ARCHITECTURE STUDENT CONTEST

19th INTERNATIONAL EDITION, HELSINKI 2024

Faculty of Architecture of the University of Porto
Prof. Clara Pimenta do Vale | Team n°11

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Portugal

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Portugal

SIENI PARK

VIIKKI'S SITE ANALYSIS

URBAN GREEN AREA

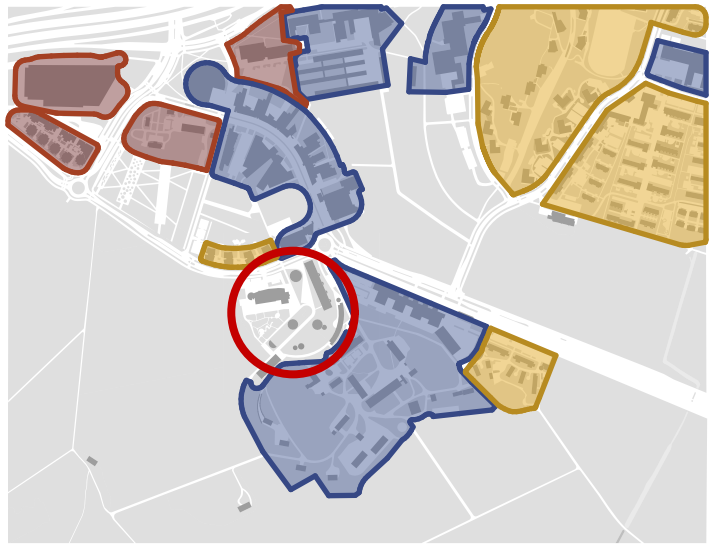
RURAL GREEN AREA

DENSE GREEN AREA

PEDESTRIAN WALKWAYS

TRAM LINE

BAANA CYCLING ROUTE

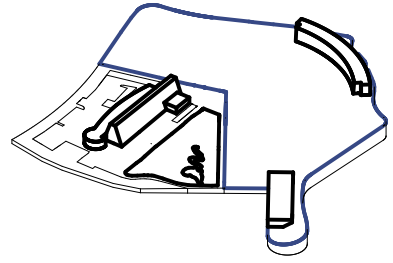


UNIVERSITY / WORKPLACE AREA

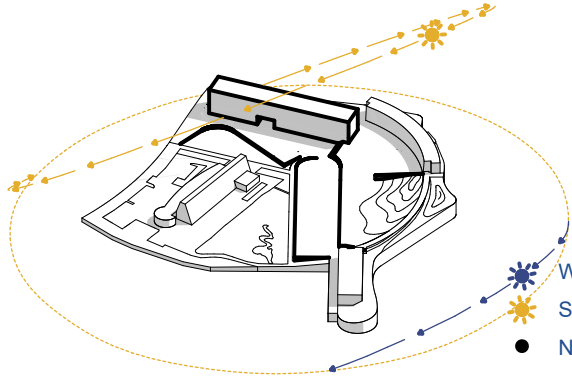
SERVICES

RESIDENCIAL AREA

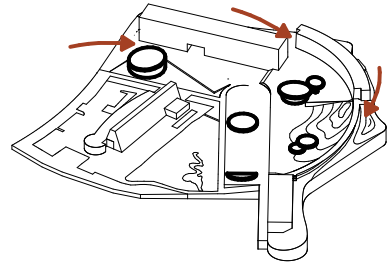
MASTER PLAN



- Intervention area
- Existing buildings

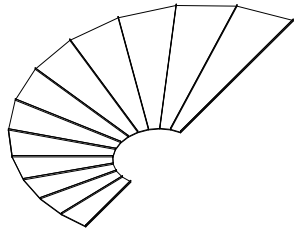


- Winter solstice
- Summer solstice
- New construction

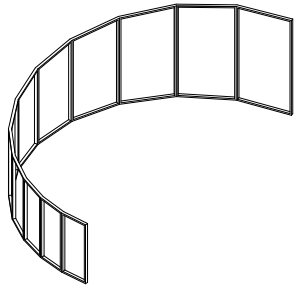


- Main entry points
- Sieni

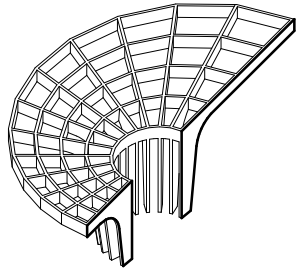
SIENI *(the mushroom)*



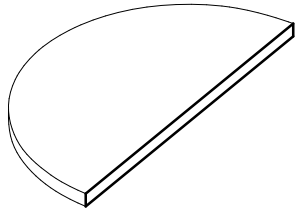
Sloped Zinc Roof for water collection with Foam Glass insulation (recycled from the demolished building) for better thermal and accoustic confort inside



COOL-LITE SKN 176 (Low Carbon Footprint Glass Façade)



Glulam Load-Bearing Structure with interlocking rings for minimum wood deformation, extending the life span of the structure



ULTIBAT GREEN PREMIUM concrete foundation slab (35% lower emissions than standard concrete)


zone A
CURVE

YELLOWRED
DEMOLITION AND NEW CONSTRUCTION

TO BE DEMOLISHED

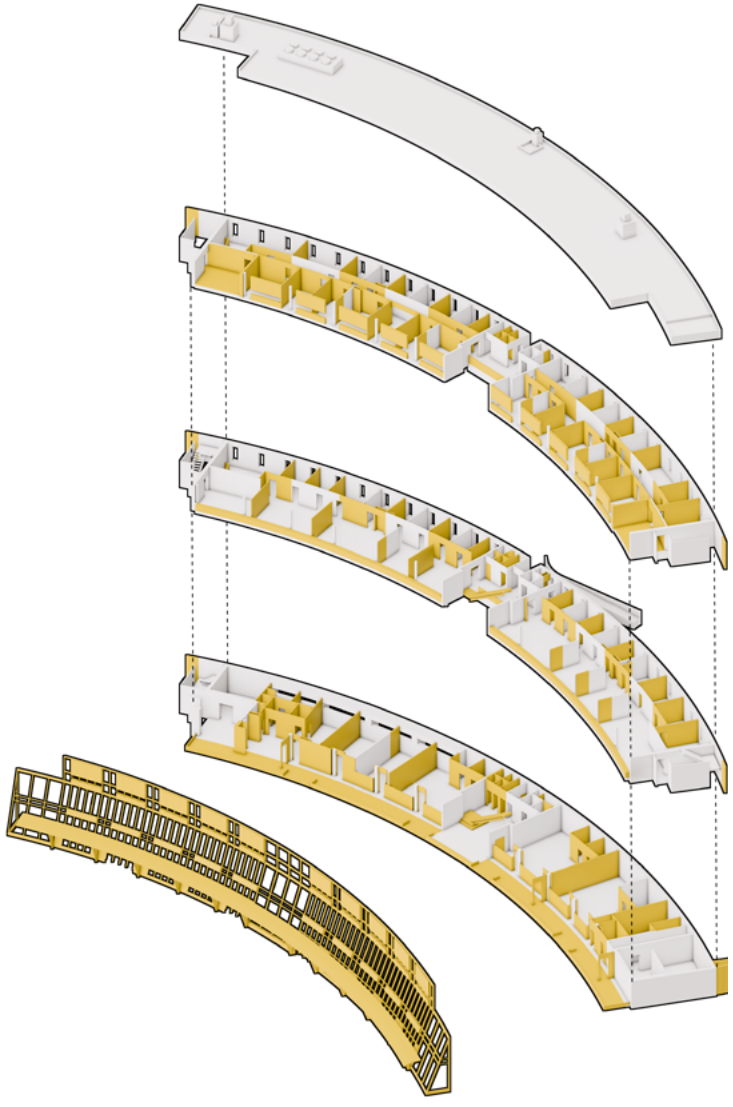
Our decision was to selectively demolish only the elements that were going against the new program and needs, reflecting a commitment to sustainability, and respect for the building's original architecture. The old façade was demolished as it did not fit the new environment.

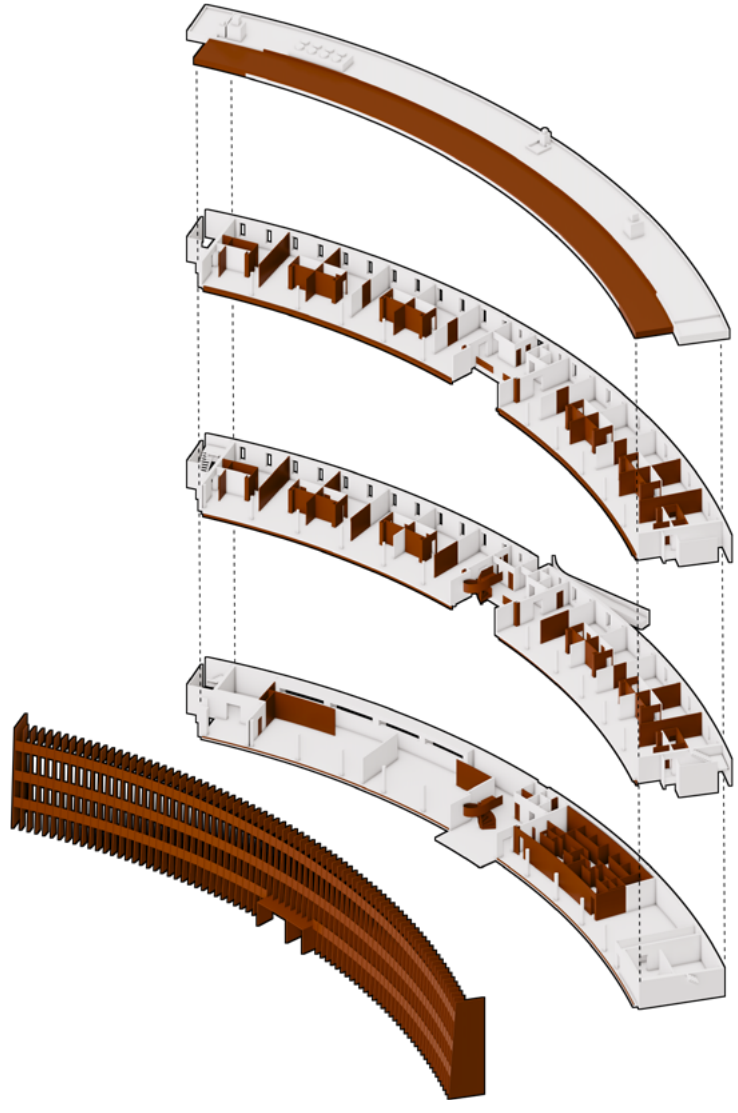
EXISTING

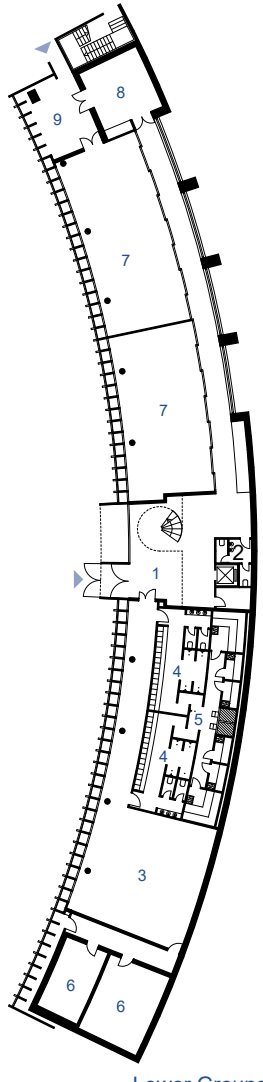
The rehabilitation involved a thoughtful approach to maintaining all structural elements and distinctive architectural features.

NEW

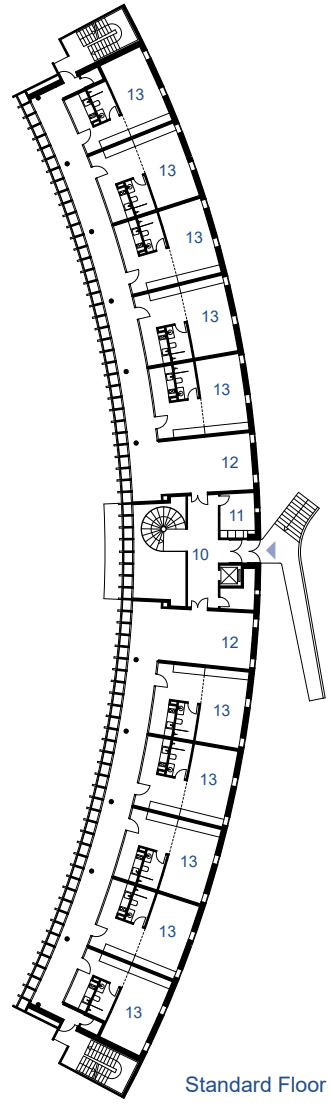
To revitalize the building, our aim was to enhance natural lighting and establish practical studio areas. We also integrated better thermal and acoustic insulation to ensure that the rooms are comfortable for residents to both live and work. The new façade presents a greener approach and is more connected to the new context.





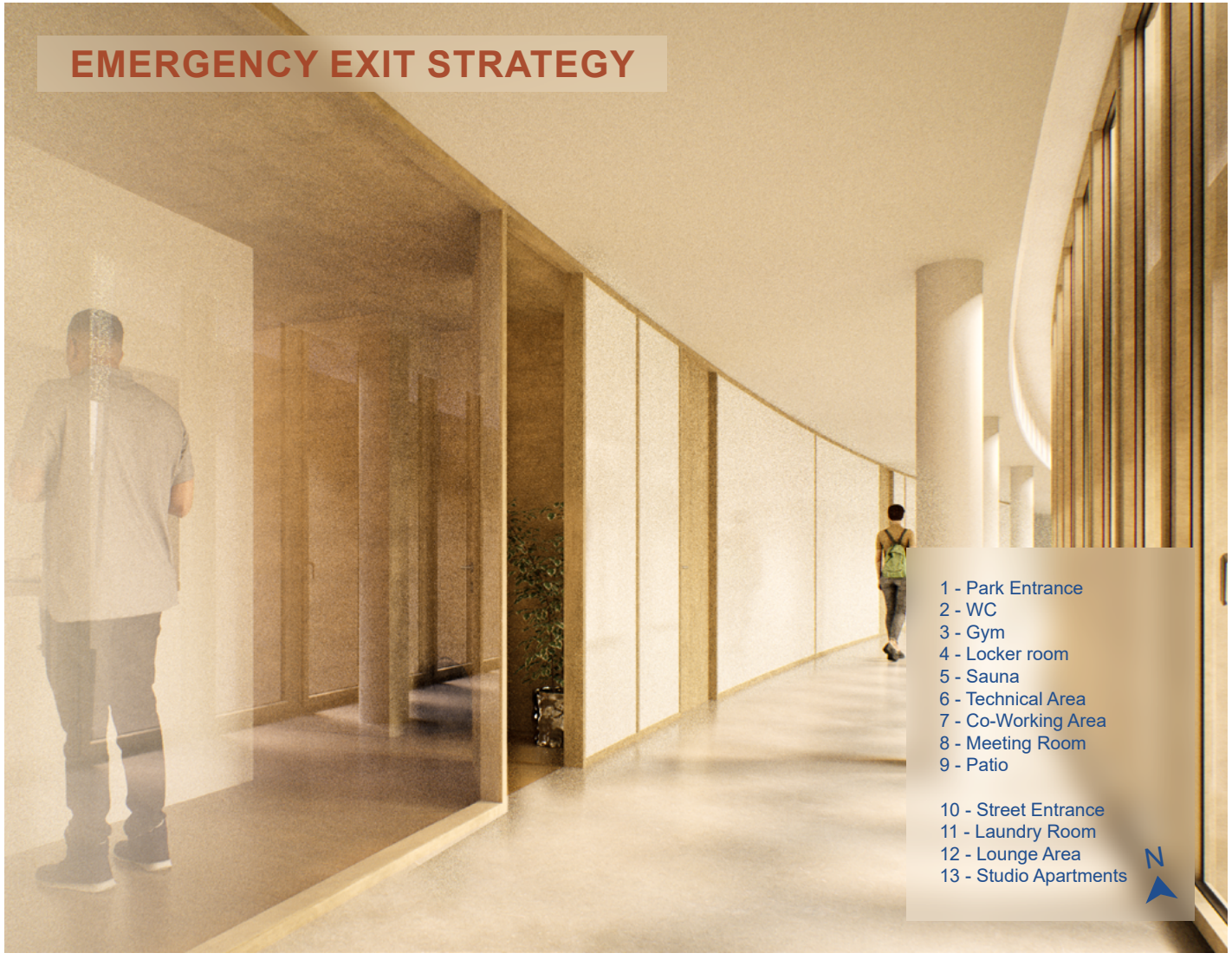


Lower Ground Floor



Standard Floor

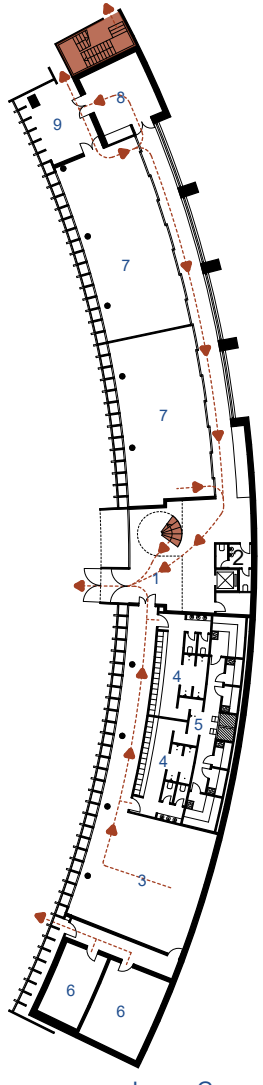
EMERGENCY EXIT STRATEGY



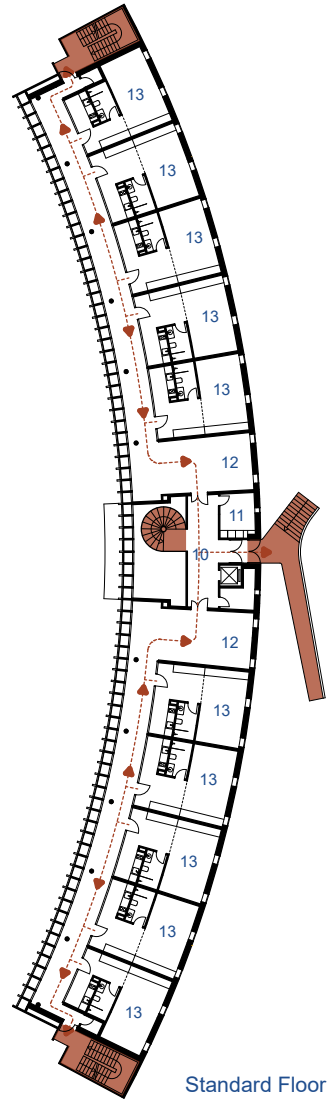
1 - Park Entrance
2 - WC
3 - Gym
4 - Locker room
5 - Sauna
6 - Technical Area
7 - Co-Working Area
8 - Meeting Room
9 - Patio

10 - Street Entrance
11 - Laundry Room
12 - Lounge Area
13 - Studio Apartments

N

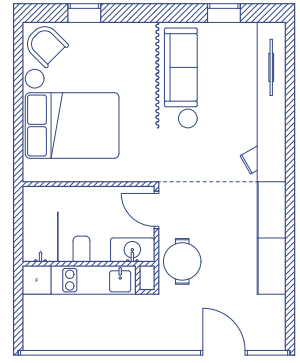


Lower Ground Floor



Standard Floor

The studio was designed to maximize natural light and ventilation. Each module features two windows in the private areas facing the street. In the more social spaces, there is a PRIVA-LITE *glass façade, that turns translucent, so that the resident can choose when he wants more or less transparency to the sunny corridor and the park. This encourages a sense of community among the residents of the studios.*



42m²

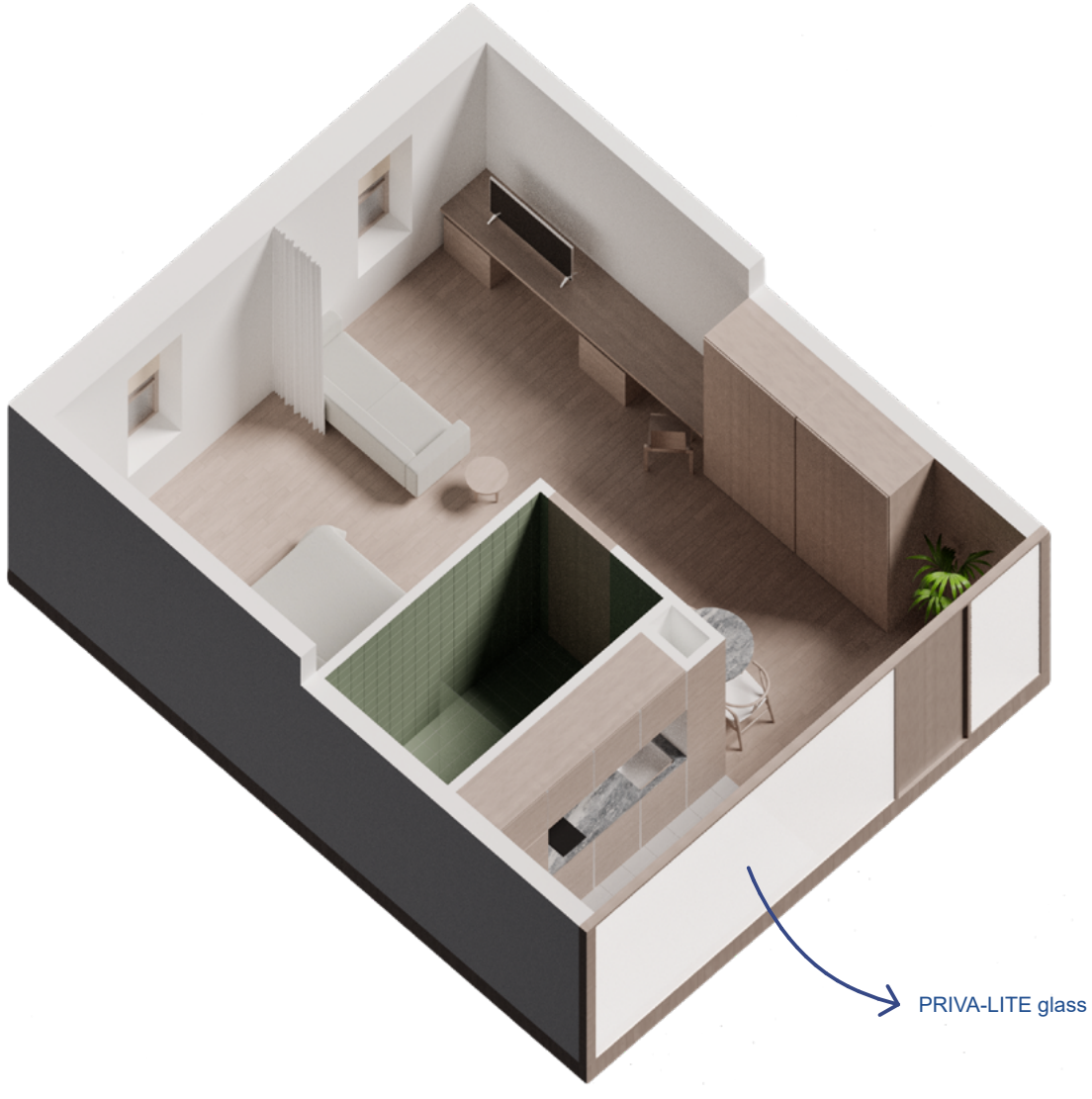
STUDIO APARTMENT

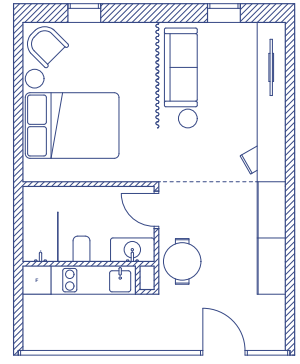
Entrance hall
Kitchen
Dining room area
Living room area
Office area
Bedroom area
Bathroom
Storage

sunrise and sunset views

ecophon SAINT-GOBAIN
glassolutions SAINT-GOBAIN
weber SAINT-GOBAIN
gyproc SAINT-GOBAIN
isover SAINT-GOBAIN

The studio was designed to maximize natural light and ventilation. Each module features two windows in the private areas facing the street. In the more social spaces, there is a PRIVA-LITE *glass façade, that turns translucent, so that the resident can choose when he wants more or less transparency to the sunny corridor and the park. This encourages a sense of community among the residents of the studios.*





42m²

STUDIO APARTMENT

Entrance hall
Kitchen
Dining room area
Living room area
Office area
Bedroom area
Bathroom
Storage

sunrise and sunset views

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glassolutions SAINT-GOBAIN
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SUSTAINABILITY STRATEGY

The building's sustainability plan uses natural airflow with passive ventilation and a double façade. Insulation walls made from recycled foam glass and better windows help to keep the building comfortable without using active heating or cooling. The extensive green roof accommodates the local biodiversity and helps controlling the indoor temperature. Additionally, the solar panels on the façade provide electricity from sunlight.They can also be moved to shade the corridor when necessary, reducing the need for polluting solutions.

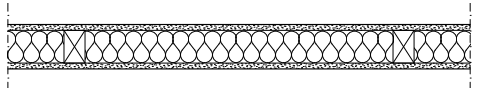
ecophon SAINT-GOBAIN

Leca SAINT-GOBAIN

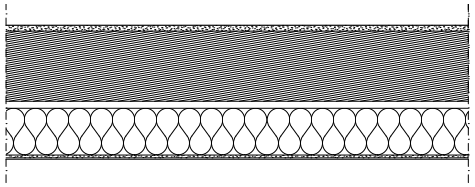
weber SAINT-GOBAIN

gyproc SAINT-GOBAIN

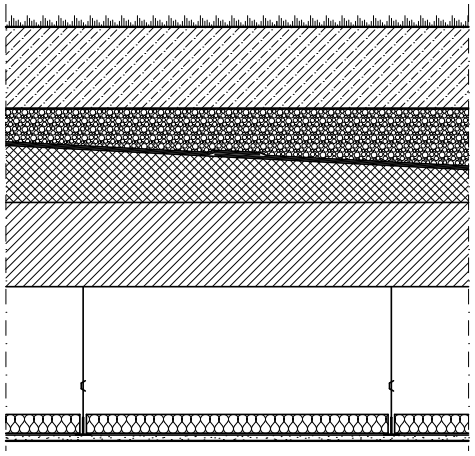
isover SAINT-GOBAIN



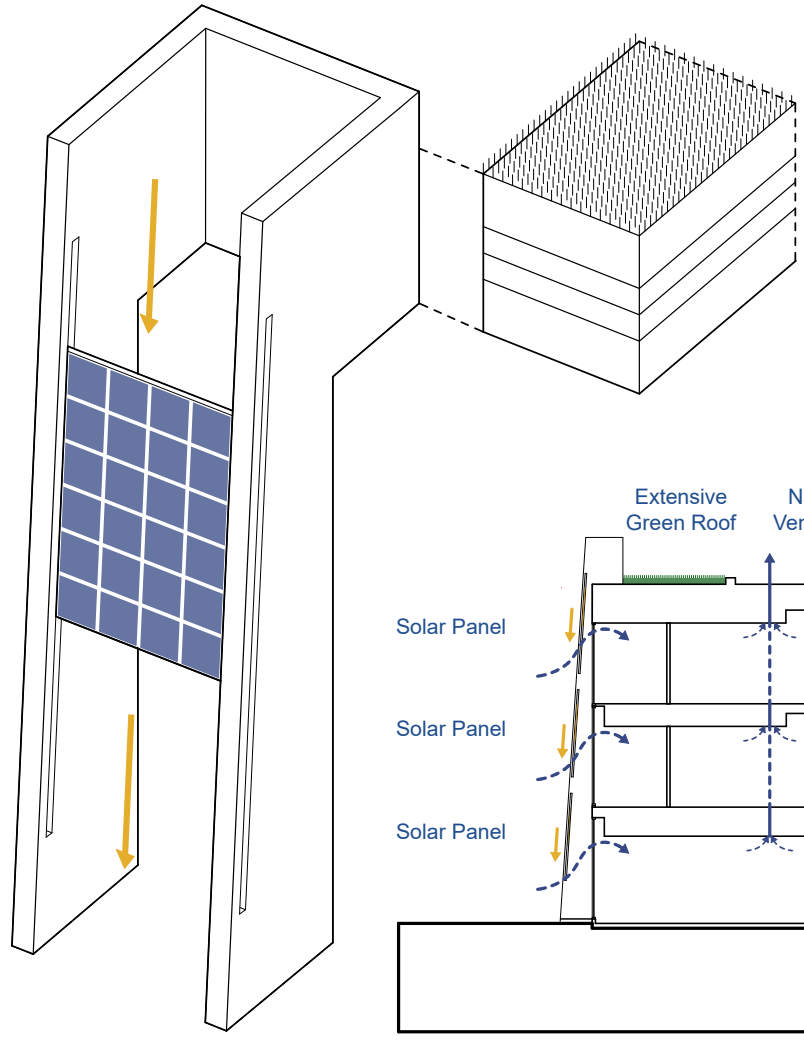
YV22- DIVIDING WALLS
1. 12.5 mm **Gyproc GHE HabitoR**
2. 70 mm Wooden stud, 45x70
3. 70 mm **ISOVER Wooden stud board 35**
4. 12.5 mm **Gyproc GHE HabitoR**

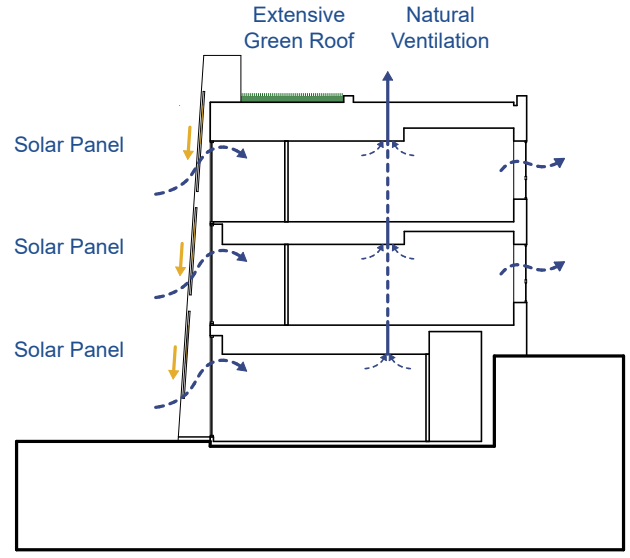


ETICS- STREET FAÇADE
1. Existing concret wall
2. Bonding
3. Thermal insulation
4. Dowels
5. Reinforcment layer
6. Overlay render
7. Paint



ROOF SLAB
1. Substrate **Nutreasy**
2. **Ecofelt PES-SB 150**
3. **Leca D**
4. **Ecofelt PES-SB300**
5. Waterproofing
6. Slope **Leca Uno**
7. Concrete slab (existing)
8. Air gap suspended ceiling
9. **Ecophon Master**
10. **Gyproc GHE 13 HabitoR**

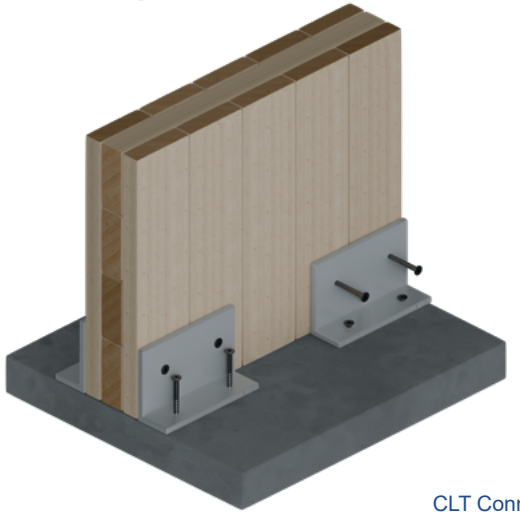




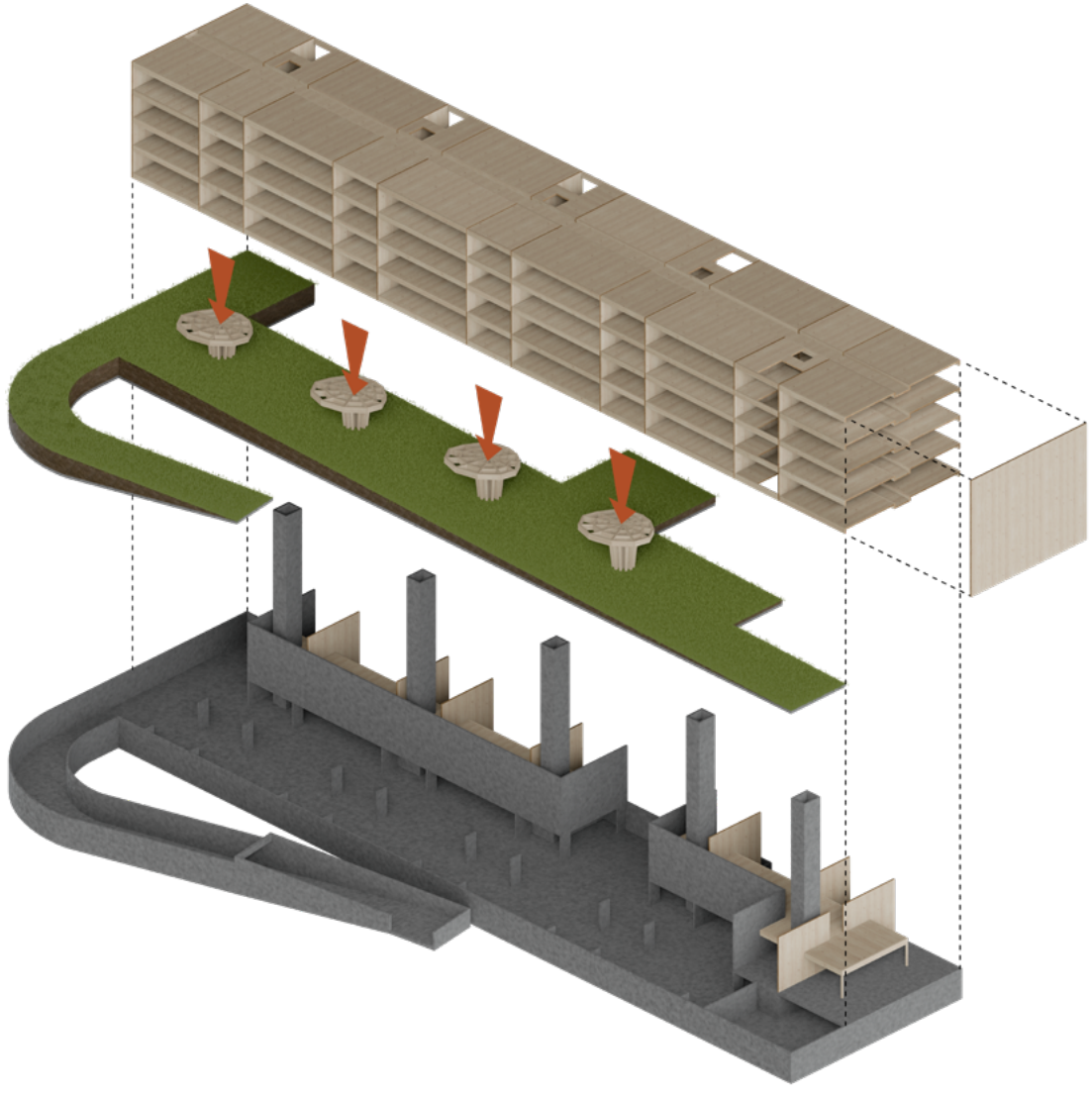
zone **B**

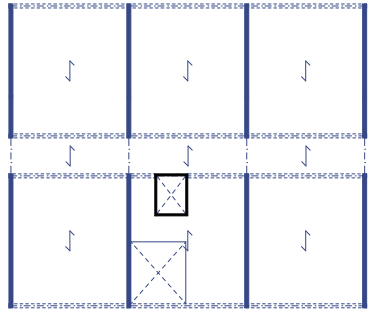
LIVING GREEN

STRUCTURAL DESIGN



CLT Connections

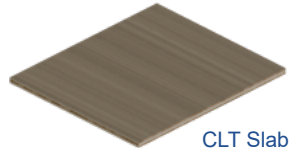




Structural Module

Glulam Beam **x300**

CLT Slab **x89**

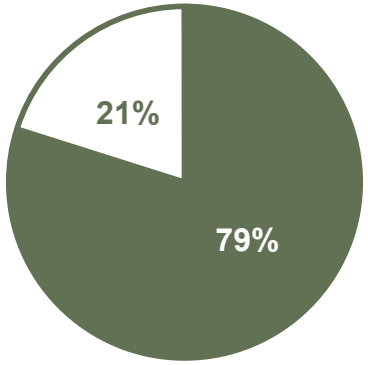


CLT Slab **x155**

CLT Wall **x104**

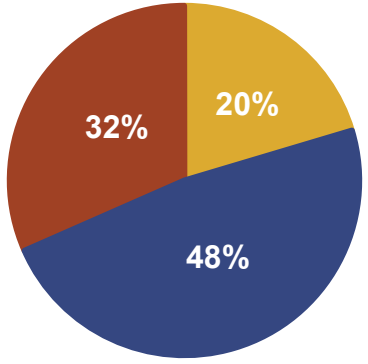
BUILDING ORGANIZATION

Building B is divided into five multifamily blocks, at each entrance, residents will find bicycle parking and access points from either the city or the park, with a connecting mezzanine. Each block features three apartments and a sauna per floor. Residents have access to two communal patios on the rooftop, connected by a walkway that weaves through the green roof.



COMMON AREAS

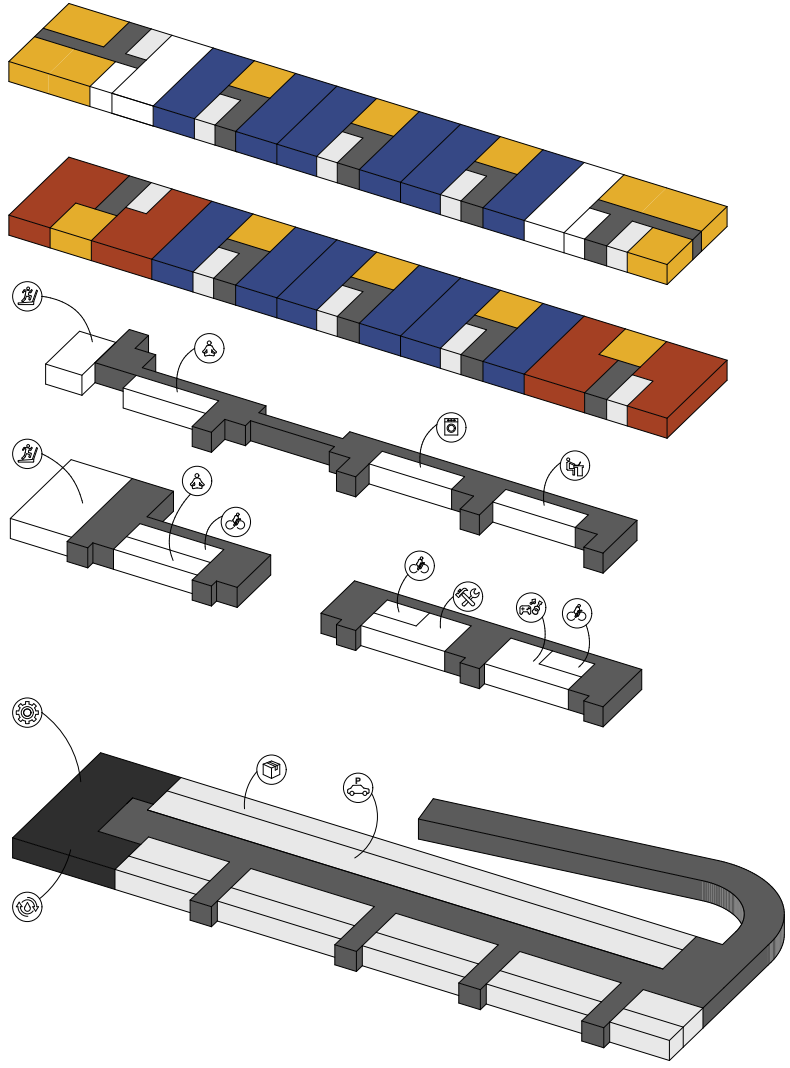
RESIDENCIAL AREAS

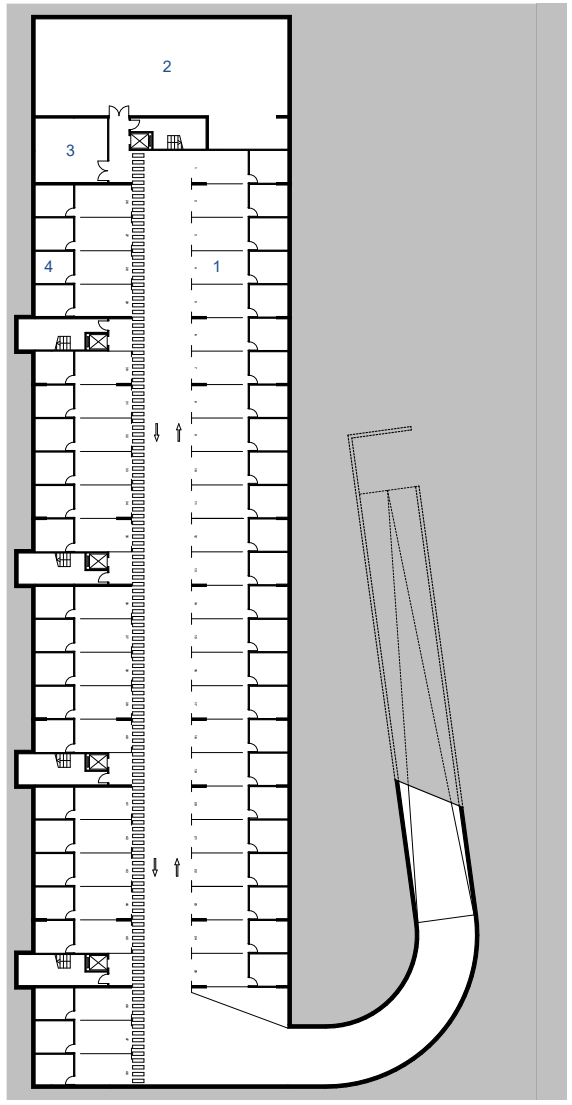


TWO BEDROOM APARTMENTS

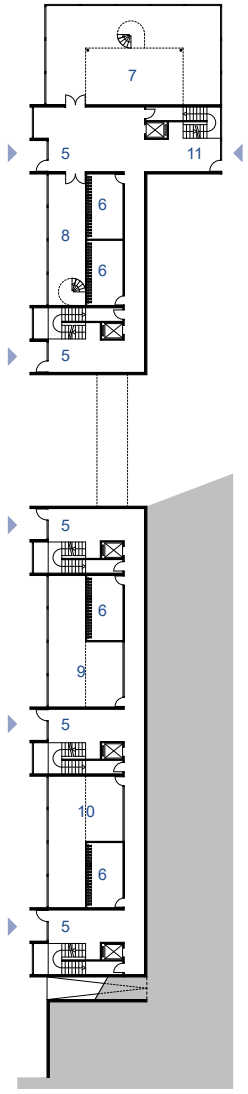
THREE BEDROOM APARTMENTS

STUDIO APARTMENTS

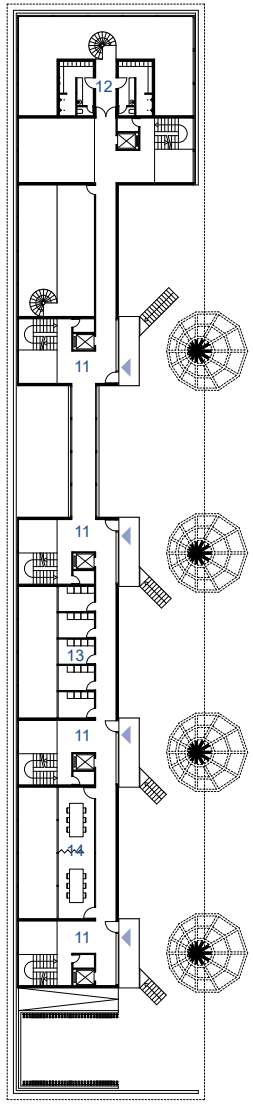




Underground Floor



Lower Ground Floor



Upper Ground Floor

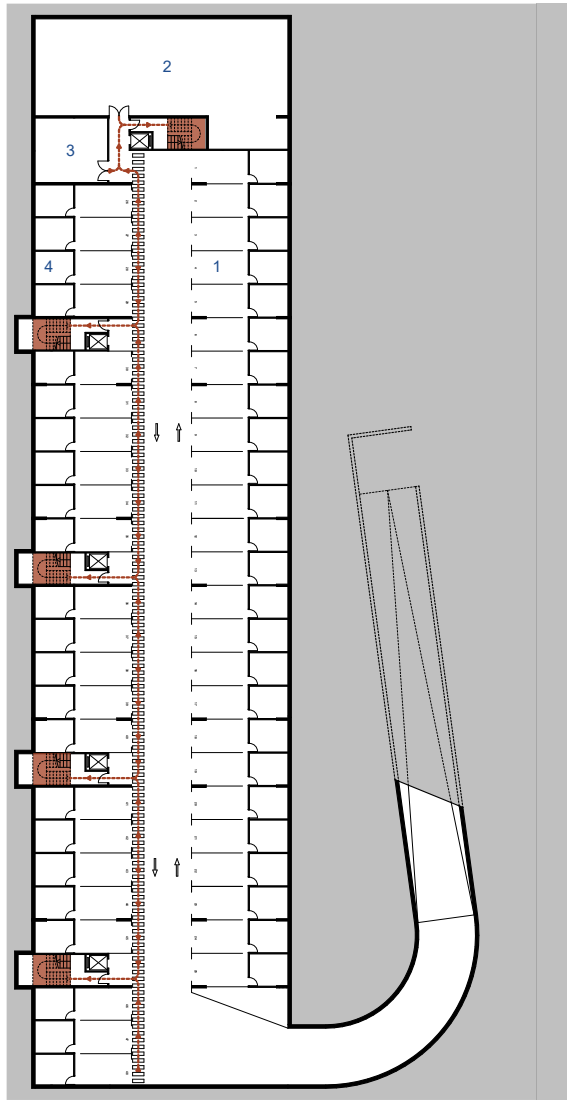
SAINT-GOBAIN

EMERGENCY EXIT STRATEGY

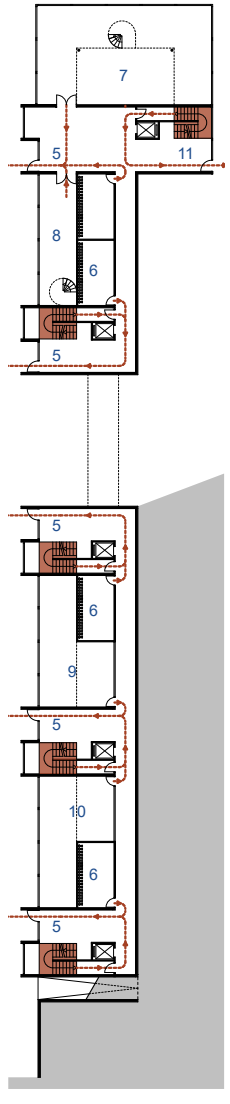
1 - Car parking
2 -Technical area
3 - Water reservoir
4 - Storage units

5 - Park entrance
6 - Bike storage
7 - Gym
8 - Yoga and wellness room
9 - Hobby room
10 - Entertainment room

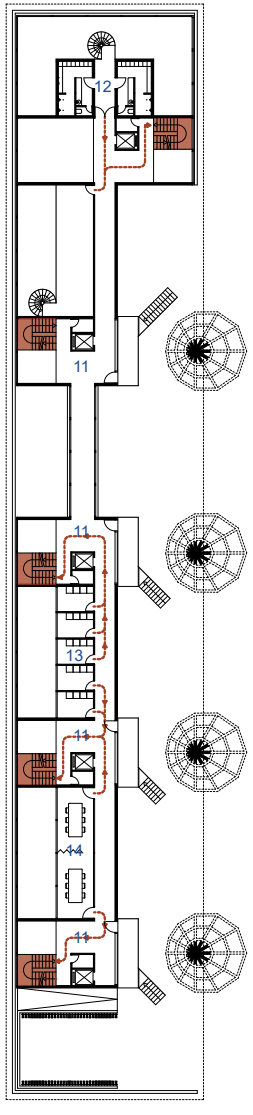
11 - Street entrance
12 - Locker room
13 - Laundry room
14 - Meeting room



Underground Floor



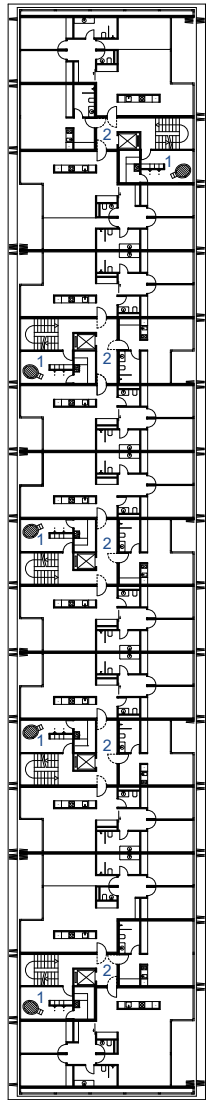
Lower Ground Floor



Upper Ground Floor

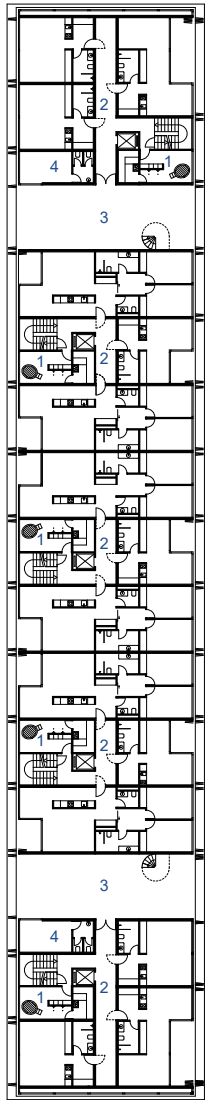
SAINT-GOBAIN

2 bedroom
studio
2 bedroom
3 bedroom
studio
3 bedroom



Standard Floor

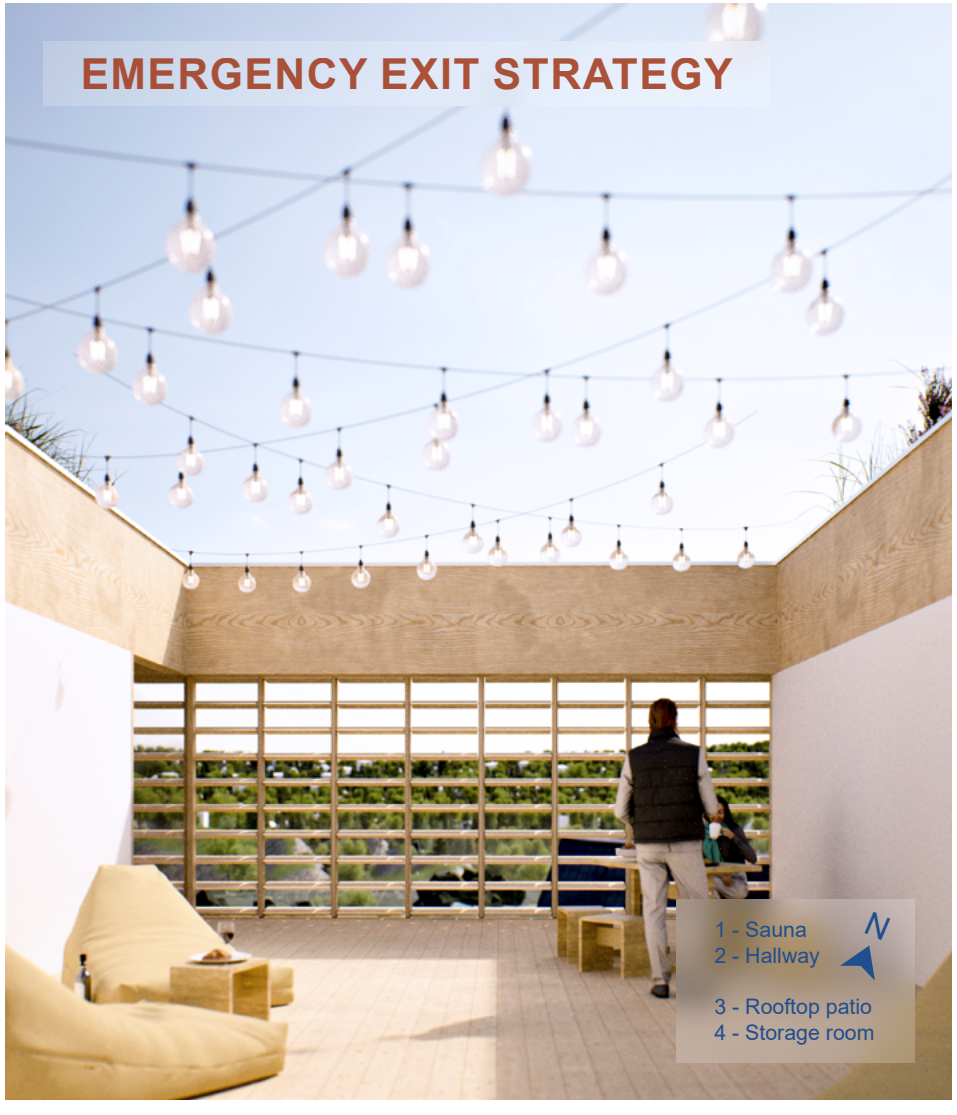
2 bedroom
studio
2 bedroom
studio
studio
studio+

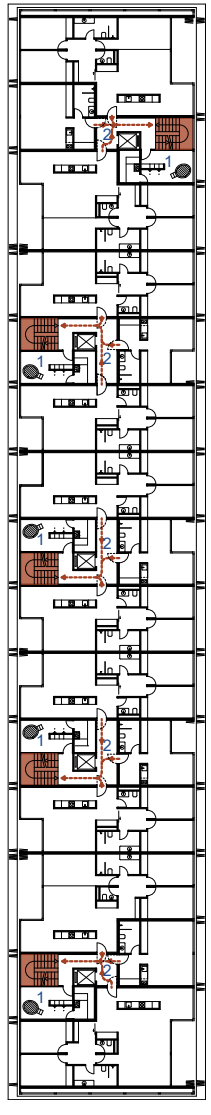


Last Floor

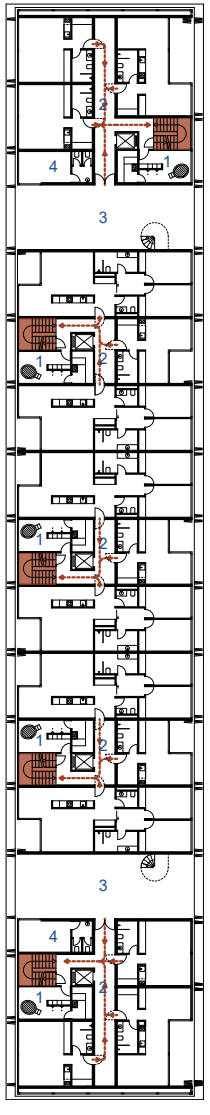
SAINT-GOBAIN

EMERGENCY EXIT STRATEGY





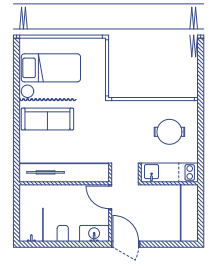
Standard Floor



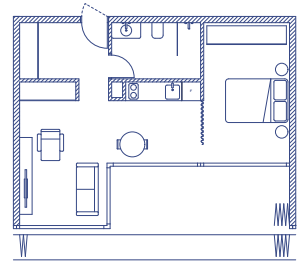
Last Floor

SAINT-GOBAIN


HELSINKI



36m²



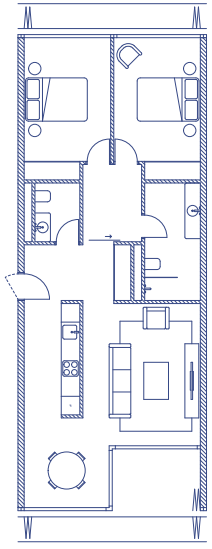
45m²

STUDIO APARTMENT

Entrance hall
Kitchenette
Dining room area
Living room area
Bedroom area
Bathroom
Storage
Balcony

sunrise/sunset views

ecophon SAINT-GOBAIN
glassolutions SAINT-GOBAIN
weber SAINT-GOBAIN
gyproc SAINT-GOBAIN
isover SAINT-GOBAIN



82m²

TWO BEDROOM APARTMENT

Entrance hall
Kitchen
Dining room
Living room
Bedrooms (2)
Bathrooms (2)
Storage
Balcony

sunrise and sunset views

ecophon SAINT-GOBAIN
glassolutions SAINT-GOBAIN
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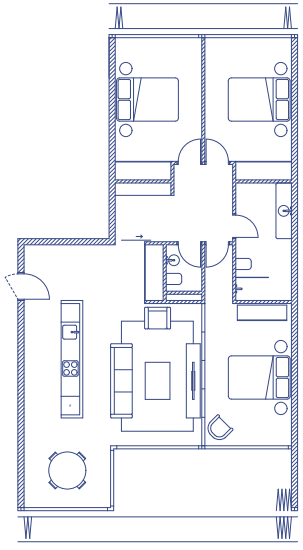

101m²

THREE BEDROOM APARTMENT

Entrance hall
Kitchen
Dining room
Living room
Bedrooms (3)
Bathrooms (2)
Storage
Balcony

sunrise and sunset views

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glassolutions SAINT-GOBAIN
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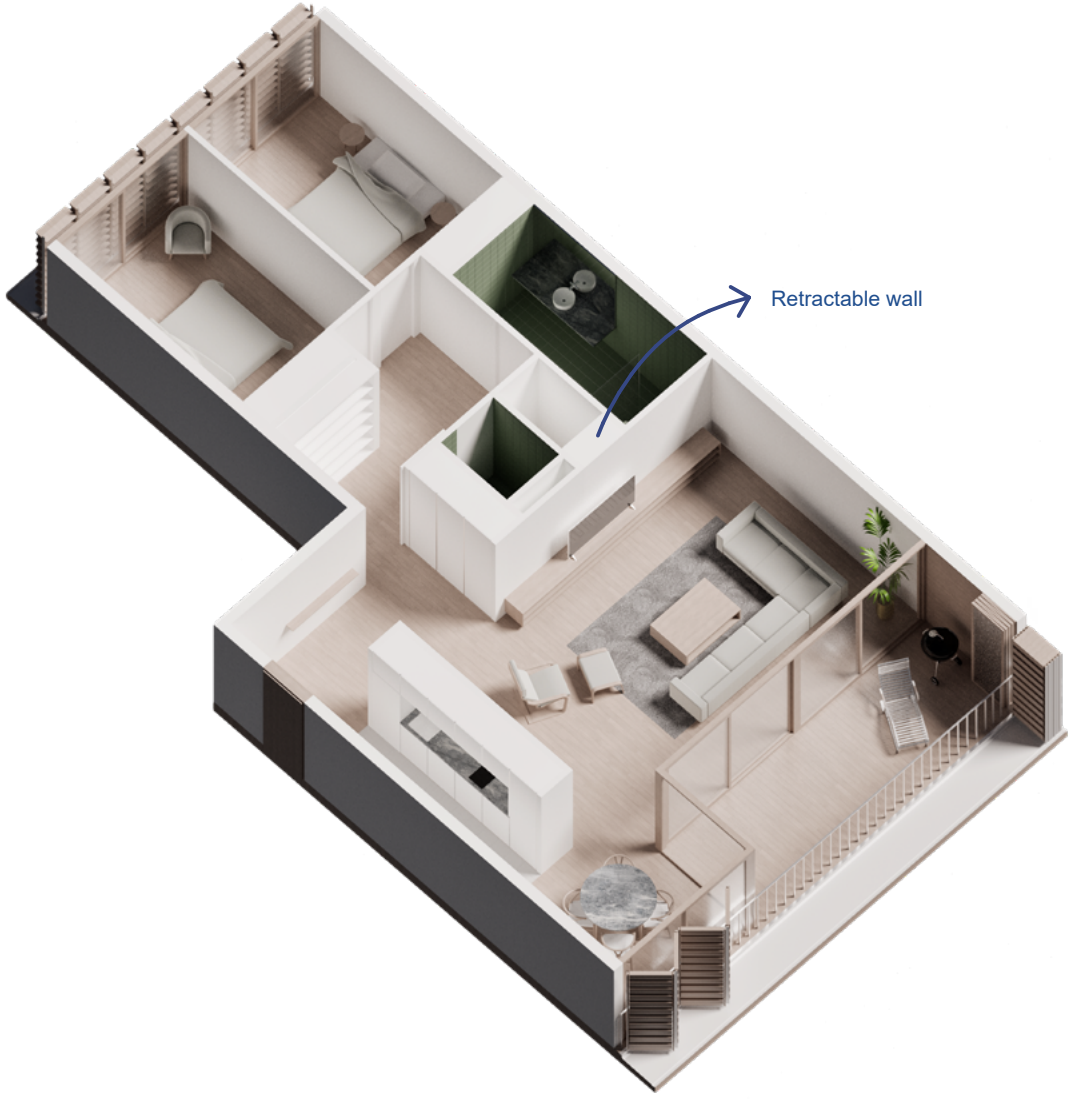

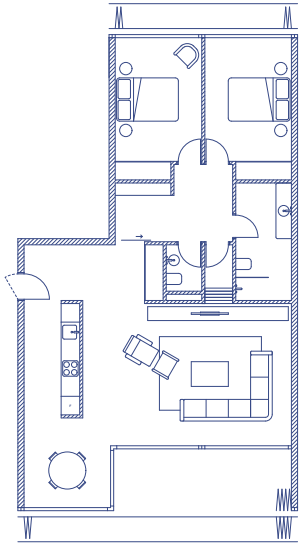

101m²

THREE BEDROOM APARTMENT

Entrance hall
Kitchen
Dining room
Living room
Bedrooms (2)
Bathrooms (2)
Storage
Balcony

sunrise and sunset views

ecophon SAINT-GOBAIN
glassolutions SAINT-GOBAIN
weber SAINT-GOBAIN
gyproc SAINT-GOBAIN
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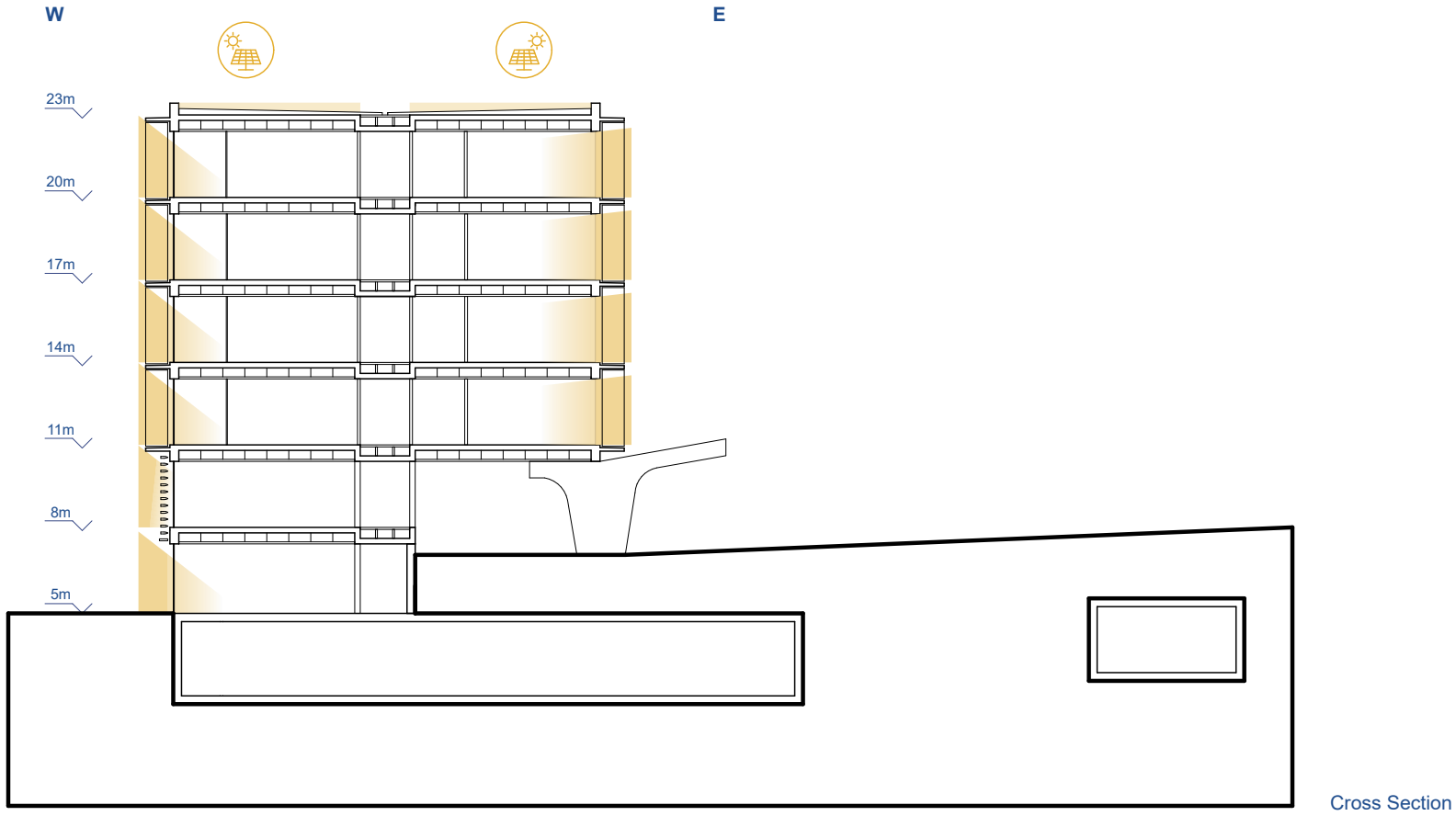
FINLAND
THE REPUBLIC OF FINLAND

NATURAL DAYLIGHT STRATEGY

With its dual west and east orientation, the building is strategically positioned to manage the impact of prolonged sunlight, through the use of highly efficent glass.

Summer Solstice



Cross Section

Calumen

Glazing 1: PANICLEAR (4mm) - Annealed
Cavity 1: Argon 90% 16 mm
Glazing 2: PLANICLEAR (4mm) - Annealed
PVB STANDARD (0.38mm)
PLANICLEAR (6mm) - Annealed

Luminous Factors CIE (15-2004)

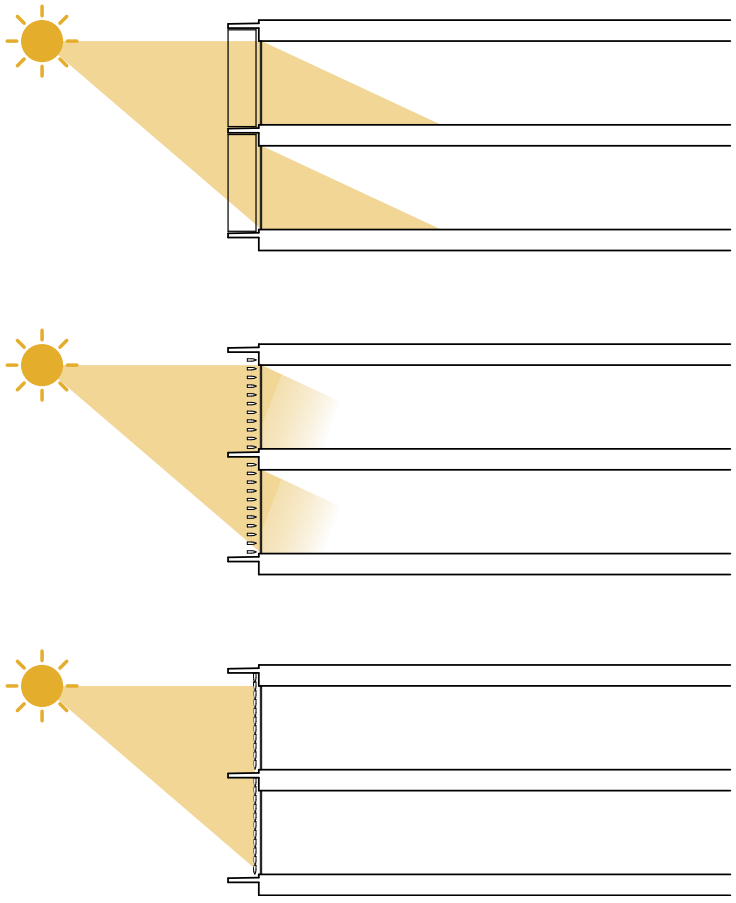
Light Transmittance (TL): 64%
Outdoor Reflectance (RLe): 15%
Indoor Reflectance (RLi): 17%

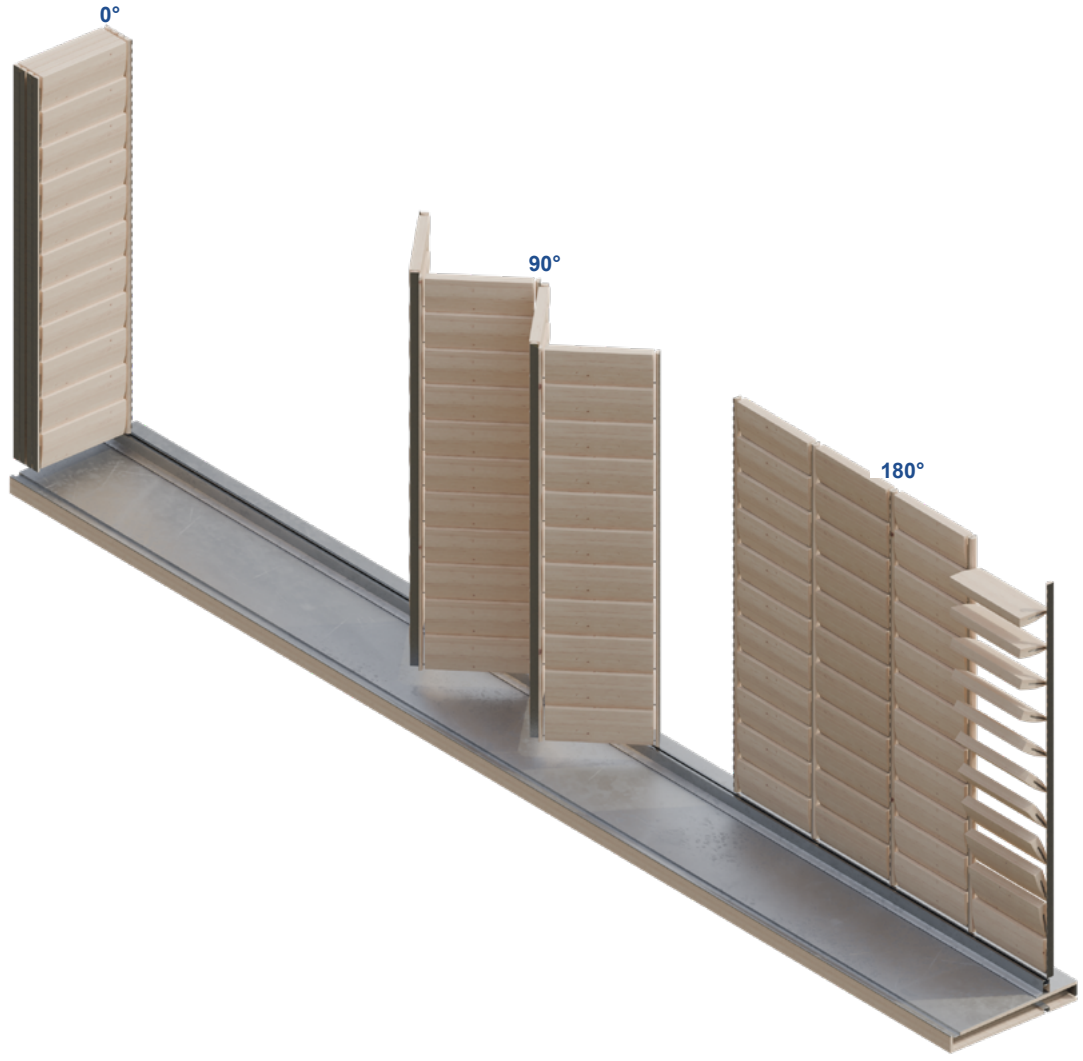
Energy Factor EN410 (2011-04)
Transmittance (TE): 31%
Outdoor Reflectance (Ree): 41%
Indoor Reflectance (Rei): 37%
Absorptance A1 (AE1): 24%
Absorptance A2 (AE2): 1%
Absorptance A3 (AE3): 3%

Solar Factors EN410 (2011-04)
Solar Factor (g): 0.35
Shading Coefficient (SC): 0.40

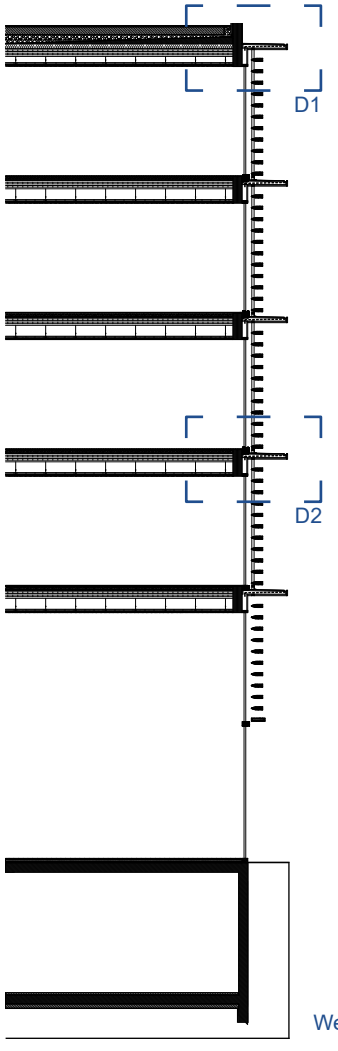
SHADING SYSTEM

Through the use of the wooden shading system, people can regulate the intensity and duration of sunlight exposure and create different rhythms in the building's façade. The folding doors can be opened to any angle between 0° and 180° and the lamel can be rotated to more precisely control the sunlight.

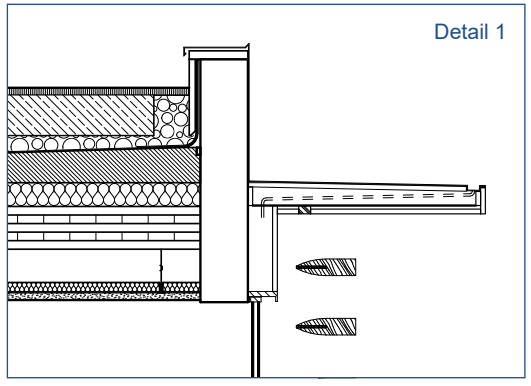


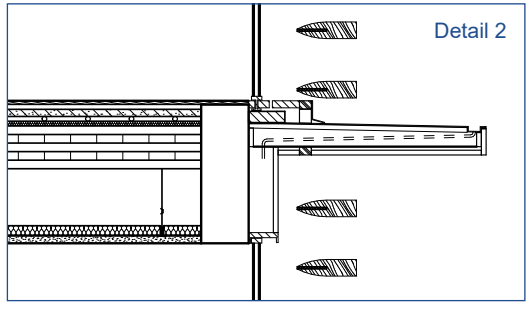


FAÇADE DETAIL



West Façade



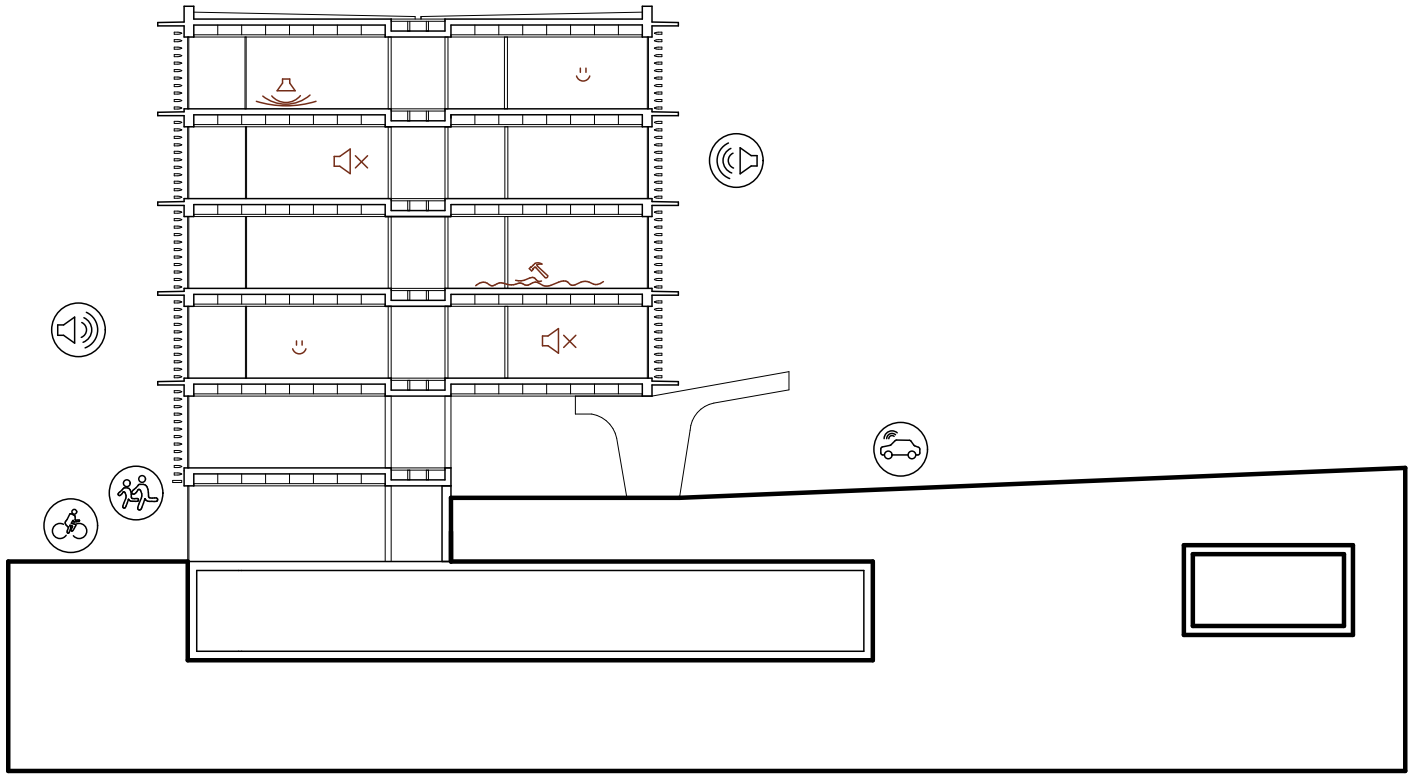


East Façade

West Façade

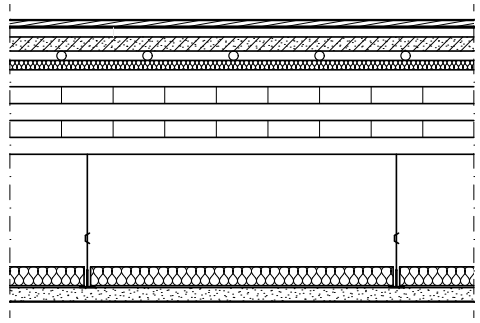
ACOUSTIC COMFORT STRATEGY

We minimize the acoustic impact caused by outside traffic noise, percussion sounds, such as hard walking and moving furniture and common air noise using slabs that are the most efficient for this nature.



Cross Section

MBL7 - SLAB



WALL COMPOSITION

1. 14 mm Parquet
2. 2 mm Foam
3. 30 mm Thin layer of screed
4. 20 mm Electro and capillary tube underfloor heating elements
5. 20 mm **Glava footstep impact sound board**
6. 180 mm CLT element
7. 270 mm Air gap Suspended ceiling
8. 40 mm **Ecophon Master™ A**
9. 30 mm Wooden ceiling

PROPERTIES

Wooden floor:
Acoustic insulation to percussion sounds : 52 - 54 dB
Acoustic insulation to air sounds: 49 - 58 dB
Fire resistance: REI90
Sound absorption class: A

REI 90

ecophon
SAINT-GOBAIN

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WALLS AND SLABS

All walls and slabs have been meticulously chosen to ensure maximum comfort and are adapted to incorporate radiant floor heating, providing uniform heat distribution and a cozy atmosphere throughout the year. Additionally, these selections ensure a high level of fire protection, offering safety and peace of mind to residents.

ecophon SAINT-GOBAIN

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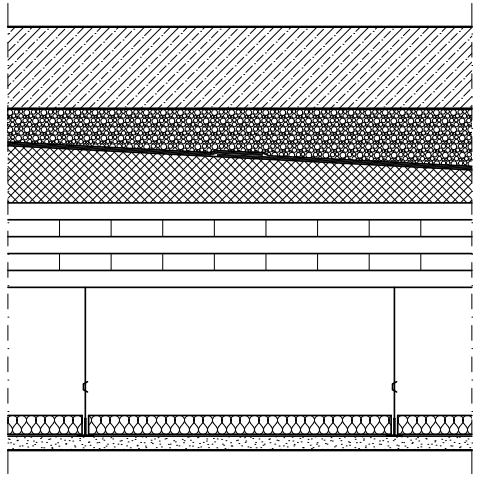
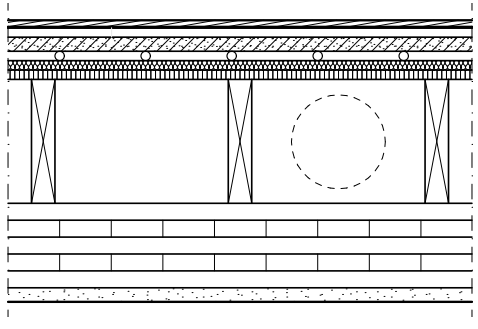


ROOF SLAB

1. Substrate **Nutreasy**
2. **Ecofelt PES-SB 150**
3. **Leca D**
4. **Ecofelt PES-SB300**
5. Waterproofing
6. Slope **Leca Uno**
7. CLT element
8. Air gap suspended ceiling
9. **Ecophon Master**
10. Wooden ceiling

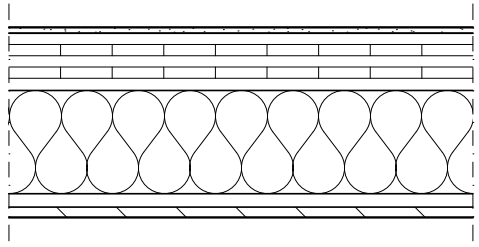
REI 90



MBL3A - SLAB

1. 14 mm Parquet
2. 2 mm Foam
3. 60 mm **Weberfloor 150 dura**
4. 12 mm **Aprobo Decibel 4**
5. 20 mm **Glava footstep impact sound board**
6. 20 mm MDF board
7. 260 mm Air gap with **ISOVER PLUS+ Stud 1** (for infrastructure)
8. 180 mm CLT element
9. 30 mm Wooden ceiling

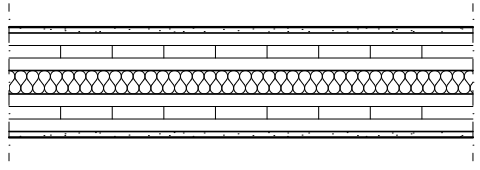
REI 90



YV1 - EXTERIOR WALLS

1. 12.5 mm **Gyproc GNE 13 Normal**
2. 120 mm CLT element
3. 0.2 mm **ISOVER VarioR Xtra**
4. 220 mm **ISOVER PLUS+ Board 32** between 245 mm **ISOVER PLUS+ Stud 1**
5. 22 mm Wooden facade **Moelven Thermowood**

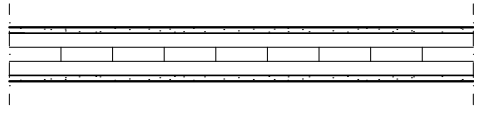
REI 150



YV1 - PARTITION WALLS WITH INSULATION

1. 12.5 mm **Gyproc GNE 13 normal**
2. 80 mm CLT element
3. 50 mm **ISOVER Cavity Wall Board 32**
4. 80 mm CLT element
5. 12.5 mm **Gyproc GNE 13 Normal**

REI 60



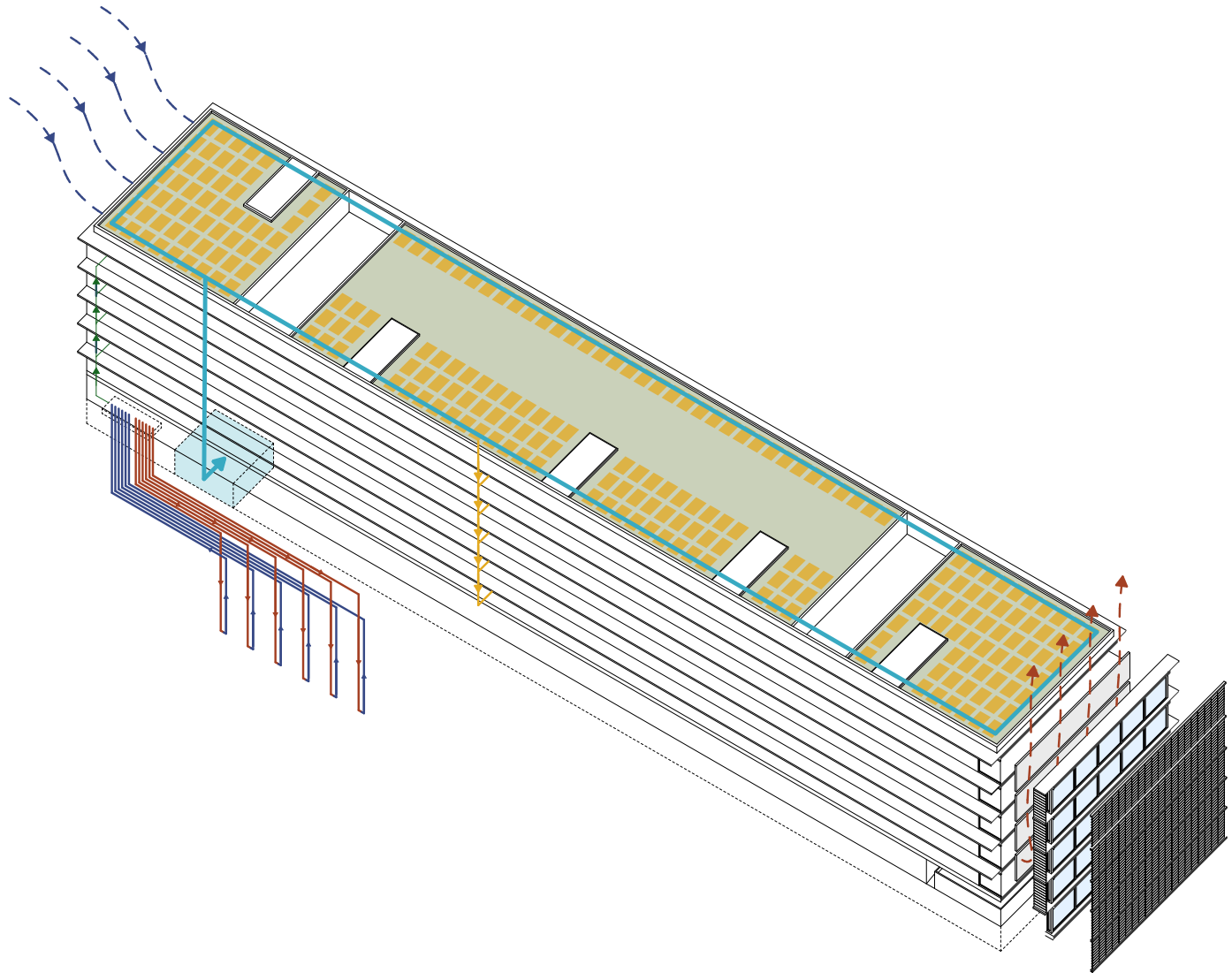
YV8 - PARTITION WALLS WITHOUT INSULATION

1. 12.5 mm **Gyproc GNE 13 Normal**
2. 90 mm CLT element
3. 12.5 mm **Gyproc GNE 13 Normal**

REI 30

SUSTAINABILITY STRATEGY

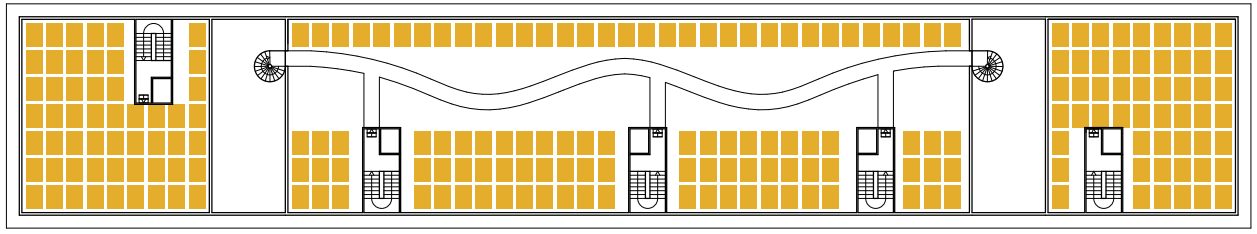
- Solar Panels
- Extensive Green Roof
- Water retention
- Passive Ventilation
- Geothermal Heating/Cooling



SUSTAINABILITY STRATEGY

Solar Panels

The building's rooftop is filled with solar panels, capturing sunlight to generate more energy than the building consumes. This excess energy is shared with Viikki, promoting sustainability. These panels not only cut costs but also reduce reliance on fossil fuels, aligning with the building's green initiatives.



Roof Top Plan

Extensive Green Roof

Water retention

Passive Ventilation

Geothermal Heating/Cooling

SUSTAINABILITY STRATEGY

Solar Panels

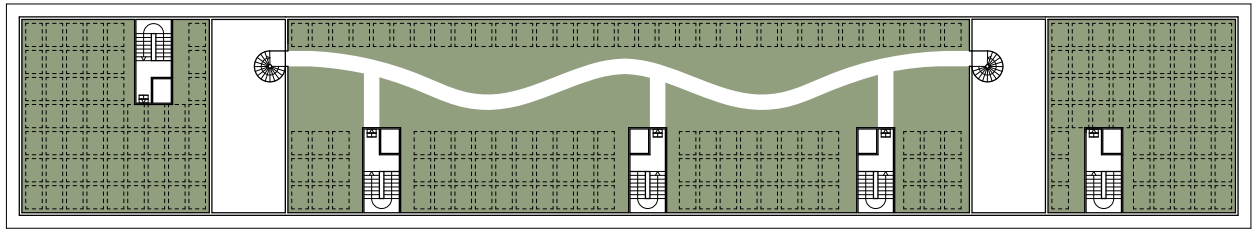
Extensive Green Roof

The green roof provides energy efficiency and improves air quality. Its soil layers naturally insulate, reduce runoff, and extend roof life. Connecting to the patios, a wavy pathway fosters a serene atmosphere, inviting residents to savor nature's tranquility.

Water retention

Passive Ventilation

Geothermal Heating/Cooling



Roof Top Plan

SUSTAINABILITY STRATEGY

Solar Panels

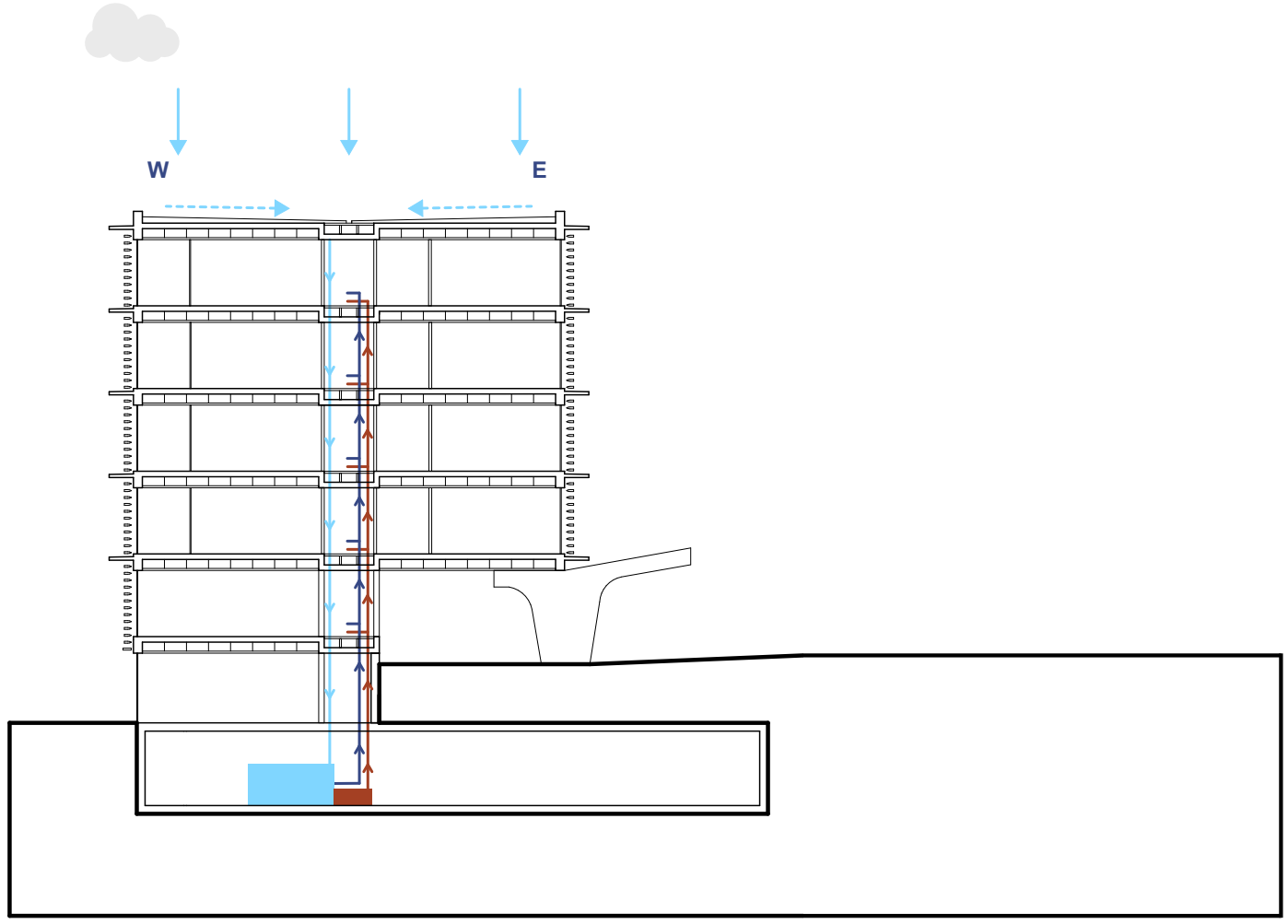
Extensive Green Roof

Water retention

The water retention system collects rainwater from the rooftop, channeling it to storage tanks located in the garage floor. Equipped with a pump system, this setup efficiently delivers either hot or cold water directly to the apartments as required.

Passive Ventilation

Geothermal Heating/Cooling



Cross Section

SUSTAINABILITY STRATEGY

Solar Panels

Extensive Green Roof

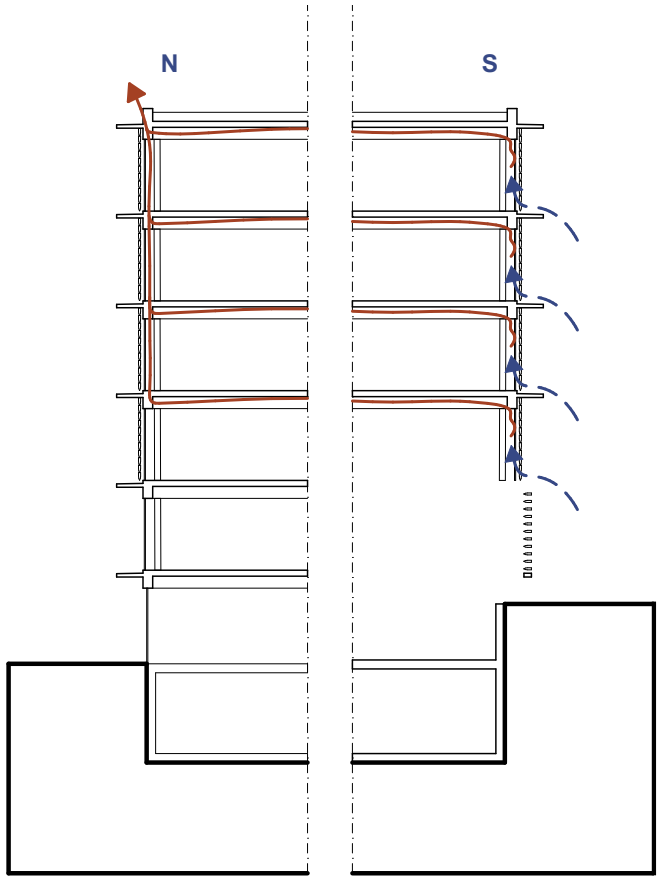
Water retention

Passive Ventilation

The building features a passive ventilation system designed to naturally circulate air. It allows cool air in during winter and expels hot air in summer, keeping the interior pleasant. This system minimizes reliance on mechanical cooling or heating.

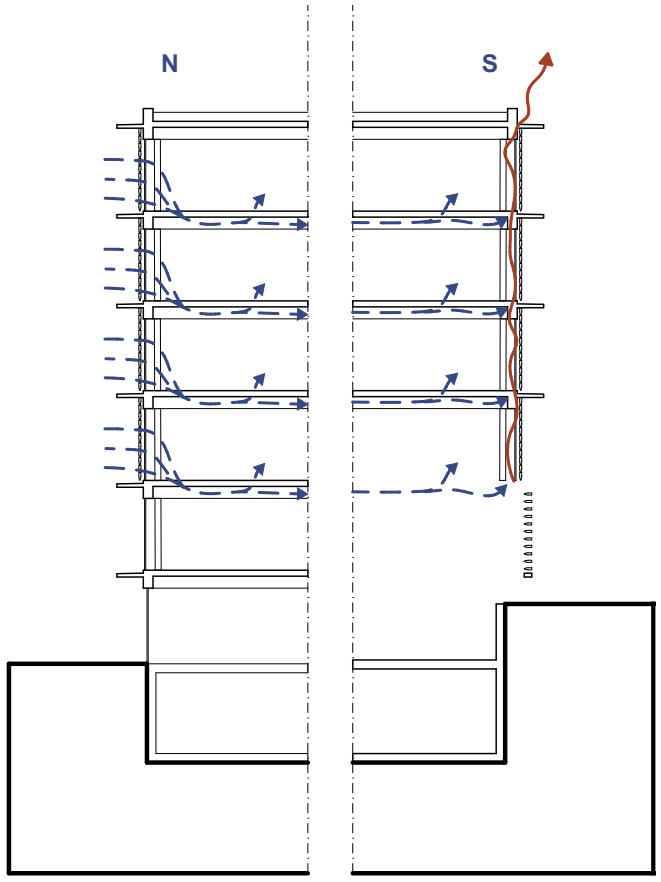
Geothermal Heating/Cooling

Winter Function Scheme



Longitudinal Section

Summer Function Scheme



Longitudinal Section

SUSTAINABILITY STRATEGY

Solar Panels

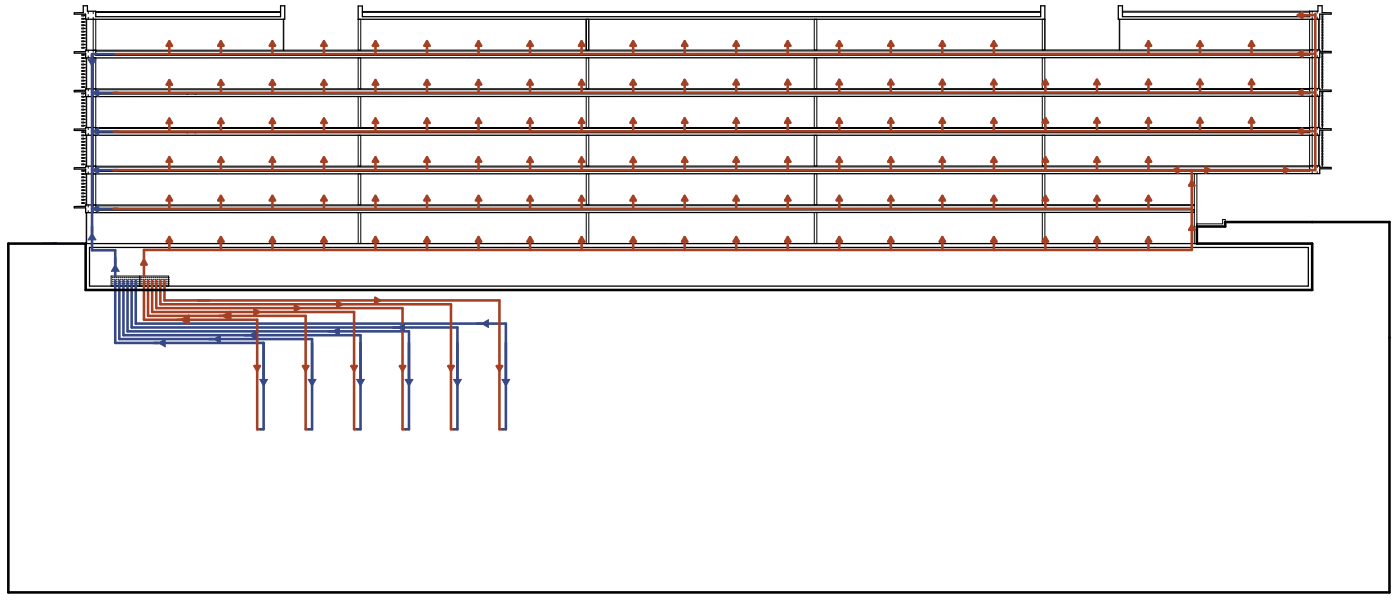
Extensive Green Roof

Water retention

Passive Ventilation

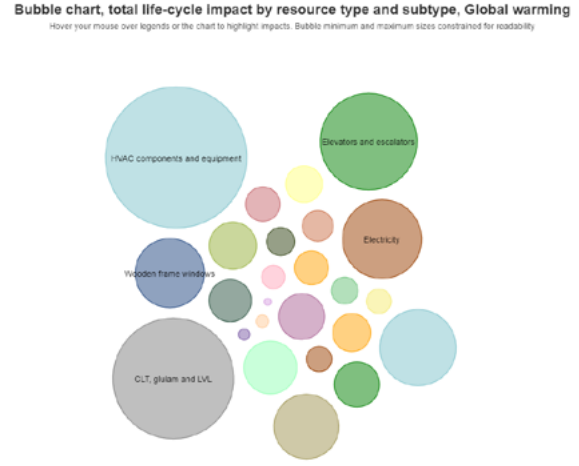
Geothermal Heating/Cooling

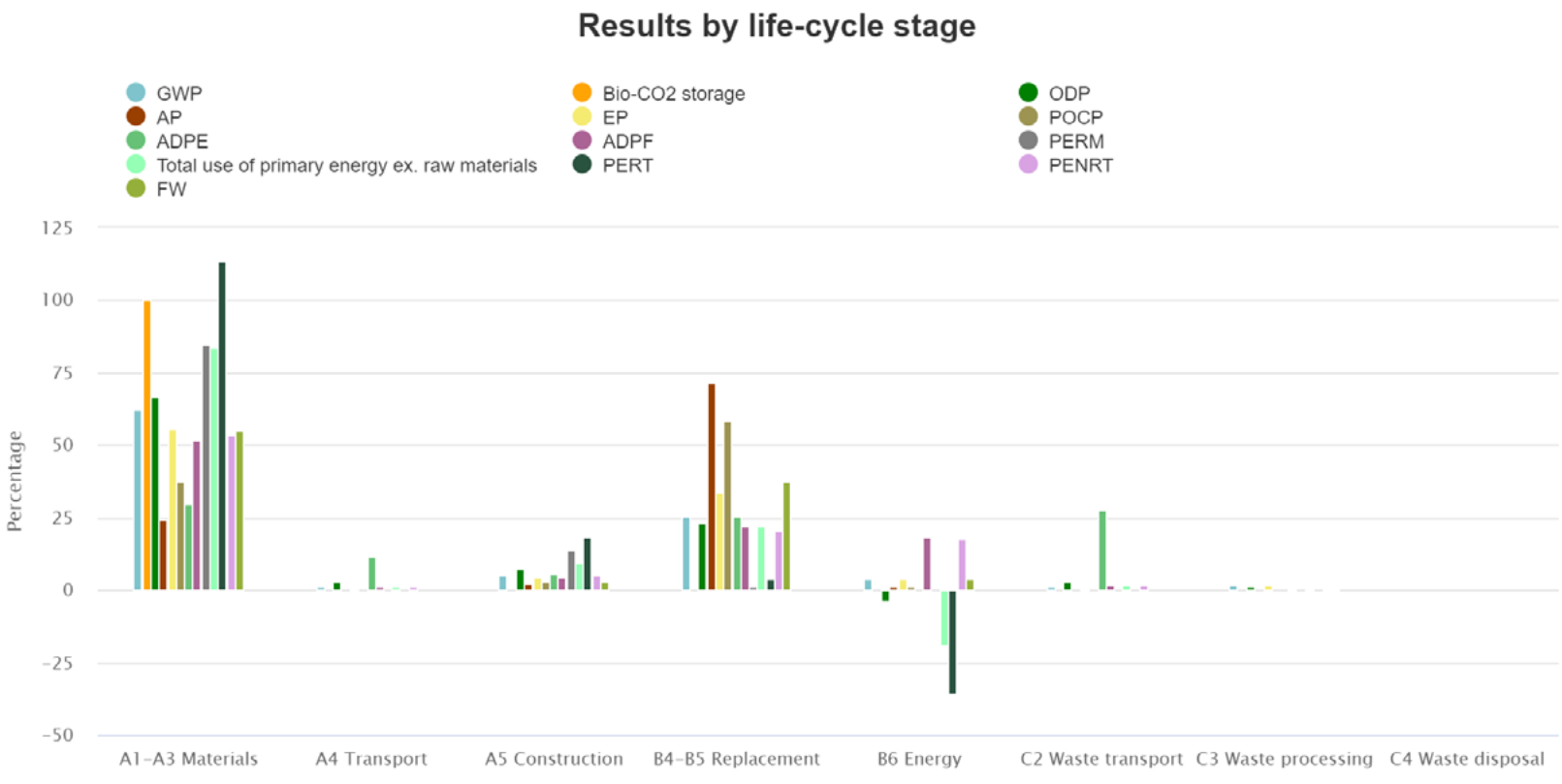
Geothermal energy leverages the Earth's subsurface heat for various applications, including power generation and heating/cooling systems. By strategically locating storage tanks for heat exchange systems in the garage floor and using underfloor heating we manage to naturally heat the building.

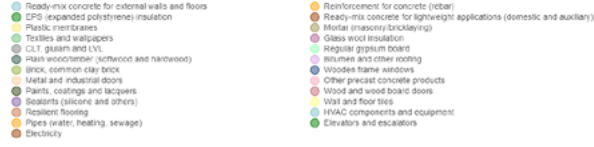


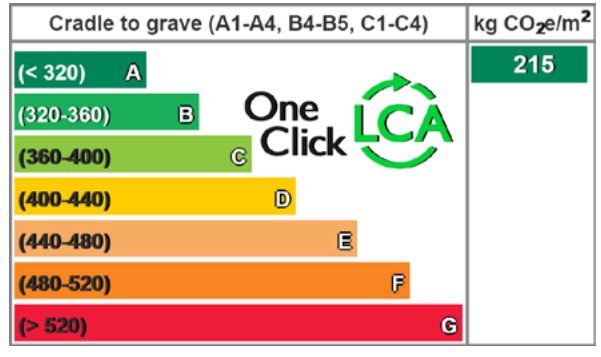
Longitudinal Section

LIFE-CYCLE ANALYSIS









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SIENI
PARK