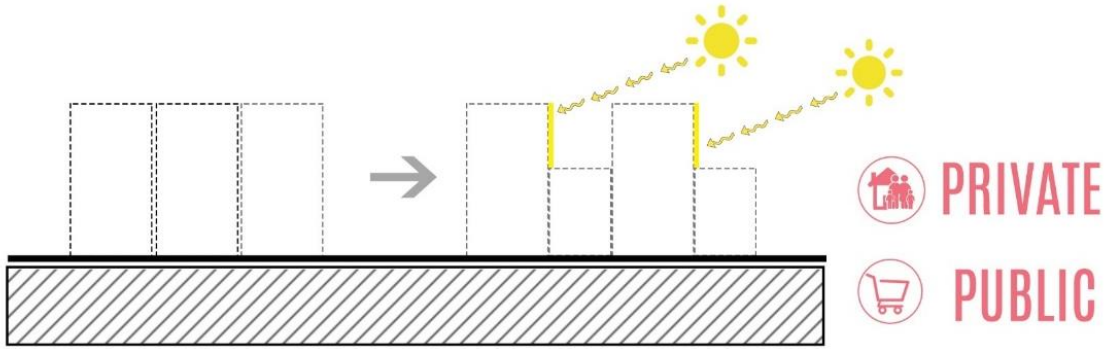
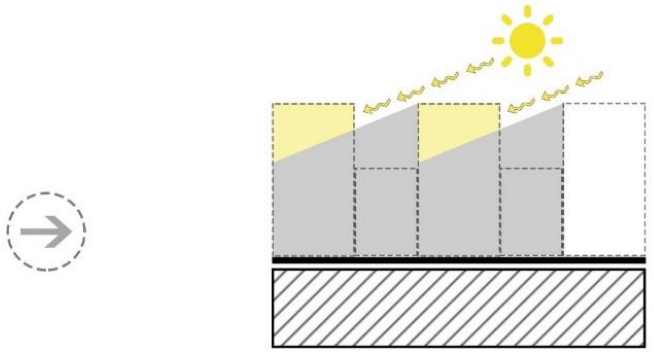
AMPHITHEATER TOWARDS THE SUN

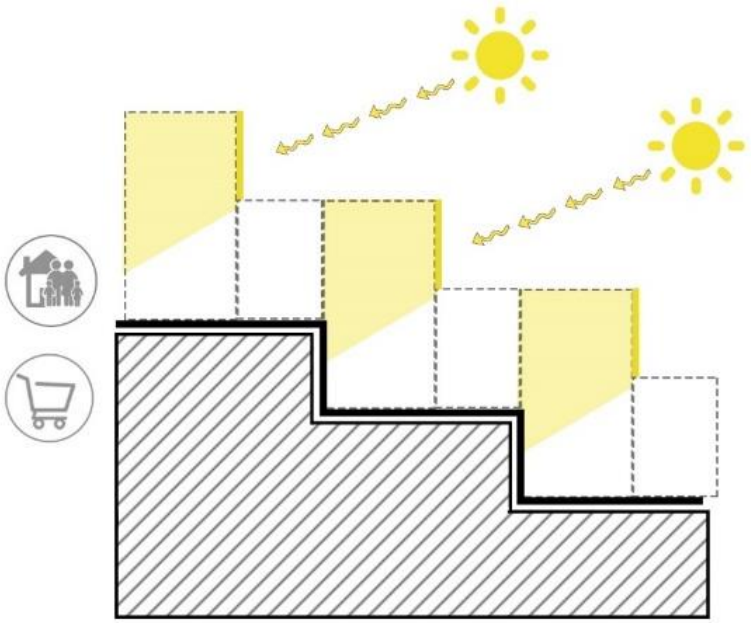
ISOVER MULTI-COMFORT HOUSE STUDENTSCONTEST EDITION 2016

MOVILA ANDREEA / VACARU AMALIA-SILVIA / **ROMANIA** / «G.M. CANTACUZINO» FACULTY OF ARCHITECTURE

1. CONCEPT







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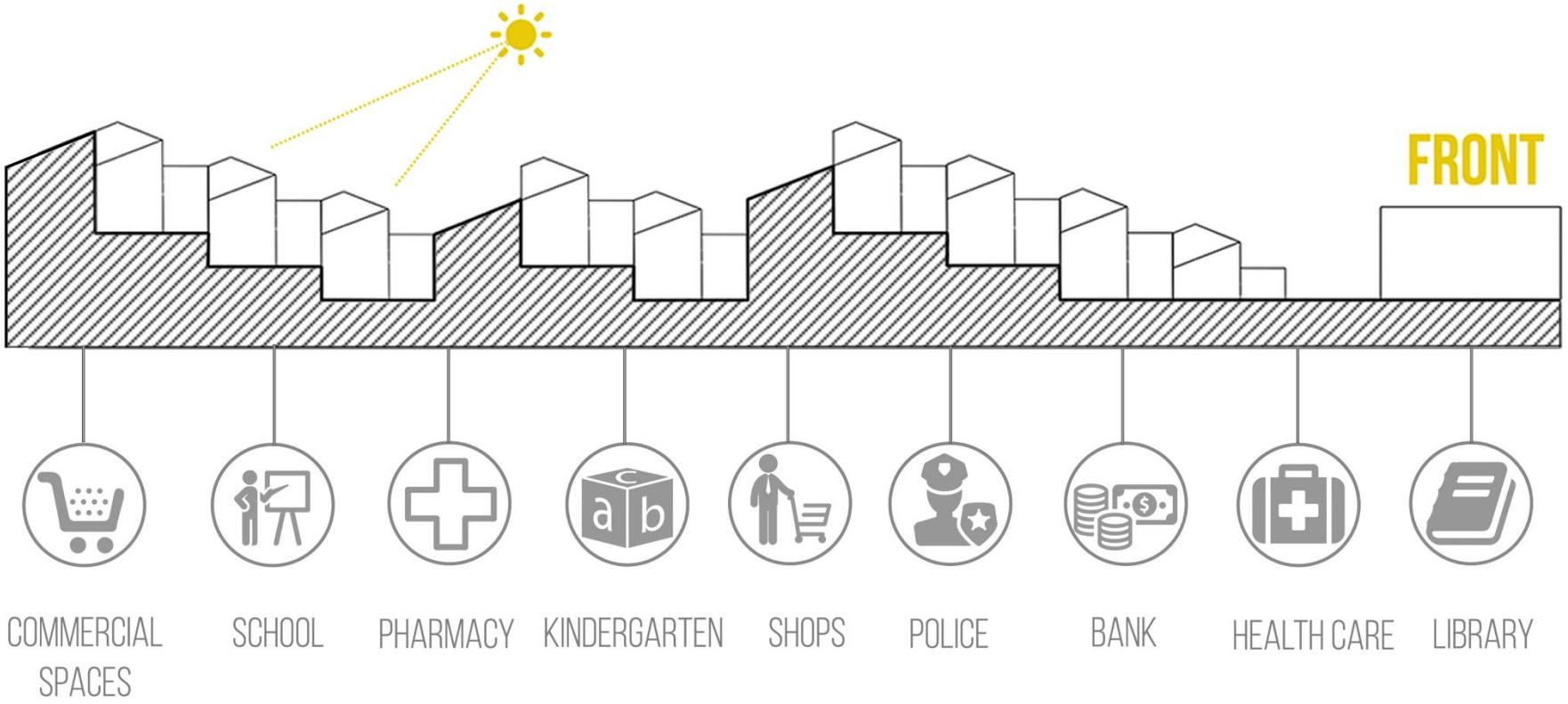
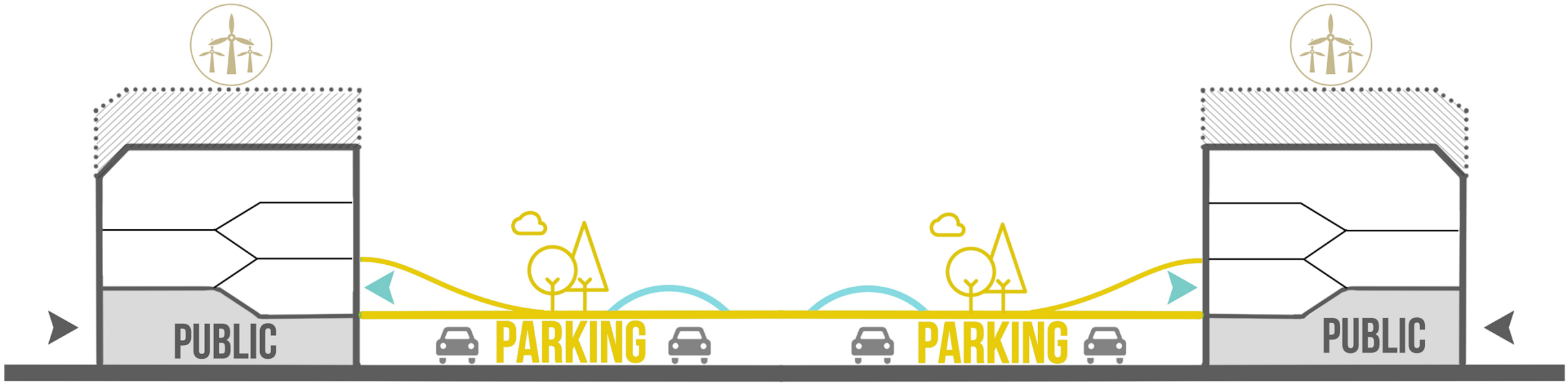
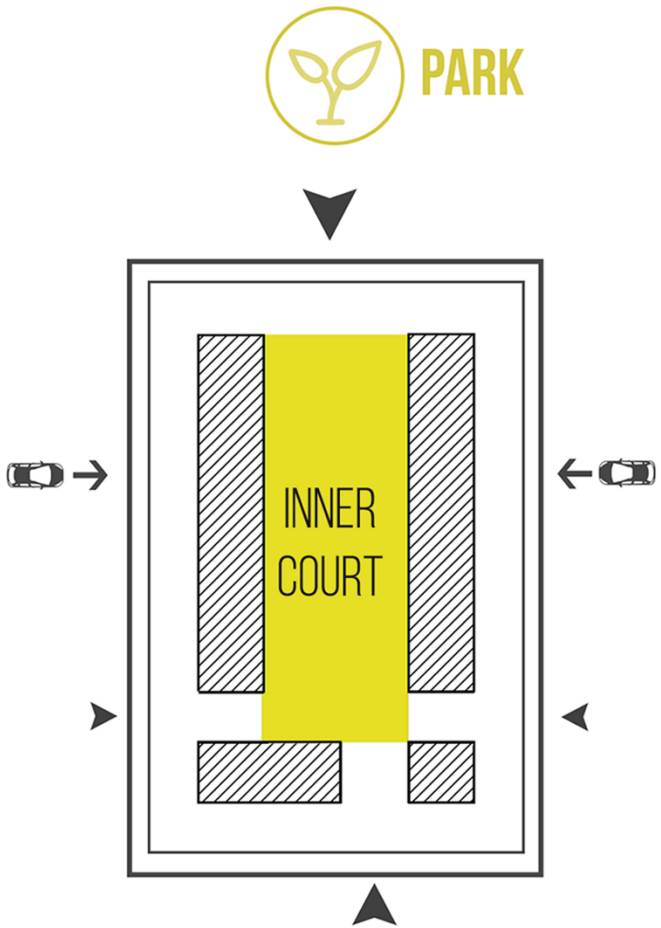

FRONT
COMMERCIAL SPACES
SCHOOL
PHARMACY
KINDERGARTEN
SHOPS
POLICE
BANK
HEALTH CARE
LIBRARY

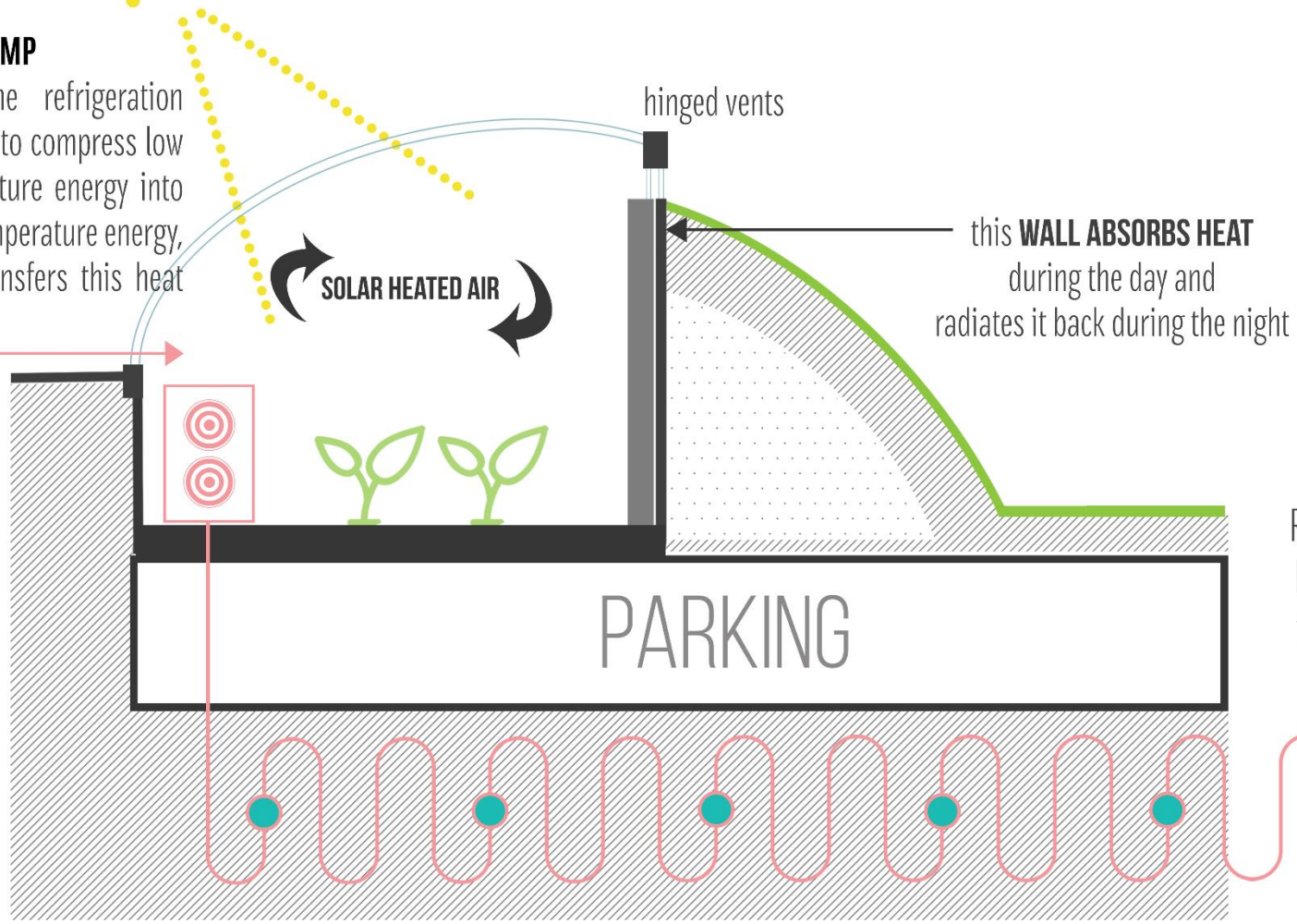

PUBLIC
PARKING
PARKING
PUBLIC

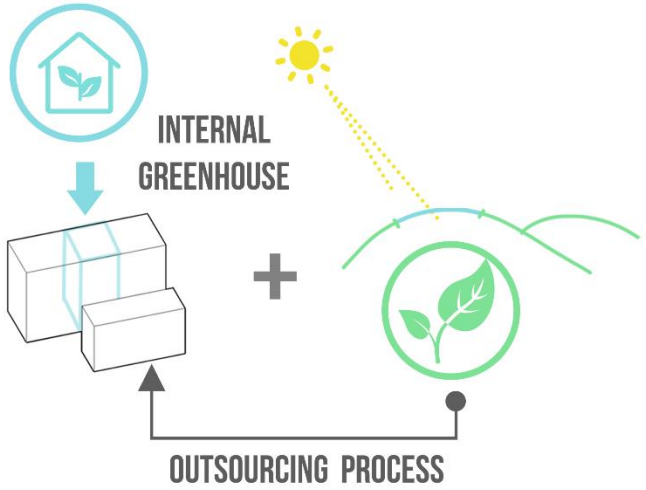

PARK
INNER
COURT

SOUTH

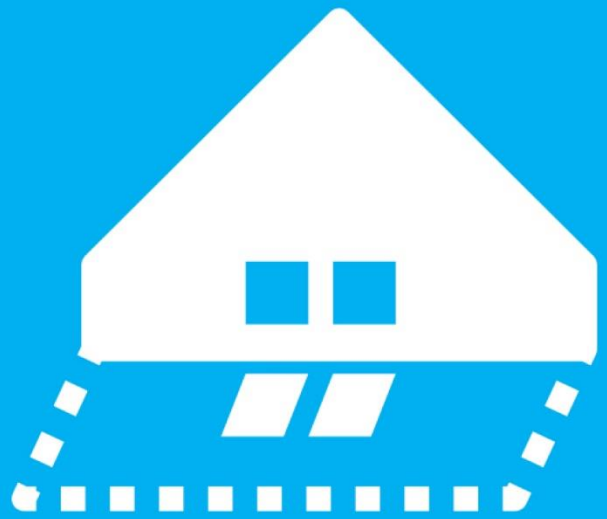
A "TECHNOLOGICAL "GREENHOUSE works as a passive solar heater by collecting solar energy during the day and transmitting heat into the home.

HEAT PUMP
uses the refrigeration process to compress low temperature energy into high temperature energy, then transfers this heat to water

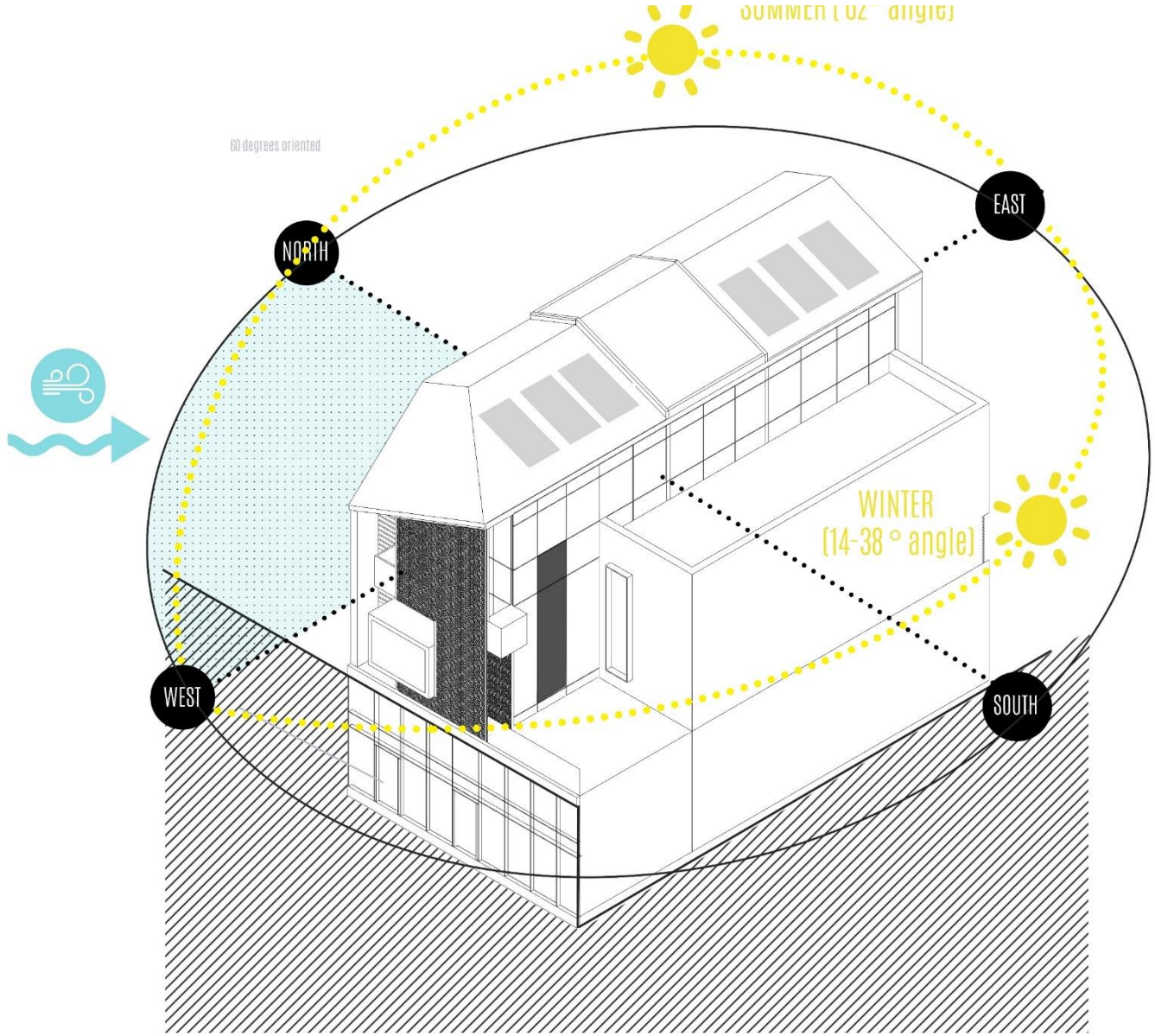


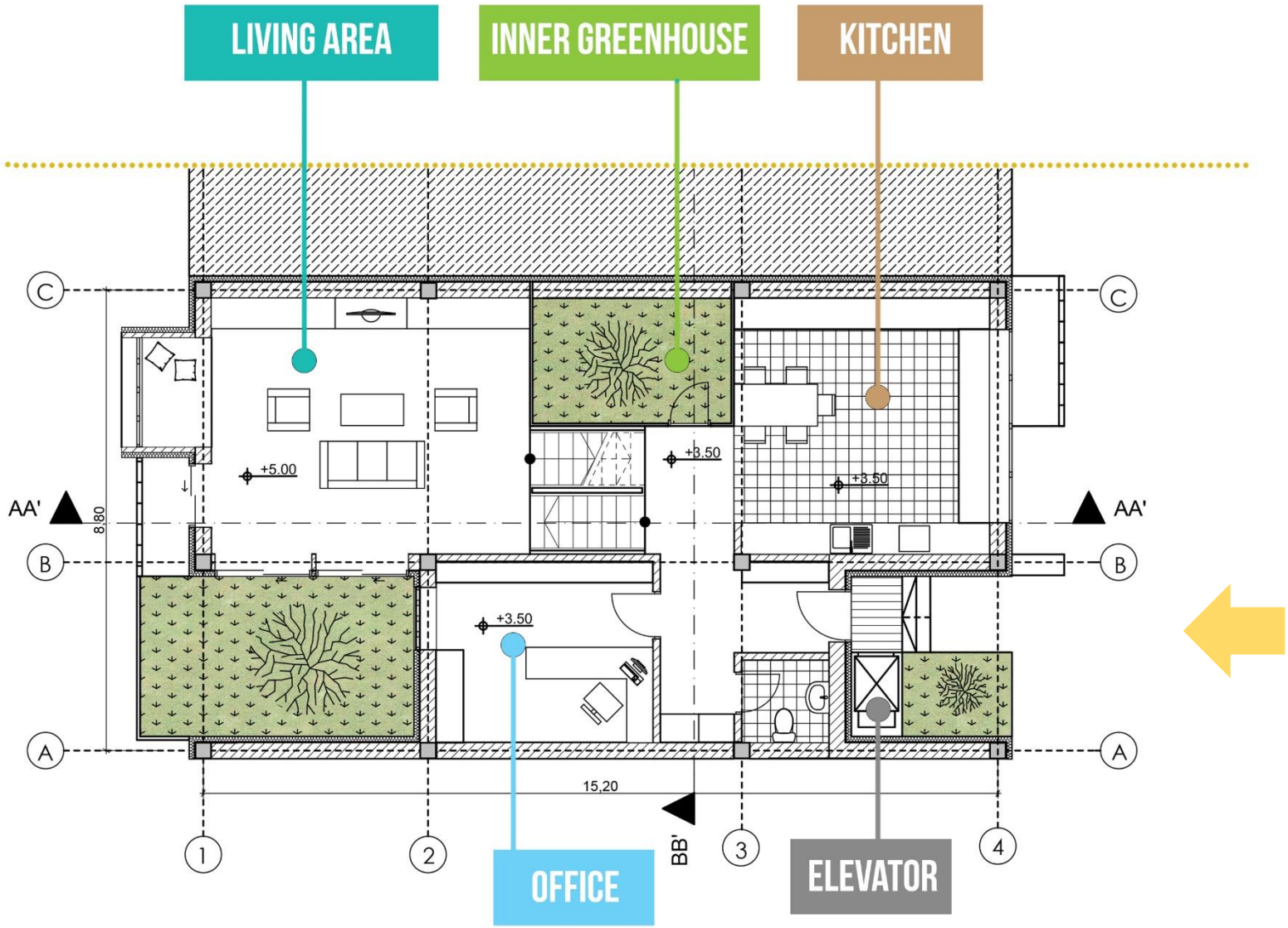


Radiant's heat pump technology harnesses this warm air to assist in **heating the circulated water** to a desired 40°C.

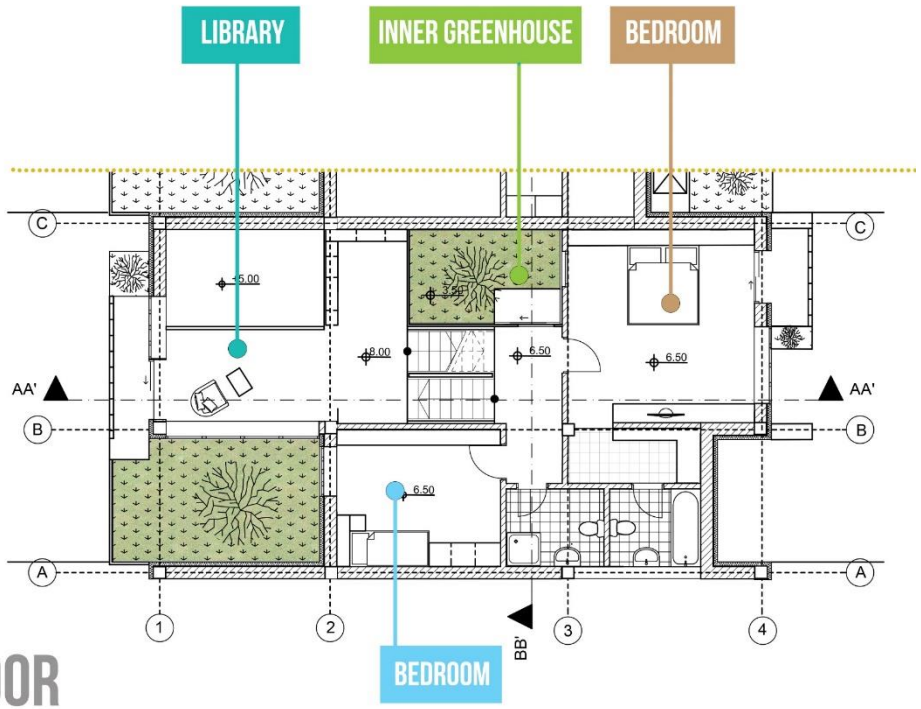


2. ARCHITECTURAL DESIGN

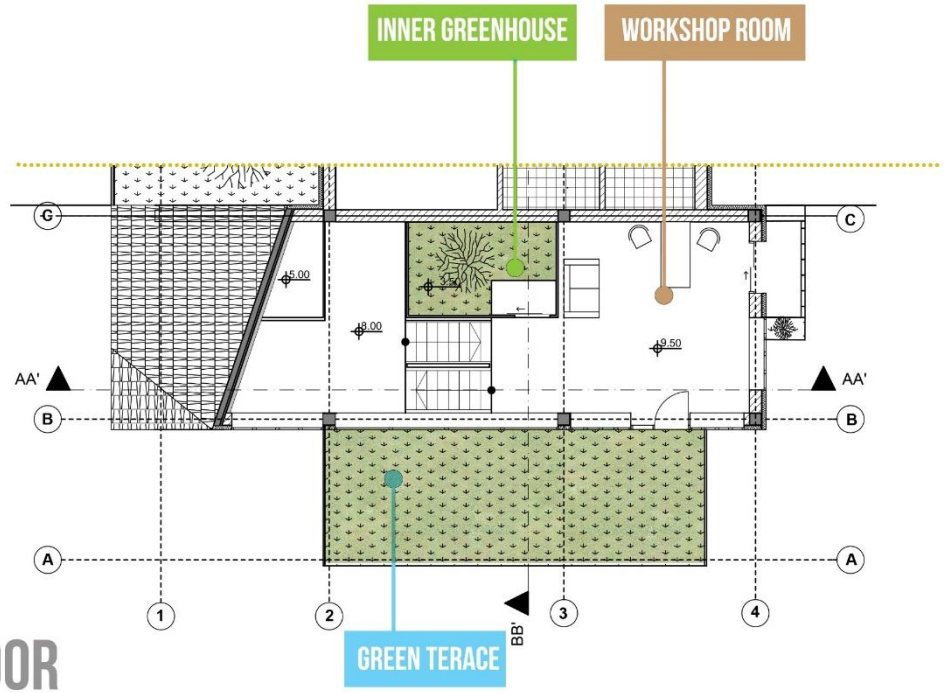

SUMMER (82° angle)
60 degrees oriented
NORTH
EAST
WEST
SOUTH
WINTER
(14-38 ° angle)


LIVING AREA
INNER GREENHOUSE
KITCHEN
C
B
A
AA'
8,80
+5.00
+3.50
+3.50
+3.50
15,20
1
2
3
4
BB'
OFFICE
ELEVATOR

FIRST FLOOR



SECOND FLOOR



THIRD FLOOR

4. MULTI COMFORT HOUSE

APPROACH

-Reduce air-conditioning costs
-Reduce winter heating costs
-Stormwater management tool

GREEN ROOF

INTERIOR GREEHOUSE

-Controlling the Humidity
-Heating and Ventilation

SOLAR PANELS

TROMBE WALL

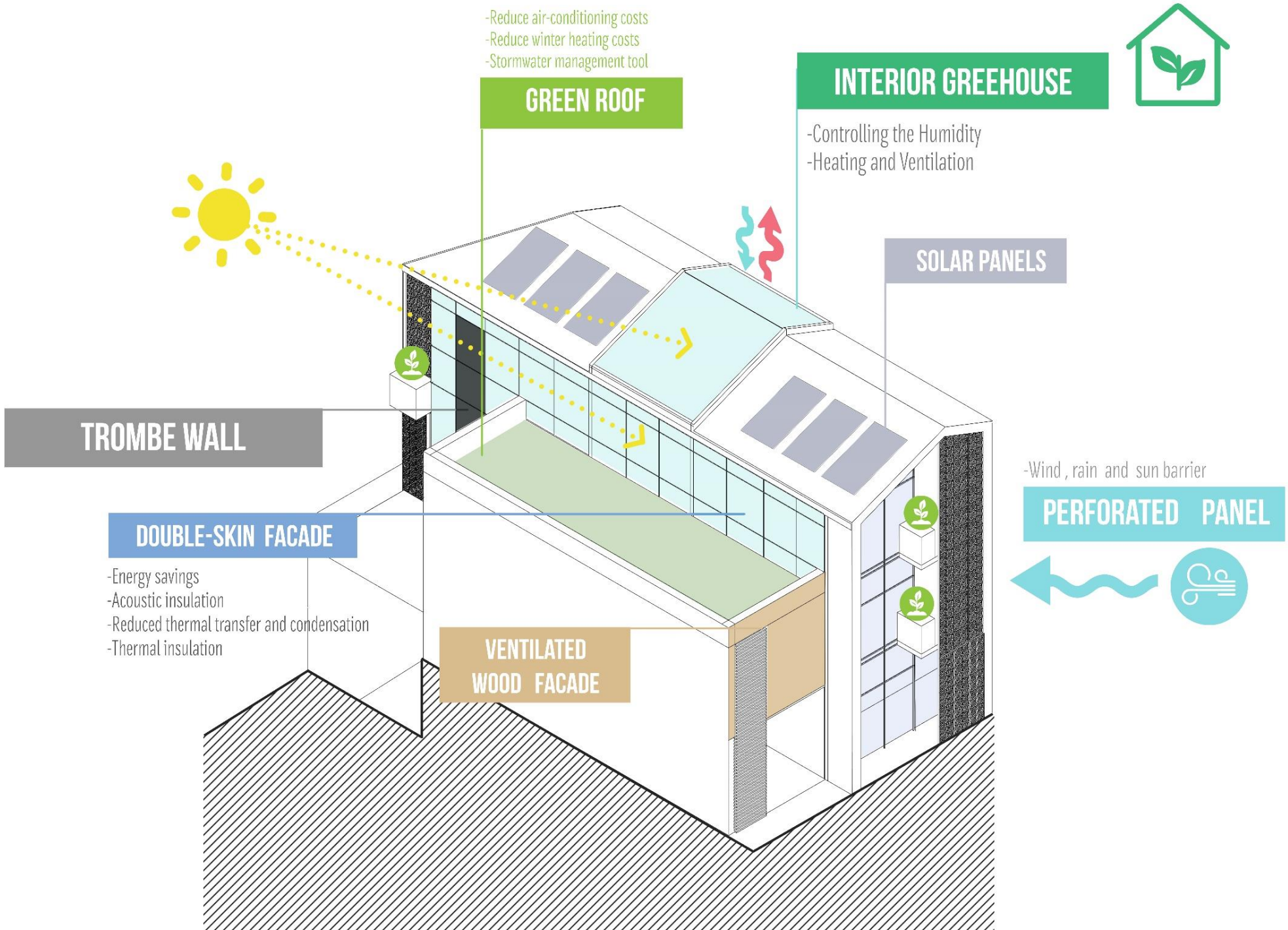
DOUBLE-SKIN FACADE

-Energy savings
-Acoustic insulation
-Reduced thermal transfer and condensation
-Thermal insulation

VENTILATED WOOD FACADE

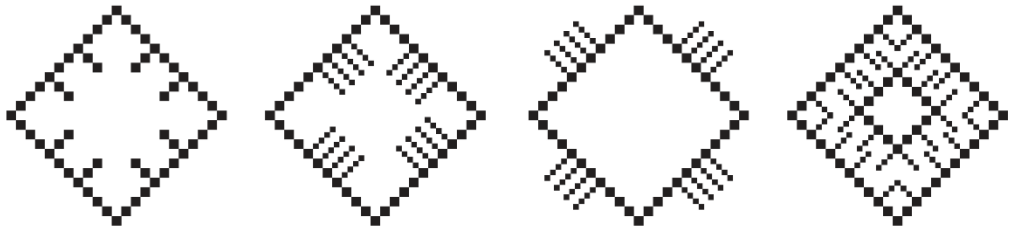
-Wind , rain and sun barrier

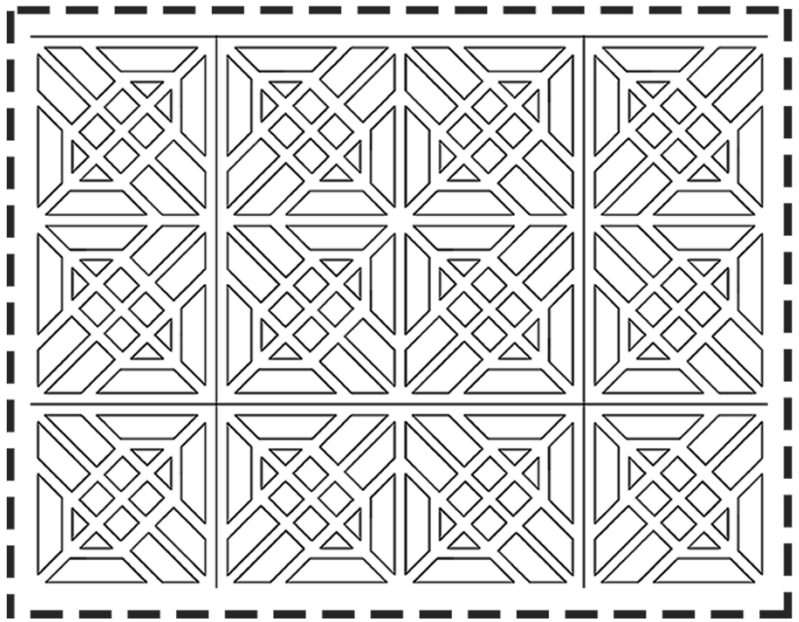
PERFORATED PANEL



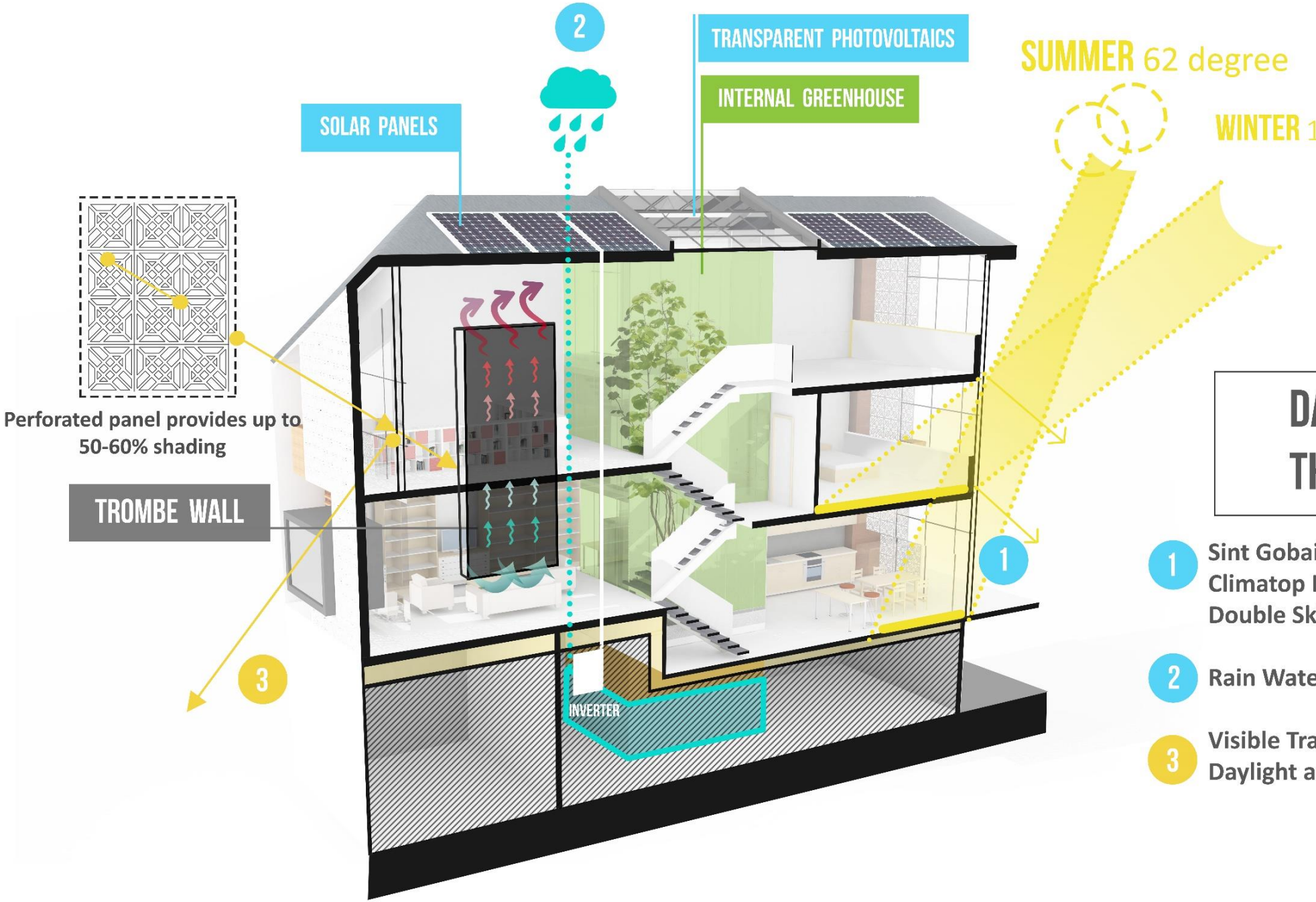
TRADITION VS. MODERNITY

THE SYMBOLISM
OF THE BELARUSIAN
ORNAMENT





SHADING PANEL



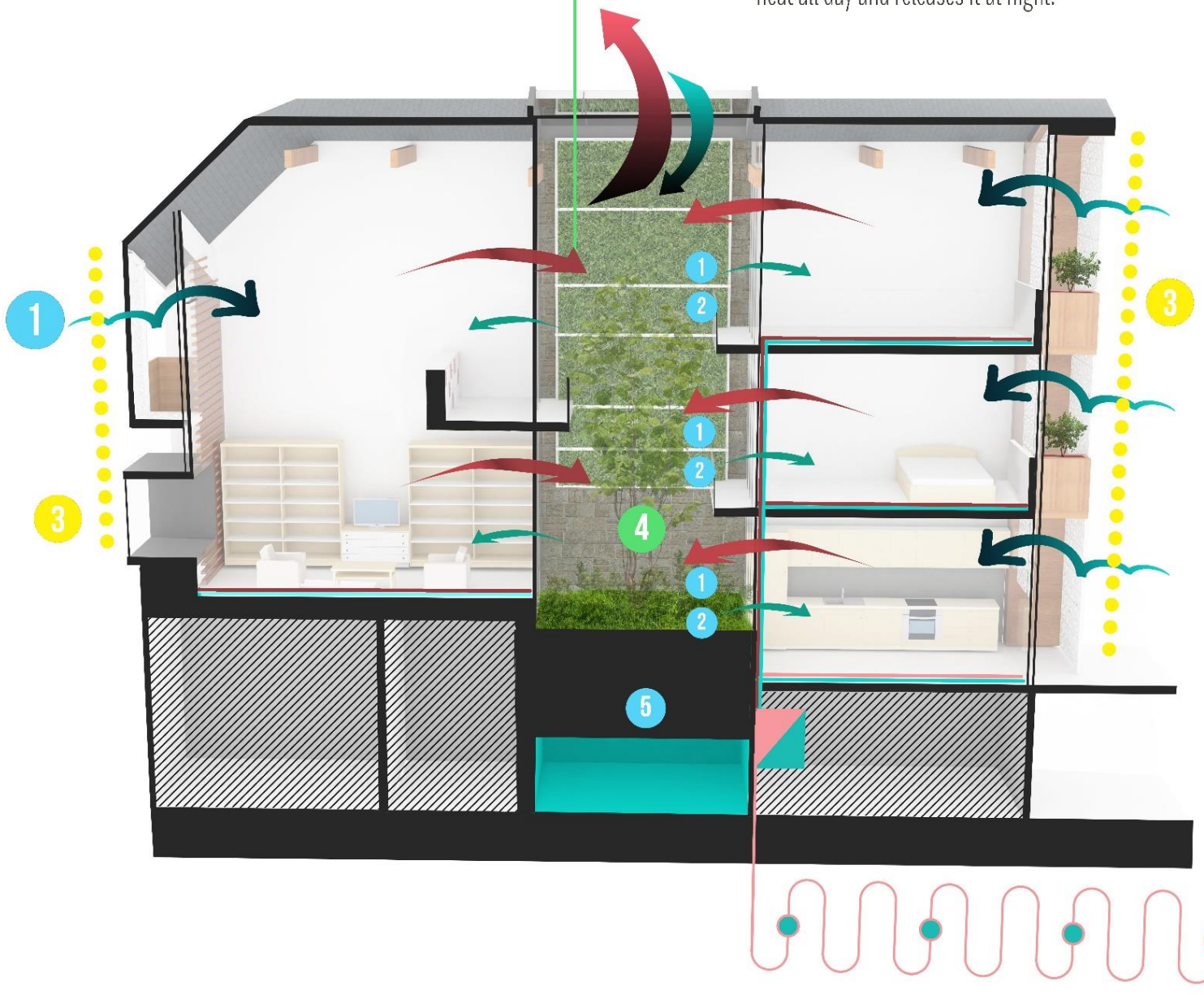
DAYLIGHTING AND THERMAL COMFORT

1. Sint Gobain Triple glazing U = 0.73 W/m²K
   Climatop LUX , 42 mm
   Double Skin Facade
2. Rain Water collector
3. Visible Transmitance : 73%
   Daylight autonomy: > 62%

GREEN WALL

STONE WALL

acting like a **thermal mass** that absorbs heat all day and releases it at night.



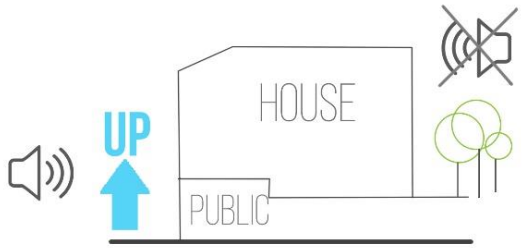
VENTILATION STRATEGY

1. Fresh Air Inlet
2. Air Outlet
3. External Sun Panel Shading
4. Greenhouse acoustic buffer
5. Rainwater storage

Airtightness: 0,6 V/h

Daytime ventilation:
Tilted windows - 25% - 1h
Night time ventilation -
Opened windows - 25% - 1h

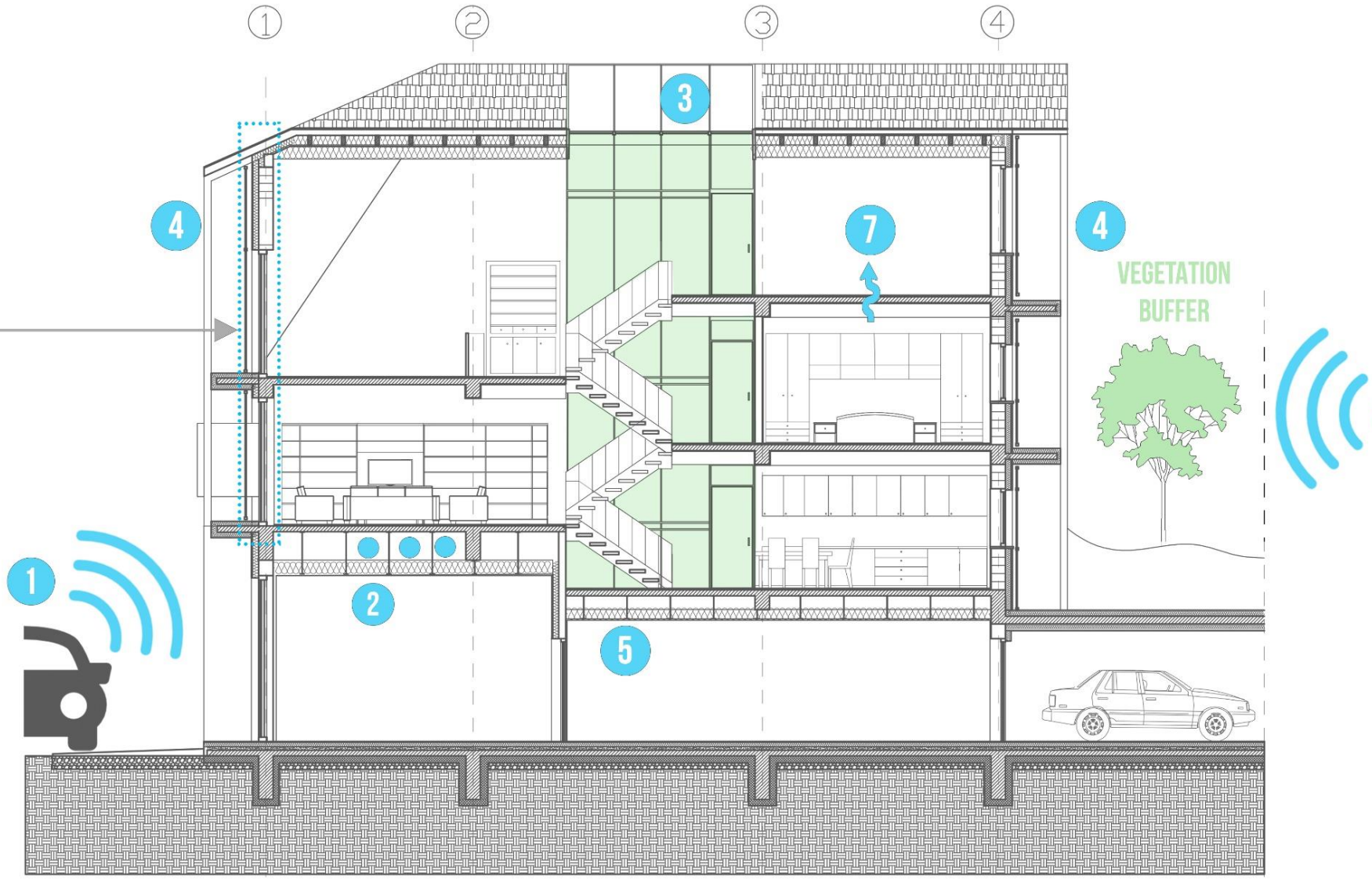
ACOUSTIC COMFORT



DOUBLE - SKIN FACADE

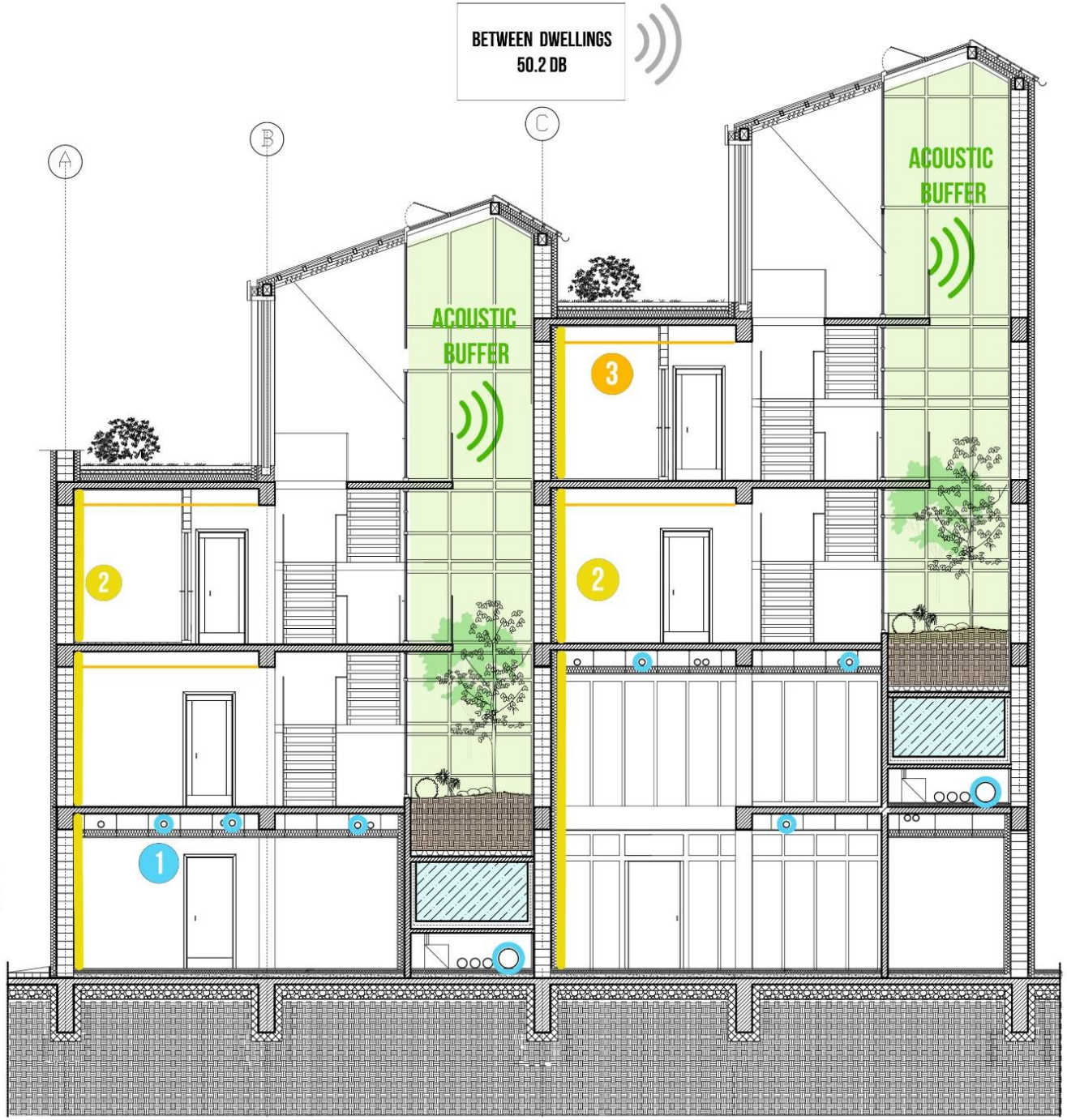
SAINT GOBAIN TRIPPLE GLAZING
CLIMATOP LUX, 35DB
42 MM , 0.73 W/M²K
U < 0.75W/M²K

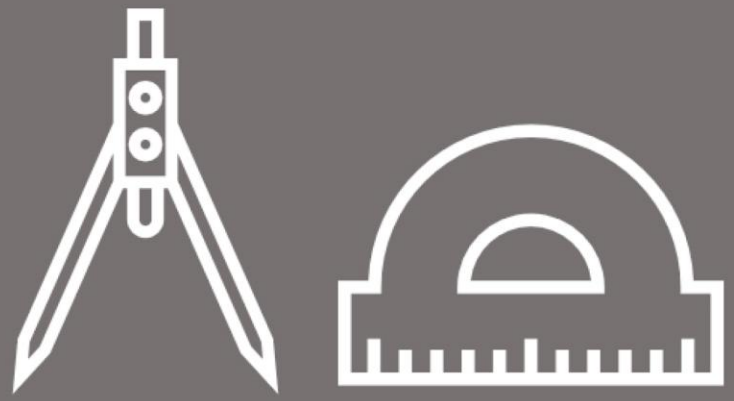
1. Background noise: (street - cars) 67 dB
2. Saint - Gobain PAM global RML ventilation pipes
3. Greenhouse acoustic buffer
4. Perforated panel
5. Sound absorbing false ceiling
   Acoustic insulation ISOVER Acoustics TP 1 25 dB
6. Background noise (inner courtyard) 31.5 dB
7. Insulation between rooms - 45 dB



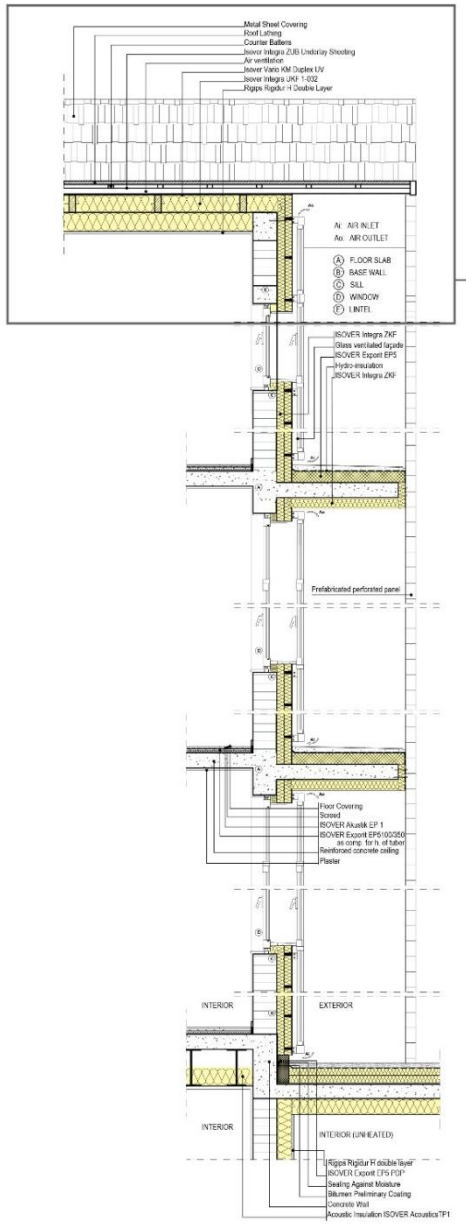
FIRE SAFETY

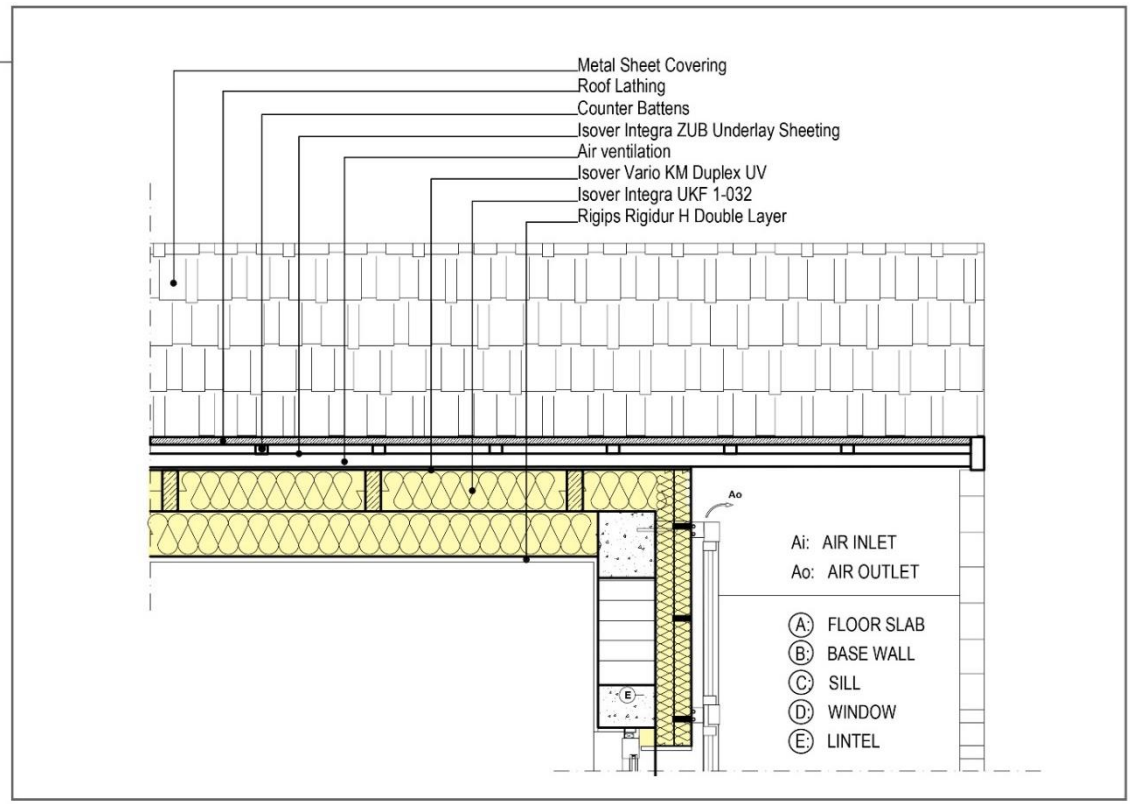
1. ISOVER ULTIMATE Protect (U Protect) FOR fire resistant ducts . Circular ducts - up to 2 hours fire resistance
2. Isover Protect BSF viscous fire safety paint
3. ISOVER EPS boards for insulating cellar ceilings, λ d = 0.032 W/(mK), Fire behaviour: Euroclass E





3. DETAILS


Metal Sheet Covering
Roof Lathing
Counter Battens
Isover Integra ZUB Underlay Sheeting
Air ventilation
Isover Vario KM Duplex UV
Isover Integra UKF 1-032
Rigips Rigidur H Double Layer
Ai: AIR INLET
Ao: AIR OUTLET
A FLOOR SLAB
B BASE WALL
C SILL
D WINDOW
E LINTEL
ISOVER Integra ZKF
Glass ventilated façade
ISOVER Expoint EPS
Hydro-insulation
ISOVER Integra ZKF
Prefabricated perforated panel
Floor Covering
Screed
ISOVER Akustik EP 1
ISOVER Expoint EPS-W25P
as comp. for h. of fabric
Reinforced concrete ceiling
Plaster
INTERIOR
EXTERIOR
INTERIOR
INTERIOR (UNHEATED)
Rigips Rigidur H double layer
ISOVER Expoint EPS PDP
Sealing Against Moisture
Bitumen Preliminary Coating
Concrete Wall
Acoustic Insulation ISOVER Acoustica TP1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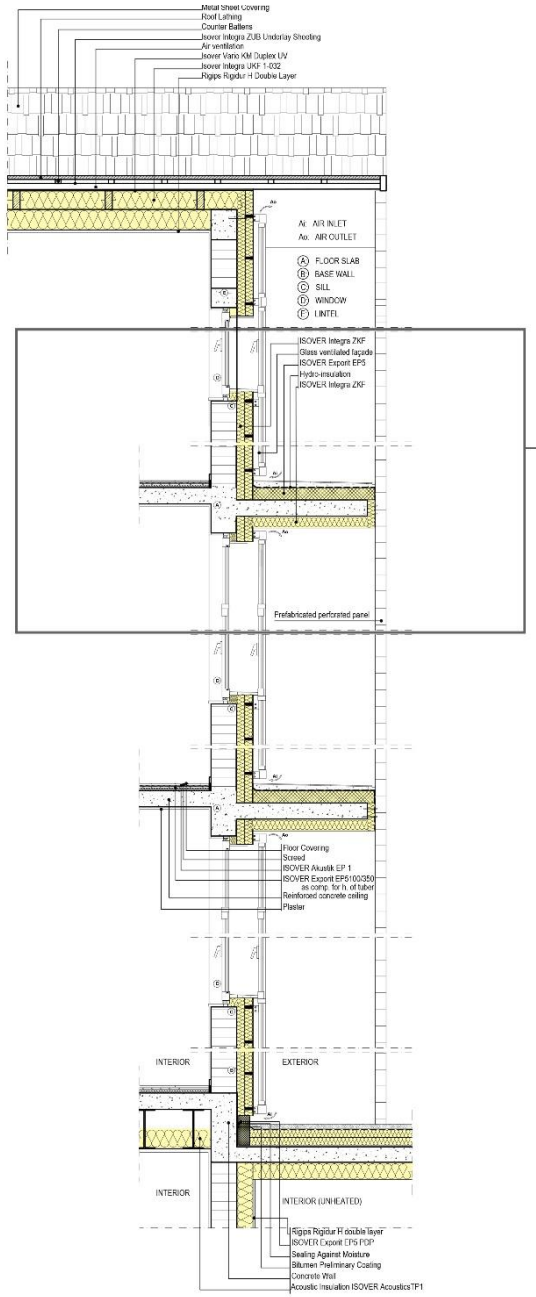
Ao: AIR OUTLET
A: FLOOR SLAB
B: BASE WALL
C: SILL
D: WINDOW
E: LINTEL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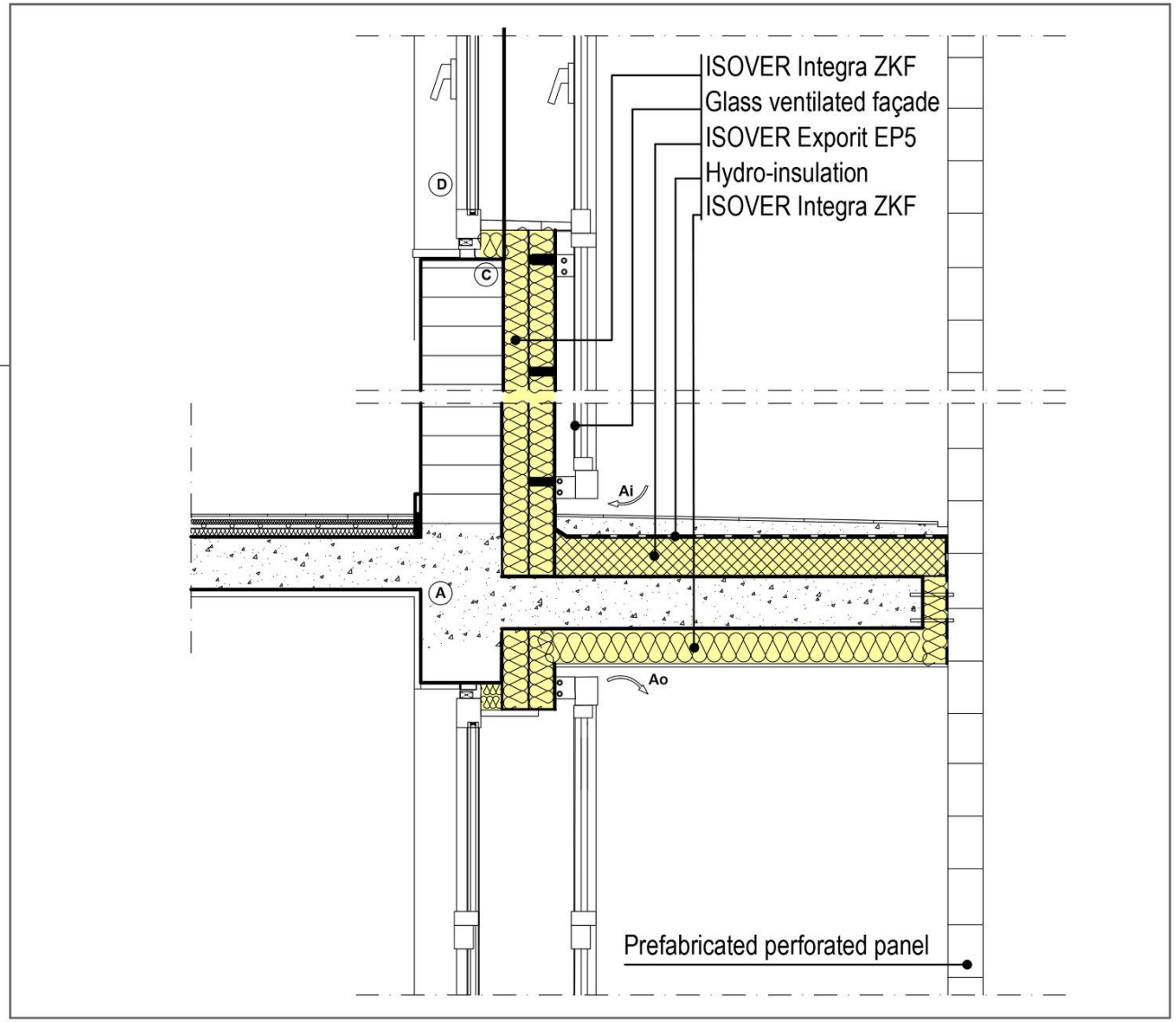
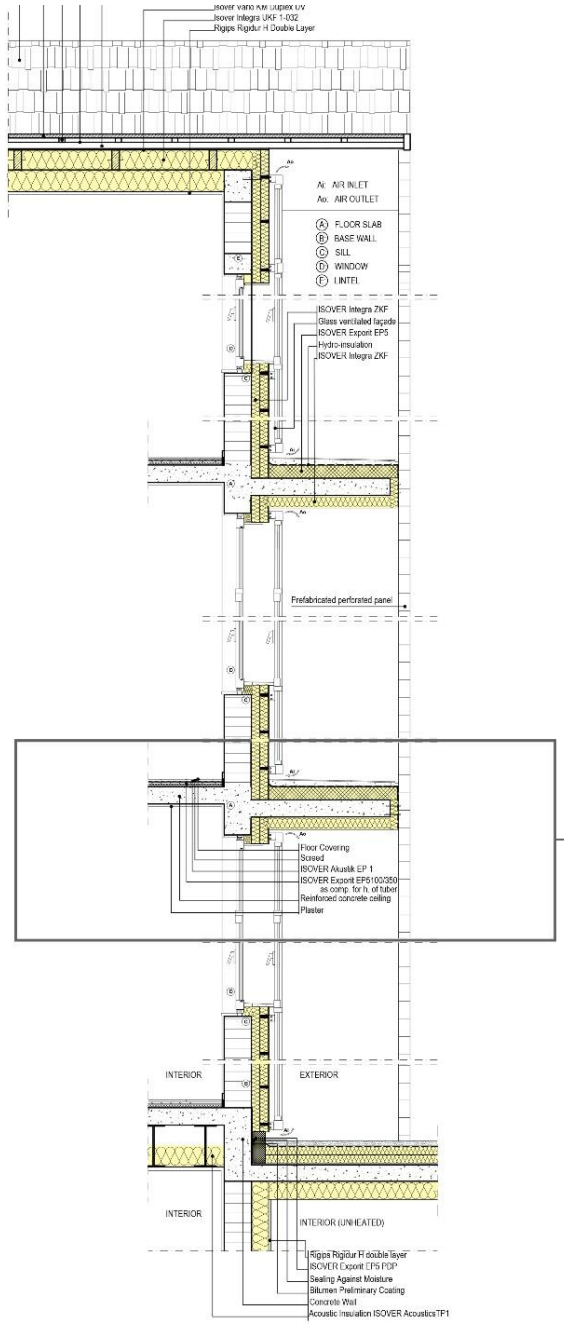
Air ventilation
Isover Vario KM Duplex UV
Isover Integra UKF 1-032
Rigips Rigidur H Double Layer
Ai AIR INLET
Ao AIR OUTLET
A FLOOR SLAB
B BASE WALL
C SILL
D WINDOW
F LINTEL
ISOVER Integra ZKF
Glass ventilated façade
ISOVER Exporit EP5
Hydro-insulation
ISOVER Integra ZKF
Prefabricated perforated panel
Floor Covering
Screed
ISOVER Akustik EP 1
ISOVER Exporit EPS100/350
as comp. for h. of tuber
Reinforced concrete ceiling
Plaster
INTERIOR
EXTERIOR
INTERIOR
INTERIOR (UNHEATED)
Rigips Rigidur H double layer
ISOVER Exporit CPS PGP
Sealing Against Moisture
Bitumen Preliminary Coating
Concrete Wall
Acoustic Insulation ISOVER Acoustics TP1


ISOVER Integra ZKF
Glass ventilated façade
ISOVER Exporit EP5
Hydro-insulation
ISOVER Integra ZKF
D
C
A
Ai
Ao
Prefabricated perforated panel


Isover Integra UKF 1-032
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Ai AIR INLET
Ao AIR OUTLET
A FLOOR SLAB
B BASE WALL
C SILL
D WINDOW
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Glass ventilated façade
ISOVER Exporit EPS
Hydro-insulation
ISOVER Integra ZKF
Prefabricated perforated panel
Floor Covering
Screed
ISOVER Akustik EP 1
ISOVER Exporit EP5100/350
as comp. for h. of tuber
Reinforced concrete ceiling
Plaster
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EXTERIOR
INTERIOR
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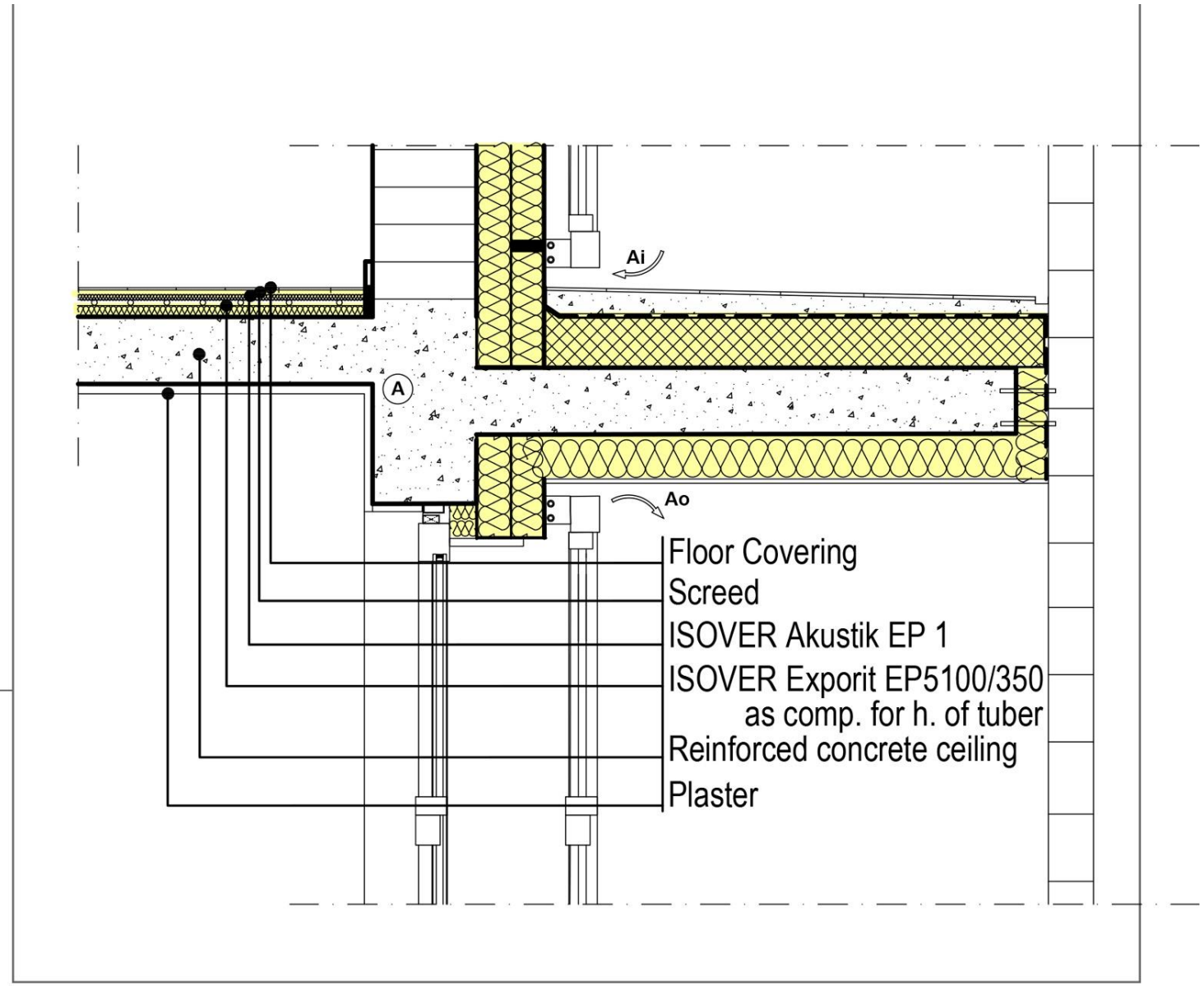
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A
Ao
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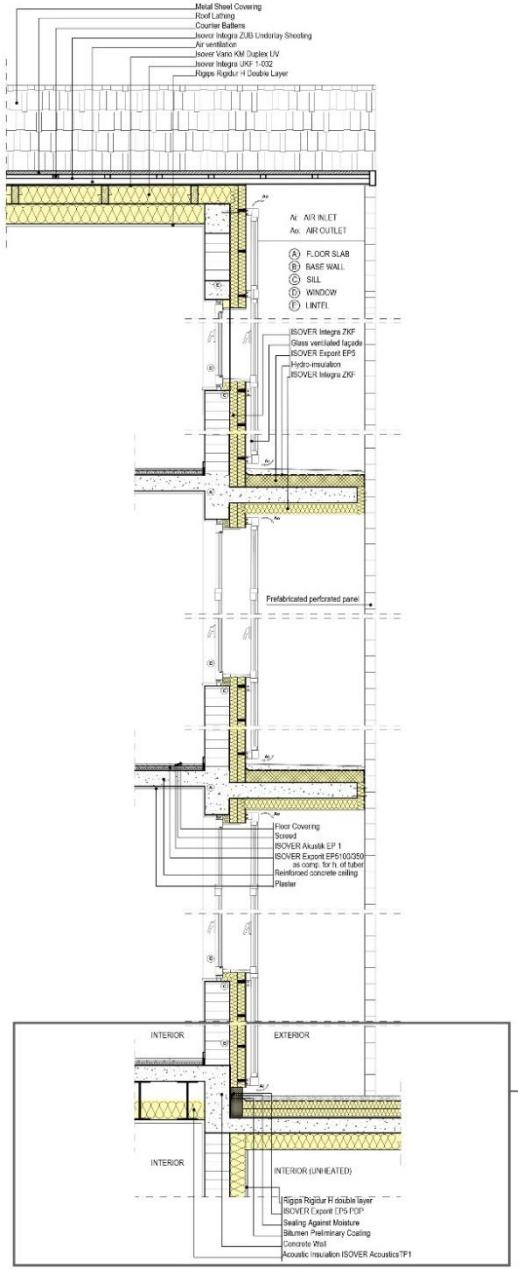
ISOVER Exporit EP5100/350
as comp. for h. of tuber
Reinforced concrete ceiling
Plaster


Metal Sheet Covering
Roof Lathing
Courrier Battens
Isover Integra ZUB Underlay Sheeting
Air ventilation
Isover Vario KM Duplex UV
Isover Integra ZKF 1-032
Rigips Rigidur H Double Layer
Ai AIR INLET
Ao AIR OUTLET
A FLOOR SLAB
B BASE WALL
C SILL
D WINDOW
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ISOVER Integra ZKF
Glass ventilated façade
ISOVER Exporit EP5
Hydro-insulation
ISOVER Integra ZKF
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Floor Covering
Screed
ISOVER Akustik EP 1
ISOVER Exporit EP5 (100/350)
as comp. for h. of tuber
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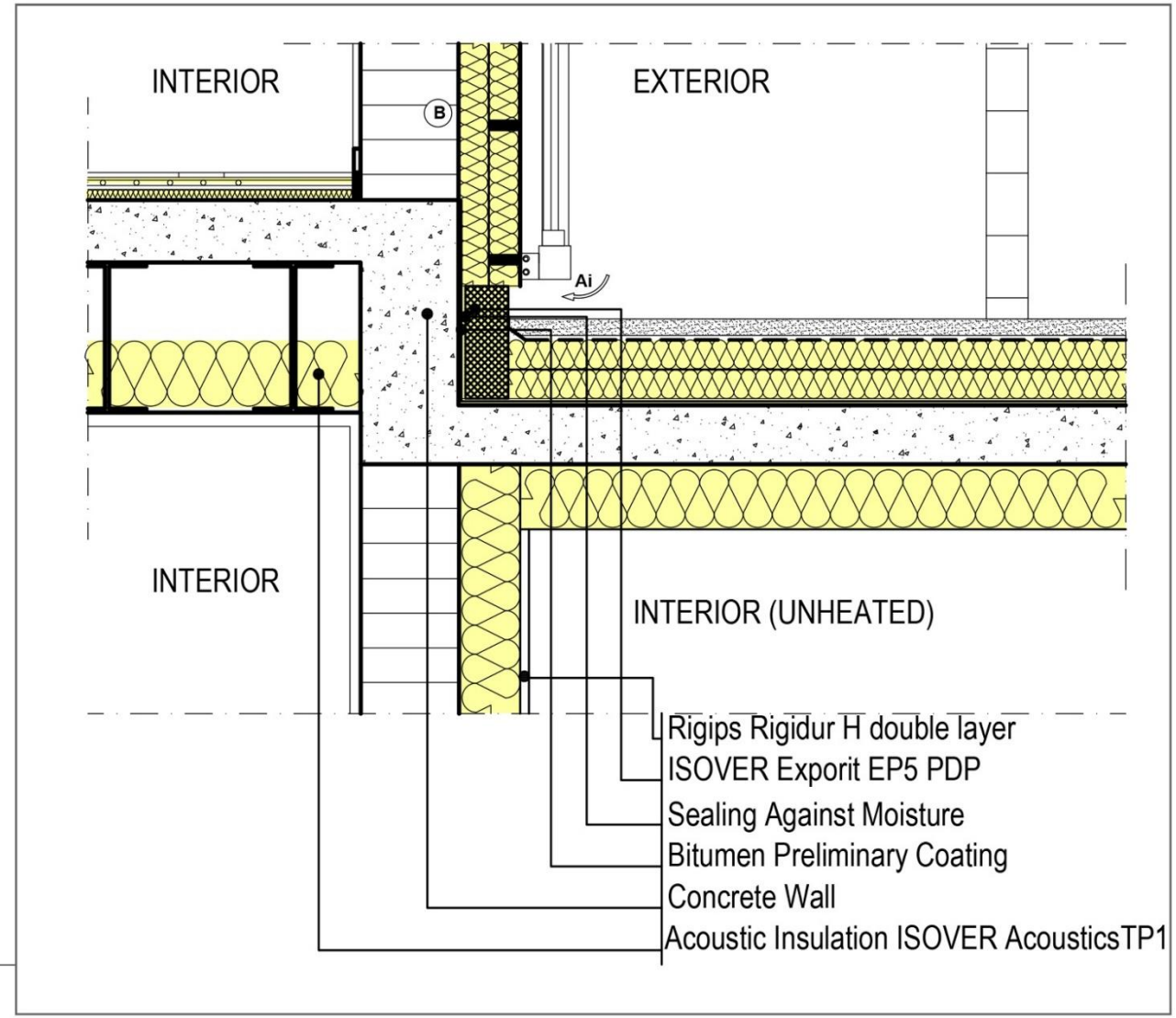
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B
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Concrete Wall
Acoustic Insulation ISOVER AcousticsTP1

USAGE

Building: Type: Residential

Usage: For living

Design Temperature: 20°

AREA INPUT

Heated Space Area: 141.10 m2

Heated Space Volume: 400.56 m3

QUALITY

Thermal Bridge - Free:

Airtightness Rate: 0.30

WINDOWS/DOORS – U VALUE

Windows: 0.73 W/(m2K)

Doors: 0.80 W/(m2K)

HVAC - SYSTEM PERFORMANCE

Heat Recovery Systems : 95.00 %

Subsoil Heat Exchanger: 33.00 %

OVERHEATING

Exterior Thermal Transmittance: 35.71 W/K

Ground Thermal Transmittance: 9.60 W/K

Ventilation Transmittion Ambient: 14.41 W/K

Solar Aperture: 10.05 m2

SPECIFIC HEAT DEMAND

Transmission Heat Losses: 4262.13 kWh/a

Ventilation Heat Losses: 491.58 kWh/a

Total Heat Losses: 4753.71 kWh/a

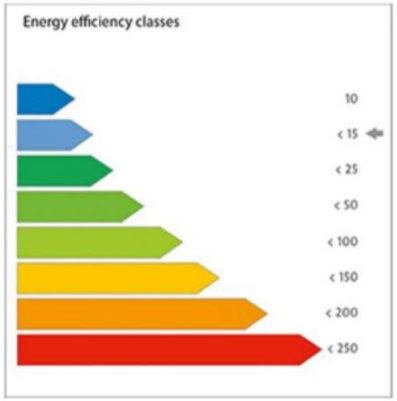
Internal Heat Gains: 1770.04 kWh/a

Solar Heat Gains: 737.53 kWh/a

Total Heat Gains: 2458.11 kWh/a

Annual Heat Demand: 2295.61 kWh/a

Specific Heat Demand: 14.25 kWh/(m2a)



4. MULTIFAMILY HOUSES

45 DEGREE ORIENTATED

USING THE SAME STRATEGIES AS IN THE ROW HOUSING CASE

GREENHOUSE

INNER COURTYARD FOR INHABITANTS

COMMERCIAL FUNCTIONS


Дзякуй!
Thank you!