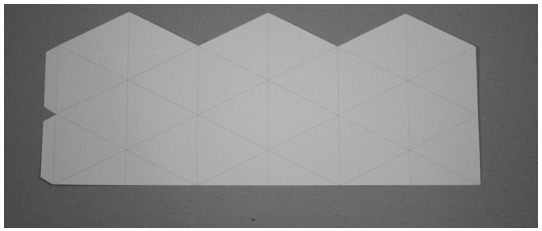


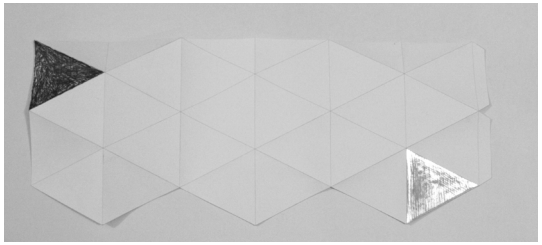
8.1. Touchstone

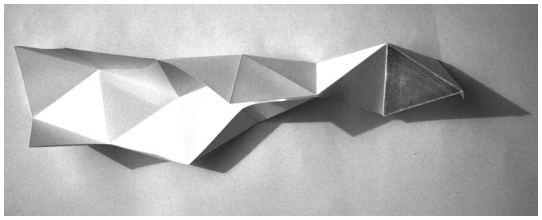
In life, we are constantly seeking ways to achieve a better life. Many times, we overlook the inherent and simple things in exchange for a faster, better way of doing things. The human soul is left out of the equation. The beauty of life becomes faded, confined to the worlds we create inside our own minds rather than the physical. We create an incredibly harsh landscape in which we are to survive – to protect us from nature, stars, rain and dust... Should we not perhaps protect ourselves from our own misconceptions. Perhaps we should engage more, feel more, and become more at peace. Why must life be so complex? Why can it not be simple?

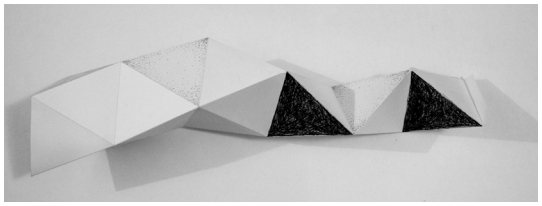
Should we not be moving towards self-awareness rather than towards a dislocated self? The current process will not stop unless there is a definite change. Our perceptions govern the way in which we react to the world around us. Perhaps our perceptions should be grounded in reality, where we physically engage with reality, where it is not simply a screen and our whole life is focused on a small square box.

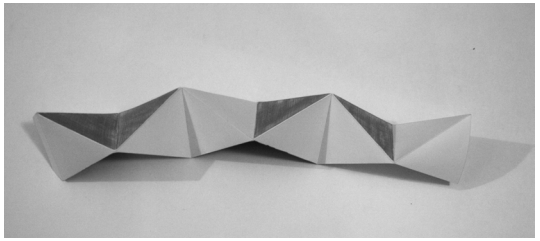
A paradigm shift is necessary - viewing the world differently, seeing it anew. We should be engaging with nature and the earth, exploring the world around us, not simply through self-analysis, but through awareness. There should be an awareness of tradition, of methods that are becoming extinct of what came before and what is now. We should become a part of the earth rather than living on it like parasites.

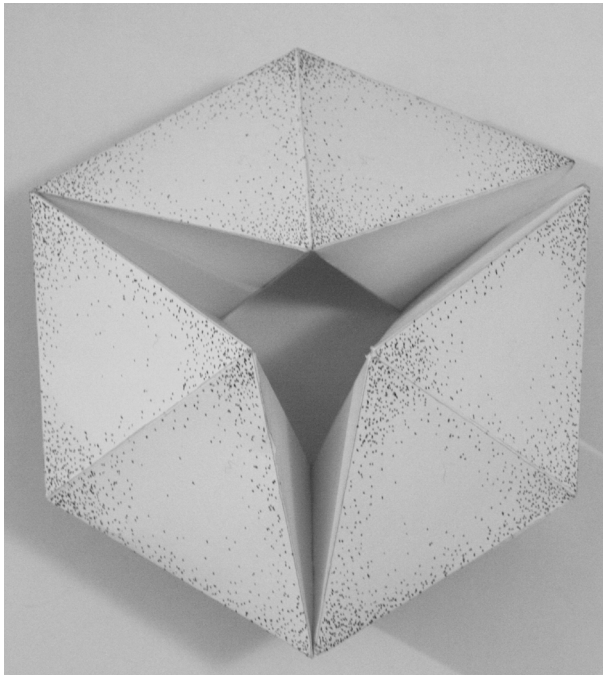












Time becomes lost

The substance of the day

Dissipitates

Do you ever touch the earth

Anymore?

When was the last time you played

Outside and got your hands dirty?

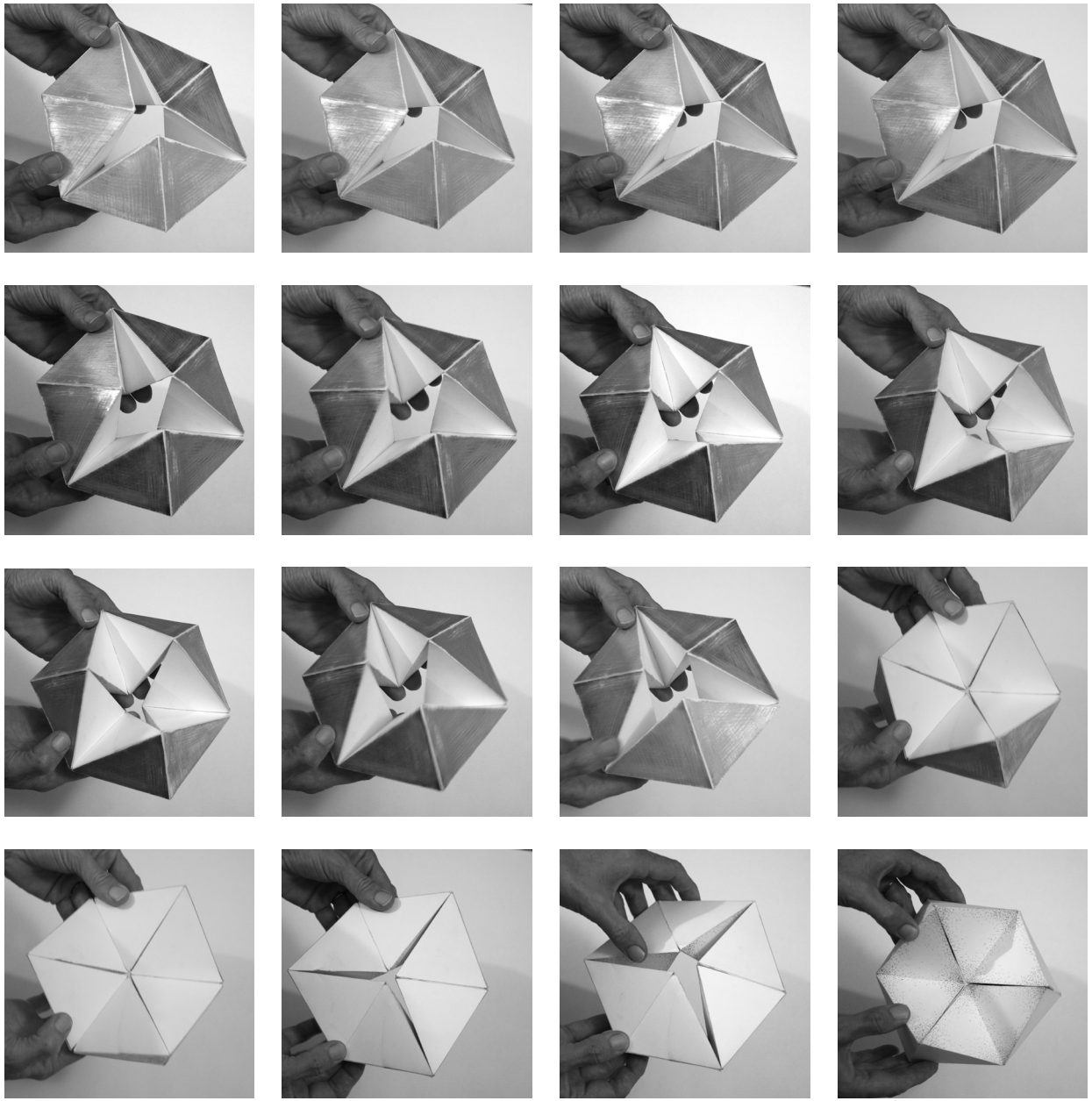
Specs of dust settling on the paintings

We are grown-

Ups now.

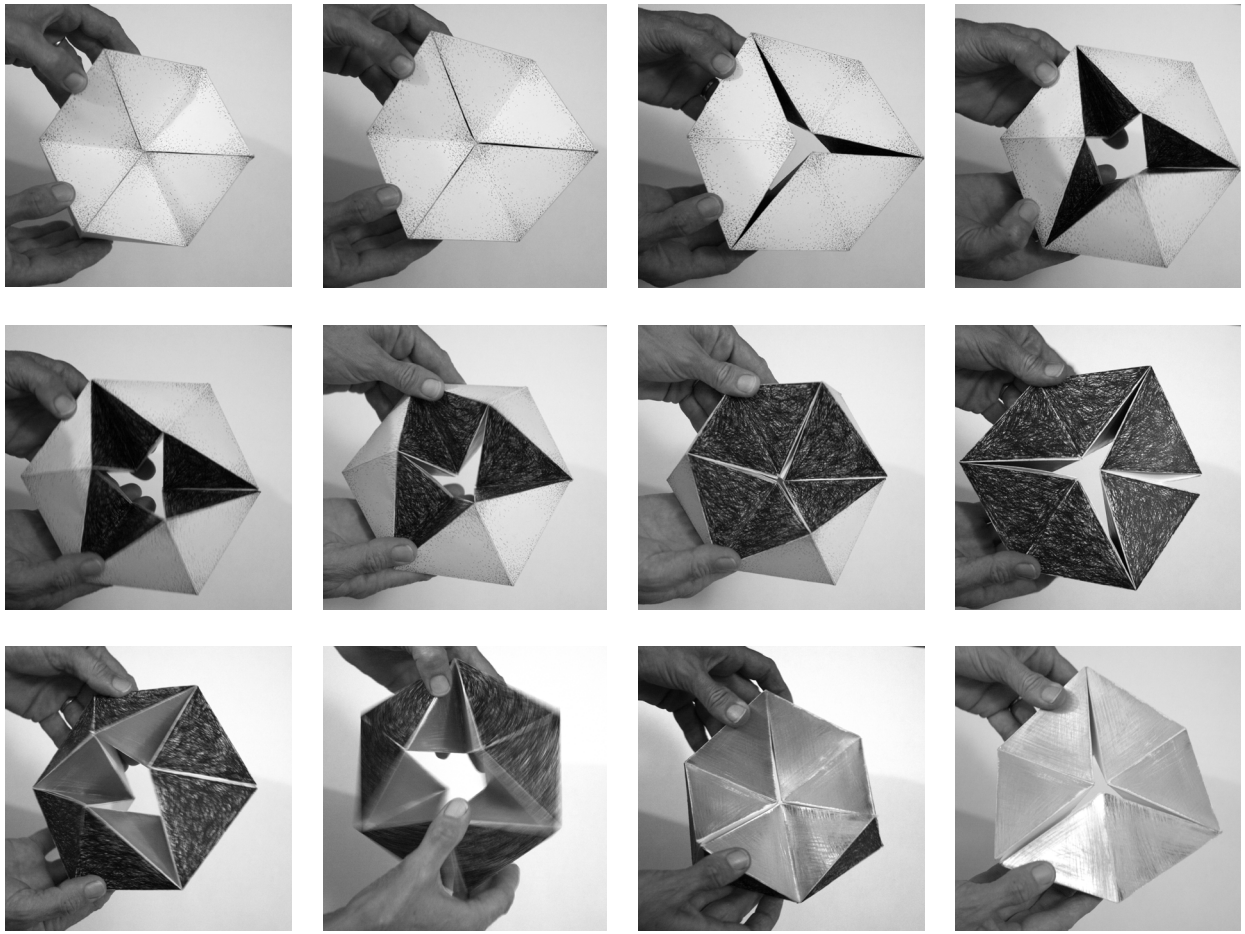
There is no time to play

There is no rest.



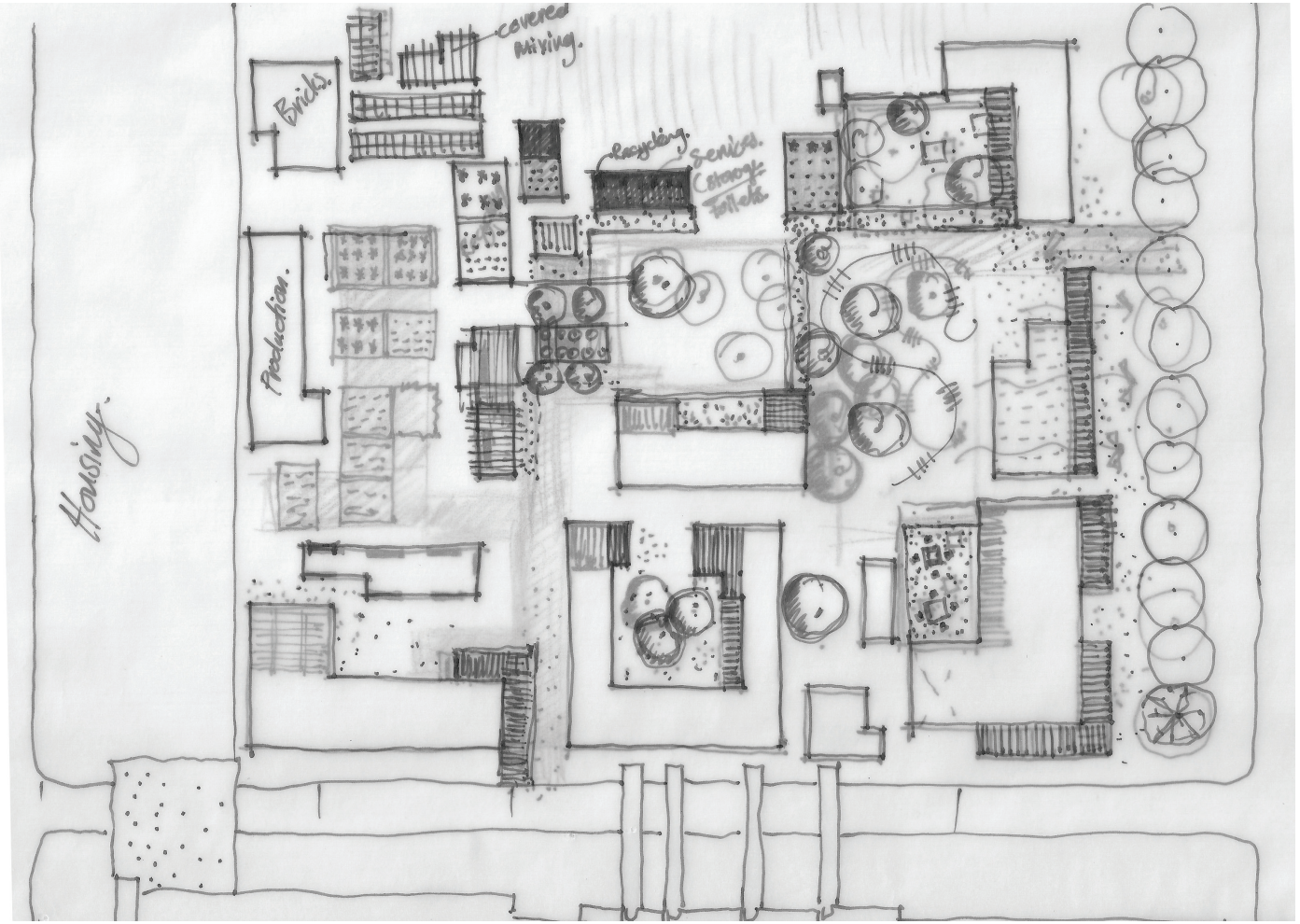
8.2. Paradigm shift.

People need to undergo a paradigm shift, concerning the way in which they view life. Why get someone to build your house for you, when you are capable of building it yourself. Natural resources are like a blank page; we need to use what we have in a responsible manner. Through a process of skills development, we are able to mould the world around us. Paradigm shift - When you know how to build your own home, when you have acquired these skills, why would you employ someone else to build your home for you, why not build it yourself? The problem should be seen from a new perspective and searching for new solutions is the answer.



Chapter 9

9. Design Process



8.1. Introduction

The heart of the centre is the main building, which is preceded by the entrance and information area. The information area becomes the first orientation point, providing core information concerning the centre's activities. The main building becomes the second orientation point consisting of a reception and waiting area, and becomes a gathering space. Information pertaining to the courses available, registration and general orientation of the centre happens at the main building.

After registration there will be a tour of the centre visually explaining how the processes work and explaining how the courses link to one another for example, how the brickyard and workshop function together, and how the theory forms the basis for the practical application.

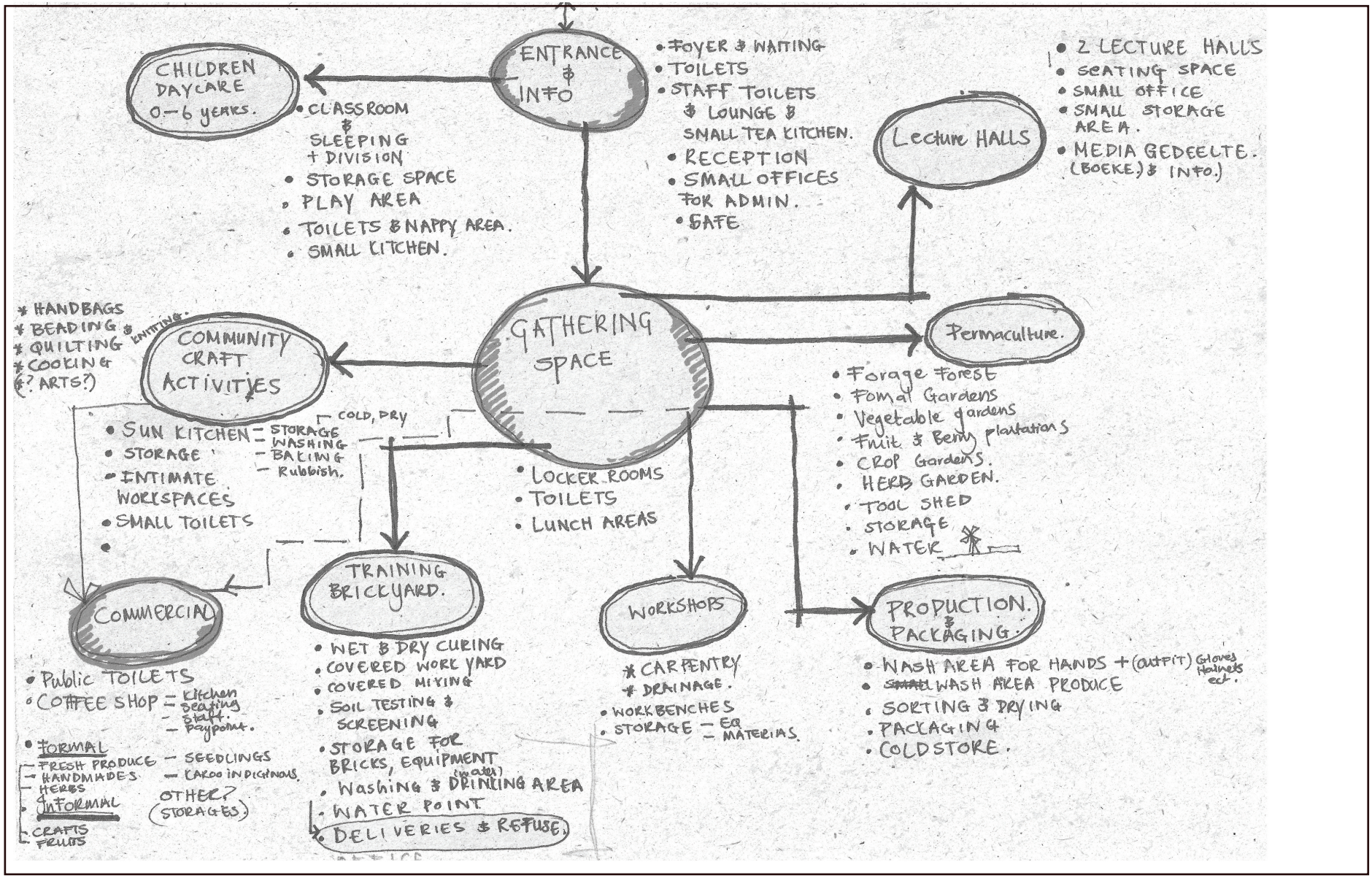
Sara is a woman from the less fortunate community in Carnarvon. She has just registered for quilting classes. She wants to learn how to make her own quilts and sell the product at a later stage at the informal market area, as she has seen some of her friends do.

While attending classes, she becomes aware of the vegetable and herb gardens and the people tending these gardens. She interacts with the people who signed up for these courses and finds that they have started their own vegetable gardens that provides fresh produce for their families. Sara decides to register for another course.

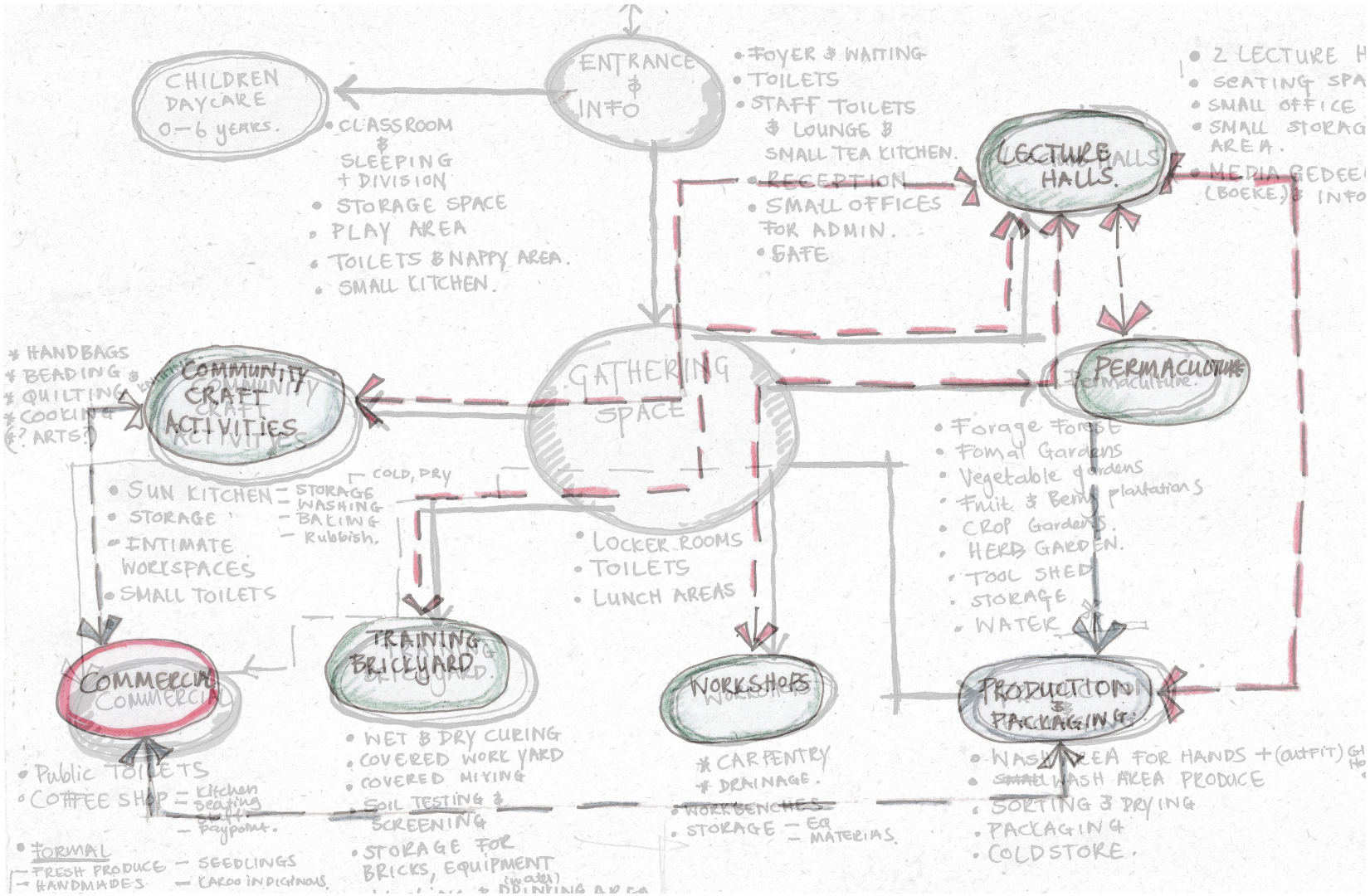
The next day she brings her husband with and he registers for the brick making course, as he has seen that some of the people who used to live in shacks have started to build their own houses making use of the centre's equipment.

Sara eventually started making her own quilts and cultivated her own vegetable garden; she also planted reeds that will be used as a sun screen for the house her husband busy is building for them.

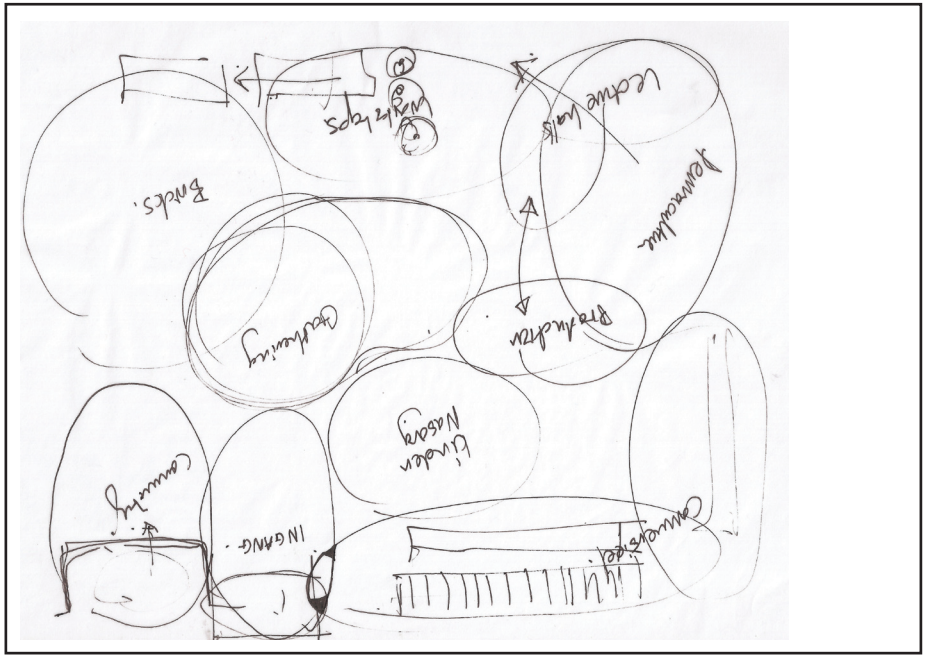
Primary Routes



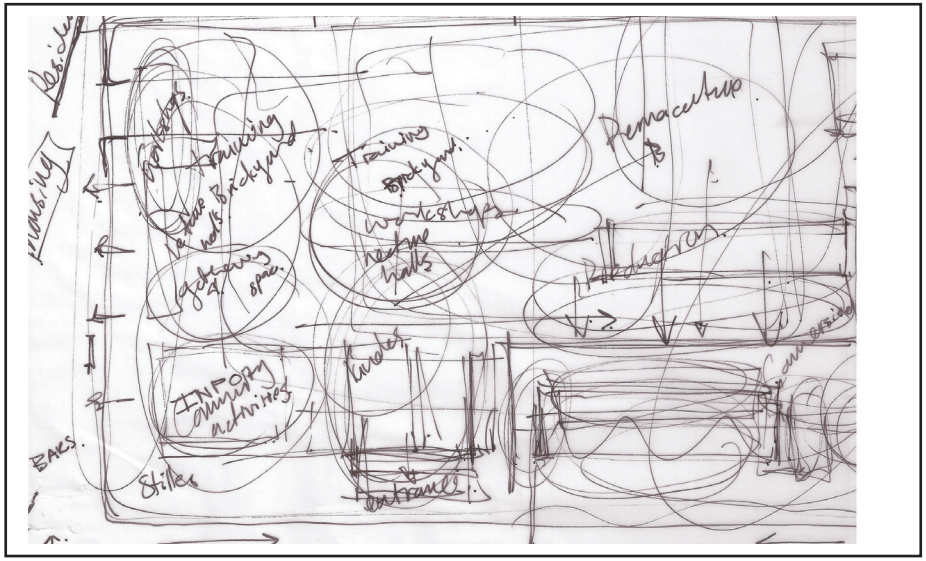
Secondary Routes



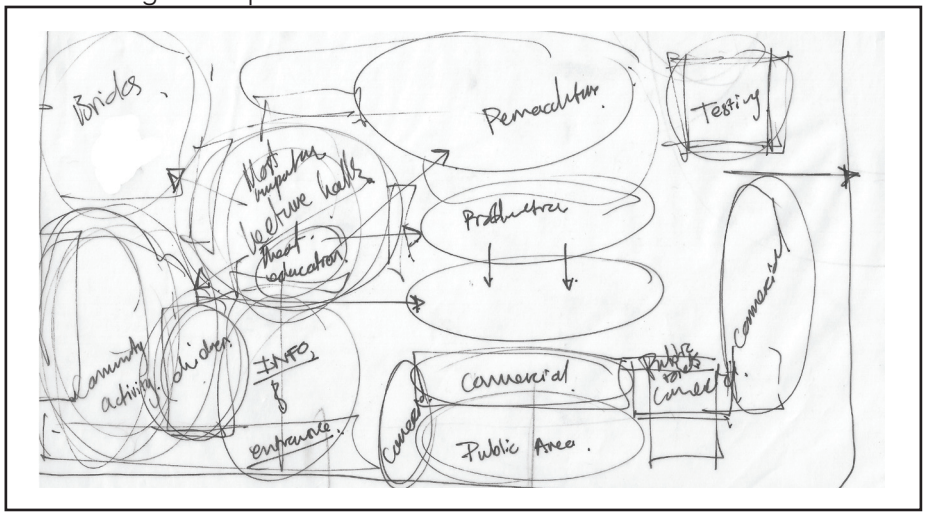
Planning Diagrams



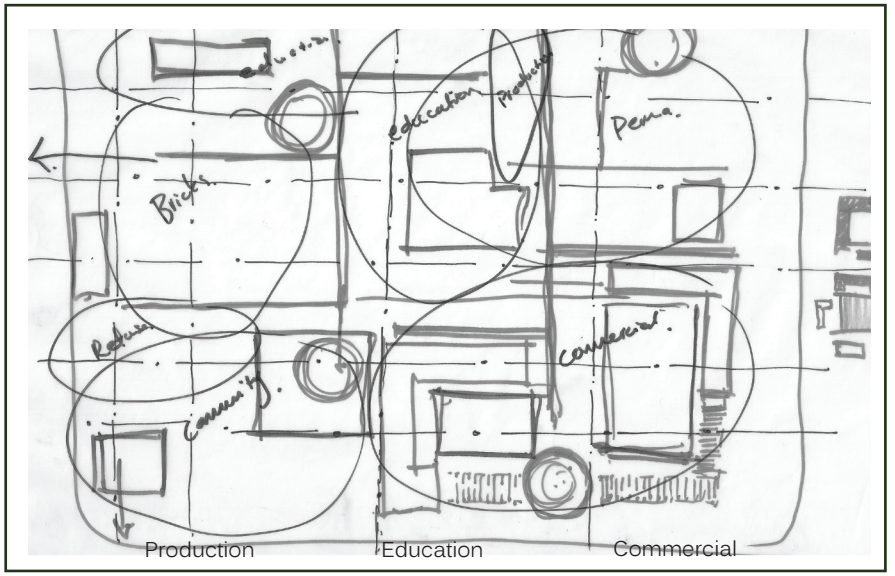
Bubble diagram of placement on site



Bubble diagram of placement on site

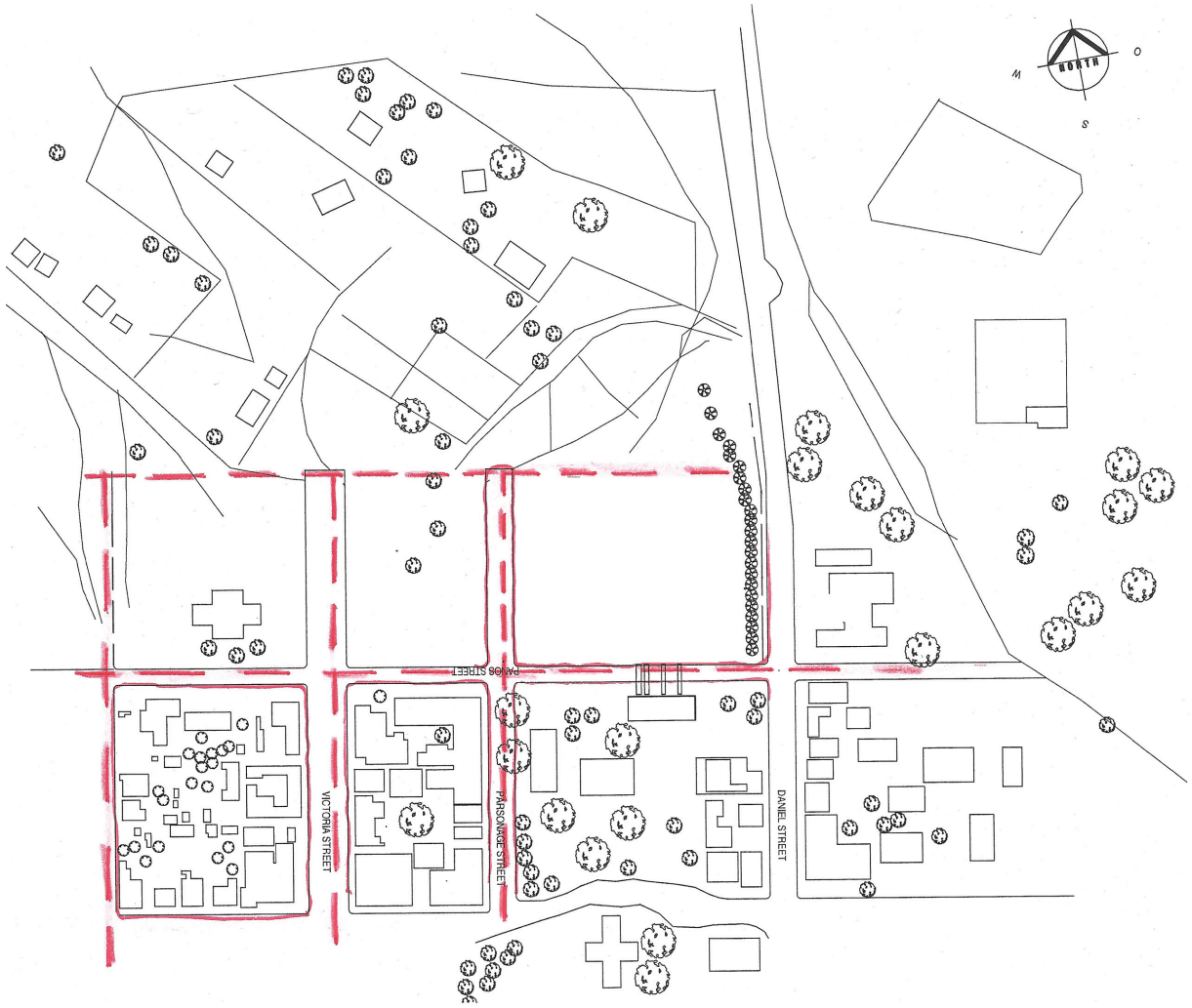


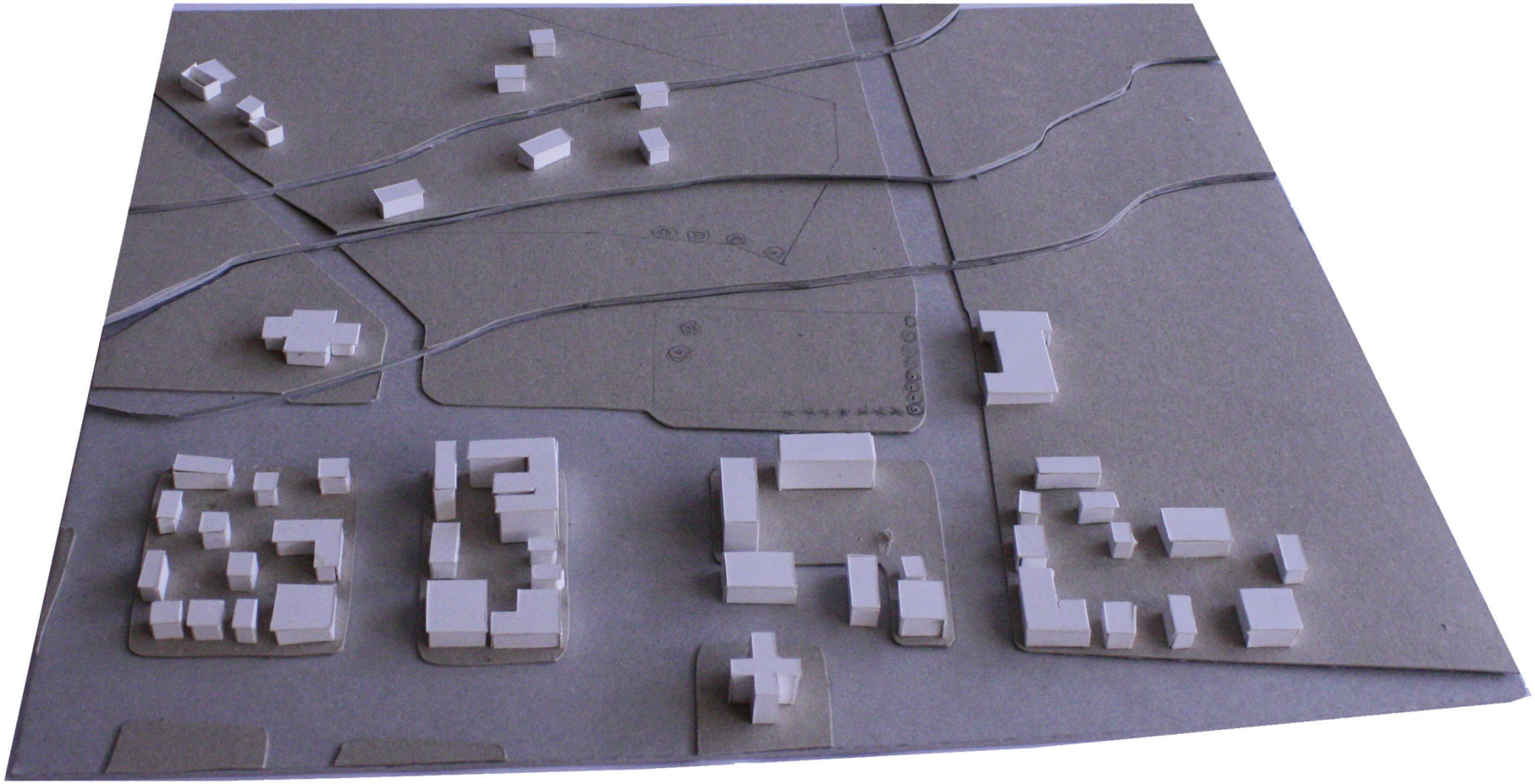
Bubble diagram of placement on site



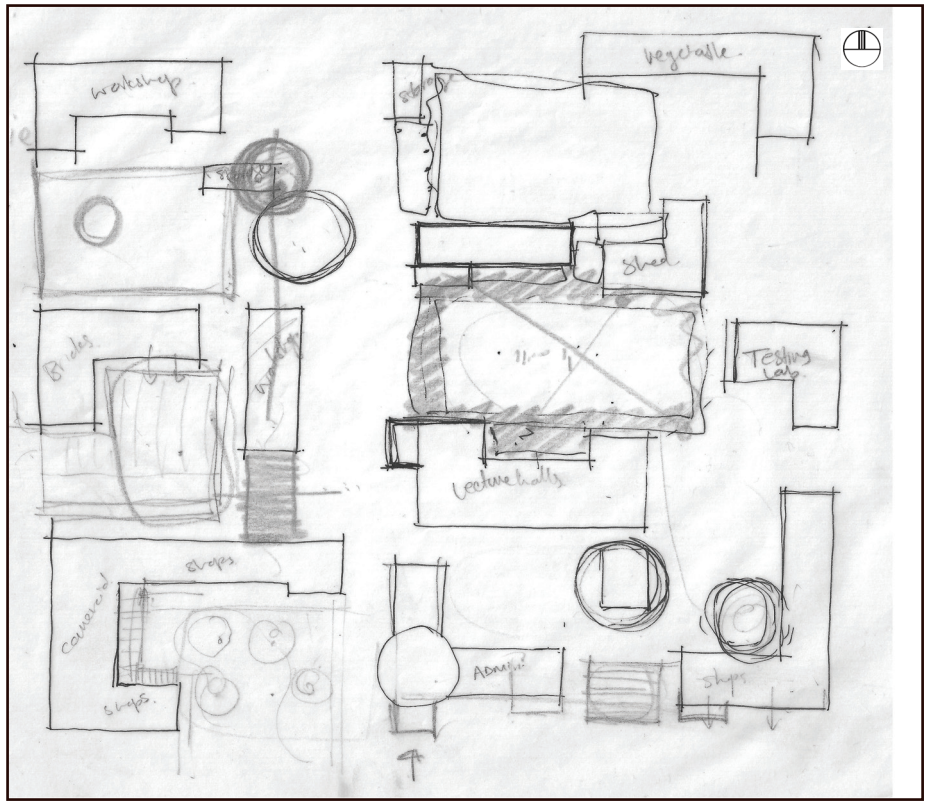
Sectors on site

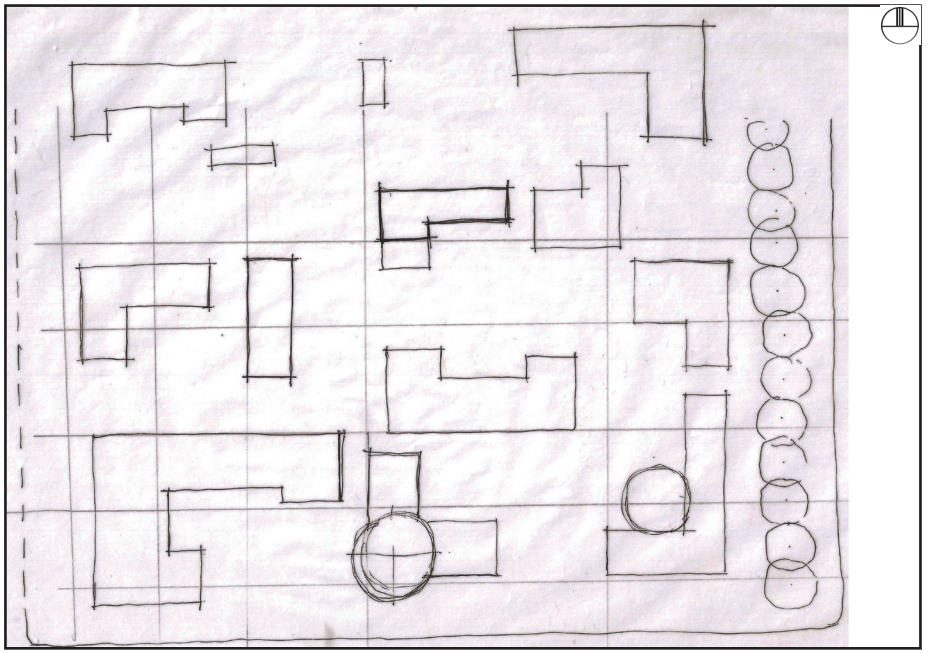
Extending the town grid onto the site to establish order and to intergrate the site with the town.

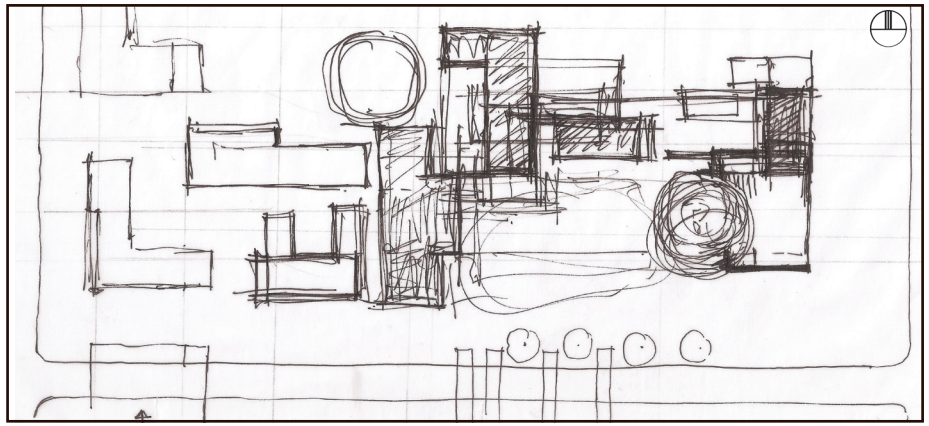


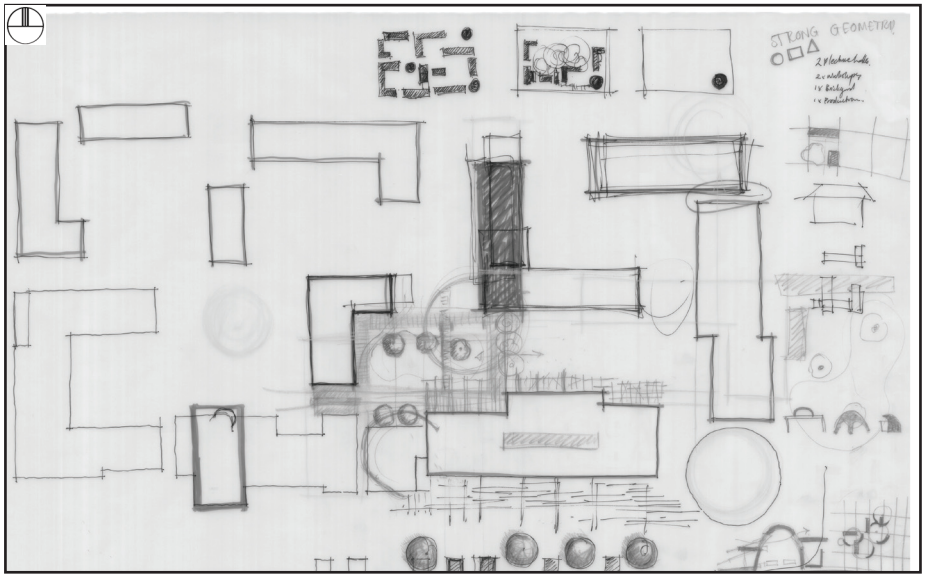


Concept model of site, depicting site and surrounding buildings.



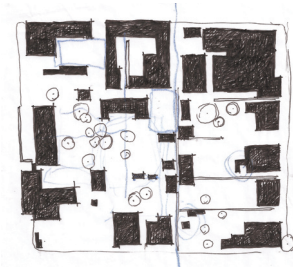






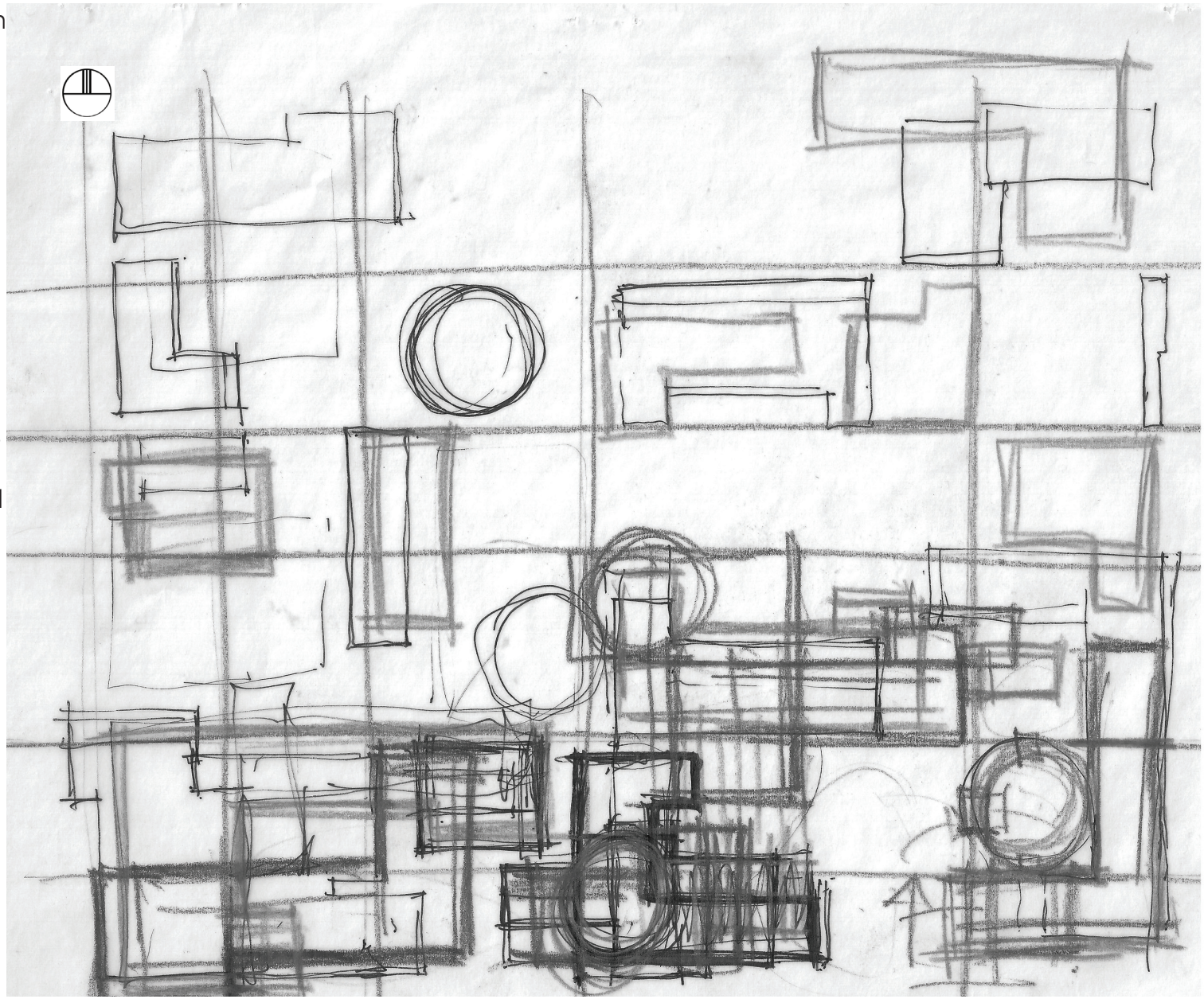
Layout scethes
92

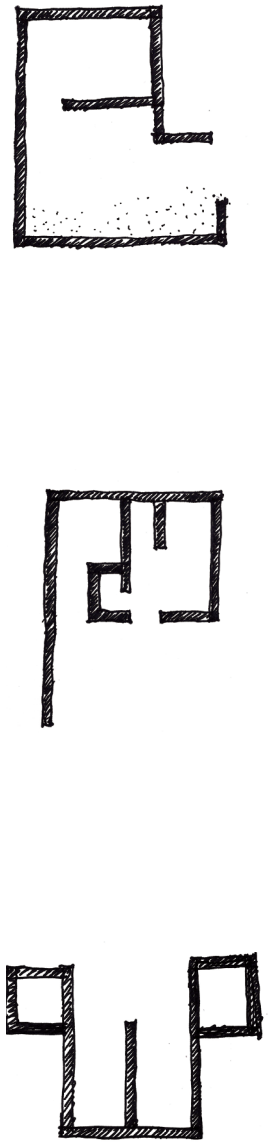
Process of intergration with town fabric.

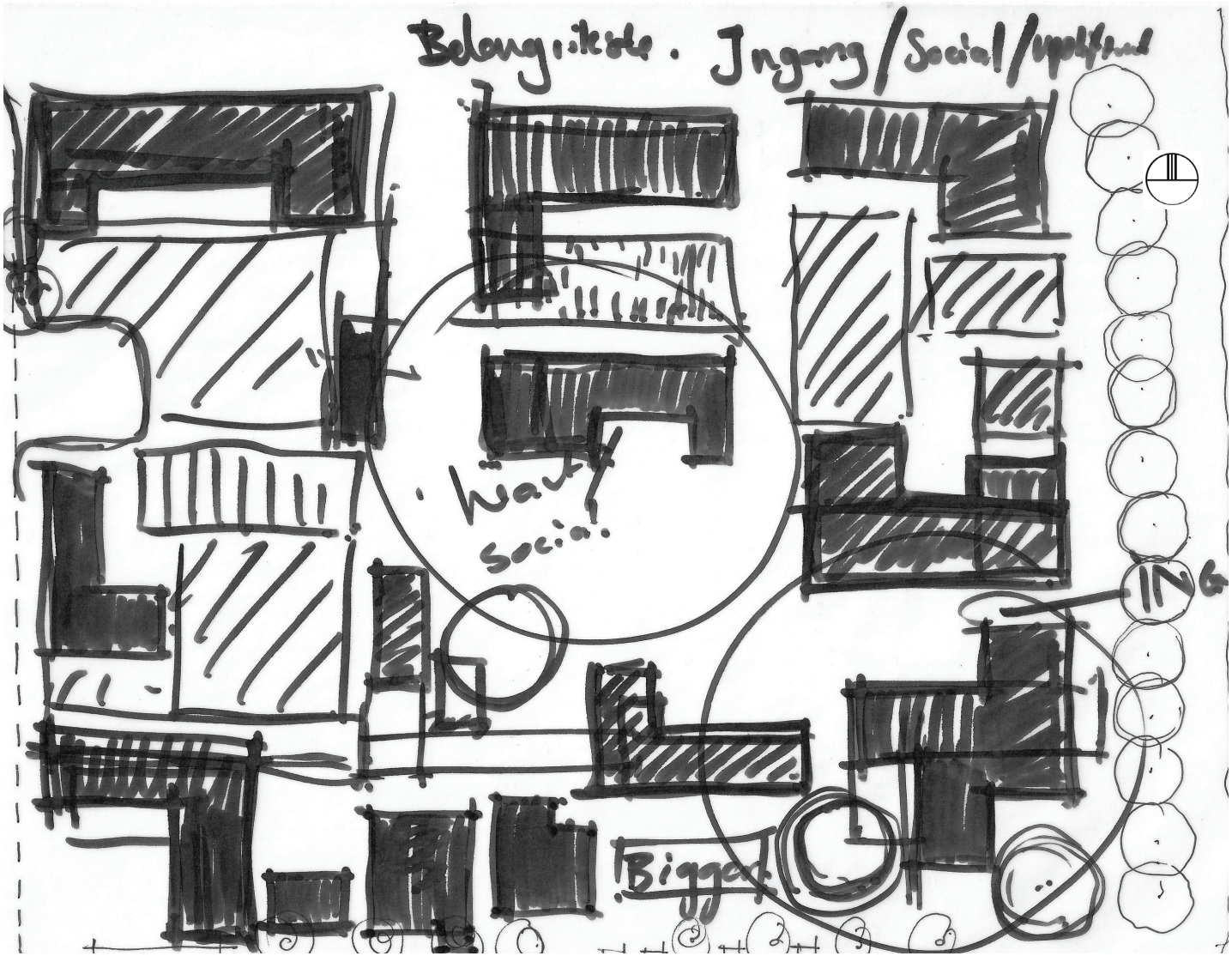


Existing town fabric.

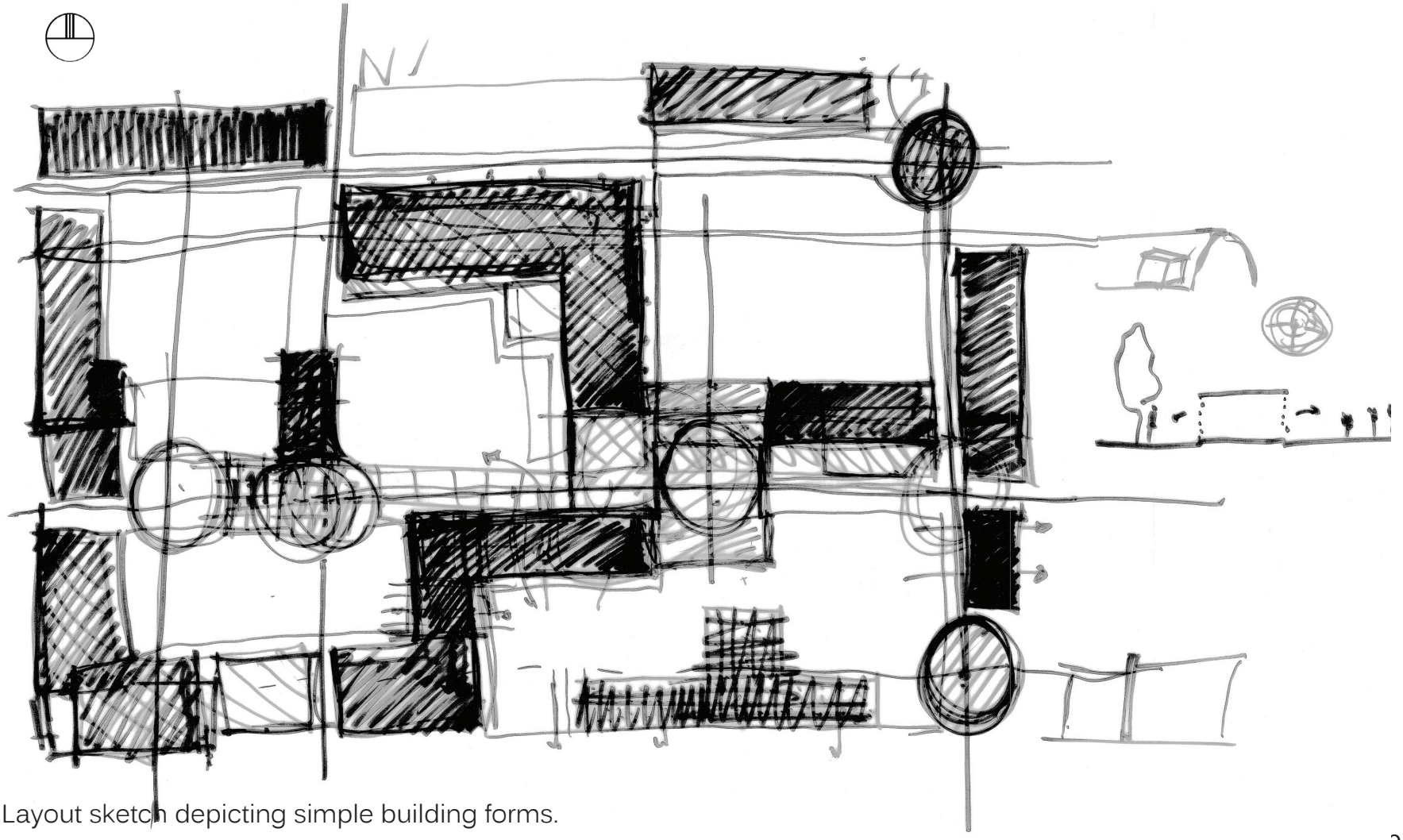
The existing town fabric in terms of massing and the solid/ void spaces. The town blocks developed naturally over time, thus becoming the embodyment of the natural order of the town forming a cohesive unity.



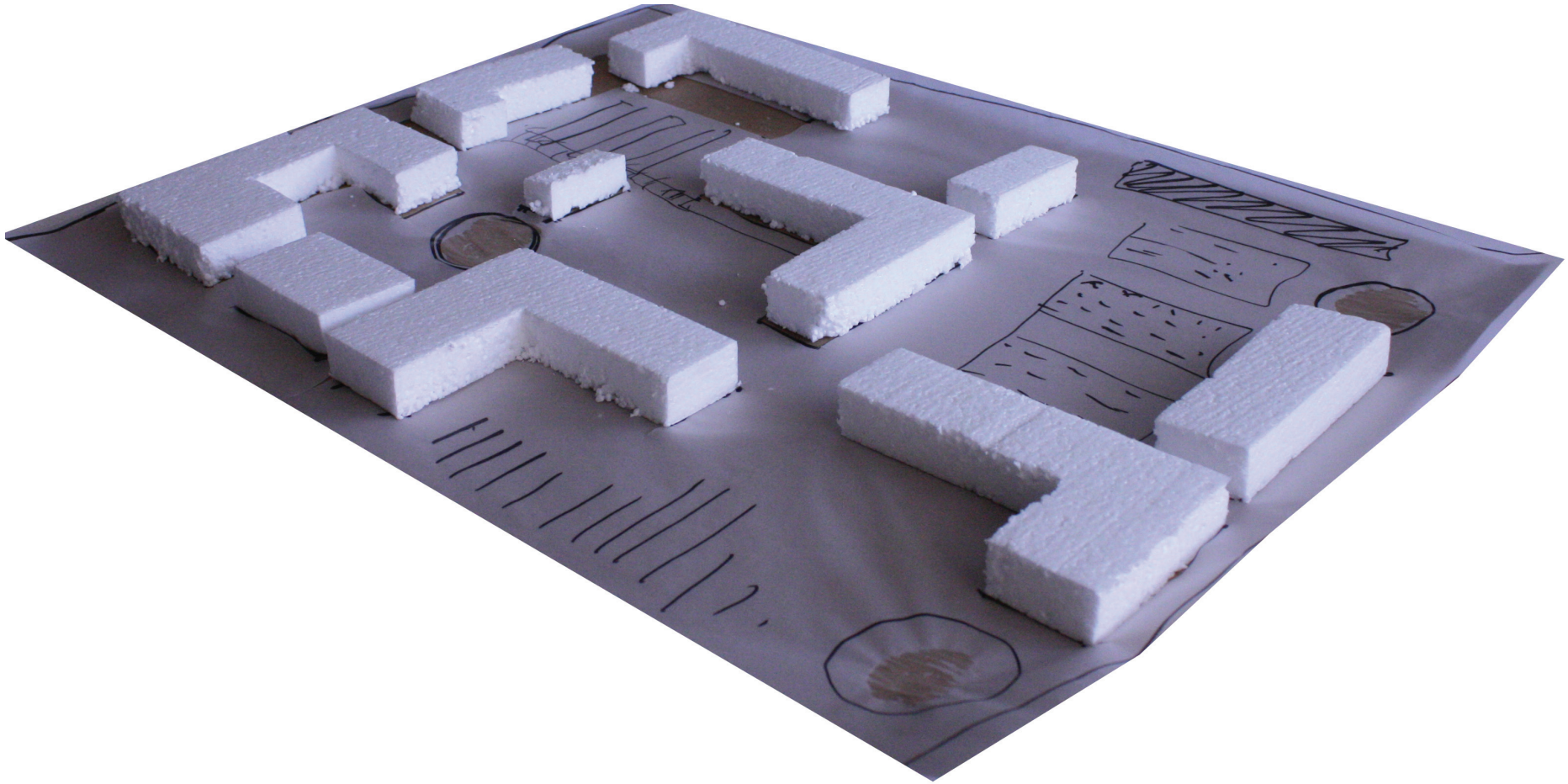




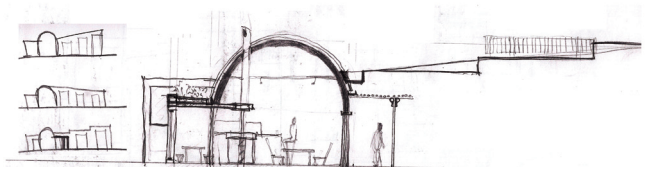
Formalised participatory sketches depicting simple building forms.



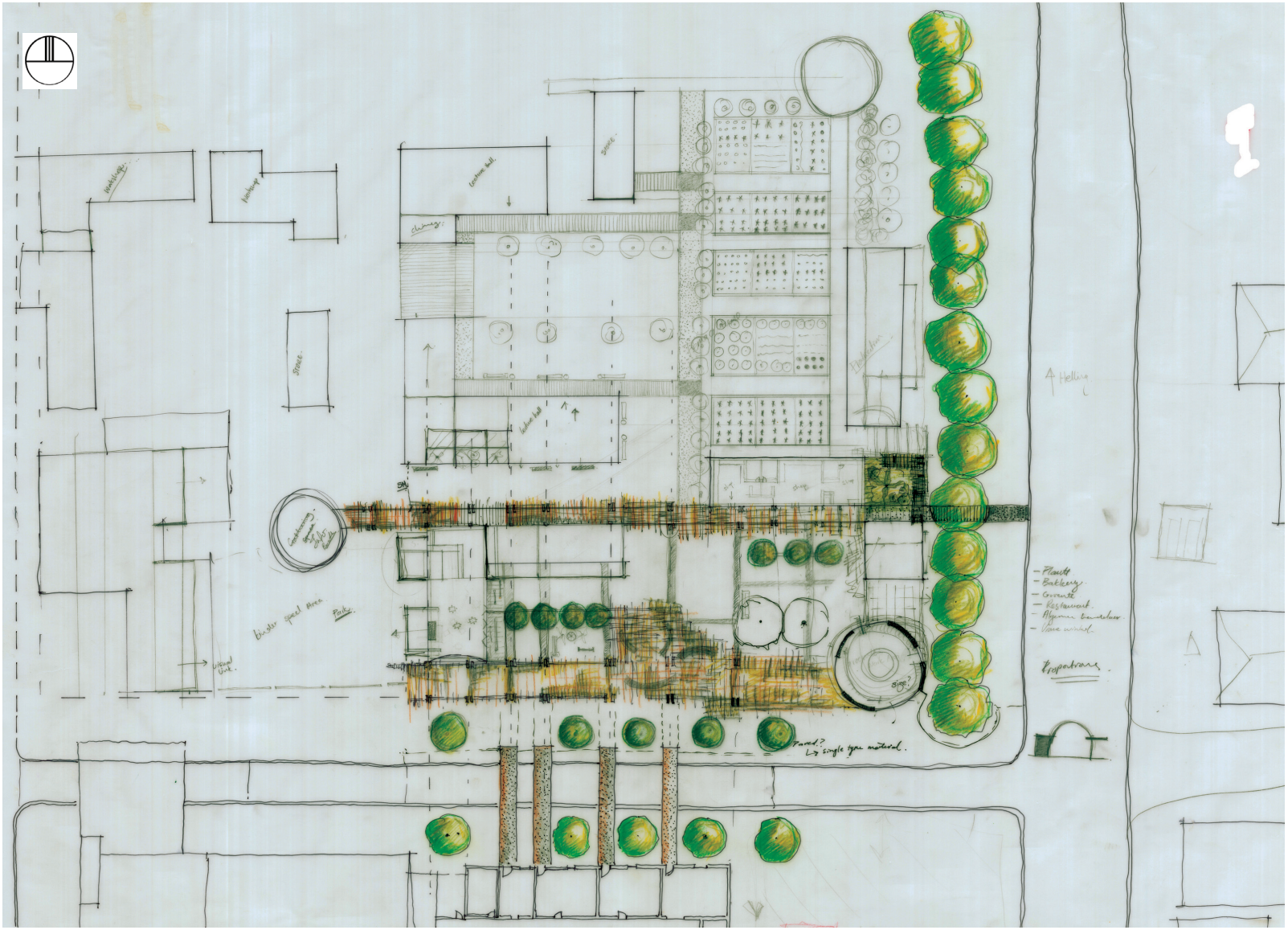
Layout sketch depicting simple building forms.



Concept model 2. Simple building forms and massing.

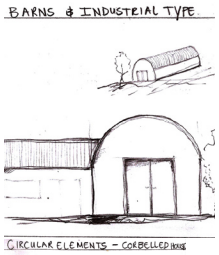


Earth construction vault system.


Hellinq
- Plants
- Bakkery
- Groente
- Restaurant
- Algemeen handelaar
- Vlaamse winkel
Tropotrans
Paved?
↳ single type material.
Bicycle speed Area
Park
visual link
Stoke
Stoke
Lecture hall
Lecture hall
Chimney
Workshop
Workshop

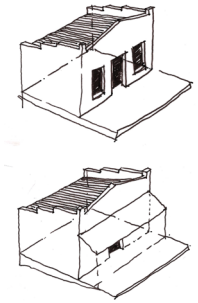


Barns in the area

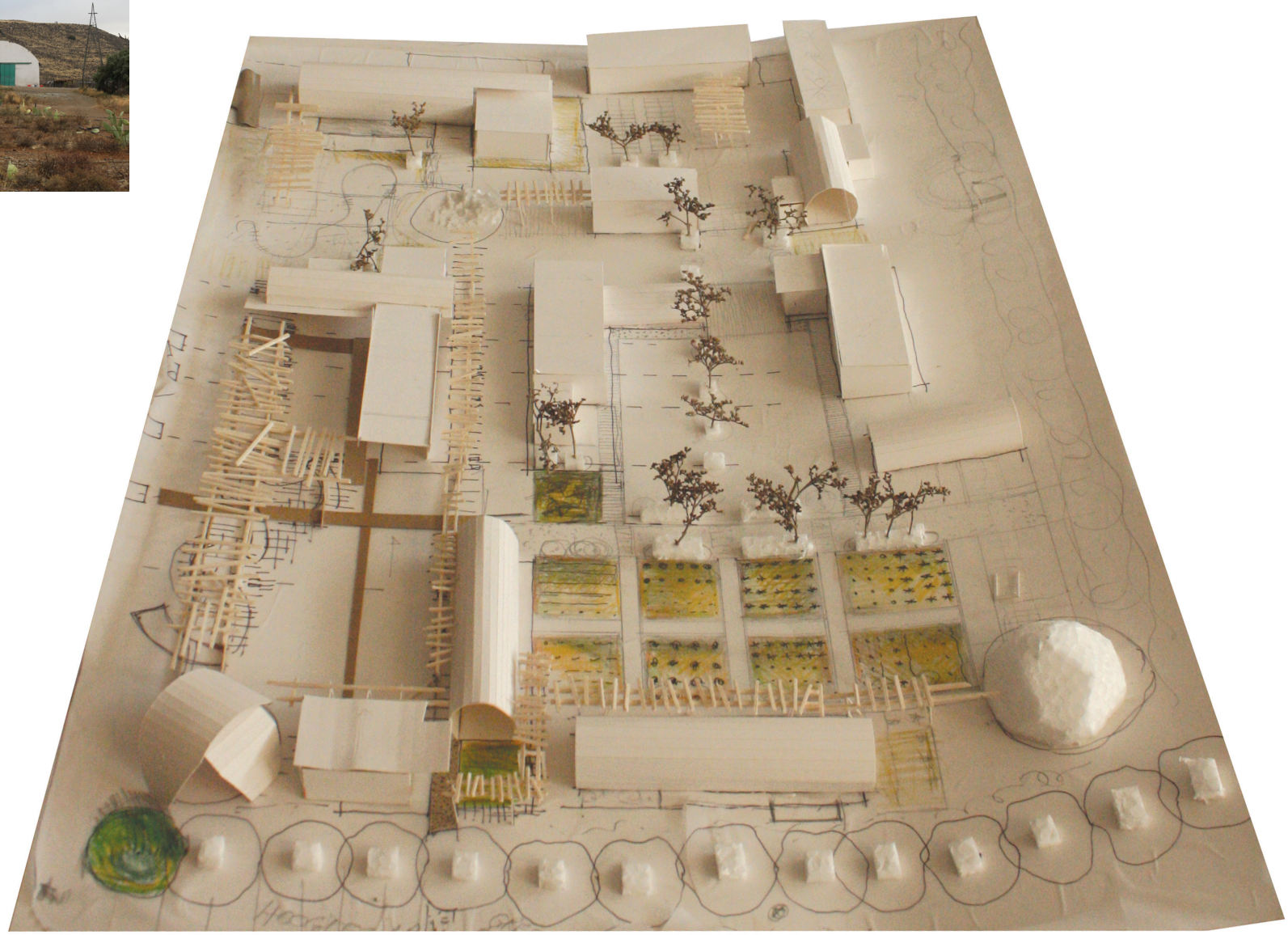




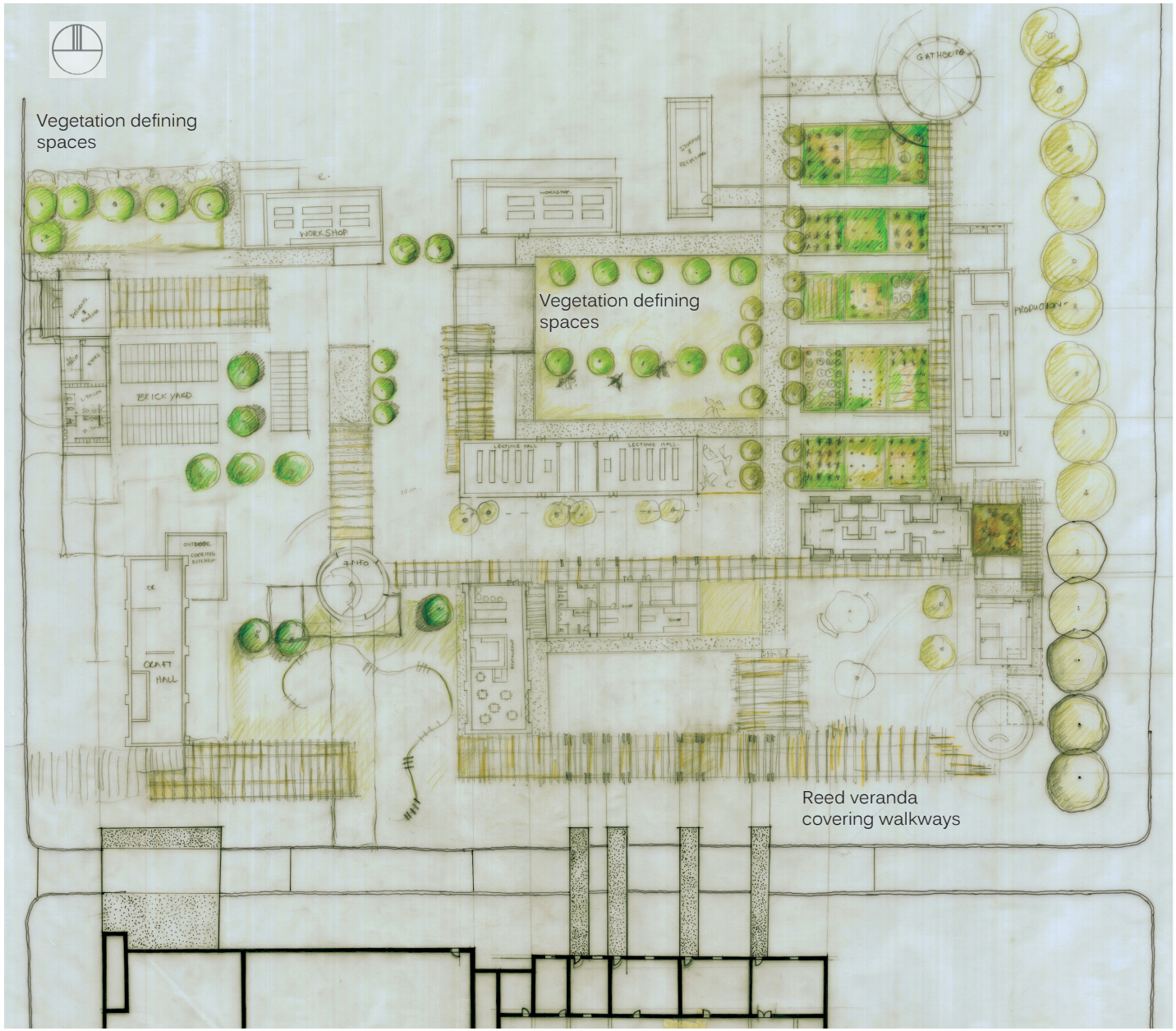
Corbelled hut



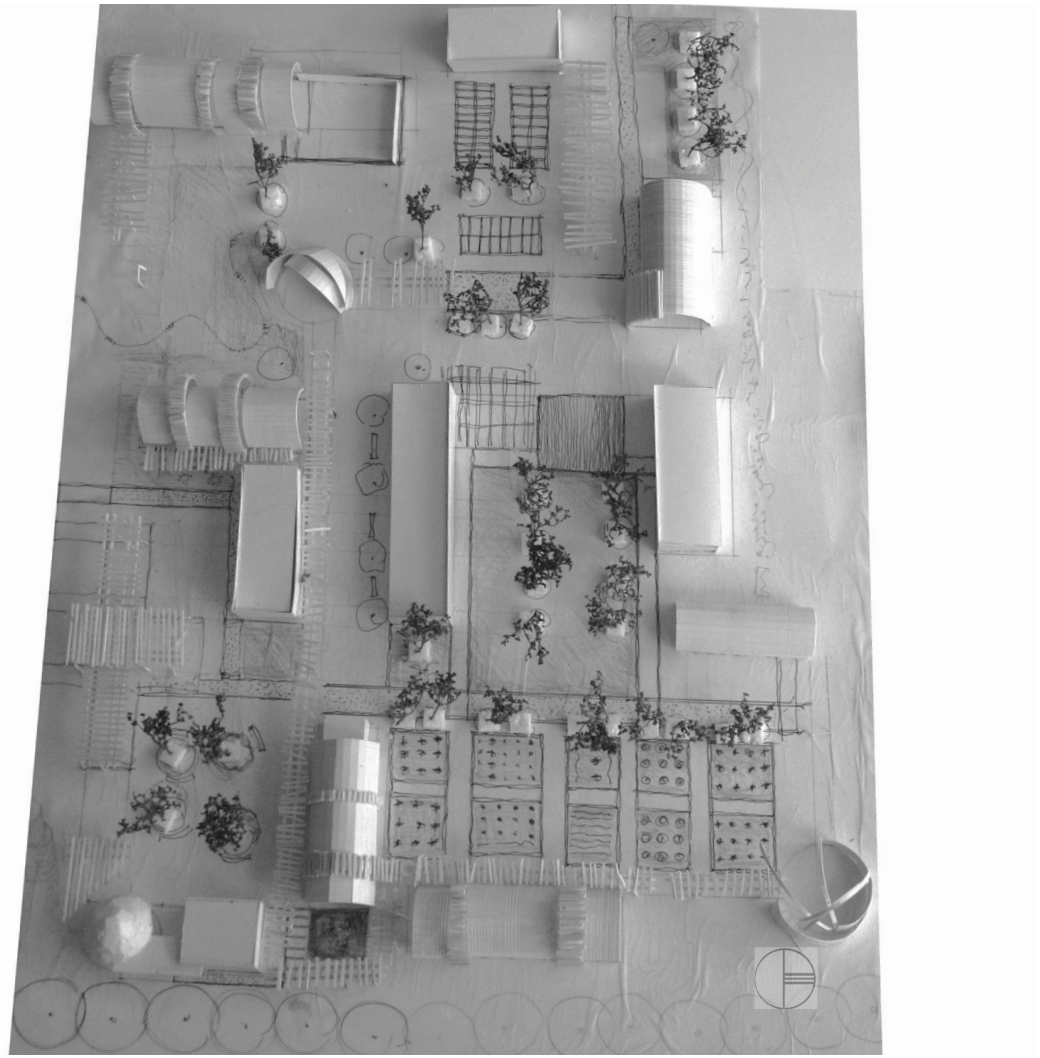
Karoo style house

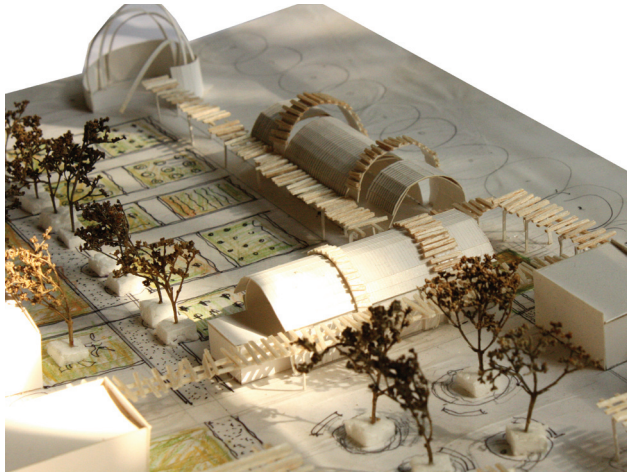


Concept model 3. Experimenting with different typologies of the area.



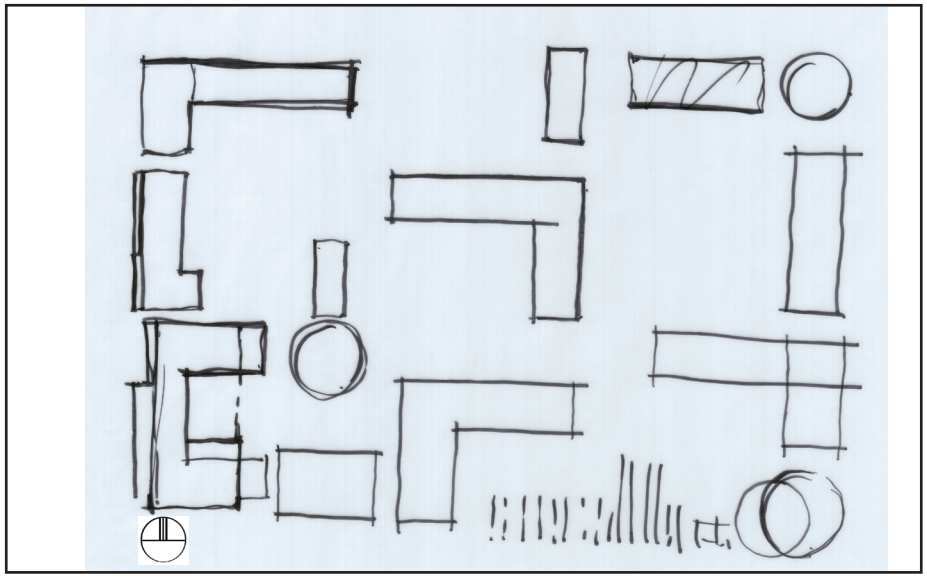
Reed veranda covering walkways.

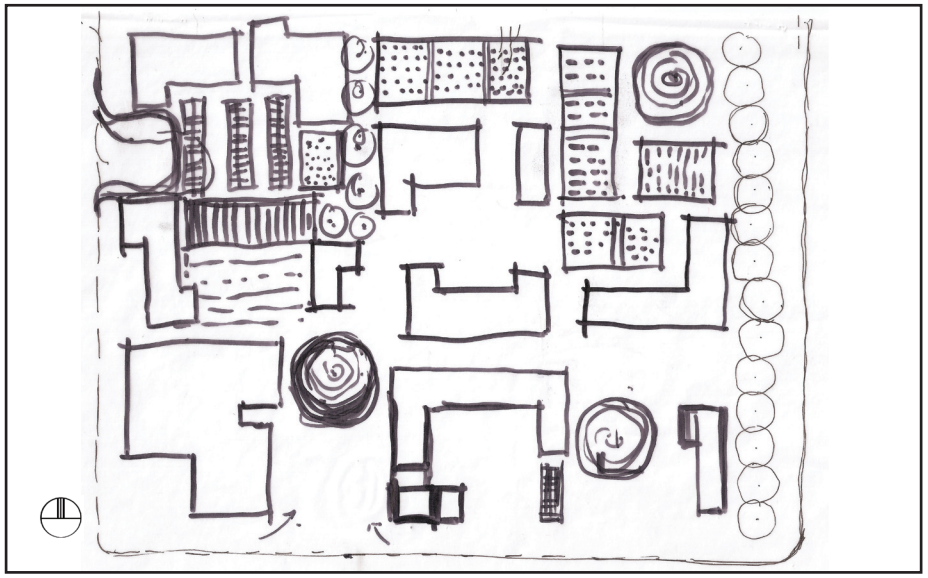


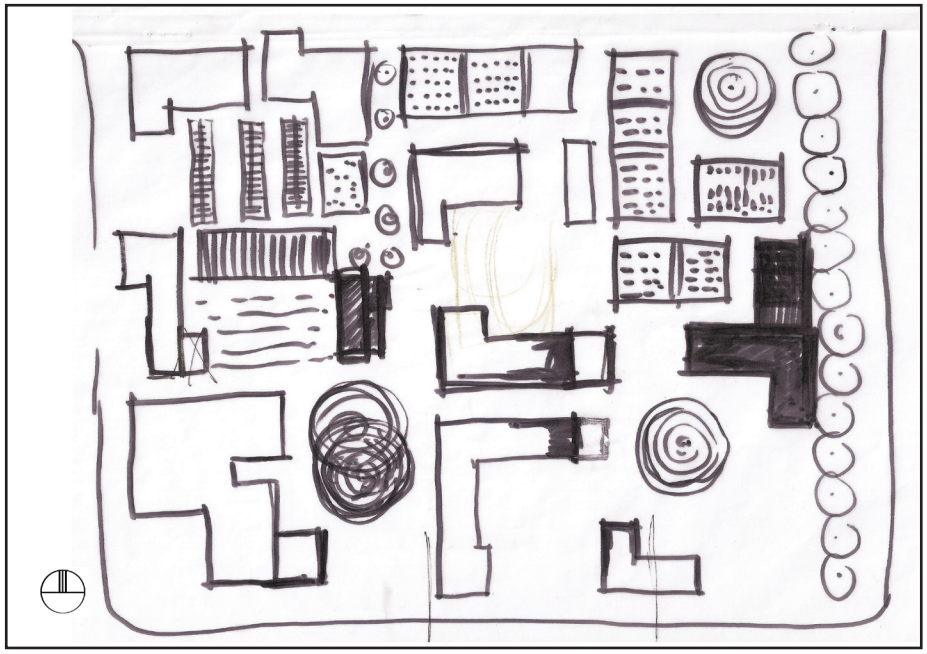


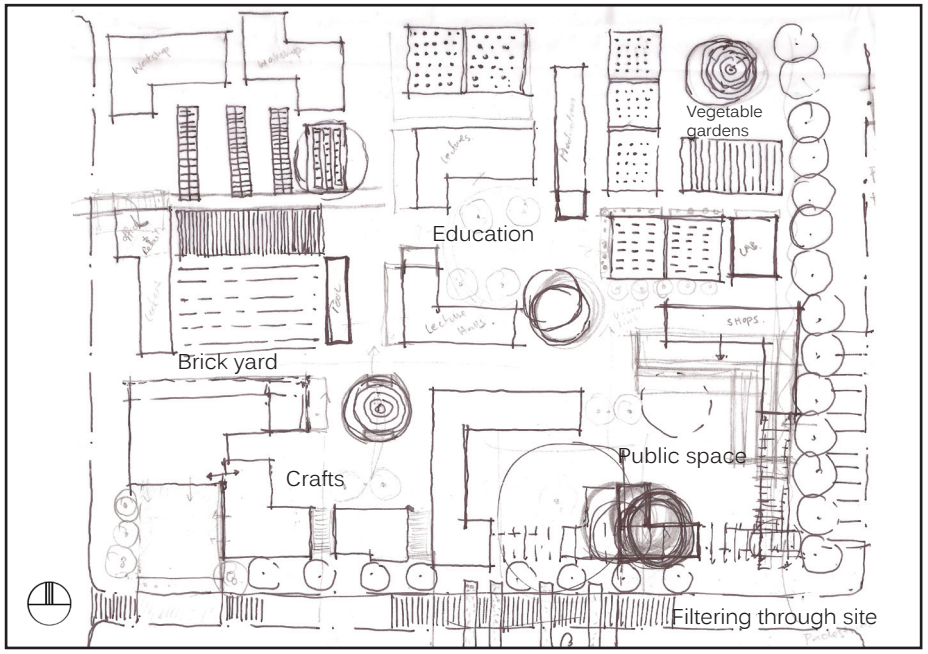


Concept model 4. Experimenting with different typologies of the area.

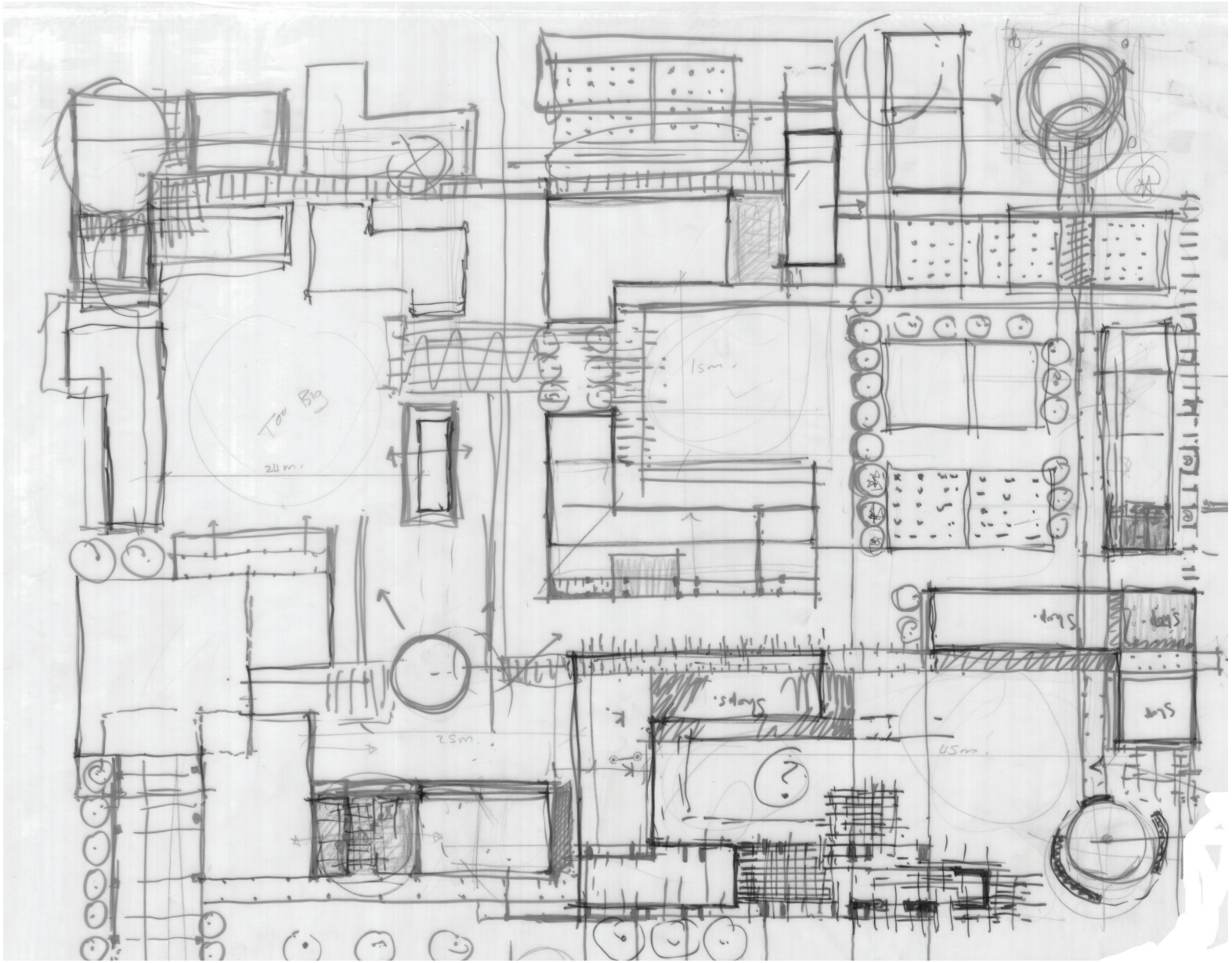




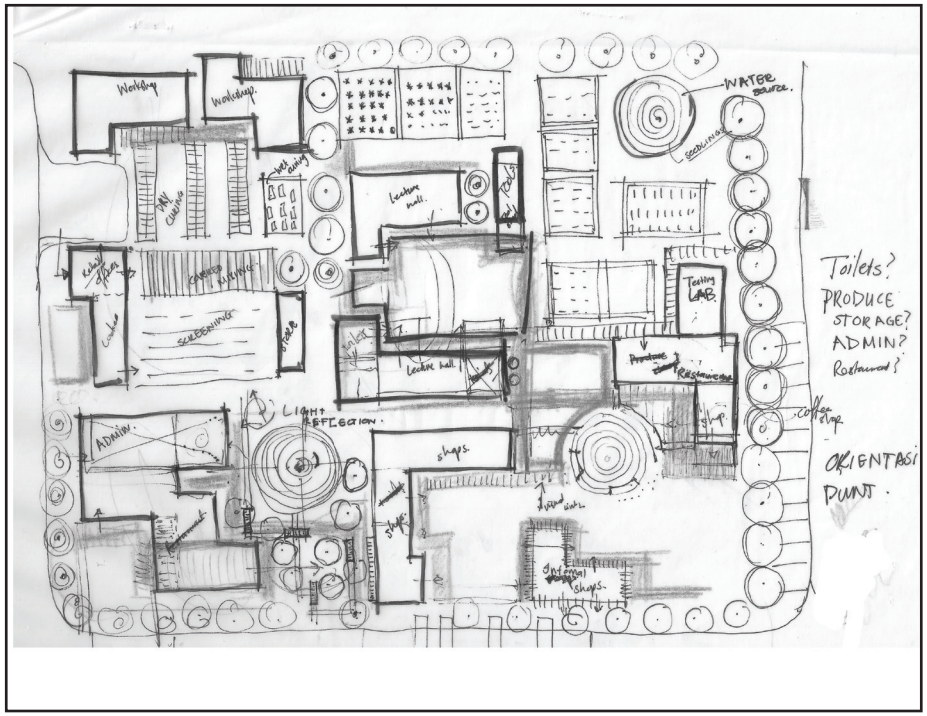


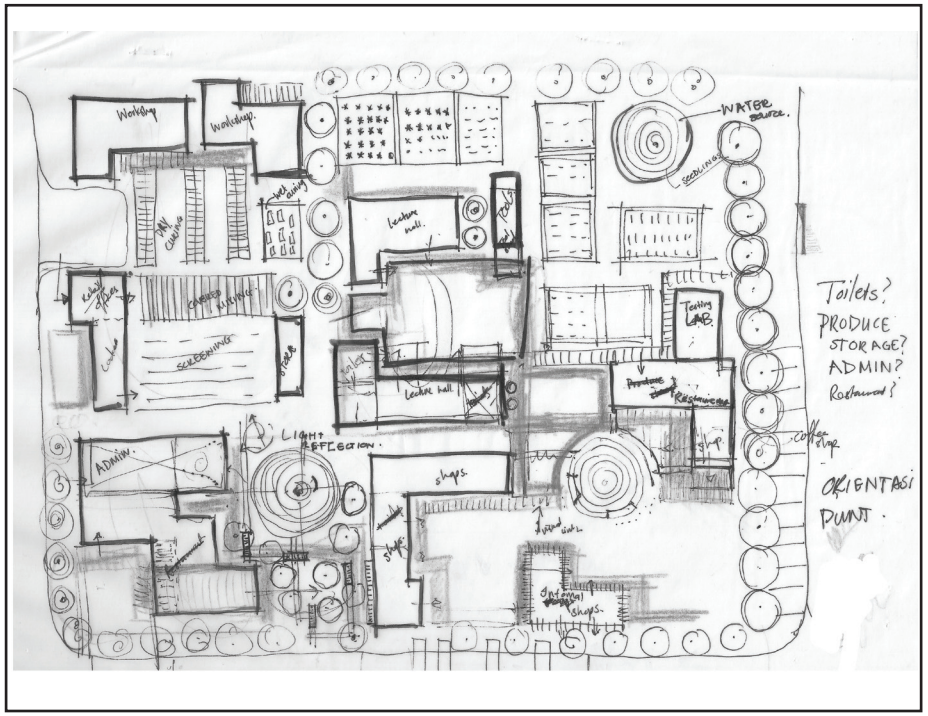


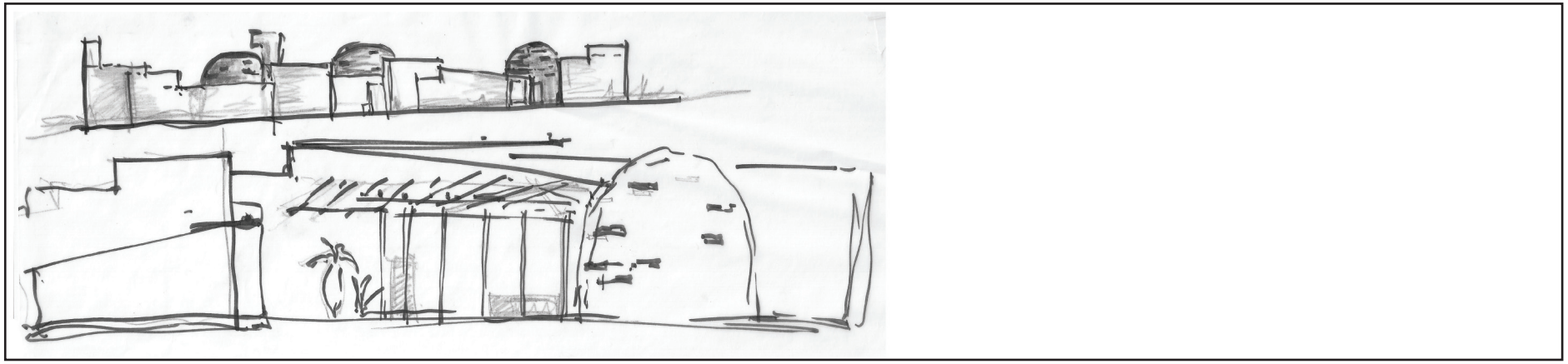
Layout and massing on site.



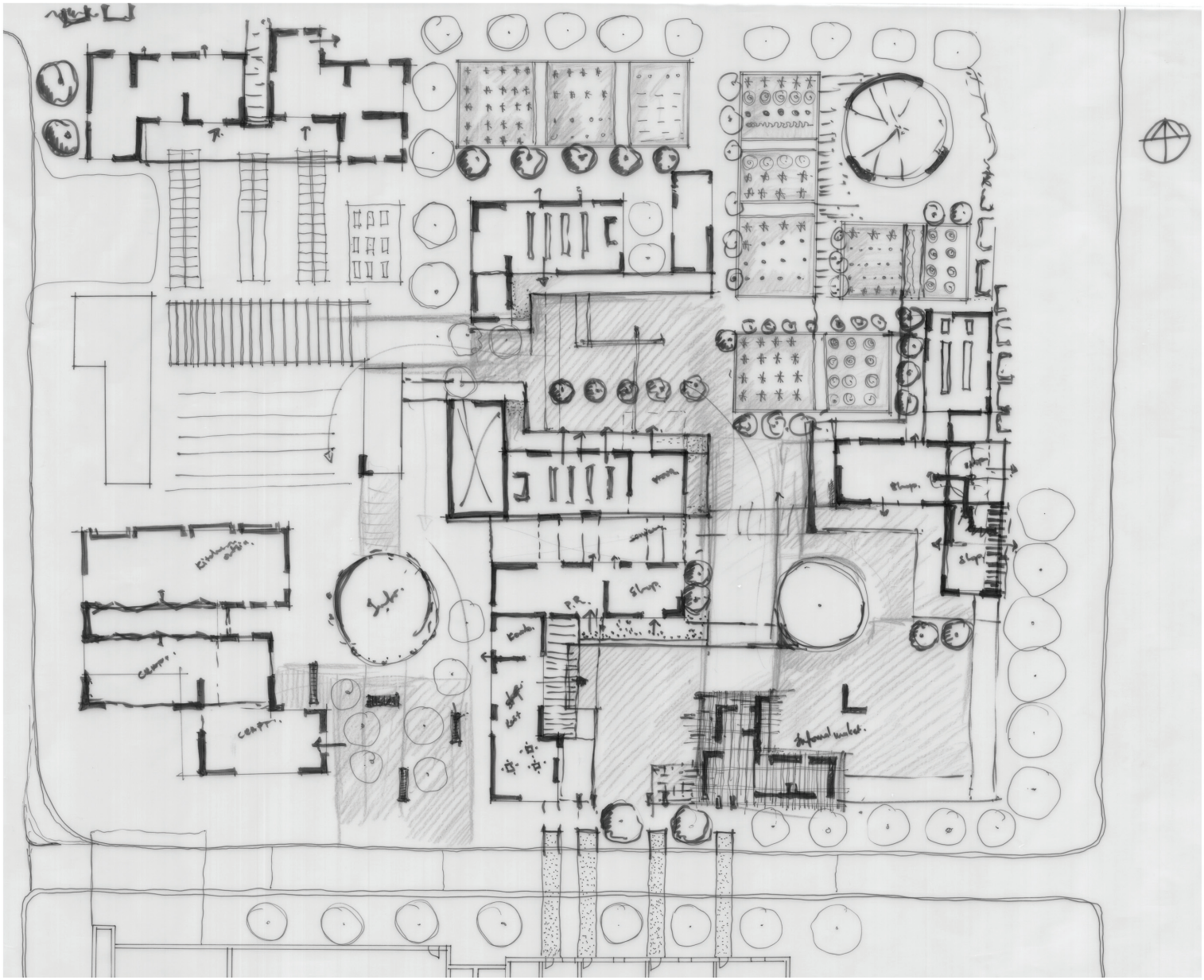
Layout and massing on site, creating social spaces



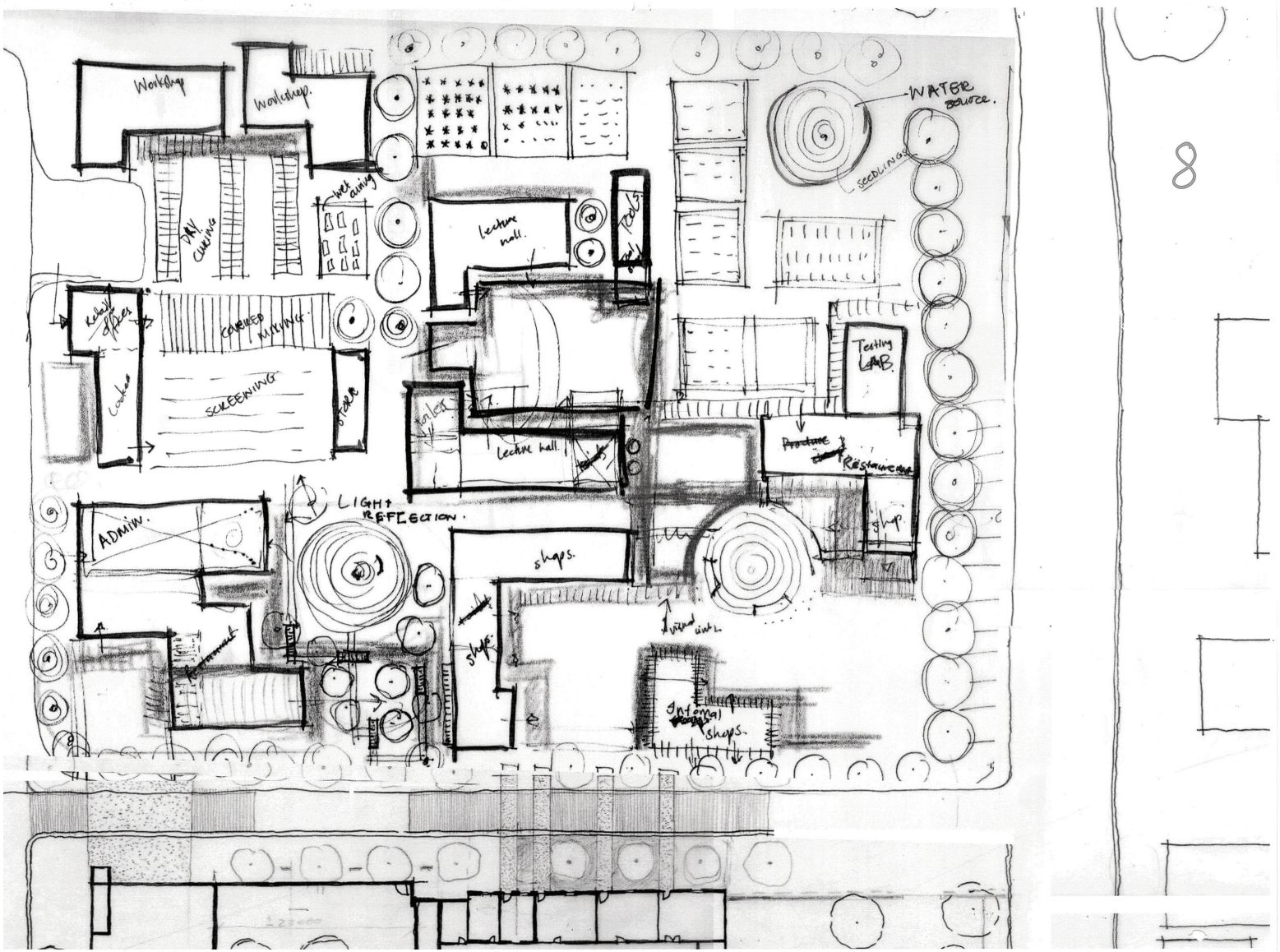




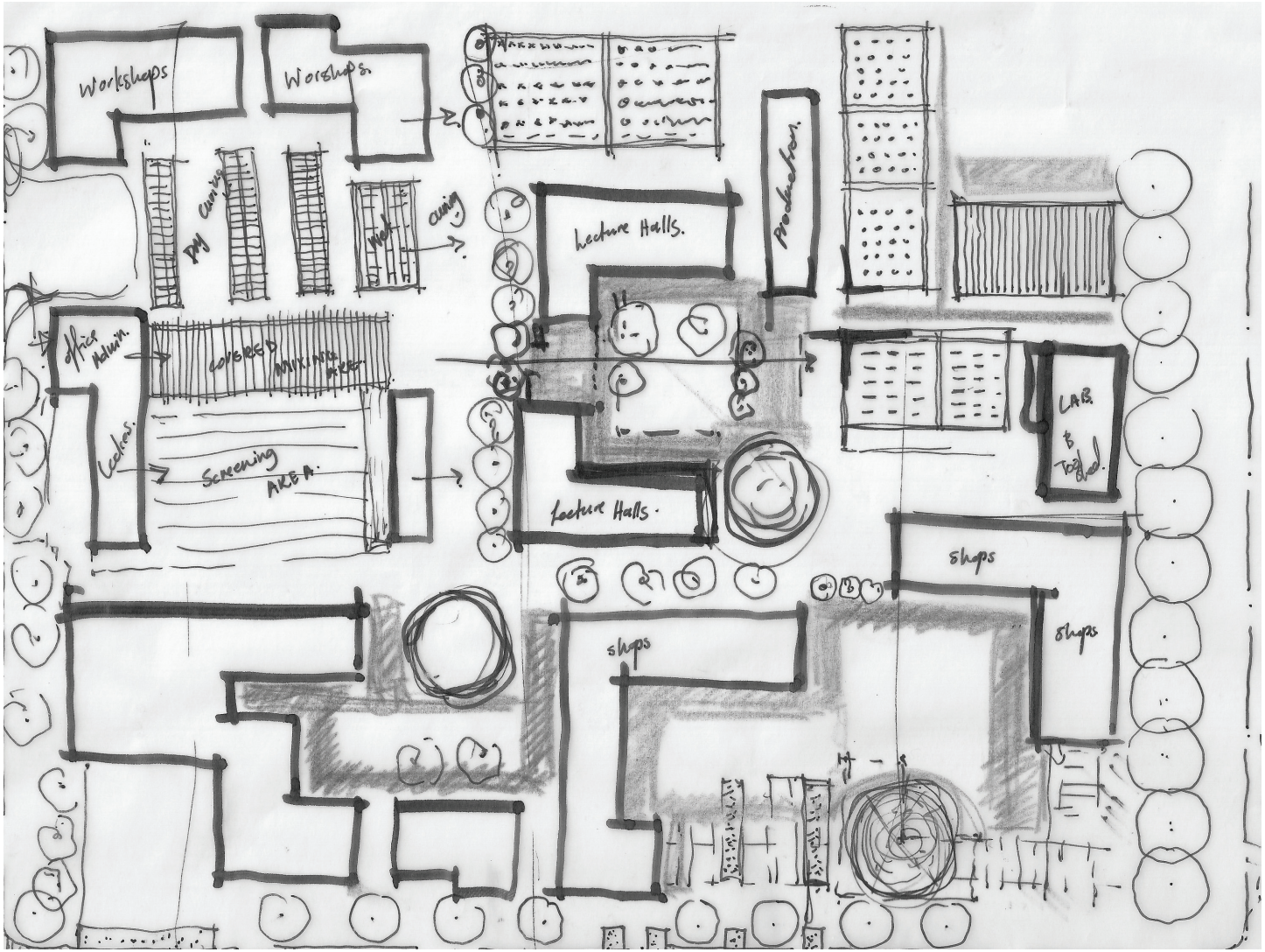
Layout and massingdevelopment



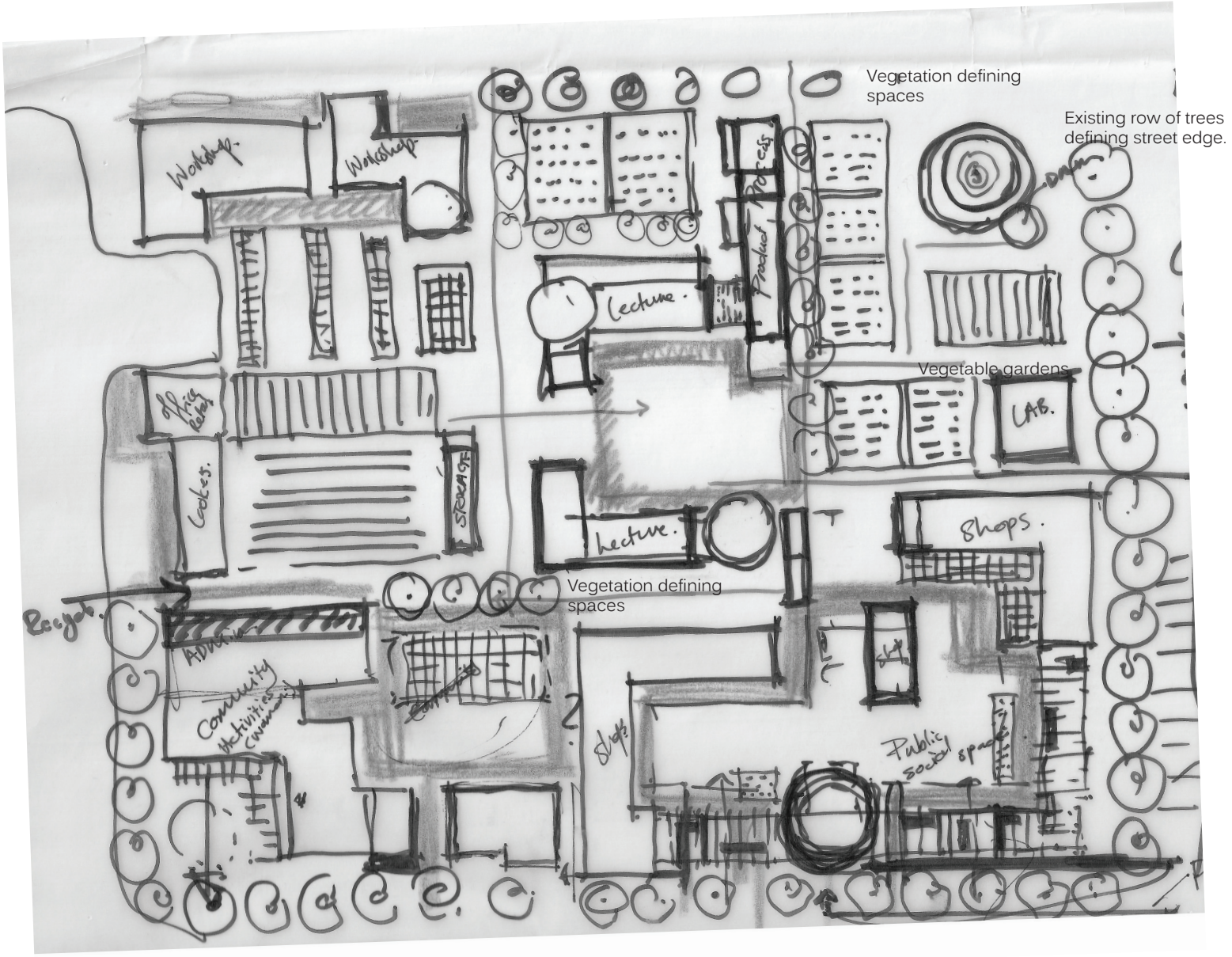
Simple plan forms using adobe bricks.



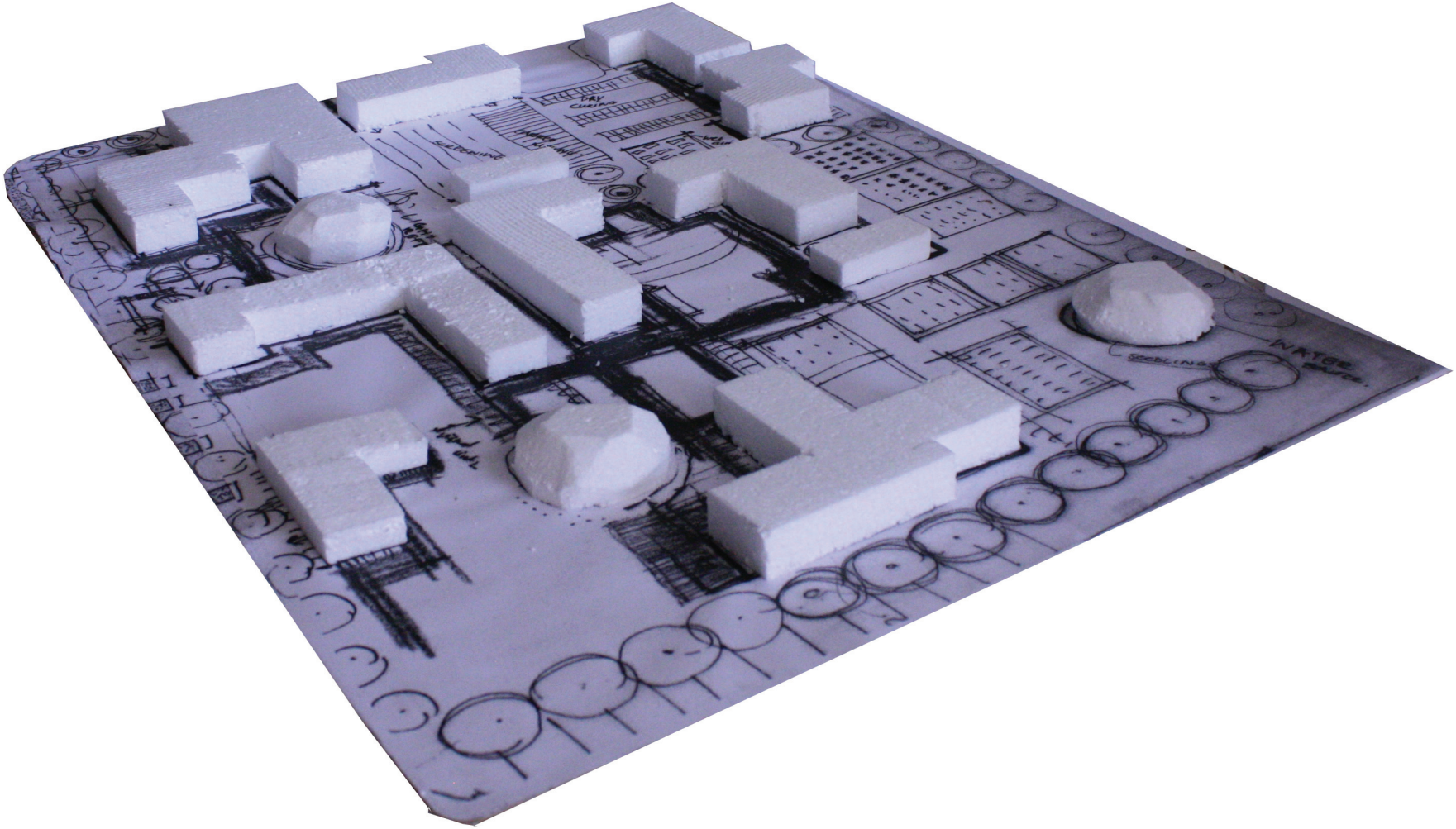
Layout and massing on site intersected with walkways.



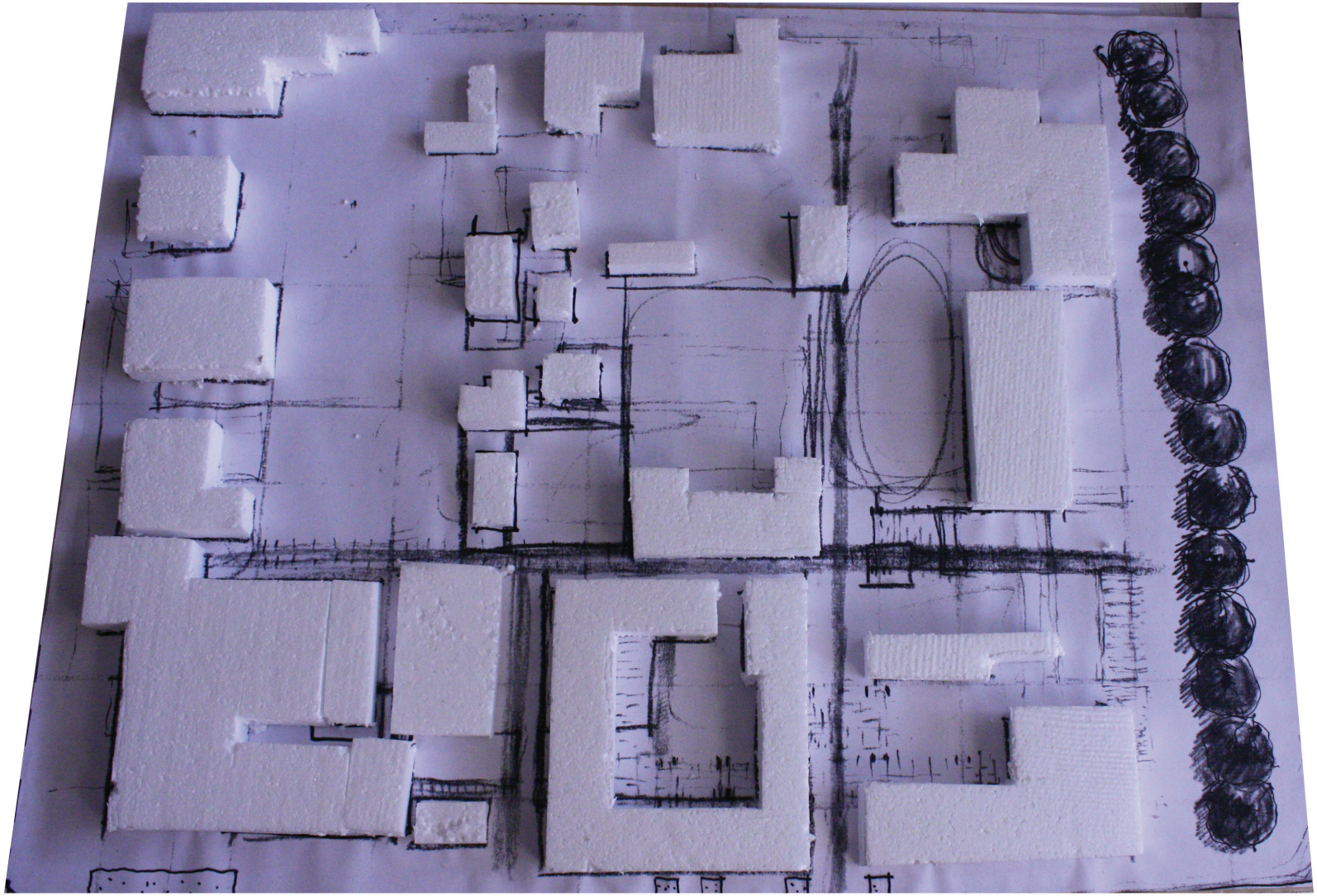
Spatial development.



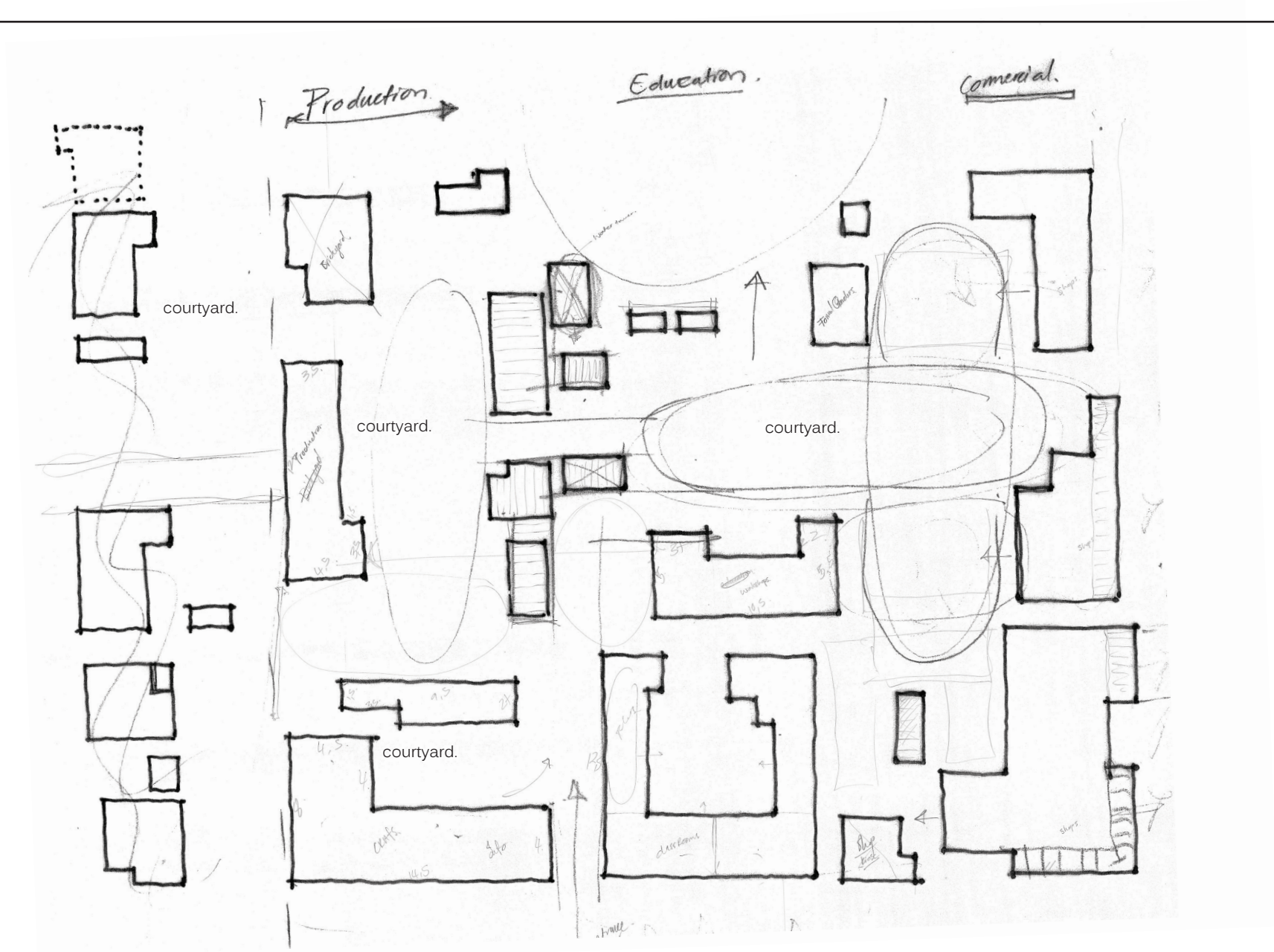
Spatial definition and vegetation.



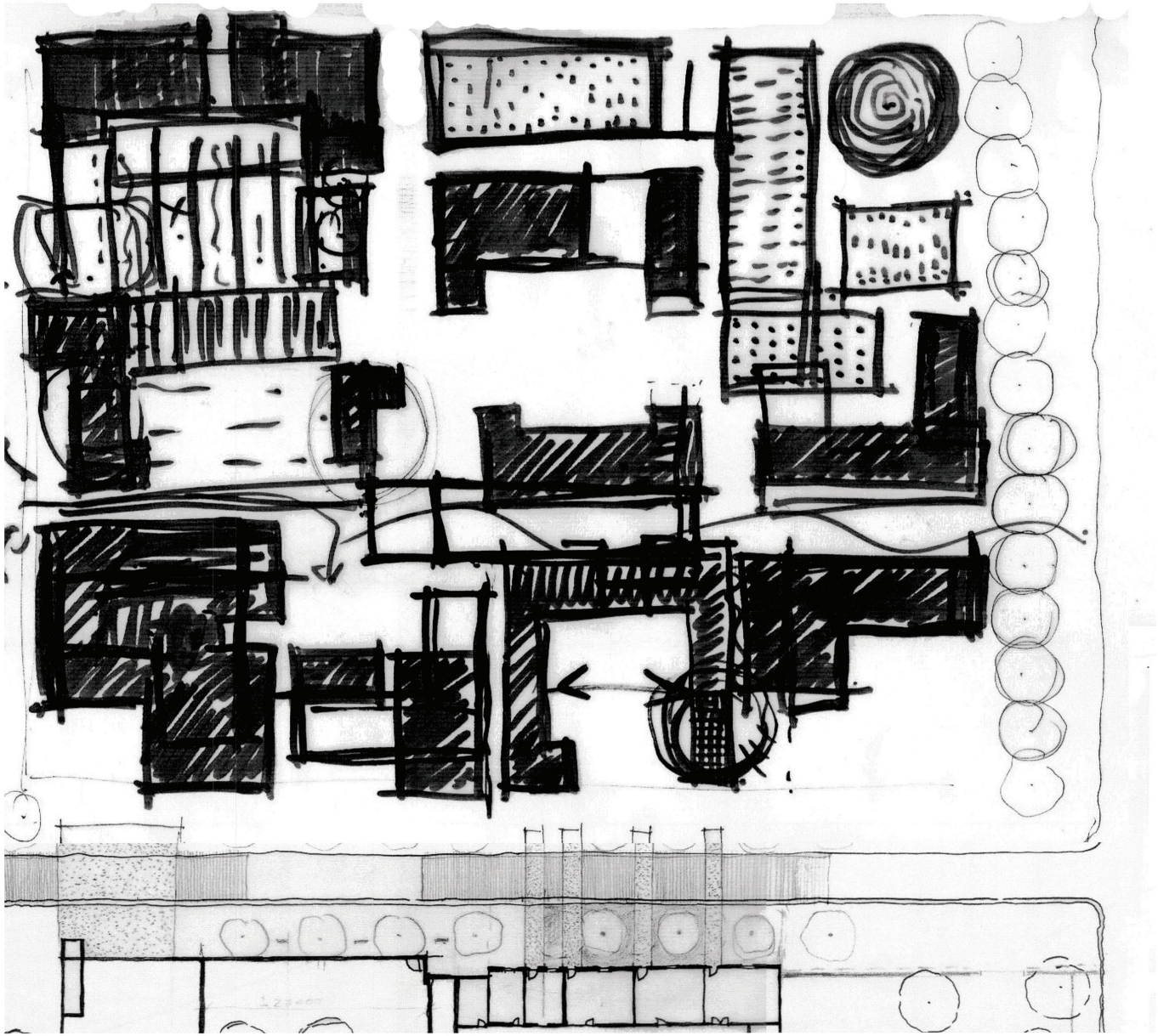
Concept model 5.



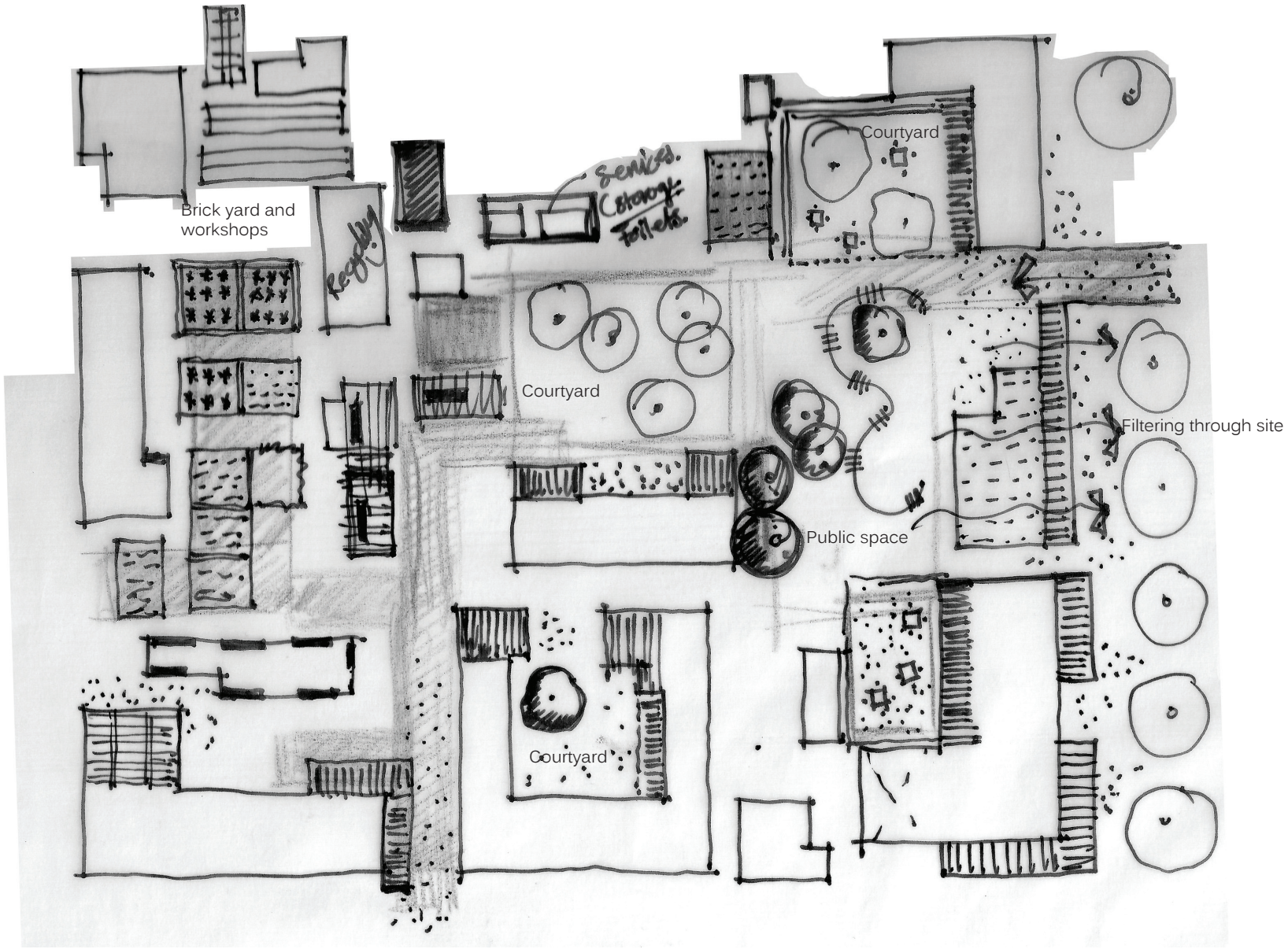
Concept model 6.



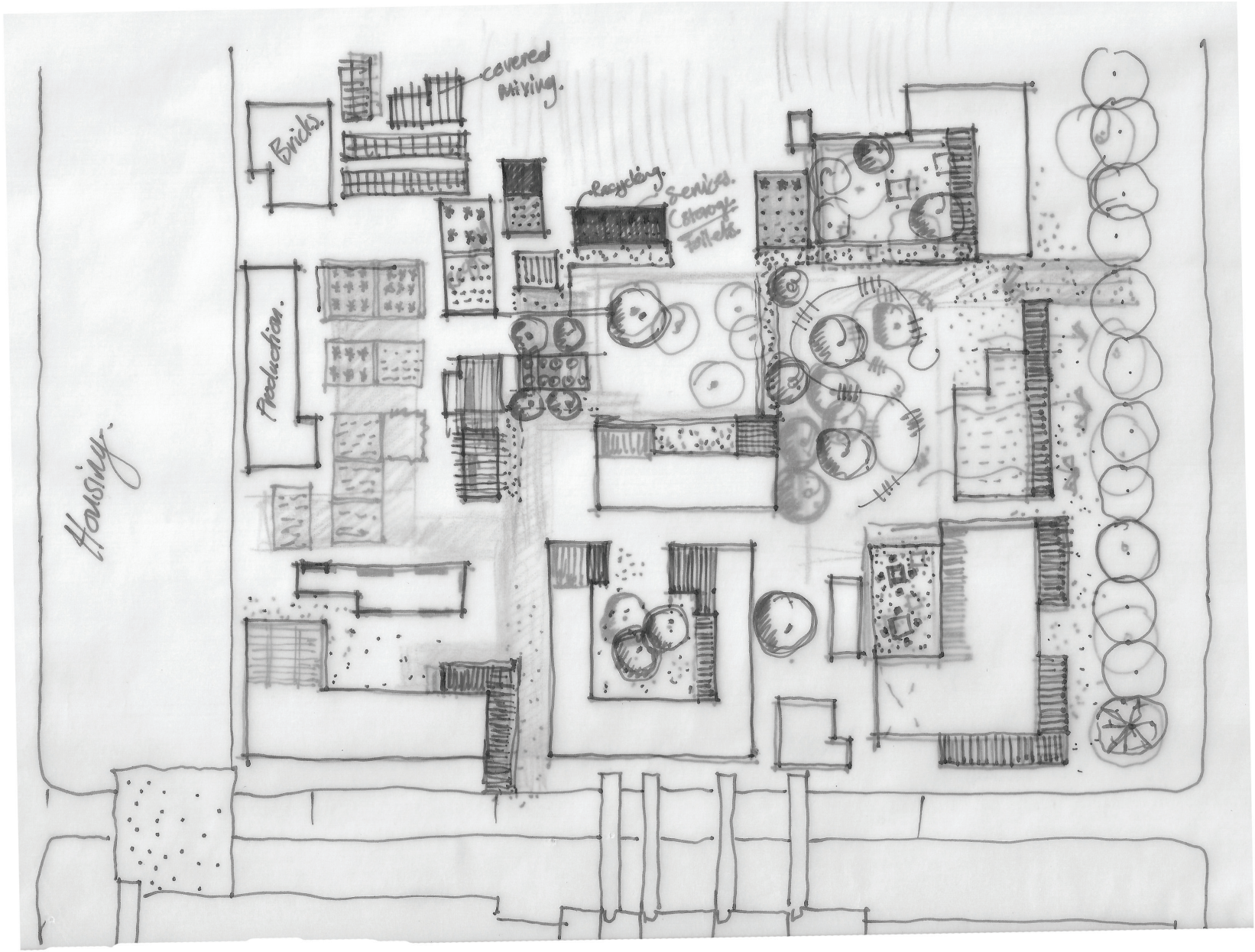
Spatial analysis



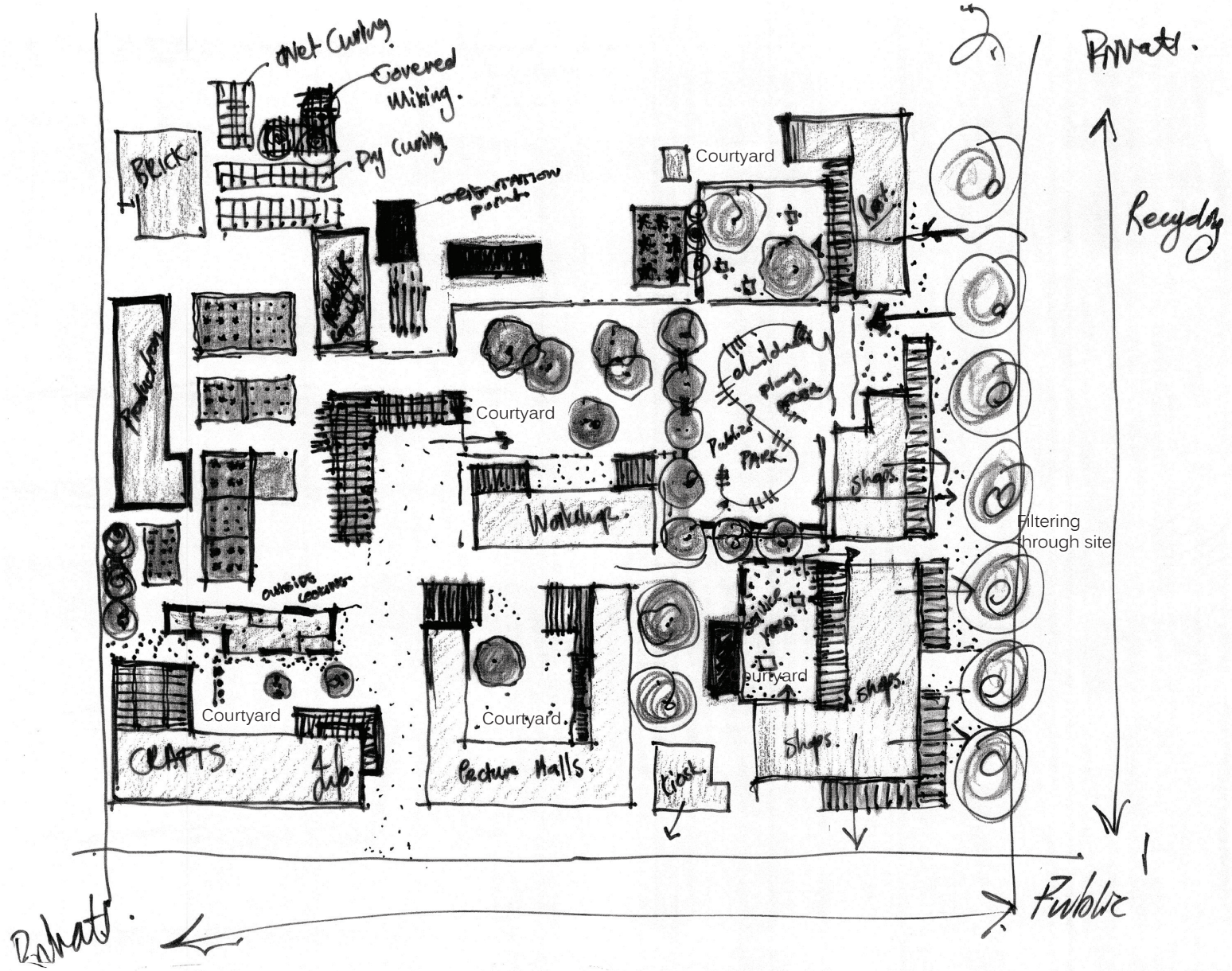
Padestrian crossings.



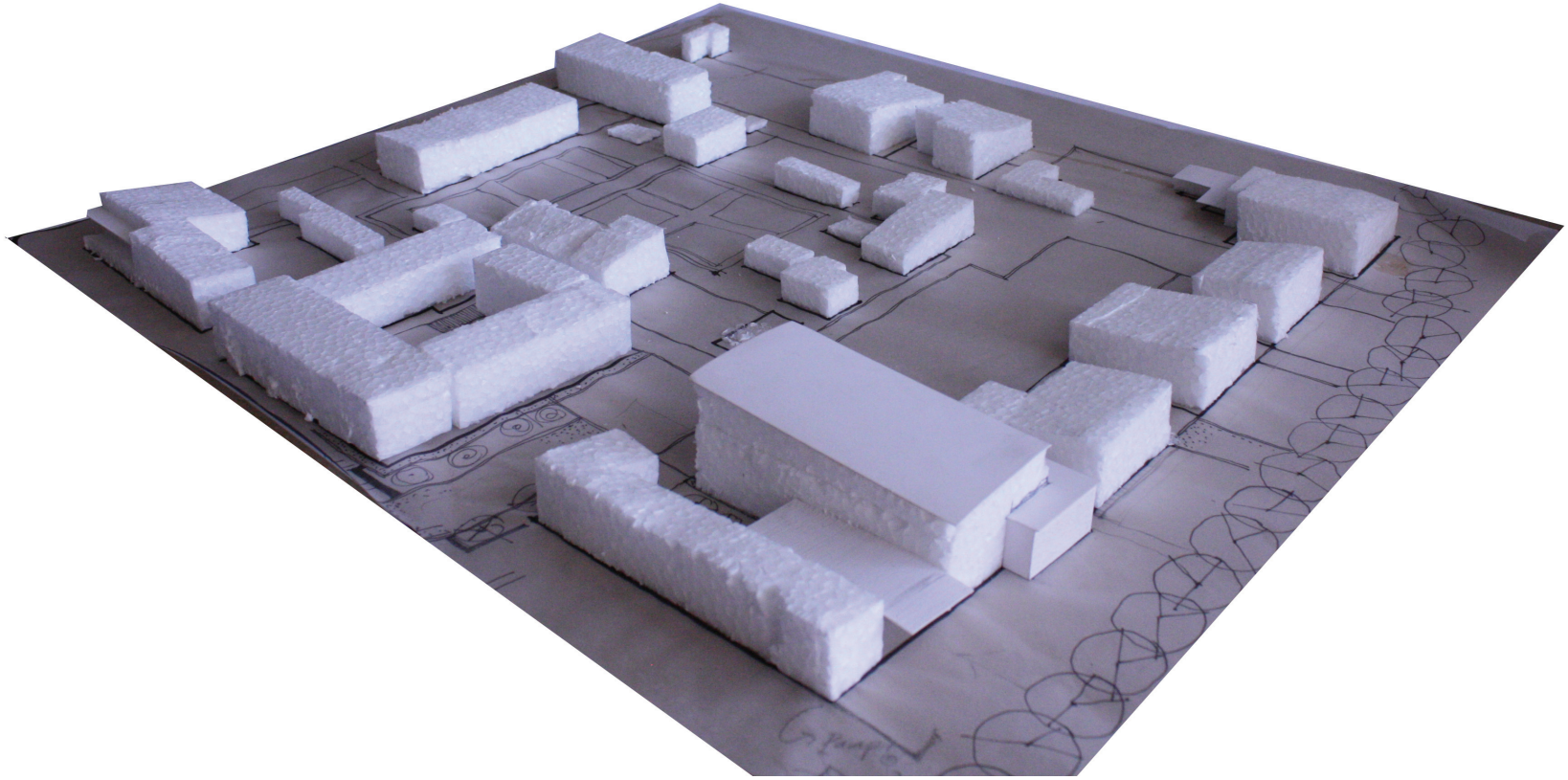
Spatial development



Spatial development

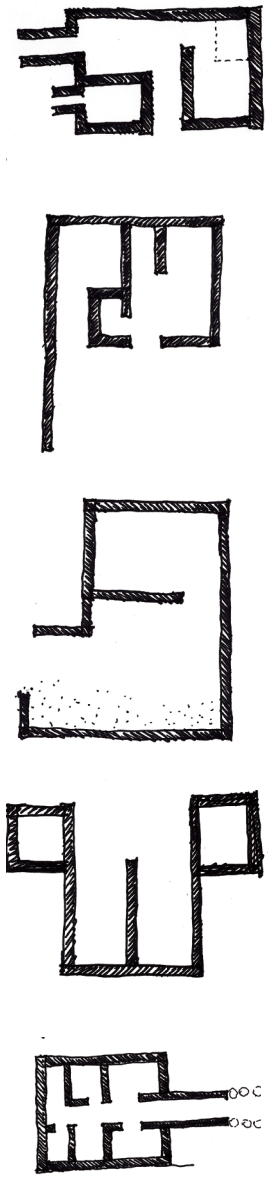


Spatial development

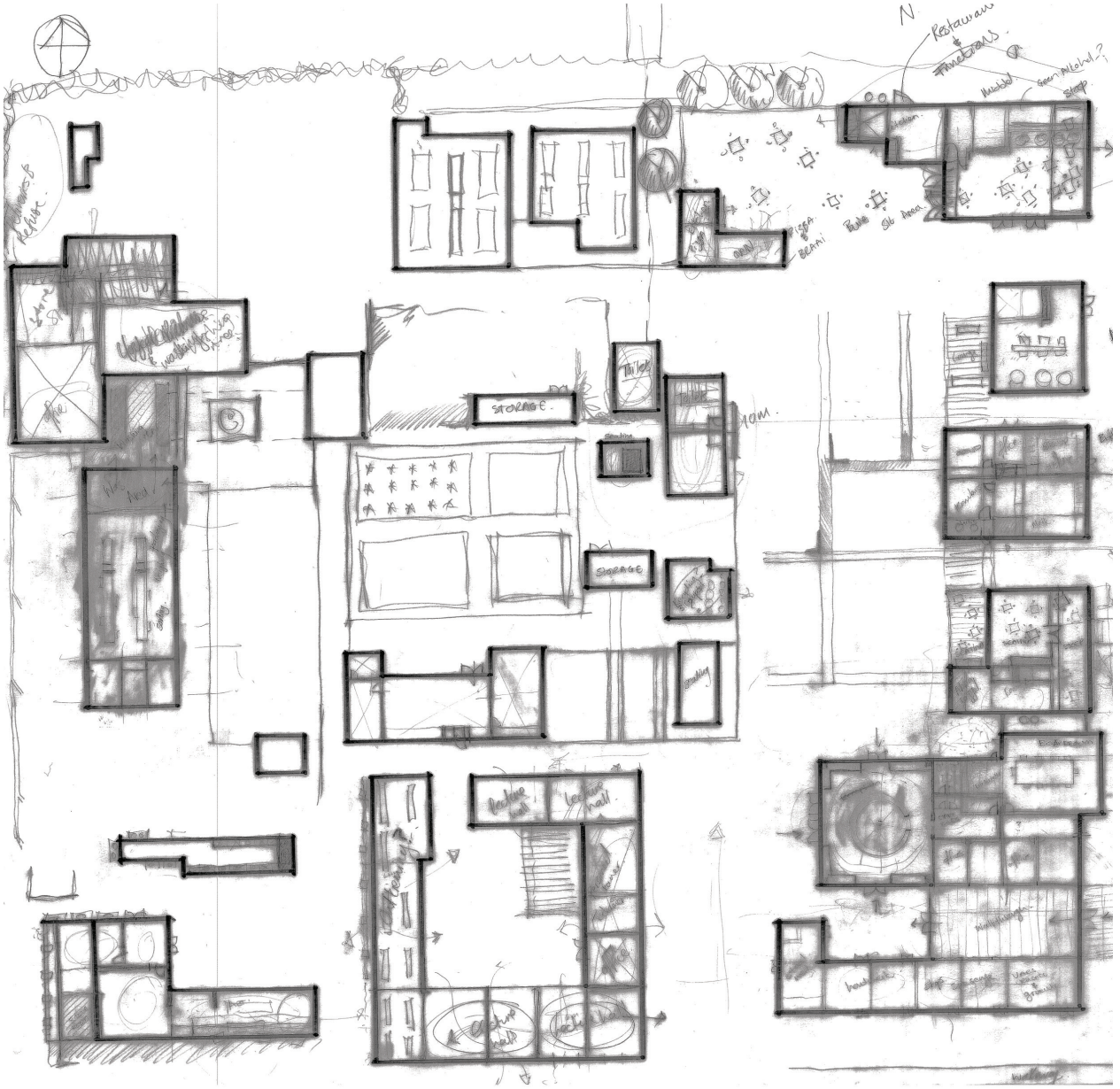


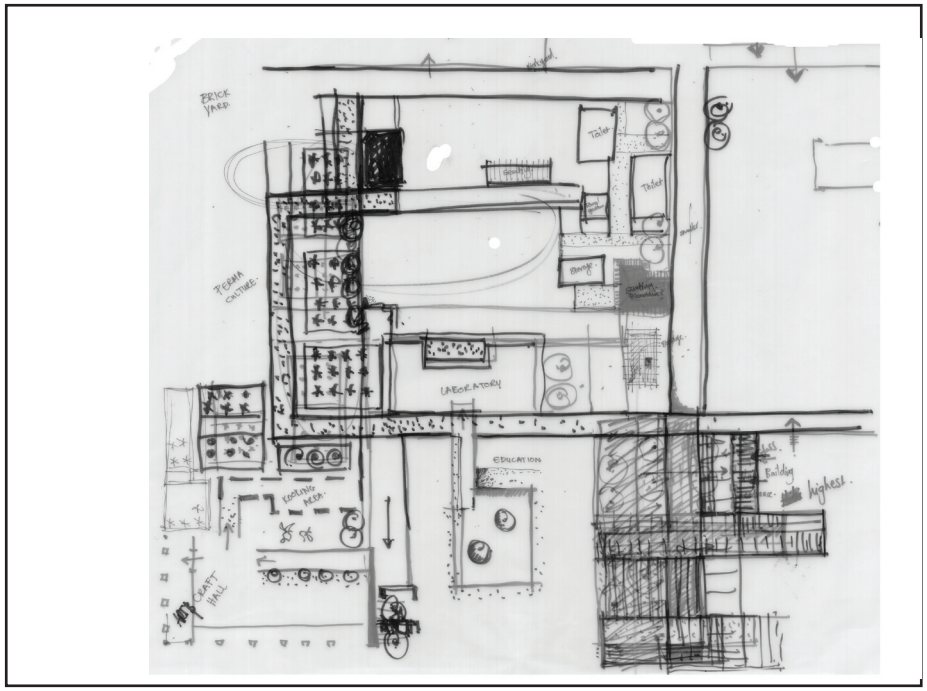
Concept model 7.

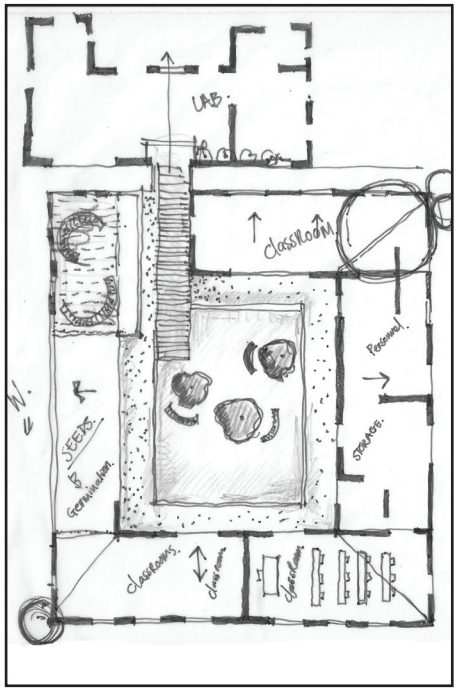
Formalised children models

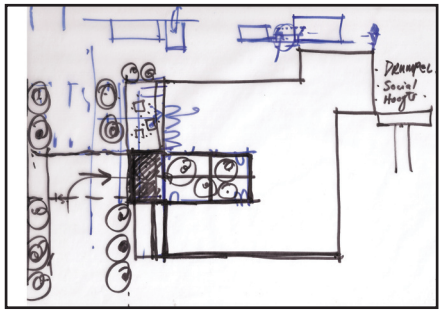


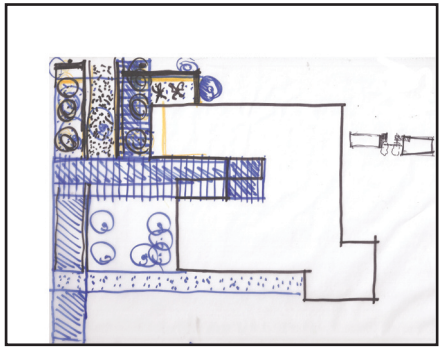
Simple plan forms

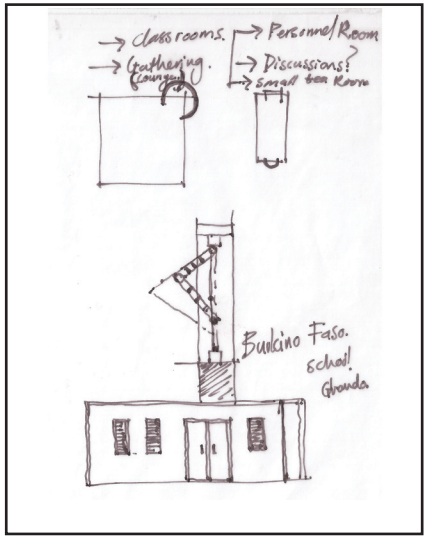


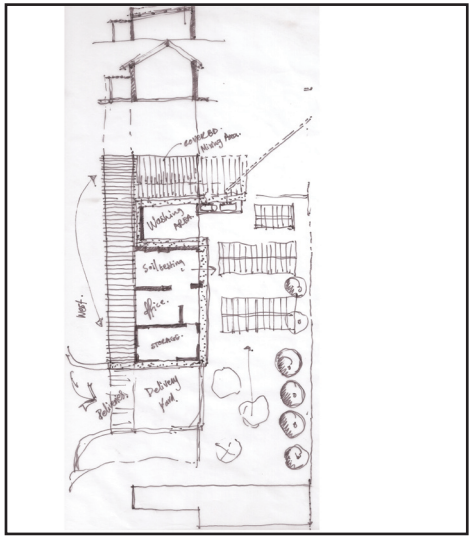


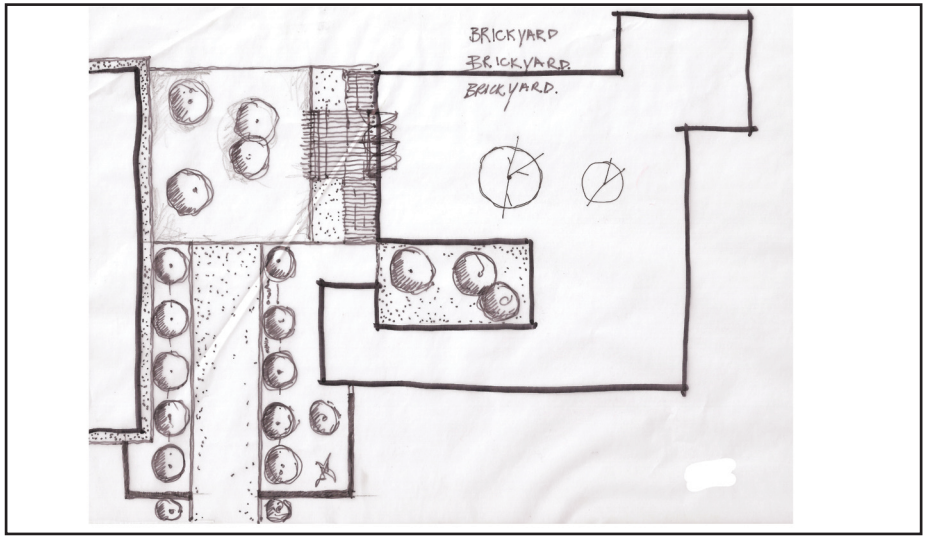












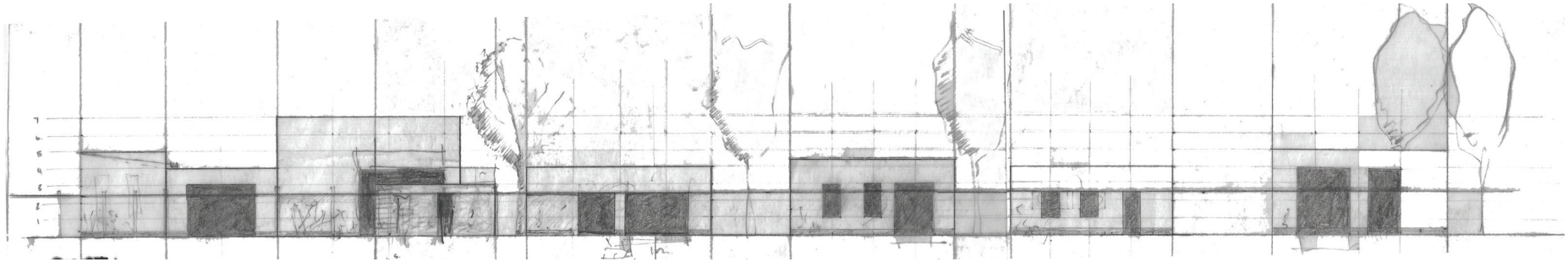
Plan development



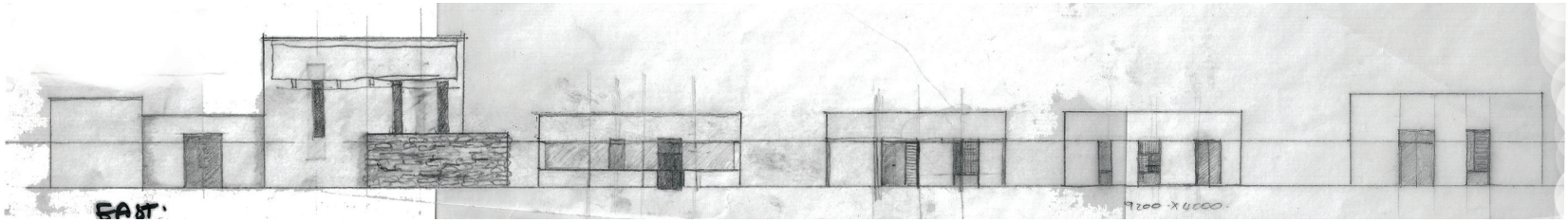
Section through main building.



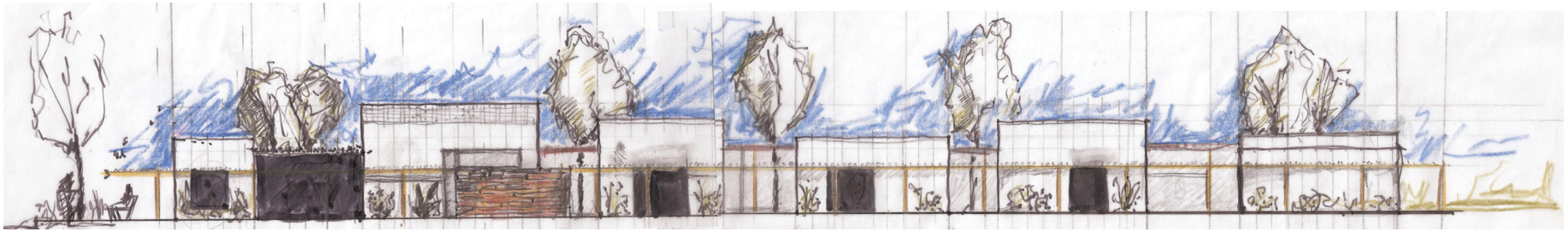
Southern elevation. Making use of Karoo proportioning systems



Development of eastern elevation. Making use of Karoo proportioning systems.



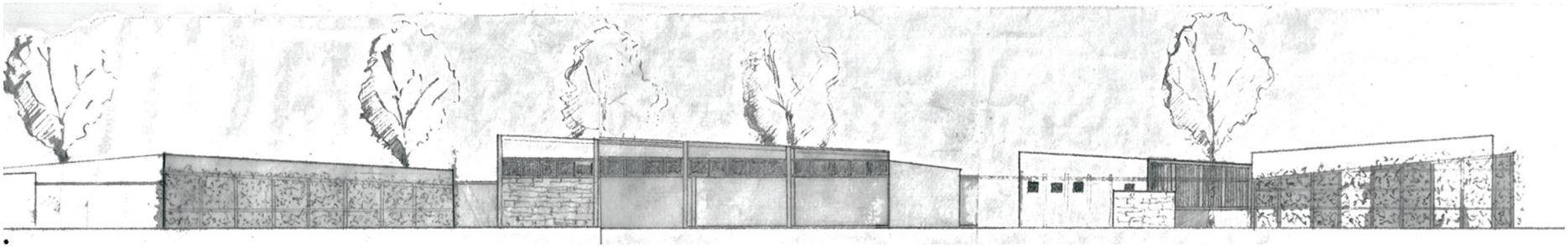
Development of easthern elevation.



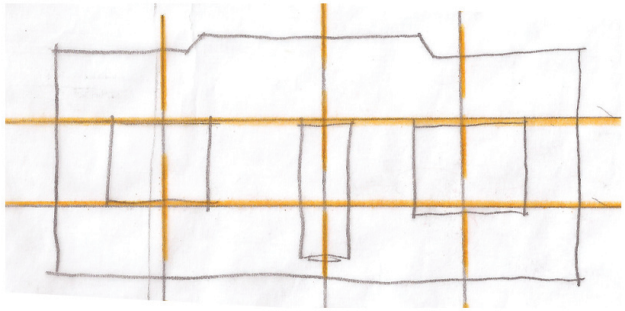
Development of easthern elevation



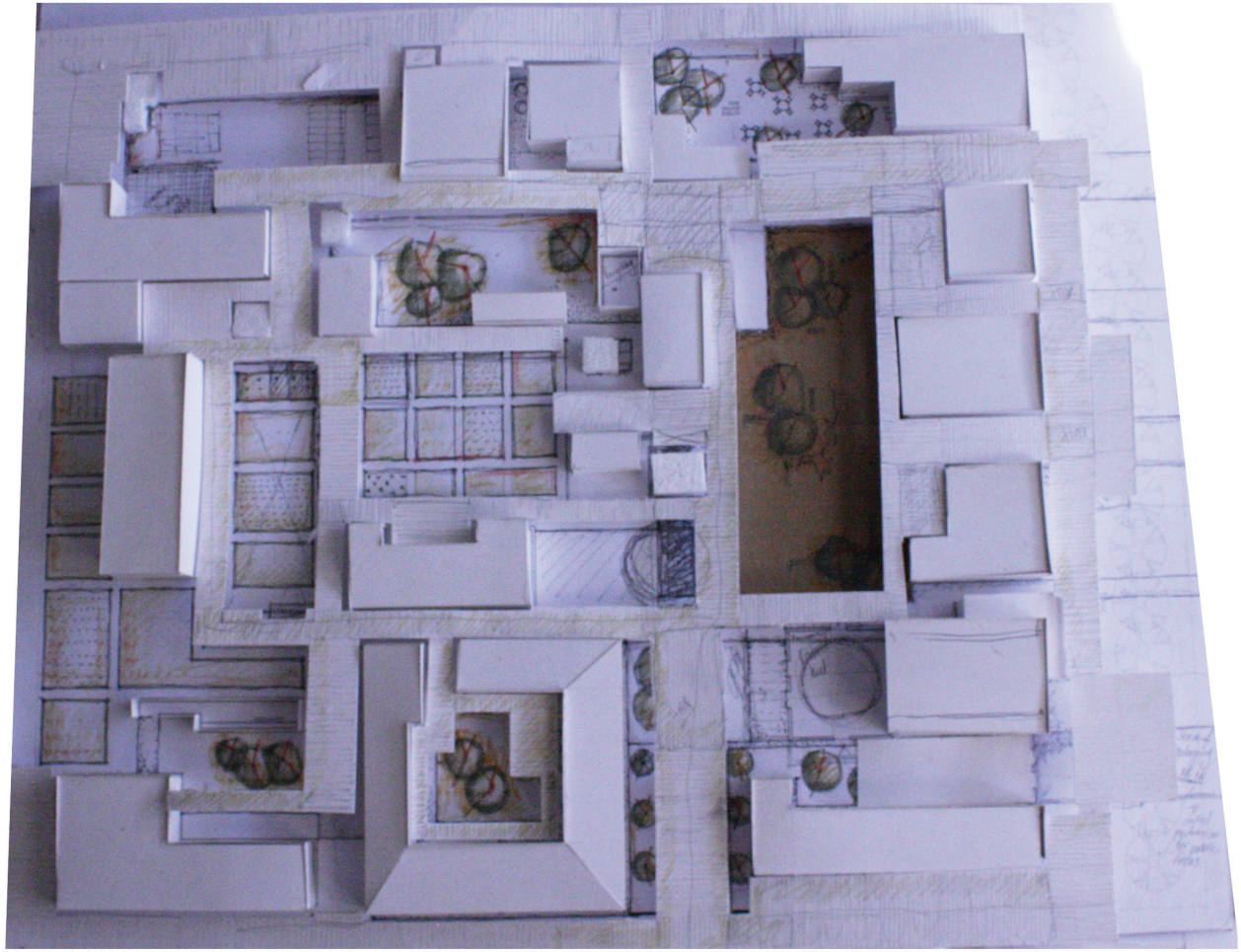
Development of easthern elevation. Making use of Karoo proportioning system



Development of western elevation making Karoo proportioning system.



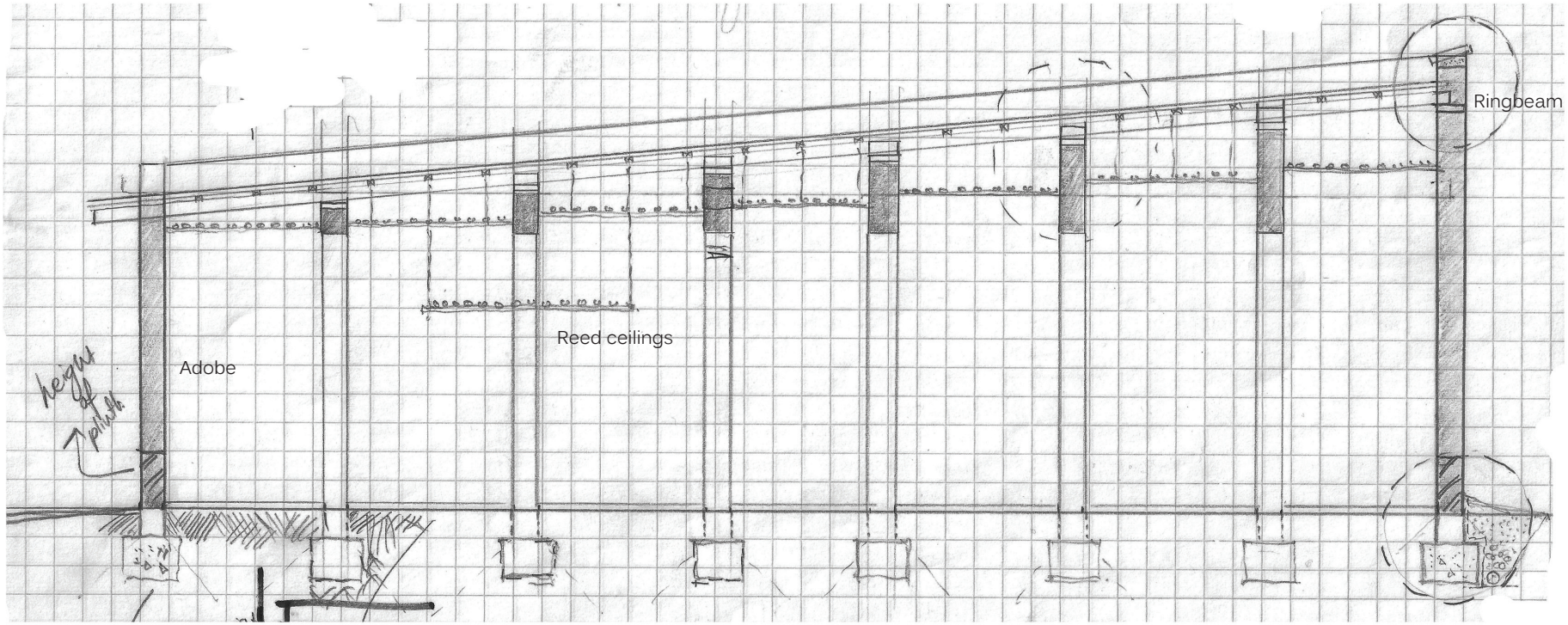
Development of elevations according to Karoo proportions.

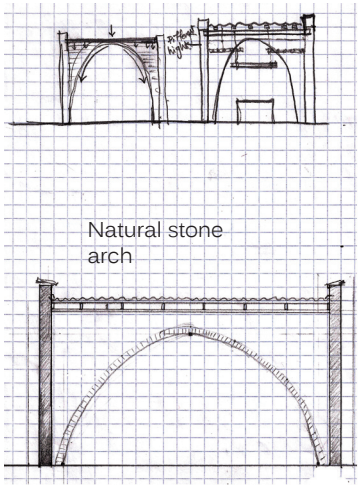


Concept model 8. Veranda links the different buildings, defining courtyard spaces and covering walkways.

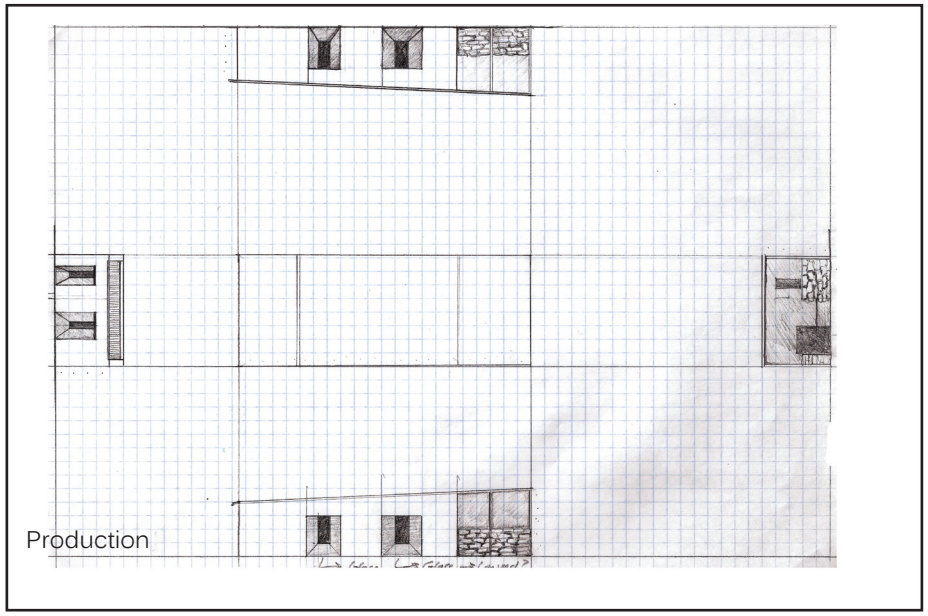


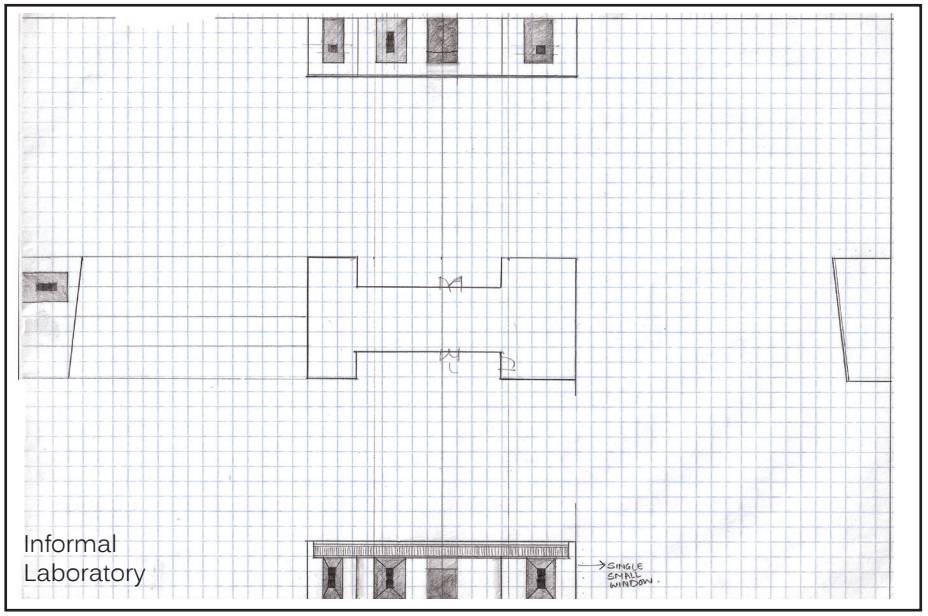
Concept model 8, Showing veranda layout.

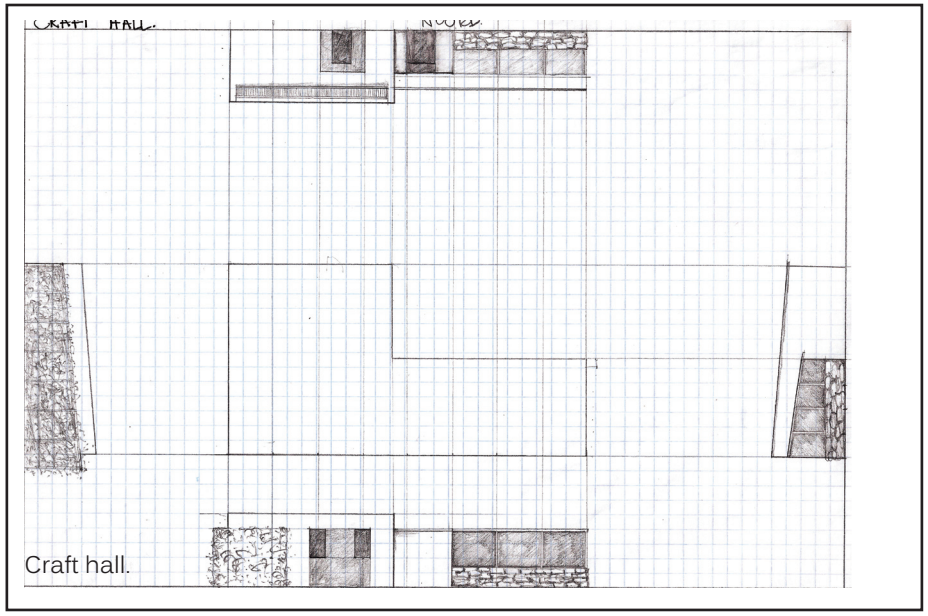


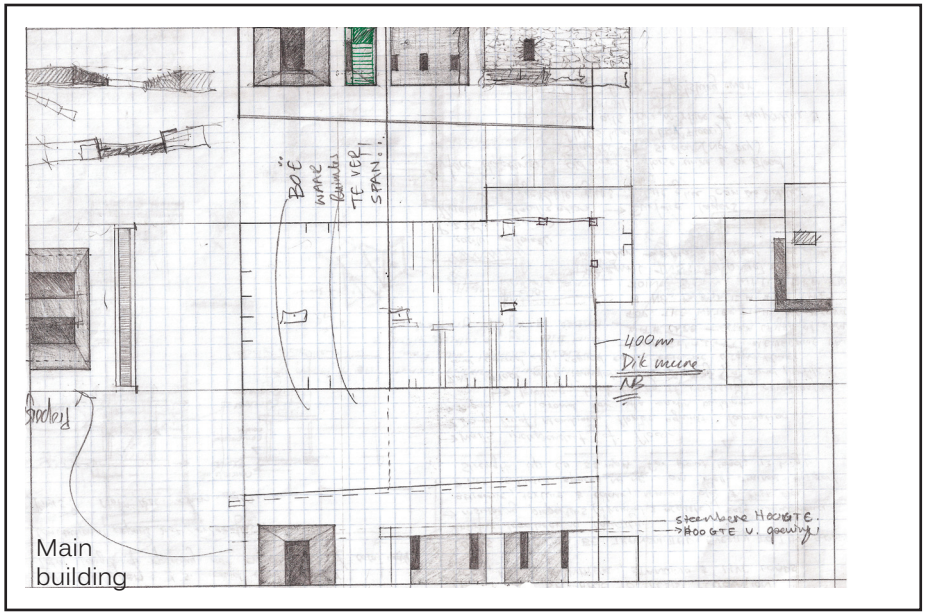


Development of section through main building.

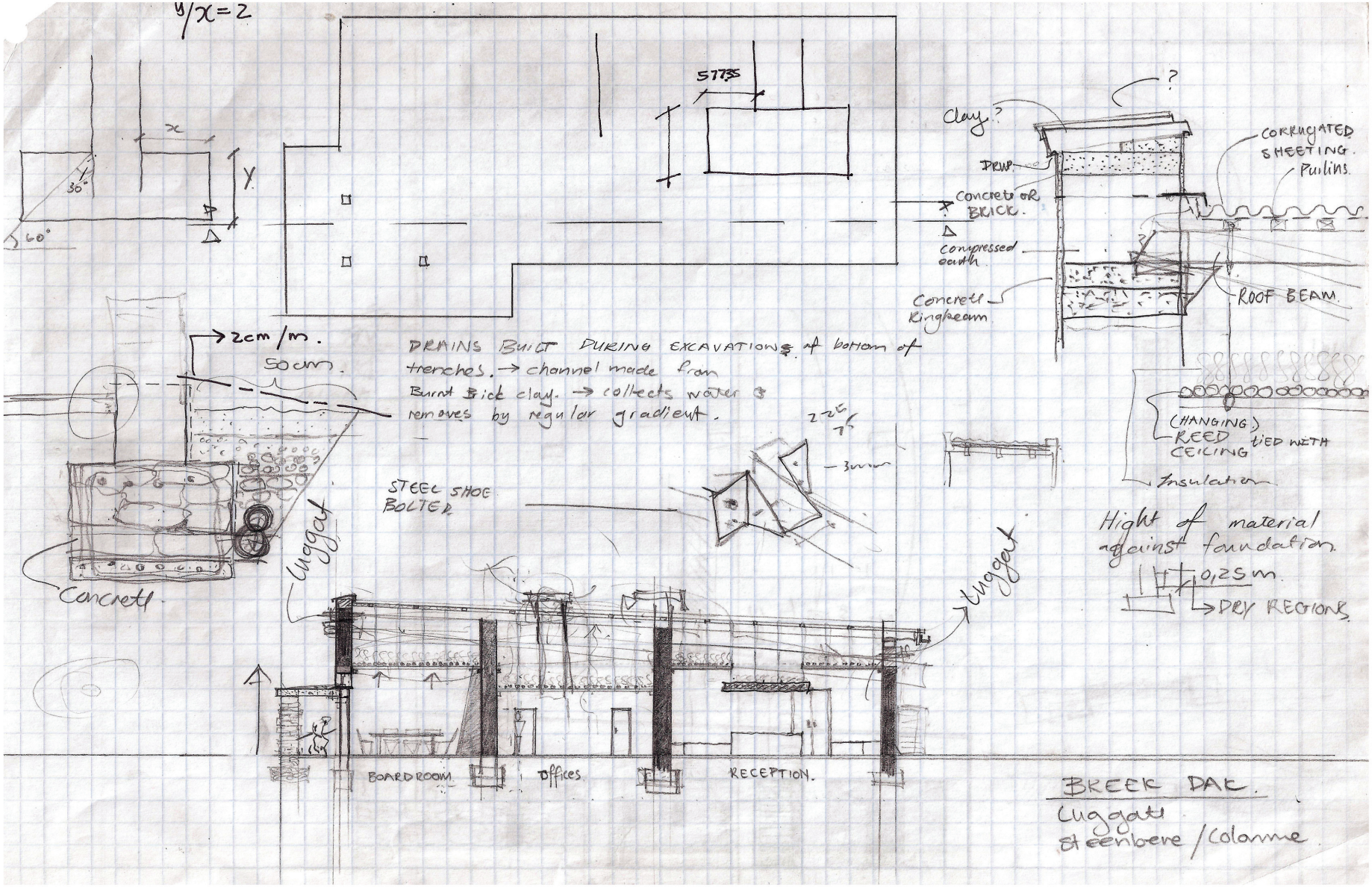




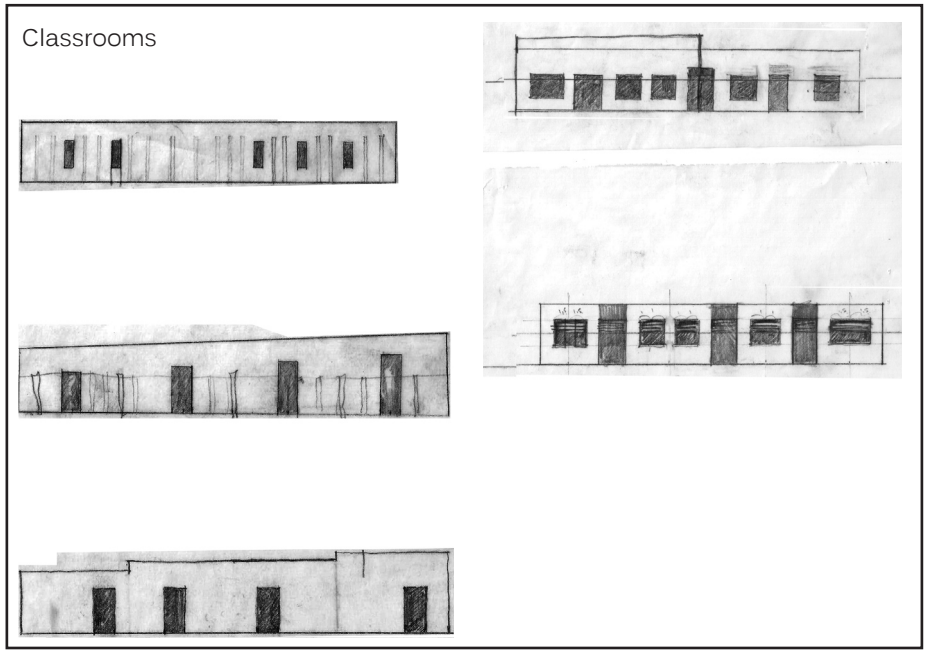


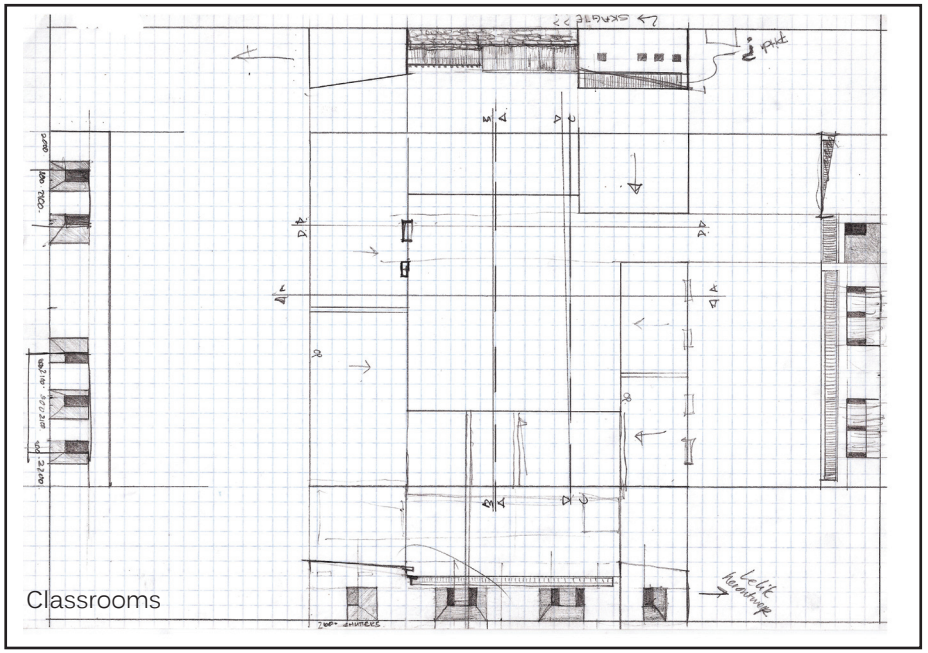


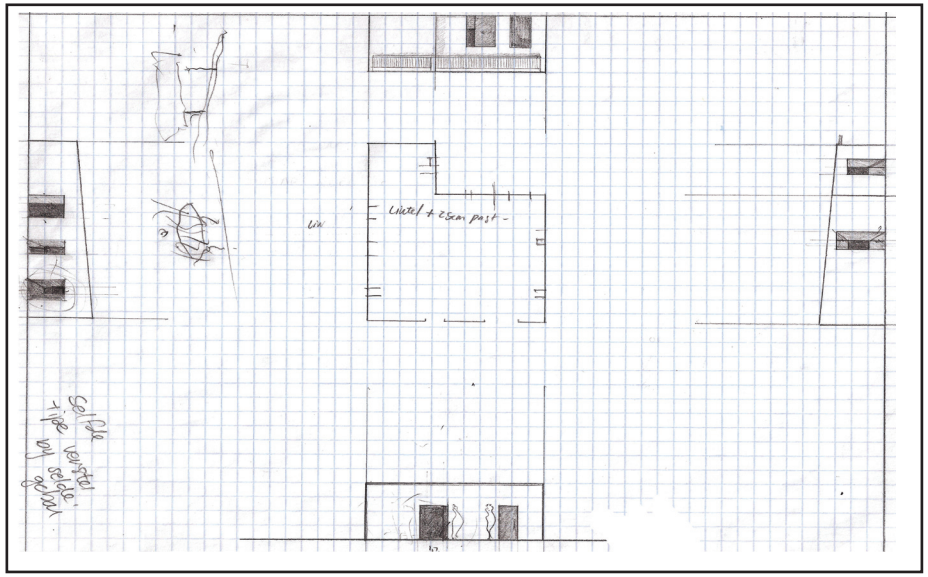
Development of elevations

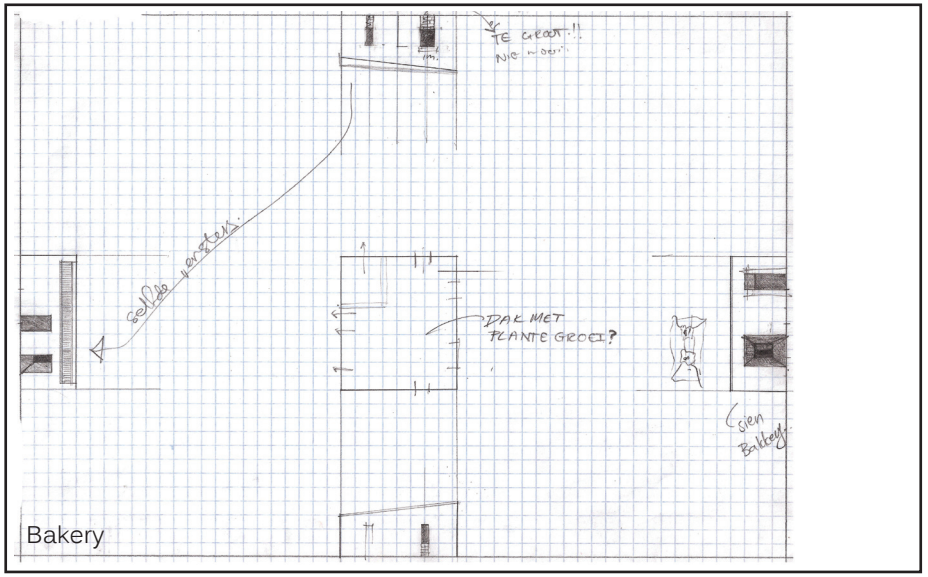


Section development, main building.

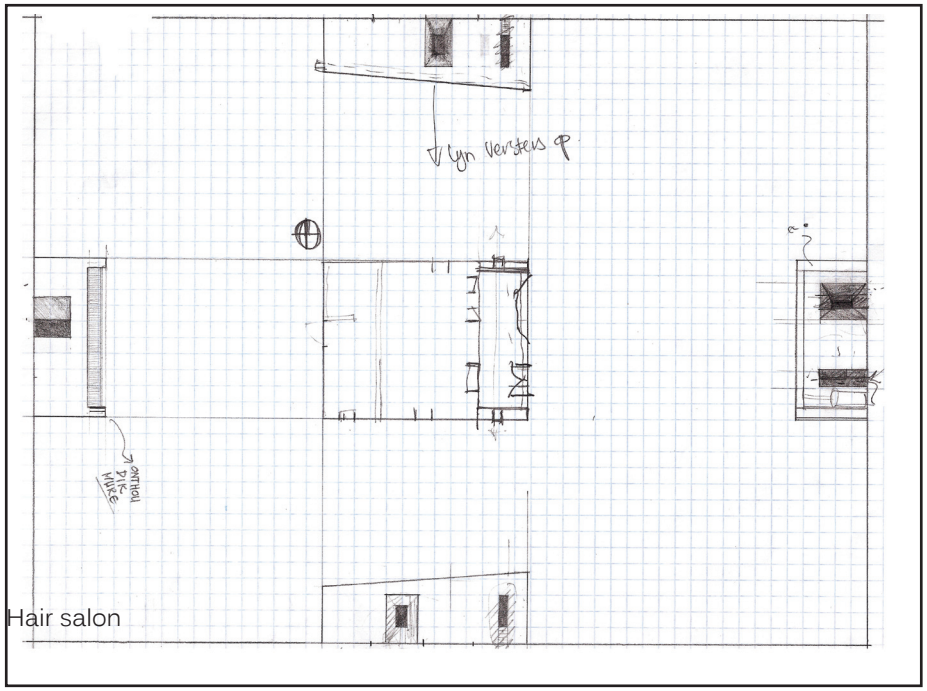




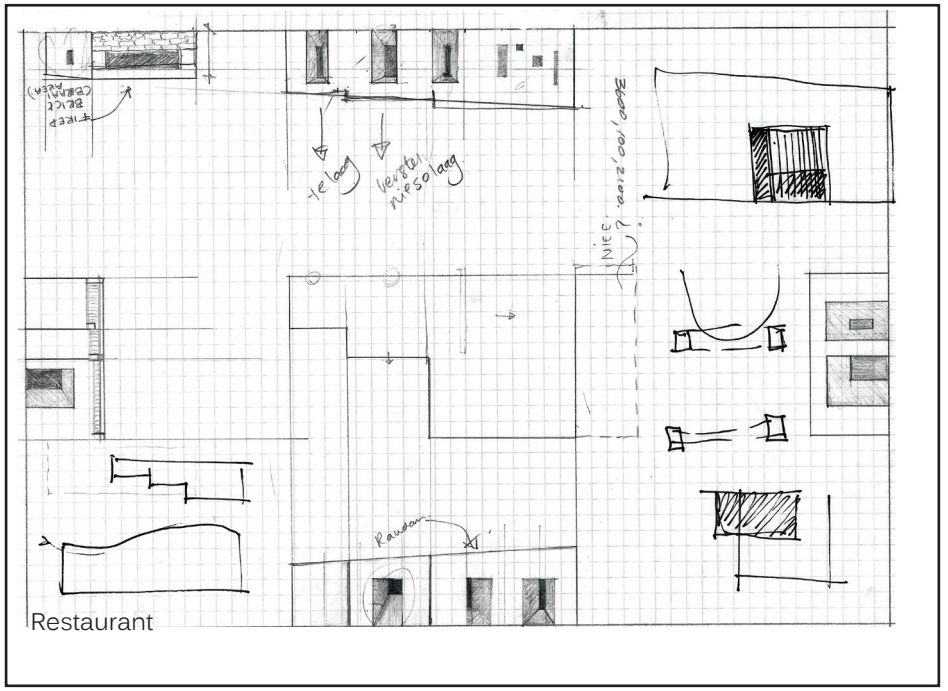




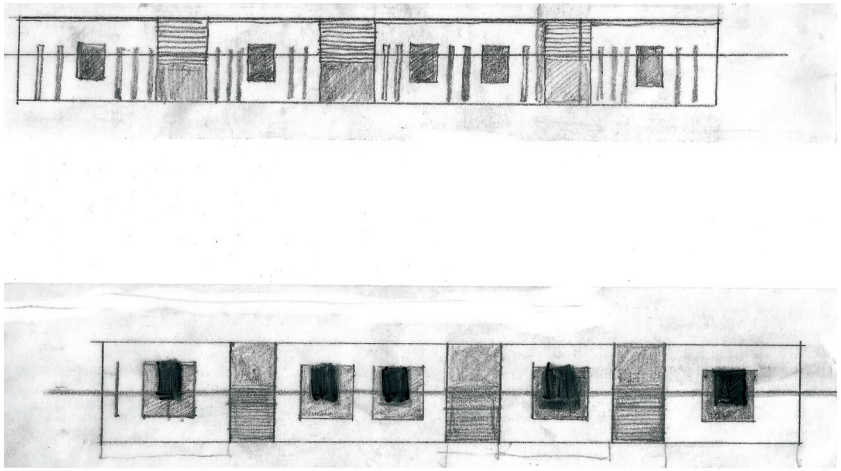
Development of elevations



Hair salon

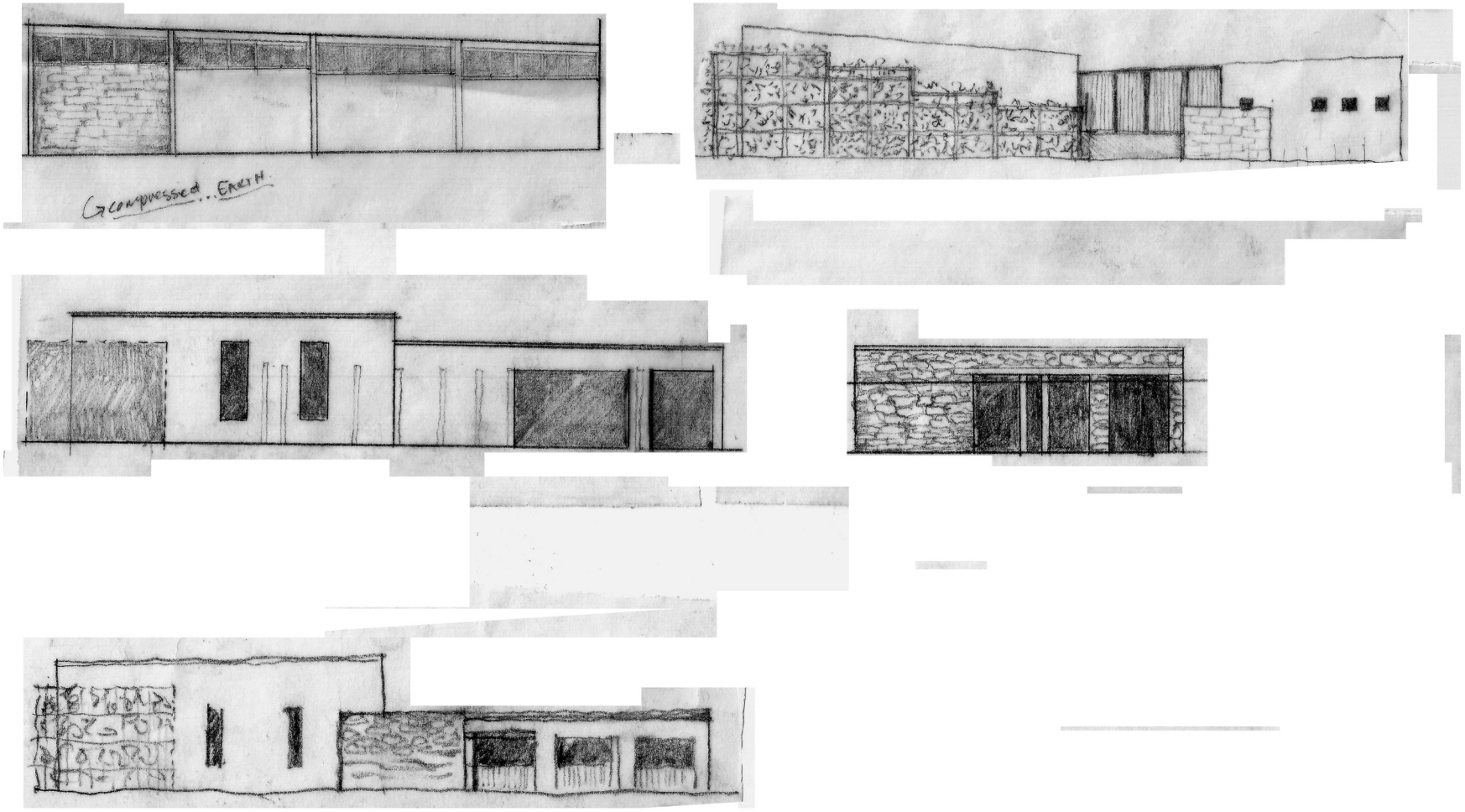


Restaurant

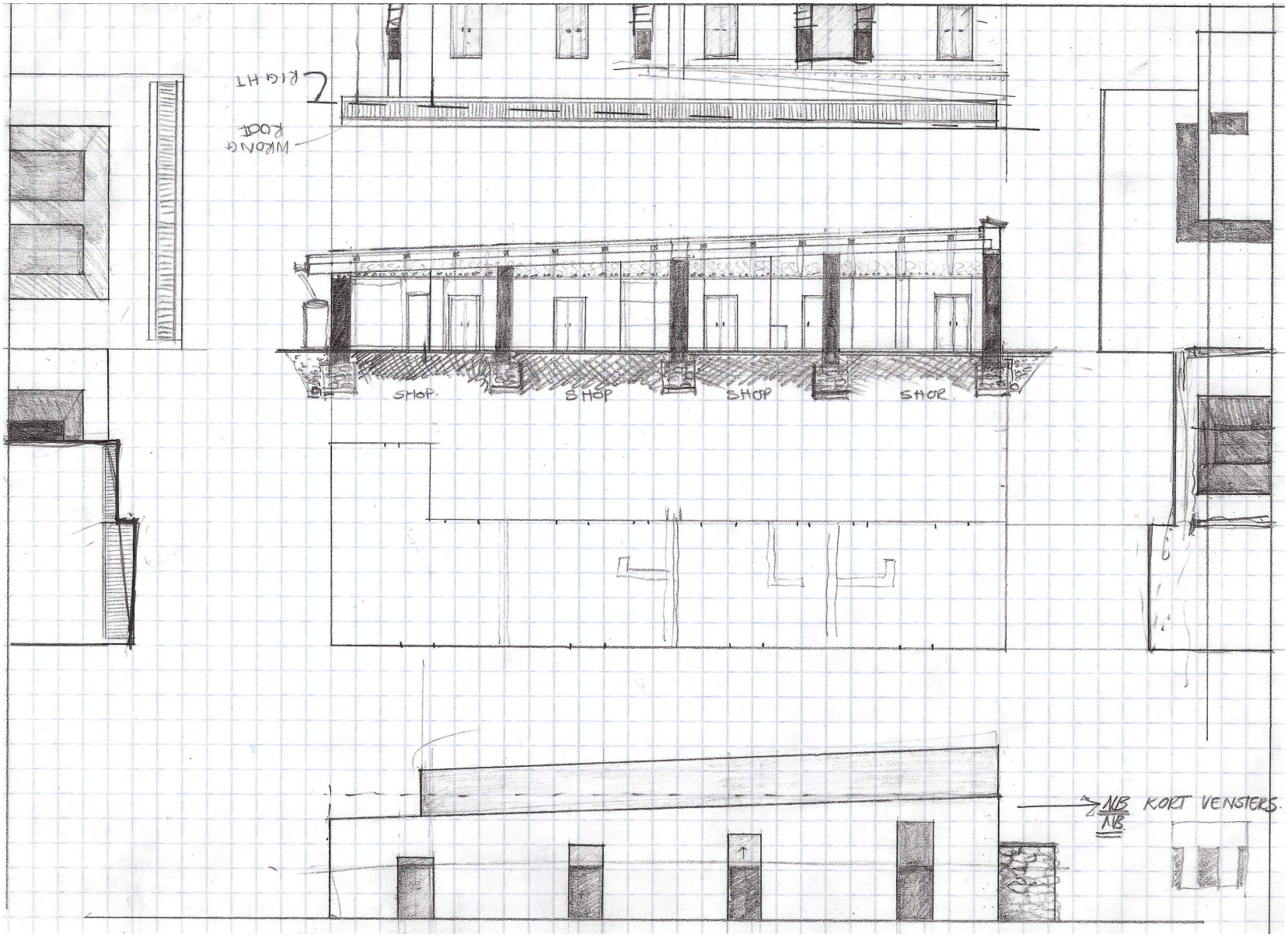




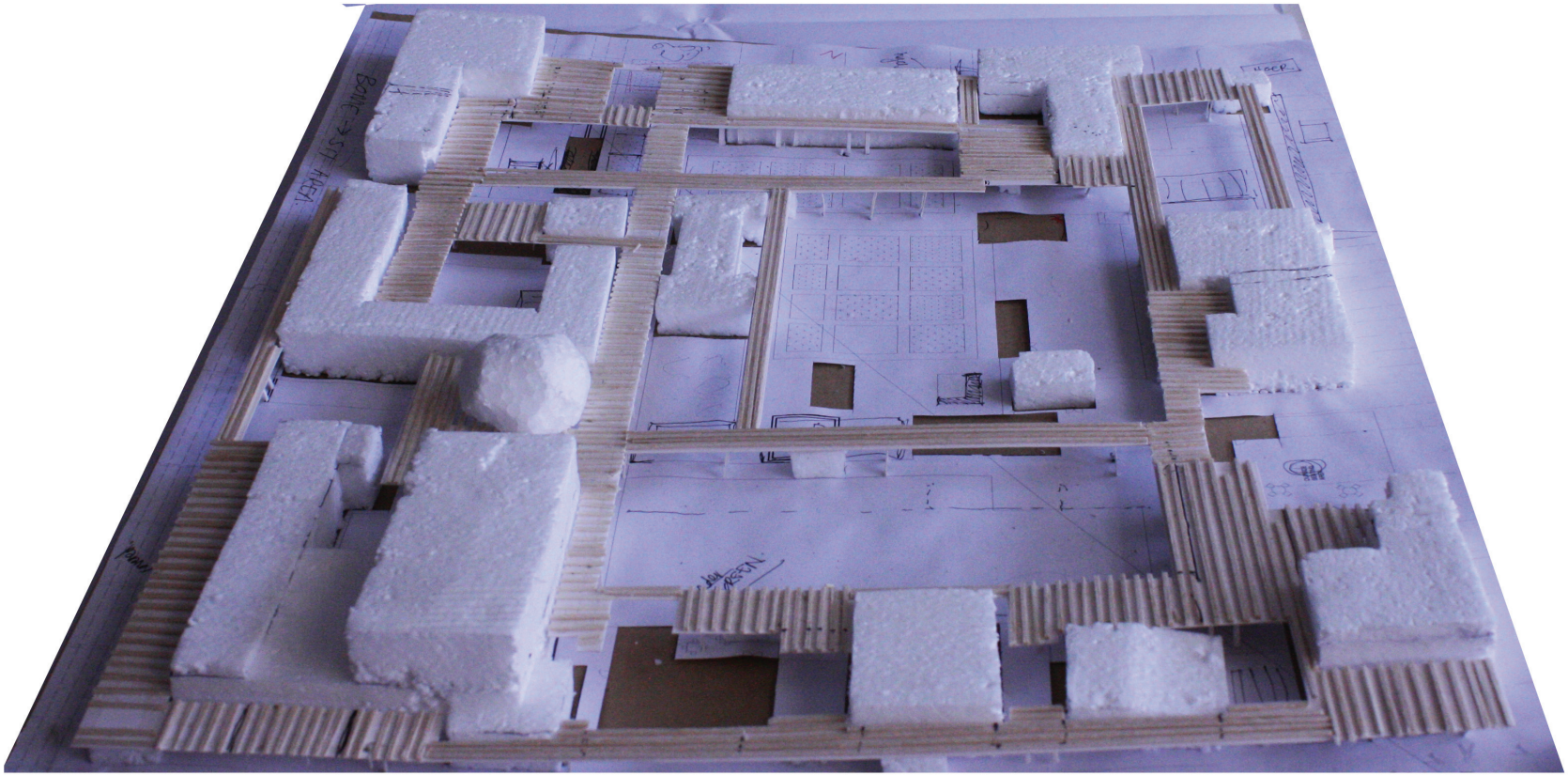
Development of elevations



Development of elevations. Craft hall and production.



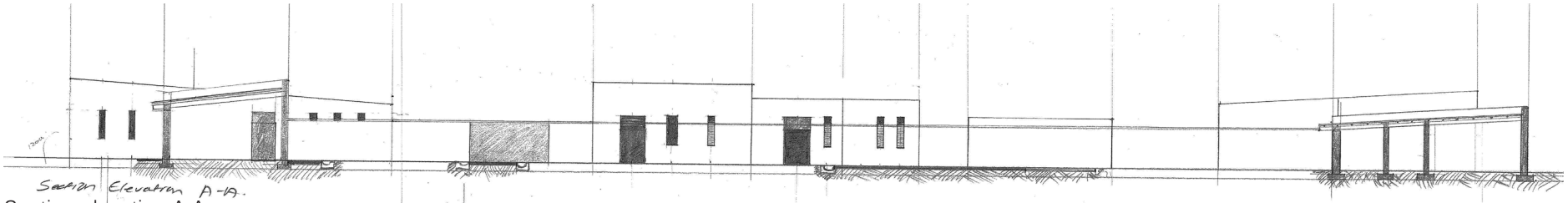
Development of elevations and section of main building, market area.



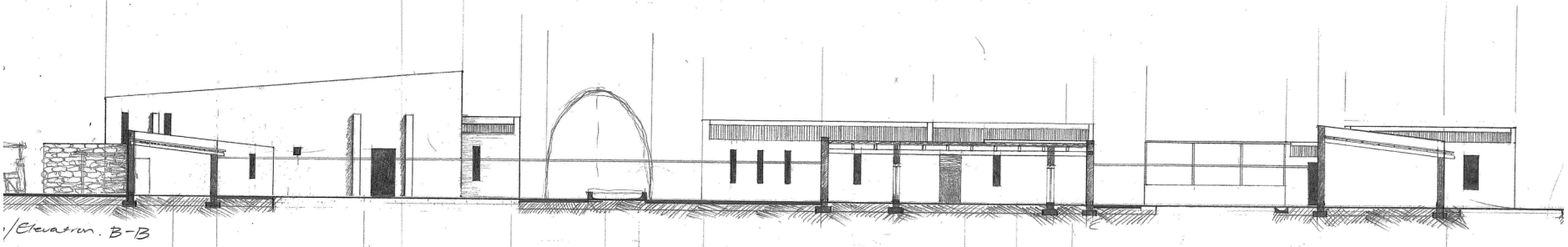
Concept model 9, showing veranda.



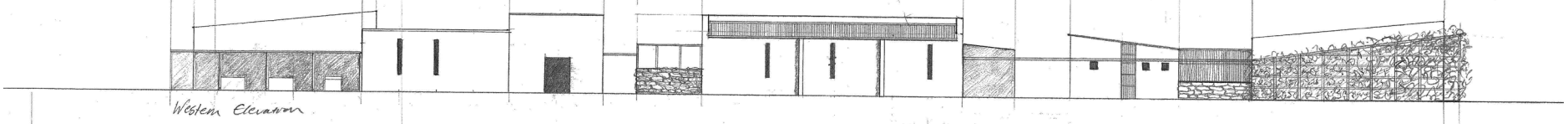
Development of plan and veranda.



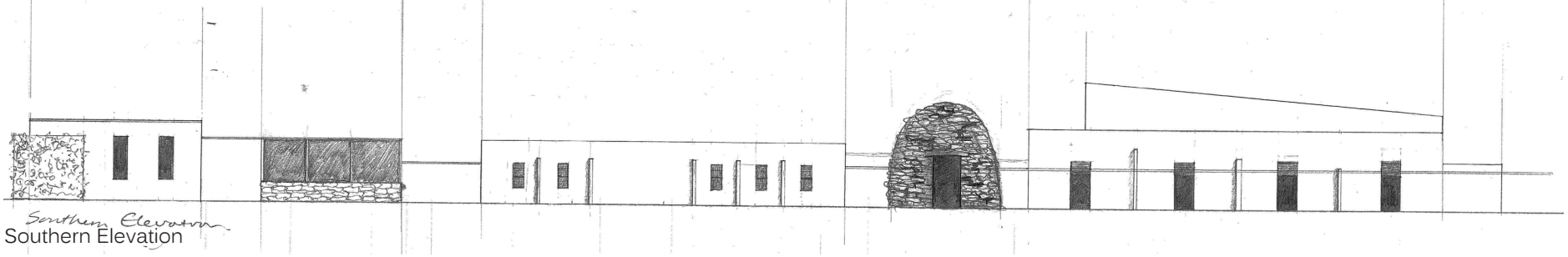
Section elevation A-A



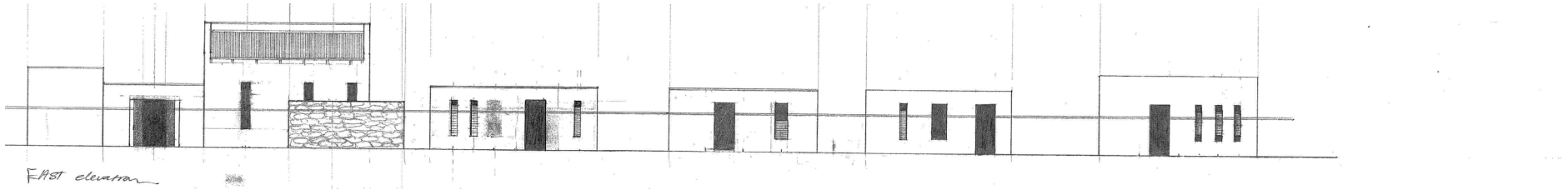
Section Elevation B-B



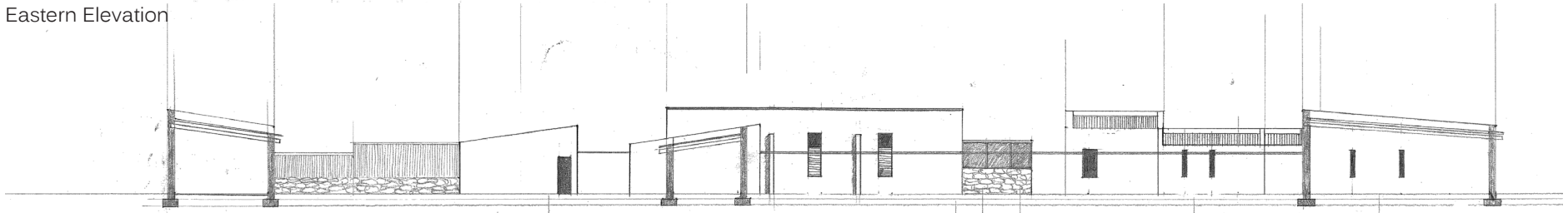
Western Elevation



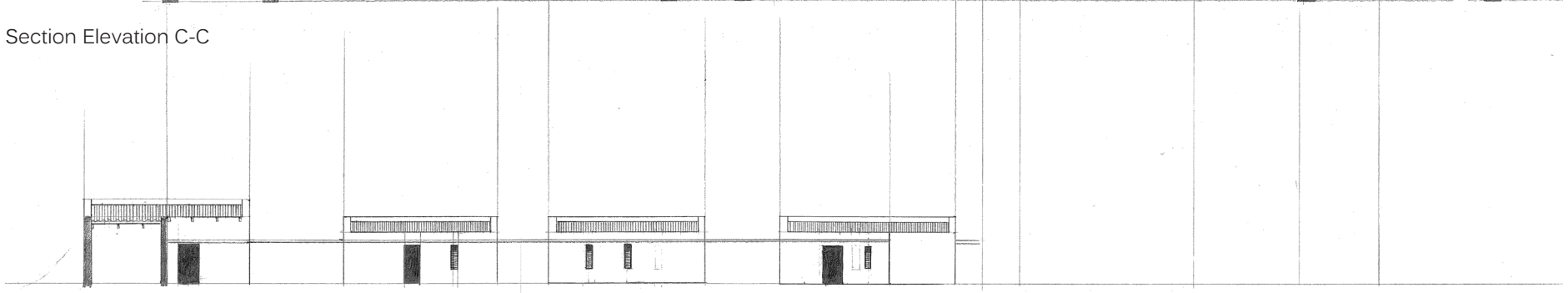
Southern Elevation



Eastern Elevation



Section Elevation C-C



Section Elevation D-D

Development of elevations.

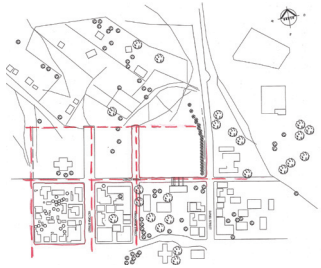
Chapter 10

10. Design synthesis

Architecture of Participation

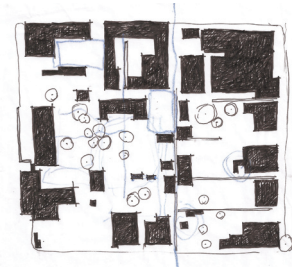


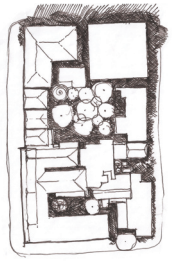
Urban order

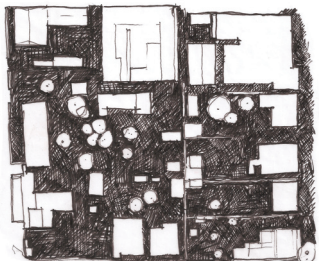


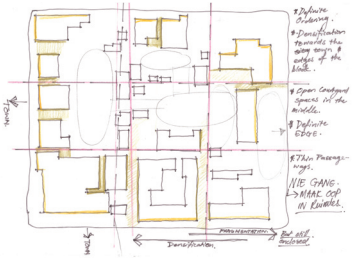


Urban Grain









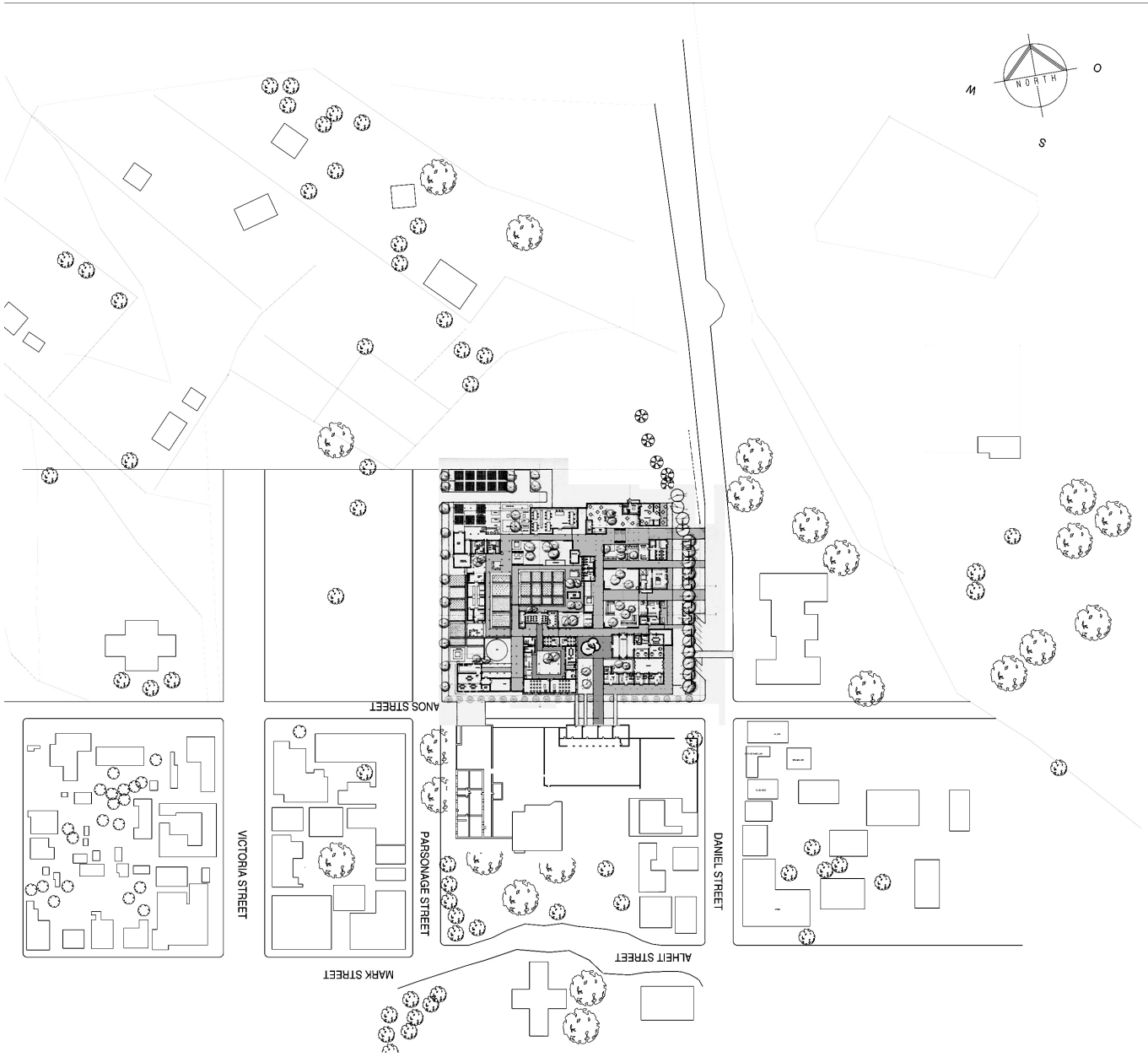
10.1. Introduction

The purpose of this project focuses on creating a place for social interaction, skills transfer, development, and empowerment. Site development brings order to the otherwise bare terrain. Inside and outside spaces become defined through thresholds and boundaries that create a comfortable spatial progression, which creates space for social interaction. The buildings are a reaction to spatial analysis, existing typologies, existing materials, available skills, climate, and the surrounding buildings in order to integrate the centre with the town.



Site

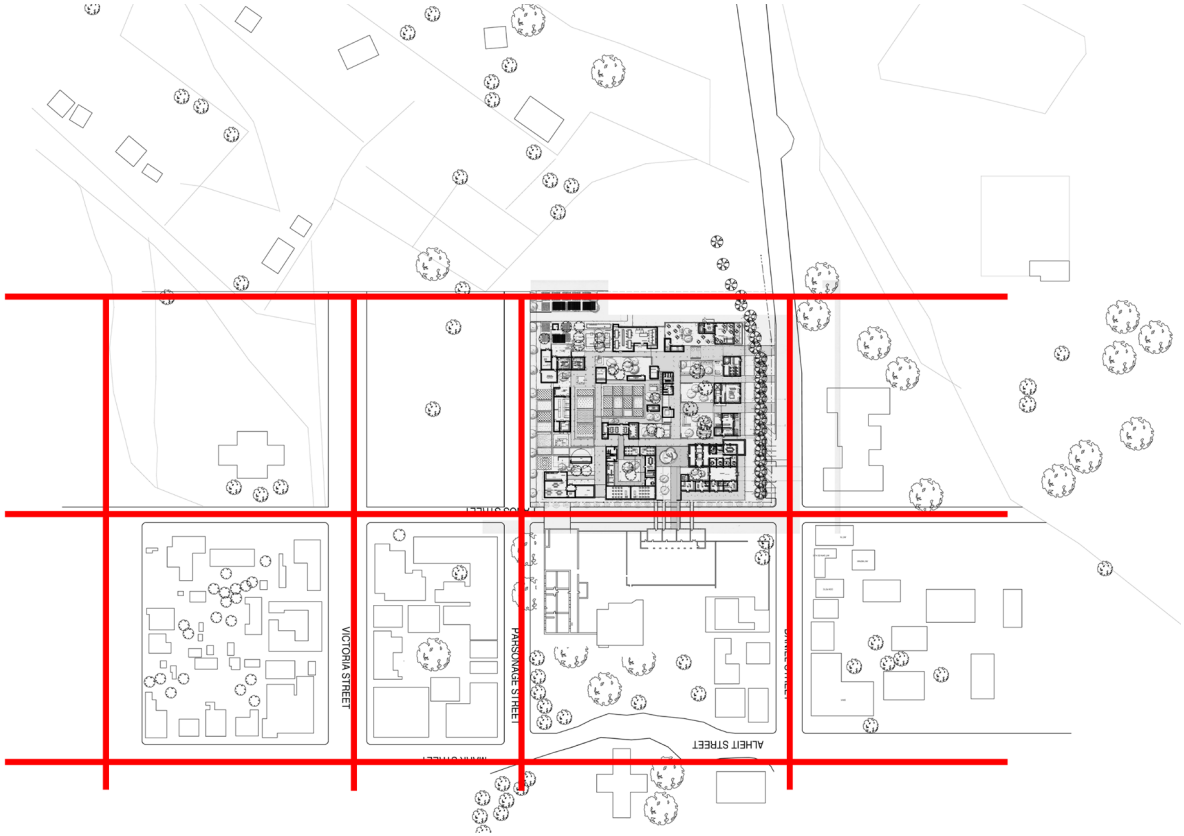
10.1. Google Earth Image. [Online] Available from Web adres [Accessed on 11 May 2008]


NORTH
W
O
S
ANOS STREET
VICTORIA STREET
MARK STREET
PARSONAGE STREET
ALHETT STREET
DANIEL STREET

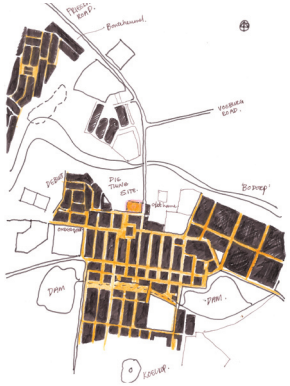
Plan on site

10.2. Site

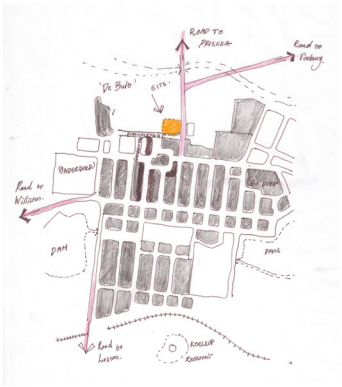
The site is a flat, bare piece of land, intersected by informal pedestrian walkways. The site did not read as part of the town and ordering and a means of integration was necessary. Imposing order to the site meant extending the town grid over the site according to the same sizes and dimensions as that of an existing town block. See chapter two.



Introducing town order to site.



Existing town order.

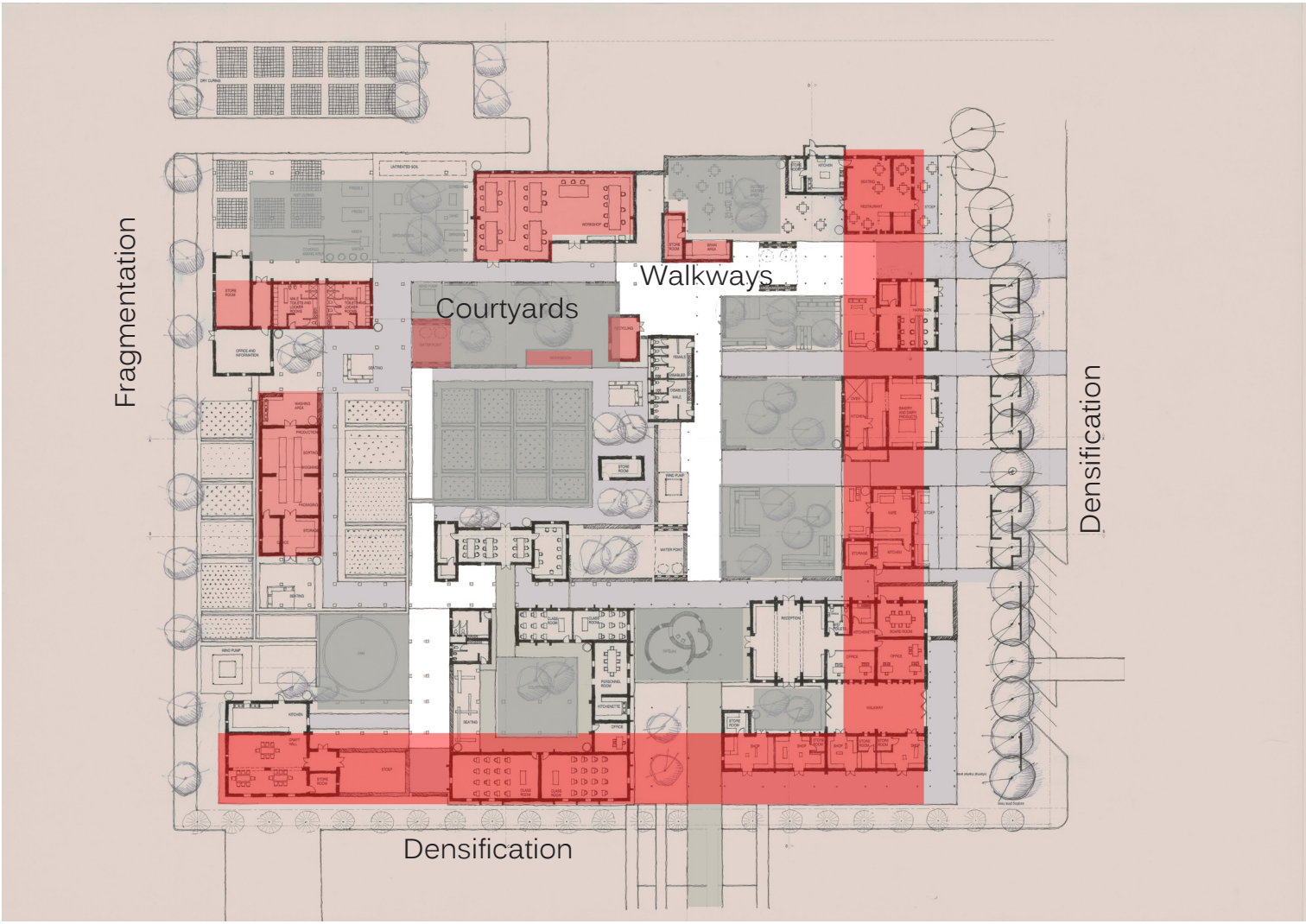


Existing town blocks.

10.3. Layout

The layout on site developed from the current town fabric (massing) and the program was determined through interaction with the community. The buildings form a more solid line densifying towards the town (Daniel Street and Panos street), and fragmenting more towards 'the gardens'. The buildings are interrupted by an arrangement of different sized courtyards and walkways. The design becomes an ensemble of buildings forming a sensitive cohesion between the different parts and the existing town. The layout is also based on the manner in which the town naturally developed over time.

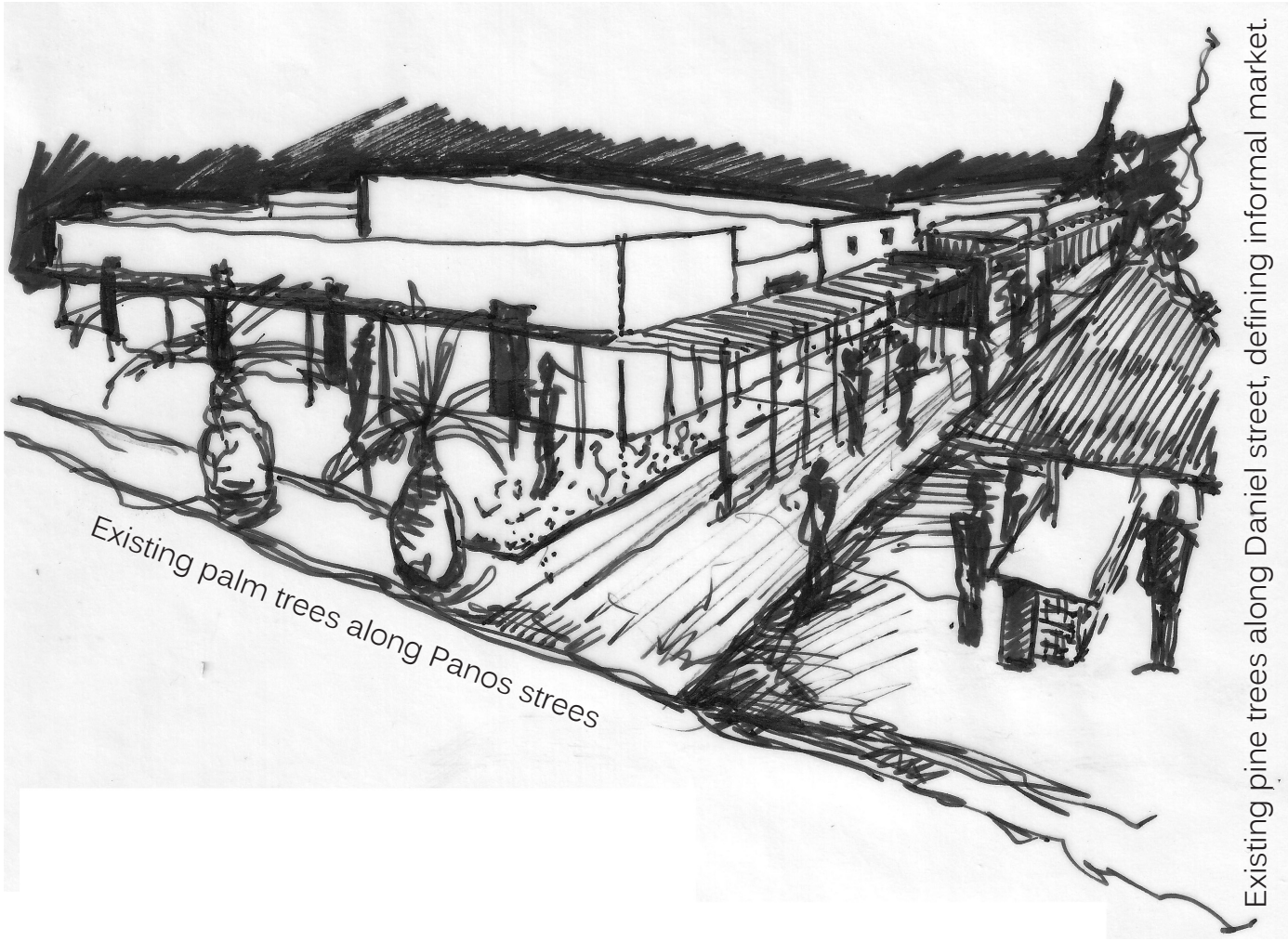
See chapter two.



Densification, fragmentation, walkways and courtyards. Derived from existing town blocks

10.4. Streetscapes

Both Daniel Street and Panos Street have old trees growing along them. The implications are that these trees, pine trees along Daniel street and palm trees along Panos street, were specifically planted somewhere during the development of the town, and need to be kept as they form part of the town's character. The trees now form part of a more developed streetscape, as the pine trees give shade to the informal market area; the street becomes a public gathering space. The trees give a sense of enclosure and arrival to the site. Pedestrian crossings link the old home and the kindergarten to the new design, as it will mostly be older people and children, who will have to cross the road to enter the centre linking the surrounding buildings to the site.See chapter two.



10.5. Centre

The centre is divided into three main sectors: commercial, educational and production. These three processes form a cyclical process of development. The accommodation list of the centre developed from within the community, surrounding buildings and functions.



Plan sectors.

10.5.1. Climatic considerations

10.5.1.1. Screens (Passive Ventilation)

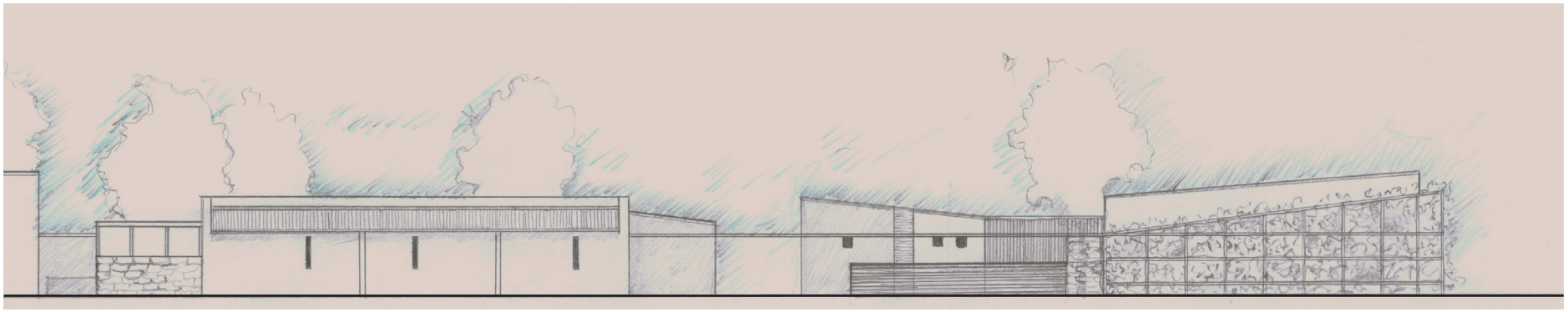
A veranda binds the buildings on site together, covering the walkways and so lowering sun-exposure and radiation. The veranda functions as a horizontal screen contributing to create a comfortable environment.

Openings have vertical screens in the form of wooden shutters. The shutters are opened during winter and closed in summer. The shutters protect the building from the low angle of the Western and Eastern sun.

Vertical screens on the Western face of the project protect the building from the low Western sun. Creeper plants grow against a vertical wooden screen that protects the western face of the craft hall from the sun's heat. On the Western face of the production area, reeds will grow to protect the building from direct sun exposure and become a windscreen. The reeds are cut seasonally, for making the horizontal veranda that binds the project. It will let in the winter sun and protect the building from direct exposure during the summer.



Veranda covering the walkways.



Vertical wooden screen, for western sun protection.



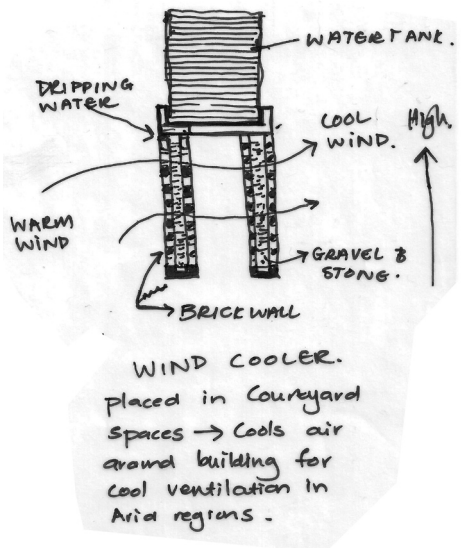
Vertical wooden shutters infront of windows.



Example of reed screens being used in the area.

10.1.5.2. Courtyard spaces

The courtyards are used for cooling the areas surrounding the buildings. The spaces are planted with trees for shade and transpiration that assist with cooling. In the courtyards are wind-cooling systems specifically adapted for the place. Ventilation in the Karoo proves difficult as intense heat floods the building, because the air is too warm. Cooling the wind that moves through the courtyard spaces creates a cooler environment that opens possibilities for more effective ventilation.

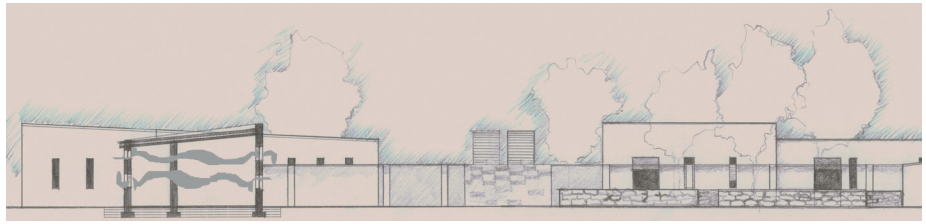


Courtyard cooling system.

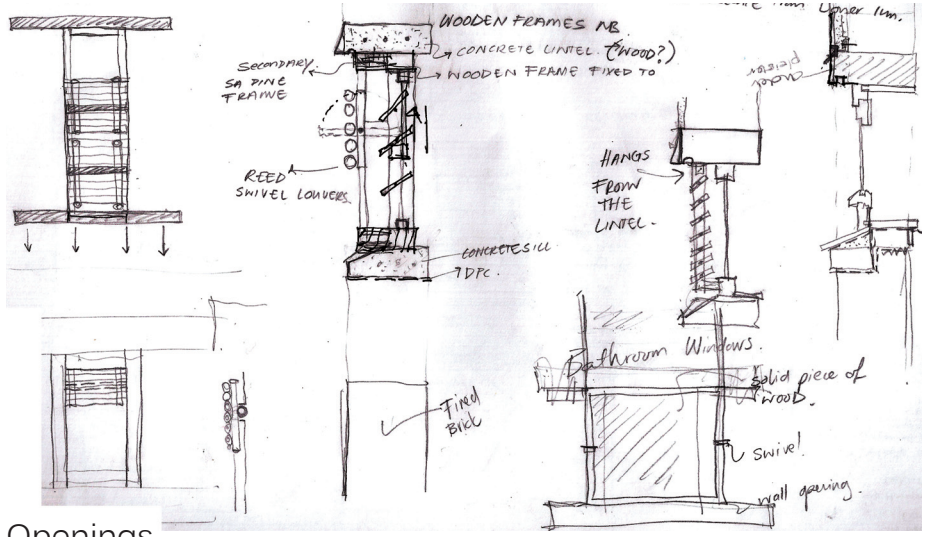


10.1.5.3. Openings

Openings are kept small to keep the heat at bay. Openings operate on two levels for ventilation, higher and lower openings, thus each layer can ventilate on its own. Openings also consist of wooden shutters that open and close as the climate varies.



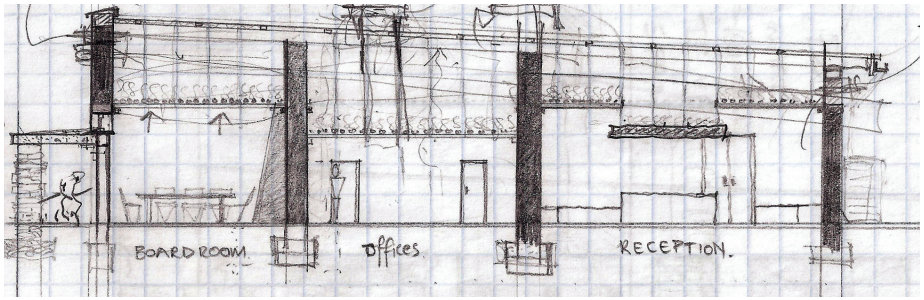
Ventilation

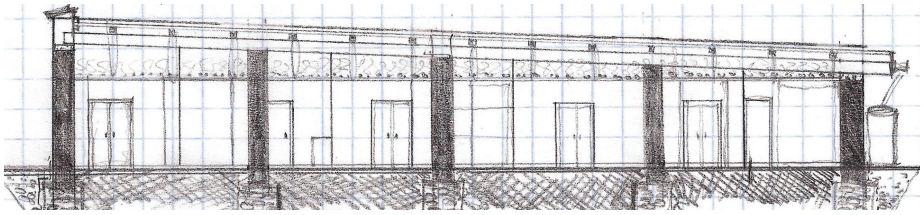


Openings.

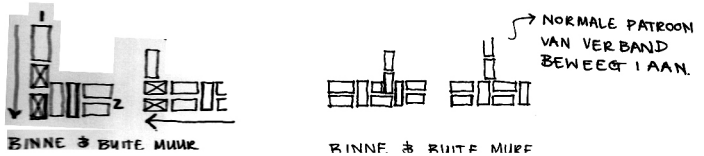
10.1.5.4. Walls

Walls are 400mm thick adobe bricks. The thickness of the wall ensures high thermal insulation and delay thermal variations creating a constant internal temperature. Earth construction works best in compression celebrating the solidity of the structure.





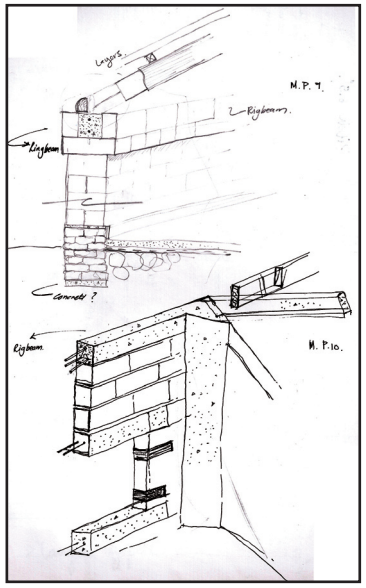
Adobe walls



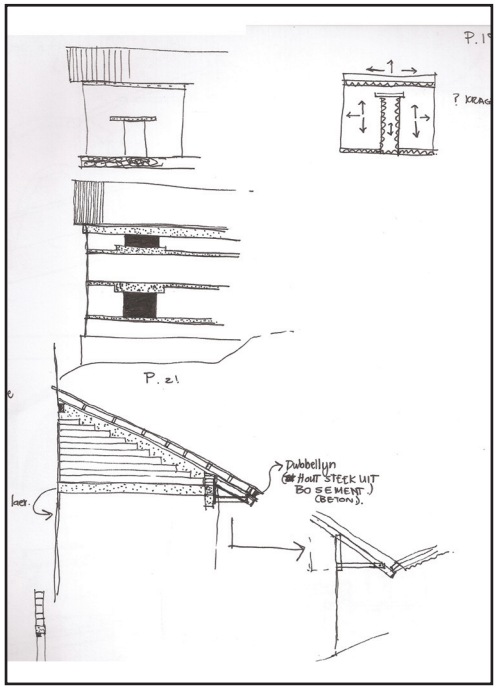
Brick layouts, mayotte 17-19.

10.1.5.5. Roof

Different types of roof systems are used in the design, exposing the people who are taught at the centre to different building methods. The first is a modification of the typical Brakdak (flat roof) that forms part of the Karoo vernacular. The roof is still made of clay straw bricks, but has a slope with a layer of lime and cement screed covered with bitumen to prevent water penetration. The earth roof delays thermal variation. The second type of roof makes use of clay straw bricks as insulation and thermal regulation covered with sink layered with reeds or stone.



Redrawn by author myotte. Roof detail.



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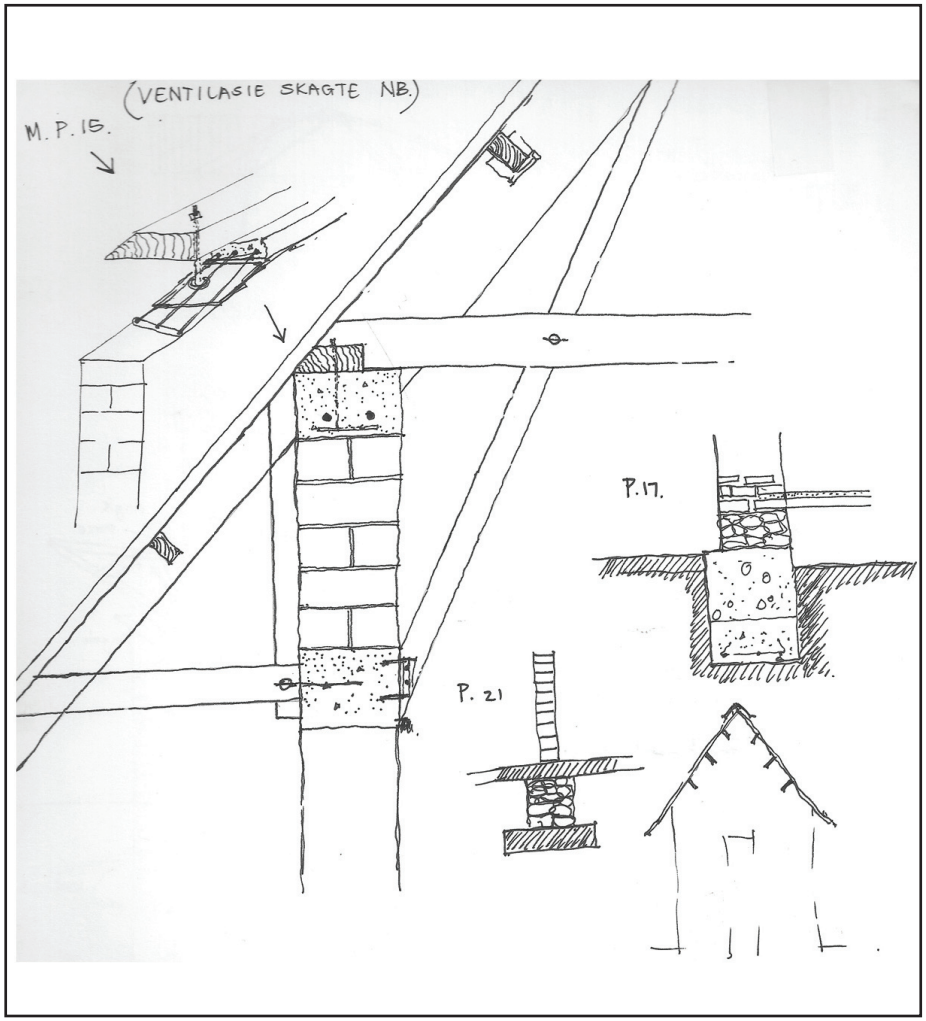
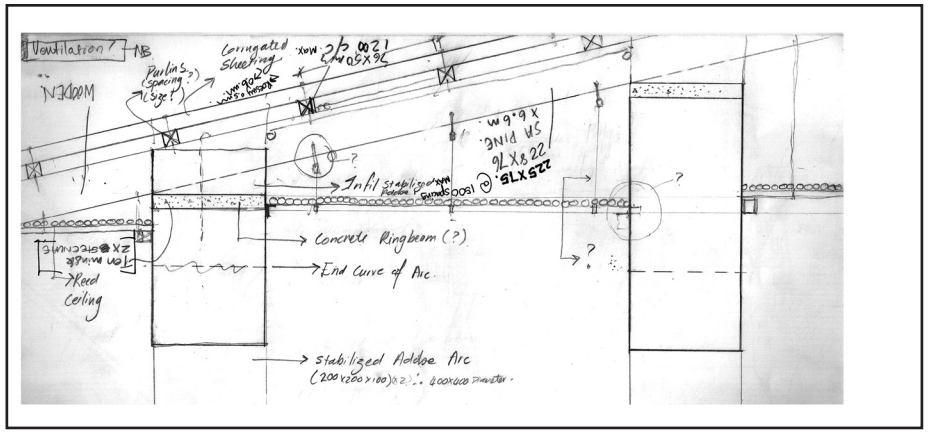
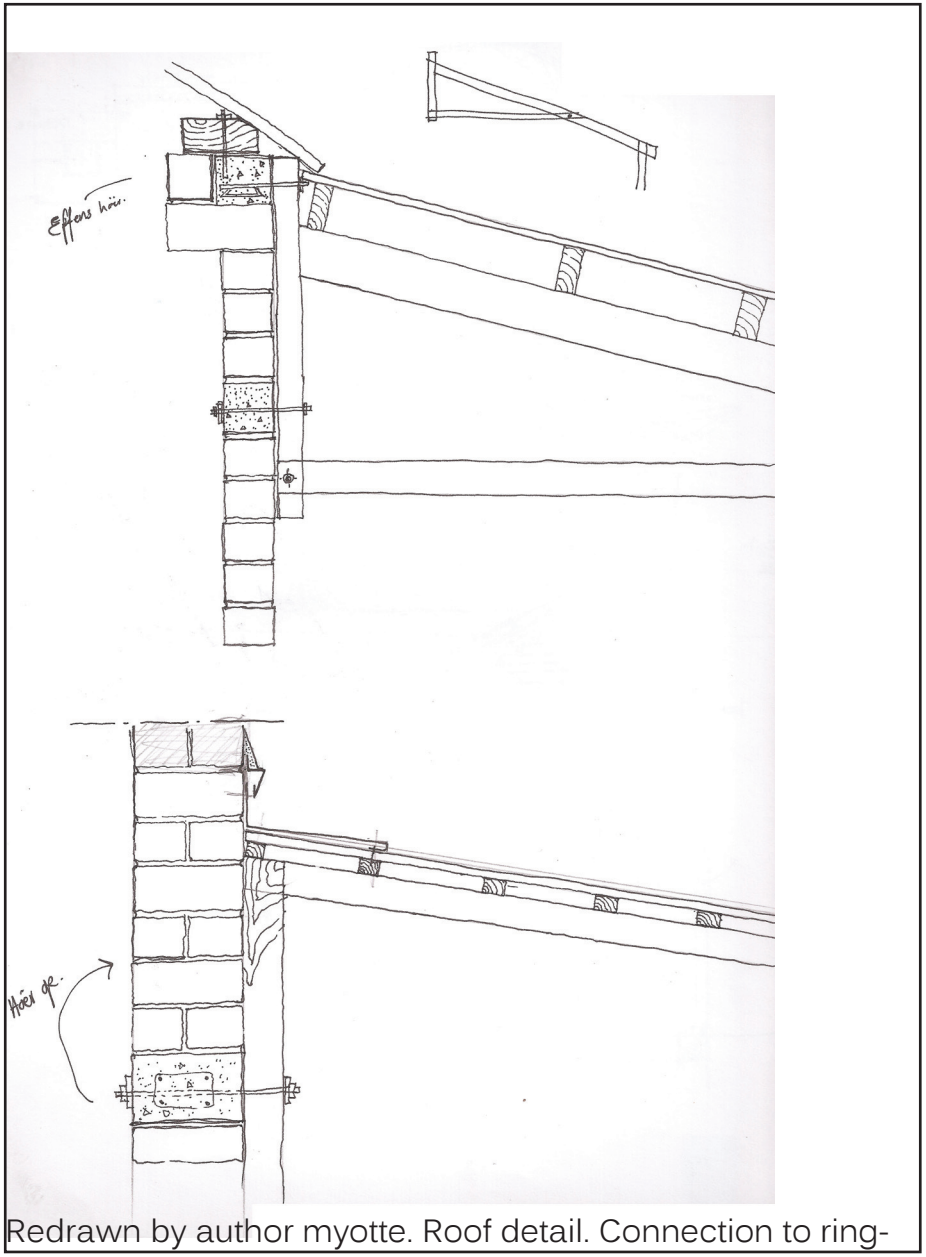
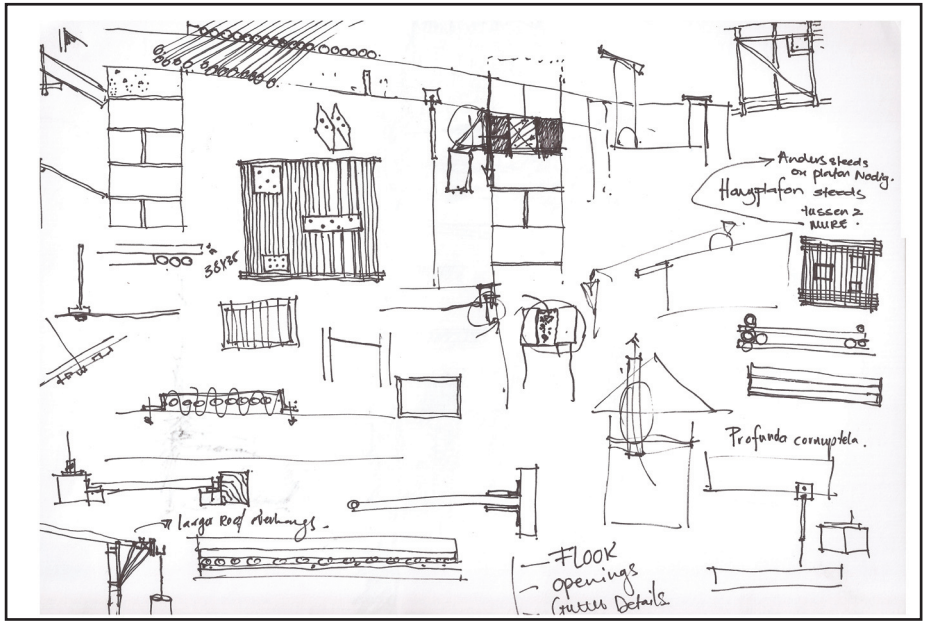




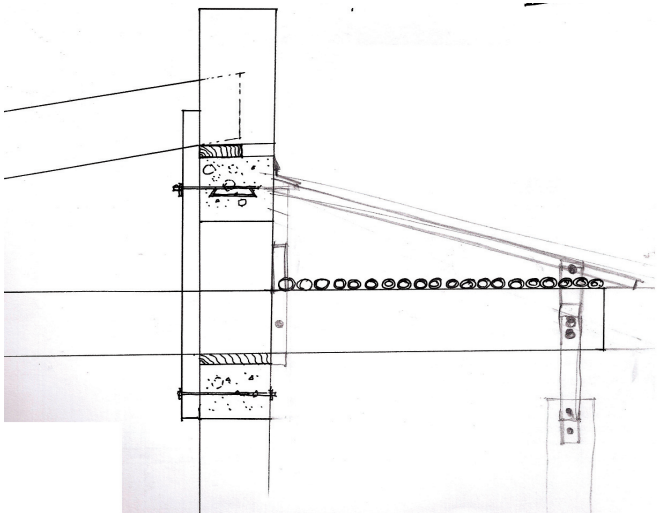
Redrawn by author myotte. Roof detail.



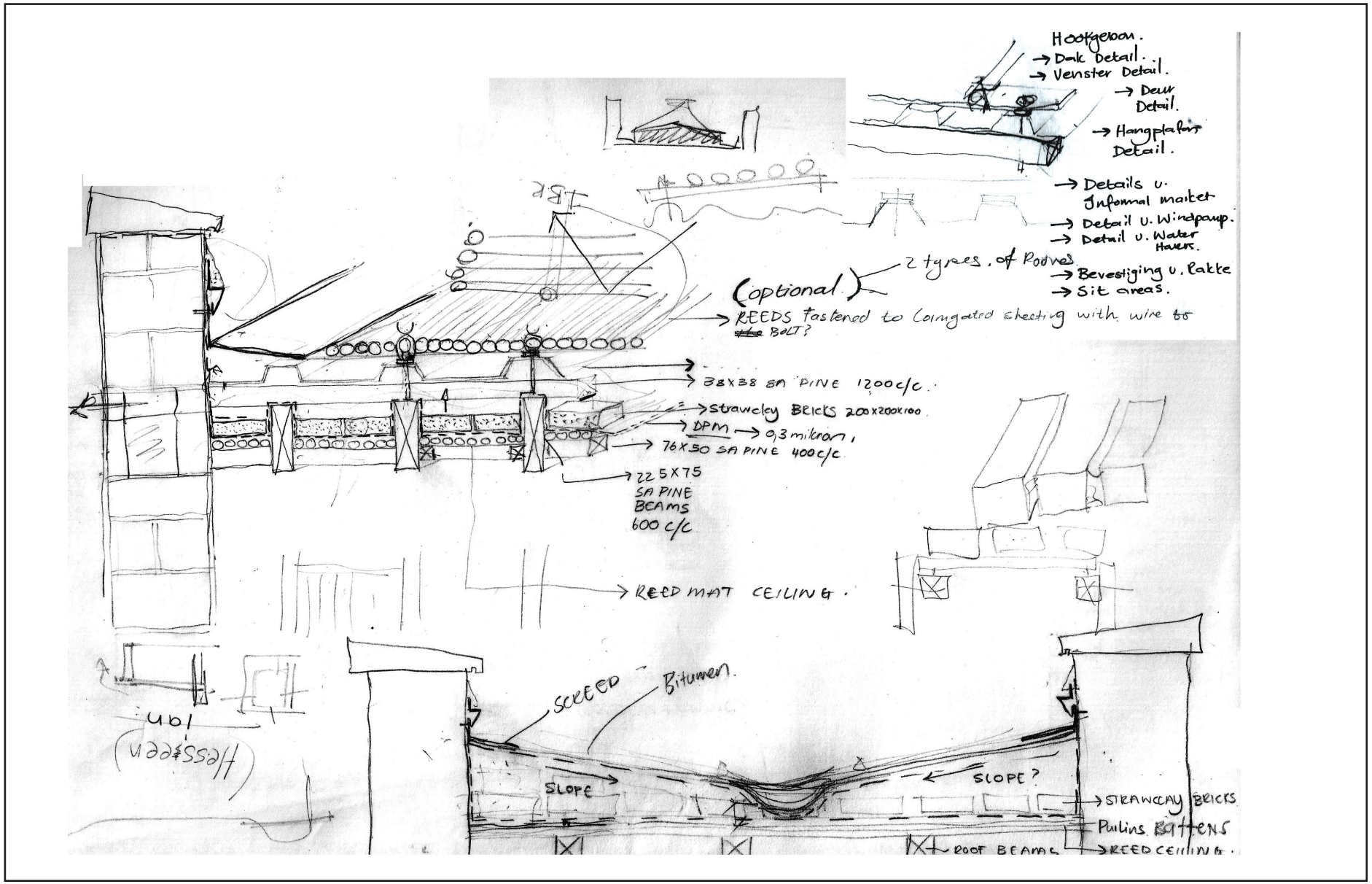
Redrawn by author myotte. Roof detail. Connection to ring-beam



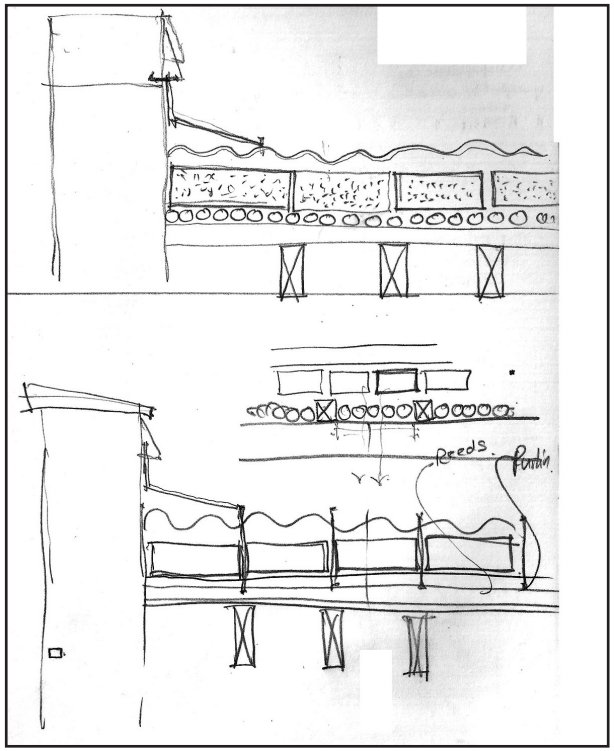
Reed ceiling



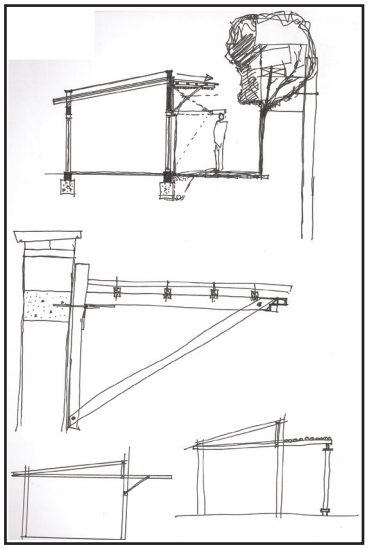
Veranda detail.



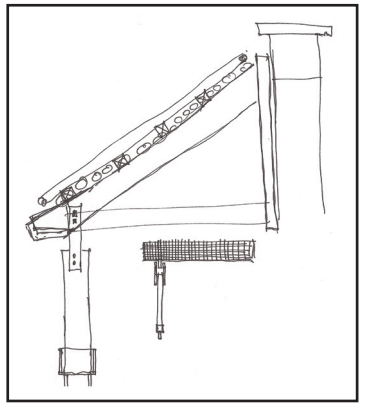
Earth construction roofs.



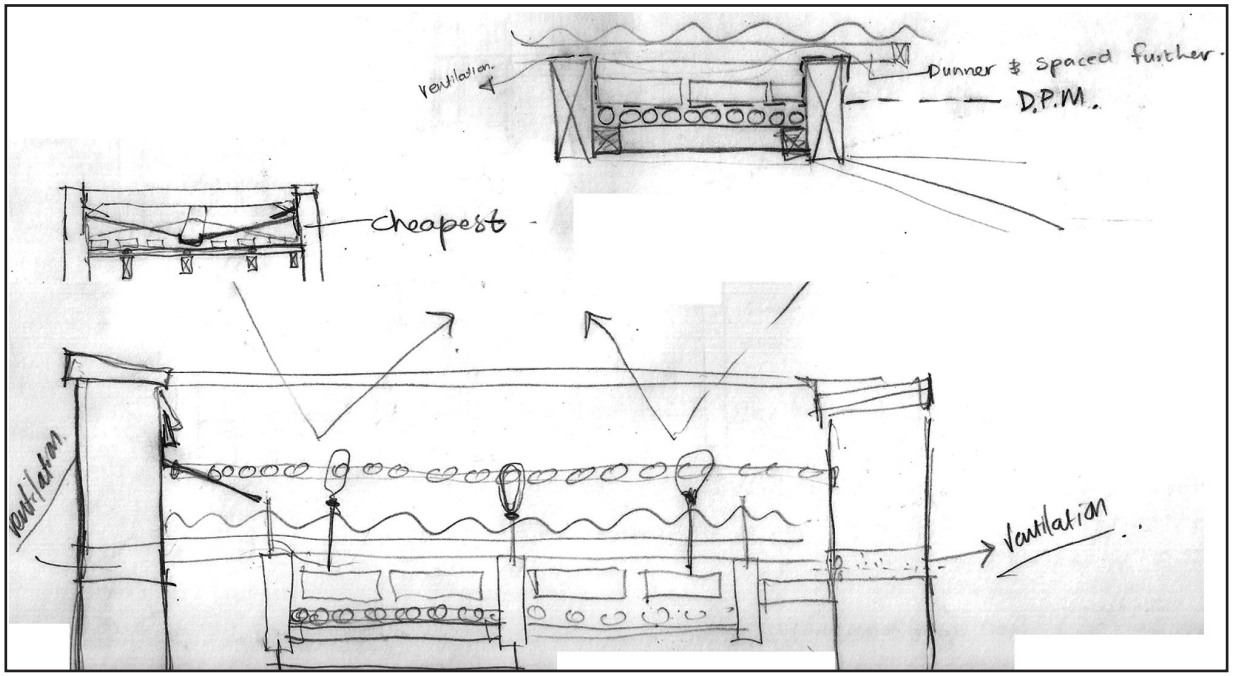
Earth construction roofs.



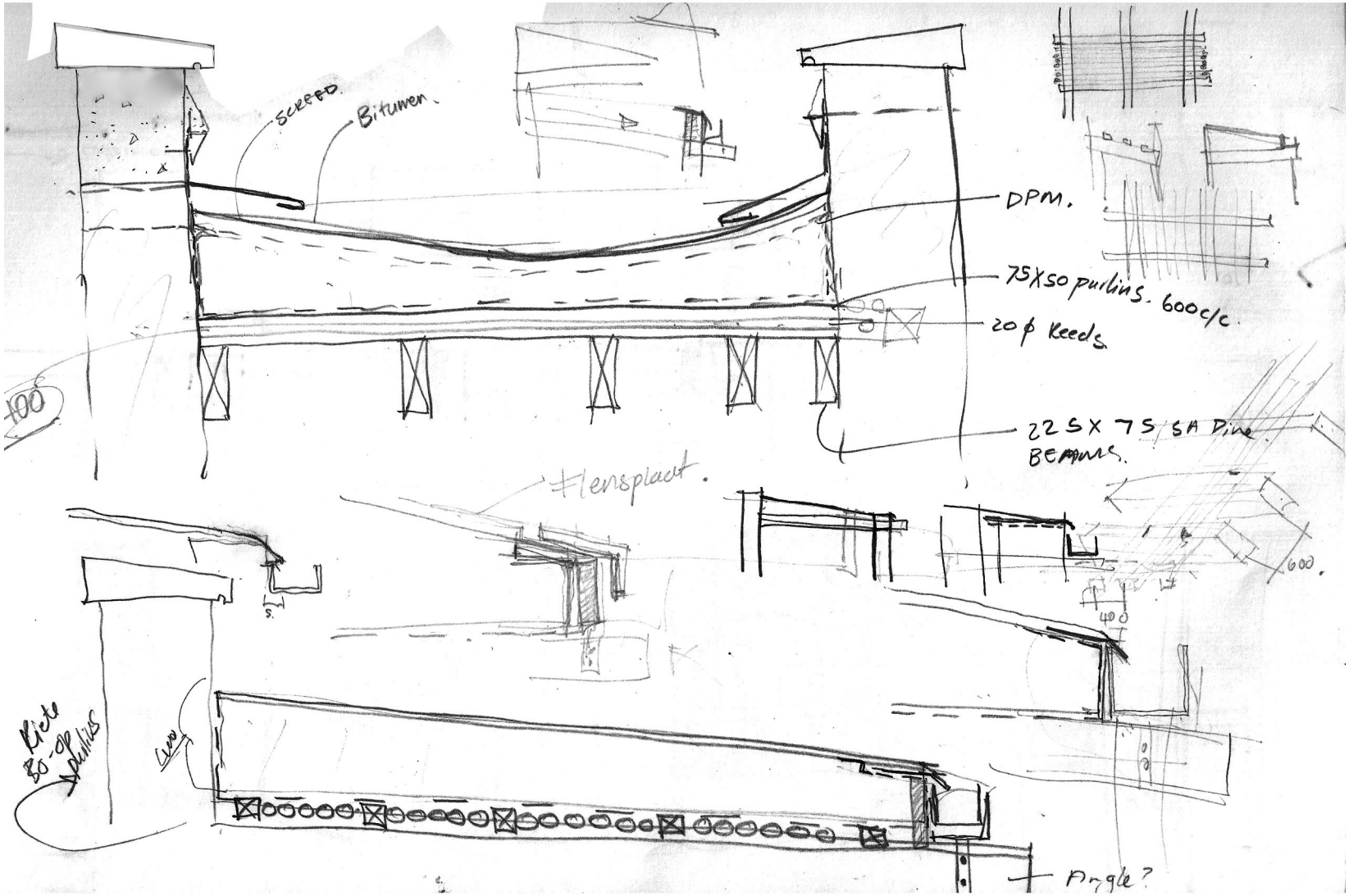
Veranda detail



Veranda detail



Earth construction roofs.



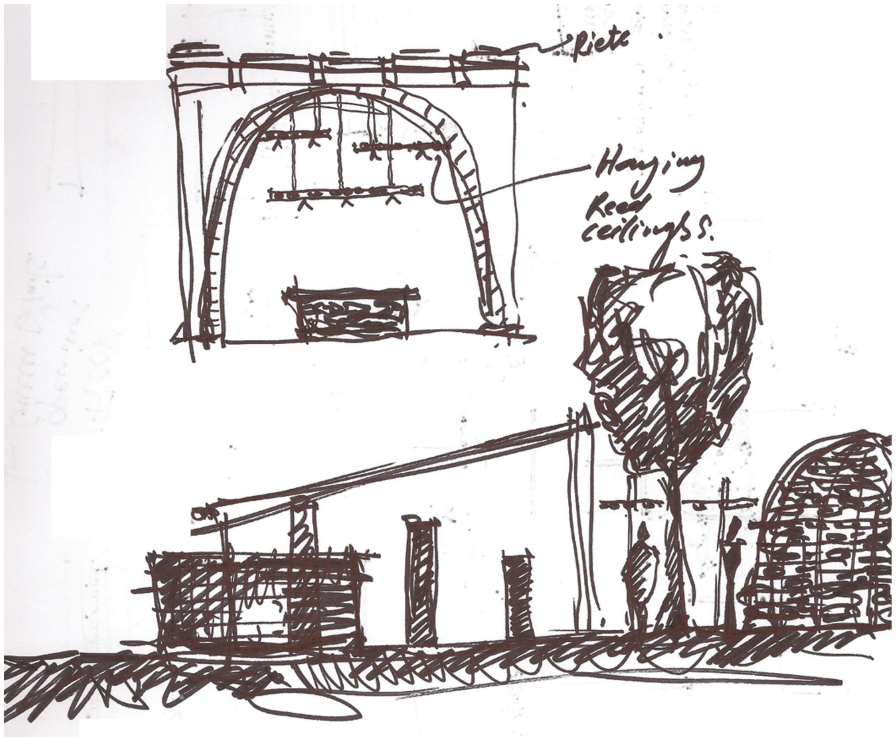
Earth construction roofs.

10.5.2. Material use

Earth construction is used in the project, as it is a traditional building method used in Carnarvon. Trying to reinstate this tradition is important, as it is essential to the community. The community will be able to build their own houses with the methods taught at the centre. Earth construction material can be use by unskilled labour, which works well in less fortunate communities, especially because the material is readily available.



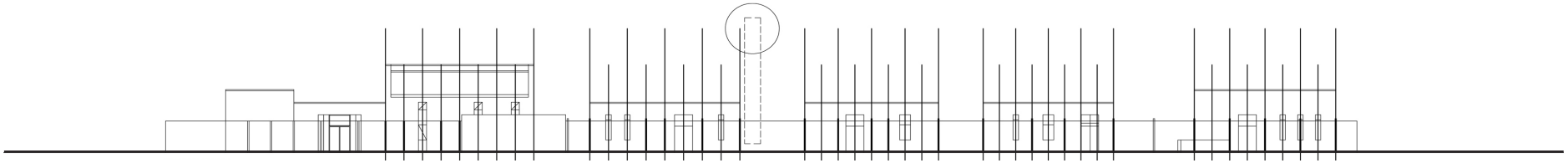
Indiginous building material and techniques.



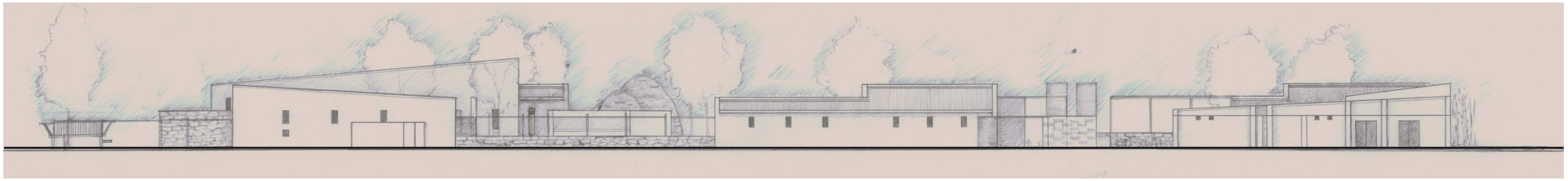
Adobe, slate (local stone), reeds, wood.

10.5.3. Typology, proportion and solid/void ratio.

All the buildings in the project are based on Karoo proportioning systems and the ratio of solid to void in the facade. There is a tendency to neglect the existing typologies in the area, or not quite understand their poetic beauty, when designing a building. The proportions of the Karoo vernacular become tangible in its simplicity and are important to conserve. Through social, spatial analysis the Karoo vernacular architecture proved to be extremely relevant.



Proportioning



Solid/ void and typology

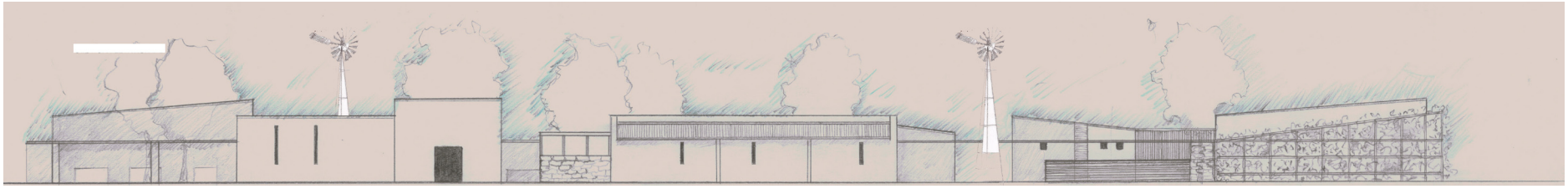
10.5.4. Pedestrian walkways

The pedestrian walkways have been formalised while still allowing people to filter through the site, exposing the community to the centre and its possibilities. The education and production sections can be closed off to the public if needed. Preferably, these areas should be left open to the public in order to increase exposure and involvement. Crime in the bigger cities is an incredible problem and this makes for 'hard architecture', architecture that does not respond to social human interaction and connection, but fragmentation and alienation. The centre is designed in a sensitive way, respecting the people's culture and history. The centre aims to reinstall a sense of pride, through a process of belonging and helping the community understand that it is their centre, for them, by them and not for any individual person. It is theirs to look after and take care of. There is very little crime in Carnarvon at present and the areas can still be locked at night if needed. Poured earth will be used for the paving decorated by the community.

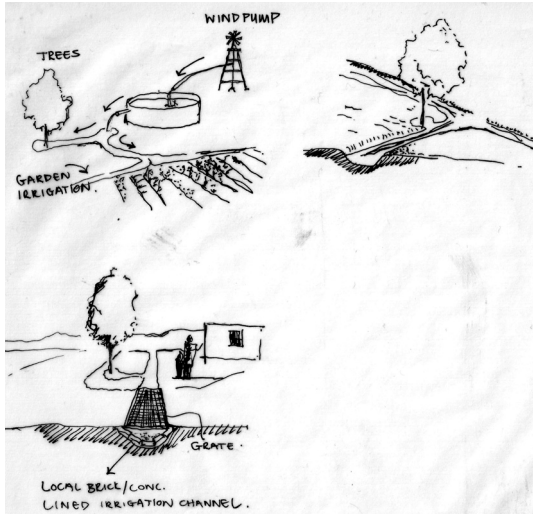


10.5.5. Water sources

'The garden' area adjacent to the site makes use of windmills that pump water to the surface for easy distribution. The same method is employed on the site. A series of windmills pump water into water storage tanks and a dam, which is located on site. The water in the dam is used for the vegetable garden and trees with a series of water channels. The wind cooling systems in the courtyards also make use of the water tanks. Some of the windmills can be replaced by electric pump systems.



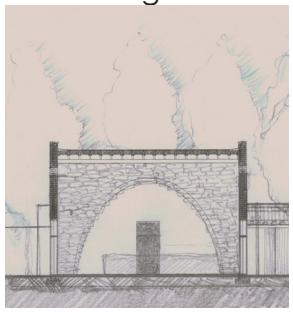
Windmill Windmill Dam



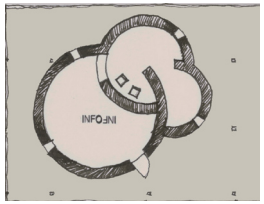
Channel systems. PETERS

10.5.6. Transformation

Transformation was applied to the corbelled hut, exploring the plasticity of the method in which the material is used. The typical Karoo house is transformed, breaking with the strict symmetry, but keeping the sensitive quality of proportion and simplicity. The two main considerations for the transformation of the Karoo houses were to create an awareness of the existing typologies that are still worthy to this day. The second being that the complex needs to draw attention and become a place of interest, while remaining true to the character of the place.



Corbel hut inverse exploring material capabilities.



Corbel hut transformed exploring material capabilities.

10.6. Commercial

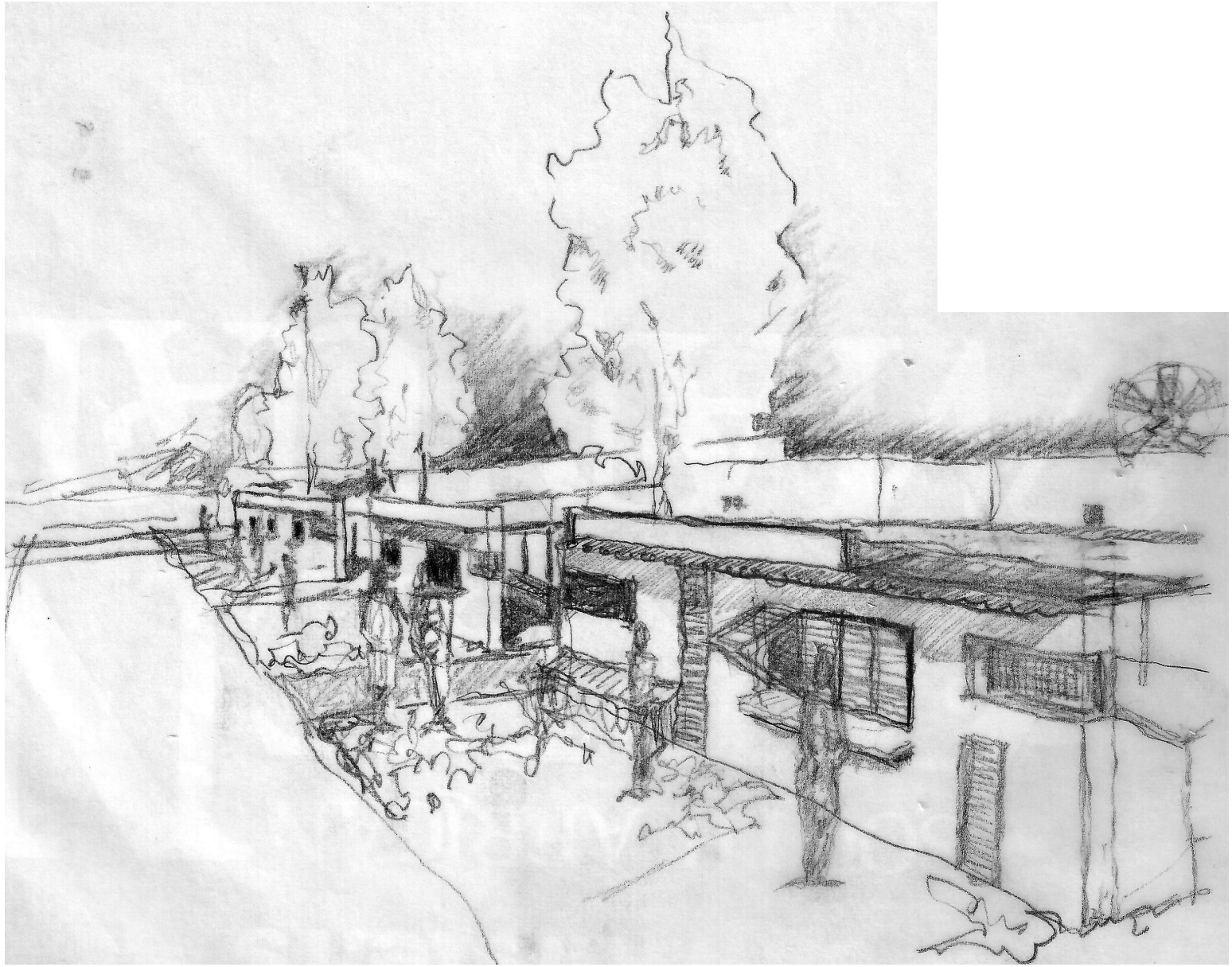
10.6.1. Placement on site

The commercial area was placed along the main road, because this is the more lively road of the two, Panos street being a dirt road with mostly pedestrians, where the main road (Daniel street) consists of vehicular and pedestrian movement. The main building occupies the corner as the point of hierarchy and orientation; it forms the heart of the centre and features the only corbelled hut on the site. There are also small multi-functional shop areas on the southern side of the building next to the entrance, where the people using the complex will be able to sell products that are made there.

The bakery and hair salon were placed next to the café. It becomes a place where the people in the centre can sit, chat, and have conversations over a small meal. All the members of the community will have use of the hair salon and bakery, but the main considerations for these specific shops was to facilitate the old age home. This becomes a way in which to incorporate the elderly of the town and motivate involvement in the centre's activities.

Upon a site visit to the church square, which is an existing public space in Carnarvon it was observed that the people are neglected, they did not have anywhere to sit and the site was polluted with empty bottles and intoxicated people. This is why the centre's public space is not located in front of the centre, but within the centre itself.

Within this public space, there is a measure of control and the people are exposed to the possibility of a better life. They are exposed to an atmosphere of hope. This space links up with the shop areas, thus the shopkeepers already have a sense of 'ownership' and responsibility for the space.



Informal market, view from street.



Commercial. Not to scale.

10.6.2. Building heights

The buildings on site, integrate with the town, responding to the heights of the existing buildings. The main building though is slightly higher than the old manse, the highest building around the site, becoming the point of hierarchy and orientation.



view from site to Panos street.



Parsonage



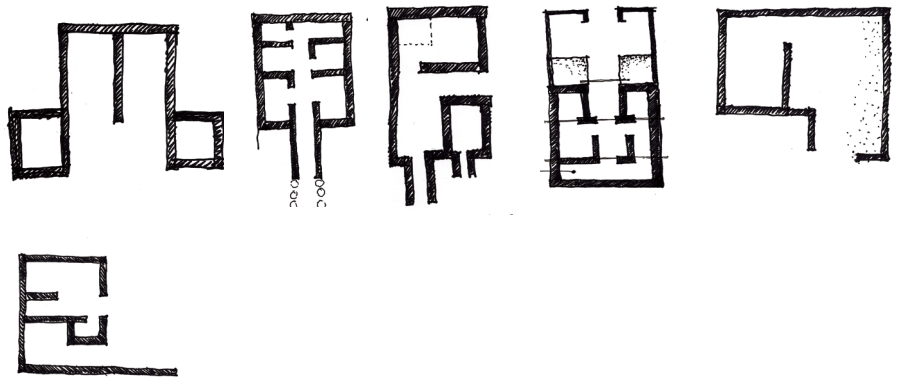
Old home.



Old manse

10.6.3. Plan form

The plan form was informed by the social spatial analysis (x). The buildings resemble the simple spatial layout of typical Karoo vernacular architecture. The difference being that the buildings are multi-functional and that the interior spaces can be used for various different functions. The commercial area and the main building will be among the buildings that are built first, as the project will commence in phases, as funding is made possible. During an interim period, the main building's shopping area can be converted into classrooms if necessary and the offices and boardroom can be used for crafts.



Architecture of Participation

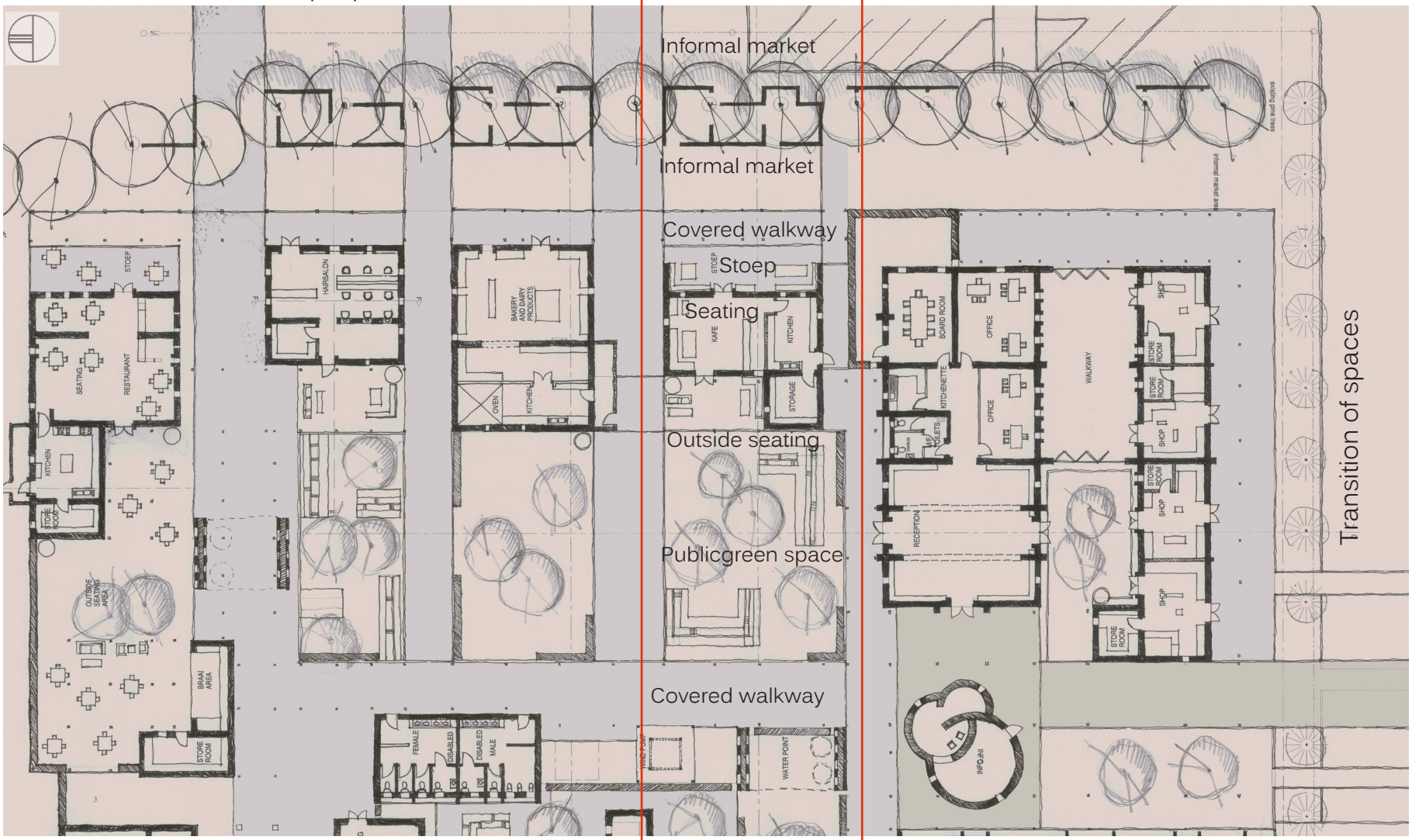
10.6.4. Vegetation

Pepper trees, Mesquite, Fig trees.

10.6.5. Public/private

There is a transition of spaces based on the public/ private transitions of space found within the Karoo. The street forms the first threshold that is met by the informal market area, filters and slows the passerby down, inviting him/her into the centre. The informal market area opens up both to the street and the formal shop areas. The formal shops and informal market area together form rows of shops on both sides. The veranda announces the transition from street into the formal market area. From inside the shop areas there is movement to a more private outside area announced by the veranda and floor finish. This area overlooks the public park area that is interrupted by another walkway and veranda that separates the commercial from the educational area.

Simple plan forms.

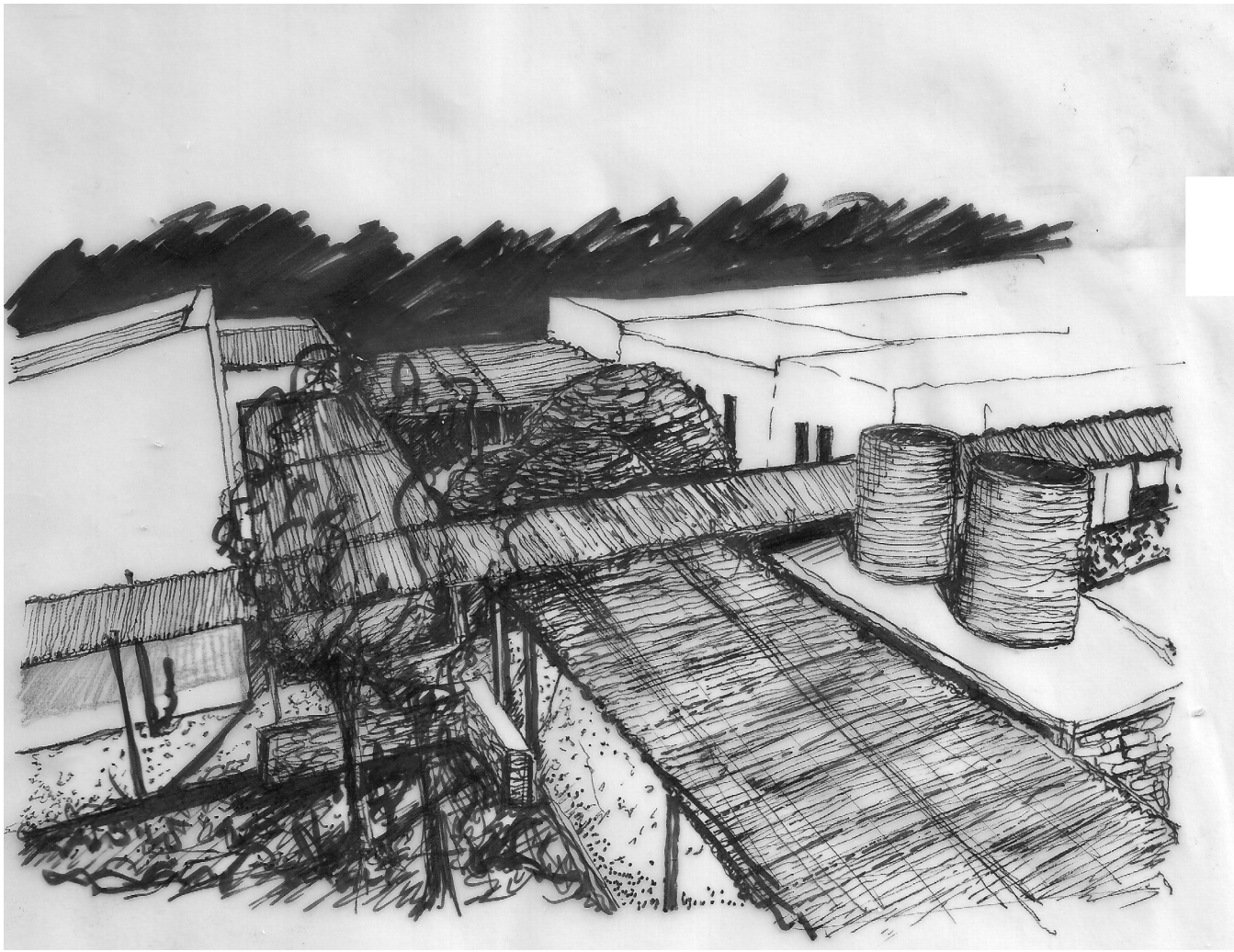


Plan form

10.7. Education

10.7.1. Placement on site

The education area consists of classrooms with a courtyard, for adult learning, a small laboratory area that functions as a school laboratory, not a formal laboratory. The laboratory will be used for testing and documenting the growth of the vegetable gardens and informal soil testing can be done there. The laboratory connects to a larger courtyard space that is used for growing vegetables, fruits and herbs. At the northern end, the workshop is located, far from the classrooms, for noise considerations, also with a small courtyard space with a workbench for outside working. The classrooms are situated across from the existing kindergarten, which initiates the education section of the centre.





Education. Not to scale.

10.7.2. Building heights

The buildings once again correlate to the building heights surrounding the centre. The buildings that line Panos street are higher and the buildings on site respond to the increase in height, though not quite as high to still take human scale and practicality into account..



view from site to Panos street.



Restaurant



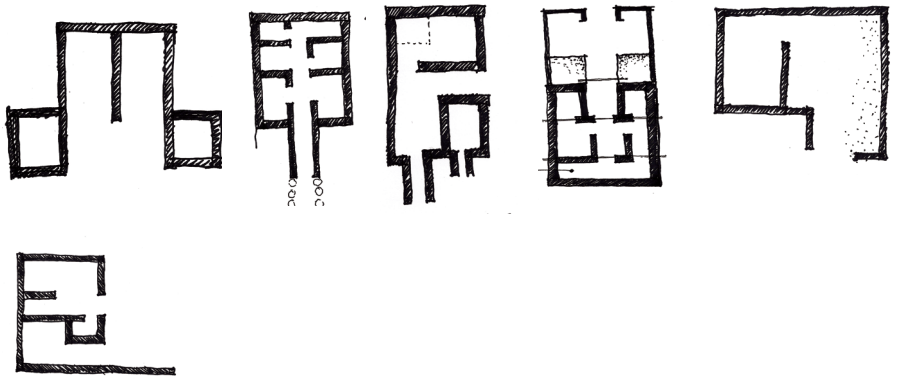
Old manse



Parsonage

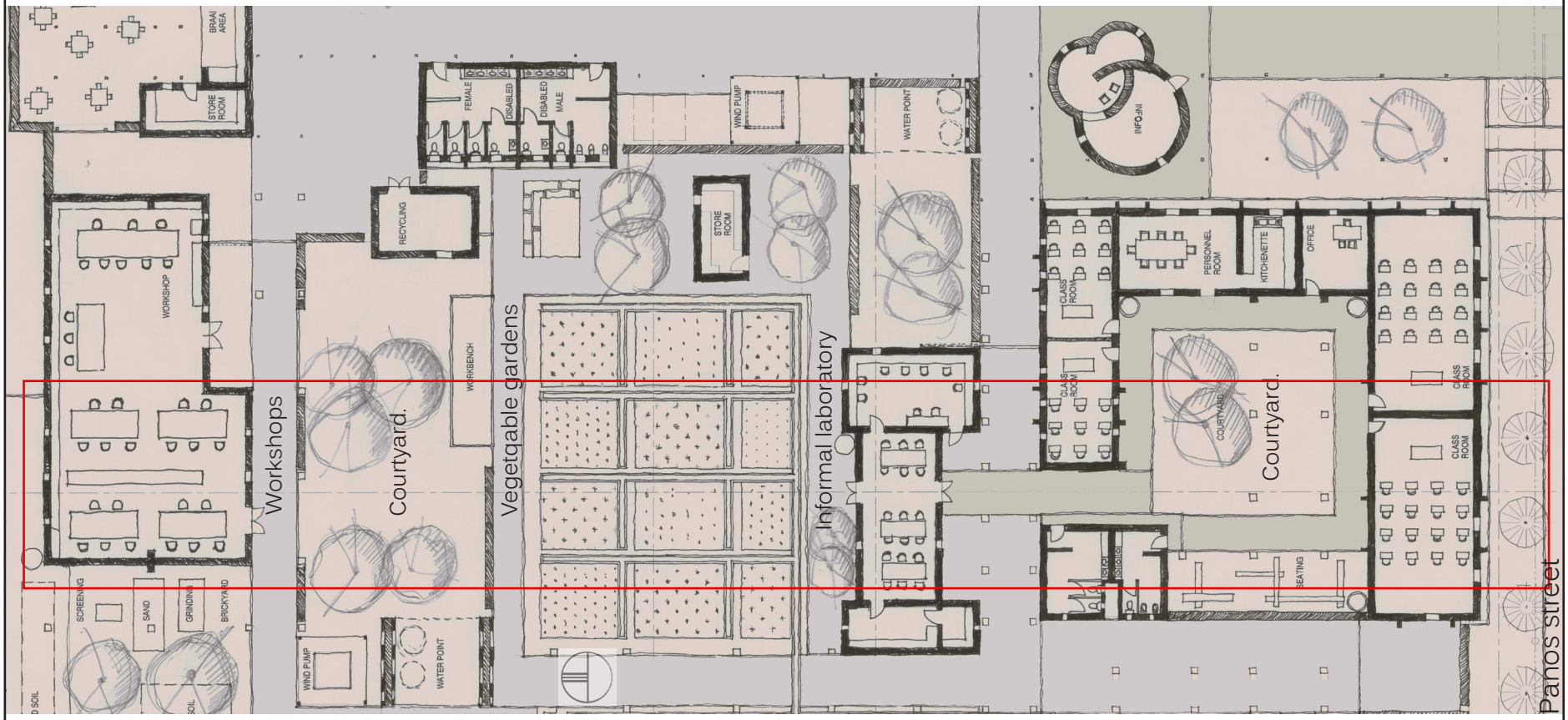
10.7.3. Plan form

The plan form was again informed by the social spatial analyses that resemble the typical Karoo vernacular architecture (x). The school building and the laboratory will be built in the last phase; the buildings are also designed to be multifunctional. The multi-functionality of the centre will prolong its use in the long term, as it is difficult to predict how a building's functions will change to adapt to the future needs of the community.



10.7.4. Public /private

There is a transition of spaces based on the public/ private transitions of space found within the Karoo. Each courtyard space is defined, and the veranda creates a transitional space from the education area to the production area with a vegetable garden forming a boundary. The education building, however has its own private courtyard and seating area, for more privacy and to minimize noise during classes. The production and the education areas are more integrated as they work in close contact with one another.



Transition of spaces

Plan form. Not to scale.

10.7.5. Vegetation

Permaculture will be cultivated in the courtyards. Permaculture (permanent culture) is a process of development where all the different parts work together for the betterment of the whole. Permaculture seeks the natural solution rather than making use of chemical products and high technology. The process is natural and makes use of the resources available. For example, the restaurant has organic waste; the waste is taken to recycling to be used for compost in the vegetable gardens, creating efficient methods of production that are in balance with nature.



Tumble weed: Medicinal value and used as cooking screens.

10.2. Tumble weed (Roberts, 1990: 23)



Pomogranate: edible

10.3. Pomegranate (Roberts, 1990: 22)



Prickly pear: edible fruit, natural barrier 10.4. Prickly pear (Roberts, 1990: 29)

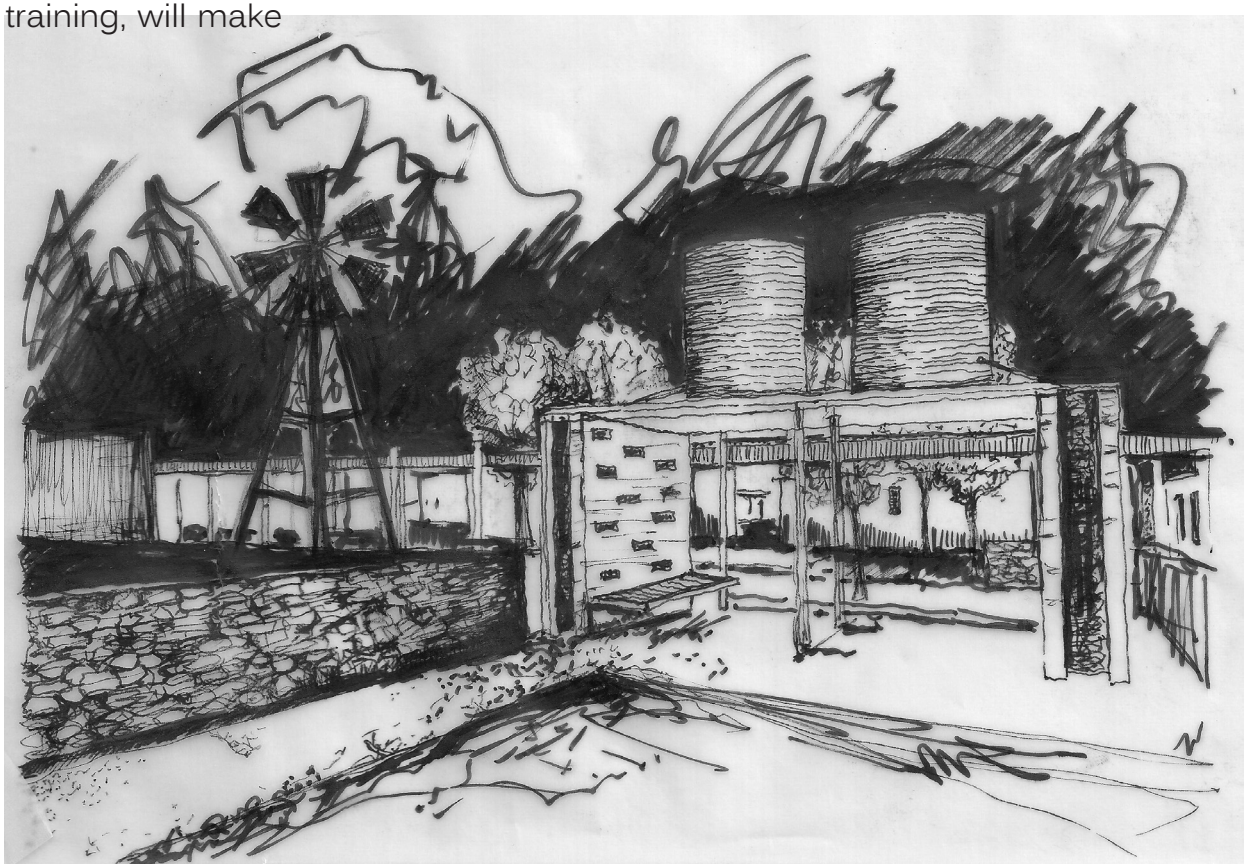


Vegetation on site.

10.8. Production

9.8.1. Placement on site

The production building will serve as the place where vegetables, fruit and herbs are washed, sorted, weighed and packaged. The production building is located next to the vegetable gardens, as these two function together. The brickyard is located at the back of the centre, if there is a need for expansion. It is also located next to the new town block that is allocated for housing. The brickyard will function as the place where the community, after training, will make bricks to build their homes.

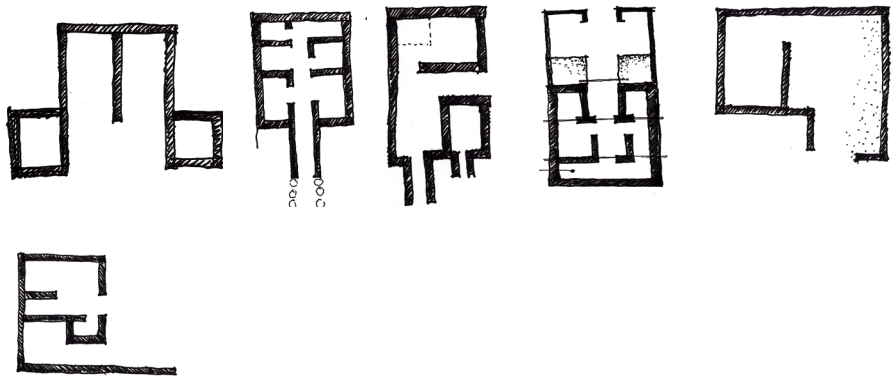




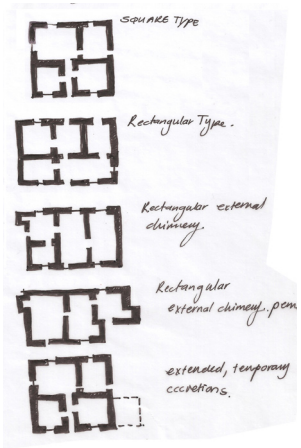
Prodution. Not to scale.

10.8.2. Plan form

The plan form was informed by the social spatial analysis (x). The buildings resemble the simple spatial layout of typical Karoo vernacular architecture. The buildings are multi-functional and can be used for other functions as the needs of the community develop. Therefore future development can happen easily.



Typical Karoo plans



Typical Karoo plans

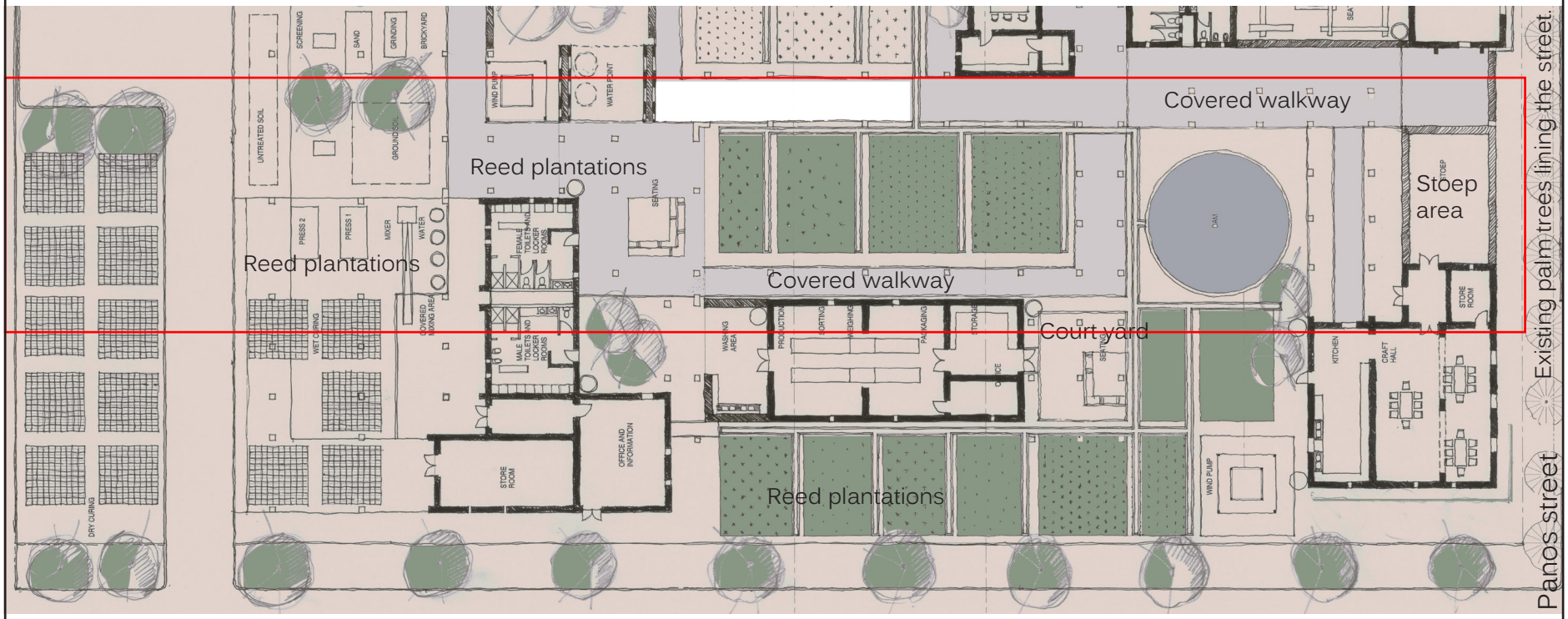
10.8.3. Vegetation

Vegetable and fruit garden swith reed plantations on the western facade.



10.8.4. Public /private

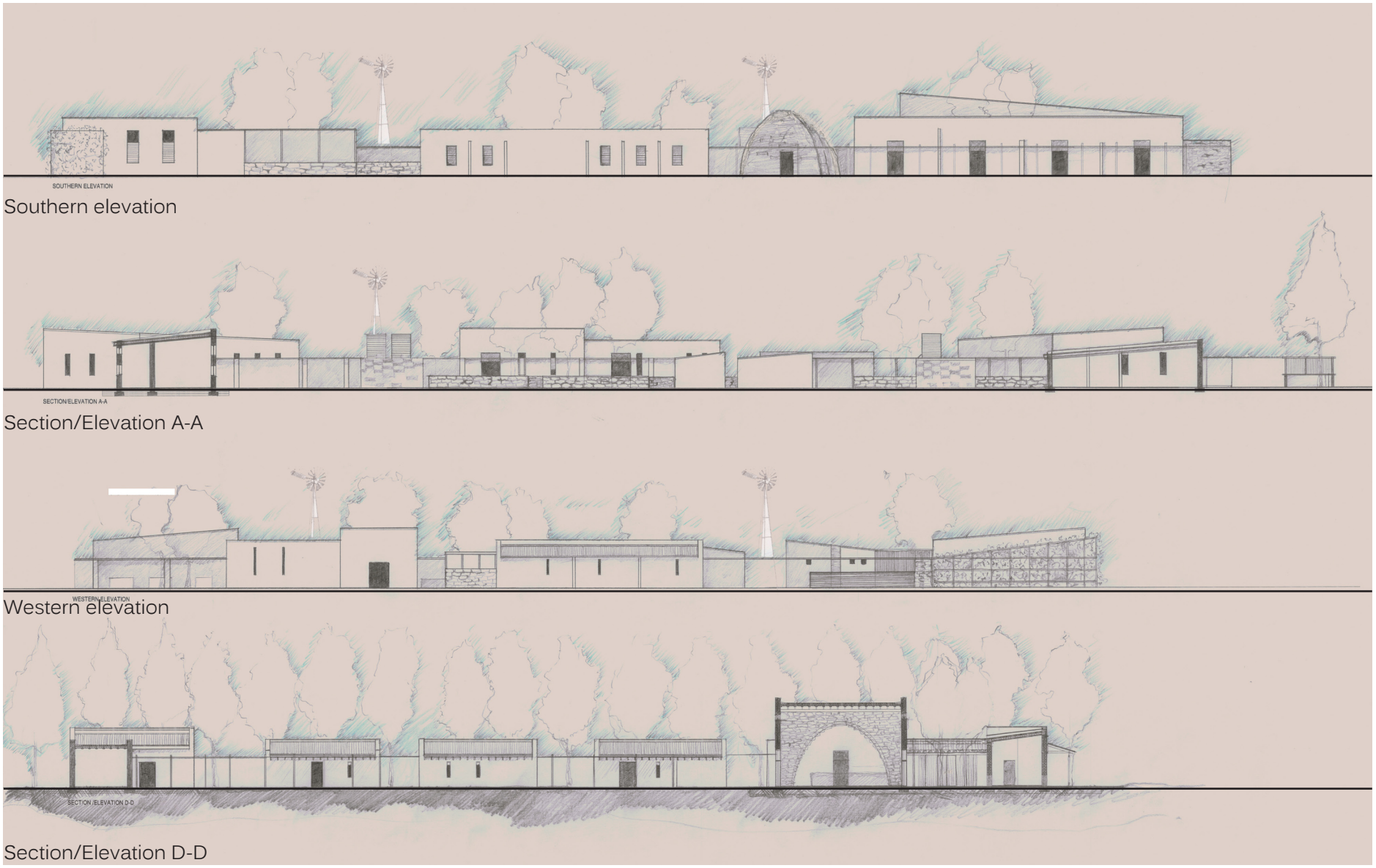
The sunscreens on the western facade create a softer transition so the street, creating a natural boundary that considers human scale. The craft hall has a stoep area, connecting it with Panos street. The woman sitting on the stoep will interact with the passersby that will stimulate interest in the centre and participation, embracing the wonderfully social nature of the people in the town.



Prodution. Not to scale.



Plan. Not to scale.

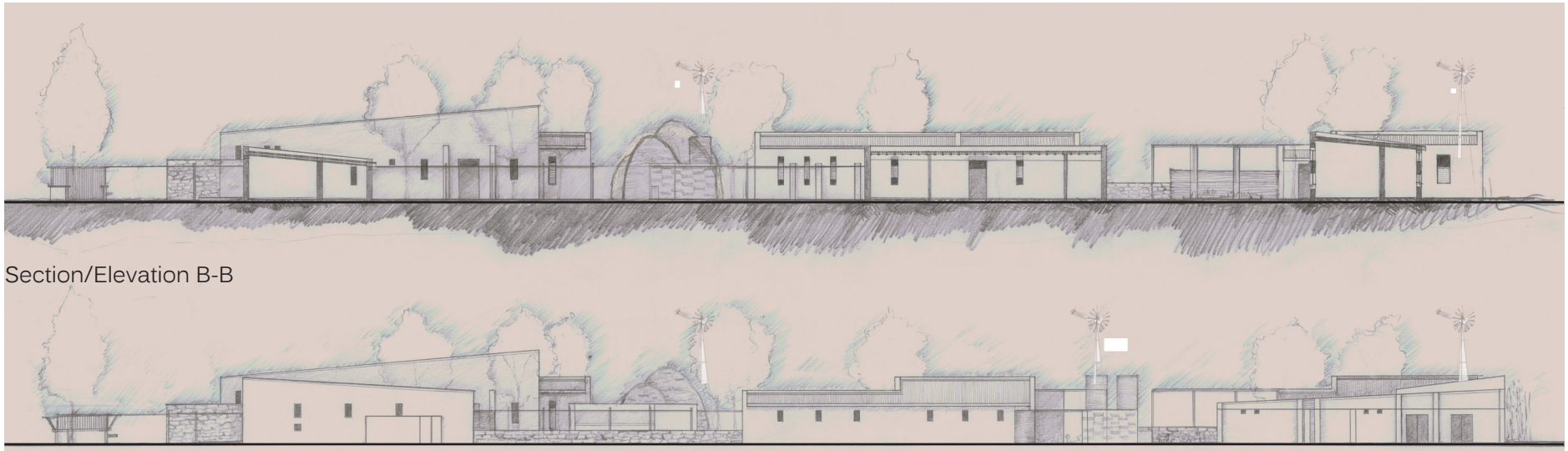


Southern elevation

Section/Elevation A-A

Western elevation

Section/Elevation D-D

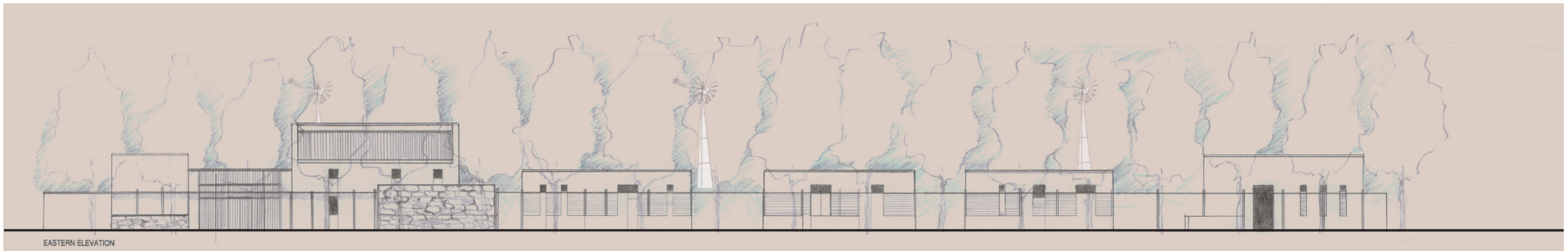


Section/Elevation B-B

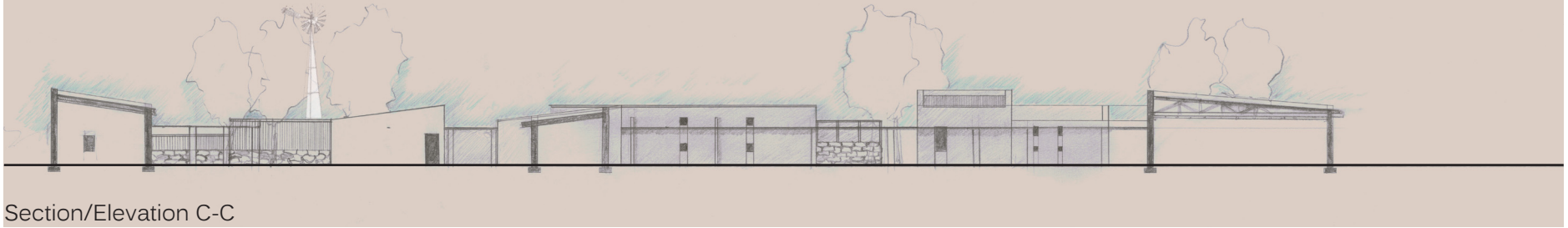
Northern elevation

10.9. Conclusion

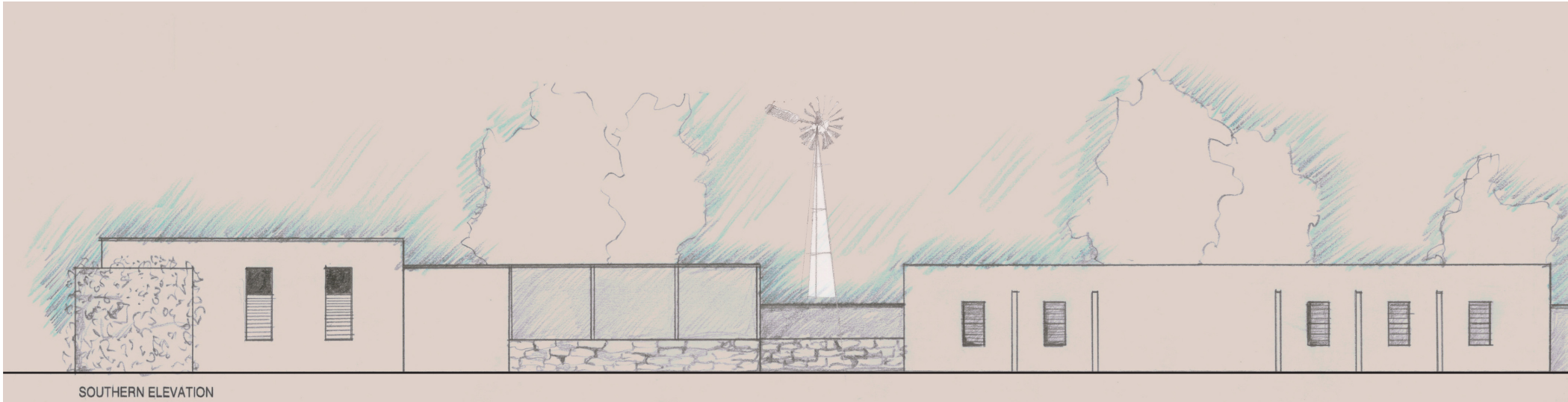
The centre is integrated into the existing town fabric, by making use of the social, spatial analysis, following the massing of existing town block layouts, responding to the surrounding buildings. It considers the practical climatic restrictions, incorporating the existing typologies found in the area to create a centre with which the community can identify and that can contribute to the meaning the town holds for the community.



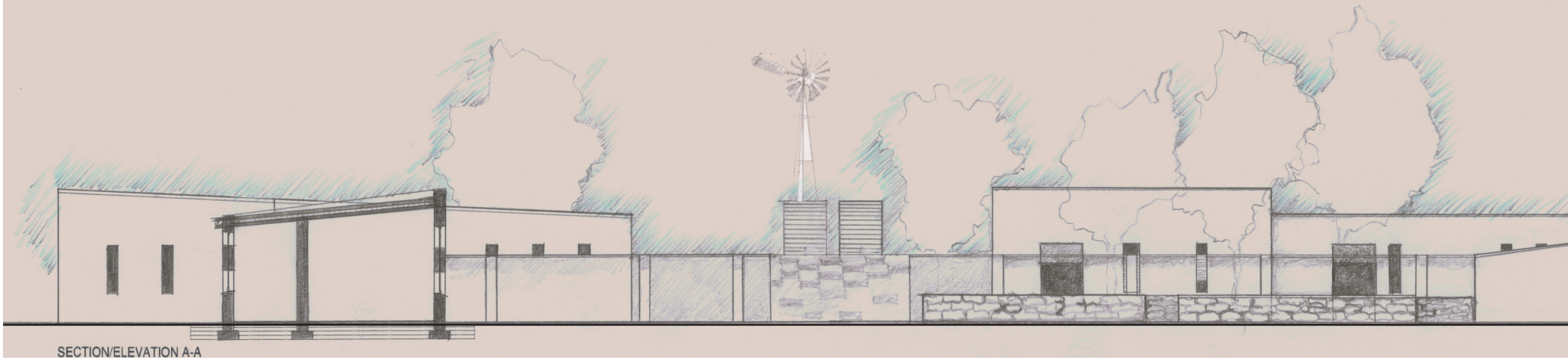
Eastern Elevation



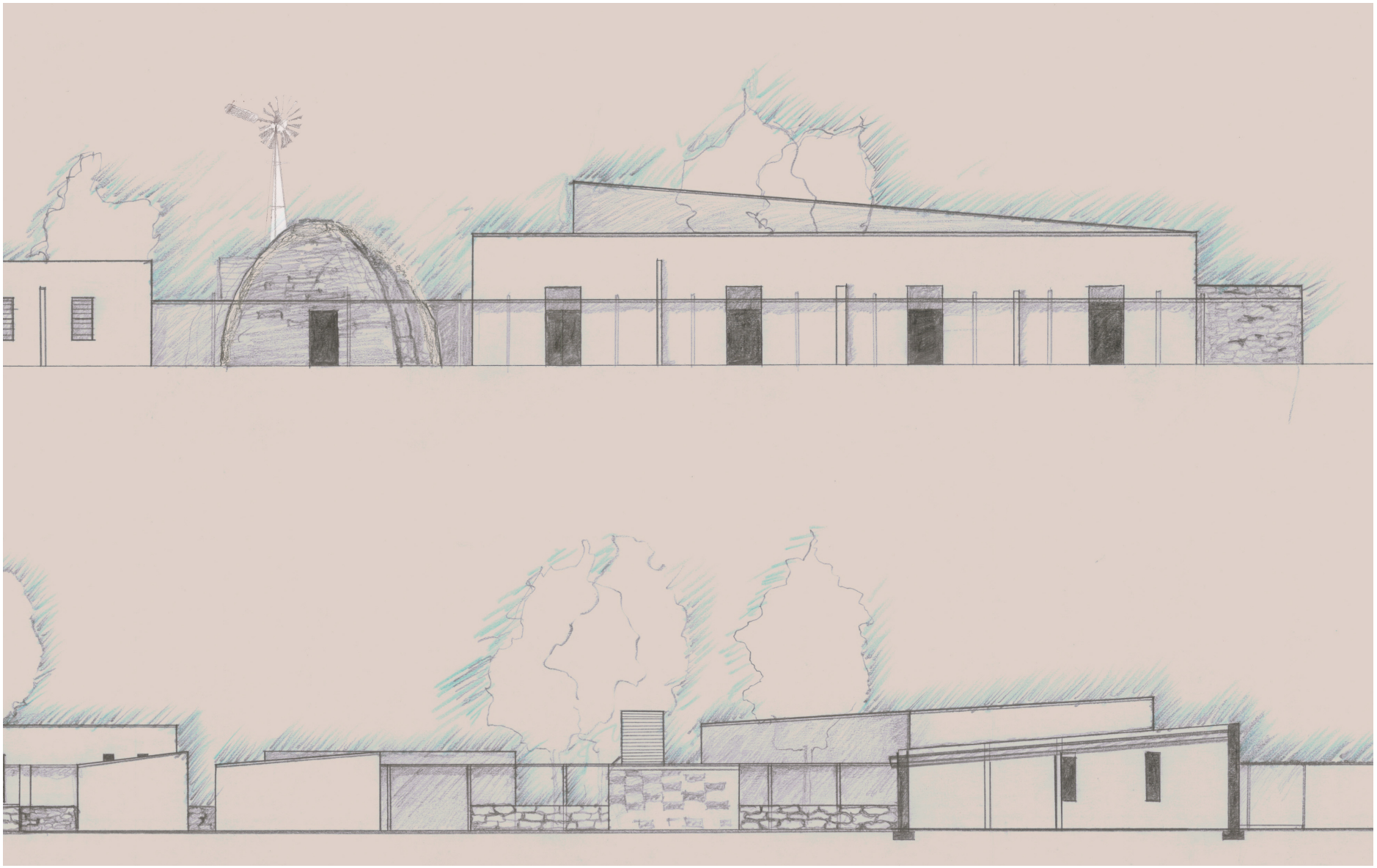
Section/Elevation C-C

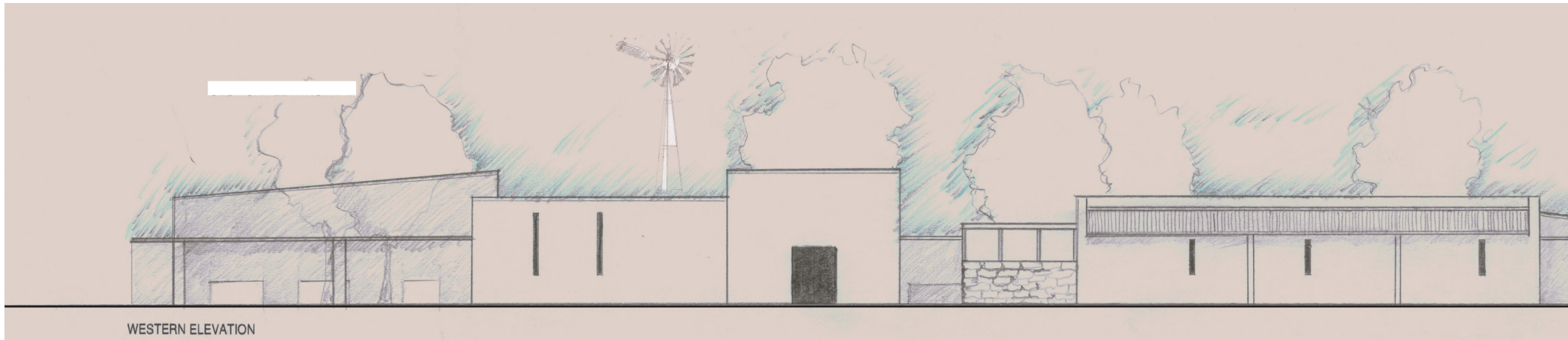


Southern elevation

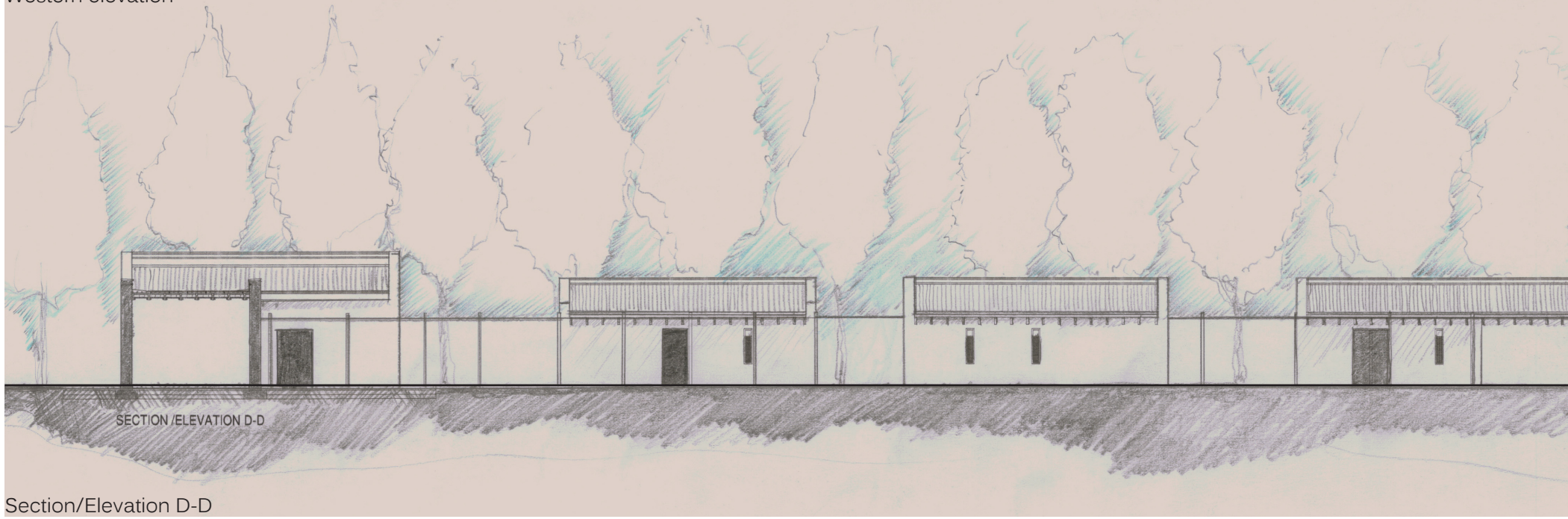


Section/Elevation A-A

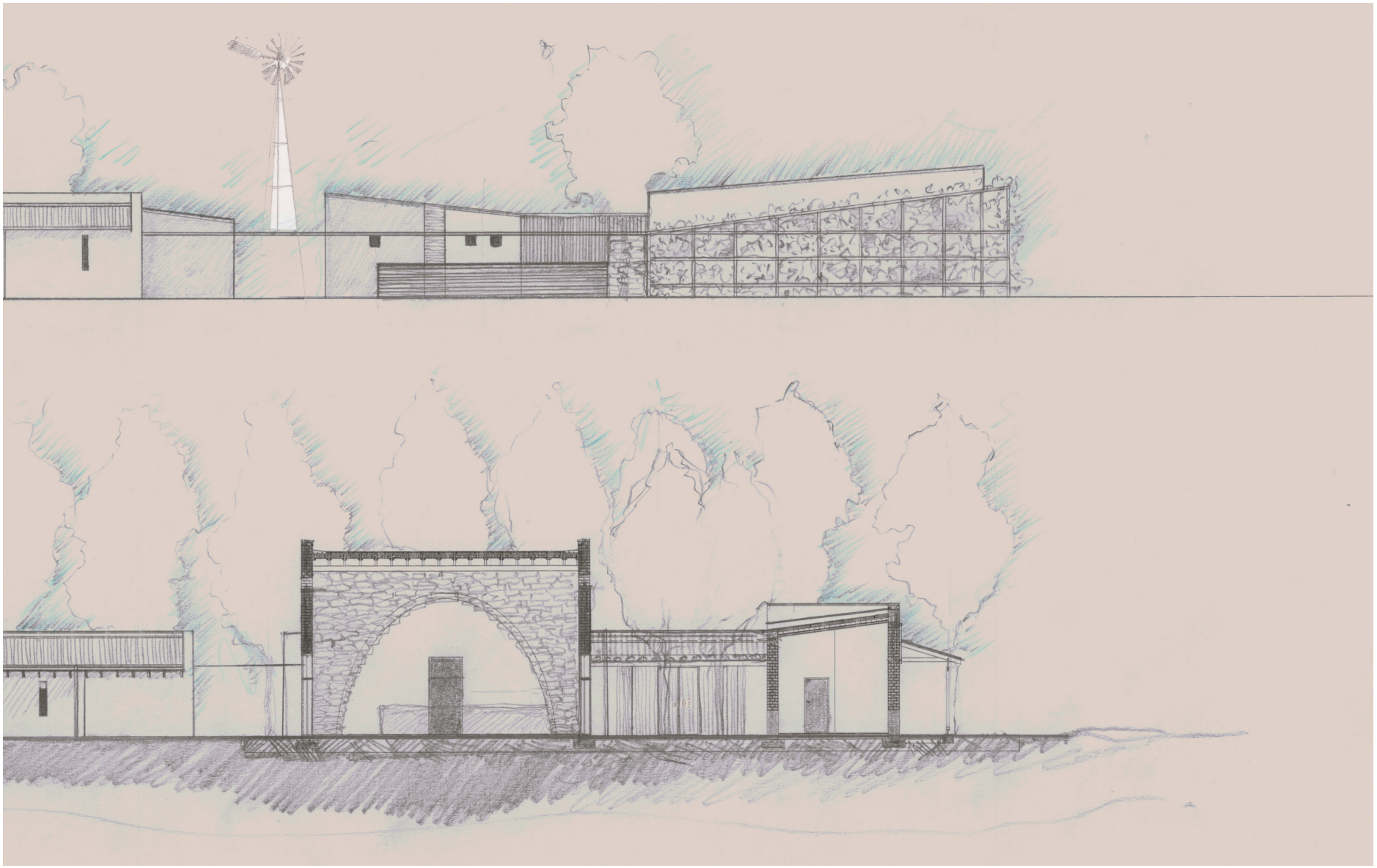


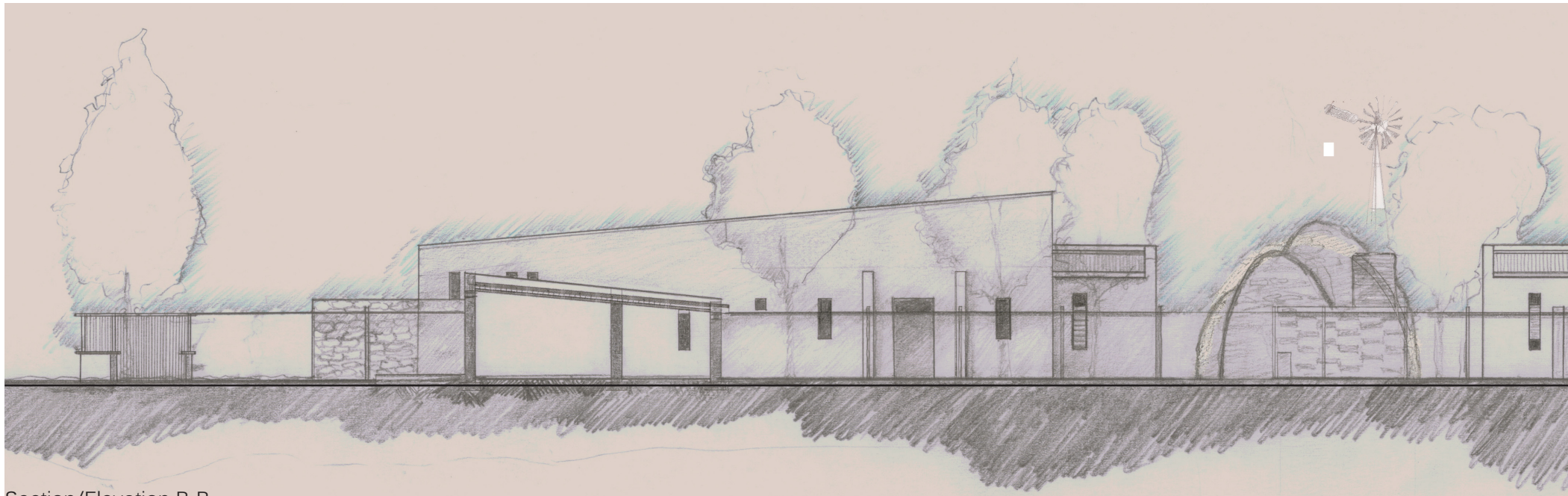


Western elevation



Section/Elevation D-D





Section/Elevation B-B



Northern elevation