MULTI COMFORT
Student Contest,
Paris 2020/2021

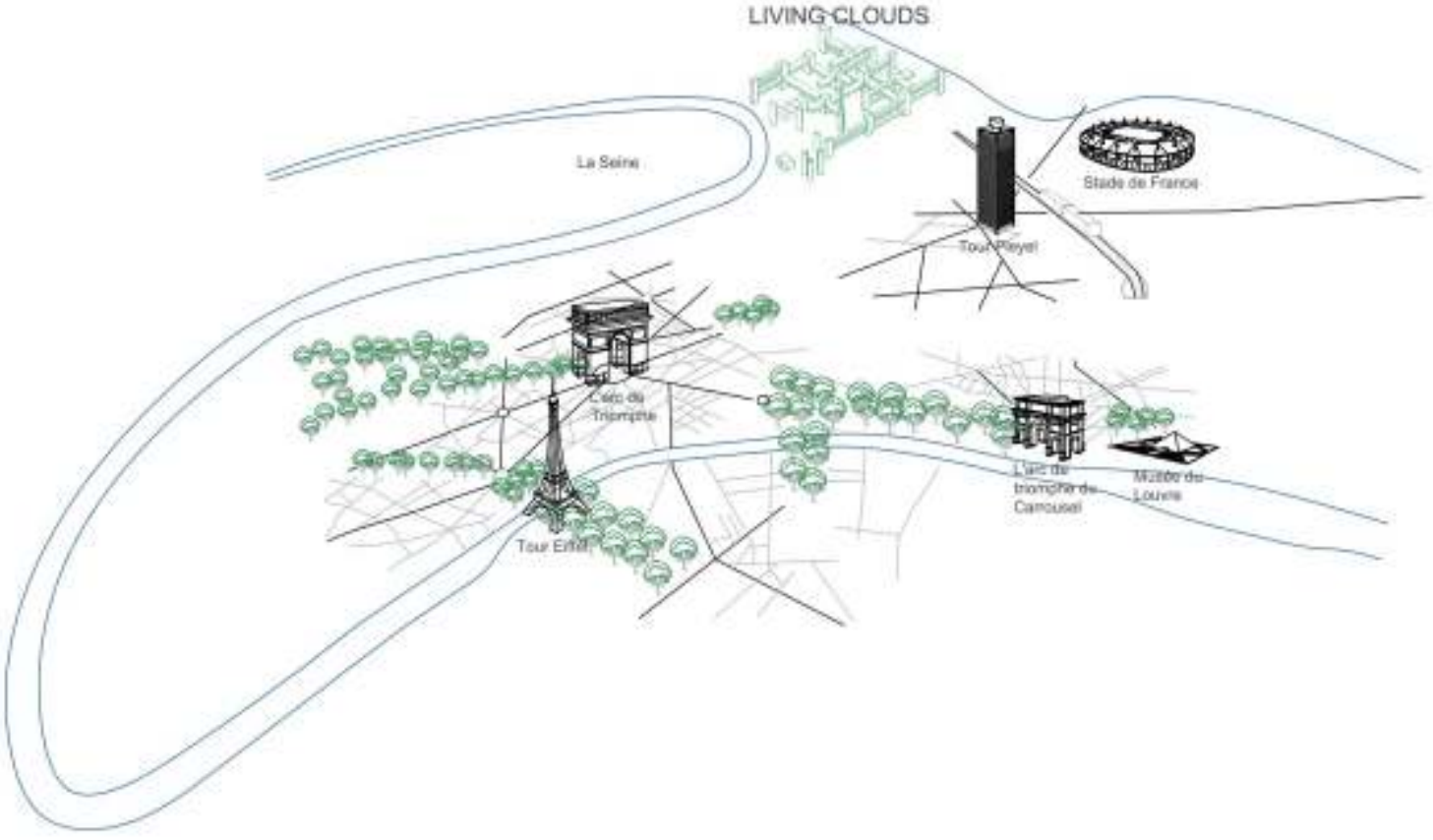
SPAIN

ESCUELA DE ARQUITECTURA DE LAS PALMAS.
UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA

CUYÁS DE GOUVEIA, JAVIER
SAAVEDRA ORTEGA, OCTAVIO LUIS



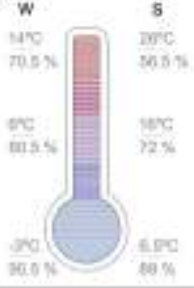
# LIVING CLOUDS




PARIS- SAINT DENIS

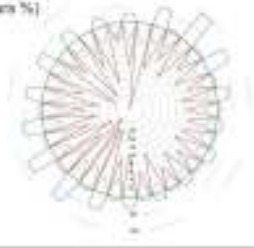
TEMPERATURE AND RELATIVE HUMIDITY

S: Summer
W: Winter




WIND

- Maximum speed. (m/s)
- Average speed (m/s)
- Frequency (hours %)



SUNLIGHT

- Summer period
- Winter period

WEATHER


History.
Coignet enterprise

La Seine

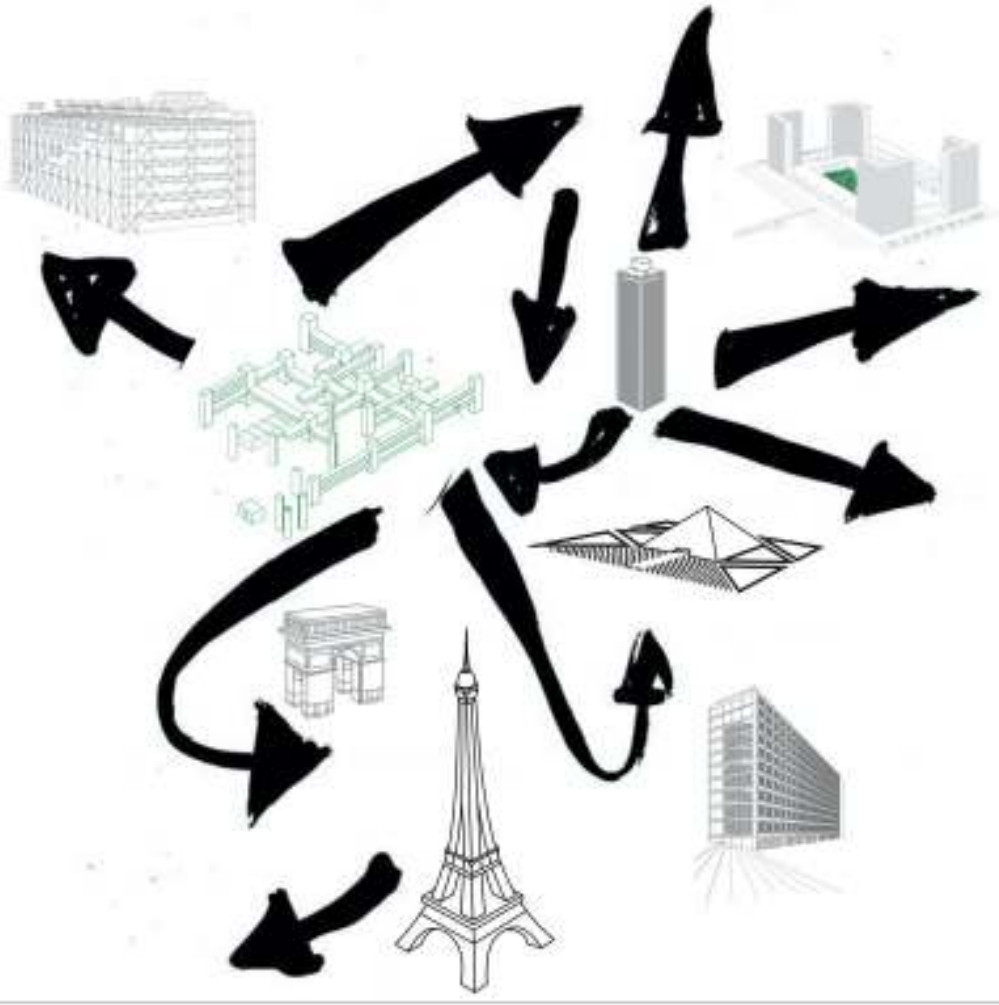
Industrial Remains

Cultural diversity

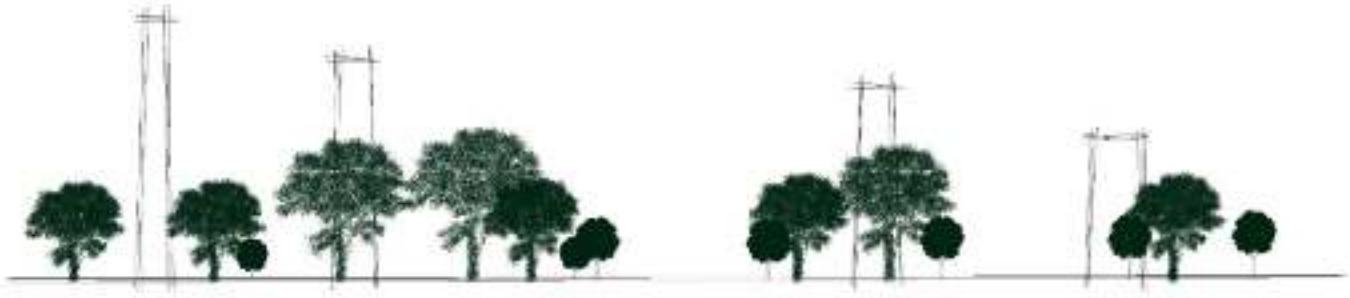
Citizen participation

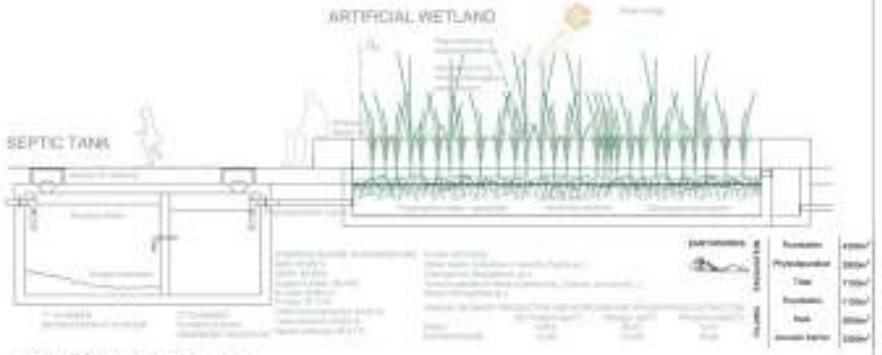
SAINT-DENIS


SITUACIONIST



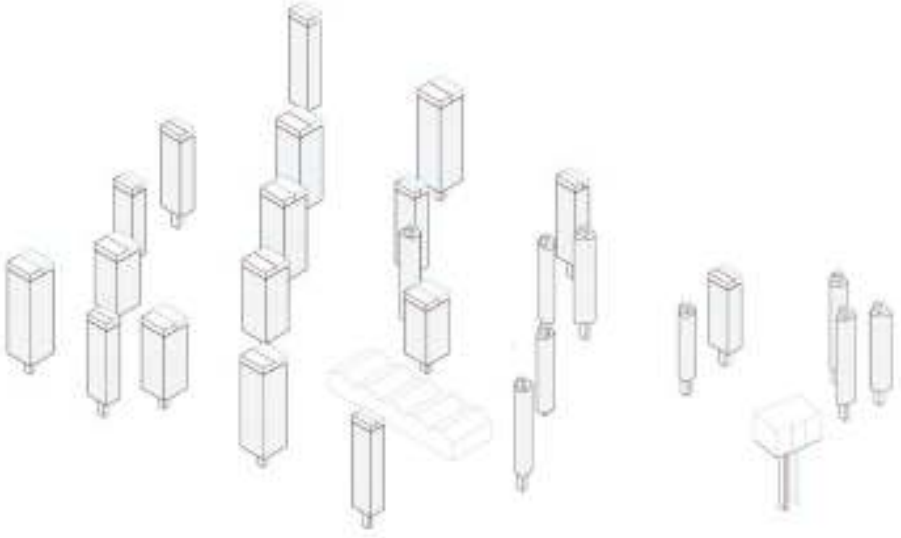
CONCEPT. Dérive française

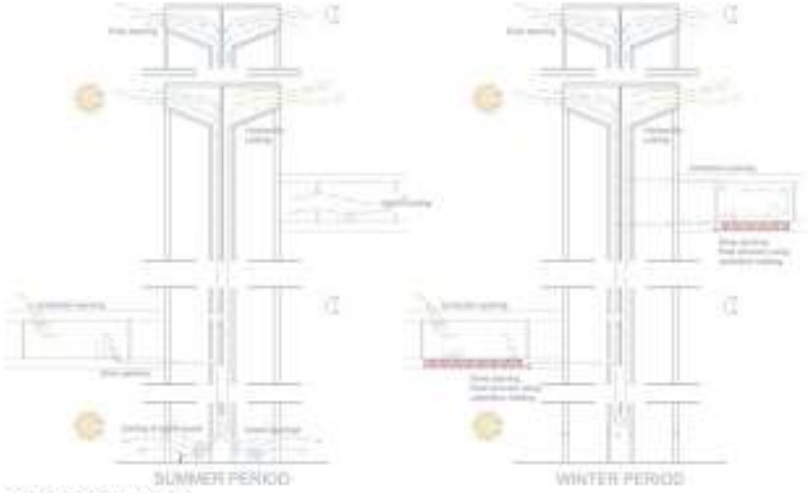





PHYTODEPURATION

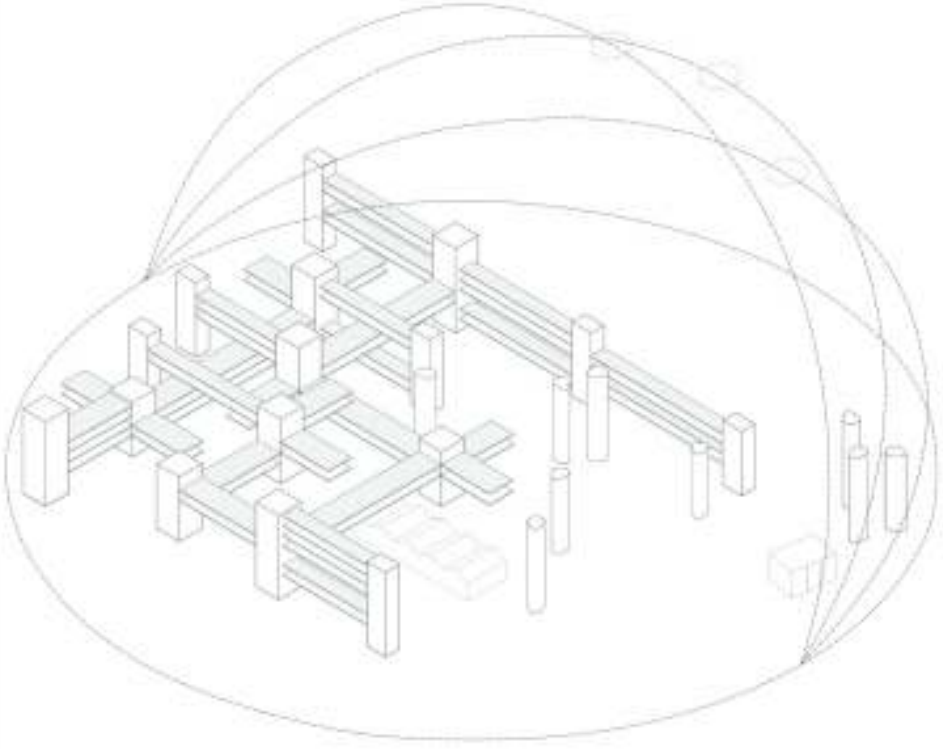
THE GROUND. LIFECYCLE

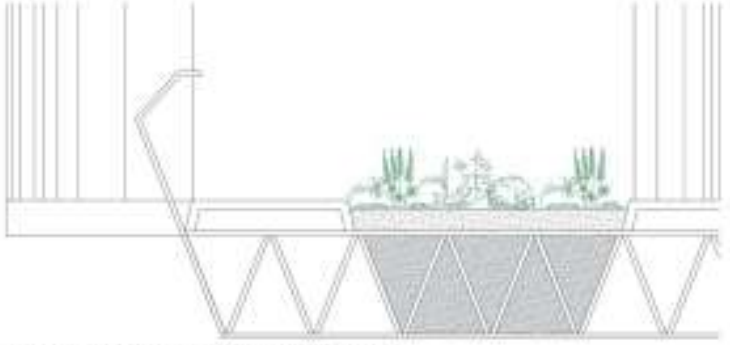





WIND CHIMNEY

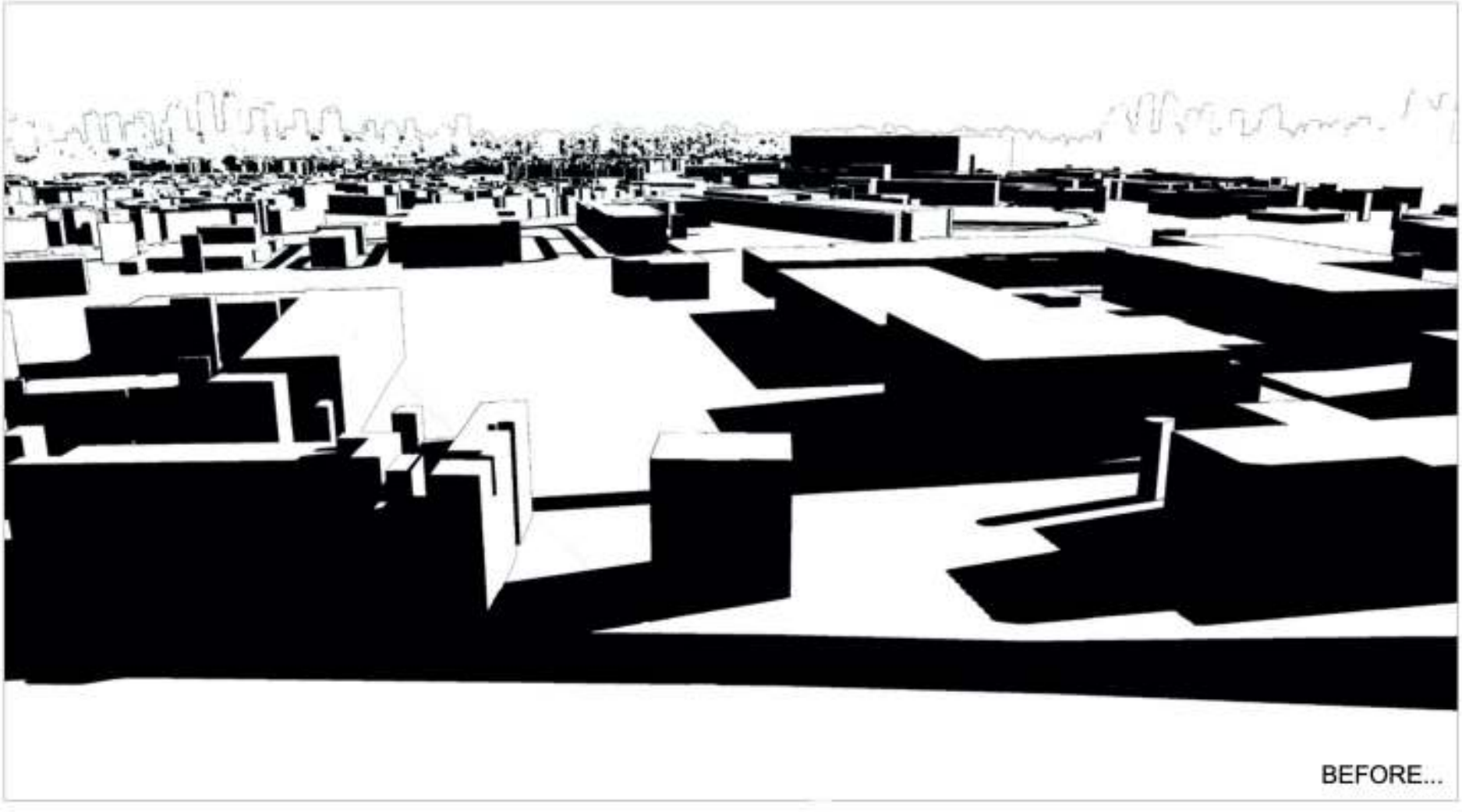
THE CHIMNEY. BIOCLIMATIC VERTICAL STREET





ORCHARDS. SELF- SUFFICIENCY


THE TRAY. INHABITED GARDEN


BEFORE...


LIVING CLOUDS


MASTERPLAN

GENERAL SECTION. Chimneys


GROUND FLOOR

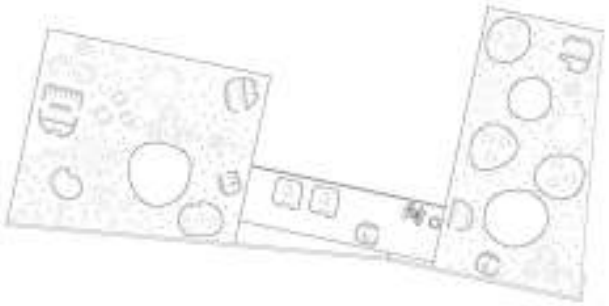

GROUND FLOOR


LIVING FLOOR


LIVING FLOOR


GREEN FLOOR

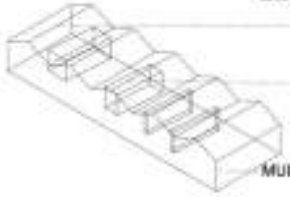

MOBILITY AND GROUND FLOOR USES



GROUND FLOOR -3.5m

GROUND FLOOR +0,0m

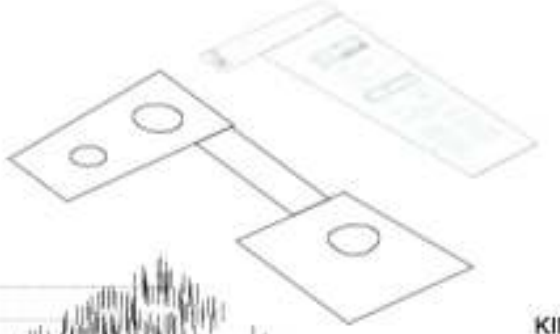
## LEISURE CENTER



ENTRY HALL

LIBRARY+
COMPUTER ROOM

MULTIFUNCIONAL ROOM+
ACTIVITY ROOM



## PRYMARY SCHOOL

MULTIFUNCIONAL ROOMS

INSIDE GARDEN

CLASSROOMS

BATHROOM

OUTSIDE PLAYGROUND

## KINDERGARTEN

CIRCULATION+
PRINCIPLE OFFICE

CLASSROOMS

INSIDE GARDEN

EXERCICES ROOM+ DORMS

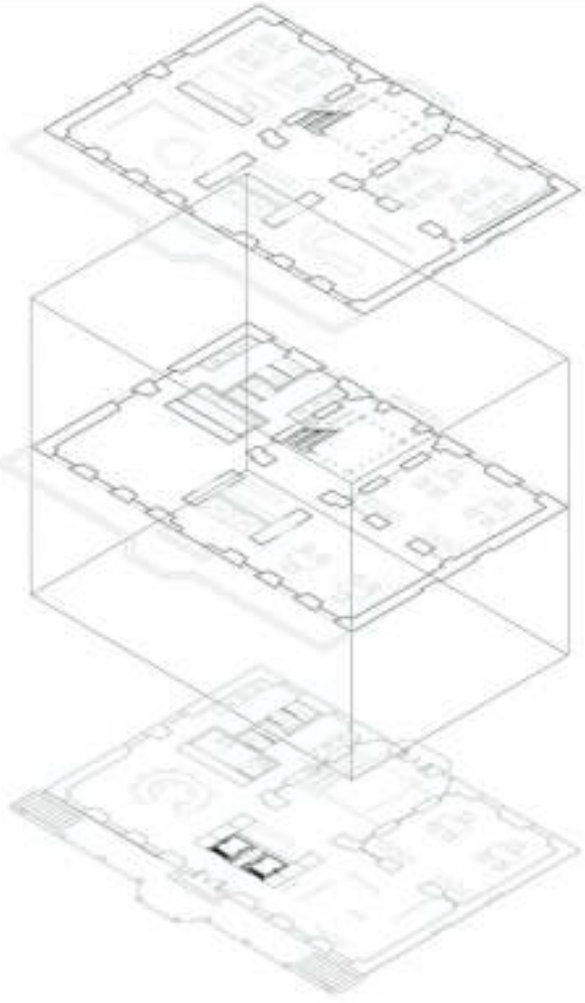
BATHROOM

# SCHOOL

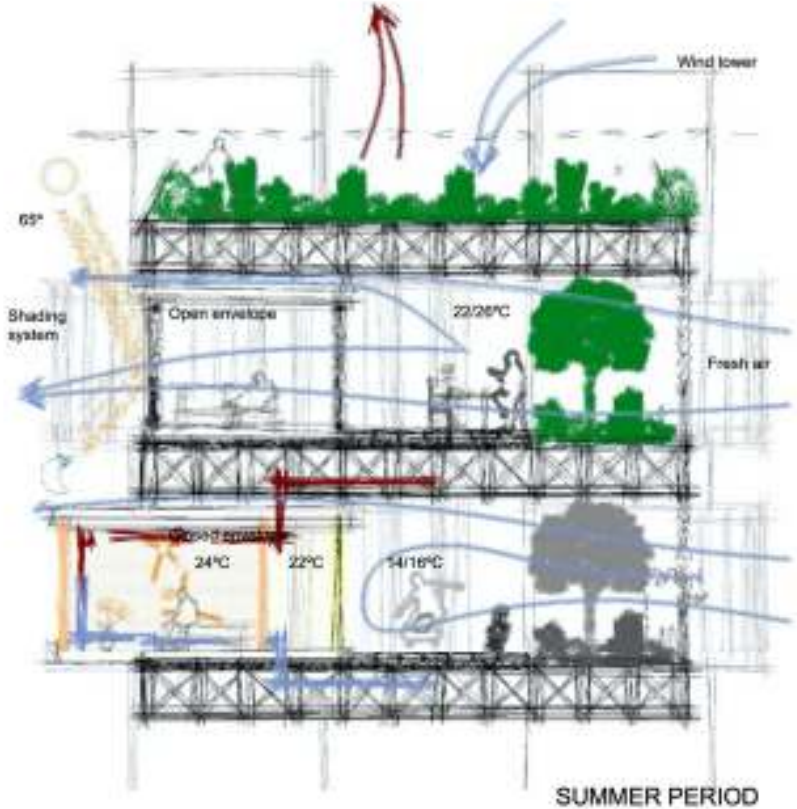
GROUND FLOOR

FLOOR 1

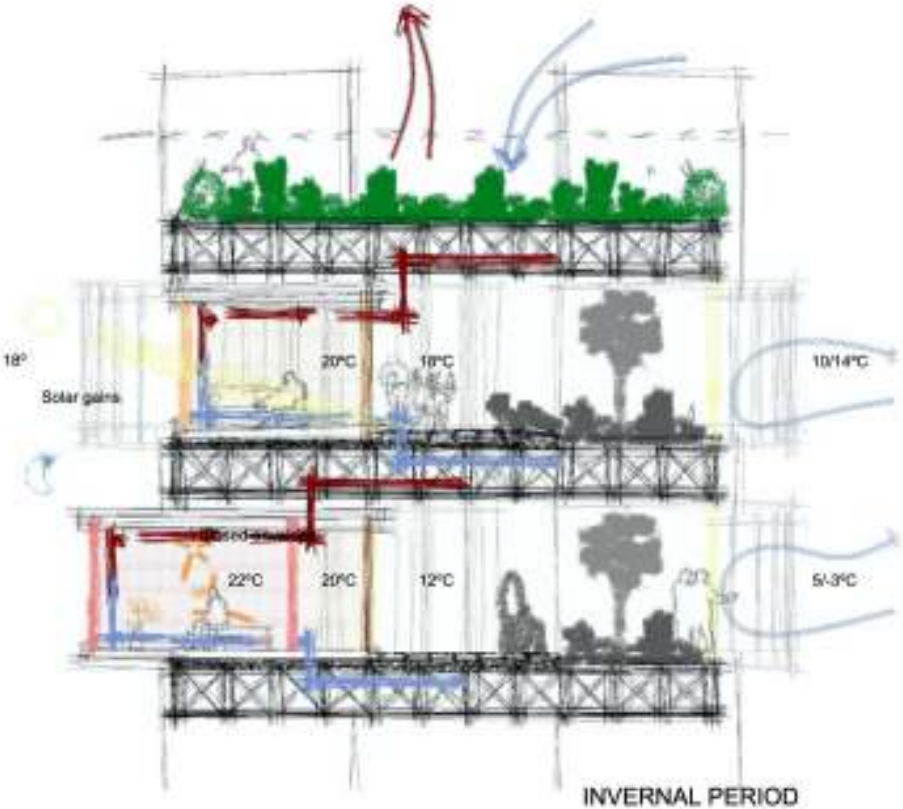
FLOOR 2




MAISON COIGNET

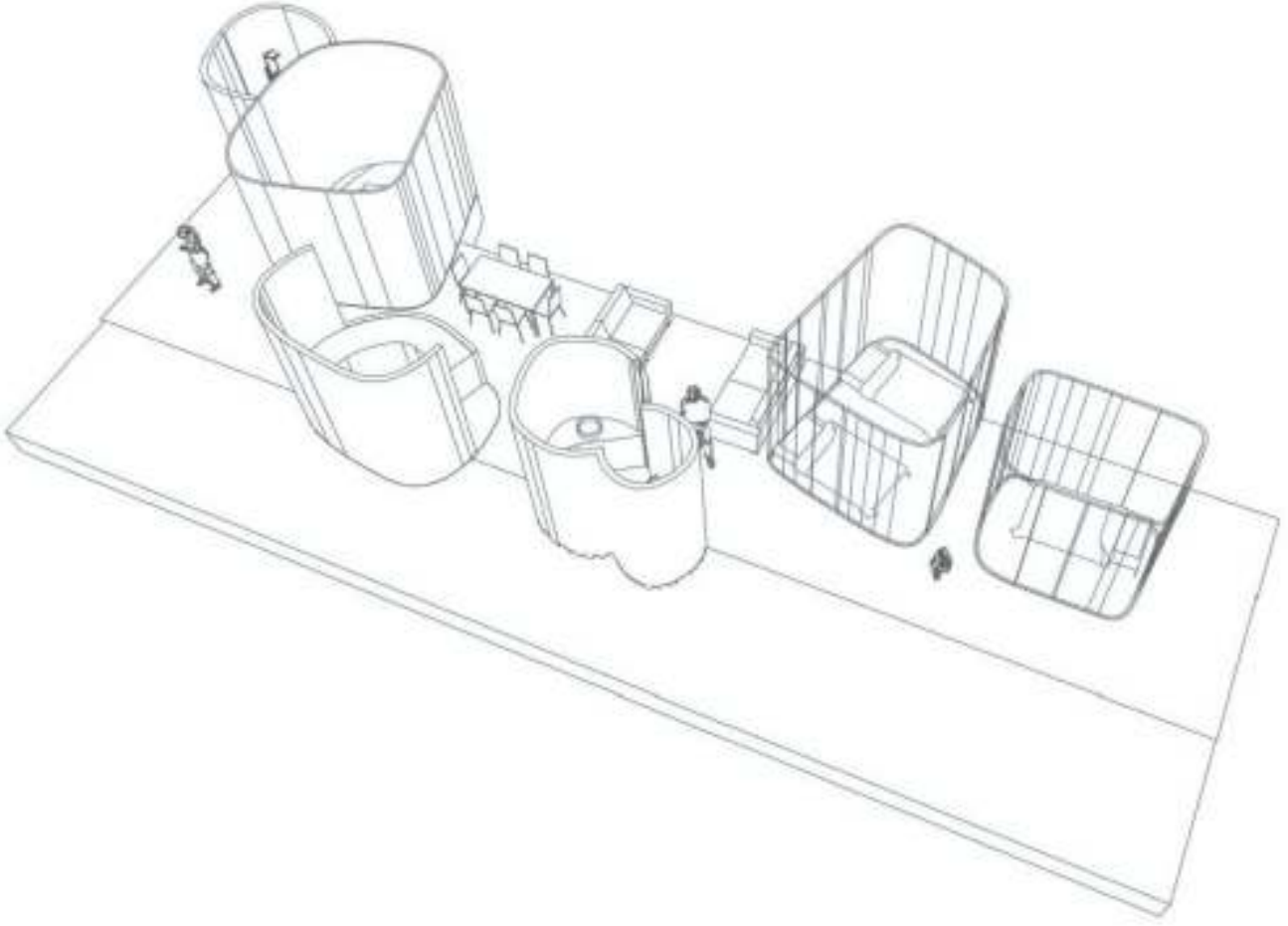



SUMMER PERIOD

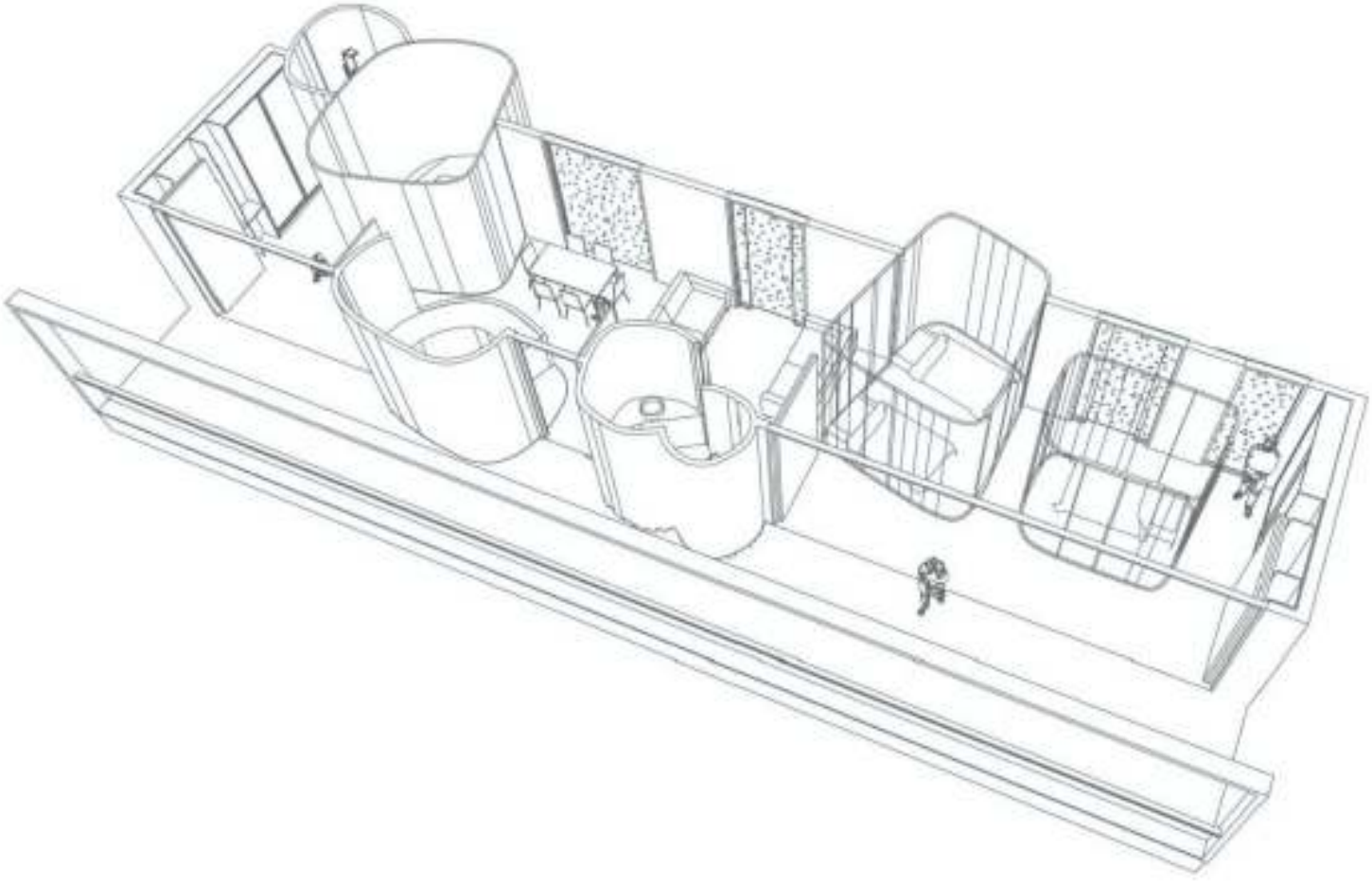



INVERNAL PERIOD

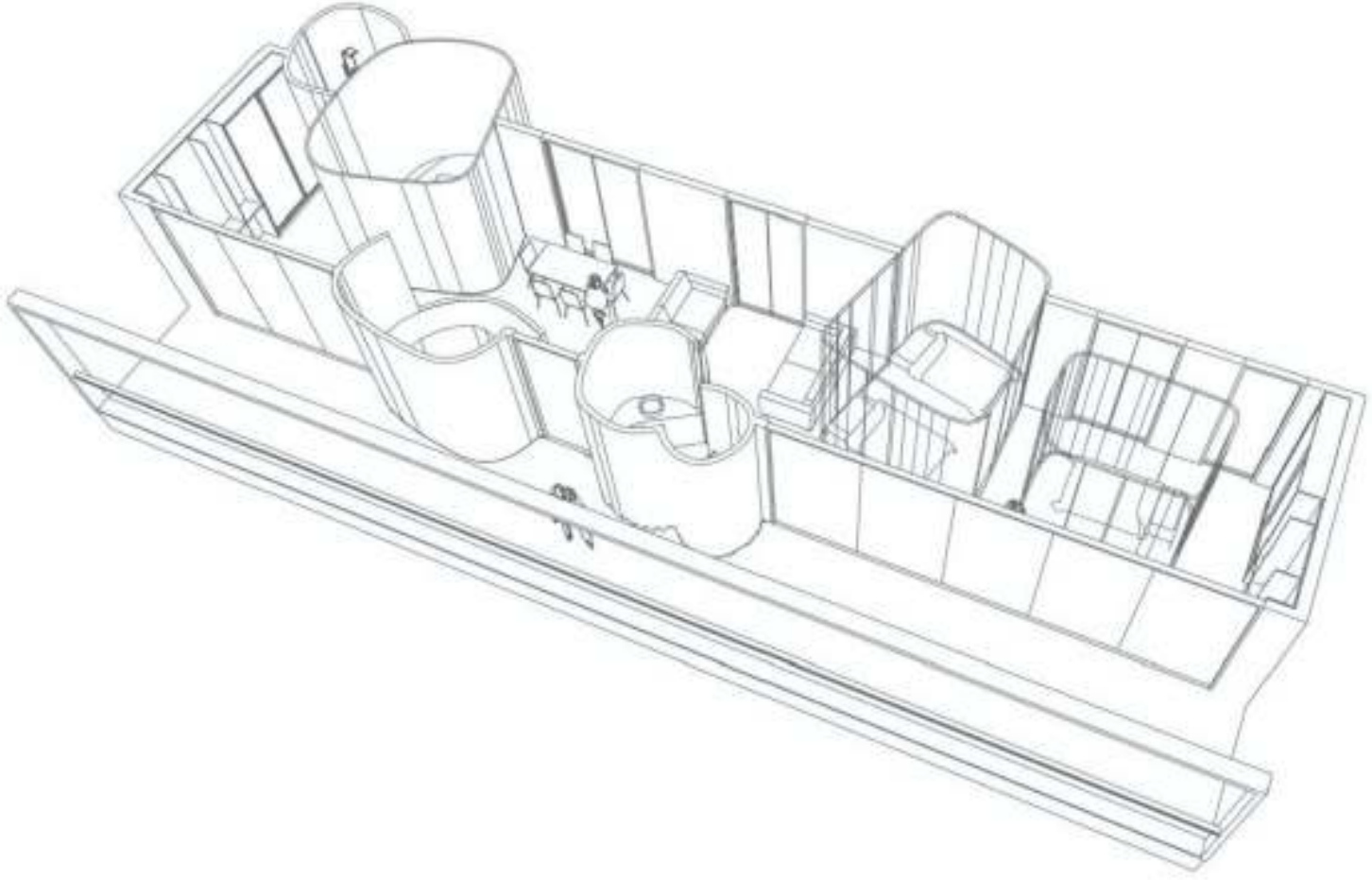
# BIOCLIMATIC SECTION



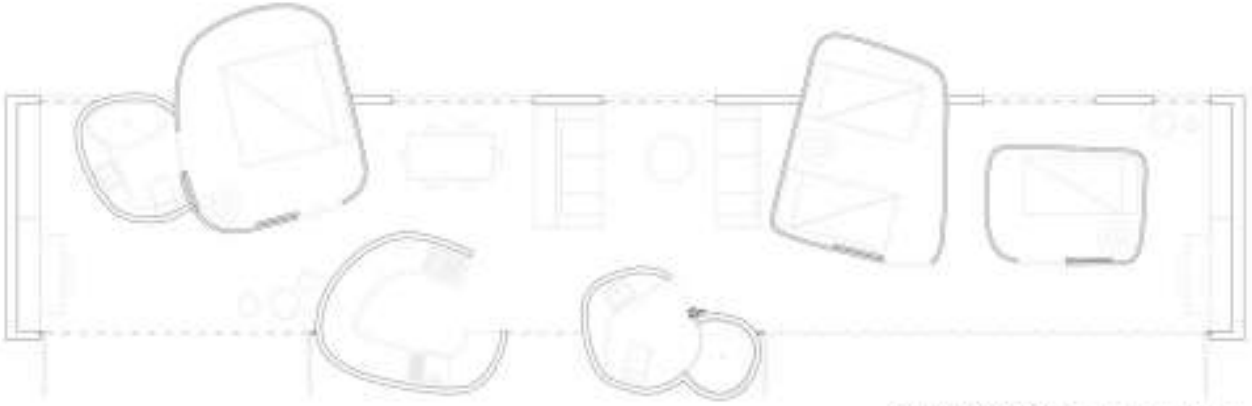
THE CAPSULE. TRAY COLONIZER ELEMENT



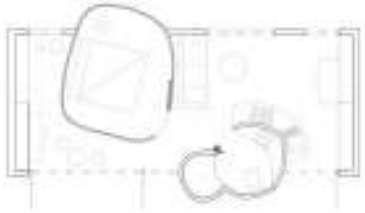
THE ENVELOPE. HOUSING UNIFYING ELEMENT. Summer



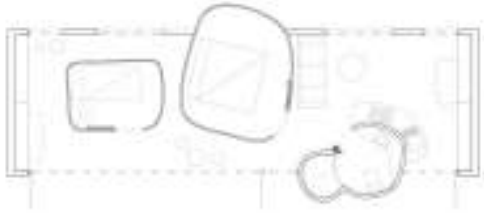
THE ENVELOPE. HOUSING UNIFYING ELEMENT. Winter



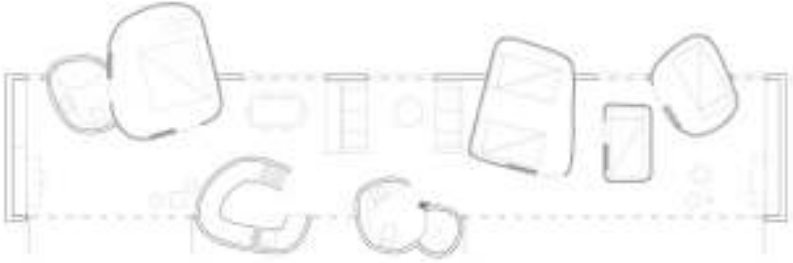
**3 BEDROOMS**, South/East/West
x70 (89 m²)



**1 BEDROOM**, South/East/West
x20 (44.5 m²)

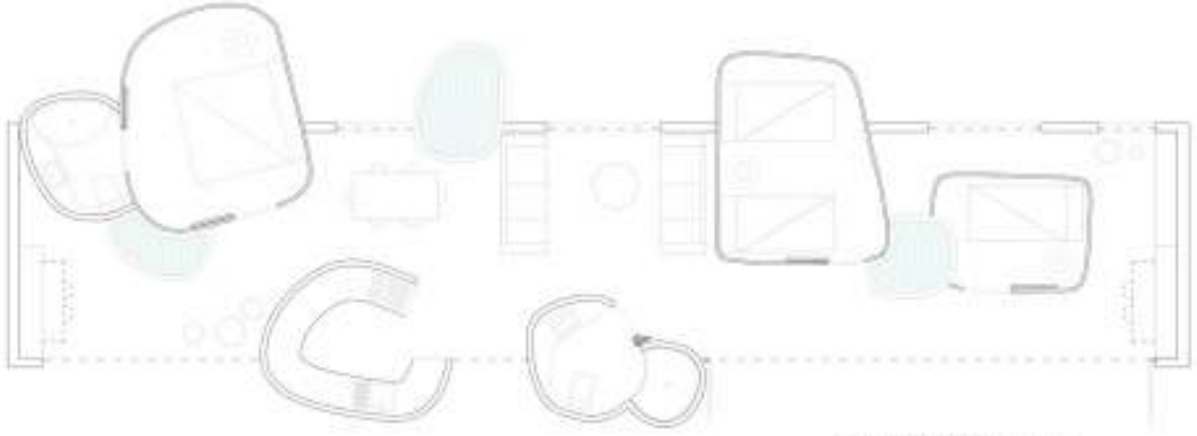


**2 BEDROOMS**, South/East/West
x30 (58.5 m²)



**4 BEDROOMS**, South/East/West
x30 (94 m²)

# APARTMENTS TYPOLOGY

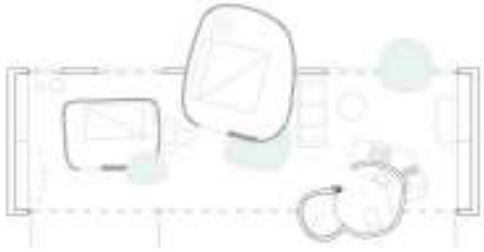


**3 BEDROOMS**, North

x10 (89 m²)

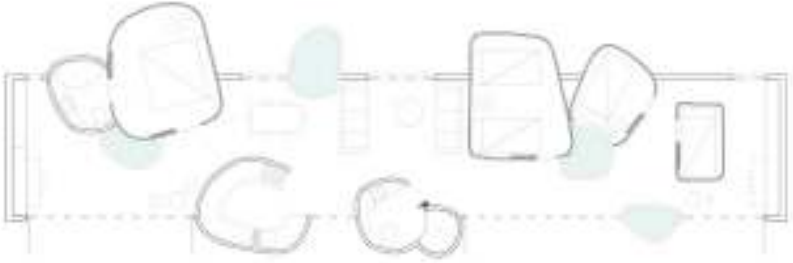
**1 BEDROOM**, North

x2 (44.5 m²)



**2 BEDROOMS**, North

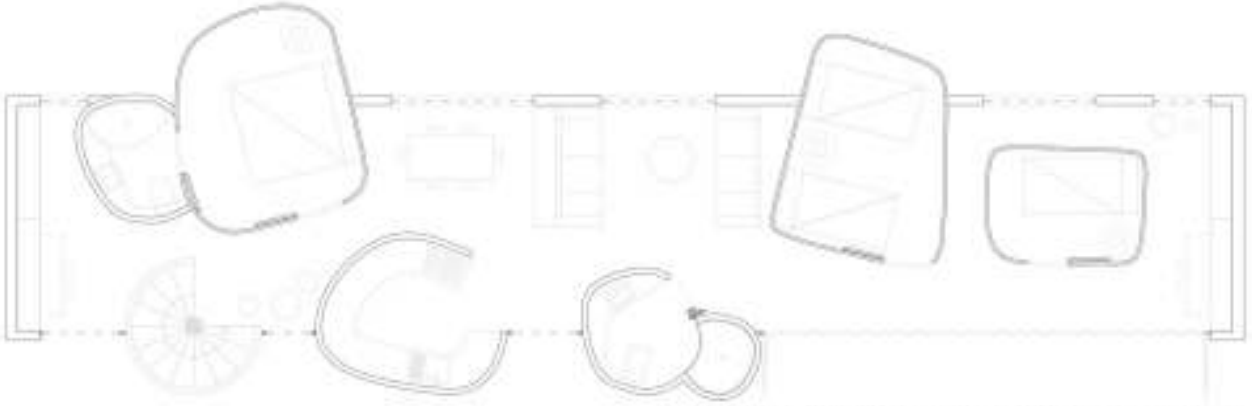
x5 (59.5 m²)



**4 BEDROOMS**, North

x3 (94 m²)

# APARTMENTS TYPOLOGY



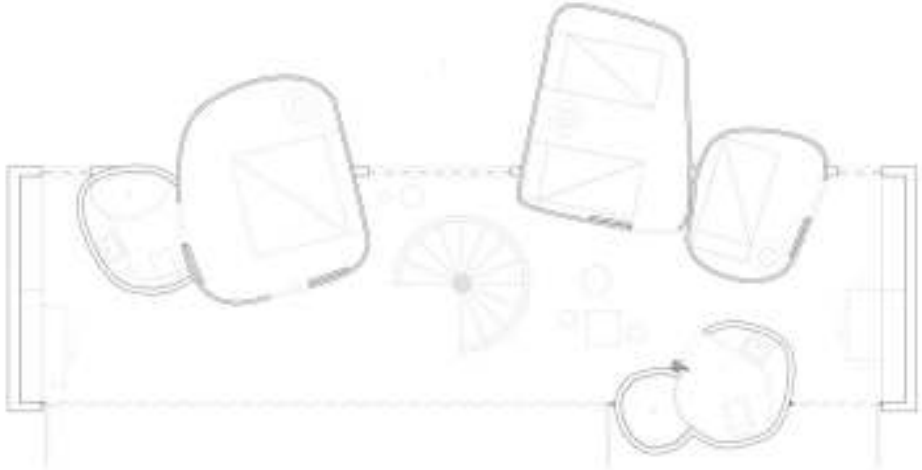
GROUND FLOOR +3 BEDROOMS. South/East/West
x10 (89 m²)

GROUND FLOOR +1 BEDROOMS. South/East/West
x20 (44.3 m²)

GROUND FLOOR +1 BEDROOMS. South/East/West
x20 (59.5 m²)

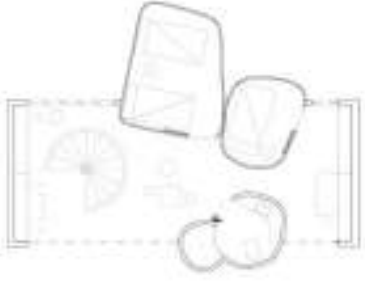
GROUND FLOOR +2 BEDROOMS. South/East/West
x10 (79.5 m²)

# APARTMENTS TYPOLOGY



UPPER FLOOR +3 BEDROOMS. South/East/West

(89,0 m²)



UPPER FLOOR +2 BEDROOMS. South/East/West

(44,0 m²)

APARTMENTS TYPOLOGY

GROUND FLOOR +1/+2 BEDROOMS
66 m²/ 48,5 m²

1/2 BEDROOMS
66 m²/ 45,5 m²

UPPER FLOOR + 2 BEDROOMS
40 m²

UPPER FLOOR +1/+2 BEDROOMS
38 m²/ 50 m²

# APARTMENTS TYPOLOGY

COMFORT

SUSTAINABILITY


# Multi Comfort

BY SAINT-GOBAIN


people


planet


prosperity

SAINT-GOBAIN

TECHNICAL ASPECTS


Hydroelectric turbine
in urban supply
1,2Kw/h for every 10L/s

LEADSUN AE5 Ultron

Power of PV Module: 180(W)
Liuthium Battery Capacity: 1310(Wh)
Light output: 2x30(W)
Color Temperature 5000(K)
Typical Luminous Flux: 9000(lm)
Light Photosensivity: 30(lx)

Double-sided Solar Panel

High efficient controller

Battery Management System

CREE LED

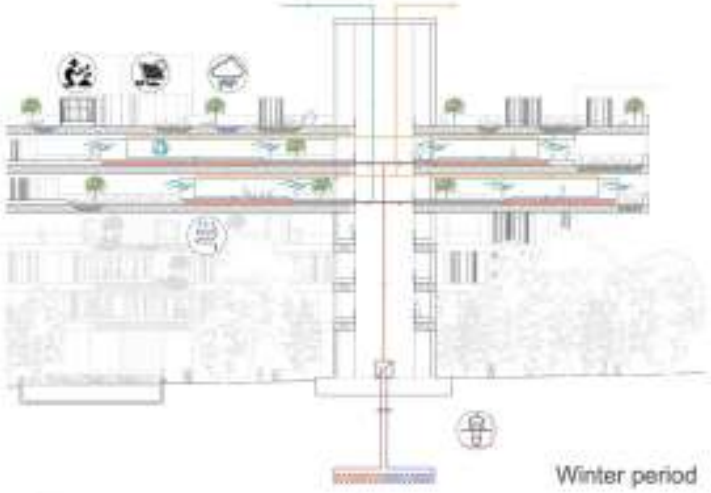
Infrared Motion Sensor

IP-65

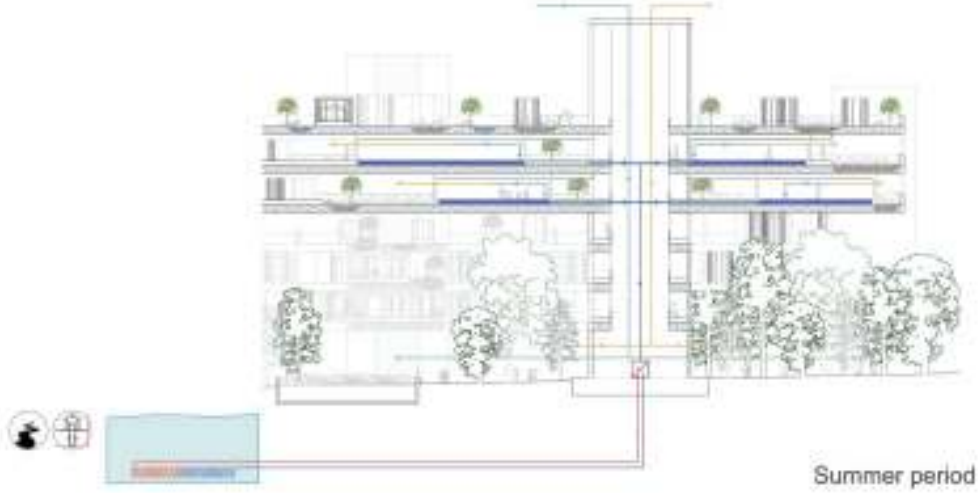
DUOMAX Módulo
TSM-PEG14

72 cell- multicrystalline module
320-340 (W)
17,3(%) Max Efficency
0/+5(W) Possitive tolerance
Surface 1,984 x 0,998 (m)

RENEWABLE ENERGY



Winter period



Summer period

Geothermal energy bypass with the thermocline of the river

Underfloor heating

Rainwater harvesting

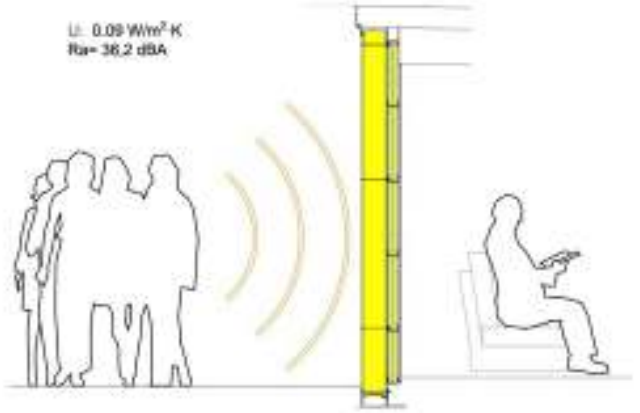
Rainwater used for toilet flushing

Photovoltaic panels

Orchards

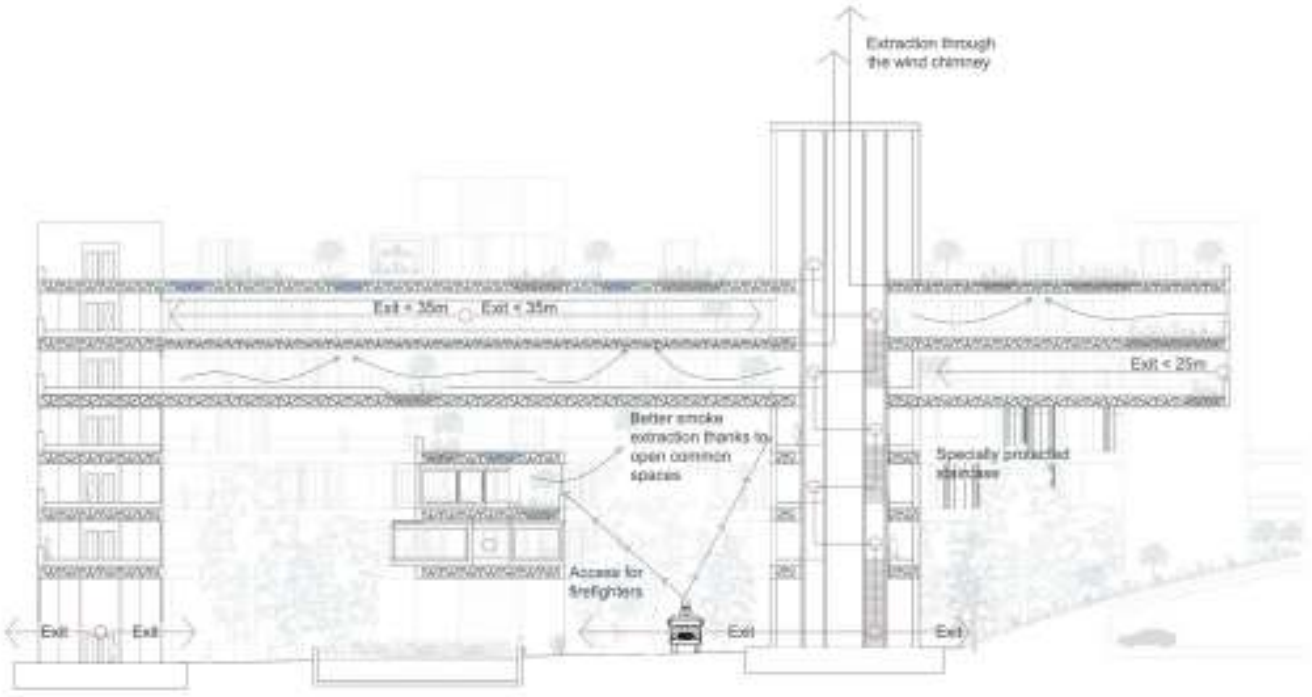
# VENTILATION AND THERMAL COMFORT. USE OF NATURAL ENERGY SOURCES AND RE-USE RAINWATER

GREEN NOISE BARRIER



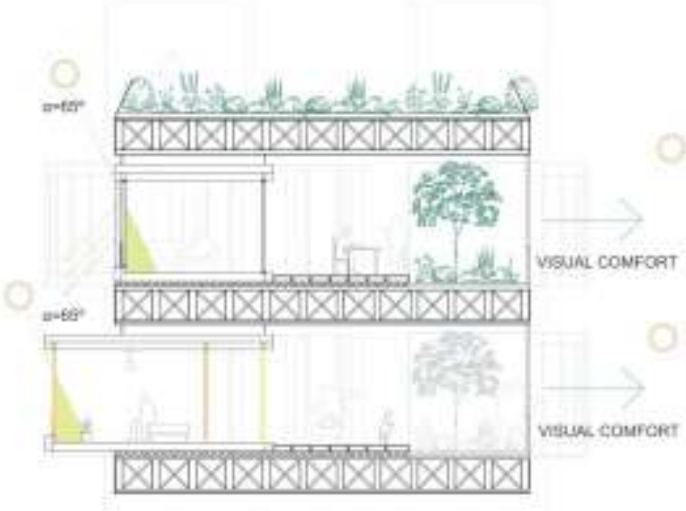


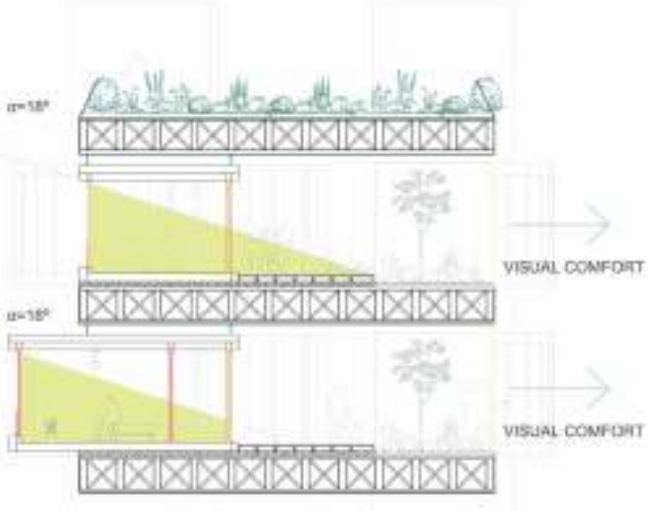
# ACOUSTIC AND THERMAL COMFORT




·Facade products are not combustible
·Pressurized enclosure and smoke extraction through the wind chimney.

FIRE SAFETY STRATEGY



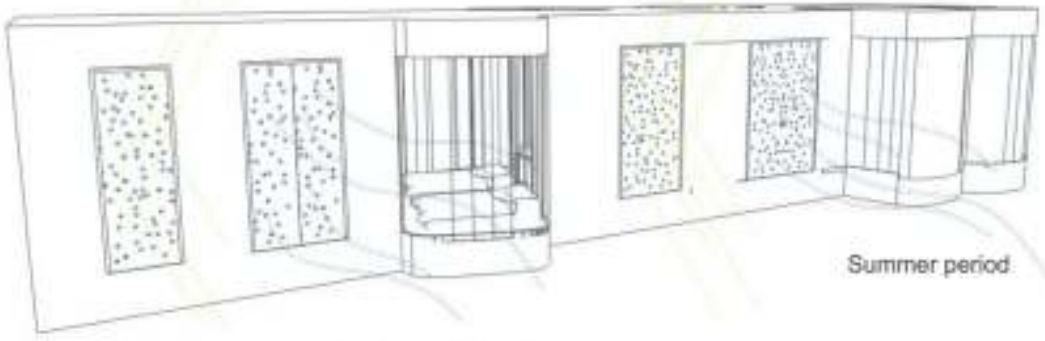

Summer period

·Double skin facade with sliding metal grids
·Shade provided by the trees
·Shady terrace

Winter period

·Direct penetration by trees dormancy in winter
·SGG CLIMATOP 6 (18 ARGON 90) 4 (18 ARGON 90)
4 COOL- LITE SKN 165 F2 PLANITHERM XN F5

# VISUAL AND THERMAL COMFORT

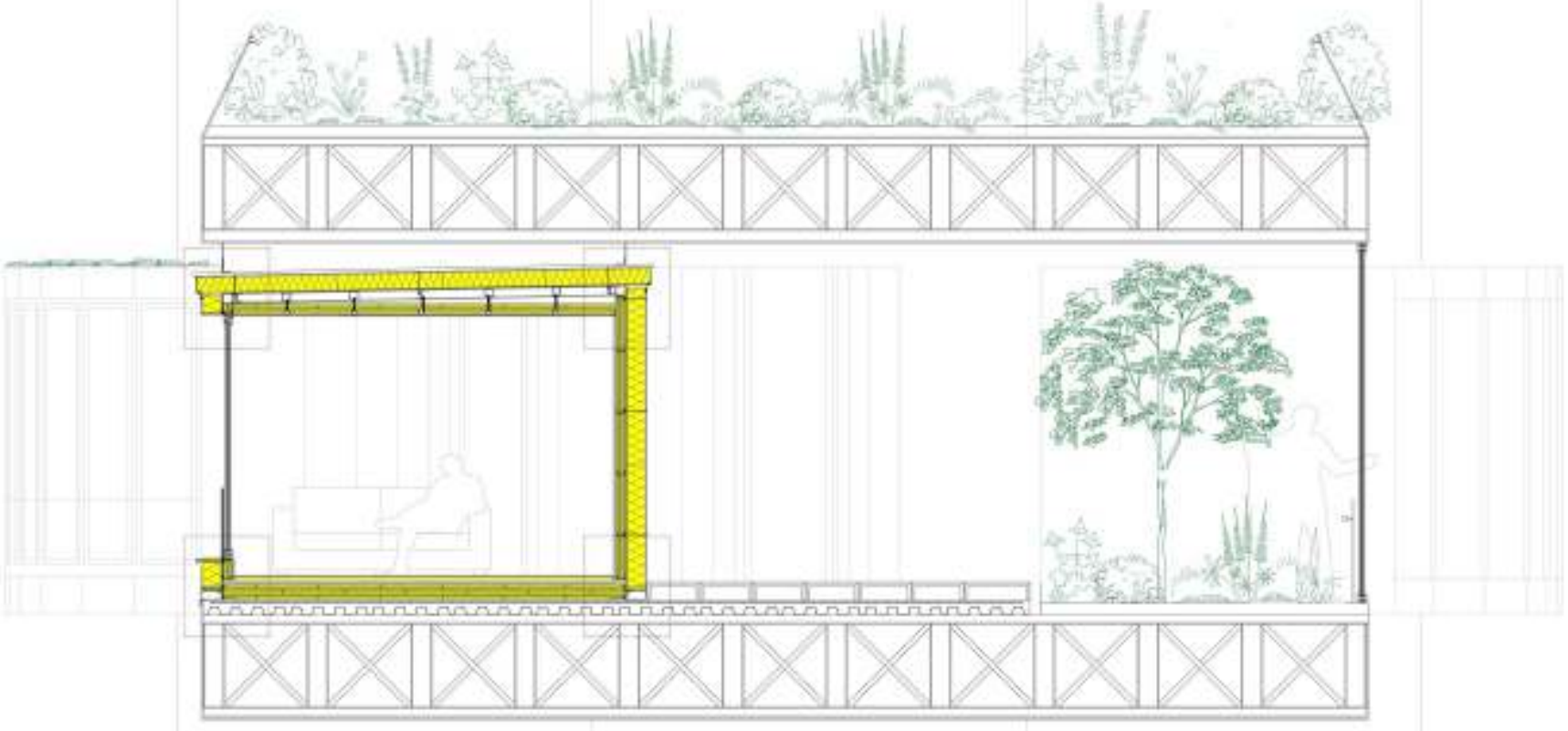


Summer period

- Perforated metal plate provides 60 to 80% shading.
- Possibility for regulation of the shading system

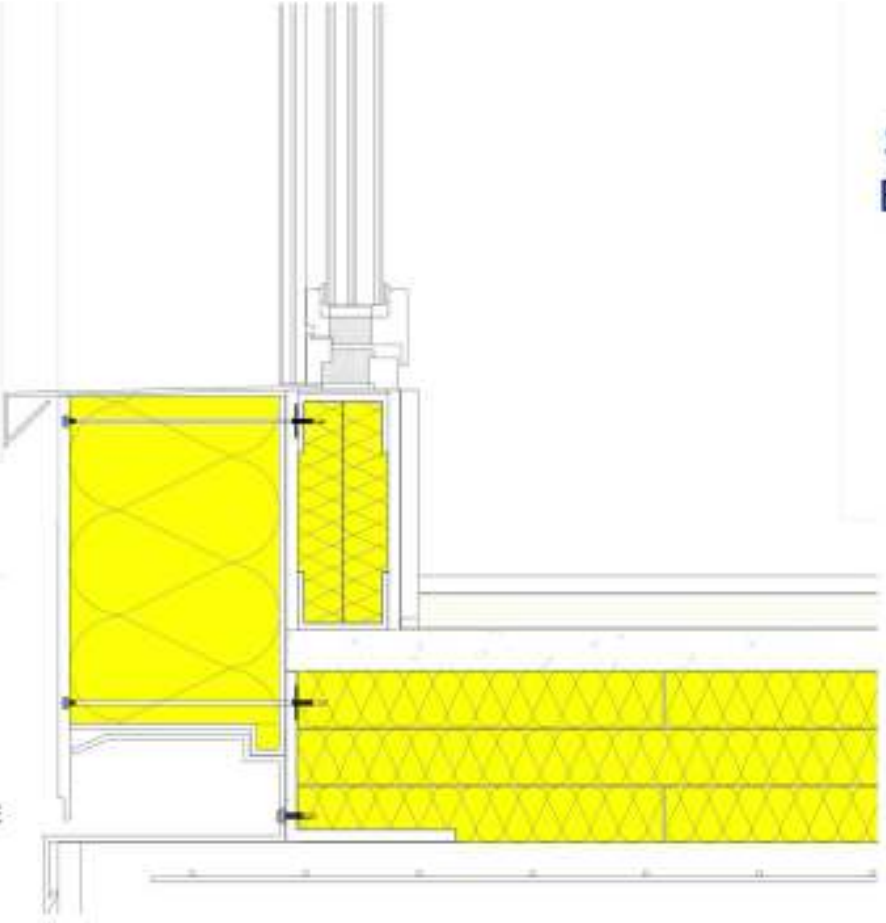
Winter period

## VISUAL AND THERMAL COMFORT



CONSTRUCTIVE SECTION

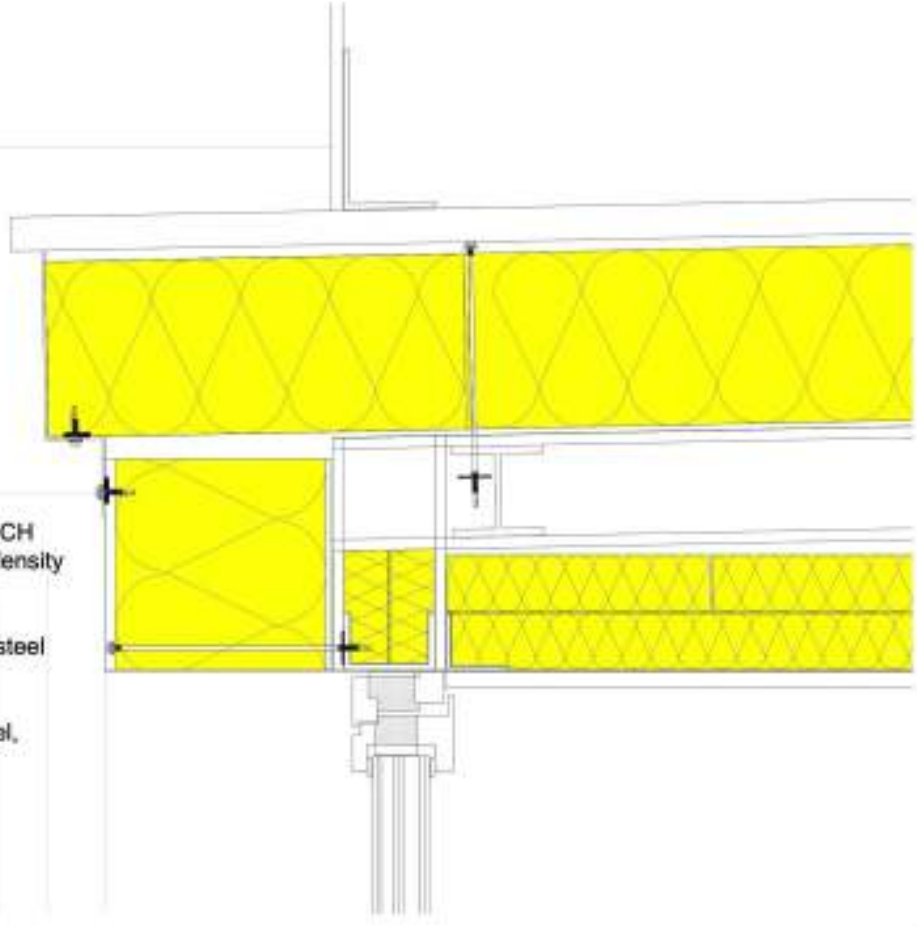
SAINT-GOBAIN
BUILDING GLASS



C-C'. GLAZED SURFACE.
45mm Overlapping railing.
Hidden fixings.
80mm Aluminium casement window frames with RTP. COR 80 Industrial. CORTIZO.

50mm Triple glazing. SGG CLIMATOP 6
(18 ARGON 90) 4 (18 ARGON 90) 4 COOL- LITE SKN 165 F2 PLANITHERM XN F5
U= 0.5 W/m$^2$·K
g = 32%

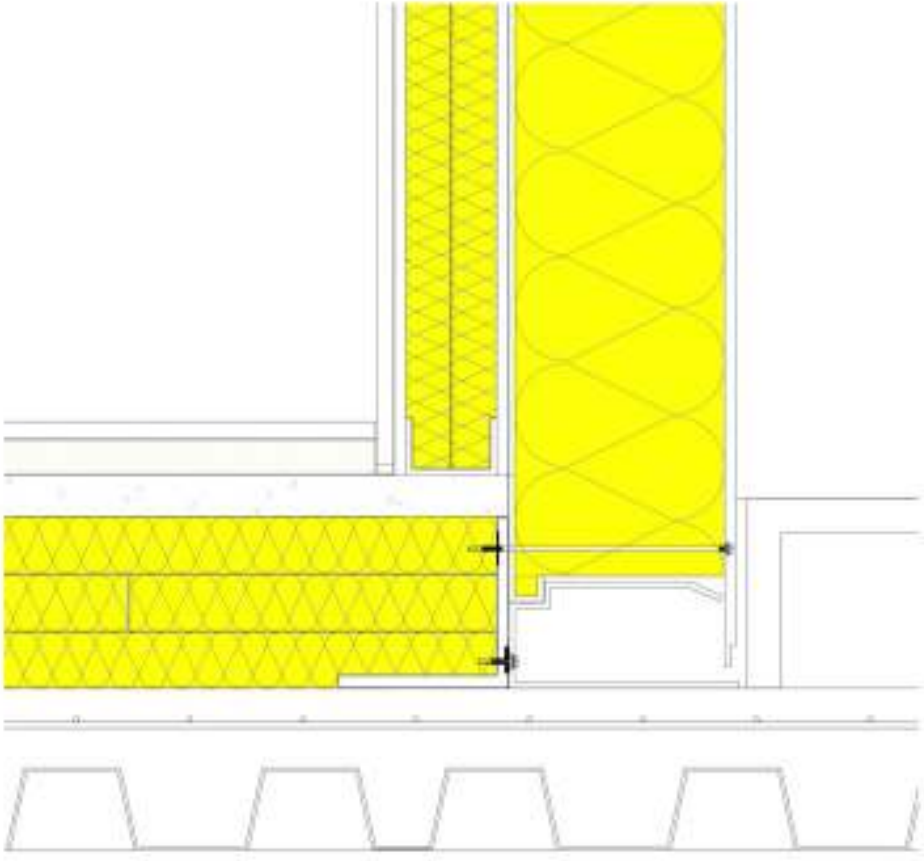
CONSTRUCTIVE DETAIL



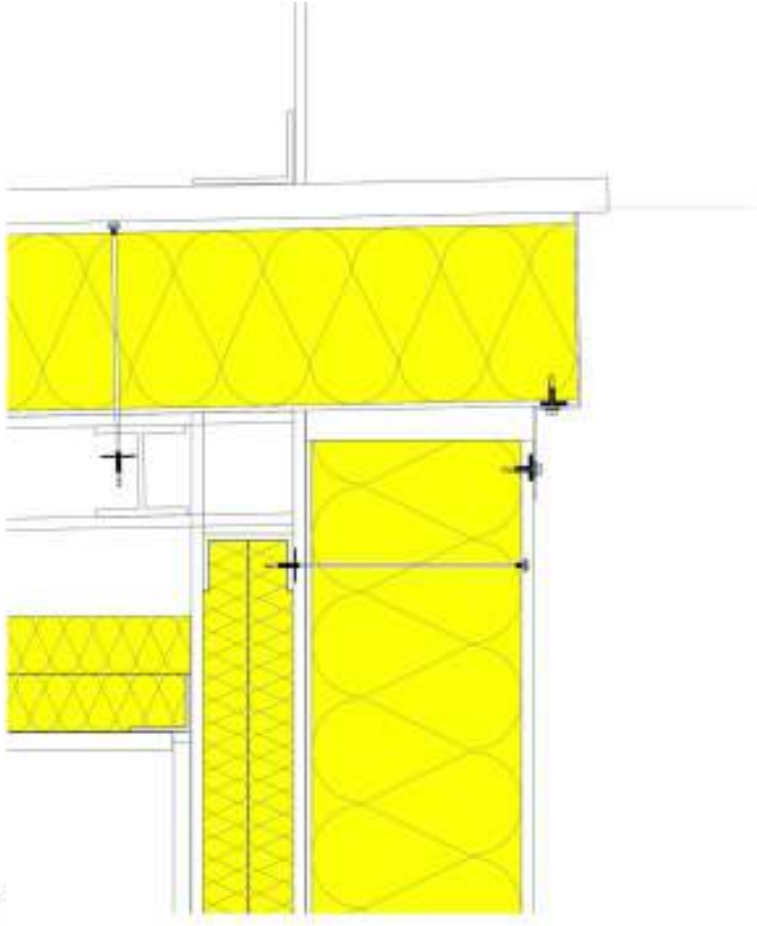
A-A' COVER OF THE HOUSE.
200mm Sandwich panel covered 5 grooves. ACH
Two steel sheets attached to a high density rock wool core.
U: 0'038 W/m$^2$·K
100mm Rectangular profile structure of rolled steel
50mm F-530 hanging fork
50mm F-530 Profile
ISOVER semi-rigid mineral wool panel, non-hydrophilic, without coating Sand Plus.
2·50mm
U: 0.036 W/m$^2$·K
25mm Plasterboard Ba 13 1200
2·12,5mm
U: 0'250 W/m$^2$·K

CONSTRUCTIVE DETAIL

D-D'. FLOOR OF THE HOUSE
15mm high density laminate
Polyethylene film
15mm Non-hydrophilic mineral wool semi-rigid panel. Sand PF. ISOVER
λu: 0'036
85mm Mortar Weberfloor radiant.WEBER.
Radiant floor system
200mm High density rigid rockwool panel, non-hydrophilic, uncoated
Tiled panel. ISOVER.
λu: 0.036
140mm 70mm corrugated iron concrete slab

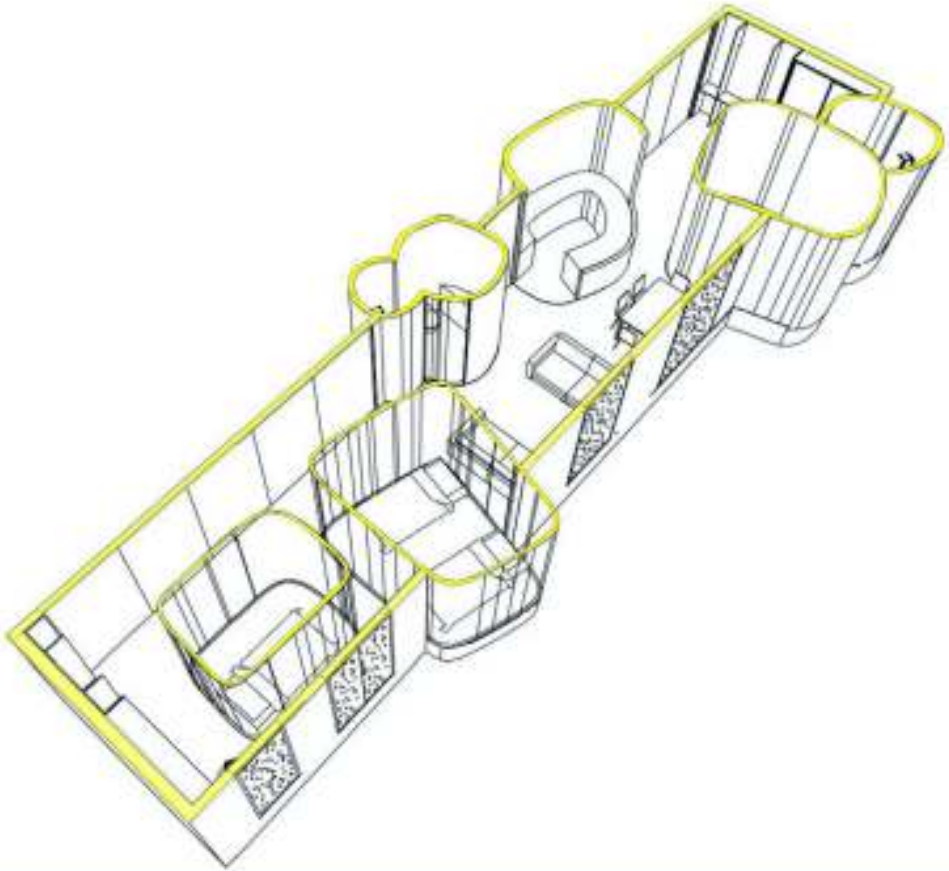


CONSTRUCTIVE DETAIL



B-B'. FACADE OF THE HOUSE.
200mm Facade panel. ACH (Hidden fixing. type M)
Two steel sheets attached to a high density rock wool core.
U: 0'038 W/m$^2$·K
100mm Rectangular profile structure of rolled steel
2·50mm Rail R-48 Placo
2·50mm M-48 Pillar Plate
Rigid rock wool panel. ISOVER, non-hydrophilic, no coating.
Ecosec system. Acustilaine 70 facades
2·50mm
U: 0.036 W/m$^2$·K
15mm Plasterboard Backing Plate BA 15 1200
U: 0.250 W/m$^2$·K

CONSTRUCTIVE DETAIL



## Calculations:

**Heat Losses:**

| | |
|---|---|
| 1. Transmission Heat Losses per $m^2$ and year: | 25.45 kWh/m²a |
| 2. Ventilation Heat Losses per $m^2$ and year: | 6.39 kWh/m²a |
| 3. Total Heat Losses per $m^2$ and year: | 31.84 kWh/m²a |

**Heat Gains:**

| | |
|---|---|
| 1. Internal Heat Gains per $m^2$ and year: | 11.34 kWh/m²a |
| 2. Available Solar Heat Gains per $m^2$ and year: | 25.66 kWh/m²a |
| 3. Total Heat Gains (Free Heat) per $m^2$ and year: | 36.99 kWh/m²a |

| | |
|---|---|
| Annual Heat Demand (KWh/m²): | 133.47 kWh/m²a |
| Specific Annual Heat Demand (KWh/m²): | 3.34 kWh/m²a |
| Specific Annual Heat Demand < 15 KWh/m² a achieved | YES |


ENERGY DEMAND