



ARCHITECTURE STUDENT CONTEST

19th INTERNATIONAL EDITION, HELSINKI 2024



Minimal Lab

Team No.17

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Tongji University, China

01 Analysis



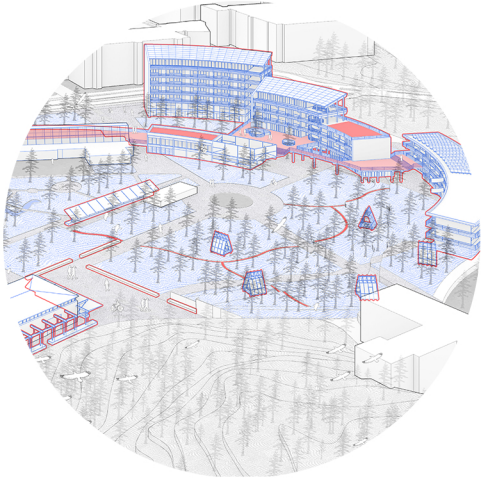
Cities evolve at a more and more rapid pace.

Buildings face demolition within their lifespan.


Reuse


Remanufacture

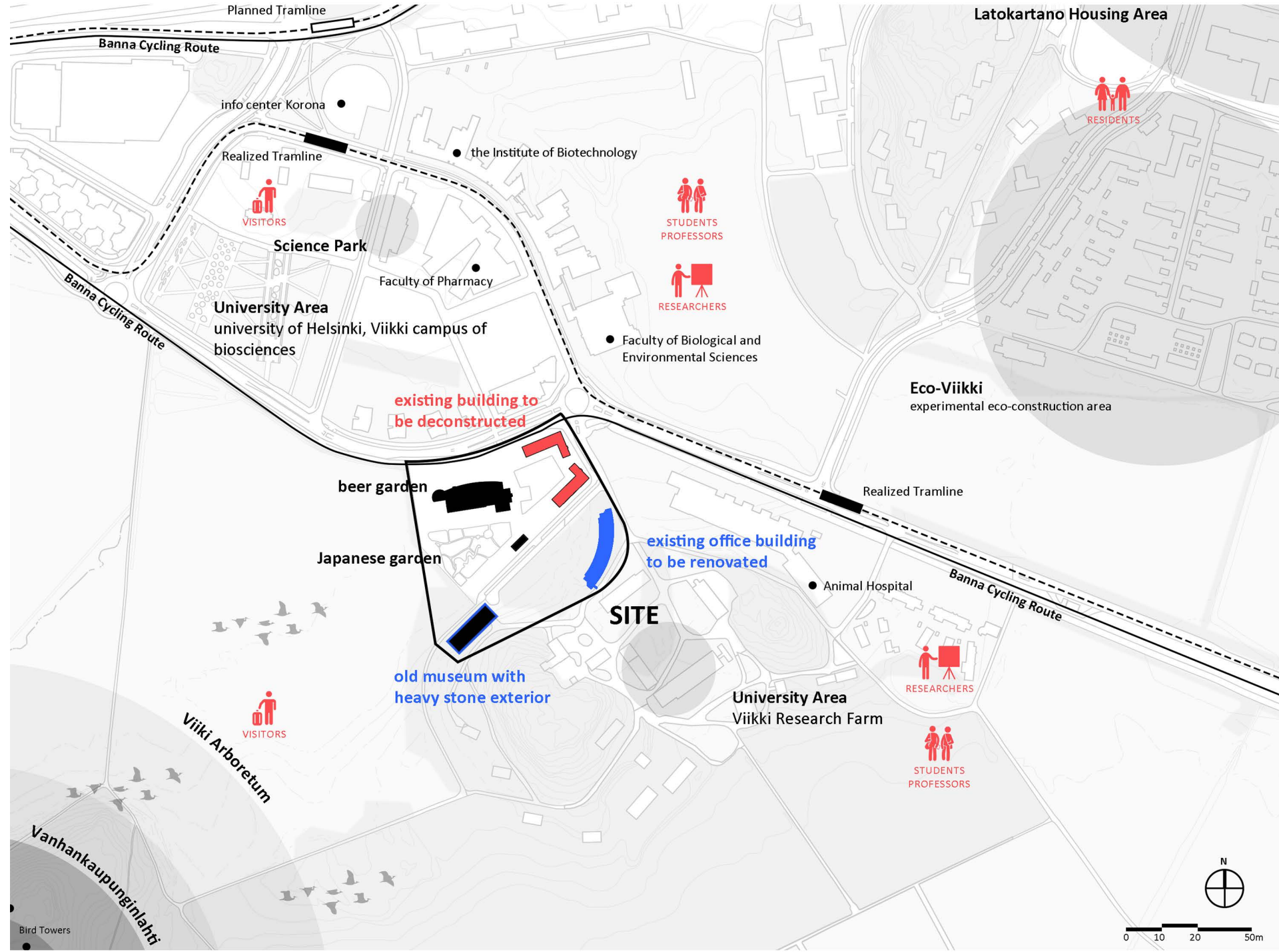

Recycle



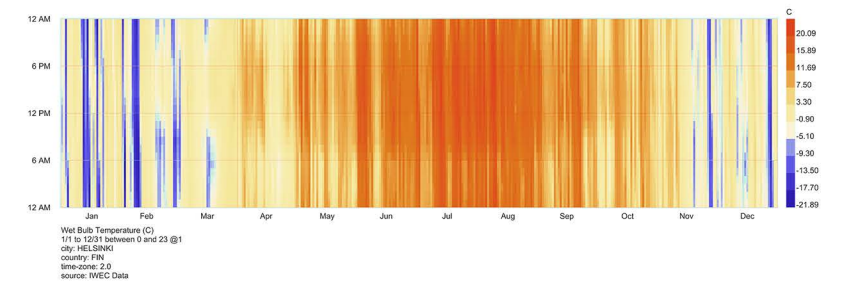
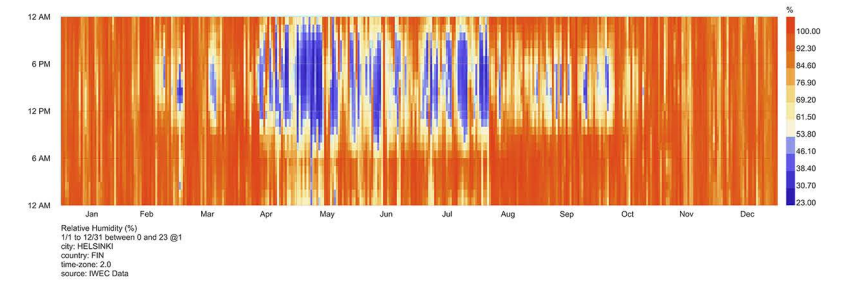
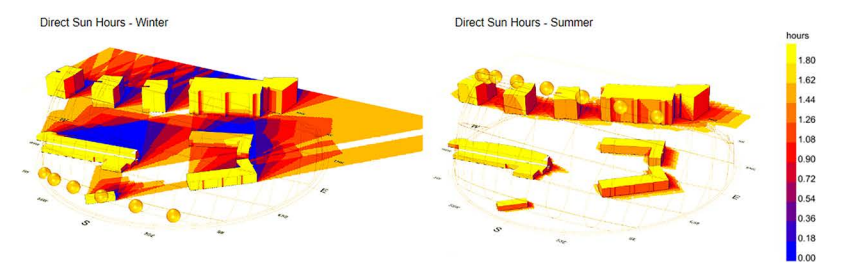
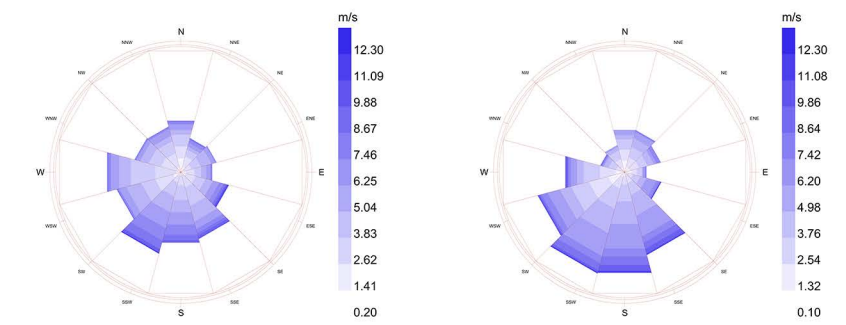
Sustainability from building to lifestyle

Maximize renewal with minimal intervention

01 Analysis



Site Analysis



Weather Analysis

01 Analysis Site Analysis

RECONSTRUCT

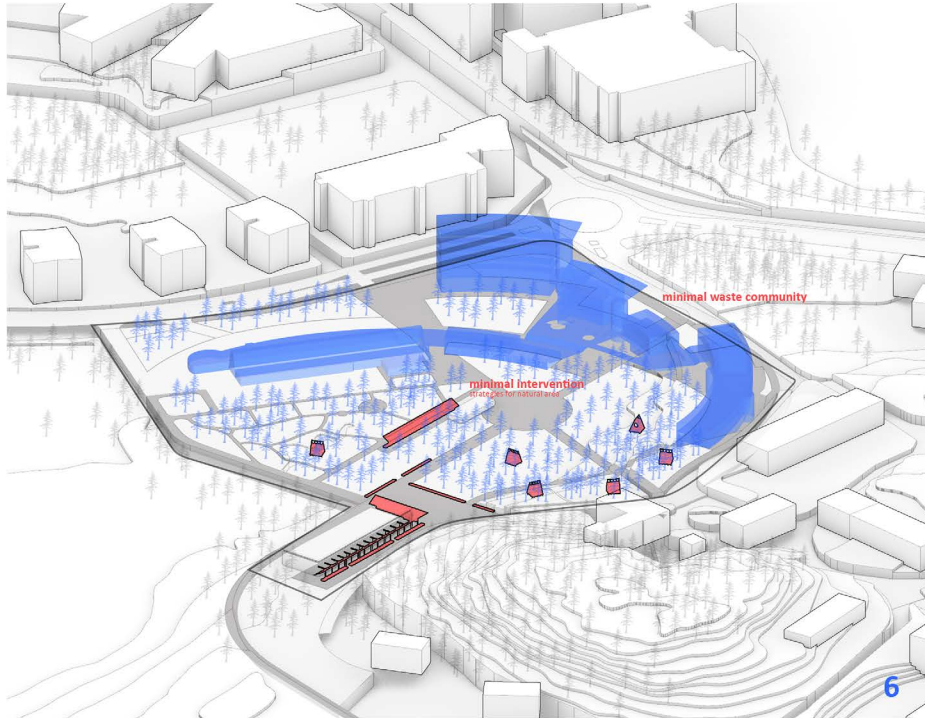
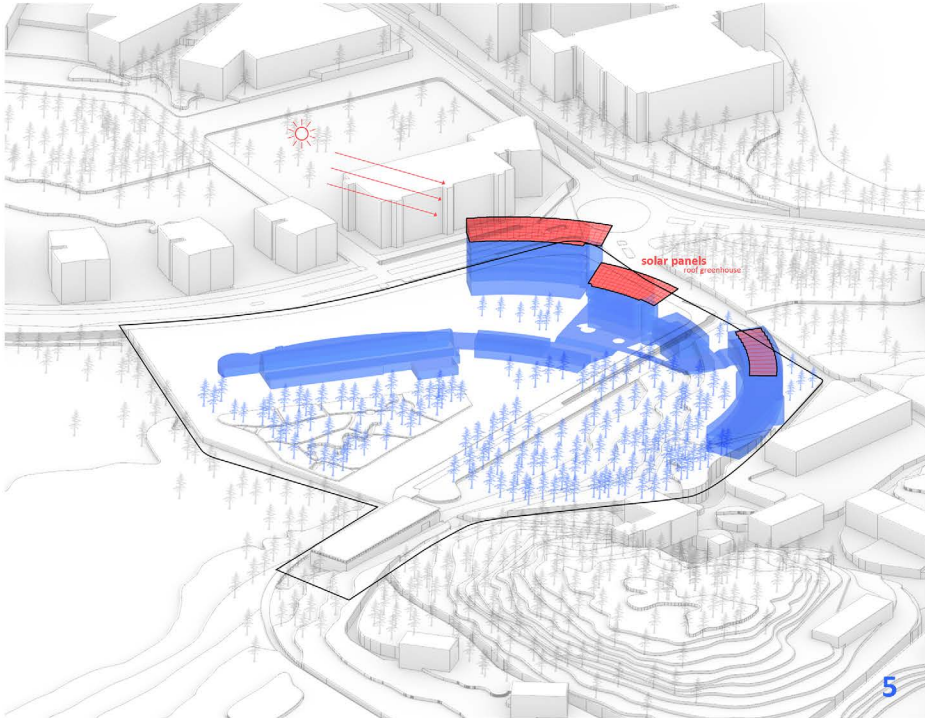
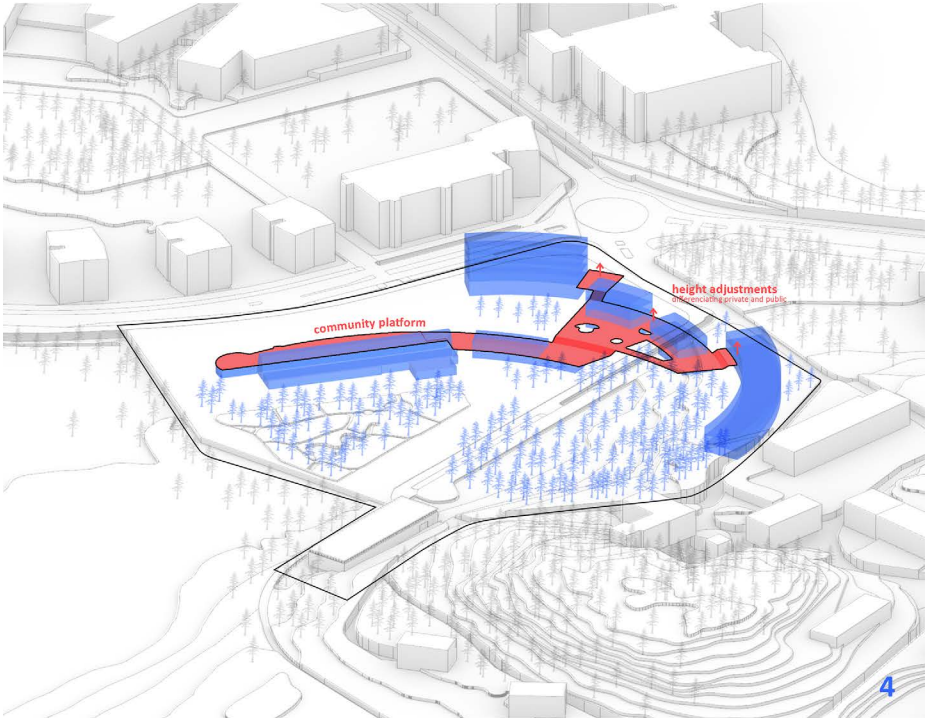
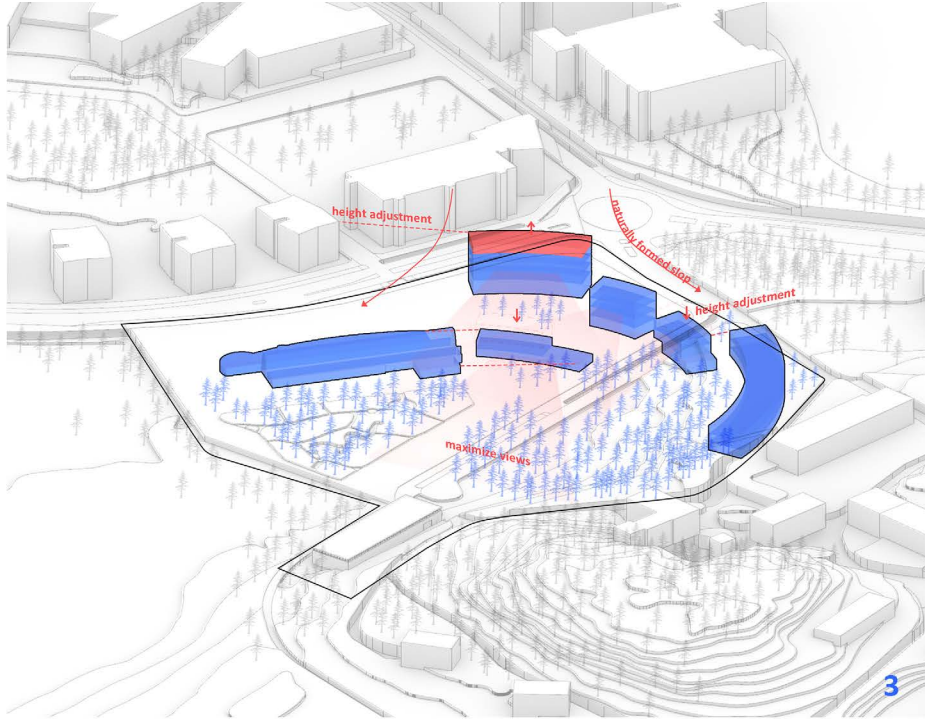
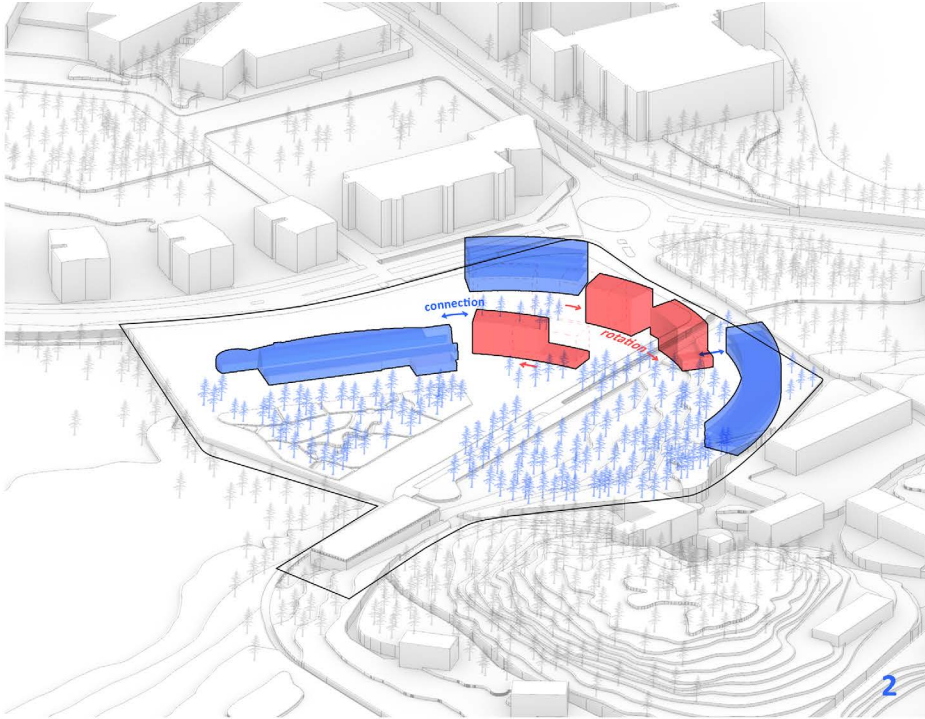
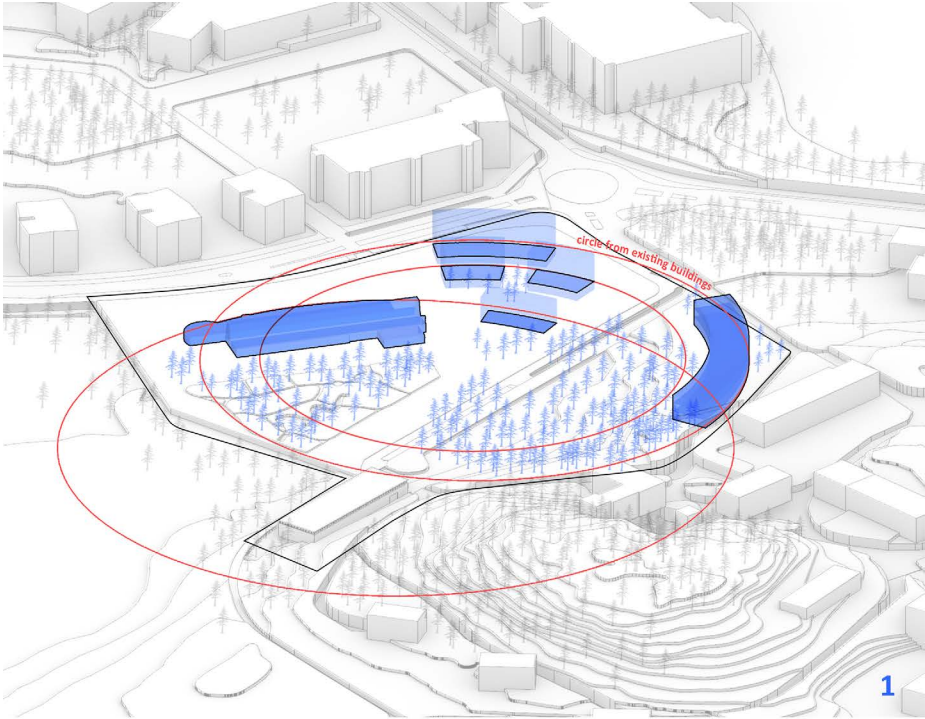


RENOVATE

KEEP



02 Strategy



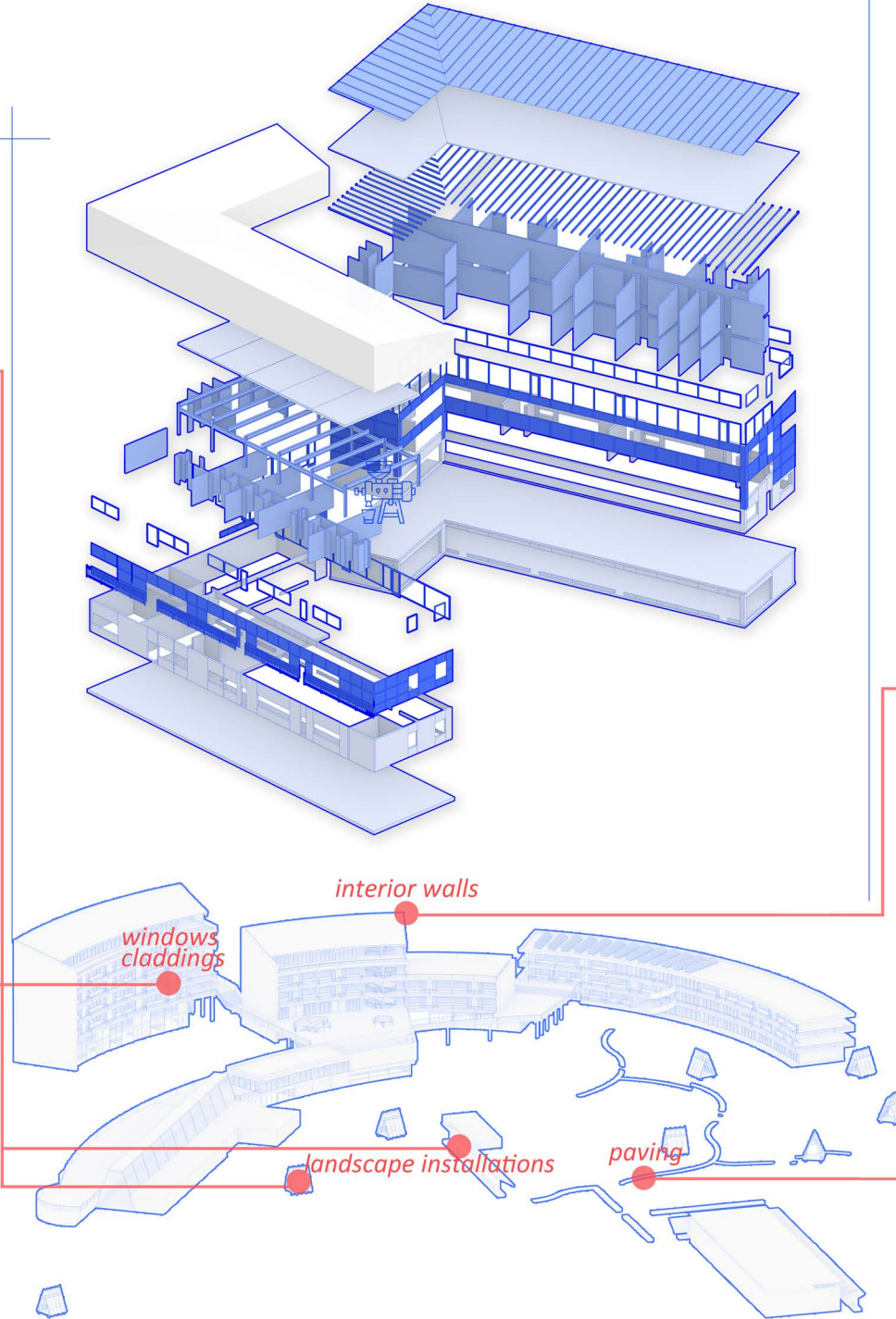
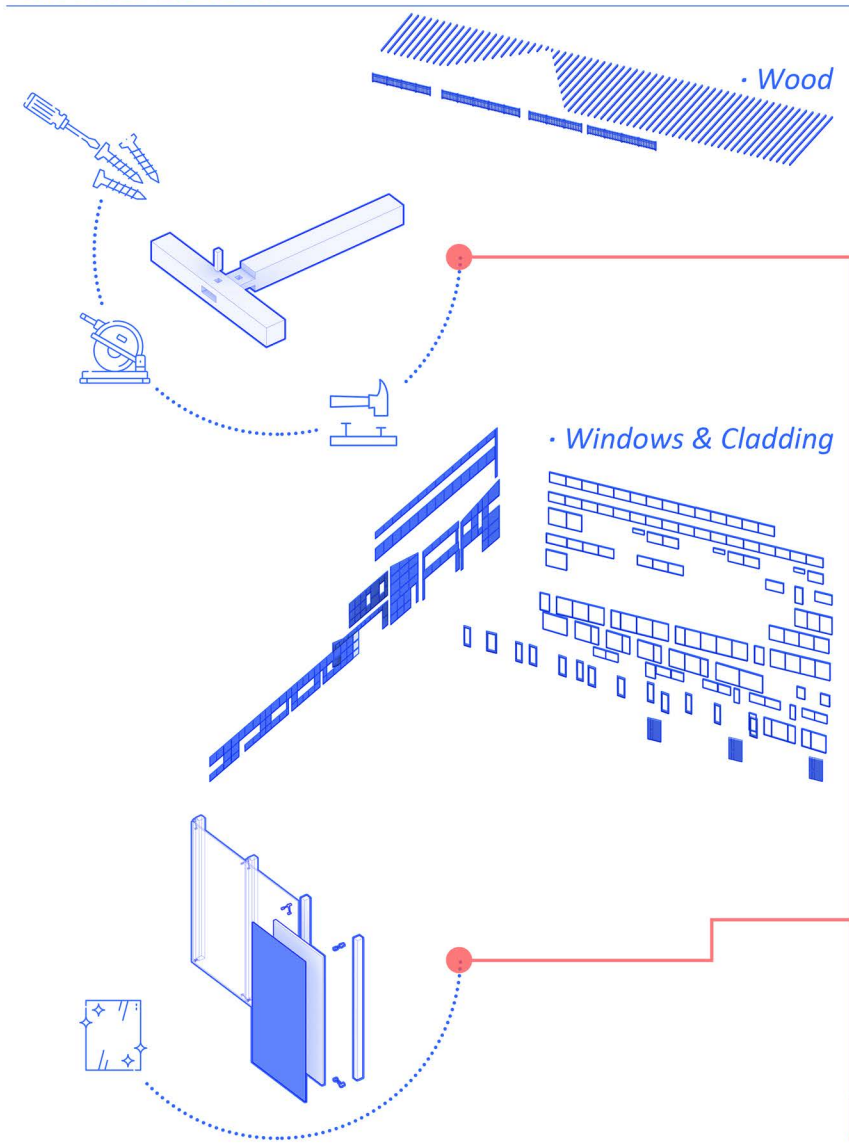
Generate Illustrations

02 Strategy

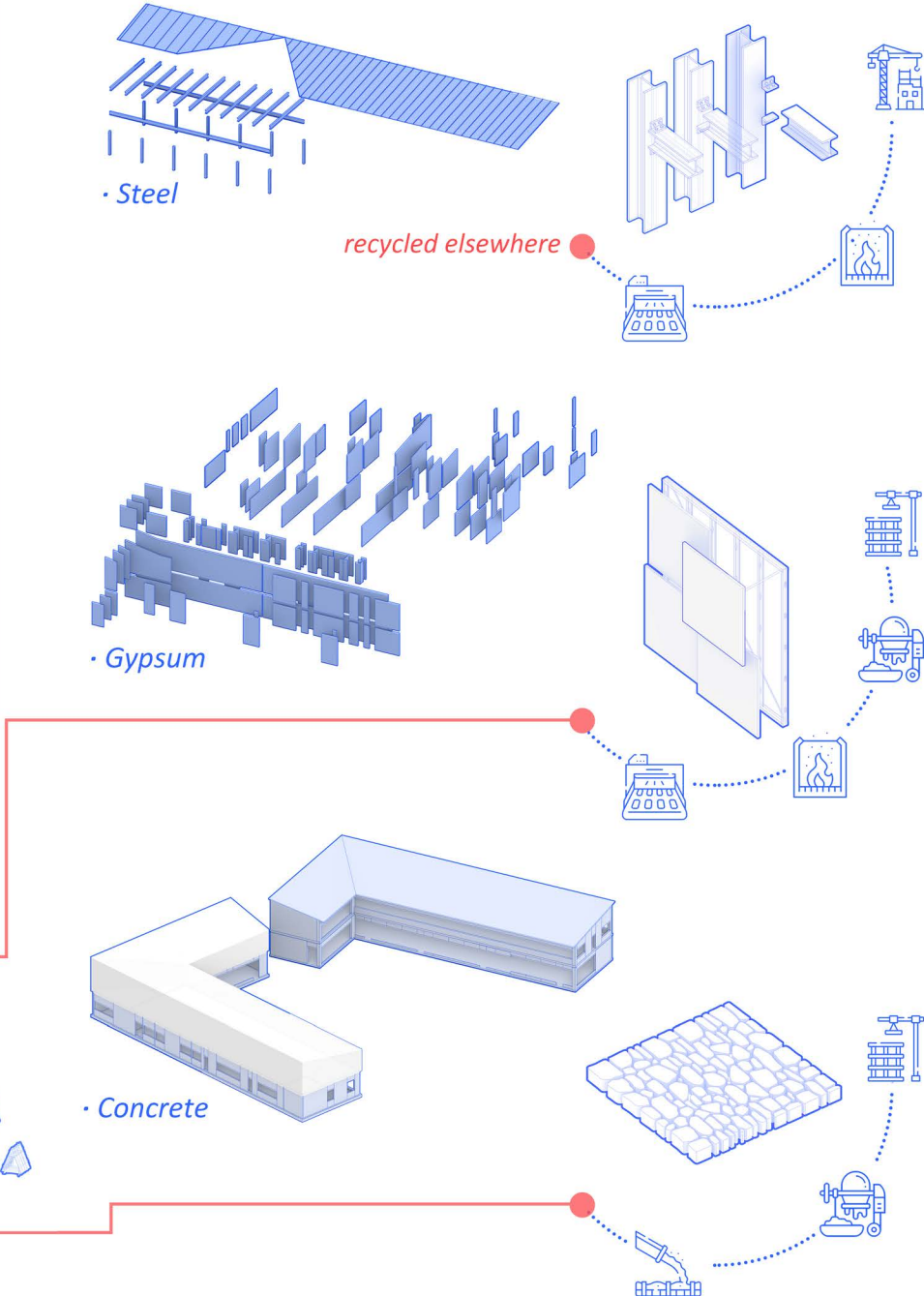
Urban Mining Analysis

for Building B

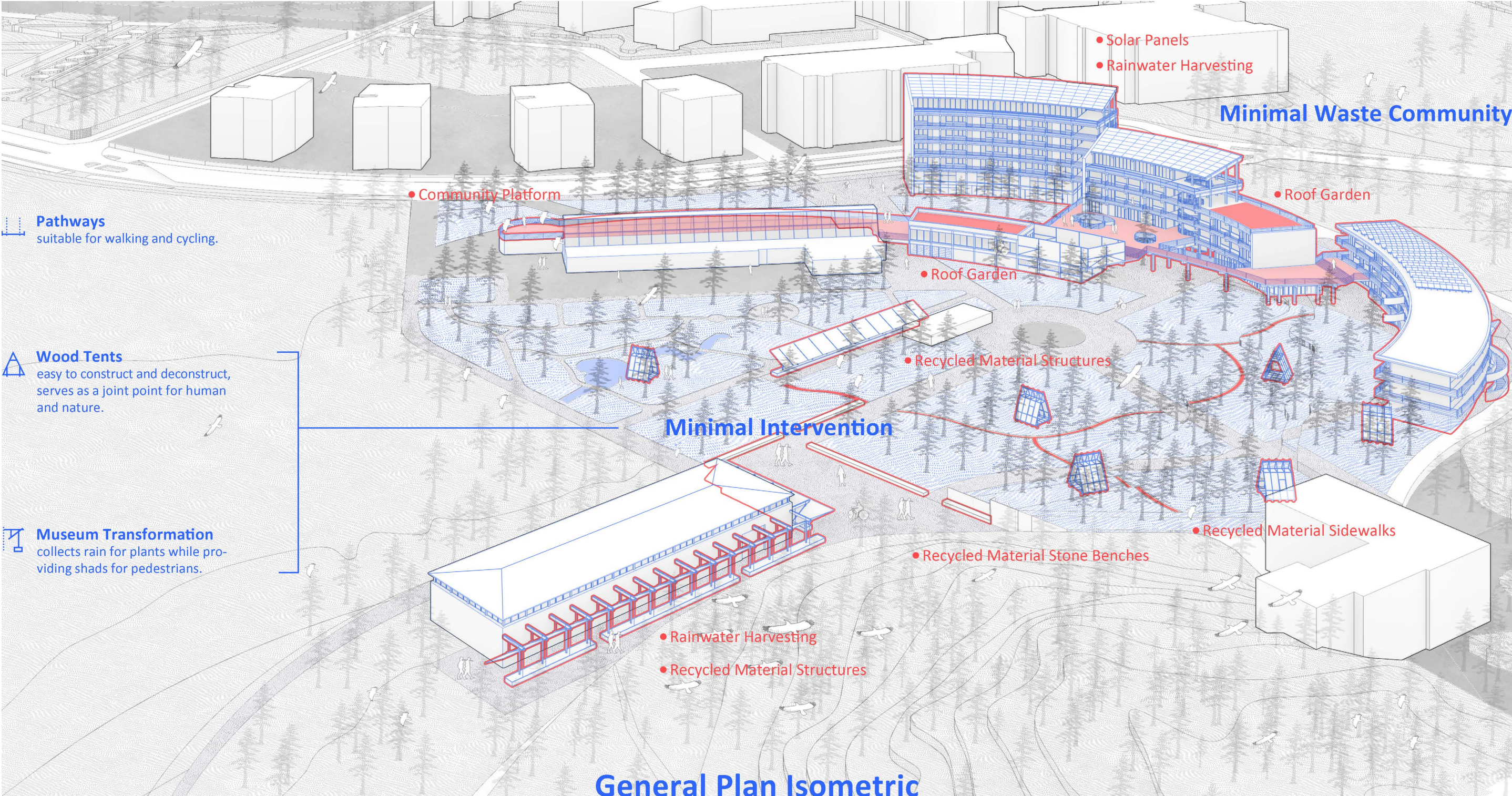
On-site Reuse



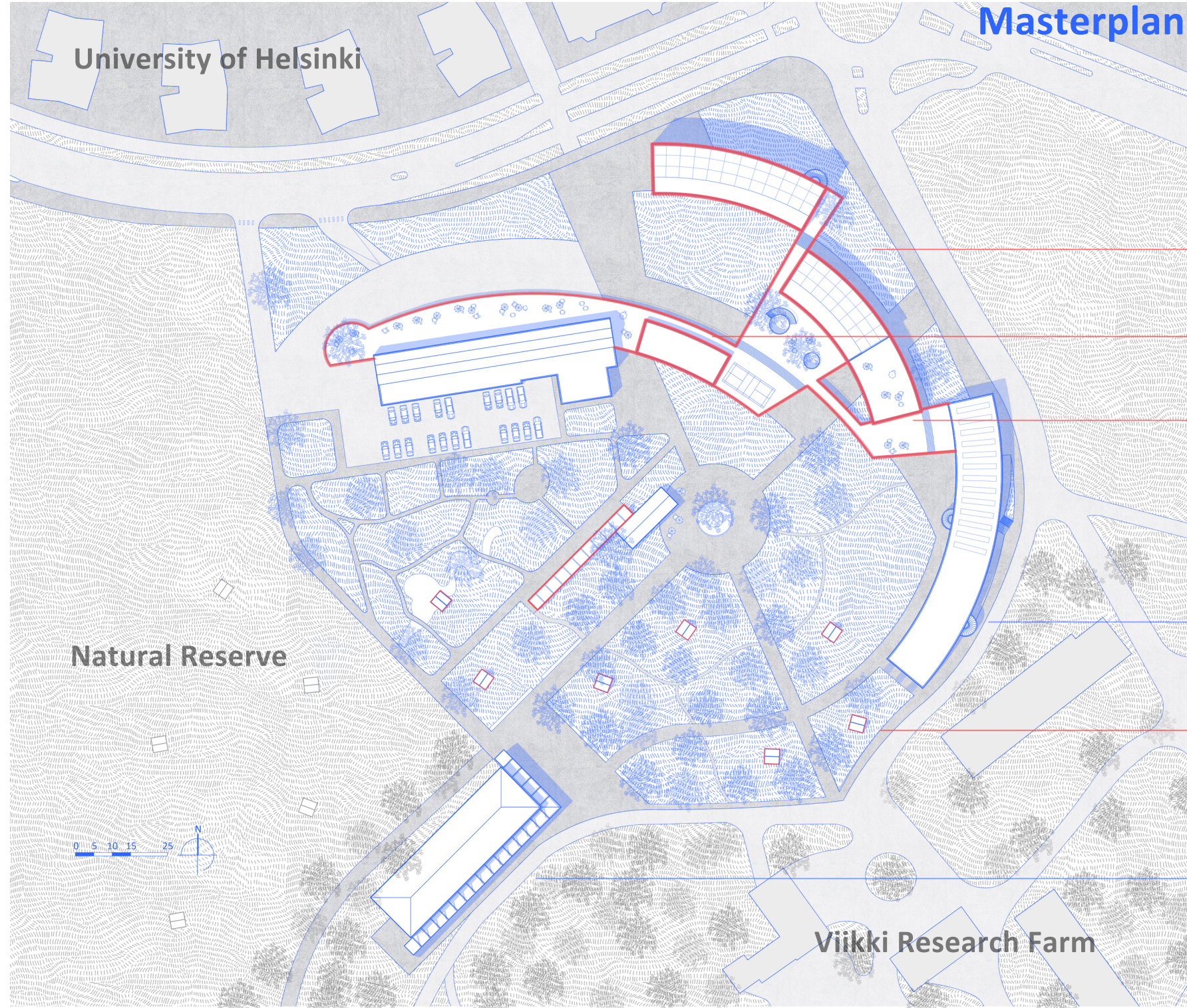
Remanufacture



02 Strategy



02 Strategy



Masterplan

New Construction

Residential

Public & Commercial

Platform system

Renovation

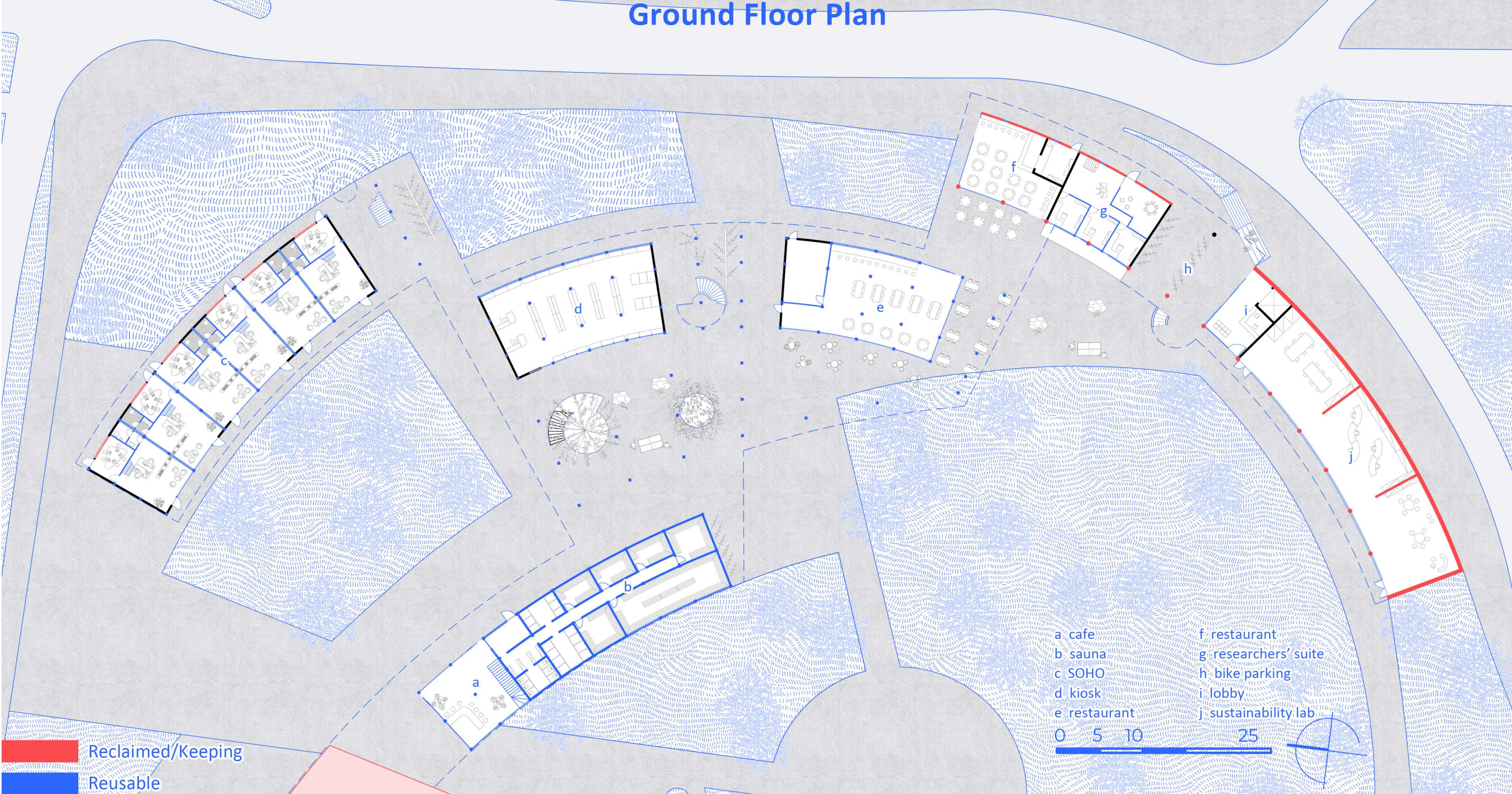
Academic complex

Landscape constructions

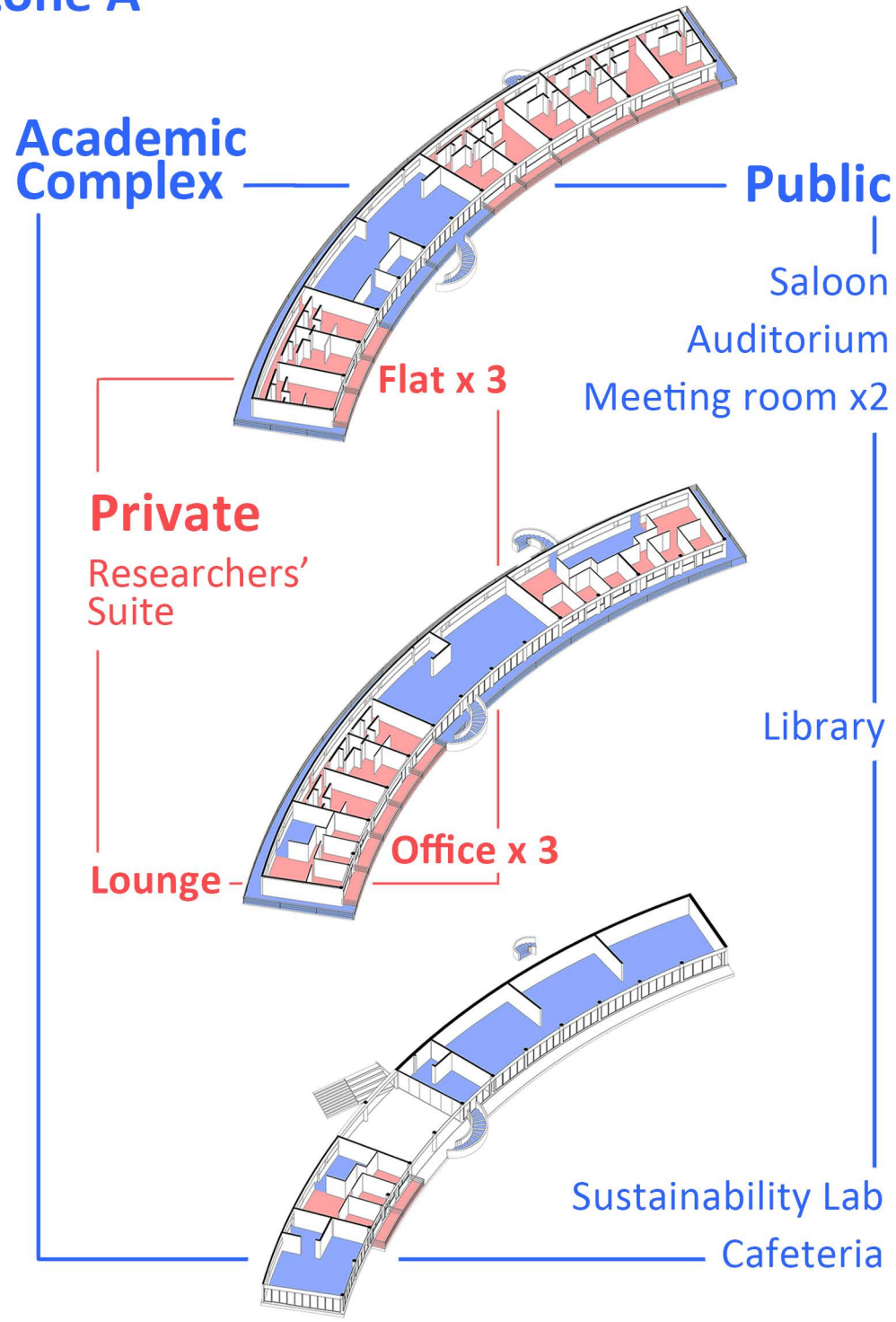
Museum transformation

02 Strategy

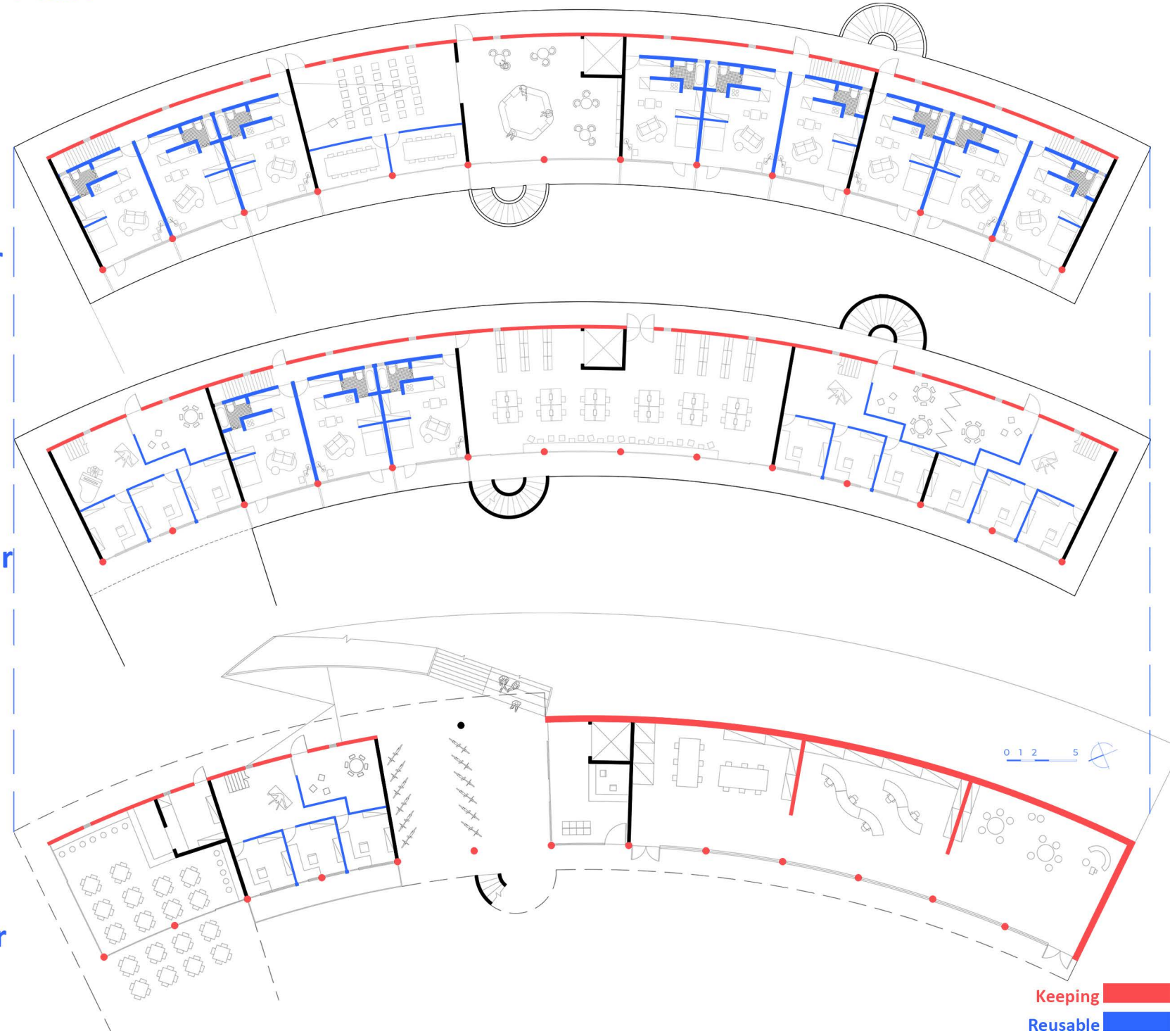
Ground Floor Plan



03 Renovation Zone A



Plan

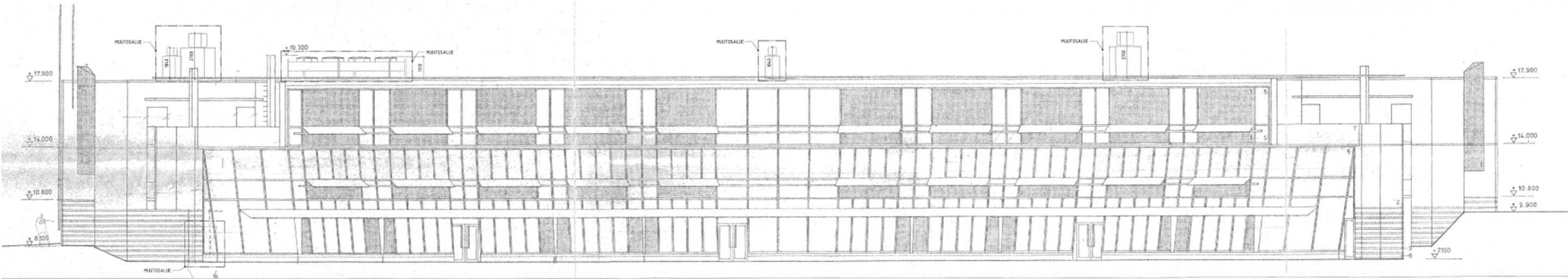


03 Renovation Elevation



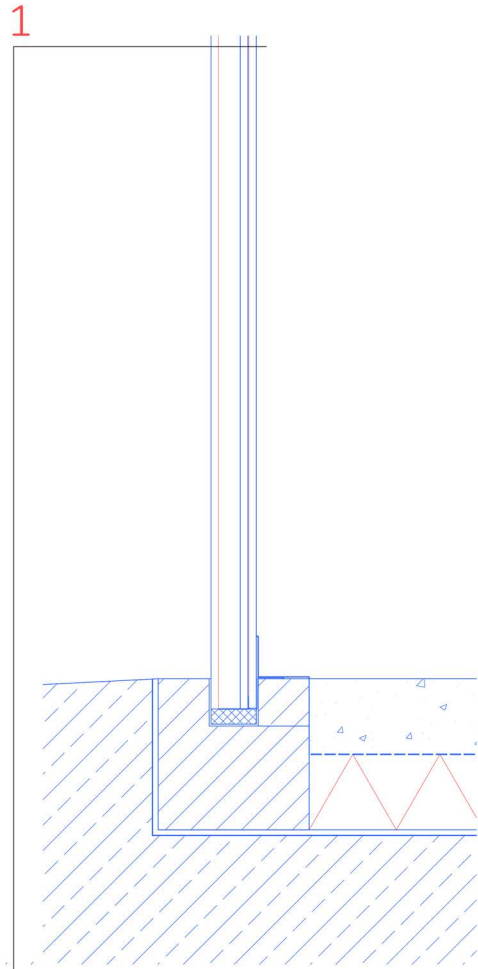
Renovated elevation

Before renovation



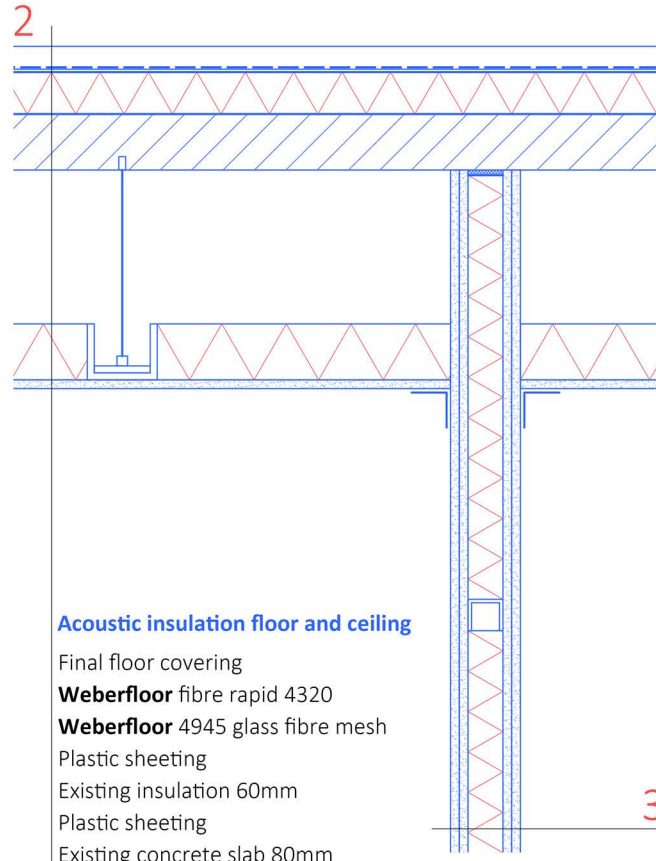


03 Renovation Details



Heating Glass System for the Lab
Powered by solar panels

- Securit **EGLAS** heating glass pane 20mm
- Low-E coating
- PVB 1.5mm
- Securit glass pane 20mm
- Thermal insulation layer 60mm
- Low-E coating
- Securit glass pane 20mm

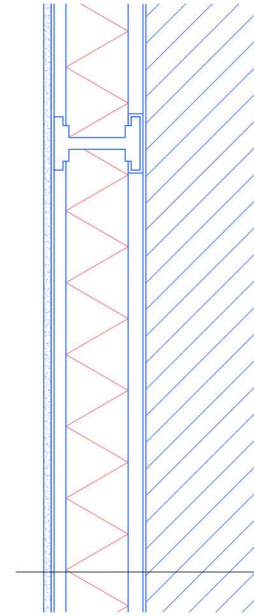


Acoustic insulation floor and ceiling

- Final floor covering
- Weberfloor** fibre rapid 4320
- Weberfloor** 4945 glass fibre mesh
- Plastic sheeting
- Existing insulation 60mm
- Plastic sheeting
- Existing concrete slab 80mm
- Isover** mineral wool 80mm
- Placo** PPH 13 1200 gypsum board 12.5mm

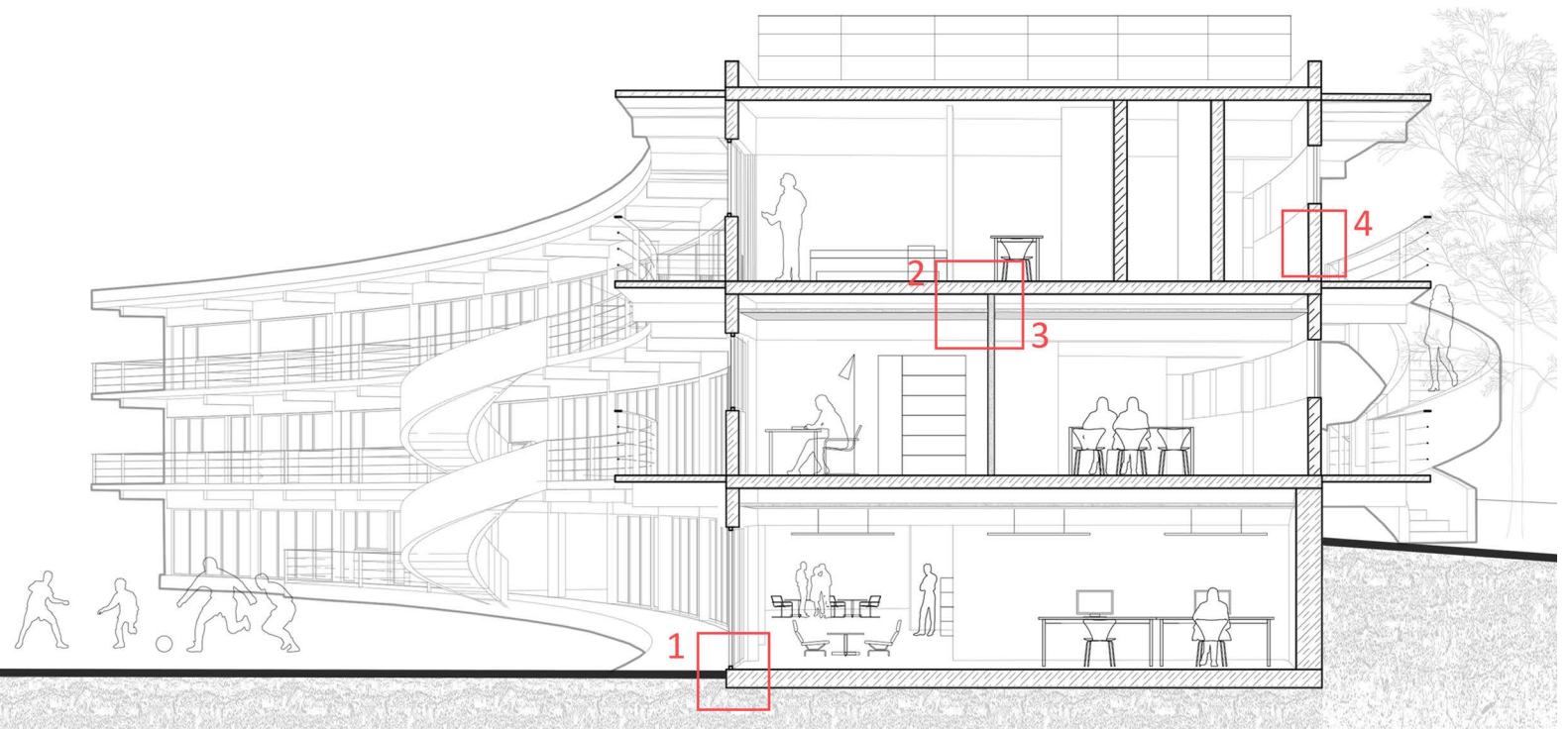
Acoustic insulation partition

- Placo** PPH 13 1200 gypsum board 12.5mm (2 layers)
- Isover** mineral wool 50mm + steel frame
- Placo** PPH 13 1200 gypsum board 12.5mm (2 layers)

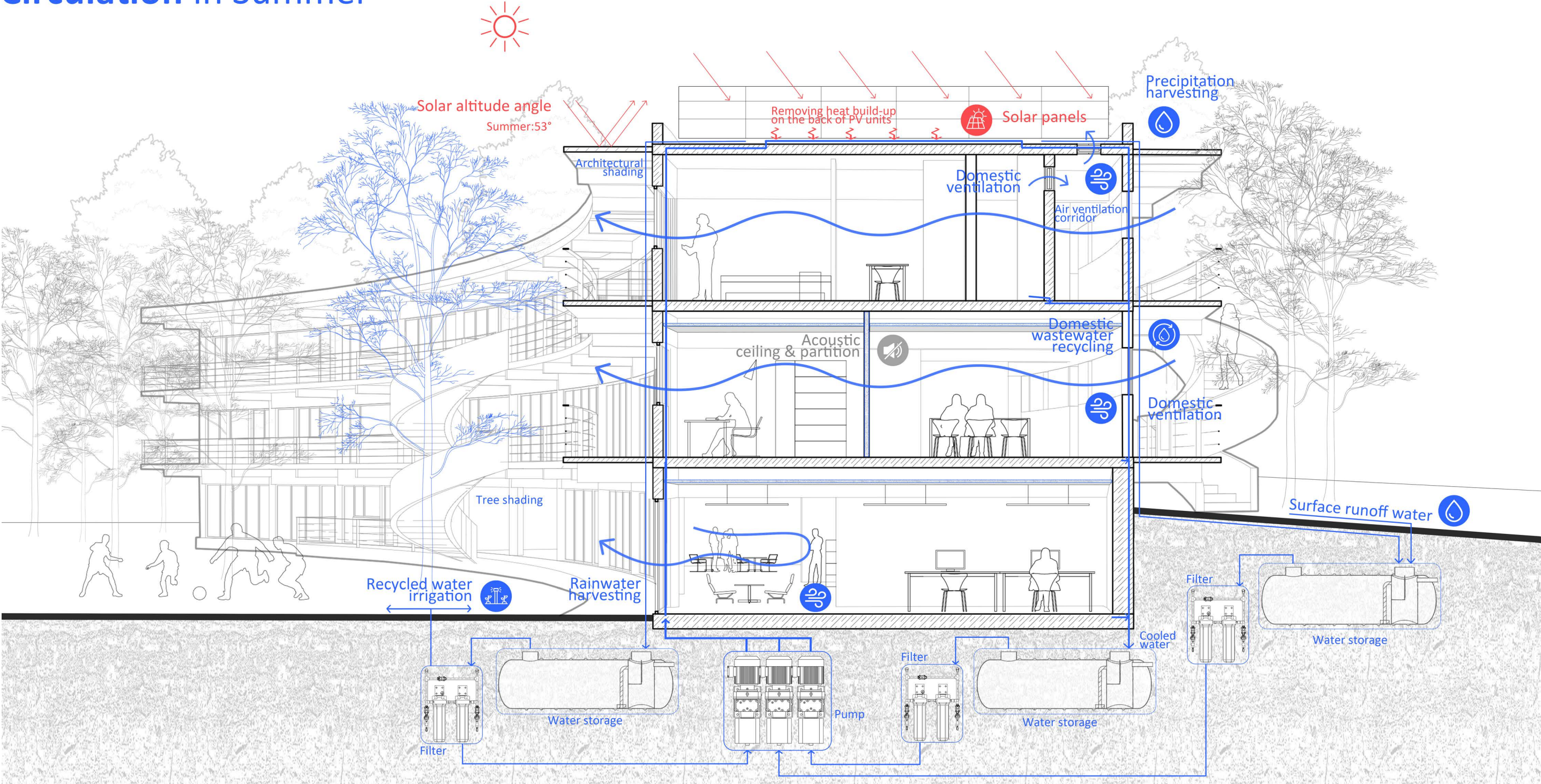


External Walls Thermal Upgrade

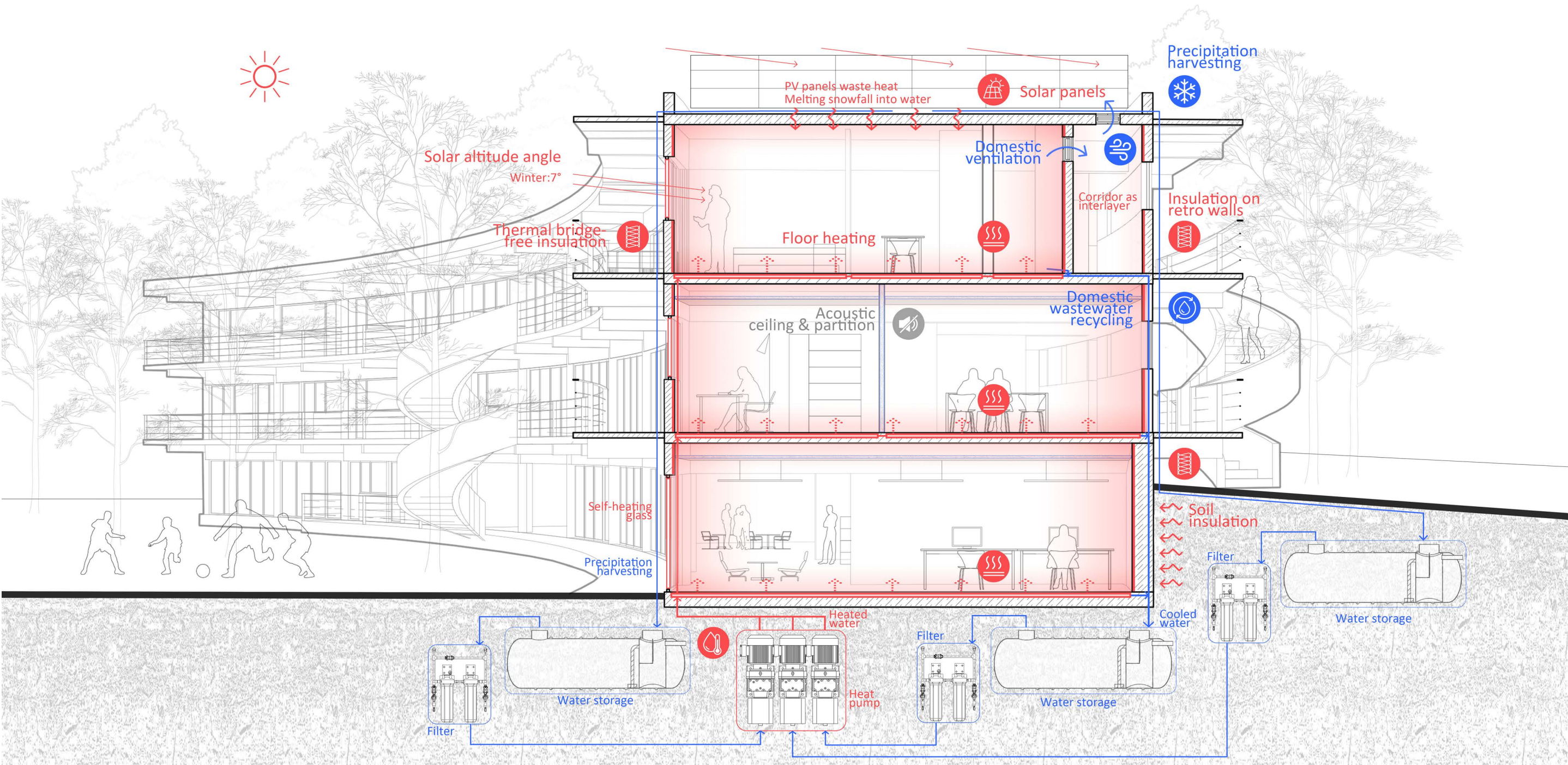
- Placo** PPH 13 1200 gypsum board 12.5mm
- Gypframe** GL8 Track
- Isover** Optima IWI Supports + **Isover** Renovation Roll Thermal 100mm
- Gypframe** GL1 Lining Channel
- Existing plaster
- Existing wall



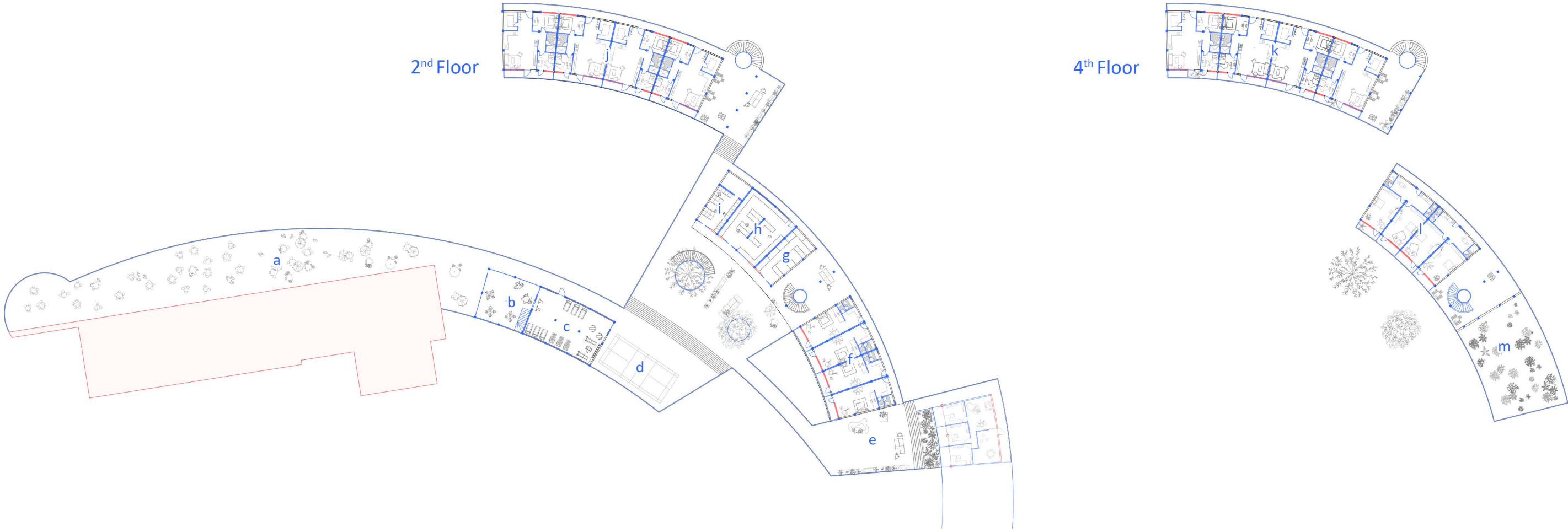
03 Renovation Circulation in Summer



03 Renovation Circulation in Winter



04 New Construction Plan



2nd Floor

4th Floor

Reclaimed/Keeping
 Reusable

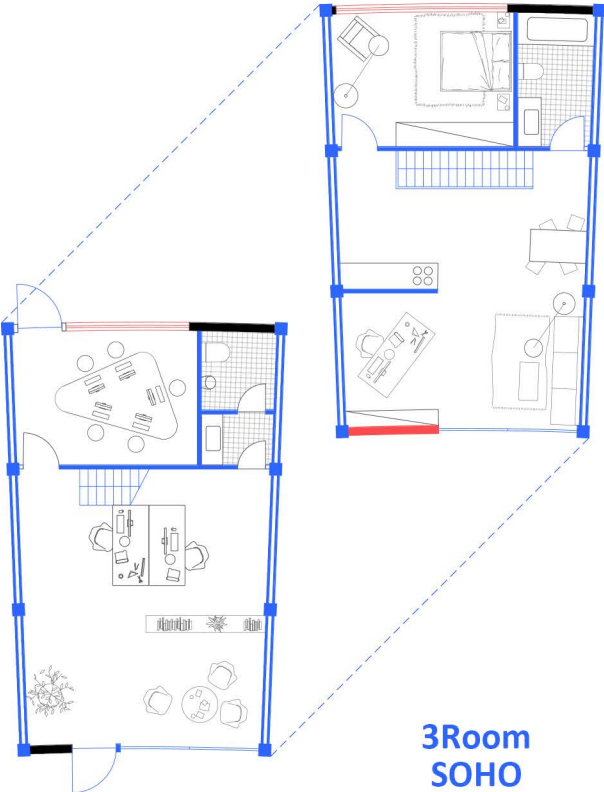
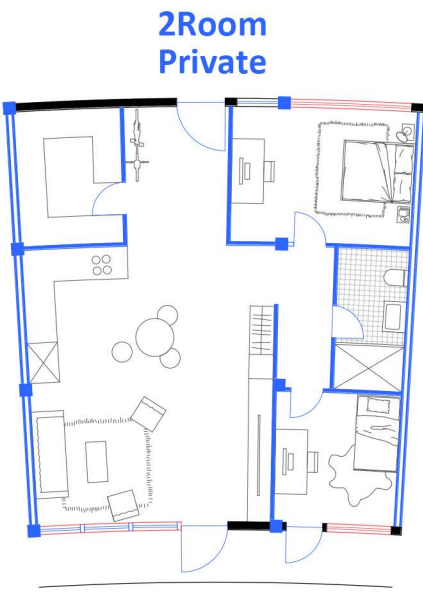
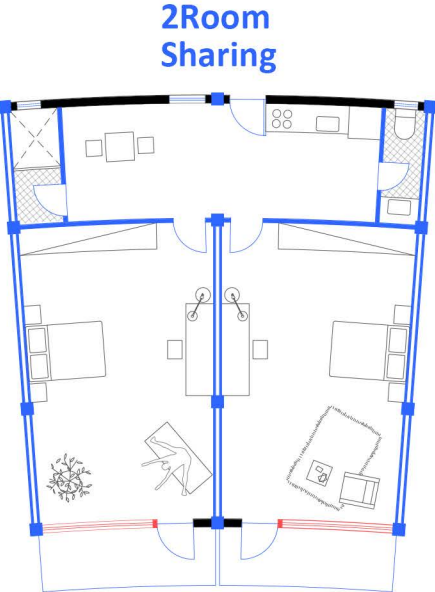
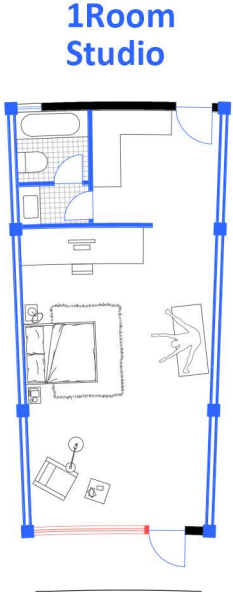
a shared rooftop with beer garden
 b cafe
 c gym
 d tennis court
 e connection to Building A

f studios
 g rental storage
 h community kitchen
 i laundromat
 j private 2-room flats

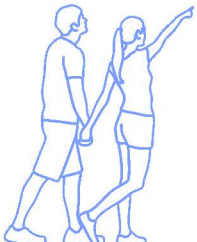
k private 2-room flats
 l shared 2-room flats
 m roof garden

04 New Construction

Different Types of Housing



Students/...





Families/...



Start-ups/Artists...



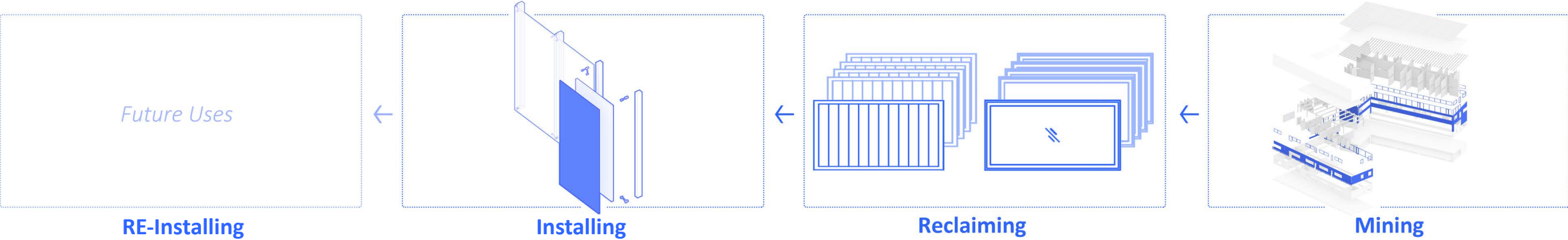
Researchers/...

 Reclaimed
 Reusable

For Different Tenants

04 New Construction Elevation

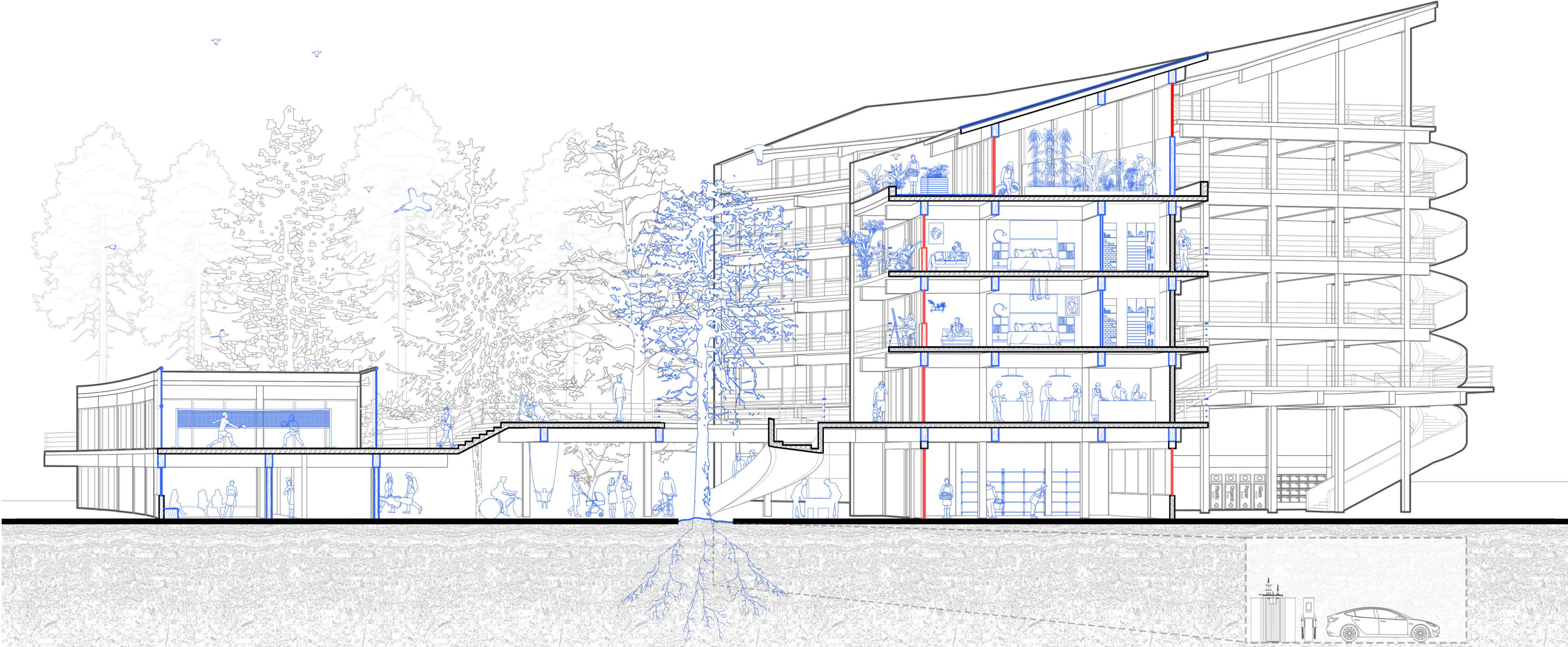
Building as Material Bank



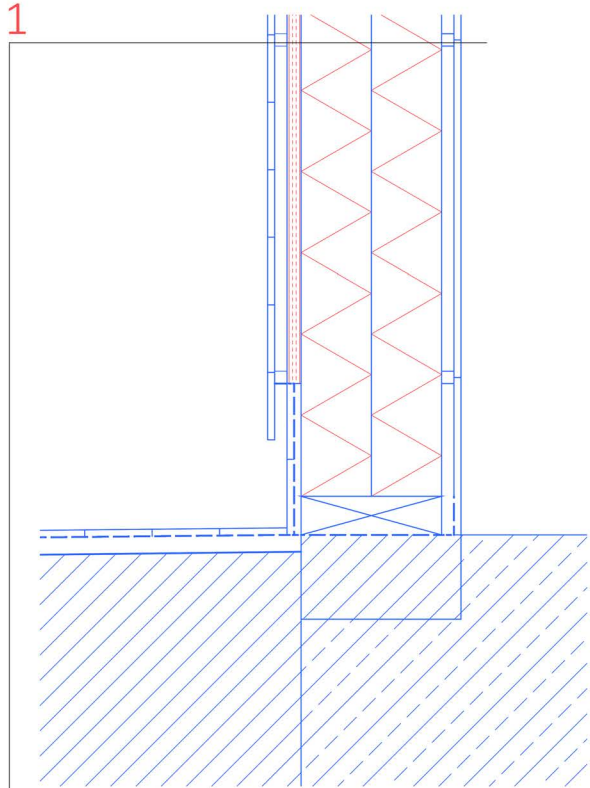
25.00
21.50
20.00
16.50
6.40
3.00
0.00



04 New Construction Section B-B'

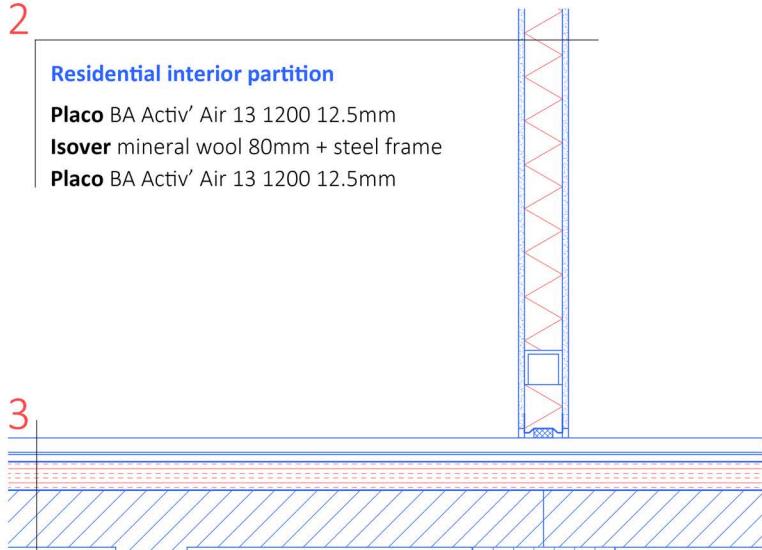


04 New Construction Details



Sauna exterior wall insulation

Exterior recycled wood panel
 Ventilation gap 22mm + timber frame
Isover Premium 33 125 mm (2 layers) + timber frame
Isover Sauna 25mm + timber frame
 Ventilation gap 22mm + timber frame
 Interior wood veneer



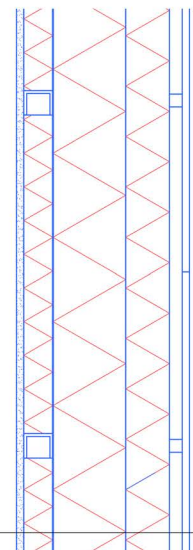
Residential interior partition

Placo BA Activ' Air 13 1200 12.5mm
Isover mineral wool 80mm + steel frame
Placo BA Activ' Air 13 1200 12.5mm

Residential floor

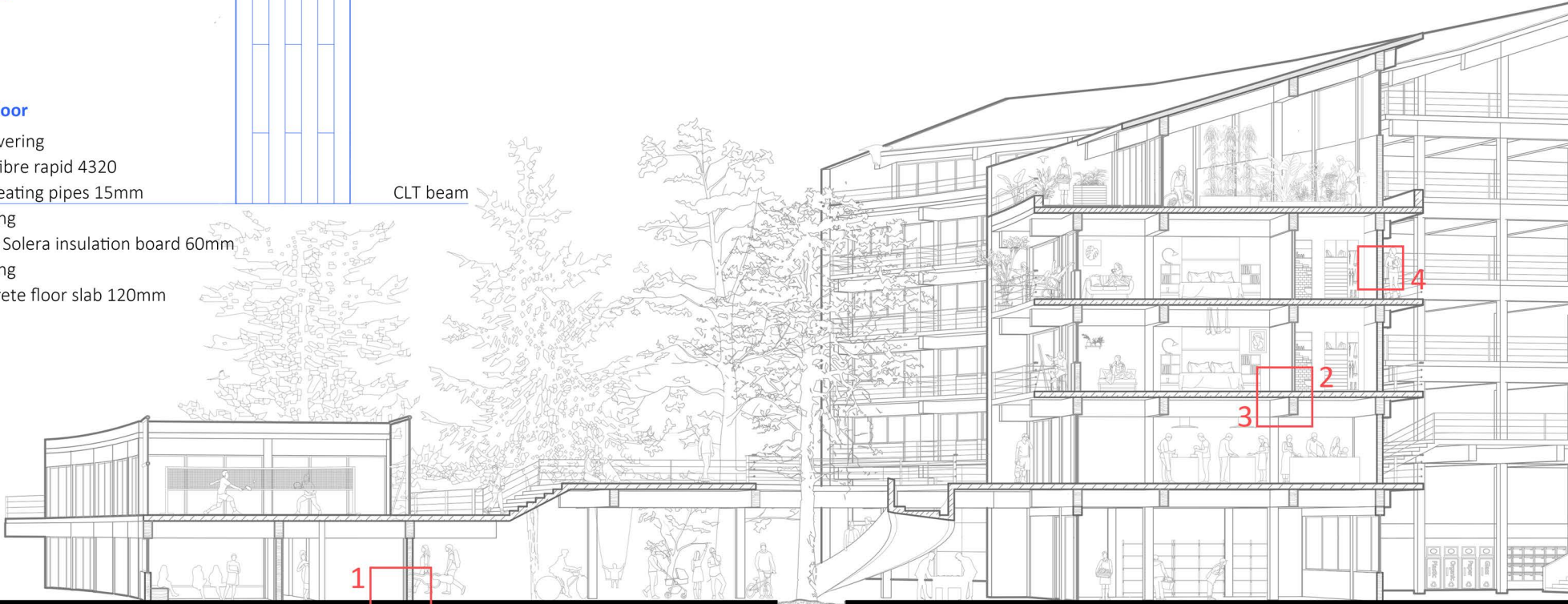
Final floor covering
Weberfloor fibre rapid 4320
 Underfloor heating pipes 15mm
 Plastic sheeting
Placo Rigidur Solera insulation board 60mm
 Plastic sheeting
 Precast concrete floor slab 120mm

CLT beam



Residential exterior wall insulation

Placo PPM 13 1200 gypsum board 12.5mm
Isover Premium 33 50mm + steel frame
Isover Vario Xtra vapor barrier
Isover Premium 33 125 mm + steel frame
Isover Facade 75 mm
 Ventilation gap 22mm + timber frame
 Exterior recycled wood panel



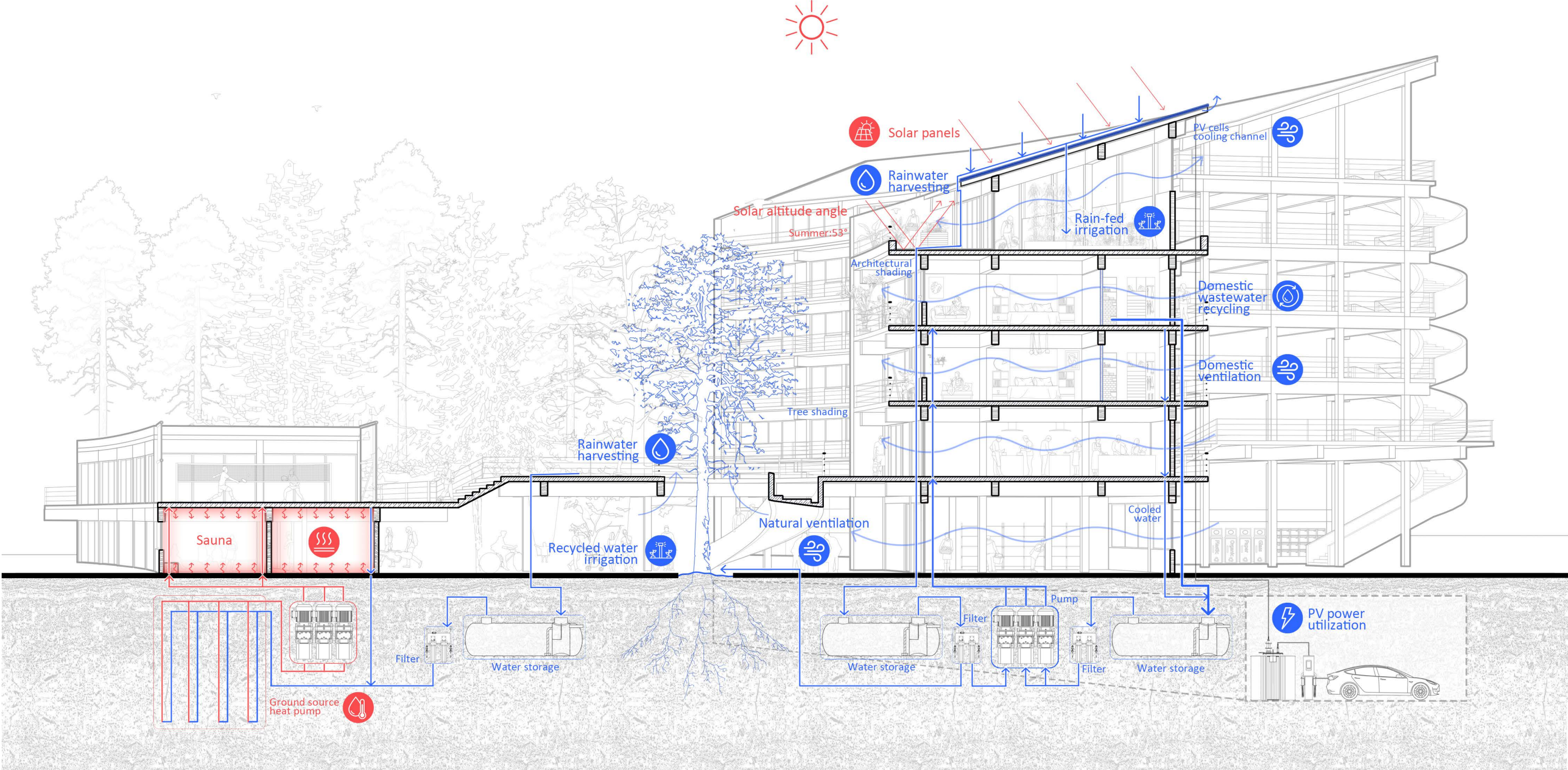
1

3

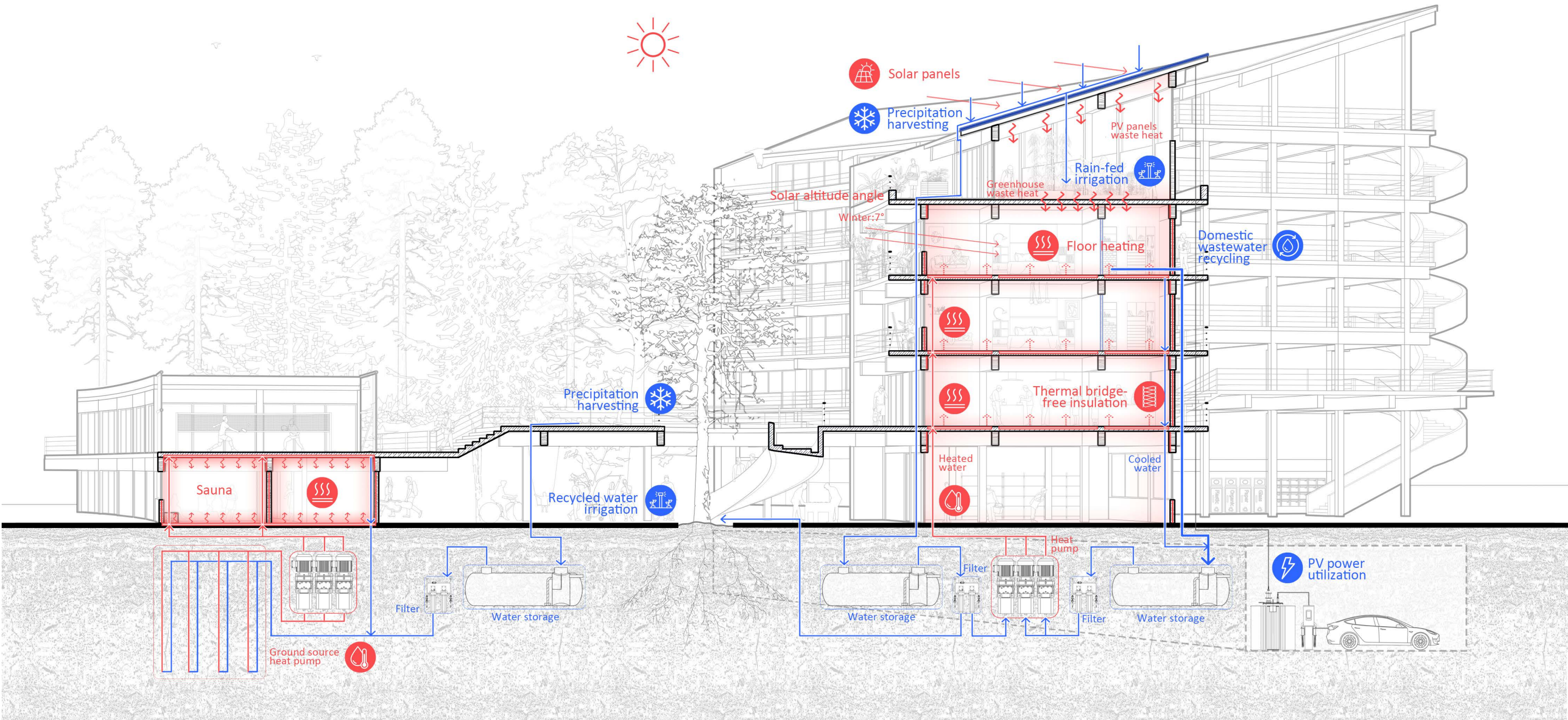
2

4

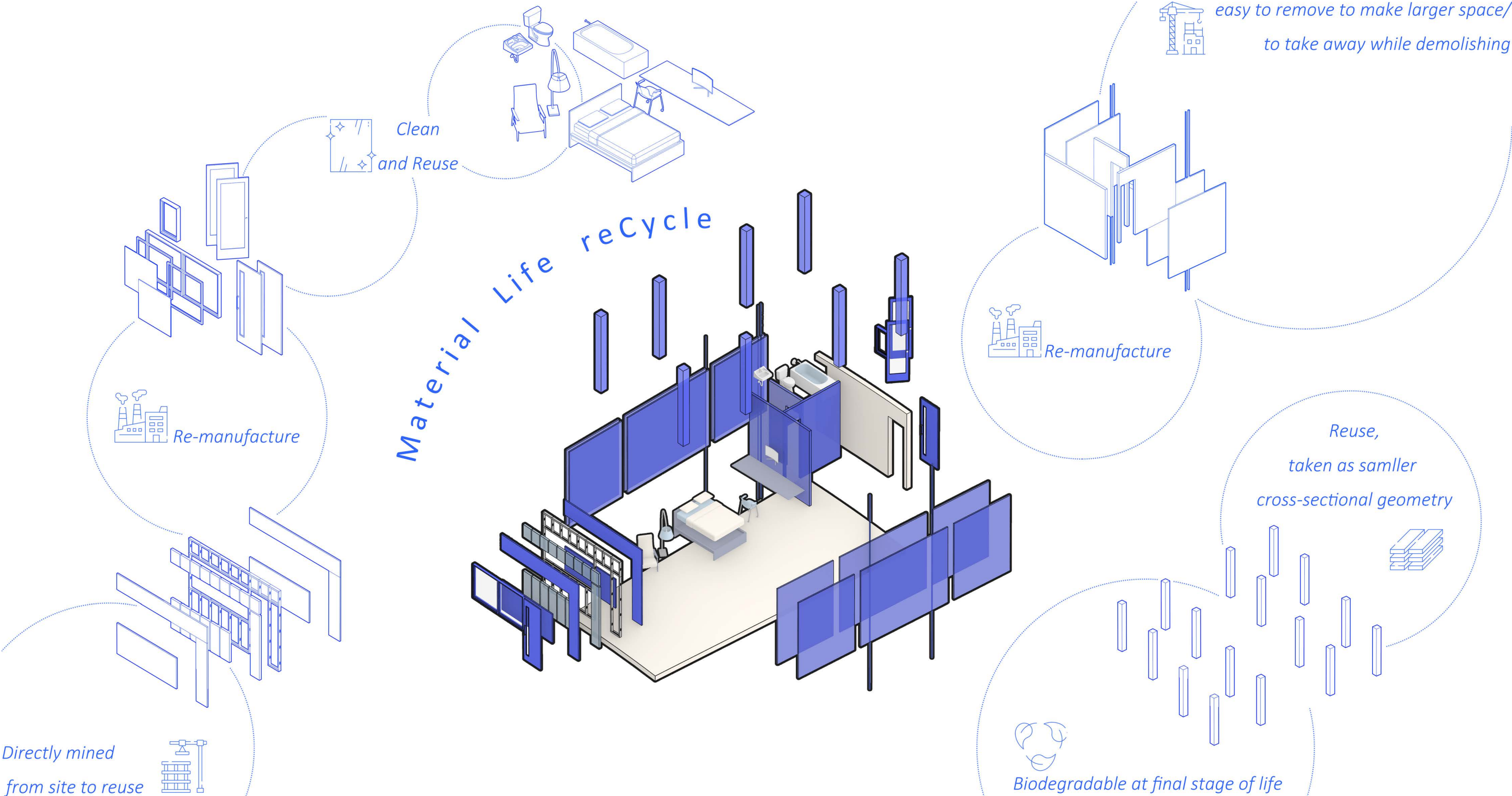
04 New Construction Circulation in Summer



04 New Construction Circulation in Winter



04 New Construction







05 Landscape Intervention

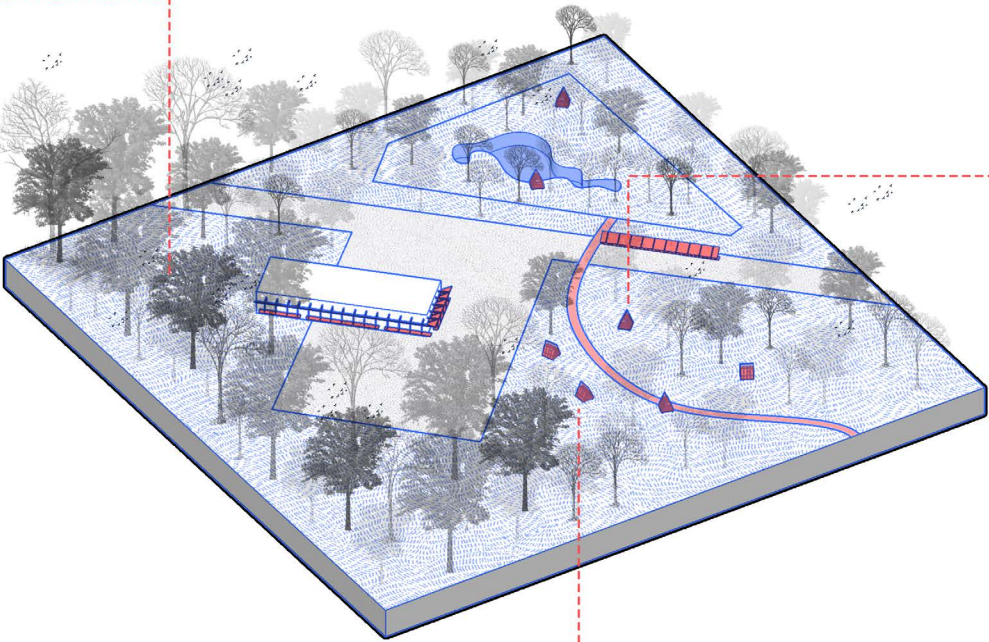


Diverse

Biofriendly

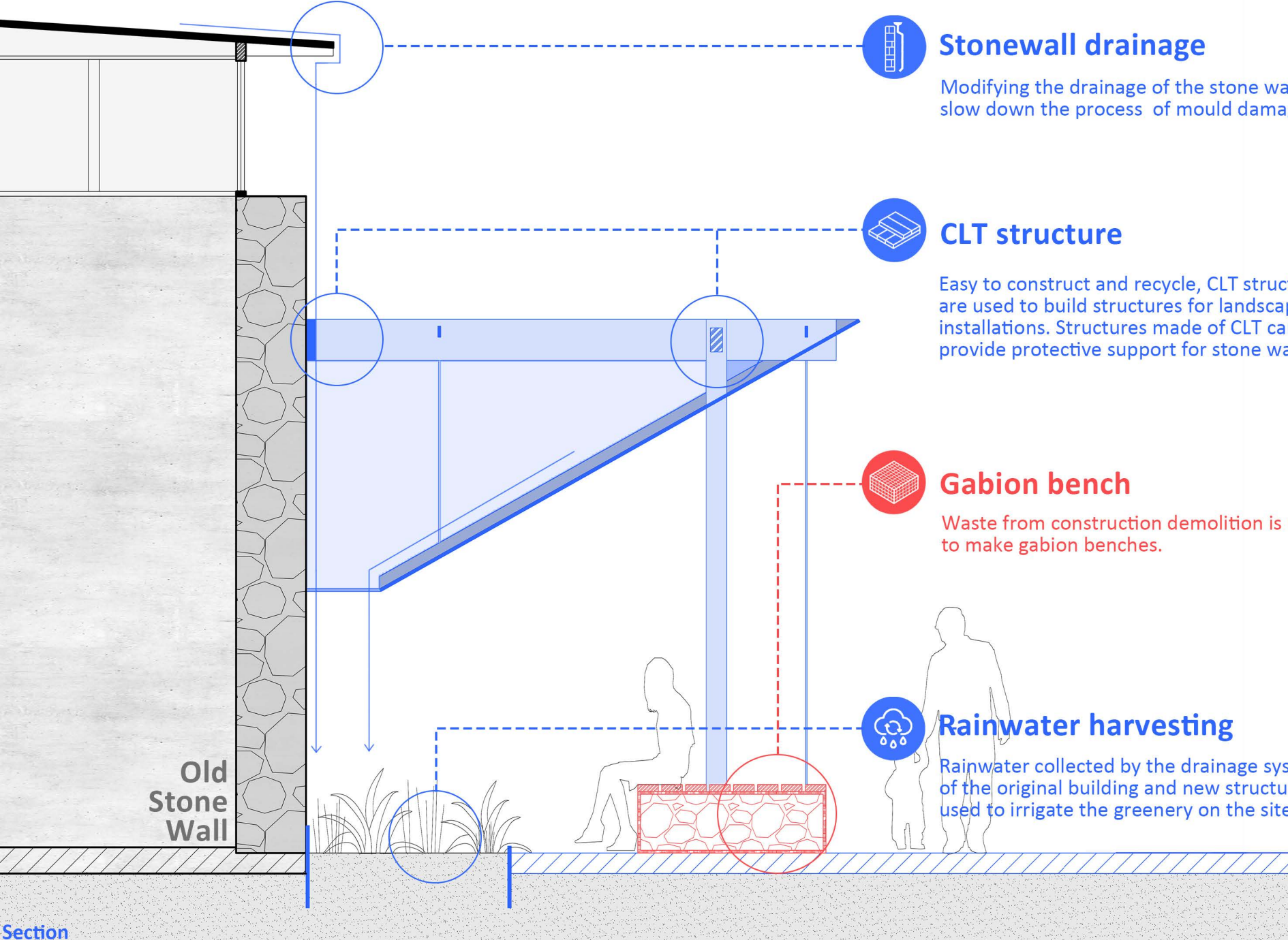


Sustainable



Landscape Intervention Analysis

05 Landscape Intervention Museum Transformation

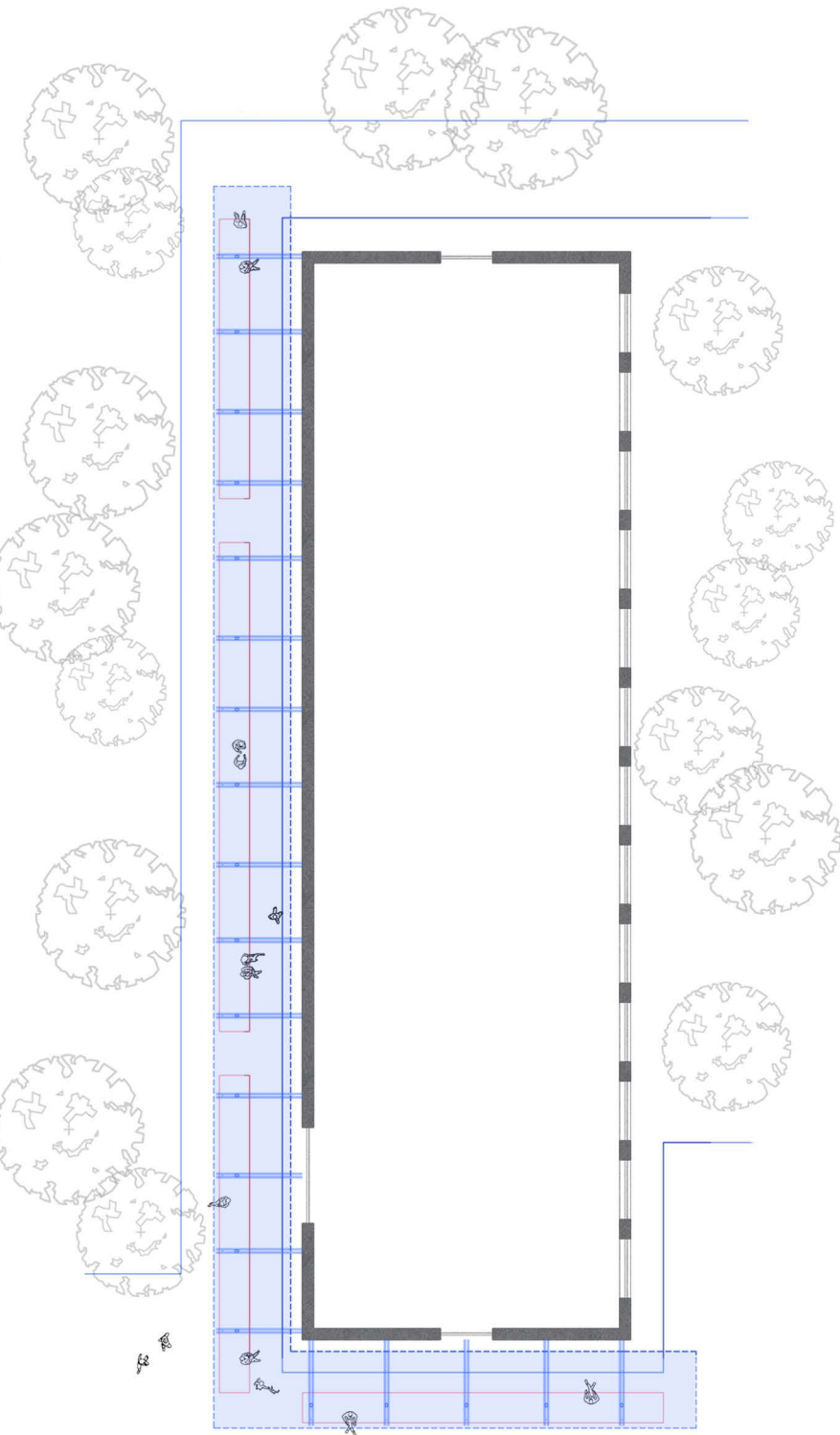


Stonewall drainage
Modifying the drainage of the stone wall can slow down the process of mould damage.

CLT structure
Easy to construct and recycle, CLT structures are used to build structures for landscape installations. Structures made of CLT can also provide protective support for stone walls.

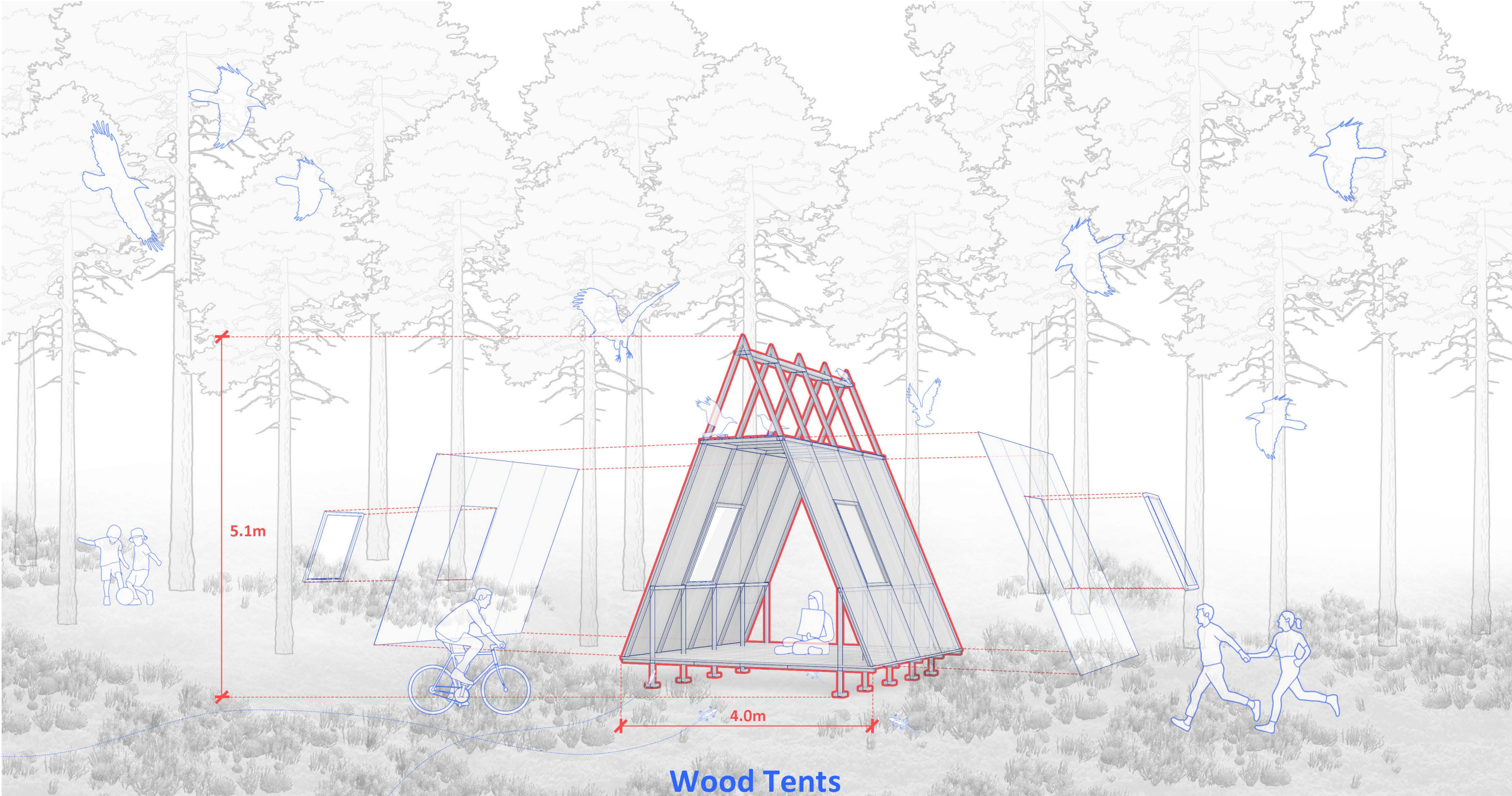
Gabion bench
Waste from construction demolition is used to make gabion benches.

Rainwater harvesting
Rainwater collected by the drainage systems of the original building and new structures is used to irrigate the greenery on the site.

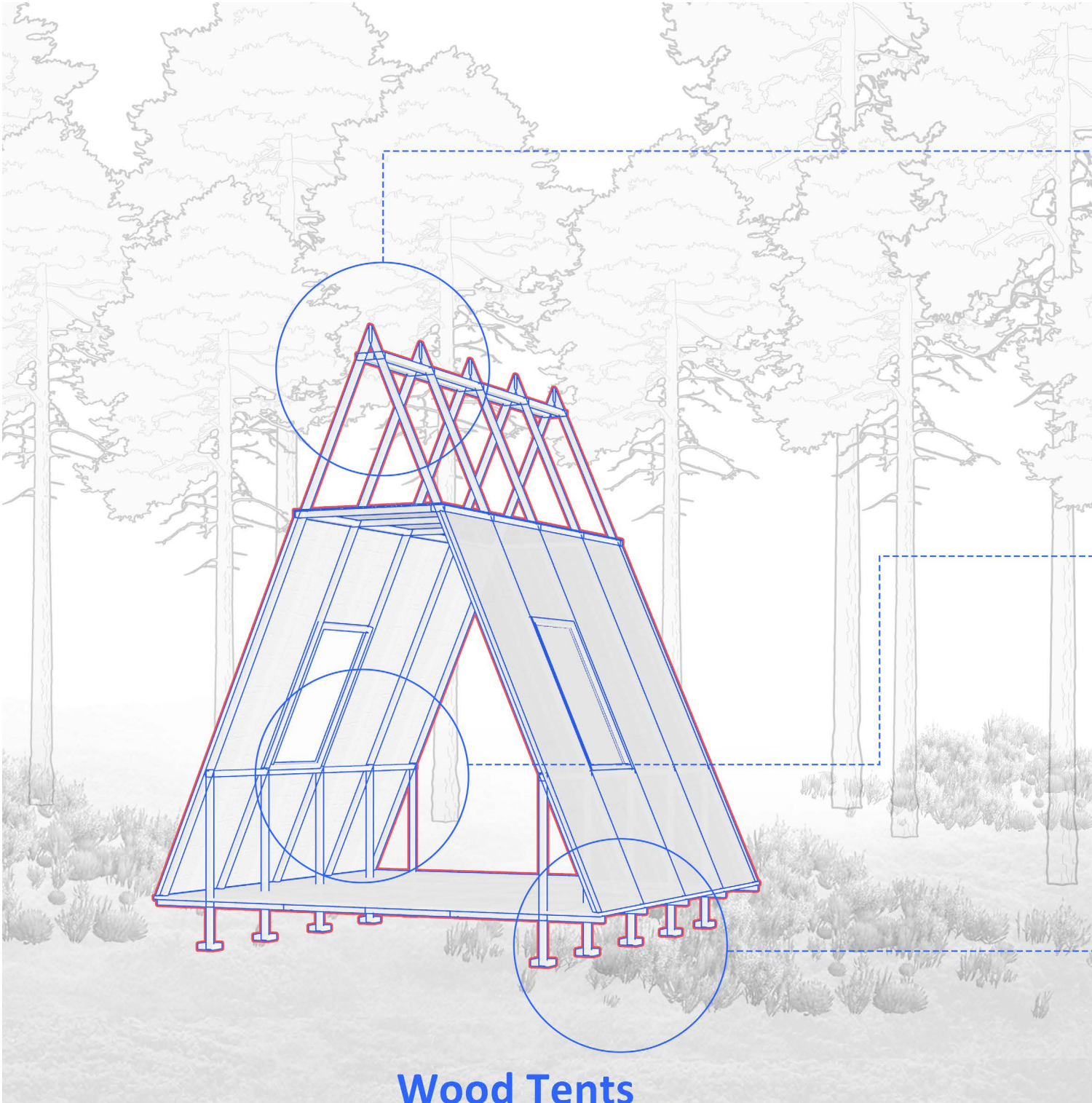




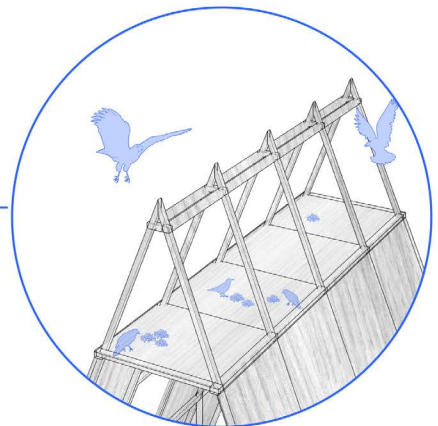
05 Landscape Intervention



05 Landscape Intervention

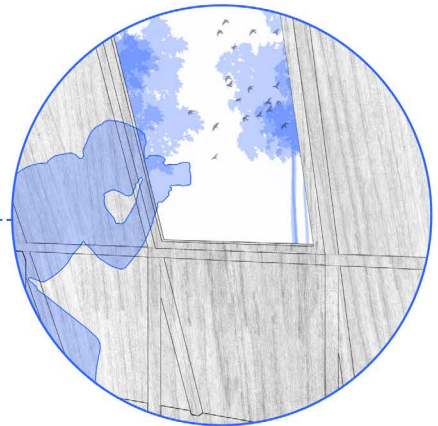


Wood Tents



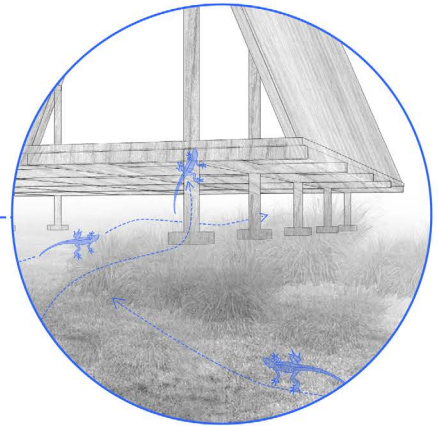
Bird Friendly

The nature reserve next to the site serves as a home to numerous bird species, and their daily movement distance can support them to come to the site. The open top will become a platform and support for birds to rest on, and it can also become a place for people to feed the birds.



Recycled CLT Boards

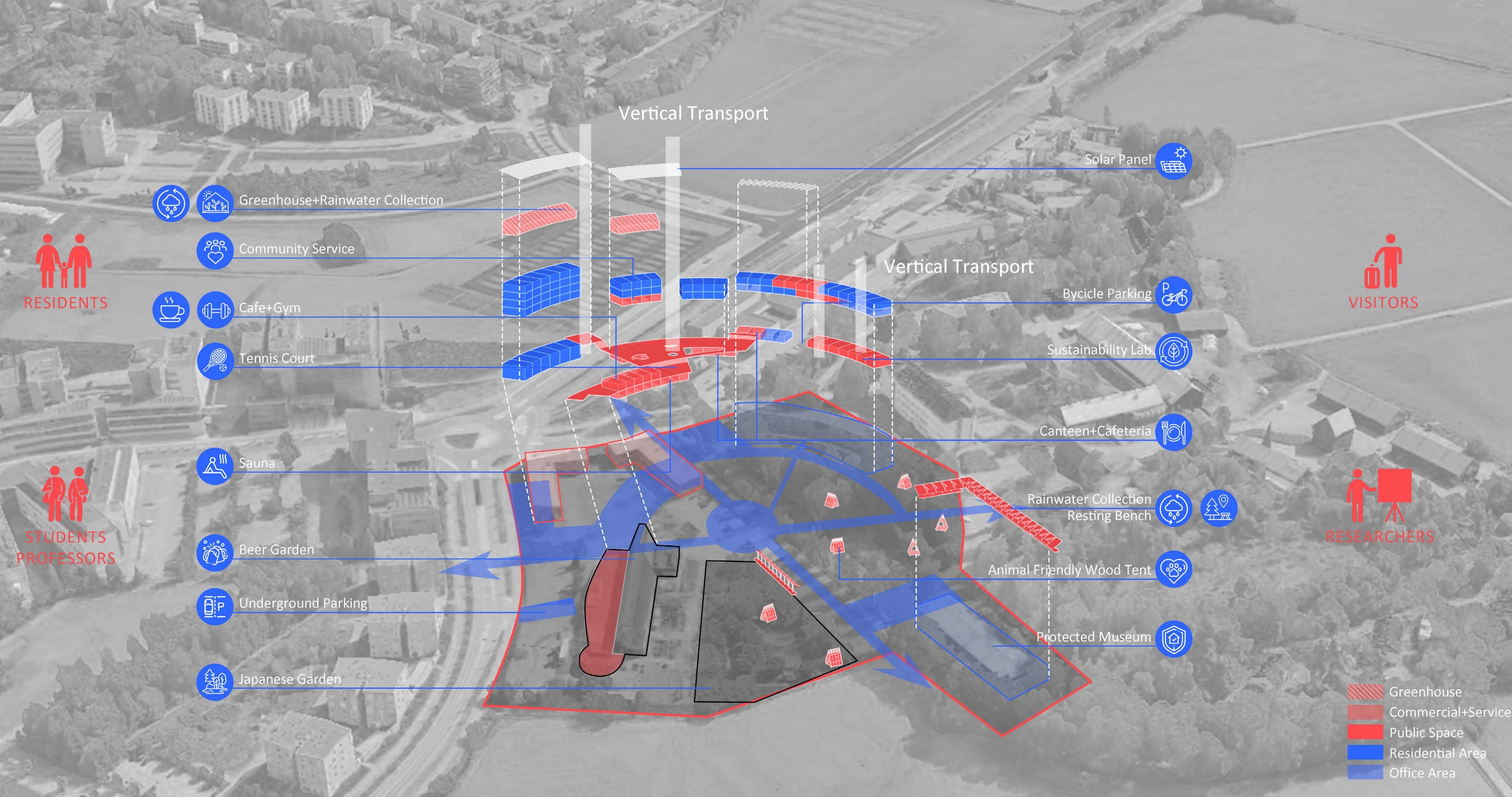
The material for the wood tent is mainly sourced from CLT boards recycled from buildings. The entire structure is lightweight and easy to assemble and disassemble to achieve the goal of minimal intervention.



Nods of Human and Nature

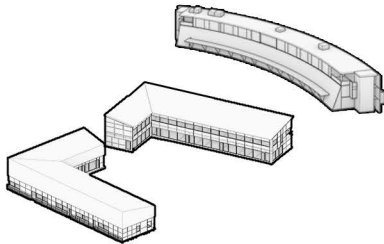
Squamates Friendly

Multiple squamate species live in the nature reserve next to the site and their daily movement distance can support them to come to the site. The open bottom minimizes disturbing the squamates' lives as much as possible and allows spaces for grass growth.



Functional Division

06 Sustainability



Old Building

New Material

Concrete Insulation CLT boards

Recycle

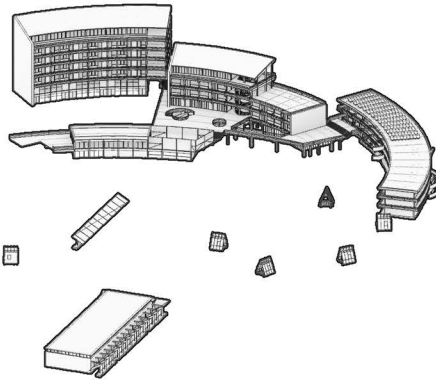
Concrete Wood Steel Gypsum

Remanufacture

Glass → Glass Wool Insulation

Reuse

Doors and Windows Sanitary Appliances Lighting CLT boards



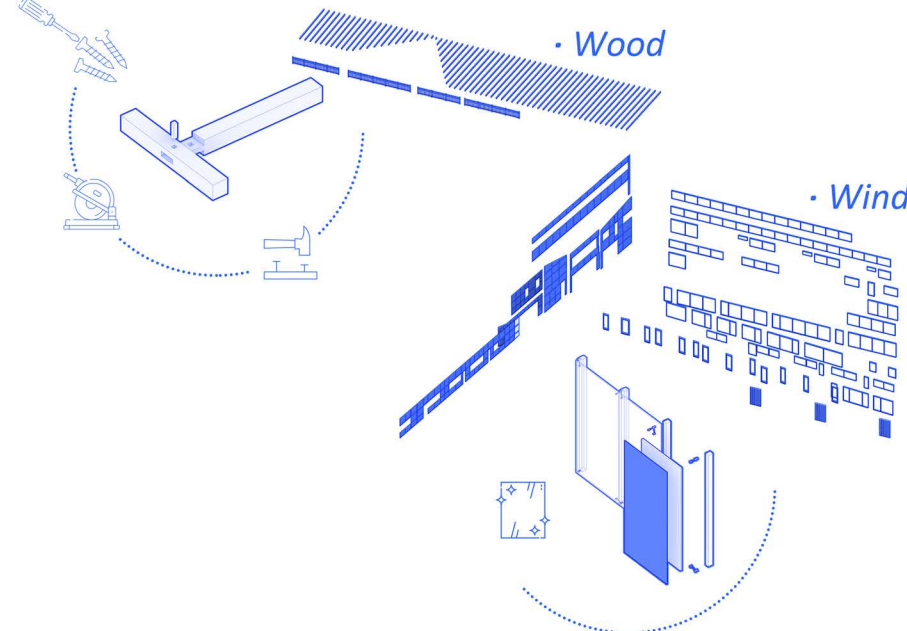
New Building

Building as Material Bank

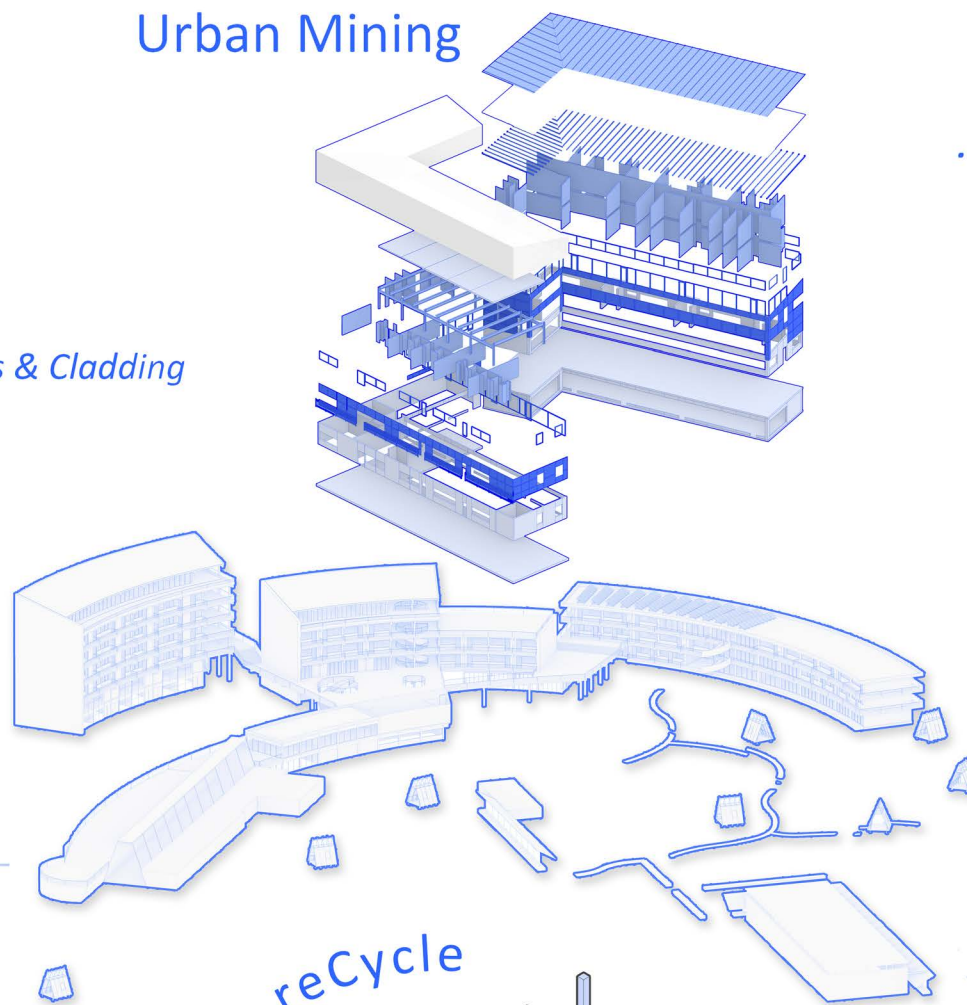
06 Sustainability

Building as Material Bank

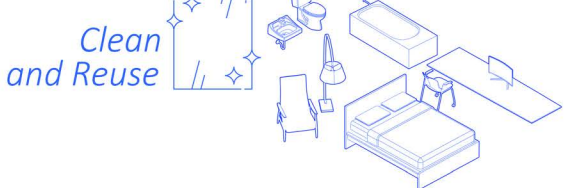
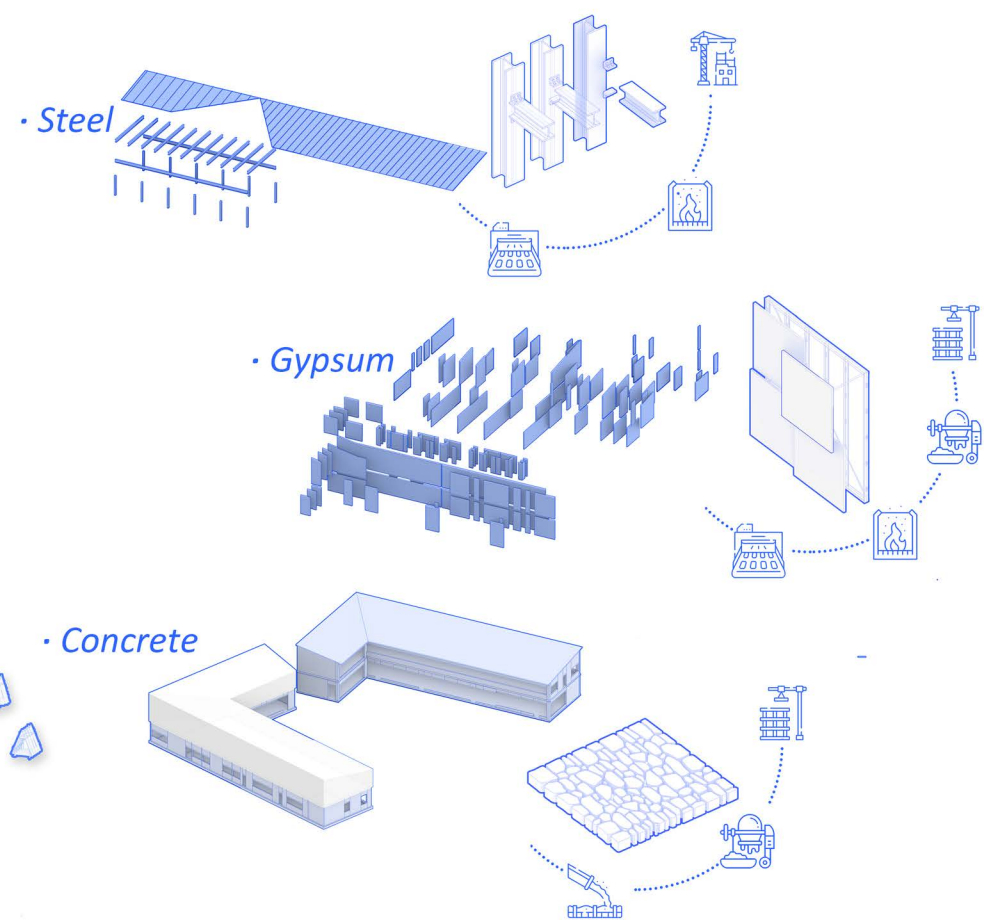
On-site Reuse



Urban Mining



Remanufacture



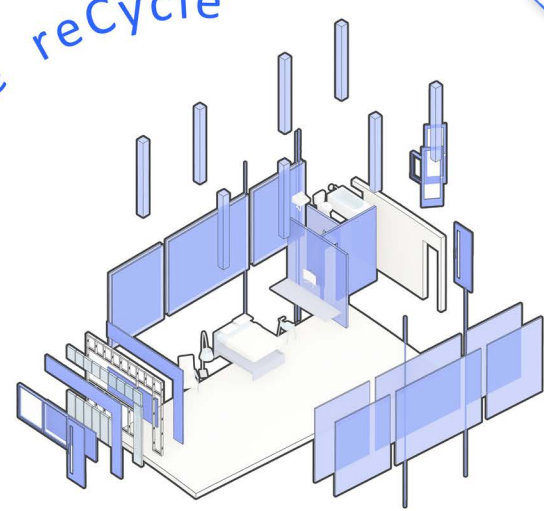
Re-manufacture

easy to remove to make larger space/
to take away while demolishing

Re-manufacture

Directly mined
from site to reuse

Material Life reCycle

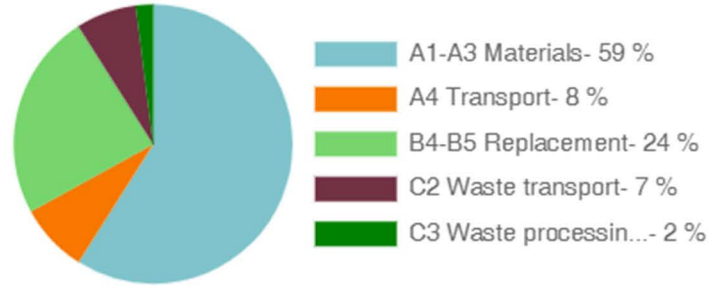


Reuse, taken as smaller
cross-sectional geometry

Biodegradable at final stage of life

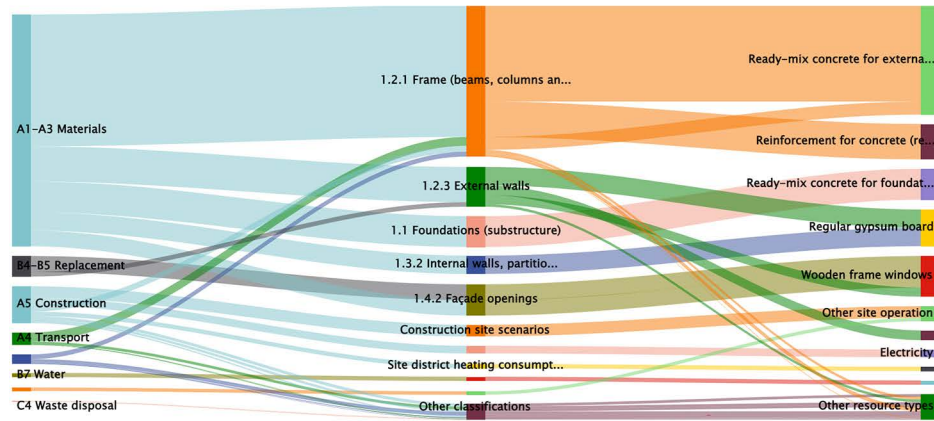
06 Sustainability

Cradle to grave (A1-A4, B4-B5, C1-C4)		kg CO ₂ e/m ²
(< 320) A		125
(320-360) B		
(360-400) C		
(400-440) D		
(440-480) E		
(480-520) F		
(> 520) G		



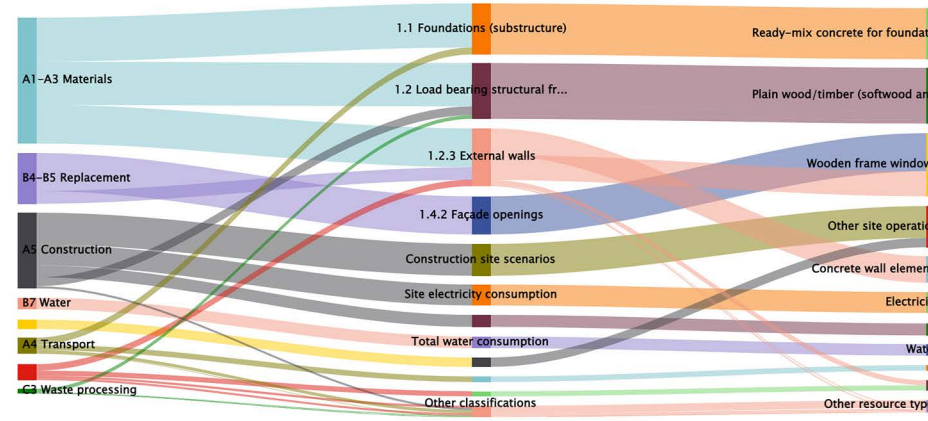
Baseline

Sankey diagram, Global warming

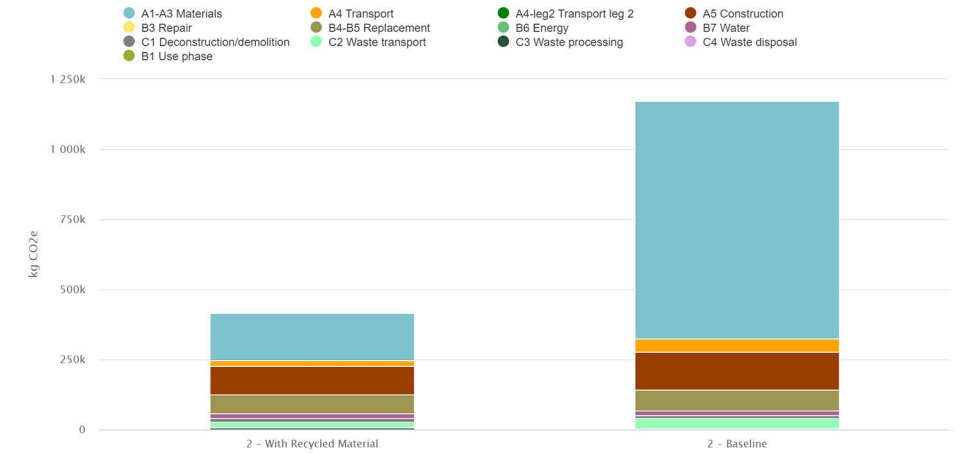


with Recycled Materials

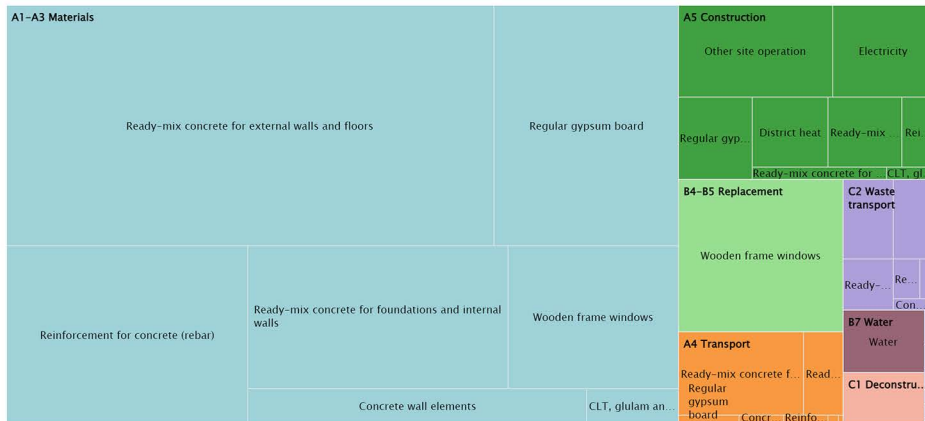
Sankey diagram, Global warming



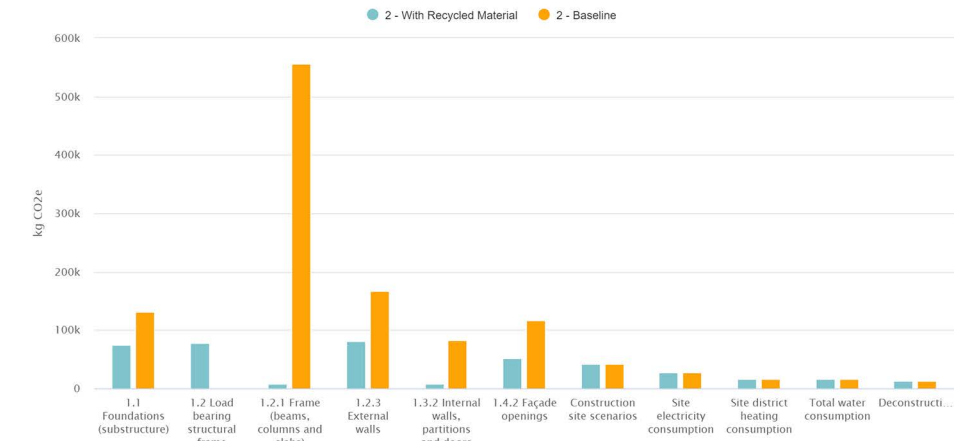
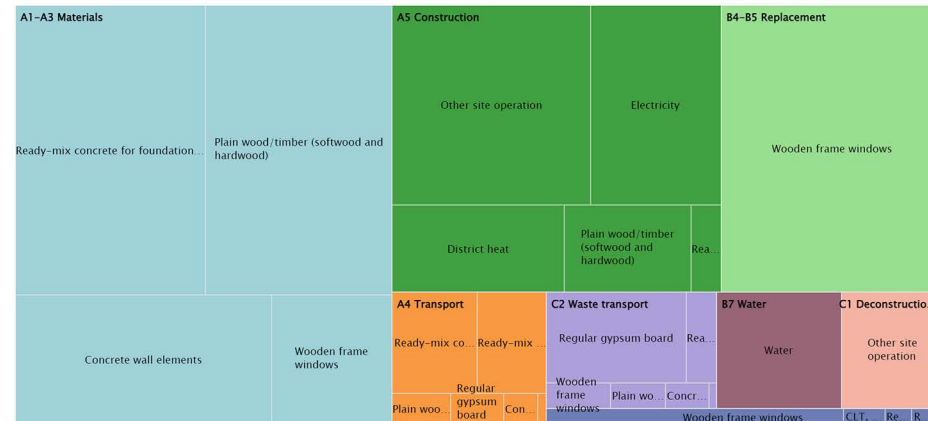
Data Comparisons



Life cycle stage - subtype

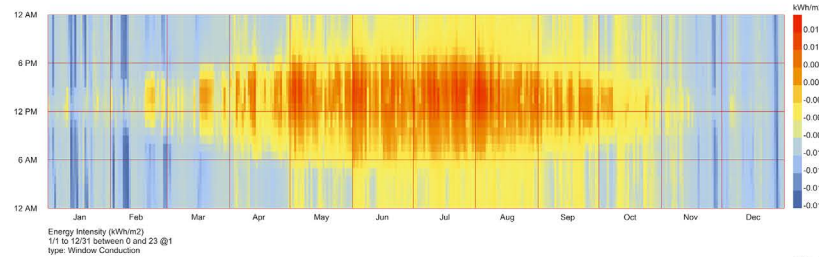
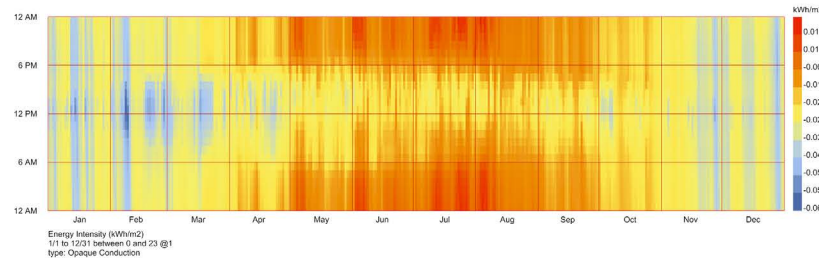
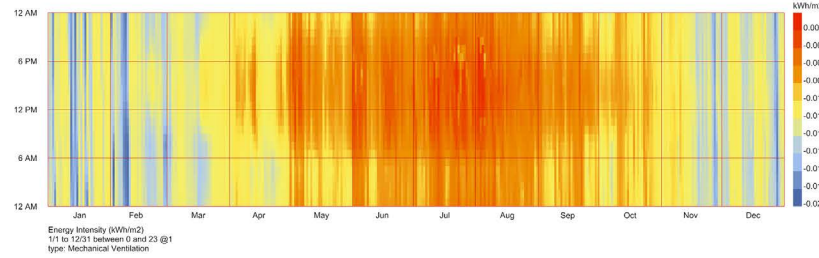
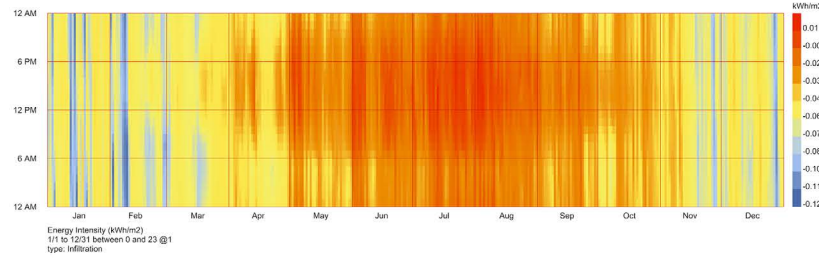
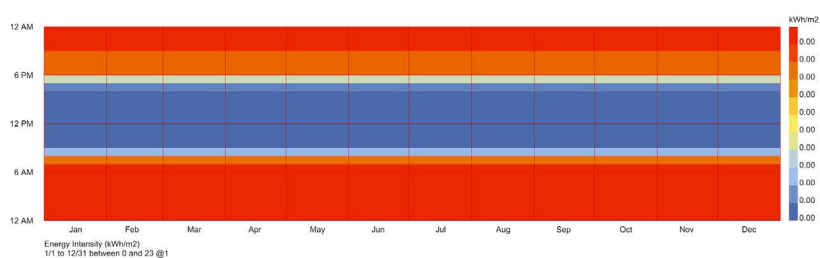
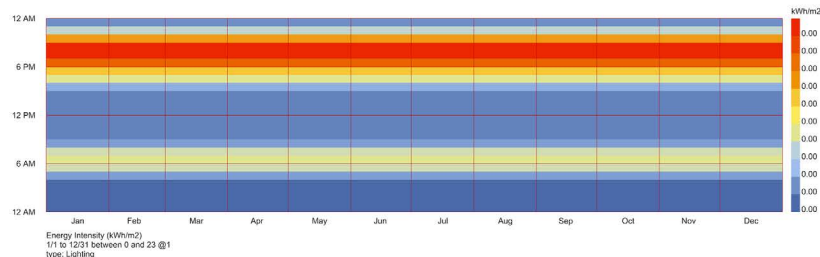
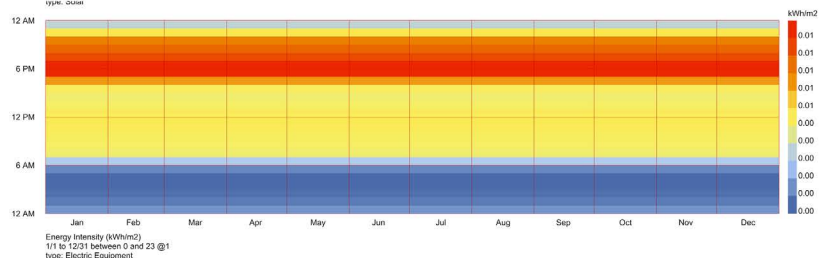
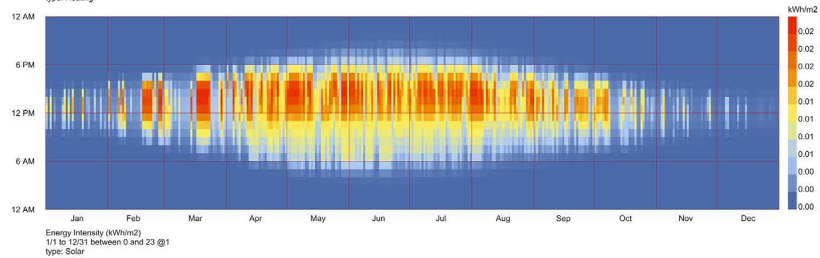
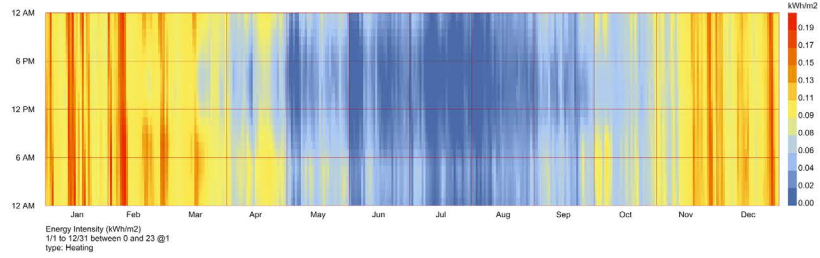


Life cycle stage - subtype

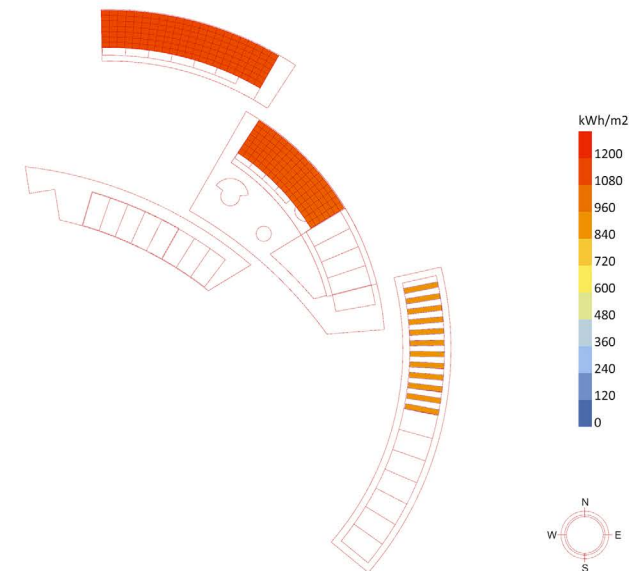
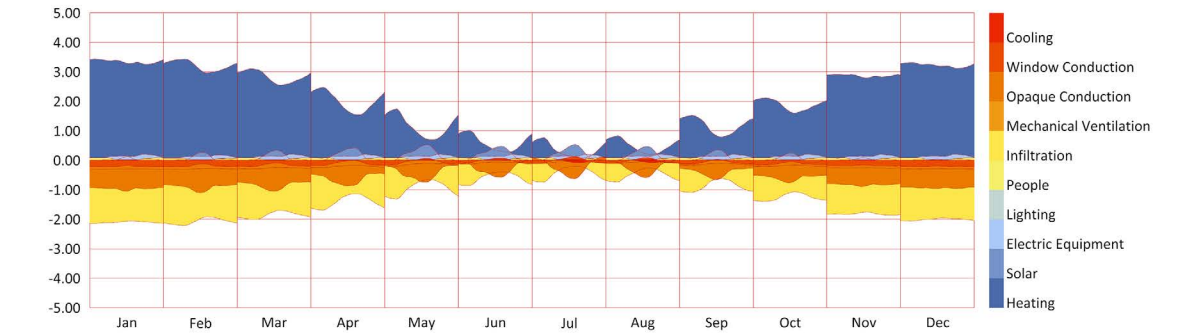
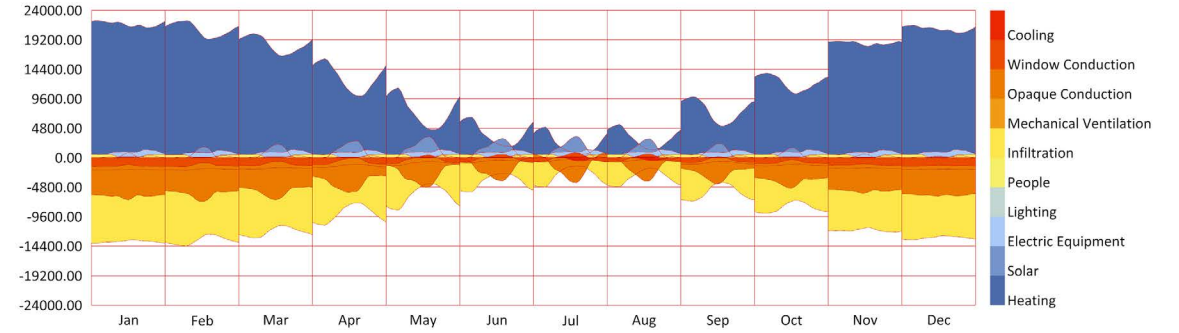


LCA Analysis

06 Sustainability



Annual Energy Intensity by Types

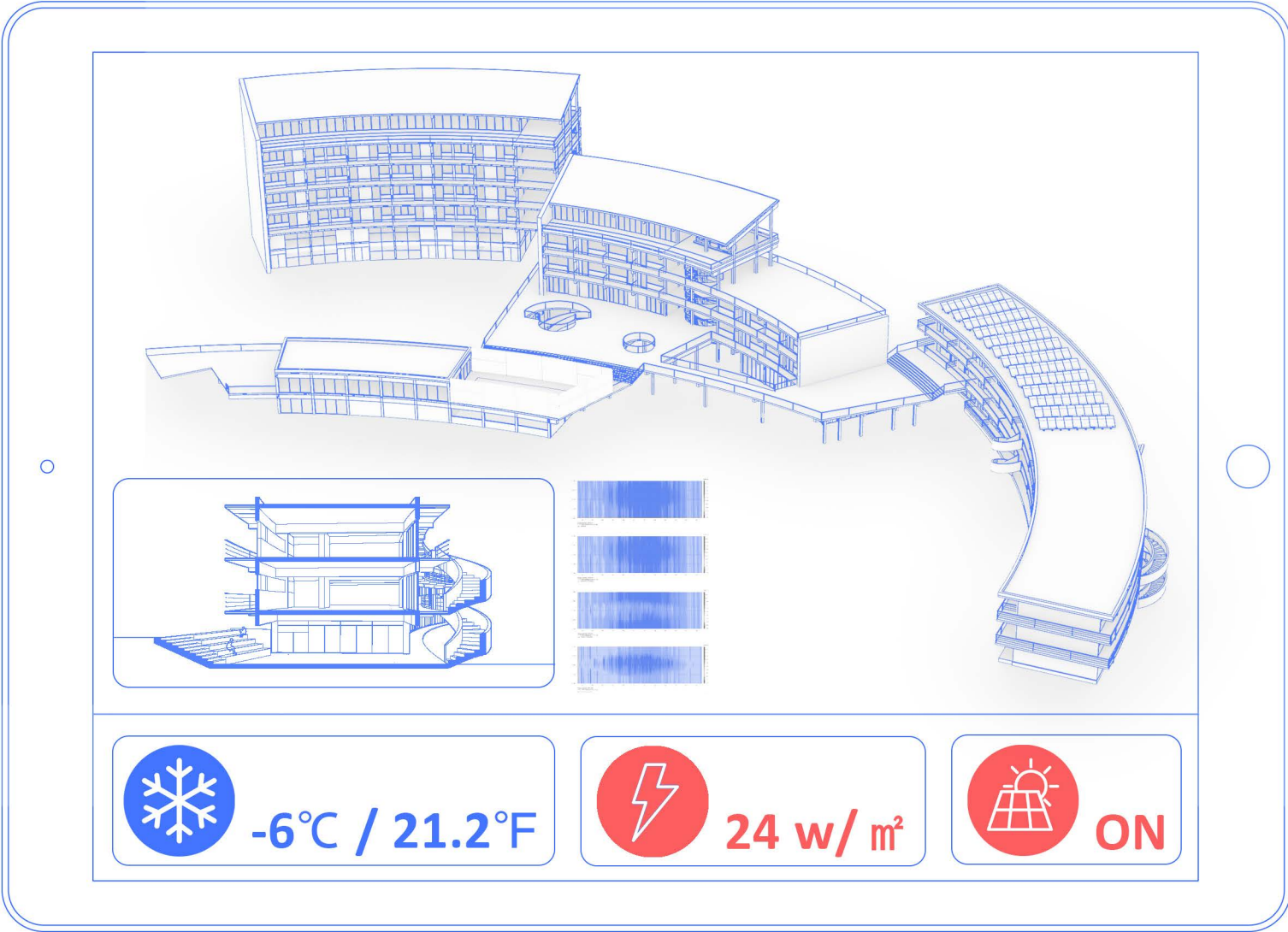


Energy consumption is mainly compensated by solar panels placed on the roof. For the New Construction part, the solar panels are combined with the building form, and the slopes cater to Helsinki's sun altitude angle as much as possible to maximize the efficiency of the solar panels. The renovation part takes the form of placing solar panels, forming a smaller intervention.

Energy Consumption Analysis

06 Sustainability

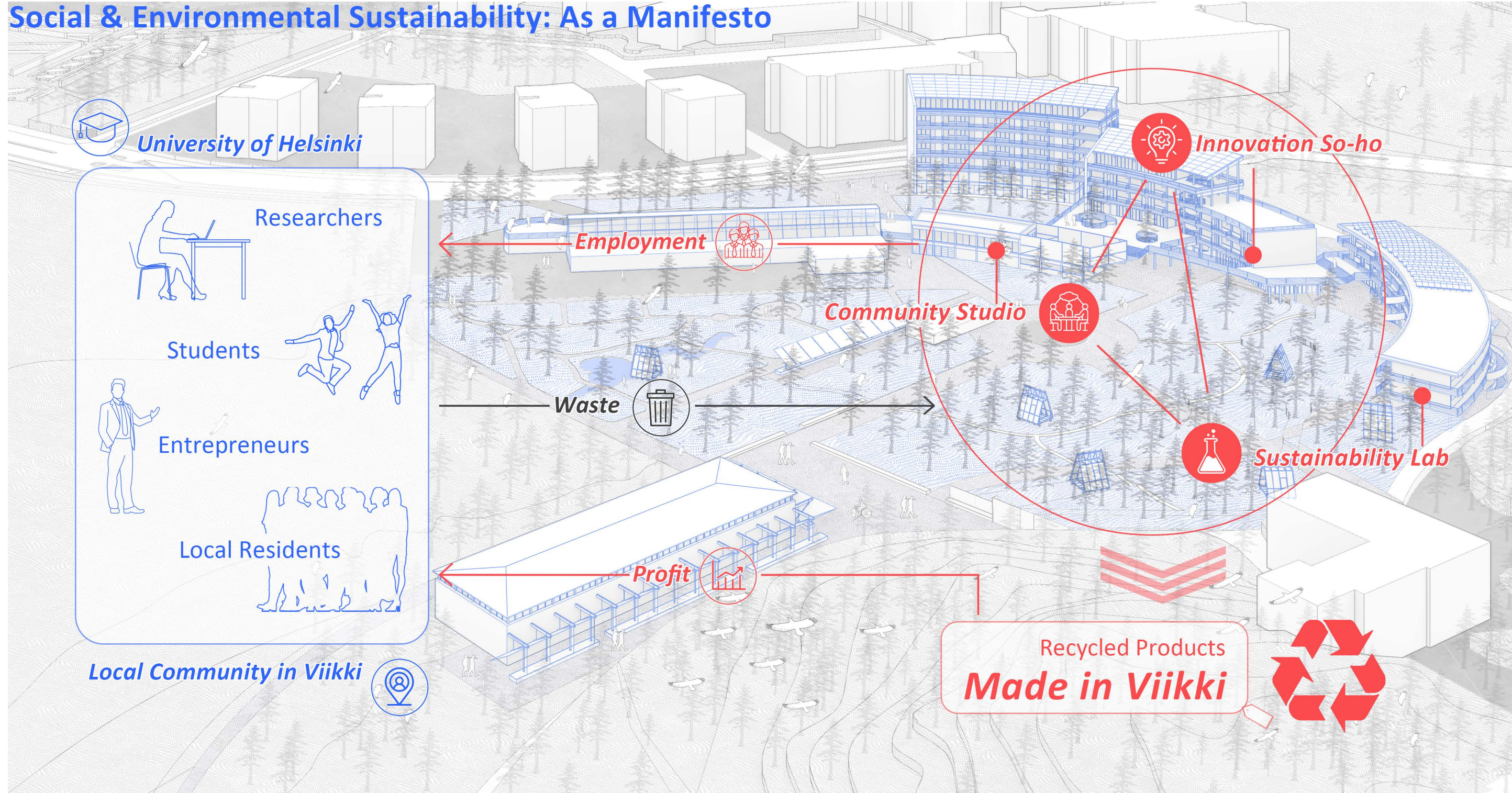
Intelligent Building Control System

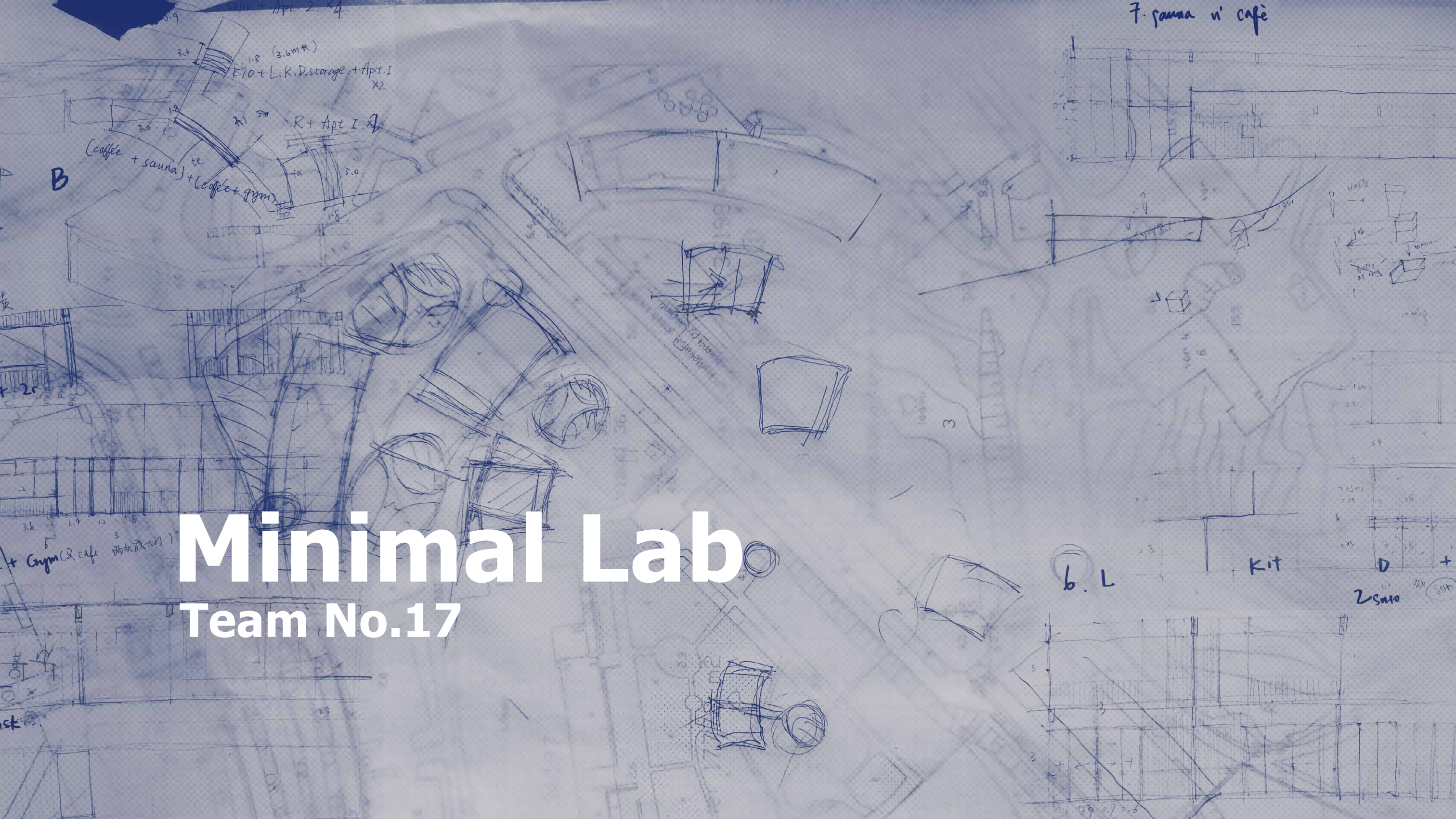


In our vision, the **intelligent building control system** can be used to monitor the energy supply and consumption ,and control the electrical equipments in the buildings. It can also monitor and predict the energy balance, optimize and control the energy efficiency.

06 Sustainability

Social & Environmental Sustainability: As a Manifesto





Minimal Lab

Team No.17

F. sauna ni cafe

1.8 (3.6m*)
KIO + L.K.D. storage. + Apt. I
x2

R + Apt. I. x2

(coffee + sauna) + (coffee + gym)

B

+ Gym (& cafe 两块板大门)

Kit

b. L

Zsato

Saha

0.6 0.9 0.9 0.6