

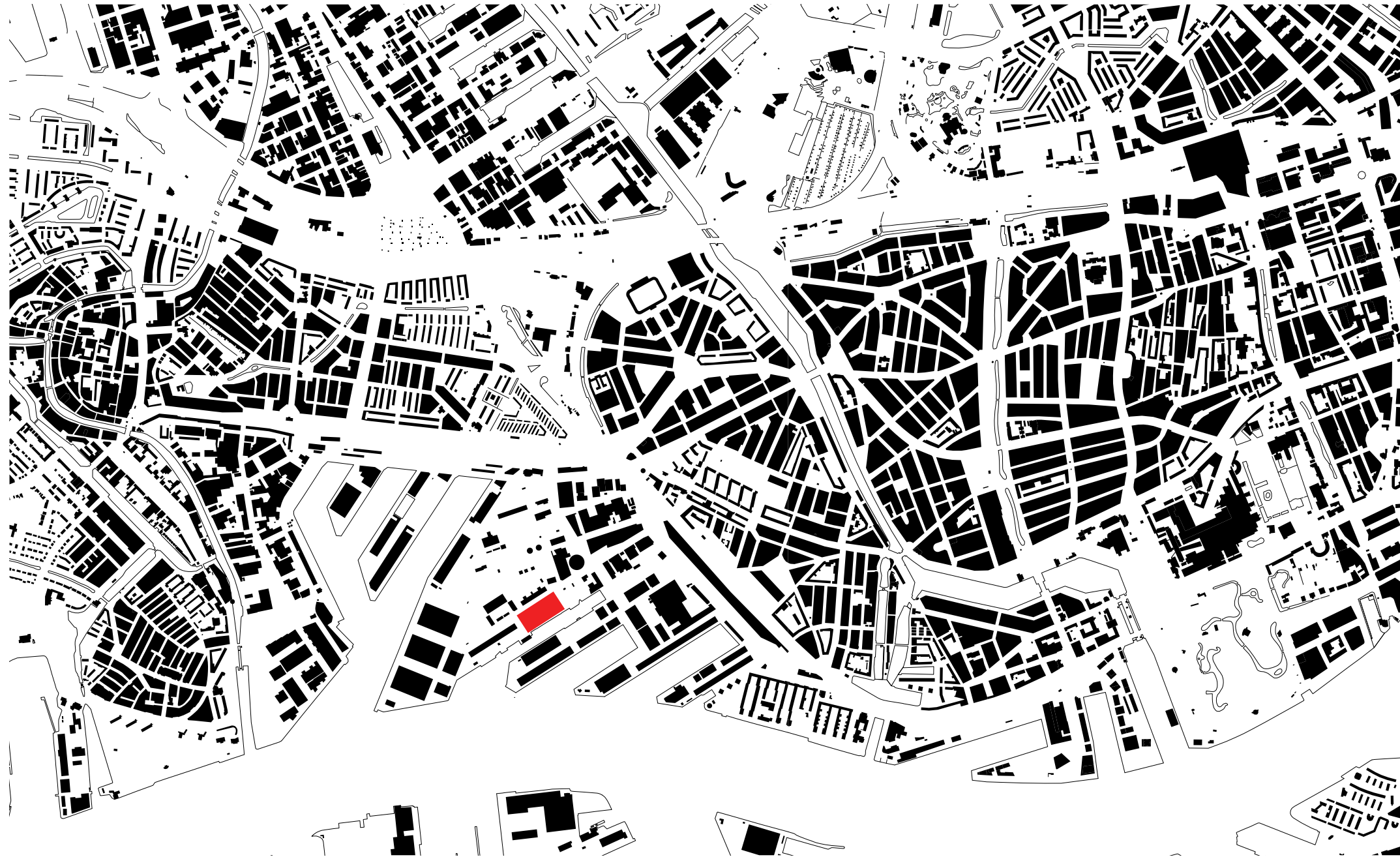
THE VALUE OF WASTE: FROM YOUR PLATE TO COMMUNITY

Affordable Co-Housing through Zero-Energy Cooperative and
Waste Management

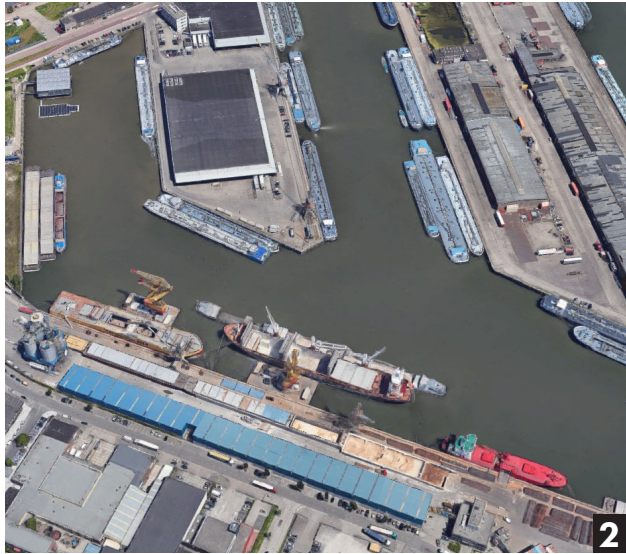


Introduction | Location

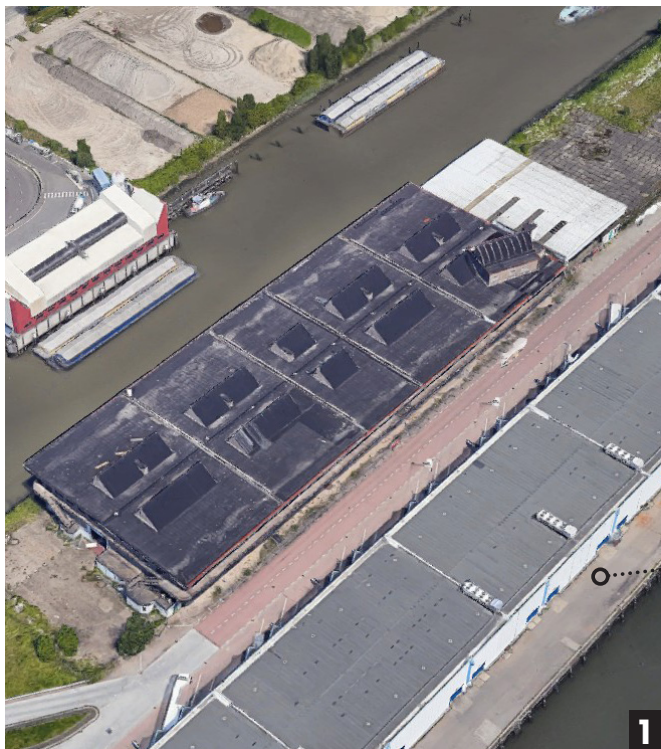
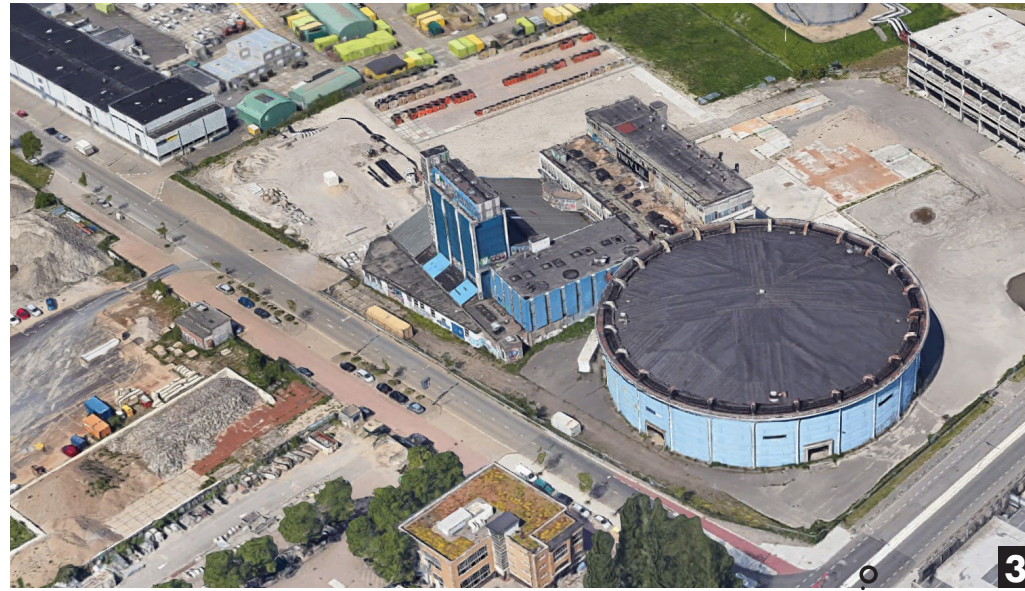
Merwe-Vierhavens, Rotterdam



Introduction | Location



Introduction | Location



Research Report | Research Question

LOCATION / Merve-Vierhavens

Industrial site

Production +Living

SITUATION / Housing Crisis, Rise in Energy Prices

Gentrification

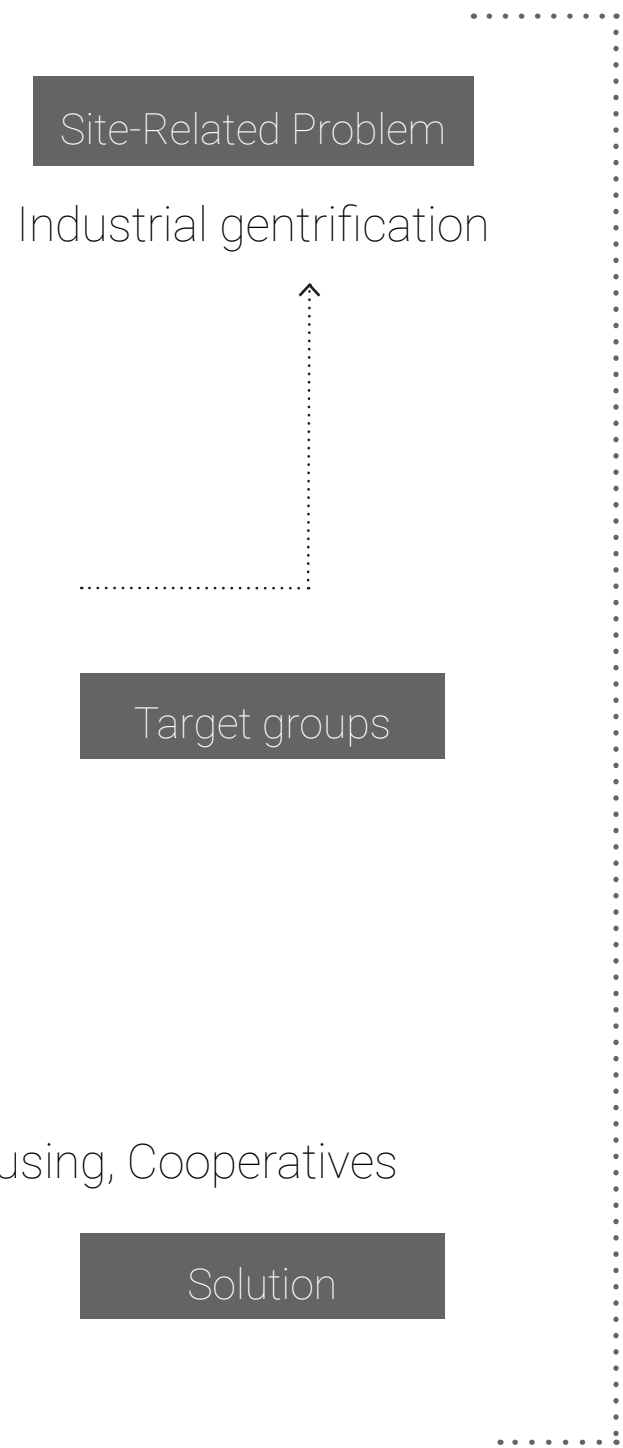
- low income families
- solo-dwellers
- creative individuals

FASCINATION / Nearly Zero-Emission Housing, Co-housing, Cooperatives

Reduction of square meters

Reduction of energy costs

Ownership through sharing



RESEARCH QUESTION:

“How can a combined model of co-operative co-housing and zero-emission buildings contribute to creating a living, working, and learning environment for low to middle-income families and solo dwellers, including creative individuals?”

Research Report | Research Question

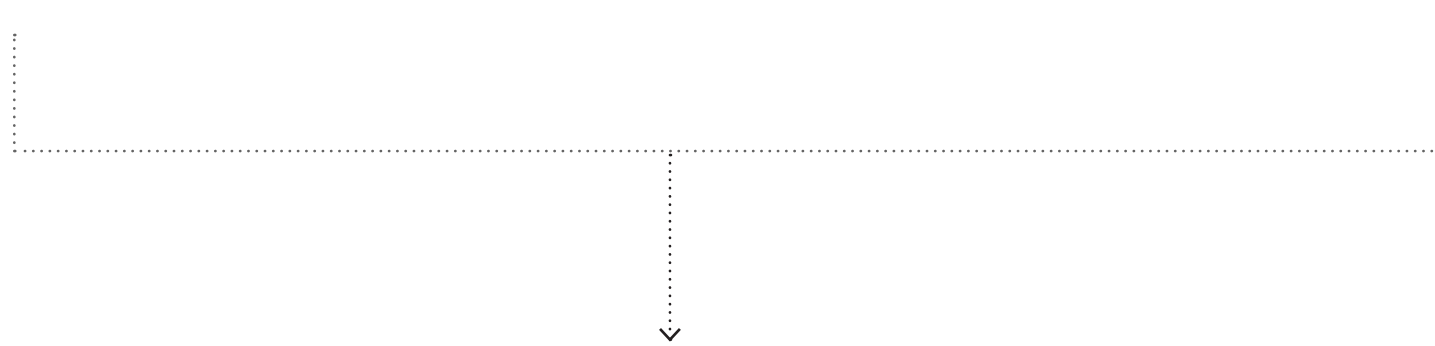
HOUSING + PRODUCTION (URBAN)

1. How does industrial activity create public space?

HOUSING

2. How does affordability resonate with practices of sharing and practices of thermal comfort?

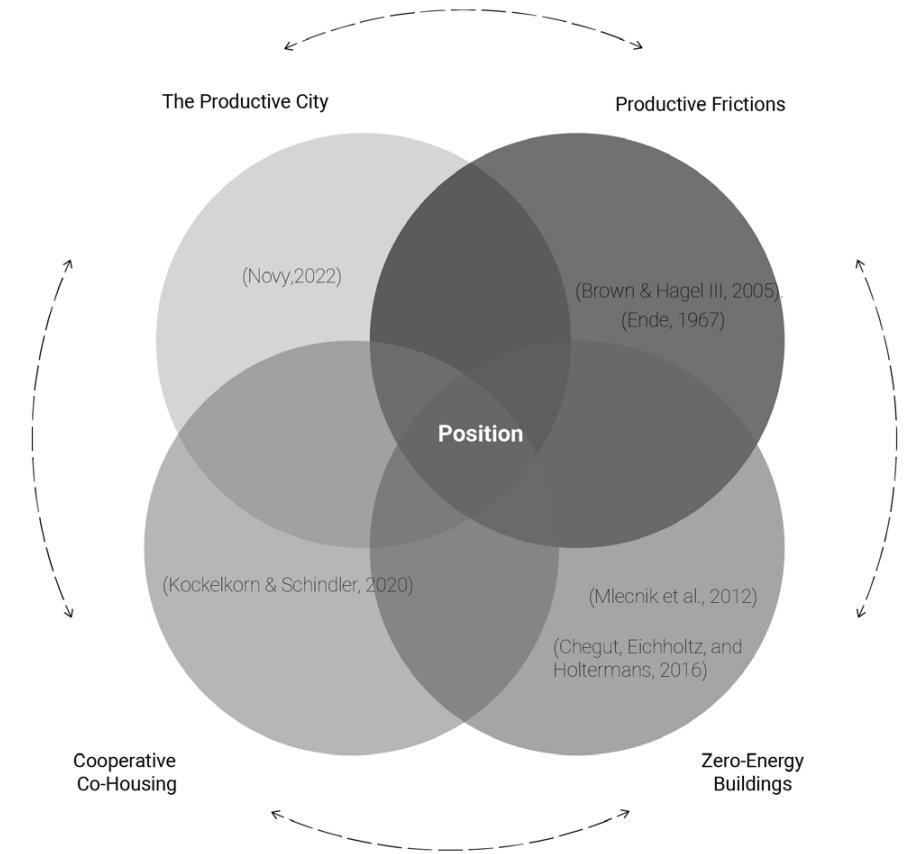
3. What are the limits and social potentials of practices of sharing and thermal comfort?



PRODUCTION

4. What is the role of waste management systems in the urban fabric?

5. "What are the synergies between waste management facilities, co-housing, and zero-energy buildings?"



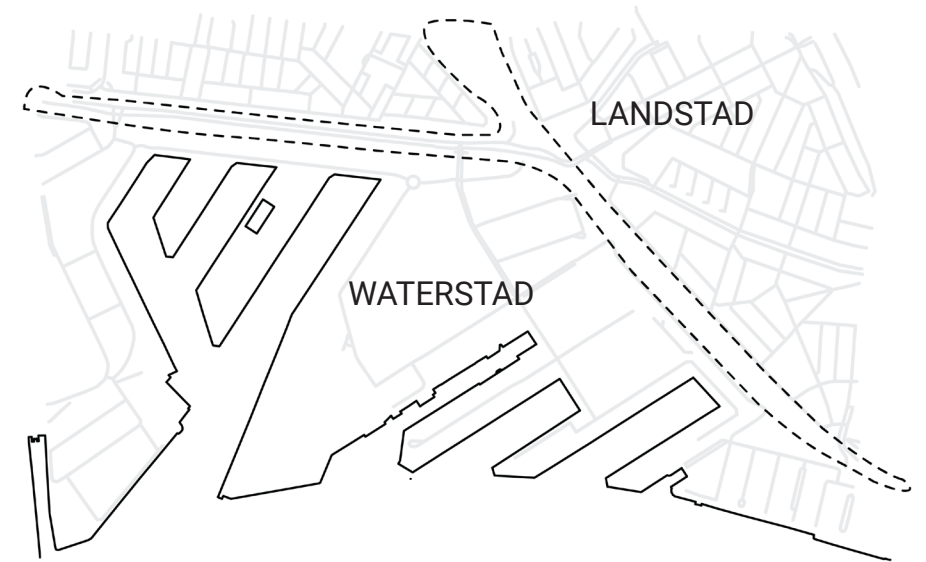
Research Report | Outcomes for Urban Design

1. How does industrial activity create public space?

De Boompjes



The Boompjes, Painting by August Willem Van Voorden

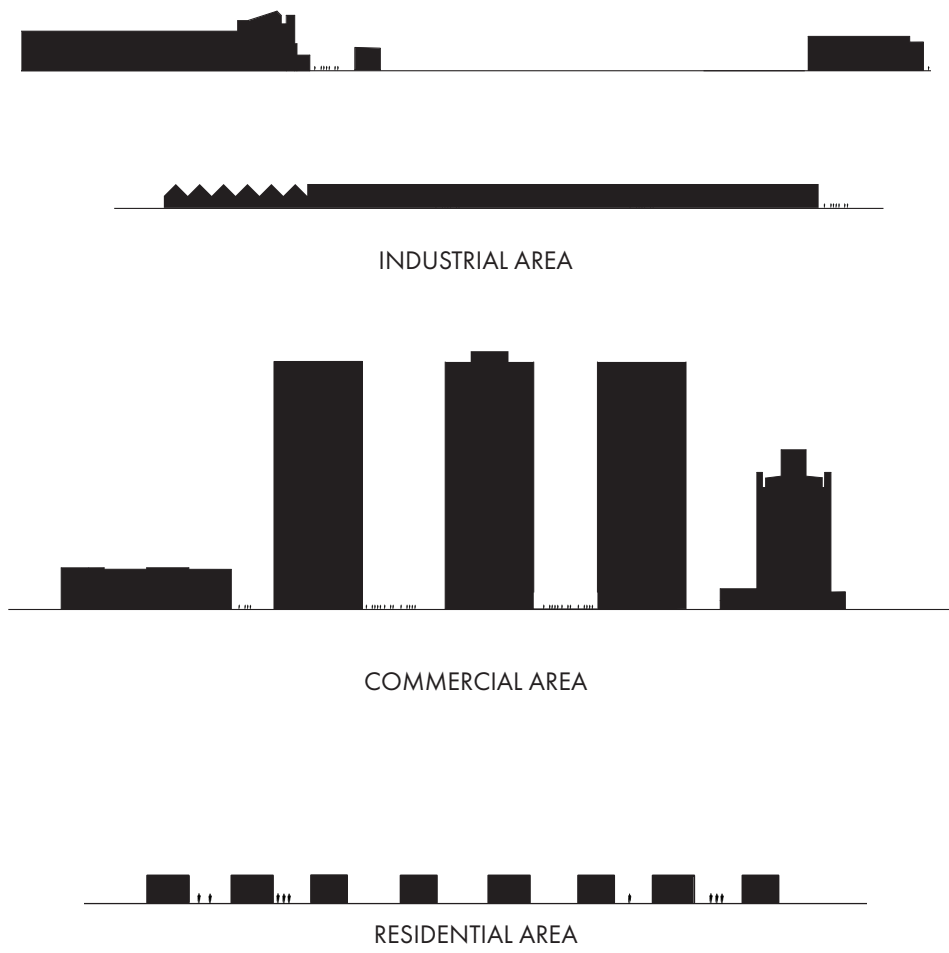


The separation between Landstad and Waterstad in the M4H area.

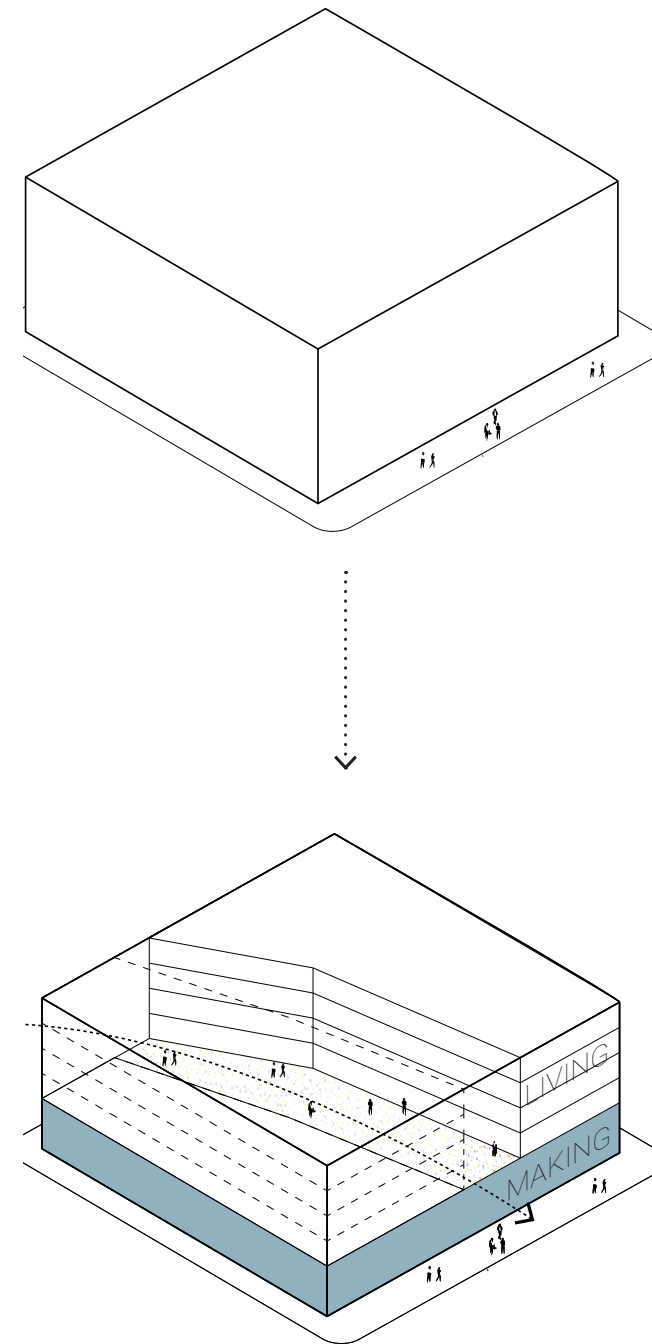


The Boompjes, Painting by Carl Edward Ahrendts (1822-1898)

Research Report | Outcomes for Urban Design



Building Proportions Around the Merwe-Vierhavens Area

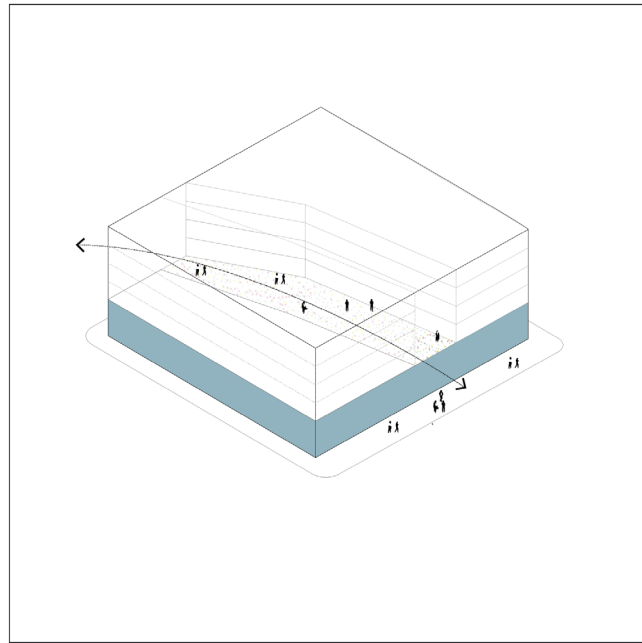


Volumetric Study, Group Work

Research Report | Outcomes for Urban Design

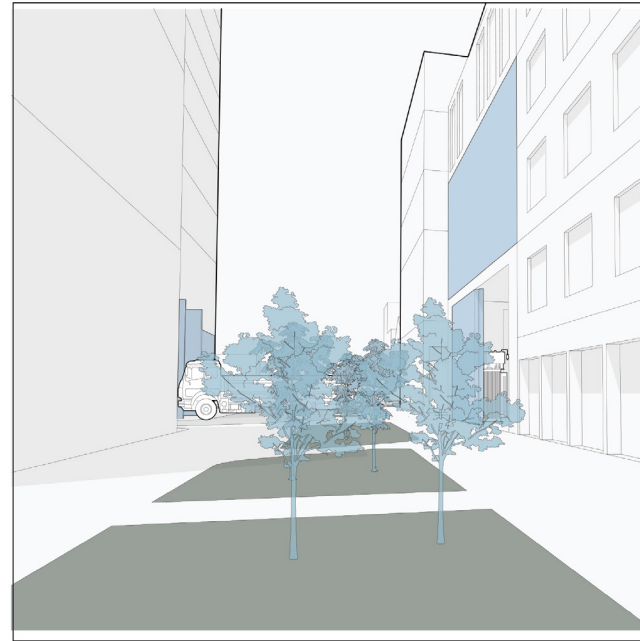
Design Principles

SPATIAL ACCESSIBILITY



Hybrid Building Block

The building block should be able to fit industrial facilities while also allowing through-block access for pedestrians.



Hybrid Infrastructure

The urban design should facilitate the vehicular movement for production logistics and the movement of people who live in the area.



Anthropometric design

The building blocks on the urban plot should relate to human proportions.

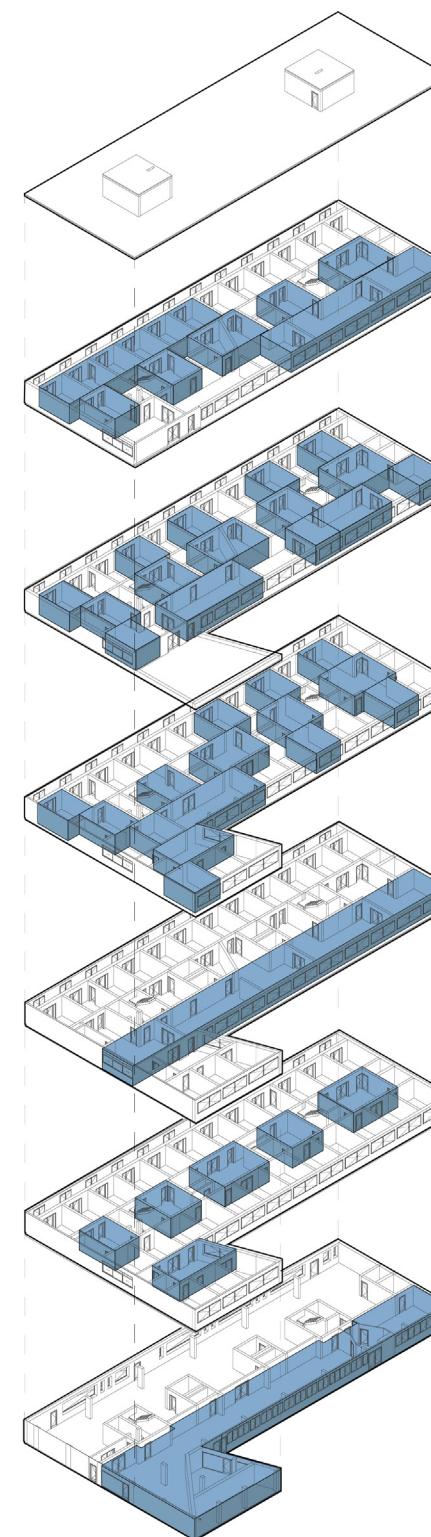
Research Report | Outcomes for Dwellings

2. How does affordability resonate with practices of sharing and practices of thermal comfort?

3. What are the limits and social potentials of practices of sharing and thermal comfort?

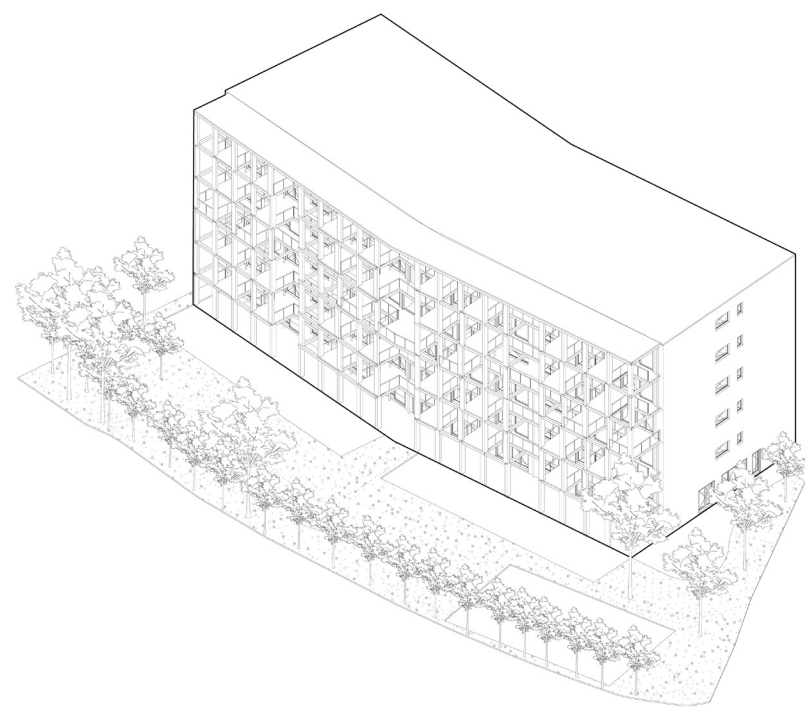
San Riemo

Munich
 Cooperative Co-housing
 2017 - 2020
 Arge Summacumfemmer, Büro Ju-
 liane Greb
 Cooperative Grosstadt eG



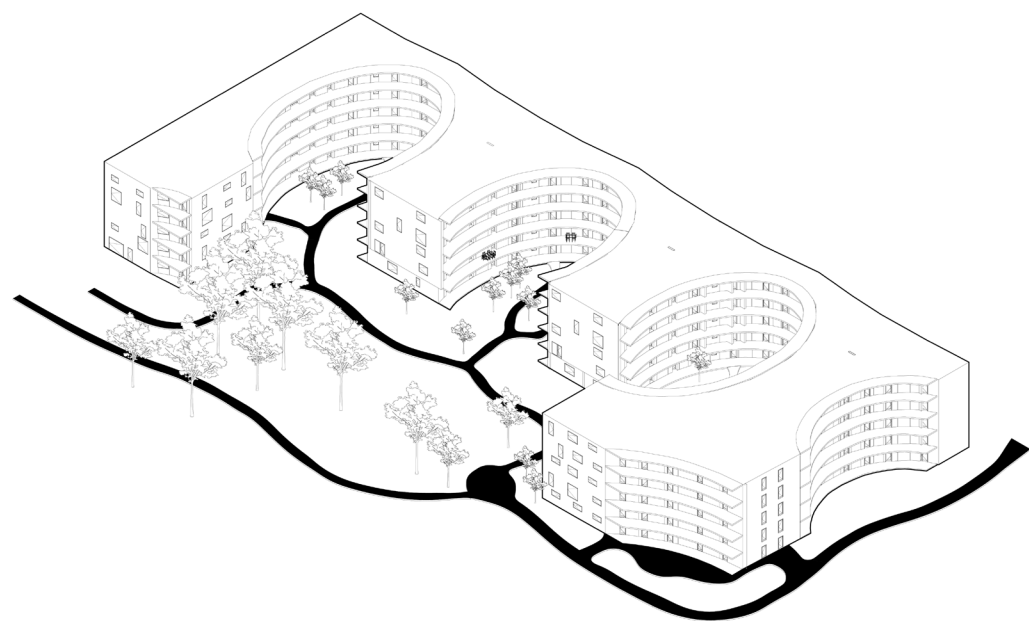
Soubeyran

Geneva
 Zero-energy Cooperative Co-housing
 2016 - 2017
 atba SA
 Cooperative Equilibre

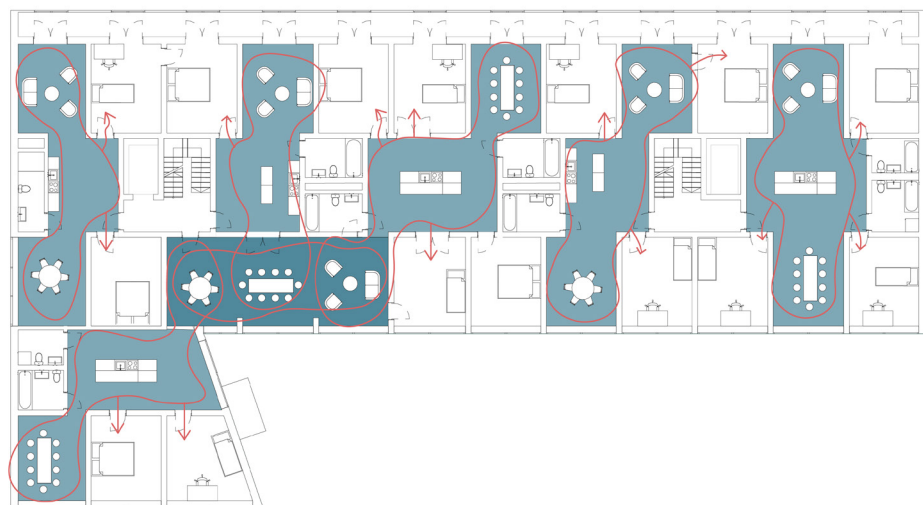


Holunderhof

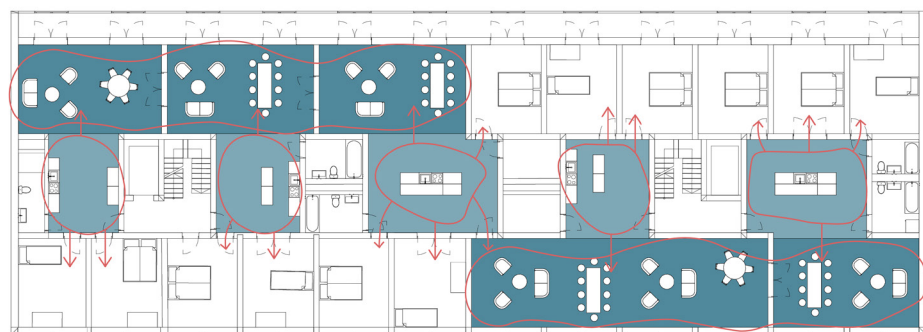
Zurich
 Cooperative Housing
 2016 - 2018
 Schneider Studer Primas, Architekten
 GmbH Non-profit building cooperative
 Röntgenhof Zurich (GBRZ)



Research Report | Outcomes for Dwellings



Shared Spaces, Third Floor - San Riemo /Munich

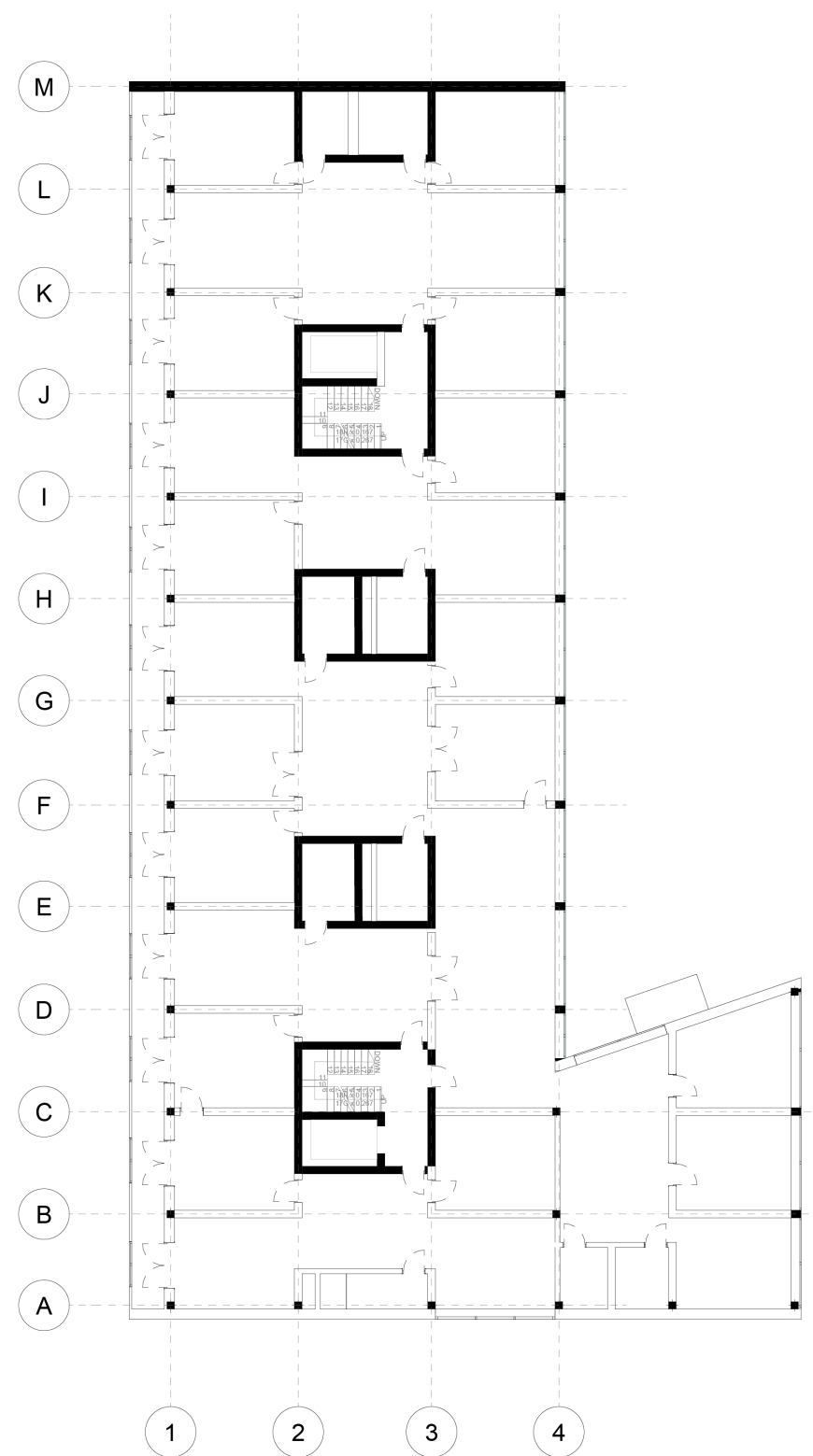


Shared Spaces, Fifth Floor - San Riemo /Munich



Adaptability + Variety

- Structural elements
- "Staircase room"
- Collective Spaces

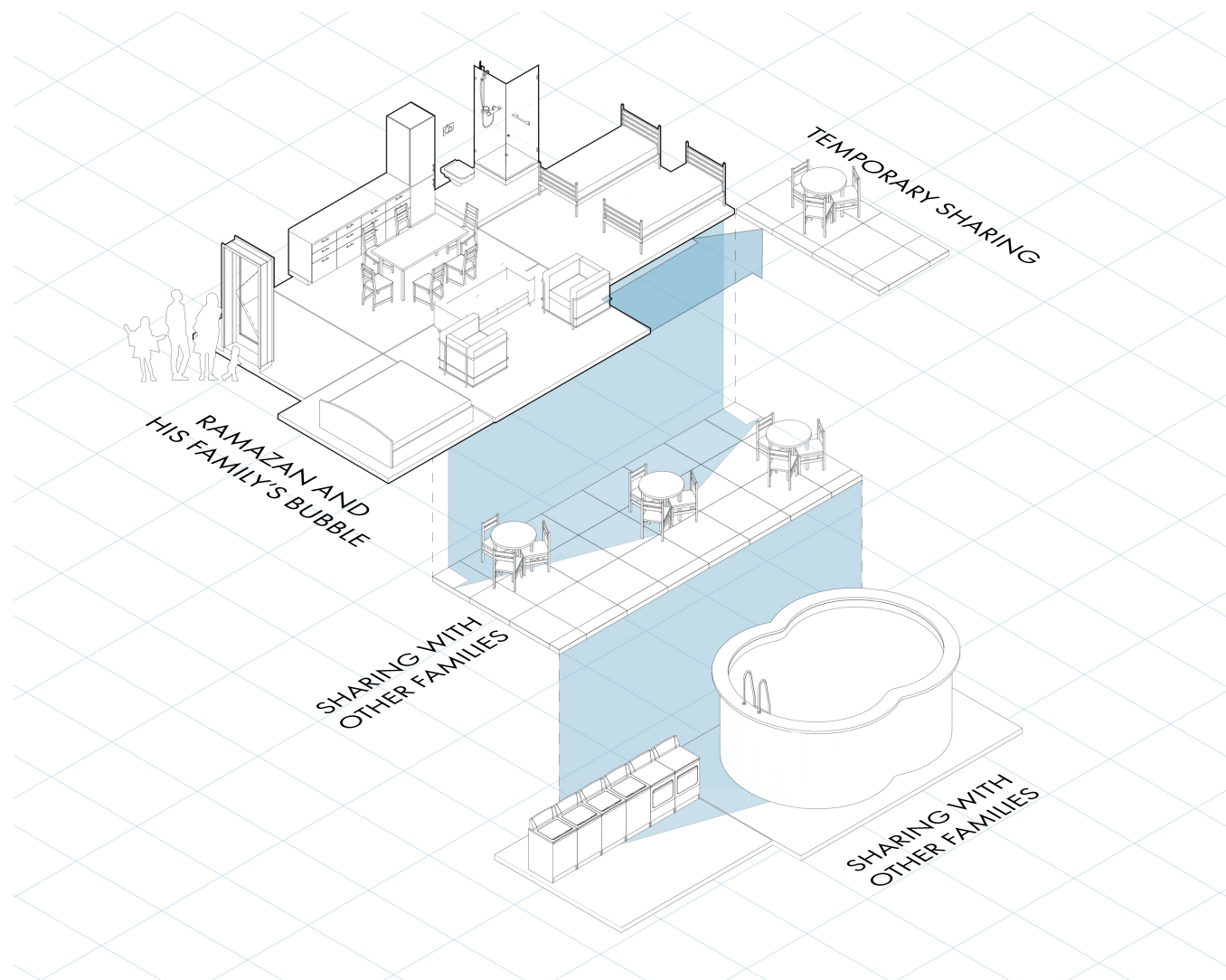


Structural Grid - San Riemo /Munich

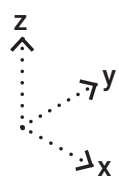
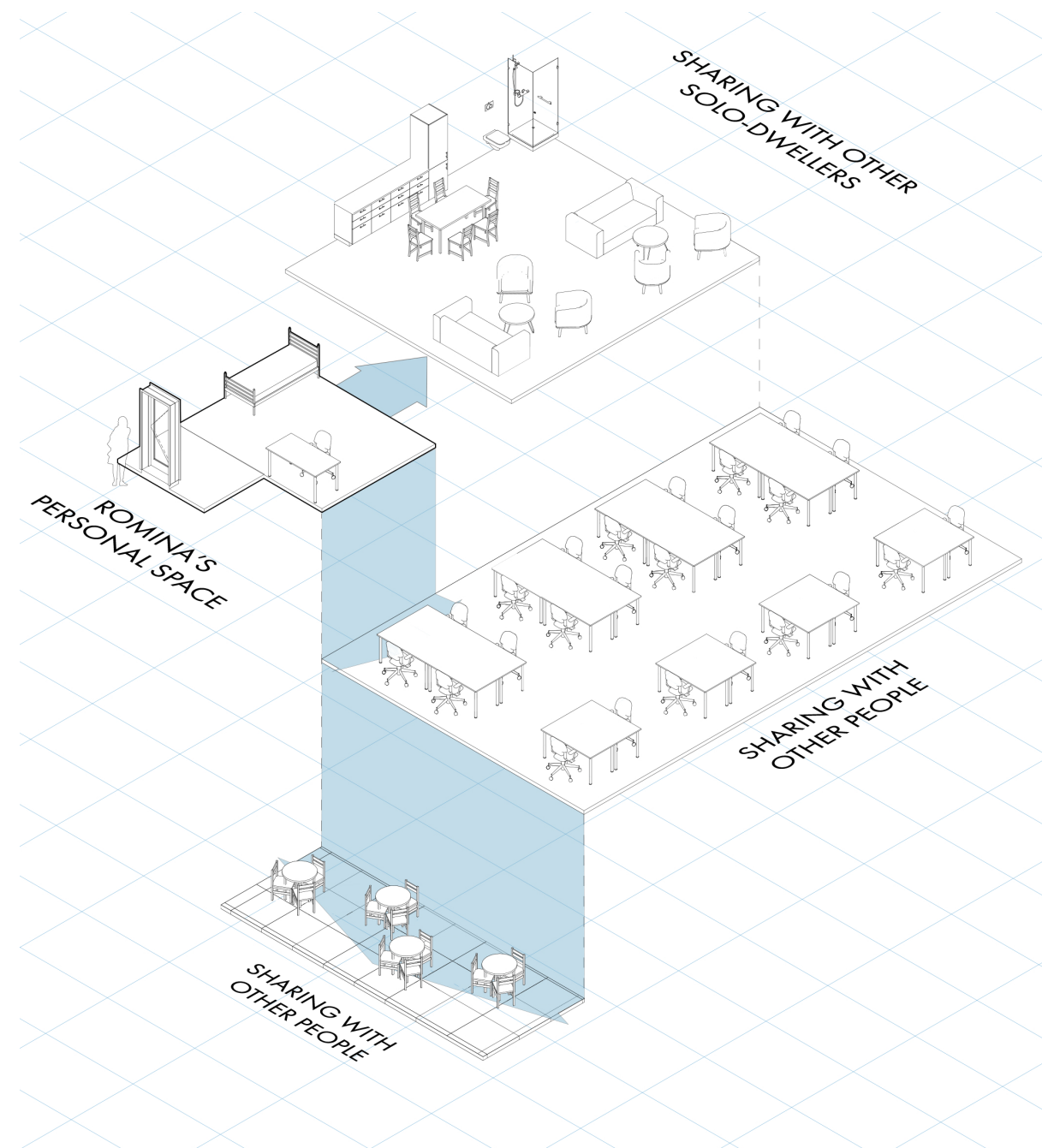


Research Report | Outcomes for Dwellings

Low-income Family



Solo Dweller

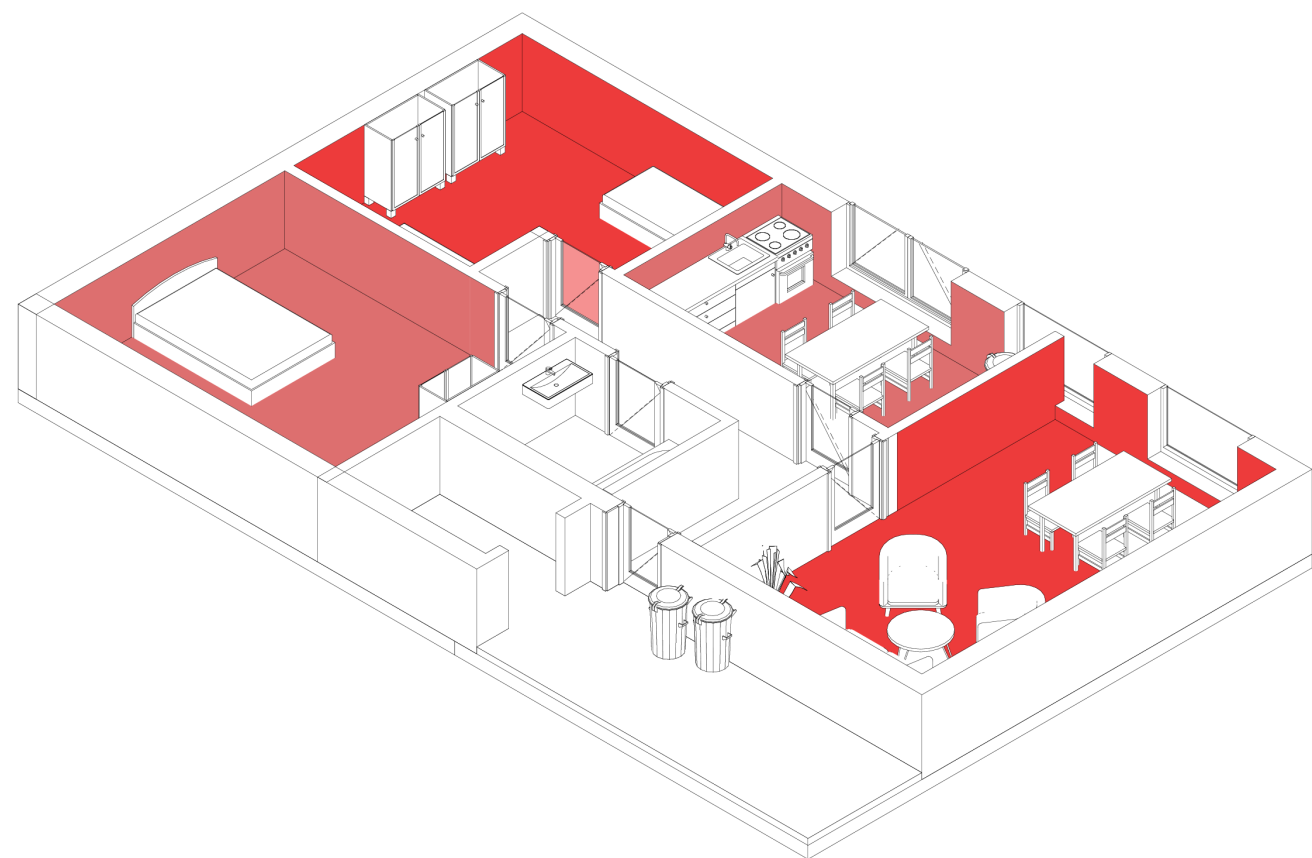


Arrow, direction y: Access within the unit

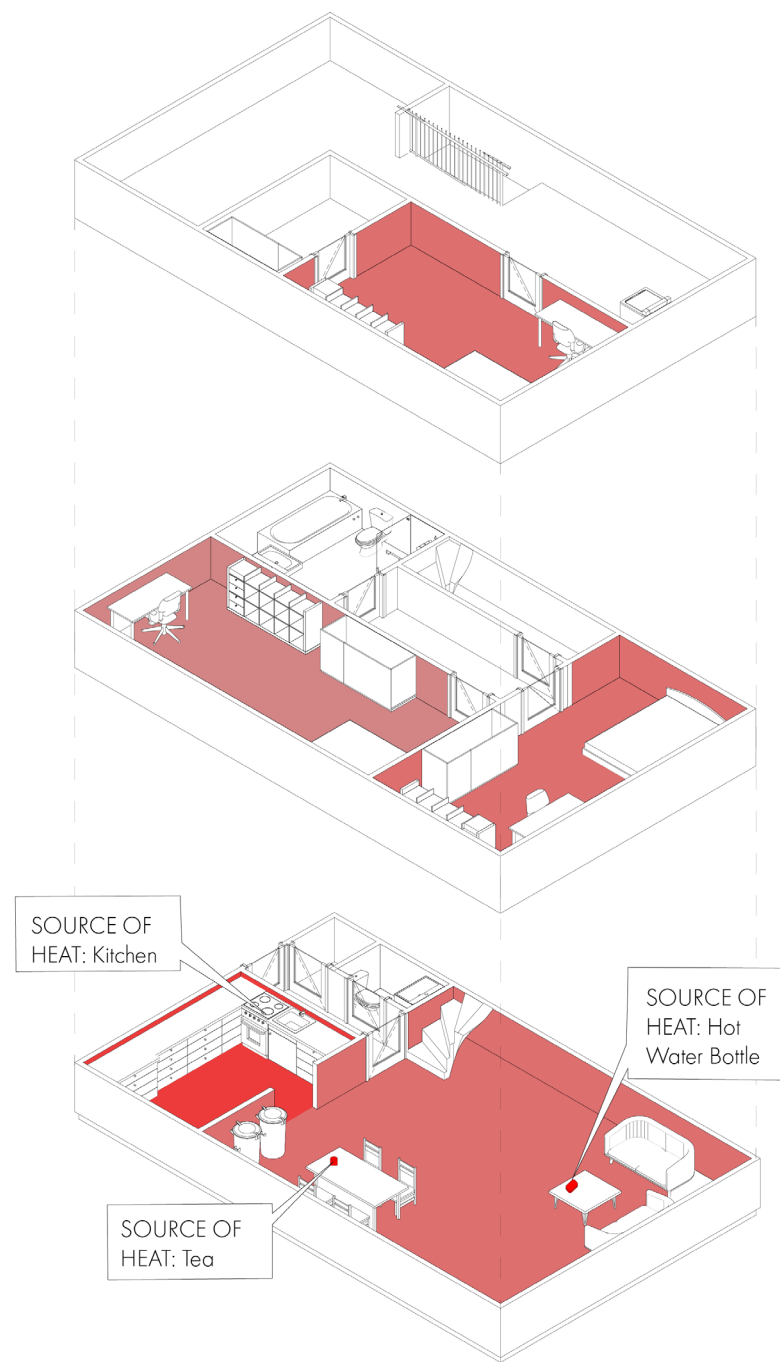
Arrow, direction z: Vertical access (via the building core)



Research Report | Outcomes for Dwellings

Low-income Family



Solo Dweller

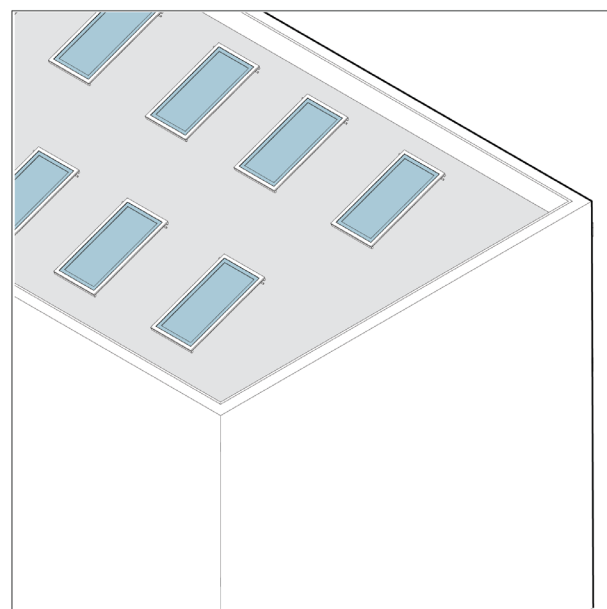


 Thermally comfortable
 Thermally uncomfortable

Research Report | Outcomes for Dwellings

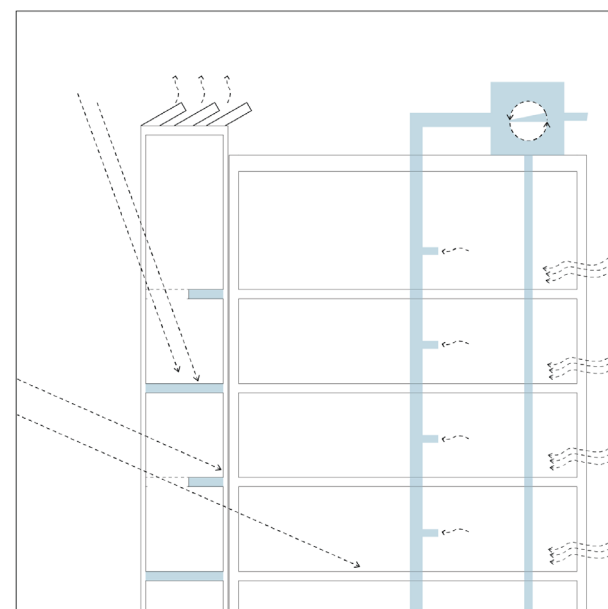
Design Principles

AFFORDABILITY



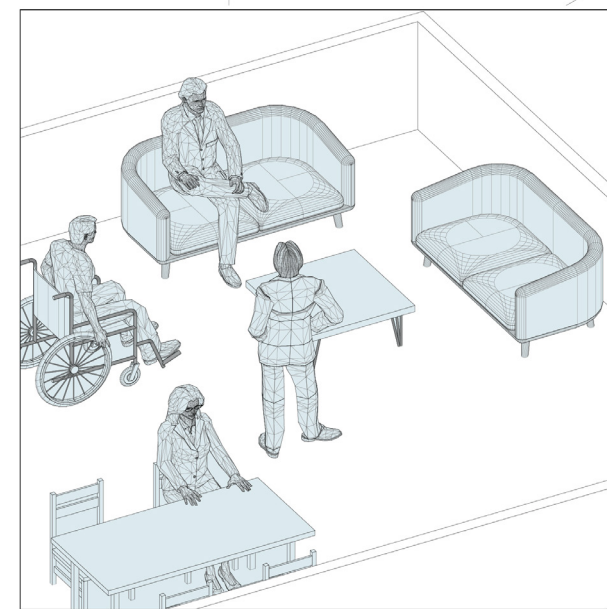
Energy Production

The building design should include systems that can generate energy from renewable resources.



Reduction of Energy Demand

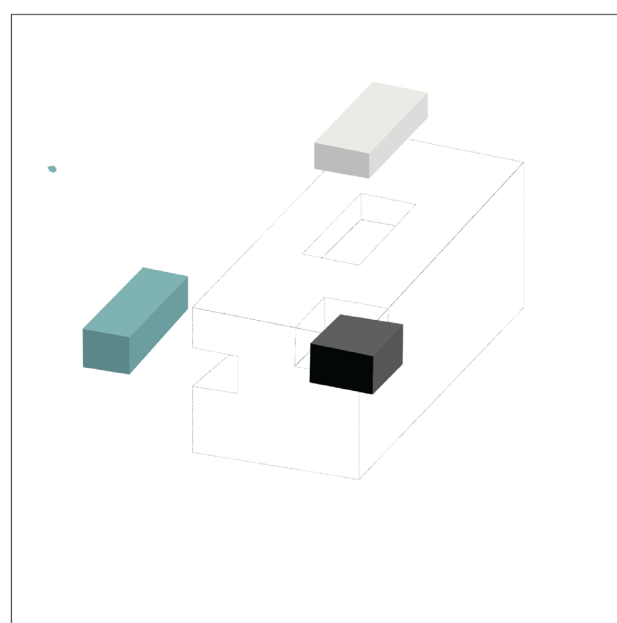
The building design should include architectural solutions and technical installations that reduce the energy demand.



Co-living

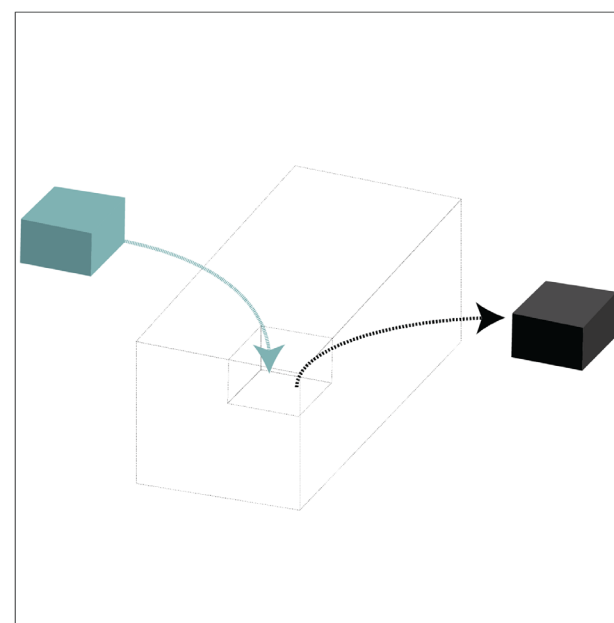
The building should include communal spaces that reduce the amount of square meters per person.

FACILITATING SOCIAL INTERACTIONS



Variety

The building should provide the users with a variety of communal spaces and apartment typologies in order to meet their demands.



Adaptability

The building design should be adaptable in order to meet the changing demands of the users over time.

Research Report | Outcomes for Production Spaces

4. What is the role of waste management systems in the urban fabric?

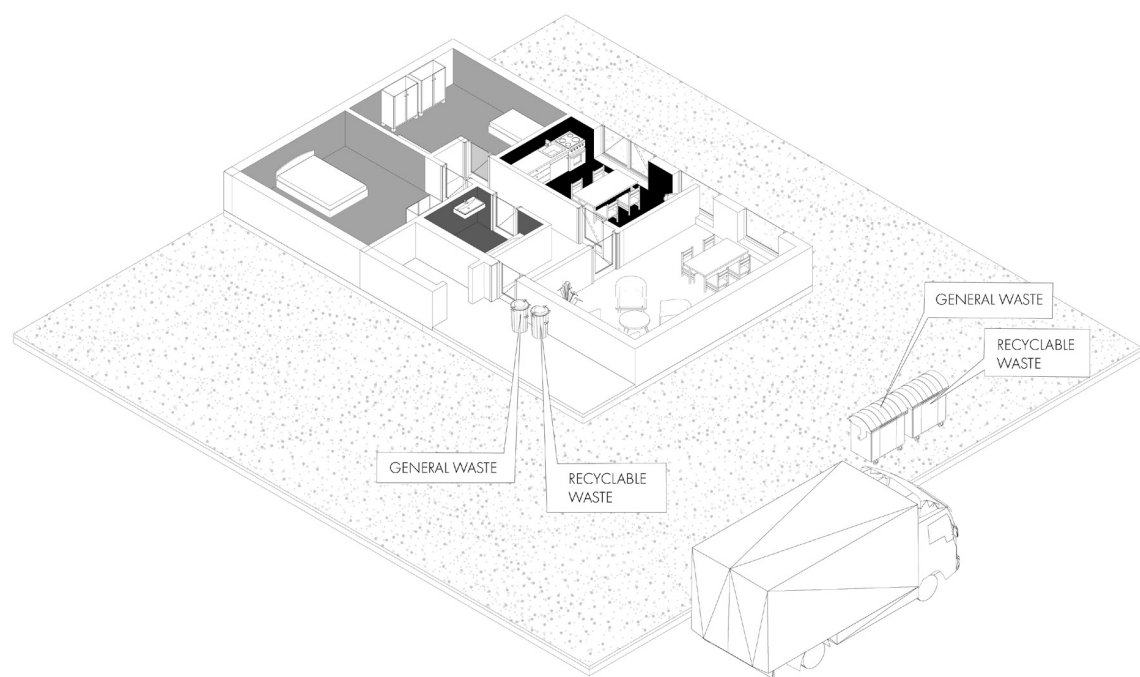
5. "What are the synergies between waste management facilities, co-housing, and zero-energy buildings?"

Trust in Government
Availability of Waste Management Systems

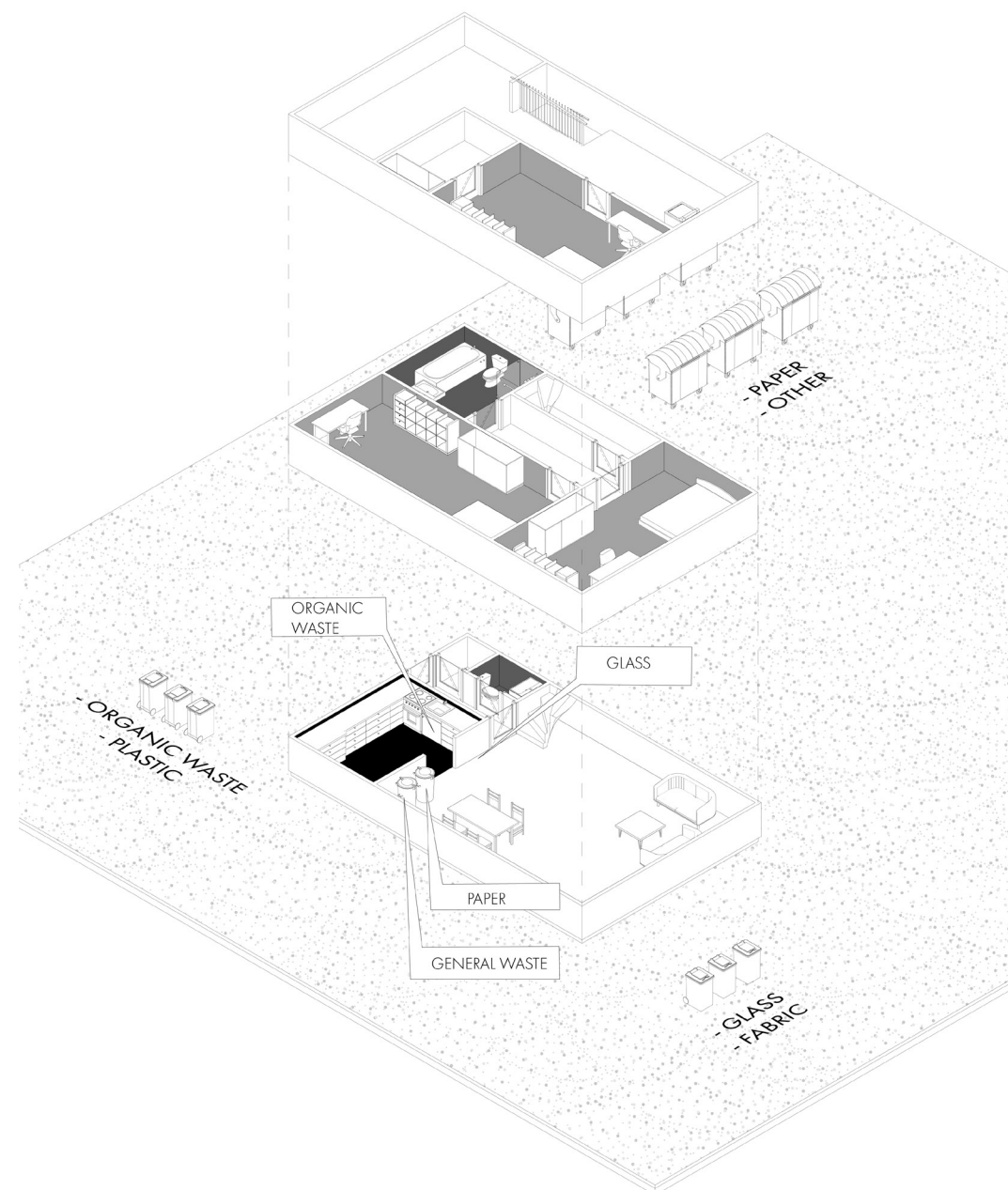
Waste and Public Space

Education → Better waste behavior

Interviews - Low-income Family

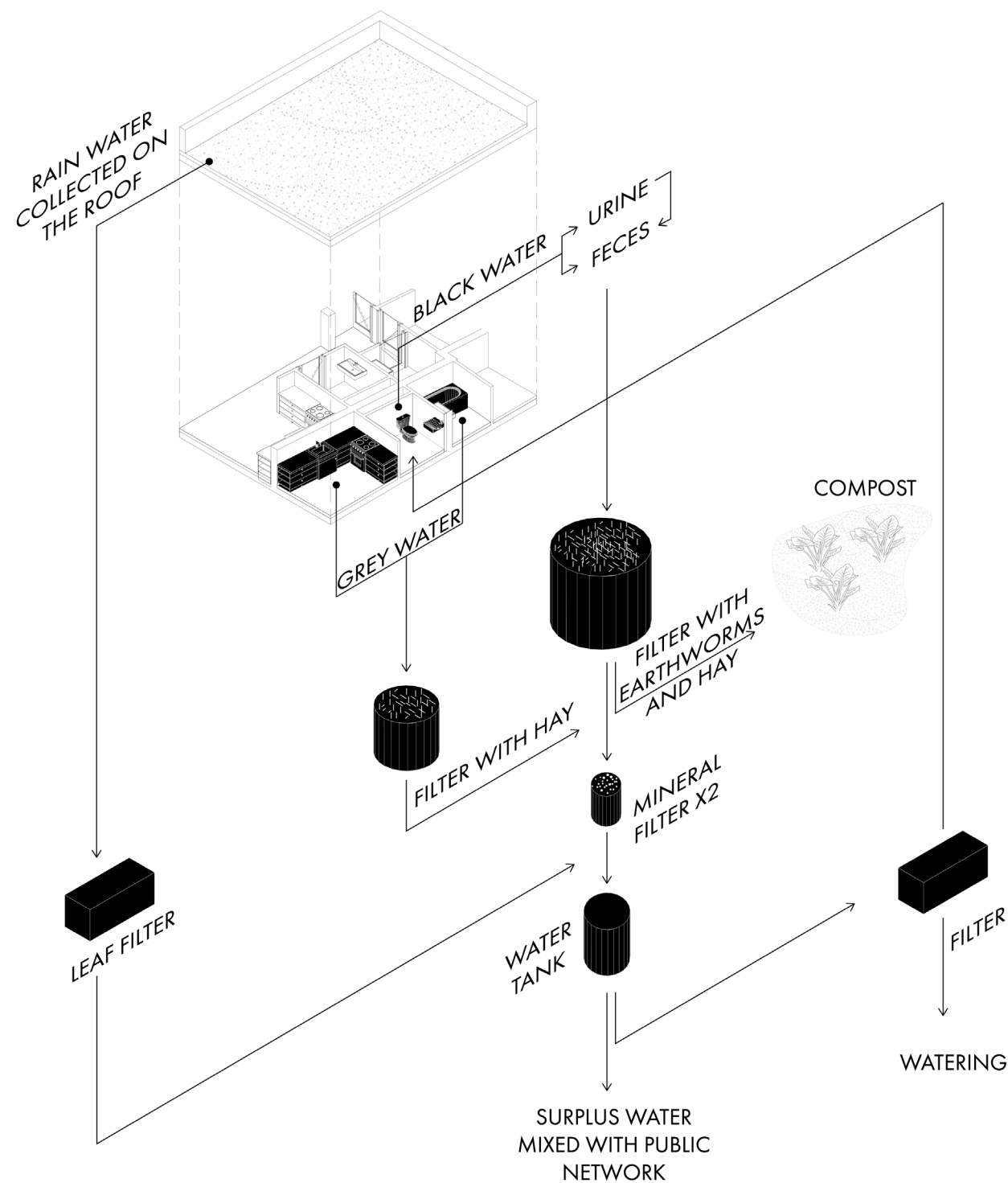


Interviews - Solo Dweller



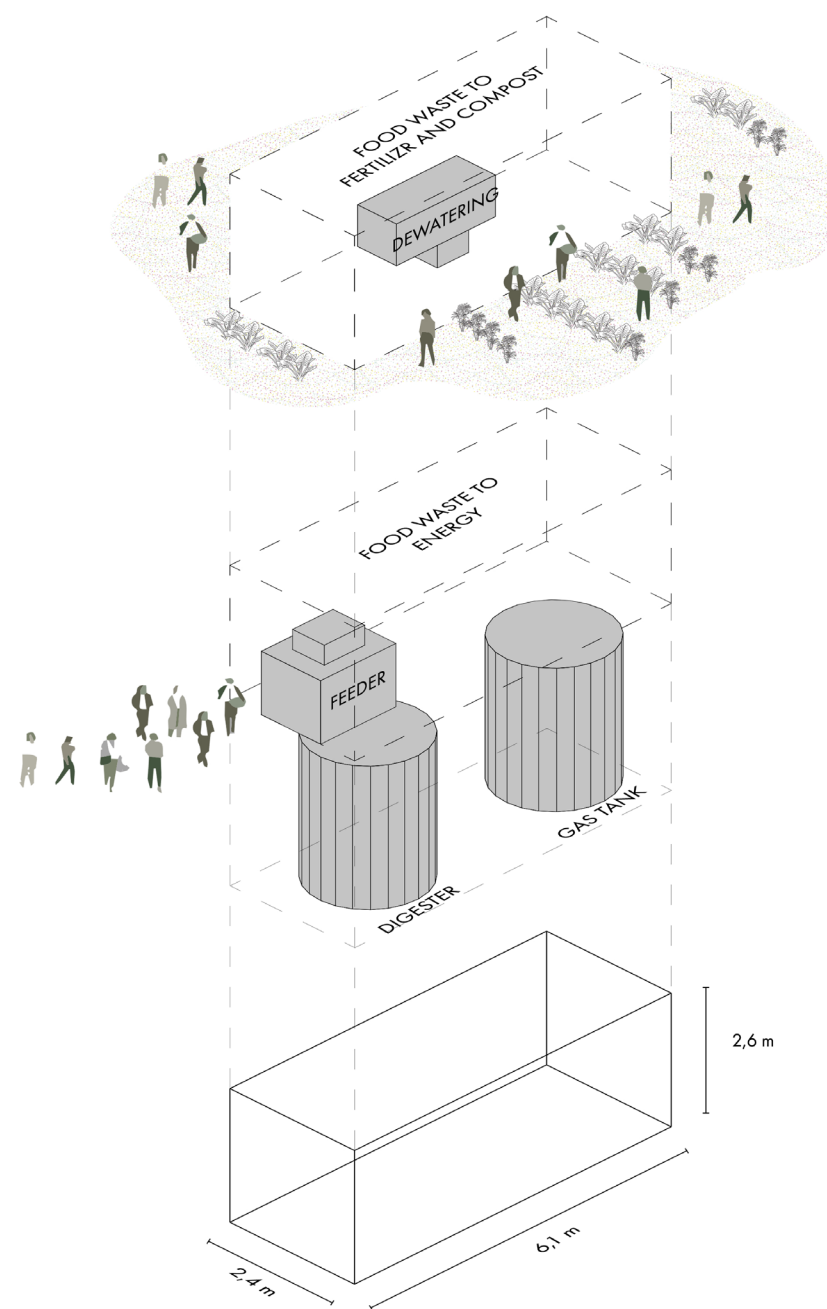
■ Waste generation: highest
■ Waste generation: lowest

Synergy with Co-housing



Collective Waste Management

Synergy with Zero-energy Buildings



Waste as a Valuable Resource: Energy

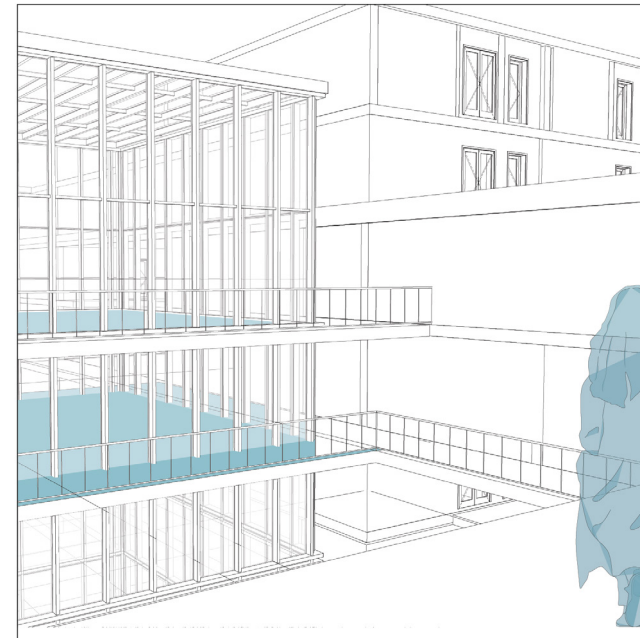
Research Report | Outcomes for Production Spaces

Findings



Collective Waste Management

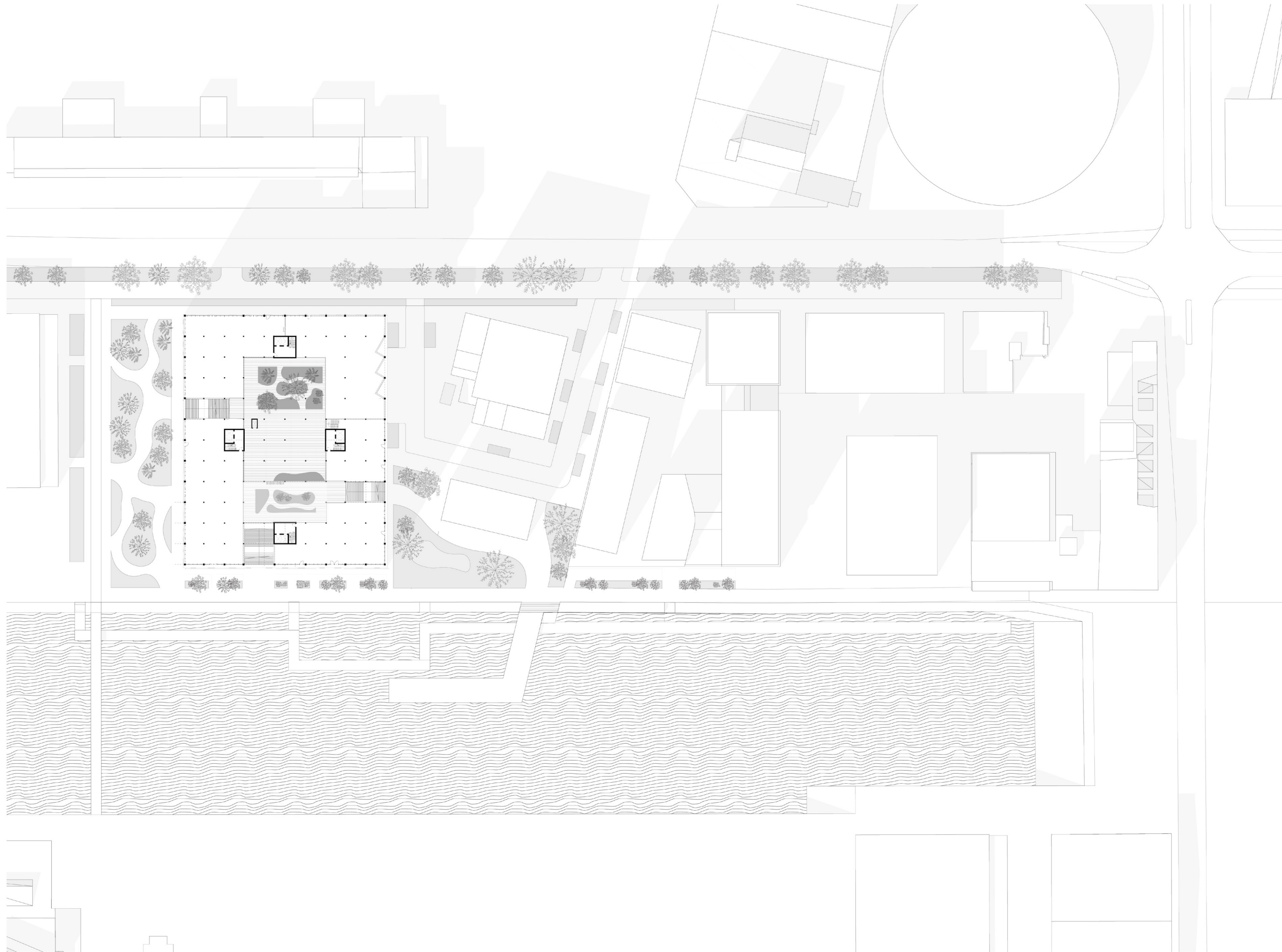
The building design should facilitate a collective waste management among the inhabitants.



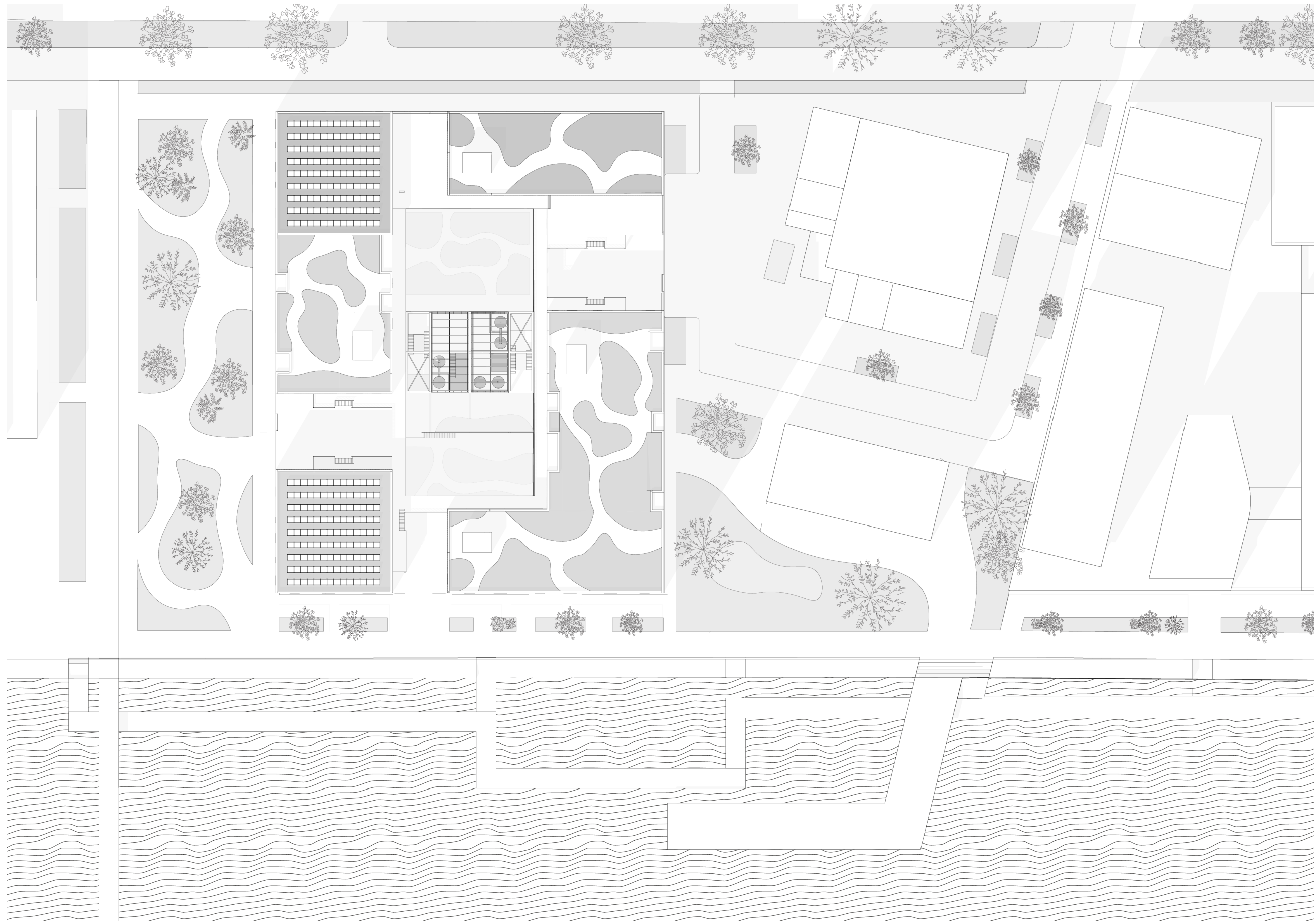
Transparency

Waste management facilities should be visible to inhabitants and the public in order to retain the educational potential of the waste management systems.

Urban Design | Urban Masterplan



Urban Design | Site Plan

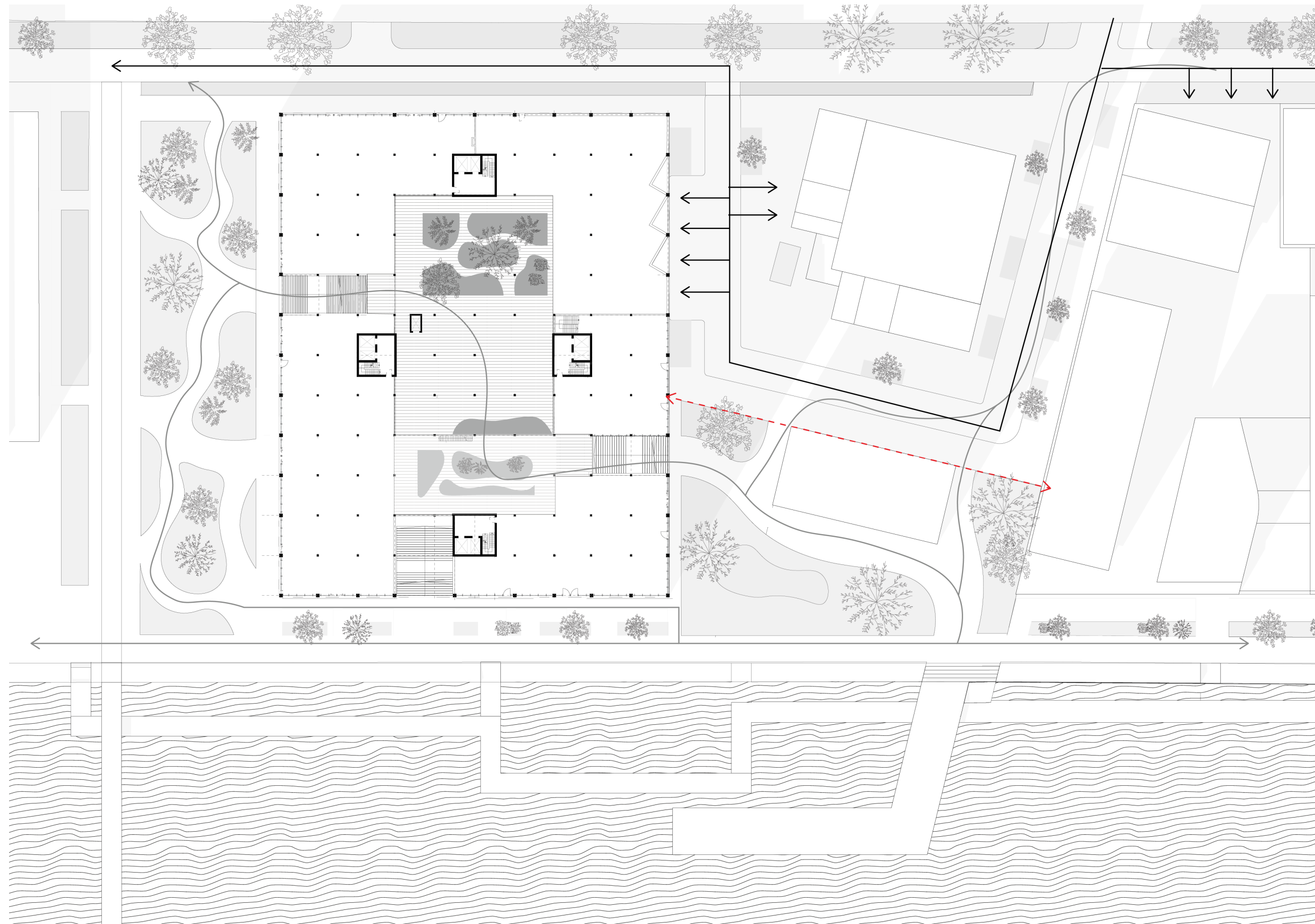


Scale 1:500



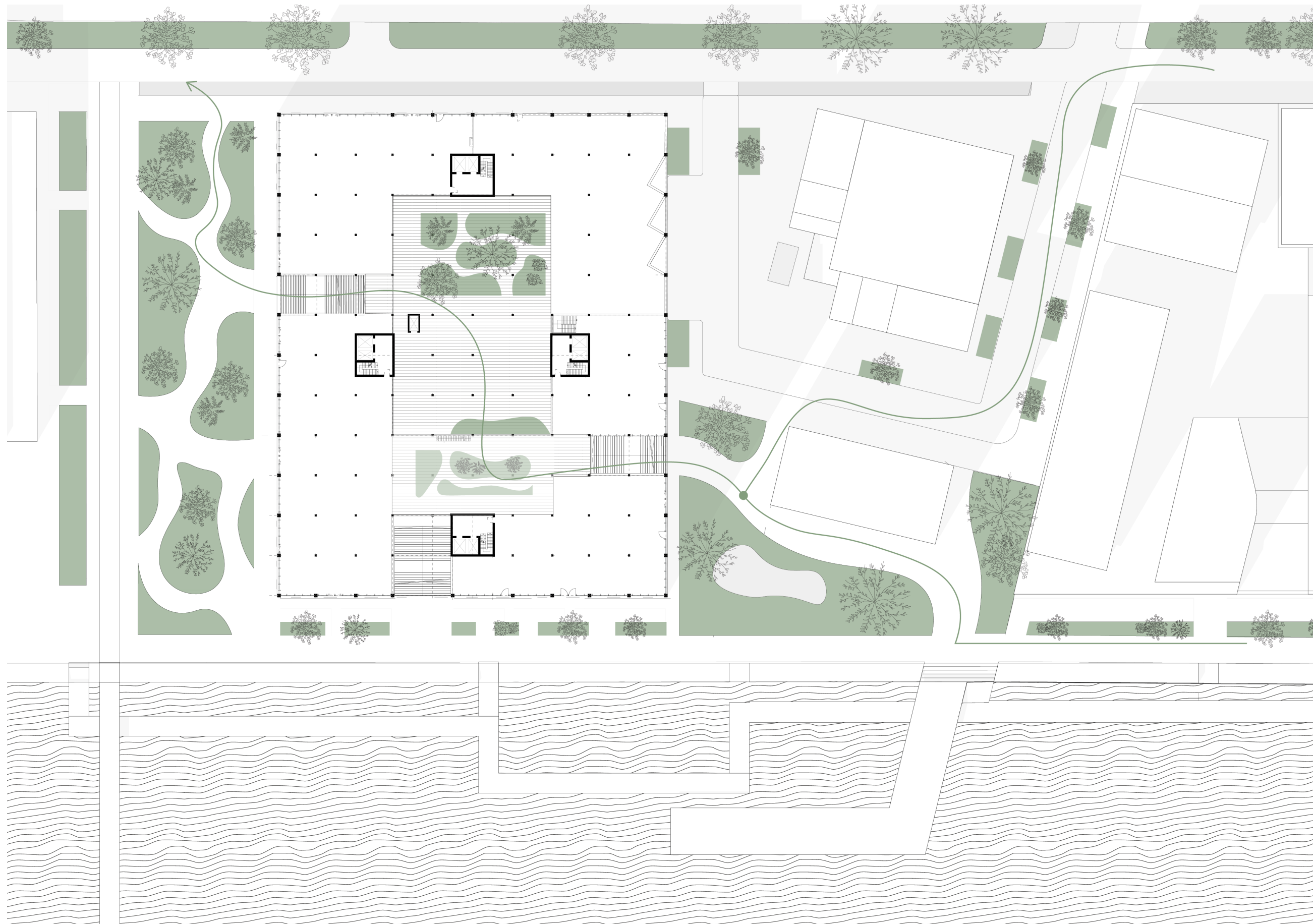
Urban Design | Site Plan

Access



Urban Design | Site Plan

Green Connections

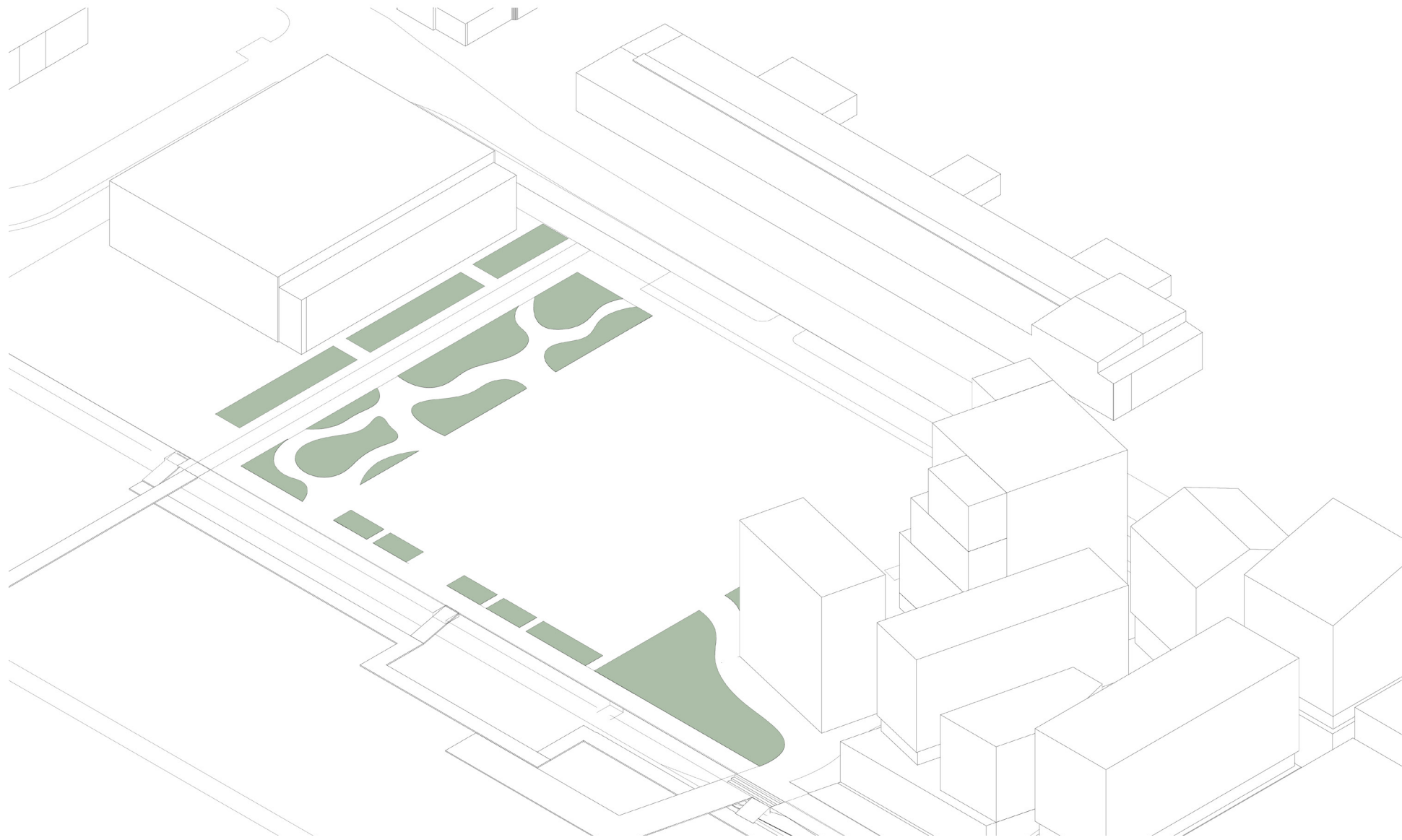


Scale 1:500



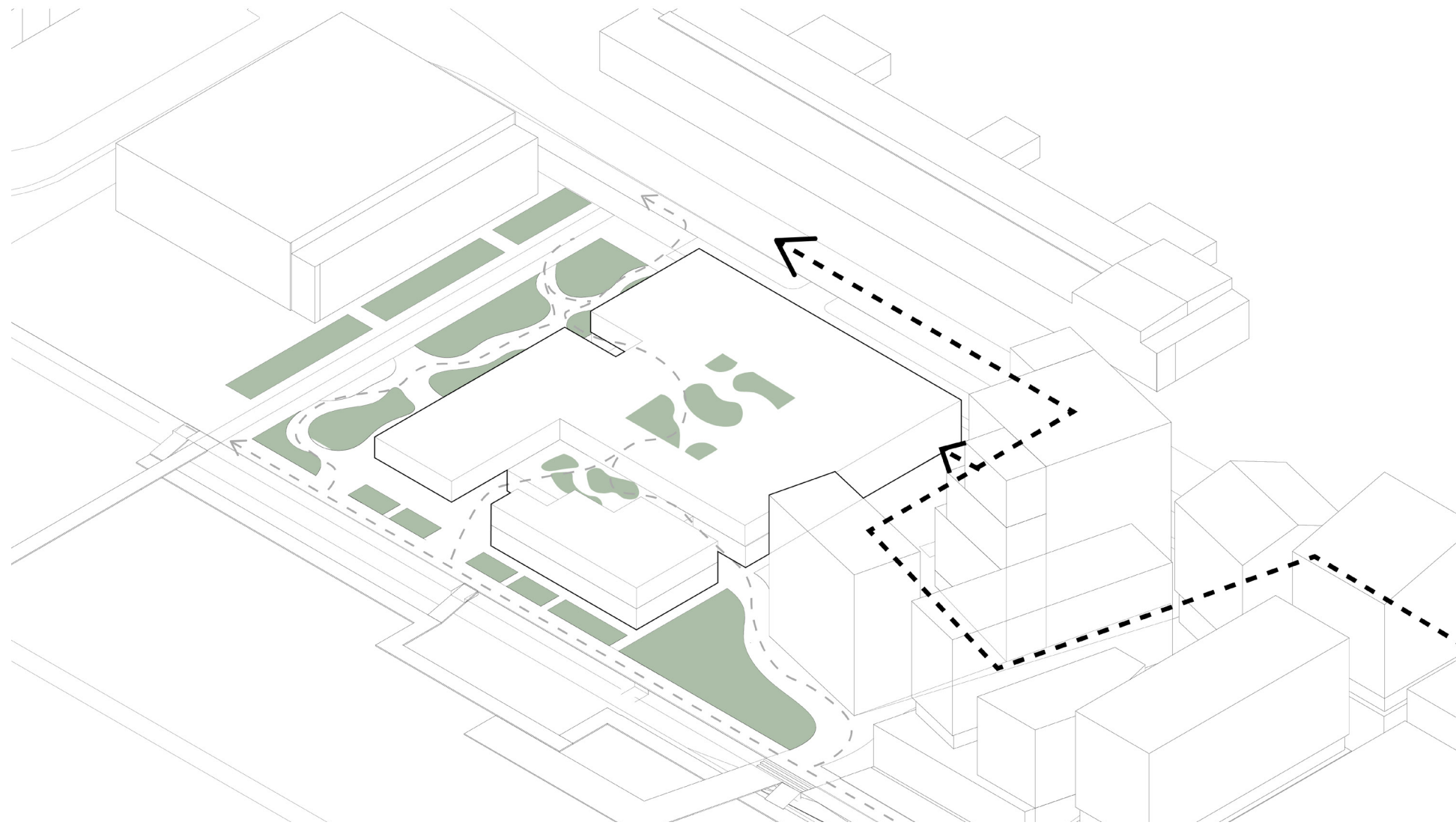
Building Concept | Design Strategy

Urban Context



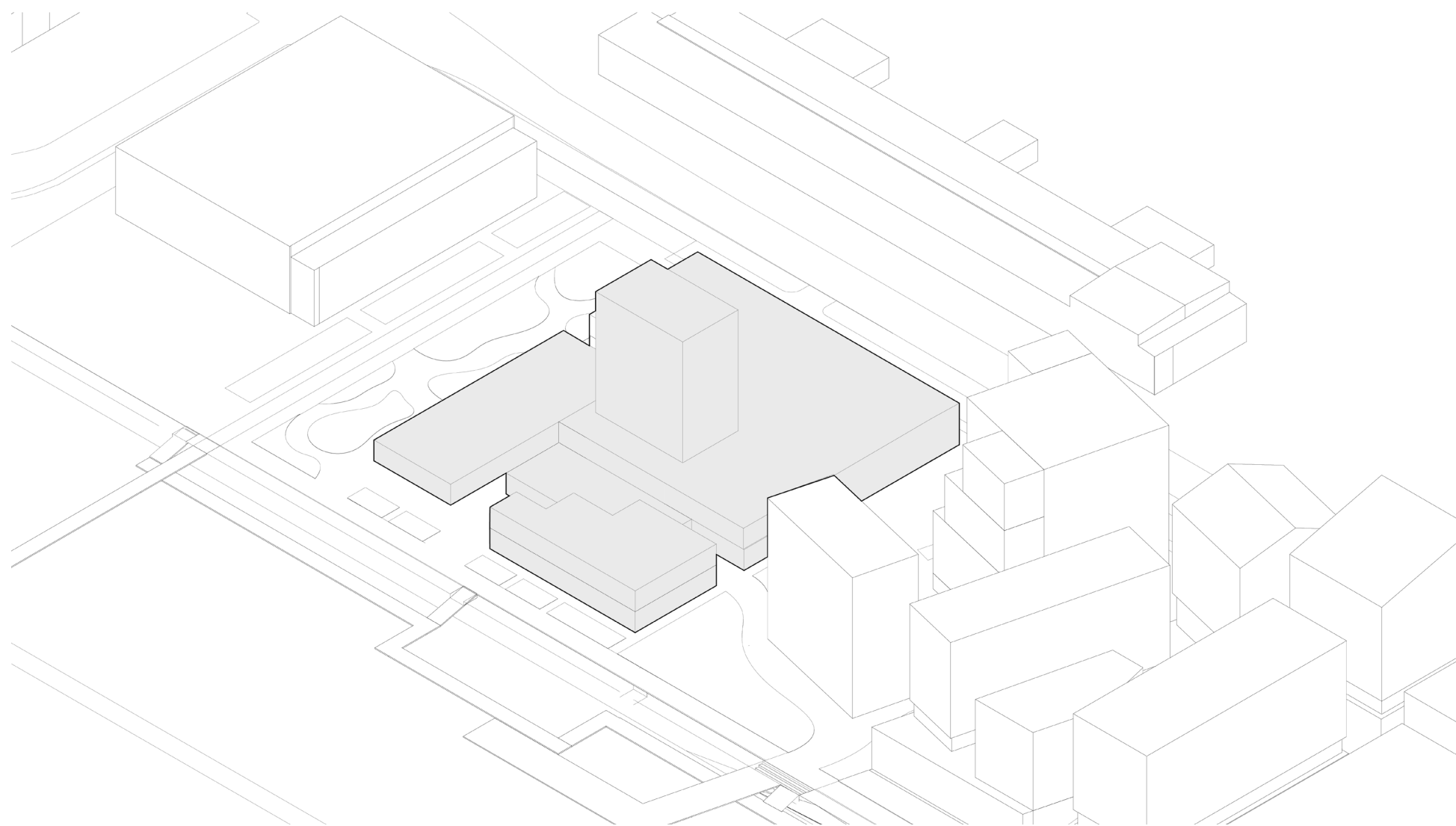
Building Concept | Design Strategy

Access On The Plinth



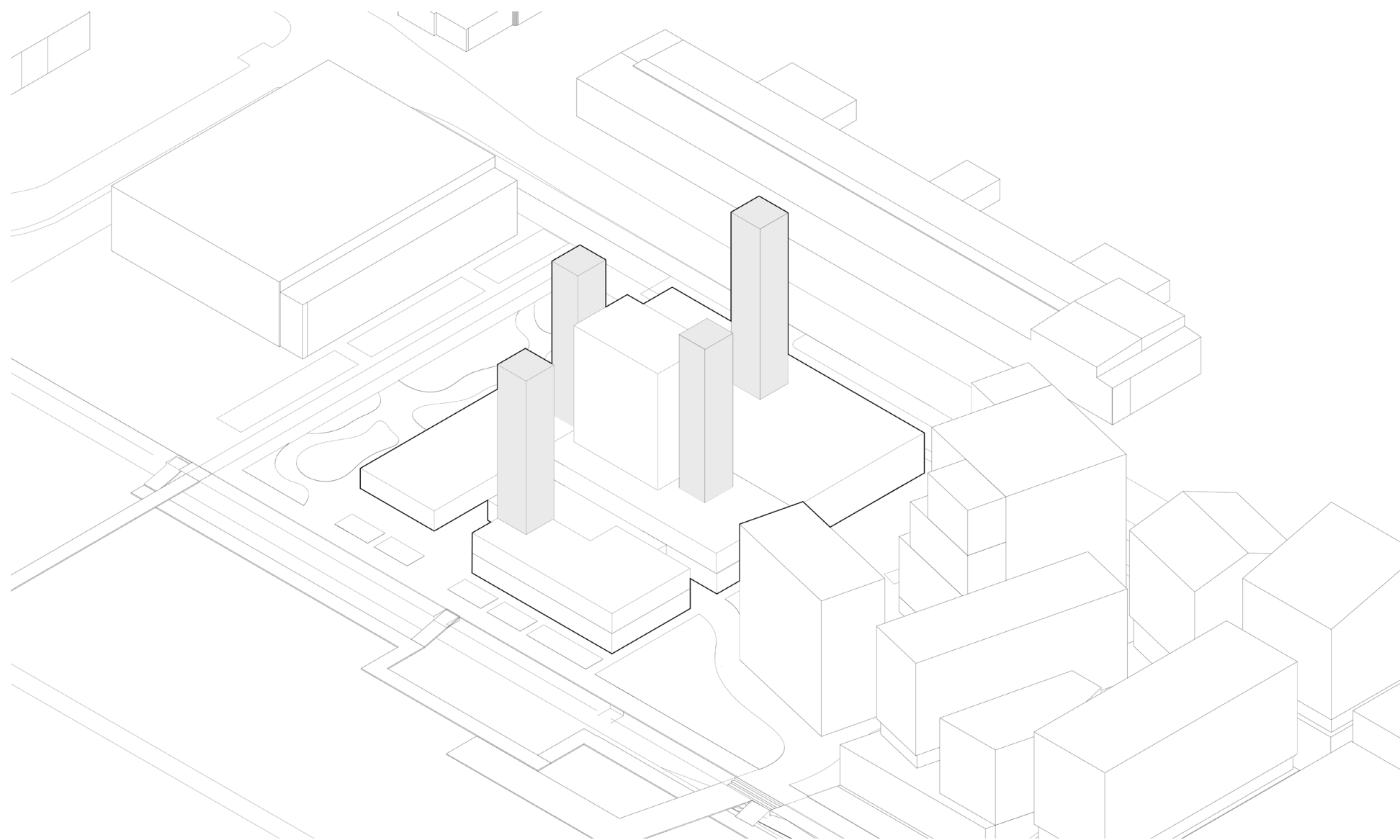
Building Concept | Design Strategy

Work



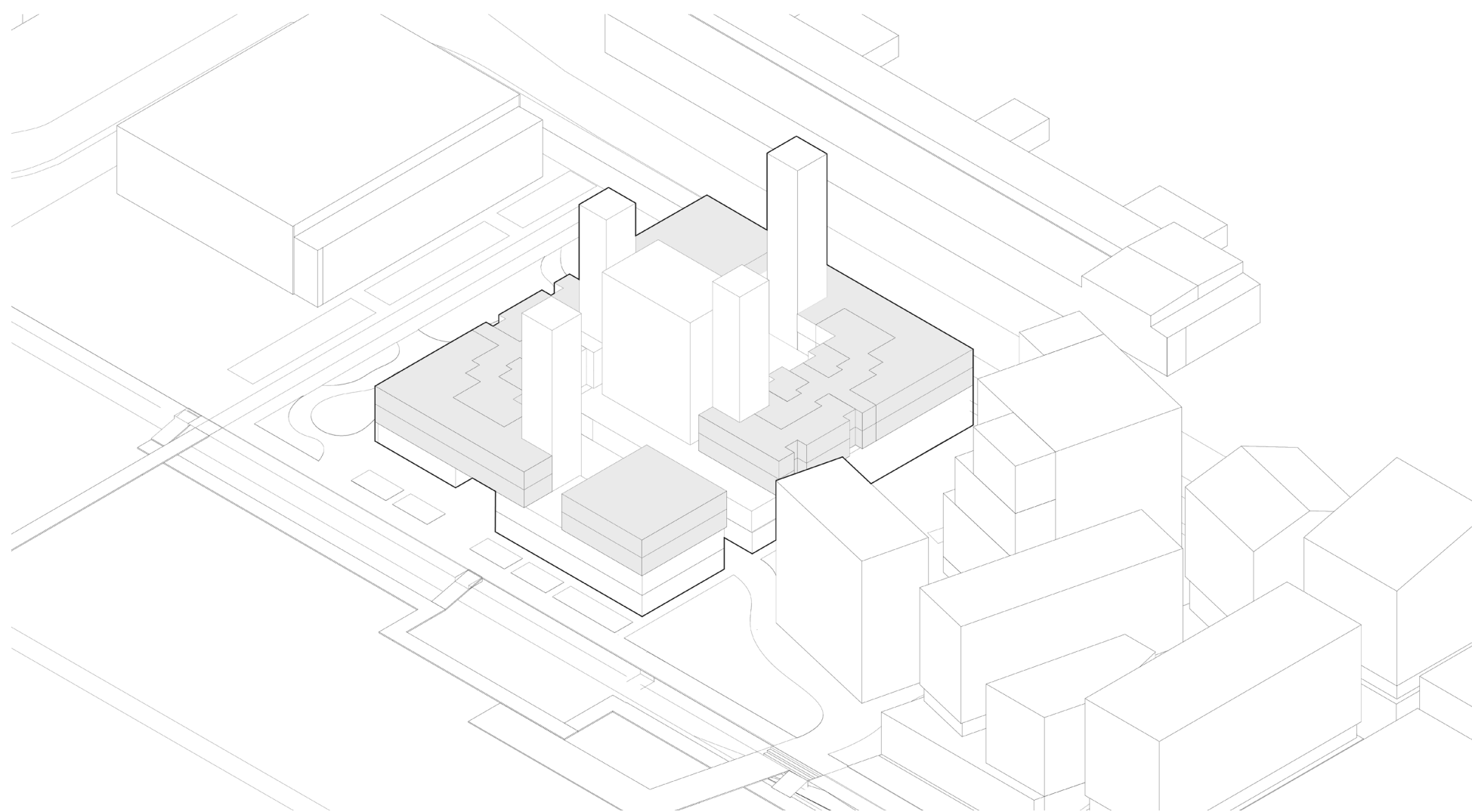
Building Concept | Design Strategy

Vertical Access



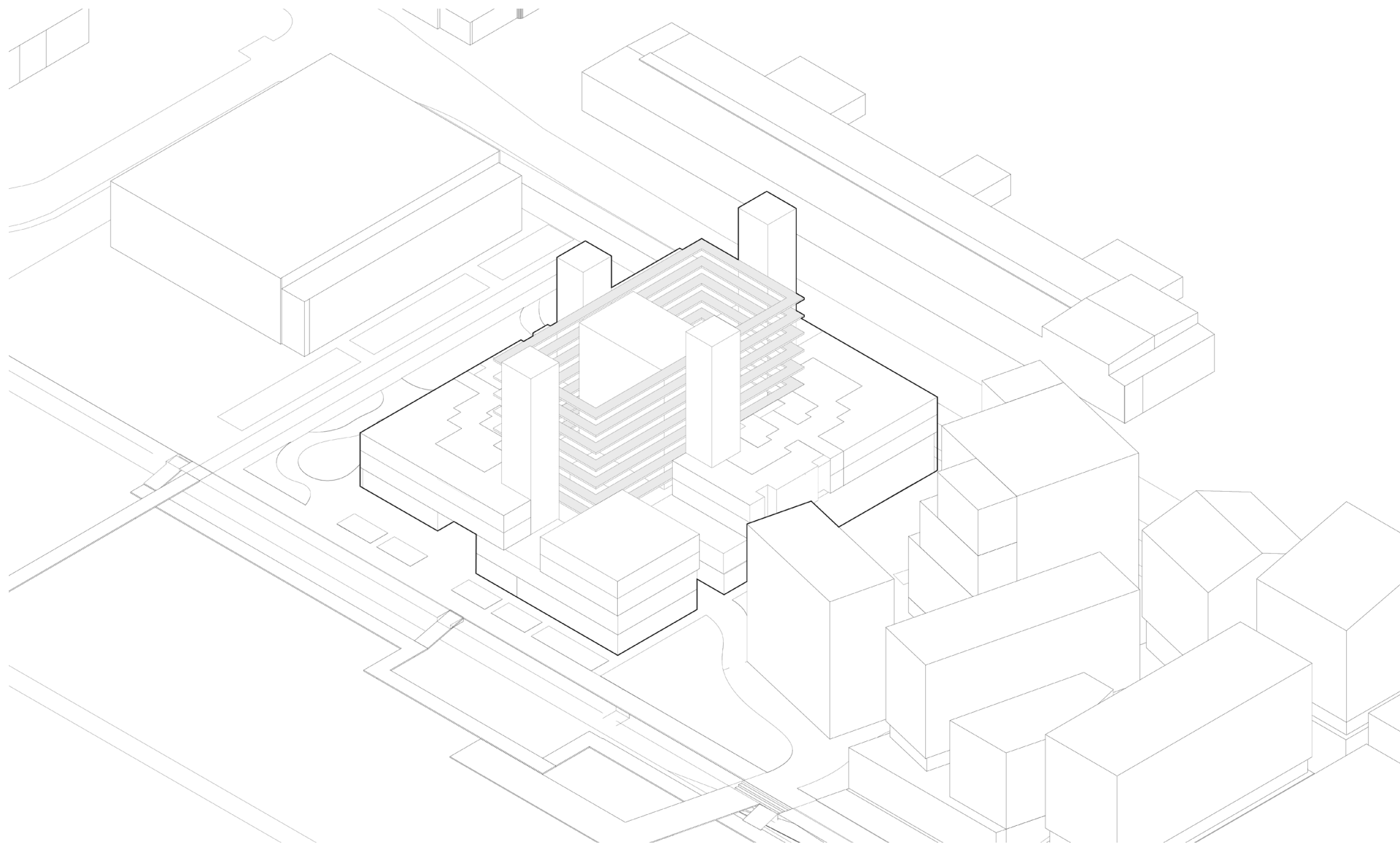
Building Concept | Design Strategy

Dwellings



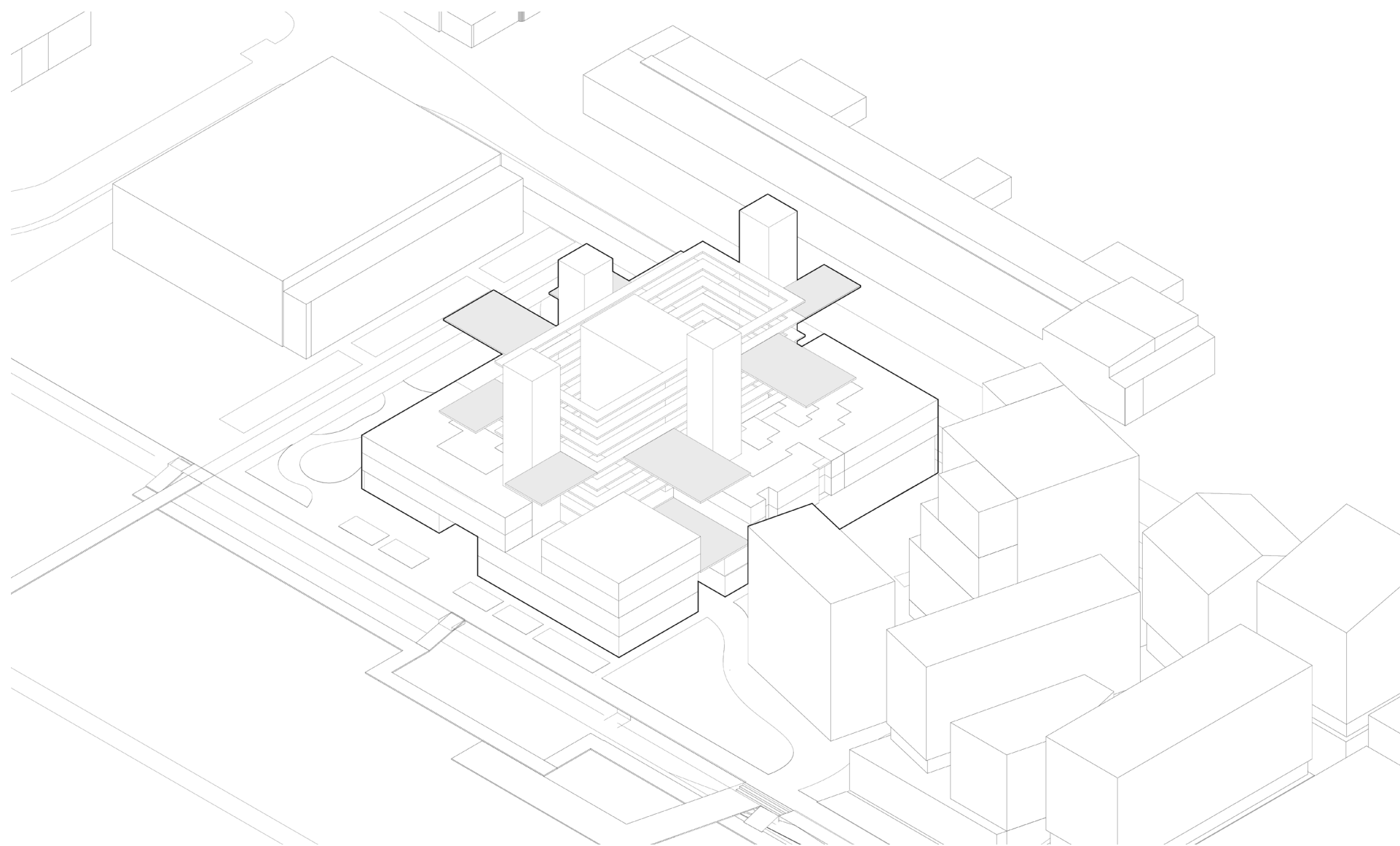
Building Concept | Design Strategy

The Timber Gallery



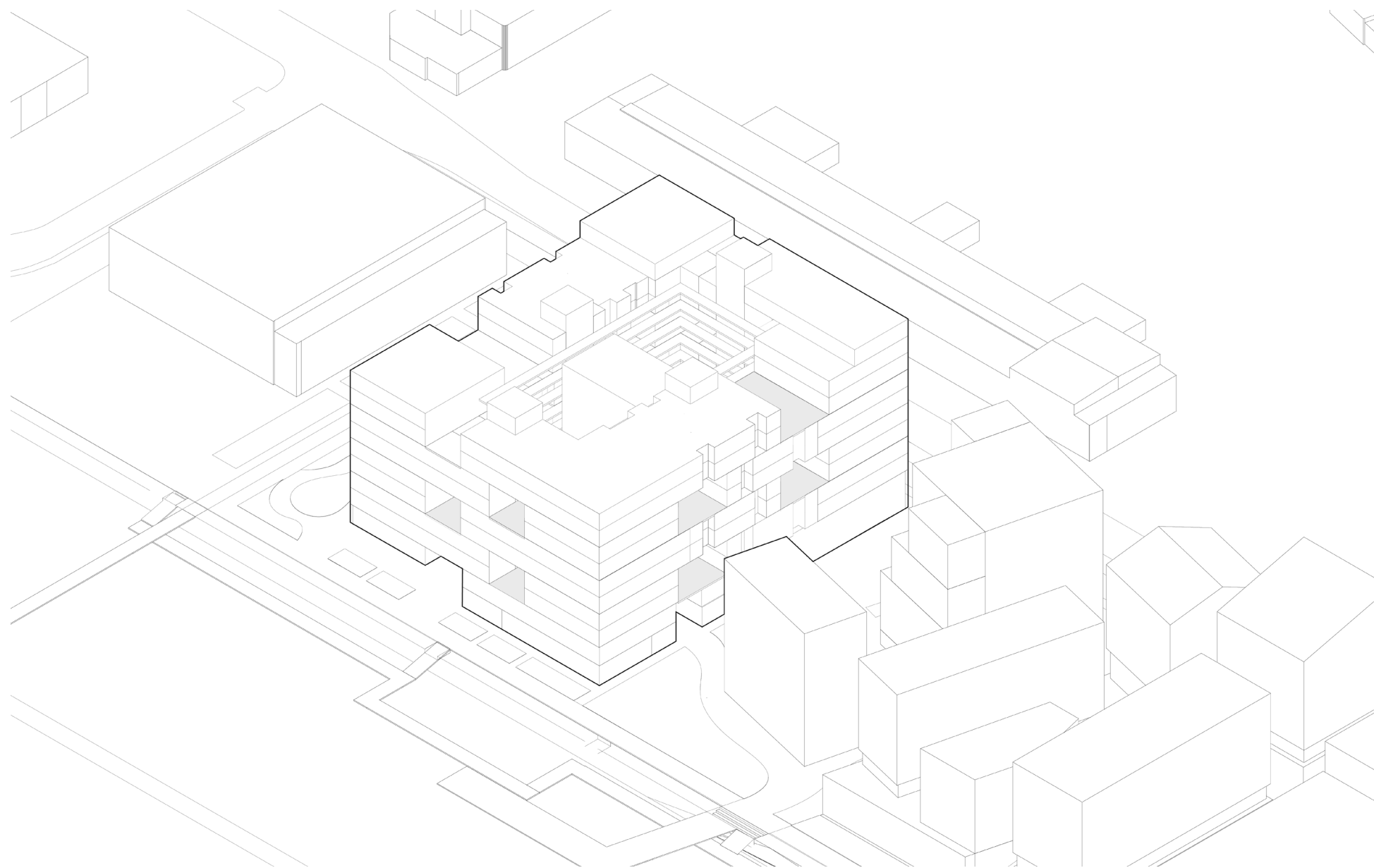
Building Concept | Design Strategy

Horizontal Access - Open "Staircase Room"



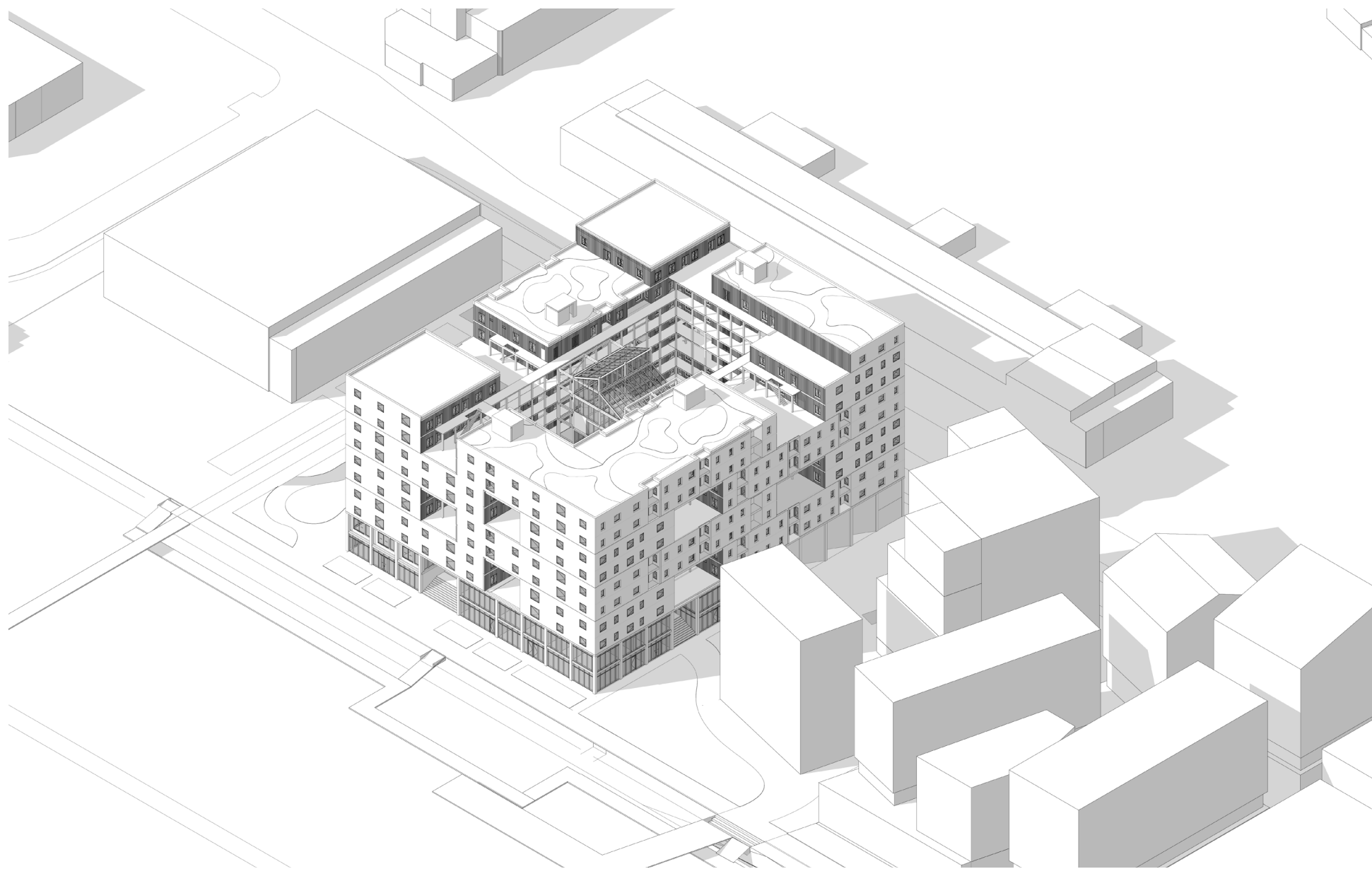
Building Concept | Design Strategy

Horizontal Access - Open "Staircase Room"



Building Concept | Design Strategy

Final Design



Building Concept | Facade

Materiality - Connection to The Urban Context



Ceramic Facade Tiles

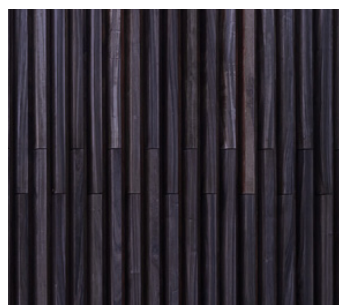


Concrete



Building Concept | Facade

Materiality - Courtyard Facade



Vertical Dark Wood Cladding



Glulam Column and Beams



Final Design | Street

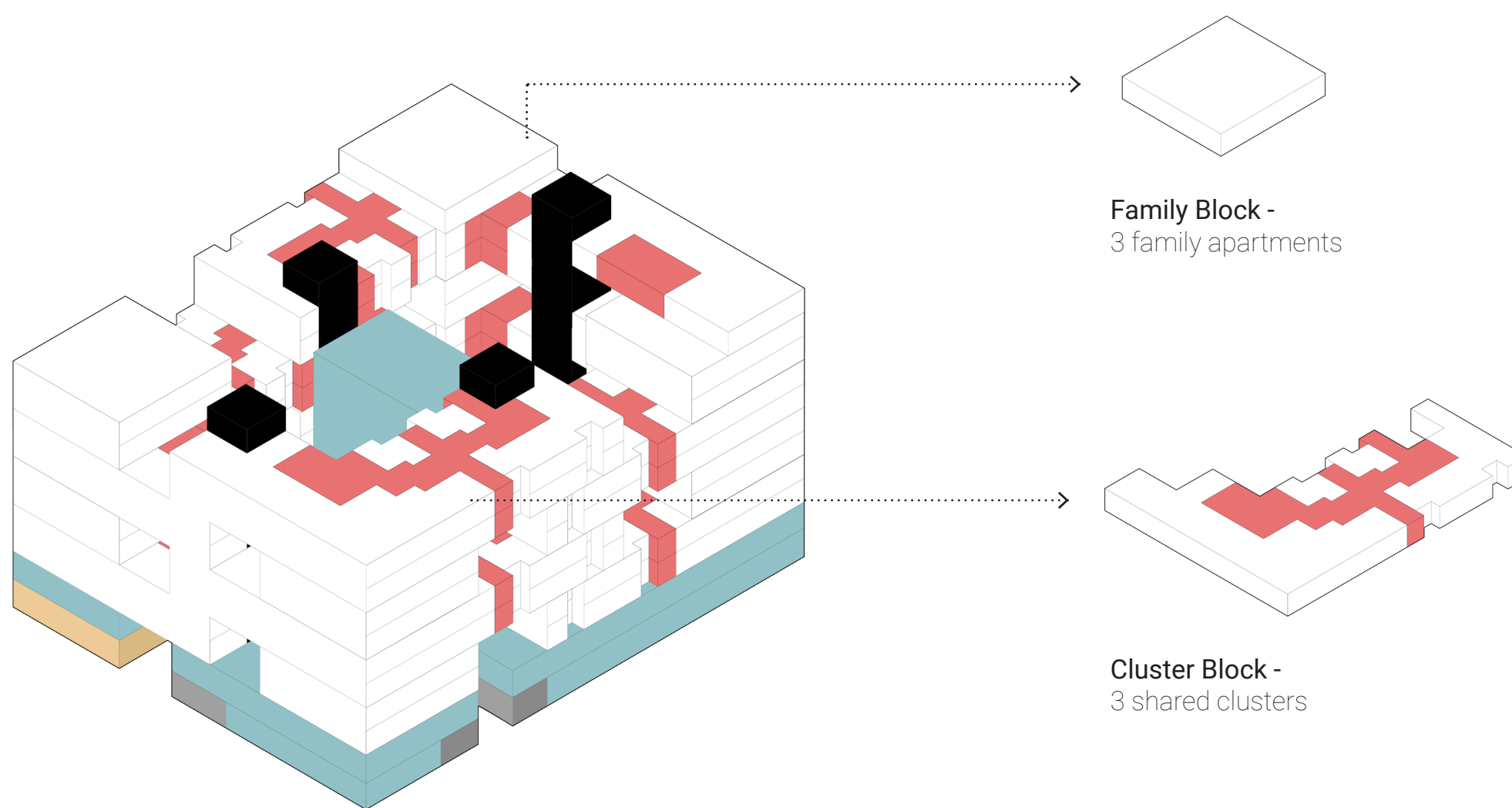


Final Design | Waterfront



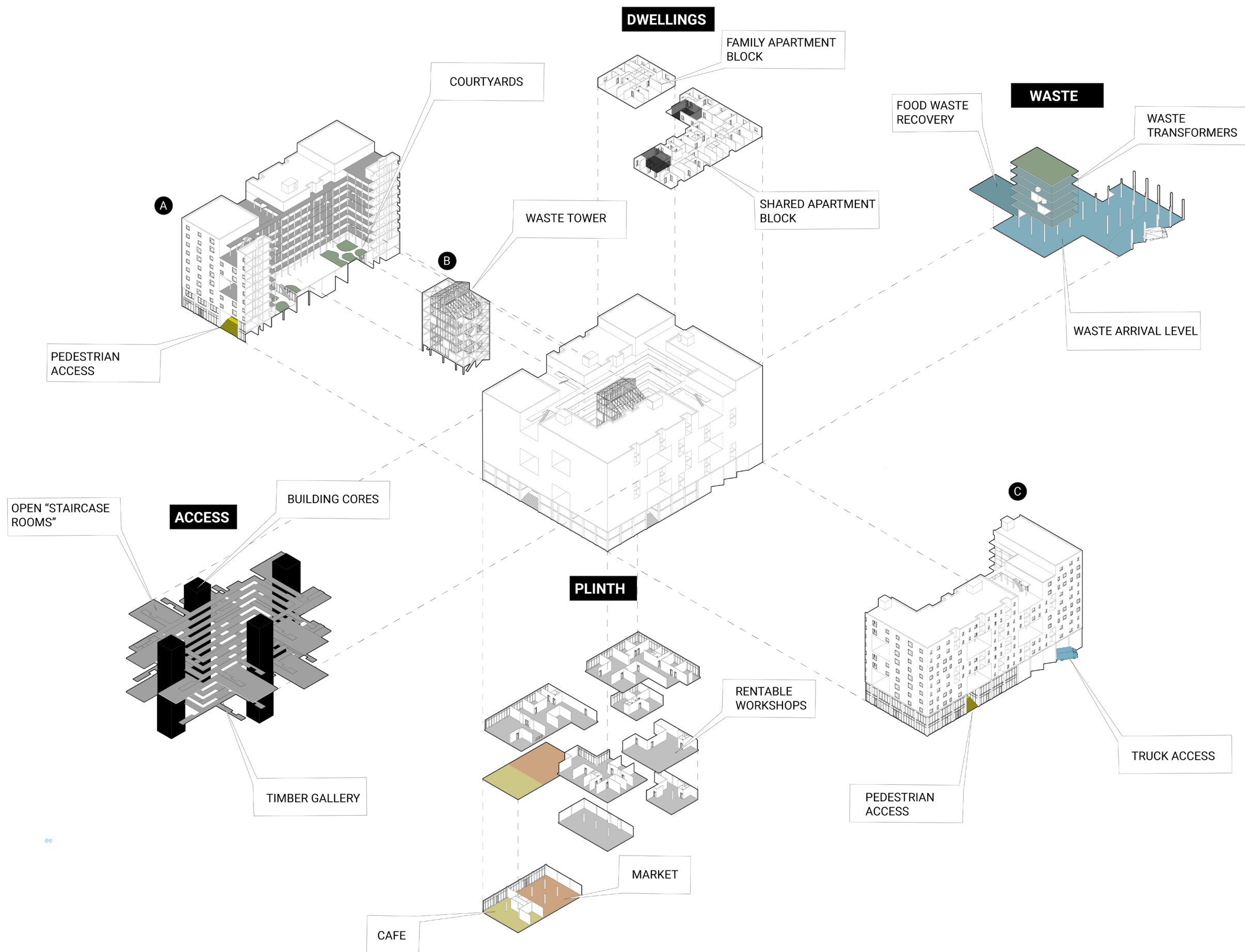
Building Design | Building Program

Program Bar



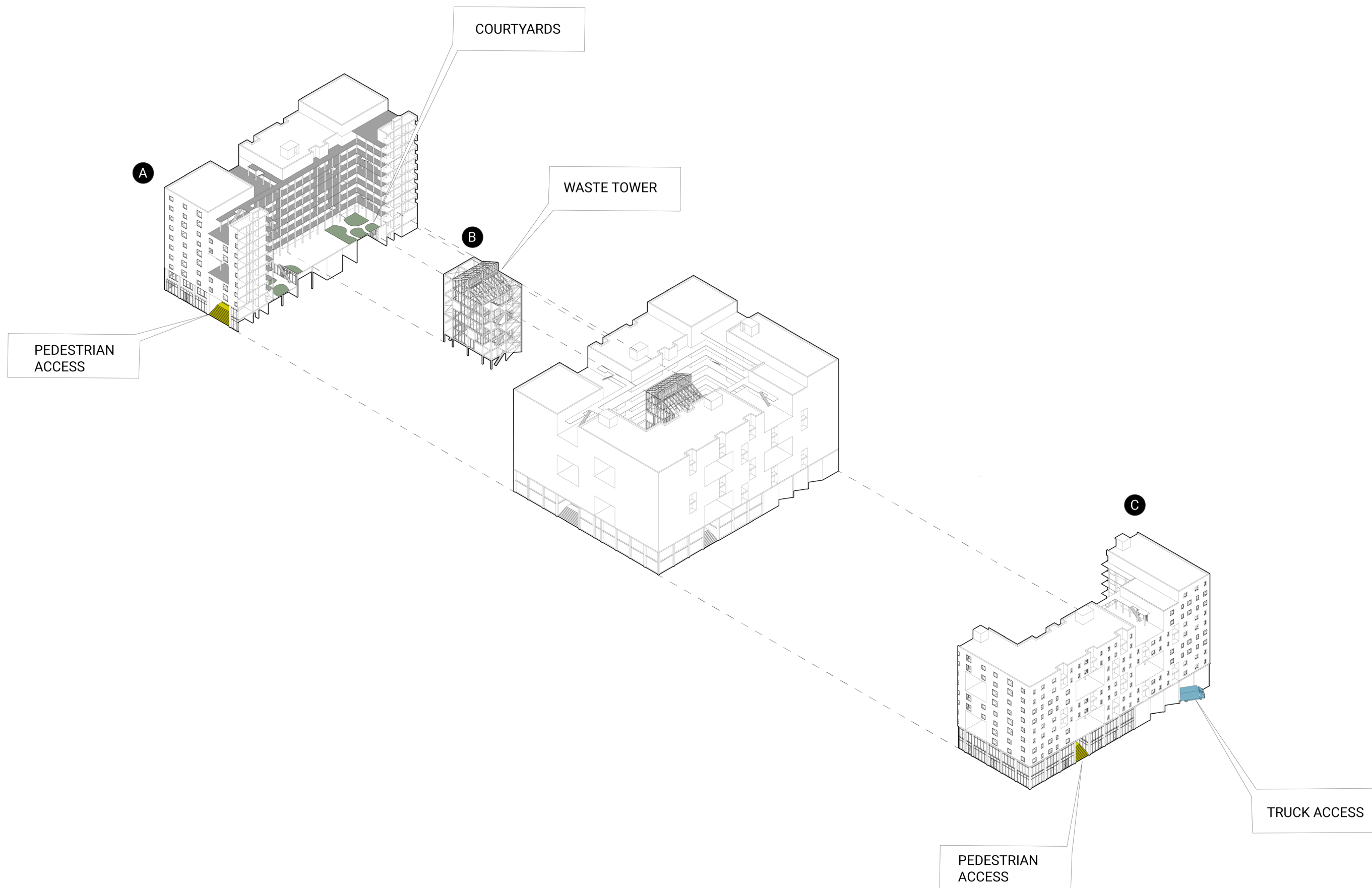
- Cooperative Housing
- Work (Waste management facilities, workshops)
- Communal Spaces (Within the shared apartments)
- Building Cores
- Commercial
- Entrances (Bike park + Dwelling core access)

Building Design | Building Program

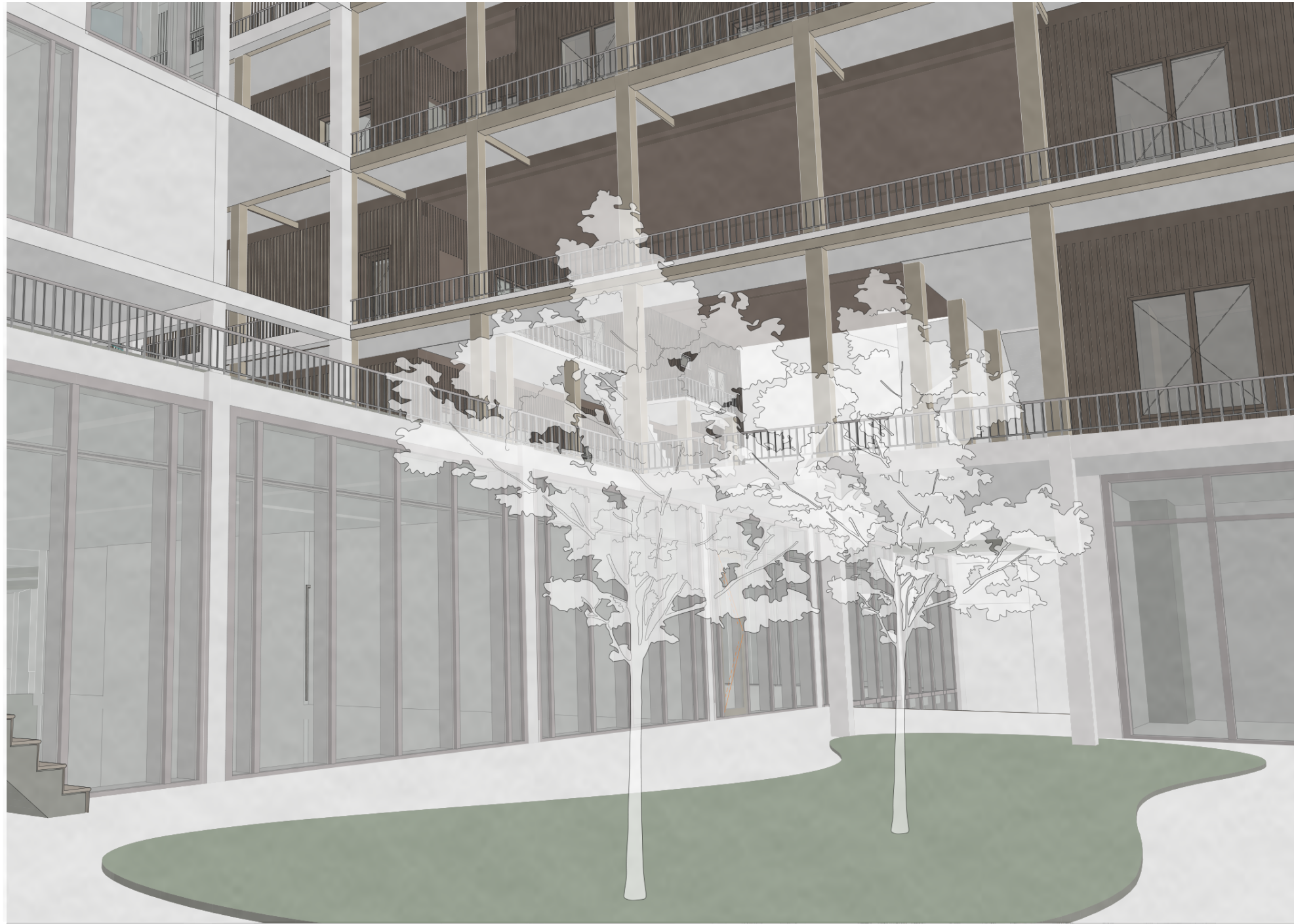


Building Design | Building Program

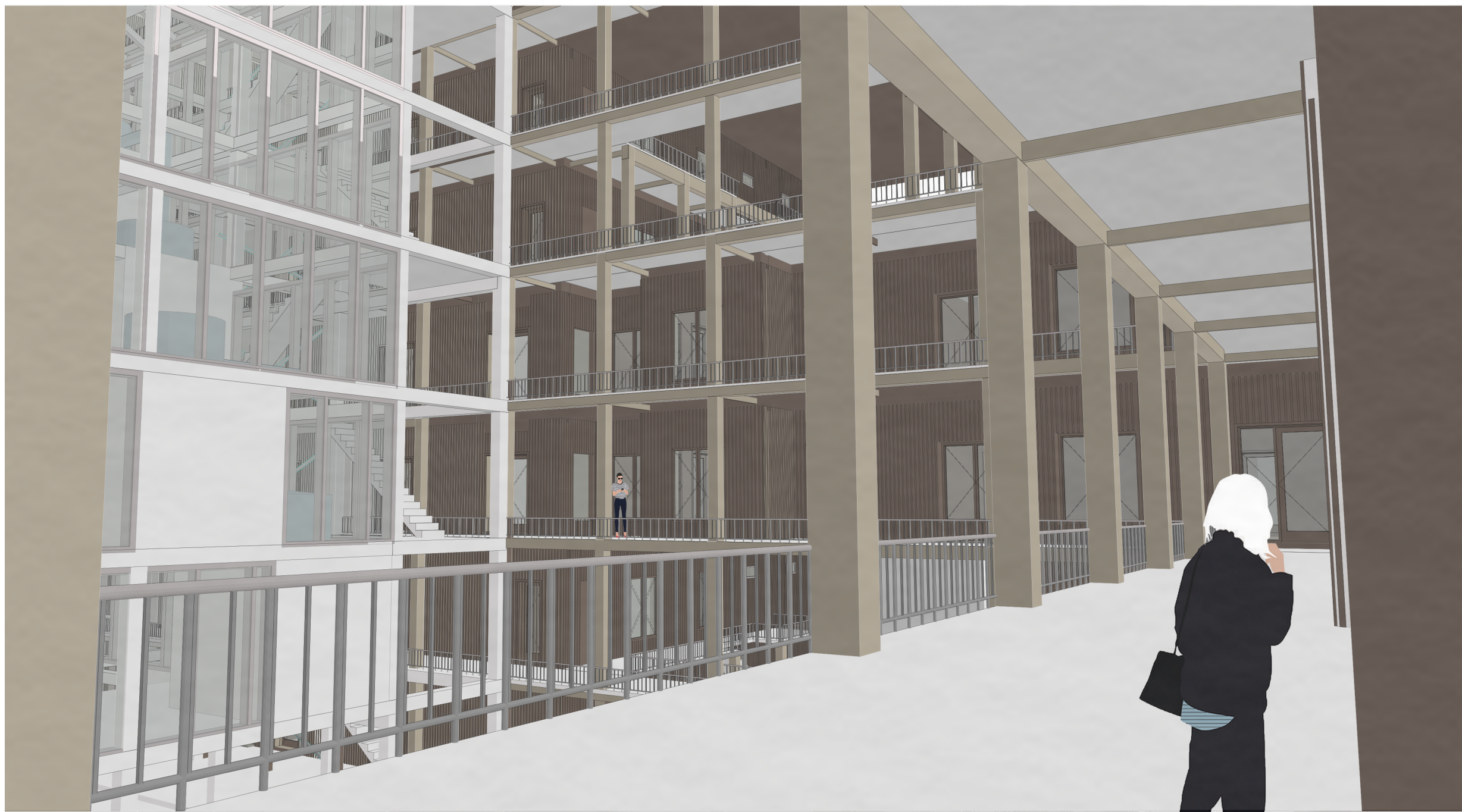
“Accidental” Awarnesses



Final Design | Courtyard

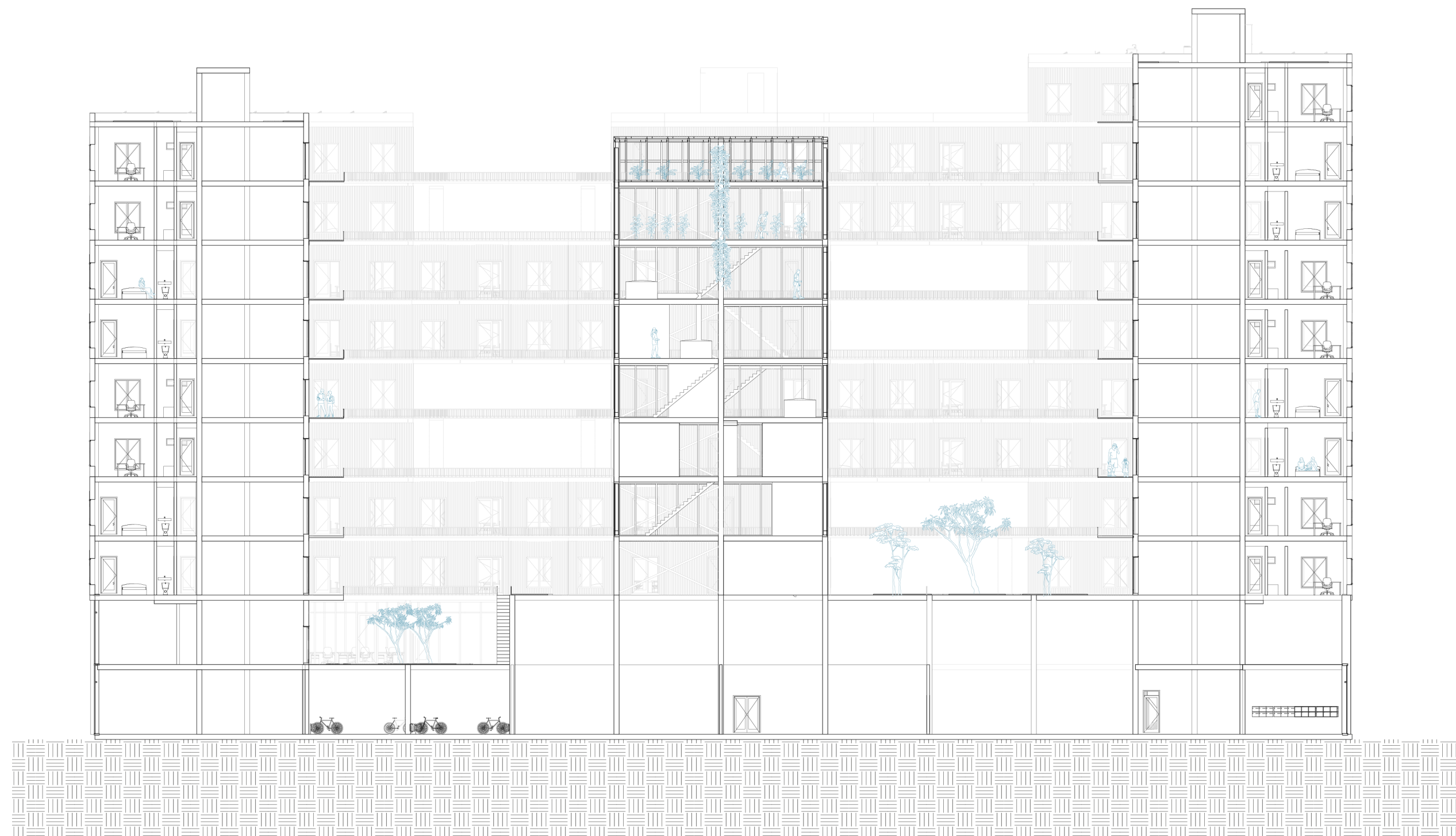


Final Design | Courtyard



Building Design | Building Program

Section

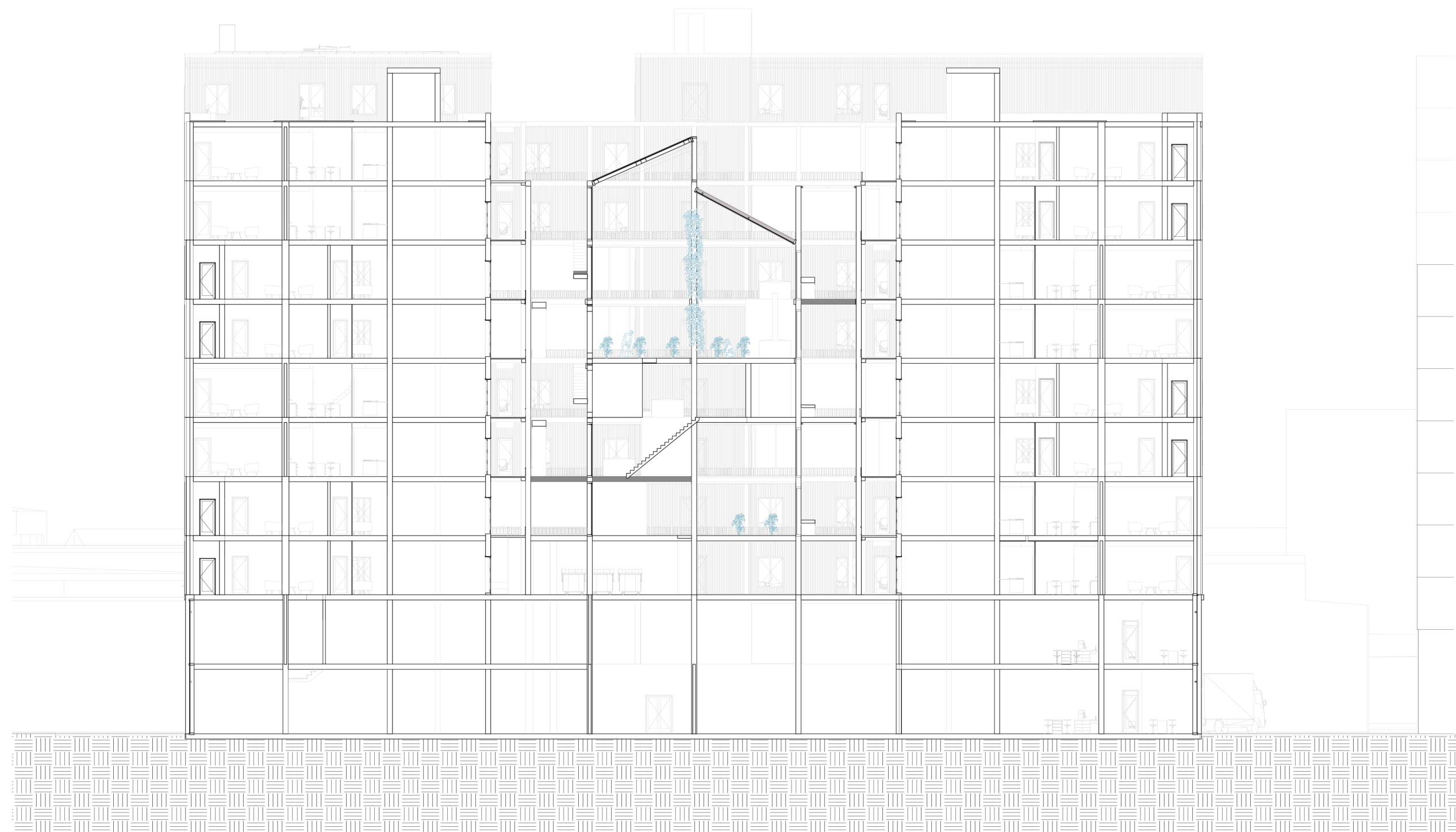


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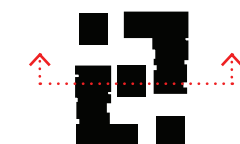
Building Design | Building Program

Section



Building Design | AR3AD100 Advanced Housing Design (2022/23 Q4)

Scale 1:200

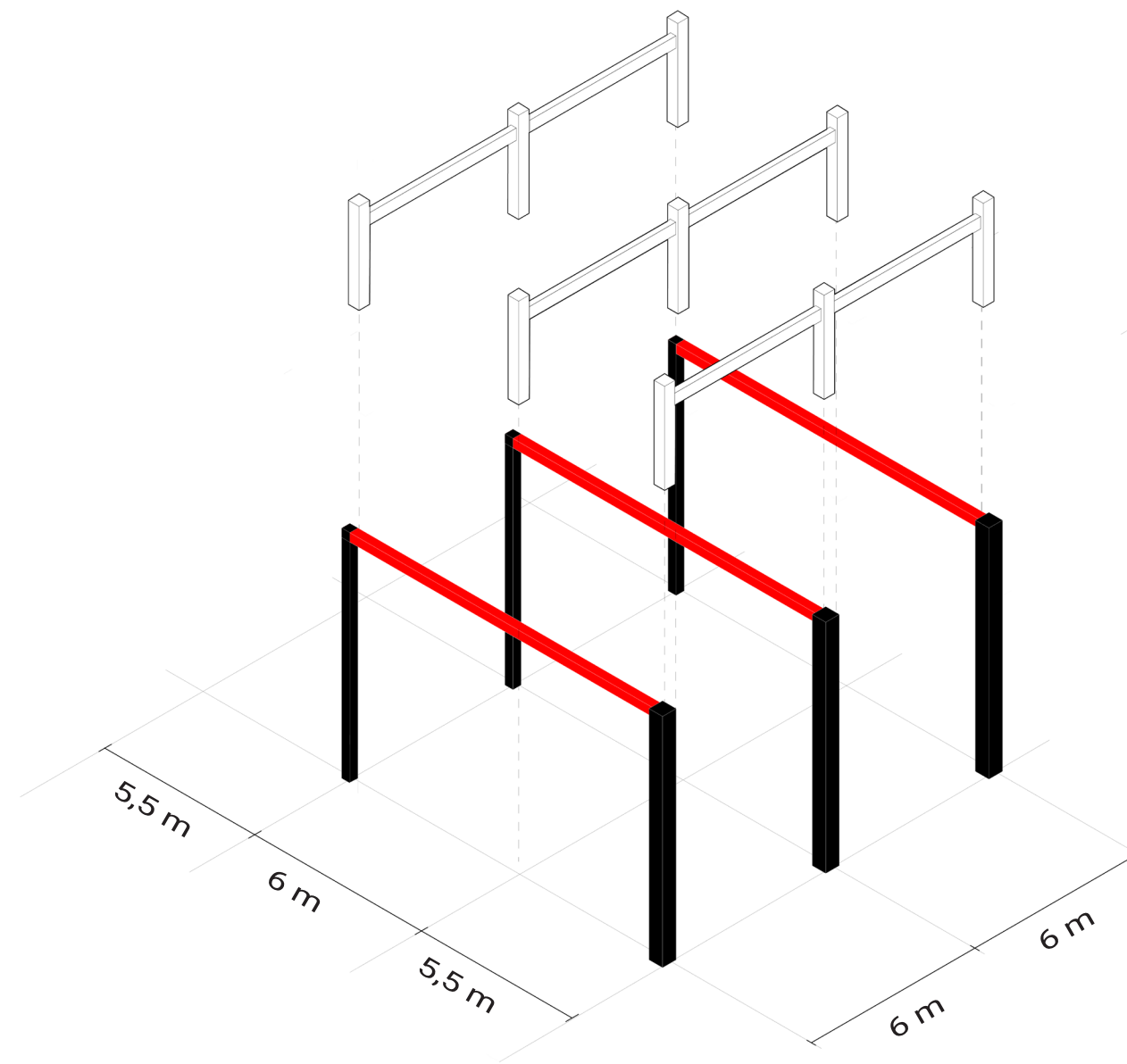
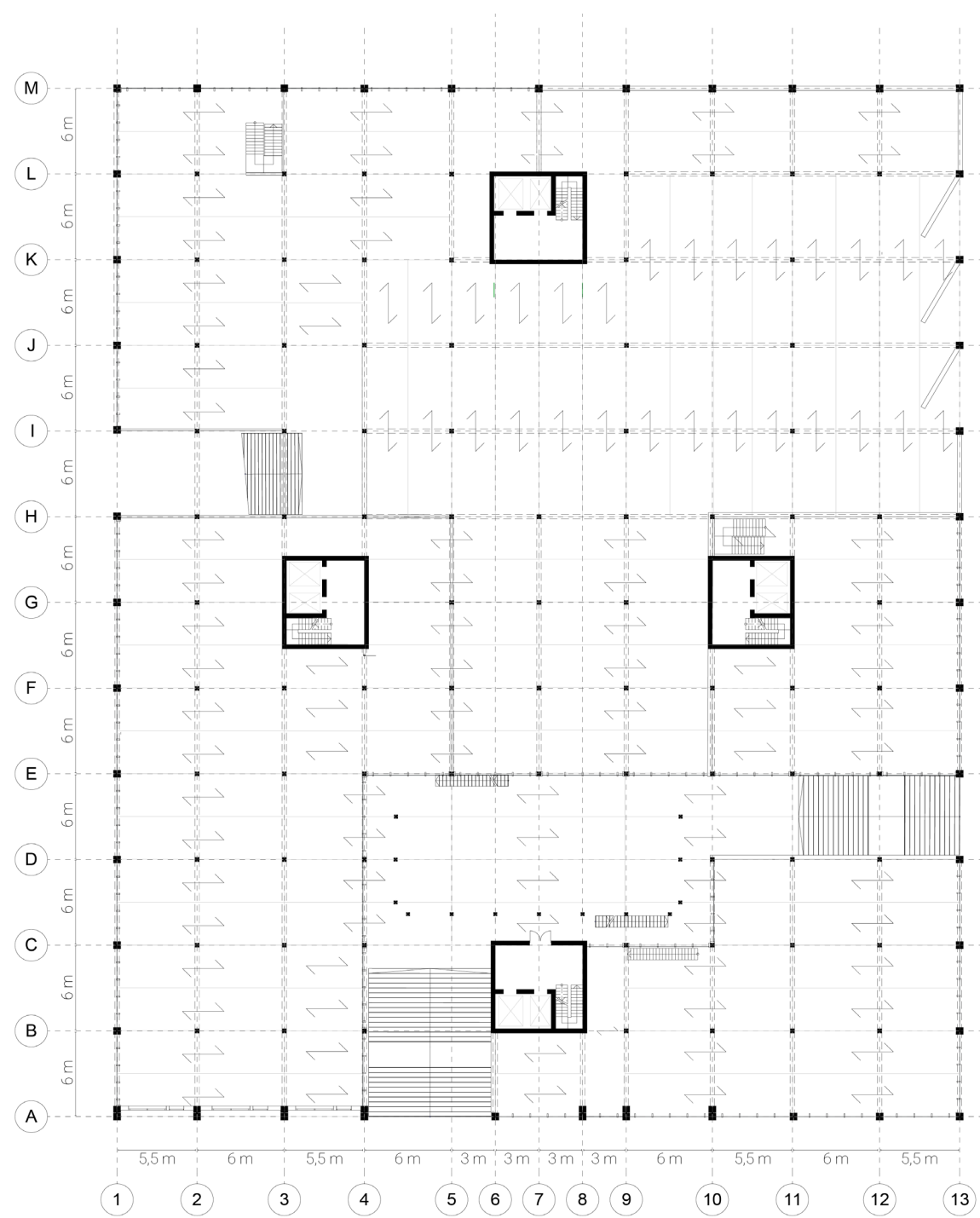


Final Design | Work Tower - Timber Gallery Connection



Building Technology | Structure

Structural Diagram

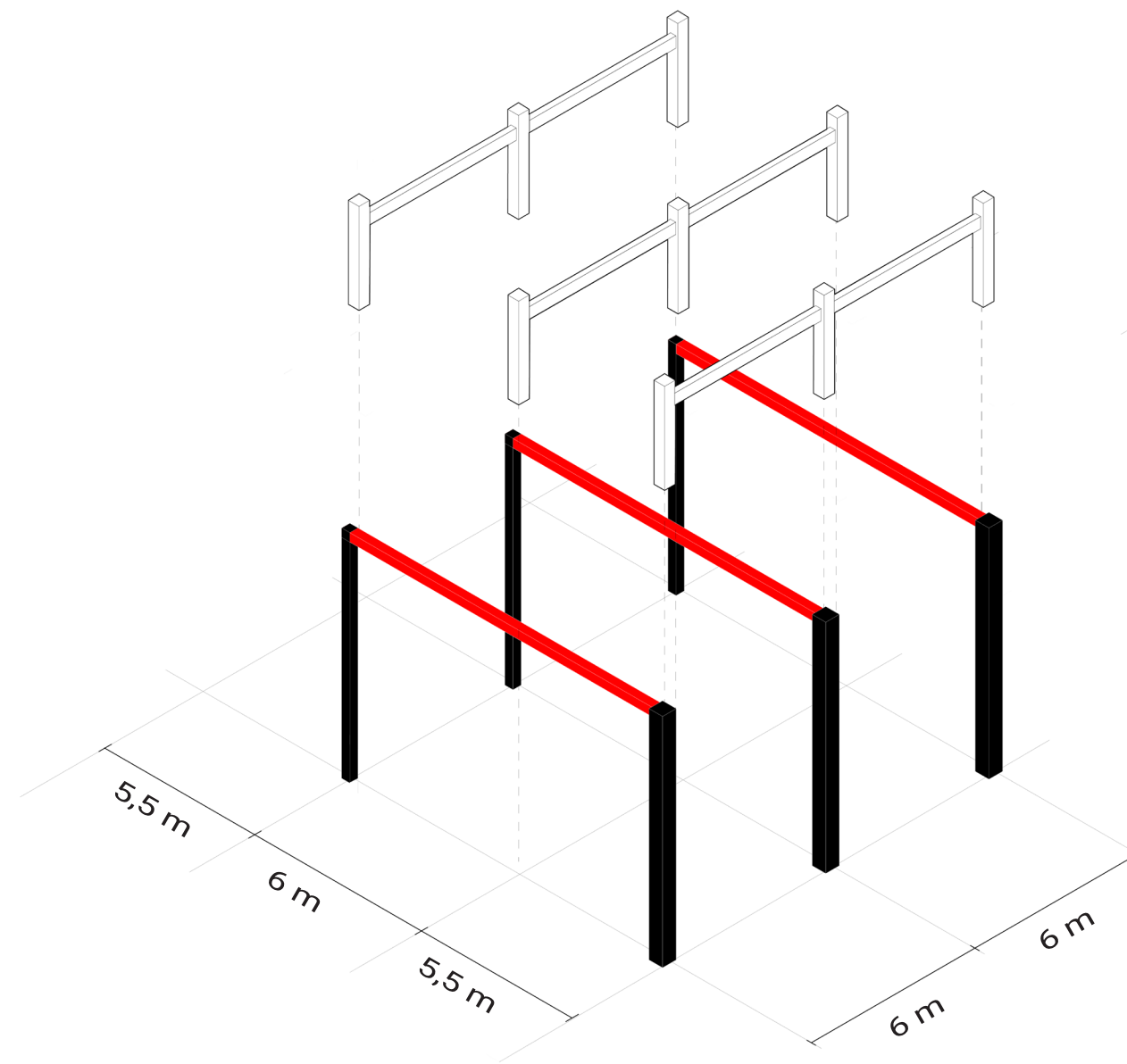
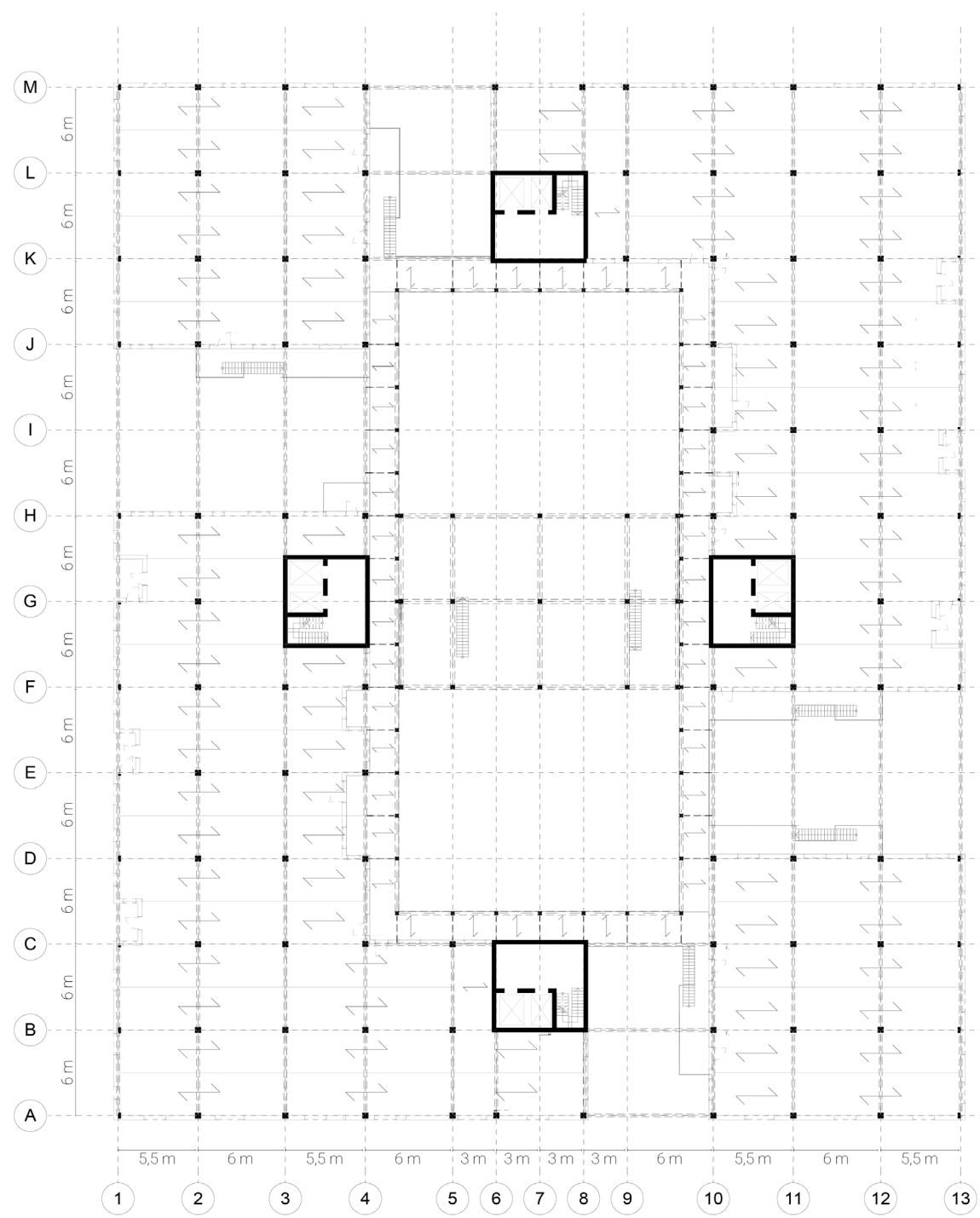


- Concrete Structure
- Timber Structure
- Transfer Beams

First Floor 

Building Technology | Structure

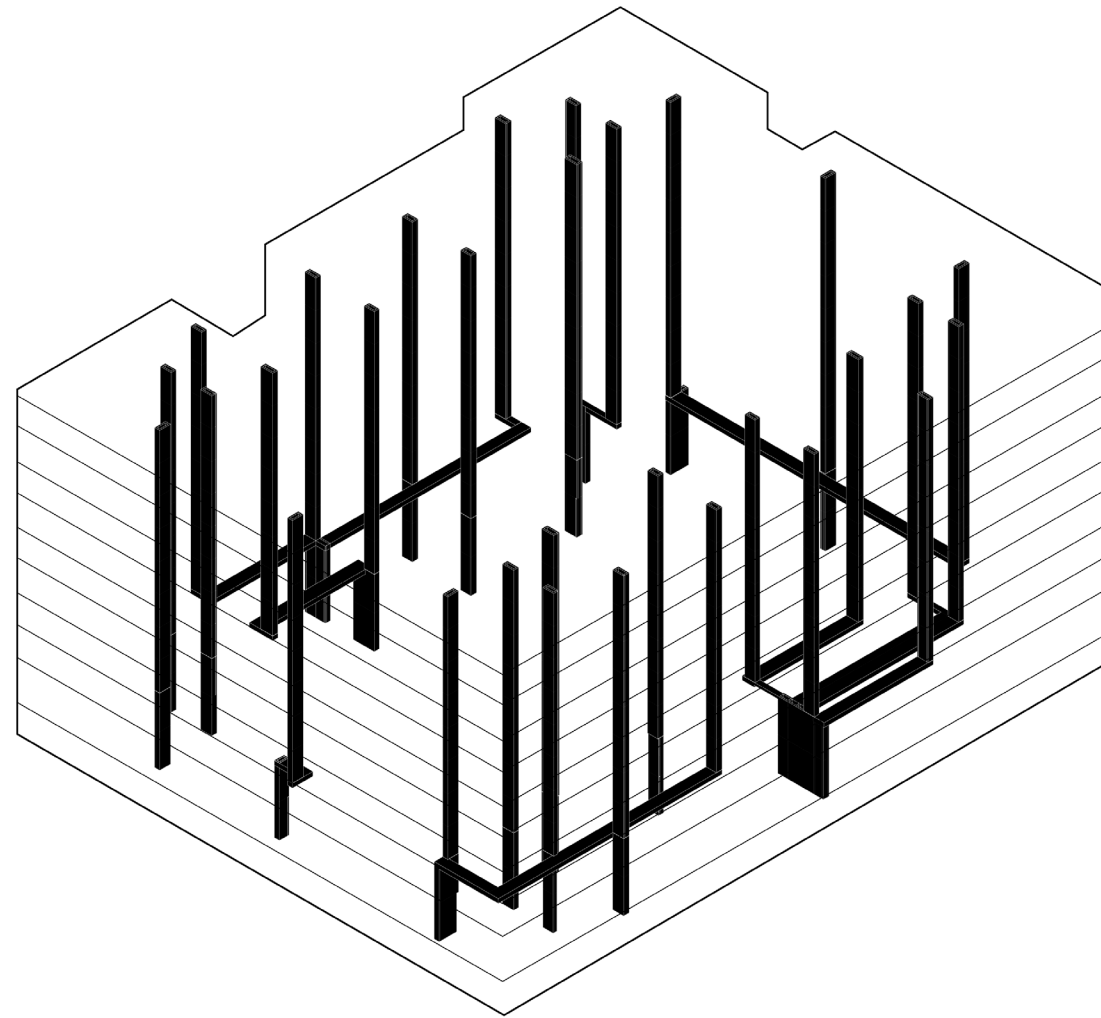
Structural Diagram



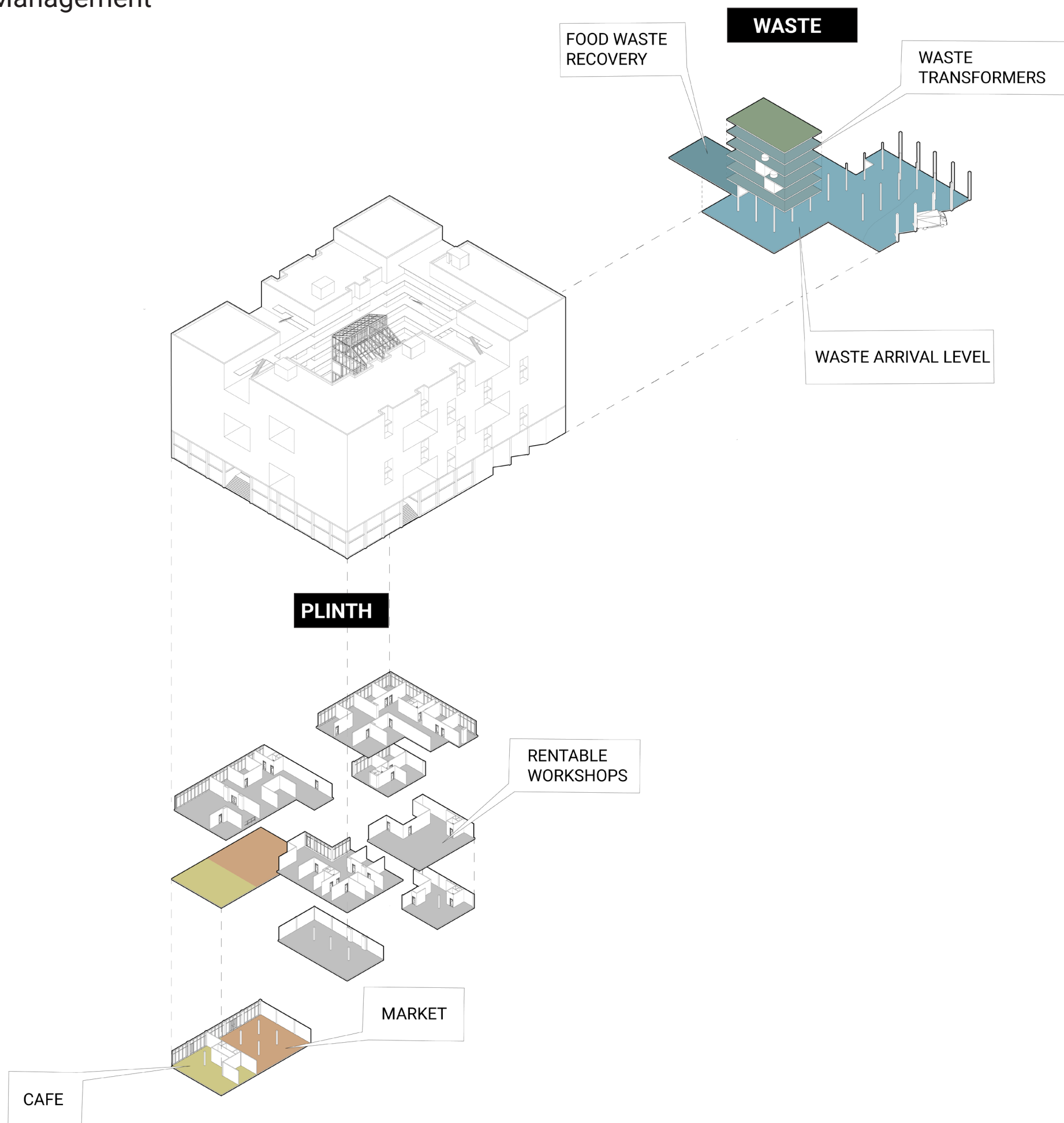
- Concrete Structure
- Timber Structure
- Transfer Beams

Second Floor 

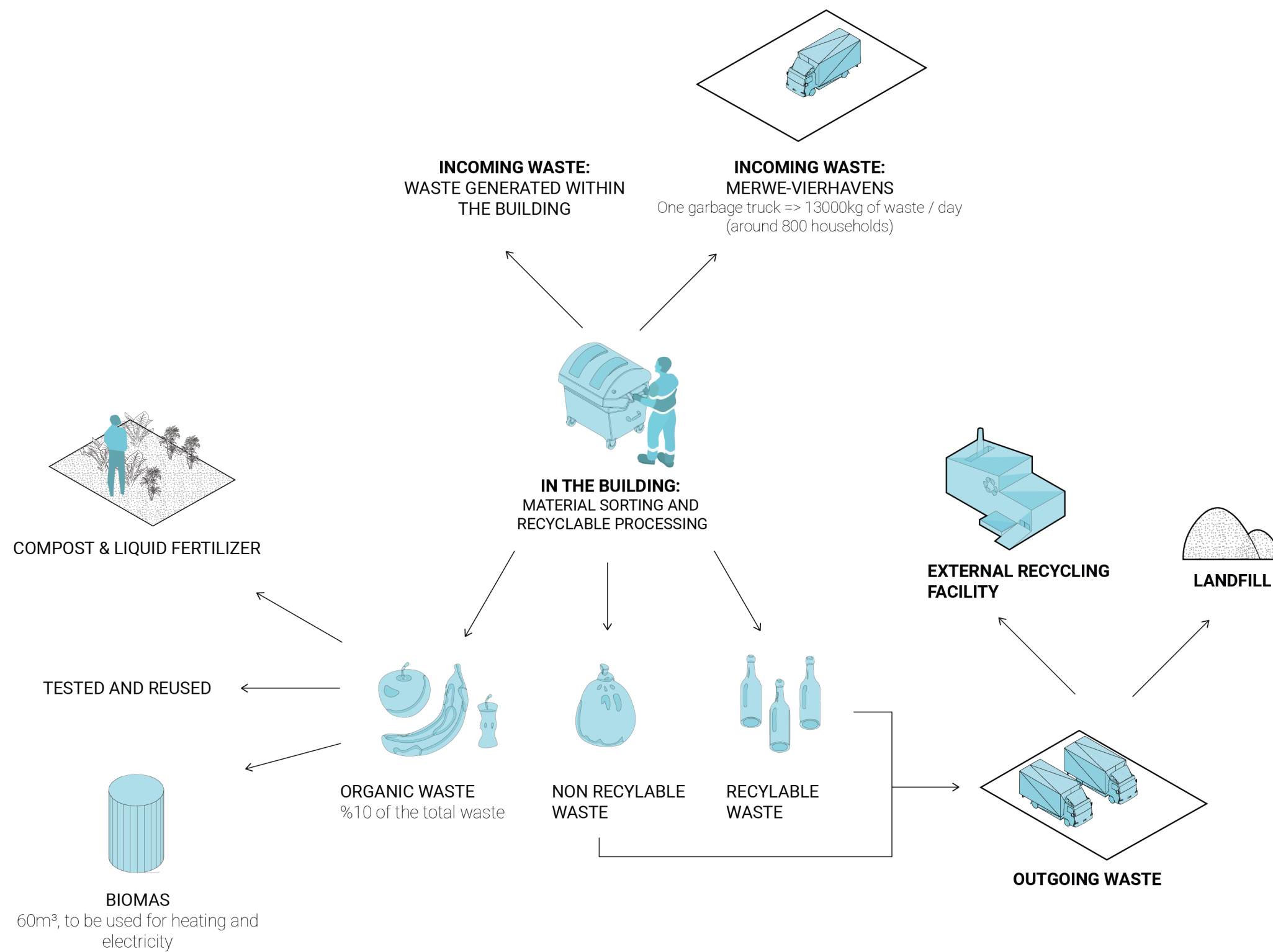
Shafts



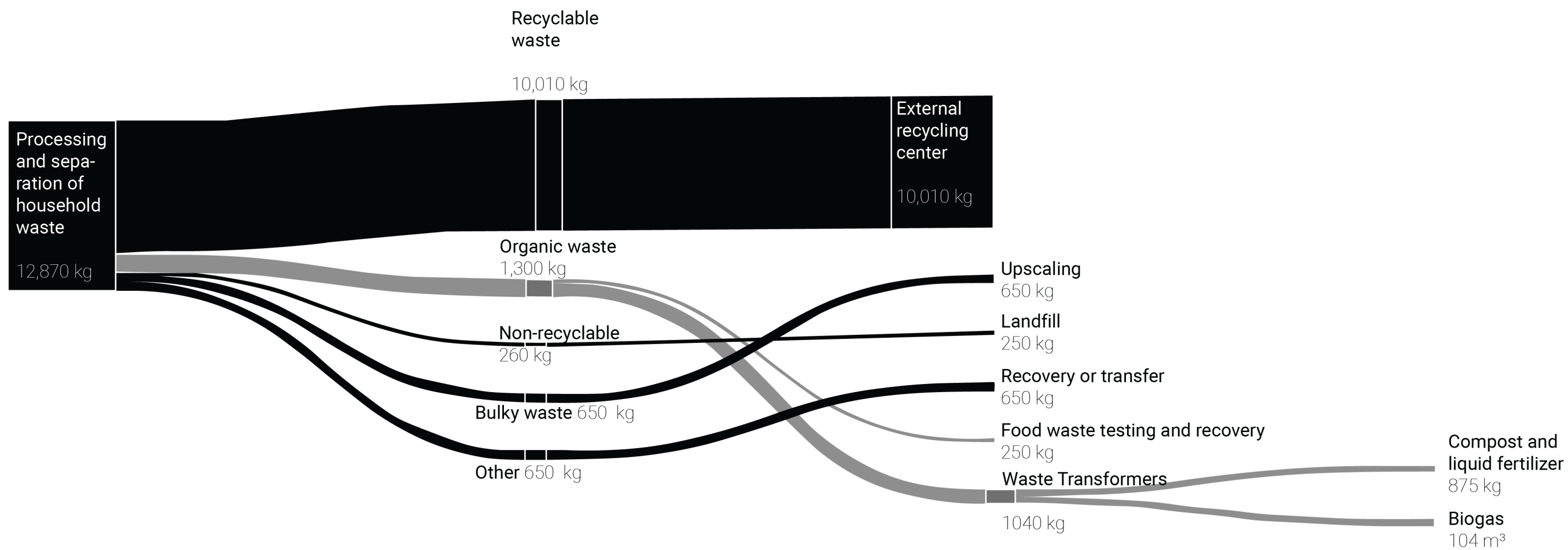
Building Design | Waste Management



Building Design | Waste Journey

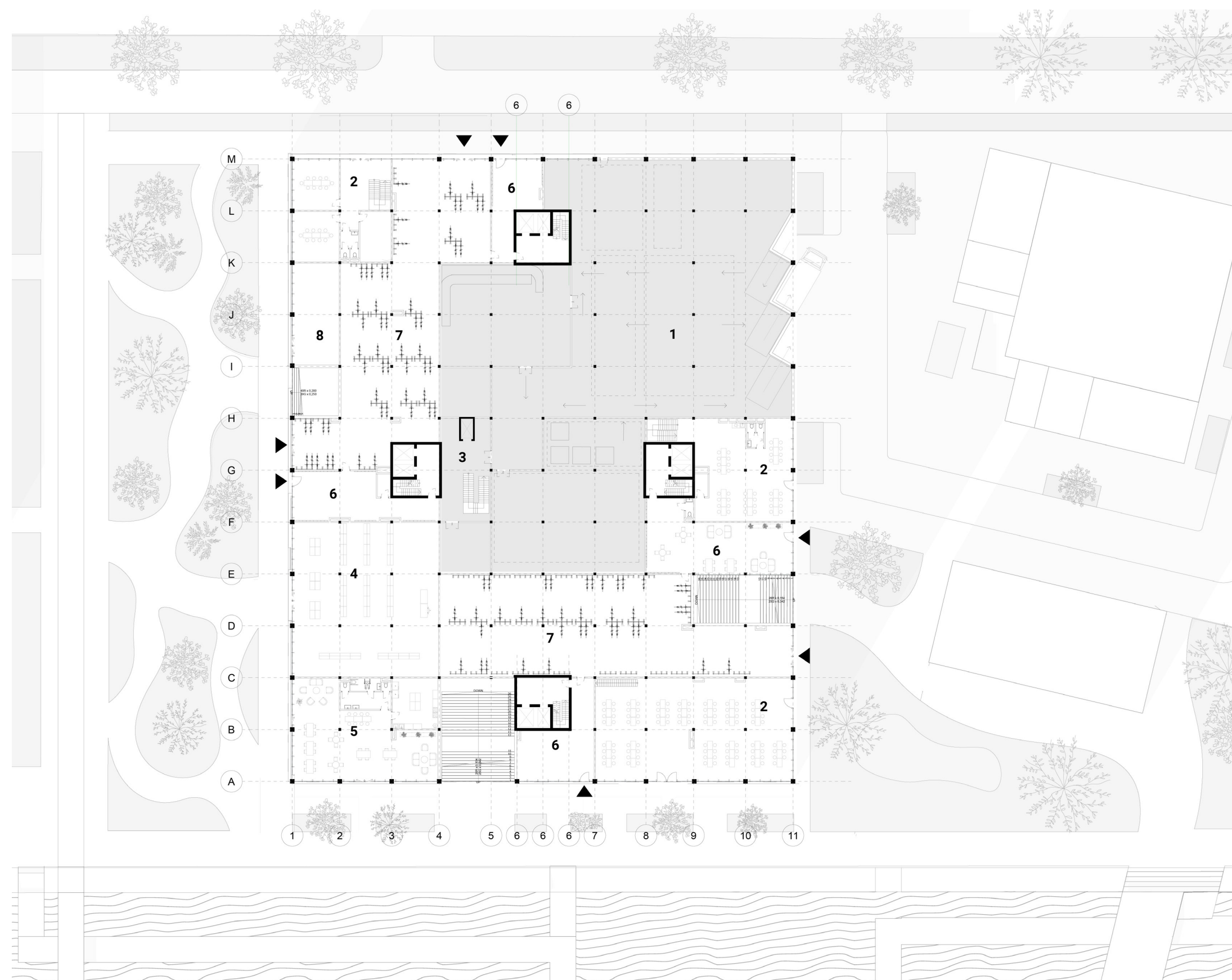


Building Design | Waste - Sankey Diagram



Building Design | Waste Management Facilities

Ground Floor



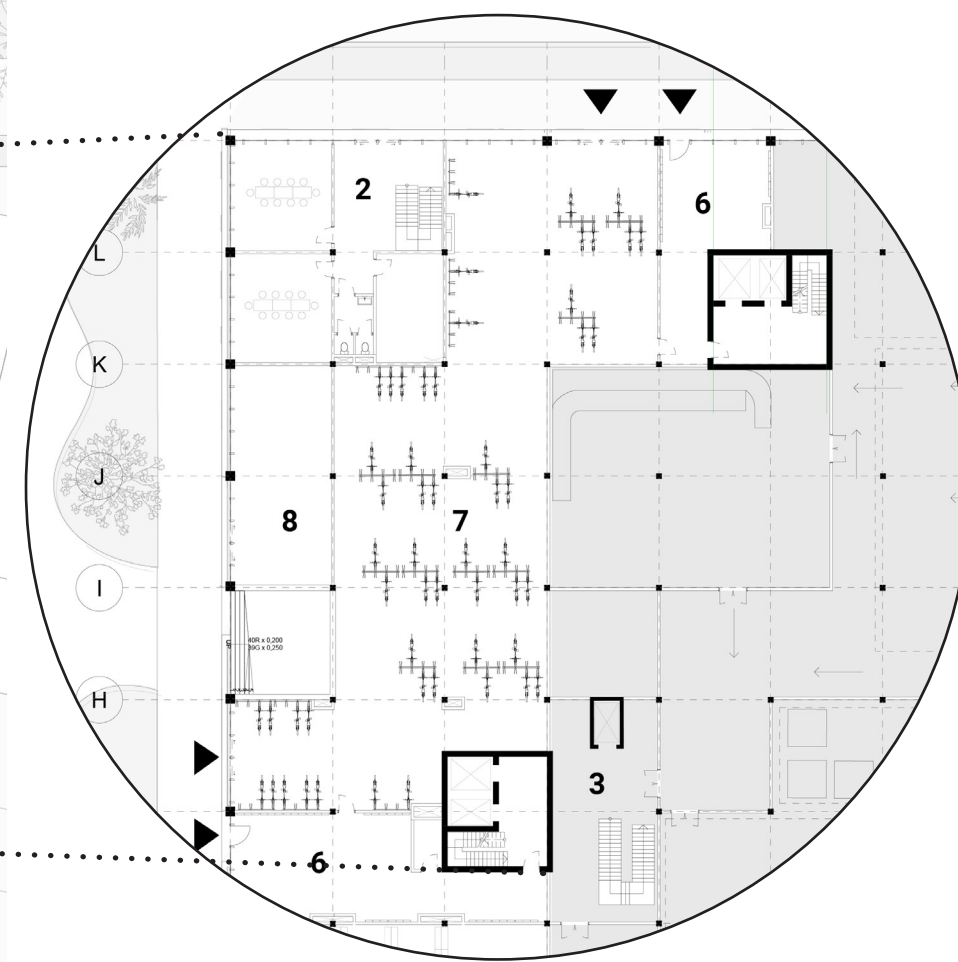
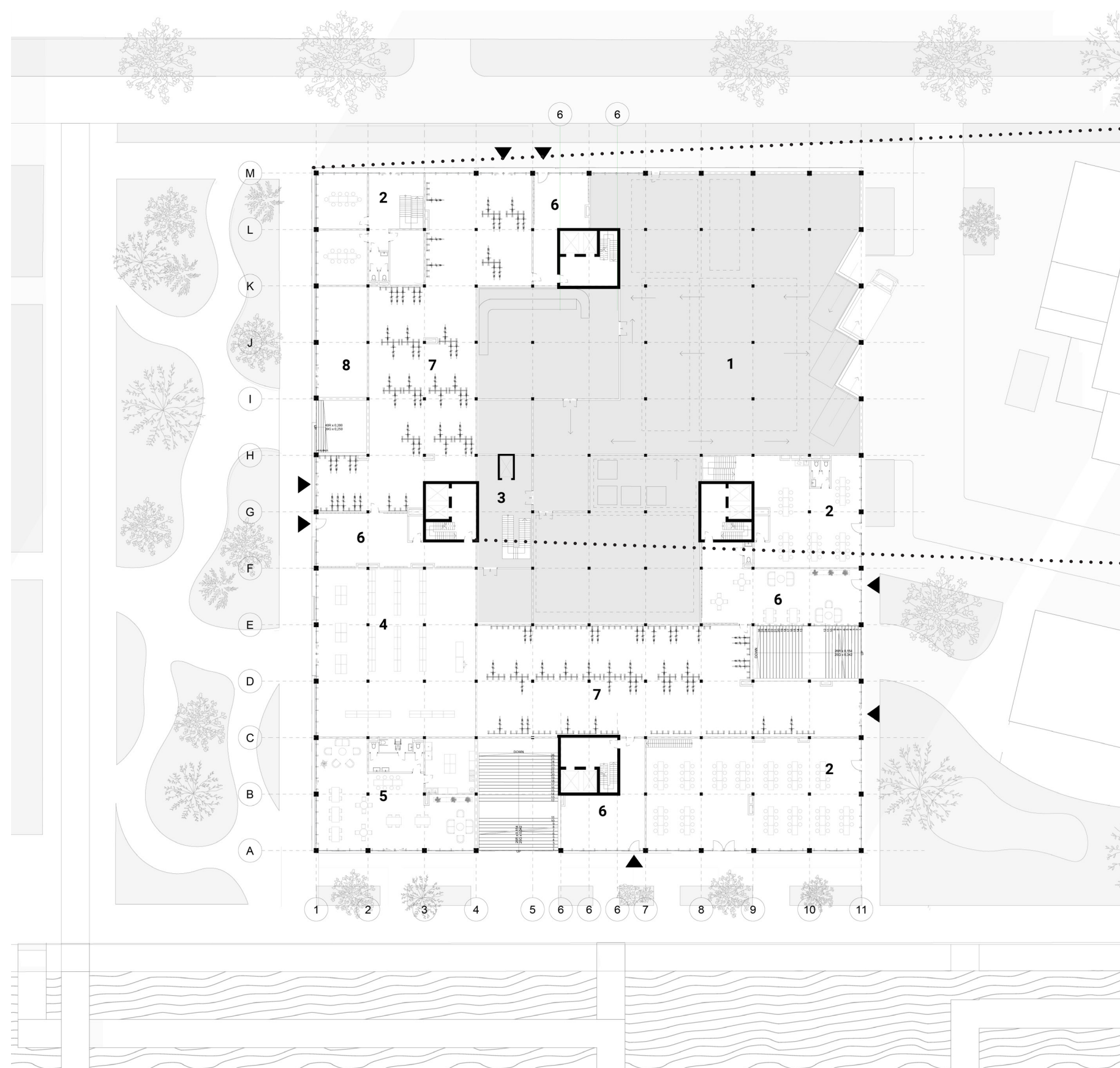
- 1** Waste Transfer Station
- 2** Co-working Spaces, Workshops
- 3** Food Transport
- 4** Market | Recovered Food, Products
- 5** Restaurant
- 6** Entrance Dwellings
- 7** Bike Parking
- 8** Bike Repair
- 9** Food Waste Testing and Recovery
- 10** Courtyard
- 11** Waste Tower

Scale 1:200



Building Design | Waste Management Facilities

Ground Floor



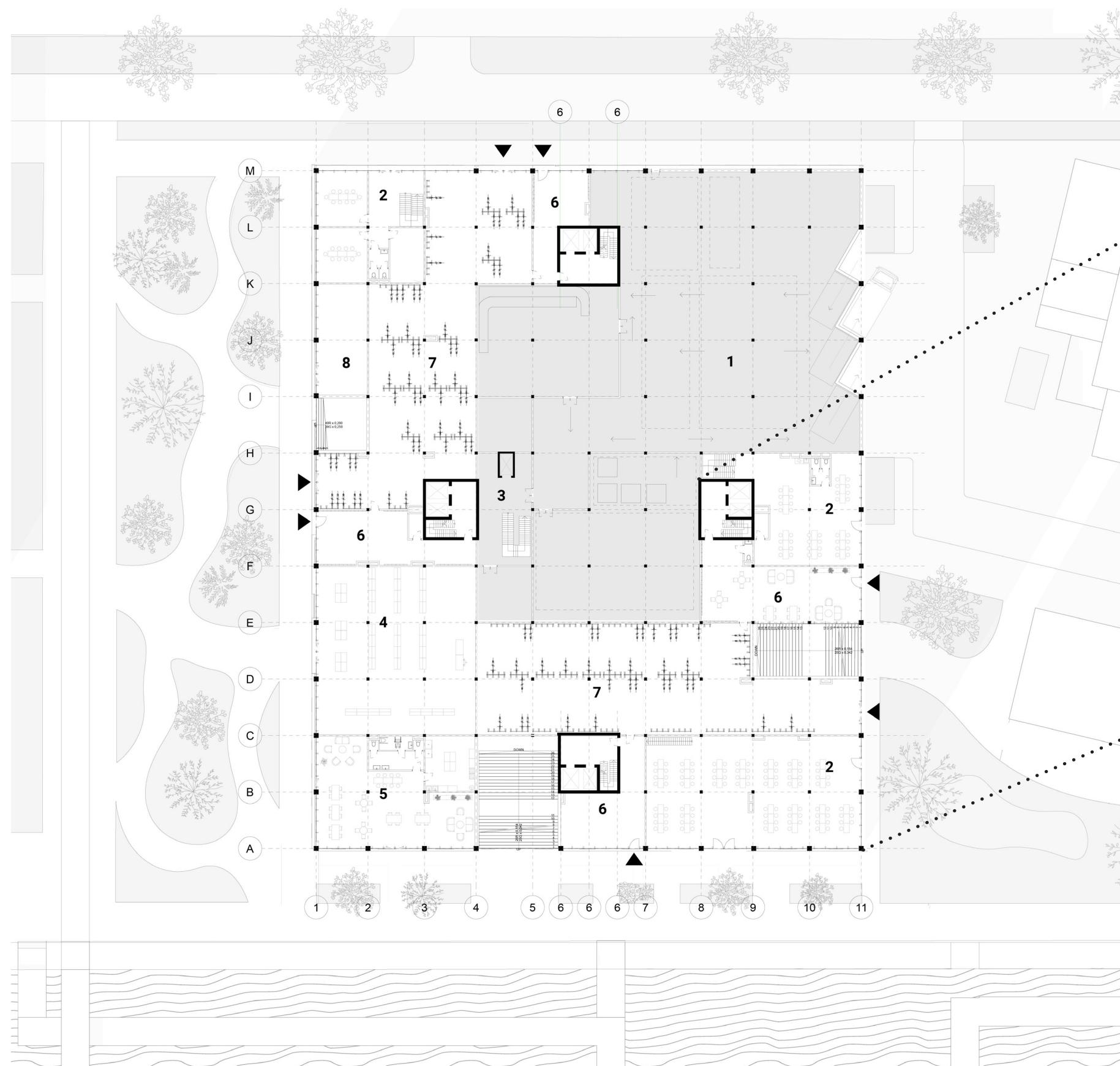
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Scale 1:200



Building Design | Waste Management Facilities

Ground Floor



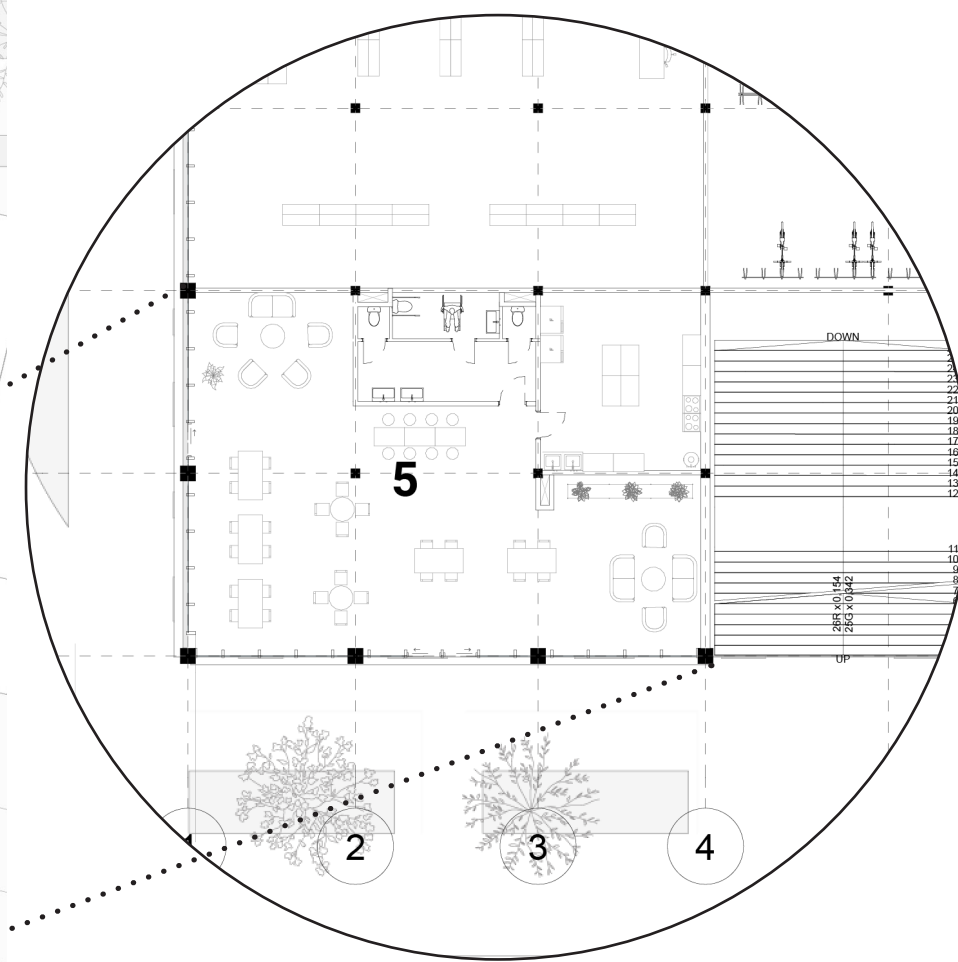
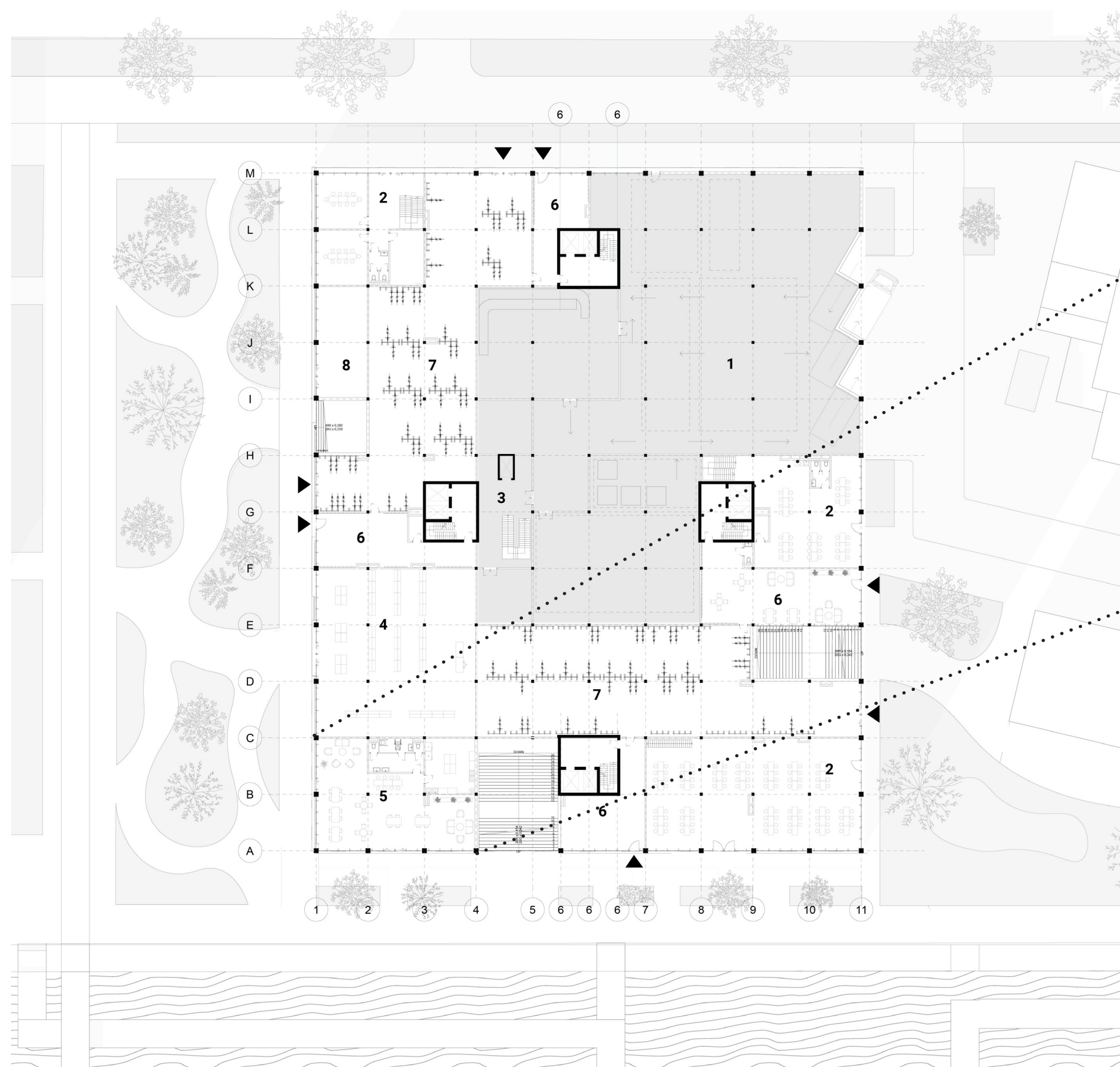
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- 10** Courtyard

Scale 1:200



Building Design | Waste Management Facilities

Ground Floor



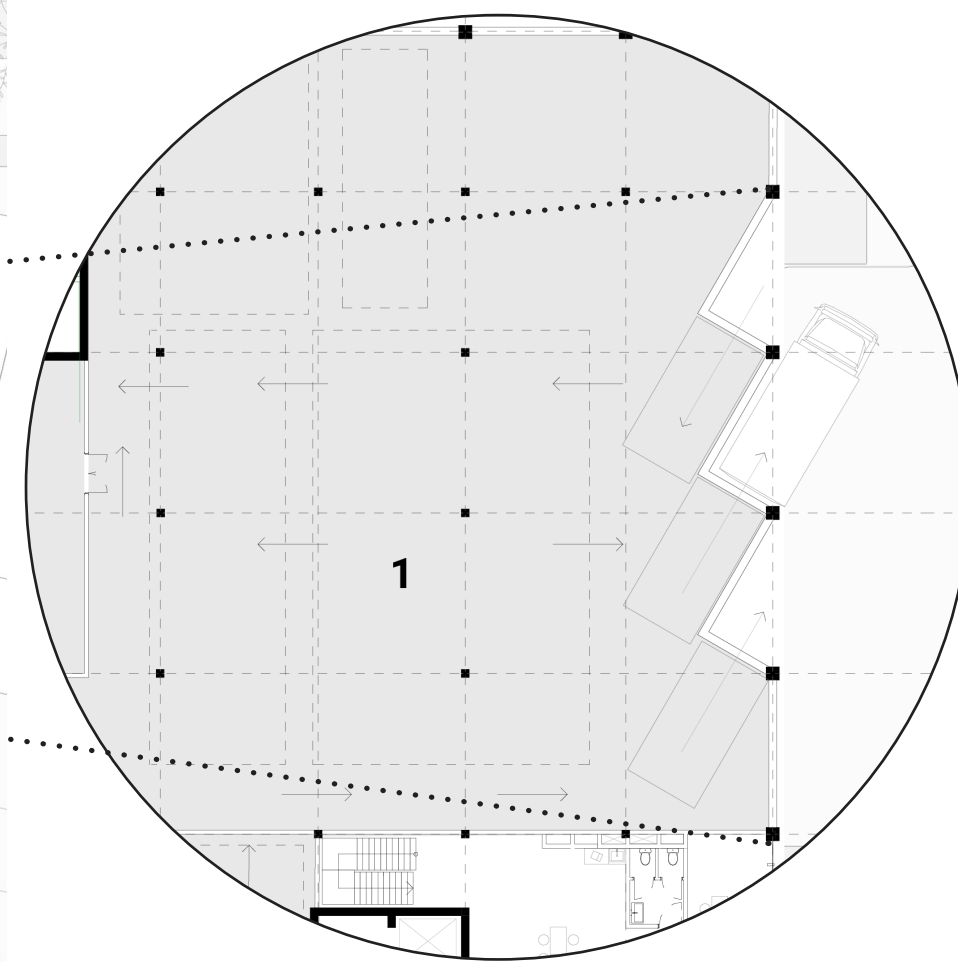
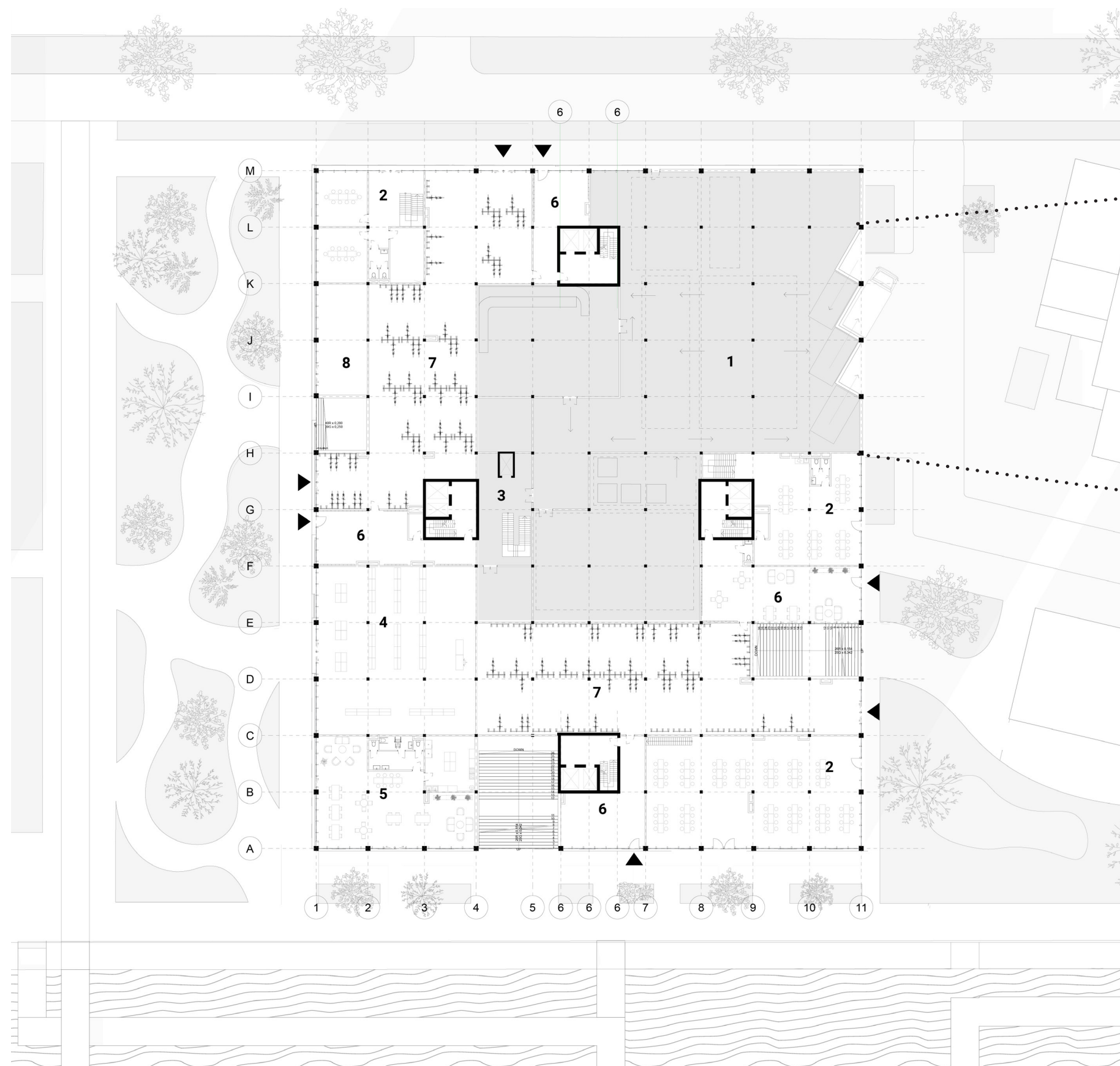
- 1** Waste Transfer Station
- 2** Co-working Spaces, Workshops
- 3** Food Transport
- 4** Market | Recovered Food, Products
- 5** Restaurant
- 6** Entrance Dwellings
- 7** Bike Parking
- 8** Bike Repair
- 9** Food Waste Testing and Recovery
- 10** Courtyard

Scale 1:200



Building Design | Waste Management Facilities

Ground Floor



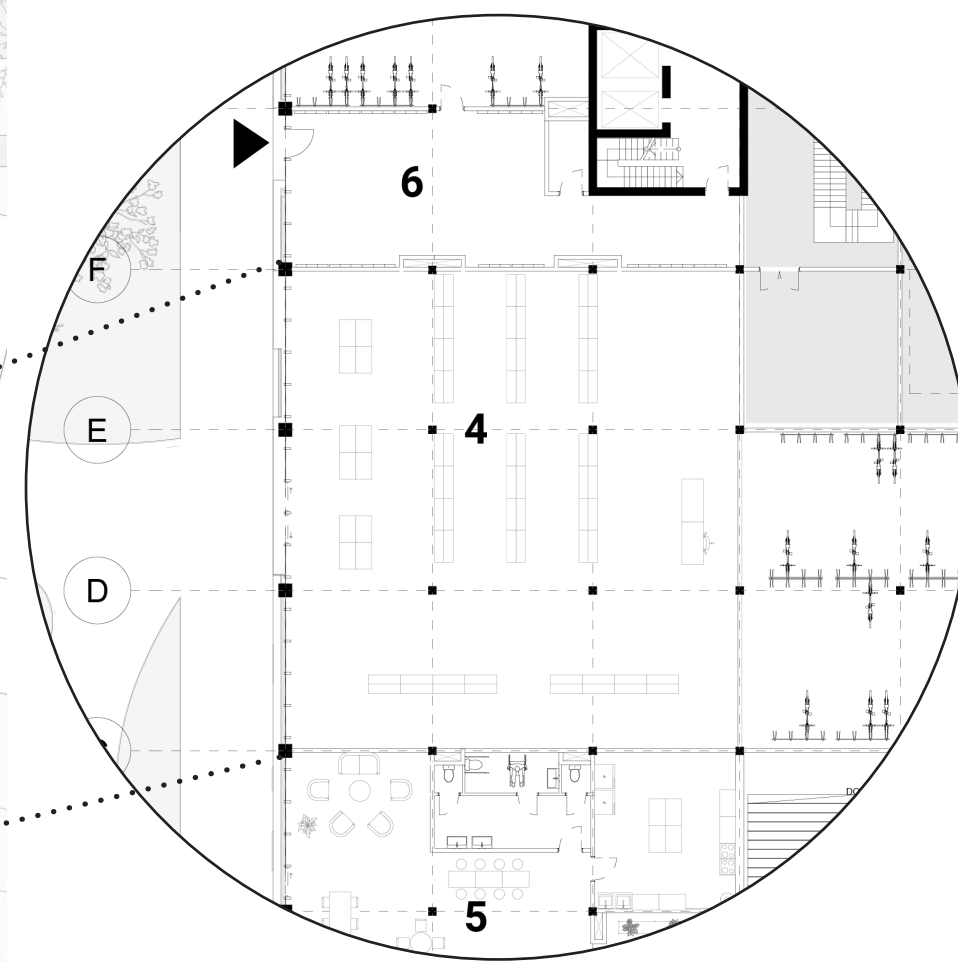
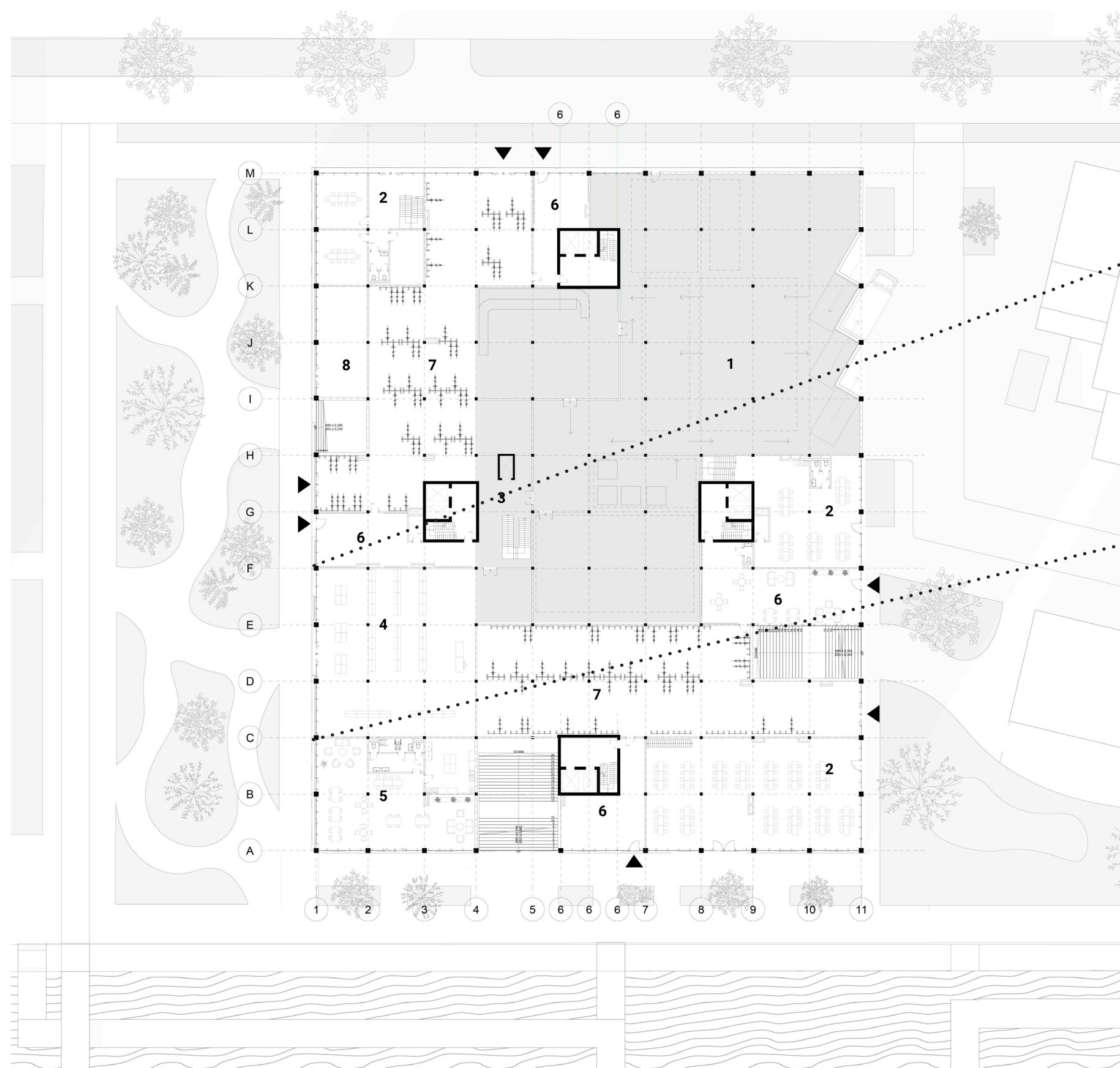
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- 7** Bike Parking
- 8** Bike Repair
- 9** Food Waste Testing and Recovery
- 10** Courtyard
- 11** Waste Tower

Scale 1:200



Building Design | Waste Management Facilities

Ground Floor



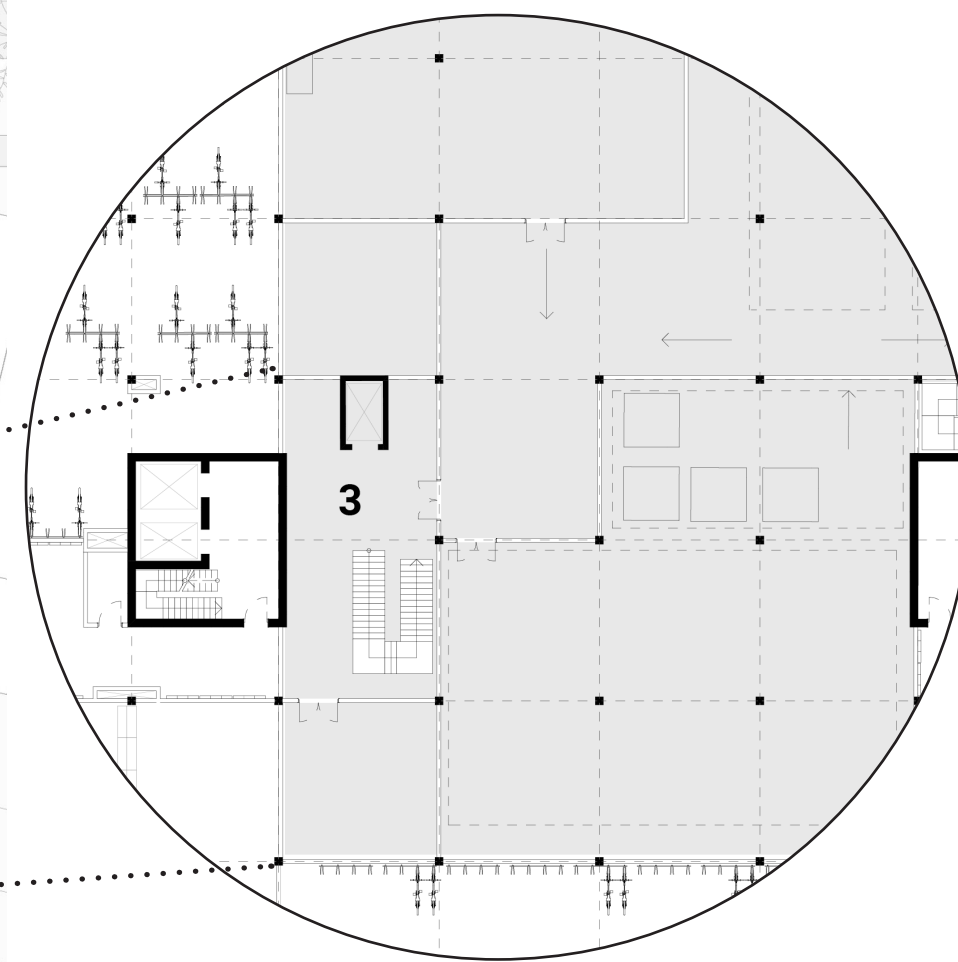
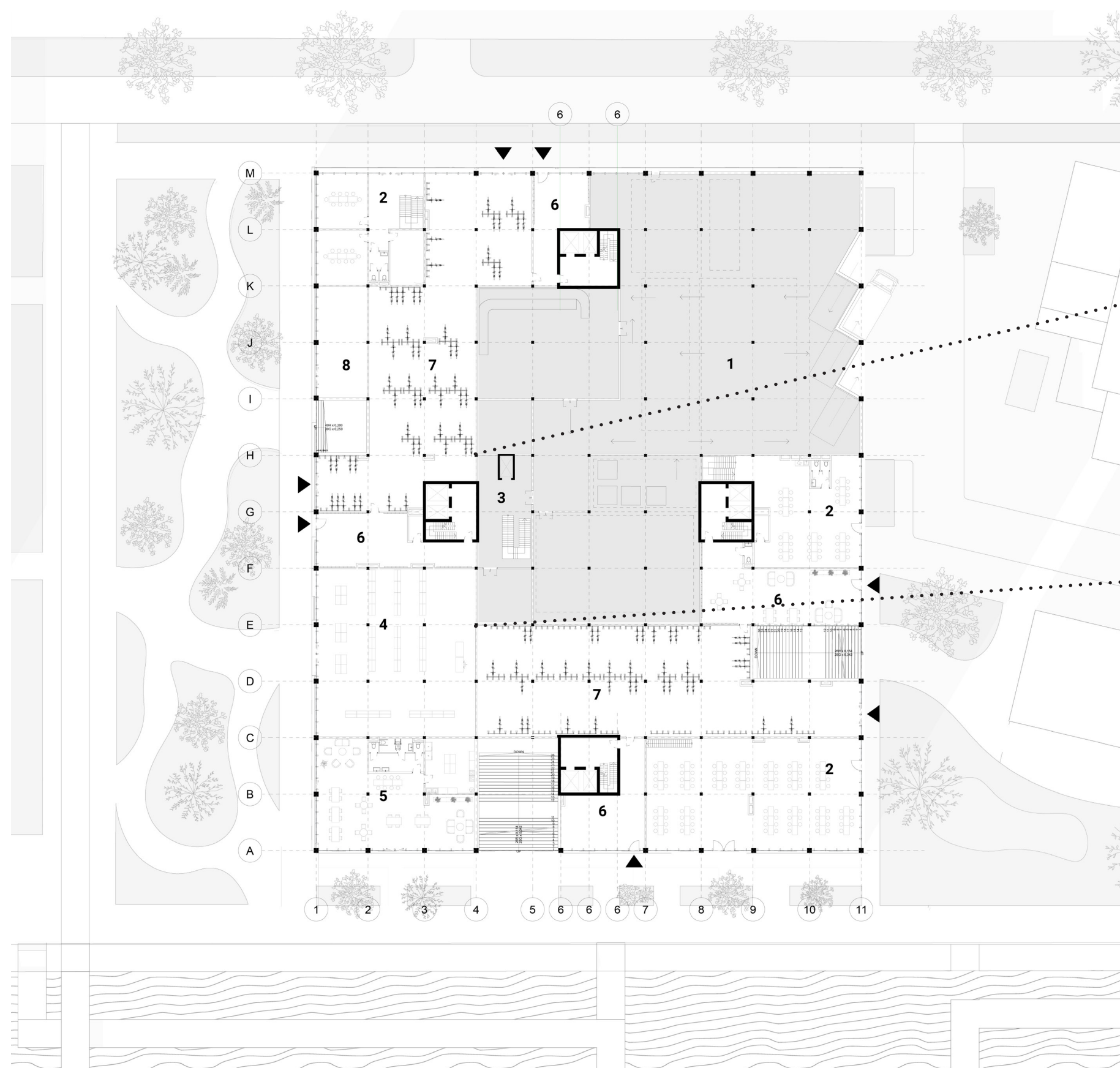
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- 7** Bike Parking
- 8** Bike Repair
- 9** Food Waste Testing and Recovery
- 10** Courtyard

Scale 1:200



Building Design | Waste Management Facilities

Ground Floor



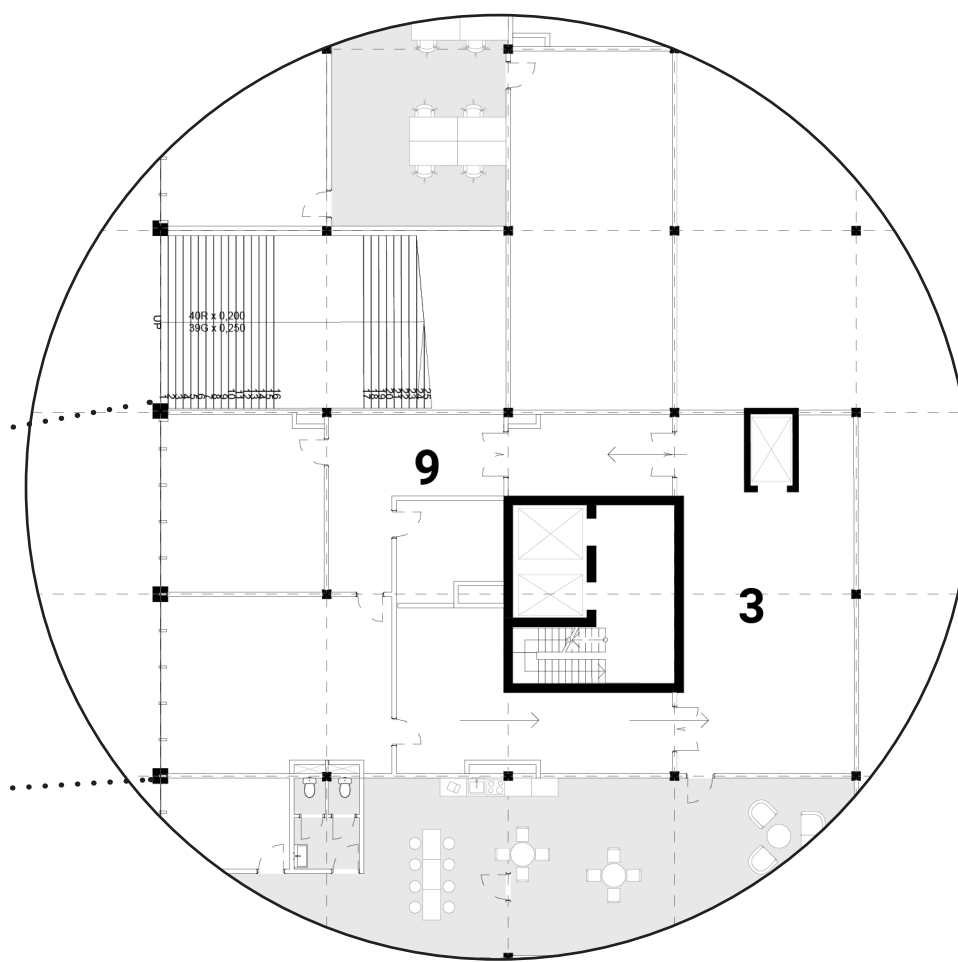
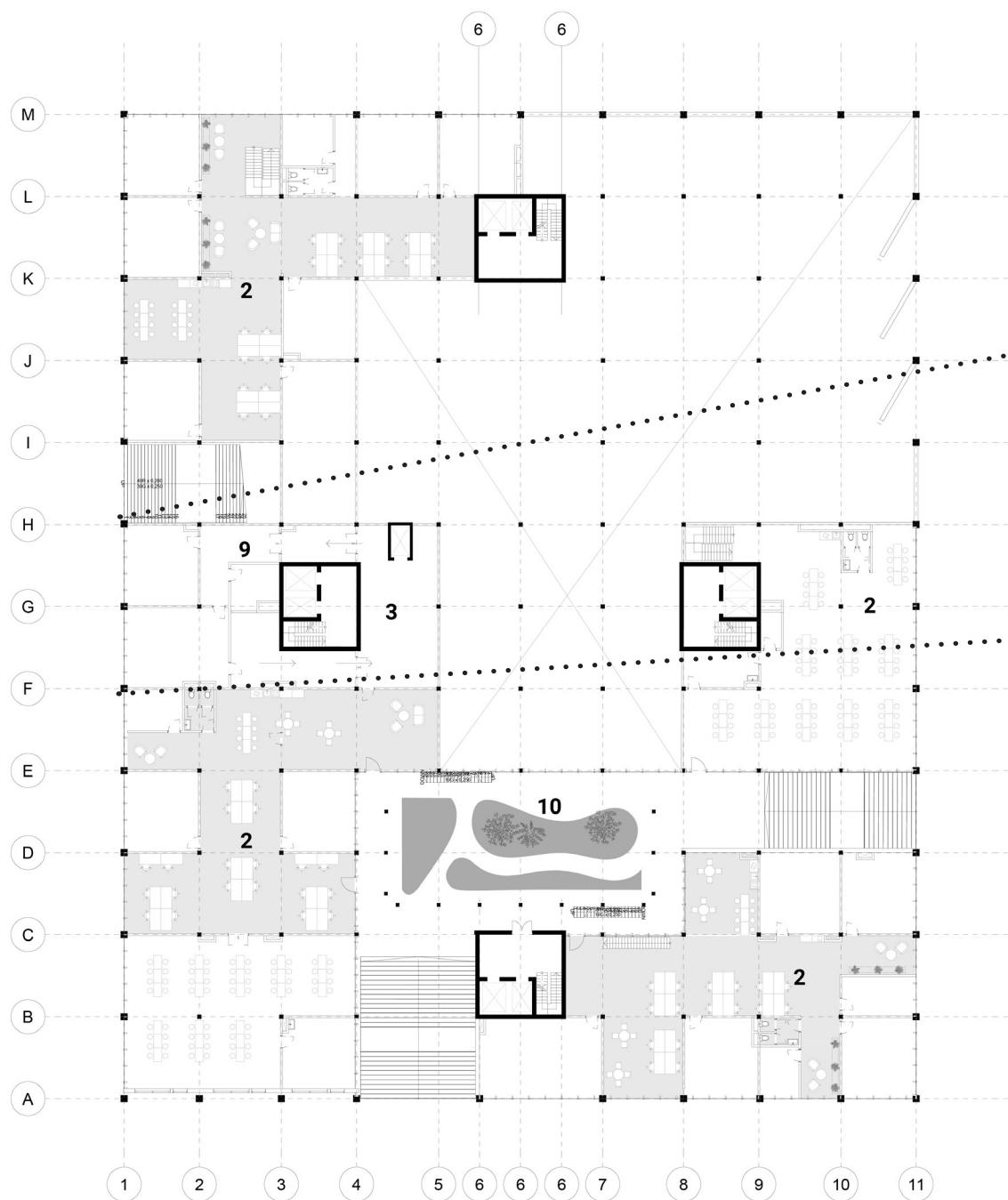
- 1** Waste Transfer Station
- 2** Co-working Spaces, Workshops
- 3** Food Transport
- 4** Market | Recovered Food, Products
- 5** Restaurant
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- 7** Bike Parking
- 8** Bike Repair
- 9** Food Waste Testing and Recovery
- 10** Courtyard

Scale 1:200



Building Design | Floor Plan

First Floor

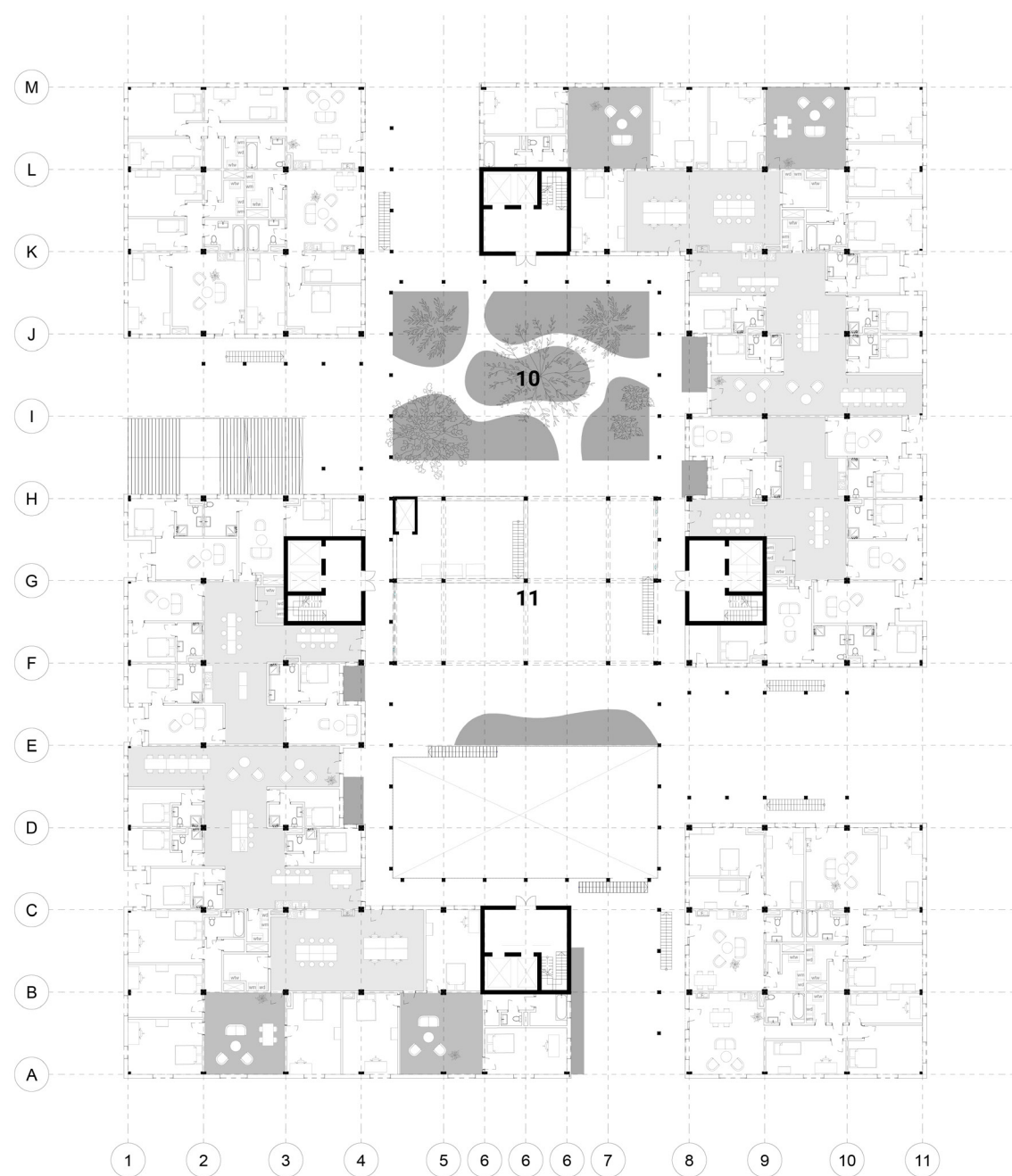


- 1 Waste Transfer Station
- 2 Co-working Spaces, Workshops
- 3 Food Transport
- 4 Market | Recovered Food, Products
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- 8 Bike Repair
- 9 Food Waste Testing and Recovery
- 10 Courtyard
- 11 Waste Tower



Building Design | Floor Plan

Second Floor



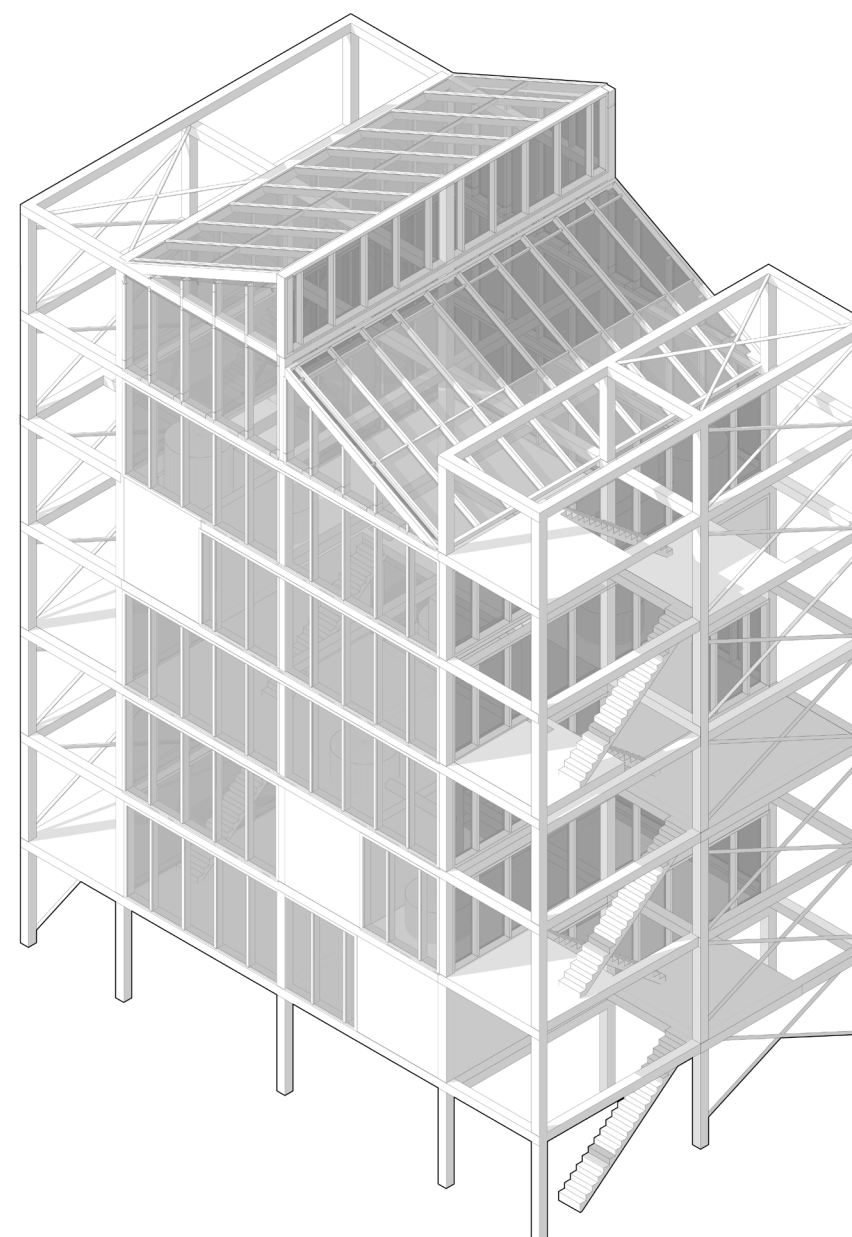
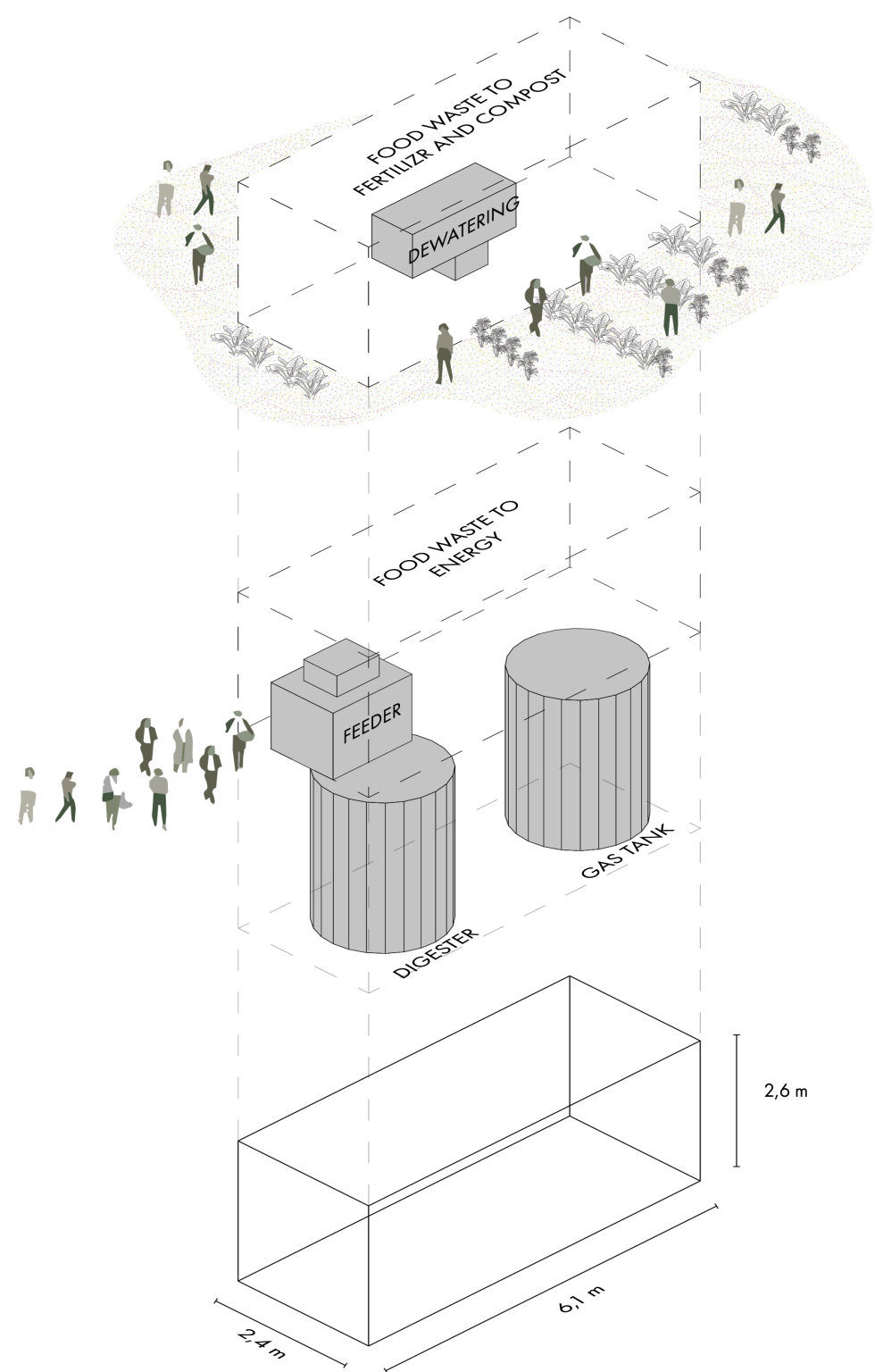
- 1 Waste Transfer Station
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- 4 Market | Recovered Food, Products
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- 6 Entrance Dwellings
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- 11 Waste Tower

Scale 1:200



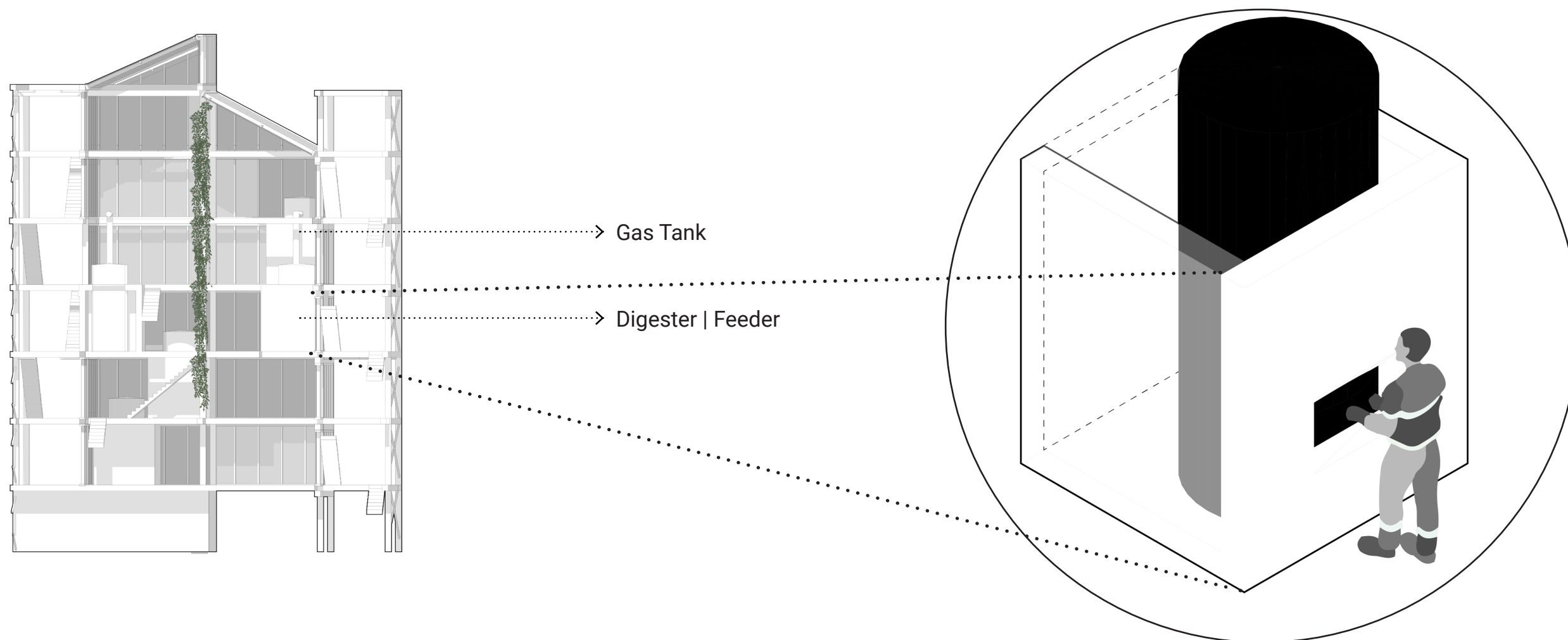
Building Design | Waste Management Facilities

Diagram - Waste Tower

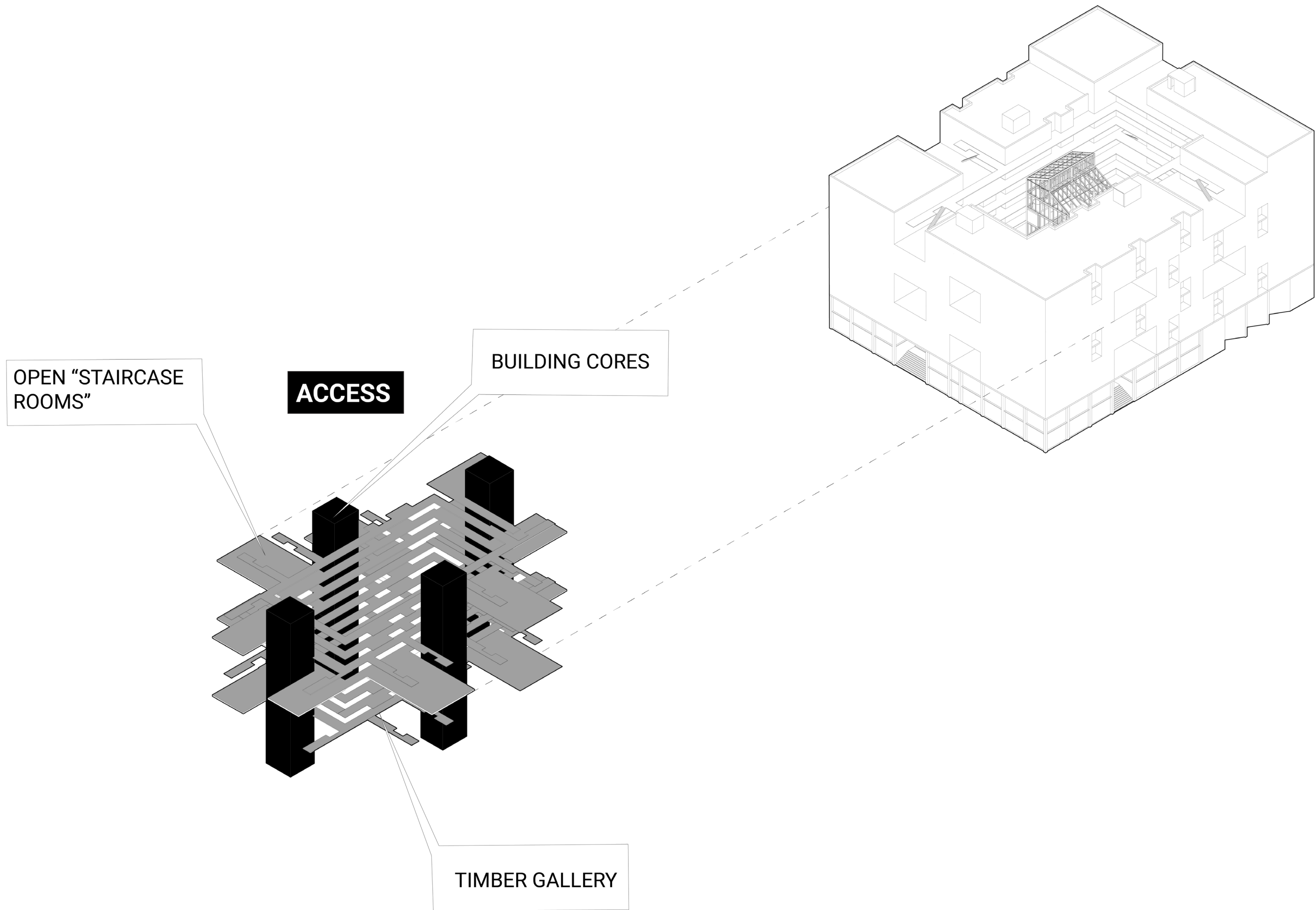


Building Design | Waste Management Facilities

Diagram - Waste Tower

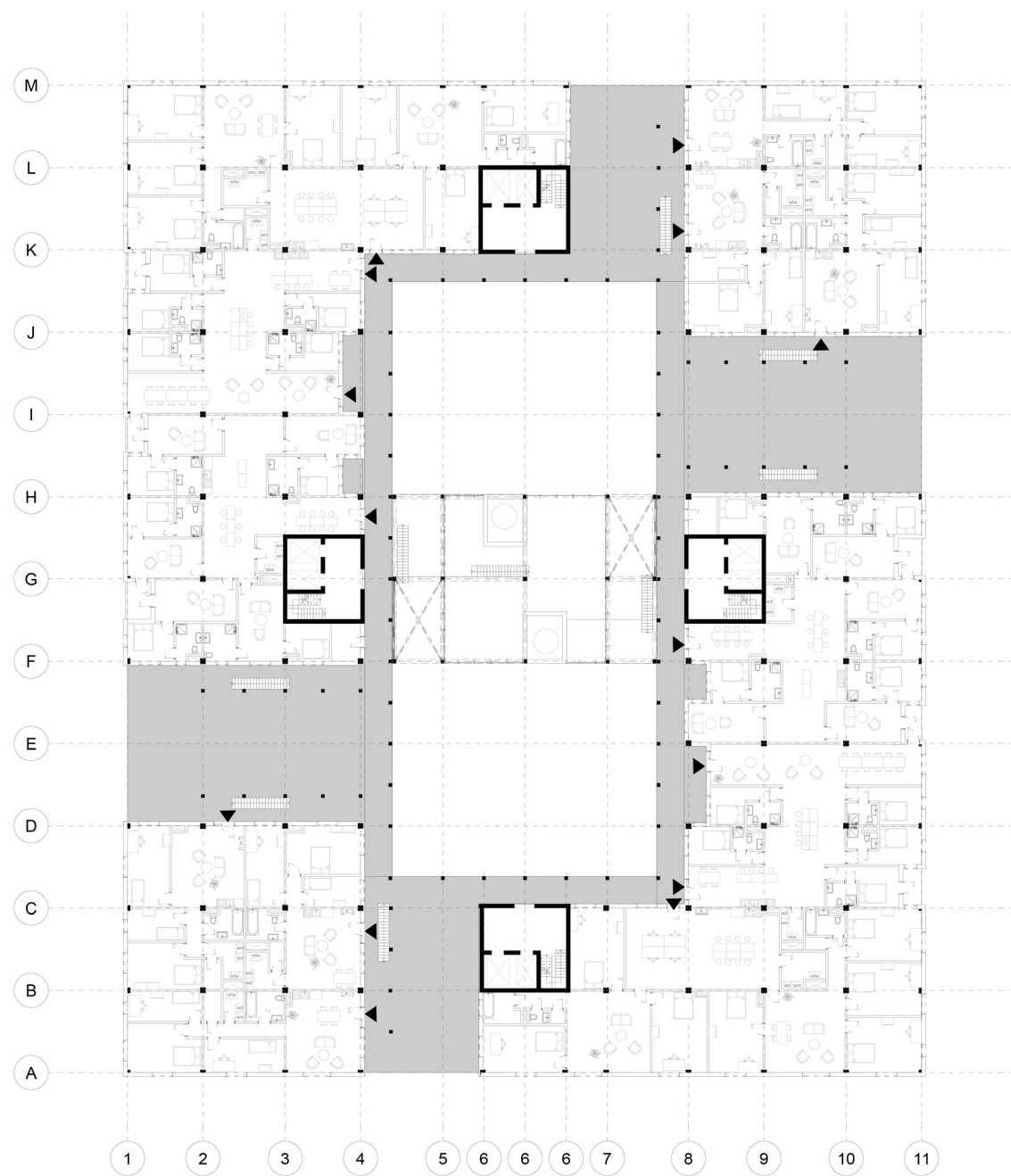


Building Design | Access

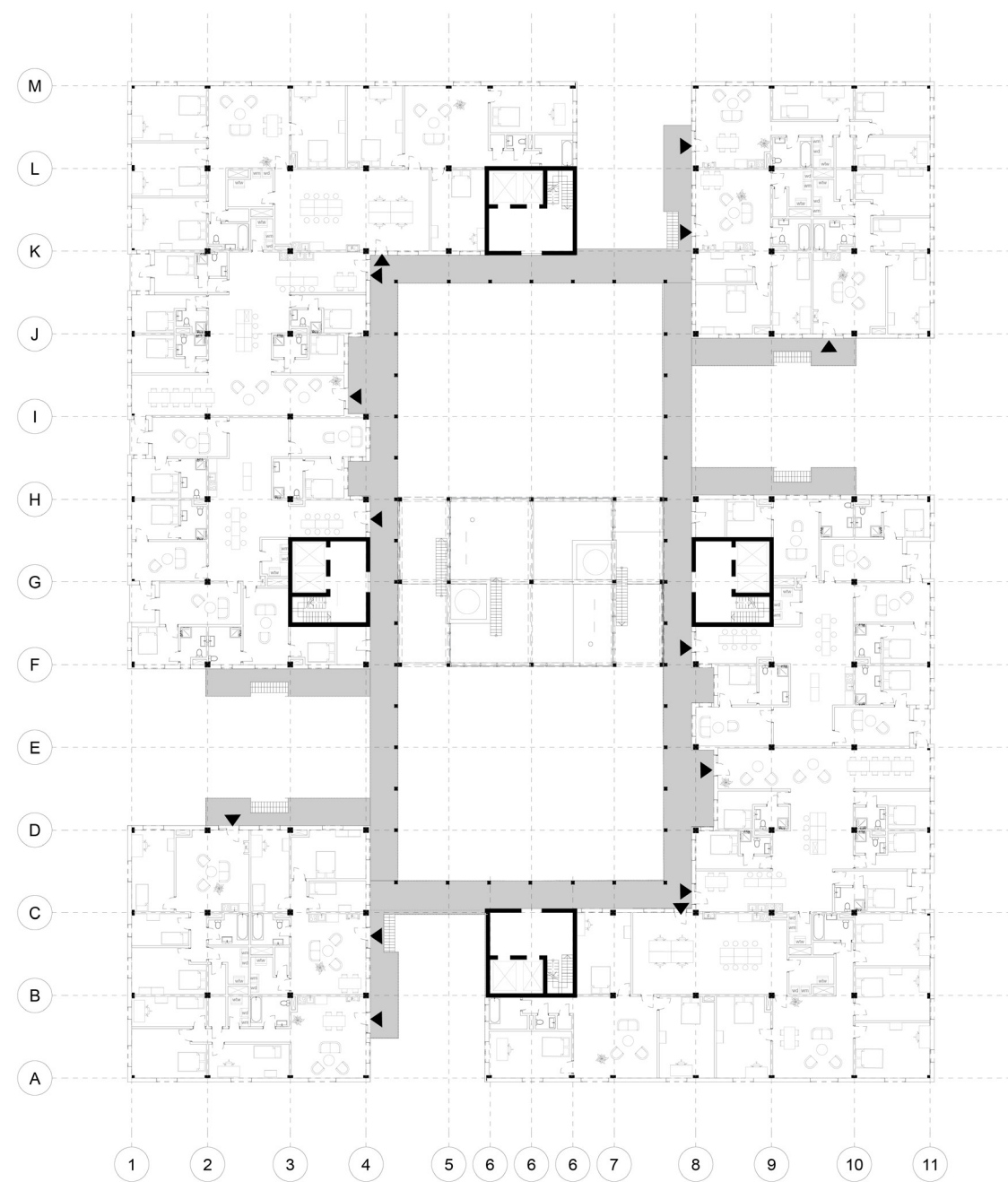


Building Technology | Access

Safety Routes - Typical Floor Plan



Fourth Floor



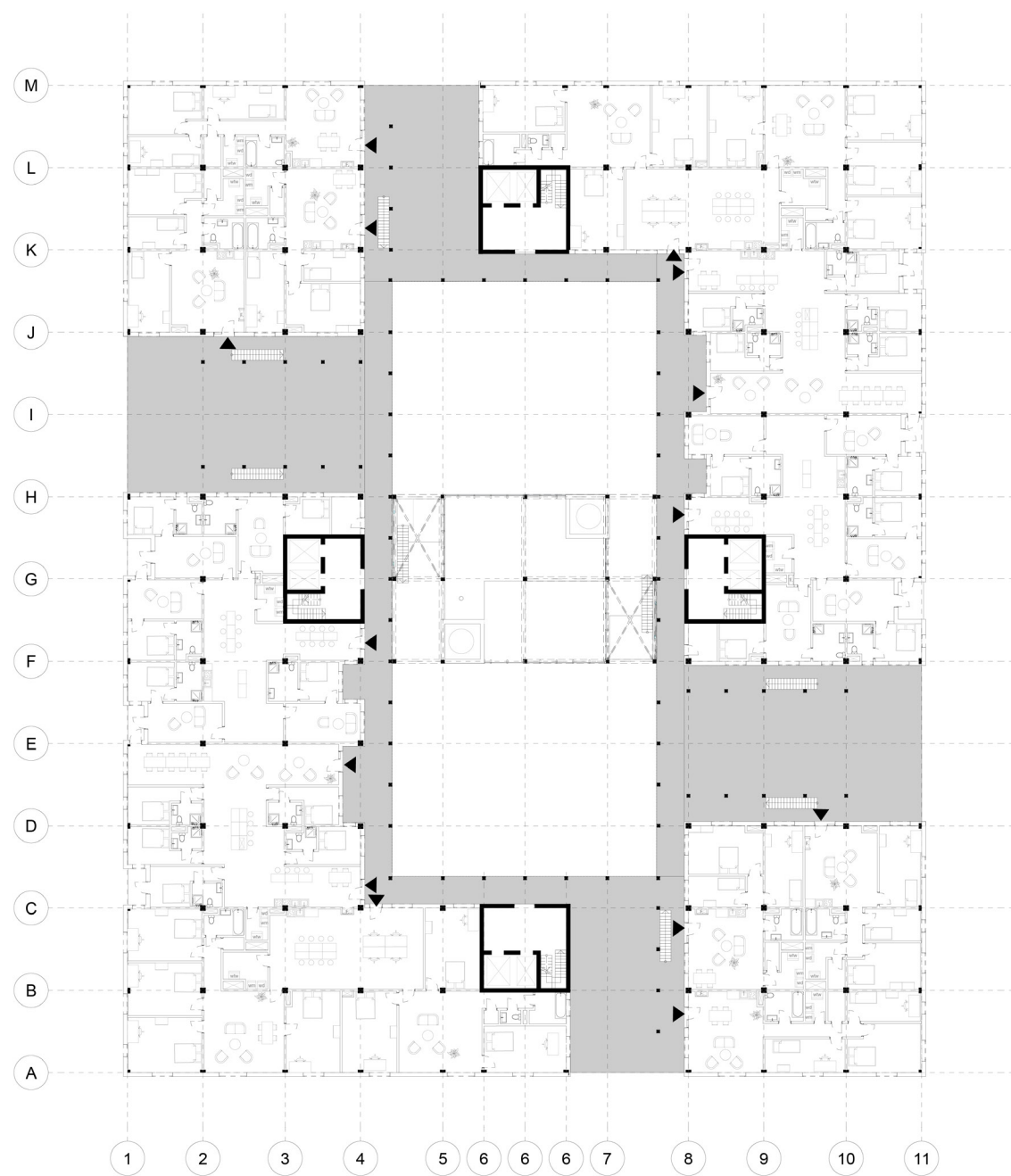
Fifth Floor

Scale 1:200

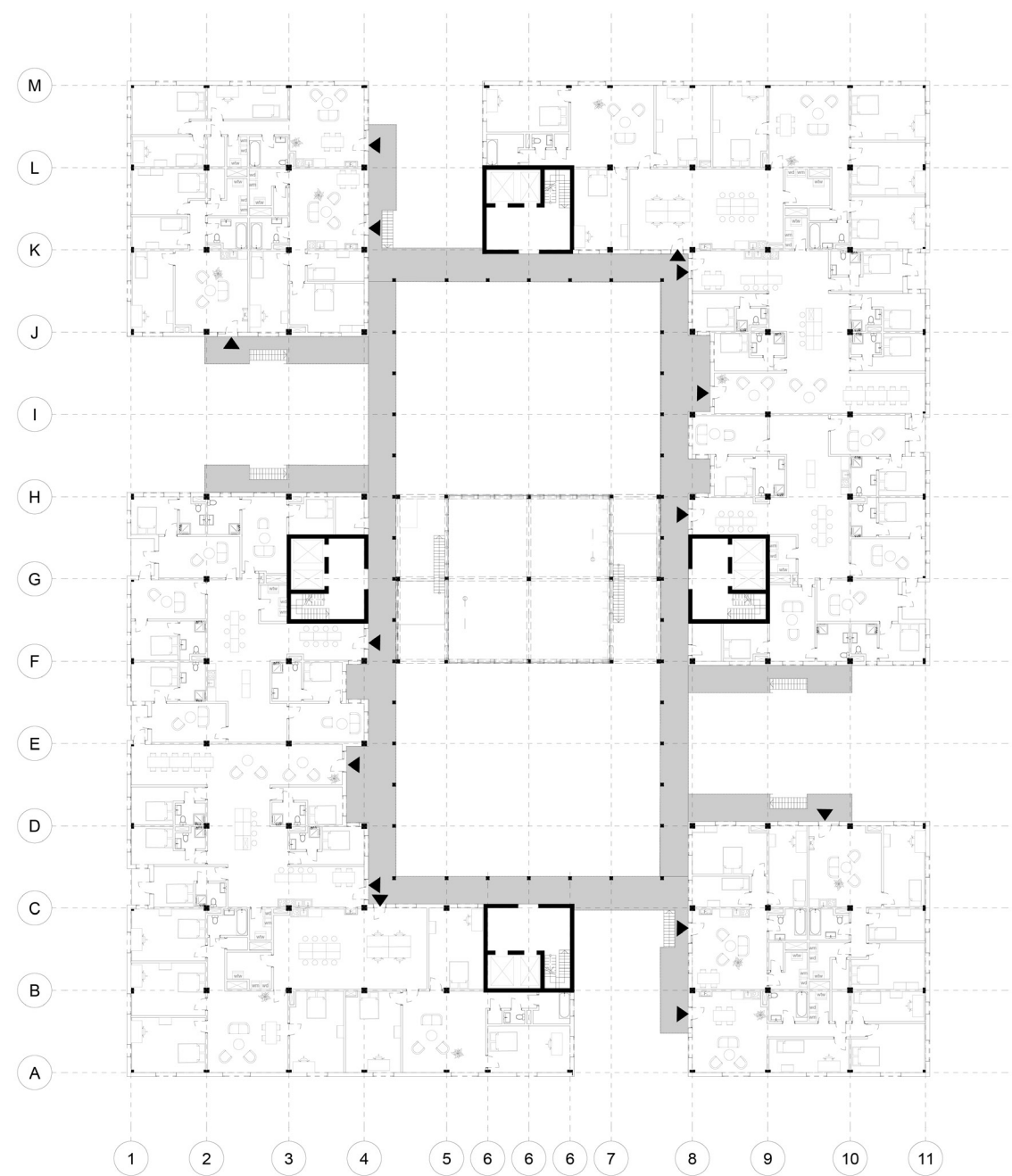


Building Technology | Access

Safety Routes - Typical Floor Plan



Sixth Floor

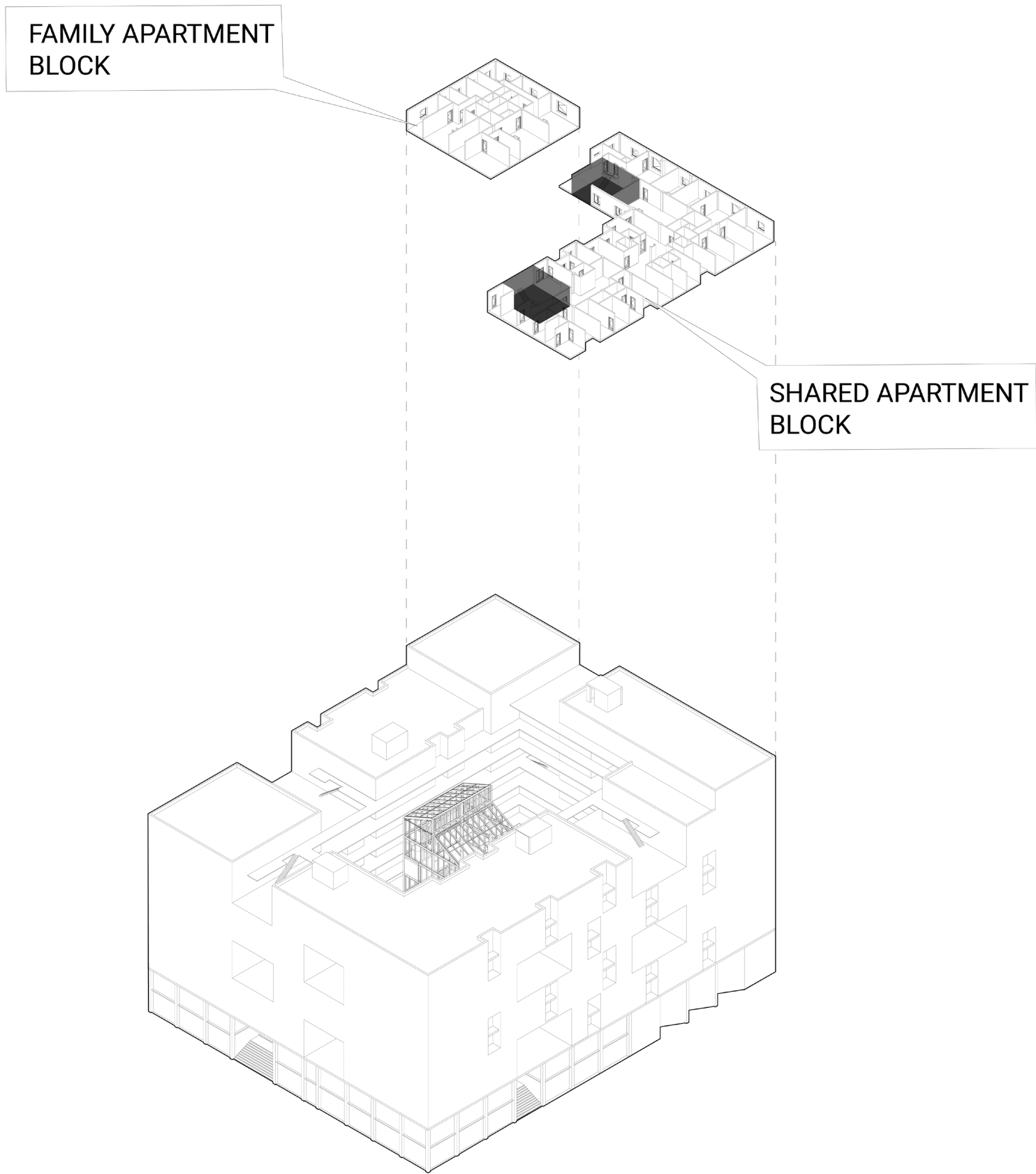


Seventh Floor

Scale 1:200

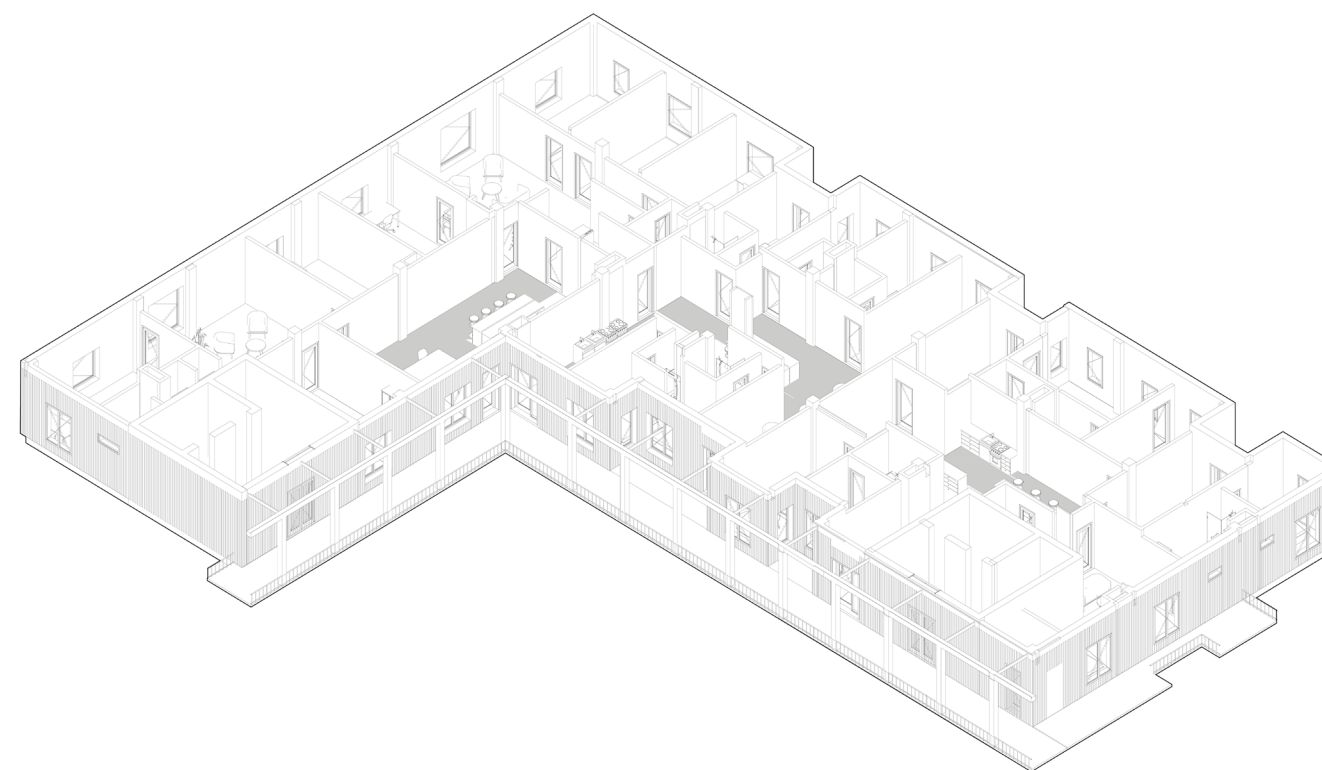
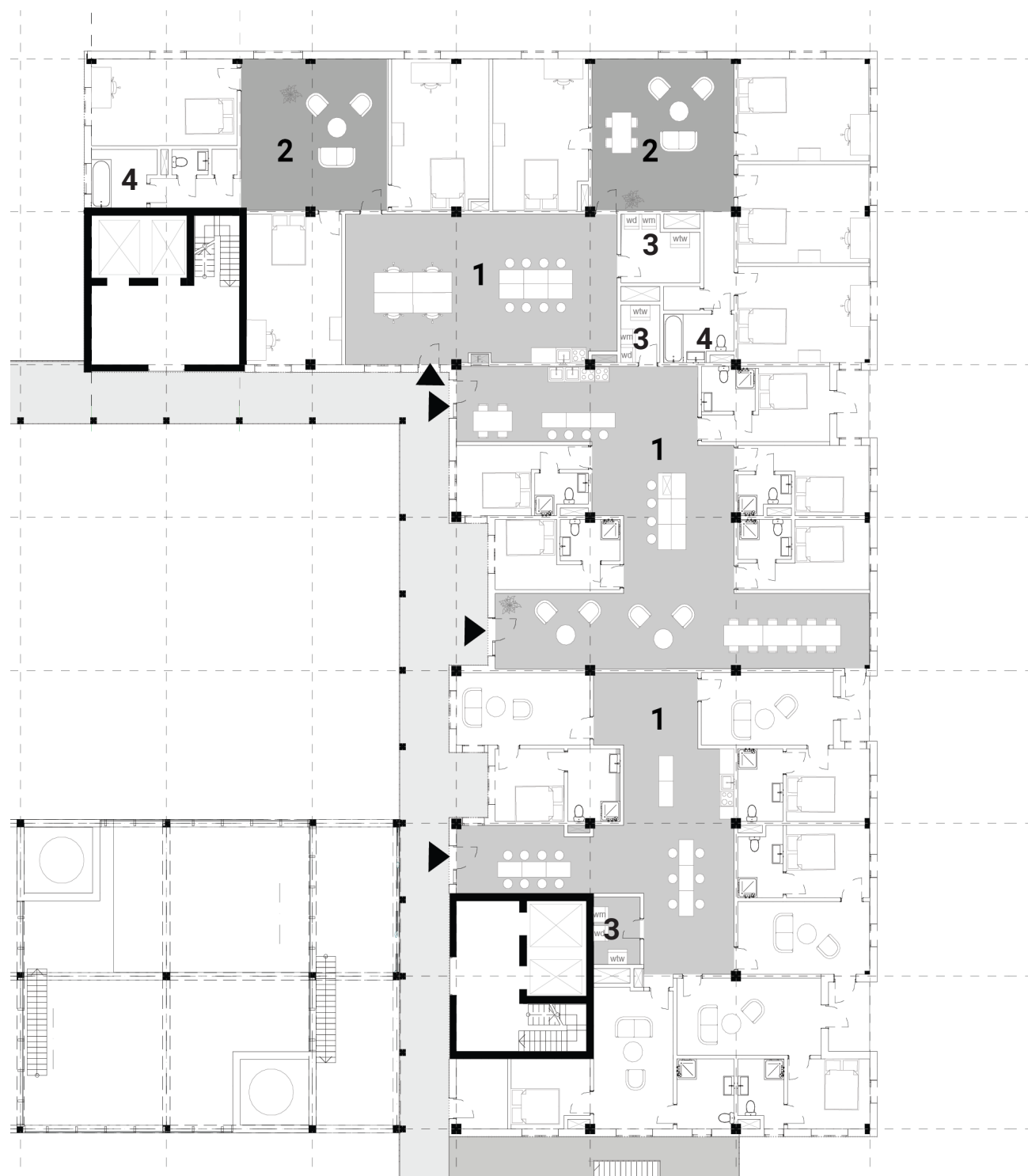


DWELLINGS



Building Design | Dwellings

Shared Apartment Block

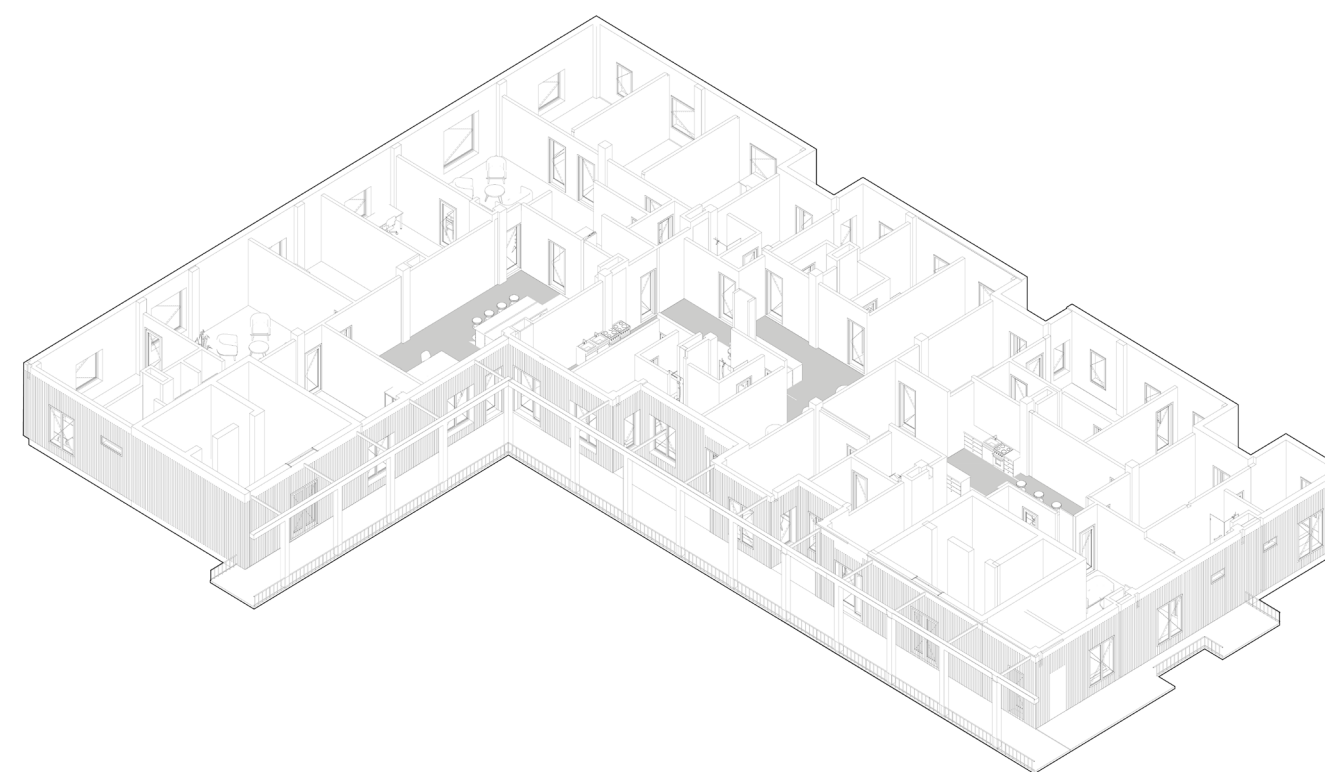
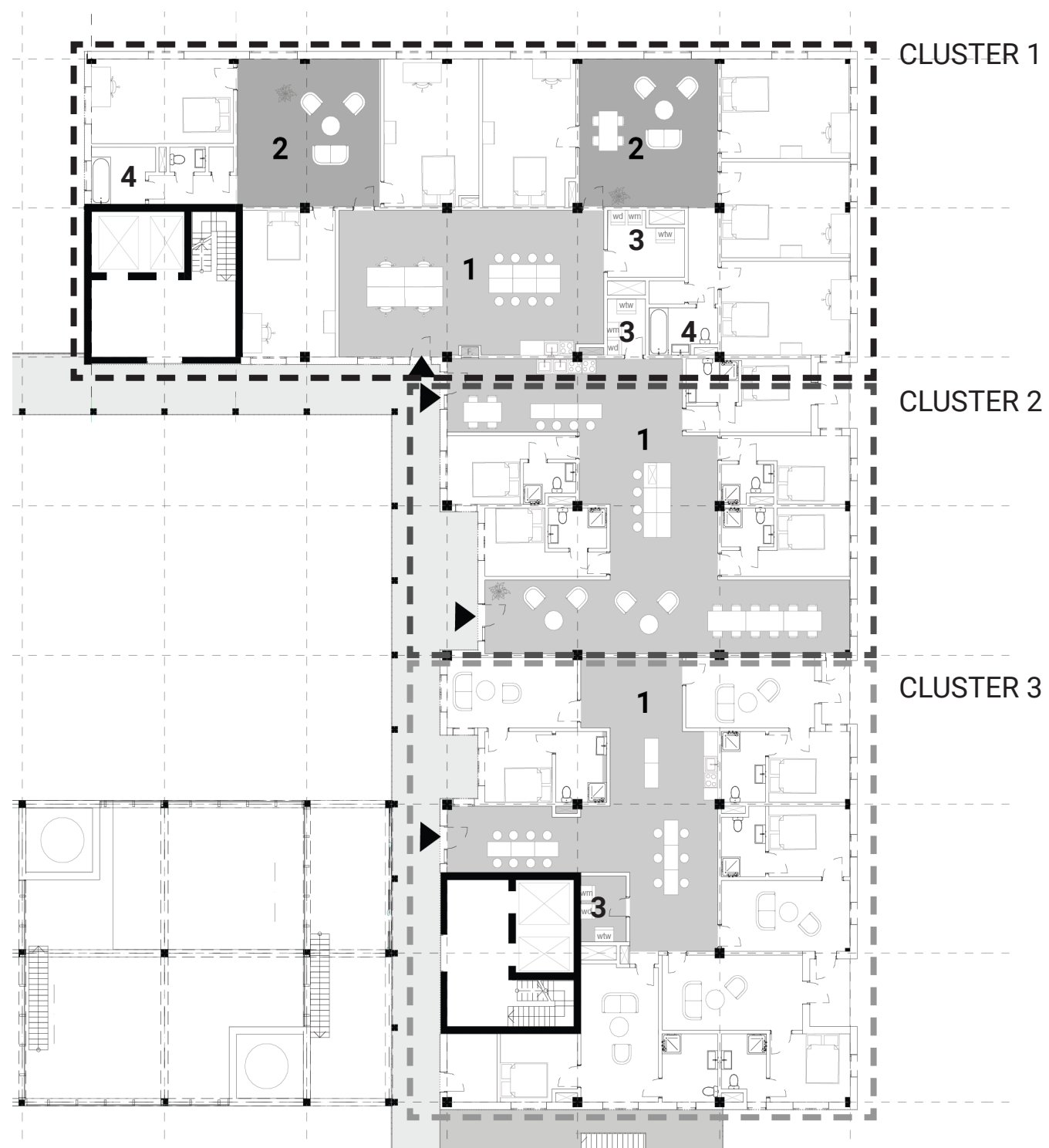


- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets



Building Design | Dwellings

Shared Apartment Block



- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets

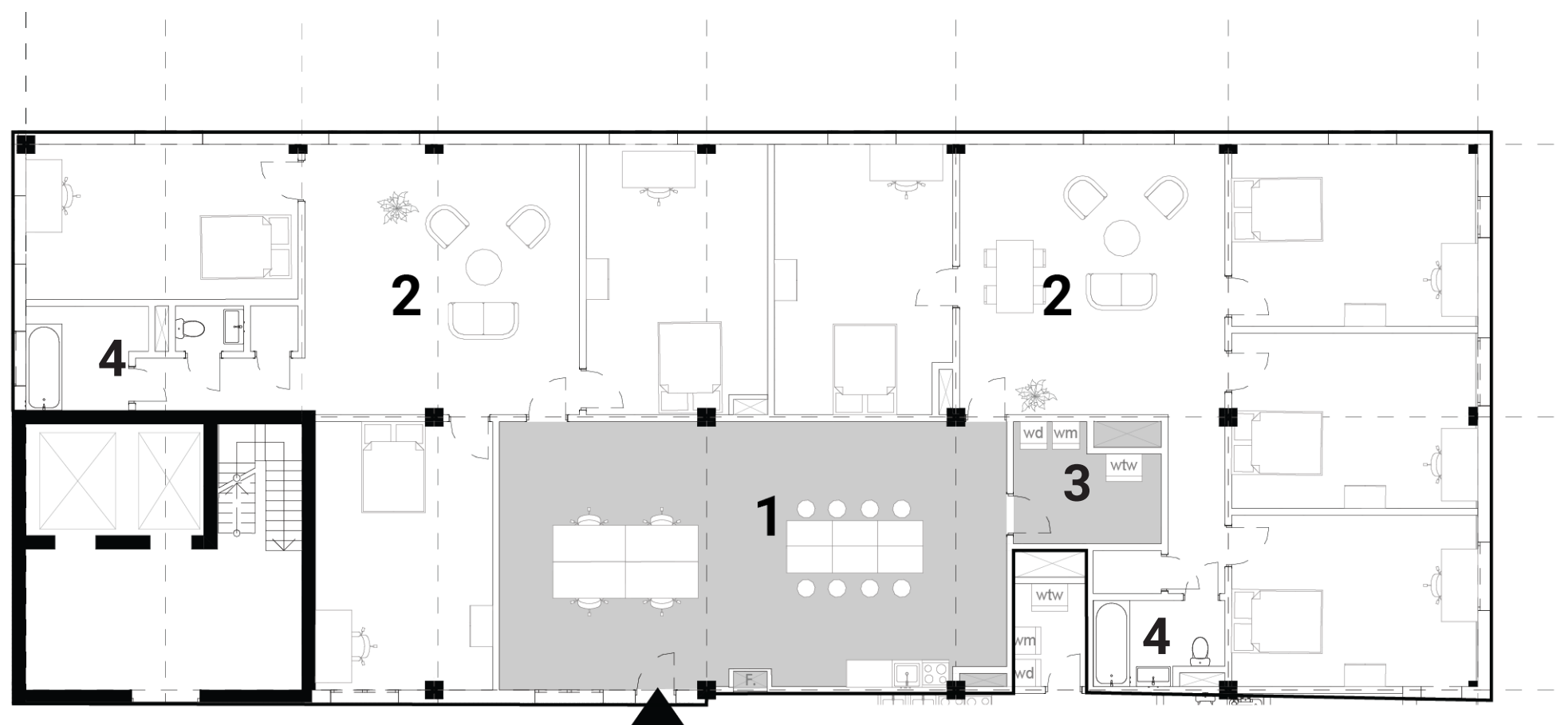


Building Design | Dwellings

Cluster 1

23 m² per person excluding shared spaces

50m² per person including shared spaces

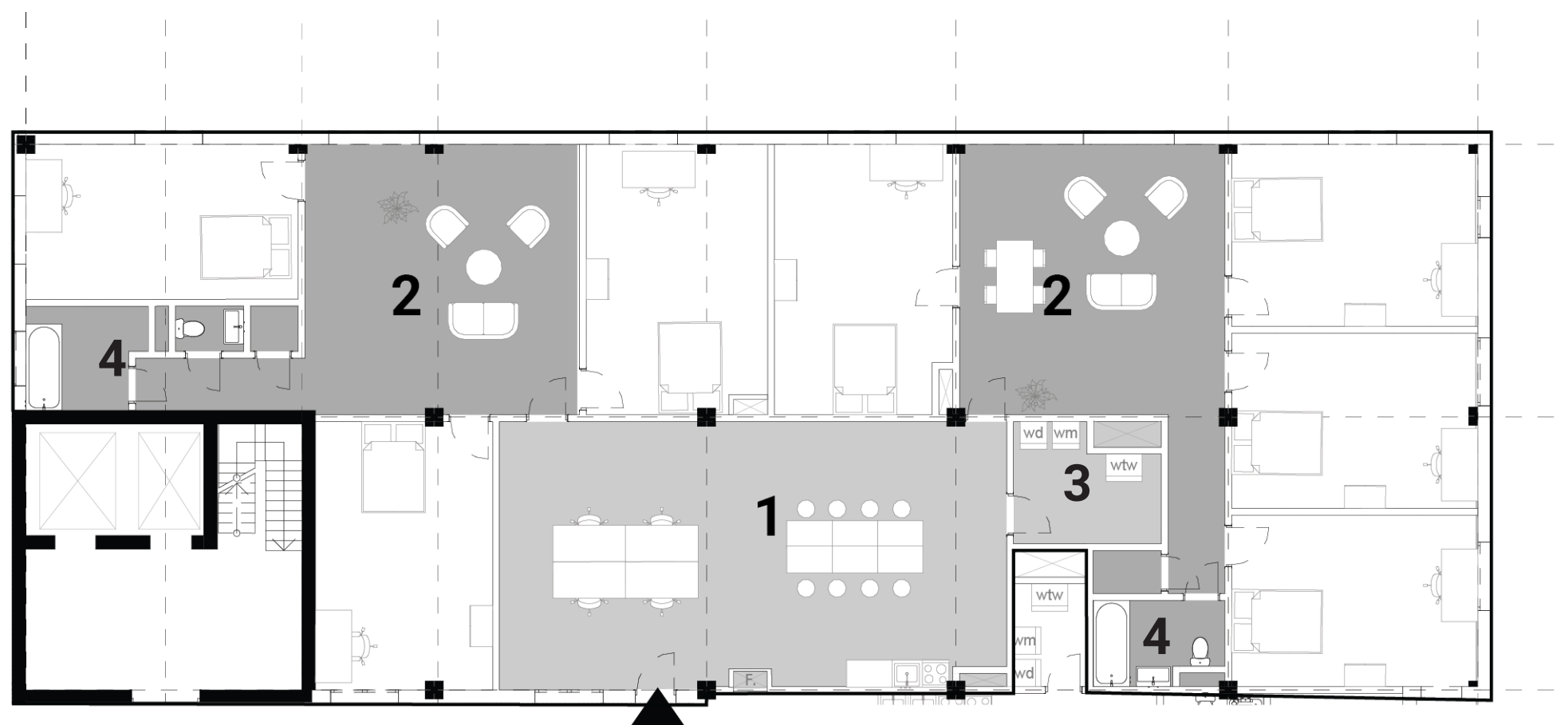


- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets



Building Design | Dwellings

Cluster 1

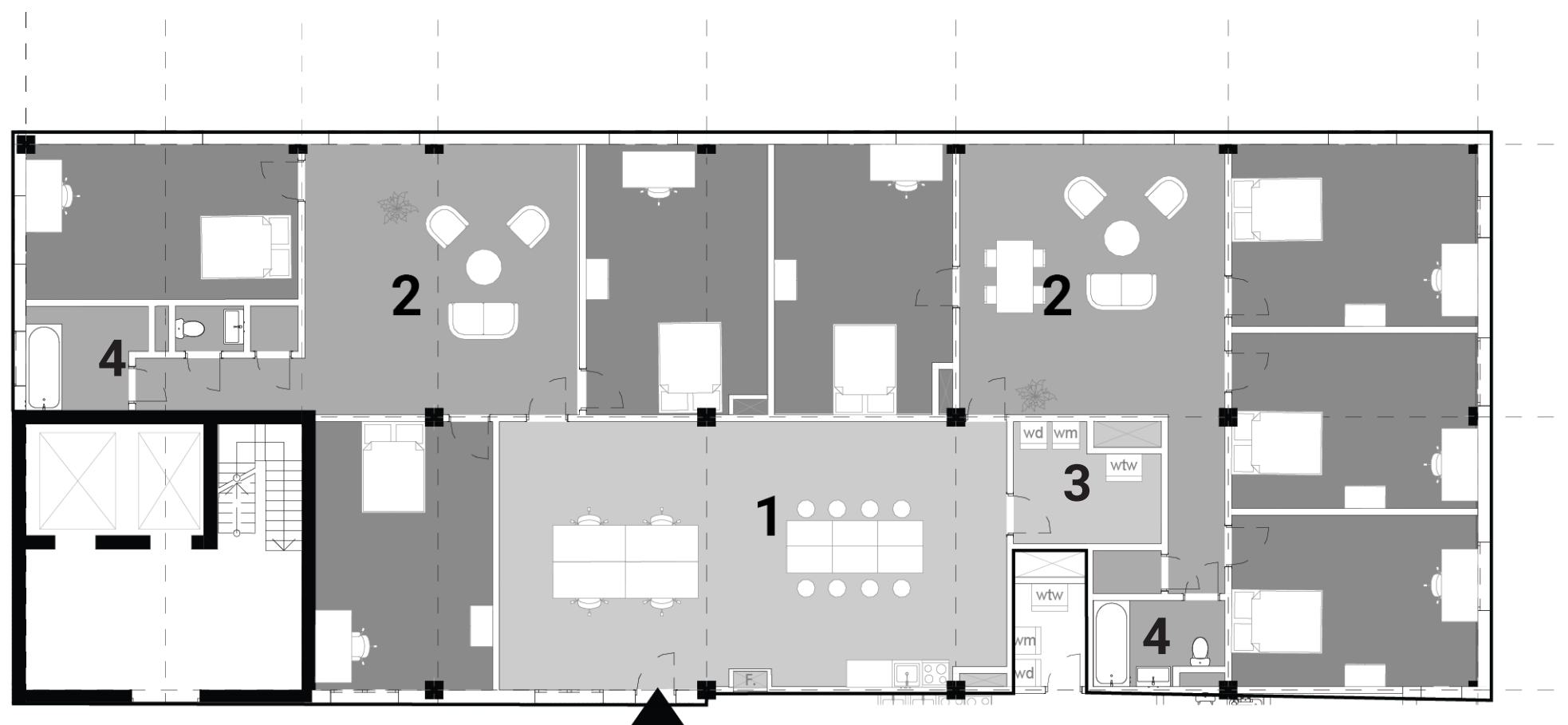


- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets



Building Design | Dwellings

Cluster 1



- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets

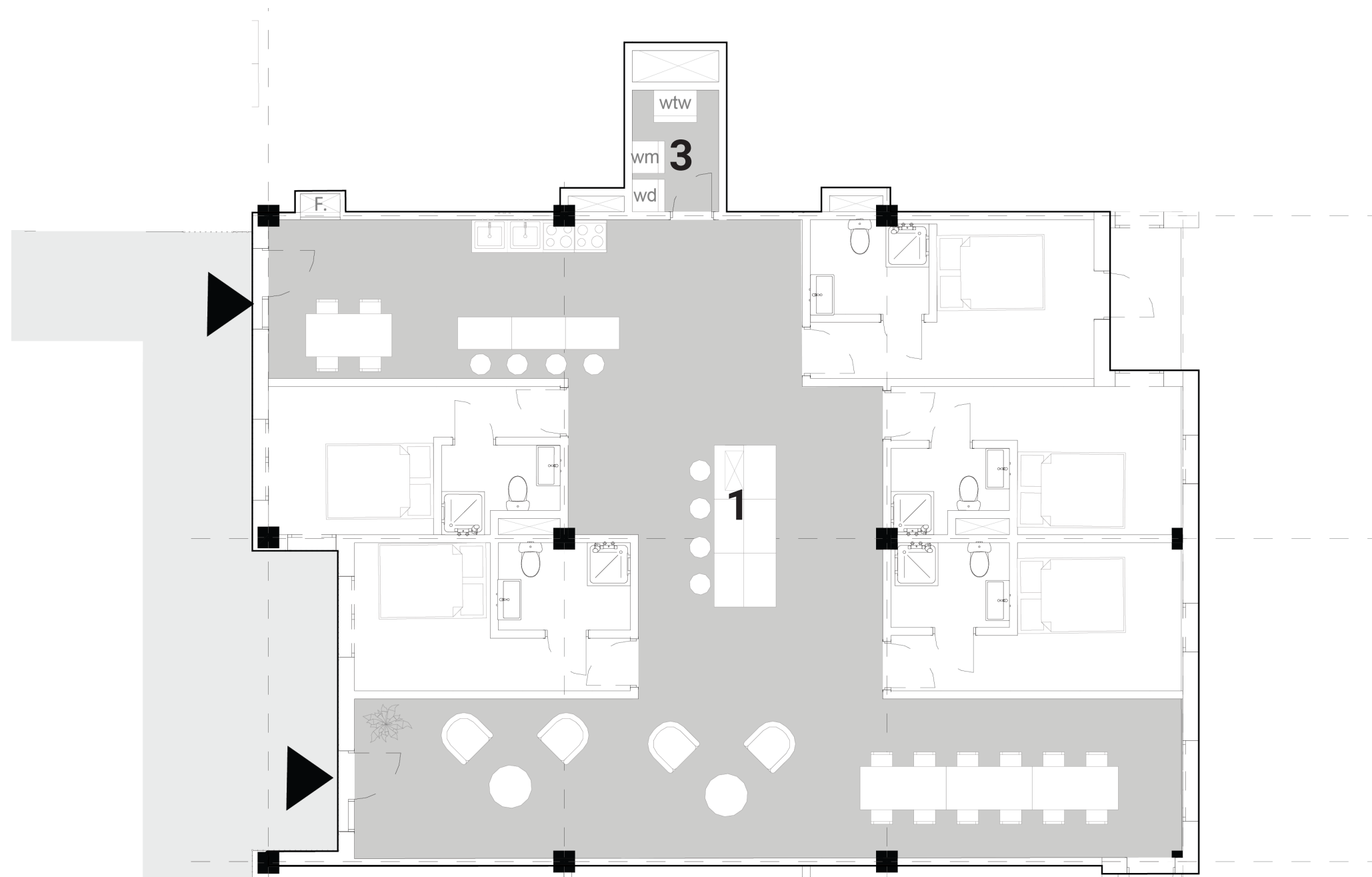


Building Design | Dwellings

Cluster 2

15 m² per person excluding shared spaces

39m² per person including shared spaces

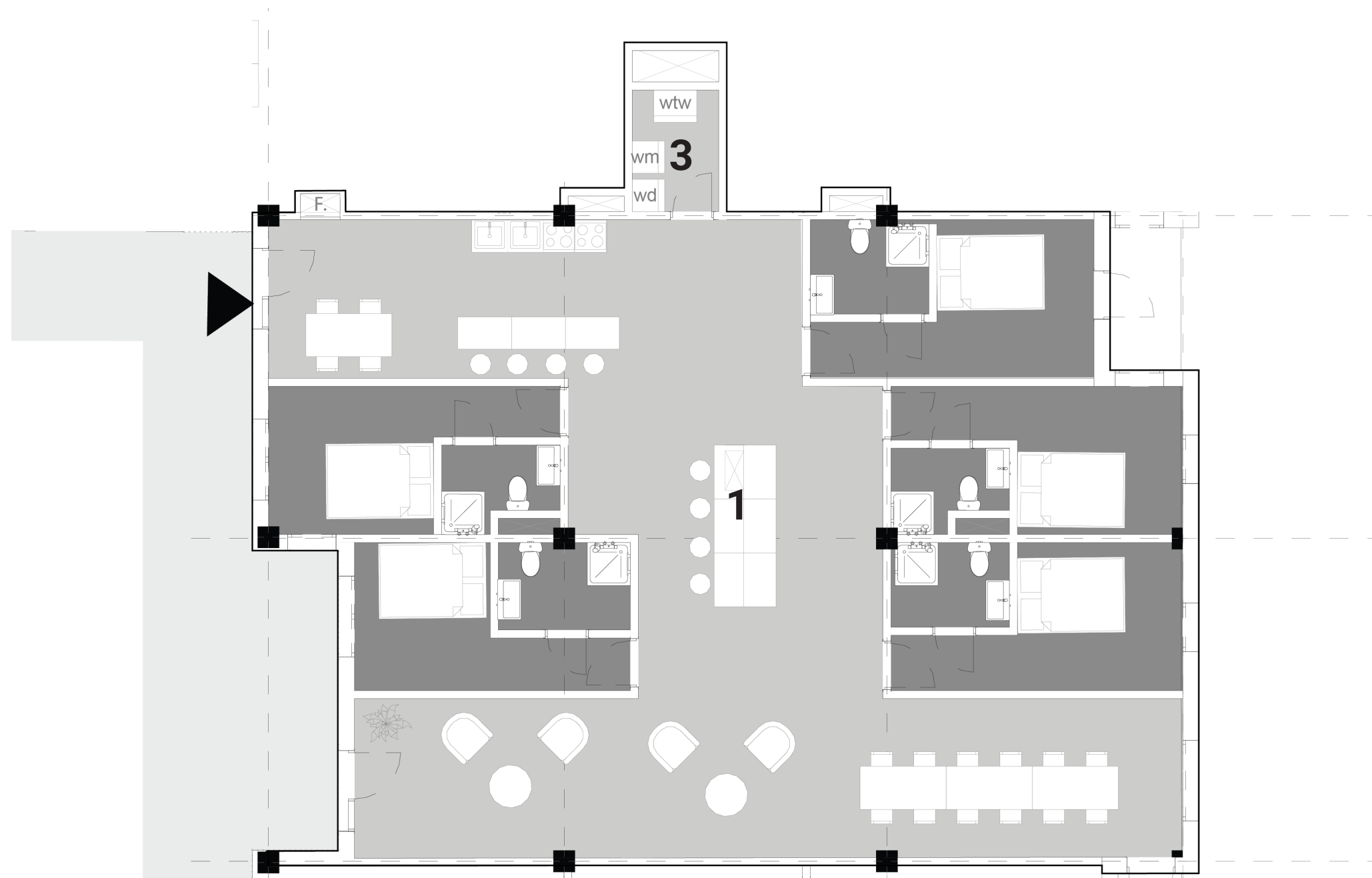


- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets



Building Design | Dwellings

Cluster 2



- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets

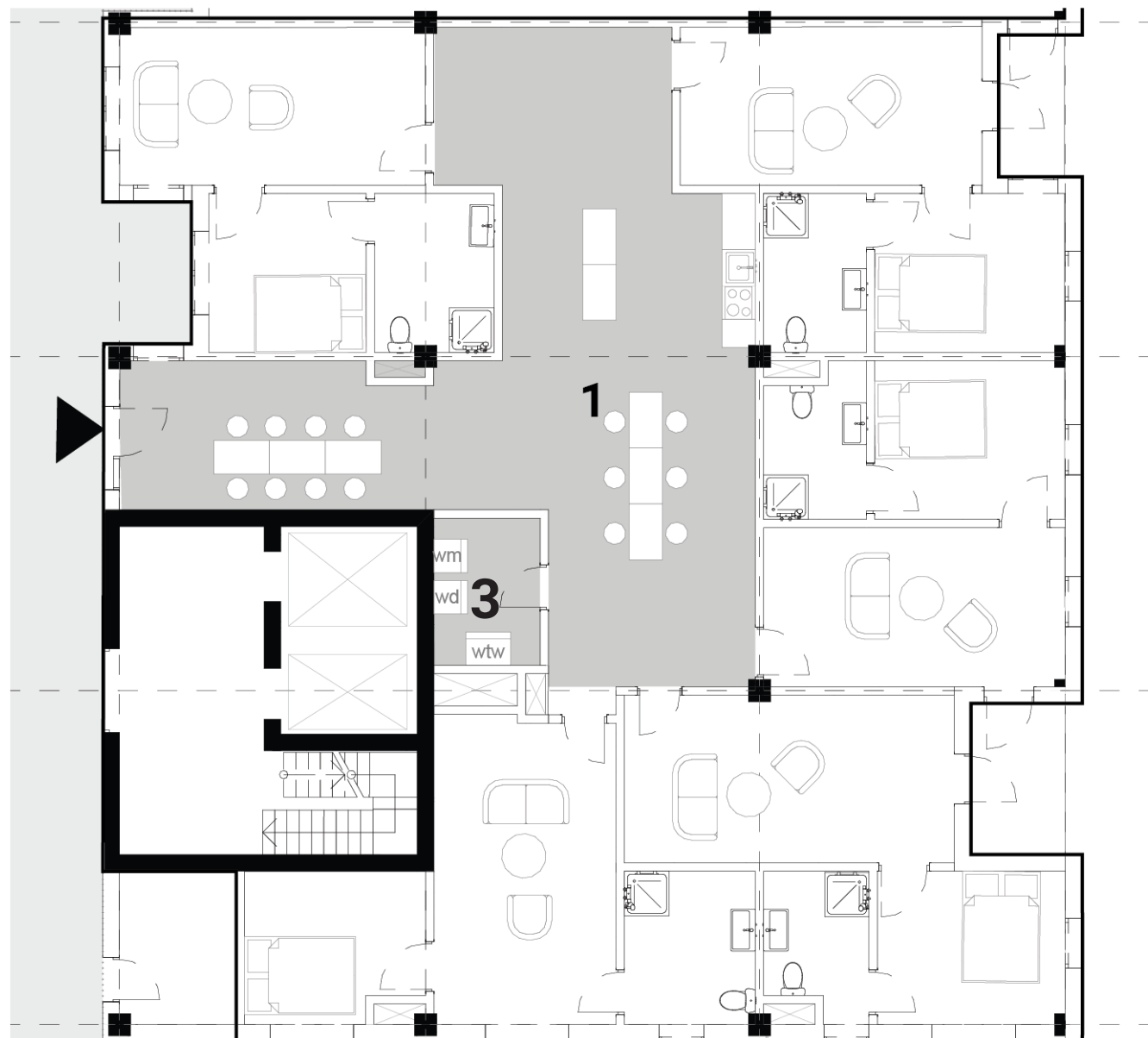


Building Design | Dwellings

Cluster 3

33 m² per person excluding shared spaces

50m² per person including shared spaces

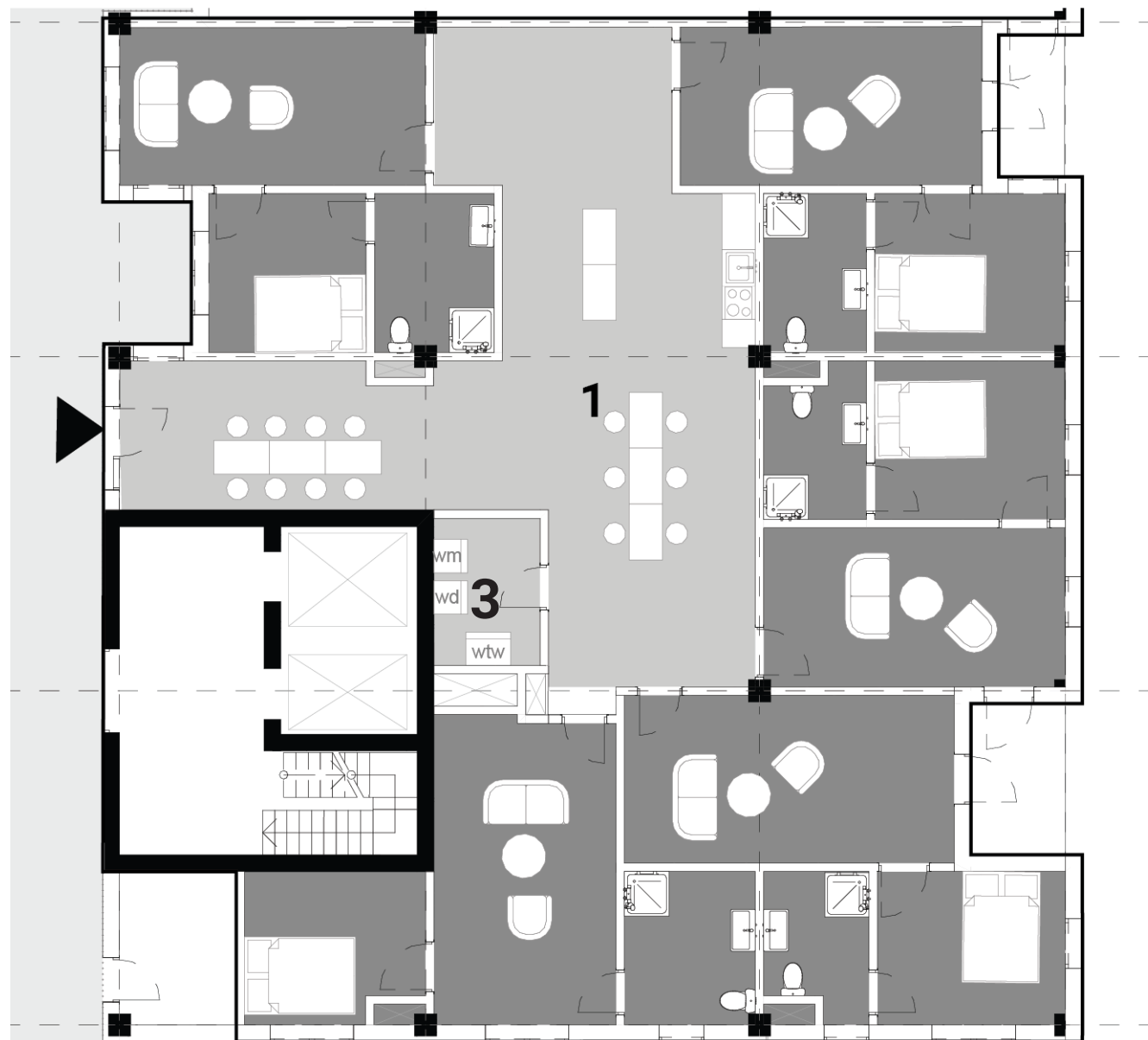


- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets



Building Design | Dwellings

Cluster 3

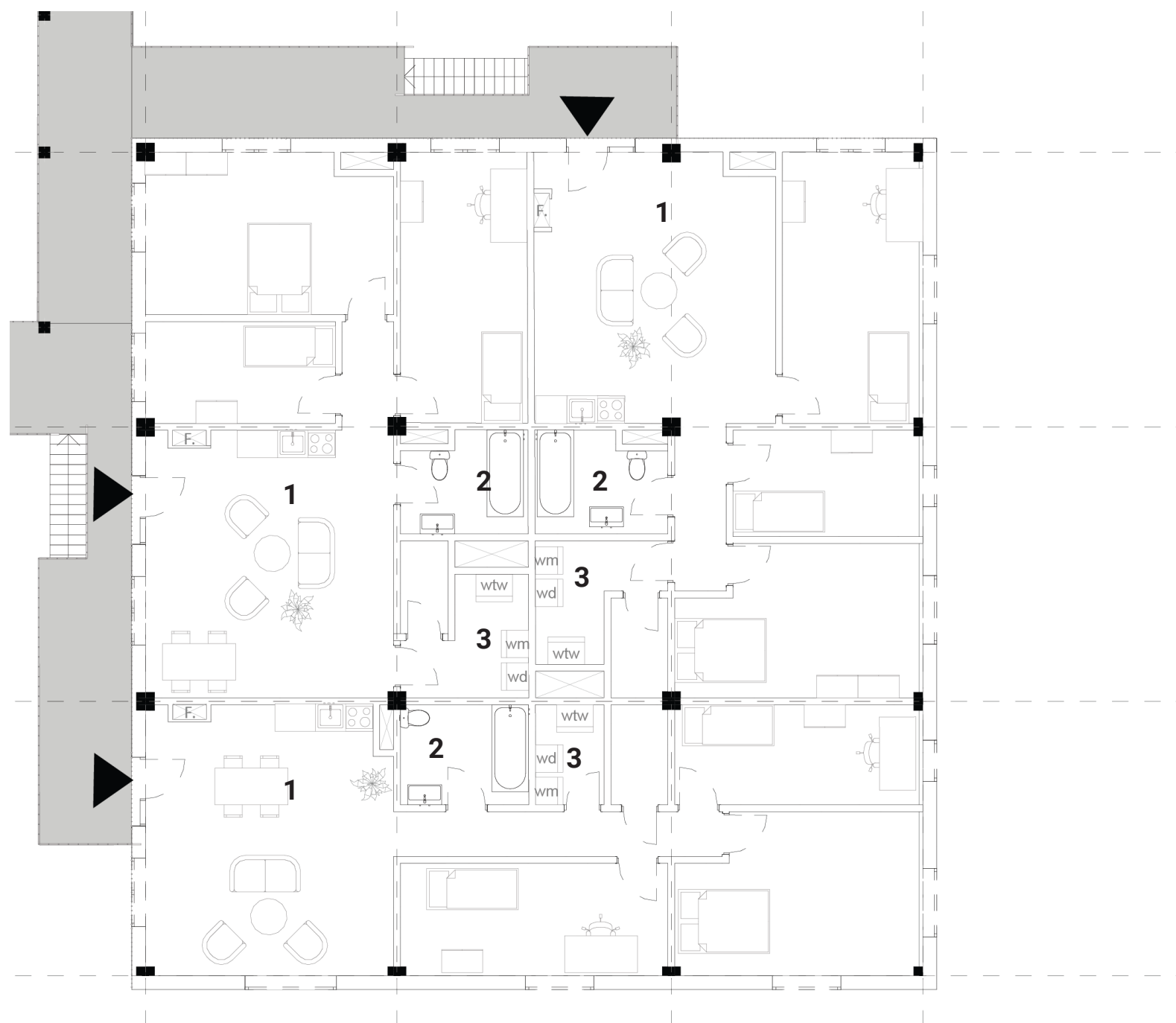


- 1 Collective Multifunctional Room
- 2 Shared Living Room
- 3 Technical Room
- 4 Shared Toilets



Building Design | Dwellings

Family Apartments

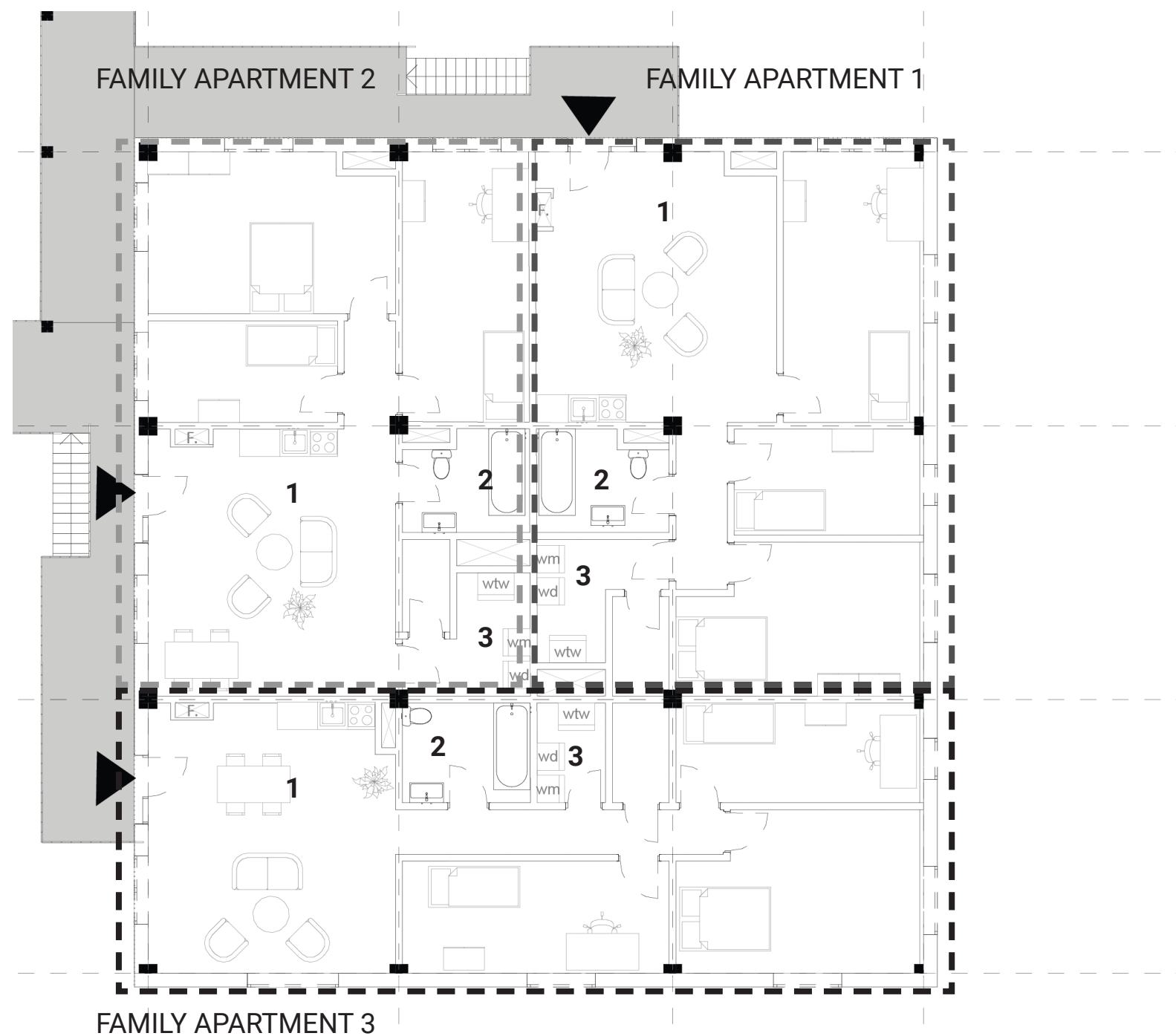


- 1 Kitchen / Living Room
- 2 Toilet
- 3 Technical Room



Building Design | Dwellings

Family Apartments

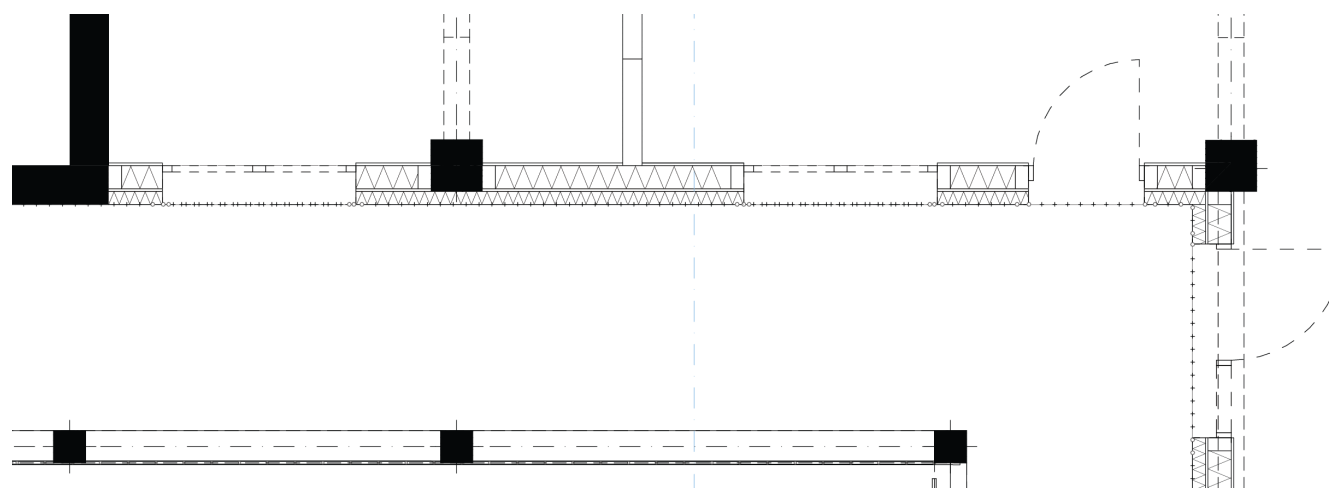
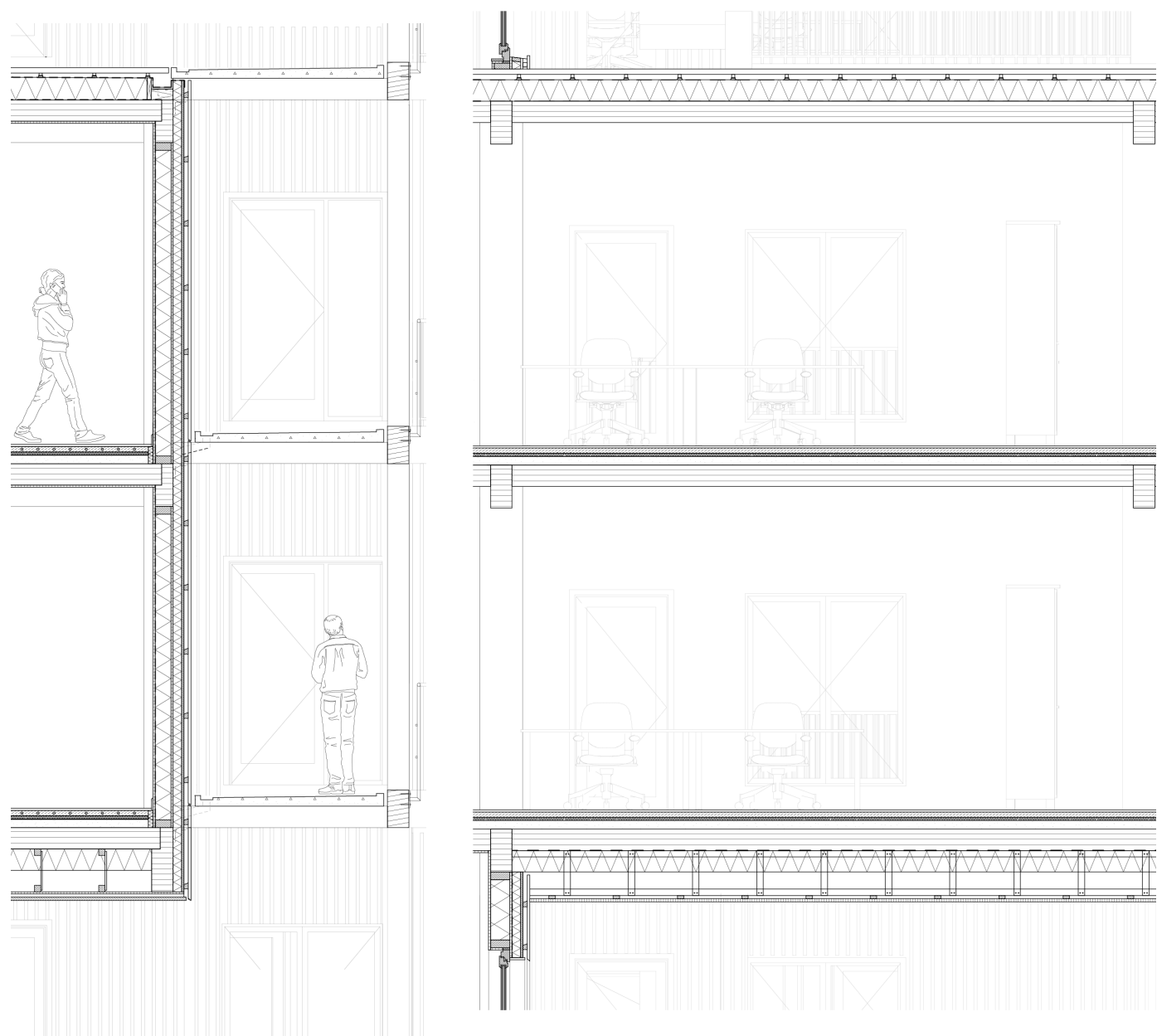


- 1 Kitchen / Living Room
- 2 Toilet
- 3 Technical Room



Building Technology | The Timber Gallery

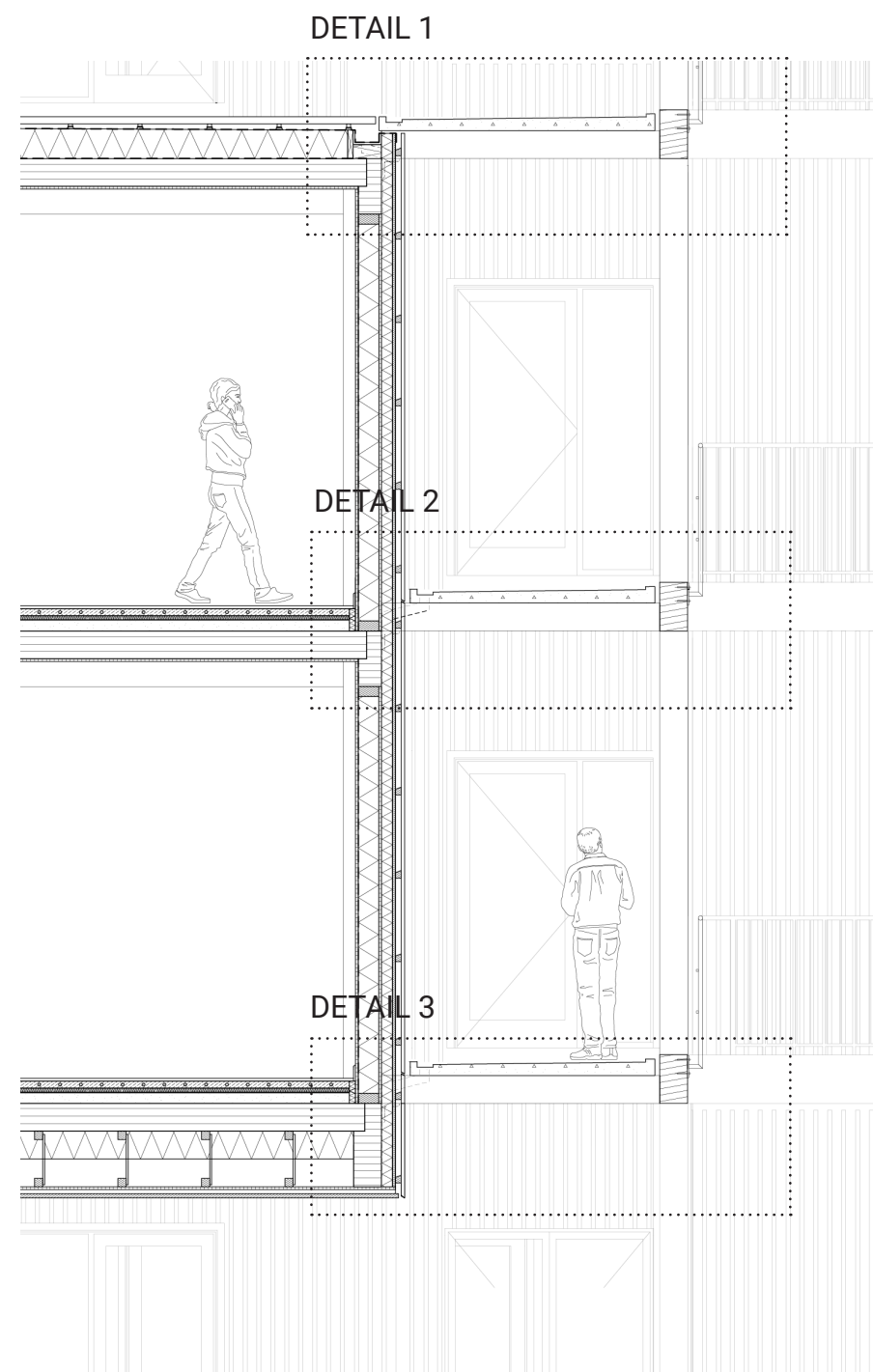
Fragment



Scale 1:50

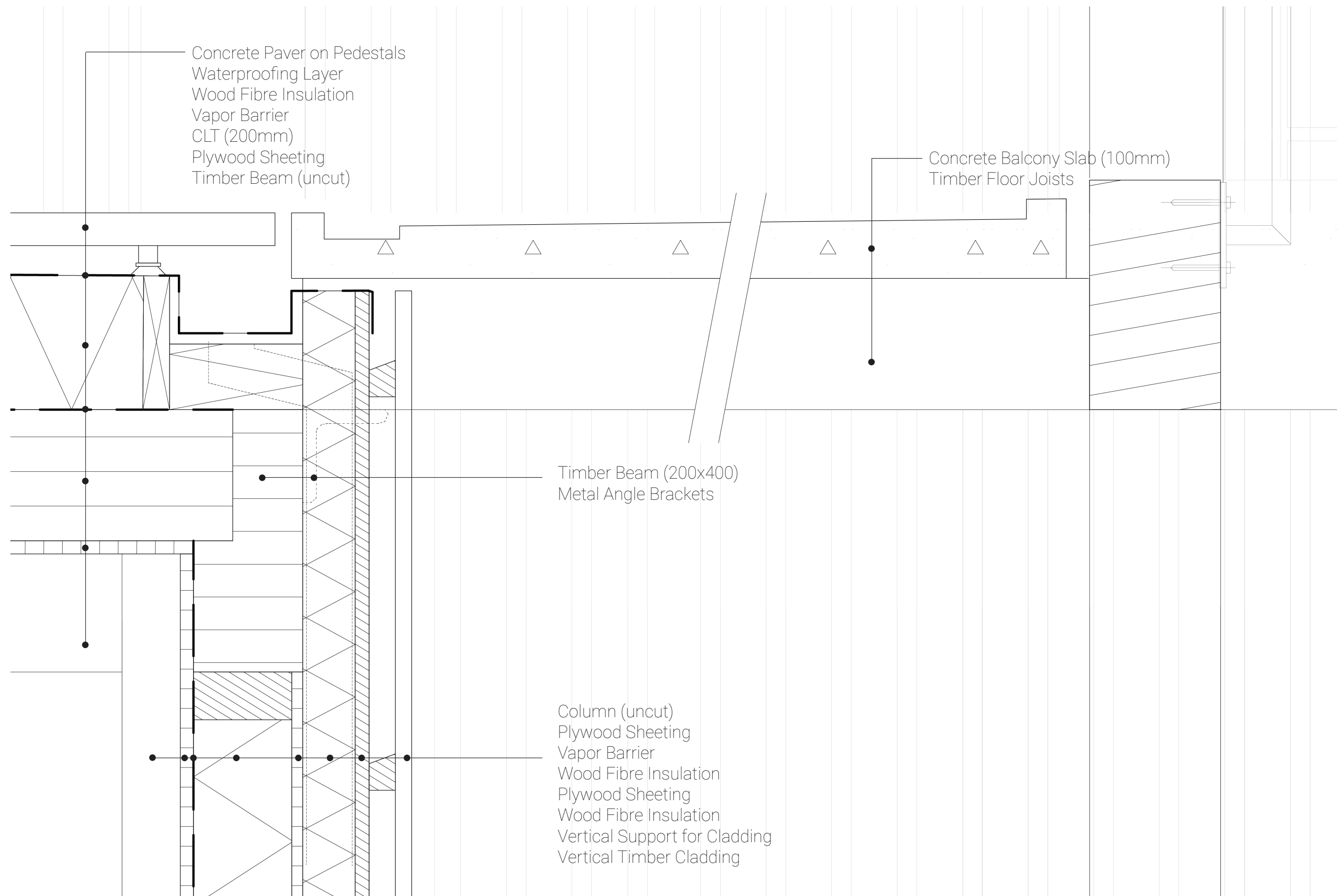
Building Technology | The Timber Gallery

Fragment



Building Technology | The Timber Gallery

Detail 1



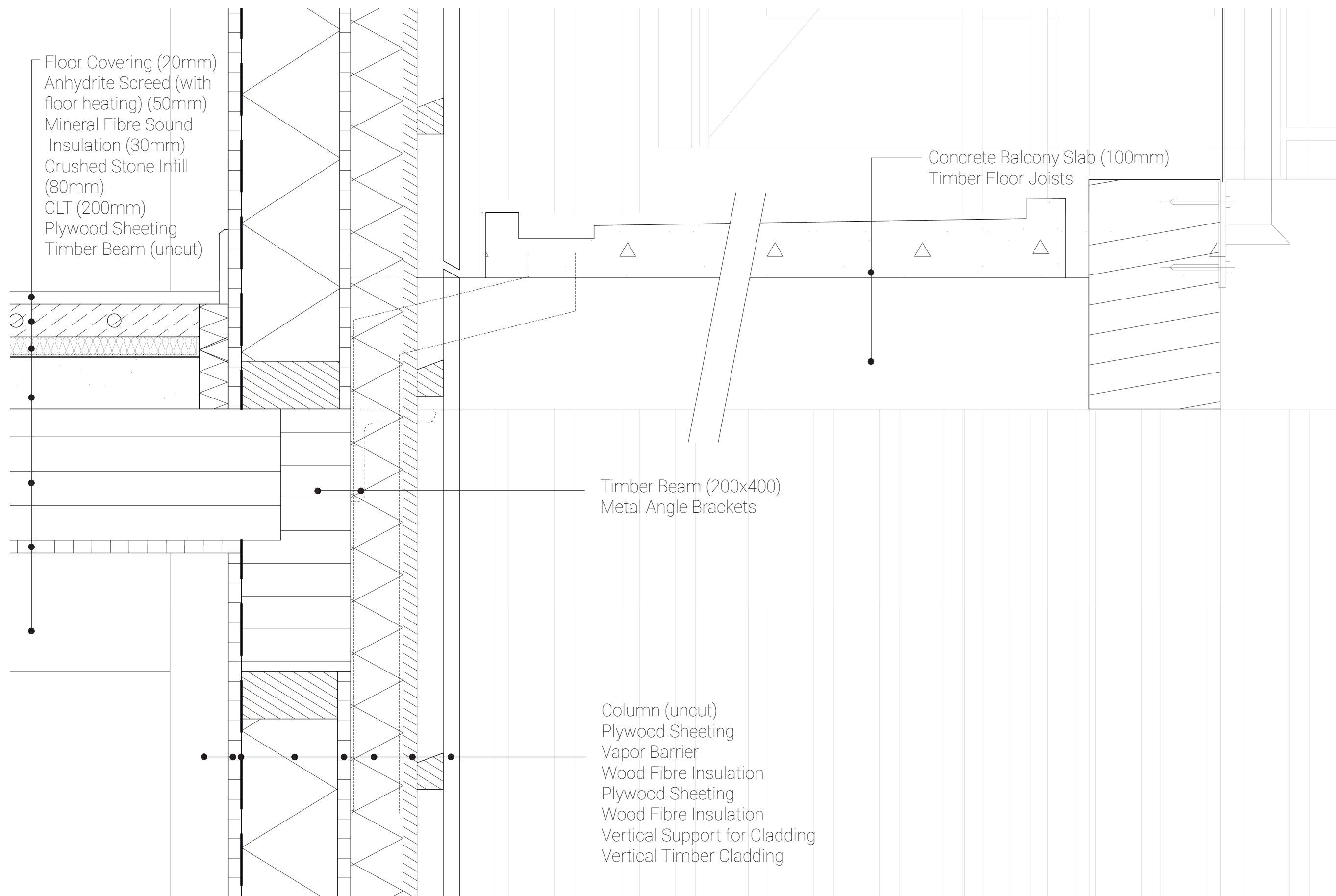
Scale 1:5

Final Design | Open "staircase room"



Building Technology | The Timber Gallery

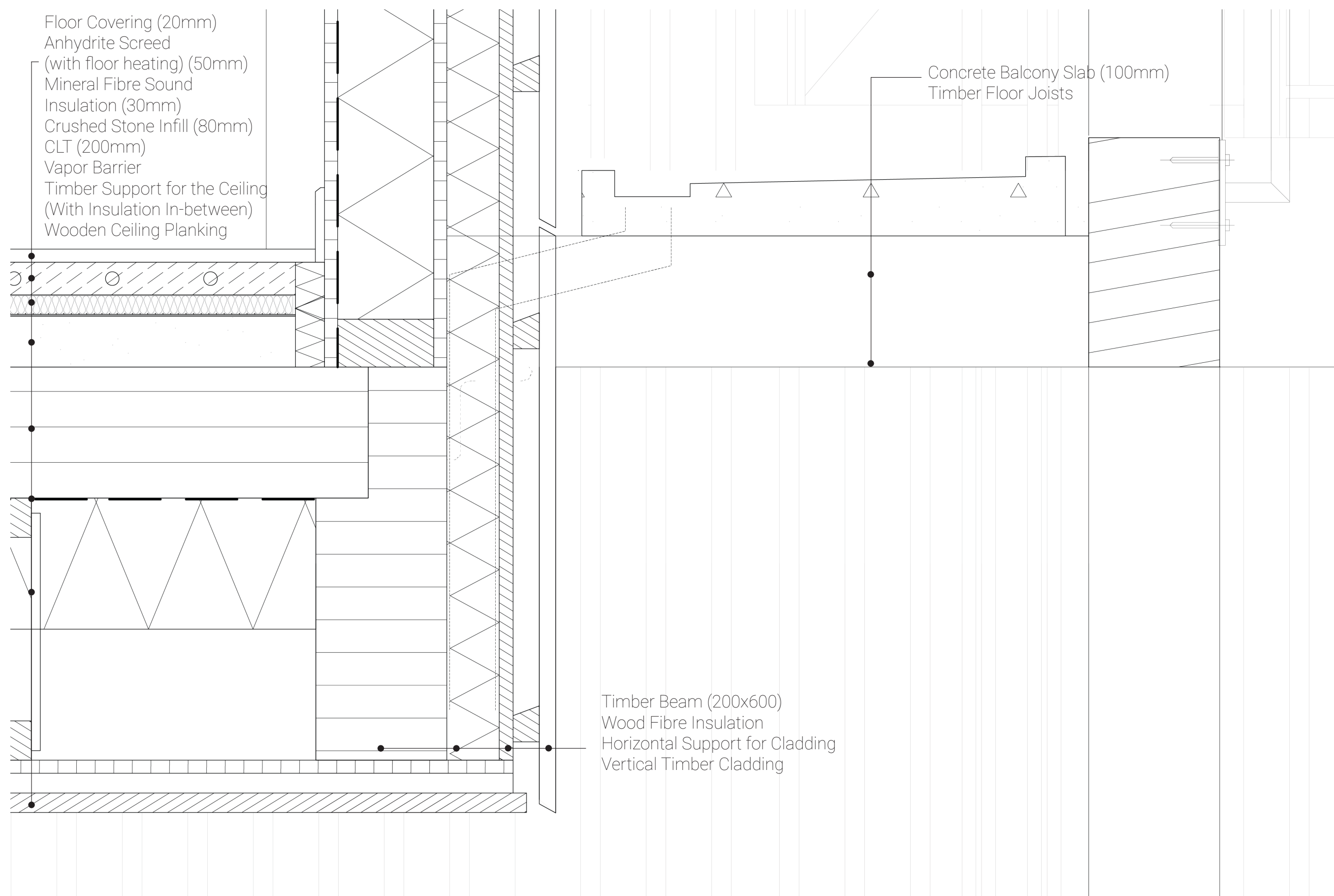
Detail 2



Scale 1:5

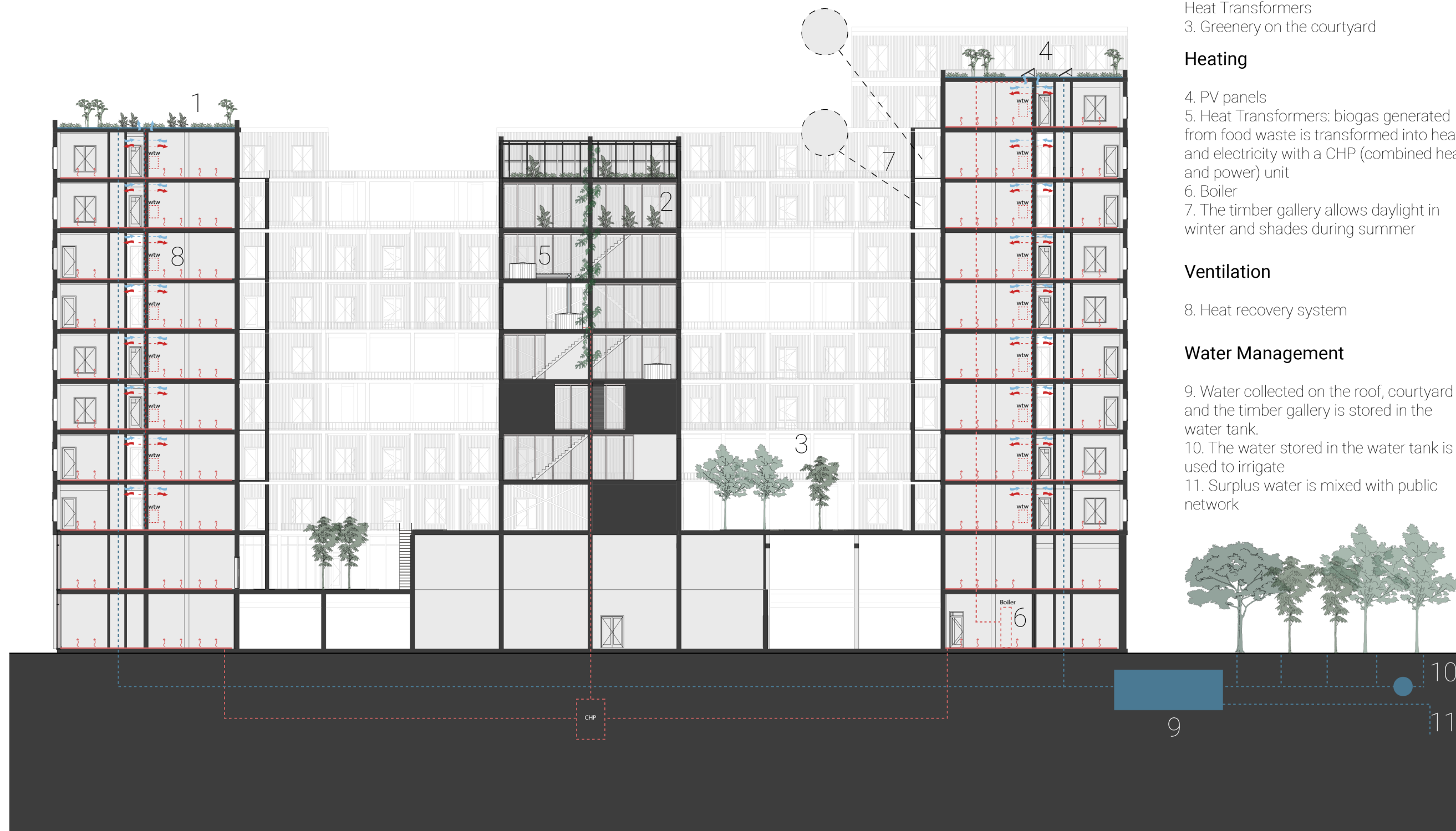
Building Technology | The Timber Gallery

Detail 3

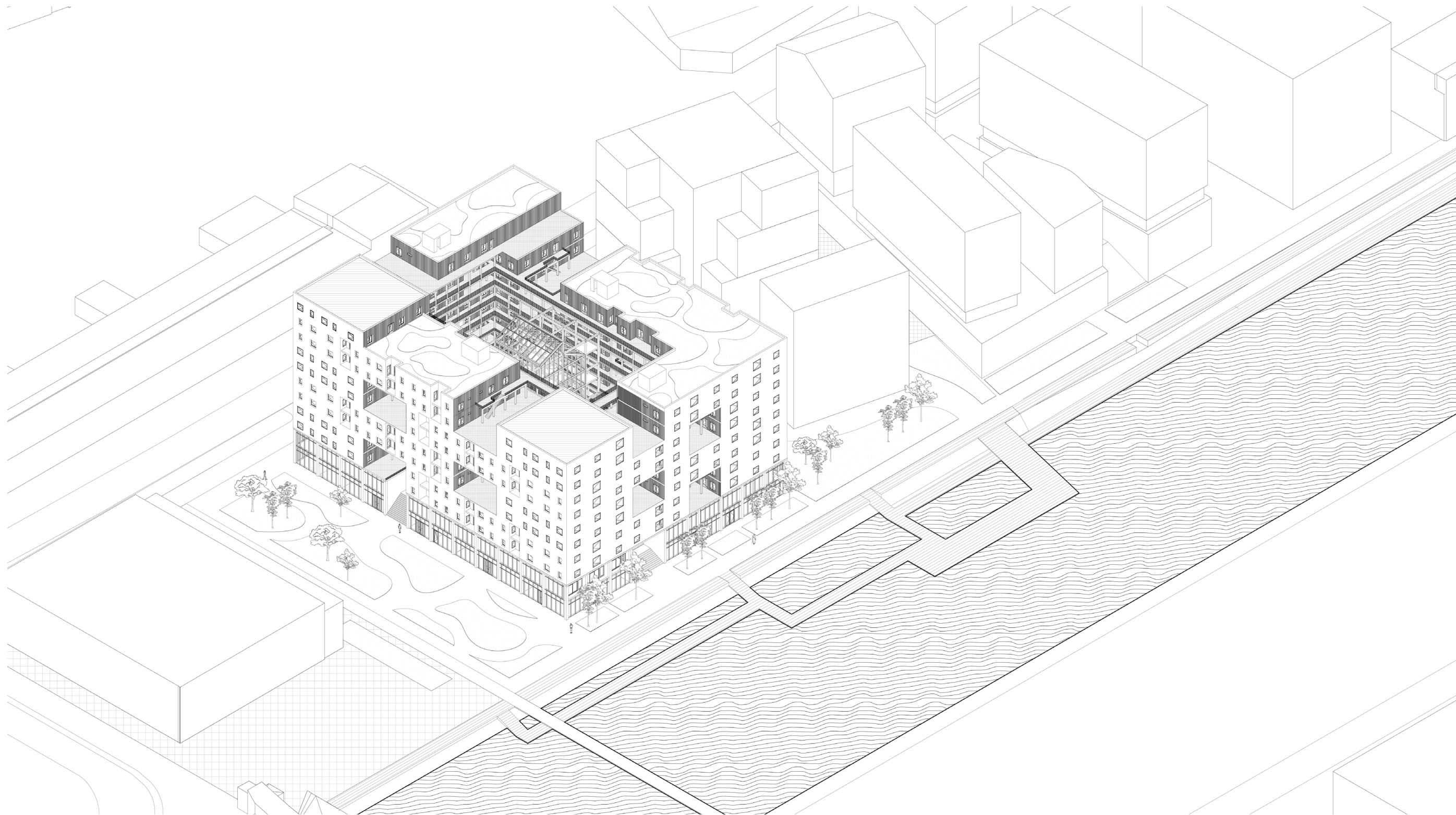


Scale 1:5

Climate Diagram



Final Design | Axonometric Mass



THANK YOU!