



ARCHITECTURE STUDENT CONTEST

18th INTERNATIONAL EDITION, LISBON 2023

DISTURB to un-disturb

The scheme aims to create a sustainable movement that integrates biophilic architecture principles into the built environment, creating a harmonious and sustainable relationship between nature and the built. As the global population grows, it becomes our responsibility to design buildings that not only meet our needs but also the needs of the planet. The aim is to strike a positive impact on nature, sustainable building, human health and comfort. The title comes into play whereby the existing is reused and made sustainable through careful selection of materials. The existing parking area is disturbed and replaced with a building boasting living facades, roof gardens and consisting of mostly low carbon building materials.



TeamNumber:
14436



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Dylan du Plessis



Department of Architecture and Industrial design



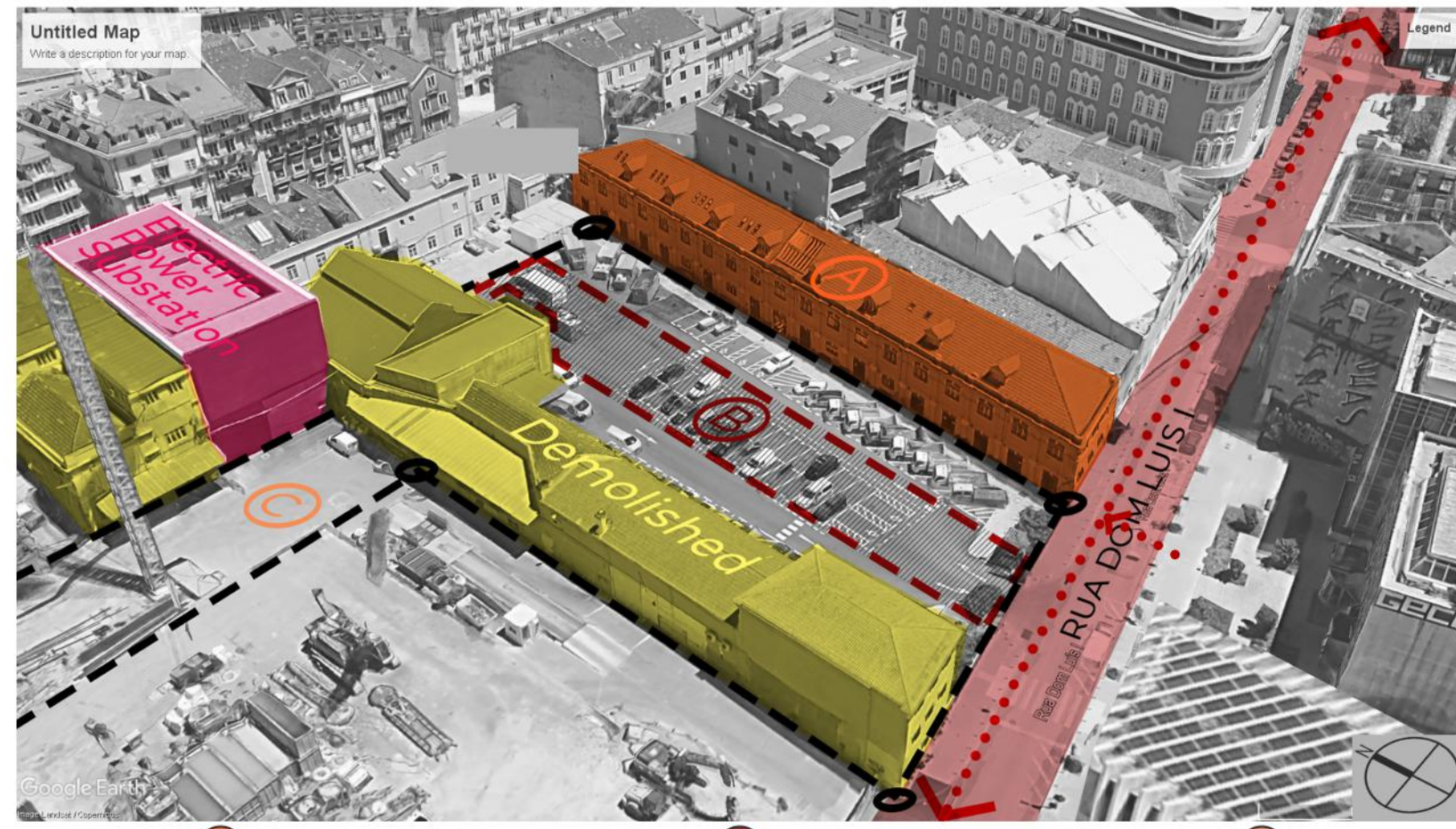
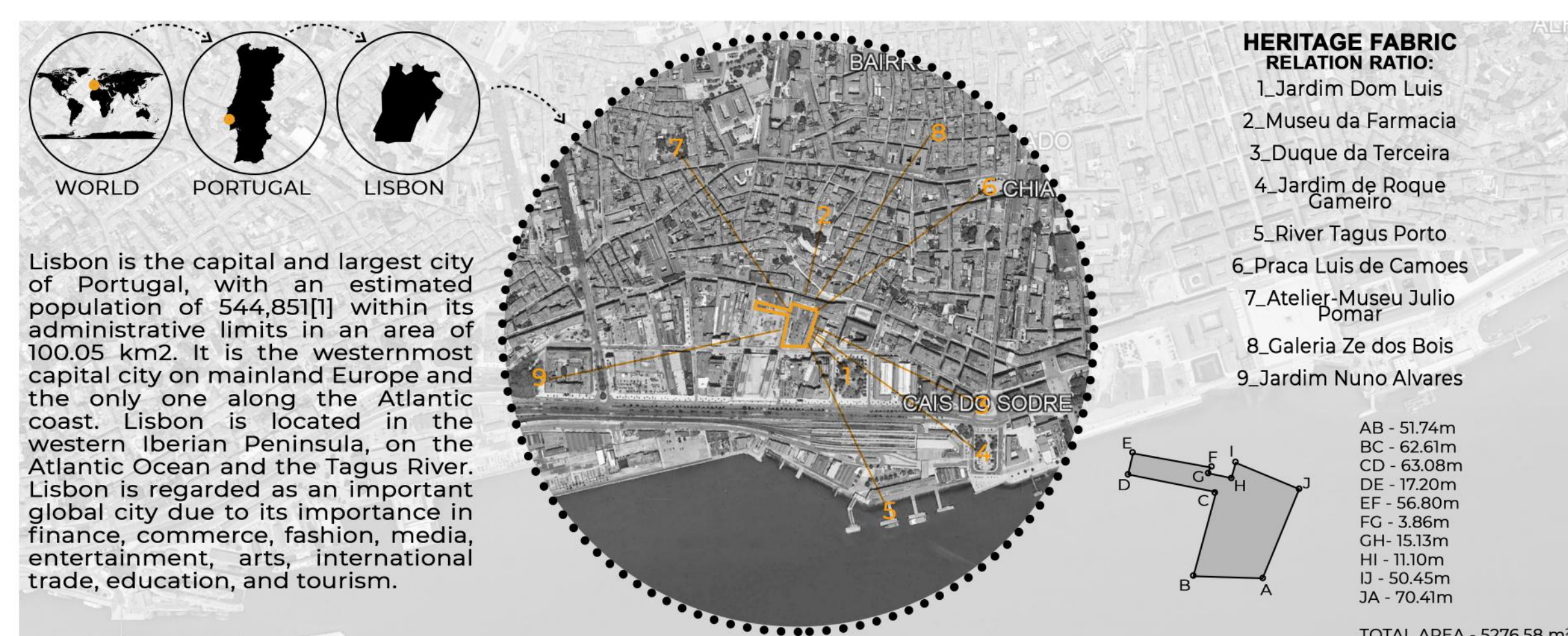
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SITE ANALYSIS



Building A-
By Renovating and reusing the existing building that will become **Lisbon Video Library**.

Building B-
New residential building, will entail a mixture of private- and co living residences. And will have underground parking.

External Area C-
Green spaces that connect buildings and provide areas for **recreation** and interaction with nearby structures.

URBAN ANALYSIS

Buildings

Vehicular Movement Paths

Green Spaces

Water Body

Site Boundary

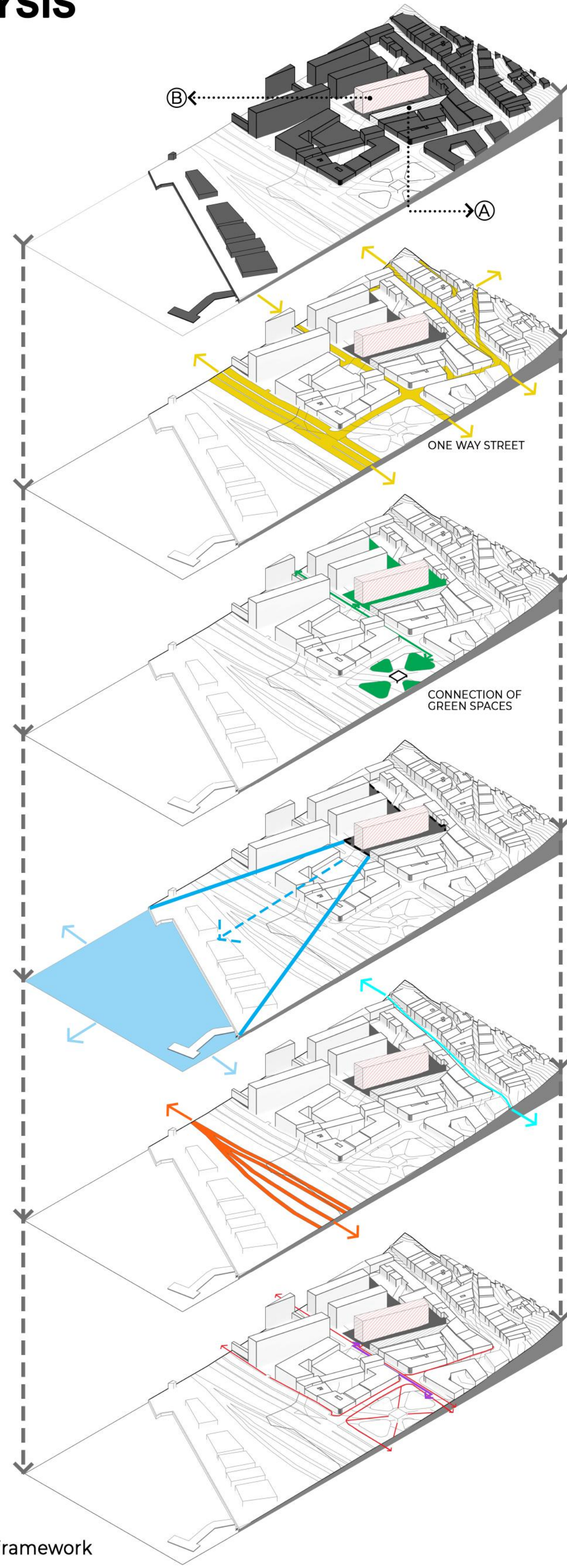
Railway

Tram

E- Scooter

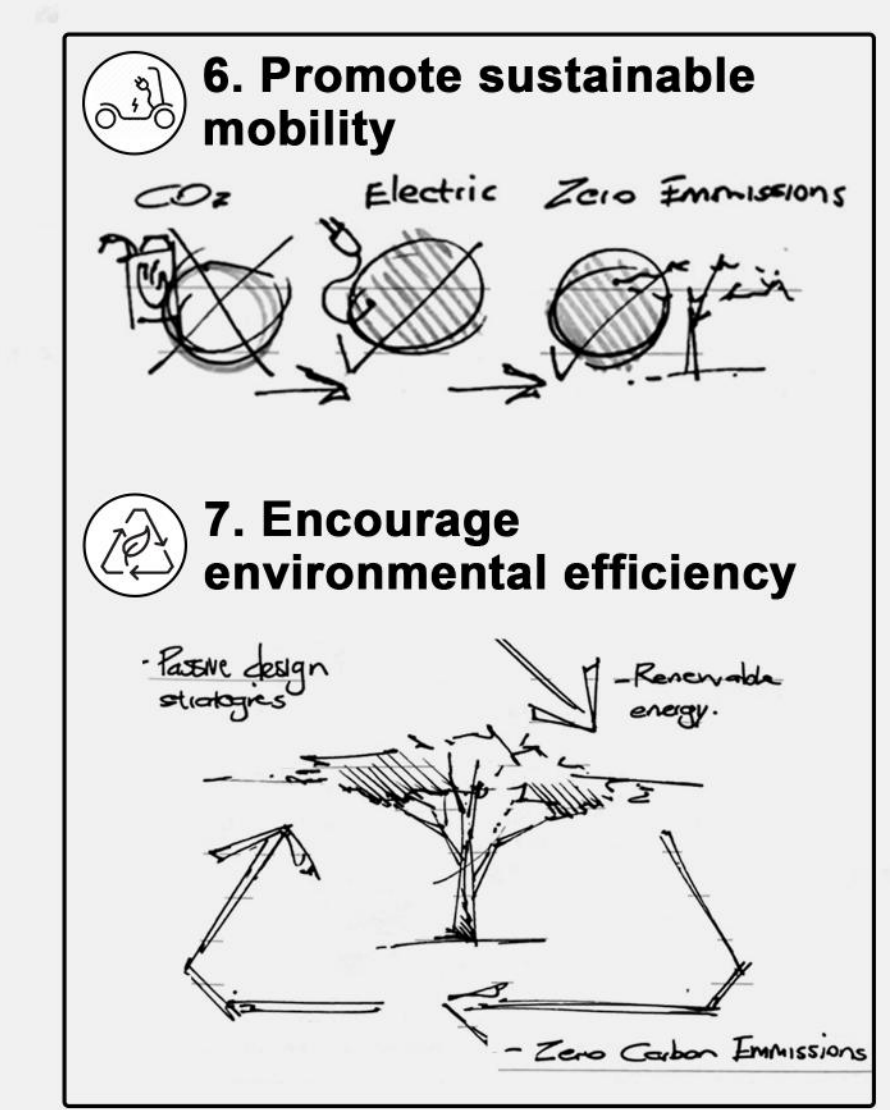
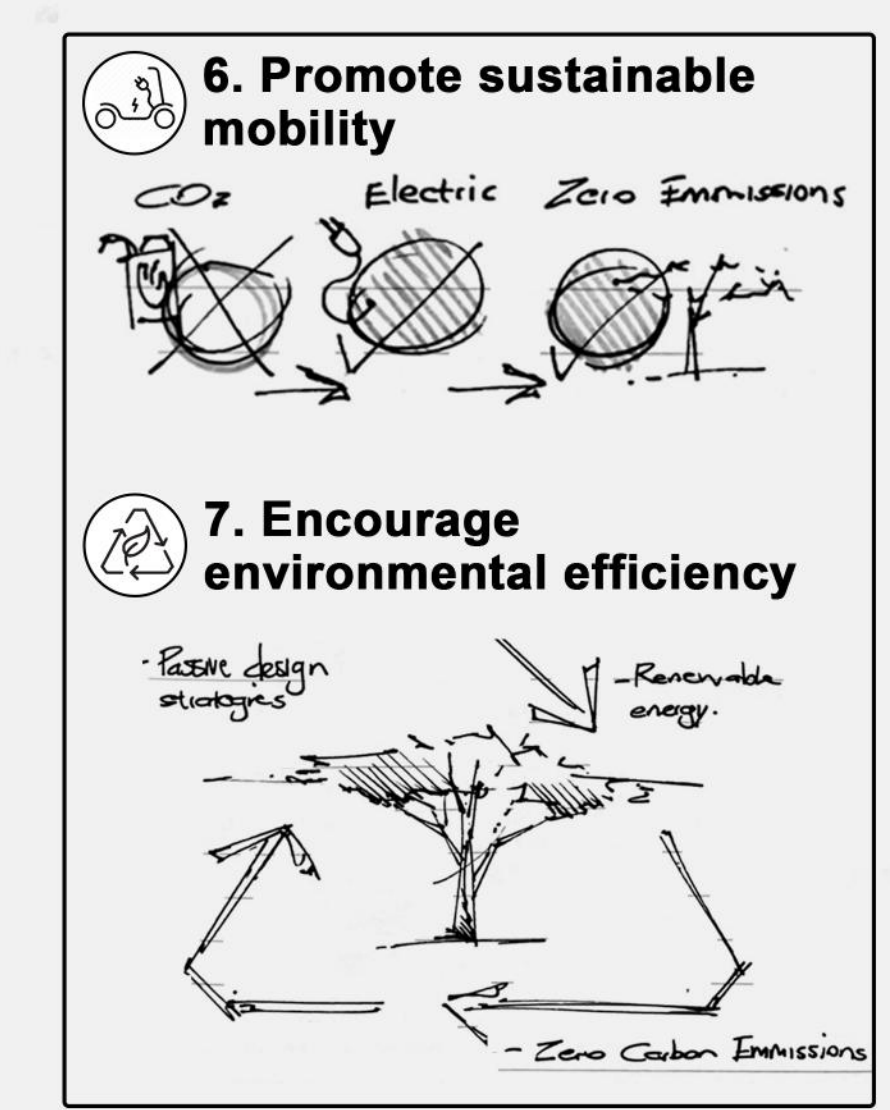
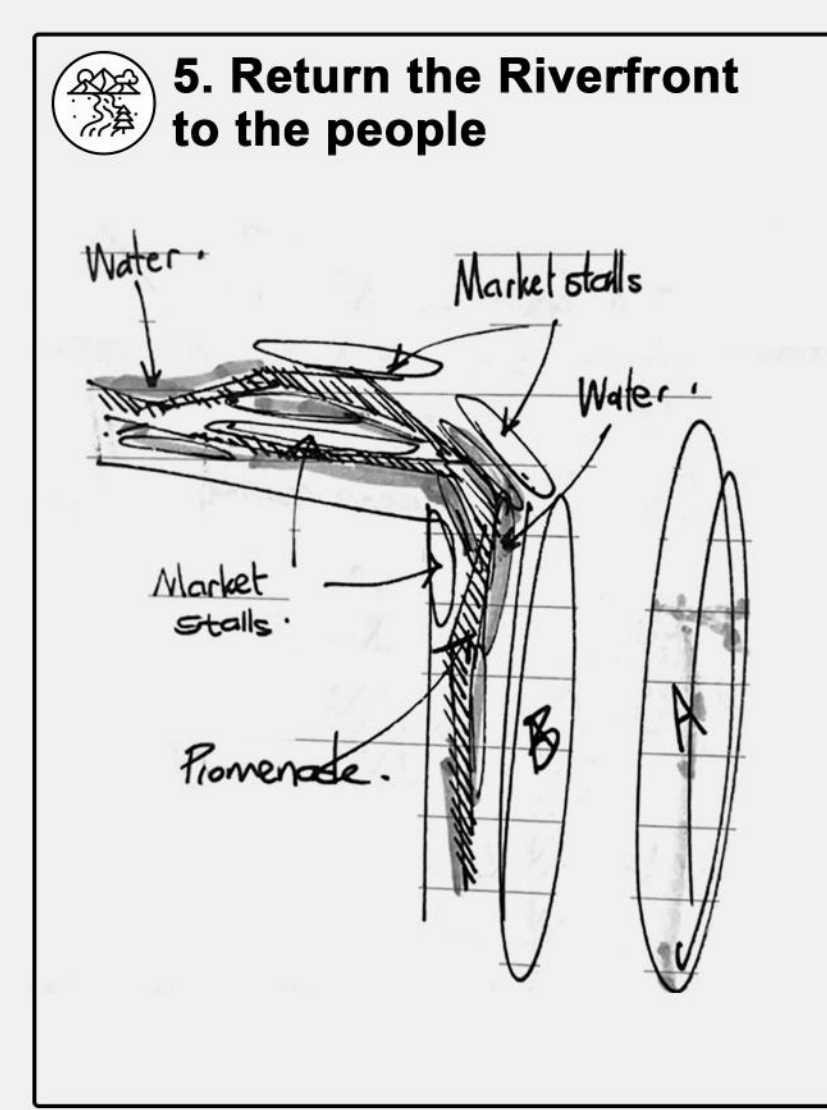
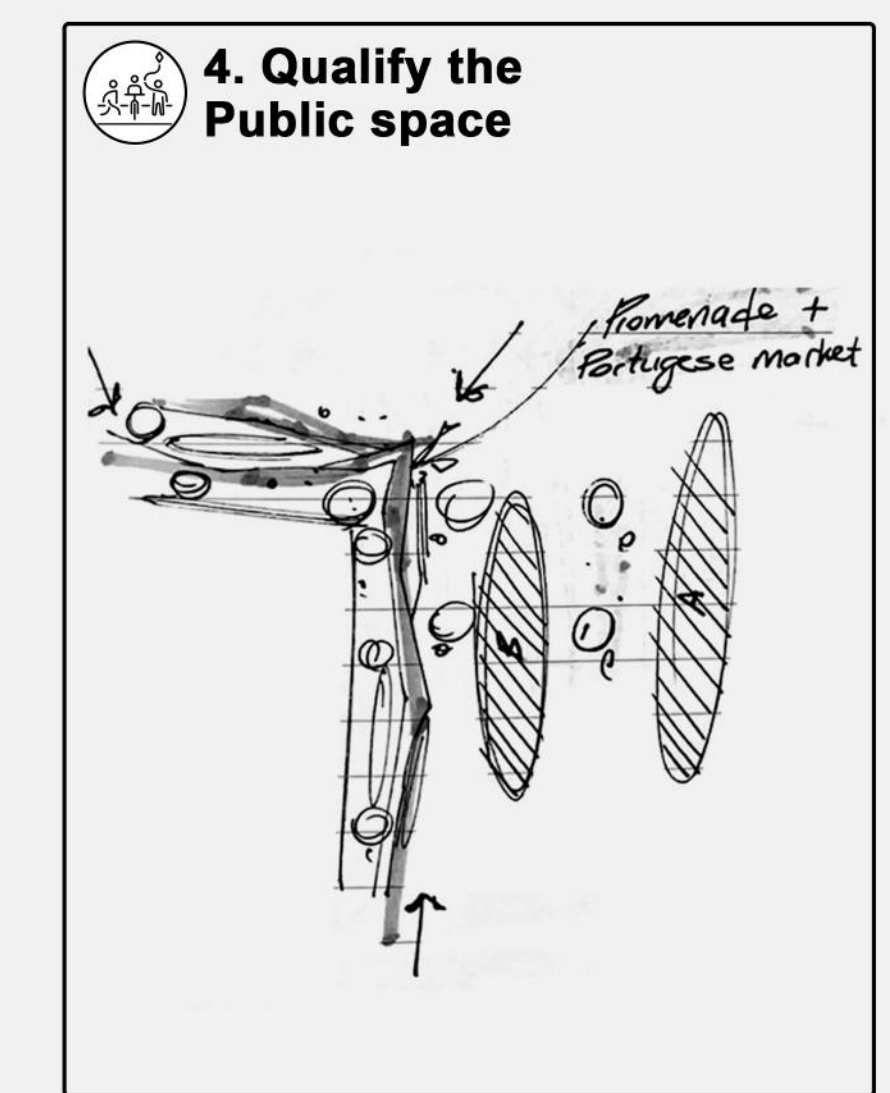
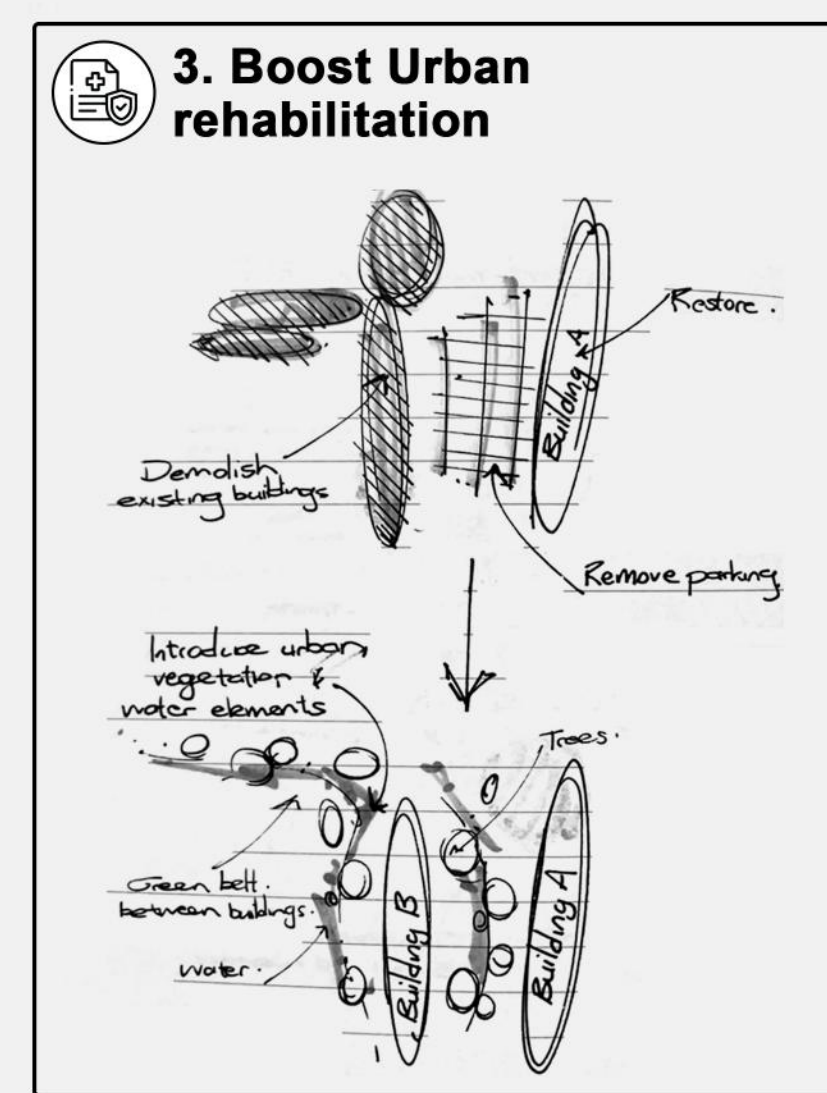
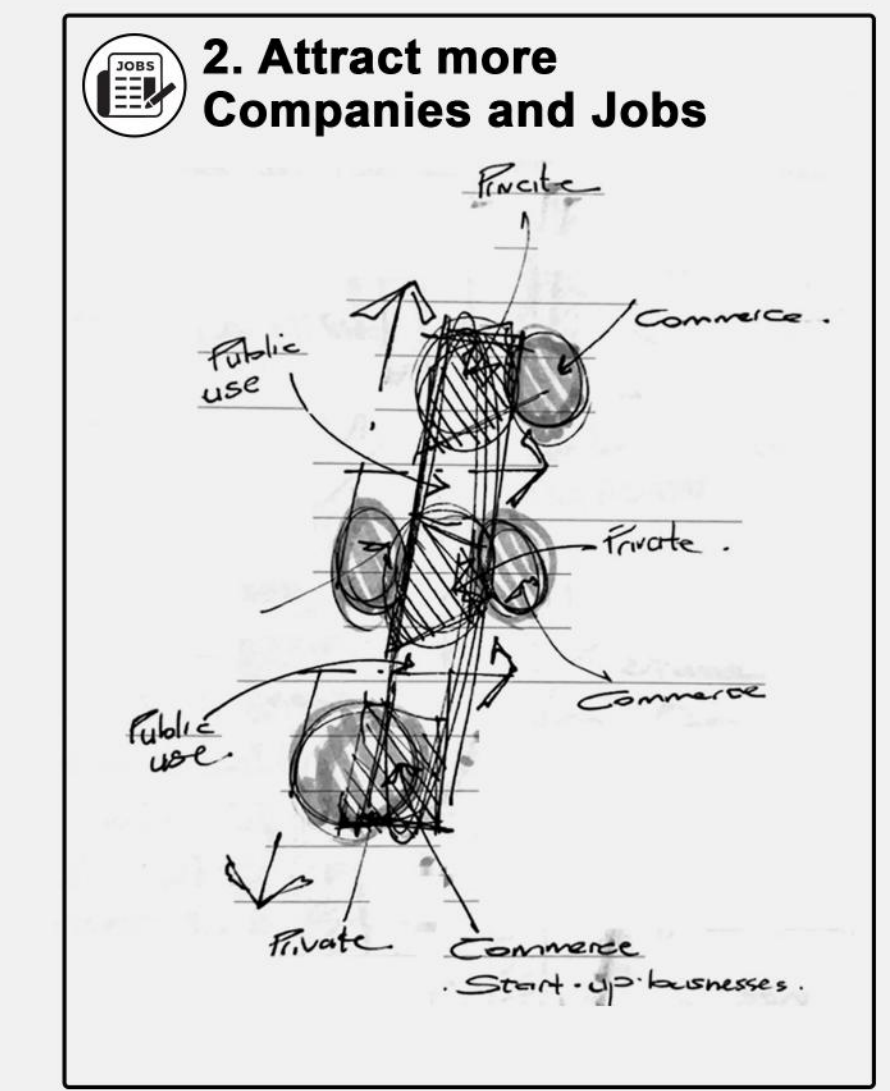
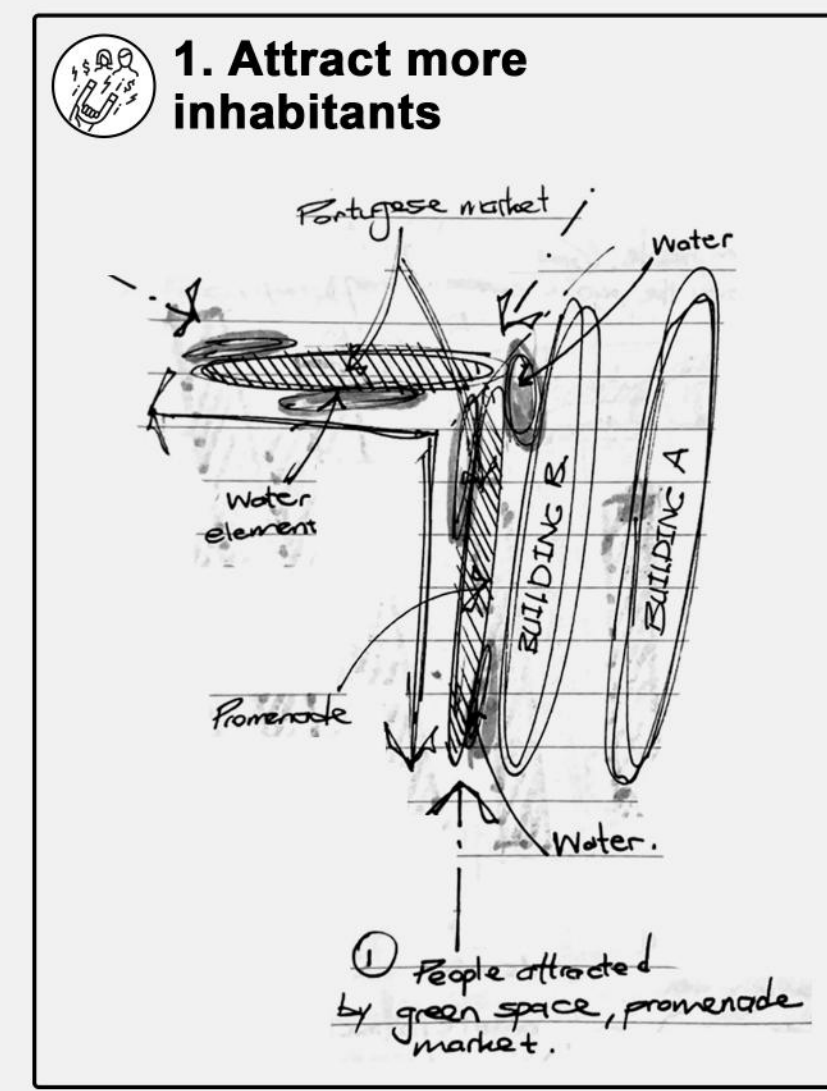
Pedestrian Walkways

Urban design framework



7 MAYOR OBJECTIVES OF THE PROJECT:

PARTI ILLUSTRATIONS:



MASTERPLAN

- 1. Attract more inhabitants**
 - Park/promenade, coffee shop, Portuguese market
- 2. Attract more Companies and Jobs**
 - Coffee shop, hot desks, Portuguese market, Atelier space
- 3. Boost Urban rehabilitation**
 - Park with abundant vegetation
- 4. Qualify the Public space**
 - Seating areas, Amphitheatre & Children play area
- 5. Return the Riverfront to the people**
 - Water elements in area C & visual connection to river
- 6. Promote sustainable mobility**
 - e-scooters, bicycles & walking
- 7. Encourage environmental efficiency**
 - Sustainable materials, low embodied carbon, renewable



Proposal - External area C
 A promenade to promote social interaction, create space for local markets and space for an urban garden

Key:
 - Pedestrian Paths
 - Vehicular Paths
 - E-Scooter Paths
 - Basement Constraints
 - Building B Constraints
 - Site Boundary
 - Tram Paths

Proposal - Streetscape
 A new streetscape where pedestrians are given right of way and vehicles are seen as visitors. Proposed is a one-way street with ample space for pedestrians, bicycles and e-scooters, connecting to nearby park.

Proposal - Building A
 Exterior of building A to be restored and interior to be redesigned to accommodate Lisbon video library and commission.

SITE AXONOMETRIC

- BUILDING A
- BUILDING B
- AREA C



TRANSITION SPACE BETWEEN BUILDINGS



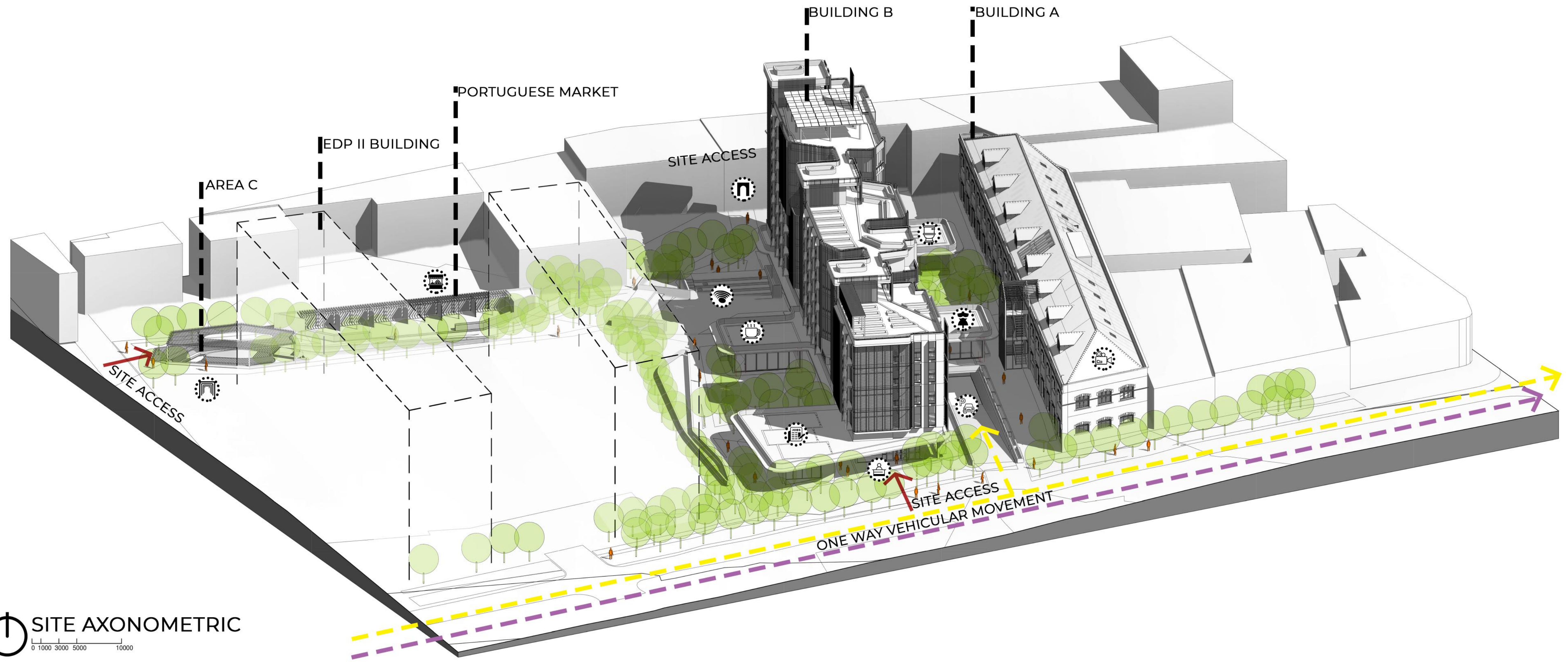
VIEWS TO RIVERFRONT



AREA C SOCIAL AND RELAXING SPACES

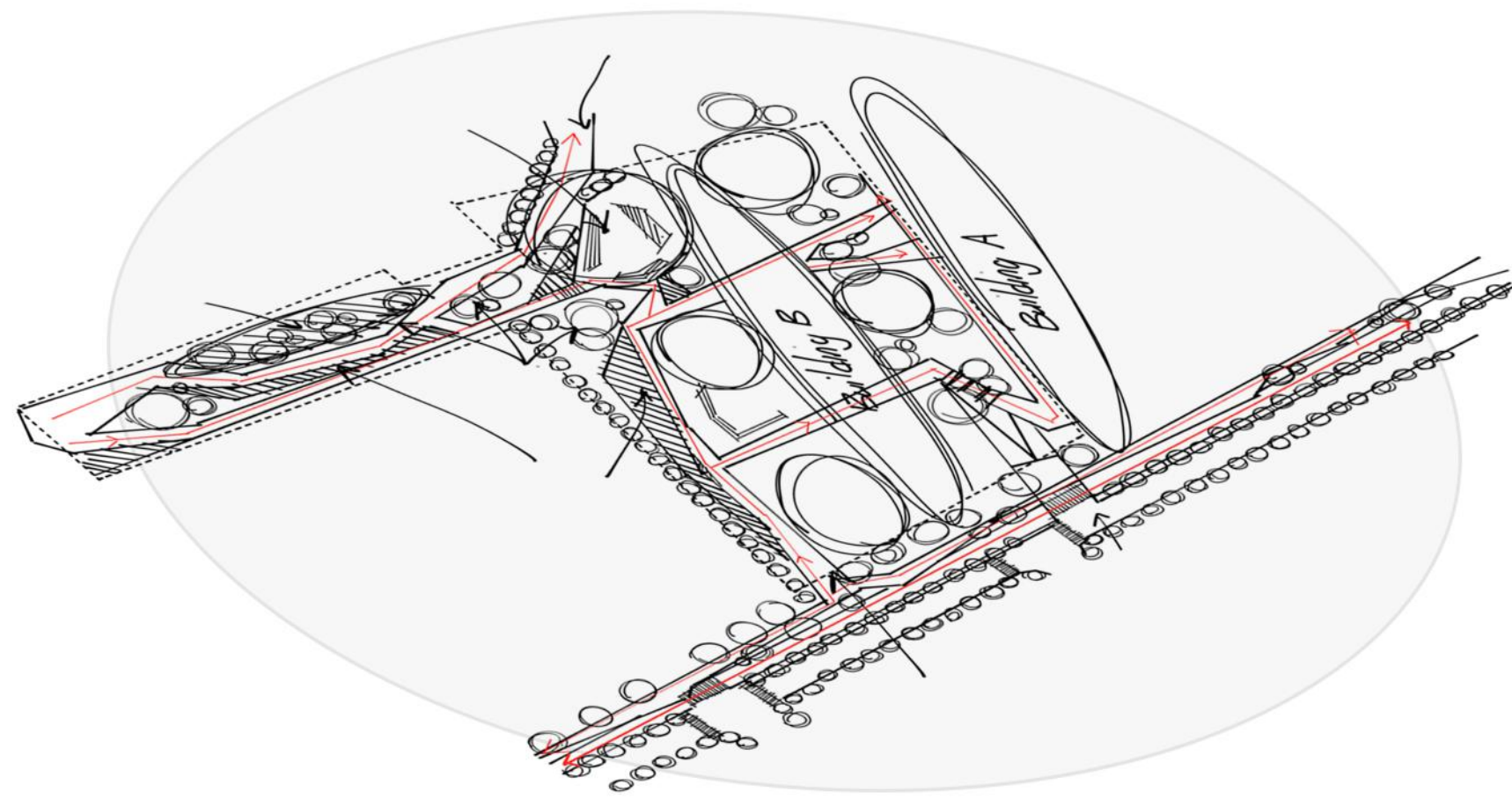


AREA C AMPHITHEATER

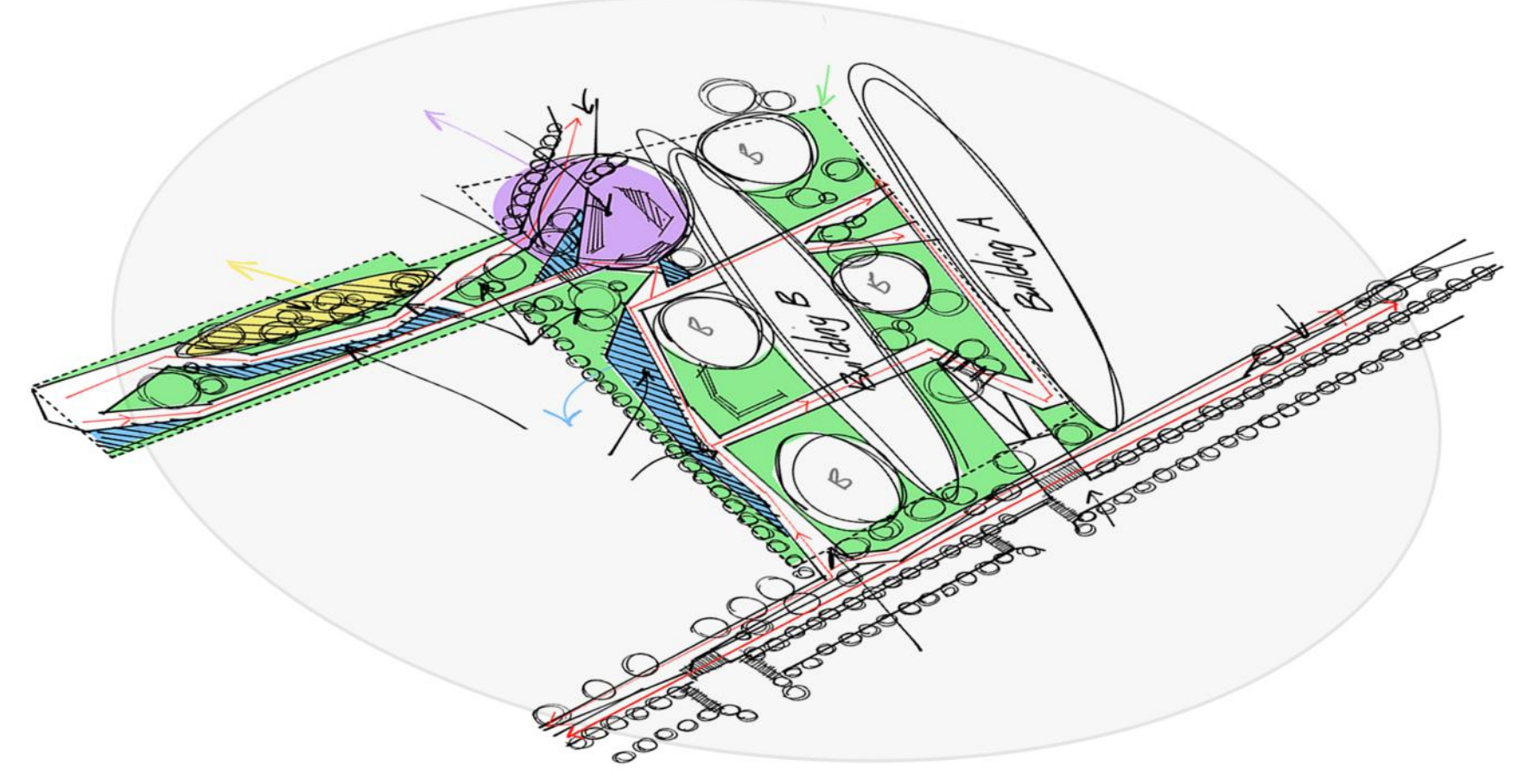


SITE AXONOMETRIC

LEGEND	
	Public Ablutions
	Entrance Reception
	Arch Access to site
	POP-up shops
	Atelier Workshop
	Portuguese Market
	Amphitheater
	Pergola seating space
	Coffee shop
	Basement Parking
	Lisbon Video Library



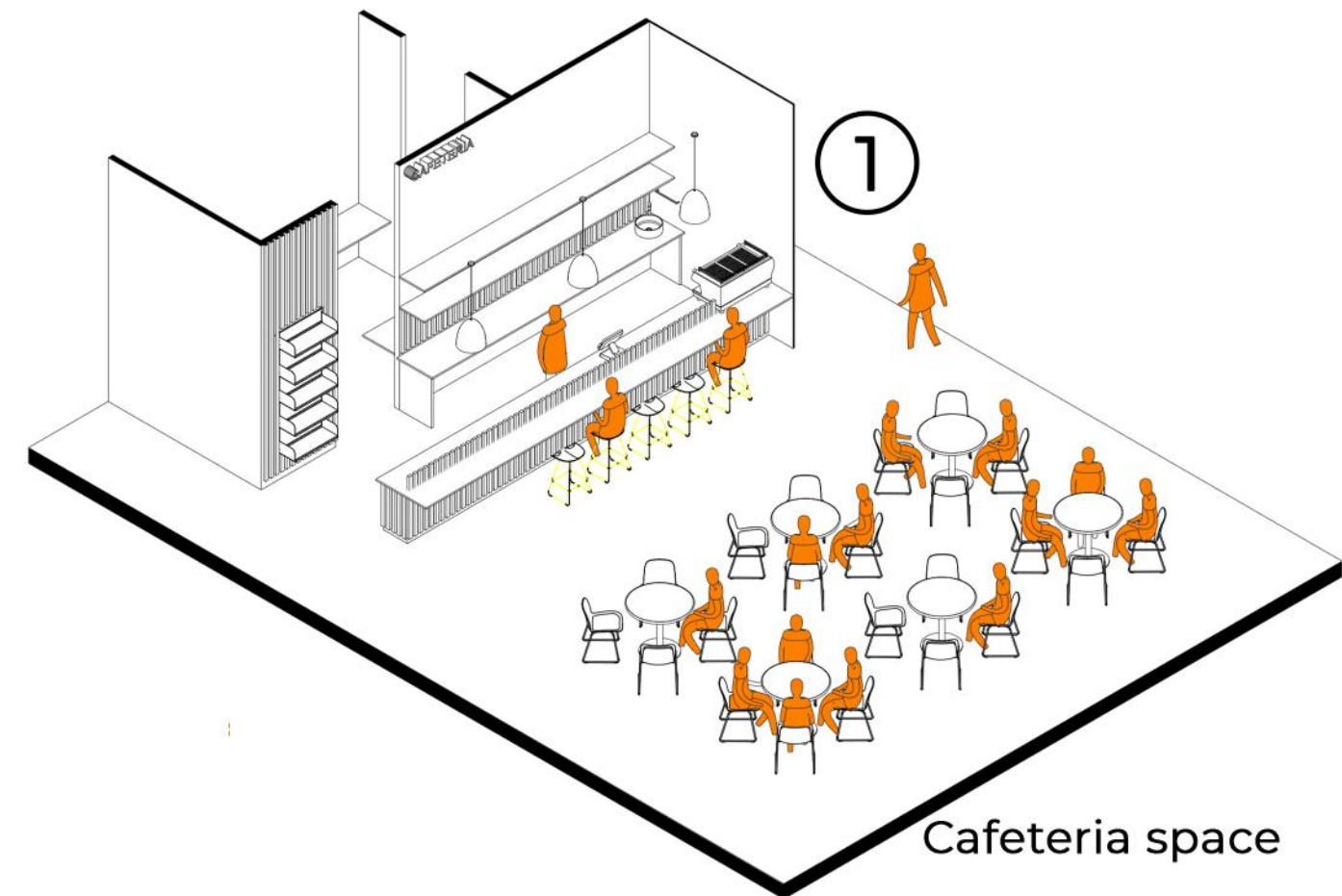
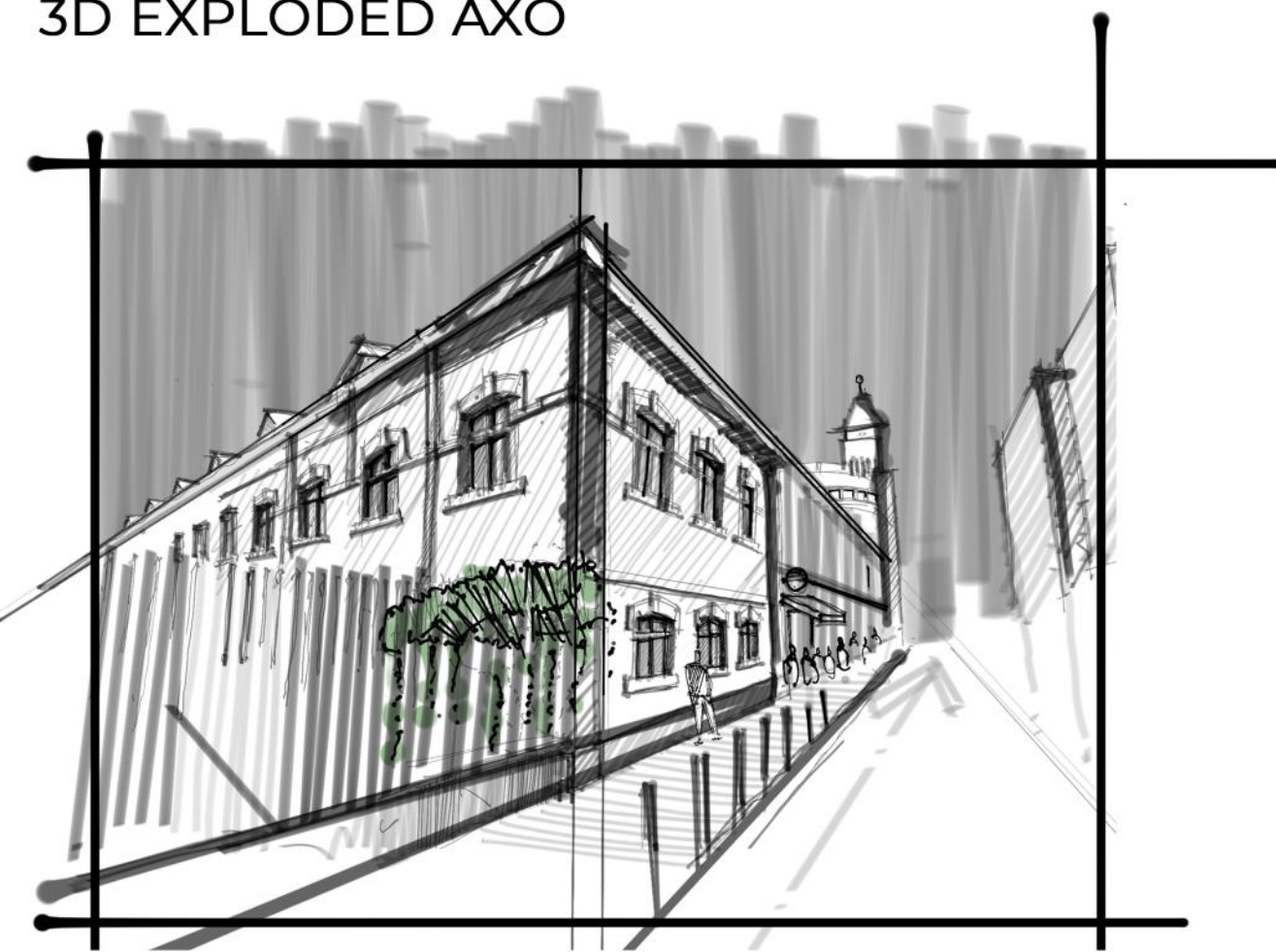
PEDEDSTRIAN MOVEMENT



AREA C PROGRAM

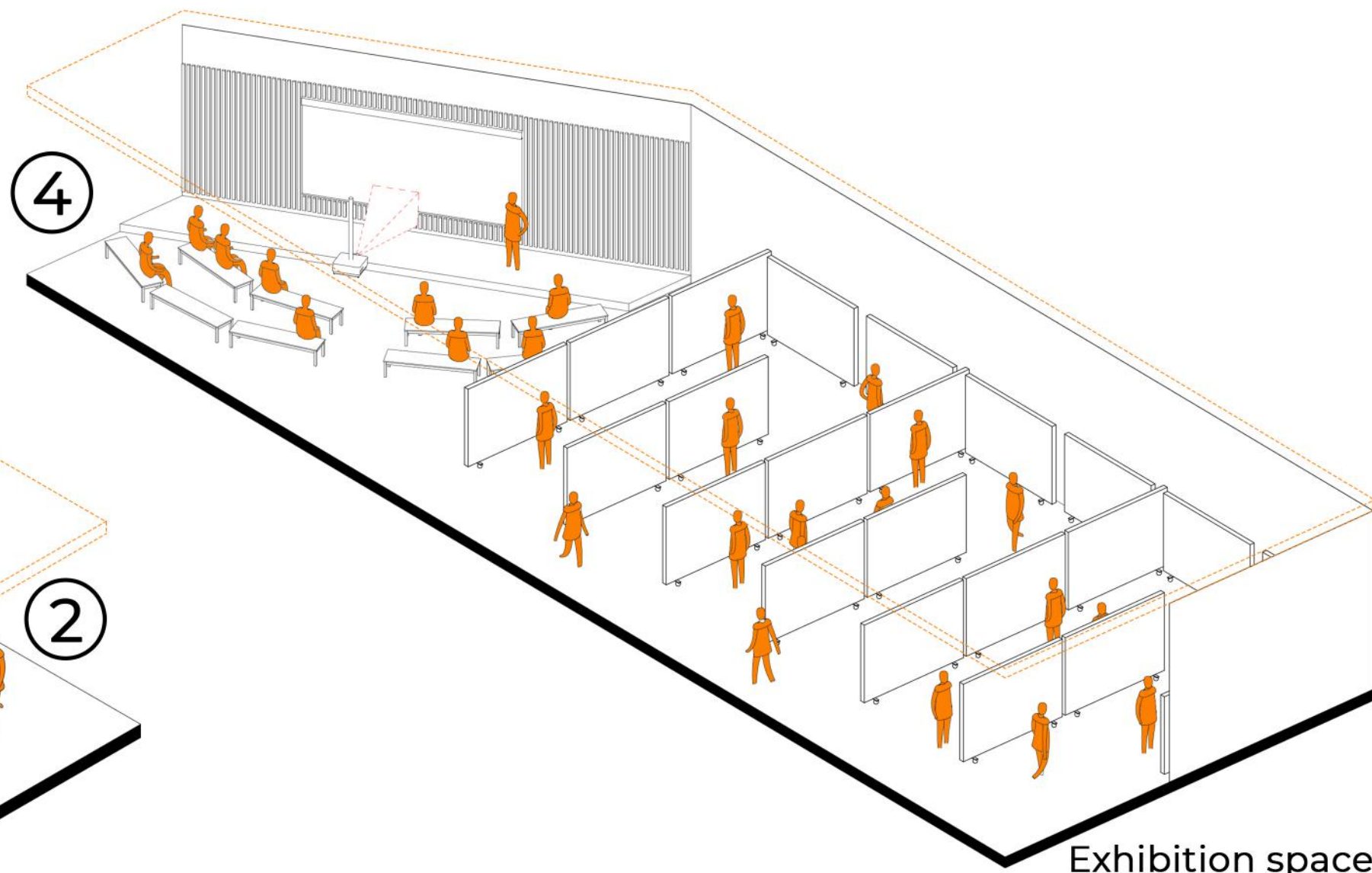
BUILDING A

3D EXPLODED AXO

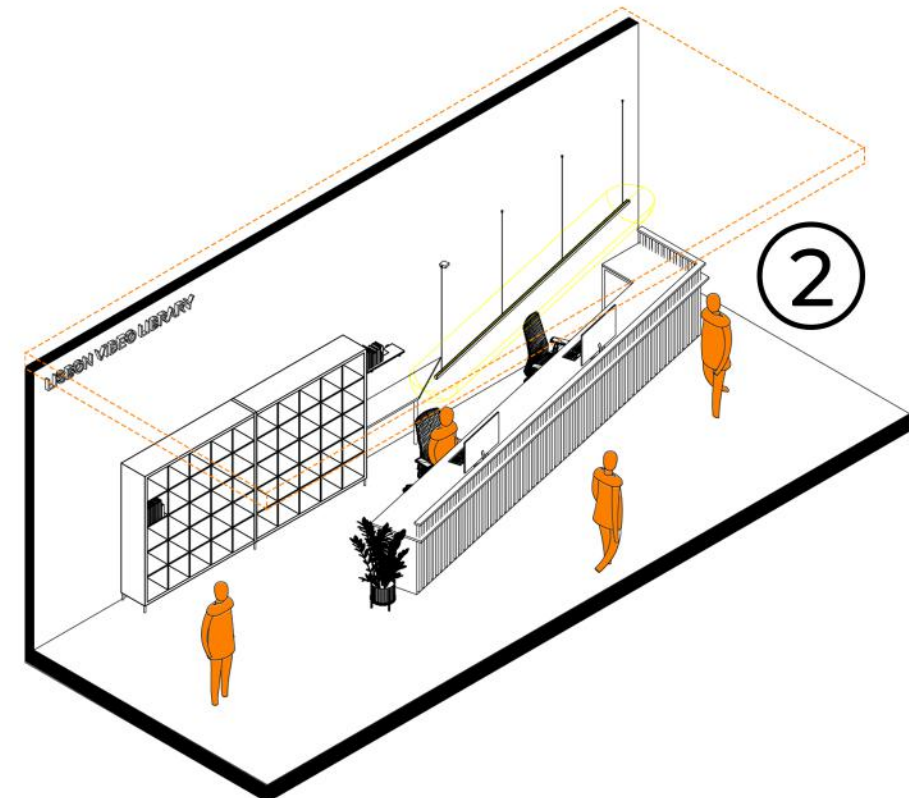


Cafeteria space

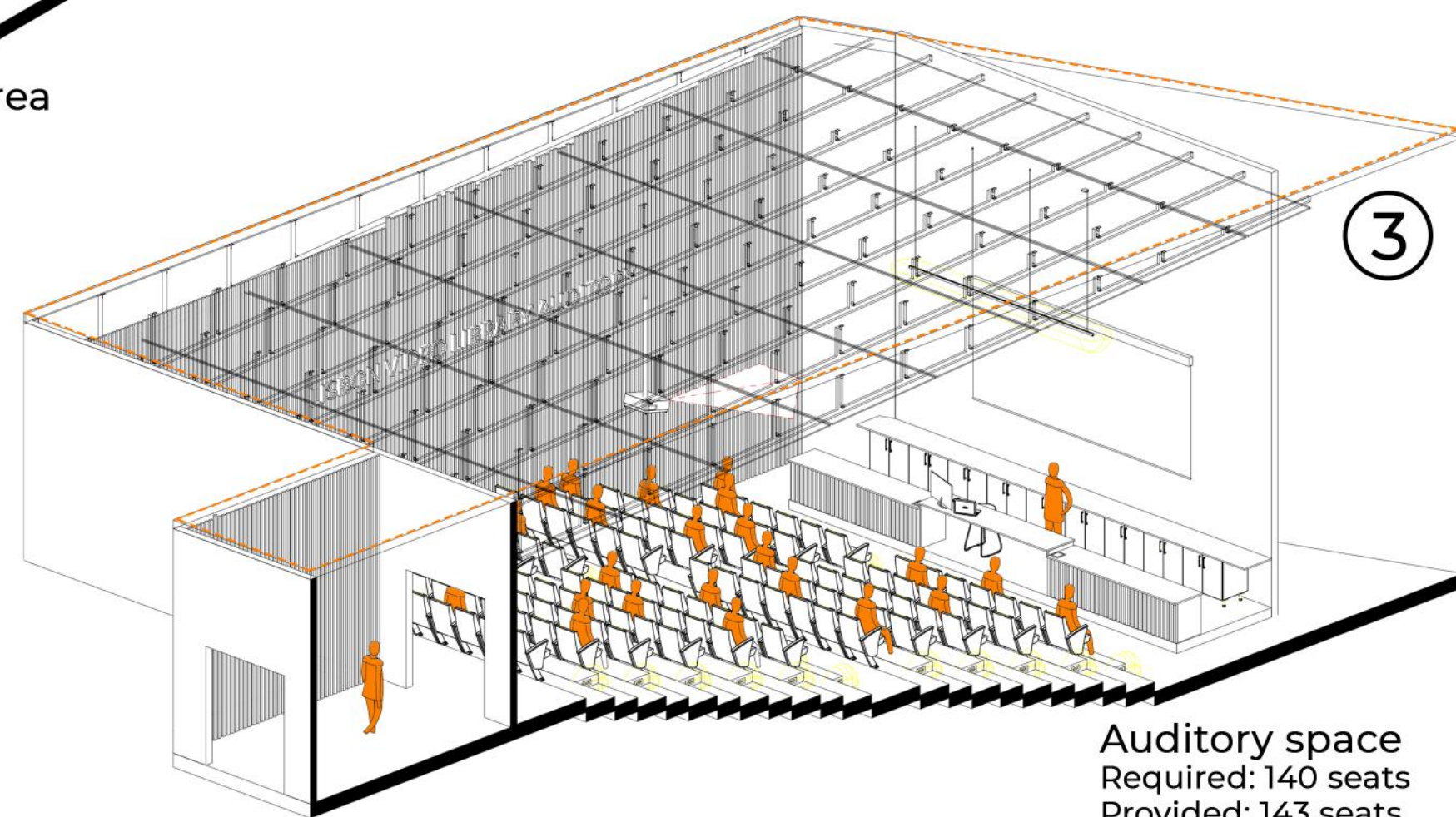
Adaptive reuse was used to introduce the new Lisbon video library. By having a hierarchical layout we introduce a space that will be able to accommodate all people.



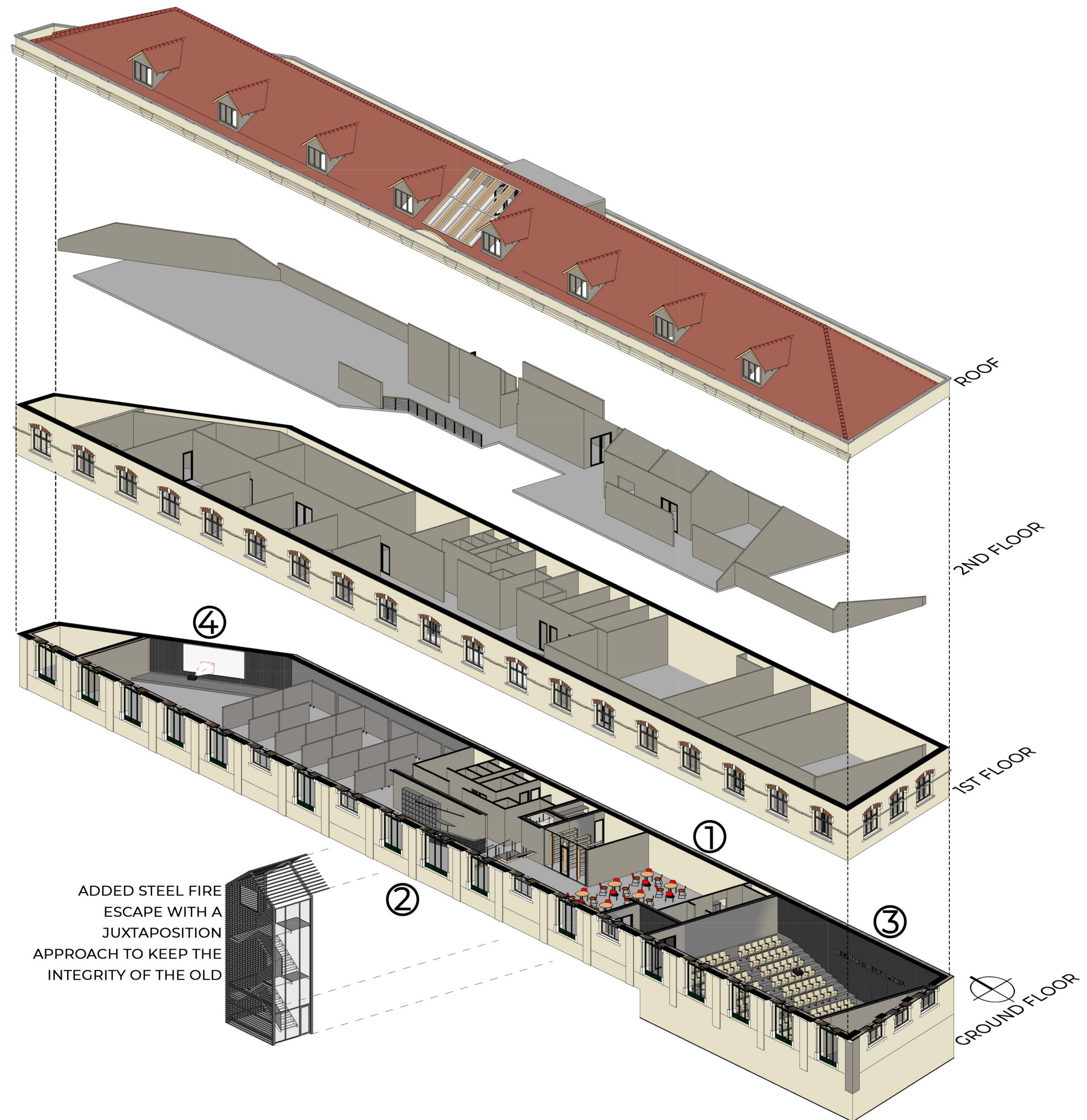
Exhibition space



Reception area



Auditory space
Required: 140 seats
Provided: 143 seats



ADDED STEEL FIRE ESCAPE WITH A JUXTAPOSITION APPROACH TO KEEP THE INTEGRITY OF THE OLD

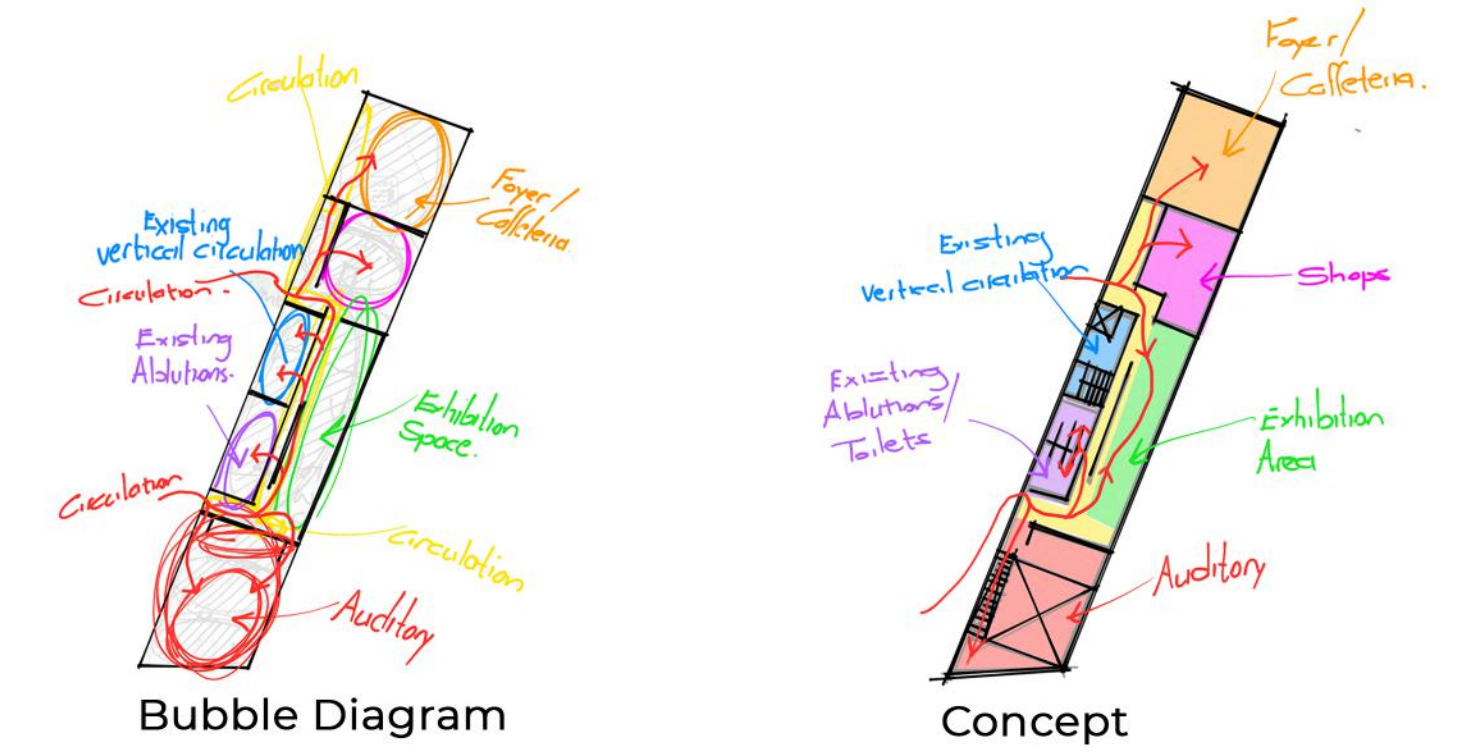
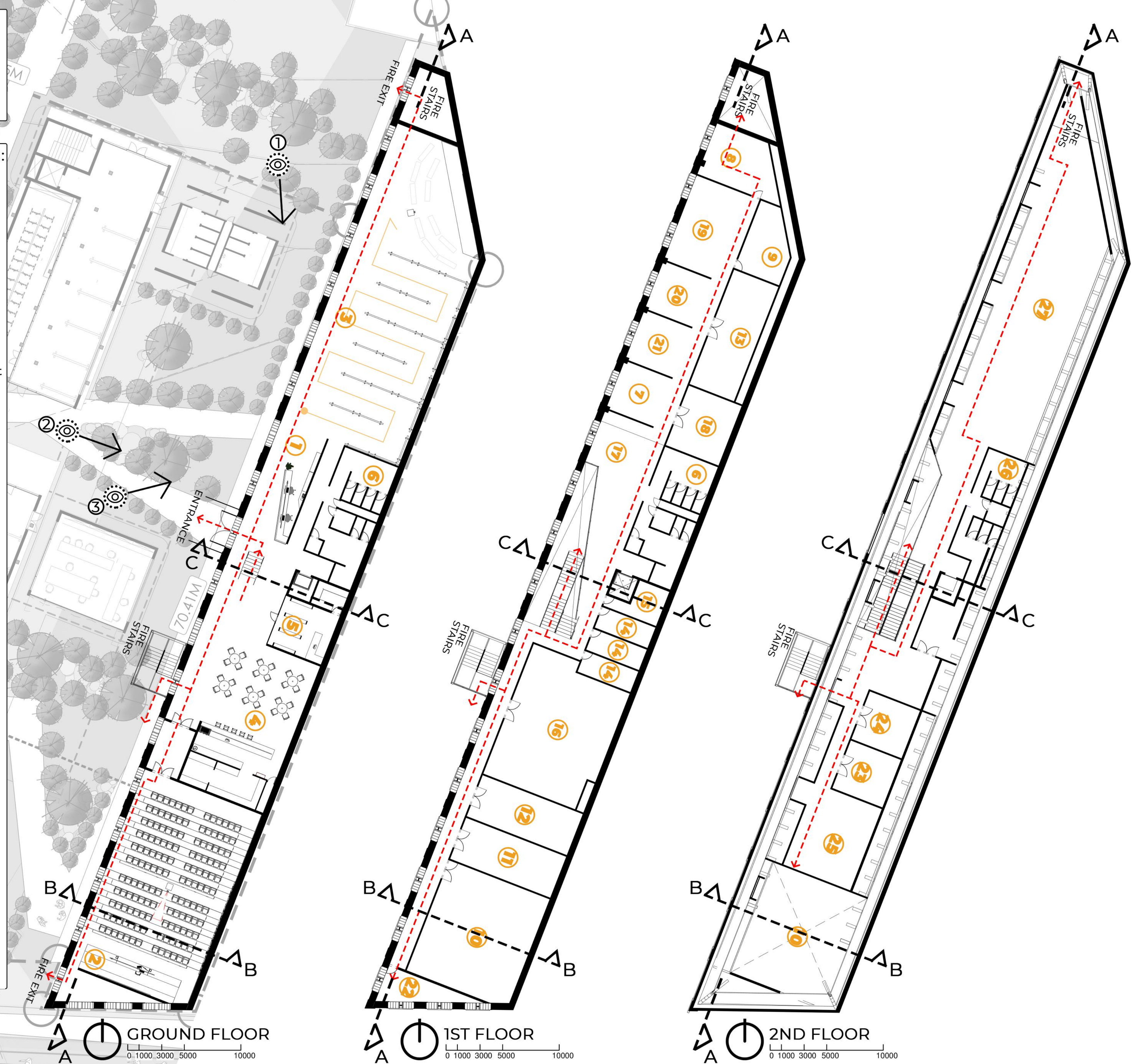


BUILDING A FLOORPLANS

- FIRE ESCAPE ROUTES
- VIEW POINT

ROOM ALLOCATIONS:

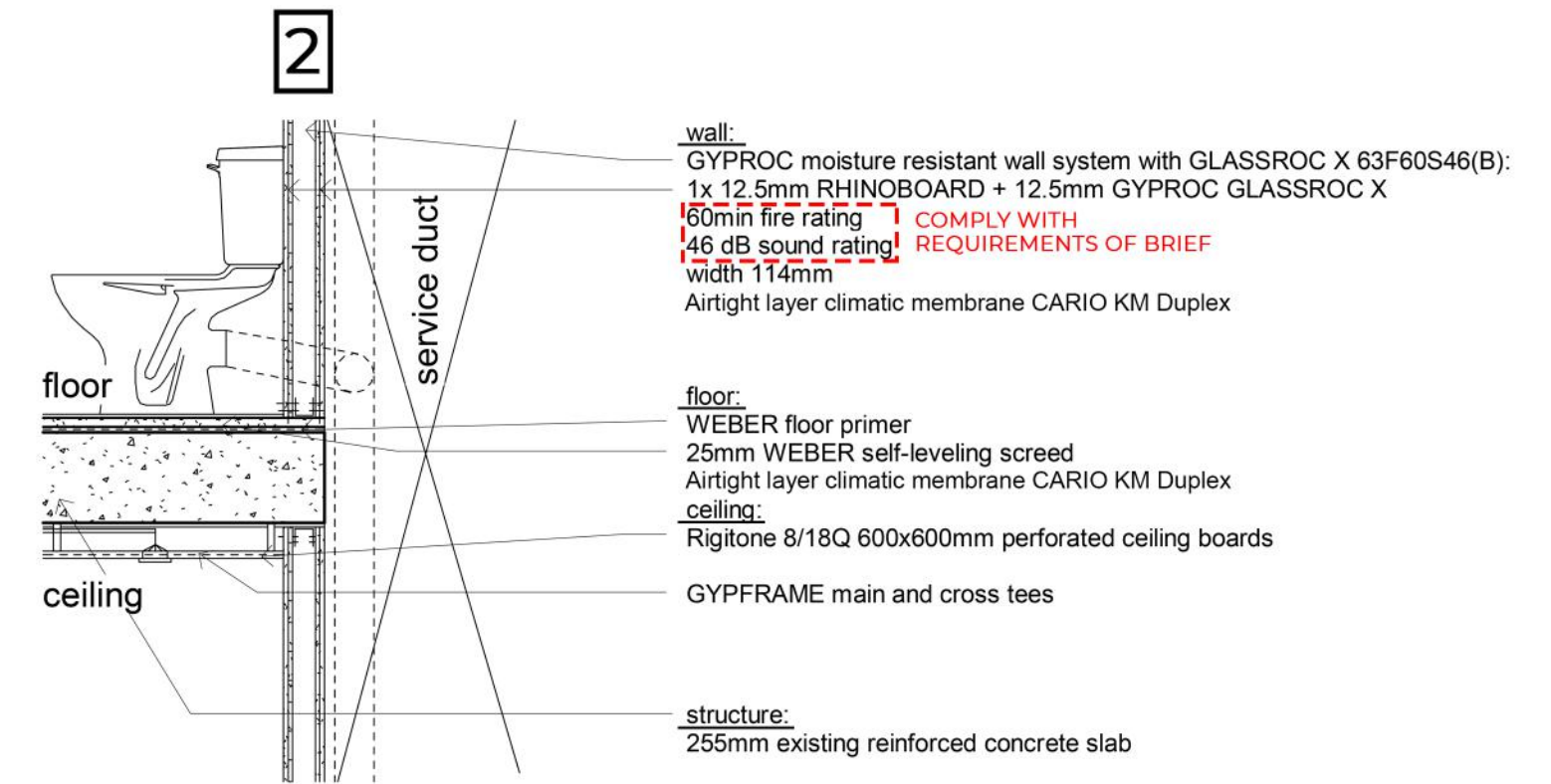
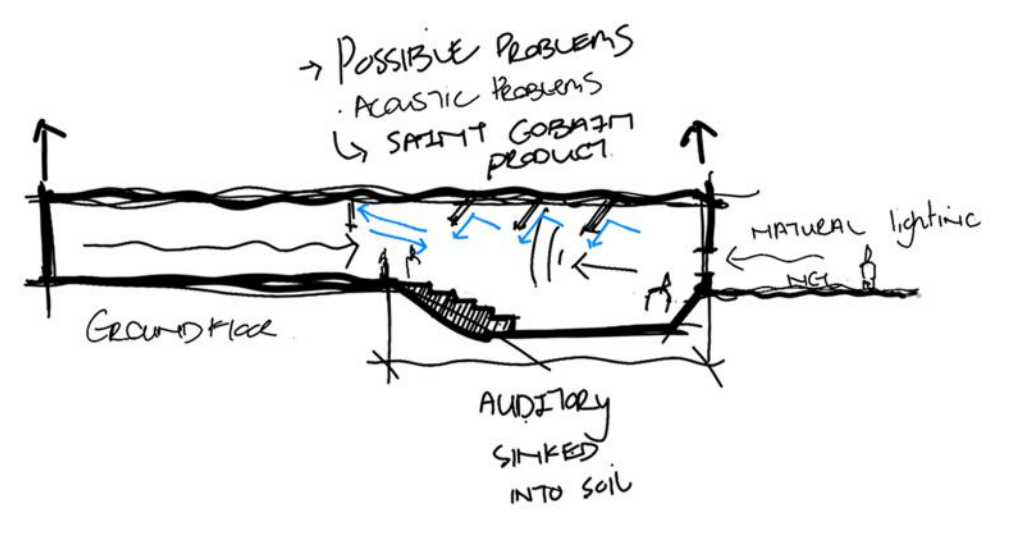
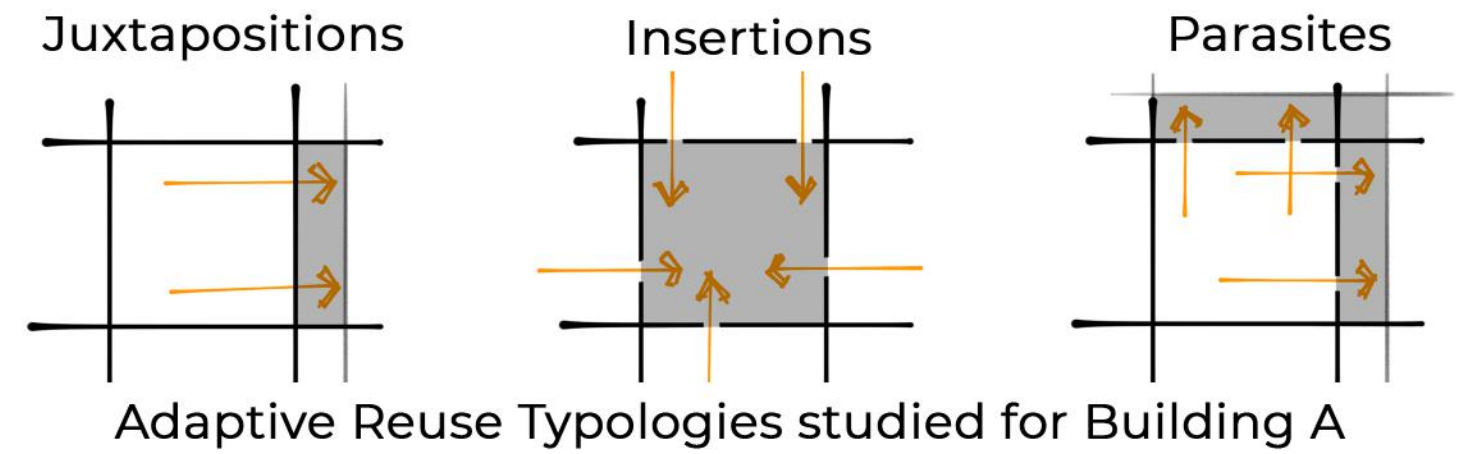
- 1** Reception
- 2** Auditory
- 3** Exhibition space
- 4** Cafeteria/ Foyer
- 5** Shop
- 6** Public bathrooms
- 7** Secretary and administrative support
- 8** Video editing room
- 9** Sound Studio
- 10** Cyclorama Studio
- 11** Film and Video discription room
- 12** Archive room
- 13** Video digitalization room
- 14** Individual visioning room
- 15** Technical support
- 16** Collective visioning room
- 17** Reading space
- 18** Filming equipment storage
- 19** Executive project production room
- 20** Co- ordinator room with meeting table
- 21** Meeting room
- 22** Network servers and backstage room
- 23** Co- ordinator room with meeting table
- 24** Meetings Room
- 25** Working room
- 26** Workers Bathroom
- 27** Workers eating pantry area



BUILDING A

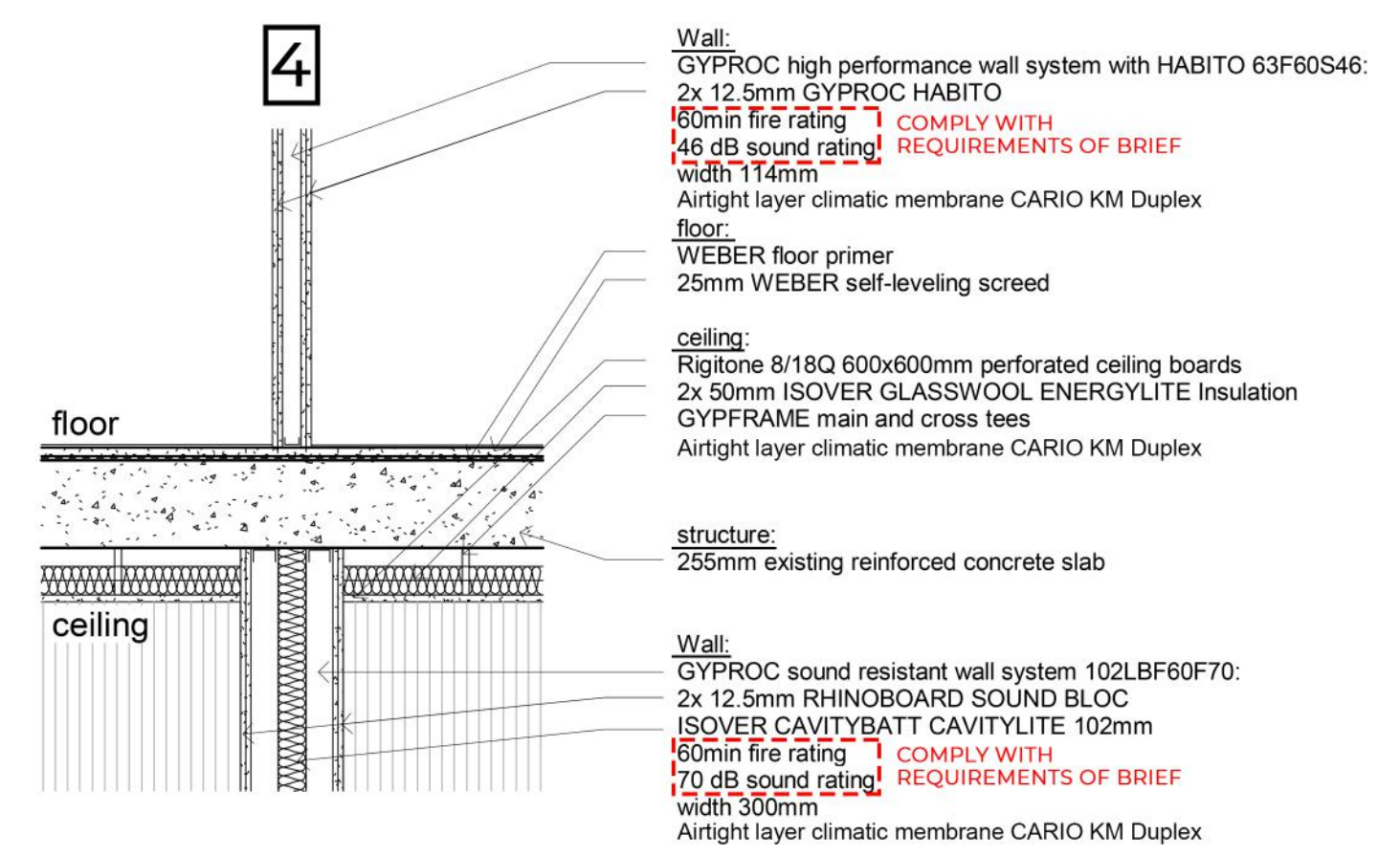
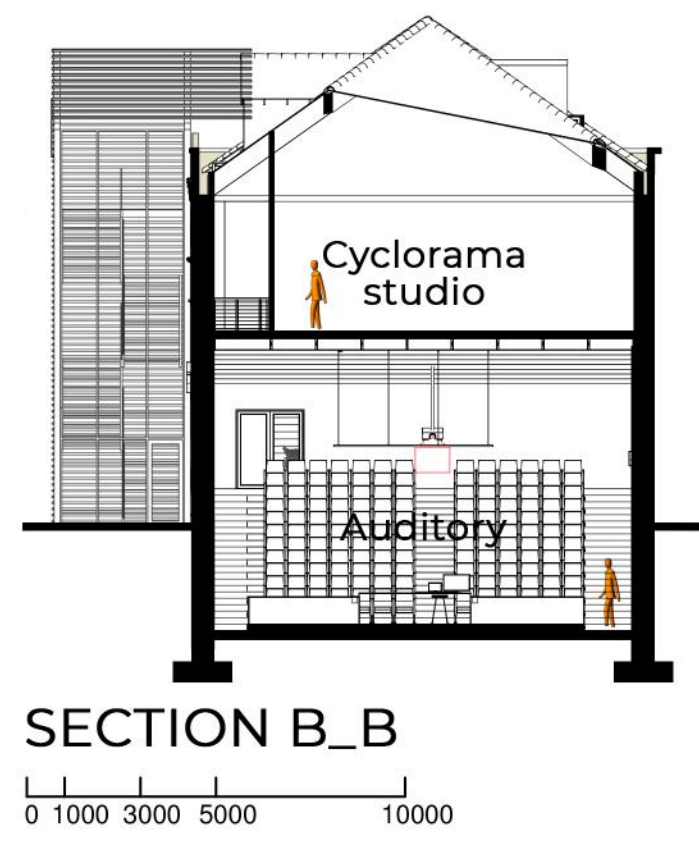
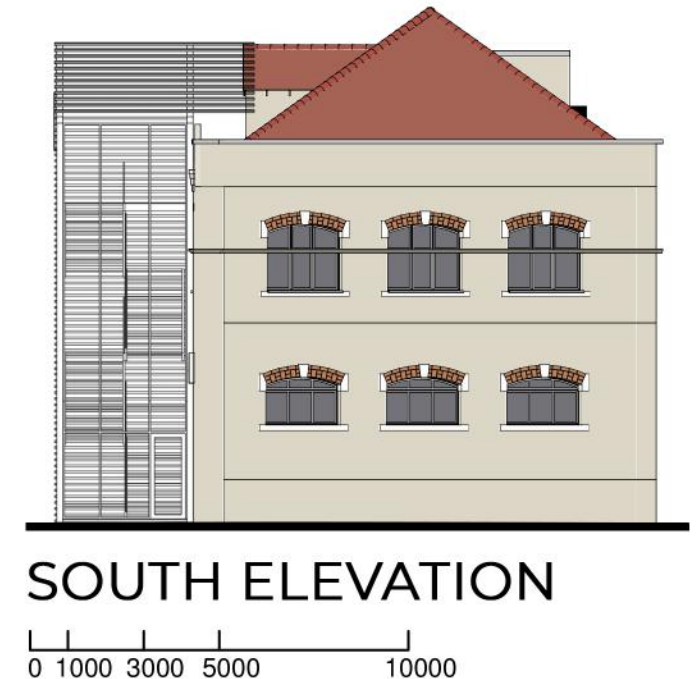
ELEVATIONS/ SECTIONS/ PRODUCTS

DIFFERENT WALL SYSTEMS	
1	EXTERIOR WALL SYSTEM
2	BATHROOM WALL SYSTEM
3	INTERIOR WALL SYSTEM WITHIN SPACES
4	INTERIOR WALL SYSTEM BETWEEN SPACE

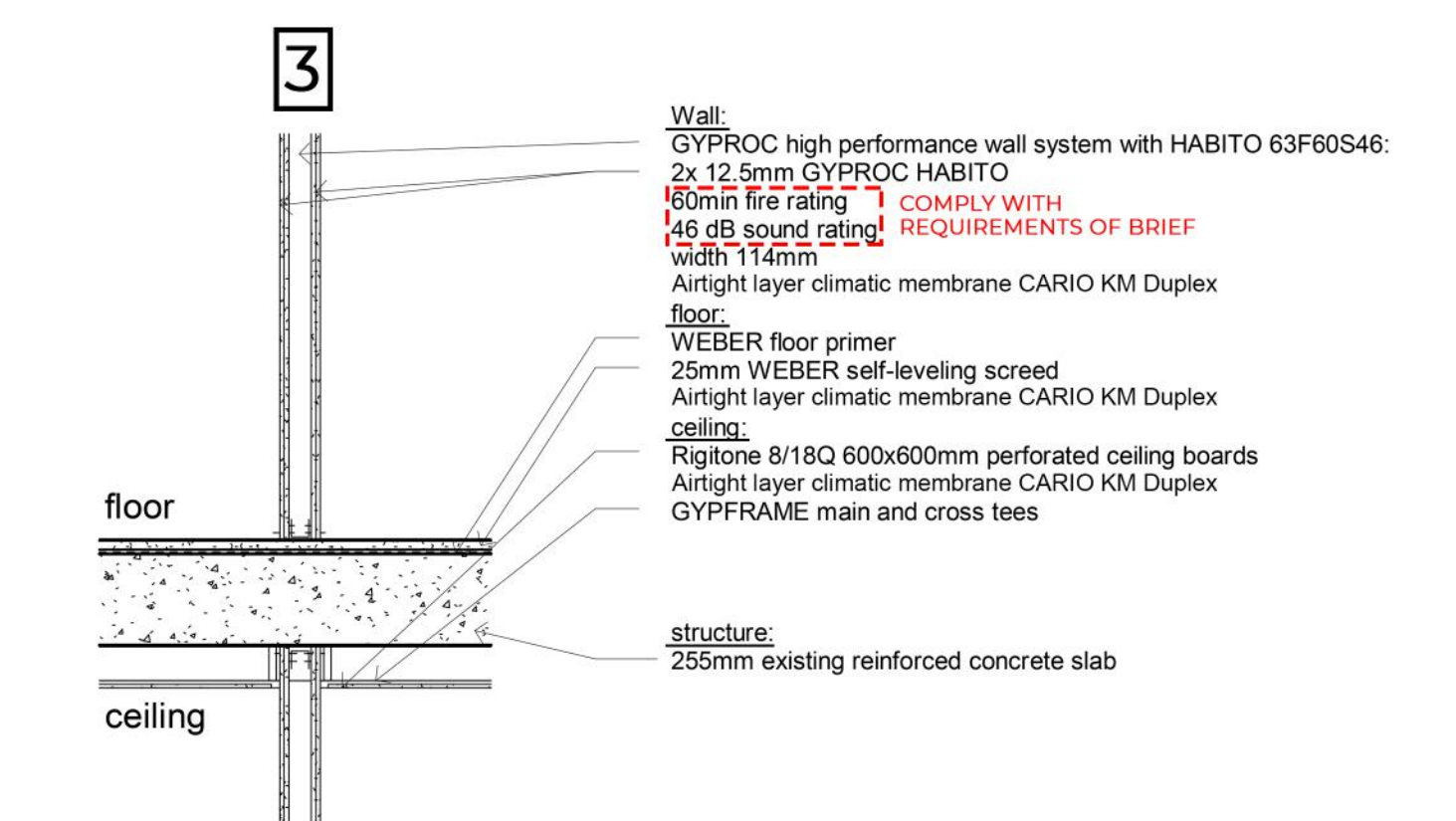
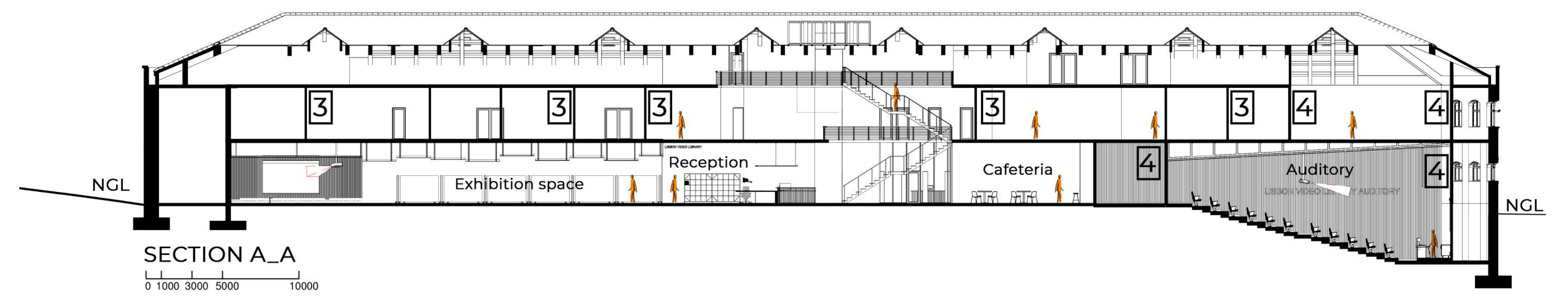


wall within bathroom detail
scale 1:20

Building A, which will soon house the Lisbon Video Library, will be treated as an adaptive reuse project in order to preserve the structure's integrity and maintain its current aesthetic, which will subsequently be contrasted with Building B's addition's aesthetic.



sound resistant wall detail
scale 1:20



interior wall detail
scale 1:20

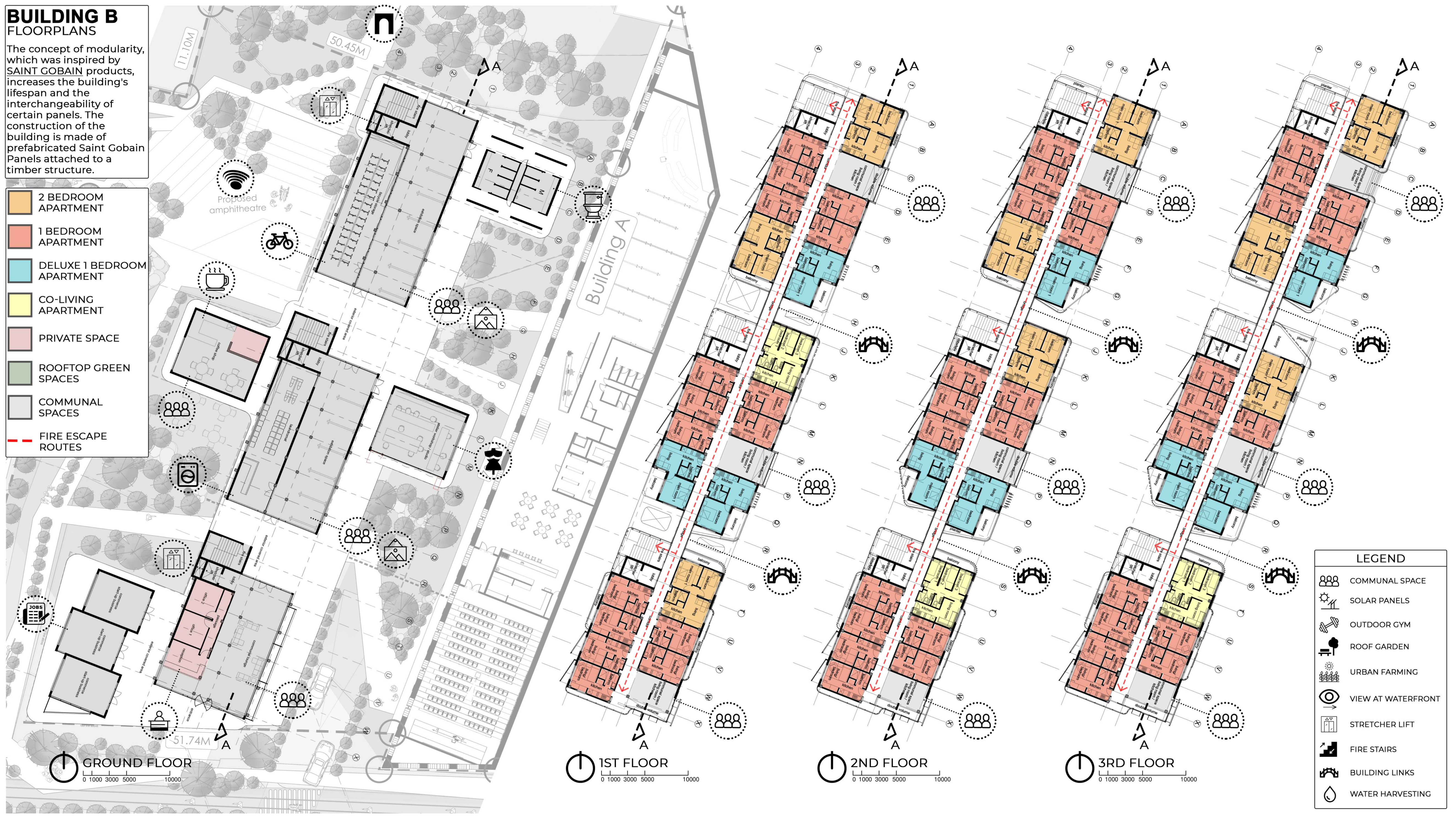
All Products used in details above

weber SAINT-GOBAIN Ecophon SAINT-GOBAIN PAM SAINT-GOBAIN RhinoLite RhinoBoard Isover SAINT-GOBAIN gyproc SAINT-GOBAIN glassolutions SAINT-GOBAIN RhinoBoard Cavitybatt Cavitylite EPD CERTIFIED

BUILDING B FLOORPLANS

The concept of modularity, which was inspired by SAINT GOBAIN products, increases the building's lifespan and the interchangeability of certain panels. The construction of the building is made of prefabricated Saint Gobain Panels attached to a timber structure.

- 2 BEDROOM APARTMENT
- 1 BEDROOM APARTMENT
- DELUXE 1 BEDROOM APARTMENT
- CO-LIVING APARTMENT
- PRIVATE SPACE
- ROOFTOP GREEN SPACES
- COMMUNAL SPACES
- FIRE ESCAPE ROUTES



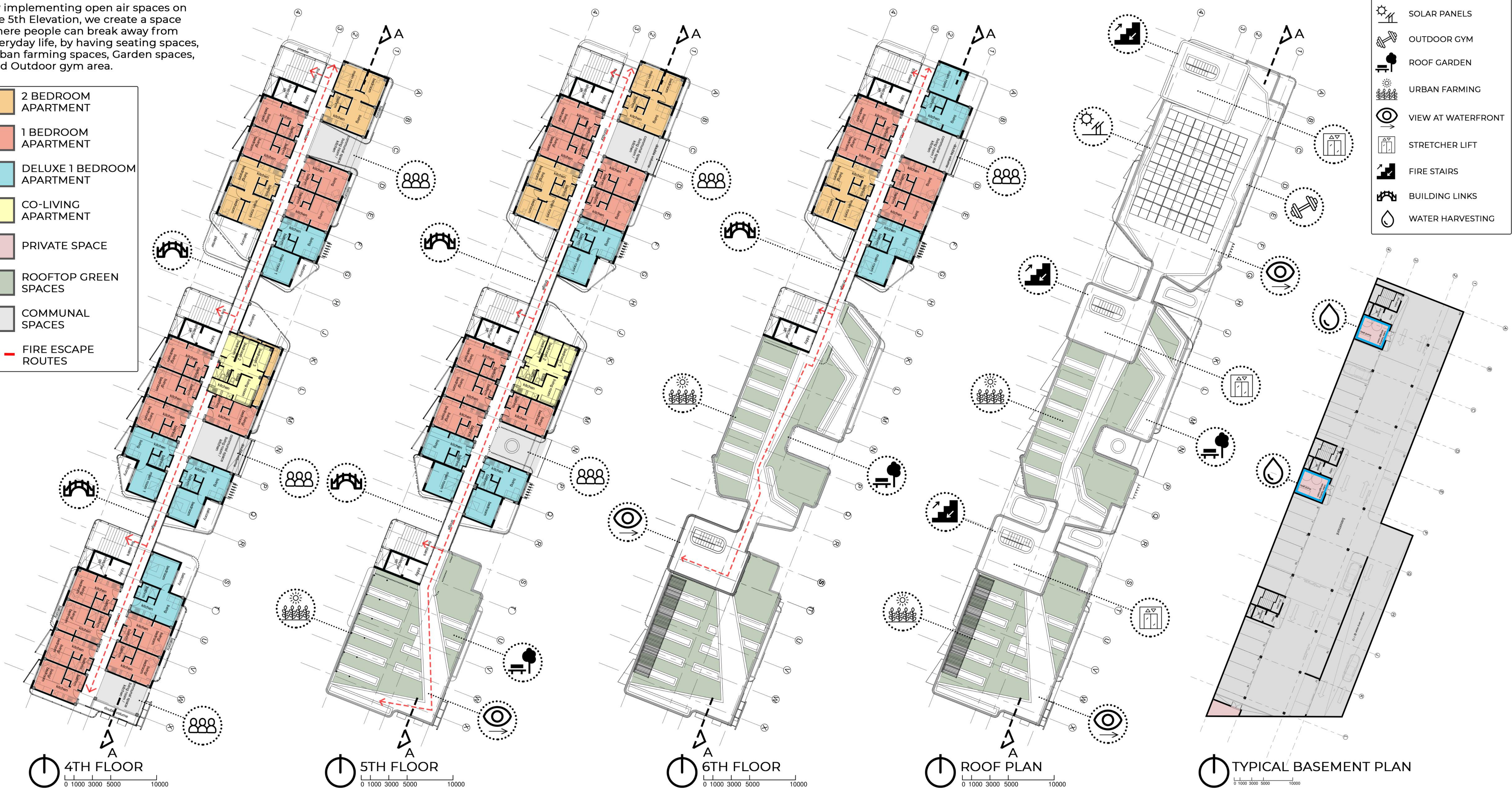
- ### LEGEND
-  COMMUNAL SPACE
 -  SOLAR PANELS
 -  OUTDOOR GYM
 -  ROOF GARDEN
 -  URBAN FARMING
 -  VIEW AT WATERFRONT
 -  STRETCHER LIFT
 -  FIRE STAIRS
 -  BUILDING LINKS
 -  WATER HARVESTING

BUILDING B FLOORPLANS

By implementing open air spaces on the 5th Elevation, we create a space where people can break away from everyday life, by having seating spaces, Urban farming spaces, Garden spaces, and Outdoor gym area.

	2 BEDROOM APARTMENT
	1 BEDROOM APARTMENT
	DELUXE 1 BEDROOM APARTMENT
	CO-LIVING APARTMENT
	PRIVATE SPACE
	ROOFTOP GREEN SPACES
	COMMUNAL SPACES
	FIRE ESCAPE ROUTES

LEGEND	
	COMMUNAL SPACE
	SOLAR PANELS
	OUTDOOR GYM
	ROOF GARDEN
	URBAN FARMING
	VIEW AT WATERFRONT
	STRETCHER LIFT
	FIRE STAIRS
	BUILDING LINKS
	WATER HARVESTING



4TH FLOOR
0 1000 3000 5000 10000

5TH FLOOR
0 1000 3000 5000 10000

6TH FLOOR
0 1000 3000 5000 10000

ROOF PLAN
0 1000 3000 5000 10000

TYPICAL BASEMENT PLAN
0 1000 3000 5000 10000



VIDEO LIBRARY PROJECTS FOR VIEWING FROM AREA C

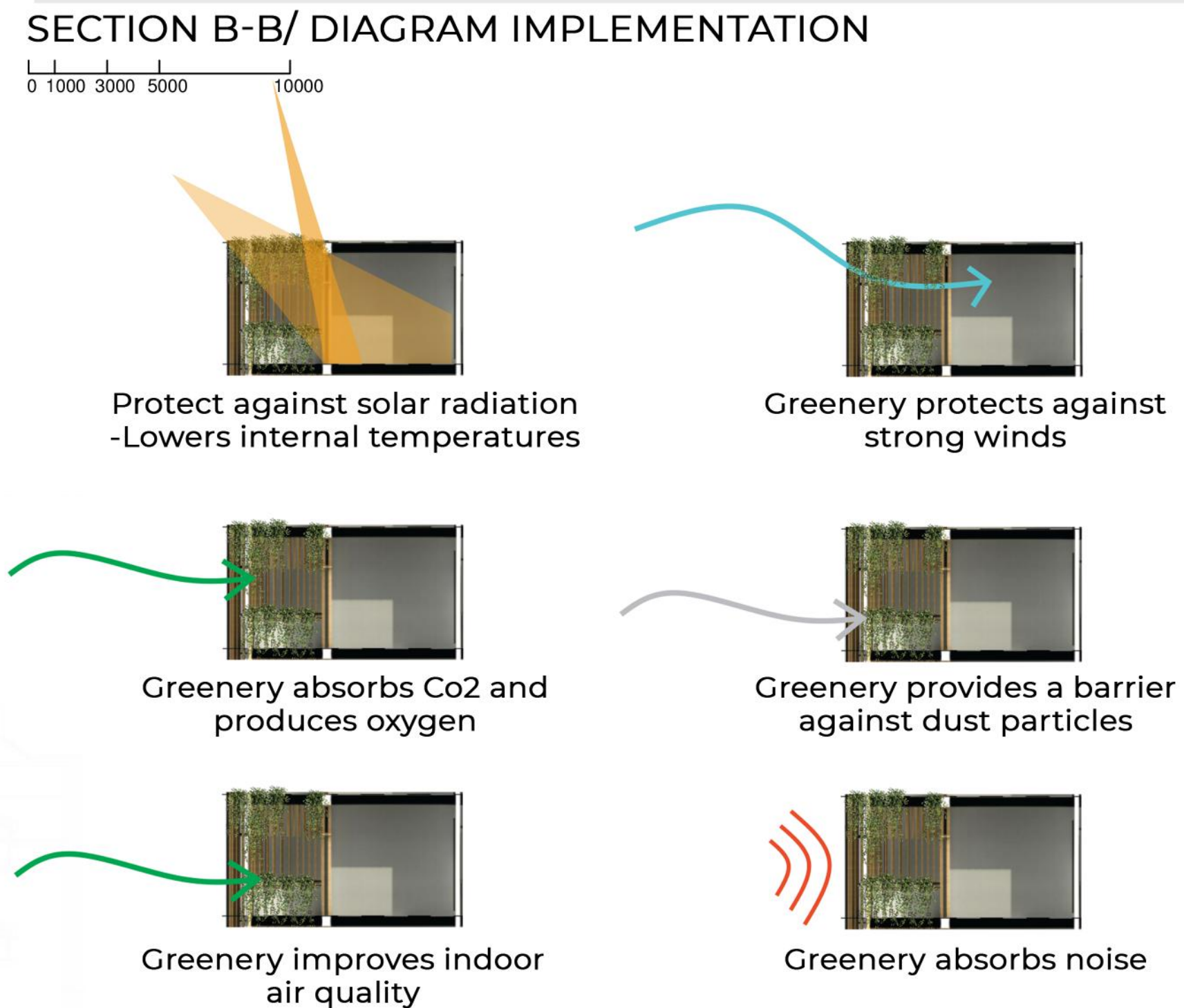
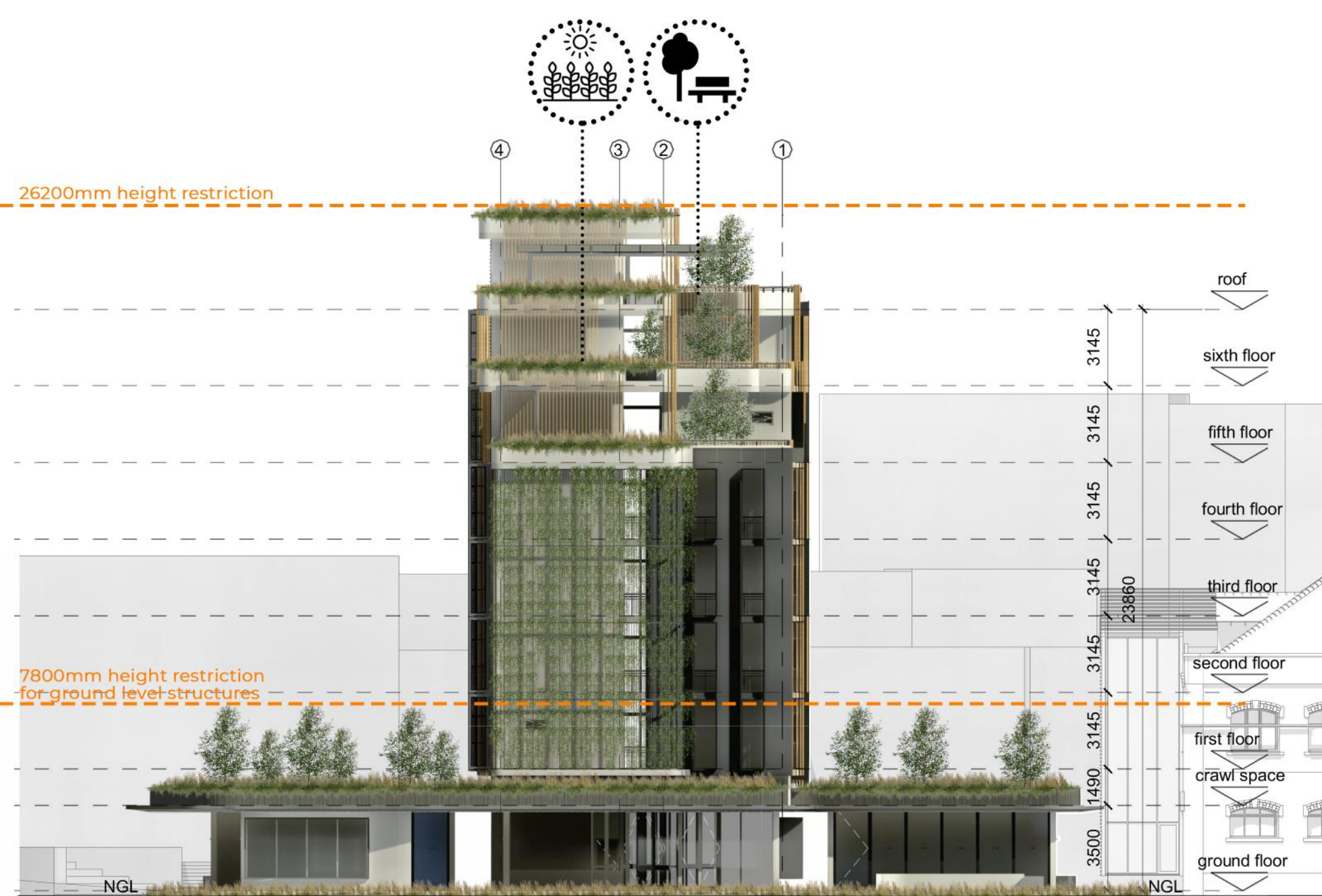
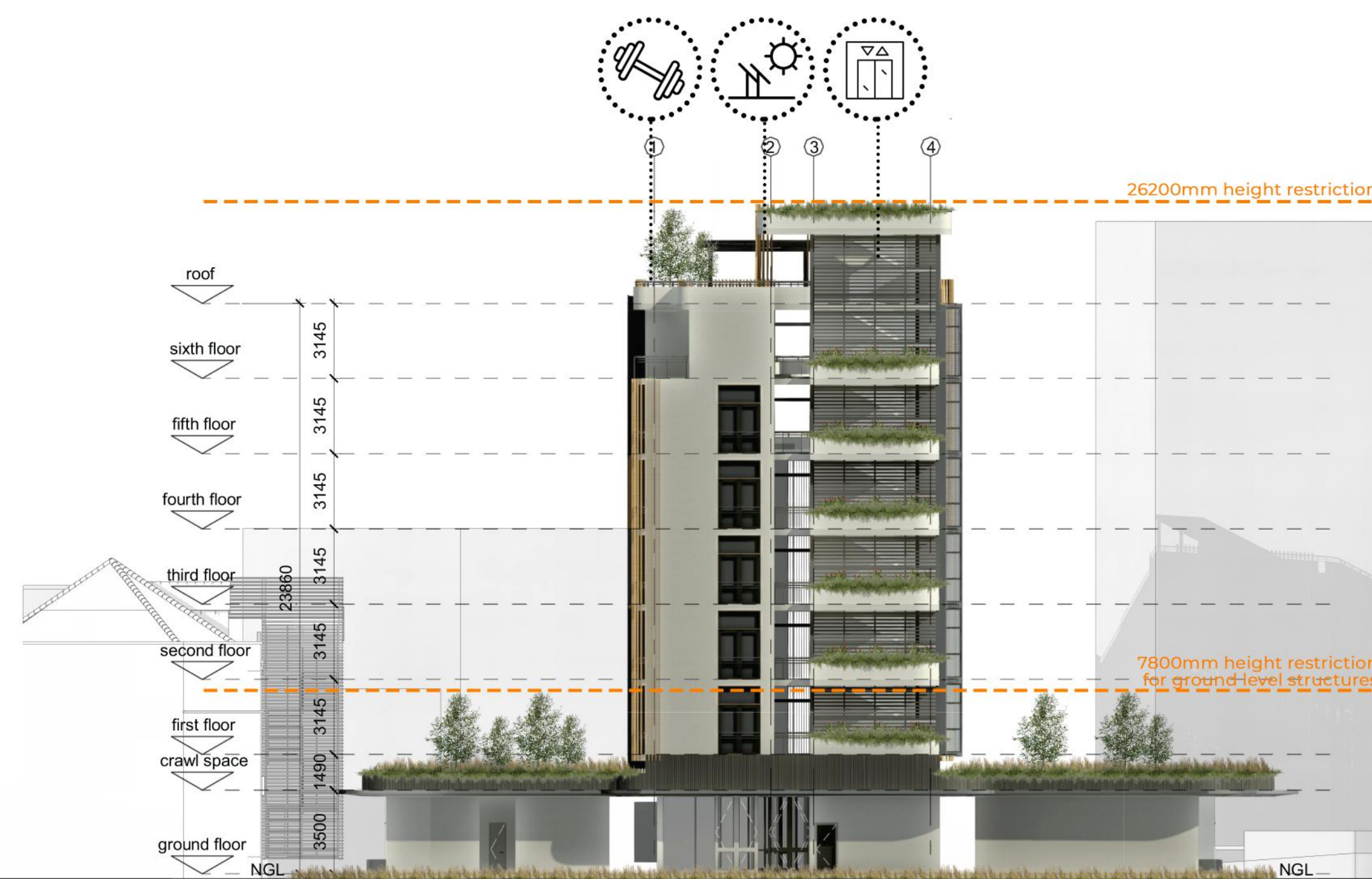
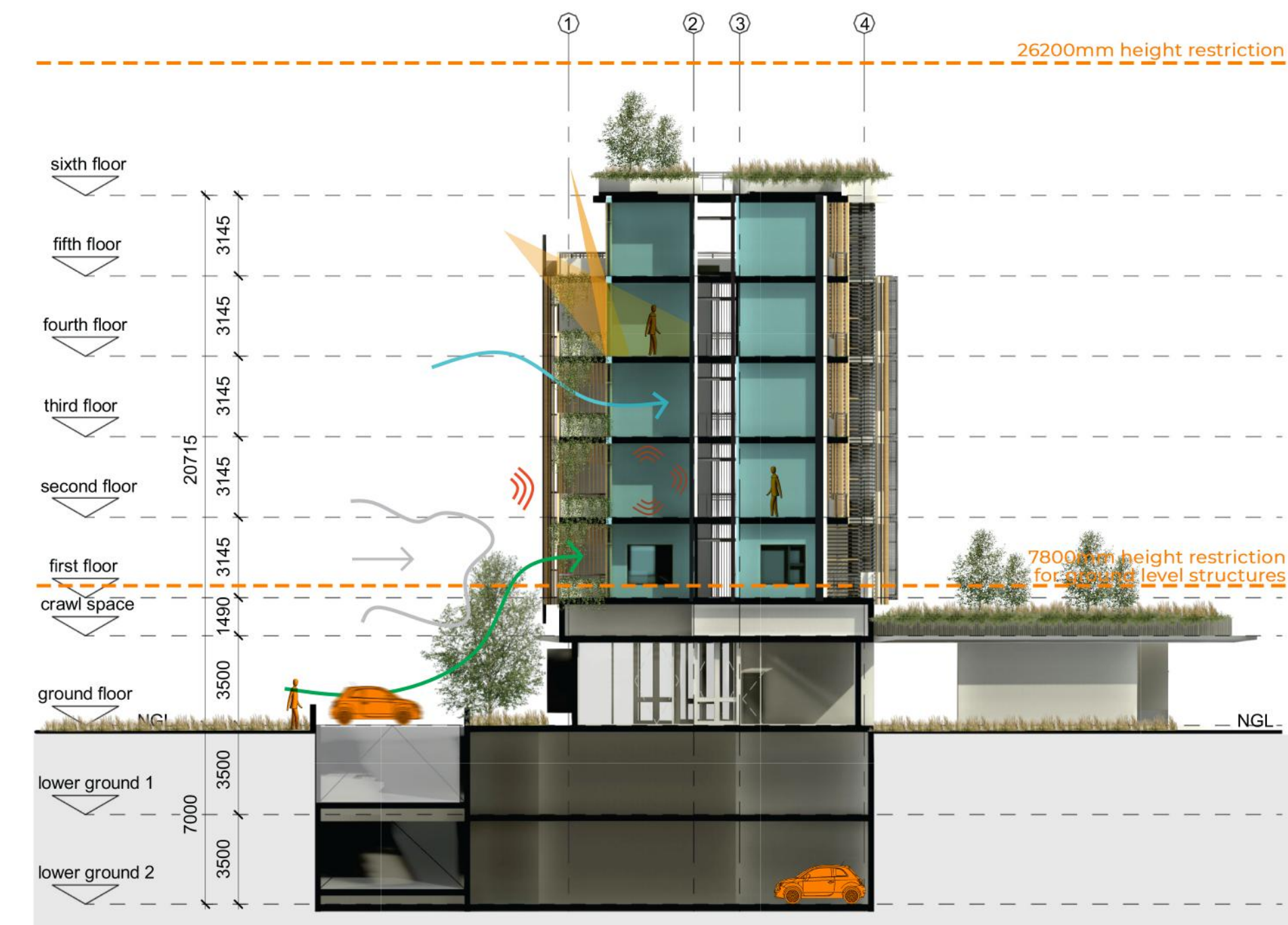
BUILDING B ELEVATIONS/ SECTION

Each unit boasts a living second skin façade which aids in protecting against solar radiation, regulates indoor air quality, lowers indoor temperatures, and absorbs noise.

LEGEND	
	COMMUNAL SPACE
	SOLAR PANELS
	OUTDOOR GYM
	ROOF GARDEN
	URBAN FARMING
	VIEW AT WATERFRONT
	STRETCHER LIFT
	FIRE STAIRS
	BUILDING LINKS
	WATER HARVESTING



- Facade treatment:**
1. Glazing: Double glazing CLIMALIT (EPD verified).
 2. Light coloured paint to minimise solar heat gain.
 3. Timber facade to lower solar heat gain and control daylighting.
 4. Vegetation on facades to improve indoor air quality, reduce solar heat gain and to protect against dust and wind.



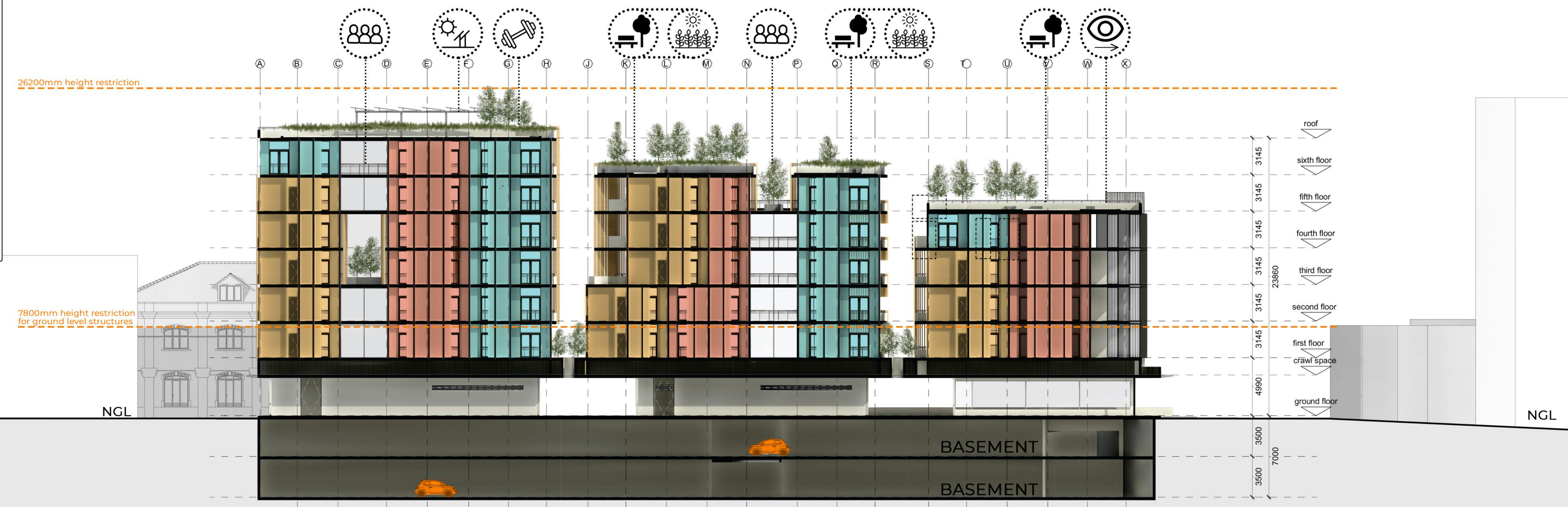
- Visual Acoustics:**
1. Avoiding glaze in all rooms with double glazing CLIMALIT.
 2. Light interiors with maximised daylighting.
 3. Vegetation on facades to promote positive emotion.

BUILDING B

ELEVATION/ SECTION

- 2 BEDROOM APARTMENT
- 1 BEDROOM APARTMENT
- DELUXE 1 BEDROOM APARTMENT
- CO-LIVING APARTMENT
- PRIVATE SPACE
- ROOFTOP GREEN SPACES
- COMMUNAL SPACES
- FIRE ESCAPE ROUTES

- ### LEGEND
-  COMMUNAL SPACE
 -  SOLAR PANELS
 -  OUTDOOR GYM
 -  ROOF GARDEN
 -  URBAN FARMING
 -  VIEW AT WATERFRONT
 -  STRETCHER LIFT
 -  FIRE STAIRS
 -  BUILDING LINKS
 -  WATER HARVESTING



26200mm height restriction

7800mm height restriction for ground level structures

roof
3145
sixth floor
3145
fifth floor
3145
fourth floor
3145
third floor
23860
3145
second floor
3145
first floor
1490
crawl space
3500
ground floor

26200mm height restriction

7800mm height restriction for ground level structures

roof
3145
sixth floor
3145
fifth floor
3145
fourth floor
3145
third floor
23860
3145
second floor
3145
first floor
4990
crawl space
3500
ground floor

BASEMENT
BASEMENT

NGL

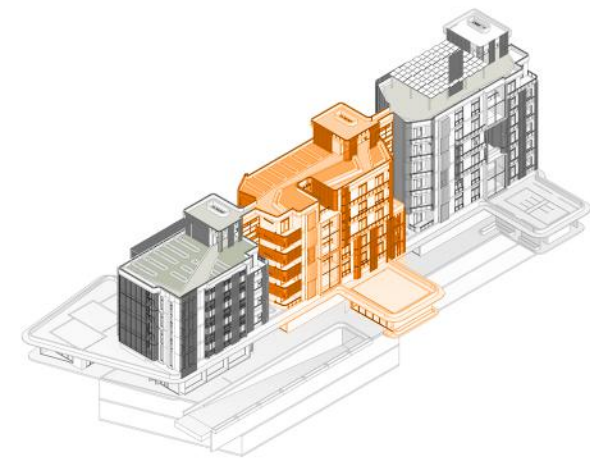
NGL

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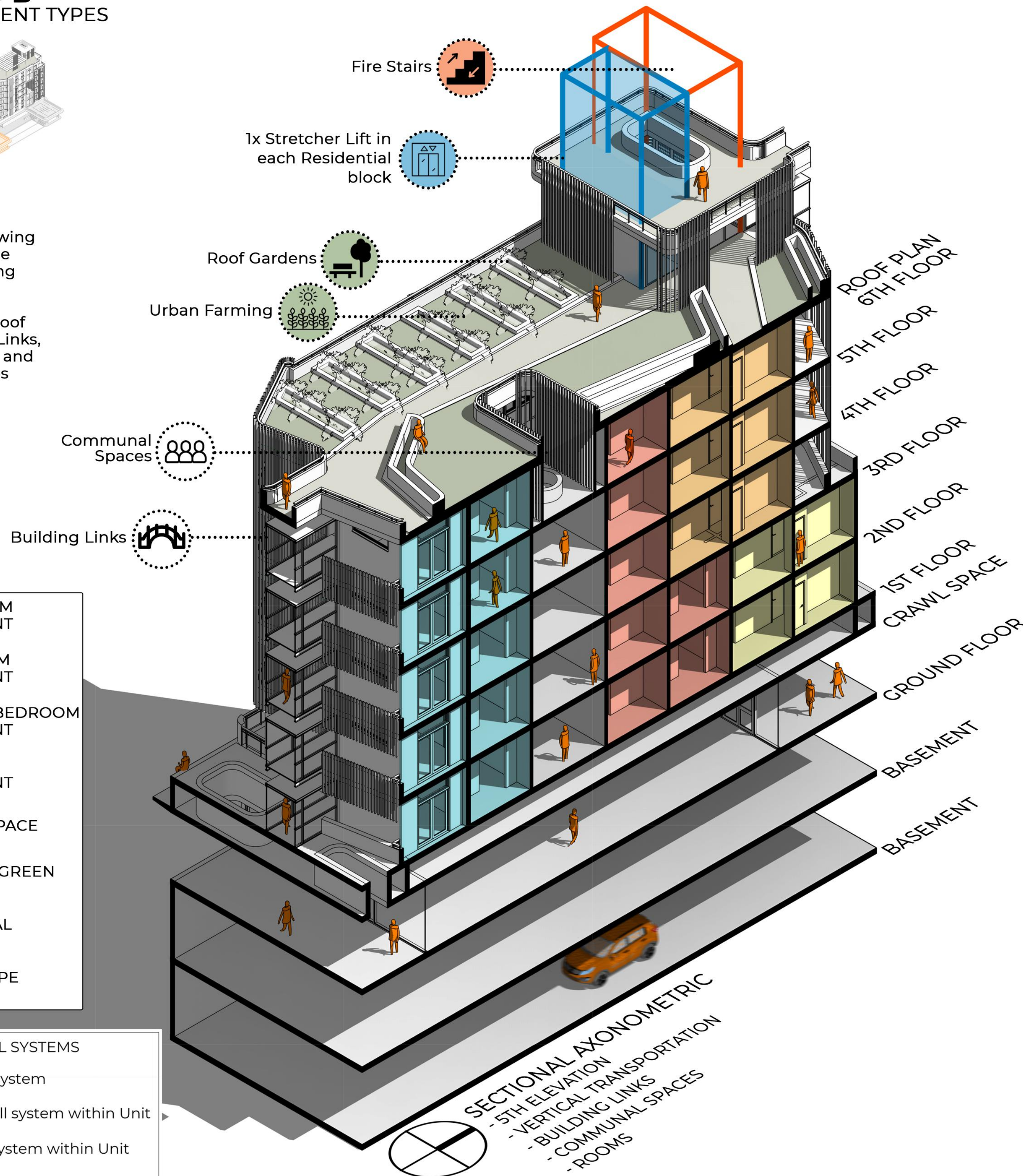
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BUILDING B

AXO/ APARTMENT TYPES

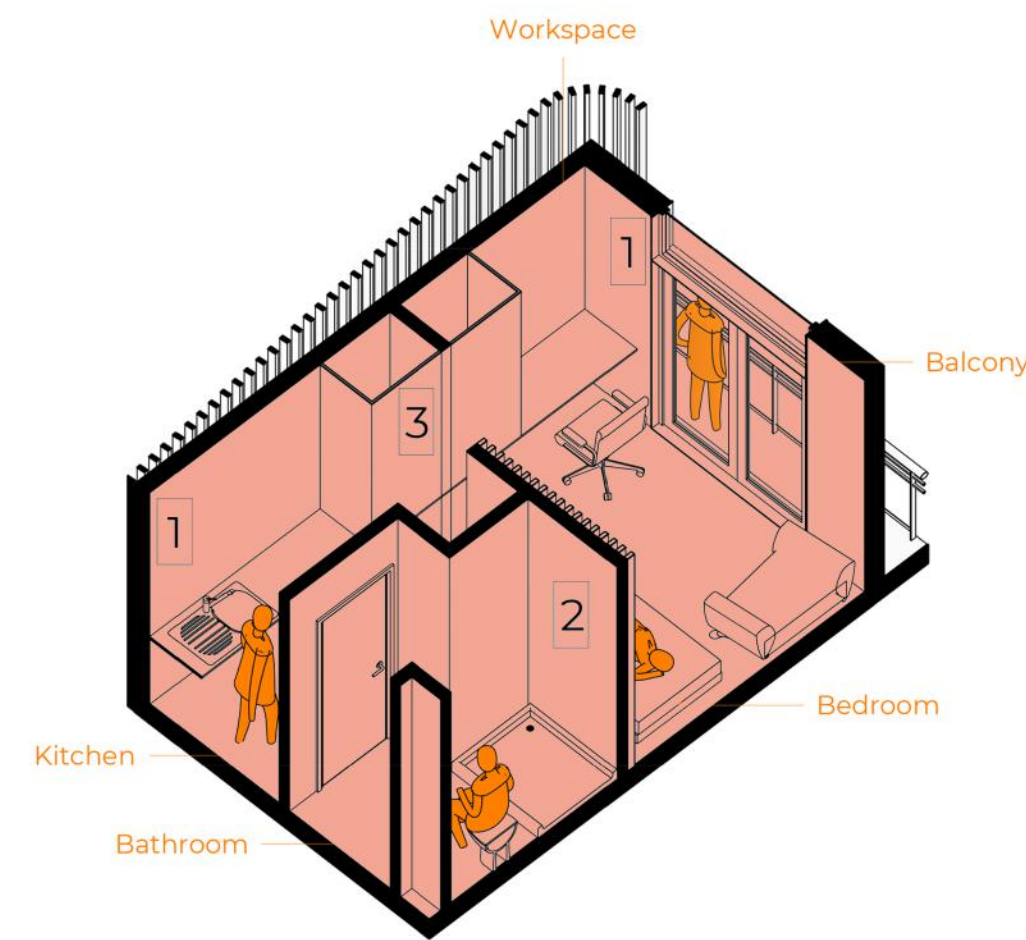


3D Sectional Axonometric showing the build up of the building by looking at the vertical transportation methods, Green roof spaces, Building Links, Apartment Types and Communal spaces

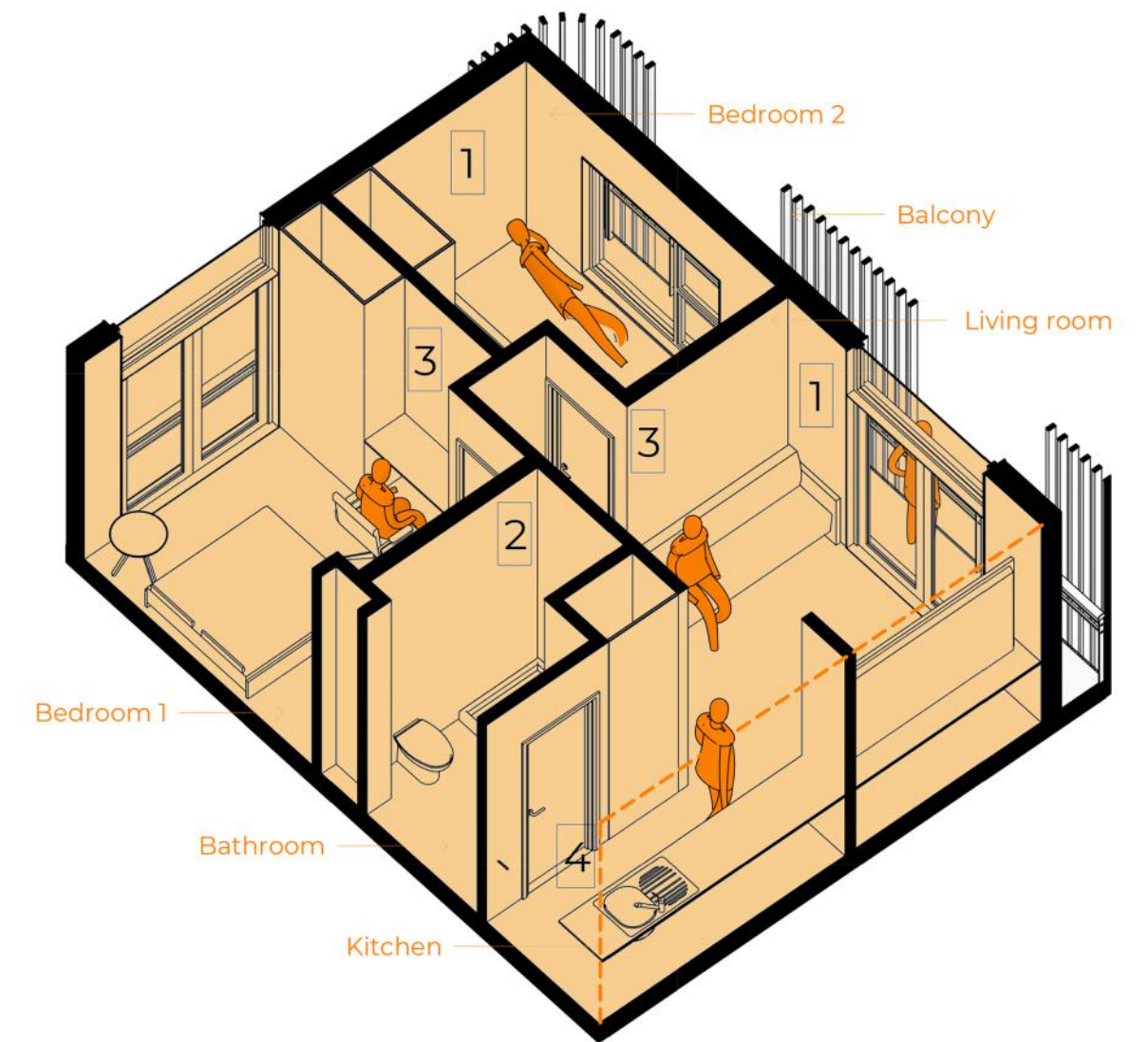


- 2 BEDROOM APARTMENT
- 1 BEDROOM APARTMENT
- DELUXE 1 BEDROOM APARTMENT
- CO-LIVING APARTMENT
- PRIVATE SPACE
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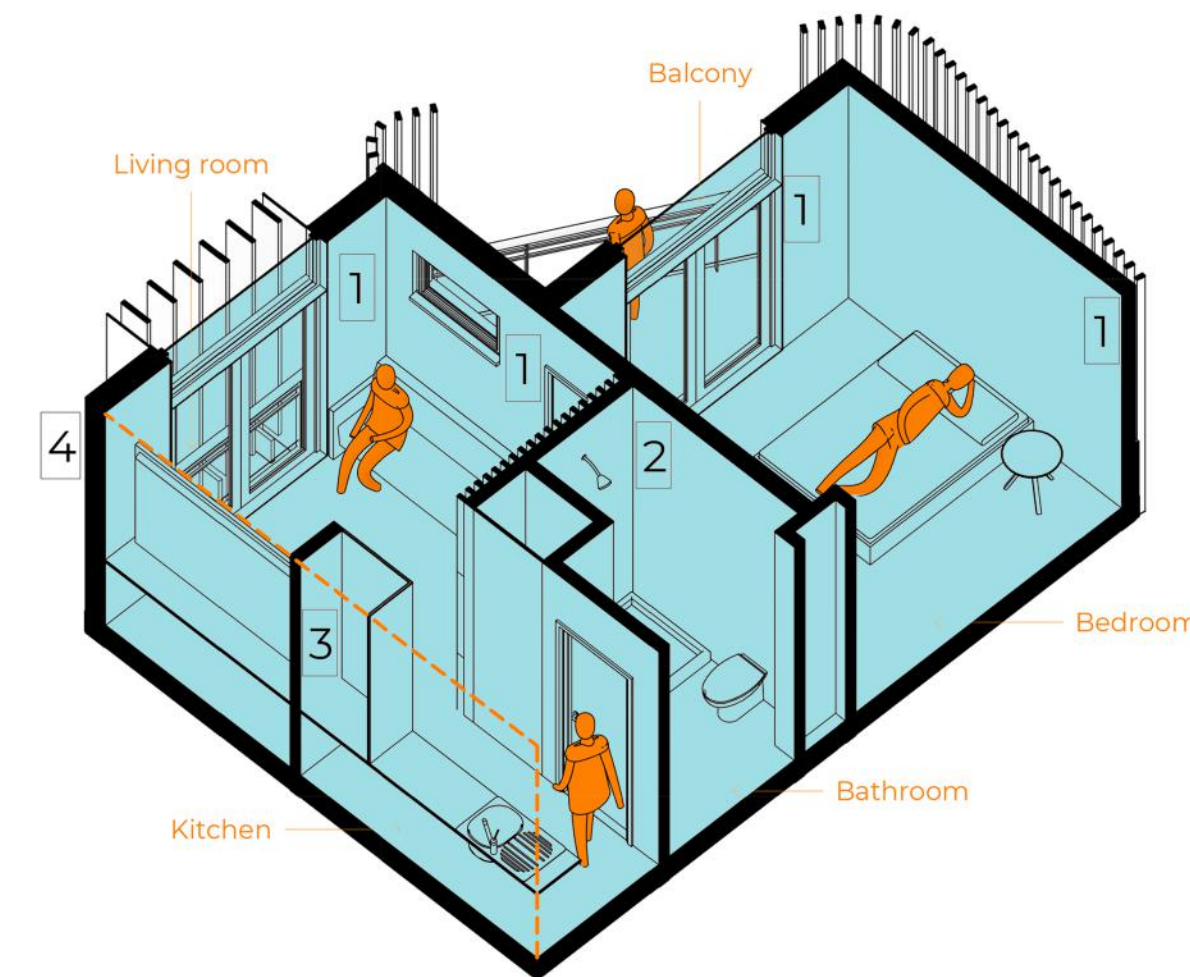
- DIFFERENT WALL SYSTEMS
- 1 Exterior Wall system
 - 2 Bathroom Wall system within Unit
 - 3 Interior Wall system within Unit
 - 4 Interior Wall system between Units



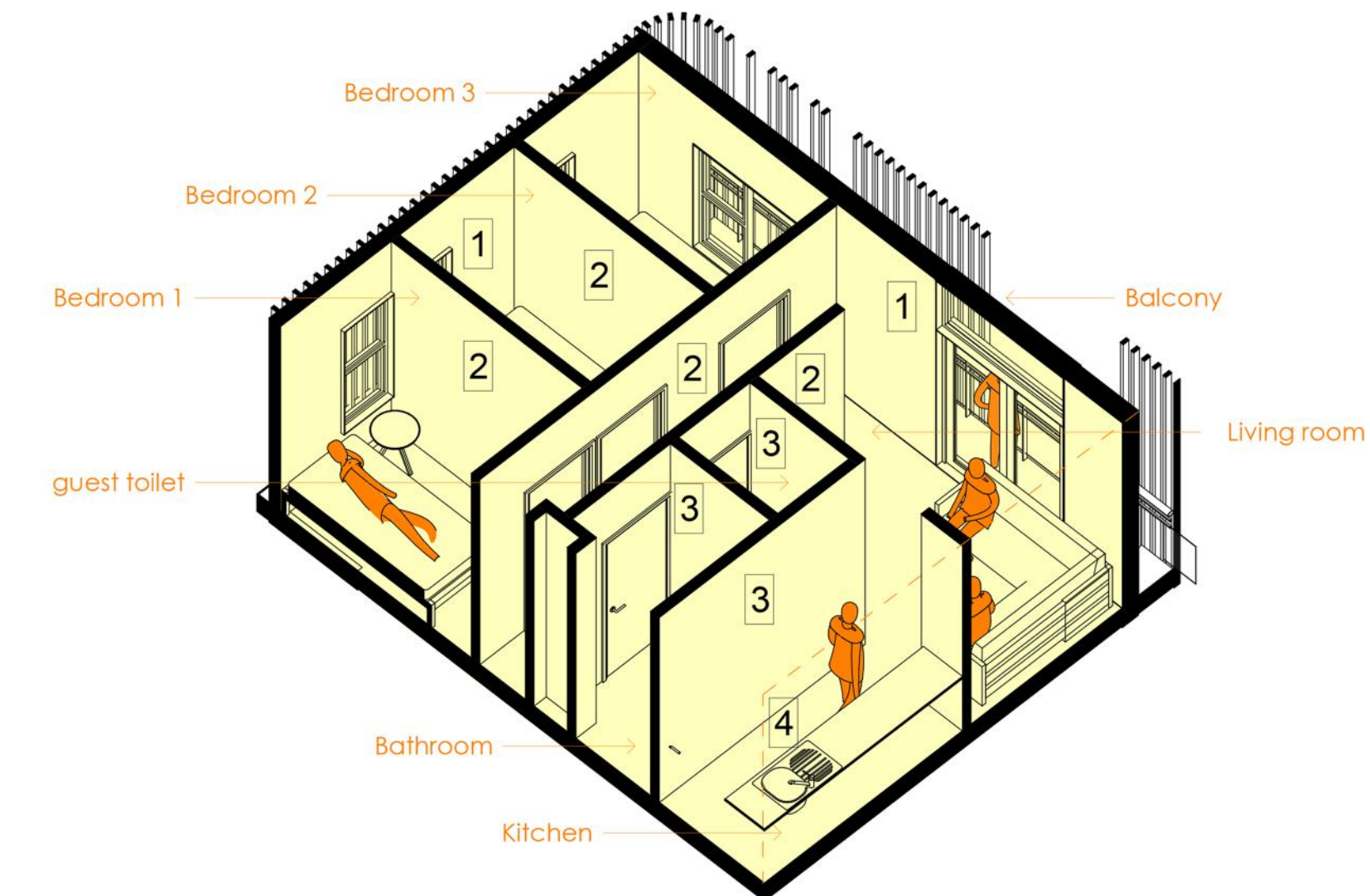
1 BEDROOM APARTMENT:
 -Small open plan unit with private bathroom, kitchen and combined bedroom and living area with a small balcony.
17m²



2 BEDROOM APARTMENT:
 -Spacious 2 bedroom unit with private bathroom open plan kitchen and living room and a bedroom with a balcony overlooking the riverfront.
35m²



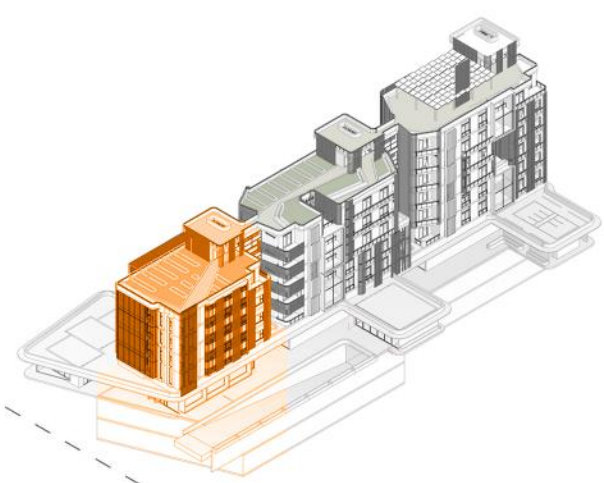
DELUXE 1 BEDROOM APARTMENT:
 -Spacious 1 bedroom unit with private bathroom open plan kitchen and living room and a bedroom with a balcony overlooking the riverfront.
28m²



CO-LIVING APARTMENT:
 -3 sleeper unit with 3 private bedrooms, shared bathroom and guest toilet with shared open plan living room and kitchen.
35m²

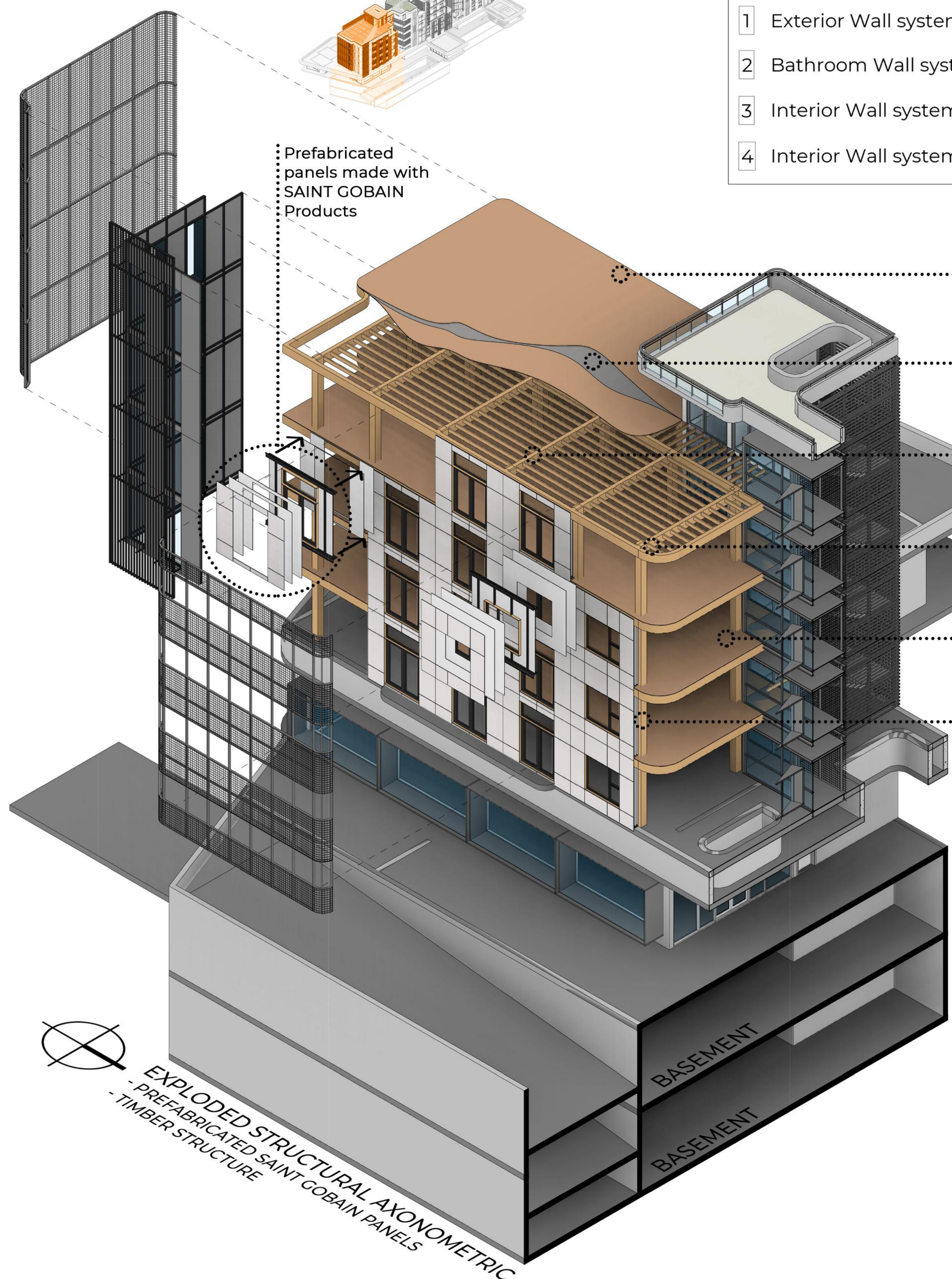
BUILDING B

STRUCTURE AND PRODUCTS



Prefabricated panels made with SAINT GOBAIN Products

- ### DIFFERENT WALL SYSTEMS
- 1 Exterior Wall system
 - 2 Bathroom Wall system within Unit
 - 3 Interior Wall system within Unit
 - 4 Interior Wall system between Units



12mm Water Resistant plywood

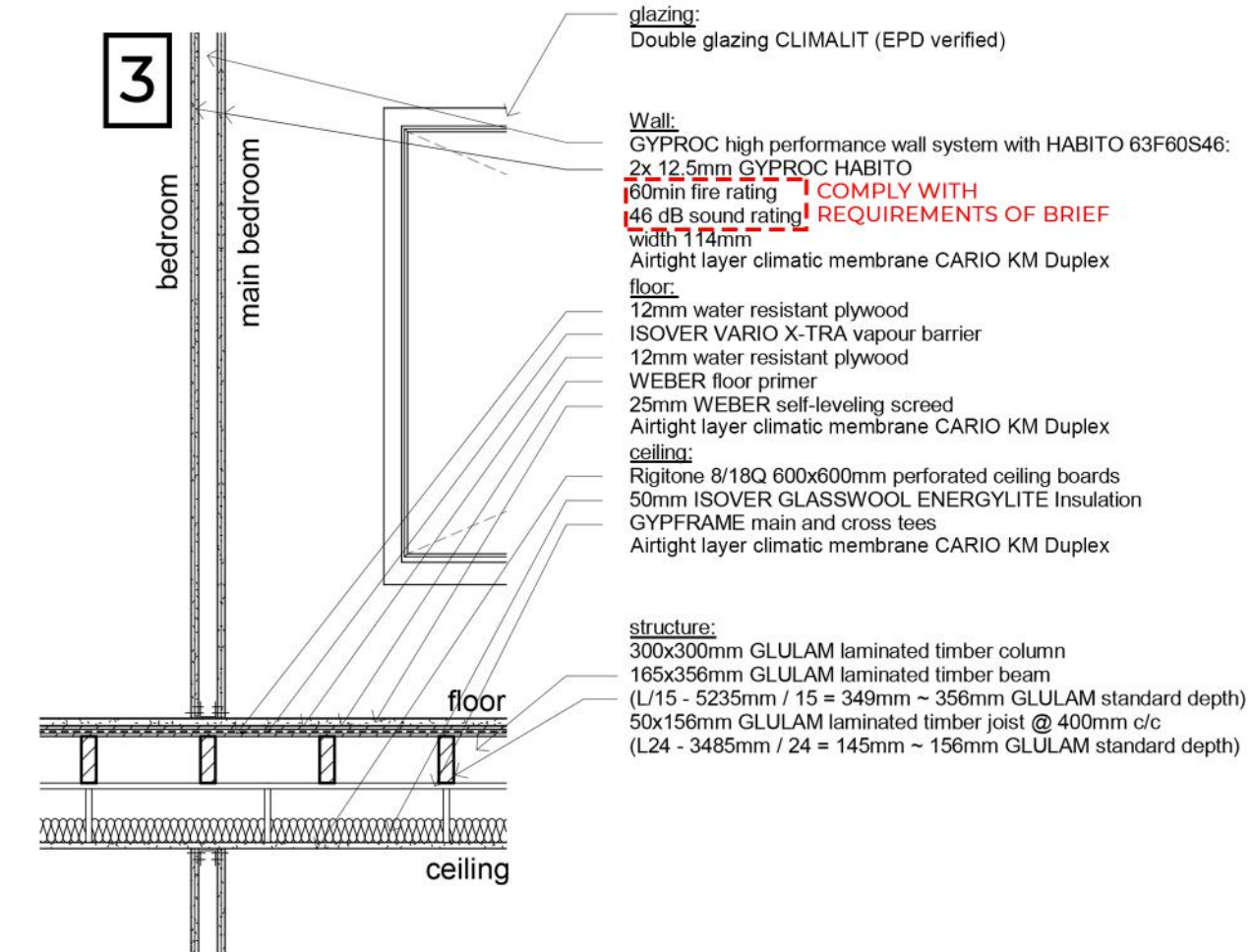
ISOVER VARIO X-TRA vapour barrier

165x356mm GLULAM laminated timber beam

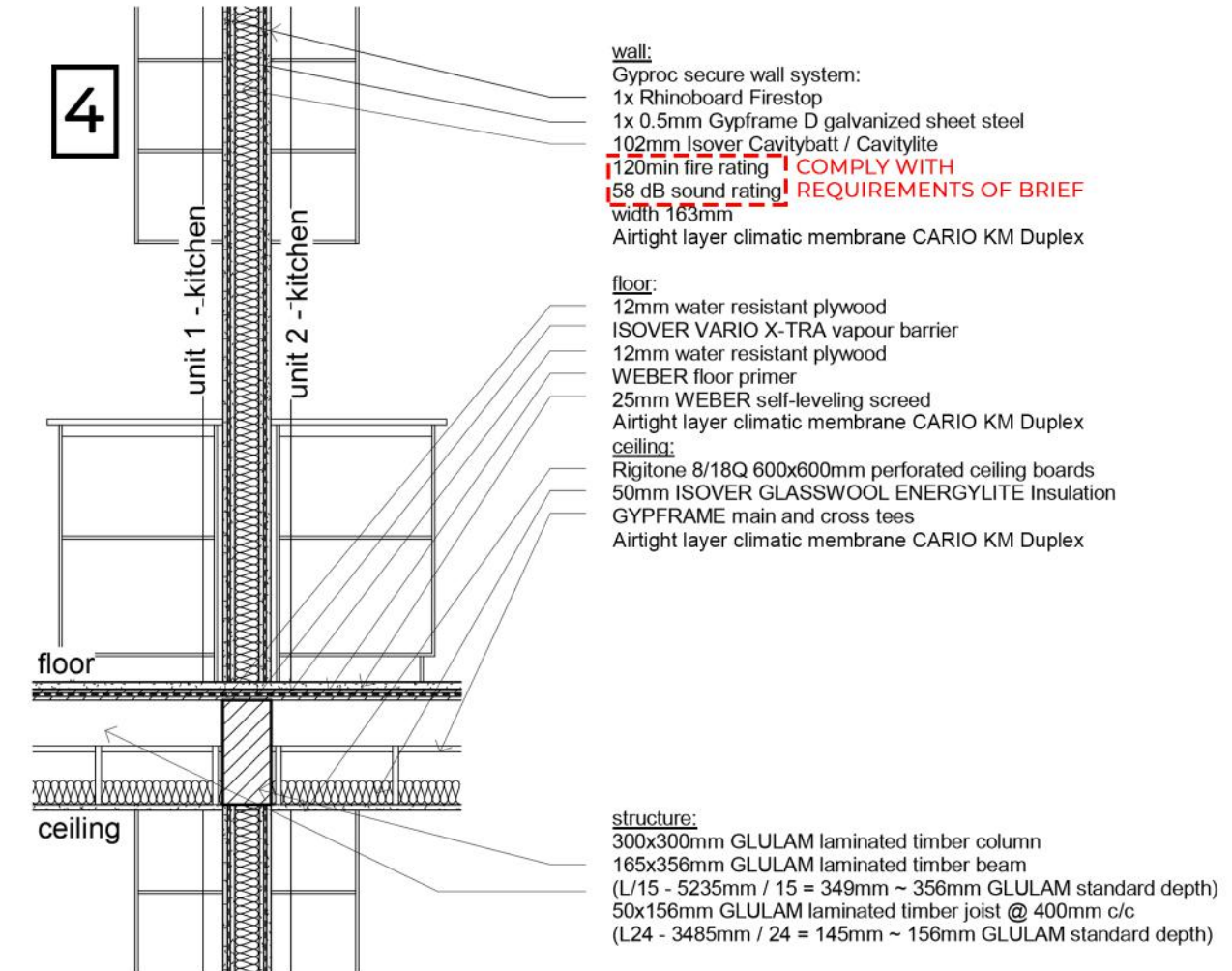
50x156mm GLULAM laminated timber joist @ 400mm c/c

12mm Water Resistant plywood

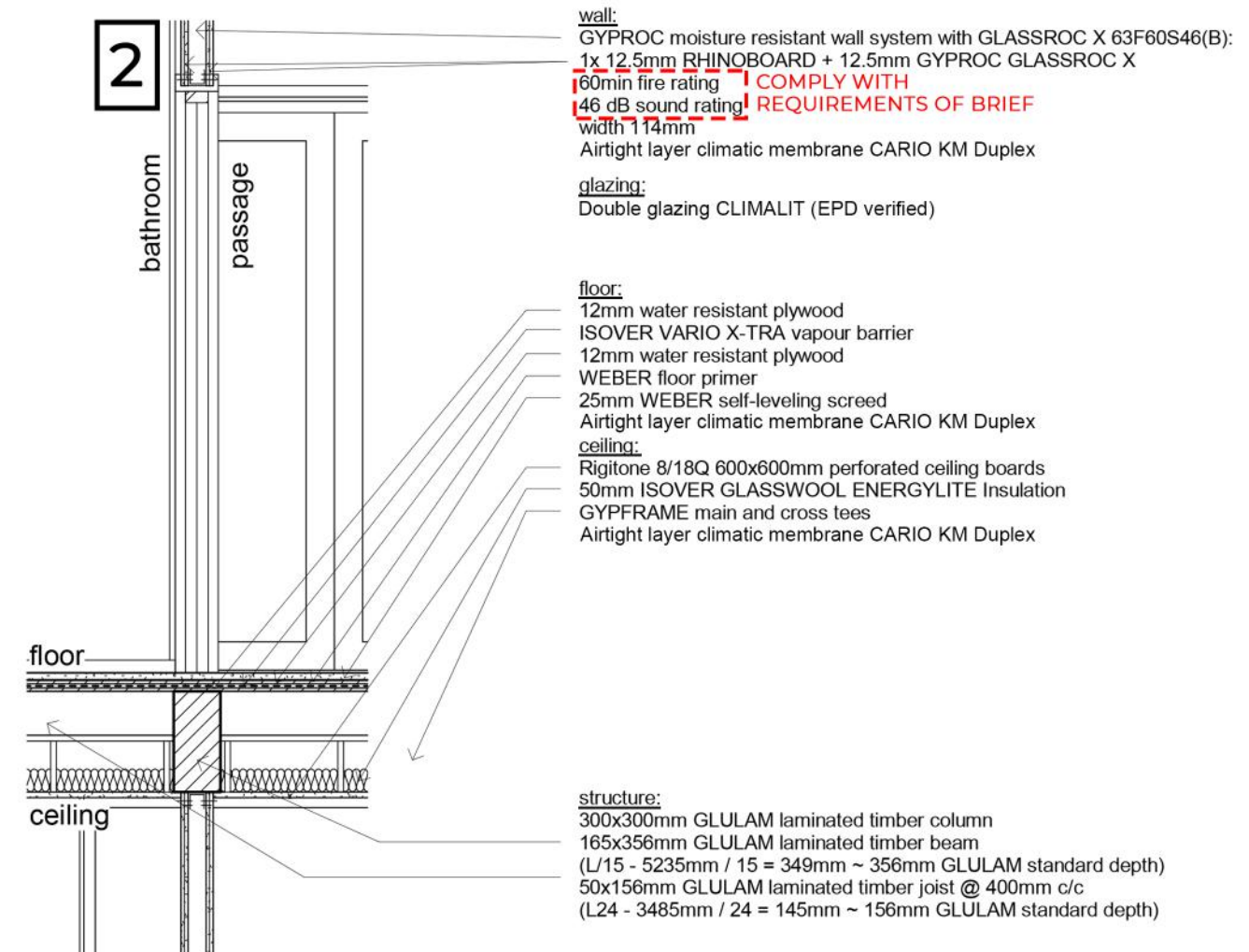
300x300mm GLULAM laminated timber column



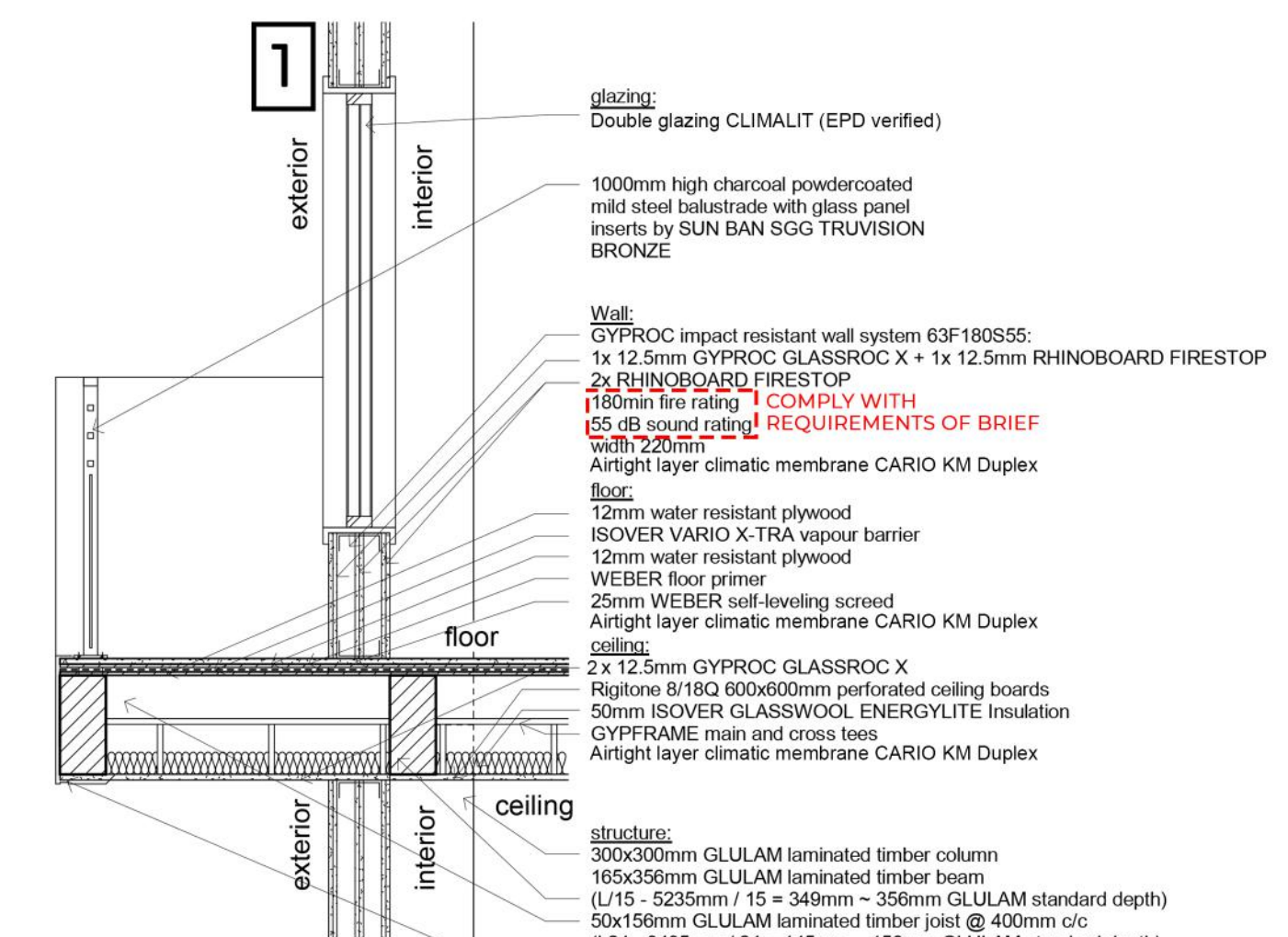
wall within unit detail
scale 1:20



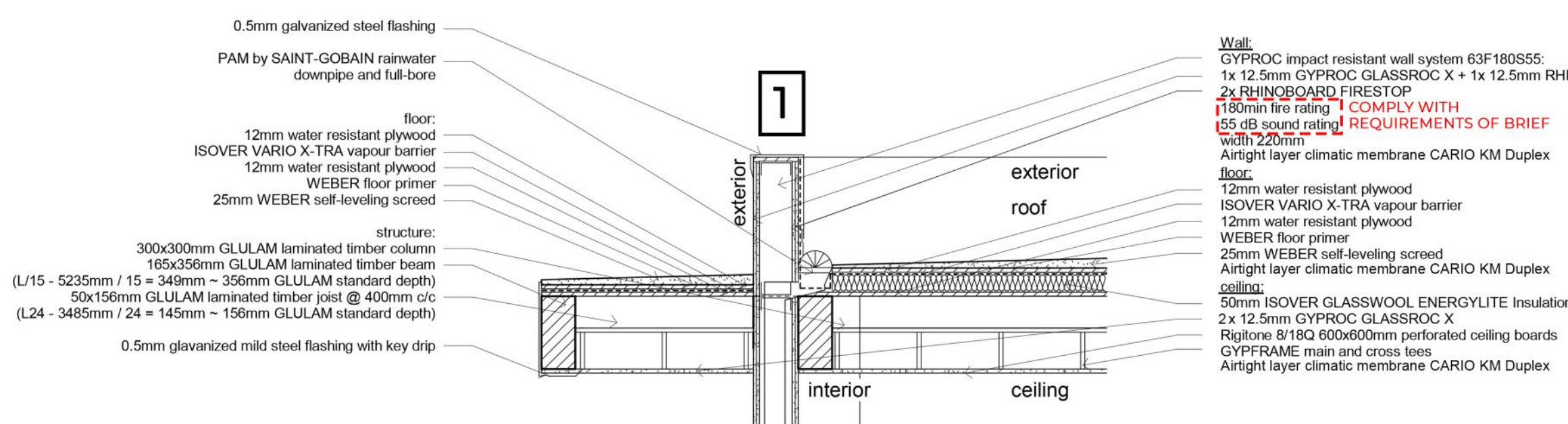
wall between units detail
scale 1:20



bathroom wall within unit detail
scale 1:20



exterior wall & floor detail
scale 1:20



exterior wall & roof detail
scale 1:20

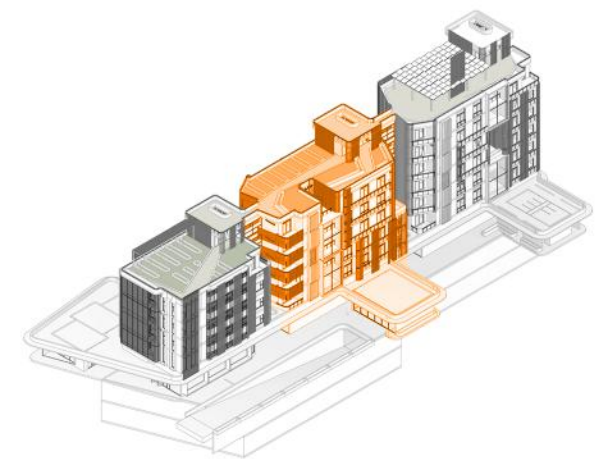
The city of Lisbon is classified with moderate to high seismic activity. We propose a timber structure (moment frame) with lightweight construction that offer more flexibility in the event of an earthquake. Furthermore, we propose shear walls for all vertical circulation due to the height of the building and the seismic and wind activity in the area.

All Products used in details above

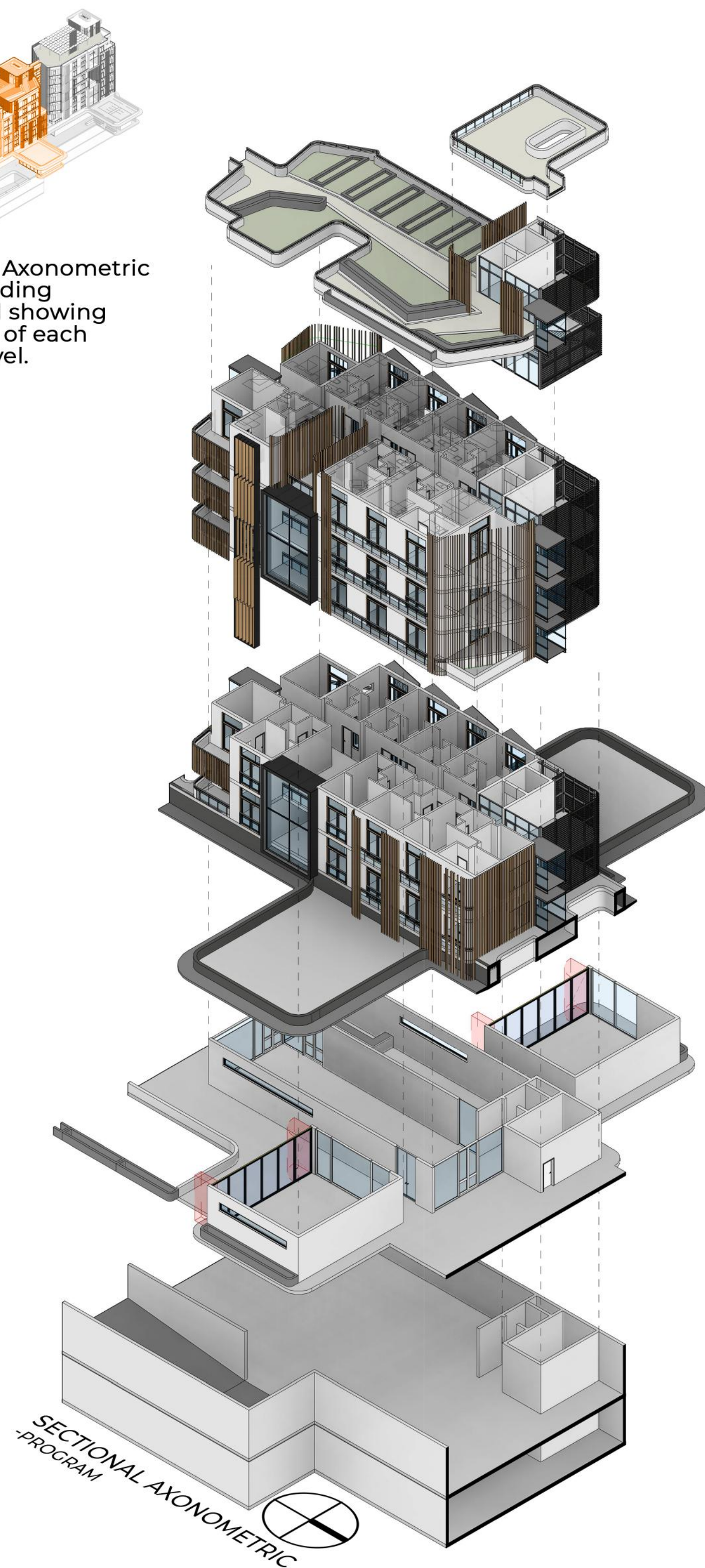


BUILDING B

EXPLODED AXO/ PROGRAM AXO



3D Sectional Axonometric showing building typology and showing the program of each individual level.



SECTIONAL AXONOMETRIC
-PROGRAM

6

- Roof communal garden
- Seating Spaces
- Urban Farming
- Outdoor Gym
- Solar farming
- Fire escape
- Stretcher lift

3-5

- 1 Bedroom Apartment
- 2 Bedroom Apartment
- Deluxe 1 Bedroom Apartment
- Private Balconies
- Shared Balconies
- Communal implementation spaces
- Fire escape
- Stretcher lift

1-2

- 1 Bedroom Apartment
- 2 Bedroom Apartment
- Deluxe 1 Bedroom Apartment
- Private Balconies
- Shared Balconies
- Communal implementation spaces
- Fire escape
- Stretcher lift

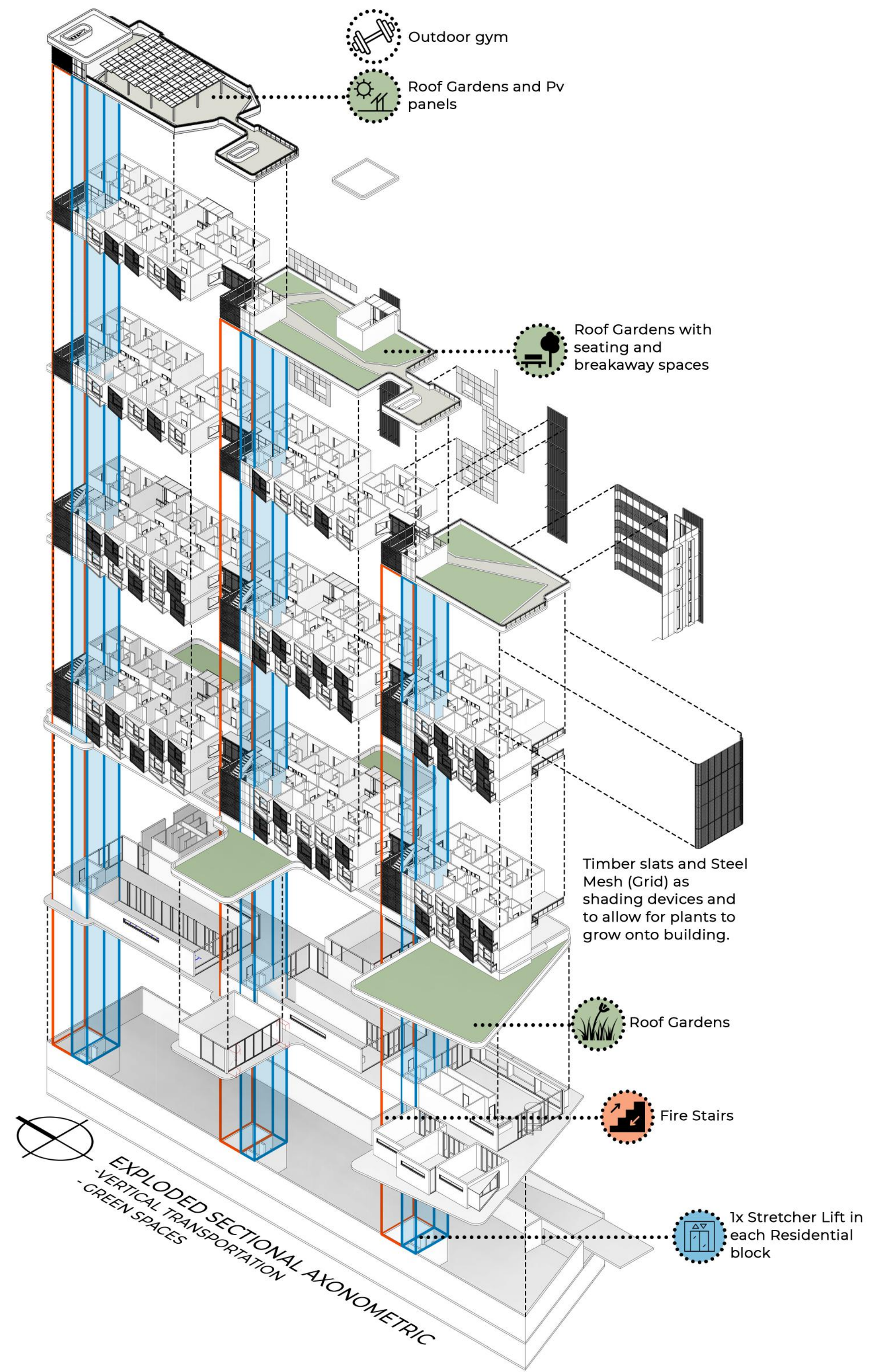
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- Reception/ Offices
- Communal Lounge
- Commerce Start-up business
- Exhibition space
- Atelier workshop/ Studio
- Bicycle storage
- Laundromat
- Public Bathrooms
- Coffee shop
- Fire escape
- Stretcher lift

-1

-2

- Parking
- Fire escape
- Stretcher Lift
- Water heating room
- Generator room
- Solar battery room
- Sump Pump Room



EXPLODED SECTIONAL AXONOMETRIC
-VERTICAL TRANSPORTATION
-GREEN SPACES

- Outdoor gym
- Roof Gardens and Pv panels

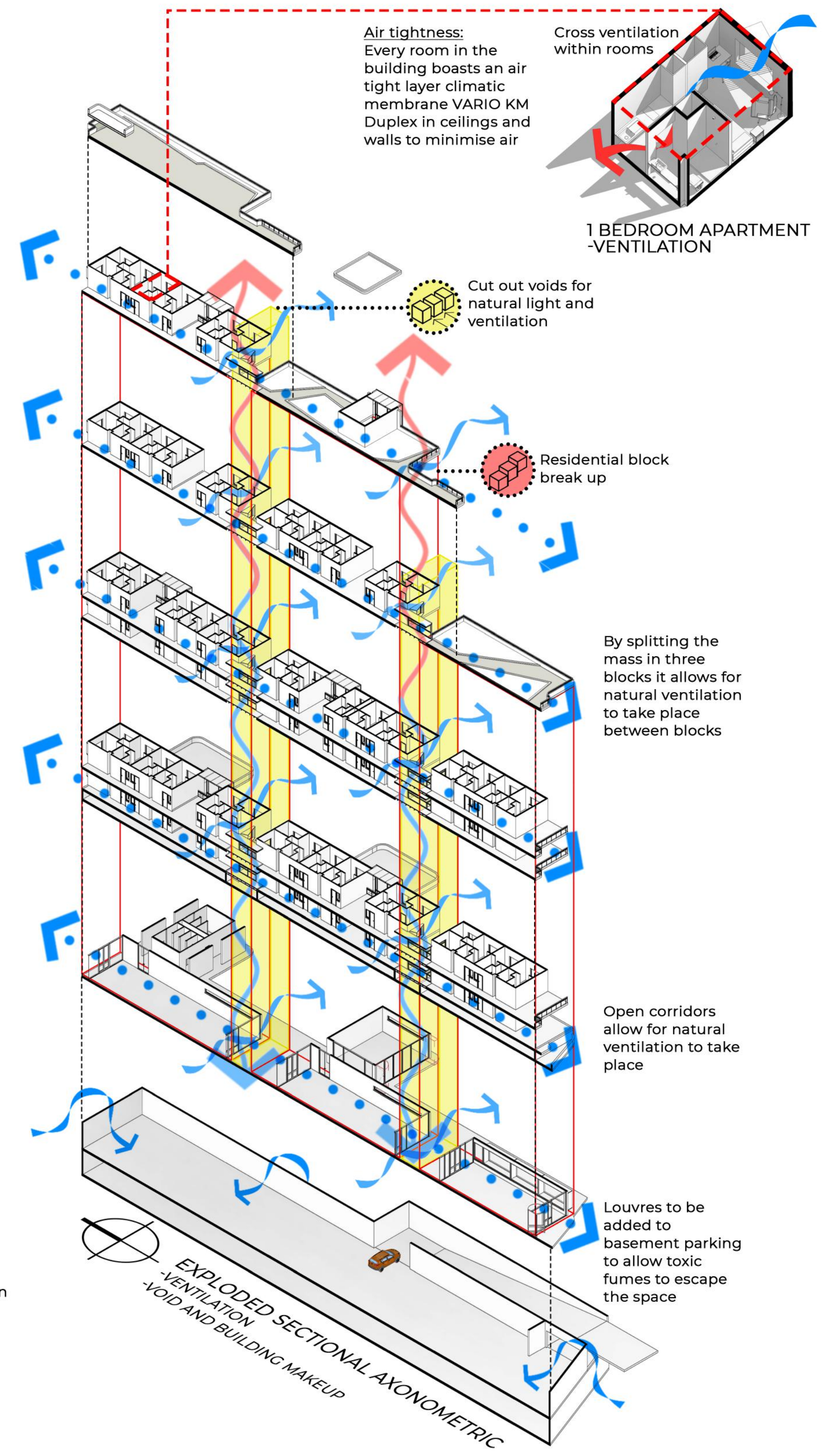
Roof Gardens with seating and breakaway spaces

Timber slats and Steel Mesh (Grid) as shading devices and to allow for plants to grow onto building.

Roof Gardens

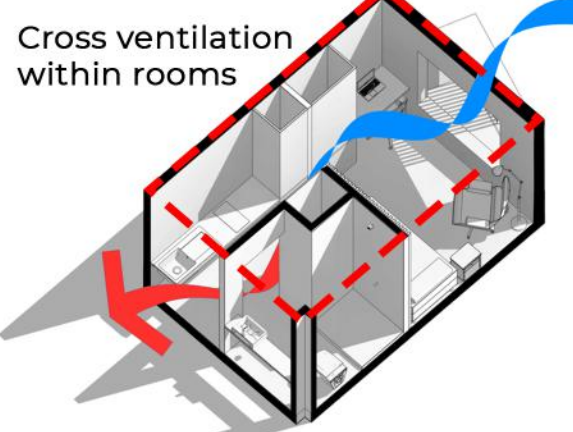
Fire Stairs

1x Stretcher Lift in each Residential block



EXPLODED SECTIONAL AXONOMETRIC
-VENTILATION
-VOID AND BUILDING MAKEUP

Air tightness: Every room in the building boasts an air tight layer climatic membrane VARIO KM Duplex in ceilings and walls to minimise air



1 BEDROOM APARTMENT -VENTILATION

Cut out voids for natural light and ventilation

Residential block break up

By splitting the mass in three blocks it allows for natural ventilation to take place between blocks

Open corridors allow for natural ventilation to take place

Louvres to be added to basement parking to allow toxic fumes to escape the space

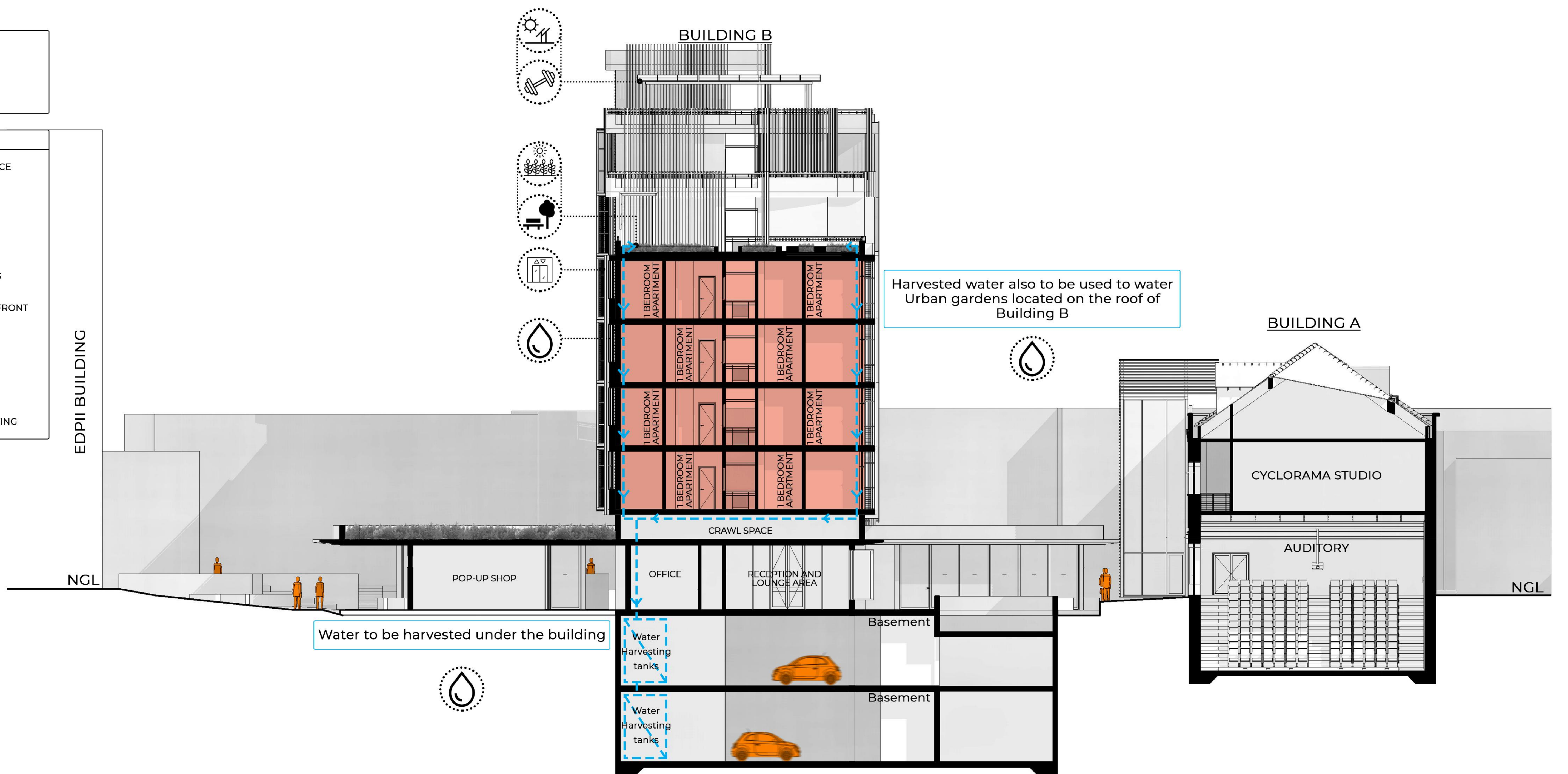
SITE SECTION

- BUILDING A
- BUILDING B
- AREA C

1 BEDROOM APARTMENT
 WATER HARVESTING

LEGEND

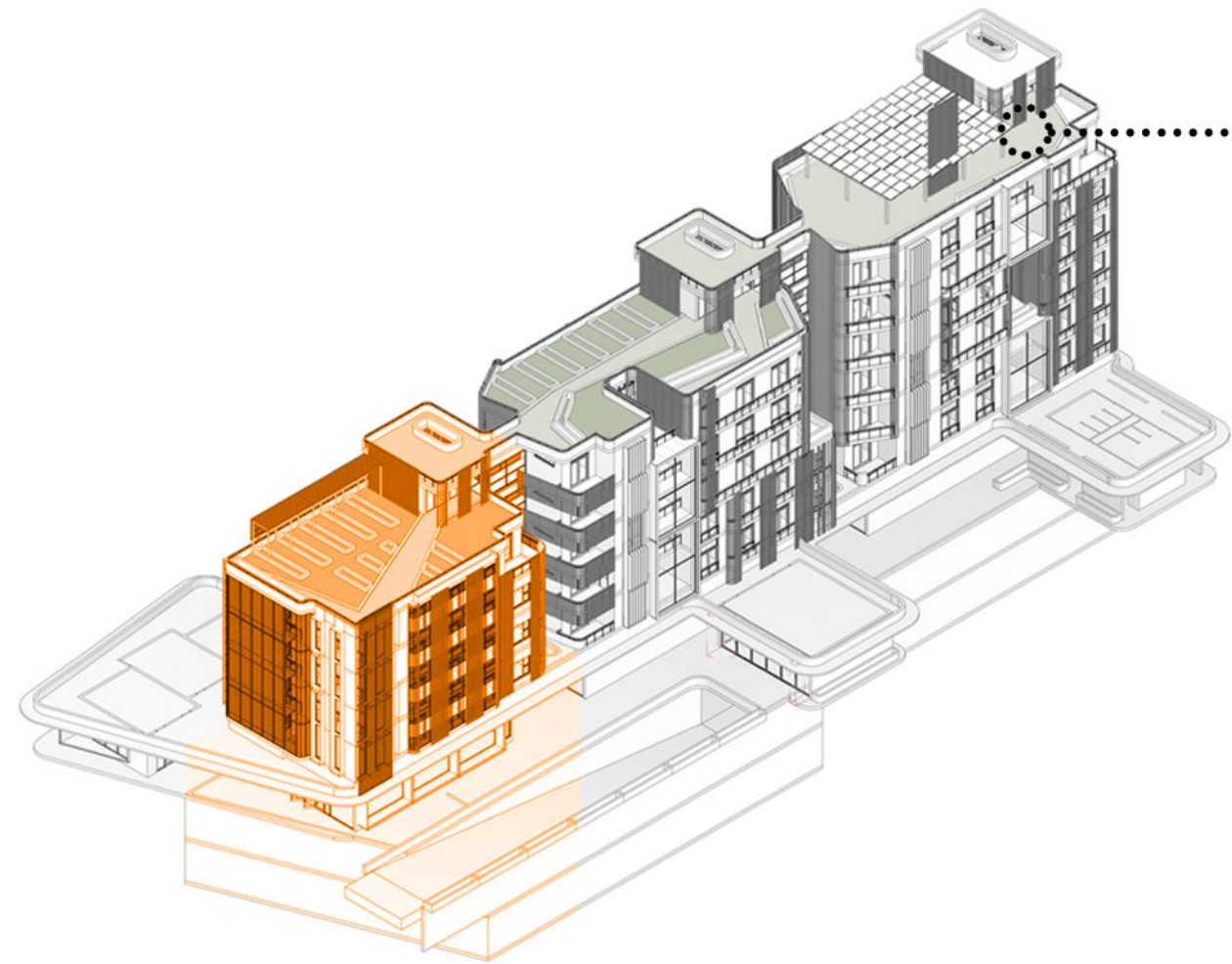
-  COMMUNAL SPACE
-  SOLAR PANELS
-  OUTDOOR GYM
-  ROOF GARDEN
-  URBAN FARMING
-  VIEW AT WATERFRONT
-  STRETCHER LIFT
-  FIRE STAIRS
-  BUILDING LINKS
-  WATER HARVESTING



SITE SECTION C-C
 0 1000 3000 5000 10000

LCA CALCULATIONS

CALCULATED ON SOUTH SECTION OF BUILDING



AXONOMETRIC SHOWING FOCUS SEGMENT

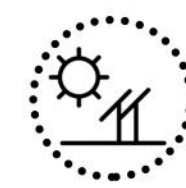
Embodied carbon benchmark ⓘ

Cradle to gate impacts (A1-A3)	kg CO ₂ e/m ²
< 210 A	145
(210-270) B	
(270-330) C	
(330-390) D	
(390-450) E	
(450-510) F	
> 510 G	

CH Q3 2021 Global - apartment ⓘ

CO₂ 246 Tonnes CO₂e

1 12 310 € Social cost of carbon



CALCULATIONS SOLAR PANELS ENERGY OUTPUT

BUILDING ROOFTOP:

54 X 550W
 = 29 700W/1000
 = 29,70KWH X 2
 = 59,40KWH

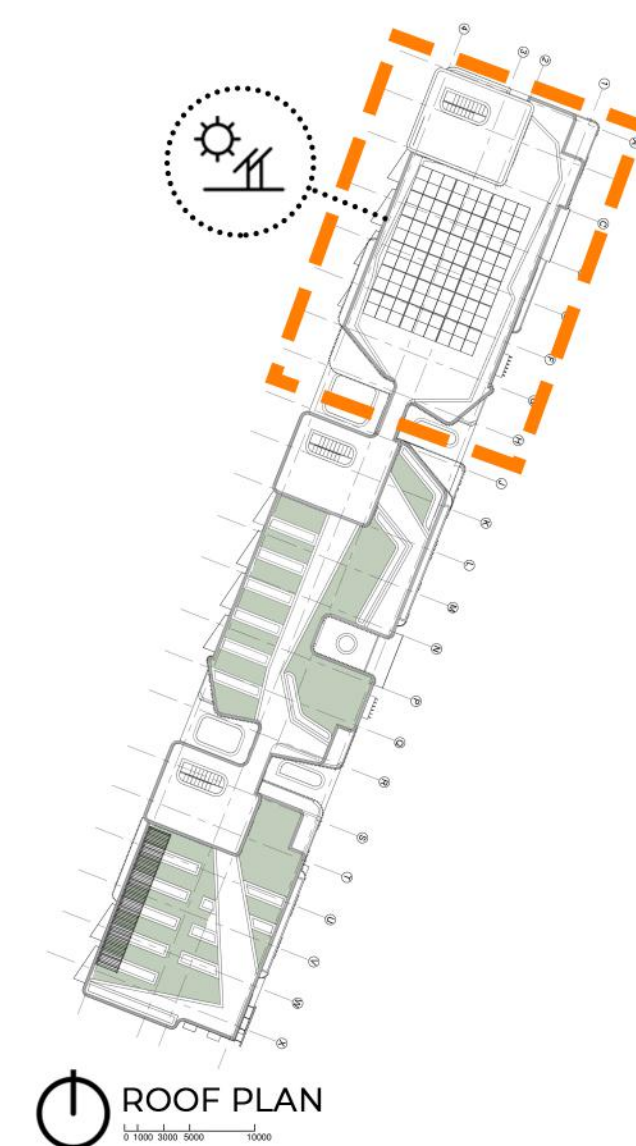
DAILY SOLAR OUTPUT:

KWH/DAY= KWH X SUN HOURS PER DAY
 = 59,40 X 6H
 = 356,40KWH/DAY

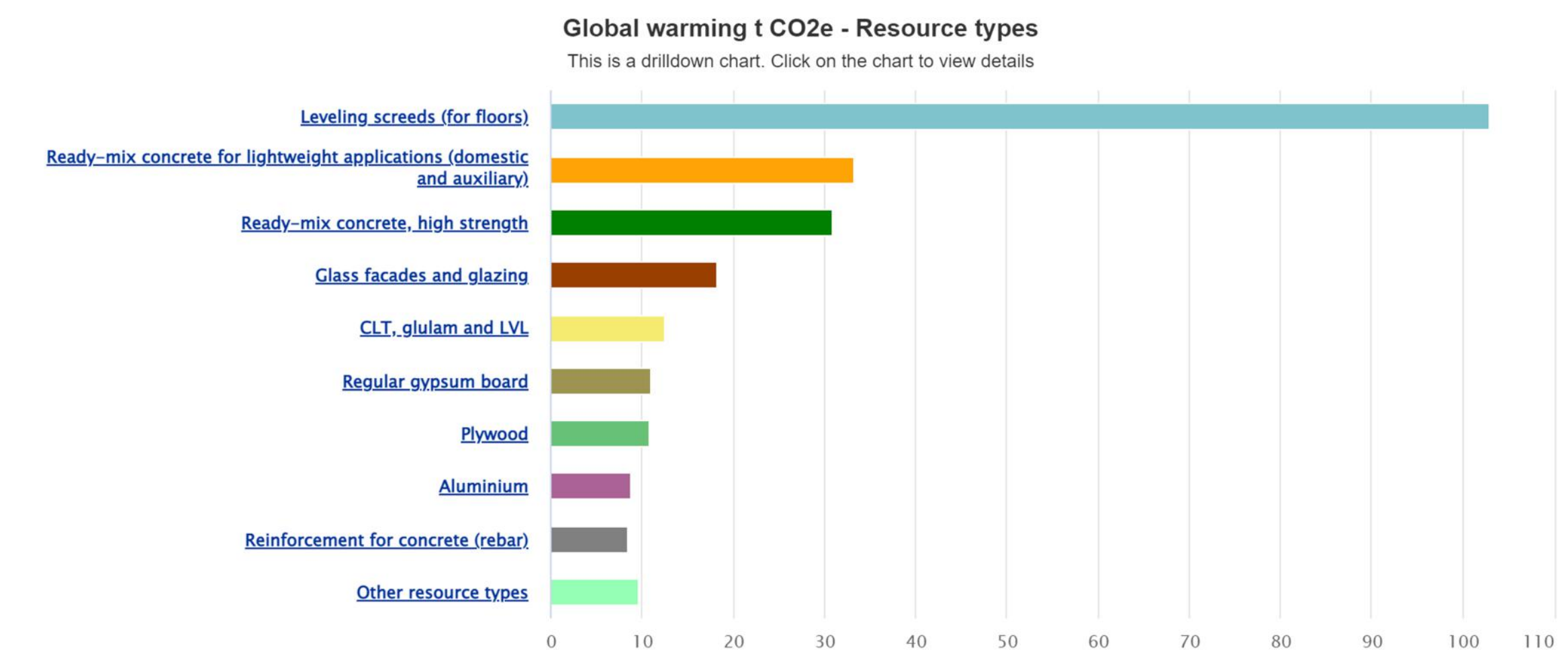
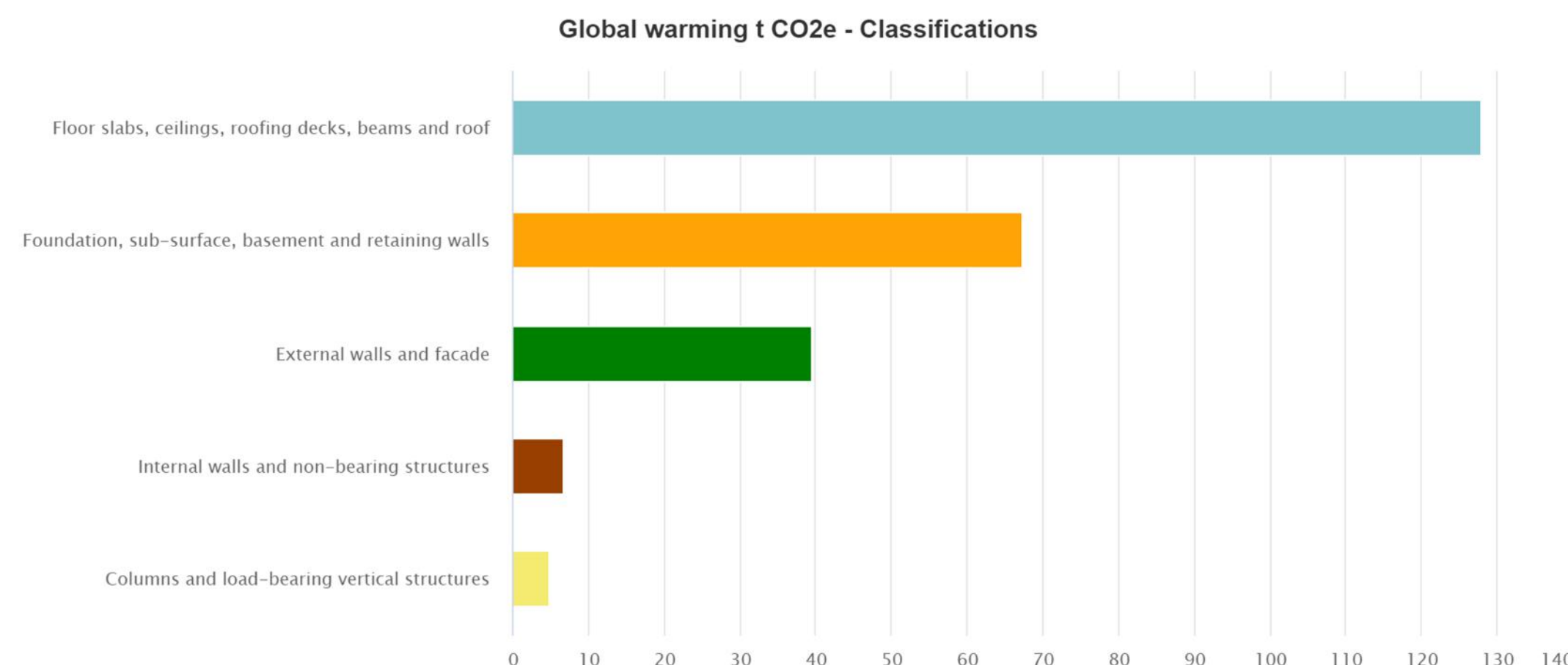
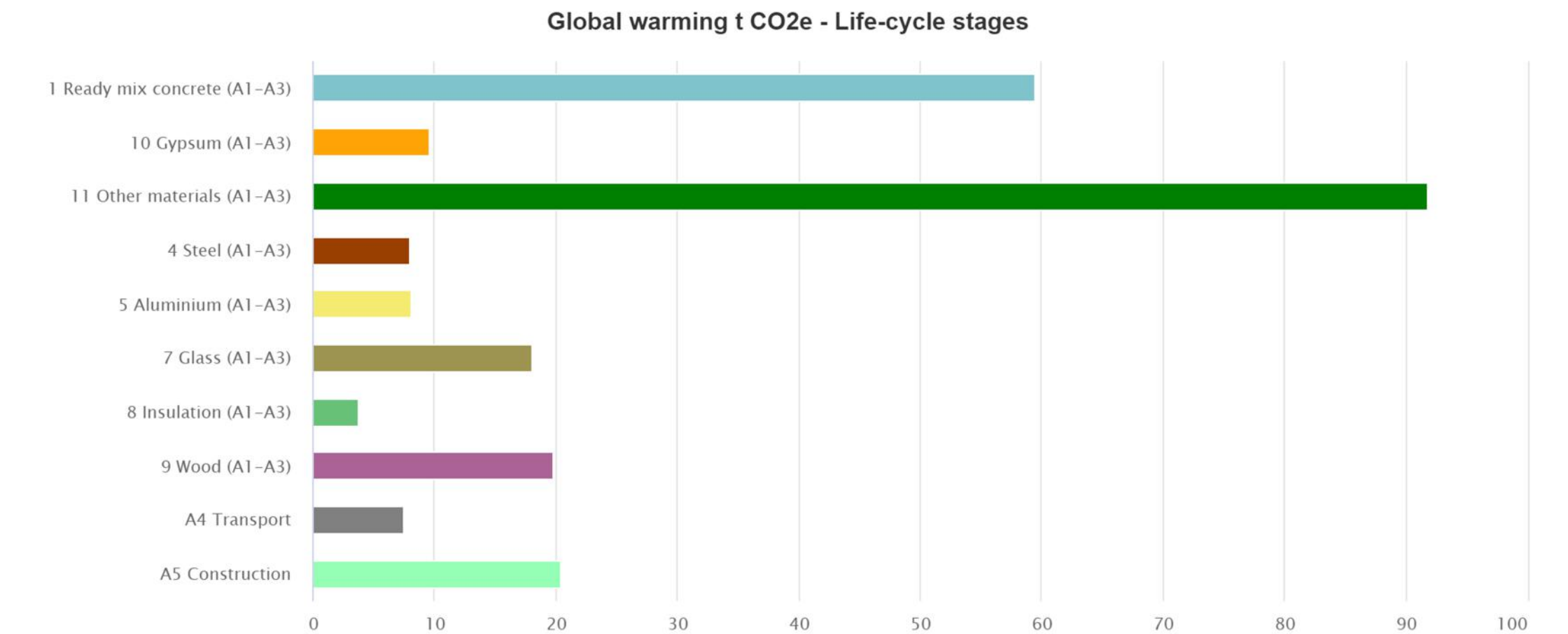
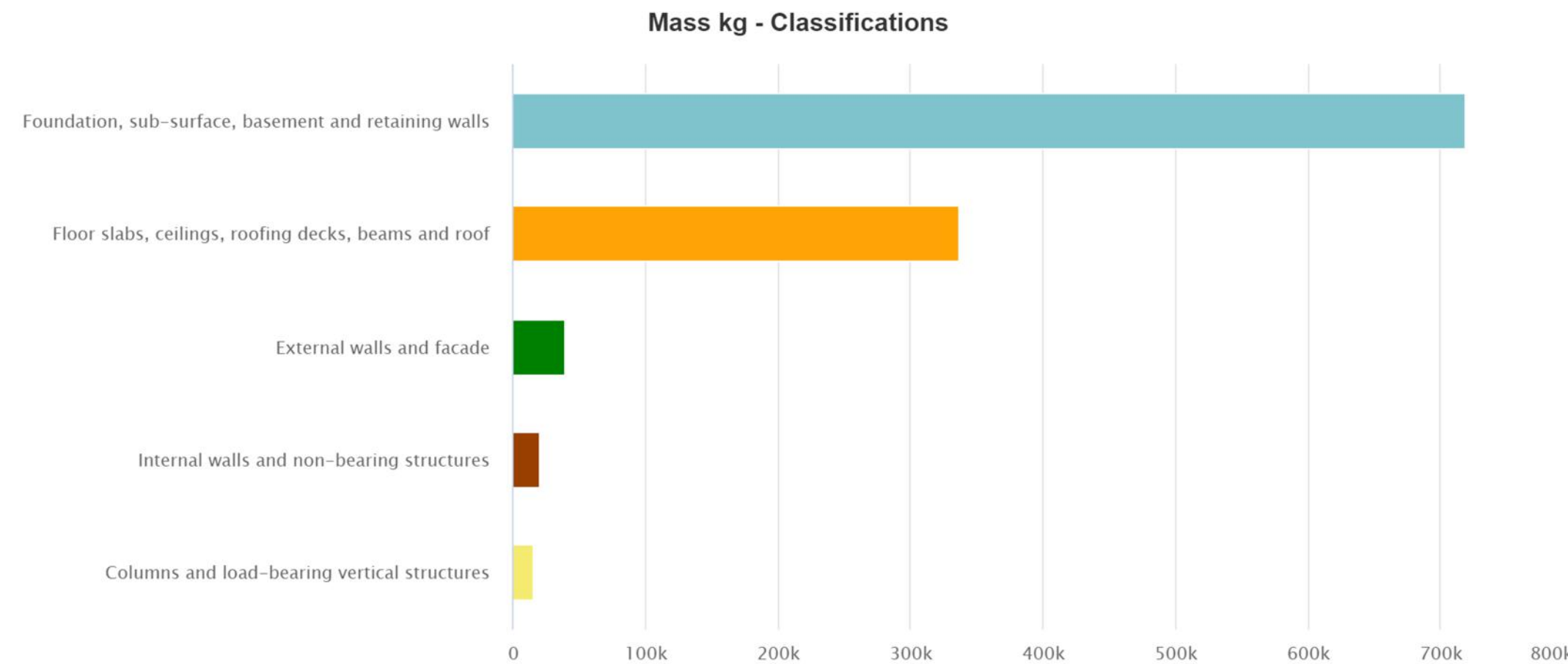
ANNUAL OUTPUT:

FULL SUN HOURS/YEAR = 6H X 365 DAYS
 = 2190H/YEAR

ANNUAL OUTPUT = DAILY SOLAR OUTPUT X HOURS PER YEAR
 = 356,40KWH X 2190H
 = 780 516KWH/YEAR
 100 000
 = 7,81MWH/YEAR

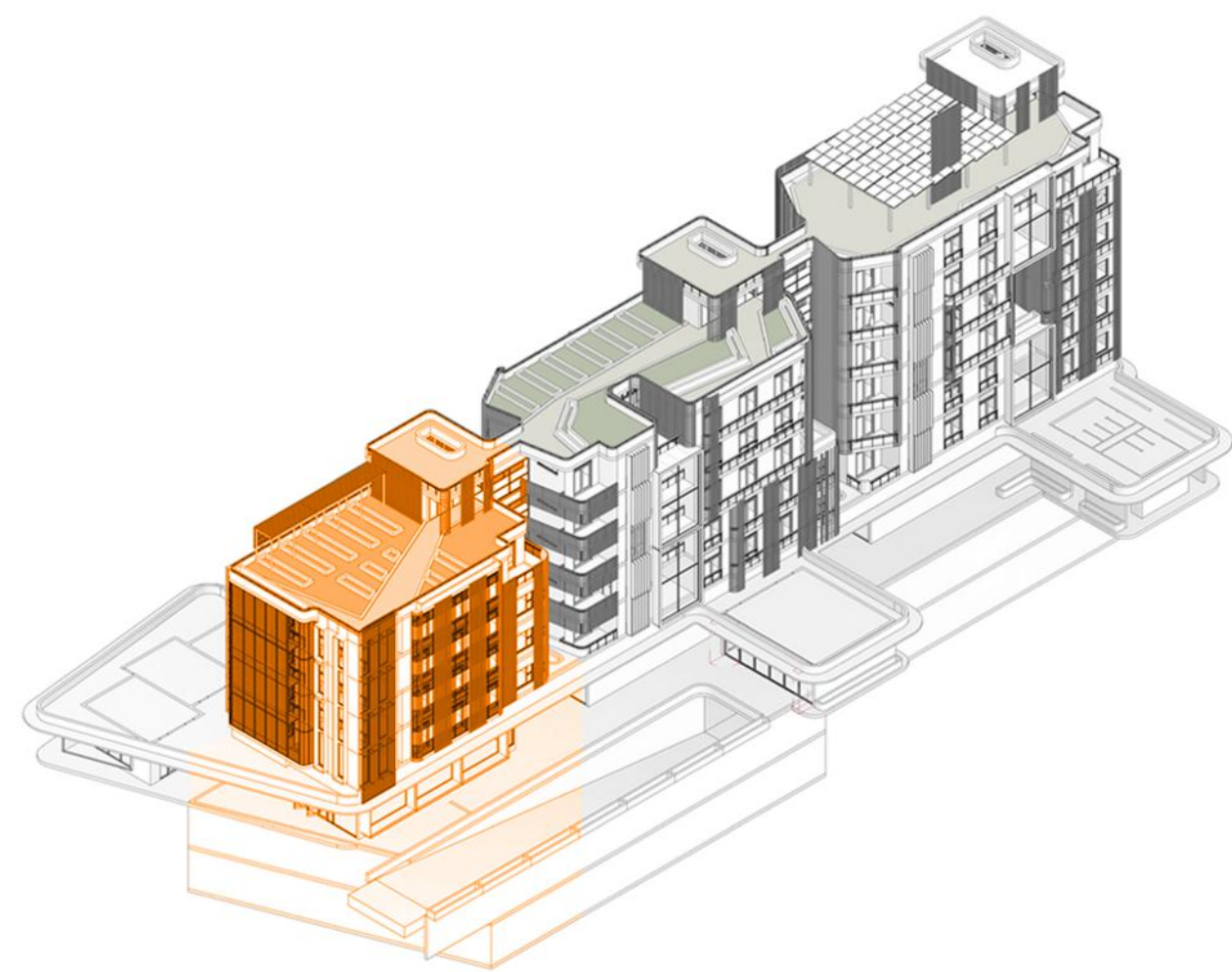


ROOF PLAN

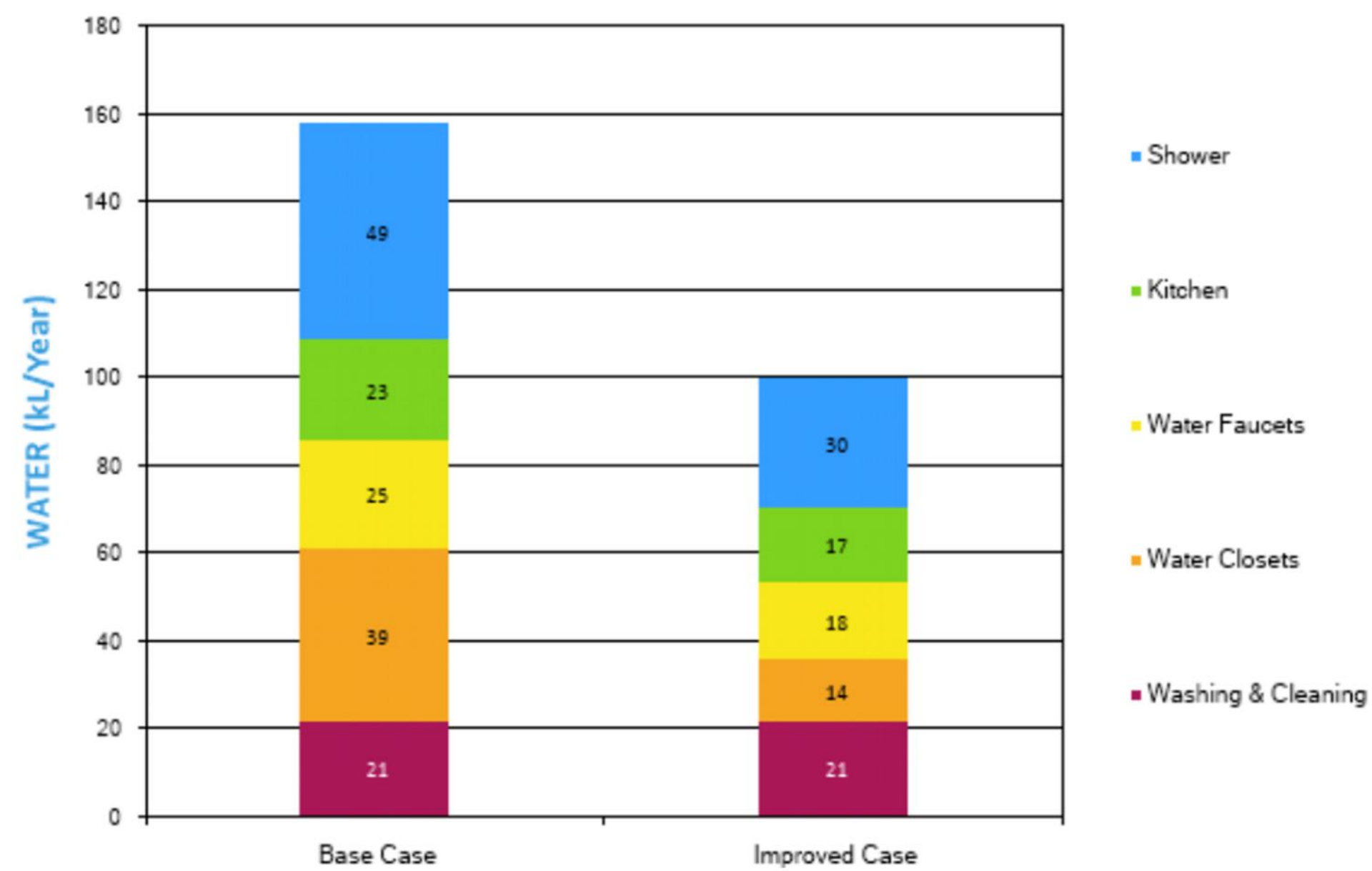


ENERGY CALCULATIONS

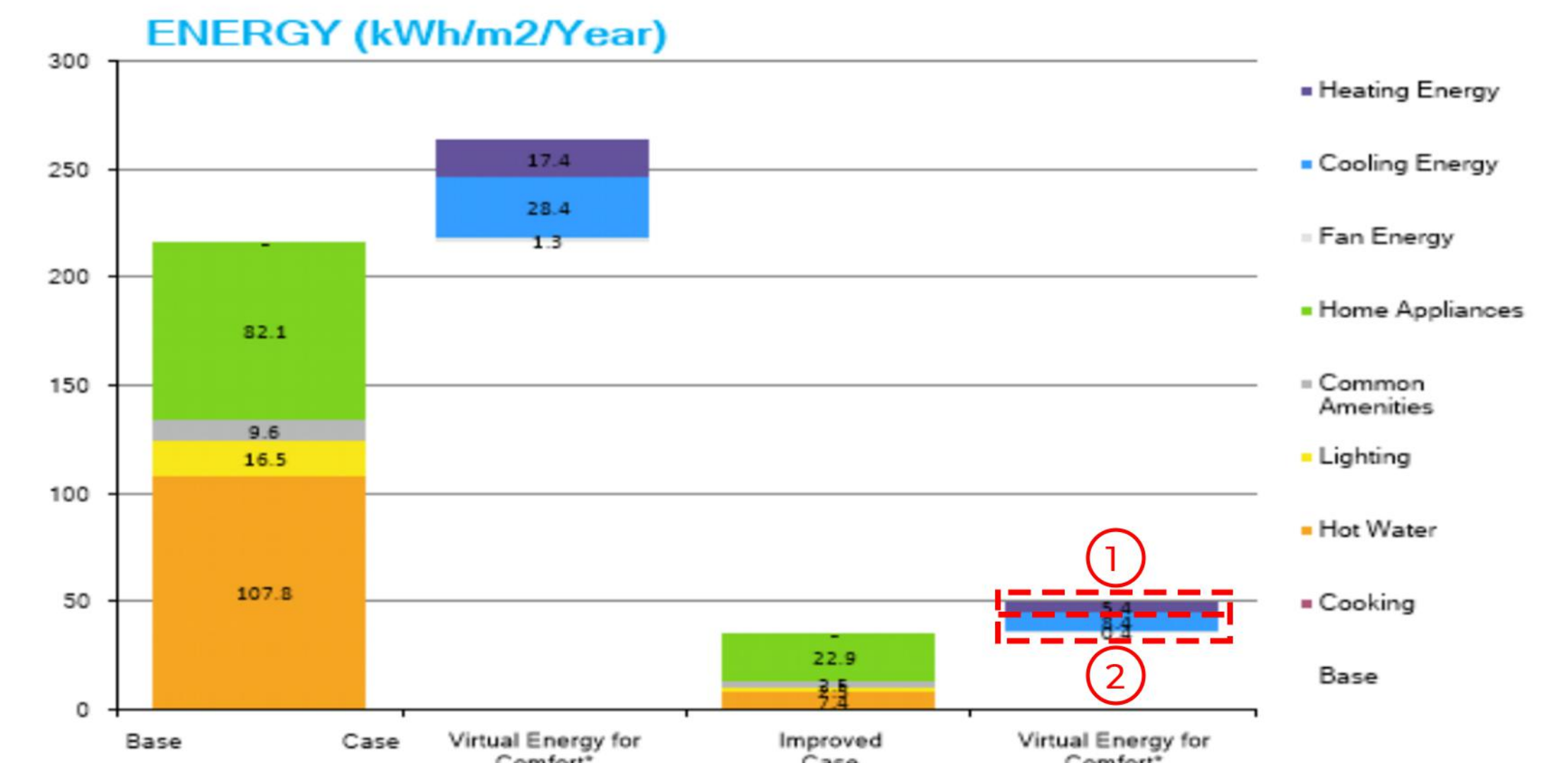
CALCULATED ON SOUTH SECTION OF BUILDING



AXONOMETRIC SHOWING FOCUS SEGMENT



WATER SAVING 36.79%



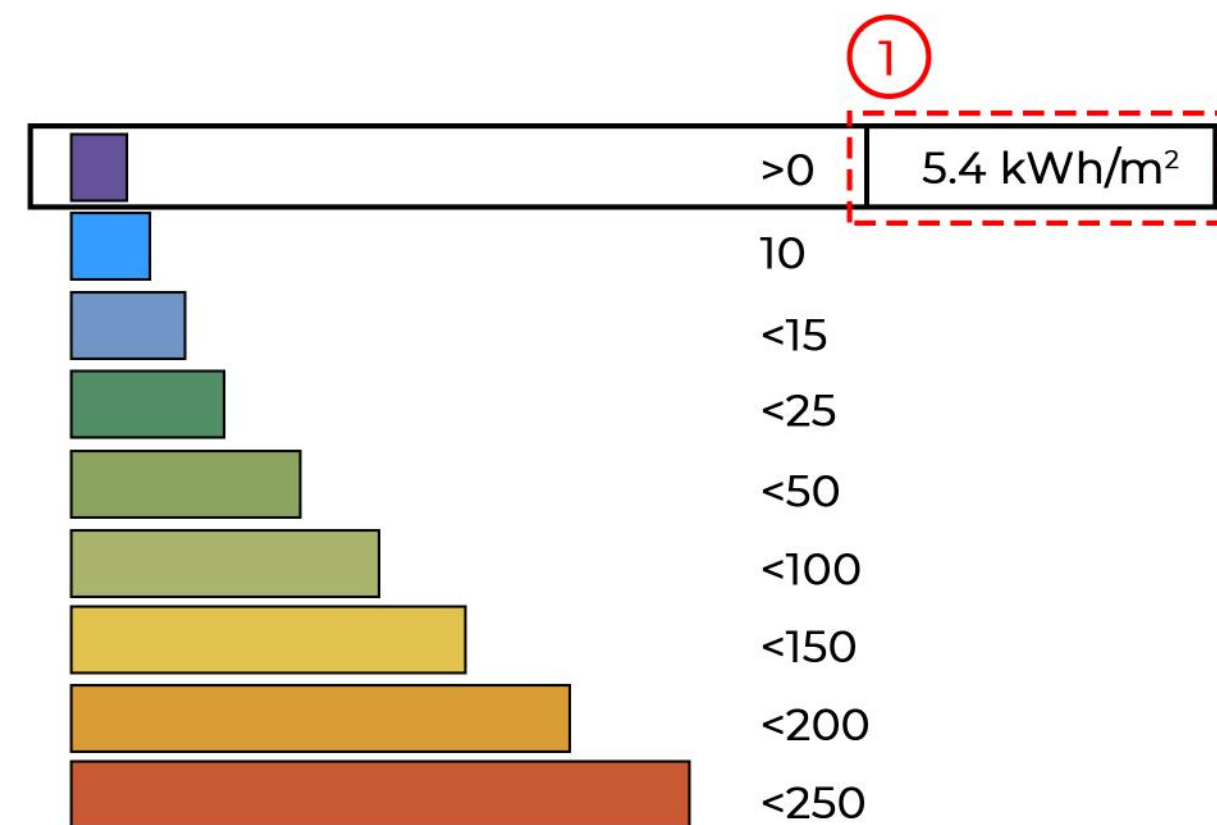
ENERGY SAVINGS 81.22%

Results

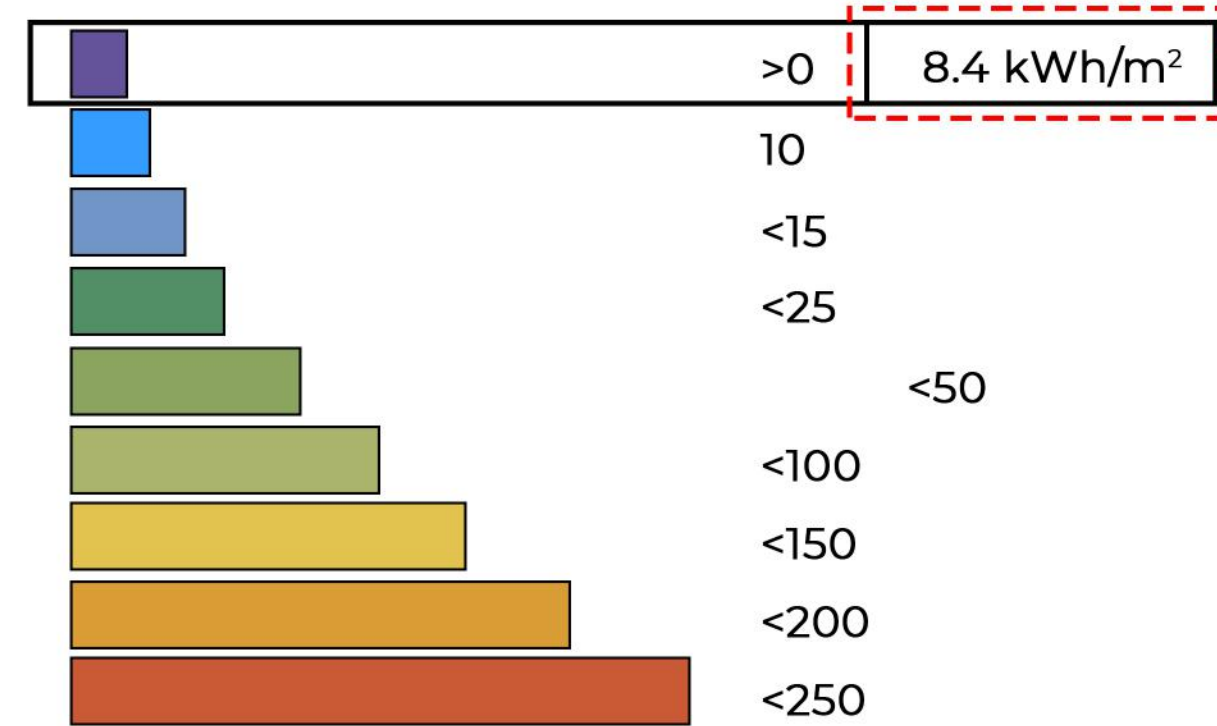
Final Energy Use (kWh/Month/Unit)	78.18	Operational CO ₂ Savings (tCO ₂ /Year/Unit)	1.26
Final Water Use (kL/Month/Unit)	8.29	Embodied Energy Savings (MJ/Unit)	24,683.01
Base Case Utility Cost (EUR/Month/Unit)	66.61	Incremental Cost (EUR/Unit)	2,214.33
Utility Cost Reduction (EUR/Month/Unit)	47.12	Payback in Years (Yrs.)	3.92
Energy Savings (MWh/Year)	158.75	Water Savings (m ³ /Year)	1,910.86
Embodied Energy in Materials Savings (GJ)	814.54	Total Subproject Floor Area (m ²)	1,097.25
Carbon Emissions (tCO ₂ /Year)	8.13	Number of People Impacted (No.)	99

Energy Efficiency Measures 81.22%

- ✓ HME01 Reduced Window to Wall Ratio - WWR of 20% WWR % 0.00
- ✓ HME02 Reflective Paint/Tiles for Roof - Solar Reflectivity (albedo) of 0.7
- ✓ HME03 Reflective Paint for External Walls - Solar Reflectivity (albedo) of 0.61 SR 0.61
- ✓ HME04 External Shading Devices - Annual Average Shading Factor (AASF) of 0.5 AASF 0.5
- ✓ HME05 Insulation of Roof : U-value of 0.37 W/m².K 0.37
- ✓ HME06 Insulation of External Walls : U-value of 0.056 W/m².K 0.056
- ✓ HME07 Low-E Coated Glass : U-value of 3 W/m².K and SHGC of 0.45 SHGC 0.00
- ✓ HME08 Higher Thermal Performance Glass : U-value of 0.05 W/m².K and SHGC of 0 SHGC 0.00
- ✓ HME09 Natural Ventilation
- HME10 Ceiling Fans in All Habitable Rooms
- HME11 Air Conditioning System - COP of 3.5
- HME12 High-Efficiency Boiler for Space Heating - Efficiency of 95%
- HMET3 Sensible Heat Recovery from Exhaust Air - Efficiency of 50%
- HME13 High-Efficiency Boiler for Hot Water - Efficiency of 95%
- ✓ HME14 Heat Pump for Hot Water - COP of 2.8 COP 2.8
- HME15 Energy-Efficient Refrigerators and Clothes Washing Machines
- ✓ HME16 Energy-Saving Light Bulbs - Internal Spaces
- ✓ HME17 Energy-Saving Light Bulbs - Common Areas and External Spaces
- ✓ HME18 Lighting Controls for Common Areas and Outdoors
- HME19 Solar Hot Water Collectors - 50% of Hot Water Demand
- ✓ HME20 Solar Photovoltaics - 72% of Total Energy Use % of Annual Electricity Use 72 Capacity kWp/Unit 1.6
- HME21 Smart Meters
- HMET4 Consumption Based Energy Meters For Source Types Both Cooling and Heating Energy
- HME22 Other Renewable Energy for Electricity Generation
- HME23 Offsite Renewable Energy Procurement - Equal to 100% of Total Operational CO₂
- HME24 Carbon Offset - 100% of Total CO₂



HEATING DEMAND



COOLING DEMAND



AREA C SOCIAL AND RELAXING SPACES



BRIDGE CONNECTION BETWEEN BUILDINGS



5TH ELEVATION SEATING GARDEN



BIRD'S EYE VIEW OF TOTAL SCHEME



BIRD'S EYE VIEW OF TOTAL SCHEME