AN ADAPTIVE VISION

ADAPTIVE REDESIGN OF 'DOK 25' MARINETERREIN

AR3AE015 Architectural Engineering: Intecture graduation studio (2017-2018)

P5 Booklet
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4418670

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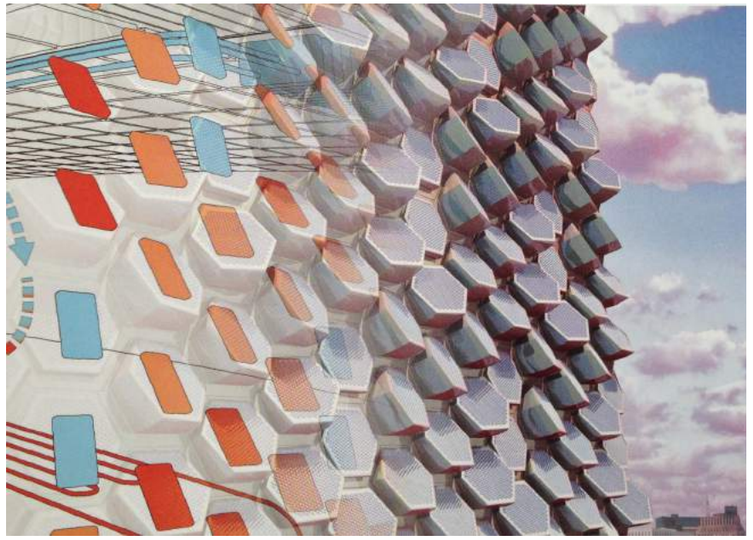
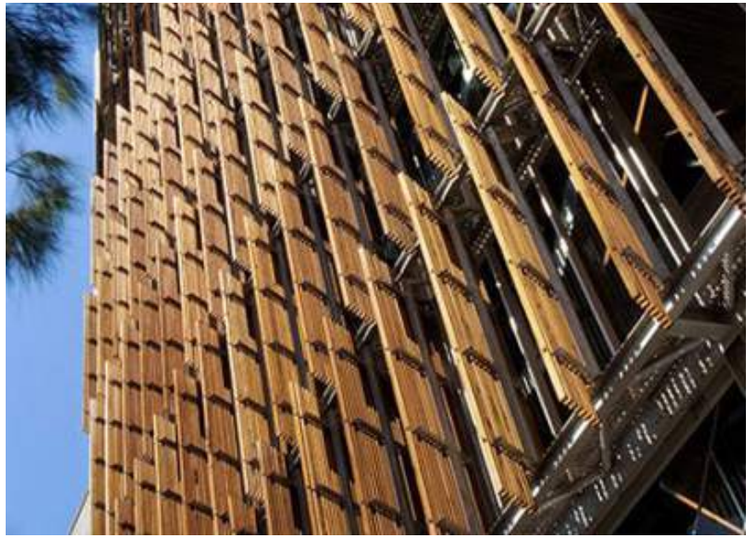
Mechanism Adaptive facade

INTRODUCTION

FASCINATION

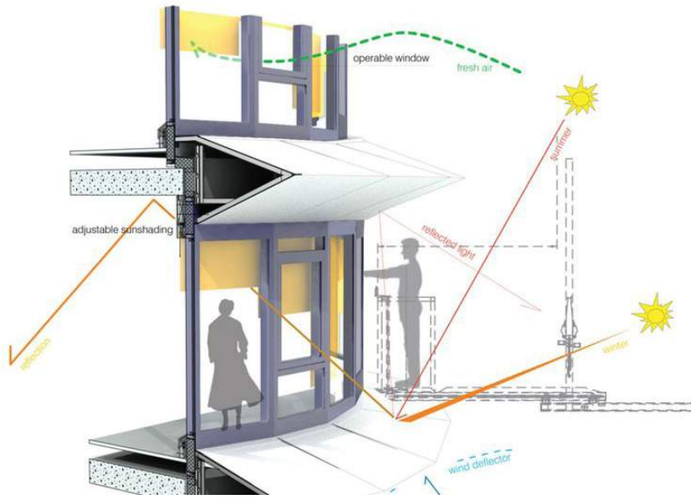
FAÇADE WHICH REACTS ON THE CLIMATE

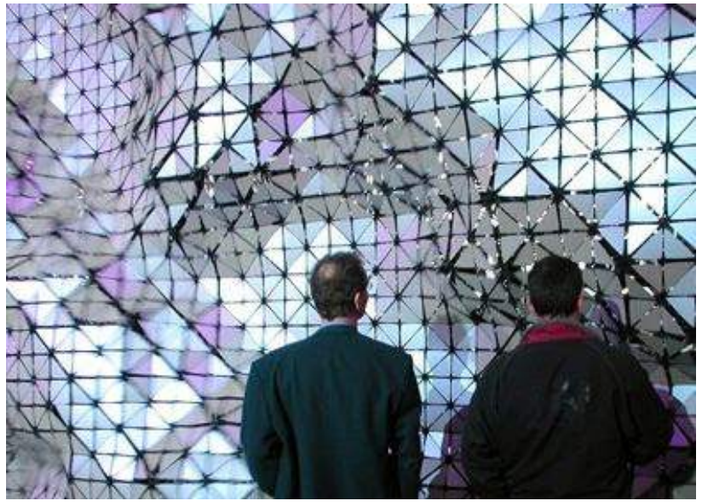




FASCINATION

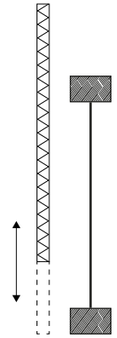
FAÇADE REACTS ON THE USER



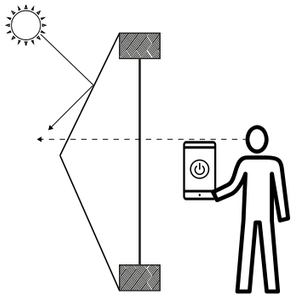


FASCINATION

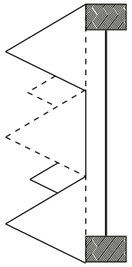
ADAPTIVE



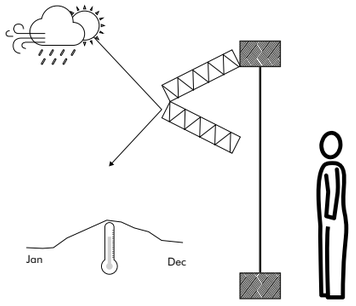
MOVABLE
2D



SMART



KINETIC
3D



ADAPTIVE

ADAPTIVITY

DEFINITION:

Capable to change the functions, features or behaviour over time,
due to several Inputs,
in response to transient performance requirements and boundary conditions.

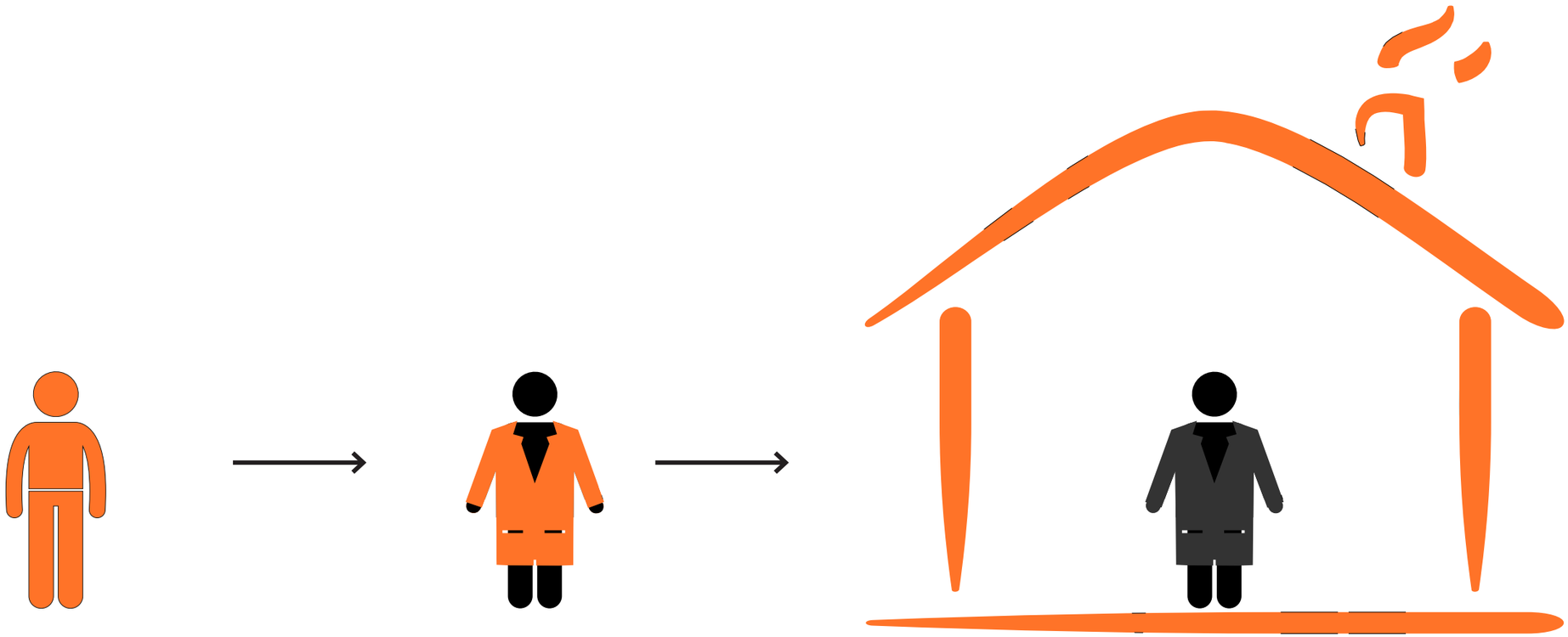
(Researcher, R.C.G.M. Loonen)

PROBLEM STATEMENT

STATIC

PROBLEM STATEMENT

THIRD LAYER



1ST LAYER

BODY

2ND LAYER

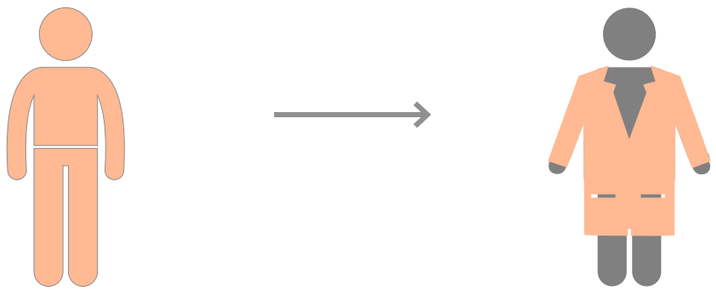
CLOTHES

3RD LAYER

BUILDING SHELL

PROBLEM STATEMENT

ELECTRICITY CONSUMPTION

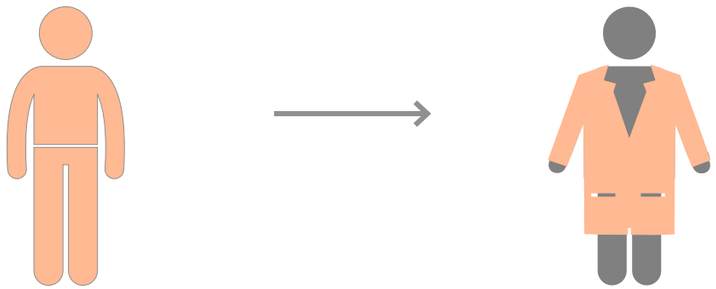


CLIMATE

PROBLEM STATEMENT

ELECTRICITY CONSUMPTION

HVAC



PROBLEM STATEMENT

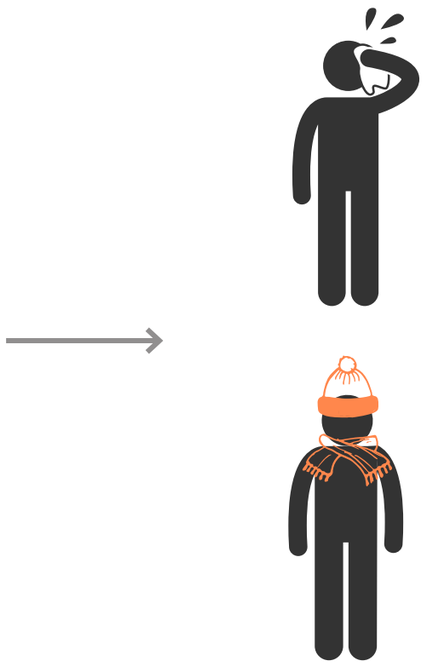
PERCEPTION COMFORT

HUMAN BODY REACTS ON THE ENVIRONMENT CHANGES

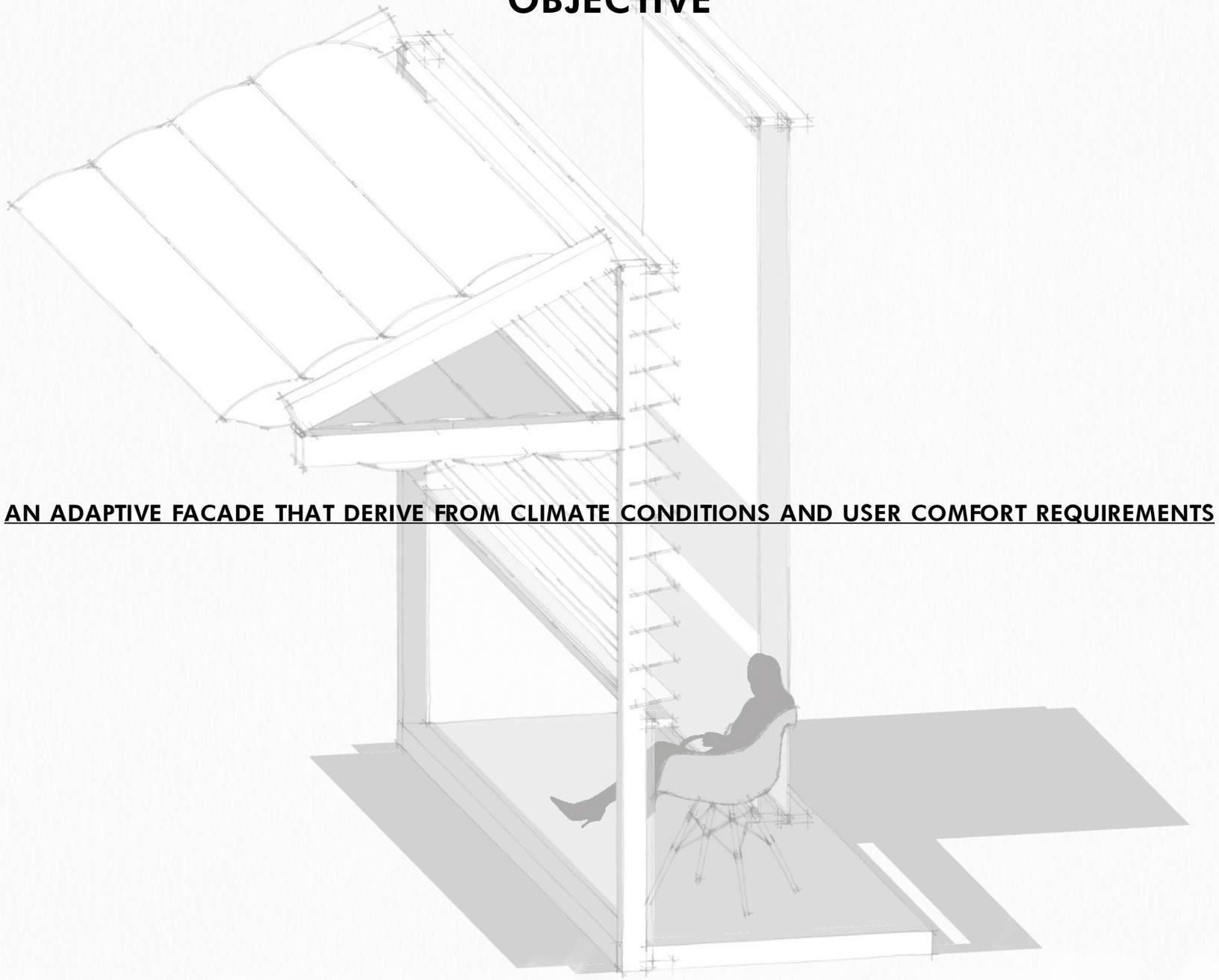
PROBLEM STATEMENT

PERCEPTION COMFORT

COMFORT PERCEPTION IS DIFFERENT FOR EVERY PERSON



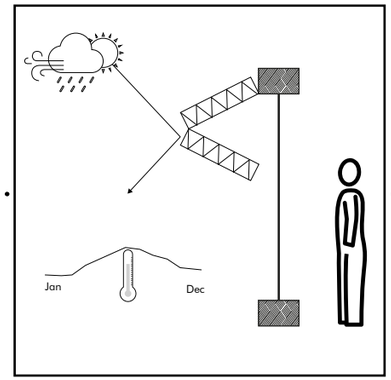
OBJECTIVE



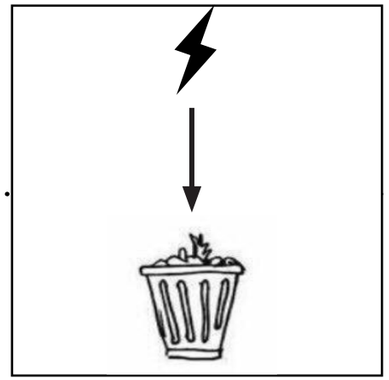
AN ADAPTIVE FACADE THAT DERIVE FROM CLIMATE CONDITIONS AND USER COMFORT REQUIREMENTS

RESEARCH

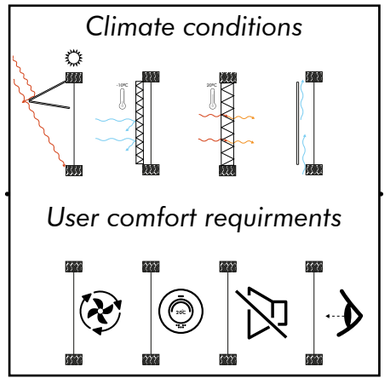
METHODOLOGY



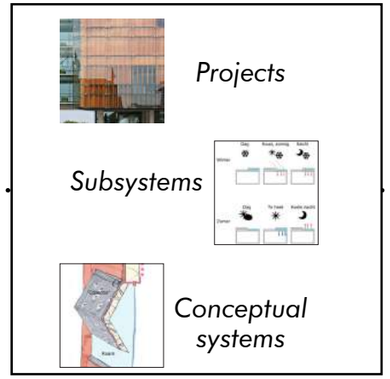
OBJECTIVE



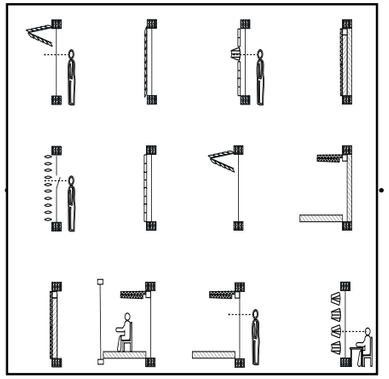
PROBLEM STATEMENT



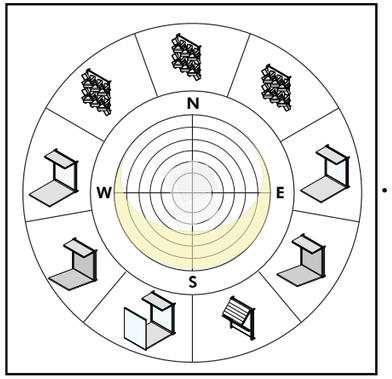
PARAMETERS



CASE STUDIES



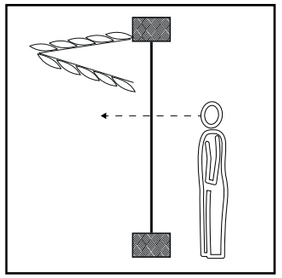
CONFIGURATIONS



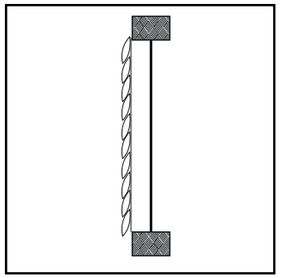
DESIGN TOOL

CONFIGURATIONS

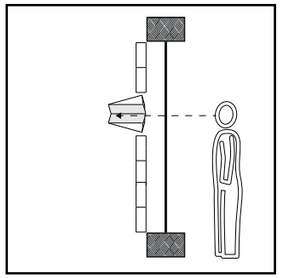
ELEMENTS



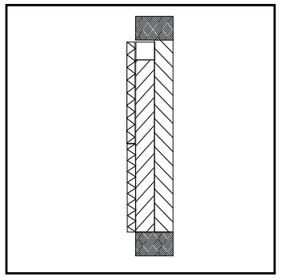
FULLY OPEN



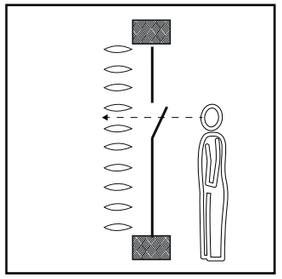
FULLY CLOSED



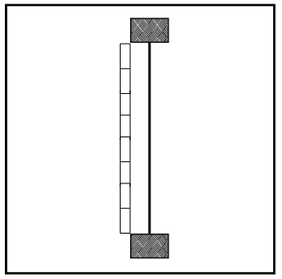
PARTLY OPEN / CLOSED



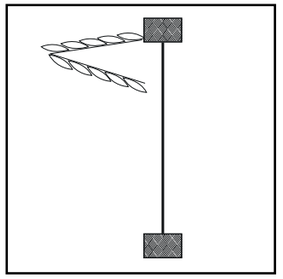
MULTIPLE LAYERS



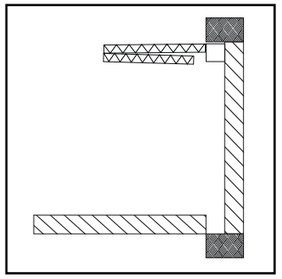
OPEN A WINDOW



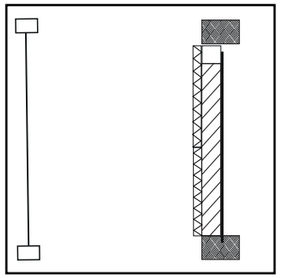
LAYER INSULATION



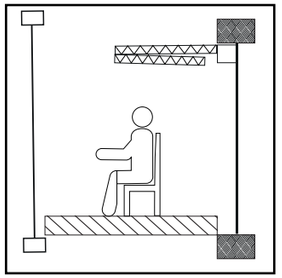
LAYER SUN SHADING



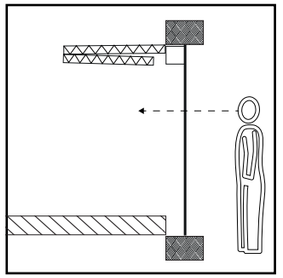
LAYER THERMAL MASS



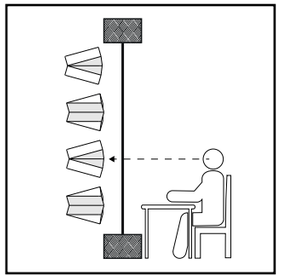
SECOND SKIN



CREATE SEATING SURFACE



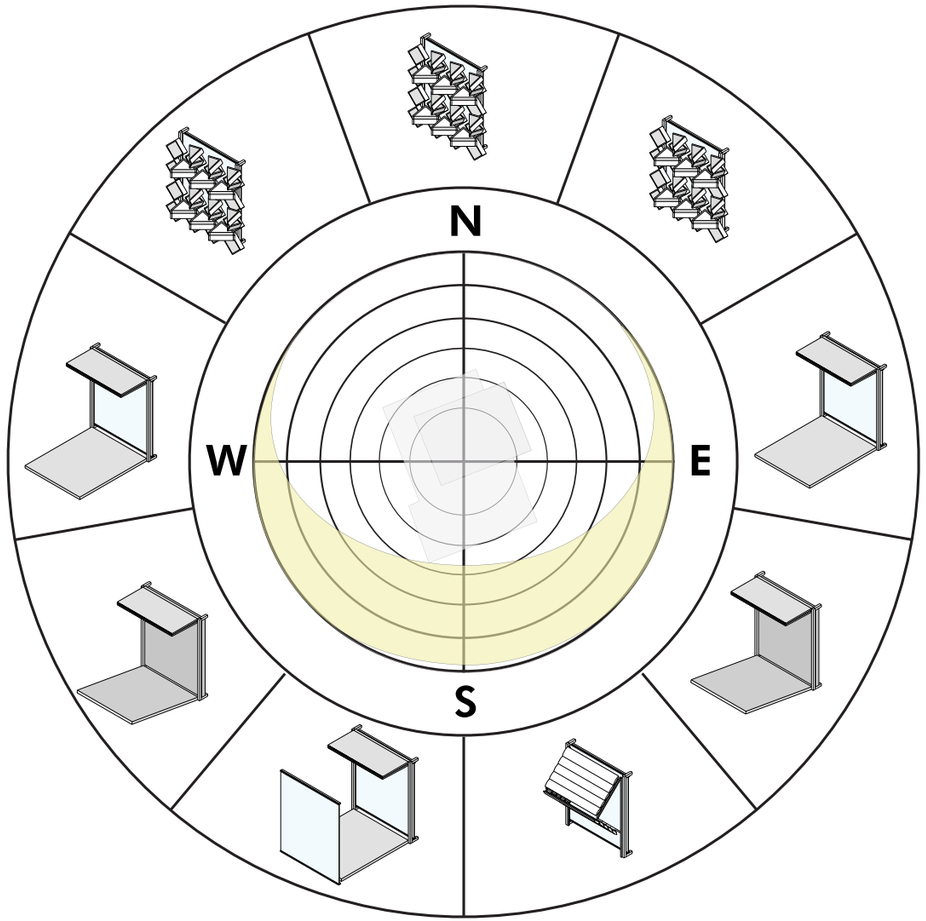
LARGE ELEMENTS COLLECTIVE TEMP.



SMALL ELEMENTS INDIVIDUAL TEMP.

DESIGN TOOL

CONCLUSION

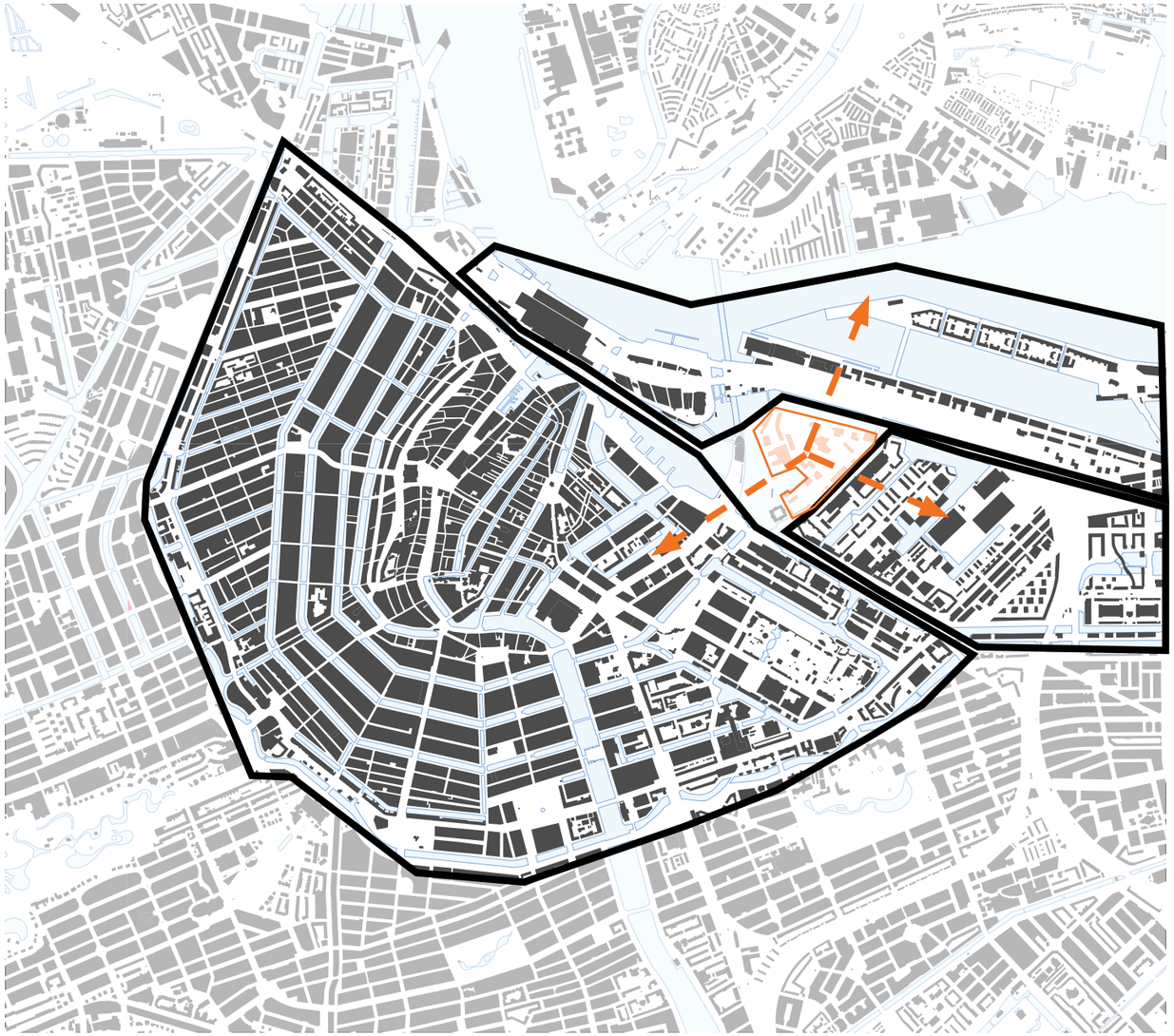


ANALYSIS

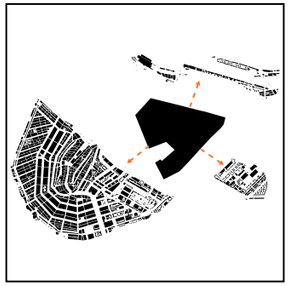
MARINETERRAIN

CONNECTING

CENTRAL LOCATED



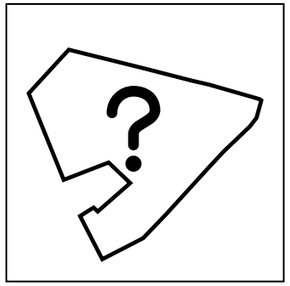
Connected with the city centre, Java island -Pietheinkade and East of Amsterdam.



CONNECTING

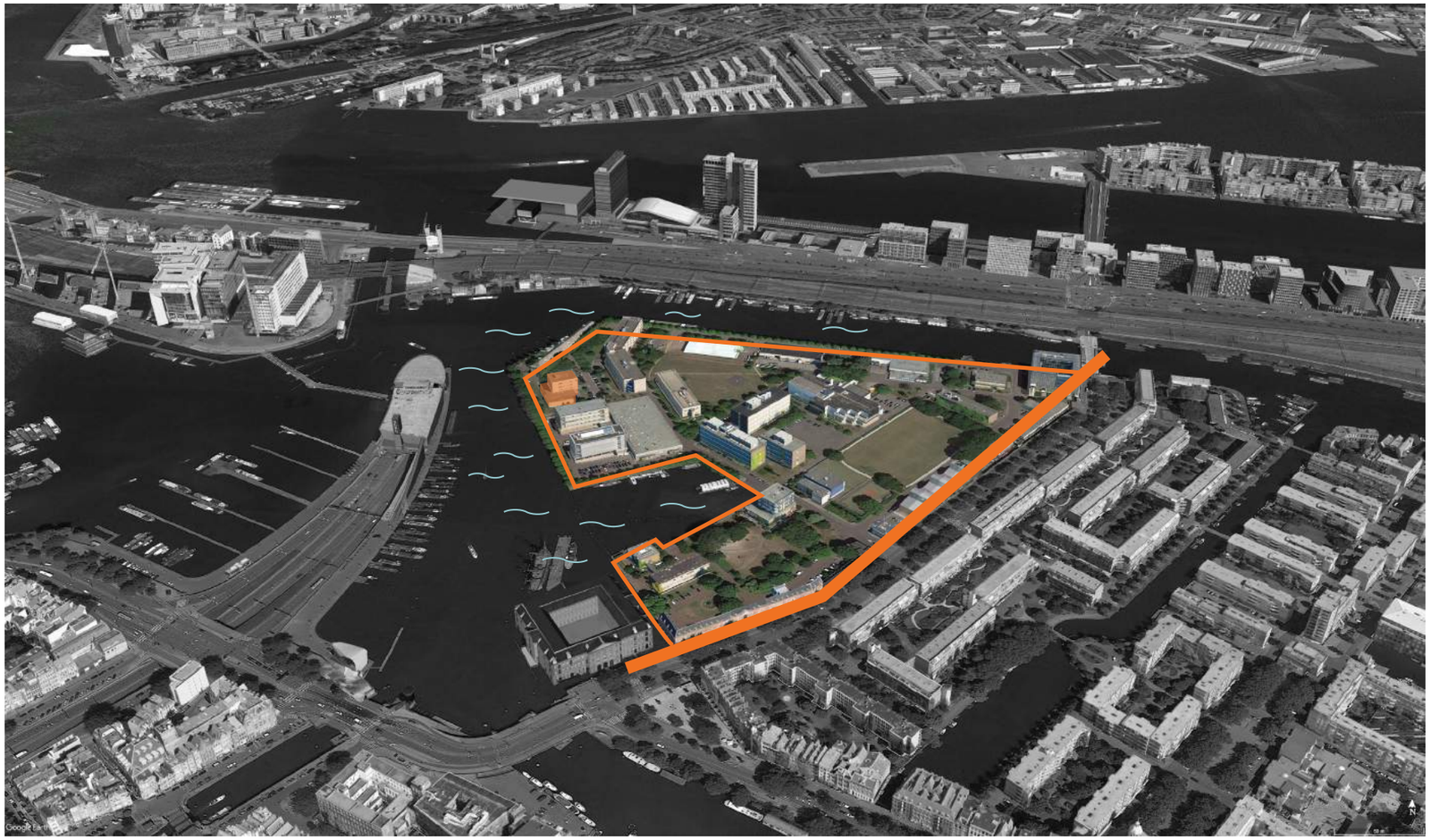
UNKNOWN AREA

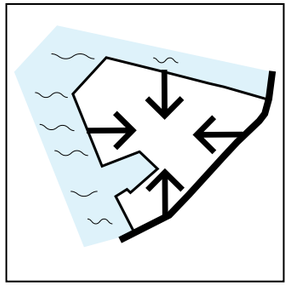
Located in Amsterdam



CONNECTING

CLOSED OF AREA, SURROUNDED BY WATER



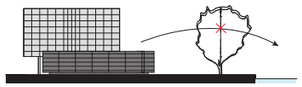


Closed of area

CONNECTING

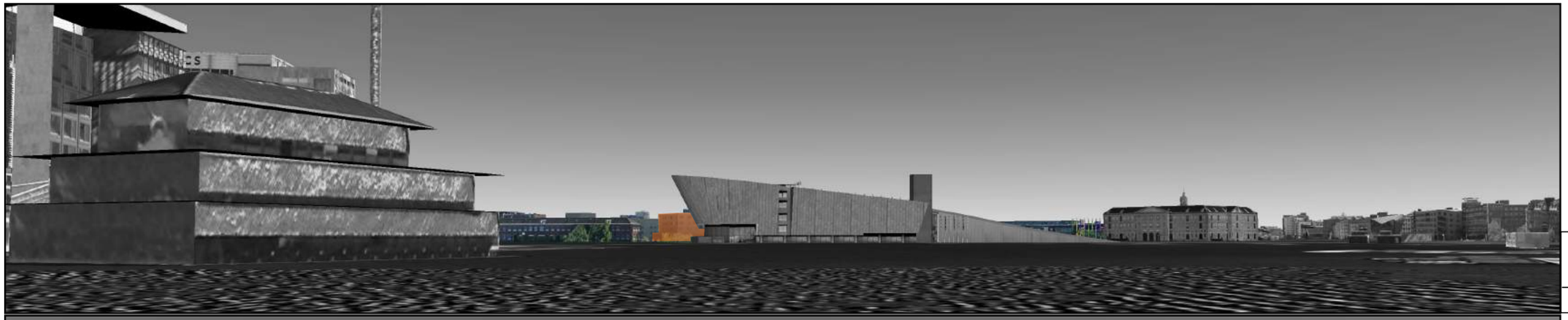
RELATION WATER

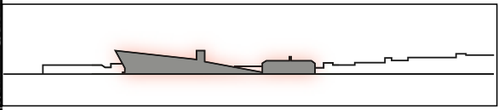
No direct connection with the water

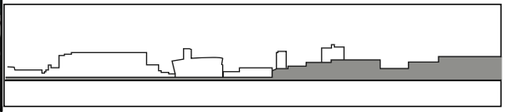


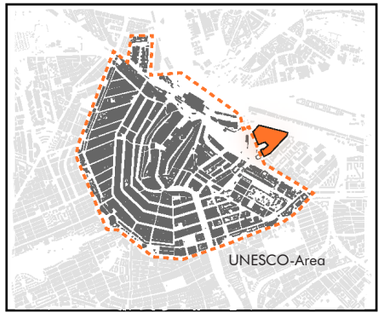
ACTIVATING

SURROUNDINGS



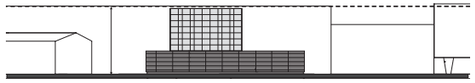






ACTIVATING

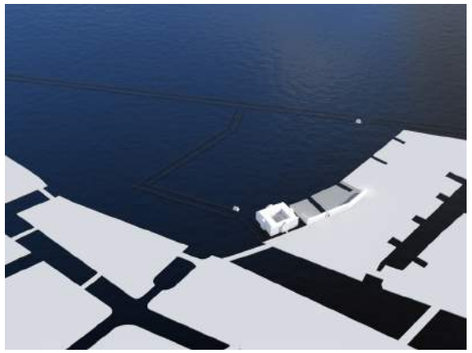
INTROVERT



Introvert: Same height with the surrounding buildings

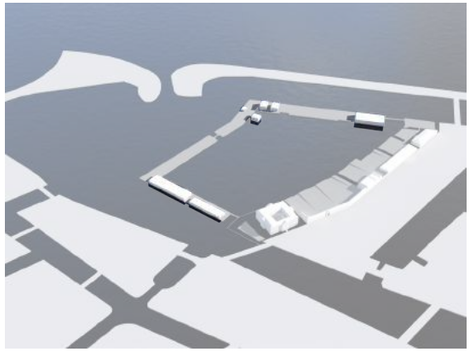
INNOVATING

FUNCTIONAL DEVELOPMENT



1655

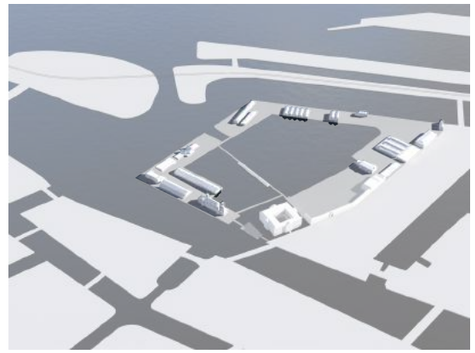
1790



1868

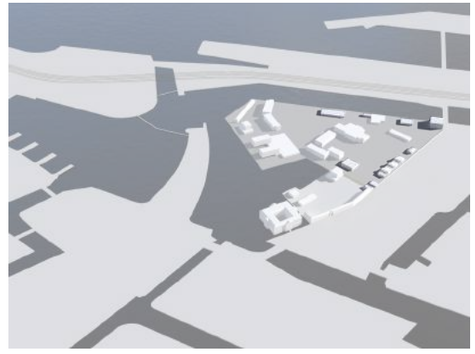
From shipyard and dock towards reclamation of the dock and construction of the IJtunnel

1915



1968

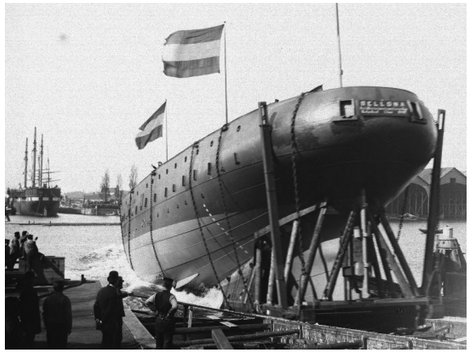
Current



INNOVATING

FUNCTIONAL DEVELOPMENT

1655



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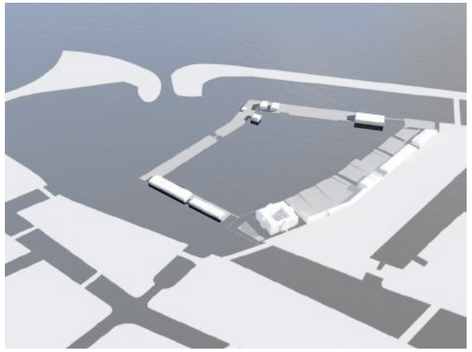
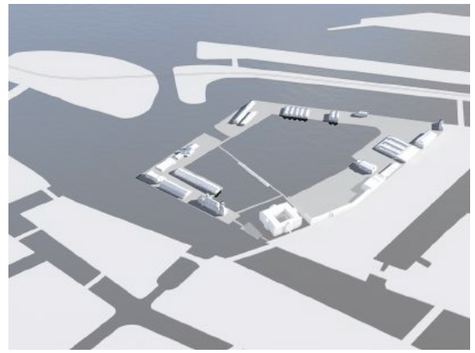


1868

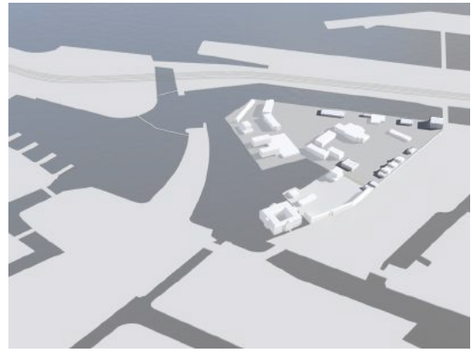
From shipyard and dock towards reclamation of the dock and construction of the IJtunnel

1915



1968

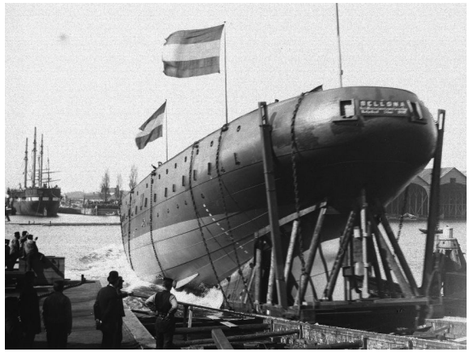
Current



INNOVATING

FUNCTIONAL DEVELOPMENT

1655



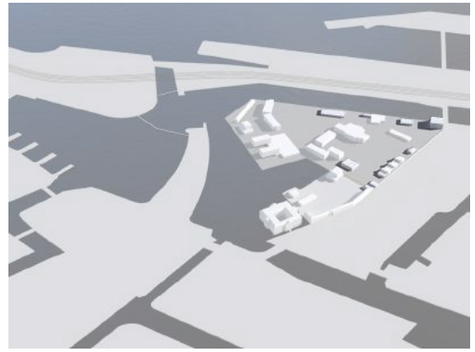
1790

1868

From shipyard and dock towards reclamation of the dock and construction of the IJtunnel

1915

1968

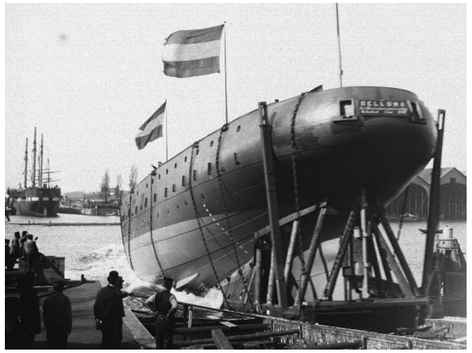


Current

INNOVATING

FUNCTIONAL DEVELOPMENT

1655



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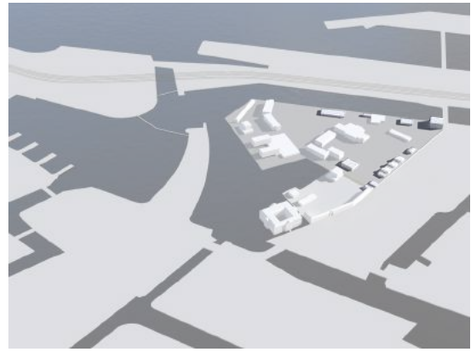
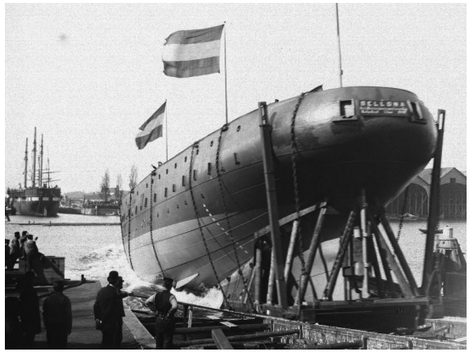


INNOVATING

FUNCTIONAL DEVELOPMENT

1655



1790

1868

From shipyard and dock towards reclamation of the dock and construction of the IJtunnel

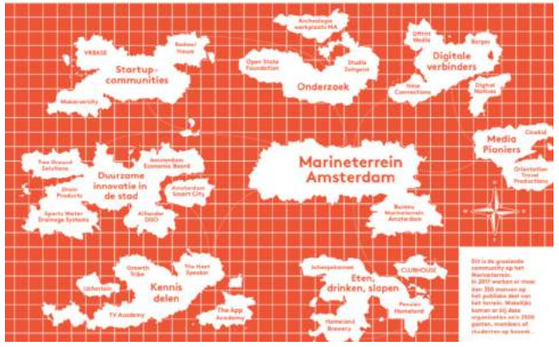
1915

1968

Current

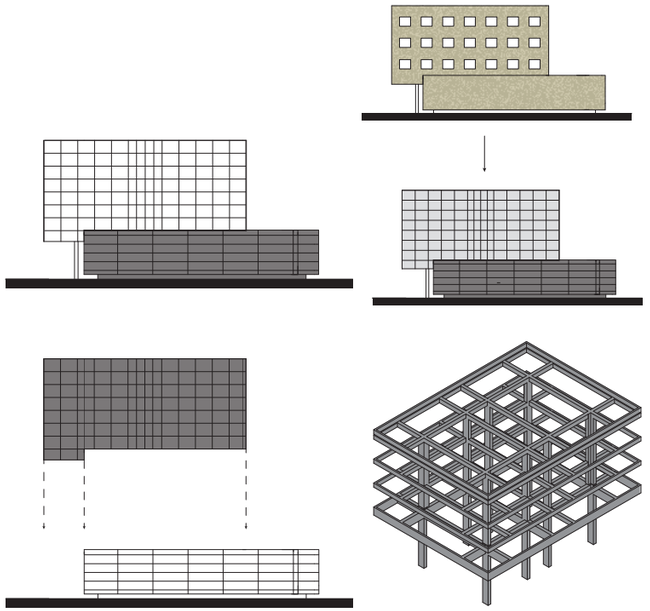
INNOVATING

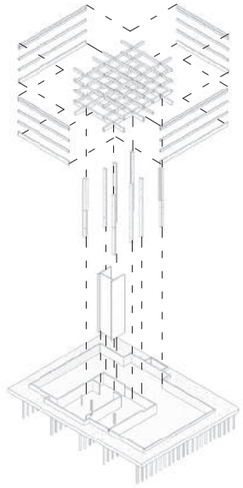
ECONOMICAL POTENTIAL

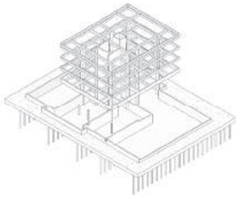


Place with economical potential
Existing stock can be used for redevelopment

REDEVELOPING

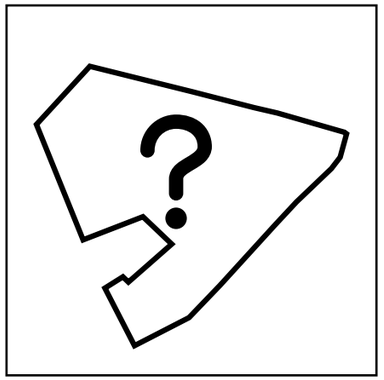




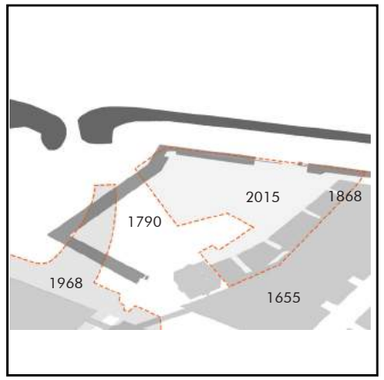


Architect: F.C. de Weger 1966-1968

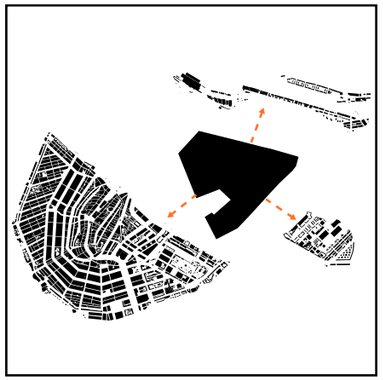
SUMMARY ANALYSIS



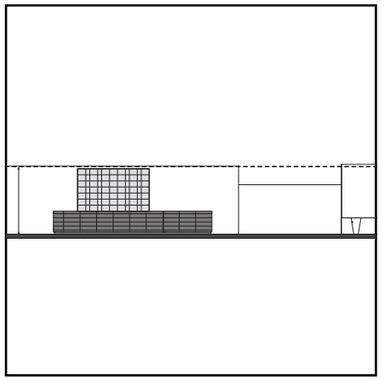
UNKNOWN AREA



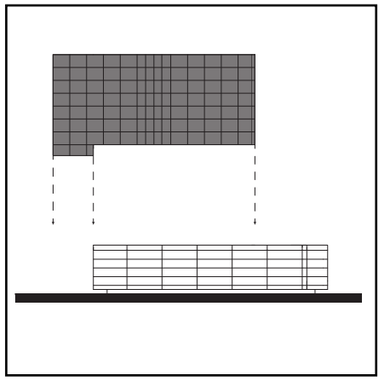
FUNCTIONALLY GROWN



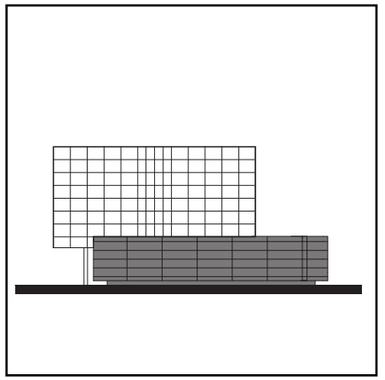
CENTRALLY LOCATED



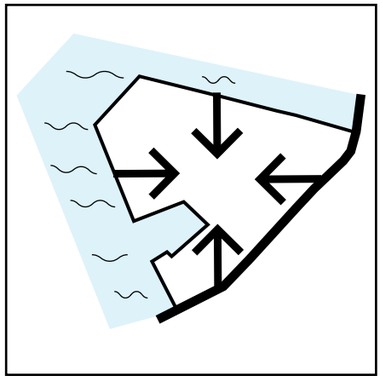
SAME HEIGHT WITH THEIR SURROUNDINGS



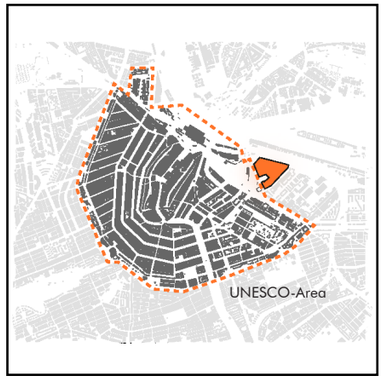
TOWER SHAPED AND OVERHANGING VOLUME



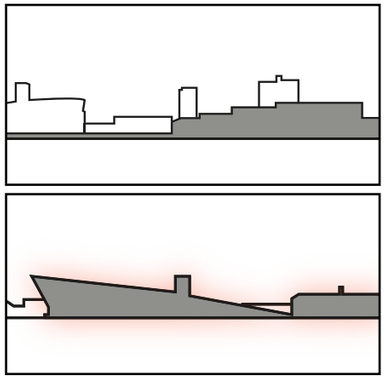
LARGE HORIZONTAL BASE



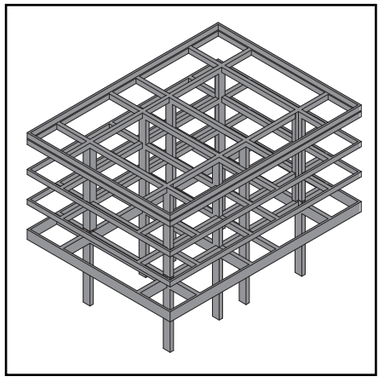
CLOSED OF AREA



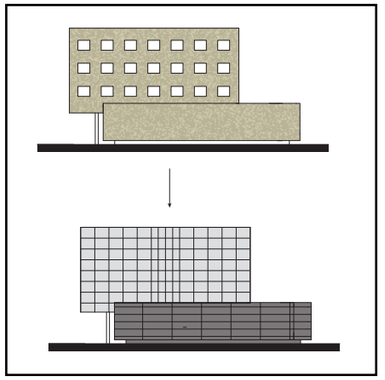
HER



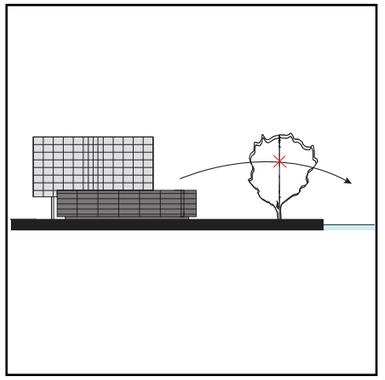
CONTRADICTIONS LOW-HIGH RISE



STRONG MONOLITHIC CONCRETE STRUCTURE



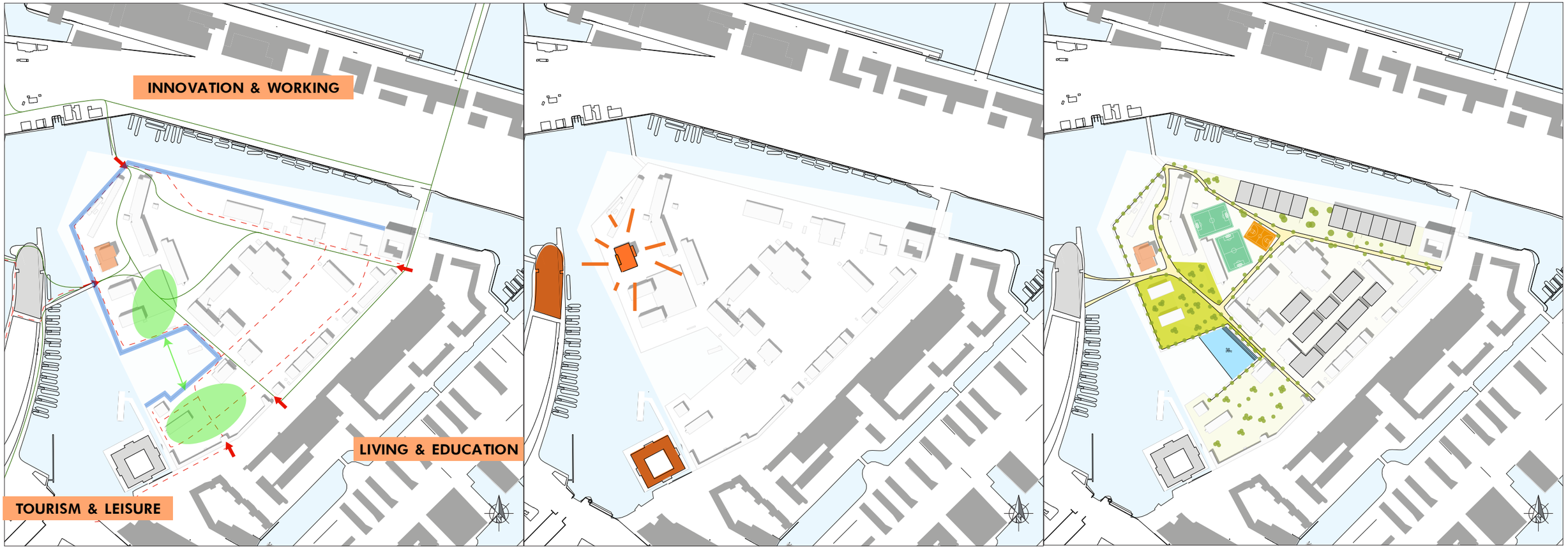
RENOVATING WHEN NECESSARY



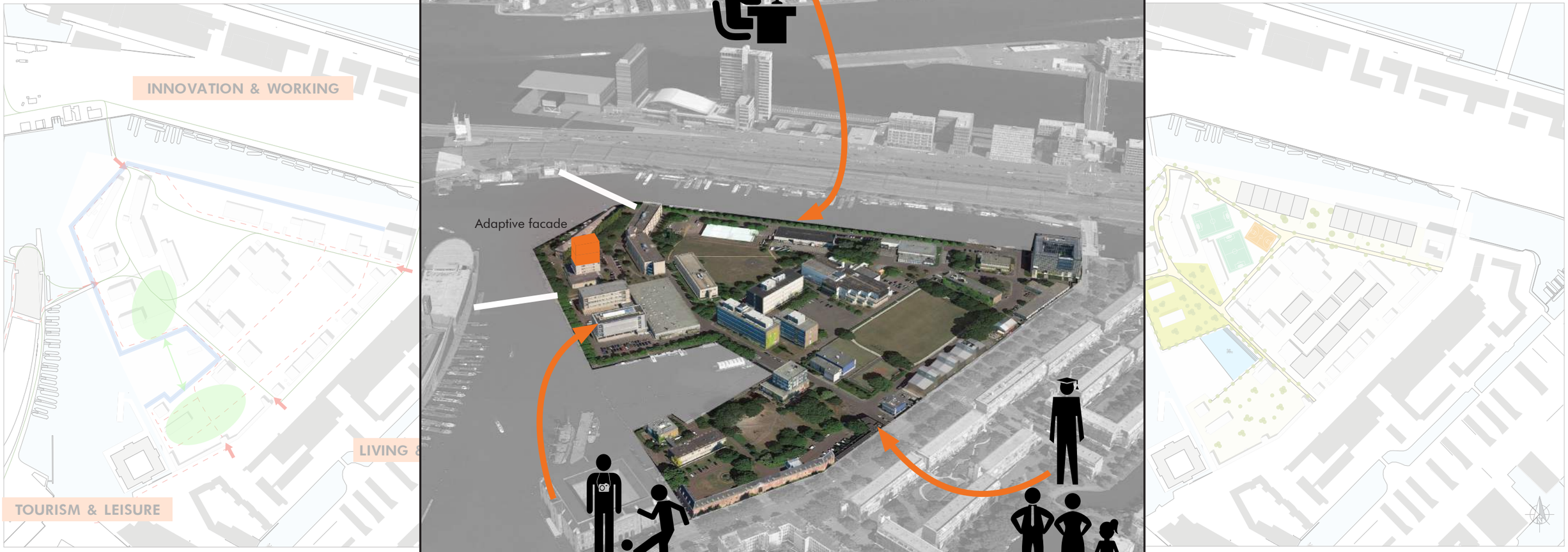
NO DIRECT CONNECTION WITH THE WATER

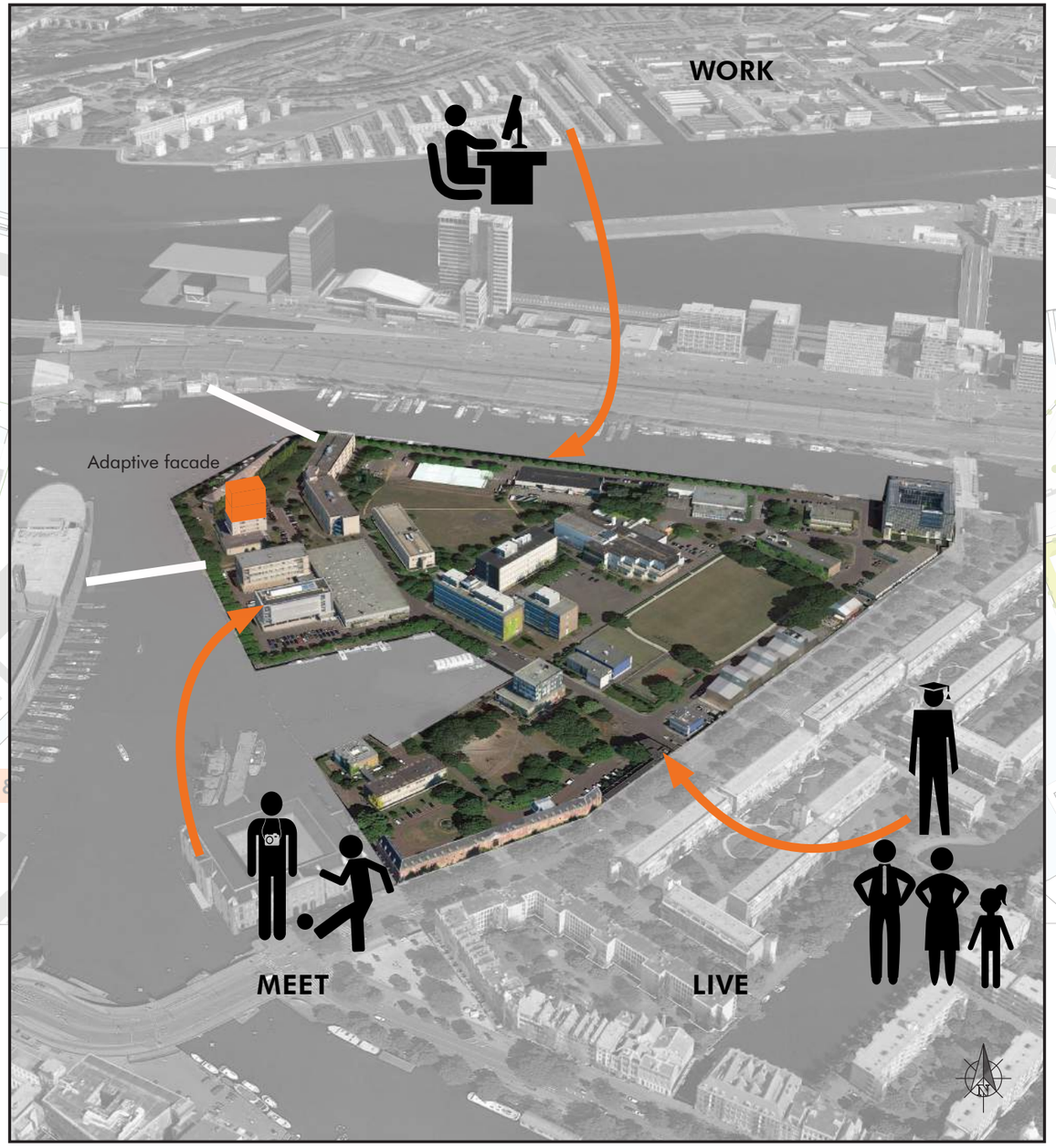
VISION

CONNECTING - *ACTIVATING* - *REDEVELOPING*

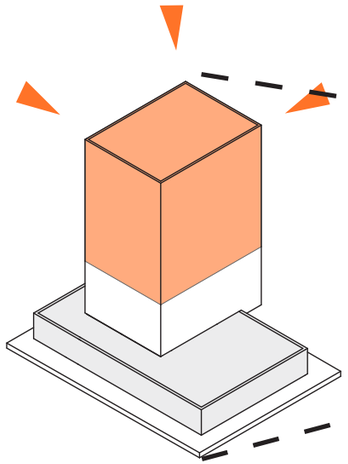


VISION

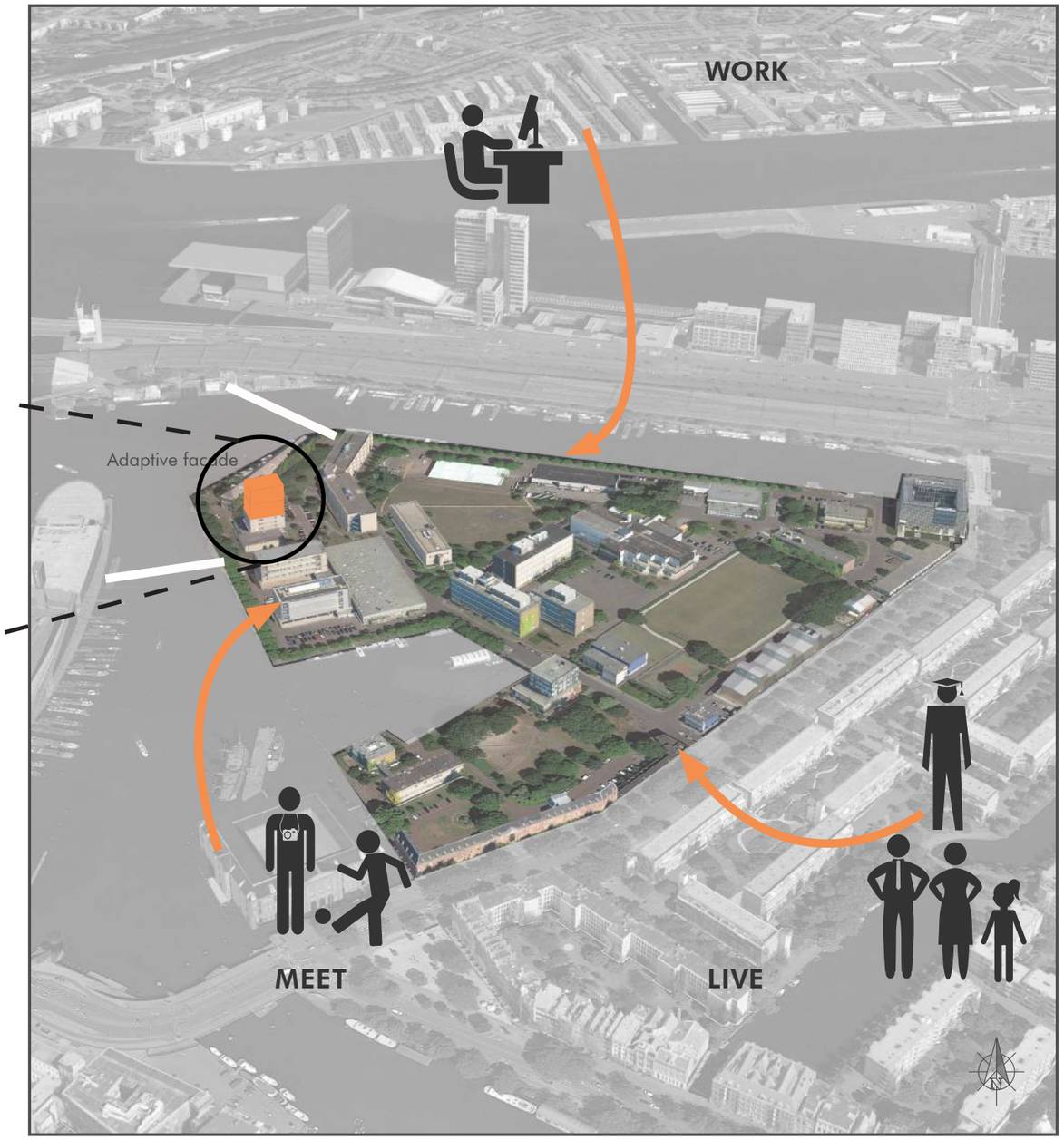

INNOVATION & WORKING
LIVING &
TOURISM & LEISURE


WORK
Adaptive facade
MEET
LIVE

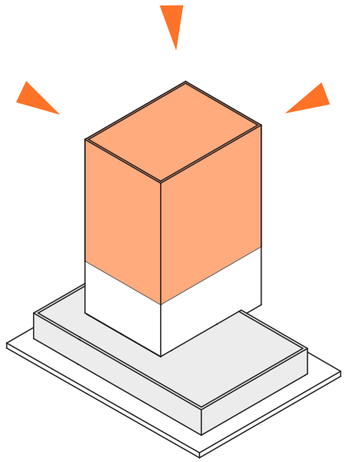
VISION



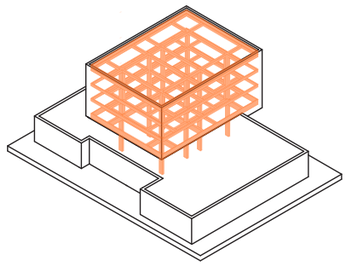
ACTIVATING



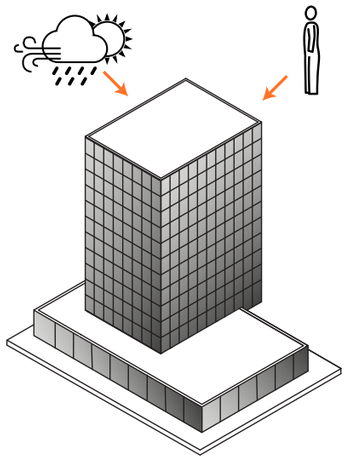
VISION



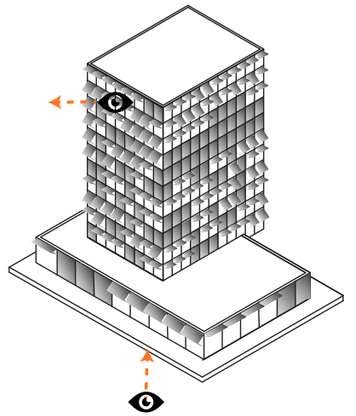
ACTIVATING



REDEVELOPING



INNOVATING

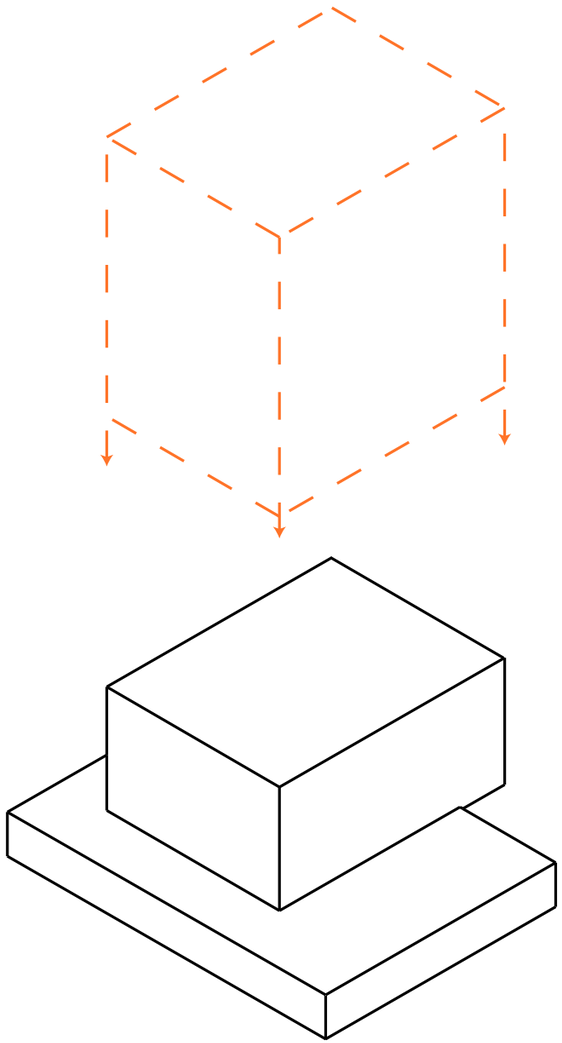


CONNECTING

DESIGN

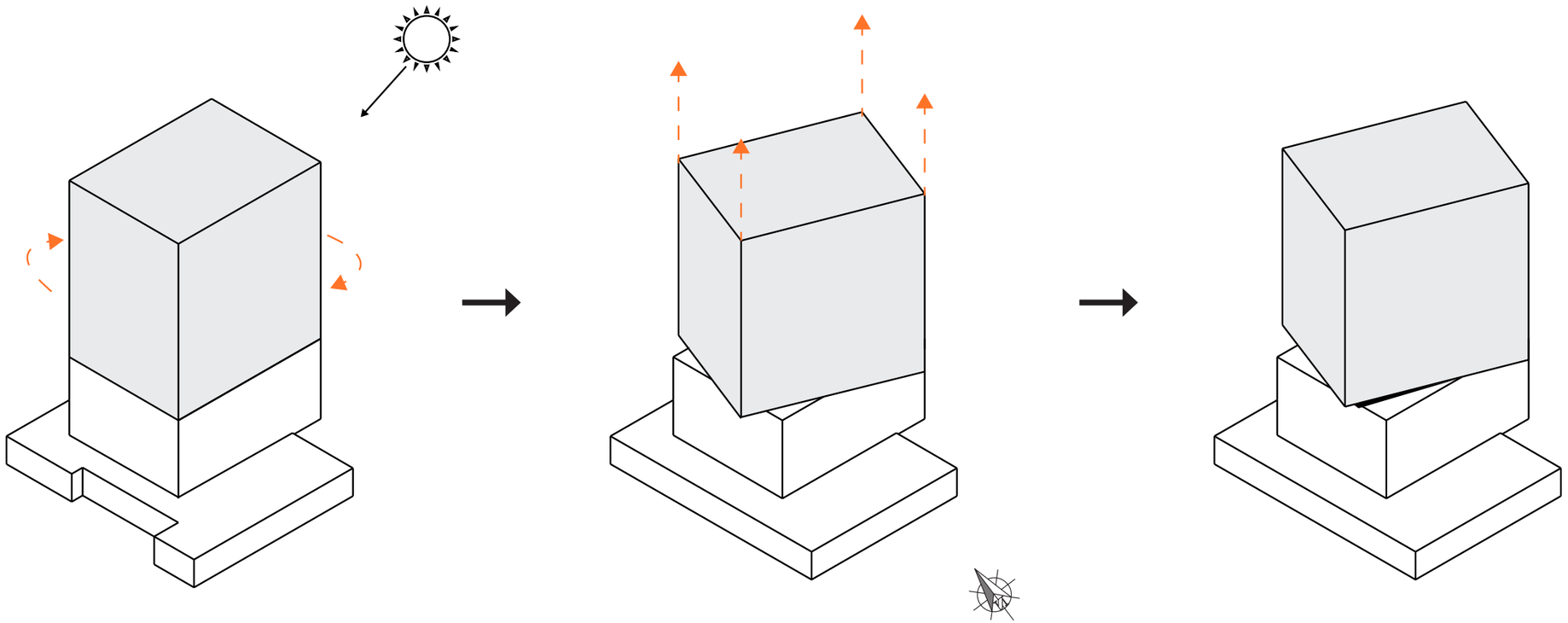
RESULTS

EXTENSION



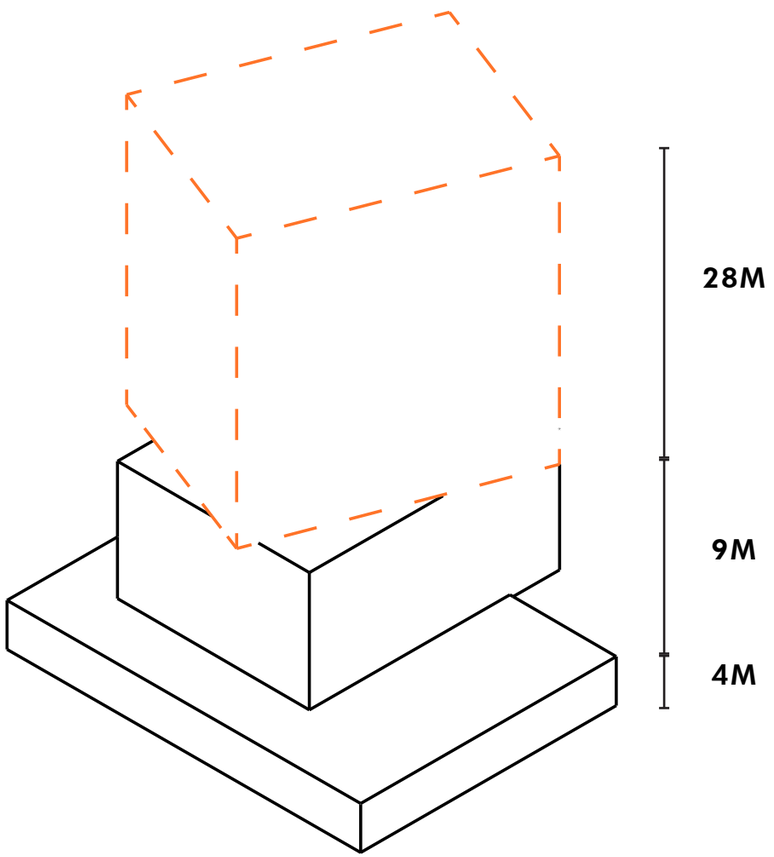
EXTENSION

FORM



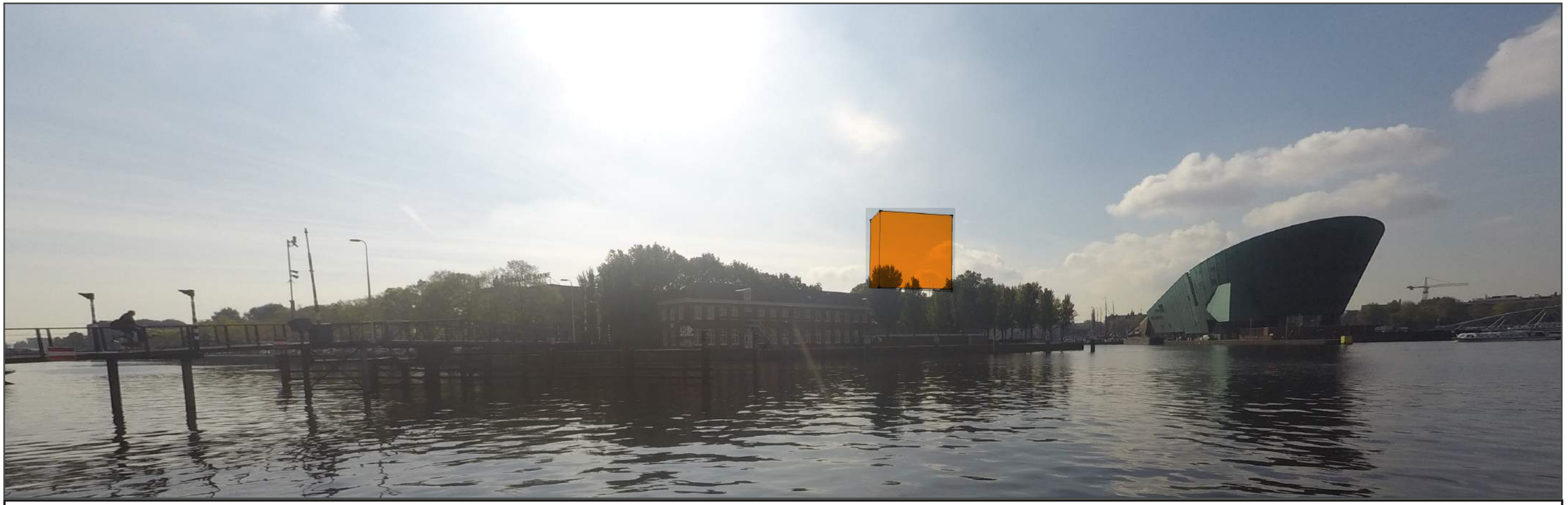
HEIGHT

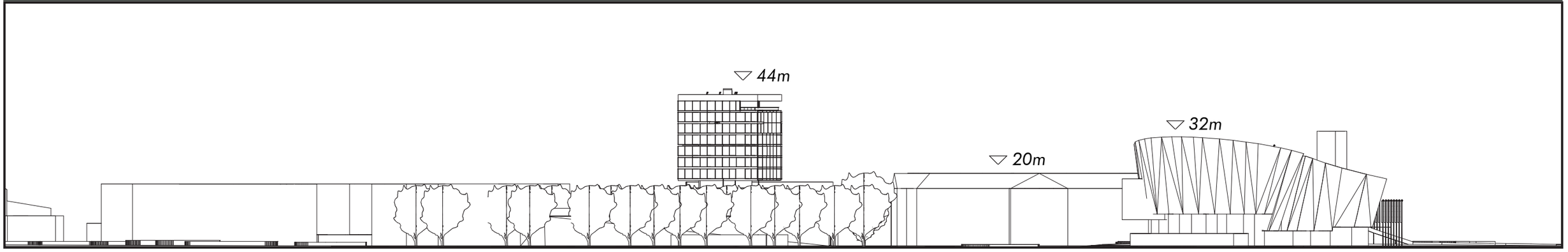
EXTENSION



HEIGHT

SOUTH VIEW

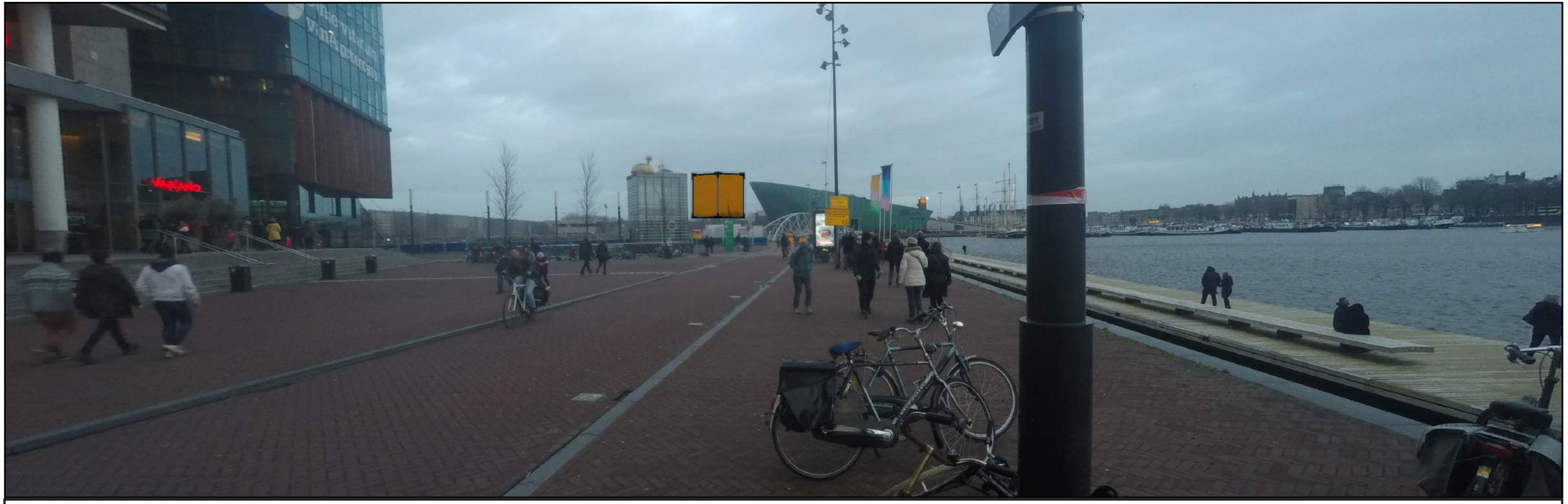


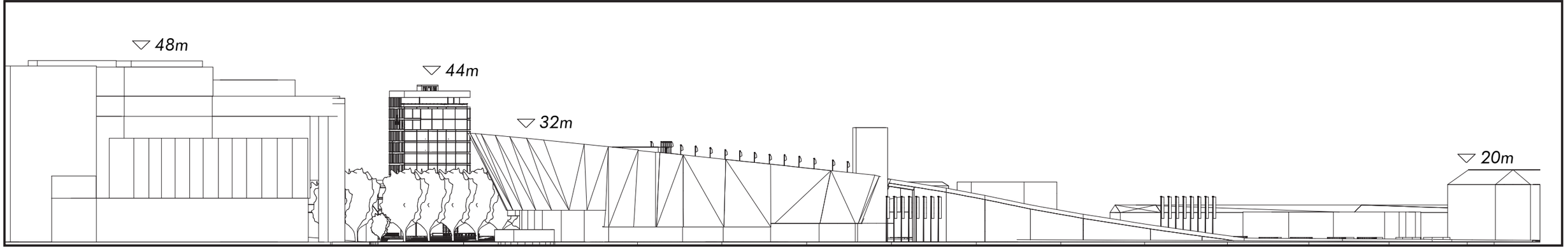


Dok 25 *National maritime museum* *Nemo Science Museum*

HEIGHT

CITY EAST VIEW

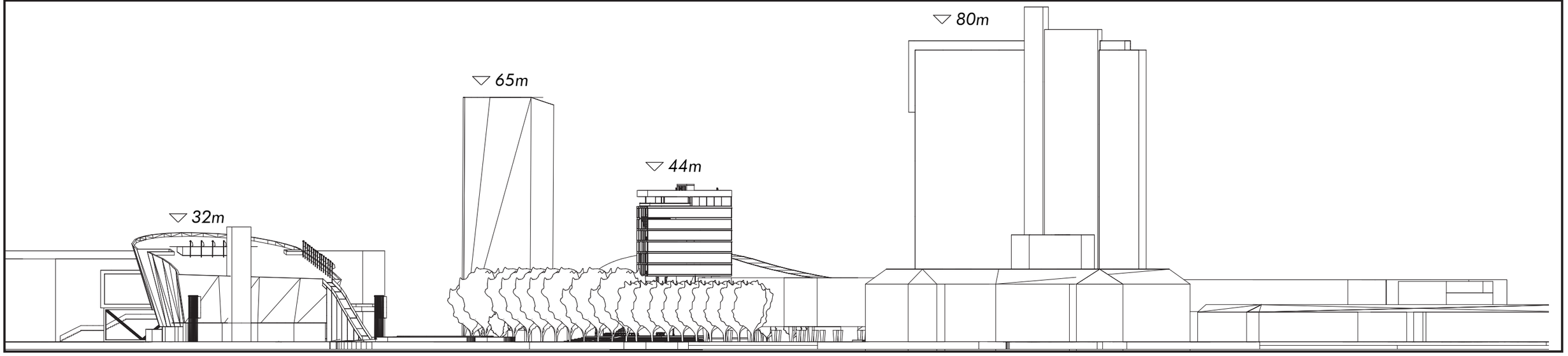




OBA *Dok 25* *Nemo Science Museum* *National maritime museum*

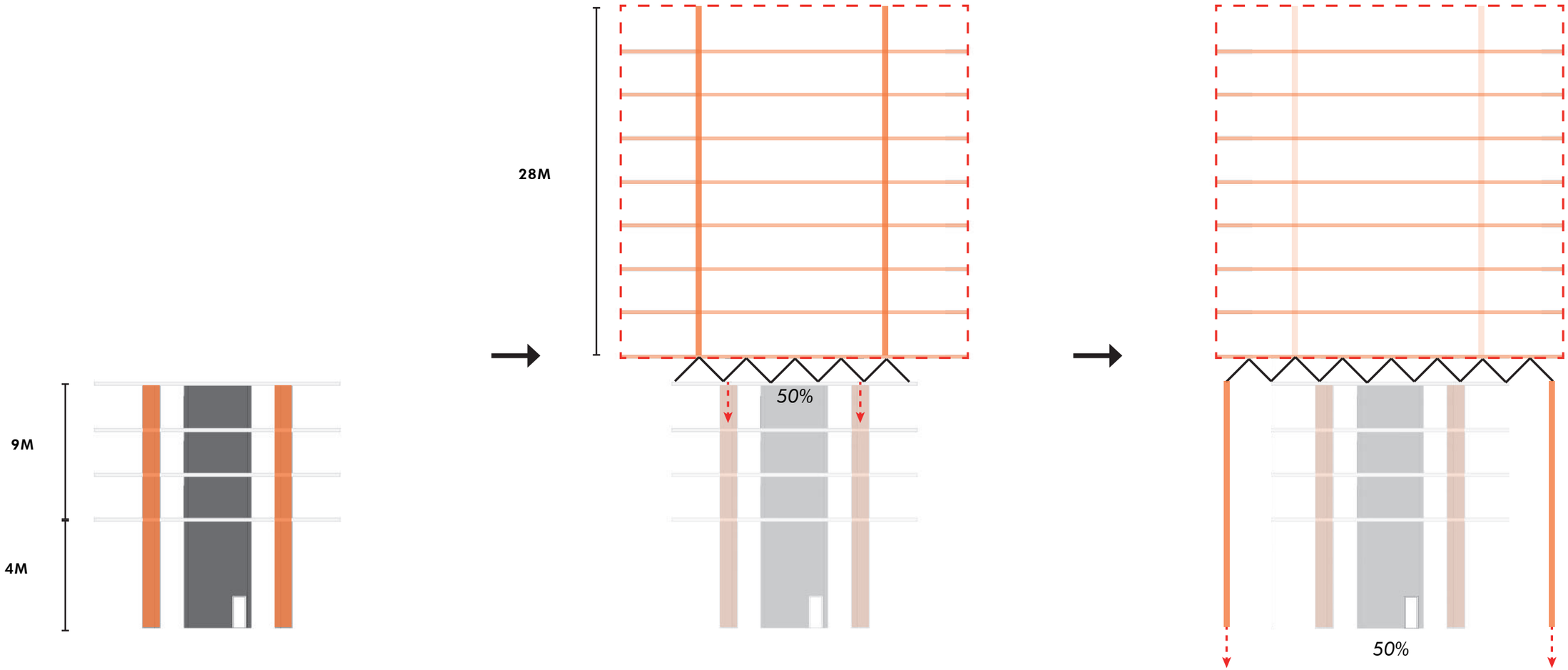
HEIGHT

NORTH VIEW



STRUCTURE

HYBRID



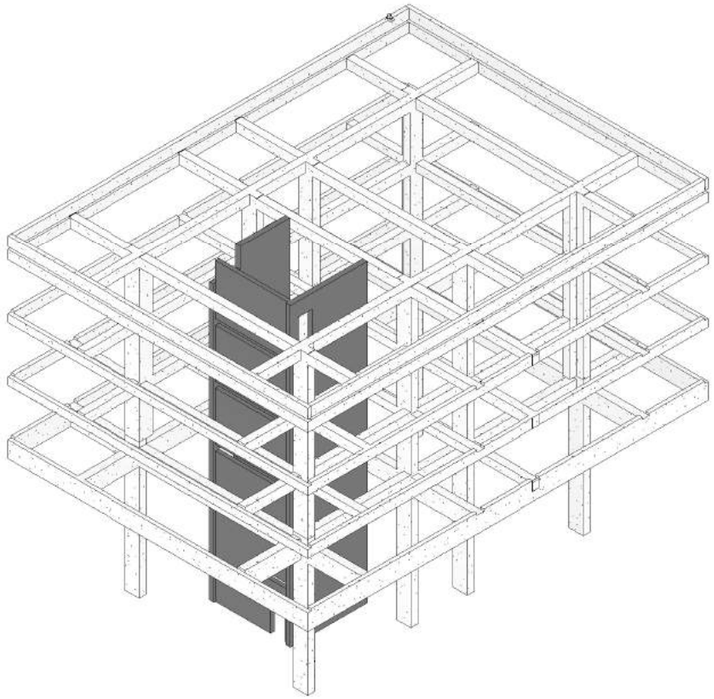
EXISTING

EMBRACE

ADDITION

STRUCTURE

HYBRID



STRUCTURE

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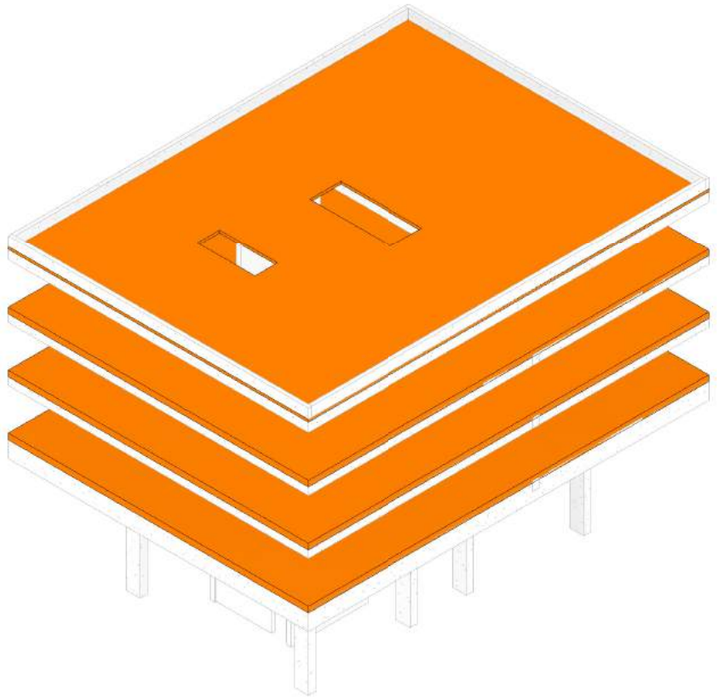

STRUCTURE

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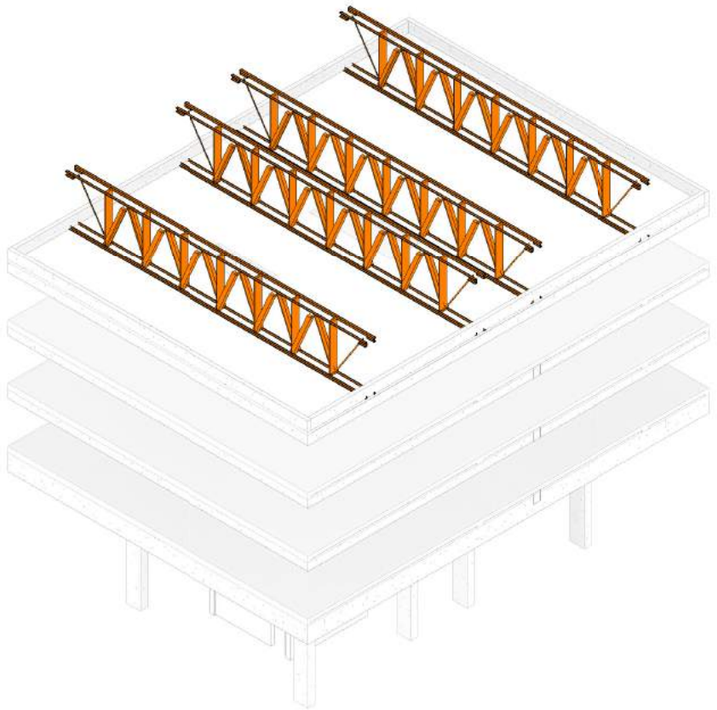

STRUCTURE

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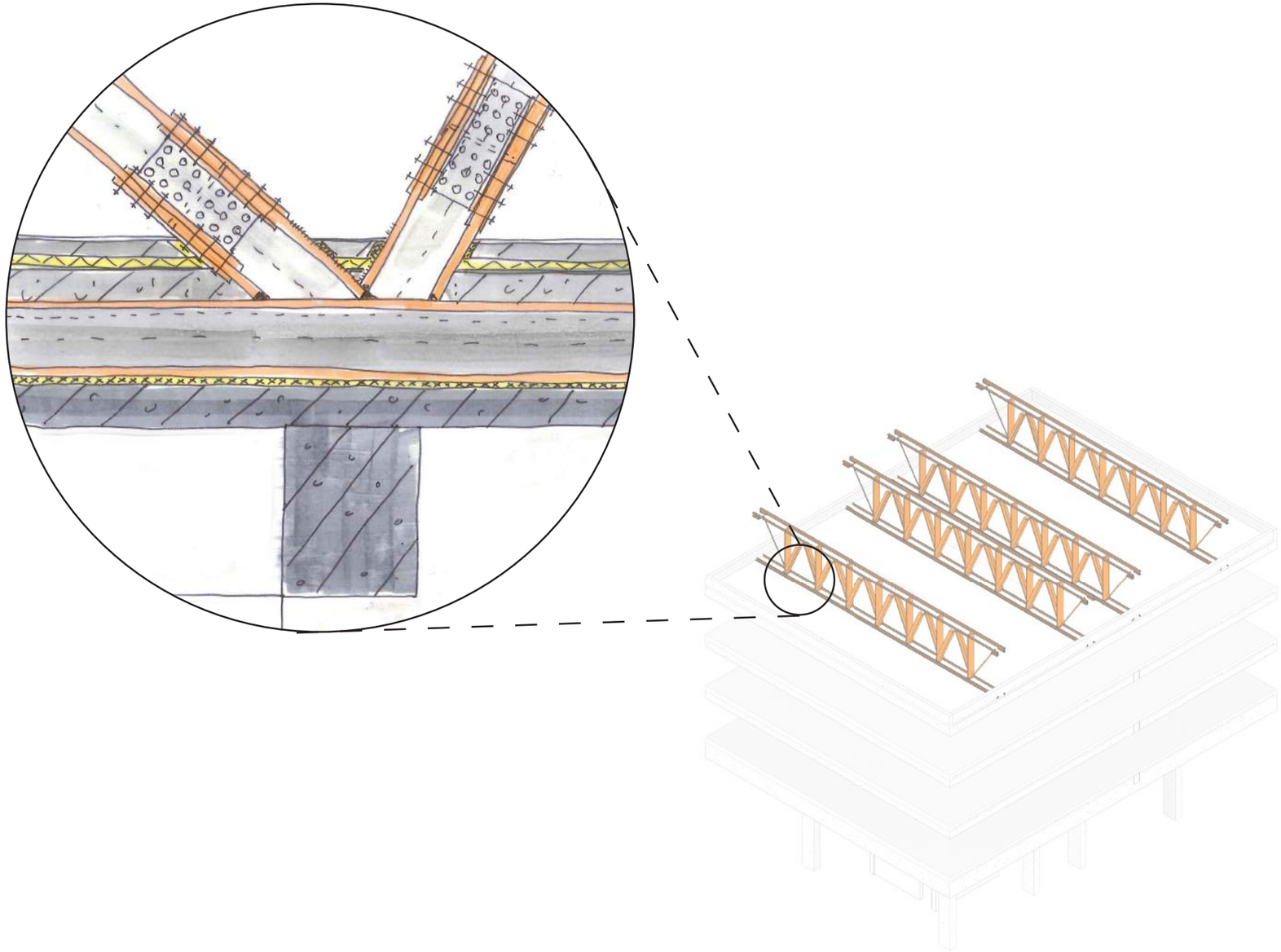

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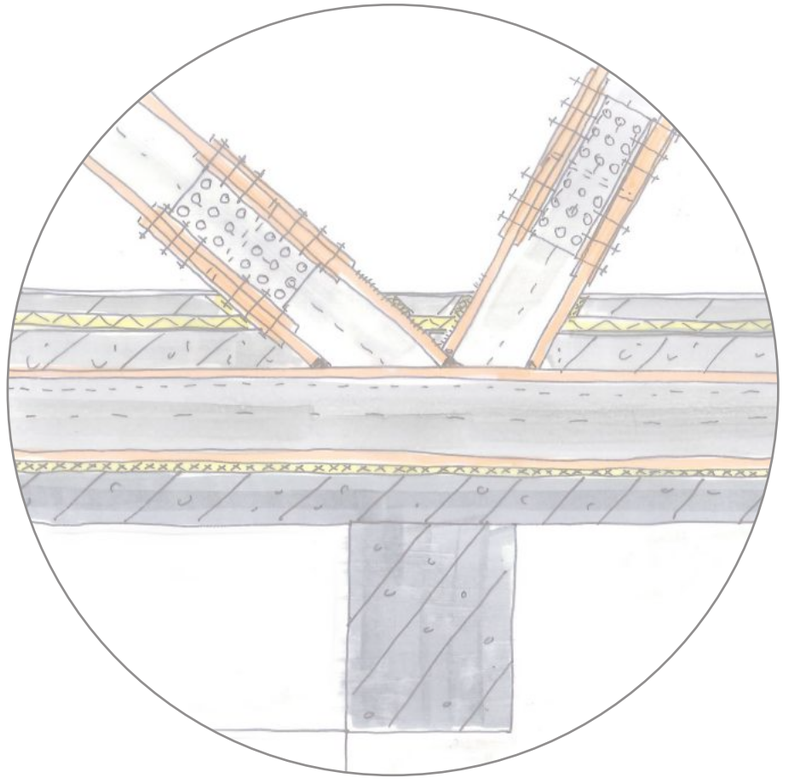

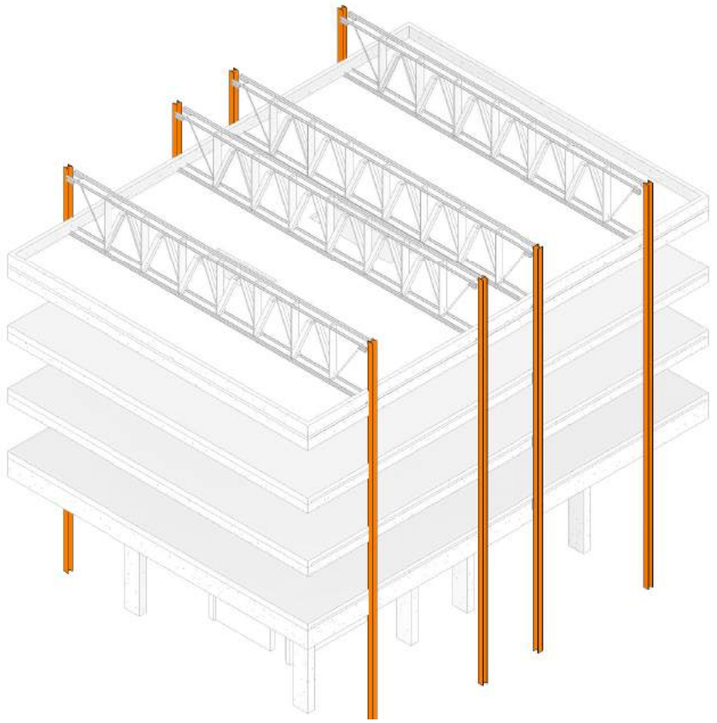

STRUCTURE

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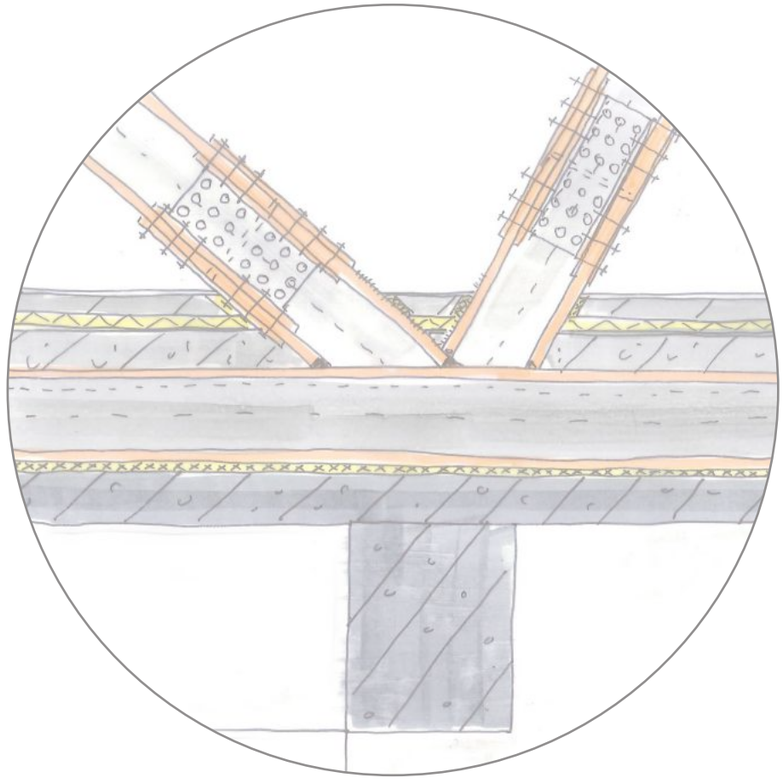

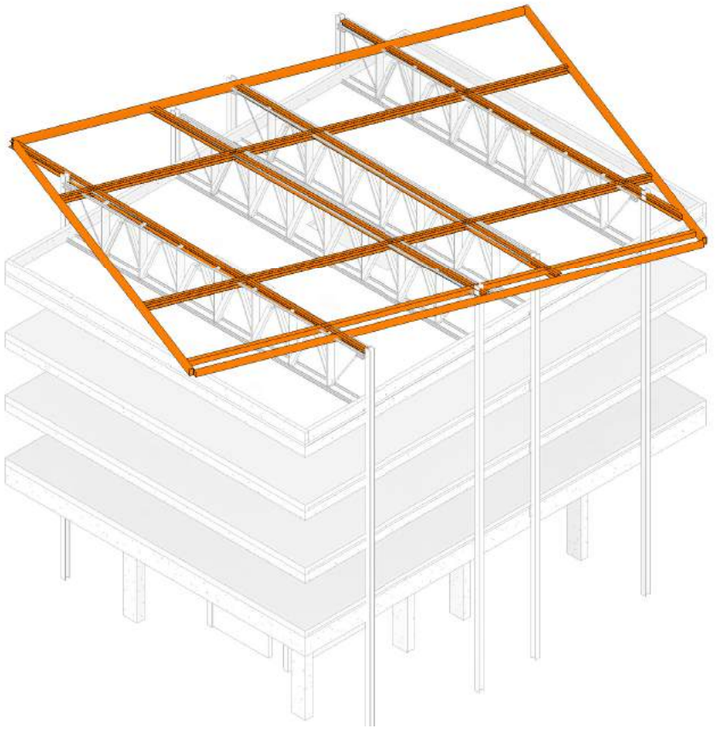

STRUCTURE

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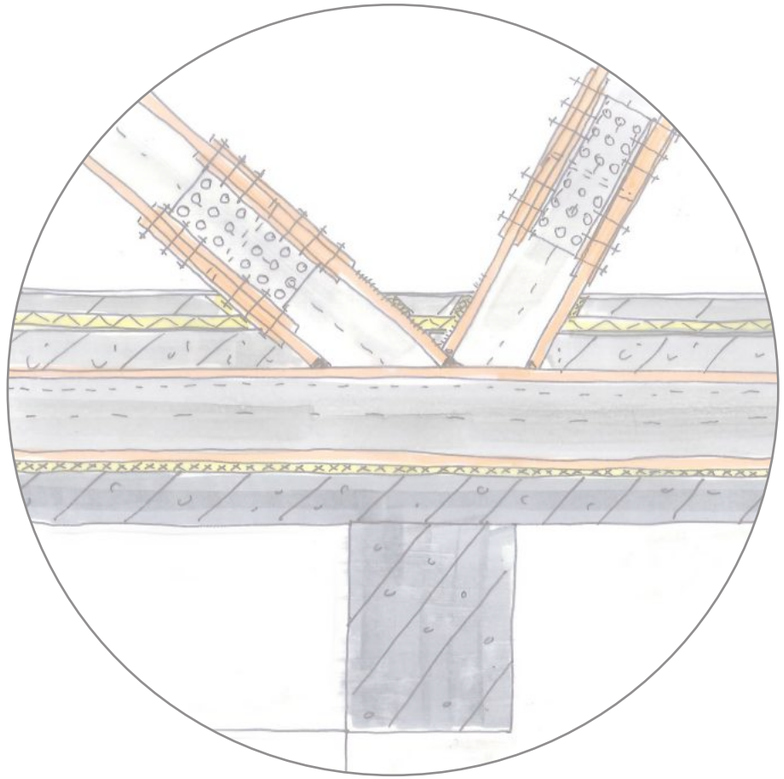

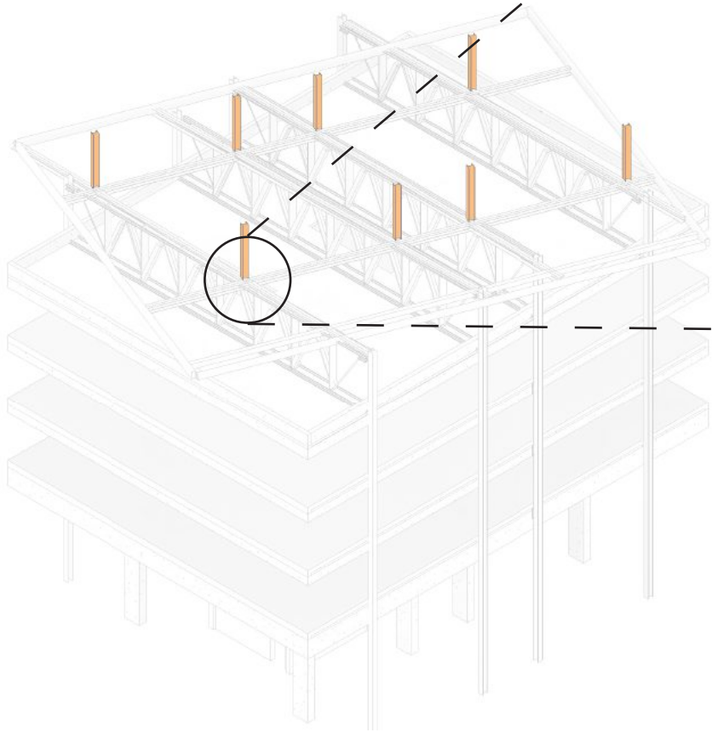

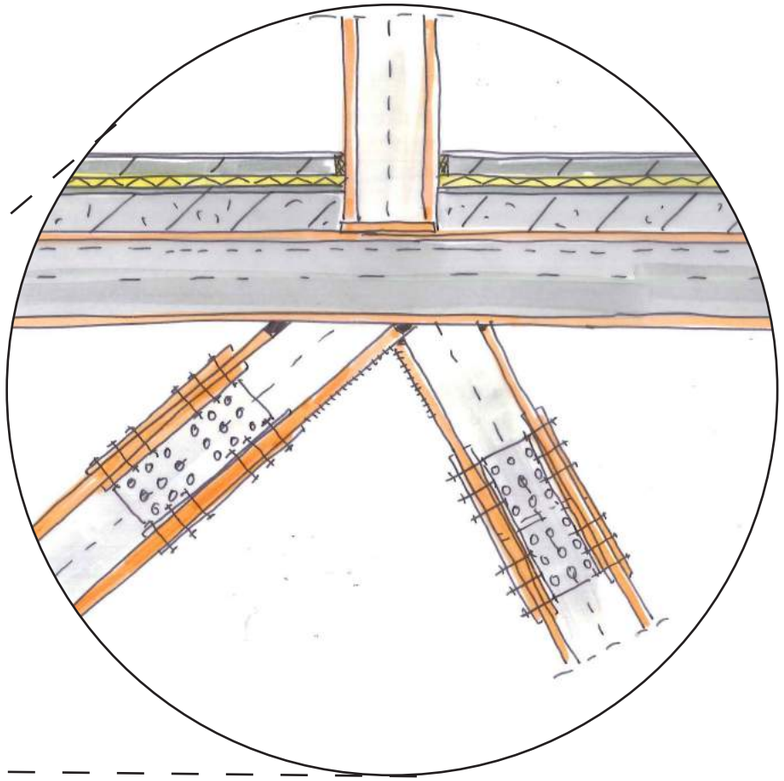

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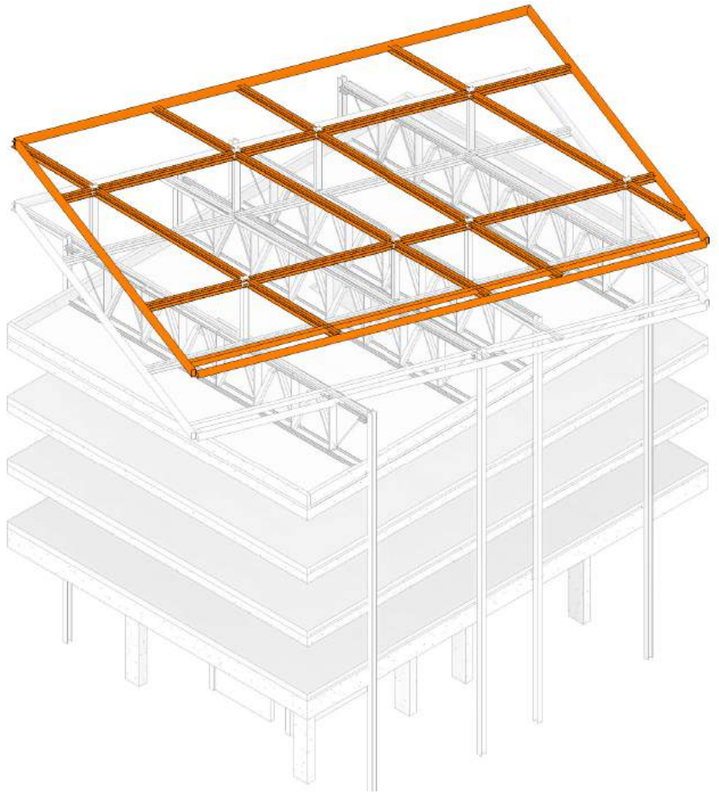

STRUCTURE

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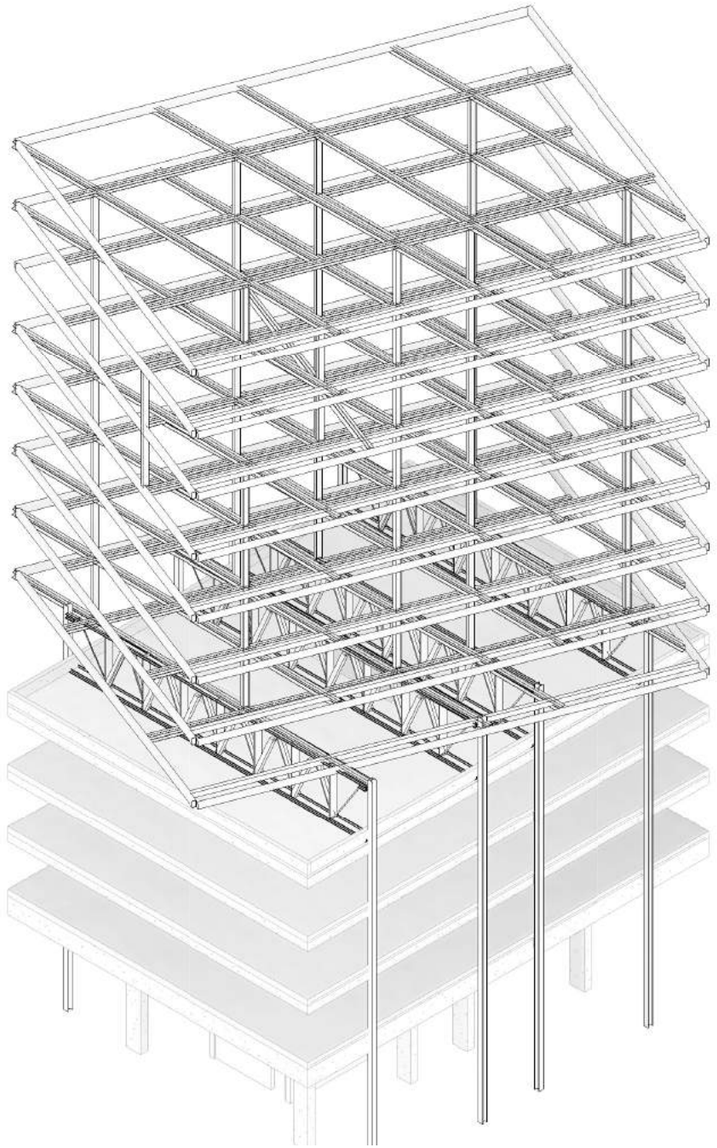
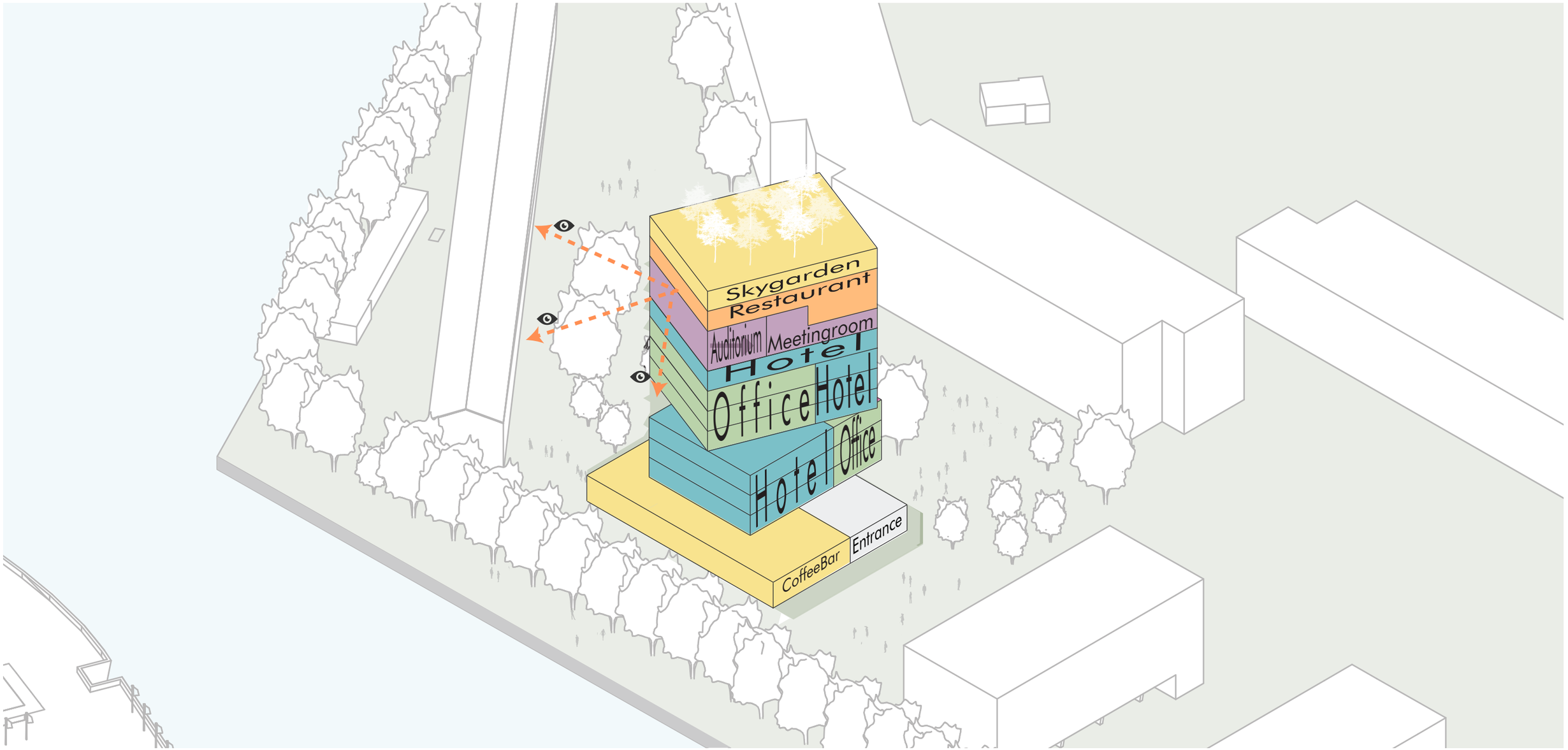
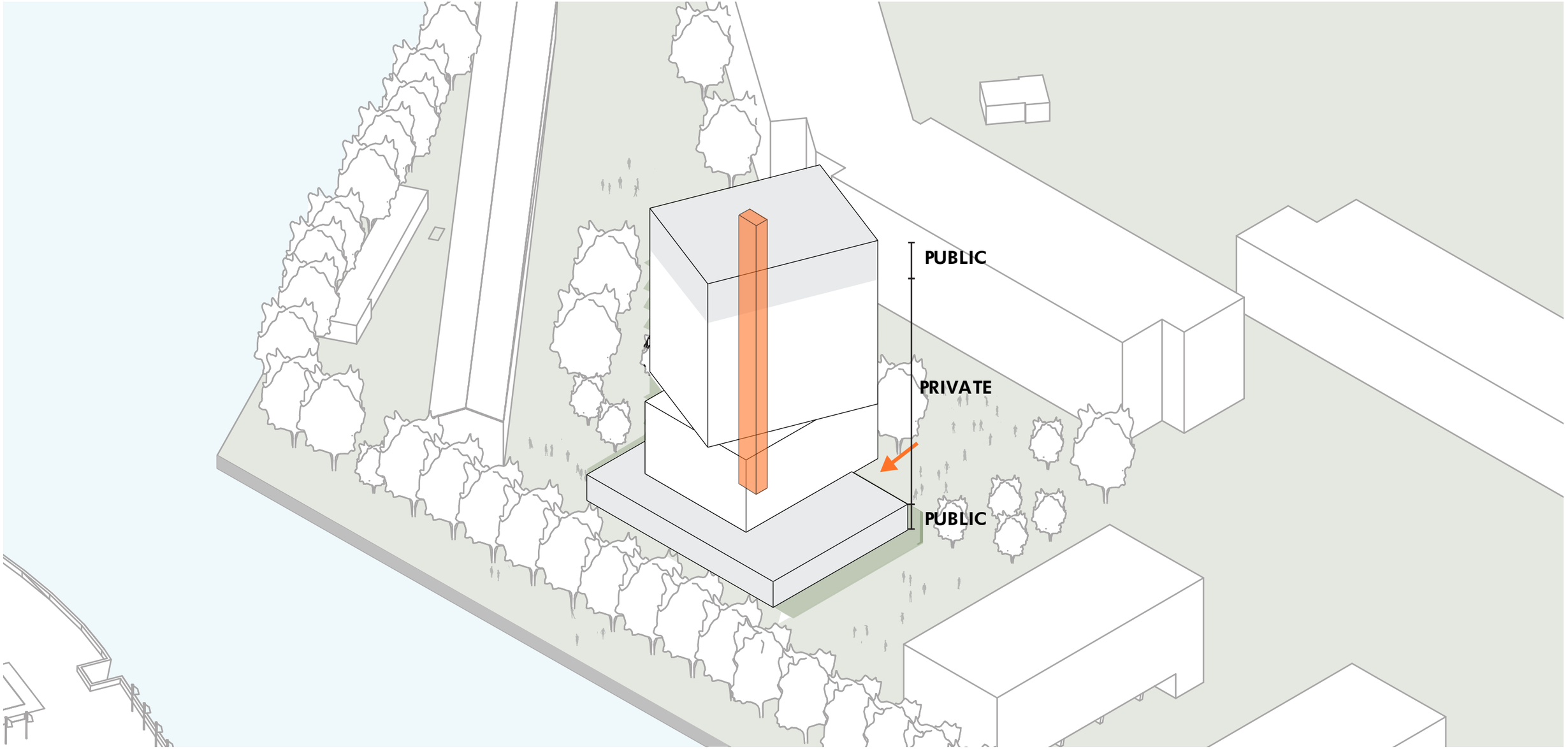


PROGRAM

HOTEL

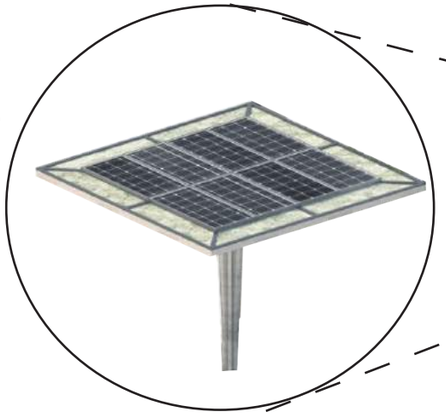


CIRCULATION

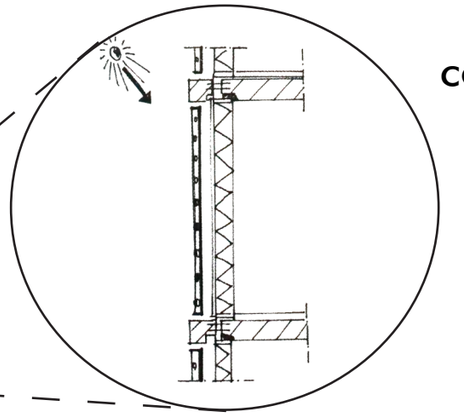


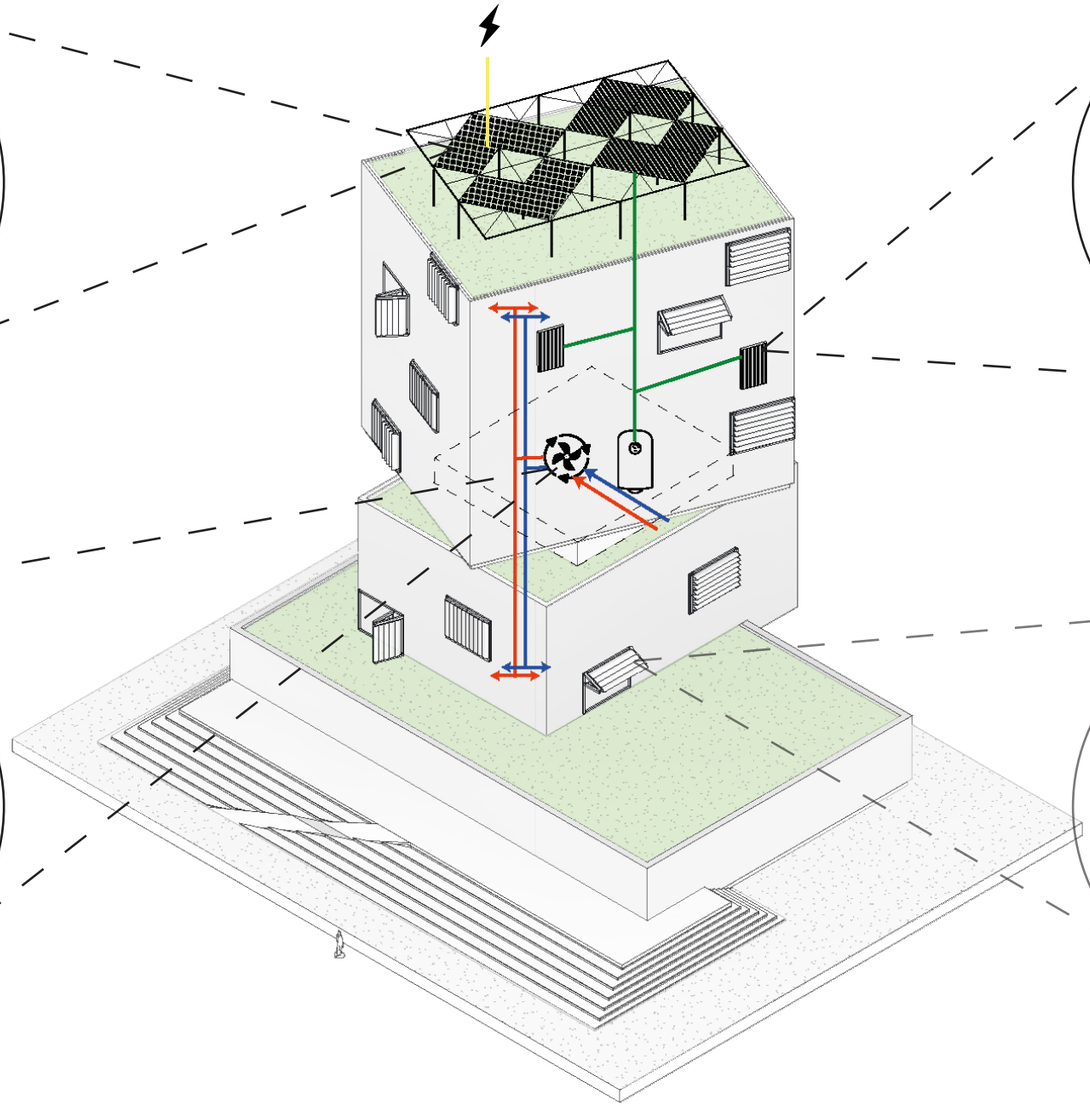
CLIMATE

PV-CELLS & SOLAR COLLECTORS



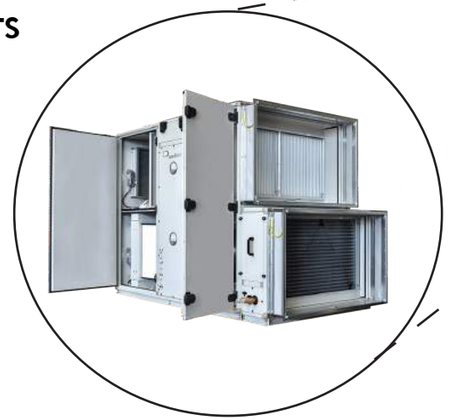
SOLAR COLLECTORS IN THE WALL



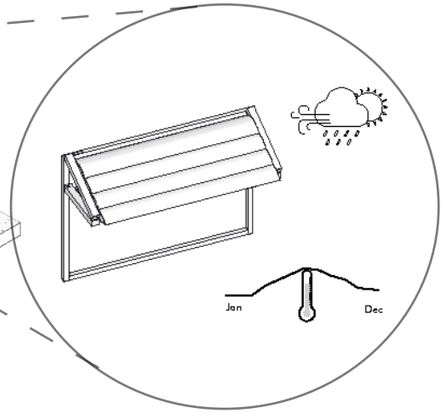


CLIMATE UNITS

- Ventilation with heat recovery system
- Boiler reservoir

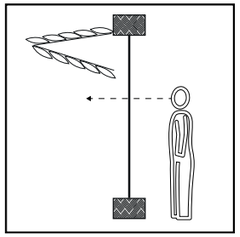


ADAPTIVE FACADE

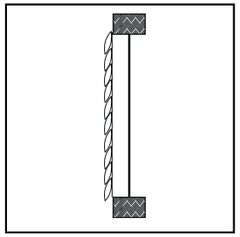


ADAPTIVE FACADE

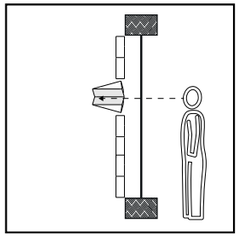
PARAMETERS



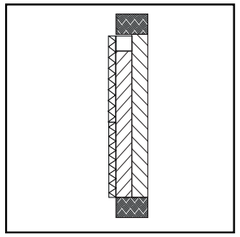
FULLY OPEN



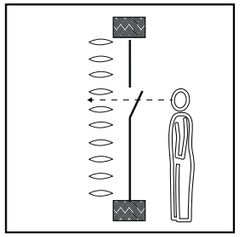
FULLY CLOSED



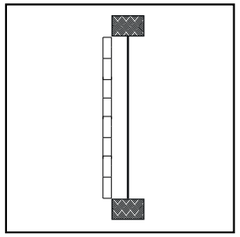
PARTLY OPEN / CLOSED



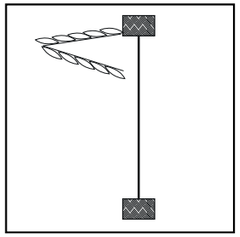
MULTIPLE LAYERS



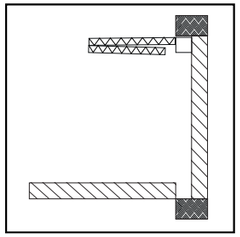
OPEN A WINDOW



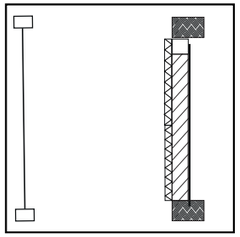
LAYER INSULATION



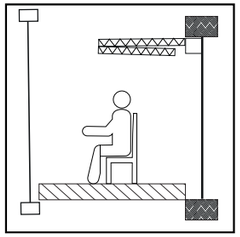
LAYER SUN SHADING



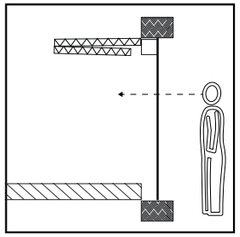
LAYER THERMAL MASS



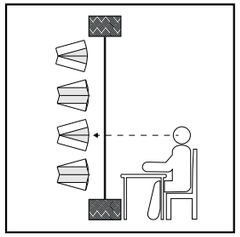
SECOND SKIN



CREATE SEATING SURFACE



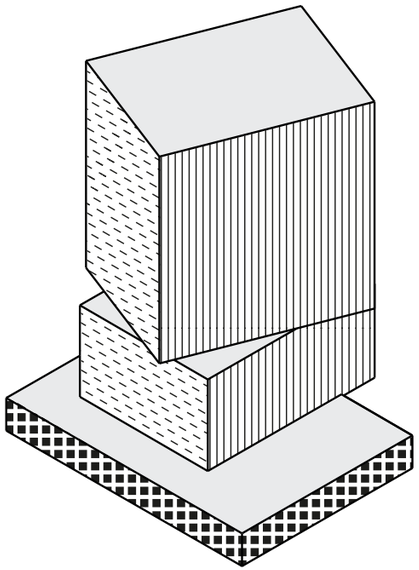
LARGE ELEMENTS COLLECTIVE TEMP.



SMALL ELEMENTS INDIVIDUAL TEMP.

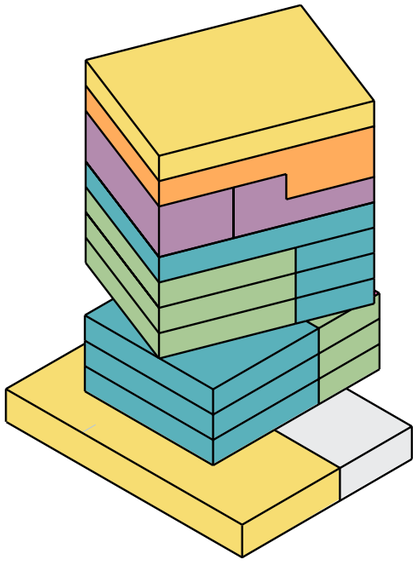
ADAPTIVE FACADE

STARTING POINT



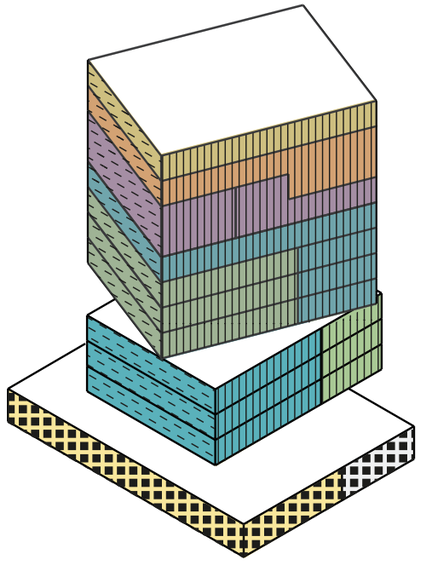
ORIENTATION

+



PROGRAM

=

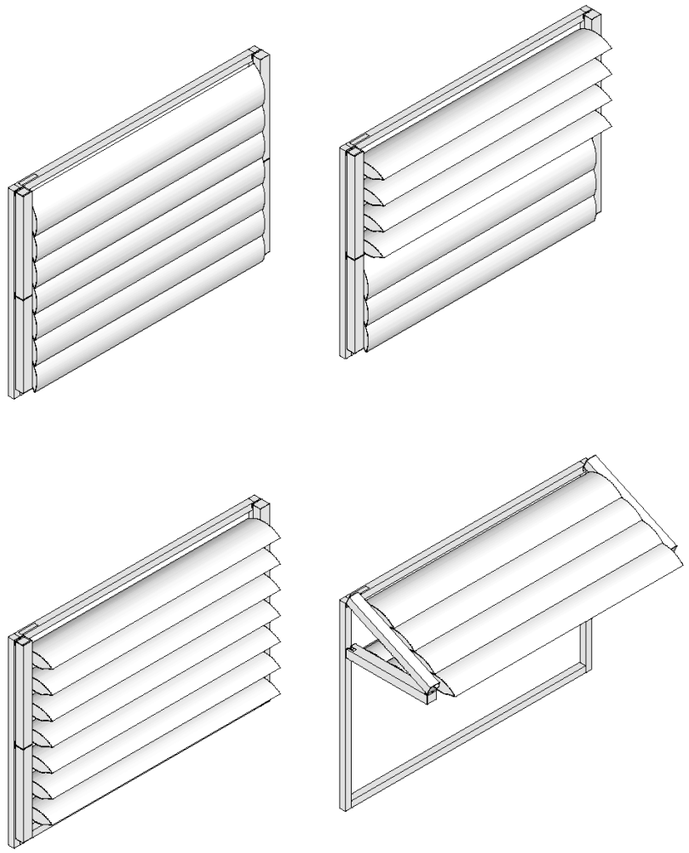


ONE BASIC FACADE ELEMENT WITH OPTIONAL ADDITIVES DEPENDING ON THE CLIMATE AND FUNCTION

ADAPTIVE FACADE

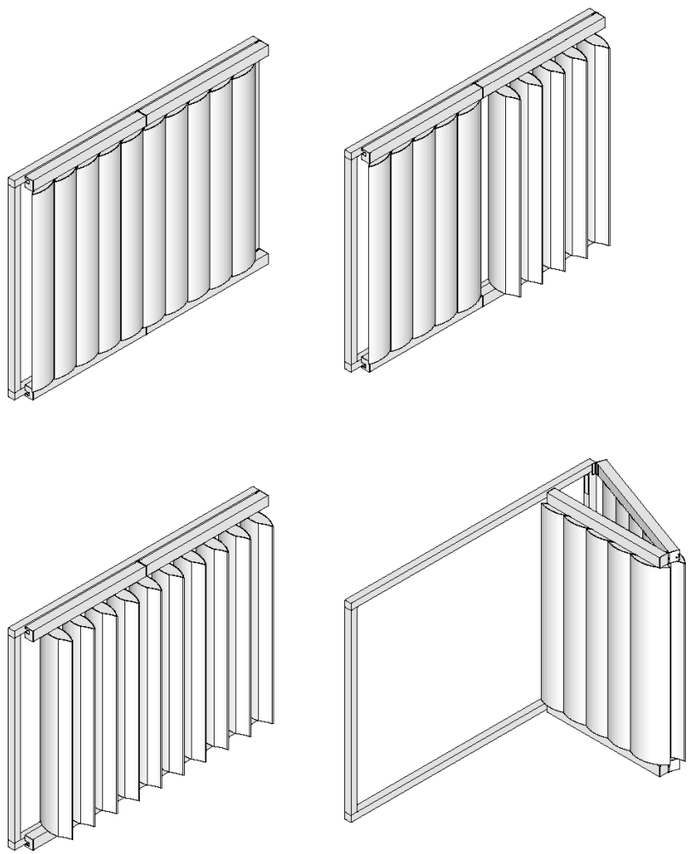
DESIGN

BASIC ELEMENT



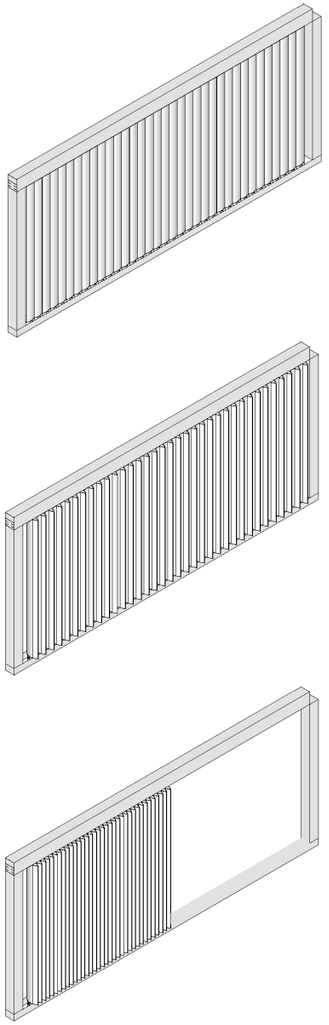
ORIENTATION

WEST FACADE



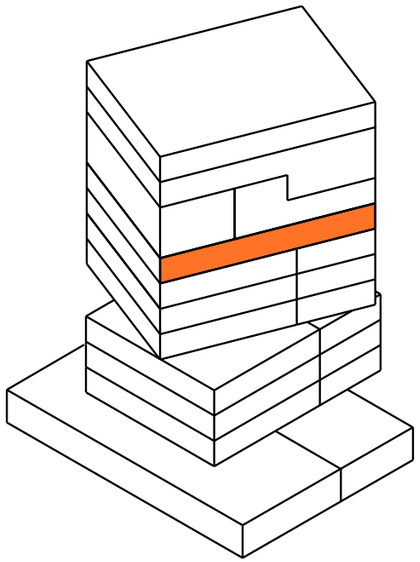
PROGRAM

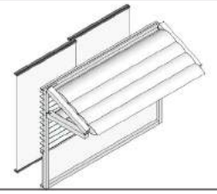
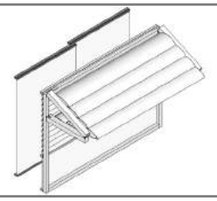
AUDITORIUM

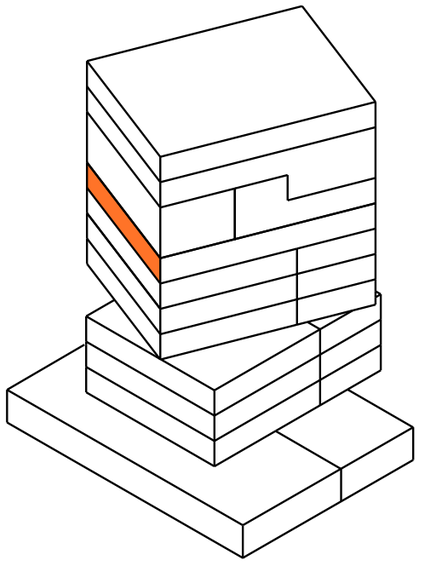


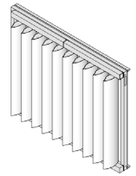
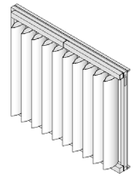
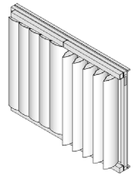
ADAPTIVE FACADE

SOUTH FACADE AND WEST FACADE



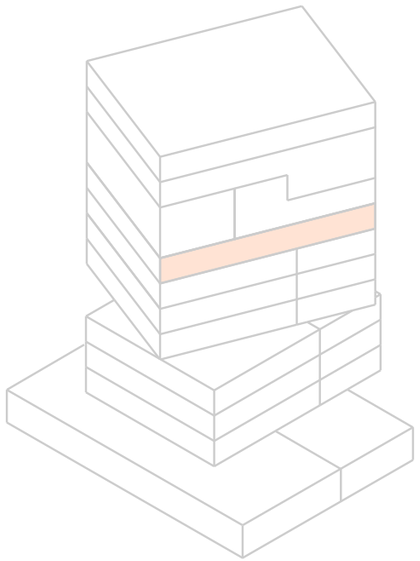
South_Hotel	Present	Absent
Summer		
Sunny		
Cloudy		
Night		
Winter		
Sunny		
Cloudy / Night		



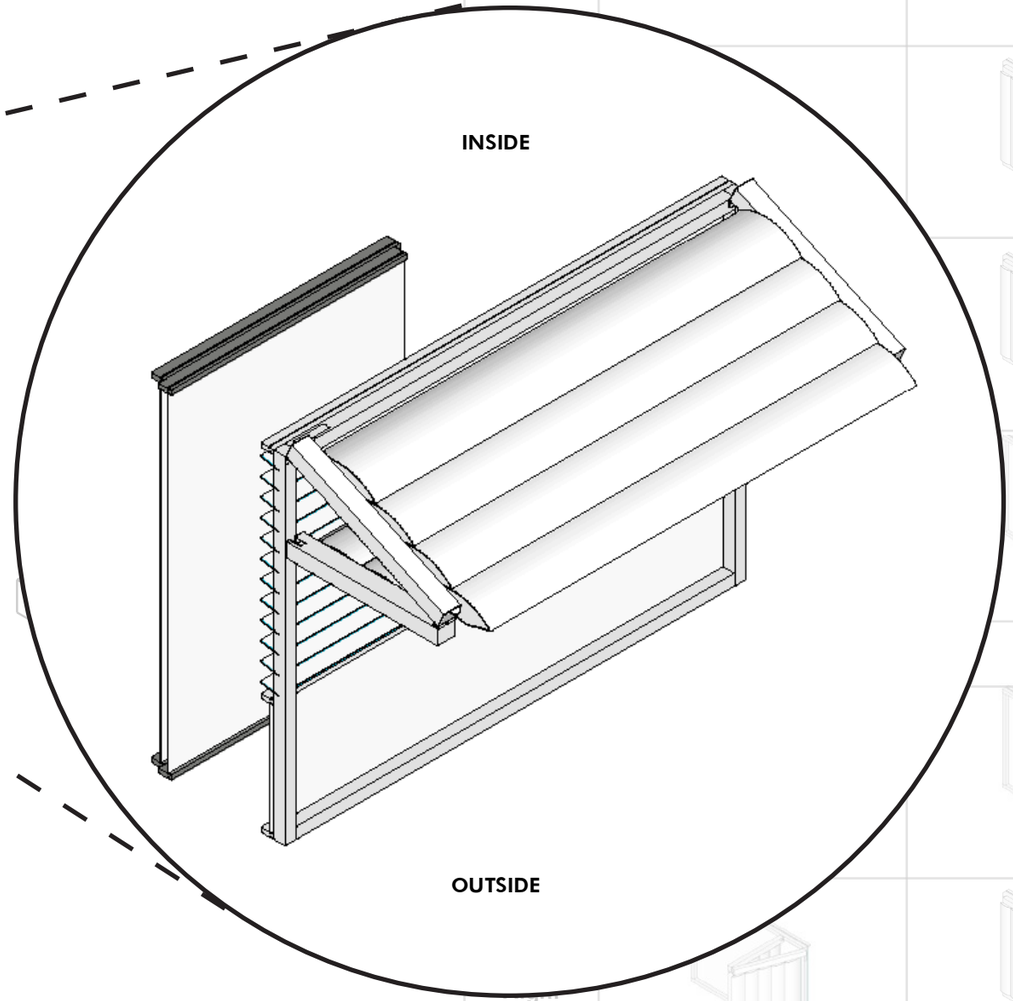
West_Hotel	Present	Absent
Summer		
Sunny		
Cloudy		
Night		
Winter		
Sunny		
Cloudy / Night		

ADAPTIVE FACADE

SOUTH FACADE AND WEST FACADE



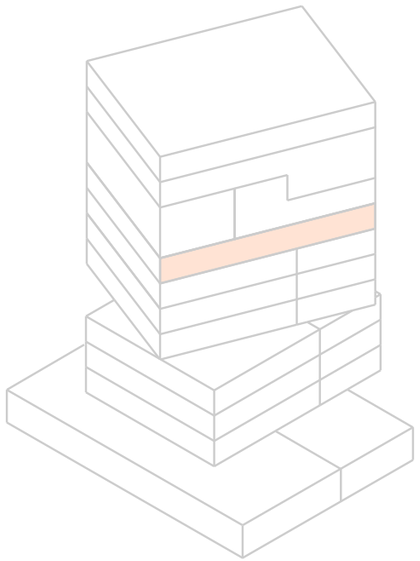
South_Hotel	Present	Absent
Summer		
Sunny		
Cloudy		
Night		
Winter		
Sunny		
Cloudy / Night		

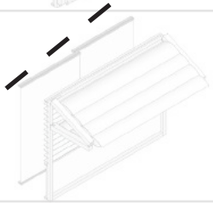
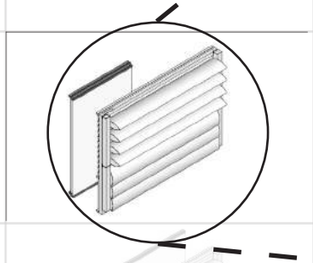


West_Hotel	Present	Absent

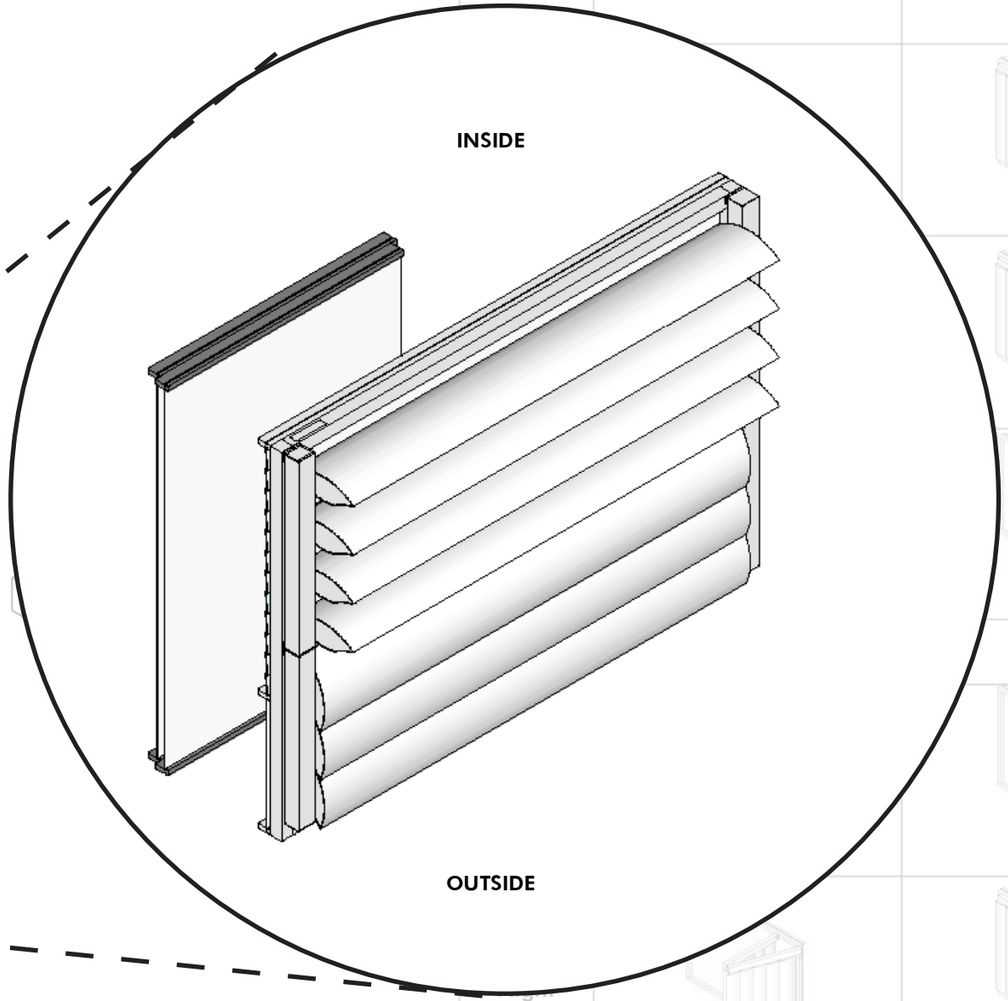
ADAPTIVE FACADE

SOUTH FACADE AND WEST FACADE

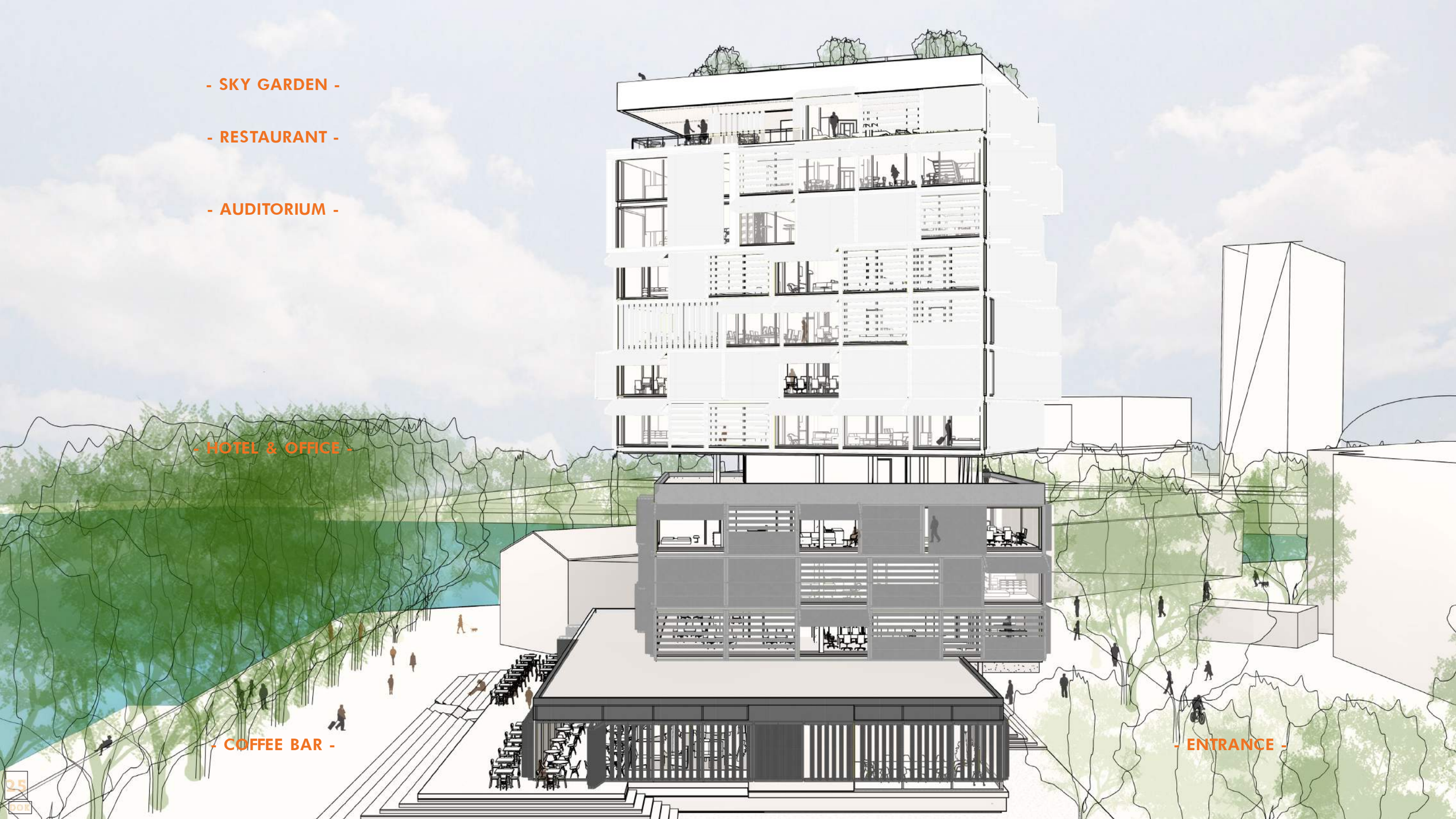


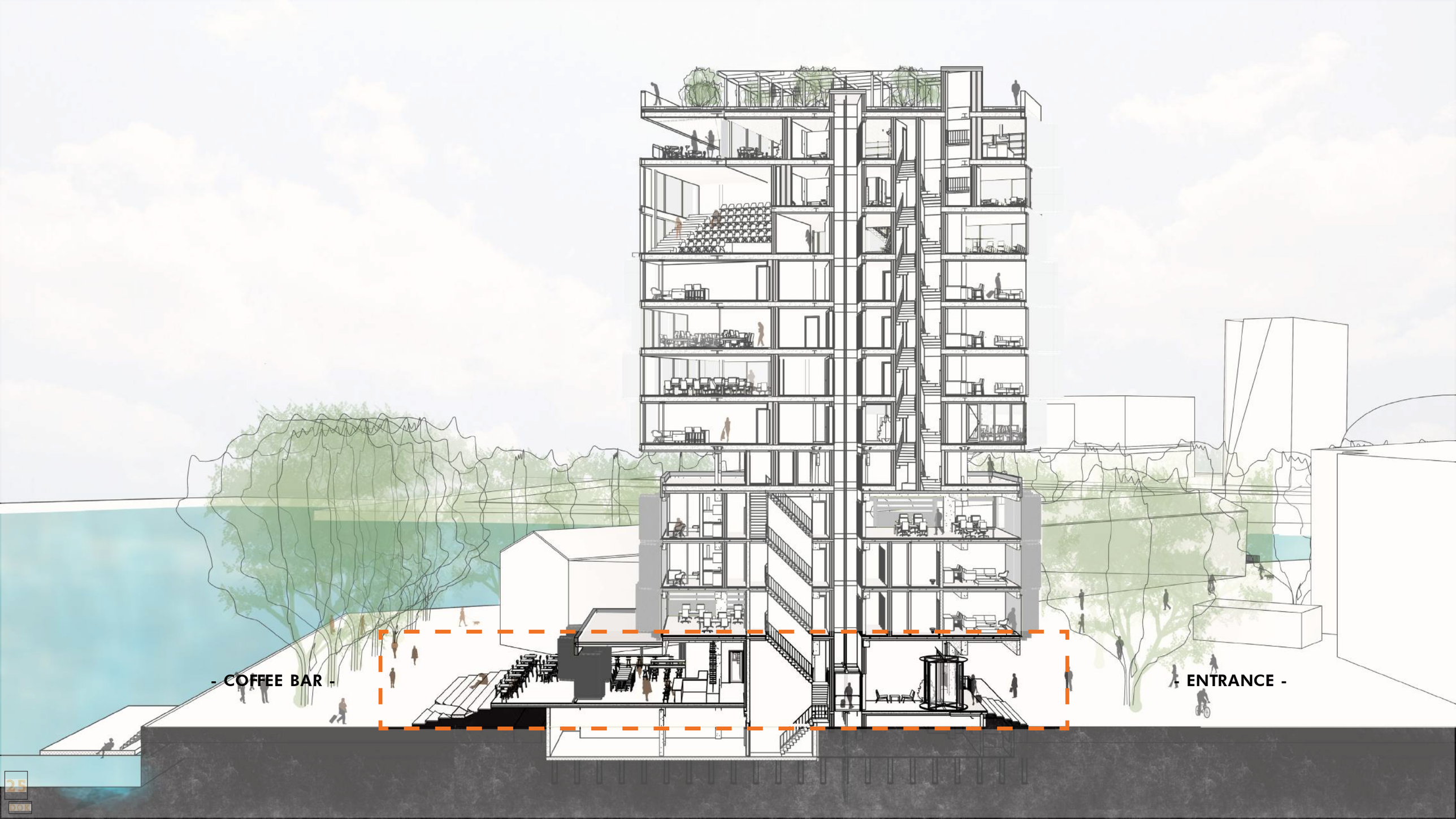
South_Hotel	Present	Absent
Summer		
Sunny		
Cloudy		
Night		
Winter		
Sunny		
Cloudy / Night		

West_Hotel	Present	Absent

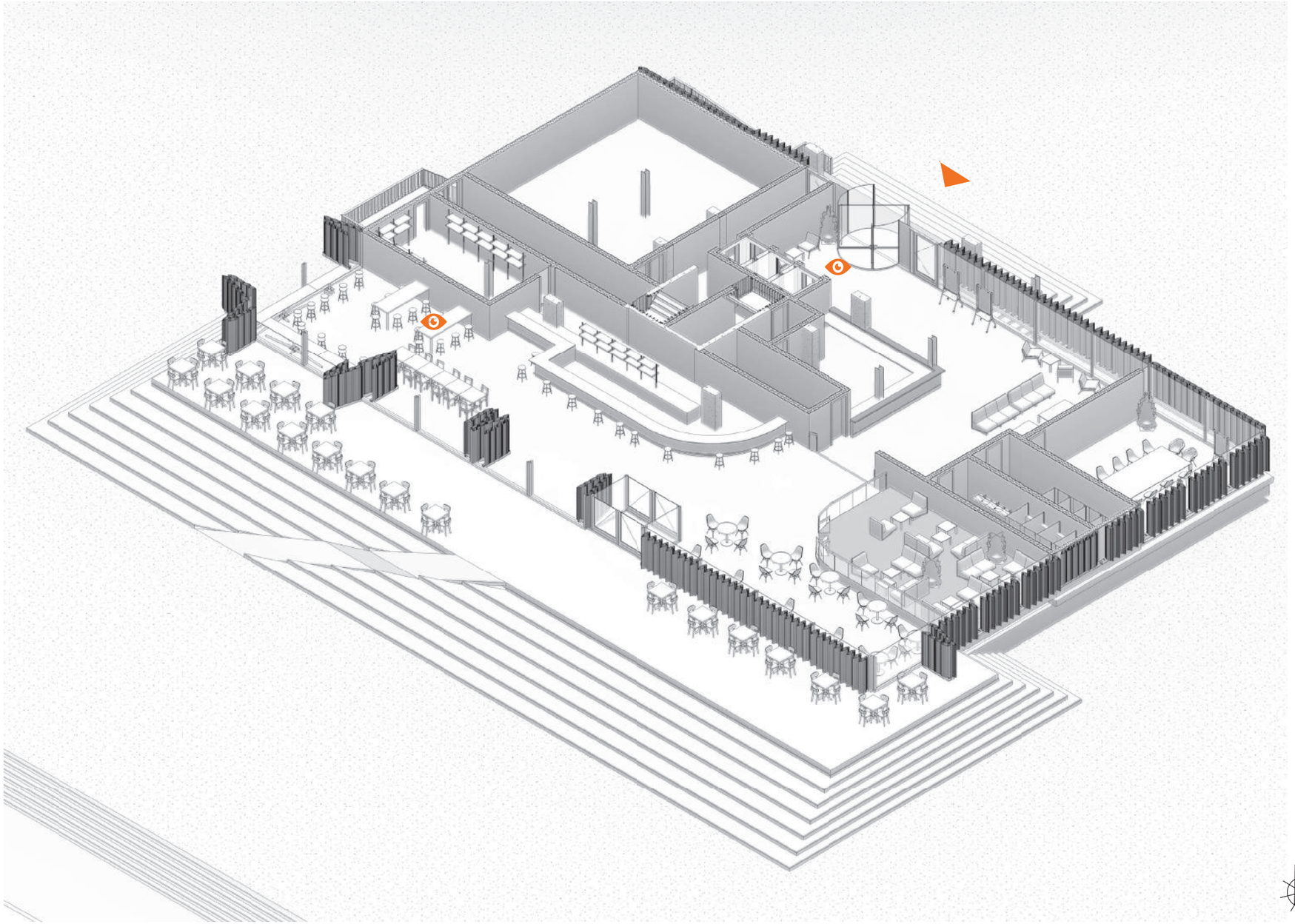


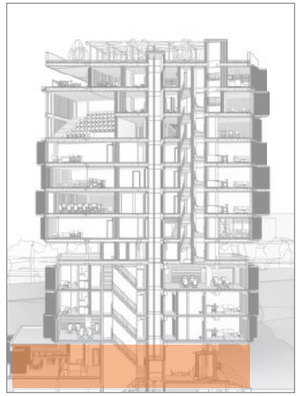
RESULTS


- SKY GARDEN -
- RESTAURANT -
- AUDITORIUM -
- HOTEL & OFFICE -
- COFFEE BAR -
- ENTRANCE -


- COFFEE BAR -
- ENTRANCE -

ENTRANCE

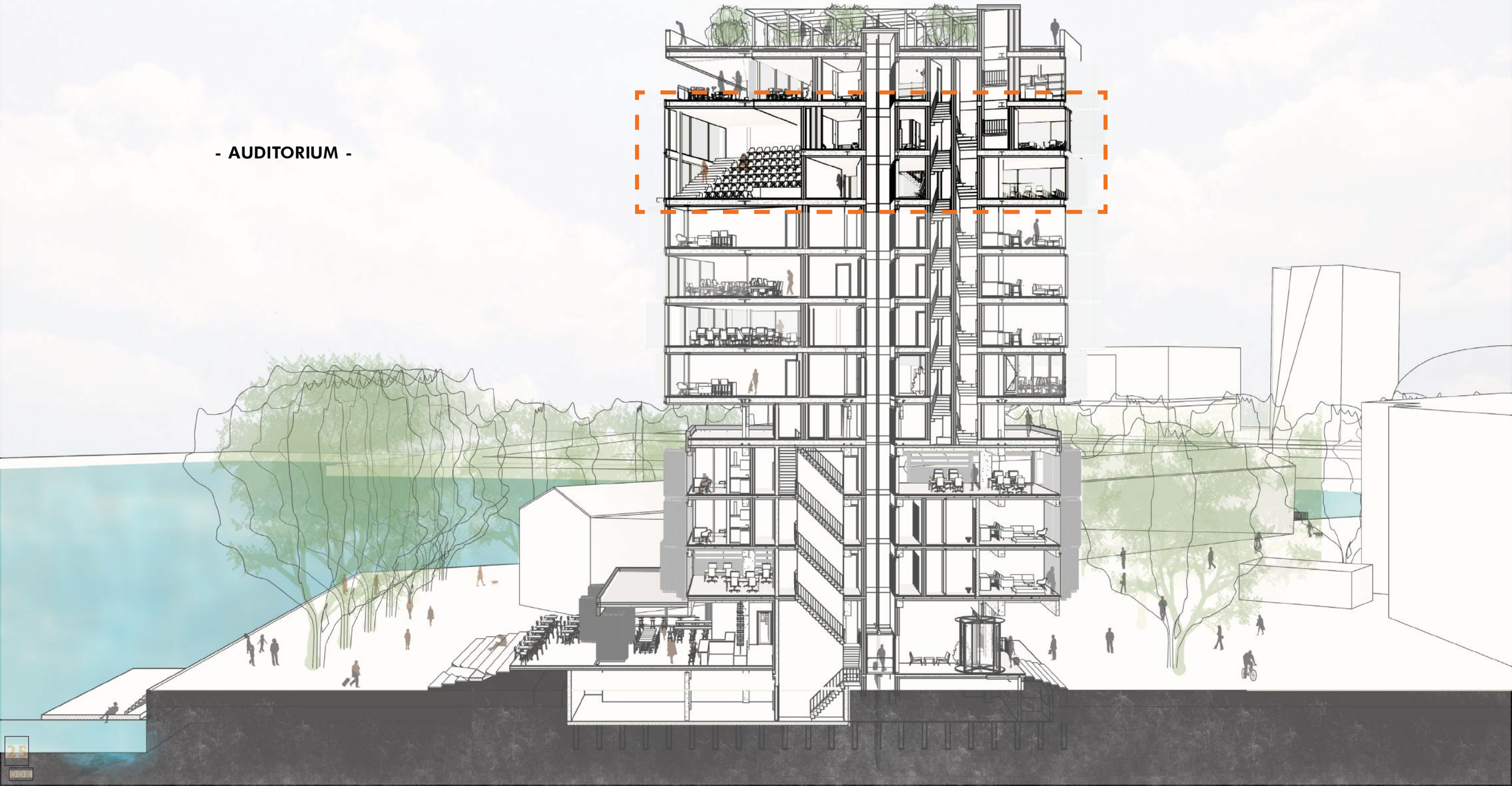




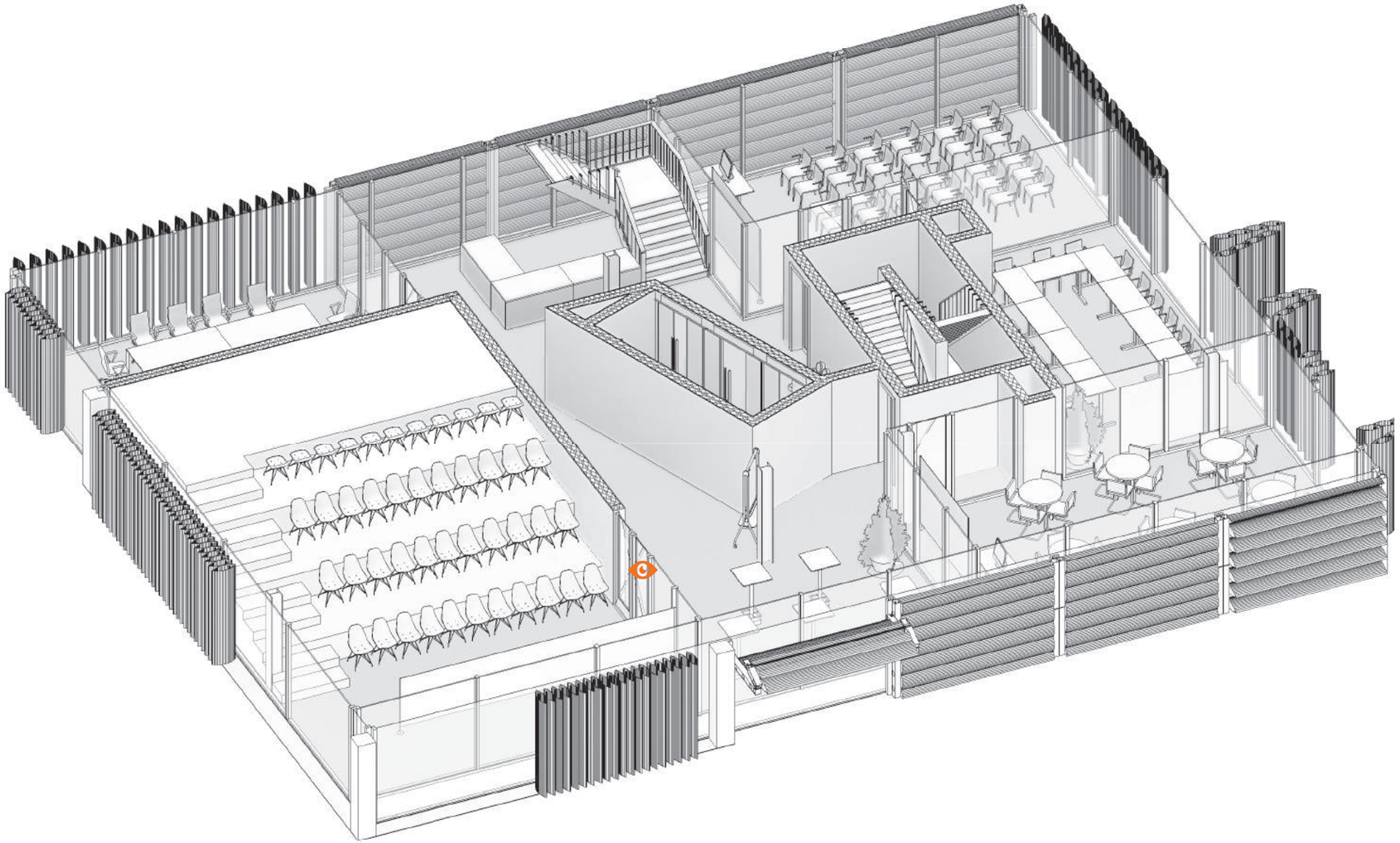
RECEPTION

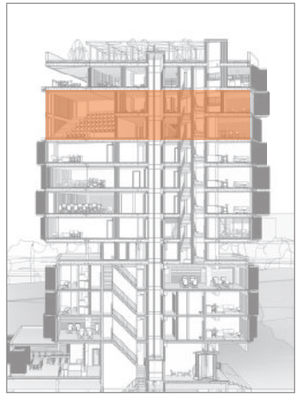
COFFEE BAR

- AUDITORIUM -



AUDITORIUM





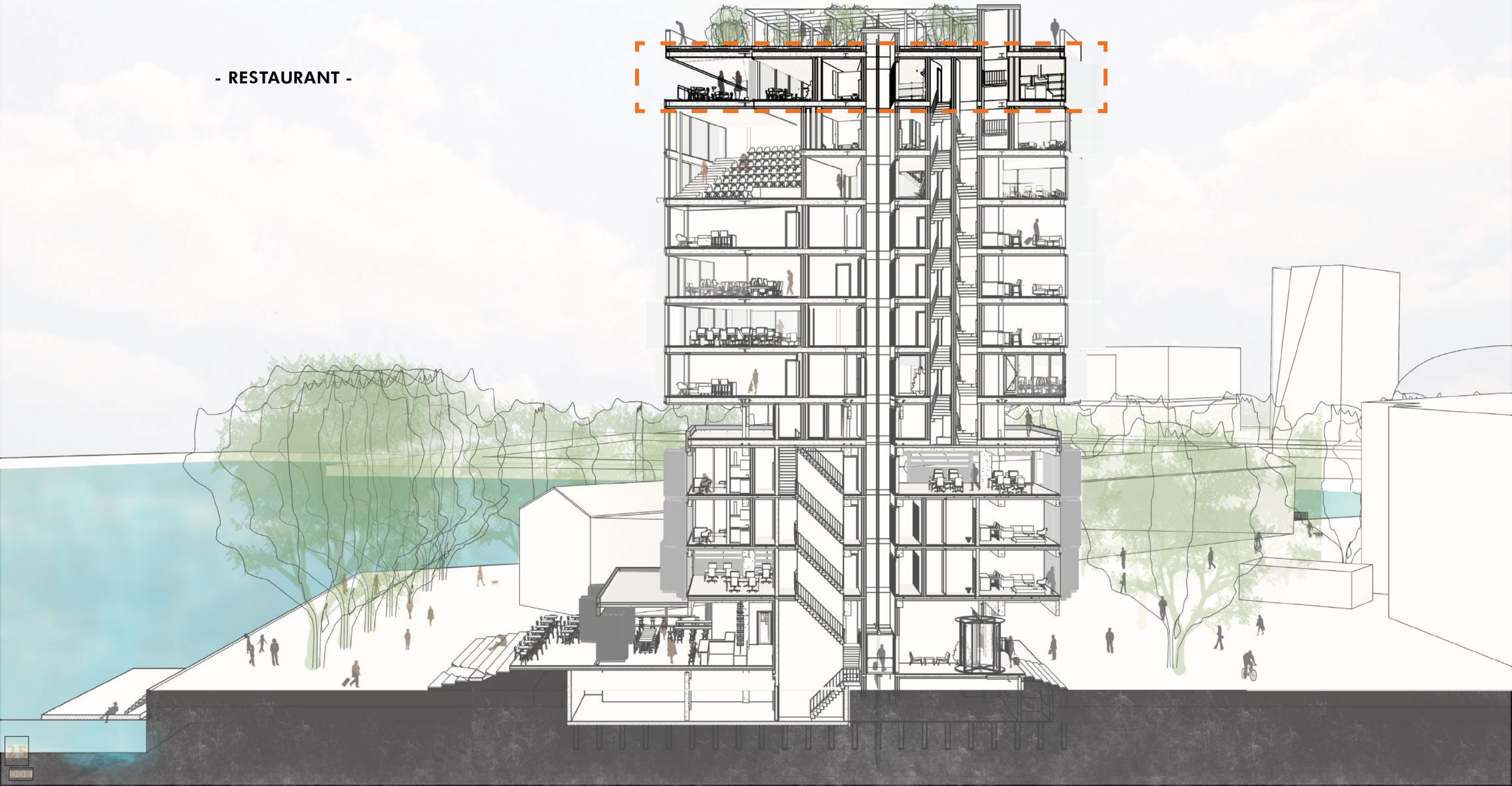
AUDITORIUM

AUDITORIUM

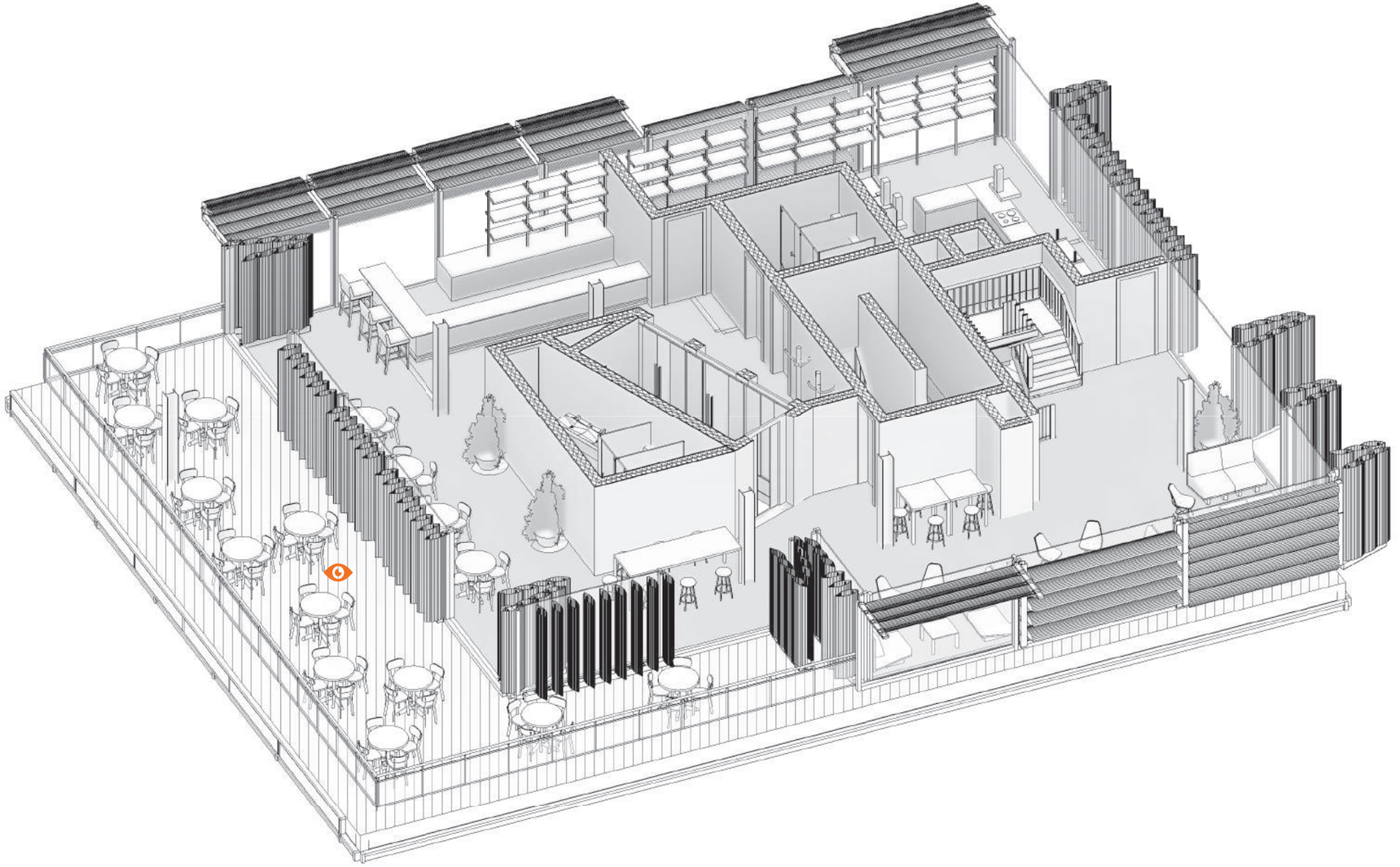
AN ADAPTIVE VISION
AR3AE015 Architectural Engineering: Intecture graduation studio (2017-2018)
29-06-2018
P5 presentation
Robert Jan Pluim

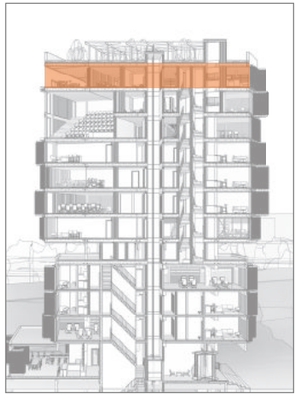
AUDITORIUM

- RESTAURANT -

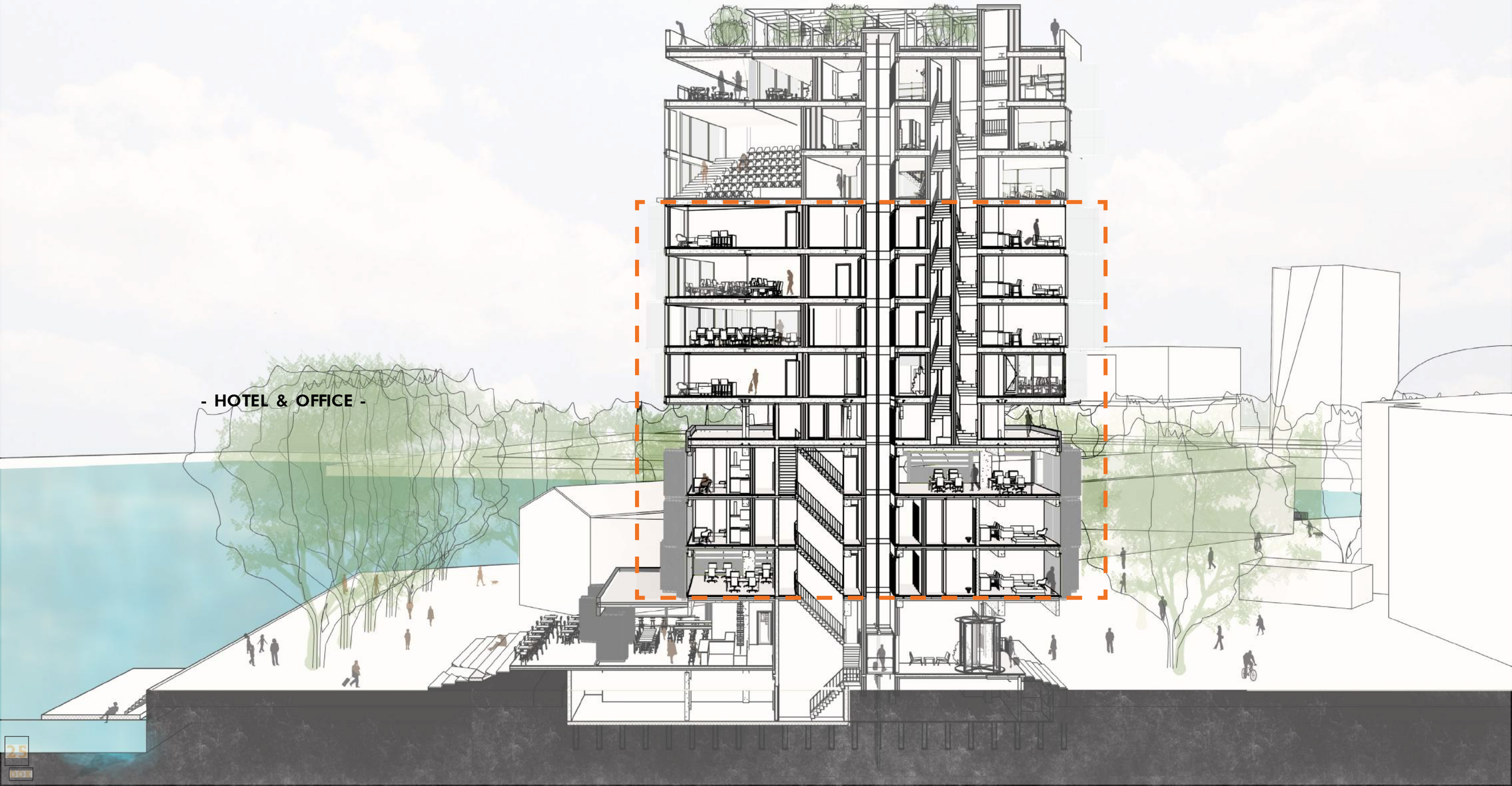


RESTAURANT

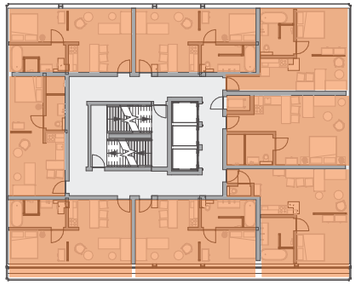




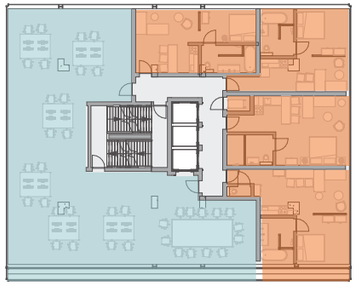
RESTAURANT


- HOTEL & OFFICE -

CONFIGURATIONS



1ST



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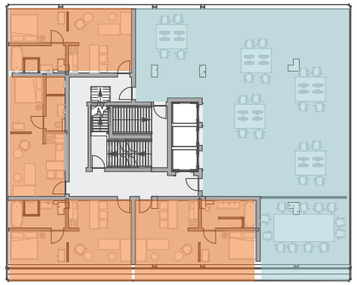

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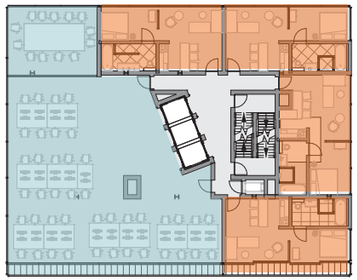

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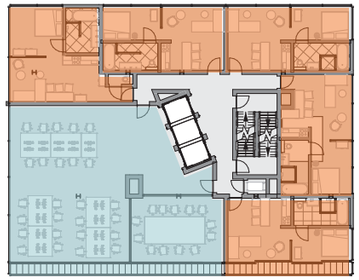

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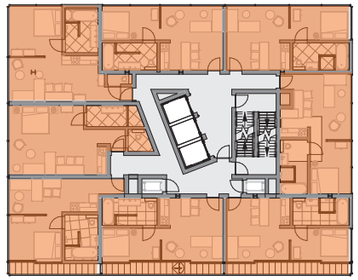

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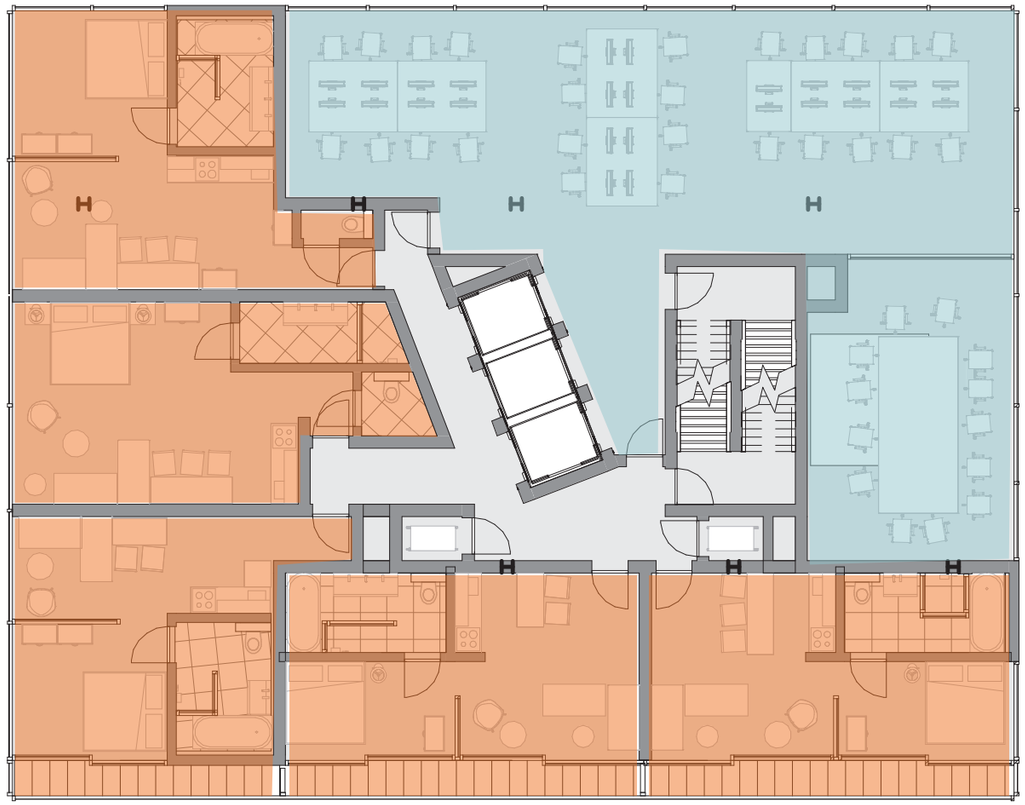
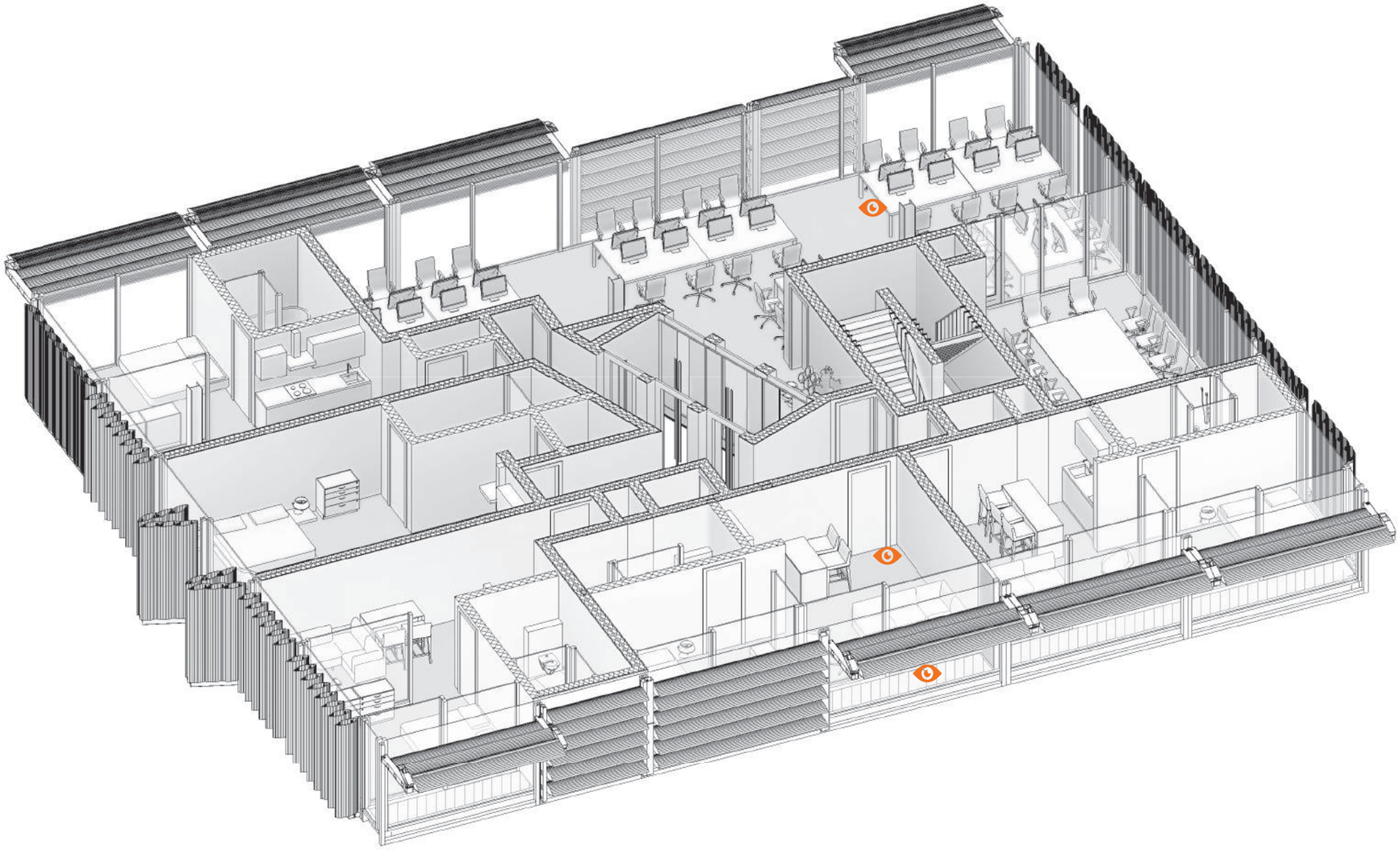
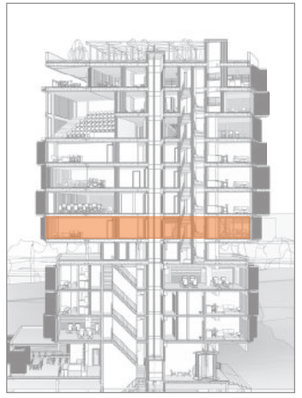


4TH

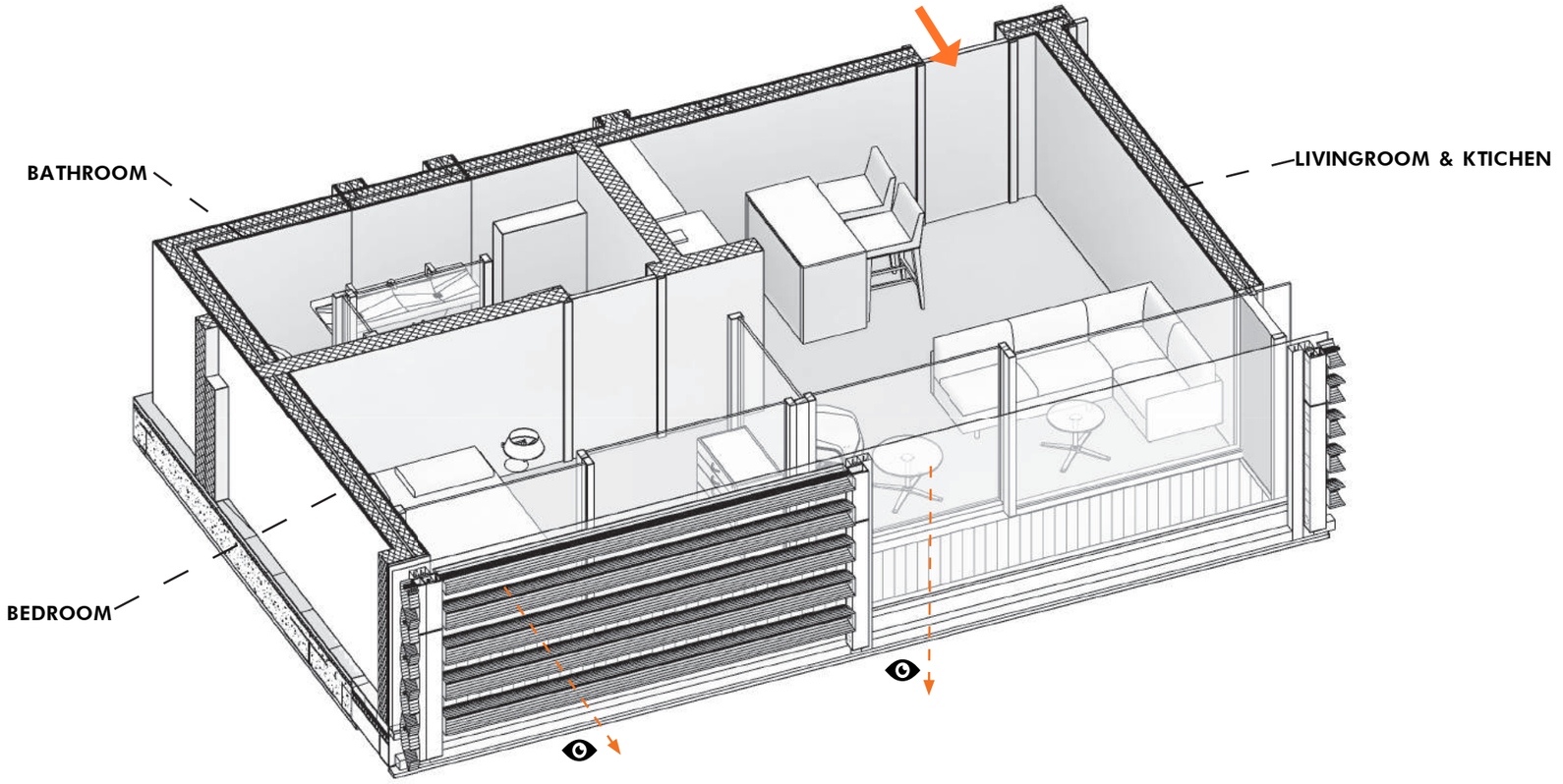
HOTEL & OFFICE





LONGSTAY HOTEL ROOM

32M2

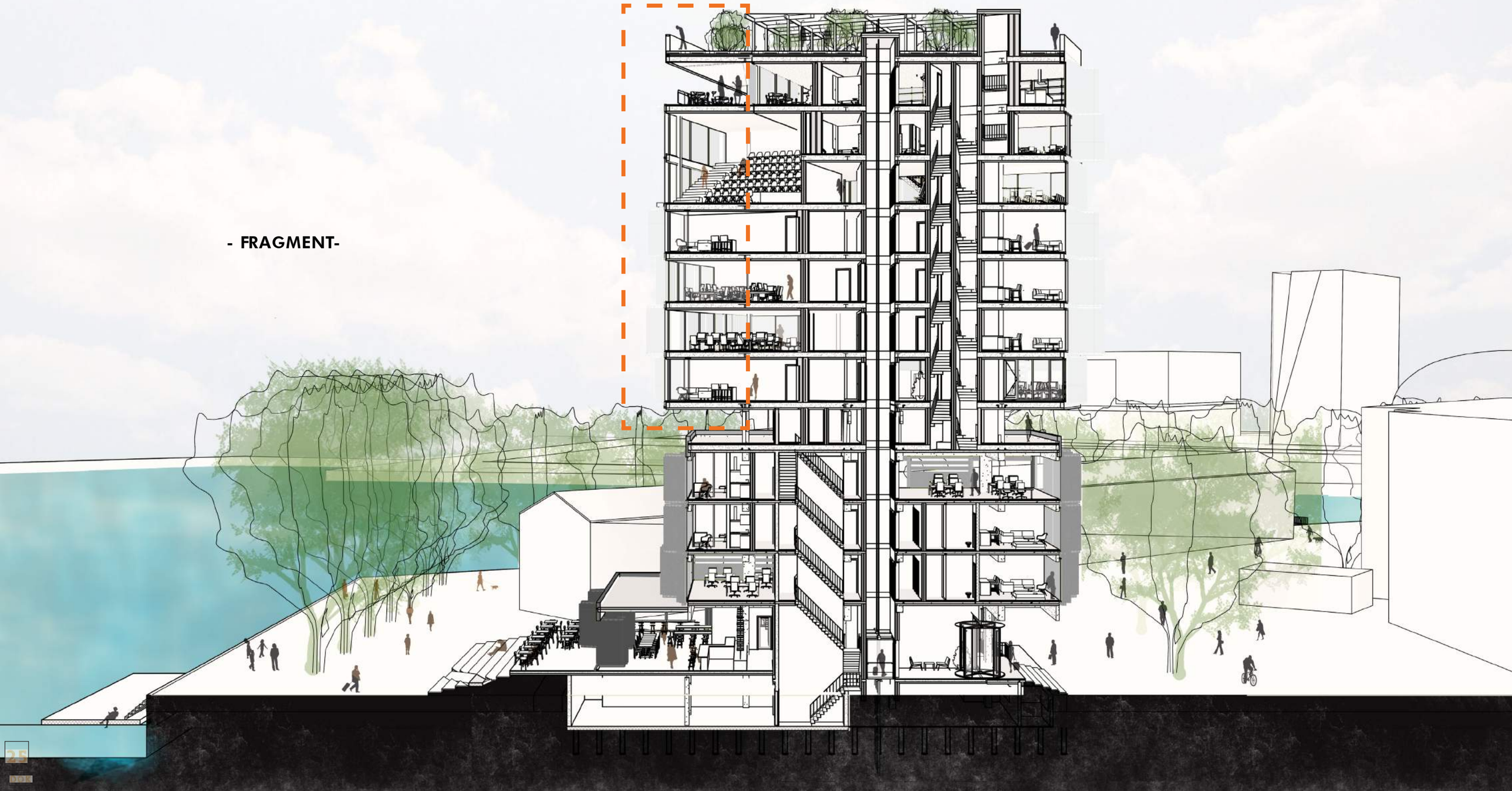


LONGSTAY HOTEL ROOM

HOTEL ROOM OUTSIDE

OFFICE

- FRAGMENT-



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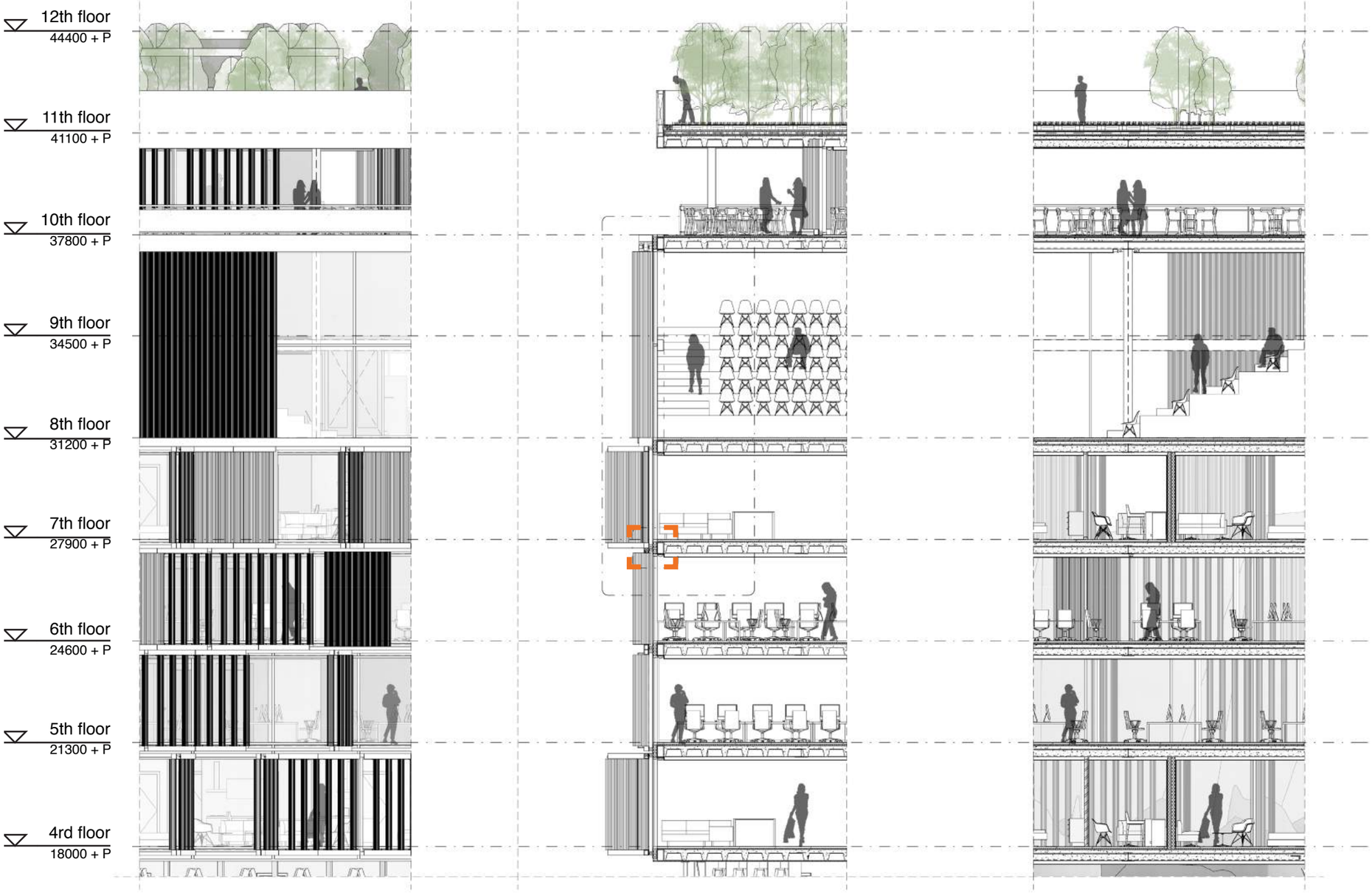
12th floor
44400 + P
11th floor
41100 + P
10th floor
37800 + P
9th floor
34500 + P
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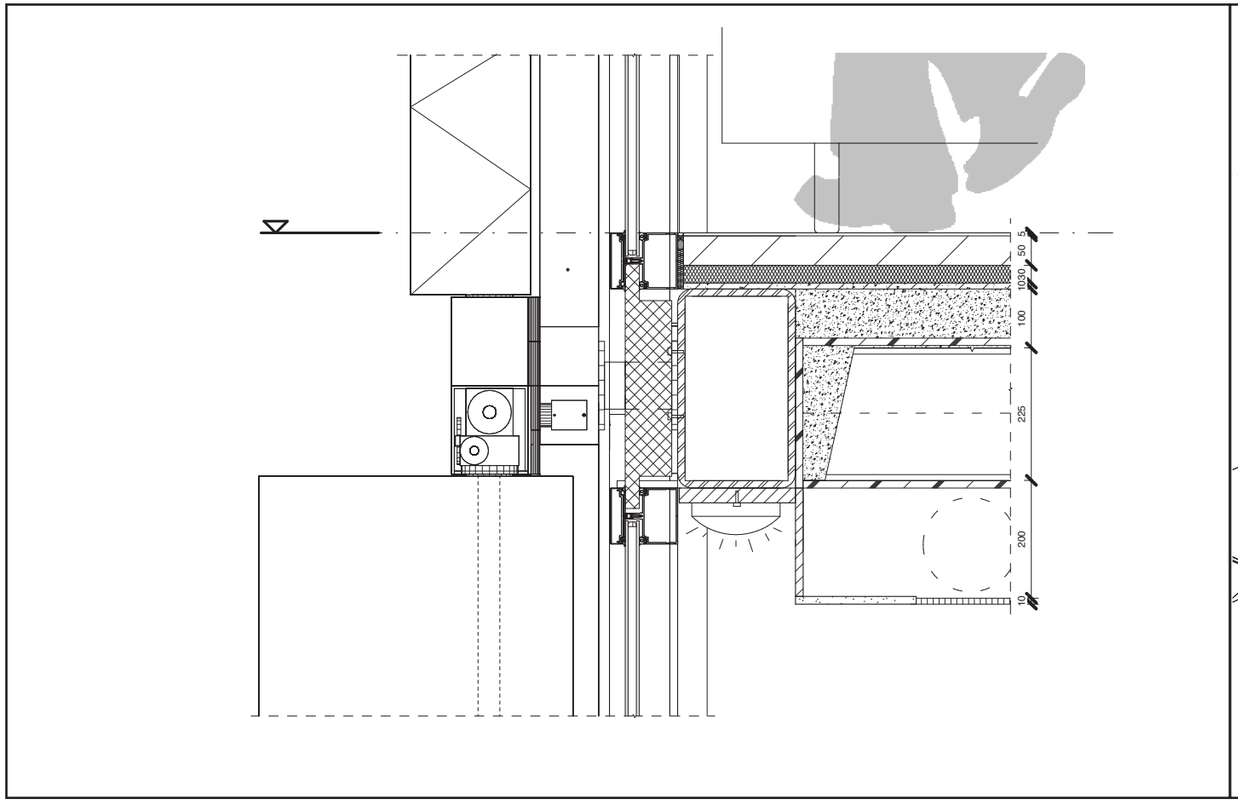
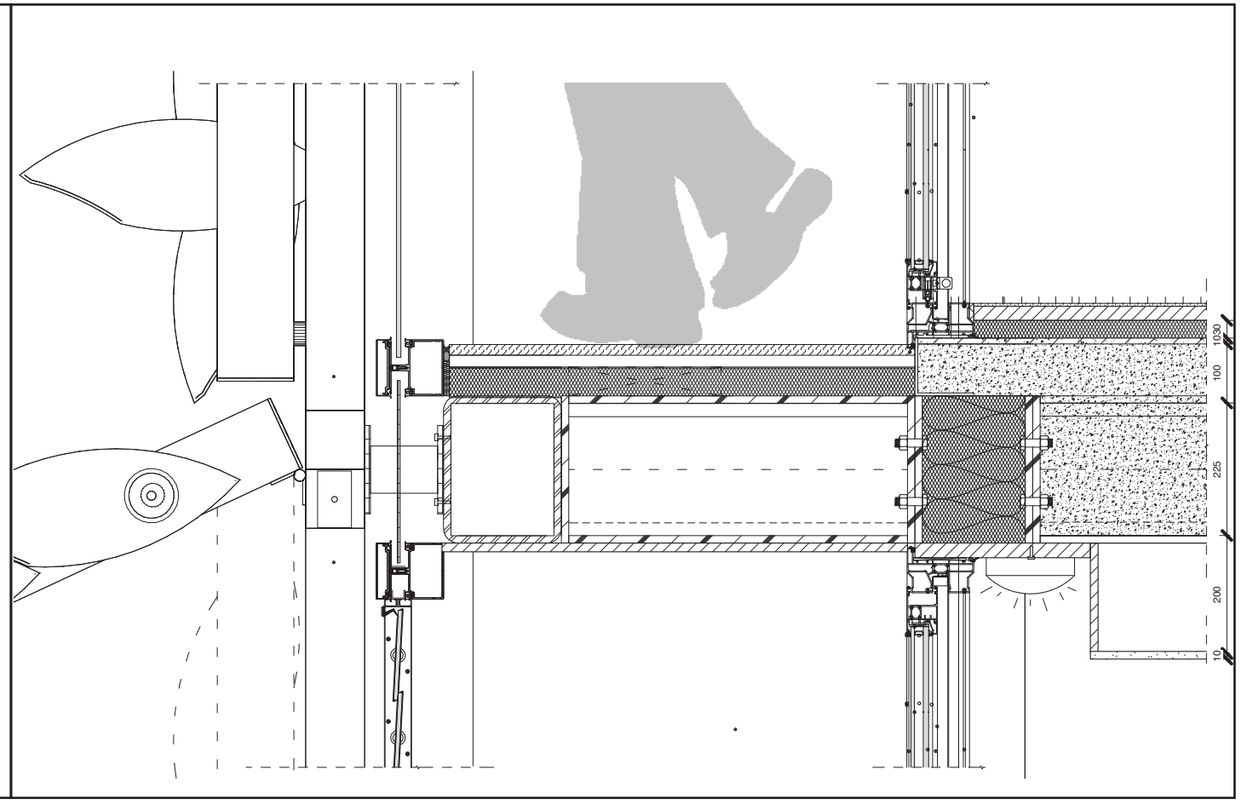
6th floor
24600 + P
5th floor
21300 + P
4rd floor
18000 + P

DETAIL

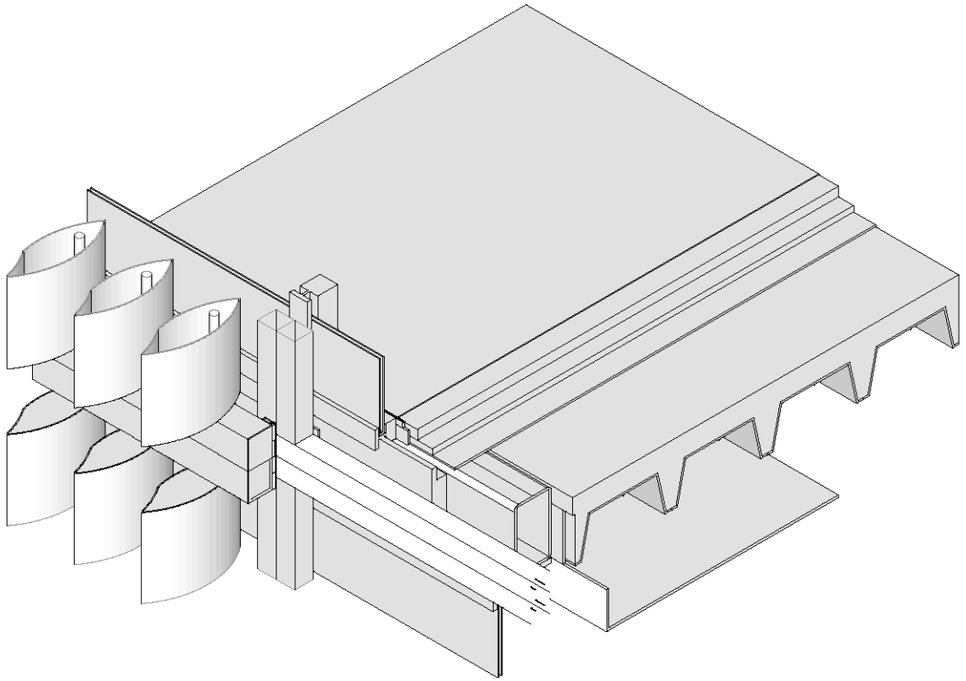


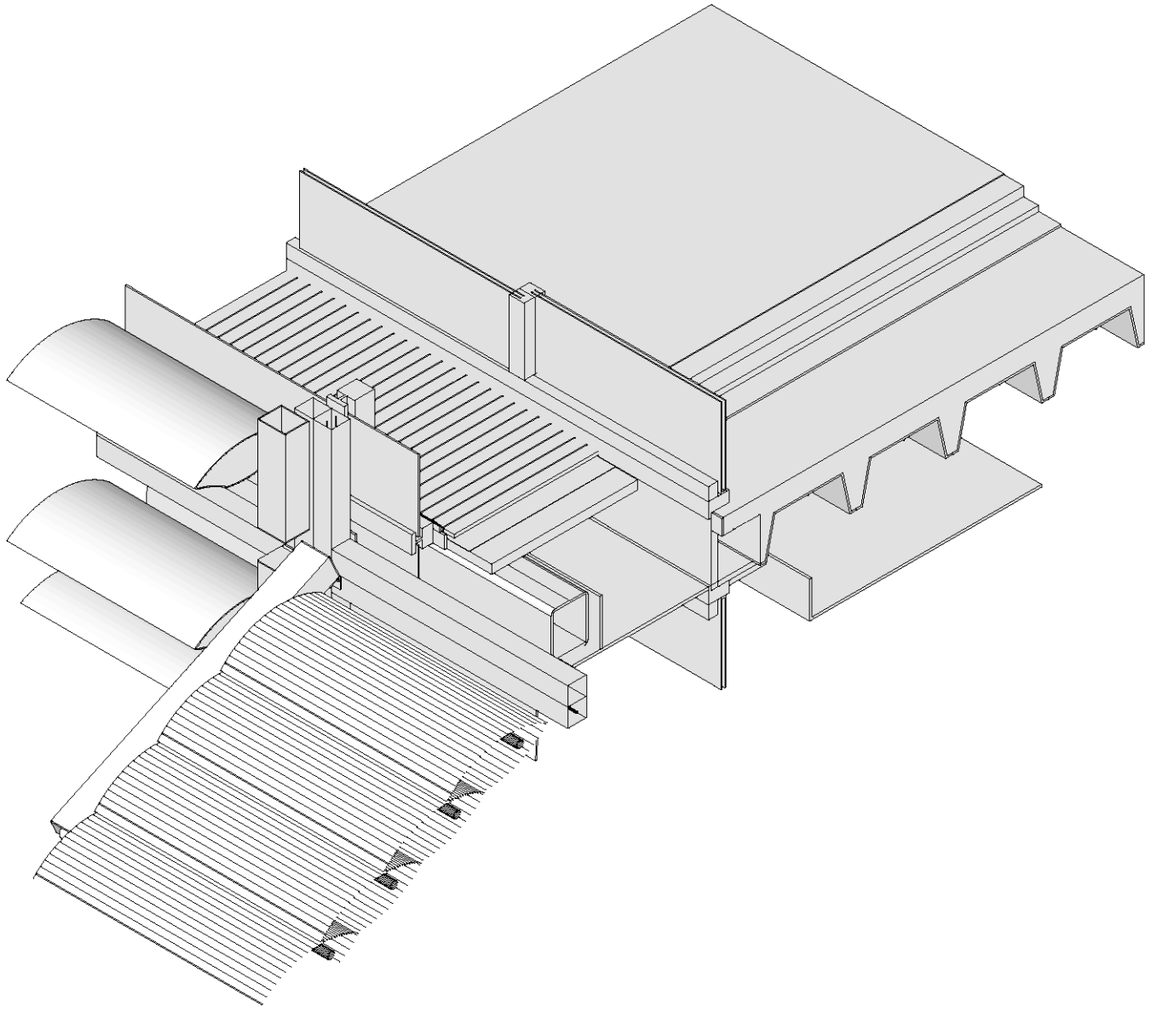
WEST FACADE



SOUTH FACADE

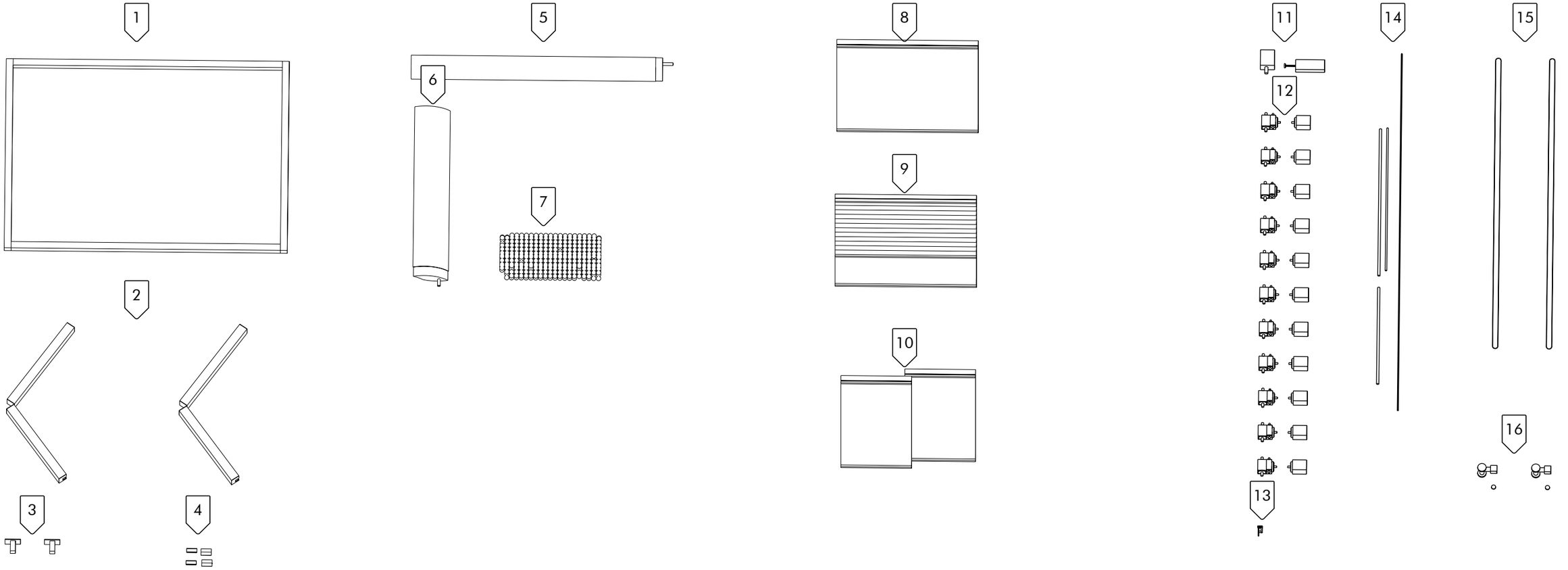
DETAIL





ADAPTIVE FACADE

ELEMENTS



MOUNTING

1. Mullion frame
2. Folding mullions
3. Console
4. Hinges

LOUVRES

5. Horizontal aluminium louvres
6. Vertical aluminium louvres
7. Insulation EPS balls

THERMAL RESISTANCE

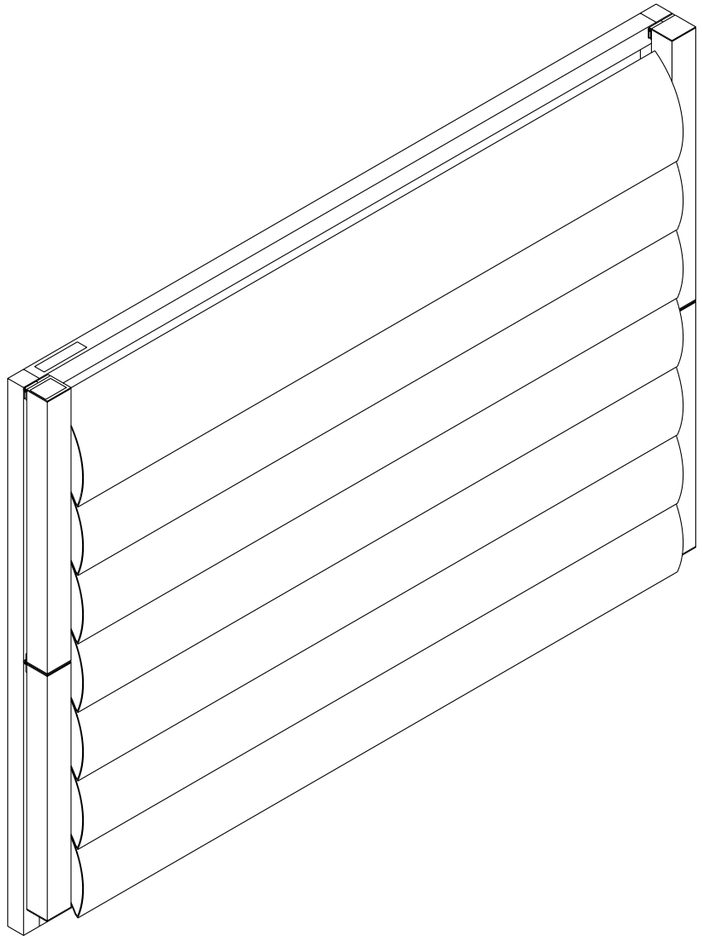
8. Curtain wall with double glazing
9. Curtain wall with single glass louvres
10. Sliding door with double glazing

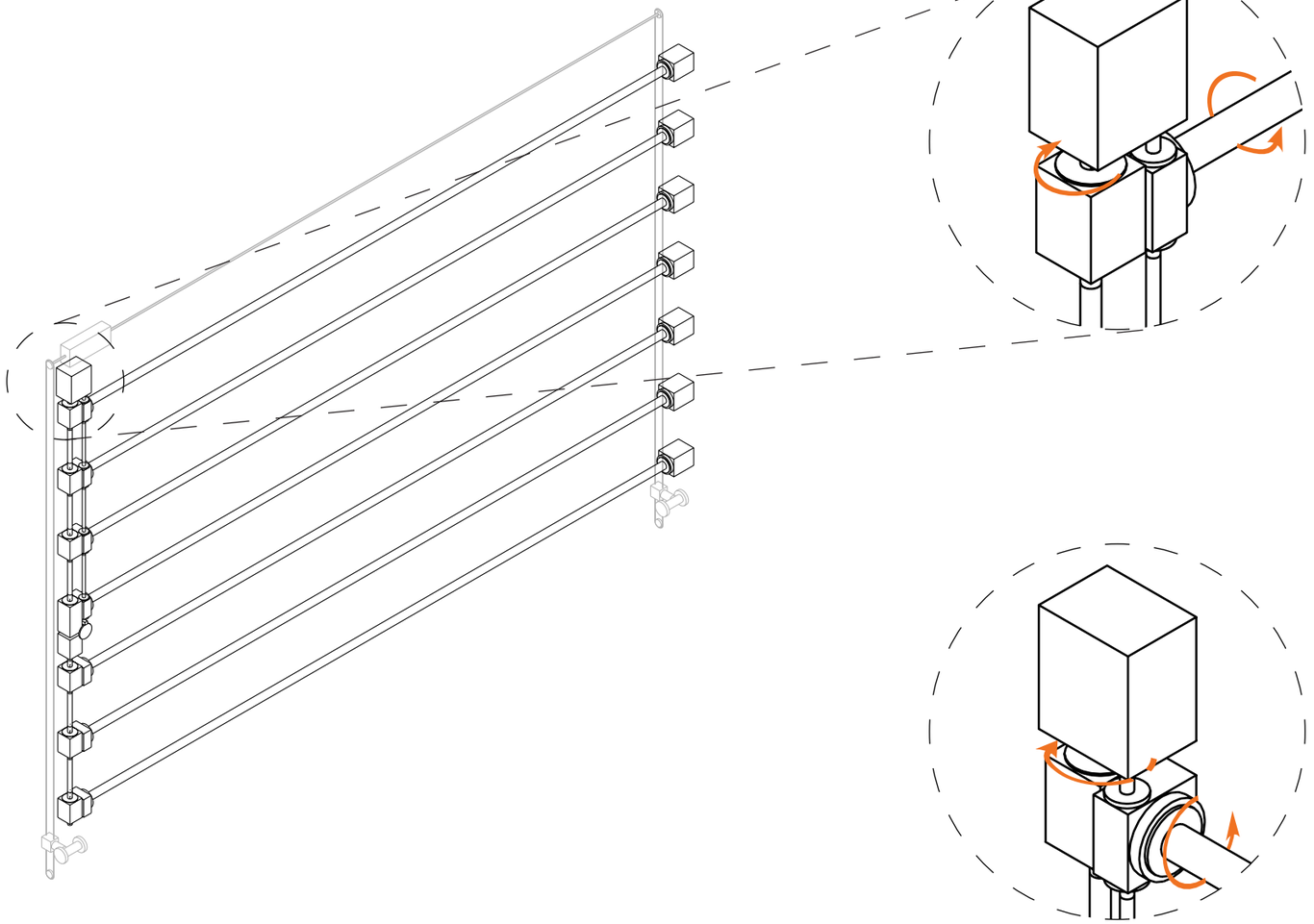
MECHANISM PARTS

11. Motor
12. Gearbox
13. Gear rack
14. Shafts
15. Steel cable
16. Pulley

ADAPTIVE FACADE

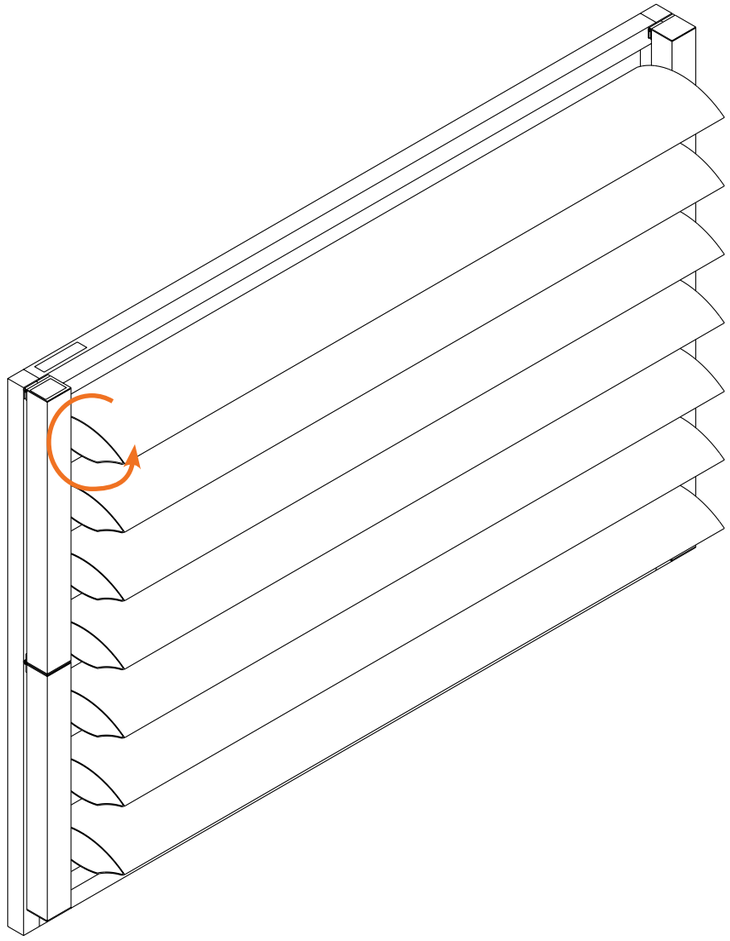
MECHANISM TILT

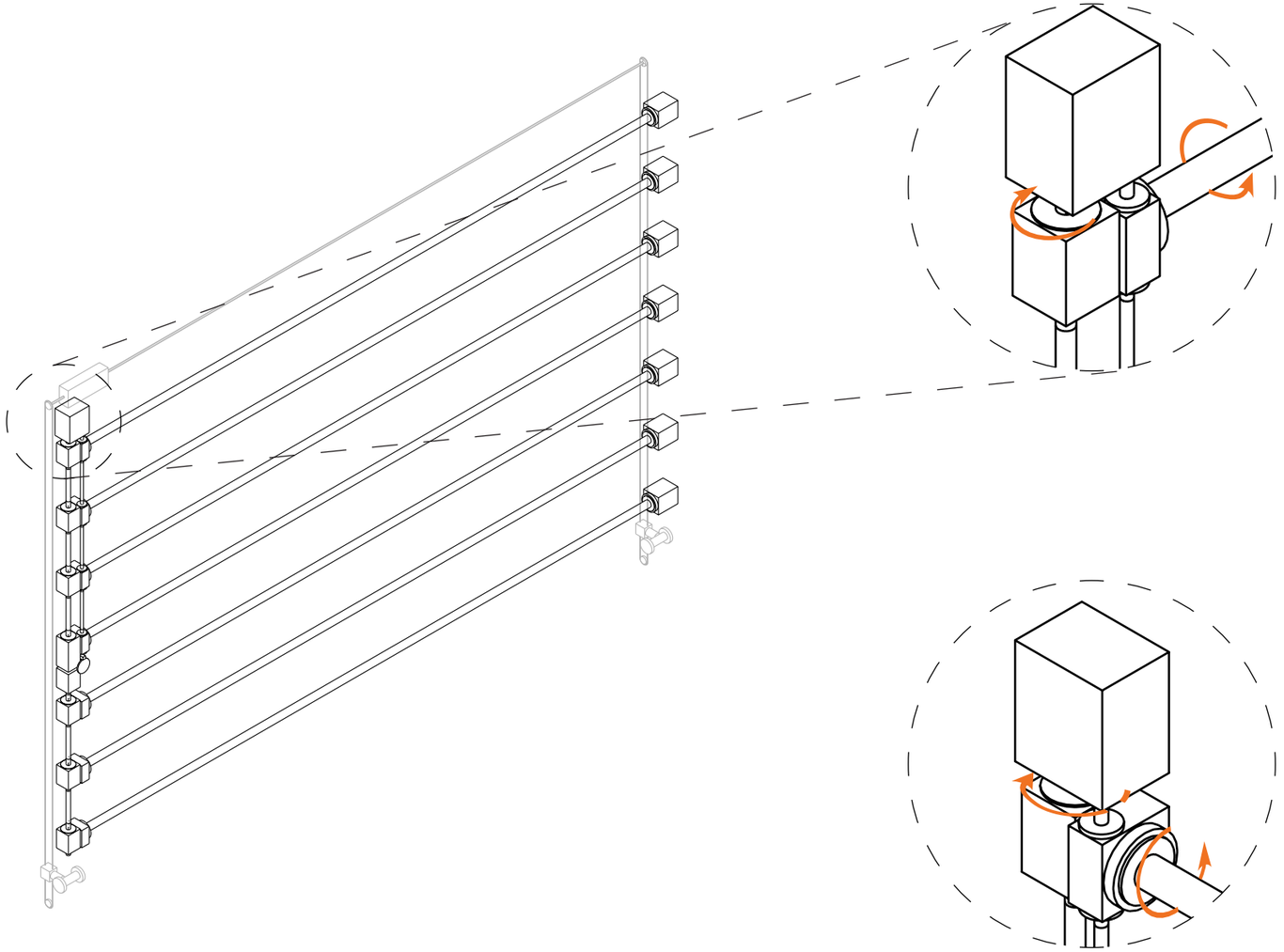




ADAPTIVE FACADE

MECHANISM TILT





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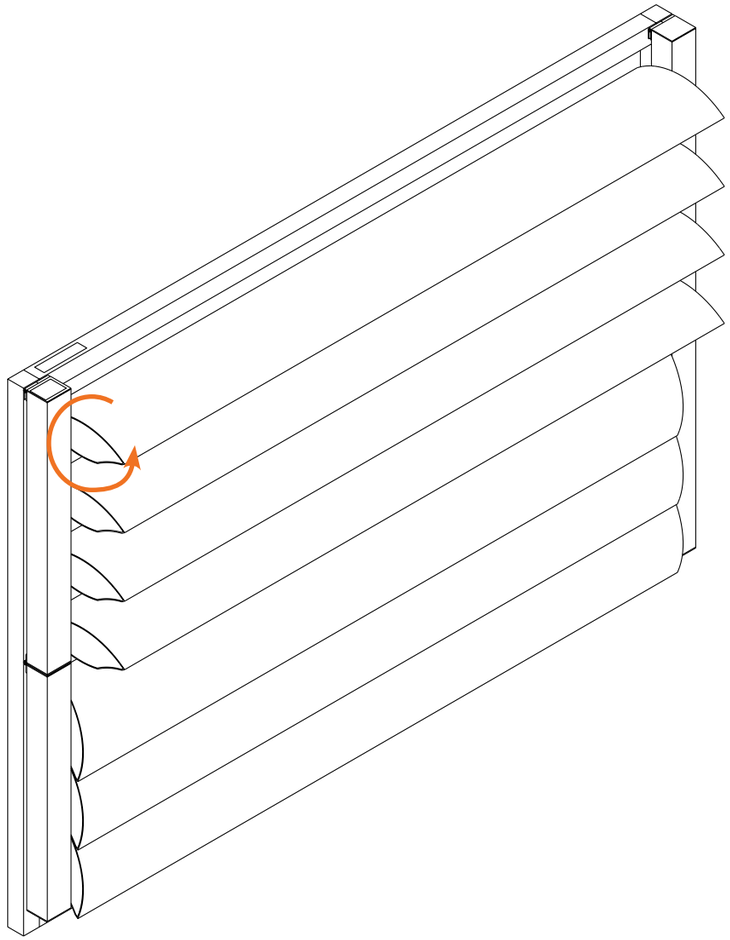
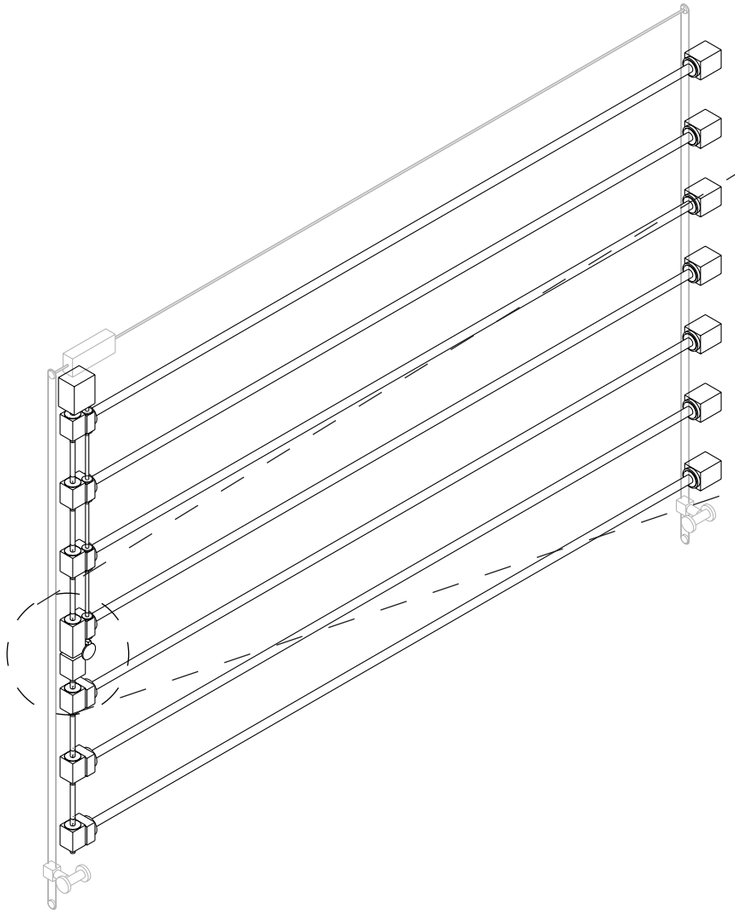
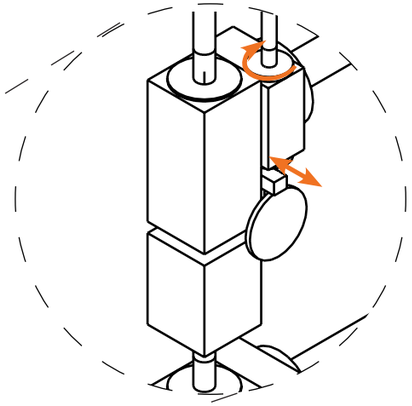
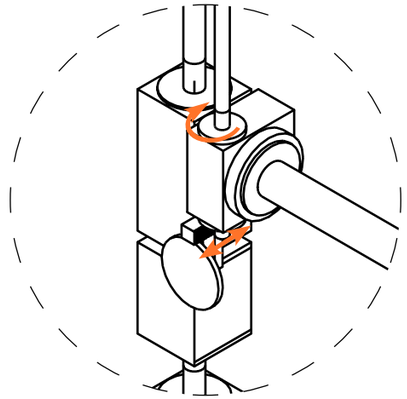
MECHANISM TILT



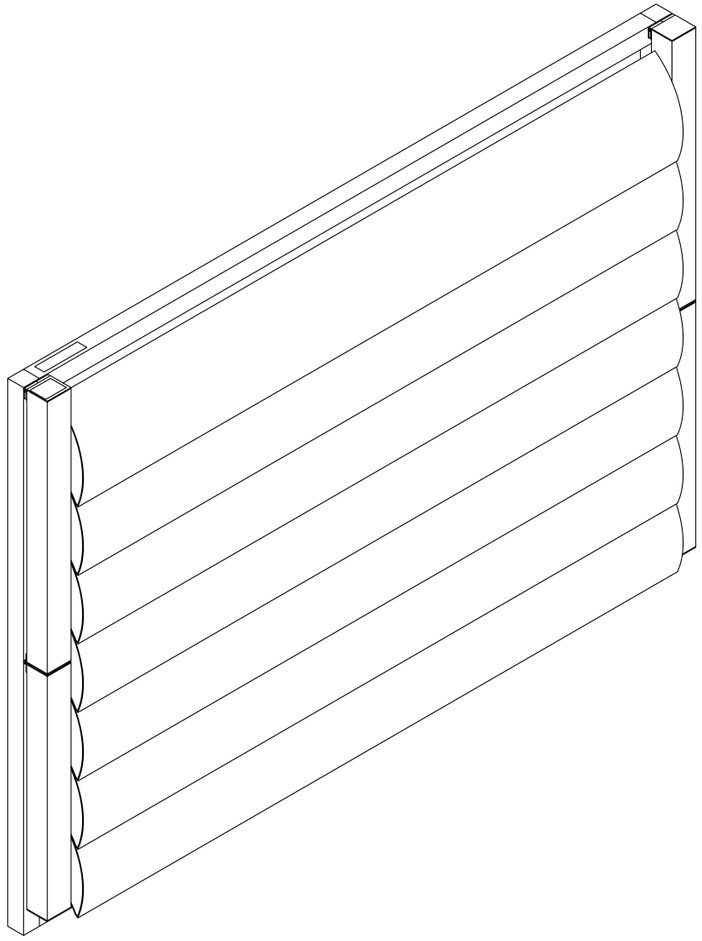


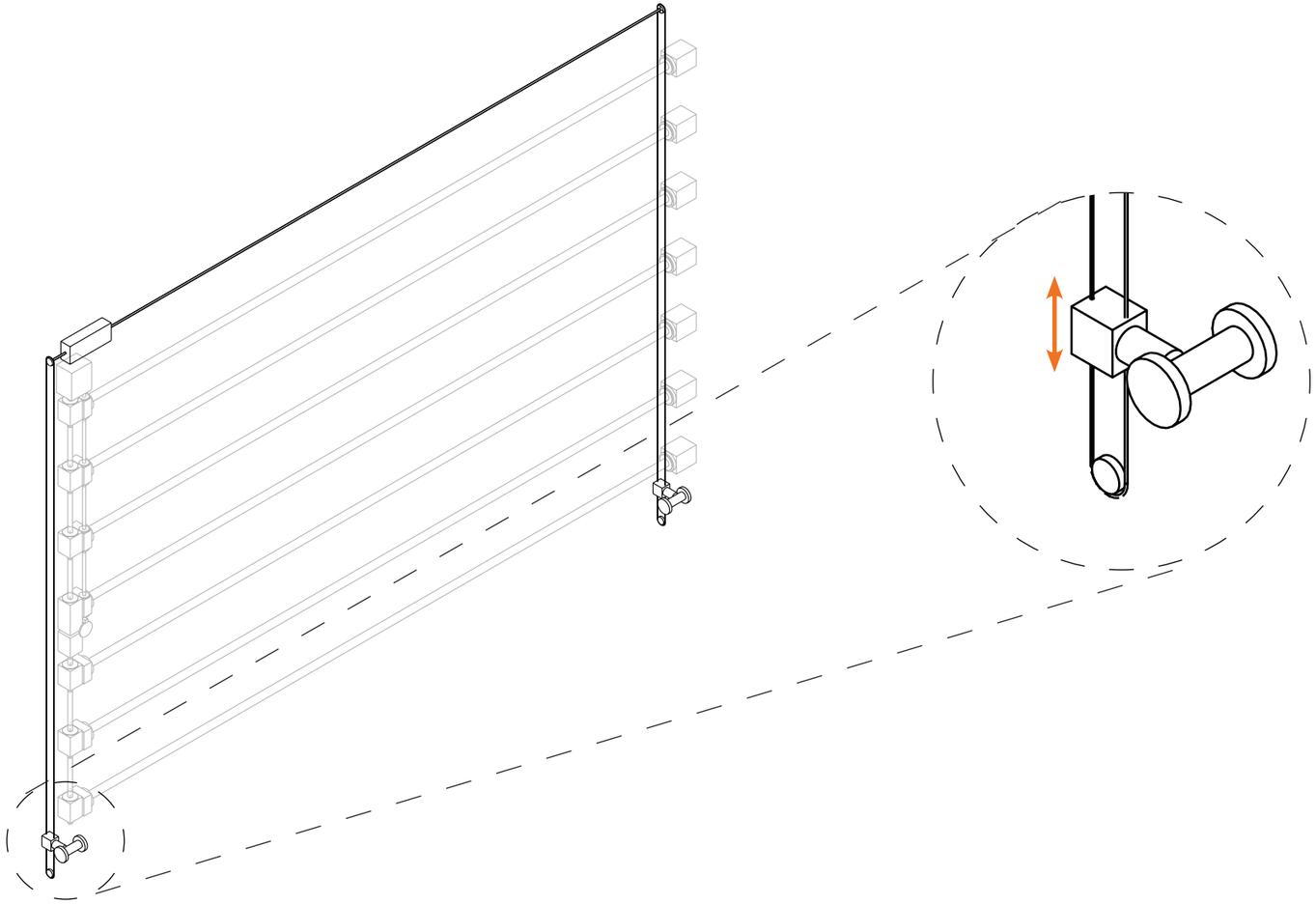




ADAPTIVE FACADE

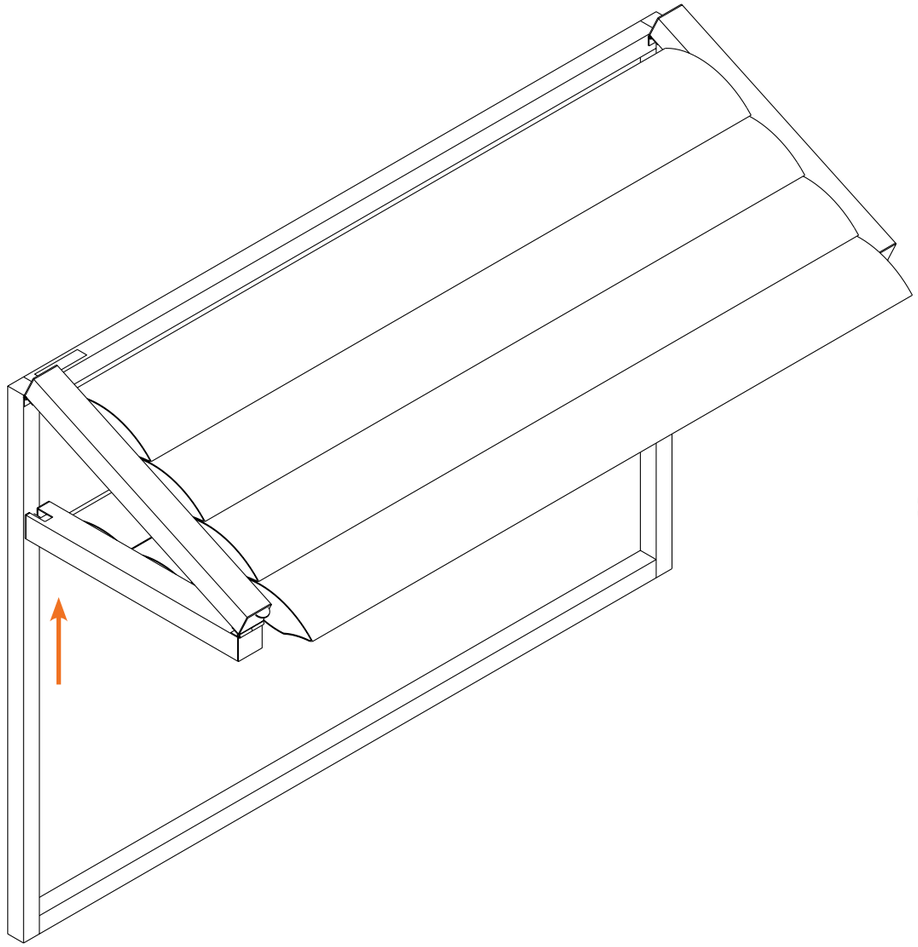
MECHANISM FOLDING

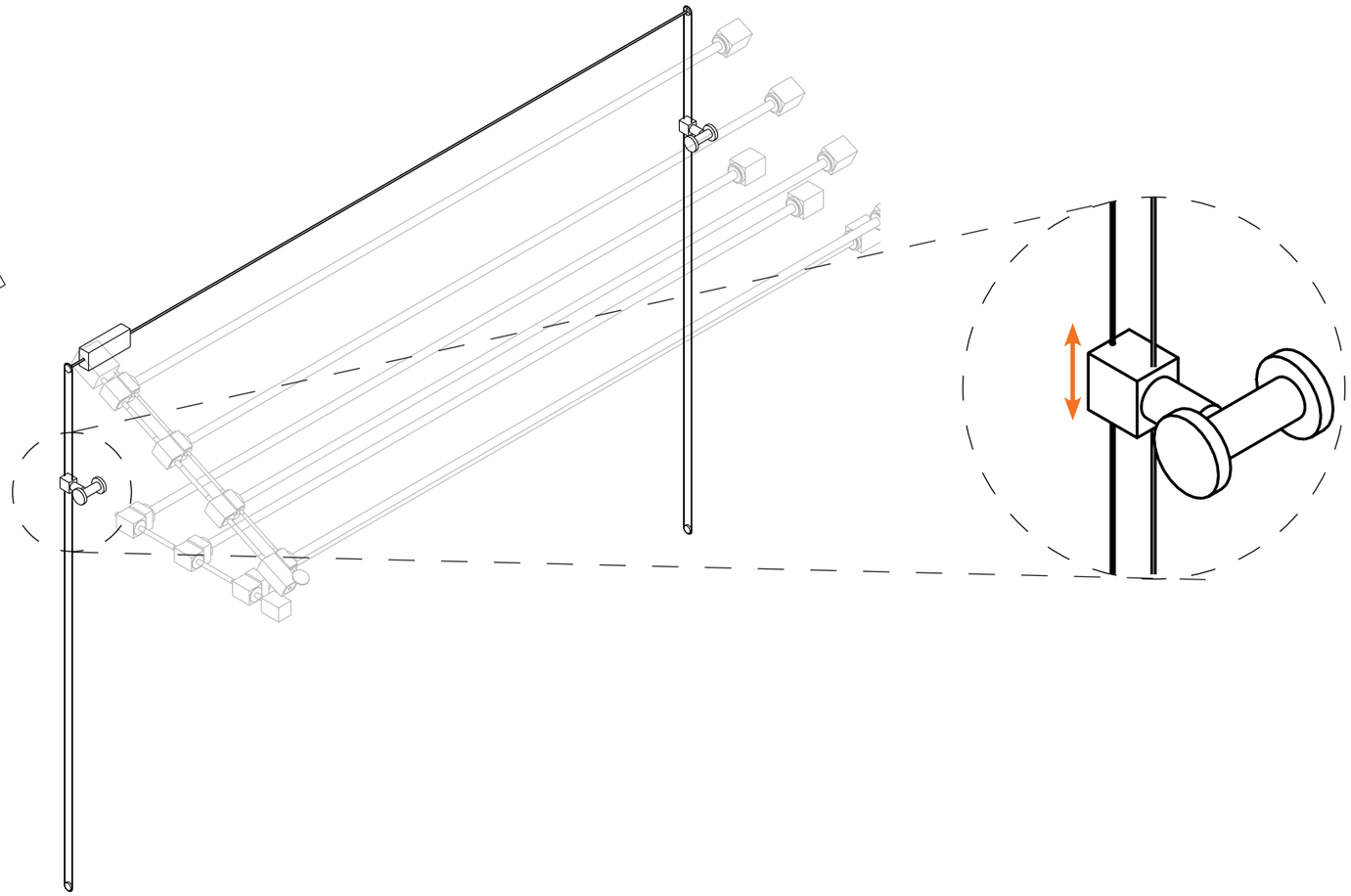




ADAPTIVE FACADE

MECHANISM FOLDING





KLIMMUUR CENTRAAL

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DOK