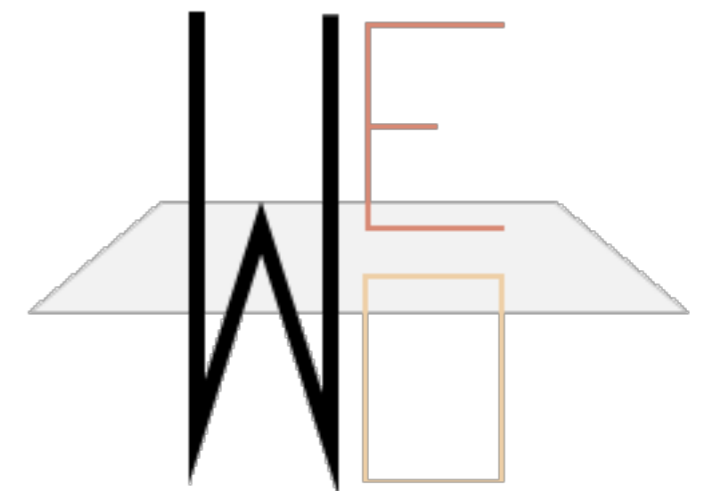


# BRIDGE BETWEEN WORK AND LIVING

MAXIMIZING USAGE BY IMPLEMENTING NEW RELATIONS IN THE BRUGGEBOUW-OOST

Architectural Engineering Graduation  
Second Life - Bruggebouw Oost

Robert-Jan Altena  
4813952



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# CONCEPT

INTRODUCTION

STRATEGY

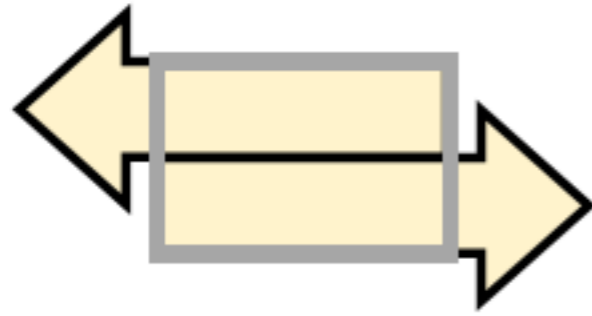
LOCATION

TOTAL CONCEPT

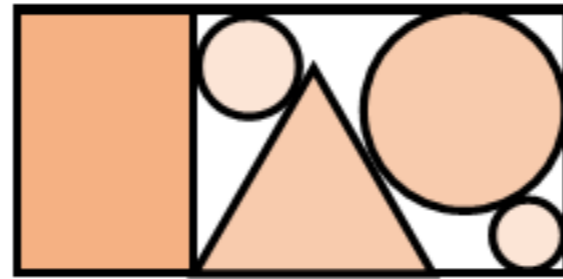
MIXING CONCEPT

MIXING CONCEPT - DESIGN

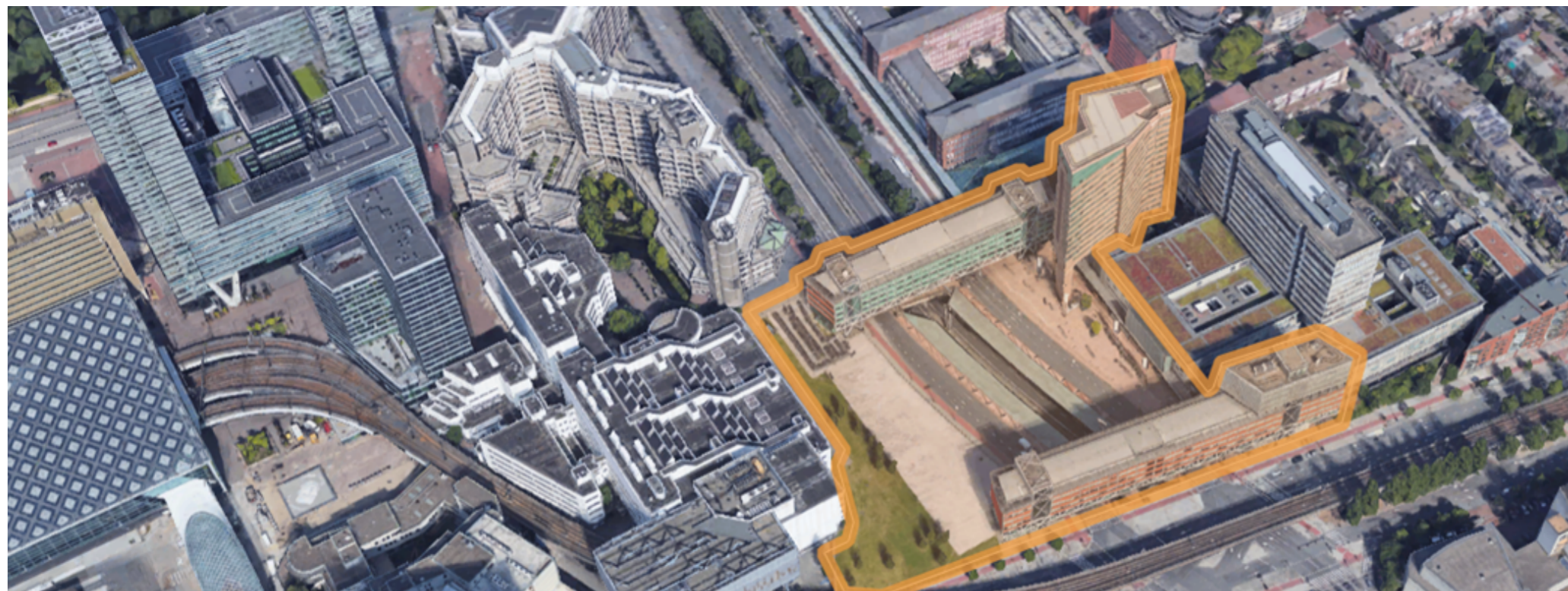
CONCEPT - UNITS



Living and working



Multiple supporting  
functions



## INTRODUCTION

Increasing lack of space in the Netherlands drives us to new interpretations of the multifunctional building. To reduce vacancy and increase effective use of existing buildings the Bruggebouw-Oost in The Hague is transformed. The integration of multifunctional concepts in the design of this building results in a new relation between functions. By combining shops, housing, working, sports and restaurants new flows and opportunities are created but new challenges emerge. Creating a new way of living between working and living where the two can benefit from each other. This by horizontally and vertically linking and overlap them getting the most out of the square meters. To make the building suitable for the future it needs to be adaptable. Therefore the building consists out of prefabricated units being housing, working and shops that can be altered throughout the years to comply with future demand. This all to strive to efficient use of the built environment.

Robert-Jan Altena  
4813952 - AE 2020

# STRATEGY

The research in this project is comprised out of proving and providing. Proving the waste of valuable space of monofunctional programs and providing technical solutions to integrate a more adaptable character inside an existing building. Our built environment has a monofunctional character which results in a waste of space.

'How to design an active adaptive building within an existing structure by maximizing the efficiency of space?'

The research 'How to design an active adaptive building within an existing structure by maximizing the efficiency of space?' questions the boundaries of 'space efficiency' and of the relation between program, building and context. This to minimize the extend of new built objects and reduce the waste of valuable space. This can be done two-sided by creating an adaptable multifunctional building that changes appearance to facilitate the user and maximize the overlap of space between functions. This composed out of the concept of 'Hybrid building' and 'space efficiency'. To implement this into an existing building a program and design guidelines need to be introduced. The first part of the research questioned the real waste of space in the context. This data was collected and visualized to show overlap and waste. These changes can be summarized into big and small adaption moments. The big has a need for adaption of the space size, services and skin. And small adaption moments are adaptable via multifunctional infills.

The importance lies in the complete separation of the shearing layers of the building. Each layer deals with this in another adaptable level. The real effectiveness of adaptive architecture, relating to the end user, is hard to define without practical monitoring. This is one risk when putting different activities within one building. Functions are defined in seven activities that all have their own character, usage per time, service demands and public private relation. The main starting point in creating this type of building is starting from the main functions with added supporting functions. The main factors of this design are physical changes, spatial qualities and infill, and the existing building as a boundary.

By accommodating functions differentiated by height multiple functions can be introduced without hard changes. The win is in combining the these heights into an active system that can create multiple functions within one space. Then the smaller changes can be made in by adding multifunctional infills and separate spaces that are multifunctional, supporting or oversized. This all to reduce the waste of space within an existing structure.



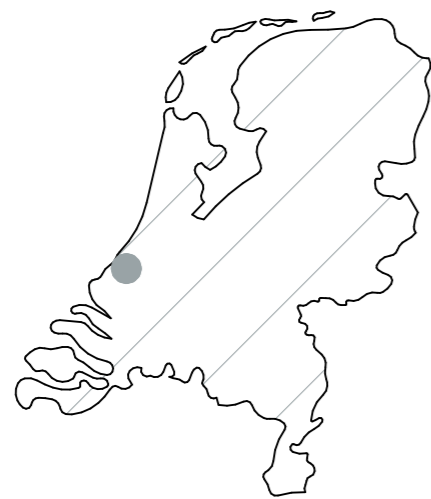
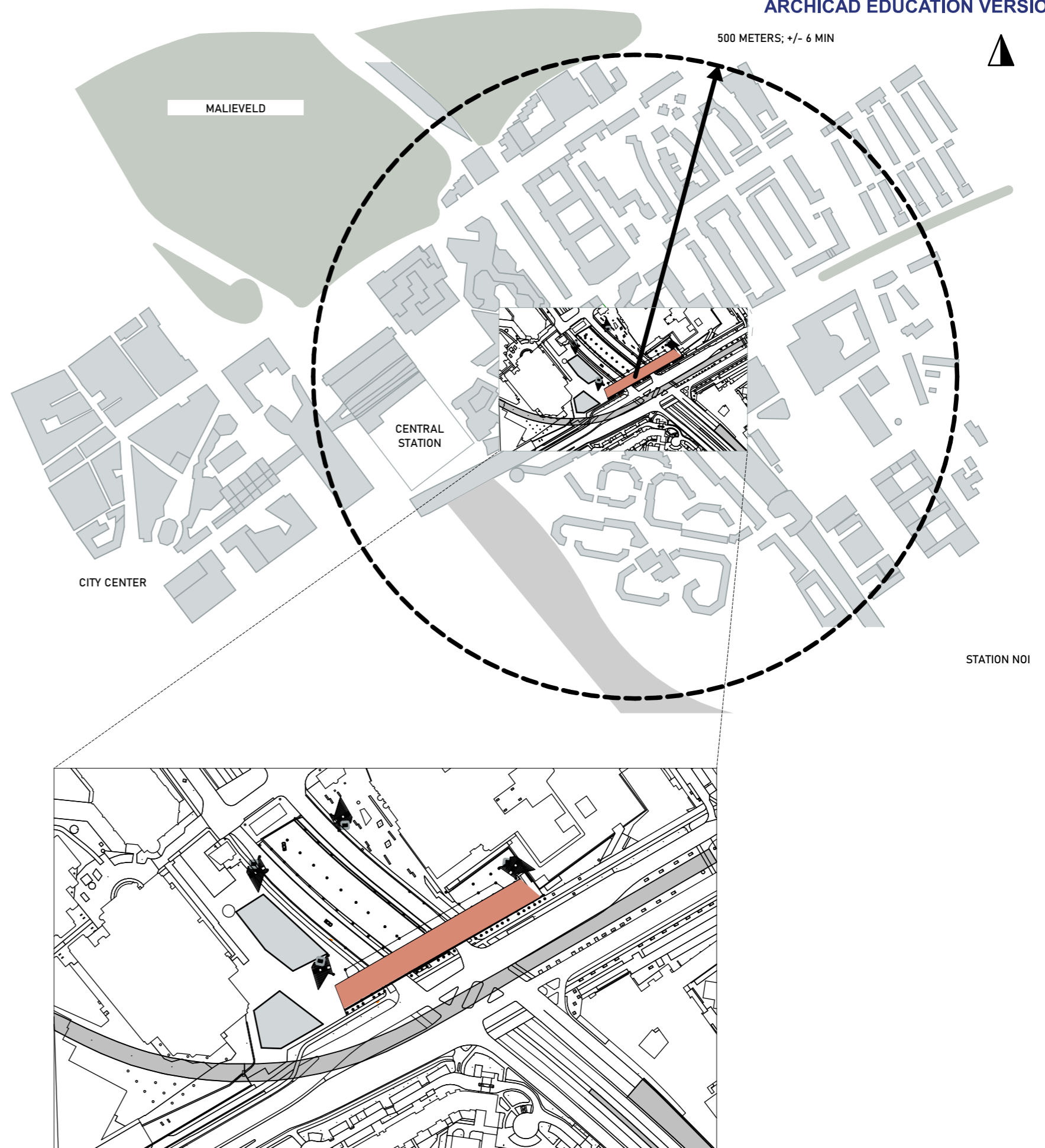
500 METERS; +/- 6 MIN



# LOCATION

The project of the Bruggebouw is located in the center of The Hague. Located between different railway stations and connected to the A12 freeway. This A-location is transformed in the future introducing a combination between offices and shops with the introduction of dwellings.

The Bruggebouw-Oost itself is a former office building built in 1999 and nowadays part of the government. Especially the structure and form are fixed and are a real objective.









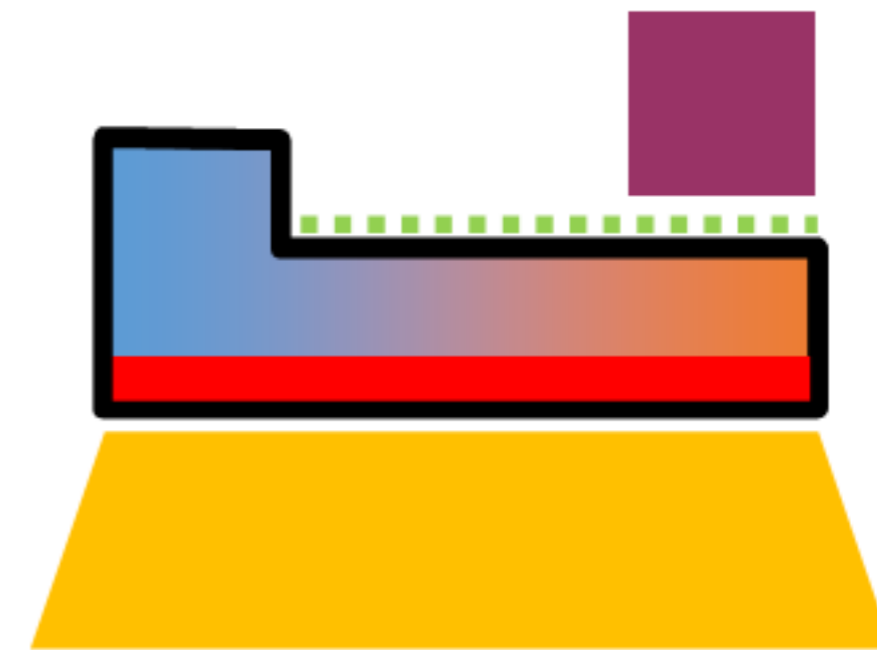
# AMBITION

The total concept to achieve maximal use.



# WEWO BUILDING CONCEPT

The total concept to achieve maximal use is summarized into four main design assignments.



## #1 Mixing

Mixing working and living as main factors



## #2 Facilities

Facilities supporting living and working



## #3 Urban connection

Connecting the building to the walking route



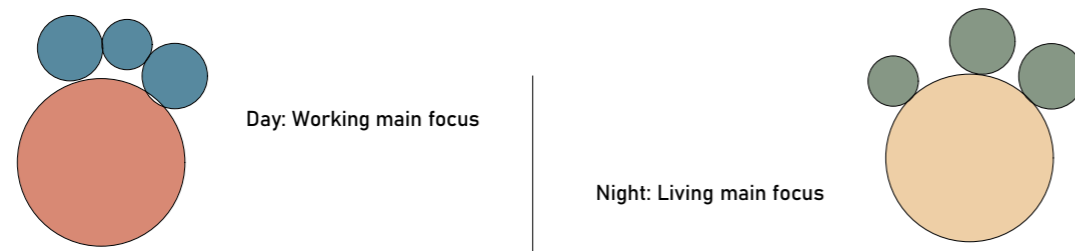
## #4 Accessible plinth

Activating the square and the building with the plinth

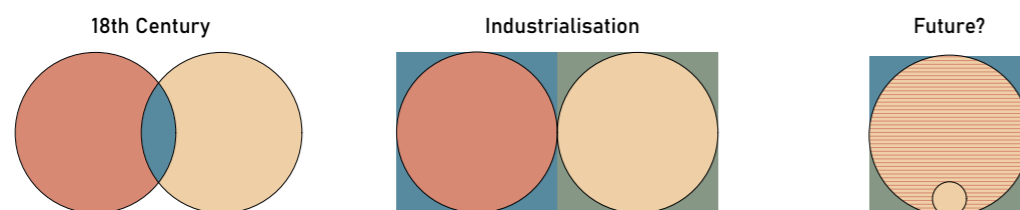


# MIXING CONCEPT

The concept switches character and focus around the day, focusing on two main functions. These main functions rely on functions that are supporting.

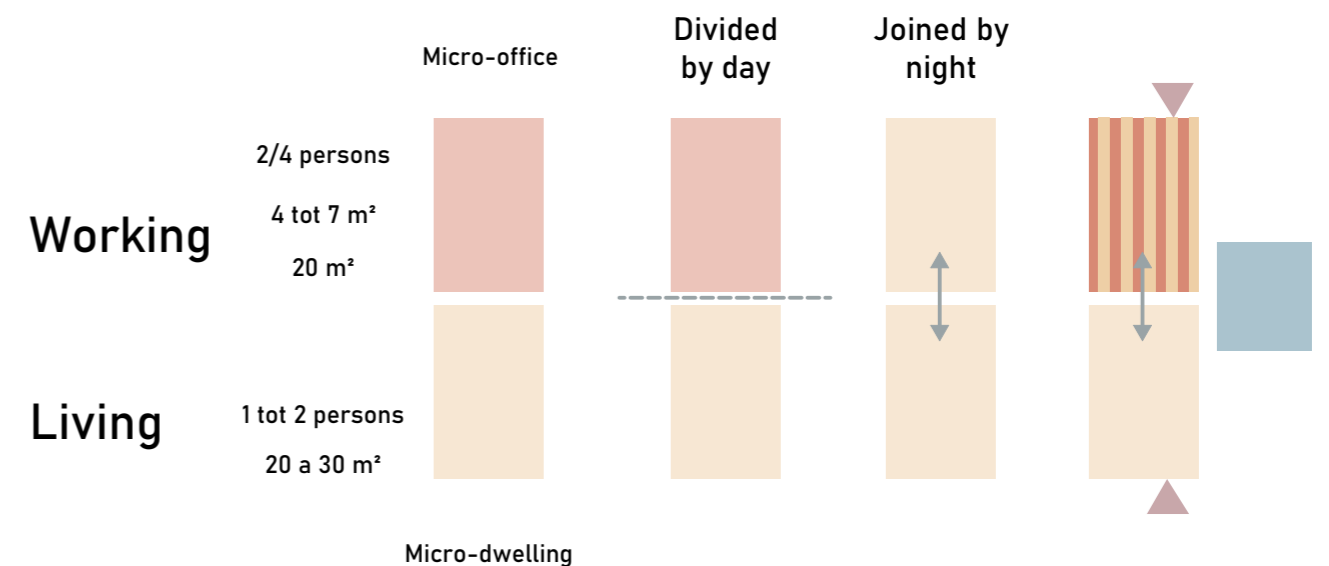


Historically the relation between working and living changes through time. Closely related to the culture within different countries and social progression.



Starting from the 18<sup>th</sup> century through the industrialization the relation between working and living became more and more intertwined. Especially with the emergence of the 'service' economy the line between the two is sometimes absent.

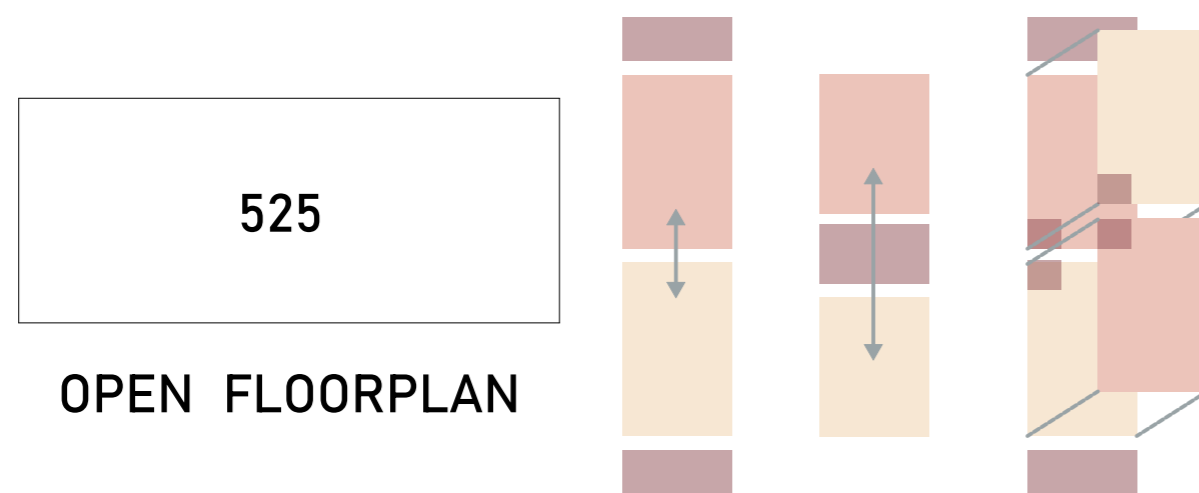
The concept revolves around the connection between working and living. Overlap is sought based on time. The private space is kept to a minimum of 20 m<sup>2</sup>. This micro dwelling is physically linked to the work space of roughly same size. By day the spaces are separated. By night they can be merged to create a 40 m<sup>2</sup> dwelling. Around 6 this space will become part of the dwelling to create a 40 m<sup>2</sup> house when he needs it the most.





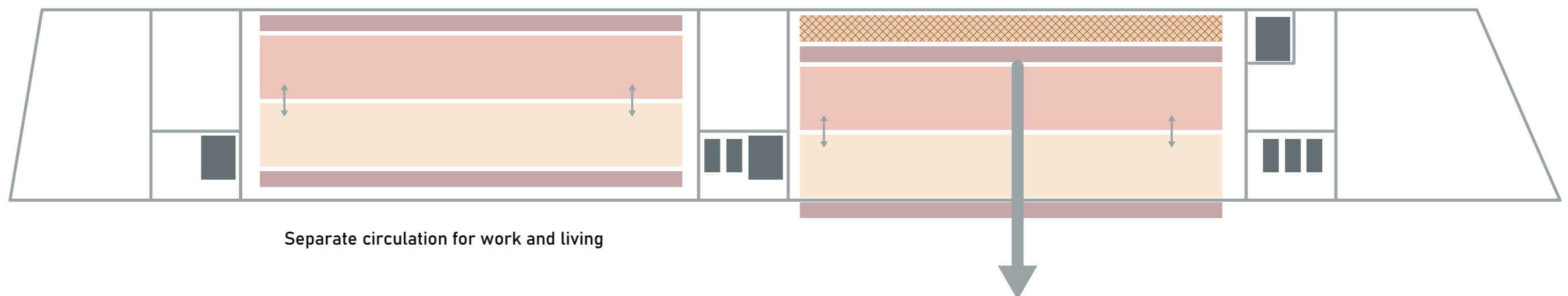
## MIXING CONCEPT - DESIGN

There are multiple ways of clustering working and living together. For the concept to work a physical connection between the two is needed. And the existing structure has its constraints.

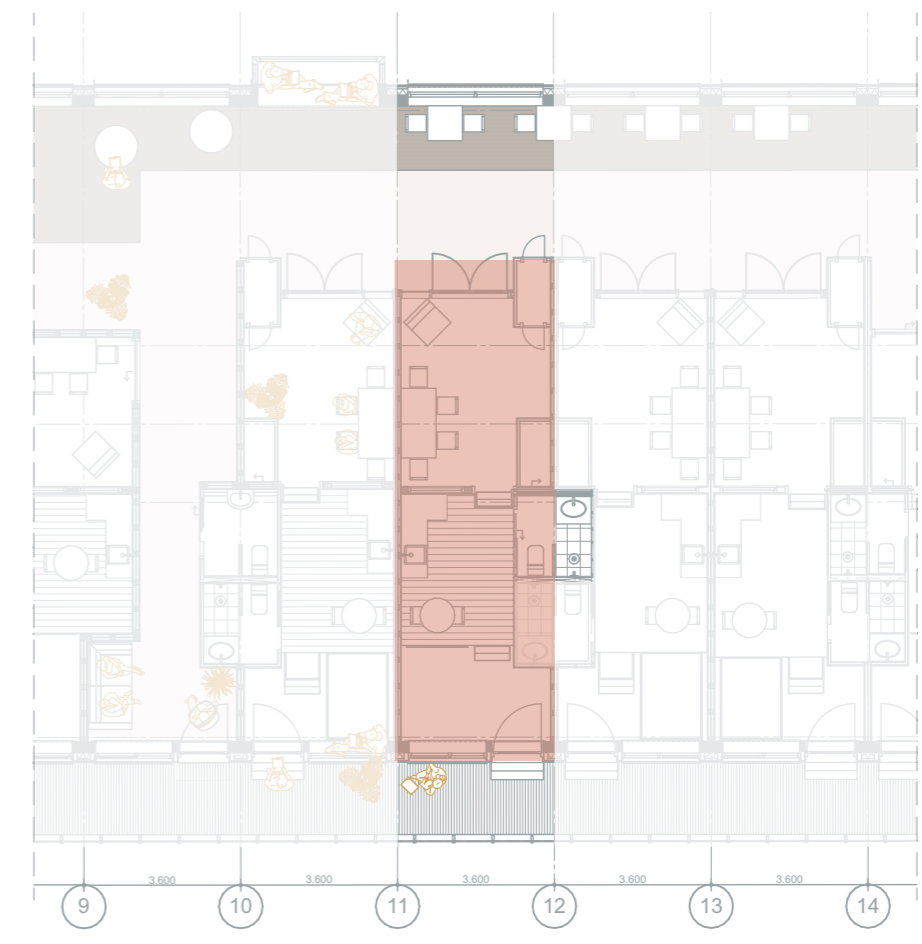
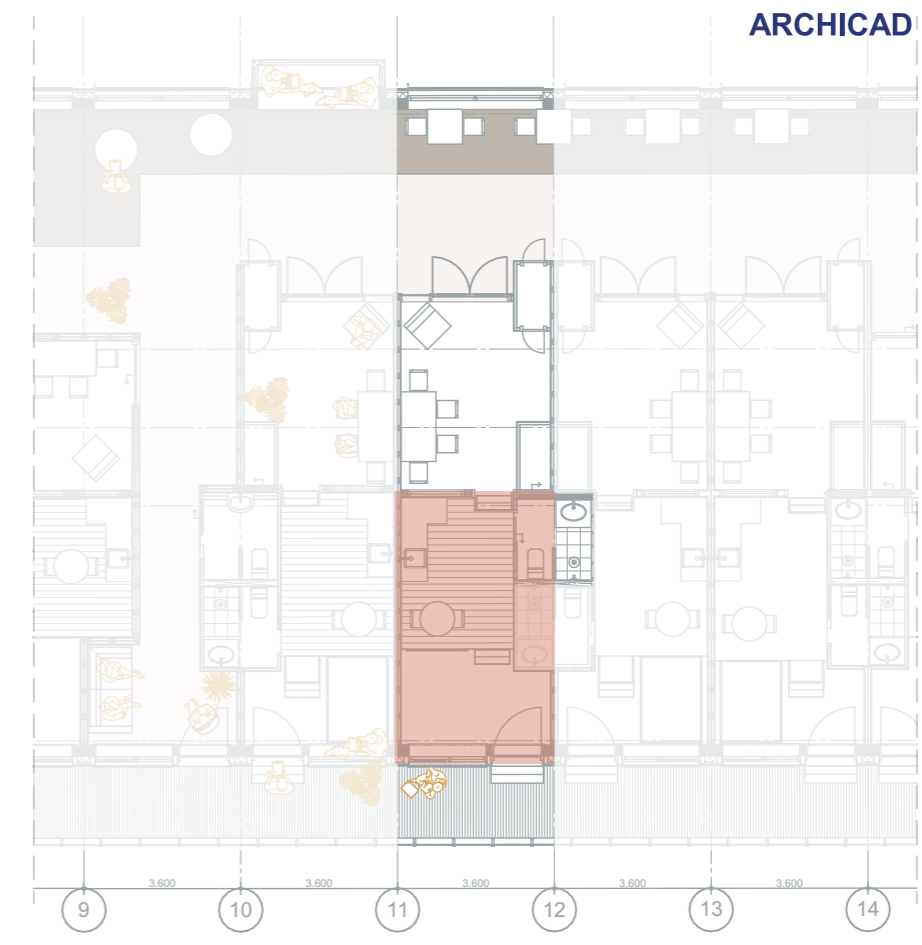
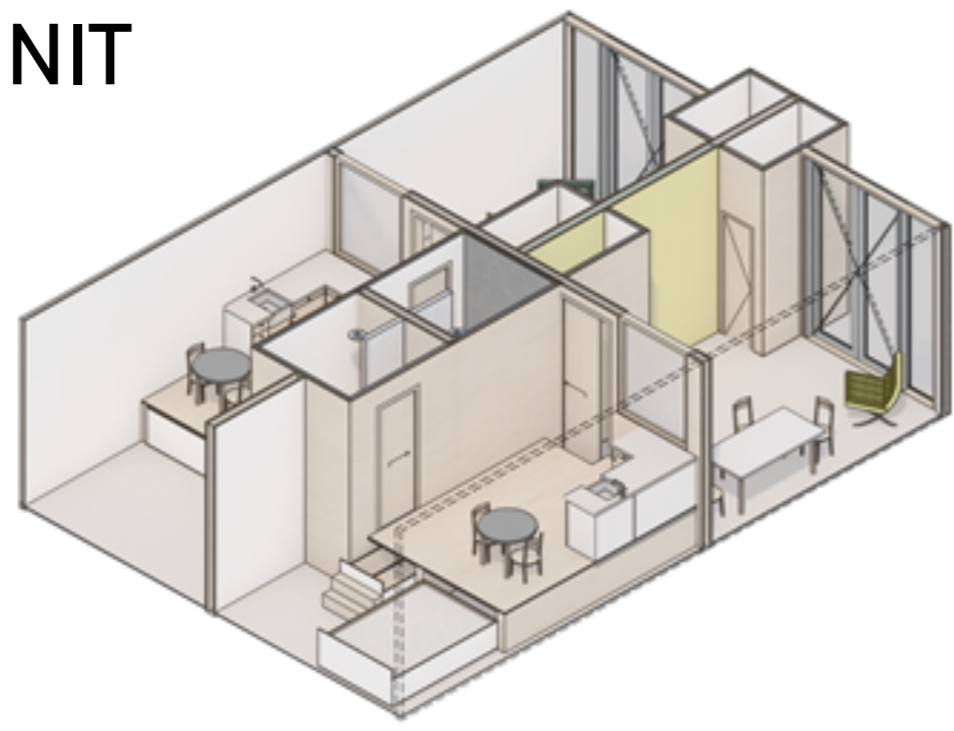


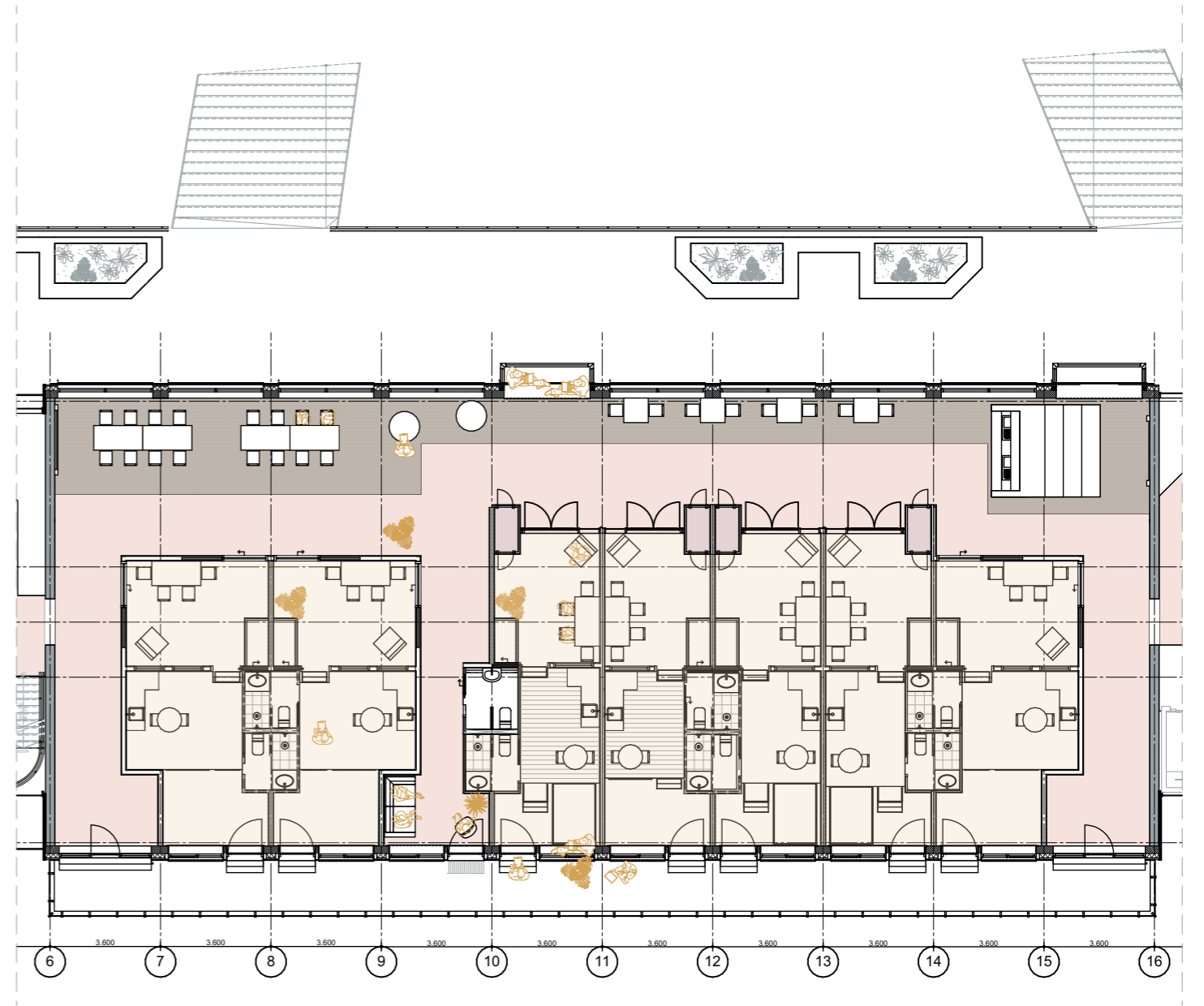
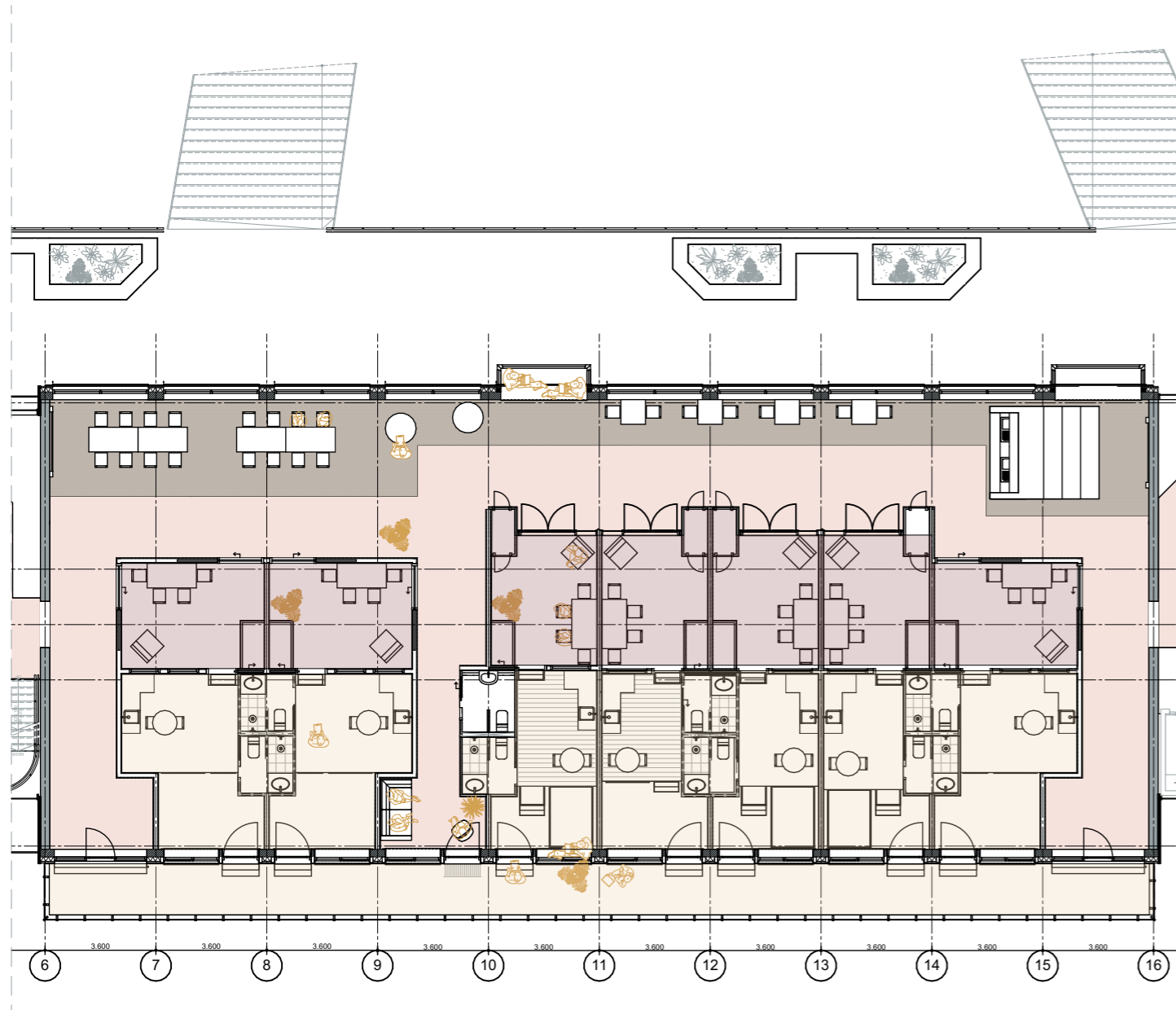
Implementing this in the floorplan of the building will be based on the orientation. With the offices on the square side, allowing to show off their companies to the public, and the residents on the sunny side of the building. By sliding the circulation of the dwellings to the outside a larger landscape is created on the west side of the building. The separation of both dwellers and workers creating more privacy and access is created by a second façade. This façade is also used as sound barrier, gallery and sun blocking.

The open floorplans are implemented with prefabricated units that resulted in three different units.



# PREFAB UNIT LONG

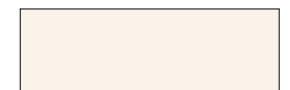




PRIVATE



PUBLIC





# DRAWINGS

CONTEXT

FLOORPLANS

ELEVATIONS

SECTIONS

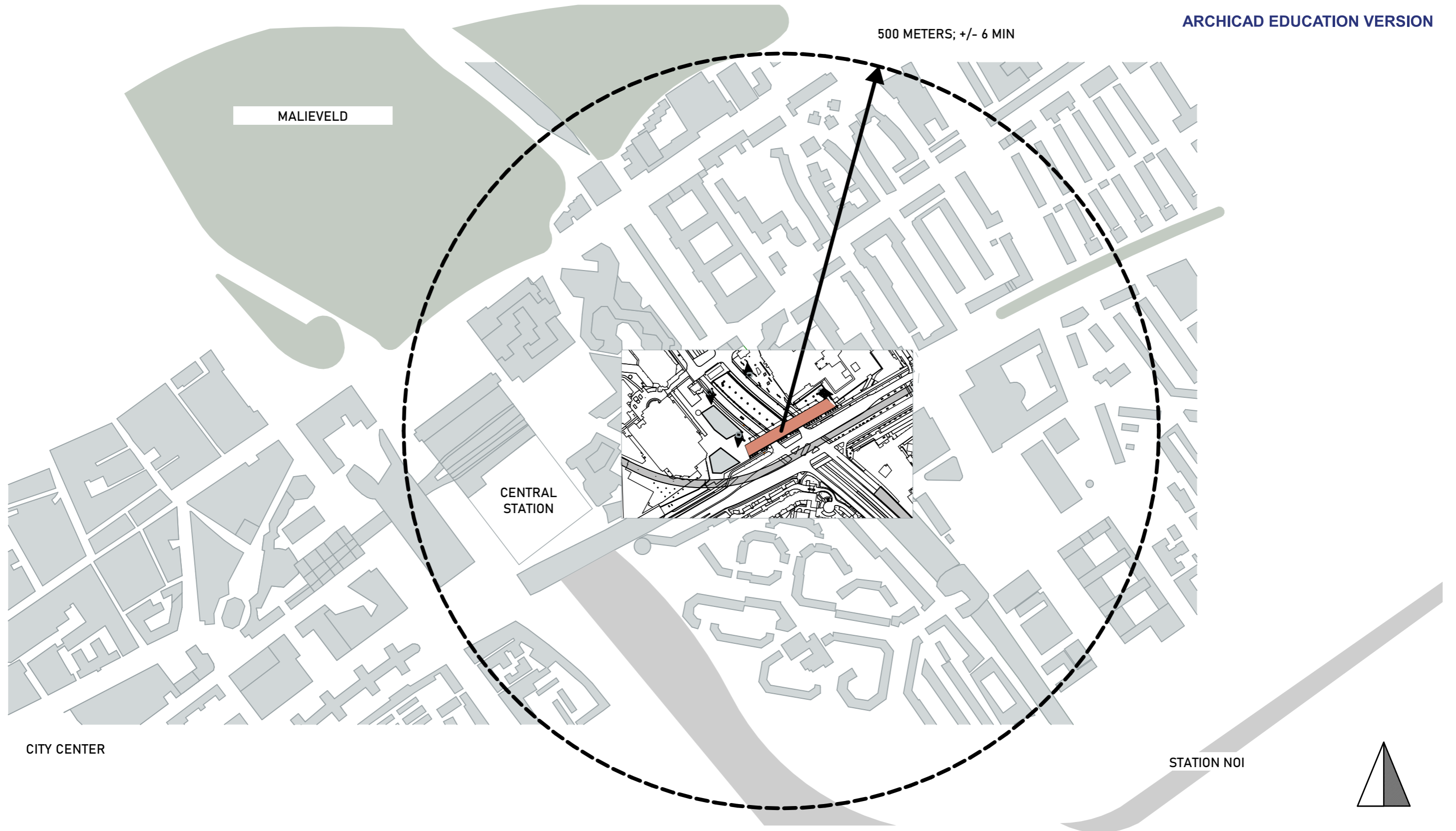
FRAGMENTS

DETAILS



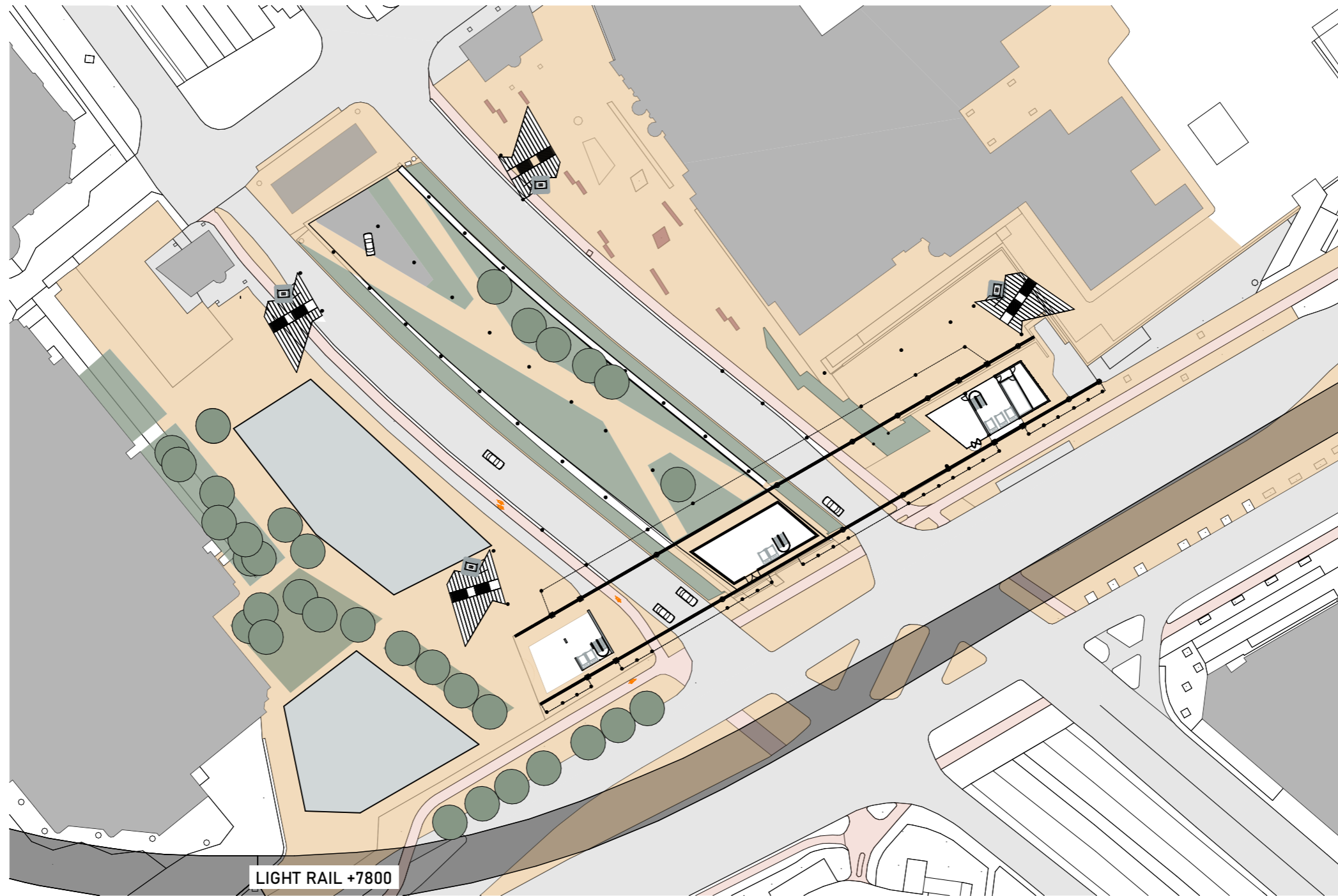
# CONTEXT

SITUATION



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>Situation 1:5000</b>	Layout number:	<b>01.5-01.5.2</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag

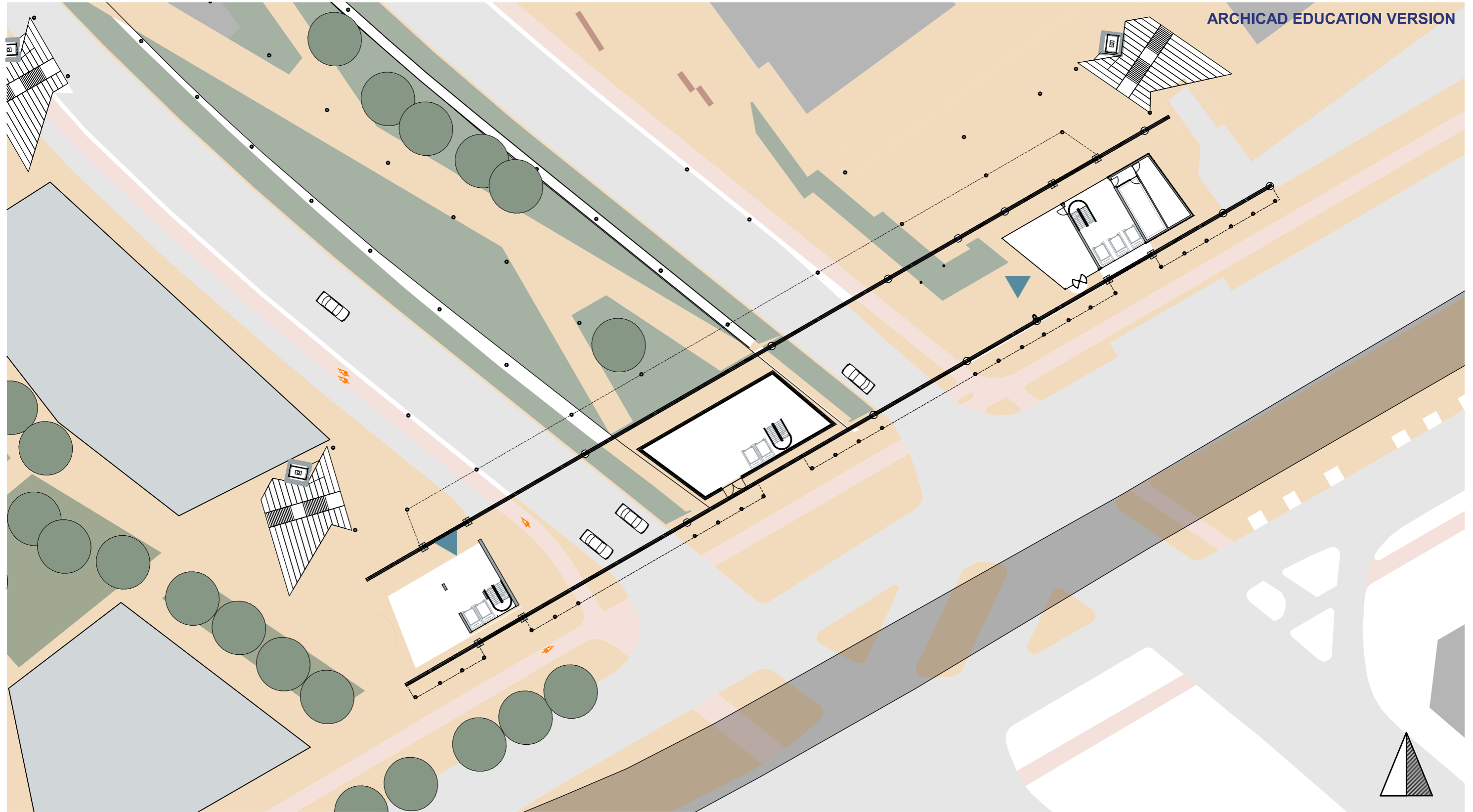












- LEGEND:
- STREETS
  - PAVEMENT
  - EXISTING BUILDING
  - BIKE LANES
  - GREEN
  - GROTIUSTOWERS
  - STAIRS + ELEV. 4X

LIGHT RAIL +7800

Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>Situation 1:1000</b>	Layout number:	<b>01.5-01.5.3</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag



LEGEND:

- |   |   |
|---|---|
|  STREETS           |  GREEN             |
|  PAVEMENT          |  GROTIUSTOWERS     |
|  EXISTING BUILDING |  STAIRS + ELEV. 4X |
|  BIKE LANES        |  ENTRANCE 2X       |

Project

**WeWo Building**  
Transformation Bruggebouw-Oost  
Grotiusplaats

Working project: **GRADUATION**

Layout number: **01.5-01.5.4**

Layout Name:

**Ground floor situation 1:500**

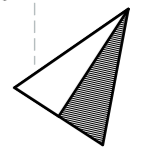
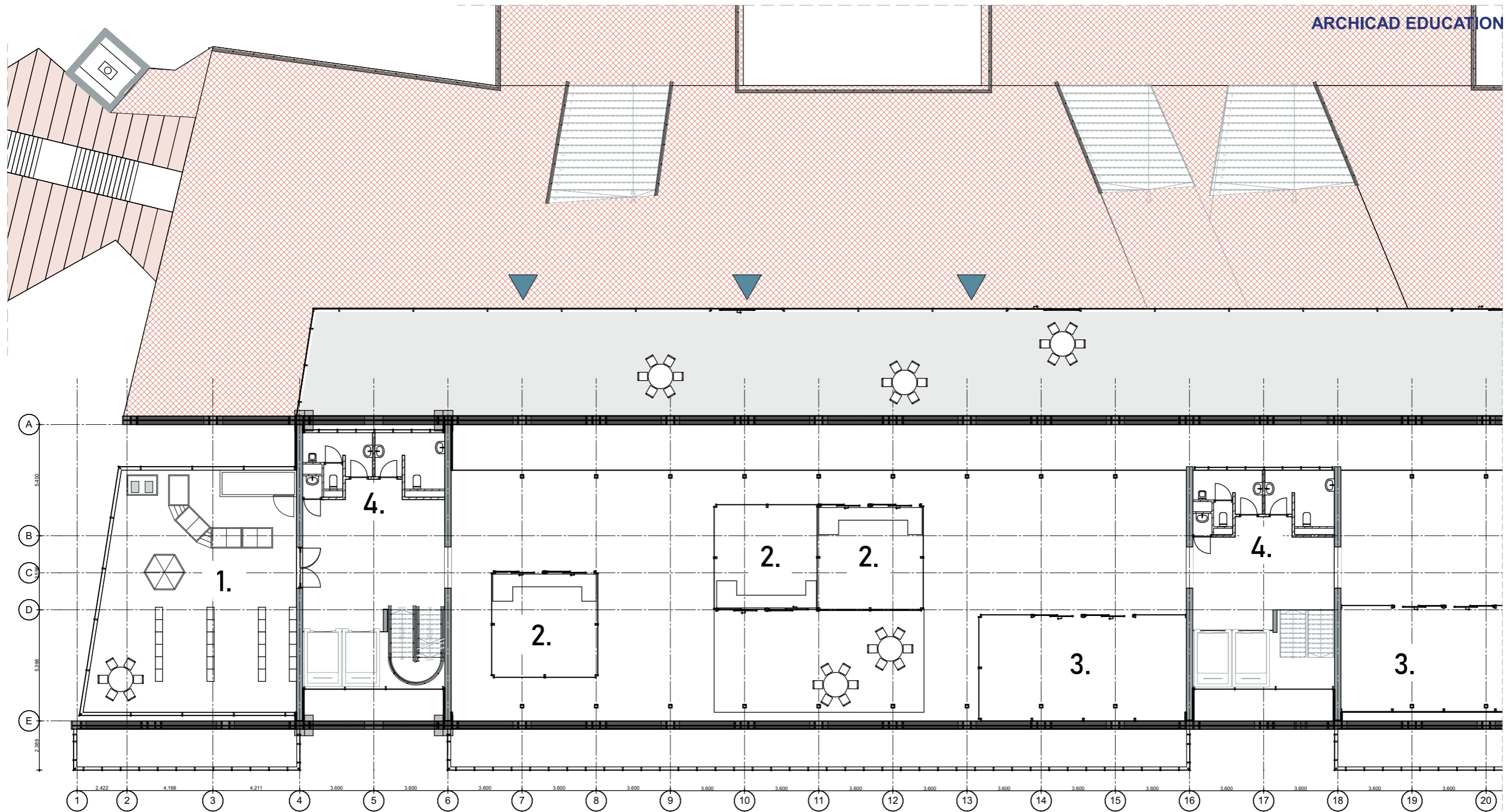
Draftsman

**Robert-Jan Altena**  
Den Haag





# FLOORPLANS

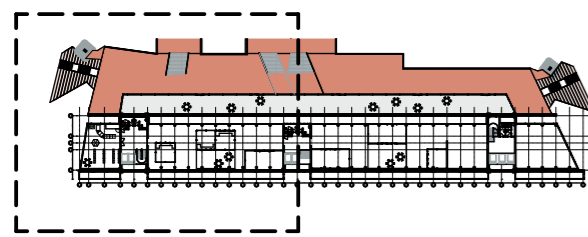


SPACES:

- 1. SUPERMARKET; 110 M<sup>2</sup>
- 2. KIOSK; 25 M<sup>2</sup>
- 3. KIOSK; 50 M<sup>2</sup>
- 4. COMMUNAL TOILETS

LEGEND:

-  TILES
-  ENTRANCE



Project

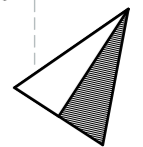
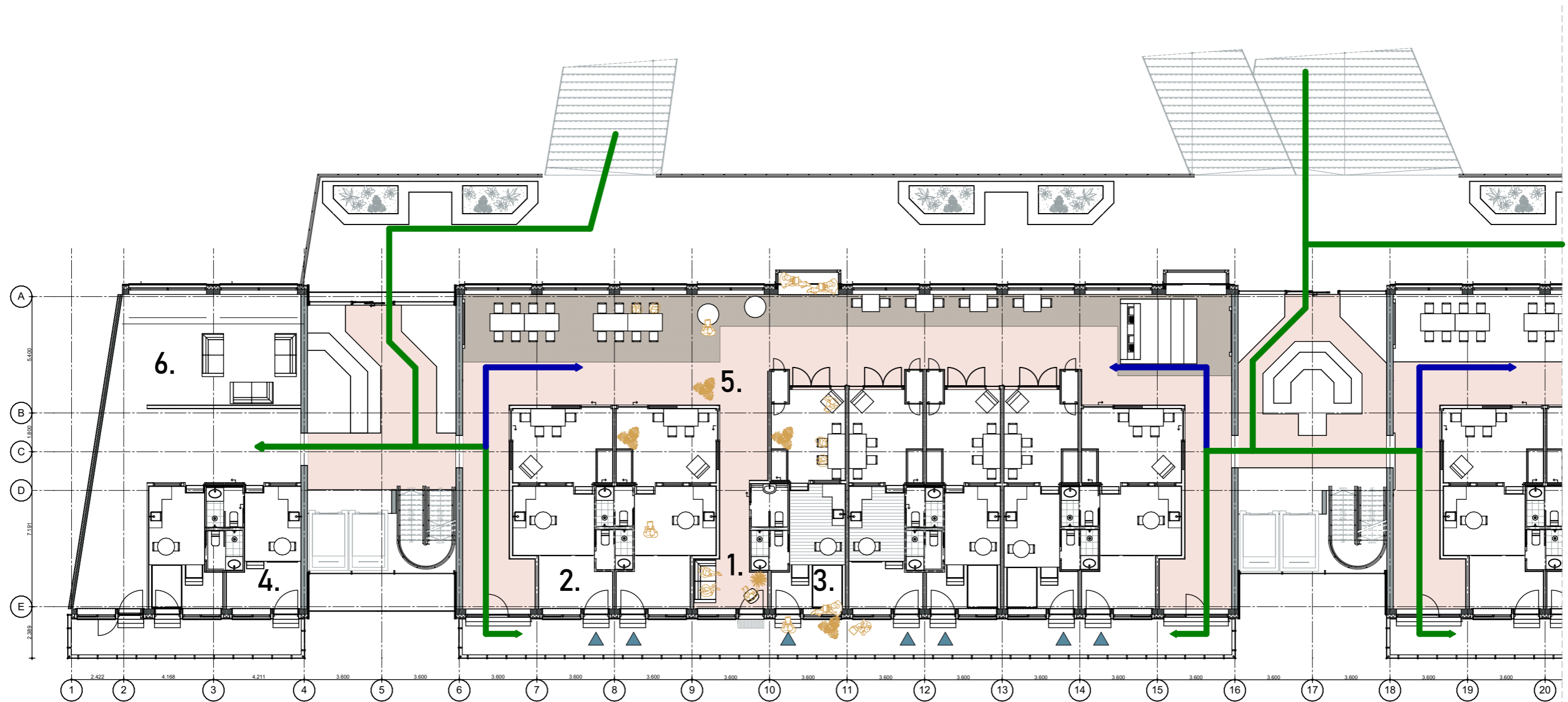
**WeWo Building**  
 Transformation Bruggebouw-Oost  
 Grotiusplaats

Working project: **GRADUATION**

Layout number: **01.6-01.6.2**

Layout Name: **1st Floor**

Draftsman **Robert-Jan Altena**  
 Den Haag

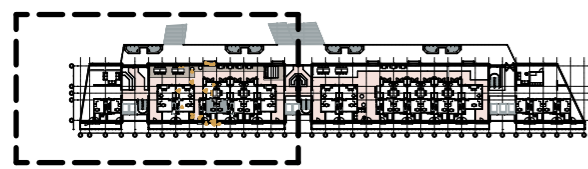


SPACES:

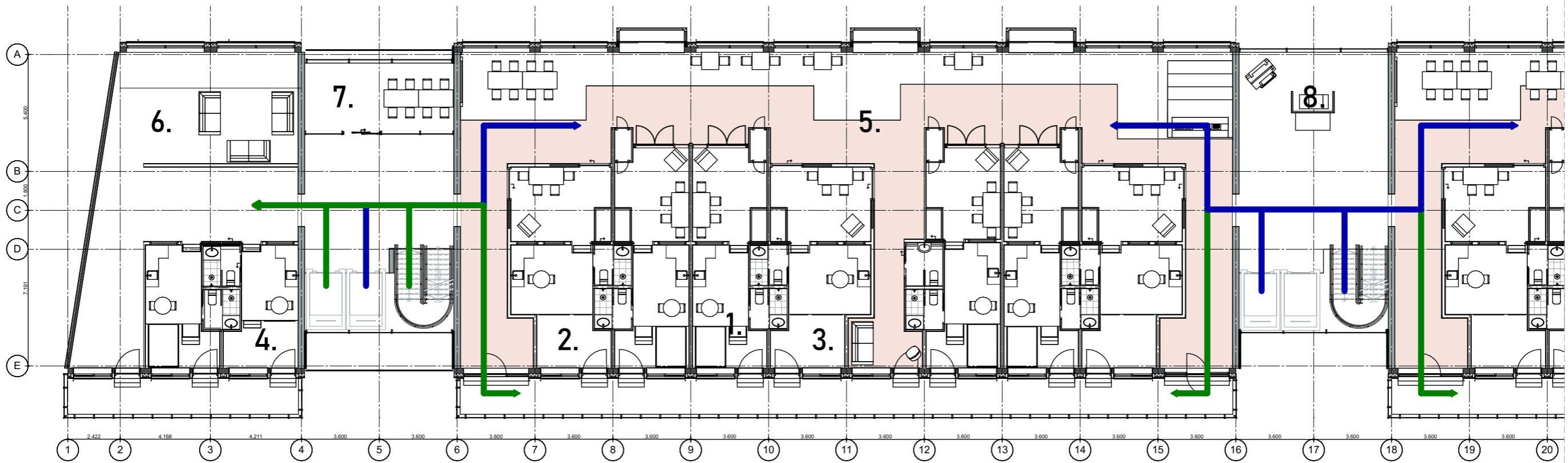
- 1. COMMON LIVING ROOMS
- 2. DWELLING 'TYPE CORNER'
- 3. DWELLING 'TYPE LONG'
- 4. DWELLING 'TYPE SHORT'
- 5. WORKSPACE
- 6. COMMON SPACE

LEGEND:

- BETWEEN SPACE
- ENTRANCE
- WALKING DWELLING
- WALKING OFFICE







Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project: <b>GRADUATION</b>
Layout Name: <b>2nd Floor</b>		Layout number: <b>01.6-01.6.3</b>
		Draftsman: <b>Robert-Jan Altena</b> Den Haag

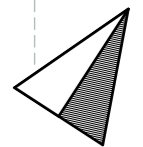
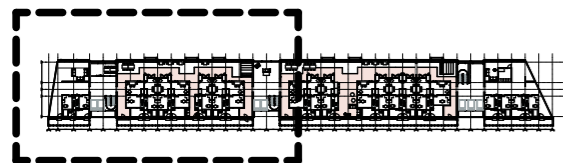


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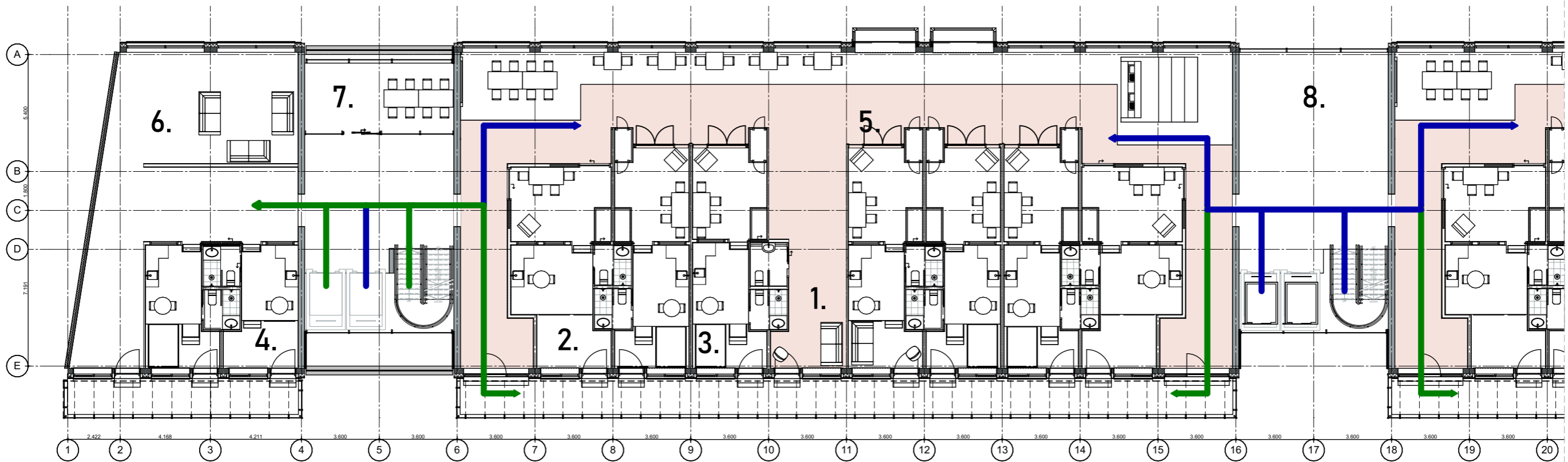
- |                           |                 |
|---------------------------|-----------------|
| 1. COMMON LIVING ROOMS    | 5. WORKSPACE    |
| 2. DWELLING 'TYPE CORNER' | 6. COMMON SPACE |
| 3. DWELLING 'TYPE LONG'   | 7. MEETING ROOM |
| 4. DWELLING 'TYPE SHORT'  | 8. PRINT SHOP   |

LEGEND:

- |   |                  |
|---|------------------|
|  | BETWEEN SPACE    |
|  | ENTRANCE         |
|  | WALKING DWELLING |
|  | WALKING OFFICE   |







Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>3rd Floor</b>	Layout number:	<b>01.6-01.6.4</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag

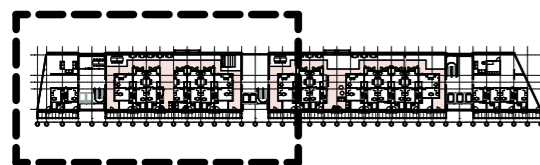


SPACES:

- |                           |                 |
|---------------------------|-----------------|
| 1. COMMON LIVING ROOMS    | 5. WORKSPACE    |
| 2. DWELLING 'TYPE CORNER' | 6. COMMON SPACE |
| 3. DWELLING 'TYPE LONG'   | 7. MEETING ROOM |
| 4. DWELLING 'TYPE SHORT'  | 8. PRINT SHOP   |

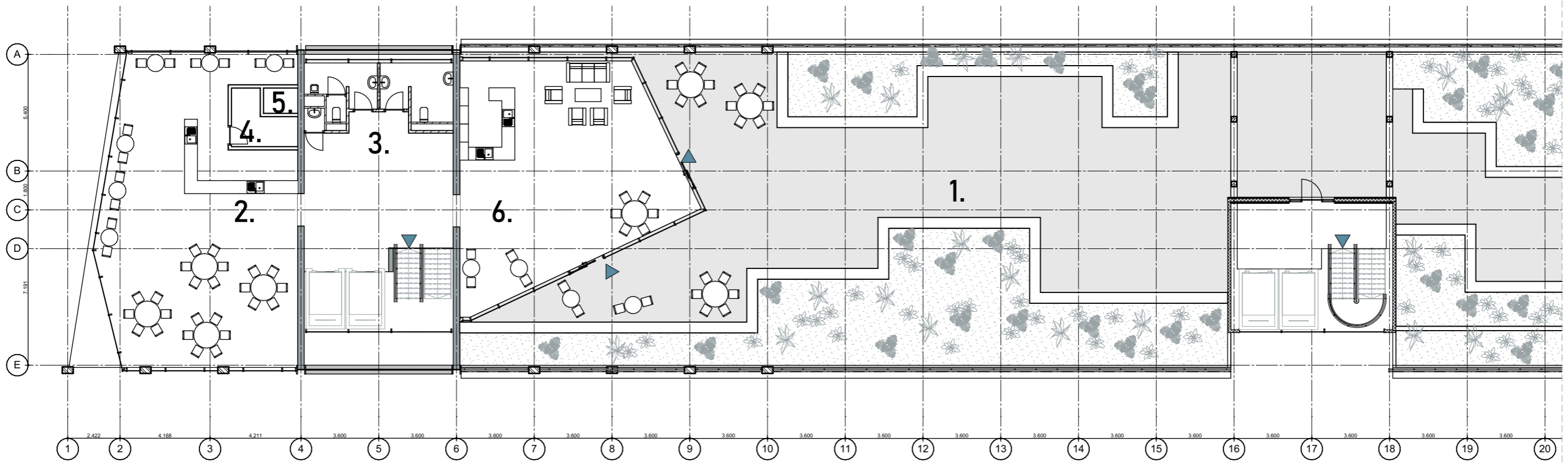
LEGEND:

- |   |                  |
|---|------------------|
|  | BETWEEN SPACE    |
|  | ENTRANCE         |
|  | WALKING DWELLING |
|  | WALKING OFFICE   |



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>4th Floor</b>	Layout number:	<b>01.6-01.6.5</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag



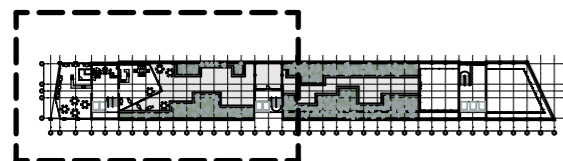


SPACES:

- 1. PUBLIC ROOFTOP GARDEN
- 2. RESTAURANT
- 3. COMMON BATHROOMS
- 4. CHANGE ROOM
- 5. COOLING ROOM
- 6. COFFEE BAR

LEGEND:

- GREENERY
- ENTRANCE



Project

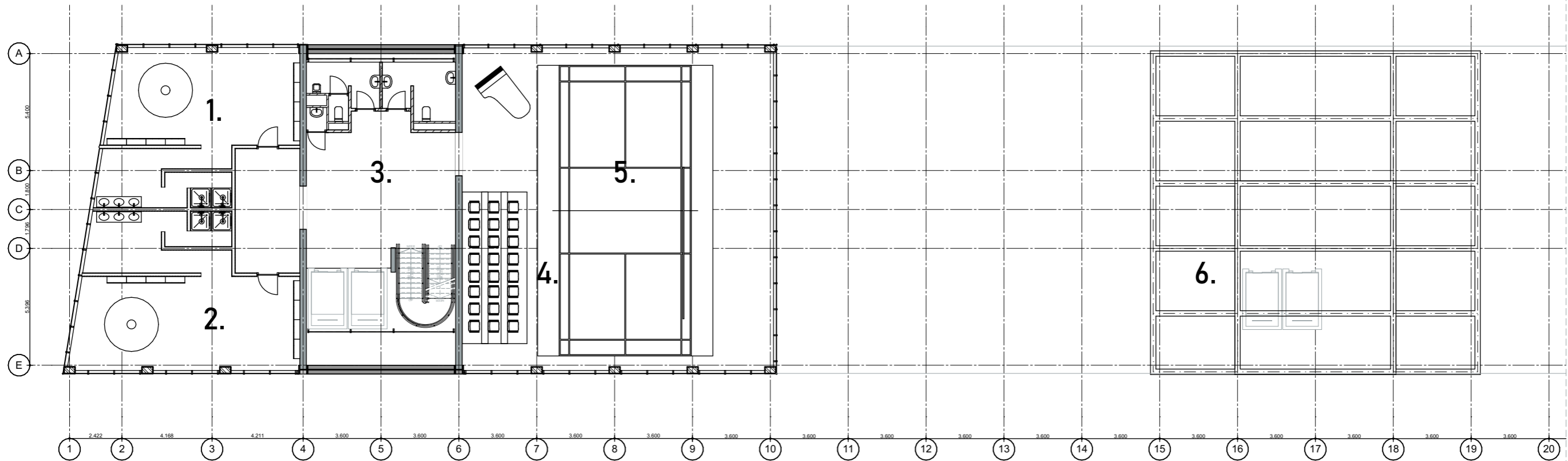
**WeWo Building**  
Transformation Bruggebouw-Oost  
Grotiusplaats

Working project: **GRADUATION**

Layout number: **01.6-01.6.6**

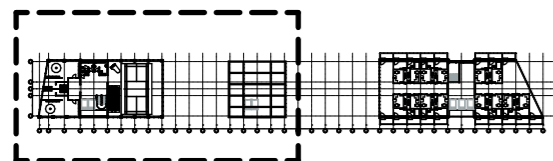
Layout Name: **5th Floor**

Draftsman **Robert-Jan Altena**  
Den Haag

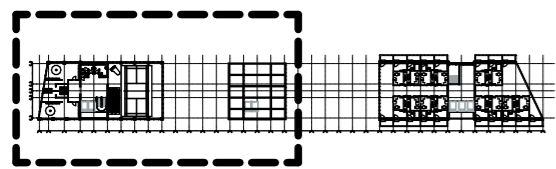
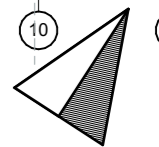
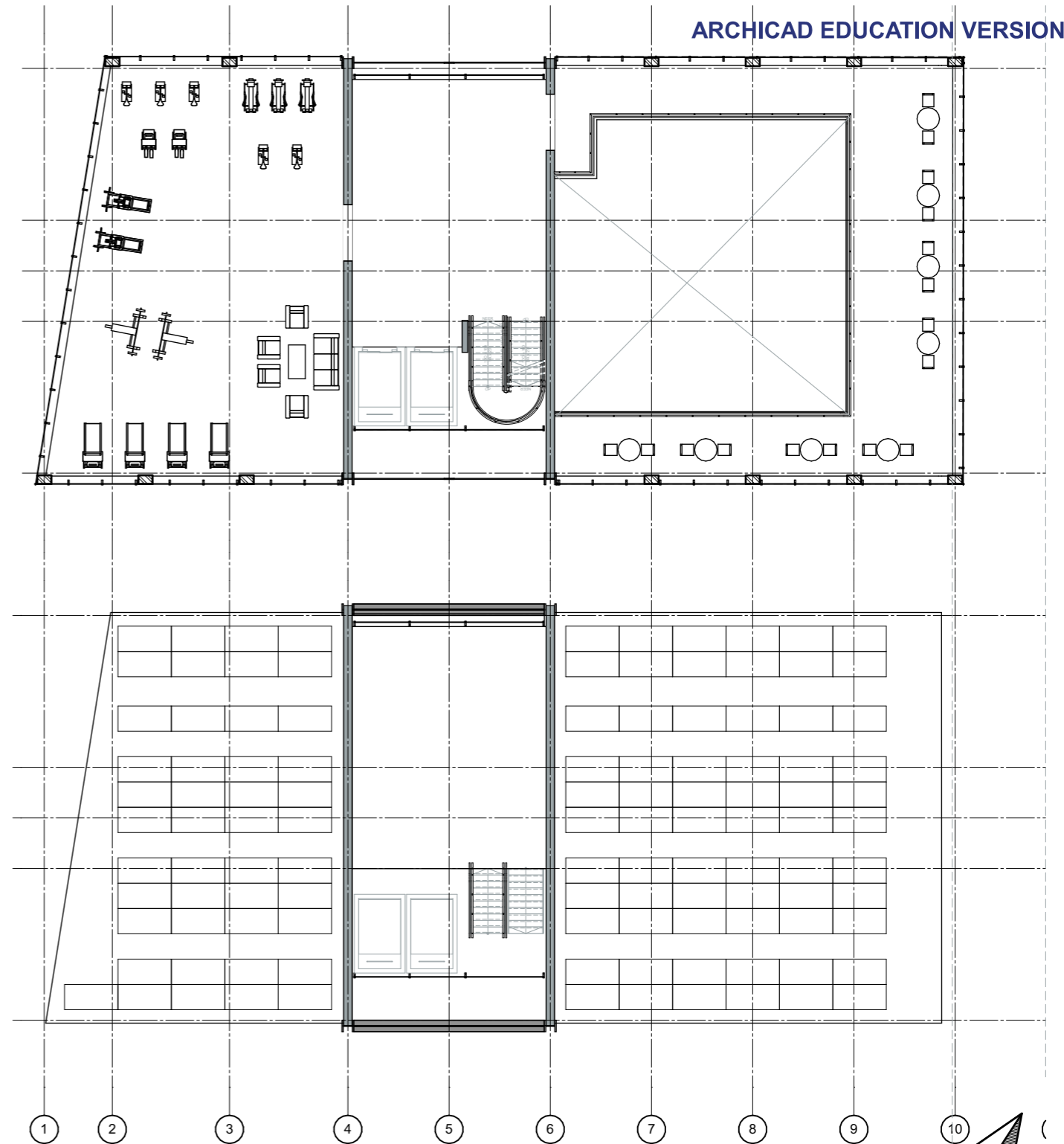
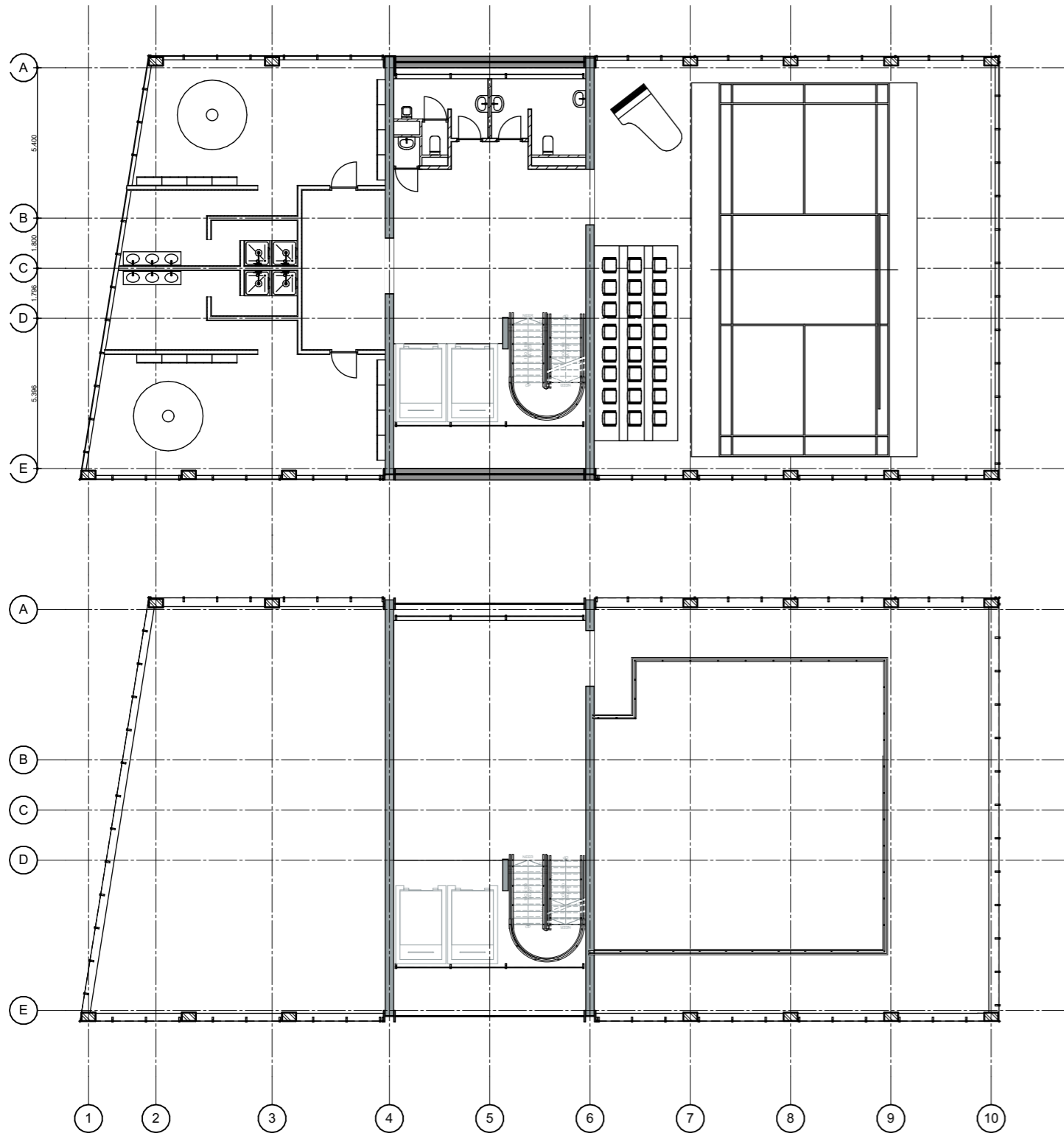


SPACES:

- |                      |                   |
|----------------------|-------------------|
| 1. CHANGING ROOM     | 5. SPORTS         |
| 2. CHANGING ROOM     | 6. SUN PROTECTION |
| 3. COMMON BATHROOMS  |                   |
| 4. TELESCOPE TRIBUNE |                   |

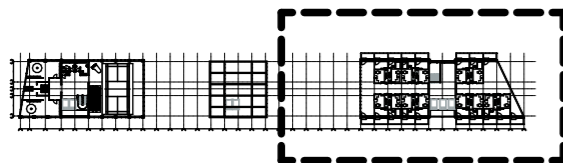
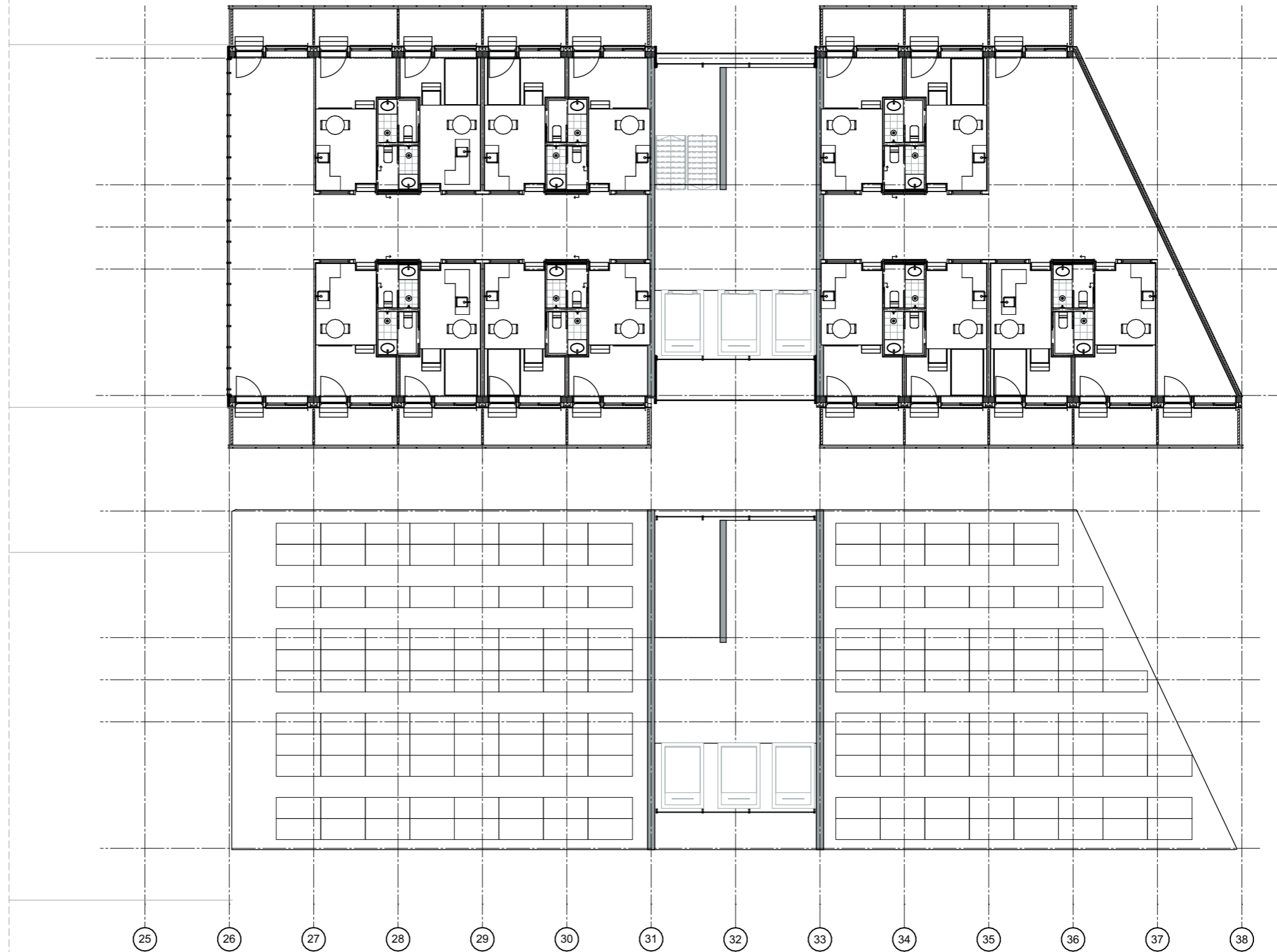


Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>6th Floor</b>	Layout number:	<b>01.6-01.6.7</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>South topping</b>	Layout number:	<b>01.6-01.6.8</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag





Project

**WeWo Building**  
Transformation Bruggebouw-Oost  
Grotiusplaats

Working project: **GRADUATION**

Layout number: **01.6-01.6.9**

Layout Name:

**North topping**

Draftsman

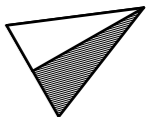
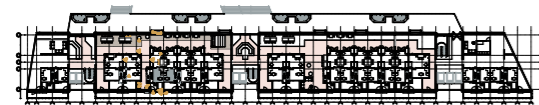
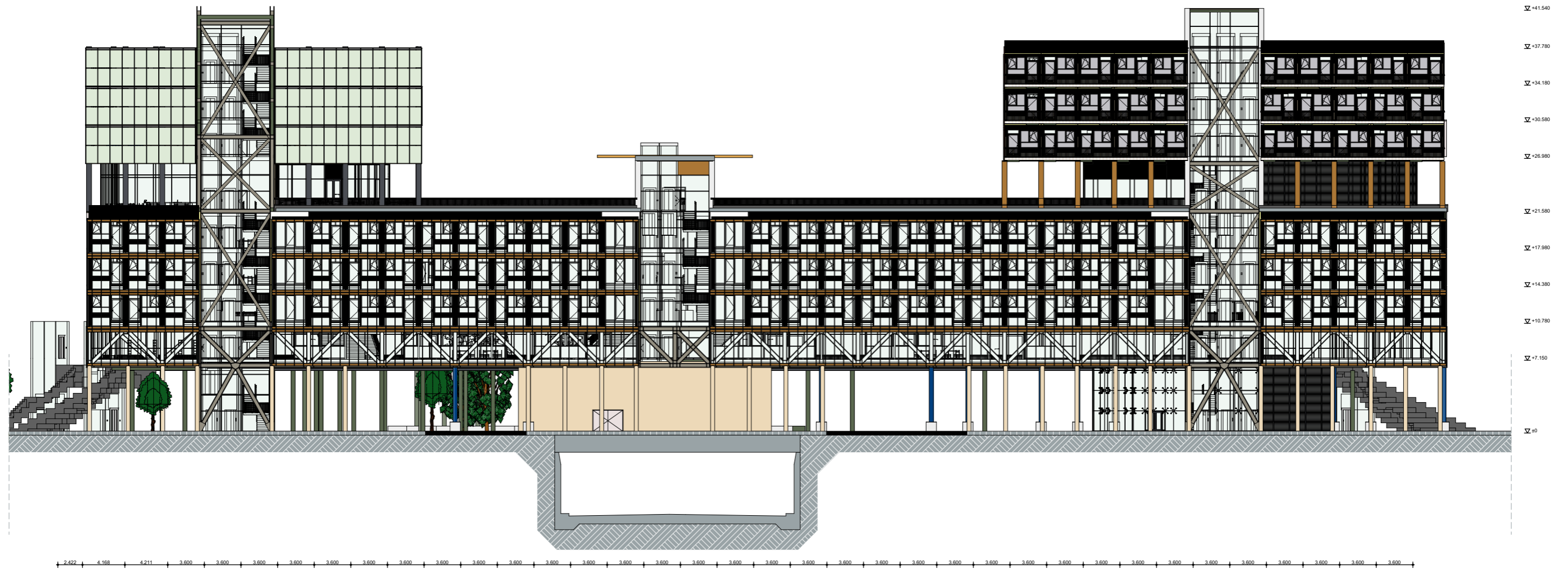
**Robert-Jan Altena**  
Den Haag



# ELEVATIONS

WEST ELEVATION

EAST ELEVATION



Project

**WeWo Building**  
Transformation Bruggebouw-Oost  
Grotiusplaats

Working project: **GRADUATION**

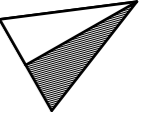
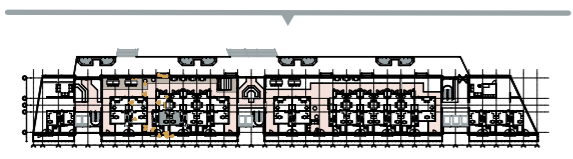
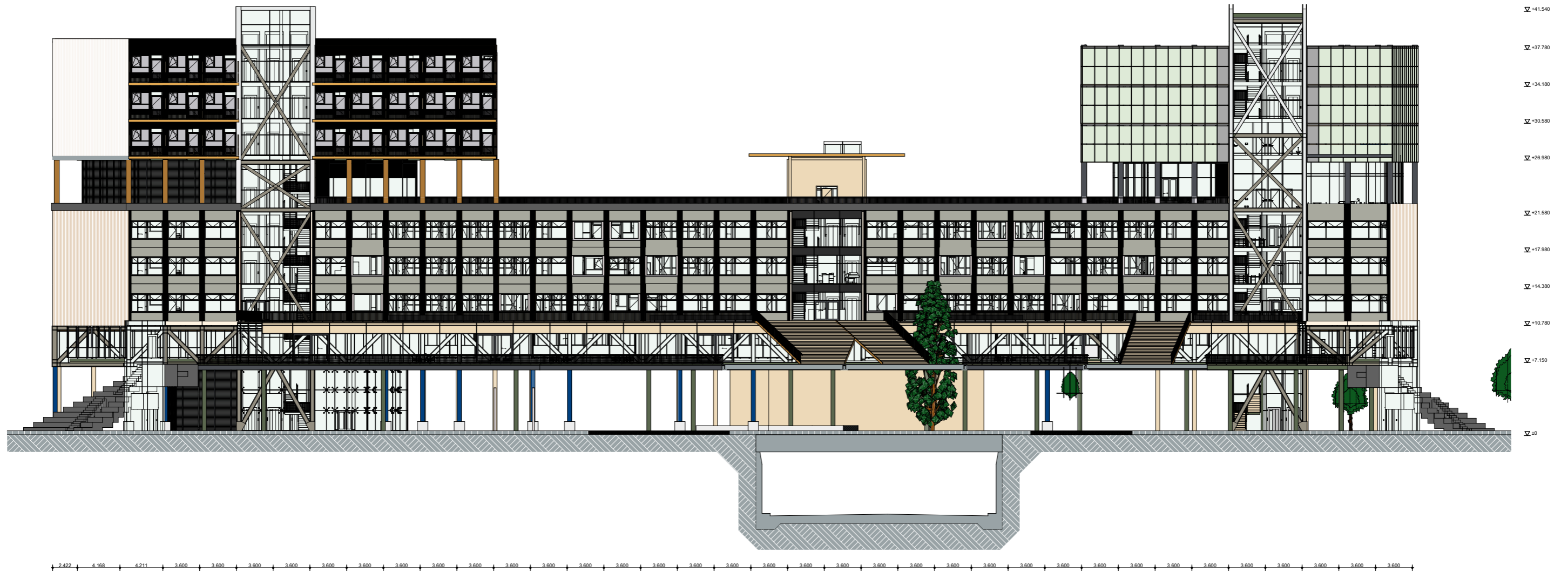
Layout number: **01.7-01.7.2**

Layout Name:

**East elevation- Dwelling  
orientated**

Draftsman

**Robert-Jan Altena**  
Den Haag



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
		Layout number:	<b>01.7-01.7.3</b>
Layout Name:	<b>West elevation- Office orientated</b>	Draftsman	<b>Robert-Jan Altena</b> Den Haag



# SECTIONS

CROSS CUT AXIS 12

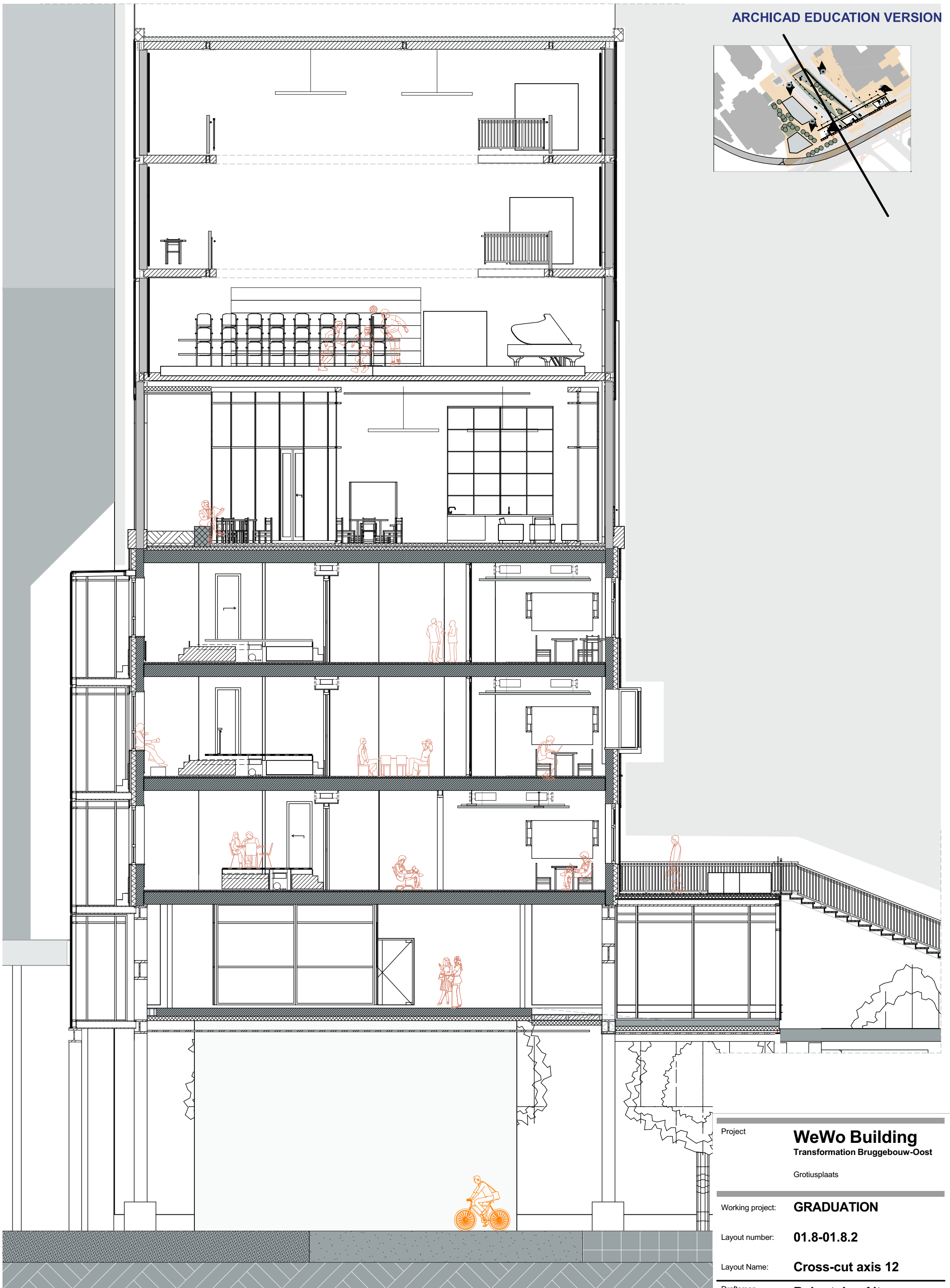
CROSS CUT SITUATION

1:50 SECTION FLOORPLAN

1:50 CROSS SECTION

FRAGMENT - VERTICAL

FRAGMENT - HORIZONTAL

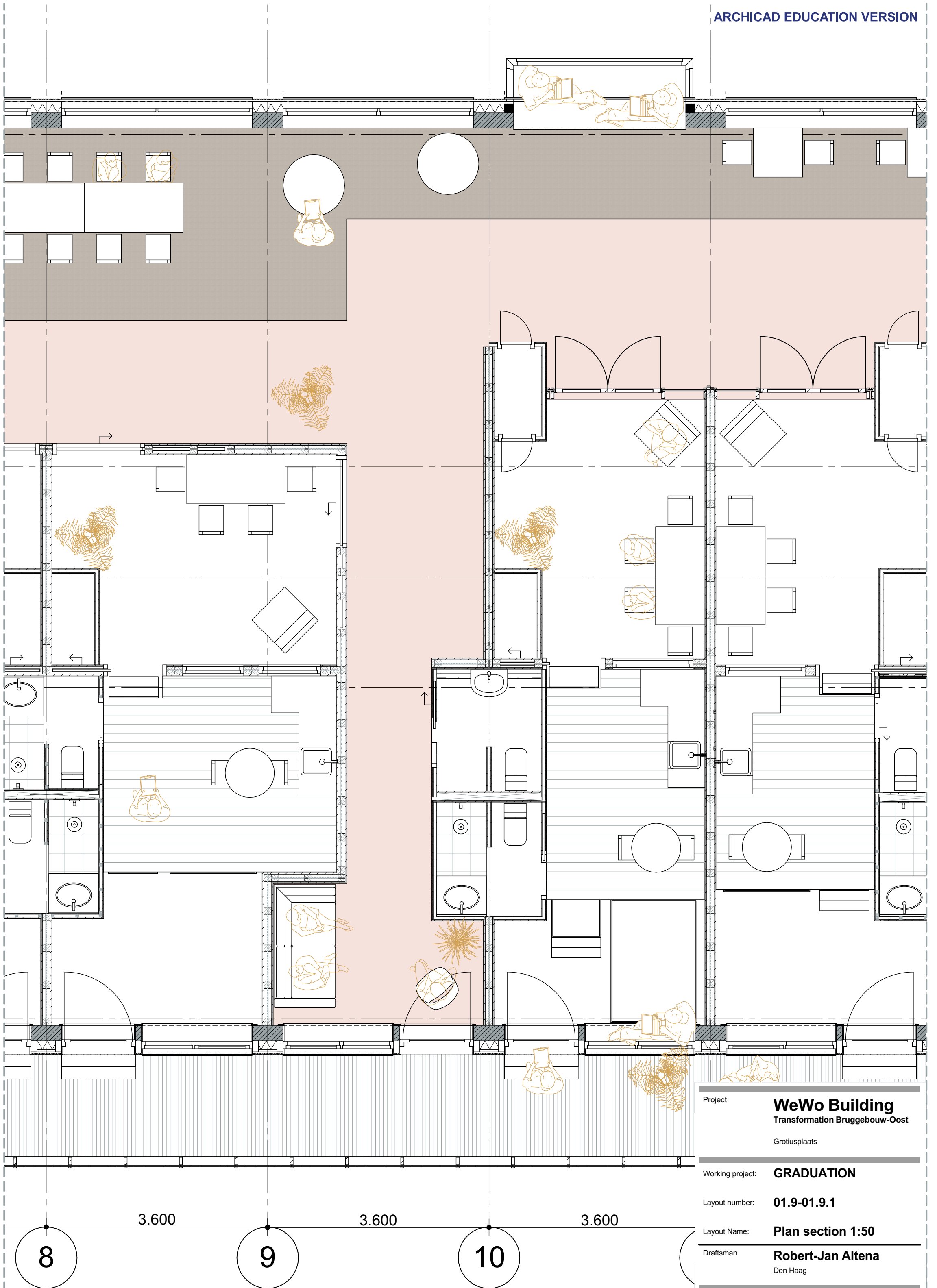


Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats
Working project:	<b>GRADUATION</b>
Layout number:	<b>01.8-01.8.2</b>
Layout Name:	<b>Cross-cut axis 12</b>
Draftsman	<b>Robert-Jan Altena</b> Den Haag



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
		Layout number:	<b>01.8-01.8.3</b>
Layout Name:	<b>Situation long cut</b>	Draftsman	<b>Robert-Jan Altena</b> Den Haag





Project **WeWo Building**  
Transformation Bruggebouw-Oost  
Grotiusplaats

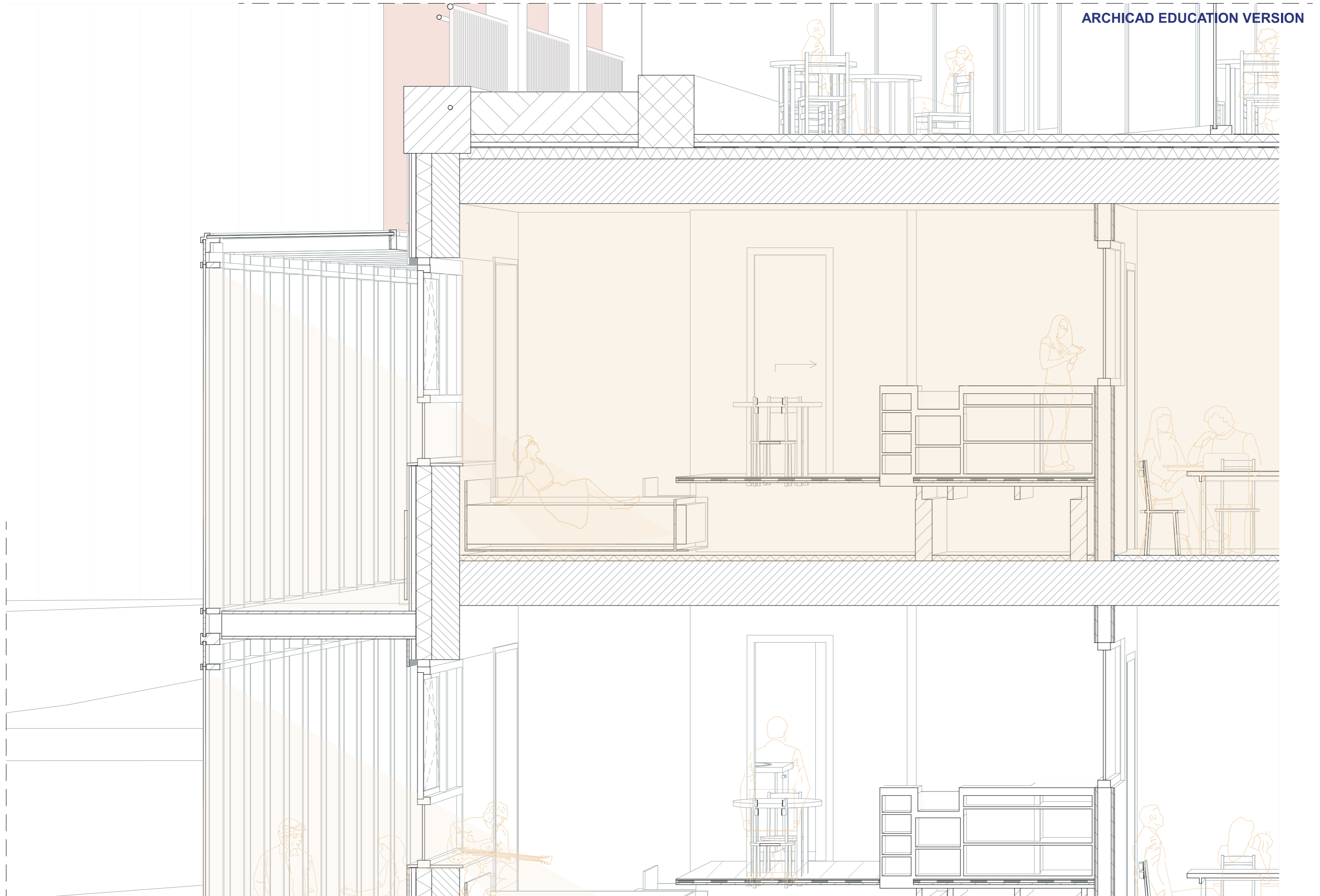
Working project: **GRADUATION**

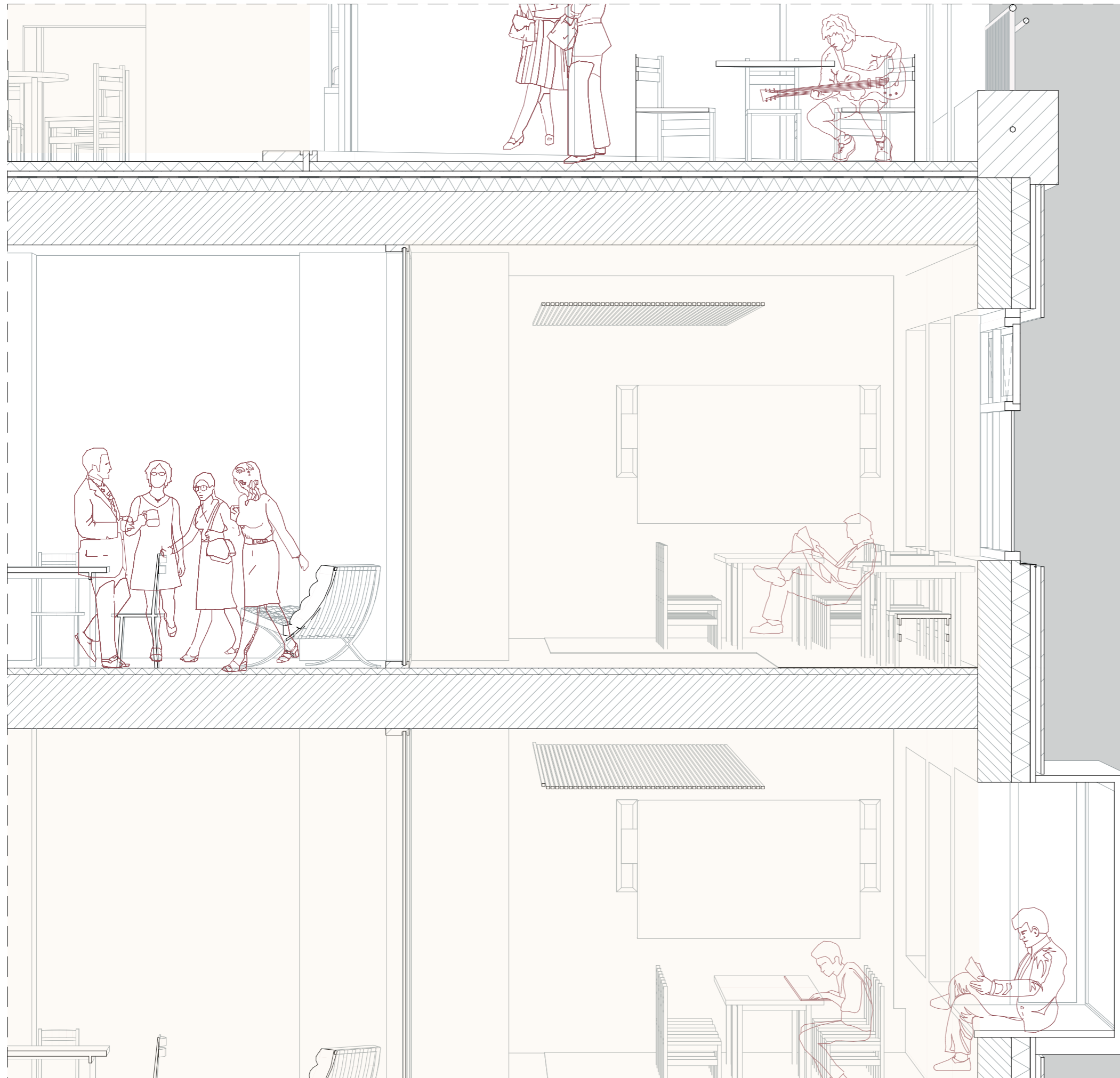
Layout number: **01.9-01.9.1**

Layout Name: **Plan section 1:50**

Draftsman **Robert-Jan Altena**  
Den Haag







Project **WeWo Building**  
Transformation Bruggebouw-Oost  
Grotiusplaats

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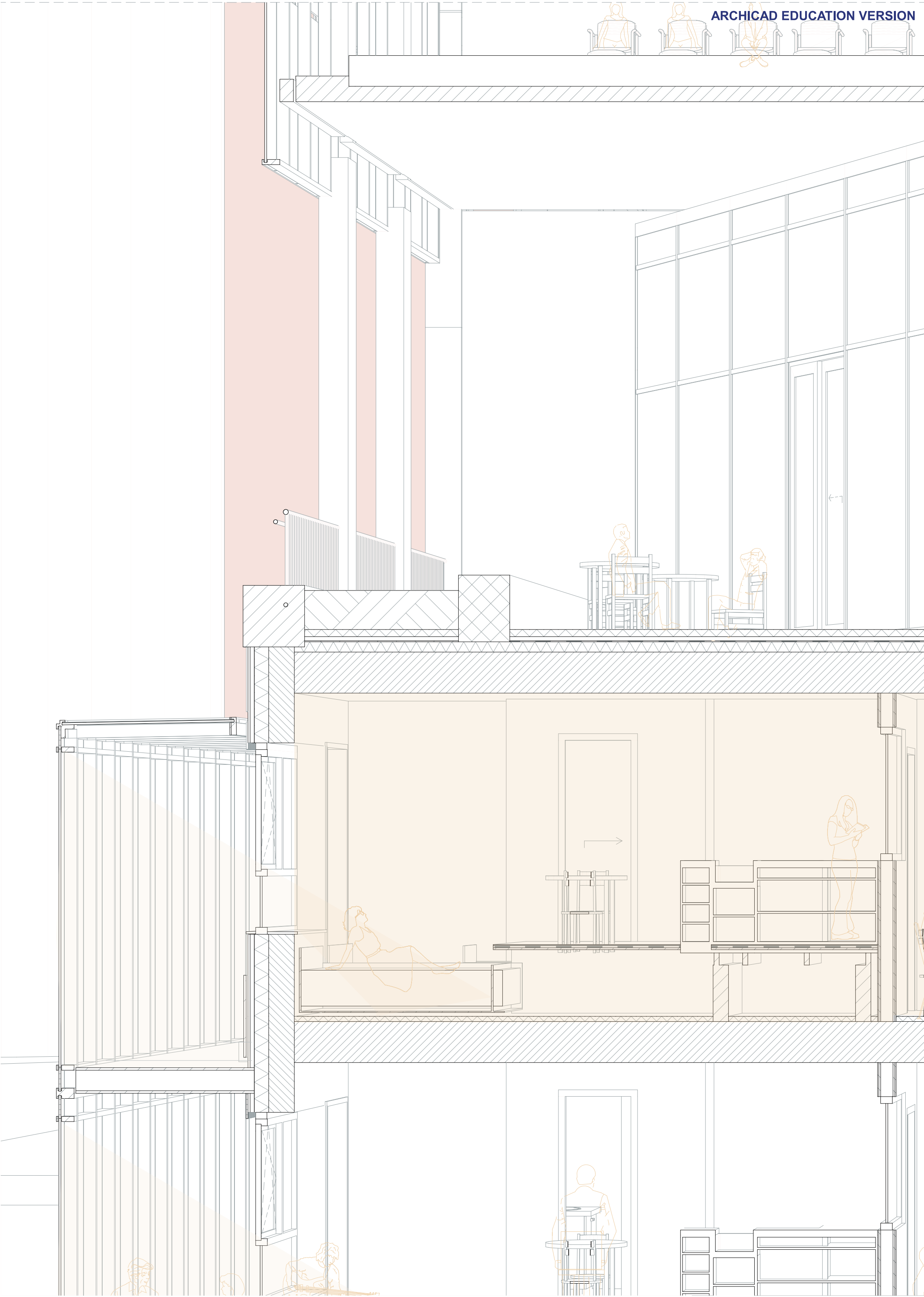
Working project: **GRADUATION**

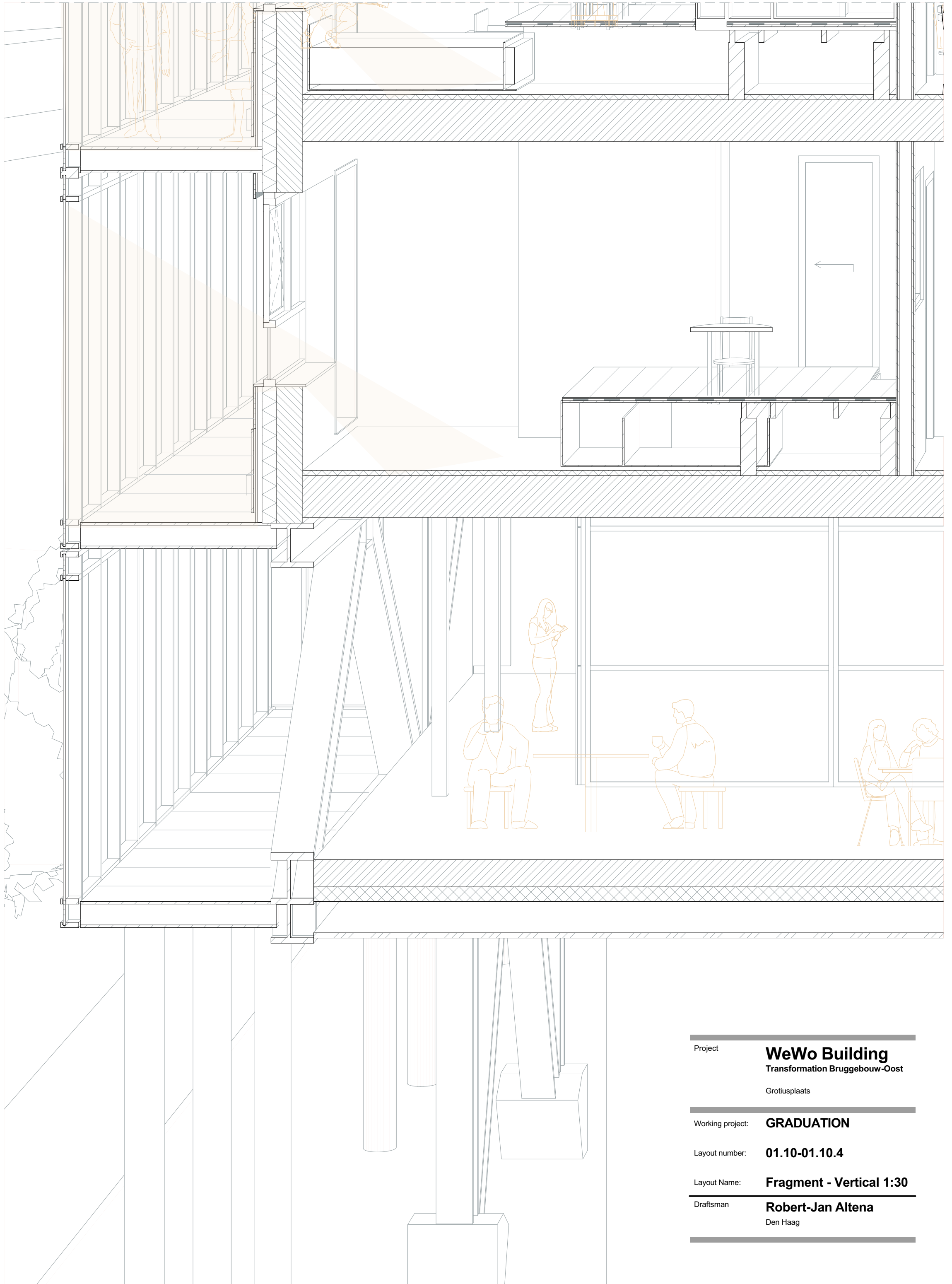
Layout number: **01.10-01.10.2**

Layout Name: **Fragment - Cross 1:30**

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Draftsman **Robert-Jan Altena**  
Den Haag





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Project **WeWo Building**  
Transformation Bruggebouw-Oost  
Grotiusplaats

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Working project: **GRADUATION**

Layout number: **01.10-01.10.4**

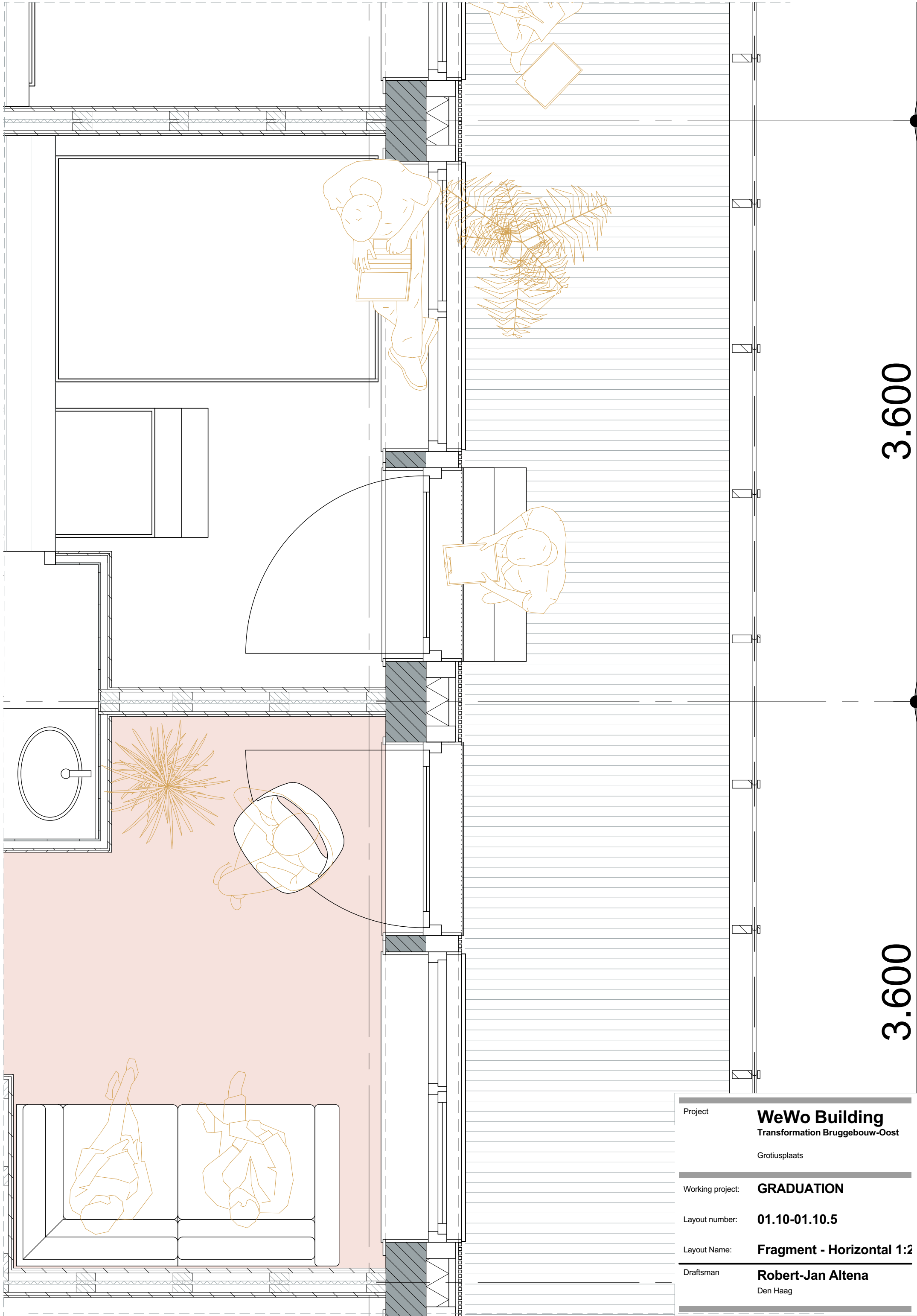
Layout Name: **Fragment - Vertical 1:30**

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Draftsman **Robert-Jan Altena**  
Den Haag

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3.600

3.600

Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats
Working project:	<b>GRADUATION</b>
Layout number:	<b>01.10-01.10.5</b>
Layout Name:	<b>Fragment - Horizontal 1:2</b>
Draftsman	<b>Robert-Jan Altena</b> Den Haag



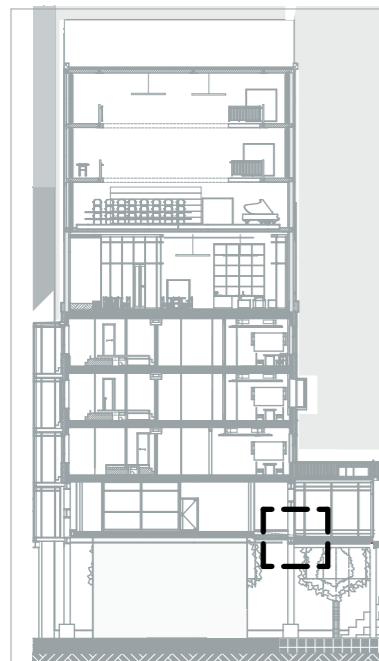
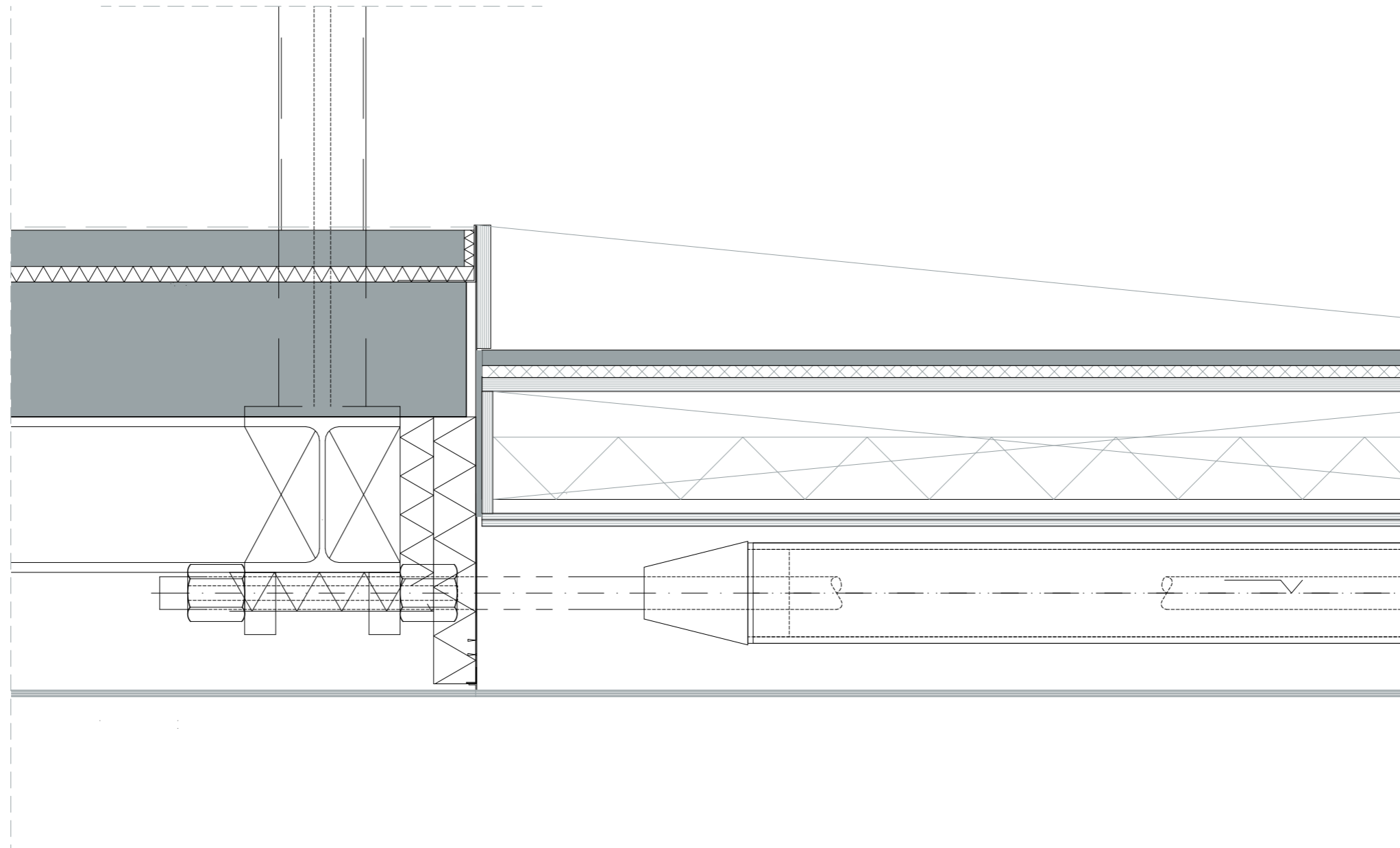
# DETAILLING

DETAIL GIRDER - SQUARE

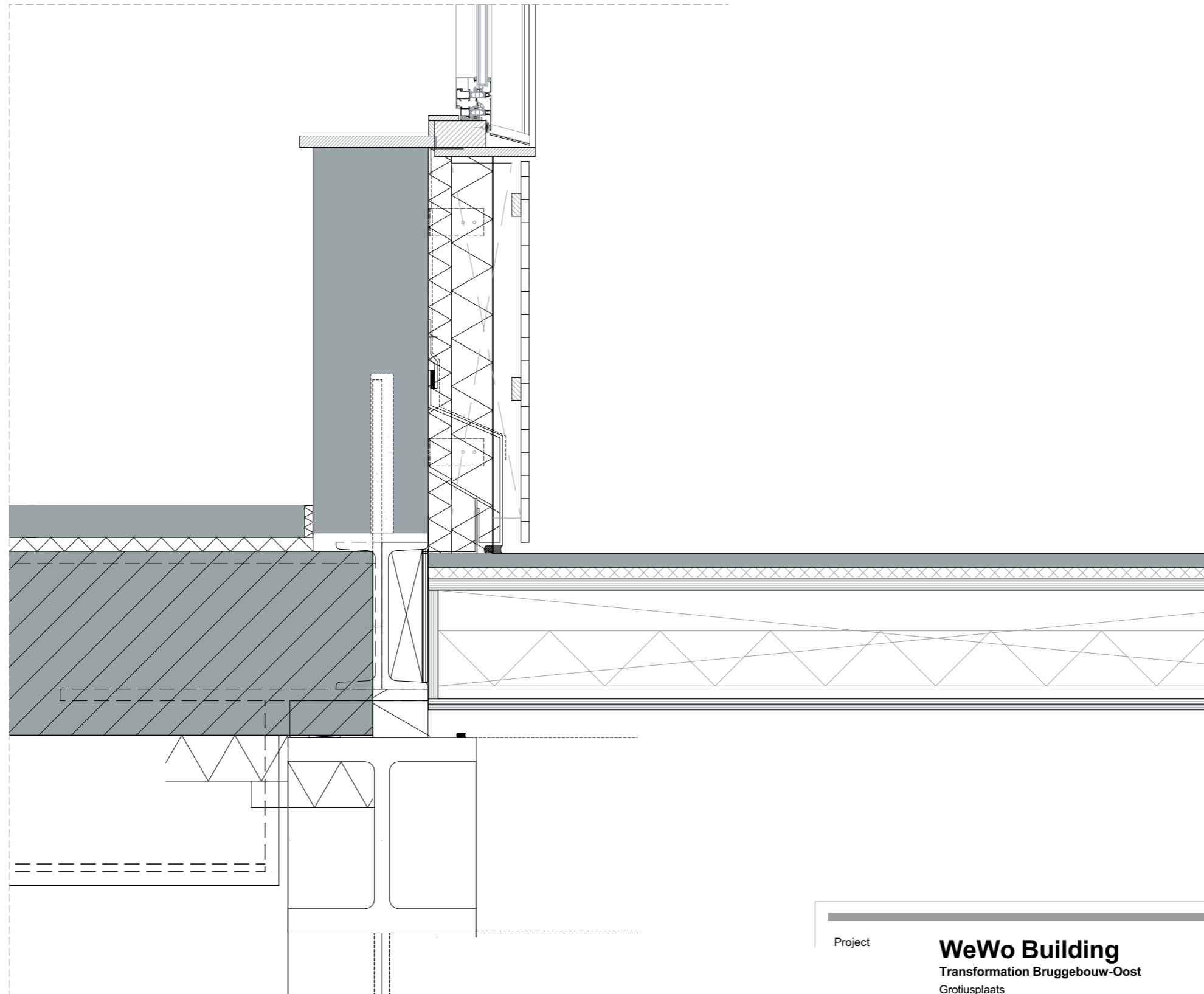
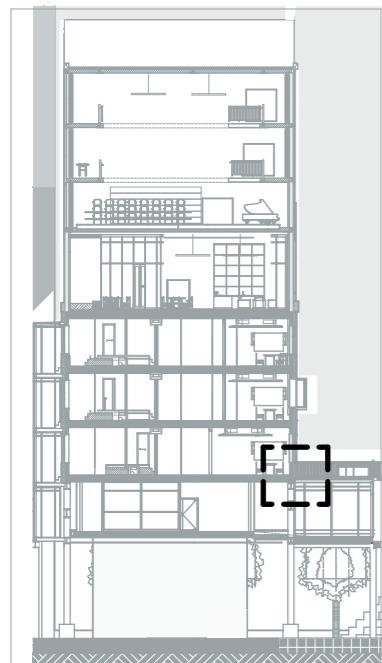
DETAIL GIRDER - WALKING ROUTE

DETAIL FLOOR - GALERY

DETAIL FACADE - INTERIOR WALL HORIZONTAL

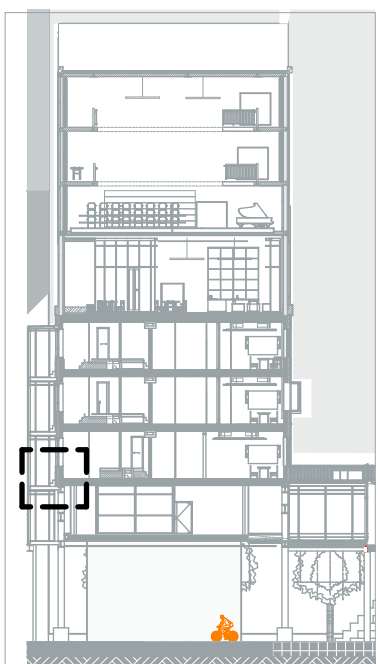
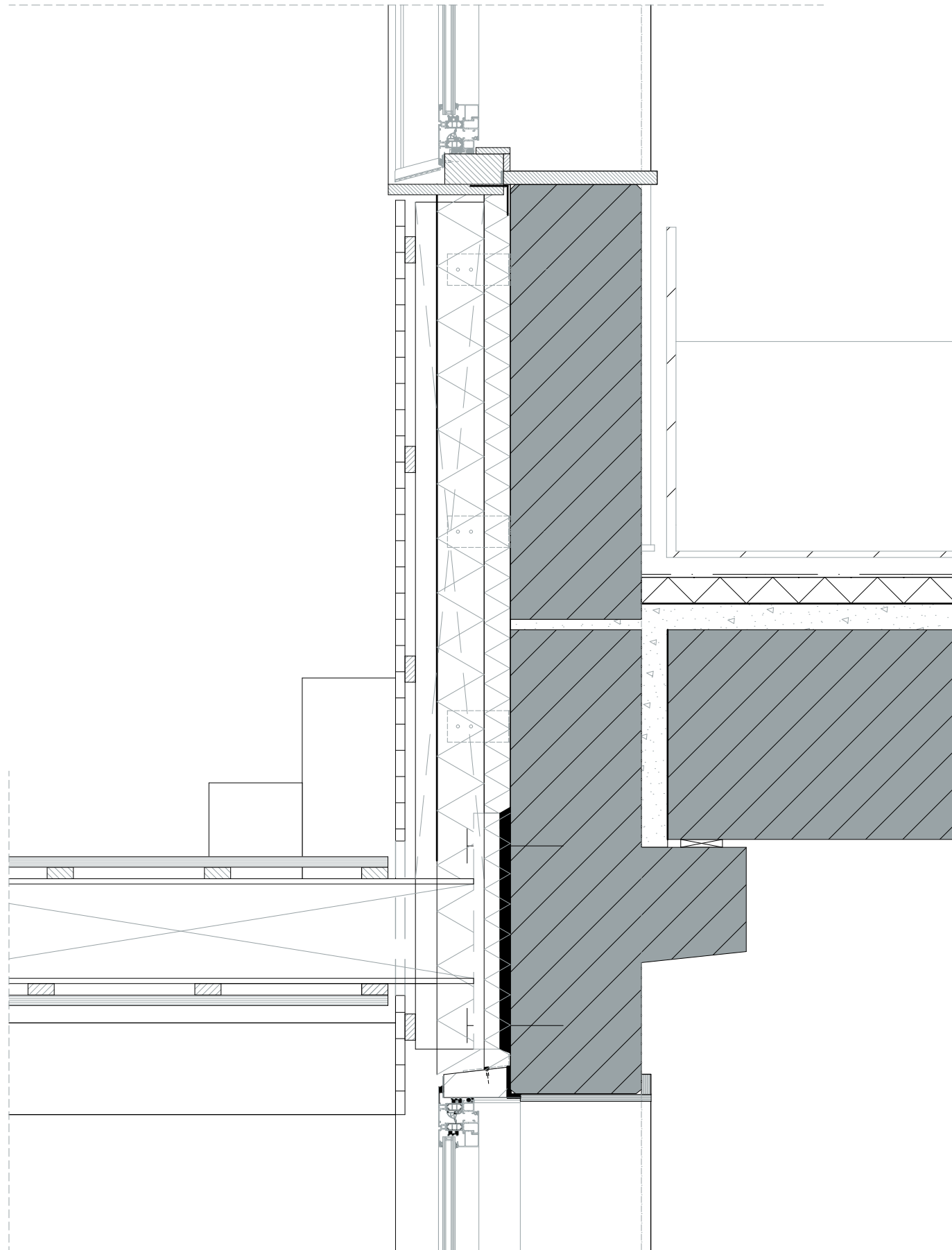


Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
		Layout number:	<b>01.11-01.11.2</b>
Layout Name:	<b>Detail girder - square</b>	Draftsman	<b>Robert-Jan Altena</b> Den Haag

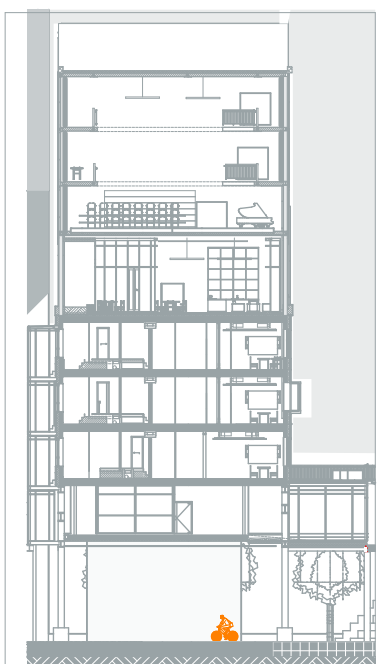
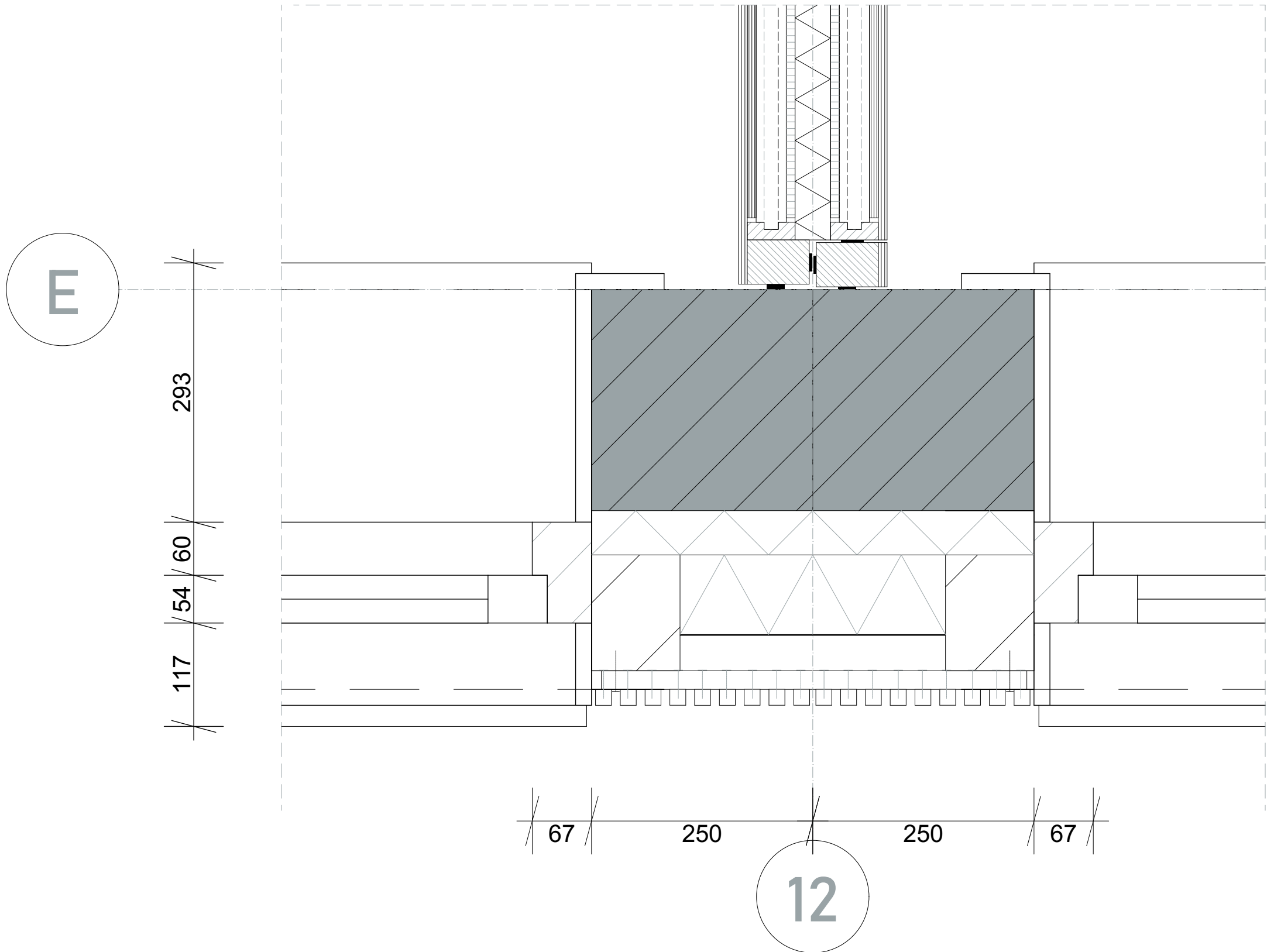


Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
		Layout number:	<b>01.11-01.11.3</b>
Layout Name:	<b>Detail girder - walking route</b>	Draftsman	<b>Robert-Jan Altena</b> Den Haag





Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats
Working project:	<b>GRADUATION</b>
Layout number:	<b>01.11-01.11.4</b>
Layout Name:	<b>Detail floor- galery</b>
Draftsman	<b>Robert-Jan Altena</b> Den Haag



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats
Working project:	<b>GRADUATION</b>
Layout number:	<b>01.11-01.11.5</b>
Layout Name:	<b>Horizontal detail facade -</b>
Draftsman	<b>Robert-Jan Altena</b> Den Haag



# BUILDING TECHNOLOGY

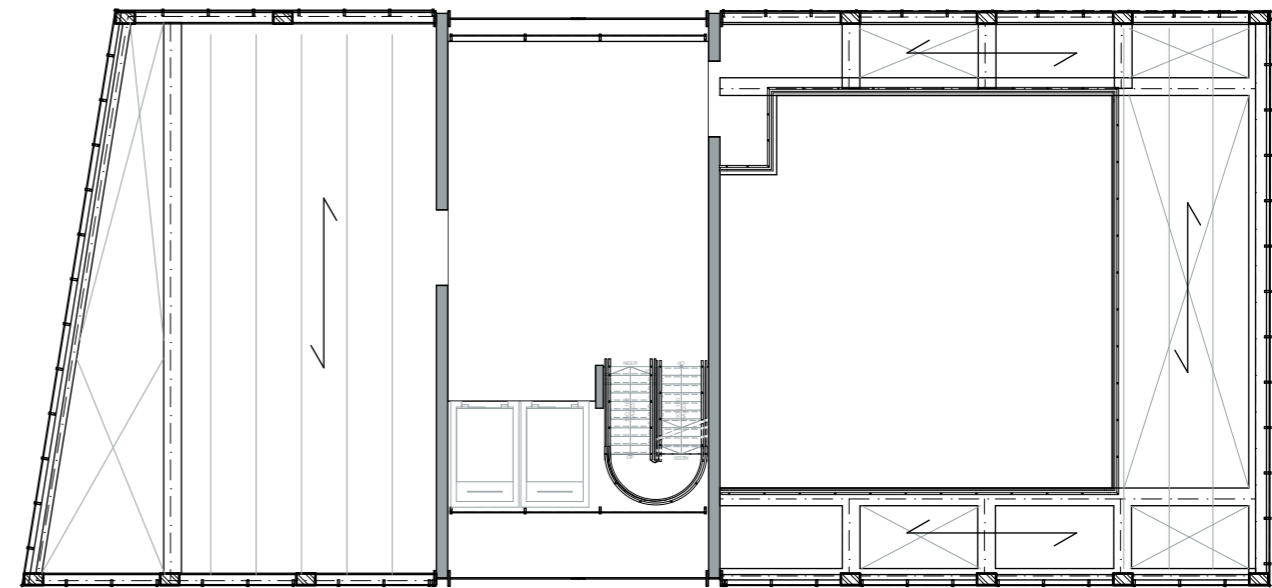
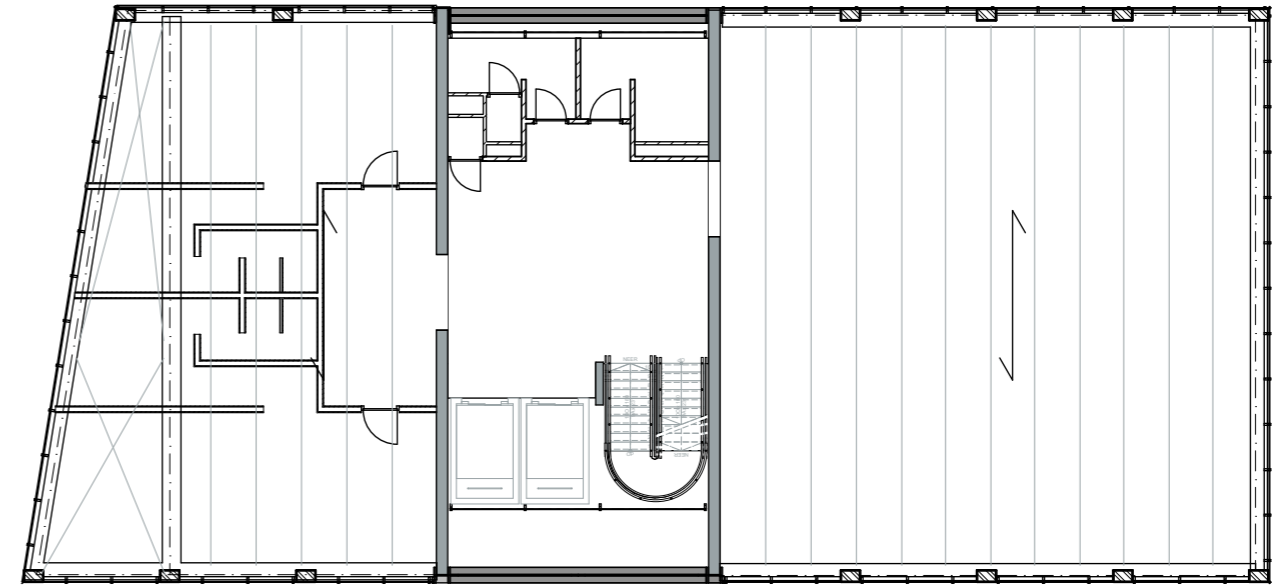
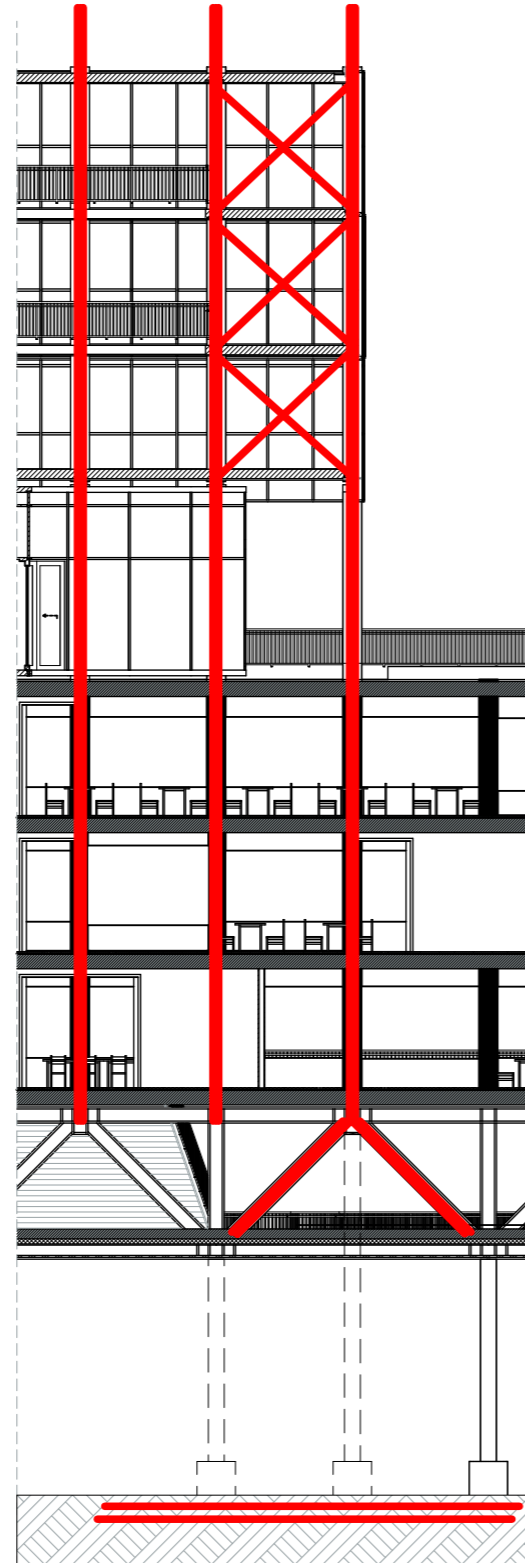
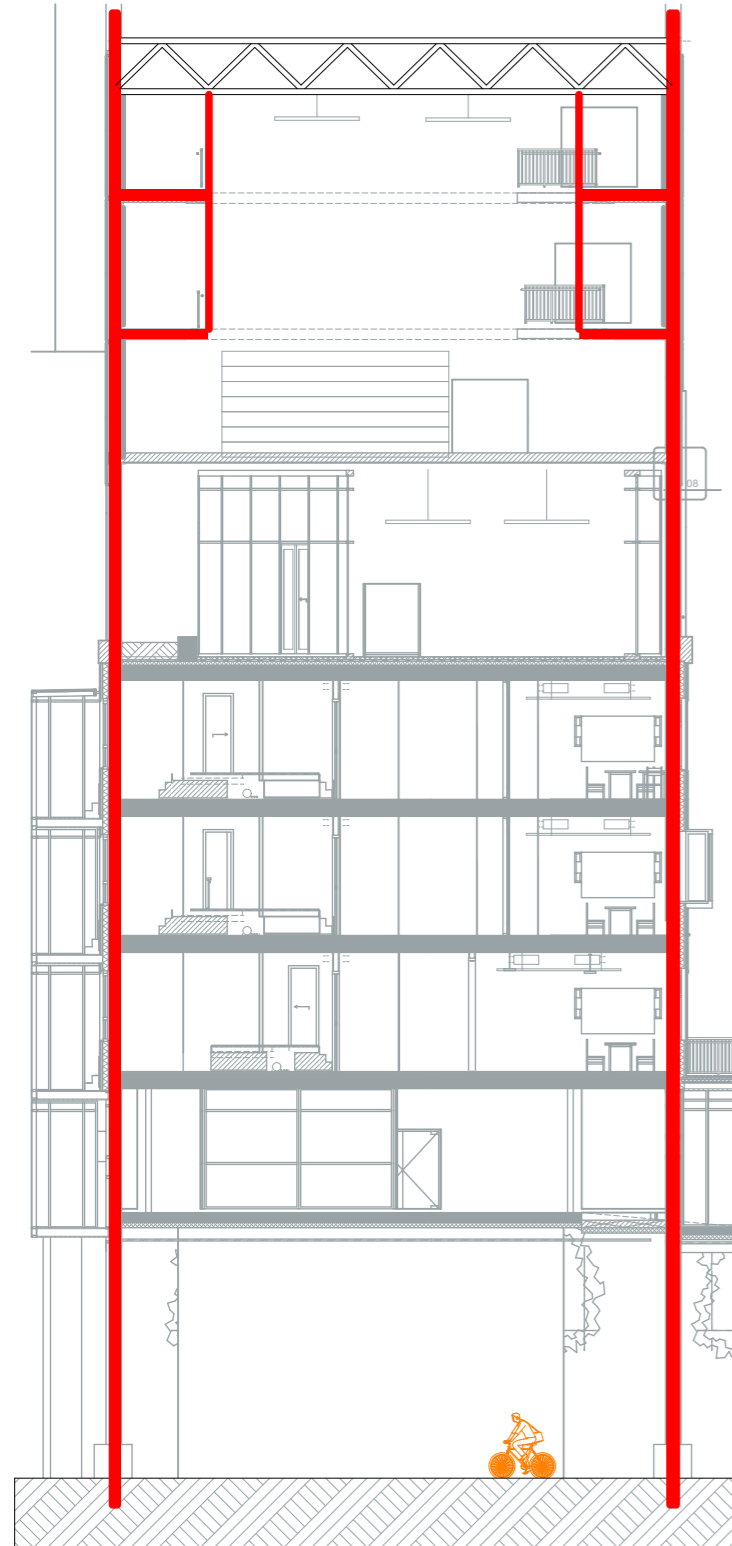
LOAD BEARING STRUCTURE

CLIMATE

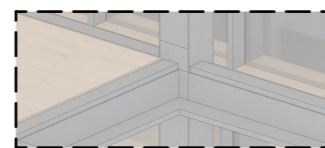


# LOAD BEARING STRUCTURE





THQ HOEDLIGGER  
THQa PETLIGGER



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>Structure new volume</b>	Layout number:	<b>01.12.3-01.12.3.1</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag



# CLIMATE

CONCEPT

SEASONS

SUN ENTRANCE

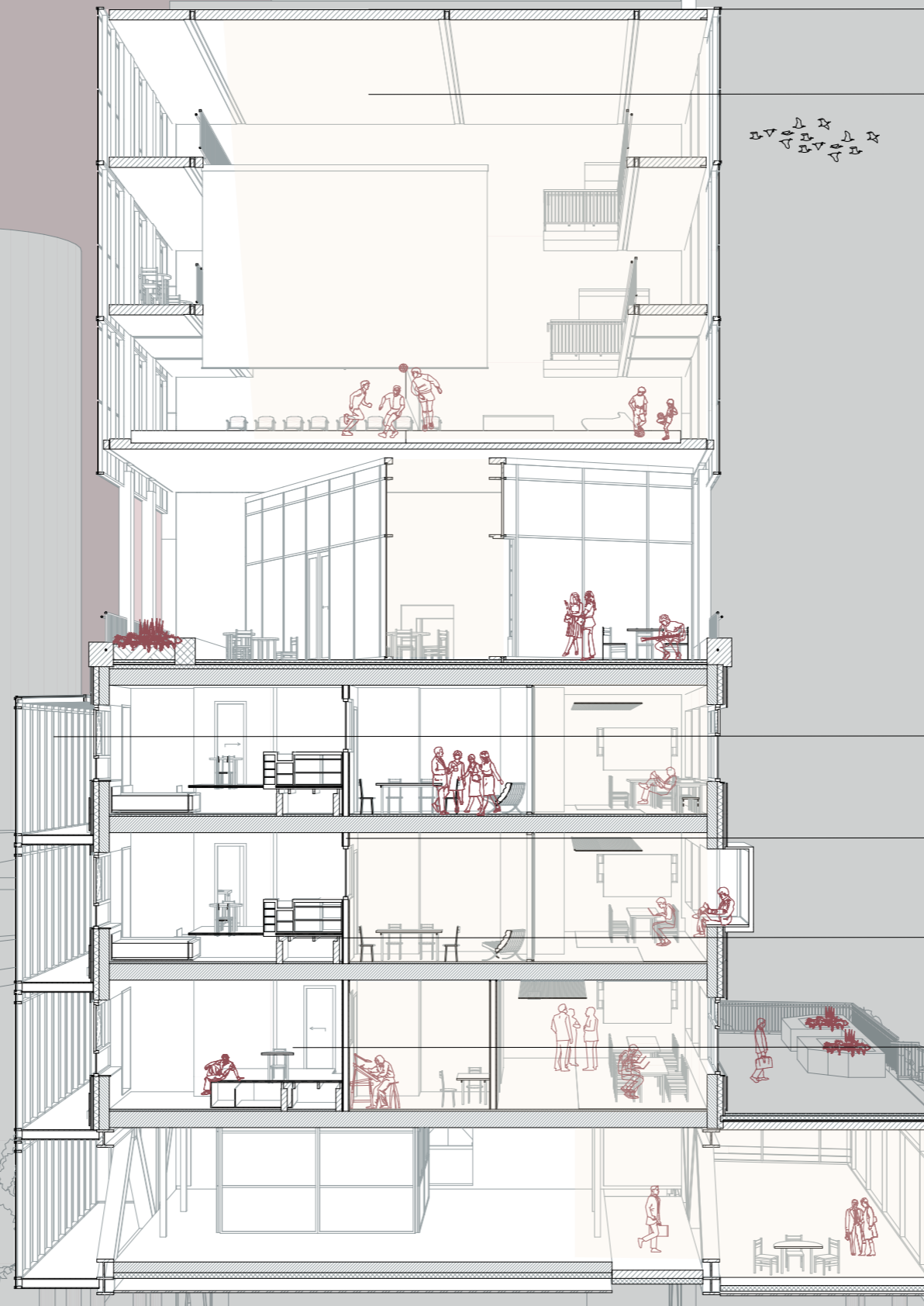
FIRE PROOVING

ELECTRICITY

# CLIMATE CONCEPT

ARCHICAD EDUCATION VERSION  
SOLAR PANELS; 280 PANELS  
1900X900; 285 WP

VENTILATION SYSTEM HEAT  
RECOVERY 95% OUT+IN



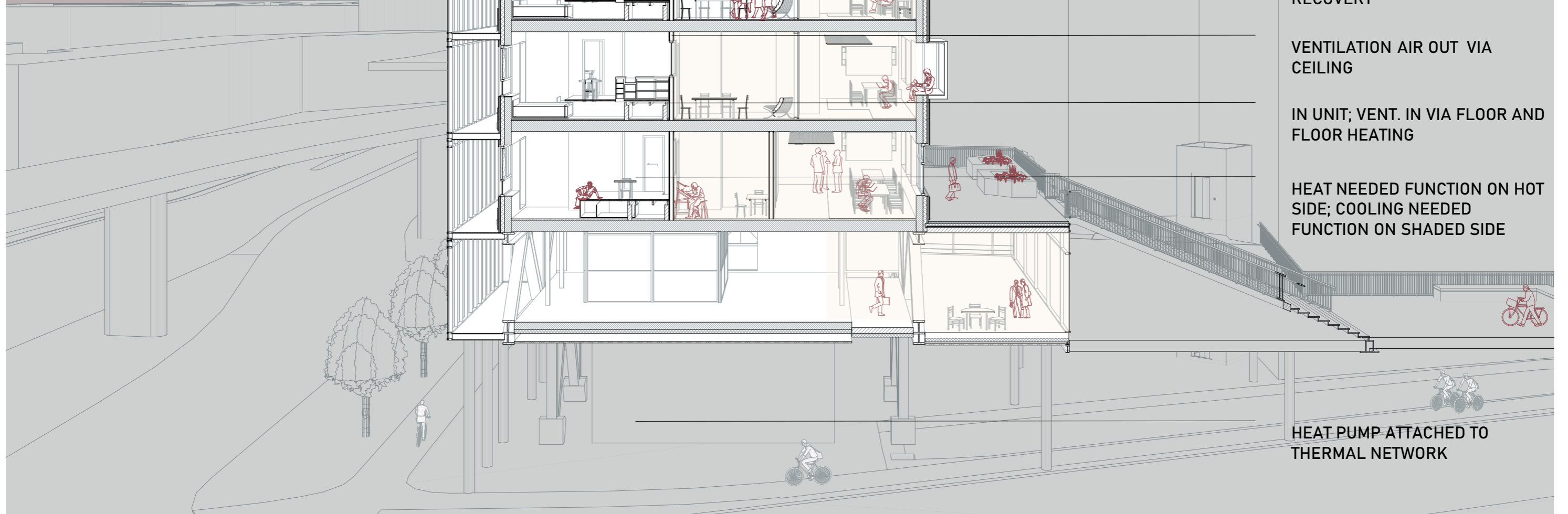
GALLERY FOR SHADING AND HEAT  
RECOVERY

VENTILATION AIR OUT VIA  
CEILING

IN UNIT; VENT. IN VIA FLOOR AND  
FLOOR HEATING

HEAT NEEDED FUNCTION ON HOT  
SIDE; COOLING NEEDED  
FUNCTION ON SHADED SIDE

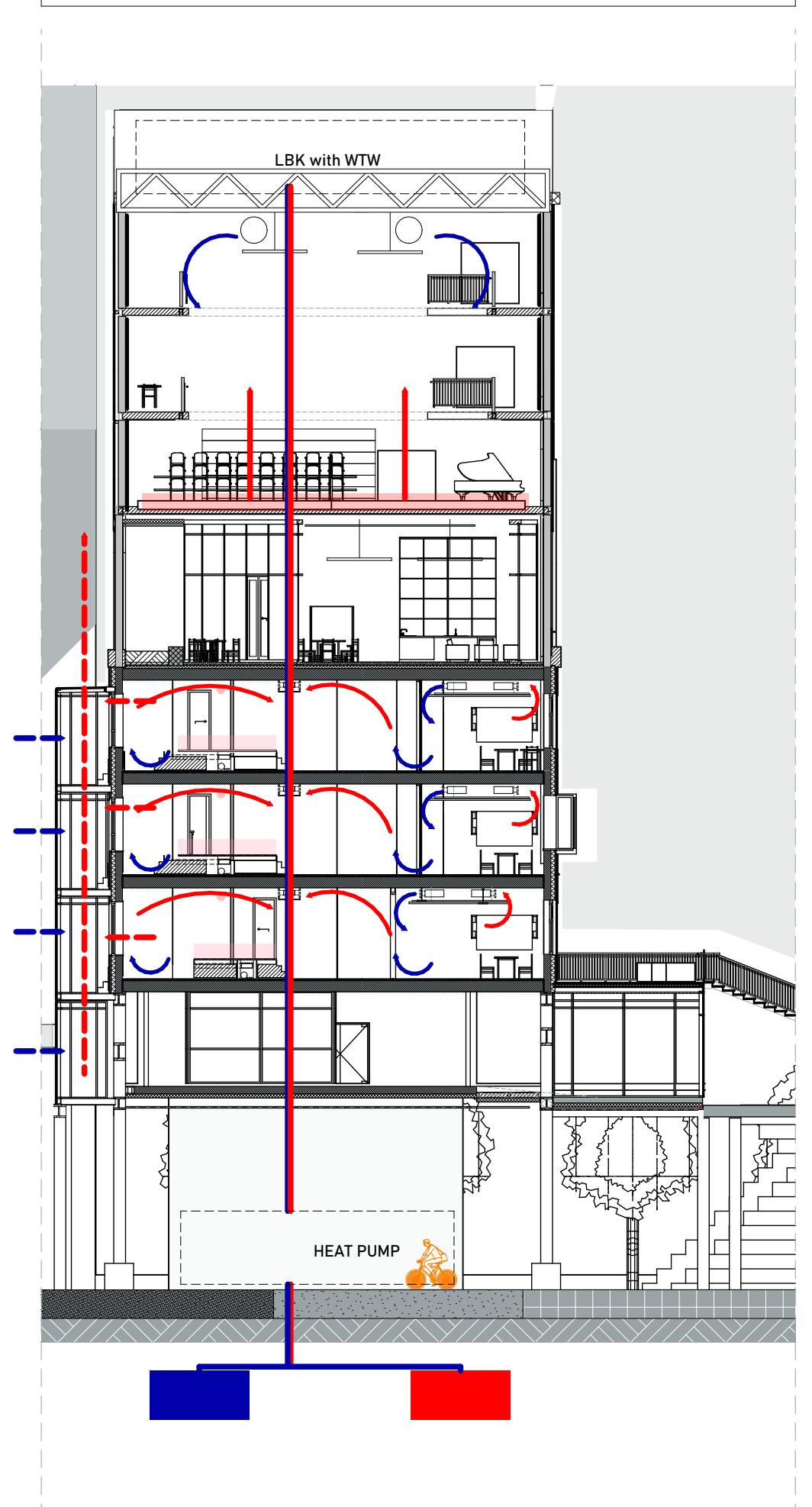
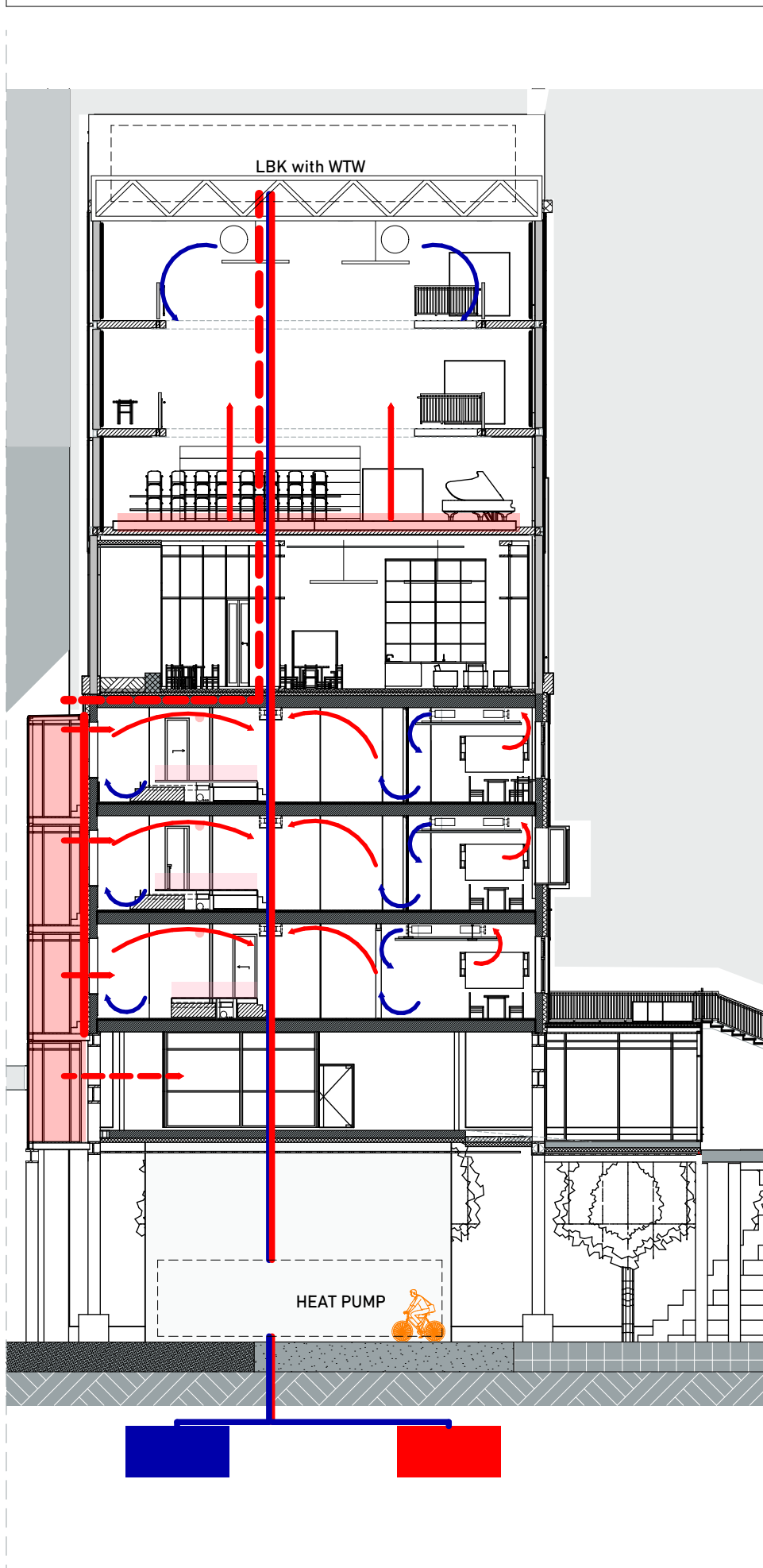
HEAT PUMP ATTACHED TO  
THERMAL NETWORK



# HEATING AND COOLING

WINTER

SUMMER



Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats
Working project:	<b>GRADUATION</b>
Layout number:	<b>01.12.4-01.12.4.3</b>
Layout Name:	<b>Climate seasons</b>
Draftsman	<b>Robert-Jan Altena</b> Den Haag

# SUN AND SHADE

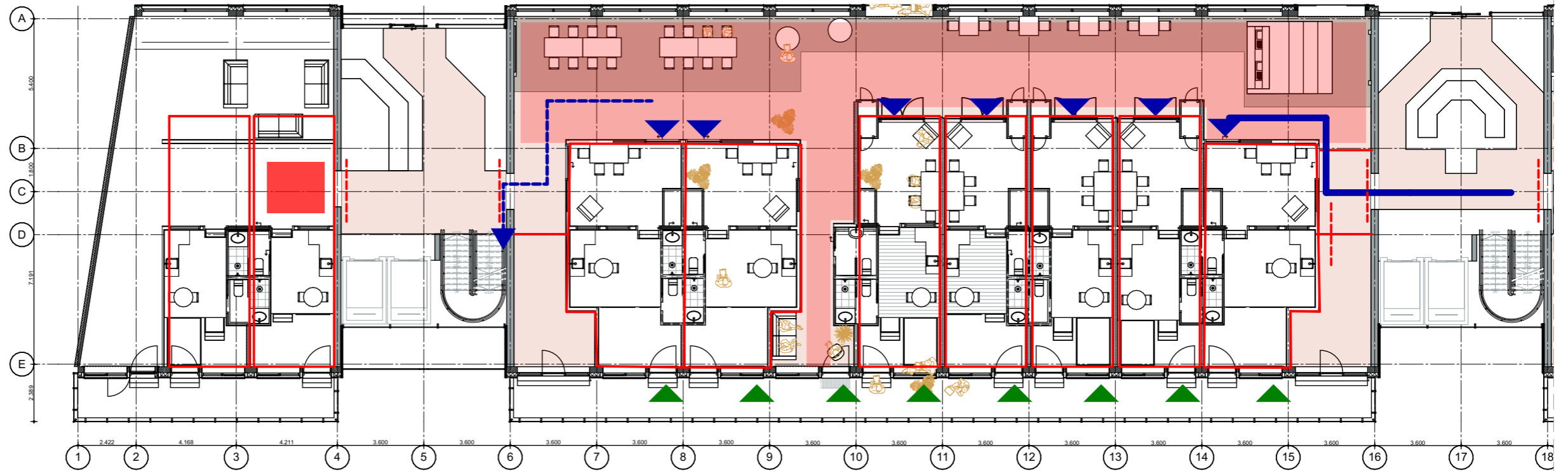



Shade from gallery


Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>Sun and shade</b>	Layout number:	<b>01.12.4-01.12.4.4</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag



# FIRE SAFETY



 30 minutes

 Fire door

 30 meters flight

 Heavy rules

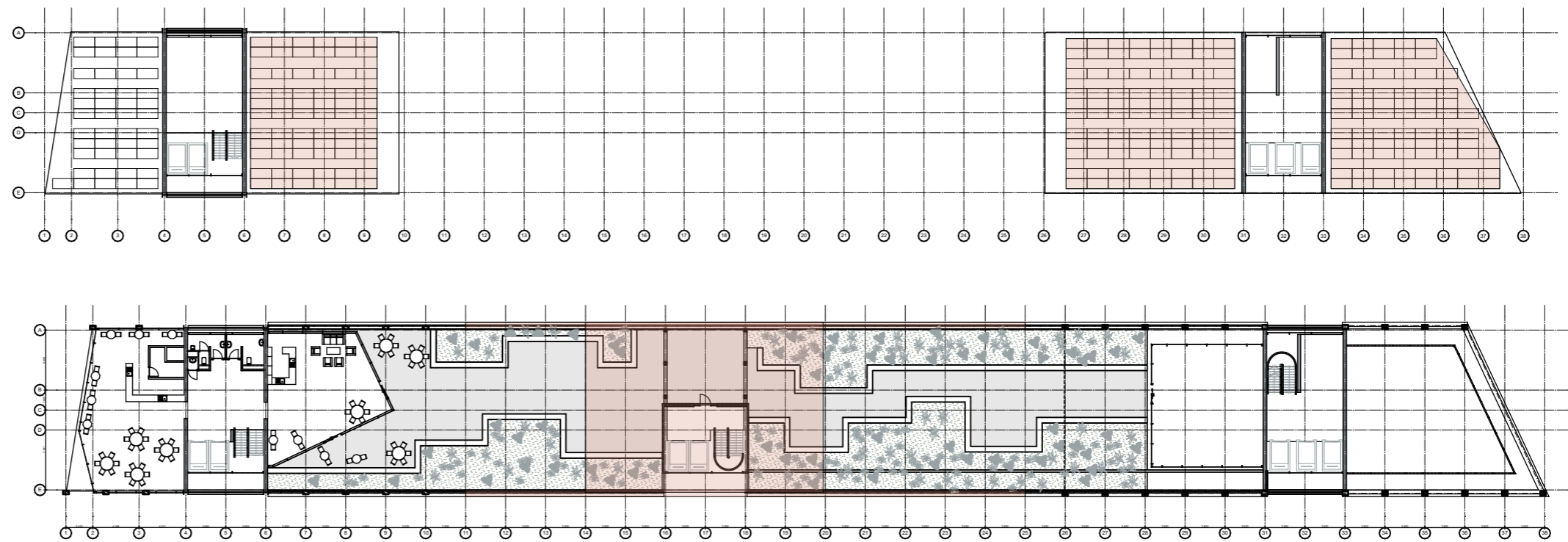
Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
Layout Name:	<b>Brand</b>	Layout number:	<b>01.12.4-01.12.4.5</b>
		Draftsman	<b>Robert-Jan Altena</b> Den Haag

9th floor 280 panels  
480 m<sup>2</sup>

5th floor 120 panels  
205 m<sup>2</sup>

5th floor 58 panels  
100 m<sup>2</sup>

785 m<sup>2</sup> horizontal  
panels



### ENERGY

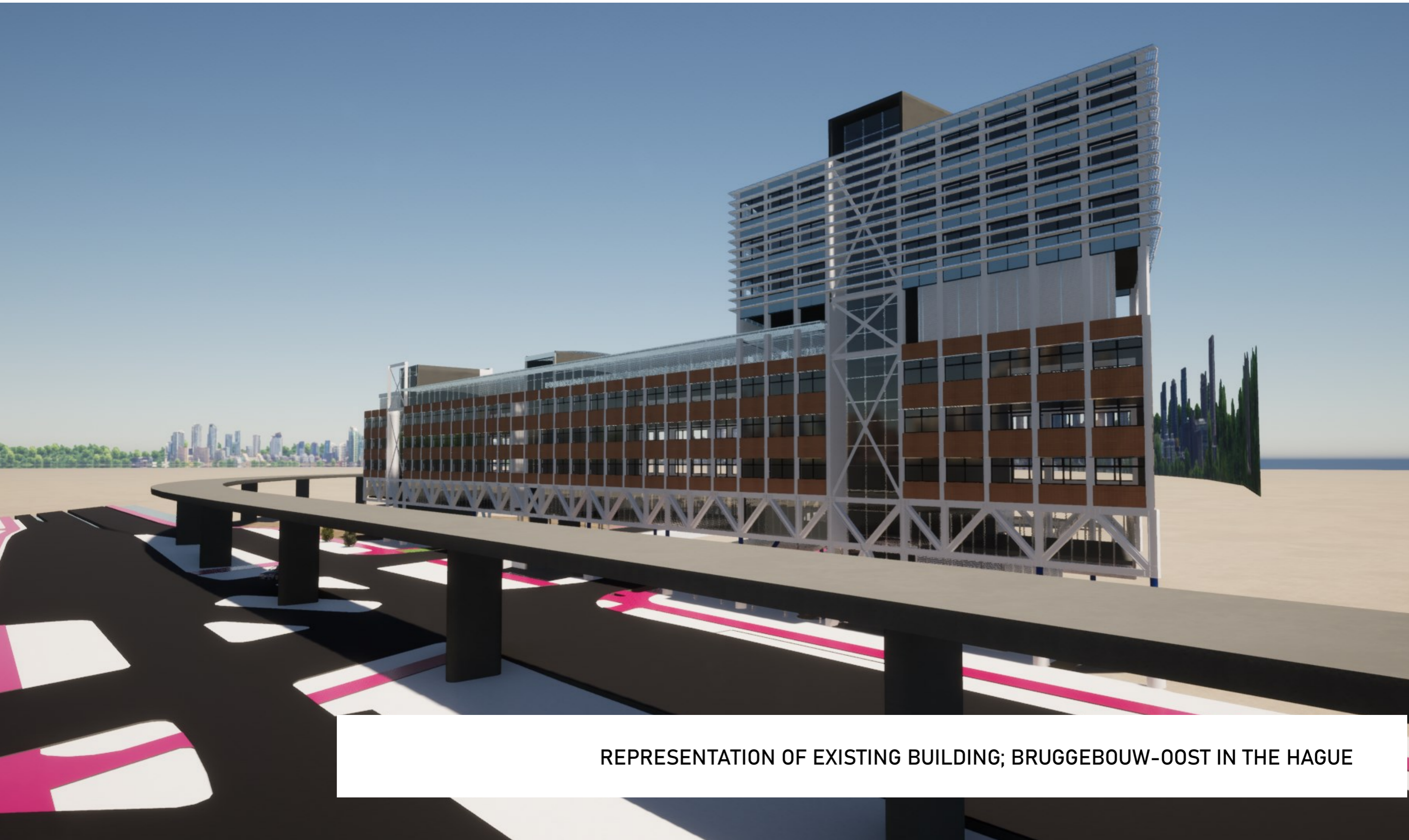
What:	Amount	m <sup>2</sup>	kWh/m <sup>2</sup>	Totally:
Restaurant	1	300		31200
Multispace	1	330	73,4	24222
Gym	1	260	73,4	19084
Dwellings	113	113	1925	217525
Work unit	113	17	61	1037
Workspace	1	800	61	48800
Supermark	1	110	467	51370
Small kiosk	1	100	109,9	10990
Big kiosk	1	200	109,9	21980
Leisure space	1	400		0

VBG	6681 m <sup>2</sup>	426208 kWh
BENG 25%		<b>106552 kWh</b>
		125355 Wp
285 Wp per paneel	440 Panels 1900x900	1,71 m <sup>2</sup> per paneel
Totaal oppervlak		<b>752 m<sup>2</sup> solar panels</b>

Project	<b>WeWo Building</b> Transformation Bruggebouw-Oost Grotiusplaats	Working project:	<b>GRADUATION</b>
		Layout number:	<b>01.12.4-01.12.4.6</b>
Layout Name:	<b>Energy</b>	Draftsman	<b>Robert-Jan Altena</b> Den Haag



# VISUALS



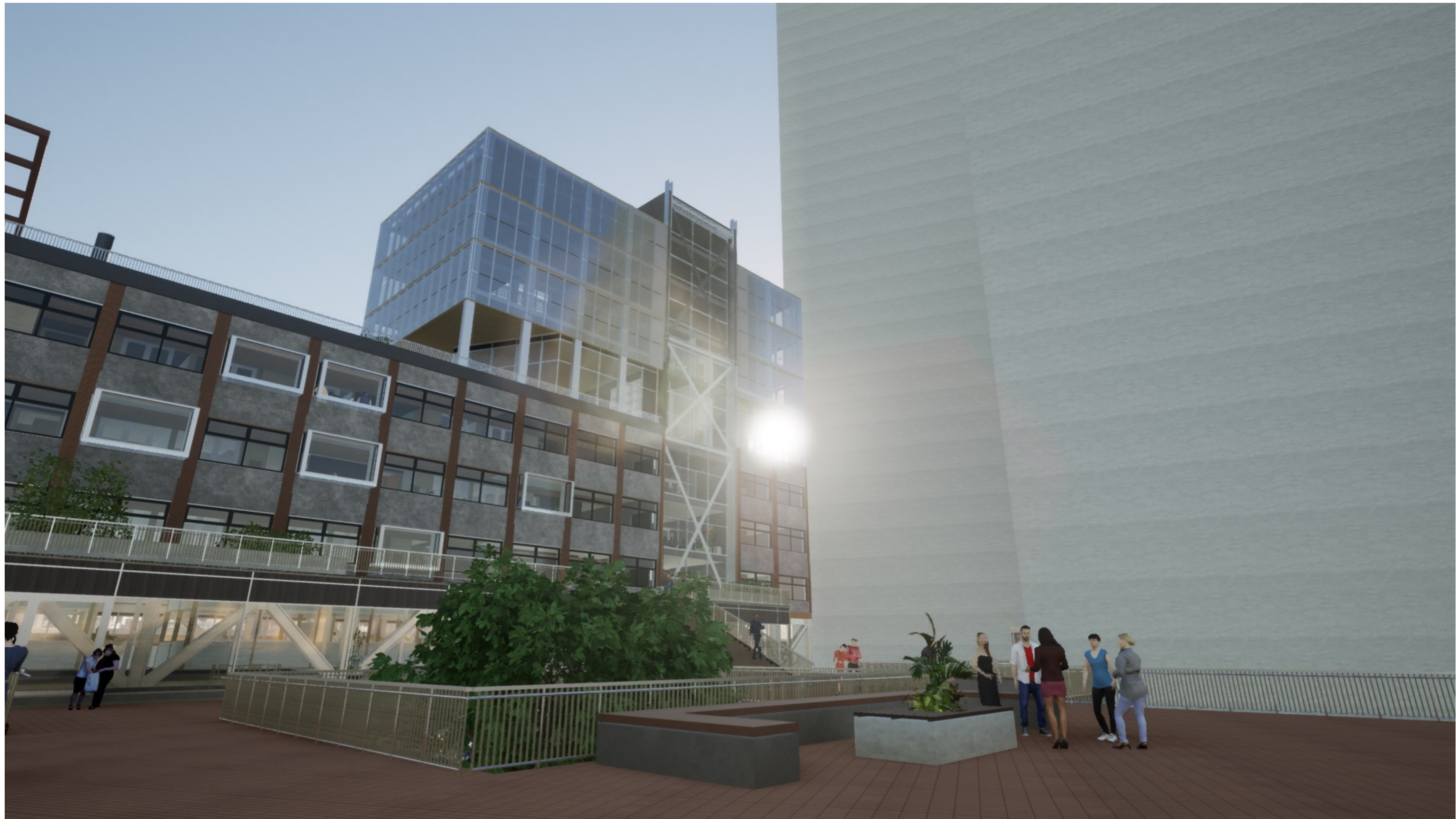
REPRESENTATION OF EXISTING BUILDING; BRUGGEBOUW-OOST IN THE HAGUE





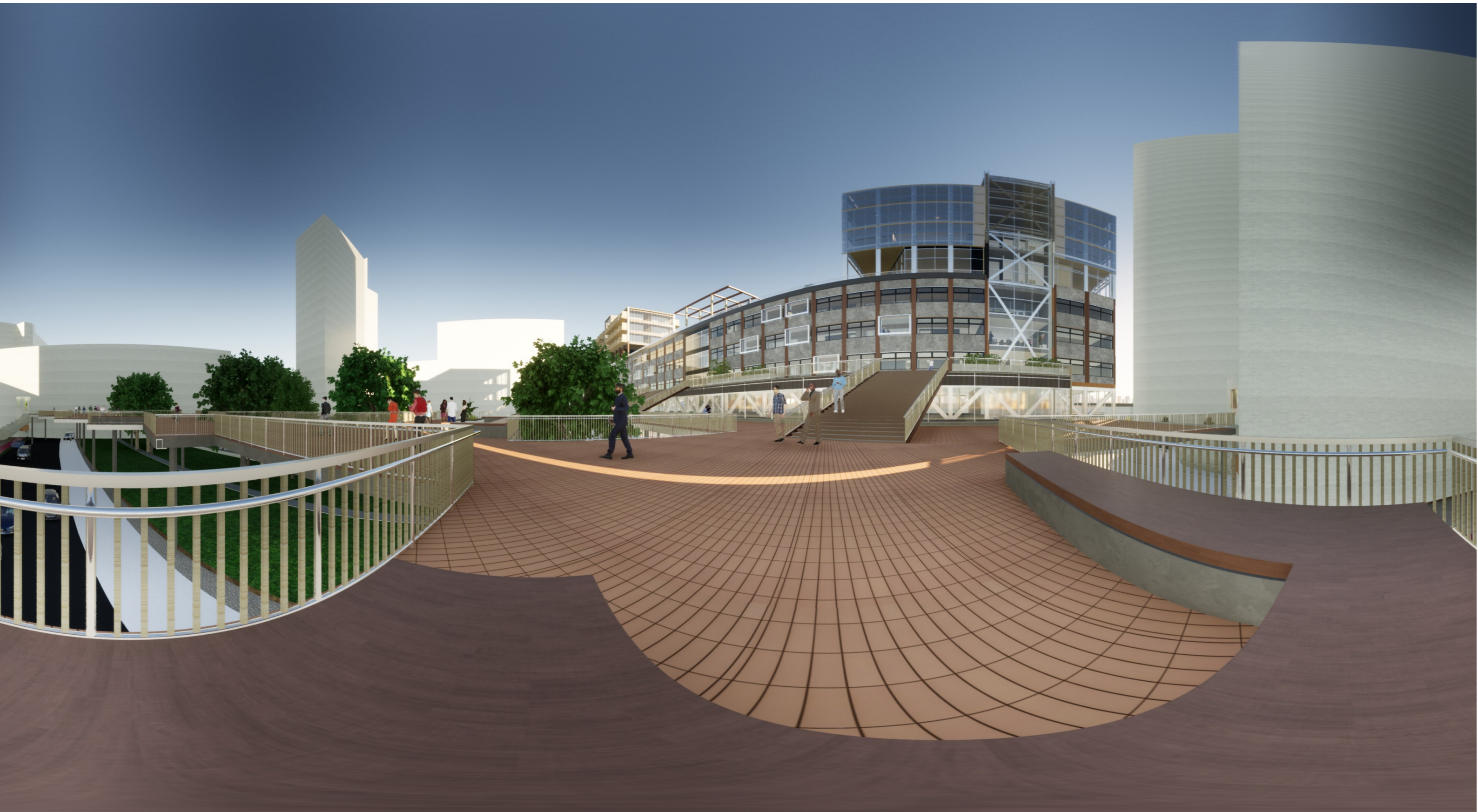
REPRESENTATION OF THE EAST FACADE OF THE NEW BUILDING





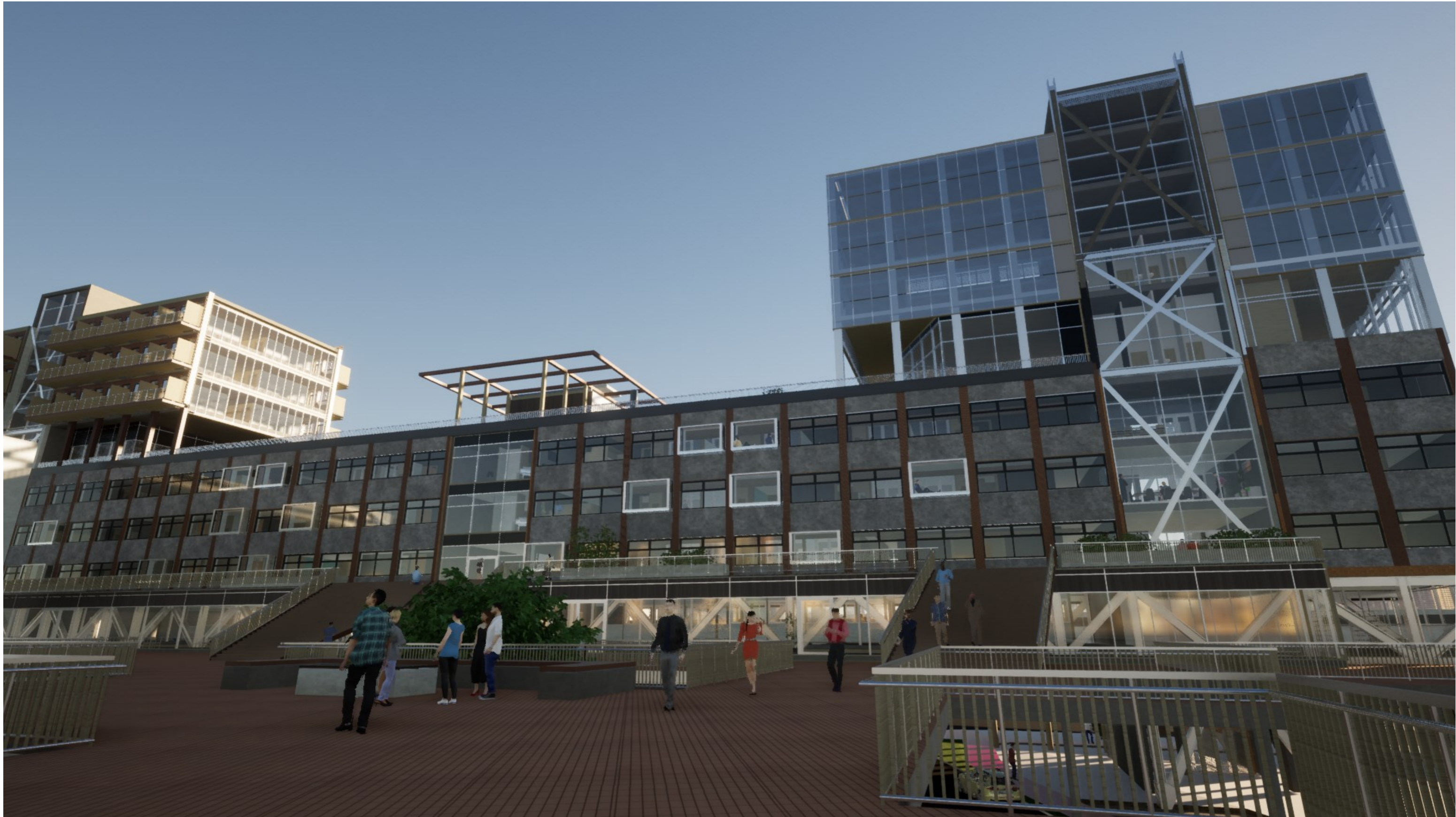
NEW ADDED VOLUME SEEN FROM THE SQUARE SIDE





PANORAMA FROM SQUARE AND NEW BUILDING





WEST FACADE OF THE NEW BUILDING





PLINTH, ON THE FIRST FLOOR





WORKING LIVING FLOORS (SECOND, THIRD AND FOURTH FLOOR)





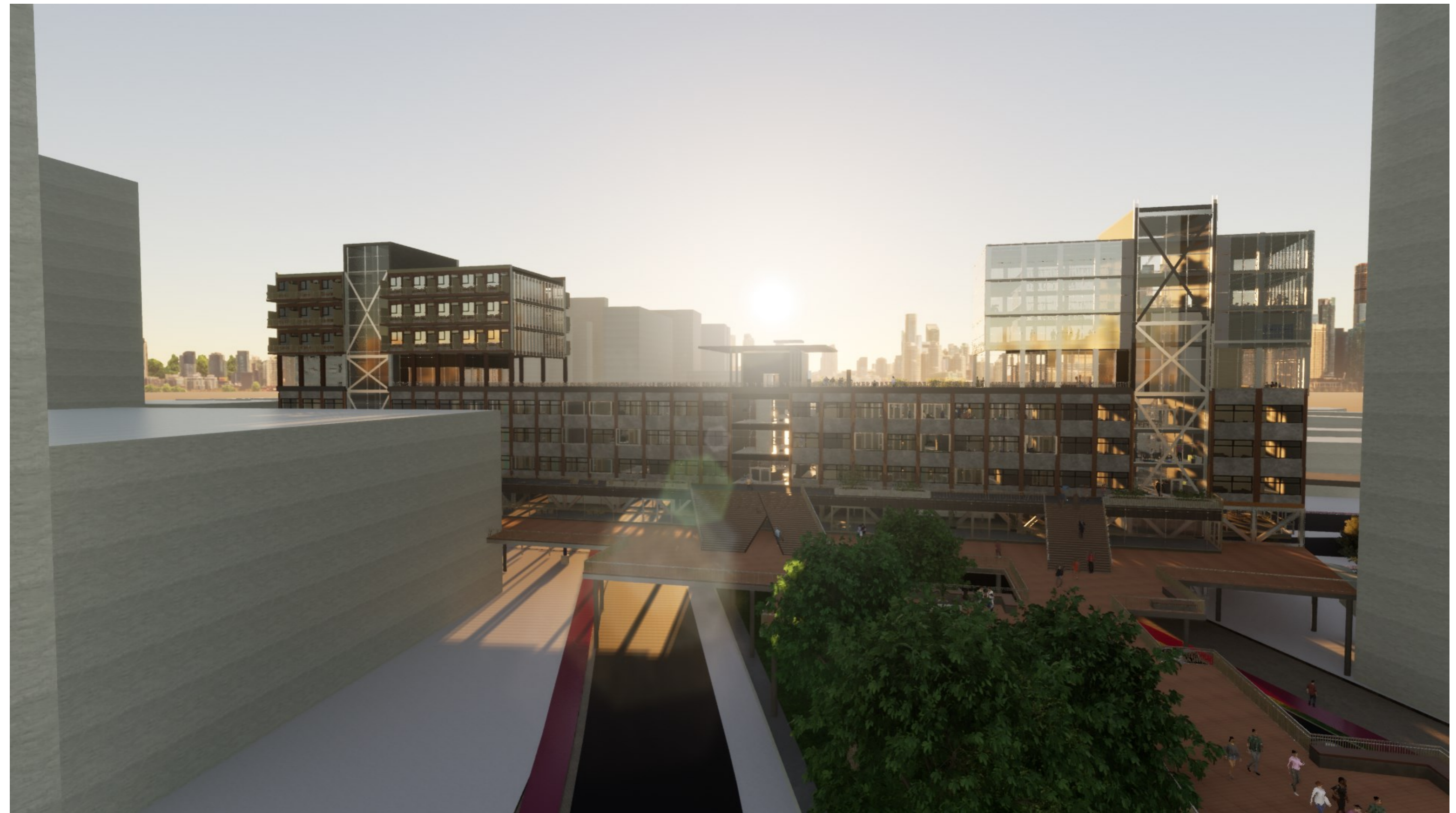
THE INSIDE OF A DWELLING





VIEW OF THE ADDED MASS SEEN FROM THE FIFTH FLOOR





OVERVIEW OF THE PROJECT; WEST SIDE