

ŠIMON KNETTIG
CITY OF THE FUTURE
2023/2024



MAIN MENTOR:
ROBERTO CAVALLO

BUILDING TECHNOLOGY MENTOR:
PIERO MEDICI

RESEARCH MENTOR:
STEFAN VAN DER SPEK

EXTERNAL CONSULTANT (UX RESEARCH):
MICHAELA HRÁČKOVÁ PYŠŇÁKOVÁ

Cover picture adapted from:
Universal City Studios. Back to the Future. Accessed January 23, 2024. <https://www.catchplay.com/sg/ed-says/article-2217-rchxfa61>.

*Shaping the user experience of architecture
through evidence-based design*

**Who is a non-architect and
experienced working with an
architect?**

**How much did you understand
the explanations and visual
outputs they were giving to
you?**

**How much did the design fulfill
your needs and desires?**

We can do much better

We should do much better



Architect's dream



‘Tower of Terror’

‘Desert-ed city’

Architect's failed dream

‘Modernistic jam’

‘Doom Line’

A photograph of the Trellick Tower, a Brutalist apartment building in London. The building is a massive, multi-story concrete structure with a grid-like facade of windows and balconies. The balconies are filled with various items, including laundry and plants, giving the building a lived-in appearance. The sky is overcast and grey. In the foreground, there are bare, dark tree branches. The text 'Trellick Tower by Erno Goldfinger' is overlaid in the center in a large, white, sans-serif font.

Trellick Tower by Erno Goldfinger

“The nightmare would start moments after entering the lobby. [...] Silence did not mean no one was there. [...] used condoms [...] passed-out vagrant [...] raped. [...] jumped to her death. [...]



**ALBERT R. BROCCOLI &
HARRY SALTZMAN** PRESENT

SEAN CONNERY AS
JAMES BOND 007

IN **IAN FLEMING'S**

GOLDFINGER®

HONOR BLACKMAN

AS **PUSSY GALORE**

GERT FROBE

AS **GOLDFINGER**

TECHNICOLOR®



SCREEN PLAY BY **RICHARD MAIBAUM & PAUL DEHN**

PRODUCED BY **HARRY SALTZMAN & ALBERT R. BROCCOLI**

DIRECTED BY **GUY HAMILTON**

EON PRODUCTIONS LTD



Architect's dream come true

Potential is there

**but the lack of clarity, evidence,
and reliability**

**generates distrust among other
stakeholders**

A black and white aerial photograph of a dense urban residential area, likely a slum. The image shows a long, narrow street flanked by rows of multi-story brick buildings. Each building has a prominent chimney on its roof, creating a repetitive pattern of dark, rectangular structures against the lighter-colored roofs. The perspective is from an elevated position, looking down the street. In the background, more buildings and industrial structures, including tall chimneys, are visible under a hazy sky. The overall atmosphere is one of a tightly packed, industrial-era city.

Architect-Client-User

A 'post-occupancy evaluation' offered by architectural offices in the EU

per cent of practices who offer service	offer a Post Occupancy Evaluation	Stage at which architects agreed to undertake the POE:		
		Design phase	Construction phase	after Completion
Austria	14	46	31	23
Belgium*	10	11	11	78
Croatia	6	100	0	0
Czechia	1	67	33	0
Denmark	6	0	0	100
Egypt*	1	n/a	n/a	n/a
Finland	9	20	40	40
France	10	41	7	52
Germany	8	43	18	39
Greece	18	33	17	50
Hungary*	27	25	25	50
Ireland	17	52	4	44
Italy	12	39	25	36
Lithuania*	13	0	100	0
Luxembourg	17	54	8	38
Netherlands*	25	56	0	44
Norway	11	50	0	50
Poland*	13	60	20	20
Portugal	26	22	19	58
Romania	35	28	23	49
Serbia*	0	n/a	n/a	n/a
Slovakia	7	18	45	36
Slovenia	7	56	0	44
Spain	15	30	10	60
Sweden	4	43	14	43
United Kingdom	24	39	9	52
2020 EUROPE-26	13	38	18	45
2018 EUROPE-26	13	n/a	n/a	n/a
2015 EUROPE-27	n/a	n/a	n/a	n/a
2011 EUROPE-26	n/a	n/a	n/a	n/a
2012 EUROPE-25	n/a	n/a	n/a	n/a
2010 EUROPE-23	n/a	n/a	n/a	n/a

Czechia 1%

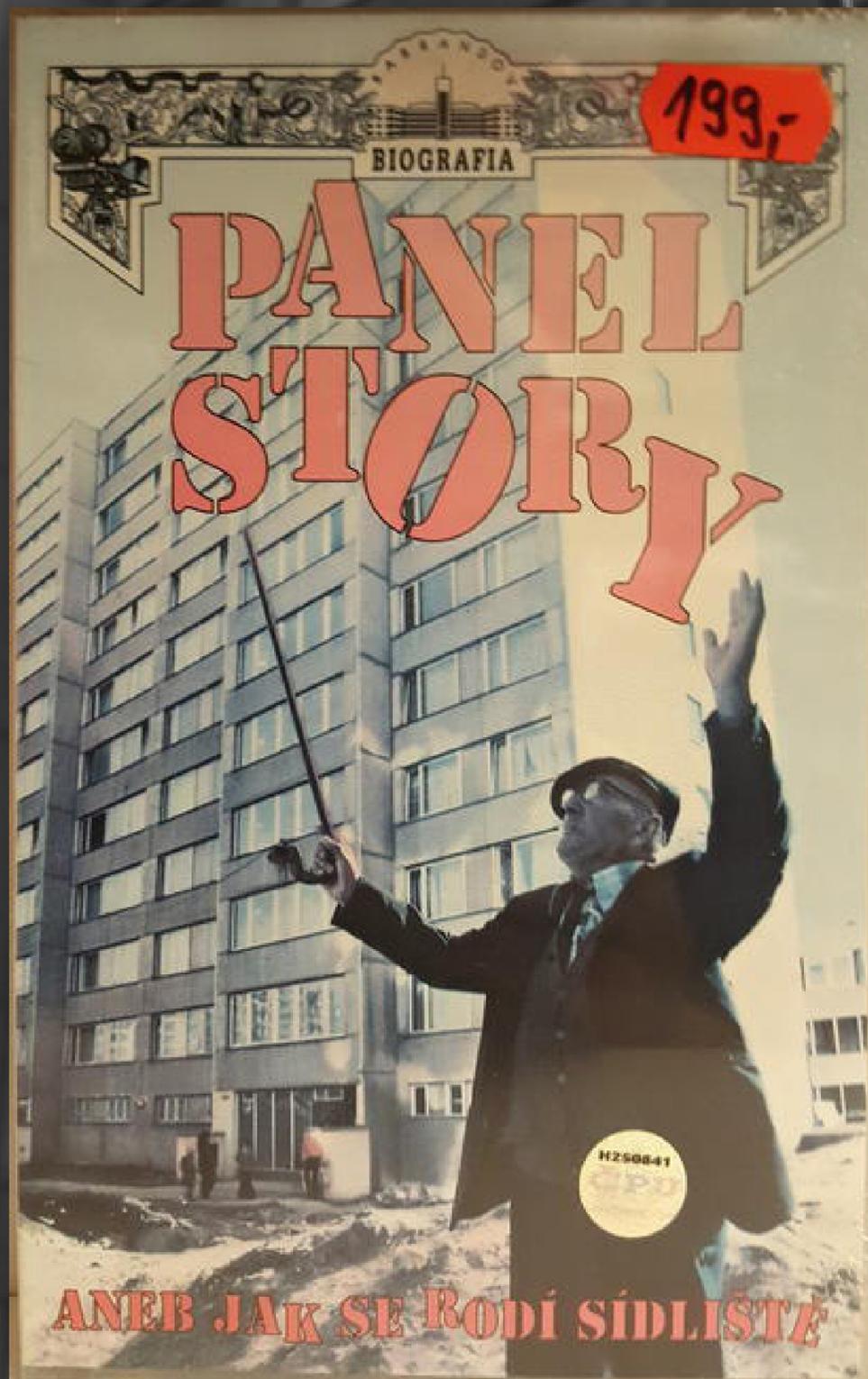
EU 13%

I have a dream

Architect-♥-User

An aerial photograph of a dense residential area in Prague, showing numerous multi-story apartment buildings in various colors like yellow, blue, and green. The buildings are packed closely together, and the city extends into the distance under a clear sky. A tall chimney is visible on the horizon.

**40% of Prague
inhabitants**



**‘Lidské králikárny’
or
‘Human rabbitry’**

Research Questions

What kind of architectural **design process** could provide **evidence-based** suggestions to **efficiently** and **reliably** enhance the **individual users'** experience of Jižní Město to the point when the district becomes **desirable** for the current and new generations?

**How to increase UX
with evidence?**

Research Questions

Localizing

the problem

Understanding

the problem

Targeting

the problem



Built environment = User interface (UI)

“user-friendly city is *like a good homepage*—information is clear, navigation intuitive [...] When you build a city for people in this way, *people will want to live there*—in much the same way that they would buy *a good product*.”

Katrina Zimmerman
Urban Anthropologist

Life is easier on iPhone.

And that starts as soon as you turn it on.



Number of UX professionals in the world

100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0

**10-40% of software
project budget spent
on UX research**

1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050

Year

Nielsen, Jakob. UX Professionals in the World (Data from 1950 to 2017 Are Best Estimates; 2018-2050 Are Forecasts). Accessed August 23, 2024. <https://www.nngroup.com/articles/100-years-ux/>.

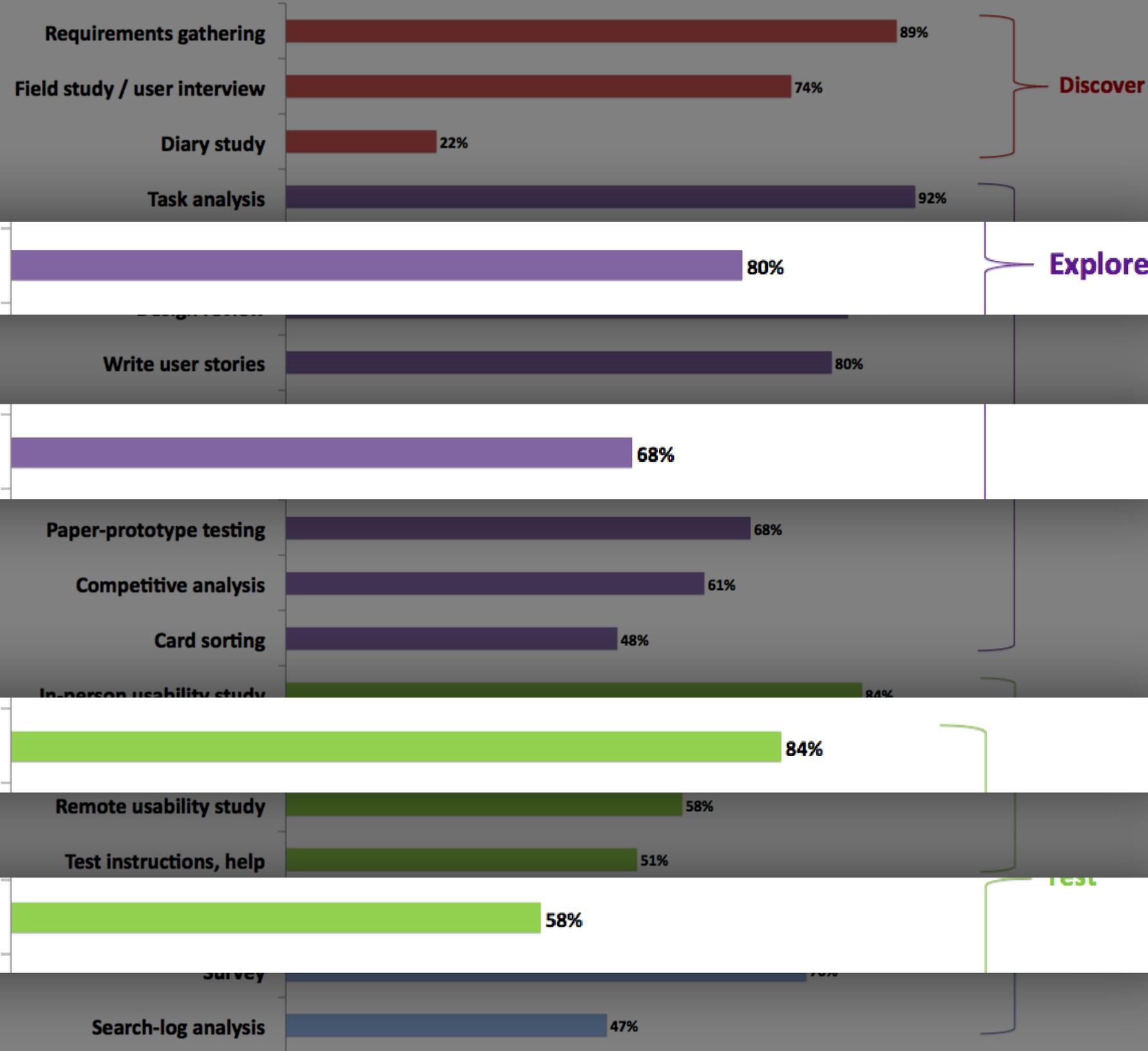


CZ

**<1% of a project's budget
spent on UX Research**

Most-Frequent UX Research Methods

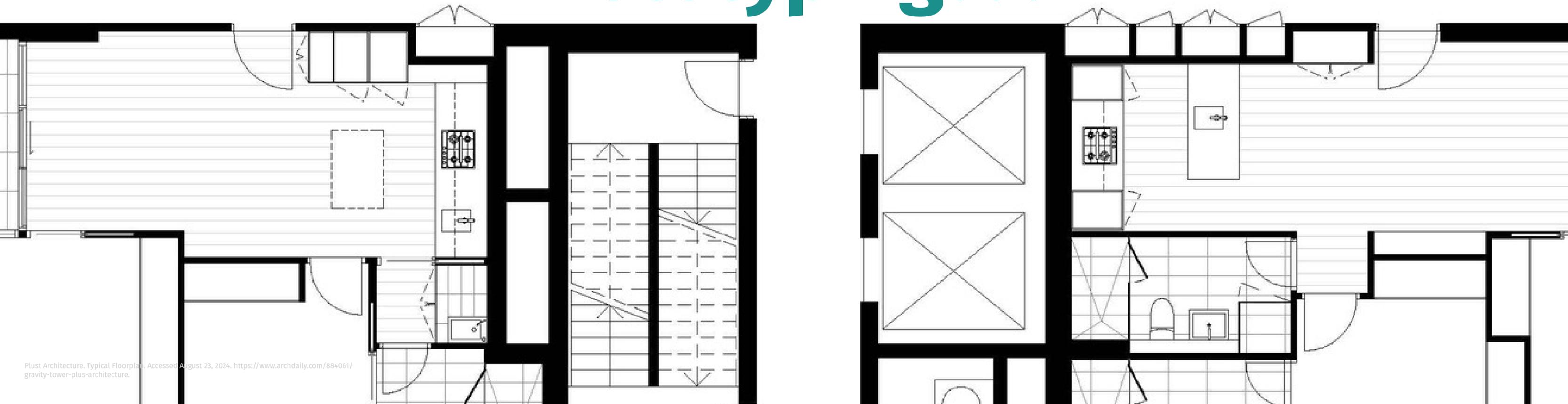
Source: NN/g UX Careers Survey



Prototyping?



Prototyping???



Prototyping???



```
1 <!DOCTYPE html>
2 <html>
3   <head><title> All About Caves</title>
4   </head>
5   <body>
6     <h1>Welcome to my website about caves!</h1>
7     <!-- Navigation bar goes below -->
8     <a href="BlueSpring%20Caverns.html">BlueSpring Caverns</a>
9     <a href="Mammoth%20Cave.html">Mammoth Cave</a>
10    <a href="Luray%20Caverns.html">Luray Caverns</a>
11    <h3>How many facts do you know about caves? Did you know...</h3>
12    <h4> <ul>
13      <li>A cave (or cavern) is a naturally occurring area or space under the
14      surface of the Earth.</li>
15      <li>Stalagmites are created as the mineral rich water droplets fall to the
16      cave floor leaving mineral deposits that grow to become pillar-like formations.
17      </li>
18      <li>Stalactites are created by the continuous dripping of mineral rich water,
19      which little by little leaves mineral deposits on the ceiling as the minerals
20      harden. </li>
21      <li> The deepest known cave is Voronya Cave in Georgia, at 2,197 m (7,208 ft).
22      </li>
23    </ul></h4>
24    <h3> Use the navigation bar at the top to look at three of my favorite
25    caves.</h3>
26    <!-- Link back to main page -->
27    <a href="index.html"> Return to Home Page</a>
28  </body>
29 </html>
```

Virtual Reality the “Archi-lab”



Why and who should care?

10% on UX = +160% UX satisfaction
+100% Sales 

Everyone should care

Architectural method

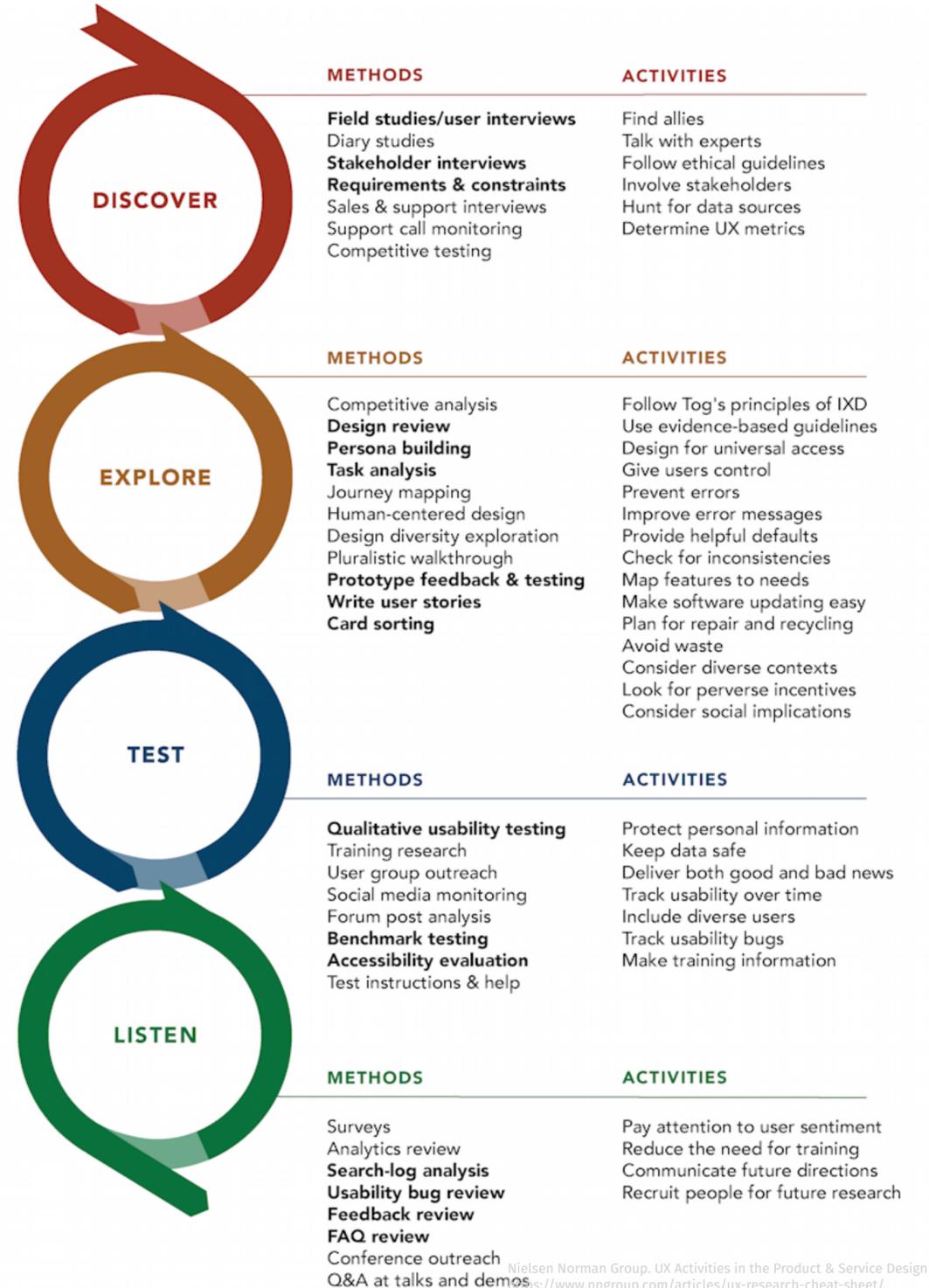


UX Research method

Základní fáze služby při projektové činnosti pozemní/krajinářské stavby

Fáze	Název	%
<input checked="" type="checkbox"/> 1 FS	i Příprava projektu	1 %
<input checked="" type="checkbox"/> 2 FS	i Návrh stavby	13 %
<input checked="" type="checkbox"/> 3 FS	i Projekt pro umístění stavby	15 %
<input checked="" type="checkbox"/> 4 FS	i Projekt pro povolení stavby	22 %
<input type="checkbox"/> 3-4 FS	i Projekt pro umístění i povolení stavby	30 %
<input checked="" type="checkbox"/> 5 FS	i Projekt pro provádění stavby	32 %
<input checked="" type="checkbox"/> 6 FS	i Soupis prací a dodávek	5 %
<input checked="" type="checkbox"/> 7 FS	i Autorský dozor	12 %

Celkem: 100%



Základní fáze služby při projektové činnosti pozemní/krajinářské stavby. Accessed February 23, 2024. <https://www.cka.cz/sluzby/clenum/kalkulacky/pozemni-a-krajinarske-stavby>.

Nielsen Norman Group. UX Activities in the Product & Service Design Cycle. Accessed April 22, 2024. <https://www.nngroup.com/articles/ux-research-cheat-sheet/>.

Back to the User methodology

- 1. Discover and Prepare**
- 2. Explore and Design**
- 3. Test and Place**
- 4. Build and Check**
- 5. Listen and Reflect**

Discover and Prepare

What users say?

Persona #1



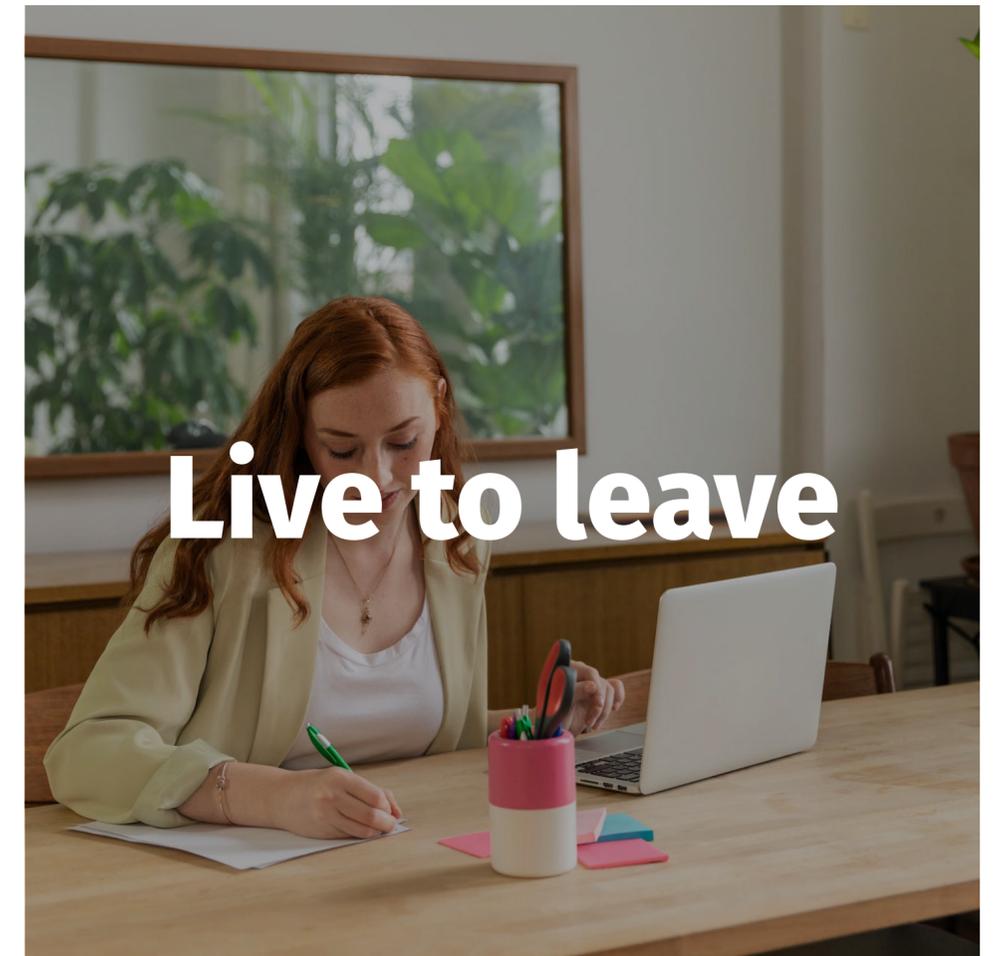
Divíšek, Martin. Jižní Město. Accessed August 23, 2024. <https://prazsky.denik.cz/galerie/praha-jizni-mesto-vystavba-sidliste.html?photo=5&back=1253170964-2784-63>.

Persona #2



Topič, Petr. Michal s Danou žijí v Azylovém Domě se svými pěti dětmi. Accessed August 23, 2024. https://www.idnes.cz/zpravy/domaci/pribehy-chudych-rodin.A161011_101943_domaci_zt/foto/ZT669c86_101825_12216028.jpg.

Persona #3



Pexels - Free to use

Urgency

1

Exciting active 'popular' environment



Keeping low-cost

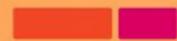


Typological diversity

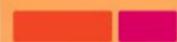


2

Addressing fragmented ownership



Living options for singles



Anonymity decrease



3

Ground empty of cars



Greenery - keeping existing amount or larger



Greenery - higher quality



Urban and countryside feeling



4

Vandalism decrease



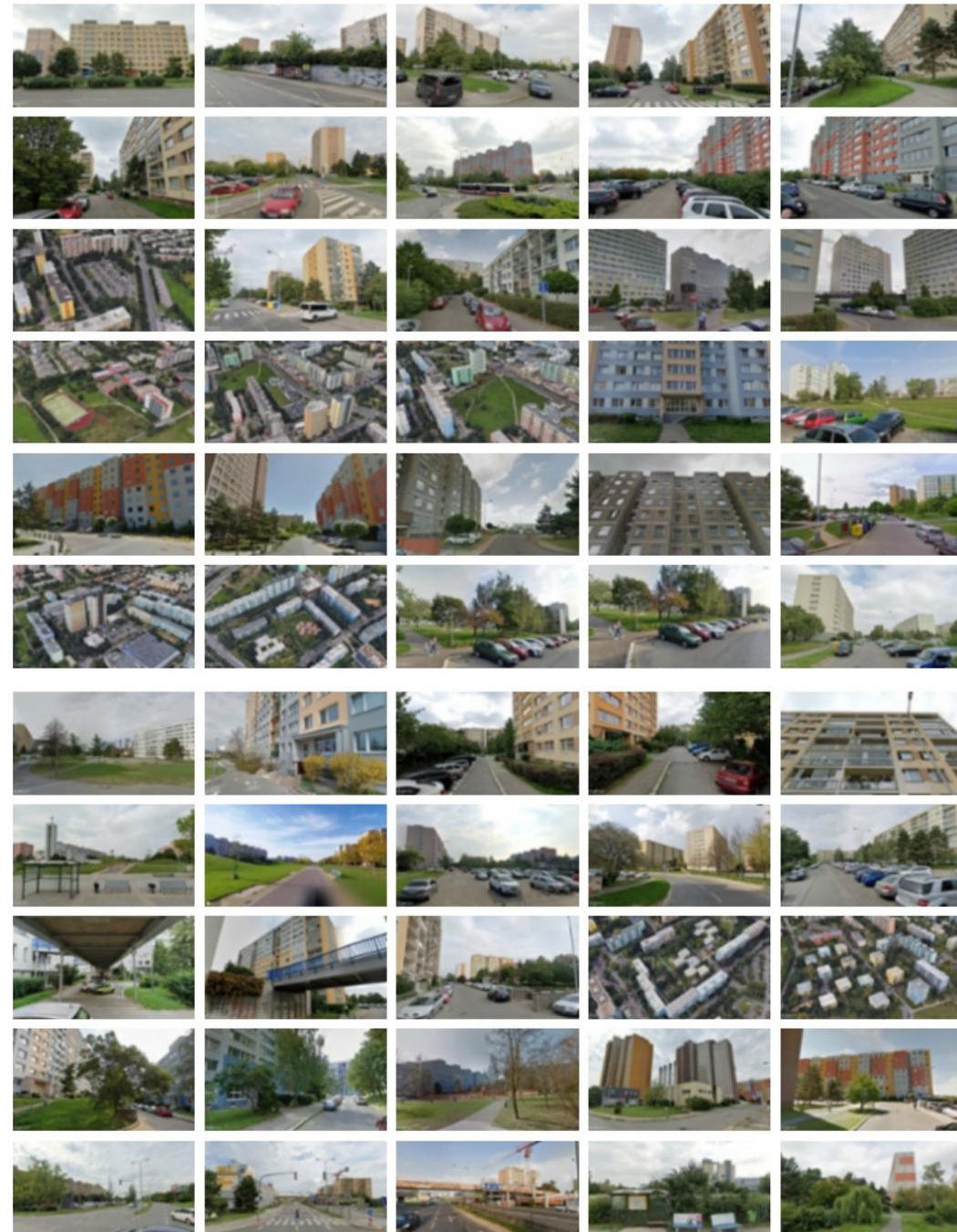
Spatial Readability



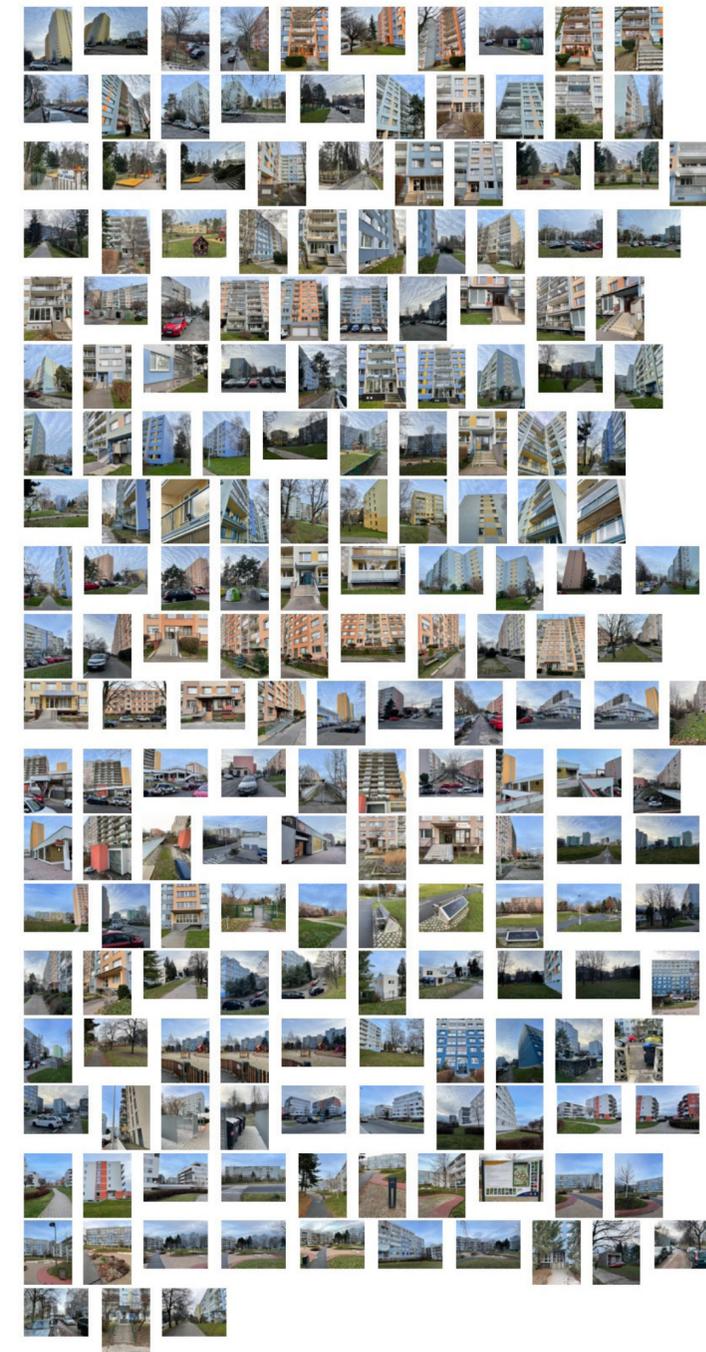
No densification - threat for the greenery



Google Earth



On site



Borders



Forehead/Blind wall



Parking



Public transport stops



Building forms

Building forms



Greenland

Greenland



Playgrounds

Playgrounds



'Street'

Street



'Courtyard'

Courtyard



Ground floor relationships

Ground floor relationship



Public accessories

Public accessories



Entrances

Entrances



Heavy roads

Heavy roads



Public amenities

Public amenities



Territoriality

Territoriality



Facade

Facade



Loggias

Loggias



Public connections

Public connections



Waste bins

Waste bins



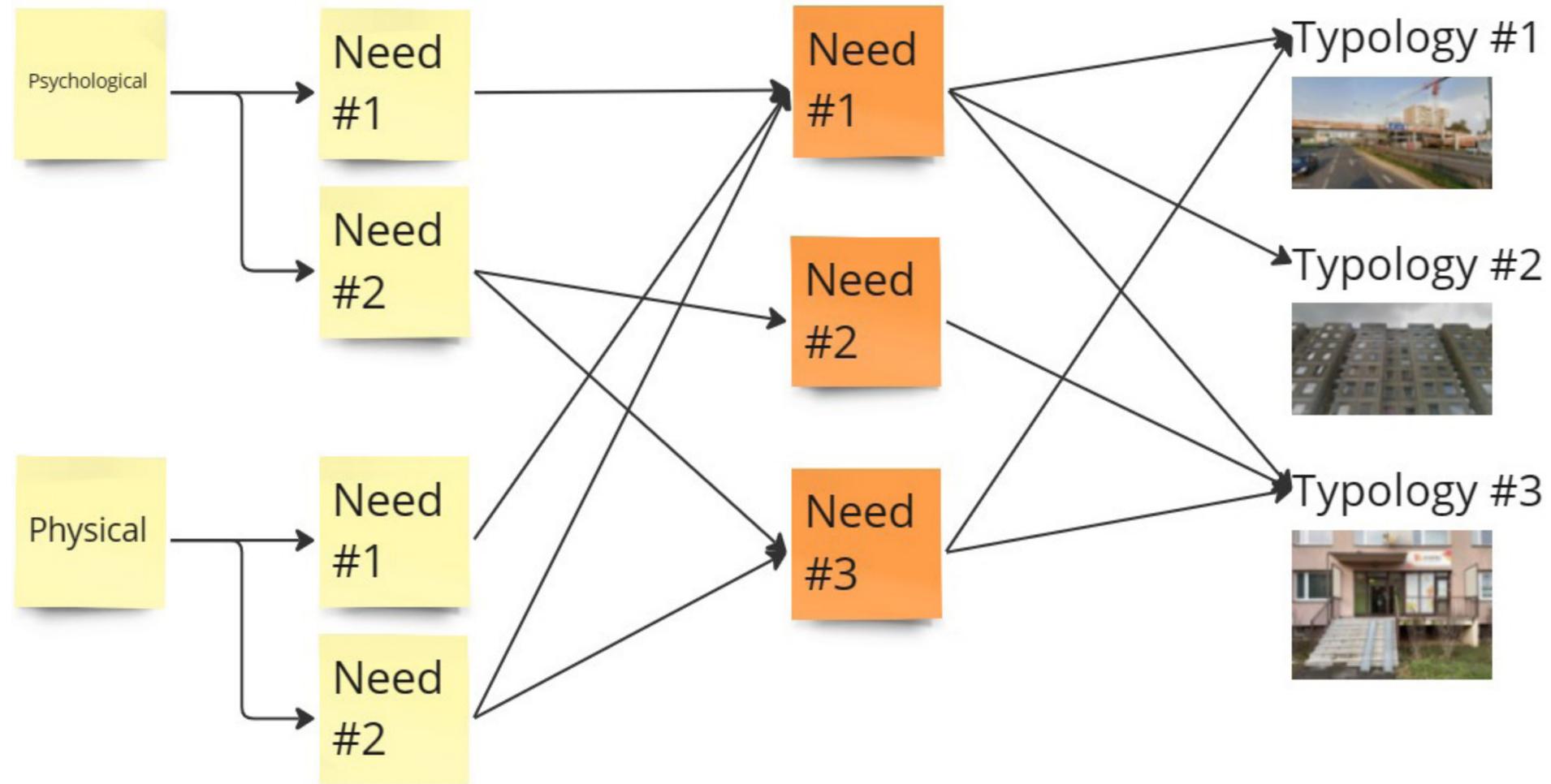
Explore and Design

Neural network analysis

Fundamental needs

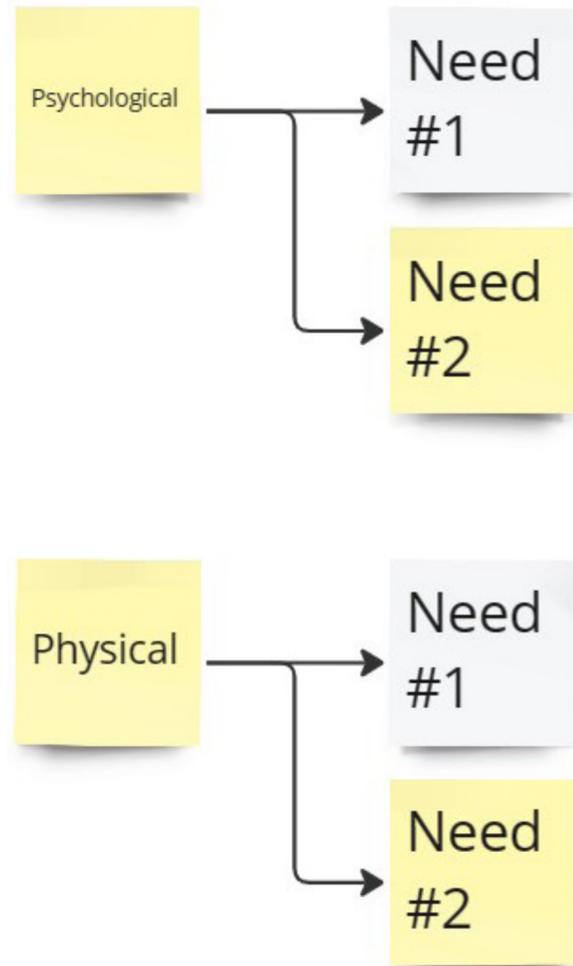
Local needs

Local typologies



Neural network analysis

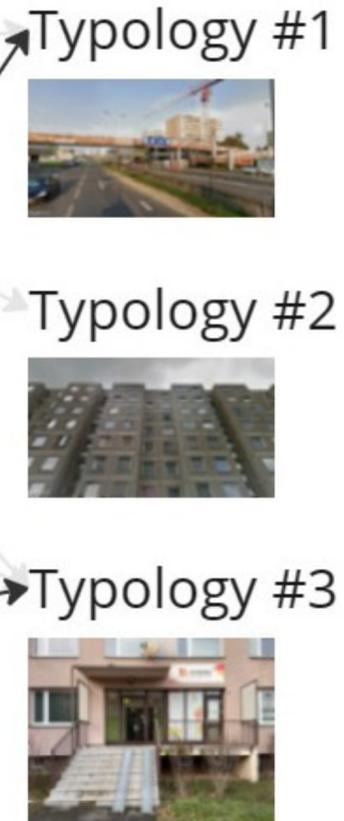
Fundamental needs



Local needs



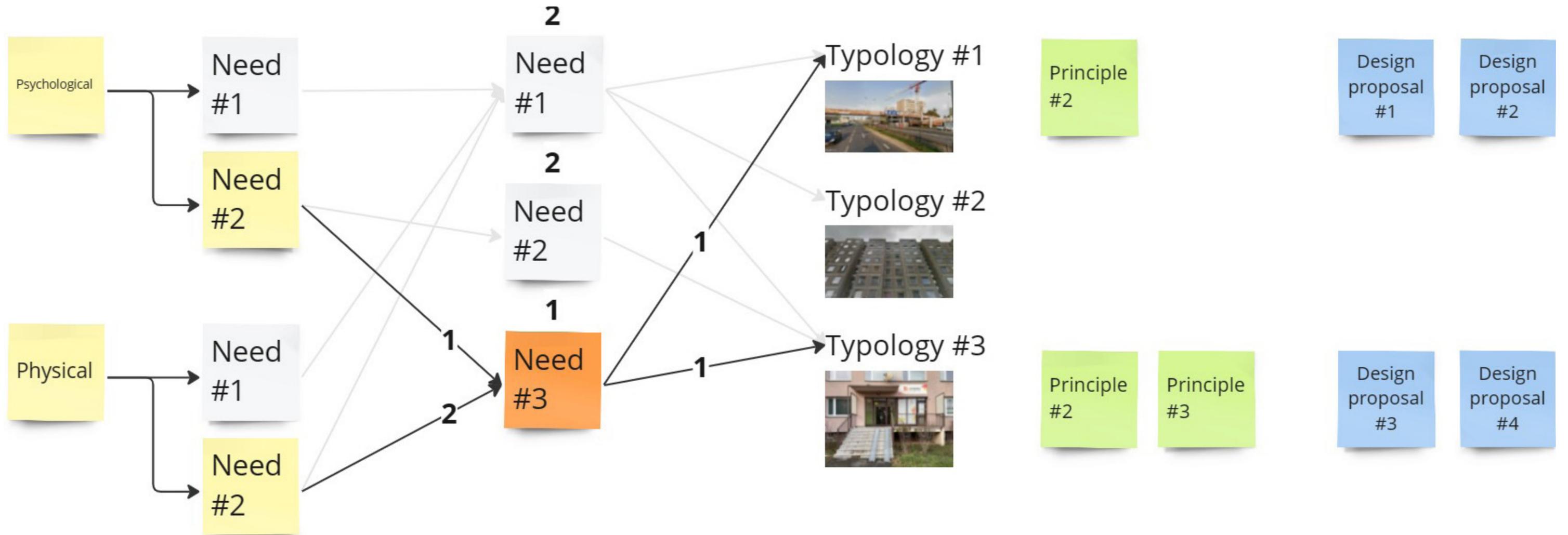
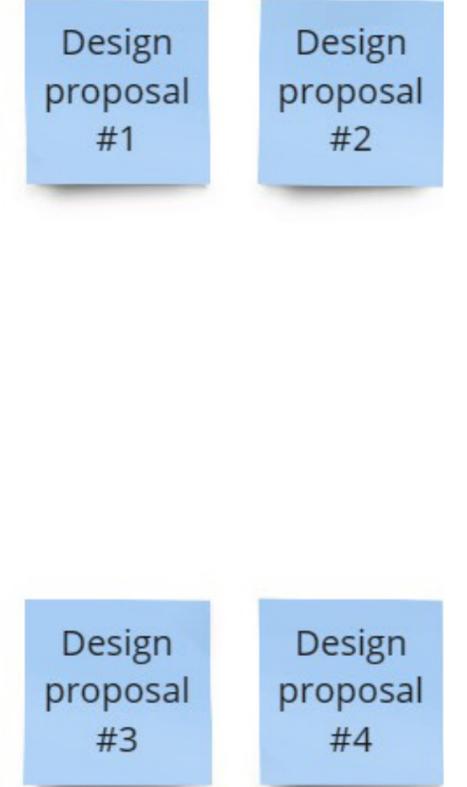
Local typologies

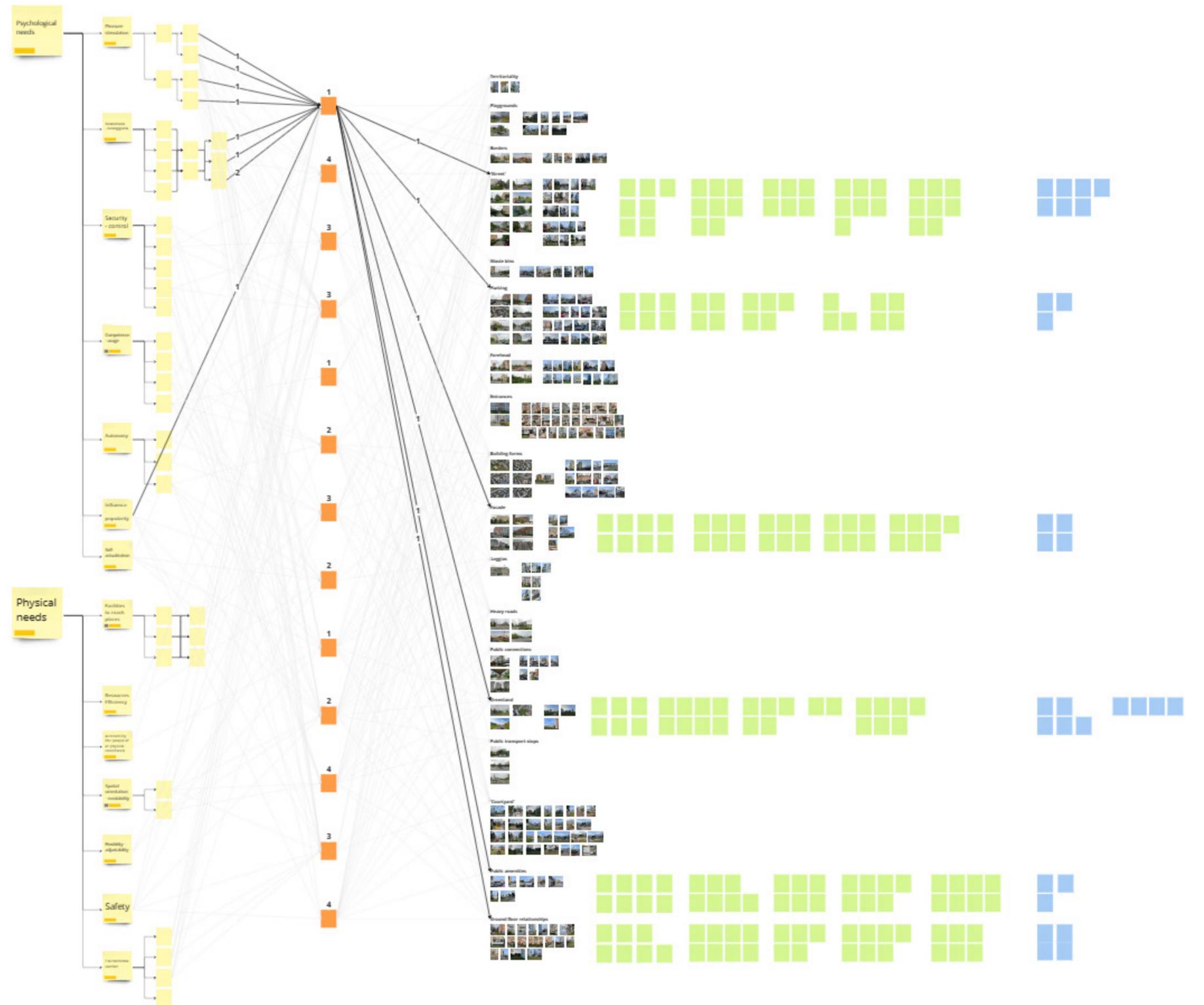
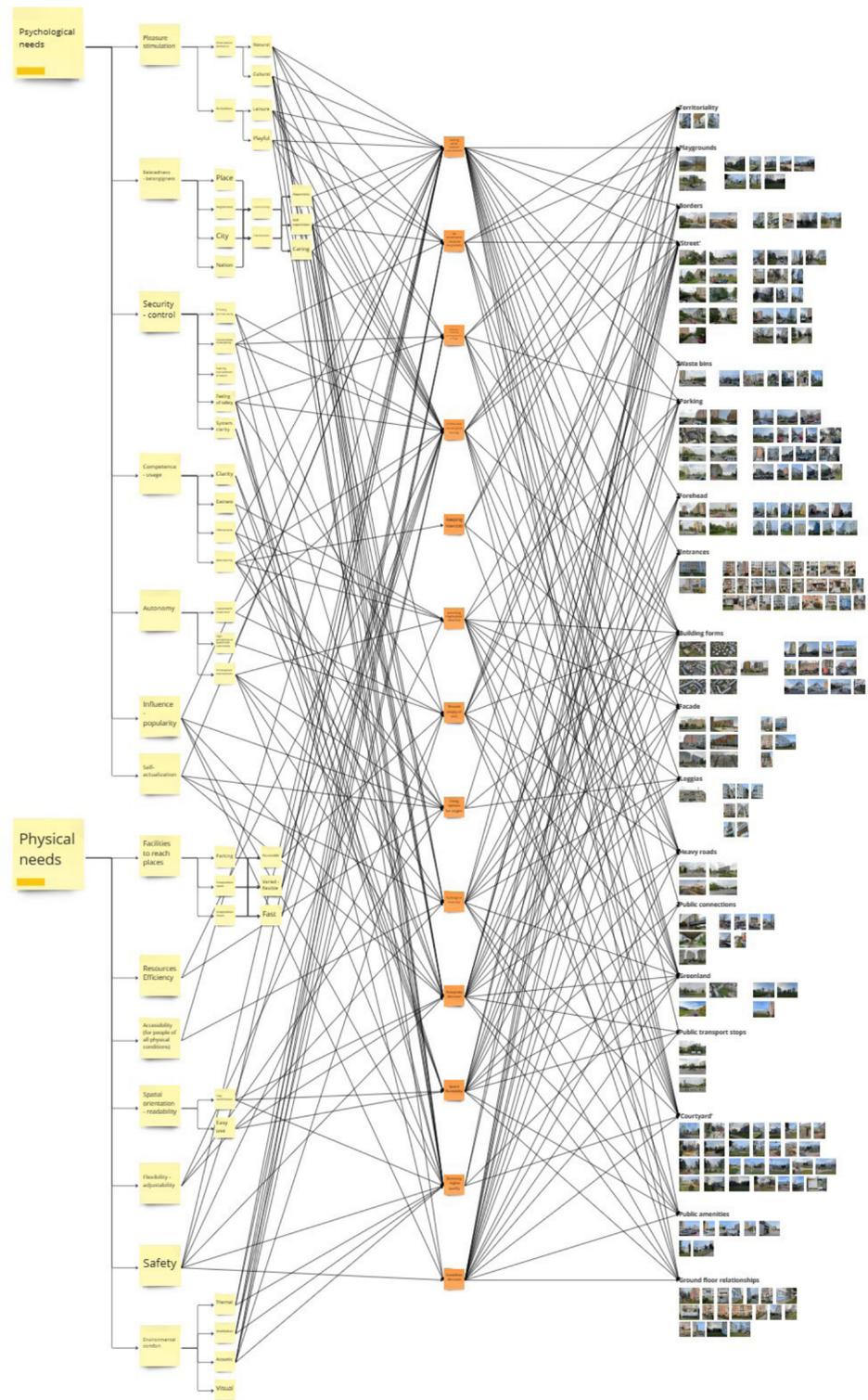


UX Design principles



Design proposals







Facade





Plinth relationships





Greenland



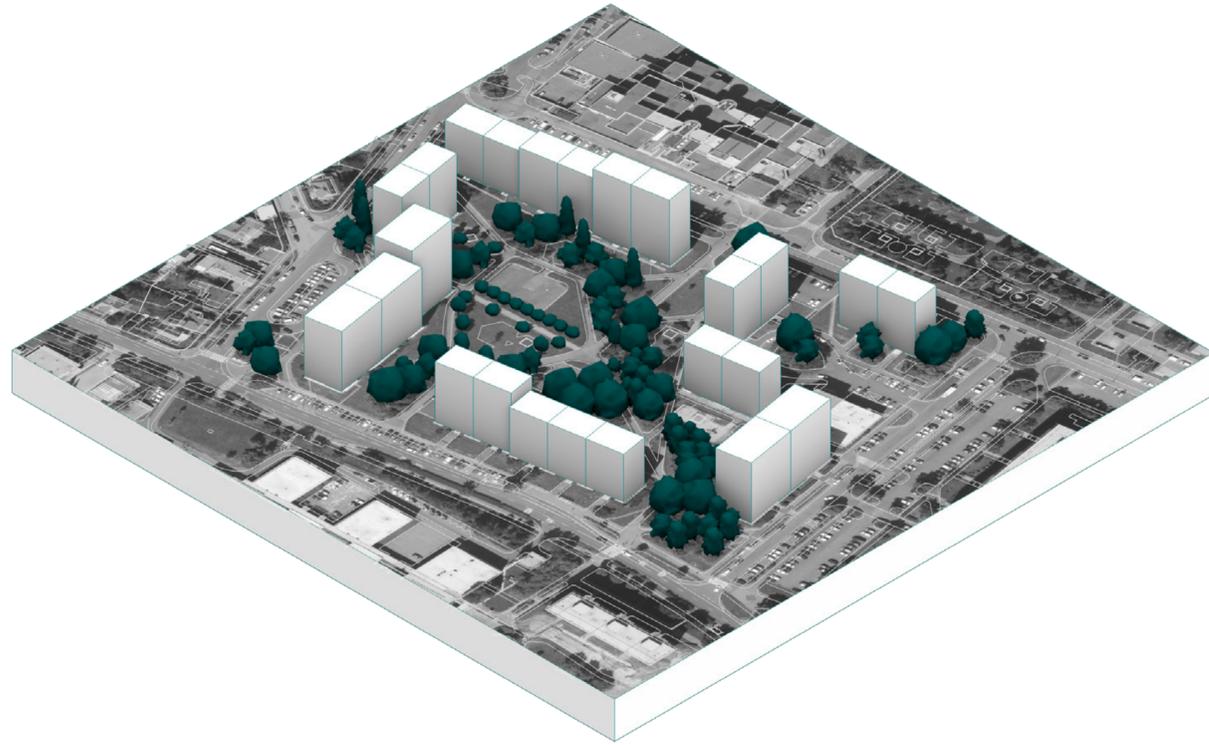
Explore and Design

Participatory Session
Design in VR

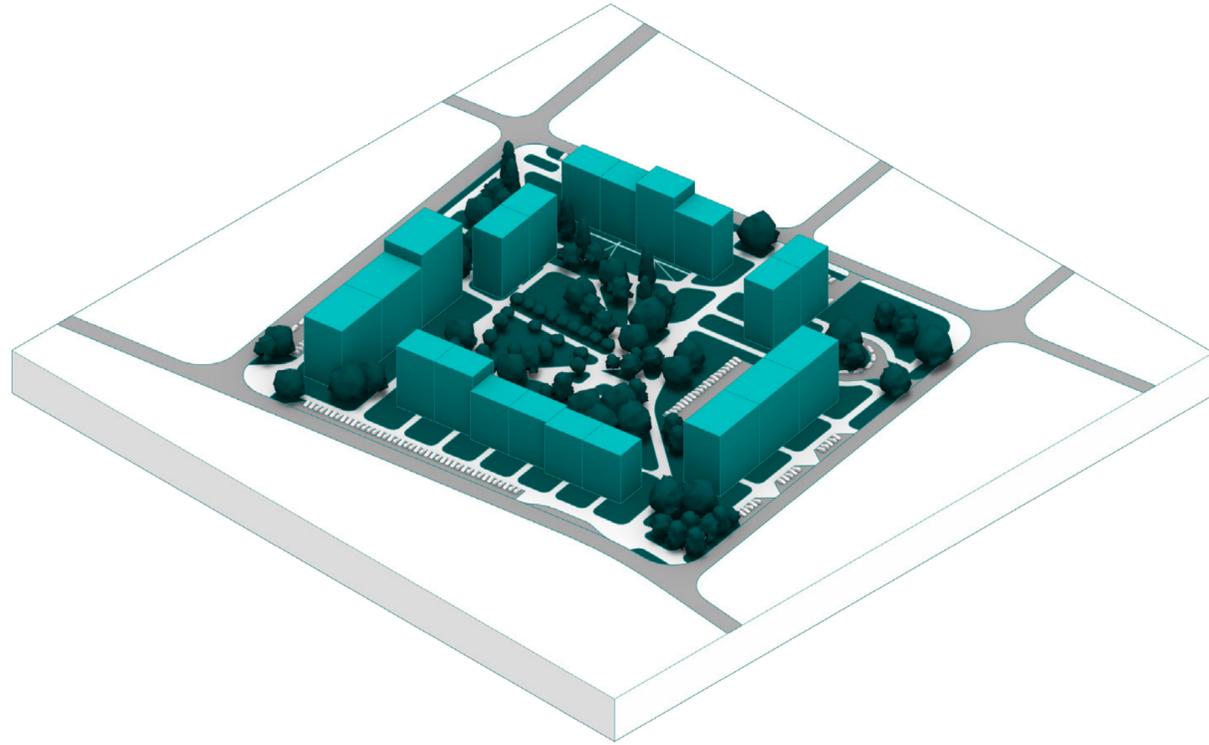




Inspirational site



Altered version



Session timeline

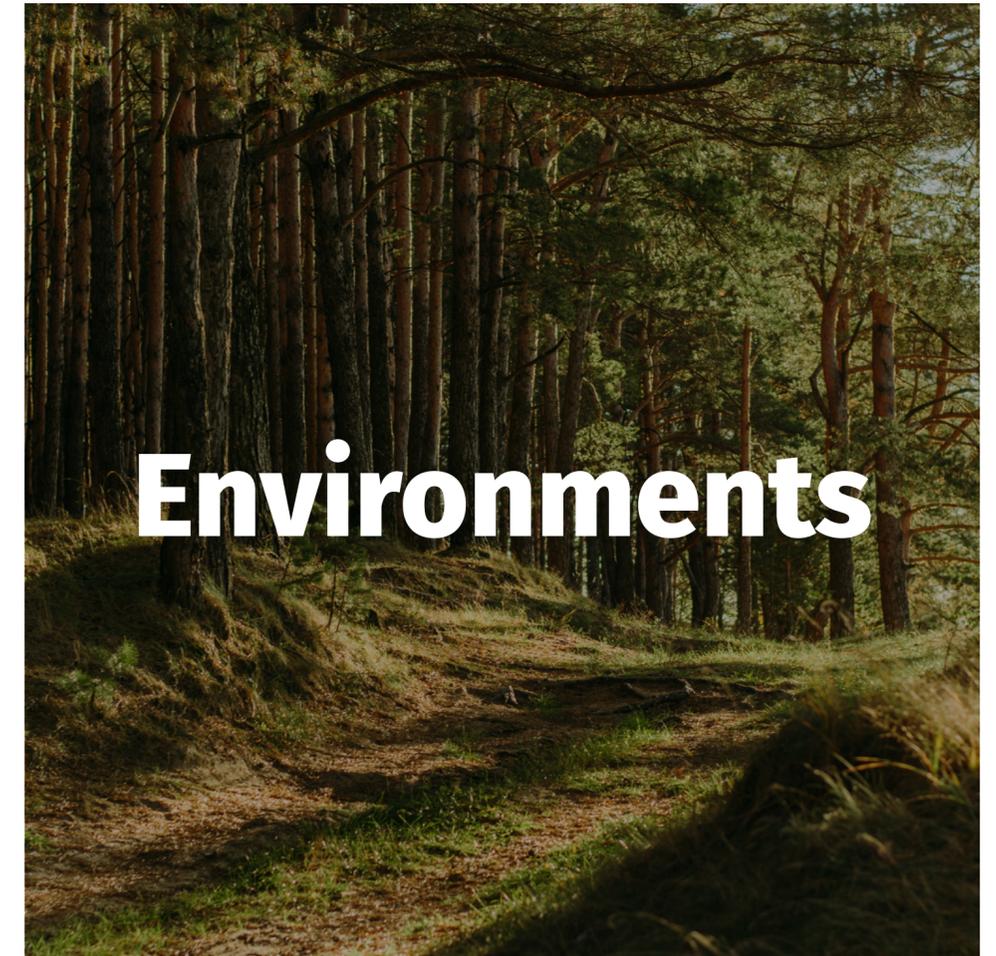
Participatory Session Design



**Participatory Session
Design
Collaging**

Collaging groups

Collaging



Typologies



Social interactions and emotions



And then what we will do during the exercise is essentially that you will try to tell your



if we talk about the enclosure but so there's
there's a certain like a anxiety frustration

Typologies



And that one's like more of a discontentness
or like this wish longing for things to be

Participatory Session
Design

Interventions Testing

Timeline per typology

Interventions Testing



Facade

Interventions Testing

Base



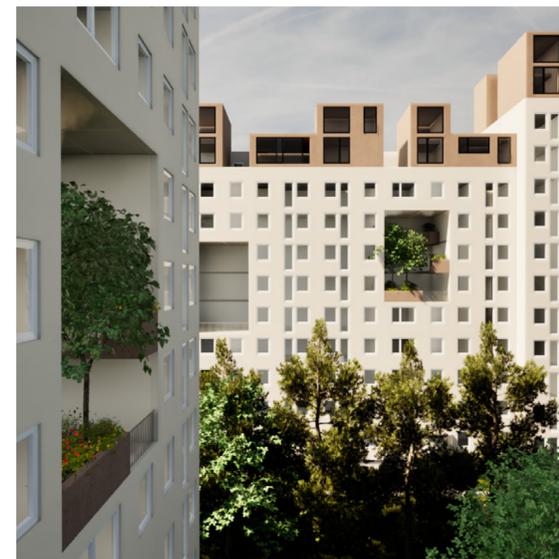
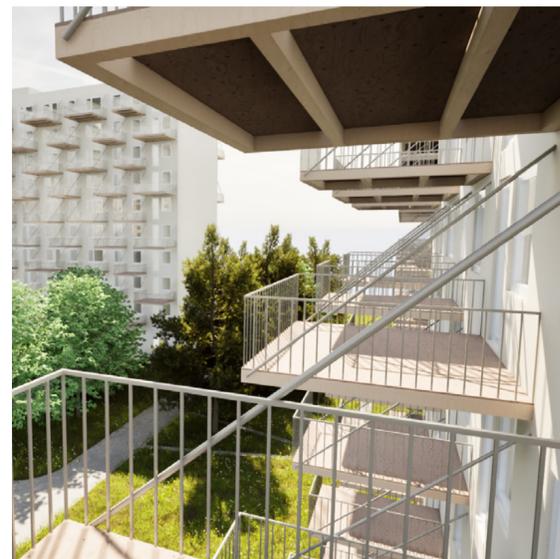
Ball-cony



Extend



Jenga



Ball-cony

Extend

What is more private?



Plinth relations

Interventions Testing

Base



Open-up



Gardening



Greenland

Interventions Testing

Base



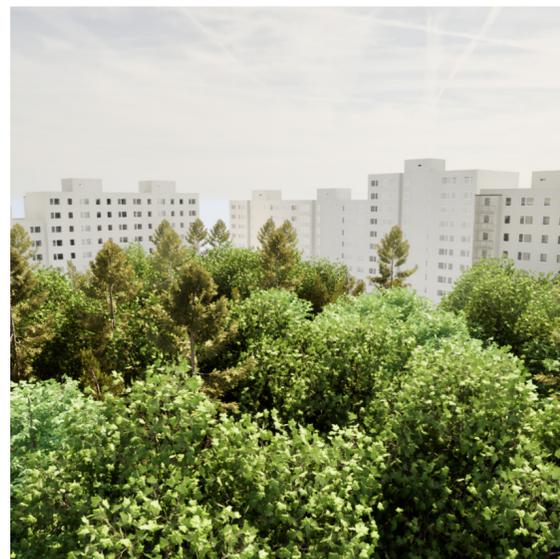
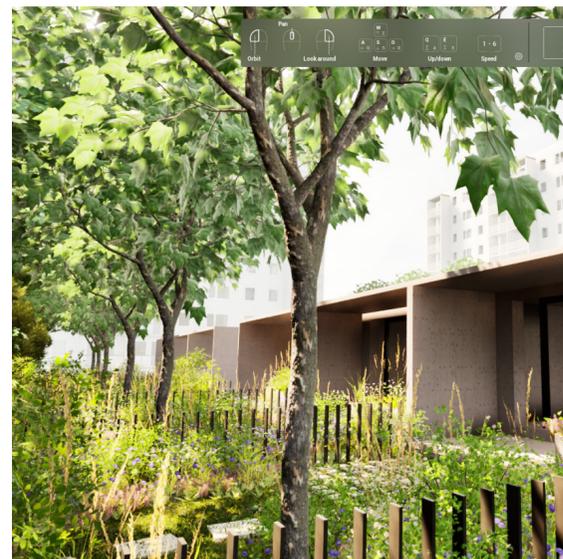
Garden nation



Urban orchard



Jungle



Participatory Session Design

Data Conclusions

Order of showcase

Greenland

**Participant
#1**

**Participant
#2**

**Participant
#3**

**Participant
#4**

**Participant
#5**

**Participant
#6**

**Participant
#7**

Last

Jungle

Jungle

Jungle

**Garden
Nation**

**Urban
Orchard**

**Garden
Nation**

Jungle

**Urban
Orchard**

**Urban
Orchard**

**Urban
Orchard**

Jungle

Jungle

Jungle

**Garden
Nation**

**Garden
Nation**

**Garden
Nation**

**Garden
Nation**

**Urban
Orchard**

**Garden
Nation**

**Urban
Orchard**

**Urban
Orchard**

First

Base

Base

Base

Base

Base

Base

Base

Rating – First impression

Greenland

	Participant #1	Participant #2	Participant #3	Participant #4	Participant #5	Participant #6	Participant #7
Highest	Garden Nation	Jungle	Jungle	Base	Jungle	Garden Nation	Garden Nation
	Base	Garden Nation	Garden Nation	Jungle	Urban Orchard	Jungle	Base
	Jungle	Urban Orchard	Urban Orchard	Garden Nation	Garden Nation	Base	Jungle
Lowest	Urban Orchard	Base	Base	Urban Orchard	Base	Urban Orchard	Urban Orchard

Rating – Informed impression

Greenland

**Participant
#1**

**Participant
#2**

**Participant
#3**

**Participant
#4**

**Participant
#5**

**Participant
#6**

**Participant
#7**

Highest

Jungle

Jungle

Jungle

Jungle

Jungle

**Garden
Nation**

**Garden
Nation**

**Garden
Nation**

**Garden
Nation**

**Urban
Orchard**

**Urban
Orchard**

**Garden
Nation**

Jungle

Jungle

Base

**Urban
Orchard**

**Garden
Nation**

Base

**Urban
Orchard**

**Urban
Orchard**

Base

Lowest

**Urban
Orchard**

Base

Base

**Garden
Nation**

Base

Base

**Urban
Orchard**

Rating – Post-edits

Greenland

	Participant #1	Participant #2	Participant #3	Participant #4	Participant #5	Participant #6	Participant #7
Highest	Missing data	Jungle	Jungle	Jungle	Jungle	Garden Nation	Garden Nation
	Missing data	Garden Nation	Urban Orchard	Urban Orchard	Garden Nation	Urban Orchard	Jungle
	Missing data	Urban Orchard	Garden Nation	Base	Urban Orchard	Jungle	Urban Orchard
Lowest	Missing data	Base	Base	Garden Nation	Base	Base	Base

Jungle





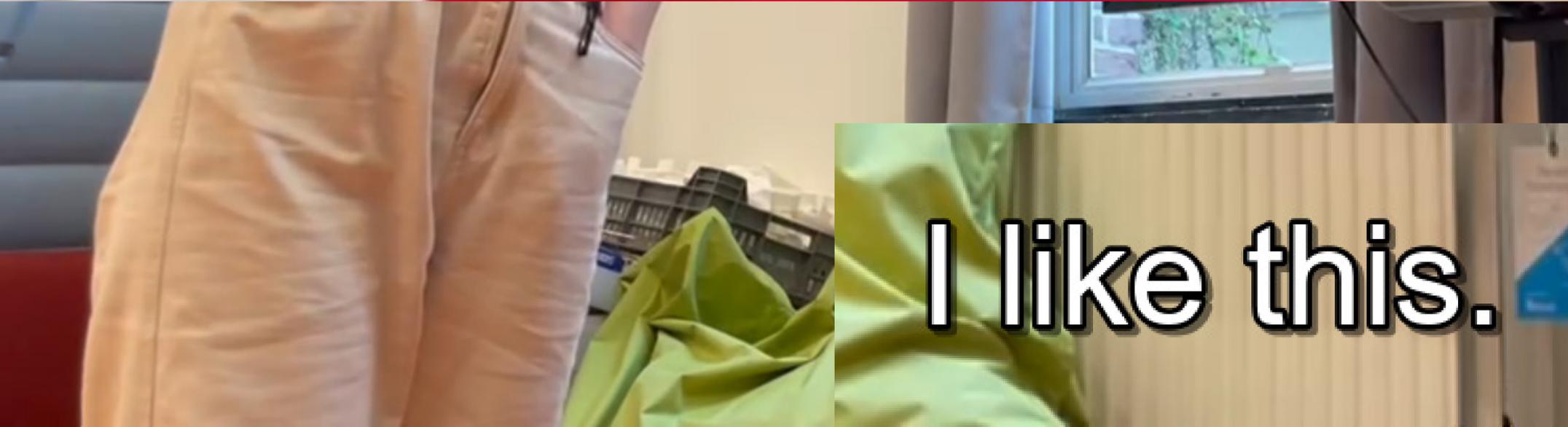
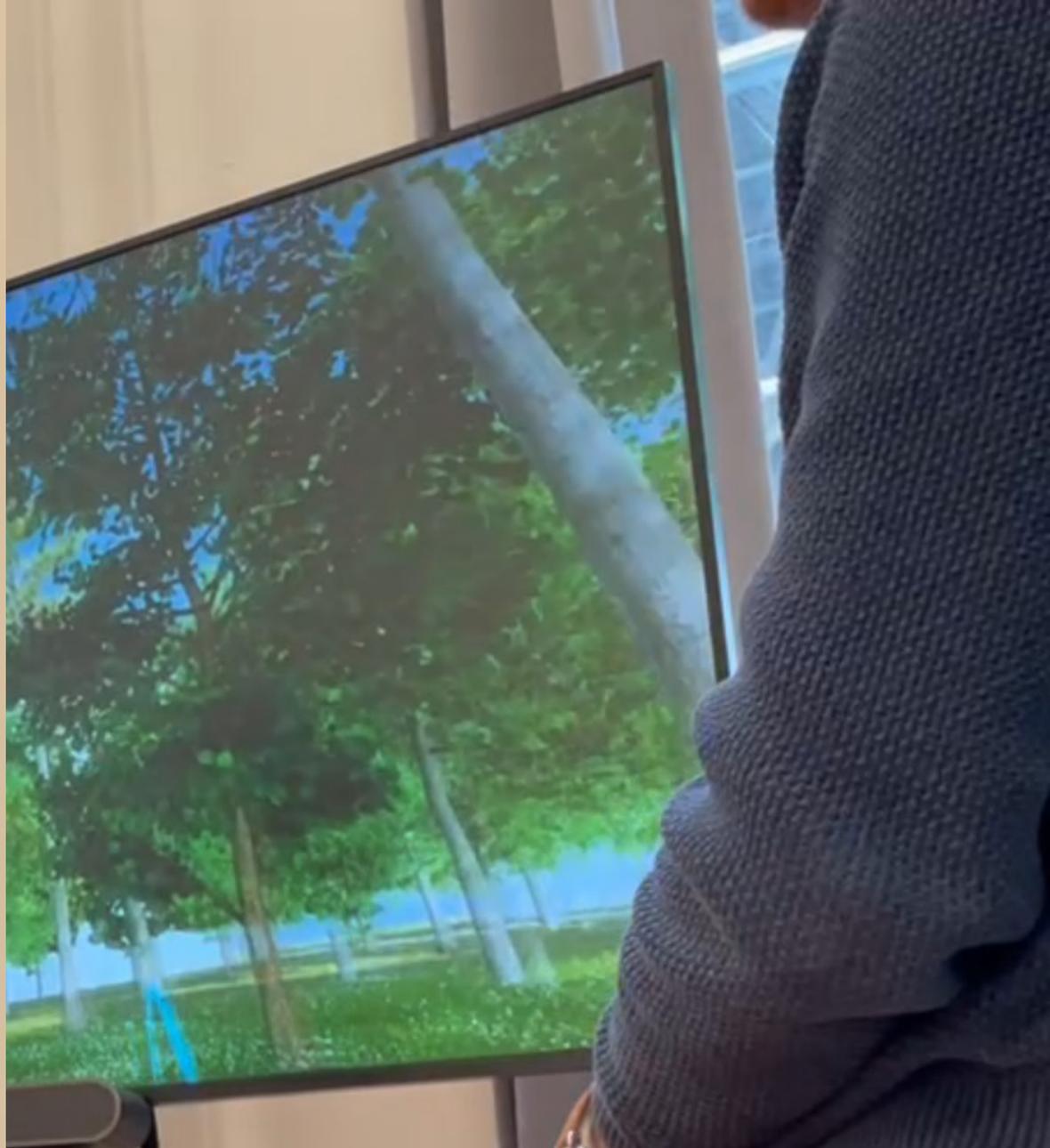
Oh shit.



It's scary.



I like this.



I like this.

Total rating

Greenland

Interventions	First impression	Informed impression	Post-edit	Total
Base	15	10	7	32
Garden Nation	22	20	17	59
Urban Orchard	11	14	15	40
Jungle	22	26	21	69

Total rating

Greenland

Interventions	First impression	Informed impression	Post-edit	Total		
Base	15	10	7	32		
Garden Nation	22	20	17	59		
Urban Orchard	11	14	15	40		
Jungle	22	26	21	69		
						+116%

Test and Place

#7 Informed impression

Interventions Testing

Lowest preference

Highest preference

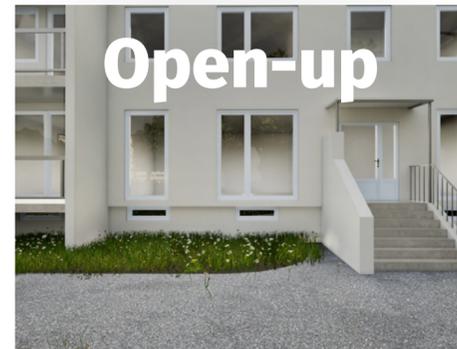
Facade



Greenland



Plinth relationships



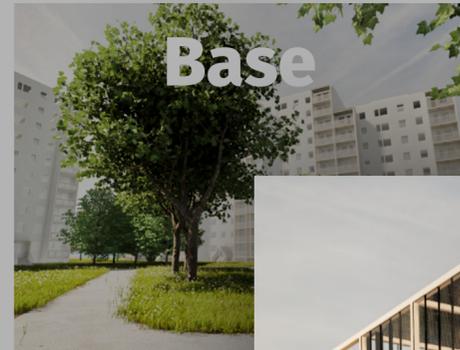
#7 Informed impression

Interventions Testing

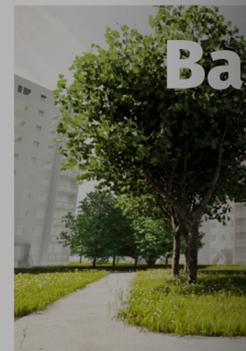
Lowest preference

Highest preference

Facade



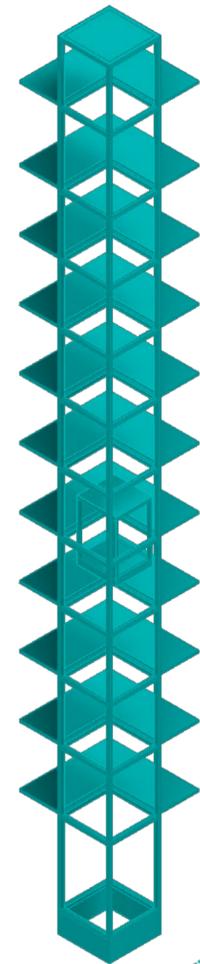
Greenland



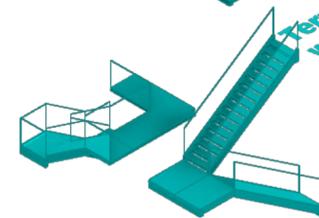
Plinth relationships



64 base combinations + 100s more with flower pots

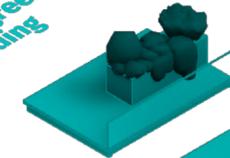


Elevator

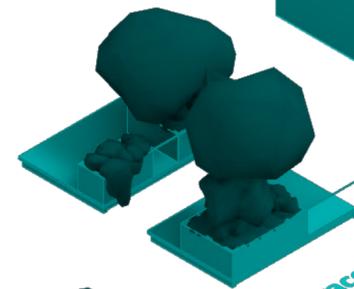


Staircase

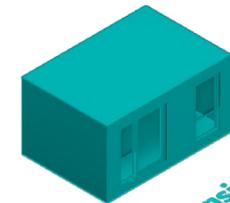
Terrace with greenery shading



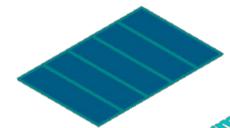
Terrace with tree pots



Extension unit 23.1 m²



Extension unit 13.9 m²



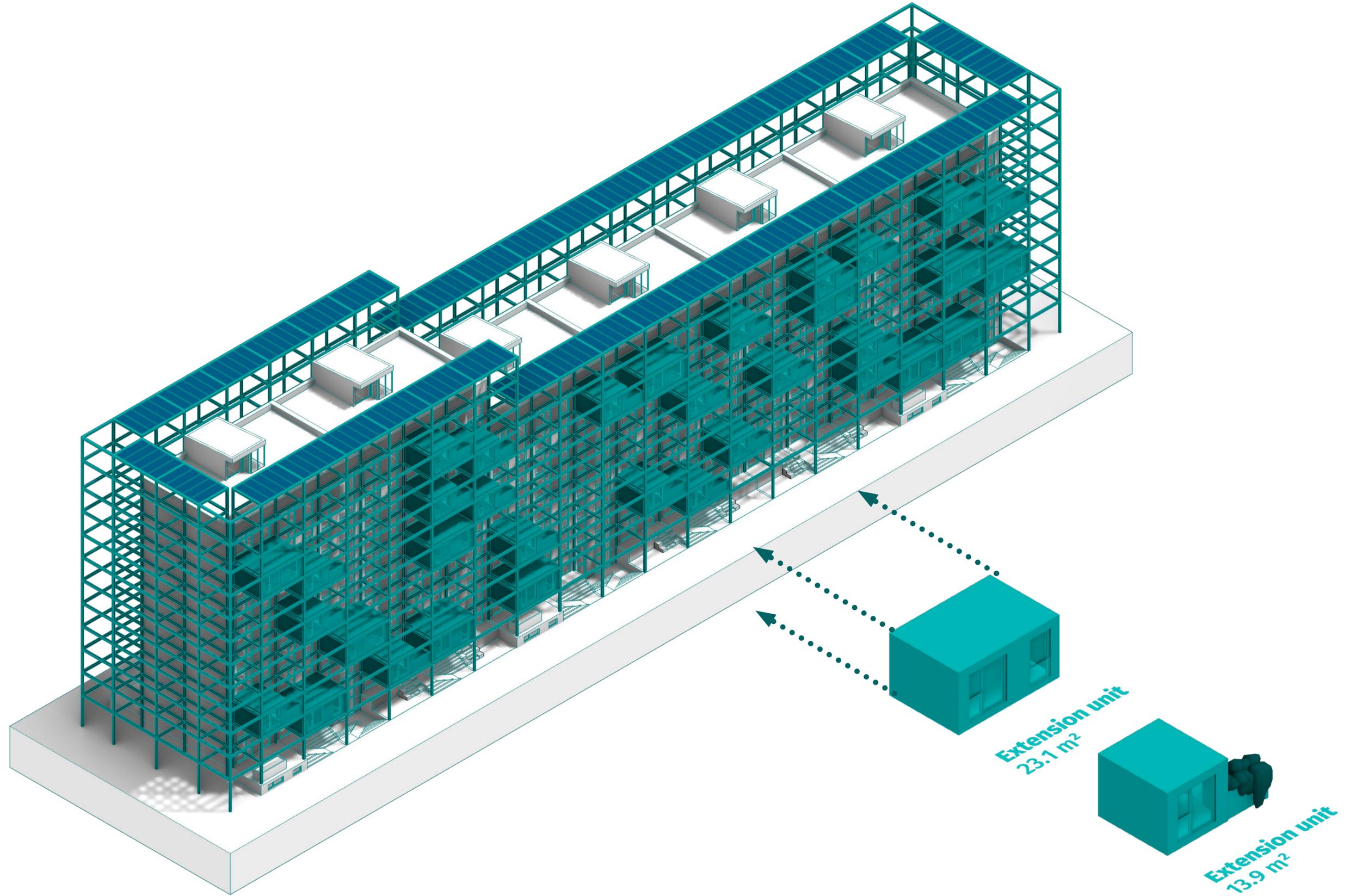
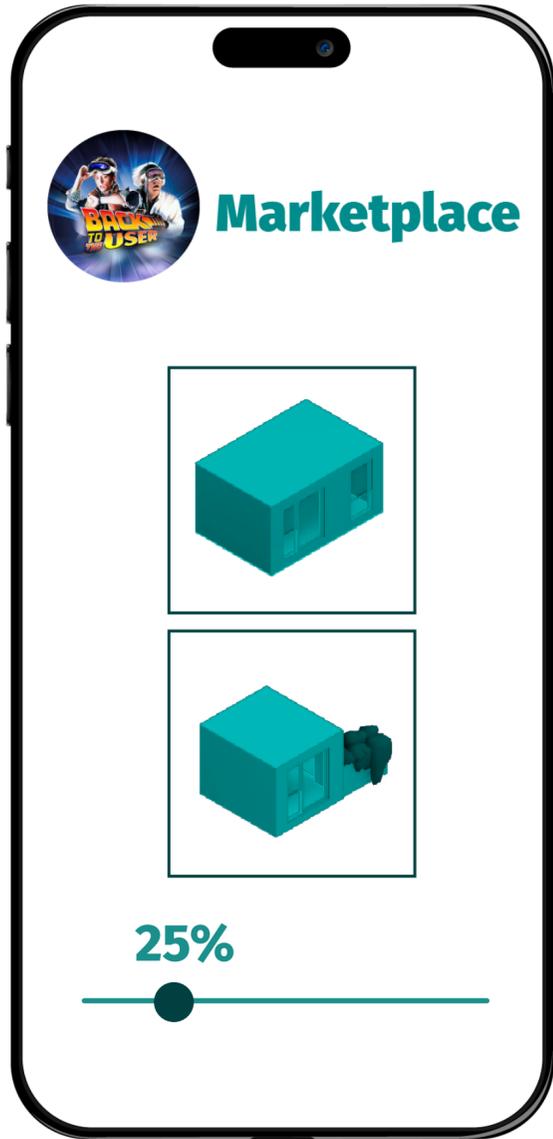
PV farm

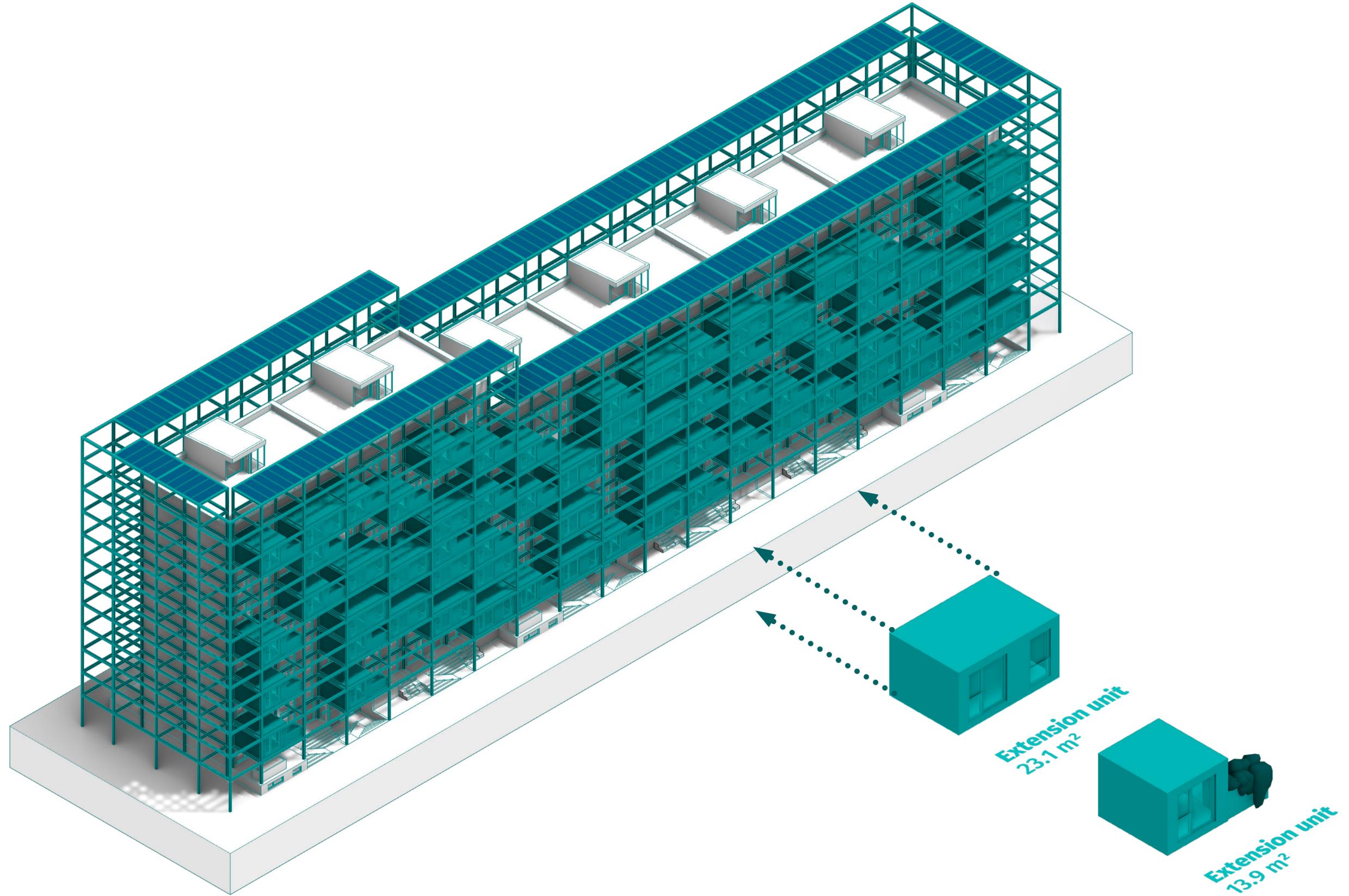
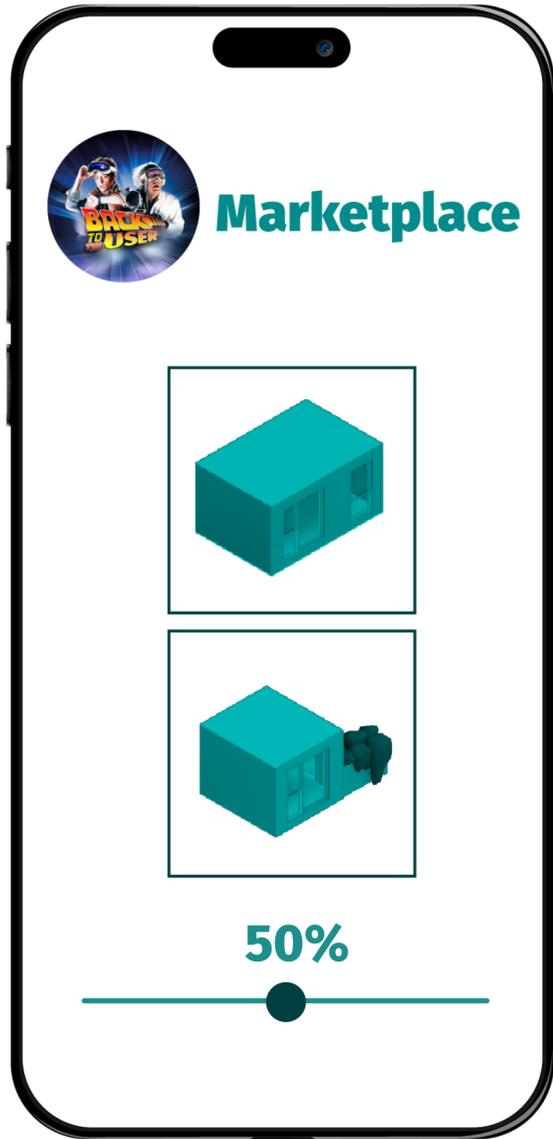
Solar chimney

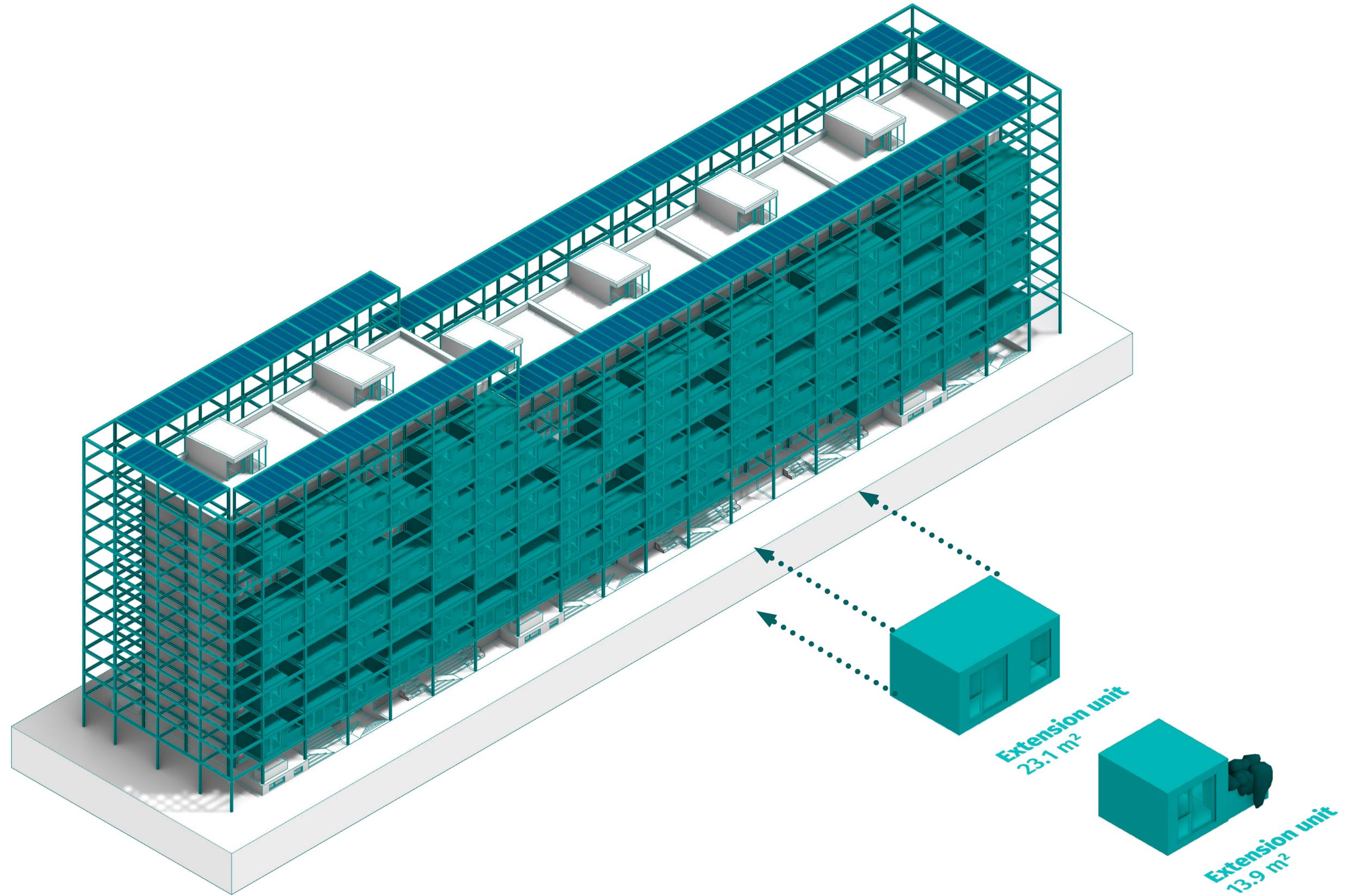
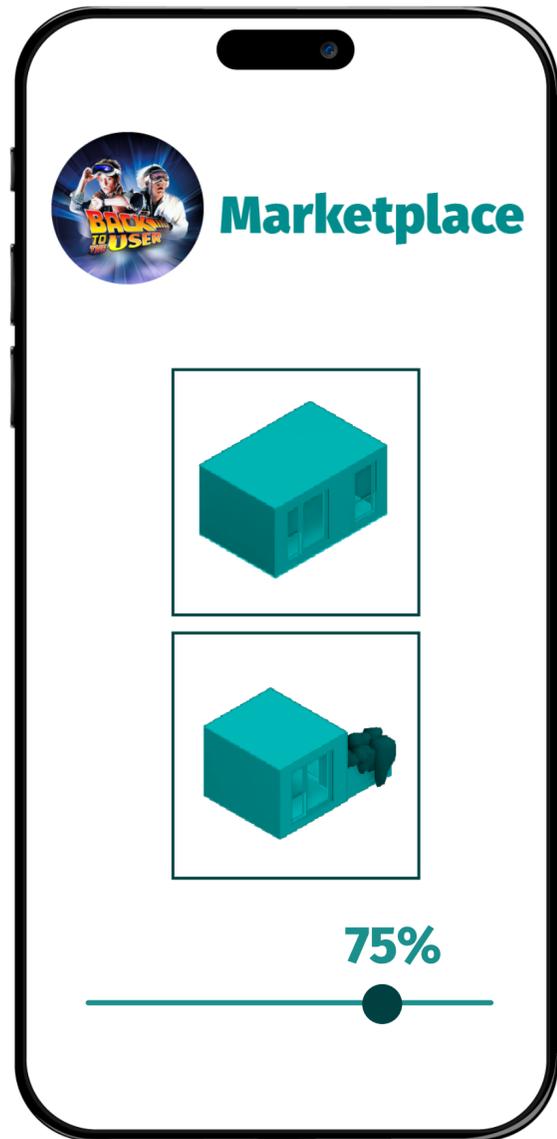


Greenhouse





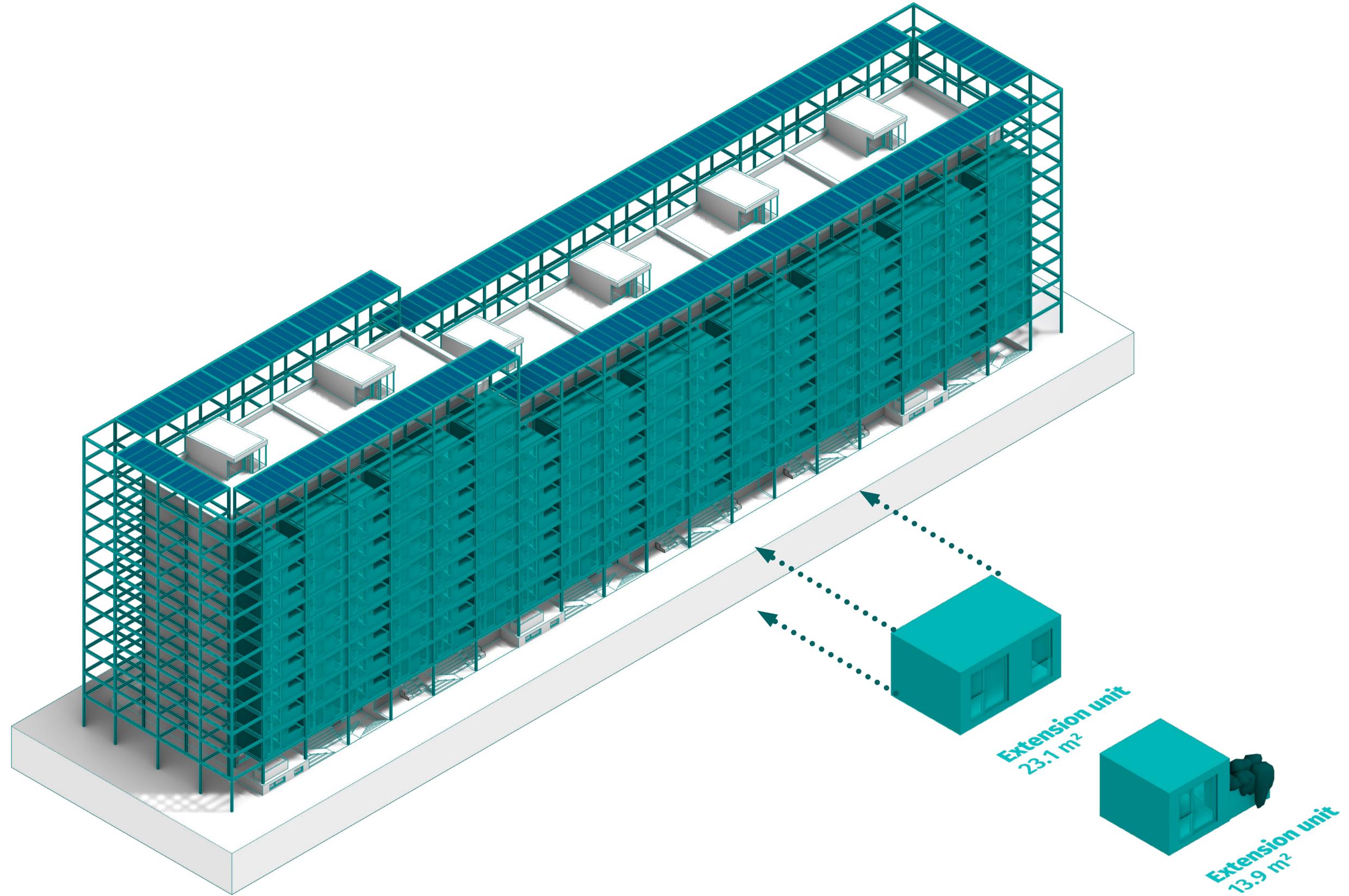


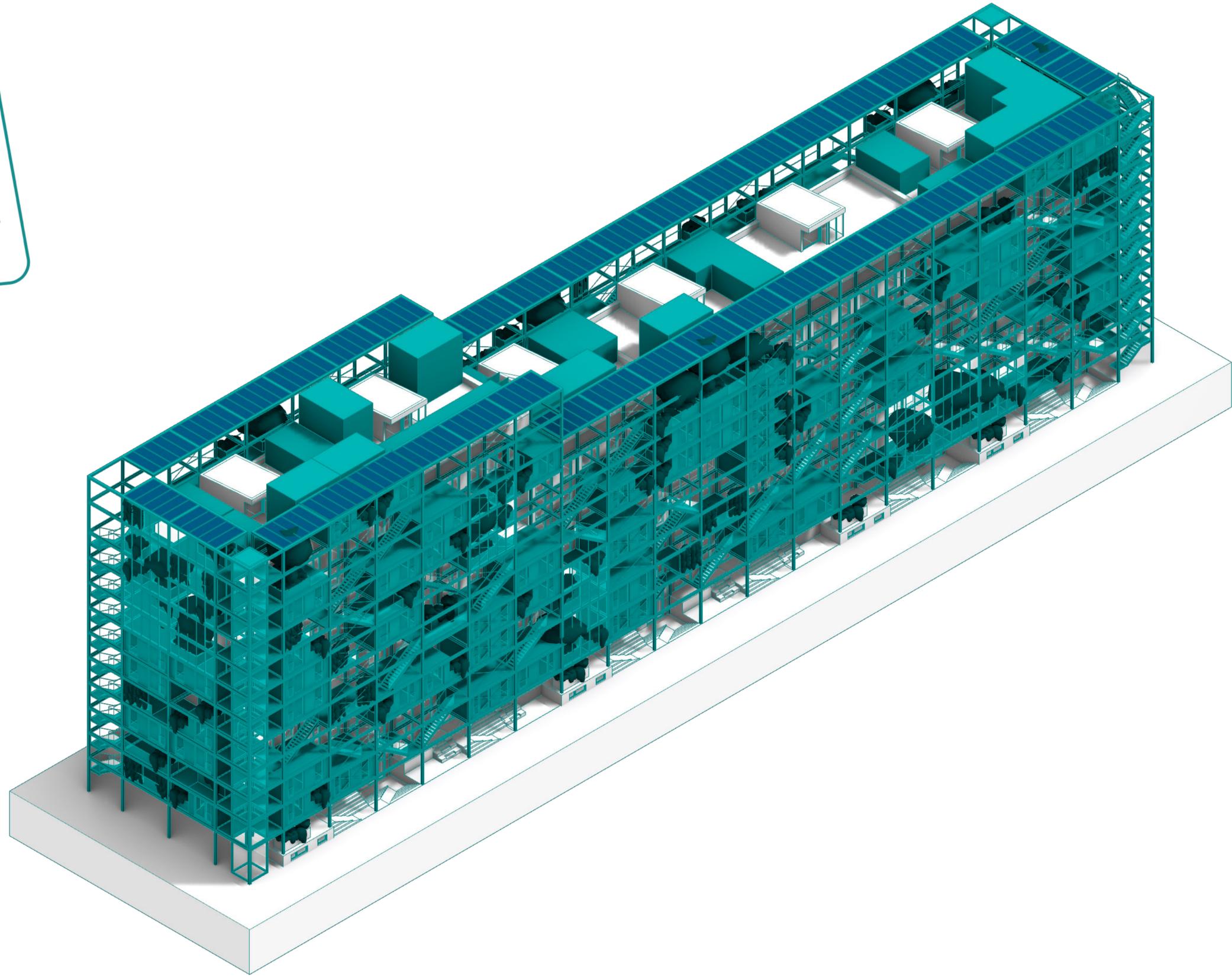
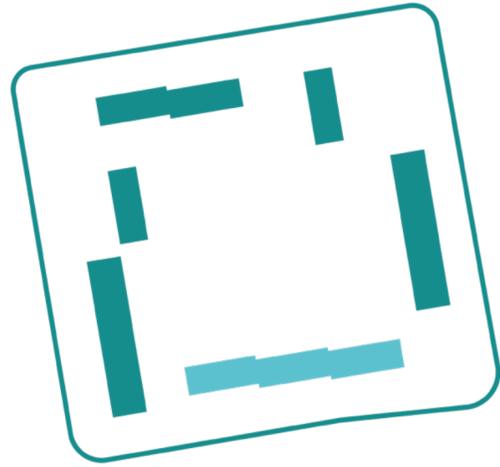


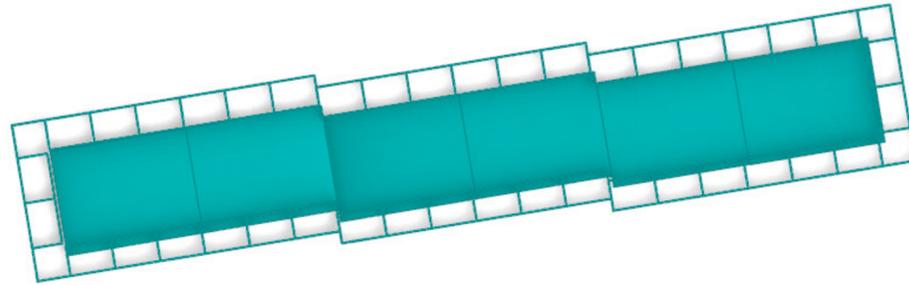
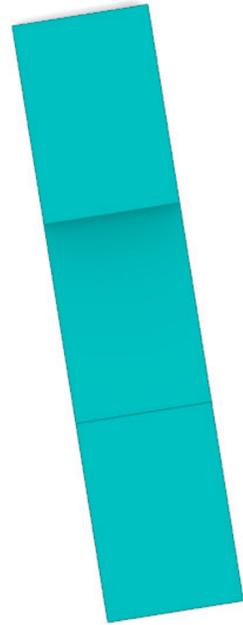
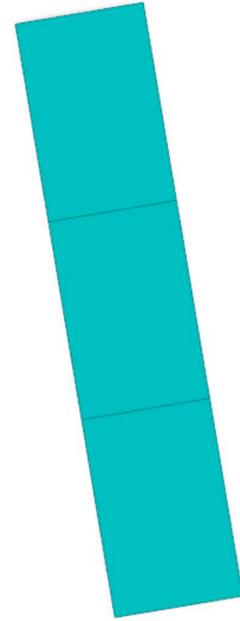
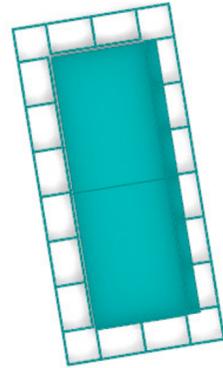
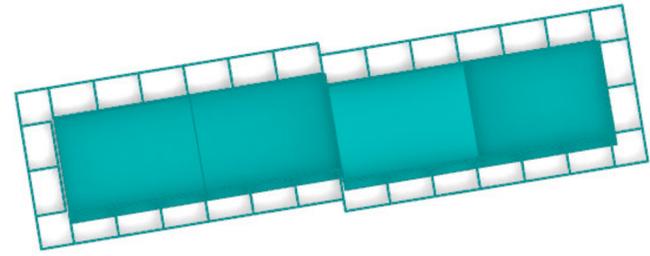
100% cover

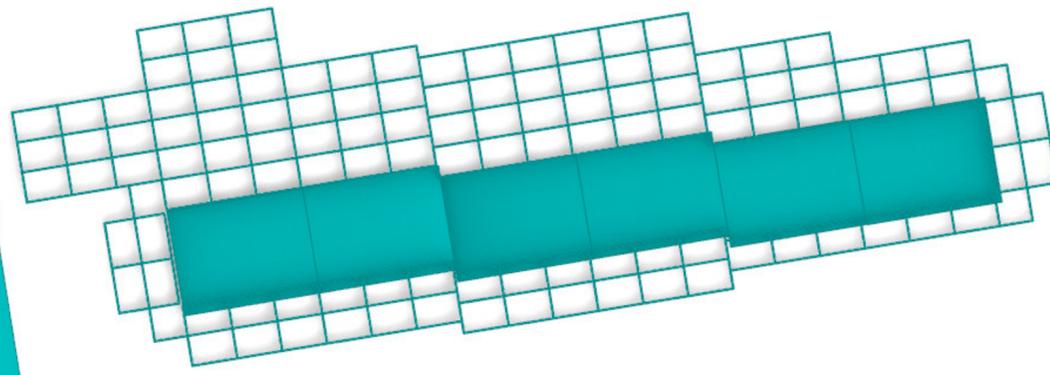
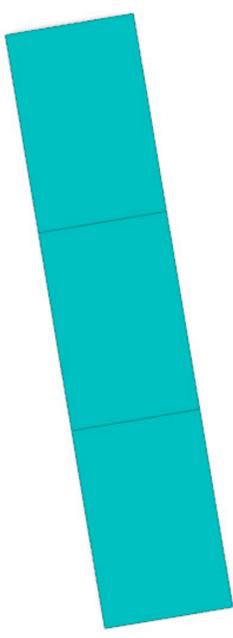
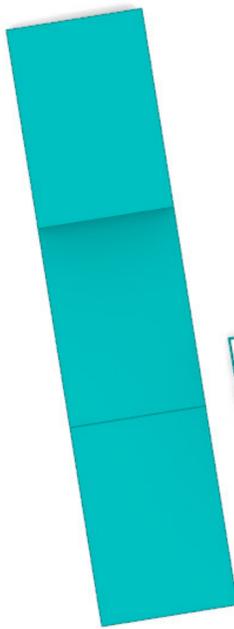
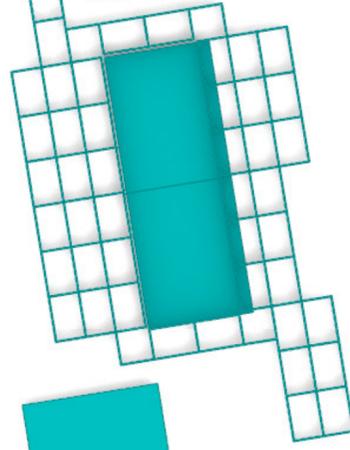
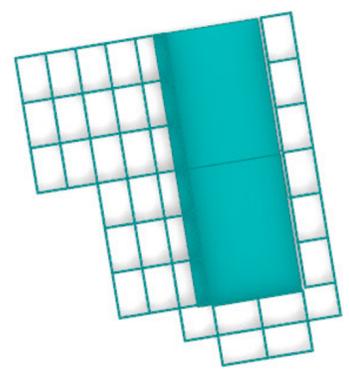
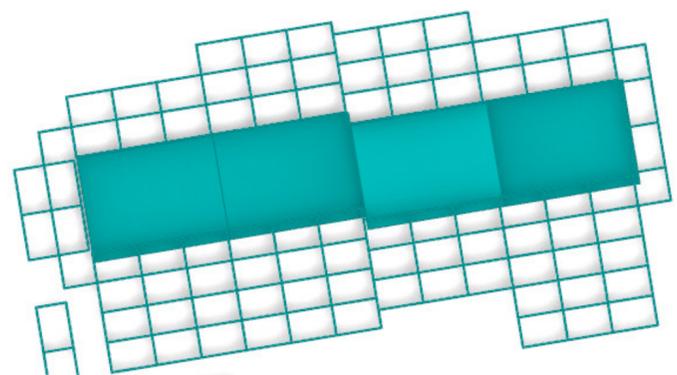
**68x Unit #1
68x Unit #2**

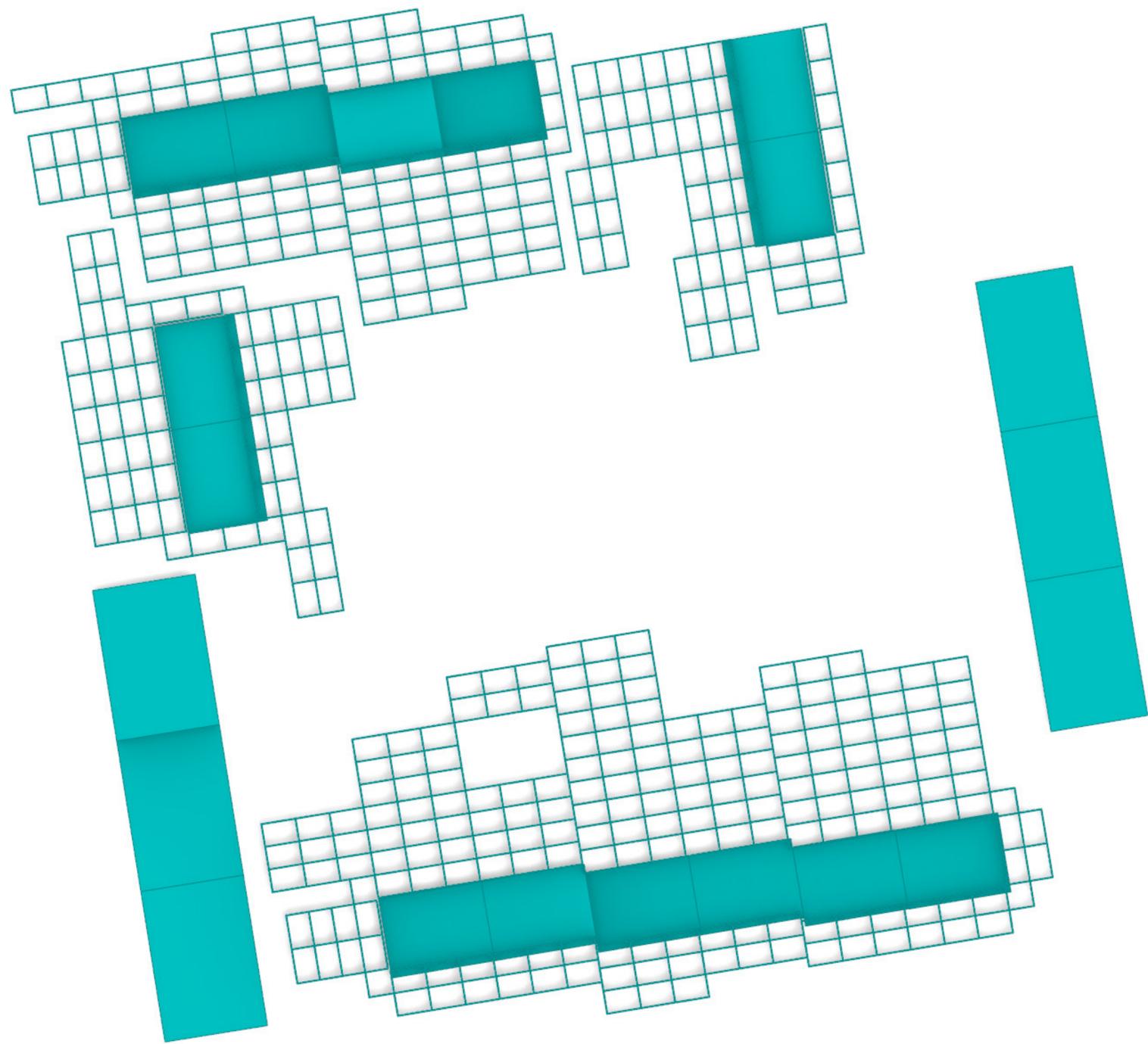
**+2516 m²
+32%**

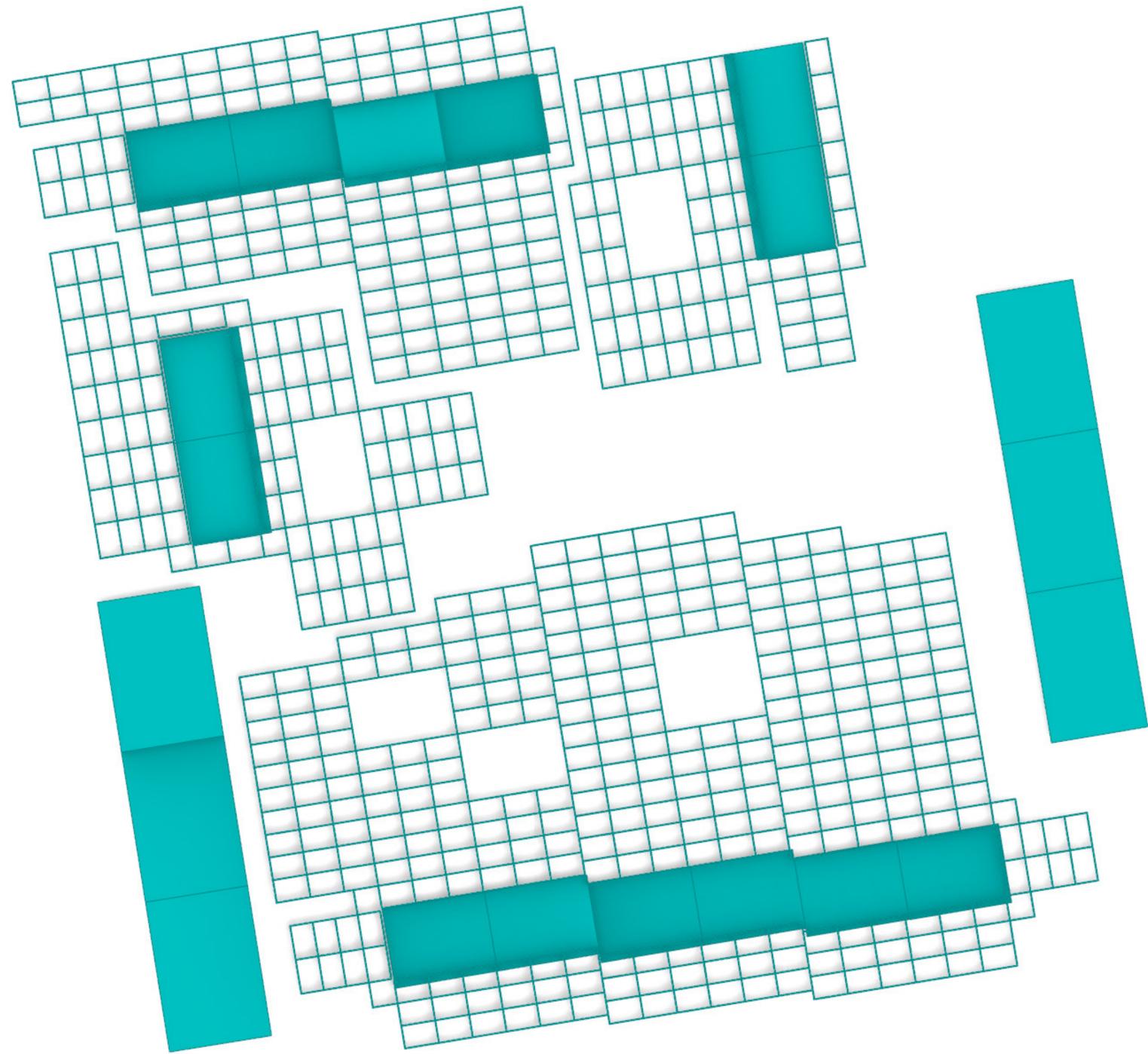








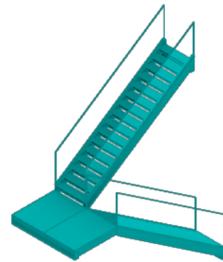




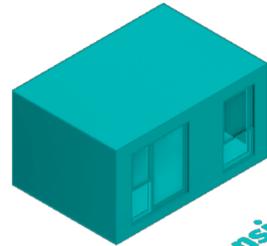
Build and Check



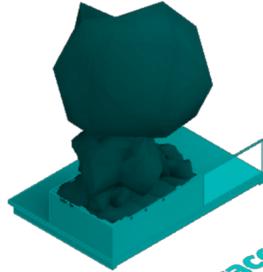
Solar chimney



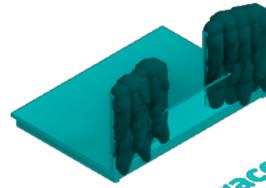
Staircase



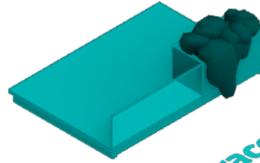
Extension unit
23.1 m²



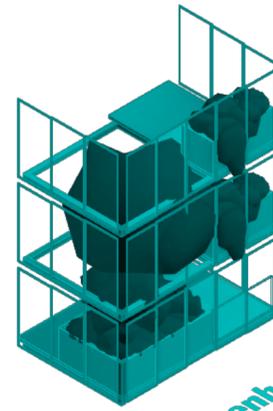
Terrace
with tree pots



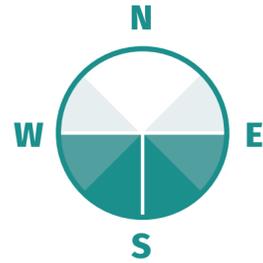
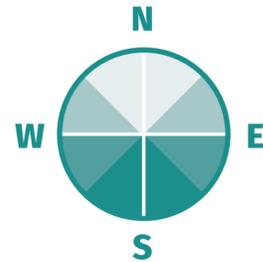
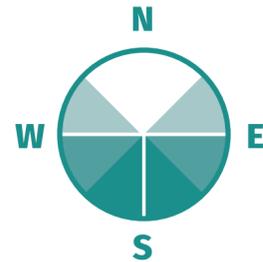
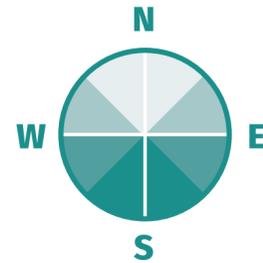
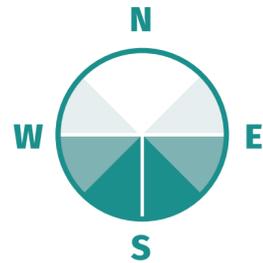
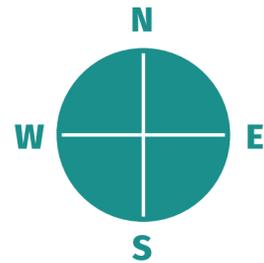
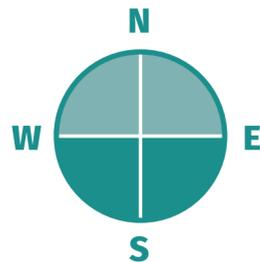
Terrace
with greenery
shading

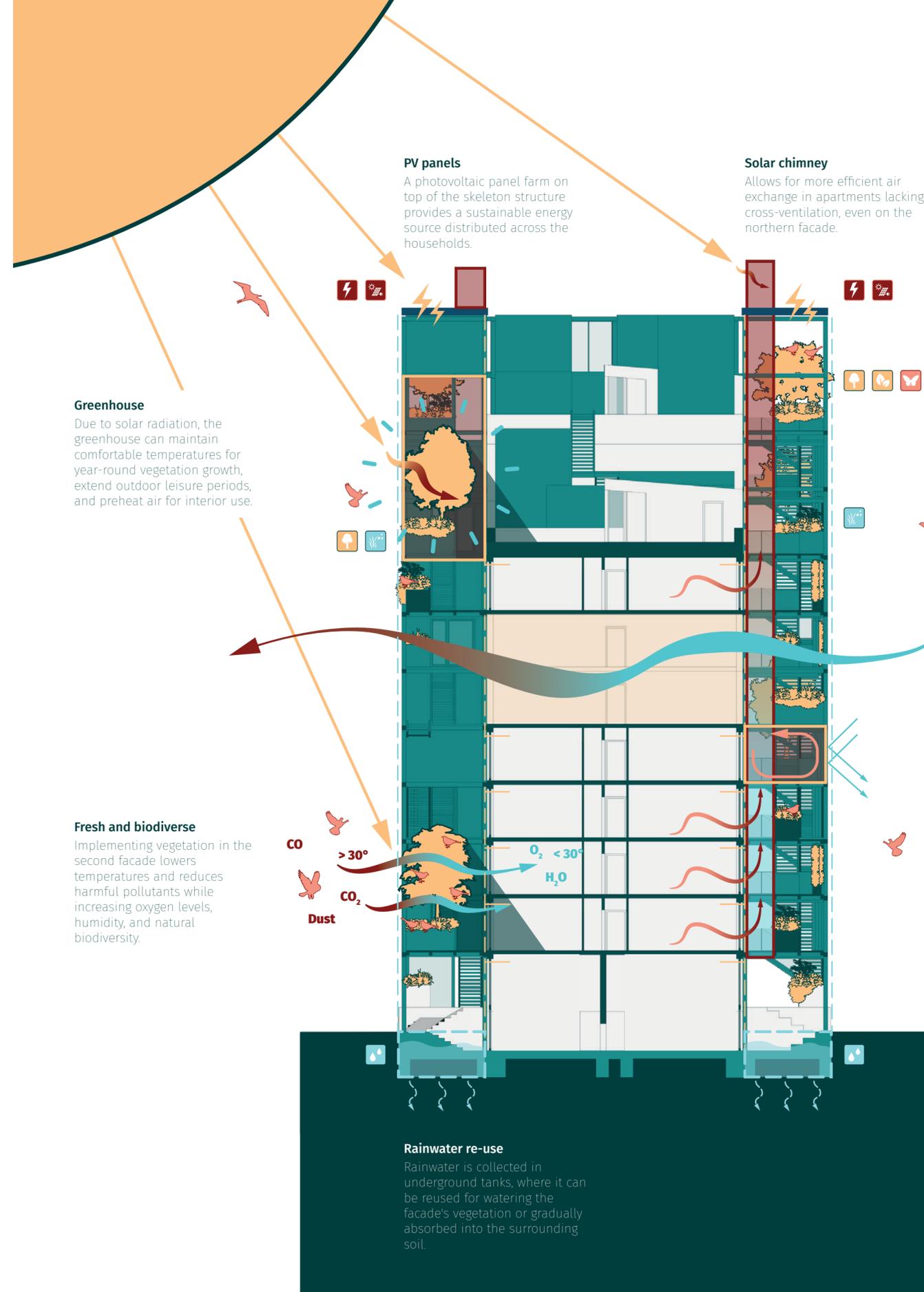


Terrace
with flower
pots



Greenhouse





PV panels

A photovoltaic panel farm on top of the skeleton structure provides a sustainable energy source distributed across the households.

Solar chimney

Allows for more efficient air exchange in apartments lacking cross-ventilation, even on the northern facade.

Greenhouse

Due to solar radiation, the greenhouse can maintain comfortable temperatures for year-round vegetation growth, extend outdoor leisure periods, and preheat air for interior use.

Communal cavity

By removing some apartment units from the existing building, a new cavity is created, offering space for communal leisure and cross-ventilation for adjacent apartments.

Fresh and biodiverse

Implementing vegetation in the second facade lowers temperatures and reduces harmful pollutants while increasing oxygen levels, humidity, and natural biodiversity.

Enclosed terrace - double-skin

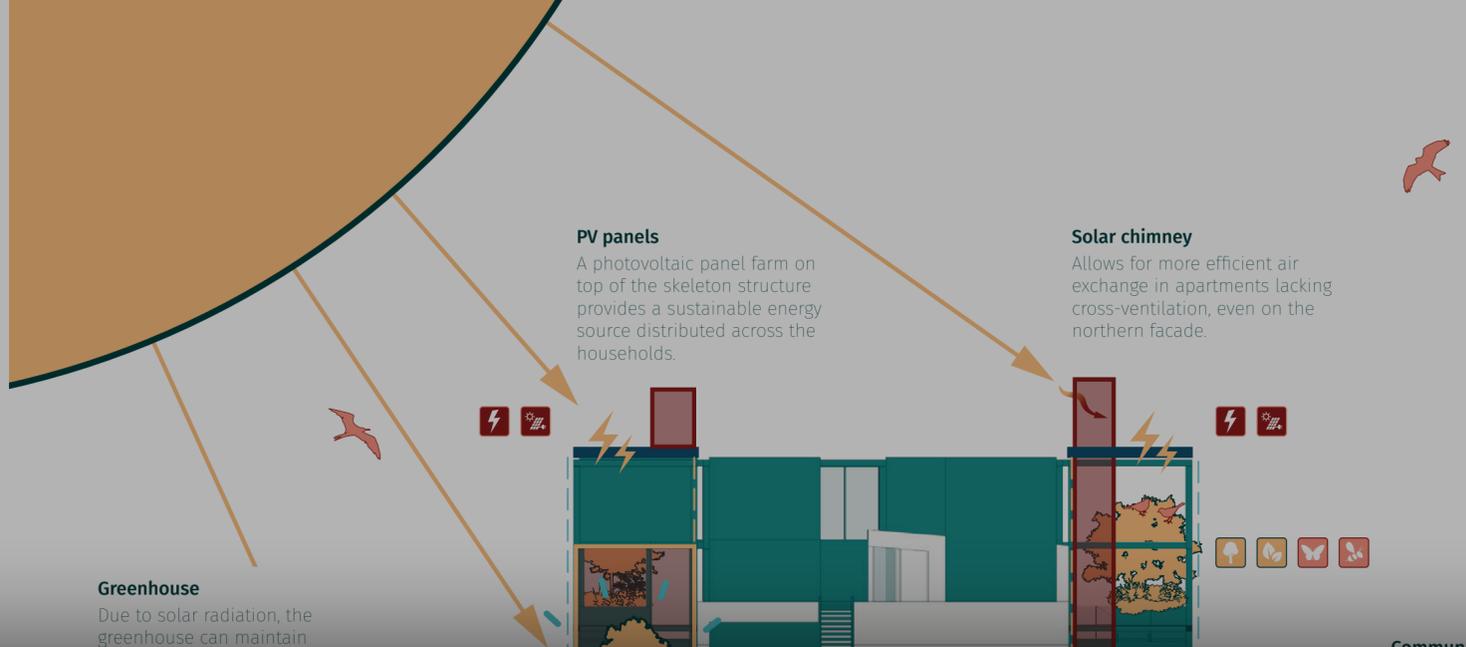
Some units may choose to enclose their terraces, creating a double-skin facade effect that reduces heat loss during winter, thus decreasing the need for additional heating.

Rainwater re-use

Rainwater is collected in underground tanks, where it can be reused for watering the facade's vegetation or gradually absorbed into the surrounding soil.

CO
> 30°
CO₂
Dust

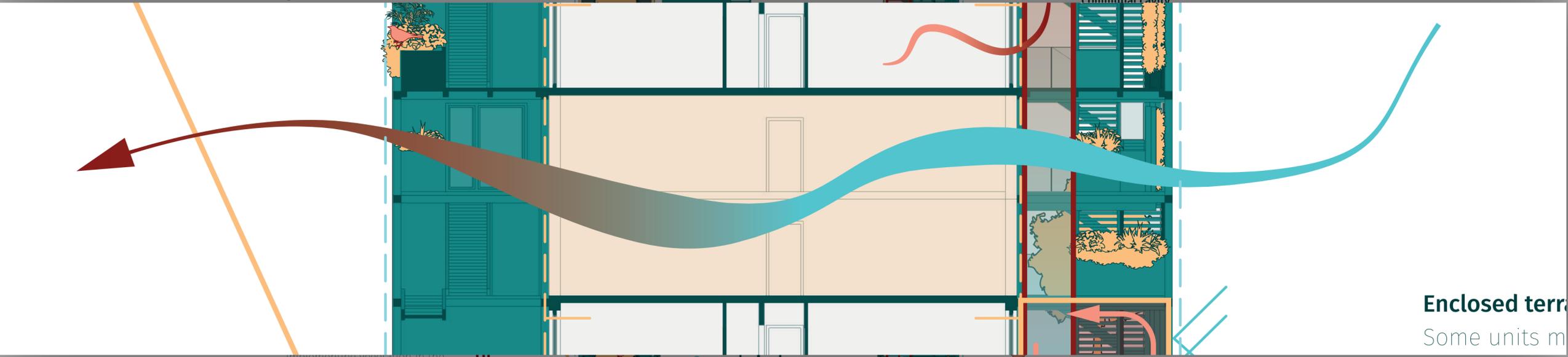
O₂ < 30°
H₂O



PV panels
 A photovoltaic panel farm on top of the skeleton structure provides a sustainable energy source distributed across the households.

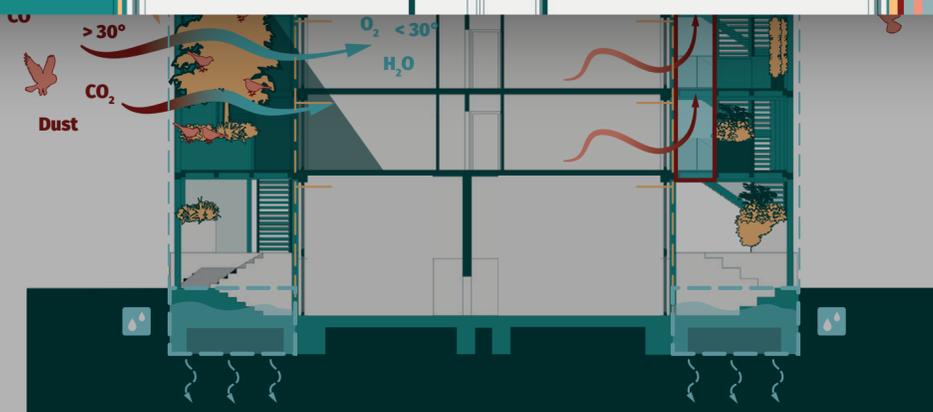
Solar chimney
 Allows for more efficient air exchange in apartments lacking cross-ventilation, even on the northern facade.

Greenhouse
 Due to solar radiation, the greenhouse can maintain

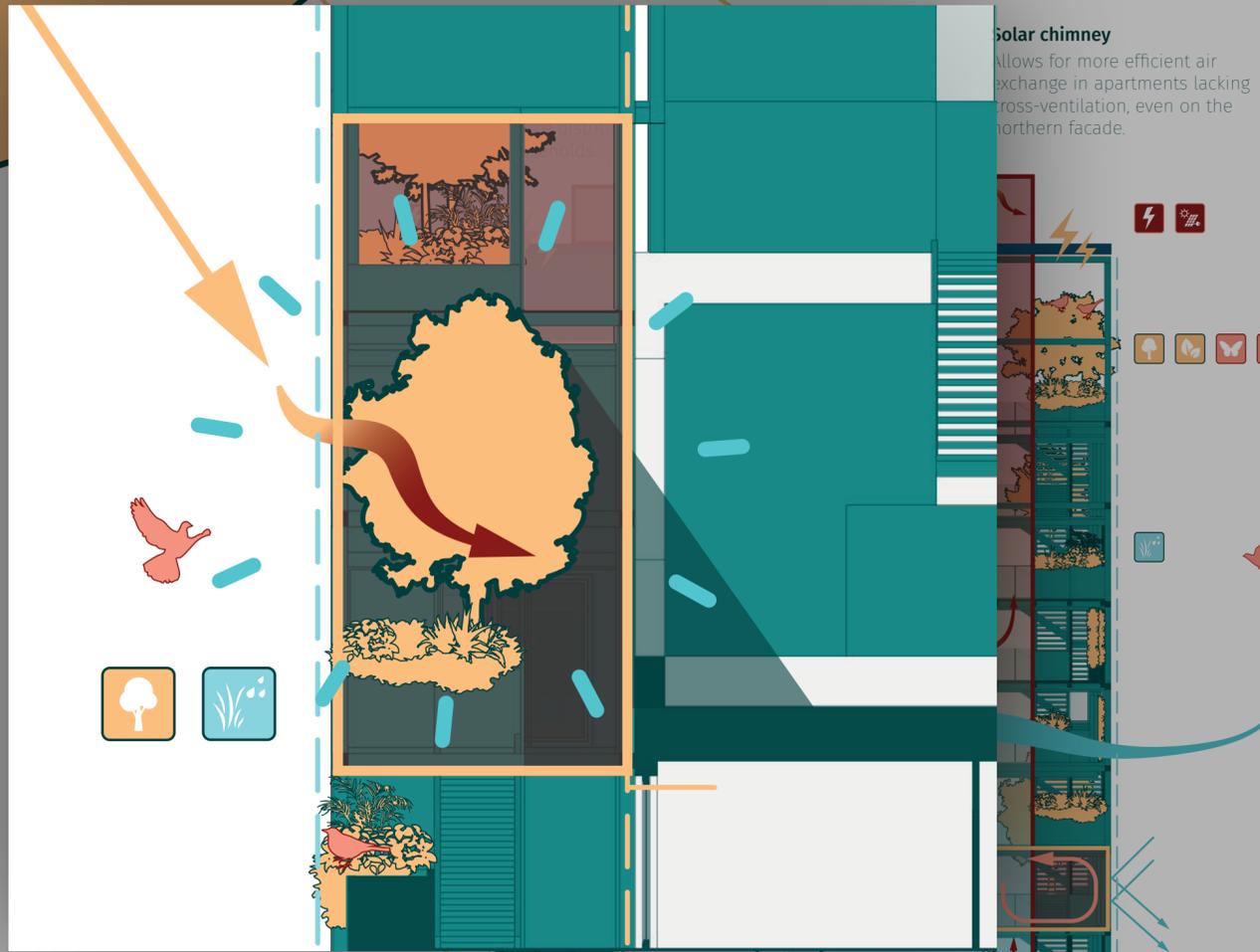


Enclosed terr
 Some units m

Implementing vegetation in the second facade lowers temperatures and reduces harmful pollutants while increasing oxygen levels, humidity, and natural biodiversity.



Rainwater re-use
 Rainwater is collected in underground tanks, where it can be reused for watering the facade's vegetation or gradually absorbed into the surrounding soil.



Solar chimney
 Allows for more efficient air exchange in apartments lacking cross-ventilation, even on the northern facade.

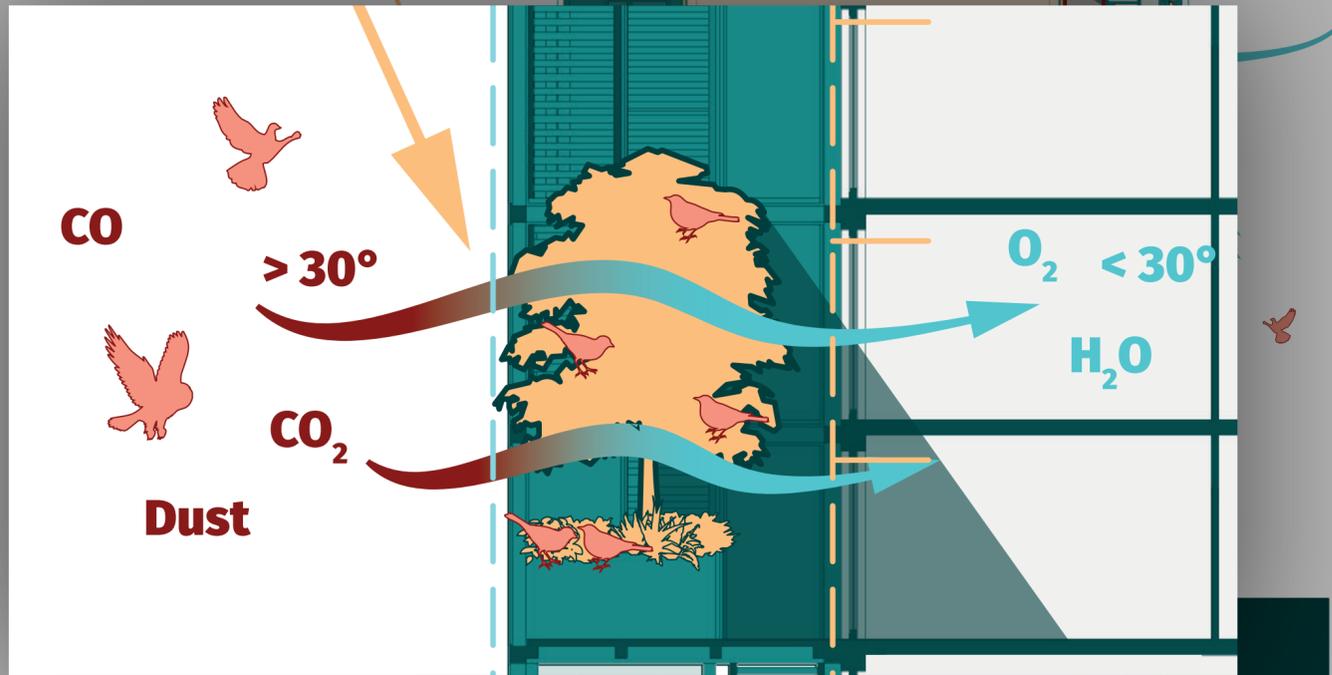
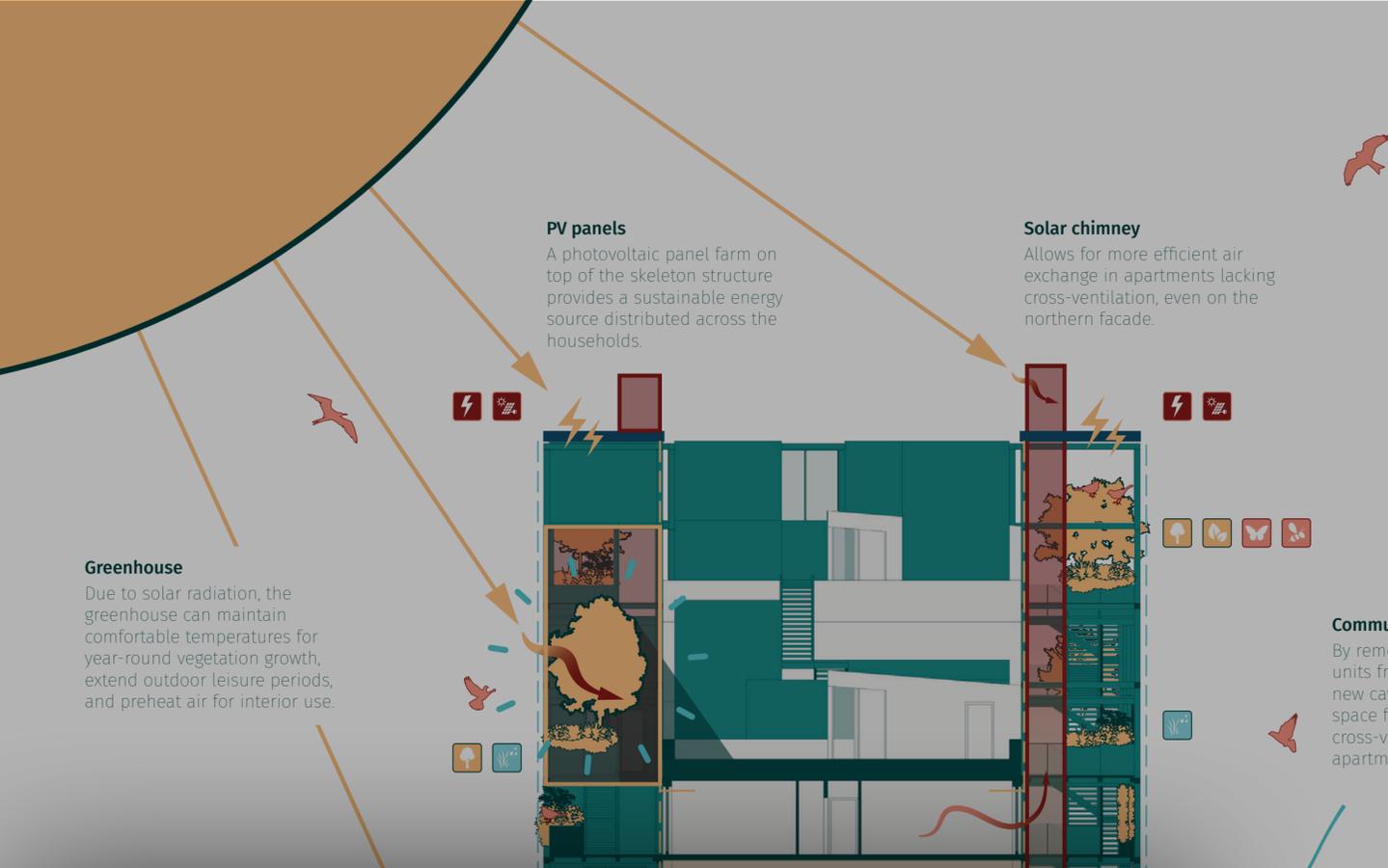
Communal cavity
 By removing some apartment units from the existing building, a new cavity is created, offering space for communal leisure and cross-ventilation for adjacent apartments.

Enclosed terrace - double-skin
 Some units may choose to enclose their terraces, creating a double-skin facade effect that reduces heat loss during winter, thus decreasing the need for additional heating.

Fresh and biodiverse
 Implementing vegetation in the second facade lowers temperatures and reduces harmful pollutants while increasing oxygen levels, humidity, and natural biodiversity.

CO₂ > 30°
 Dust
 O₂ < 30°
 H₂O

Rainwater re-use
 Rainwater is collected in underground tanks, where it can be reused for watering the facade's vegetation or gradually absorbed into the surrounding soil.



Enclosed terrace – double-skin
Some units may choose to enclose their terraces, creating a double-skin facade effect that reduces heat loss during winter, thus decreasing the need for additional heating.

Rainwater re-use
Rainwater is collected in underground tanks, where it can be reused for watering the facade's vegetation or gradually absorbed into the surrounding soil.



PV panels

A photovoltaic panel on top of the skeleton provides a sustainable energy source distributed to households.

Greenhouse

Due to solar radiation, the greenhouse can maintain comfortable temperatures for year-round vegetation growth, extend outdoor leisure periods, and preheat air for interior use.

Fresh and biodiverse

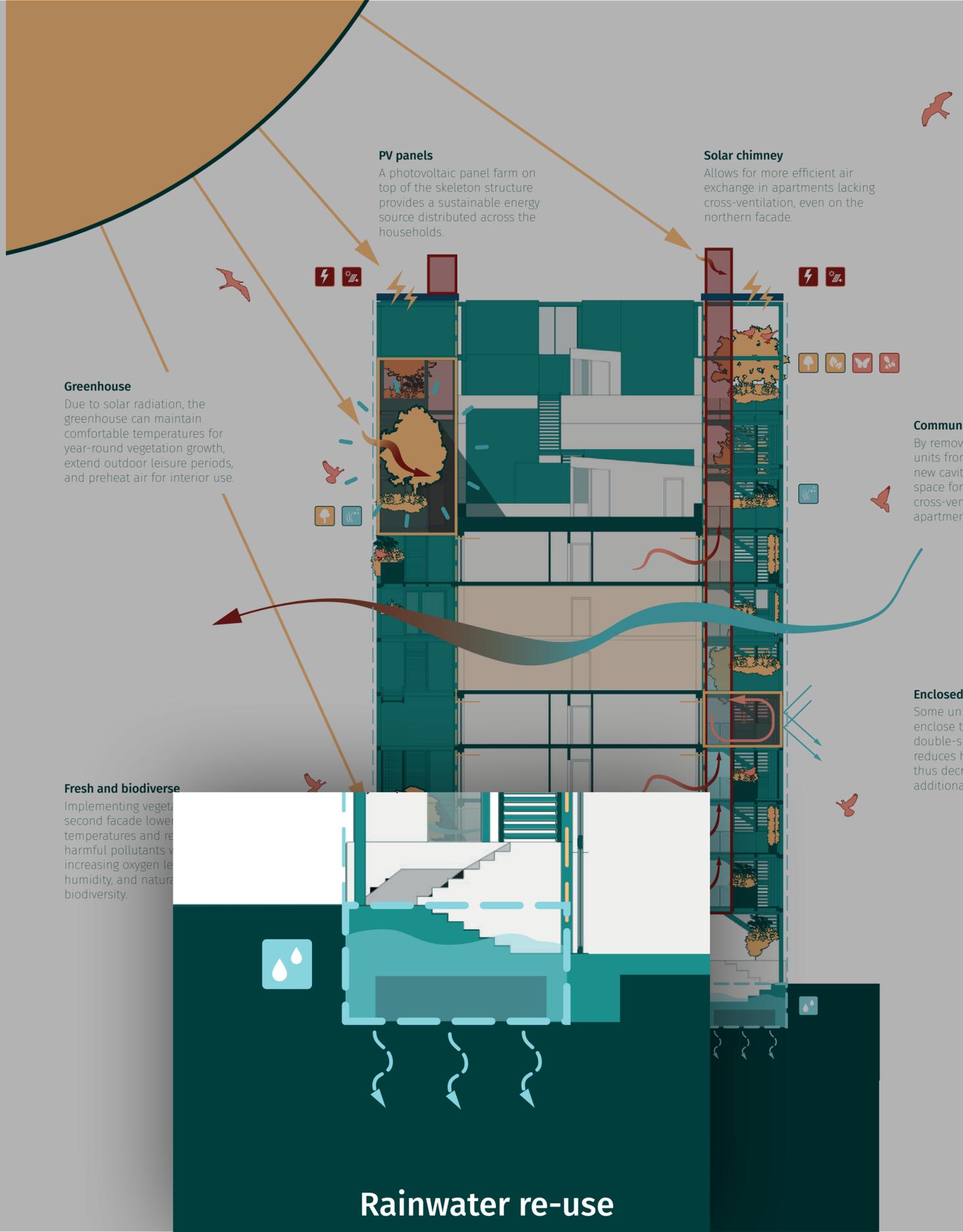
Implementing vegetation in the second facade lowers temperatures and reduces harmful pollutants while increasing oxygen levels, humidity, and natural biodiversity.

CO₂ > 30°
Dust

Rainwater re-use

Rainwater is collected in underground tanks, where it can be reused for watering the facade's vegetation or gradually absorbed into the surrounding soil.





PV panels

A photovoltaic panel farm on top of the skeleton structure provides a sustainable energy source distributed across the households.

Solar chimney

Allows for more efficient air exchange in apartments lacking cross-ventilation, even on the northern facade.

Greenhouse

Due to solar radiation, the greenhouse can maintain comfortable temperatures for year-round vegetation growth, extend outdoor leisure periods, and preheat air for interior use.

Communal cavity

By removing some apartment units from the existing building, a new cavity is created, offering space for communal leisure and cross-ventilation for adjacent apartments.

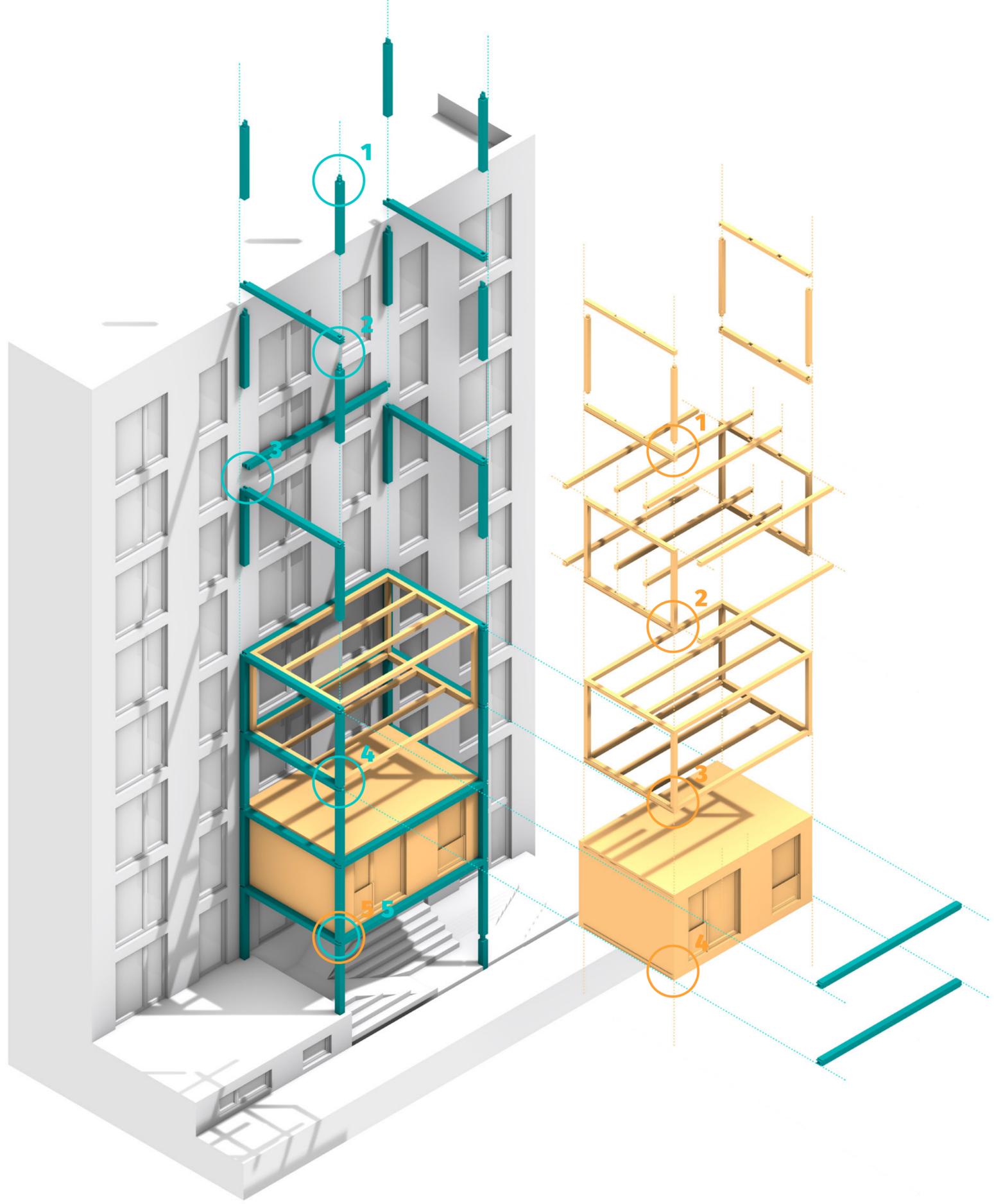
Enclosed terrace - double-skin

Some units may choose to enclose their terraces, creating a double-skin facade effect that reduces heat loss during winter, thus decreasing the need for additional heating.

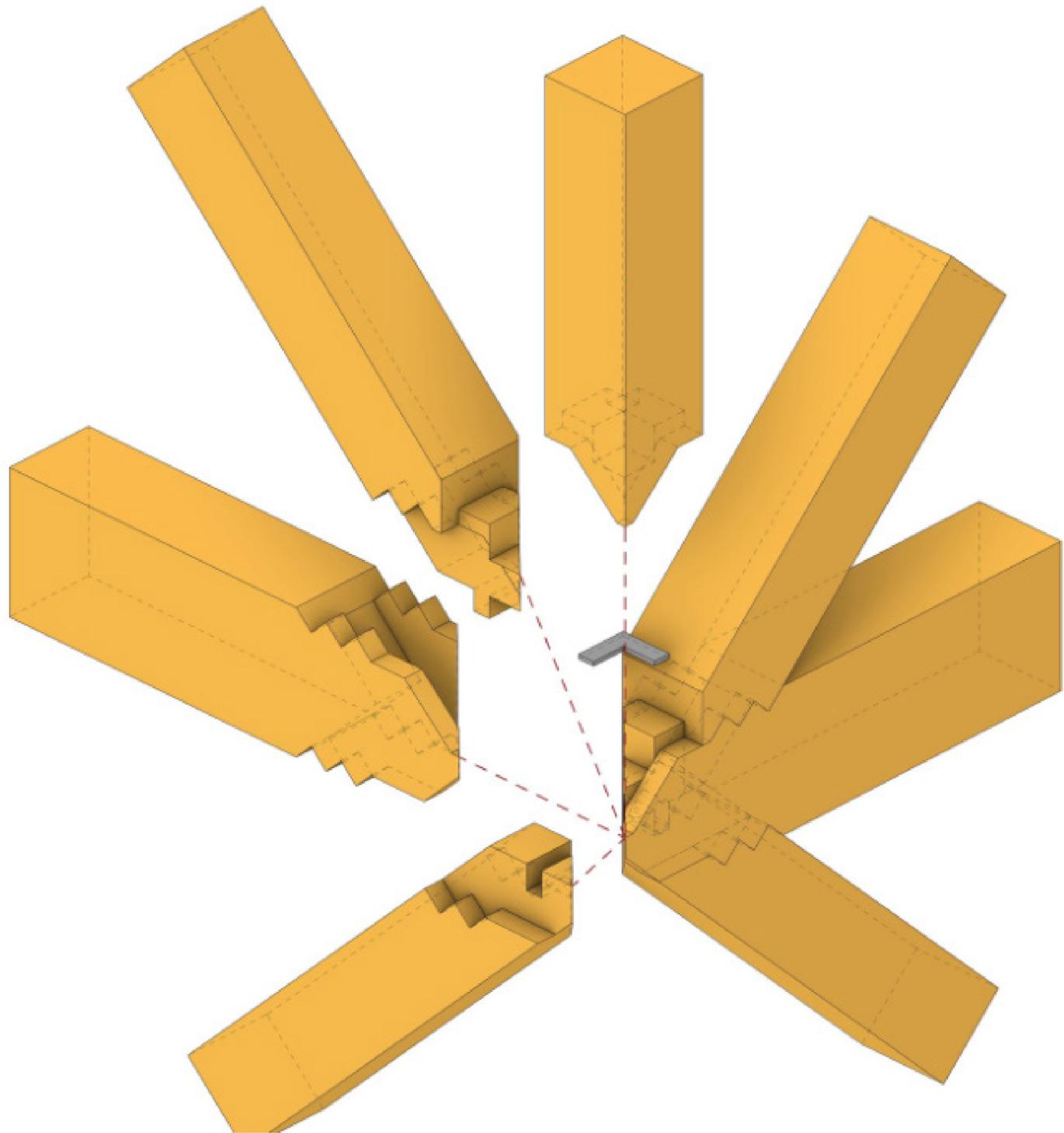
Fresh and biodiverse

Implementing vegetated second facade lowers temperatures and reduces harmful pollutants while increasing oxygen levels, humidity, and nature biodiversity.

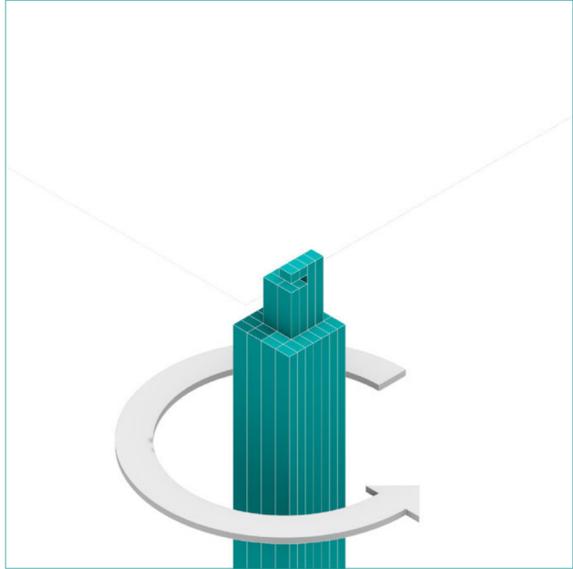
Rainwater re-use



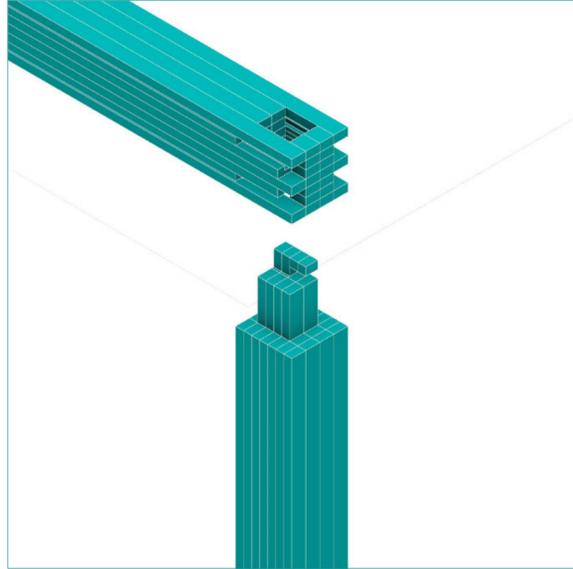




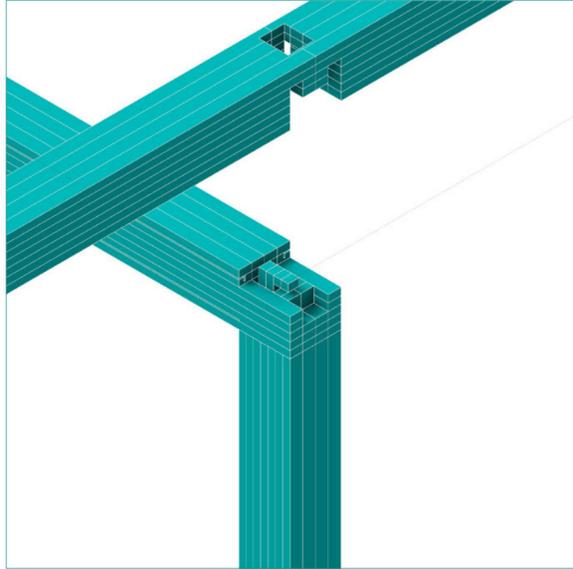
1



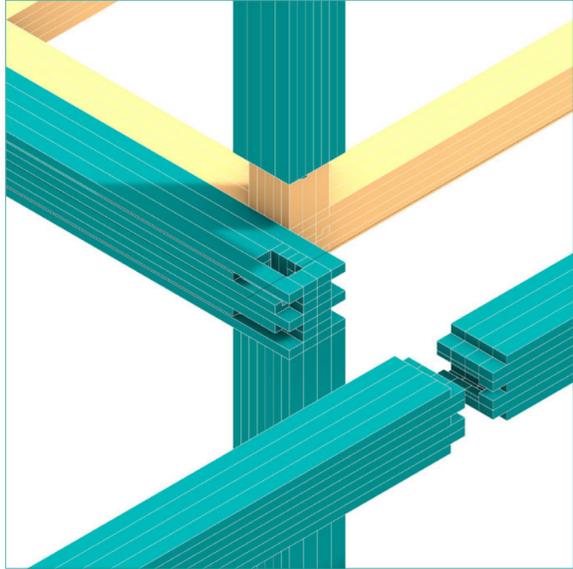
2



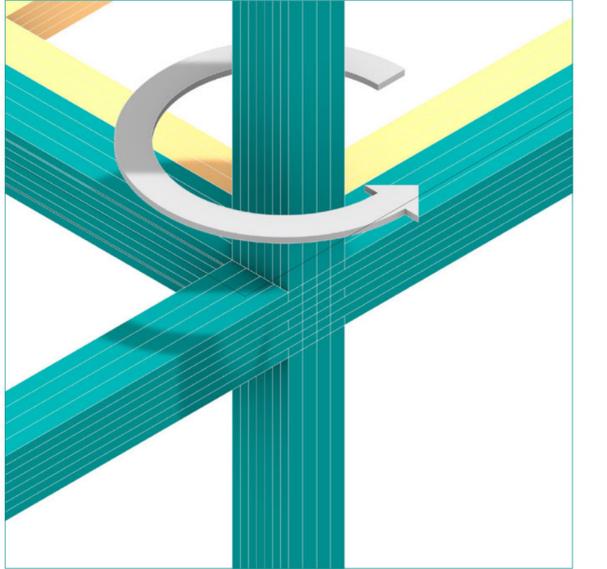
3



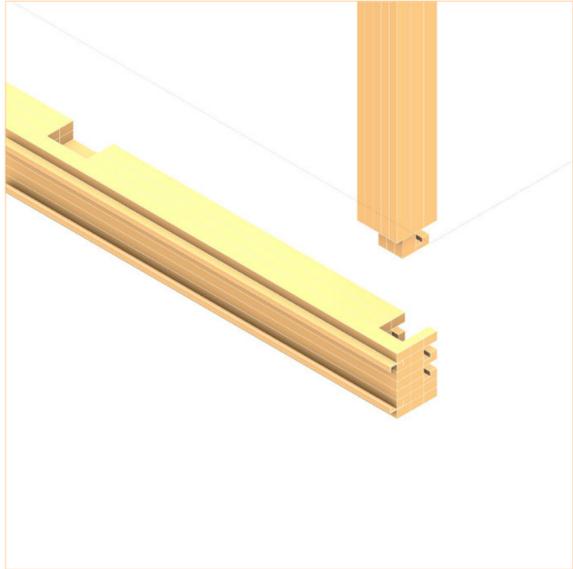
4



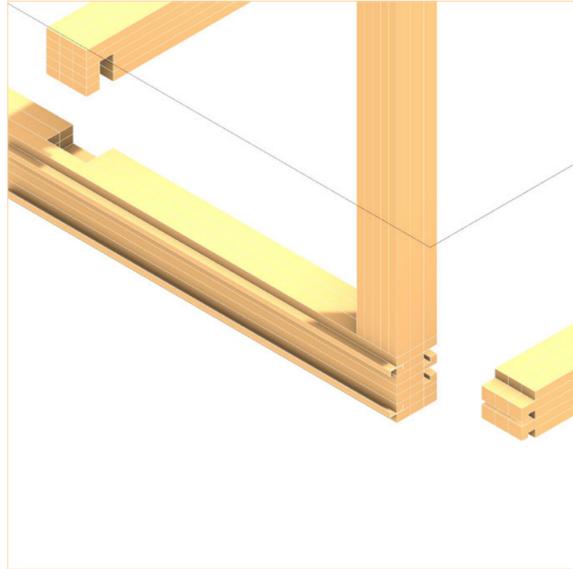
5



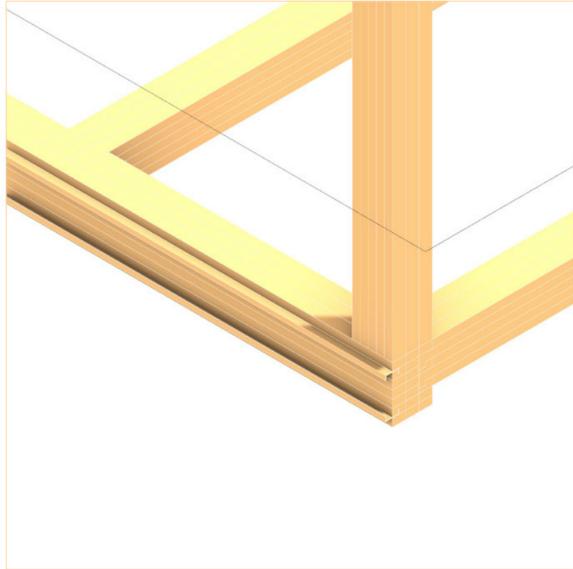
1



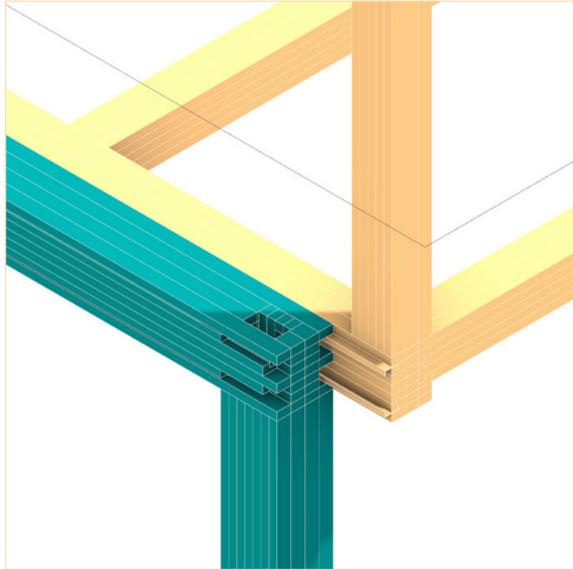
2



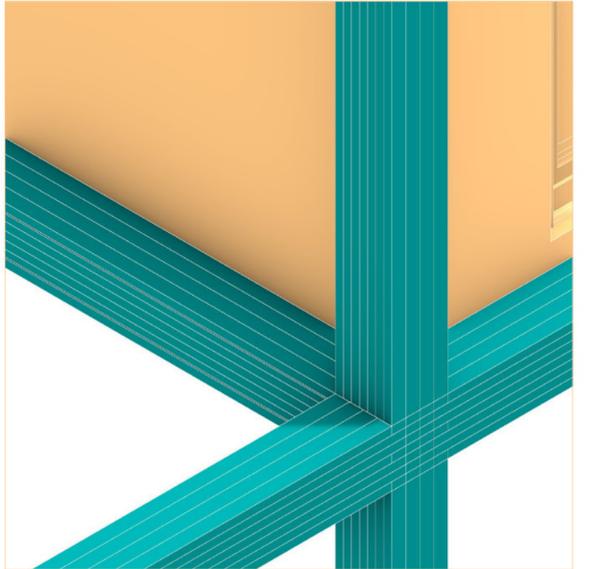
3



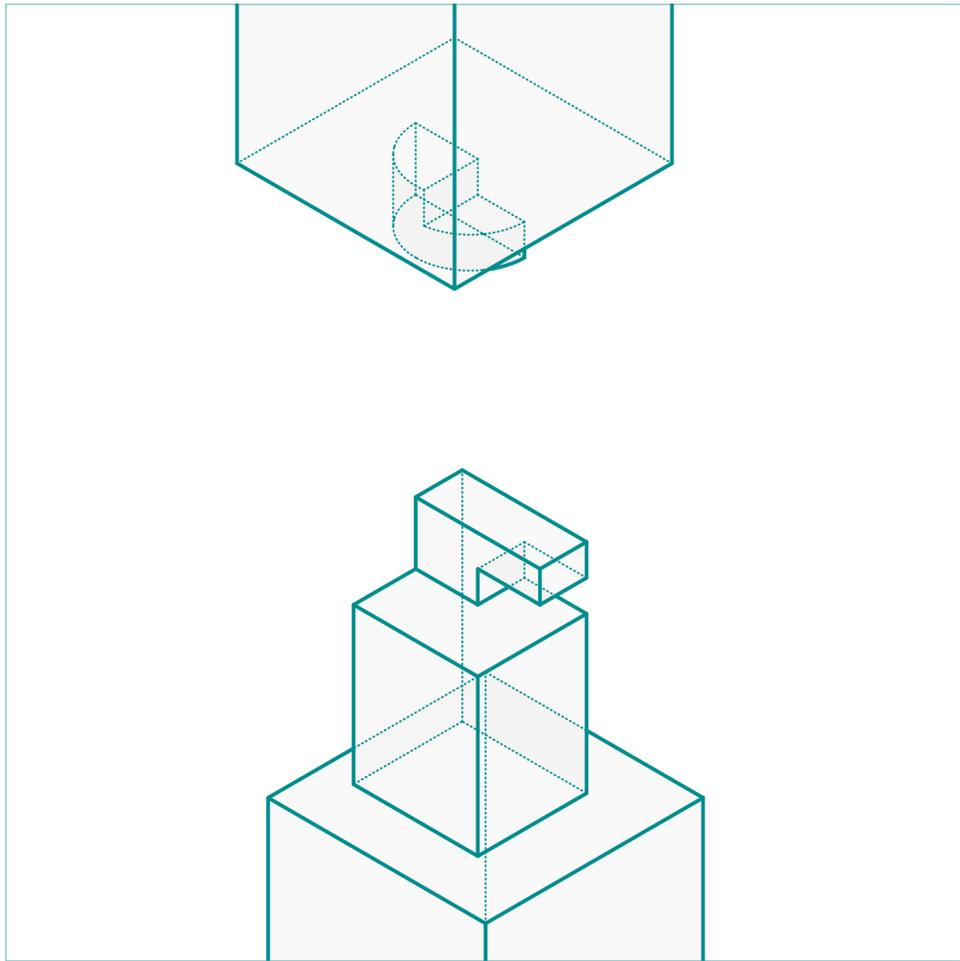
4



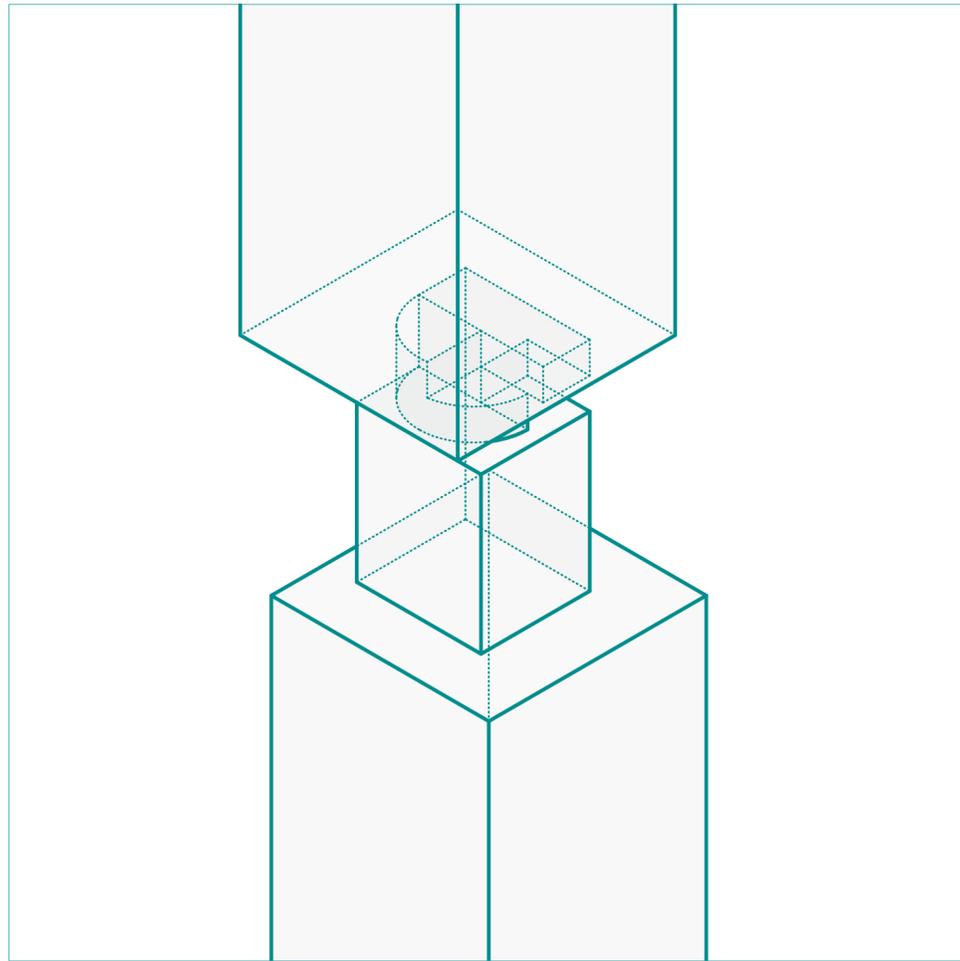
5



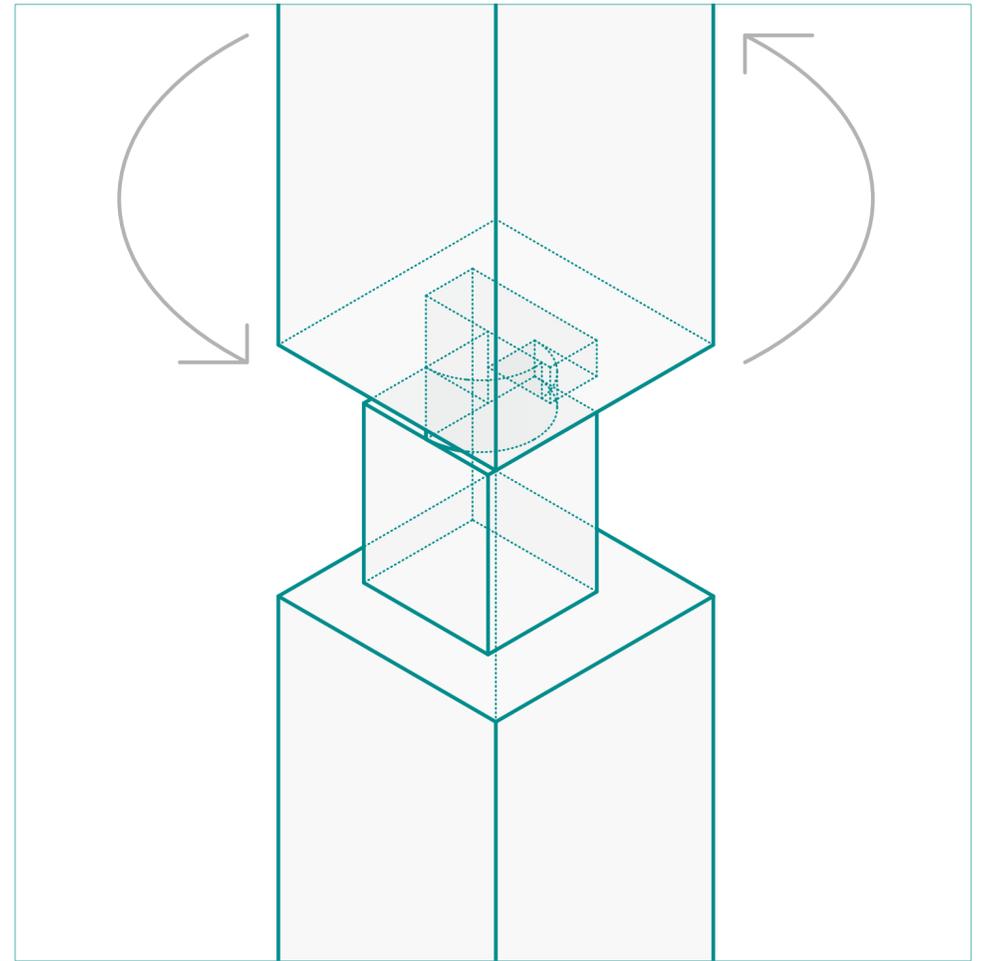
1

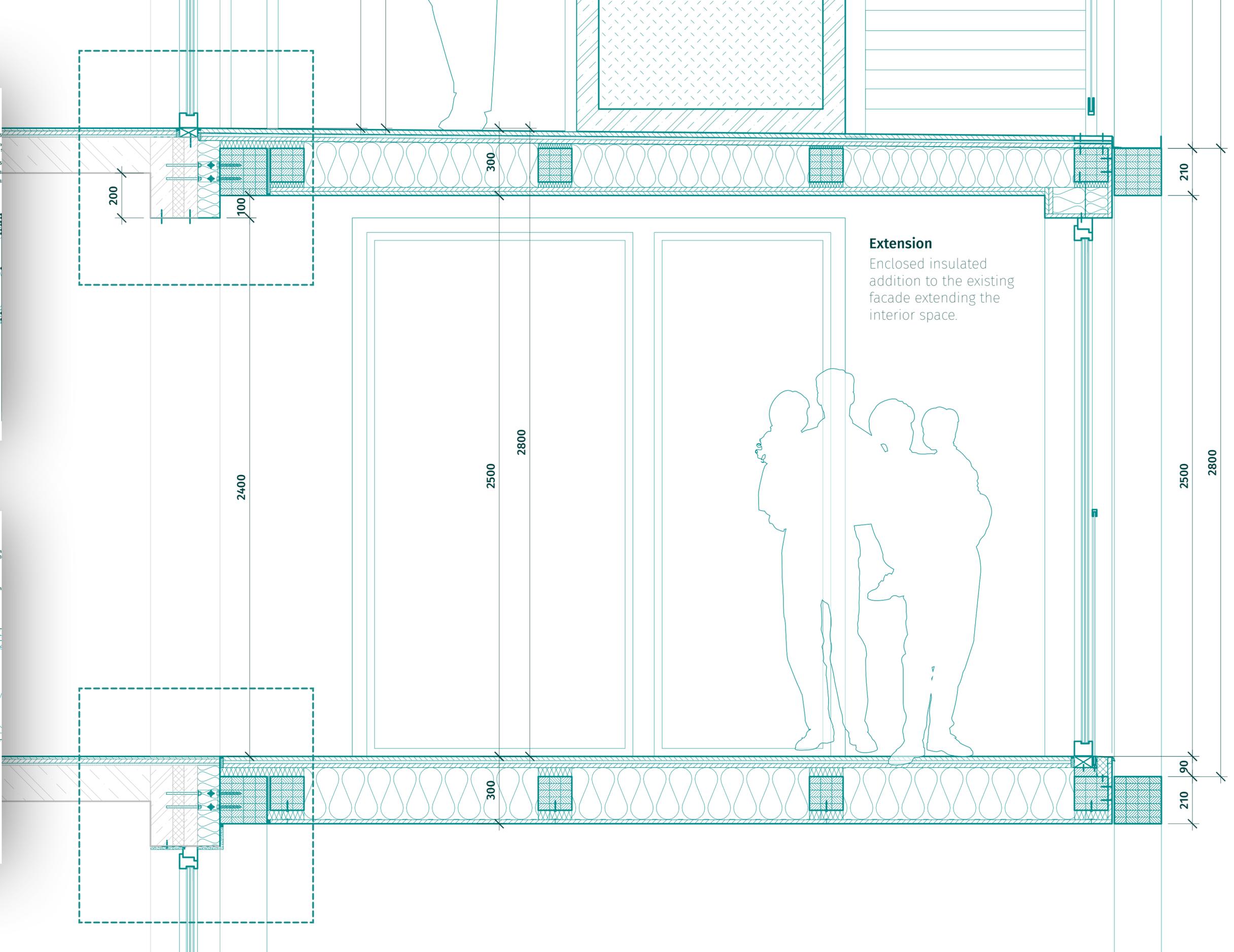
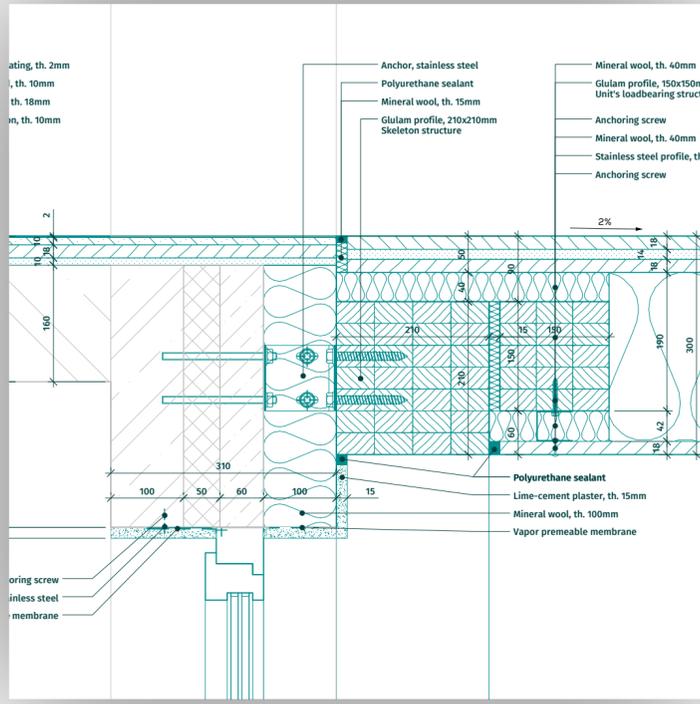
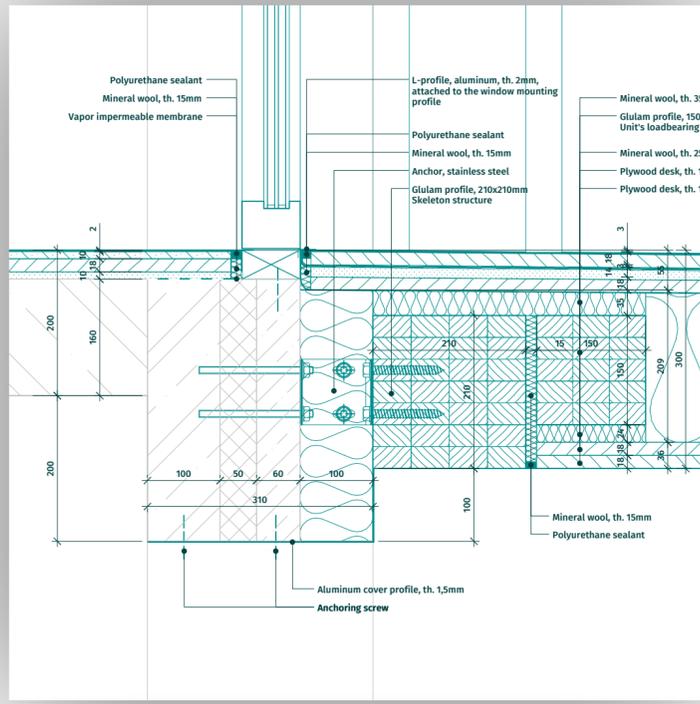


2



3





Listen and Reflect

Mark Zuckerberg: First Interview in the Metaverse | Lex Fridman Podcast #398



Mark Zuckerberg: First Interview in the Metaverse | Lex Fridman Podcast #398, 2023. <https://www.youtube.com/watch?v=MVYrJJNdrEg>.



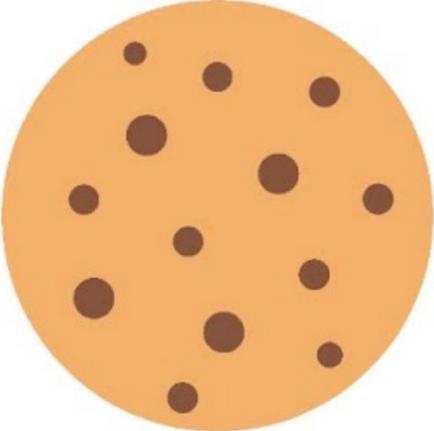
Video player controls including play/pause, volume, progress (2:04 / 1:04:38), and settings icons.



Cookies

We use cookies and similar technologies to help personalise content, tailor and measure ads, and provide a better experience. By clicking accept, you agree to this, as outlined in our Cookies Policy.

[Accept](#) [Preferences](#)

✕

43% of Americans



**How was your
meditation in the
Greenhouse today?**



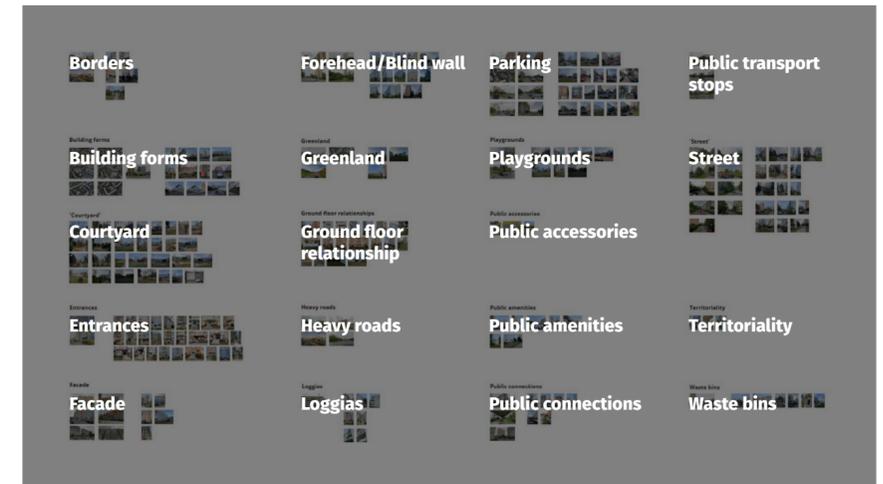
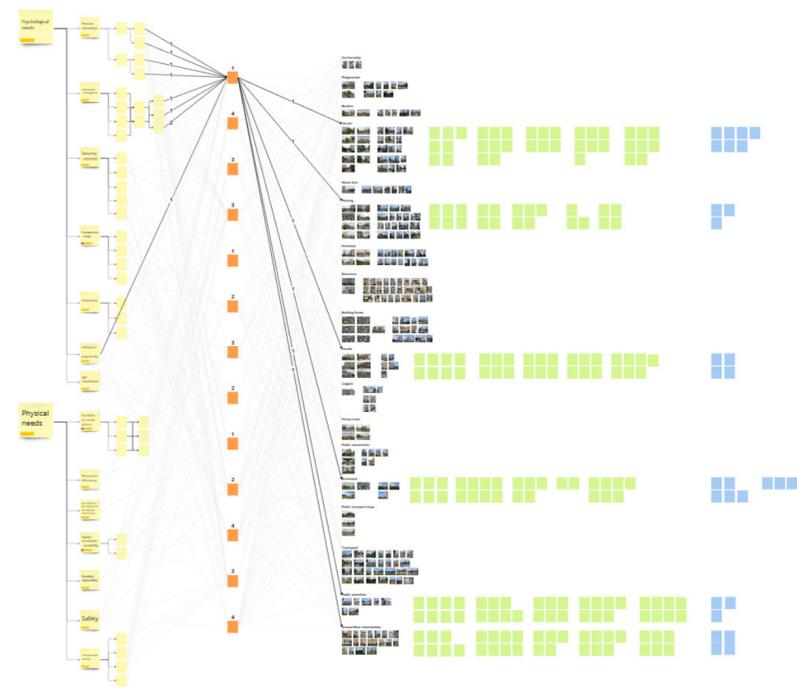
Listen and Reflect

Final reflection

Localizing

Understanding

Targeting



More questions...

How does look **spatial privacy?**

How does look a **meeting spot among panelaks?**

What is **spatial readability and when it matters?**

How should we restructure architectural education?



