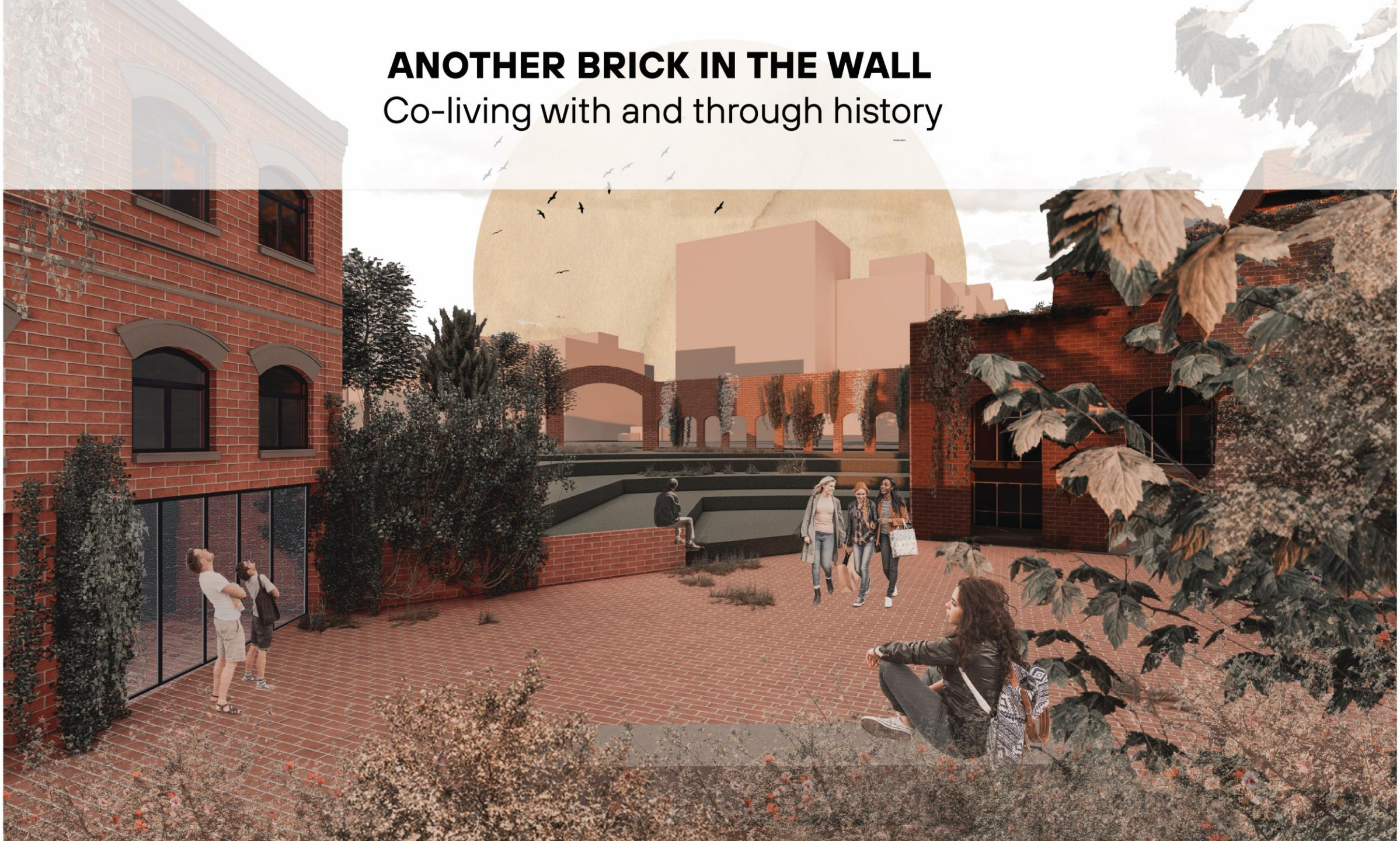
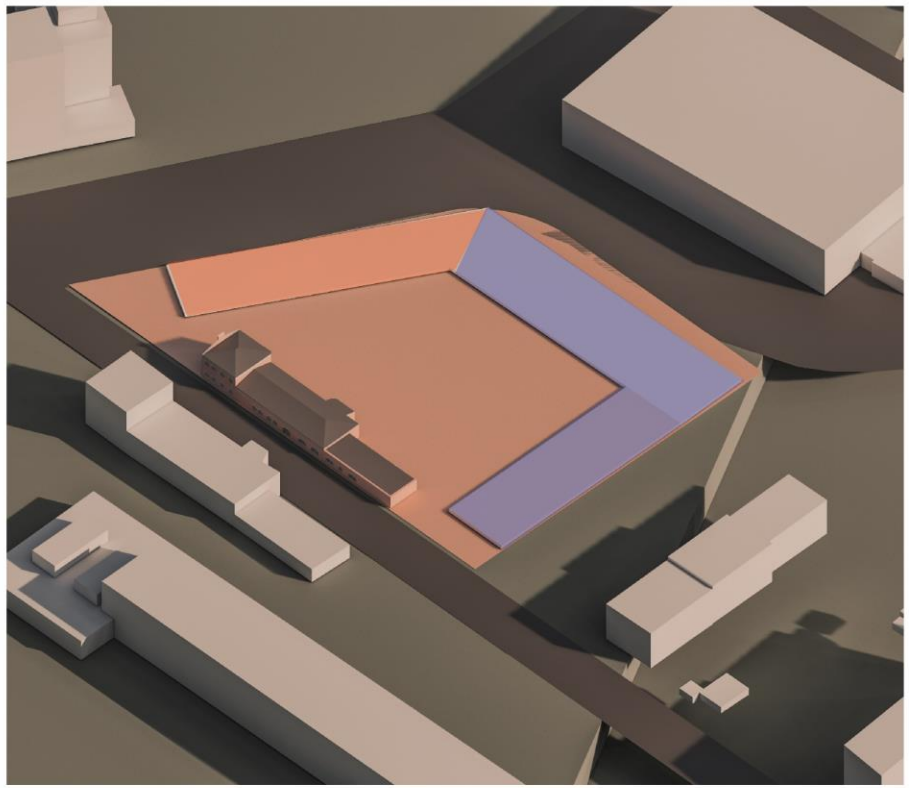
ARCHITECTURE STUDENT CONTEST

17th INTERNATIONAL EDITION, WARSAW 2022

ANOTHER BRICK IN THE WALL

Co-living with and through history



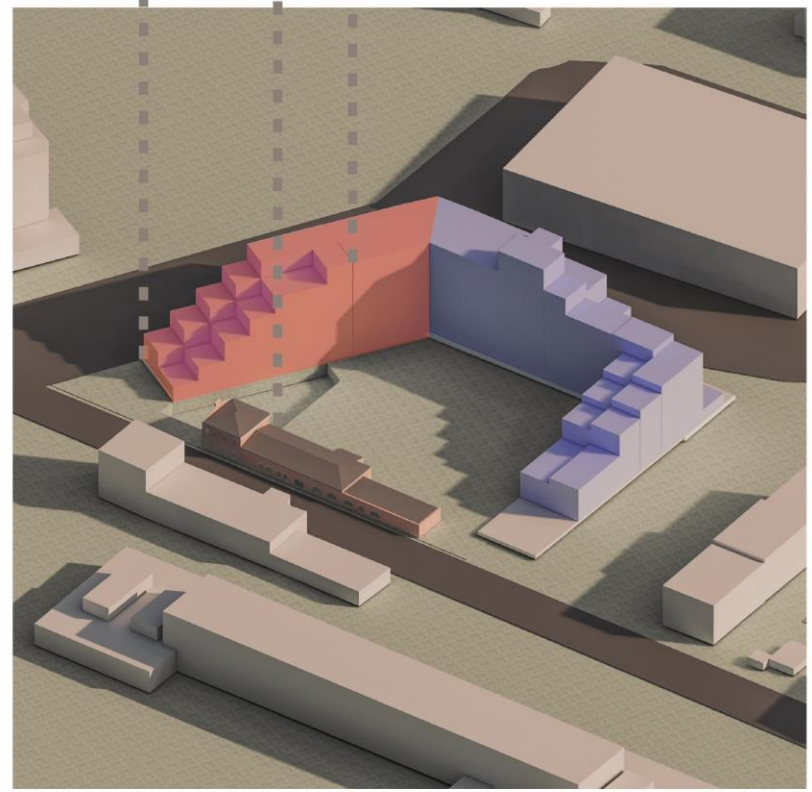


INITIAL BUILDING SPACE

SEPARATION OF STUDY AND CHILL AREA FROM THE RESIDENTIAL AREA

STEPS GOING DOWN TO THE FACTORY, HIGHLIGHTING THE MONUMENT

CREATING A DEEP AREA TO FORM A SQUARE WITH THE FACTORY AREA

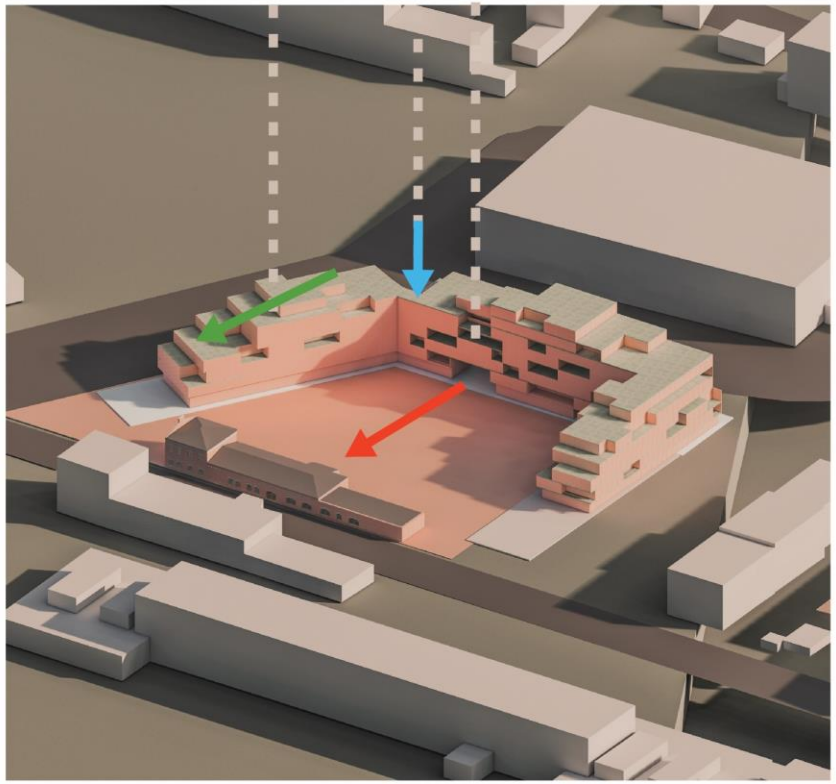


MORPHOLOGY DEVELOPMENT

TERRACING THROUGH
GREEN ROOFS

DECREASE OF
THE CORNER

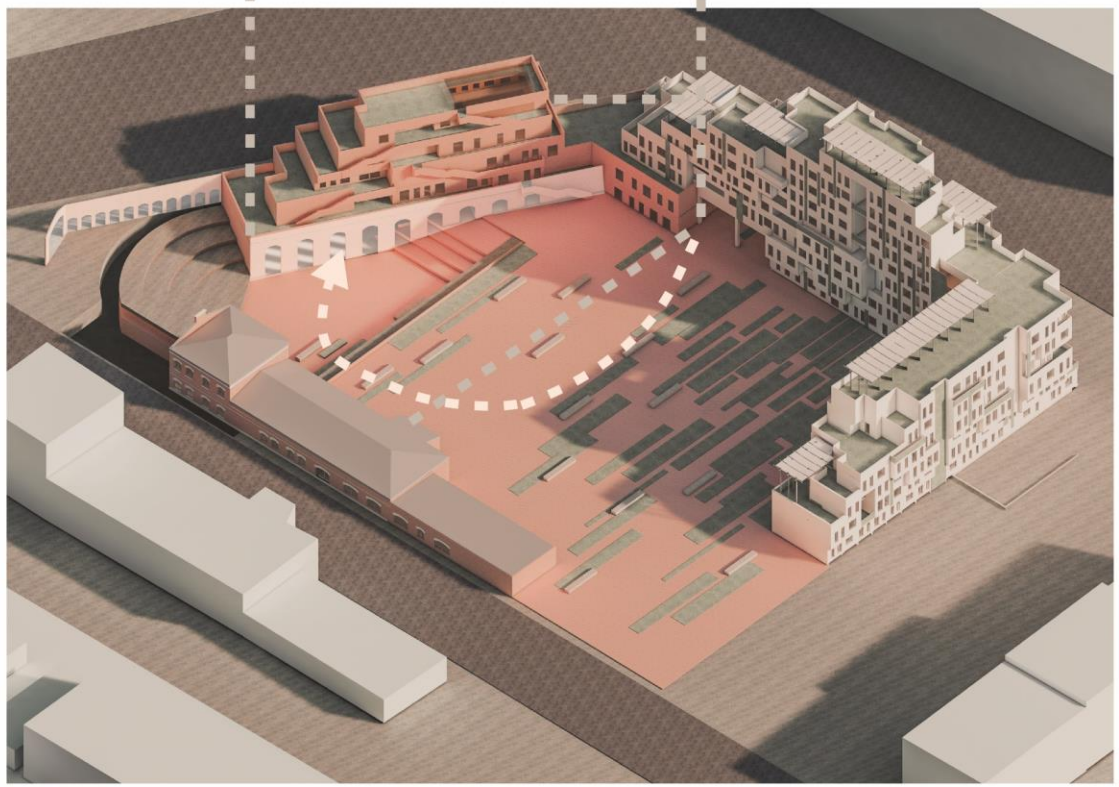
CREATION OF A DIRECT AXIS
BETWEEN THE STATION AND THE
MONUMENT



VOLUME FINISHING

TAKING OVER THE ARCADE MOTIVE
AND INTEGRATING IT INTO THE
HUB AREA

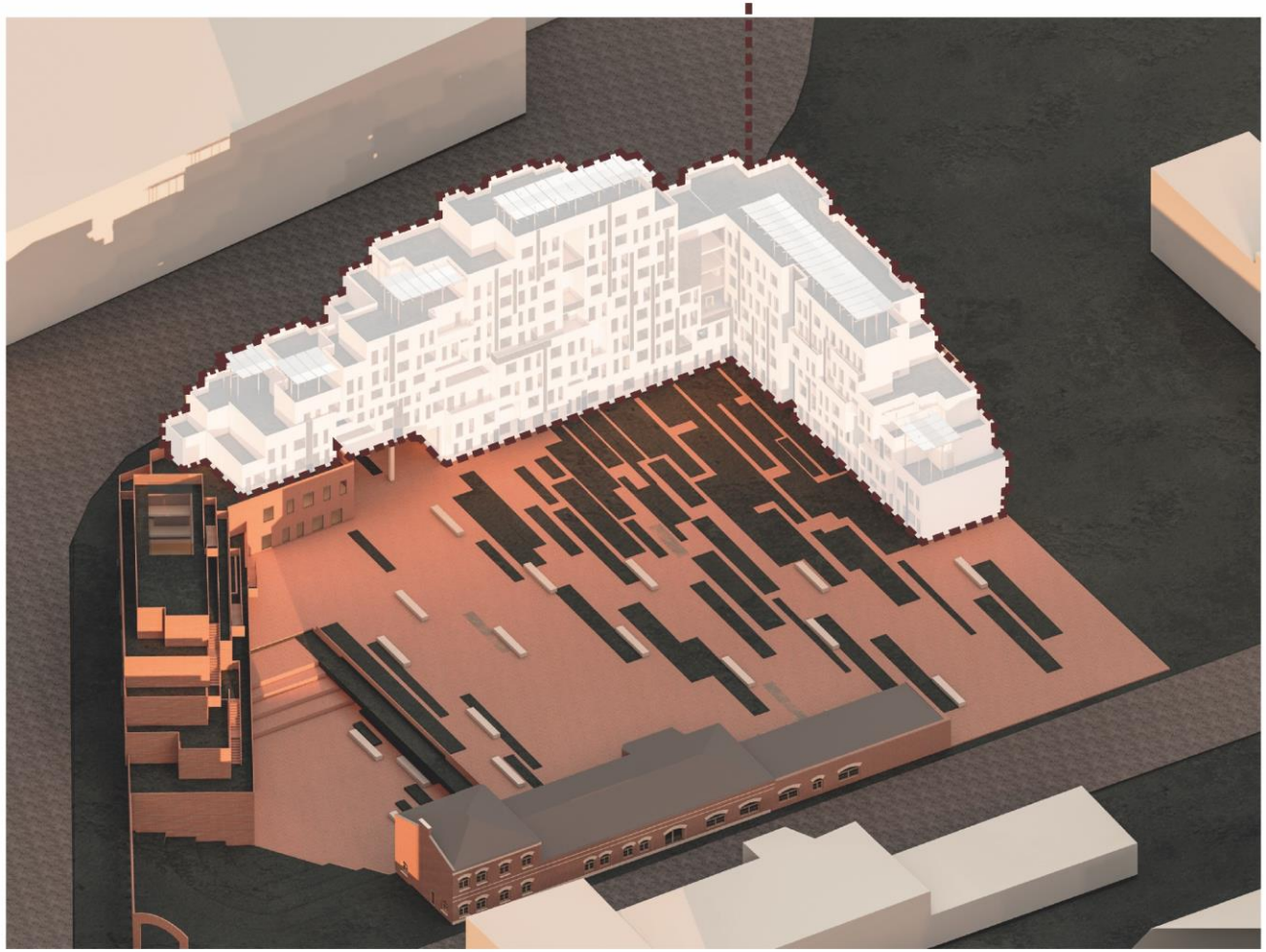
ASSOCIATION OF THE FACTORY
WITH THE PUBLIC BUILDING,
COOPERATING WITH THE STATION
AXIS - THE FACTORY BECOMES A
CONNECTION ELEMENT



THE FINAL RESULT

MATERIALS

CLT RESIDENTIAL BUILDINGS

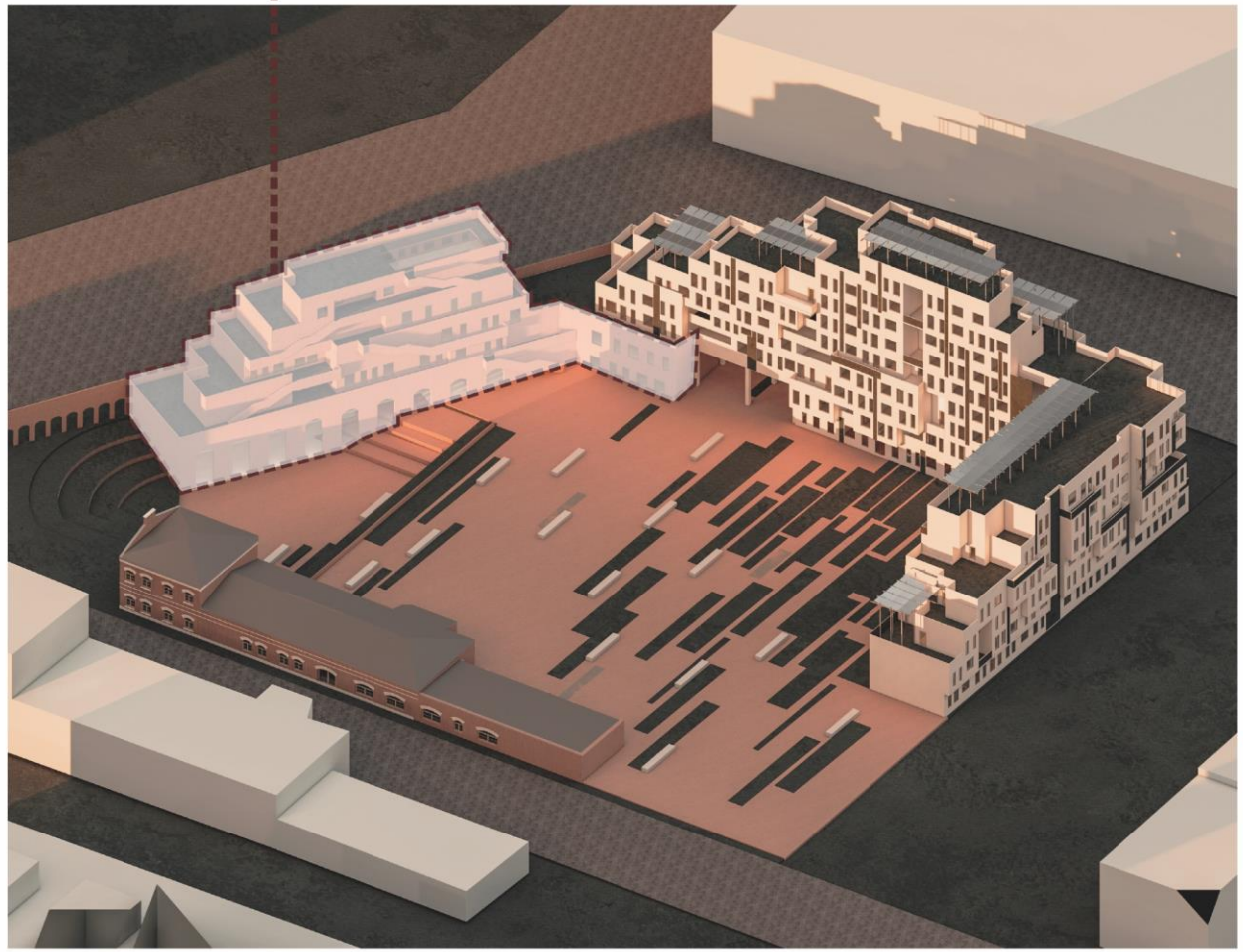


ADVANTAGES OF USING CLT

Noise - There is less noise during construction. No grinding, cutting, welding. This improves the whole process for neighbours.
'Wellness' - CLT exudes natural resin aroma - it's got a softness that absorbs sound and generally improves the whole ambience of the building.
Heat Insulation - Timber has excellent thermal properties and CLT panels can easily create low heat loss factors.
Less Foundation - Because CLT structures are far lighter, less material to create the foundation is needed. It's also easier to span obstacles (tunnels, drains, etc).
Environmental Benefits - The biggest benefit of all is that fully sustainable 'farmed' spruce & pine are already growing in Europe at such a rate that there's more than enough timber to build all the housing needed, with no side-effects or risk to virgin forests.

MATERIALS

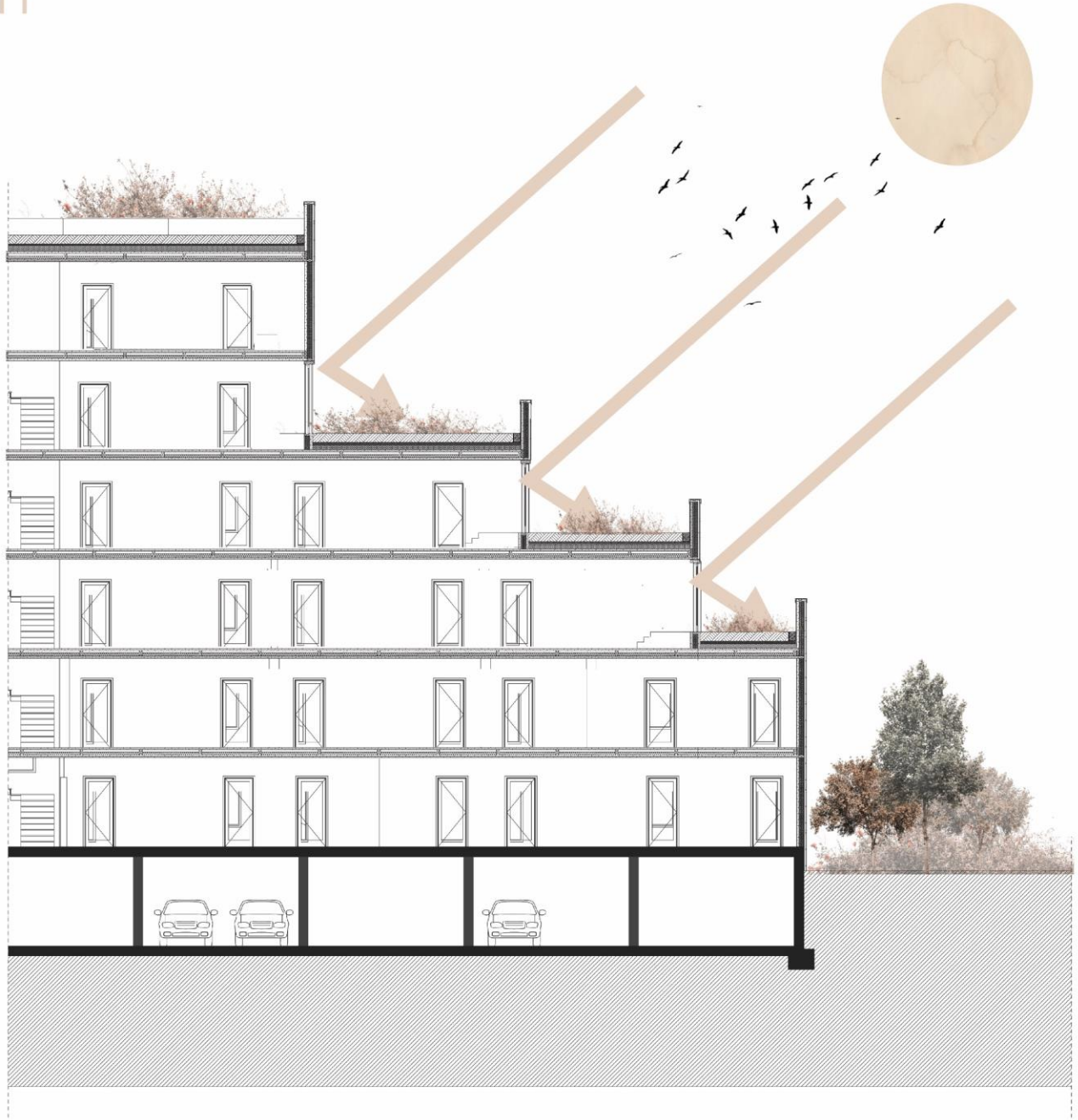
REUSED MATERIALS FROM OLD BUILDING



BUILDING MATERIAL CIRCULARITY

Slicing and modelling the old bricks from the initial buildings, we create a new facade for the student hub building. Reusing the existing material determinates less expense in the construction of the new building, helping also the environment by saving a lot of energy. Reusing materials also leads to a new and original construction, that represents the future and makes reference to the past at the same time.

LIGHT



SOUTH ORIENTATION FOR ALL THE BUILDING COMPLEX

INTELLIGENT USING OF LOW -E WINDOWS AND SAINT GOBAIN PRODUCTS

COOLITE - SKN 154 II AT NORTH ROOMS, WITH LESS LIGHT TRANSMITANCE AND PLANITERM XN II - 81 WITH HIGHER LIGHT TRANSMITANCE AT SOUTH, FOR BIGER PASSIVE SOLAR GAIN

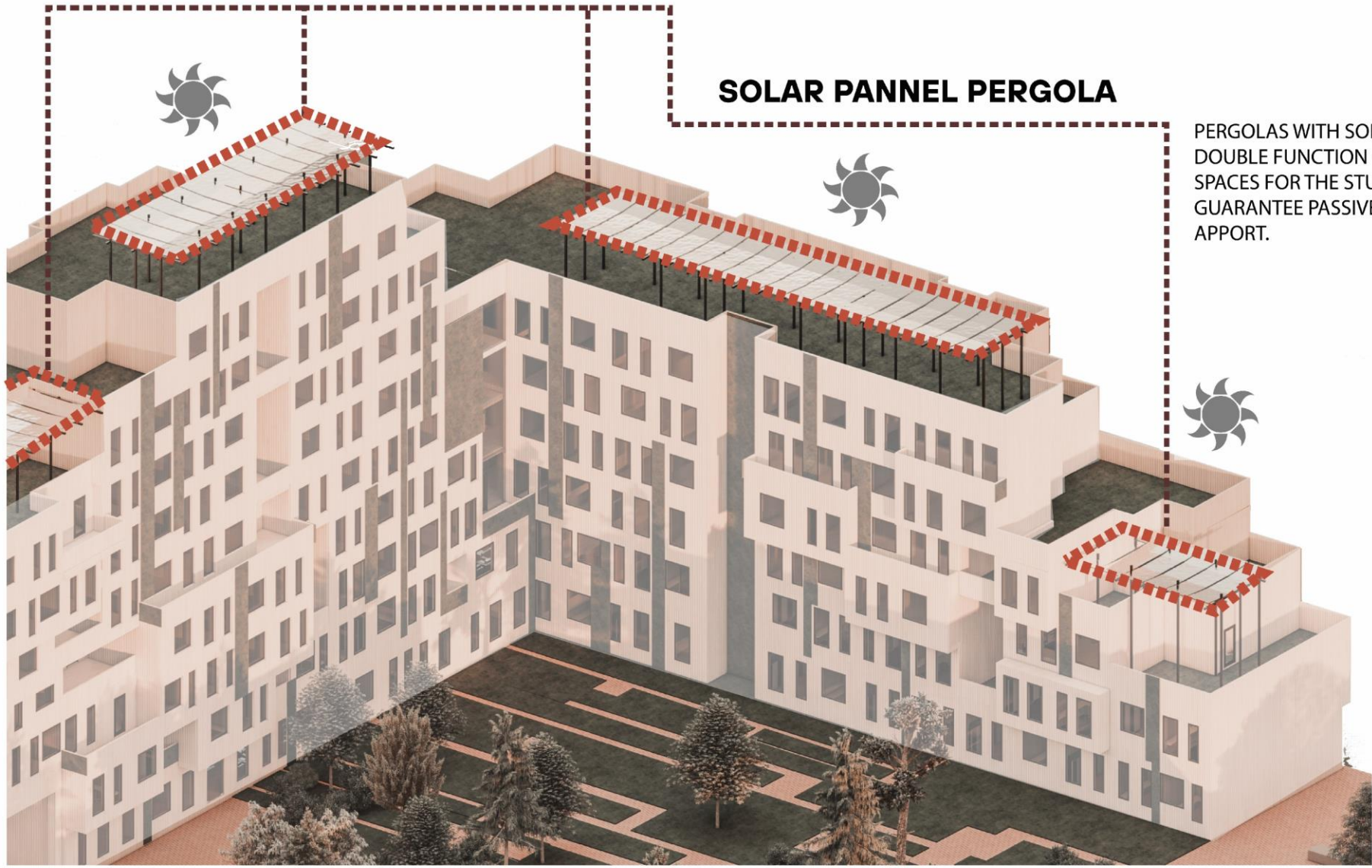
UTILIZATION OF GREEN ROOFS

WATER REUSE & HEAT PUMP

WATER COLLECTING FROM THE GREEN ROOF USING A RAINWATER TANK

TRANSFERING THERMAL ENERGY THROUGH HEAT PUMP

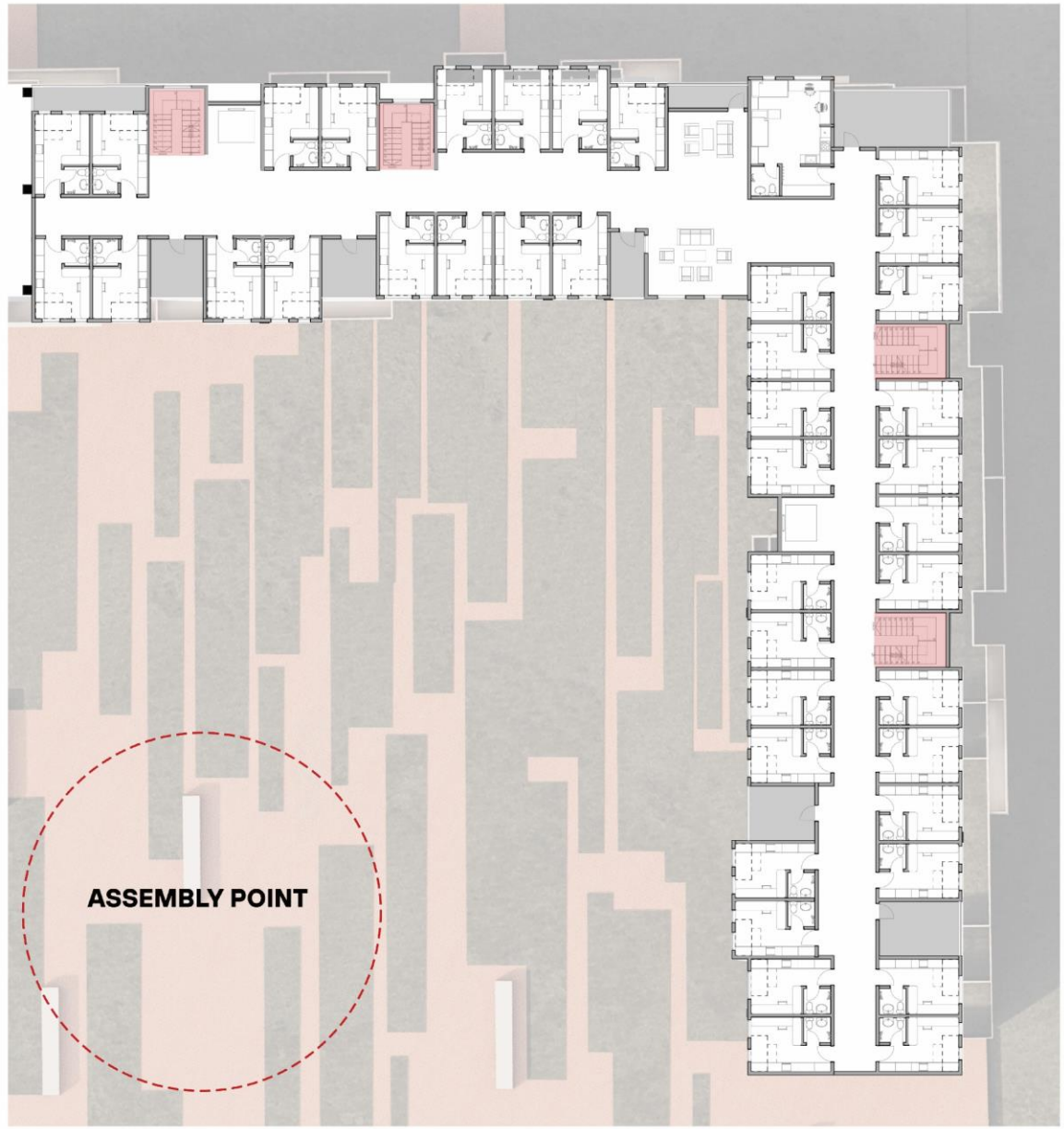
ENERGY EFFICIENCY



SOLAR PANNEL PERGOLA

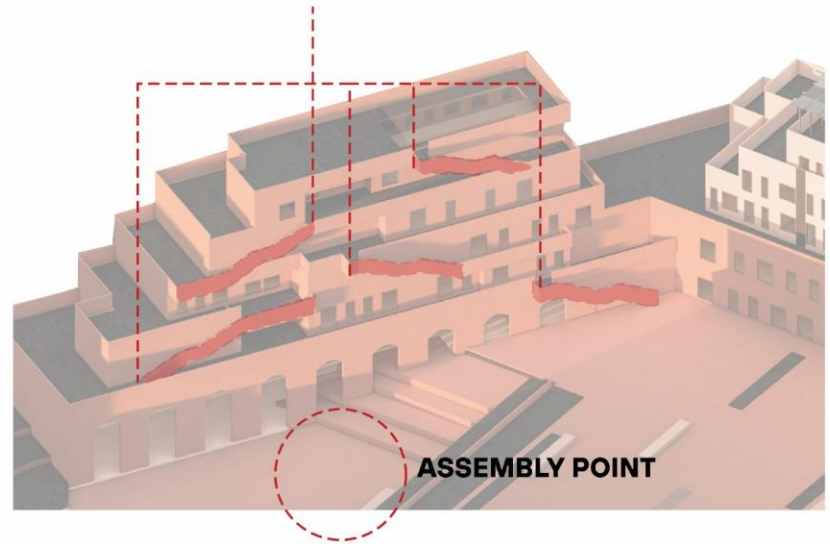
PERGOLAS WITH SOLAR PANELS HAVE DOUBLE FUNCTION - TO MAKE PROTECTED SPACES FOR THE STUDENTS AND TO GUARANTEE PASSIVE SOLAR ENERGY APPORT.

FIRE SAFETY

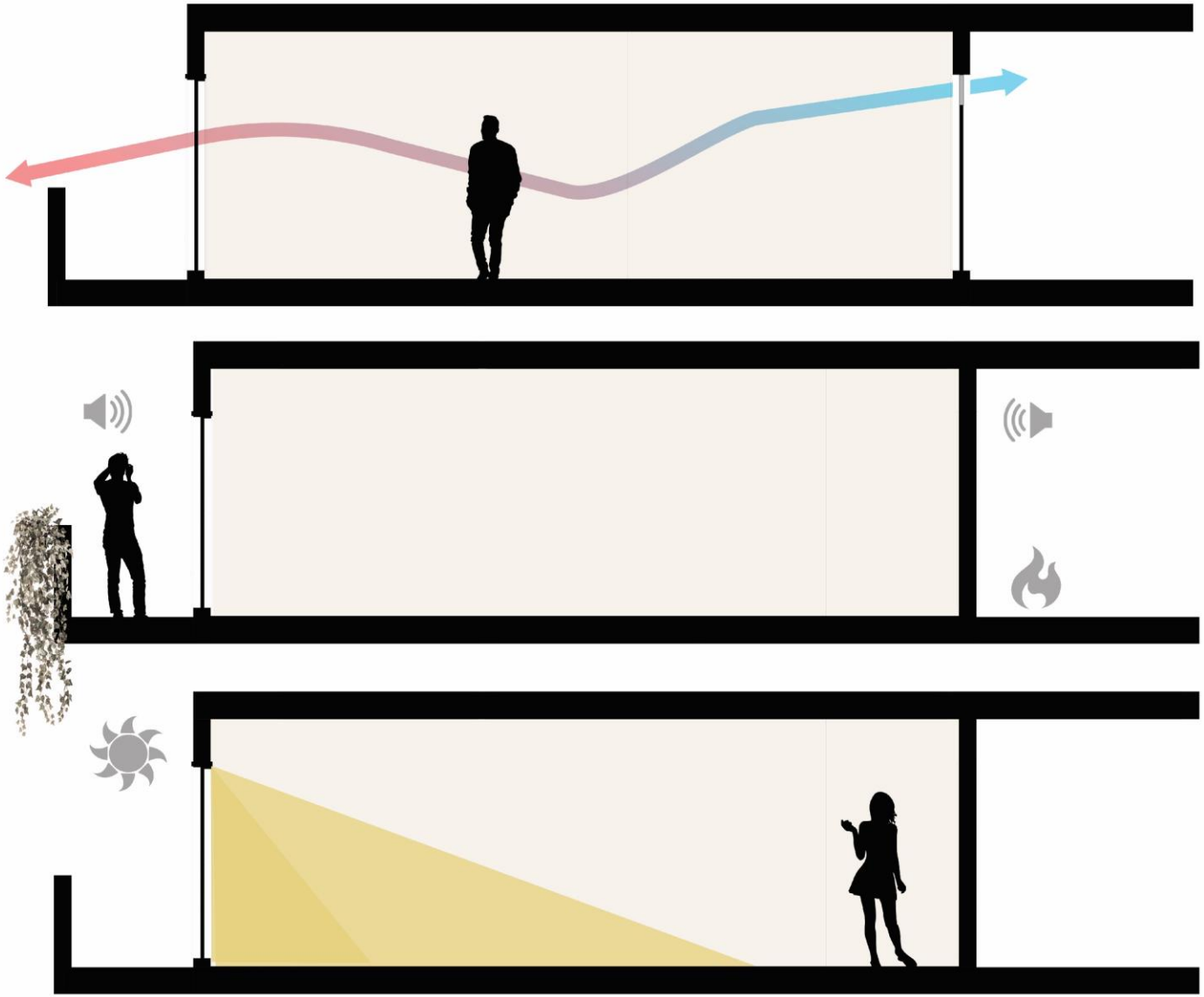


FOR THE RESIDENTIAL AREA
A fire evacuation option was considered alongiside the intelligent choices of materials (Rigips RF Fire Protection Board)

FOR THE PUBLIC AREA
Stairs on the inside and the outside of the building



ROOM STRATEGIES



CROSS VENTILATION

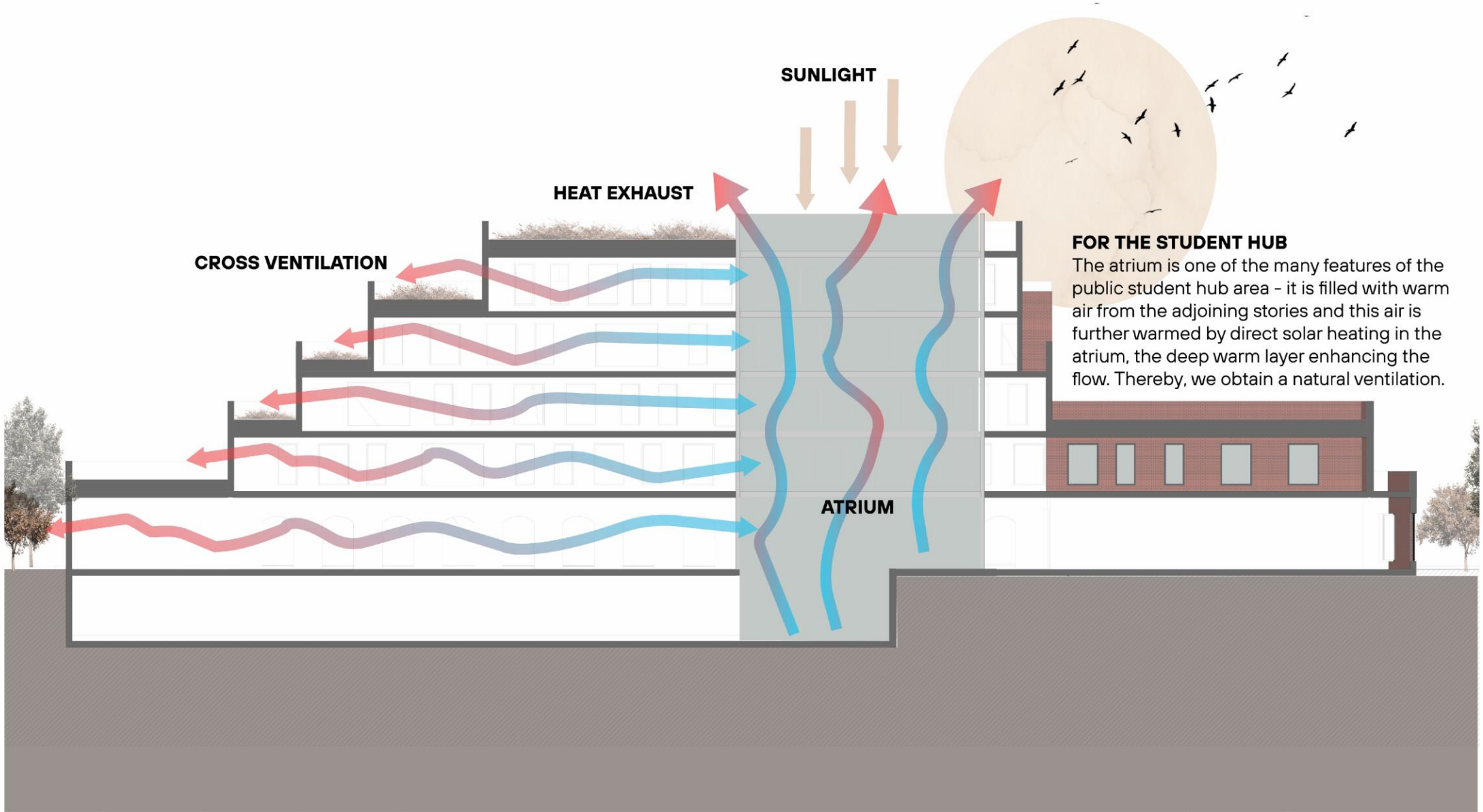
FIRE RESISTANCE WITH RIGIPS FIRE PROTECTION BOARD

FOOTFALL SOUND AND HALL SOUNDPROOF ISOLATION WITH RIGIPS BLUE ACOUSTIC

GREEN WALLS FOR ACOUSTIC PROTECTION

LOW E - COOLITE - SKN 154 II AND LOW E PLANITERM XN II - 81 WITH DIFFERENT LIGHT TRANSMITANCE FOR SOLAR PASSIVE GAIN AND ADECVATE LIGHTING

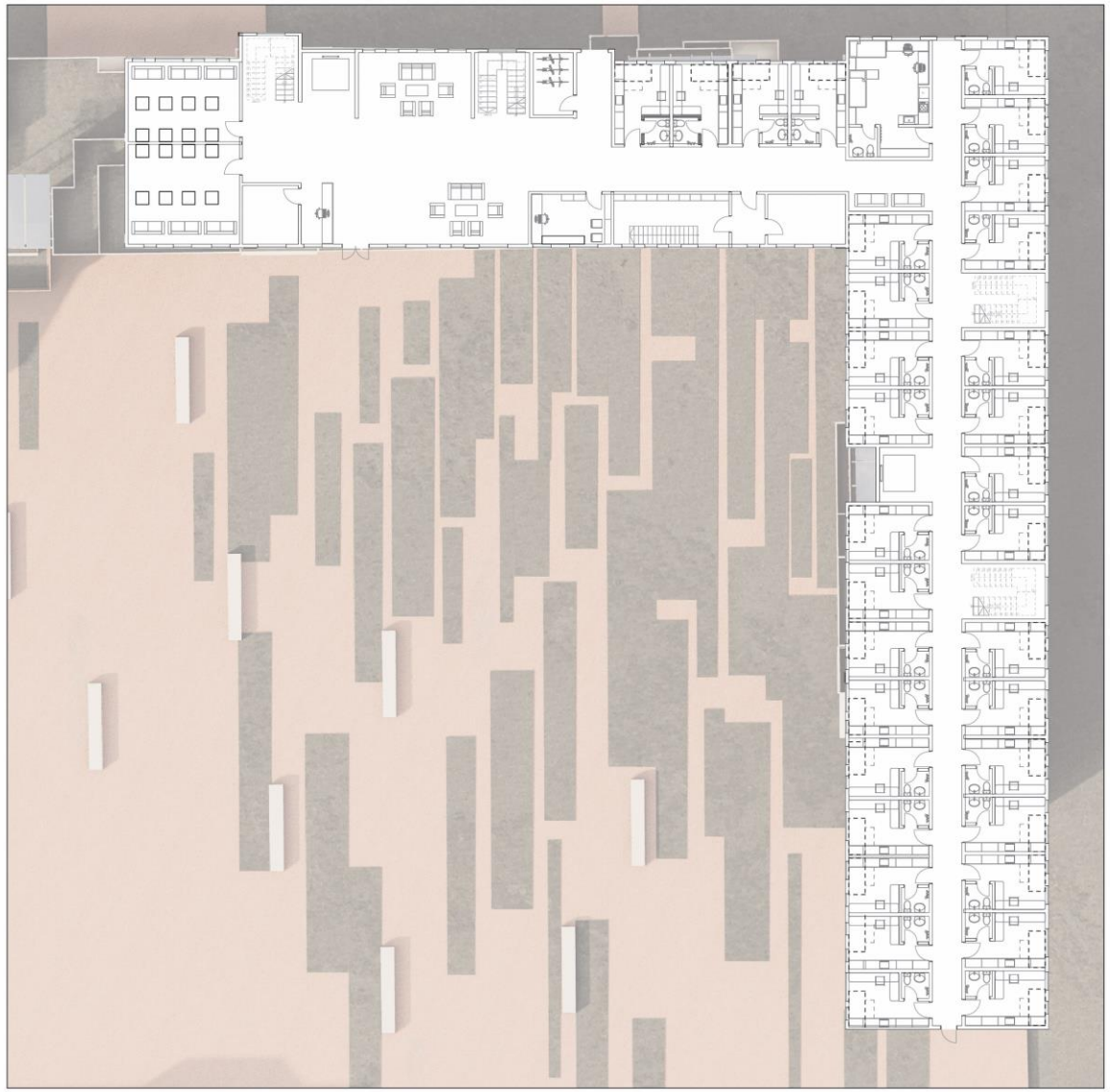
VENTILATION



FOR THE STUDENT HUB

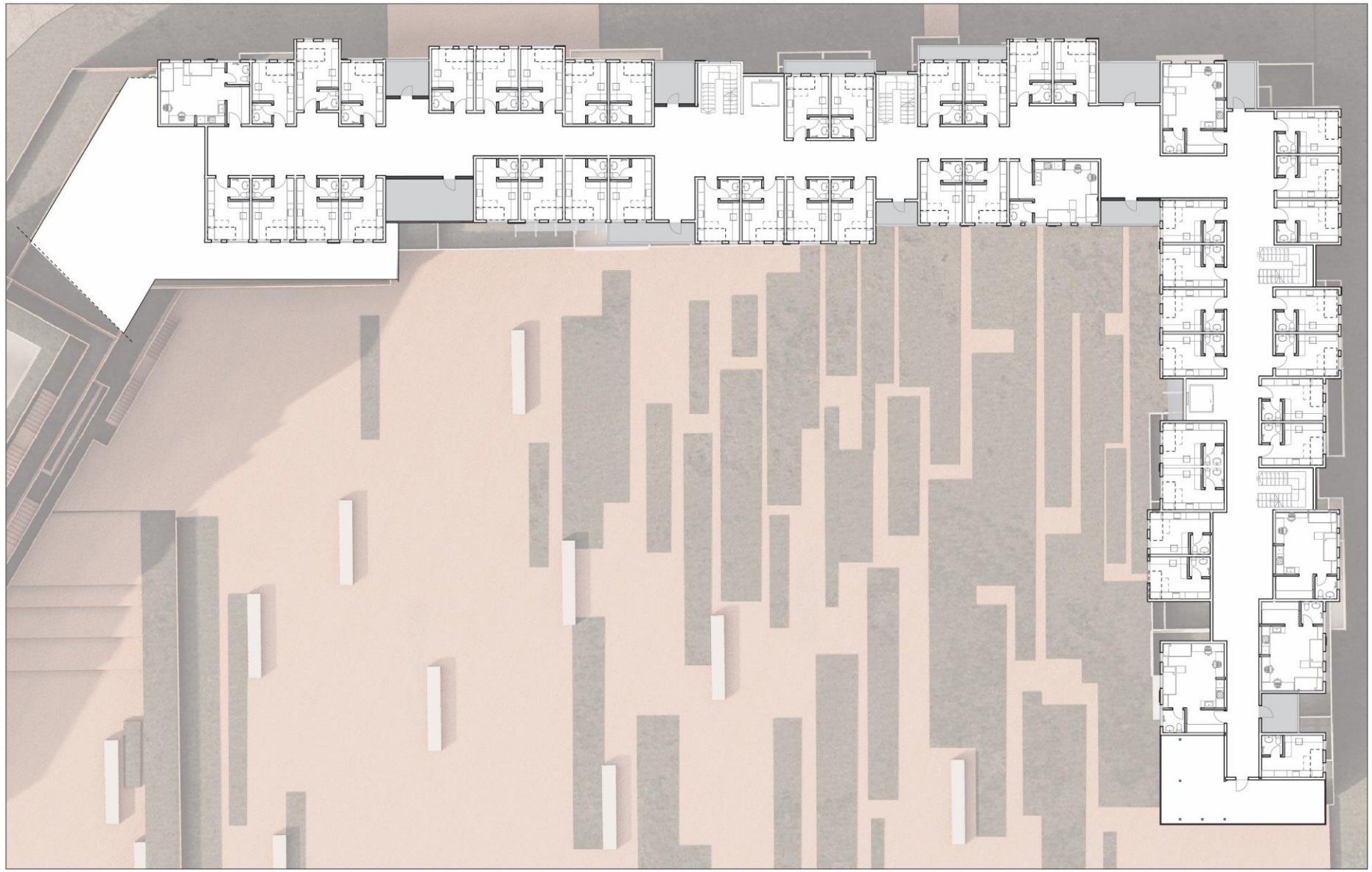
The atrium is one of the many features of the public student hub area - it is filled with warm air from the adjoining stories and this air is further warmed by direct solar heating in the atrium, the deep warm layer enhancing the flow. Thereby, we obtain a natural ventilation.


EDA

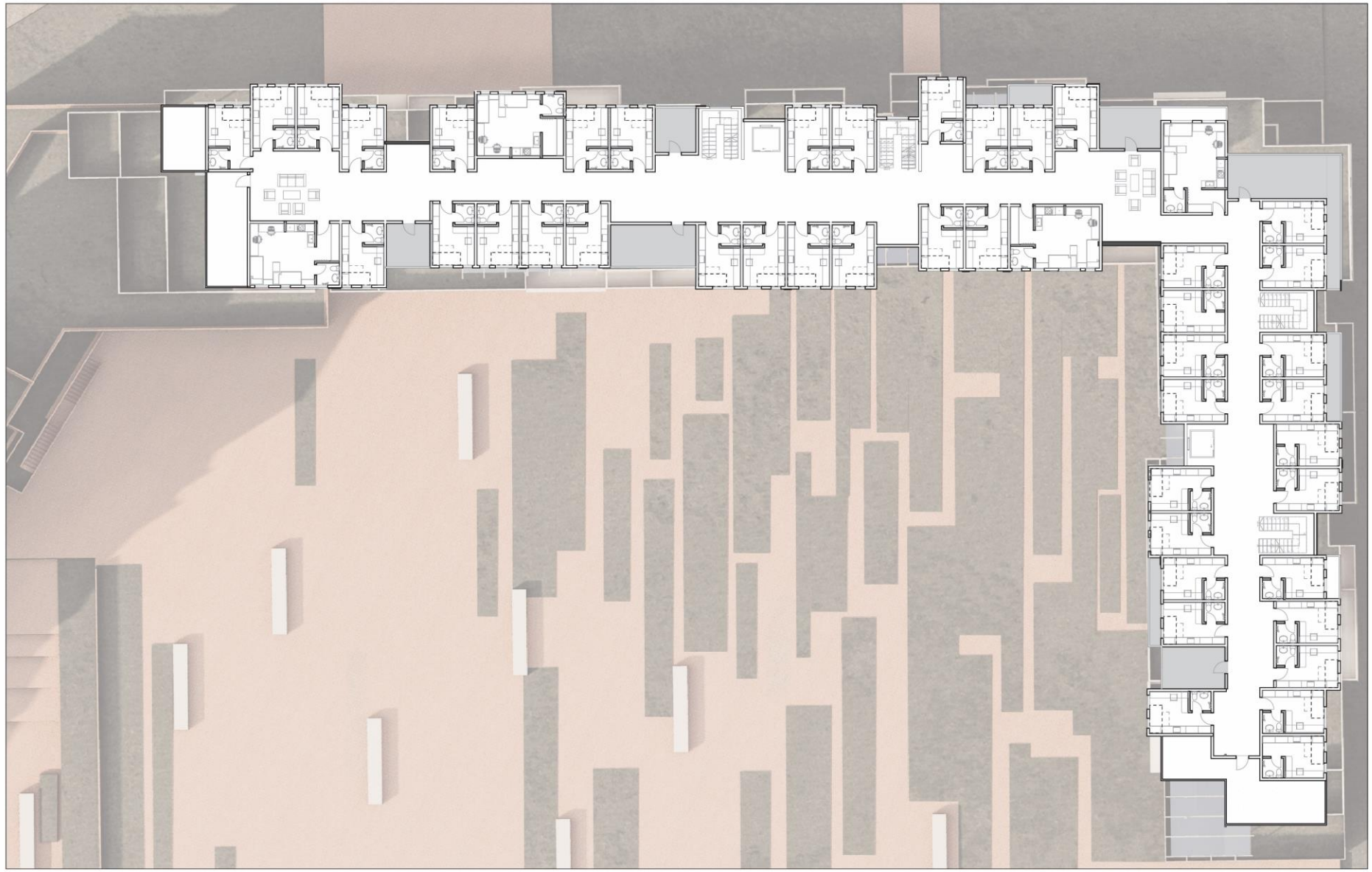


floor plan
sc 1:200

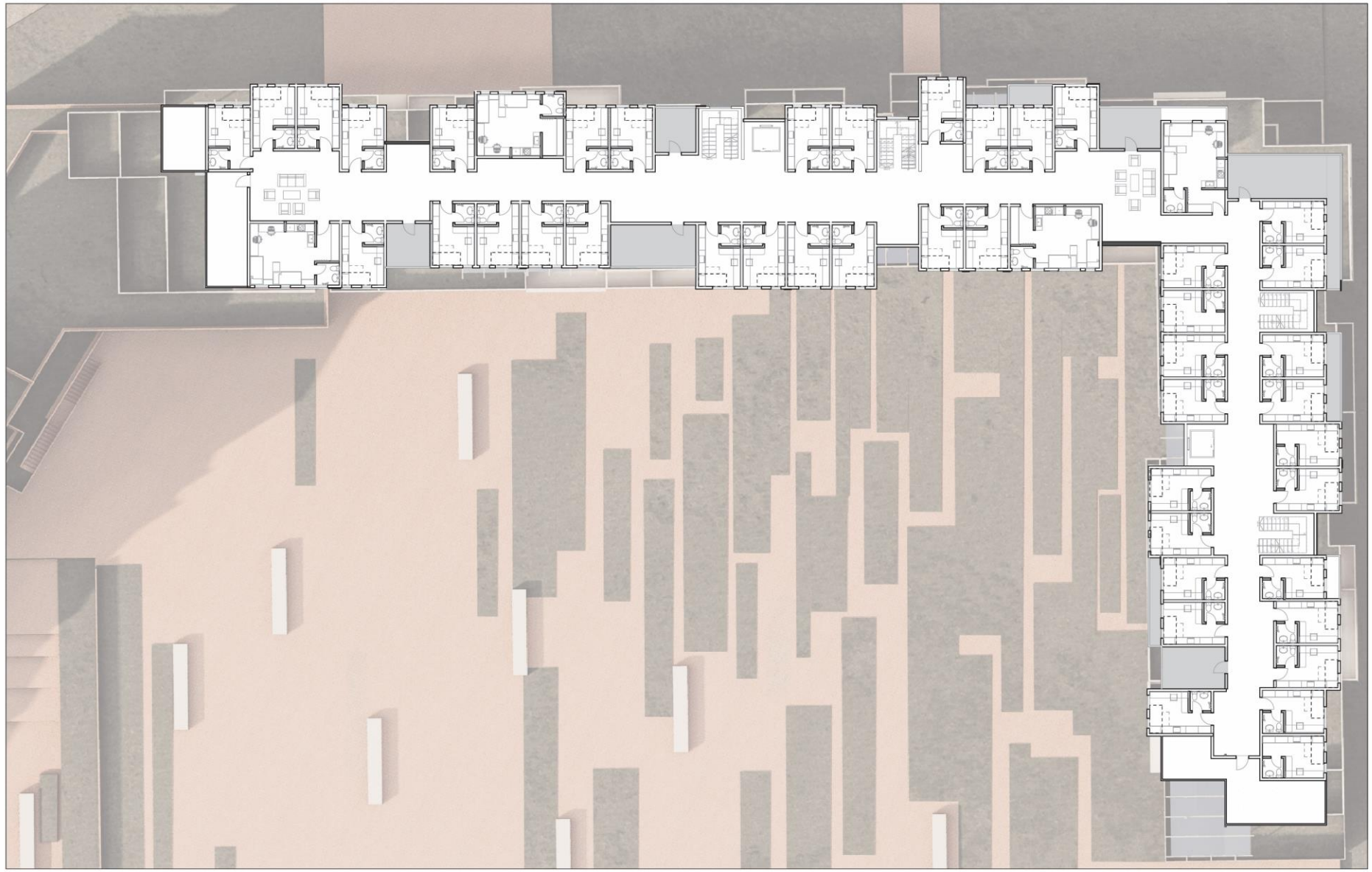
first floor plan
sc 1:200



second floor plan
sc 1:200



third floor plan
sc 1:200



third floor plan
sc 1:200

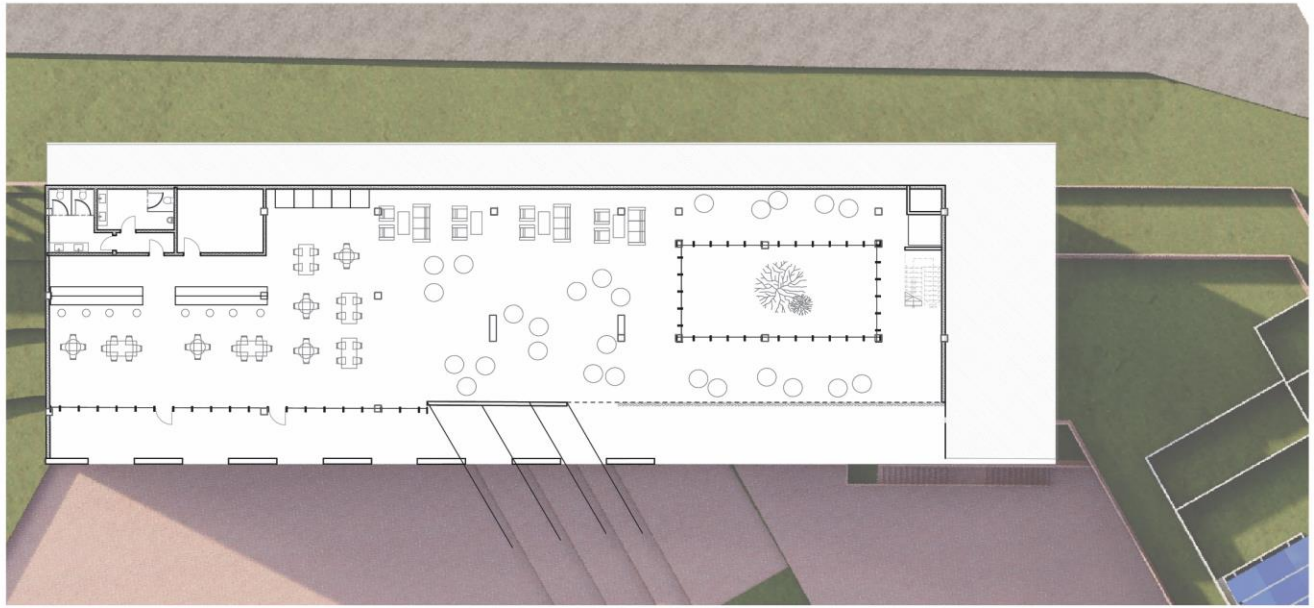
fourth floor plan
sc 1:200

fifth floor plan
sc 1:200

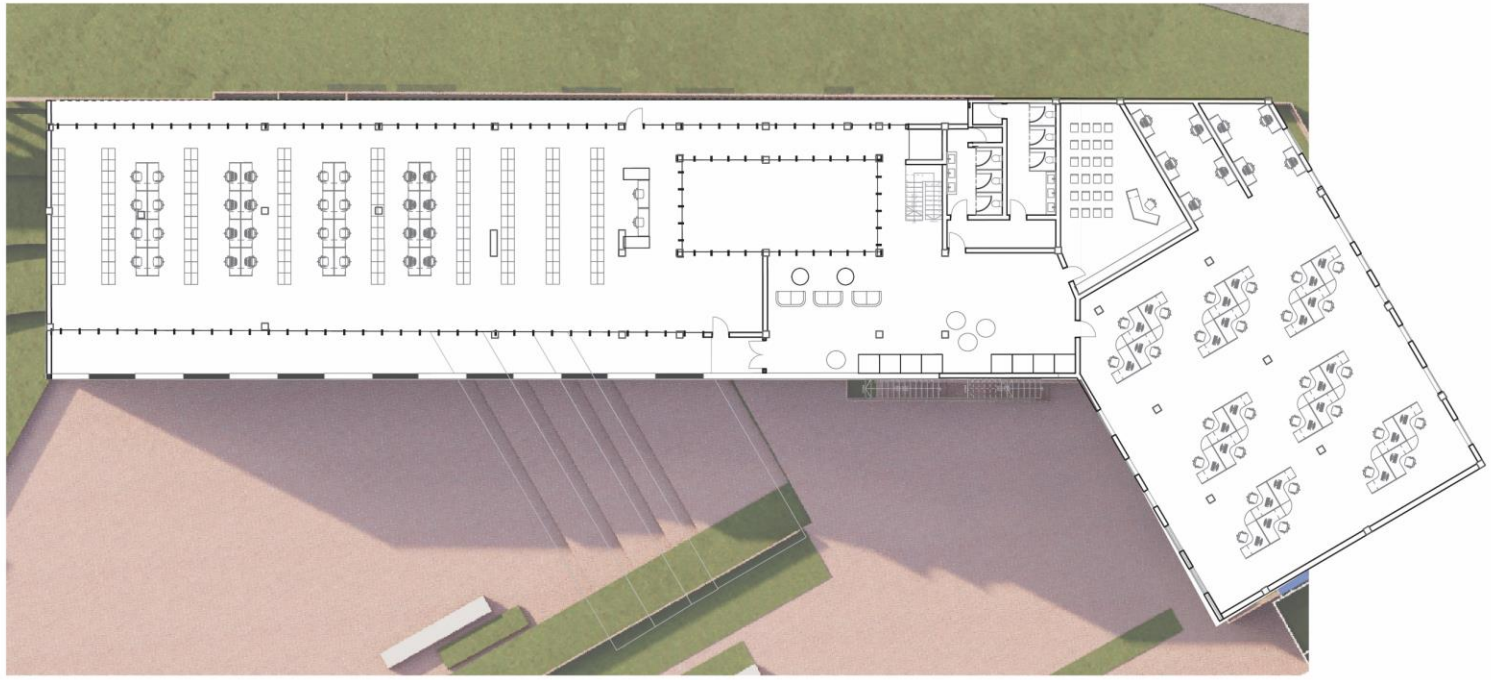
sixth floor plan
sc 1:200

seventh plan floor plan
sc 1:200

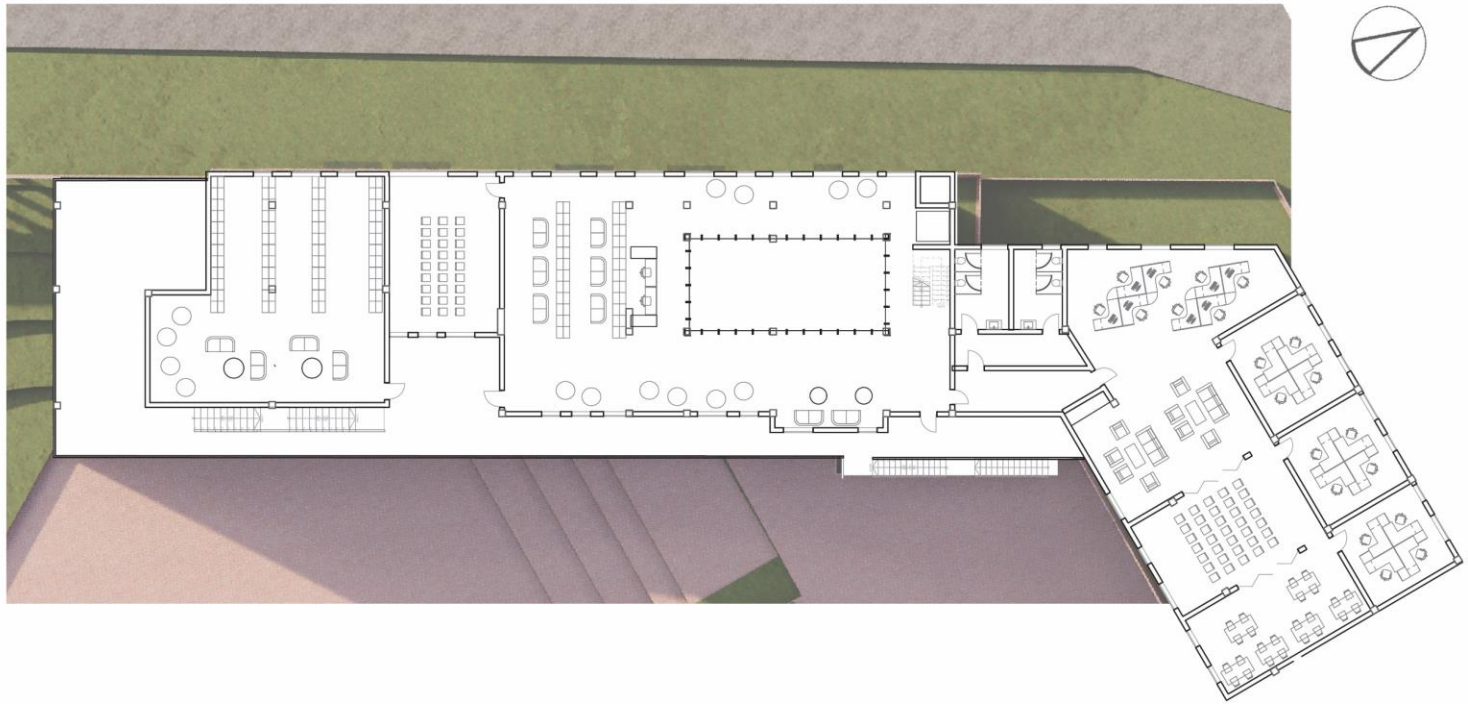
eighth plan floor plan
sc 1:200



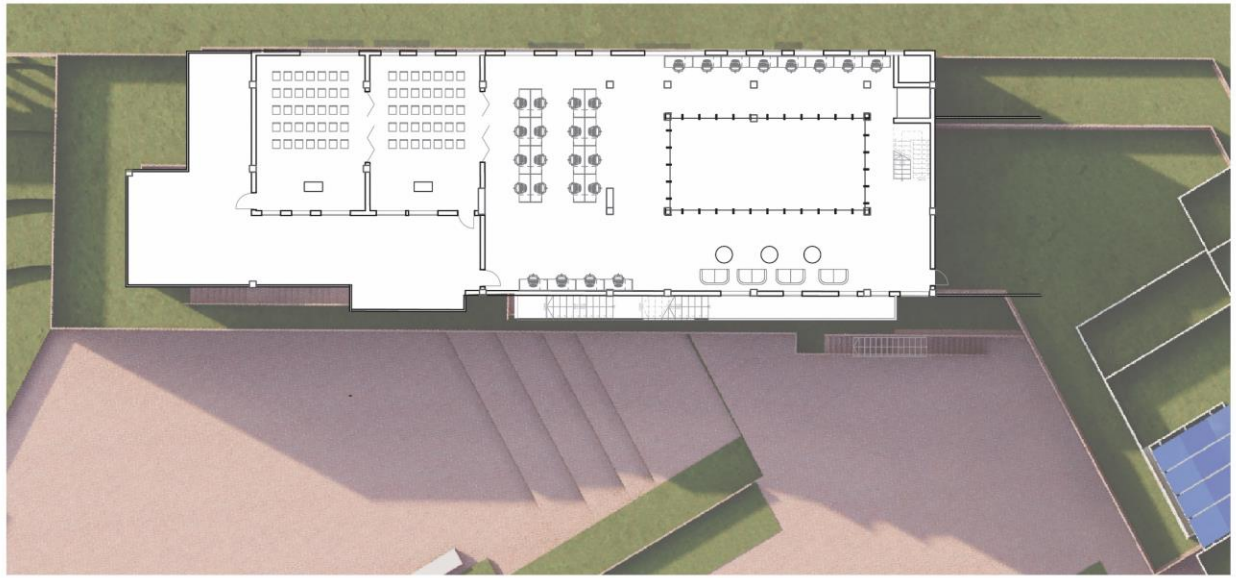
student hub underground floor plan
sc 1:200



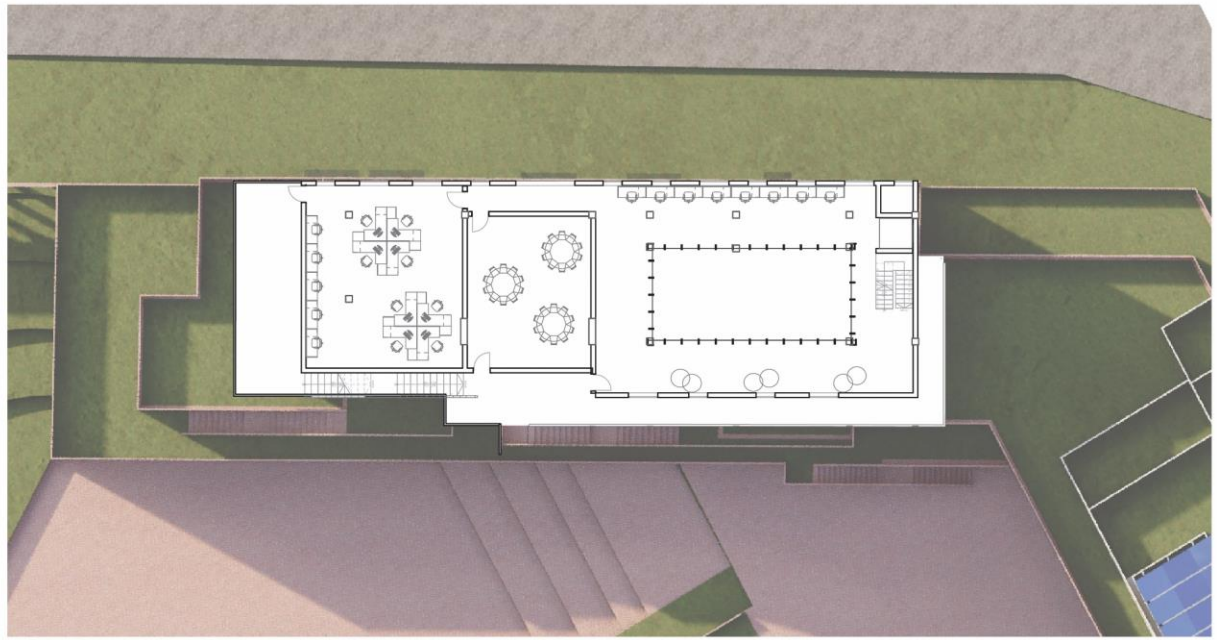
student hub ground floor plan
sc 1:200



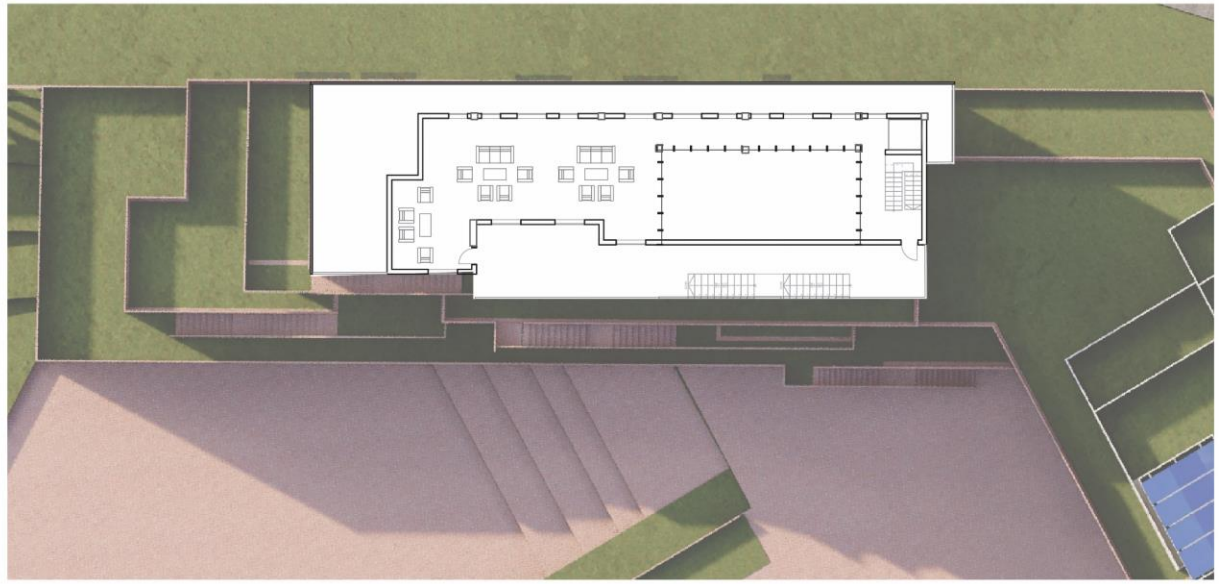
student hub first floor plan
sc 1:200



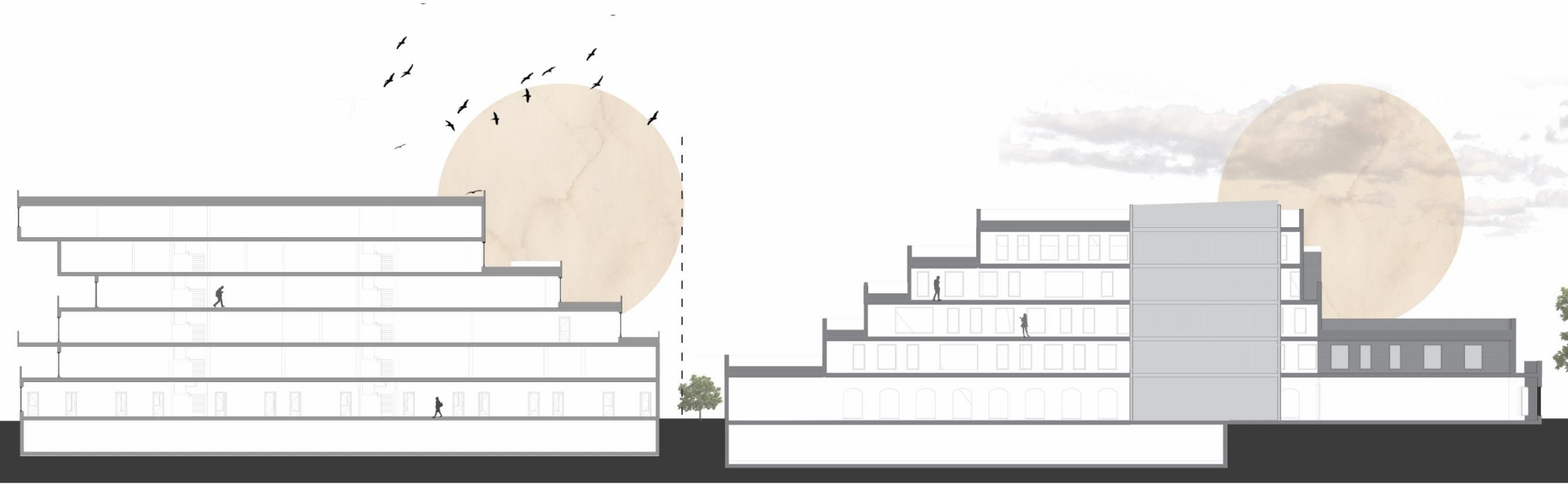
student hub second floor plan
sc 1:200



student hub third floor plan
sc 1:200

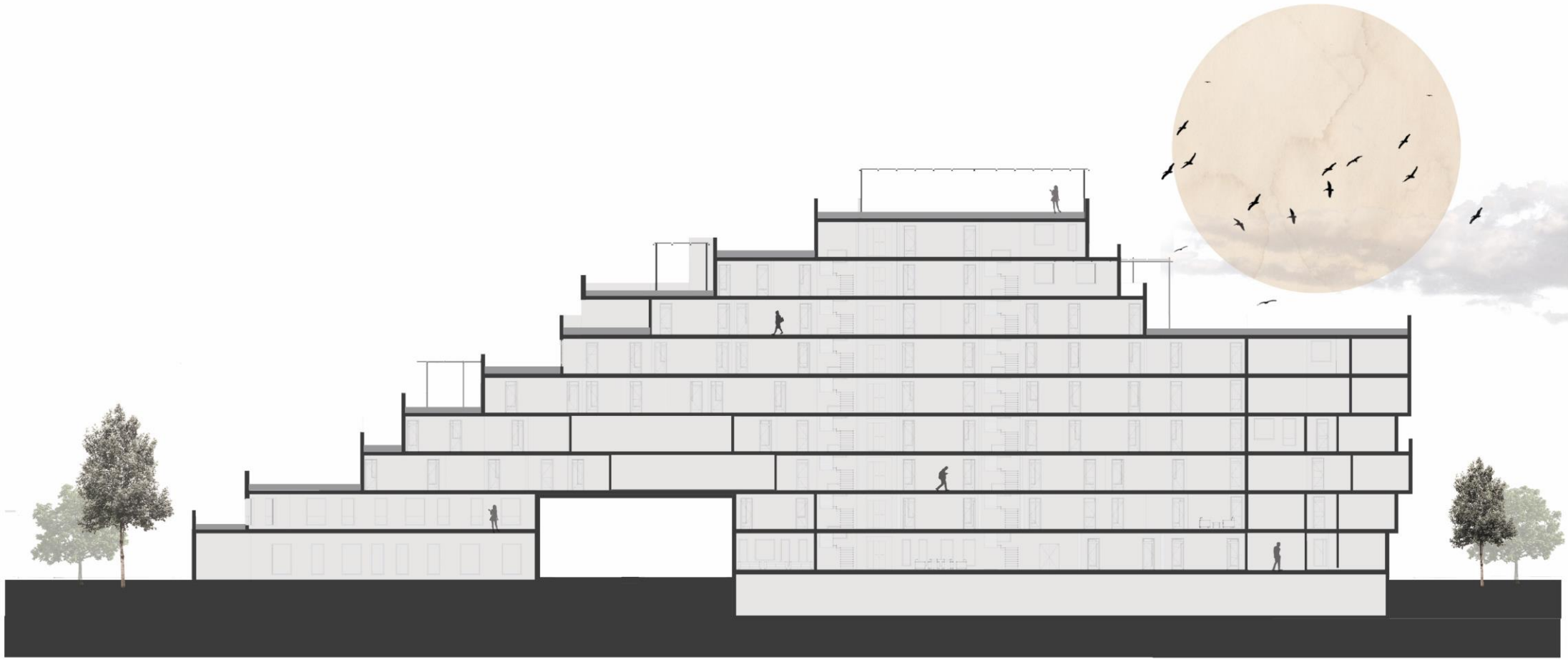


student hub fourth floor plan
sc 1:200



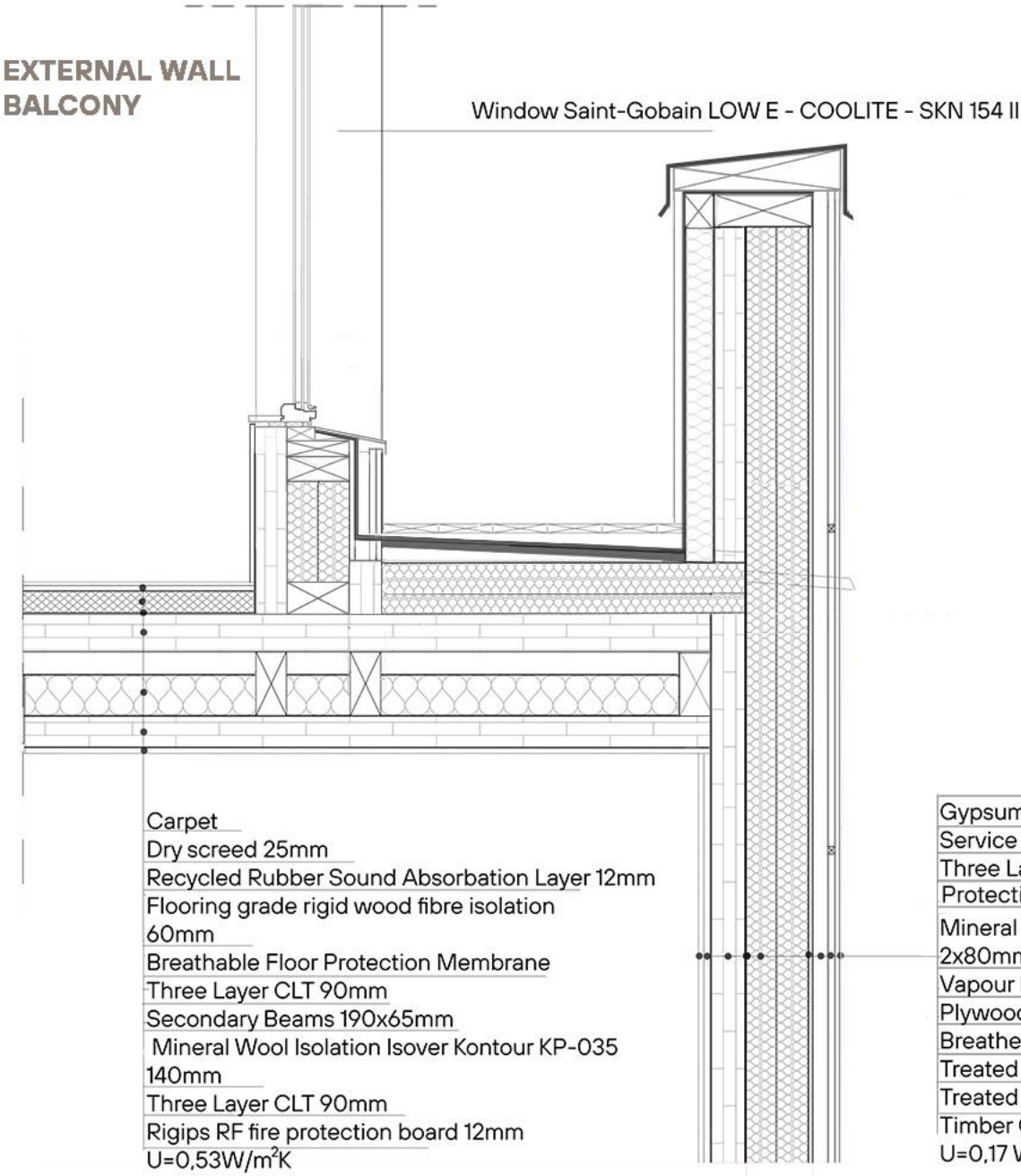
cross section
residential building
sc 1:200

longitudinal section
student hub
sc 1:200



longitudinal section
residential building
sc 1:200

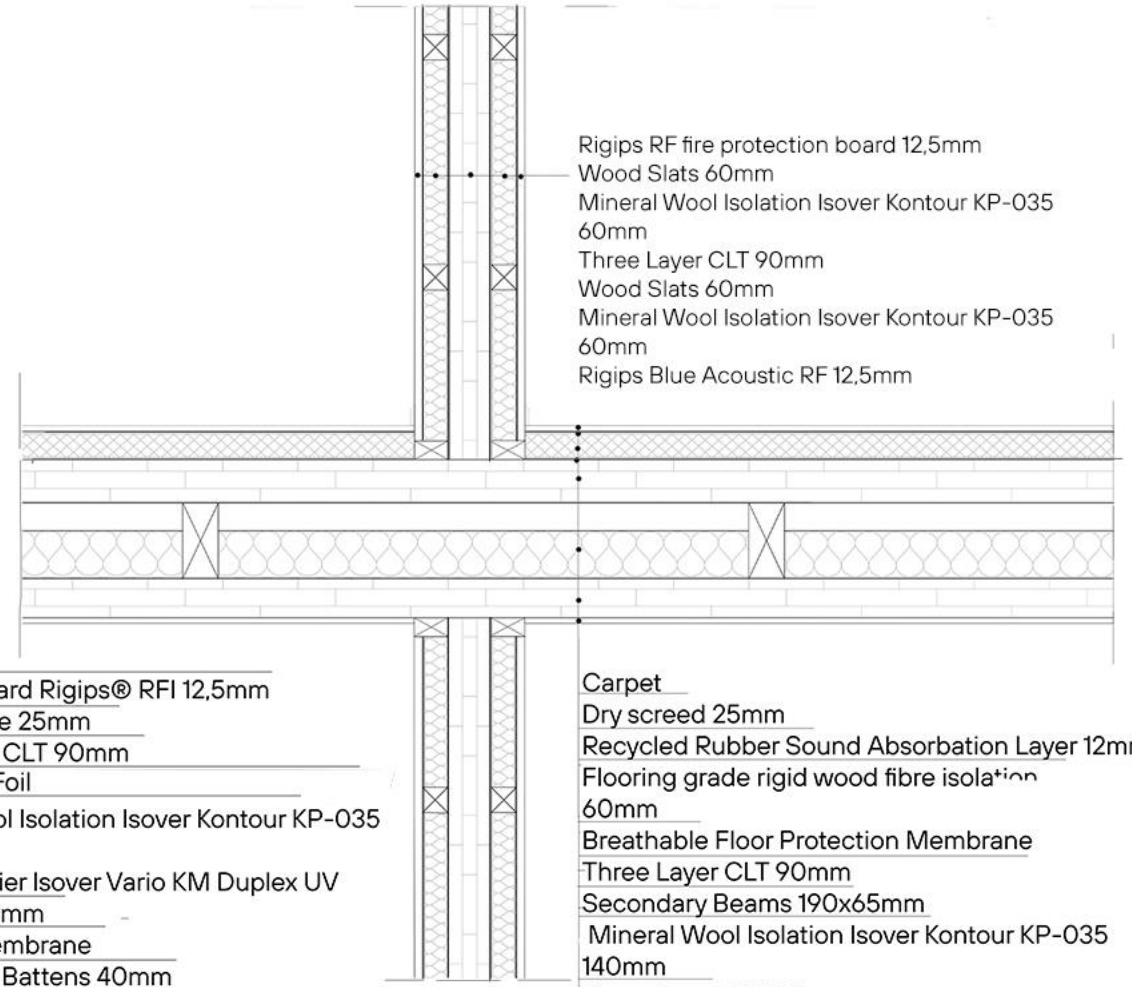
EXTERNAL WALL BALCONY



Carpet
Dry screed 25mm
Recycled Rubber Sound Absorbation Layer 12mm
Flooring grade rigid wood fibre isolation 60mm
Breathable Floor Protection Membrane
Three Layer CLT 90mm
Secondary Beams 190x65mm
Mineral Wool Isolation Isover Kontour KP-035 140mm
Three Layer CLT 90mm
Rigips RF fire protection board 12mm
U=0,53W/m^{2}K

Gypsum Board Rigips® RFI 12,5mm
Service Zone 25mm
Three Layer CLT 90mm
Protection Foil
Mineral Wool Isolation Isover Kontour KP-035 2x80mm
Vapour Barrier Isover Vario KM Duplex UV
Plywood 9.2mm
Breather membrane
Treated SW Battens 40mm
Treated SW Counter Battens 25mm
Timber Cladding vertical 22mm
U=0,17 W/m^{2}K

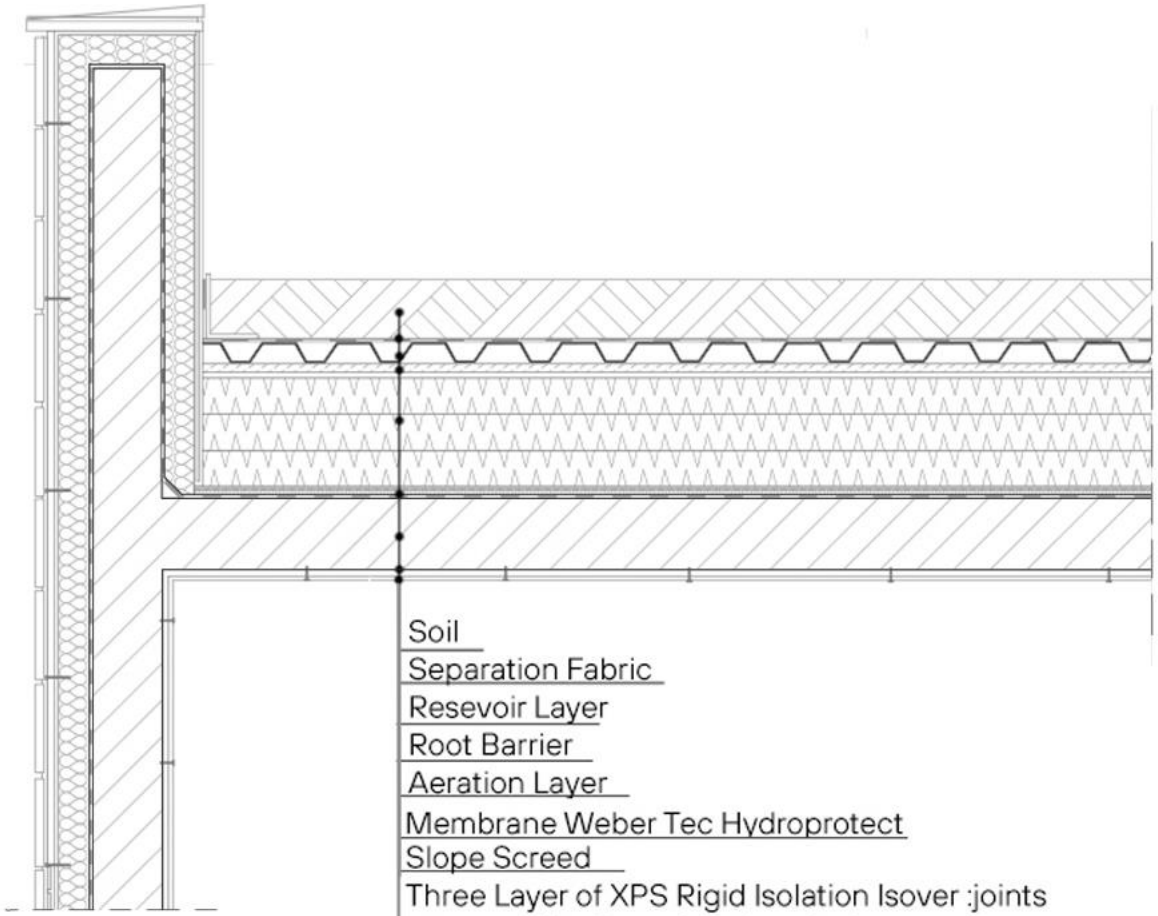
PARTITION WALL WITH INTERMEDIARY FLOOR



Rigips RF fire protection board 12,5mm
Wood Slats 60mm
Mineral Wool Isolation Isover Kontour KP-035 60mm
Three Layer CLT 90mm
Wood Slats 60mm
Mineral Wool Isolation Isover Kontour KP-035 60mm
Rigips Blue Acoustic RF 12,5mm

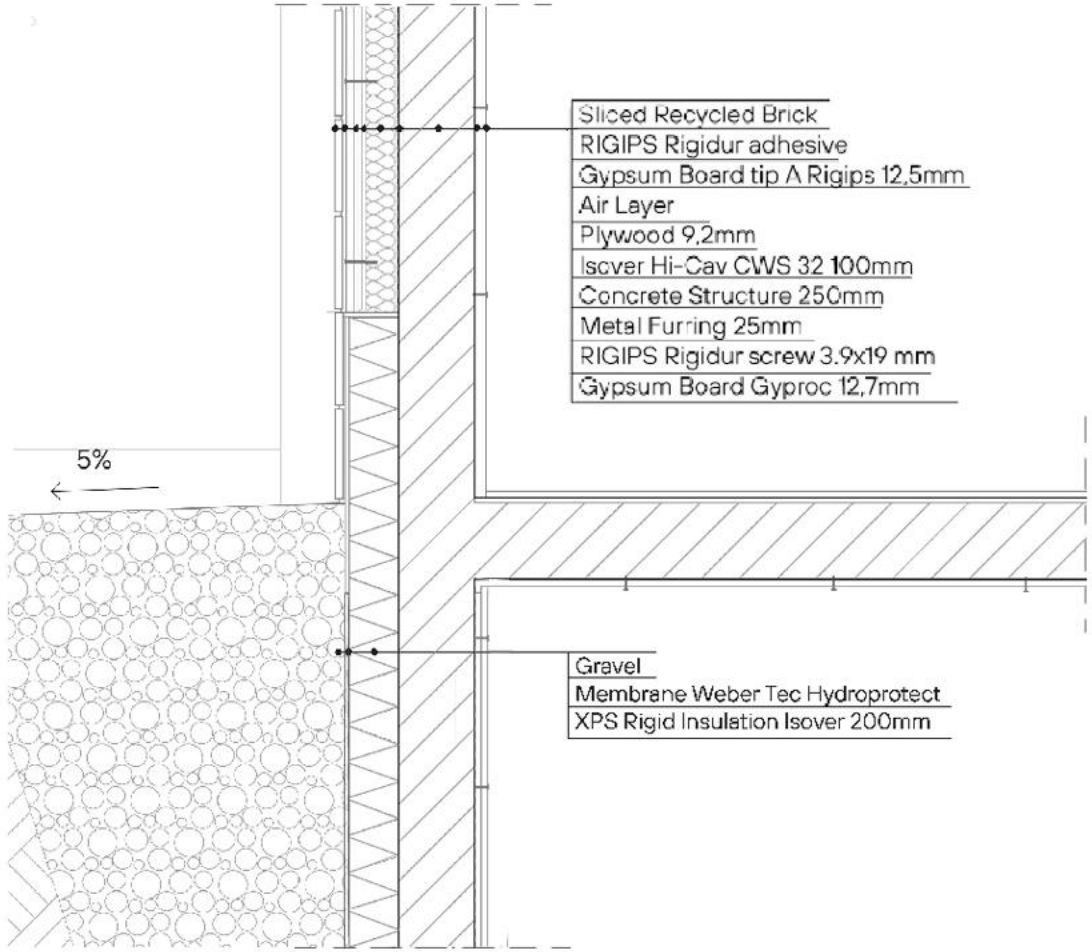
Carpet
Dry screed 25mm
Recycled Rubber Sound Absorbation Layer 12mm
Flooring grade rigid wood fibre isolation 60mm
Breathable Floor Protection Membrane
Three Layer CLT 90mm
Secondary Beams 190x65mm
Mineral Wool Isolation Isover Kontour KP-035 140mm
Three Layer CLT 90mm
Rigips RF fire protection board 12mm
U=0,53W/m^{2}K

GREEN ROOF



Soil
Separation Fabric
Resevoir Layer
Root Barrier
Aeration Layer
Membrane Weber Tec Hydroprotect
Slope Screed
Three Layer of XPS Rigid Isolation Isover :joints staggered horizontal and vertical
Vapour Barrier VARIO® KM Duplex
Concrete Structure 250mm
Metal Furring 25mm
RIGIPS Rigidur screw 3.9x19 mm

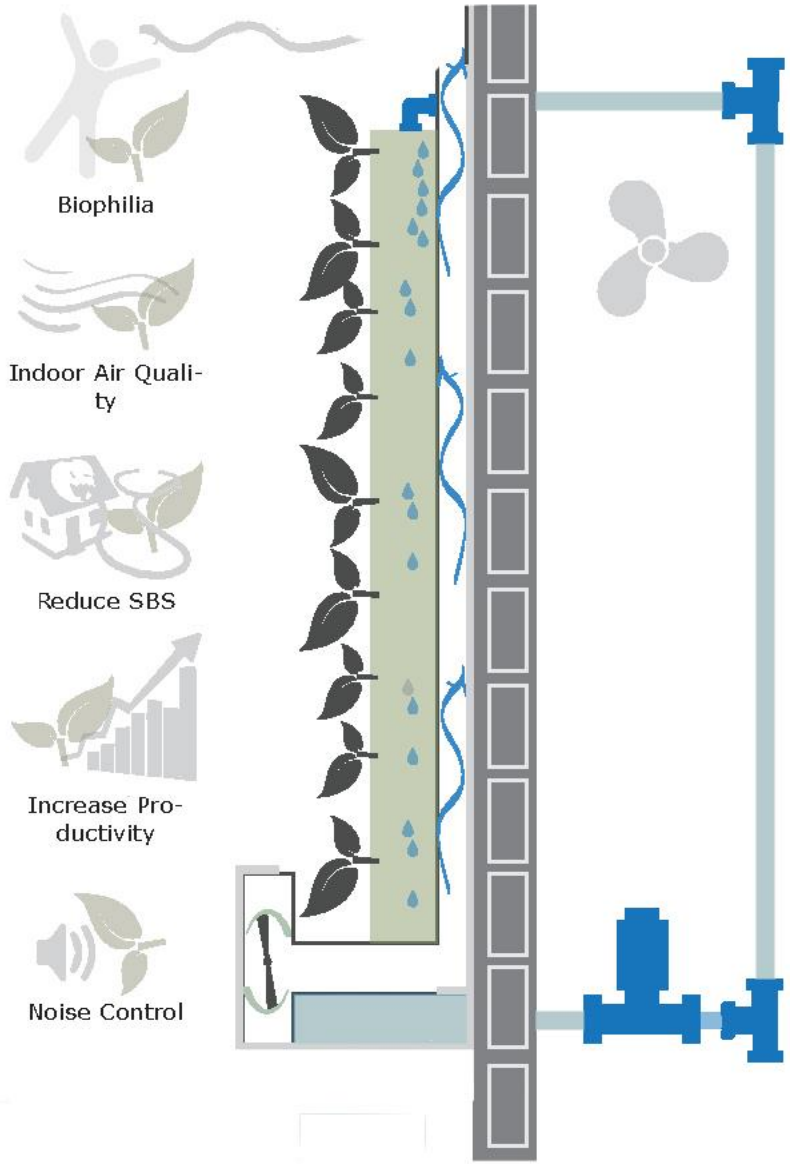
GROUND FLOOR (BASEMENT)

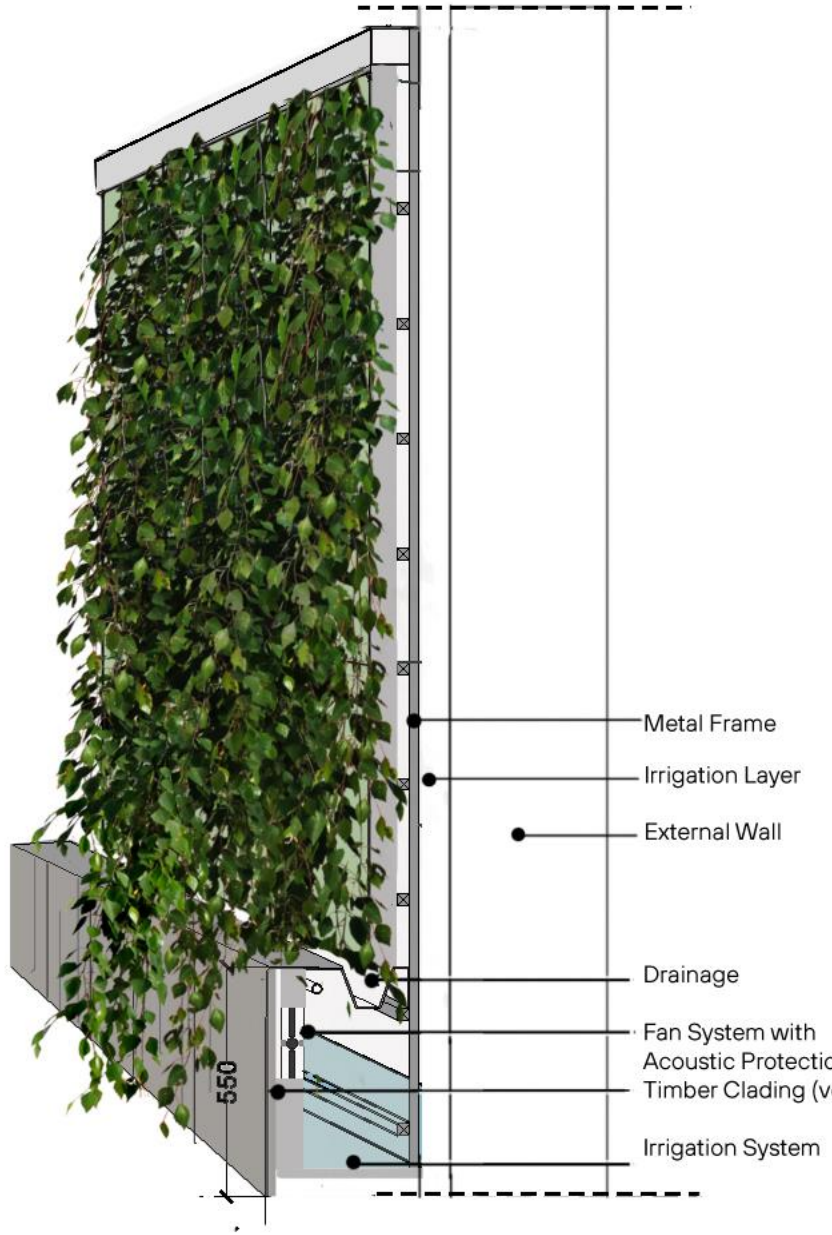


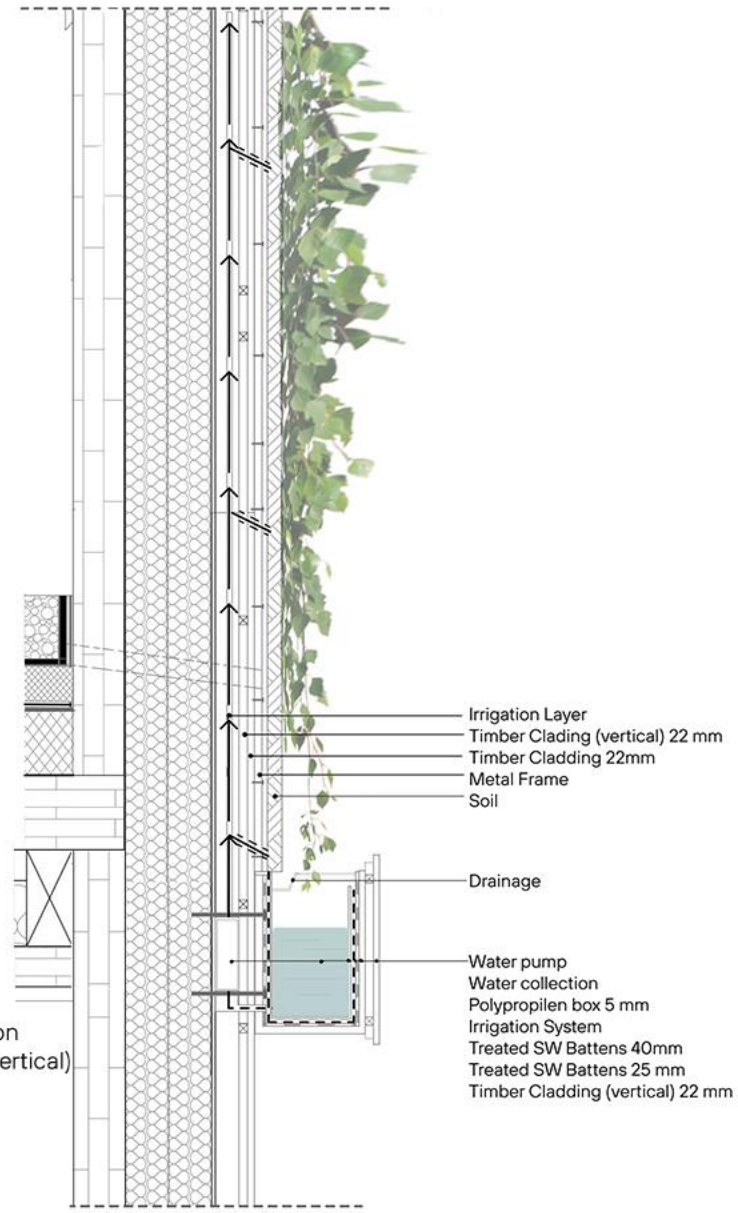
Sliced Recycled Brick
RIGIPS Rigidur adhesive
Gypsum Board tip A Rigips 12,5mm
Air Layer
Plywood 9,2mm
Isover Hi-Cav CWS 32 100mm
Concrete Structure 250mm
Metal Furring 25mm
RIGIPS Rigidur screw 3.9x19 mm
Gypsum Board Gyproc 12,7mm

Gravel
Membrane Weber Tec Hydroprotect
XPS Rigid Insulation Isover 200mm

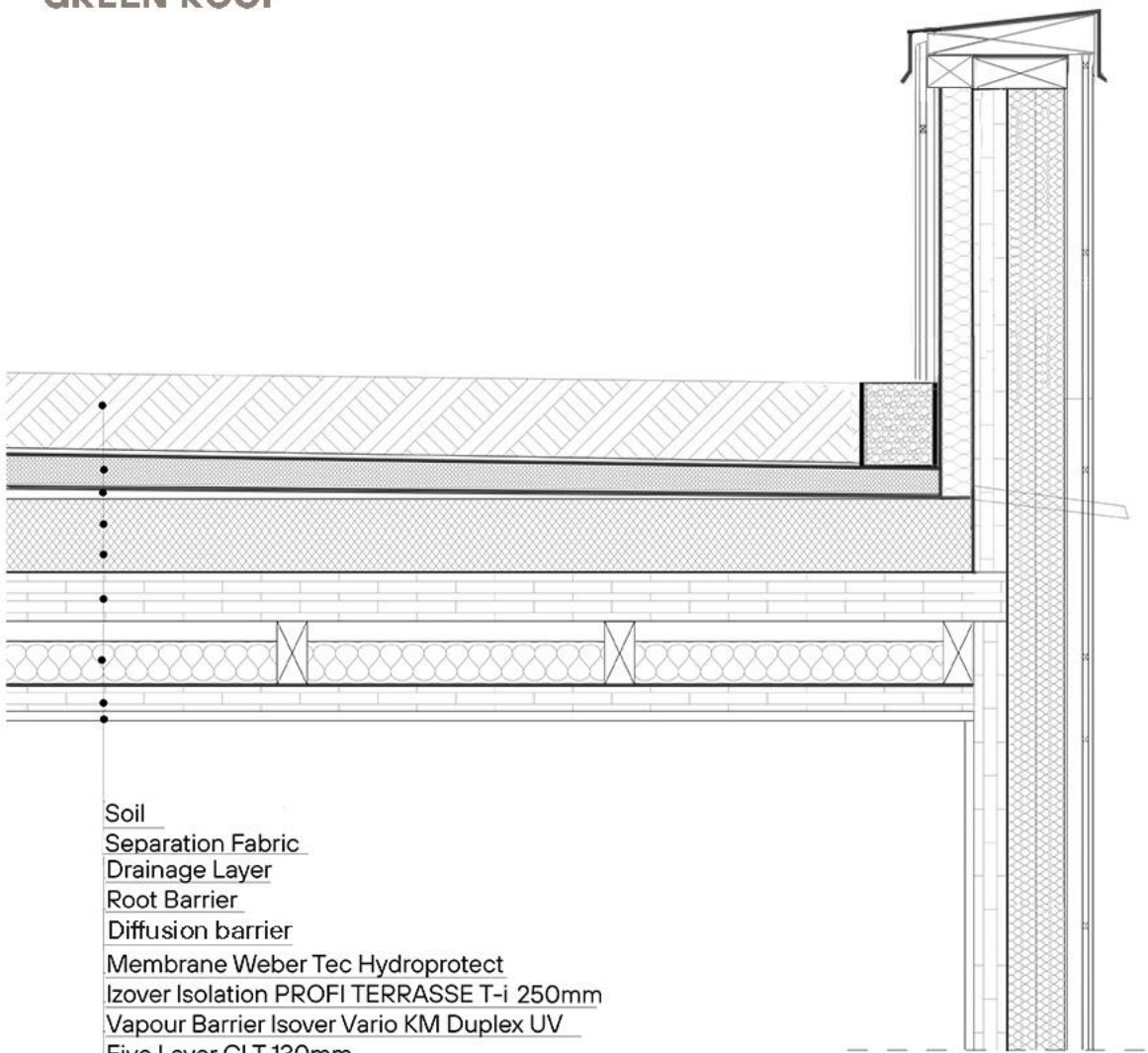
EXTERNAL WALL WITH GREEN SYSTEM ATTACHED





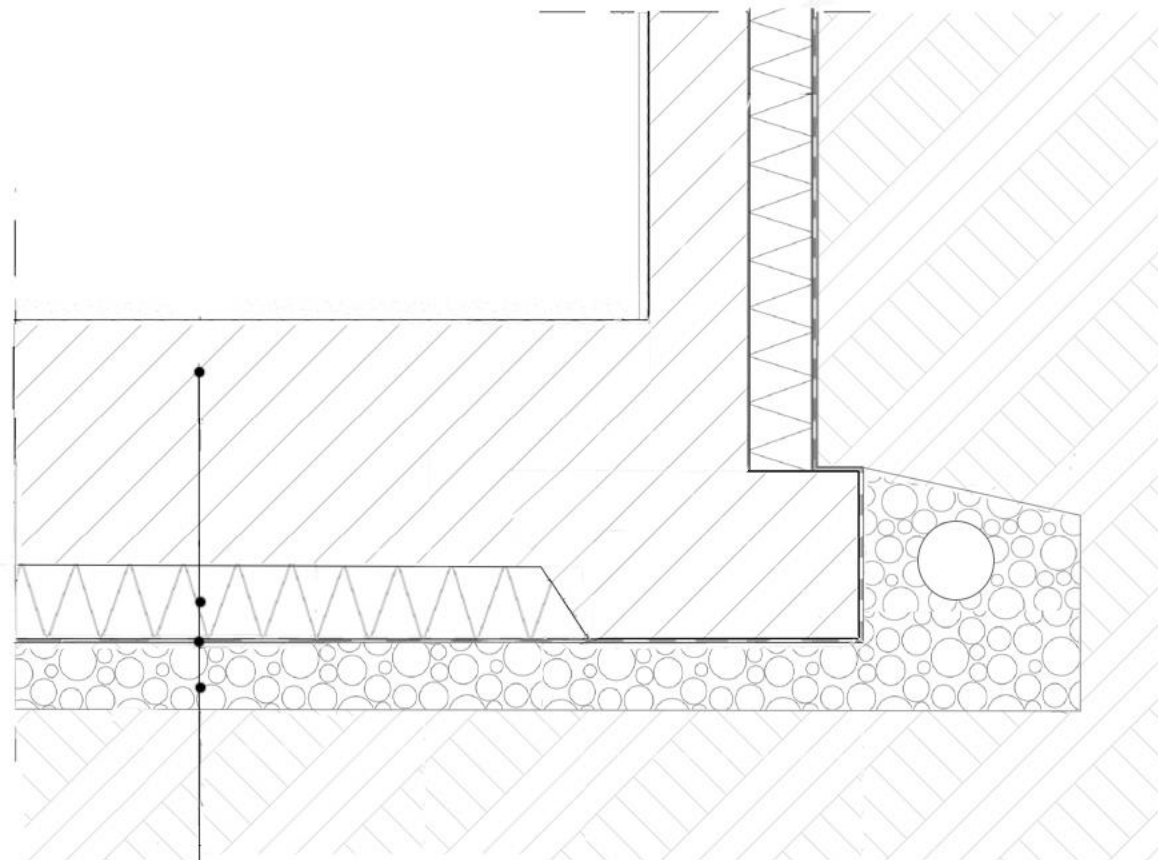


GREEN ROOF



Soil
Separation Fabric
Drainage Layer
Root Barrier
Diffusion barrier
Membrane Weber Tec Hydroprotect
Izover Isolation PROFI TERRASSE T-i 250mm
Vapour Barrier Isover Vario KM Duplex UV
Five Layer CLT 130mm
Secondary Beam 190x65mm
Mineral Wool Isolation Isover Kontour KP-035 140mm
Vapour Barrier Isover Vario KM Duplex UV
Three Layer CLT 90mm
Rigips RF fire protection board 12mm
U=0,12 W/m^{2}K

GROUND FLOOR (BASEMENT)



Structural Layer Concrete 500mm
Layer of XPS Rigid Isolation Isover 200mm
Membrane Weber Tec Hydroprotect
Gravel

ENERGY PERFORMANCE EVALUATION
ECODESIGN

Key Values

General Project Data

Project Name:	Ecodesign	
City Location:		
Latitude:	52° 14' 0" N	
Longitude:	21° 1' 0" E	
Altitude:	0,00	m
Climate Data Source:	Strusoft server	
Evaluation Date:	10.05.2022 09:25	

Building Geometry Data

Gross Floor Area:	**509,40**	m^2
Treated Floor Area:	**430,91**	m^2
External Envelope Area:	**832,93**	m^2
Ventilated Volume:	**1284,70**	m^3
Glazing Ratio:	**5**	%

Building Shell Performance Data

Infiltration at 50Pa:	**2,96**	ACH

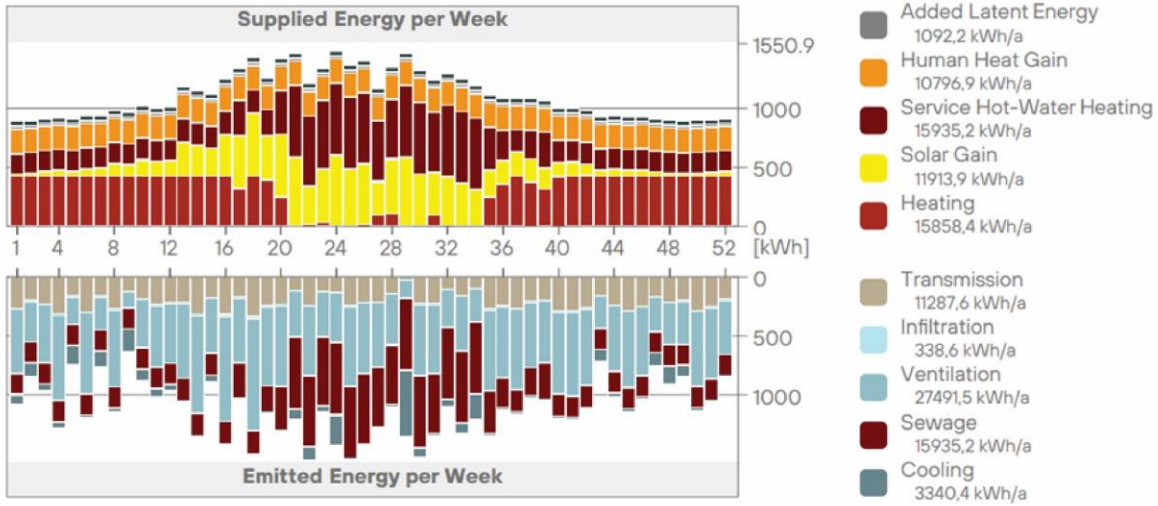
Specific Annual Values

Net Heating Energy:	**36,80**	kWh/m^2a
Net Cooling Energy:	**7,75**	kWh/m^2a
Total Net Energy:	**44,55**	kWh/m^2a
Energy Consumption:	**87,02**	kWh/m^2a
Fuel Consumption:	**85,48**	kWh/m^2a
Primary Energy:	**105,86**	kWh/m^2a
Fuel Cost:	**--**	GBP/m^2a
CO_2 Emission:	**16,76**	kg/m^2a

Degree Days

Heating (HDD):	**4116,63**
Cooling (CDD):	**1237,11**

Project Energy Balance



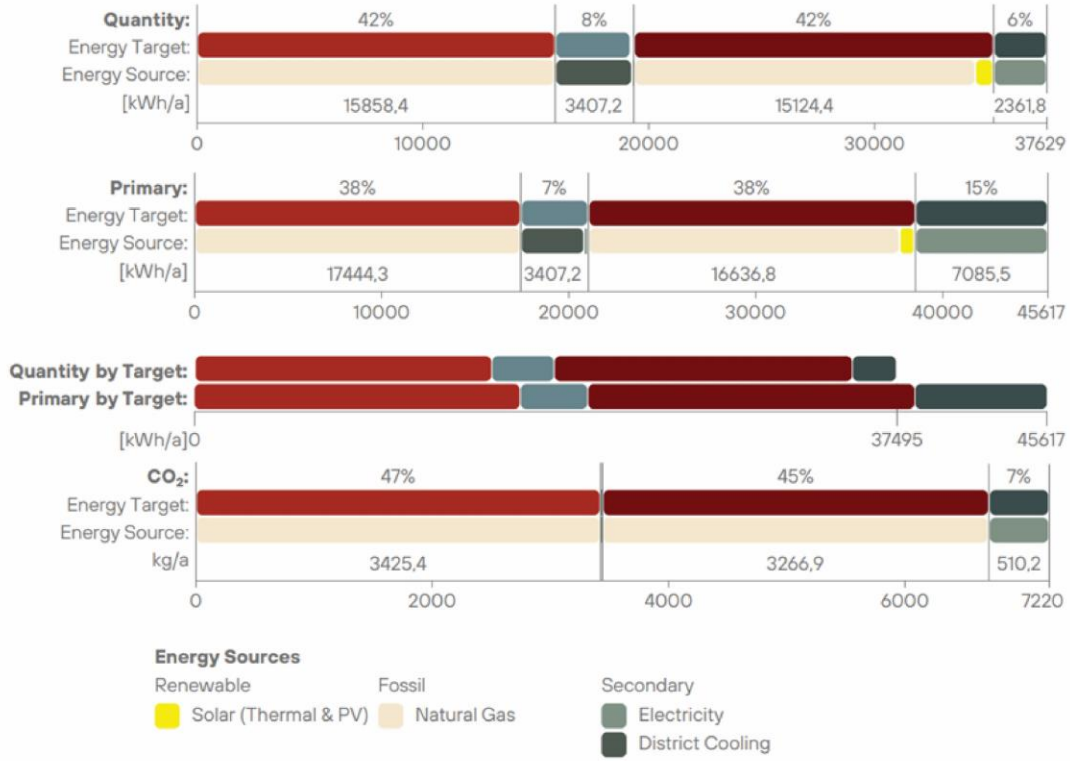
- Lighting and Equipment 2361,8 kWh/a
- Added Latent Energy 1092,2 kWh/a
- Human Heat Gain 10796,9 kWh/a
- Service Hot-Water Heating 15935,2 kWh/a
- Solar Gain 11913,9 kWh/a
- Heating 15858,4 kWh/a
- Transmission 11287,6 kWh/a
- Infiltration 338,6 kWh/a
- Ventilation 27491,5 kWh/a
- Sewage 15935,2 kWh/a
- Cooling 3340,4 kWh/a

Thermal Blocks

Thermal Block	Zones Assigned	Operation Profile	Gross Floor Area m^2	Volume m^3
Residential Building Thermal Block	17	Residential	509,40	1284,70
Total:	**17**		**509,40**	**1284,70**

Energy Consumption by Targets

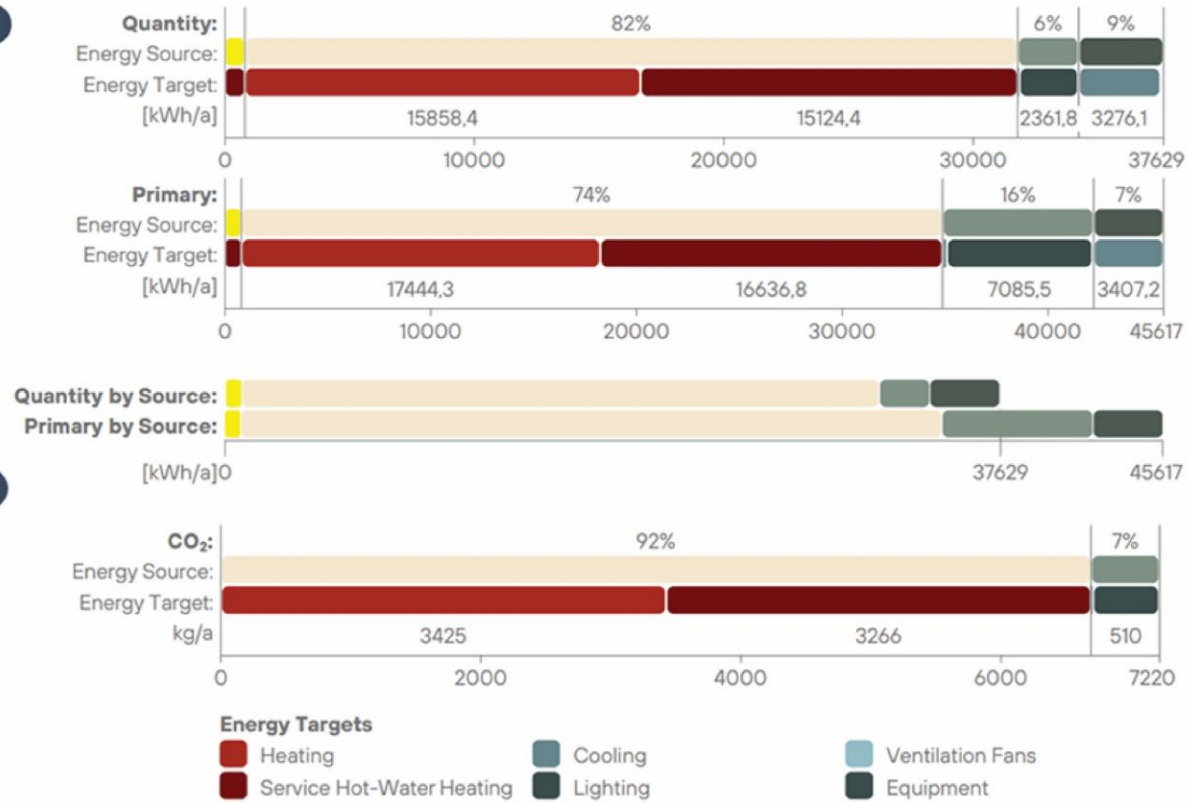
Target Name	Energy Quantity kWh/a	Primary kWh/a	Cost GBP/a	CO_2 Emission kg/a
Heating	15858	17444	0	3425
Cooling	3340	3607	0	14
Service Hot-Water	15935	17480	0	3270
Ventilation Fans	0	0	0	0
Lighting & Appliances	2361	7085	0	510
Total:	**37495**	**45617**	**NA**	**7220**



ENERGY PERFORMANCE EVALUATION
ECODESIGN

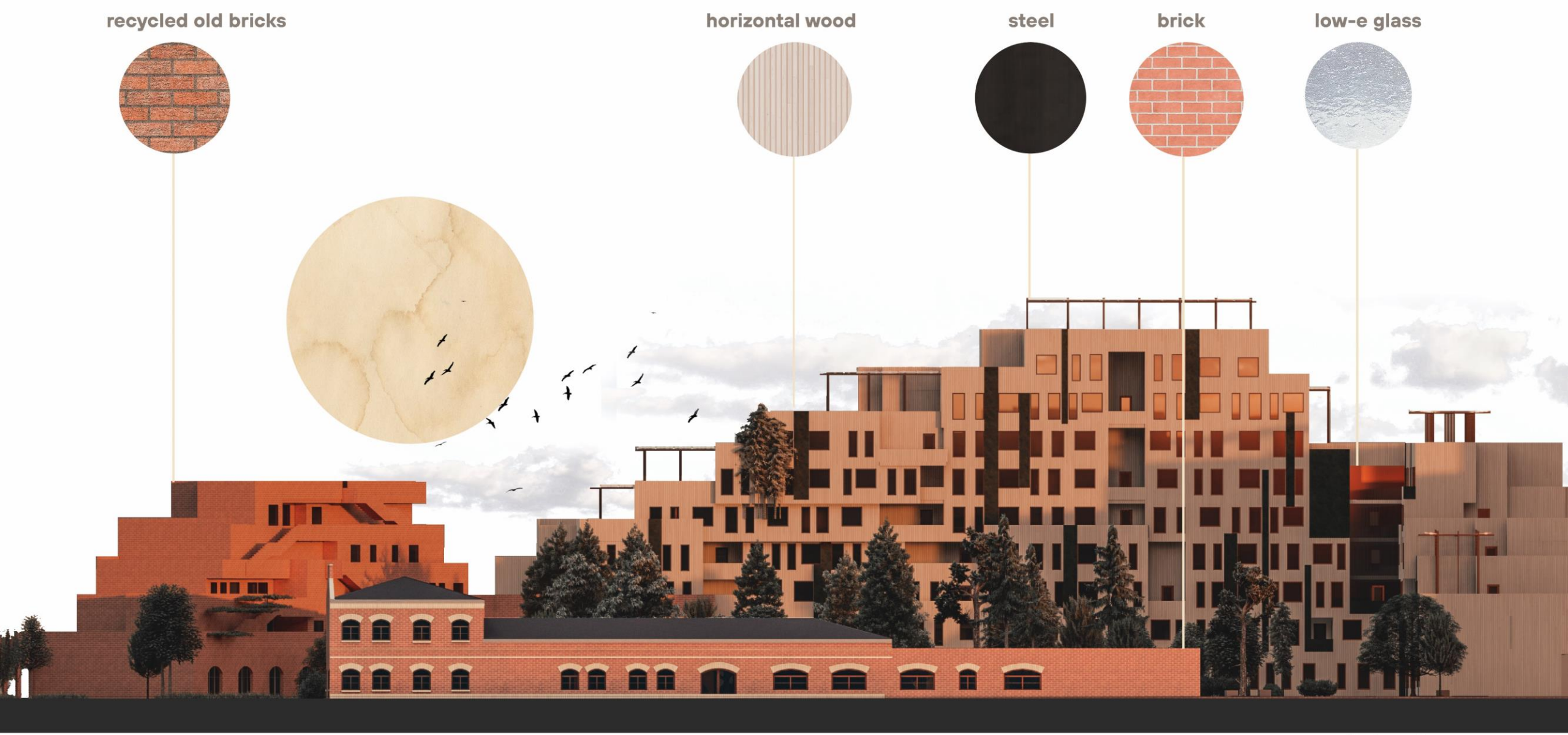
Energy Consumption by Sources

Source Type	Source Name	Energy Quantity kWh/a	Primary kWh/a	Cost GBP/a	CO_2 Emission kg/a
Renewable	Solar (Thermal & PV)	794	794	NA	0
Fossil	Natural Gas	30982	34081	--	6692
Secondary	Electricity	2444	7334	--	528
	District Cooling	3407	3407	--	0
Total:		**37629**	**45617**	Not Applicable	**7220**

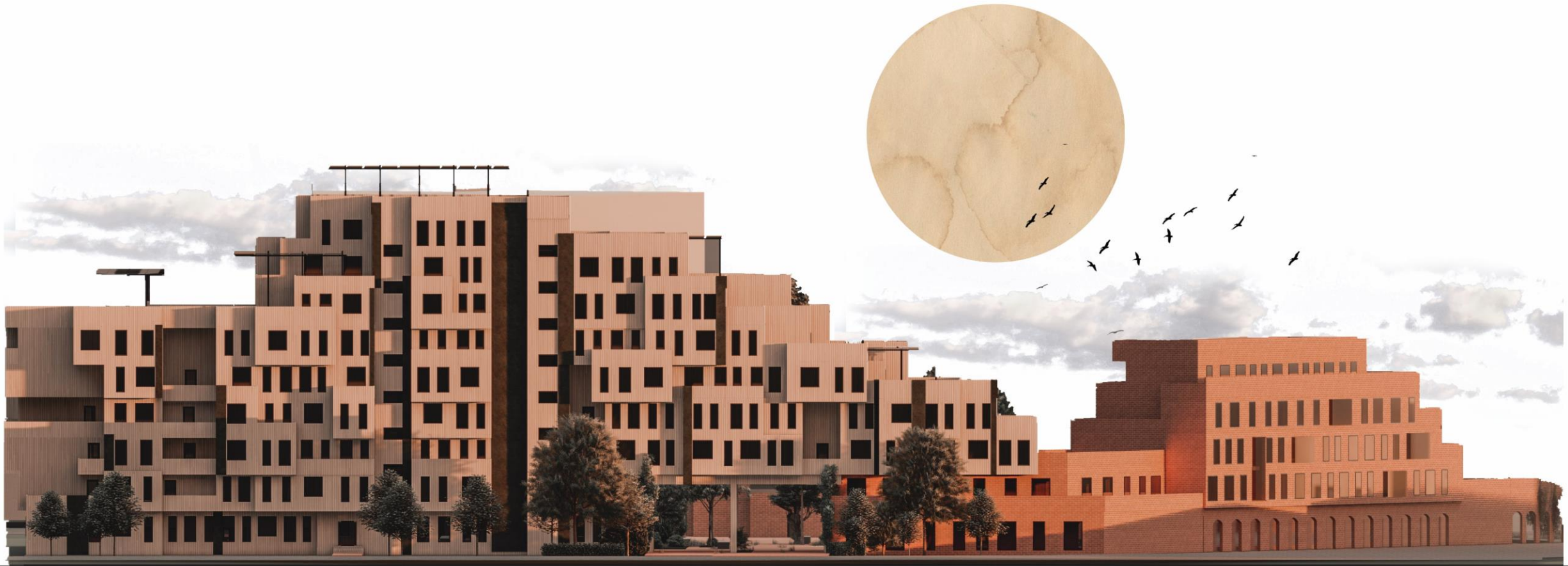


Environmental Impact

Source Type	Source Name	Primary Energy kWh/a	CO_2 emission kg/a
Renewable	Solar (Thermal & PV)	794	0
Fossil	Natural Gas	34081	6692
Secondary	Electricity	7334	528
	District Cooling	3407	0
Total:		**45616**	**7220**



south facade
sc 1:200



north facade
sc 1:200

west facade
sc 1:200

est facade
sc 1:200