

Housing Affordability in Amsterdam

Mid-income Rental Housing



P5 Presentation | MSc4 Architecture, Urbanism and Building Sciences, TU Delft | Dwelling Graduation Studio | Dutch Housing
Arne Harboe Sørensen | 4435478 | a.harboesorensen@tudelft.nl

Mentors: Theo Kupers, Ferry Adema, Pierijn van der Putt

1. Introduction Graduation Studio

2. Location Research

3. Problem Statement

4. Housing Affordability

5. Design Site

6. Plan

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Dutch Housing Graduation Studio

Stronghold Amsterdam

- Design Task: design a housing project that fits in a scenario for the future of Amsterdam.
- Study: historical, present day and future challenges of Amsterdam -> scenario.
- Design Site: entire belt of former defence works, which runs around the city center.
- Aim: creating an urban fabric that is vibrant, denser, more diversified and more sustainable than before.



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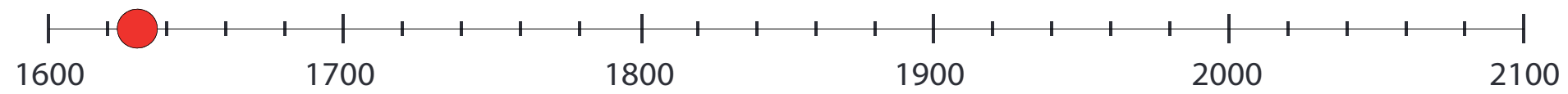
5. Design Site

6. Plan

Singelgrachtzone

Historic growth -1630

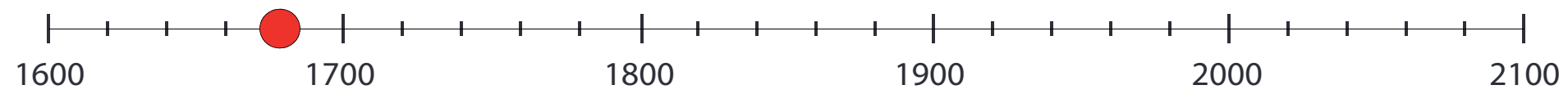
LOCATION



Singelgrachtzone

Historic growth -1680

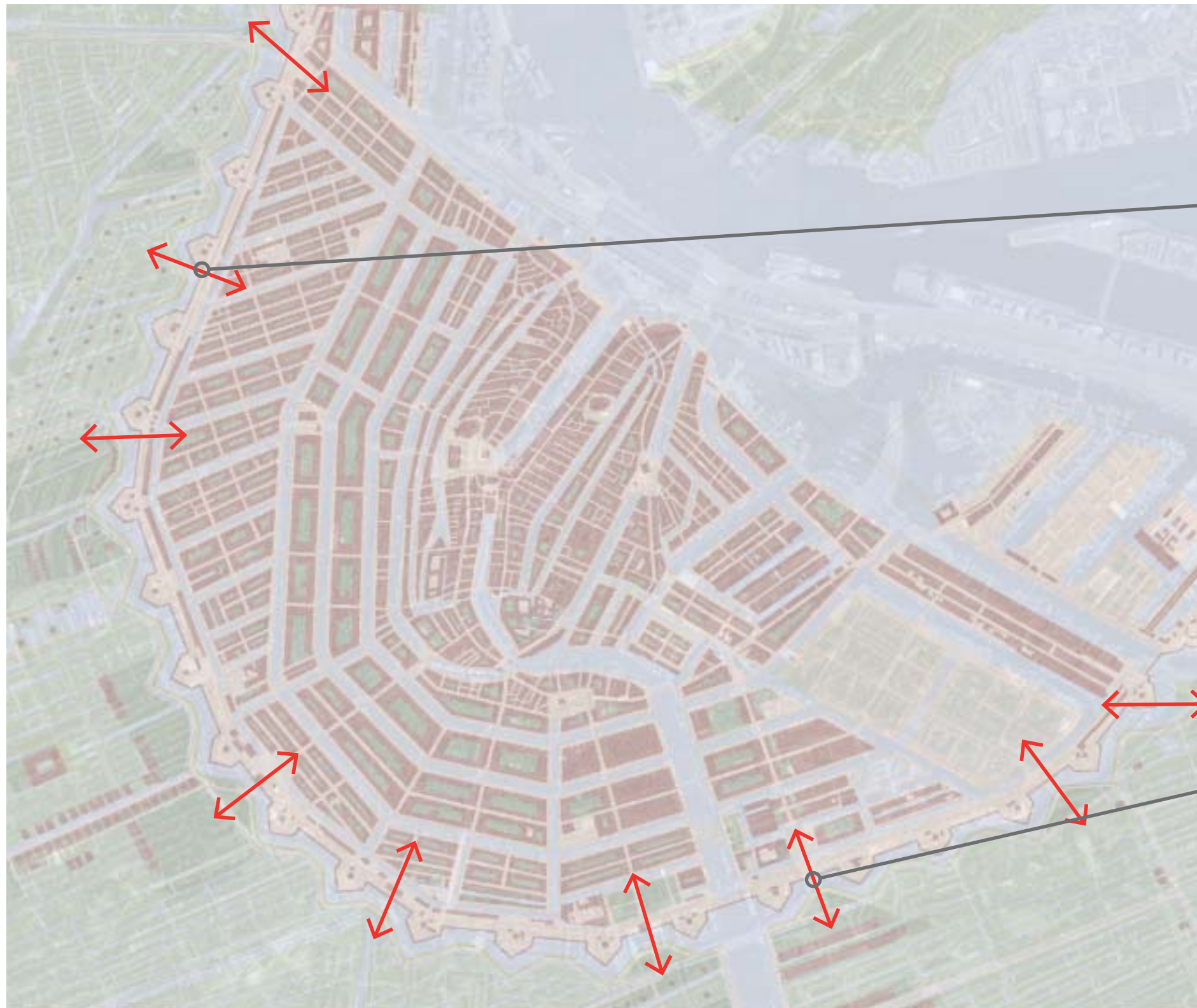
LOCATION



Singelgrachtzone

Historic growth -1680

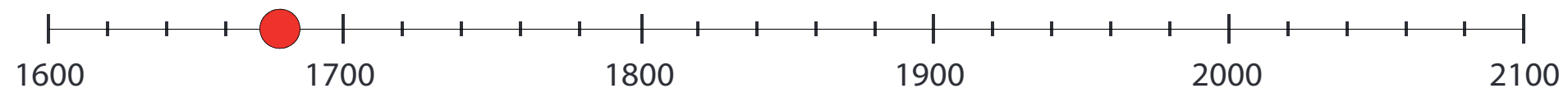
LOCATION



Zaagmolenpoort, 1664



Weesperpoort, 1662



Singelgrachtzone

Historic growth -1850

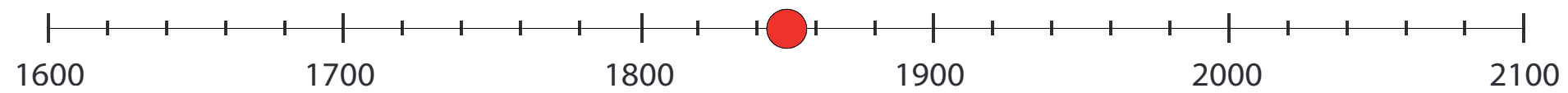
LOCATION



Amsterdamse-Pijp Gas Company, 1826



Hollandsche Gazfabriek, 1845



Singelgrachtzone

Historic growth -1940

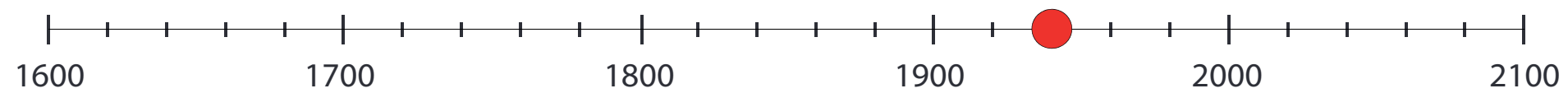
LOCATION



Marnixstraat, 1900



Groenmarkt (market district), 1890



Singelgrachtzone

Historic growth - 2017

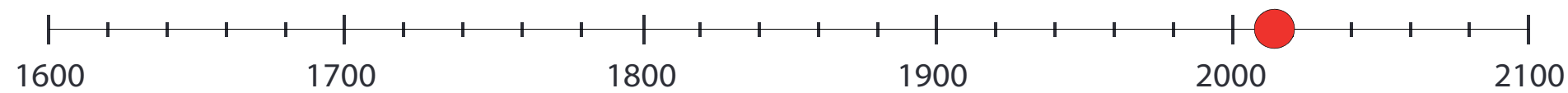
LOCATION



Marnixstraat, 1998



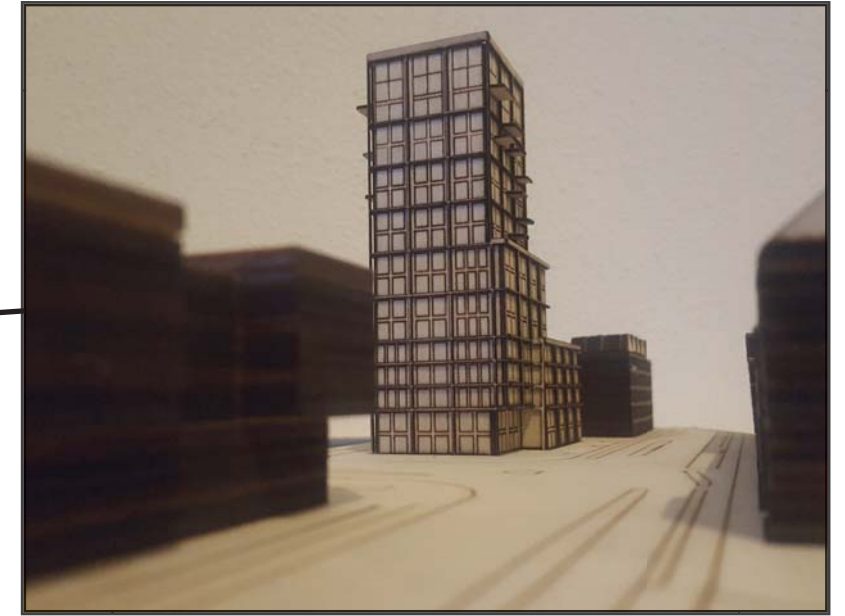
Het Marnix (public swimming pool), 2006



Singelgrachtzone

Historic growth - 2040

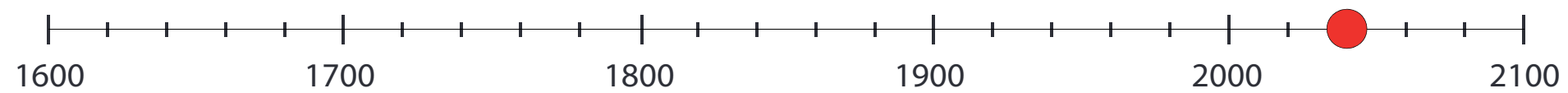
LOCATION



Marnixstoren, 2020?



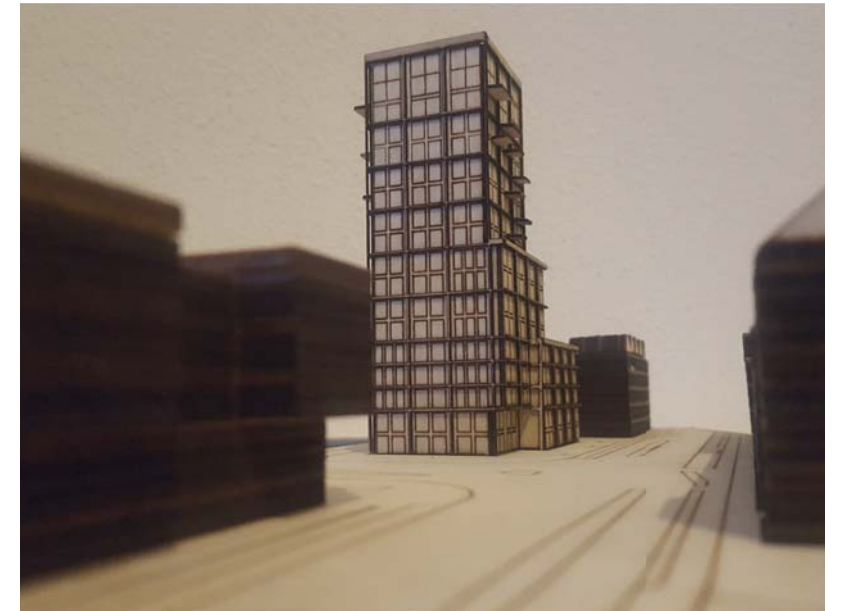
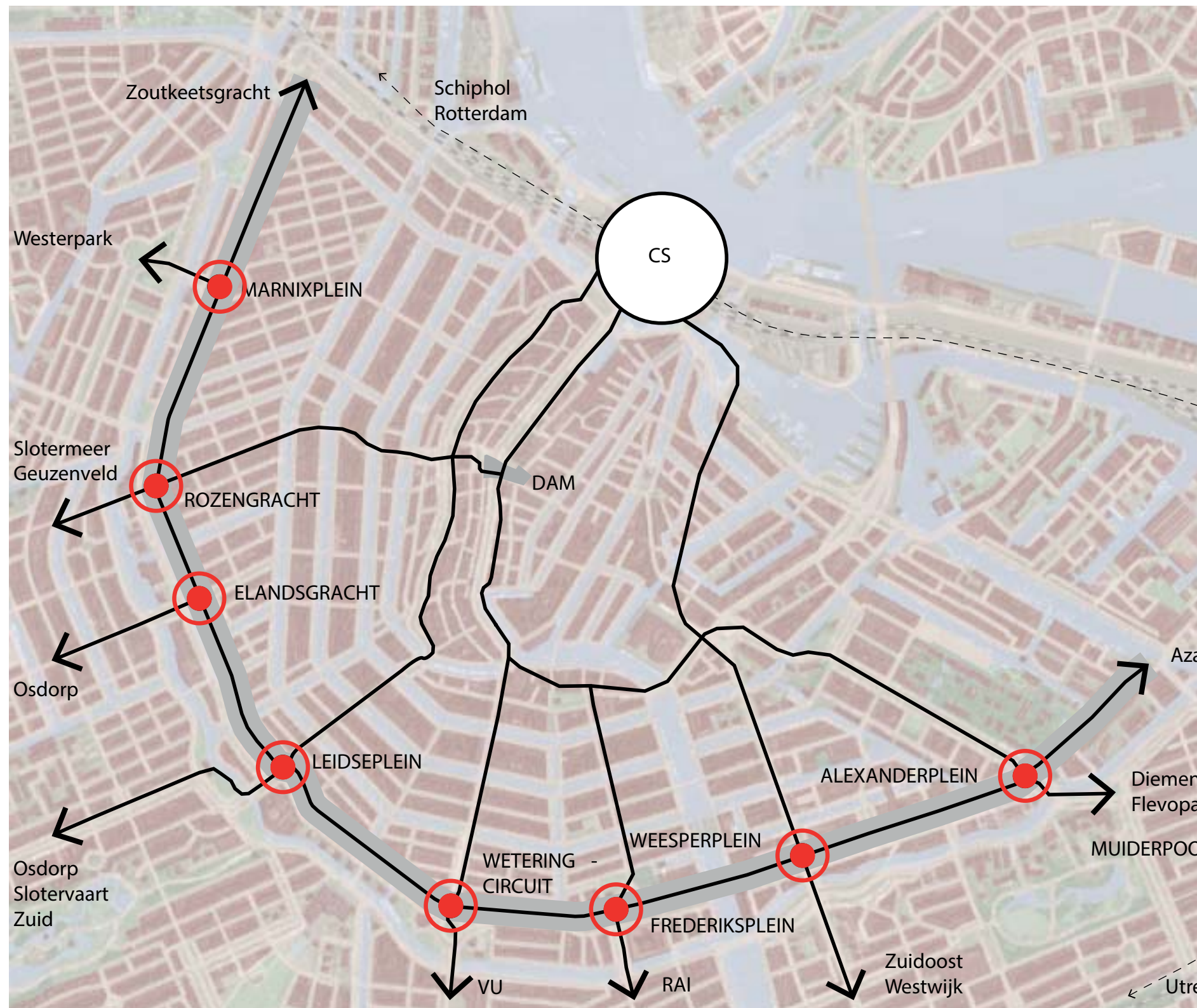
High-rise Weesperplein, 2018



Singelgrachtzone

Historic growth - 2040

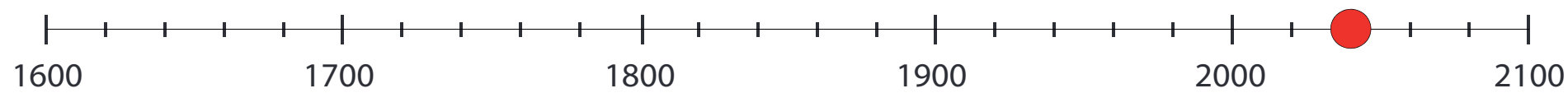
LOCATION



Marnixtoren, 2020?



High-rise Weesperplein, 2018



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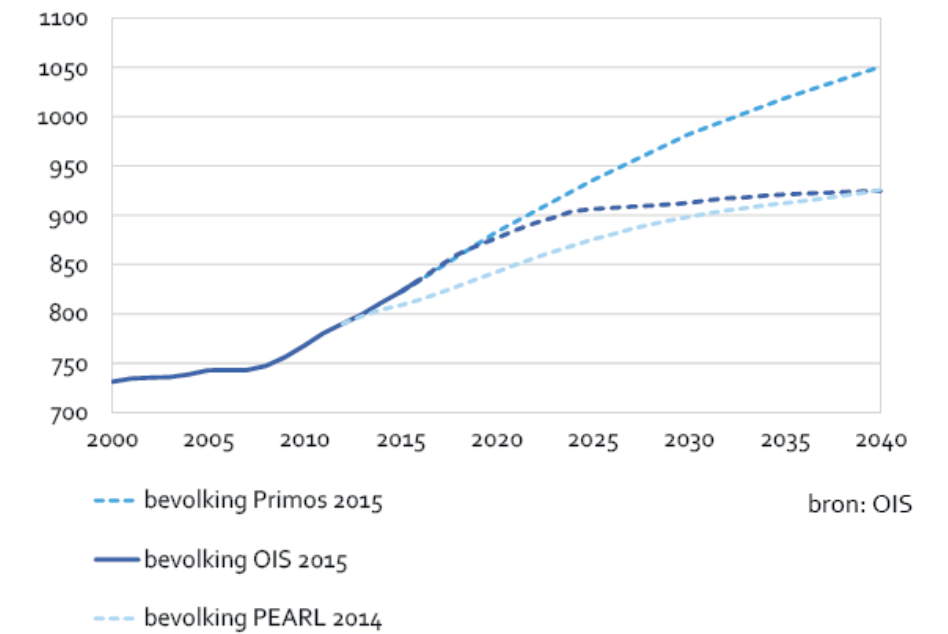
6. Plan

Future scenario

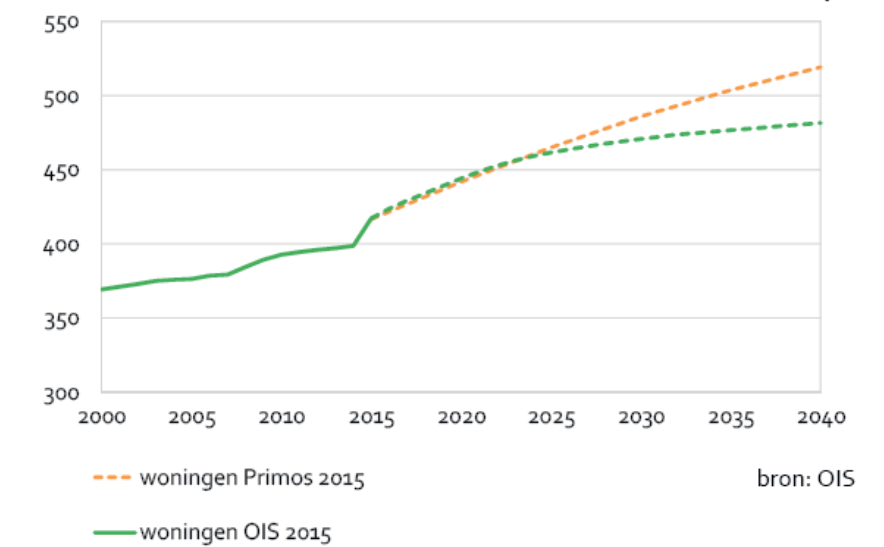
Prognosis Singelgrachtzone

- Problem 1: The prognosed population growth and housing stock causes pressure on the housing market. This drives rents and housing prices even higher, resulting in a divided city.
- Target group: If we leave it to the market, people with a low or middle income will no longer be able to live in Amsterdam

Bevolkingsontwikkeling Amsterdam volgens verschillende prognoses, 2000-2040



Ontwikkeling woningvoorraad Amsterdam volgens verschillende prognoses, 2000-2040



Future Scenario

Relevance

- Problem 2: The demand for middle-class rental housing, in the segment between € 710 - € 1.000 / month, is by far the largest
- Cause: The mid-income group does not qualify for social housing and are often locked out of home ownership, due to a lack of income and savings.
- Consequence
 - Divided city
 - Homogenisation of the population
- Target group: Mid-income group -> large and diverse group consisting of singles, couples and families that strongly contribute to the socio- economic power of the Metropolitan Region of Amsterdam.

segment	maximum rent / sales price	target group	income
Cheap social rent (top limit*)	< € 592,55	Lowest income	€ 22.200
	< € 635,05	Lowest income	€ 30.150
Social rent	< € 710,68	Low-income	€ 36.135
Cheap Sales	< € 152.000	Low-income	€ 36.135
Mid-rent	€ 711 - € 1000	Mid-income	€ 34.911 - € 43.786
Affordable sales	€ 152.000 - € 200.000	Mid-income	€ 34.911 - € 43.786

- Solution: Amsterdam encourages the development of at least 20.000 mid-income rental homes until 2025
- Design task: Provide adequate and affordable housing for the middle class and create an urban fabric that is vibrant, denser, more diversified and more sustainable than before.

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Housing Affordability

Mid-income housing

- Question: *Which design principles can be used to enhance housing affordability for mid-income households in Amsterdam's city center?*
- Aim: Facilitate in newly built rental apartments in the price range of € 700 and € 1.000 per month

Case Study

Mid-income housing



1. COUBERTIN ZEEBURG



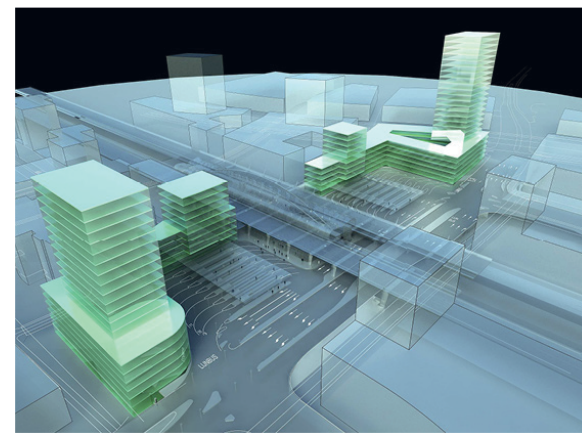
2. STELTLOPER



3. POORT VAN TOOROP



4. SANDEBAK



5. 3N4



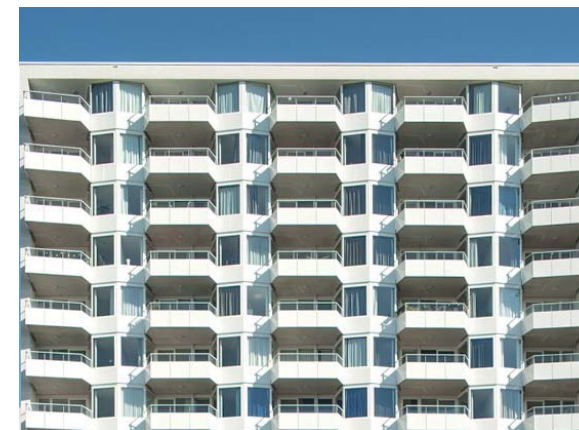
6. TOON TERWIJDE



7. SQUARE



8. KING



9. QUEEN

AFFORDABILITY

Conclusions

Case study

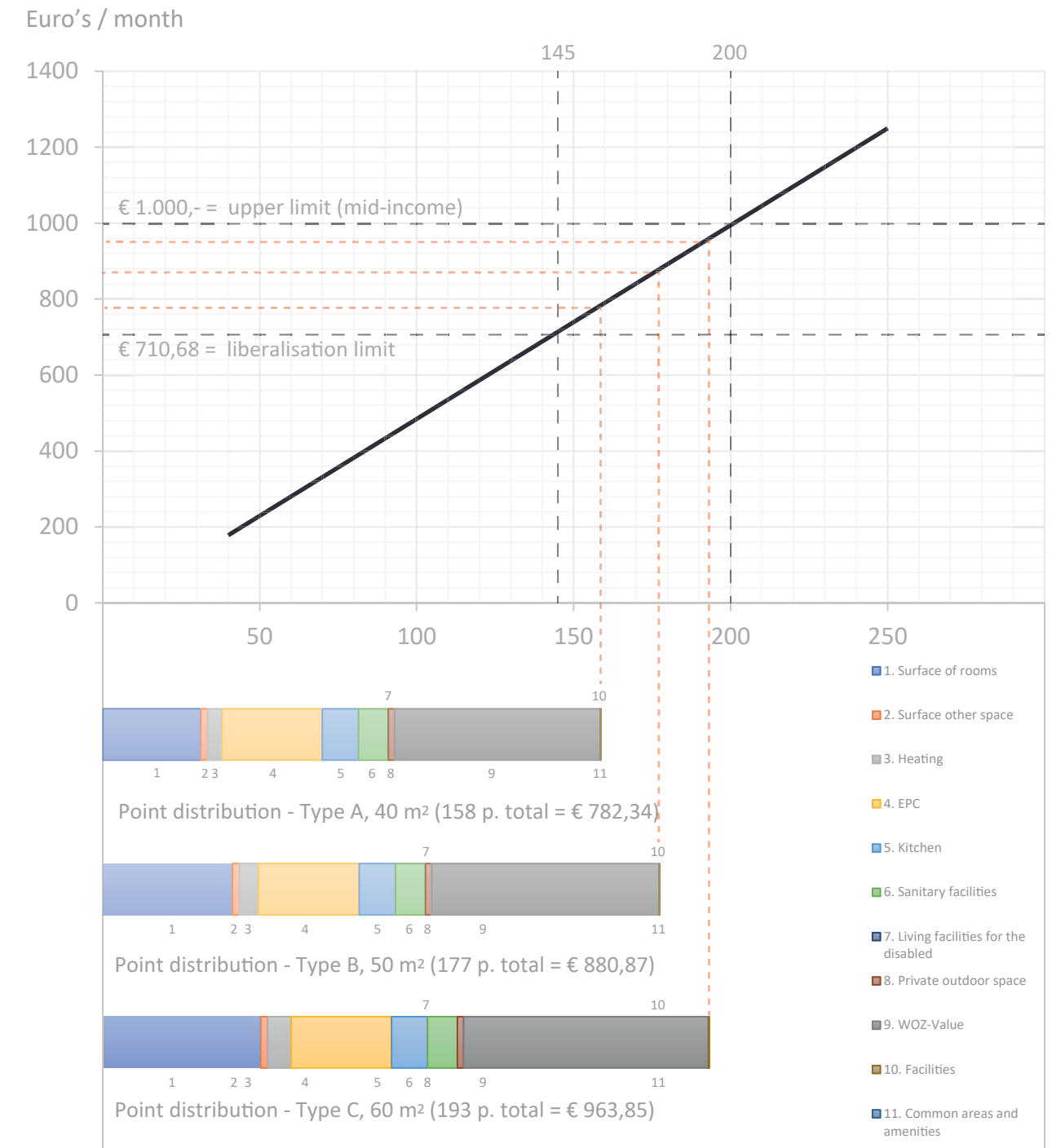
- Clear structure with an appropriate mix of different types of units within an organized grid
- (facade) materials have a lasting/durable and maintenance-friendly character. Prevent using an extensive variety of materials,
- Sustainability is based on the long-term operation of the building (in relation to own-interest)
- Focus on energy saving and reduction of CO2 emissions. (efficient climate system)
- Compact building mass, standardization, mass production/manufacturing

Property Valuation System

Rental price

- The Property Valuation System is a method to determine the height of rental housing in the Netherlands
- It translates the dwelling's characteristics into a number of points, on which the rental price is determined.
- Points are rewarded to the following categories:

1. Surface of rooms
2. Surface of other spaces
3. Heating
4. EPC
5. Kitchen
6. Living facilities for the disabled
7. Private outdoor space
8. WOZ-value
9. Facilities
10. Common areas / amenities



Conclusions

Property Valuation System

- The apartment's floor areas range from 40m² to 65m² (in accordance with rental rates from € 700 and € 1.000 per month)
- A dwelling smaller than 50m² does not require a private outdoor space

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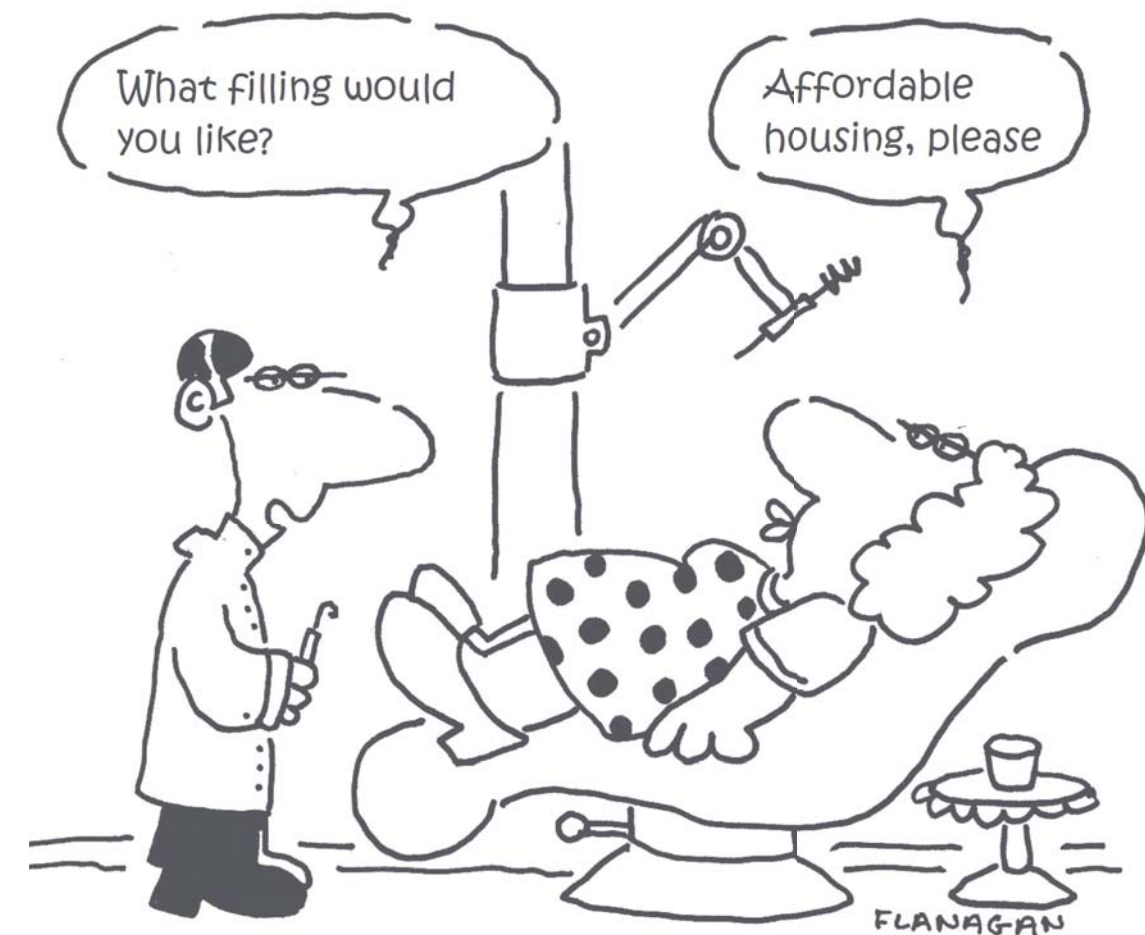
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Urban Dentistry

Scenario based strategy

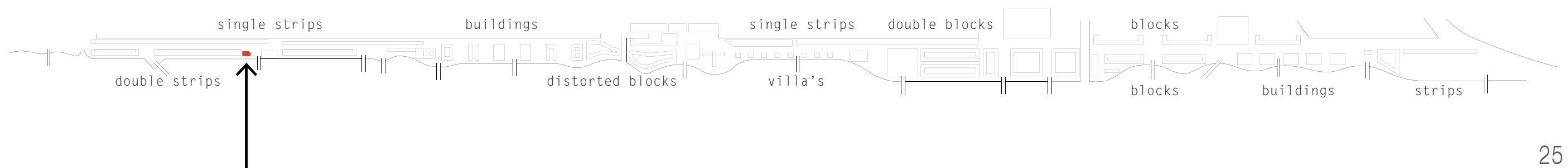
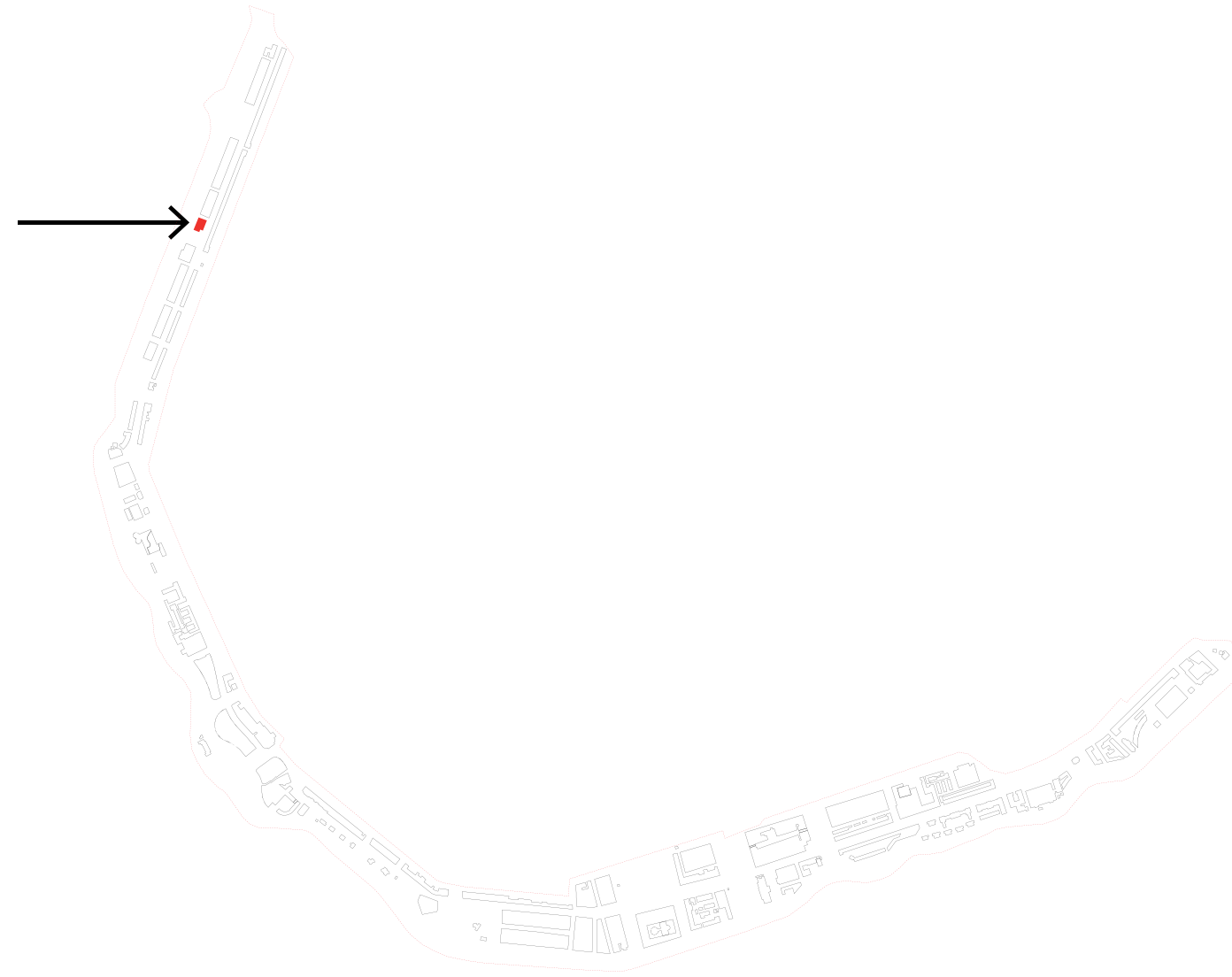
- Periodic check-up: Localize potential 'rotten teeth' within the urban fabric.
- Diagnostic assessment: Examine diagnostic criteria for assessment:
 - outdated property
 - not contributing to the city
 - low densityRecommendation for appropriate intervention/treatment.
- Intervention: Treatment or extraction of the rotten tooth/teeth
- Renewal: Replace the rotten tooth/teeth



Urban Dentistry

Site selection

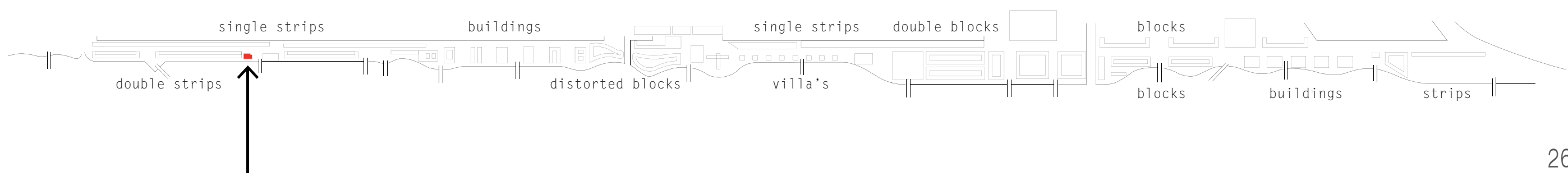
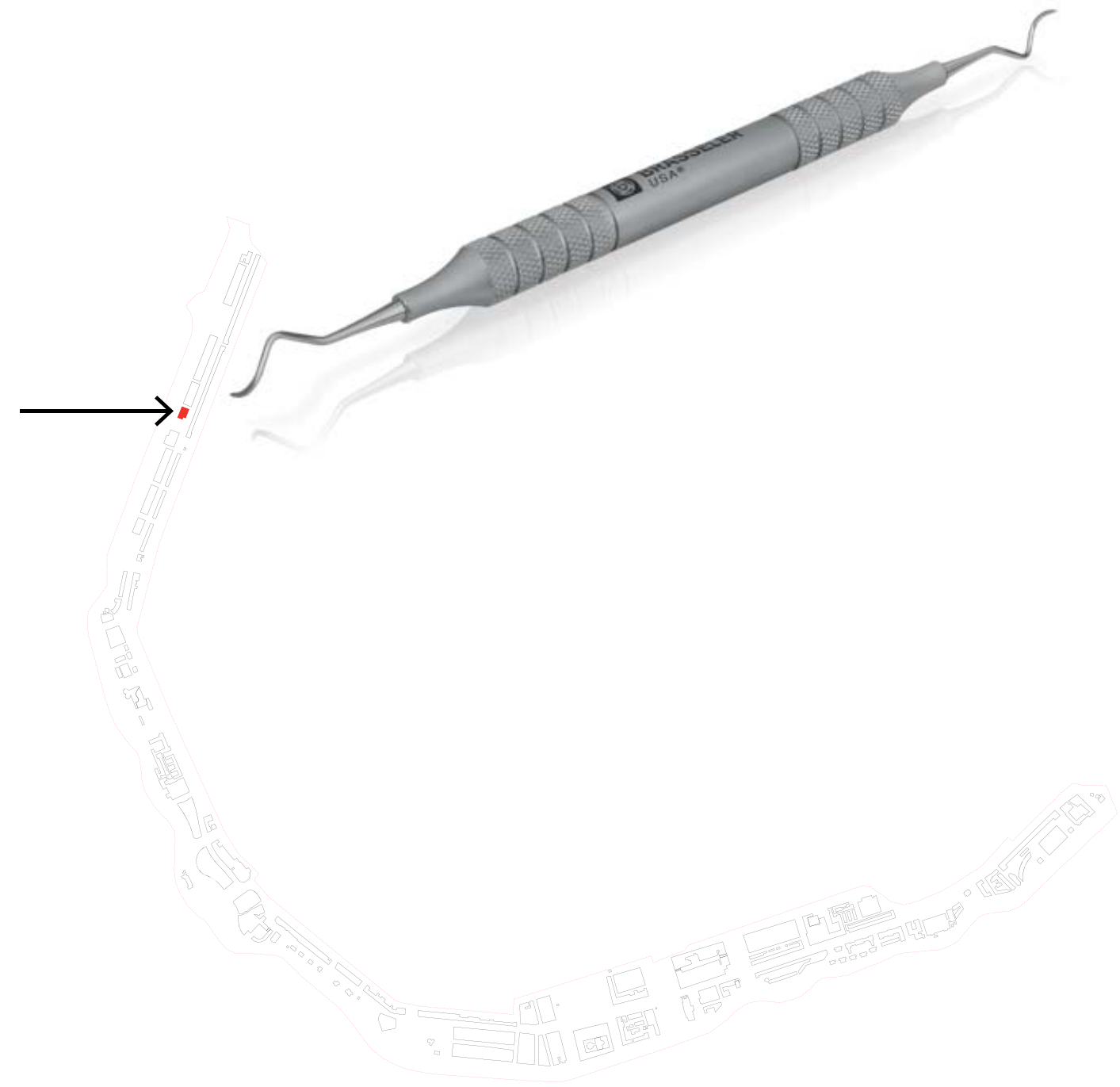
DESIGN SITE



Urban Dentistry

Site selection

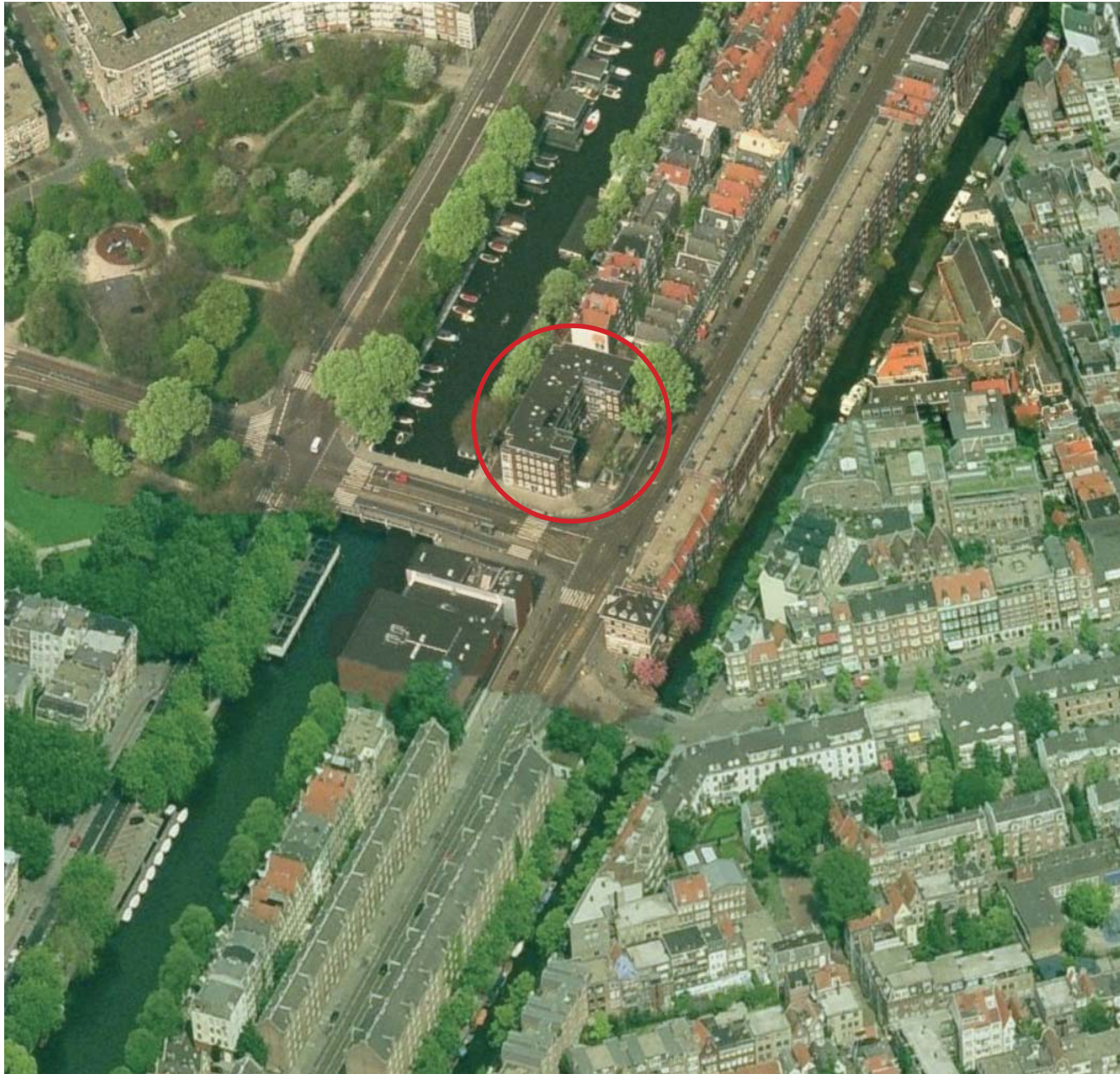
DESIGN SITE



Design Site

Marnixplein: rotten tooth

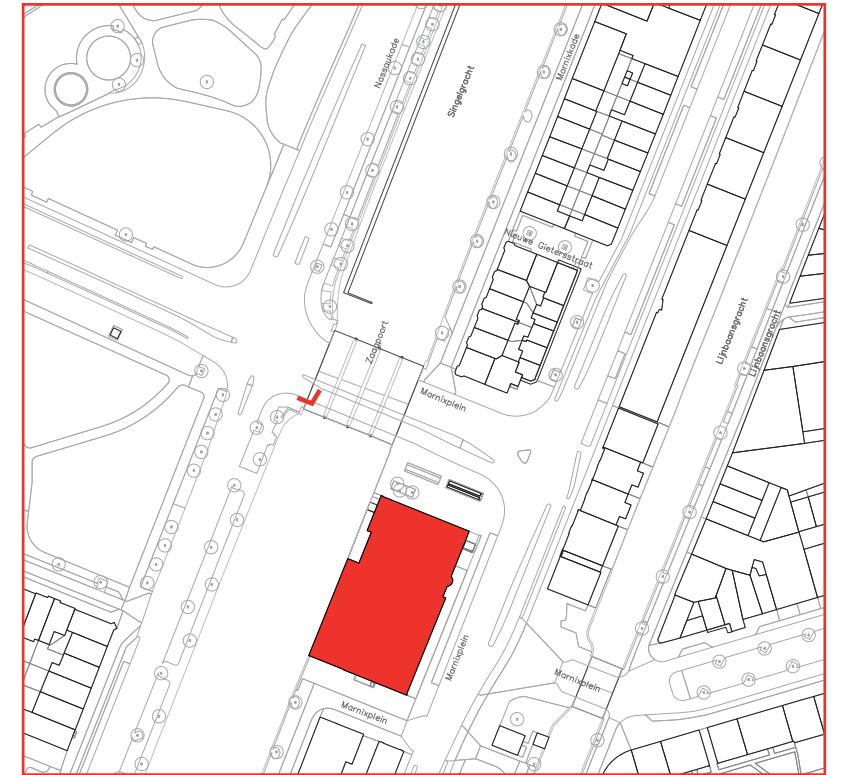
DESIGN SITE



Design Site

Het Marnix

DESIGN SITE

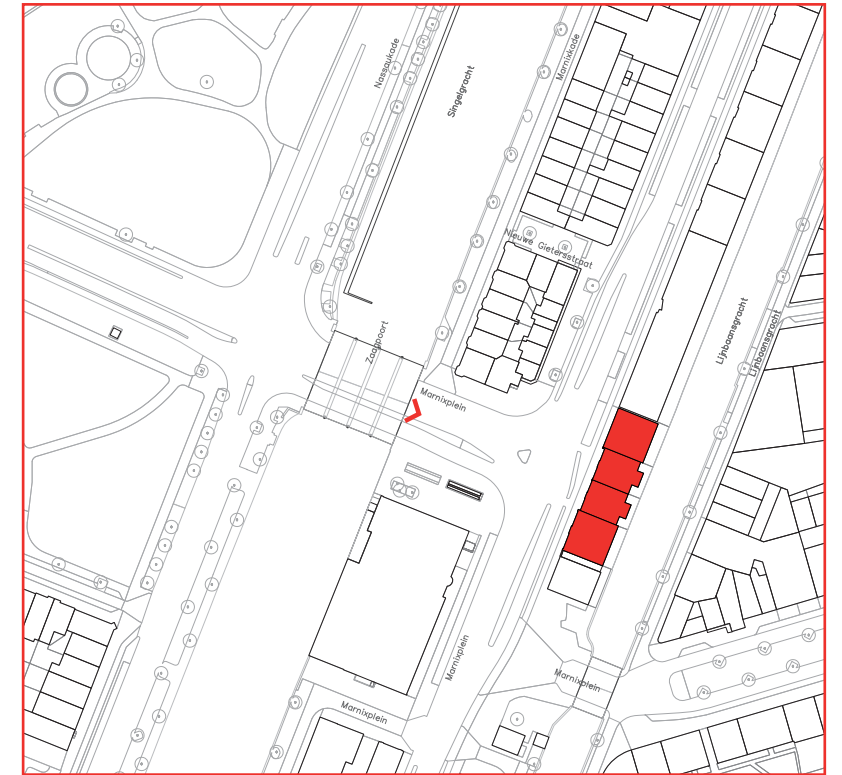


- Public swimming pool / fitness
- 2006

Design Site

Marnixplein 2-8

DESIGN SITE

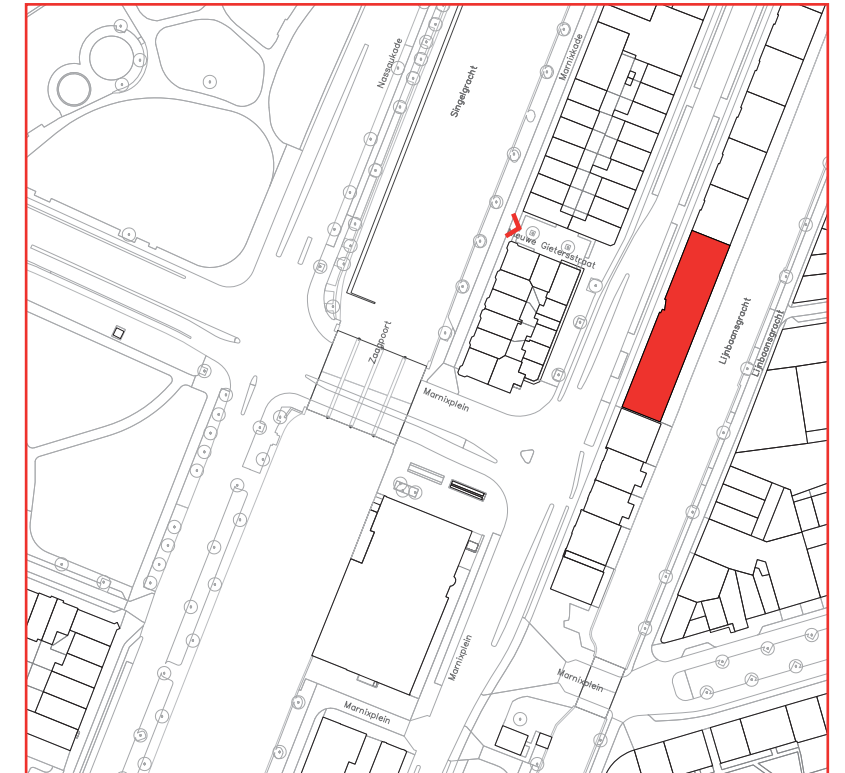


- Housing
- 1891

Design Site

Nieuwe Gietersstraat

DESIGN SITE

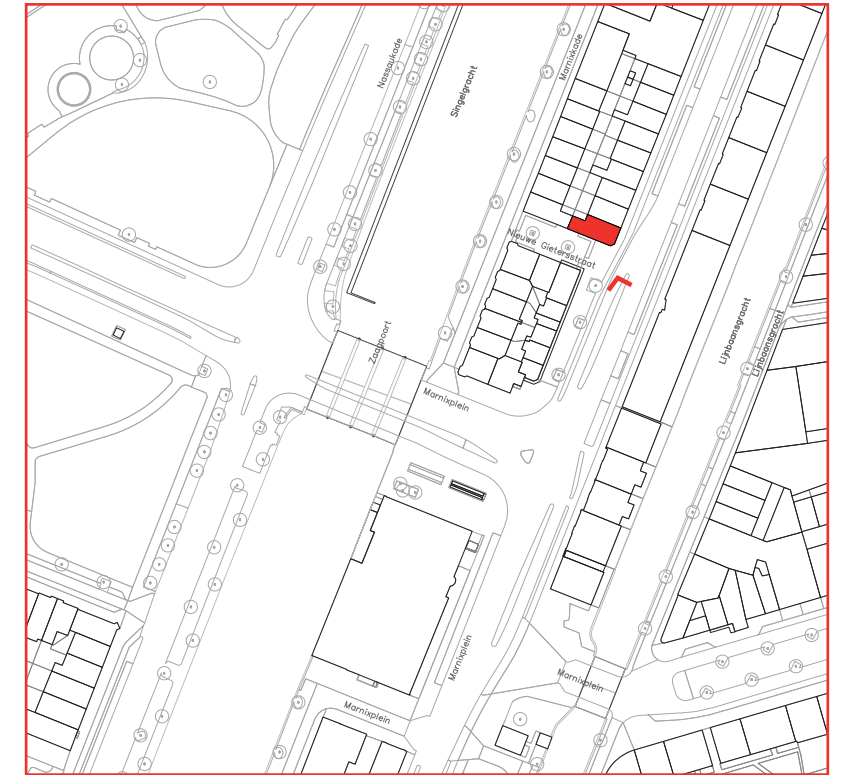


- Housing
- 1998

Design Site

Small scale retail

DESIGN SITE

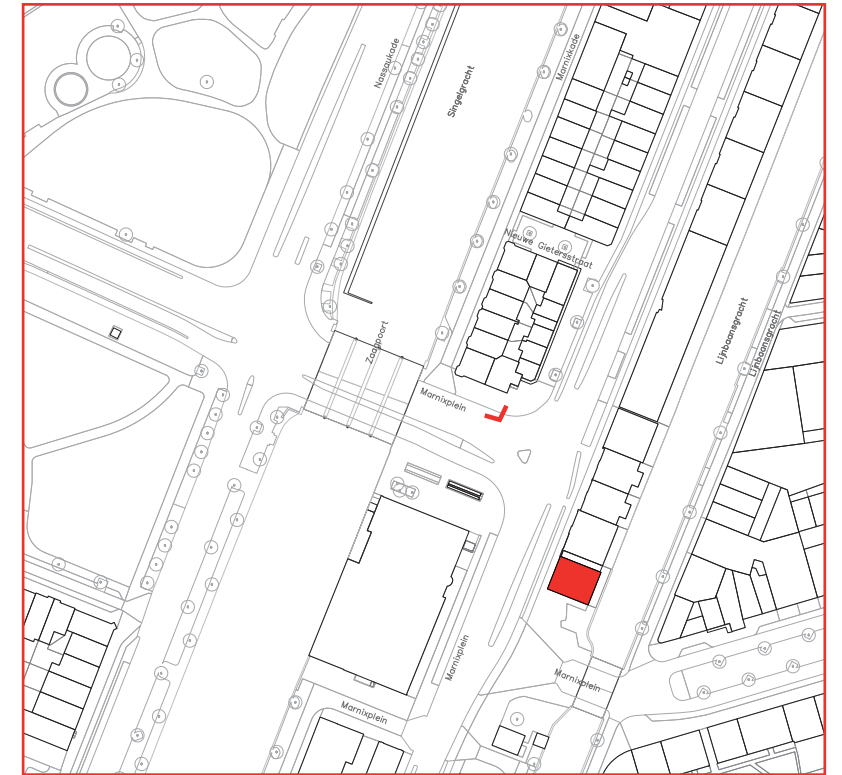


- Fruit/vegetable store
- Row housing (1874)

Design Site

Bockting

DESIGN SITE

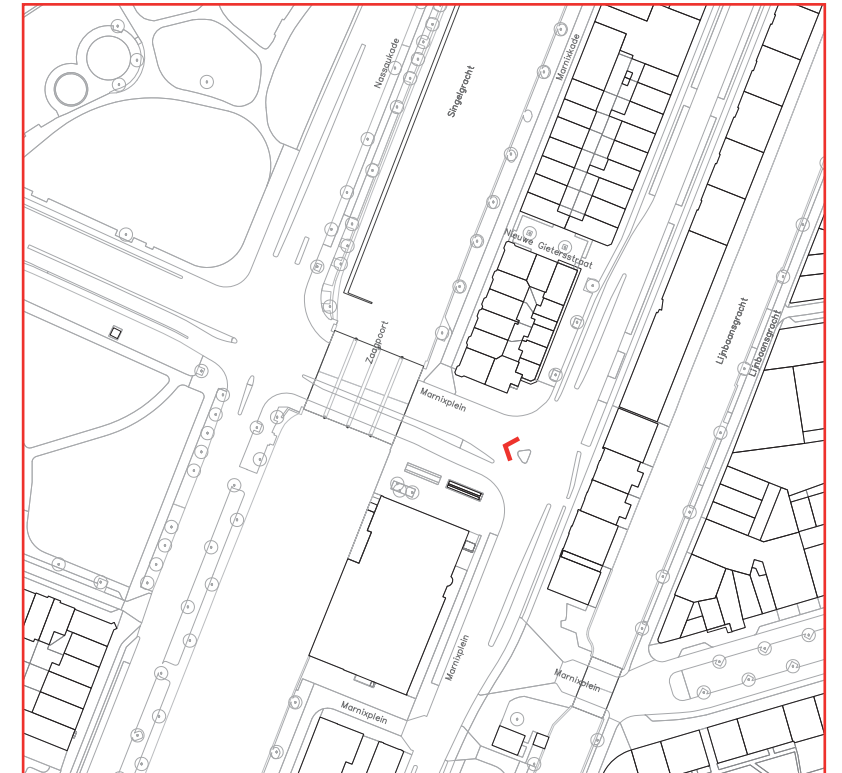


- Piano specialist shop
- 1891

Design Site

Zaagpoortbrug

DESIGN SITE

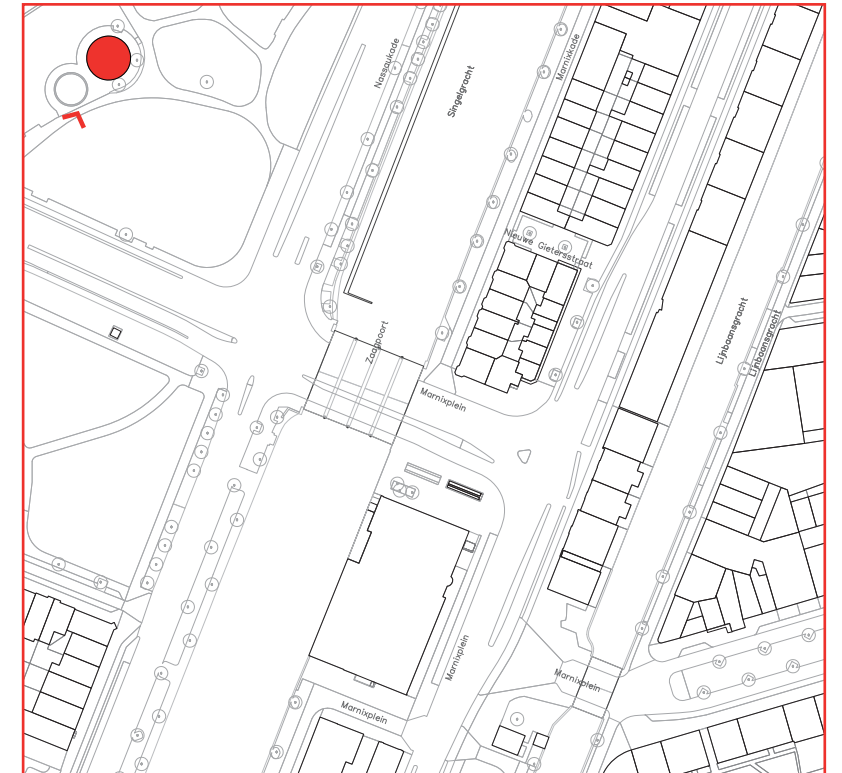


- Bridge Singelgracht
- Zaagpoortbrug

Design Site

Frederik Hendrikplantsoen

DESIGN SITE



- Public green, leisure

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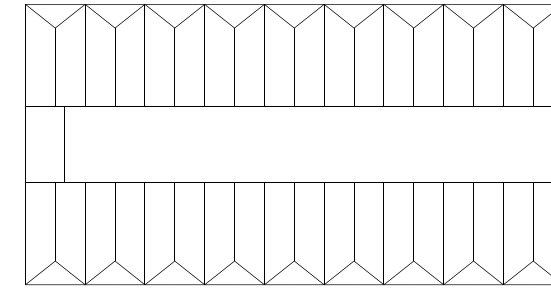
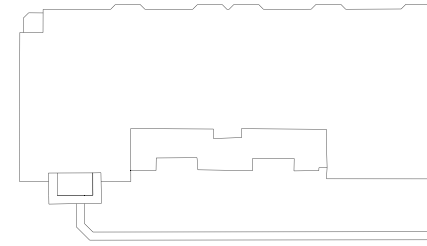
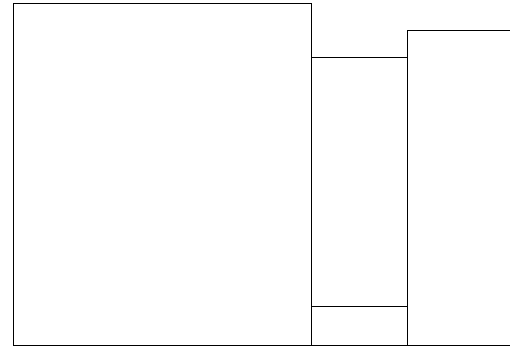
5. Design Site

6. Plan

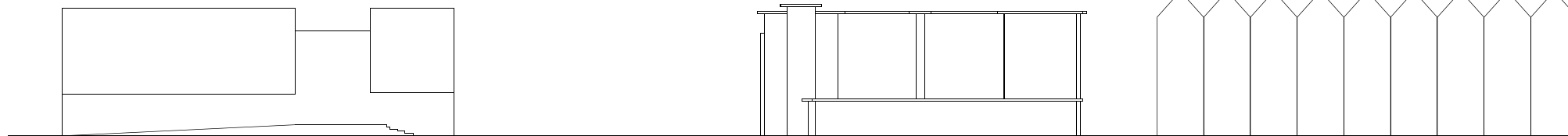
Building Concept

Existing situation

PLAN



Top view

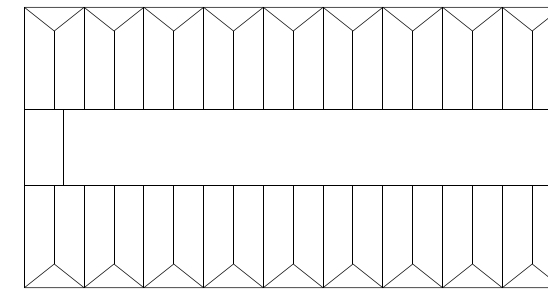
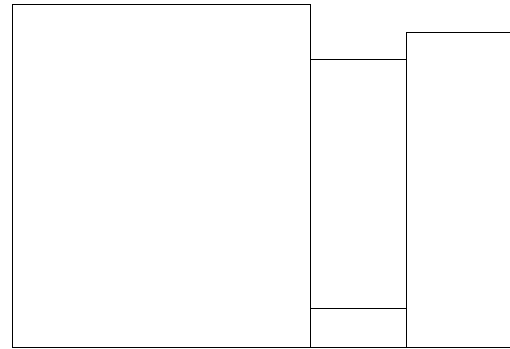


Elevation - East

Building Concept

Demolish existing structure

PLAN



Top view

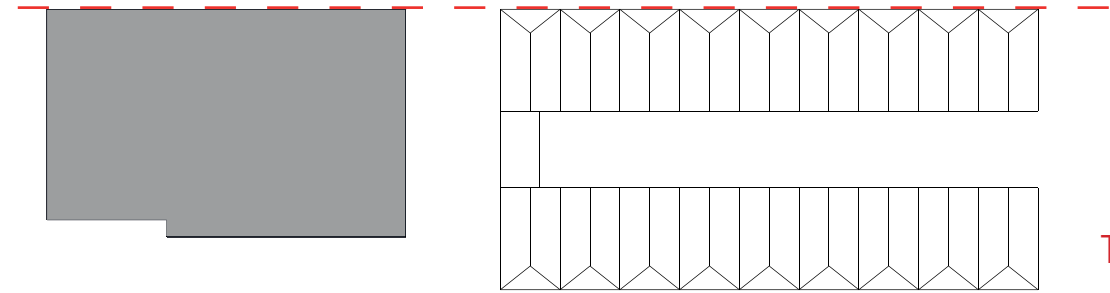
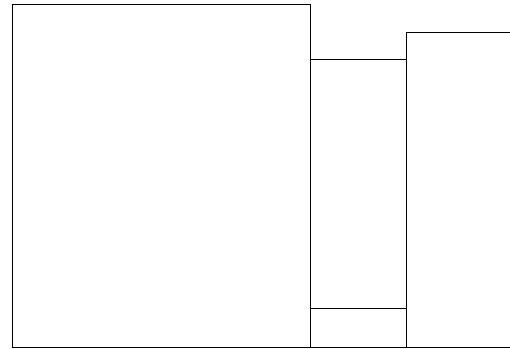


Elevation - East

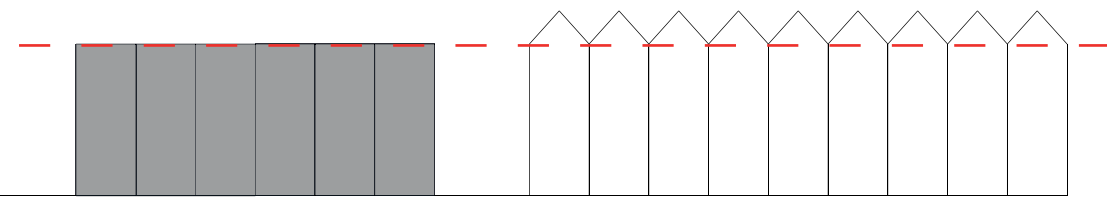
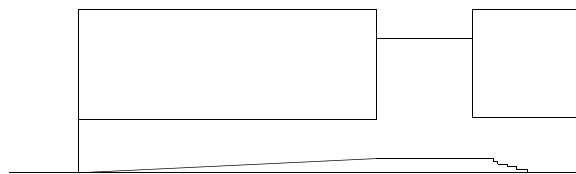
Building Concept

New mass

PLAN



Top view

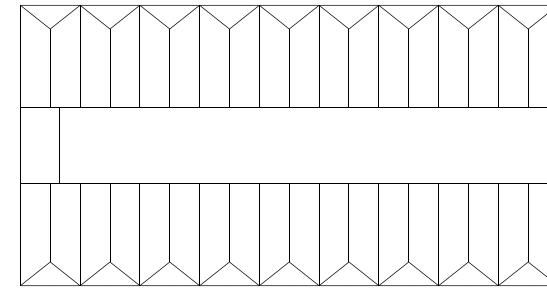
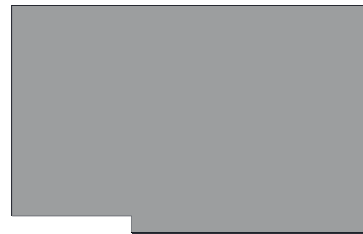
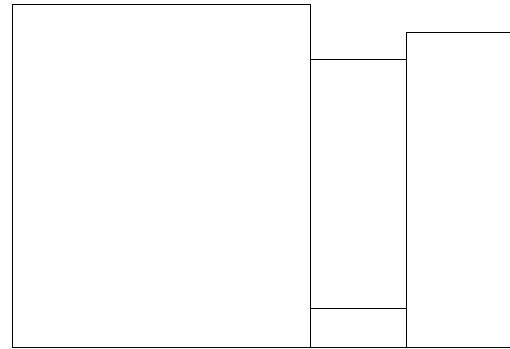


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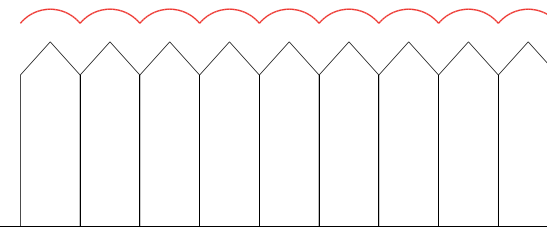
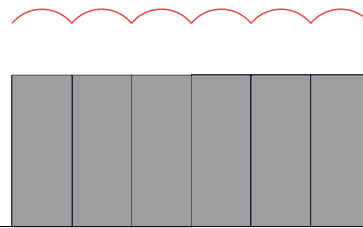
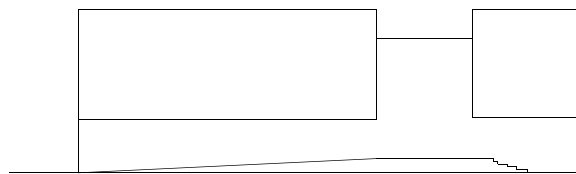
Building Concept

Continuation of the urban fabric

PLAN



Top view

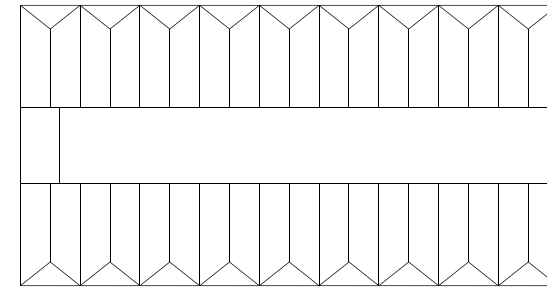
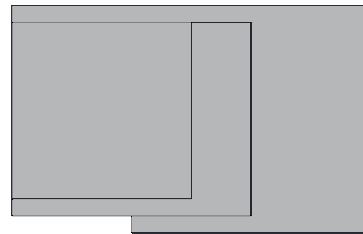
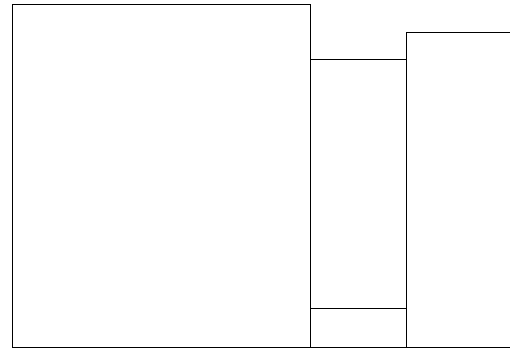


Elevation - East

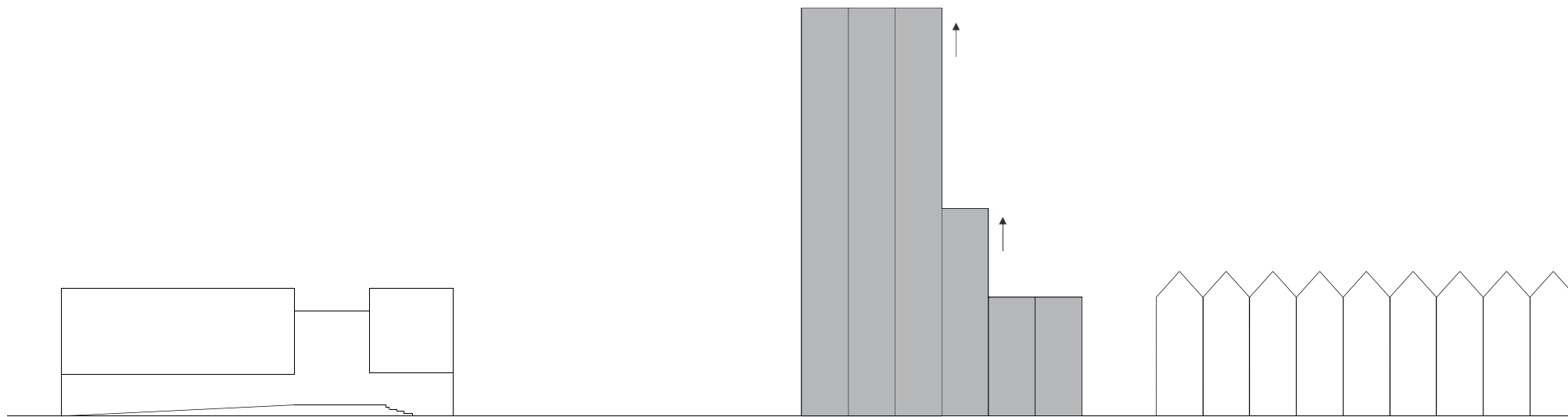
Building Concept

Cascading tower

PLAN



Top view

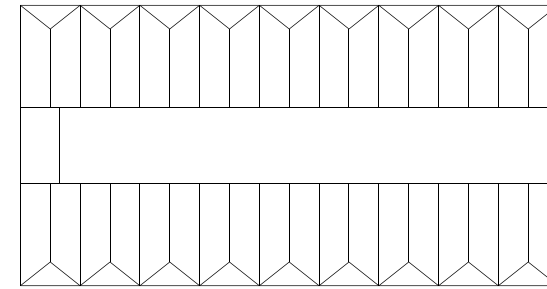
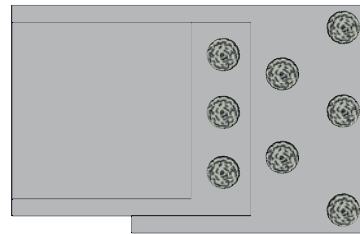
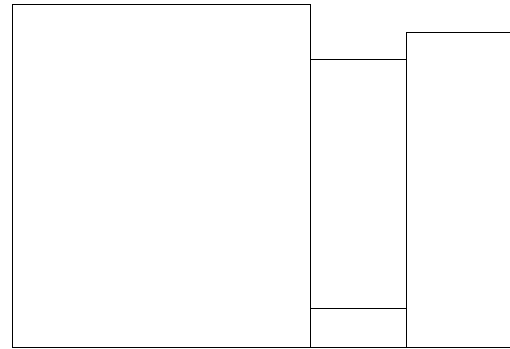


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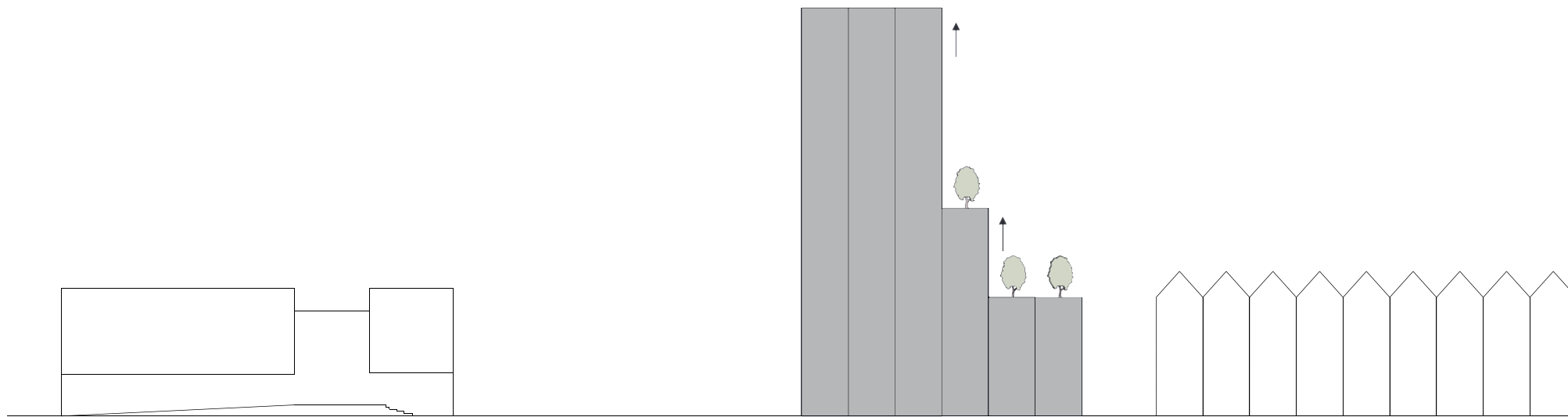
Building Concept

Common roof gardens

PLAN



Top view

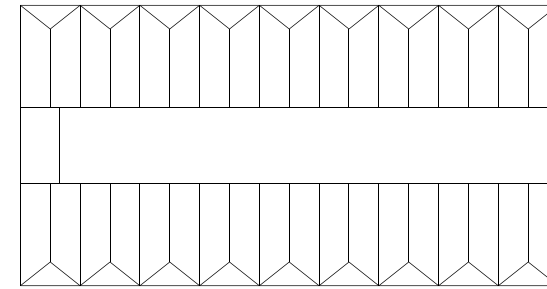
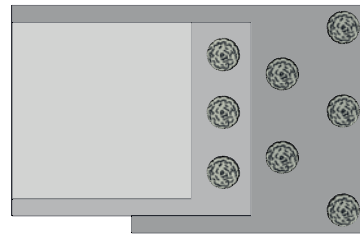
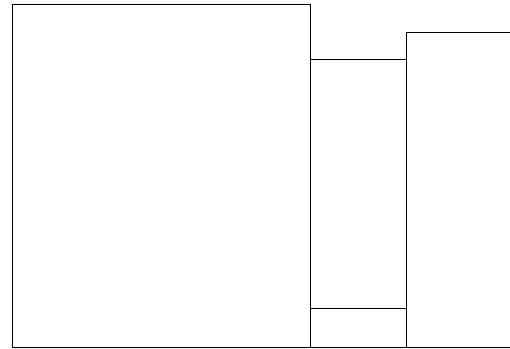


Elevation - East

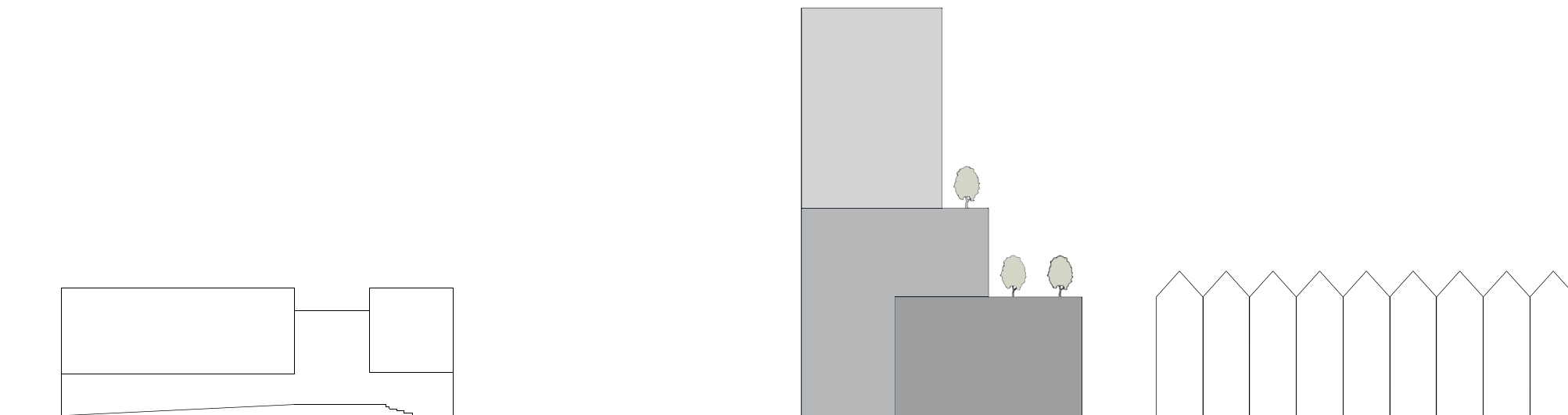
Building Concept

Setbacks split the building mass

PLAN



Top view

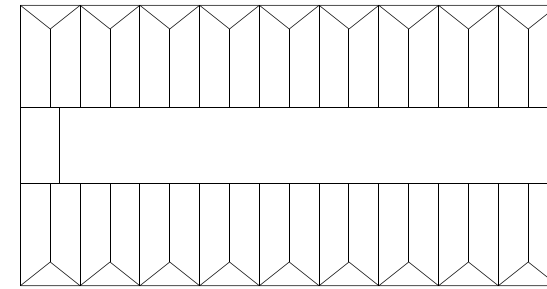
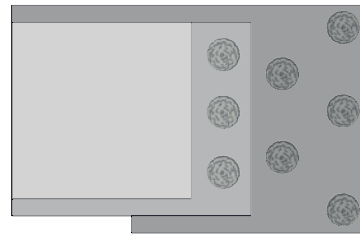
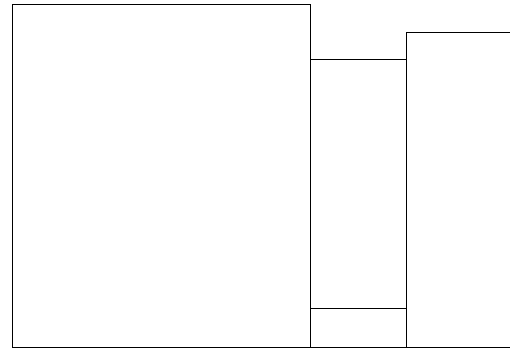


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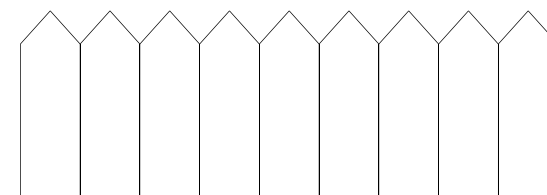
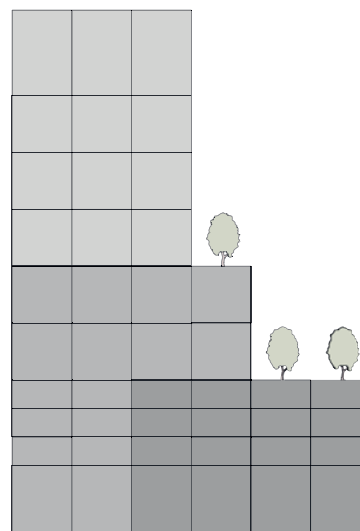
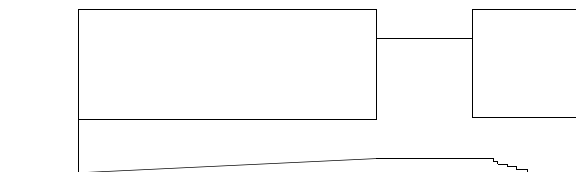
Building Concept

Framing increases 'readability' of the design

PLAN



Top view

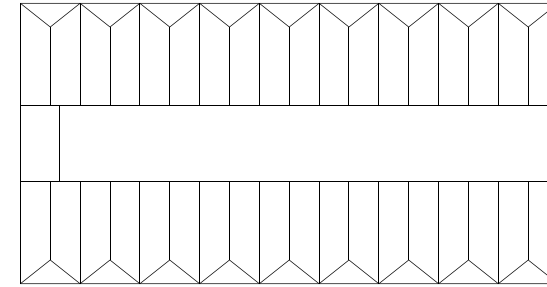
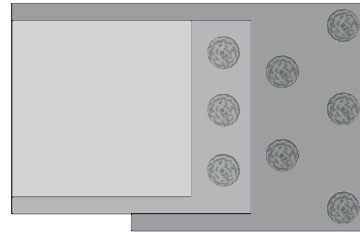
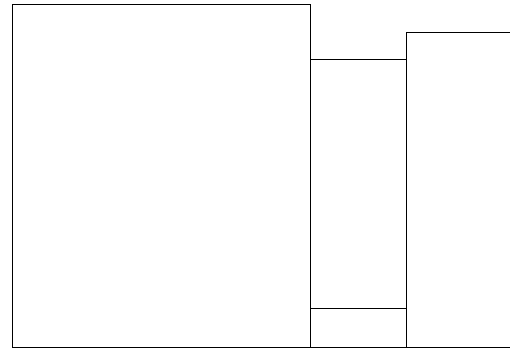


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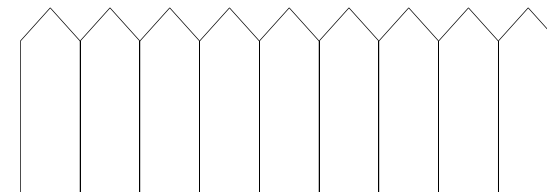
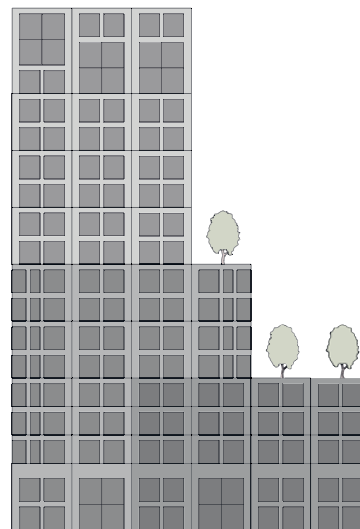
Building Concept

Facade openings

PLAN



Top view

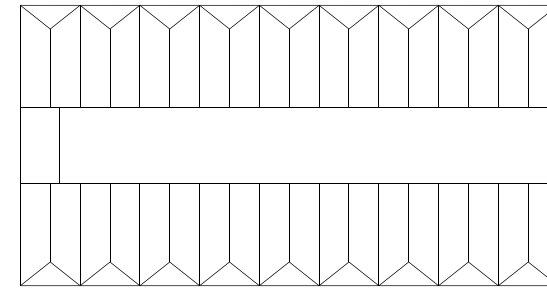
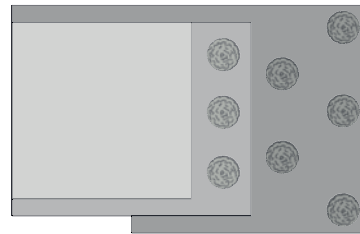
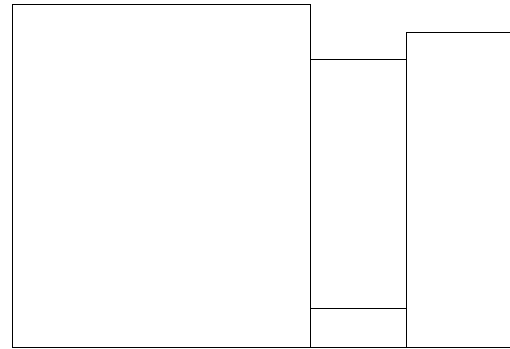


Elevation - East

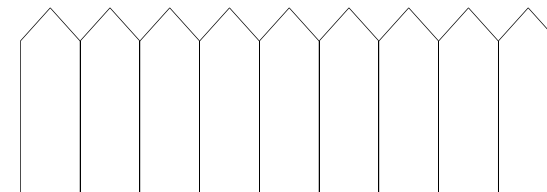
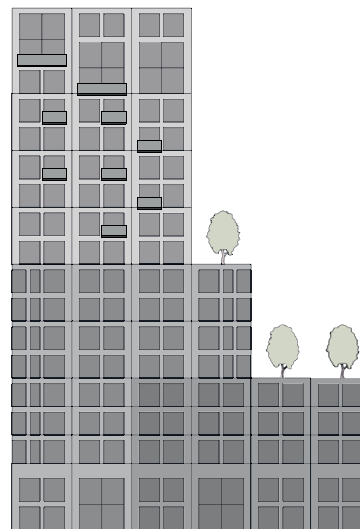
Building Concept

Balconies follow the shape of the building

PLAN



Top view

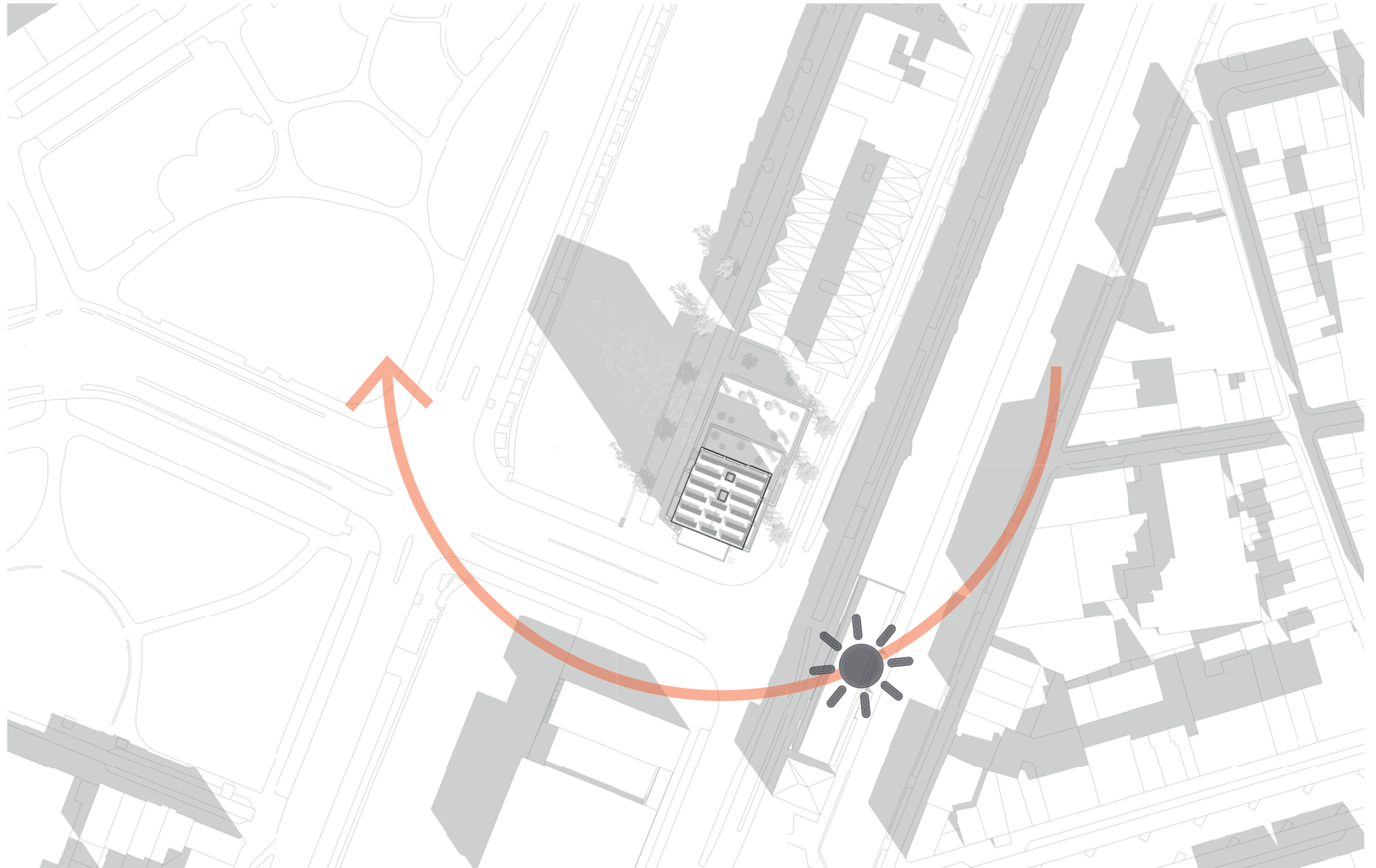


Elevation - East

Building Plans

Situation - Orientation

PLAN



Building Plans

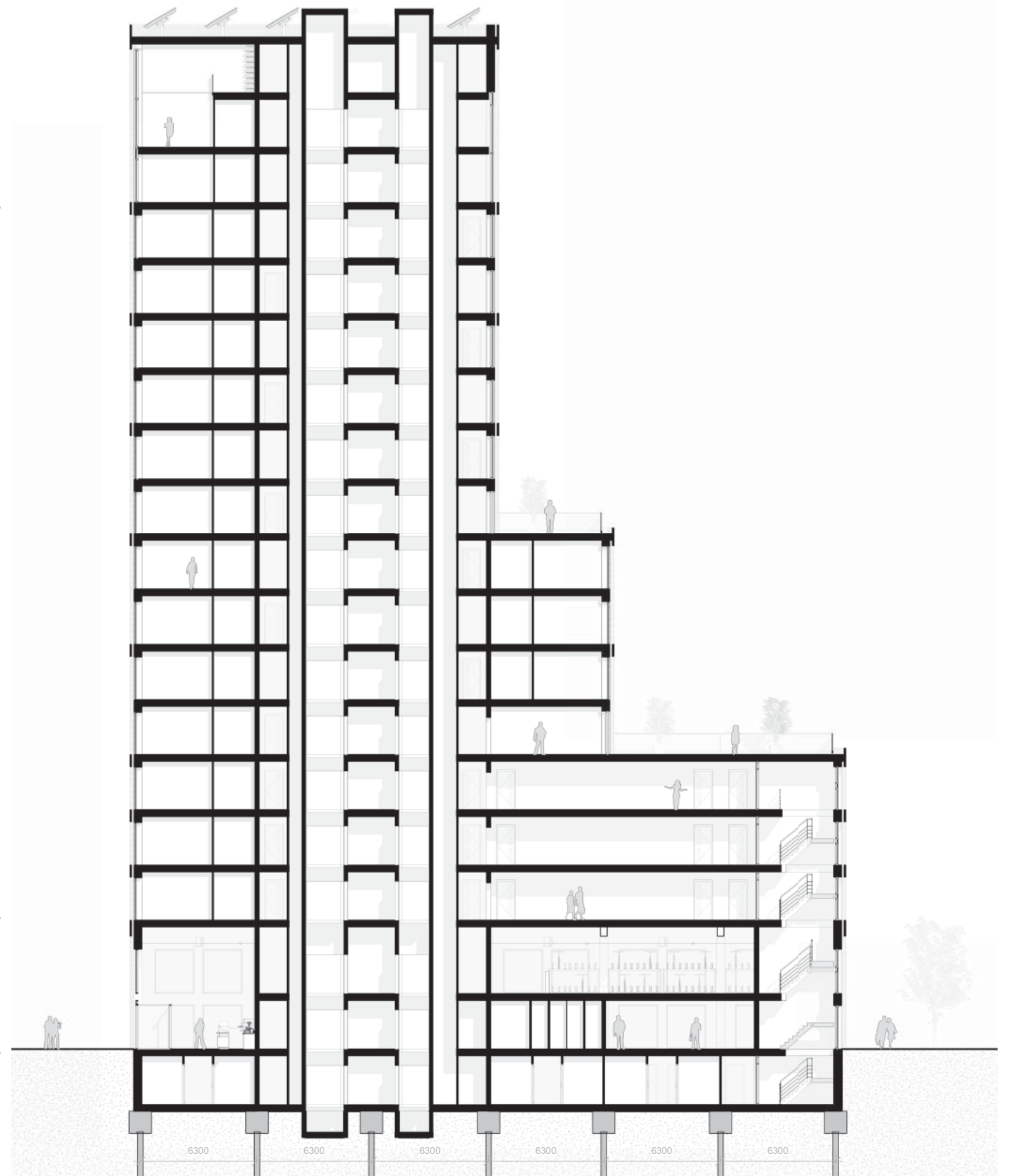
Proposed Program

Lofts (4)

Affordable dwellings (88),
common roof gardens

Commercial space (horeca),
office space, bike storage

Storage units, technical room



PLAN

Building Plans

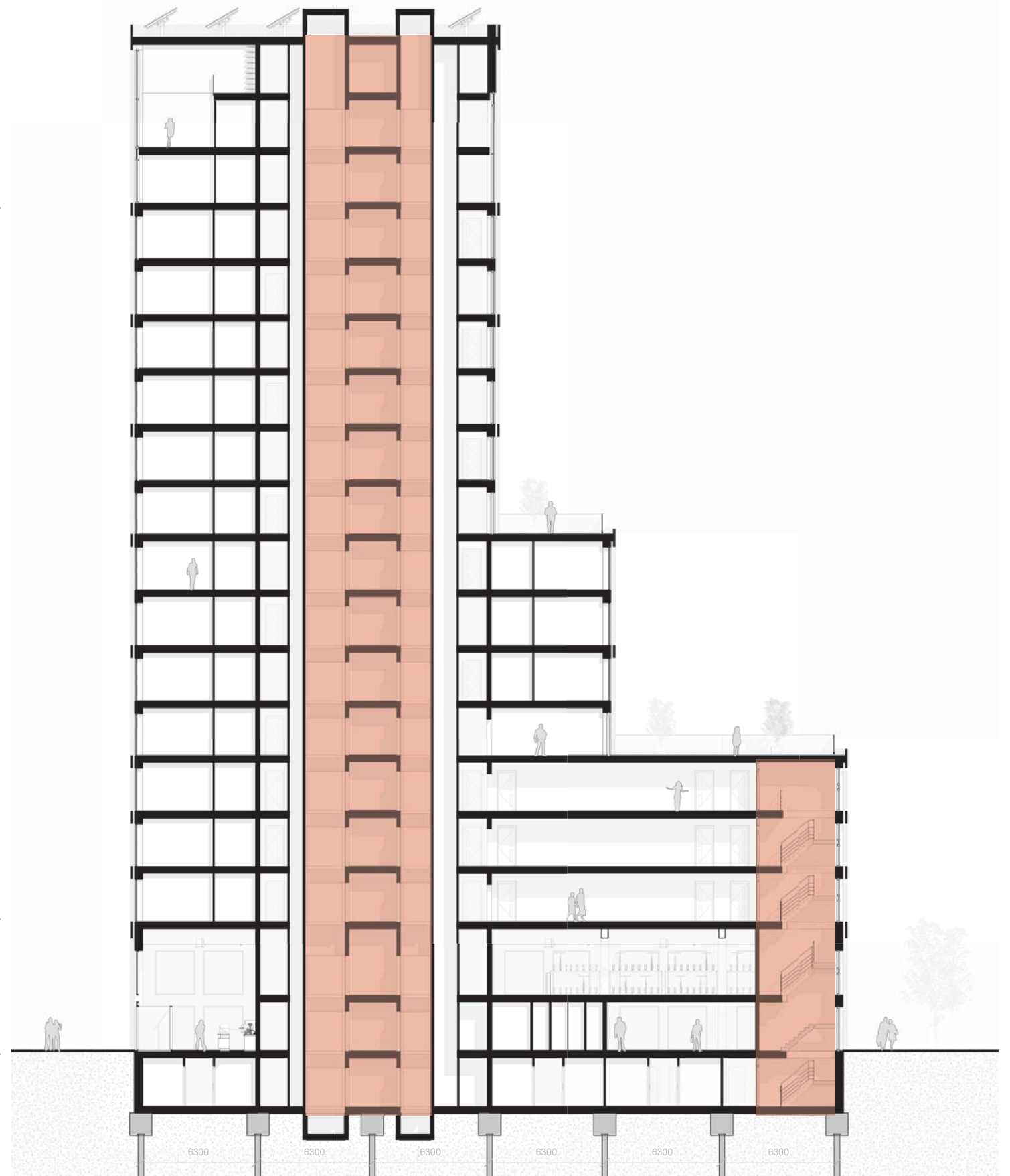
Proposed Program

Lofts (4)

Affordable dwellings (88),
common roof gardens

Commercial space (horeca),
office space, bike storage

Storage units, technical room



PLAN

Building Plans

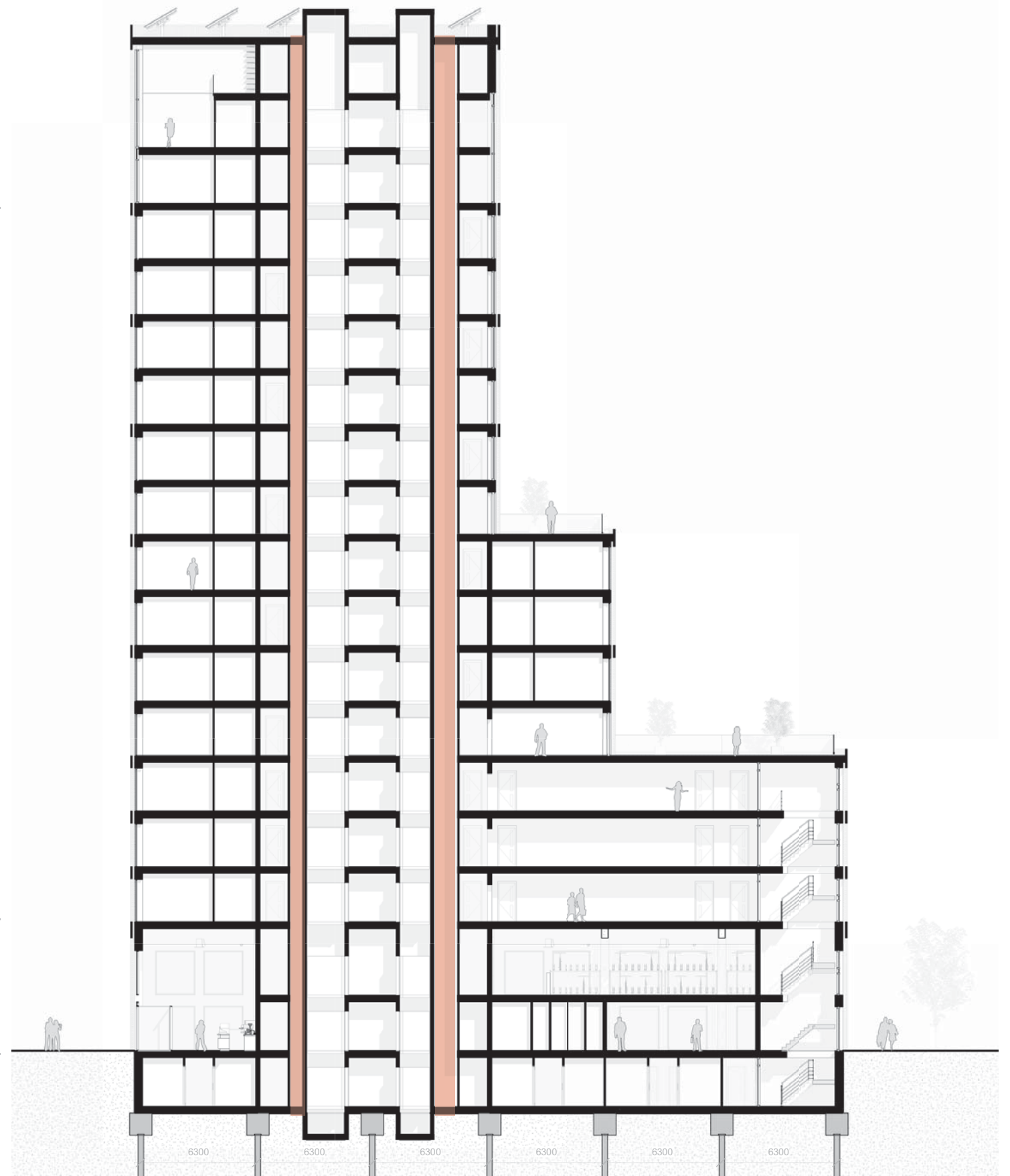
Proposed Program

Lofts (4)

Affordable dwellings (88),
common roof gardens

Commercial space (horeca),
office space, bike storage

Storage units, technical room

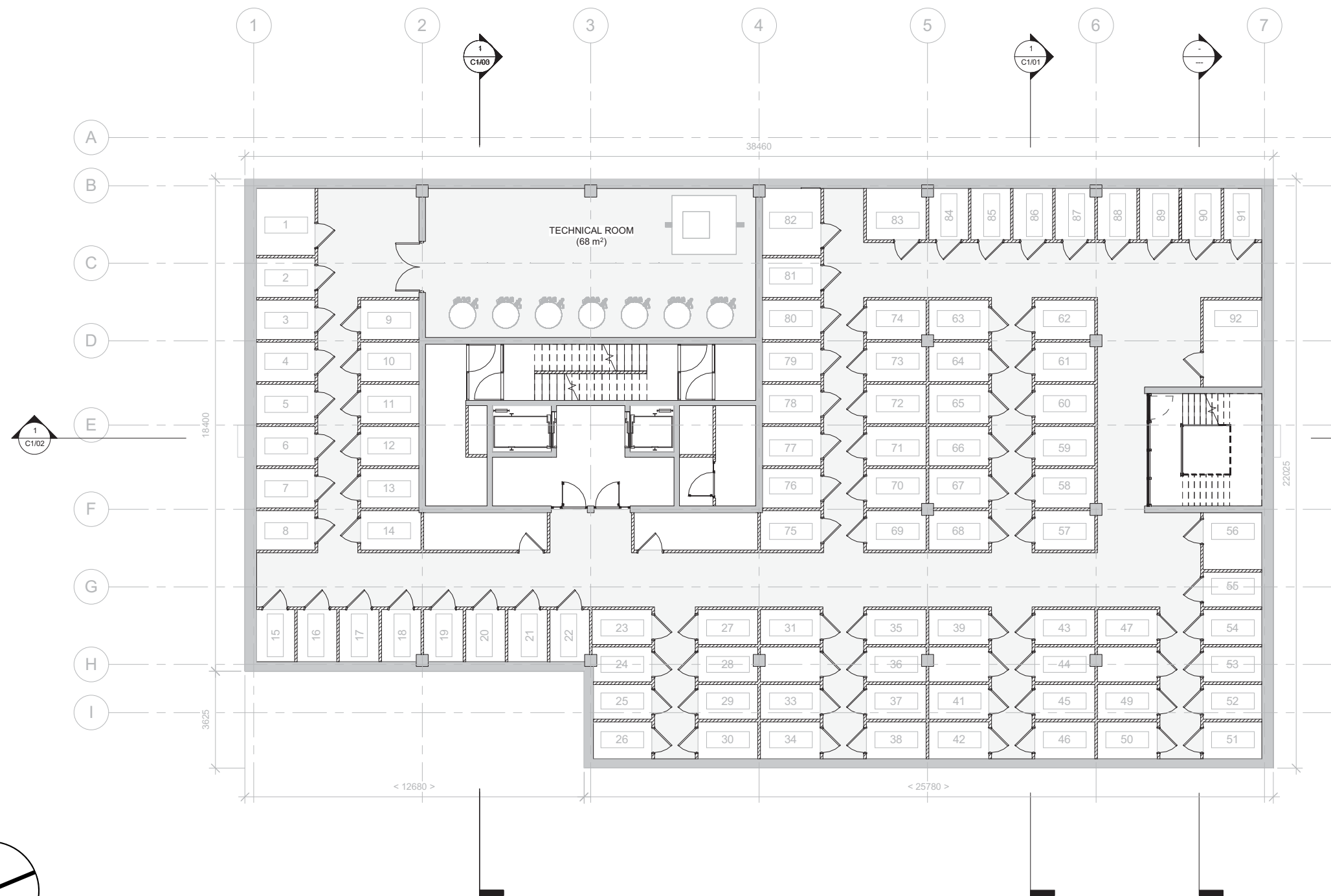


PLAN

Building Plans

Floor plan - Basement

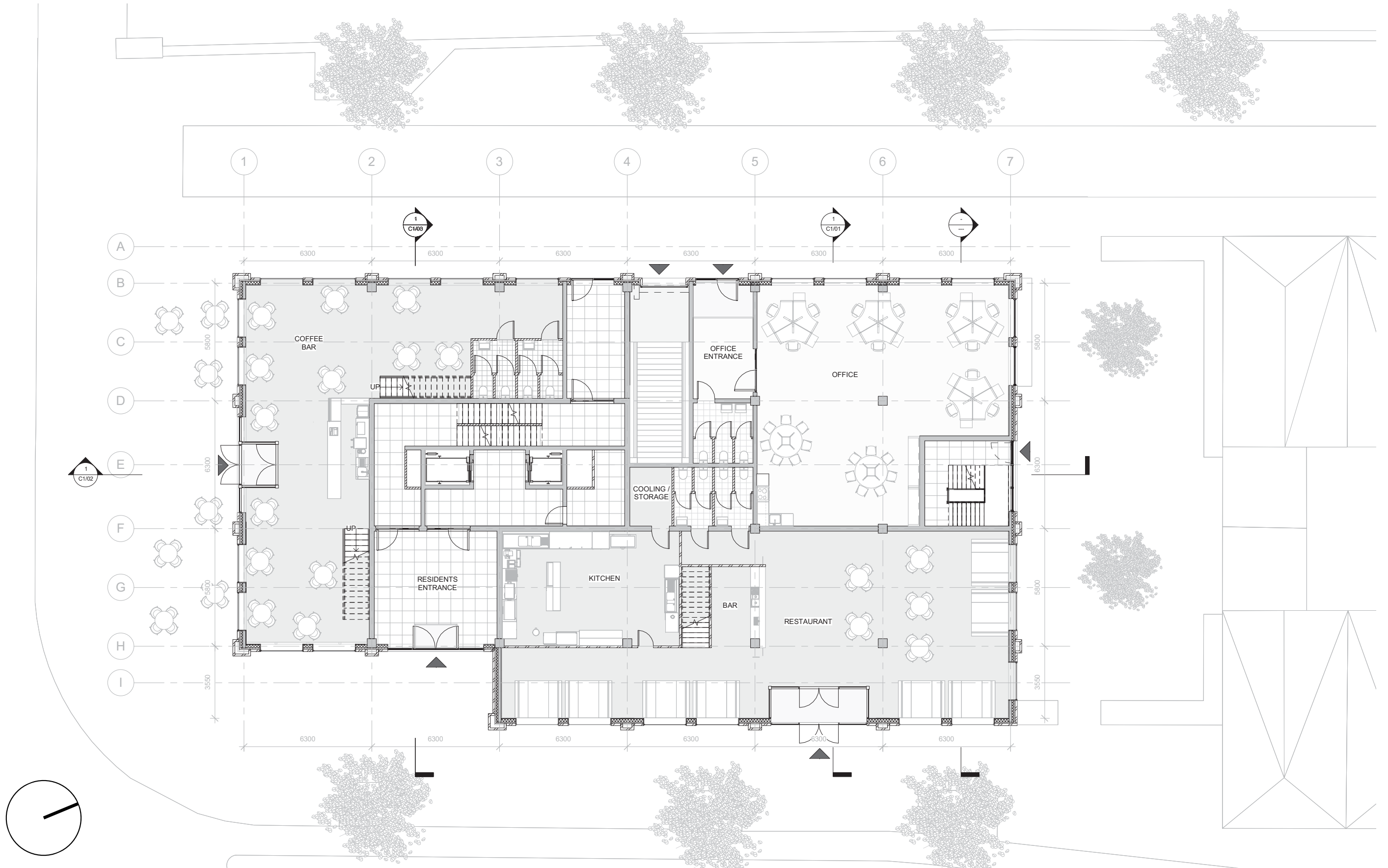
PLAN



Building Plans

Floor plan - Ground Floor

PLAN



Building Plans

Impression Coffee-bar

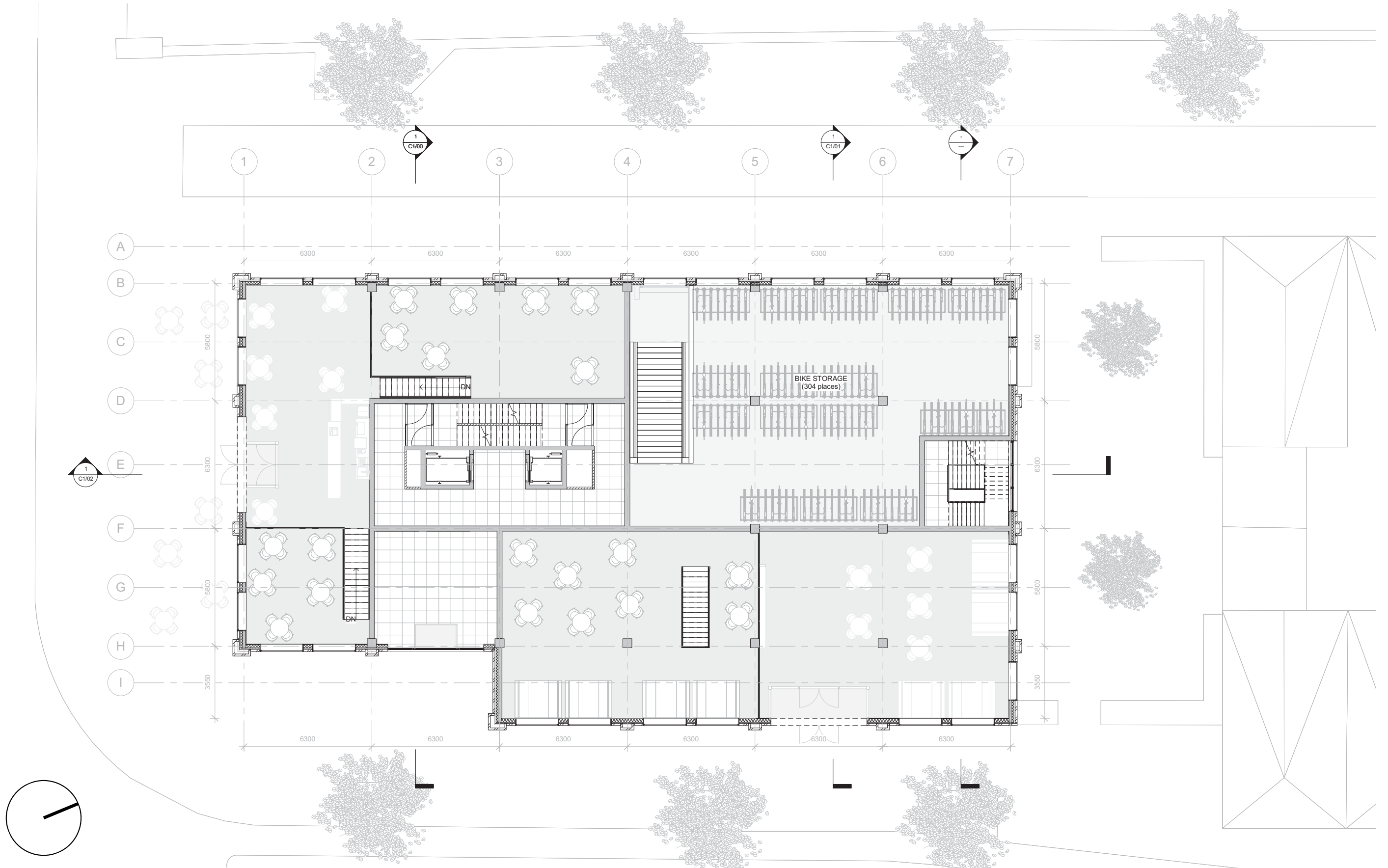
PLAN



Building Plans

Floor plan - Level 2

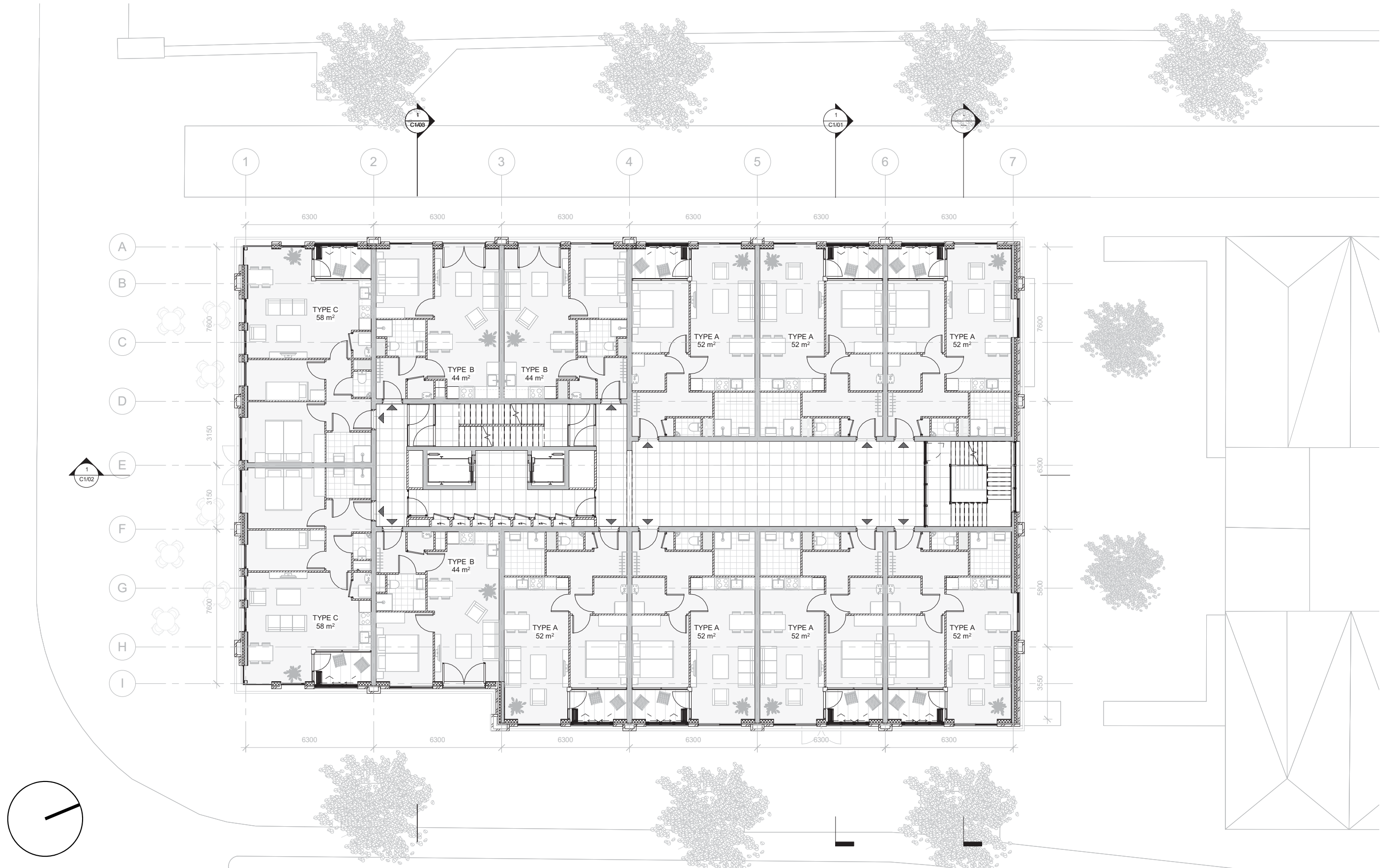
PLAN



Building Plans

Floor plan - Level 3

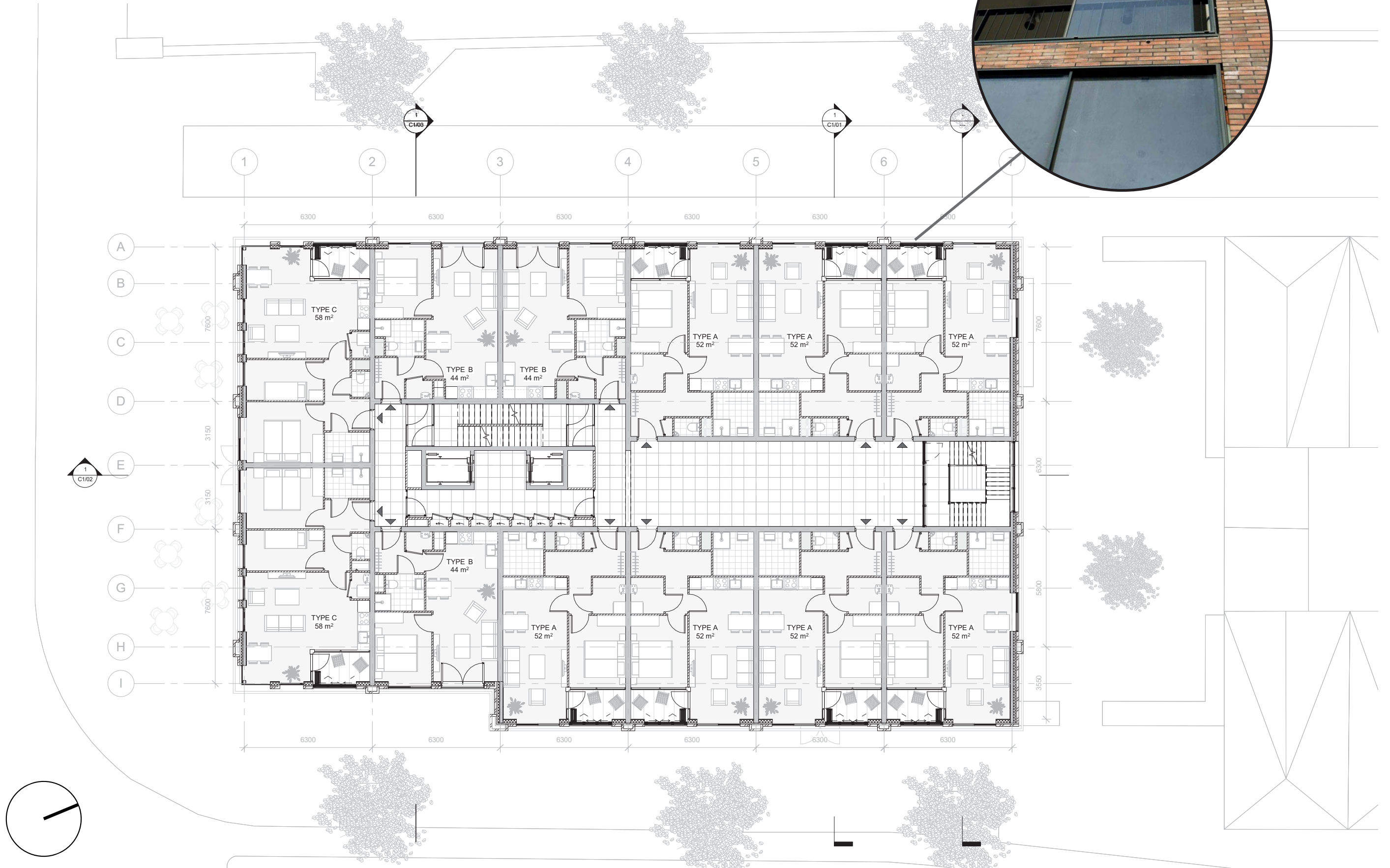
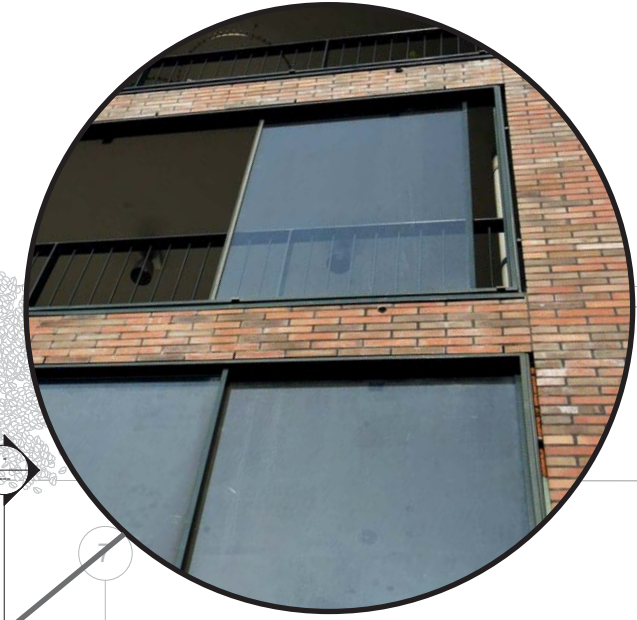
PLAN



Building Plans

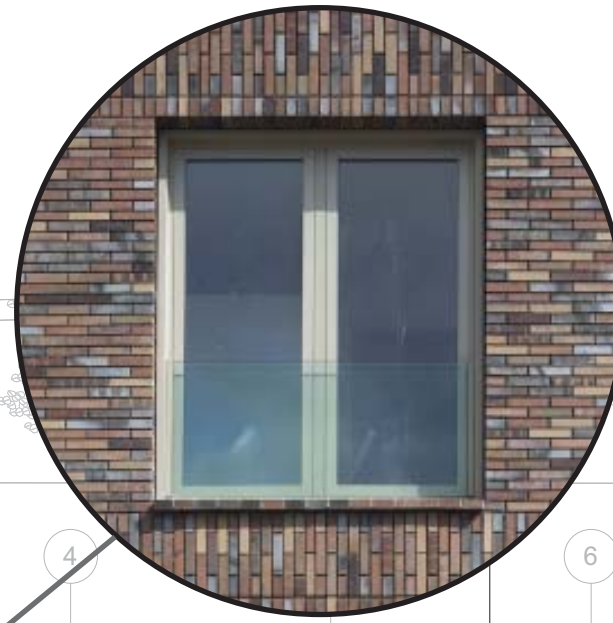
Floor plan - Level 3

PLAN

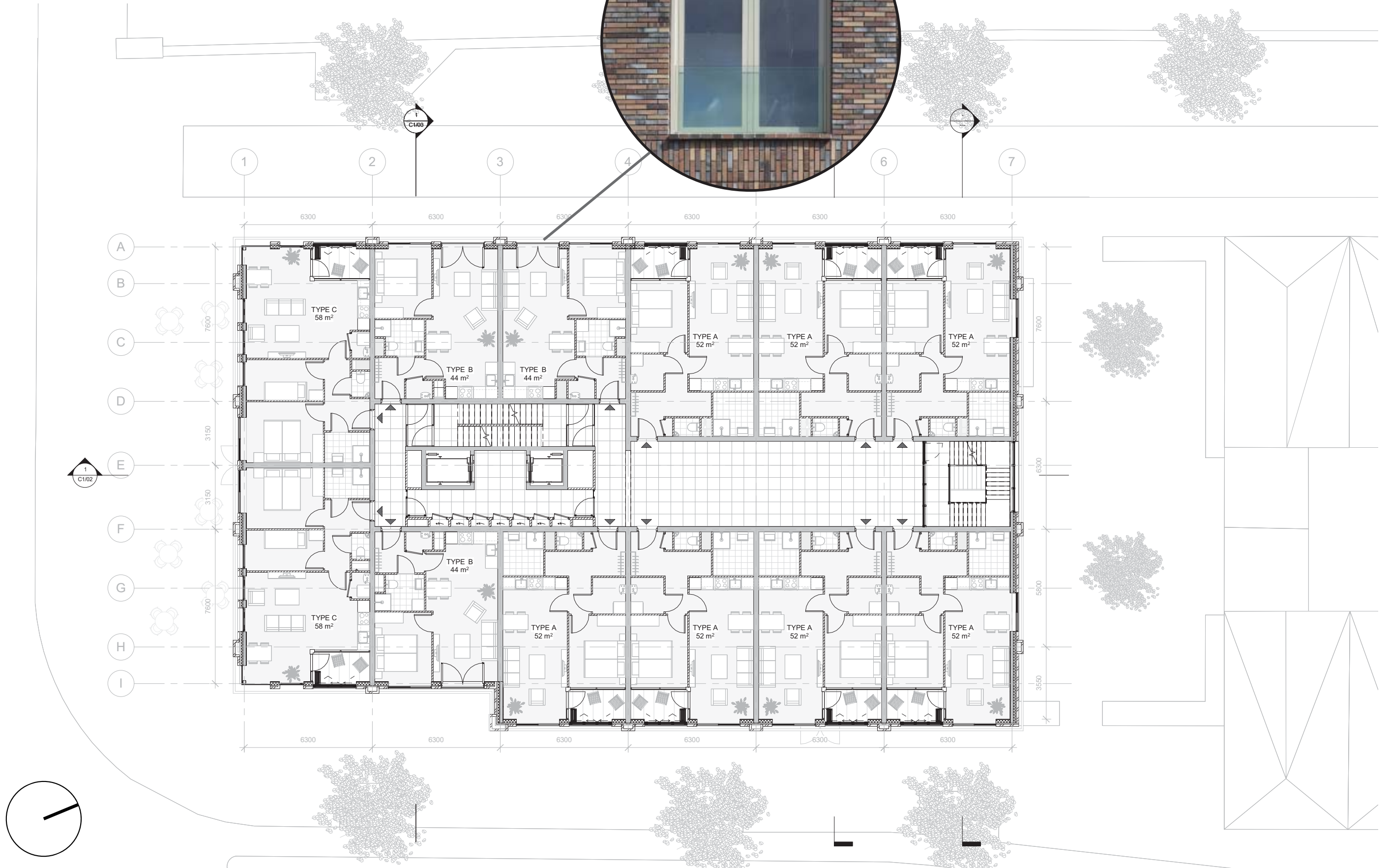


Building Plans

Floor plan - Level 3

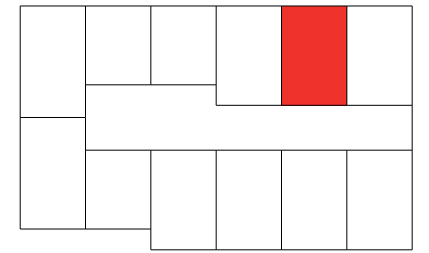


PLAN

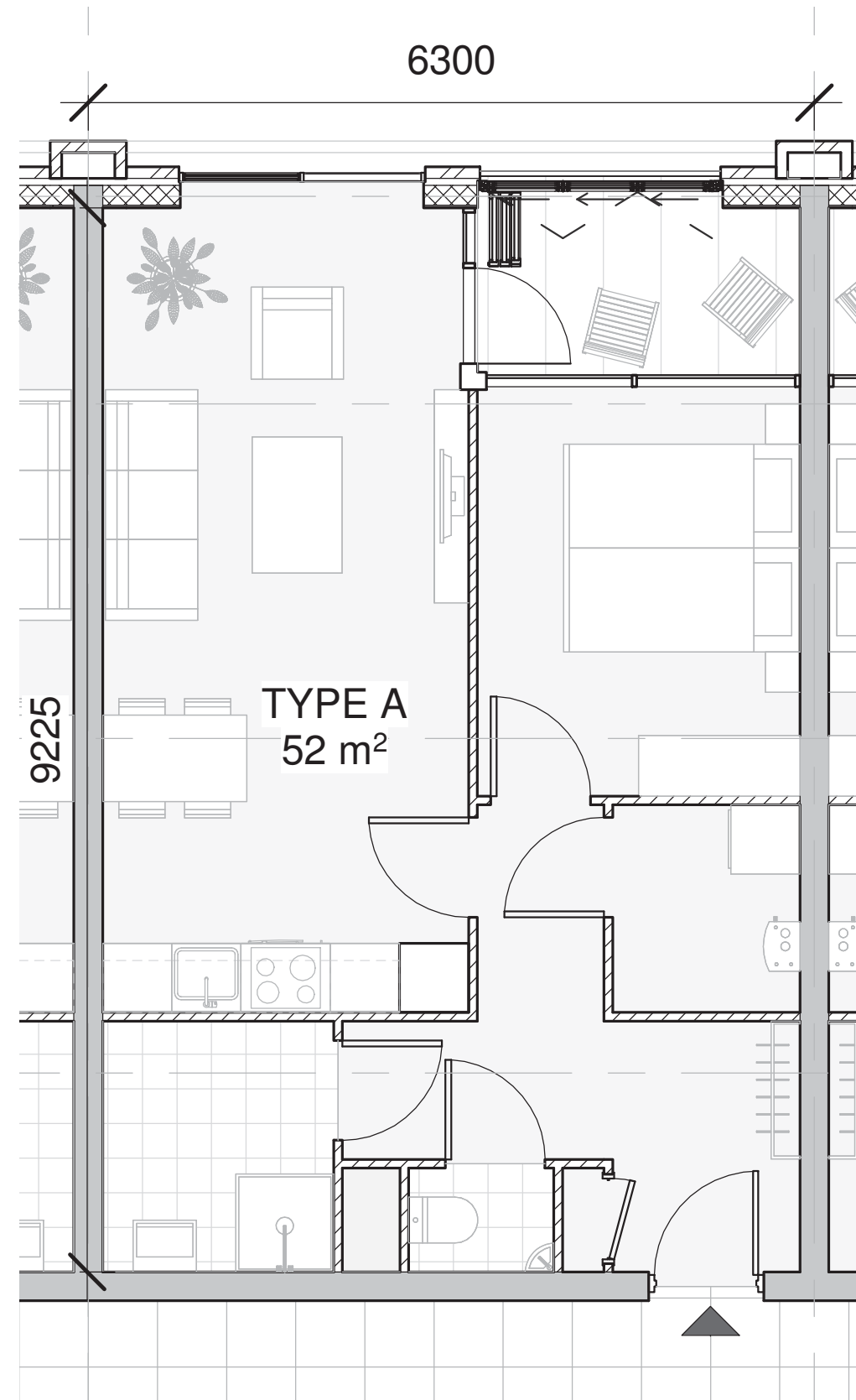


Dwelling Typologies

Type A - Couples



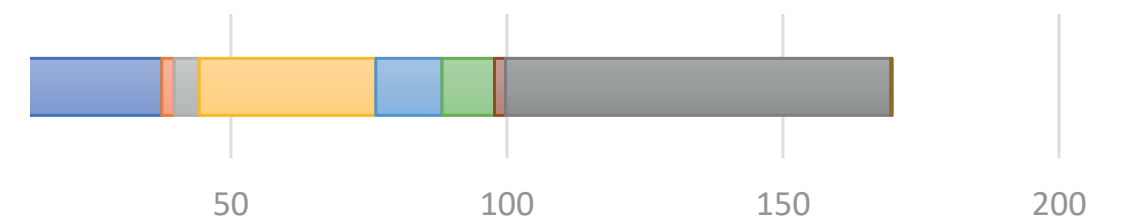
Level 3



Details

- Total number of units: 21
- Two-room apartment
- 52 m² usable floor area
- Loggia - 4.5 m²

- Rental price: € 844,59
- Points WWS: 170

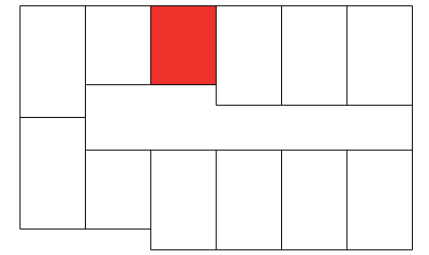


- | | |
|---------------------------------------|--------------------------|
| 1. Surface of rooms | 2. Surface other space |
| 3. Heating | 4. EPC |
| 5. Kitchen | 6. Sanitary facilities |
| 7. Living facilities for the disabled | 8. Private outdoor space |
| 9. WOZ-Value | 10. Facilities |
| 11. Common areas and amenities | |

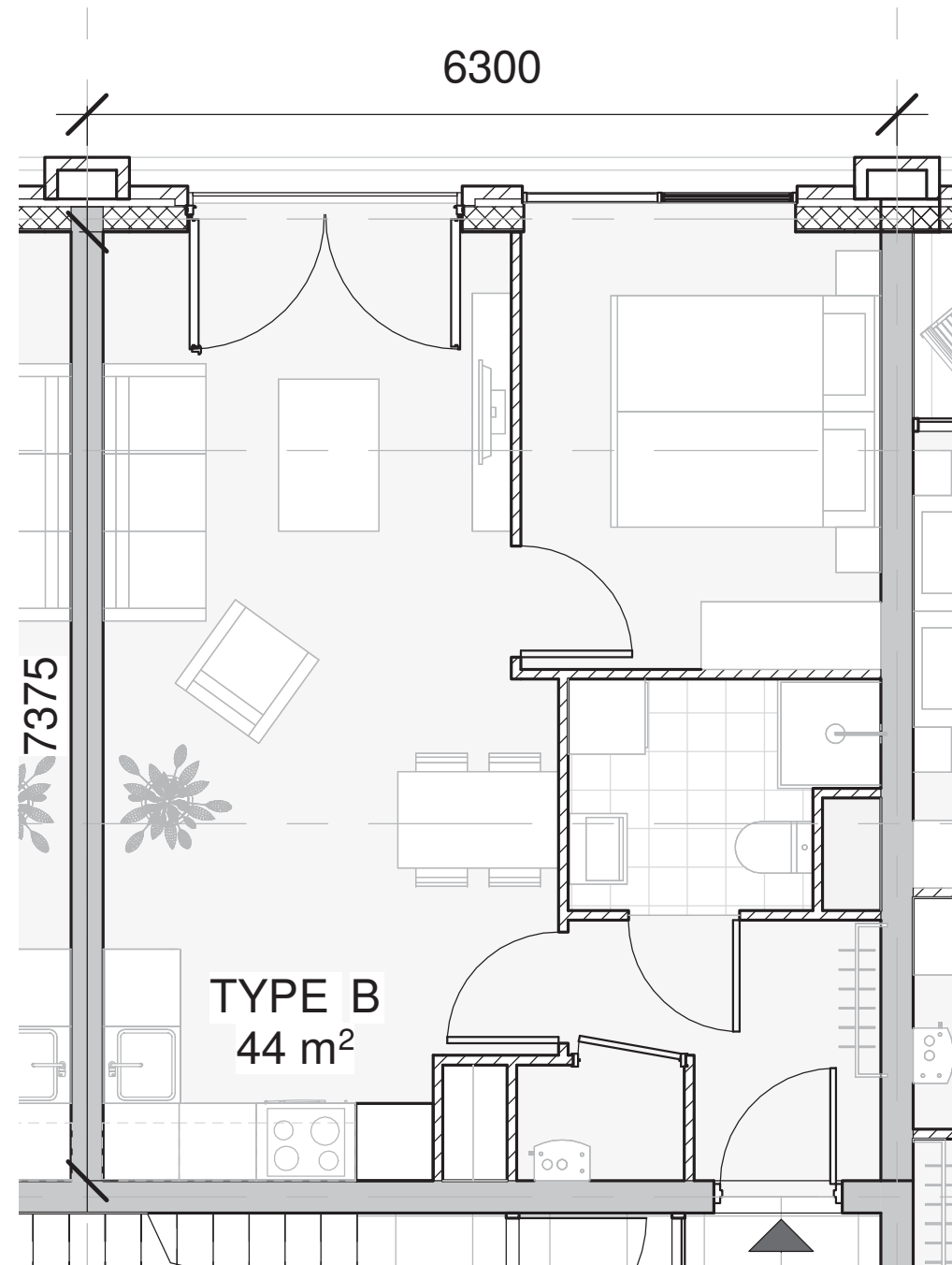
PLAN

Dwelling Typologies

Type B - Starters / Singles



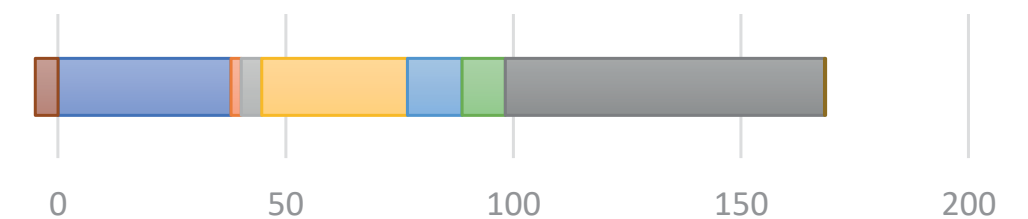
Level 3



Details

- Total number of units: 18
- Two-room apartment
- 44 m² usable floor area
- 'Juliet balcony' (french doors)

- Rental price: € 813,46
- Points WWS: 164



- 1. Surface of rooms
- 2. Surface other space
- 3. Heating
- 4. EPC
- 5. Kitchen
- 6. Sanitary facilities
- 7. Living facilities for the disabled
- 8. Private outdoor space
- 9. WOZ-Value
- 10. Facilities
- 11. Common areas and amenities

Dwelling Typologies

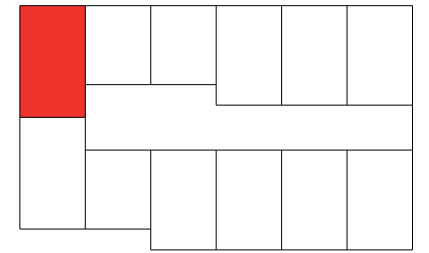
Type B - Interior impression

PLAN



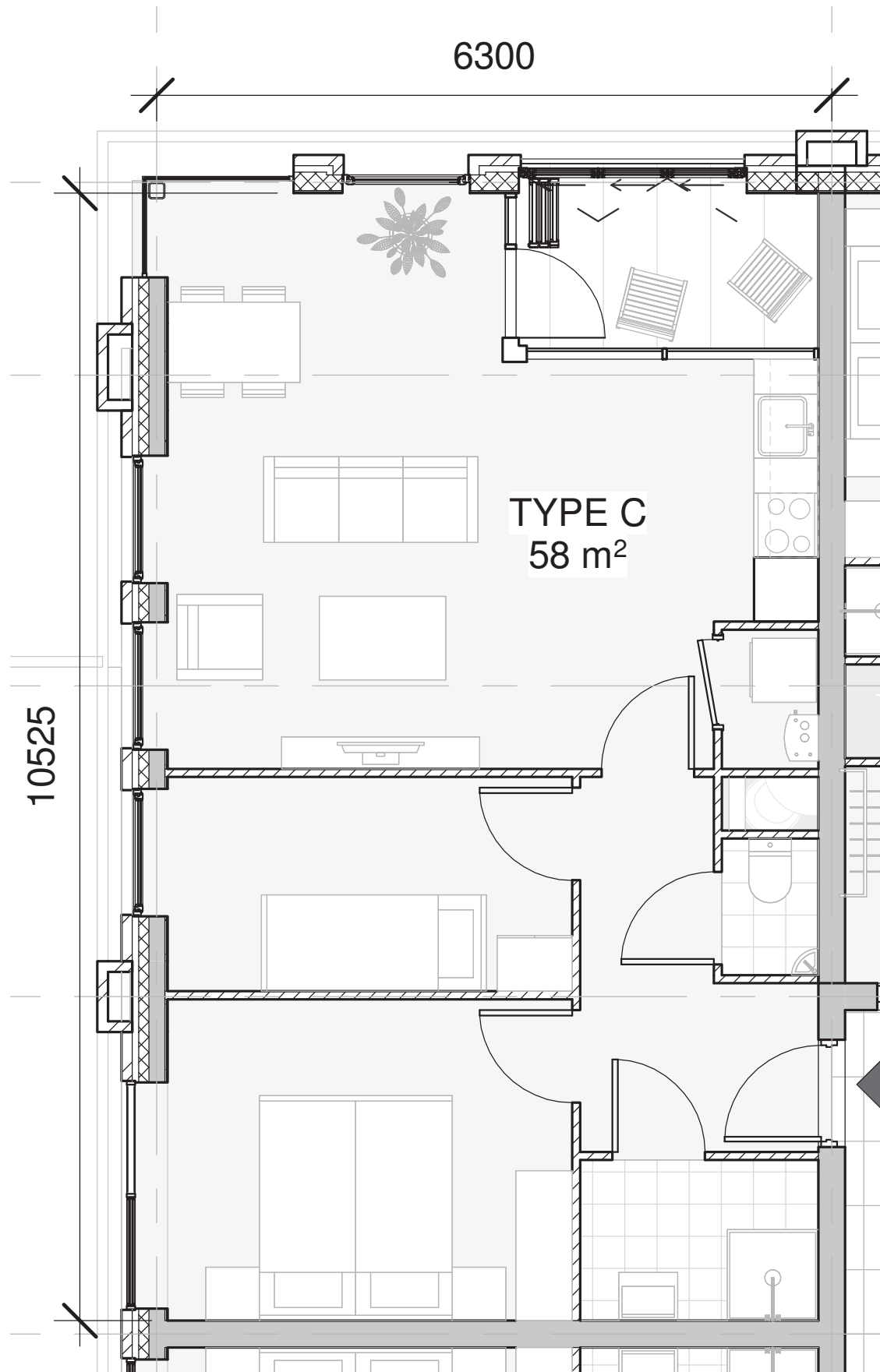
Dwelling Typologies

Type C - Couples / Young families



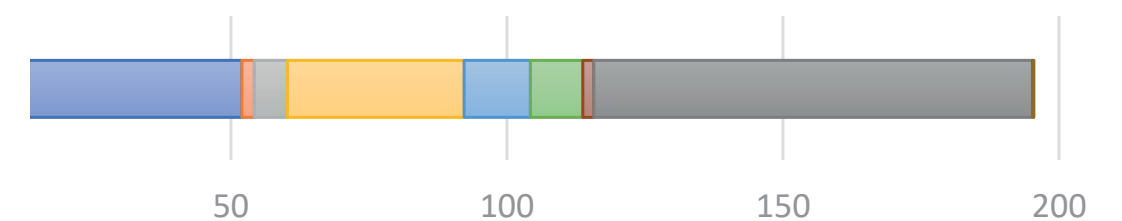
Level 3

PLAN



Details

- Total number of units: 13
- Three-room apartment
- 58 m² usable floor area
- Loggia - 4.5 m²
- Rental price: € 974,23
- Points WWS: 195

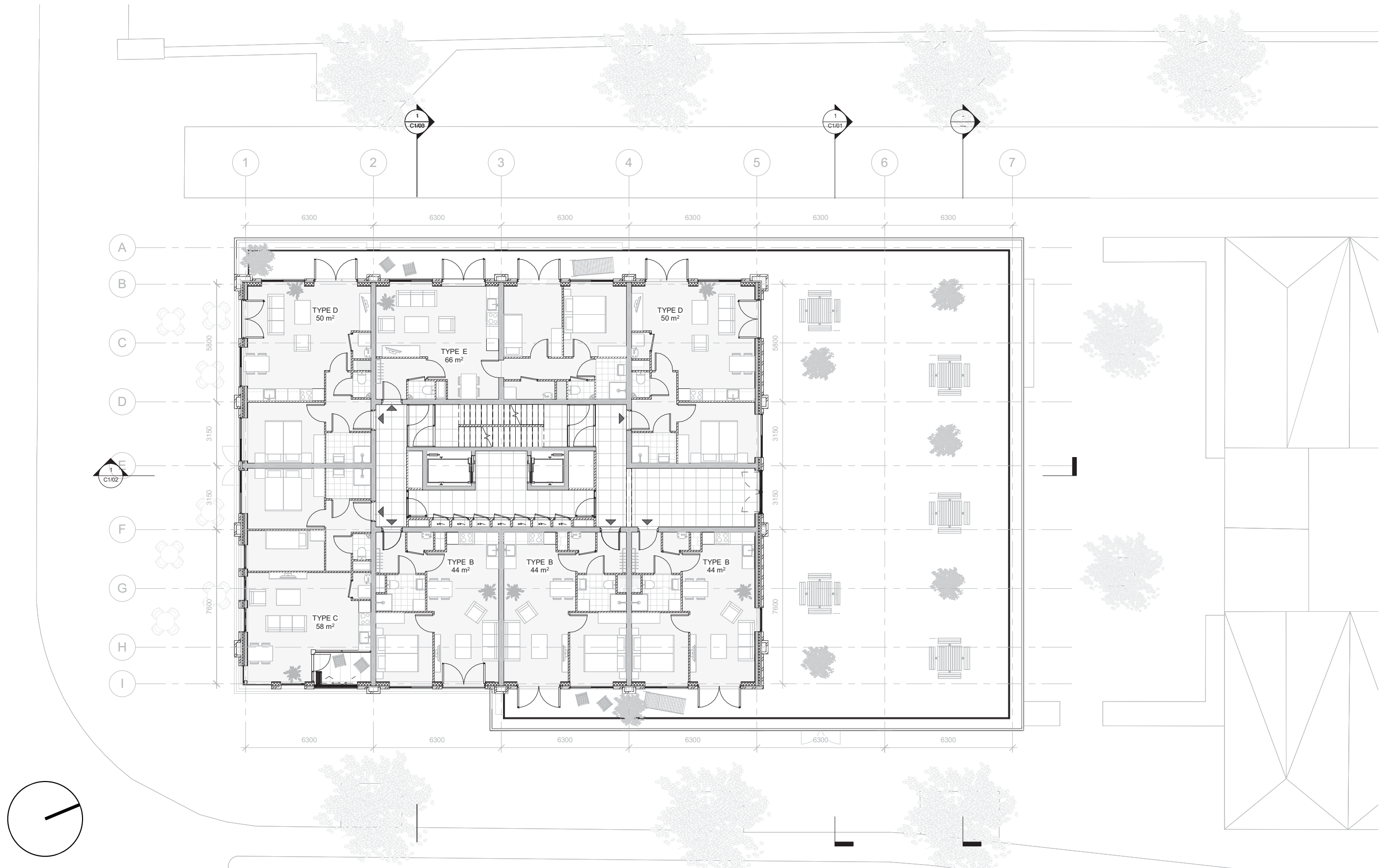


- | | |
|---------------------------------------|--------------------------|
| 1. Surface of rooms | 2. Surface other space |
| 3. Heating | 4. EPC |
| 5. Kitchen | 6. Sanitary facilities |
| 7. Living facilities for the disabled | 8. Private outdoor space |
| 9. WOZ-Value | 10. Facilities |
| 11. Common areas and amenities | |

Building Plans

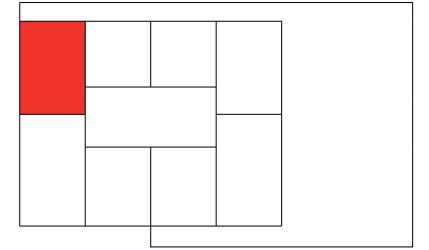
Floor plan - Level 6

PLAN

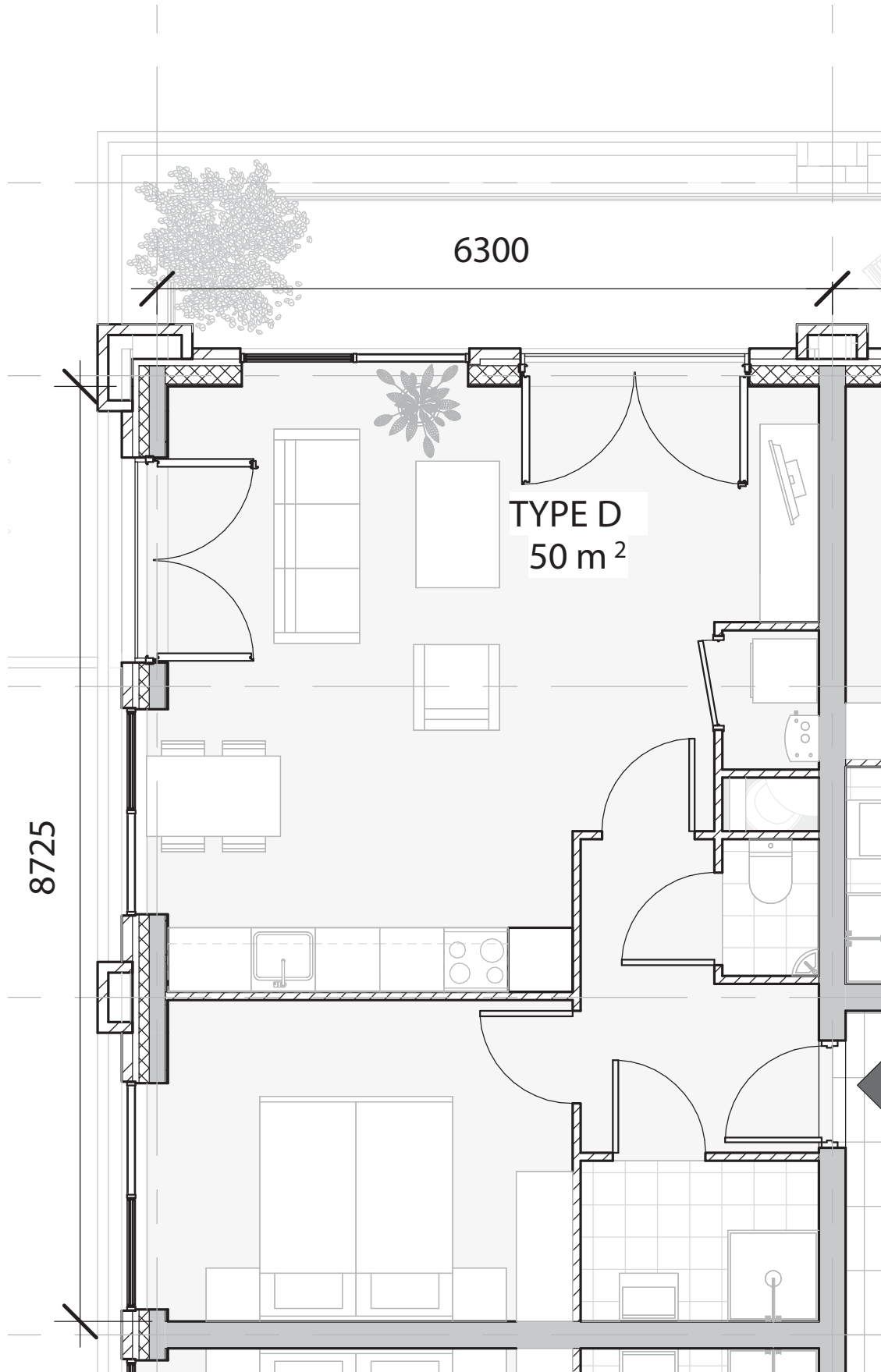


Dwelling Typologies

Type D - Couples



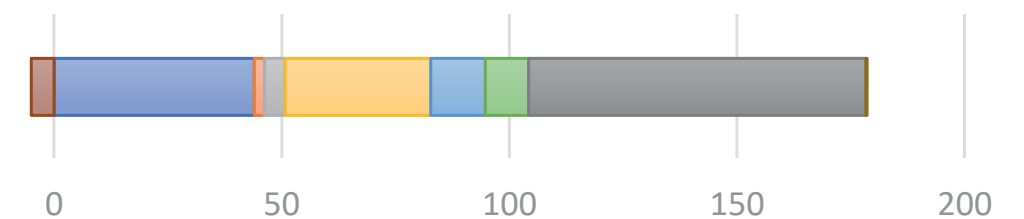
PLAN



Details

- Total number of units: 20
- Two-room apartment
- 50 m² usable floor area
- Juliet' balcony (french doors)

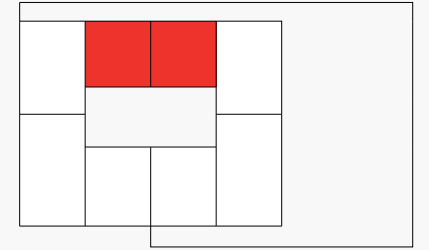
- Rental price: € 865,31
- Points WWS: 174



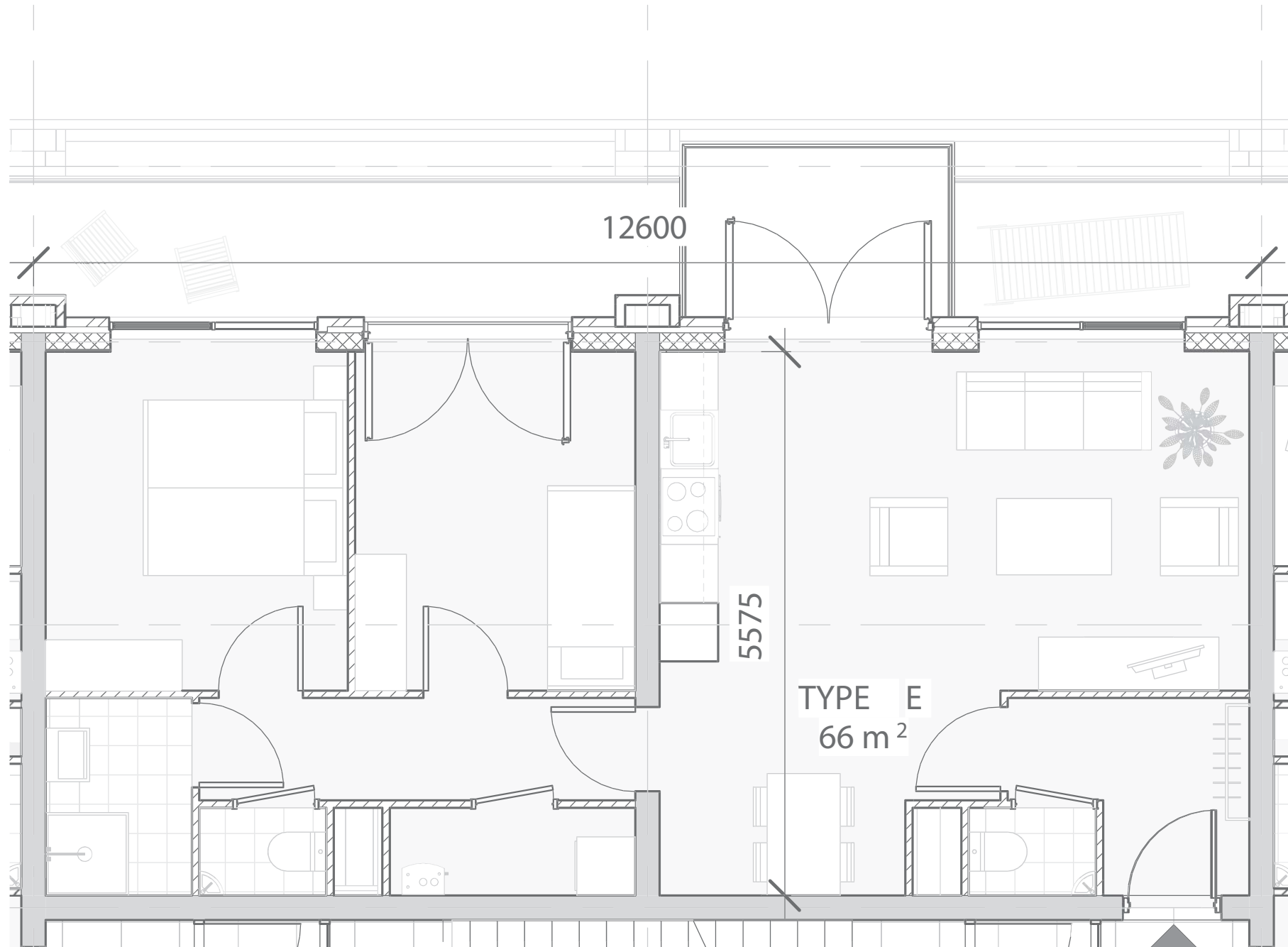
- 1. Surface of rooms
- 2. Surface other space
- 3. Heating
- 4. EPC
- 5. Kitchen
- 6. Sanitary facilities
- 7. Living facilities for the disabled
- 8. Private outdoor space
- 9. WOZ-Value
- 10. Facilities
- 11. Common areas and amenities

Dwelling Typologies

Type E - Couples / Young families



Level 7



PLAN

Details

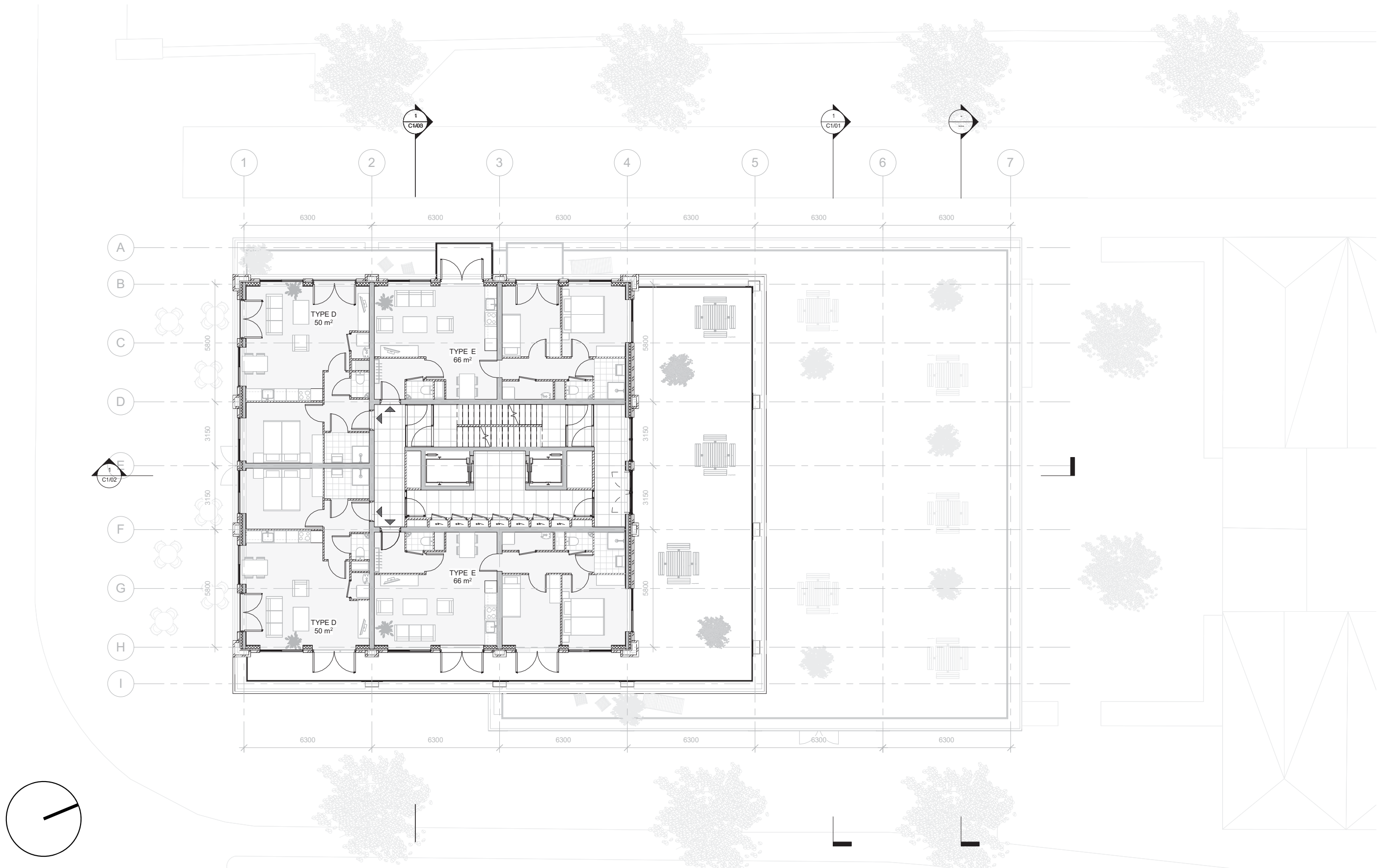
- Total number of units: 16
- Three-room apartment
- 66 m² usable floor area
- Balcony - 5 m²

- Rental price: € 984,58
- Points WWS: 197

Building Plans

Floor plan - Level 10

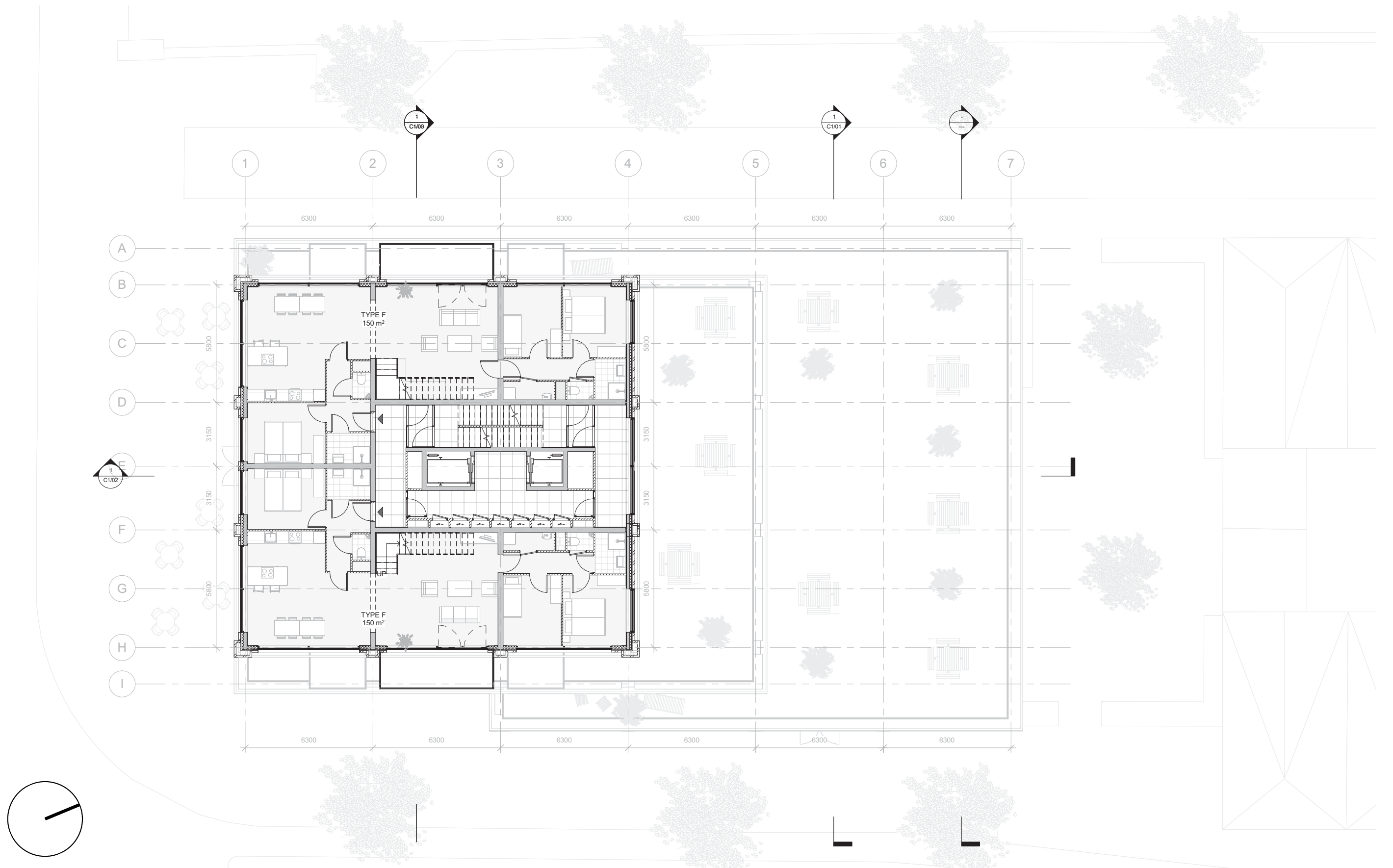
PLAN



Building Plans

Floor plan - Level 16

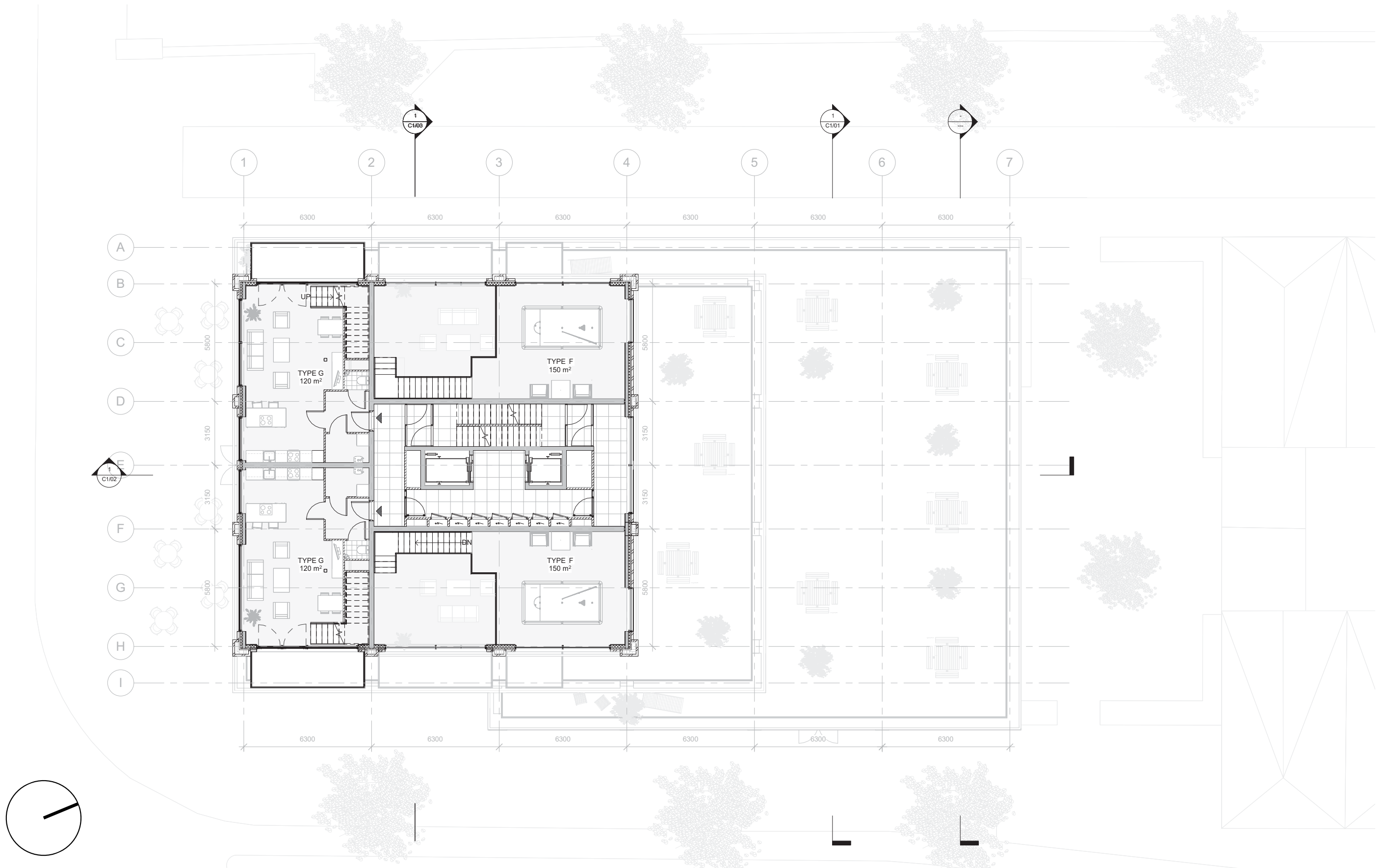
PLAN



Building Plans

Floor plan - Level 17

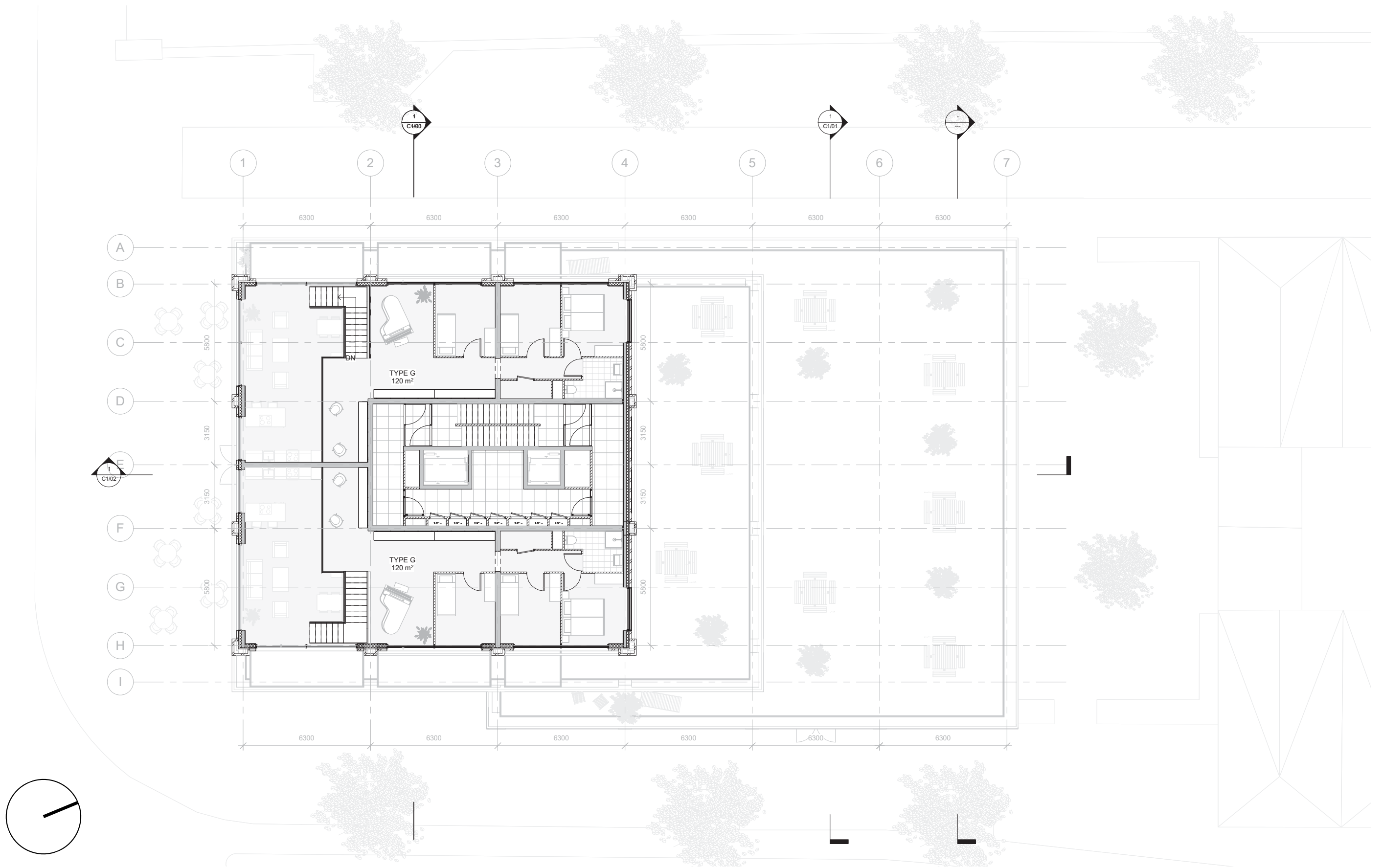
PLAN



Building Plans

Floor plan - Level 18

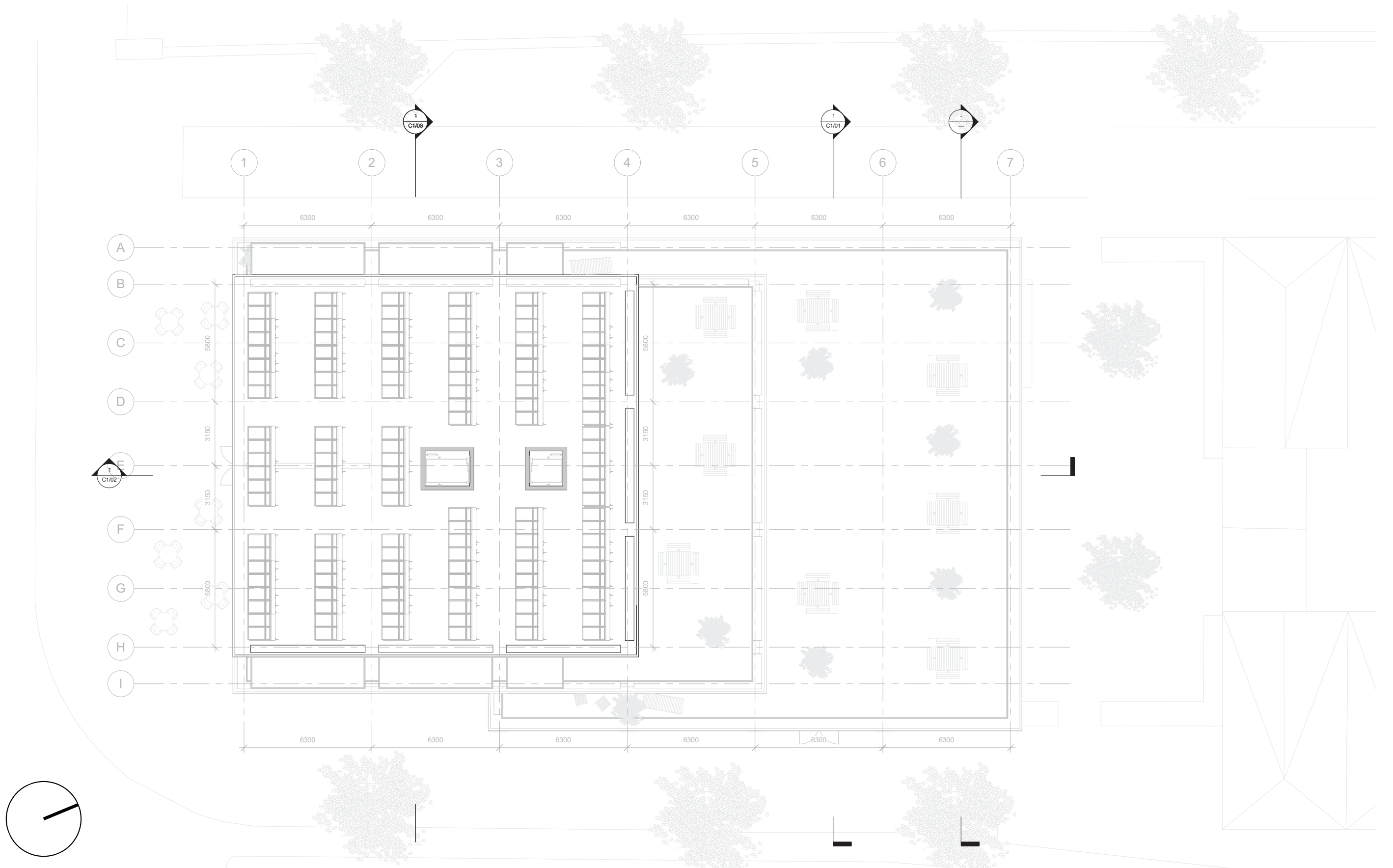
PLAN



Building Plans

Floor plan - Level 19

PLAN



Climate Concept

Hone Surface Power

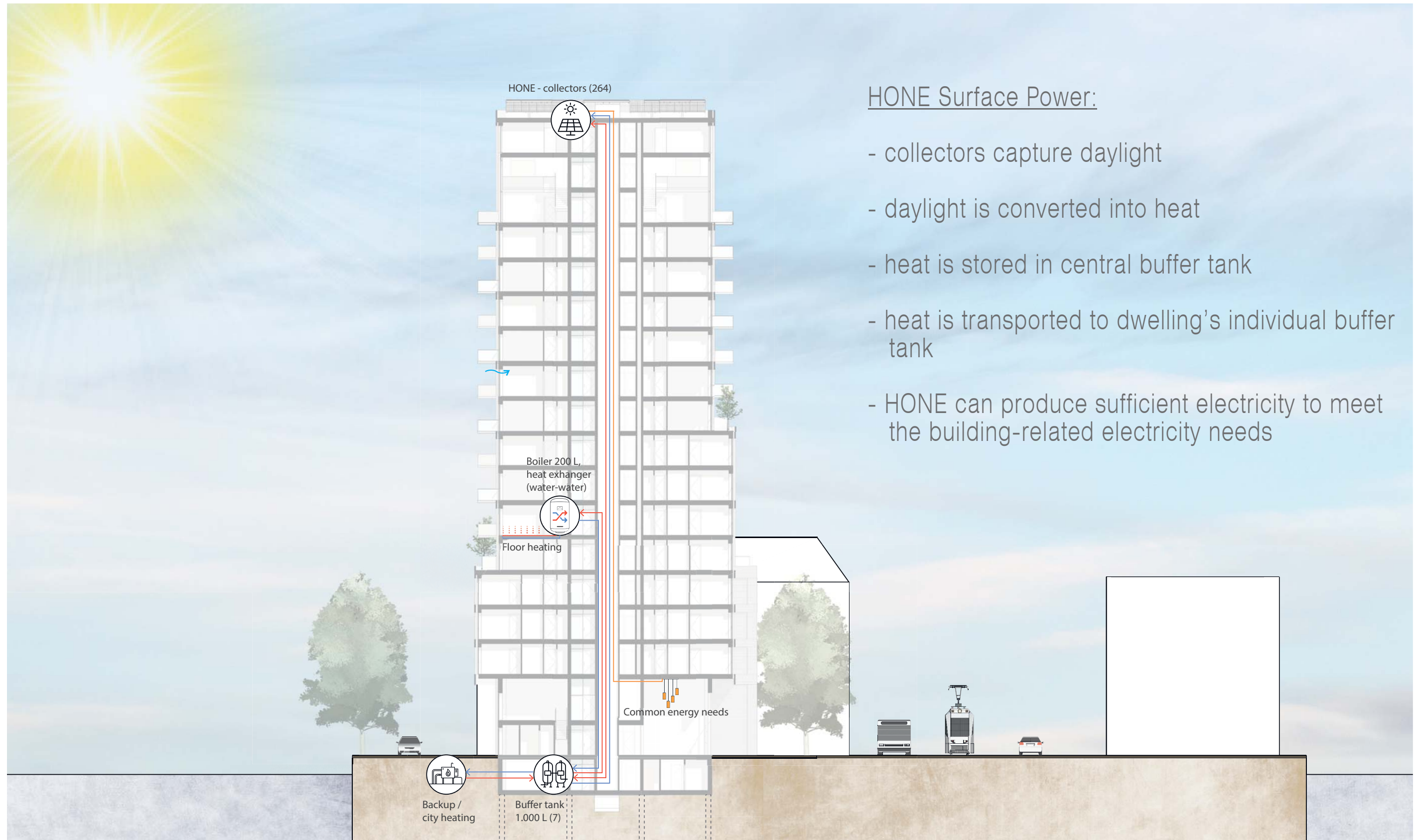
PLAN



Climate Concept

Hone Surface Power

PLAN



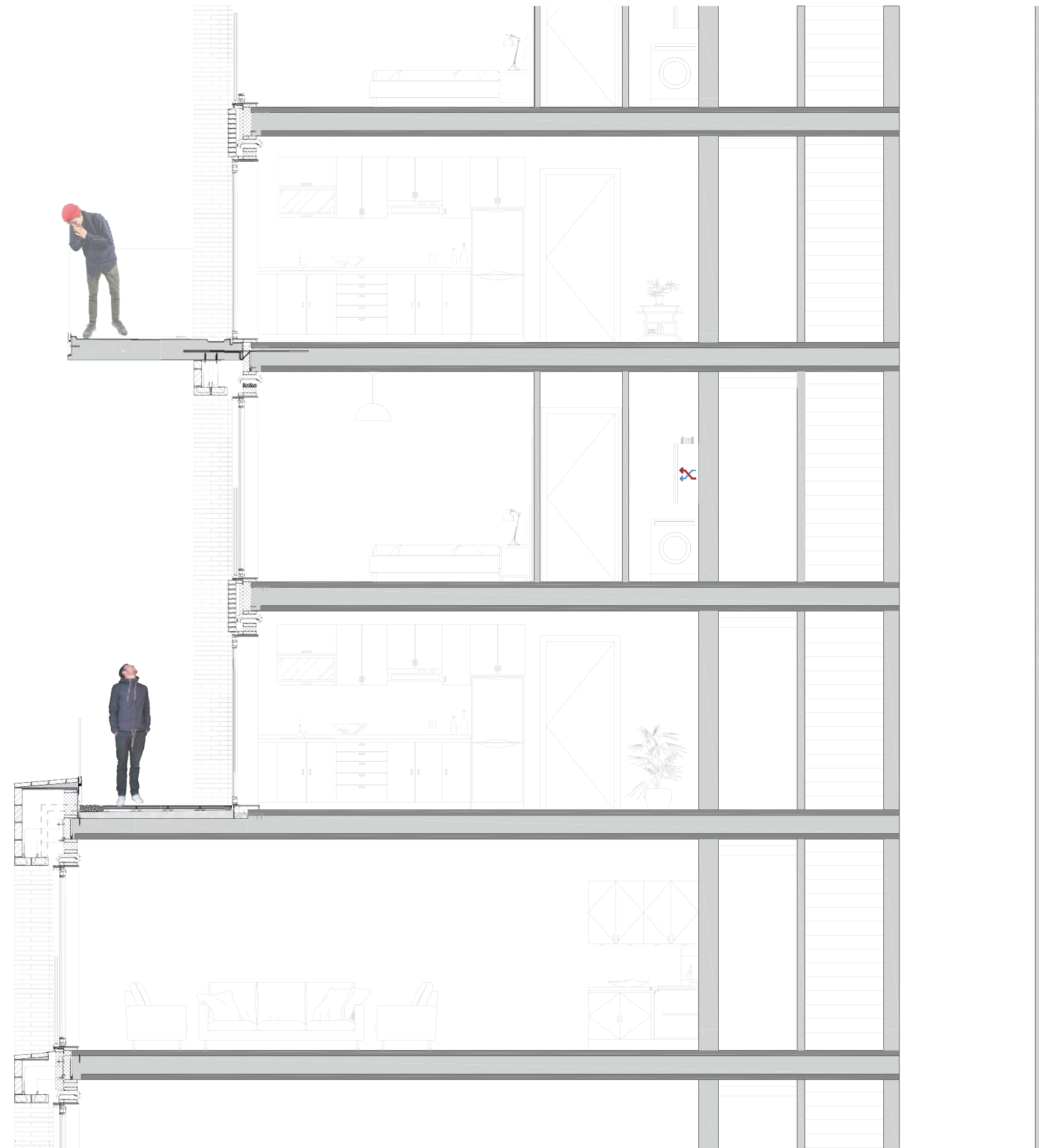
HONE Surface Power:

- collectors capture daylight
- daylight is converted into heat
- heat is stored in central buffer tank
- heat is transported to dwelling's individual buffer tank
- HONE can produce sufficient electricity to meet the building-related electricity needs

Climate Concept

Apartments

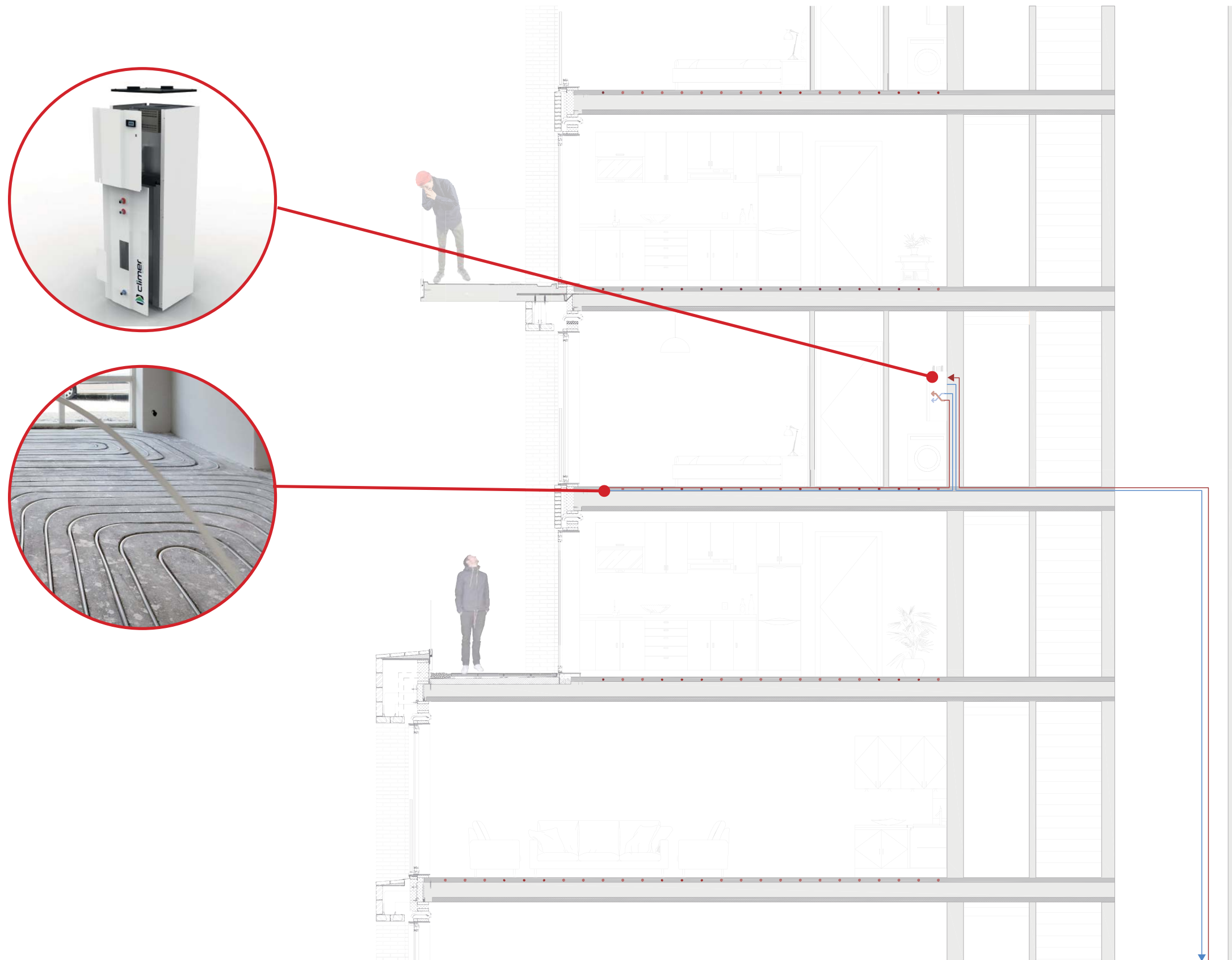
PLAN



Climate Concept

Heating / Cooling

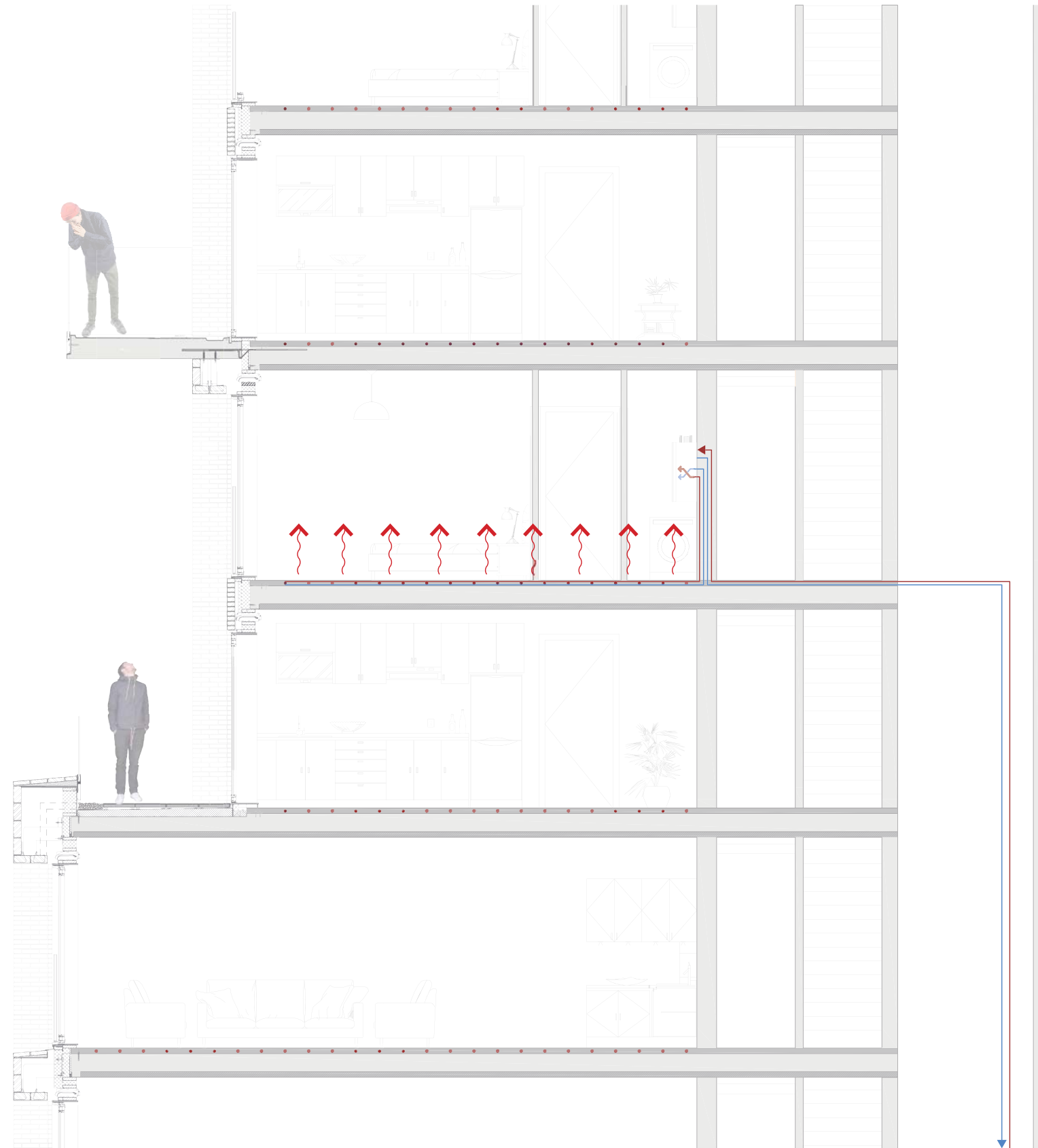
PLAN



Climate Concept

Heating / Cooling

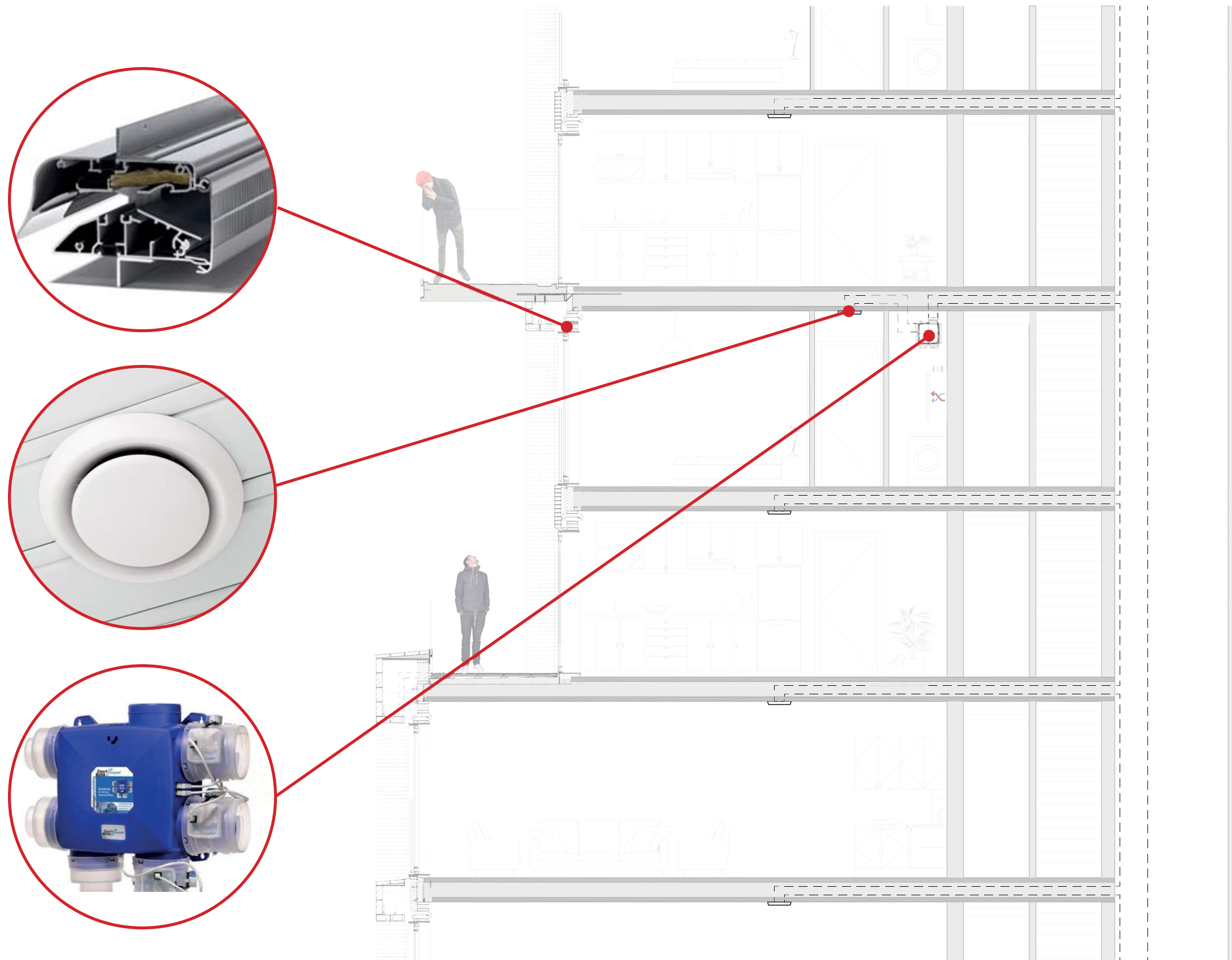
PLAN



Climate Concept

Ventilation

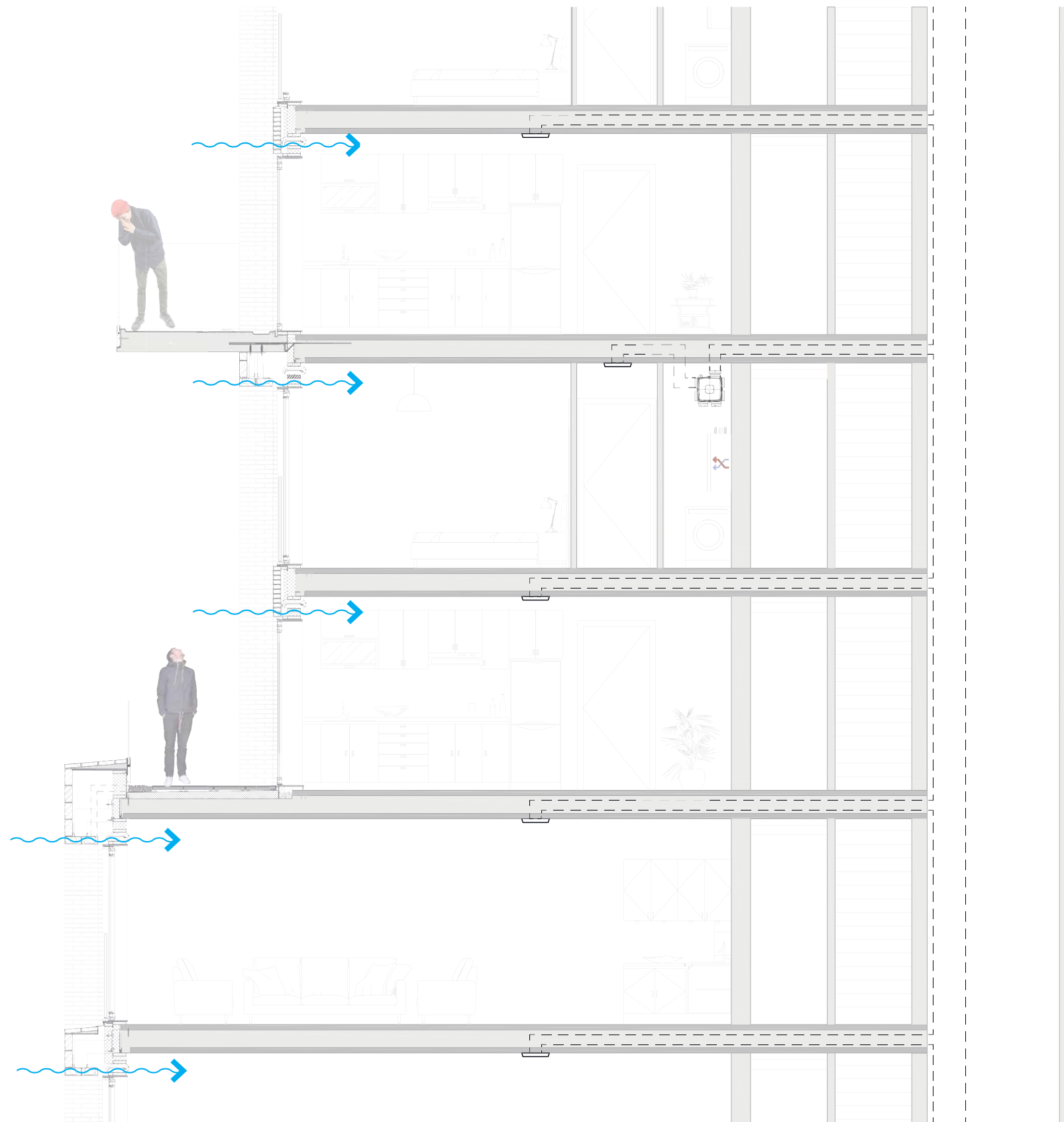
PLAN



Climate Concept

Ventilation

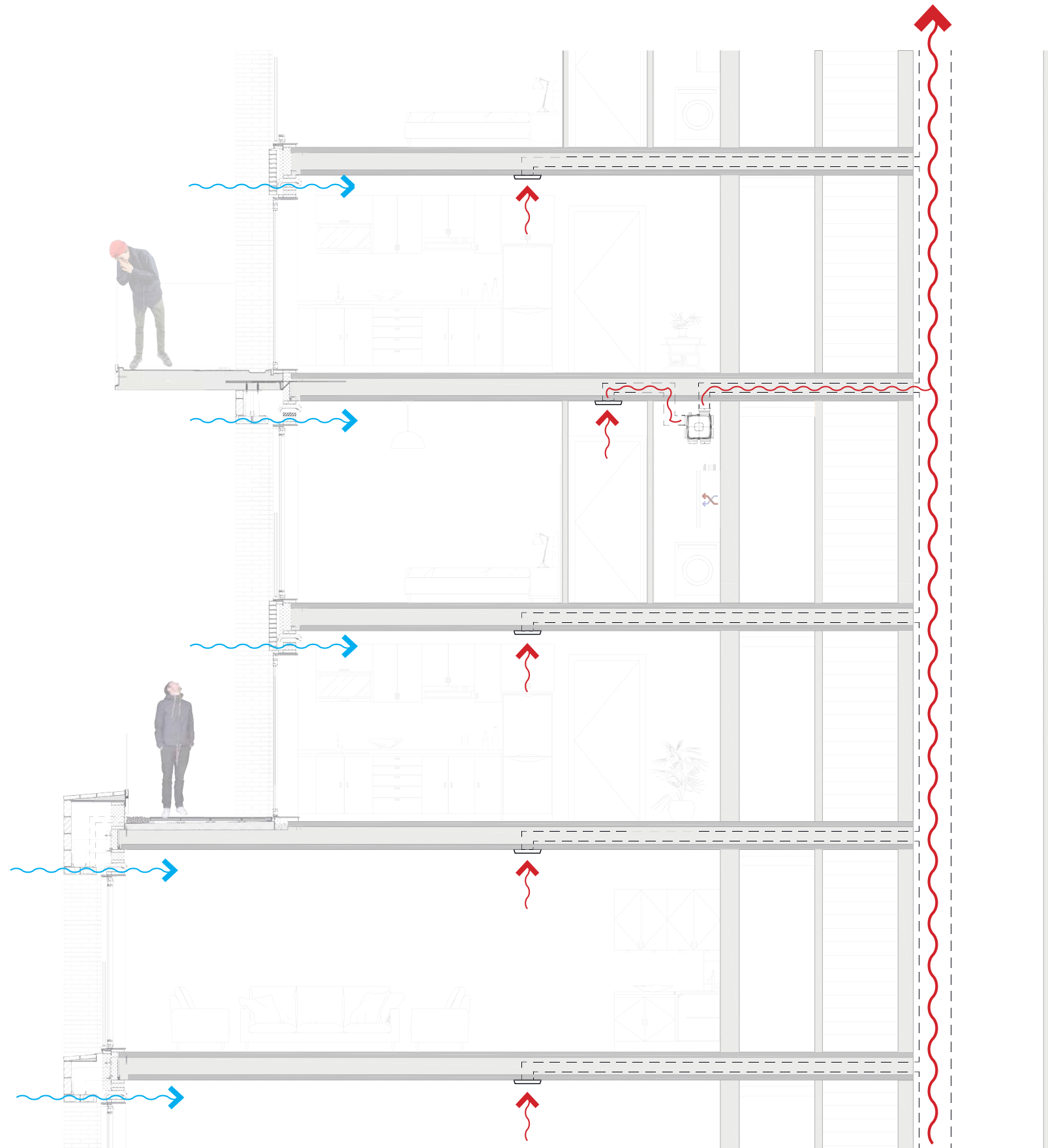
PLAN



Climate Concept

Ventilation

PLAN



Climate Design

Hone Surface Power

- Total energy demand: 308.450 kWh / year

TYPE	FLOOR AREA	RENTAL PRICE	NUMBER OF UNITS	PERSONS PER UNIT	ENERGY CONSUMPTION	TOTAL ENERGY DEMAND
A	52 m2	€ 844,59	21	2	2.950 kWh / year	61.950 kWh / year
B	44 m2	€ 813,46	18	2	2.950 kWh / year	53.100 kWh / year
C	58 m2	€ 974,23	13	3	4.000 kWh / year	52.000 kWh / year
D	50 m2	€ 865,31	20	2	2.950 kWh / year	59.000 kWh / year
E	66 m2	€ 984,58	16	3	4.000 kWh / year	64.000 kWh / year
F	... m2	-	2	4	4.600 kWh / year	9.200 kWh / year
G	... m2	-	2	4	4.600 kWh / year	9.200 kWh / year
TOTAL			92	221		308.450 kWh / year

- Total energy yield: 198.000 kWh / year

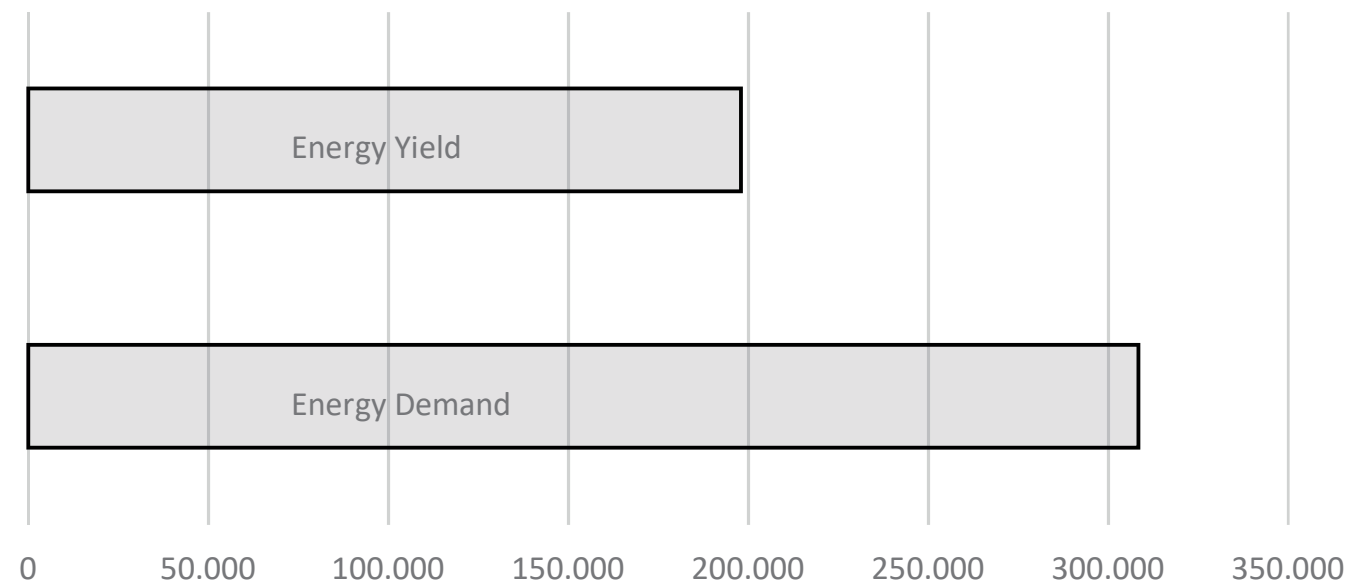
		TOTAL YIELD
Thermal yield per panel	750 kWh / year	198.000 kWh / year
Electricity yield per panel	95,5 kWh / year	25.212 kWh / year
Number of panels	264	
Number of buffer tanks (1000 liter)	7	
Pump units	7	
Individual boilers (200 liter)	92	
Water-water heat pump	92	

Climate Design

Energy demand

- Conclusion:
 - Hone Surface Power provides 64% of the building's energy demand
 - Produces sufficient electricity to meet the building-related electricity needs

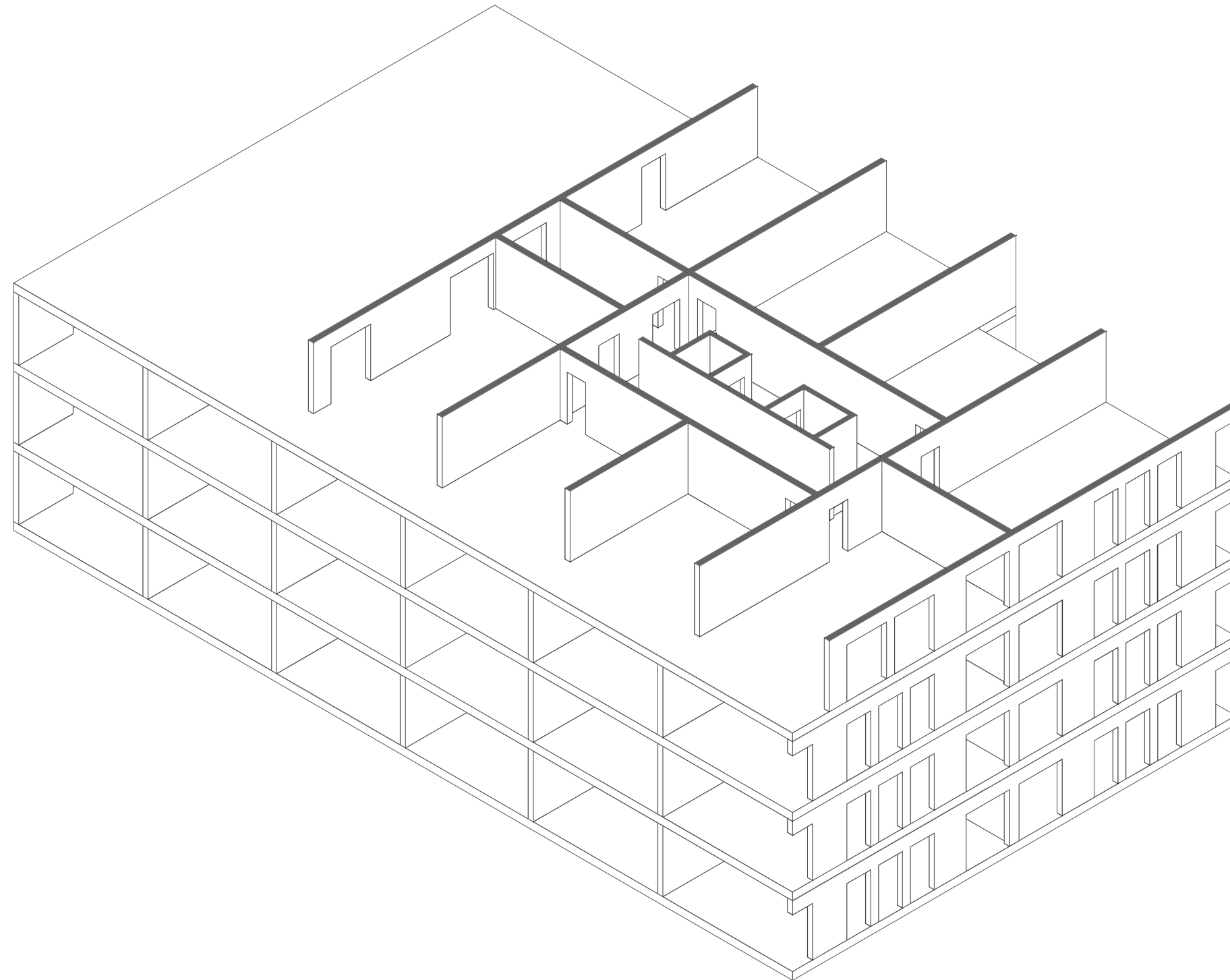
Energy demand and energy yield ratio



Structure

Construction principle

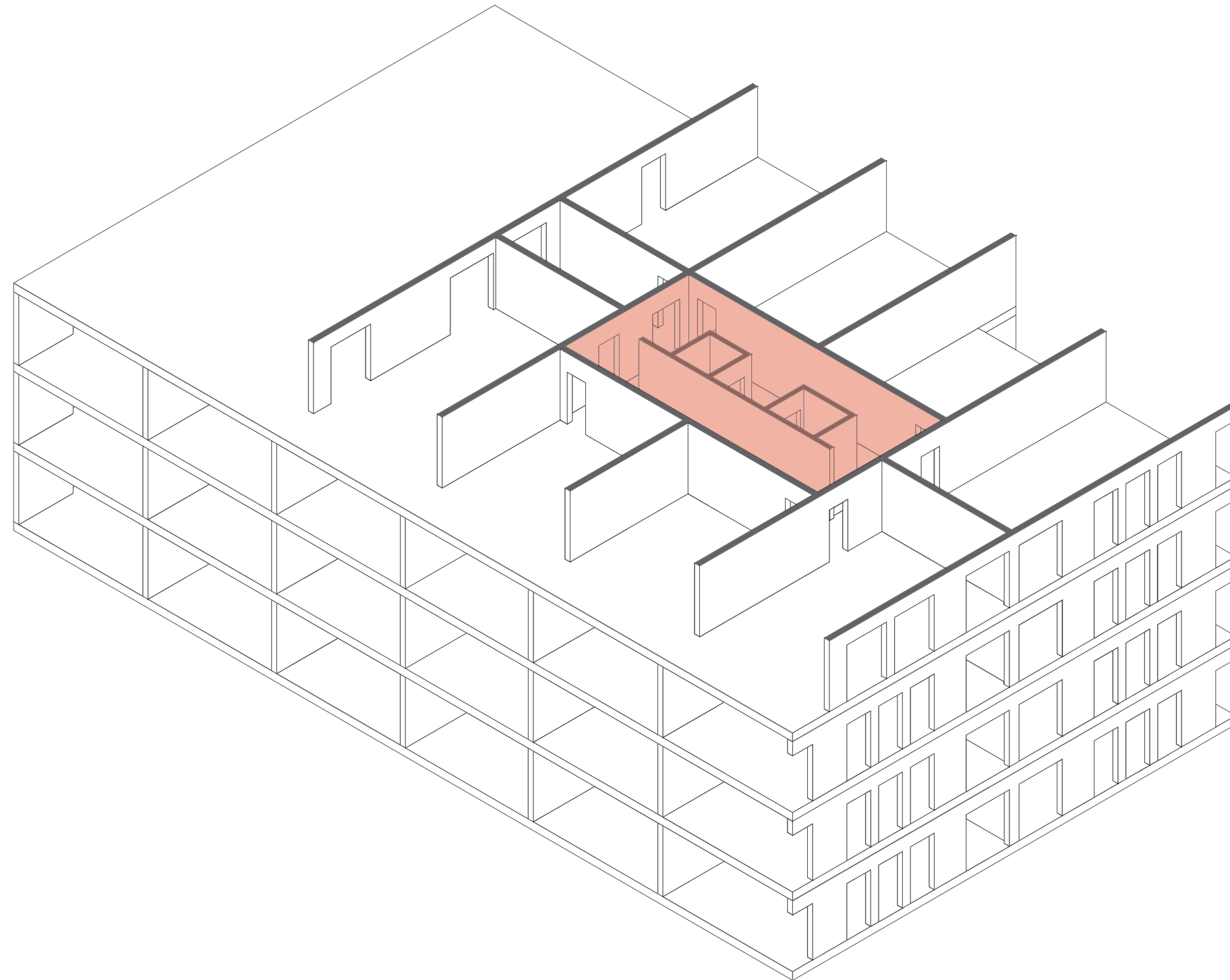
PLAN



Structure

Construction principle

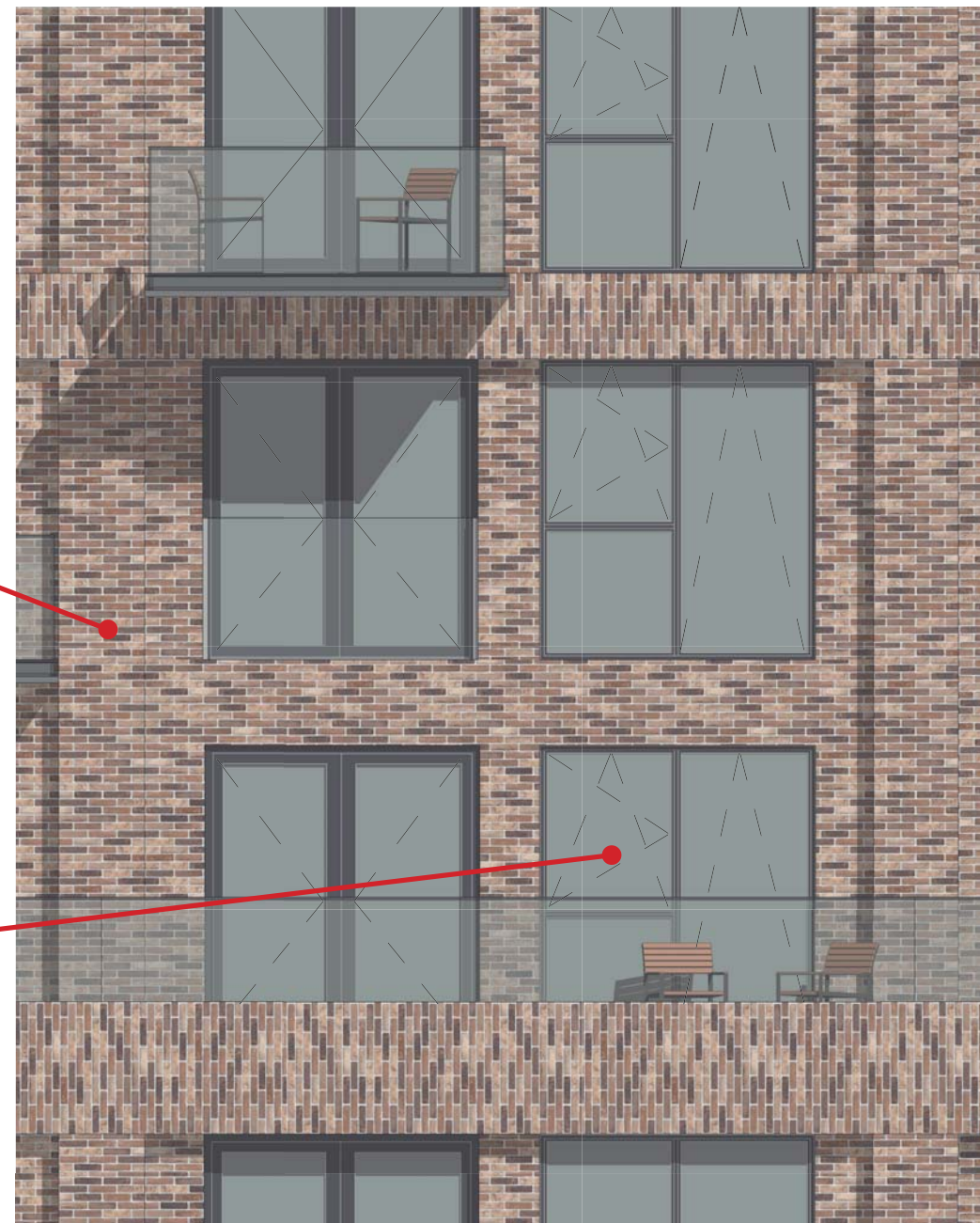
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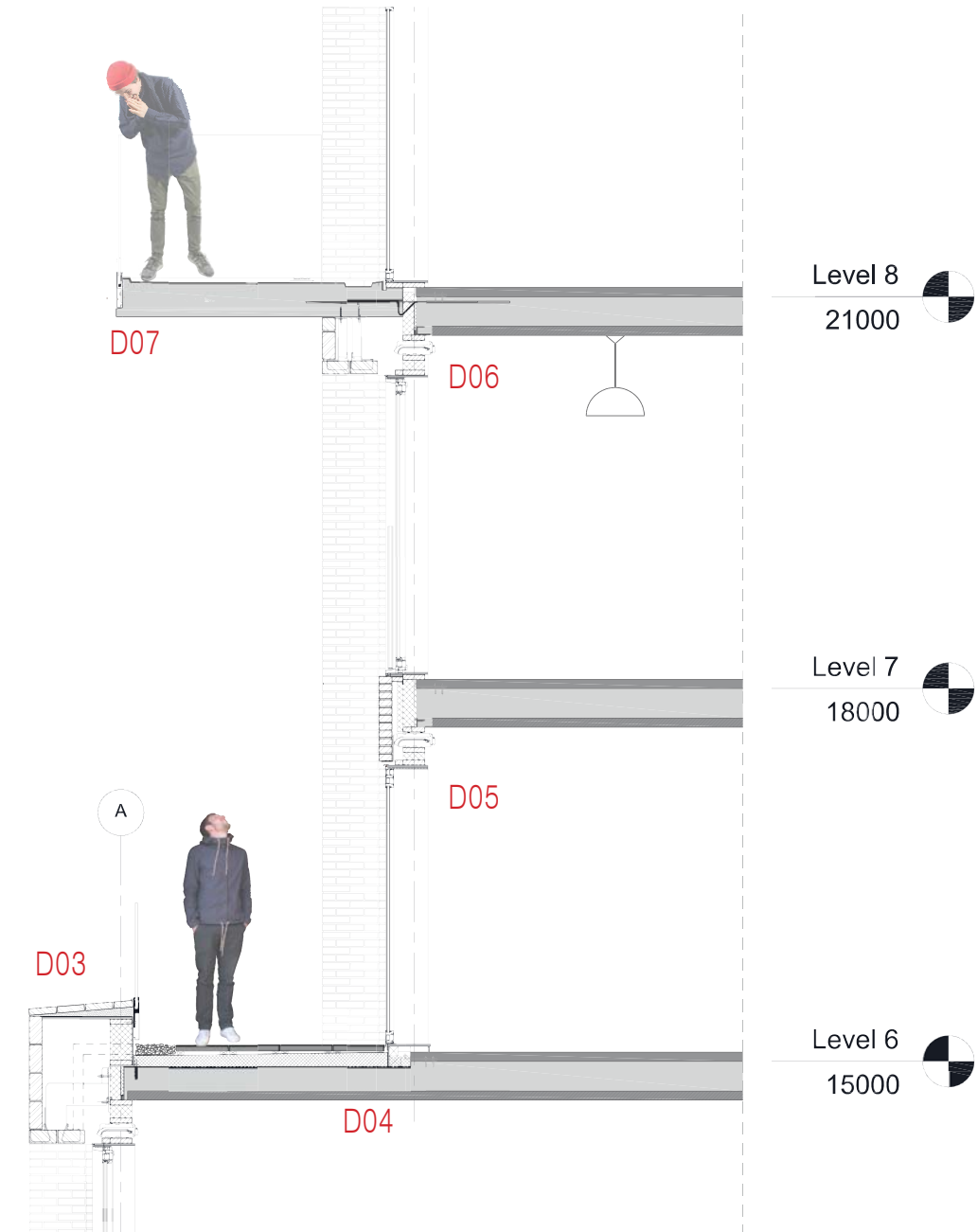
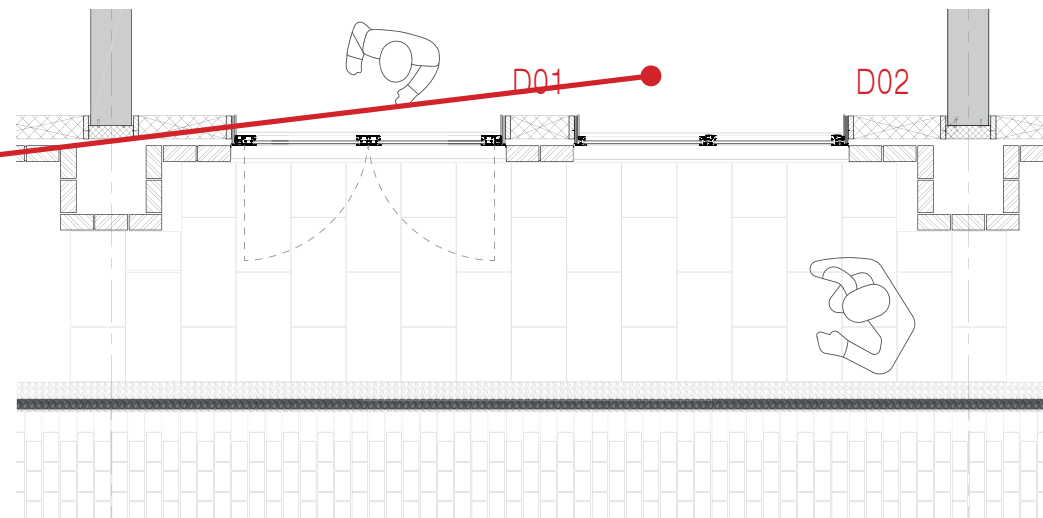
Building Plans

Facade Fragment

PLAN

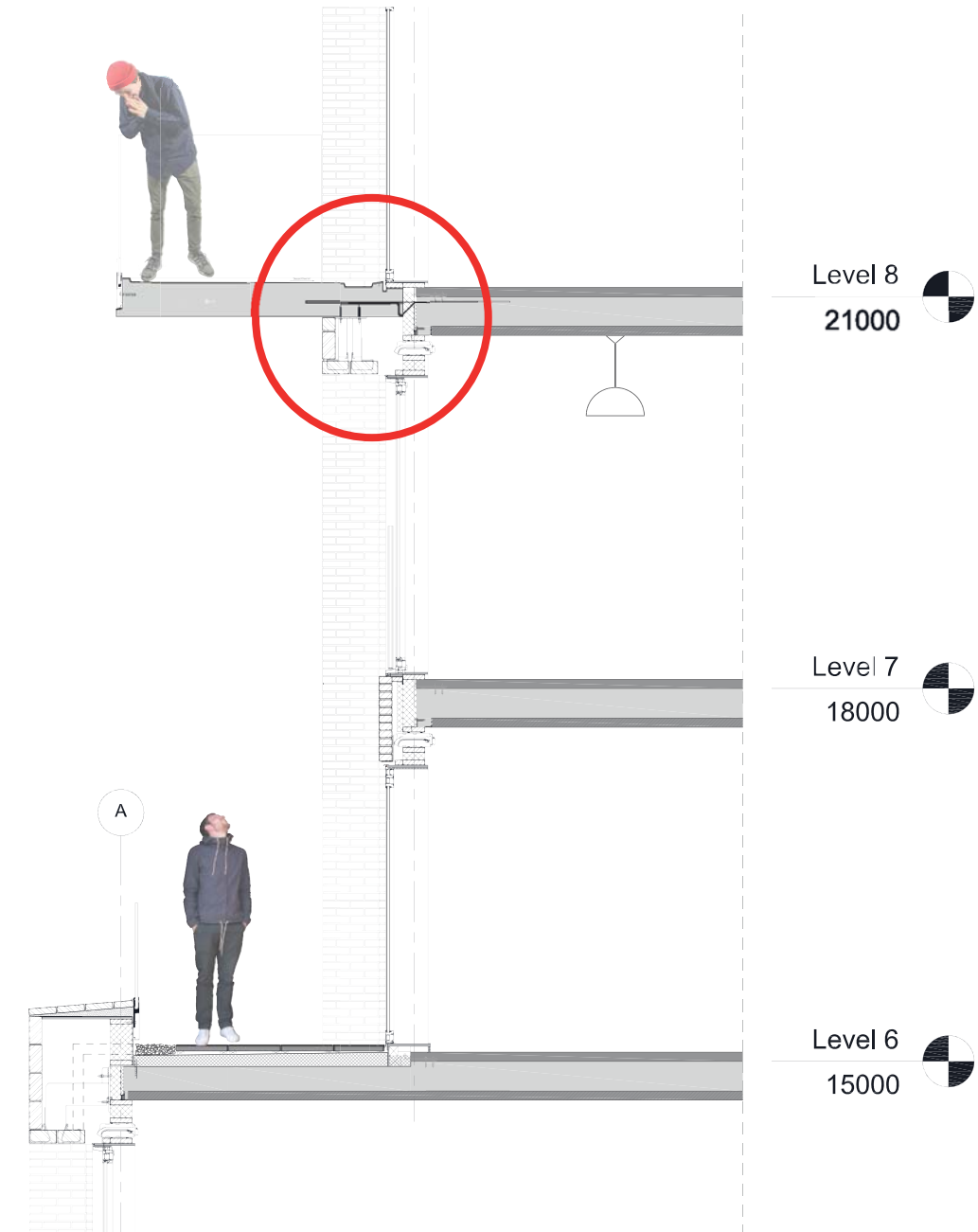
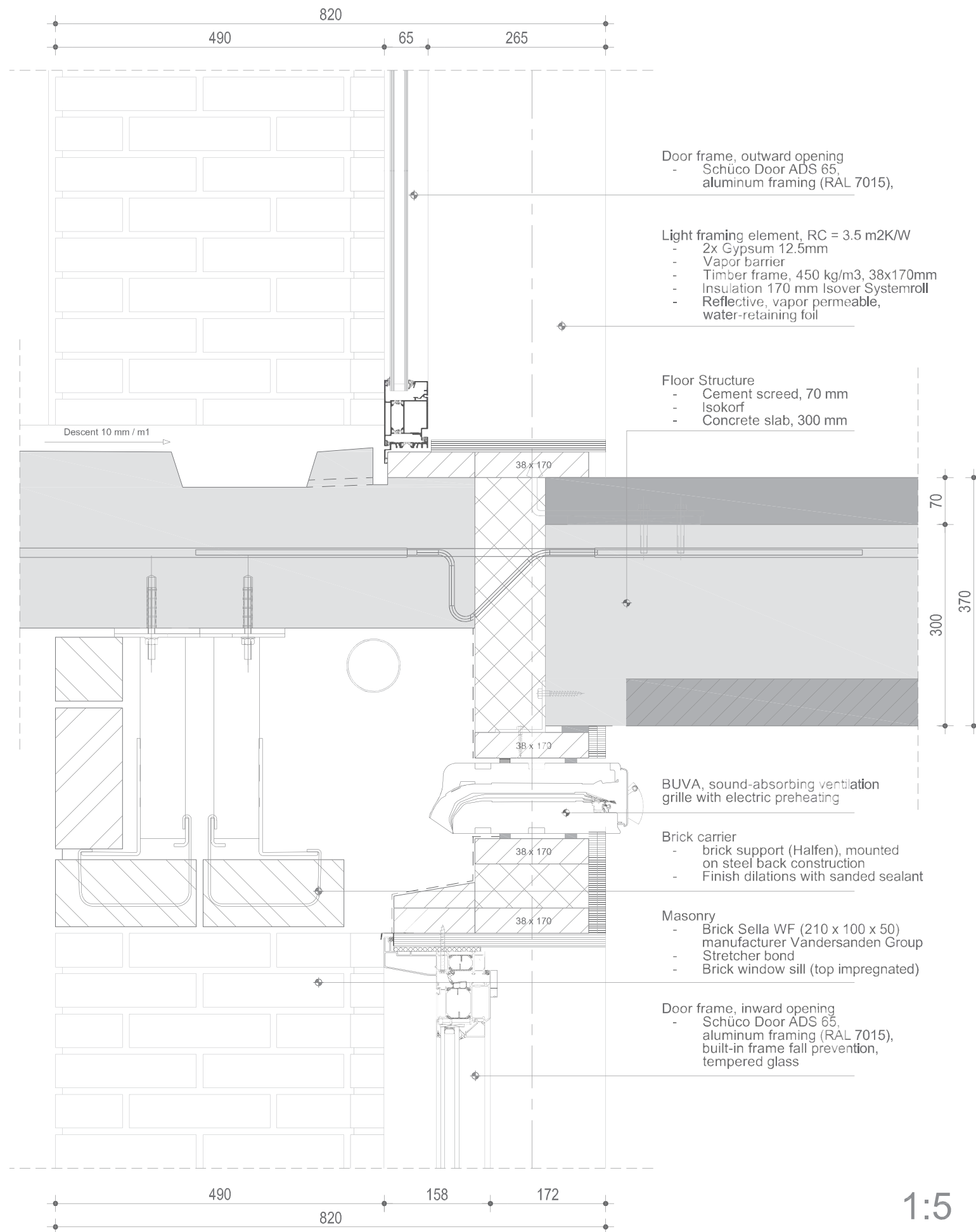


FACADE FRAGMENT 1:25



Building Plans

Details



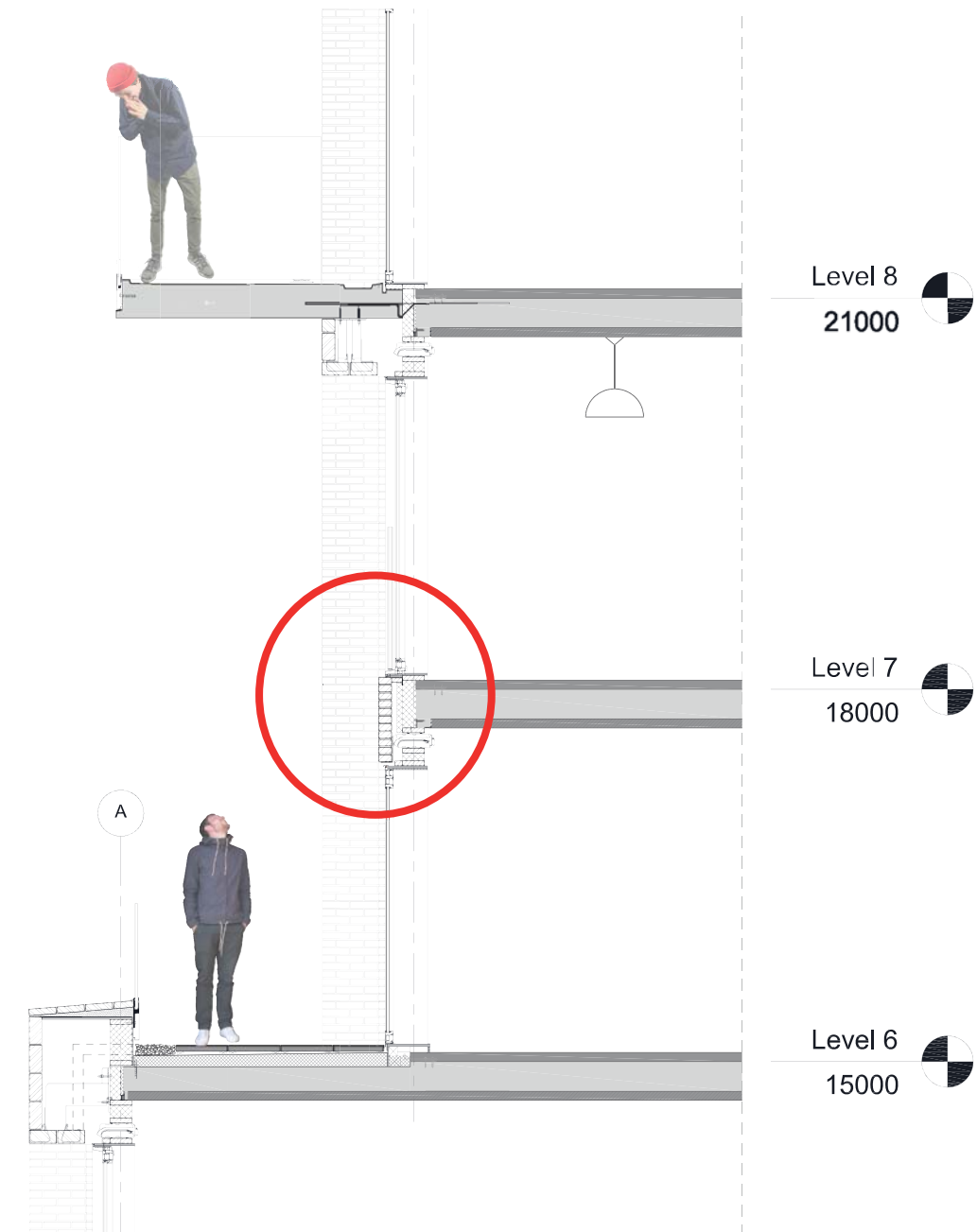
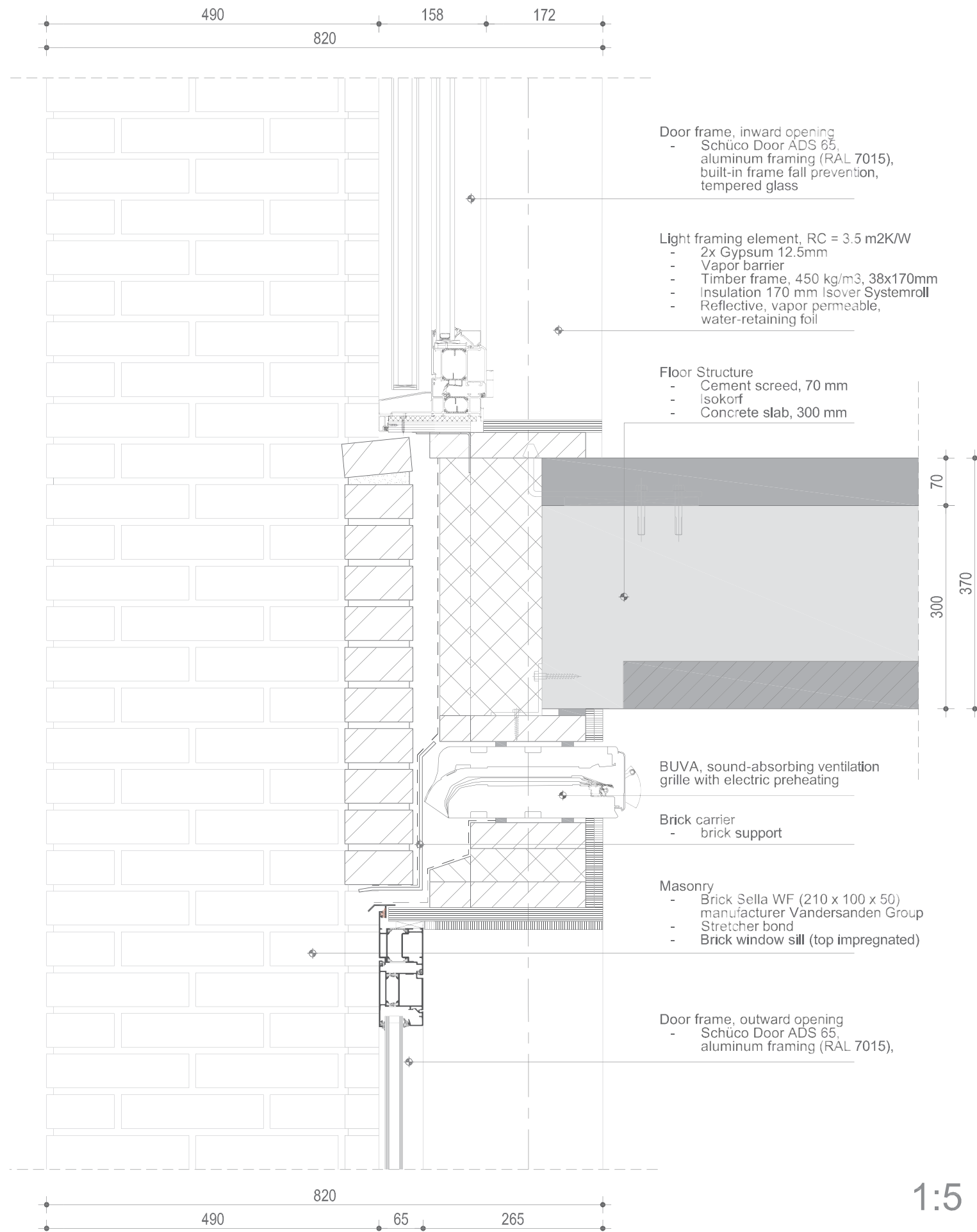
PLAN

1:5

84 - 90

Building Plans

Details



PLAN

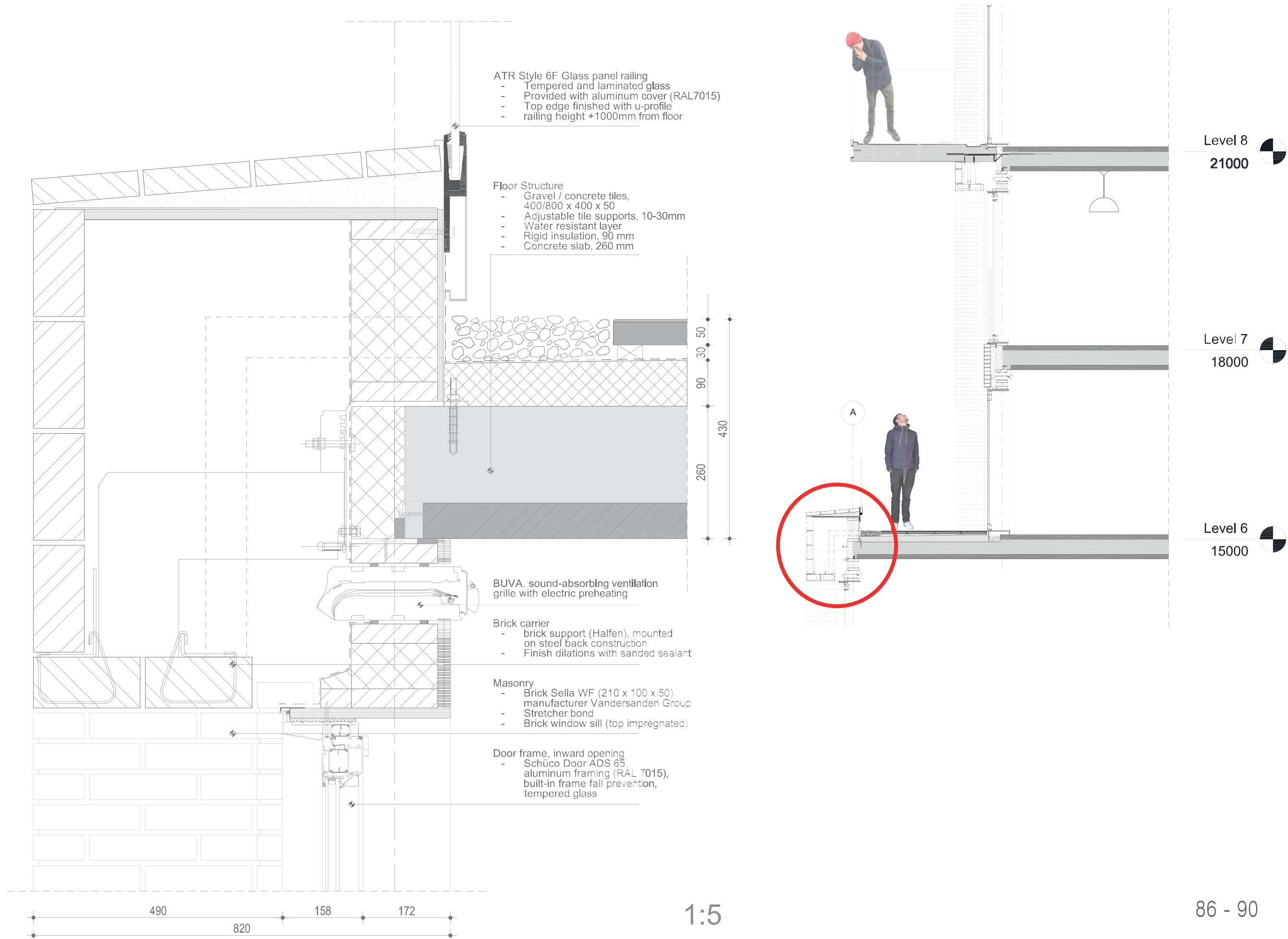
1:5

85 - 90

Building Plans

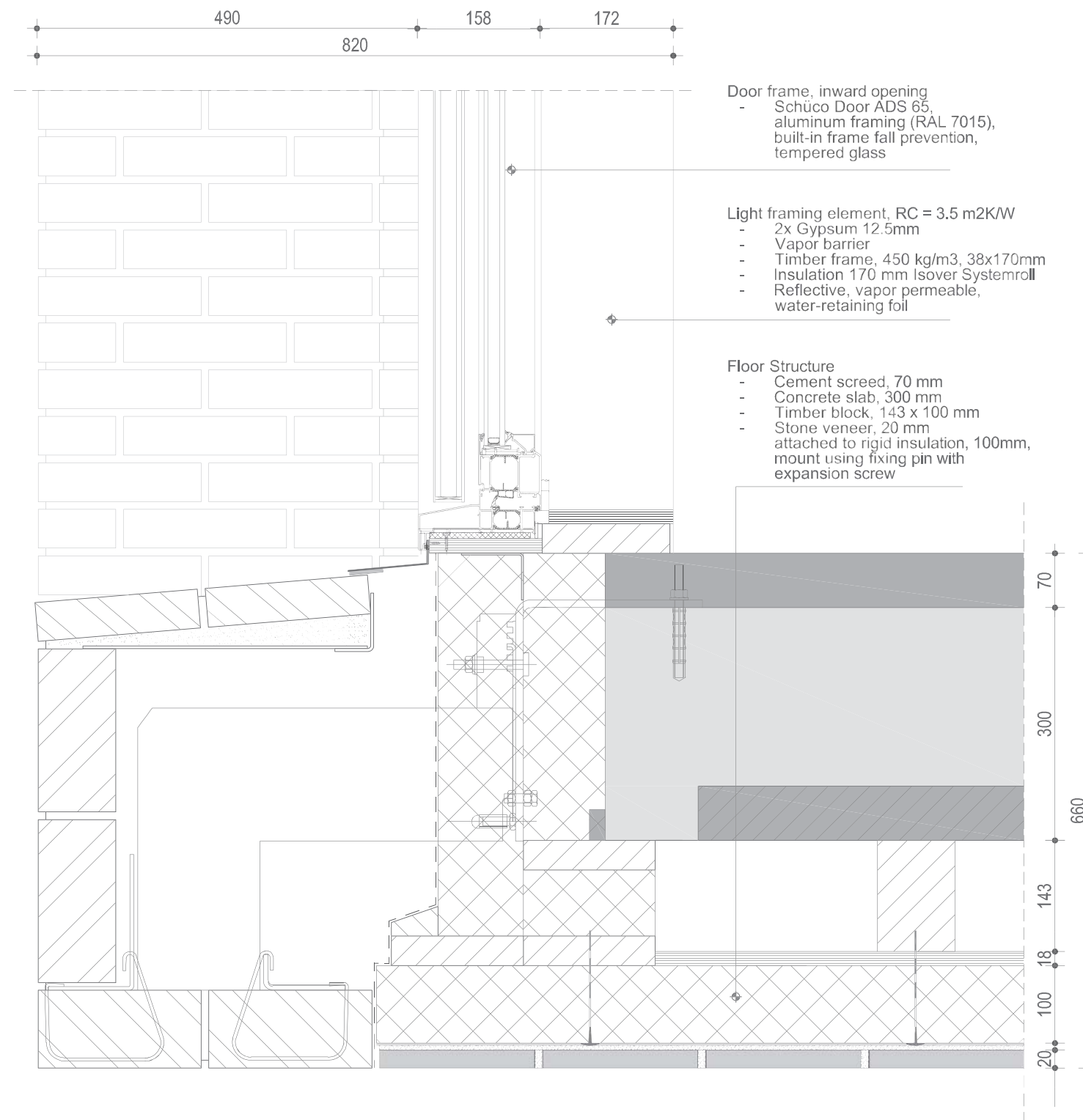
Details

PLAN



Building Plans

Details



PLAN

1:5

Building Plans

Floor plan - Elevations



PLAN



THANK YOU!