



# **Exploring city spaces:**

**An exploration into mapping  
practices and rule based  
design.**

**Paper submitted in partial fulfilment of Masters in Architecture  
(Prof)**

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20 October 2010**

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# Abstract:

This paper has been written in 3 sections. With some adjustments, the first section is largely the theory paper, the second my technology paper, and the third an exploration of my design. These three sections have been written as disparate parts. Ideas and themes are carried through the three papers, but they do not read as a coherent whole.

This year has been a journey into the city of Cape Town; an exploration of its complexity, vibrant city - spaces and everyday life. This is essentially what this paper is about, and is a theme that is explored in all three sections in different ways- with the third drawing and building on the first two.

I started with ideas of Lefebvre and the work of CHORA as a methodology for exploring the 'everyday practices' in the city – and moved through this to an engagement with rule based design and algorithmic architecture. The design chapter loops back to the beginning of the paper, and draws from and is informed by both the initial research, and rule- based methodology.

All three of these sections have been exploratory processes engaging with this set of ideas around complexity within the city. I do not see them as providing an answer as to how to design or explore cities, but rather as an attempt to engage with these very real questions.

They are a series of ideas that have enabled me to see parts of the 'hidden world' within Cape Town, and explore this through ideas of the unknown and unimaginable in architecture.

# Part I

# Glossary:

**CHORA:** An architectural/ Urban research organisation based in London and Amsterdam whose work forms a basis for much of this project.

**Everyday life:** As used by the theorist Henri Lefebvre, this term refers to cyclical and linear patterns of activity and practices that happen within cities. These are activities are considered to contain the potential to subvert dominant readings of the city, containing more complex readings of space.

**Mapping:** Used mainly in its revisionist sense – mapping is considered as the practice which creates the territories drawn. As such it is a potentially useful tool in the creation of difference.

**Ordinary:** Used in reference to Jennifer Robinson's idea of 'Ordinary cities' which counteracts the idea of first and third world cities, proposing instead that all cities should be read for their own potential.

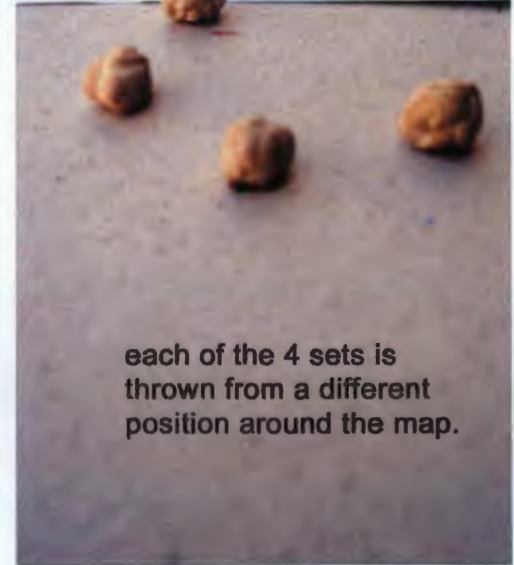
**Rhythm analysis:** An analysis based on the idea that through understanding rhythms of life which are both cyclic and linear, we can understand the 'everyday'.





tourist map of cape town  
jar of beans

28 beans  
(4 x 7)



16

17



27

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1



2



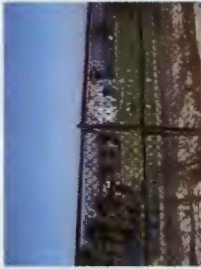
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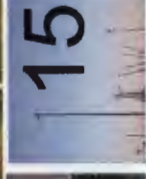
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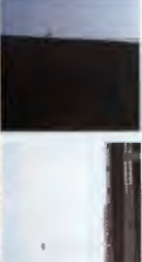
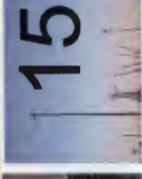
12



13



15



1

(e) Old unwanted furniture sold, second hand  
 (o) Furniture changes hands to second hand shop owner, a new life for the product.  
 (t) The furniture is transformed from being discarded to valuable – becomes street furniture for informal settlers and passing people in its transitory state.  
 (m) It is sold on the sidewalks by locals and foreign African traders, amidst food stalls, Nollywood films, and Congolese music possibly to be put into a newly acquired house.

Actors: old furniture owners, new buyers, shopkeepers, informal settlers.

Other links: **property trade, second hand furniture, migration** (other parts of Africa/ cape town), **informal settlers/ right to the city.**

2

(e) Leaves Indonesian factories built on old rice paddies with cheap labour and hardwoods.  
 (o) Imported into South Africa, brought by Indofurn.  
 (t) Stored in a warehouse in Woodstock, between being bought and being sold/ Transitory state; the street becomes a leisure space for workers during lunch hour, a canteen.  
 (m) Furniture sold from a shop in Century city to the wealthy in cape town; Workers commute between factories in Woodstock and homes in the peripheries mostly.

Actors: Indofurn buyers, Woodstock storage keepers, shoppers in century city; other factory workers.

Other links: upper market furniture shops amongst **second hand shops, property trade.**

3

(e) Fabric produced elsewhere arrives at the fabric shops; African sewing machines for sale.  
 (o) Fabric sold by the shops to create something new, a new garment. Sewn in the factories around creating clothing; Shoes imported from Italy- people's shoes (supergas);  
 (t) Transformed from fabric to clothing; workers inhabit the city during the day – rhythmic change from inhabited to empty at night; workers as creators become buyers in the evening; street becomes leisure space during lunch, commuting space in the evening.  
 (m) Creations sold commercially as clothing elsewhere; workers migrate between Woodstock and the cape flats/ peripheries.

Actors: sellers of fabric, textile factory workers, buyers of fabric, commercial buyers of garments, sewing machine buyers/ sellers.

Other links: **migration** – here and elsewhere, city – cape flats, **quiet streets at night.**

4

(e) Neglected shops dating from a time of 5 digit phone numbers; houses being sold through agents.  
 (o) Houses fall under dispute; houses sold and bought from agents in this street; German language signs.  
 (t) Change from family business to prime property as property prices rise; Change from inhabitant to visitor of your home through selling - a change of hands.  
 (m) Moving out of the city; moving houses; moving countries, migrants from Germany come to kloof street to live?

Actors: house buyers, house sellers, agents, German migrants.

Other links: **migration, germany** – south Africa – germany?

5

(e) mountain scape removed, becomes houses, sports grounds, and pedestrian paths; residential ' quarry' street; old german missionary land.  
 (o) new houses and a new path/ pedestrian street;  
 (t) workers inhabit the mountain in the day, return to periphery of the city in the evening; site of work becomes site of recreation in the afternoon, living in the evening.  
 (m) Workers heading home on foot to get to public transport, move through the city. School children walk up from the school below for afternoon sports.

Actors: construction workers, domestic workers, Kloof street inhabitants, German migrants, school children.

Links: **migration** from outside south Africa, **commuting** of workers within the city, **germany, mountain as leisure space/recreation.**

6+7

(e) Tenement housing on the mountain; old cottages for slaves on the outskirts of the city, being sold as property prices rise.  
 (o) Houses bought by wealthy home owners, foreign tourists and migrants.  
 (t) old 'low cost' housing becomes sought after, estate agents advertise to german tourists (german language signs)  
 (m) Walking home from work in the city changes to commuting into the city.

Actors: home renters, estate agents, foreign tourists, foreign residents (german)

Links: **migration** from outside South Africa, **commuting** within cape town, **property trade.**

8

(e) empty space of the mountain  
 (o) Long summer evenings with good weather, walking distance to the mountain.  
 (t) children walk up to the edges of the city after school, use the mountain as a park (no reserve signs) - swings strung from trees; tourists visit the noon gun cafe  
 (m) movement of children and people up and down the mountain on foot;

Actors: school children, tourists

Links: **mountain as leisure space;** tourists space.

9+10

(e) Outskirts of the city, empty land beyond the city limit becomes burial ground for muslim saints/ political prisoners  
 (o) present: change from outskirts to profitable and desirable land close to the city centre.  
 (t) becomes sacred sites where identity/ right to the city is asserted; informal housing develops on the mountain.  
 (m) tourists visit slave burial/ muslim burial grounds, pilgrims visit shrines; attempt at living and working in the city, as opposed to commuting.

Actors: market, community bodies, informal settlers.

Links: **Informal settling, migration** from outside cape town/ south Africa (Africa); **mountain as contested space;** right to the city.

11

(e) Mountain as empty land, site of freedom, escape from the city.  
 (o) Drive to the mountain to hike/ walk your dog; change from provincial reserve to national reserve - paths created, cleared, cared for and signs erected to ensure safety of walkers by contract workers.  
 (t) Becomes a site of leisure, escape from the city; mountain as a site of work during working hours; mountain as a site of exclusive volunteer work.  
 (m) Return home to the suburbs; return to cape flats/ peripheries of the city in the evenings.

Actors: leisure walkers on the mountain; contract workers

Links: **mountain and elsewhere** – peripheries of the city linked to the centre (**commuting**); mountain as **leisure space;** **mountain as contested ground**

12 + 13

(e) Old stadium demolished, and part of the metropolitan golf course.  
 (o) new stadium being built  
 (t) Change from exclusive sport to 'peoples sport' for the world cup; surrounded by barbed wire and high security for public space.  
 (m) Weekdays a working space, not leisure space. Mass migration to South Africa for the world cup, fans will pass through.

Actors: fans, workers, managers of golf course, managers of stadium.

Link: **leisure space vs. working space.**

14

(e) Old customs house forecourt no longer needed.  
 (o) new government, home affairs used to be inside – a different type of customs (human)  
 (t) deserted at night, crowds of immigrants and refugees in the day applying for papers; informal markets set up to provide food; skate boarders on weekends.  
 (m) home affairs moved to Maitland, deserted at night, car park in the day; might be demolished – cticc: next door might take over.

Actors: immigrants from outside South Africa, home affairs, informal traders, skateboarders.

Link: **Migration** (from outside south Africa), point of entry/ gateway.

15

(e) cape town docks  
 (o) receive goods  
 (t) continuous change of goods that arrive and leave the port  
 (m) Migration of goods that arrive from somewhere and leave for elsewhere; workers who arrive and leave in shifts working throughout the night.

Links: **migration** of goods, **commuting** people.



## game board

Using the first derive and bean sites located on the tourist map, i created an initial game board. The bean sites were used to determine the grid points which abstracted the map and sites into a 'interpreted' series of possibilities in the form of the perspex 'game - board'.

The thread indicates all the sites that 'exist within' bean site no.1 This could be repeated for the others, and adapted to changing situations - representing a condition in the city.



specific



people



texture



plots



mountain

informal housing,  
 second hand furniture trade  
 foreign owners (refugees)  
 high end designer furniture  
 indofurn - furniture imported  
 sidewalk as public space - factory workers  
 sitting under a tree  
 health clinic, mechanic  
 park and a bit of empty city land  
 old terraced housing  
 new modernist blocks  
 empty park, sparkling pool  
 children walking home



African sewing machine company,  
 textile company above,  
 fabric shops opposite.  
 Supergas: people's shoes of Italy.  
 renovating old buildings,  
 modernist blocks.  
 parking and leftover spaces  
 under the highway.  
 resting space under the highway.  
 parking next to the railway lines,  
 looking to the city centre.  
 slick designer shops,  
 second hand car shop,  
 terraced housing beyond.  
 goodhope centre,  
 old plaza, new flats for living.



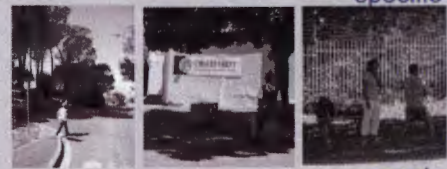
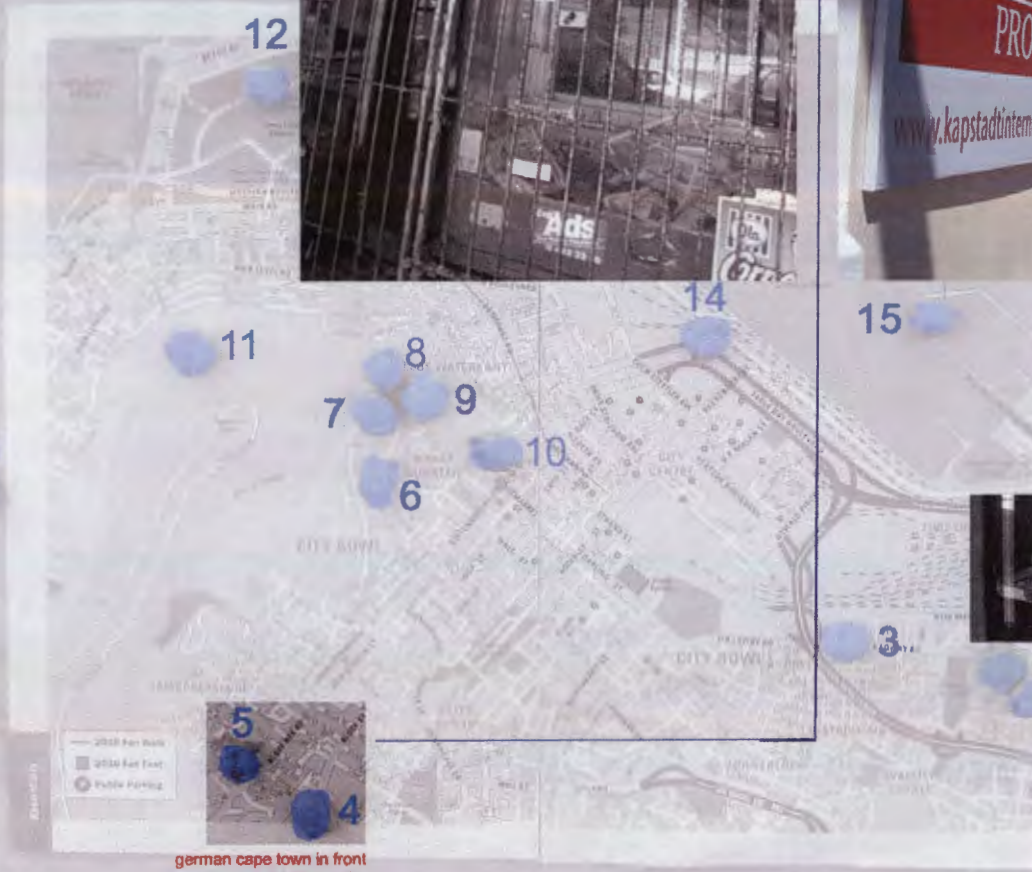
specific

people

texture

plots

mountain



specific

people



texture



plots



mountain

german cape town in front of the mountain.  
 real estate selling glittering houses.  
 deserted old (Bawa) shop:  
 leftover korean nailclippers,  
 henna haircolour, 5 digit phone number,  
 german books.  
 tai chi in a park,  
 benches under a tree  
 jan van riebeeck high school, german school.  
 quarry in the city.

27

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11



11  
 arab hotel  
 colourful houses, tourist ready,  
 decaying walls, foreign real estate,  
 tenement housing - freedom court.  
 stairs up the mountain - sitting space.  
 tourists walking  
 larger houses, neon gun cafe.  
 mountain as a park,  
 panorama of the city below.  
 tana baru, sacred grave, slave history,  
 above informal settlement  
 cobbled streets, people sitting on stoeps,  
 mosques and corner shops.

14



specific



people



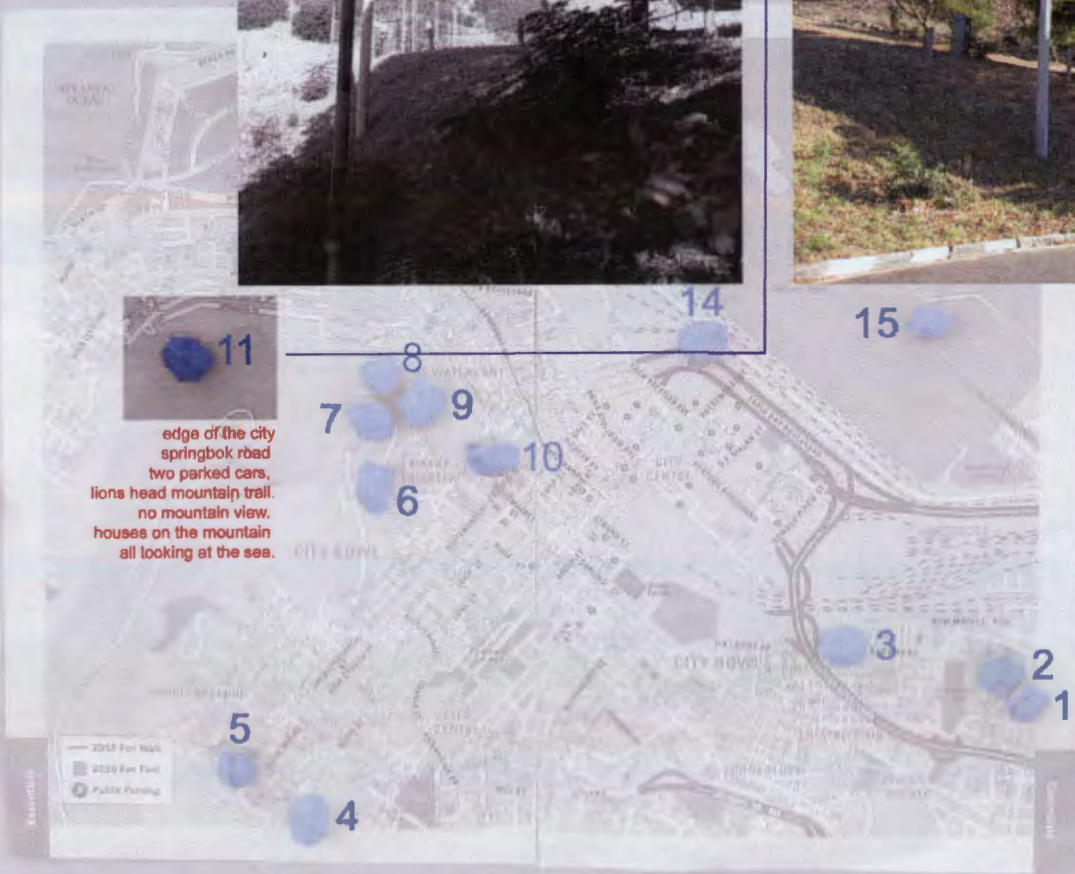
texture



plots



mountain



specific



people



texture



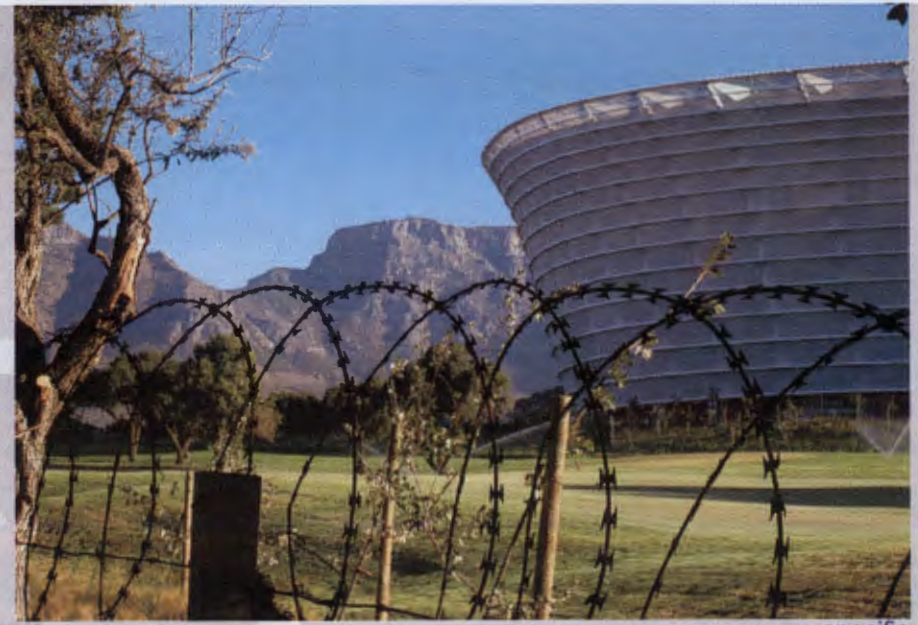
plots



mountain



brand new (public?) stadium  
 sprinkled green golf course -  
 bounded by drymass.  
 barbed wire, security cameras, security.  
 The sea- small wafts through.  
 a few remaining cottages amongst the line  
 of apartment blocks.



specific



people



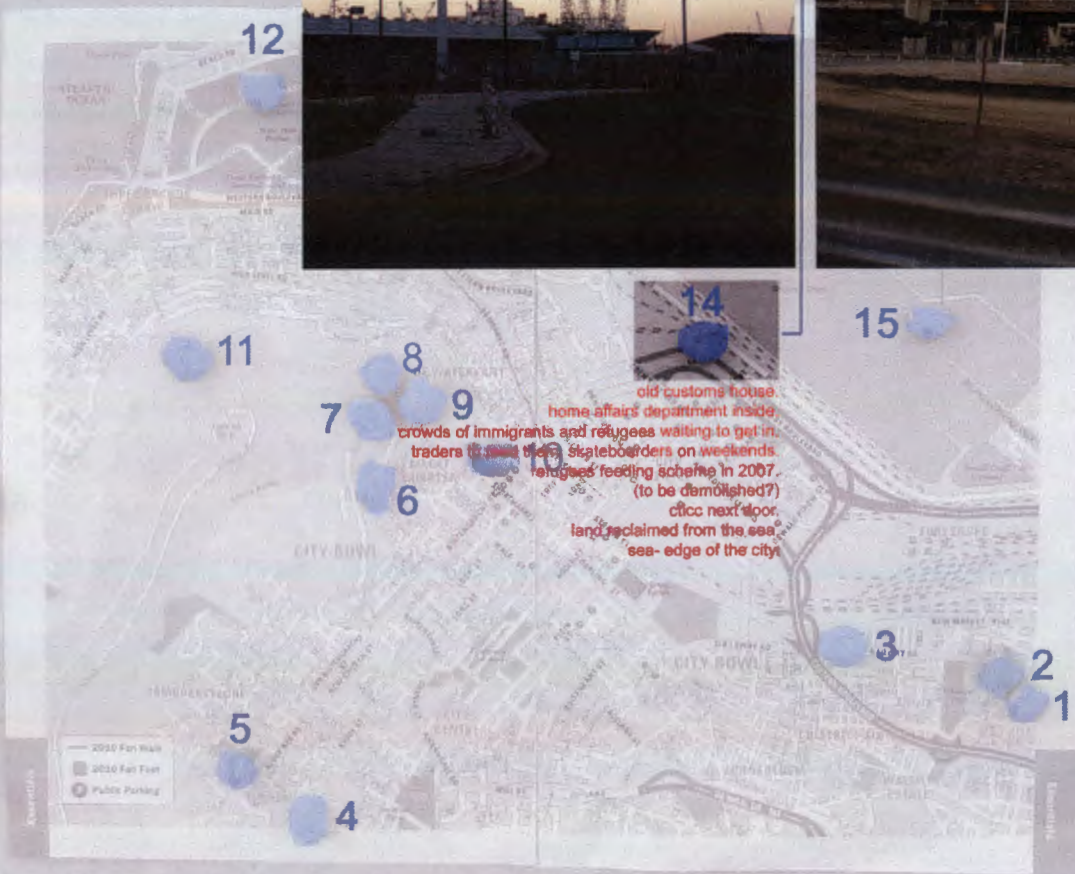
texture



plots



mountain



old customs house  
 home affairs department inside  
 crowds of immigrants and refugees waiting to get in.  
 traders to sell their State borders on weekends.  
 refugees feeding scheme in 2007.  
 (to be demolished?)  
 clinic next door  
 land reclaimed from the sea  
 sea-edge of the city

specific



people



texture



plots



mountain

french  
garrison  
1781



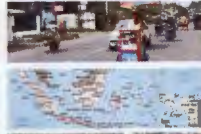
mitchell's plain  
khayelitsha



athlone (castle)



indofurn:  
centurycity,  
indonesia,  
woodstock



mediteranean,  
cameroon



bonteheuvel



florist



trafalgar square



milnerton  
market  
green point  
grand  
parade



vasco da gama



kenyan mosque



drc



cameroon



new brighton  
advert



In other words, a map is a model for,  
rather than a model of, what it  
purports to represent.

Map: Proctor & Kitchin Ltd.  
Publ. Copyright 1988 (1974)

# 'empty' public land



- a trafalgar park
- b cornwall/ gympie str.
- c page/ williams str.
- d Trafalgar House apts. Parking lot
- e Pine road temporary/ informal housing
- f Queens road park
- g old housing/ council land
- 1 sir lowry road/ main road
- 2 sidewalk as seating during lunch hour
- 3 trader at corner, access to train station
- 4 key access to train station
- 5 'pedestrian street' sidewalk living room
- 6 sidewalk backyard/ washing hanging outside
- 7 sidewalk display area/ living room outside
- 8 sidewalk livingroom/ display area

## activities



## furniture second hand materials

- Furniture
1. Indofum
  2. Lifestyle
  3. Namso
  4. Sofas and chairs
  5. Van der Merwe's furniture
  6. Rabia's store
  7. Akili's Store
  8. Nazly's store
  9. Mediterranean Furniture
  10. Other second hand equipment
  11. Mr R/ Bargain Buys
  12. Pink Dalmation
  13. Salvation Army.
  14. Lewis Headquarters

## fabric factories

- Clothing/ Fabric
1. clothing store
  2. clothing factories
  3. Kwaai Lappies
  4. other lappies
  5. Sew Cafe

## eating /drinking

- Eating/drinking:
1. halaal eatery
  2. da Gama fisheries
  3. Mrs. Adams' stall
  4. Dhaka Superette
  5. Cour des grands
  6. Mediterian Supermarket
  7. Mediteranean coffee bar
  8. old man and his table

## educat ional/ services

- Educational:
1. Silvertree Pre primary
  2. Madressah (at mosque)
  3. Dentist

## housing

- Housing:
1. Trafalgar Place apts
  2. Shop houses
  3. Rented/ private houses

- Other:
1. Florist

## by- laws broken



## (m) sleeping

(m) sleep overnight or camp overnight or erect any shelter, unless in an area designated for this purpose by, or with the written consent of the City, provided that this shall not apply to cultural initiation ceremonies or informal settlements.

## 7(a + b) obstructions

### OBJECTS CAUSING AN OBSTRUCTION

7. No person, other than a peace officer or other official or person acting in terms of the law shall—
- deposit, pack, unpack or leave any goods or articles in a public place, or cause any goods or articles to be deposited, packed, unpacked or left in a public place, other than for a reasonable period during the course of the loading, off-loading or removal of such goods or articles; or
  - in any way obstruct the pedestrian traffic on a sidewalk by bringing or allowing to be brought thereon any object or motor vehicle.

## (a)(i) bldg materials

28 September 2007

Province of Western Cape: Provincial Gazette 6469

1353

- without the prior written permission of the City or otherwise than in accordance with any conditions determined by the City when granting such written permission—
  - leave, store, pack or unpack goods or cause or permit goods to be left, stored, packed or unpacked, or accumulate or cause to be accumulated in any public place or balcony or verandah erected beyond the boundary of a public road any building materials, motor vehicle wheels, spare parts of motor vehicles, building, waste materials or scaffolding; or

## 13(a) washing

### PROHIBITION OF CERTAIN ACTIVITIES IN CONNECTION WITH OBJECTS

13. No person shall in a public place—
- including on a balcony or verandah erected beyond the boundary line of a public road, wash, clean or dry any object, including any clothing, except in an area designated by the City for this purpose;

### DRYING OF WASHING ON FENCES ON BOUNDARIES

14. No person shall dry or spread washing, bedding or other items in a public place or on a fence on the boundary of a public road except where conditions in an informal settlement are such that it is not possible to do otherwise.

## (b) cars

- effect any repairs to a motor vehicle or boat, except where necessary for the purpose of removing such motor vehicle from the place where it was involved in an accident or has a breakdown unless it is in a designated taxi rank or unless—
  - the motor vehicle or boat is in a designated taxi rank;
  - the motor vehicle or boat is owned by a person resident on premises immediately adjacent to a public road and such work is carried out by a person so resident, but not where a motor workshop is run for commercial purposes; or

## 16 (a + b) for sale

### CONTROL OF GOODS OFFERED FOR SALE

16. (a) The City may, after consideration and consultation and implementing the necessary enabling licensing system, designate public places, public roads or road intersections where no person shall, display or offer for sale any goods or produce except as may be prescribed by the City, provided this will not apply to the selling of newspapers at intersections or to the sale of goods by non-governmental organizations or developmental organizations which may apply for exemption for all their traders.
- (b) Notwithstanding paragraph (a), the City may issue licenses for the sale of goods and produce and in so doing, the City may limit the number of permits for an area and stipulate such conditions as it may from time to time prescribe.

# (m)sleeping

(m) sleep overnight or camp overnight or erect any shelter, unless in an area designated for this purpose by, or with the written consent of the City, provided that this shall not apply to cultural initiation ceremonies or informal settlements.



# 7(a + b)obstructions

## OBJECTS CAUSING AN OBSTRUCTION

- 7. No person, other than a peace officer or other official or person acting in terms of the law shall—
  - (a) deposit, pack, unstack or leave any goods or articles in a public place, or cause any goods or articles to be deposited, packed, stacked or left in a public place, other than for a reasonable period during the course of the loading, off-loading or removal of such goods or articles; or
  - (b) in any way obstruct the pedestrian traffic on a sidewalk by bringing or allowing to be brought thereon any object or motor vehicle.



# (a)(i)bldg materials

28 September 2007 Province of Western Cape: Provincial Gazette 6469 1333

- (a) without the prior written permission of the City or otherwise than in accordance with any conditions determined by the City when granting such written permission—
  - (i) leave, store, pack or unstack goods or cause or permit goods to be left, stored, packed or unpacked, or accumulate or cause to be accumulated in any public place or balcony or verandah enclosed beyond the boundary of a public road any building materials, motor vehicle wrecks, spare parts of motor vehicles, building, waste materials or scaffolding; or

# 13(a)washing

## PROHIBITION OF CERTAIN ACTIVITIES IN CONNECTION WITH OBJECTS

- 13. No person shall in a public place—
  - (a) including on a balcony or verandah enclosed beyond the boundary line of a public road, wash, clean or dry any object, including any clothing, except in an area designated by the City for that purpose.



## DRYING OF WASHING ON FENCES ON BOUNDARIES

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# (b)cars

- (b) effect any repairs to a motor vehicle or boat, except where necessary for the purpose of removing such motor vehicle from the place where it was involved in an accident or bus a breakdown unless it is in a designated taxi rank or unless—
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# graffitti?



connections across



nazly's family

1. Nazly's store
2. ex - worker in mediteranien furniture
3. Mr. R - father
4. Pink dalmation - sister

cameroon community

1. mediteranean supermarket
2. mediteranean coffee bar
3. mediteranean furniture
4. Silvertree pre primary

fabric +factories

1. clothing factory 1
2. clothing factory 2
3. clothing factory 3
4. kwaai lappies
5. lappie shop (ex worker, buys remainder)
6. proposed sew cafe
7. kwaai lappies storage

congolese community

1. congolese nollywood/ laundry
2. cours des grands - congolese community gathering place
3. silvertree pre - primary

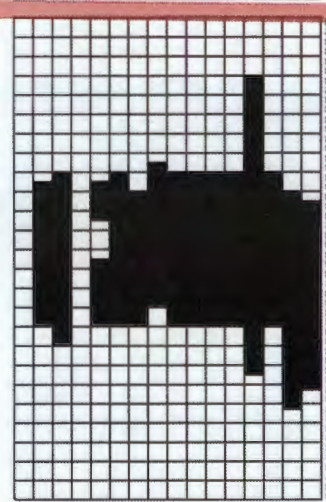
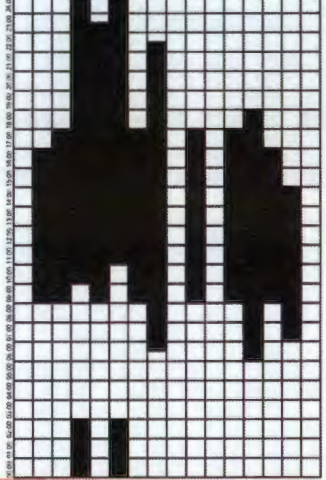
mosque/ madrasah

1. Namso
2. local muslim community(mrs Adams)
3. Dhaka superette (bangladesh)
4. Rabia's children (Kenya)
5. Akili

furniture

1. Indofum
2. Sofa and chairs
3. Second hand furniture shops
4. Lewis Headquarters

lewis furniture headquarters  
 shoe shop  
 mediterranean furniture  
 mediterranean coffee bar  
 mediterranean supermarket  
 cour des grands  
 florist  
 Dhaka's superette  
 empty building for sale  
 da gama fisheries  
 kwaai lappies storage  
 Namsso  
 Mrs. Adams stall  
 lifestyle store  
 other lappies  
 proposed sew cafe



salvation army  
 Pink dalmation  
 Mr. R's bargain buys  
 clothing store (not open)  
 dentist  
 old man and his table  
 appliances/ furniture repairs  
 nazy's furniture  
 akil's furniture/ appliances  
 rabie's furniture  
 van der menwe's furniture  
 sofas and chairs  
 congolese video/laundry  
 clothing store  
 halaal eatery  
 kwaai lappies

time

**a** two shops converted living  
 service lane  
 yard  
 kitchen/converted living unit  
 central space used for storage  
 entrance/store pavement/ outdoor living

**b** front shop/store family living behind  
 yard integral to living space  
 kitchen/converted living

**c** coffee bar  
 yard with additional building  
 kitchen  
 bar  
 bar

**d** cour des grand bar  
 yard with additional building  
 tv area  
 bar  
 seating  
 colonnade

**e** cameronian supermarket  
 yard?  
 kitchen?  
 closed supermarket  
 cellphone stall  
 colonnade

**f** dhaka supermarket  
 yard?  
 kitchen?  
 open supermarket shelves  
 counter  
 counter  
 colonnade

**g** florist  
 yard?  
 kitchen?  
 2 desks + shelving  
 flowers in tins  
 colonnade

**h** office  
 yard?  
 kitchen?  
 plasterboard addition  
 colonnade

### varied spaces



### 'victorian' structures



# using public space



blank wall  
shade from sun  
empty pavement



blank wall  
shade from sun  
step/ledge



blank wall  
overhang/shelter  
chairs and seats



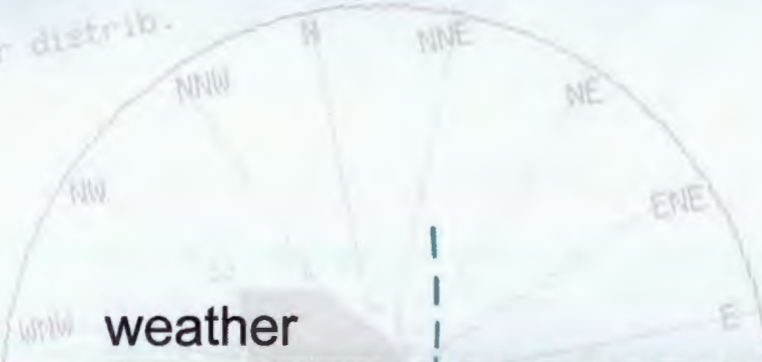
living space above  
balcony onto street  
work below



grass bank/soft surface  
shade from sun



Winddir distrib.



weather



NW winter wind + rain

mountain views

SE summer wind

## SE summer wind

Woodstock is known in Cape Town for its high wind factors.

## NW

The effects of the wind on urban development are severe, especially in the winter periods.

## views

Moutnain views up to devils peak, and from the upper slopes - views over the sea.

## underground water channel:

there is a single underground water channel, in the largely arid area.

## fire risk:

The upper slopes are fire risk areas. This is particularly above the highway.

## crime



### gympie street

The specific crime areas identified are gympie street - although this has been 'cleaned up' recently, it remains a more vulnerable area. The area between Albert and Victoria Road is considered a high crime area.

### french redoubt

The french redoubt was identified in 2006 as a site being used for drug dealing. It has since been fenced in and is no longer accessible. Trafalgar Park remains unsafe, particularly in the evenings.

## history



Zonnebloem  
homestead

Fort Knokke

## historical routes

Although not a specific building or structure main road is one of the earliest routes out of Cape Town - speculation indicating it was an early Khoi pastoral route. The Khoi would have passed through on seasonal migrations to the Liesbeek Valley.

For the first 200 years of the settlement at the Cape, the primary role of the area was as a movement passage and boundary to the city. Main and lower main road follow these same routes.

## heritage buildings

There are no specific heritage buildings which fall within the specific frame of research. One of the most important factors are the routes, and fine grain of the built fabric.

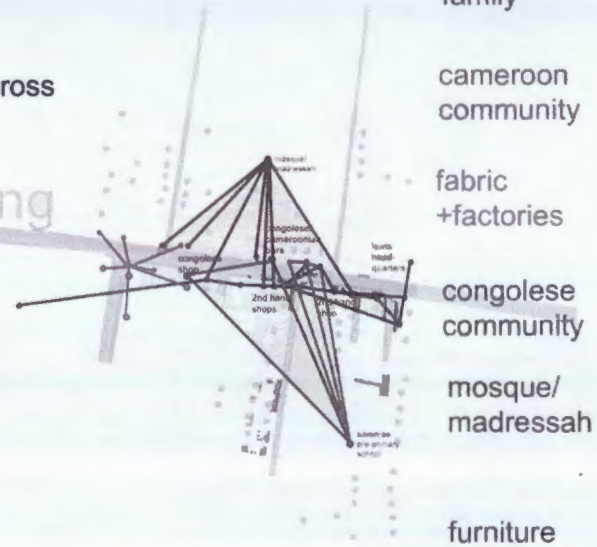
## french redoubt

The French Redoubt was built in 1781 by a french Garrison at the Cape. It forms part of an early VOC defensive line stretching from Fort Knokke (below woodstock station) and including, the Hollandse redoubt, and the Burger redoubt up to the Zonnebloem Homestead. It was later used as a toll gate for entry of produce into the city markets.

connections across

housing

commuting



nazly's  
family

cameroon  
community

fabric  
+factories

congolese  
community

mosque/  
madressah

furniture



## model

Each of the perspex layers represents a different 'layer' on the site. These are only layers identified in the field work research namely - nazly's family, cameroon community, fabric + factories, congolese community, mosque/madressah, furniture.

The toothpicks indicate where overlaps occur between the different layers. This is only a representation of one possible organisation of the perspex 'boards'.

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# 01. Context:

*Architecture - "the possibility of transforming the banals of everyday into magnificence." (Lefebvre 1988)*

I began this year with a strong conviction of the importance of the 'everyday life' of the city, and the potential this could hold for architecture. In order to engage with these ideas, I needed to know more about this city, the everyday practices and hidden spatial practices that constitute its being. The starting point was not architectural, but a search for a difference in architecture through difference in the city. I therefore started this project by reading about Cape Town.

One of the first readings I came across was on the relationship of Table Mountain to the city and its history. It was a key starting point as it questioned the iconic image of the city and how we read it.

This postcard-image is a view from Blouberg Strand which was a 'whites-only' beach during Apartheid (Fields, Meyer and Swanson 2007). It is a view of the city and mountain that can only be seen in its complete form from Table Bay. It is an external view of the landscape as opposed to a more intimate understanding of the everyday city. It is iconic of Cape Town, yet scarcely seen by the city's inhabitants most of whom reside in the metro South East (Vergunst 2000).

This image reading led me to the first part of the research which was about questioning ways of seeing the city. As illustrated with the image of Table Mountain, 'seeing' assumes a subject looking out and a subjective position on the city in relation to a specific social and historical context. (Agrest in (Allen 2000)) The title 'how to see' questions this 'dominant' reading of the city, with the intention to engage with the hidden world behind and within it. This is therefore the first question in understanding the context – how do we see differently?

While this question of development doesn't relate directly to architecture, it's the basis of many of the projects that we deal with when studying. Through the past 4 years of my architectural education there has been significant emphasis placed on the social potential of architecture. This is not in a strictly modern sense of a building as an agent of social change – but rather in the form of questions around the relevance of a proposed project or importance of a chosen site within the city. The importance of this question is around the positioning of both siting and architectural proposals.

The idea of the importance of 'everyday' leads into that of 'ordinary cities' in a contemporary and broader scale. The importance of understanding all cities as ordinary is critical of the 'developmentalist' position taken by urban theorists particularly with regards to African cities. It is an issue relevant to this research as it frames the question of the 'everyday' within a broader critical context.

*"Cities remain at least officially inscribed in a narrative of development...which is about assisting residents in a 'good and moral way' which might not be about meeting their needs."* (Simone 2004)

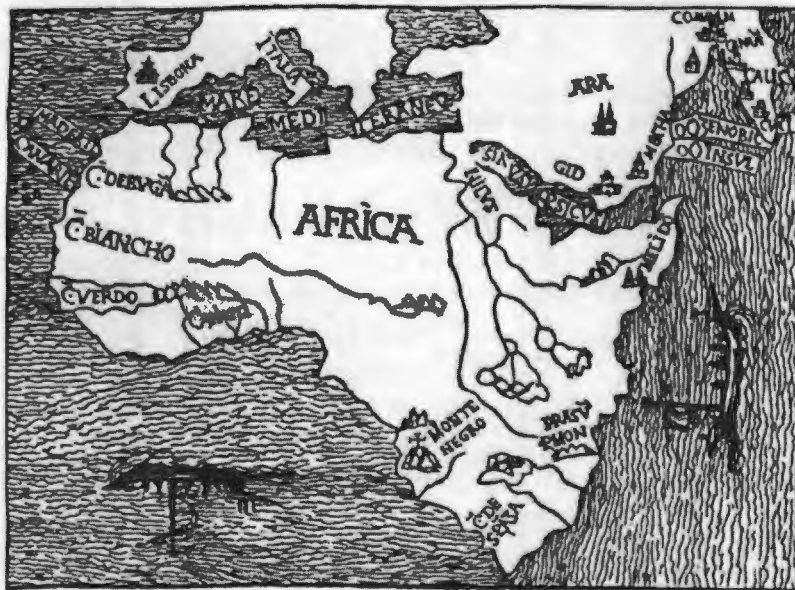


Figure 3: A 1508 Wood cut map created by Montalboddo Fracan, illustrating the Greco-Roman belief that the world was reversed below the equator. (Vergunst 2000)

Urban academic literature on 'third world cities' is extensive but largely focuses on negative aspects and problems to the extent that exploration is often constrained. The only solution is seen as 'dealing with the problem' which often neglects diverse urban experiences. (Robinson, 2006). While these developmental approaches aim to incorporate ideas of the everyday poor - the 'poor' are characterised by poverty and nothing else. The informal sector is only considered as a problem of the larger political economic structure.

While the 'developmentalist' approach is problematic, only looking at 'everyday practices' as positive 'self generated processes' can be similarly. Focusing on the 'everyday' can hide problems that exist within it, and the controls that potentially enforce it. It is easy to see everyday urbanity as a source of innovation through the use of urban space, innovative recycling and efficient living. The problem is that this focus can mask problems of mobility, poverty and security concerns.<sup>6</sup> While the first approach often excludes the possibility of change with a 'dystopic' position, the second is not concerned with an 'escape'. (Nuttall 2004)

This really highlights one of the key questions of the 'ordinary' in contemporary cities – it assumes a choice on the part of its citizens for a particular way of life. This is a critical question around my site research in Woodstock.

Initially mesmerised by the incredible innovation and entrepreneurial potential that I saw in the area, a second reading led me to question what this means. This led me to realise that the transgressions of boundaries exist in a tension between creativity and control.

My site research in Woodstock revealed that a few shops open from 10am as opposed to standard working hours. The initial reason mentioned for this was that it allows the shopkeepers to take care of their personal lives before work. This creates a change in the use patterns of the site. Further probing revealed that the reason this practice began was because 'packing out furniture' onto the street for display contradicts street by-laws (City of Cape Town 2007 - 2010) (City of Cape Town 2007 - 2010). The change in opening hours was prompted by an attempt to avoid the law enforcement police who 'usually come before 10am'. (Nazly 2010) (Rashida 2010) While it has had some positive implications for the shop-keepers, the fear of being fined or having goods confiscated remains. 'Packing out' as a practice is partially informed by the shops not having sufficient space to store and display goods in their shop, and their inability to afford larger spaces to rent. (Nazly 2010)

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<sup>6</sup> Jennifer Robinson raises this as a key concern of the Rem Koolhaas project on Lagos (Living in Dystopia).

# 02. Methodology

## (how to see):

### The everyday, Lefebvre and other responses

#### 'Everyday'

Modern planning was largely based on a panoptic view of cities which considered the universal as opposed to the individual. The focus was on the image of the whole from a 'constructed distance' (Graafland 2008). A more grounded reading of the city through ideas of the 'everyday', attempt to subvert this view.

The 'everyday' as a topic for study was made prominent through the work of Henri Lefebvre. Lefebvre argues that in the manner that prior to Marx, labour was not considered worthy of study, the everyday was not a consideration. It was considered a passive background to life. Much of colonial discourse was based on the lack of validity of the 'local' and existing practices of the everyday. These were practices studied for their inferiority and lack of worthiness, in a thoroughly ethnographic way. Questioning space within a Marxist tradition Lefebvre proposes that through an understanding of everyday practices, the subversion of spatial hegemonies can be achieved. (Lefebvre 1988)

This importance of the 'everyday' relates to bigger ideas of the right to the city – where Lefebvre argues for a right to urban life and the access it enables. This is different to a return to gentrified urban cores. The argument he makes is that through attention to 'ordinary processes' and 'everyday life' in the city, exists the potential to subvert the hegemony of the planned city and formal exclusive production processes. (Merrifield 2002) These two concerns are underlying themes to this research.

Njabulo Ndebele supports a similar concern for the ordinary. He argues that *"rediscovering the ordinary, the stories remind us necessarily that the problems of South African social formation are complex and all embracing; that they cannot be reduced to a single, simple formulation."* (Ndebele 2006, 51)

Ndebele poses this as a response to the protest literature of the

Apartheid years which benefitted from binaries. This method of writing obscured the complexities that exist within lived narratives in favour of a strong moral polarity. The result was a lack of analytical investigation. While it may have been appropriate for its time, the conditions that made protest literature relevant no longer exist.<sup>1</sup> Ndebele argues that we need ways to 'free the social imagination' and he suggests that this lies in the 'ordinary'.

It offers a way of writing the city that crosses boundaries. Where the apartheid city was a highly controlled environment, the post – apartheid context has opened up the possibility of 'difference' not only in spaces now, but in re-reading what spaces were.<sup>2</sup>

## Cape Town

Cape Town is often described as a 'non – African' or a 'European' city. Along with this is an assumed lack of urban vitality. While it is a category that I don't agree with, it is easy to fall into thinking of the city as overtly divided. I realised this through some of my initial site readings and research. One of my initial sites was a parking lot in Bantry Bay.<sup>3</sup> Going there, I expected to find a wealthy, beach environment – knowing the site from having grown up in Cape Town. However, I happened to be there at 4.30pm in the afternoon when the parking lot was working as a sort of 'informal taxi rank' (Site Observations 2010).



Figure 1: Taxis waiting for passengers in a parking lot in Bantry Bay. (Site Observations 2010)

What I realised through this was that my initial assumption of Bantry Bay as wealthy and largely 'white' area was a partial reading. In the practices of people using the space it belongs as much to those who work there and use the public spaces, as to those who live there. Not negating questions of inequality, the appropriation of spaces by

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<sup>1</sup> Ndebele argues that protest politics ended in 1968 with SASO and the BCM

<sup>2</sup> This is an idea explored by Robinson in reference to the crossing of boundaries during apartheid. (Robinson 2009)

<sup>3</sup> In the initial research I was going to look at sites which fell outside of the tourist map and visited several, of which this was one. I did not however continue these visits, and therefore it does not form a part of the site research.

its users makes the city more than it is. The 'everyday' city of people moving through space: of taxi drivers' sitting on the beach amongst retired old people on a Tuesday afternoon, is a practice that changes the nature of the site.



Figure 2: Taxis waiting; Taxi drivers and home bound workers resting in the green verges surrounding the parking lot, above the beach in Bantry Bay. (Site Observations 2010)

The difference is that while the inhabitants have made a 'mark' on the city in the sense of owning and living in these places, the 'workers' don't have any physical claim to the space. Their bodies occupy the spaces, but leave no trace.

This example highlights the potential importance in the everyday and the ordinary. My question is firstly around how we can see these practices, and secondly whether they can be written into the urban fabric.

## Rhythm analysis

Lefebvre's later writings with Catherine Regulier on 'Rhythm analysis' suggests a way of seeing these everyday practices. Rhythm analysis is a method, based on the work of a Brazilian philosopher Lucio dos Santos that attempts to understand the world through processes. As proposed by Lefebvre – it challenges a binary condition – arguing that in order "to grasp a rhythm it is necessary to have been grasped by it." (Goonewardena 2008)

These ideas don't prioritise any single sense, and propose instead that "the city is heard as much as music as it is read as a discursive writing." (Goonewardena 2008, 156) This method is an attempt to understand multiple experiences across time and place, both repetitive and singular. (Goonewardena 2008, 153)

What is particularly useful in this approach is that the observer is always both inside and outside of the situation. One example that illustrates this is Lefebvre sitting in his apartment and recording the 'rhythms' that happen outside his apartment window. The window is not an abstract location of a 'mental eye' seeing the city from above – but a real location from where the reading is both of "sights and insights". It is a subjective position within the city, clearly articulated as that.

This proposes an understanding of the city from the everyday: outside of its rhythms as a 'researcher' yet implicated within them by moving through and in the site. This approach potentially reveals patterns of movement and change that are hidden within the city and would not be known or revealed through a more conventional urban analysis. In some ways, it reveals the 'secreted structure'<sup>4</sup> of the city that exists within the abstract modern city-space.

Rhythm analysis draws on an older tradition of the Situationists<sup>5</sup> and De Certeau (Certeau 1984) who attempted to read the everyday city through a pedestrian or flaneur. The flaneur reads the city from the intimate street scale in order to follow its lived complexity through wandering. (Nuttall 2004) For the Situationists, this was based on the idea of political subversion in order to challenge capitalist property relations in the city. They created alternative maps and narratives of the city based on these wanders in an attempt at 'destabilising' the dominant image of the city. (Graafland 2008)

Unlike the earlier approaches, rhythm analysis attempts to understand complexity through distancing. While both approaches involve an individual reading the city; the 'rhythm analyst' is a 'reflexive wanderer' both following spontaneous events, as well as maintaining a distance. The flaneur on the other hand, only follows singular events, not knowing what gets repeated.

Both of these approaches have been relevant to my research methodology. It was in response to these ideas that I mapped out my path in my site research, acknowledging my explicit involvement. The 'rhythm analyst' approach informed the observations over a week and a day, as well as a series of interviews with inhabitants who live and work within the site in order to find their 'everyday practices'.

## Questions of Development

This approach raises the question of inequalities in the 'everyday life' of South African cities. One of the implications of seeing cities as ordinary or 'everyday' is that fixed binary categories of the first and third world are broken down. In the words of Ndebele, this has the potential to free the 'social imagination (Ndebele 2006)'.

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<sup>4</sup> The idea of a secreted structure raised by Lefebvre in relation to older settlements/ towns. The example used is Navarrenx, a village in the Pyrenees where Lefebvre grew up. (Merrifield, *Metromarxism: A Marxist tale of the city* 2002) As Lefebvre puts it in a particularly expressive metaphor, societies 'secrete space' producing and appropriating it as they go along. He suggests that in modern societies this complex secreted space which is at once perceived, conceived and lived is reduced to an abstraction. (Forty 2000)

<sup>5</sup> Lefebvre was initially involved with the Situationists.



Figure 4: Pine Road in Woodstock in the evening (left) and during the day(right) when the furniture is packed out. (Site Observations 2010)

Similar tensions are evident in the use of public space. On a sunny day, this part of main road is filled with people sitting on the pavements, steps and ledges in shady areas on the side of the road. (Site Observations 2010) The nearby Trafalgar park is however under-used as it is considered an unsafe environment. The particular urban atmosphere created by people sitting on the pavement, is therefore not only, or not necessarily because they simply want to be there, but also potentially informed by them being afraid to be in the shady park with no activity.



Figure 5: Factory workers sitting in the shade during lunch time on main road on a hot day. (Site Observations 2010)

The argument to be made is that these 'self – organised' processes that rhythmanalysis reveals do not happen in isolation, but are informed by and inform the way the city works. (Forty 2000) <sup>7</sup>

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<sup>7</sup> In reference to Forty's quote by Lefebvre: "this space has nothing innocent about it: it is quite simply the space of the dominant mode of production, and hence the space of capitalism." (Adrian Forty, Space)

## Conclusion:

*Underlying the importance of the everyday, the ordinary and the ideas of rhythm analysis, is a critique of the way the city is currently read by architects and planners. Re-reading the city is not a new idea, but a re-emerging concern in a different context. It is based on the idea that re-framing a binary position on the city can lead to a new question and proposal. This questions the idea of the city and its image and could be pertinent in developing an architectural response.*

*The multi-dimensionality of space as argued for by Lefebvre begins to suggest ways of dealing with these ideas spatially. However – while Lefebvre is highly critical of the role of architects in ‘abstract space’, his proposed triadic dialectical nature of space means that it is never only the ‘abstract space’ of planners. It is always interpreted and used for lived purposes. The urban topography is the environment in which the complexities and negotiations of the triad are played out.*

*The key question is how to act in this context, with this ability to see differently. Can spatial practice respond to these dynamic spaces and design for change? (Without neglecting basic needs)*

*The work of CHORA, an architectural research group, engages many of these ideas through mapping. They question practice and representation in an effort to move beyond modern ‘abstract space, in an attempt to understand complex urban contexts. Their research starts with an immersion into the city in an attempt to find the ‘hidden emotions. (Bunschoten, Binet and Hoshino 2001). This is then followed with ‘pocket world’ analyses where greater complexity is both isolated yet revealed (Graafland 2008). Their approach is explored later in more detail(04).*

# 03. Methodology (How to tell):

## Moving outside, mapping architecture and drawing differently

*Once cities are seen and read differently - how can we represent this 'difference'? Can the representations be instrumental in the creation of spaces of mobility and change?*

This section investigates revisionist mapping and interrogates drawing through identifying potential techniques that could 'engender new realities'. (Corner, *The Agency of Mapping* 1999) It is based on the premise that *"a map is not a territory."* (Korzibsky in (Vergunst 2000))

South African cities are largely characterised by apartheid planning which was used as a tool of control and segregation. While our cities are no longer officially racially separate, they remain divided. (Pieterse, *Post Apartheid Geographies in South Africa: Why are Urban Divides so Persistent* 2009) Despite these boundaries, often of capital, the everyday life of the urban populations transgresses the divisions. As with the case of the 'invisible' in Bantry Bay mentioned before, there are transgressions of space which are not evident in statistics or mappings of the city. The ultimate question is how these 'un-mappable territories' can be represented and what they can mean for future development of the city.

Lefebvre argues that drawing techniques used by architects are part of the larger discourses of power. It is one of the prime means through which space is abstracted and homogenised. One of the reasons for this is that drawing privileges the eye above other senses. This is considered particularly true of modern architectural planning, which reduces a complex field and context to a plan which is drawn in a 'void'. (Forty 2000) (Vidler 2000)

In recognising that mapping was often used a tool of control, James Corner raises the question and possibility of it becoming an enabling mechanism that can reveal and realise unseen possibilities. This

requires a movement outside of the fixed discipline of architecture into the *"uncertainty of an ever shifting reference in the world itself."* (Allen, Practice: Architecture, technique and representation 2000) Stan Allen supports this approach, arguing that traditional representations assumed stable objects and fixed subjects which are not able to respond to the contemporary 'network' city which is composed of patterns of movement.

These ideas aim to draw the vitality of everyday life into representations and ultimately into architecture. Allen proposes this can be achieved through a shift from an architecture that is an artefact to one of effects. It is through these ideas that mapping becomes particularly relevant and potentially useful.

## Moving Outside

*"Colonial landscapes and maps were part of the imperial process of mediating between the familiar and the strange through the manipulation of spatial perspectives and symbols."(Katherine Bull, Positioning the Cape.) (Vergunst 2000)*

Mapping is a practice through which hegemonic relationships were both created and entrenched. Early maps of the Cape illustrate this, often showing the land as empty without inhabitants. In a review of representations of Table Mountain, Nicolaas Vergunst argues that attempts to 'map' Cape Town were related to creating a system of knowledge in order to make the place legible. They created an image of the Cape as a well organised and bounded settlement presented on a grid of co-ordinates created by the traveller for his means. The result was a settler's orientation and imposition on the landscape of the Cape. Maps are essentially a socially constructed form of knowledge that reproduce and reinforce political boundaries. (Vergunst 2000)

In proposing a revisionist approach Corner is responding to this condition. He argues that in a similar way that it was used hegemonically, mapping may provide a mechanism for designers to both see and respond to the complexity of contemporary urban spaces.

Corner identifies four particular types of mapping: the drift, rhizome, layering and the game board. (Corner, The Agency of Mapping 1999) All of these deal with space in a different way in order to achieve similar ends. Game – board mapping is of particular interest to this project, for it is one of the techniques that incorporate elements from the others mapping techniques. It not only reframes and identifies important issues but identifies relevant actors or agents. It is then 'played with' by various participants with the aim to negotiate a design solution.

The drift or derive relate to the Situationists and their individual reading of the city. It draws on the ideas of 'street level desires' of

the everyday, and the impressions of the city as explored in the previous section.

A rhizome is open-ended mapping where any point could connect to any other point, with multiple readings possible.

Layering refers to the superimposition of various elements to produce a heterogeneous surface. The idea of layering as a mapping technique is expanded by Stan Allen and Diana Agrest who propose adopting ideas from film and music. It relates to their argument for an 'allographic architecture' as opposed to an autographic architecture. This is compared to writing a script or composing a musical score – where while written by the author – every 'interpretation' is correct, and each could be very different from the previous. These techniques also allow varied narratives such as various programs, events, times and scales to be recorded simultaneously. As with layering, they remain compositional with a limited number of scores/ actors.

The potential in this approach is that architecture is considered as a stage or film set (Leach 2002) where meaning is derived from the activities that take place within it. The stage aids the performance, but does not define the 'play' which is always more than the individual actions which enable it. (Heynen and Loeckx 1998)

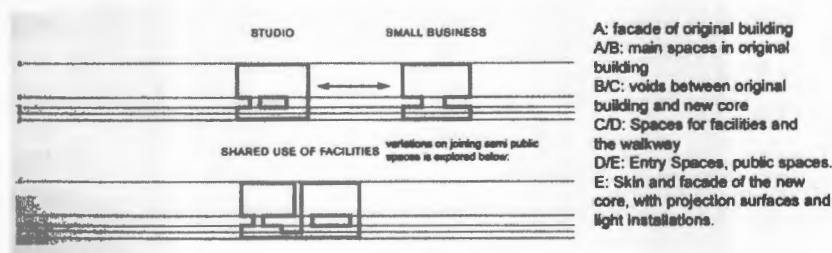


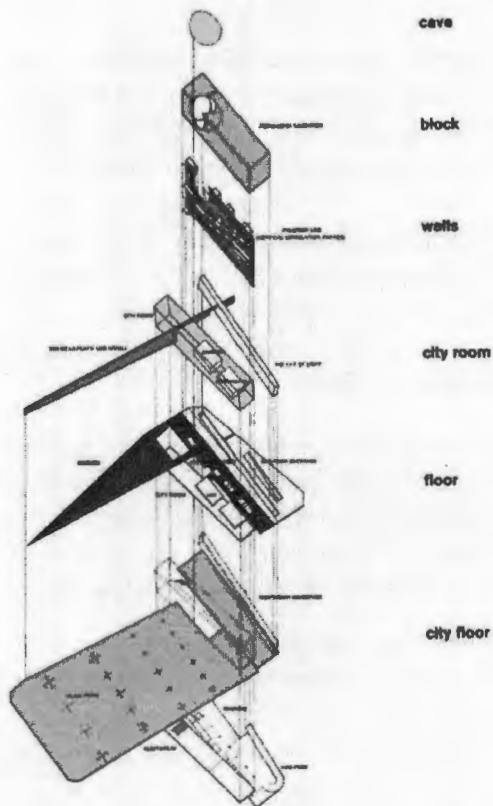
Figure 6: A diagram from the Salamander Project by CHORA (explored in [03]) illustrates a variation on joining private spaces. (Bunschoten, Public Spaces 2002)

Parc de la villette, by Bernard Tschumi and Rem Koolhaas's scheme for the same project are examples where layering has been used, in addition to the work of CHORA, which is explored in more detail later. In these projects, mapping is used as a technique in order to negotiate complex programmatic and siting requirements by extending what is considered in the design. The product is defined through what it could enable.

The ultimate approach is to move the attention from making an image to the process of production (Corner 1999). The potential of this is not as a metaphorical process that is written into the design, but rather where the act of producing and the effect of the product become important. **Concious framing** is the key idea in order to generate new possibilities.

The Situationists proposed that 'revolution' is fundamentally a question of active participation –not a product of aesthetic

contemplation. (Leach 1999) Mapping- and particularly game – board mapping, engages this possibility. It is an attempt to realise the subjective and creative act implicit in the act of recording. A central issue is therefore once again the **problem of architecture as a single image.**



Exploded view of the Constantini Museum and the urban square it is situated in, illustrates layering.

Figure 7: from CHORA's proposal for the Museum in Buenos Aires. (Bunschoten, Public Spaces 2002)

Architecture cannot be fully allographic because of its physical presence. While the script and score are literally re-created every time they are performed, architecture can only partially achieve this through use – the 'stage' set is always the same.

Yet at the same time, architecture will always be partially allographic. There will always be 'walkers' to recreate the space as they move,<sup>8</sup> regardless of whether this was intended. There is no direct correlation between space and its use. (Reiser 2006)

A similar critique applies to that of 'revisionist drawing'. All architectural drawing is notational, and is a system of signs that will

<sup>8</sup> In reference to De Certeau's walking in the city, and Robinson on Lefebvre – suggesting that each time we move we create a different space. (Certeau 1984) (Robinson, Ordinary Cities: Between Modernity and Development 2006)

always be open to various interpretations. The meaning in the drawing is inscribed into it, not a property of it (Leach 1999). Therefore, in a similar argument to Lefebvre, space is both abstract, but always more than abstract. The intended physicality of architecture limits its discursive and deconstructivist possibilities.



Figure 8: Not necessarily intended for this purpose, the shaded walkway opposite Trafalgar House in Woodstock functions as an outdoor living room in the way that it is used, adapted and inhabited. (Site Observations 2010)

The essential critique is therefore not of conventional drawing techniques but rather how these are framed. In many process based design approaches a critique often involves material already implicated in the design process. While this might lead to a more beautiful architectural outcome – this is through a self-referential and internal debate. It is through extending the material implicated in the design that the field is potentially opened to difference.

## Conclusion:

*Mapping and new types of representations focus not only what these representations mean but what they can achieve in the physical environment. Through revising this, there exists the possibility for creating something new and different. Both Maps and architectural drawings create the landscapes they describe.*

*I started this with a search into ways of drawing differently. However, my conclusion is that a change in notations of drawing is a passive response – whereas drawing in factors not normally considered is an active critique. The architectural potential lies in intervening 'productively' in the city with 'open ended, optimistic proposals'. Allen proposes that this can be achieved through a shift*

*from an architectural object to a field (Allen 2009). This would challenge the binary conventional positions in architecture.*

*This approach proposes an opening and extension of the 'material' involved in the design process. Through a mapping of elements and factors not normally considered, but which constitute the larger 'field' - the frame is shifted.*

*The underlying proposal is therefore that in order to respond to complexity we need to reframe the context and the question. The question is not what architecture can mean, but what it can enable.*

# 04. A Case Study (How to play):

## Explaining the rules through a case study of the work of CHORA

The key questions from the previous sections are around what the spaces of mobility and complexity could be? And how the broader 'field' and extended 'material' can be incorporated into architectural considerations?

I came across CHORA's work last year and further reading prompted me to look into it again. CHORA is an urban/ architectural research group who design in changing contexts. They use multi-disciplinary teams in an aim to respond to complex cities with complex needs. For these reasons, CHORA's work is the basis of this case study and informs my research methodology.

Their starting premise is that there is something different or contingent in the contemporary urban context. Each project begins with an attempt at understanding and seeing this difference.<sup>9</sup> The methodology is tested through various scales of projects. It does seem stronger in its urban approach than architectural, however is still valid in its attempt at opening up the field<sup>10</sup>. The research begins by looking at the city as a whole, starting with an 'immersion into the city' in order to find the 'proto – urban conditions'. This is then followed by framing and categorising a set of importance issues specific to the context. The final proposal is a negotiated solution – the result of which is a 'prototype' that is fixed yet indeterminate.

The key tool used by CHORA is that of game board mapping which is conceived as a working surface where various affected participants are invited to negotiate their differences – or this is simulated. As described earlier, this draws on the mapping techniques of the

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<sup>9</sup> CHORA frames their work within the context of changing situations: new EU states, changing Western European cities as a result of new immigrant populations, and changing social practices in Japan.

<sup>10</sup> Used in relation to Stan Allen's article on the object and field: this relates to the previous section with the attempt to change the material implicated in design processes. (Allen, From Object to Field: Field Conditions in Architecture and Urbanism 2009)

derive in relation to individual desires, and layering, where multiple demands have to be dealt with. The game board deals with both representational and active aspects of mapping, engaging with the lived and perceived realities of various groups. These tools are used to contest the boundaries of modern architectural planning and design. In this sense they are a response to the 'abstract space' of modernism as defined by Lefebvre. However unlike the aim of Lefebvre and the Situationists – the proposal is for a negotiated solution as opposed to a 'revolution'. (Graafland 2008)

## How to see?

### Proto – urban conditions

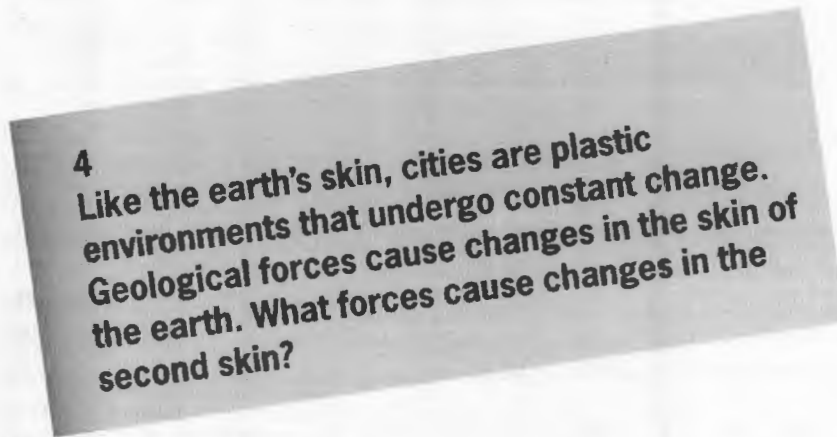


Figure 9: (Bunschoten, Binet and Hoshino, Urban Flotsam: Stirring the city 2001)

The assumption that underpins their work is the existence of a 'second skin' which contains the unplanned and changing elements that exist in cities: and that understanding this leads to the potential for new possibilities. The initial approach is therefore to understand the 'second skin' through an 'immersion' into the city with 'new eyes' in a search for what they call 'hidden emotions' which are to be found in 'proto – urban conditions'.

The 'immersion into the city' is based on the derive as an attempt to both understand the everyday practices, and its links to larger 'global' processes which are the 'proto – urban conditions'. These proto-urban conditions are new aspects which are changing the way the city works. They make the city 'tick.' This is my interest in their work; it relates directly to ideas of ordinary cities, everyday life and self-organised processes raised earlier.



Figure 10: Bean Throwing in Kyoto. (Bunschoten, Binet and Hoshino, *Urban Flotsam: Stirring the city* 2001, 373)

The immersion into the city is explored through practices such as 'bean throwing'. Beans are literally thrown onto a map of the city, the sites of which are then researched. Through the random process of investigating the city, known hierarchies and boundaries are removed. This enables a new way of 'seeing' which relates to ideas raised by Jennifer Robinson where the city is seen as 'ordinary'. (Robinson 2006). The site research in Cape Town is based on this approach.

Through the bean throwing – hierarchy is dissolved in the randomness of the beans – yet reasserted through the framing of the map. Informal settlements are considered as ordinary as inner city areas, all with their own complexity, and linked into broader patterns and networks. (Graafland 2008) This conscious re-framing is what is really different about the practice. It rests on the idea that framing will always happen, but could happen differently.

The architects/ designers involved in the immersion remain the 'readers', and the processes of 'self organisation' that are found will always be specific to the 'finder'. The difference is that they are

'found' in a field. The factors to be 'framed' are 'drawn out' from existing structures and contain 'local force'. They are those elements which are potentially the site of a new 'social imaginary' as referred to by Ndebele. (Ndebele 2006).

CHORA's work is based on the importance of involving actors and agents in the design process. The Designer's role is adapted to that of a curator who designs the processes, interactions and organisational structures. It is a method of working that recognises the varied input necessary in contemporary practice. (Spatial Agency 2010) The resolution of the design is not defined by an individual, but through 'playing a game.'

Graafland is somewhat critical of this process, suggesting that while this rhetoric suggests the stepping back of the designer – it is more a change of roles. The *"meta language" remains in the hands of the designer, and not the public.*" (Graafland 2008). While this is true, the position of the designer is still more limited than that of a star architect.

This question leads to a more serious critique of the involvement of actors and agents. The approach focuses on local authorities who *'anchor conditions, actors – who participate with clear desires and agents – who have the ability to create change'*. (Graafland 2008) This ultimately raises questions on the involvement of those who lack power, who are disadvantaged and may not be able to effect change on their environment. This is both a critique of their application and to some extent the limits of the approach. In an act of negotiation with only those who have power, the potential of the process and the extent of understanding practices of the 'everyday and ordinary' are limited. It raises questions as to how the 'marginalised' can be involved in order to effect change – raising issues of government and management but also participation processes and how they can 'truly' include marginalised groups.

The second question that this leads into is the role of the designer in a context such as this. The game board mapping approach requires distancing of the designer from the design process. While it may seem to change the role of the designer, it does not necessarily limit questions of their agency within the process and does not absolve them from responsibility towards the process.

In the South African context this is a pertinent question. Private groups such as rate payers associations often specifically aim to protect the property rights of middle class owners without concern for the greater public good. While this is one of the aspects that could be negotiated through the process, the reality is that poorer communities don't have the monetary or legal power basis to ensure effective negotiation. (Pieterse 2009) The game board rules do not ensure a 'neutral' or necessarily fair response. The bigger decision underlying the design proposal still lies with the designer.

In my site research in Woodstock this question arose with regards to an increase in the cost of property which will likely force out much of the working 'rental' classes in the area. A likely property price hike would leave large groups out of the 'negotiation', drastically changing the nature of a 'negotiated proposal'. This could have possible negative effects for the 'marginalised' and poorer populations in this part of the city. In a case such as this – who guides the proposal? Leaving it to the 'game board table' could be highly problematic.

This critique also raises question of who has been left out of my current site research. It highlights the contingency of 'everyday practices' within the city.

## How to play?

### **Pocket worlds:**

Following the initial immersion into the city, further research is gathered into the identified sites in order to frame issues which rules can be designed around. Framing these 'pocket – worlds' or scenarios is a key tool as it reveals a more detailed view of the existing city. This idea is based on the concept derived by Claude Levi – Strauss and Arno Schmidt, who propose that hidden realities can be revealed through a reduction of scales, enabling a "more precise view of a complex reality." (Graafland 2008)

Each Pocket –World is identified as a site of change through the processes of erasure, origination, transformation and migration. This categorisation borrows ideas from anthropology, where rituals of change are both signifiers and a means of understanding change in society (Heynen and Loeckx 1998). The site research is focused on 'seeing' these processes of change. The method enables the recognition of richness within contexts without directly aiming for it. It is essentially a **strategy to unlock hidden information.**

In Copenhagen, the site is a suburb which is treated as a game board. CHORA design a dynamic master plan based on rules relating to density, landscape, open space and managing waste.<sup>11</sup>

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<sup>11</sup> Raoul Bunschoten - Pg. 240, Case study on a new suburb: hoje taastrup; (architecture and participation.)



Figure 11: A 'DNA code' indicating specific components, and the larger game board for the new suburb of Hoje Taastrup in Copenhagen. (Bunschoten, Public Spaces 2002, 58-59)

(Bunschoten 2005) Similar ideas are implemented in an architectural response evident in the diagram below for the Salamander factory complex. It indicates a 'negotiation' between various programmes, services and spaces. The essential proposal is for a rule-based plan for developing possible scenarios. (Bunschoten, Public Spaces 2002)

## How to tell?

### Taxonomy and unfolding:

The next step in CHORA's approach relates to the ideas of mapping and representational techniques raised earlier.

Their work is composed along a time line with a set of rules which differentiates dynamic modelling from static master planning. (Bunschoten, Public Spaces 2002) By relegating parts of the design process to 'agents and actors' – it mimics a 'script' as proposed by Allen. (Allen, Practice: Architecture, technique and representation 2000) In their architectural products this approach is evident in the idea of a 'prototype'.

a visual business plan: construction and gradual occupation by programmes over a period of ten years.

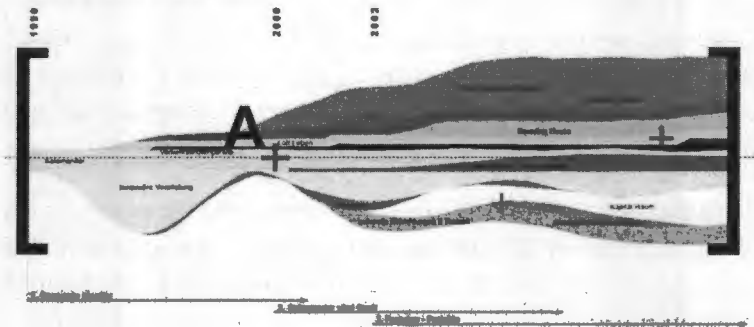


Figure 12: Mapping of a visual time plan for the Salamander Project indicating construction and gradual occupation by various groups. Certain fixed dates are identified, with others left open ended (indicated with arrows). (Bunschoten, Public Spaces 2002, 48)

The design process is composed of a series of scales and scores – with the architectural product one possible outcome of a single process which could have led and will lead to many different products.

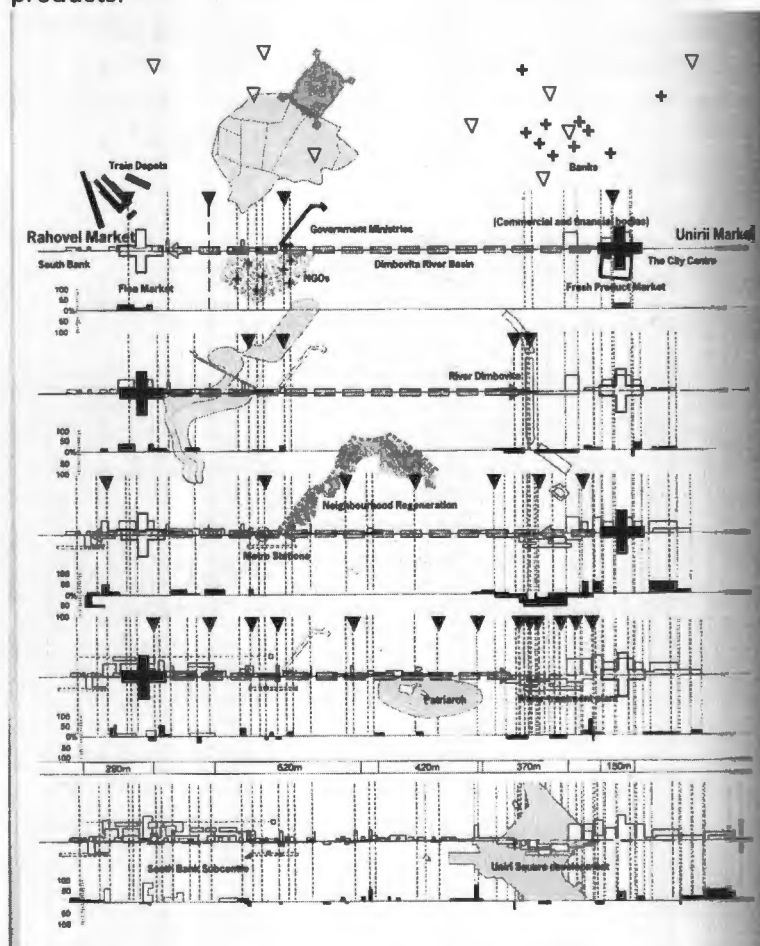


Figure 13: A 'score' for a project in Bucharest. (Bunschoten, Binet and Hoshino, Urban Flotsam: Stirring the city 2001, 414)

The rules are devised through a series of 'taxonomies': In Urban Flotsam 3 particular categories are used to order elements of different scales. These are categories of movement that exist within the earth's 'second skin': (1.) Slow heavy substantial elements like the ground, certain buildings, and infrastructures; (2.) Medium elements which are mobile, smaller, and operate in multiples like people and their use of space; (3.) Ephemeral aspects such as the weather, electricity, and money.

Each category is composed of a field with specific characteristics, and which behaves differently. It is through the interaction and layering of the various fields that new possibilities can emerge. (Bunschoten 2003). This recalls the work of Tschumi and OMA in the Parc de la Villette competition. One of the biggest differences is that for CHORA the fields are 'drawn out' from the existing situation, whereas with both OMA and Parc de la Vilette they are created as an abstraction. (Graafland 2008)

The 'taxonomies' frame and limit the endless possibilities contained in these fields. Yet by dealing with different scales, programs, events, and speeds, they maintain the necessary complexity.

In their architectural work the game board is the building, programme or site – and not necessarily the wider urban context. In a museum designed in Rome it lies in the open-programming of the exhibition spaces and the incorporation of a public space on top of the building. The game board is the site which consists of servicing that enables various activities to take place.

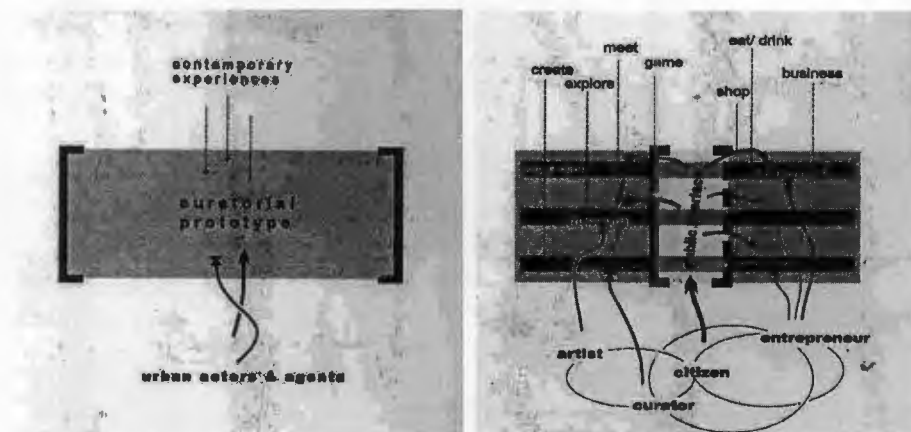


Figure 14: Diagram indicating the 'game board' function of the Municipal Museum of Contemporary Art in Rome. (Bunschoten, Public Spaces 2002, 55)

The three categories mentioned are adapted and changed to suit different projects. The specific categories and rules respond to the specific contexts. (Bunschoten, Binet and Hoshino, Urban Flotsam: Stirring the city 2001)

# How to act?

## Liminal bodies and prototypes

The architectural proposals are termed liminal bodies which are seen as prototypes. Liminality is characterised by 'ambiguity, openness, and indeterminacy' which can lead to the generation of new narratives and perspectives (Liminality 2010). The term prototype refers to objects which need to be tested and are therefore contingent. CHORA presents this as a programmatic/organisational condition. The prototype is identified through the research and responds to the proto-urban condition, adding a 'new story' or narrative to the broader field.

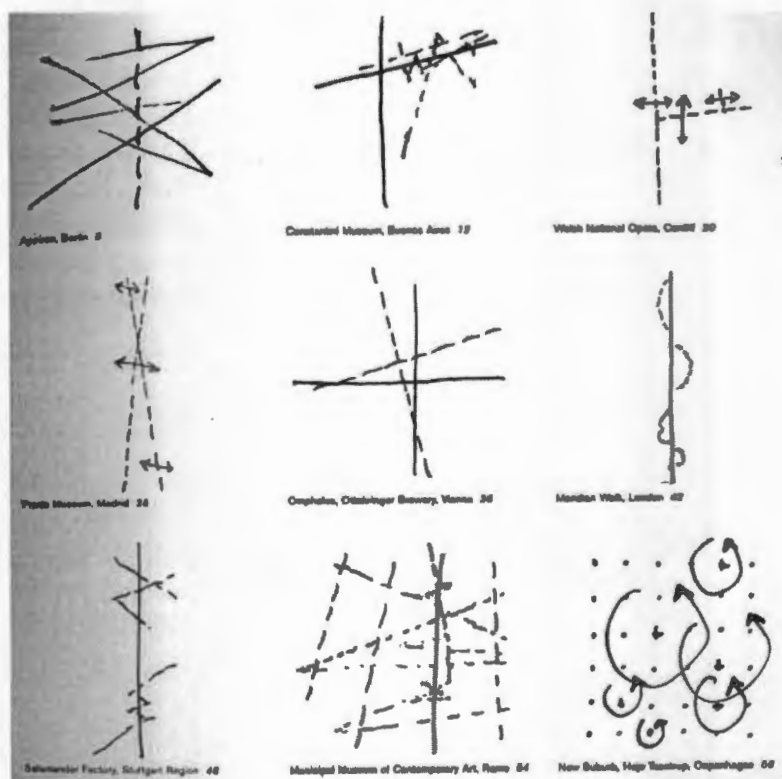


Figure 15: Various 'prototypes'. (Bunschoten, Public Spaces 2002, 7)

*"an organisation of programmes in a new and initially singular manner. The prototype in this case is not an object in itself, it is a device in the form of a specific architectural configuration, an organisational structure embedded in the architecture or urban space that links and intertwines programmes in such a way as to give them dynamic properties."* (Bunschoten, Public Spaces 2002, 5)

They argue that through this approach they achieve an element that is both indeterminate yet specific. It is a result of this dual nature that the prototype is liminal and contains enabling possibilities. The form that this prototype takes is usually that of an 'embedded diagram'.

Bunschoten sees diagrams as enabling devices: their undefined nature means that their interpretation allows them to transform 'matter, qualities and situations'. These characteristics are considered to be essential to public space. The diagram is therefore the rule. It is singular, yet remains a 'key attractor for a variety of people, events, collective expressions and programmes.' Figure 13 illustrates several examples.

The use of diagrams to drive an architectural project is not specific to CHORA. Vidler argues that the 'diagram' underlies much contemporary work. The reason for this lies in its potential for being "performative rather than representational" (Vidler 2000, 6). The approach expands on the modern tradition, which could be seen as problematic by reducing a complex scheme to a single image that can only be interpreted by the architect. Its nature of either being performative or reductive depends on how it is interpreted and used. Figure 19 illustrates the performative potential of the diagram in the Salamander Factory. In this case, the simple diagram can be read in many different layers.

### **Salamander Factory:**

The Salamander factory is an example of an architectural design which was developed through this approach. Located in Kornwesthem outside Stuttgart in Germany, the project is a regeneration of a disused factory as part of a broader urban framework. It incorporates questions of time, change, complexity of program, and shifting scales as raised by Allen, and is illustrative of CHORA's response to the creation of liminal prototypes.

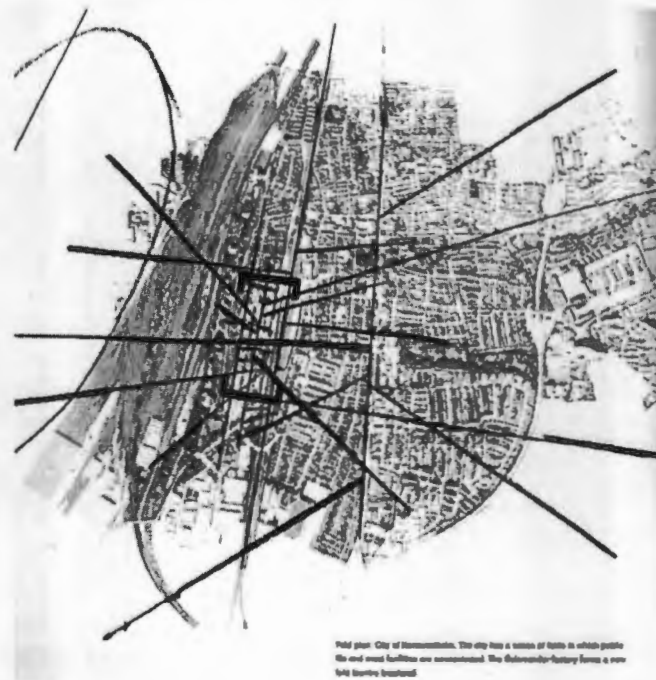
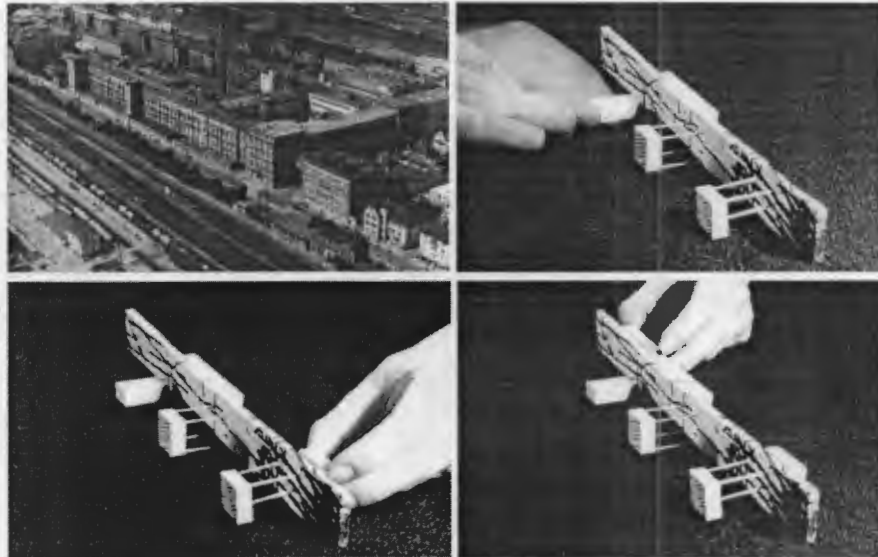


Figure 16: Urban Plan for Kornwesthem indicating the series of 'folds' where most public facilities are located. The Salamander Factory is indicated in the brackets. (Bunschoten, Public Spaces 2002, 46)

The architectural approach does not start with a search for prototypes, but rather a response to various other factors. When production was relocated, the empty site created a split in the town. CHORA saw this as a potential site of redevelopment and a possible new face for the city.

Through an initial workshop with municipal authorities, factory managers and other individuals, scenarios were developed on the potential of the factory complex. The vision was to use the site as part of a larger framework of north – south 'folds' through the town. (Figure 16)



Factory complex; infrastructural spine with plug - in programmes

Figure 17: (Bunschoten, Public Spaces 2002, 49)

The prototype is essentially a spine diagram which corresponds to both the larger urban ideas, and the specific factory conditions. The proposal is the creation of a backbone with new infrastructure, which can grow and develop over time. It contains services that can accommodate housing, start up business space, retail, and spaces for large companies. Part of this 'infrastructure' is public space, the largest of which is a park which runs through the city. While the process is open-ended, the proposal responds to a highly specific idea of development in the city. This is a position taken by the designers.

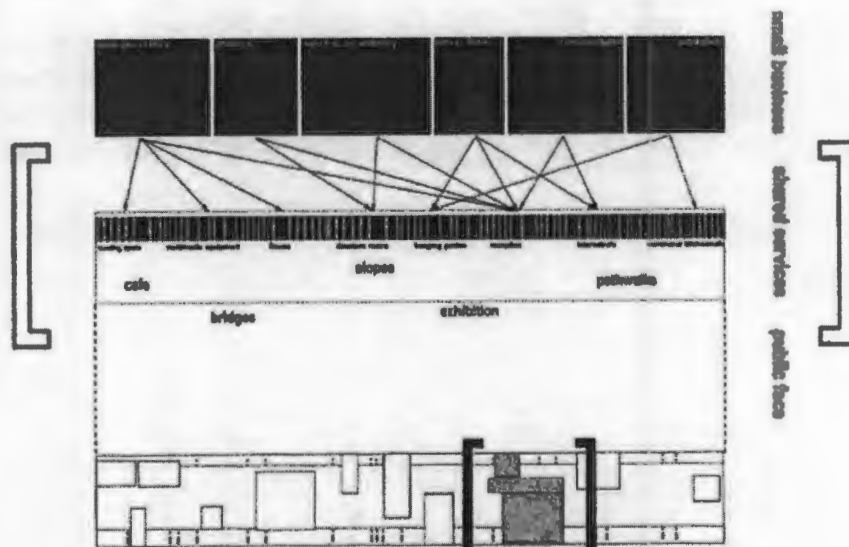


Diagram explaining interlinking programmes and spaces

Figure 18: (Bunschoten, Public Spaces 2002, 53)

The ability for change is programmed into the structure, enabling the development to respond to the dynamic urban environment. The spine generates other programmes around the factory complex such as links to public transport, restaurants and other cultural activities. (Fig. 15)

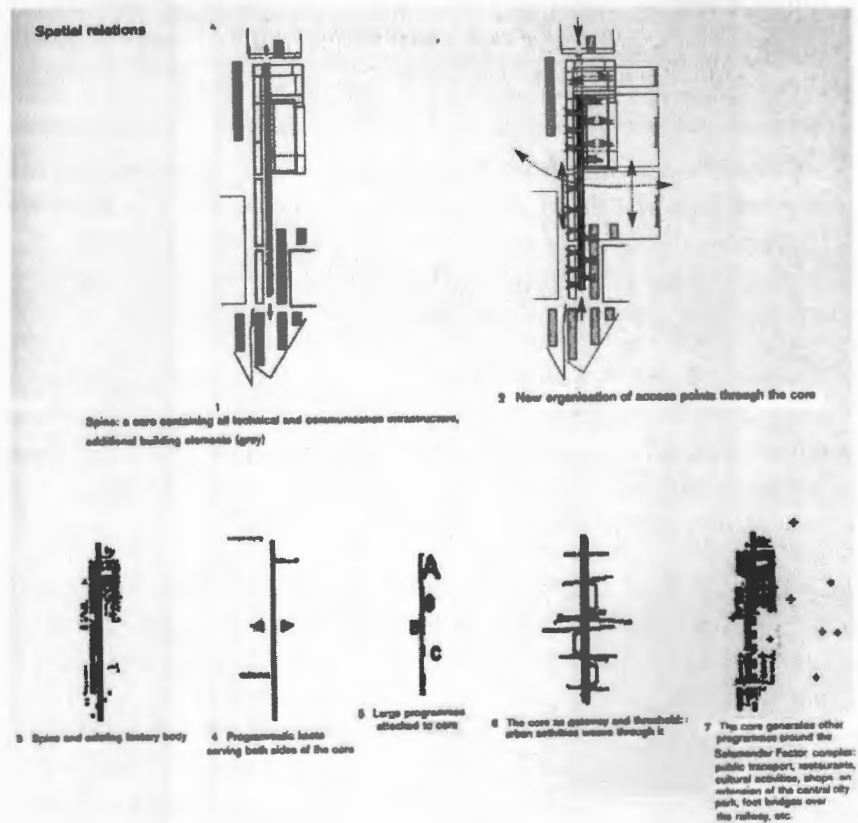


Figure 19: (Bunschoten, Public Spaces 2002, 51)

The reasoning behind this approach deals with the complexity of the city at various scales: all of which attempt to respond to primary spaces and services, open ended use, and the invention of future possibilities. Ultimately public space needs space, *'fields to play and act in, and objects to play with and react against.'* *"This is architecture. The rest is city life."* (Bunschoten, Public Spaces 2002, 6)

## Conclusion:

*I have as yet been unable to find much written about the effectiveness of what CHORA practise. There is little evidence of how this approach is received in practice. The architectural work used for the case study is un-built, as is much of their work. The actual ability to accommodate change over time, and the resultant 'performativity' of the constructions is unknown.*

*My own site research in the following section is largely based on the methodology of CHORA. Their techniques are adapted to both the limited means of my project, and the critique of their work. This critique is largely influenced by the readings in the first two sections, which play a part in my methodology.*

*I began my site research with the bean – site approach, however unlike CHORA, I mapped out my path through the city. Additionally, while CHORA investigate multiple bean sites and their interrelationships – I chose one, as a sample which correlates and raises issues pertinent to the city as a whole.*

*One of the most significant critiques of CHORA's approach is that they do not consider those without power. In my site research I attempted to respond to this through incorporating the findings of a participation process<sup>12</sup> which incorporated the views of 'marginalised groups', and the incorporation of writings on the city by the Centre for Popular Memory. My project has not extended to the involvement of 'actors and agents' but rather focuses on a kind of 'simulation' of this through layering of various factors that are pertinent to the site conditions and the city as a whole. This was to expand my knowledge of the city into other readings. The research on the site was done through a combination of observations, wanderings, interviews, and readings of other urban reports and 'news' articles. This is explored in the following section.*

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<sup>12</sup> This was done in 2002 for the Woodstock – Salt River Revitalisation Framework done by NM and Associates.

# 05. Site Research (How to act?)

## Throwing beans, recording rhythms, and mapping difference

This section is composed of my research in the city. It draws on the methodology and theories covered in the previous 3 sections. It corresponds directly with the mapping activities done and should be read as a complement to them.

### Throwing beans

I began this project by questioning the nature of Cape Town, through the iconic postcard image of Table Mountain. The starting point was an attempt to understand and reveal what is hidden beneath the city or the hidden emotions in the words of CHORA.

I chose the 'postcard' image for its symbolic value to the city – and the many 'complexities' that it hides. Through literature, readings and the case study emerged a set of possibilities that I wanted to explore and test.

From the starting point of 'collaging' various other 'Cape Town's' into the postcard I 'immersed' myself into the city. Drawing on ideas of the 'ordinary' city revealed an urban topography that is vast and controlling yet crossed, changed, and created every day. To 'see' the city I began with the 'bean throwing' method used by CHORA.

In order to do this, it was necessary to frame the project through a particular 'map' that was to be re-read. My choice was a tourist map of the central city of Cape Town. While a very simple procedure – the act and decision of throwing beans took time. It was difficult to both let go – but frame that act. The choice of the 'tourist map' excluded so much of the city, yet the bean sites were potentially expansive. Each time I started the process, I questioned what I was potentially missing in 'other' maps. I settled on the tourist map because in a similar way to the postcard collage, it offered the

possibility to de-centre the centre. It also stems from a broader concern of the 'right to the city'.

The 'bean site' approach has strong correlations with the argument made by Jennifer Robinson of 'Ordinary cities'. It highlights the idea that dynamic 'everyday' practices exist everywhere. Framing was necessary in order to create a 'pocket world' that could be read.

Once I identified 15 bean sites within the map, I went on a 'derive' of the bean- sites identified. This process revealed the diversity of the city and how frequently it connects to places beyond itself.



Figure 20: Plinoc: 24 hour laundry/computer services/Nollywood + Bollywood dvd shop owned by Congolese in Woodstock. (Site Observations 2010)

Having visited the bean sites, the next step was to draw out the important factors from the 15 sites, in order to find a common thread. It was an initial attempt at finding 'proto-urban conditions' within the city through 'pocket world' scenarios. In writing out the mini – scenarios I included literature on the city. These additional stories added a layer of complexity to the visual one of the site visits, and a further depth into what is hidden beyond the image of city. While this still maintained the focused framing, it expanded this beyond my own knowledge and my initial visual interpretation of the sites. Through a conscious attempt to re- read the city differently, I found various narratives on how the city is used and what it means for different people. This is illustrated in the mappings done for each of the sites.

The next stage for the research was a further investigation into one of the sites.

## Choice of sites

Of the 14 sites, I chose one. The 14 bean sites are all random, however because of the limitations of this project I needed to focus on one site in order to fully understand its particular processes and 'pocket world scenarios'.

This phase consisted of two parts: my initial research focused on the 'everyday life of the site' through the mapping of the transient everyday practices (drawing on a rhythm analysis approach); the second part looked at more conventional urban analyses that spoke to broader social, spatial and historical concerns. These two research processes happened parallel to each other.

This second part draws on a revitalisation framework for Woodstock Salt River drawn up by a NM Associates<sup>13</sup>, and various city documents such as the MSDF review, and articles on transport in the city. Relevant to both parts has been research into by – laws on streets, zoning and land use in the area. The research done by NM and Associates includes a participation process with various groups in the area.<sup>14</sup>.

In order to take the research forward, I needed to create 'taxonomies'. I used the idea of 3 movement categories of slow, medium and ephemeral set up by CHORA, as a basis to begin identifying categories. I later expanded this to include the historical context, ecological concerns and urban/ everyday practices. The combination and intersection of these categories informed the design proposal.

The 'derive' illustrated that the main concerns are commuting in the city, migration, and the relationship to the mountain. These factors were also prominent on the chosen site and the overall urban analysis. Commuting is a daily reality of many of the inhabitants of Cape Town and the commuter patterns indicate changing ways of inhabiting the city.

## Broad Site Research

### Commuting

*"More than 40% of learners in Cape Town commute to schools outside their neighbourhoods on a daily basis? What kind of spatial habits and expectation does it give rise to and will the future city*

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<sup>13</sup> A local urban design/ planning firm, including architects.

<sup>14</sup> The participation process consisted of a series of focus group discussions between February and May 2002. They included educational institutions, resident's and rate-payers associations, street people area forum and local business representatives. This was in addition to informal discussions with interested professionals in the area. The framework that was devised attempted to address the concerns of those involved.

*infrastructures be able to keep up?* (Pieterse, *Blurring Boundaries: Fragments of an Urban research agenda 2005*)

Findings on the site by NM and Associates show that 90% of the students in the area commute to school ( NM and Associates Planners and Designers 2002). Apartheid planning limited its poorer, non – white populations to the limits of the city, creating the necessity for travel (MSDF Review/ New City SDF 2002). Maintained spatial segregation in cities means that this condition is still prevalent. It is compounded by a choice parents make to send their children to what are considered to be better schools in the city centre and suburbs. (M. Librarian 2009). Many of the commuters into the city centre come from the metro – south east.<sup>15</sup> (MSDF Review/ New City SDF 2002)

While rail is the most used public transport in Cape Town, bus and taxi routes are important along Main Road. Peak traffic volumes in the early morning, afternoon and evening are situated around school and work starting times, school ending times, and work ending times. (Site Observations 2010)

Within the rail system, the Woodstock Station is among the higher used stations in the city, which is indicative of the employment (MSDF Review/ New City SDF 2002) and educational facilities in the area. 27918 users pass through Woodstock station on a weekly basis. Although only 5845 disembark, the numbers remain significant – with 60% of these passengers being school goers (Woodstock - Salt River Revitalisation Framework 2002). This results in high usage patterns of the station in the after school from 3-4pm, in addition to before and after work peak times. Located on the corner of Station road, Mrs Adams, an informal trader confirmed these patterns of peak activity, responding to it by opening her stall from 6am -6pm (Adams 2010).

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<sup>15</sup> Evident in the lower rates of traffic entering and leaving these poorer residential areas of Cape Town. (MSDF Review/ New City SDF 2002)



Figure 21: Mrs Adam's stall on the corner of Station Road, Woodstock, on a rainy day. (Site Observations 2010)

One of the key suggestions in the Revitalisation Framework is of 'support facilities for schools'. They suggest mobile libraries that can service the schools in the area. According to their report, this is a facility needed by local schools who at the time were attempting to raise funds for them. While it is an old report, these facilities remain a problem and therefore an opportunity (Librarian, Woodstock Library 2010).

This condition led me back to idea of Lefebvre and the 'right to the city' which is where I started the research. Beyond the need for specific public facilities it raises questions of higher density city spaces.

## History

The historical research into the site has not been a focus, but is significant in the area. There are two key historical factors– the first is of main road as a thoroughfare, and the second is the gateway function of the site. There is a national monument in Trafalgar Park – the French Redoubt (1781) which links to the 'gateway' history of the area.



Figure 22: The French Redoubt at Trafalgar Park, behind the fence. (Site Observations 2010)

Main road was one of the first key routes out of the Cape Settlement. It was probably laid according to earlier Khoi migratory routes into the Liesbeek valley. The dry slopes of the area indicate that its early function would have been largely migratory. While the pre-colonial history is speculative, the historical importance of the route remains significant. ( NM and Associates Planners and Designers 2002)

The nearby Trafalgar park is the site of an early gateway into the city. It contains the 'Lines of Munnik' which connected the Zonnebloem homestead to Fort Knokke on the coast, forming an early defensive line for the VOC in Cape Town. It was built in 1781 by a French garrison and later formalised as a toll gate in the mid – 19<sup>th</sup> century. Farmers would pay a tax to bring produce into the city market. This use meant it was a natural gap between development zones.

In 2007 the French Redoubt on Trafalgar Park was bricked up and fenced in following the structure being used for drug dealing. The current situation is that while the site has been 'cleaned up' of drug dealers – the ruins are inaccessible and fenced in.

## Urban Development

Early urban development in the area was spurred by the introduction of Electric trams in the 1890's. This made the area increasingly accessible and was followed with speculative development<sup>16</sup>. It maintained a link to the sea until the expansion of

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<sup>16</sup> There was 394 % of development between 1882 – 1913. In 1900 538 new houses were built. (Woodstock - Salt River Revitalisation Framework 2002)

the railway, harbour and reclamation of the foreshore from the 1920's – 60's destroyed Woodstock beach and Fort Knokke. To some extent, the site has maintained its gateway 'status' as it continues to offer potentially cheaper land within close proximity to the centre. The speculative nature of the initial development has continued, with the result being unstable tenure of rental spaces. (Woodstock - Salt River Revitalisation Framework 2002) The site research is largely based on the current practices within these speculative Victorian shop developments.

The research and interviews point to a particular problem for the future with regards to a rise in property prices in the area. Woodstock is currently one of the last remaining working class neighbourhoods close to the CBD. Interestingly large parts of the area which are residential are zoned general commercial. This is because zoning was implemented after the development of the area. Most of these buildings are rented accommodation. With low property prices, this has enabled flexibility in land use. An increase in property prices will potentially challenge the tenure of these inhabitants. The effect is beginning to be seen with groups of tenants having been evicted to areas such as Delft (Troy 2010).

The area is being encroached by gentrification from developments such as the Old Biscuit Mill and the extension of the CBD (Woodstock Development retains the Suburb's Charm and Heritage 2008). While there is a general welcoming of the area being 'cleaned up' by tenants, the implications in the near future will likely change the area completely. One shop tenant said his building value has increased from 400 000 last year – to over 2 million this year – the result being that he can no longer afford the rental demanded. (Namso 2010)



Figure 23: The property value of this building increased from 400 000 to 2 million in 1 year. (Namso 2010) (Site Observations 2010)

## 'Everyday' Practices

This section is based on questioning what actually happens on the site in an effort to discover what this could mean for architecture. It was gathered through a series of site observations, readings on the site, and interviews with those who live and work there.

Drawing on an article by Hilde Heynen and Andre Loeckx<sup>17</sup> – architecture can attempt to be a receptacle, an agent of change or a stage. It is the 'stage' potential that I am most interested in. It is not about researching passing contingencies - but questioning the potential underlying tensions and ambiguities that could lead to a different proposition.

This research revealed that in addition to the issues of commuting, high crime precincts, and importance of schooling in the area, several positive 'self organising' processes exist on the site. These processes exist in a series of networks across the site that relate to various family groupings and trade. The following are the most prominent.

### **Second Hand Furniture Trade:**

For the past 10 years there has been a lucrative second hand furniture and building materials trade. 4 of the 8 second hand shops

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<sup>17</sup> Their article is based on 3 research papers done on Ankara, Turkey; a Berber village, and Brussels and its public space. These contexts are relevant because they all deal with conditions of urban change and an attempt at understanding urban contexts.

are owned by different members of the same family. Of the 4 additional shops, 1 is owned by a previous employee of one of the 'family'. Of the remaining 3, 1 is locally owned, and 2 are owned by Kenyans.

The trade survives on people bringing up goods from the dumping yard in Beach road, Woodstock, or unwanted furniture which is donated to the shops. The shops are mostly small, and most are located in 1928<sup>18</sup> 'Victorian' structures. An important daily ritual consists of 'packing out' all of the furniture onto the sidewalk in order for it to be displayed. Since the beginning of this year the law – enforcement police have been more vigilant than usual on their enforcement of pavement by-laws, and have fined several of the shopkeepers. Members of the 'family' – who I will refer to as Nazly's family (one of the most well known daughters) - still keep their goods outside. They have adapted their practice to open after 10am, as the law enforcement mostly patrol before then. (Nazly 2010) The fear of high fines, or confiscated furniture in this low – profit industry, has meant some of the other owners keep their goods inside. (Rabia 2010)

Nazly's outdoor furniture display functions as an outdoor living room for the informal inhabitants of Pine Streets and others in the area who stop to take a break when passing through. She said that she invited Faiza (one of the inhabitants of the informal settlement) to 'have a smoke with her when she first moved in' and she now comes every day. Interestingly Nazly has a good relationship with the informal inhabitants who reside behind her shop. She allows them access to her fridge, electricity, and fresh drinking water during the day. (Nazly 2010)

Nazly and her extended family all live in Bonteheuwel. One of her previous employees, a Cameroonian, had adapted the 'kitchen area' of the shop for living because of the unsafe situation in the townships for foreigners. The other foreign furniture shop owners live in the back or above their shops. (Rabia 2010) (Nazly 2010) (Rashida 2010)

*What is interesting about this case is not only the evidence of how 'everyday life' manoeuvres around imposed controls – but the specific spatialities that many of these practices take. The sidewalk for the three blocks around these furniture stores functions very literally as an outdoor living room while Trafalgar Park nearby is barely used. These shops attract passerby's through their sidewalk display, the actual structures are used largely for the storage of goods.*

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<sup>18</sup> This is the date that Trafalgar House was established – a Victorian –type (April 04 2008: Woodstock: Building Renovated 2008).



Figure 24: An outdoor living/ trading area under a sheltered colonnade in Woodstock. (Site Observations 2010)

*It is similar entrepreneurial response to that of the Sew Café. They opened up a gap in the market selling what others 'give away'.*

### **Other Furniture Trade:**

This second hand furniture trade co-exists with a larger furniture trade in the area<sup>19</sup>. This includes custom made- furniture built on site in a workshop at the back of the shop (Sofas + Chairs) and sold in the front, and the refurbishment of old second hand furniture. (Evan 2010) (Ridwaan 2010). The Lewis Company headquarters offices are also in the area, and include a subsidiary of the company dealing with expensive outdoor furniture (Lifestyle). One street back from the main road are the warehouses of Indofurn, an importer of

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<sup>19</sup> NM and Associates findings confirm this indicating that the highest numbers of businesses deal in furniture.

Indonesian furniture which is then sold in the high end complex of Northgate Island<sup>20</sup> outside Century City.

*The varied nature, sources and scales of the furniture trade in the area is incredibly interesting. Several of the furniture shop owners said that they opened up shops in the area because of this existing network. Customers came to the area to shop for furniture. (Ridwaan 2010)*

*The Cameroonian furniture store, and Sofa + Chairs are retail 'types' which combine manufacturing with sales. In the case of the Sofa + Chairs store, sales are largely internet based, with the small show room functioning more as a meeting room to discuss material specifications.*

### **Cameroonian:**

In the Trafalgar Park complex the three shops/ enterprises all named Mediterranean (furniture/coffee bar/ superette) with various spellings are owned by Cameroonian nationals. The supermarket has been divided into two parts, with a cell phone kiosk located within it. While not particularly willing to reveal information on themselves, it seems as though the Coffee Bar functions as a sort of Cameroonian 'community centre'. (Cameroonian, Mediterian Supermarket 2010) From 4pm the coffee bar begins to be filled with customers. The cooking of Cameroonian food starts in the afternoon to prepare for this. A South African employee indicated that not many South Africans frequent the place, and it is mostly the reserve of Cameroonians from around Cape Town. Of the 4 that I spoke to, 3 lived in the area, and one outside. The coffee bar is open from 11am – 2am every day of the week. (Cameroonian, Mediteranean Coffee Bar 2010) (SA 2010)



Figure 25: Mediterranean Superette/ Coffee Bar/ Second Hand Furniture. (Site Observations 2010)

The owner of the furniture shop used to work for Nazly and lived in her shop for part of that time. When she no longer wanted to deal in electrical appliances, she advised him to open his own shop. He continues to look after hers when she is not able to and watches

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<sup>20</sup> Northgate Island is described as Cape Town's largest designer furniture and 'lifestyle' complex located near the mall of Century City. (Northgate Island 2010)

over it in the evenings - as he lives in the area (Nazly 2010). He sells refurbished second hand furniture and appliances. He was not willing to talk to me himself.

### **Congolese:**

A friendlier response indicated that Court des Grands bar functions as a 'community centre' for the Congolese community living around Cape Town. Run by two brothers who live in Table View, the bar mostly attracts Congolese migrants to watch Nollywood movies, English Premier League football games, and gather after Sunday afternoon football games in observatory or Salt River depending on the availability of fields. A 24 hour Congolese shop/laundry (Plinoc) opposite is the only other visible Francophone – Lingali speaking presence in the area. However as with the Cameroonian bar, from 4pm it started to fill with francophone clientele (Site Observations 2010). This was confirmed by the owners. The bar is open from 10 am – 2am, but is busiest on weekends and football evenings. The choice of Woodstock for the location of these premises was both its affordability and proximity to the city centre. (Iloo 2010) (Congolese 2010)

*In both of these situations, the Cameroonian and Congolese 'bars' essentially function as community centres and public spaces for these specific communities. This potentially redefines the relationship between public and private places in the city. Unsafe and unwelcoming public places in South Africa have led to increased privatised spaces made public through their use. This is true both for immigrant communities as it is for South Africans. While they contain a certain emancipatory potential – they are also exclusionary spaces only for certain people. (Heynen and Loecx 1998) Activities such as this question the nature of designing public space in the city and the assumption of these necessarily being open and visible to all.*

*The Plinoc Laundry and Mediteranean Superette both indicate retail types that are stores which are subdivided internally into two. The Mediterranean Superette contains a cellphone and watch repair kiosk distinct to the main store and run by a different owner who sublets that space. The Plinoc Laundry contains the laundry area at the back, and the general computer and Nollywood DVD shop near the front.*

### **Fabric:**

A particularly interesting and entrepreneurial fabric trade exists in the area. Historically known as a textile area – this is no surprise. Yet the decline in the textile industry has opened up the space for alternative businesses. Kwaai Lappies is a shop which buys off cuts of fabric from large manufacturers and importers in South Africa and sells these to the public. Open for 8 years now, the owner started his business by selling off-cuts at flea markets. He expanded

to currently having a large shop surrounded a few remaining textile industries. He opens the shop at 5:45 in the morning tapping into the commuting 'factory ladies' market before they start work. In the recent past, they bought fabric and sewed their own clothes before work started at 8am. Factories no longer open early now, and the owner has therefore started a sew – café: where he hires out sewing machines on an hourly basis<sup>21</sup>. He no longer deals in the smallest 'lappies' and sells these to a former employee who has opened a smaller shop opposite. (Namso 2010) (Troy 2010)



Figure 26: Kwaai Lappies (left) deals with larger stock, while the smaller off-cuts are sold to Los Lappies (right) across the road. (Site Observations 2010)

*The 'sew café' is a particularly innovative idea, and an example of a self organised process that generates self reliance (in the words of Matthew Barac (Barac 2007).) The question it raises is both what this space could be like, and whether this could lead to the proliferation of other similar spaces that respond to such needs- with services that could accommodate various innovative activities of various scales.*

*A further interesting note on the type of program is that while the kwaai lappies is a street trade, customers are largely those from within the industry, being mainly factory workers from the area, with some external designers. The opening times of the shop respond to the nature of the key clientele.*

#### **Mosque:**

The mosque is located two roads back from main road. It is 'mapped' as it was repeatedly raised in interviews for its religious and educational function in the area. It is a local community mosque

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<sup>21</sup> having bought a job lot of sewing machines when one of the textile factories went bankrupt (Interview 2010)

which is frequented by the more transient inhabitants of main road. The Kenyan second hand furniture family (Rabia), Bangladeshi superette owner (Dhaka), and the owner of the Woodstock Namso all indicated the mosque as a central place of worship. In addition a 3pm daily madrassa is held from the mosque where a variety of children from the various immigrant and local communities gather. (Muhammad 2010) (Namso 2010) (Rabia 2010)

*The mosque is another significant public facility and public space in the area which is combined with an educational facility. While the network associated with it is not function specific, it forms a community around it. Namso is a larger furniture and curtaining shop.*

#### **General:**

Nazly's father opened his second hand business about 10 years ago. His 2 daughters and granddaughter started theirs between 6 and 4 years ago. He grew up in District 6, and their mother, Nadeema, in the Woodstock area. The owner of Kwaai Lappies is also a former resident of the area, and currently lives further up the mountain in University Estate. Mrs. Adams' who runs a vegetable stall, has grown up and lived her entire life in the area. This seems to indicate a connection between people and the significance of the place in their personal history. It is not conclusive, but an interesting observation.

One of the concerns that I had while 'investigating' these everyday practices in the city was around those that were going to remain hidden from me. This area of Woodstock is synonymous with a significant drug trade in the area, however this was barely raised. It was mentioned by the Silver tree crèche teachers in complaining about how the Pine Street informal inhabitants used drugs in the park, or throw drugs into the property when police raid their homes. They often find the substances on Monday morning (and had the Monday prior to my visit). (Silvertree National War Memorial Foundation 2010) The only other reference was to the Gympie Street ex - residents who were known drug users and traders, and have since been evicted. (Troy 2010) The omittance of what is indicated as a big problem in general reports is possibly one of the most significant 'self - organised' practices in the area. It is important to mention it because like crime in the area, although it is a 'hidden' non - visible layer it needs to be dealt with by more significant social structures.

Crime was a particularly big problem around Gympie Street - and while the area remains unsafe, the eviction of apparently 'problematic' people towards the end of last year has drastically increased safety in the area. (Site Observations 2010) Crime will be a consideration somewhat in the design approach, but as a distinct and complex social issue will not be considered further.

## Connection to the Mountain

The nearby Trafalgar Park is potentially an important ecological site within the city, as it could enforce and re- create a link between devil's peak, the city and the sea. It forms a part of the larger open space network in the area. NM and Assoc.'s proposal for Trafalgar Park is for a high order recreational facility. The park is currently largely unused with the exception of children passing through on their way to the bus stops and station, pausing to play after school. (Site Observations 2010)

The swimming pool adjacent to this park is well patronised and a successful public facility. It doesn't have any direct relationship to Trafalgar Park at present.

The area is known for its particularly strong South Easter in summer, and the North West rain and wind in winter which strains built structures. ( NM and Associates Planners and Designers 2002)

NM and Assoc. research indicates that there are 'elevated blood lead levels detected in the Woodstock working class inhabitants. This points to a combination of lack of green recreational spaces and high traffic volumes. It indicates a need for 'green' spaces: an additional argument for the proposed Trafalgar Park mountain link. ( NM and Associates Planners and Designers 2002)

I started the project by interrogating the 'postcard image of table mountain' – and return now to the 'landscape'. While there is a need for green public open space in the city, there is also a need to interrogate the potentials of landscape within an urban context and what this could be. While Trafalgar park is a significant public open space within the area, the site research indicated that it is not a widely used space. (Site Observations 2010)

## Conclusion:

*Many of the 'everyday' activities happen within the same kinds of spaces. While this could raise the argument that these would be possible regardless of the space – there are certain modifications and patterns of inhabitation that seem to indicate why people use certain areas and not others. I aim to draw these factors into my design proposal.*

*The main locations of the varied activities are 'Victorian' strip shops which have accommodation above and colonnades in front. Many of the other businesses are adaptations of this, where the 'stoep' has been enclosed. These spaces can accommodate both businesses and housing. They are layered, with the front colonnade creating a sheltered street space; the main body; the kitchen at the back (converted to living in some); and the back yard. Some have living units upstairs.*

*Many of the owners create an additional layer for living, private back space or counter space with a secondary access to these spaces.*

*The close proximity to each other means that some of the shops are contained within 2. (Nazly 2010) In the case of the Court des Grand bar, the owners moved from a neighbouring shop which was slightly smaller. In the Cameroonian supermarket the shop is subdivided with a separately run cell phone kiosk within it (Cameroonian, Mediterian Supermarket 2010). This points to the need for various sizes of accommodation required.*

*The research points to the lack of a relationship between the programmes and the architectural spaces. Many of the same spaces have been used for varied purposes from commercial to public and private. The hints for a design proposal lie in the ability to accommodate varied activities, and the possibility for change or extension.*

*It is important to clarify that this is by no means a condition that is necessarily true for all spaces and all programmes. While it does relate to ideas of open – programmed architecture raised through the case study, and the idea of architecture as a stage – it is also highly particular to the kinds of small urban spaces that are accommodated. It is in this type of transient urban condition that people inhabit and re-inhabit space. It does not negate the need for highly specific spaces within the city.*

*This leads into the question of what the architecture can do. The inhabitation is ephemeral in its nature, but the physical form will likely outlast this. Based on this, what are the physical and material responses architecture needs to have?*

# Conclusion:

This paper has been a search into the everyday practices of the city in order to find what was hidden within it. The result was the 'finding' of a complex system of social networks and local organisations in a part of the city. These city spaces reveal a world of innovation and ingenuity, which work within and around the planned and controlled abstract city.

Through this site research, literature and case studies emerged a series of ideas on the city. The work of Raoul Bunschoten with CHORA attempts to respond to these concerns through an inclusive approach to design. While by no means the only answer to designing in a contemporary context- it is one of the few practices who question what it means to design for complexity beyond complex drawings. They engage with ideas of seeing and reading the city differently - where the architecture is one element within a broader field.

One of the evident limitations to the approaches researched was their limited material and physical response. The innovative 'hidden' processes which are uncovered are reduced to tracings and 'tents'<sup>22</sup> in the architectural response. Their aim for 'operative architecture' is attempted through an organisational idea. (Bunschoten, Binet and Hoshino 2001) This is a potential limit in the approach of considering the practices of the 'everyday' – as their very nature is transient. This is a question that I have carried through into my design proposal.

Ultimately, these proposals attempt to respond to this liminal nature of city spaces. They move attention from the creation of an image to a process of production. (Corner 1999) As opposed to a metaphorical process that is written into the design, they argue for an approach where the act of producing and the effect of the product become important.

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<sup>22</sup> One of the proposals in Urban Flotsam in response to a self organised process is to set up a tent on the site. (Bunschoten, Binet and Hoshino, Urban Flotsam: Stirring the city 2001)

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# Part 2:

# **Glossary:**

## **Algebra:**

The word algebra comes from the Arabic word 'al jabr' which means – 'to put together'. Algebra is the branch of mathematics which relates to the study of rules and operations.

## **Algorithm:**

An algorithm is the development of a finite number of rules based on the extraction of logical principles from a system. They can be used for tedious computation as well as to generate unpredictable results.

## **Geometry:**

Geometry means 'earth – measuring' and is the field of mathematics which is concerned with 'lengths, areas and volumes'.

## **Scripting:**

Scripting is a computer programming language. In architecture, it is the basis of digital modelling where the programming language is based on writing 'rules' for spatial relationships in order for them to be modelled.

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# 01. Introduction:

Through my architectural design education, the predominant approach to technology has been where materials are applied to a design. Only then is the design adapted so that it works. This is widely prevalent within architecture where form is prioritised over material considerations. (Furjan 2007) The representational tools that are used emphasise 'geometric descriptions' which do not necessarily relate to the material systems. Production, construction and the materialisation become an afterthought to the drawing of the 'shape'. (Menges, Manufacturing Diversity 2006)

A similar critique applies to the consideration of 'context' in architecture. It is an important consideration as architecture is not isolated, and always located. Yet in much contemporary architecture the context is metaphorically translated into the building design.

This second part to the research, investigates alternatives to this prevalent practice. It follows on from my theory paper – which questioned the possibility of creating an architecture of 'effects' as opposed to an 'artefact'. (Allen 2000)

The second reason for my interest in algorithmic architecture lies in its potential in dealing with complexity in the contemporary urban context.

My site research in Woodstock, explored in the first section, is indicative of contemporary urban spaces which consist of an immense system of activities, peoples and functions that exhibit a highly specific yet indeterminate nature. The research revealed a complex system of social networks and locally self – organised processes. My conclusion, and response led me to question the possibility of incorporating these ideas into an architectural proposal, and to question this process of (architectural) production.

Where modern architecture was largely ocular (Furjan 2007), algorithms offer the potential to explore architecture as part of a 'complex' larger system. It also challenges the dominant 'post – modern' emphasis on linguistics and the resultant internal architectural debate that had little to do with materials and production. (Kwinter and Payne 2008) This is becoming increasingly

possible through a different understanding to the process of design, relating to new technologies where “the same system that lays out the grid of the surface in the design process can in turn drive the machine that cuts those elements. Design and fabrication are linked together...” (Allen, Practice: Architecture, technique and representation 2000).

This paper therefore explores both the material and physical potential inherent in algorithmic architecture, in addition to the underlying methodology. It is the rule – based design approach that is particularly relevant to my design.

This approach will be explored through a series of studies starting with the general potential (01) and meaning of algorithms in architecture. The second section looks at an early (02) example of algebraic architecture. This will be followed by a series of brief precedent studies beginning with the work of Aranda/Lasch Architects (03) which will include a critique of their work through projects that focus on material and ecological approaches more specifically. All of these sections include possibilities of non – digital translations of the ideas. This is followed by a practical exploration from a workshop that I did (04). The fifth section looks at an overall critique of the use of algorithms and digital software (06).

Algorithmic architecture is by no means the only way to deal with complexity in the contemporary context – the analogue examples are a few which cover other techniques which look at similar ways of thinking. Most of these are early examples, done before computers. The particular potential of digital algorithmic architecture lies in the higher computational ability, and the increasing speed with which many of these issues can be responded to. Multiple conditions can be layered and reviewed simultaneously. In the words of Reiser + Umemoto, it enables an “‘and and and’ argument – neither pure classical models, nor pure structural honesty, nor pure compositional formalism, implying a more open – ended process.” (Reiser 2006, 27)

# Scope of work:

The potential scope of the field is vast, and includes varied approaches and ideas. This paper looks at algorithmic architecture from design to production. This describes the field as a whole, in turn focusing on three particular approaches – largely formal (rethinking form), material and structural investigation, and lastly building and material as part of a larger eco-system.

I will not be looking at the broader parametric field. Within algorithmic architecture there exist many examples of work – I am focusing on those that specifically relate to multidimensional approaches and are responsive to their context. For each algorithmic example I have focused on one ‘analogue’ example from many possibilities.

This does not seem to be the prevalent approach to algorithmic architecture, but is gaining momentum, and is the potential of algorithmic designing. This way of designing is largely experimental which means there are limitations inherent to each approach. The limited ‘architectural’ built structures are indicative of this.

# 02. Algorithmic Designing:

This section will begin with a brief background into algorithmic architecture and its potential usefulness. This will be followed with a more detailed explanation of what it entails. The final part will look at how these techniques relate to production processes.

The roots of architecture can be found in complexity theory, where a large number of factors need to work interactively. (Kwinter and Payne 2008)

## A Brief Background

Algorithmic design processes enable 'complex forms' to be grown from simple iterative means. It is a rule based approach which maintains the qualities of the initial module.

It is often confused with parametric designing. The difference is that parametric designing deals with control and manipulation of design at all scales. Algorithmic design on the other hand provides methods of generating complexity based on simple component rules. The component therefore does not change – but grows and adapts. (Sakamoto and Ferre 2007) Both approaches focus on defining relationships between geometries and therefore constitute an algebraic approach as opposed to a geometric one<sup>1</sup>. They are often used in conjunction with one another. This essay will focus on algorithmic architecture.

In some senses these technologies enable us to create 'secreted' (Merrifield 2002) structures as talked about by Lefebvre. He uses this term in reference to his home village in the Pyrenees (Navarrenx) as an example of a 'secreted space' which is produced and appropriated by people as they go along. This is described as the opposite to modern societies who reduce complex space, which

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<sup>1</sup> This means that although the 'parts' might be geometric, the relationship between the parts is algebraic.

is at once perceived, conceived and lived, to an 'abstraction'. (Merrifield 2002) Cities such as Navarrenx developed over centuries with the ability to adapt to climatic and social conditions through emergence.

The potential in algorithmic architecture lies in being able to achieve a similar complexity of older cities – where time is compressed through the method of generation. This approach significantly changes the relationship between architectural drawing and production – enabling increased control over the implementation and materialisation of projects. This is in addition to the potential optimising of materials, time, and building quality. This reunification of processes of representation, production and construction is one of the most significant effects of new digital technology. (Allen 2000) In a seemingly paradoxical way – digitally controlled fabrication means that the designer is almost as close to the materialisation as in older 'craft processes' – however with a greater precision, control and increased ability to explore variations. (Menges 2005, 62)

In addition to this re-connection to production processes, is the potential link to materials. This is an approach where the performative capacities of materials are implicated in the design process. The design is then 'grown' with this knowledge. It is based in an understanding of biological and natural processes. Achim Menges terms this 'morphogenetic' – and it entails no differentiation between formation and materialisation. It is a return to 'truth to materials' in a more inherent sense. It is not about mimicking the forms of natural structures – but understanding the logic. (Menges 2006)

The third potential of algorithmic architecture which I will look at in this paper relates to dealing with the environment and sustainability. It is an approach which considers 'environment' as a continuous condition through structures – and therefore requires a rethinking of materials and 'atmospheres'.

*"Extending the concept of a material system by embedding its material characteristics, geometric behaviour, manufacturing constraints and assembly logics allows for deriving and elaborating a design through the system's intrinsic performative capacities."*

(Menges 2006, 79)

Most design is parametric or algorithmic. The greater potential in digital designing is that the designer can move beyond the limitations of 'hand – eye coordination'. And test the possibilities over a range of options at a much greater speed. This does not

mean that subjectivity is not a consideration but rather that 'design logic' can be embedded in an interactive system. It is still driven by the designers 'hand' and 'eye'. It essentially combines intuition and precision – the intuition has to guide the process and make the rules. The precision is the realm of the computer.

## Writing Rules

Algorithmic architecture involves writing rules.

It entails problem solving, simulation, and rule based intelligence. It is a procedure that is designed to address a set of problems with a limited number of steps. The rules need to be derived from a logical extraction of key principles. "It involves deduction, induction, abstraction, generalisation and structured logic." (Terzidis 2003, 65)

Algorithms have been widely used in solving planning problems for interior spaces. (Terzidis, Expressive Form 2003) As mentioned, rule based design is not new – most designs consciously or unconsciously apply a set of rules which often deal with proportions, structures, materials and cost limitations. However these are not likely not be algorithmic rules – as they could remain open, vague, and incomplete. Often only the designer can interpret them. (Williams 2004) This is sometimes due to the limits of 'manual' computation.

Computers have no intelligence – but they have extensive computational abilities. Therefore, each algorithmic rule can only have one possible interpretation so that no intelligence is required in interpreting it. An algorithmic approach requires searching for these rules and patterns of 'inherent logic'. The real potential in digital algorithmic architecture lies in identifying the inherent logic and an increase in computational possibilities to respond to this 'logic'. While humans have intelligence, they have limited computing powers. Computers on the other hand, have infinite computing powers. But they cannot create the rules.

One of the most important features of Algorithmic rules is that they don't relate to fixed quantities but are about consistent relationships. This allows changes in the system while maintaining certain fixed rules. This is not numerical but relational. (Williams 2004)

## Flocking Experiment

An early experiment with algorithms was Craig Reynold's Flocking experiment. The experiment consisted of units or 'boids' which were treated independently with specific rules. Despite the individual

treatment, there was a tendency toward flocking each time the model was simulated. (Allen 2000)

This simulation was one of the first modelling devices which began to dissolve the polarity between order and randomness, and as such was one of the precursors to Algorithmic and parametric design. Each Boid is defined by precise and simple rules. They are relatively indifferent to overall form and extent, focusing on the 'local' condition and relation of the Boid to its 'neighbours'.

The rules are relational. As a result variations and obstacles in the environment are accommodated through fluid adjustment. Despite the 'fluidity' - the process reveals patterns which tend towards similar configurations. In addition, different sizes of 'flocks' reveal the same structure.

Reynold's Boid experiment is an abstract example, but draws out the potential of algorithms – hinting at what could be possible in the built environment. Namely, the ability to adjust to 'obstacles' in a given context, and take into consideration localised differences. (Allen 2000)

*"We thrive in cities precisely because they are places of the unexpected, products of a complex order emerging over time."* (Allen 2000, 160)

Architecture mostly consists of thousands of parts, which are often very different. Algorithmic architecture interrogates the relationship between the whole and its parts in addition to the nature of the parts. It essentially works on an understanding of relationships. This enables the means and approach that is capable of incorporating and adapting to change in cities without destroying the essential coherence of the system.

## Emerging Cities

Rule-based design is governed by rules which must be designed. These rules are based on simulation ideas with the aim to grow a response. This relates to research which now<sup>2</sup> consider cities as 'emergent systems' similar to bird flocks and ant colonies. This is also similar to what can be modelled with software programs as

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<sup>2</sup> In the last 20 years it has become clear that cities, far from being messy, disorganised forms, have rather well defined spatial structures. Order and pattern appear on all scales, with urban activities forming clusters of different sizes. These clusters are supported by networks which transport energy to sustain them and which (pg. 47)

illustrated in the simple Boid's experiment. Neil Leach proposes that this shared 'emergent logic' lends itself to computer modelling of 'emergent' urban forms.

*"Like these other populations, such as those of ants, birds and even networks of neurons, or the global economy, it displays bottom up collective intelligence that is more sophisticated than the behaviour of its parts."* (Leach, Swarm Urbanism 2009, 58)

This idea of 'emergence' is evident in older 'secreted' settlements as well as contemporary informal settlements<sup>3</sup>. These city systems- are not structured around individual components but a broader environment, which to some extent flattens the hierarchy within the design process. These settlements 'emerge' through an interaction of communities and their environment. The results is a 'mutually resilient organisation'. (Leach, Swarm Urbanism 2009)

In architecture, this idea of emergence is often translated into an 'emergent effect' where grids are morphed or adapted to represent change. Whether digitally or manually produced, the use of a fixed base geometry means that these schemes are always limited.

While De Landa argues for a rethinking of the decision making process that gives rise to these 'emergent' effects' he does not have any answers. Both De Landa and Leach however caution against over-simplifying these (urban) systems, realising that the material complexity of cities "far exceeds anything that we might be able to model as yet through digital computation." (Leach, Swarm Urbanism 2009, 58)

## It is a different approach

This approach requires re-thinking questions of control in design. To really engage complexity and indeterminacy in the city requires a radically different way of thinking. This is particularly difficult for a discipline that has been focused on 'legible functional relationships'. A historic commitment to control and separation means that a change in production and approach could radically change architecture. (Allen 2000)

In a desperate attempt to survive, architecture and planning have opposed the idea of a shift from order to chaos – planning to uncontrolled growth. The assumption is that by relinquishing control, architecture will suffer. Algorithmic designing is one method which maintains a certain control, yet allows for indeterminacy.

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<sup>3</sup> Brazilian Favela's are cited as an example.

Algorithms are considered abstract and universal mathematical operations that can be applied to almost any kind or quantity of elements. It is not about the person who invented it, but its efficiency, speed and general applicability. The result is that the use of algorithms is regarded as suspicious to some and a process which overlooks human sensitivity and creativity. Instead of a 'star' architect it gives credit to an anonymous procedure. (Terzidis 2003)

It is an increasingly impersonal process of design. This is however, not necessarily a negative approach, and it does not remove the role of the designer – but changes it. (Reiser + Umemoto 2006) The parameters and rules have to be designed. What they consider, how they work and the relationships that they establish belong to the realm of the designer.

With digital algorithmic designing, these 'relationships' have to be translated into mathematical functions for scripting to be possible. This is one of the major limitations of the approach as it requires a high degree of programming knowledge. What is potentially more important than the ability to programme is the logic which the approach follows. This can be dealt with through 'design teams', thereby including those who have the necessary expertise. This is currently prevalent in larger projects which require extensive computation. (Menges 2006)

## Production

Architecture has largely not kept up with technological advances in other fields. Where it has this has mostly been through surface treatments. The building industry is notoriously against innovation. It uses century old technologies, avoiding risk and drawing on historic considerations in order to not change. The result has been that architecture is 'sluggish' in comparison to other design practices in fully implementing and adopting new technologies. Examples are the aeronautical and automobile industries which have been benefitting from computer aided design processes since the 1980's. At that time architecture was "immersed in ideological and repetitive debates in a realm of referents severed from material production." (Kwinter and Payne 2008)

Initially, computer aided design software was treated as an extension of the drawing board – used mostly for its recording possibilities. (Menges 2005) This is the manner in which I have been taught to use CAD where the focus is on representation. This does not engage with a deeper investigation into the potential of these tools for redefining ideas and production in architecture.

***“Designers don’t think in numbers –they think in relations.  
Standard CAD doesn’t store relations, they store numbers.”***

(Kwinter and Payne 2008)

The first manufacturing systems were NC (numerically controlled) and were developed with the support of the US military to overcome limitations of mass production in the 1950’s. This was largely for metal work. The current range of tools are CNC systems – computer numerical controlled. These are the basis for most CAM – computer assisted manufacturing – applications. (Menges 2006)

Menges argues that “the resulting transfer and integration of digital manufacturing and its increasing affordability has begun to significantly transform the building industry.” (Menges 2006, 71)

These new production models have introduced a new set of constraints. they have also increased the possibilities of making for the designer. Algorithmic designing and modelling enables a vast range of factors to be considered in the design process. From the ‘microscopic to the macroscopic’ – they can potentially act as organising principles not only representations. (Reiser + Umemoto 2006) At the same time, machine constraints have replaced physical constraints

## Conclusion:

*Algorithmic architecture is the process of designing through localised rules that relate to parts. Through the development of rules related to internal and external factors, a structure can be ‘grown’ that responds to various factors simultaneously. In a way, it’s a bit like mapping diverse factors and layering them.*

*Algorithmic architecture is not necessarily digital architecture. It is the approach to design that makes it algorithmic not necessarily the digitisation. Similarly, digital architecture is not necessarily algorithmic or parametric.*

*There are 2 main approaches to architecture using algorithms. The first relates to developing efficient and cost effective solutions. It reflects the nature of the software, which was mostly designed for other industries and therefore aim to create complex forms in the most cost effective manner. It involves problem-solving in order to rationalise costs. (Menges 2005)*

*The second approach deals with explorative architecture. It recognises the potential of algorithmic modelling not only to rationalise a design, but engage with as a basis for the design*

*process that is rule based - and through this potentially deals with heterogeneous concerns. It is the second that I am interested in and therefore the focus of this paper and an aspect that I have explored in my design.*

# 03. An early example:

## The Great Mosque in Cordoba

Algorithmic architecture is not necessarily digital architecture. There is a difference between computation and computerisation. Computerisation involves using a computer and digitising data. Computation is a process that can be done mentally, and involves analysing, codifying and systematising data. Using the computer means that the explorations can extend the limits of human prediction.

I am starting with an 8<sup>th</sup> century structure as an illustration. This structure is not strictly algorithmic – but deals with many of the issues and potentials raised by algorithmic architecture with regards to an ‘embedded design logic’.

The Great Mosque in Cordoba is a structure (founded between 784 – 786) built over nearly 8 centuries. It is an example of ‘algebraic’ architecture as opposed to geometric / Euclidian where the relationship between the parts is important. It isn’t necessarily algorithmic, but the repetition of units according to ‘rules’ makes it a similar approach. This is common aspect in Islamic Art.

The overall typology draws from Iraqi and Syrian Umayyad and Abbasid mosques. It consists of an enclosed forecourt which opens into a covered space for worship. The enclosure would usually have been oriented towards Mecca<sup>4</sup> with a prayer wall marked by a Mihrab (niche) for leading the prayer.

In the first stage of construction (785 – 800) the typology of mosque resulted in a simple structure of 10 parallel walls perpendicular to the prayer wall. These walls were supported on columns and pierced by arches which defined a covered space equal to the court.

The arched walls are perpendicular to the views through. Columns are located at the intersection of the two directions – creating an “undifferentiated but highly charged field.” (Allen 2009, 124) The result is a compiled ‘parallax’ effects as you move through the space. The court facing wall is completely open with no single

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<sup>4</sup> In this mosque the prayer wall apparently faces Damascus

entrance to the enclosed space. Unlike axial or processional 'church spaces' the space is non – directional. It is essentially an accumulation of 'one thing after another'.

The mosque was enlarged in 4 stages. Each of the additions left most of the existing structure intact. The 'local' relationships of the columns remains fixed – with the greater typological structure being enlarged. The relationship between parts remained the same over the 8 centuries of adaptation. What I find interesting about this example is that the independent elements are 'added' to form an 'indeterminate whole'. The parts are not fragments of a larger framework, but parts which have their own properties. This is very similar to the algorithmic ideas being explored.

It has created a field configuration which is inherently expandable. "The possibility of incremental growth is anticipated in the mathematical relations of the parts." (Allen 2009, 124) The result is that the expansion has not been at the expense of the 'whole'.

Allen compares this structure to western classical architecture in order to highlight the differences. The fundamental difference is that this structure is 'algebraic' – working with numerical units combined one after another. This is in contrast to 'geometric designs' which consist of figures organised in space creating a fixed composition. While changes and additions can happen, these are either within the compositional constraints or change the composition.

*"The mosque in Cordoba is not simply added and elaborated – but each stage replicates and preserves the previous stage of construction by the addition of self – same parts. And at Cordoba – when later consecrated as a church, the existing spatial order resists re-centering."*

(Allen 2009, 124)

Rafael Moneo quoted by Allen suggests that the modifications have not destroyed the original mosque – but revealed the integrity of it in that it continues to be 'itself' in the face of all these interventions. This 'integrity' doesn't relate to the overall form or geometric relationships – but the relationship between the 'parts'.

This is evident in the columns in the mosque. The addition to the mosque was done meant the addition of columns with different capitals – however the colour scheme of alternating red and black marble has been maintained. (Kubisch 2004)

The result is a subtle distinction between the different parts which is more of a 'difference in degree than a difference in kind.' (Reiser + Umemoto 2006) The maintenance of the rule of alternating red and black columns maintains coherence – while the different capitals articulate a distinction.

This analysis can't be generalised to refer to 'western' and other architecture, and it is likely that these analyses could apply to many other structures. This analysis also leaves out the incredible decorative elements and roof structures of the mosque, focusing on the overall planning.

The inherent possibilities in the design are particularly interesting as a consideration – and link closely to ideas of algorithmic architecture, in a non – digital sense. Whether this approach was necessarily intentional in the initial design is unknown. There is a lack of authorship implicit in this design and illustrated in the ease with which the design was changed and adapted over time. Although changes have been attributed to specific rulers or architects, the essence of the building has been maintained.

This relates to the "profound impersonality" found in much canonical work. (Reiser + Umemoto 2006) In this case, it could be a distinct feature of the 'algebraic nature' of the design. While the initial architect is implicated throughout the 8 centuries – it is in the 'rules' relating to the "column, arch, skylights and interval that structures their relationship." (Allen 2009, 124)

# 04. Precedent Studies:

I started this with a search into the processes and applications of Aranda/Lasch architects. Through the search emerged other possibilities for algorithmic designing. Aranda/Lasch begin their algorithmic architecture based on practices that are found, while those discussed later propose a rethinking of structure, material and effect. All of the examples given engage with the idea of architecture as part of a larger system. (Allen 2009)

## a. Aranda/Lasch and Packing

The New York based architectural firm Aranda/Lasch headed by the architects Benjamin Aranda and Chris Lasch, practice in an almost cartographic sense. Through 'layering' of ideas and visual information, they attempt to rethink preconceptions about architecture. Their practice in a sense requires 'unlearning', by breaking down systems into components and later reassembling the parts. Each of their projects has a similar approach in terms of understanding, but always dealing with a different set of questions. Furthermore, they anchor their work within cultural practices bringing together craft and computation through geometry, mathematics and pattern. (Sakamoto and Ferre 2007, 194) (Eakin 2006)

They attempt to draw out the 'logic' in existing processes, arguing that there are 'things you can see if you know how to look.' (Eakin 2006)

Their architecture investigates the biological processes which are found in structures. They see this as offering potential for the interpretation of program. This means that before ideas "take on definite forms there is an undifferentiated state which is free of any organisation." These 'patterns' drive the projects, and are only later adjusted to local features.

They use computer scripting as 'tooling' in order to grow the patterns. This results in a pre-material pattern. When a development is imposed onto this formless matter it then engages

with 'substance, organisation and material'. (Aranda and Lasch 2006)

*"The source of wonder behind one crystal is not the storm it came from but rather the elusive internal logic that remains resolute and unmoving through all crystals."* (Aranda and Lasch 2006, 8)

They look at techniques of spiralling, packing, weaving, blending, cracking, flocking, tiling. The aim is to investigate the essential rules that underlie these practices, in order to use them to simulate phenomena based on these rules. This is the algorithm. The aim is for new spatial organisations and logics of construction which move beyond strict geometries.

Each project consists of:

1. A recipe
2. Shapes made by that recipe
3. A project that uses that recipe within an architectural context
4. Programmatic computer code (making the recipes widely available).

The recipe is the first rule. As described earlier, the rules have to be clear in order to be an algorithm – with no room for interpretation. The use of algorithms enables an extension of the exploration process beyond what would have been possible with drawing. They potentially enable the same material to be used differently. This is however not always clear in the final proposition, and does not consider that some materials are more suited to certain processes than others.

Each 'tooling' example has a computer code which can be used with all major 3D modelling software. The algorithms were initially made accessible online with the intention that they could be shared and evolve.

#### **PACKING PRODUCES STABILITY THROUGH ADJACENCY**

One of the exercises they conduct relates to the tool of 'packing'. Packing as explained by Aranda/Lasch is an organisational method in which an element's position to its neighbour is determined by certain rules. There can be no overlapping, things can't be too close. (Aranda and Lasch 2006)

### Recipe for Packing

1. Create a shape\* of a random size.
2. Pick a random point.
3. a) If the shape is inside another shape, or overlaps another shape,<sup>†</sup> throw it away and go back to step 1.<sup>‡</sup>  
b) If not, place it. Go to step 1.

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This 'recipe' potentially allows for various different shapes to be packed together in different ways. Aranda/ Lasch explore the 3 dimensional possibility of packing and take these ideas into a 'log cabin' design.

Log cabins are traditionally constructed through a procedure of cutting trees into logs of a specific size, and then stacking them. They ask the question of whether this could be reversed – stacking first, and then cutting. By cutting after stacking, the trees rings were dominant, and the structural potential of the 'sphere' was released. It also released the capacity for the log to change shape from circle to ellipse to bar. This in turn enabled increased control and adaptability for the program.

The structural potential of the log as material is not clearly illustrated in the final proposition. None of the literature clearly articulates this and moves from referencing the idea to dealing with it as 'tiling' of the façade.

External factors such as the circulation requirements, orientation for views and solar gains /passive climate control were considerations. The physical products are always in a conversation between the algorithm and other external pressures.

The potential of packing was explored in the façade through tiling. While the initial pattern is based on stacking the logs and then cutting. This is then adjusted to particular façade conditions. The north façade is left more opaque to minimise heat loss. The south facing façade opens up toward the western edge of the building, where the common spaces are, to take advantage of the view.

Instead of focusing on the overall form, the algorithms allow the potential for 'local' organising. This is done through differential

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<sup>5</sup> (Aranda and Lasch 2006)

actuation of the façade' which involves computer modelling the placement of tiles according to the rules. (Menges 2006)

These variations are then producible and materialised through the CNC manufacturing procedures which mean that every 'tile' could be cut differently without a substantial increase in the cost.

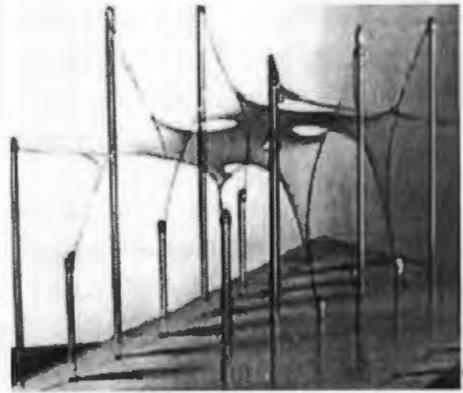
## b. Material and Structure:

A significant critique of the work of Aranda/Lasch lies in their lack of a structural and material approach. They don't start with a material – the initial algorithm identifies a 'pre-material' pattern. For the log cabin, this meant that the visual permeability and ability of the façade to modulate light was not related to its structural stability.

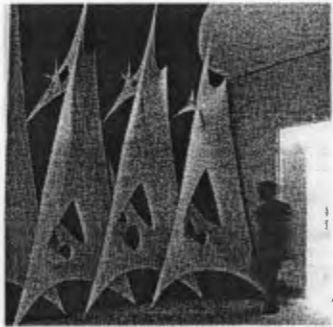
This was a factor hinted at in the initial description, but not carried through as an actual structural proposition. This is a different approach to that of Achim Menges who proposes that the potential of algorithmic architecture lies in its ability to return to material and physical properties.

Much contemporary digital architecture uses algorithmic and parametric programming to make complex forms possible with the most efficient structures. (Menges 2005) Menges starts his research with an understanding of form, material and structure as part of a 'polymorphic system'. It is an approach that recognises structural properties, environmental influences, and logic of manufacturing from the beginning. Complex organisation and forms are derived from the interaction of the system- and its intrinsic material capacities. (Menges 2006) He calls this a 'morphogenetic approach' - based on development biology and bio-mimetic engineering.

It is essentially form- finding through structural analysis and external forces. This is not a new approach and was a dominant feature of the work of Frei Otto among others from the 1950's. Many of the earlier examples of 'form-finding' focus on the 'global' structure aiming for structural stability of the overall system. This is usually defined by an overarching single 'rule'. The difference in Menges' work is that while he begins with the material properties - explores multiple rules that enable 'localised' differentiation.



This is evident in the project 'Membrane Morphologies 02'. It is a project done with Michael Hensel in which the material and structural properties of the nylon membrane are considered in conversation with the holes introduced into the fabric for the purpose of an exhibition. The result is a stable state that is a 'negotiation' between the form, visual requirements and structure.



A second similar project is the 'Metapatch Prototype' designed by David Newton and Joseph Kellner. The project began under the premise of the hypothesis that a system which consists of uniform elements could be both stable and variable.

The project required detailed investigations into the physical properties of the materials being used as well as digital modelling to determine the parameters within which a stable result could be produced. Digital modelling was also used to determine the sequence of assembly.

The screen uses equal flat timber panels, which are fixed differently in order to achieve convex and concave curves through local changes. Through the use of 'differential actuation' of these equal components – a complex self – supporting state was produced.

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<sup>6</sup> An illustration of a soap bubble model made with needles and thread. (Polatoz 2008)

<sup>7</sup> Membrane Morphologies 02' (Menges, polymorphism 2006)

**While this example is of a screen used in an exhibition, it deals with the idea that through knowledge of material properties – simple repeated elements could create complex conditions. And through this – respond to varying requirements – in this case being lighting. (Menges 2006)**

This technique is used for the arrangement of tiling on the façade of the Aranda/Lasch's log cabin – however only for its arrangement of tiles – not its 'self – supporting' possibilities. The potential is that it could lead to a system that deals with both.

#### **Non- Digital:**

As mentioned, this 'form finding' technique is not new, and not limited to digital technology. However, as mentioned, many of the earlier examples of form finding deal with a single overall stability which is not necessarily able to respond to 'local' differences necessary.

The work of Eladio Dieste is an early example that achieves this, and is very similar to the algorithmic work of Menges cited above.

Eladio dieste was an uruguayan engineer of the 1960's. Without a computer, he applied his extensive knowledge of the physical and structural properties of reinforced brick to designing. His practical and theoretical knowledge and experience resulted in him knowing how far he could displace a brick from the next in construction – maintaining the integrity of the construction. The repetition of these small displacements enabled incredible formal effects which produced difference without 'disjunction'. (Allen 2009)

While the approach didn't involve digital computation – it required an incredibly high level of material knowledge. His aim was to develop intelligent design with limited resources. He achieved this through maximising the inherent properties of brick and the inherent stability in catenary forms. The combination enabled him to achieve vaults of as thin as 2 inches which could span over 20 feet. (Ochsendorf 2004, 96) He did this through structural experimentation suggesting that 'construction wisdom' has been abandoned for 'planes' which are easier to draw. (Anderson 2004, 183)

*"it is not enough to use brick because we like its texture and the fact that it is a material full of historical references. It is not that this is bad in and of itself, but we can take much better advantage of its possibilities." (Eladio Dieste in (Anderson 2004, 187))*

A structural approach opens up the question of efficiency and economy in contemporary architecture – as it questions the ‘planar’ approach. These examples illustrate the structural potential of algorithmic architecture to create heterogeneous structures. This is something that Aranda/Lasch hint at – but don’t achieve – in that the logs are reduced to an idea and implemented as tiling.

## c. Environment and Atmosphere

A second issue that is raised through the log cabin example relates to the potential of dealing with environmental concerns through algorithmic architecture. The 'tiled' façade with varying opacity and the 'bedroom bar' for thermal massing are examples of this. (Aranda and Lasch 2006)

Helene Furjan, Achim Menges and Michael Hensel propose that this approach doesn't engage with the full 'algorithmic' potential of 'environmental design'. This is because the 'log cabin' approach treats the enclosure as a two-dimensional surface which is adjusted to consider the environment as an 'external factor'.

Algorithmic architecture potentially opens up the possibility of thinking of buildings as environments as opposed to the building within an environment.

It requires a shift in thinking from architecture as a building system to architecture as a 'conditioner of effects' that deals with heat, light, moisture and shadow among others. (Furjan 2007) This idea draws on one of Reyner Banham's two categories of architecture – namely those without substantial structures and instead adjustable and vague external boundaries. He refers to the campfire as an illustration of this idea as it creates a non-physical barrier that has a graduated threshold of heat and light. It extends outwards from the fire, and is affected by external conditions. Banham proposes this as a possible means of thinking about sustainable architecture. (Hensel and Menges 2007)

Weather simulation, thermodynamic knowledge and extensive material research enable this shift. It requires thinking of materials beyond structure - questioning what they do in their environment on micro and macro scales. (Furjan 2007) It's a vast field – but essentially deals with the 'atmosphere of environments and effects of materials' as a primary concern in design.

An in depth approach is enabled through algorithmic scripting which means that multiple conditions and scales can be responded to simultaneously. This would include external concerns, and internal requirements and intentions. Weather simulation is important as it enables predictions.

These are all possible 'rules' that could be programmed. Through digital modelling – feedback loops would be possible. This is not only about being reactive, but both creatively responding to conditions

and creating conditions, with knowledge of external factors. The 'campfire' creates an 'internal' condition.

*The design practice proposes the use of "scripting simulation modelling to genetically 'breed' envelopes as enhanced environmental systems." (Furjan 2007, 122)*

Many of the approaches focus on a 'digitally responsive' building which physically regulates itself to the changing external conditions. It is an aim for a 'stable instability' which responds to the dynamic nature of external environmental conditions. (Furjan 2007, 122)

While the approach requires looking at the space as an eco - system – one of the sites of the most impact is the threshold. Research done by Menges and Hensel on 'Morpho-ecologies' indicated that material systems 'never tended towards full enclosure surfaces'. This was initially thought to be a default in the early research – but since indicated the importance and desirability of a 'gradient material threshold'. It emphasises that environments continue across thresholds. (Hensel and Achim 2009, 204)

This is not a new idea, and is evident in the Suresnes Open air school designed by Beaudoin and Lods (1932 – 1936). The north side of the school was main building's façade – while the other three external walls were all open – constructed with glass panels which could be folded back completely. Floor – heating, and the 'thermal energy store' of the back wall meant that classes could take place completely exposed to exterior conditions. The physical boundary was replaced with a dynamic 'heat' gradient which worked at a micro-climatic level. The floor heating meant that up to seating height (which was the most inhabited area) the environment was largely moderated. Above this – it responded more to the need for 'oxygen – rich fresh air.'The result was a 'gradient material threshold'.

This example is not 'algorithmic' where the 'envelope' was 'grown'. It is also not entirely passive as it requires a degree of consistent energy input for heating. I have included it in this section as it is illustrative of the idea of a continues yet moderated environment. It is an interesting example which illustrates the potential of the 'campfire'. The argument is that the overall result is more efficient than an enclosed structure which would need to be modulated with heating and fresh air requirements.

**Non- Digital:**

The ideas around continuous environments often relate to high – tech approaches. The idea of a ‘porous’ threshold is however not a new idea, and can be found in older systems which achieve similar results. The Mughal jaalis are an example of this; they create a ‘stable – unstable’ environment. (Hensel and Achim 2009) The jaali is a perforated lattice screen used extensively in Mughal architecture. In Mughal structures they are often stone.

They modulate sunlight and air in addition to visual permeability. This creates a ‘virtual space’ within a physical space. The result is two co-existing conditions which follow different rules. The porosity of the envelope means that the internal environment is always changing, but always modulated. The jaali provides shade to the interior without obstructing wind movement. The porosity of the membrane results in the ‘Venturi Effect’ where air is speeded up as a result of the constriction. This acts to further cool the air (Snelling 2010).

This form of environmental modulation deals with more than the flow of air – including the lighting, ornamentation and overall ‘atmosphere’ as a result of the design and materials used. While it is a relatively simple technique it requires a level of knowledge of thermodynamics in order to respond to specific weather conditions. It is also a system that would require manual adjustments for changing weather conditions.

The essential idea that it illustrates is the overall importance of gradient thresholds and thermodynamics.

## d. Conclusion:

*The work of Aranda/Lasch Architects was a starting point for this search into algorithmic architecture. Their approach begins with a formal search. Only later in their process are the 'patterns' related to what the spaces and forms can do. A simple change in the way of thinking about making a log cabin, did however enable a different outcome.*

*I chose to expand on this particular case study because it relates directly to issues that I am looking at on the site – with regards to packing. It is evident from the example, that while they talk about 'packing' and its spatial possibilities this is relatively subtle in the design proposed.*

*Apart from the issues raised through the precedent studies – one of the most significant critiques lies in that most of their 'architectural work' is not built. This opens up questions of the limitations of their practice.*

*"Who really believes in nature of nature (the logic of living) and who's imagination is limited to making amusing pictures of it."*

*(Kwinter and Payne 2008)*

*The examples that I have used in this section have provided a means with which to evaluate the work of Aranda/Lasch and have opened up question of Algorithmic architecture. I started with the idea that the potential of algorithmic architecture lies in its ability to respond to various factors heterogeneously. Through the series of brief precedent studies I illustrated alternative means for dealing with the different concerns of structure, material, and atmosphere. Each of the projects does tend to focus on a particular aspect. They all require extensive knowledge of the particular field and research into potential possibilities whether they are digital or not. They also all contain the potential for a non-digital approach which uses the same 'design logic'.*

# 05.Surface

## Amplifier:

At the beginning of the second semester I spent 2 weeks in Johannesburg at a course on algorithmic architecture. The course was an introduction/ crash course into rule based design from design to production. The course convenors Jeroen van Ameijde and Kristof Crolla<sup>8</sup>, hold the strong conviction that algorithmic architecture is vital to the future of architecture.

The course began with 2 days of learning scripting in Grasshopper, a graphic scripting aid for Rhino. It was not a course to learn the program, but engage with and explore the idea of rule based design. These two days were then followed with a series of design exercises which involved cardboard model making. The parameters for these design exercises were two materials –glass and mdf ; a rule based design; and the idea that this could be built by the end of the two weeks.

The design that I was involved in was a parametric surface. It began with the idea of a honeycomb structure which was driven by a search for fluid geometry that could be constructed with rigid materials. Hexagons enable dense packing in 3 dimensions.<sup>9</sup> Honeycombs are an example of a system of this packing which adapts to local differences through a range of irregular hexagons which create a stable structure. Unfortunately the structural aspect didn't get carried through the design.

This idea was initially explored through a series of cardboard models, with adaptations and improvements at each stage. One of the problems that we faced in the cardboard model was achieving curvature. We could build it using the cardboard tolerances, but realised that slight variations in the hexagons themselves were needed to create actual curvature with MDF.

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<sup>8</sup> Jeroen van Ameijde is Head of Digital Prototyping and Design Research Lab Course Tutor at the Architectural Association. Kristoff Crolla teaches at the Hong Kong University.

<sup>9</sup> A hexagon tiles the plane with minimal surface area. Thus a hexagonal structure uses the least material to create a lattice of cells within a given volume. (Wikipedia)

The final design achieved this through modelling the project in Grasshopper and using Rhino. This was done with extensive help from the tutors. The result was a script which was based on the base geometry of the hexagon.

The design was to be an MDF surface which would hold glass perpendicular to it. The script essentially defined a series of 3 triangles which composed the hexagons. The hexagon was not defined as a form in itself, but as a relationship between these three triangles. The slots for the glass were defined in relation to the size of the triangle, with minimum distances from edge of the mdf defined based on estimated material tolerances.

The final design product was a hanging sculptural 'surface amplifier', as the curvature of the surface increased, the length of glass would increase, and the hexagonal structure adapt to make it buildable. Each of the final +/- 200 triangular pieces was unique, and produced directly from the Rhino model.

While the structure was simply a hanging sculptural piece, the potential of the idea was an adaptive and responsive surface. The practical application of a feature like this would be an adaptive screen or façade in architectural terms, which could change according to different external and local conditions. Scripting meant that the 'definition' could be applied to any surface achieving various results<sup>10</sup>. This is illustrated in the renderings.

For this relatively simple product, the scripting required was extensive. While the ability to construct the sculptural piece in less than two weeks was only possible because of the use of scripting.

This highlighted the limitations of algorithmic architecture at the current moment. The complexity of scripting required for creating adaptive systems requires extensive knowledge of base geometries, their inherent relations and logics, and computer programming. This is also what is potentially engaging about the field, as it gets to the roots of structures and geometries. It is easy to create infinite variety, but not to create meaningful and purposeful difference.

---

<sup>10</sup> This turned out to be particularly useful as on the cutting day the surface needed to be shrunk because of cutting time limitations. This affected all the components and could be done fairly quickly.

## 06. A critique:

There are significant criticisms of this approach to design. The digital method contains the ability to deal with complex systems, however the forms generated are limited to the mode of production. This is namely the computer and its ability to replicate surface, colour and texture. Anthony Vidler argues that digital production contains within it a “notorious aversion to any ambiguity” – where the potential open ended nature of a sketch or a line is reduced to a ‘thin – line clarity and all-over surface pattern.” (Vidler 2000) So while the proponents critique drawing for its reduction to surface, they neglect the ambiguity inherent in a drawn line.

An additional major concern is that the approach almost points to the need for architects to become ‘programmers’ and specialists in everything. (Landa 2003) A heterogeneous approach keeps asking “and and and...” with each of these ‘and’s’ requiring extensive knowledge and research. While Menges suggests that the understanding of the ‘design logic’ is more important – the potential of the architect is limited without being able to actually write their own ‘rules’. In addition, limited knowledge of scripting could have a negative effect, as it could result in over-simplified rules being written.

With analogue algorithmic architecture, the limitations lie in the limited computational possibilities and the ability to deal with heterogeneity. The computational and ‘feedback’ limitations will always be much greater.

One of the biggest problems that has been identified with digital architecture is that the modelling software is used to design with. The problem is that a computer cannot determine the rules – it can only ‘resolve the rules’. (Reiser + Umemoto 2006) The result of this is that digital experimentation has tended to focus on **representations** of technology, complexity and computation. (Kwinter and Payne 2008)

The output is therefore often highly stylised where the space between architecture and its image has closed. In addition to this – the process is controlled and stopped at any point by the ‘designer’.

The randomness involved in stopping the development of the process/ growth questions the initial method of attempting to deal with complex systems and its inherent logic. It seems to reduce it to a method of dealing with complex form for the sake of generating 'visual' complexity. Sanford Winter and Jason Payne suggest that current generation of algorithmic designers are largely a problem for their lack of engagement with intellectual issues. The result is that 'everything looks the same'. (Sakamoto and Ferre 2007)

As with most design – the aim is to create something that works better than what existed. The potential of algorithmic architecture does not lie in proposing complexity for the sake of complexity- but responding to the complex physical and social world with responsive structures. This is what I attempted to illustrate through the various examples above.

It is an approach that focuses 'meaning in architecture on the behaviour and effects as opposed to a metaphoric idea'. Architecture is rooted in its physicality, and algorithms offer the potential to return to this. Not through a 'perfect' solution but one which continuously asks questions. It enables the combination of various 'models' through the form of rules, at different scales. The result is heterogeneous possibilities. In a sense it enables us to 'secrete our structures' over a much shorter period of time.

One of my key questions about the method and approach is the implied neutrality of the process. There is an assumption of mathematical clarity within the rules that are designed and steps taken. This is reinforced by the biological references to growth patterns – which seem to neutralise the design process.

This was a question that became particularly evident in the workshop in Johannesburg, where these 'universal' ideas of algorithmic architecture were used in a local context devoid of any local consideration. This is potentially a problematic approach as the process of developing rule based designs seems to remove the designer's agency in the process.

De Landa's proposal for growing urban forms raises these questions, and he proposes the consideration of urban agents in defining the rules of growth as opposed to abstract data. How this could be modelled is not yet known. (Leach, Swarm Urbanism 2009, 61)

This series of questions links back to Kwinter and Payne's criticisms of contemporary practice and its lack of an intellectual basis. The design rules that define low density urban settlements or high density space filling solutions are highly specific design decisions

which have social and political implications outside of themselves. (Leach, Architectural Design 2009) Both could be 'secreted structures' and consider various concerns based on genetic growth patterns, but that does not neutralise the design decisions that drive the process.

This is not an issue that is specific to algorithmic architecture, but has the potential to become increasingly hidden because of the different role of the designer.



## Craig Reynolds flocking experiment

3 simple rules:

1. maintain a minimum distance from other objects in the environment (other agents as well as obstacles)
2. match velocities with other agents in the neighbourhood.
3. move toward the perceived centre of mass.



*"what is striking about these rules is that none of them said "form a flock" ... the rules were entirely local, referring only to what an individual boid could do and see in its own vicinity. if a flock was going to form at all, it would have to do so from the bottom up, as an emergent phenomenon. And yet flocks DID form, every time."*  
(M. Mitchell Waldrop)



great mosque of Cordoba

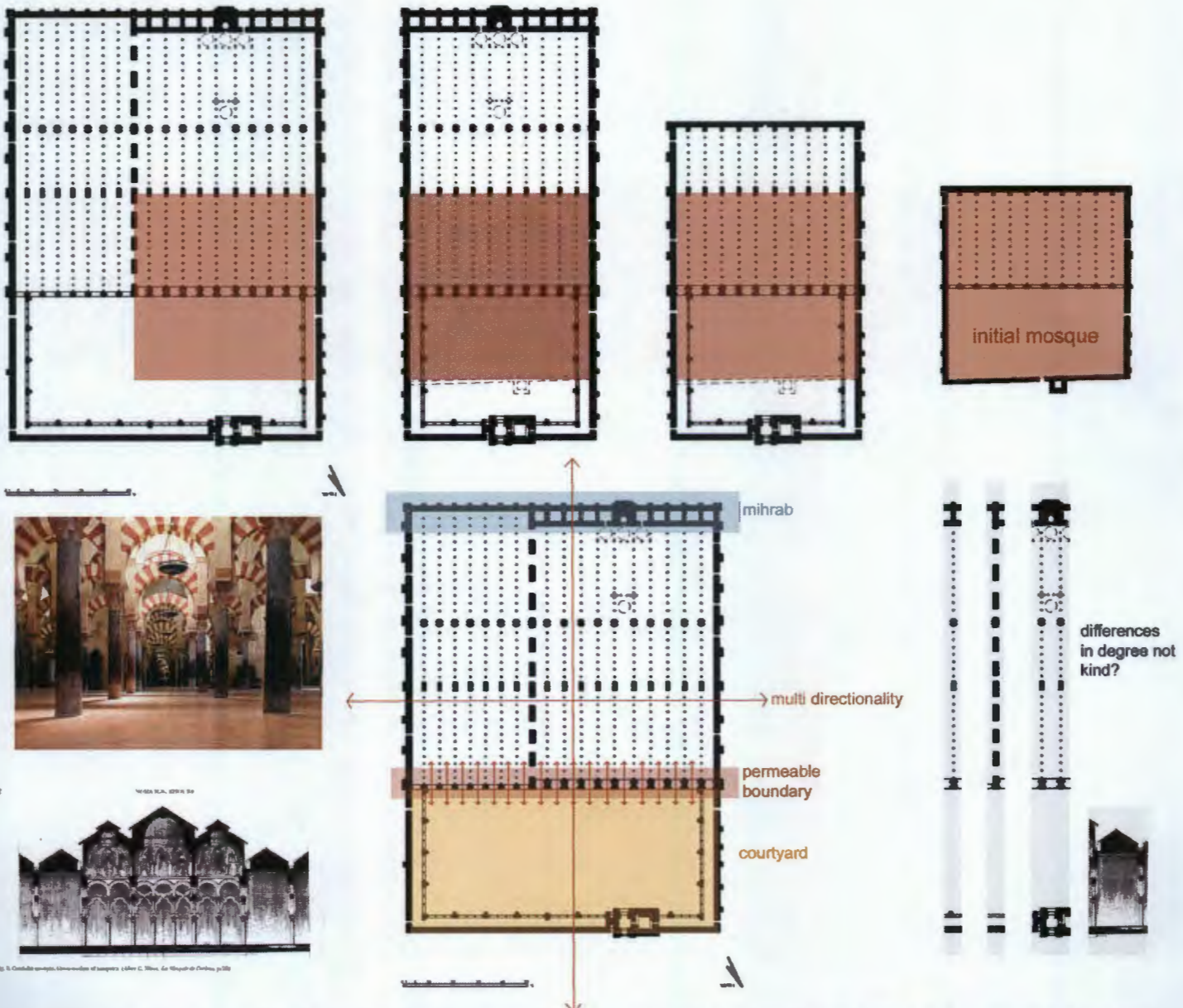
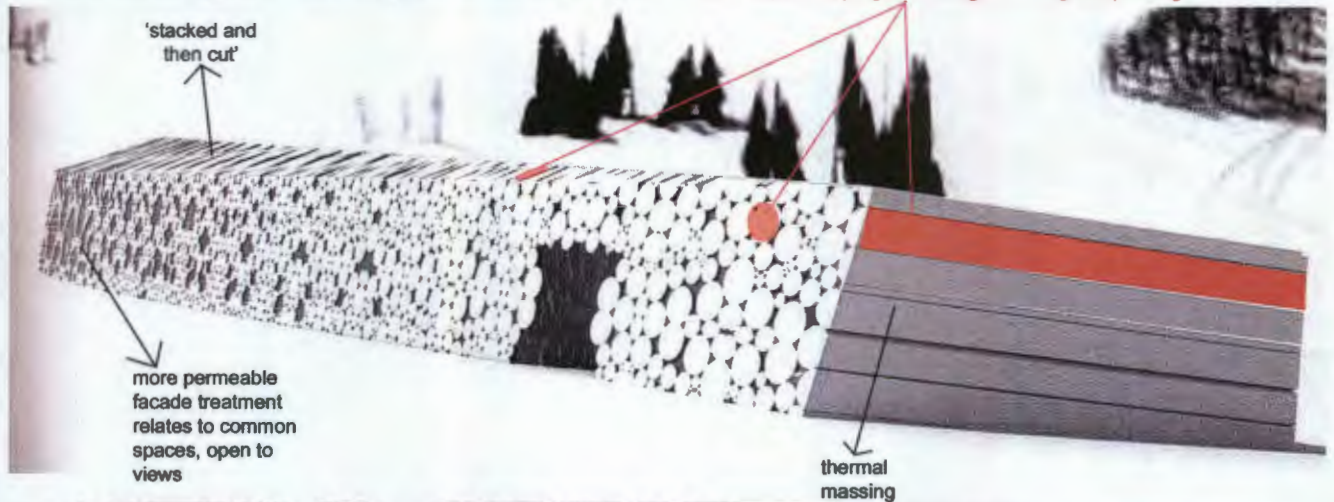


Fig. 5. Cordoba mosque. Dimension of spaces (after C. Wills, *La Mezquita de Cordoba*, p.28)

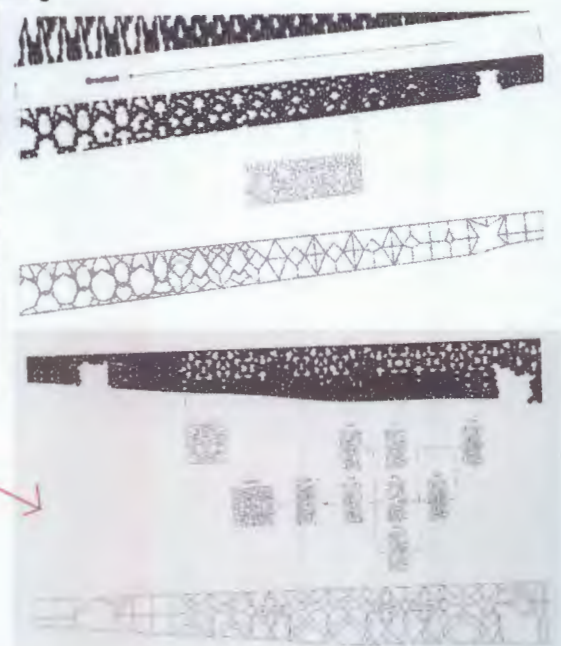


# Packing produces stability through adjacency.

By cutting after stacking, the structural potential (through adjacency) of the logs was released at the same time as their ability to change shape - from circle to ellipse to bar. Structure and opacity are controlled and respond to program through stacking and packing.

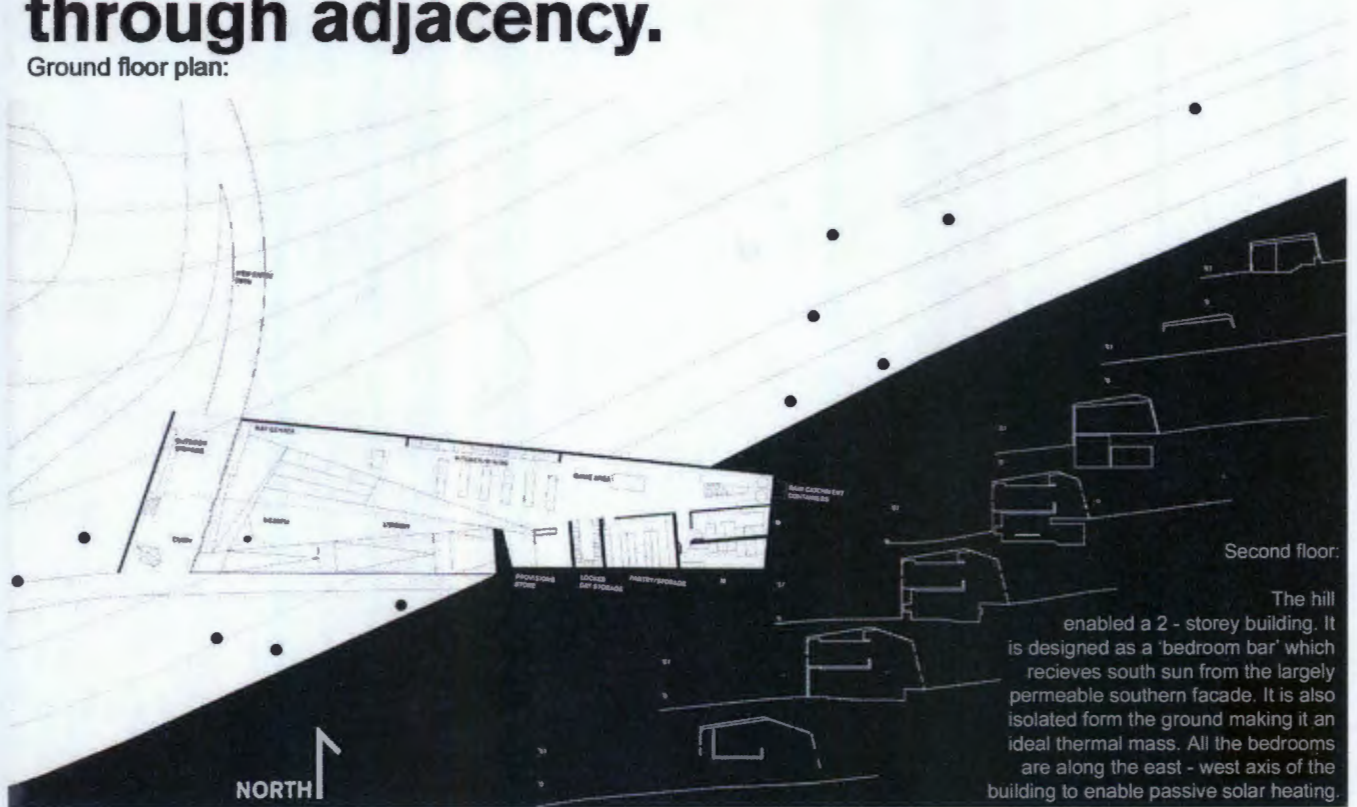


The north facade is more opaque to minimize heat loss.



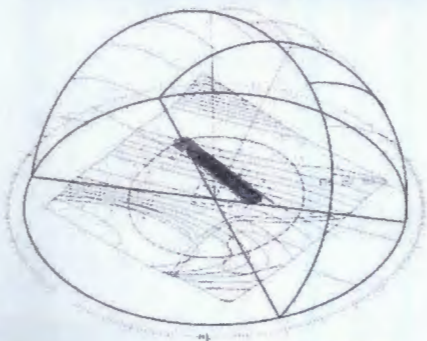
# Packing produces stability through adjacency.

Ground floor plan:



Second floor:

The hill enabled a 2 - storey building. It is designed as a 'bedroom bar' which receives south sun from the largely permeable southern facade. It is also isolated from the ground making it an ideal thermal mass. All the bedrooms are along the east - west axis of the building to enable passive solar heating.



Sun Angle Calculator

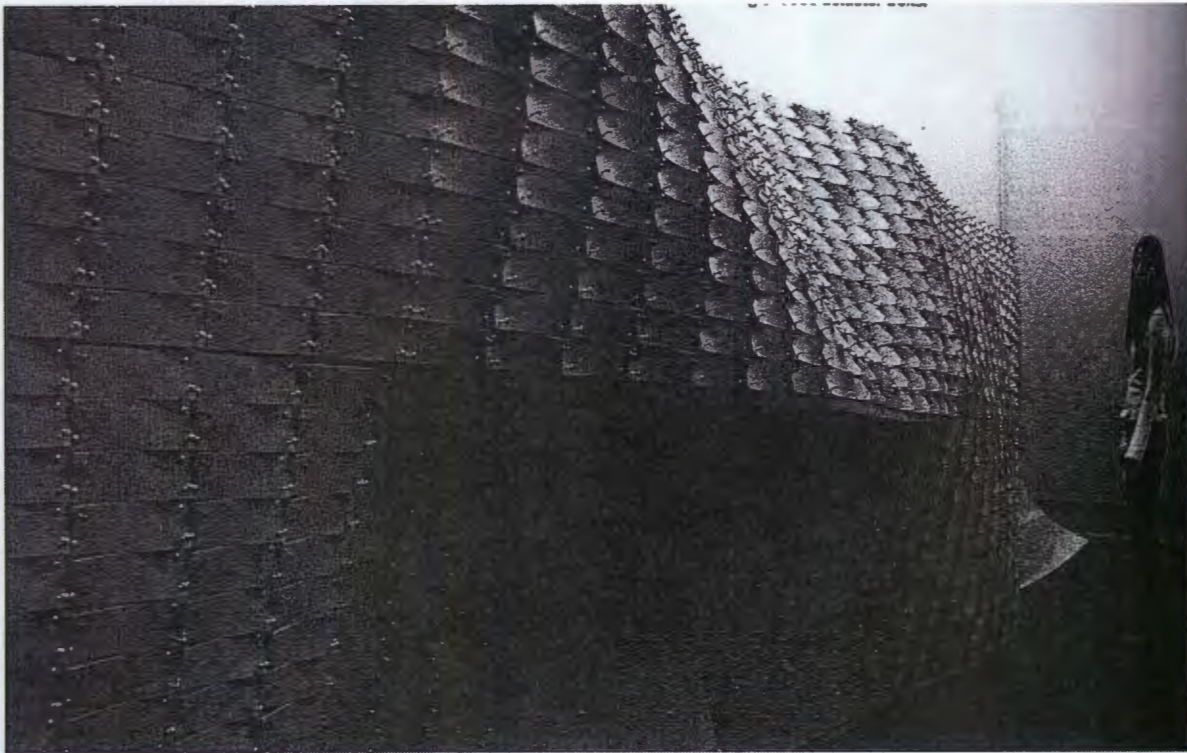
References: [Aranda and Lasch, 2006. pg 22-31]



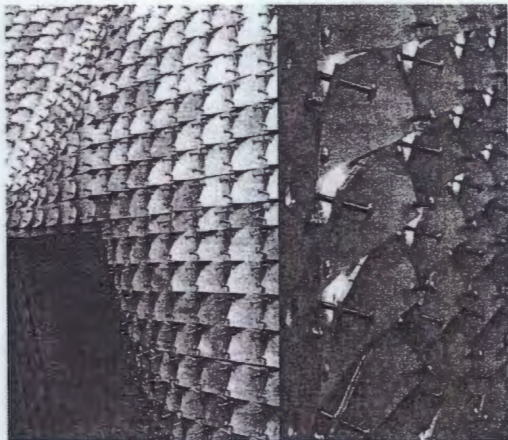
Ground floor: shape and orient for views



Circulation: use hill for ADA compliance



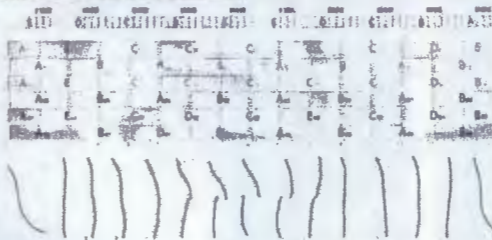
Metapatch project 02'



curves enable variable lighting



Differential surface actuation



A prototype which displays curvature resulting from the differential fastening of 7680 bolts.

Developed by Joseph Kellner and David Newton, this experiment was driven by the idea that a system consisting of uniform parts could achieve variation with a stable configuration.

The result is complex curvature achieved through a range of 'local' actuations. The parts are simple wooden elements fastened to a larger patch with 4 bolts (in each corner).

Two of the bolts in opposite corners are permanently fixed. The other two are adjustable - tightening these causes the wooden block to bend. Incremental tightening results in 'global' or overall curvature.

Detailed investigations into the nature of the materials was necessary in order to model the structure and assembly sequence.

The material system consists of:

- 48 identical patches
- 1920 equal elements
- 7680 bolts

Once put together the structure is flat. Only when incrementally fastening the bolts does it rise into a 'stable, self-supporting state' with convex and concave curves.

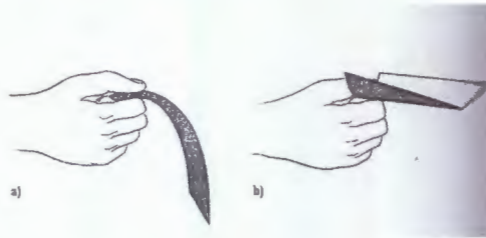


## Structural

Eladio Dieste worked in the 1960's without a computer. He used his knowledge of statics and the strength of materials to engage with the full potential of brick construction.

-Based on his theoretical knowledge and extensive practical experience, Dieste knew how far bricks could be displaced while maintaining (and in some cases improving) the structural integrity.

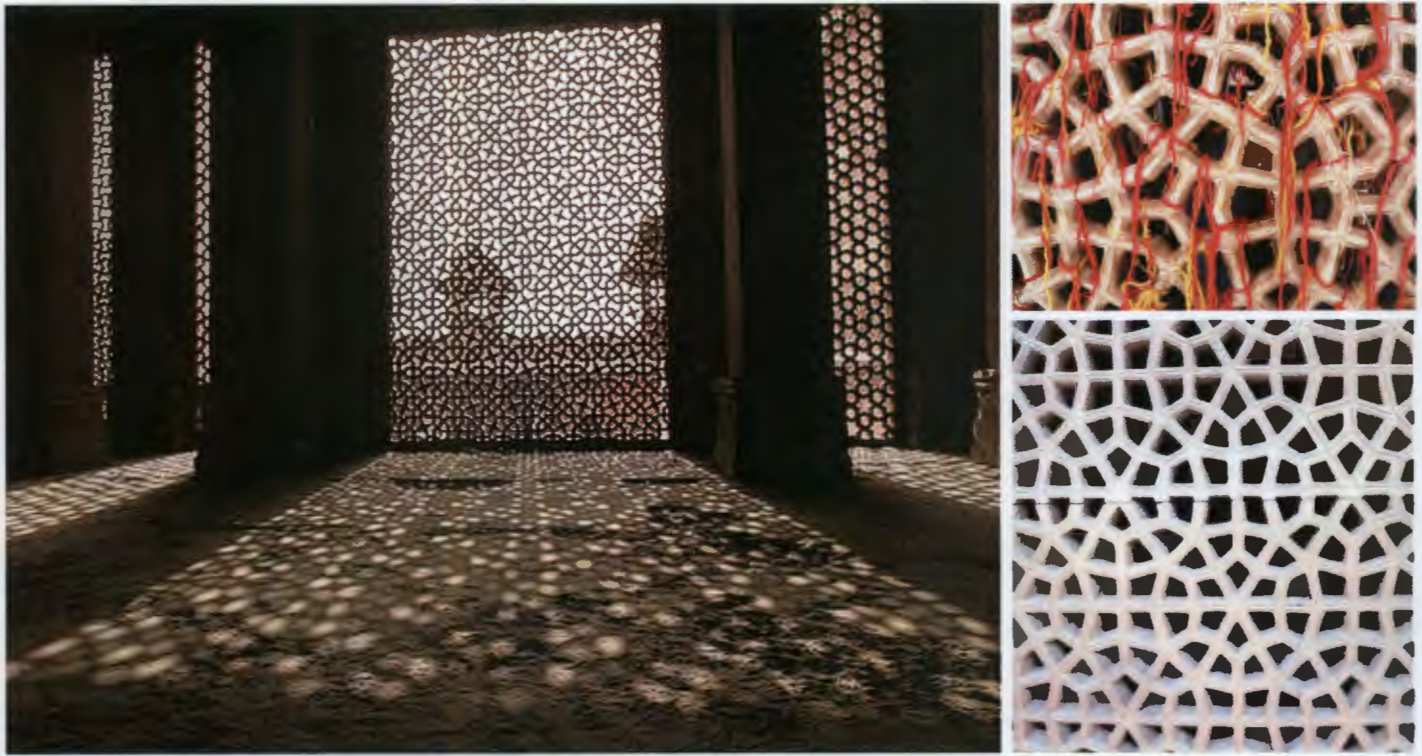
These displacements are enabled by the internal structural logic of the system. It required a rethinking between part and whole, local variation, and overall stability.



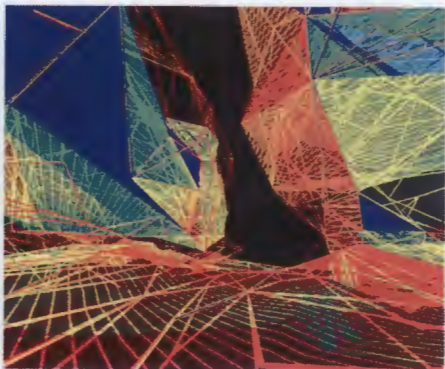
The strength of paper is greater when bent than otherwise.



## Complex Hierarchy: Whole More than the Sum of its Parts



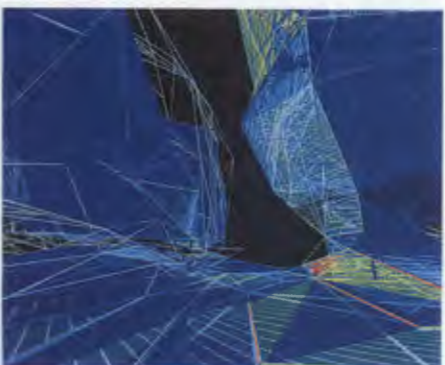
## Environmental modulation



Digital daylight analysis for the  
**Jyvaskyla Music and Art Center**  
 designed by Ocean North.

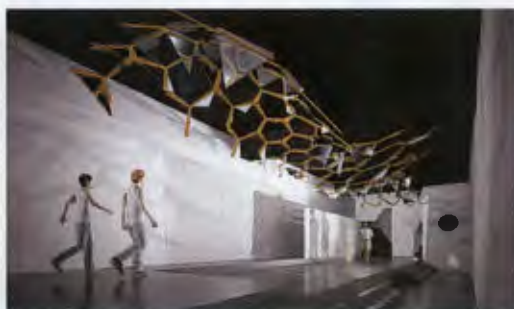
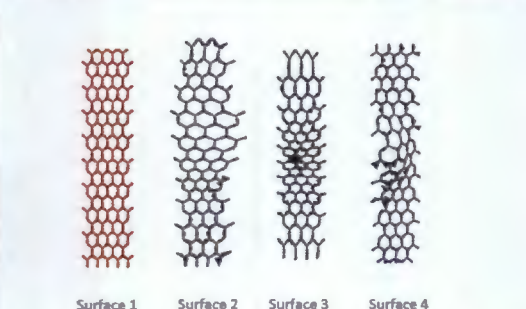
Top: midday 21 June  
 Bottom: midday 21 December

Red indicates highest intensity  
 Blue indicates lowest intensity.





Surface Amplifier  
Johannesburg Workshop



# 07. Conclusion:

The choice of focusing this part of my thesis on algorithmic design processes was based on an interest in exploring possibilities of working with design differently.

I am interested in the method for what it can mean for the development of a responsive architecture in a contemporary context. The architects mentioned above are a few who look at algorithmic architecture beyond the complexity of forms – and rather for what they can achieve.

These processes challenge the distinction between structure and form<sup>11</sup>, and enable experimentation with new materials and possibilities within significantly less time.<sup>12</sup>

*“The seemingly contradictory ambition of differentiation and economy of designers and manufacturers alike is becoming resolved by the transformation of mass customisation from a futuristic goal to a realistic approach.”* (Menges, Manufacturing Diversity 2006)

The second side to this is that algorithmic architecture doesn't necessarily involve a digital resolution – but rather a heterogeneous response. The importance of the 'algorithm' lies in the consideration of 'inherent logic' of systems.

To some extent design always consists of rules devised by the designer. What is particularly interesting about algorithmic design is the heterogeneous aspects that it attempts to respond to in order to respond to difference. It enables you to ask the question “and and and”. (Reiser + Umemoto 2006, 27) This is a question that I have taken through to my design process, which is an attempt at engaging with these multiple ideas.

---

<sup>11</sup> (Menges, Manufacturing Diversity 2006)

<sup>12</sup> (Menges, Manufacturing Diversity 2006, 72)

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# Part 3:

# Contents:

## Introduction and approach

01. Siting and Programming.....	5
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# Introduction and Approach

*“Rediscovering the ordinary, the stories remind us necessarily that the problems of South African social formation are complex and all embracing; that they cannot be reduced to a single, simple formulation.” (Ndebele 2006, 51)*

This set of ideas was a key starting premise to my research this year, and is an issue that I returned to in the design phase. It is a statement which encompasses questions of the ‘everyday’ emergent practices within city and the complex heterogeneous nature of urban environments. Both of the papers that I wrote in the first semester respond to these questions in different ways.

I began this year by looking for what was hidden within the city, in an attempt to find and see things differently.

The design process started by re-reading these ideas, and drawing out the social, spatial, and architectural potential within them. This was done both in terms of design methodology as well as interpretive gestures.

The design process is informed by ideas of allographic architecture which is composed of a series of scales and scores within a broader field. They were about layering and mapping heterogeneous concerns, with the potential for developing difference and ‘engendering new worlds’ through these processes.

It drew on ideas of ‘packing’ from the site, and its potential in designing higher density spaces, and creating new worlds within existing ones, enabling the city’s inhabitants to hide when they need to. It draws on the spatial relationships from the site, which thrives on glimpses and closed doors, and deep inner worlds which only the inhabitants know.

It is about designing in order to accommodate diverse activities and the hidden potential which the city survives on. And designing through rules, in order to affect an ‘emergent’ result ‘beyond what I could have imagined’.

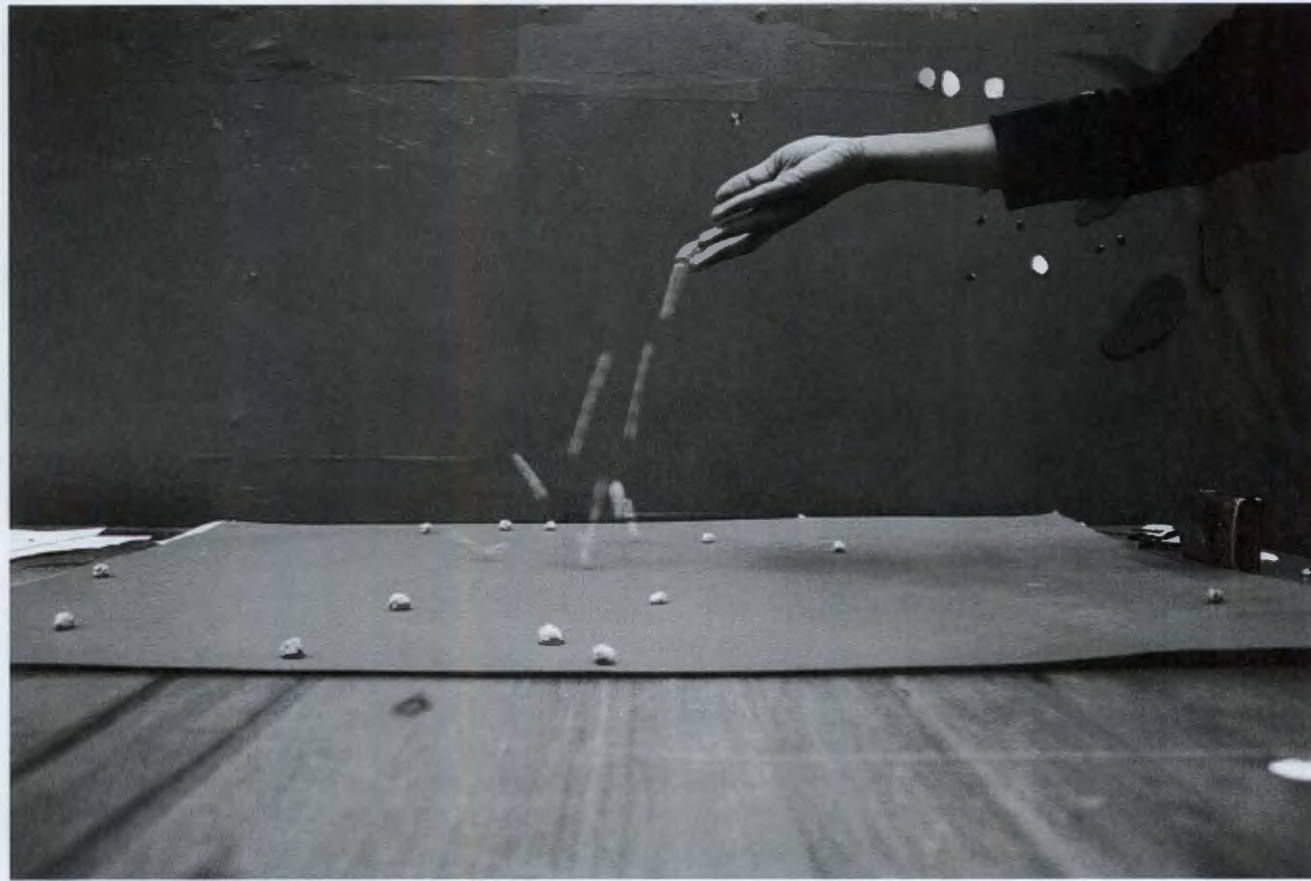
My design is exploratory. It is about testing and exploring the set of ideas that I was questioning in the papers. It was not as linear as it seems, and I did not know the series of steps I would take at the outset. Furthermore there were adjustments throughout that changed the process drastically.

It is a design methodology that oscillates between ideas of rule based design and explorations into everyday life and its problems and potentials.

The design methodology is a type of analog algorithmic architecture, which blurs the boundaries between an interpretive exploration and a 'growth' pattern. It has not been scripted and therefore is not strictly 'grown', but it does draw on real site data and constraints, and therefore tends towards 'emergence'. At the same time, many of the steps taken are a result of critical and interpretive questions raised through the research, questioning existing spatial hierarchies, organisations and practices.

In some senses this design process reads as a kind of recipe, with a series of (largely) precise steps and rules which result in an outcome. It is not a recipe for designing in cities, but a series of ideas and steps that are highly specific to this particular project and location. In addition, each of these steps could have led to very different outcomes.

The initial design was based on the siting and programming, and a series of 3 models:





## After Collage: Two Conditions of the Generic

we posit either an unchanging unit deployed along a variable trajectory or the simple repetition of a variable unit. In both cases transformation is a quality perceived through deployment in quantity. In this way we understand the universal as the space of ubiquitous difference rather than of a fixed and unchanging background.

*(Reiser + Umemoto, 2006. pg. 52)*

## zoning



<ul style="list-style-type: none"> <li>GENERAL BUSINESS B1</li> <li>GENERAL BUSINESS B2</li> <li>GENERAL BUSINESS B3</li> <li>GENERAL BUSINESS B6</li> <li>GENERAL COMMERCIAL C2</li> <li>GENERAL COMMERCIAL C3</li> <li>GENERAL COMMERCIAL C4</li> </ul>	<ul style="list-style-type: none"> <li>COMMUNITY FACILITIES</li> <li>GROUPED DWELLINGS</li> <li>GENERAL INDUSTRIAL</li> <li>GOVERNMENT</li> <li>MUNICIPAL PURPOSES</li> <li>PUBLIC OR OPEN SPACE</li> <li>PROPOSED STREET PURPOSES</li> </ul>	<ul style="list-style-type: none"> <li>GENERAL RESIDENTIAL R3</li> <li>GENERAL RESIDENTIAL R4</li> <li>GENERAL RESIDENTIAL R5</li> <li>GENERAL RESIDENTIAL R6</li> <li>GENERAL RESIDENTIAL R7</li> <li>GENERAL RESIDENTIAL R8</li> </ul>	<ul style="list-style-type: none"> <li>RAILWAY PURPOSES</li> <li>SPECIAL BUSINESS</li> <li>SINGLE DWELLING</li> <li>STREET PURPOSES</li> <li>SEA</li> </ul>
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## land ownership



Publicly owned land
Vacant Land
Underutilised land
Open spaces

## economic structure



<ul style="list-style-type: none"> <li>Mixed-Use</li> <li>Manufacturing/Industrial</li> <li>Commercial</li> </ul>	<ul style="list-style-type: none"> <li>Internal trade: Food &amp; vegetables</li> <li>Internal trade: Clothing &amp; Shoes</li> </ul>
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## aerial photograph



## public transport and pedestrian movement



<ul style="list-style-type: none"> <li>Public Transport</li> <li>±5-7 minutes walking distance to station</li> </ul>	<ul style="list-style-type: none"> <li>Elevated pedestrian walkways</li> <li>Formalised Transport Interchange of Metropolitan significance</li> </ul>
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## site photograph

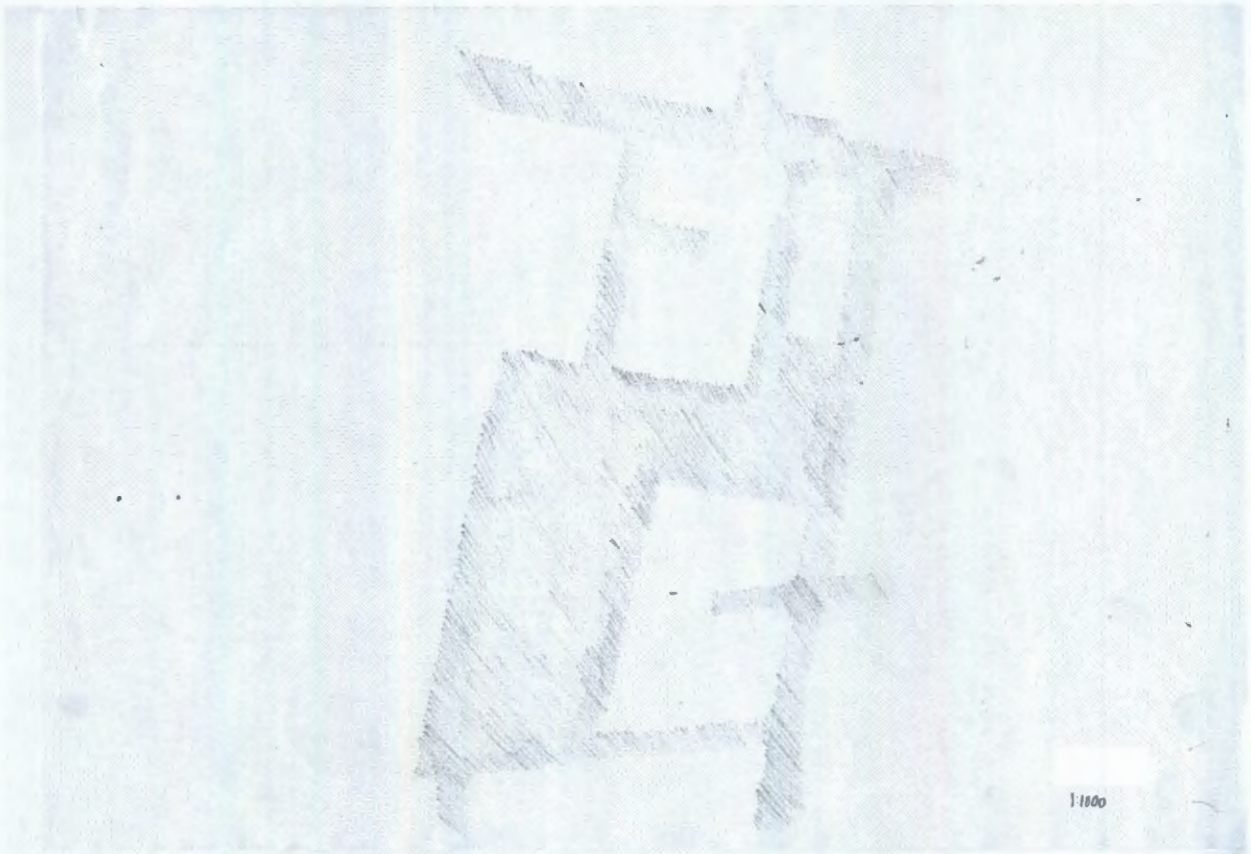


## general site maps

(source: NM & assoc. Woodstock Revitalisation Framework; google earth; own photograph)



shadows/shade



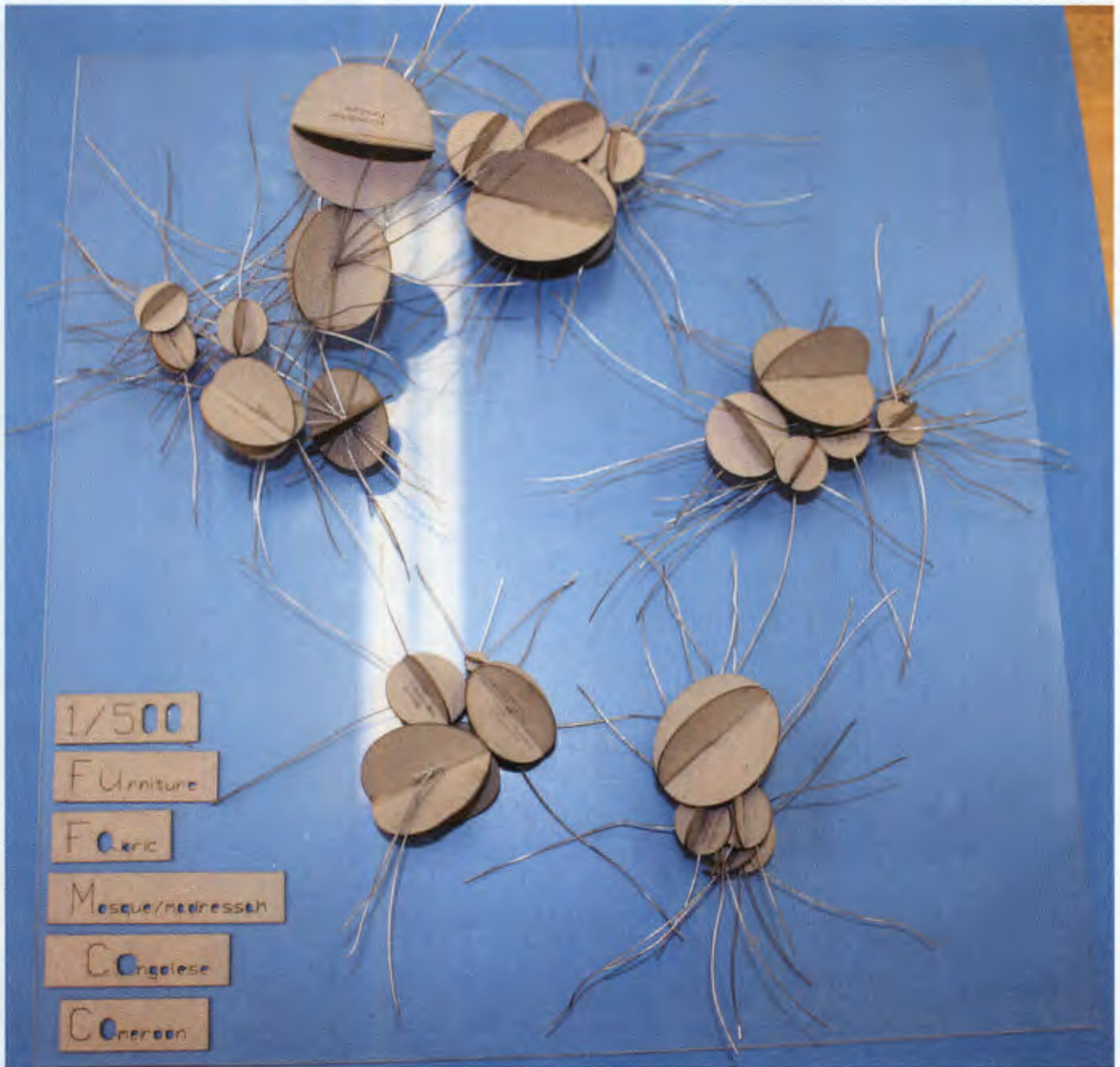
public space



site and surrounds



building heights

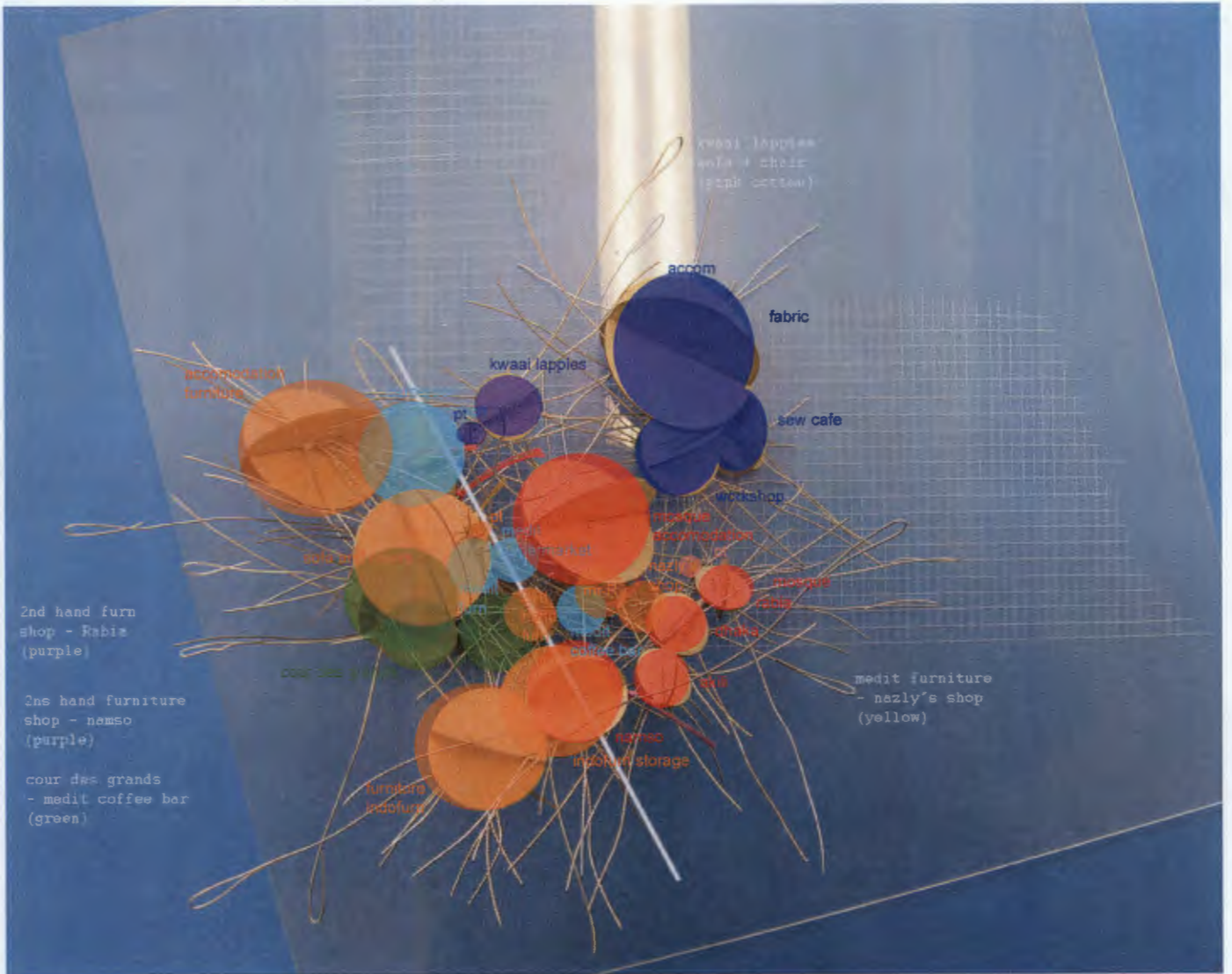


1/500  
 Furniture  
 Fabric  
 Mosque/bedressah  
 Congolese  
 Cameroon



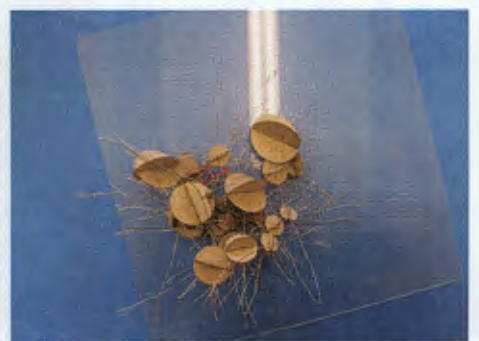
**Overlaps:**

- purple:  
2nd hand furniture shop (furn)  
- Rabla (mosque).
- 2nd hand furn shop (furn)  
- Namso (mosque)
- pink:  
kwaal lappies (fabric)  
- sofa + chair (furn)
- yellow:  
medit furniture (cameroon)  
- nazly (furniture)
- green:  
cours des grands (congolese)  
- coffee bar (cameroon)

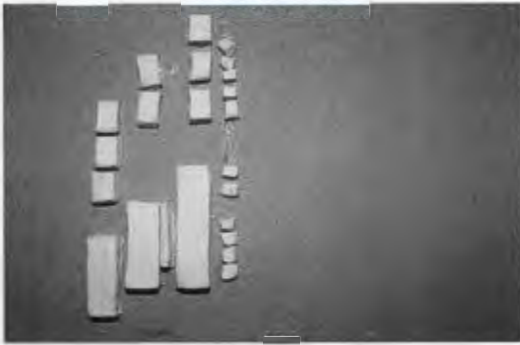


social networks

the mapping of functions relates to the mapping of functions that i did on the site - its another layer - not spatialised but drawn out and located in relation to the site. its another layer.



functional relationships within the network model



cameroonian network



mosque/madrasah network



furniture network



congolese network



fabric network

model 2: the various networks with their associated range of spaces

# Congolese

Plinoc Laundry and computer shop



permanent (ppl): 5 ppl  
 additional (ppl): Negligible  
 users:  
 no. of units: 79  
 acoustics: med-noisy(washing machines)  
 lighting: semi (m)  
 ventilation: high  
 street relationship: direct  
 display: yes  
 invisibility: no

cours des grands



permanent (ppl): 2 ppl  
 additional (ppl): 1  
 users (ppl): 30 +  
 no. of units: 45  
 acoustics: noisy  
 lighting: semi - artificial(l)  
 ventilation: high  
 street relationship: indirect-not necessary  
 display: no  
 invisibility: somewhat

Communal facilities:

Accommodation:

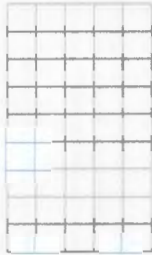
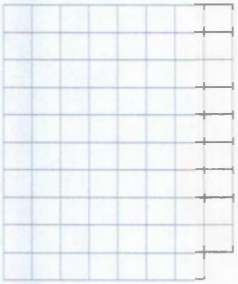
ppl:  $8 \times 4 = 32$  units (collective)

sanitation:  $1200 = 6$  sanitation units (collective)

Public toilets: 4

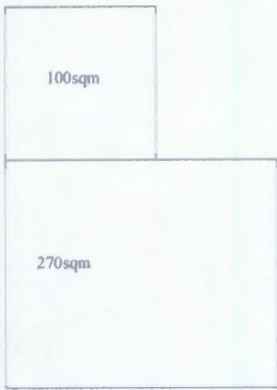
Overlap:

Accommodation  
 +  
 Public toilets



# Furniture

Indofum



permanent (ppl): 4 ppl  
 additional (ppl): 10ppl  
 users: NA

no. of units 77

acoustics: medium  
 lighting: artificial  
 ventilation: medium  
 street relationship: not necessary  
 display: no  
 invisibility: somewhat

Sofas and  
Chairs

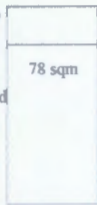


permanent (ppl): 2 ppl  
 additional (ppl): 5ppl  
 users: NA

no. of units 107

acoustics: noisy  
 lighting: natural (h)  
 ventilation: high  
 street relationship: direct  
 display: yes  
 invisibility: no

Nazly's shop



permanent (ppl): 6 ppl  
 additional (ppl): 0  
 users (ppl):

no. of units 22 \* 3 = 66

acoustics: medium  
 lighting: natural(h)  
 ventilation: high  
 street relationship: direct  
 display: yes  
 invisibility: somewhat

Mr R.

Other Second  
hand fum  
shop



permanent (ppl): 1  
 additional (ppl): 0  
 users: N

no. of units 3

acoustics: medium  
 lighting: natural (h)  
 ventilation: medium  
 street relationship: direct  
 display: yes  
 invisibility: somewhat

Communal facilities

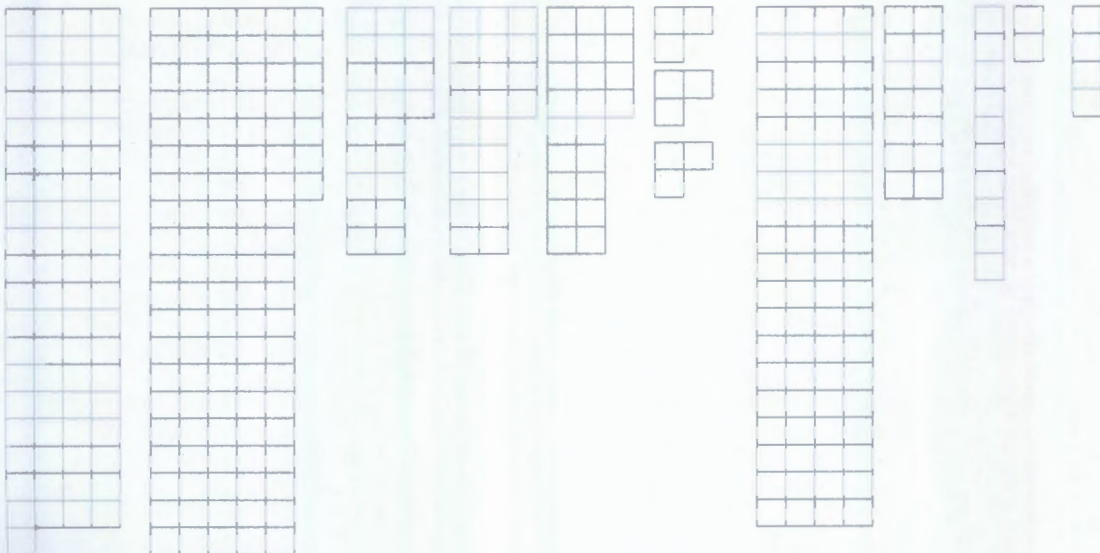
Accommodation:

ppl: 19 x 4 = 76 units (collective)  
 (10 individual)  
 sanitation: 8000 = 14 sanitation units (collective)

Public toilets: 4?

**Overlap:**

office space (100sqm for indofum)  
 +  
 Storage space (indofum + smaller shops)  
 +  
 workshop (sofas and chairs)



# Fabric

Factory  
(workshops)



permanent (ppl): 20 ppl  
 additional (ppl): ? (40)  
 users: NA  
  
 no. of units: 57  
  
 acoustics: noisy  
 lighting: natural (h)  
 ventilation: medium  
 street relationship: not necessary  
 display: no  
 invisibility: no

kwaa  
lappies



permanent (ppl): 8 ppl  
 additional (ppl): 0  
 users (ppl):  
  
 no. of units: 50  
  
 acoustics: medium  
 lighting: natural (h)  
 ventilation: medium  
 street relationship: direct  
 display: yes  
 invisibility: no

lappie  
shop



permanent (ppl): 1  
 additional (ppl): 0  
 users: N  
  
 no. of units: 2  
  
 acoustics: med  
 lighting: natural(h)  
 ventilation: medium  
 street relationship: direct  
 display: yes  
 invisibility: no

sew  
cafe



permanent (ppl): 2 ppl  
 additional (ppl): 0  
 users: N  
  
 no. of units: 27  
  
 acoustics: noisy (machines)  
 lighting: natural(h)  
 ventilation: medium  
 street relationship: indirect  
 display: somewhat  
 invisibility: no

## Communal facilities:

### Accomodation:

ppl: 11 x 4 = 44 units (collective)  
 + 20 individual units

sanitation: (44) = 16 sanitation units (collective)  
 2 individual sanitation unit

Public toilets: 4

Offices: 5 offices  
 1 shared boardroom  
 1 reception space  
 1 kitchenette

### Overlap:

Accomodation

+

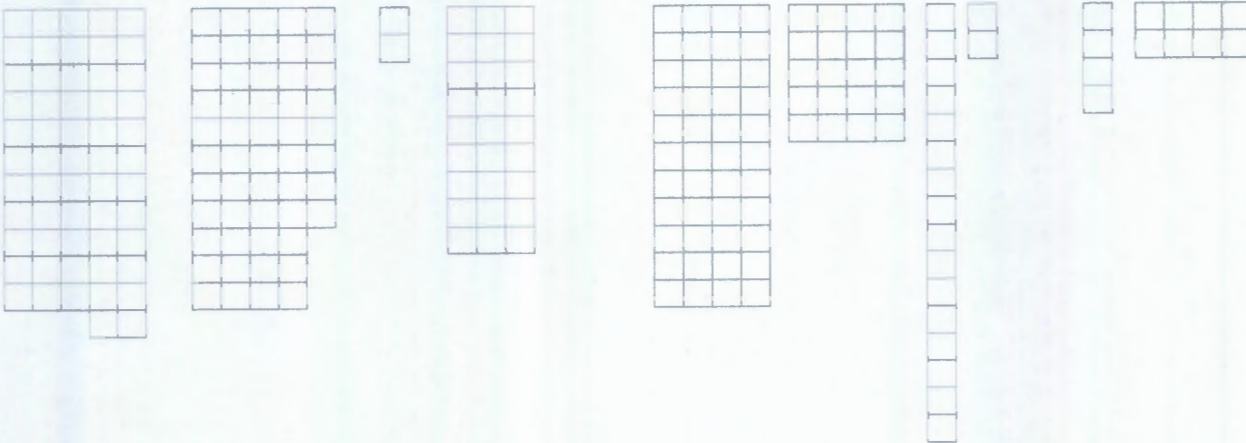
Public toilets

+

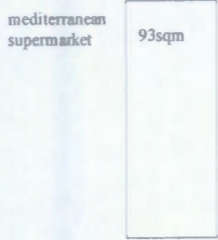
Storage space

+

office spaces



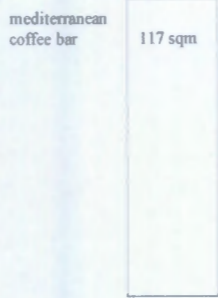
# Cameroon



permanent (ppl): 3 ppl  
 additional (ppl): 0  
 users: NA

no. of units: 27

acoustics: med.  
 lighting: semi (m)  
 ventilation: med  
 street relationship: direct  
 display: yes  
 invisibility: no  
 delivery/parking: sm1 scale delivery access



permanent (ppl): 2 ppl  
 additional (ppl): 0  
 users (ppl): 30 - 40+

no. of units: 33

acoustics: noisy  
 lighting: semi-low  
 ventilation: medium - high (cooking)  
 street relationship: direct  
 display: no  
 invisibility: somewhat  
 delivery/parking: small scale delivery access



permanent (ppl): 3 ppl  
 additional (ppl): 0  
 users: N

no. of units: 27

acoustics: med.  
 lighting: natural (h) -med  
 ventilation: medium  
 street relationship: direct  
 display: yes  
 invisibility: no

Communal facilities:

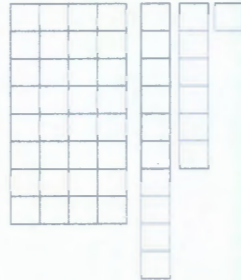
Accommodation:

ppl: 8 x 4 = 32 units (collective)  
 10 individual units  
 sanitation:  $\frac{32}{5} = 6$  sanitation units (collective)  
 1 individual sanitation unit

Public toilets: 4

### Overlap:

Storage space  
 +  
 ablutions  
 +  
 accommodation



acoustic: quiet, medium, noisy  
 lighting: natural(h), semi (m), artificial (l) (high quality, medium, low)  
 ventilation: high, medium, low (air flow exchange required)  
 street relationship: direct, indirect, not necessary  
 display: yes, no  
 invisibility (hiding) yes, somewhat, no

height: 3, 4, 5m (depending on function)

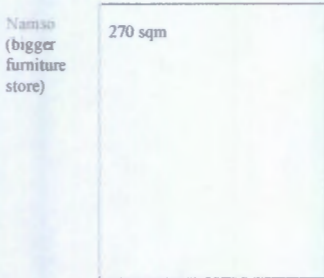
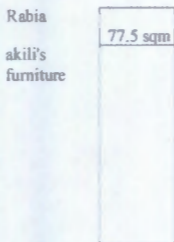
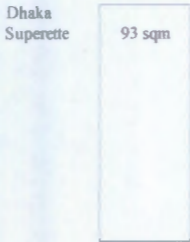
# Mosque/madrasah

Mrs Adams 25sqm

Other traders

Other traders

permanent (ppl): 2 ppl  
 additional (ppl): NA  
 users: NA  
 no. of units 3  
 acoustics: NA  
 lighting: NA  
 ventilation: NA  
 street relationship: direct  
 display: no  
 invisibility: no



permanent (ppl): 3 ppl  
 additional (ppl): 0  
 users (ppl): 0  
 no. of units 27  
 acoustics: medium  
 lighting: semi-artificial  
 ventilation: medium  
 street relationship: direct  
 display: yes  
 invisibility: no

permanent (ppl): 1  
 additional (ppl): 0  
 users: 0  
 no. of units 22  
 acoustics: medium  
 lighting: natural(h) - artificial (l) (in storage spaces)  
 ventilation: medium  
 street relationship: direct  
 display: yes  
 invisibility: somewhat

permanent (ppl): 2 ppl  
 additional (ppl): 0  
 users: N  
 no. of units 22  
 acoustics: medium  
 lighting: natural(h)  
 ventilation: medium  
 street relationship: direct  
 display: yes  
 invisibility: no

Communal facilities:

Accommodation:

ppl: 13 x 4 = 52 units (collective)

sanitation: 446 = 7 sanitation units (collective)

Public toilets: 4

**Overlap:**

**Accommodation**

+

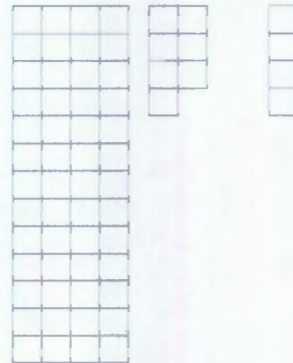
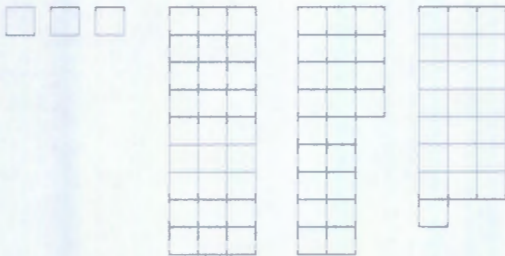
**Public toilets**

+

**Storage space (Mrs Adams, Superette, Rabia, Akili's)**

+

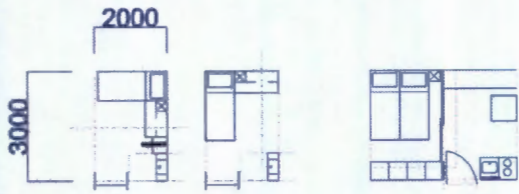
**workshop (Namso, second hand furniture)**



# living spaces

single unit

double unit



# serviced spaces

bathroom

toilet + kitchenette

public toilets

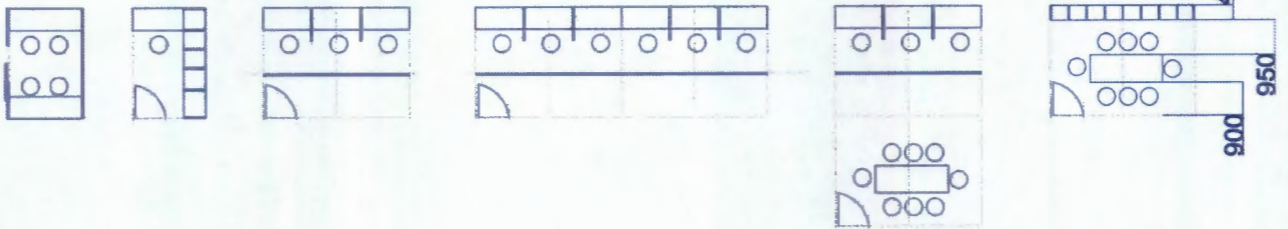


# work spaces

individual office

shared workspace

meeting room



workshop with sink inside

sink outside



6 sqm

drawing at 1:200



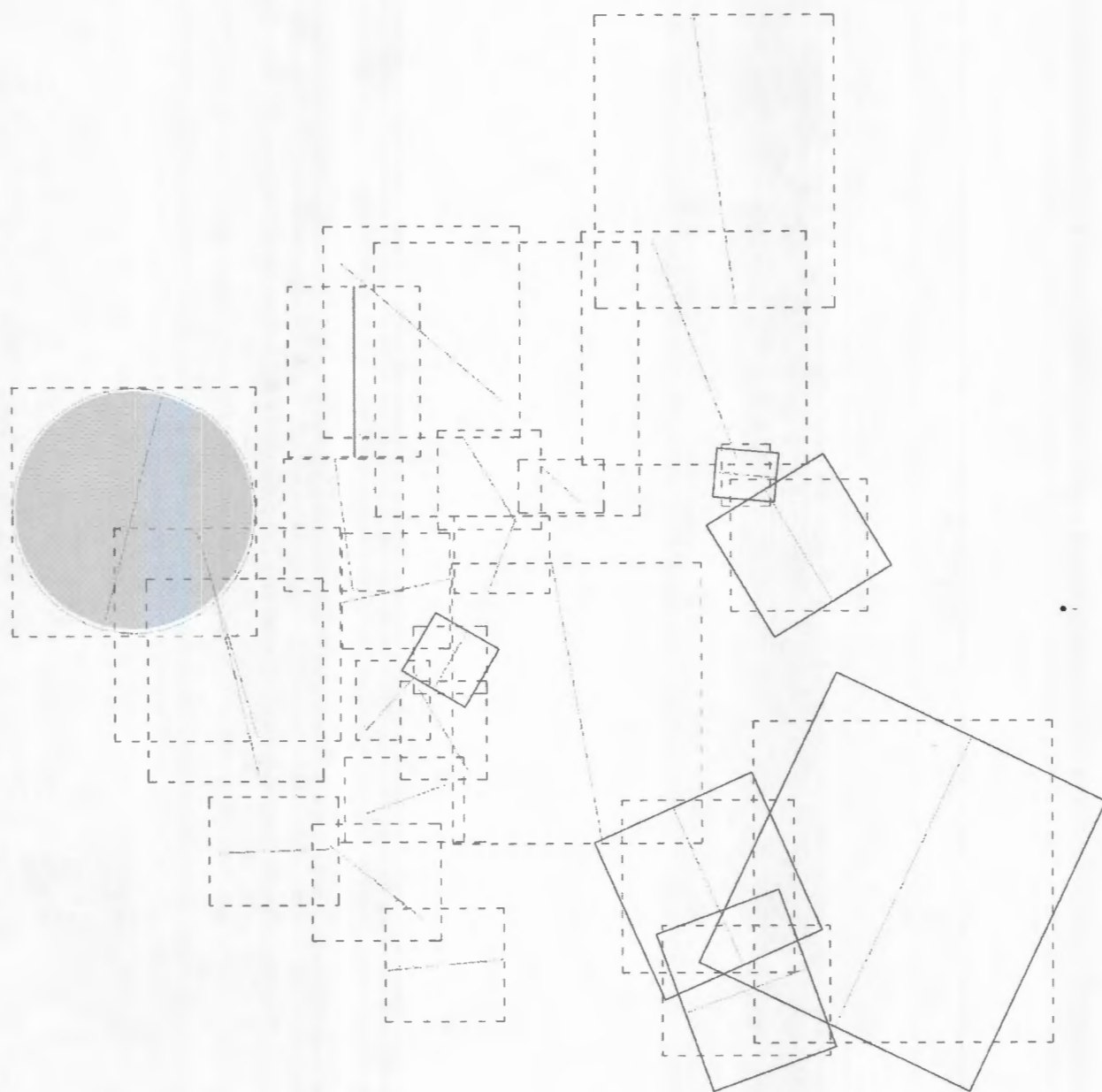
plaster model map  
drawing scale: 1:500 at A3



**model 3: site constraints**  
original size: 1:500

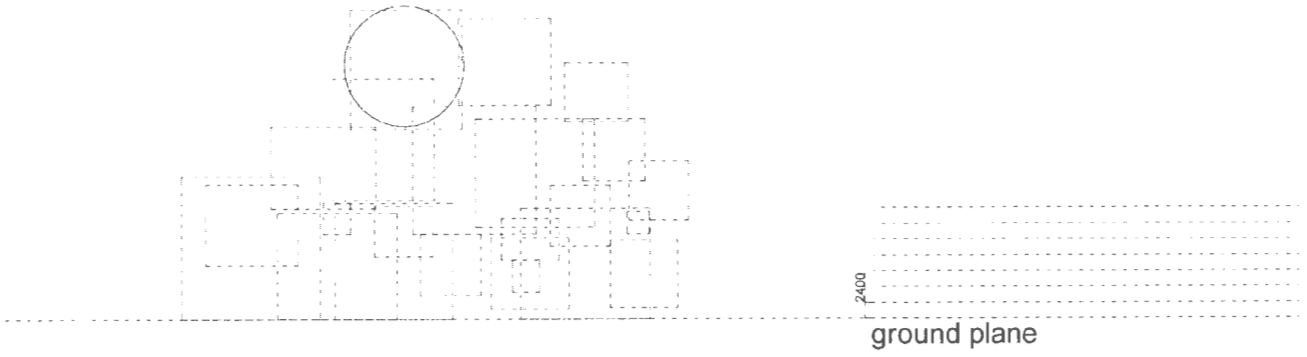


site function map  
drawing scale: 1:500 at A3



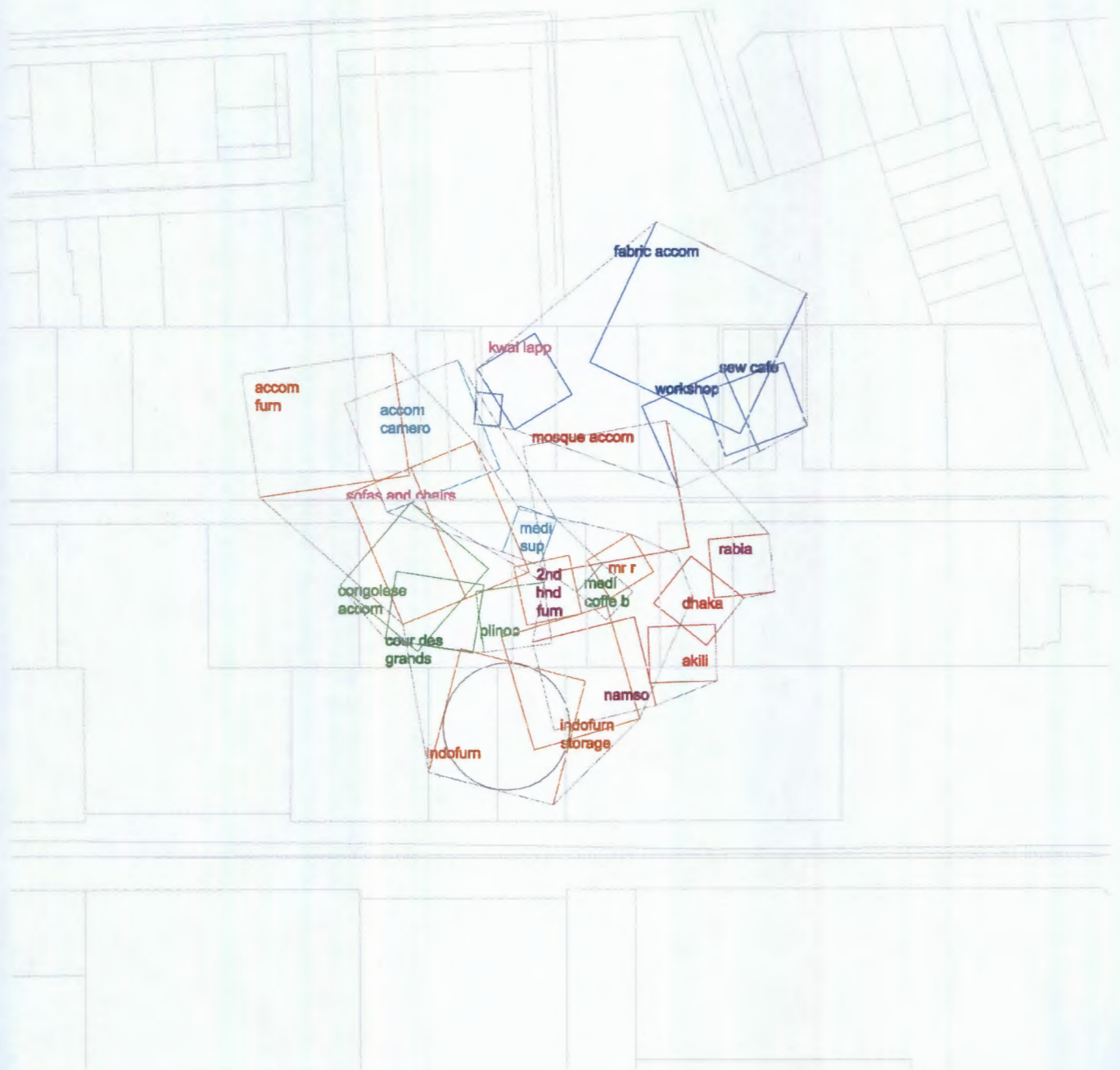
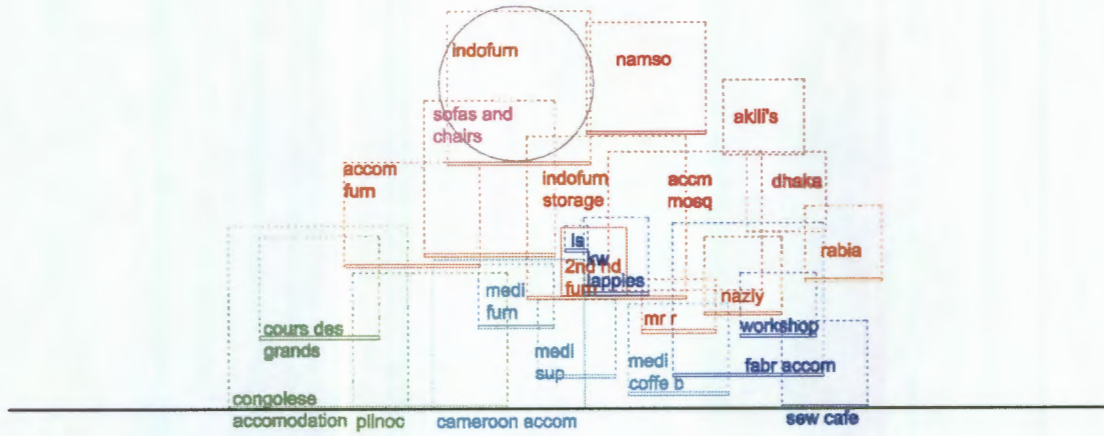
## Drawing the networked model (1)

The circle was used as a referencing scale



## Drawing the networked model (2)

The circle was used as a referencing scale:

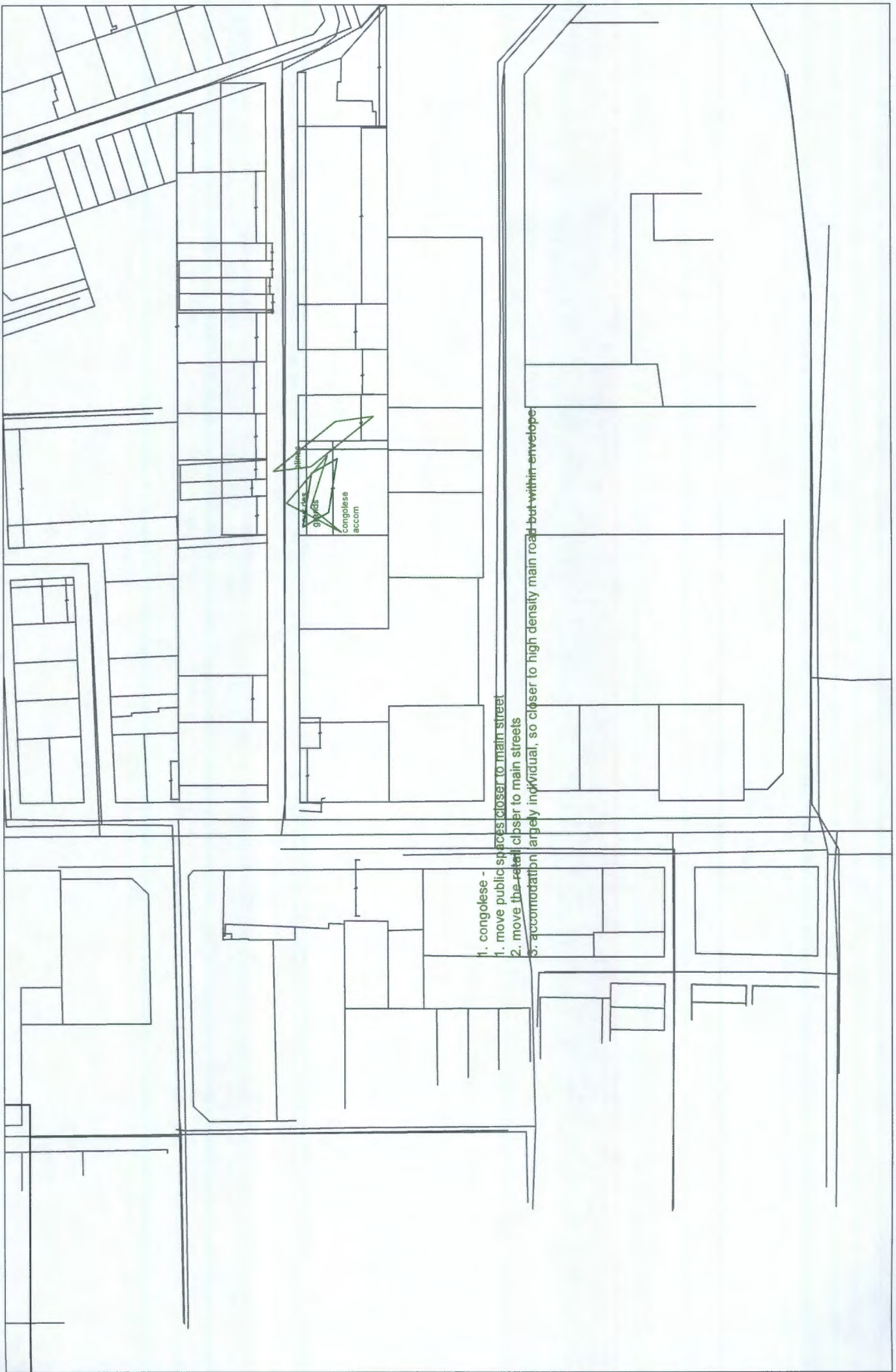


## locating the network model

The colours are used to identify the different networks and their overlaps.

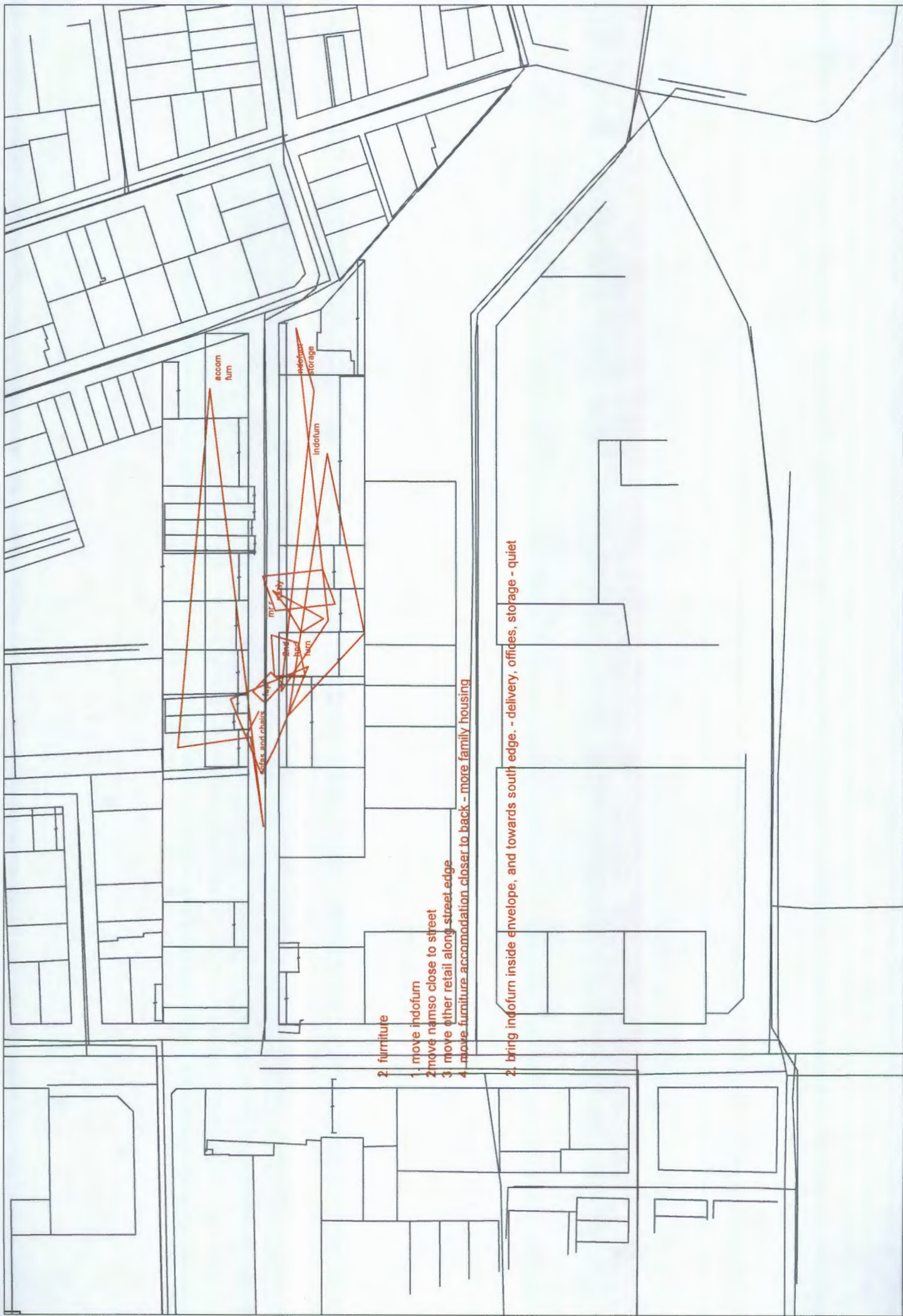


transformational drawings



congolese  
accom

1. congolese -
1. move public spaces closer to main street
2. move the retail closer to main streets
3. accommodation largely individual, so closer to high density main road but within envelope





sew cafe  
workshop

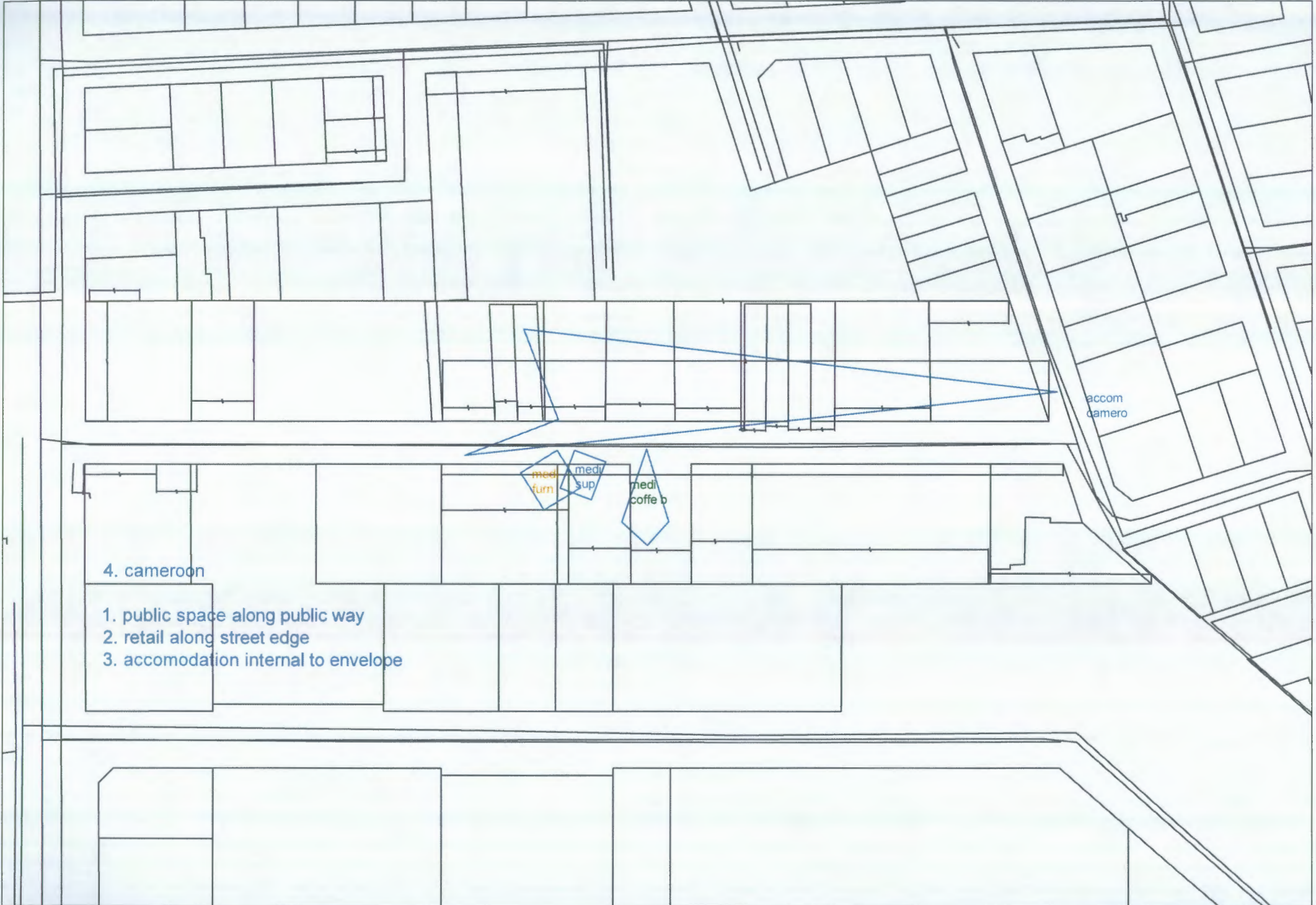
fabric accom

kiva app

fpt

3. fabric

- 1. move sew shop closer to public space
- 2. accomodation into site
- 3. retail onto main road



accom  
camero

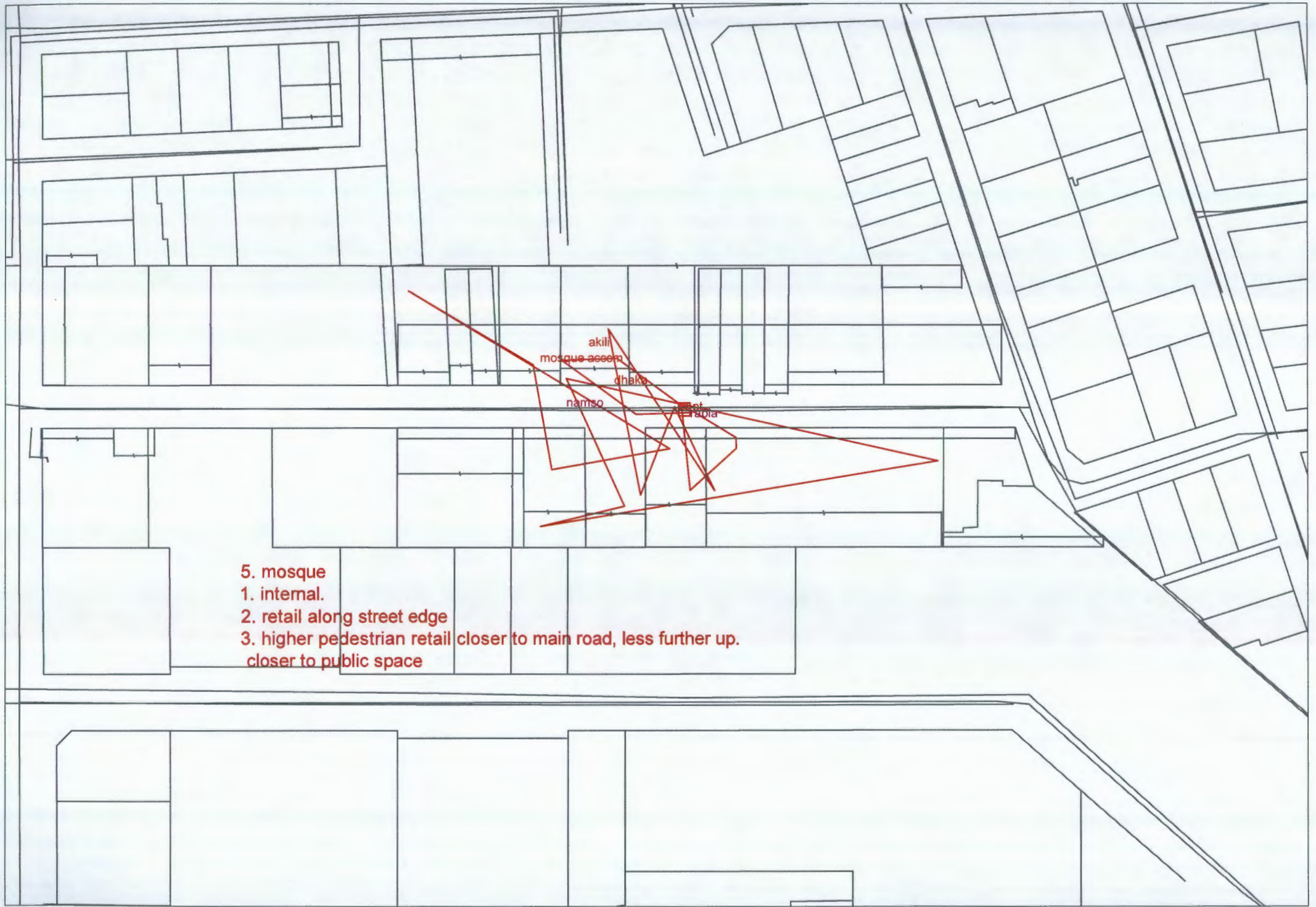
med  
furn

med  
sup

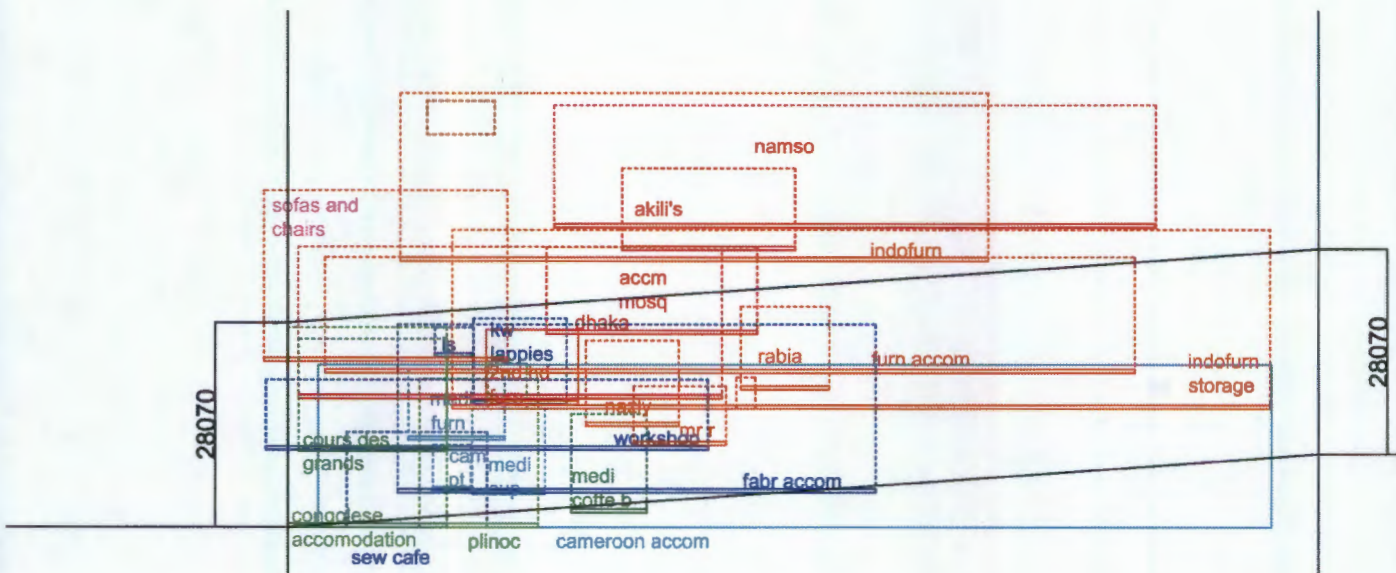
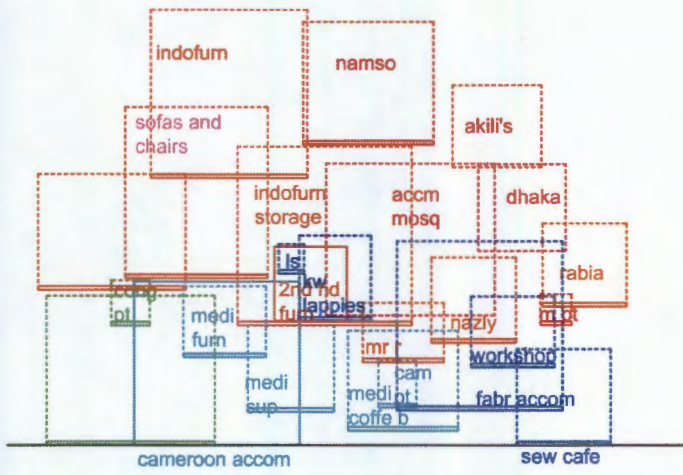
med  
coffe b

4. cameroon

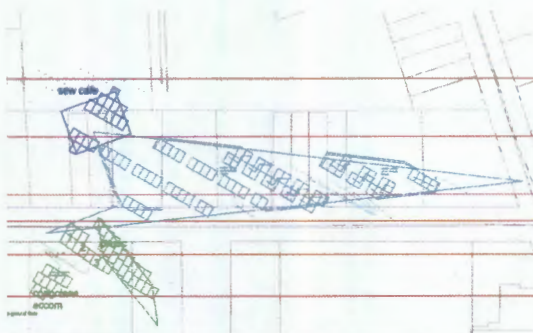
- 1. public space along public way
- 2. retail along street edge
- 3. accomodation internal to envelope



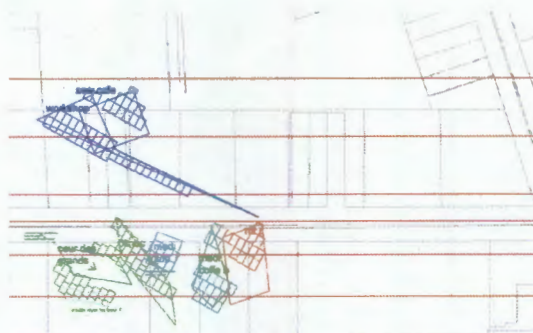
- 5. mosque
- 1. internal.
- 2. retail along street edge
- 3. higher pedestrian retail closer to main road, less further up.  
closer to public space



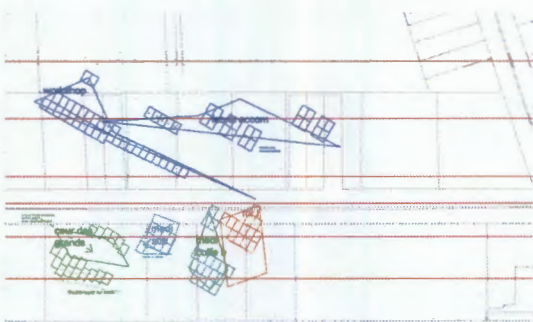
stretching into the site



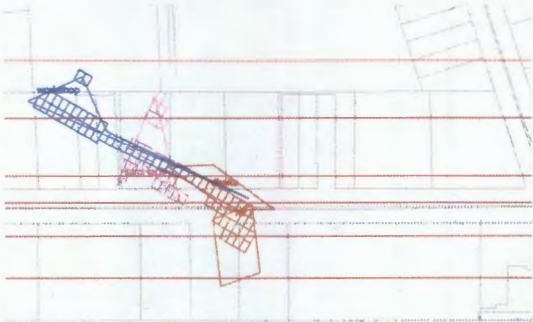
01  
1:500



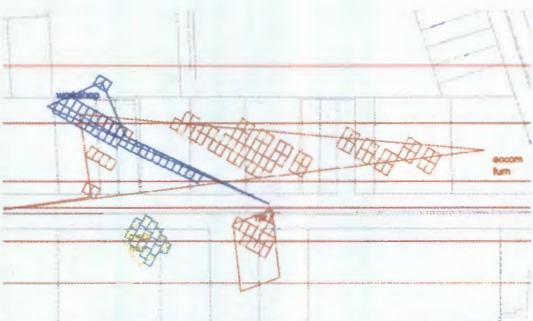
02  
1:500



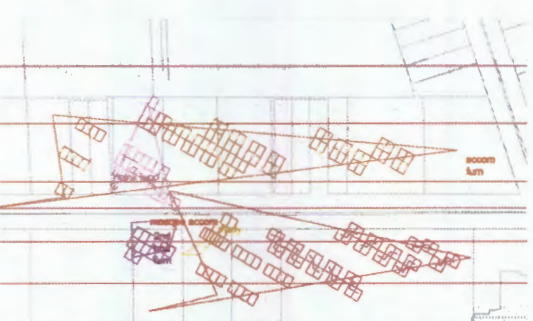
03  
1:500



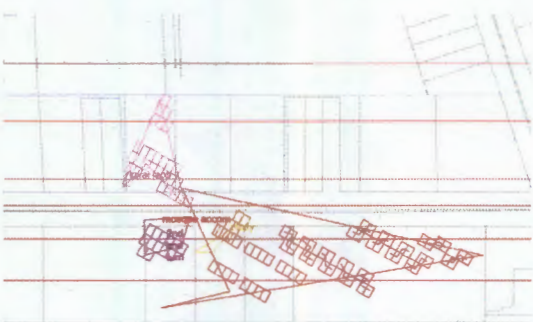
04  
1:500



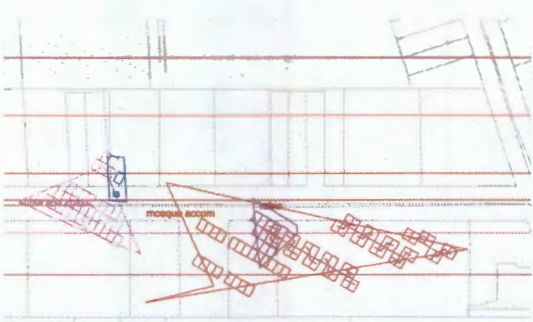
05  
1:500



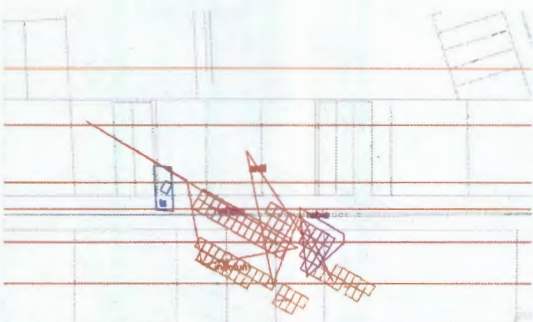
06  
1:500



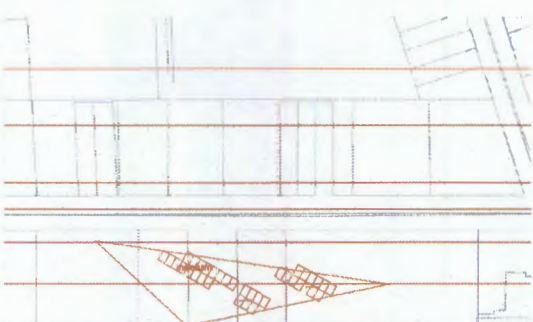
07  
1:500



08  
1:500



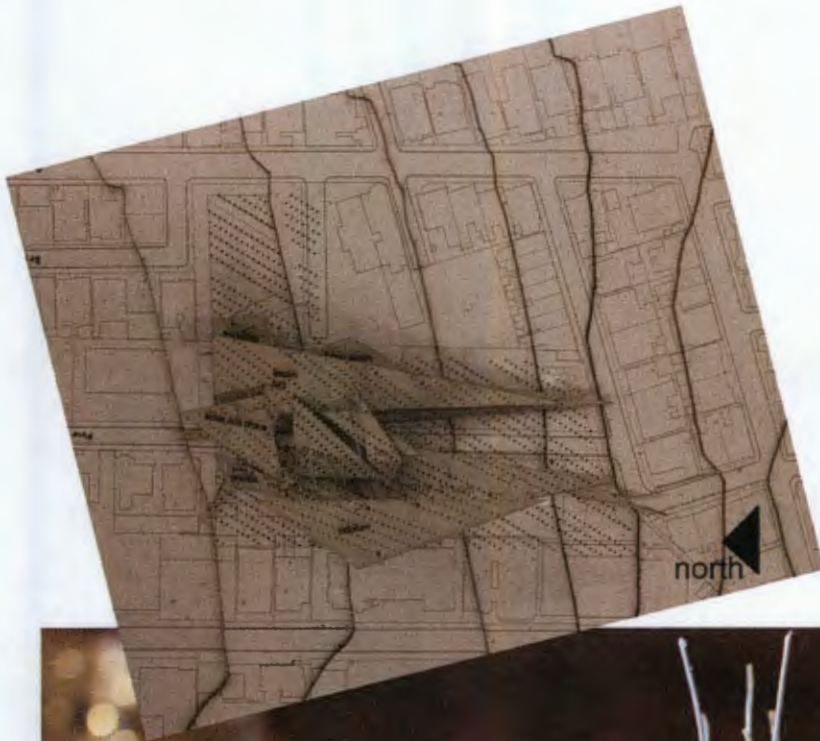
09  
1:500



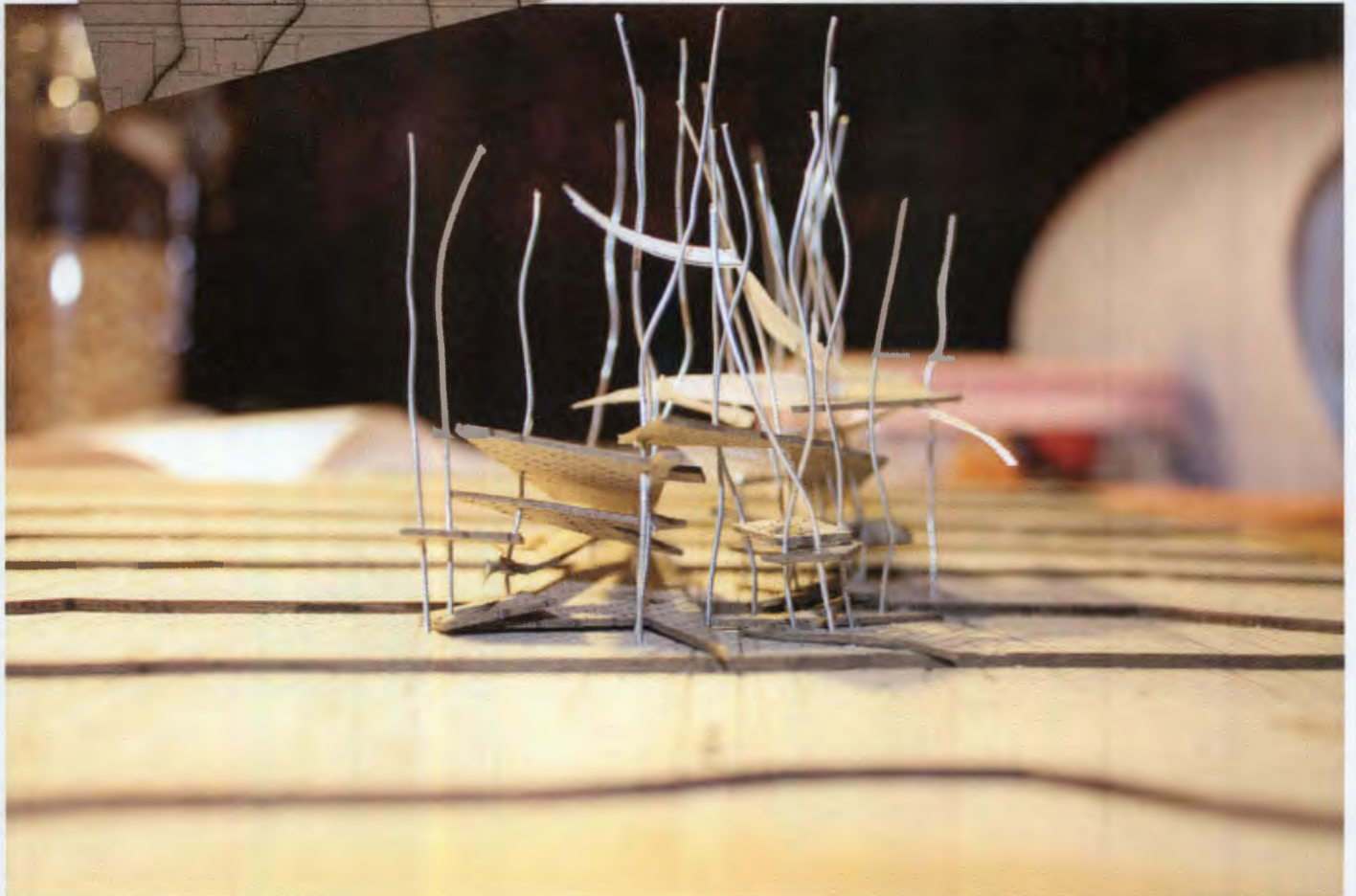
10  
1:500

## Bringing back the modules

Drawings at a scale of 1:500 in a4

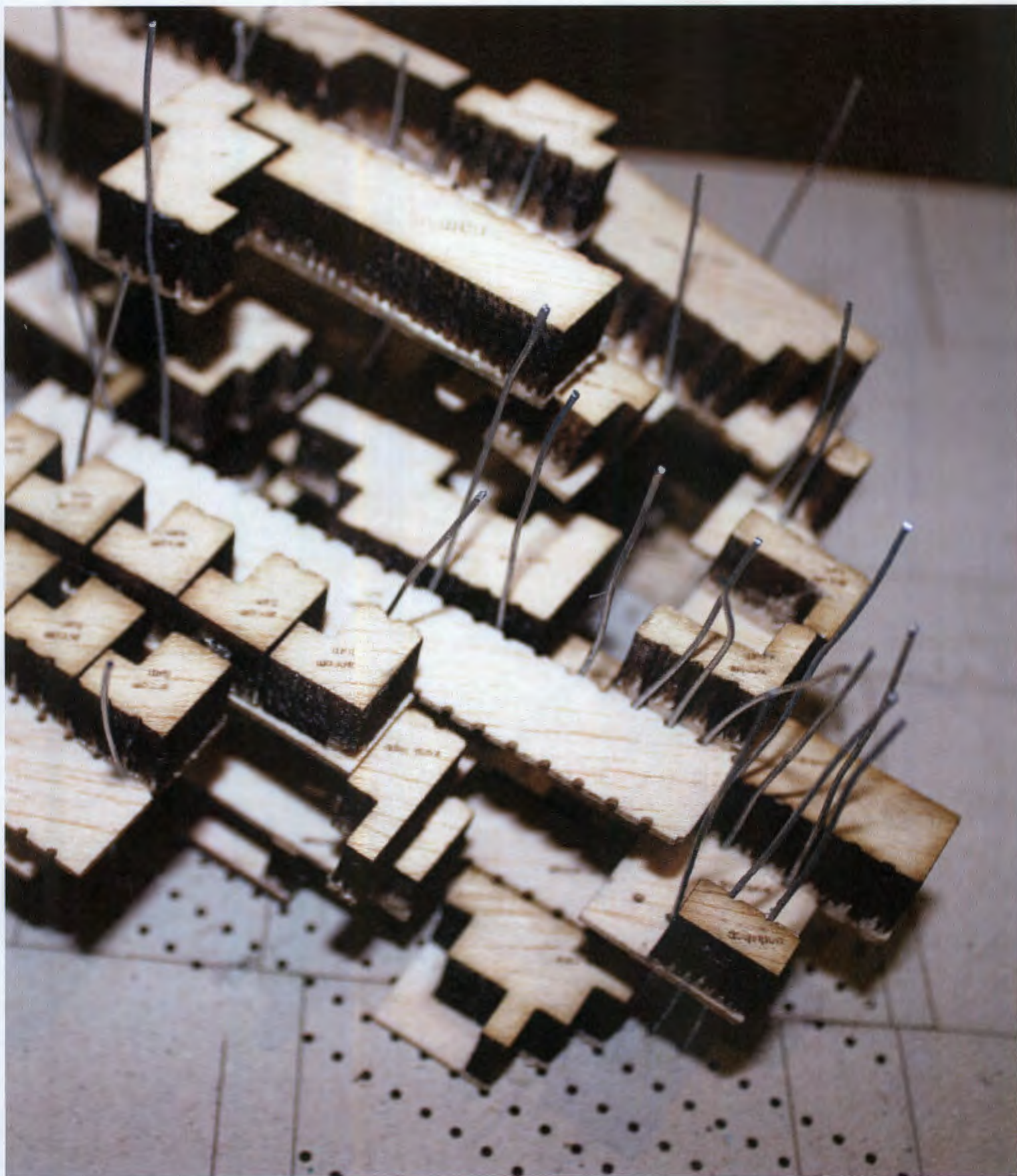


colour coding of networks



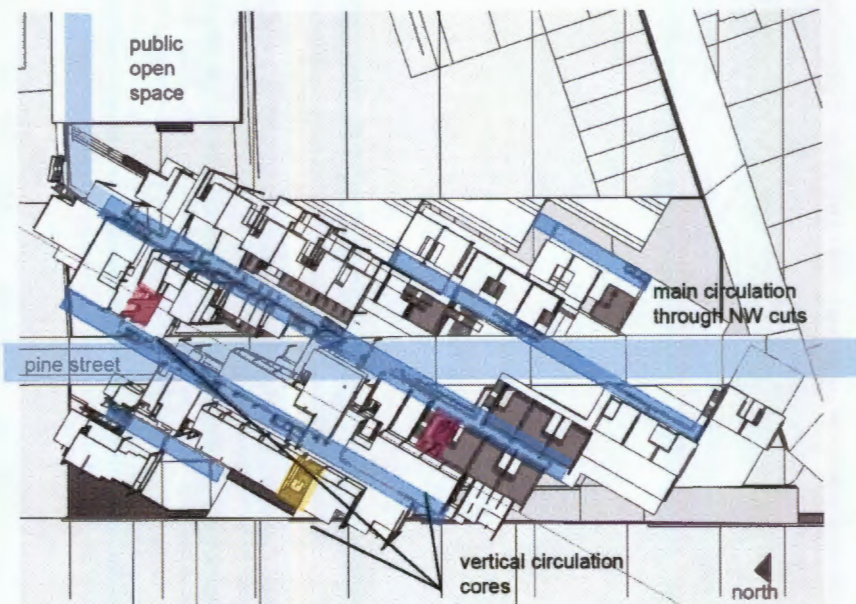
model 4: addition

original size: 1:500

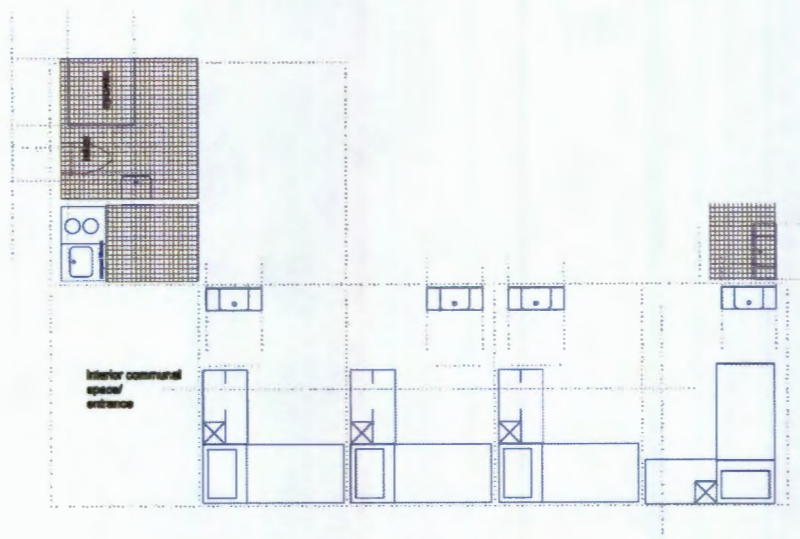
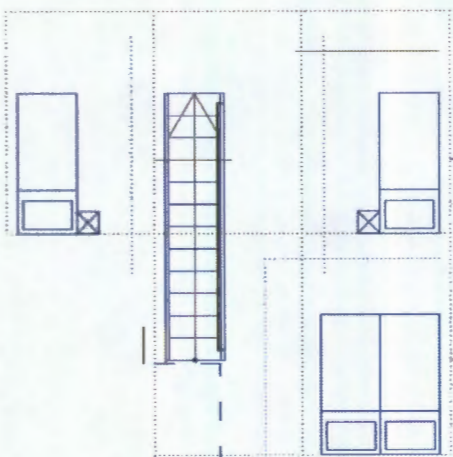
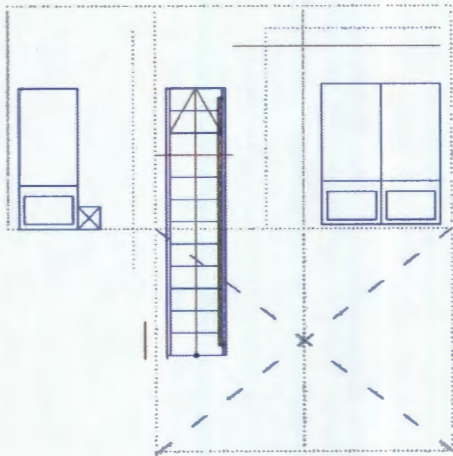
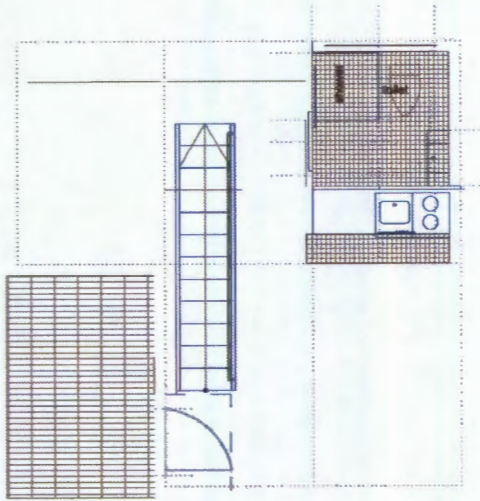


model 5: emerging

original size: 1:500



**circulation diagram**  
diagram not to scale

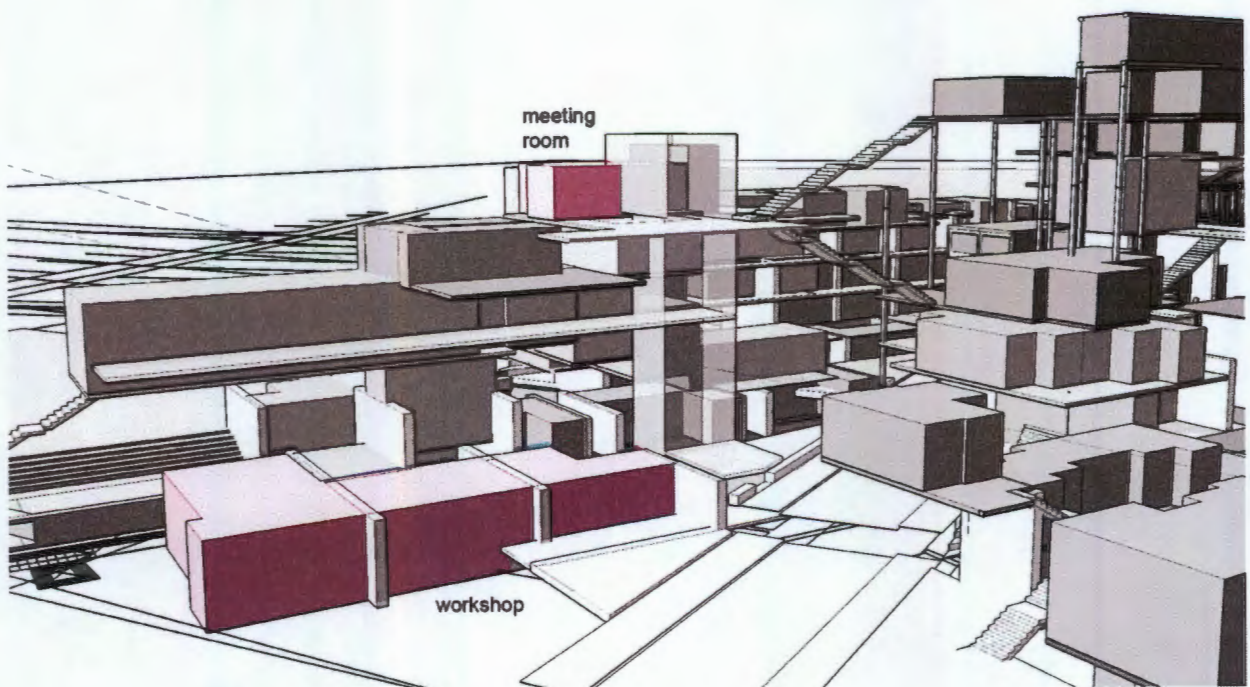


family accomodation

individual accomodation

# acomodation units

drawing at 1:100

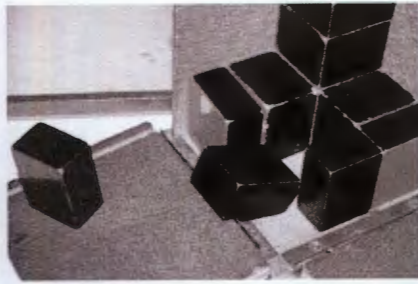
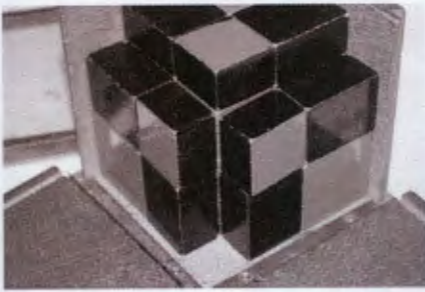


sofa + chairs

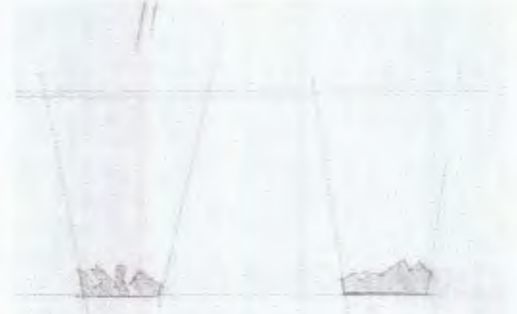
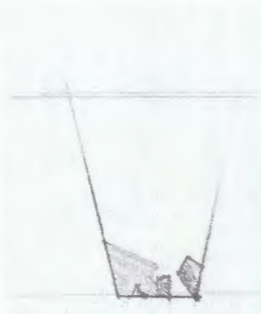
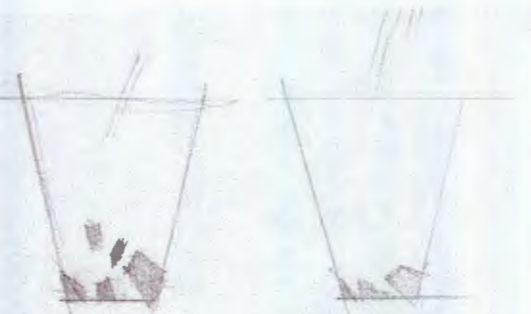
## fragmented programme

diagram not to scale

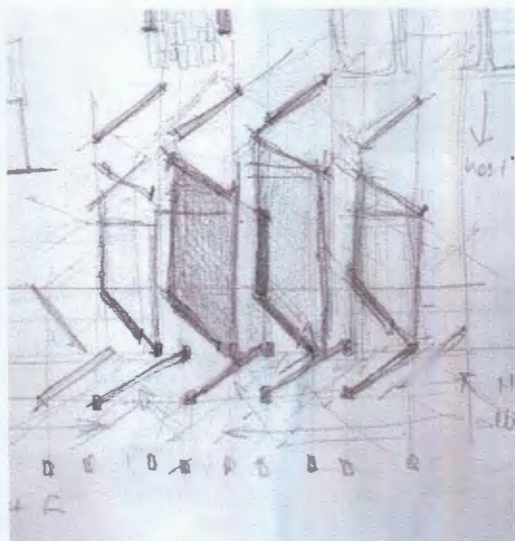




cube

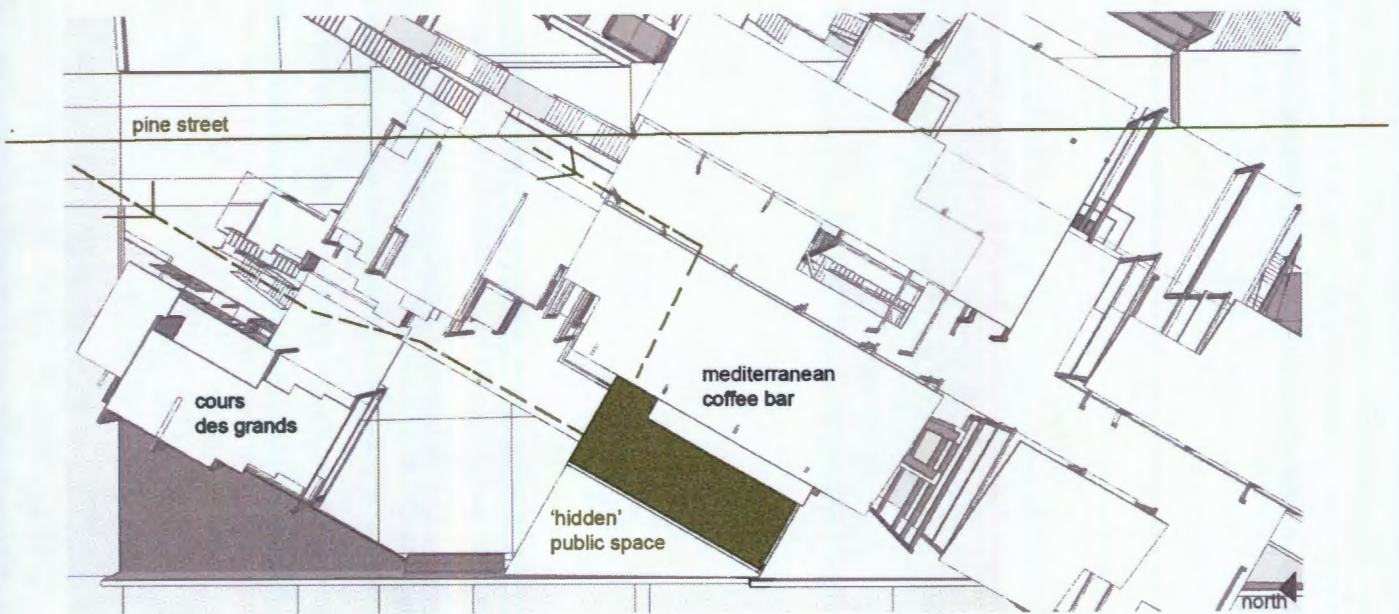


throwing beans (drawing on buttons)



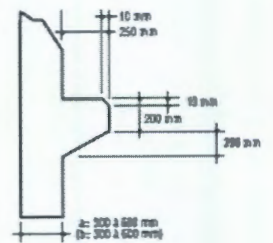
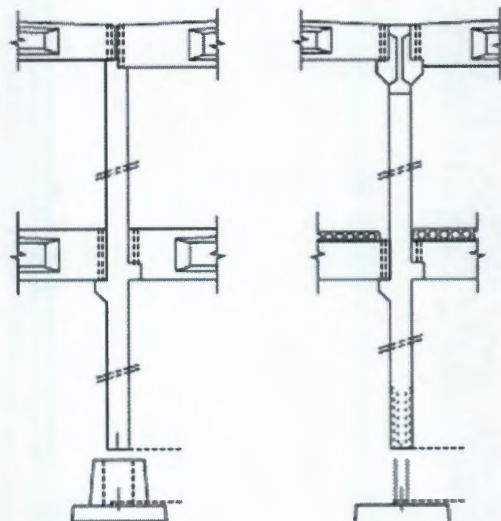
hiding and being seen

early ideas of hidden spaces

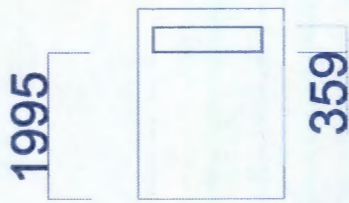


# hidden space

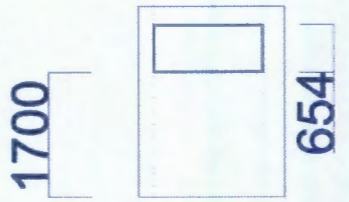
diagram not to scale



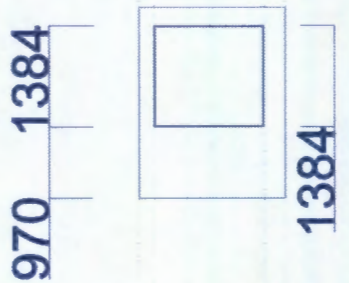
**Precast concrete construction systems**  
(<http://www.ronveaux.be>)



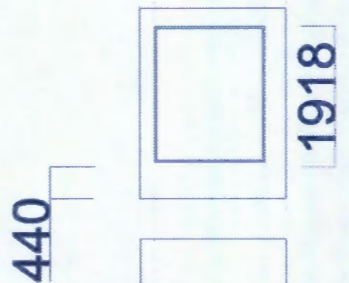
bathroom/  
top light window.



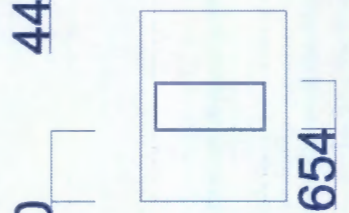
standing  
workspace



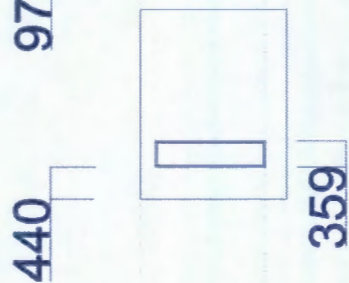
seated  
workspace



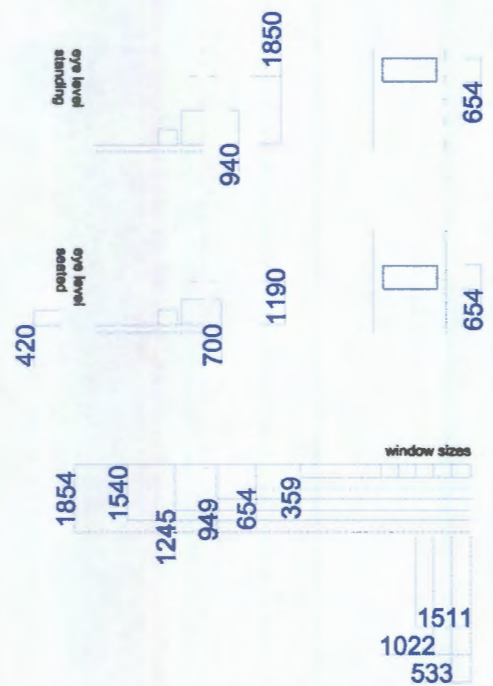
shop front  
windows



seated workspace,  
storage above  
the desk.



low window



## elevation panel explorations

drawing at 1:100, height explorations 1:200

# 01. Siting and program

My research took place around bean site 1 and bean site 2 (identified in Part 1), with most of the urban research focusing on beans site 1. This informed my choice of site, which is located within bean site 1. It was one of a series of possible sites, chosen for its proximity to main road and location within this area.

It is situated off main road, on Pine Street, and is a combination of un-built plots that are publically owned and zoned for housing.

The site research began with a 'conventional' reading of shading, shelter, wind, building heights and restrictions for the site and the area. These inform later design development decisions.

Program:

My initial site research in the first semester was an investigation into the socio-spatial practices on a portion of main road. Drawing on the idea of the existing Victorian row – shop/house led me into the idea of developing a range of open – programmed (universal), yet specific spaces which drew on existing spatial practices from the site. The idea is that this would enable the creation of a range of spaces of varying scales which could accommodate various uses.

These spaces are of retail/ workshops/ office spaces/ accommodation and storage spaces. They are each named after a space or person on the site which identifies the specific type of practice that they are designed for.

The effect of this is that while there are general principles used to design these various spaces, they are not as universal as the row – house but take into account the change that people have made to these row houses and the various spatial practices that exist within them.

This was driven by the idea of the site as a 'genetic pattern' of the city. Mirroring the variability of scale and range of networks created the ability for a specific yet general programming and critical spatial response.

## 02. Framing the context

This phase consisted of a series of three models. They both inform each other yet deal with a discrete set of specific ideas about the city and its spaces. These models began through a visualisation of the 'invisible' and hidden process that exist on the site, and are each a type of mapping of them.

### 1. Social and spatial networks (model 1)

Considering the city as having a 'genetic pattern' borrows from the language of algorithmic architecture, with its roots in the idea that cities are systems not unlike other biological systems. (Leach, 2009)

This was used as an interpretive gesture at the starting point of the design as a springboard into a range of other ideas. The site research illustrated a series of networks of social relationships. These 'networks' are multi-functional, containing a range of activities, each of different scales. An example is the furniture network which varies from large scale higher end retail, to small second hand shops. Within this network are accommodation spaces and 'public spaces'<sup>1</sup> in addition to the retail areas. Borrowing this idea, I mapped out the networks and relationships between the various 'urban agents', and the 'communities' they create.

This 'networked' model was constructed based on the existing sizes of the various programs for the site. Each of the spheres relates to a particular type of activity, and is named after it. The circular discs are scaled to the floor area of each of the different programmes. It

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<sup>1</sup> In this case the use of the street as a public space, but intimately linked with the second hand furniture trade.

was constructed as a series of separate networks, and then linked where they overlap. Using wire to connect the various parts meant that these relationships could adjust to the addition of new pieces networks.

By using spheres and circles the model is indicative (not formal) of the relationships among and between the various groups. While the model was constructed with an understanding of what is on the site, it re-constructs these relationships through the model-making process. It creates new relationships between the various programmes and contests the hierarchy of shop/house in the 'Victorian' structures. The three-dimensional nature of the model packs and folds the various programs into vertical relationships.

This model is one possible outcome of what could have led to many different results. The particular way in which the initial modules were connected, and then linked to each other led to one highly specific outcome. When the various networks were linked the most common overlap was identified and linked. However, within this linking process, the order with which I linked the various networks and the particular attachment again led to one specific outcome, of which there could have been several results.

This was the start of my exploration into the potential of 'analogue algorithmic architecture'. While the initial thinking drew on ideas of 'urban agents' used to simulate growth, it is limited in its simulation and extent. The organisation is a rough approximation of what could be – and the network is one type, isolated within many.

What the model does is to question what the networks and range of spaces could mean spatially as opposed to socially<sup>2</sup>. The spatial implications of this are evident in the connection of various activities through the built structure, and the accommodation of various scales of accommodation for each of the programmes identified. It explores and creates unexpected and unknown overlaps, made visible through the making.

## 2. The module of 6sqm

"Any habitable room other than a kitchen, scullery or laundry shall consist of a minimum 6sqm with no linear dimension less than 2m."<sup>3</sup>

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<sup>2</sup> The current relationships on site are spatial, but not reflected in the urban fabric.

<sup>3</sup> South African National Building Regulations.

This is a stipulation of the South African national building regulations for minimum building sizes. The minimum height allowed for a floor area of 6sqm is 2.4m for a bedroom, and 70% of habitable spaces.

The spatial practices that exist on the site have largely adapted to available space of the Victorian row shops, and contest the spatial norms that are used in conventional planning. The result is an interesting high density use of space. While people use space in a particular way, it does not mean that this is the way space should be designed, as many of these accommodations are a result of necessity.

At the same time, there is an implicit choice of many of these inhabitants to live in these mixed-use, higher density spaces close to the city centre, for ease of access and commuting to the city. This was an idea that was evident in the general site research (Site Research, 2010).

The question that this raised was around how to draw from ideas of existing spatial practice, but build within reasonable spatial standards.

The design uses these minimum 'building blocks' as stipulated by the national building regulations as a starting point into questioning and testing the limits of the spatial practices possible within them. As the starting module for the project they reference the 'universal' idea of the 'Victorian row shop' which the project draws on. Yet, in the way the design develops, these modules are clustered and adapted to a range of variations that are specific to the design process. They are then articulated specific to the spatial practices and developed into the planning.

The series of clay models indicates the various ranges of spaces within each of the networks, all as a multiple of this initial building block. These accommodation sizes were used to define the circular parts used for the 'network' model, and the attached schedule accommodation explains the various programs, sizes and specific requirements.<sup>4</sup>

The use of a module enabled the idea of self-similarity, containing the variability of the site into different but similar parts. They became the minimum space parameters for the design process,

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<sup>4</sup> The attached list is one of the initial iterations of the 'accommodation schedule'. While the various types of spaces have not changed, the number and scale of accommodation units has been adjusted as a result of precedent research. This needs to be updated.

ensuring habitable spaces would be created. It is an attempt at a very specific, yet open response.

### 3. The site and its constraints.

This was the third model along with a drawing of the site which deals with very particular and site specific ideas in relation to building, lighting and the neighbouring structures. It developed out of identifying important concerns for the site, the building and its neighbours. As with the previous two models, there was a contestation between what would be considered in terms of the existing norms and planning standards, and what was being challenged.

This model was conceptualised as the kind of container within which to start packing within.

The maximum height at the main road edge of the site is 7 storeys. This draws on the maximum building height of commercial developments in the area. This drops down to 4 storeys at the 'park end' to create a human scale for the public open space, and limit the shadow cast onto it. The 7 storey floor height at the main road edge is not the height of the immediate neighbours, but is relative to nearby developments. The 'back' of the site, at the southern end is largely residential, and the maximum storey height drops down to respond to this, with a maximum of 2 storeys.

The cuts into the model are for trees, the street that moves through the site, and cuts perpendicular to the NW axes. The street opening has a minimum height of two storeys. The spacing and placing of the cuts was a result of combined consideration for the wind and natural lighting for the enclosed structure, as well as site precedent for building depth.

The cuts were created after mapping the 2 x 3m grid (informed by the 6sqm module) onto the site. They are placed at 12m intervals, and are 6m wide.

These cuts were intended to be possible open spaces within the building. The wind in the area is particularly strong in both summer and winter, in the SE/ NW direction. The cuts were intended so that the surrounding buildings could function as windbreaks for these open spaces. Their orientation was based on the optimal direction

for windbreaks being perpendicular to the prevailing wind. (School of Forest Resources and Conservation, 2009) The identified cuts were envisioned as these possible 'windless' open spaces. Windbreaks however need to be calculated based on what is actually built and physical heights. This was an initial idea which requires an increasingly complex response as a result of the porous nature of the structure.

The size of this spacing was identified through a search into the maximum day lighting depth in buildings.<sup>5</sup> This roughly identified a maximum building depth of 11m. This was combined with the site precedent of building depth of between 12 – 15m.

The depth of spaces between the cuts is 12m, adjusted to the modular grid on the site. In the final model, the use of the buildings as windbreaks for the open spaces was in conflict with the views up to the mountain and sunlight into these central spaces. The result is that they aren't particularly effective in the structure, and need refinement.

The measurements that I used needed to be precise in order to serve as parameters within which to work, however they are rough estimations.

The building lines and set backs for the specific site were not considered. The site slopes down 10m and while this is not a feature in the initial model, the structure sits within one basement floor, utilising the slope.

The final consideration in this model was for views from the site, up to the mountain and the city. This is barely visible in the plaster model, but was an informant in the design and evident in the next stage.

## 4. Functional mapping

Combined with the creation of this plaster model, I mapped the various functions onto the site according to the kind of spaces and proximity to openings they would need. This site mapping was done according to 'fields' of activity in locations that related to the site and its 3 edges.

These edges are important in the access and planning. They are essentially the public open space, and the two street edges of Pine

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<sup>5</sup> I couldn't find specific data for Cape Town, so used a study done in Australia with similar lighting conditions.

Street. This identified areas of higher density near main road and along the street edges, with more lower density residential activities towards the mountain side of the site.

I did this mapping based on the idea of retail collecting nearer 'main road' side of the street, and more family housing towards the more residential edges of the site (mountain side). This references the importance of trade along main road. Activities such as 'workshops' needed street access but did not need to be on the street edges. Retail however specifically needed to be seen from the street, following existing practice, where visibility was very important to trade. The public functions included in the programming were not specifically linked to the street edge. This draws on the existing spatial practice, where although they are located along the street, they are internalised 'hidden' spaces' such as the Cameroonian and Congolese Bars.

# 03. Transformations

This phase consists of a series of drawings and adjustments to first phase that bring the different ideas together and begin to structure them. Each of the steps is abstract, but aims to maintain or create a specific set of social and spatial ideas. The transformations of the drawings were done with the specific idea of maintaining the spatial relationships established through the network model, while the packing realised the need for a negotiation between these relationships and structural stability.

## 1. Drawing the models

The next step of the design process was to combine these three models. This was mediated with an intermediary model.

In order to do this I needed to extend the molecular model into the site model, and then lay out the actual modules onto this.

I did this in a series of steps:

The first involved the placing of the networked model onto the site. I placed it positioning the highest density parts closest to the main road edge, with the largest number of small end retail along the lower – street edge. These were two factors that were important in the functional mapping of the site. There were exceptions to this, which later were adjusted.

I then drew the model onto the site. I started by drawing rectangles around the circles in the orthogonal orientation of a N-S axis, and then rotating these to align with the centre line of the circle. I drew this model in a flattened plan and elevation.

Both of these decisions are somewhat arbitrary and could have happened in many different ways with potentially radically different outcomes. The particular decisions do however stem from a series of reasons. The first being that the network model had no

orientation – and therefore needed to be placed. I placed it according to what I thought was the optimum orientation, and later made some adjustments to this. The main adjustment was removing the ‘furniture storage’ component, and moving it further down below housing.

The reason for drawing the model in this manner was in order to attempt to capture the various orientations and transformations which were evident in the networked model. In order to do this I needed to start with a geometry that could be ‘transformed’. My choice of the rectangle related back the use of these modular rectangular building units and the orientation of other buildings around the site. It was representative of this condition. While the model is made out of spheres, because they are two pieces of cardboard, they have an orientation that is specific to the way that they were networked. This initial drawing therefore locates the networks in relation to an idea (and orientation) of the site.

The next step was to stretch this drawing into the actual site, and according to the identified site conditions and mappings. I did this only with the ‘plan’ in order to maintain the vertical relationships established by the networked model.

I had to do this in an order with a series of steps, because by stretching it, it meant that a change in one space, would affect all the other spaces around it – in order to maintain those relationships. Retail was stretched to street edges and closer to main road, whereas, family accommodation towards the back of the site. The storage spaces were stretched to more easily accessible areas towards the back of the site, and the offices near main road, but not necessarily on the street. This stretching was done according to the functional mapping that I did on the site.

The vertical spatial relationships that were established in the networked model were maintained, and this ‘elevation’ redrawn to match the plan. While the molecular model was made to scale, the sizes of the spheres was based on floor areas of each of the spaces. This meant that in the vertical direction, the spaces were overscaled. There were also large gaps and openings within this drawing, as a result of the stretching process. The next stage required a re-packing of these spaces.

## 2. Packing

In order to achieve this, I numbered each of the spaces in the sequential order from the bottom up, maintaining their vertical

ordered relationship. I then started at the bottom and packed them together on top of each other.

What this meant that while the order of packing was maintained, their vertical relationships changed according to the spaces around them. The different spaces were stacked on top of those directly below them. This meant that some spaces which were initially on the same level, dropped down to a space directly below it. This was an adjustment that resulted in a more tightly packed structure, which was necessary in order to start to physically structure these spaces.

### 3. Adding them together

The results of these 'transformations' is evident in the next model which considers these adjustments putting the 2 x 3m grid back onto the site, and stacking the various planes according to their numbered order. This model also illustrates the adjustments made according to the plaster model in terms of maximum heights and slopes for views.

It consists of a series of triangular planes which are derived from the stretched model, and are tilted for views of the city and mountain. It illustrates ideas of higher density closer to main road, sloping down towards the mountain and up against the city edge. The cuts are only indicated in the pattern on the surface, and are not in their actual spatial sense as yet. In some senses it's a 3 dimensional diagram that encompasses most of the initial ideas. This 'fourth' model is a result of the addition the previous 3 with the drawing.

### 4. Bringing back the modules

The next step in the combining of the three models was to bring the module back in. the idea was to place the initial modules and their spaces along these new identified fields. I saw the intermediate model as an instructive conceptual model and not a formal model. I placed out the modules onto these surfaces. Initially I did this according to the extents of the fields identified, but later adjusted this back the overall grid. This meant that the 2 x 3m grid initially identified extended throughout the site. The result is a highly structured but organic model. This is visible in the fifth model.

# 04. Adjustments.

This phase of the design responds to the required negotiation between the real and the conceptual in terms of both design ideas and the design process. It is an explanation of further changes which happened through these considerations and the emergence of the design through this.

## 1. Adjustments

While the fifth (balsa wood model) was still conceptual, the building structure begins to emerge from it in a more cogent manner. It highlighted issues which needed to be resolved particularly in terms of lighting, and led to a series of adjustments based on it –which function in the place of a ‘feedback loop’ for the project.

The absence of a feedback mechanism, has meant that new decisions have to manually be translated into the old design decisions, and affect changes within it. While it is a time consuming process, it has led to an emergent design that is increasingly responsive to ideas it develops.

This was not something that was consistent throughout the changes made. Changes to the program sizes for example were not reflected in changes in the initial networked models which would have led to a different outcome for each of the subsequent steps. These changes and adjustments for sizing and lighting did however result in an adjustment of the packing of the buildings. When some of the planes and spaces were shifted for better lighting conditions, the vertical relationships were adjusted for the same reason and structural continuity, and the spaces repacked accordingly.

## 2. Connections + networks.

While this fifth model was informed by the networking of spaces, the actual network was not illustrated. In the initial iteration of the physical networking, the idea was to connect the ‘systems’ within themselves, and then have key access points situated at the overlaps identified in the social networks. After an initial attempt at this, the result was a highly complex circulation system, with too

many stairs and bridges, which wasn't viable and didn't respond to the open-ness of the nature of these systems. Furthermore, the initial network has adapted as a result of adjustments.

This concern led me to two decisions: the first to connect the spaces according to their location and not necessarily social network, and the second being to have the main circulation within the 'cuts' through the site.

The placing of these physical connections within these cuts enabled the various networks to be linked to each other in these areas. These are either physical or visual connections, or both.

This has meant that the various social networks initially identified are not isolated, but linked into the broader structure through these cuts.

The result is that, as an example, if you walk up and through the second cut, you will largely pass through the 'furniture network'. There are bits of other networks along the same trajectory, and the 'furniture accommodation' is accessible from this side but not in a direct relationship by the shortest path.

While this decision limits some of the dynamism of direct connections between the various systems, across the site, it enables more physical and visual connections through these open spaces. As you look down and through the 'first cut' you see the various aspects of the Congolese network and its connection to the Cameroonian network.

The vertical circulation is located in the overlaps between the various networks. These are the points in the design which were most accessible to the largest number of spaces. The location of these vertical cores was therefore not linked to a hierarchy of program or function, but rather access. This is indicated in the attached diagram.

### 3. Fragmented programmes, spatial explorations, programme precedent.

My initial spatial explorations were around what was possible within the 6sqm modules, for various spatial practices of different scales and multiples. In the design proposal this gets adapted to my actual programming of specific spaces. This is

most evident in the workshop and office spaces, but also visible in the accommodation units which vary from 'individual' accommodation to 'family accommodation'. I will explain two of these adaptations in more detail below.

## a. offices

While the site precedent gives some examples of spaces that could be accommodated for various uses, the potential for these types of programmes pointed to more variation that could be possible based on similar ideas. An example of this are a series of small office spaces with shared communal facilities. These kinds of spaces could offer cheap and various sizes office spaces for short term rental.

A precedent for this type group called Sunshine Suites based in New York (Sunshine Reality Management, 2010). Their by-line is 'where start-ups grow up'. They offer a range of spaces possible from 2 – 10 people which can be rented on a monthly basis. These are not enclosed spaces, but open work spaces with lockable desks. The rent includes access to a reception area, and meeting rooms in addition to a mailbox address for the month.

Most of the offices that currently exist on the site are those of big companies, with a few smaller individual spaces adapted to office use. There seemed the potential to create spaces like this to offer an increased variety.

My design proposal accommodates this through a series of small offices, which contain various sizes of spaces, from individual desk and shelf areas, to clusters of two or three. In practice small businesses or individuals could inhabit one or many. There is a shared reception area, to control access, a kitchenette and toilet provided, as well as a shared boardroom/ meeting room. The design of the offices has created 4 of these clusters of various sizes. The idea is that some could be rented out as whole units, or individual offices.

## b. Workshops:

The workshops are treated similarly, and draw on the idea of a furniture shop and sew café which exists in the area. My proposal creates a series of smaller and larger workshop spaces which could accommodate a range of various manufacturers.

There are three types of these spaces – the workshop, sofas + chairs and the sew café – which all have workshop spaces and allocated facilities such as meeting rooms for clients.

The Sofas + chairs shop on the site is a small furniture shop whose trade is based largely on online sales. This shop has a small show room along main road, with a small manufacturing space behind. The sales of the shop are based on people ordering furniture to specifications online, which are then custom-made in the factory.

The 'sofa + chairs unit' proposal accommodates this kind of activity, with the workshops located on the ground floor. Further up, is a board room and small office spaces where the makers could meet with and discuss specifications and products with the potential clients. It is located within a network of other furniture shops, as is the existing .

A space such as this, although conceptualised for 'furniture' is essentially open to any trade that has a component of making, displaying and meeting. It could extend to small scale manufacturers of clothing.

### c. Accommodation units:

The accommodation planning for this project was similar to the rest of the planning, but differentiated in that it needed to accommodate a certain number of people. There are two main types – individual housing, and family housing. This housing component does not exist on the site to the same extent in the manner in which I have proposed, but a large number of the existing shops have rooms at the back, or are adjusted for housing in the evenings.

A rough estimate of the number of people associated with each of the activities led to the number of housing being provided. This was later adjusted to the siting.

While it is specifically housing, it follows the same design principles as the rest of the programmes, and therefore could be relatively adaptable to small business/ offices.

The spatial practices on the site meant that the accommodation that people create for themselves is minimal. These kinds of space are accommodated in the planning of many of the retail spaces, through the idea of a 'back door' and series of layering which could be used for either office spaces or living spaces. They essentially create a

private part distinct from the visible front. The idea was to follow this practice to an extent, to accommodate the practice of 'hidden' back spaces. At the same time, I did think there was the potential to develop housing to complement this. There was a clear concern for housing in the area, because of the proximity to the central city, and the urban potential of the area. The particular site had been inhabited by informal settlements, most of whom had been evicted. (Site Research, 2010)

The 'housing' proposal contains two housing types – individual housing and 'family housing'. The individual housing consists of a series of individual rooms linked with a shared kitchen and bathroom area, and small communal space. It has an associated outside area. The family units could be of one, two or three rooms. They are one type of accommodation with various iterations.

## d. Fragmented programs:

In the workshop spaces described above, the activities are split into two locations despite a connection of programme. This is an idea which borrows from the existing site practice, where these workshop spaces, and some of the shops are split over two or three units (Site Research, 2010).

In the development of this design process, cutting through the planes meant that several of the programs were split apart by these cuts. In the packing of the various spaces, in some cases, the levels of the parts were split. This was done with an initial consistency with the housing, which slopes down towards the mountain with the result being terraced housing with better views. For the other programmes, this was decided on a combination of factors of whether the programs needed to be on the same level, the better location for each of the different parts, and the effects for surrounding spaces.

In the example of the Sofa + Chairs unit, the split results in the workshops on the ground floor, and the offices above. It made more sense for the workshop spaces to be located on the ground floor because of possible equipment. There were no spaces below the Sofa + chair space, which meant the 'packing' would drop the space down. This minimised structure and the shadow of such a large space onto other parts of the structure which would have had serious negative lighting effects.

This decision making process, was a similar consideration for other programs split for similar reasons – dependent on the specific 'local'

conditions. The fragmented program is turned into an opportunity of layering different functions.

## 4. Hidden and unexpected spaces.

One of the potentials of algorithmic/ rule based architecture is the ability to create what you could not imagine. Through setting in motion a process, it enables the creation of the unexpected. Although my design process has been more limited than a possible digital response, this has still been achieved to some extent. Because of the fixed nature of what I started with, it is in the interaction of the various factors that the 'unexpected' emerges.

The idea of sight lines and 'invisibility' was a question raised earlier in the year around this project. It was a question that was raised where many of the spaces on the site were not about being seen, and the idea of understanding them in their totality, but the opposite of that. There is a constant duality evident in the site research between being seen but also hidden. While the street is important as a public space, it is a site of contestation between being public and policed.

My first en loge began to question the possibility of looking at site lines and the idea of things which are hidden or unknown. The two exercises question what you see when you walk down a street, and whether these sight lines could be manipulated to affect what is seen and what is hidden. The second exploration was around the layering of space. It is based on a wooden toy which is a cube with the same pattern on all sides when closed, yet when taken apart is composed of a series of different sizes and orientation of blocks which make up this regular front<sup>6</sup>. The third idea which raised these possibilities early on in the process was that of packing drawn from the site. This was taken through into the design more strongly.

Although these early ideas did not directly inform the design, they informed ways of thinking about space and a series of spaces. The angled axes, and variation of similar components achieves a similar (combined) effect. These were implicit spatial ideas in the visualisation of the networks and the ideas of layering evident in the spatial planning.

A good example of this is the Congolese bar (Cours des grands) and the Mediterranean coffee bar. These are two 'public functions'. Their connection through the molecular model and overlap of

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<sup>6</sup> This cube is called a trinomial cube and the sizes of the blocks are based on the algebraic equation  $(a + b + c)^2$

functions meant that these would be linked through an overlap. Although the models that they draw from are directly on the street, they are introverted functions, which point to a different kind of public space within a less visible, discrete realm. For these reasons they were not adjusted to the street edge in the process of stretching.

The overlap is an open 'public space' away from the street, yet somewhat visible from it. Both spaces have direct street access (the one up stairs, and the other behind the supermarket). Using the slope on the site meant that they could be distinct and yet connect on level in a public platform between them. It's a sunny bright space, grassed and perfect for sleeping on – and although glimpsed from the street, not directly visible. Unlike a 'hidden park' it has associated public functions looking out and over it. This space is the roof of a unit below.

This is one example of the spatial order that the design enables, and is repeated in various ways throughout the building. The accommodation areas largely follow a similar logic, with public street fronts, leading into individual access visible from the street, but not on the street, and more private 'back/ hidden' gardens. These gardens are visible from the residential side of the site, and overlooked by other housing units.

What is established is not a series of processional relationship as exists within the Victorian houses, but a networked spatial relationship where spaces loop back. Many of the roofs of adjacent units become terraces and open spaces for those below.

The design process enabled this series of unexpected public open spaces. These are articulated in the design as a series of different types of spaces, with their materiality and function dependent on their location within the structure in terms of weather, shade and light, and surrounding functions. This treatment returns to diagrams on public space done for the initial research component, and used a similar categorisation to identify the places which range from grassy soft spaces, to shaded and unshaded hard surfaces.

# 05. Articulating Differences

This phase of the design aims to take the initial conceptual ideas into a very specific material and physical proposal.

## 1. Structural ideas + materiality.

Algorithmic architecture is the process of designing through localised rules that relate to parts. Through the development of rules related to internal and external factors, a structure can be 'grown' that responds to various factors simultaneously.

The structural and material ideas for the project developed out of a concern for the local context, and the kind of building. The high density urban context demands a largely robust material response, and ease of construction.

Following the methodology of a rule based design, which could accommodate local adaptations and changes led me into a three part variable structure. The result is a variation from the three storey load bearing buildings to a concrete frame structure which could respond to the robust needs of the various programmes, and enable a variety of infill panels, to a lighter steel structure.

The load bearing concrete wall structures are largely residential, and respond to the need for party walls, and a heavy base for these everyday activities, which have largely similar programs. These would likely be in situ.

The lighter concrete framed structure, maintains the robustness, but enables increased variability in the infill panels, that can accommodate the various activities. The structural spacing started with a 6-8m span drawing on hollow core flooring spanning abilities. This gets negotiated with the structural requirements of other parts as the structure develops.

The lighter steel is largely situated on the upper floors, and other the office spaces. The lightness of the steel structure means it is well suited to these locations and functions. The steel structure is tied

back to the concrete frame, which needed to be adjusted for this load.

The varied nature of the structure meant that while this 'tier' system was the starting point, the actual structure is more of a mix between these three systems. Exceptions to the rules meant that some housing units of a height of three floors were concrete frame construction if they were raised off the ground to enable this to be possible. These adaptations and changes were based on a series of rules which I devised relating to the effect that was needed for specific situations.

Concrete structure:

An initial search was around the use of precast concrete components, for its variability. A further reading into some of the more contemporary examples of this, resulted in a change in thinking about these systems. Many of the contemporary precast systems are a series of parts of different sizings which respond to different loading conditions. The idea of using these systems meant it would be possible to extend the idea of 'local' adaptation to varying column and beam sizes depending on the location and needs. This is my structural intention.

The concrete frame sits outside of the load bearing wall structure. They interact through shared floors, and the concrete framed structure creates overhangs and 'collonades' for the load bearing accommodation below. The concrete frame results in a shift in the grid to accommodate this adaptation, with associated spatial effects. The staircases and bridges are held within this structure.

## 2. Elevations and lighting conditions.

The elevational treatment follows on from the idea of an adaptive system. The initial idea stemmed from research into precast concrete panels.

However unlike the universal systems usually generated with these panels, what I wanted to achieve a response to the local requirements of the different types of spaces – in terms of both materiality and lighting conditions. Following the premise of the design which draws on a combination of highly specific, and universal ideas, the elevations respond to these. This is a design response to creating variability.

In order to deal with varied lighting requirements I devised a series of facades that responded to and enabled various lighting and seeing conditions.

The initial iteration of these panels was based on the module sizes. The idea is that this series would be able to respond to a variety of different lighting, sighting and privacy requirements. There are 6 different types of panels, each of which are in the different modular sizes. These height standards draw on Neufert spatial planning standards, and then get adapted to the use of standard steel residential window sizing (KSW, 2010).

I developed the range by initially looking at the programmes, and then generalised this. They are essentially based on heights and seeing out when you are standing, sitting, lying down. The additional three are blank panels, shop front windows which are full display panels, and high windows – therefore not seeing out, but getting light in.

The second iteration needed these fixed panels to be adaptive to the different material requirements of the various units.

My material choice relates to the robustness of use, and ease of fixing. So similarly to the structure, it varies initially in a stacking from the heavy concrete base construction to light concrete infill panels which are used for the concrete frame. The idea is that these will be similar, but vary in terms of thickness and added insulation, because of different acoustic and thermal needs. The steel structure with mainly offices would have timber clad panels and galvanised iron roofing.

The infill panels will also depend on the uses of spaces, and specific articulation. Timber panelling would be used in some of the concrete frame construction in the hidden spaces, where the functions are more private. Within the harsher concrete construction, this change in materiality is used to create moments of hidden softness, more sheltered and hidden.

The roofsheeting is used as cladding for the offices on the NW side, in response to direct rain in winter.

### 3. Landscape

The landscape concern is not an isolated issue, yet needs clarification. The building sits within the site, and merges into and utilises the landscape. The site is terraced at half levels, to accommodate the steep slope, which enables increased variation in

the spaces possible. This depth of land is used as a further layer of 'hiding' activity.

There is fluid integration between the interior and exterior in the way that the structure is designed, where programs often leak into the cuts they create.

## 06. Critique:

This design process stems out of ideas raised in the theory and technology papers. The concern for context, program and space follow a similar logic to my engagement with the city, in addition to having drawn from the site research.

It stems from what I find a problematic engagement with context – that cannot be considered only for what it is, but what it relates to. The Victorian row house model and development of main road is a 1920's initiative in speculative development. While it has adapted to various uses, it is intrinsically low density, and relates to a particular time and place. The planning around this site responds to this among other concerns.

The decisions which inform my design process arise from a negotiation between what is existing and what could be. I did not start the process suggesting that what I propose is the answer to developing in the city – but that questions of density, building height, relationship to context and street are questions that I believe exist within any design response, whether dealt with self-consciously or not.

This stems from my papers, and is continuous throughout my approach referring to ideas of conscious framing. While I don't deal with all of these ideas in as much detail as I should– this is an essential question within my design approach, and choice of methodology.

I have explained the design process in this chapter as a set of steps around what I have done, and what I am proposing. Each of these steps relates to a series of very specific social and spatial ideas, either interpretive or real. It is these ideas that enable me to develop rules for the process.

One of the problems is that this seems to reduce an open ended process to very specific parameters. So while the series of steps identify and create a response to very specific parameters drawing on particular ideas, their inclusion in the design process is interpretive.

The 'wind' cuts are a good example of this, within many. Comparing this to ideas of digital algorithmic designing makes this particularly evident. In a rule based approach done digitally the idea is that references such as 'wind' or 'sun concerns' are not located within fixed geometries but relational systems. Very real specific knowledge of these systems would enable a responsive design.

While my decision for placing the cuts stemmed from their perpendicular direction to the prevalent wind, it is an isolated decision within a 'system' of concerns that would need to be considered for the wind.

However, while these cuts don't work as wind breaks, the series of design steps, including this decision, have led to a specific and unique outcome. This outcome would have been less specific, were it not for the specific nature of the 'wind cut parameter'. In the design, the cuts both enable and respond to a system of social and spatial networking.

It could easily be argued that the 'wind cuts' are more interpretive than responsive despite the specific decision that governed them.

A similar critique can be read in the process of bringing back the modules into the design. The idea of developing a surface area which will be filled with a module sounds like a precise procedure that will have one possible outcome. It follows a logic of digital processes where a path is developed through a result of various considerations, and a base geometry or shape then extended and adapted to this path.

Yet in this process, it has not been for two reasons. The first is that the planes created were scaled to the initial spaces, but these areas were not fixed in the stretching process. While this was intended, the result was that many of the planes were much larger than the initial spaces identified. The problem links into the second concern – where the use of modules of a fixed geometry mean that they were placed more than extended.

The second reason which links into this first, is that there is no feedback mechanism to the beginning of the design. Changes in ideas of program and space allocations affected the number of modules through the design process. In a digital modelling program, these change would feed back into all of the previous 'transformations', whereas in the 'analog' interpretation this doesn't happen. Changes and alterations happen later in the process without these automatic adjustments.

I do not think that this nullifies the value of working within a rule based design. In both cases the result of these design decisions has been an incredible variability and spatial complexity, which, it could be argued, could not have been realised without the rule based processes. This is where the potential of rule based design is particularly evident.

The critique is then more a caution against assuming that asking 'real questions' which is where my design started – will lead to 'real answers'.

I see this design project as an oscillation between the interpretive and the real. While drawing on very real questions and issues within the city, there is no linear relationship between where the process starts and ends. It is this nature of rule based design that potentially leads to unexpected outcomes.

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