



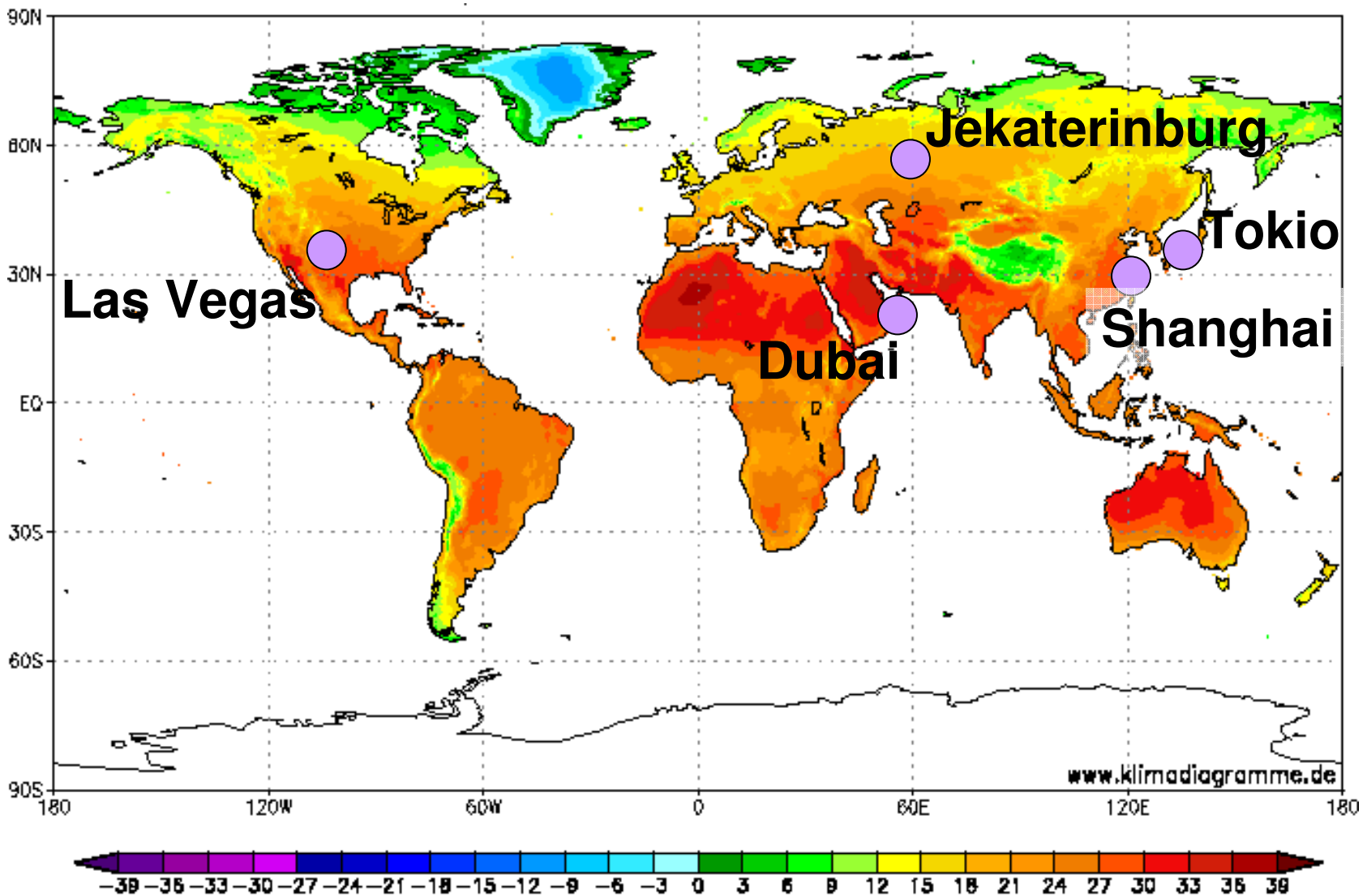
Passive Houses in different climates

Ludwig Rongen

University of Applied Sciences, Erfurt (Germany)

RoA RONGEN ARCHITECTS GmbH

www.rongen-architekten.de



Source:
PHI

Passive House Jekaterinburg

40 - 80 cm insulation

very good heat recovery

very good air tightness

good triple glazing (or better?)

south orientation

night ventilation

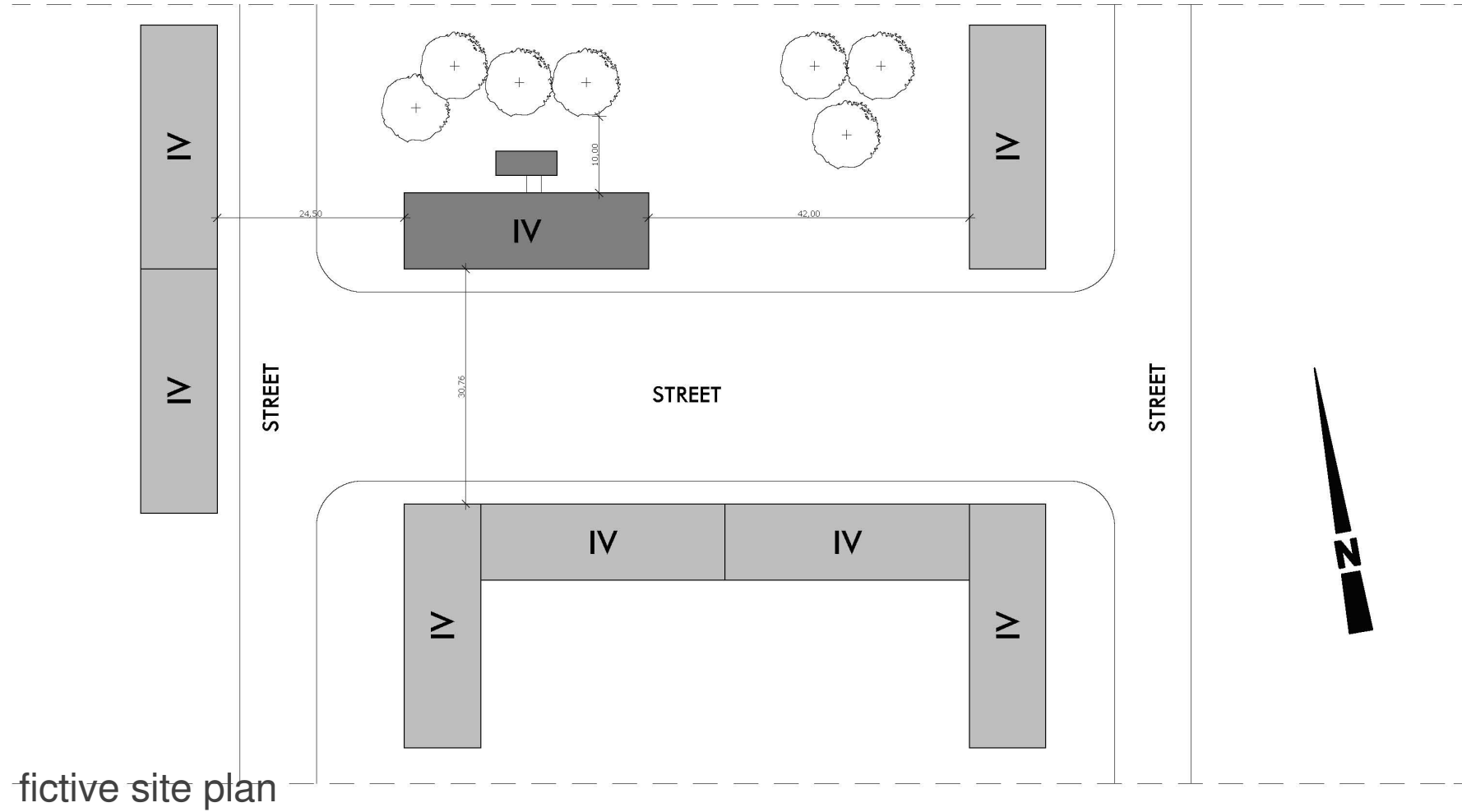


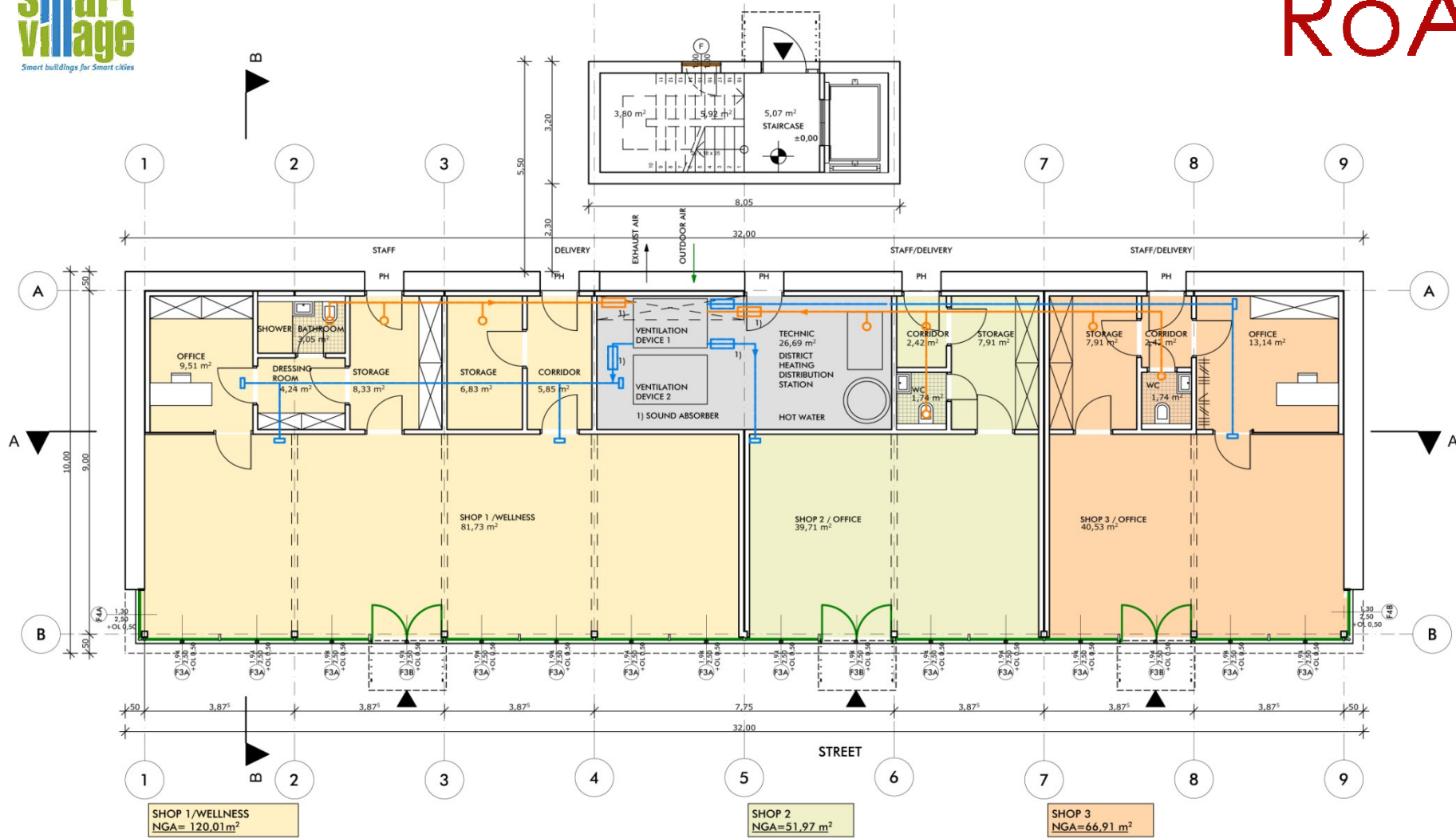
< -20 °C

Heating: 22 kWh/(m²a)

Cooling : 0 kWh/(m²a)

Dehum.: 0 kWh/(m²a)





SHOP 1/WELLNESS
NGA= 120,01 m²

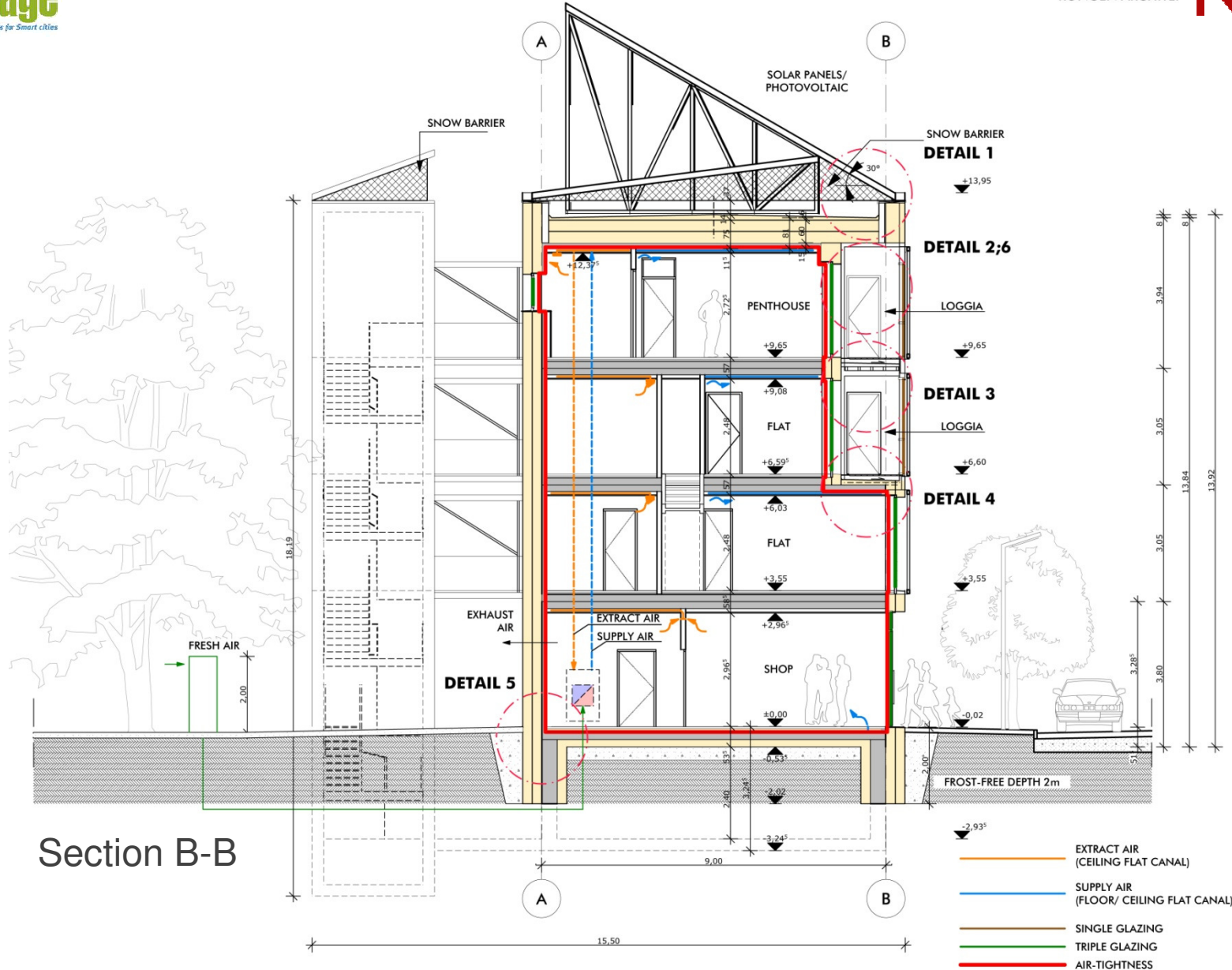
SHOP 2
NGA=51,97 m²

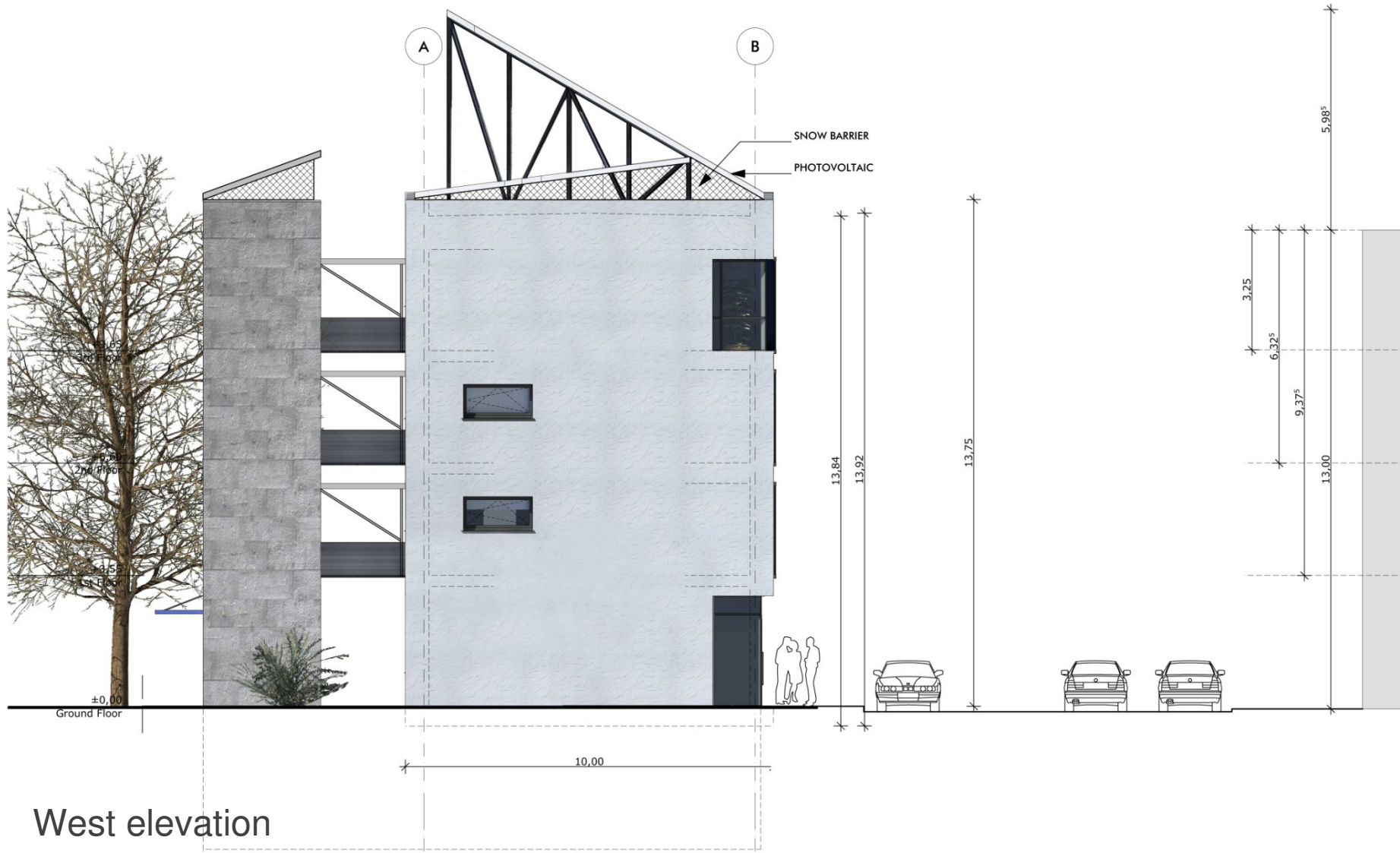
SHOP 3
NGA=66,91 m²

- EXTRACT AIR (CEILING FLAT CANAL)
- SUPPLY AIR (FLOOR FLAT CANAL)
- SINGLE GLAZING
- TRIPLE GLAZING



Ground floor

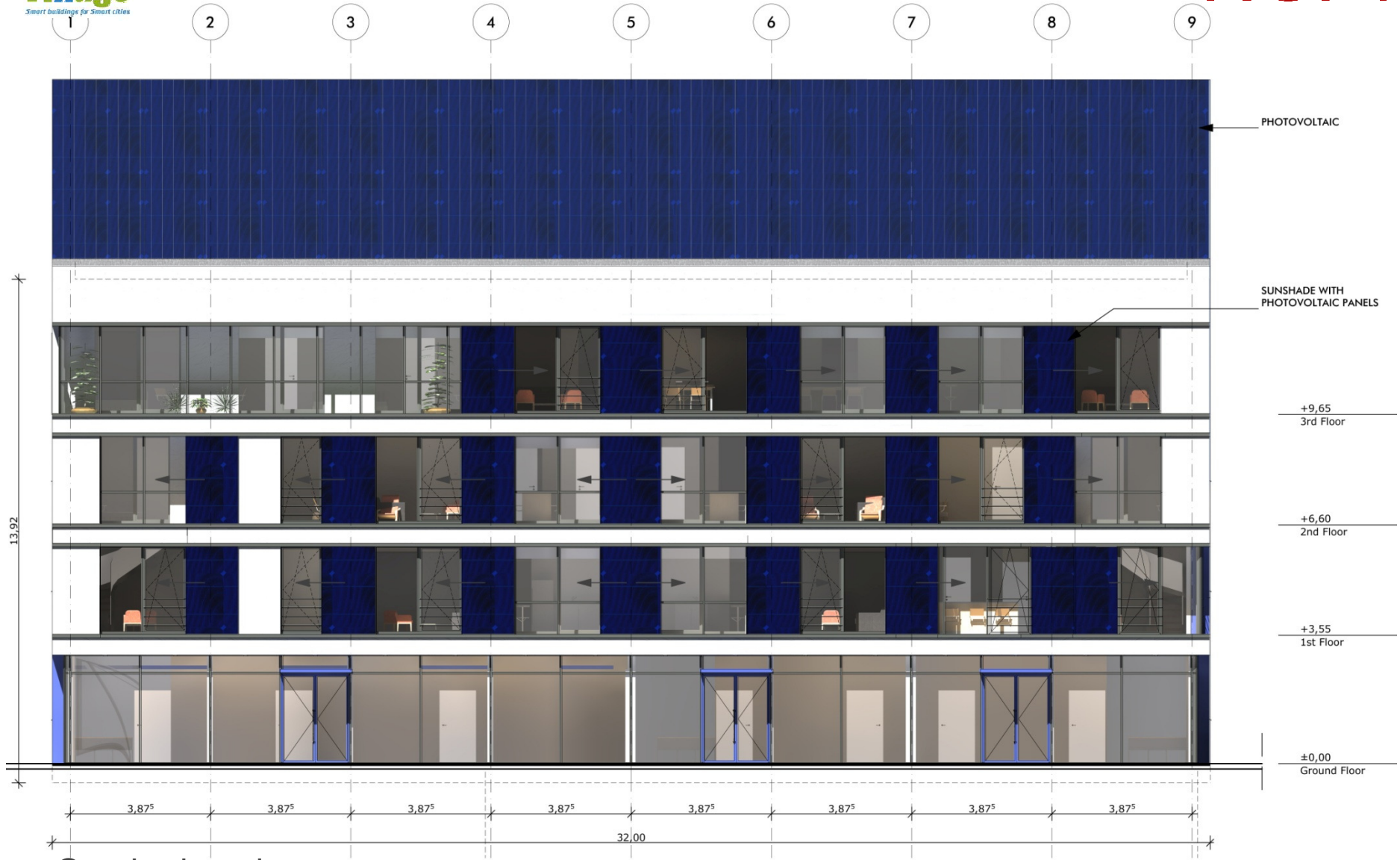




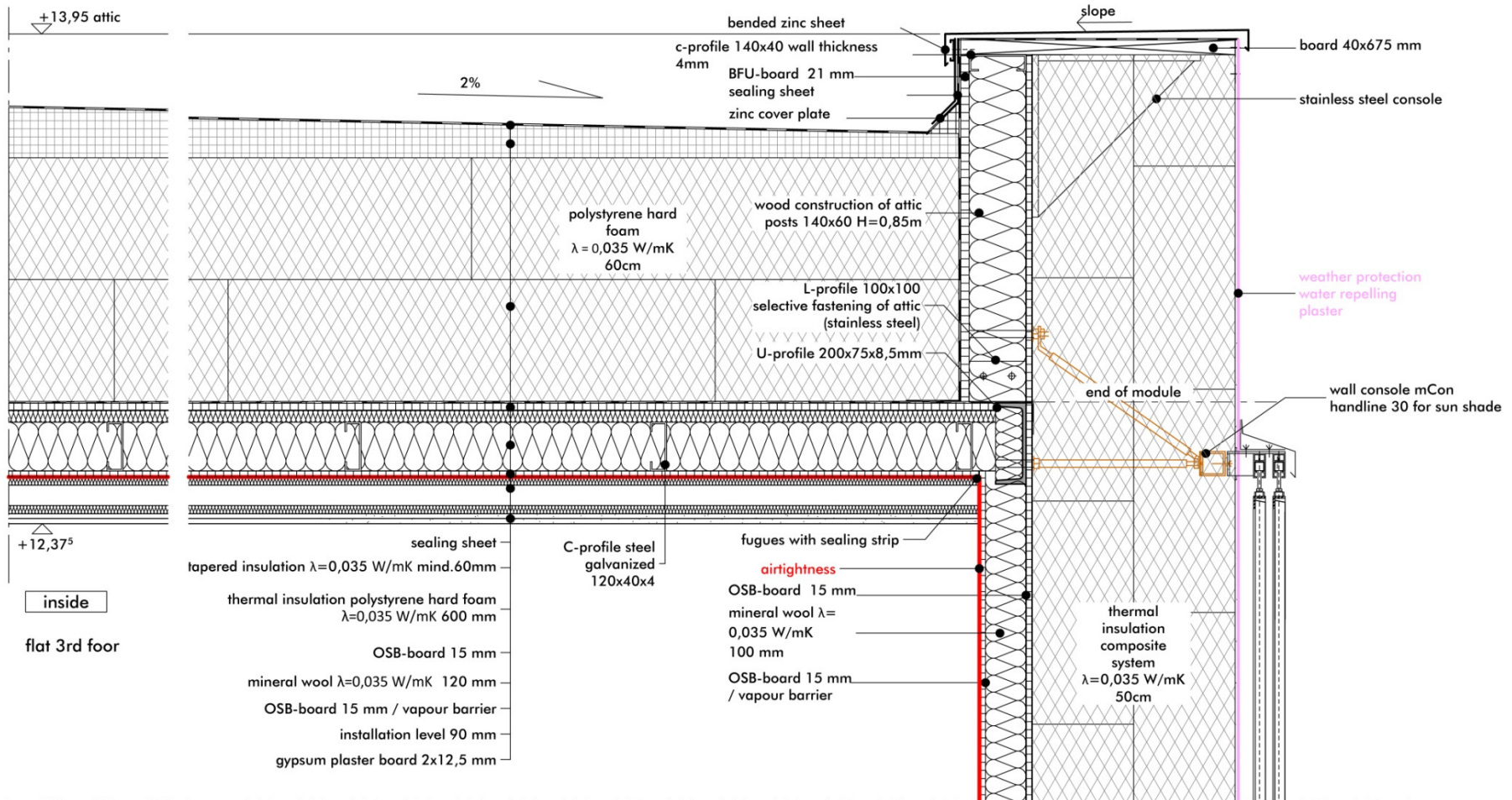
West elevation



North elevation



South elevation



Detail - Attic



North-east aspect



South-west aspect



Urban situation in Tokyo (Photos: Eliza Zawada)

Passive House **Tokio** / Shanghai

~ 20 cm insulation (roof!)

energy recovery, bypass with humidity control
(summer)

no night ventilation

double/triple clear glazing

moveable shading

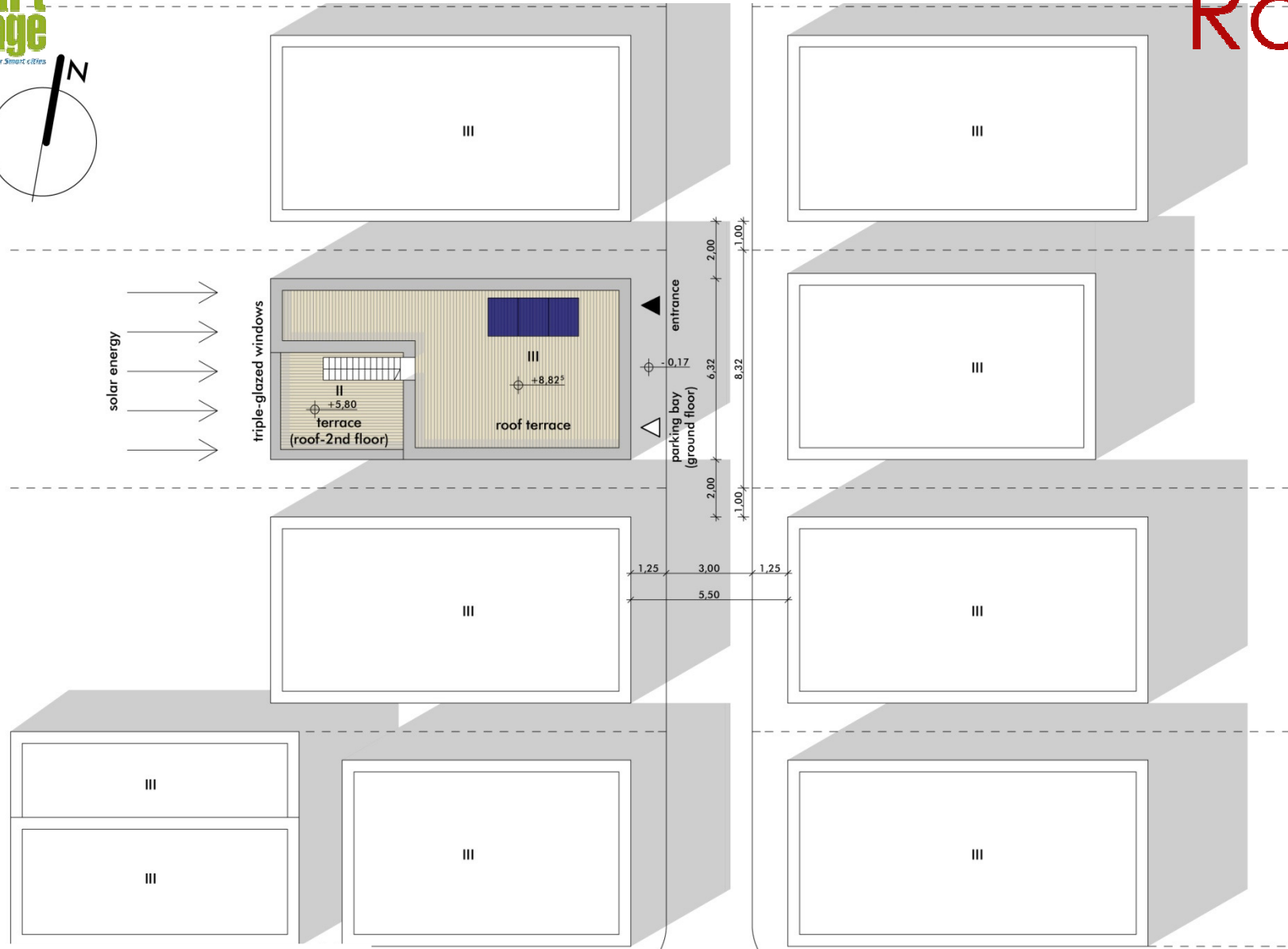
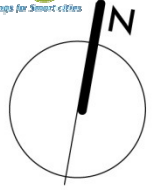
separate cooling and dehum.

Heating:	15 kWh/(m ² a)
Cooling:	1 kWh/(m ² a)
Dehum.:	6 kWh/(m ² a)

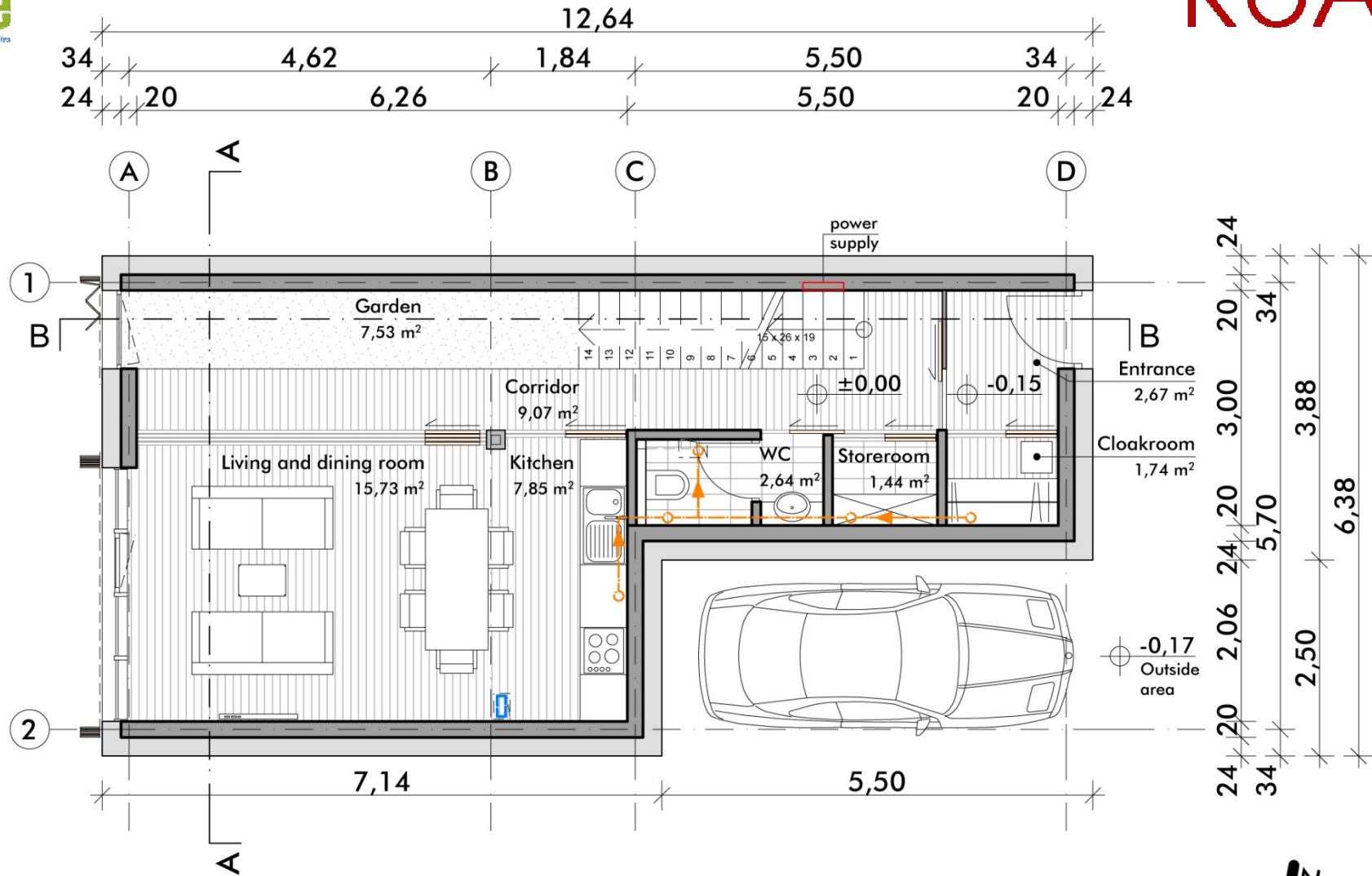


winter: 0 - 5 °C
summer: 25 - 30 °C
~ 20 g/kg

Source:
P111



Fictive Site plan



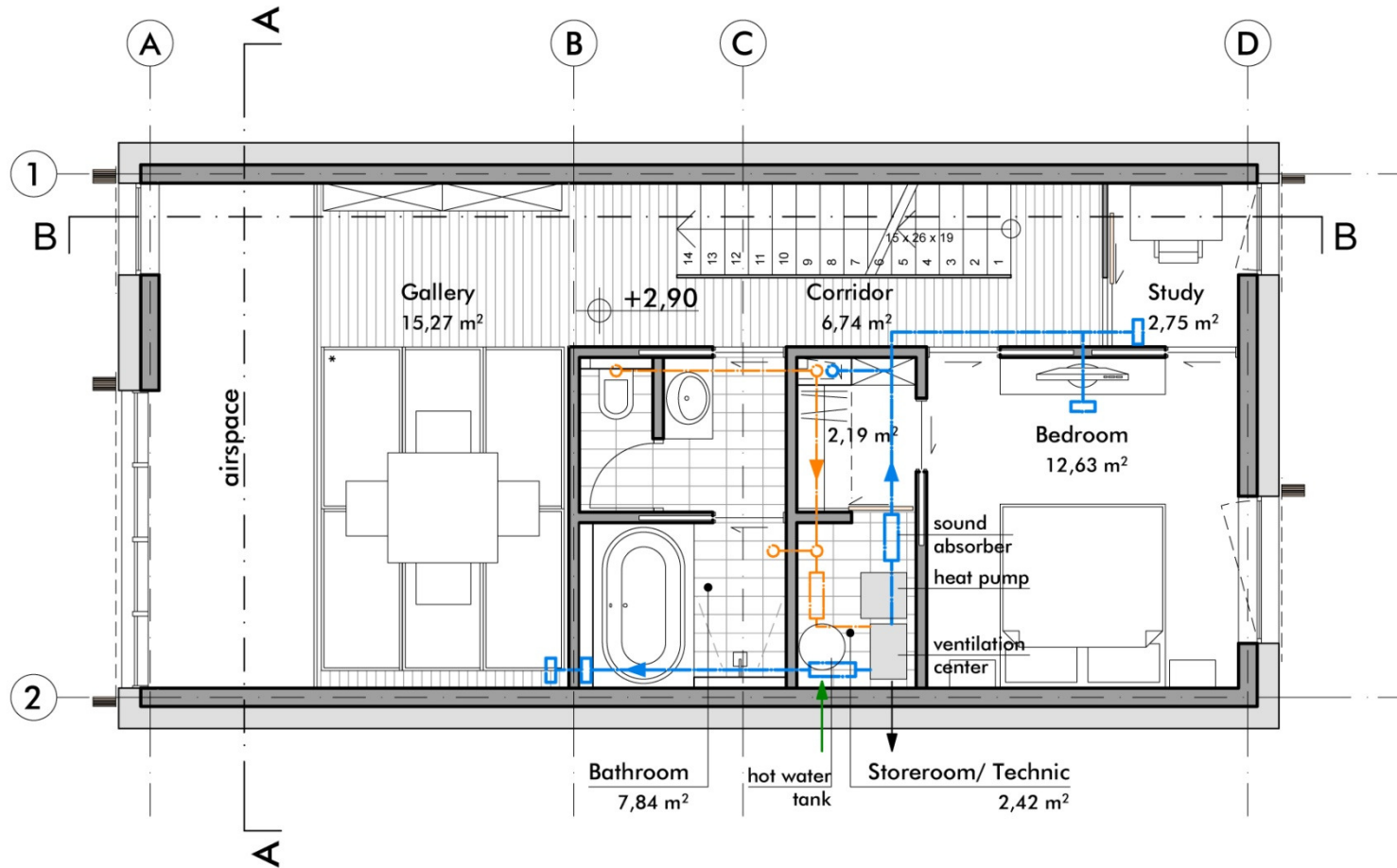
Ground floor area _{netto} = 48,67 m²
 Housing area _{netto} = 141,25 m²
 Garden/ terrace area _{netto} = 66,75 m²

— extract air
(ceiling flat canal)

— supply air
(floor/ wall flat canal)

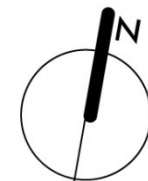


Ground floor

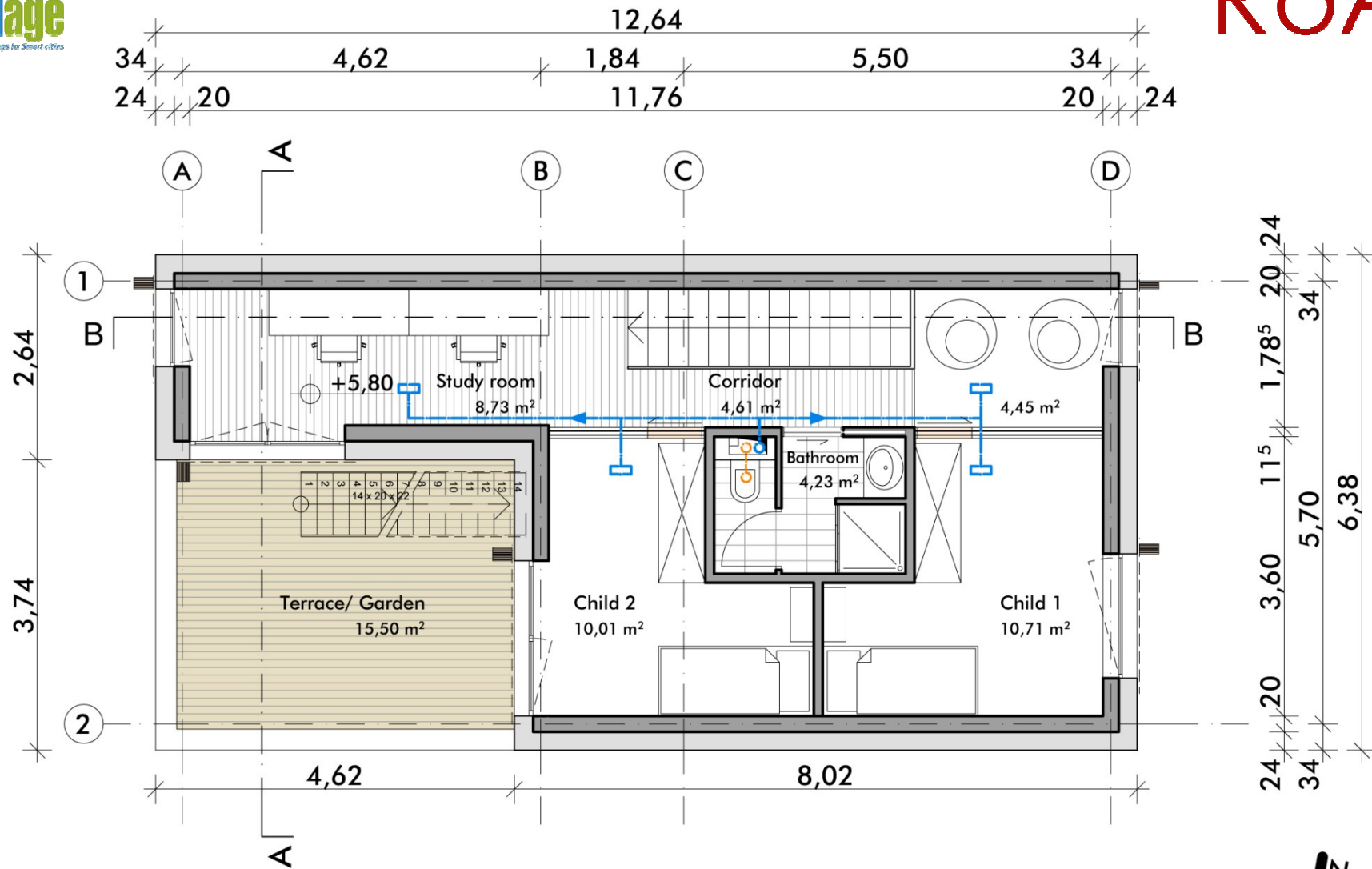


* Tatami Kantou 176x88 cm
 First floor area _{netto} = 49,84 m²



→ exhaust air
 → outdoor air



First floor

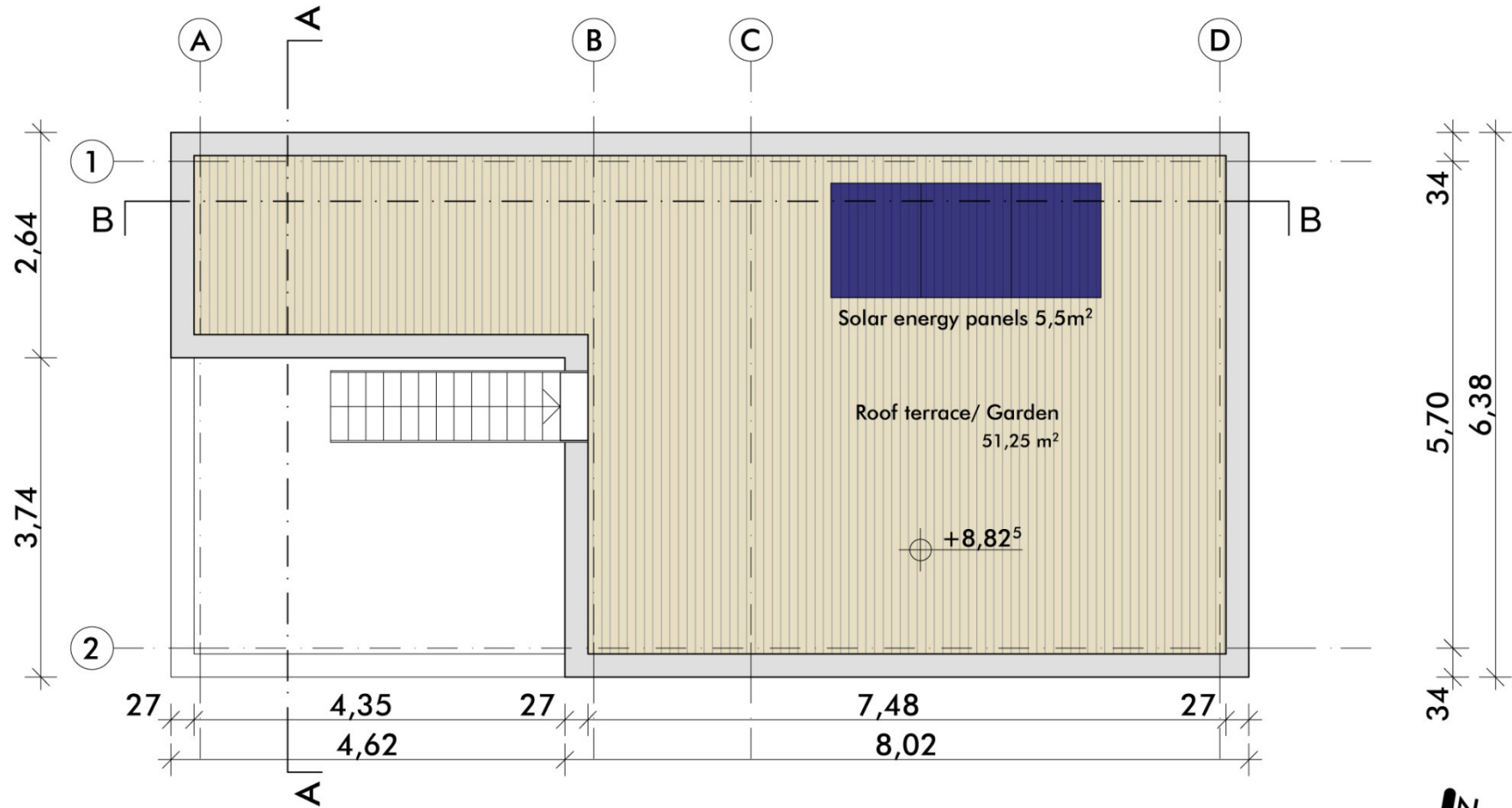


Second floor area $_{\text{netto}} = 42,74 \text{ m}^2$
 Garden area $_{\text{netto}} = 15,50 \text{ m}^2$

-  extract air (ceiling flat canal)
-  supply air (floor/ wall flat canal)

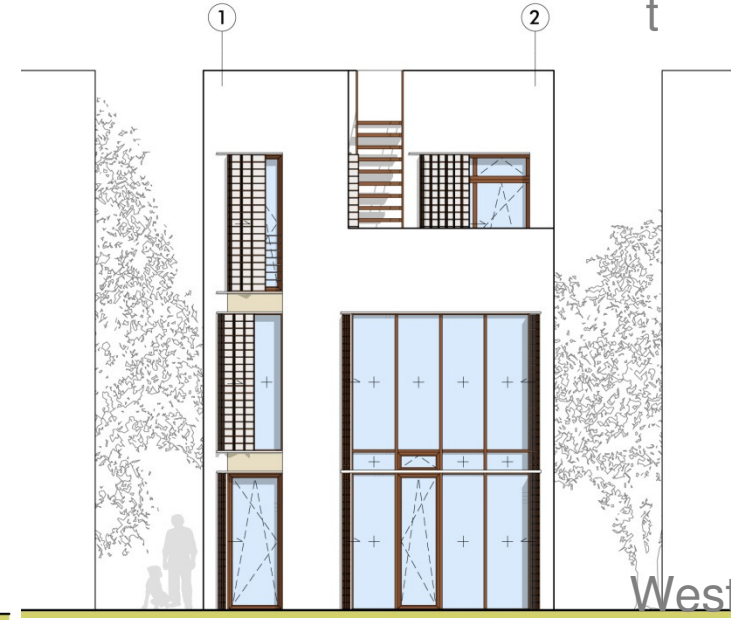
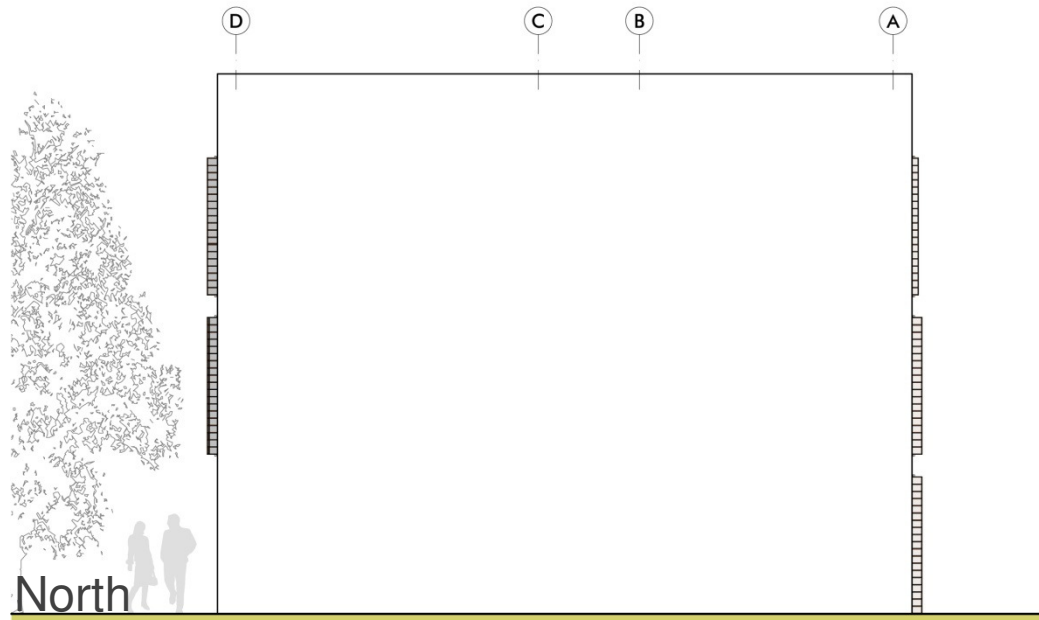
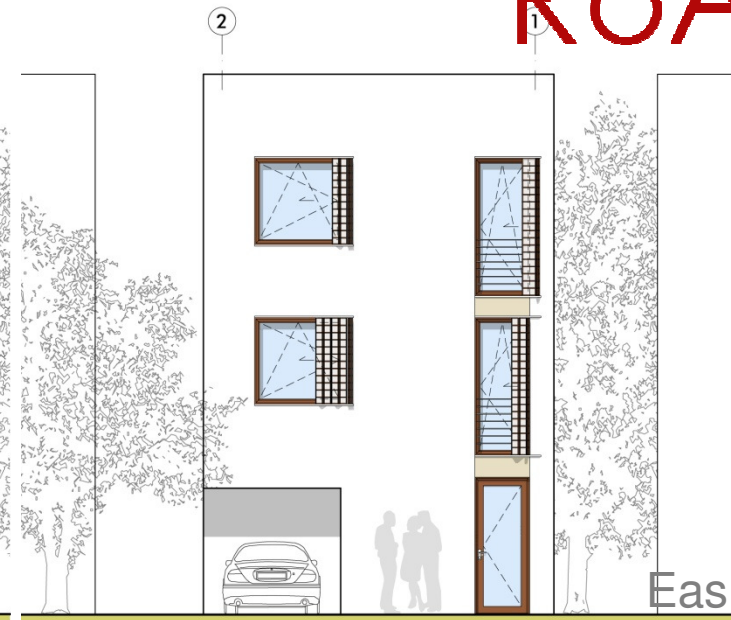
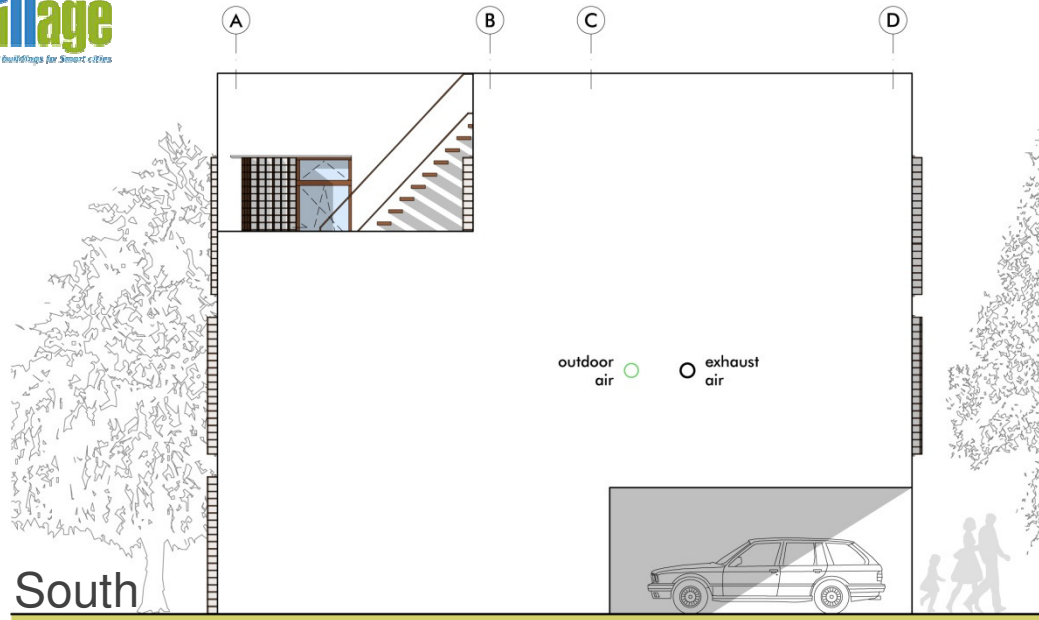


Second floor



Roof







West aspects







Living room



Kamakura Passive House
KEY ARCHITECTS (Miwa Mori)

Passive House Las Vegas

~ 20 cm insulation

energy recovery (winter)

night ventilation

double solar protective glazing

fixed shading

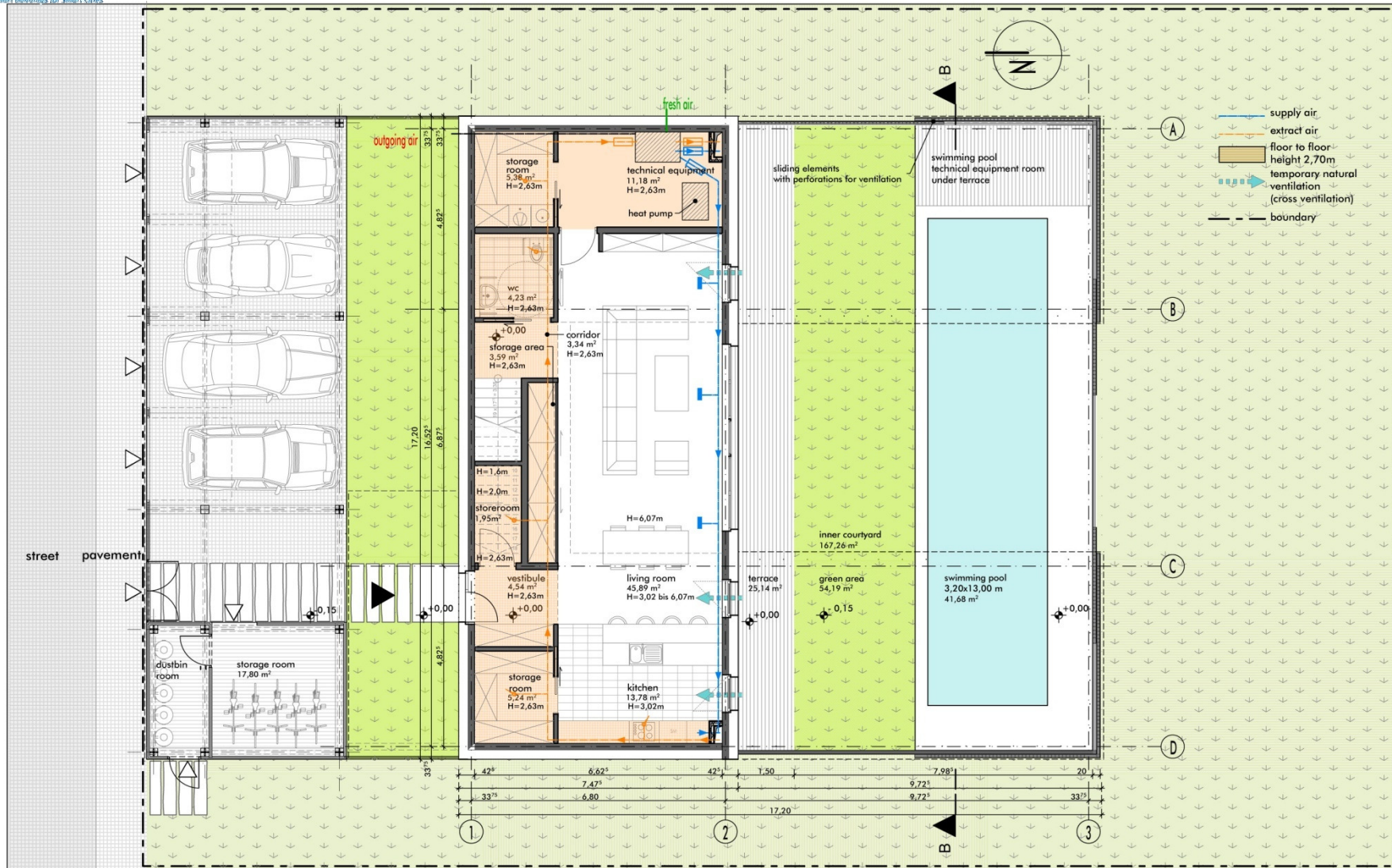
Heating: 15 kWh/(m²a)

Cooling: 15 kWh/(m²a)

Dehum.: 0 kWh/(m²a)

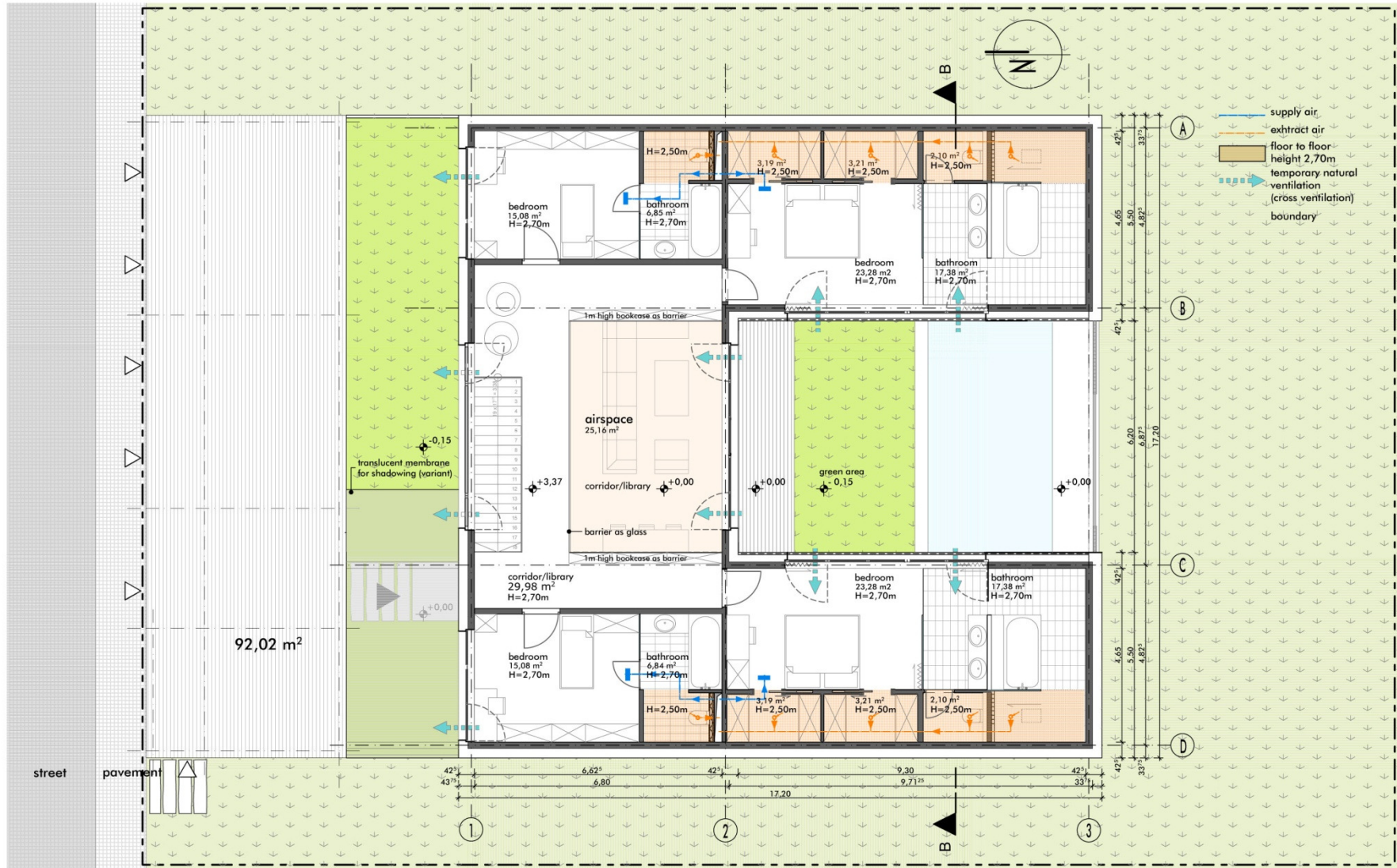


5 - 40 °C
≤ 10 g/kg



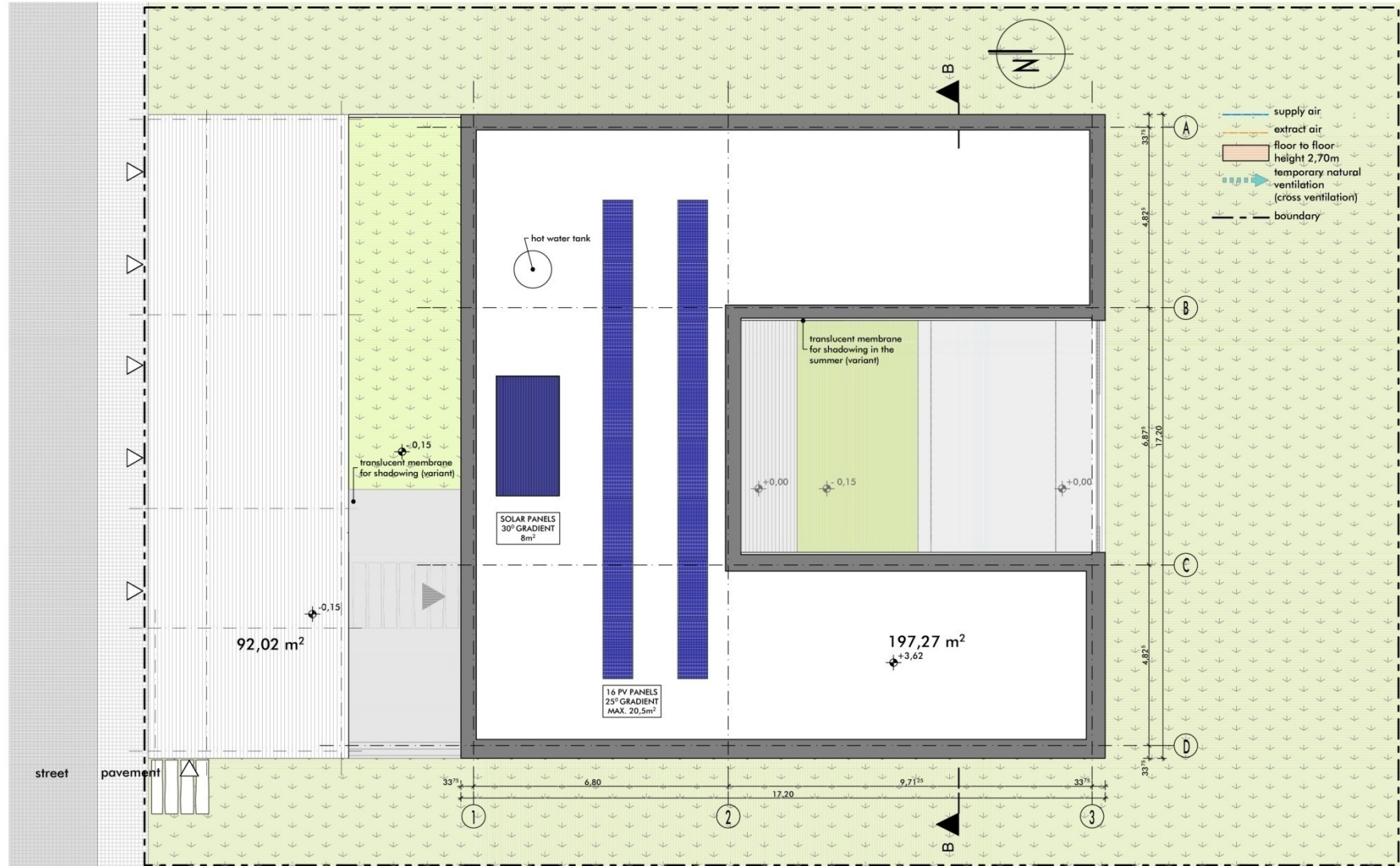
VARIANT A GF	94,21 m ²
INNER COURTYARD	167,26 m ²

Ground floor



VARIANT A 1.F	172,15 m ²
AIRSPACE	25,16 m ²

First floor



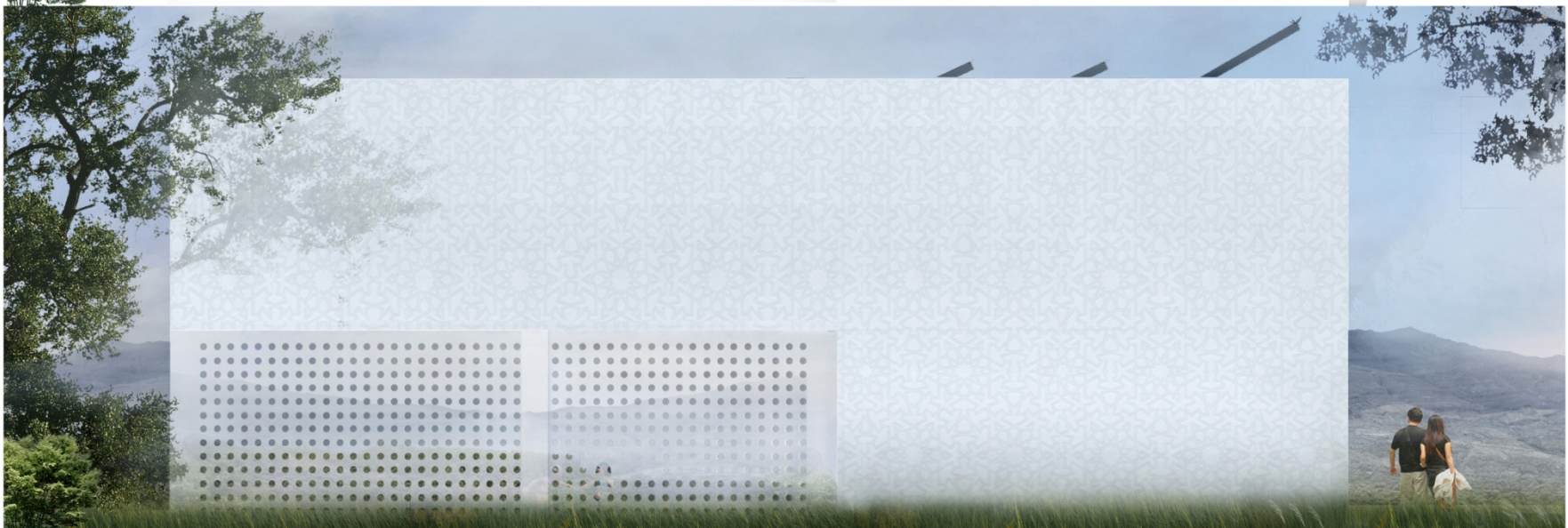
VARIANT A RF 197,27 m²



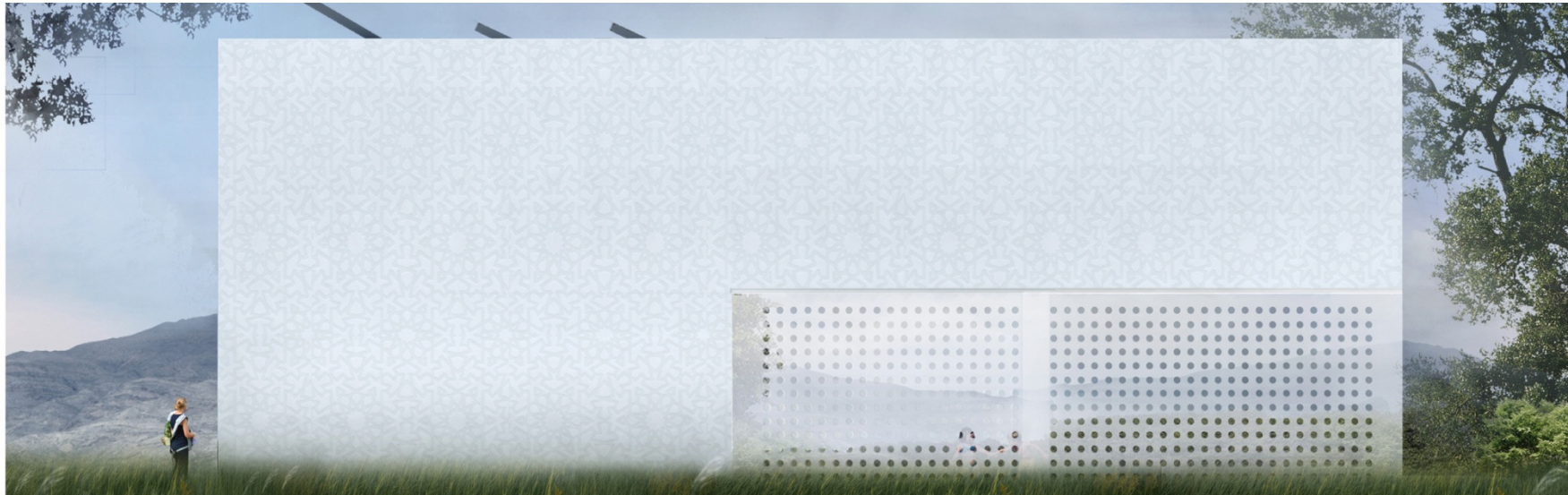
NORTH ELEVATION



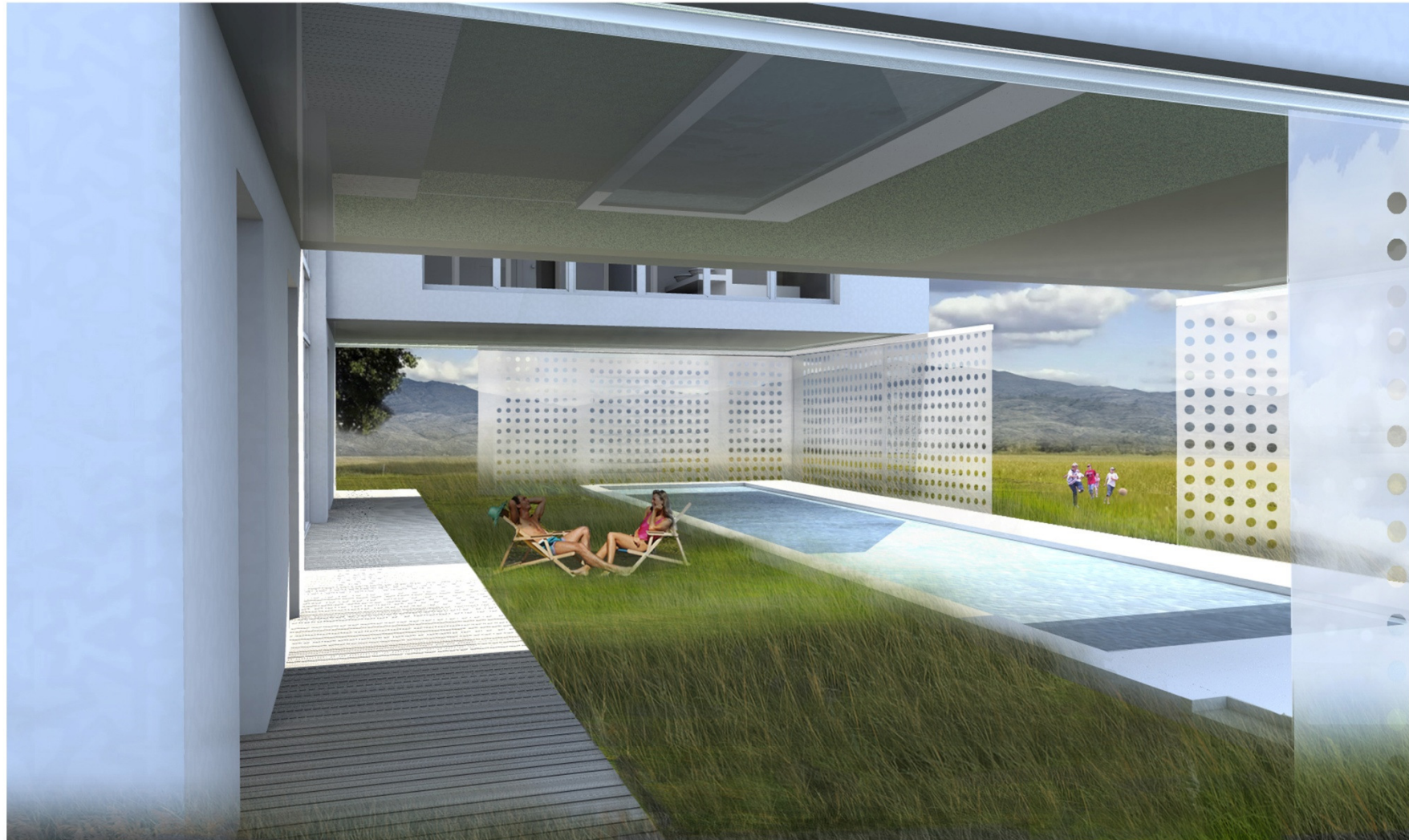
SOUTH ELEVATION



EAST ELEVATION



WEST ELEVATIONS



INNER, PRIVATE COURTYARD VIEW



SOUTH- EAST PERSPEKTIVE



LIVING ROOM

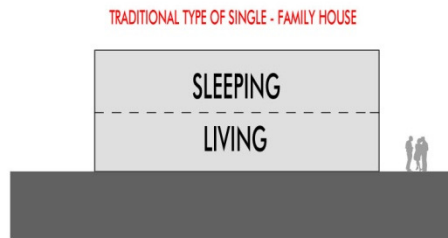
Passive House Dubai

- ~ 25 cm insulation (roof!)
- airtight, energy recovery
- triple solar protective glazing
- fixed shading
- small windows
- no night ventilation
- supply air cooling possible: $P < 10 \text{ W/m}^2$

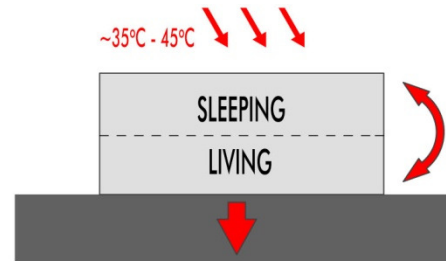


> 40 °C
20 - 25 g/kg

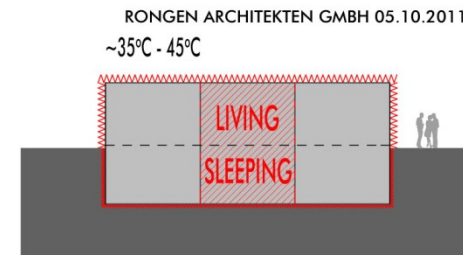
- Heating: 0
- Cooling: 40 kWh/(m²a)
- Dehum.: 10 kWh/(m²a)
- no insulation: > 300 kWh/(m²a)



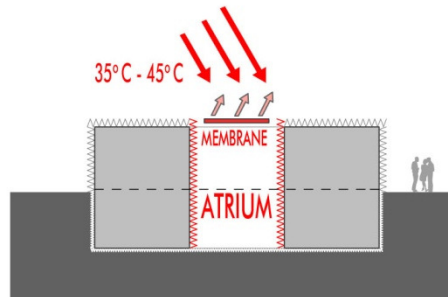
STEP 1
TRADITIONAL TYPE OF SINGLE - FAMILY HOUSE



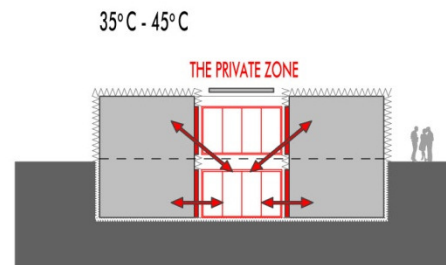
STEP 2
LOOKING FOR THE GOLDEN MEANING OF COMFORTABLE LIVING IN A HOT CLIMATE IN DUBAI



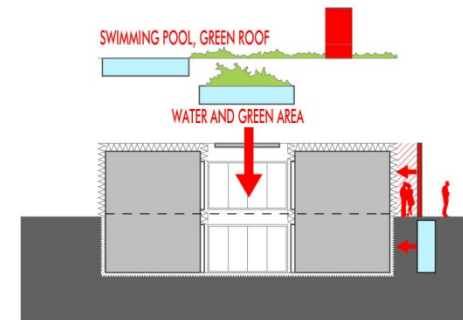
STEP 3
THE PASSIVE HOUSE AIR CONDITION CONCEPT AND 30 CM INSULATION PROTECT LIVING AND SLEEPING AREA FROM OVERHEATING.



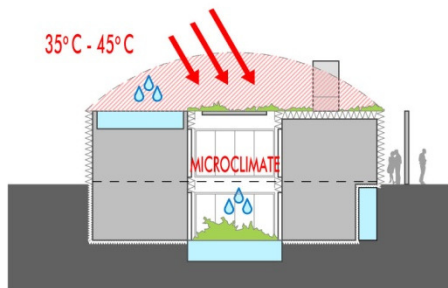
STEP 4
WHITE MEMBRANE PROTECTS ATRIUM FROM OVERHEATING



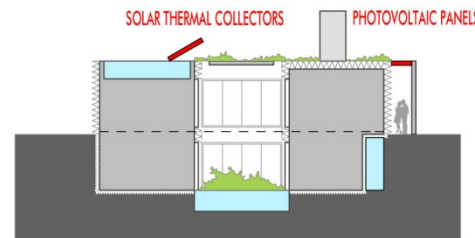
STEP 5
WINDOWS DESIGNED TOWARDS ATRIUM. ROOMS HAVE THE PRIVACY OF OPENING ONTO THE ATRIUM.



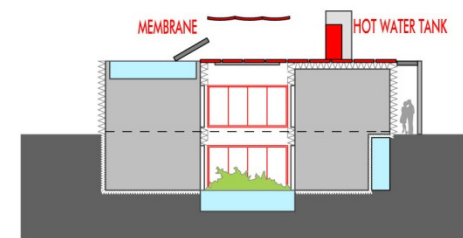
STEP 6
GREEN AND WATER AREA IN THE INNER COURTYARD AND SWIMMING POOL ON THE ROOF GIVES THE OWNERS THE OPPORTUNITY TO LIVE IN HARMONY AND COMFORT WITH NATURE, IN DUBAI'S HOT CLIMATE.



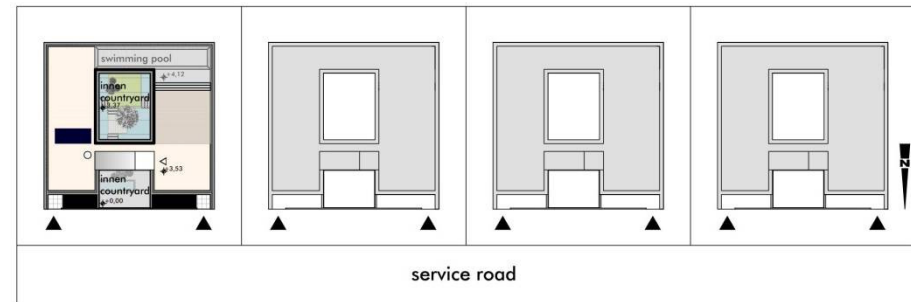
STEP 7
THE COURTYARD PROVIDES A COOLER MICROCLIMATE AND BLOCKS THE WIND.



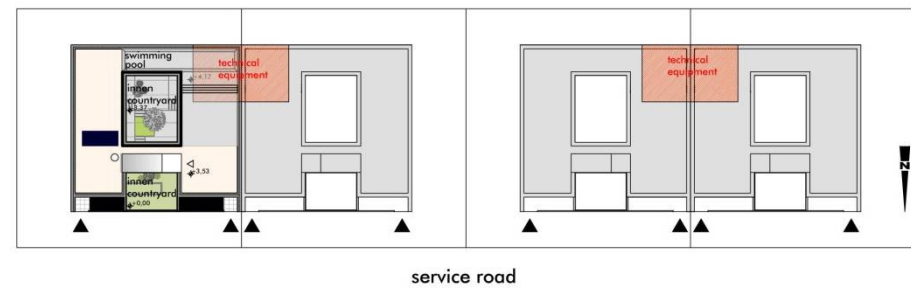
STEP 8
ACTIVE SOLAR CAPTURE



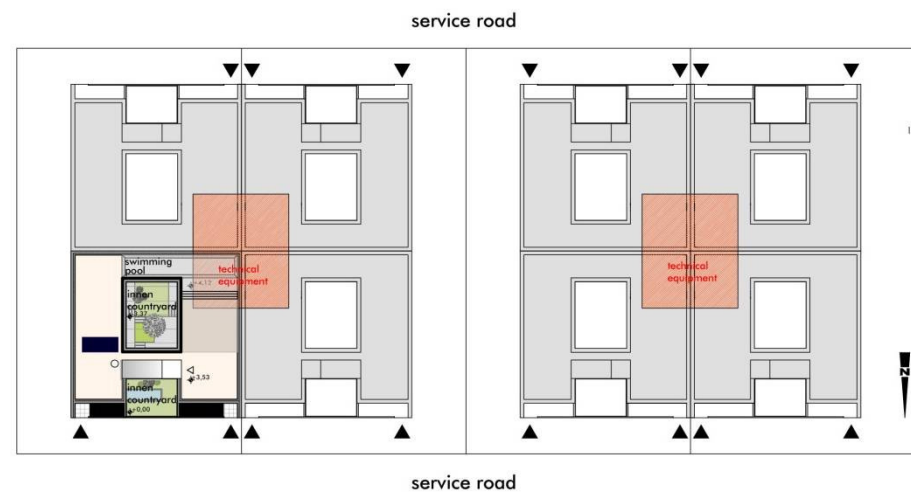
STEP 9
CHANGES AFTER OPTIMIZATION :
- NO GREEN ROOF - WHITE FOIL AND WHITE PLATES;
- HOT WATER TANK ON THE ROOF;
- WHITE MEMBRANE ON THE PART OF THE ROOF;
- SMALLER WINDOWS



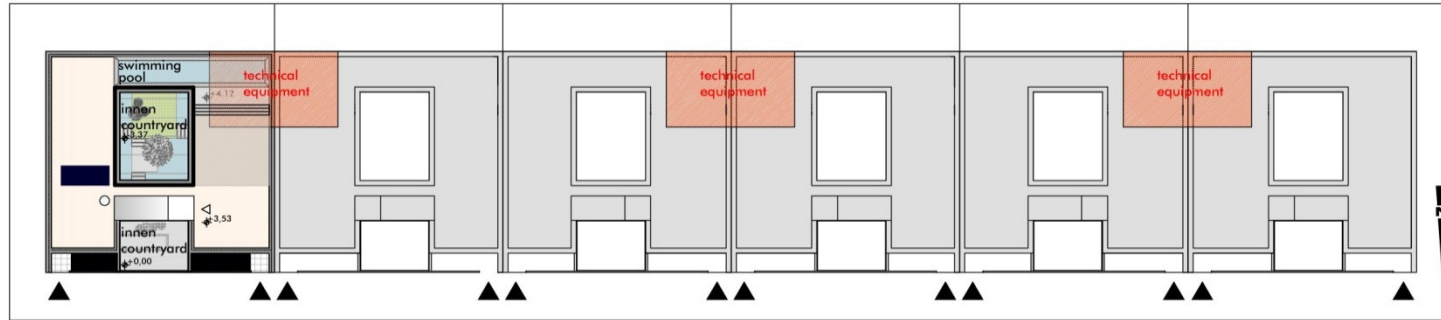
SINGLE FAMILY HOUSES



SEMI-DETACHED HOUSES



4 HOUSES BLOCK

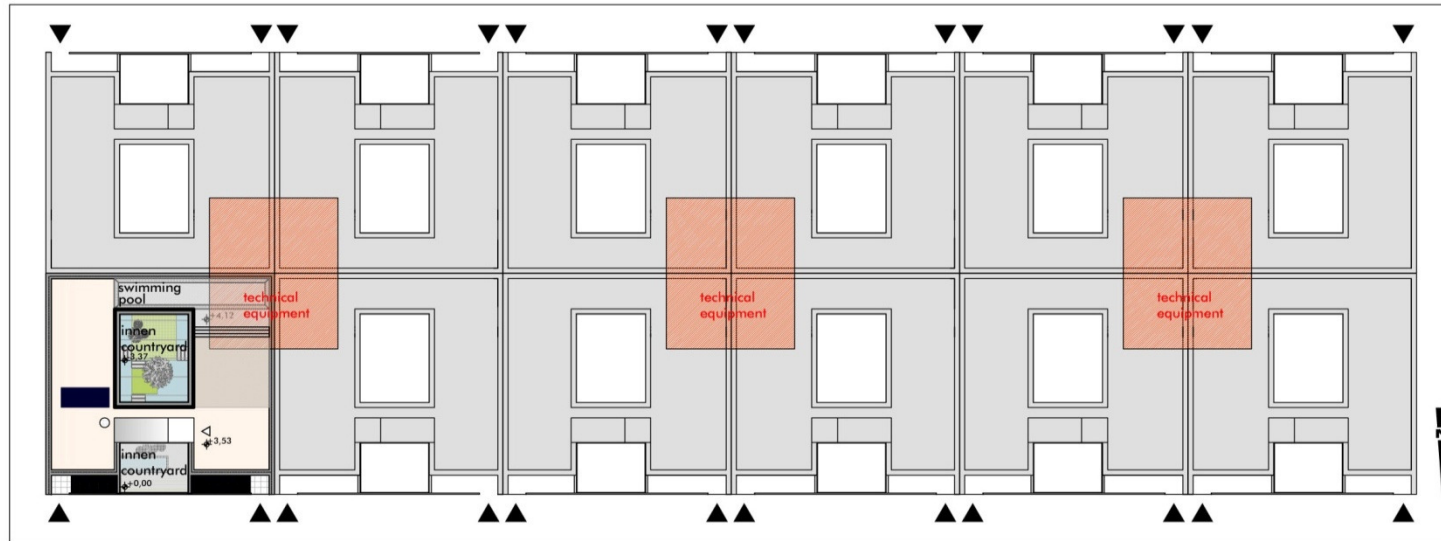


service road

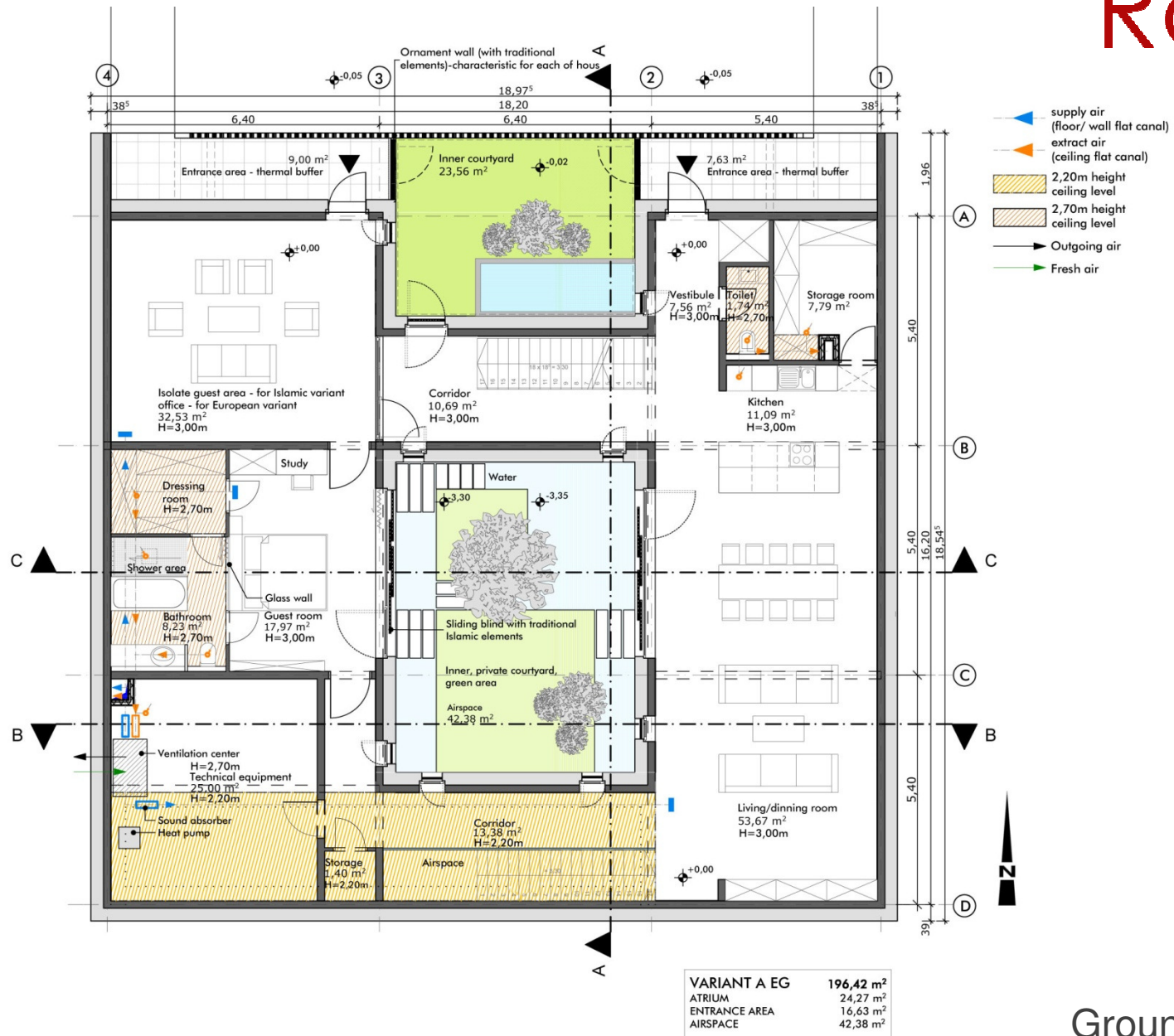
ROW OF HOUSES

ESTATE OF TERRACED HOUSES

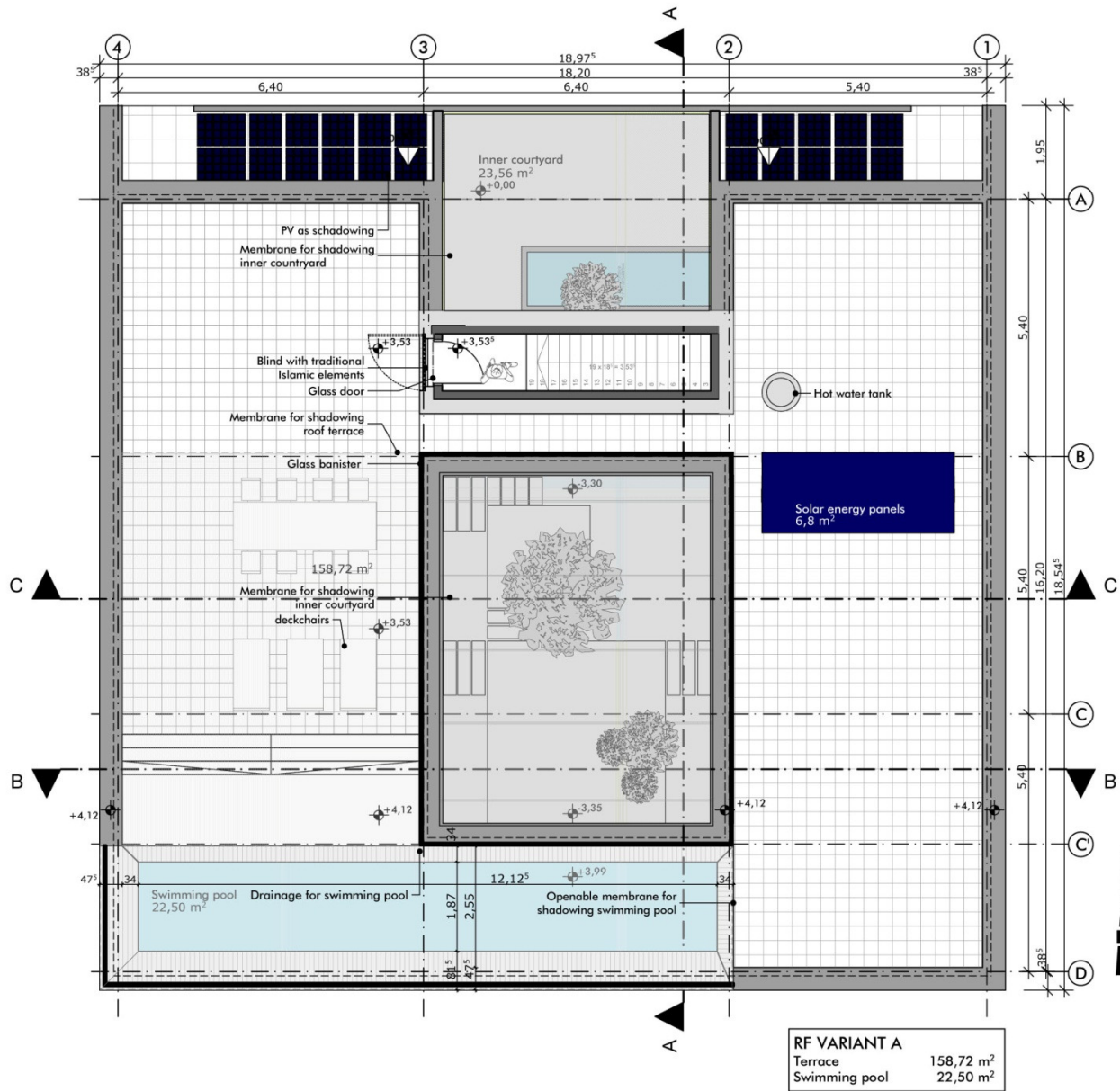
service road



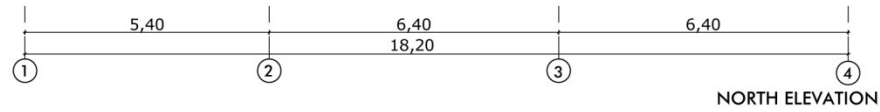
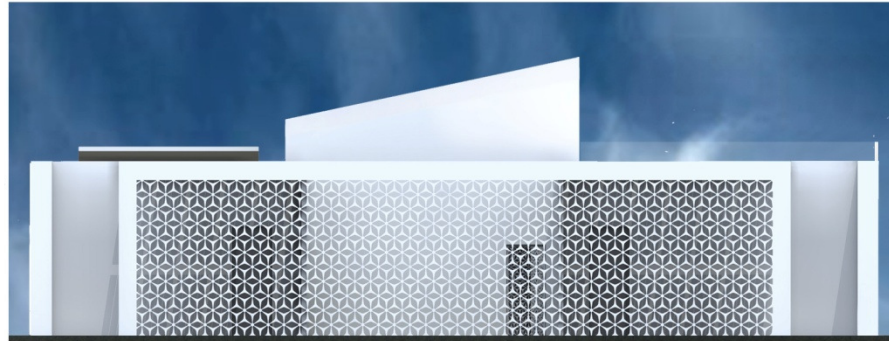
service road



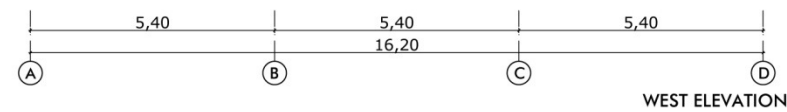
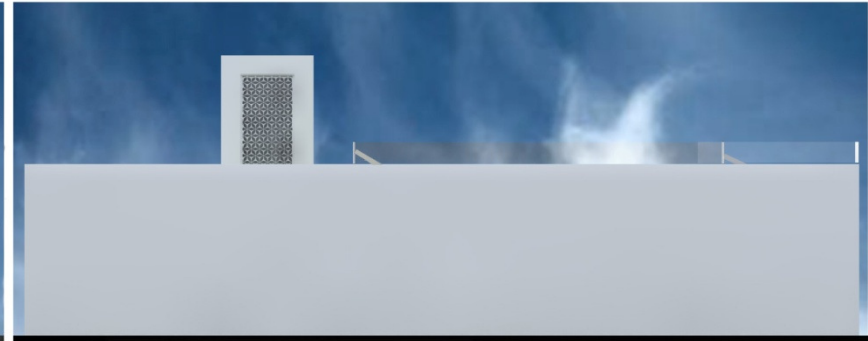
Ground floor



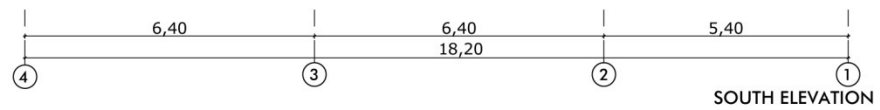
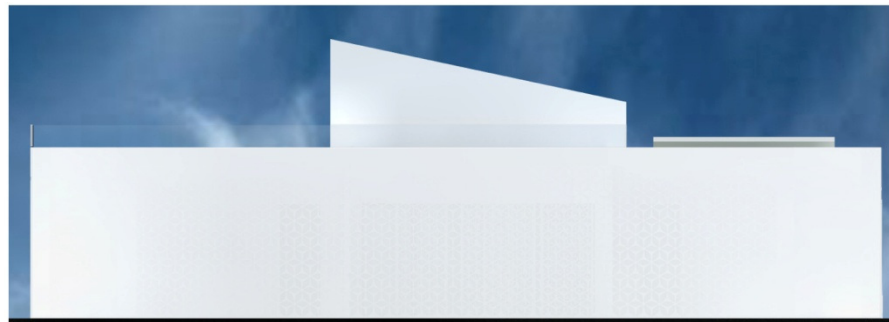
Roof



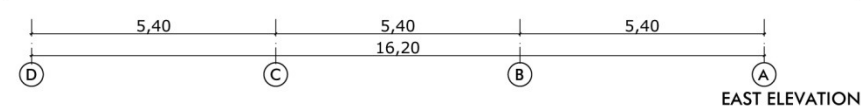
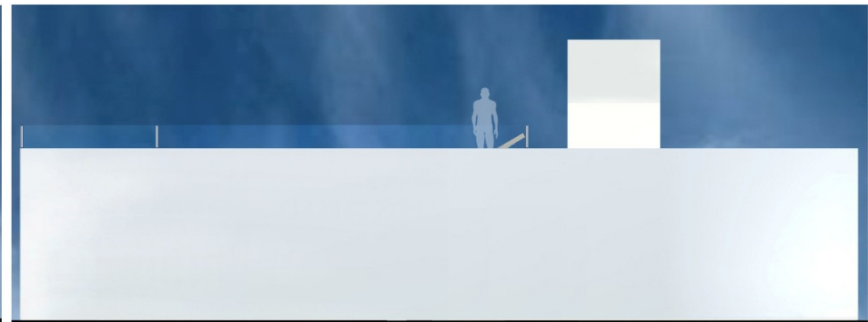
NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION







Passive House Tokio / Shanghai

~ 20 cm insulation (roof!)

energy recovery, bypass with humidity control
(summer)

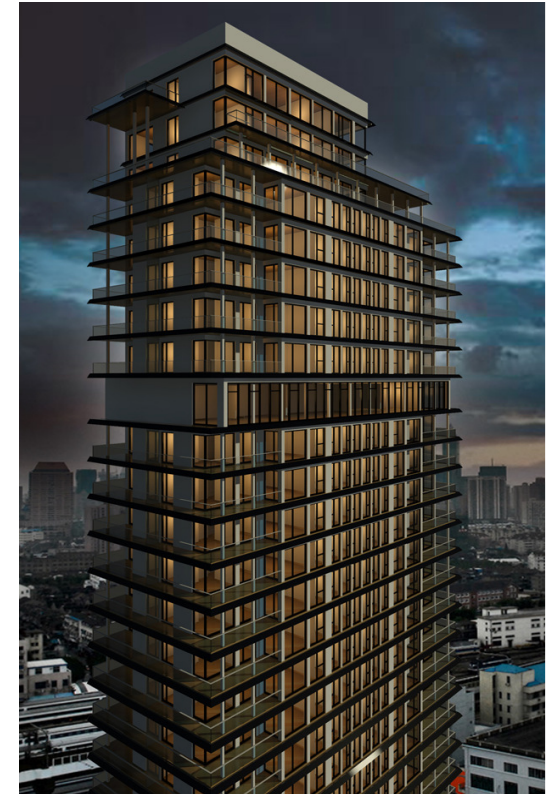
no night ventilation

double/triple clear glazing

moveable shading

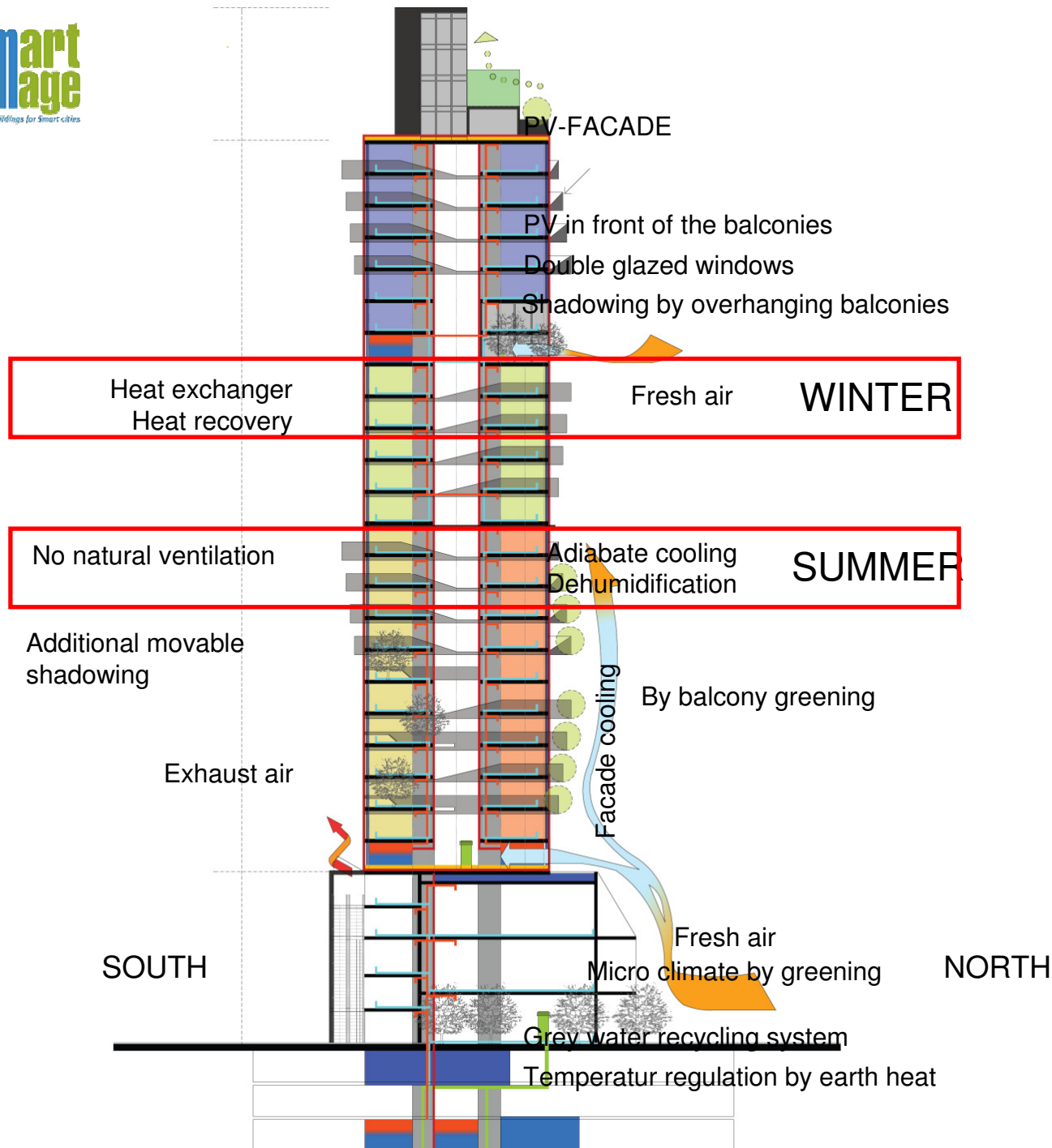
separate cooling and dehum.

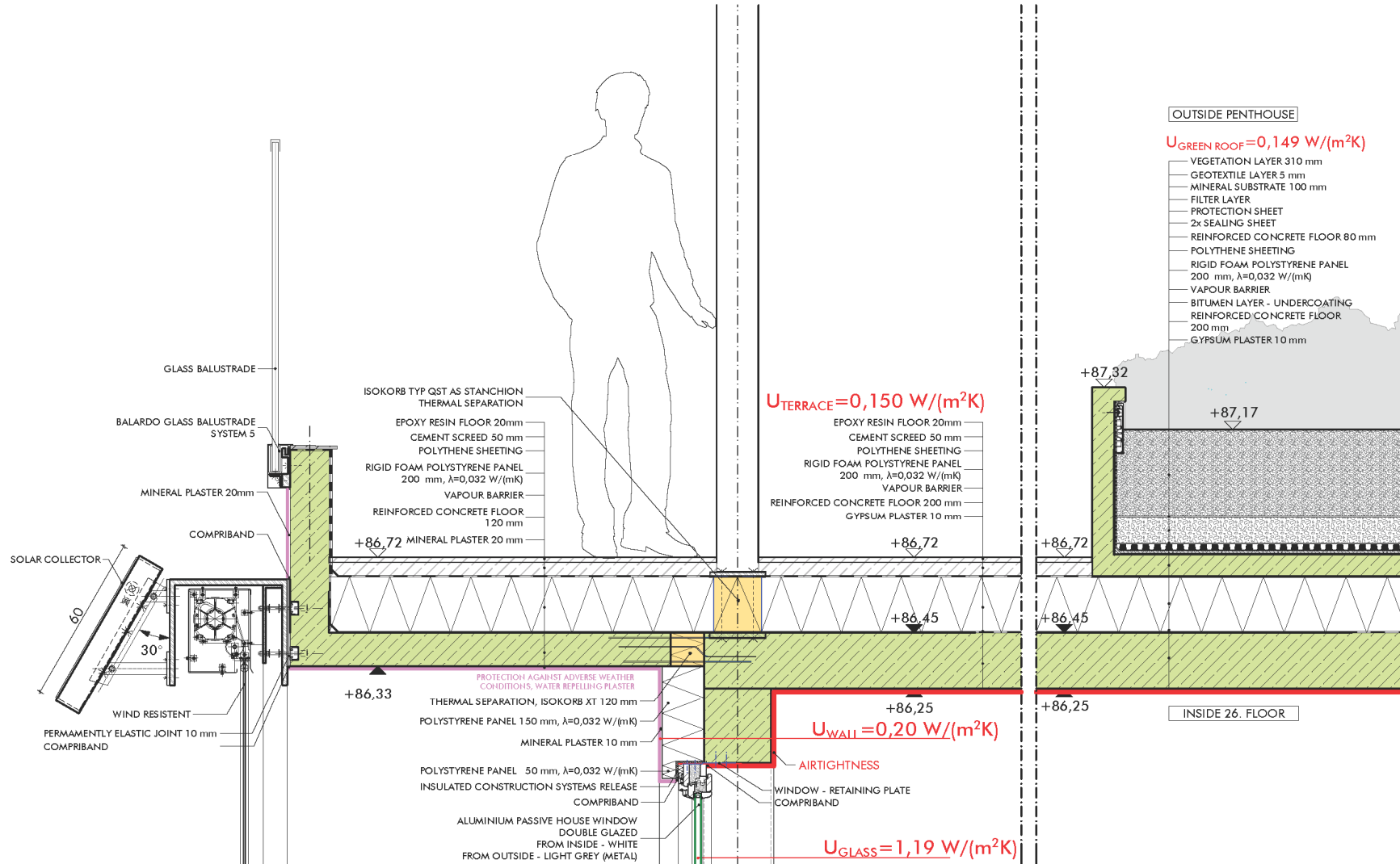
Heating:	15 kWh/(m ² a)
Cooling:	1 kWh/(m ² a)
Dehum.:	6 kWh/(m ² a)

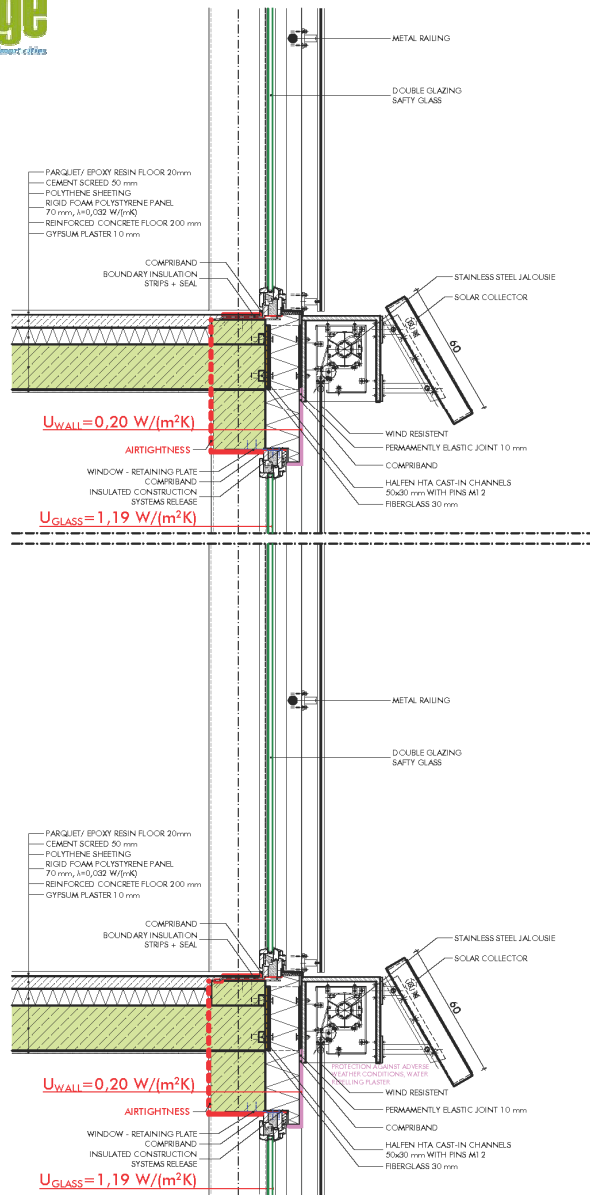


winter: 0 - 5 °C
summer: 25 - 30 °C
~ 20 g/kg

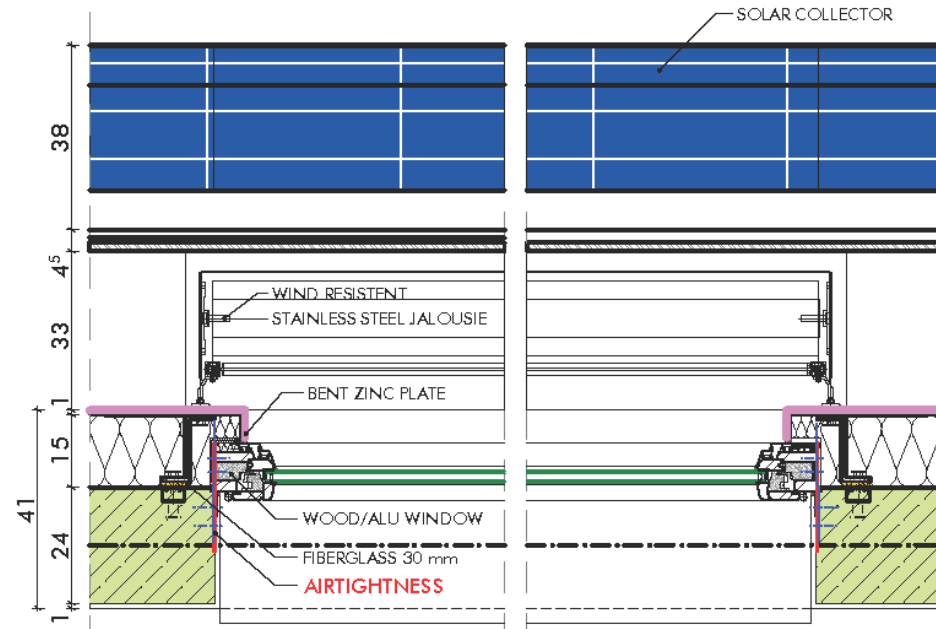
Source:
P111



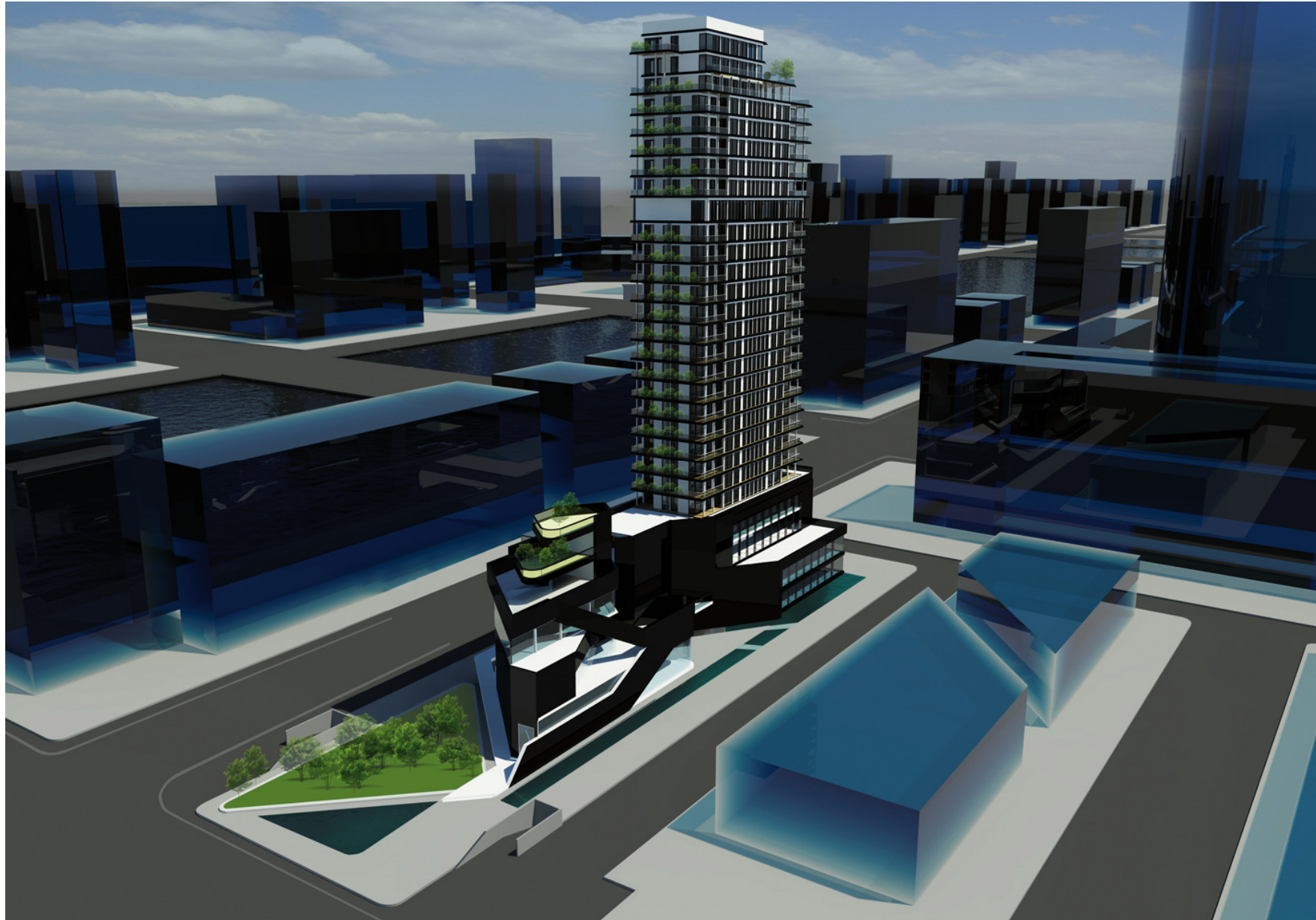




SOUTH FACADE CONSTRUCTION SCALE 1:10



SOUTH FACADE SECTION SCALE 1:10





THANK YOU VERY MUCH FOR YOUR ATTENTION