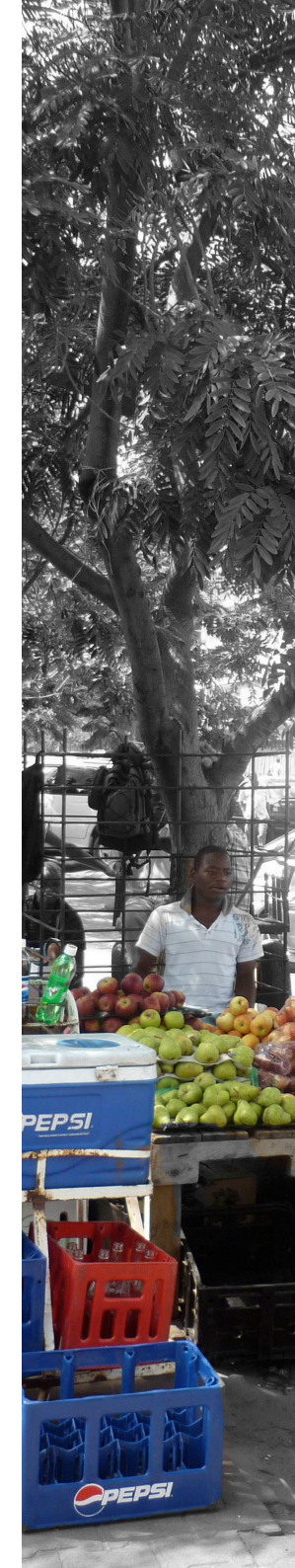


# REVITALIZATION OF THE BAIXA DE MAPUTO THROUGH DENSE INFORMAL HOUSING

MAPUTO STUDIO 2011-2012  
Faculty of Architecture, TU Delft

Graduation project presentation  
Evert Willeumier  
2-2-2012



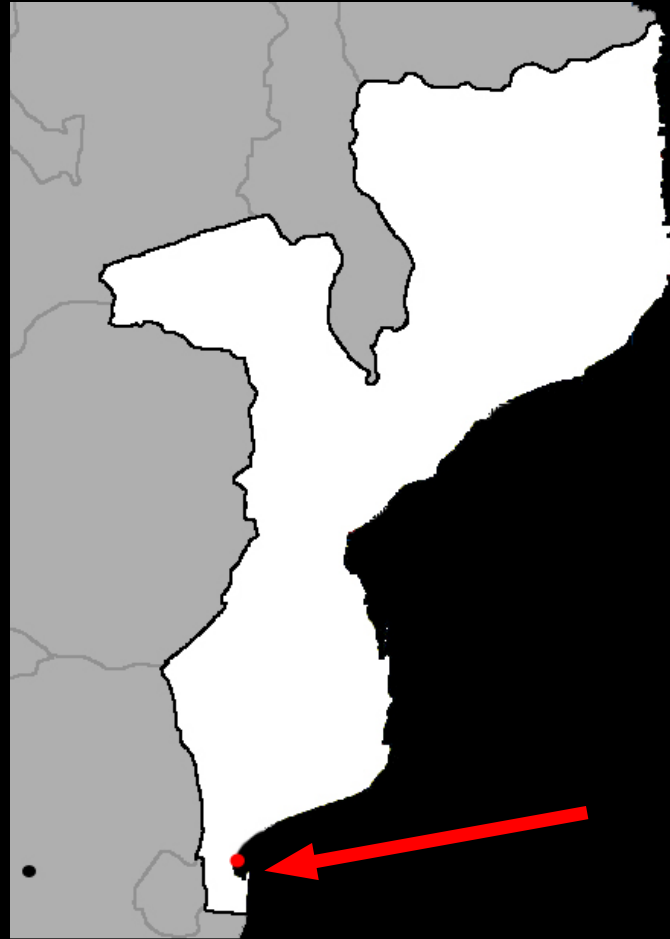
# MOZAMBIQUE



# MOZAMBIQUE



# MAPUTO



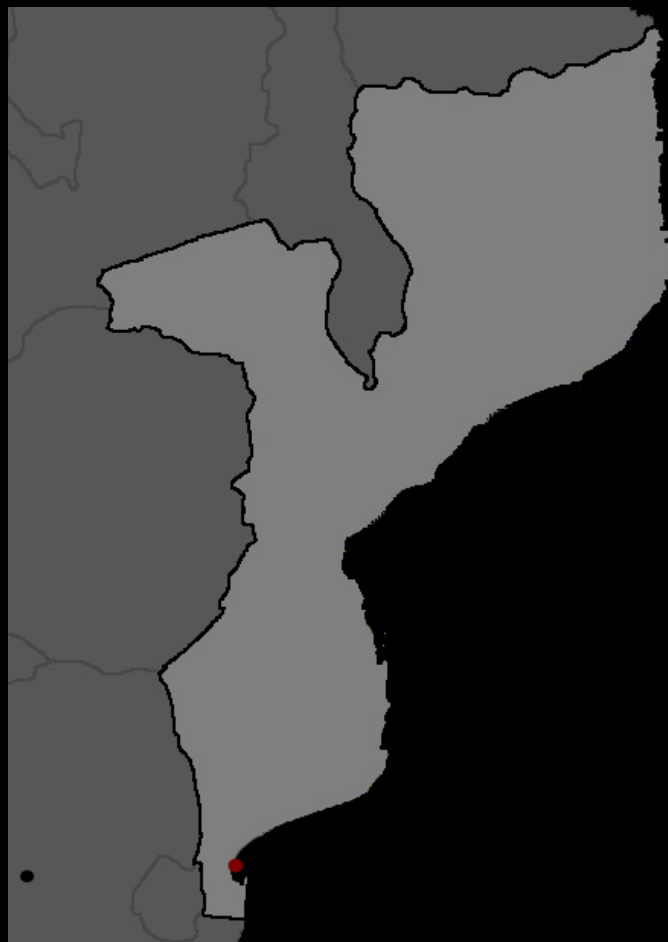
0 200 km



# MOZAMBIQUE

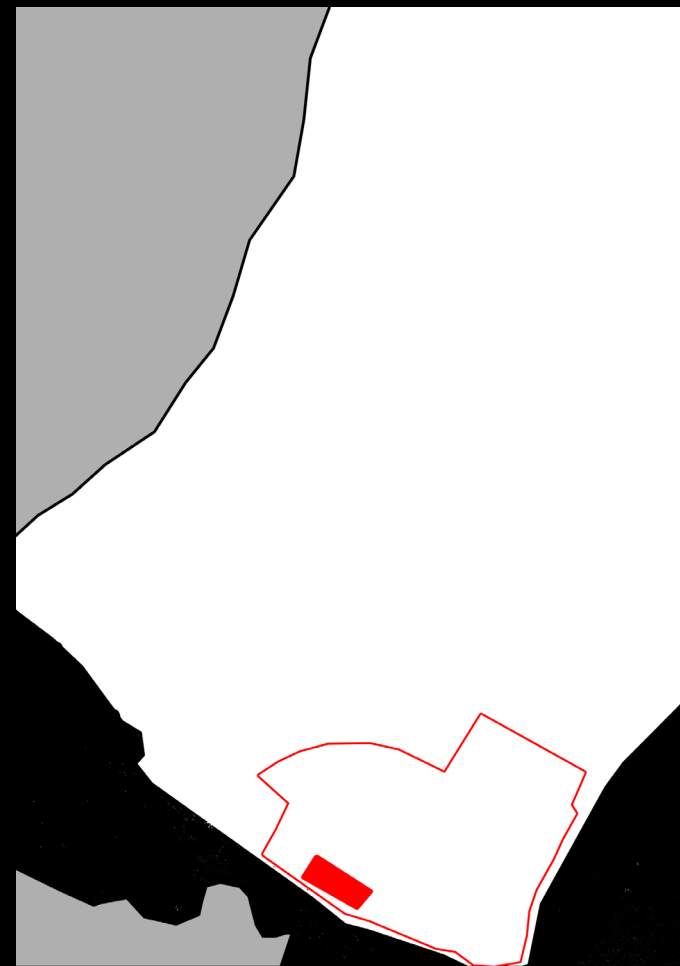


# MAPUTO



0 200 km

# BAIXA



0 2 km



# CONTENTS

1\_Brief introduction to Maputo

2\_Research questions

3\_Proposed solutions

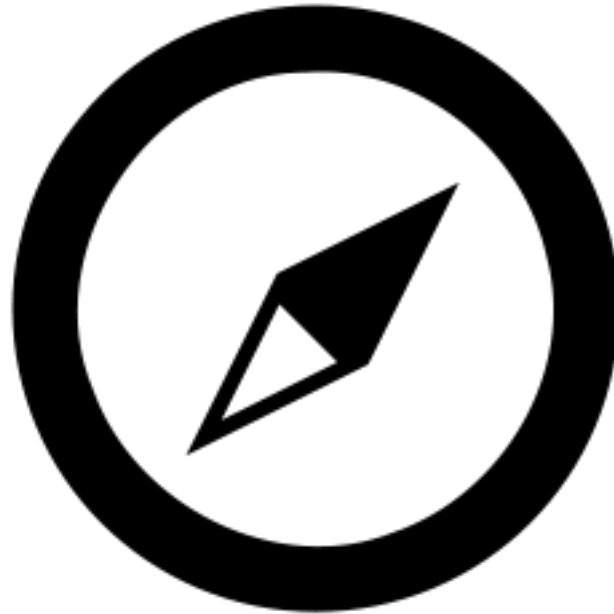
4\_Urban design

5\_Architectural design

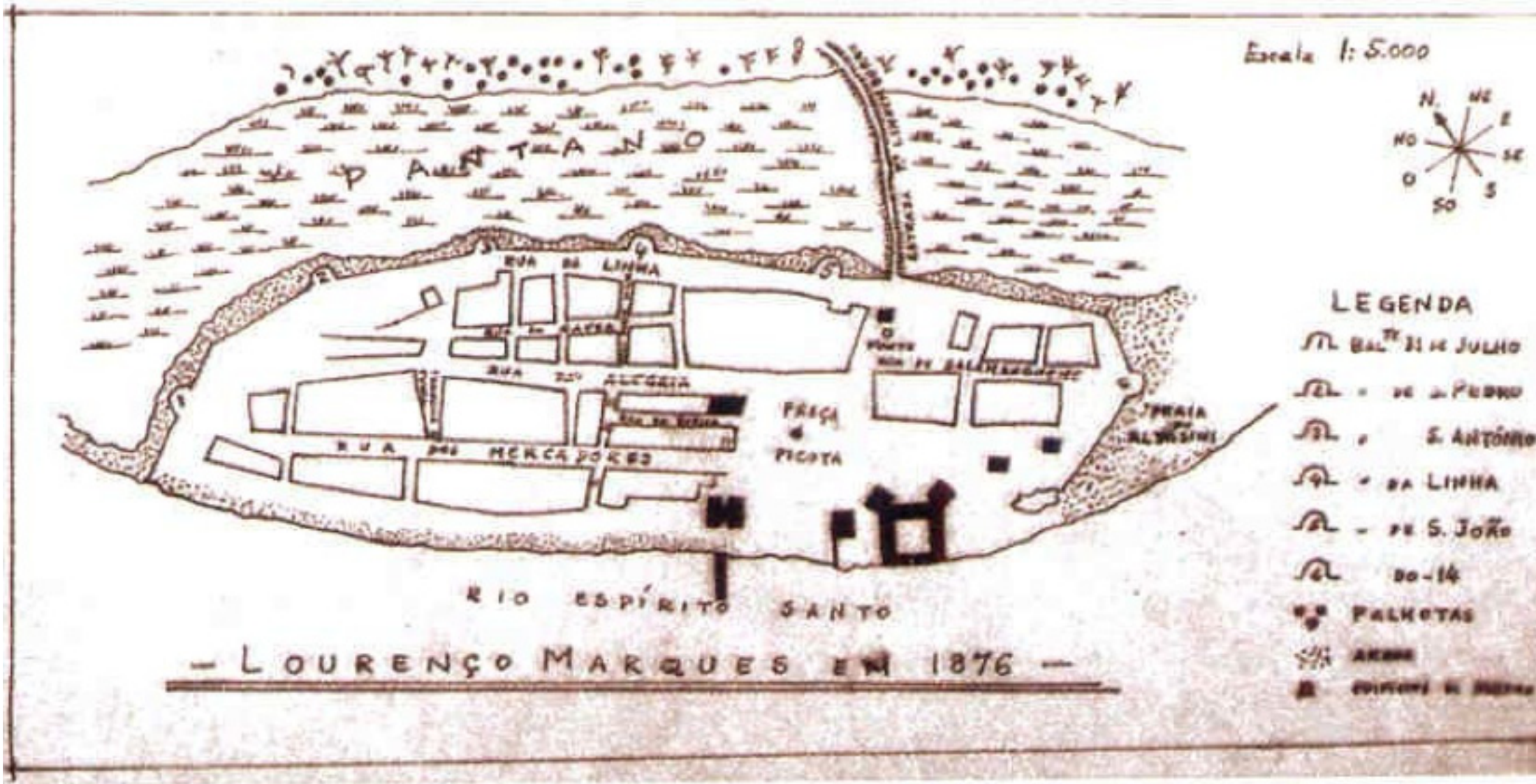
6\_Future steps



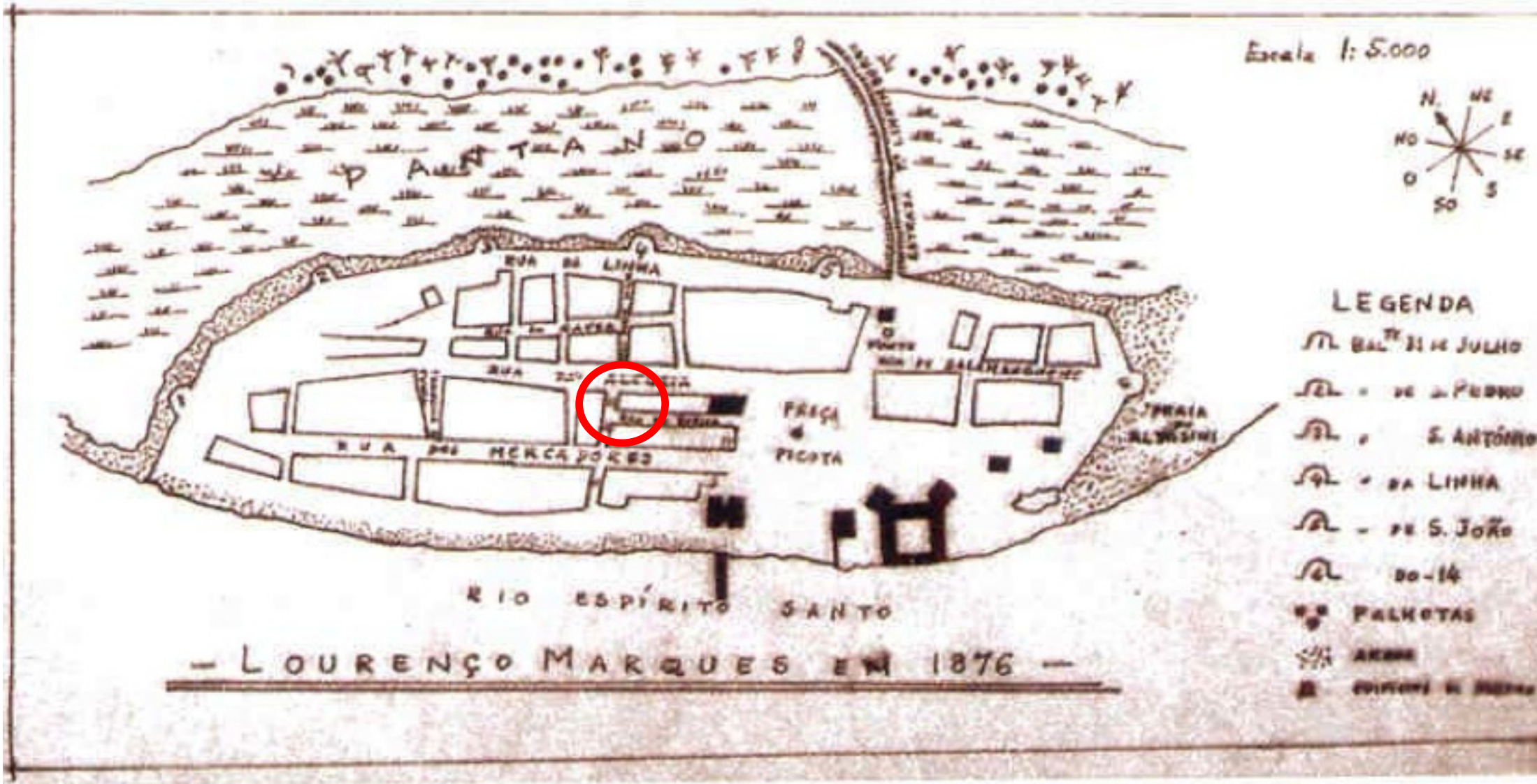
# **PART 1**\_brief introduction to Maputo



# Portuguese trading post *Lourenço Marques*



# Portuguese trading post *Lourenço Marques*





1975









\_far away from city centre

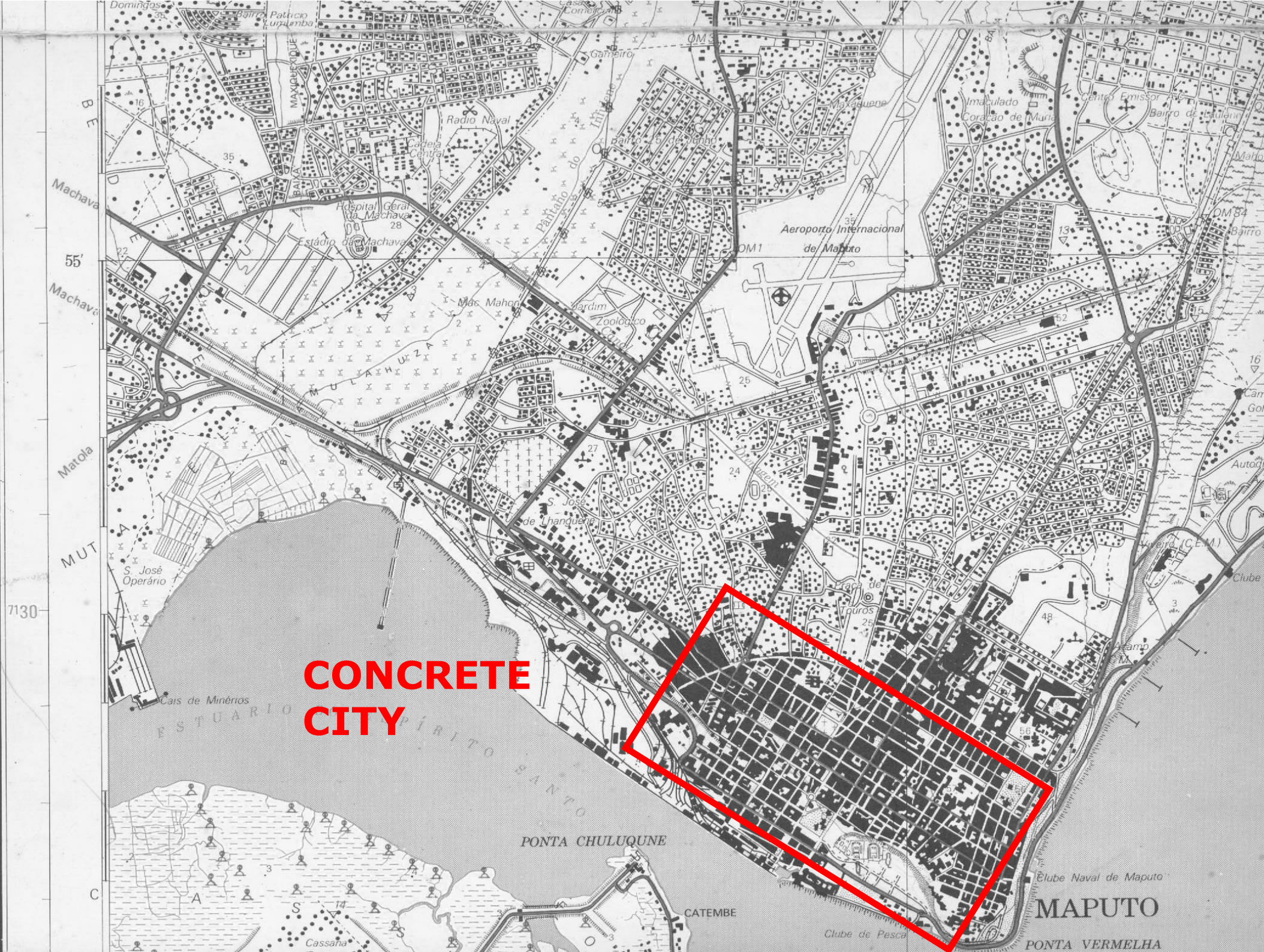
\_sparsely built



\_small "shacks", simple materials

\_INFORMAL





**CONCRETE CITY**

MAPUTO

PONTA VERMELHA

\_high rise

\_concrete





**BAIXA**

ESTUÁRIO DO ESPÍRITO SANTO

PONTA CHULUQUENE

MAPUTO

PONTA VERMELHA

CATEMBE

Clube de Pesca

Clube Naval de Maputo

Clube

Autódromo

Cam. Golfe

Bairro

Machava

Centro Emissor

Bairro de Matola

Imaculado

Coração de Maria

Aeroporto Internacional de Maputo

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OM3

OM5

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OM7

OM8

OM9

OM10

OM11

OM12

OM13

OM14

OM15

OM16

OM17

OM18

OM19

OM20

OM21

OM22

Machava

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Matola

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\_colourful

\_daily life = outside



# "OLD BAIXA" vs. EASTERN DEVELOPMENT



\_misplaced



\_traditional heart of the Baixa



# PART 2\_research questions



## ② Research **question\_1**

*How to integrate currently vacant plots and upper floors into a revitalization strategy for the Baixa de Maputo?*

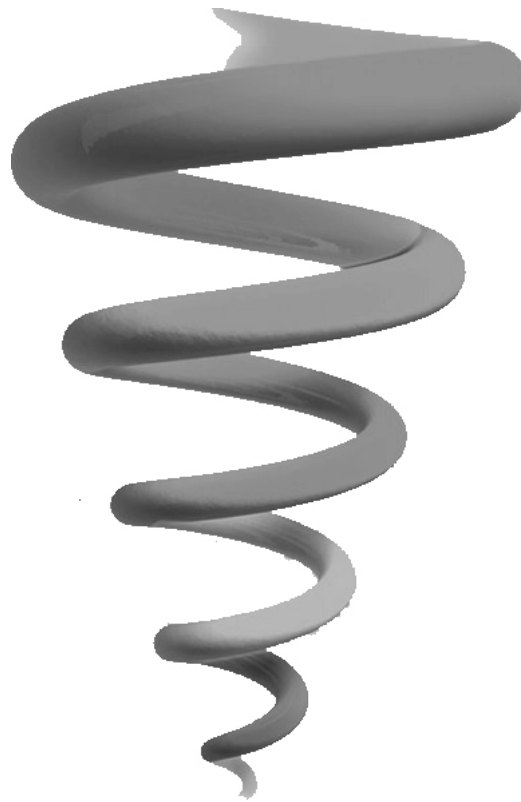




Why is a 'revitalization strategy' necessary?



A 'revitalization strategy' necessary to stop the self-reinforcing negative spiral of rundown buildings appearing.



A 'revitalization strategy' necessary to stop the self-reinforcing negative spiral of rundown buildings appearing.



## ② Research **question\_2**

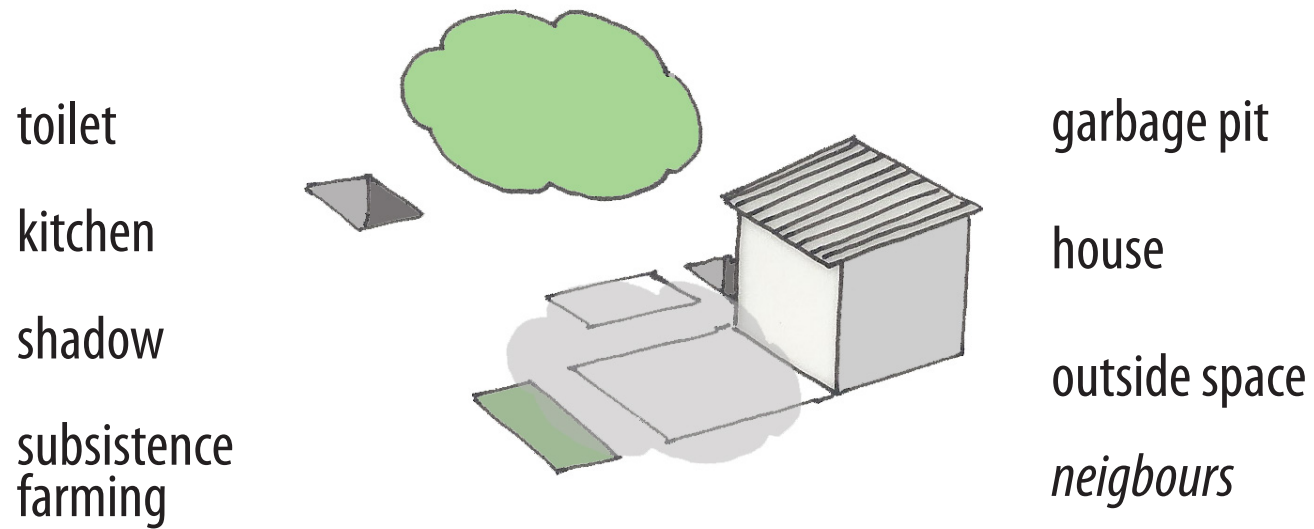
*How to provide shelter / living space in the dense urbanity of the Baixa de Maputo, following a local, informal style?*



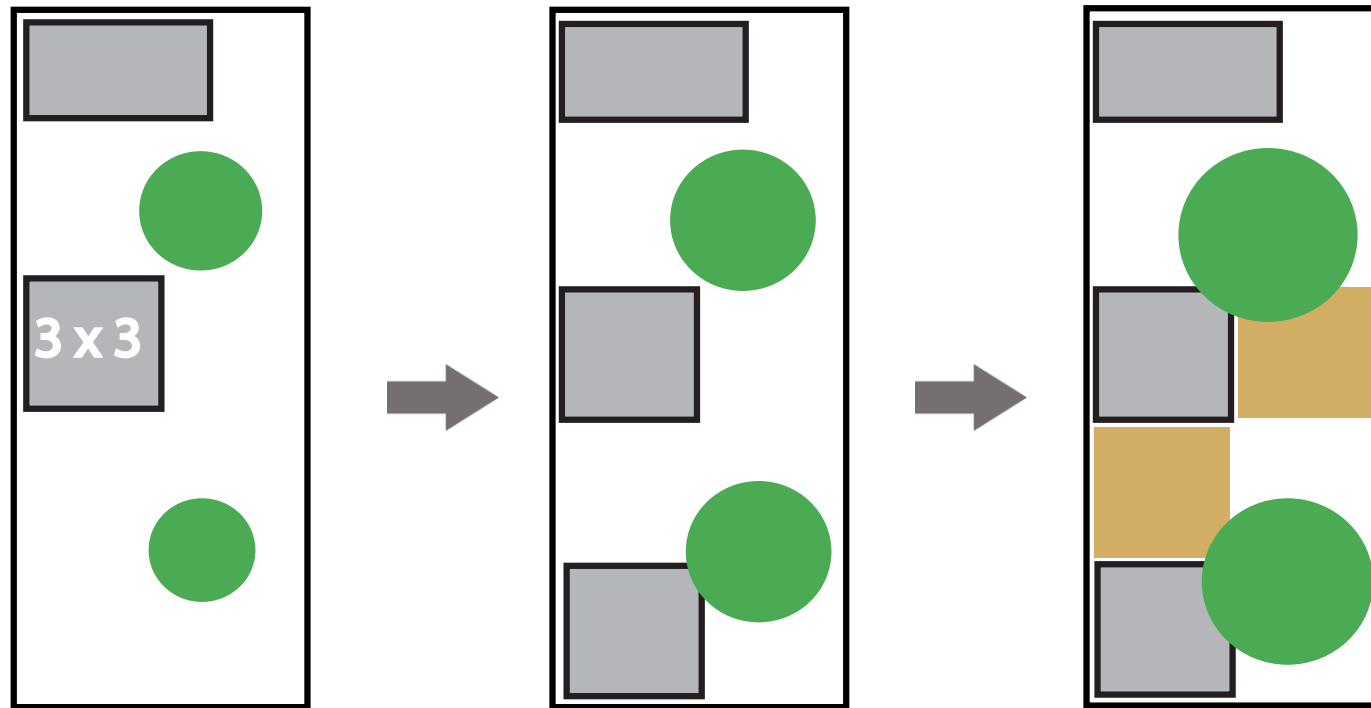
# Informal living typology\_



# Informal living typology\_ *basic elements*



# Informal living typology\_ *growing building*

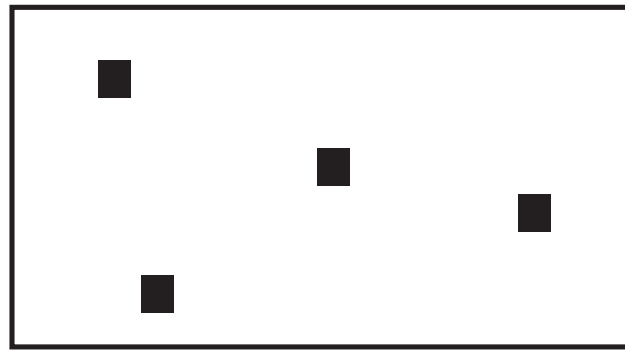


# PART 3 \_proposed solutions

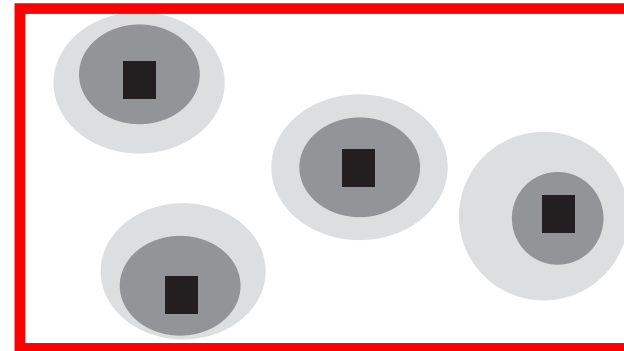


💡 Proposed solution to **question 1** *\_strategy for vacant plots*

## CONCEPT



small scale interventions



influence surroundings  
*CATALYST*



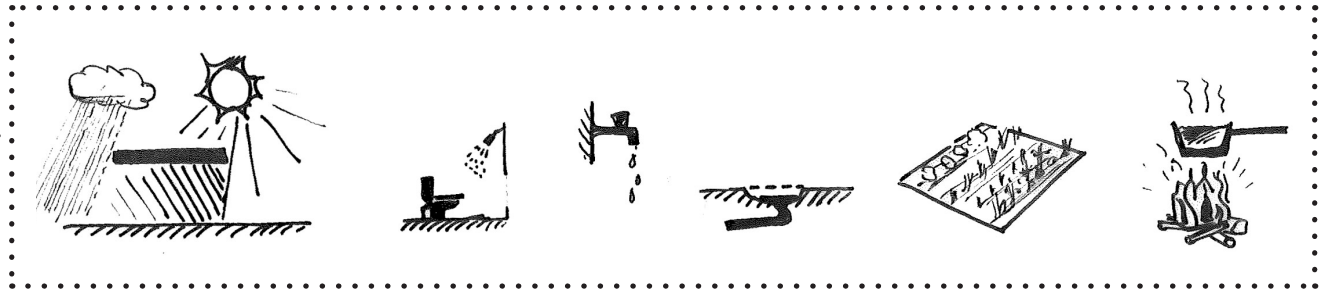
💡 Proposed solution to **question 2** *informal living in Baixa?*

**METHOD of several steps**



💡 Proposed solution to **question 2** *informal living in Baixa?*

analysis following  
on-site research

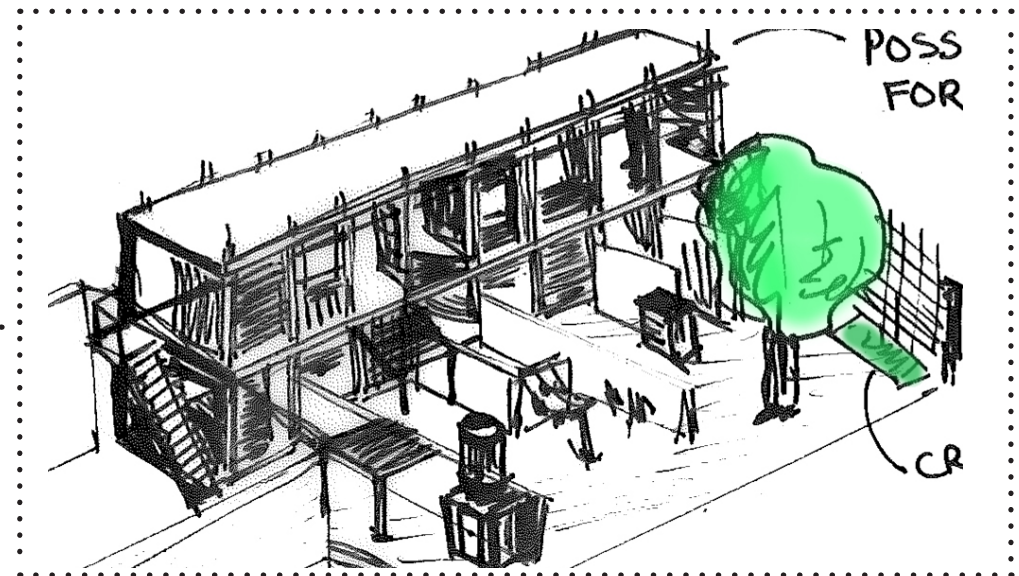


💡 Proposed solution to **question 2** *informal living in Baixa?*

analysis following  
on-site research

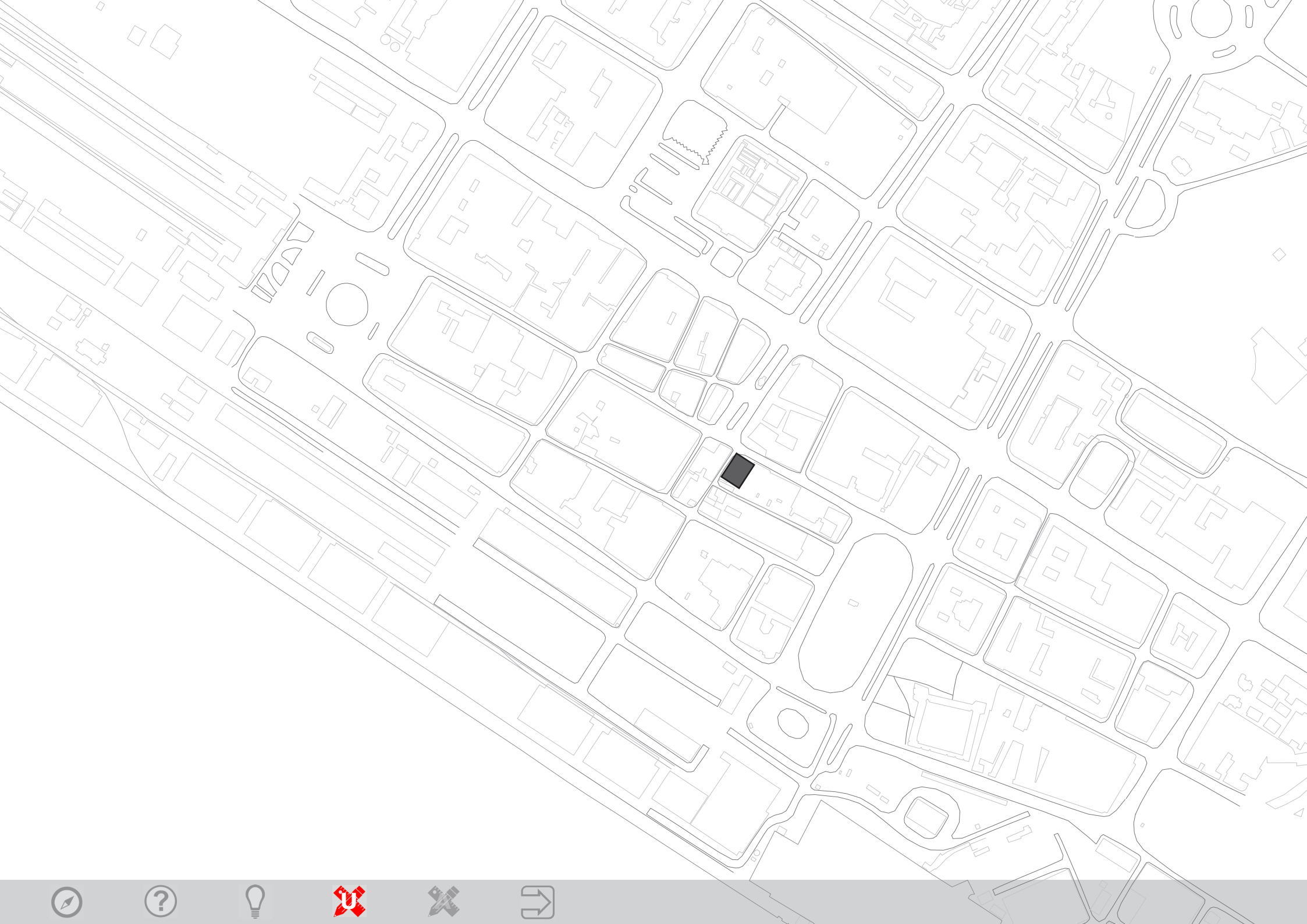


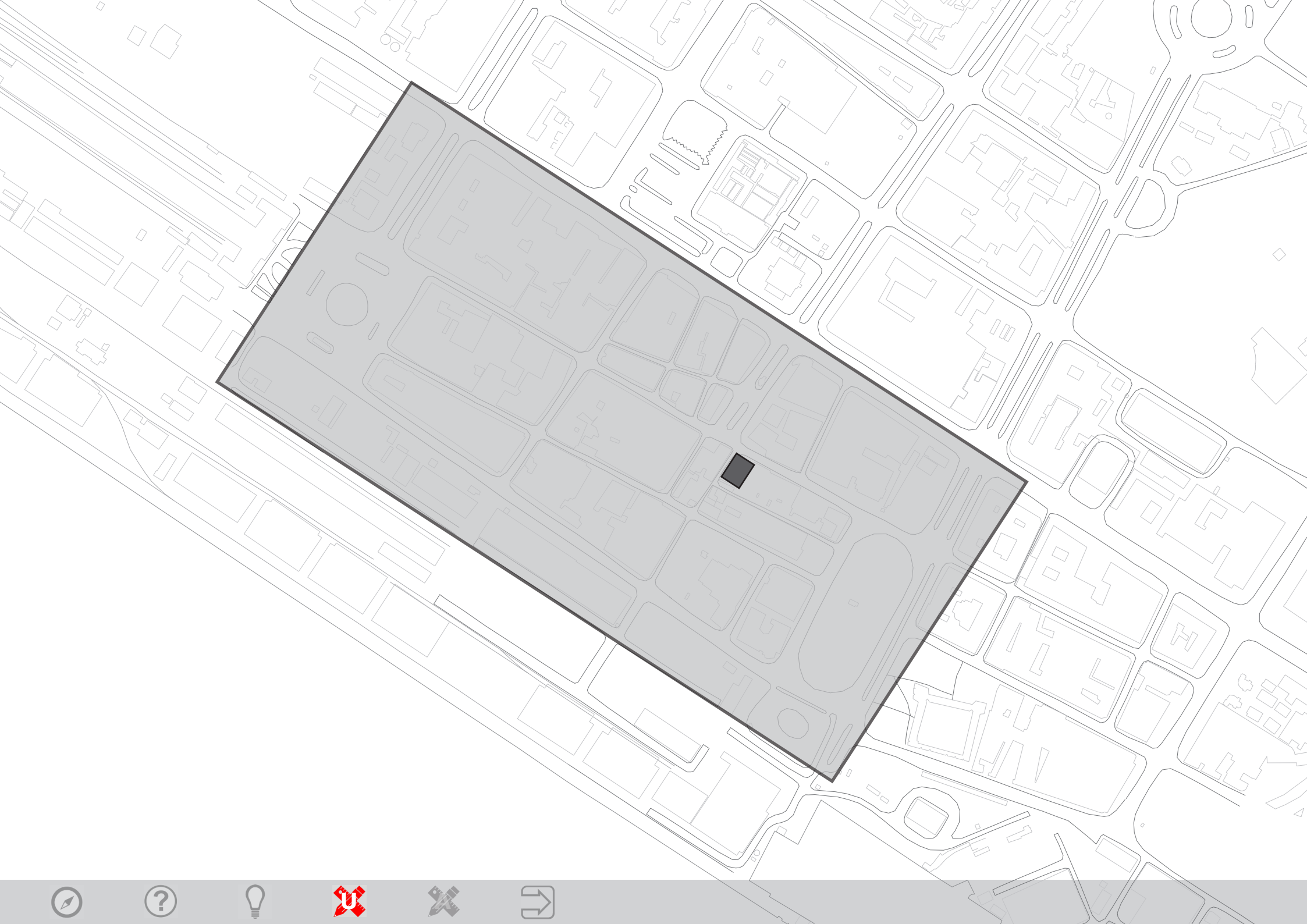
densify into  
urban context

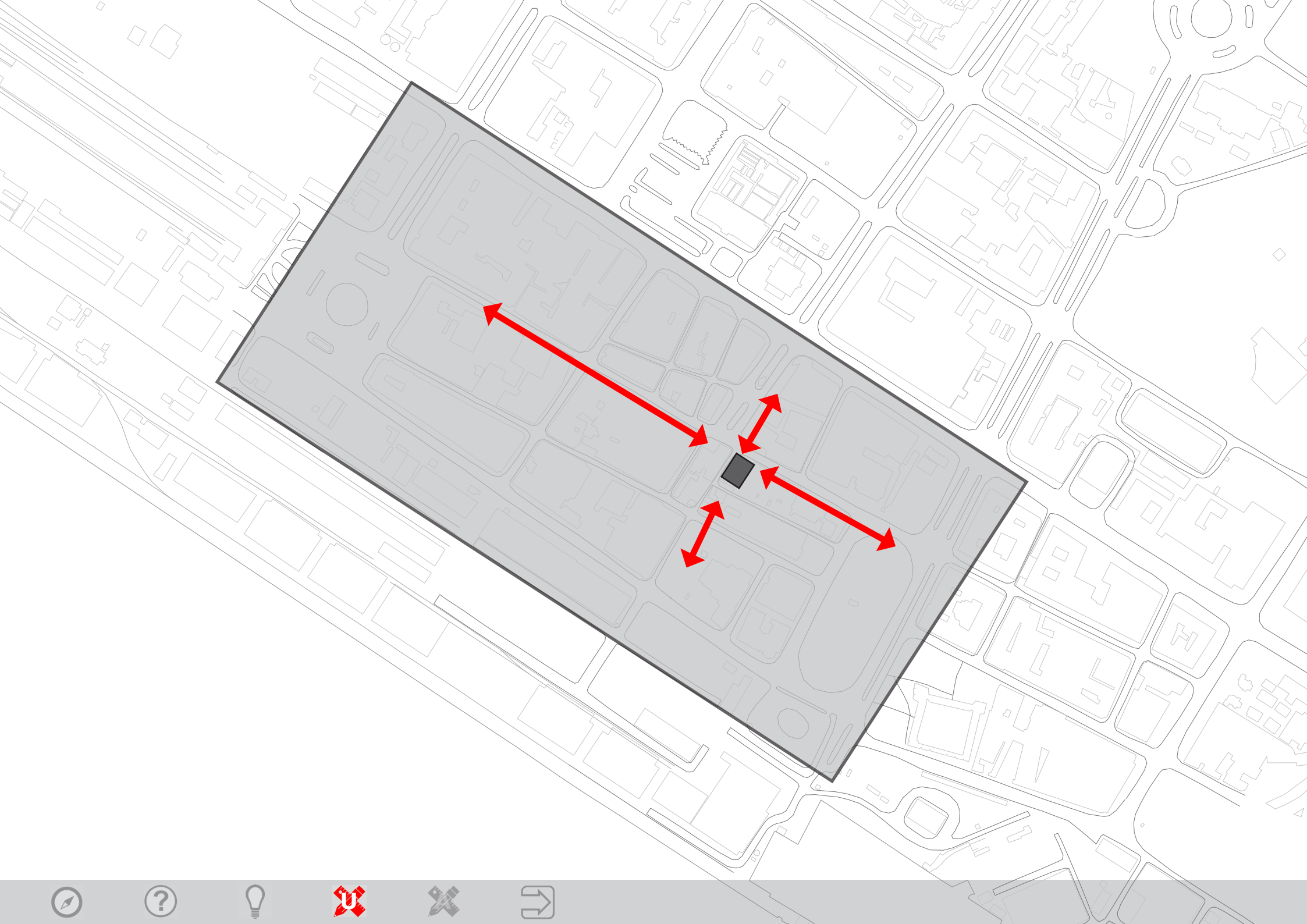


# PART 4\_urban design









## Concept of urban plan

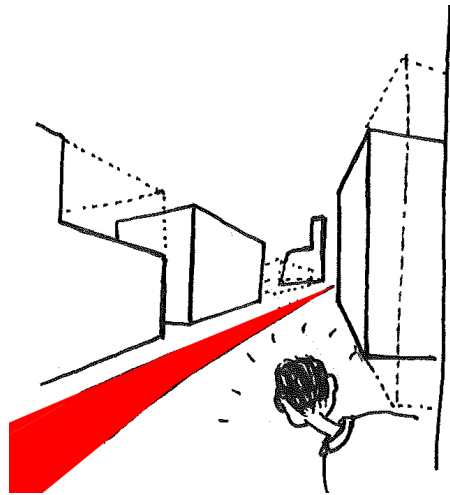
...aims to **link** and **preserve** by introducing a subtle but tangible urban element along certain routes through the old Baixa



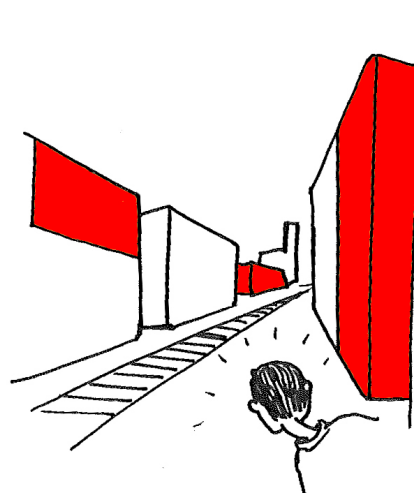
# Routes running through the Baixa link to vacant plots



route



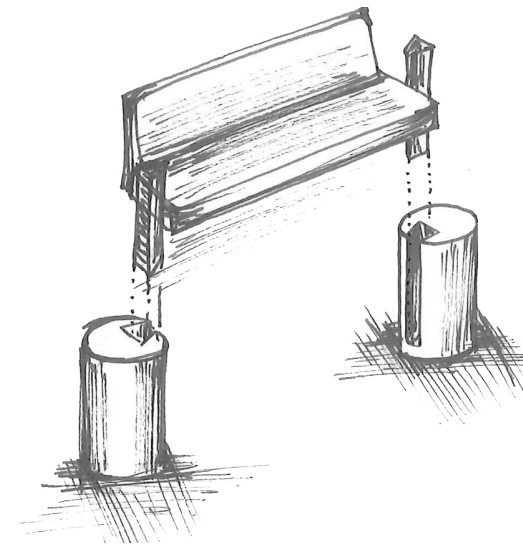
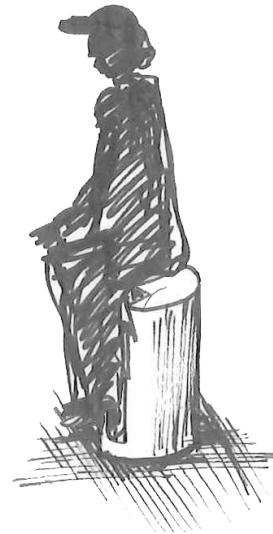
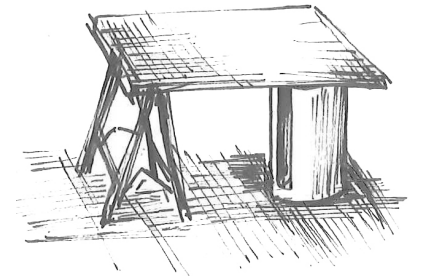
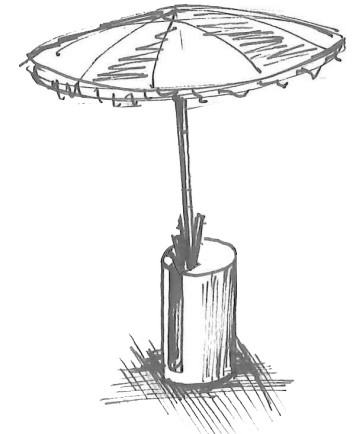
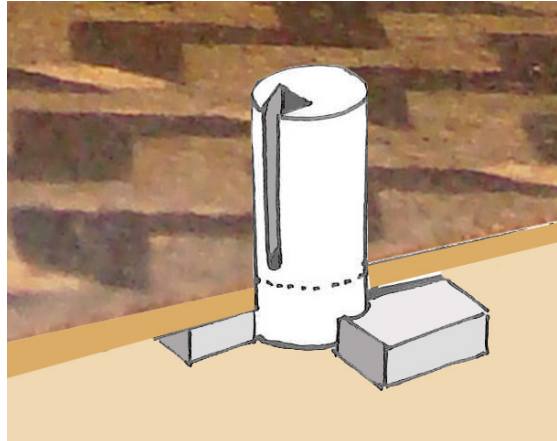
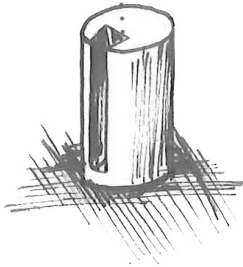
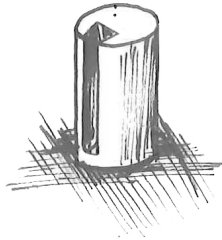
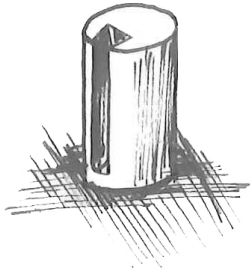
vacant  
plots filled



*revitalization(?)*



# Design proposal for visualizing the urban routes



# PART 5 \_architectural design



# Site for architectural design





## 3 REQUIREMENTS

1\_offer an affordable place to sleep, work and live

2\_sustainable and self-sufficient (water and waste)

3\_growing *building* typology



## 3 REQUIREMENTS

1\_offer an affordable place to sleep, work and live



2\_sustainable and self-sufficient (water and waste)

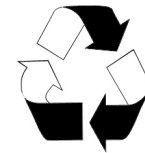
3\_growing building typology



## 3 REQUIREMENTS

1\_offer an affordable place to sleep, work and live

2\_sustainable and self-sufficient (water and waste)



3\_growing building typology



## 3 REQUIREMENTS

1\_offer an affordable place to sleep, work and live

2\_sustainable and self-sufficient (water and waste)

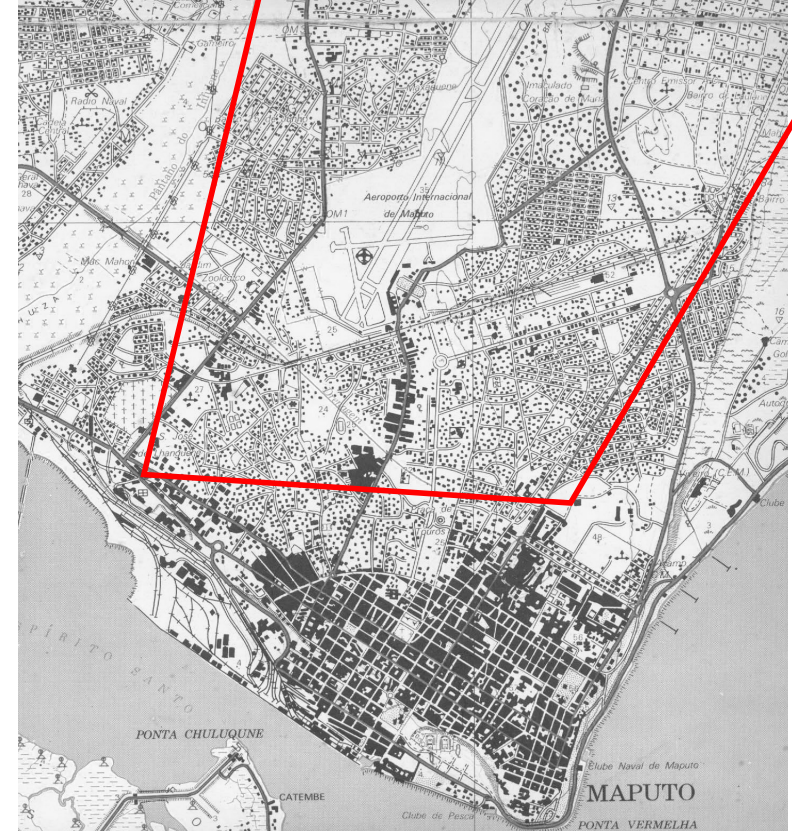
3\_ *growing building* typology



# TARGET GROUP

a\_semi-homeless from periphery

b\_homeless inside Baixa



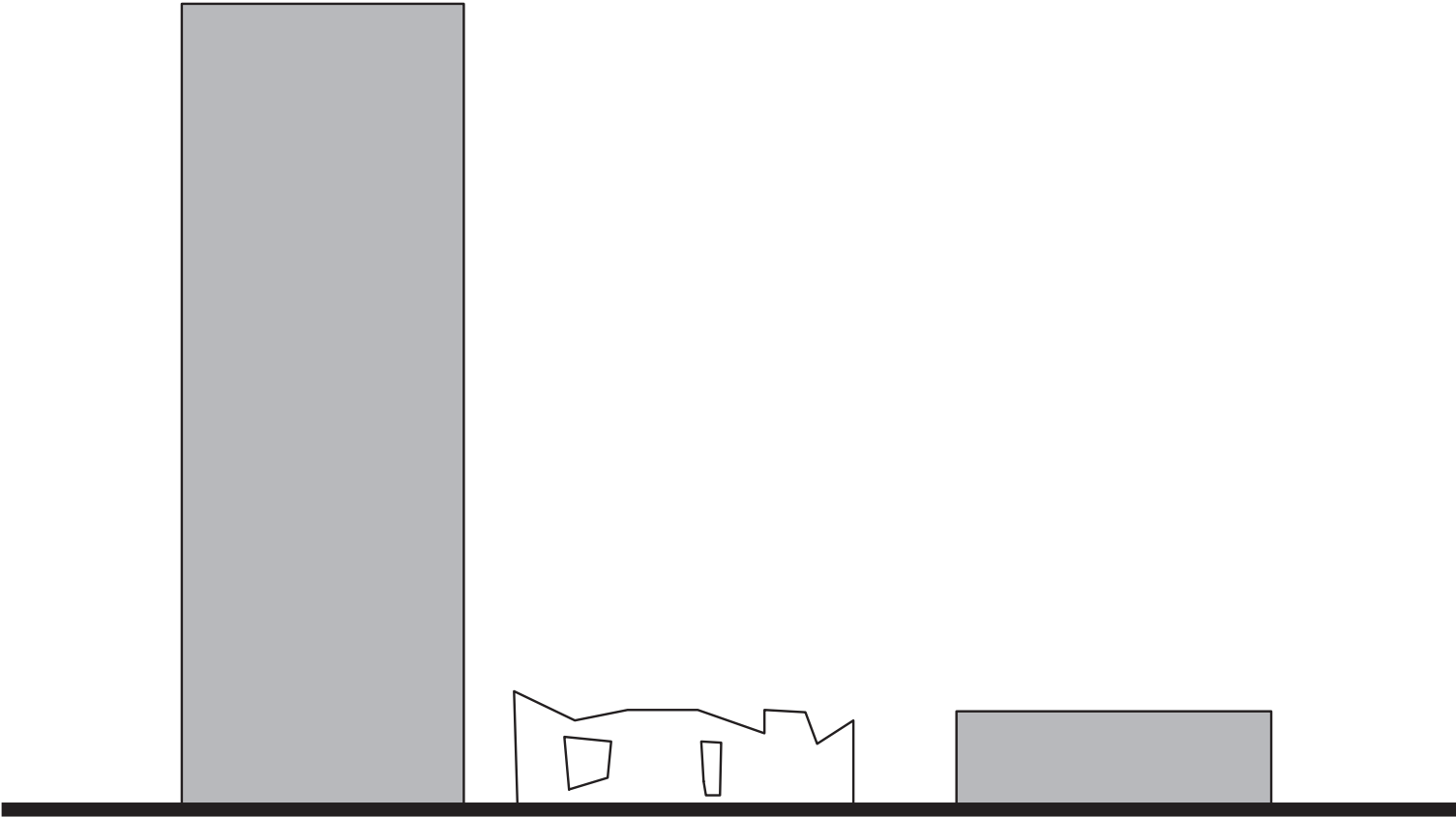
# TARGET GROUP

a\_semi-homeless from periphery

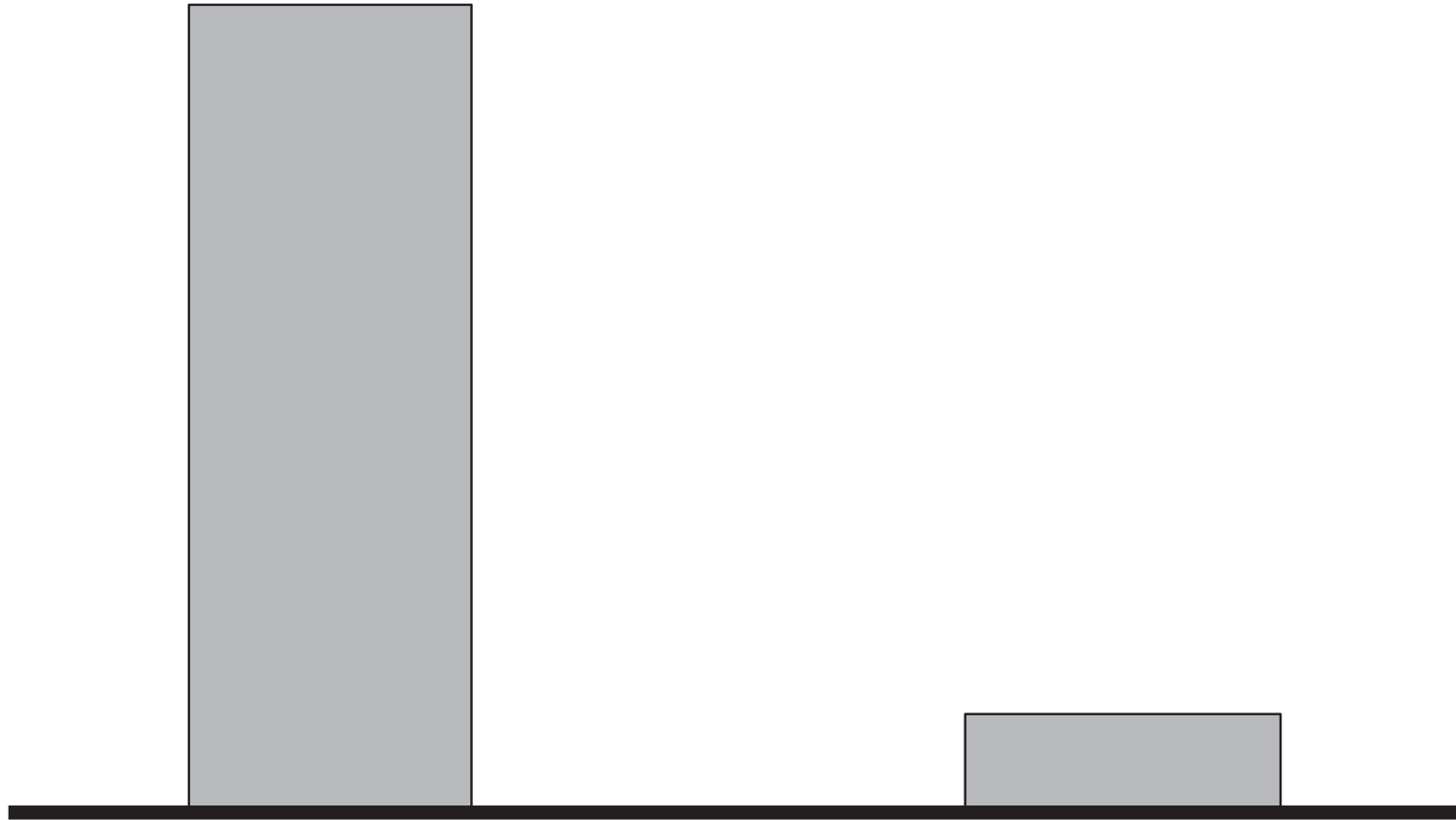
b\_homeless inside Baixa



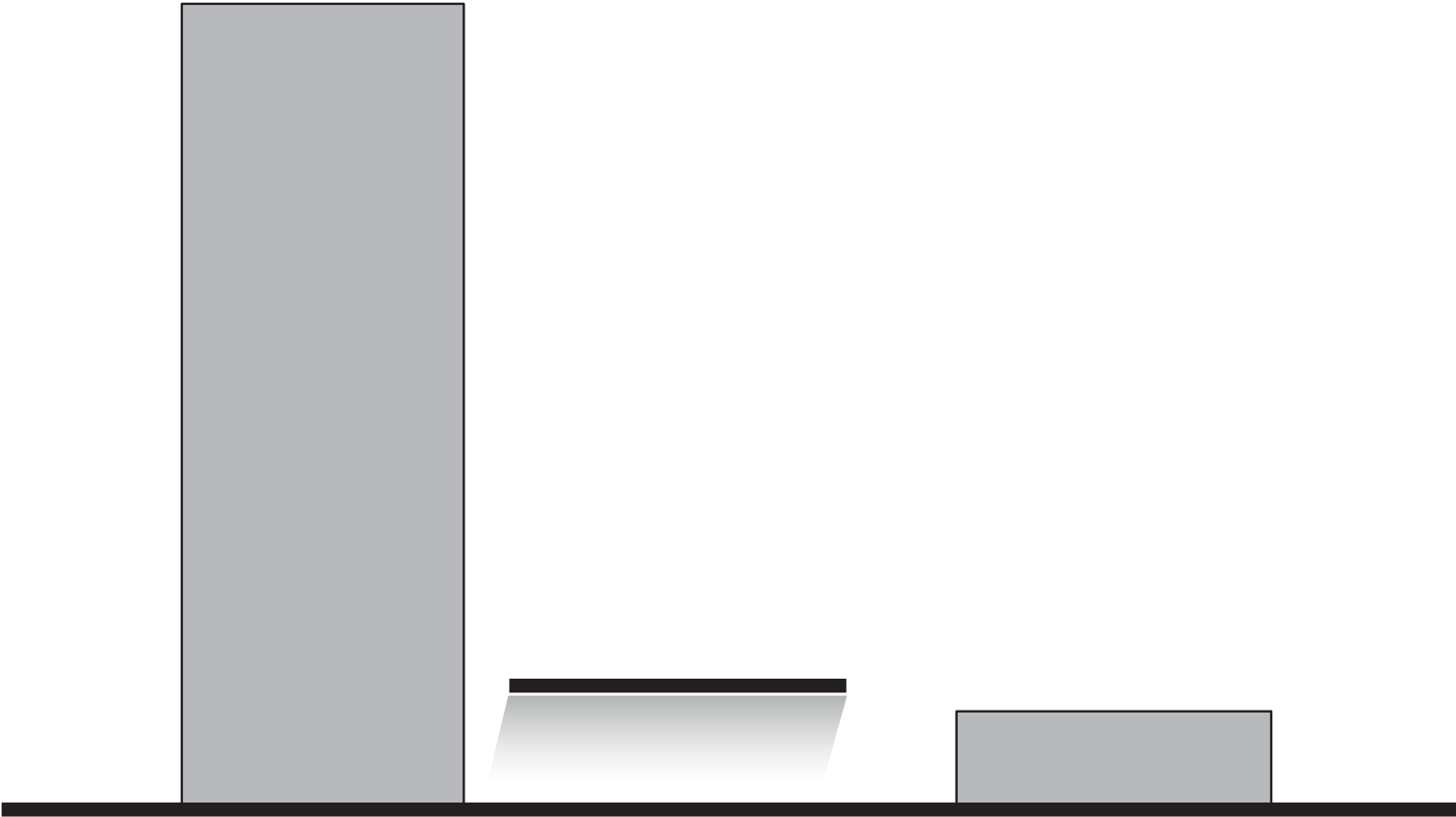
# CONCEPT



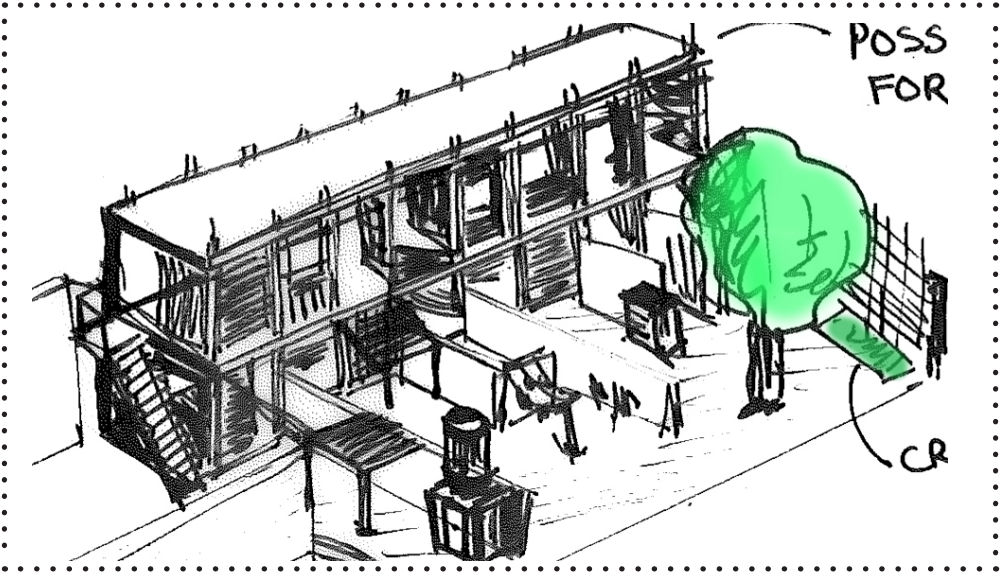
CONCEPT



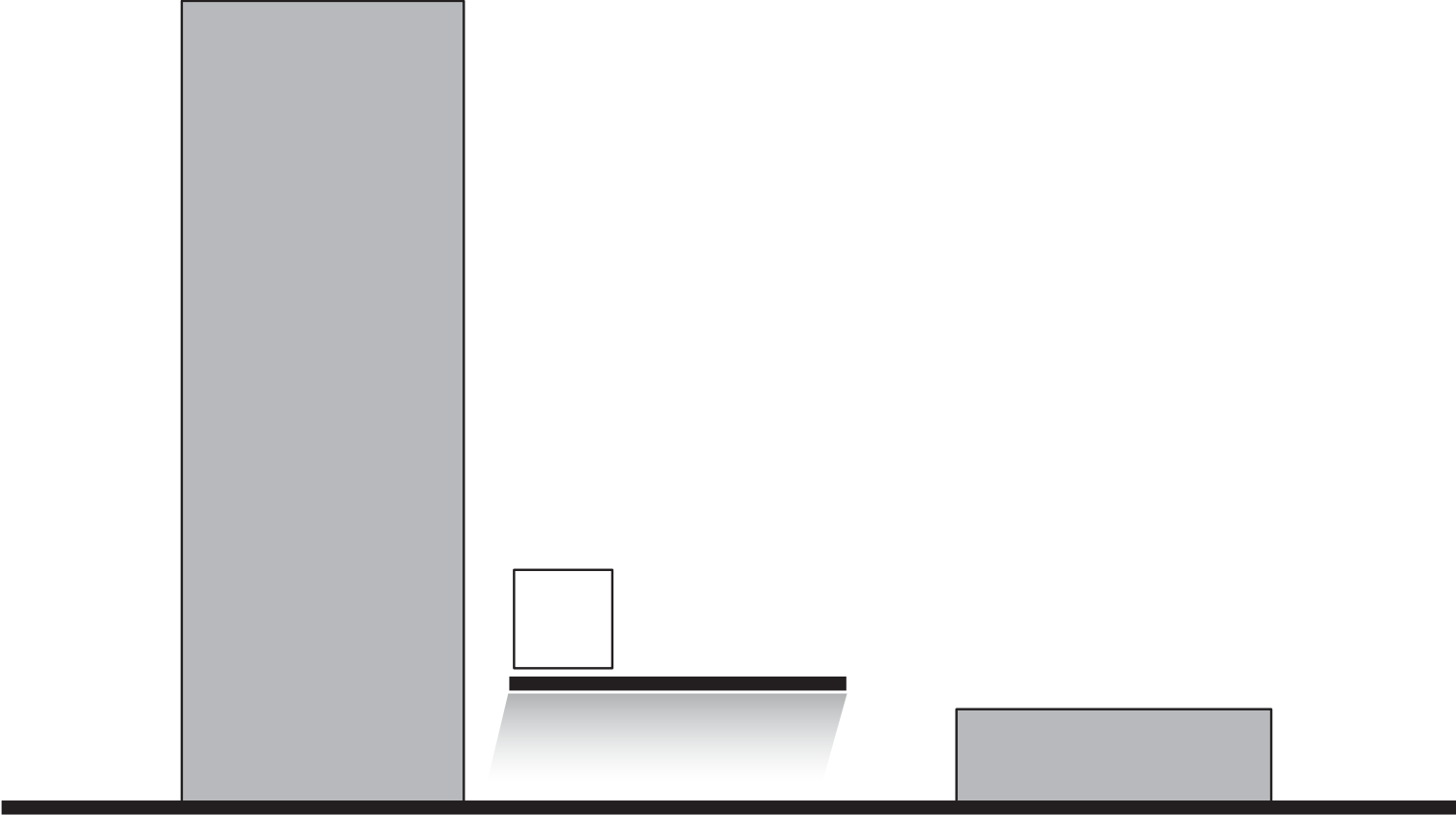
# CONCEPT



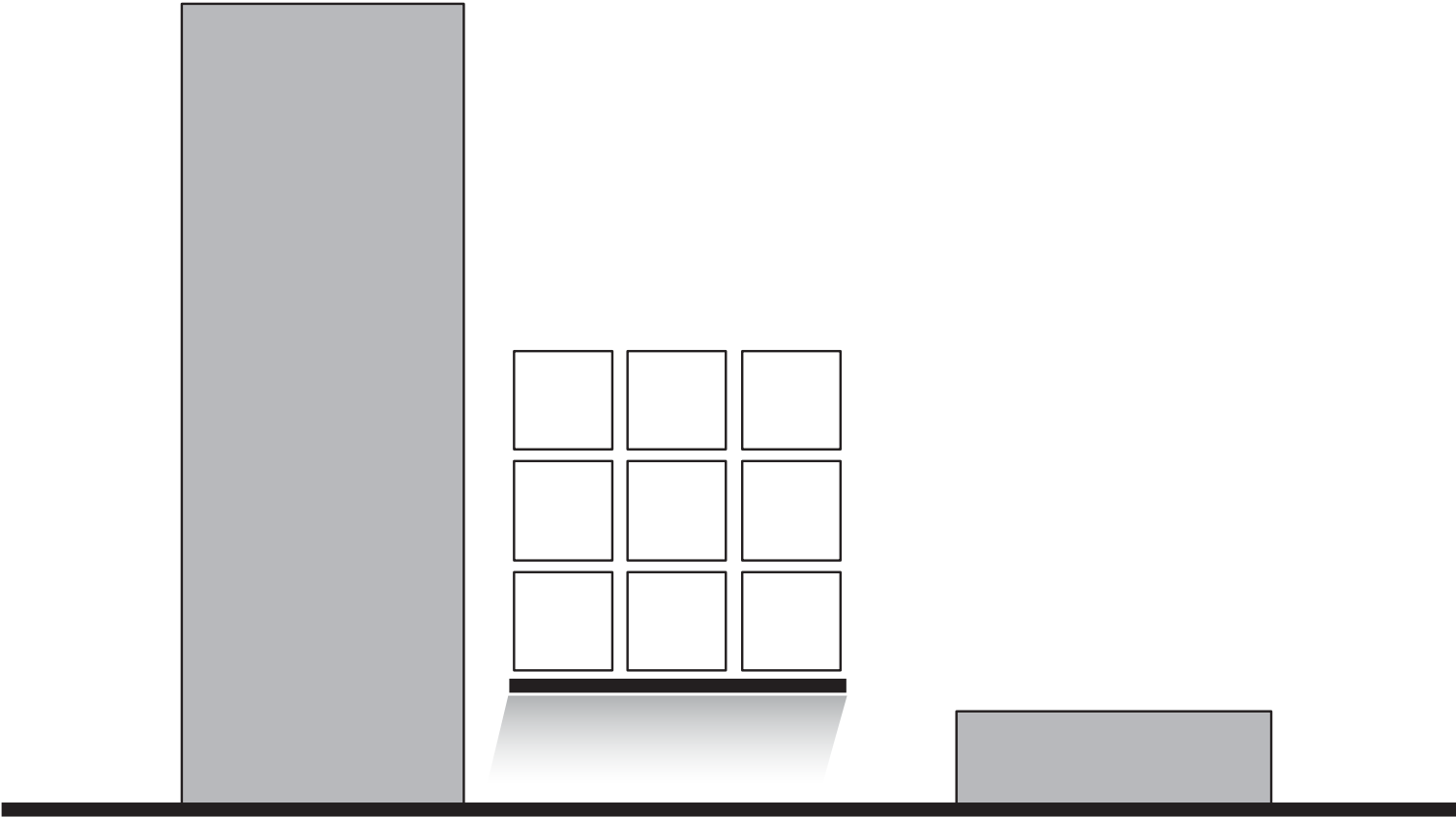
# CONCEPT



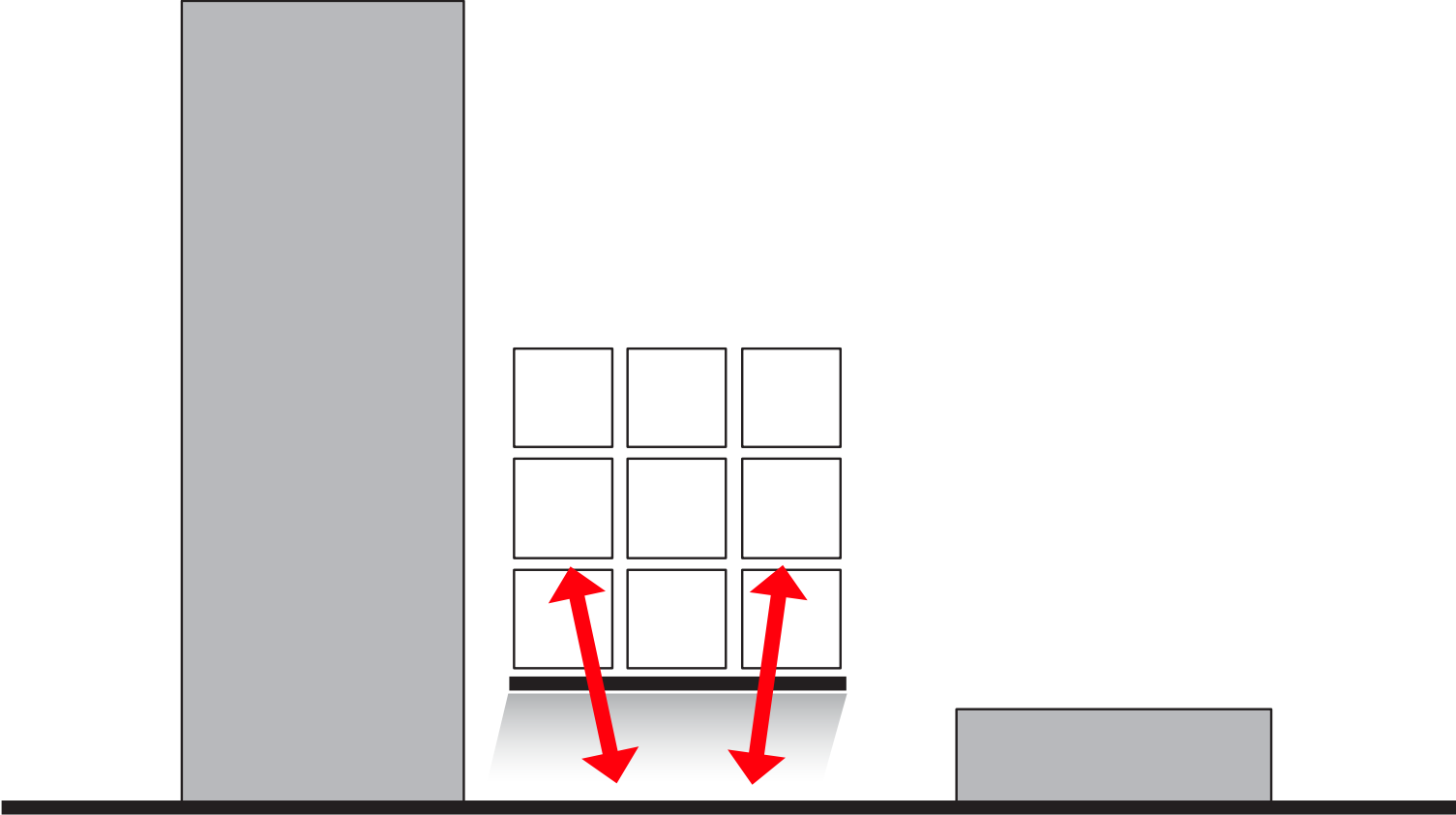
# CONCEPT



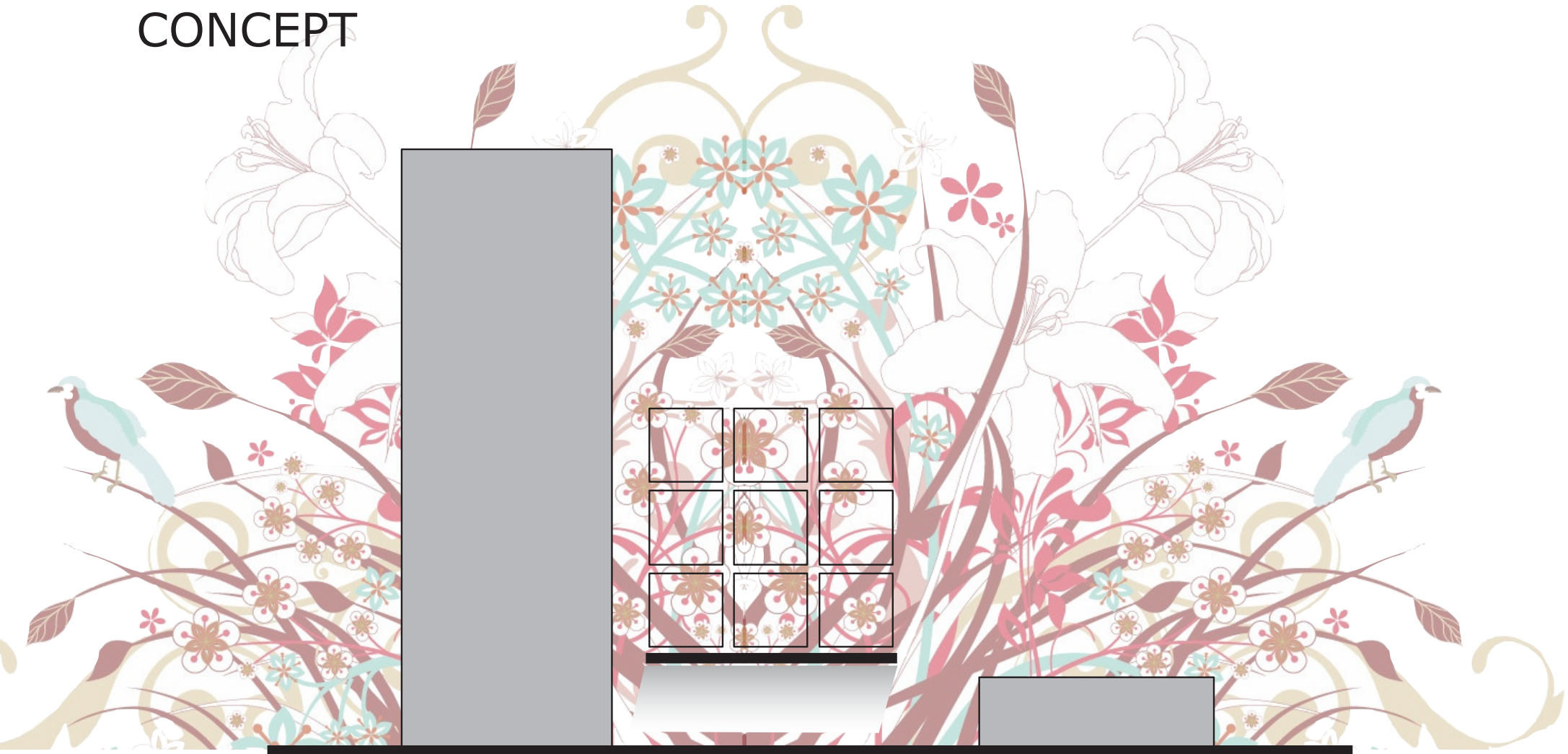
# CONCEPT



# CONCEPT



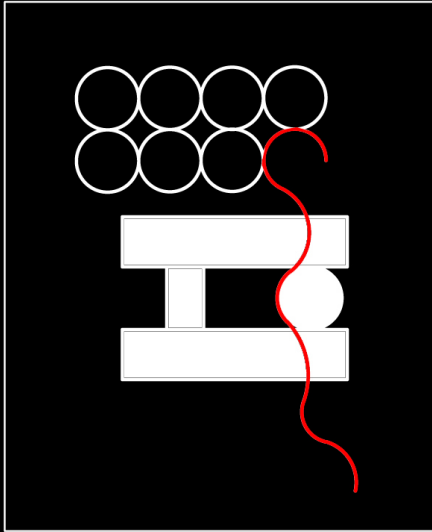
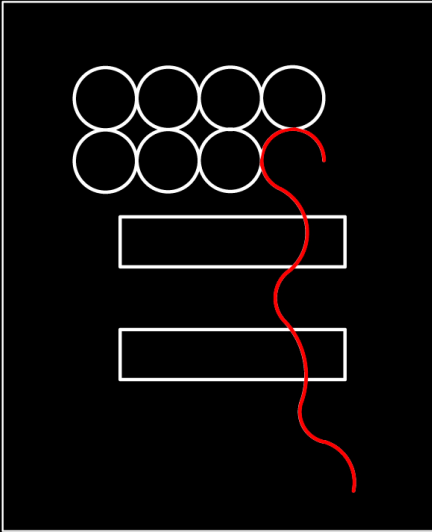
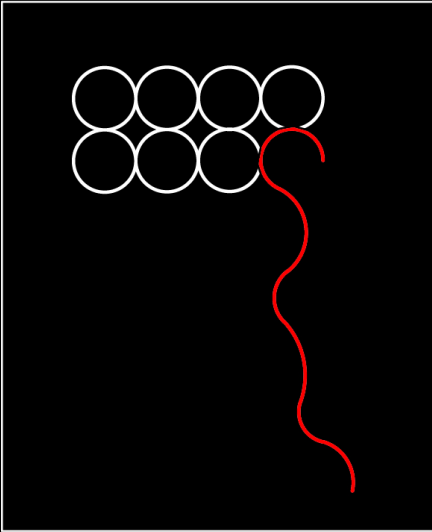
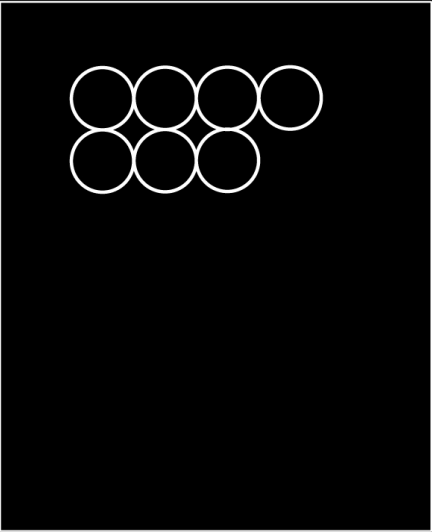
# CONCEPT



# The design...



# Schematic build up of shapes and volumes



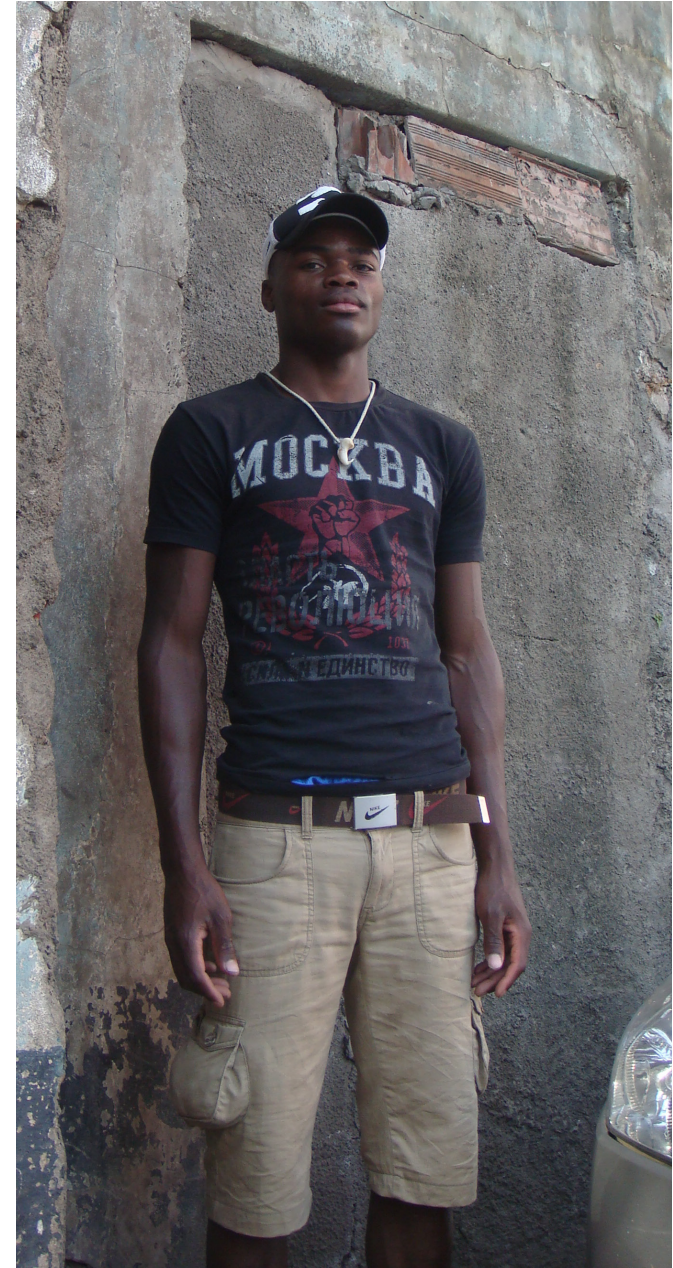
*'a day in the life of Angelo'*

\_20 years old

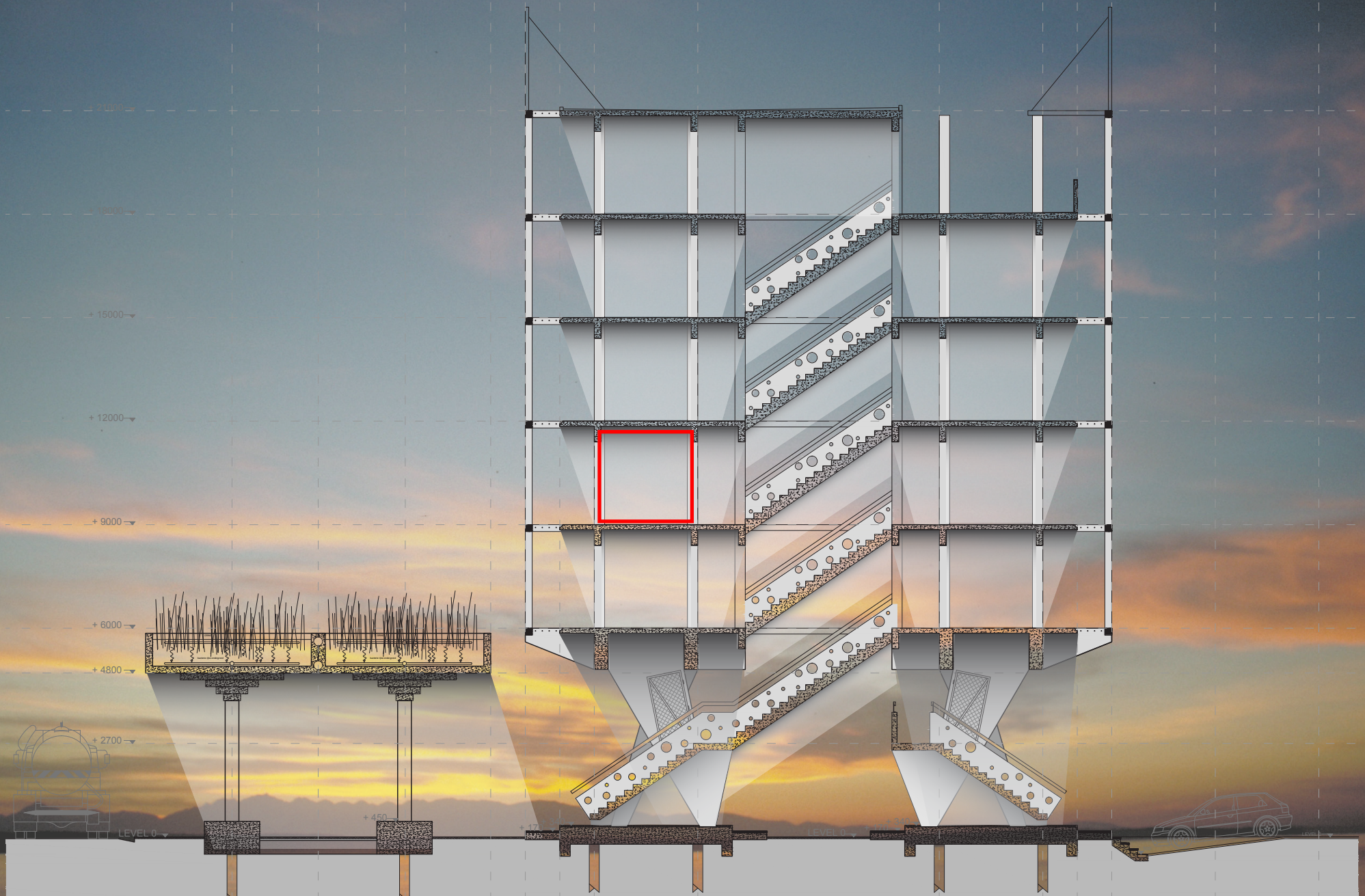
\_orphan

\_homeless

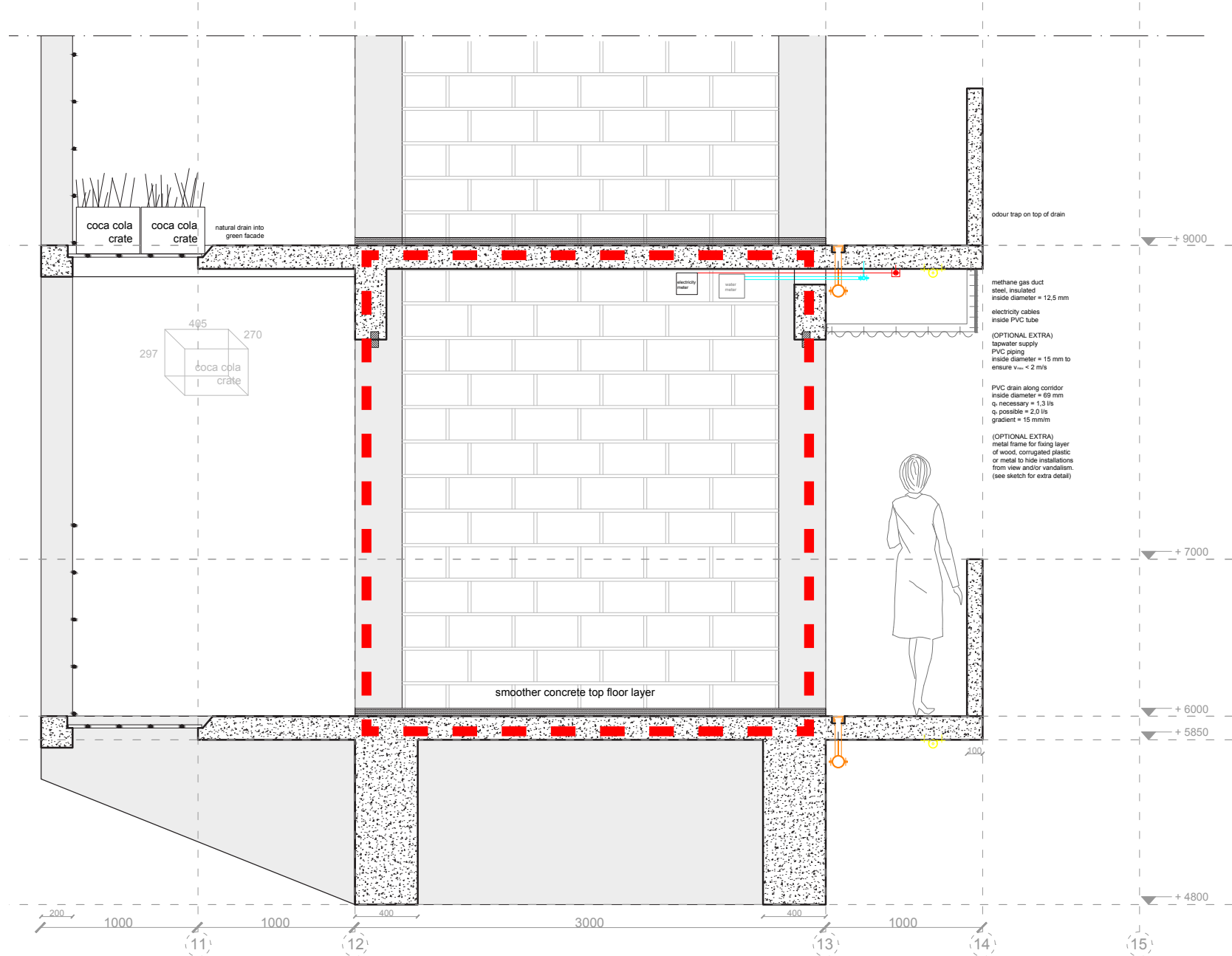
\_car washer / market carrier



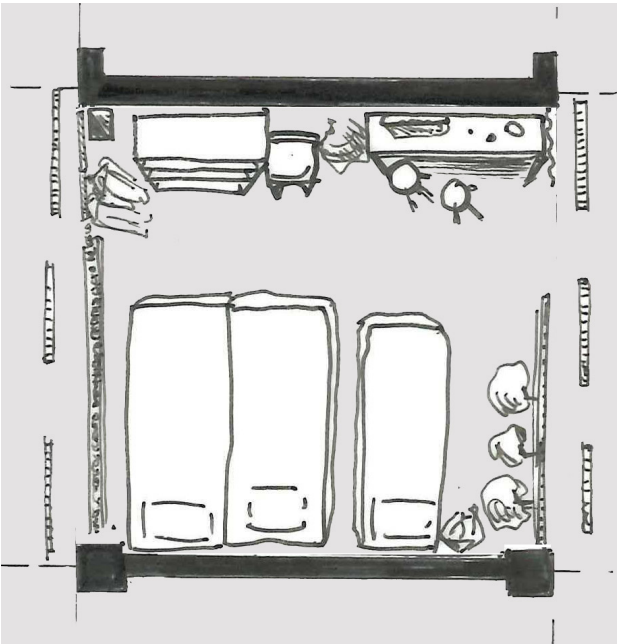
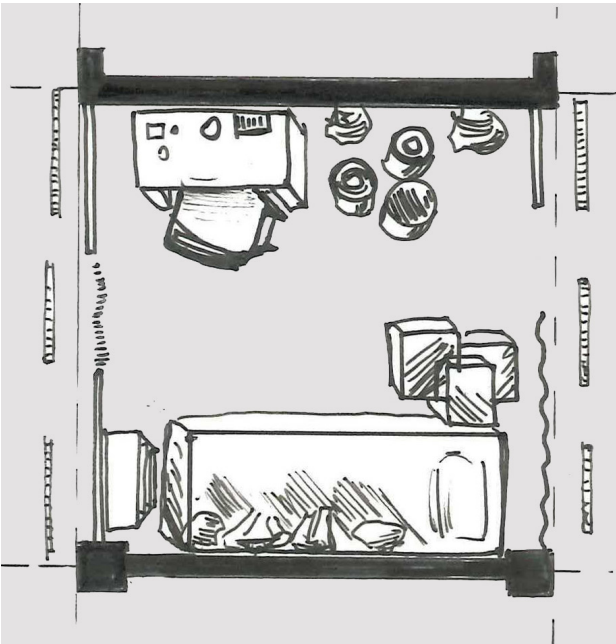
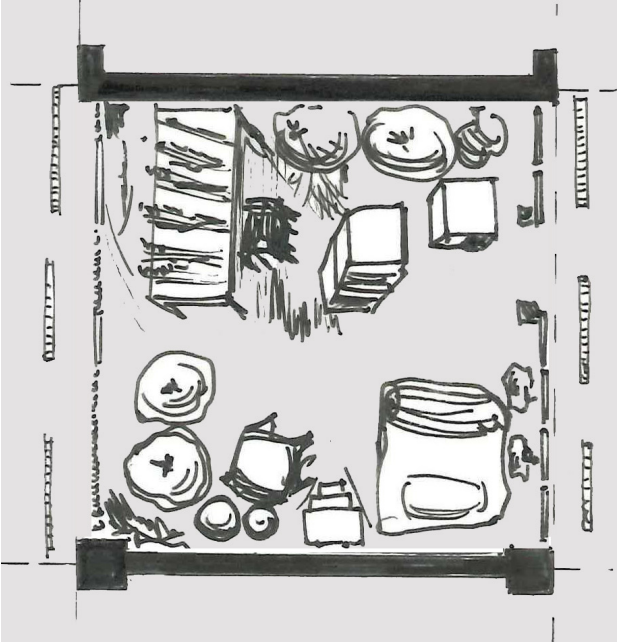
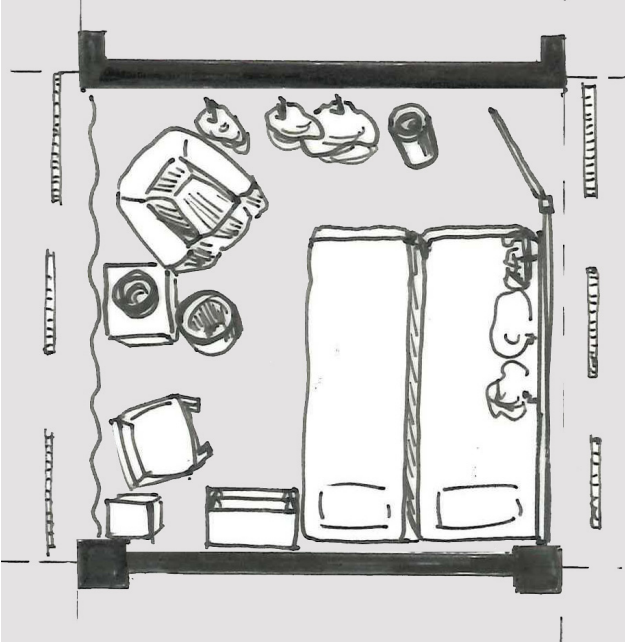
He wakes up, in his little living unit (3x3x3m)...



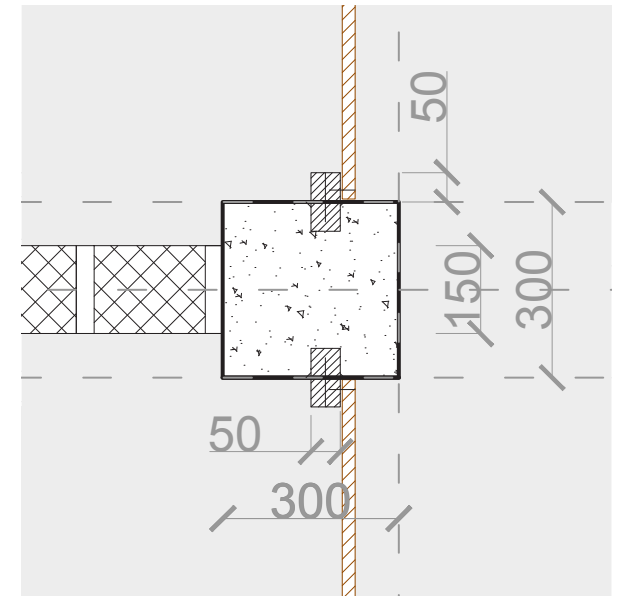
... checks cell phone for messages...then gets up.



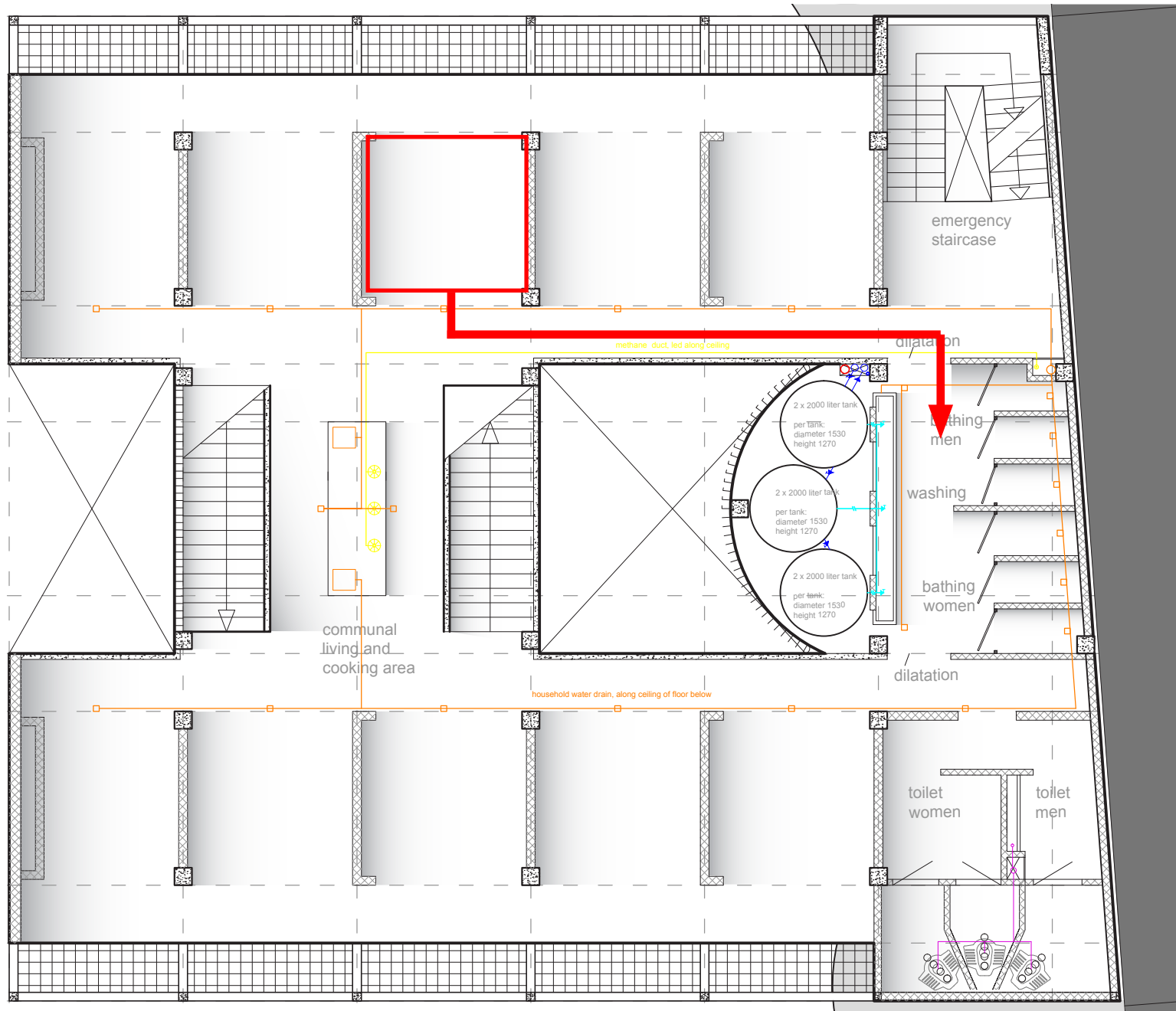
Has a hard time finding a towel, maybe different arrangement?



Then opens the 'door' in his self constructed facade...



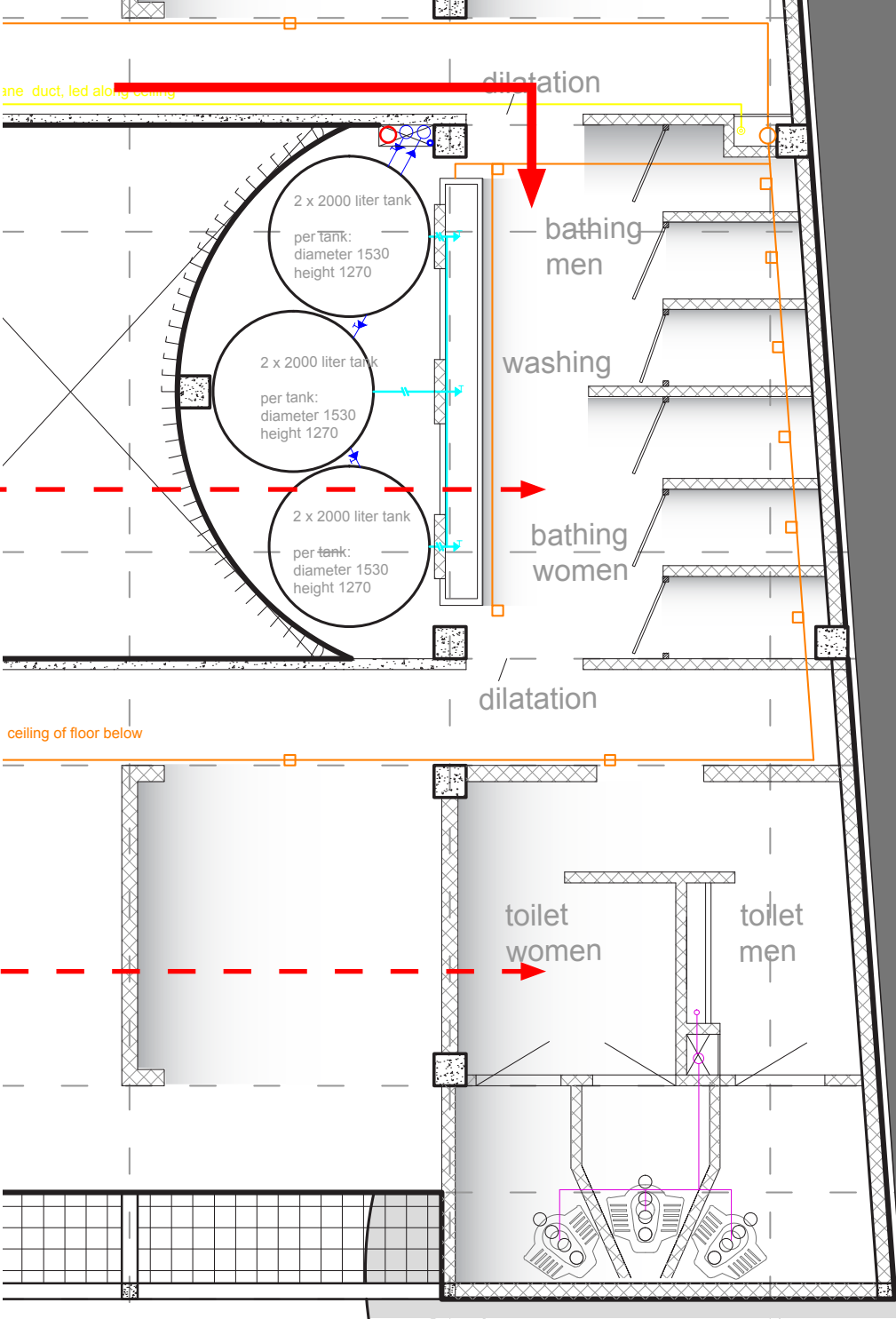
... heads for the toilets and showers...



...uses the toilet  
and washes himself.

showers

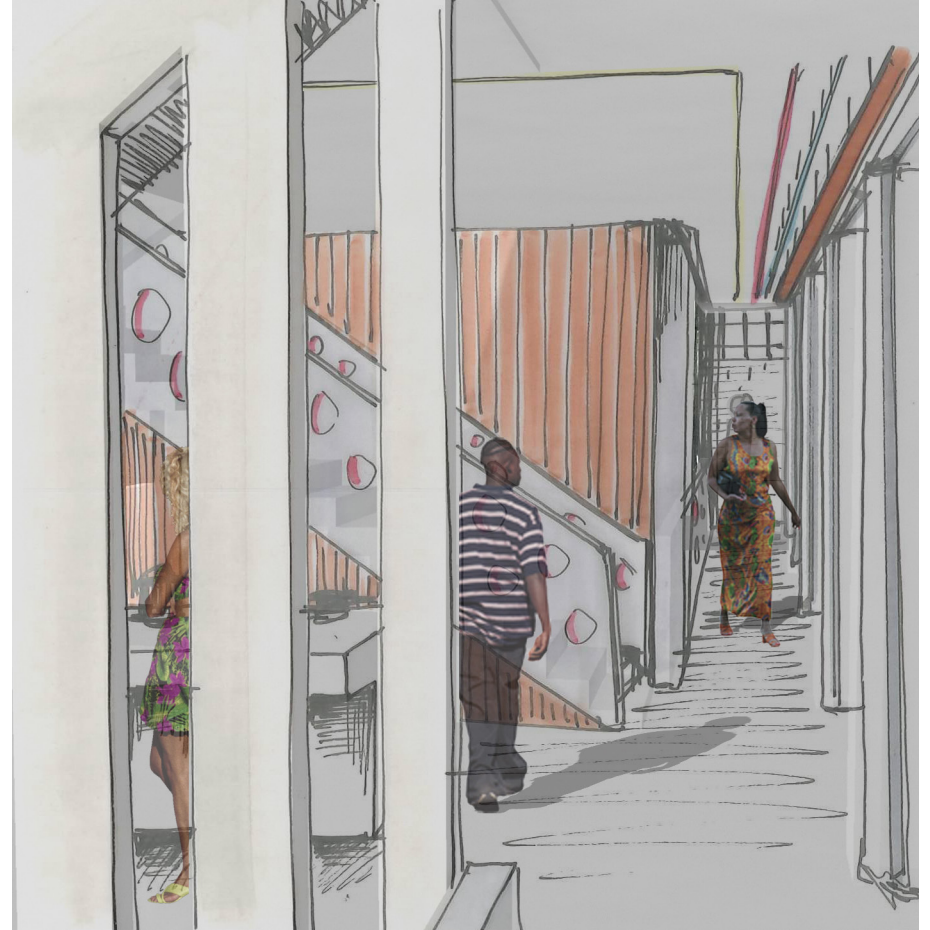
toilets



Considers himself lucky to have clean water and toilet!



Heads back over to the communal kitchen, meets others...

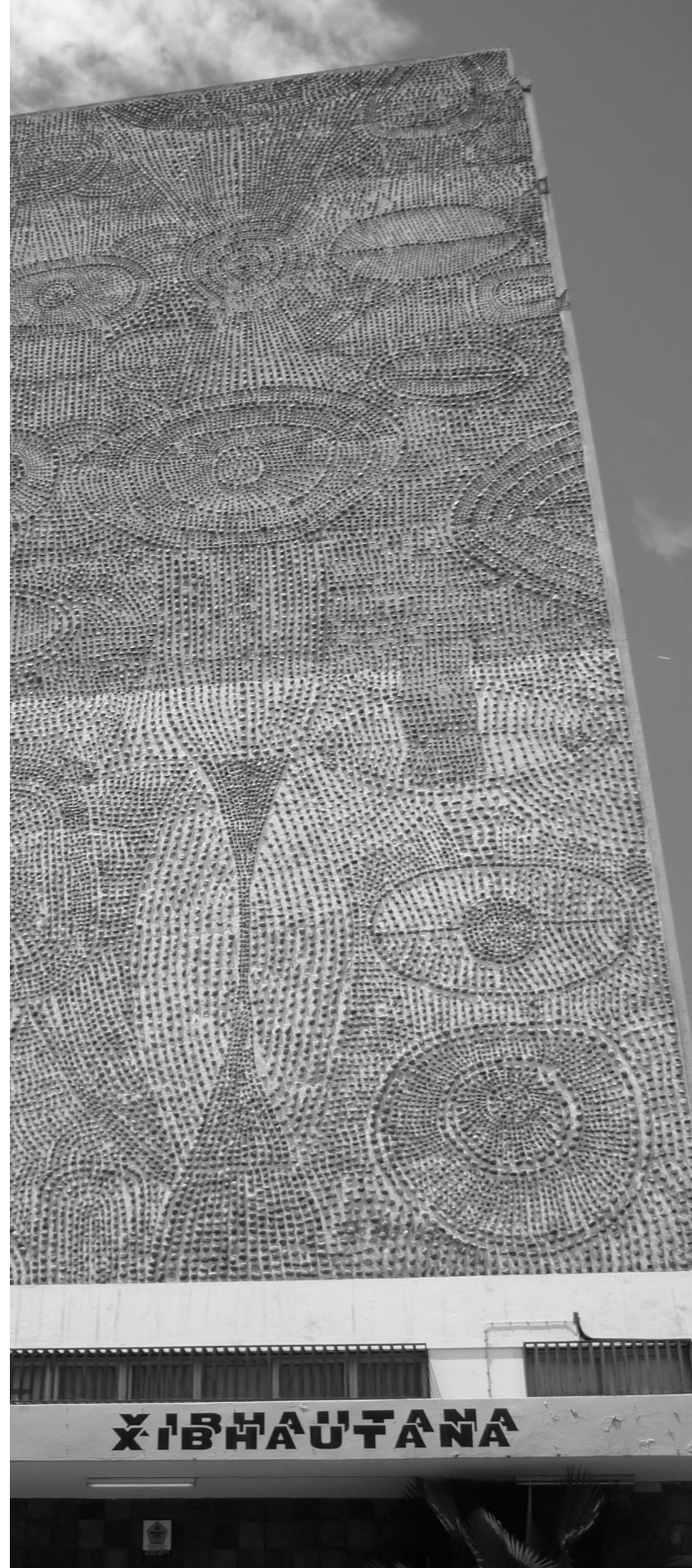


... and heads downstairs to the public area, which is already bustling with activity...



...passes the gate that at  
the bottom of the stairs...





**खिबहाउताना**



...makes a chat with (informal) vendors, and goes off to work at the central market...





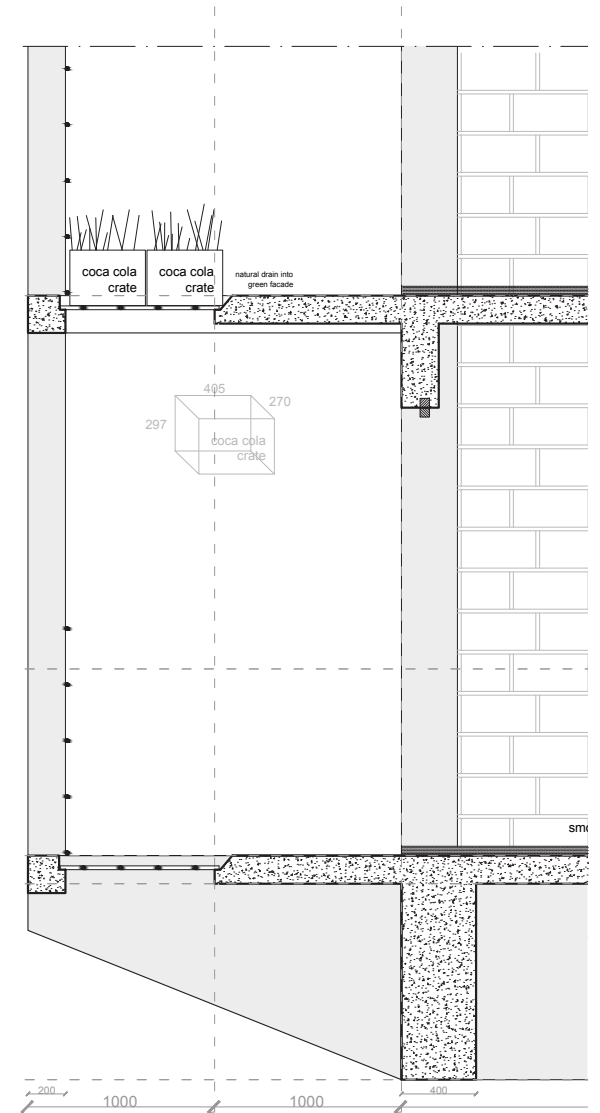
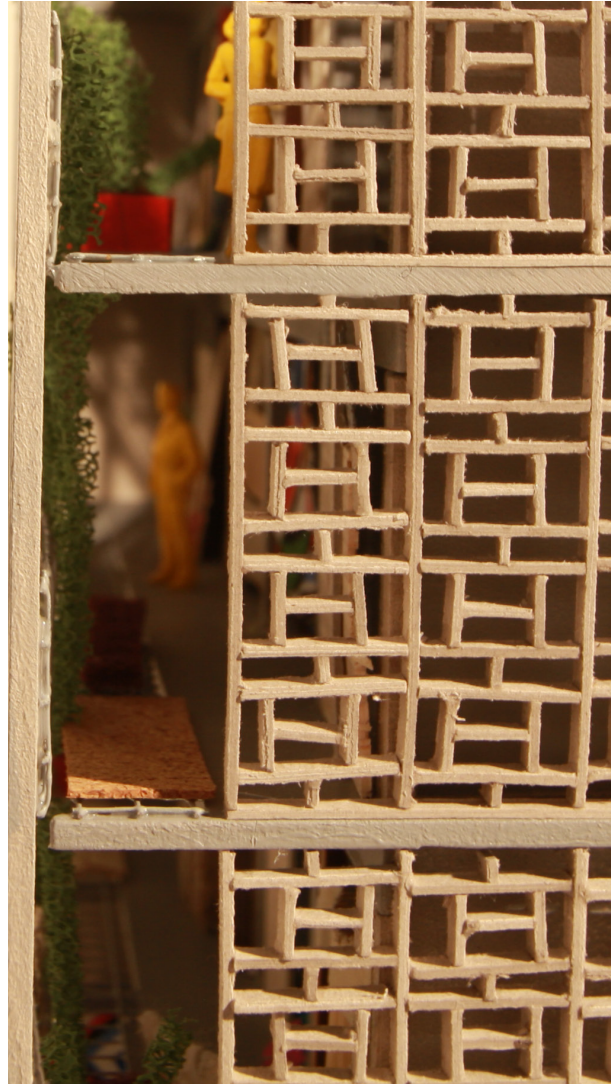
He comes back from work...



...notices his piece  
of facade frame isn't  
that well covered...



...while it's such an easy and productive way to keep his room cool and grow some small scale crops such as corn or *sorghum*.



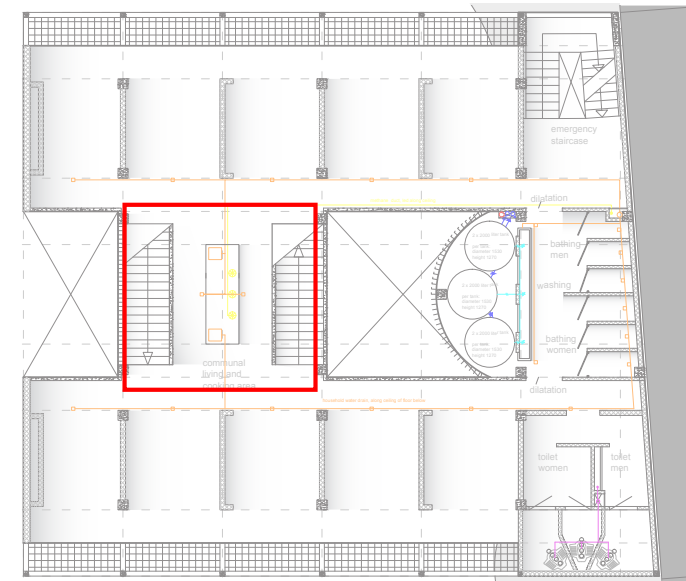
He walks into the cool shade underneath the concrete umbrellas...



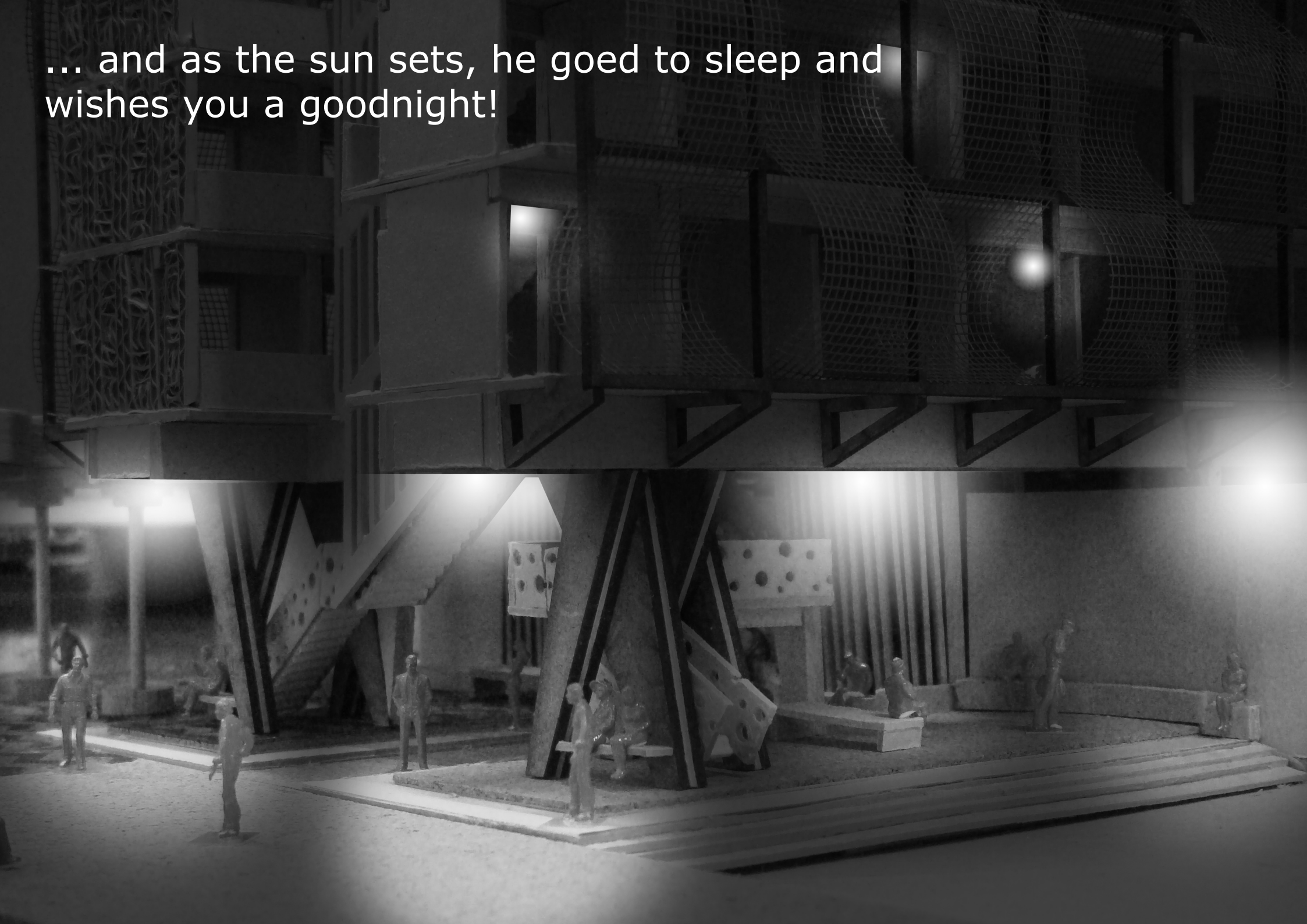
Then goes to the back,  
to see if there are any  
cars to be washed.



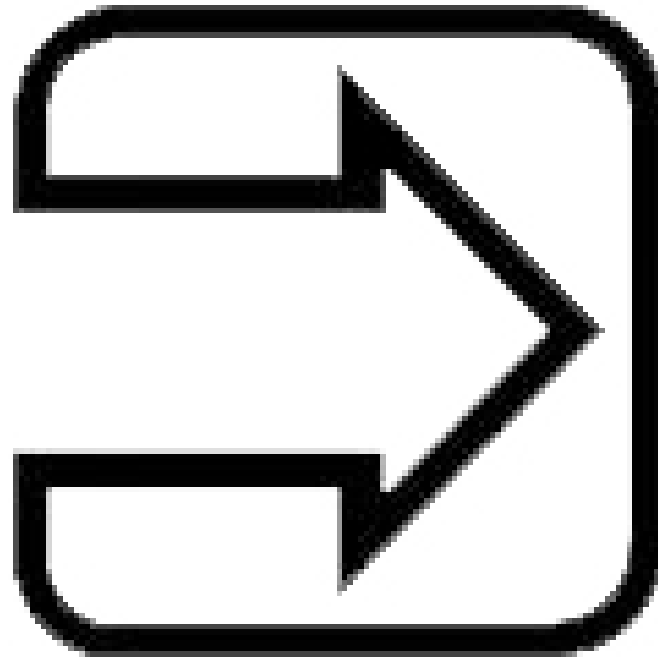
Cooks himself a meal at the end of the day, in the communal kitchens, with methane gas from the biogas reactor...



... and as the sun sets, he goes to sleep and wishes you a goodnight!



# PART 6\_future steps



Future steps could concern, among others:

monitoring large scale property development

mapping the development of vacancies

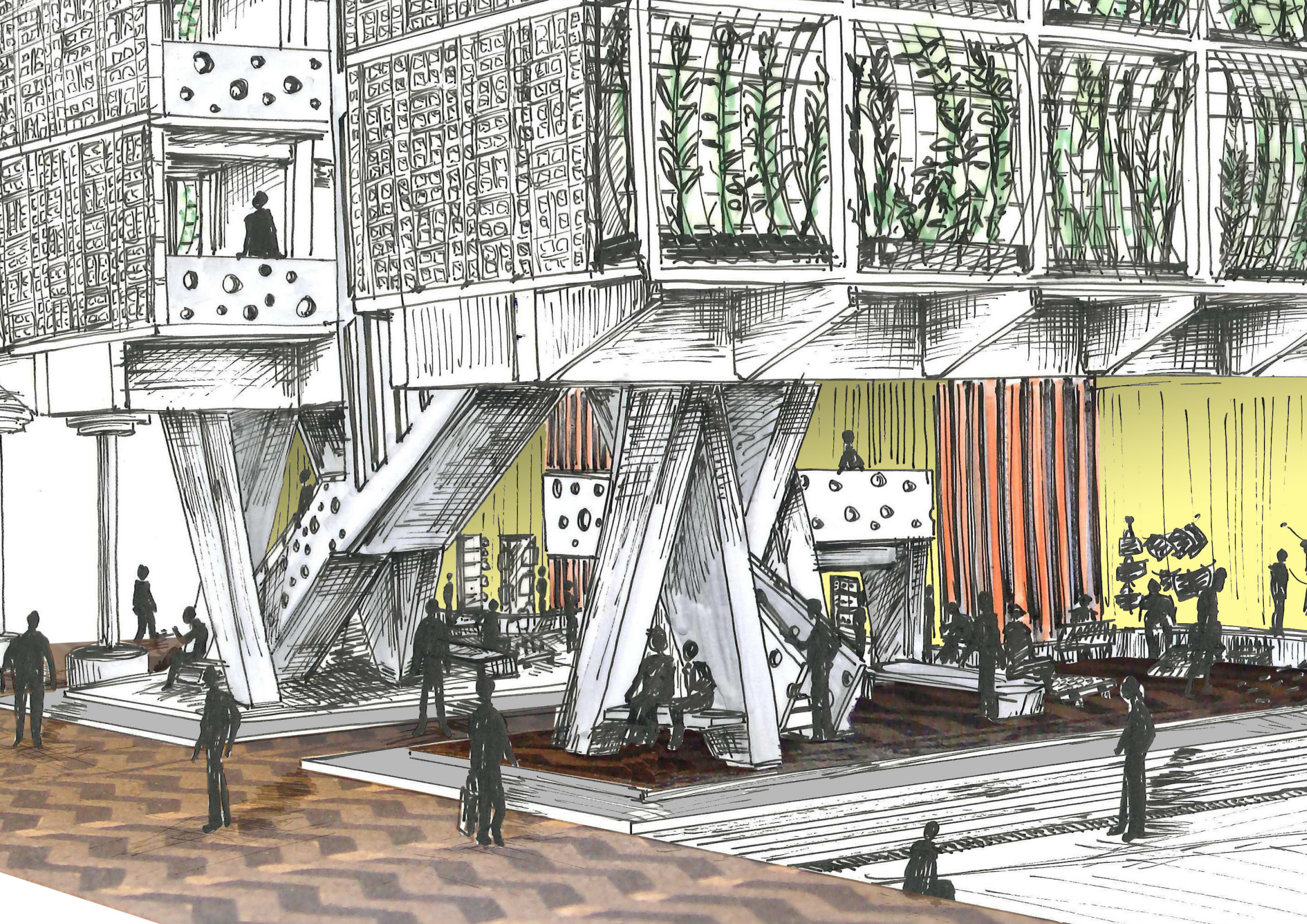
feasibility of the living unit

ownership of the plot

more detailed financial plan in terms of building costs

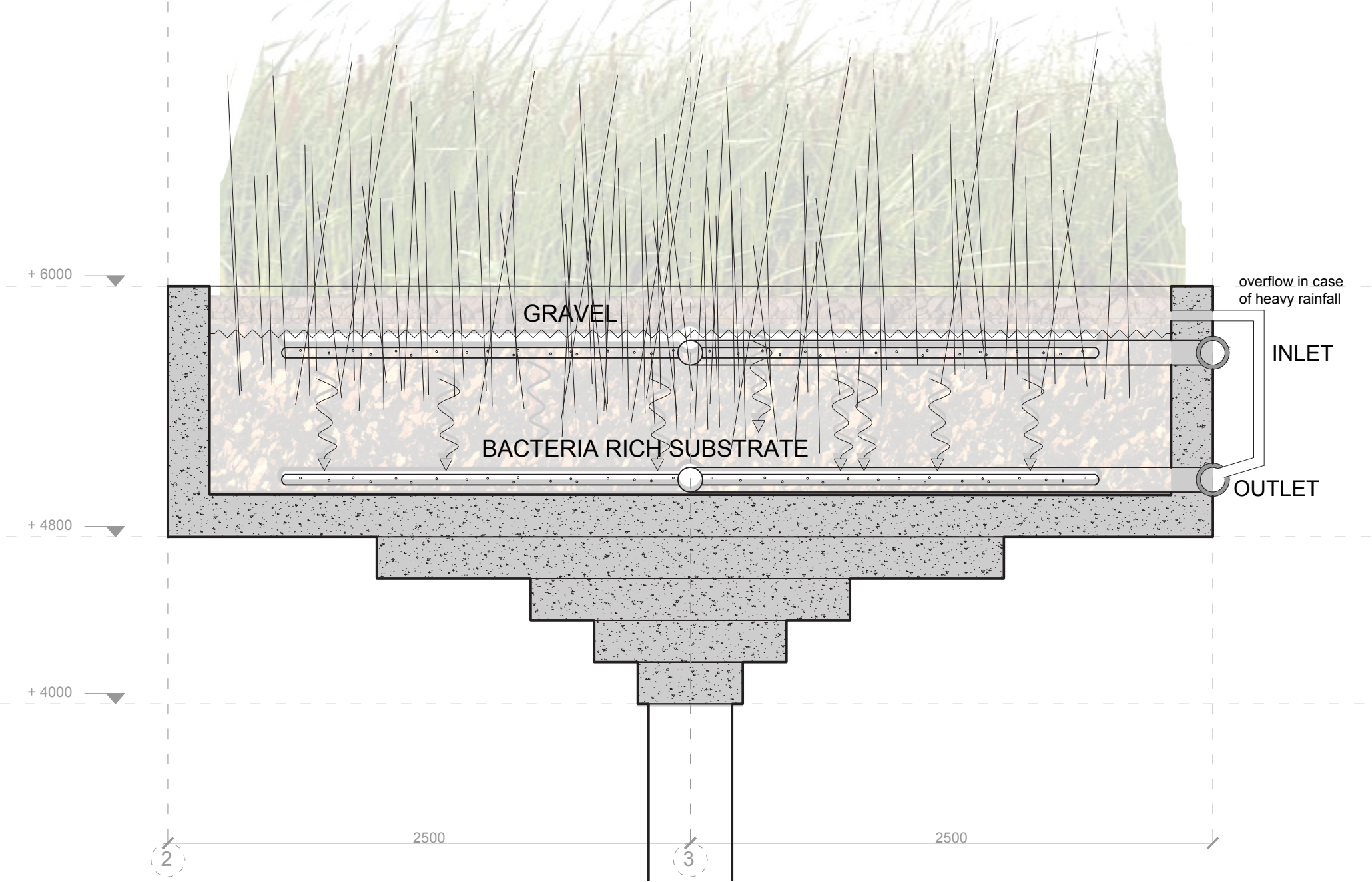
continued research into income level of target group





**EXTRA SLIDES**

# wetlands systems



## INITIAL COSTS

### *Building costs determinants:*

surface area of one floor (m2)	270
total gross floor area (GFA) (m2)	1215
cost of structure per m2 GFA	400
building costs structure	€ 486.000
building costs water & waste installations	€ 50.000
cost of plot	n.a.

Total investment necessary	€ 536.000
----------------------------	-----------

## EXPLOITATION COSTS (per year)

interest (4% of investment)	€ 21.440
maintenance of building (1% building costs)	€ 4.860
maintenance of installations	€ 2.500
Electricity common rooms	€ 5.000
Concierge / caretaker	€ 3.000
Profit for investor	€ 25.000
Debt amortization	€ 23.000

Total exploitation costs (per year)	€ 84.800
-------------------------------------	----------

Debt paid off in # years	23
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## REVENUES

rent per living unit / month	€ 50	
# living units	45	
		€ 2.250
rent per inhabitant / month	€ 10	
# inhabitants	70	
		€ 700
rent per stall / month	€ 50	
# stalls	12	
		€ 600
informal vending facilities pp / month	€ 10	
# informal vendors	20	
		€ 200

Total rent revenue (per month)	€ 3.750
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Total rent revenue (per year)	€ 45.000
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sale fertilizer	average price / tonne	€ 400	
	solid fertilizer (ton/yr)	12,4	
			€ 4.960
	average price / tonne	€ 200	
	urine (ton / yr)	50,4	
			€ 10.080

Billboards above facade		
front (north-west)		€ 15.000
rear (south-east)		€ 10.000

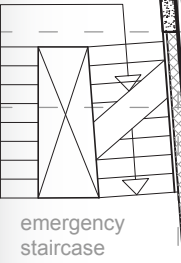
Total revenue (per year)	€ 85.040
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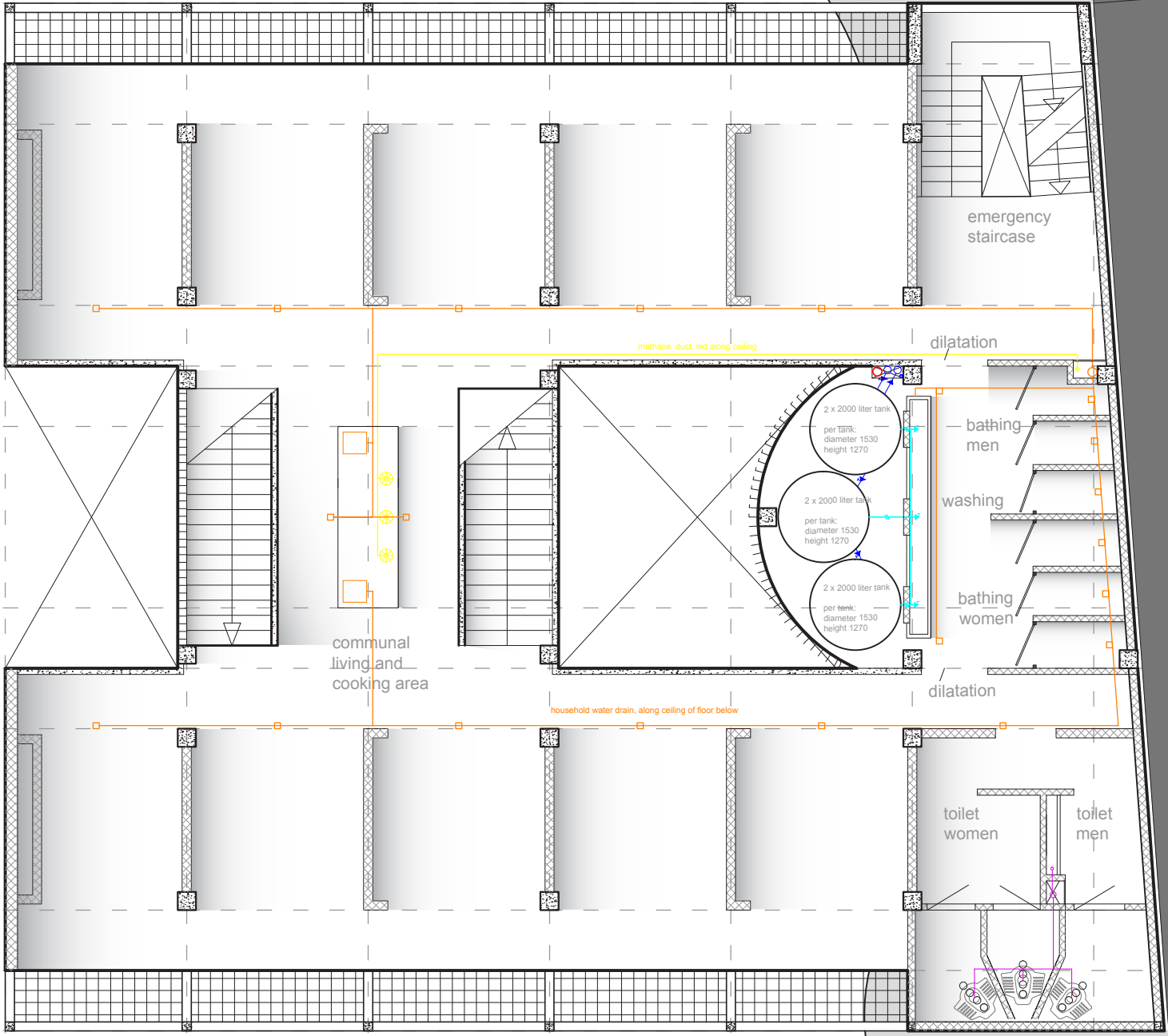


3500  
1000  
1000  
3000  
1000  
1000  
3000  
1000  
1000  
3000  
1000  
1000  
3000  
1000  
1000

maintenance deck for wetlands



emergency staircase



dilatation

methane duct, led along ceiling

2 x 2000 liter tank  
per tank:  
diameter 1530  
height 1270

bathing men

washing

2 x 2000 liter tank  
per tank:  
diameter 1530  
height 1270

bathing women

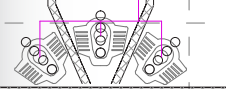
dilatation

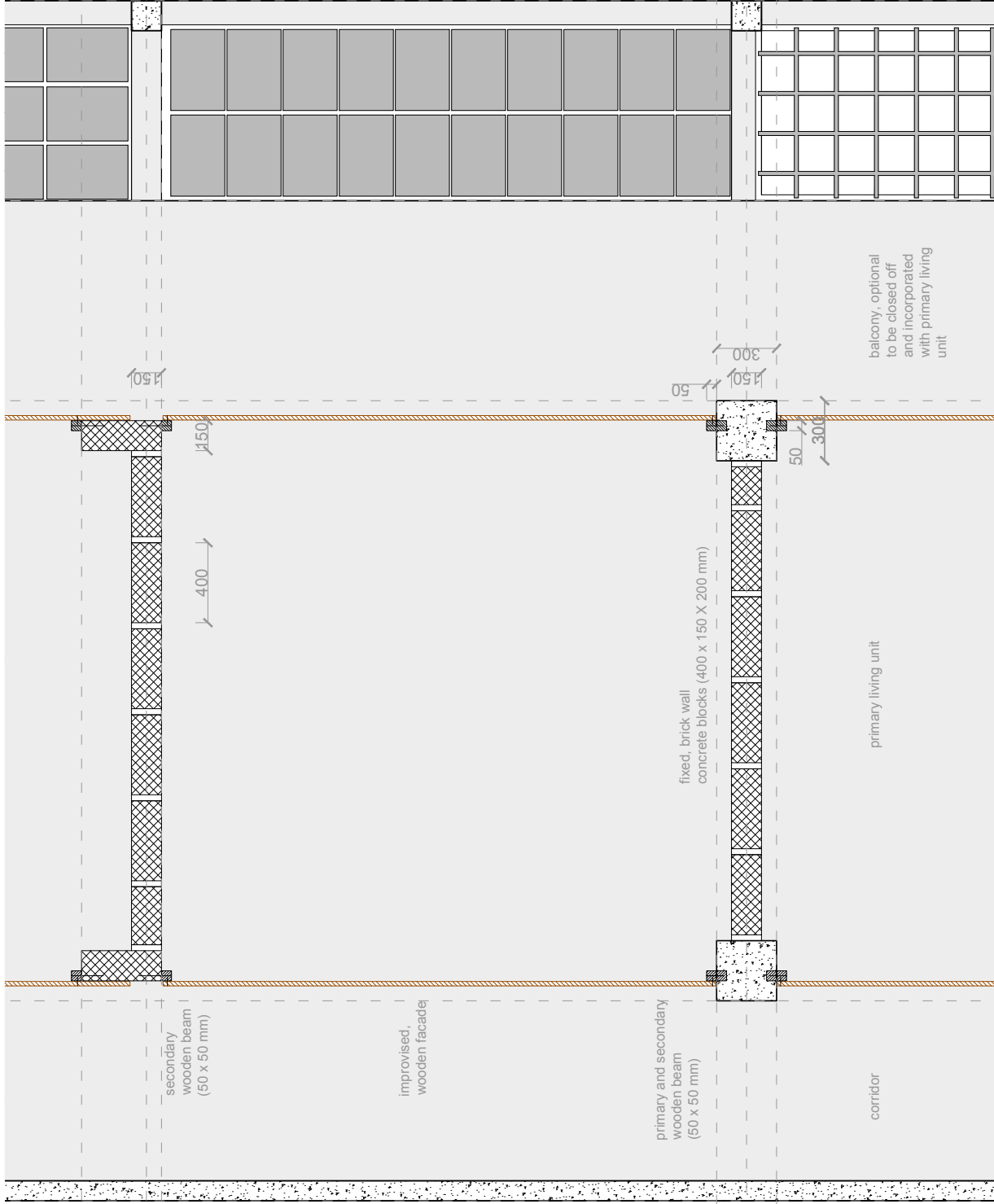
communal living and cooking area

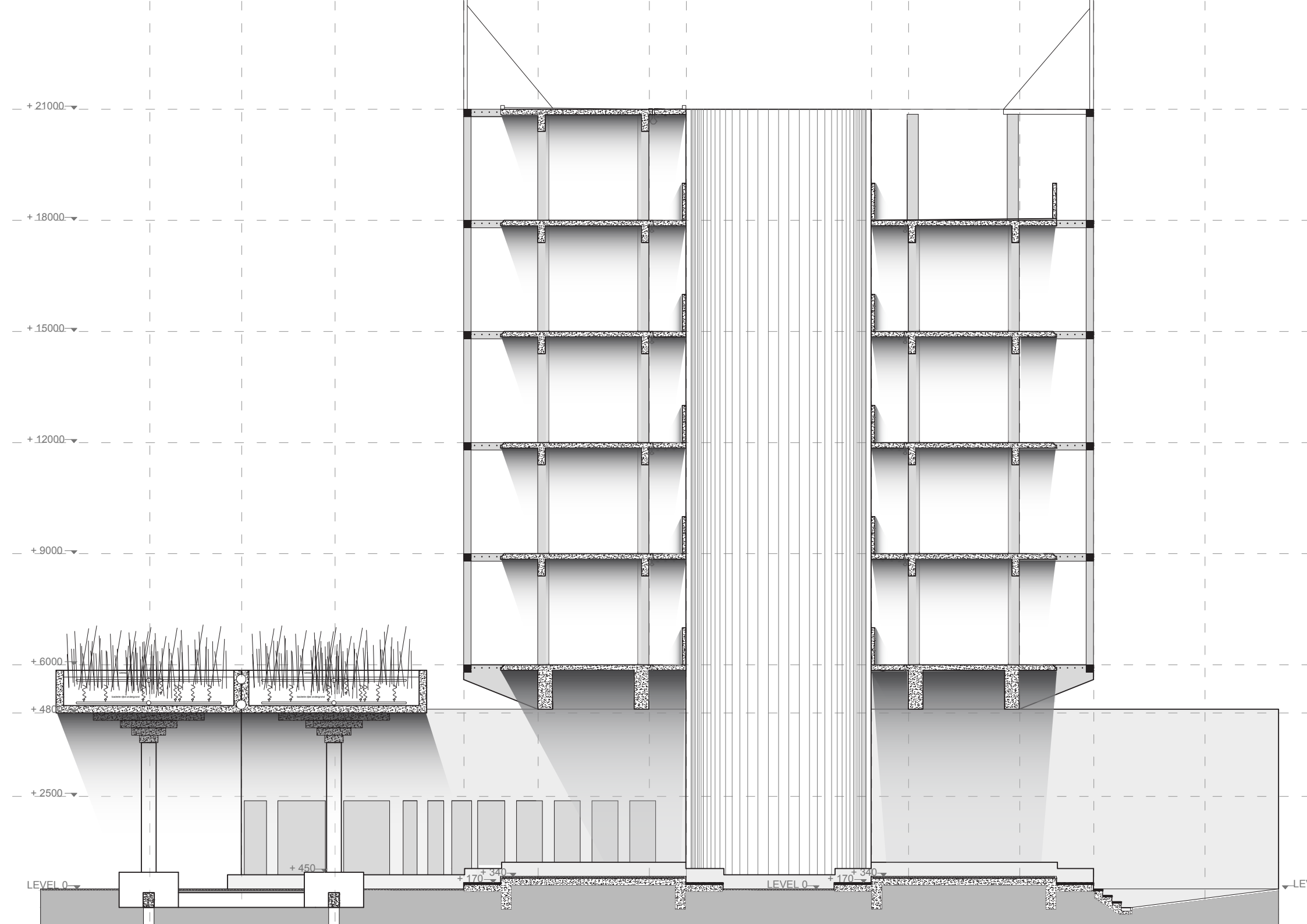
household water drain, along ceiling of floor below

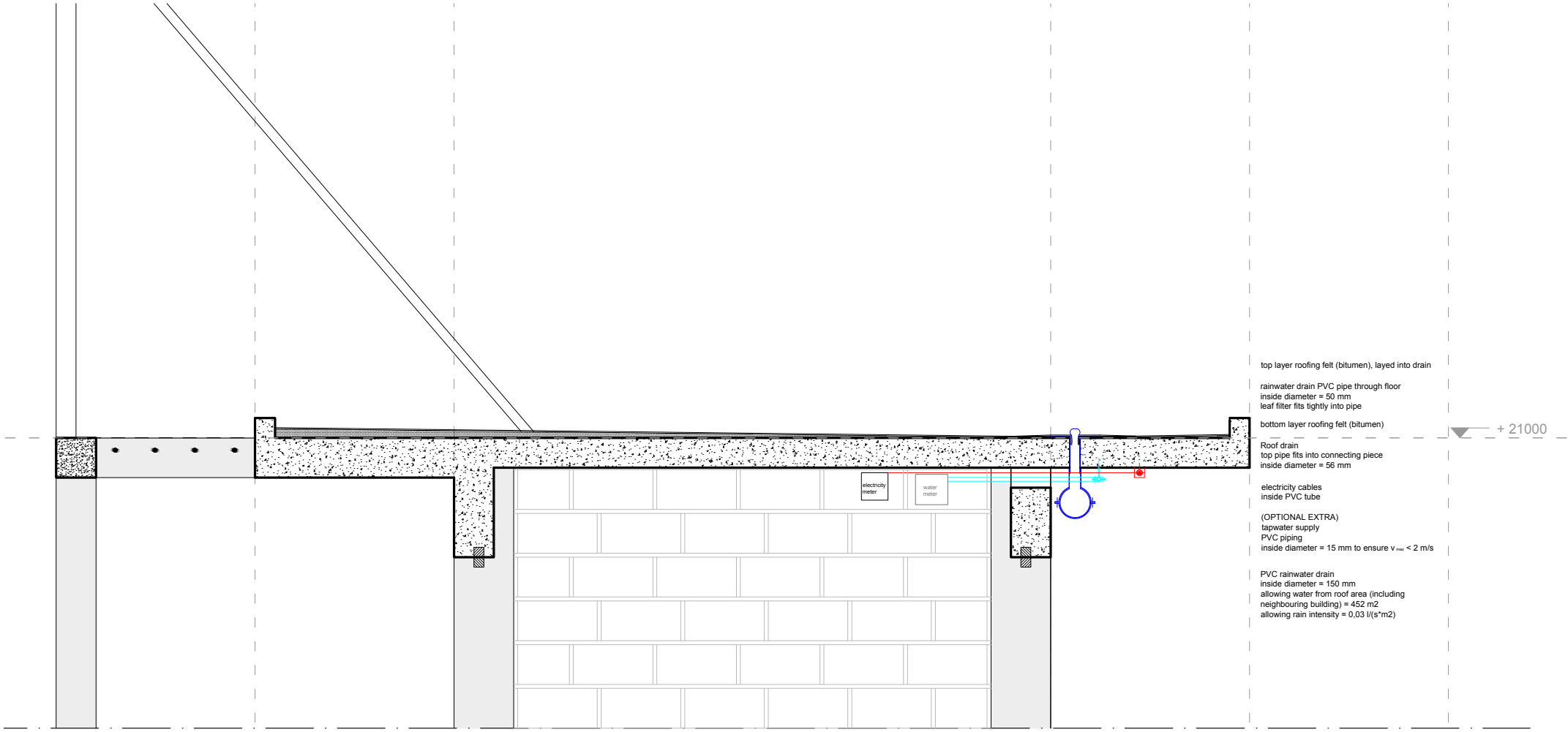
toilet women

toilet men









top layer roofing felt (bitumen), layed into drain

rainwater drain PVC pipe through floor  
inside diameter = 50 mm  
leaf filter fits tightly into pipe

bottom layer roofing felt (bitumen)

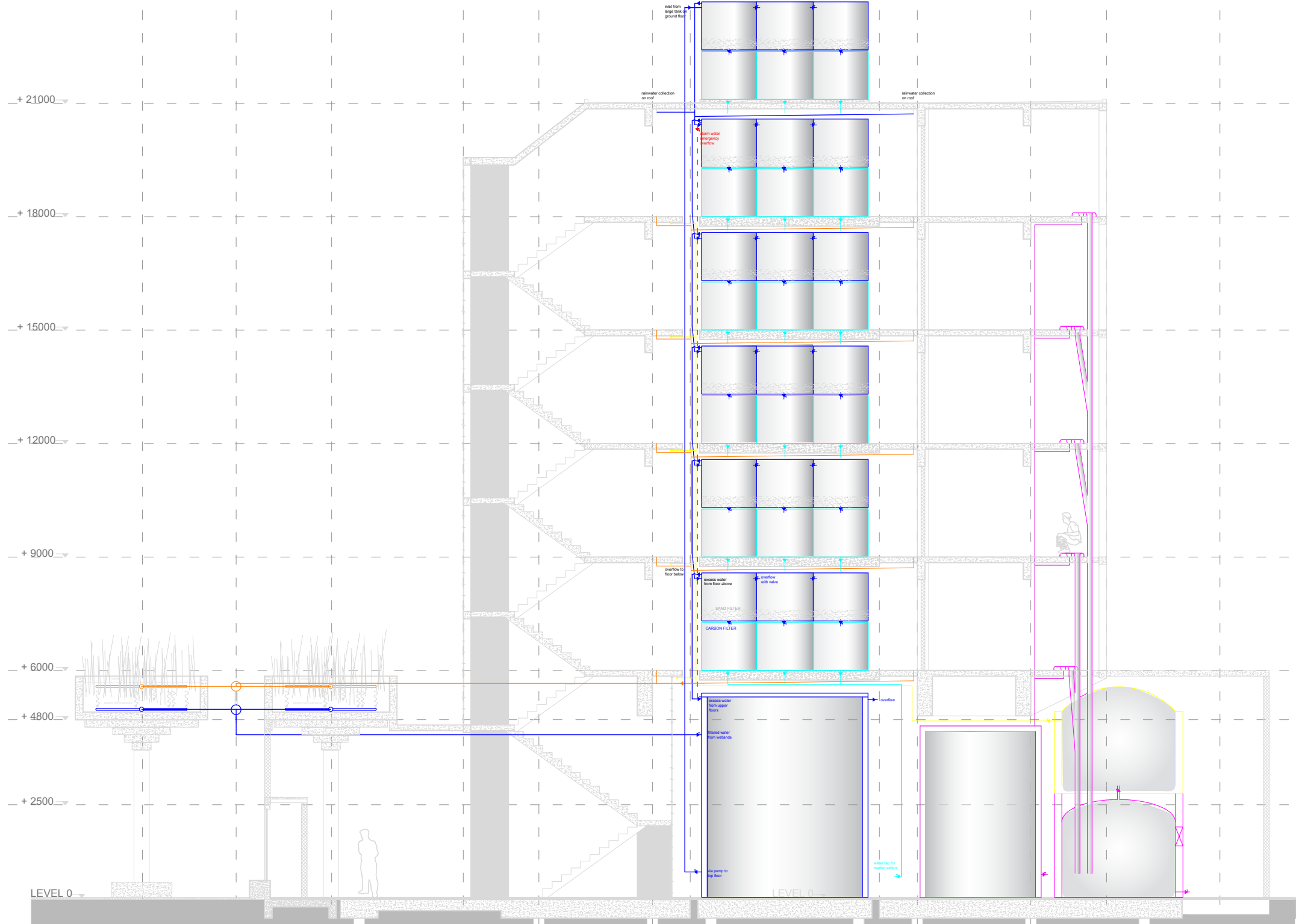
Roof drain  
top pipe fits into connecting piece  
inside diameter = 56 mm

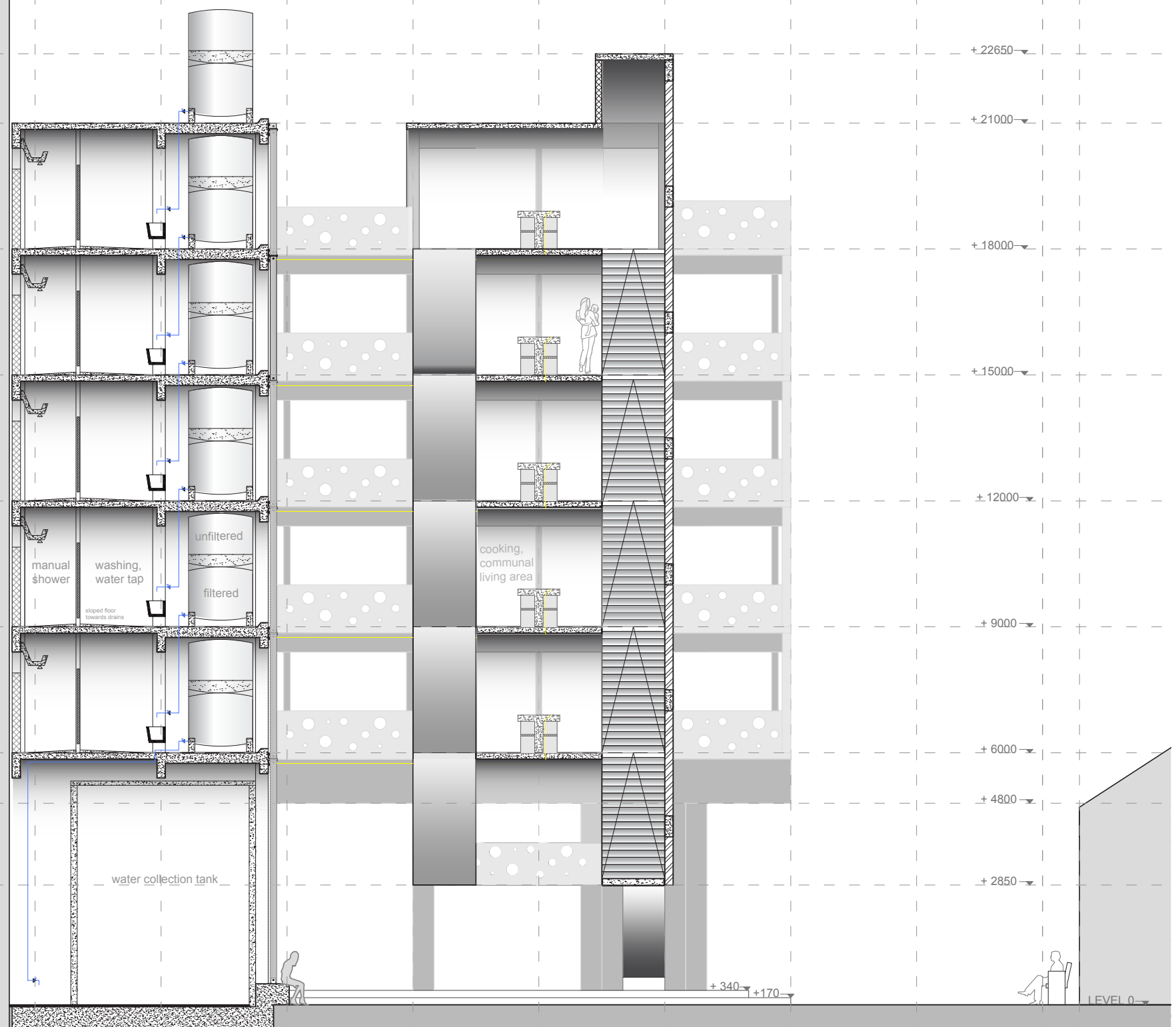
electricity cables  
inside PVC tube

(OPTIONAL EXTRA)  
tapwater supply  
PVC piping  
inside diameter = 15 mm to ensure  $v_{max} < 2 \text{ m/s}$

PVC rainwater drain  
inside diameter = 150 mm  
allowing water from roof area (including  
neighbouring building) = 452 m<sup>2</sup>  
allowing rain intensity = 0,03 l/(s·m<sup>2</sup>)

+ 2100





+22650

+21000

+18000

+15000

+12000

+9000

+6000

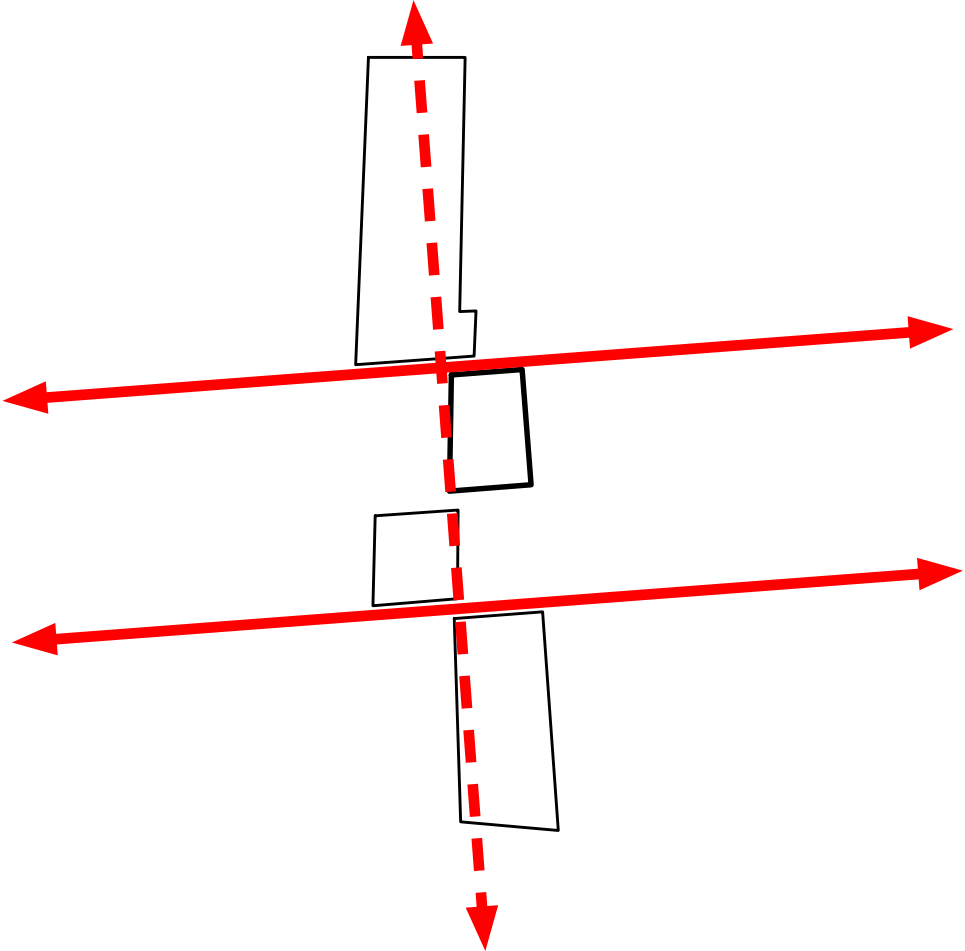
+4800

+2850

+340 +170

LEVEL 0

# Public spaces working together



# Urban element design process



MOTIVATION: cars on the pavement --> pedestrian un-friendly - (?) -> lack of informal vending.



Port of Maputo geographically close to the Baixa, but few remaining physical links.



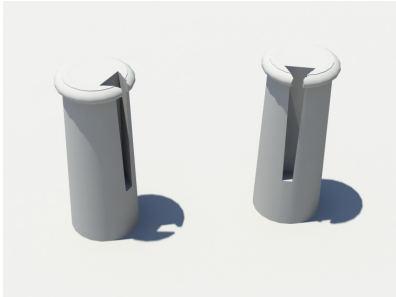
'street element' from harbour: bollard



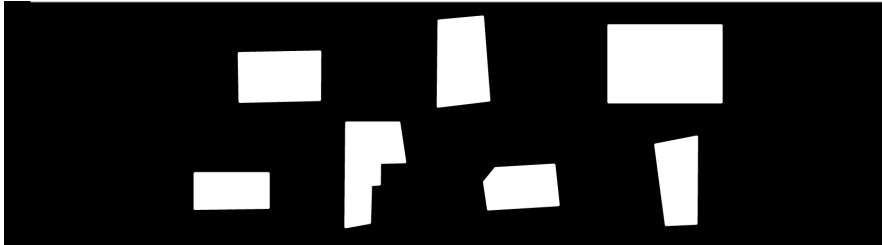
informal vending



guiding urban element, such as an 'Amsterdammertje'



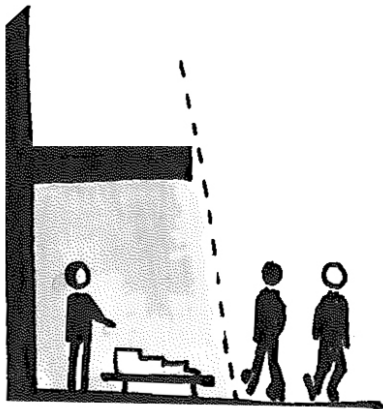
# EASTERN BAIXA LARGE SCALE PROPERTY DEVELOPMENT



# INFORMAL ACTIVITIES

Referring to a very wide scale of activities taking place in the public domain, and *seemingly* lacking organization and legality.

*Determinants for informal vending: people passing by, shadow and preferably a blind wall.*



The future? - the 3x3x3 sustainable Scottish box inserted into the concrete structure?



# Prevailing winds on site



Source: windfinder.com, location: Maputo Bay

# Angelo at the site



# Distinction between general and site specific solutions for a vacant plot in the Baixa:

## GENERIC methods for approaching vacant plots in the Baixa:

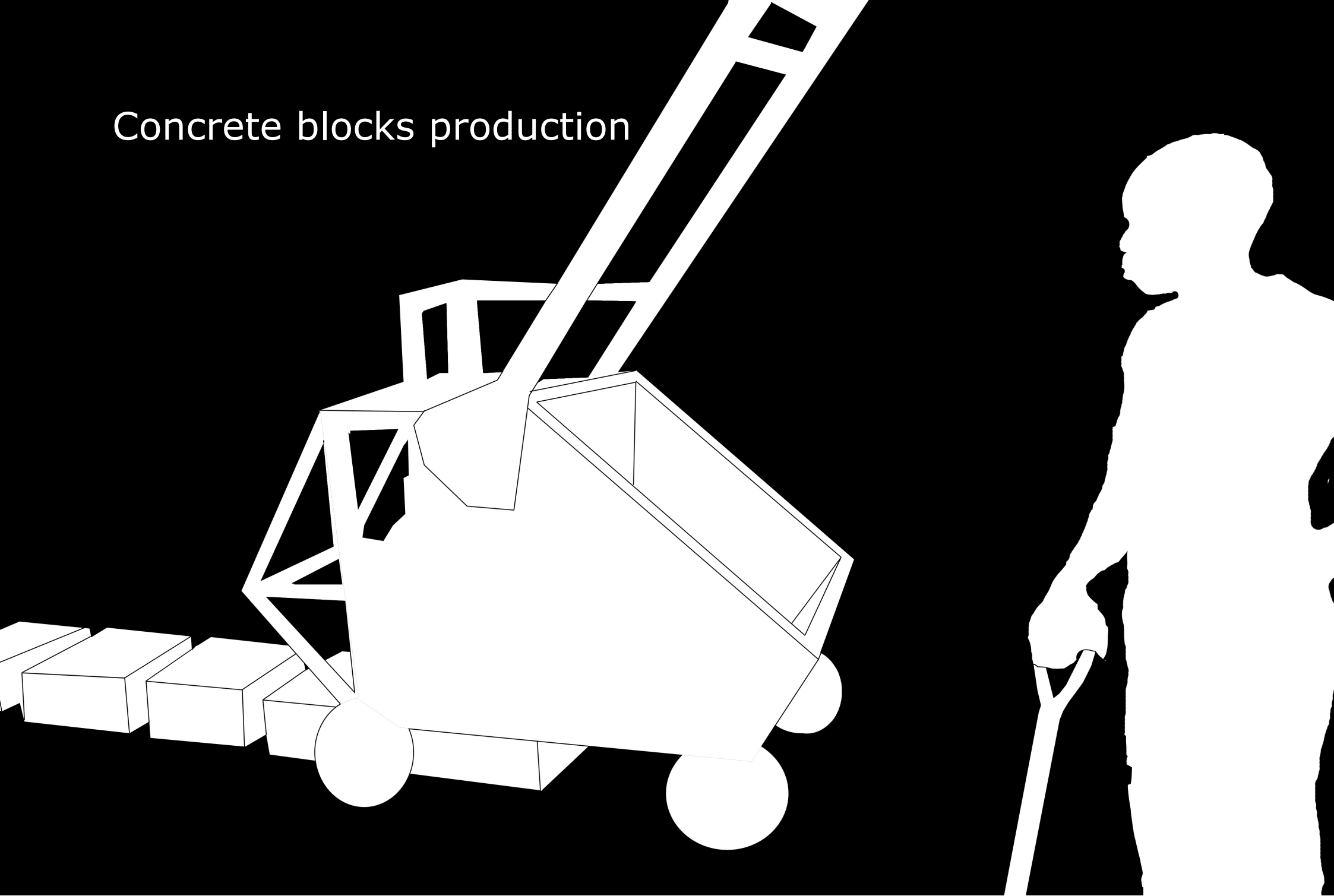
- Remove remaining ruins and possible walls along pavement;
- Small scale interventions, acupuncture, as to increase the rate at which a structure can be introduced and built;
- Catalytic interventions, as to lead to further urban upgrades in its immediate surroundings; it should radiate energy!
- Prevent long term use as car park, which further degrades the plot through unwanted activities and also further delays possible new functions;
- To make the plot accessible, link the new structure or function to the existing or future urban plan.

On a more controversial note: in my opinion the intervention, be it a new structure or a renovated old building, does not necessarily need to be a landmark. A functional building for the community can suffice. There is enough interesting architecture in the Baixa, but it seems to lack enough people to fully make use of the architecture. Therefore icons are not needed, but simple, cheap and socially functional structures are more valuable.

## SITE SPECIFIC methods for approaching one particular vacant plot, currently a ruin:

- The intervention should be quick built and cheaply built;
- Among others, include a residential function, of which there is clearly little in the Baixa
- Allow easy accessible, shadowed, public space created on ground level; therefore the building can be seen as multifunctional (residential and public);
- A pedestrian passageway through the site "opens up" the relatively closed urban morphology of the old Baixa;
- Include a unique installations system for Maputo, which runs as a pilot project (regarding the sustainability in dense urban Maputo).

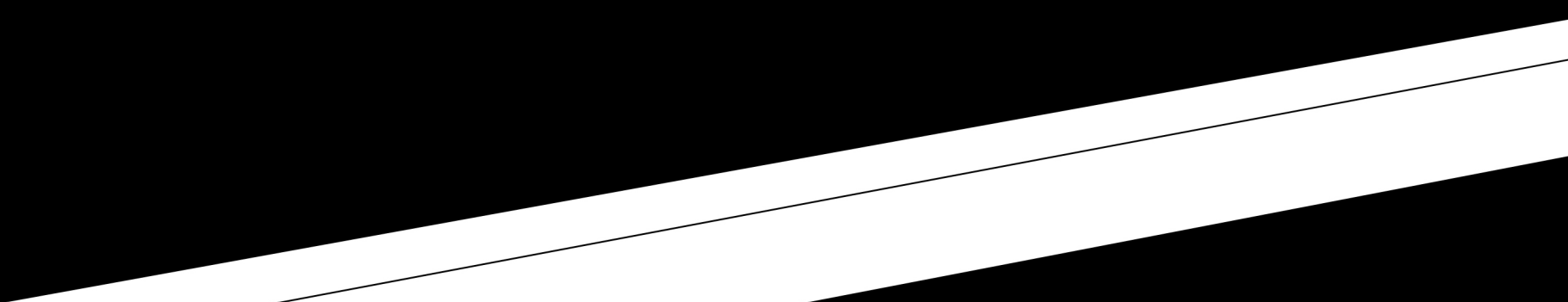
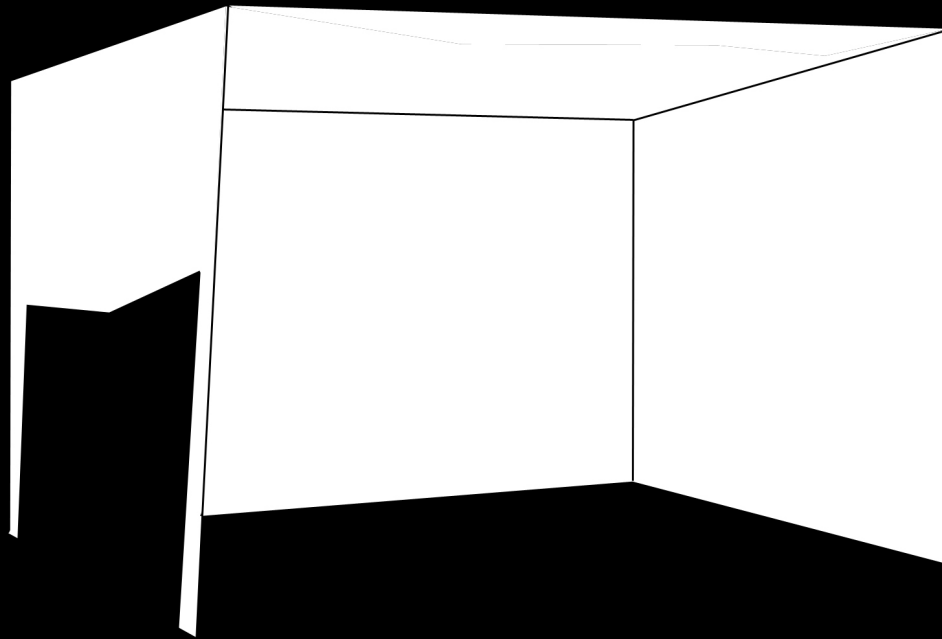
Concrete blocks production

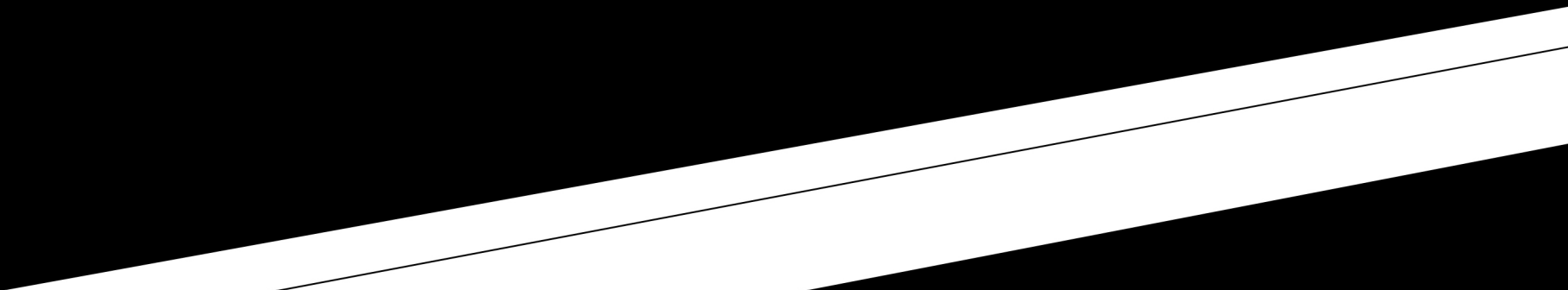
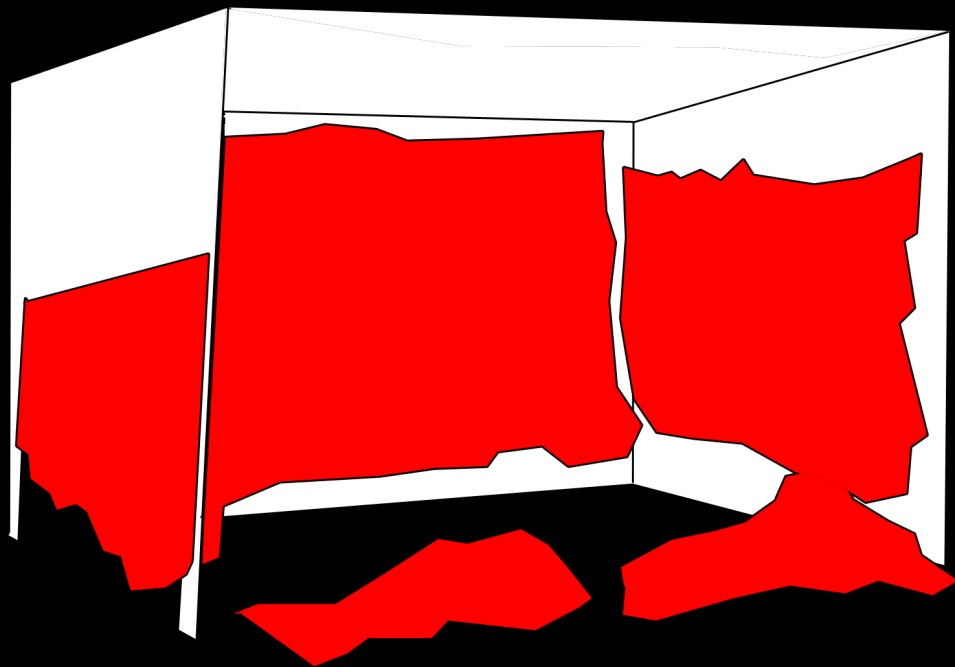


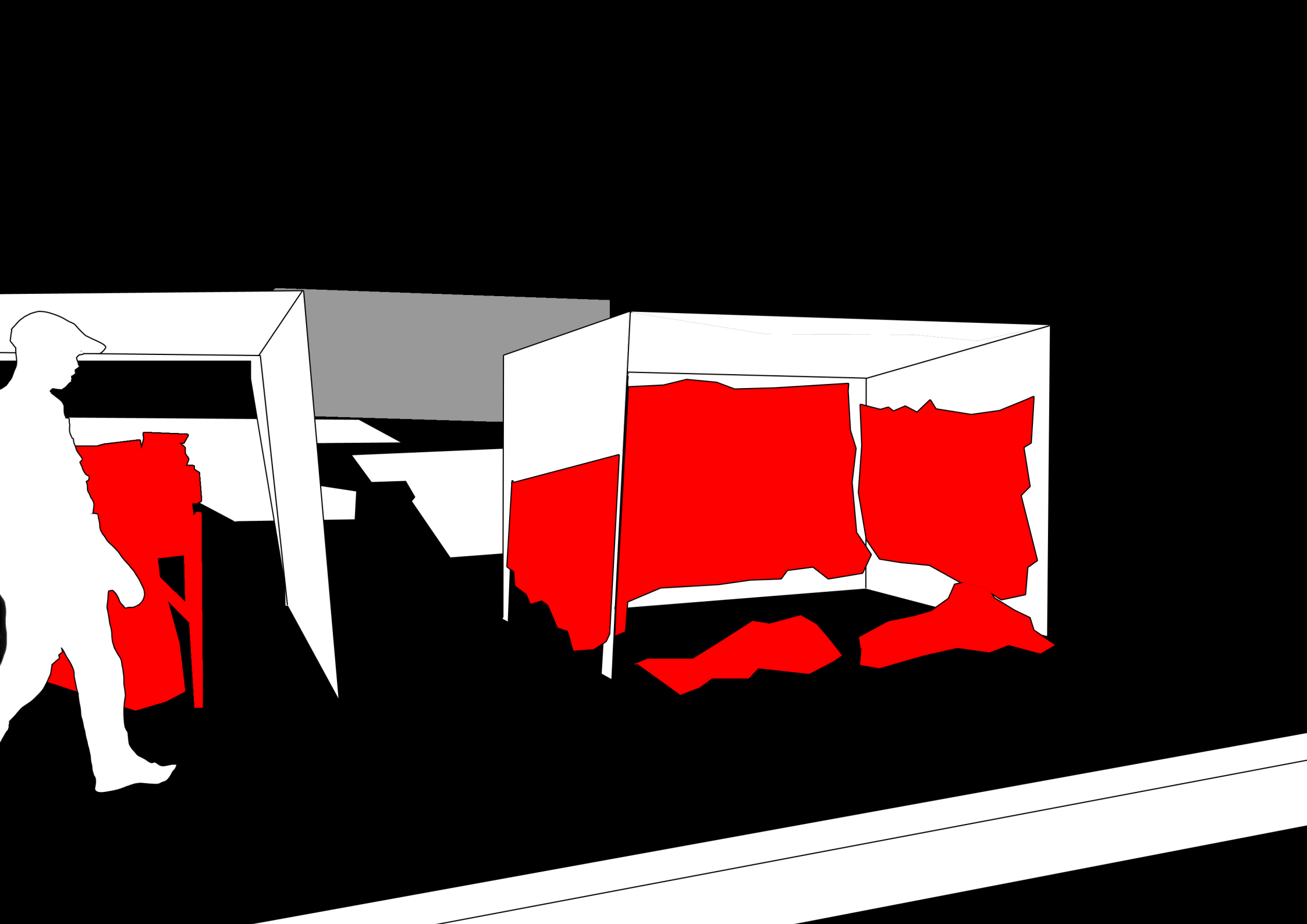
# Research sites vs. the Baixa







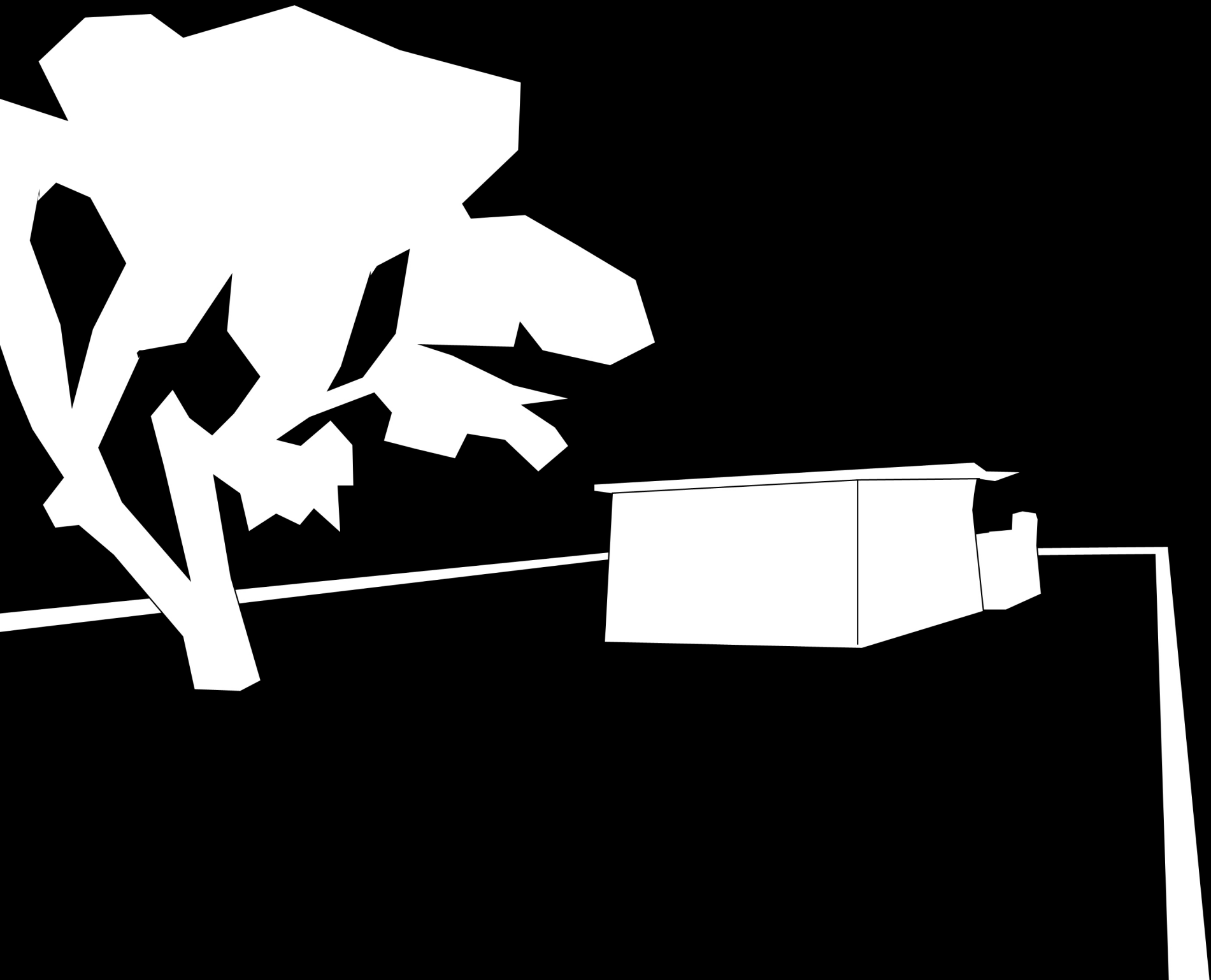


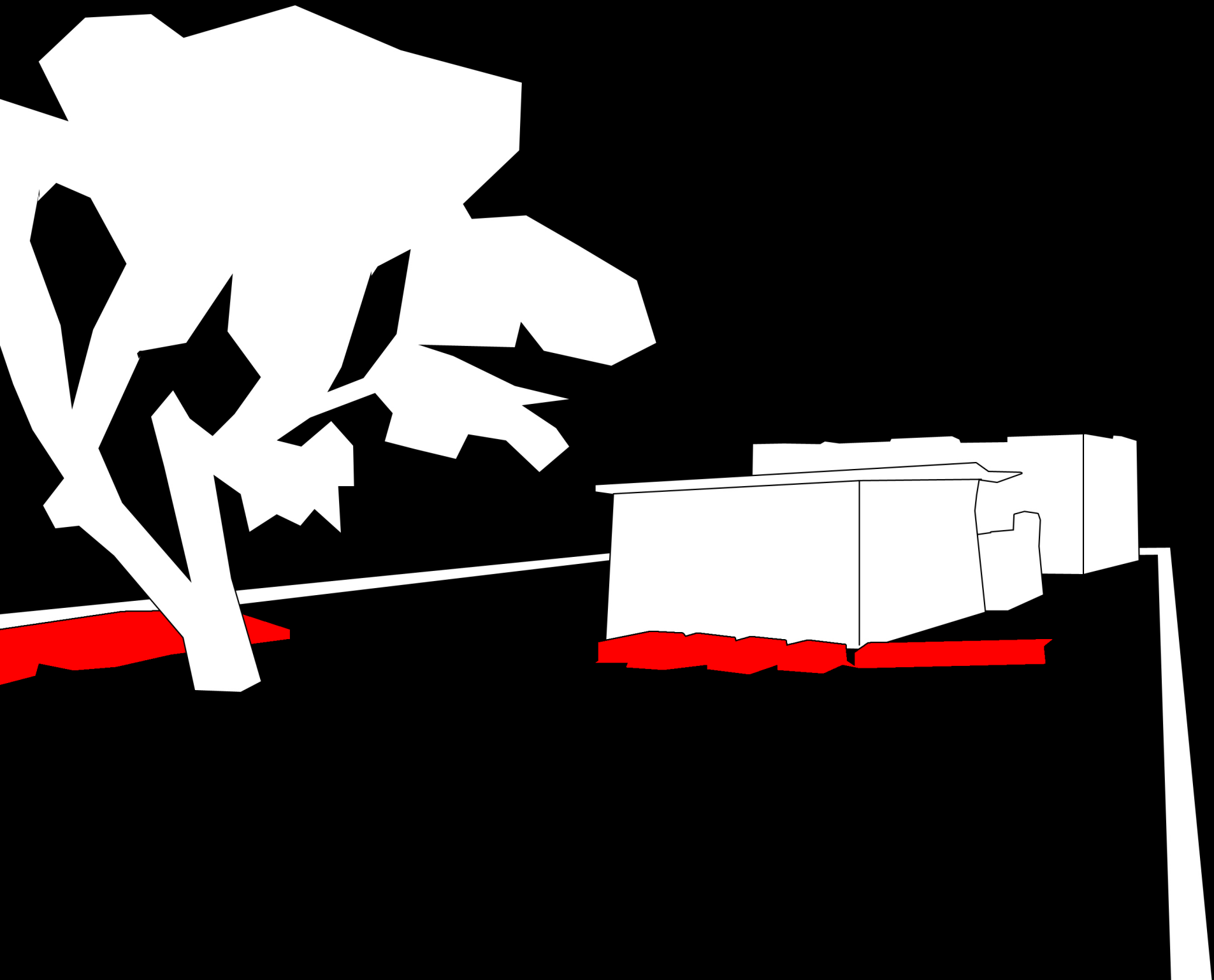


LOW DENSITY









HIGH DENSITY



