

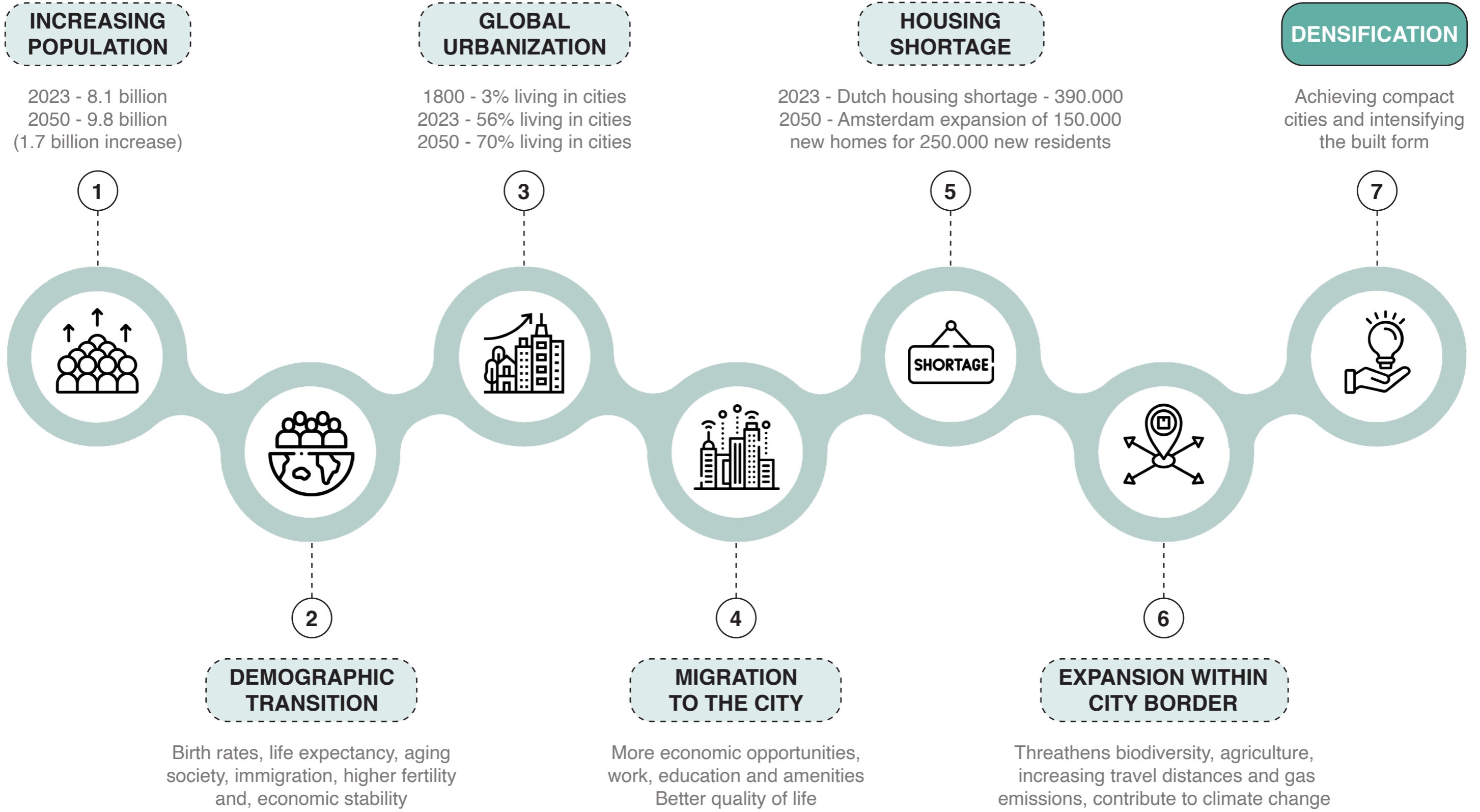


INTEGRATING DENSITY, LIVABILITY, AND HERITAGE IN POST-WAR NEIGHBORHOODS

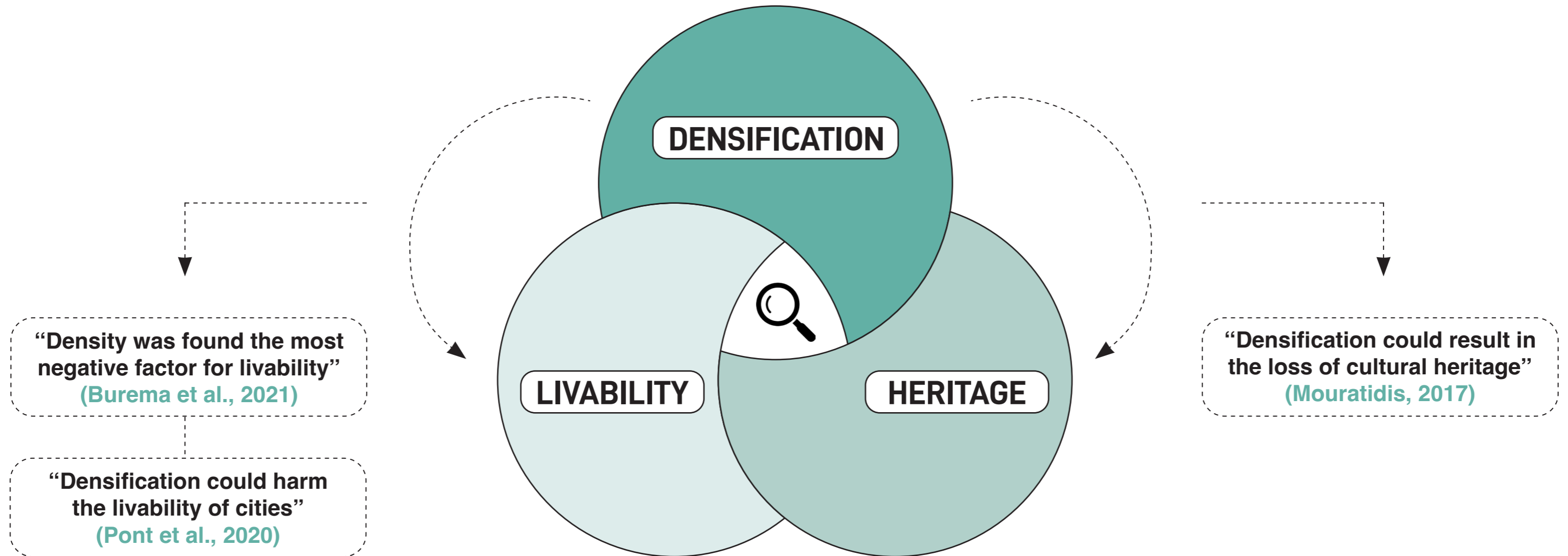
P5 Presentation: Adapting 20th Century Heritage: Resourceful Housing

Darren van der Waart | 5264472 | July 02, 2024

INTRODUCTION | PROBLEM STATEMENT



INTRODUCTION | PROBLEM STATEMENT



DENSIFICATION DEFINITION:

Densification is an urbanization strategy for achieving compact cities by intensifying the built form, and making optimal use of limited space for living.

(Jenks et al., 2003)

LIVABILITY DEFINITION:

Livability is the degree to which a place is good for living and refers to the communal connection with the urban surroundings and how suitable an area is to live in.

(Cambridge Dictionary, 2023)

INTRODUCTION | RESEARCH QUESTION

PROBLEM STATEMENT

WHY?

With the growing population, high rates of migration together with the high demand for housing, densifying the existing built environment is inevitable. For this, countries are looking primarily to post-war neighborhoods because of their spatial layout and low density. However, the densification of these neighborhoods threatens the loss of potentially valued heritage and in addition, densification can diminish livability.

MAIN RESEARCH QUESTION

How can a post-war neighborhood be densified, while improving its livability and preserving its heritage values?

WHAT?

SUB-QUESTION 1.

What are the heritage values of the Louis Couperus neighborhood in Amsterdam New West?

HERITAGE

SUB-QUESTION 2.

What set of factors determine the livability of a neighborhood?

LIVABILITY

SUB-QUESTION 3.

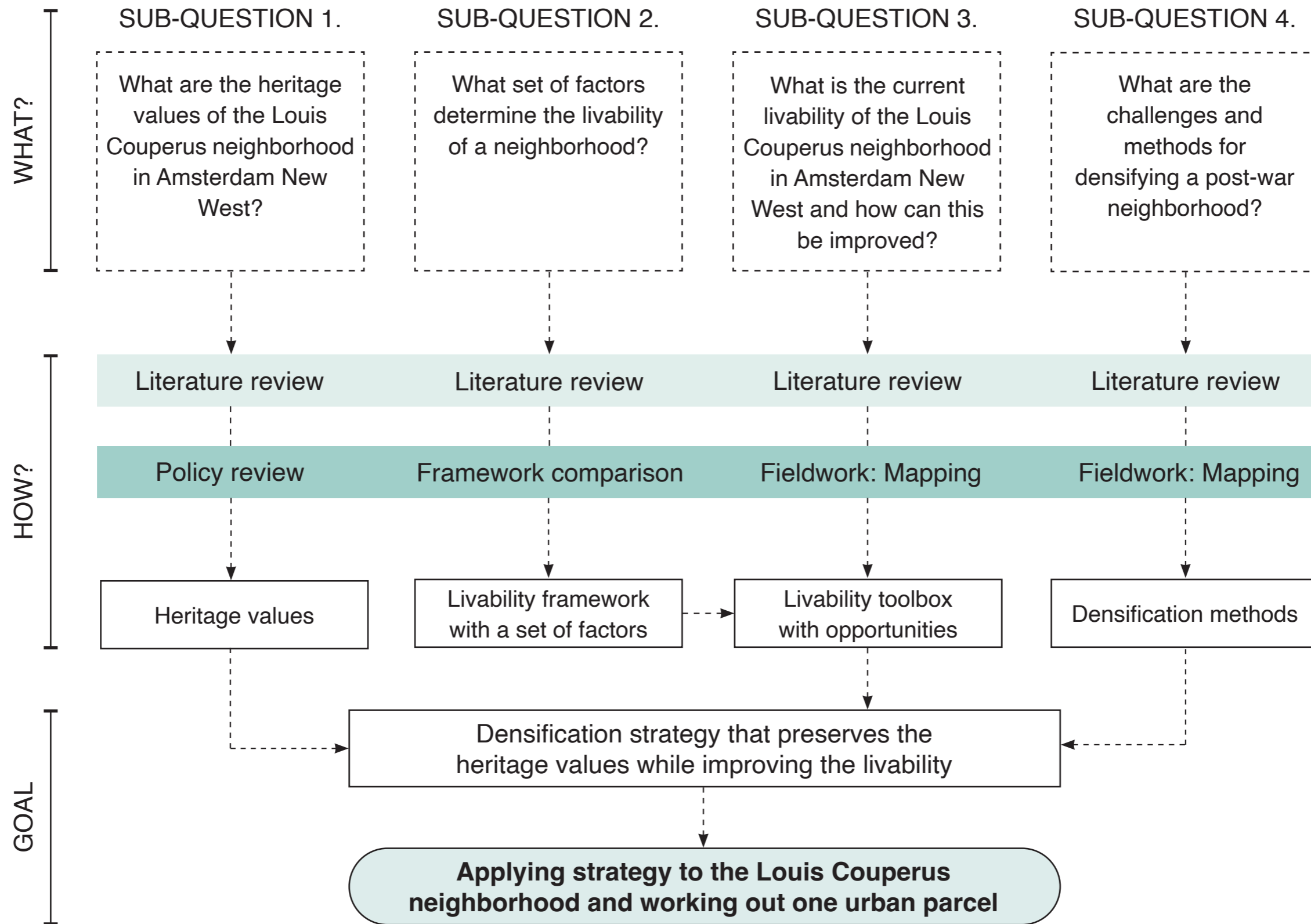
What is the current livability of the Louis Couperus neighborhood in Amsterdam New West and how can this be improved?

SUB-QUESTION 4.

What are the challenges and methods for densifying a post-war neighborhood?

DENSIFICATION

INTRODUCTION | RESEARCH METHODS



LOUIS COUPERUS NEIGHBORHOOD (SLOTERMEER, AMSTERDAM NEW WEST)

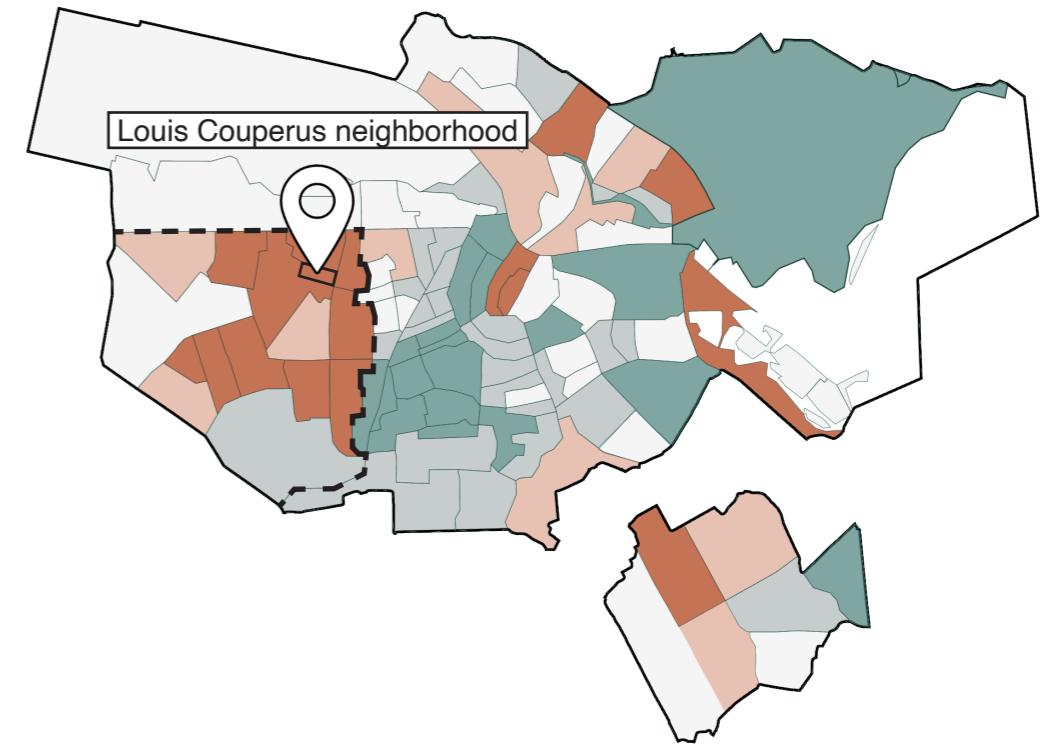


Elenbaas (2011)



Gemeente van Amsterdam (2022)

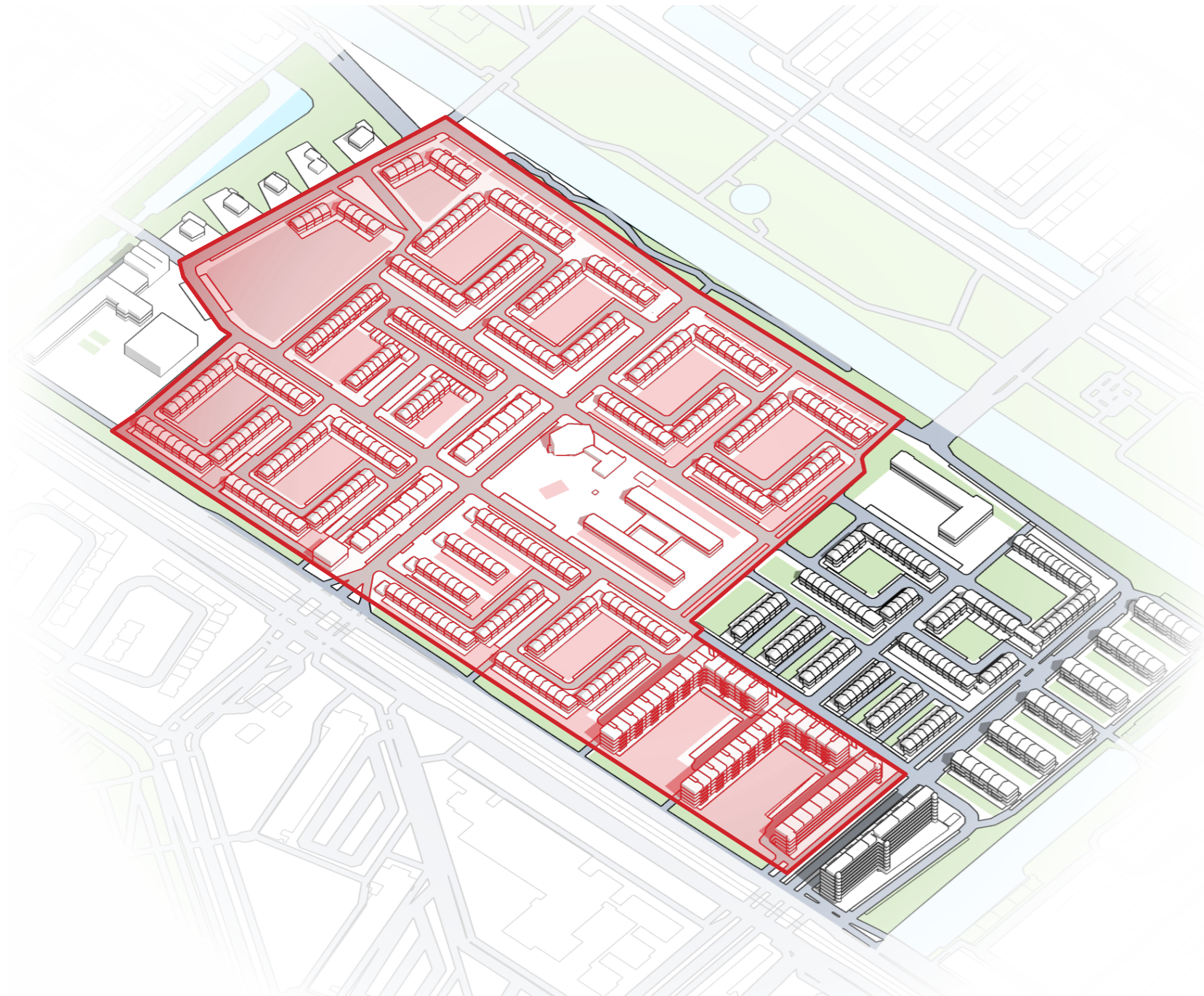
SATISFACTION SCORE | LOUIS COUPERUS NEIGHBORHOOD



Neighborhood satisfaction scores of Amsterdam



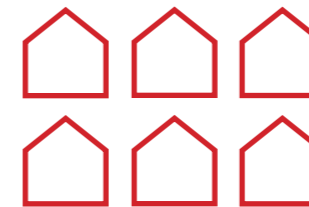
RENEWAL PLAN | LOUIS COUPERUS NEIGHBORHOOD



Stadgenoot & Gemeente Amsterdam (2024)

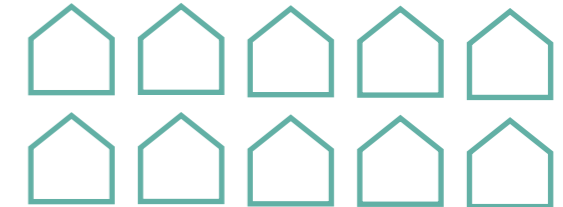
Demolish

370



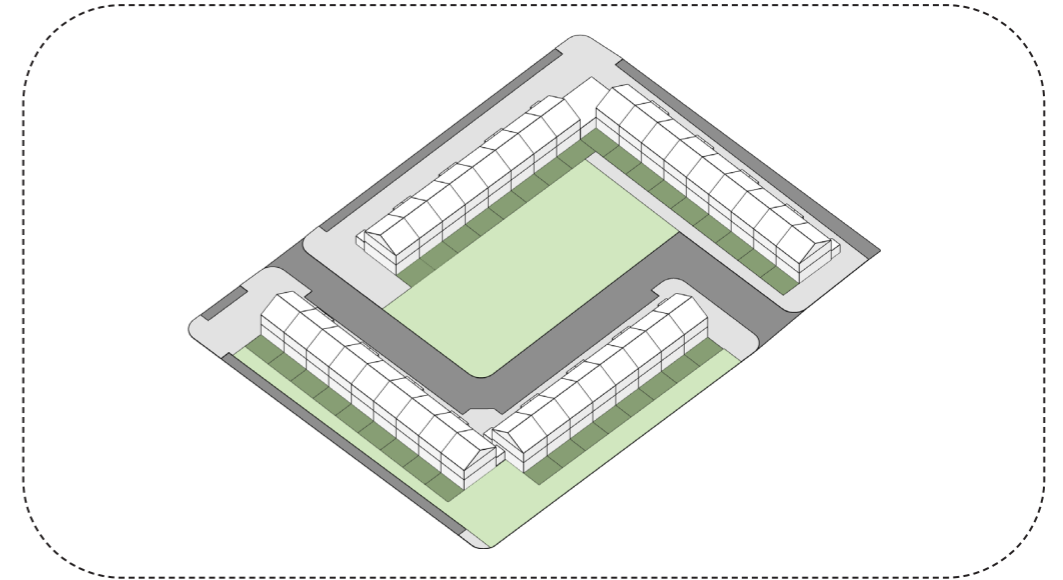
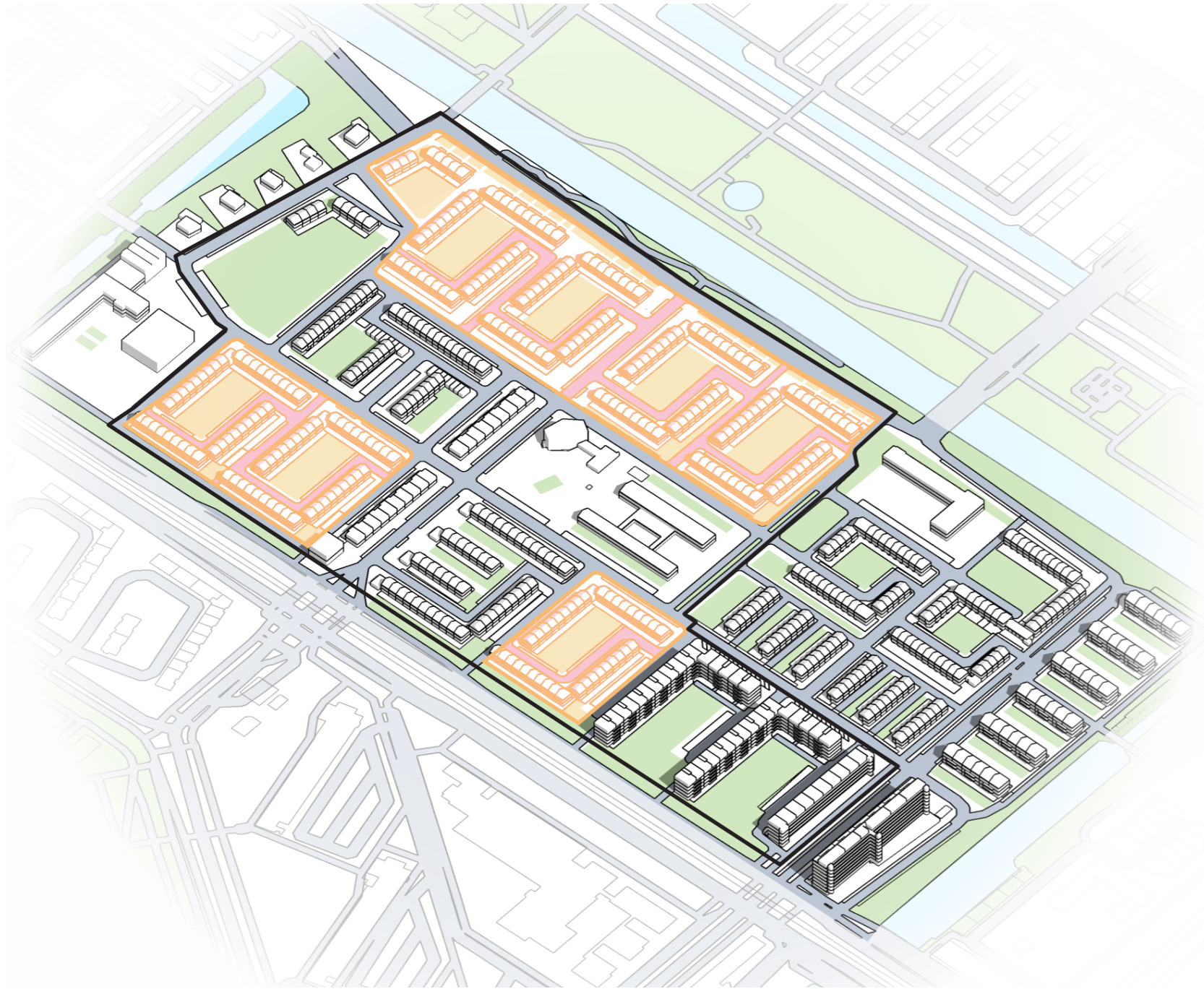
Added

500

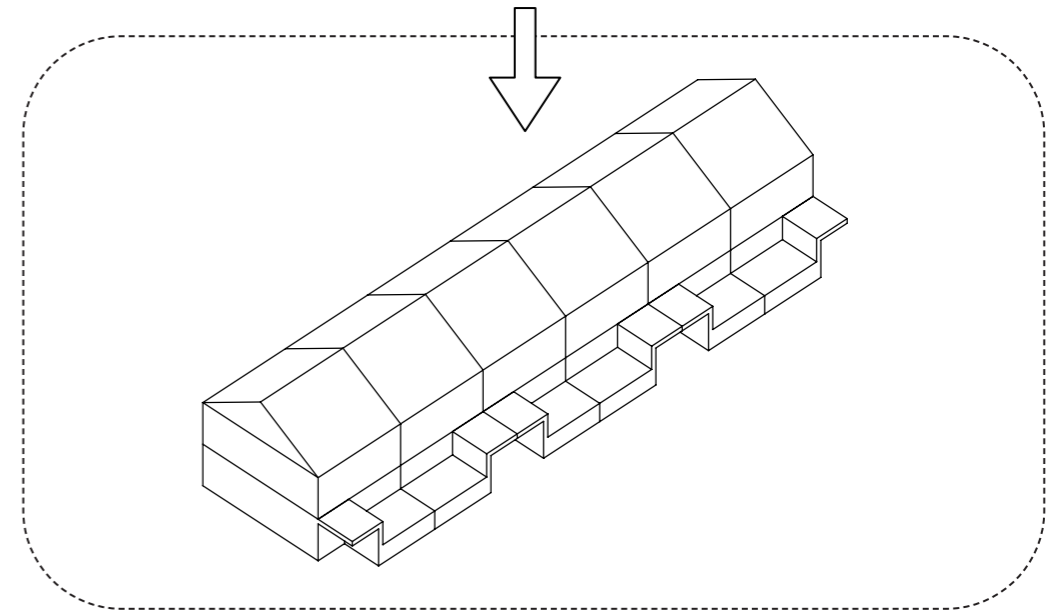


Can this be done differently?

OPEN COURTYARD PARCELLATION | LOUIS COUPERUS NEIGHBORHOOD



Open courtyard parcellation



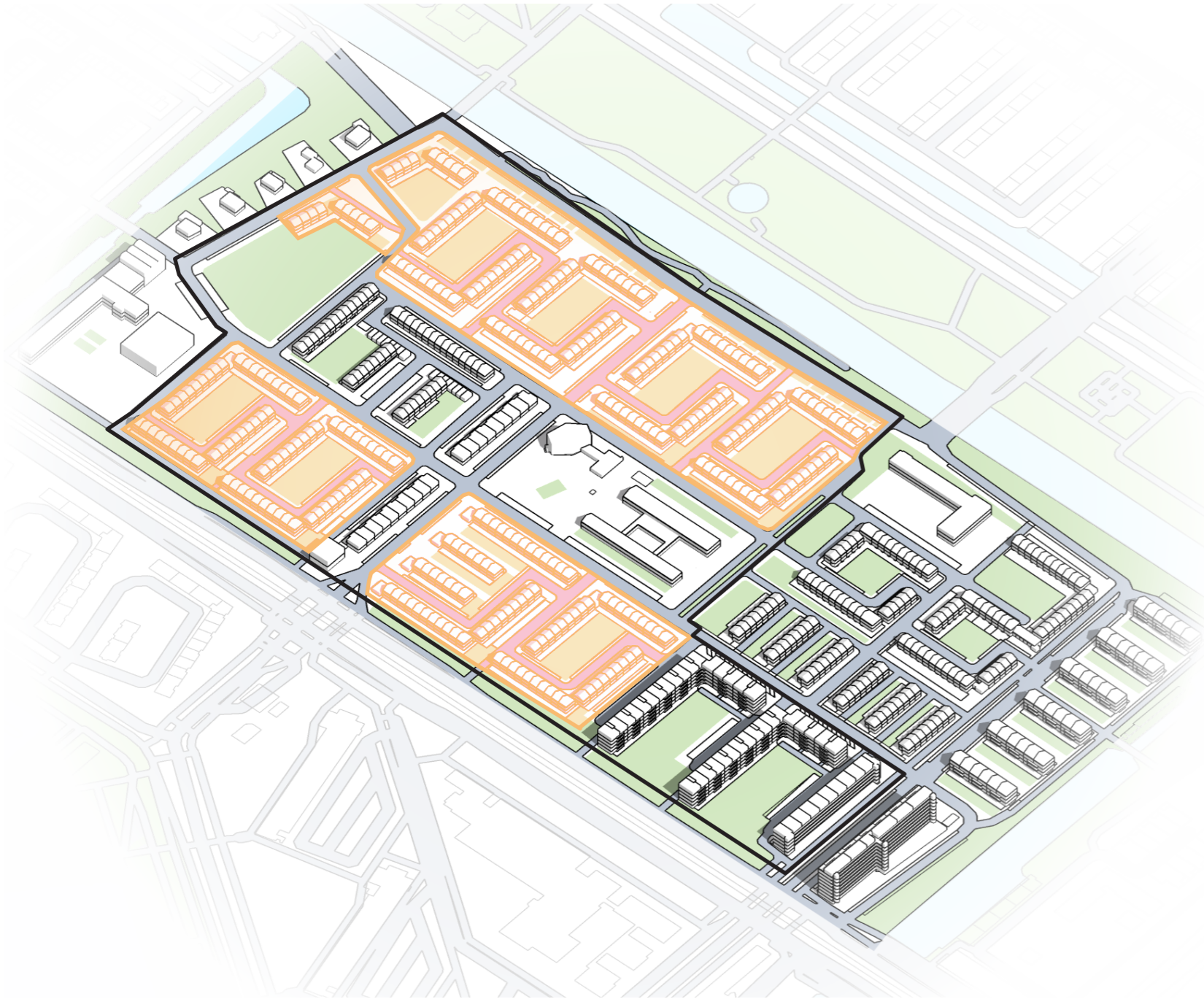
Duplex typology

INTRODUCTION | SITE CONTEXT

OPEN COURTYARD PARCELLATION | LOUIS COUPERUS NEIGHBORHOOD



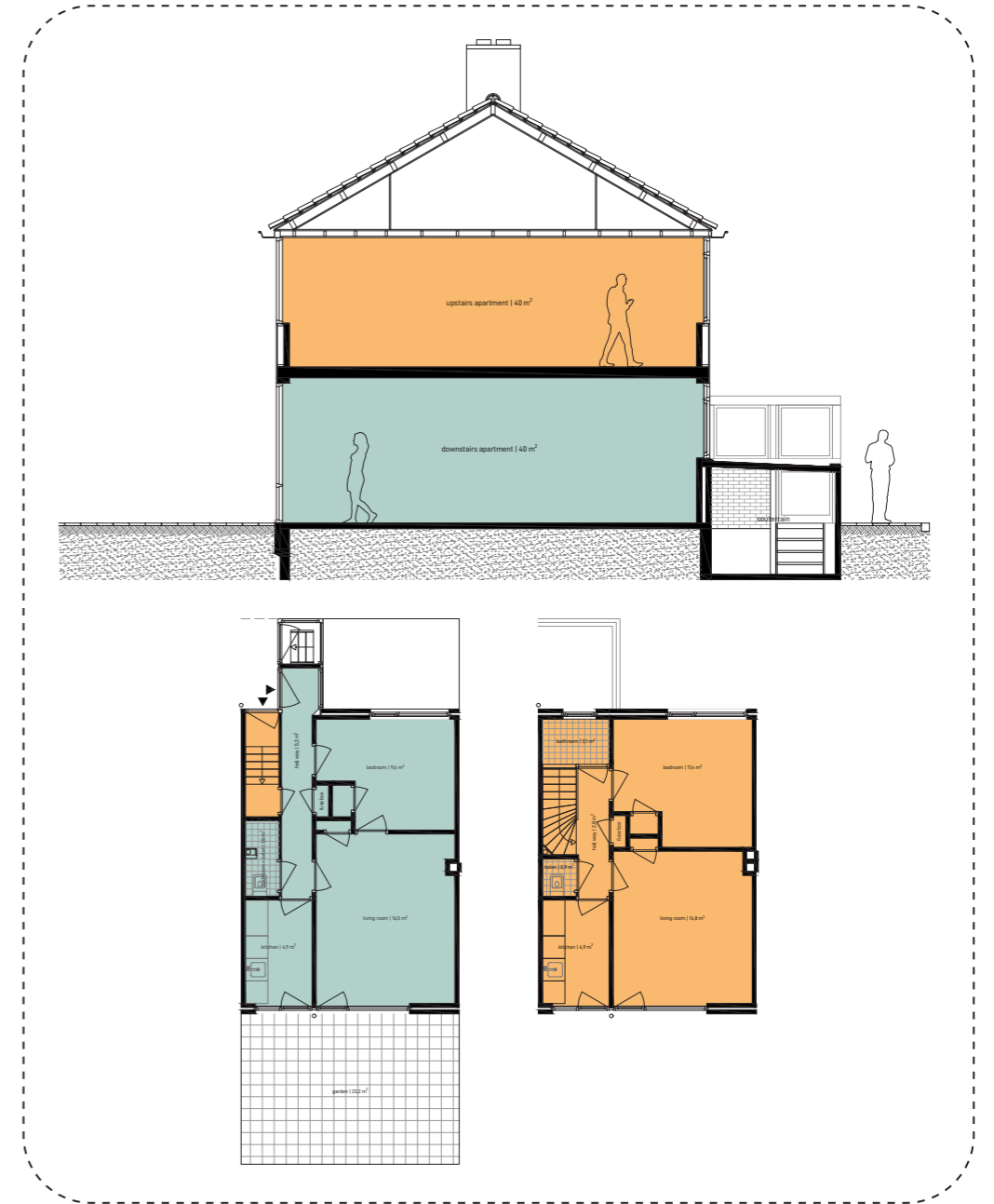
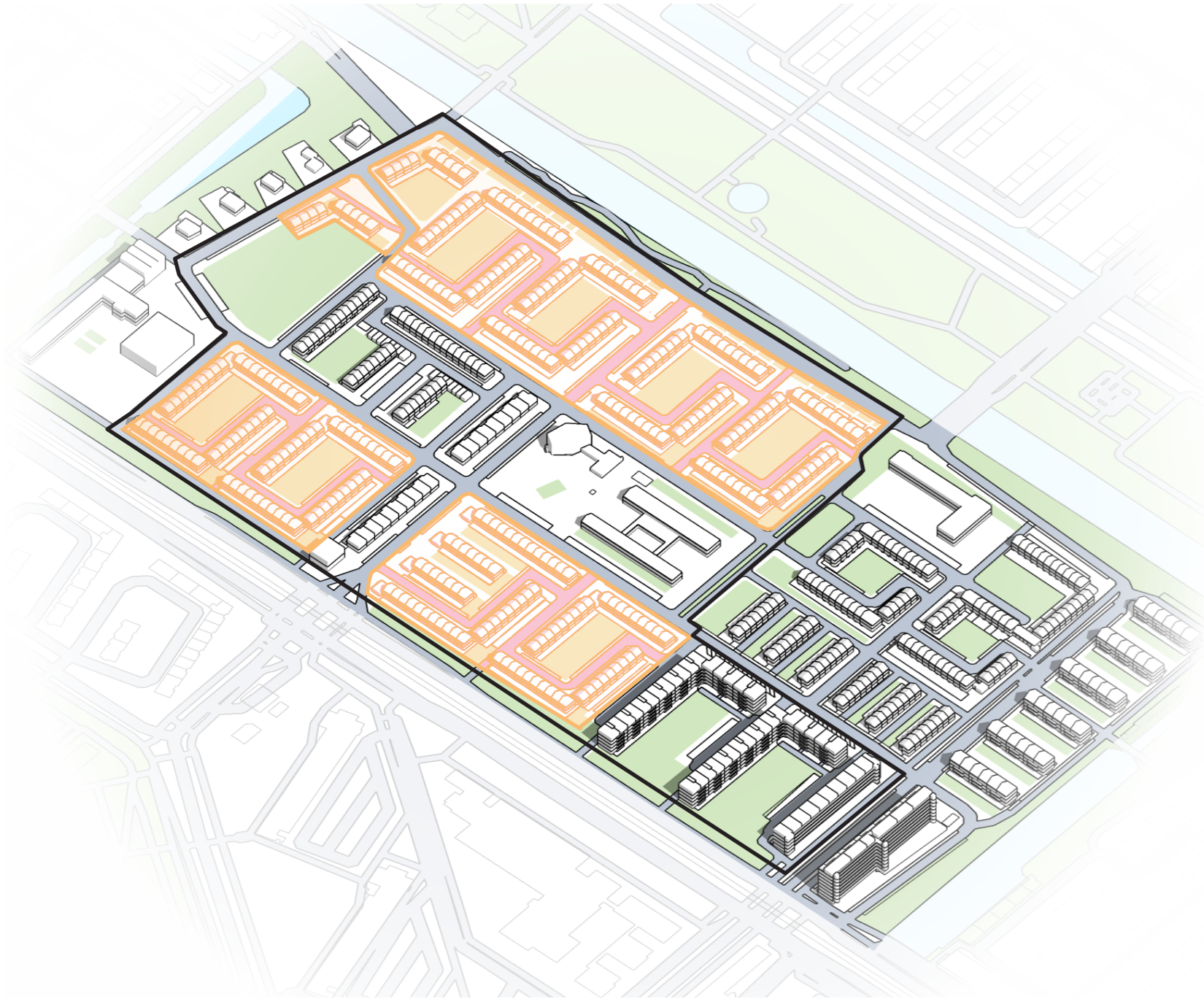
DUPLEX TYPOLOGY | LOUIS COUPERUS NEIGHBORHOOD



Stadgenoot (2024)

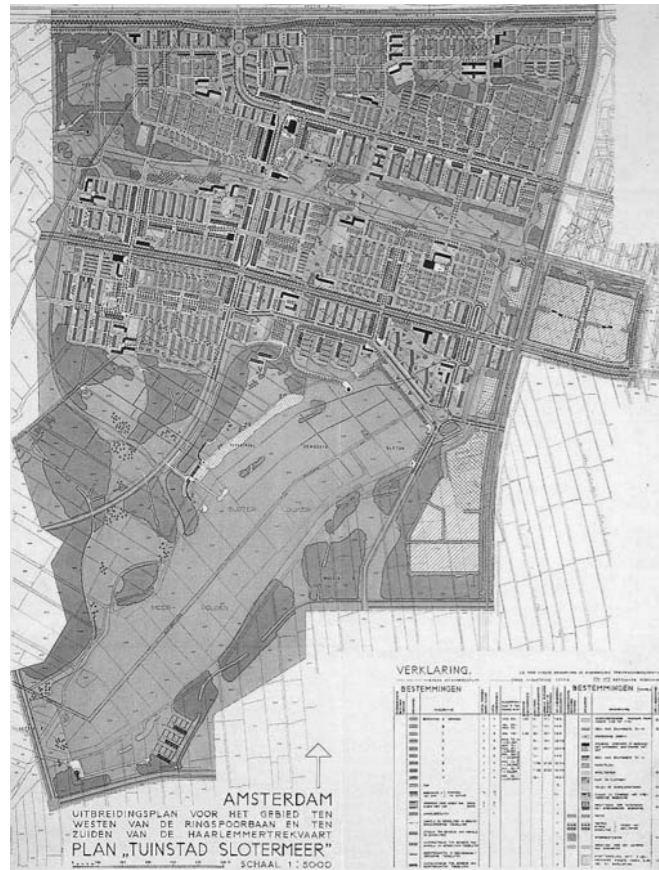
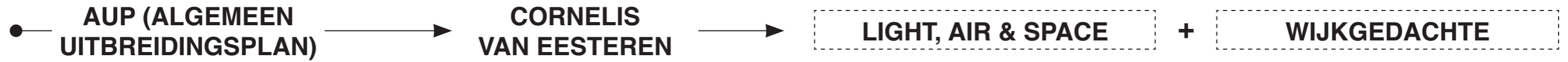
Duplex typology

DUPLEX TYPOLOGY | LOUIS COUPERUS NEIGHBORHOOD

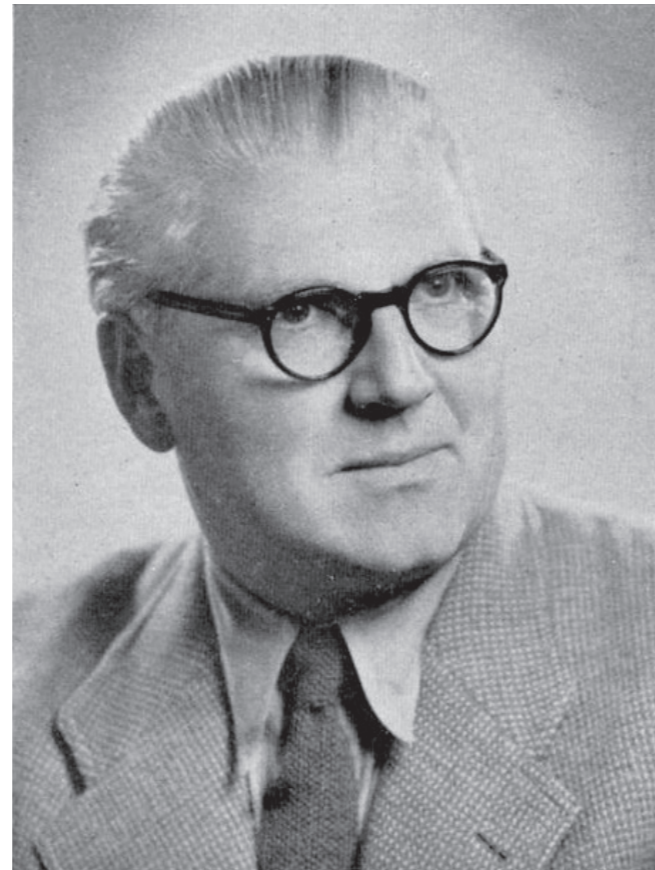


Duplex typology

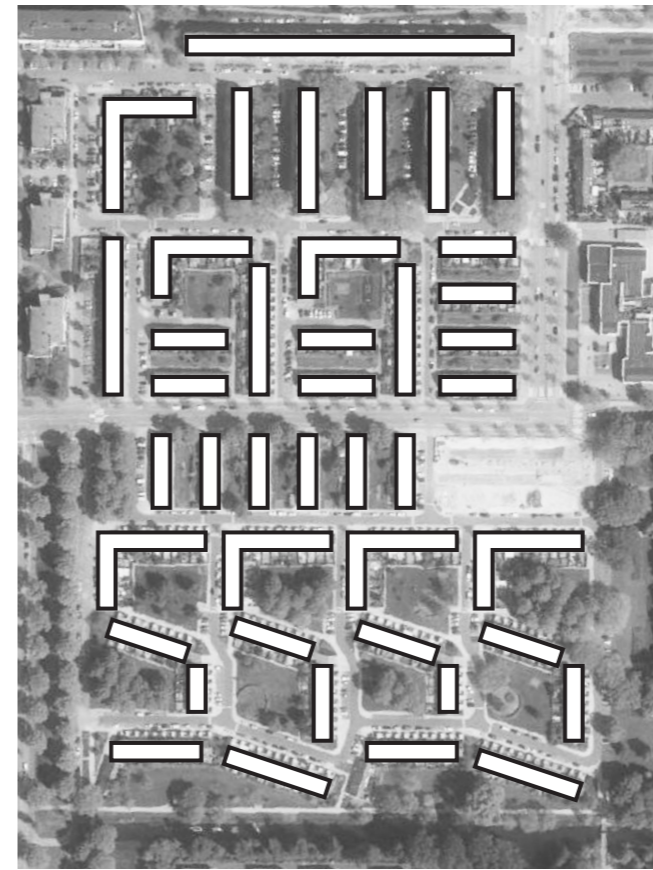
RESEARCH | WESTERN GARDEN CITIES



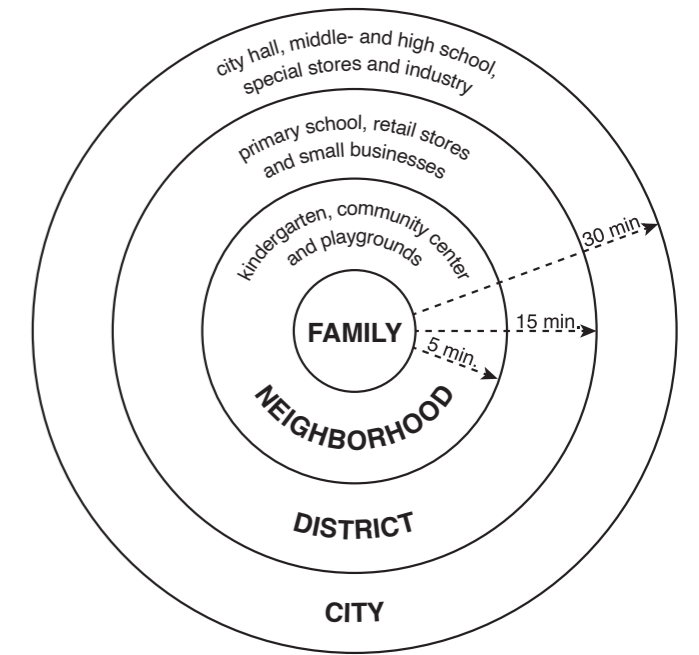
Gemeente Amsterdam (2019)



Delpher (1948)



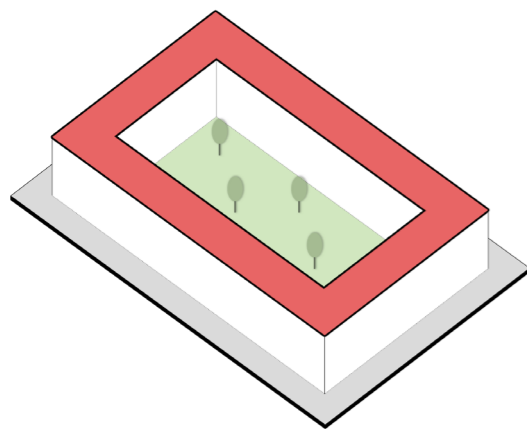
Google Earth (2024)



RESEARCH | WESTERN GARDEN CITIES

● — PLAN SOUTH (1917-1925) | H.P. BERLAGE —>

AUP (ALGEMEEN UITBREIDINGSPLAN) | VAN EESTEREN



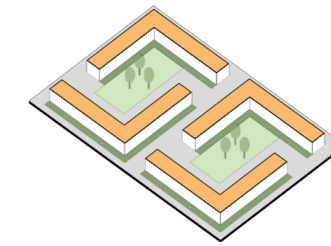
Closed building blocks



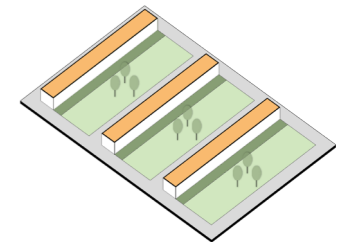
Google Earth (2024)



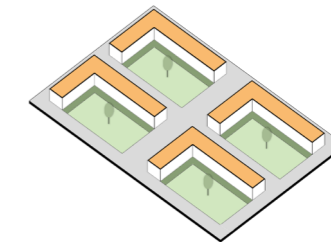
Google Earth (2024)



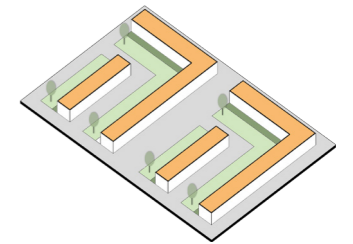
Open courtyard



Strip allotment



Hooked allotment

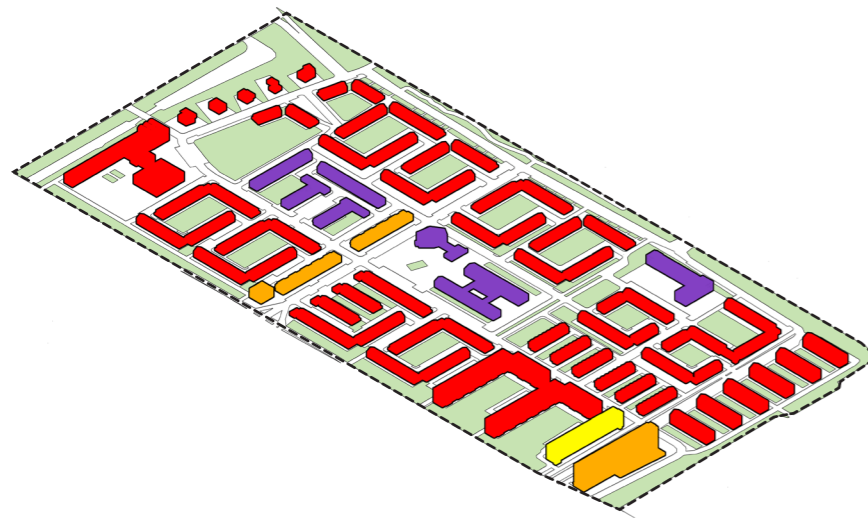


Hooked & Strip

Light Access to daylight
Air Clean air by greenery
Space Sufficient open space

LOUIS COUPERUS NEIGHBORHOOD

Total Valuation

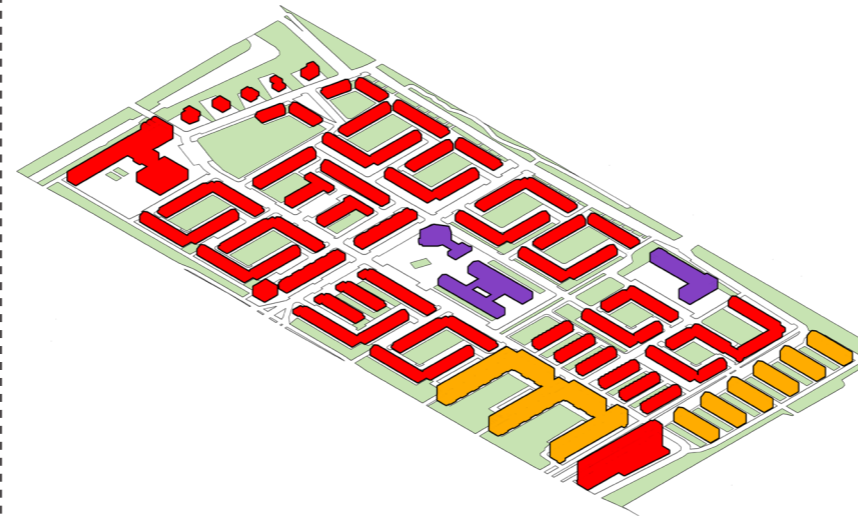


- Monument / monument-worthy
- High Value
- Medium High Value
- Low Value

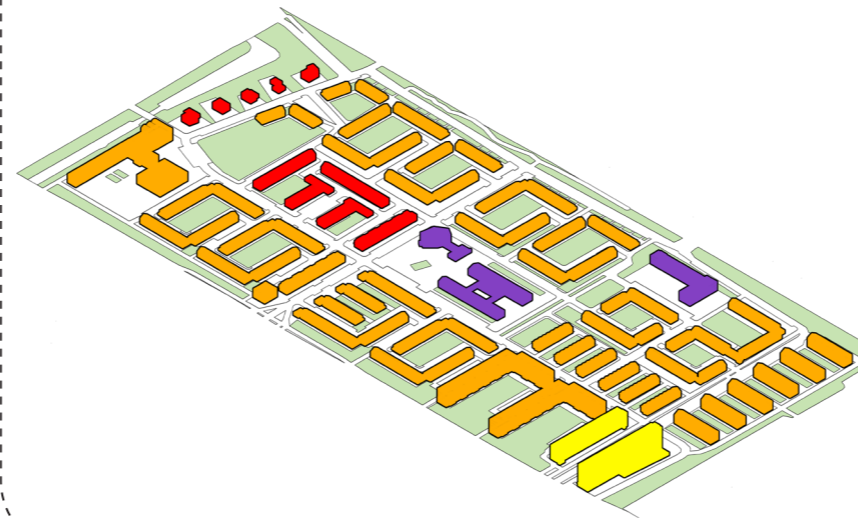
Bureau of Monuments & Archaeology (BMA) (2010)
& Gemeente Amsterdam (2010)

ARCHITECTURAL CONSIDERATIONS (A+B)

(A) Typology

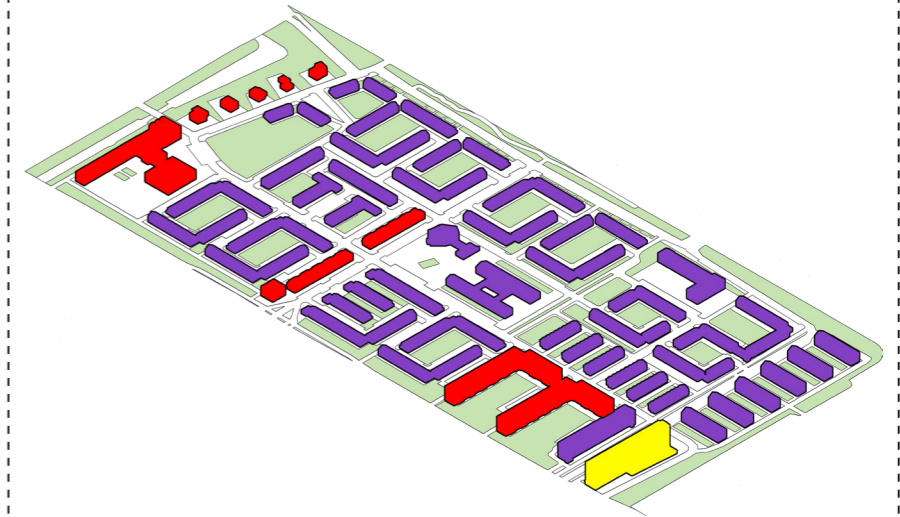


(B) Architecture

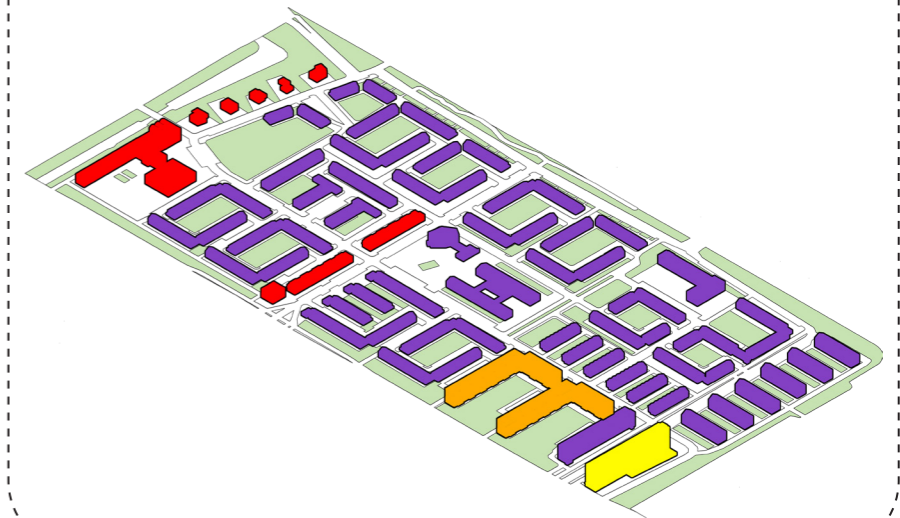


URBAN DESIGN CONSIDERATIONS (C+D)

(C) Parcellation

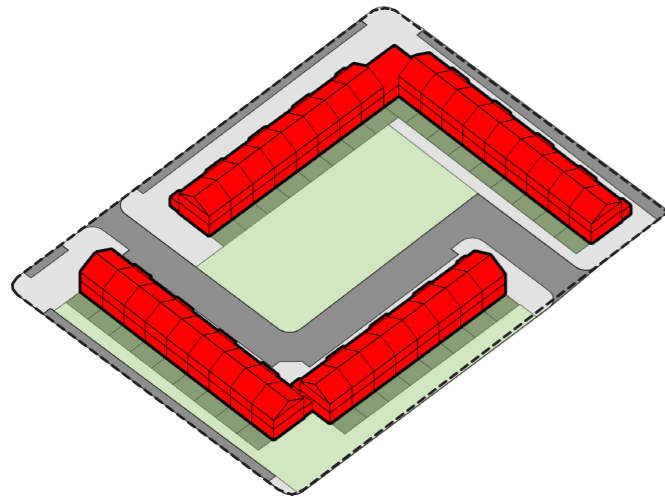


(D) Garden City Character



OPEN COURTYARD PARCEL (DUPLEX)

Total Valuation

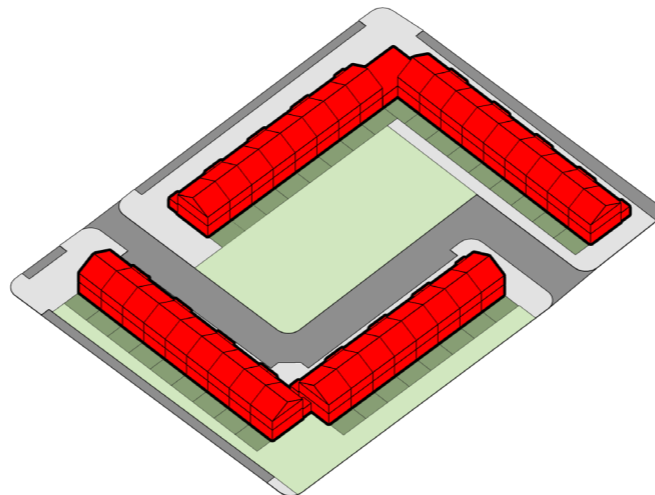


- Monument / monument-worthy
- High Value
- Medium High Value
- Low Value

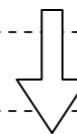
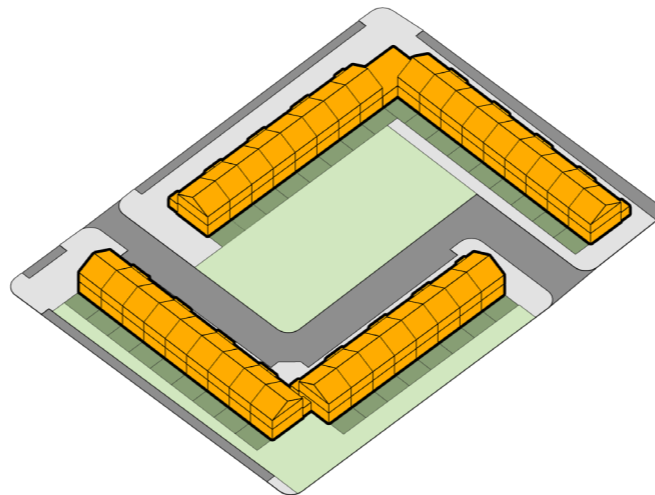
Bureau of Monuments & Archaeology (BMA) (2010)
& Gemeente Amsterdam (2010)

ARCHITECTURAL CONSIDERATIONS (A+B)

(A) Typology



(B) Architecture

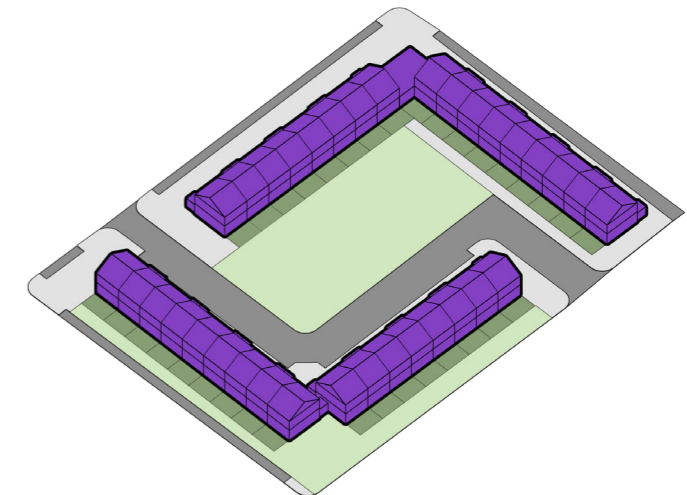


“The original architectural elements’ form, size, material, detailing, and color must be preserved or restored. Non-original materials may be used if they respect the facade’s authenticity”.

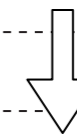
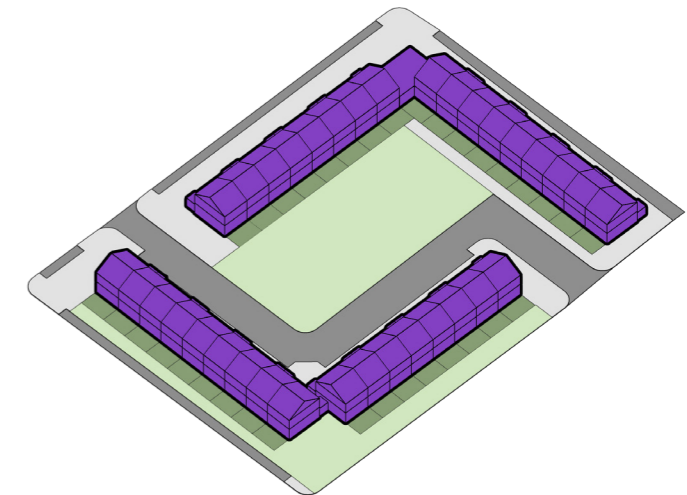
Bureau of Monuments & Archaeology (BMA) (2010)

URBAN DESIGN CONSIDERATIONS (C+D)

(C) Parcellation



(D) Garden City Character

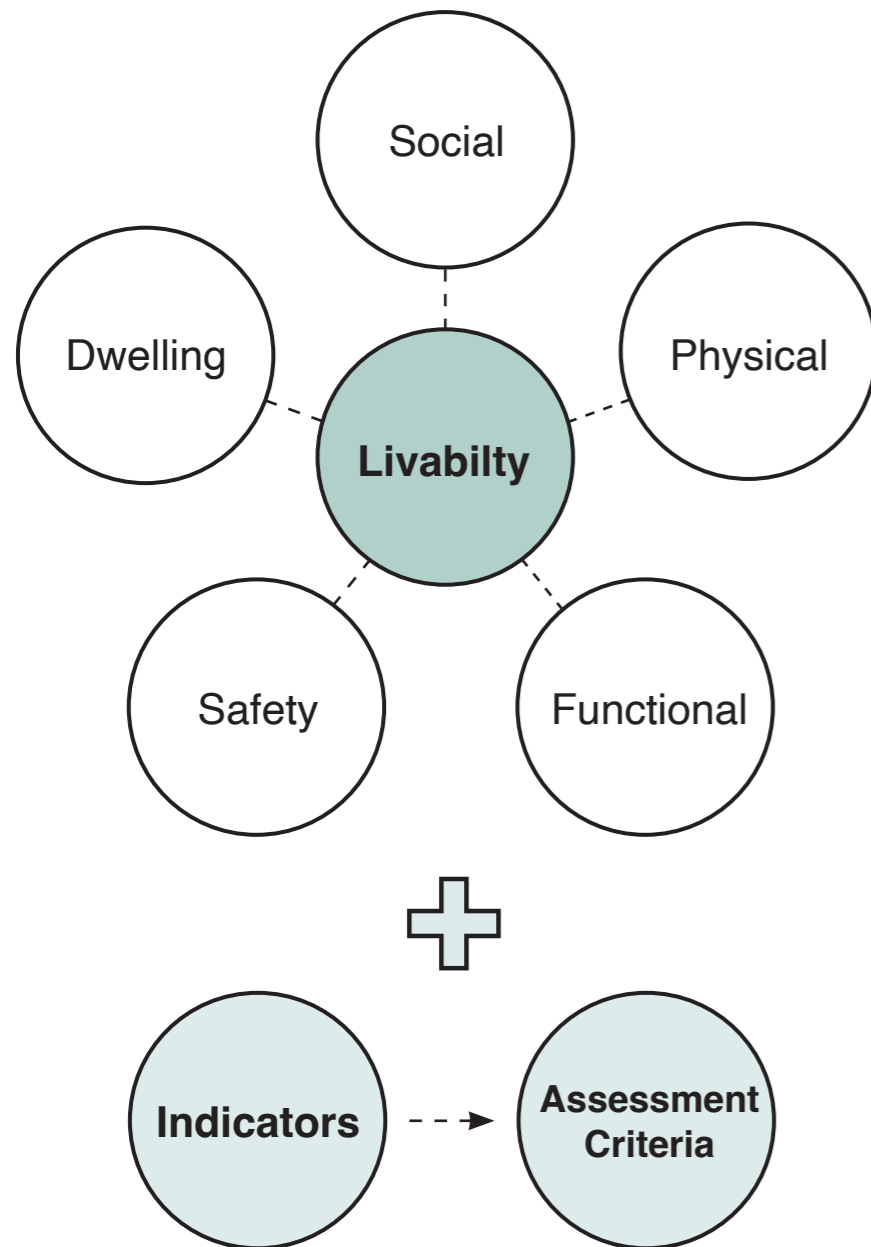


“The spatial quality, including the relationship between buildings and public spaces, sightlines, and coherence with the garden city ensemble, must be preserved”.






Bureau of Monuments & Archaeology (BMA) (2010)

RESEARCH | LIVABILITY FRAMEWORK

LIVABILITY FACTORS

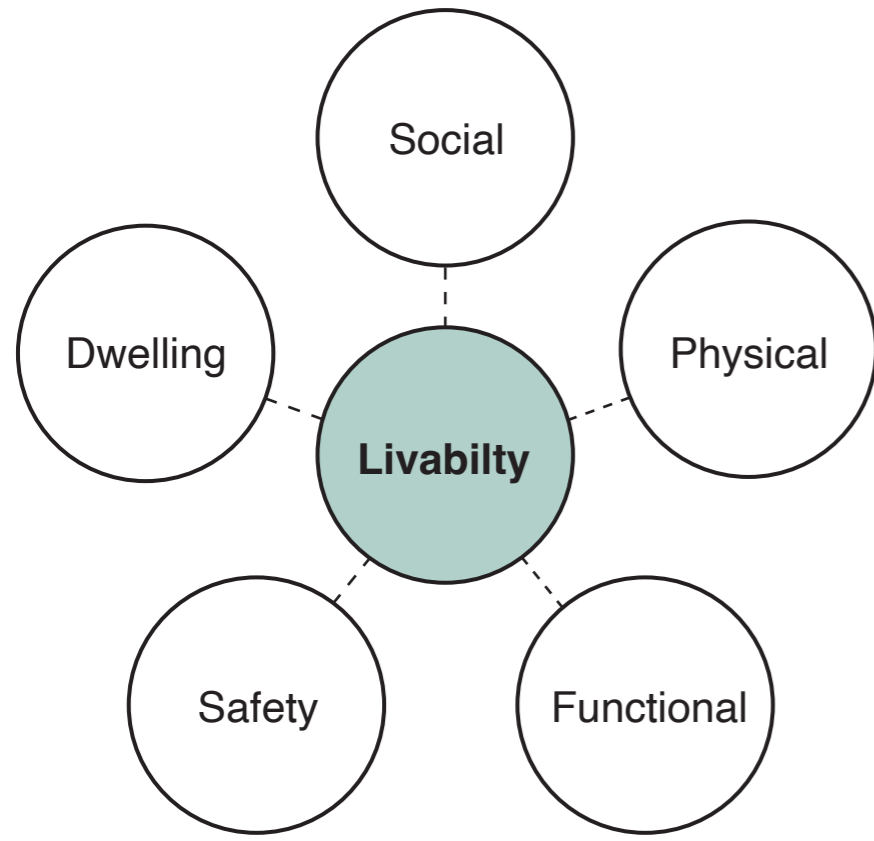


LIVABILITY FRAMEWORK

Livability Framework: Van Der Waart (2024)		
Dimensions	Indicators	Assessment Criteria
Social 	Social cohesion Community feeling Residents satisfaction Behaviour of neighbors Diversity Employment rate	Availability and use of meeting Places Activities and relation of the residents Interviews/Questionnaire Nuisance Age and background Interviews/Questionnaire
Physical 	Proximity of open public spaces Proximity of parks and playgrounds Infrastructure Density Environment quality Maintenance of built environment	Measuring the distance of open public spaces Measuring the distance of parks and playgrounds Separation of car, bicycle and pedestrian Dwellings within a given area of land Biodiversity and pollution Building and infrastructure maintenance
Functional 	Availability of facilities Availability of education Mix of functions Proximity of transport Accessibility Employment opportunities	Supermarkets, stores, medical and hospital Kindergarten and schools Presence of variation in functions Public transport and parking Infrastructure, public transport and parking Availability of workplaces
Safety 	Perceived safety Crime rate Accident rate	During day-time and night-time Theft, vandalism and violence Traffic accidents
Dwelling 	Size of dwelling unit Availability of outdoor space Diversity Vacancy rate Nuisances	Sufficient usable space Balconies and gardens Construction periods, typologies and ownership Number of vacant dwellings Location and neighbors

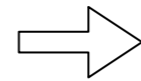
RESEARCH | LIVABILITY TOOLBOX

LIVABILITY RESEARCH →



Louis Couperus neighborhood

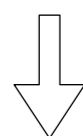
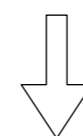
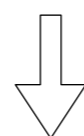
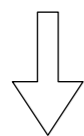
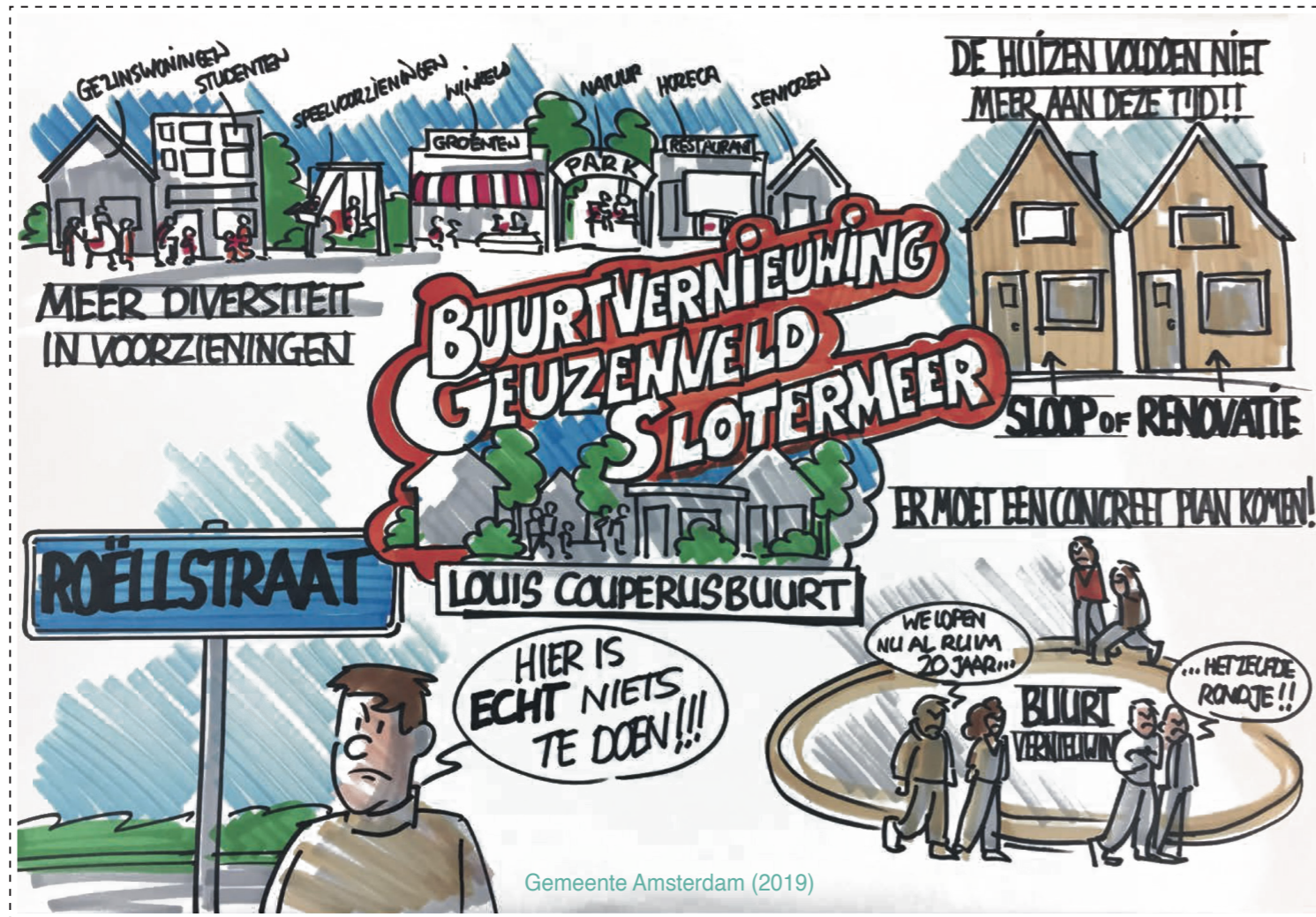
- Present
- Courtyard
- Centre
- Streets



LIVABILITY TOOLBOX

Dimension	Neighborhood scale ← → Dwelling scale				
		Central plaza	Community garden	Community room	Co-working space
Social Icon: Group of people	○ ●	● ●	●	●	● ●
Physical Icon: Buildings	Benches	Parks	Picnic area	Collective garbage	Bicycle parking
	● ●	○ ●	● ●	○ ● ●	● ● ●
Functional Icon: Target	Shops	Restaurant/Café	Playground	Sport field	Outdoor gym
	●	●	○ ● ●	○ ● ●	● ●
Safety Icon: Shield	Street lighting	Road signs			Eyes on the street
	○ ● ● ●	● ● ●			○ ● ● ●
Dwelling Icon: Building	Active plinth				Outdoor space
	●				○ ● ●
	○ Present	● Courtyard	● Centre	● Streets	

HOW TO IMPROVE THE CURRENT LIVABILITY?



Renovation existing dwellings to improve livability

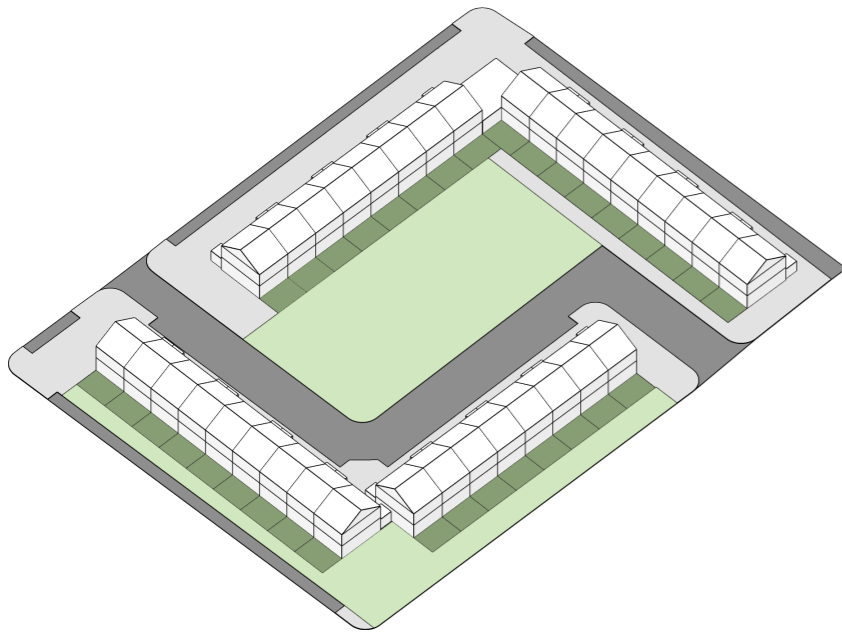
Diversity in dwellings to reduce social segregation

More facilities and social meeting places

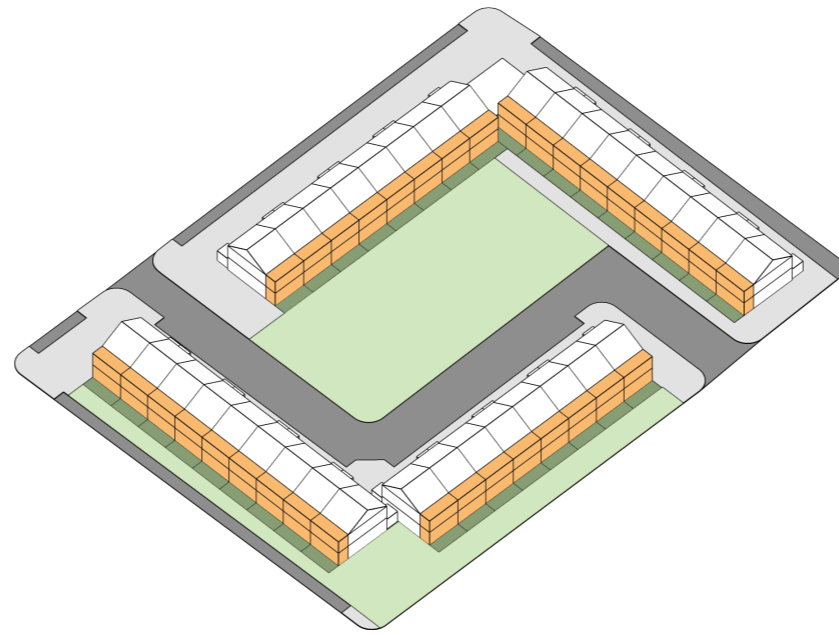
A safer living environment with more eyes on the street

RESEARCH | DENSIFICATION METHODS

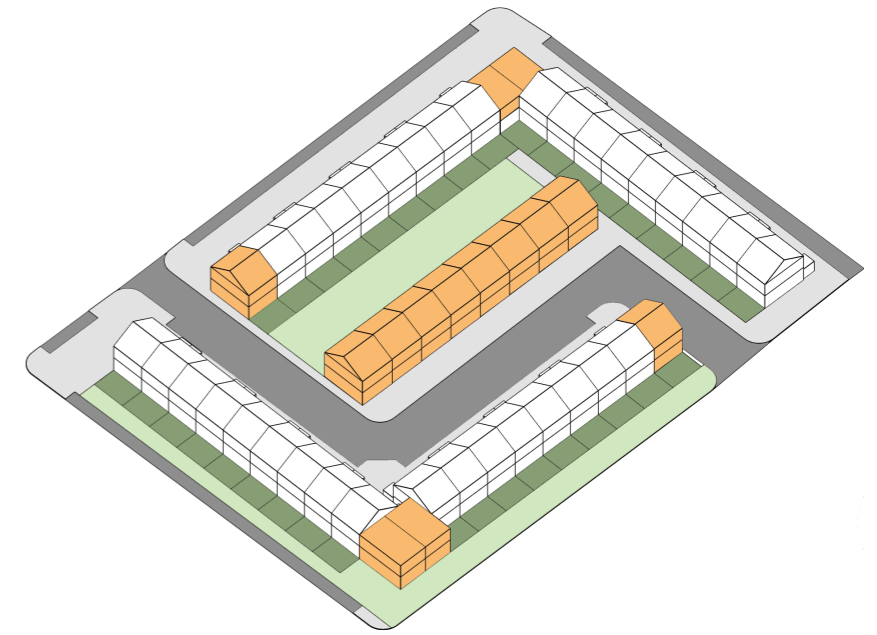
Case Study: Open Courtyard Parcellation



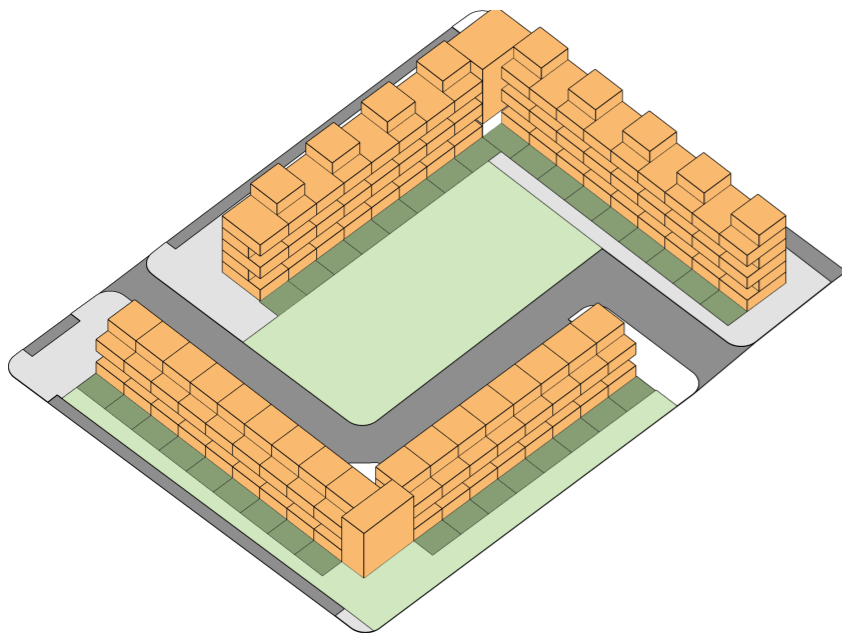
① Filling Backyards



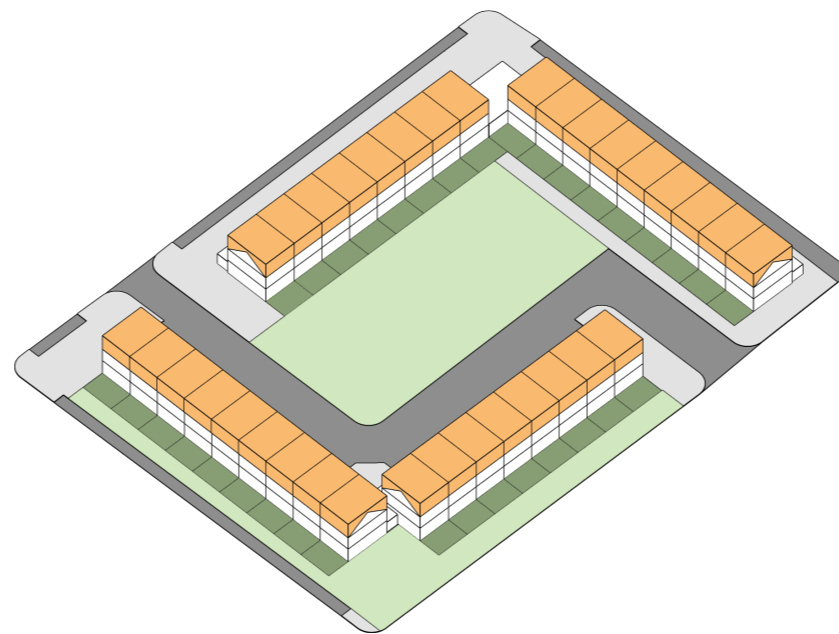
② Infill



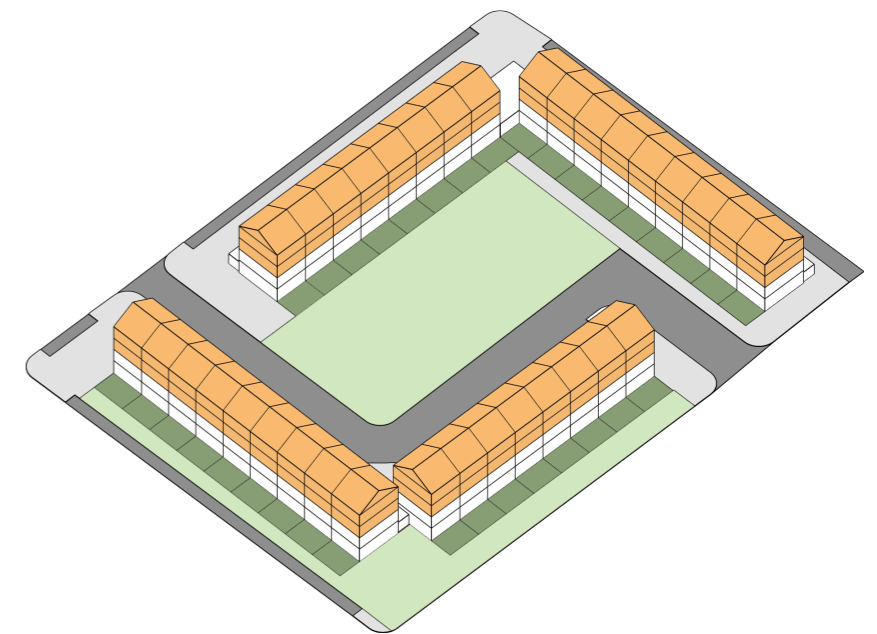
③ Demolish & Rebuild



④ Roof Transformation

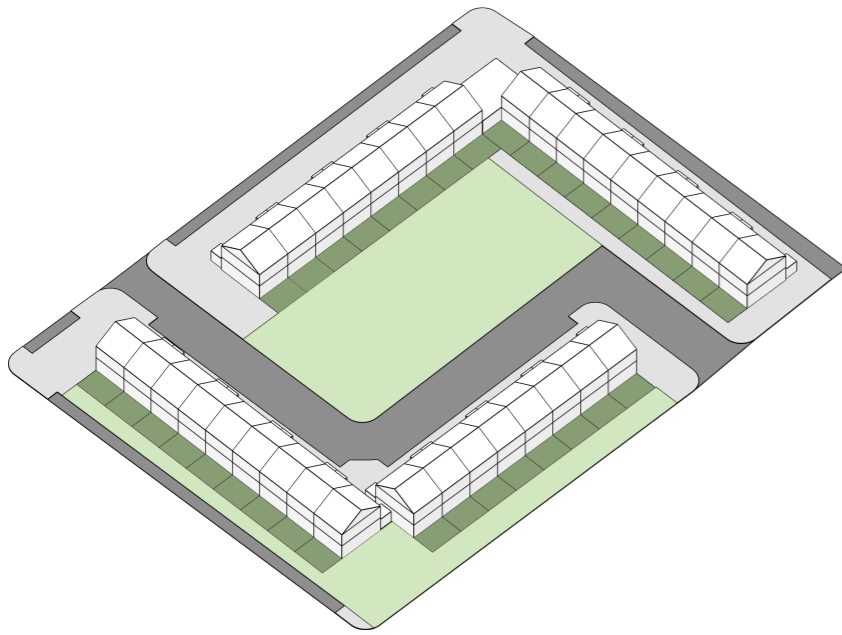


⑤ Roof Stacking

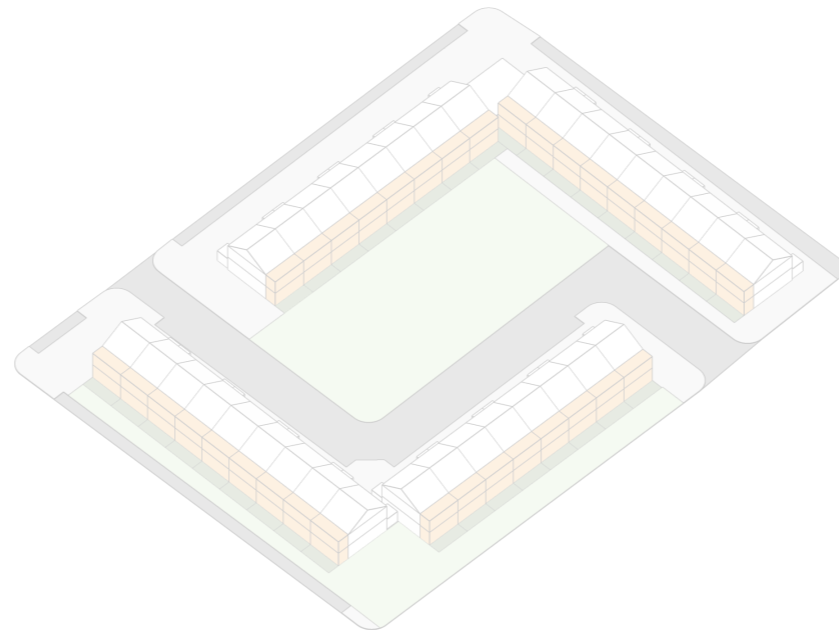


RESEARCH | DENSIFICATION METHODS

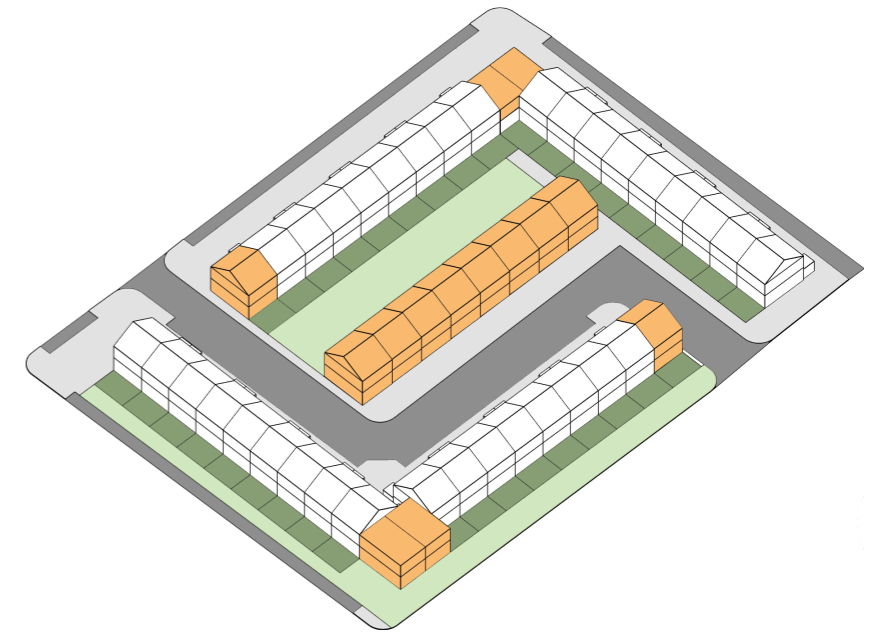
Case Study: Open Courtyard Parcellation



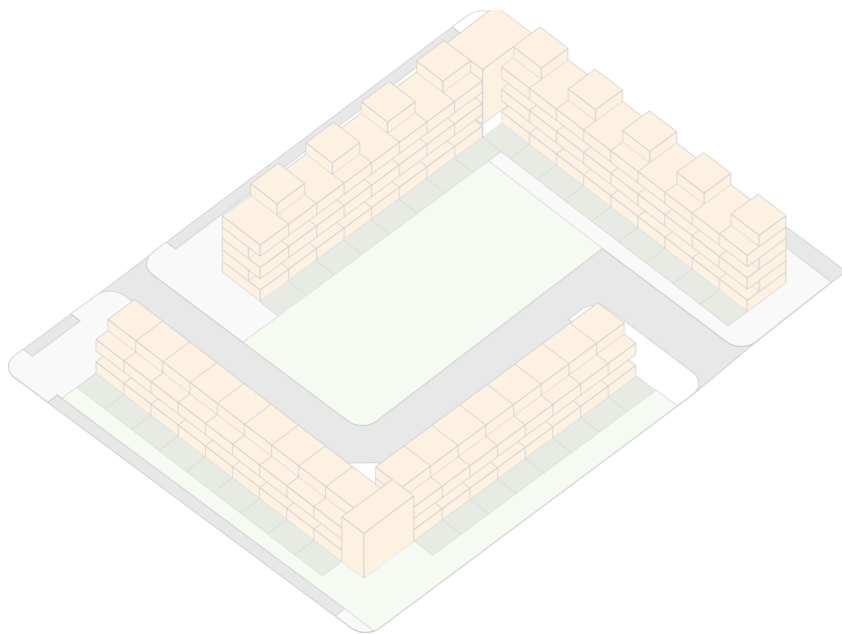
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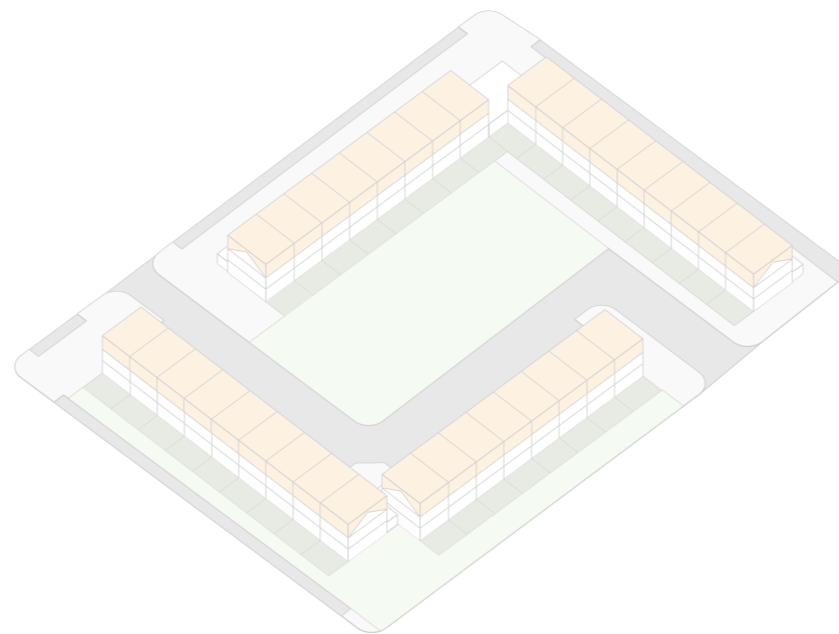
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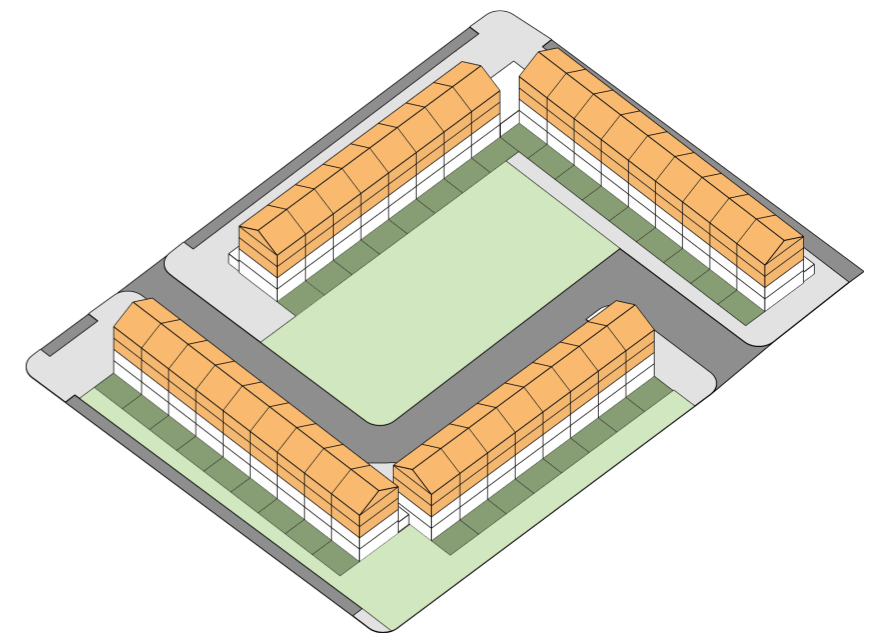
③ Demolish & Rebuild



④ Roof Transformation



⑤ Roof Stacking



RESEARCH | CURRENT DENSITY

MEASURING DENSITY

$$\text{Floor Space Index (FSI)} = \frac{\text{Gross Floor Area}}{\text{Site Area}} = \frac{4290 \text{ m}^2}{7725 \text{ m}^2} = 0.55$$

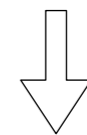
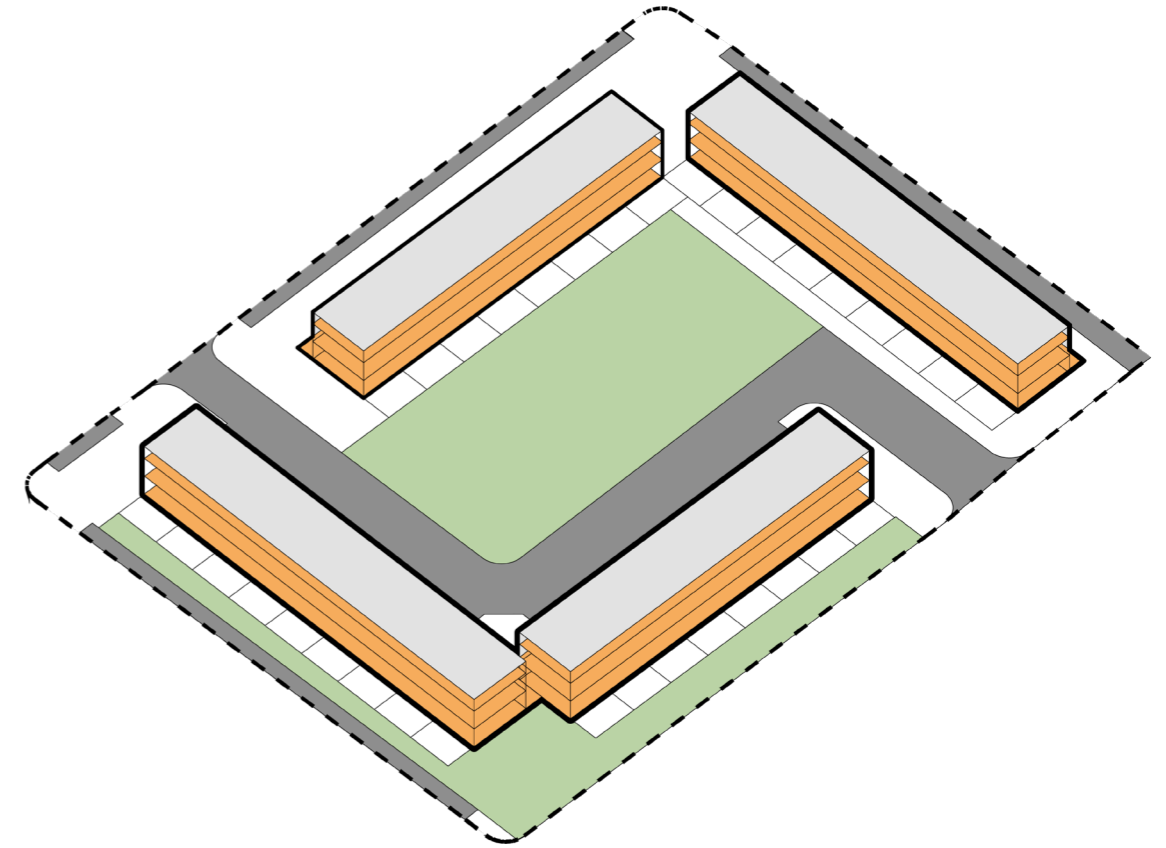
$$\text{Gross Floor Index (GSI)} = \frac{\text{Footprint of building(s)}}{\text{Site Area}} = \frac{1650 \text{ m}^2}{7725 \text{ m}^2} = 0.21$$

$$\text{Layers (L)} = \frac{\text{Gross Floor Area}}{\text{Footprint of building(s)}} = \frac{\text{FSI}}{\text{GSI}} = \frac{4290 \text{ m}^2}{1650 \text{ m}^2} = 2.60$$

$$\text{Open Space Ratio (OSR)} = \frac{\text{Unbuilt area}}{\text{Gross Floor Area}} = \frac{1-\text{GSI}}{\text{FSI}} = \frac{6075 \text{ m}^2}{4290 \text{ m}^2} = 1.41$$

Planbureau voor de Leefomgeving (2022)

CASE STUDY: OPEN COURTYARD PARCELLATION



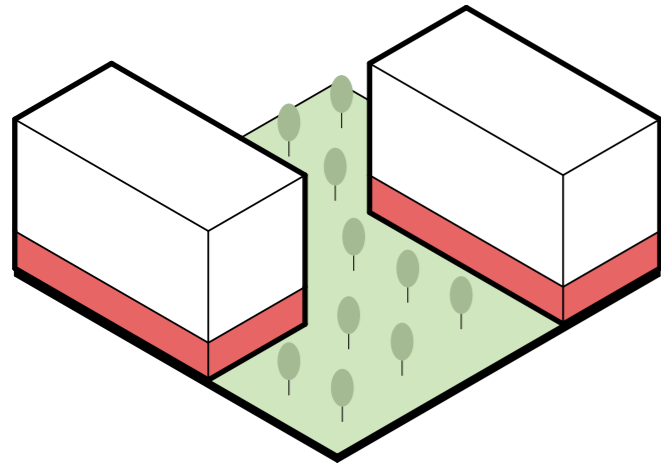
Amsterdam
FSI = 1.5 / 2.0

Rommelse (2021)

Louis Couperus neighborhood,
open courtyard parcellation

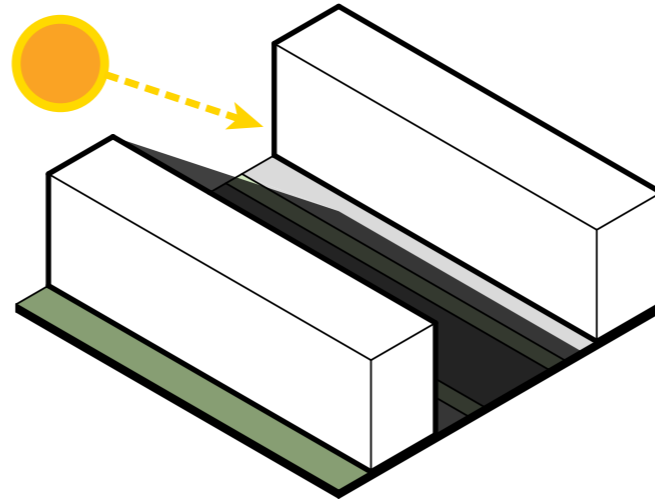
FSI = 0.55

RESEARCH | LIVABLE DENSITY



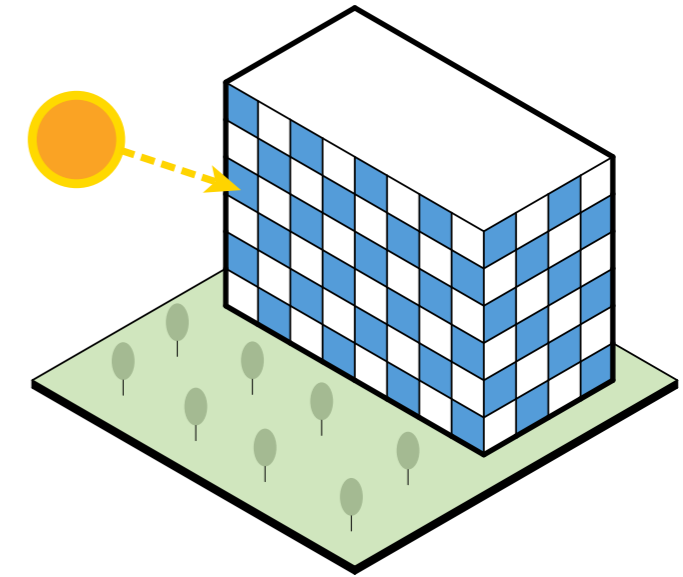
Facilities: Livable density is accompanied by the increase of facilities and a balance between built and unbuilt space.

Uytenhaak (2008)



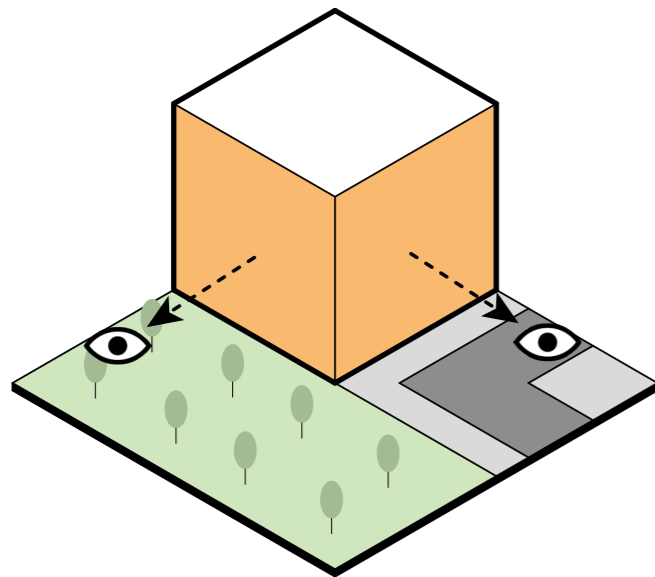
Daylight: Maintaining a daylight angle of 45 degrees while designing volumes.

Uytenhaak (2008)



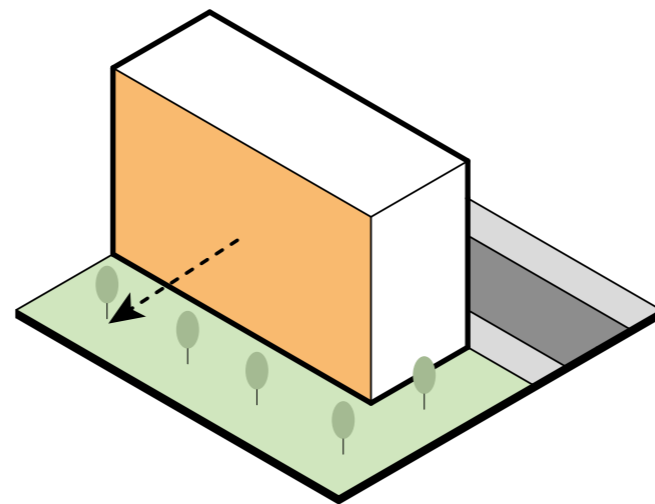
Daylight: sufficient openings in the facade to allow daylight to enter the volume.

Alexander et al. (1977) / Uytenhaak (2008) / Bouwbesluit (2024)



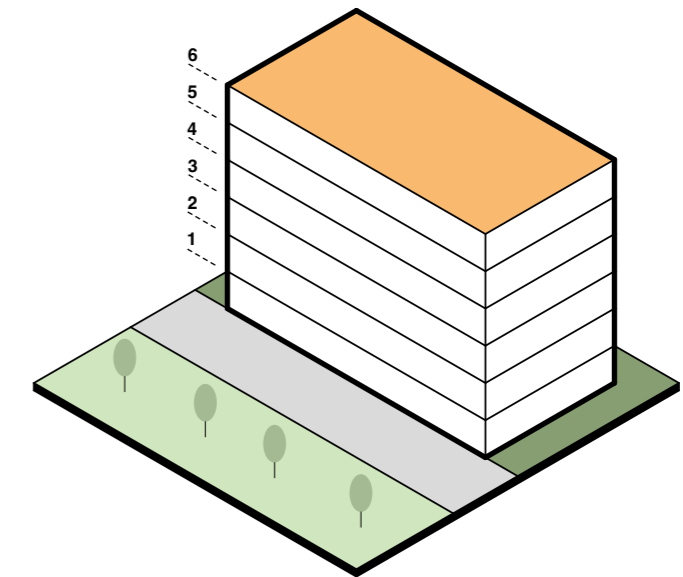
View: View from at least two different sides of the dwelling on the neighborhood surroundings.

Uytenhaak (2008) / Montgomery (2015)



Privacy: Leaving space on one side of the building creates a sense of safety and enough open space.

Gehl (2010)

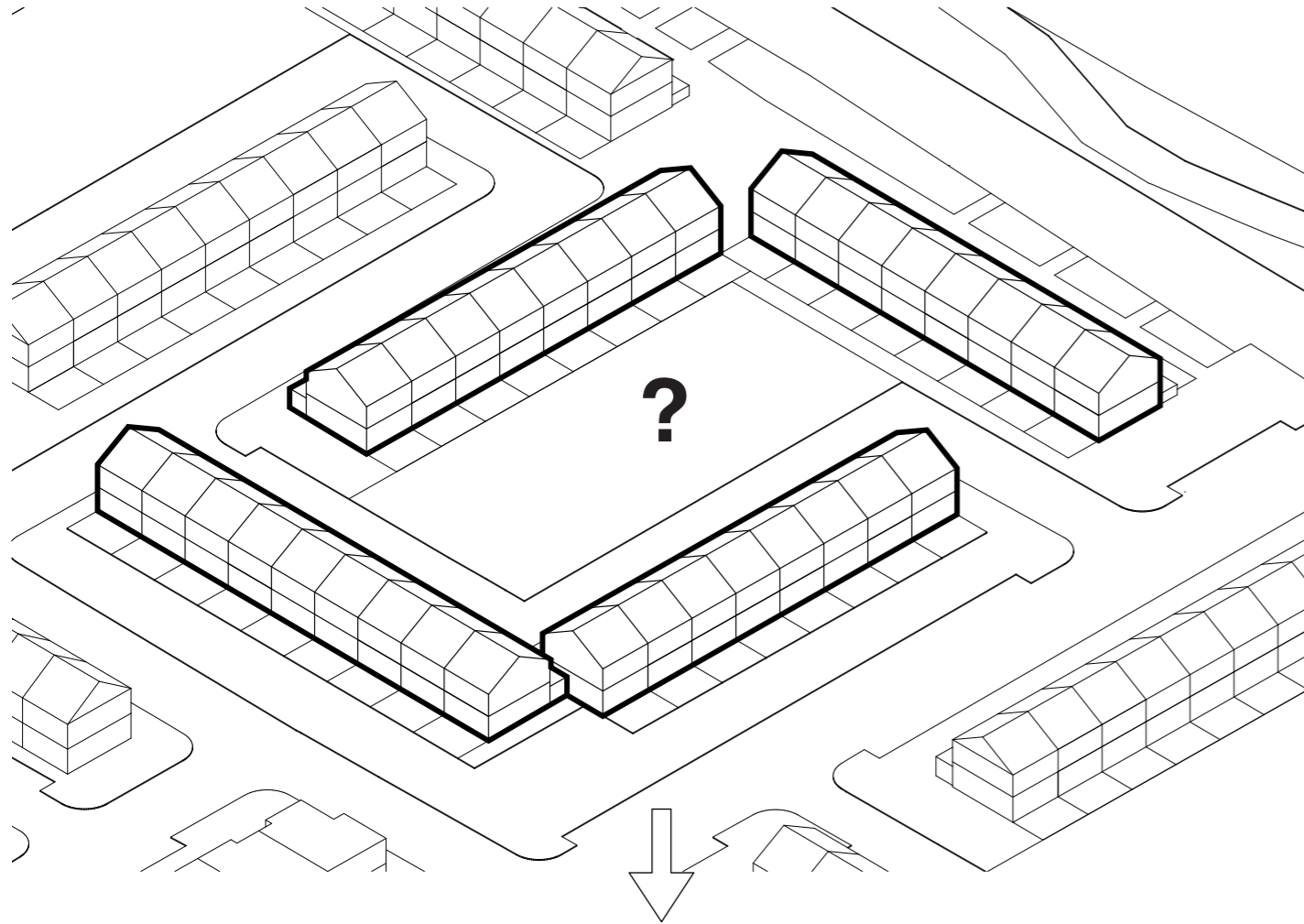


Human Scale: Maximum of six stories to maintain a connection on street level.

Gehl (2010) / Alexander et al. (1977)

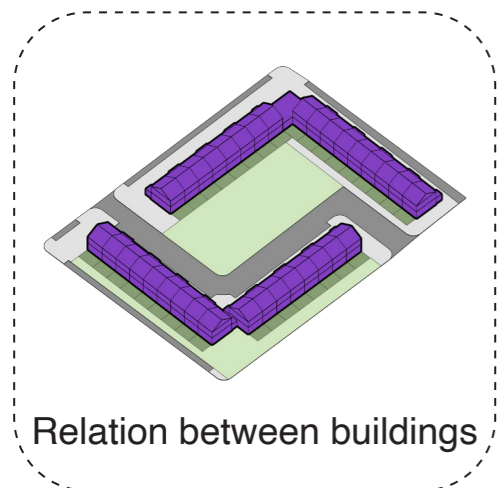
RESEARCH TO DESIGN | HOW TO DENSIFY?

CURRENT SITUATION

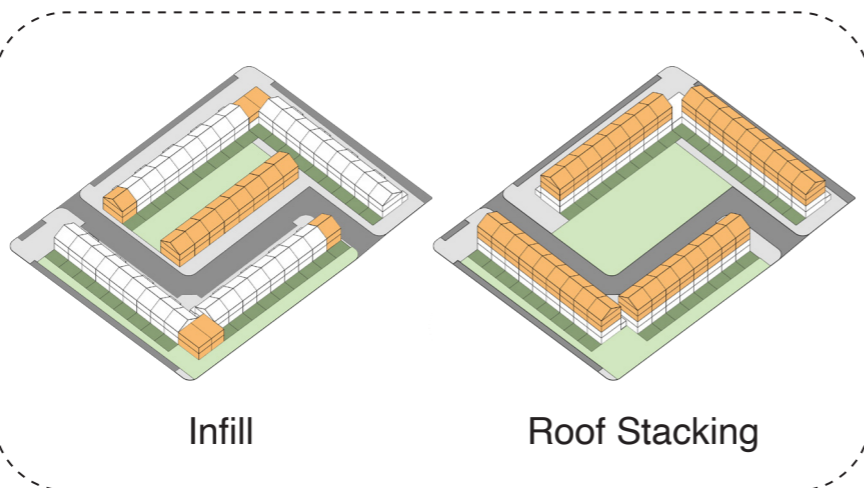


Heritage Valuation

Densification Methods



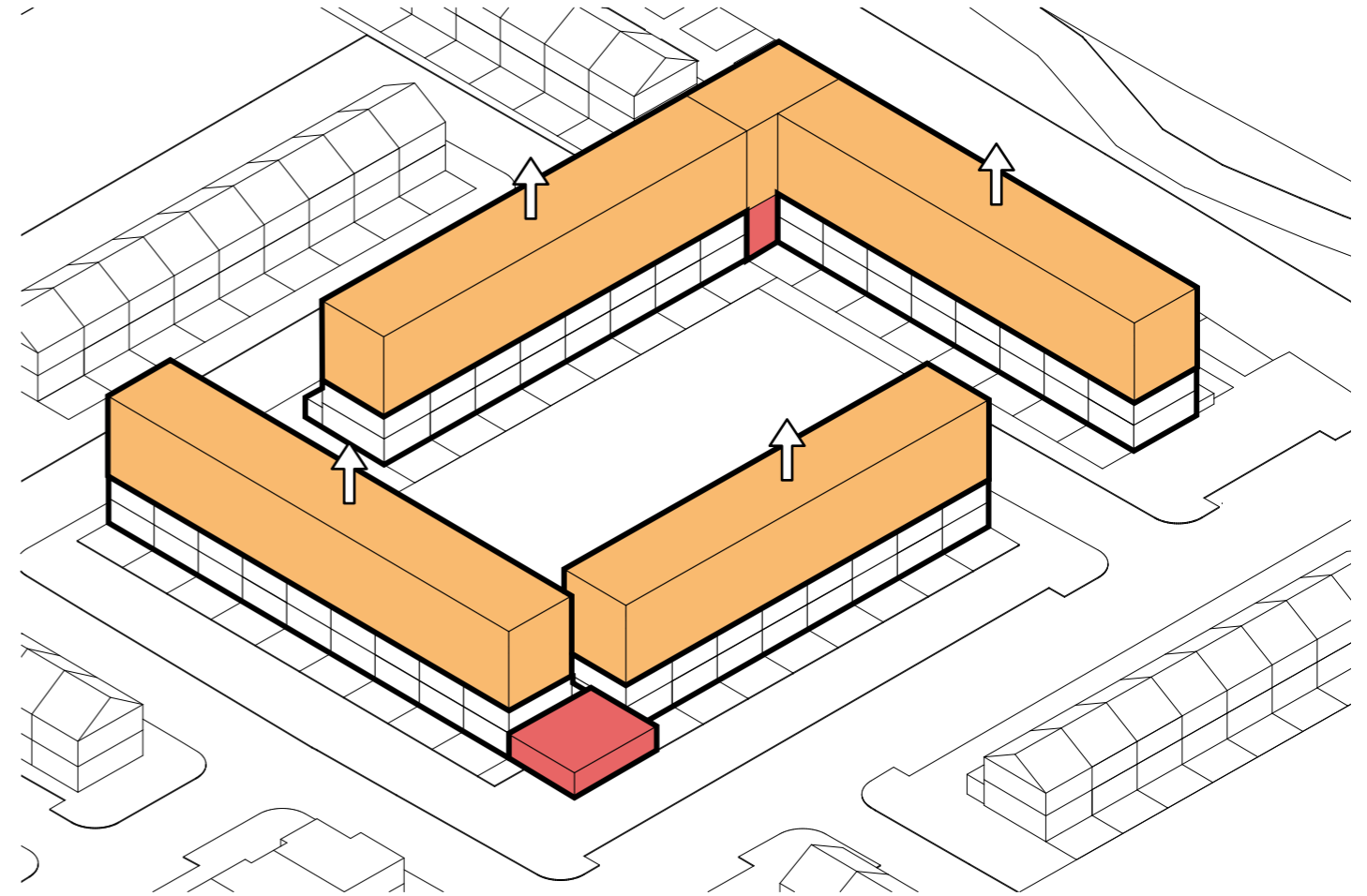
Relation between buildings



Infill

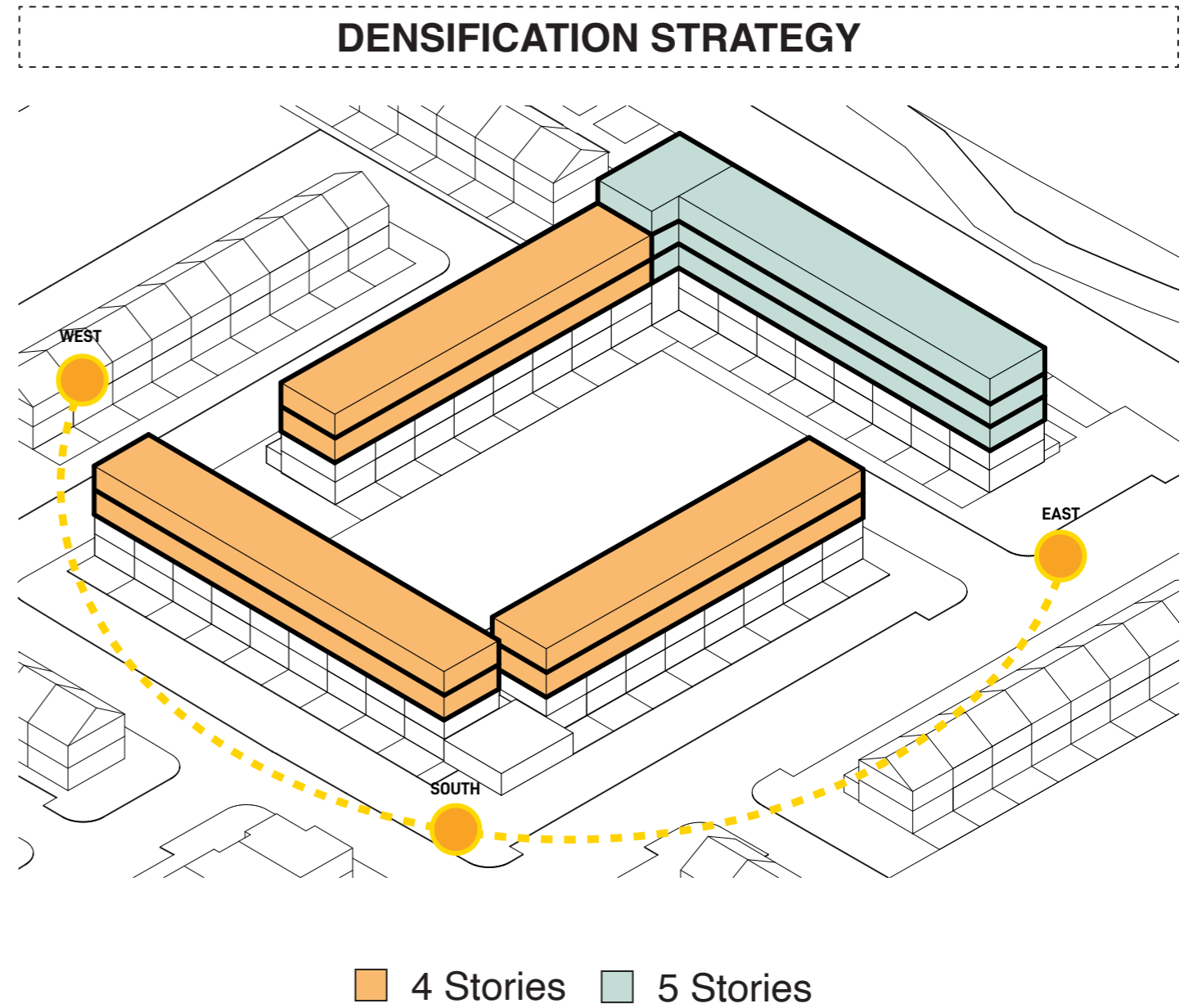
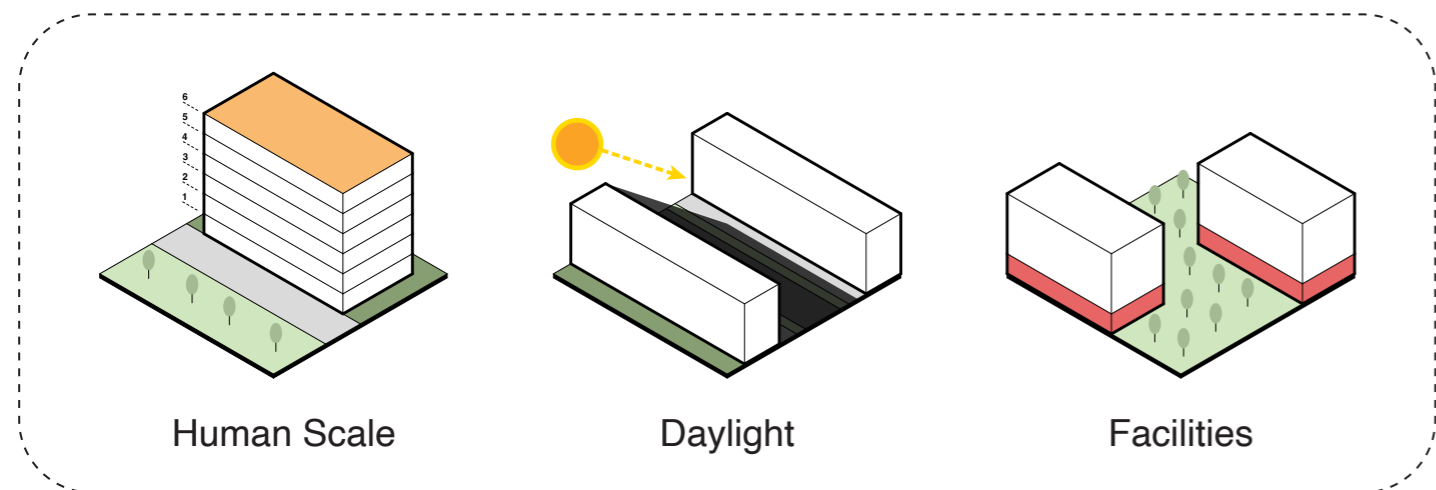
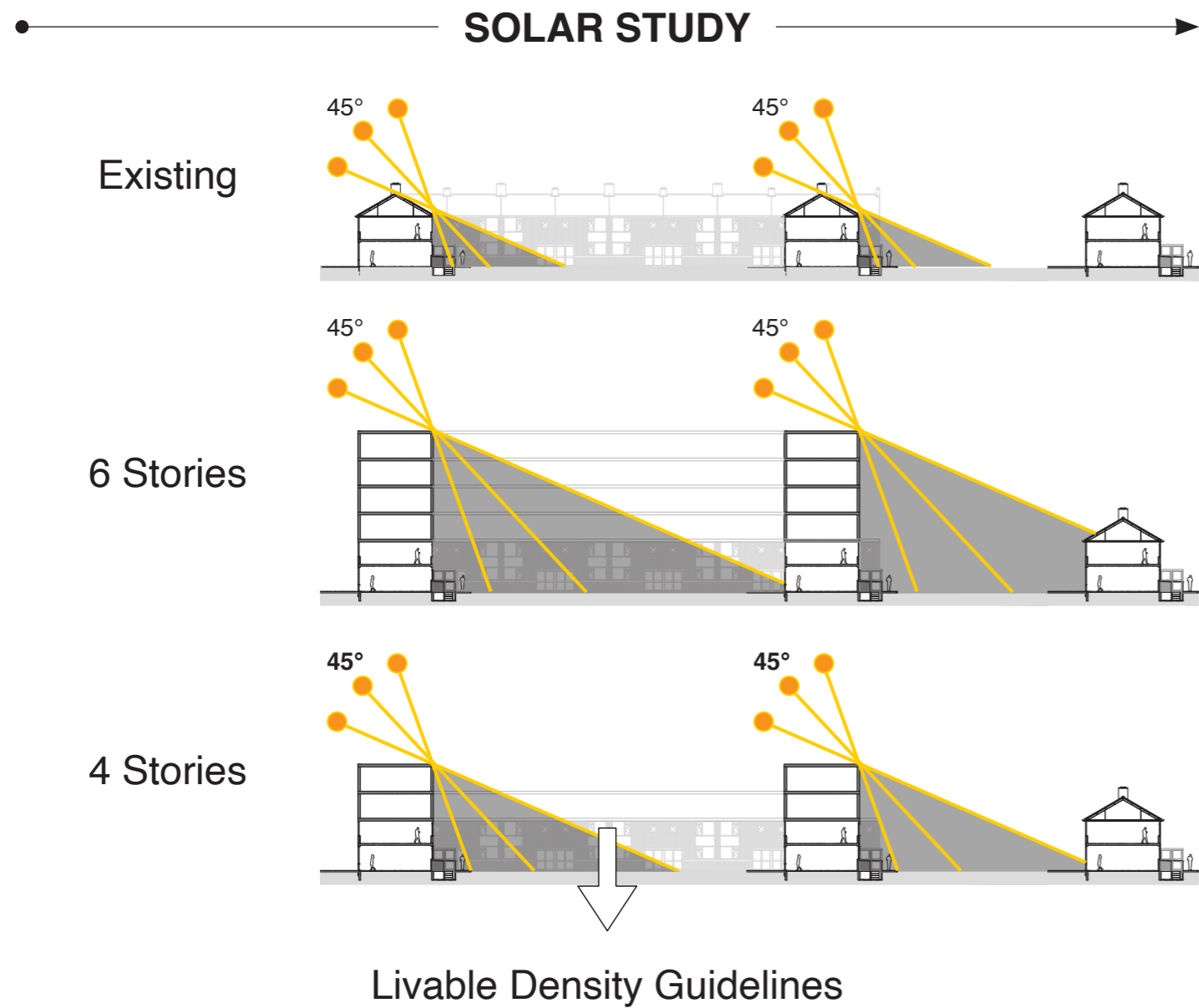
Roof Stacking

DENSIFICATION STRATEGY



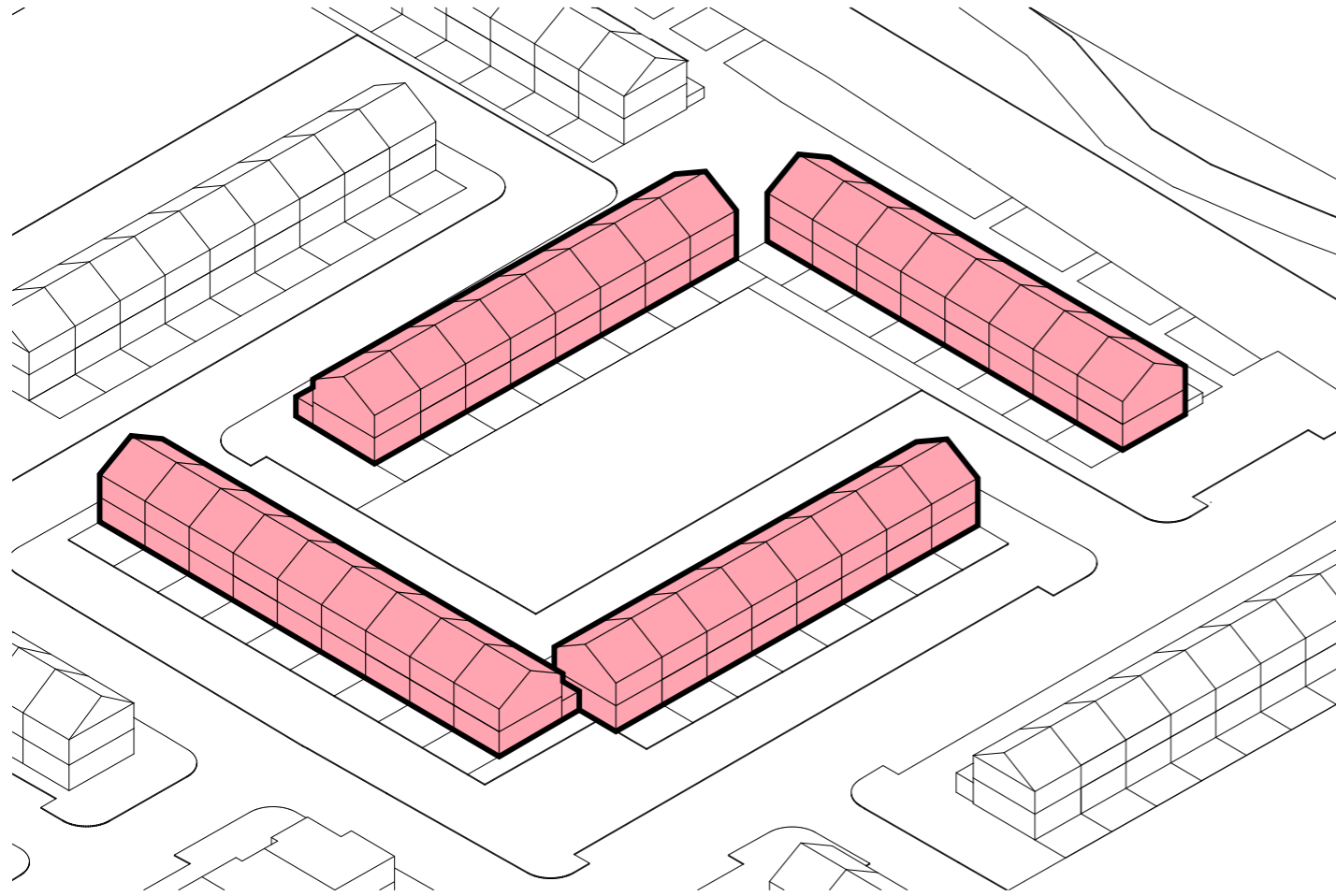
Orange Roof stacking Red Infill (facilities)

RESEARCH TO DESIGN | HOW TO DENSIFY?



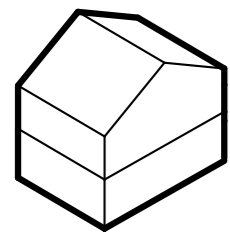
RESEARCH TO DESIGN | HOW TO DENSIFY?

CURRENT SITUATION

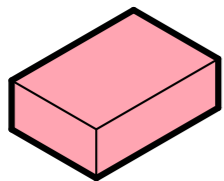


Duplex

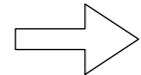
40 m²



33 units

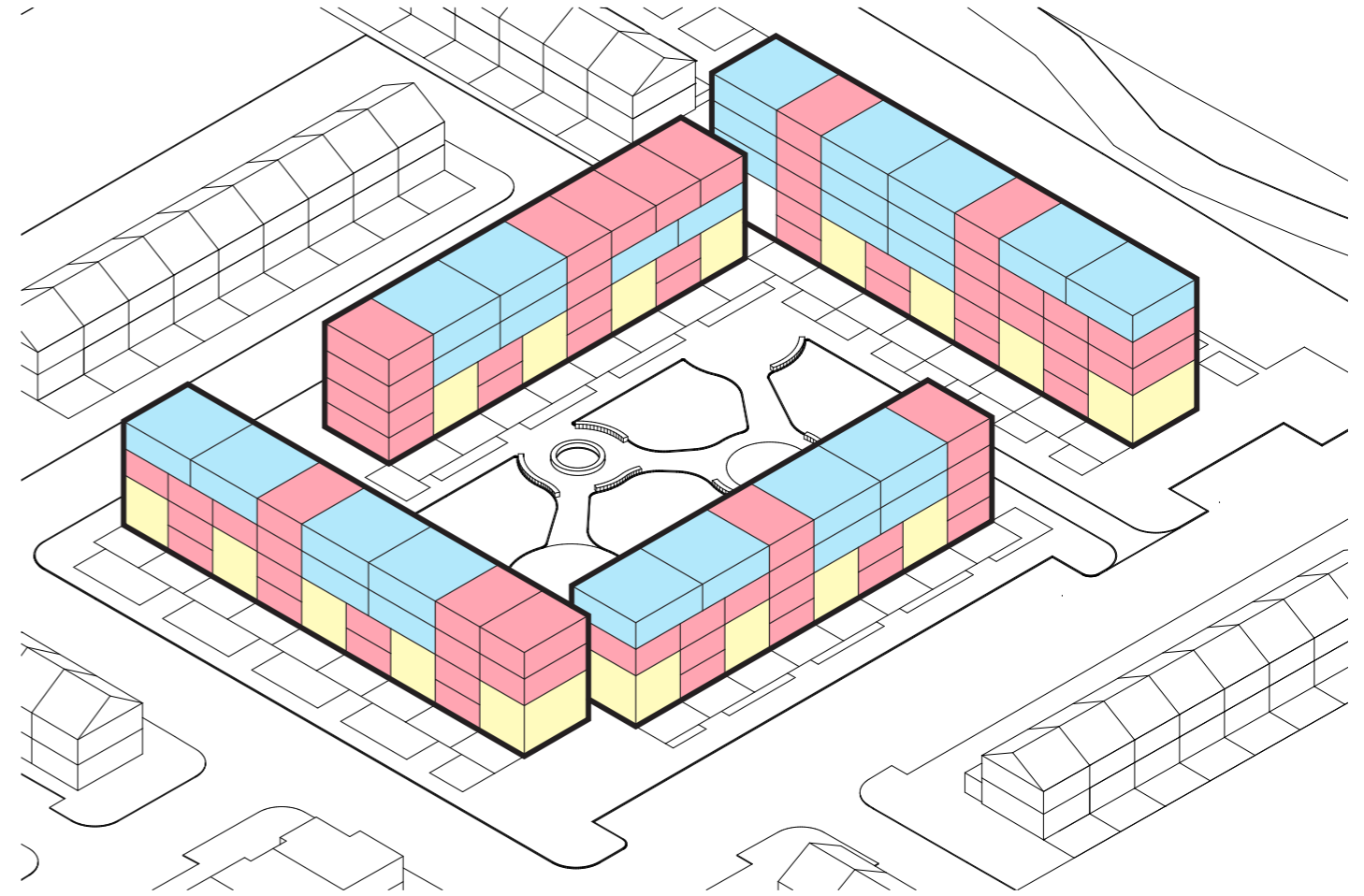


66 units



66
dwellings

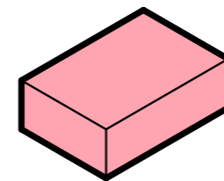
DENSIFICATION STRATEGY



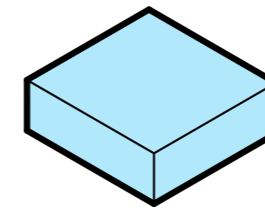
40 m²

60 m²

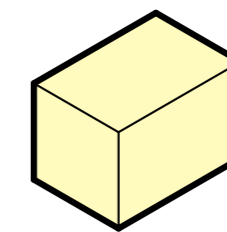
80 m²



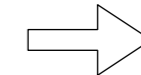
67 units



29 units



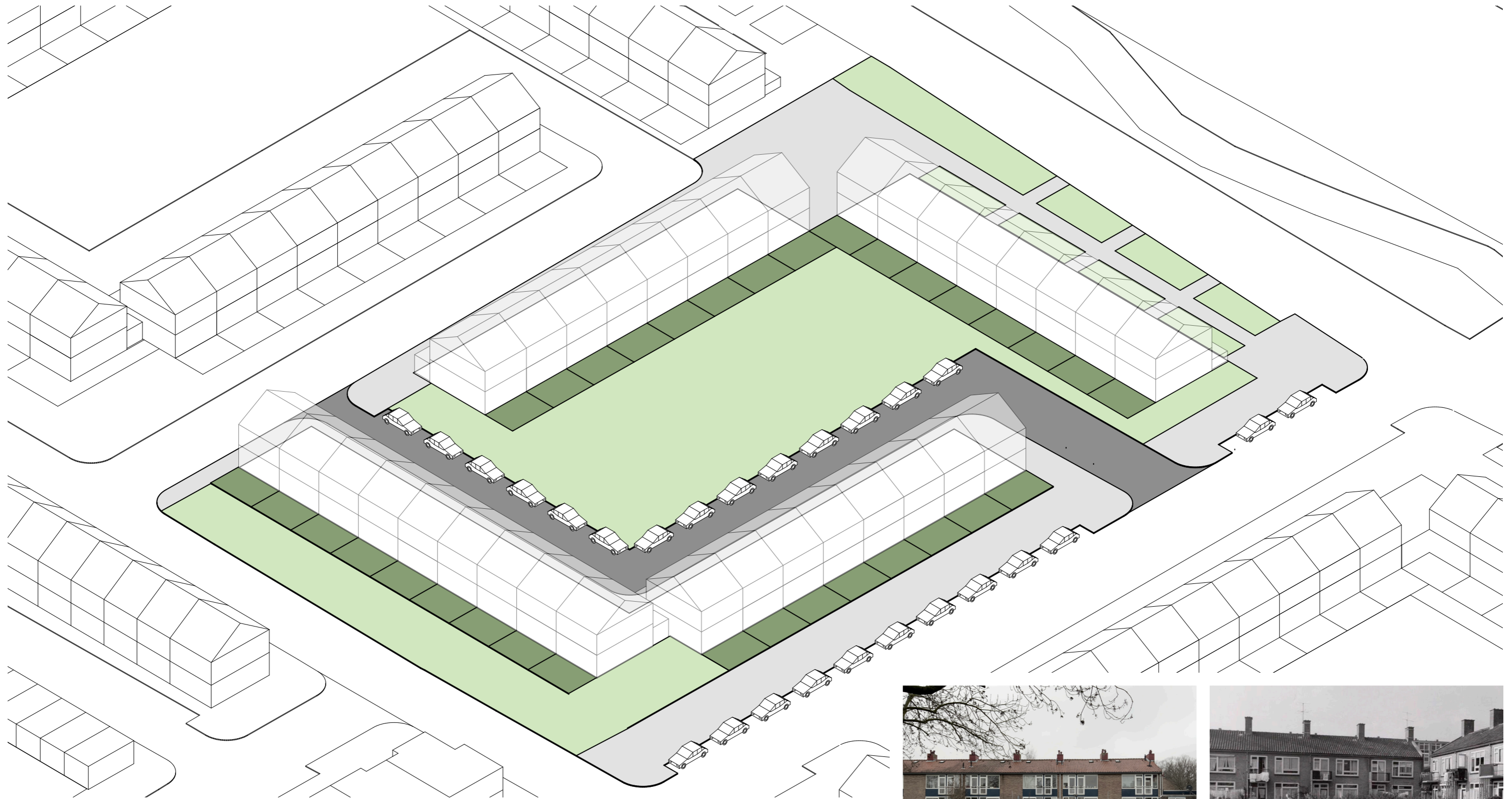
17 units



113
dwellings

RESEARCH TO DESIGN | LIVABILITY OPEN COURTYARD

CURRENT SITUATION

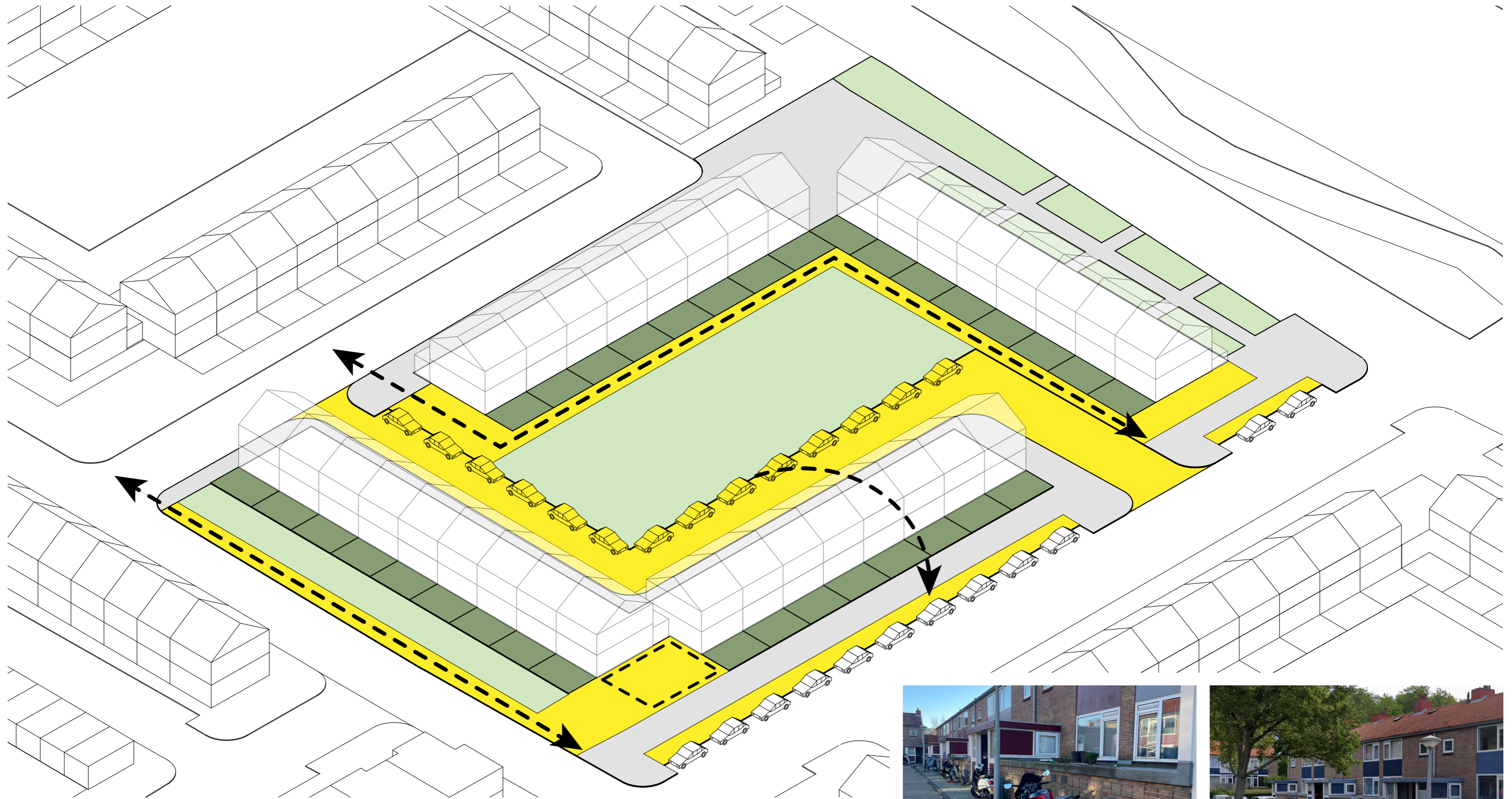


- Open courtyard with green field
- Parked cars adjacent to the courtyard
- Gardens not accessible from the courtyard



RESEARCH TO DESIGN | LIVABILITY OPEN COURTYARD

DEMOLITION CURRENT SITUATION

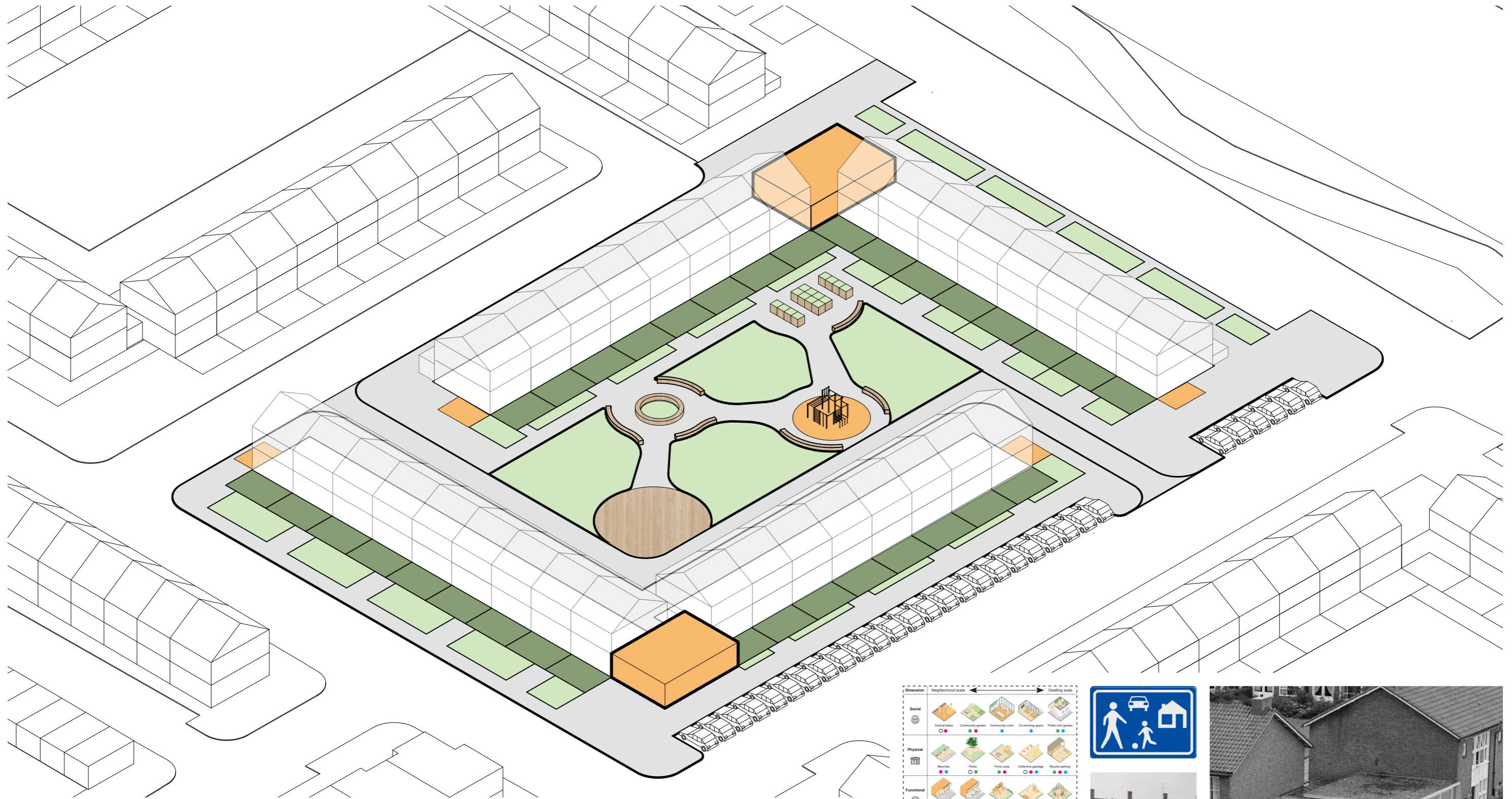


- Creating walking paths
- Making the gardens accessible from the courtyard
- Remove the car to outside the courtyard



RESEARCH TO DESIGN | LIVABILITY OPEN COURTYARD

NEW SITUATION

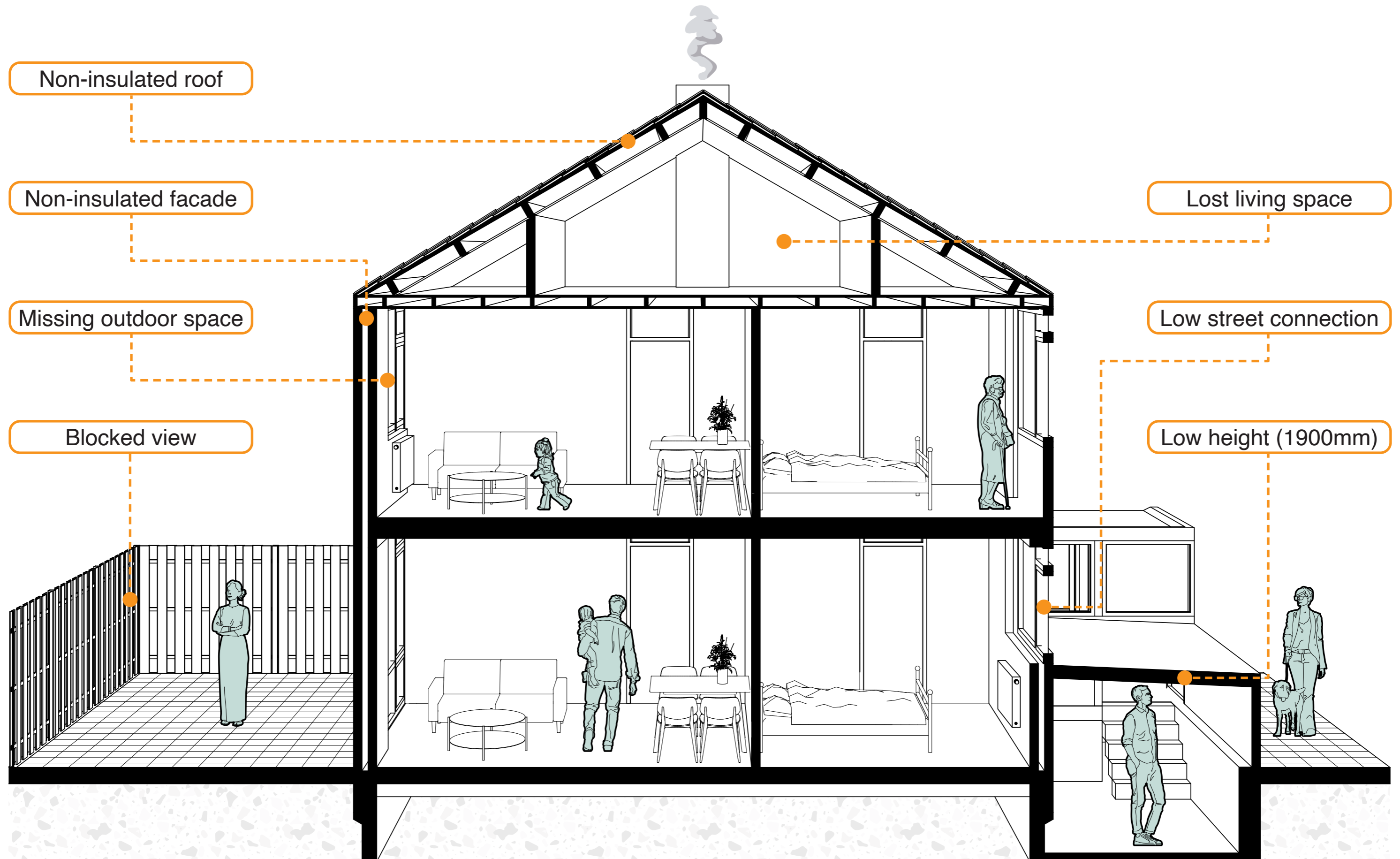


- Walking paths through the courtyard
- Courtyard becomes a woonerf
- Facilities based on livability toolbox

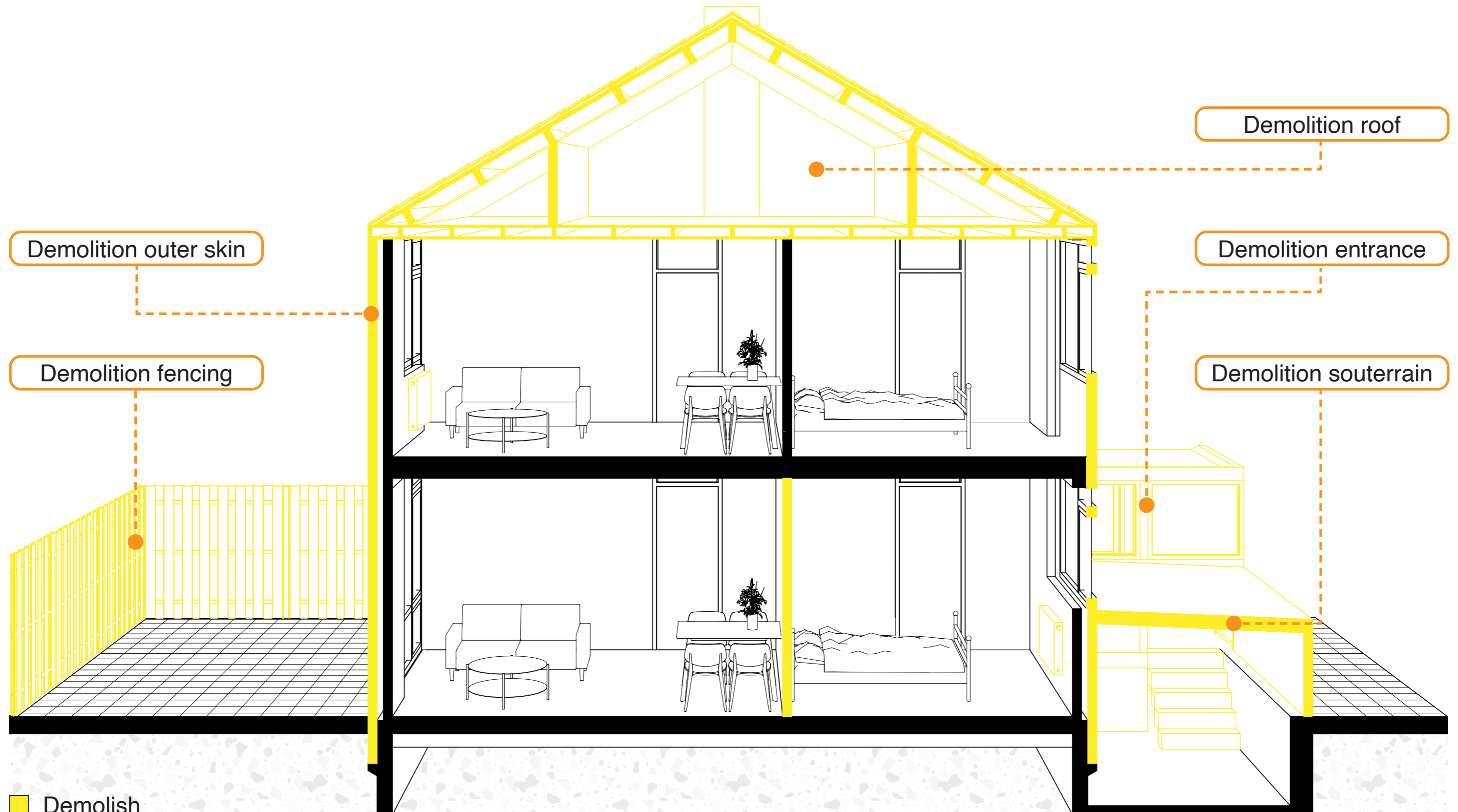
Dimension	Neighborhood scale	Dwelling scale
Social	Central place, Community garden, Community room, Co-working space, Public outdoor garden	Public space, Public square, Community garden, Co-working space, Public outdoor garden
Physical	Public space, Public square, Community garden, Co-working space, Public outdoor garden	Public space, Public square, Community garden, Co-working space, Public outdoor garden
Functional	Street, Pedestrian path, Playground, Sport field, Outdoor gym	Street, Pedestrian path, Playground, Sport field, Outdoor gym
Safety	Street lighting, Road signs, Eyes on the street	Street lighting, Road signs, Eyes on the street
Dwelling	Active path, Street lighting, Road signs, Eyes on the street	Active path, Street lighting, Road signs, Eyes on the street



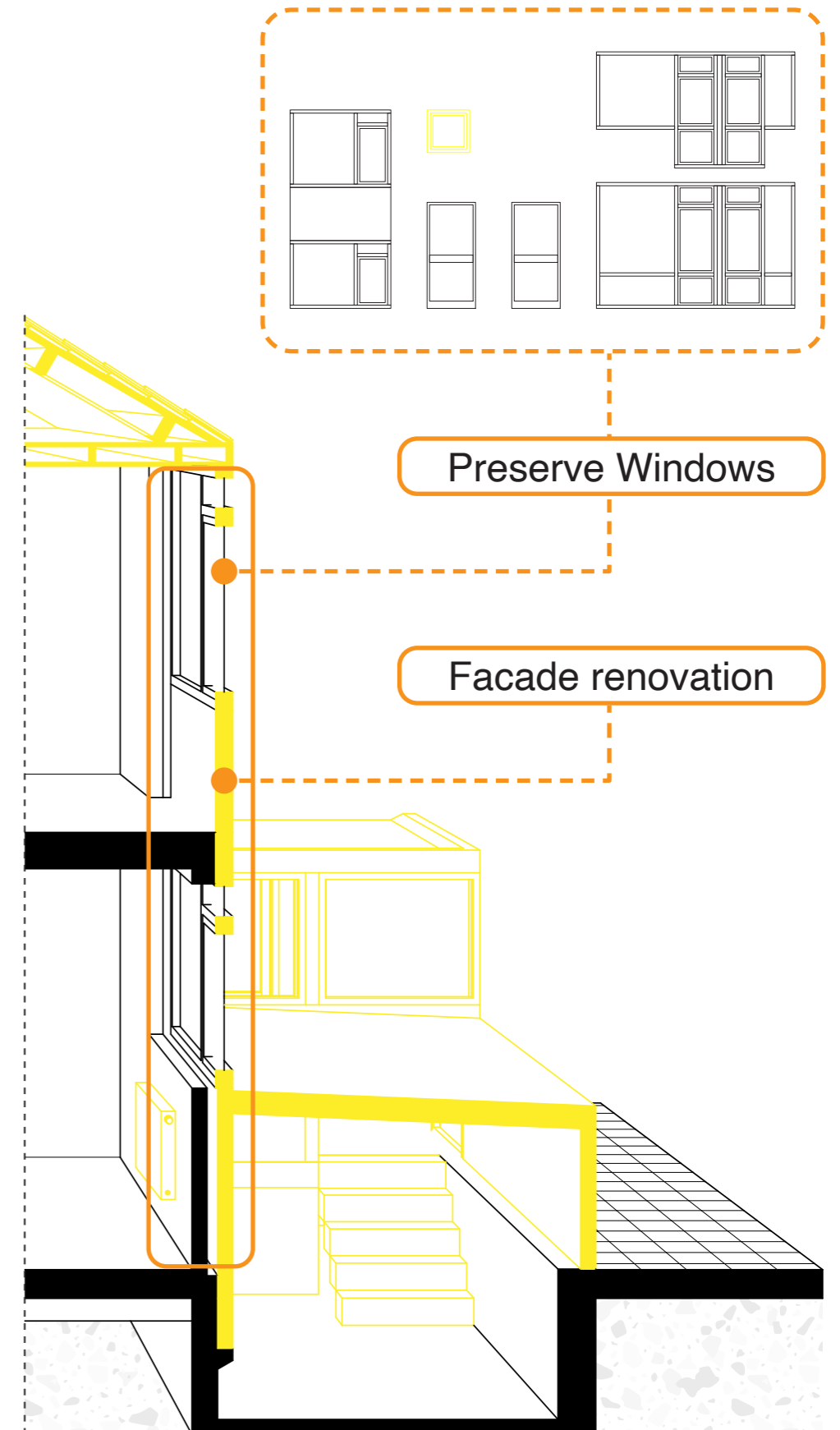
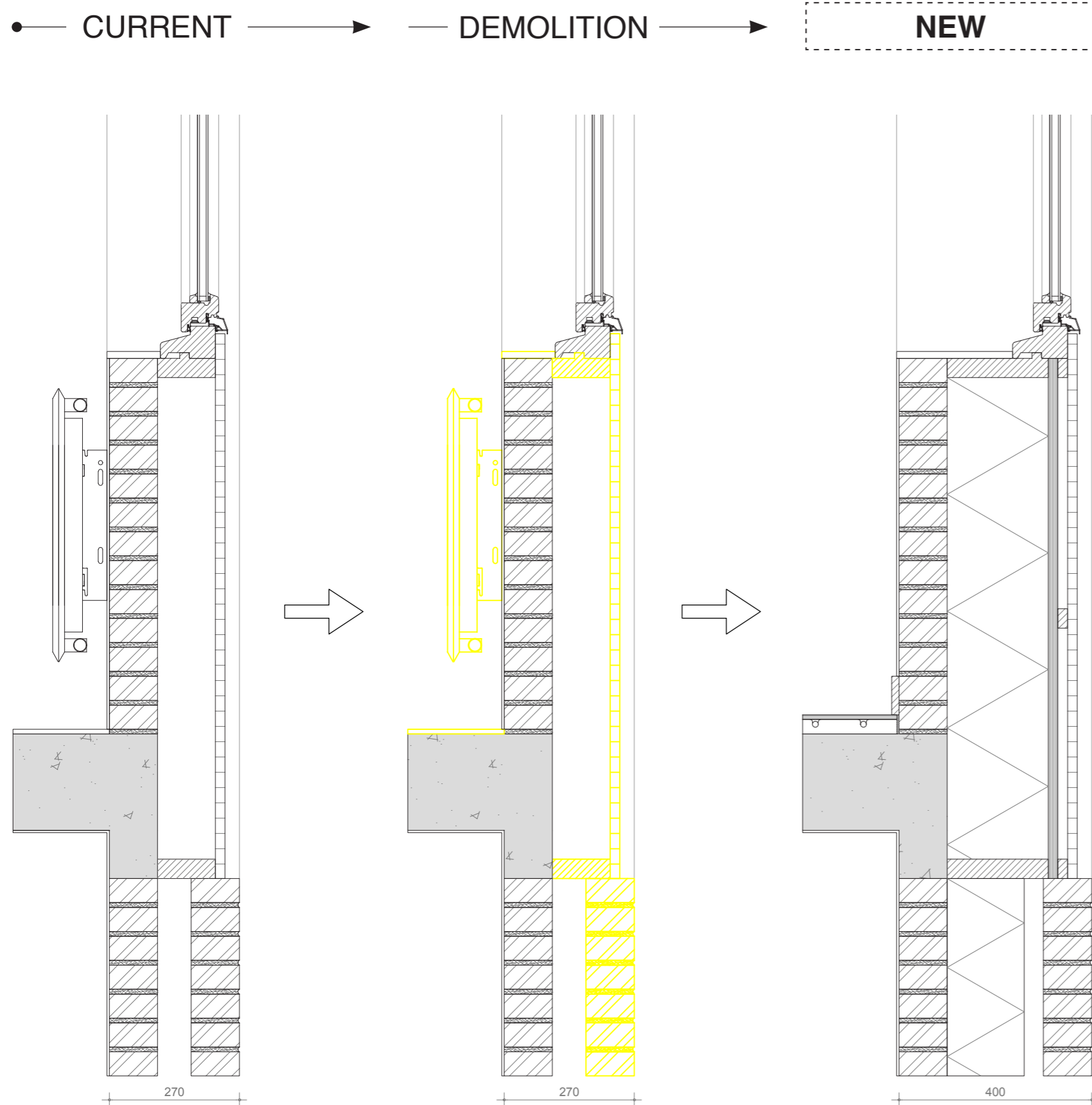
DESIGN | DUPLEX RENOVATION



DESIGN | DUPLEX RENOVATION



DESIGN | DUPLEX EXTERIOR RENOVATION

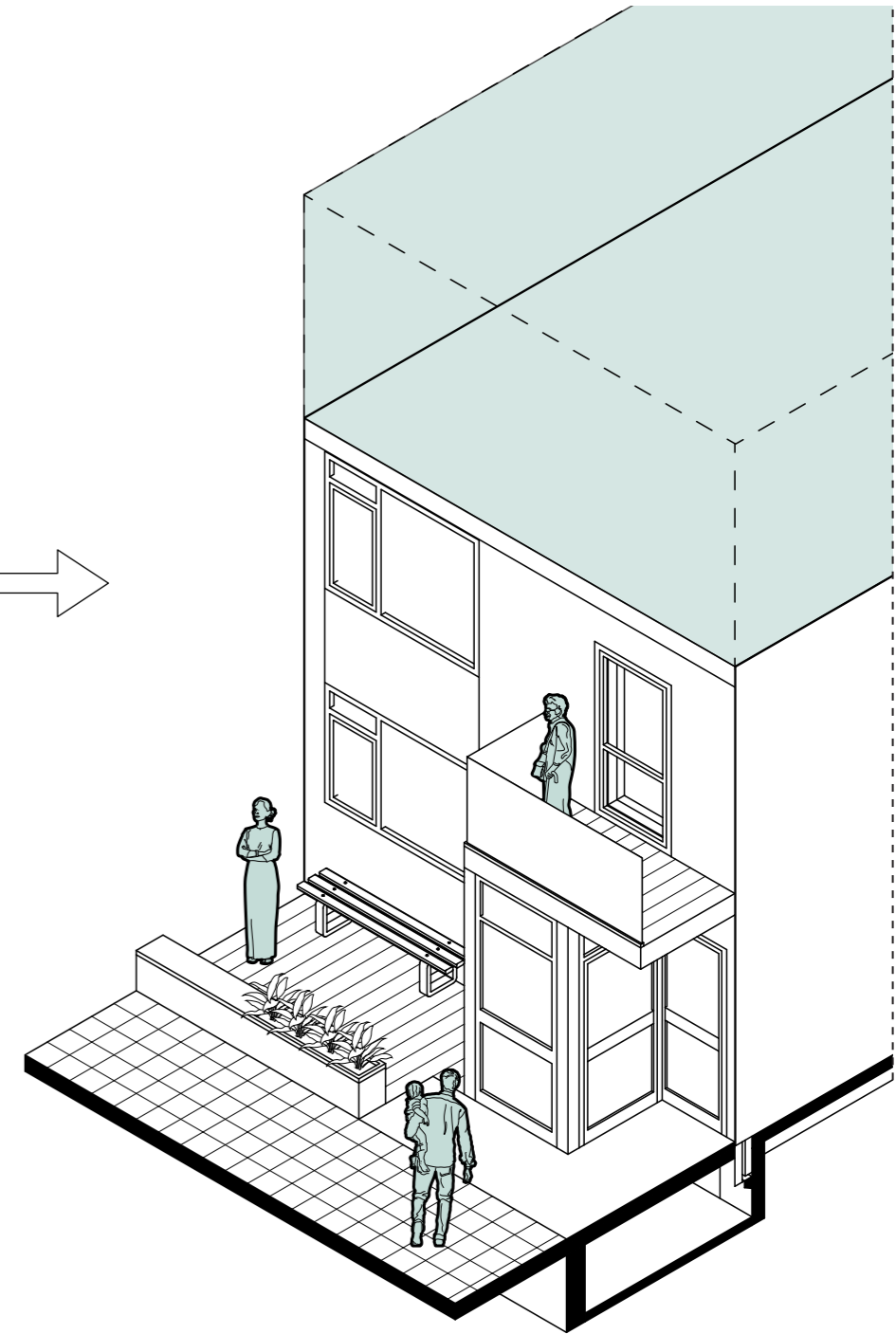
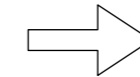
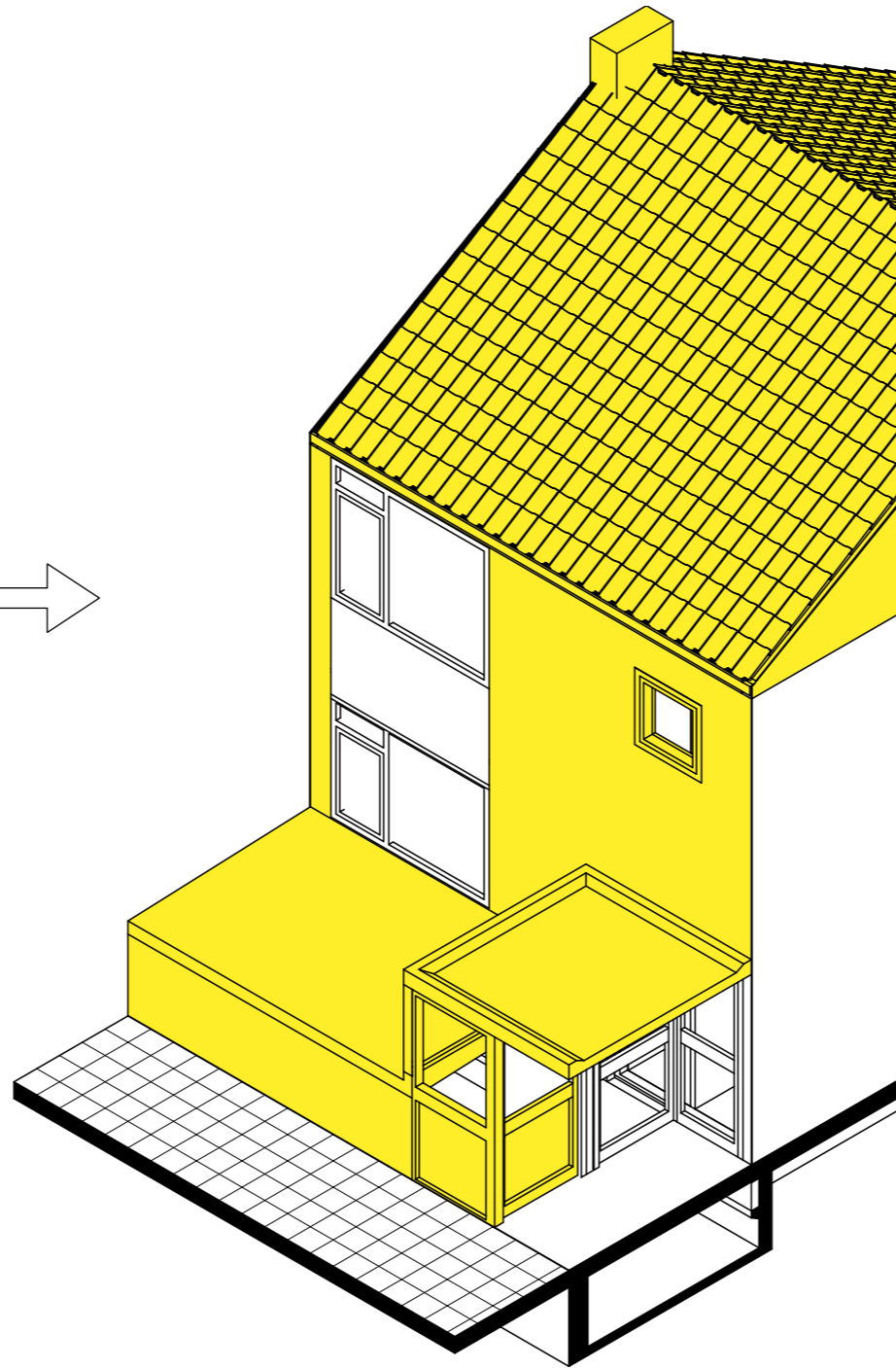
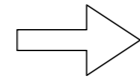
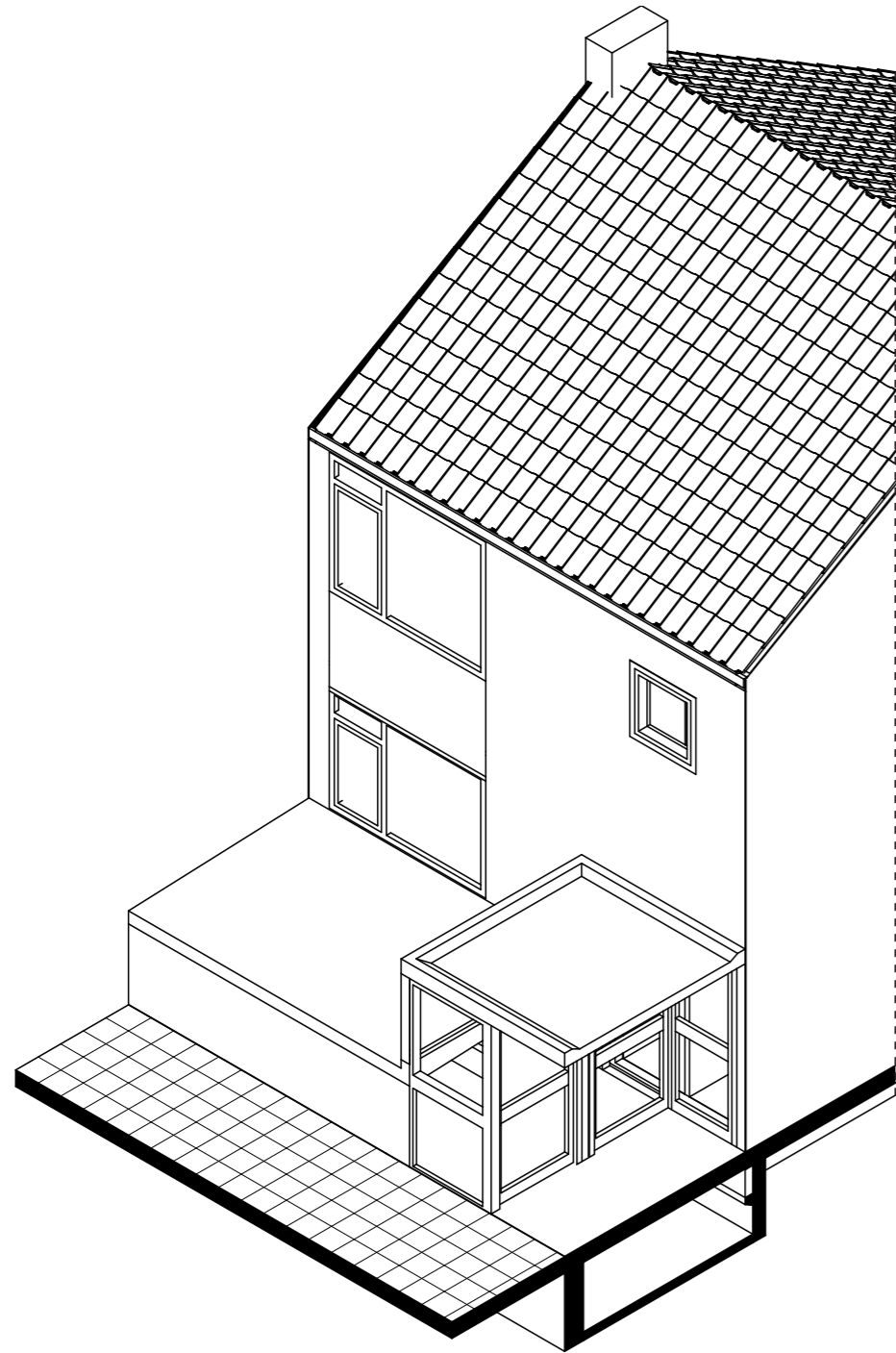


DESIGN | DUPLEX EXTERIOR RENOVATION

● — CURRENT FRONT FACADE —>

— DEMOLITION FRONT FACADE —>

NEW FRONT FACADE

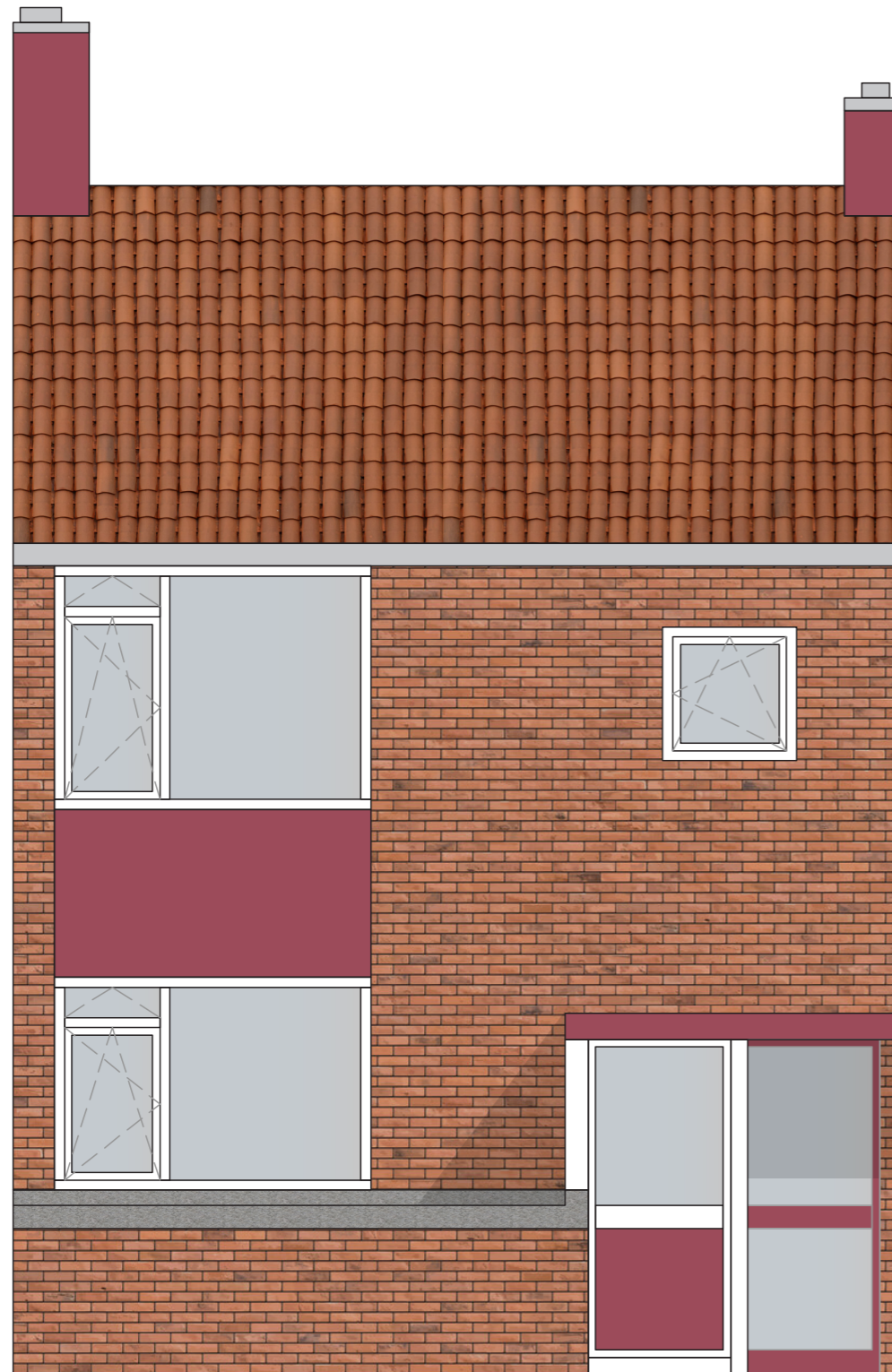


■ Demolish

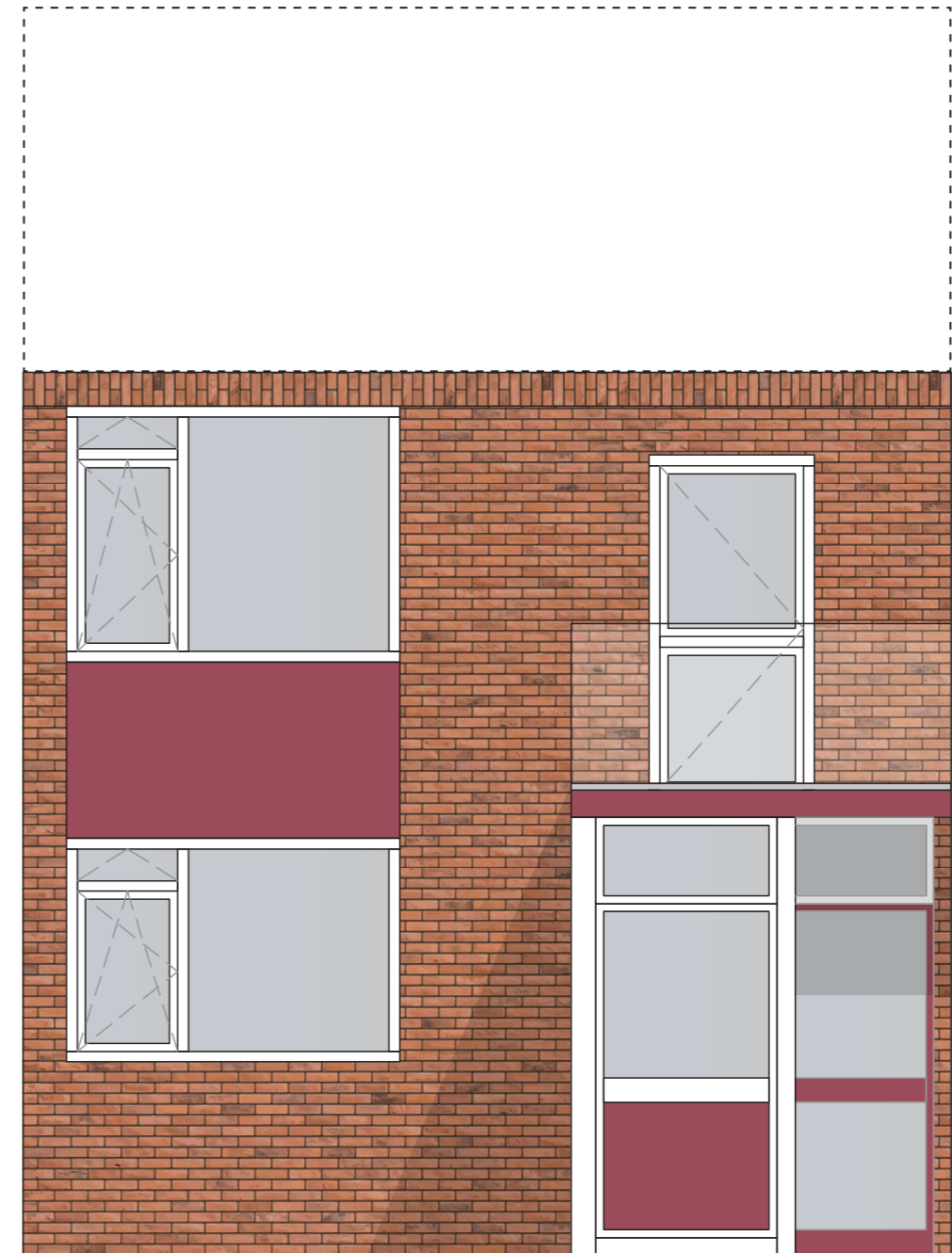
- Outdoor spaces in the courtyard
- More connection and eyes on the street

DESIGN | DUPLEX EXTERIOR RENOVATION

● CURRENT FRONT ELEVATION →



NEW FRONT ELEVATION

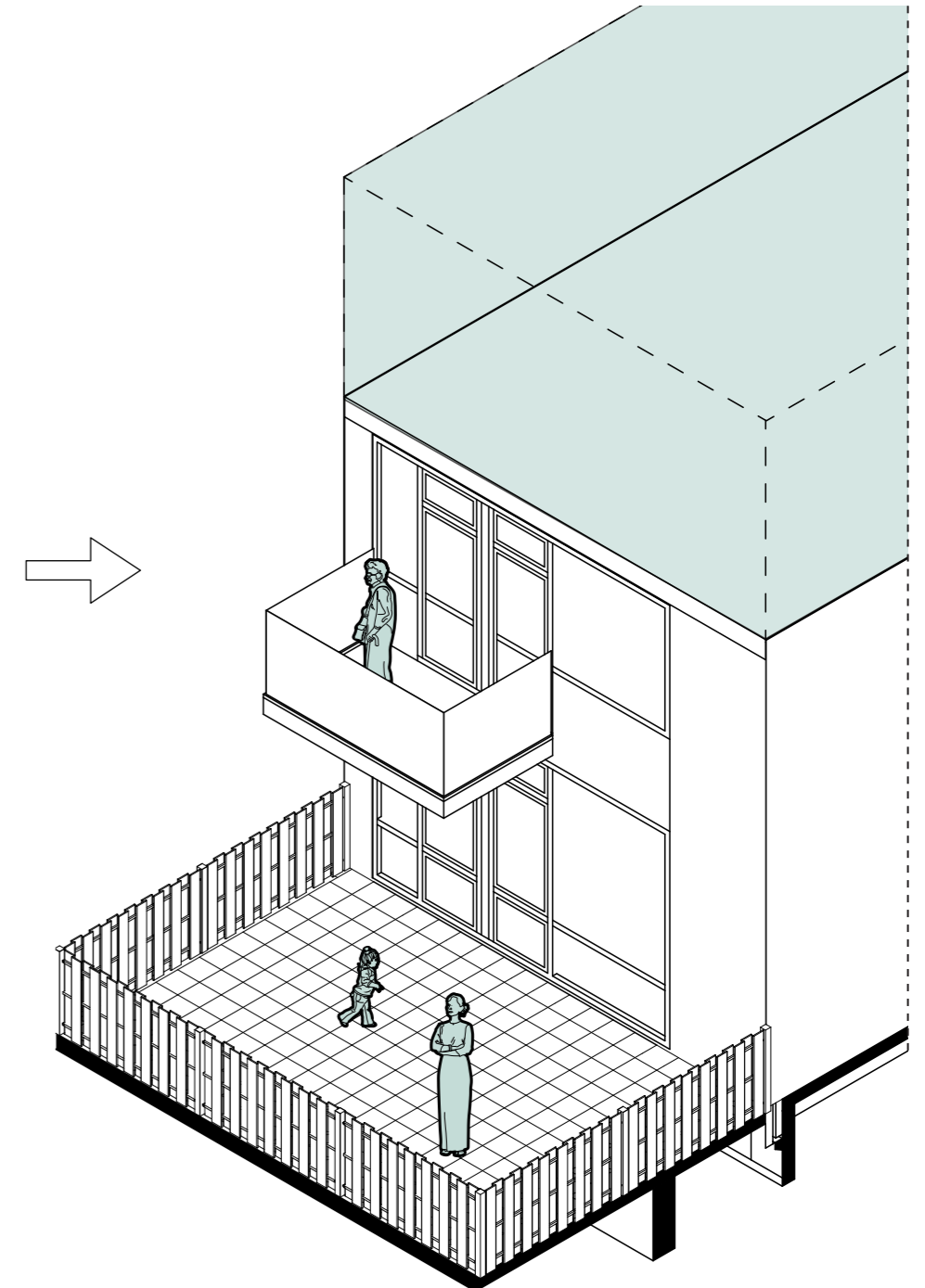
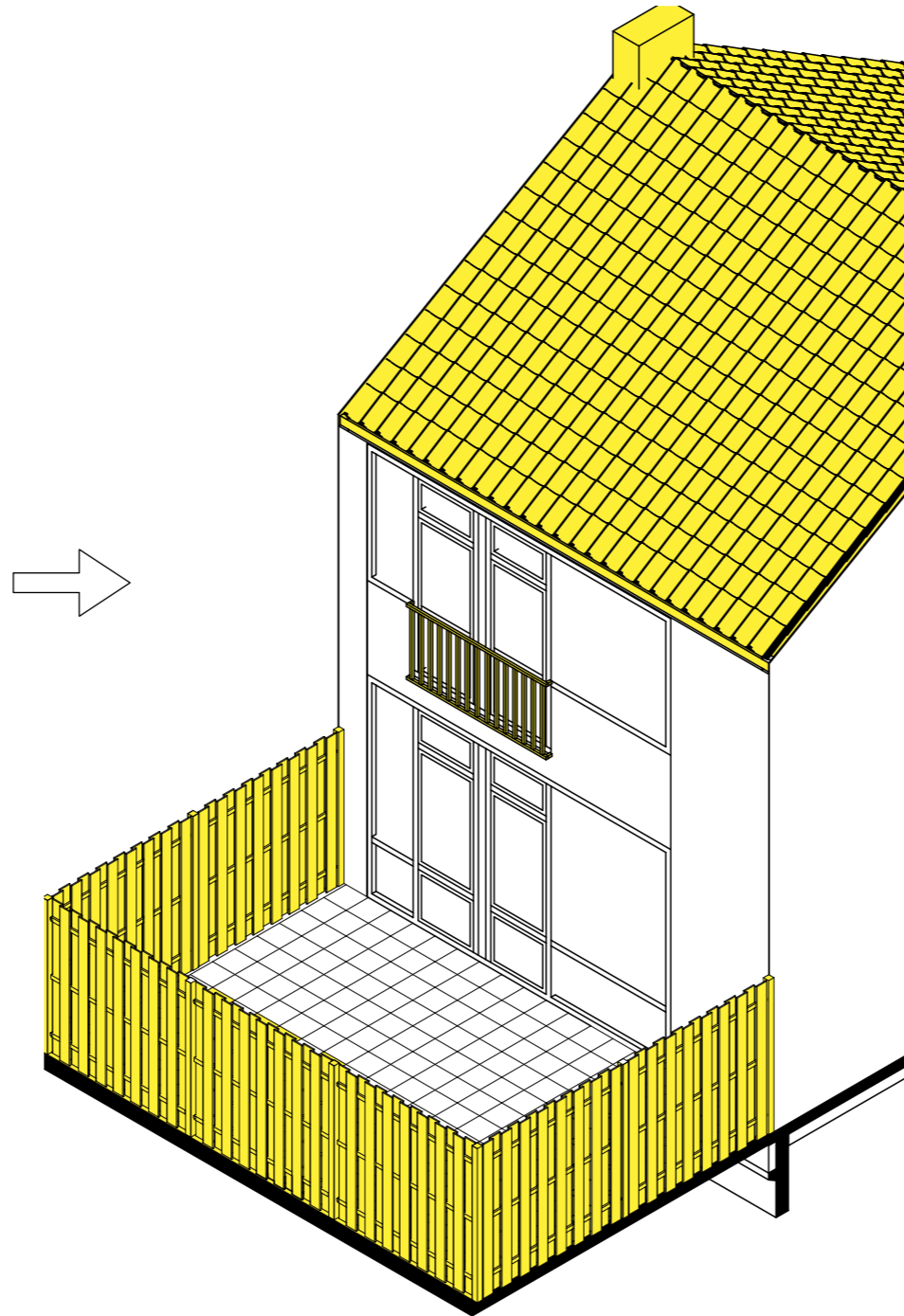
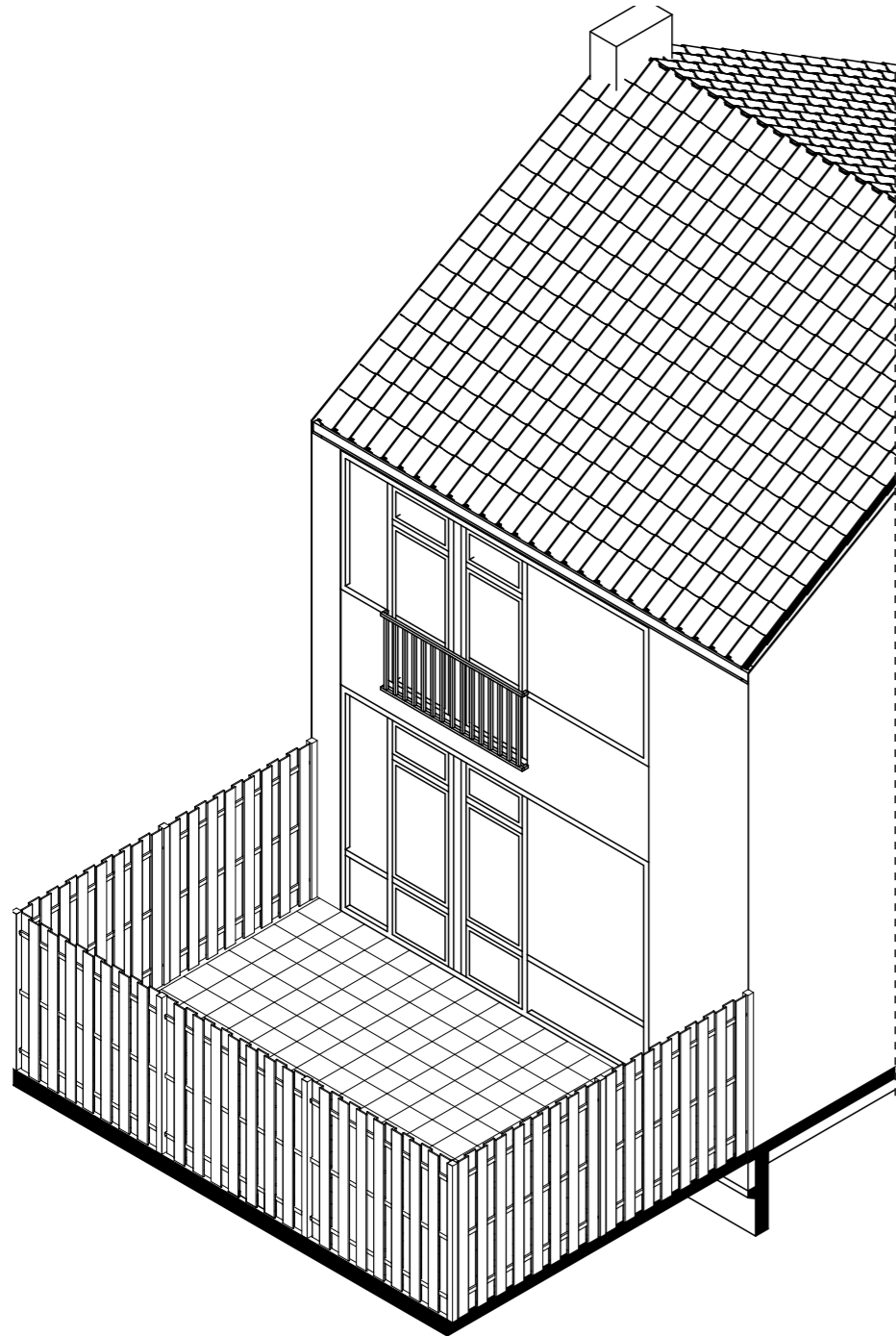


DESIGN | DUPLEX EXTERIOR RENOVATION

● — CURRENT BACK FACADE →

— DEMOLITION BACK FACADE →

NEW BACK FACADE

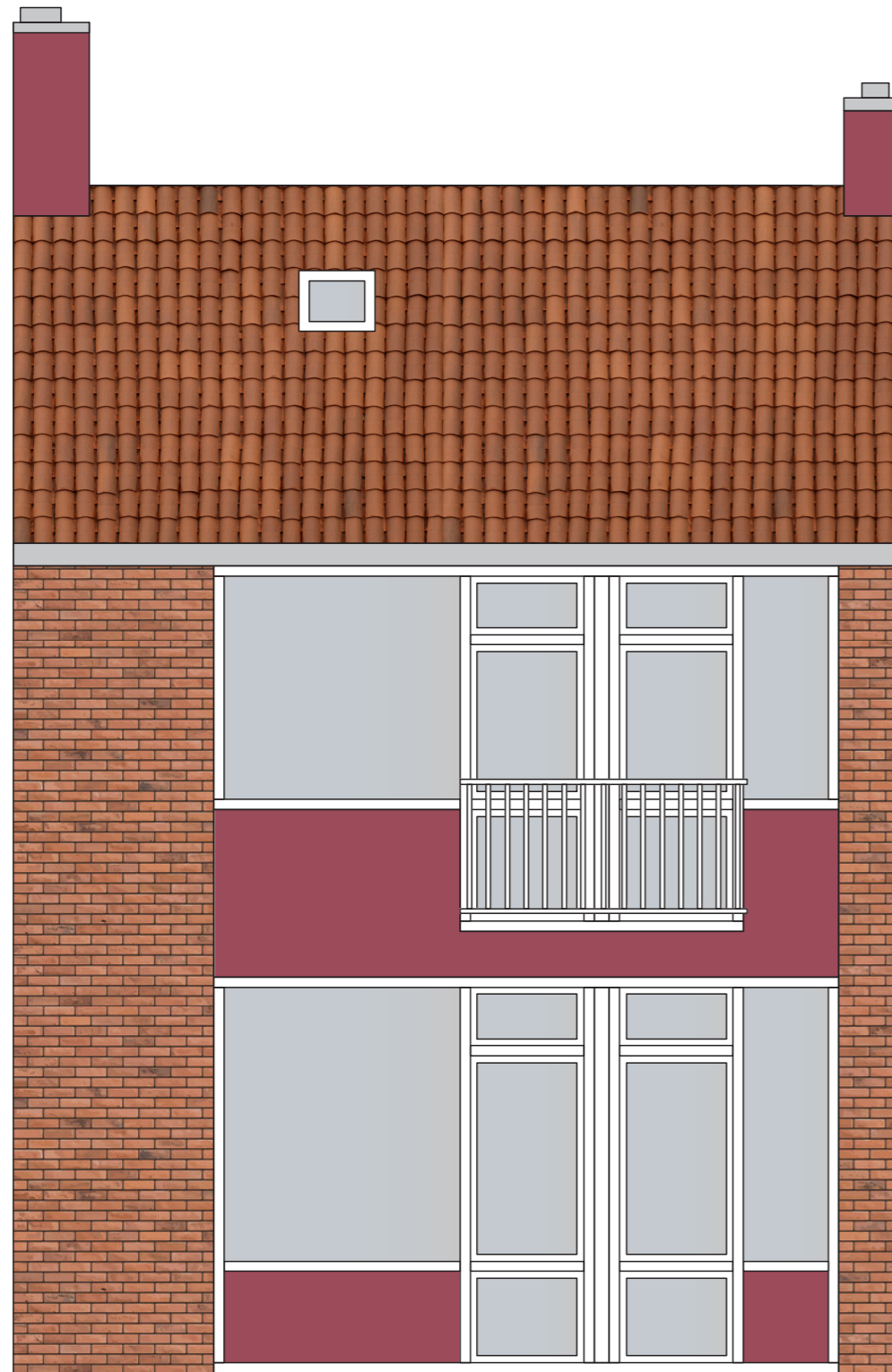


■ Demolish

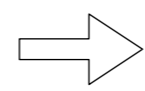
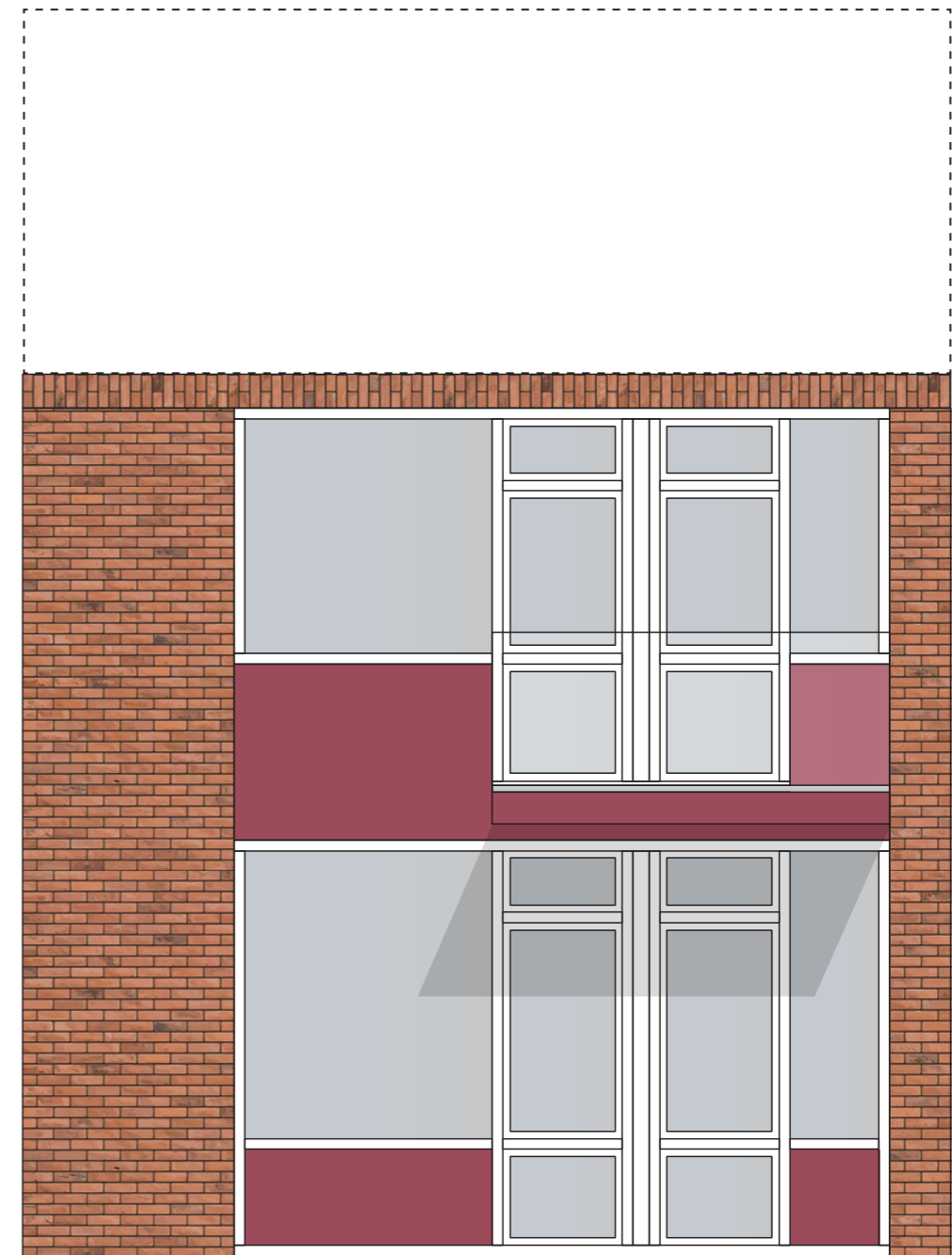
- Outdoor space on the south side / street
- More connection and eyes on the street

DESIGN | DUPLEX EXTERIOR RENOVATION

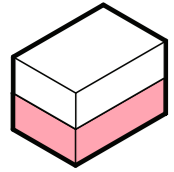
● CURRENT BACK ELEVATION →



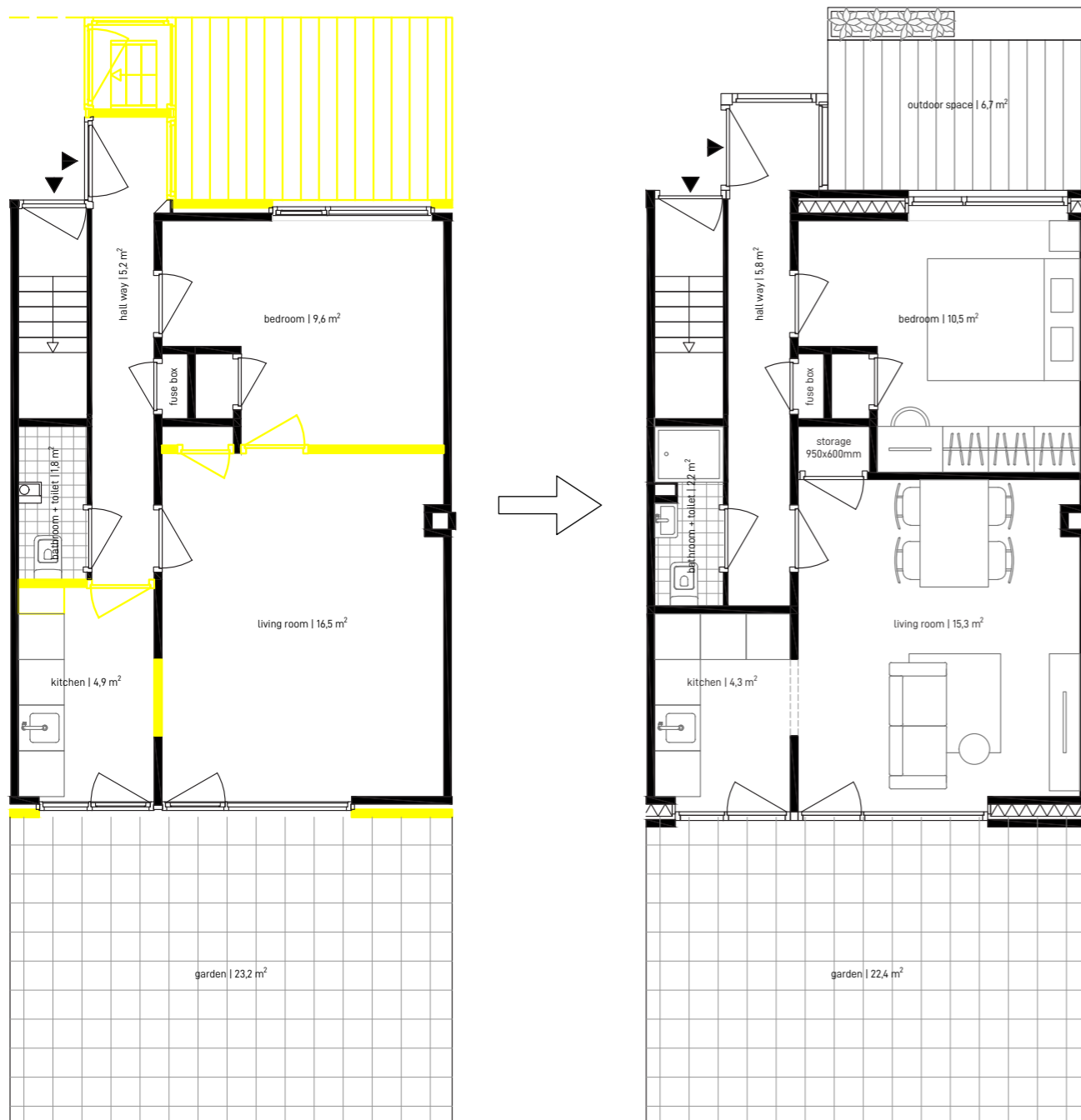
NEW BACK ELEVATION



DESIGN | DUPLEX INTERIOR RENOVATION

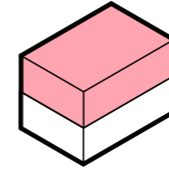


GROUND FLOOR PLAN | 40m²

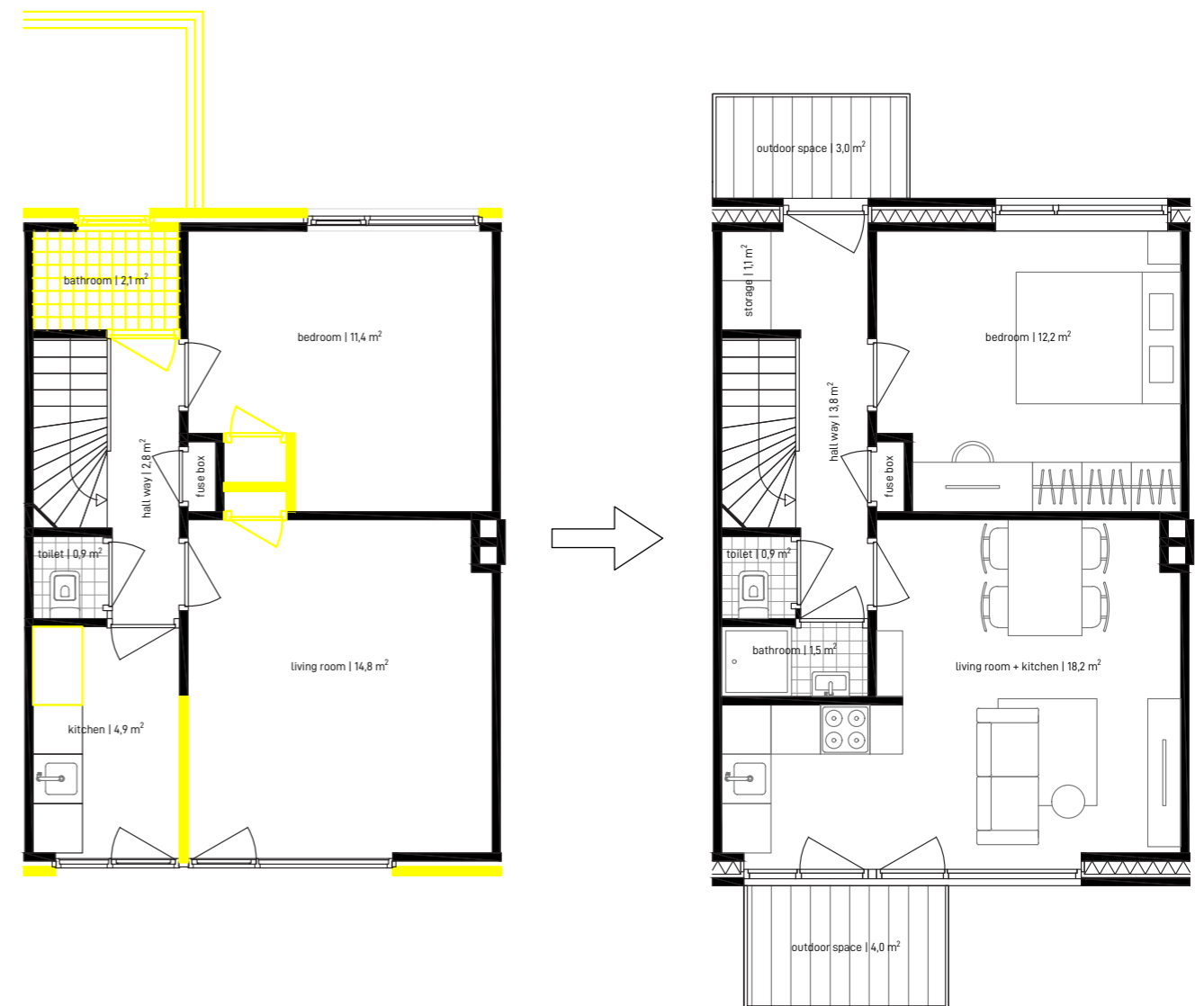


- More bathroom space
- Connecting the kitchen
- Front outdoor space
- Facade insulation

Demolish

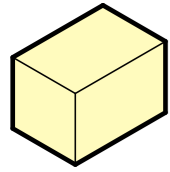


FIRST FLOOR PLAN | 40m²

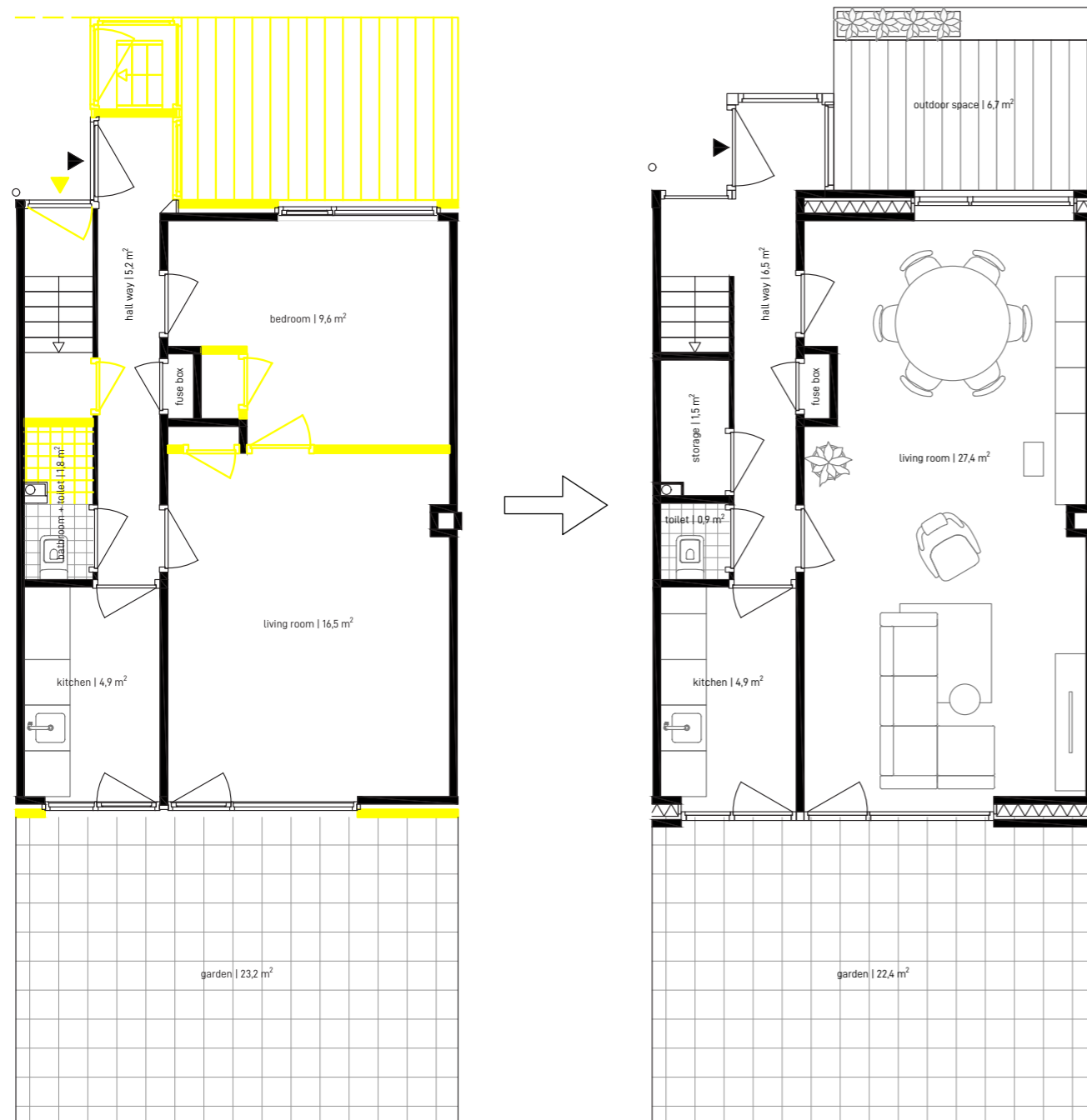


- Connecting the kitchen
- Front outdoor space
- Daylight in the hall way
- Back outdoor space
- Facade insulation

DESIGN | DUPLEX INTERIOR RENOVATION

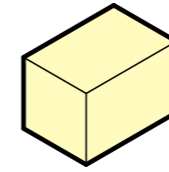


GROUND FLOOR PLAN | 80m²

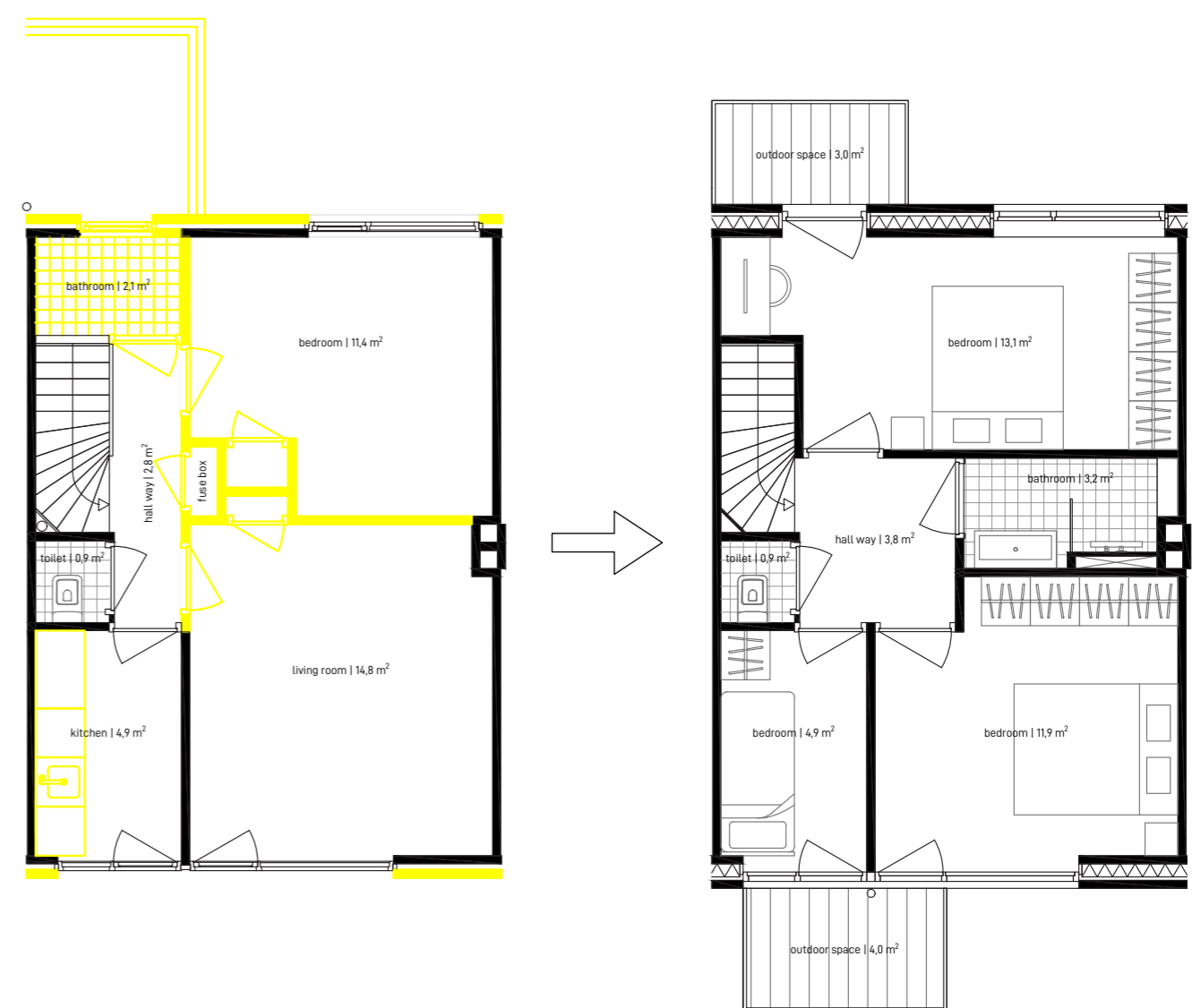


- Front outdoor space
- Full length living room
- Storage space
- Facade insulation

Demolish



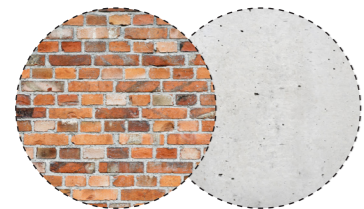
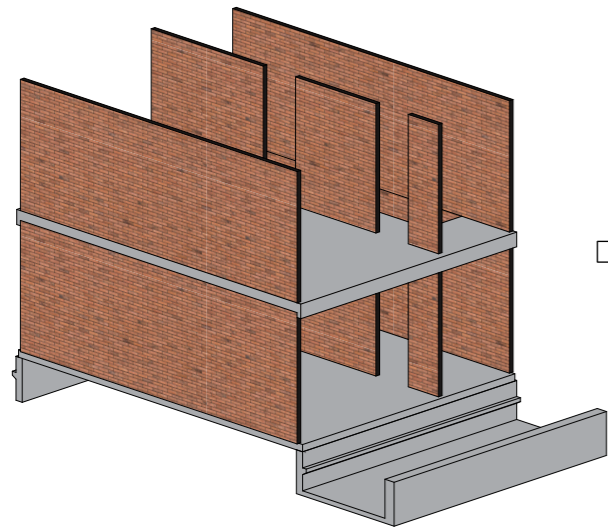
FIRST FLOOR PLAN | 80m²



- Front outdoor space
- Bigger bathroom
- 3 bedrooms
- Back outdoor space
- Facade insulation

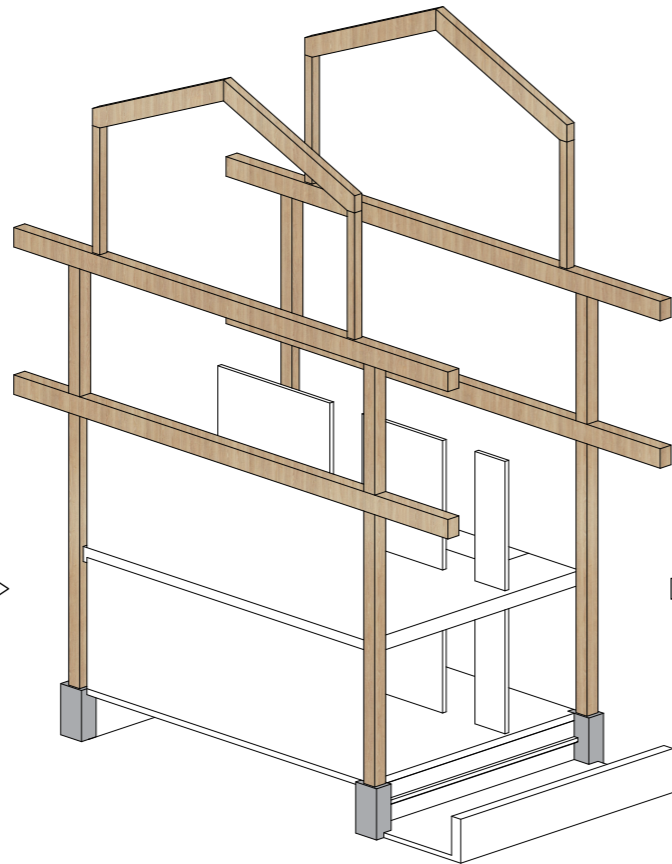
DESIGN | SUPPORTING STRUCTURE

EXISTING STRUCTURE



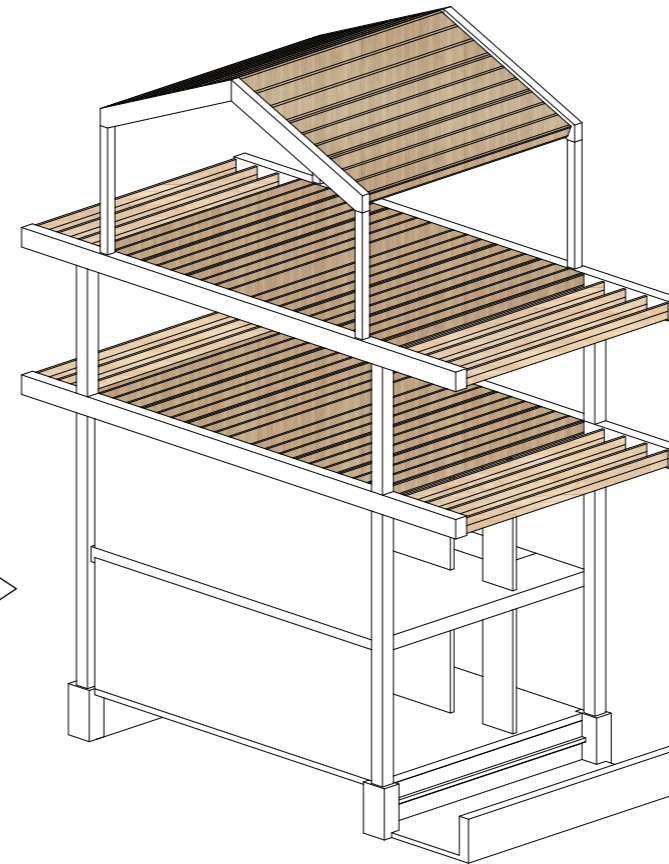
- Brickwork loadbearing walls
- Concrete floors

WOODEN STRUCTURE



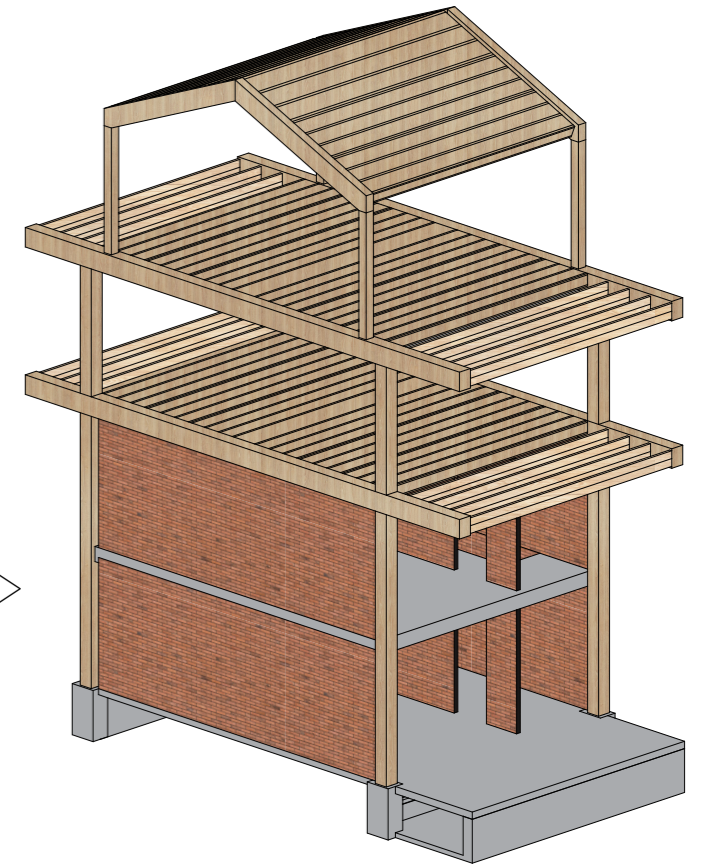
- Glulam columns (300x300mm)
- Glulam beams (400x300mm)
- More flexibility and less material

WOODEN FLOORS



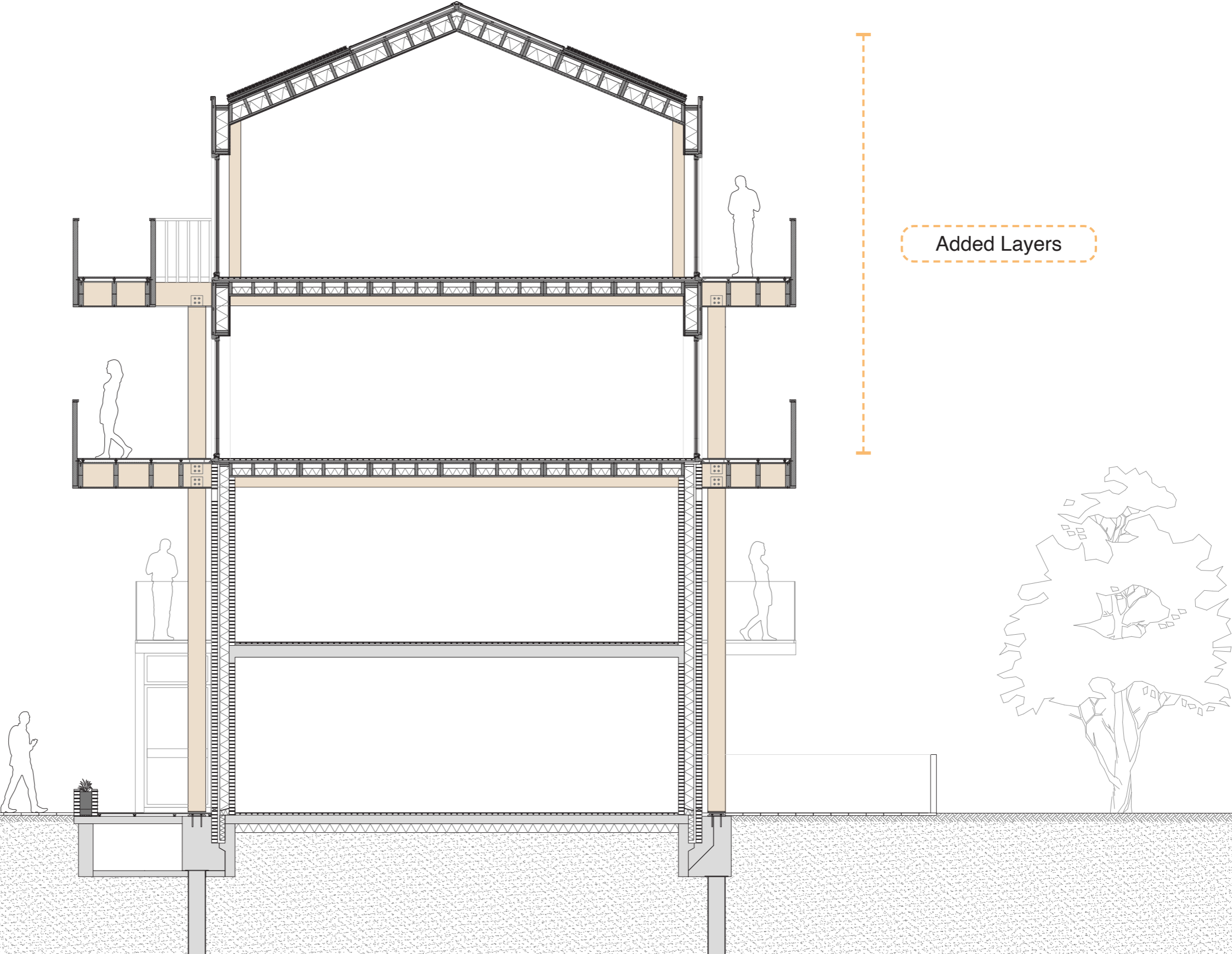
- Kerto-Ripa floors (1200x5800mm)
- Faster construction period (prefab)
- Filled with insulation for sound

NEW STRUCTURE

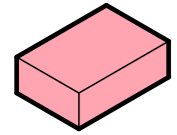


- Concrete foundation
- Stand-alone structure

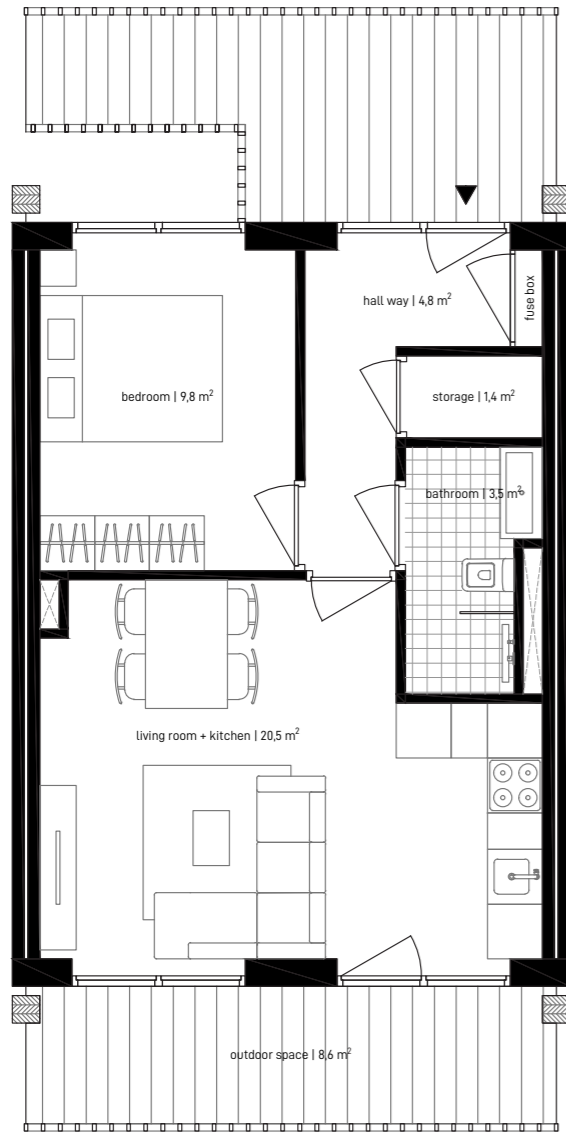
DESIGN | SECTION



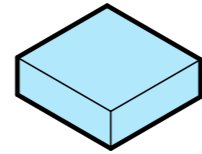
DESIGN | ADDED DWELLINGS



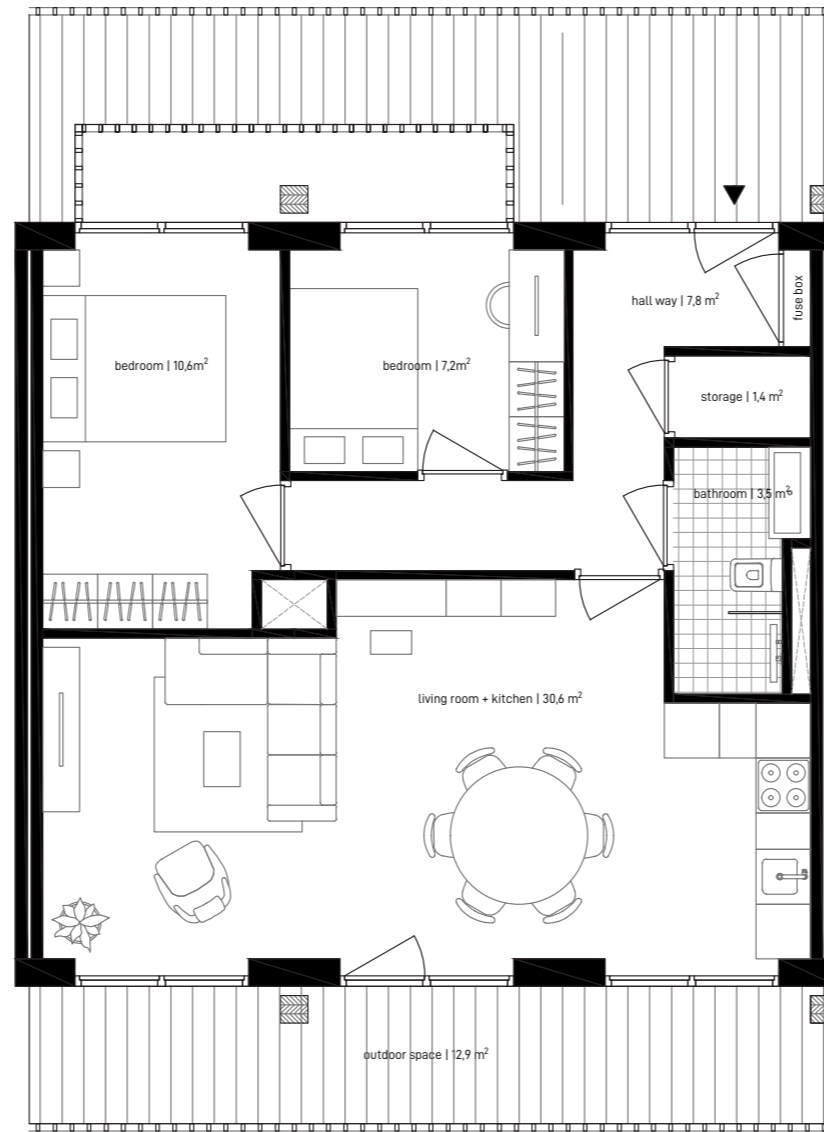
NEW DWELLING | 40m²



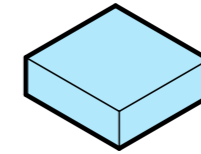
- Similar to existing 40m² duplex
- Follows existing shafts
- 1 bedroom



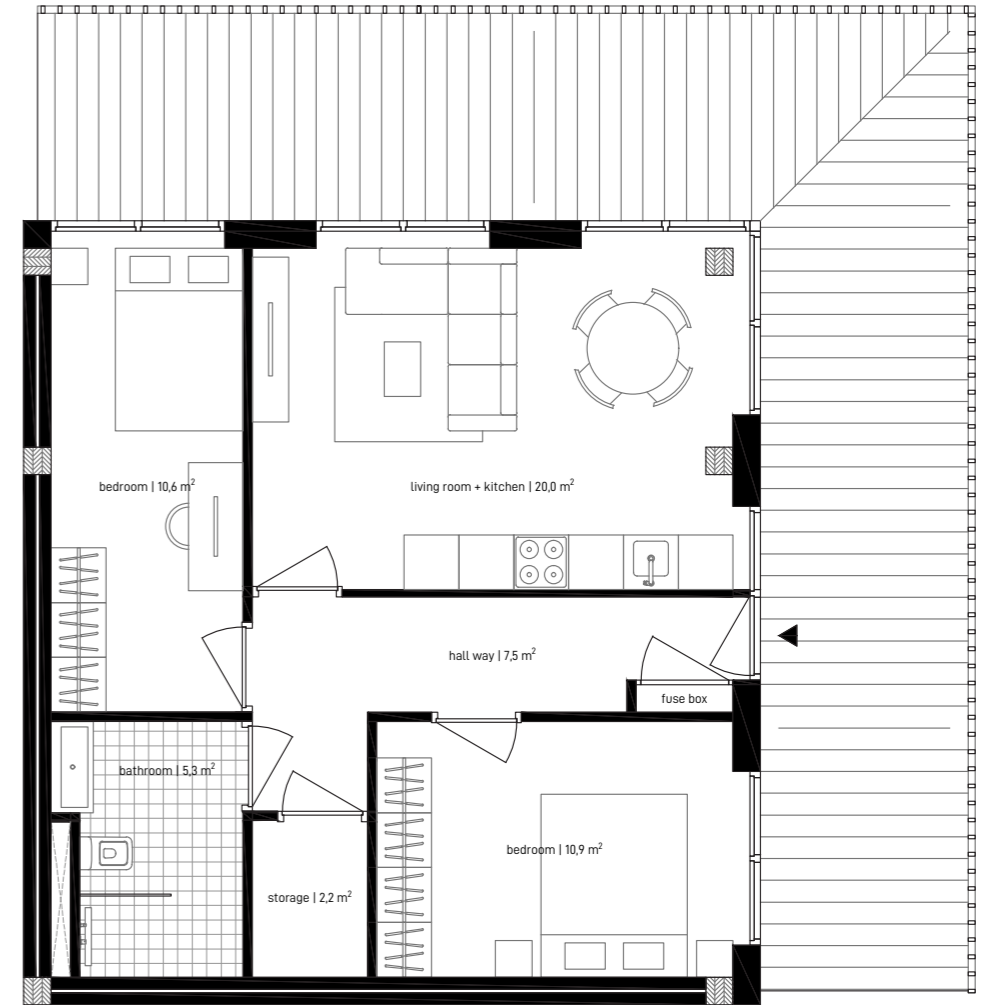
NEW DWELLING | 60m²



- 1.5x grid of existing duplex
- 2 bedrooms
- Outdoor space over full width



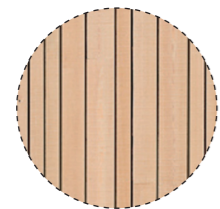
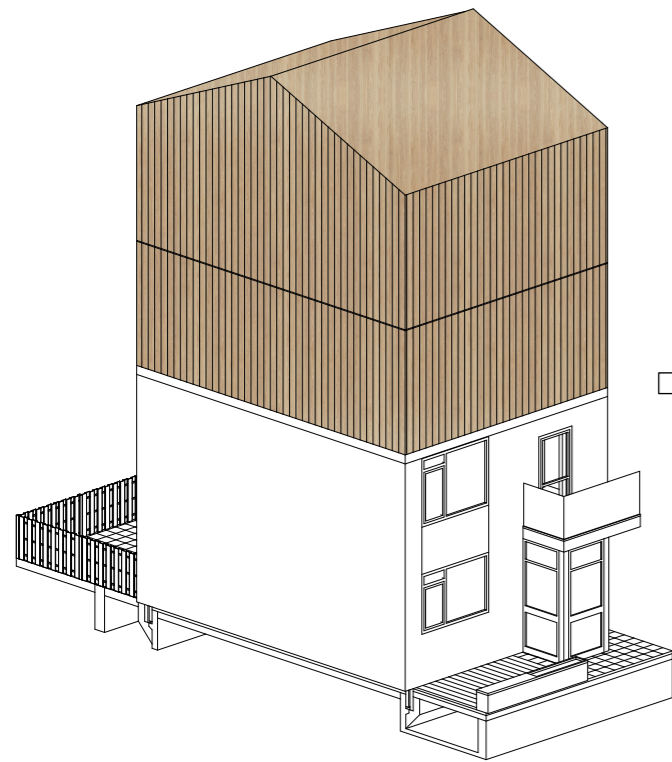
CORNER DWELLING | 60m²



- Corner dwelling (3x in plan)
- 2 bedrooms
- No private outdoor space

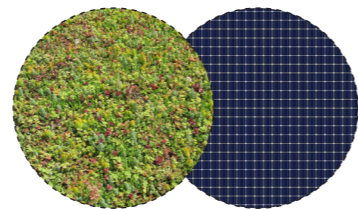
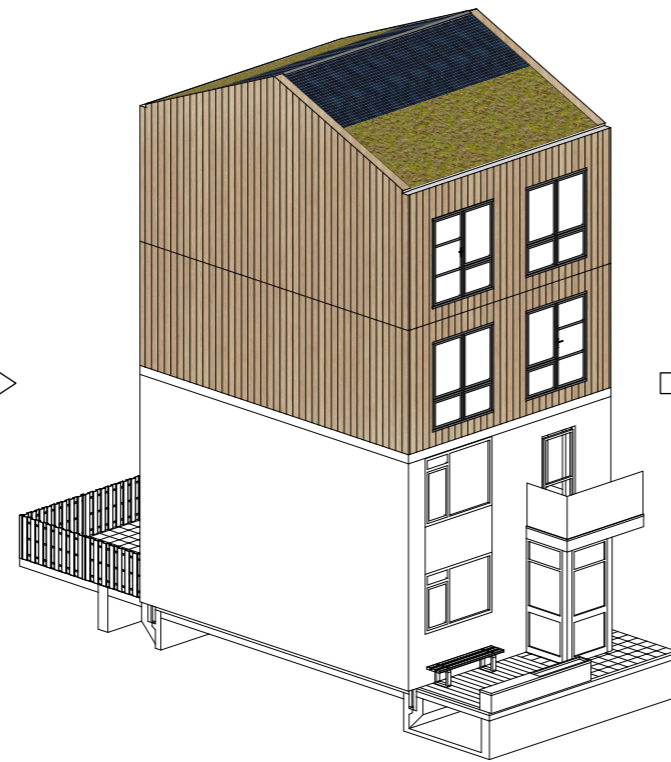
DESIGN | ROOF STACKING

WOODEN EXTERIOR



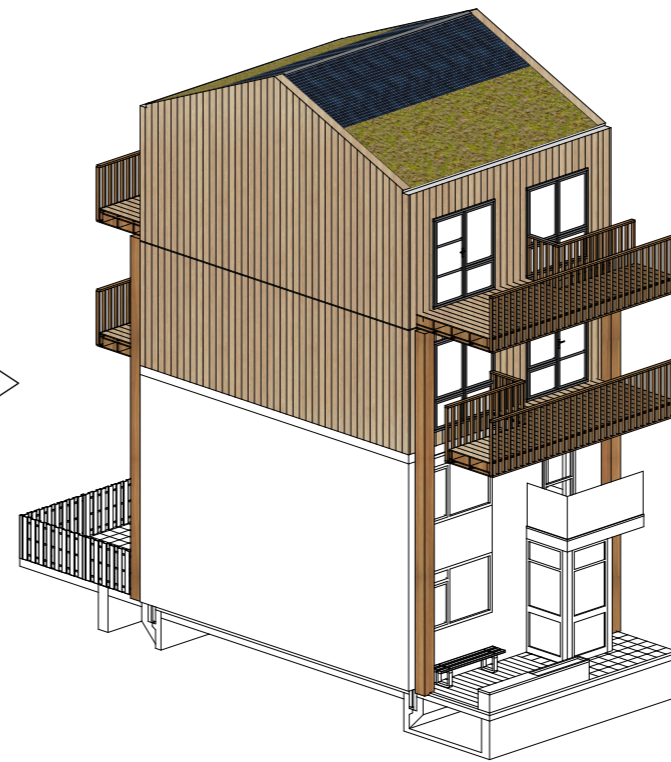
- Wood as contrast to the existing
- Siberian larch wood cladding

GREEN ROOF / PV-CELLS



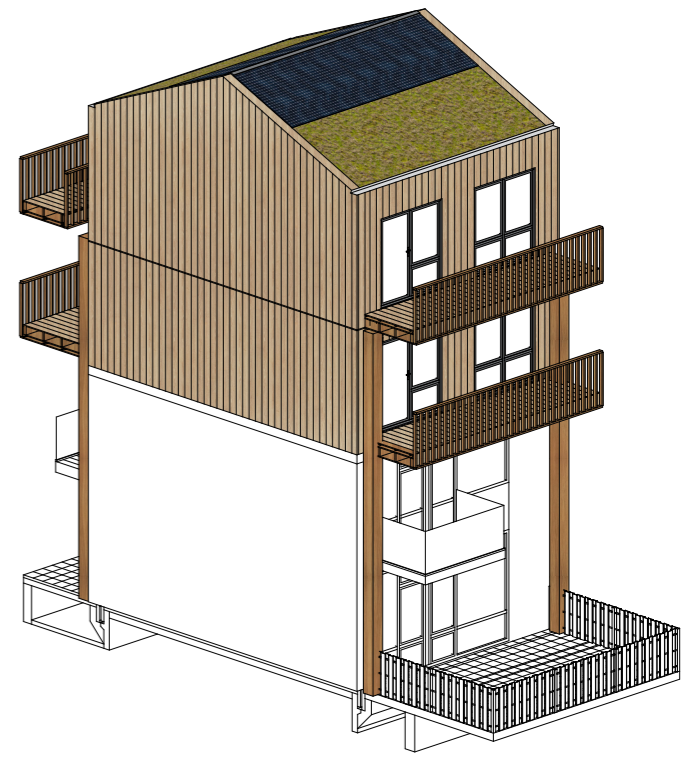
- Sedum roof for water absorption
- Solar panels for energy

FRONT FACADE



- Gallery access with voids
- Bankirai wooden railing slats

BACK FACADE



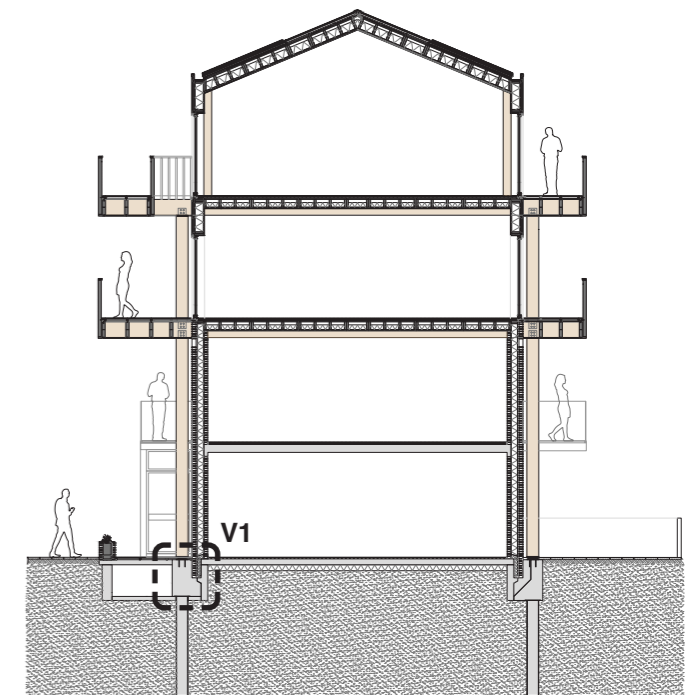
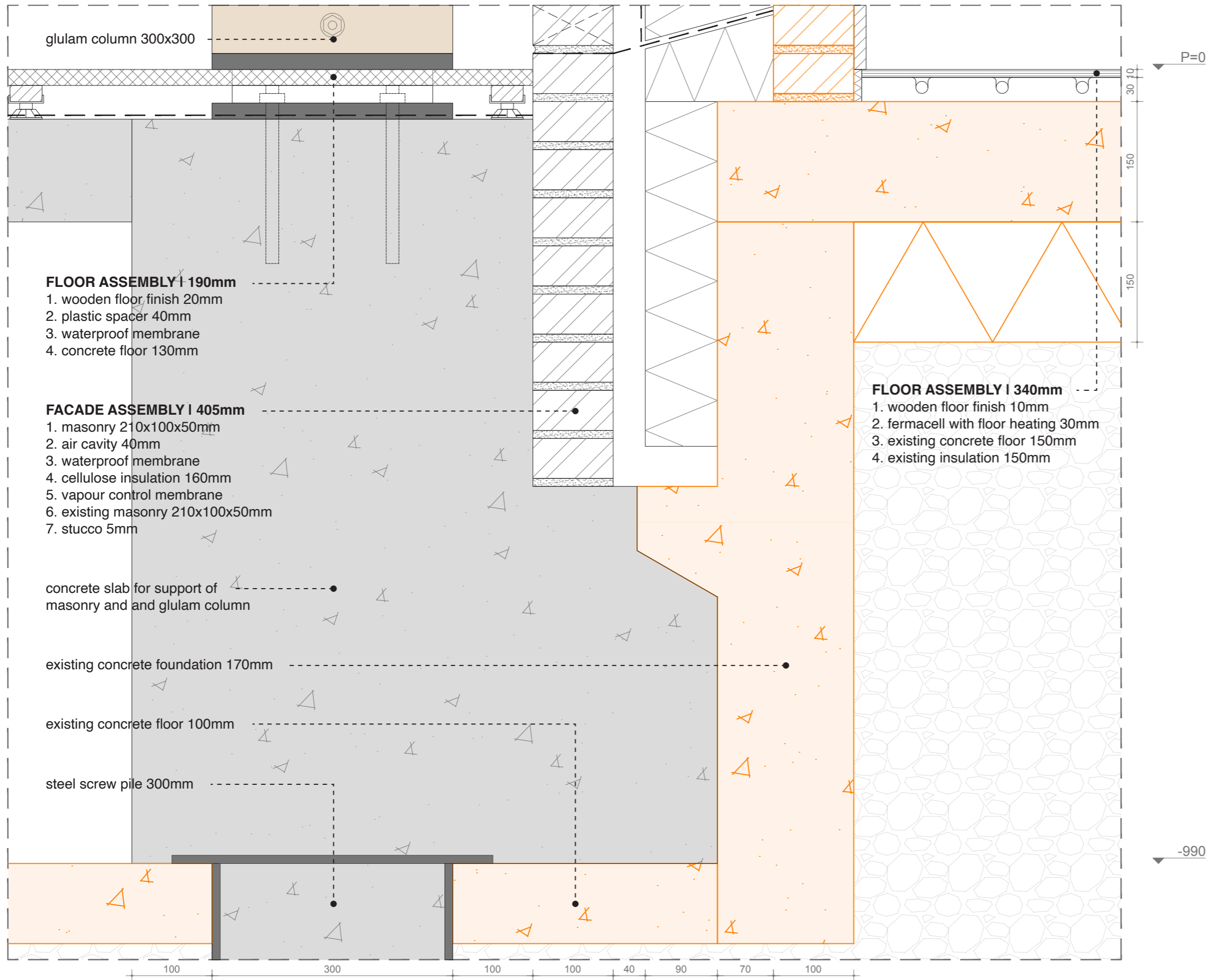
- Outdoor space over the full width
- Bankirai wooden railing slats

NEW FRONT ELEVATION

NEW BACK ELEVATION



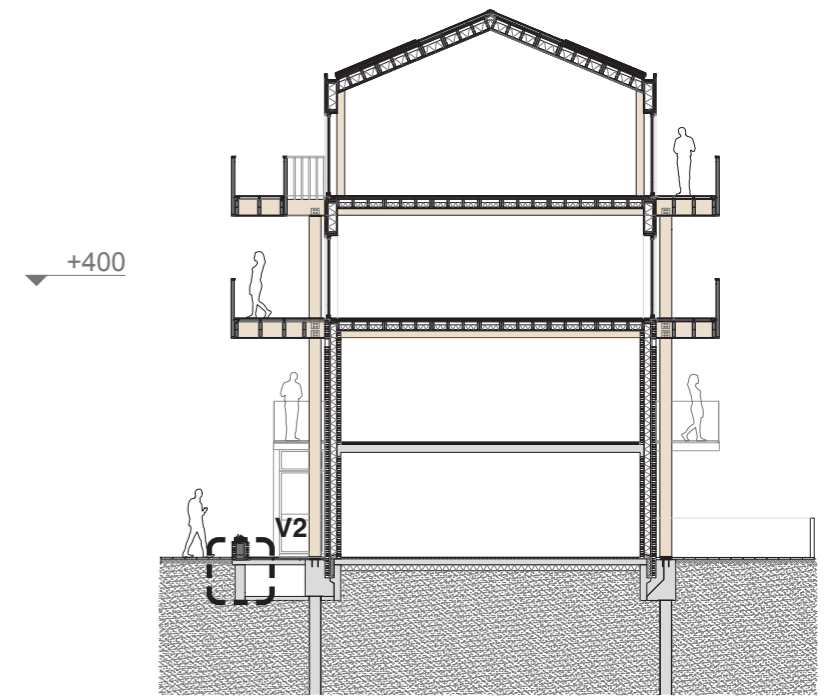
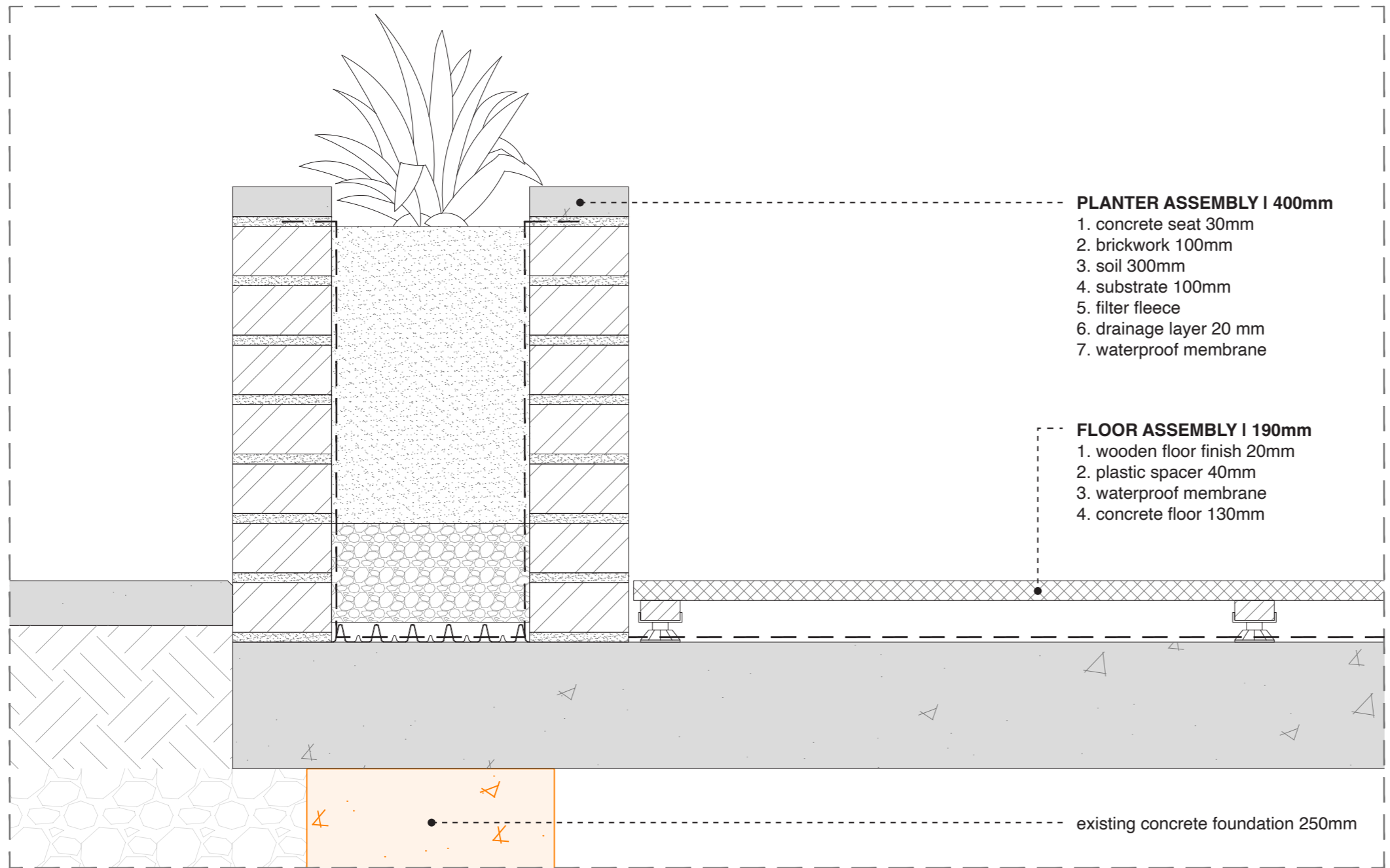
DETAIL V1 | GROUND FLOOR (1:5)



- Existing
- Glulam structure
- Concrete

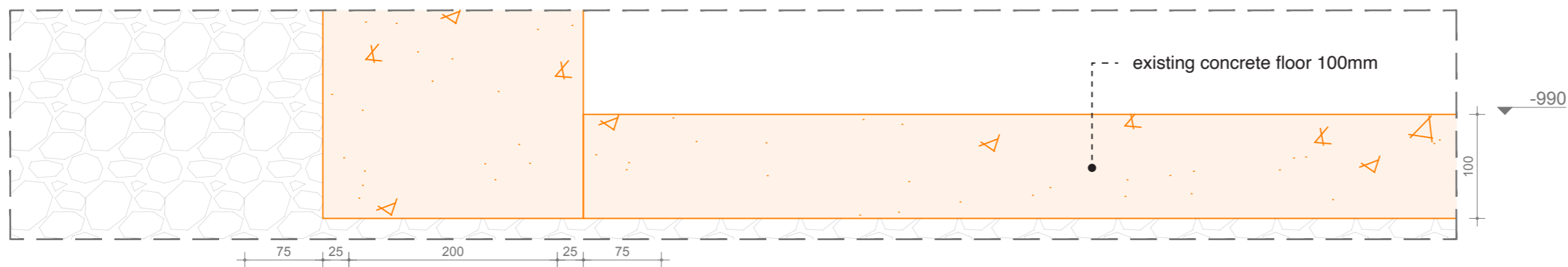
- New roof stacking structure on concrete foundation with steel screwing poles

DETAIL V2 | GROUND FLOOR (1:5)

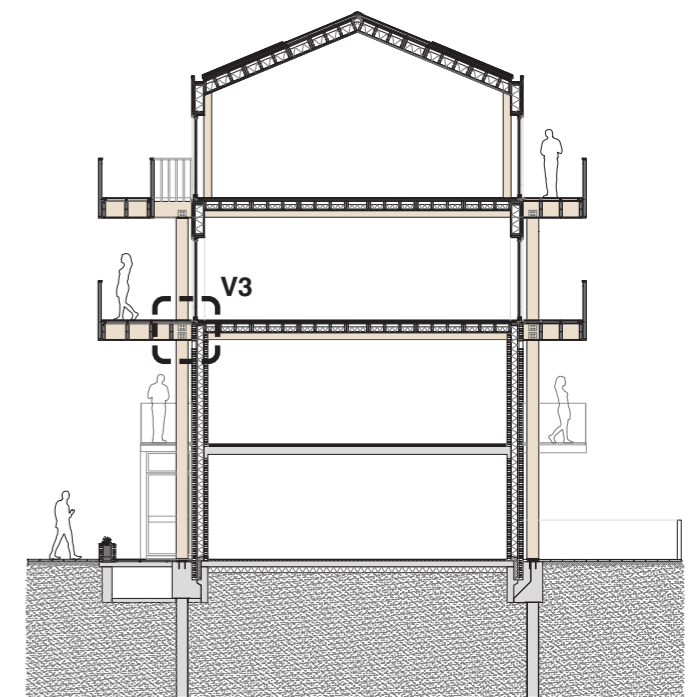
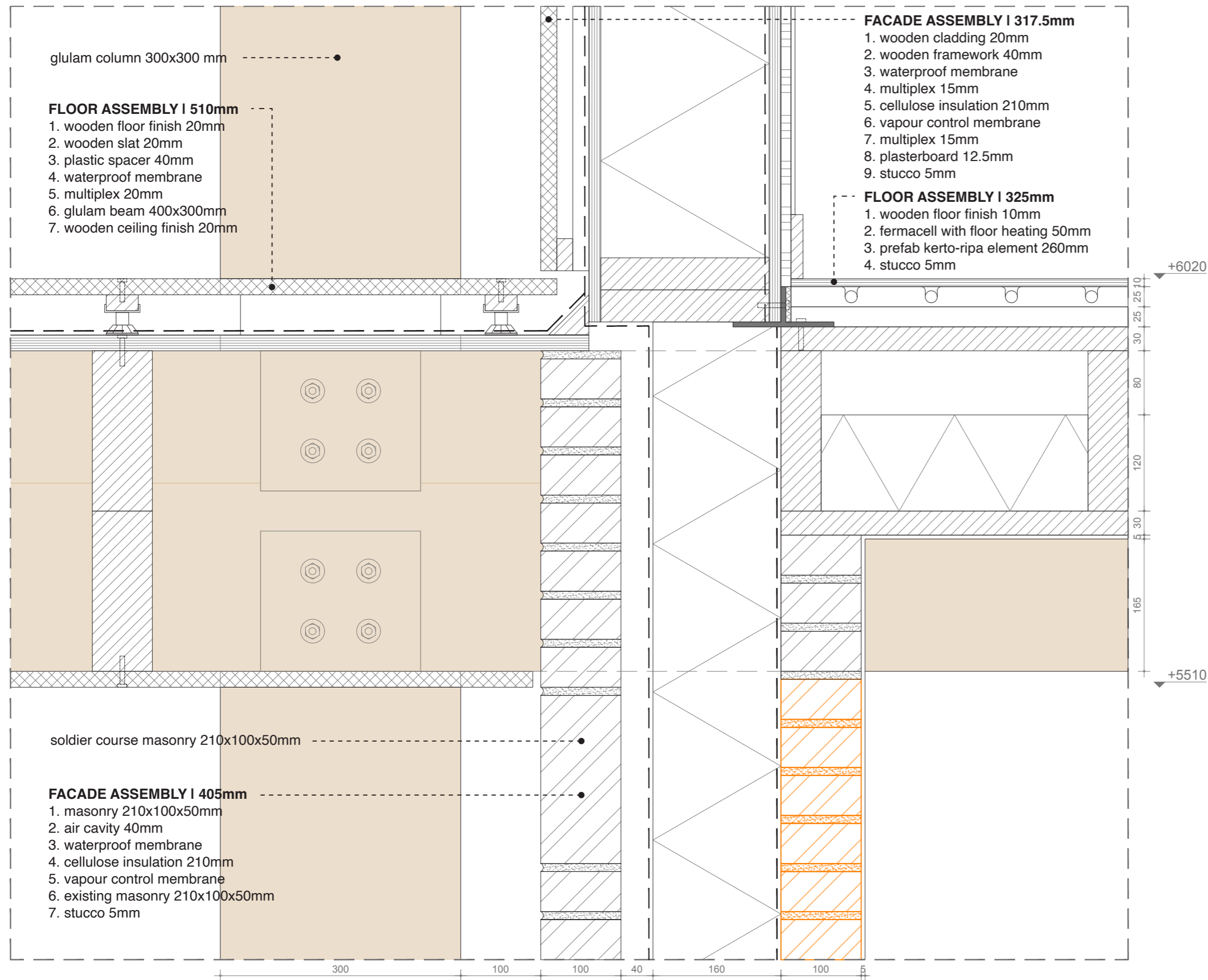


- Existing
- Glulam structure
- Concrete

• Seating planter as separation between public/private and indication of ownership



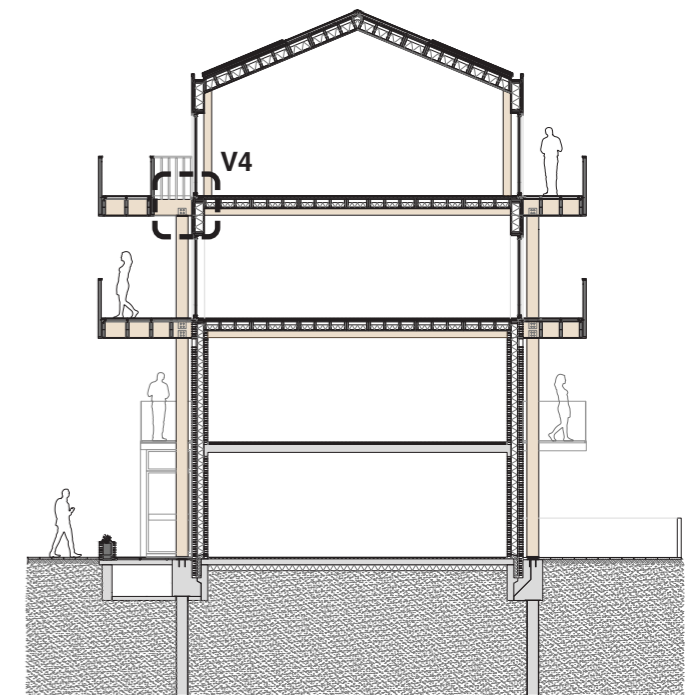
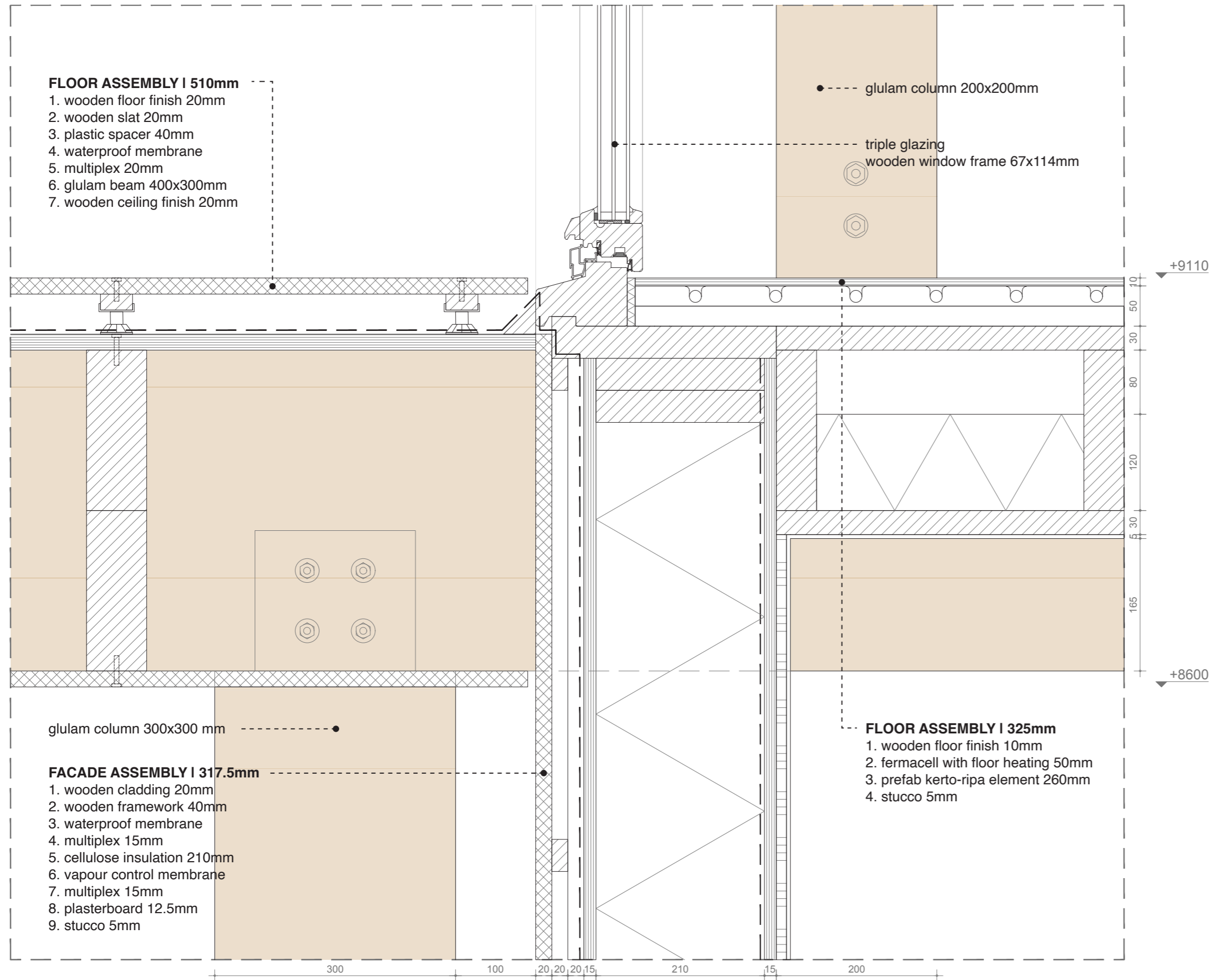
DETAIL V3 | SECOND FLOOR (1:5)



- Existing
- Glulam structure
- Concrete

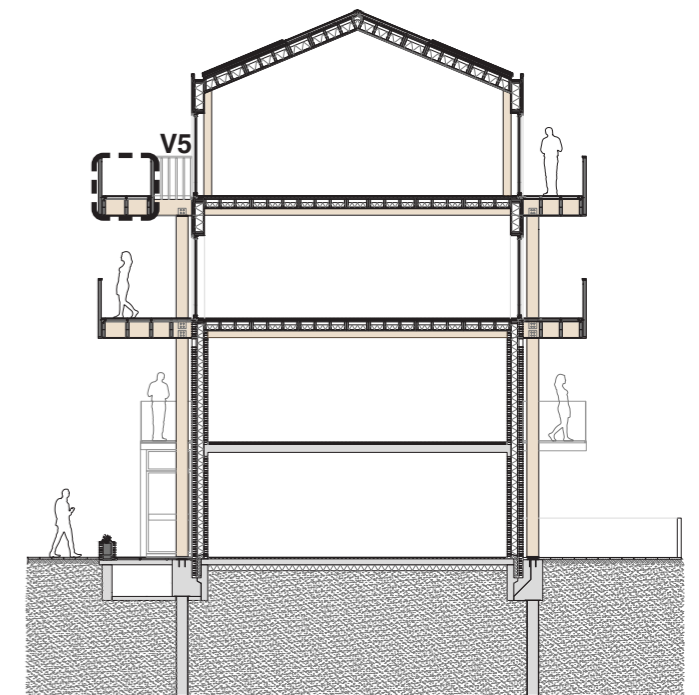
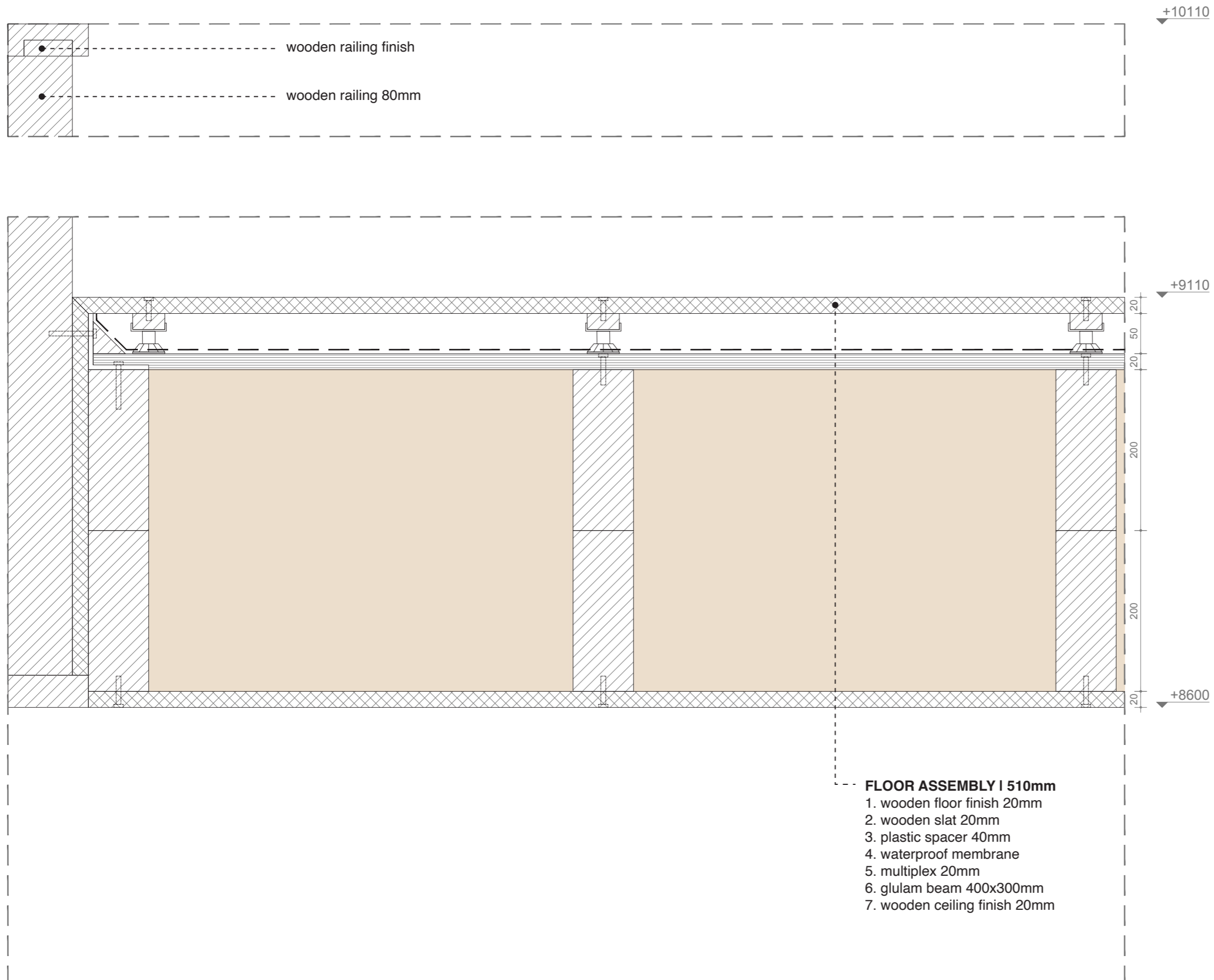
- Soldier course as end of a chapter
- Same facade en gallery finish
- New and old facade in one line

DETAIL V4 | THIRD FLOOR (1:5)



- Existing
 - Glulam structure
 - Concrete
-
- Kerto-Ripa floors (prefab) between glulam structure
 - Wooden window frames

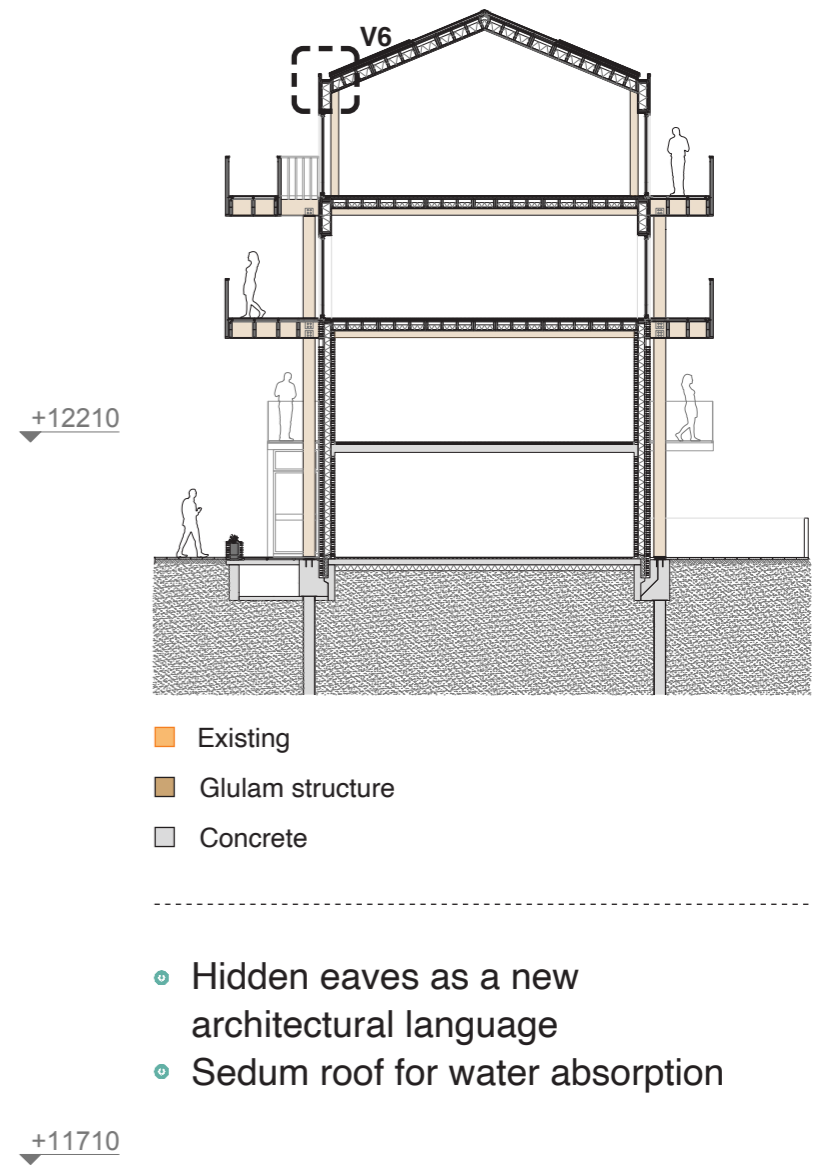
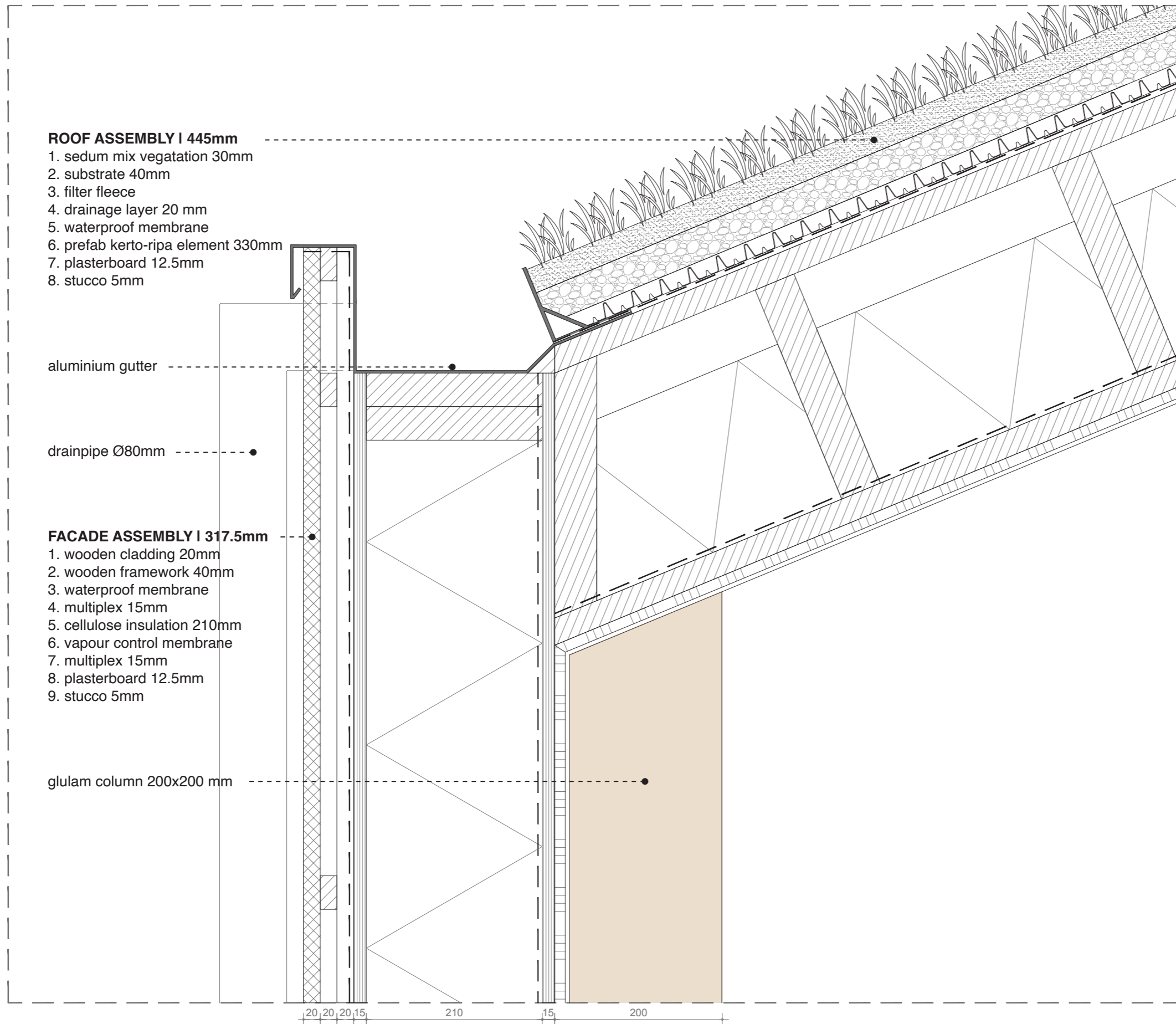
DETAIL V5 | GALLERY RAILING (1:5)



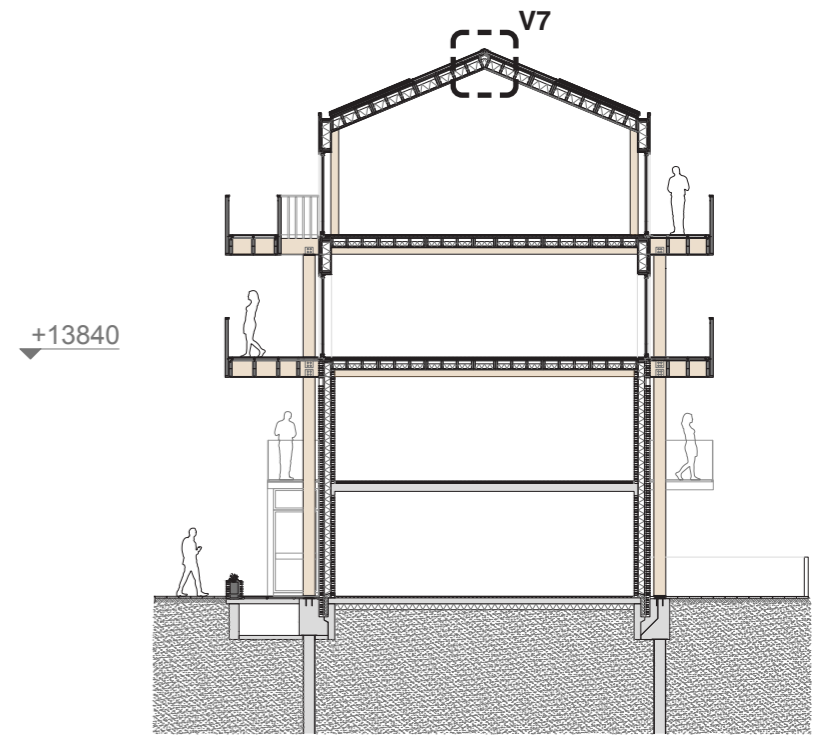
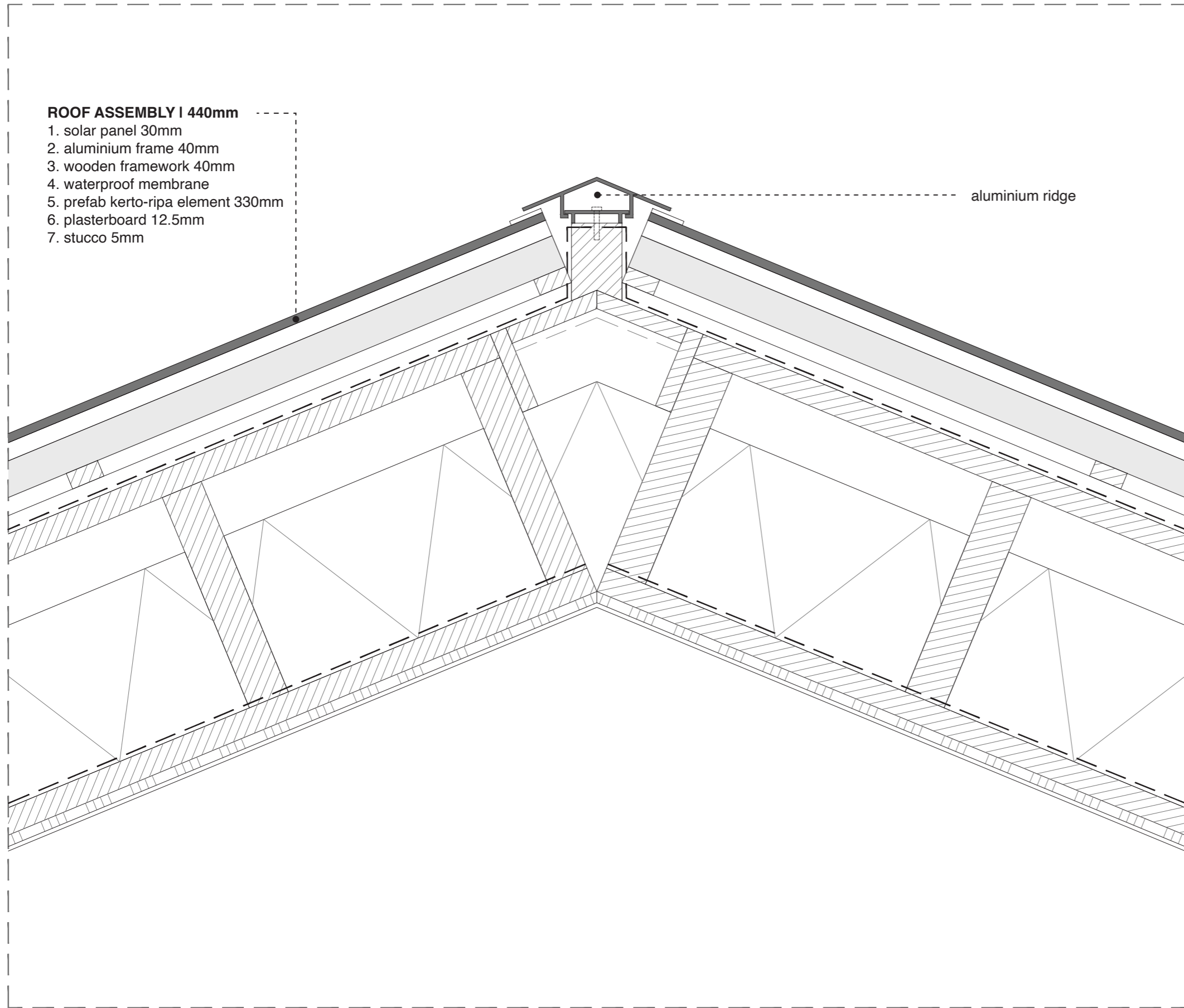
- Existing
- Glulam structure
- Concrete

• Wooden railing from bankirai in front of the gallery to create layerness

DETAIL V6 | ROOF EAVES (1:5)



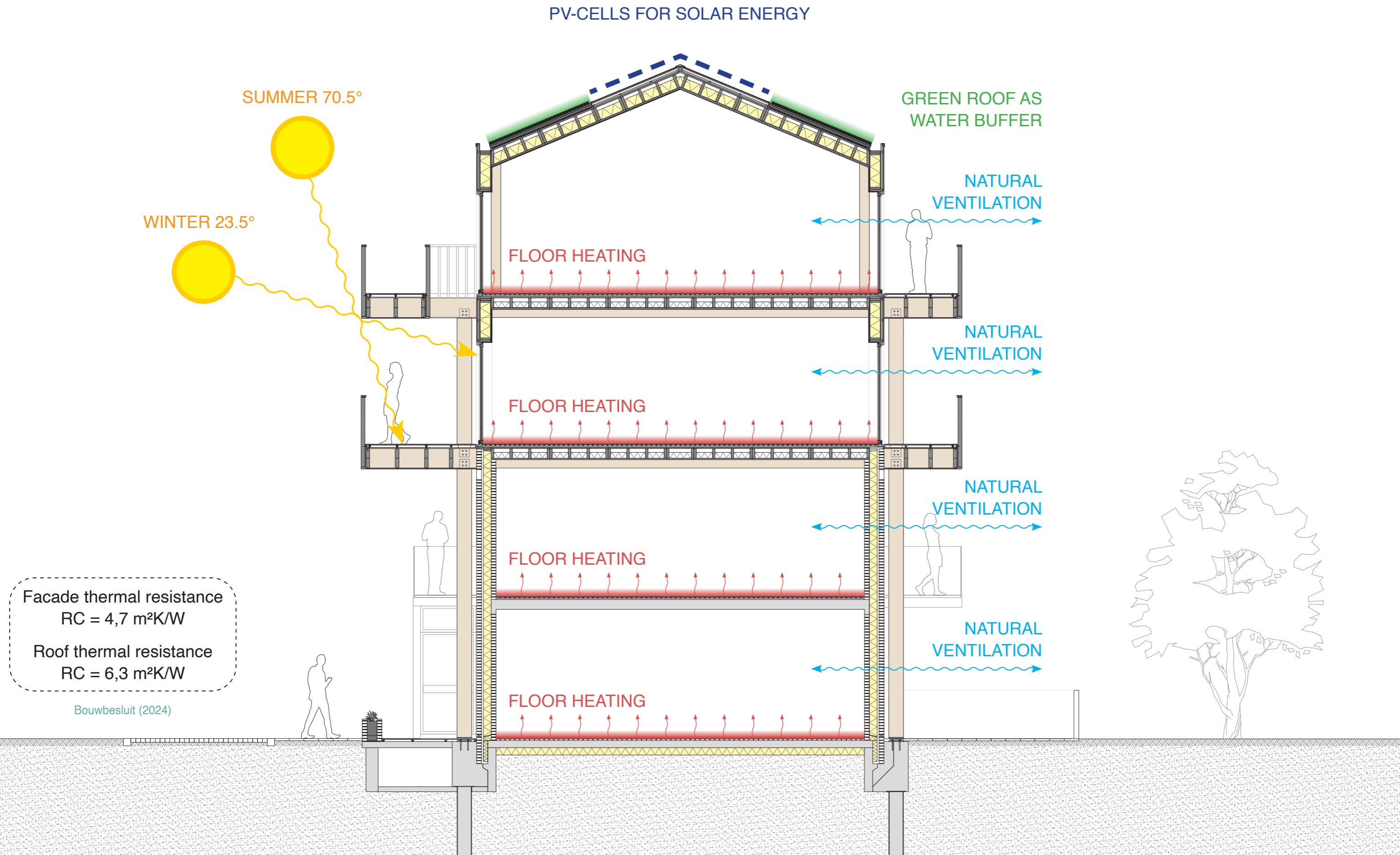
DETAIL V7 | ROOF RIDGE (1:5)



- Existing
- Glulam structure
- Concrete

• Solar panels at the top of the roof

DESIGN | CLIMATE CONCEPT

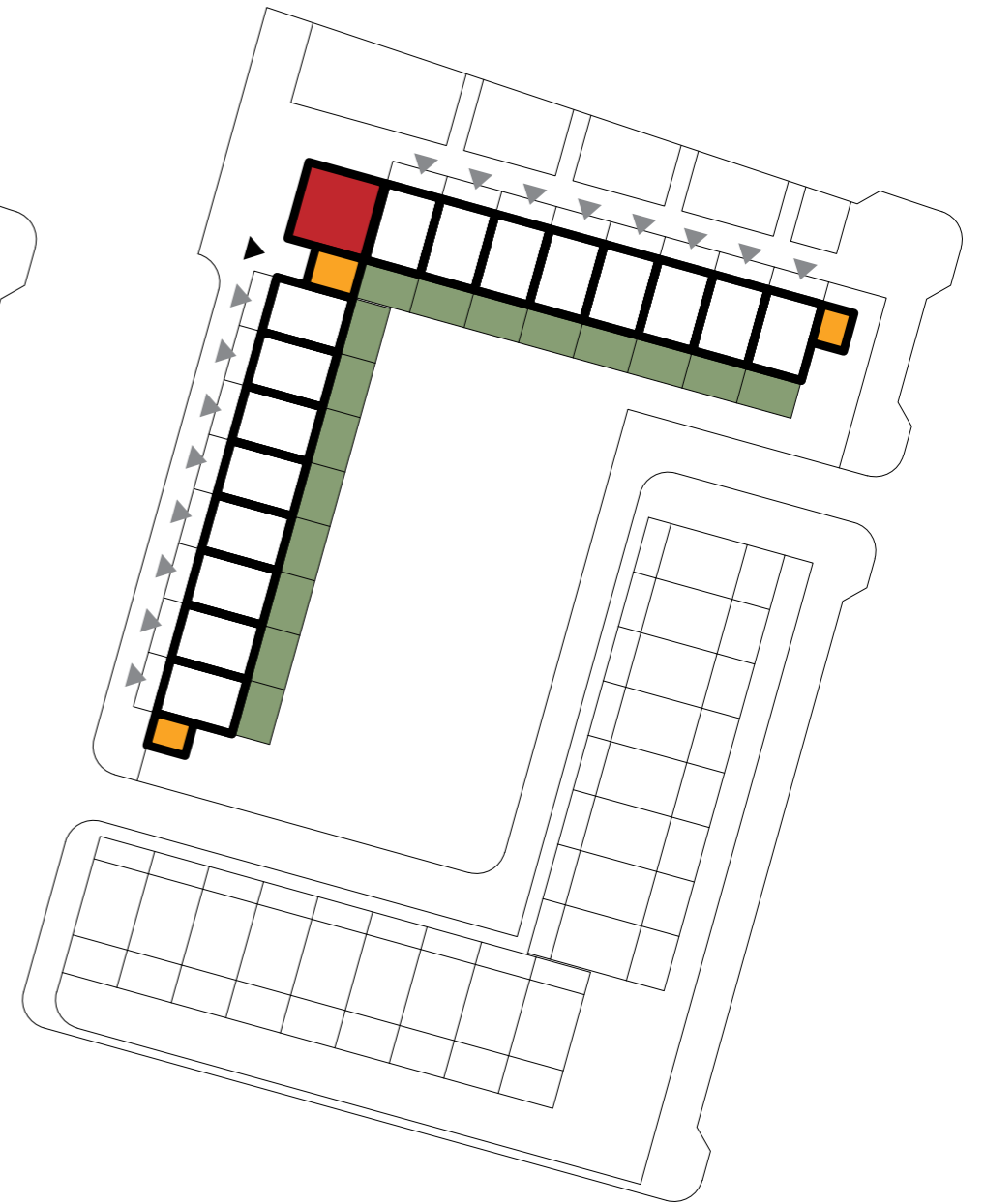
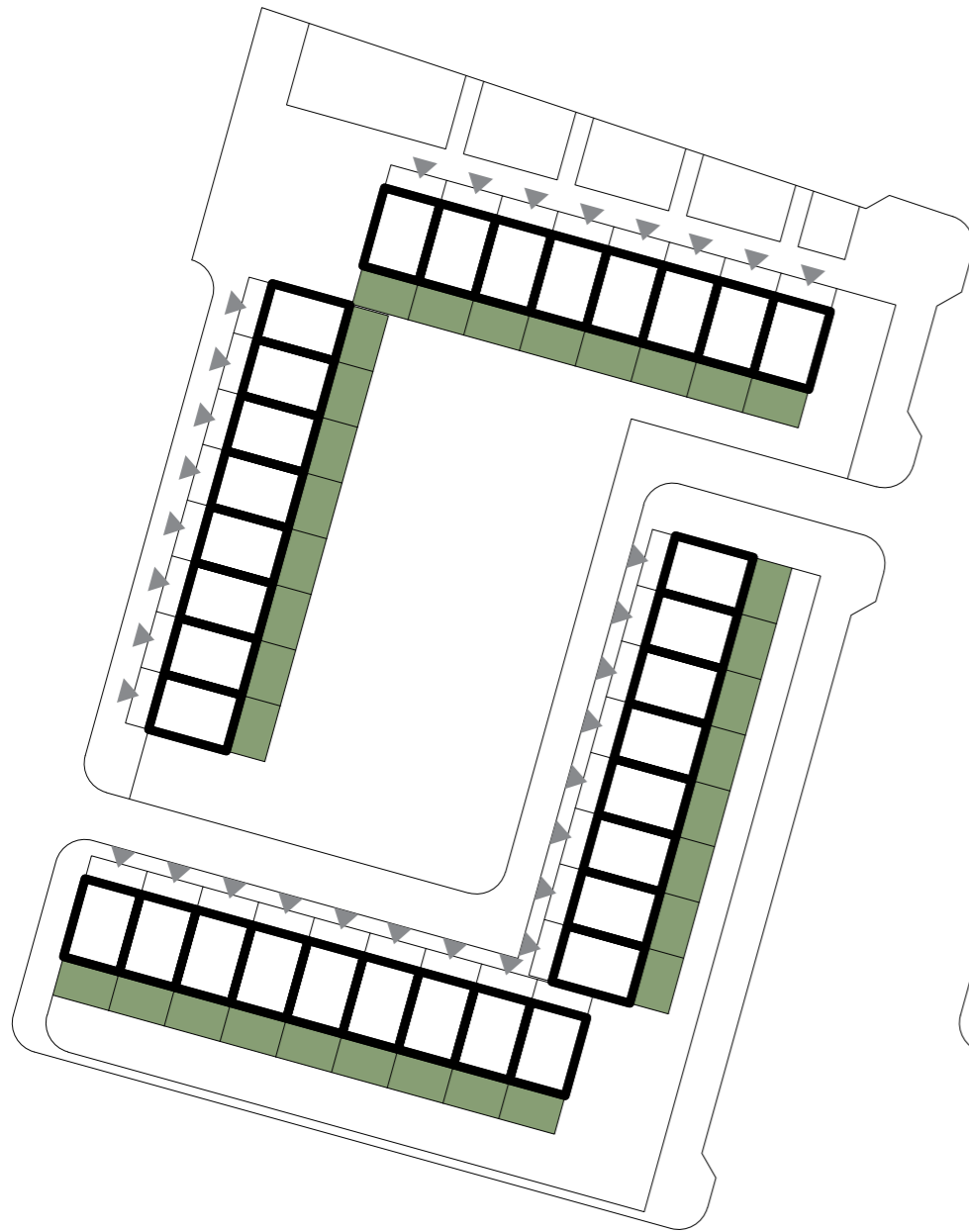


DESIGN | ACCESS STRATEGIES

● ———→ EXISTING SITUATION

ACCESS STRATEGY 1

ACCESS STRATEGY 2



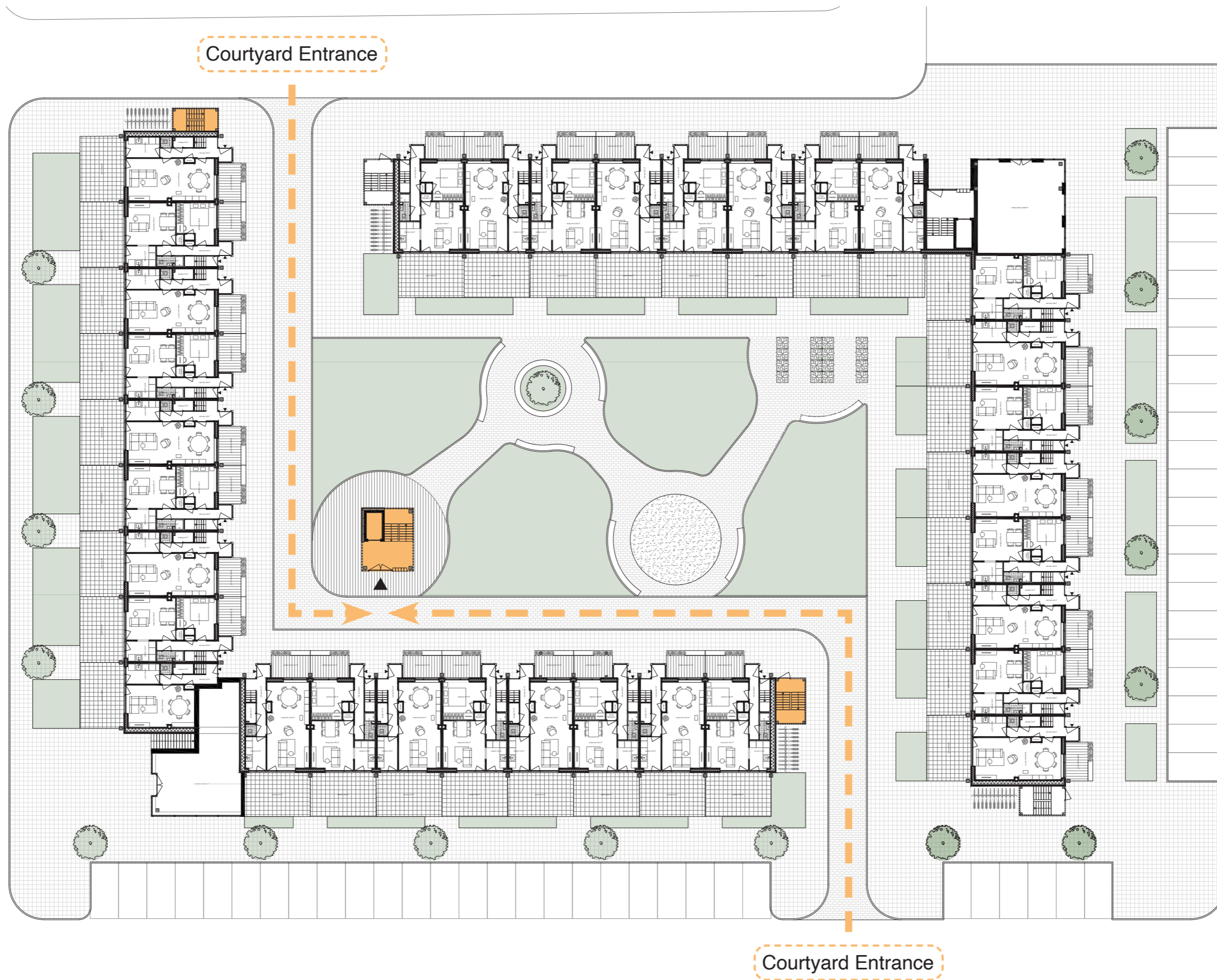
- Entrances on the north / north west
- Back garden on the south / south east

- Main entrance in the courtyard
- Escape routes on the corners

- Main entrance on the corner
- Escape routes on the corners



DESIGN | GROUND FLOOR PLAN (STRATEGY 1)



- 33 dwellings



DESIGN | ENTERING THE COURTYARD (STRATEGY 1)



DESIGN | THE COURTYARD (STRATEGY 1)



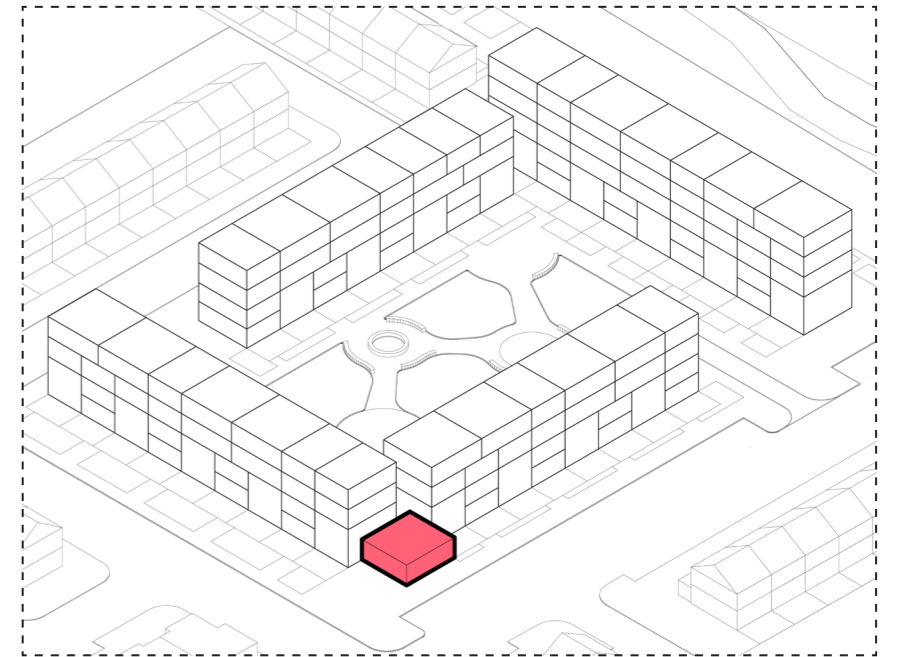
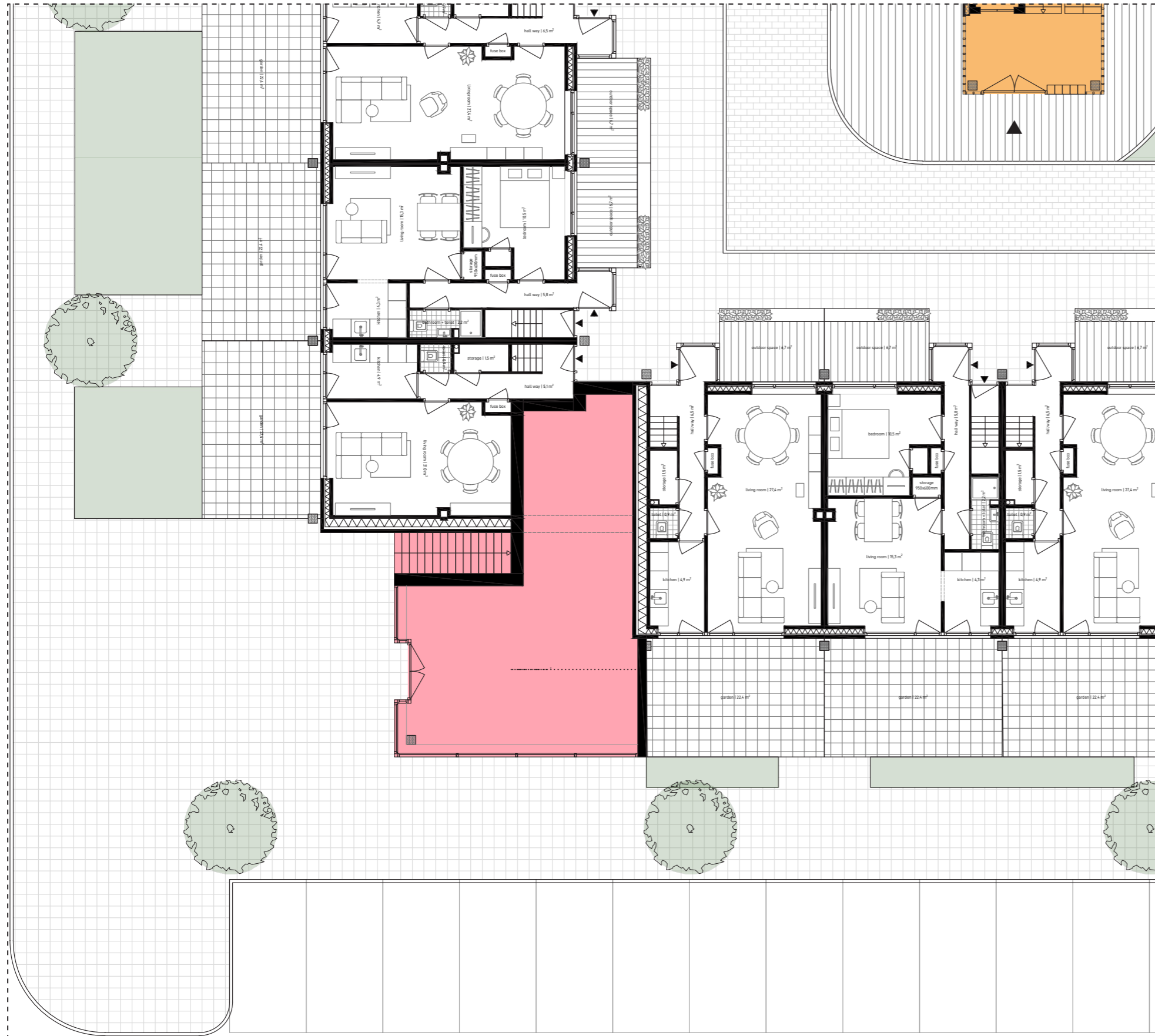
DESIGN | GROUND FLOOR PLAN (STRATEGY 1)



• 33 dwellings



DESIGN | GROUND FLOOR PLAN (STRATEGY 1)



Google Earth (2024)



DESIGN | CORNER (STRATEGY 1)



DESIGN | CORNER (STRATEGY 1)



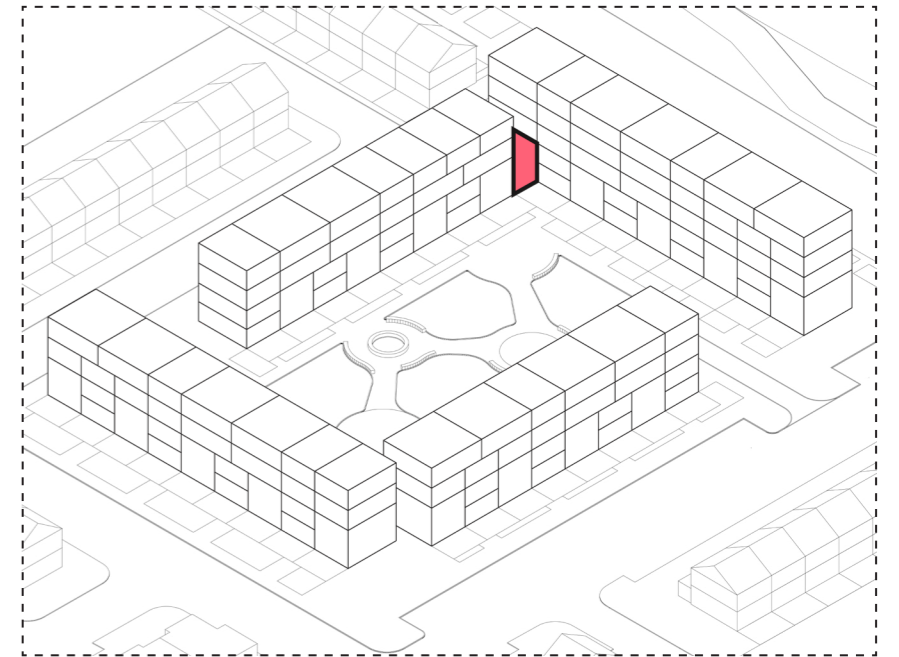
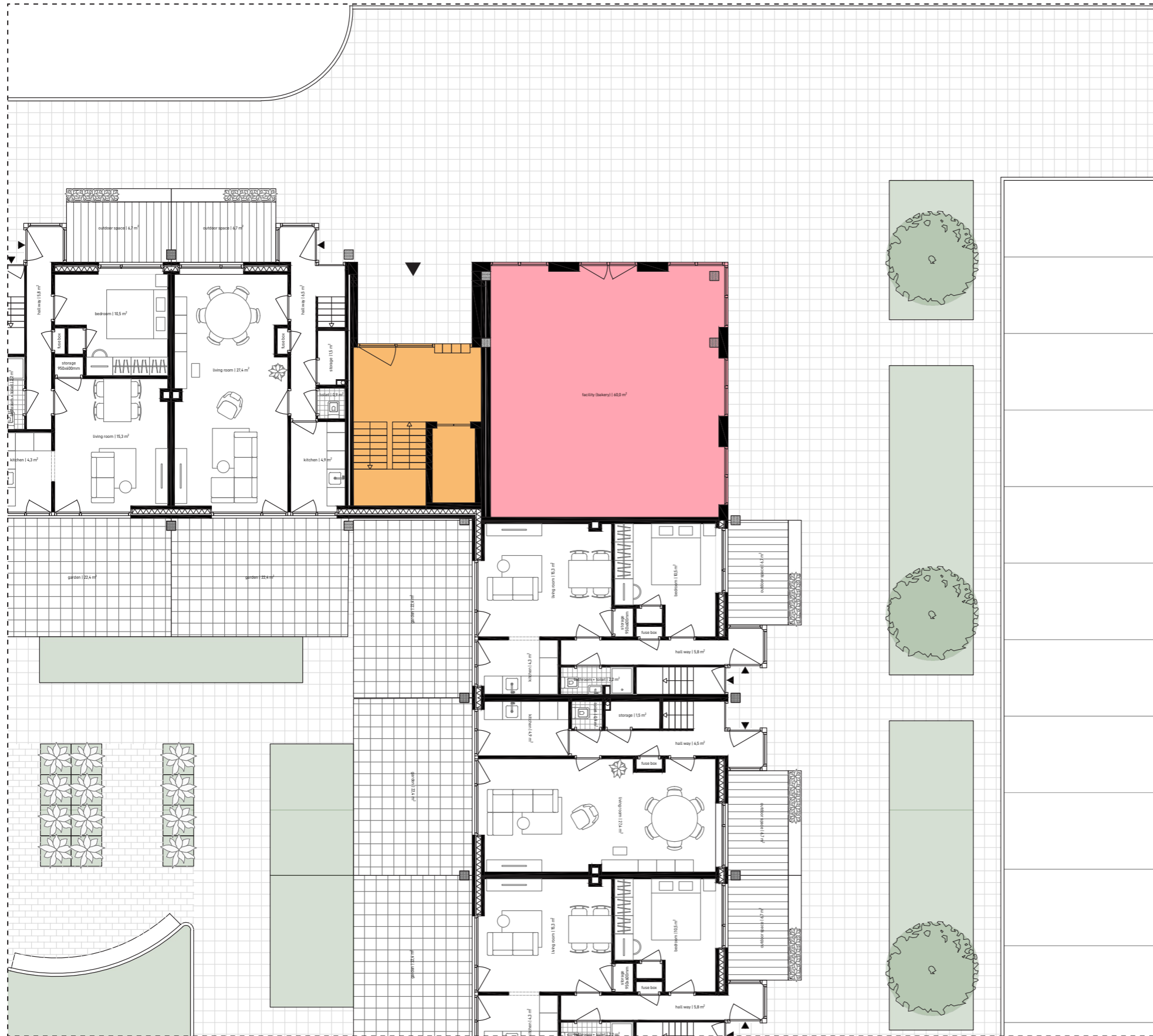
DESIGN | GROUND FLOOR PLAN (STRATEGY 2)



• 33 dwellings



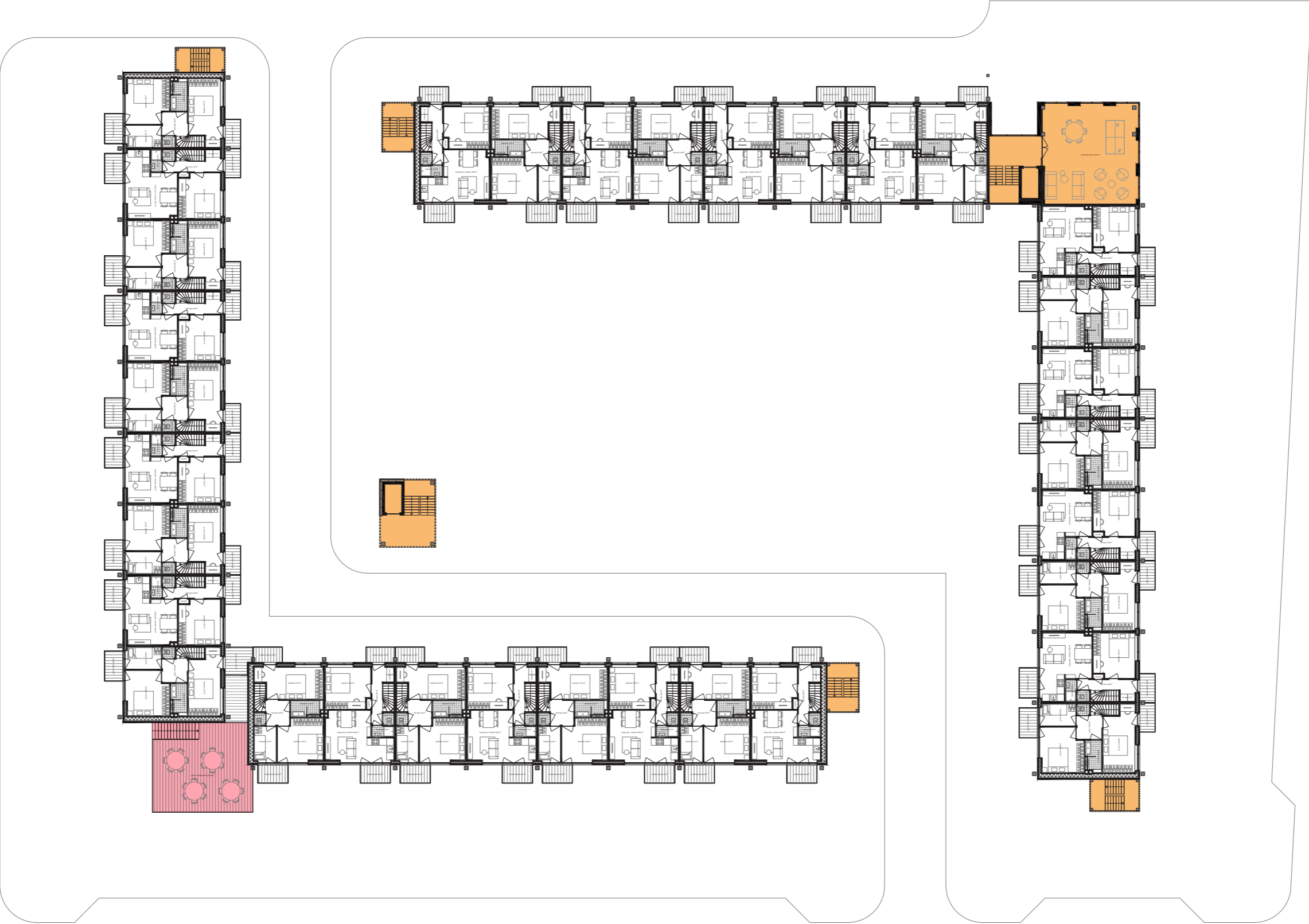
DESIGN | GROUND FLOOR PLAN (STRATEGY 2)



DESIGN | CORNER (STRATEGY 2)



DESIGN | FIRST FLOOR PLAN



• 33 dwellings



DESIGN | SECOND FLOOR PLAN



• 29 dwellings



DESIGN | ACCESS GALLERY



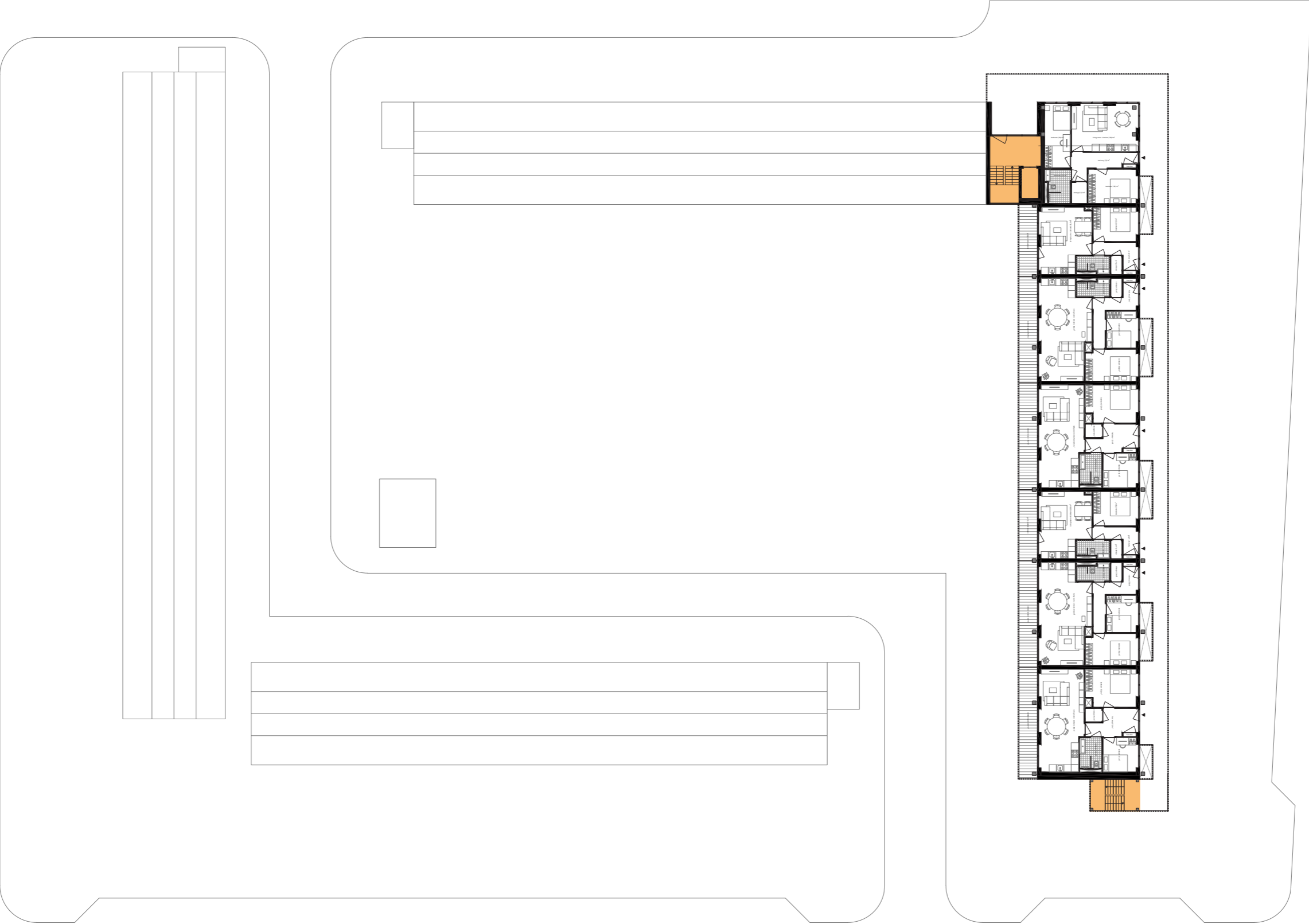
DESIGN | THIRD FLOOR PLAN



• 28 dwellings



DESIGN | FOURTH FLOOR PLAN (STRATEGY 2)



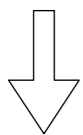
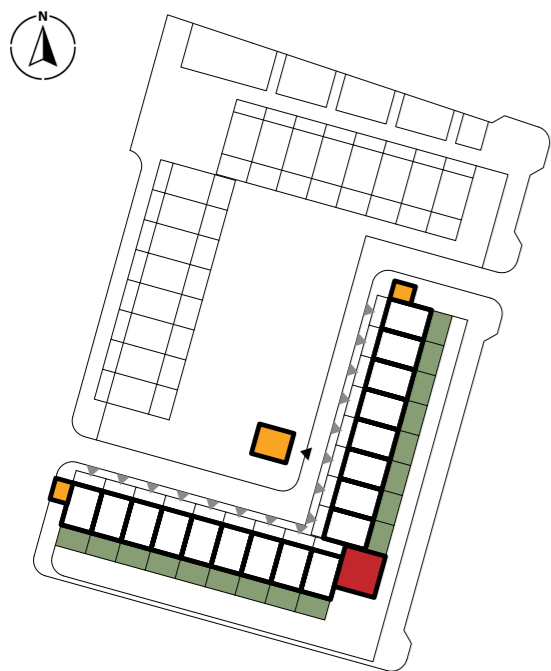
• 7 dwellings



ASSESSMENT | ACCESS STRATEGIES

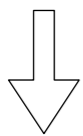
ACCESS STRATEGY 1

- Main entrance in the courtyard
- Escape routes on the corners



more eyes on the street

more social interaction



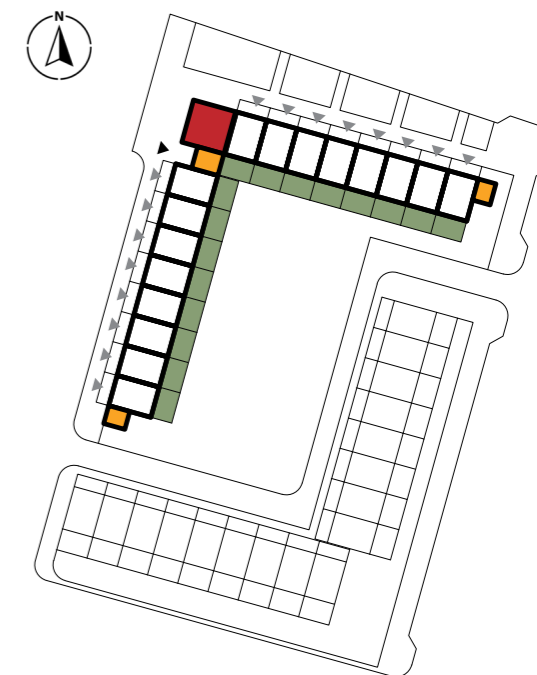
LIVABILITY

ISOMETRIC | NEW DENSIFIED SITUATION



ACCESS STRATEGY 2

- Main entrance on the corner
- Escape routes on the corners



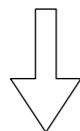
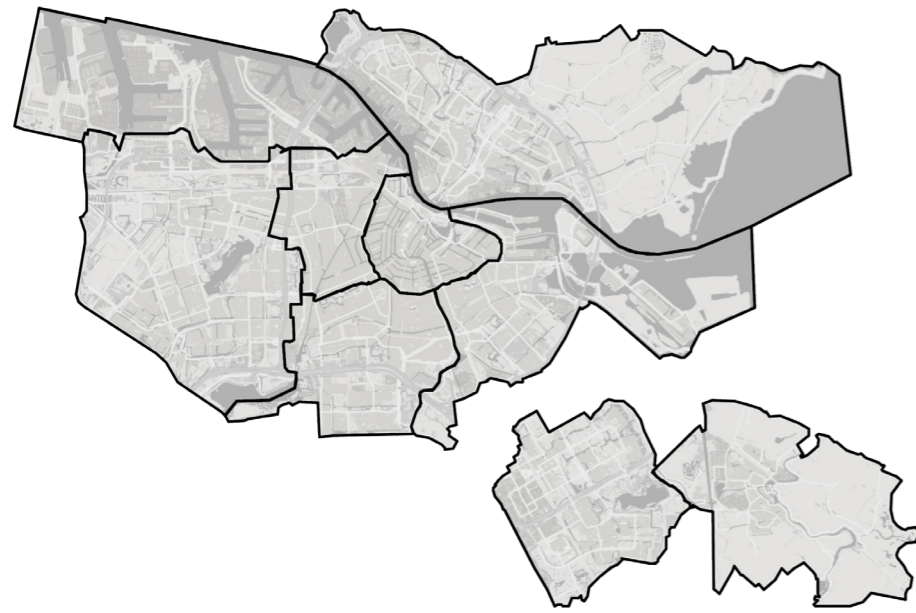
+1 more dwellings per floor



DENSIFICATION

ASSESSMENT | DENSIFICATION (FSI)

FSI | AMSTERDAM (AVERAGE)

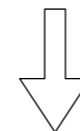
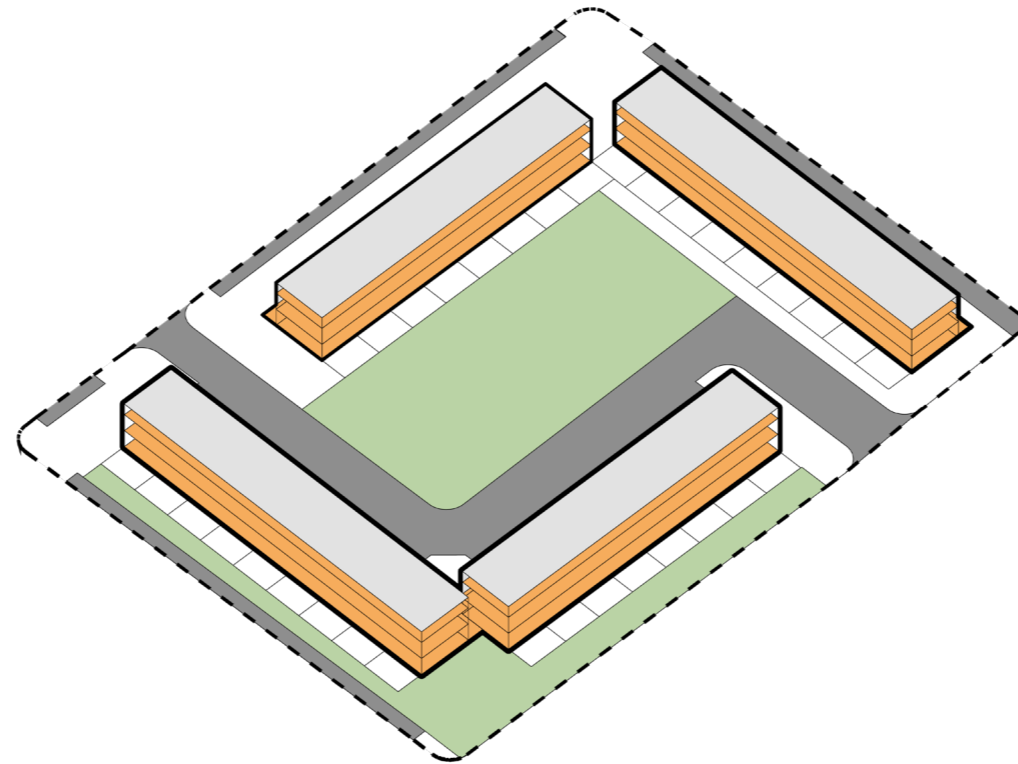


Amsterdam (Average)

FSI = 1.5 / 2.0

Rommelse (2021)

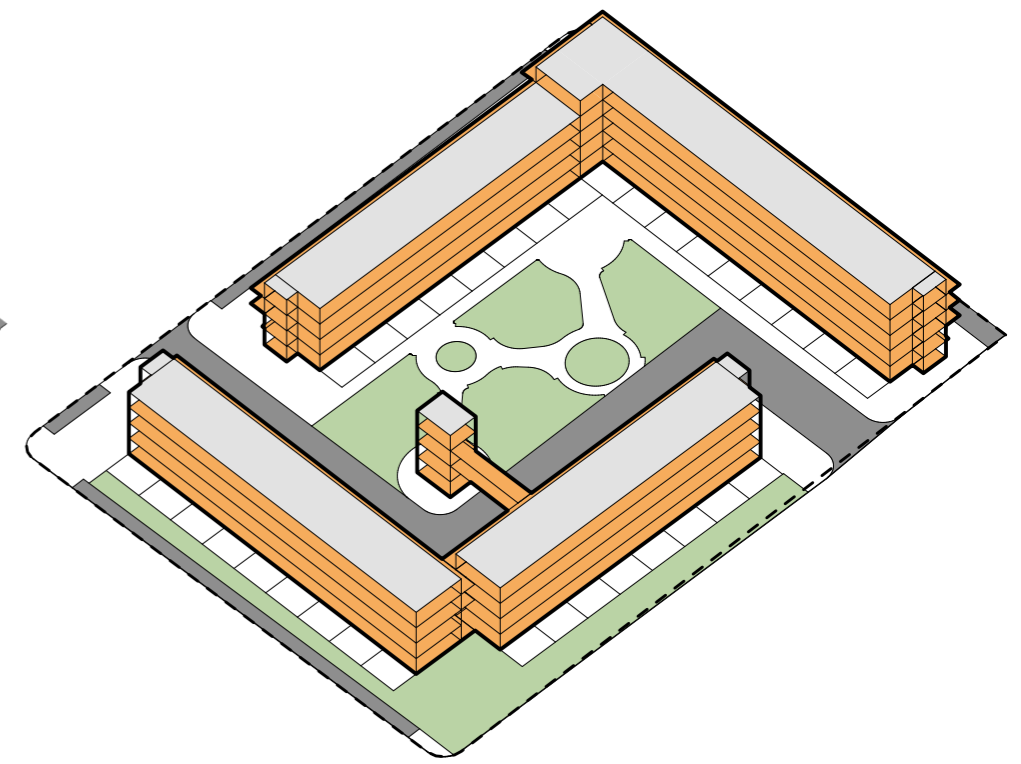
FSI | CURRENT SITUATION



Current situation of the
open courtyard parcellation

FSI = 0.55

FSI | DENSIFIED SITUATION



New densified situation
(+5600m² Gross Floor Area)

FSI = 1.28

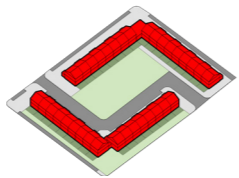
ASSESSMENT | HERITAGE

ARCHITECTURE

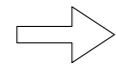
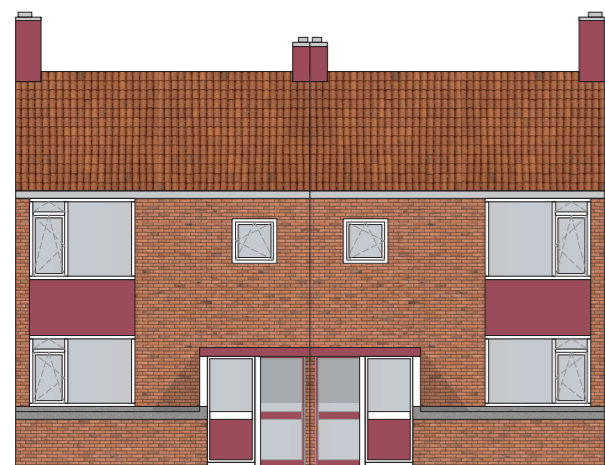
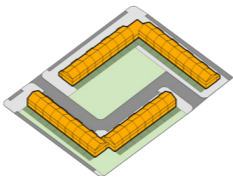
“The original architectural elements’ form, size, material, detailing, proportion, and color or design must be preserved or restored. Non-original materials may be used if they respect the facade’s

Bureau of Monuments & Archaeology (BMA) (2010)

(A) Typology



(B) Architecture



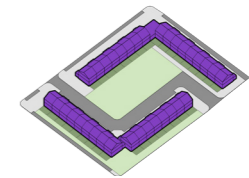
- Respect for the authenticity of the facade
- Similar materialisation, color, and detailing
- Entrance portal with altered proportions
- Vagueness for the new architecture due to no regulations

URBAN DESIGN

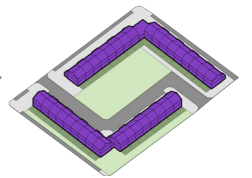
“The spatial quality, including the relationship between buildings and public spaces, sightlines, public-private relationships, and coherence with the garden city ensemble, must be preserved”.

Bureau of Monuments & Archaeology (BMA) (2010)

(C) Parcellation

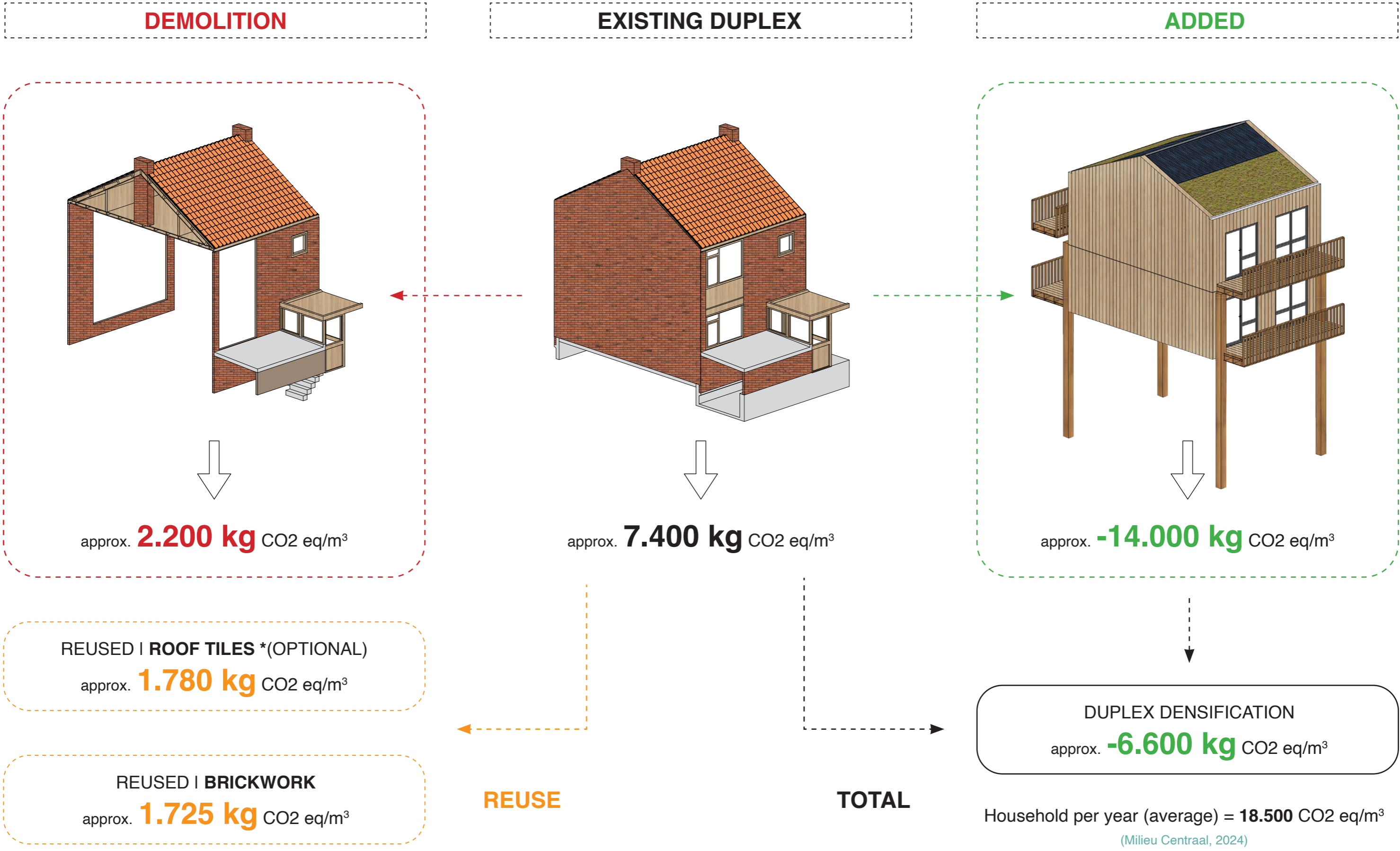


(D) Garden City



- Preserved relationship between buildings
- Preserved public-private relationship
- Adjusted sightlines due to new height

ASSESSMENT | CARBON FOOTPRINT



THE END | THANK YOU FOR LISTENING

