

Co-build vertical community

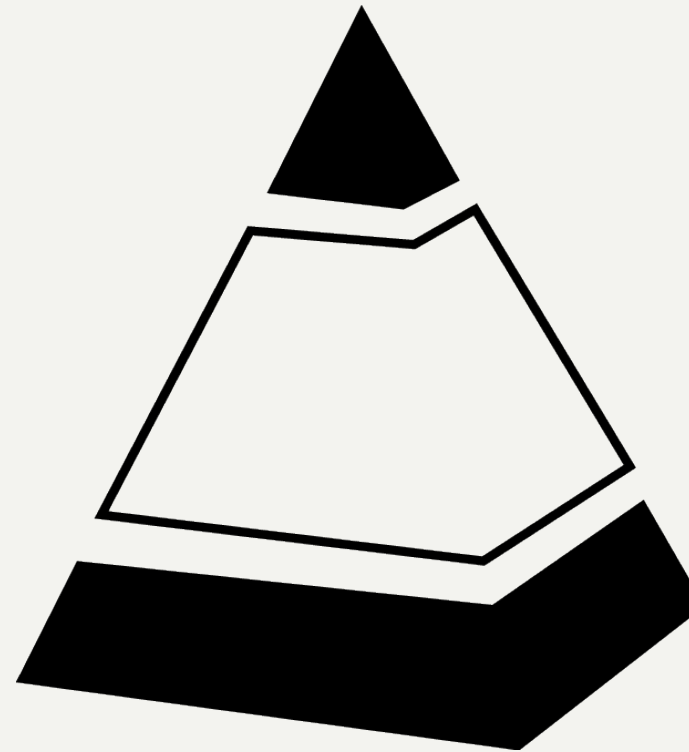
A bottom up vertical community based on a modular leasing system in vacant office building

P5 2501

Mara Wang
4580761

- 1 Problem**
- 2 Research**
- 3 Design**
- 4 CONCLUSION**

1 Introduction



Problem 1:

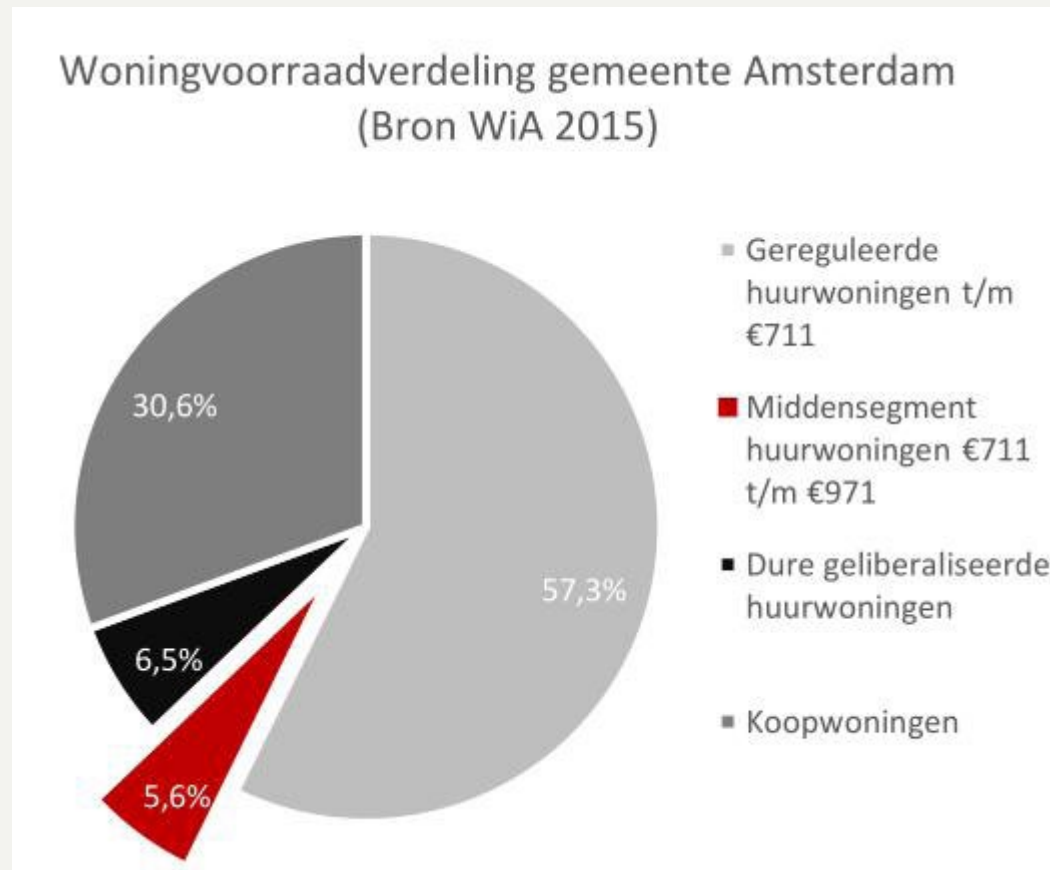
Middle - income housing pressure

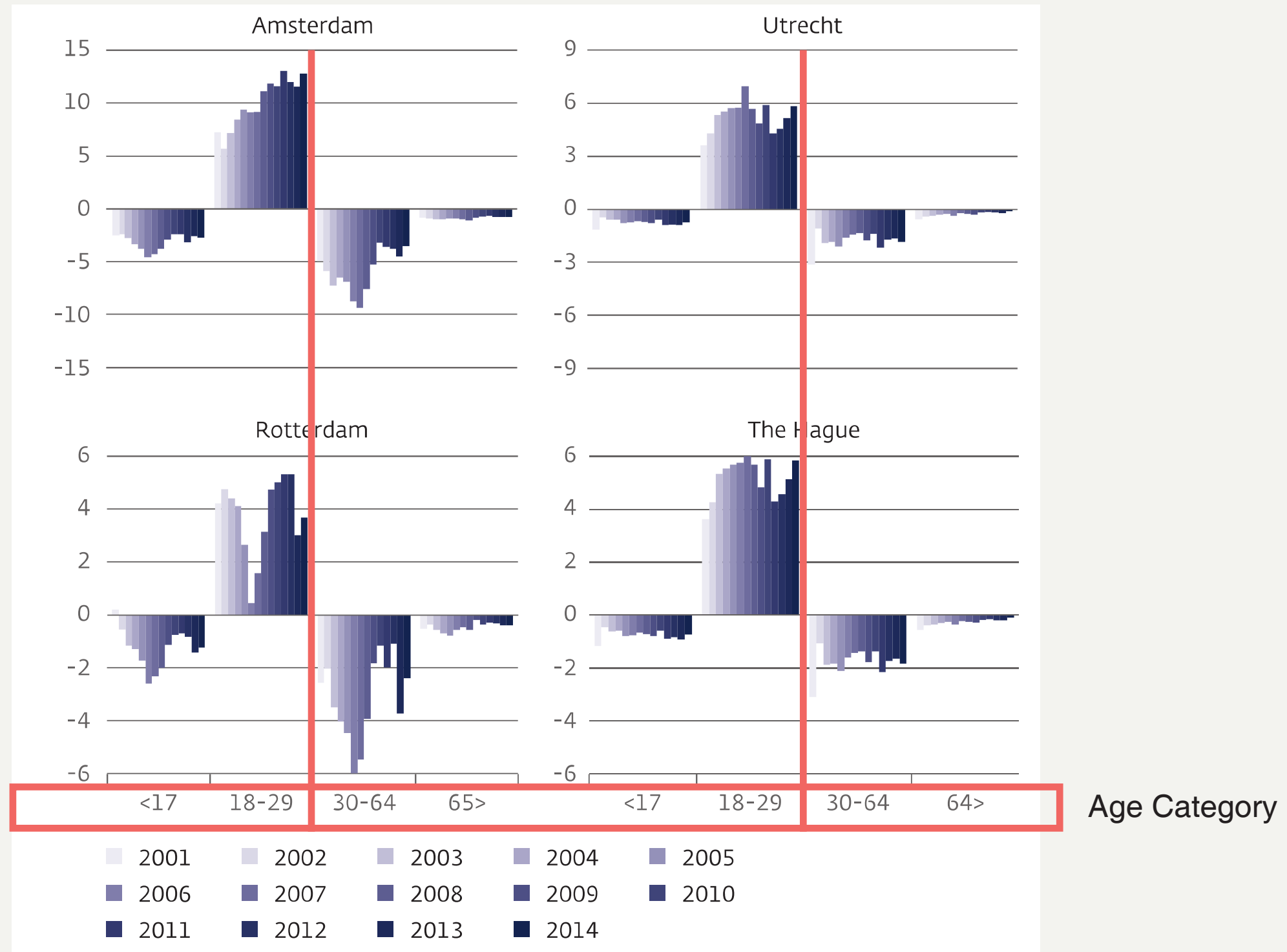
Definition

Income per year : € 35,000-70,000

Rent per month: €725 - 1,000

1. Not eligible for social housing
2.(80%)Demand >> Supply(5.6%) in the housing market



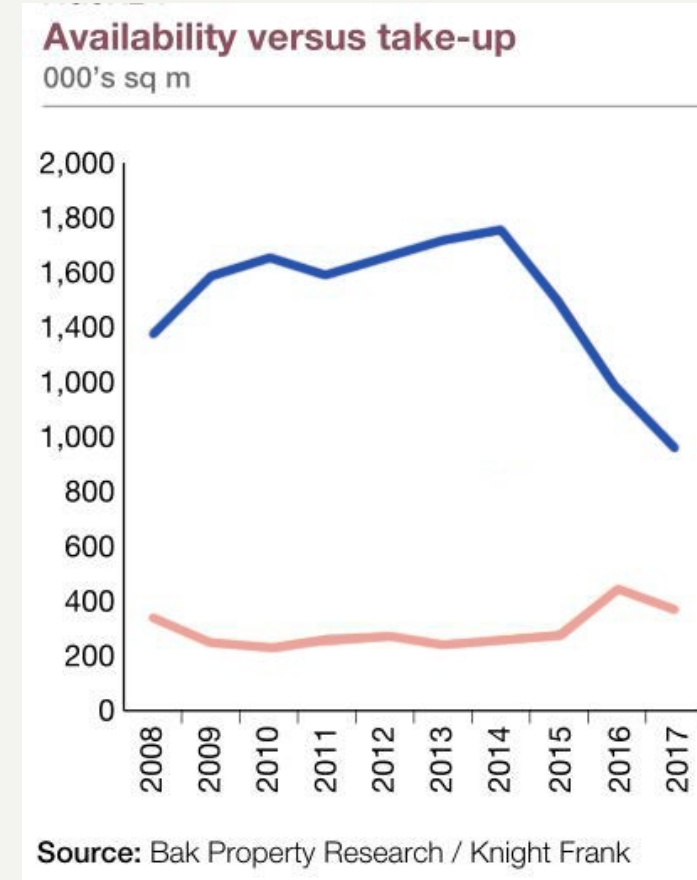


Net migration into the four major cities, 2001-2014, by age category (De Nederlandsche Bank. 2017)



Amsterdam

18.3%



Office vacancy problem in Amsterdam

Unused Office space (m²)

Amsterdam - 680,000

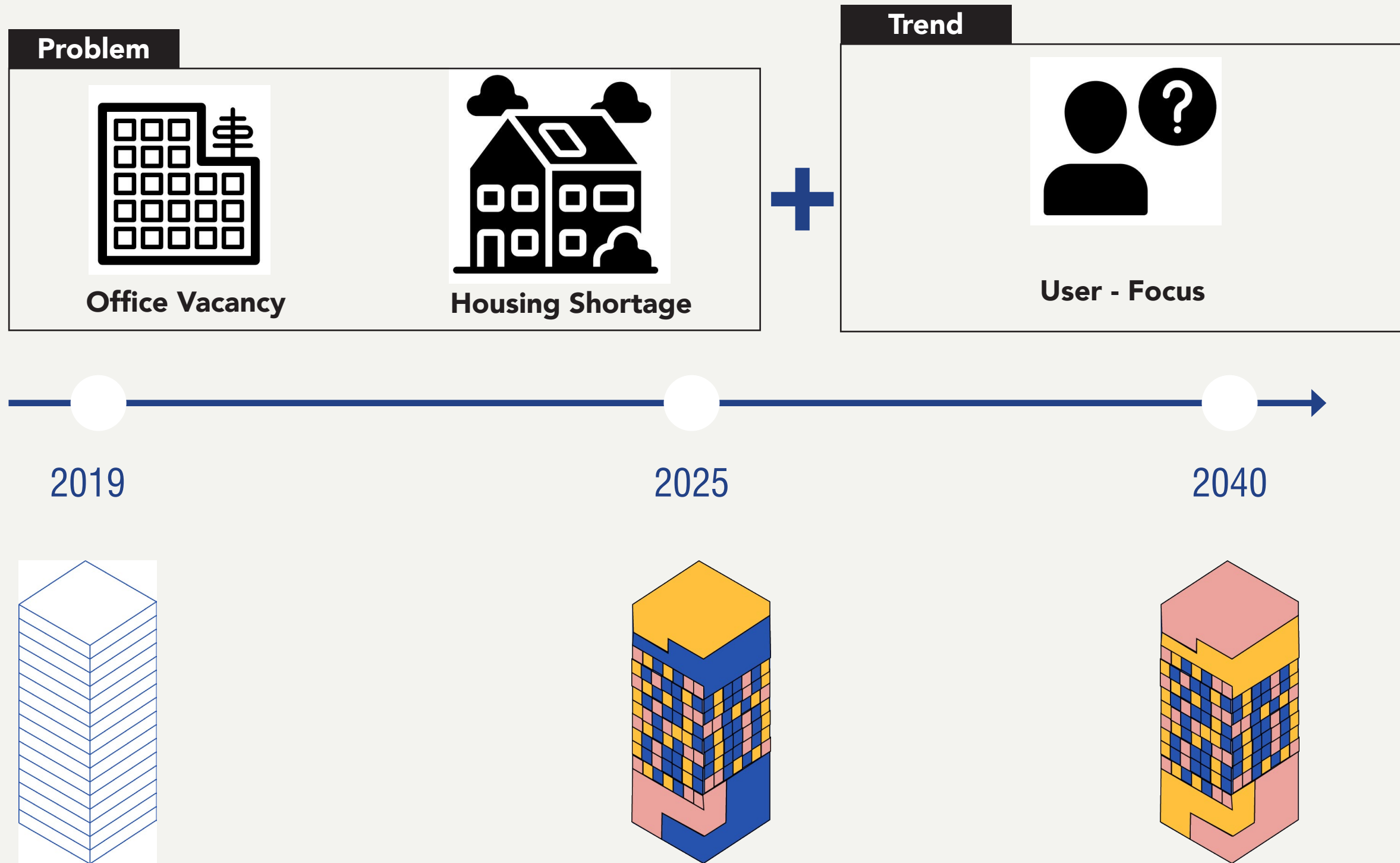
Den Haag - 591,000

Rotterdam - 724,000

Utrecht - 620,000 Dutch Office Market Report 2018

Bak Property Research/

Knight Frank



A top-down framework facilitating a residents bottom-up approach

Flexible react to residents and neighborhood requirement

Overall Design Question

How can we design a system in the redevelopment process to **balance the bottom up and top down** design method in order to reach a **maximum shared value** in a **vertical community**?

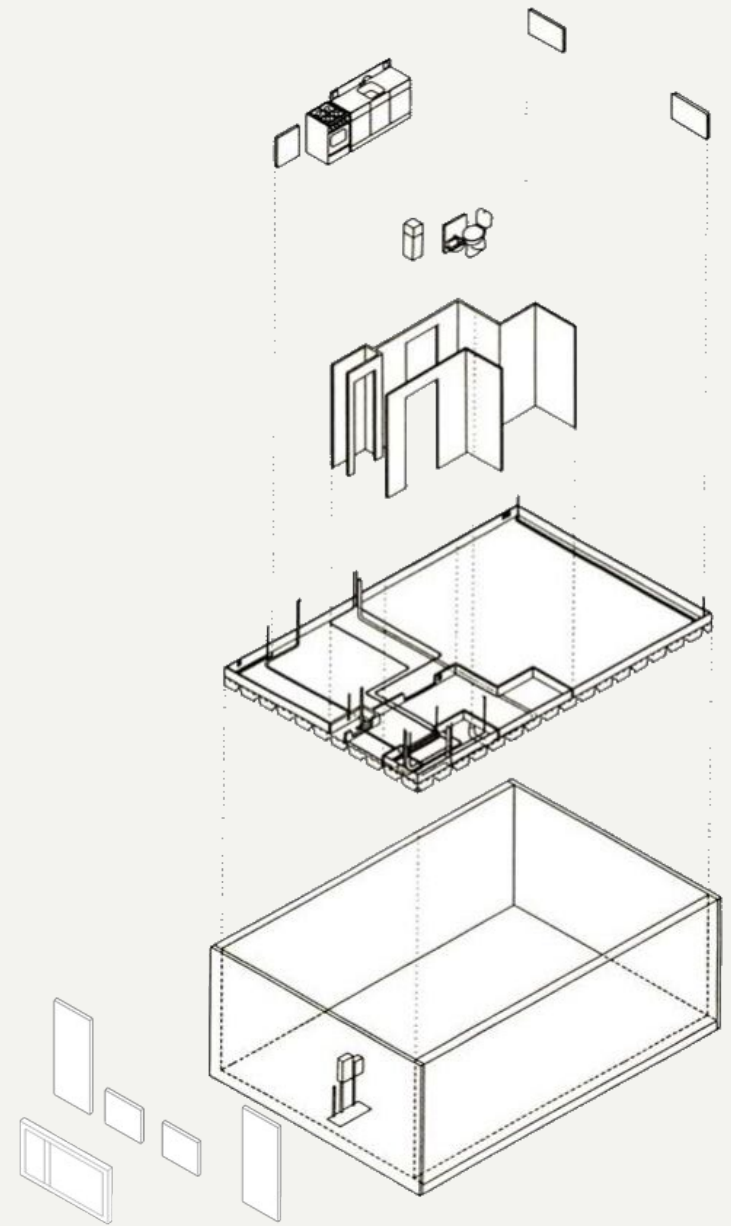
1 Problem

2 Research

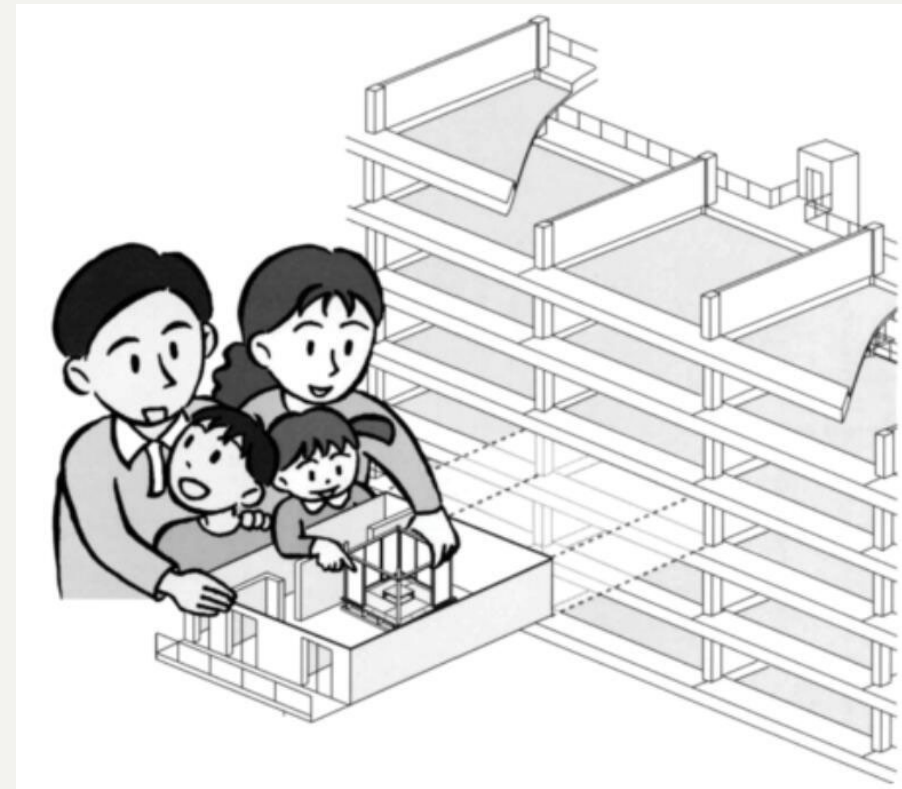
Research Question

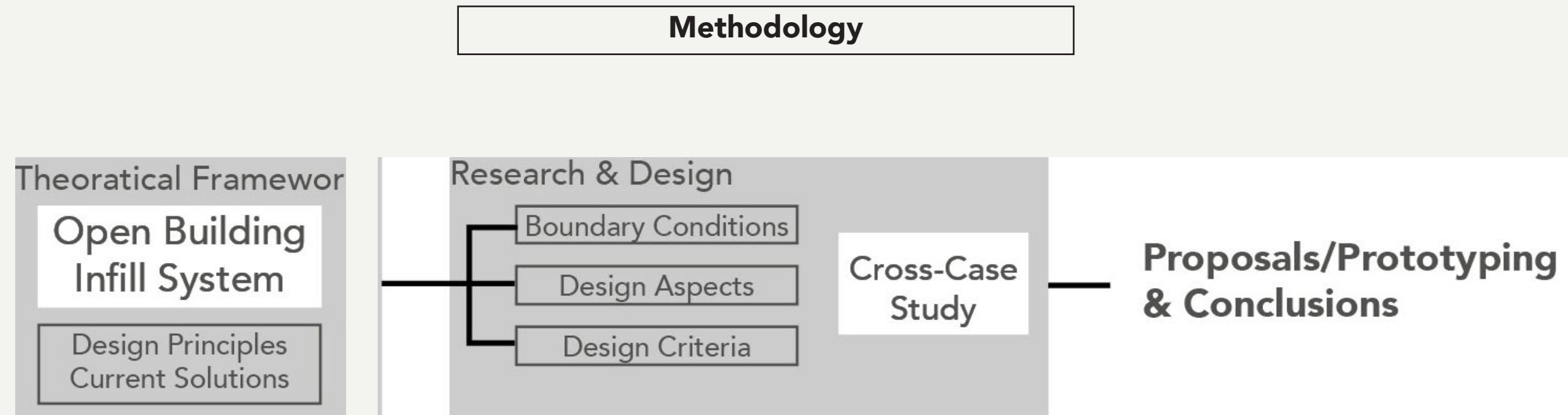
What can we learn from precedents solutions and products to **elevate the design of Open Building plumbing solution** to reach the maximum adaptability in floor layout design in renovation project?

Theory



- Base + Support (Fit out)
- User involvement & Customization
- Upgrade infill

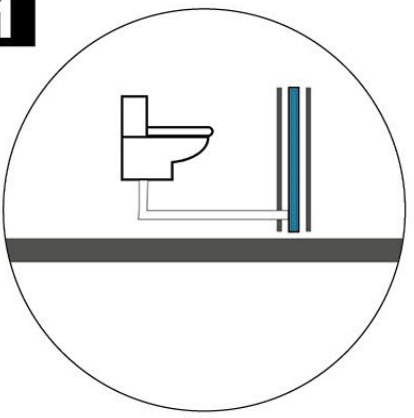
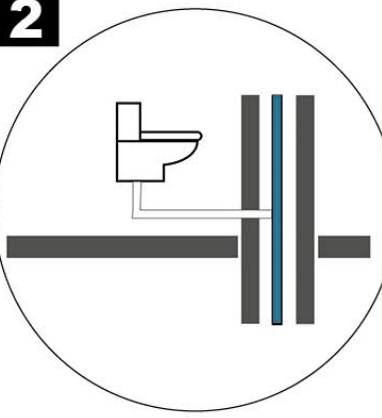
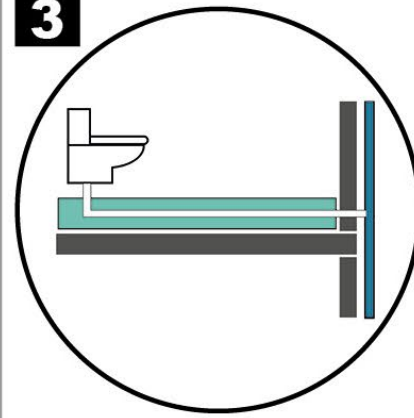
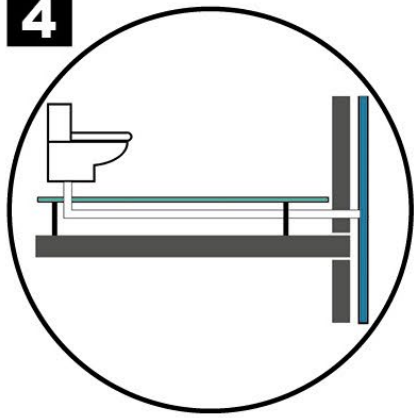
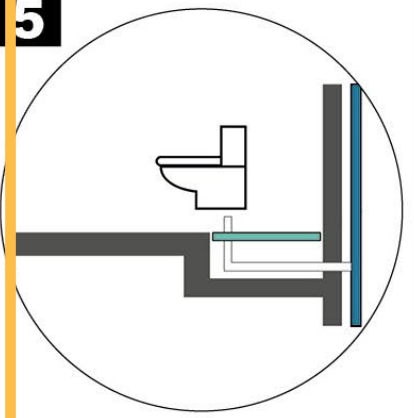


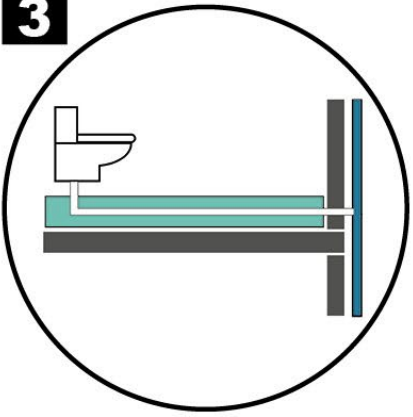
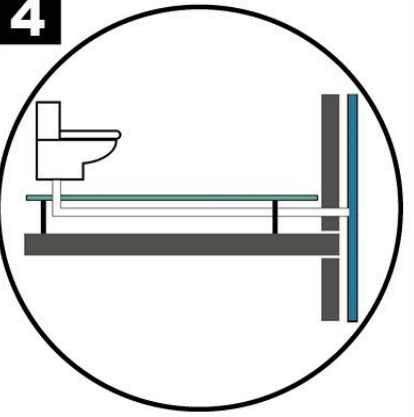


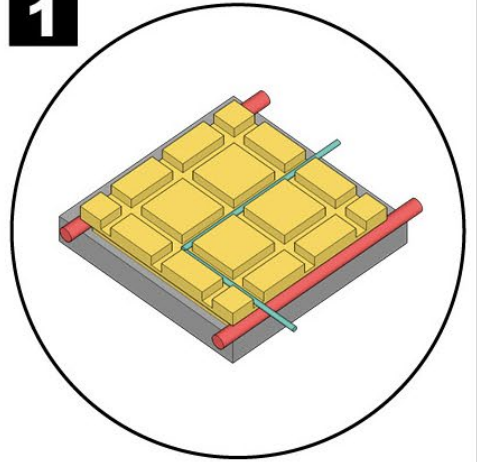
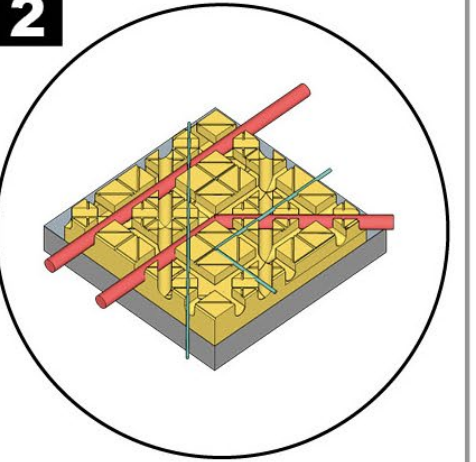
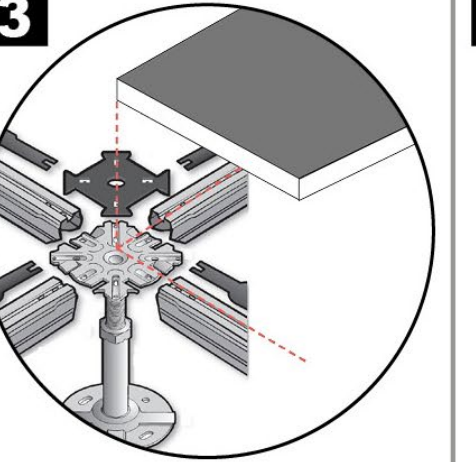
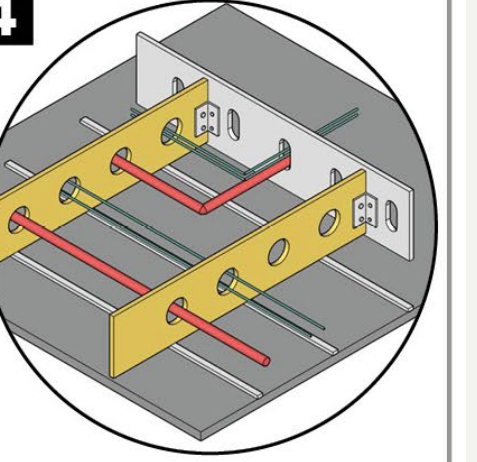
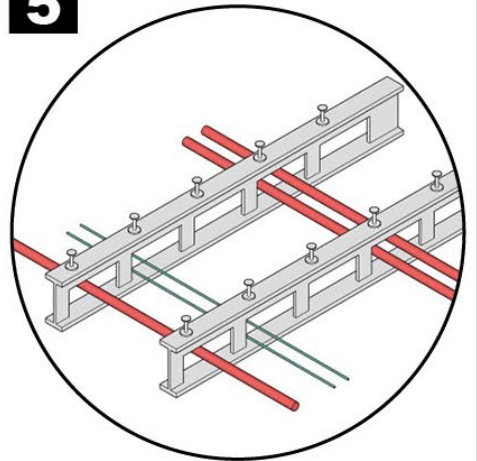
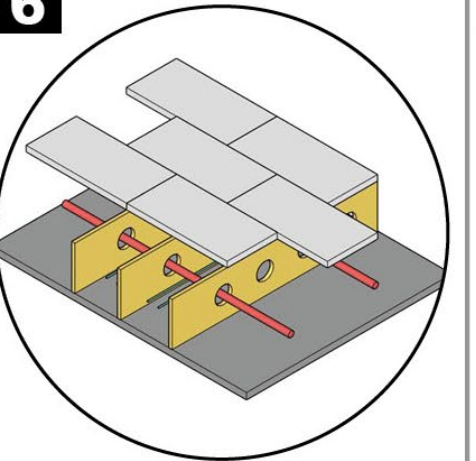
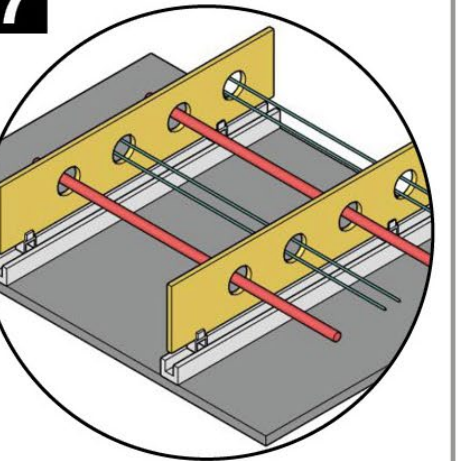
Sub - question :

- 1)What are the current common plumbing solutions in Open Building project and which one could be best fit into the context of the design project?
- 2)During the transformation process from office space into multifamily apartment, what is the technical advantages and limitations?
- 3)Which design aspect should be considered in the comparison between previous solutions? And what kind of criteria should be considered under each aspects?
- 4)What can we learn from the cross case study to elevate the current solutions?

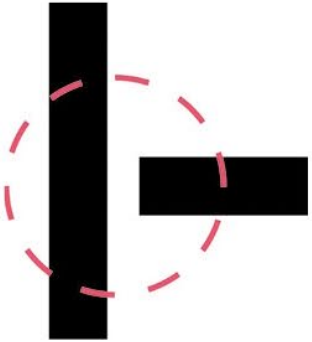
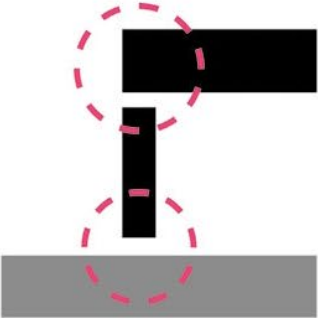
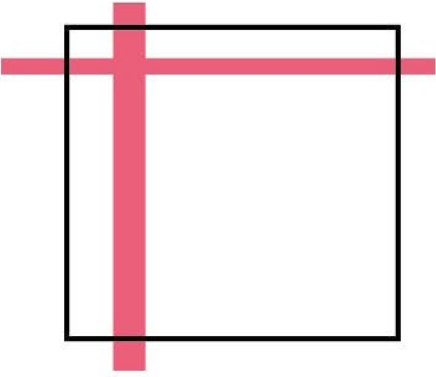
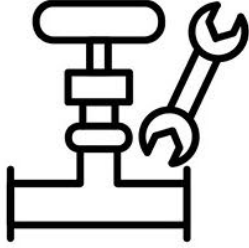
Part 1: conventional plumbing system solution in open building

		1	2	3	4	5
						
		Cabinet	Fixed Shaft	Matura System	Raised Floor	Floor Trench
Position	Supply pipes	in floors and walls or ceilings	in floors and walls	in Matrix Tiles	in hollow raised floor	in floor trench or raised floor
	Grey drainage pipes			in Matrix Tiles		in floor trench with floor covering
	Black drainage pipes			in or between walls		
Slope (Min)	Grey drainage pipes	2%	2%	0	2%	2%
	Black drainage pipes	1%	1%	0	1%	1%
Space Needed		20cm extra wall thick and max 40cm floor height	20cm extra thick for the double wall	10cm height on the floor of the whole dwelling	max height 40cm for the raised floor	min height 40cm or more for the raised floor
Reference project		Tilla (1)	Solids (2)	Voorbrug Renovation Project (3)	Japan Dwelling	NEXT 21 (4)
Floor Layout Flexibility		●●●○○	●○○○○	●●●●○	●●●●○	●●●○○

3		4	
Matura System		Raised Floor	
in Matrix Tiles		in hollow raised floor	
in Matrix Tiles			
in or between walls			
0	2%		
0	1%		
10cm height on the floor of the whole dwelling	max height 40cm for the raised floor		
Voorbrug Renovation Project (3)	Japan Dwelling		
●●●●○	●●●●○		

1		2		3		4	
Matura 1		Matura 2		Raised Floor		Staalframe	
5		6		7			
Slimline		Infra +		Flexvloer			

Design aspects & criteria

Connection Panel - Partition Walls	Joint Support - Main Floor	Pipe Flexibility	Installation
			
<ul style="list-style-type: none"> - thermal quality - acoustic quality - finishing - disassembly 	<ul style="list-style-type: none"> - structure safety - amount of elements - dis/assembly - adaptability 	<ul style="list-style-type: none"> - installation - pipe numbers - adaptability 	<ul style="list-style-type: none"> - amount of elements - accessibility - adaptability - finishing

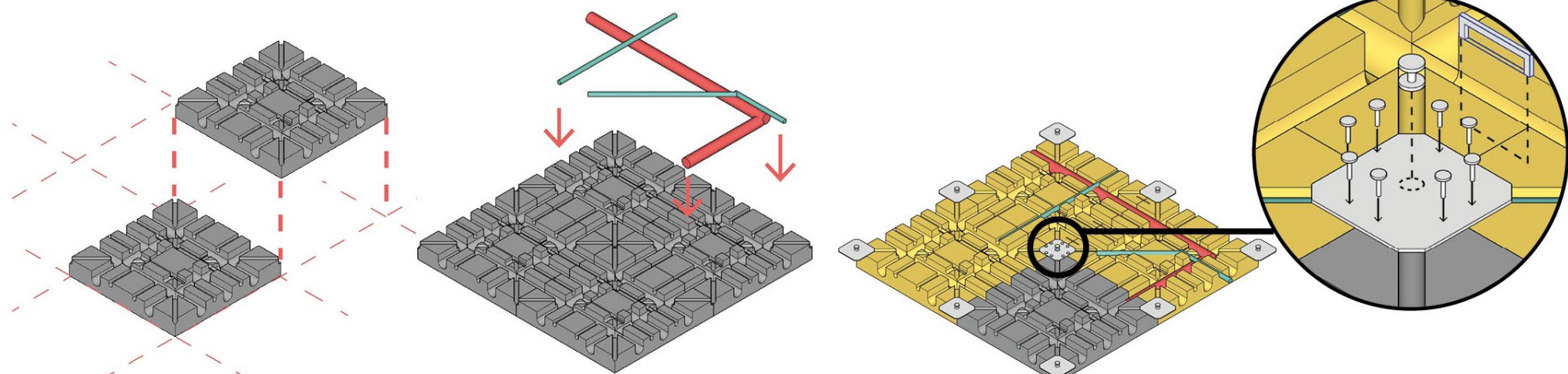
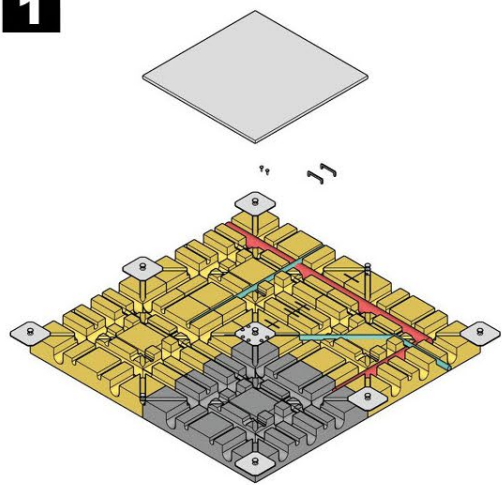
thermal quality	●●●●○	●●○○○	●●○○○	●●○○○
acoustic quality	●●●●○	●●○○○	●●○○○	●●○○○
dis/assembly	●○○○○	●●○○○	●●○○○	●●○○○
adaptability	●●●○○	●●○○○	●○○○○	●●○○○
conclusion	●	●	●	●

amount of elements	●●●●○	●●○○○	●●●●○	●●○○○	●●●●○
installation	●●●○○	●●○○○	●●○○○	●●○○○	●●○○○
adaptability	●●●○○	●●○○○	●●○○○	●●○○○	●●○○○
conclusion	●	●	●	●	●

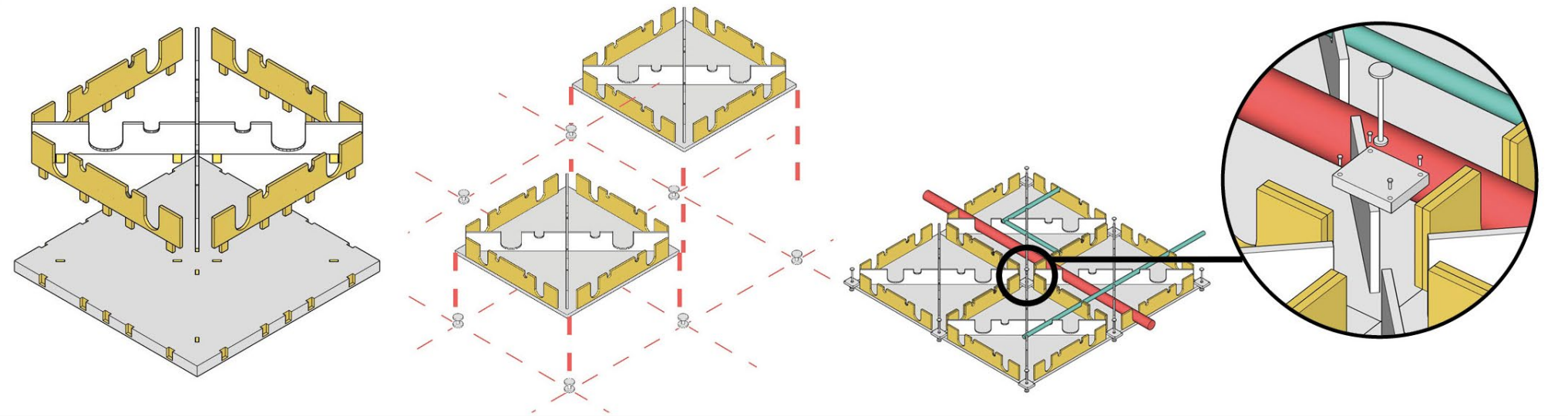
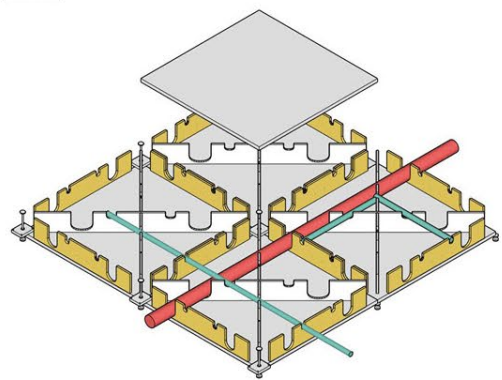
installation	●●●●○	●●●●○	●●○○○	●●○○○
pipe numbers	●●○○○	●●●●○	●●○○○	●●○○○
adaptability	●○○○○	●●●○○	●●○○○	●●○○○
conclusion	●	●	●	●

installation	●●●●○	●●●●○	●●○○○	●●○○○
pipe numbers	●●○○○	●●○○○	●●○○○	●●○○○
adaptability	●○○○○	●●●○○	●●○○○	●●○○○
conclusion	●	●	●	●

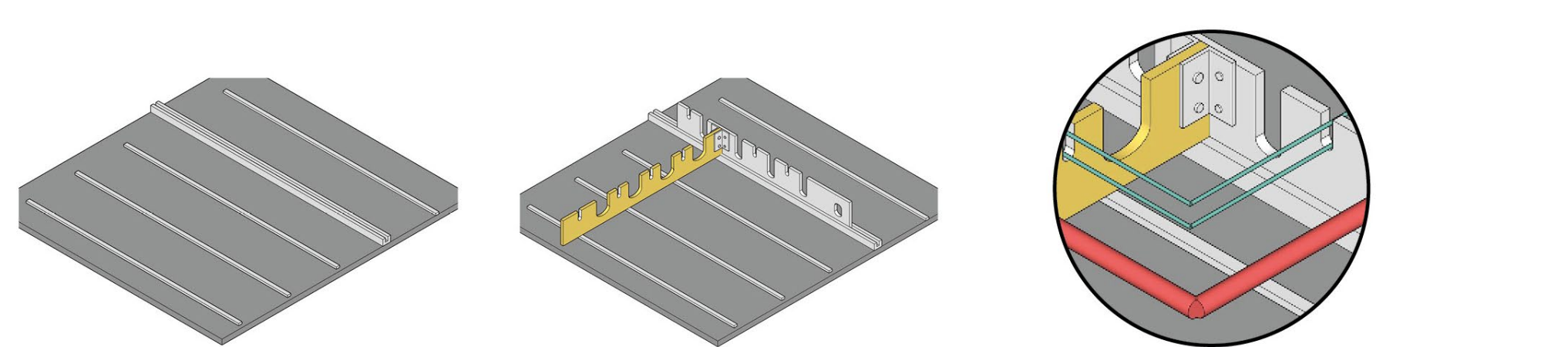
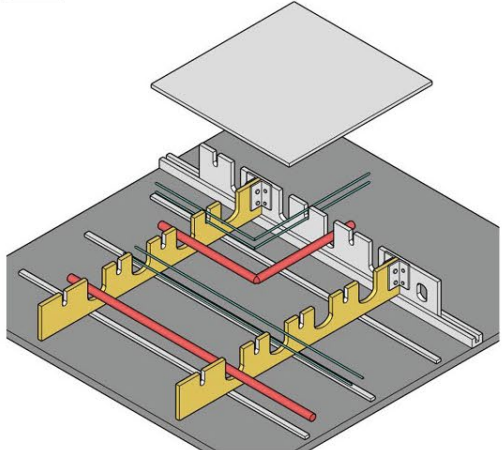
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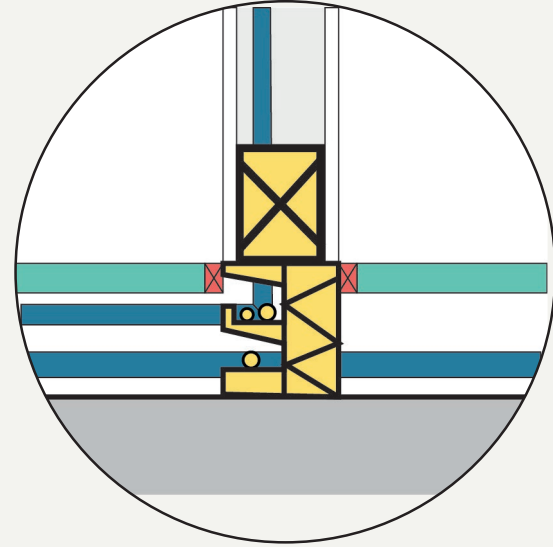
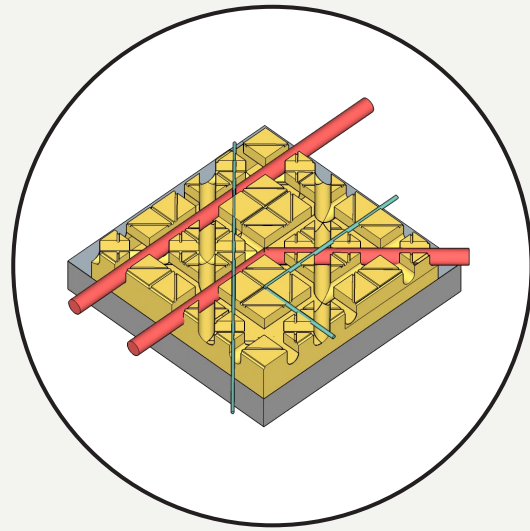
2



3

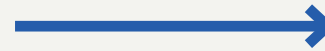


RESEARCH SUMMARY

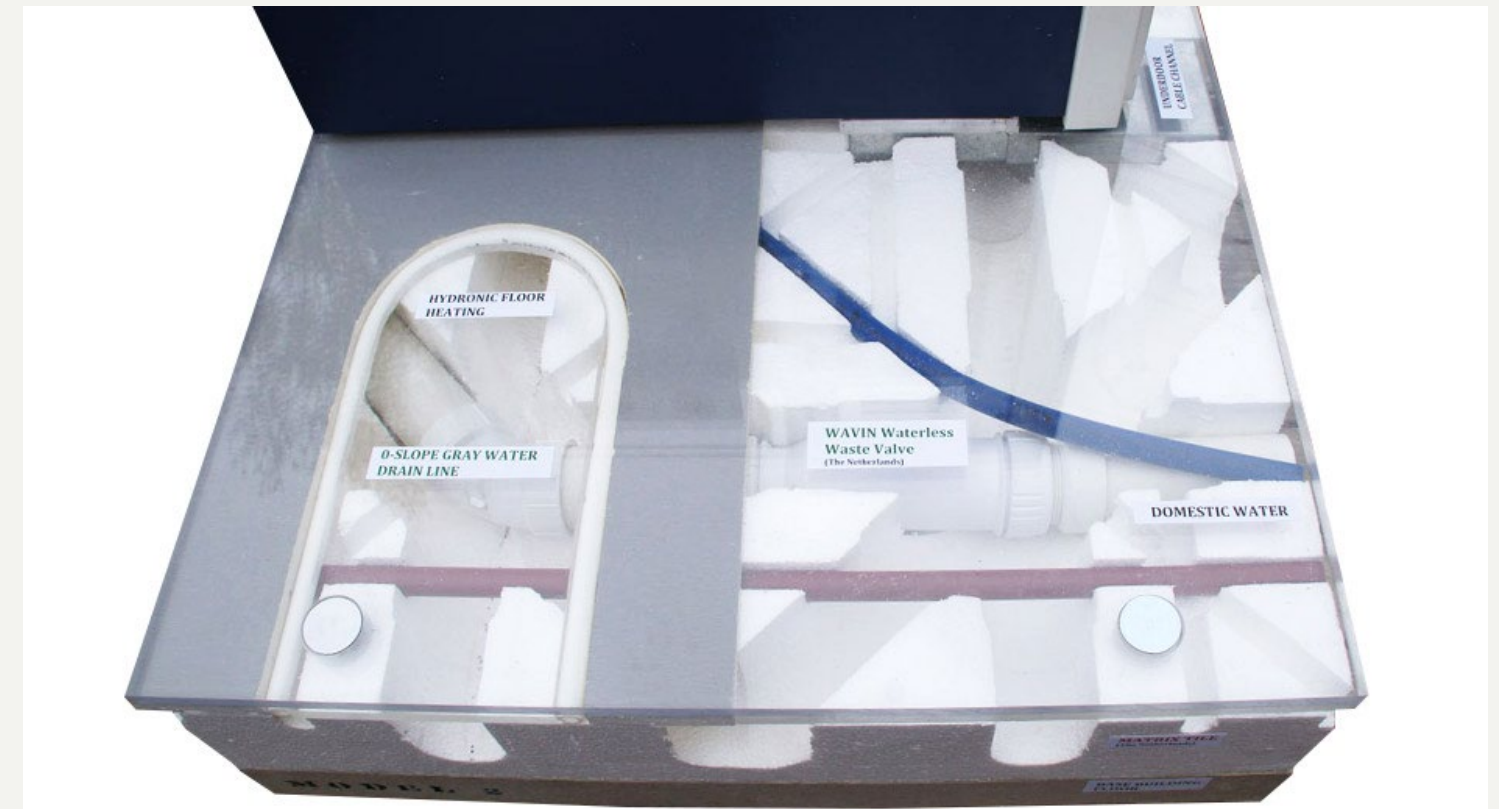
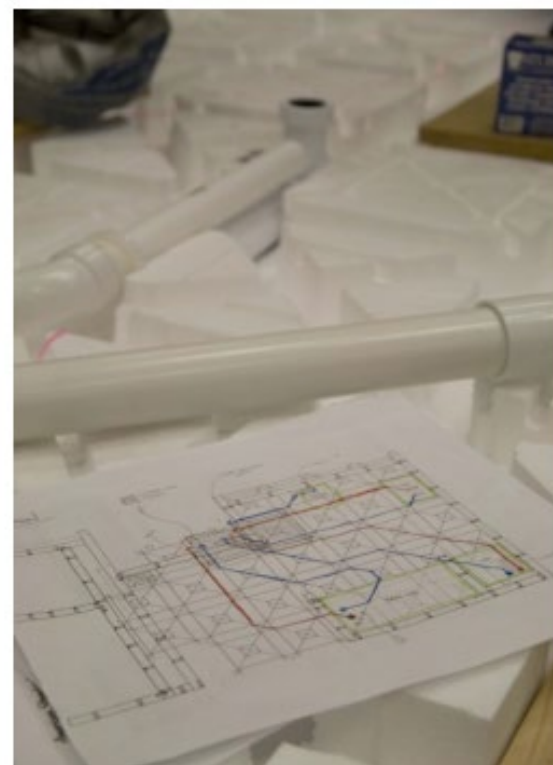
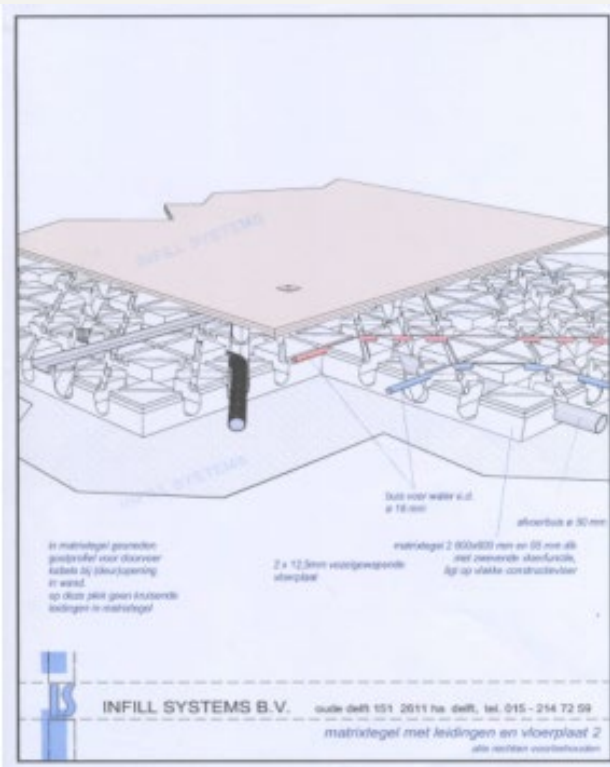


Matura System

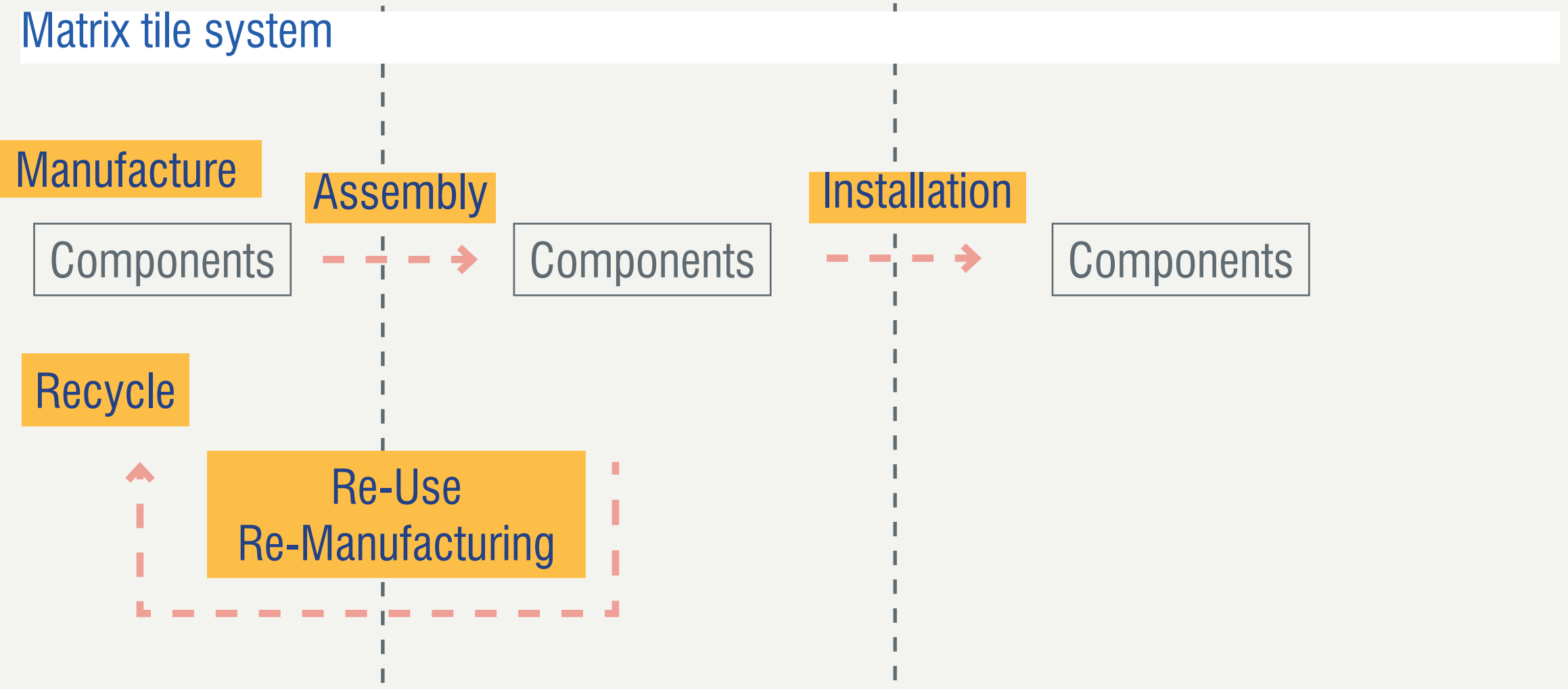
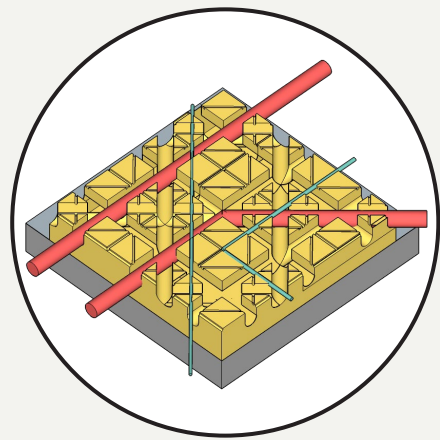
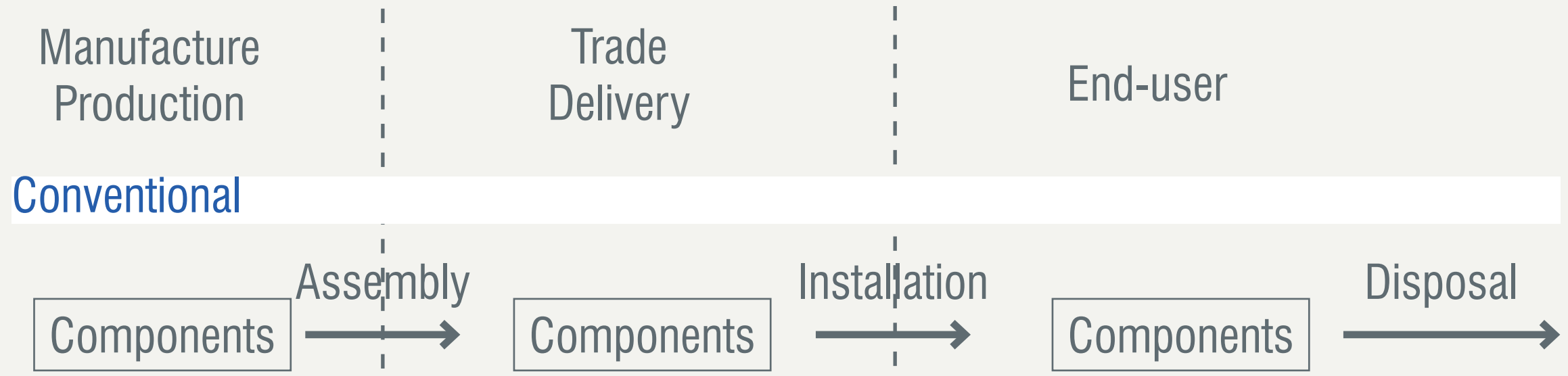
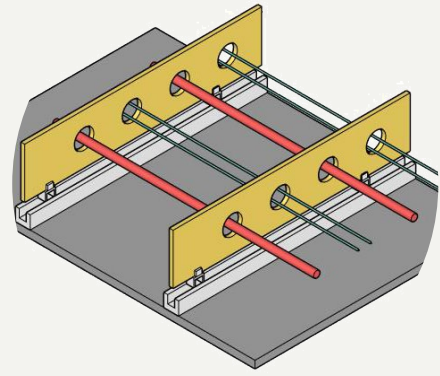
Tech
Solution



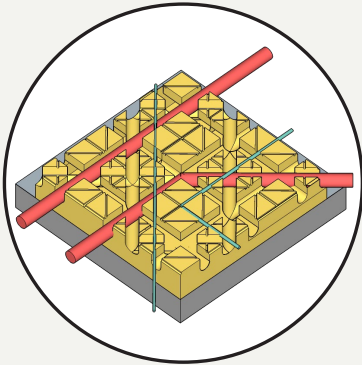
Design



SUPPLYCHAIN MANAGEMENT



Matrix tile system



- Prefabricate
- Modular
- Batch production
- Improved sound and thermal isolation between floors

- Light construction onsite
- Faster insulation

- Light weight

Manufacture

Assembly

Installation

Components



Components

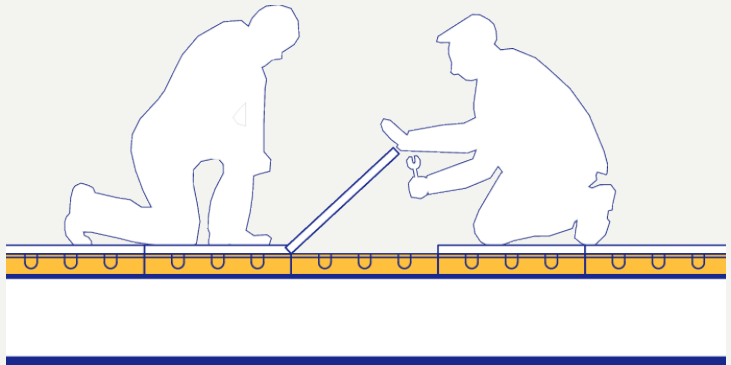


Components

Recycle

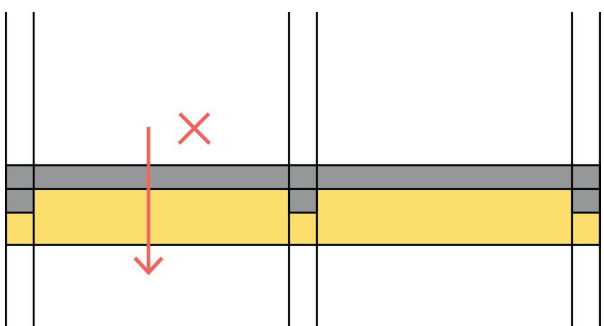
Xps

Re-Use
Re-Manufacturing



Maintenance

- Easier maintenance (all plumbing is within a unit)
- Support / Accesories flexible



floor penetration difficulties (pre Design limitation)



Thermal and acoustic

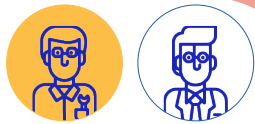
- 1 Problem
- 2 Research
- 3 Design

STRATEGY

Initiative

Transformation Possibility Assessment

Transformation Potential Measurement Tool



Architect +
Project Developer

TOP DOWN

Support Design

Principle Design

1. Zoning & plot division
2. Facade & climate
3. Communal space ...



Principle Architect

TOP DOWN

Fit-out Design

User - participate design process

Instant feedback modular rent system



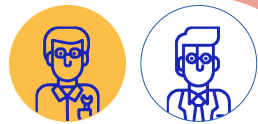
Architect Consultant
+ Customer

BOTTOM UP

Initiative

Transformation Possibility Assessment

Transformation Potential Measurement Tool



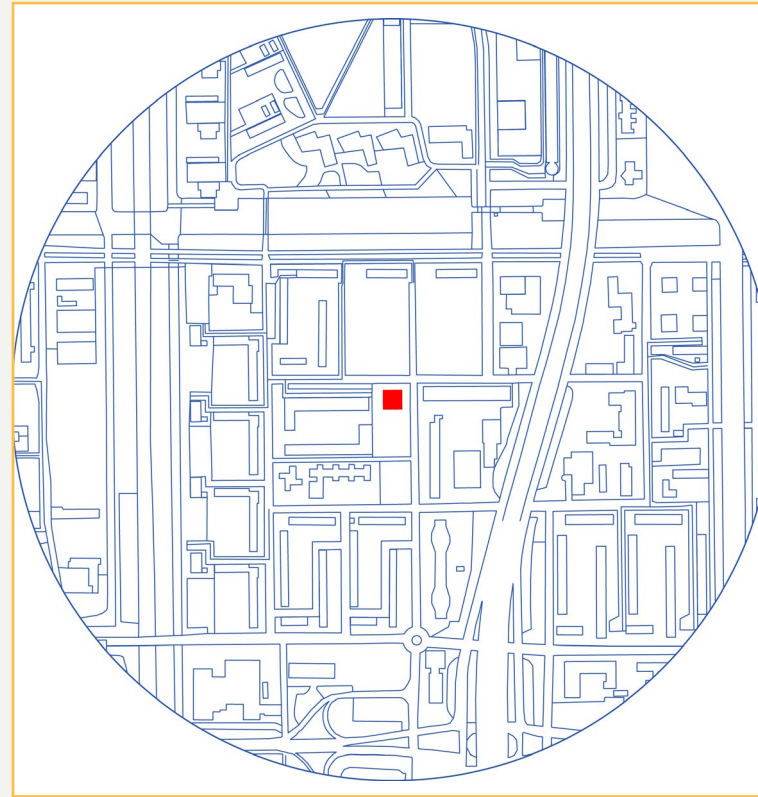
Architect +
Project Developer

TOP DOWN

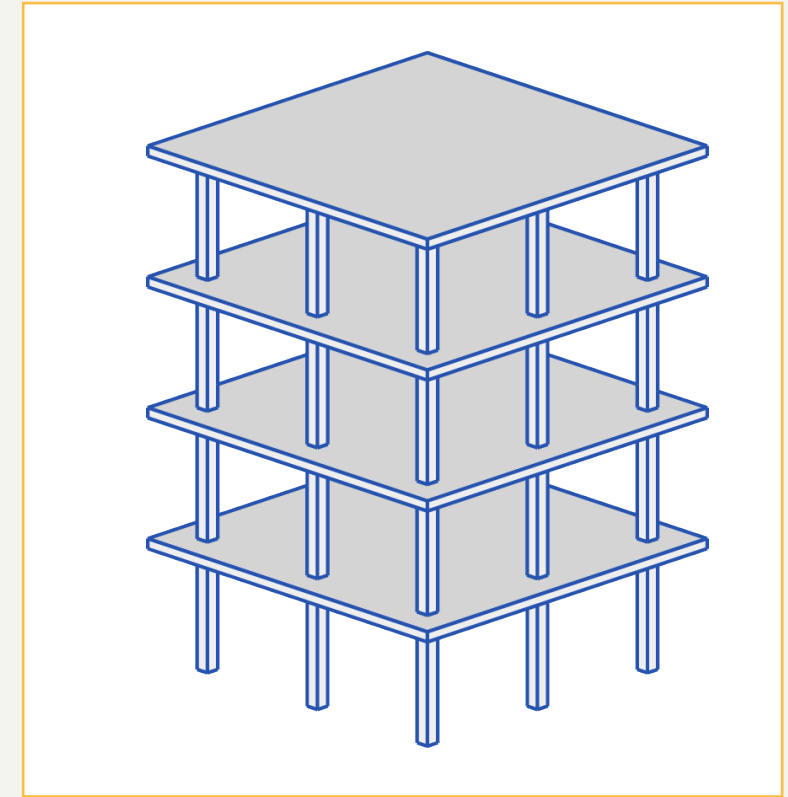
Transformation Possibility Assessment



City



Neighborhood



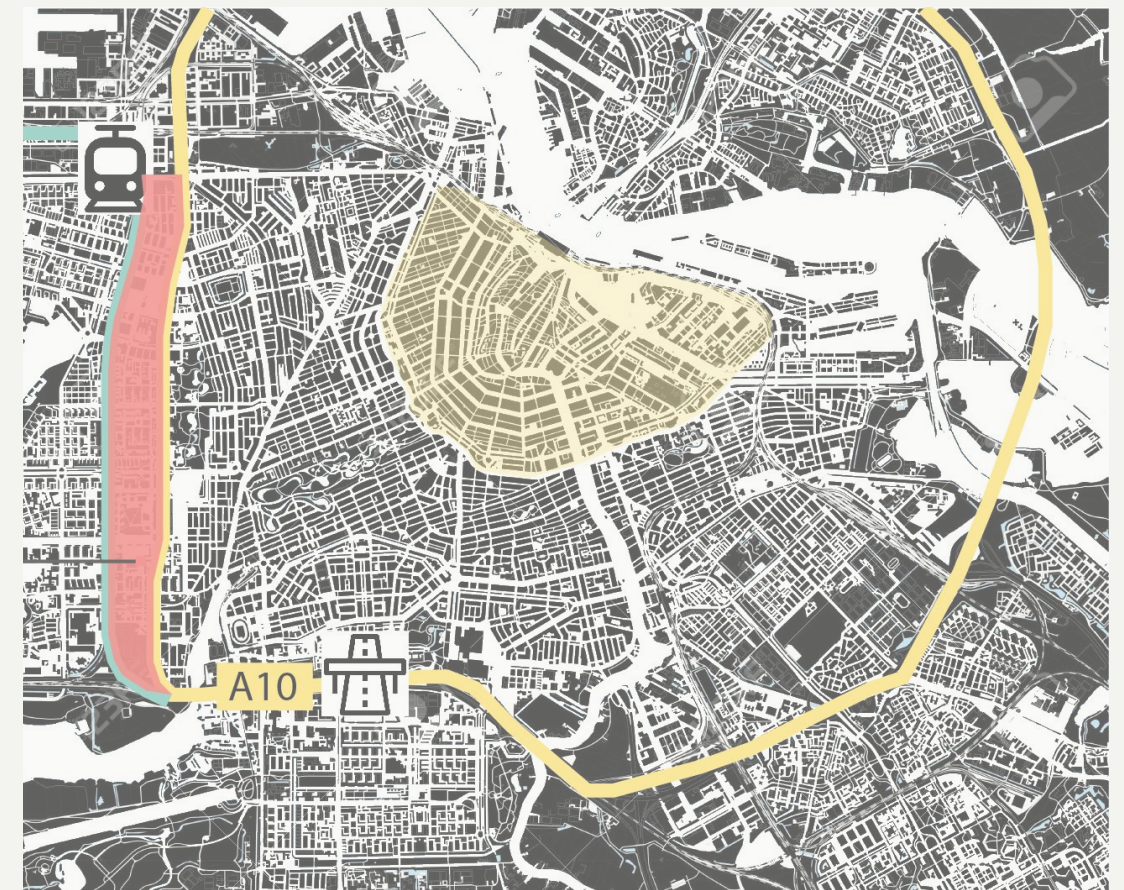
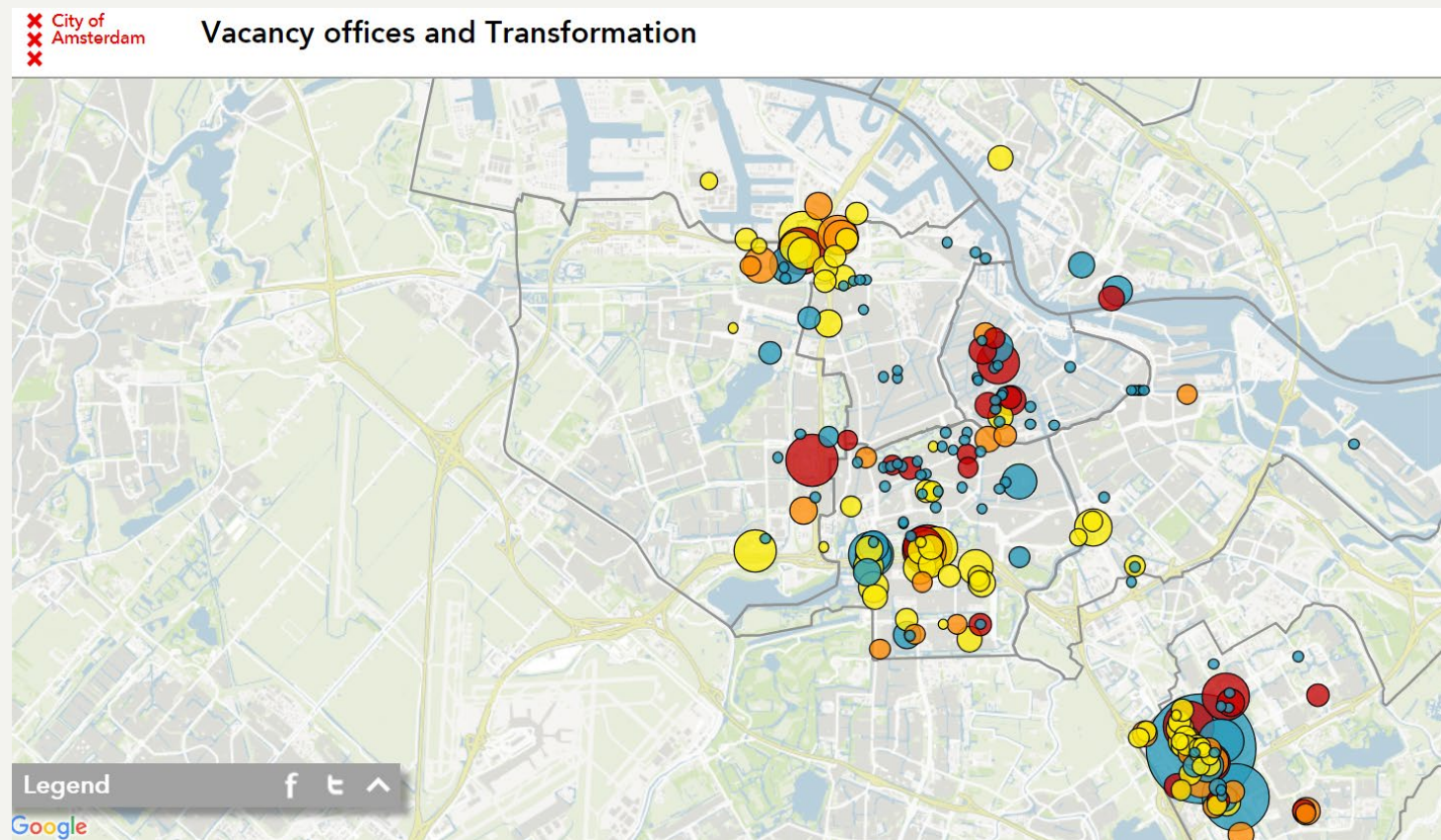
Building

Mapping Potential Area

High vacancy area

+

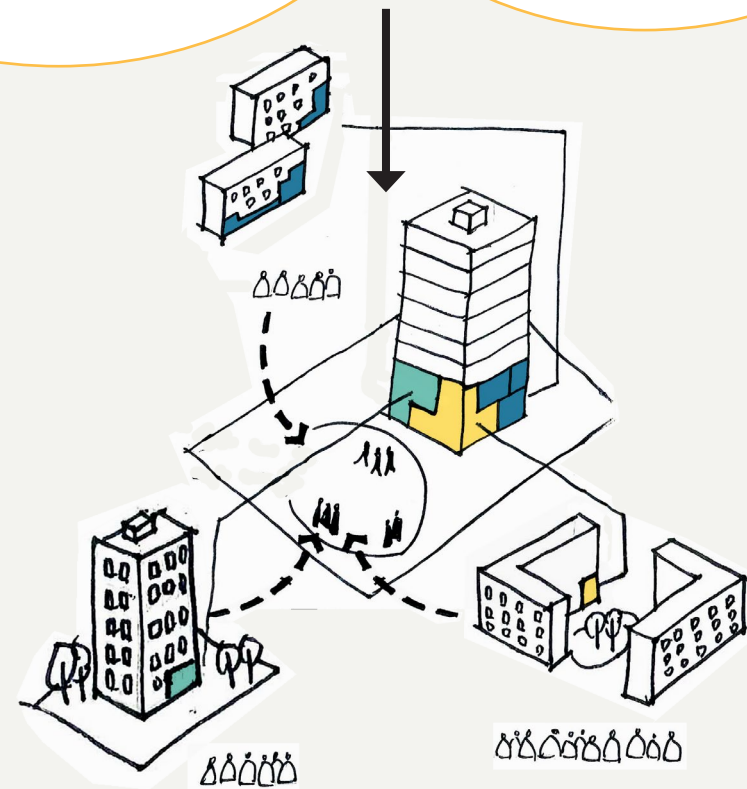
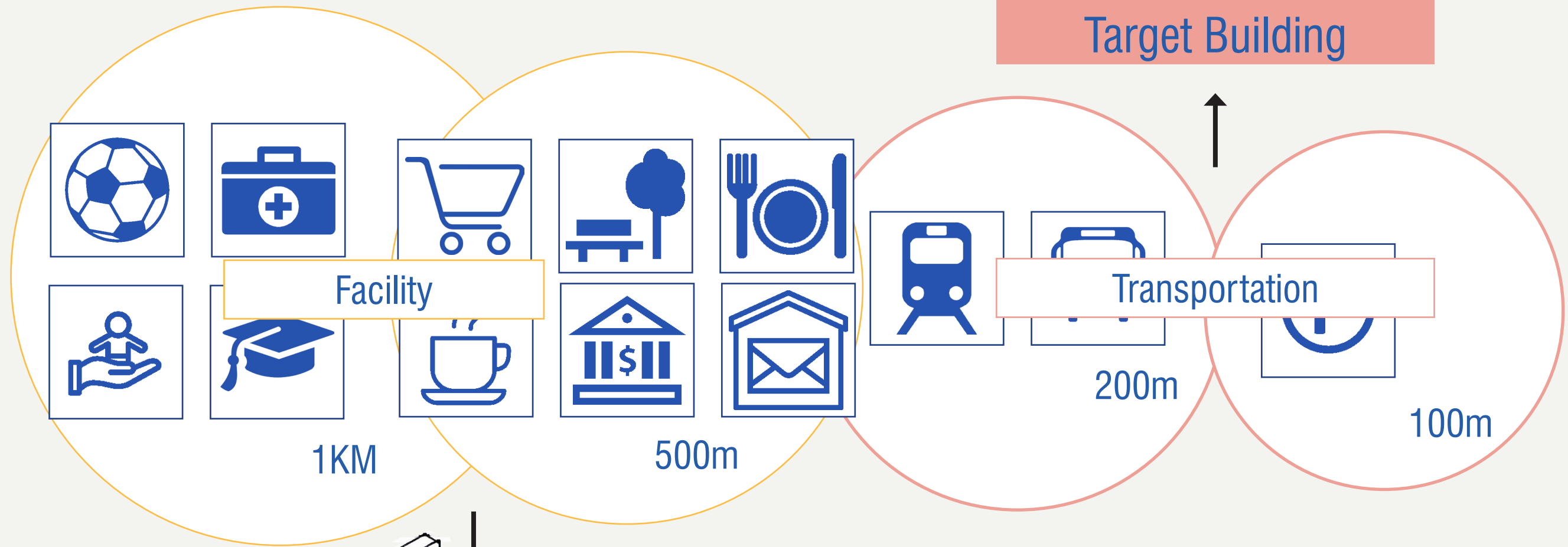
Middle income housing developing area



Nieuwe West



Decisive Factor for Target Building



Technical

Shaft ?



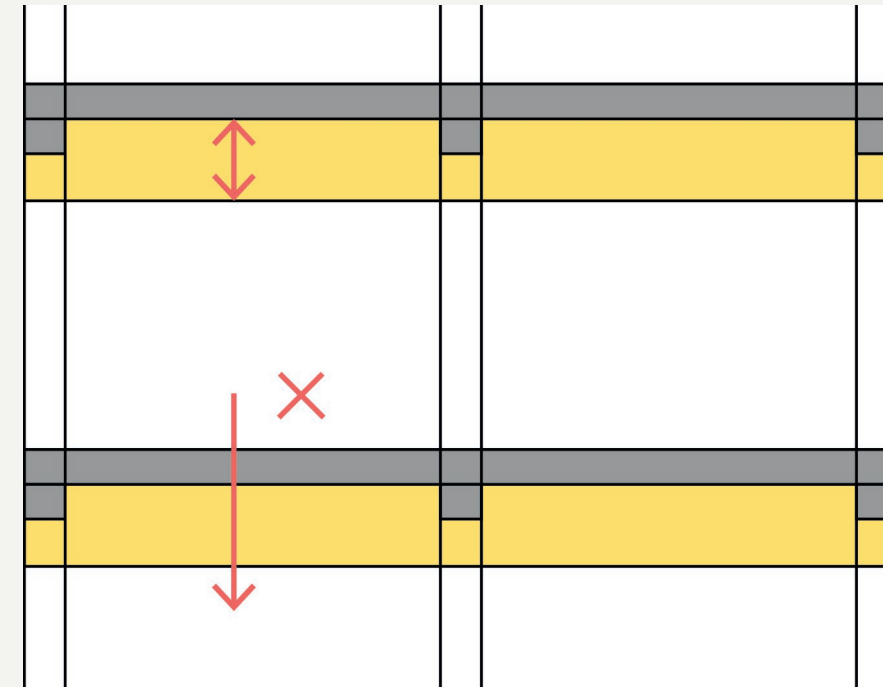
Plumbing



Floor heating & cooling



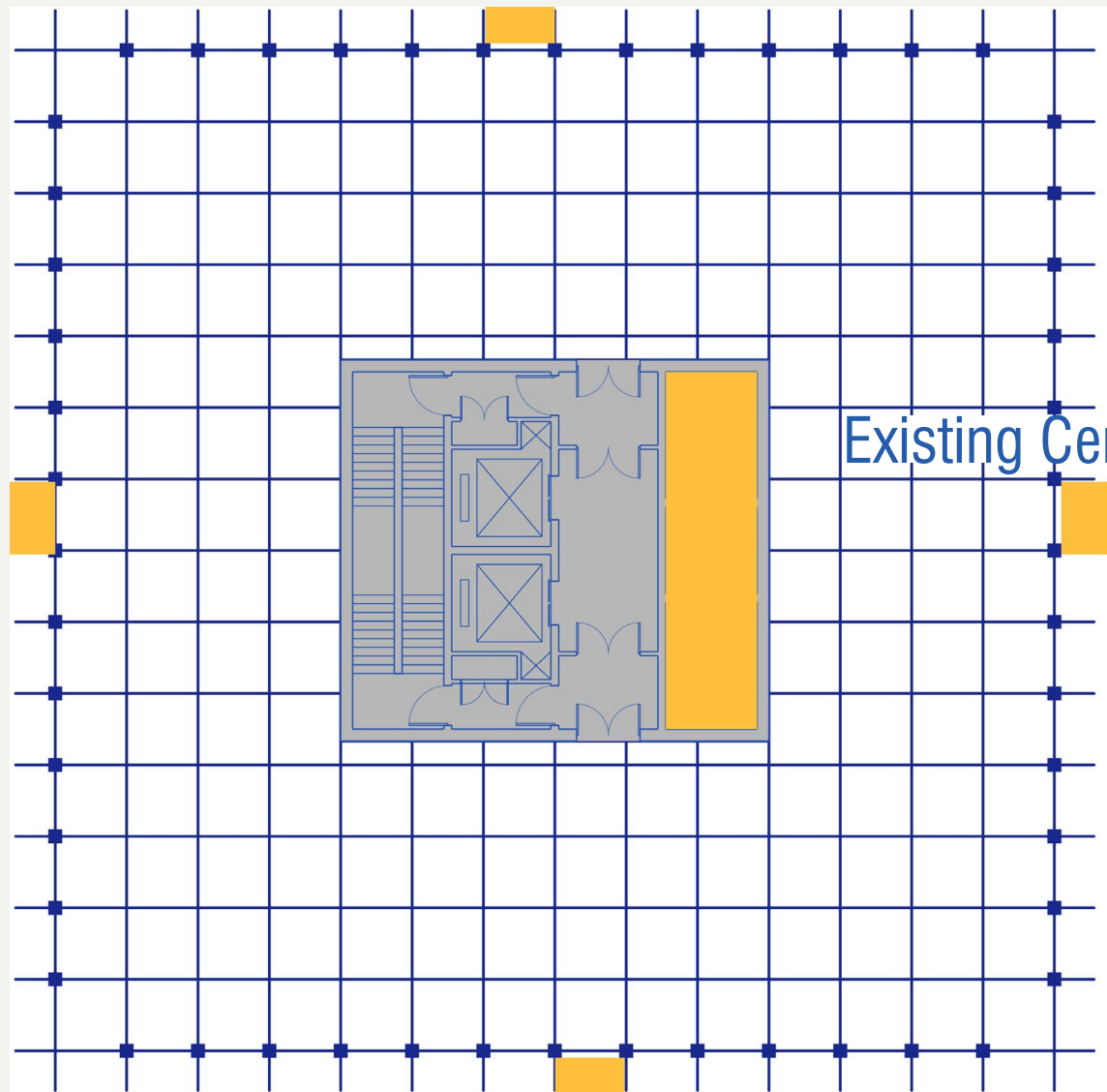
Electricity
Partition Wall



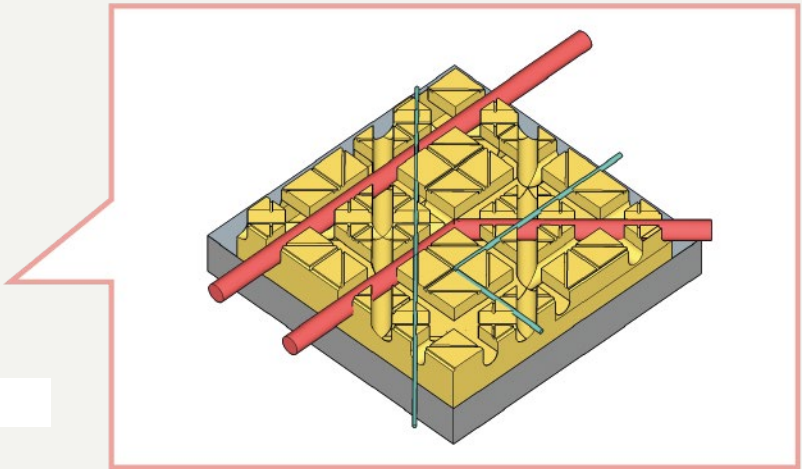
Reinforced concrete floor
? steel trusses

Technical Solution

Extra shaft on the facade



Existing Central Shaft

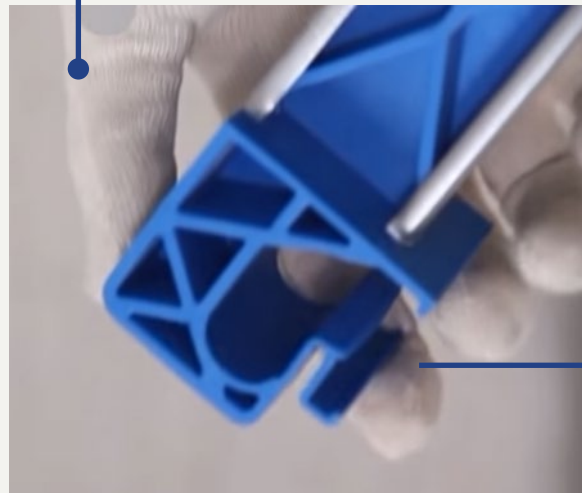
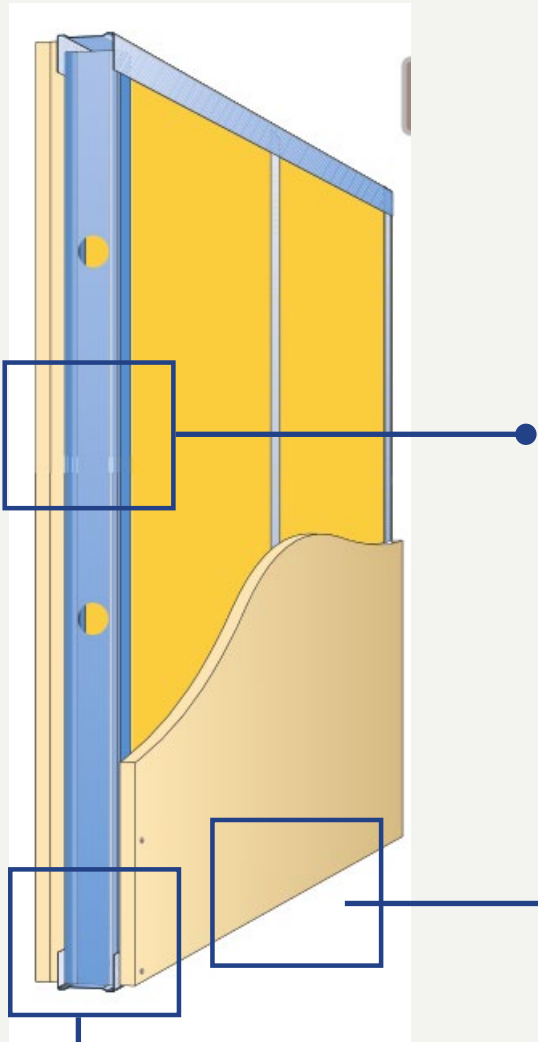
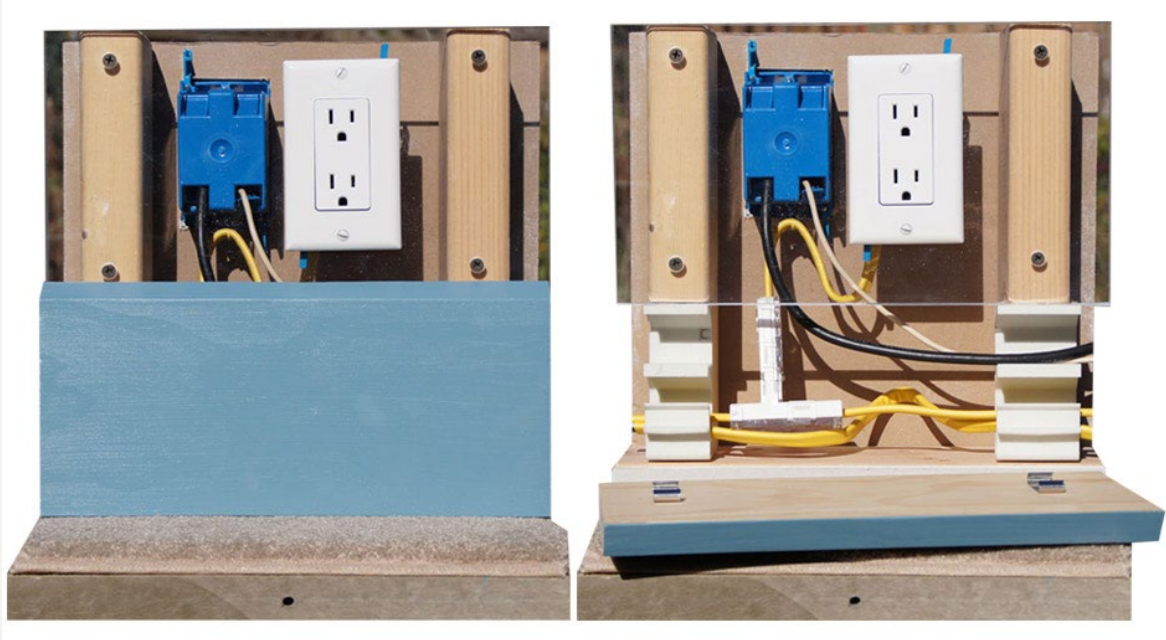


Plumbing



Floor heating & cooling

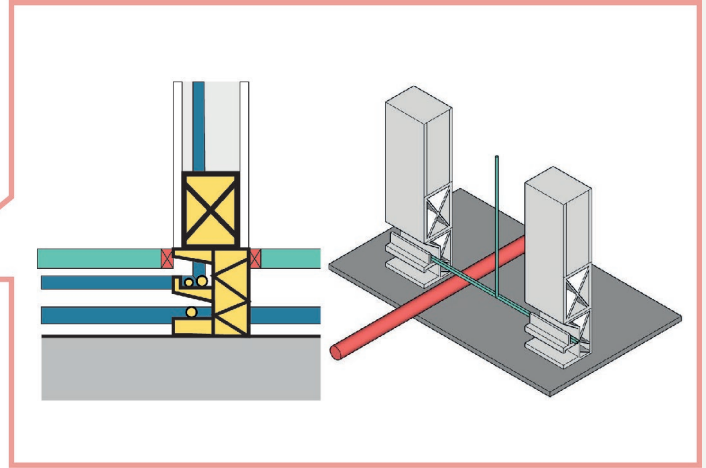
Technical Solution



Placo ® Easycable



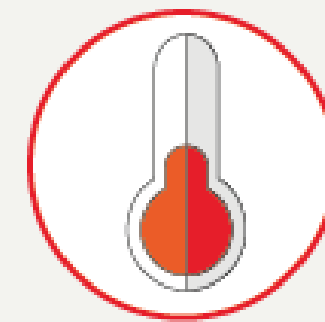
Electricity Partition Wall



Facade



Aesthetic



Office < Apartment

Thermal Insulation

Location

Building Information:

Built Year: 1968

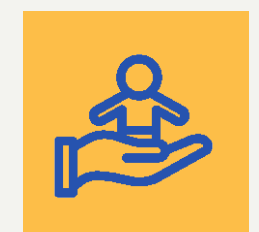
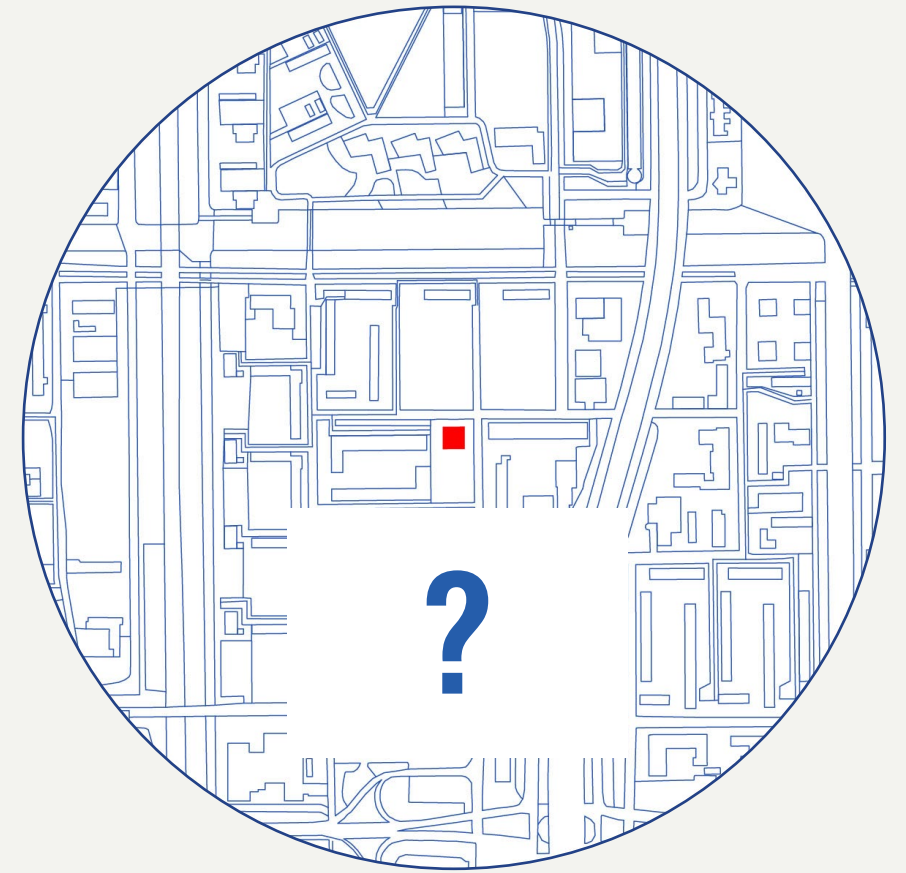
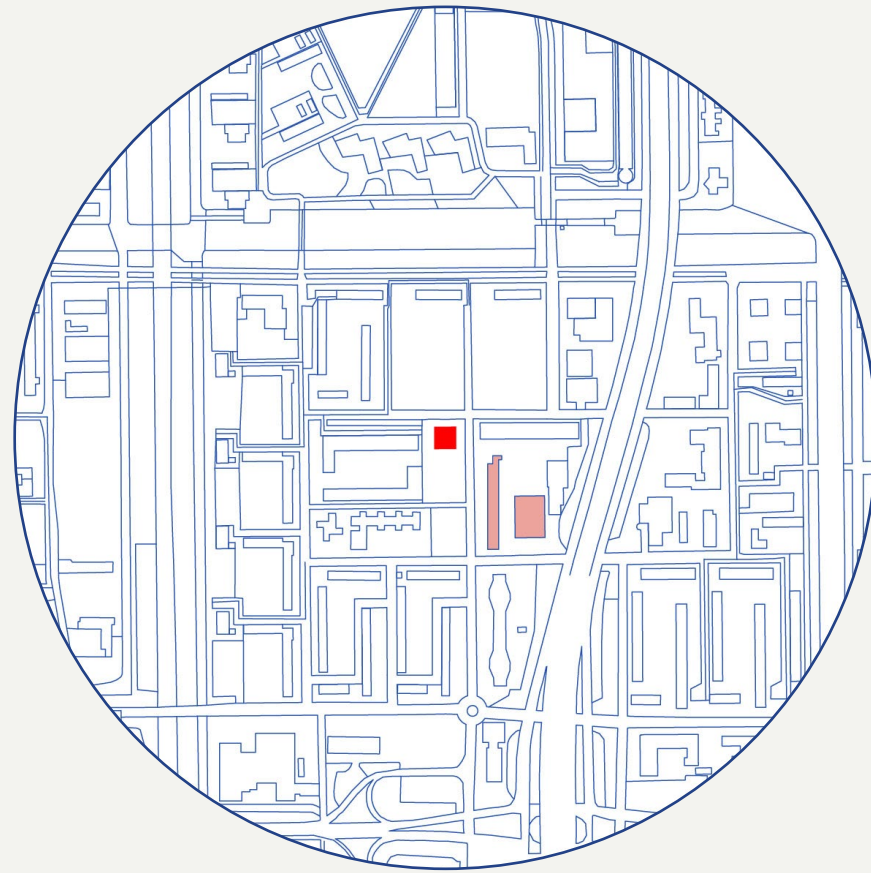
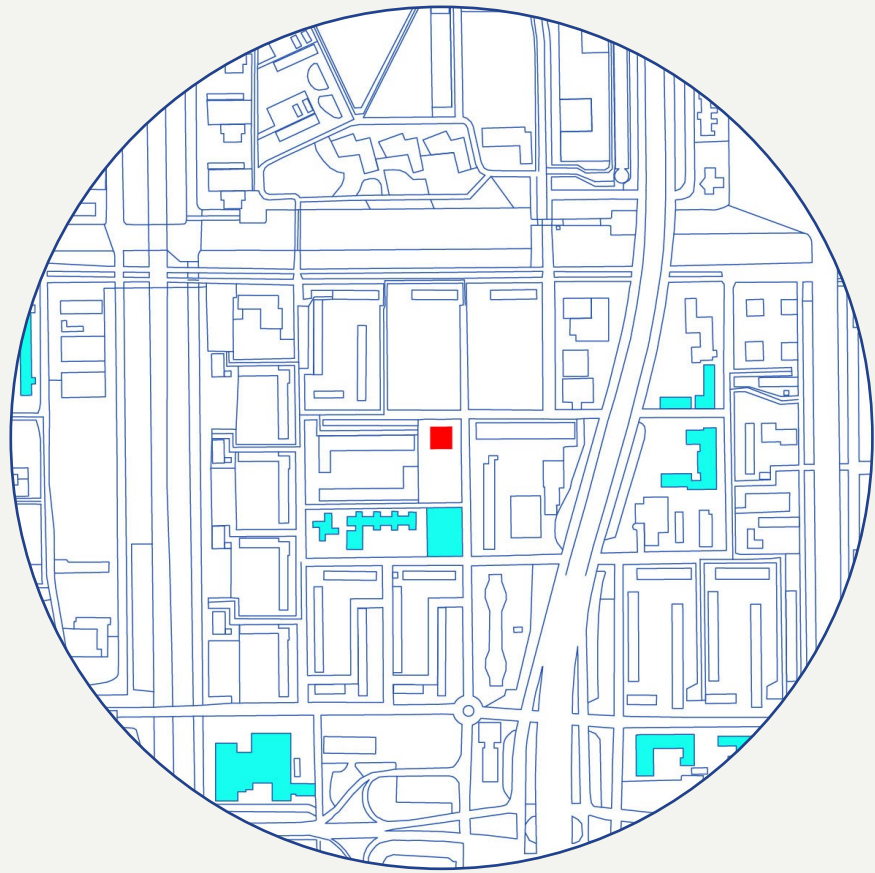
Floor Area :9500 m2

Floors : 12

Location :

Rijswijkstraat 175 in Amsterdam

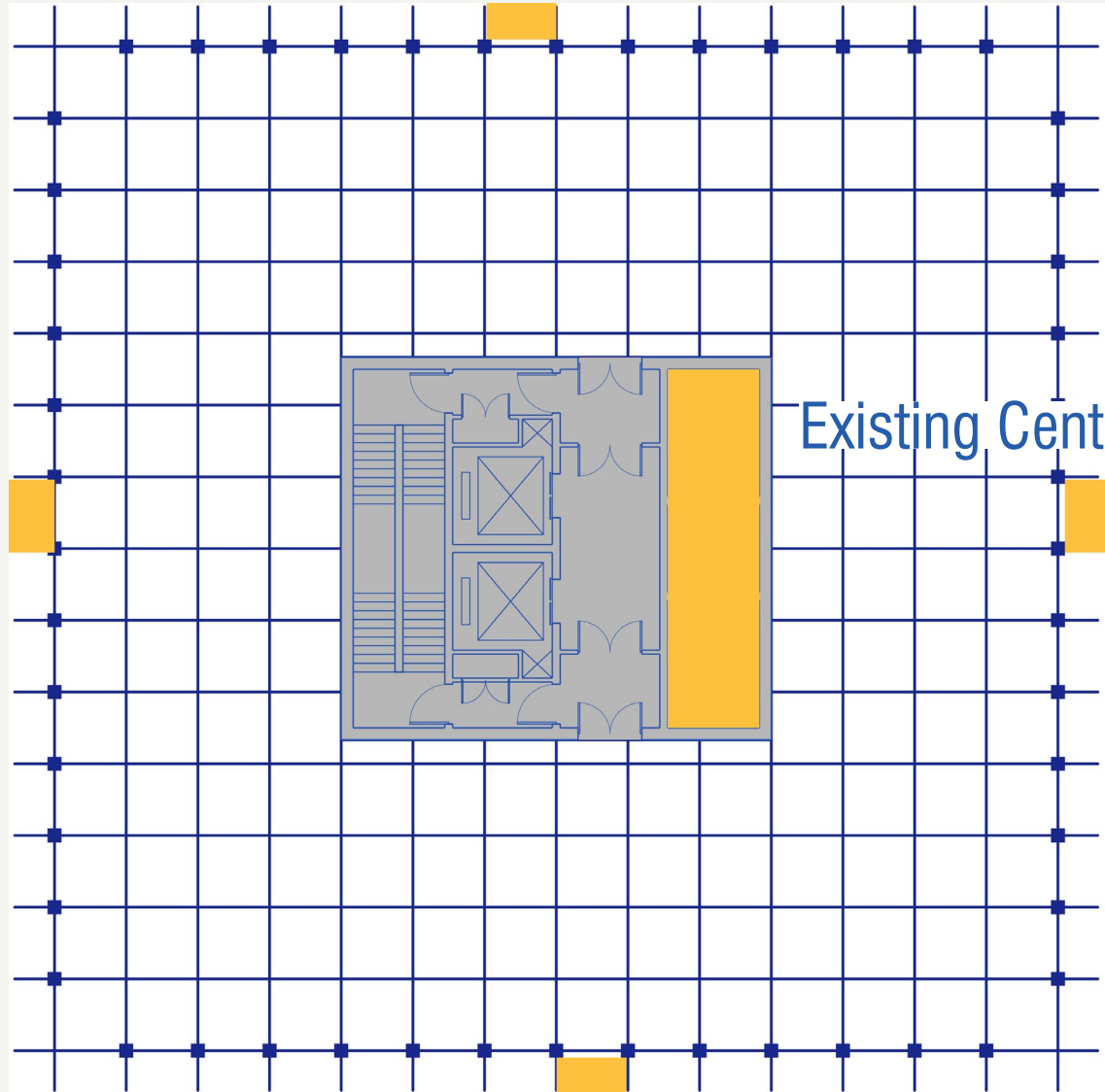




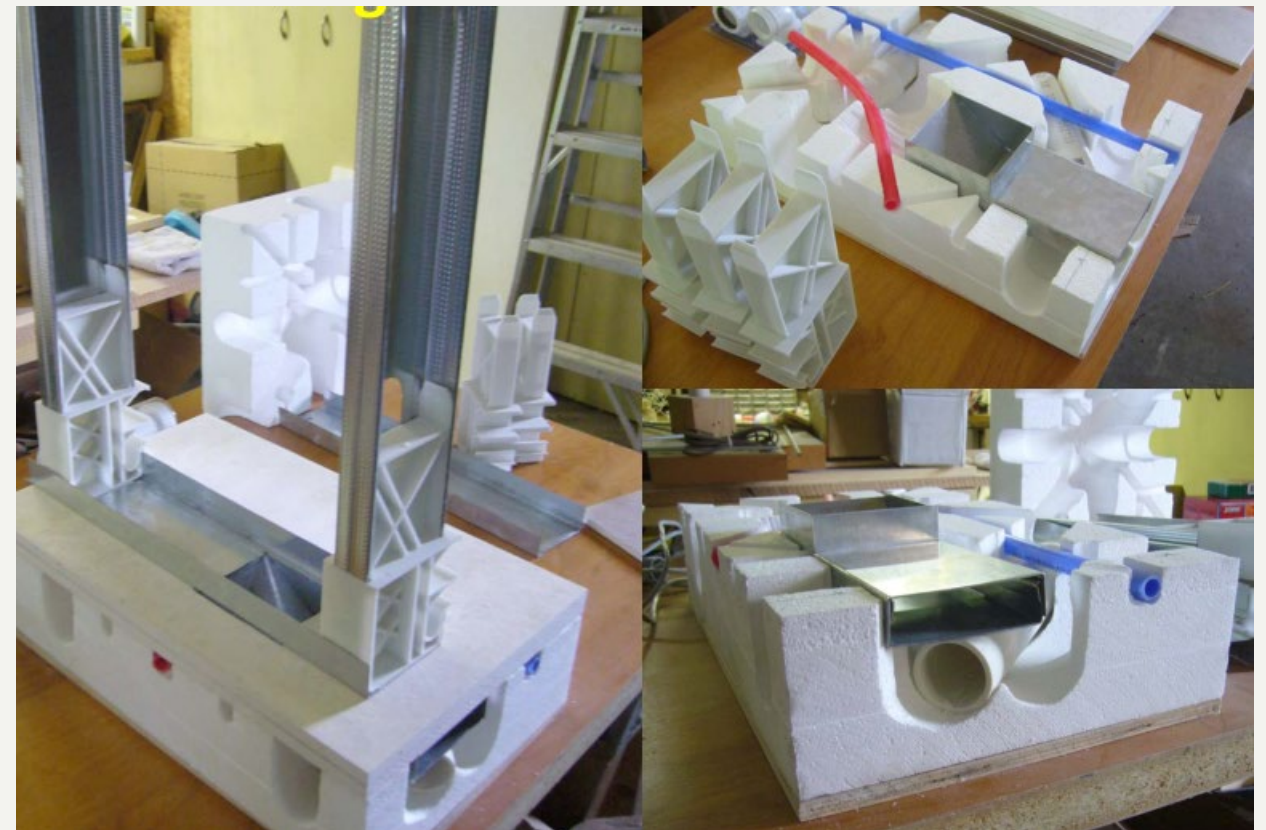
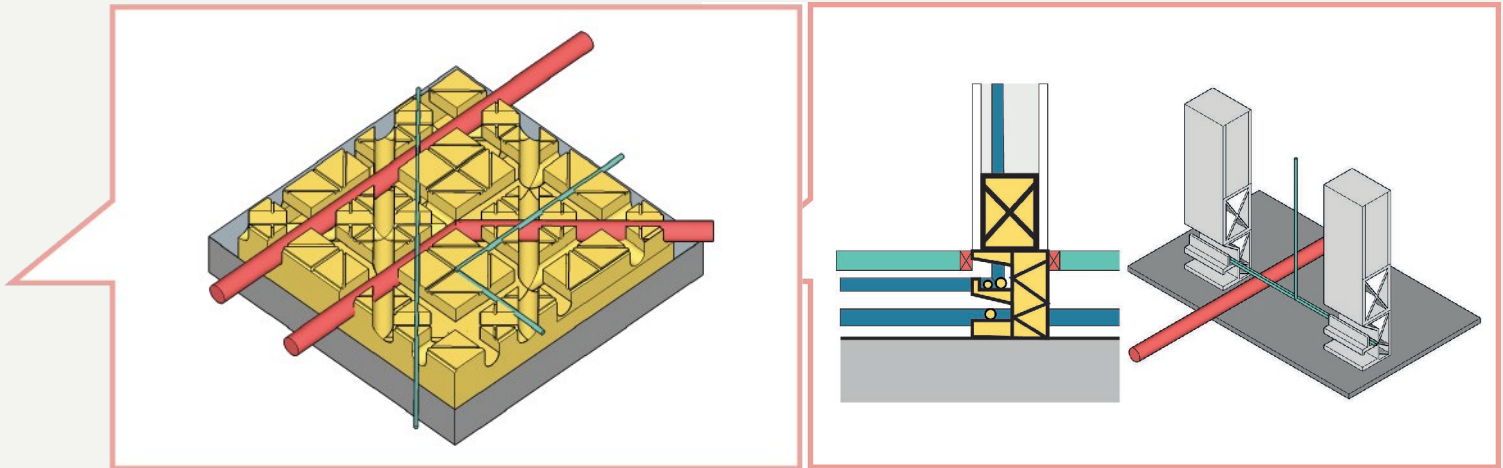
“Missing” function

Technical Solution

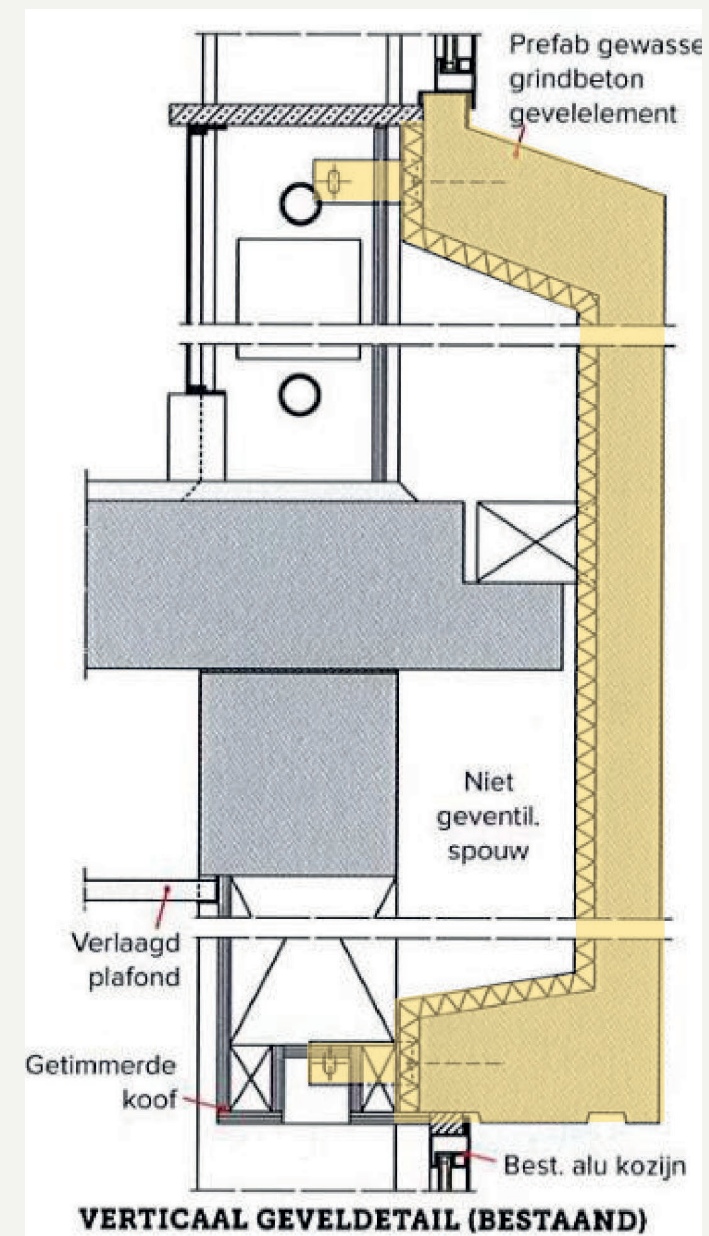
Extra shaft on the facade



Existing Central Shaft



Facade



Support Design



Principle Architect

Principle Design

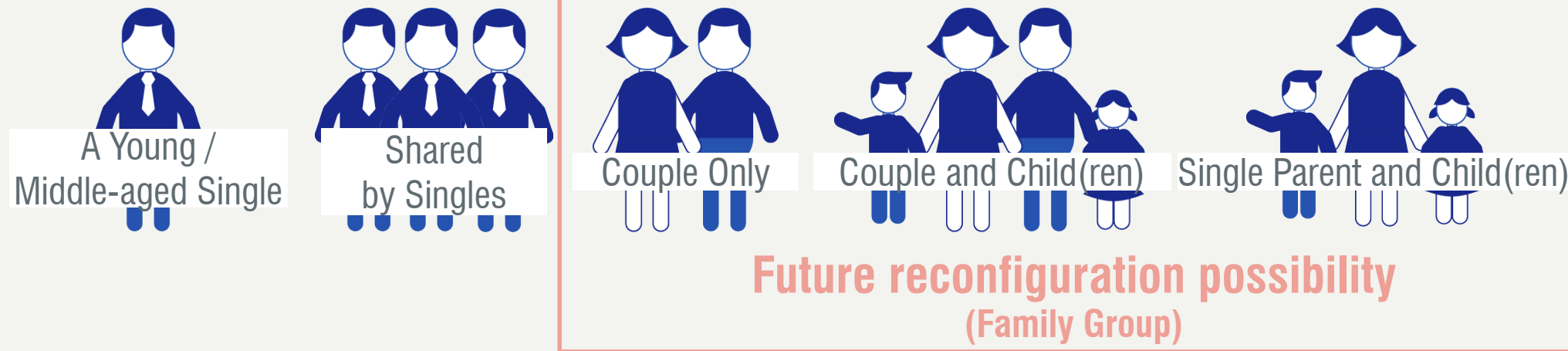
1. Zoning & plot division
2. Facade & climate
3. Communal space ...

TOP DOWN



Target Group Analysis

Middle - income Group

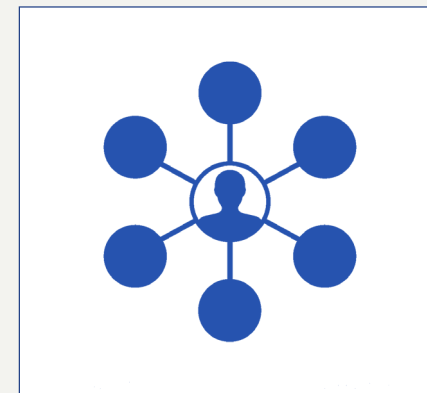


28 ~ 66
years old

Age



Renting




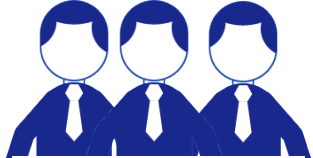
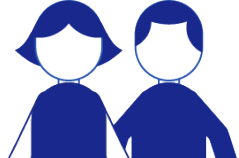
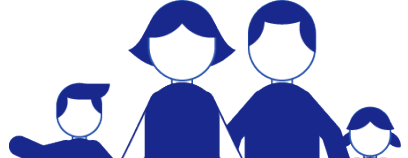
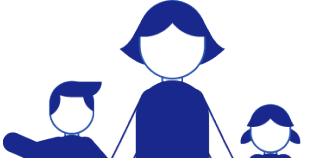
Social Network



City Life



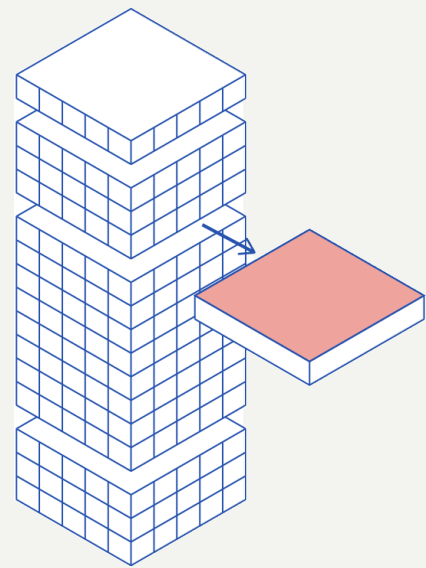
- Middle Income Housing Program & Market Research

Category of household (Middle - income leasing customer)					
Family models	 A Young / Middle-aged Single	 Shared by Singles	 Couple Only	 Couple and Child(ren)	 Single Parent and Child(ren)
Wish & Needs					
Child - raising				●	●
Family Support (Facilitys use)				●	●
Networking of individuals	●	●	●	●	●
Diversification of work styles	●	●	●		
Privacy for individual members		●	●	●	●

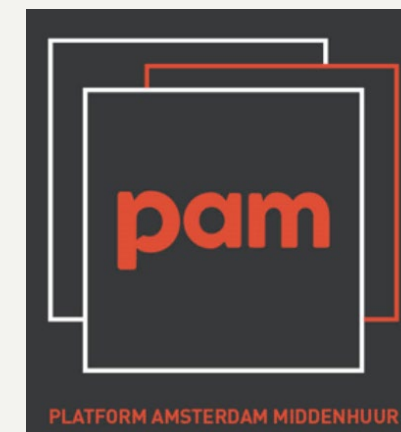




- Middle Income Housing Program & Market Research



Floor area per quality level and type	Standard ★	Plus ★★	Extra ★★★
Studio	<50	<50	<50
1 Room	50 - 60	50 - 60	50 - 60
2 Room	60 - 70	60 - 75	60 - 80
3 Room	80 - 100	80 - 100	80 - 100



PLATFORM AMSTERDAM MIDDENHUUR



Zoning Principle for typical housing floor

- Middle Income Housing Program & Market Research

► Customization Solution for size of families, age group...

Category of household (Middle - income leasing customer)

Family models Program Option		A Young / Middle-aged Single		Shared by Singles		Couple Only		Couple and Child(ren)		Single Parent and Child(ren)	
		1 room	2 rooms	3 rooms	2 rooms	2 rooms	3 rooms	2 rooms	3 rooms		
★	Standard	<50	60 - 70	80 - 100	60 - 70	60 - 70	80 - 100	60 - 70	80 - 100		
★★	Plus	/	60 - 75	80 - 100	60 - 75	60 - 75	80 - 100	60 - 75	80 - 100		
★★★	Extra	/	60 - 80	80 - 100	60 - 80	60 - 80	80 - 100	60 - 80	80 - 100		

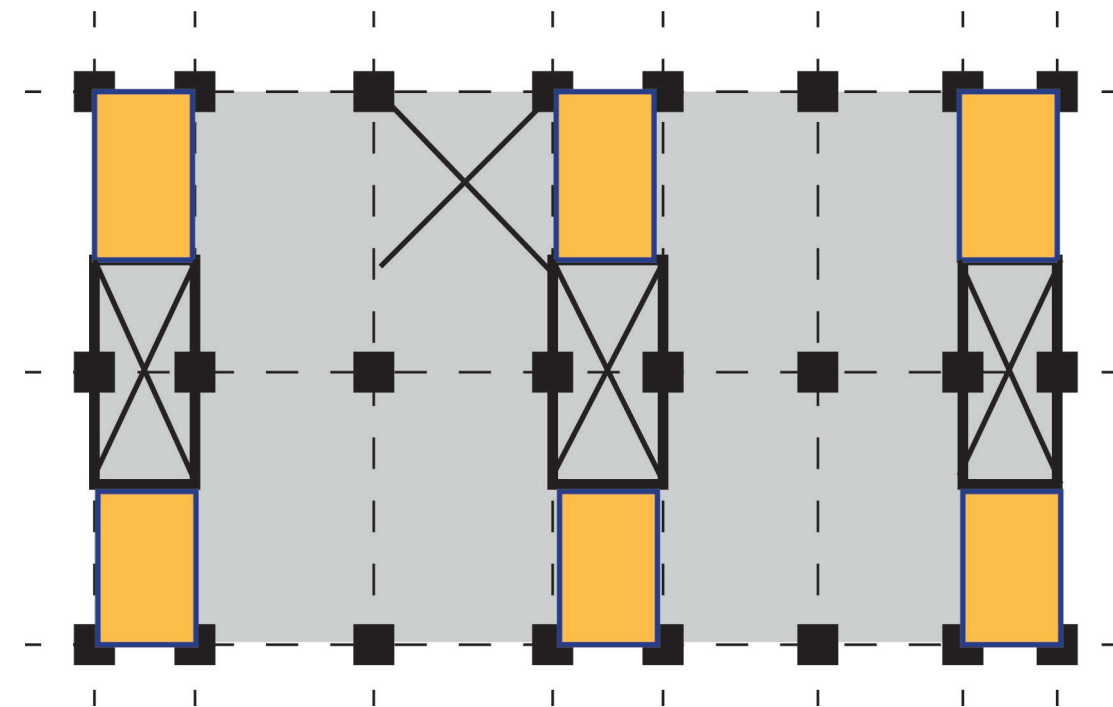
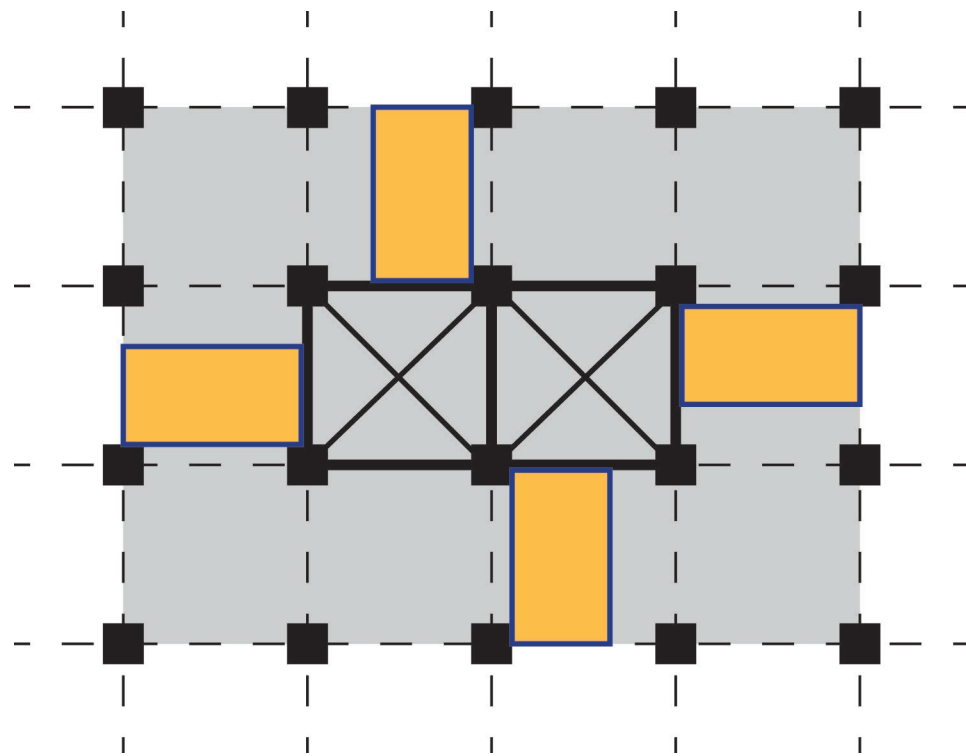




Zoning Principle for typical housing floor

- Technical Solution for customization plan design
- Zoning Strategy for future adaptability and social intermediate space

Intermediate Space

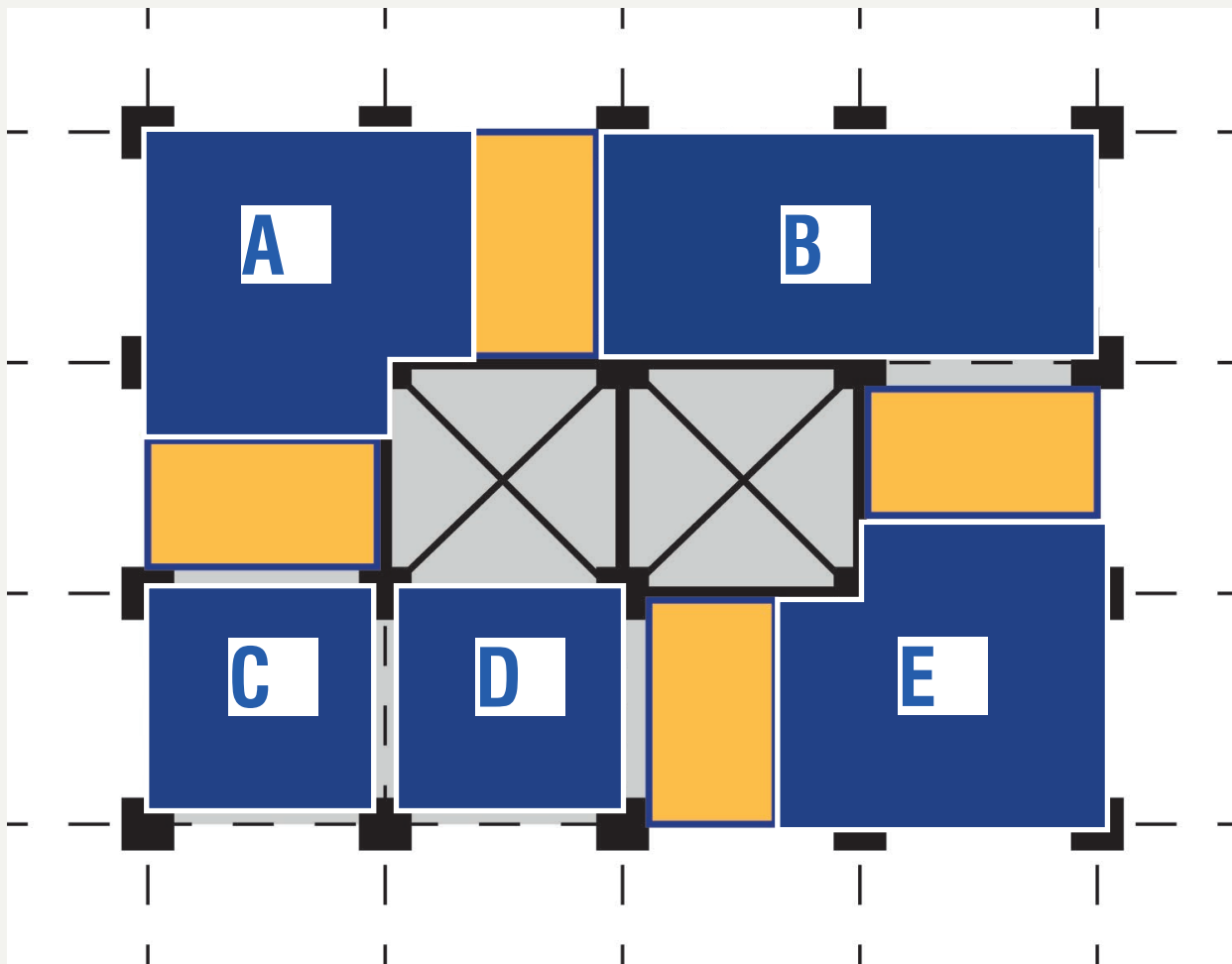


Certain space on the plan are left “blank” in the beginning

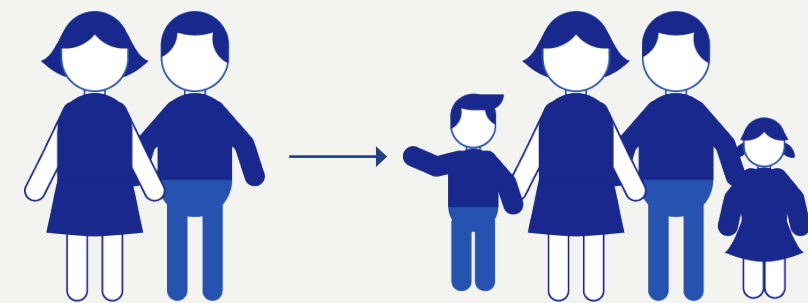
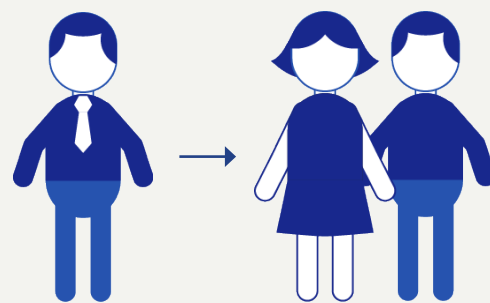
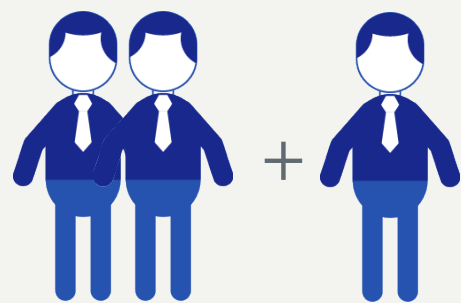
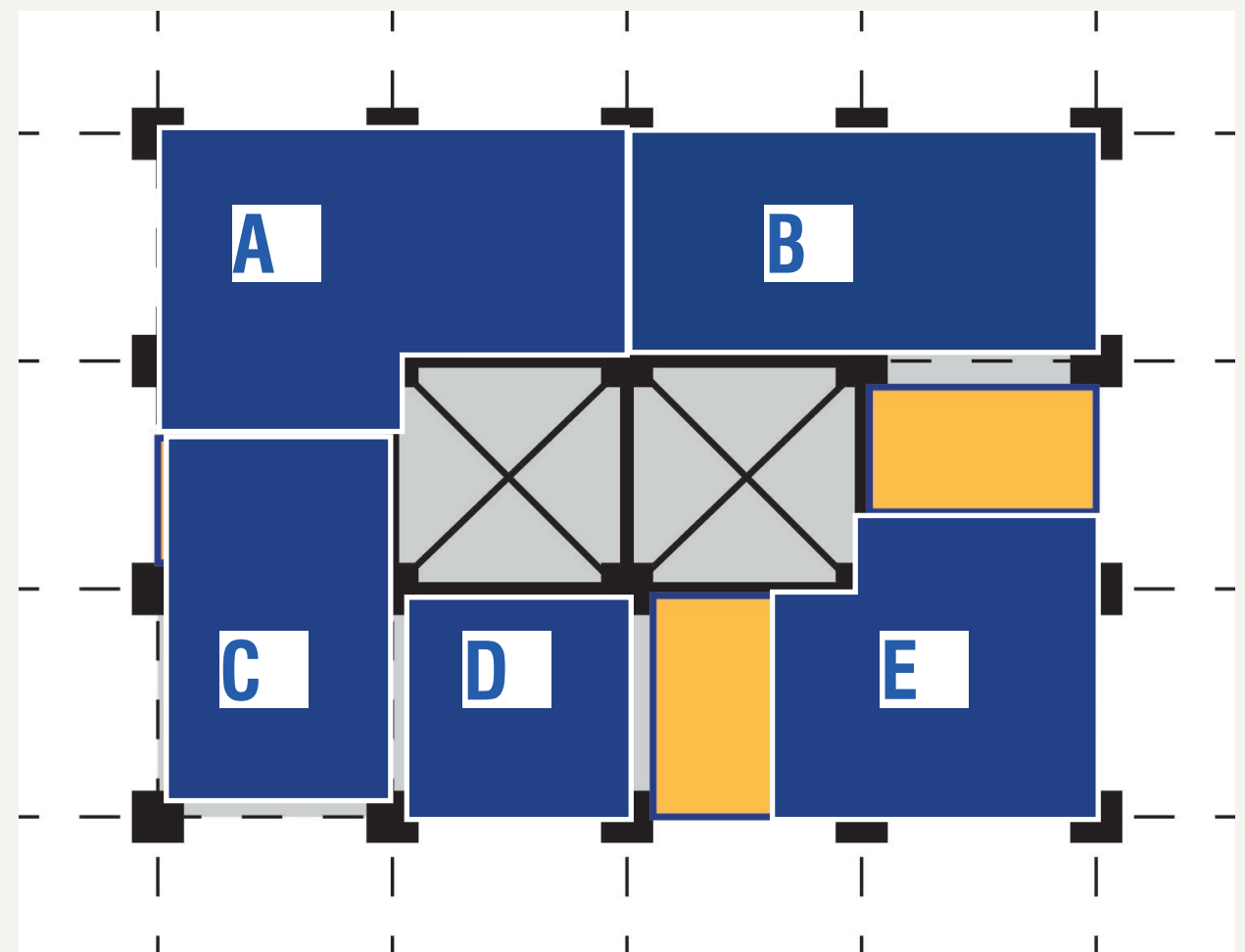


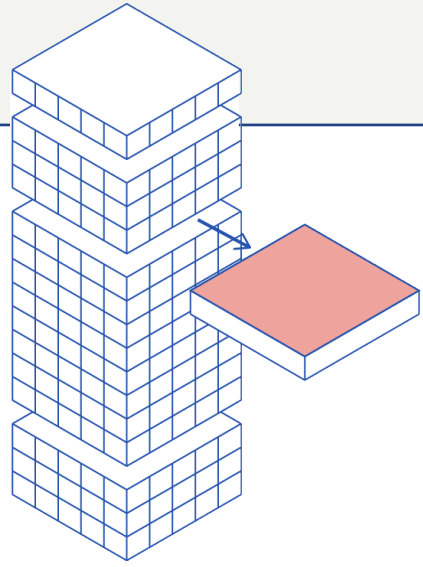
Intermediate Space = Future Reconfiguration Zone

A

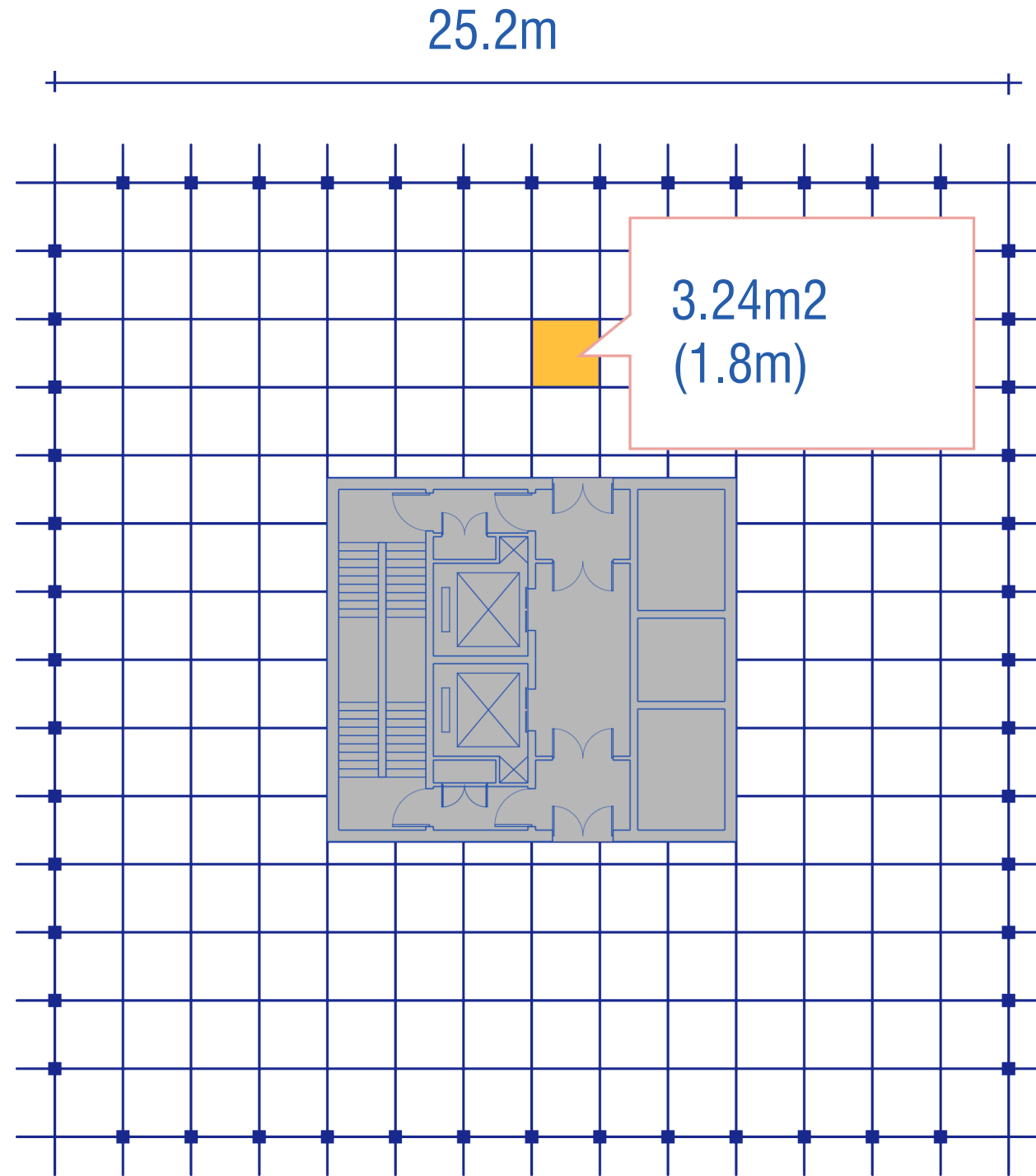


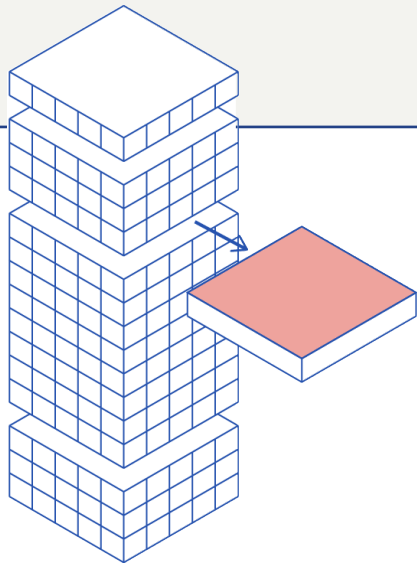
Family size change
More tenants ...





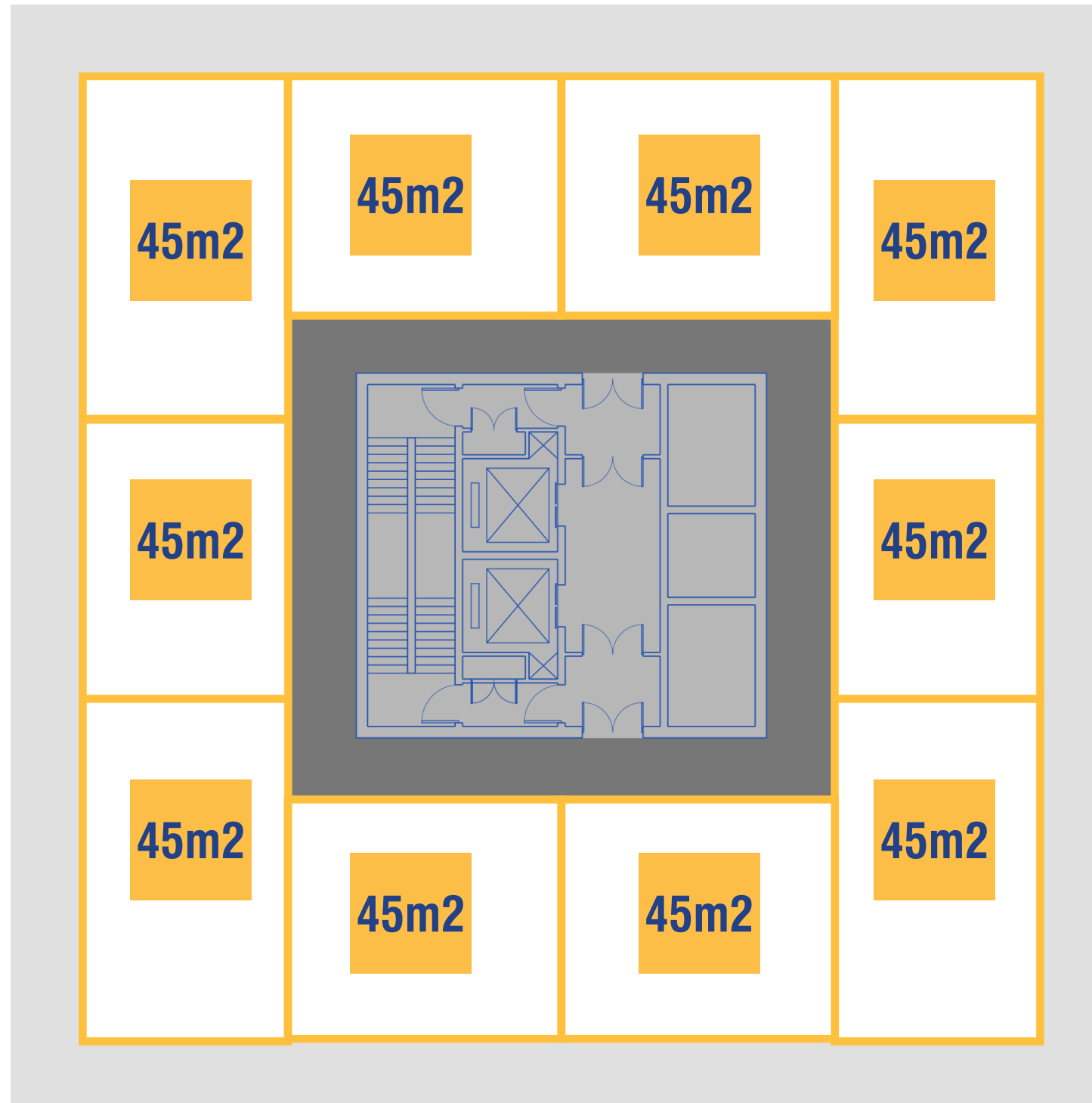
**Case Building
Zoning Design**

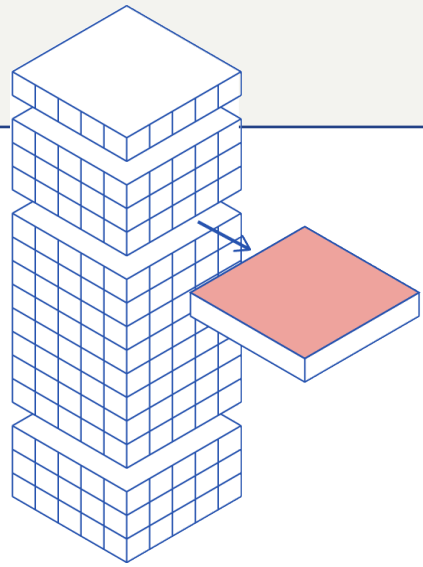




Case Building Zoning Design

45m² module *10
1.8m width corridor

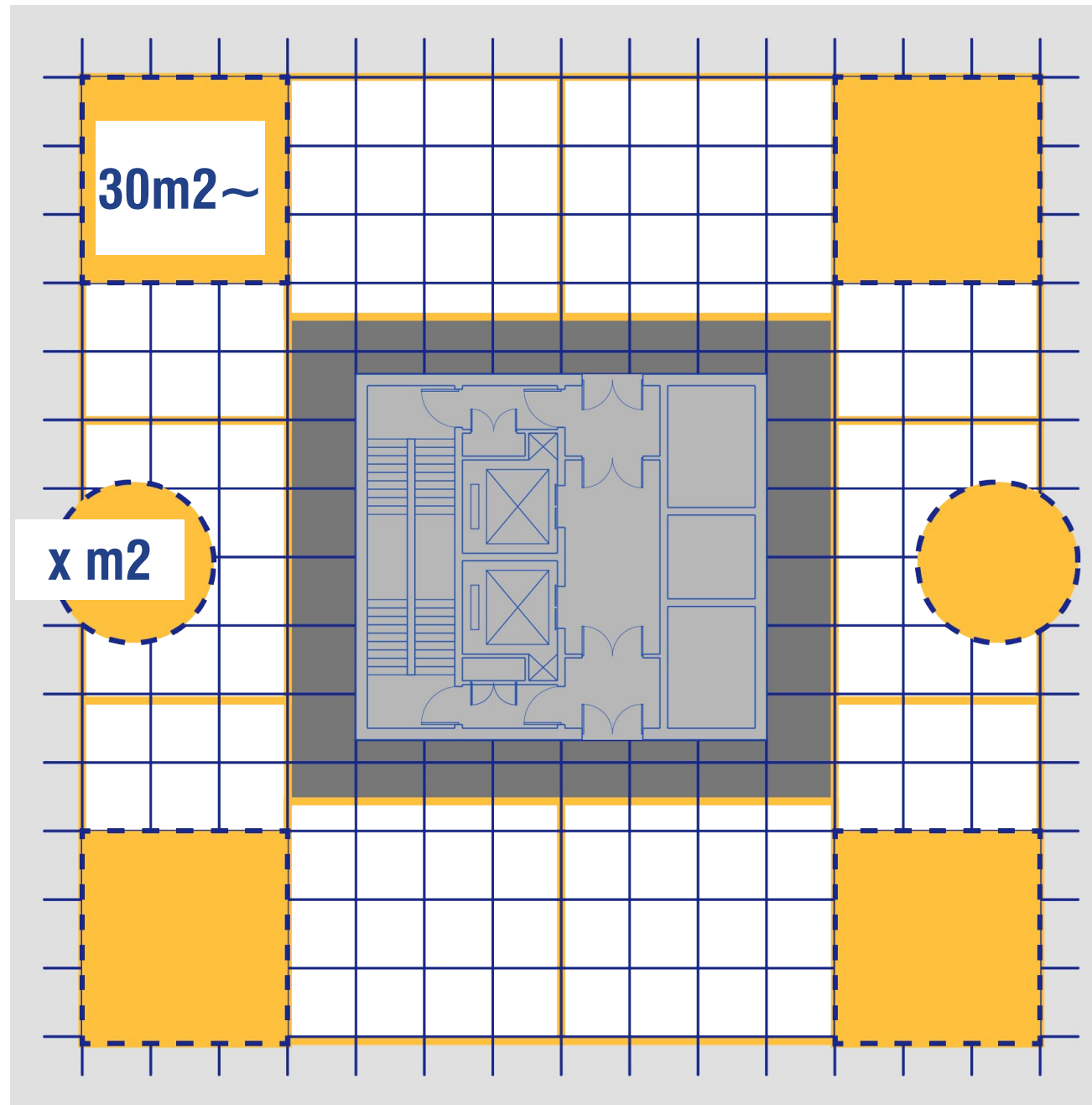


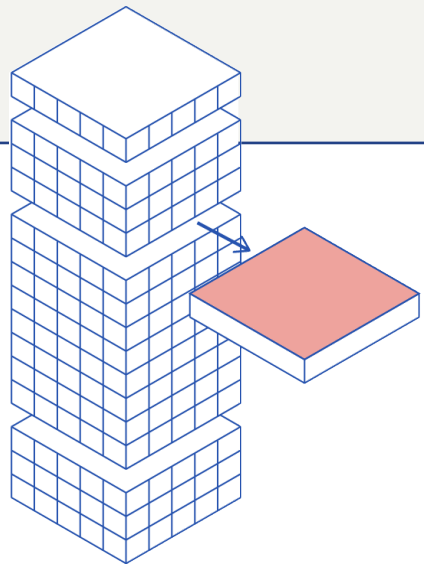


Case Building Zoning Design

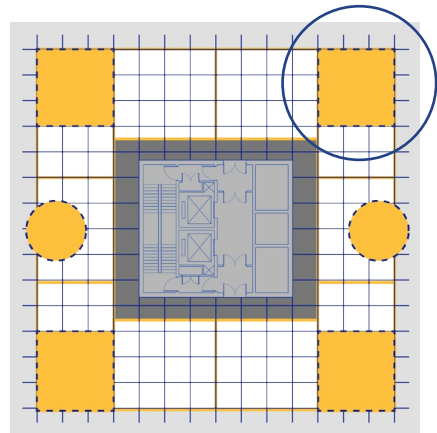
Corner Unit(1F):
30m² “free zone”
+ social intermediate space

Middle Unit (1 + 1F):
15-30m² “free zone”



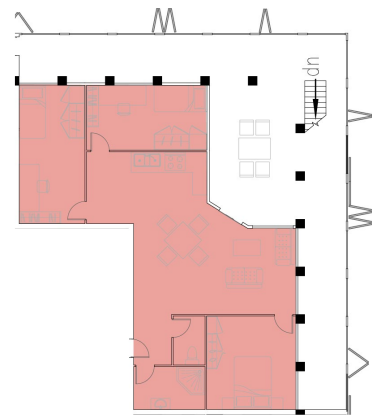


Principle 1:
Unit area + or -



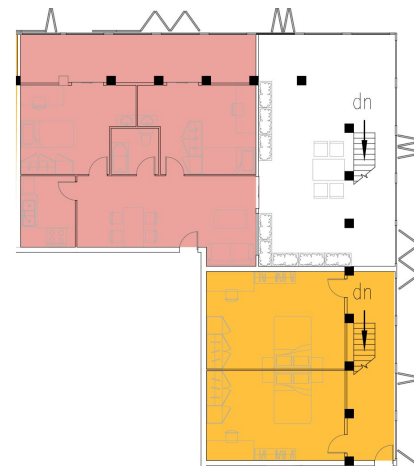
Corner Unit

Reconfiguration and expansion possibility



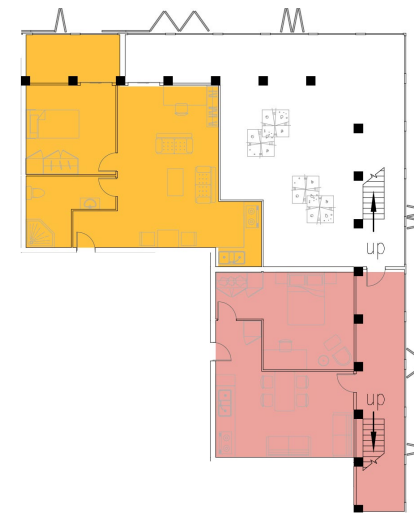
Communal space:
18m²

75m² Shared Apartment
3 Person



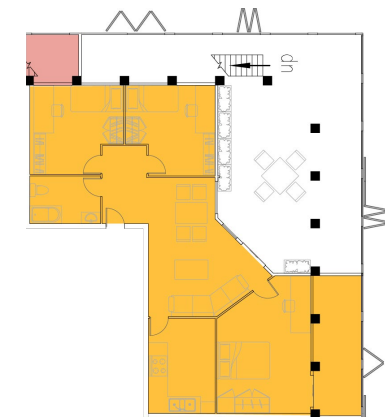
Communal space:
24m²

60m² Shared Apartment
2 Person
+
90m² Family Housing
1 couple + 2 children
(2F)



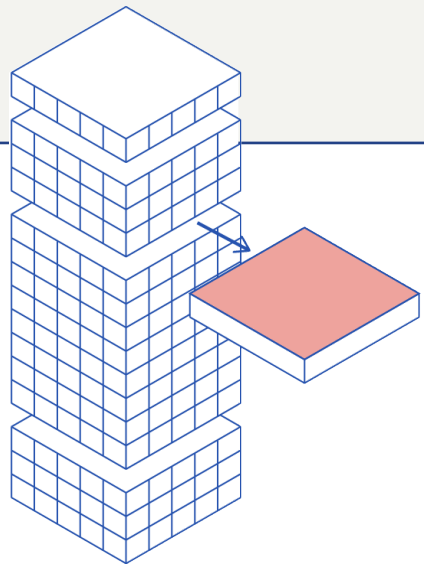
Communal space:
30m²

60m² Apartment
1 Couple
+
90m² Family Housing
1 couple + 2 children
(2Floors)

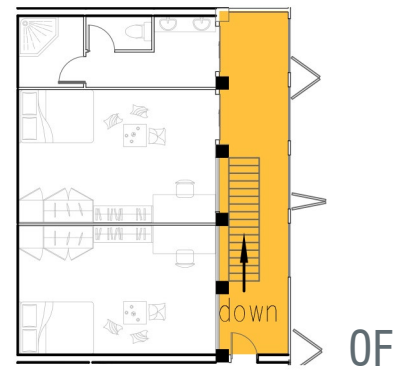
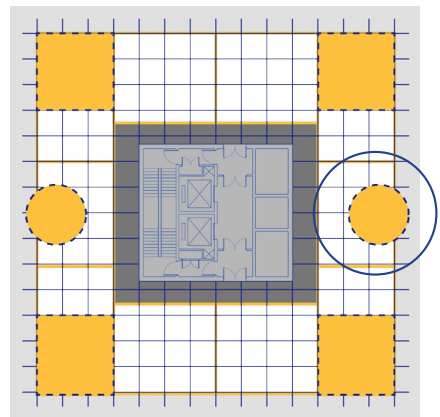


Communal space:
25m²

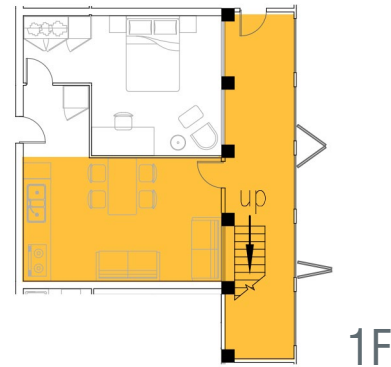
75m² Apartment
Single Parent
+ 2 children



Middle Unit (2 Floors) Reconfiguration and expansion possibility



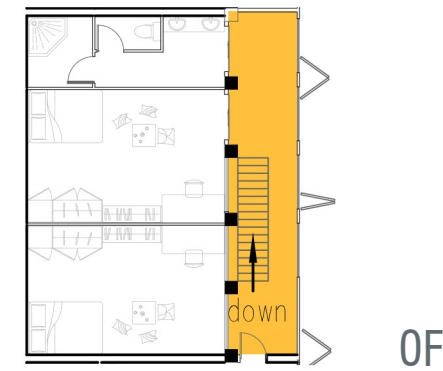
0F



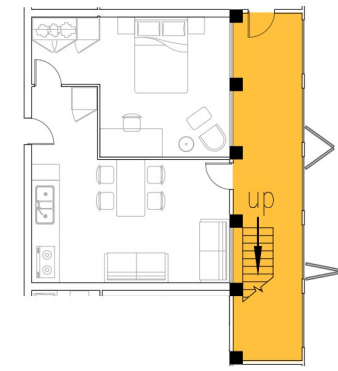
1F

1.0
Communal space:
15 m²

75m² Family Housing
1 couple + 2 children
(2Floors)



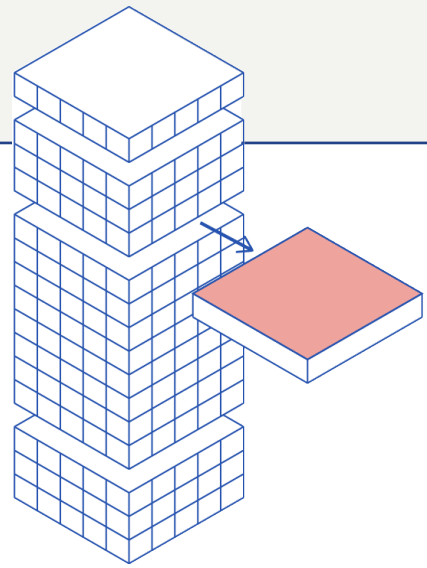
0F



1F

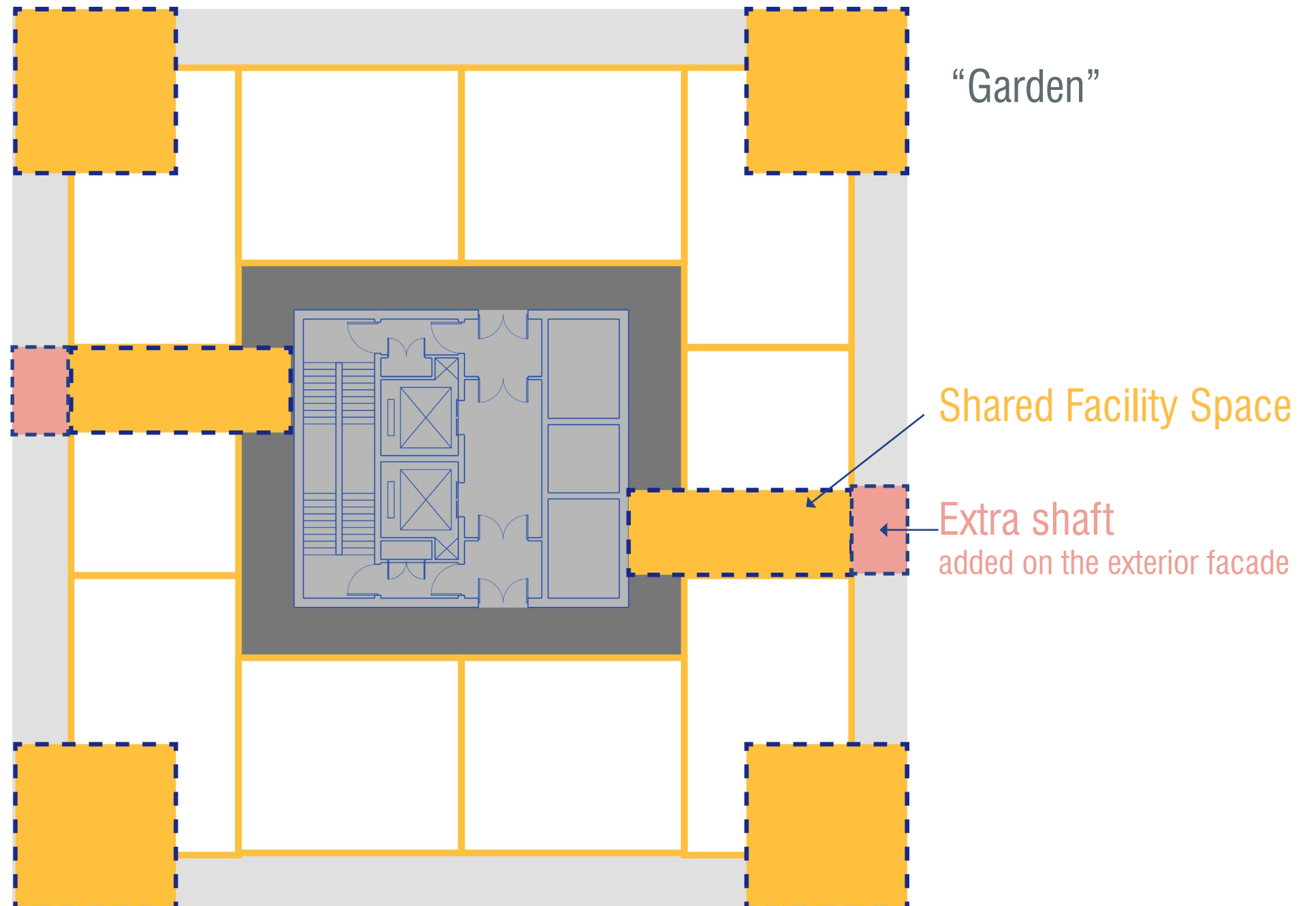
2.0
Communal space:
0 m²

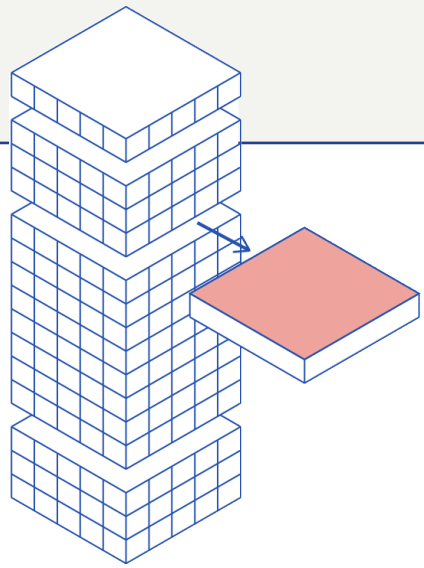
90m² Family Housing
1 couple + 2 children
(2Floors)



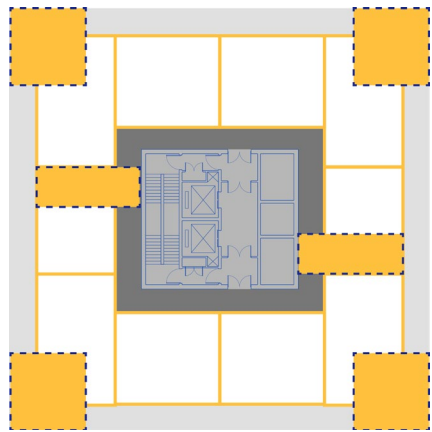
**Principle 2:
Communal Space**

Every 2 floor is a "Unit"

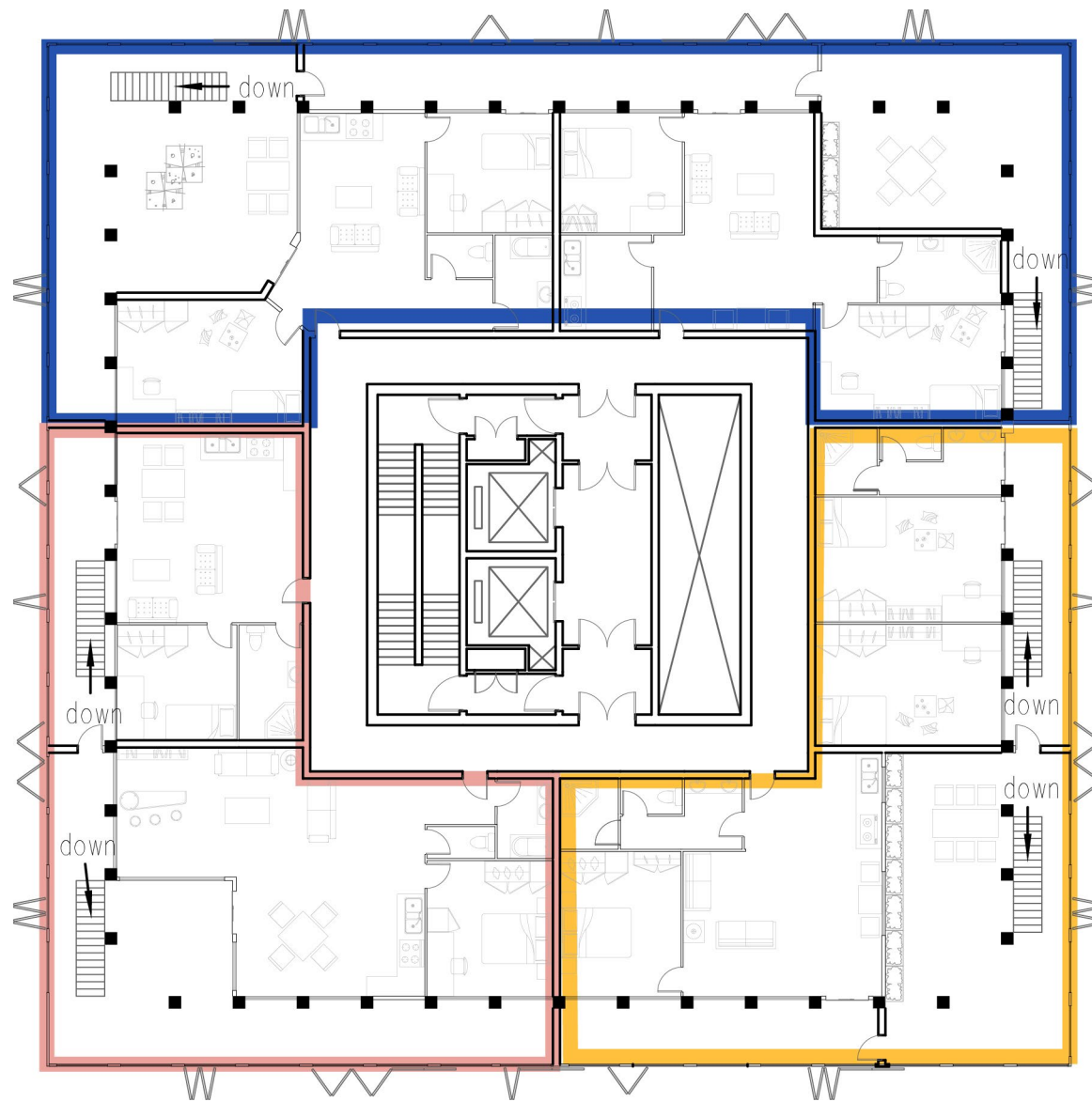


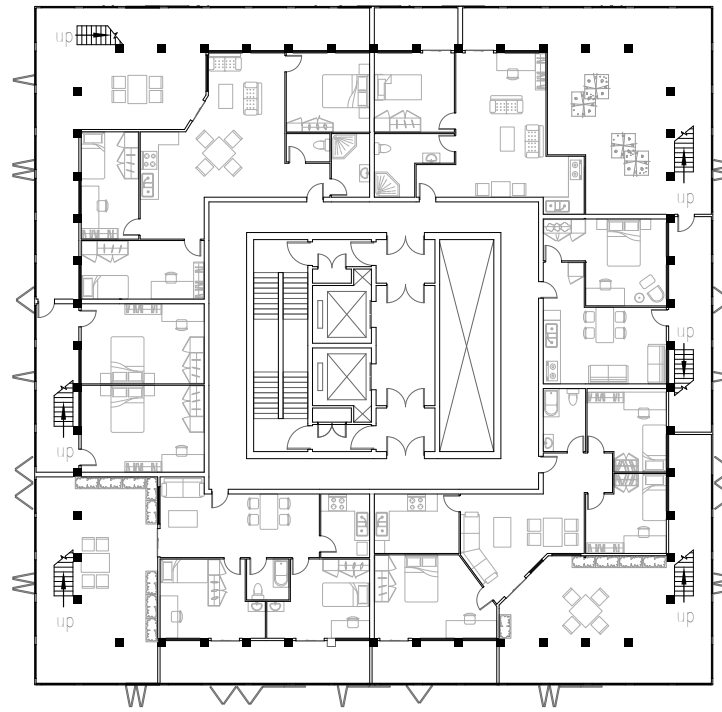
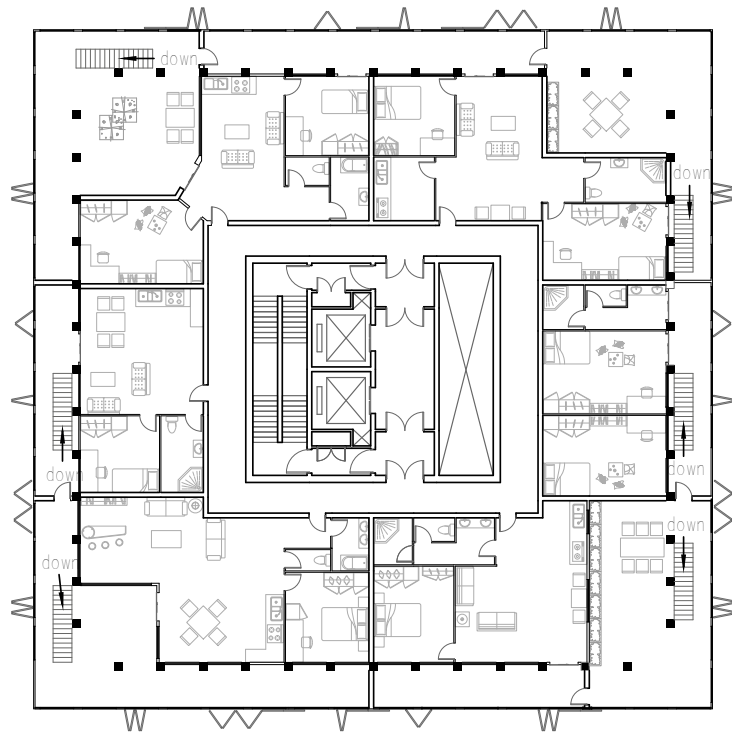
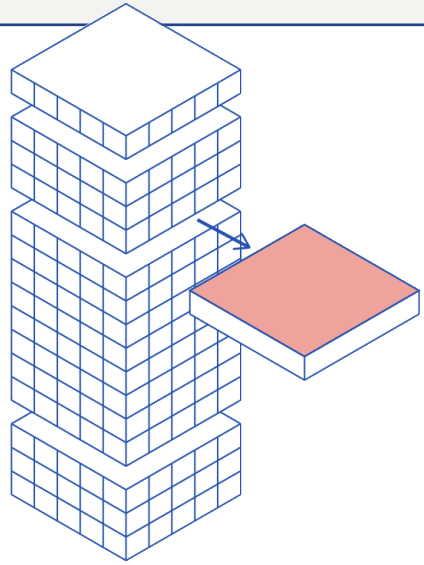


**Principle 2:
Communal Space**

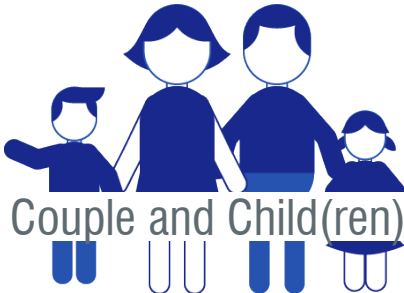
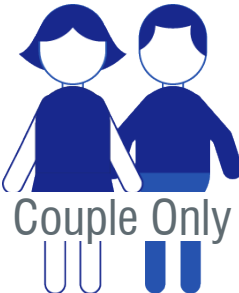
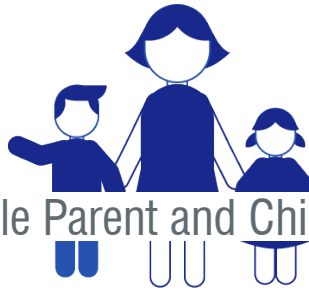
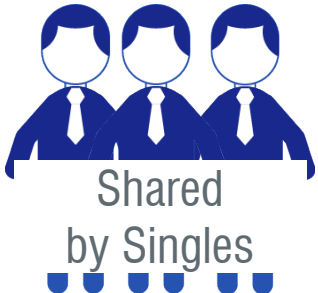


Public Space Accessibility:
Shared by nearby unit for safety reason





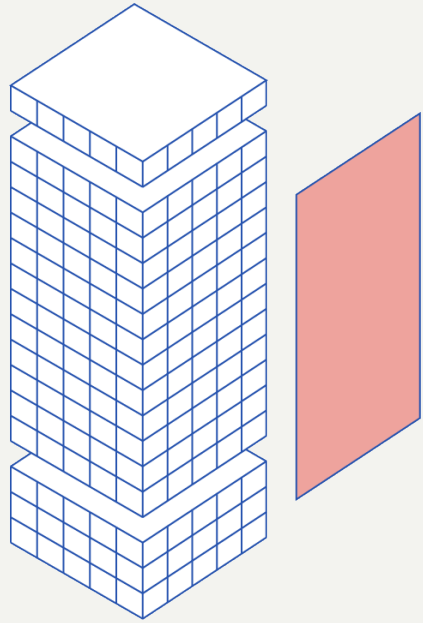
Typical residential(2 floor as 1 “unit“)

Household Type	Number
 Couple and Child(ren)	90m2 *2
 Couple Only	75m2 *1 60m2 *1
 Single Parent and Child(ren)	75m2 *1
 Shared by Singles	75m2 *1 (3 person) 60m2 *1 (2 person)

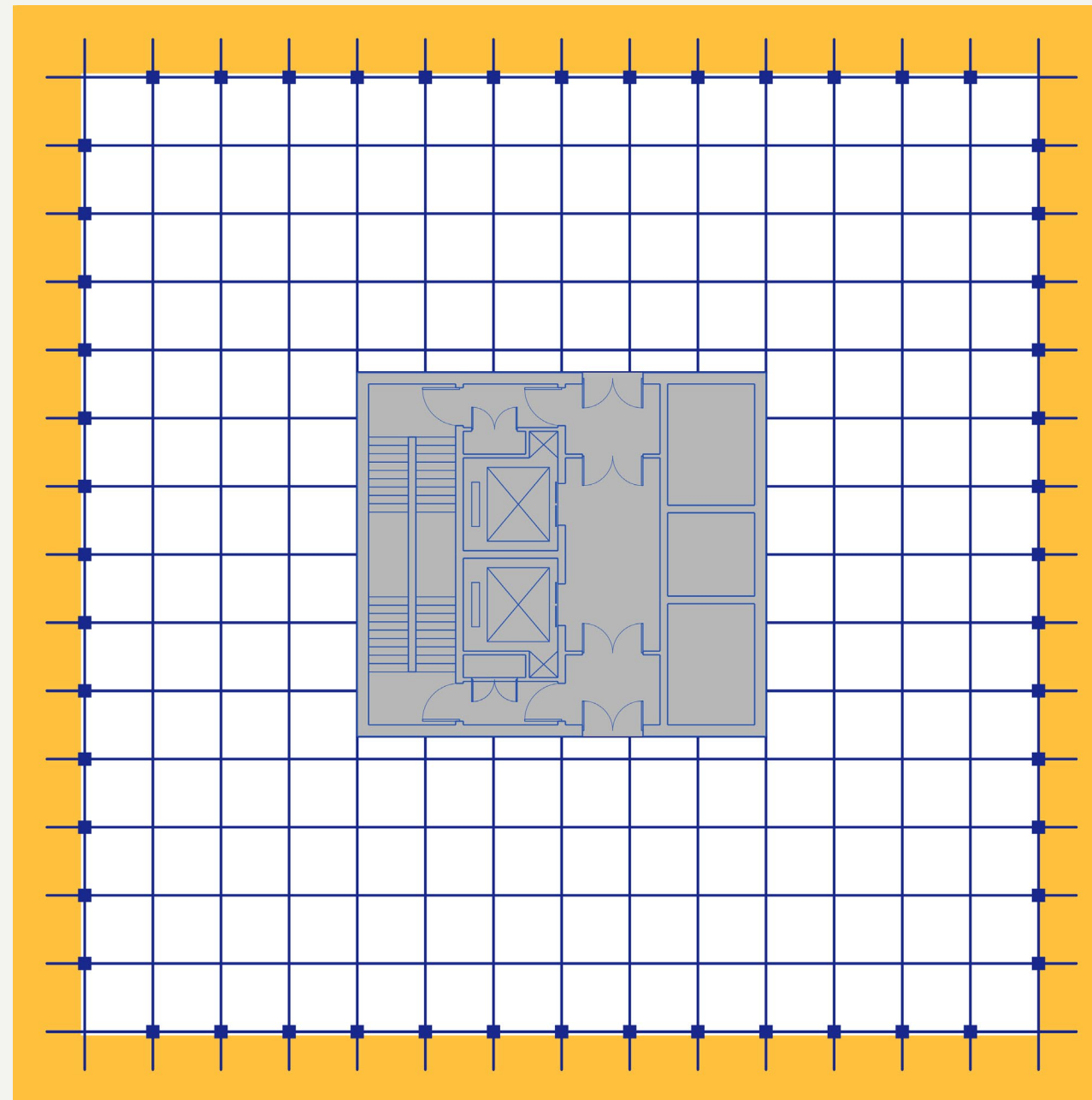




Facade + Structure Renovation

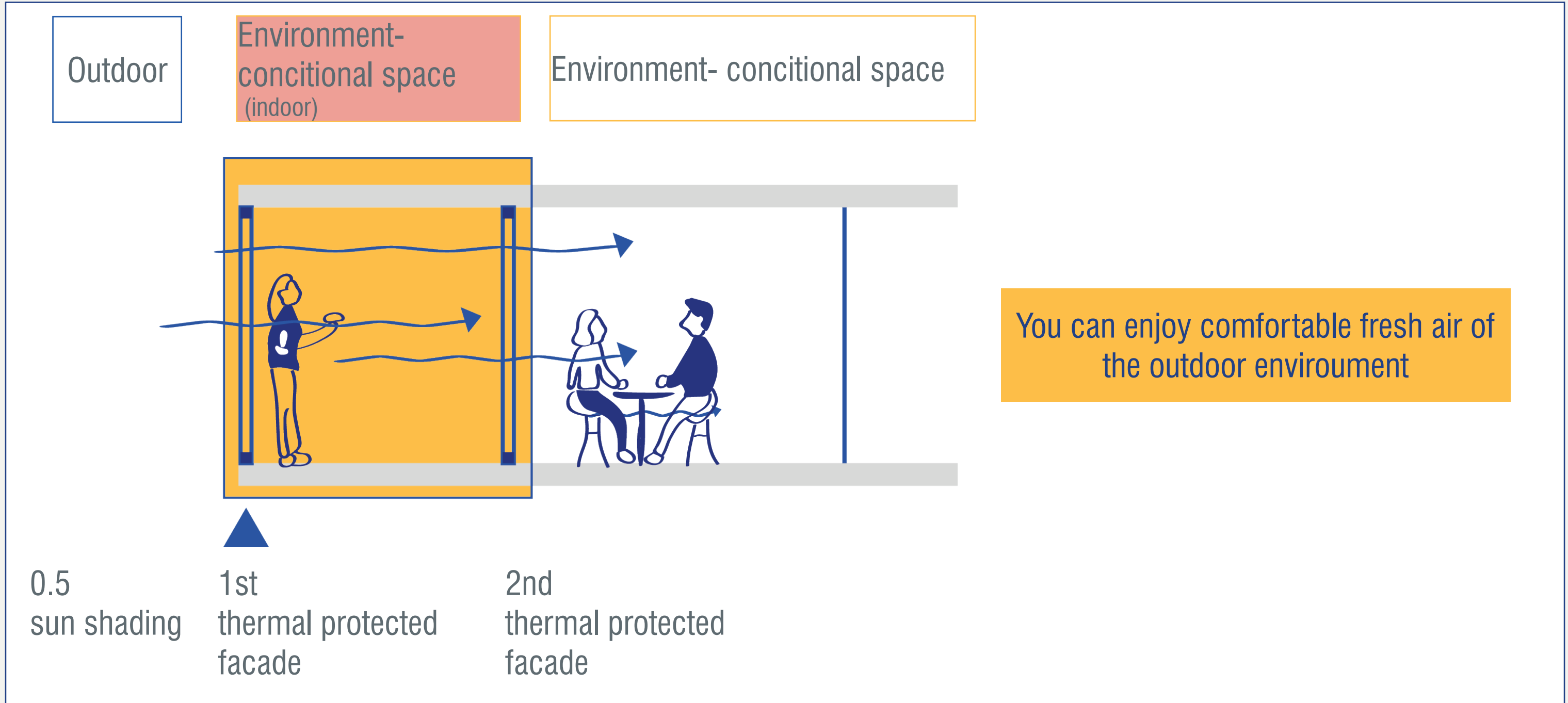


Climate Protection + Community Social Space



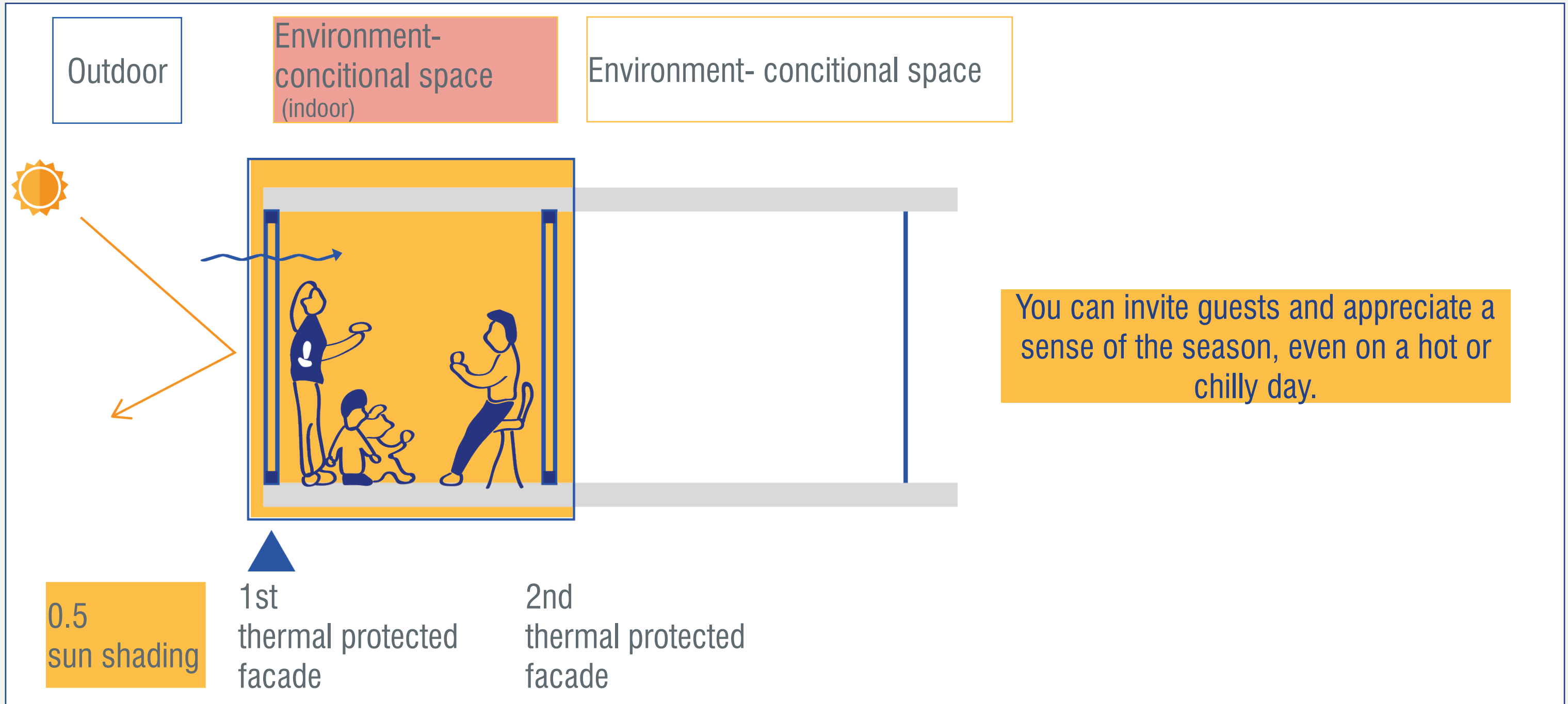


Intermediate Space = Environment - Conditional Space



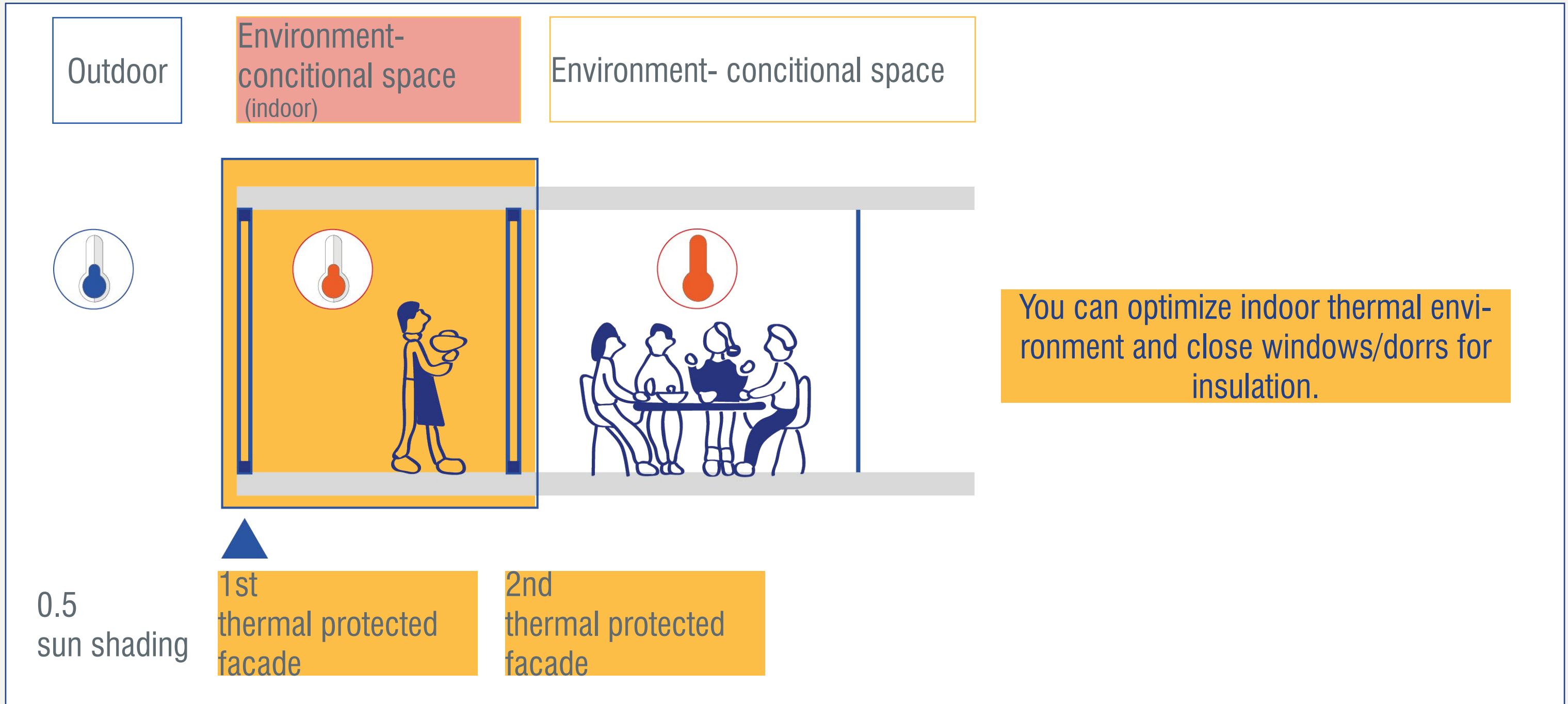


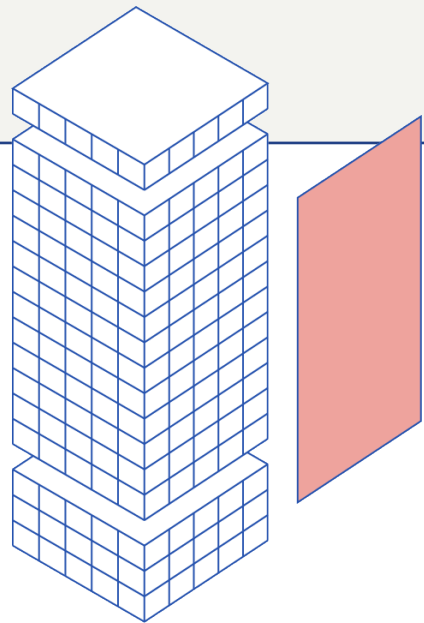
Intermediate Social Space + Environment - Conditional Space



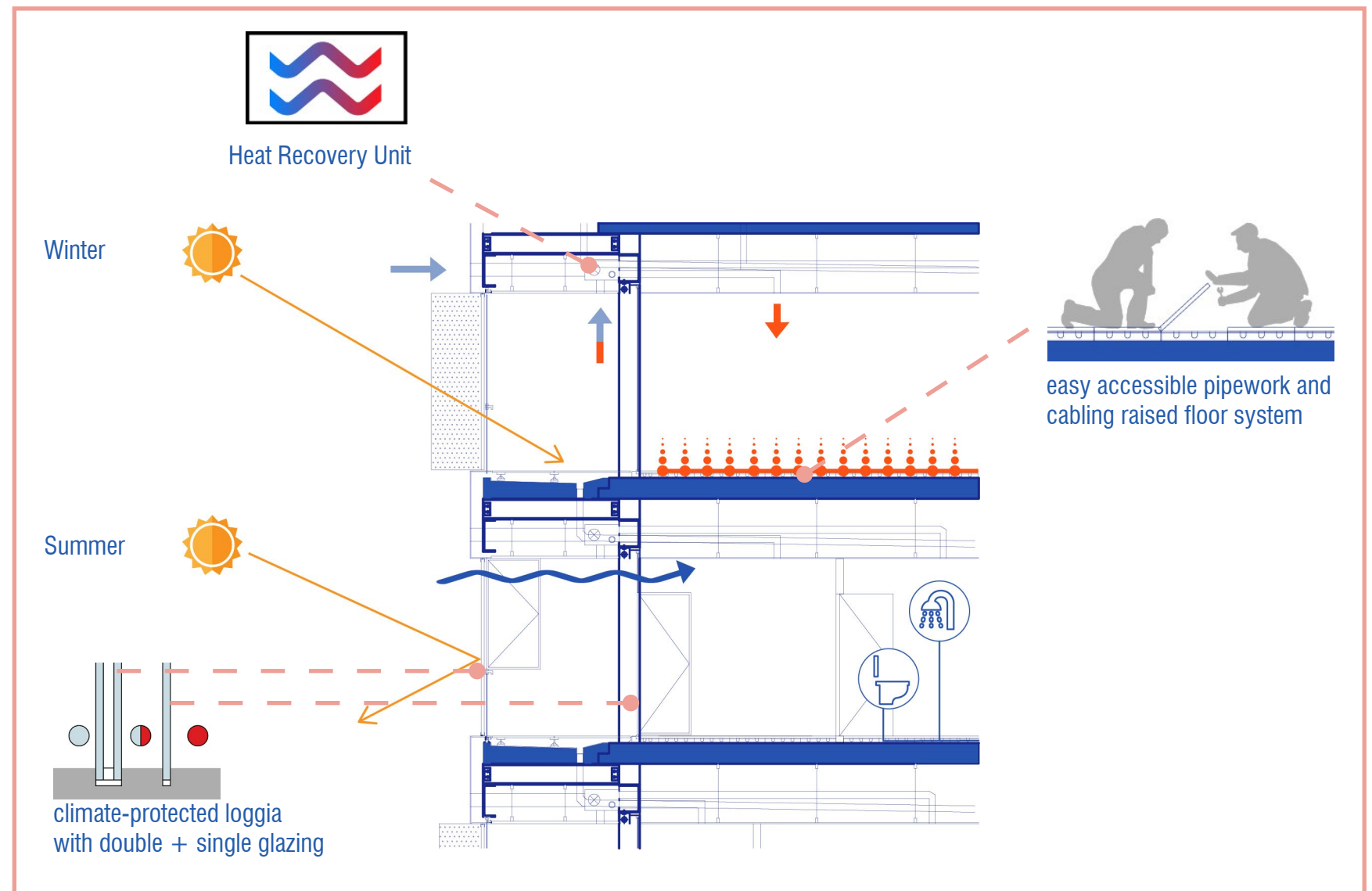
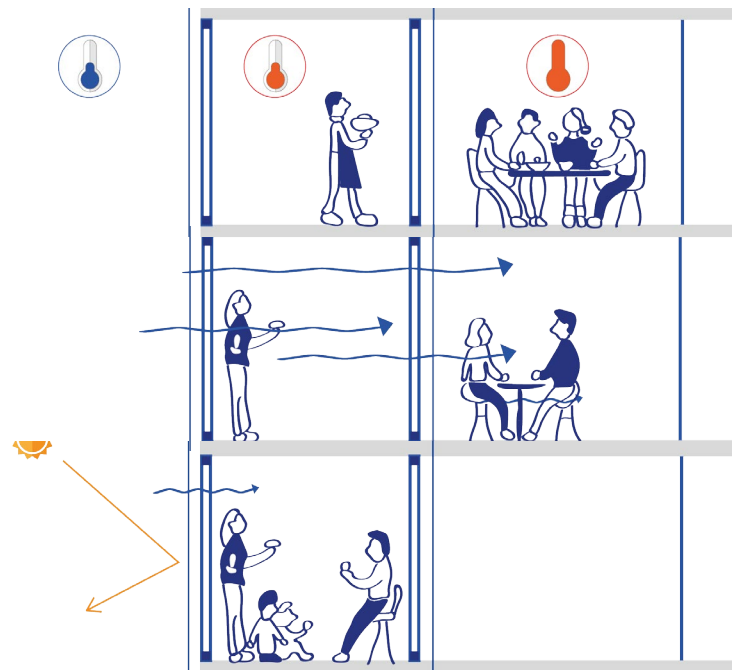


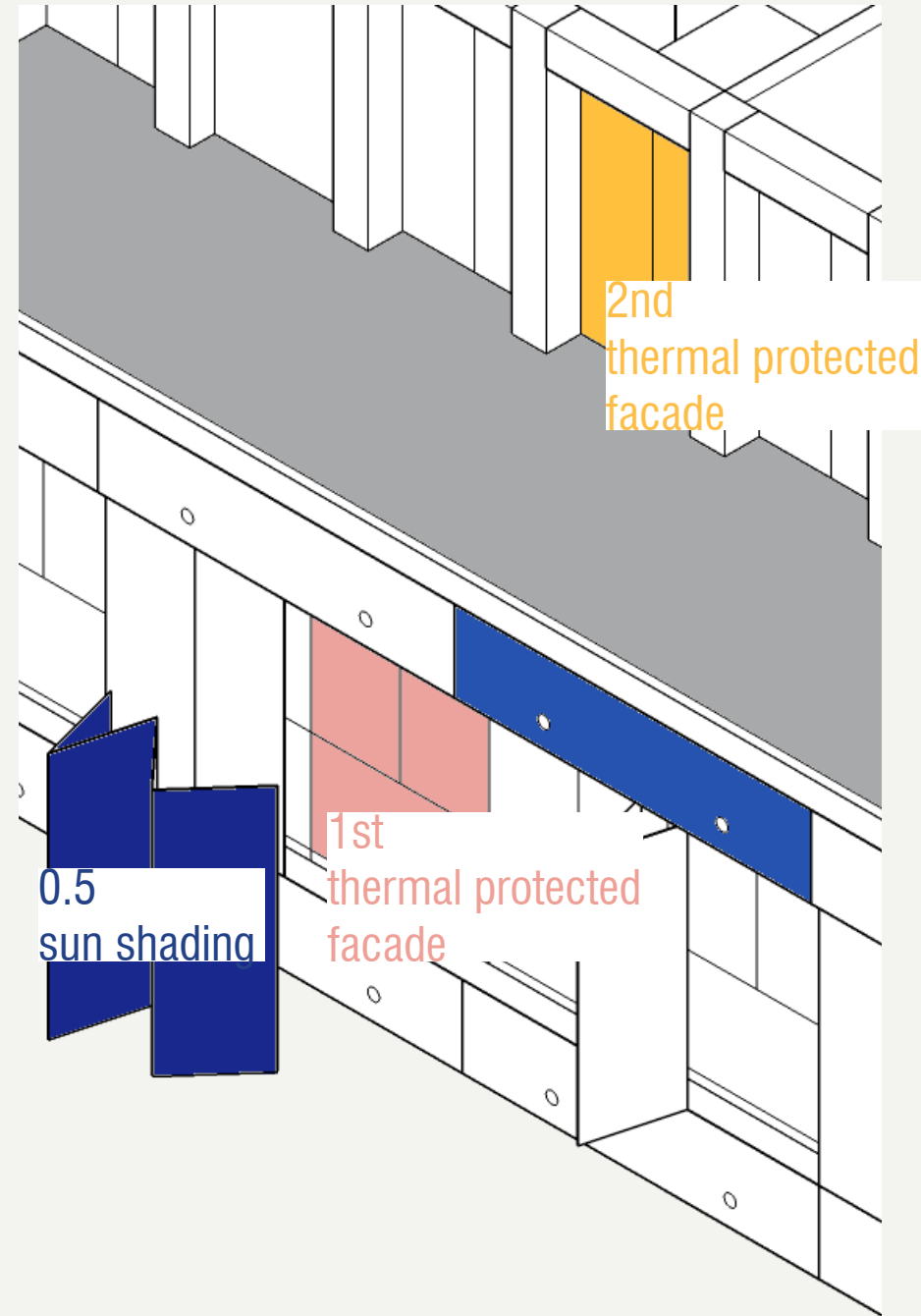
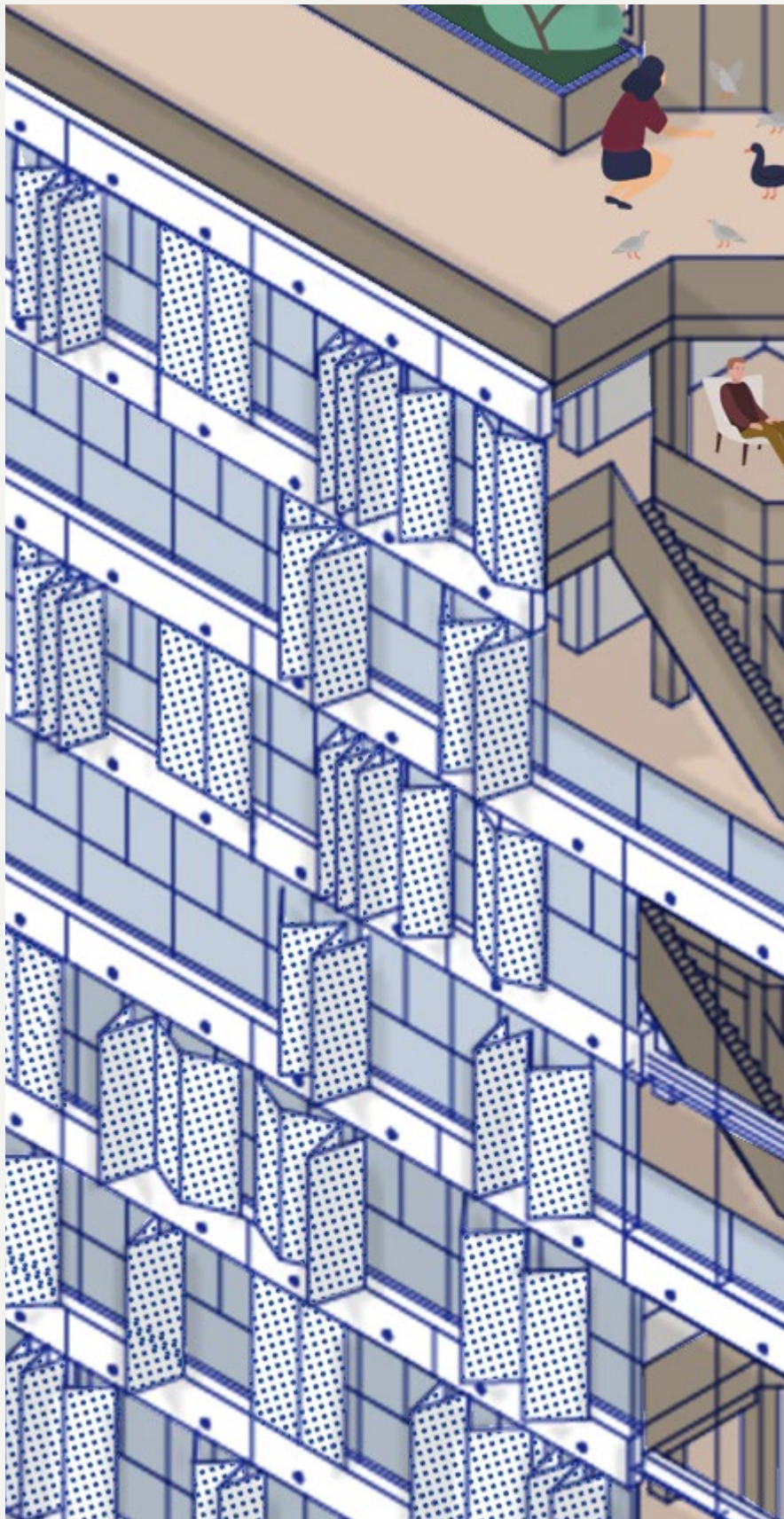
Intermediate Social Space + Environment - Conditional Space



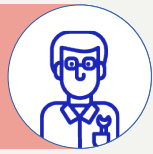


Facade

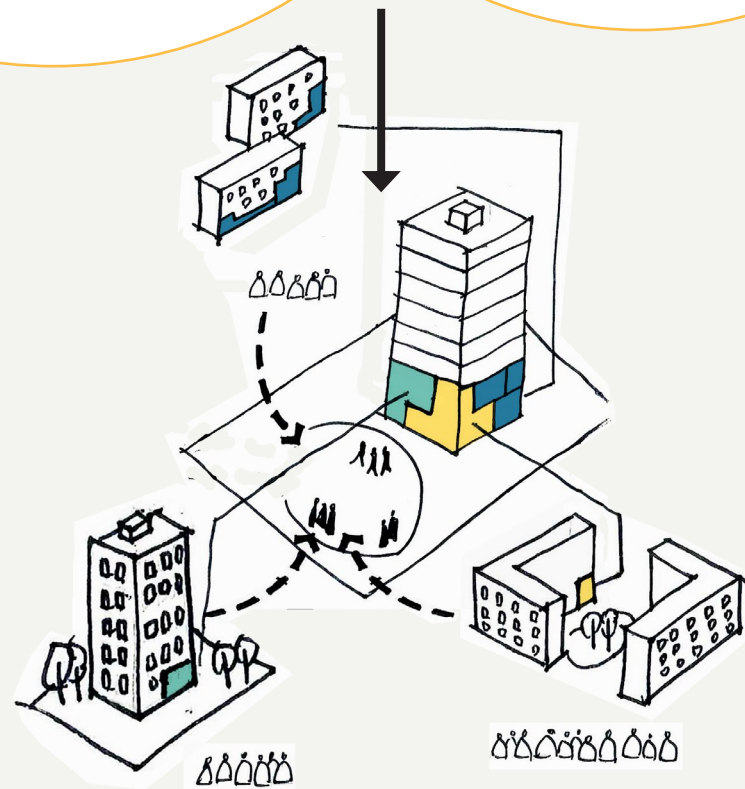
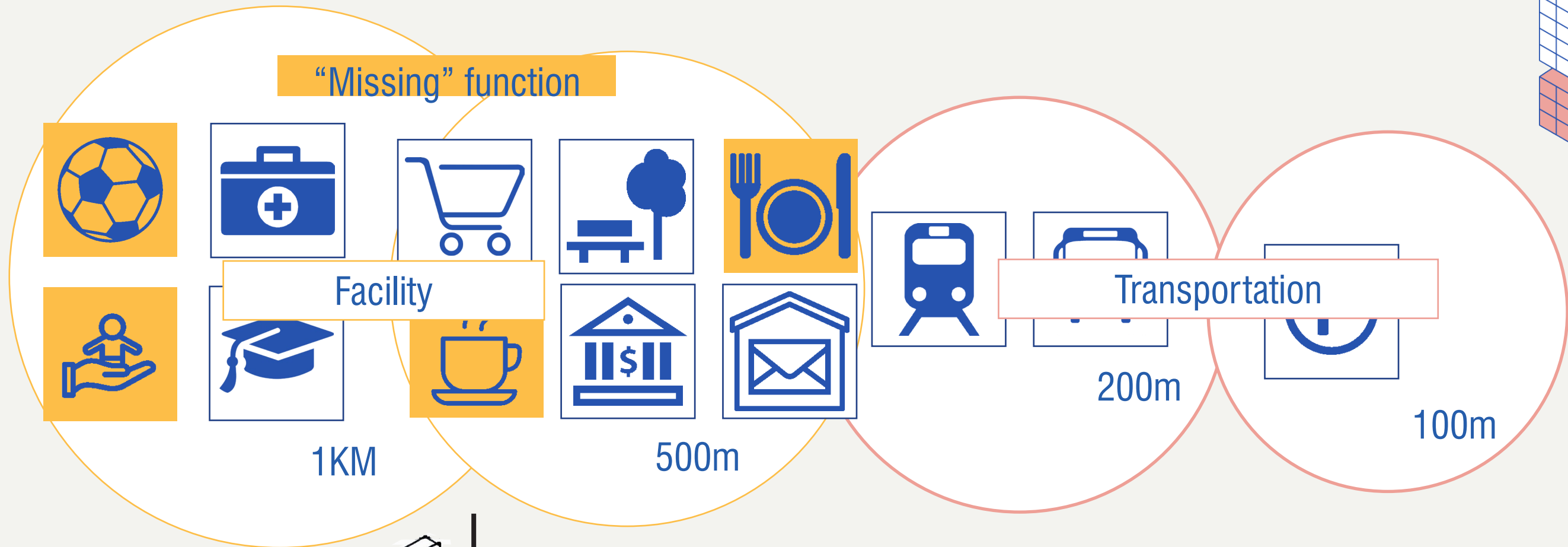
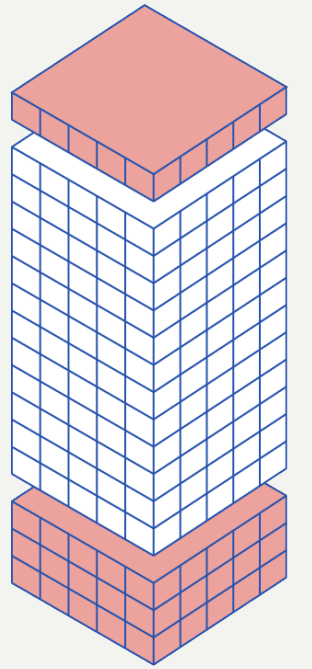


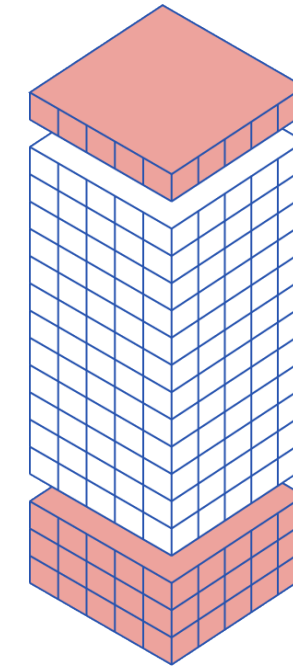
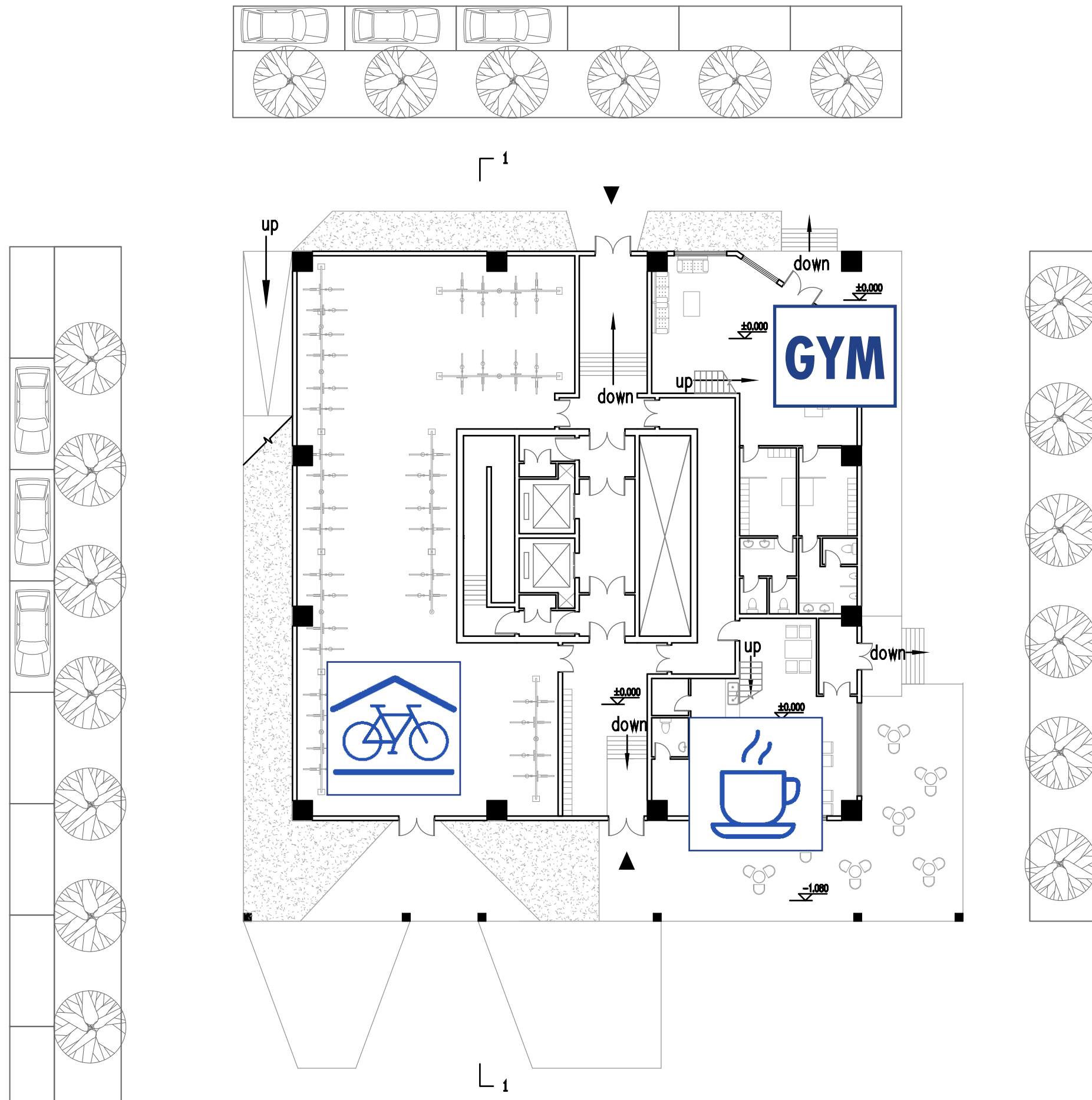


Materiality Reference

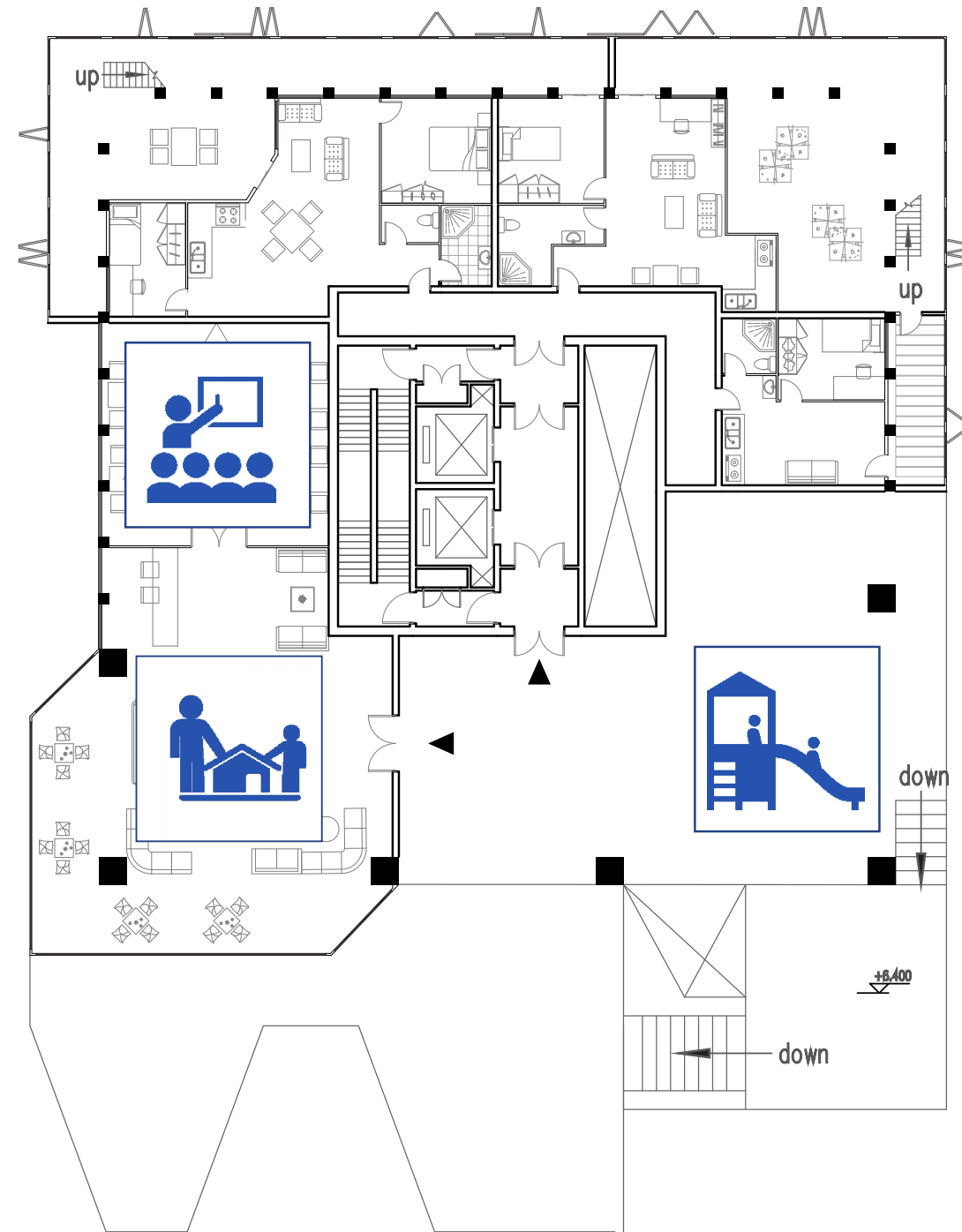
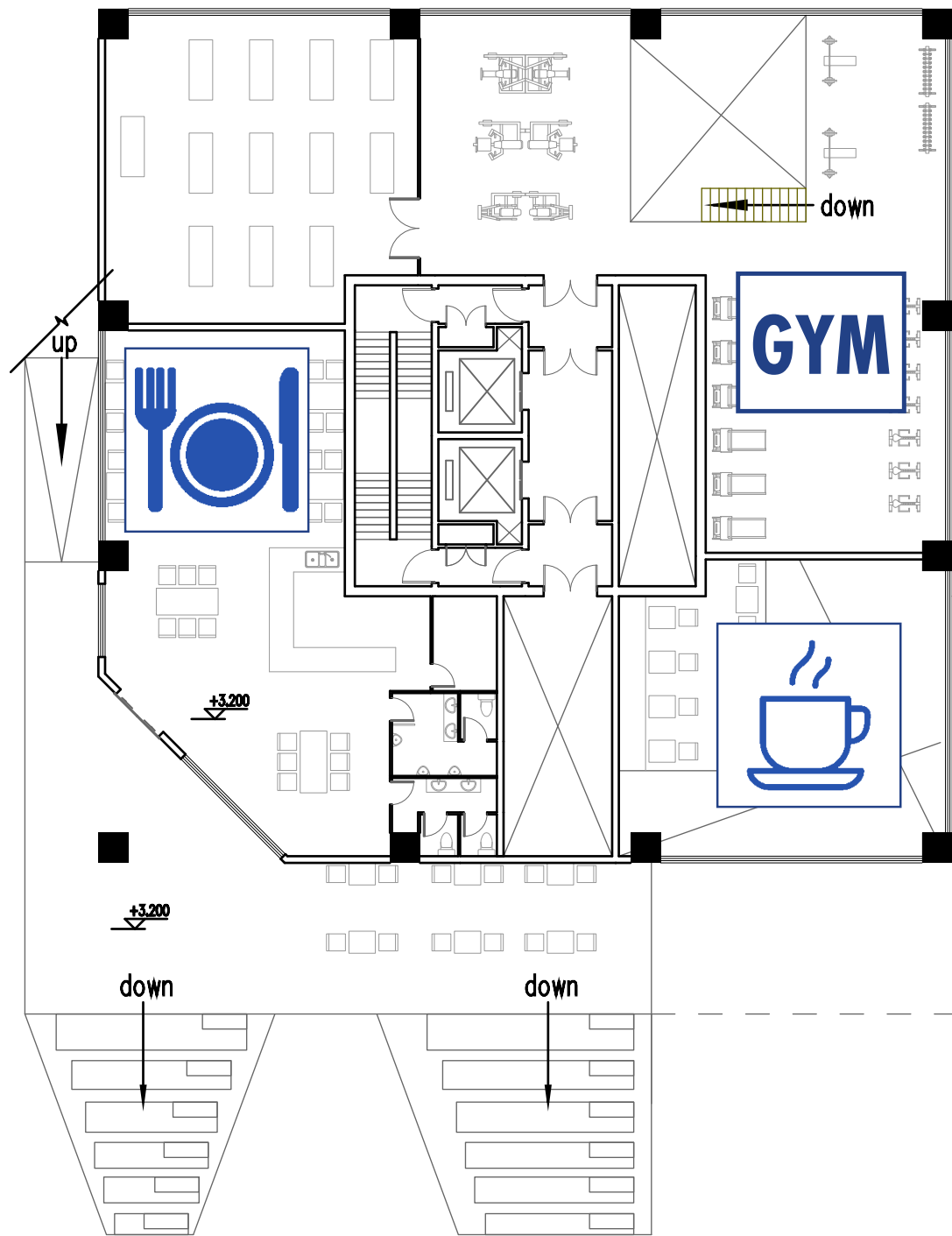
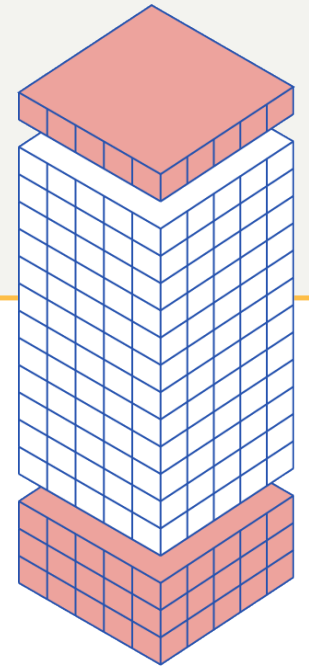


Facility & Public Function Redevelopment



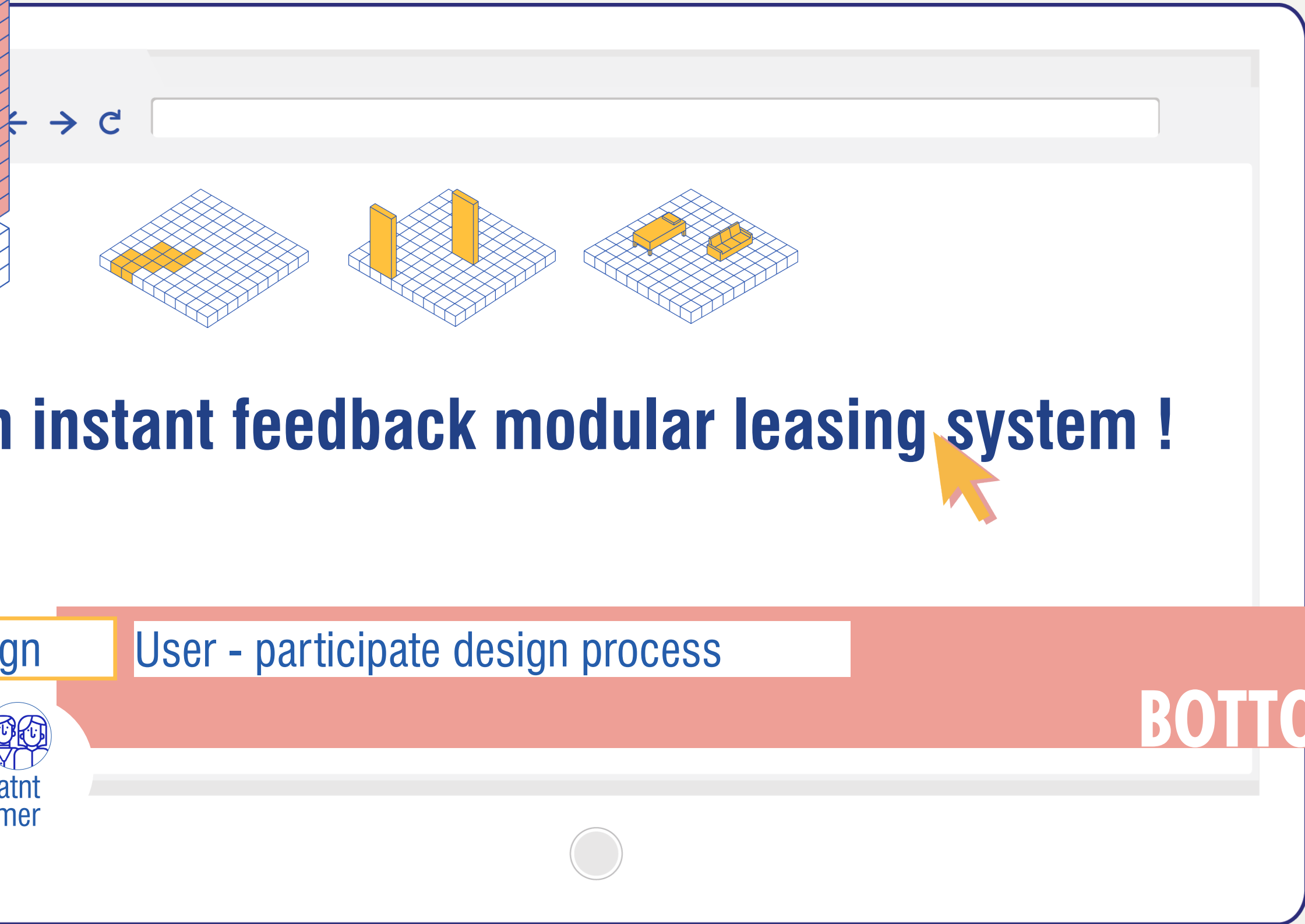
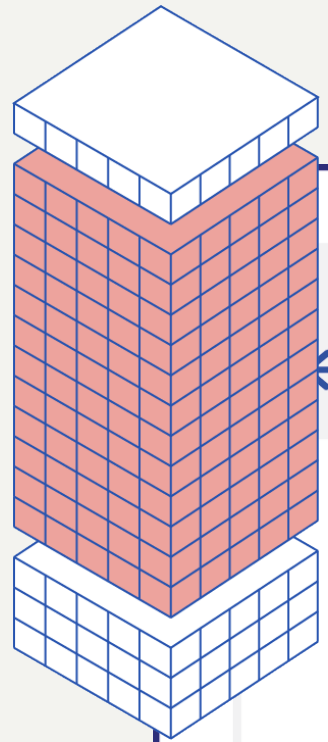


Bottom Floors:
 Public function serve for local neighborhood
 + Gym
 + Cafe / Recreation Space
 Public function serve for residents:
 + Bike storage
 + Post box



Open ground for families and childrens
Coomunication with the local community



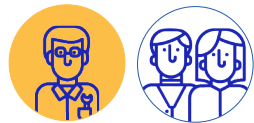


An instant feedback modular leasing system !

Fit-out Design

User - participate design process

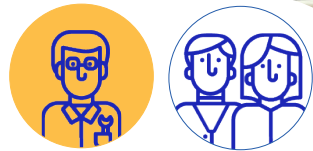
BOTTOM UP



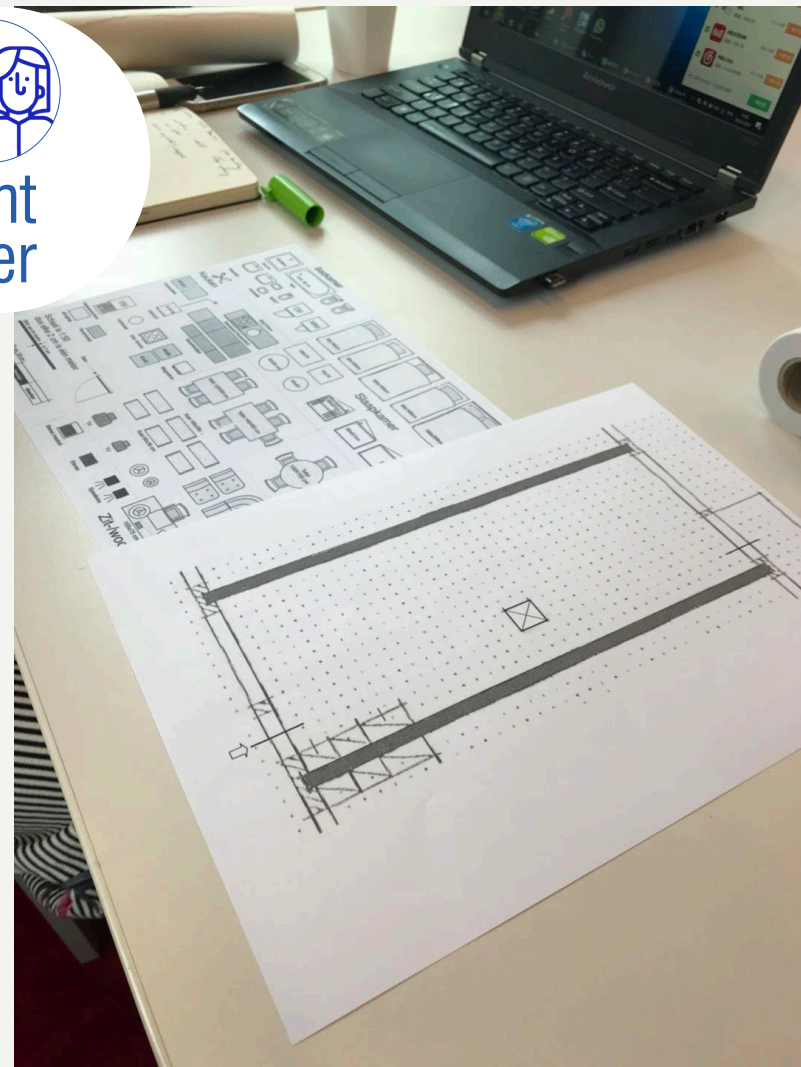
Architect Consultant
+ Customer

Fit-out Design

User - participate design process



Architect Consultatnt
+ Customer



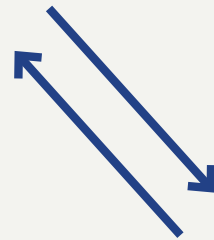
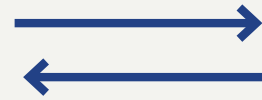
Is there a more efficient way in the new age ?



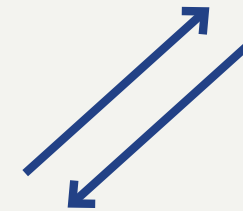
Housing Association



Customer



Architect





Online Modular leasing System

Frontstage

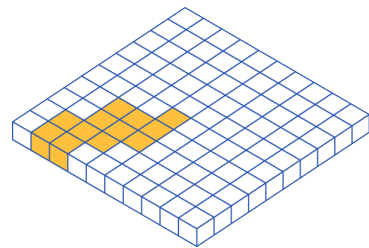
Backstage



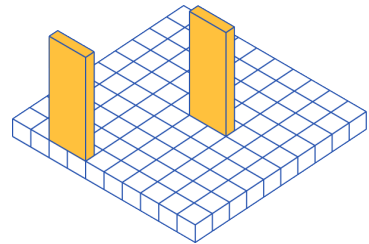
Architect



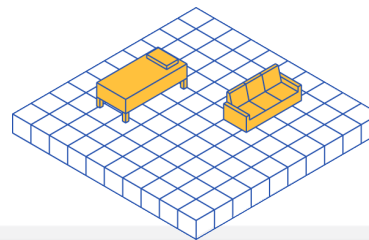
Customer



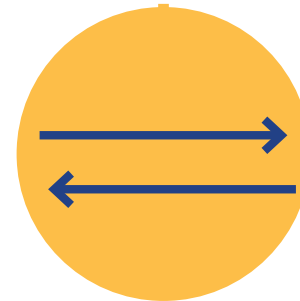
Floor plan design
Surface area / heating area



Partition wall for rent



Furniture for rent



Housing Association





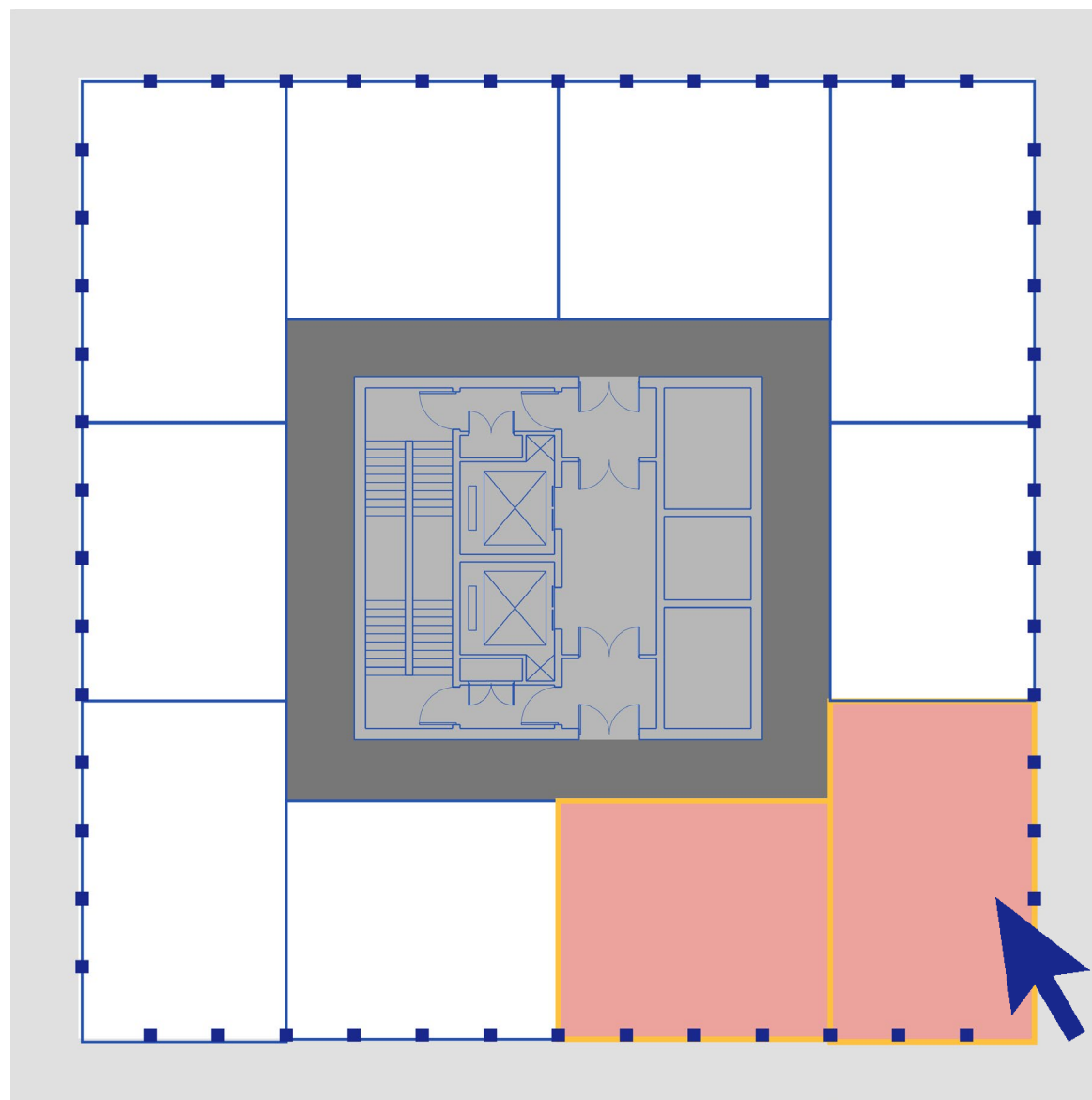
Step1:Housing Allocation - Floor Area Confirm



Architect



Customer

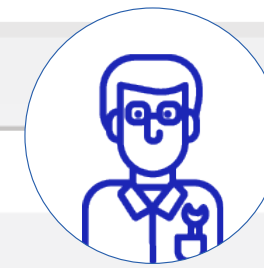


Select unit position based on zoning principle

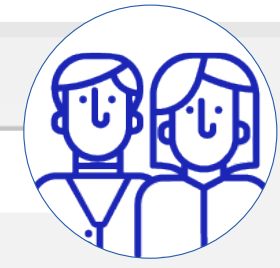




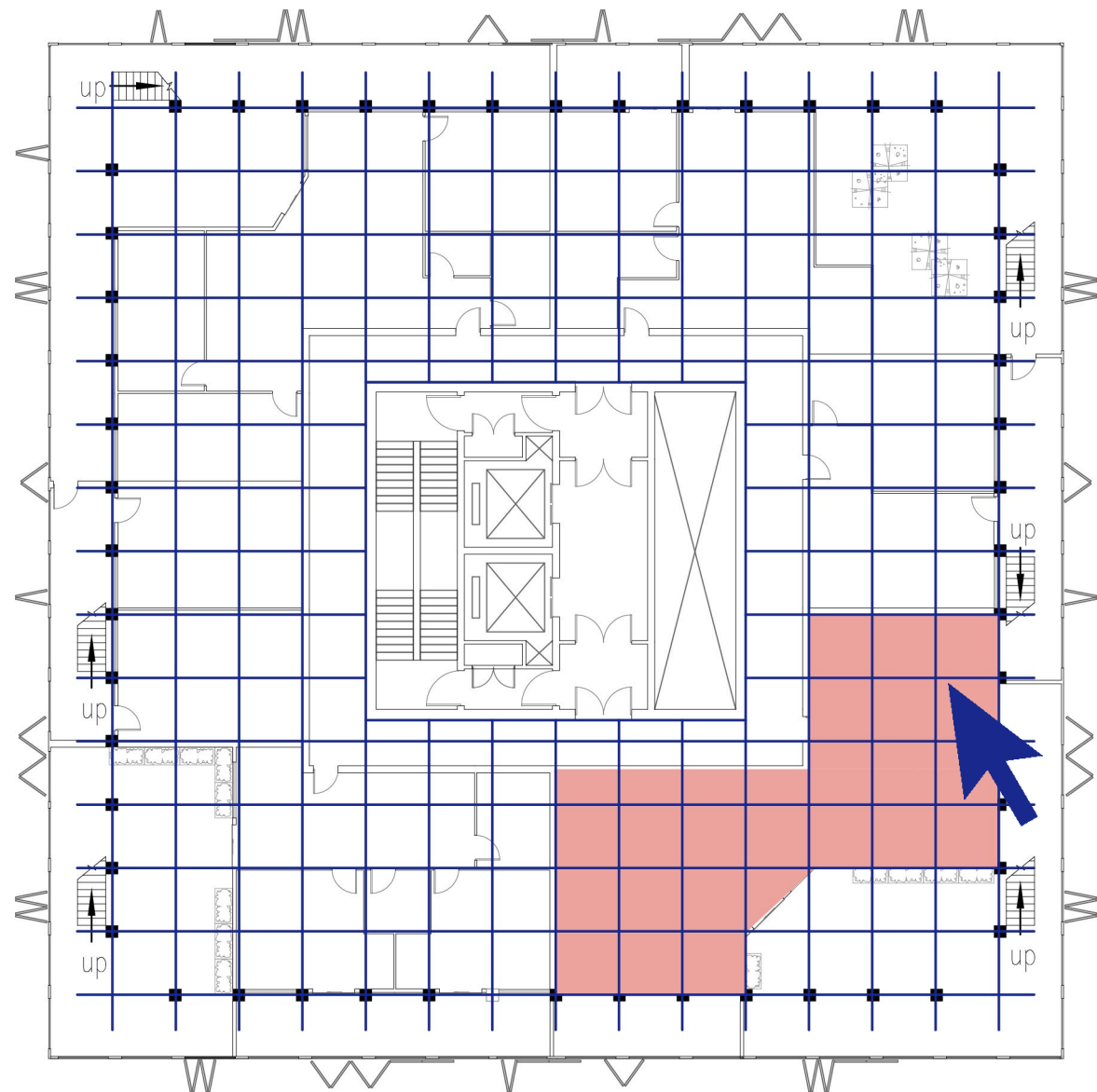
Step2:Unit layout design



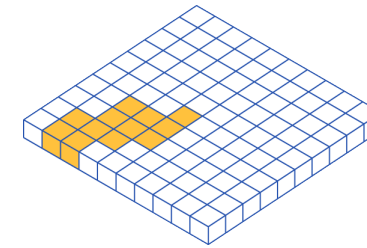
Architect



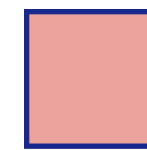
Customer



Rent:



Floor plan design
Surface area / heating area



3.24m²

$$\times \underline{24} = \text{€ } \text{aaa}$$

80m²





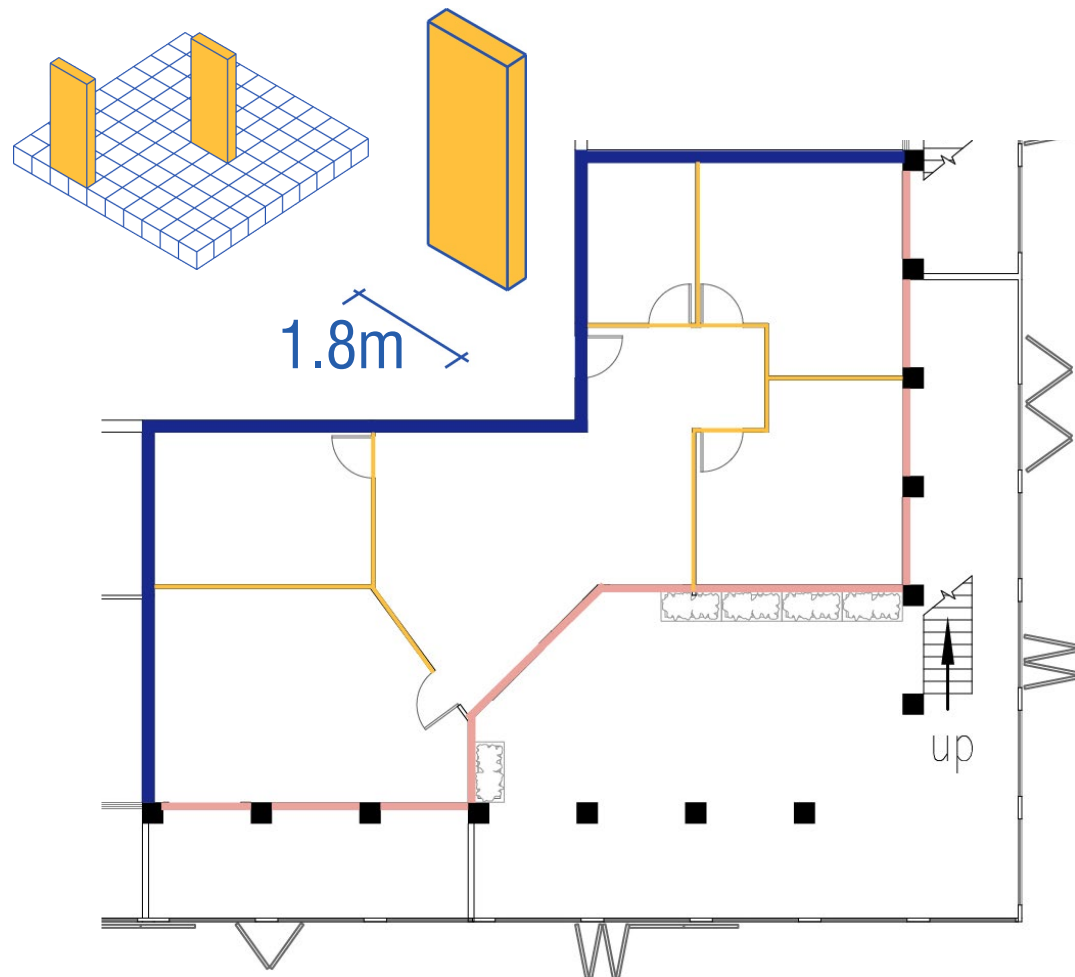
Partition wall for rent



Architect

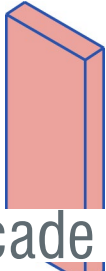


Customer



Rent:

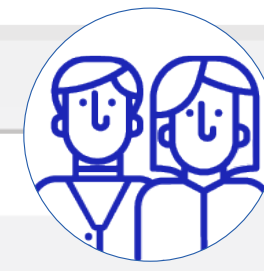
 **x 10 = € aaa**
Indoor partition wall

 **x 12 = € aaa**
Facade panel

 **x 13 = € aaa**
Unit Wall

Total € aaa



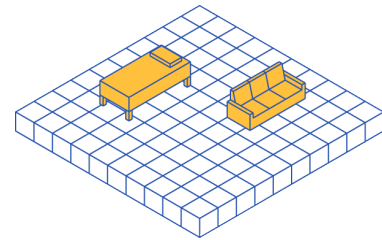


Architect

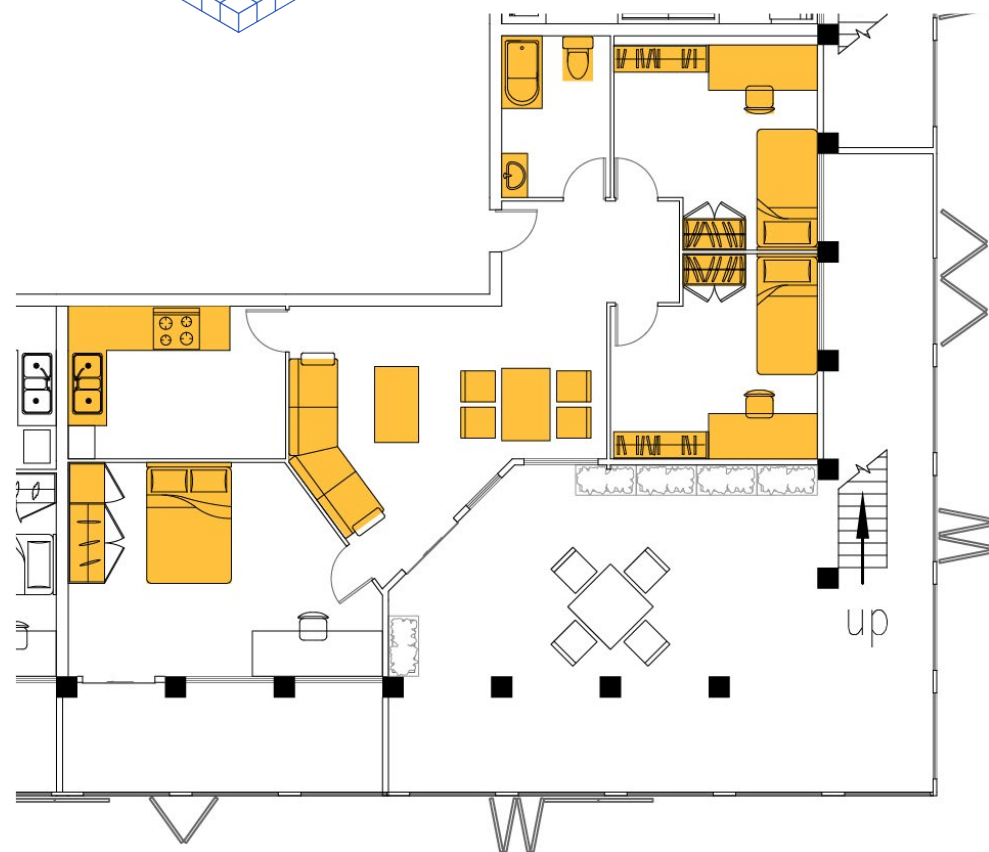
Customer



Furniture Selection



Furniture for rent



Rent:

Storage

 x 1 = € a

 x 2 = € a

 x 2 = € a

Table & Chairs

 x 1 = € a

 x 1 = € a

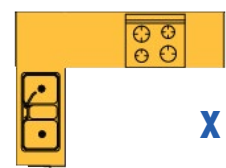
 x 2 = € a

Beds

 x 1 = € a

 x 2 = € a

Kitchen

 x 1 = € a

Bathroom

 x 1 = € a

 x 1 = € a

 x 1 = € a

Total = € aaa



- 1 Problem
- 2 Research
- 3 Design
- 4 **CONCLUSION**

STRATEGY

Initiative

Transformation Possibility Assessment

Transformation Potential Measurement Tool



Architect +
Project Developer

TOP DOWN

Support Design

Principle Design

1. Zoning & plot division
2. Facade & climate
3. Communal space ...



Principle Architect

TOP DOWN

Fit-out Design

User - participate design process

Instant feedback modular rent system



Architect Consultant
+ Customer

BOTTOM UP

Design Brief V1.0
Apartment unit : 42- 60
Surface floor: 12450m2
Floor: 14F
Parking plot: 50
Public Function:
Cafe
Gym
Restaurant
Bike Storage
Community center
Roof garden



THANK YOU!