# Design booklet Complex Projects, New York Midtown. Leverhouse as a social office.

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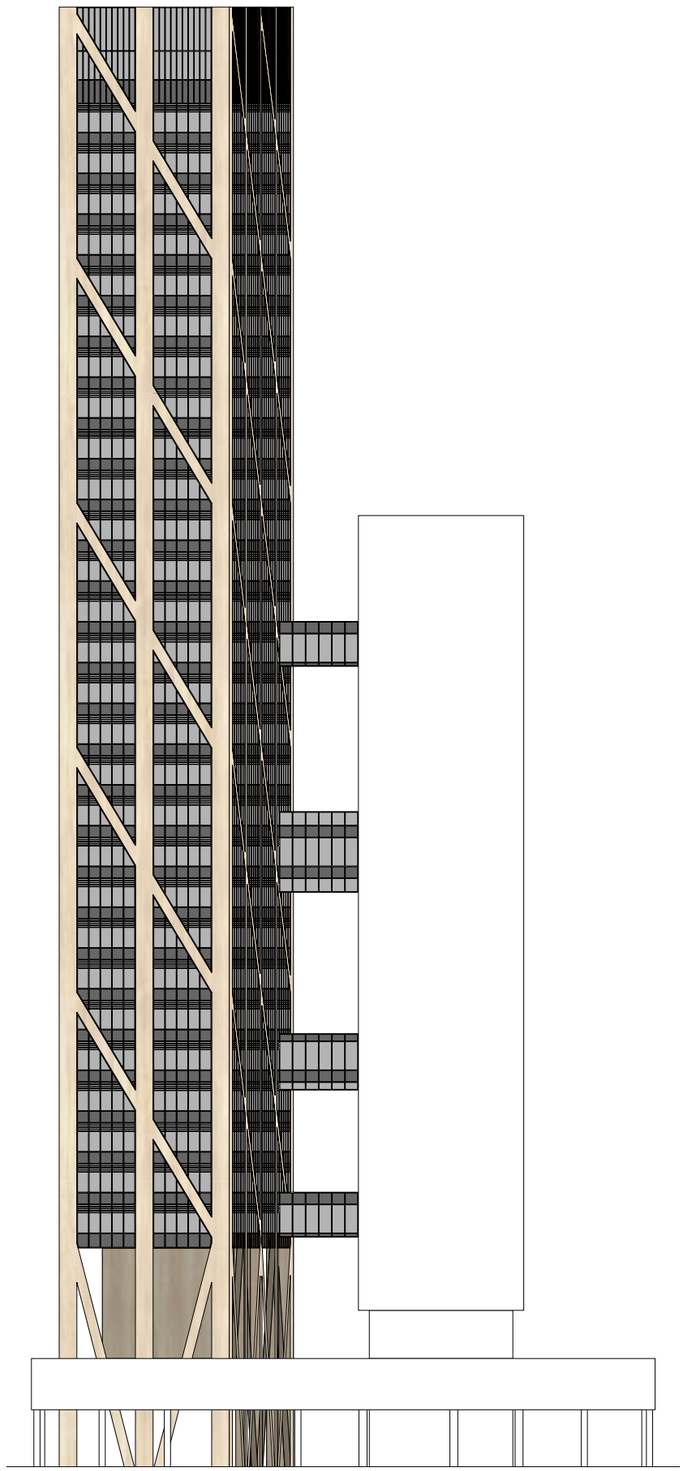
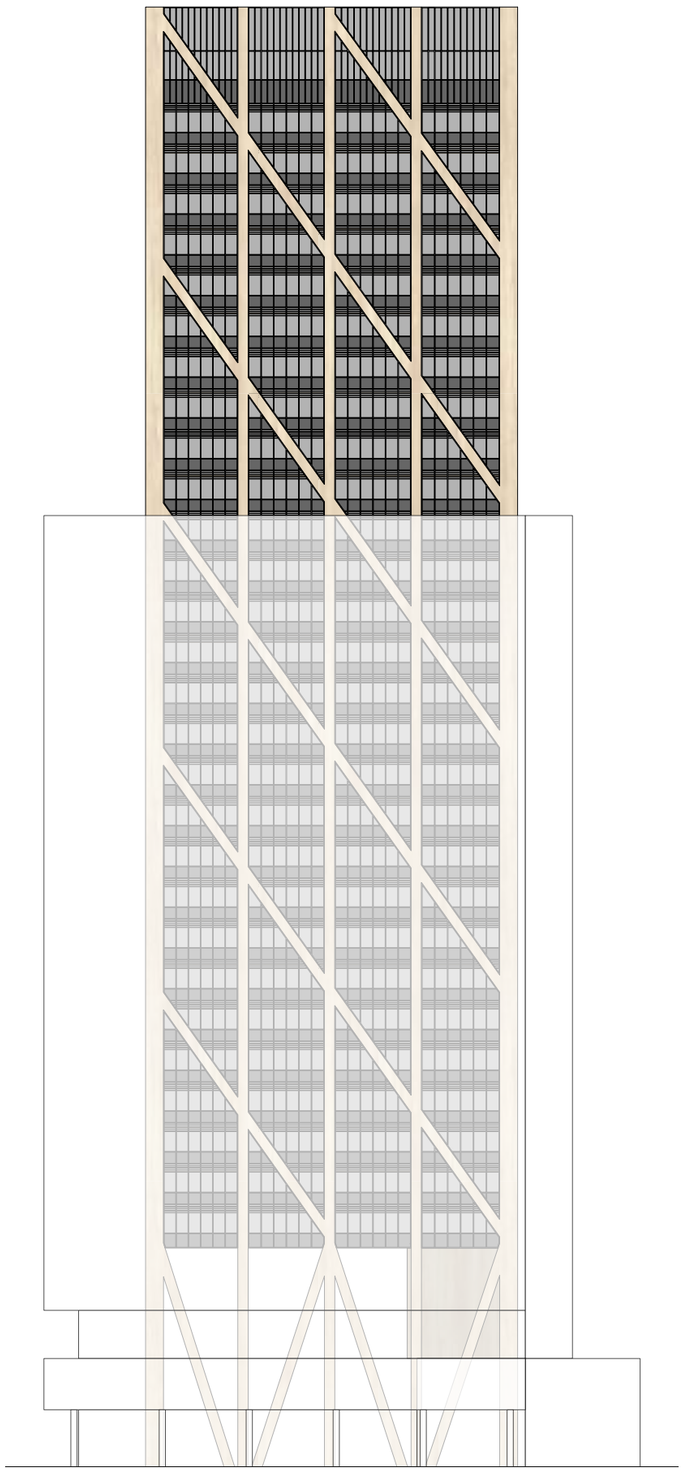
4287274

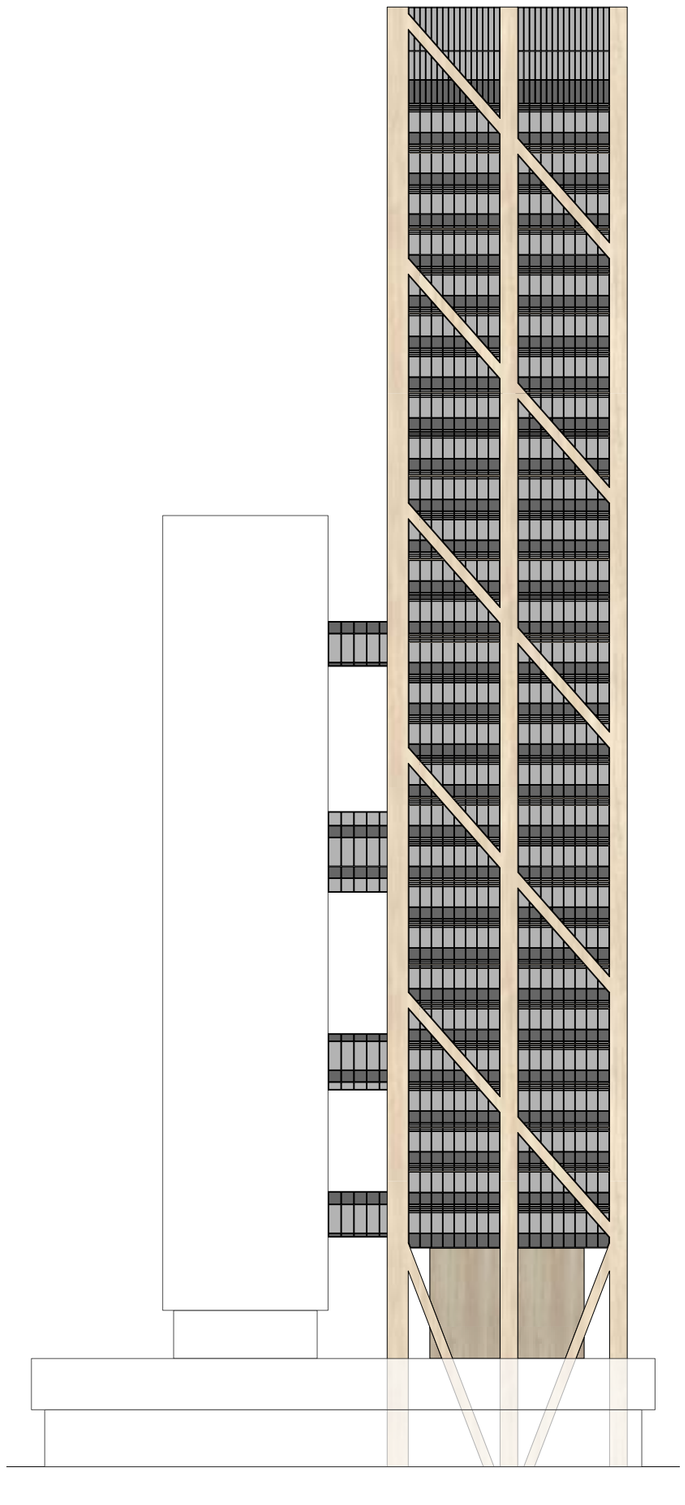
This booklet is made for my graduation presentation at the Technical University Delft, Architecture, Urbanism and Building Scienses. In this booklet a collection of drawings and representations of the design concept is shown which is made during the graduation studio Complex Projects, New York Midtown. *Daan Rijnders*



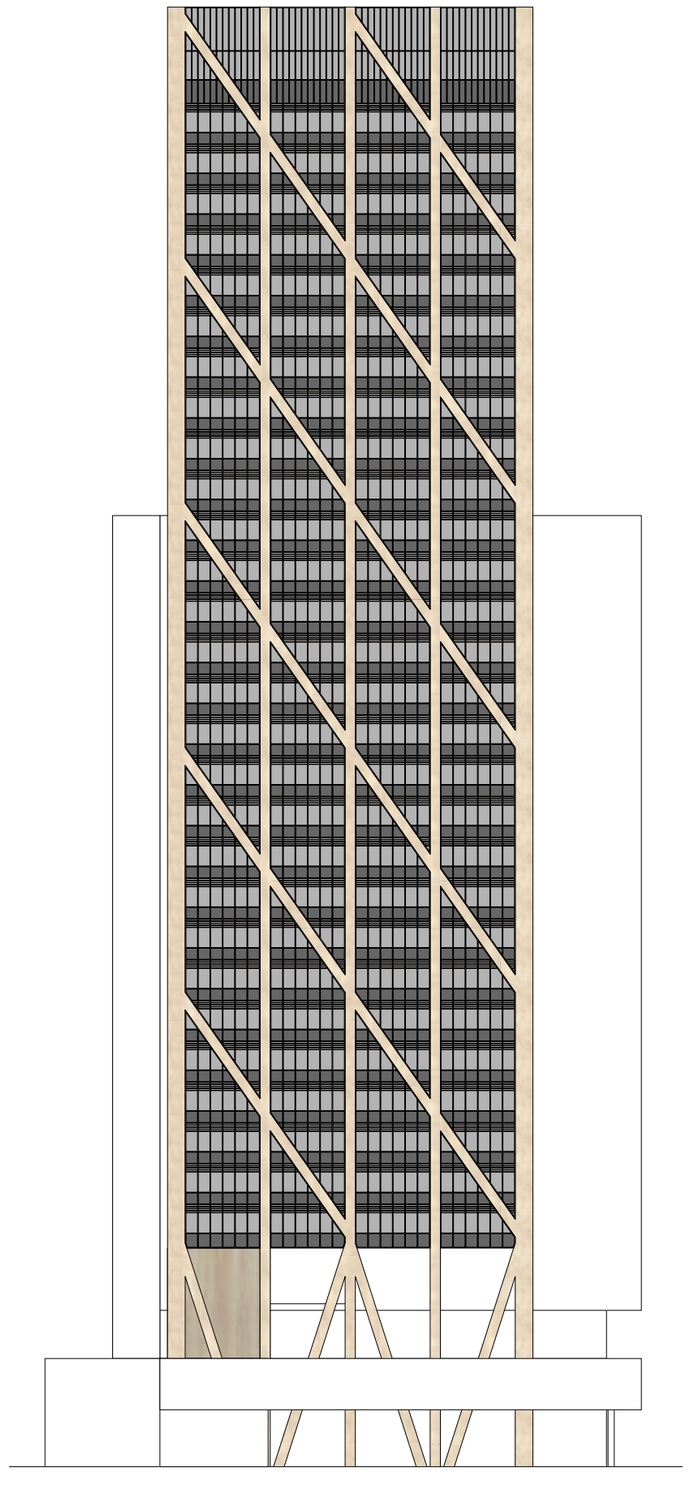
East Facade



North Facade

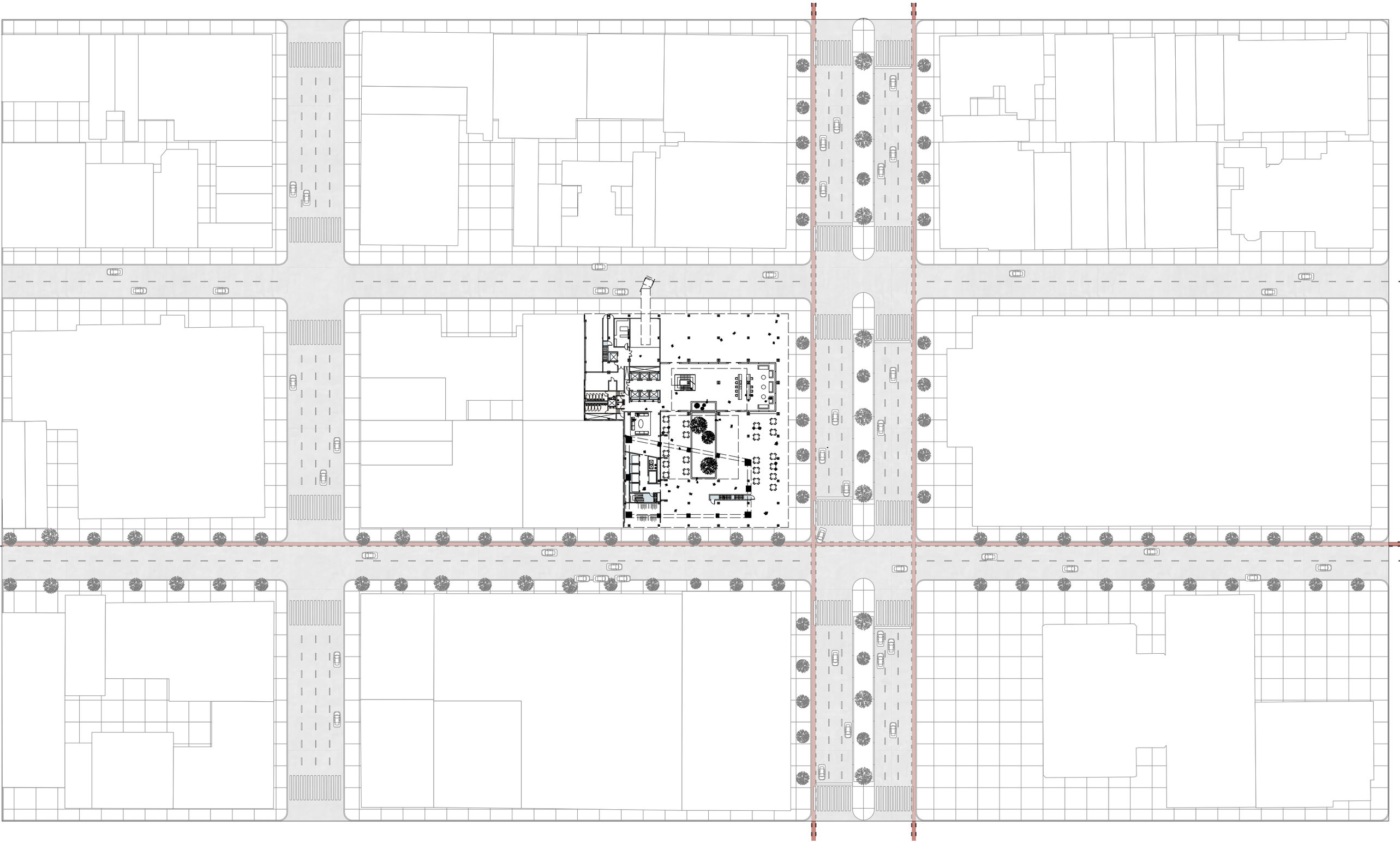


West Facade

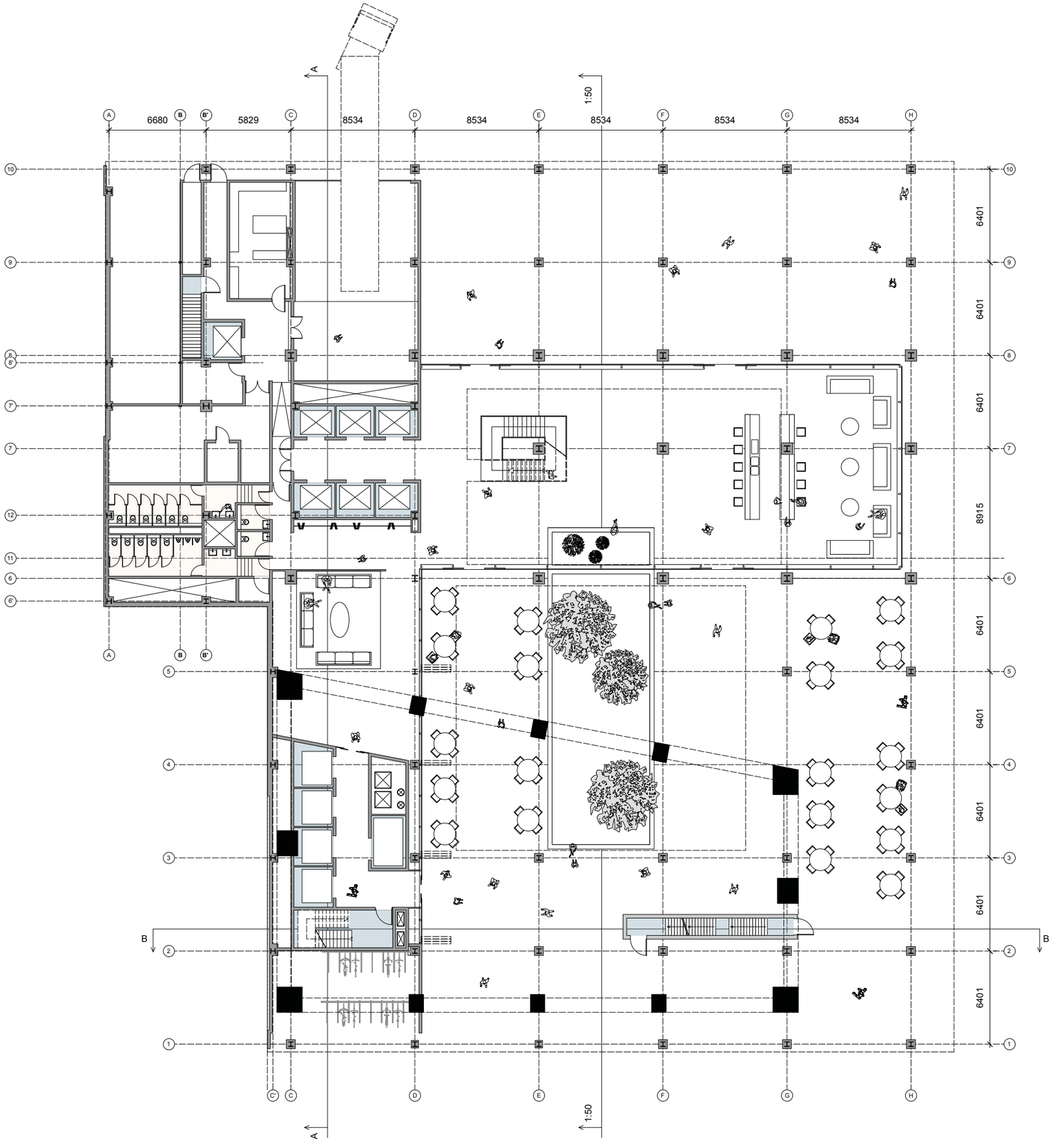


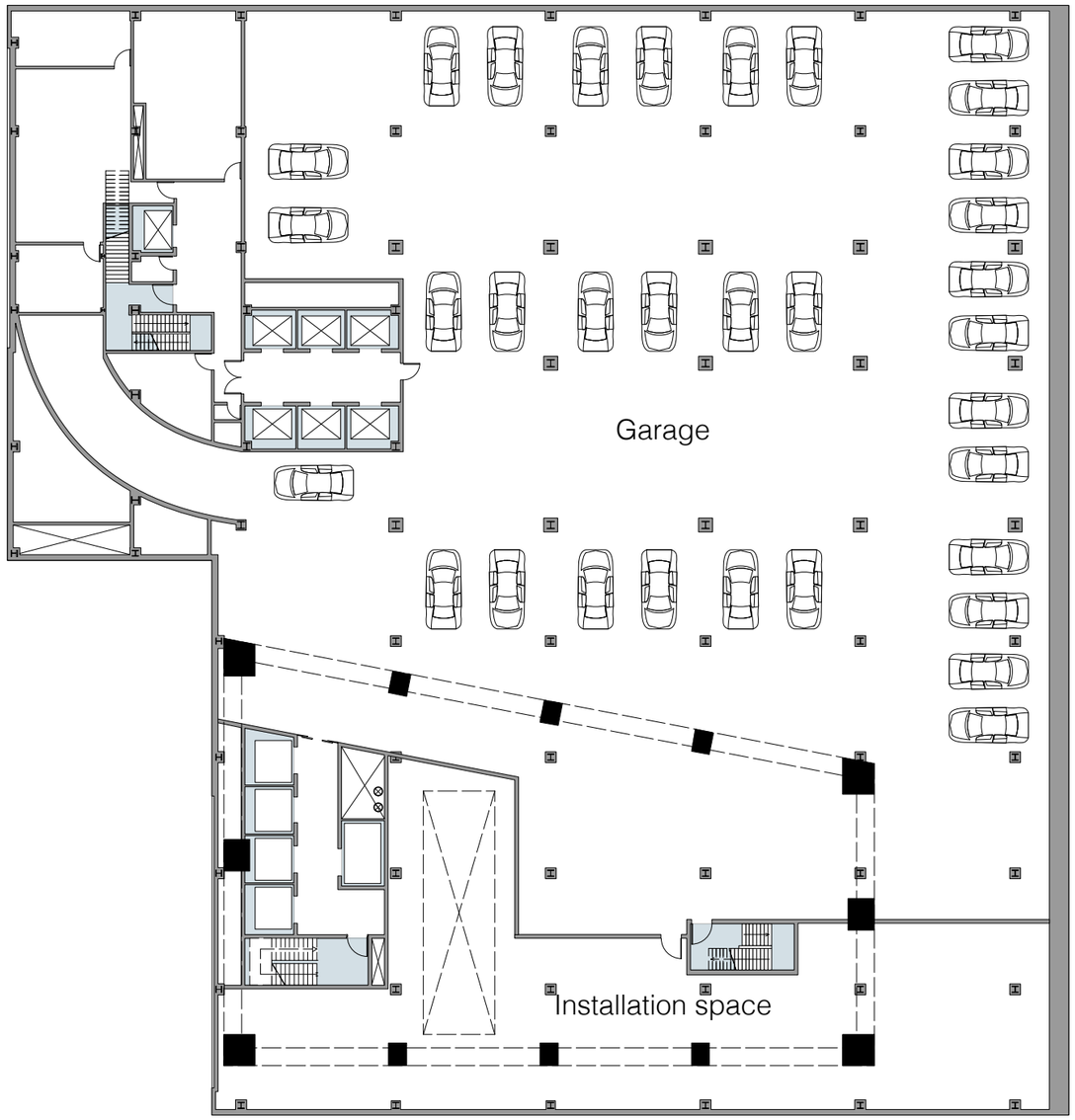
South Facade

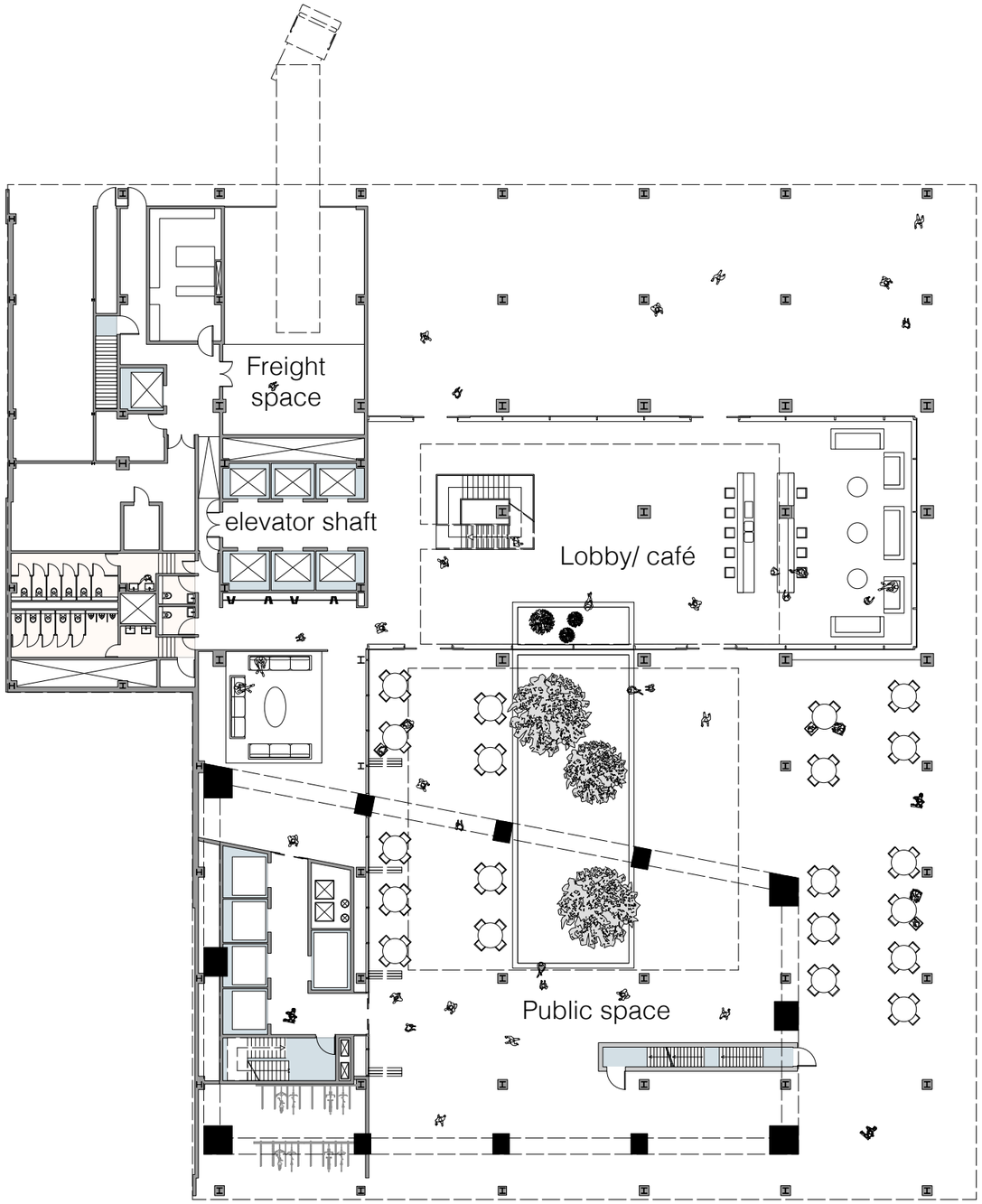
Site location



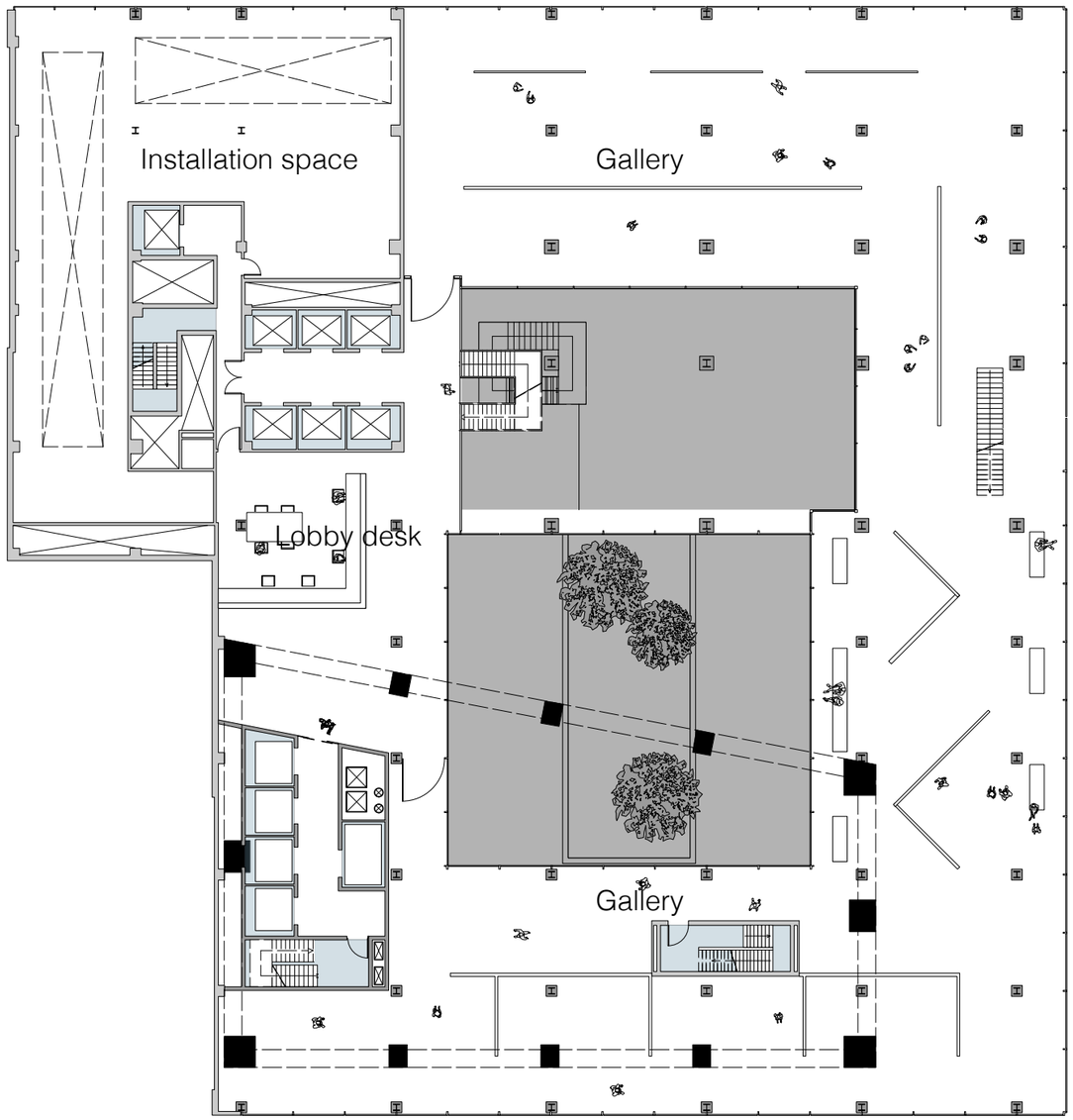
Urban implementation

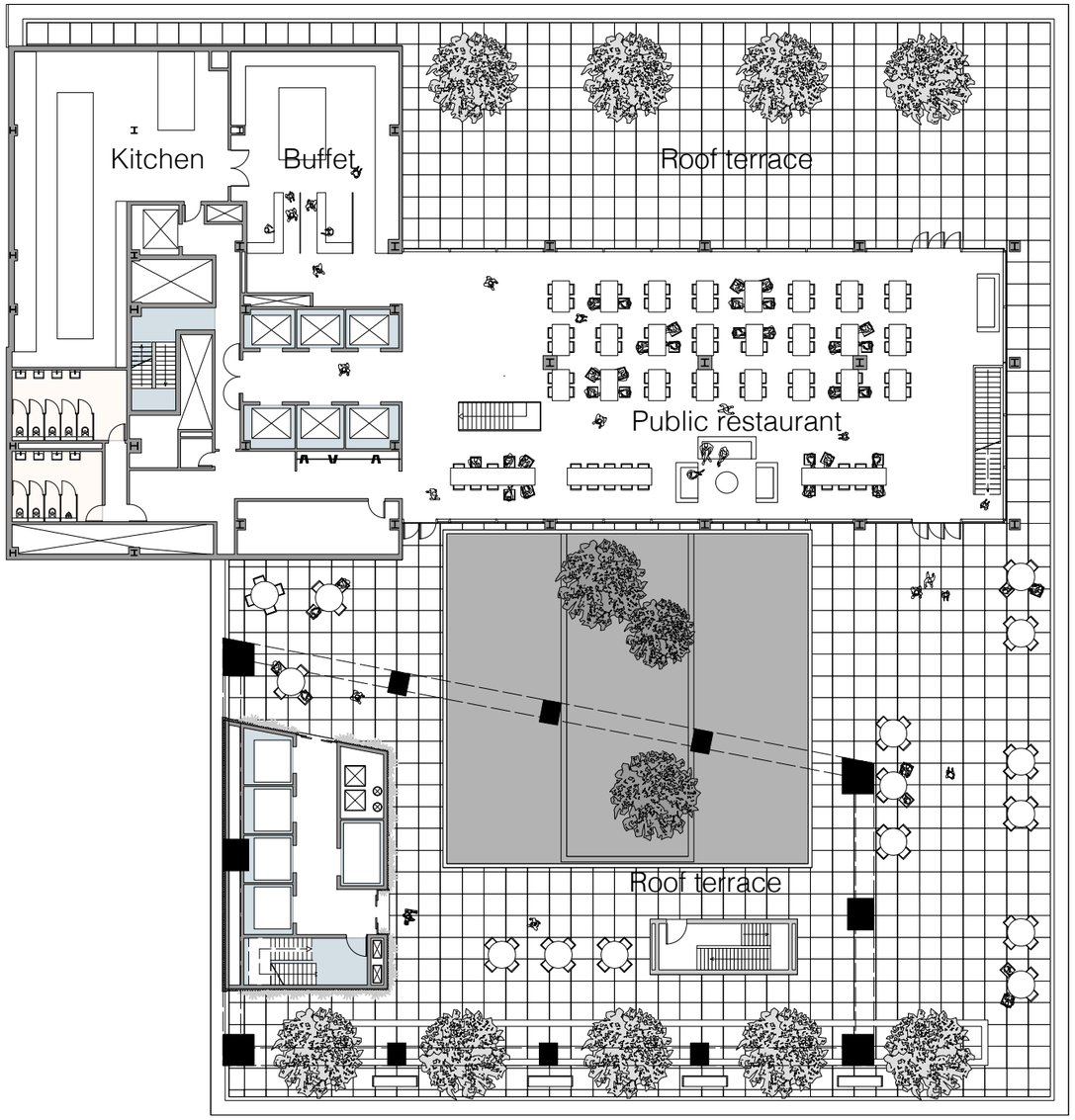

A
1:50
A
6680
5829
8534
8534
8534
8534
8534
6401
6401
6401
8915
6401
6401
6401
B
B
1:50

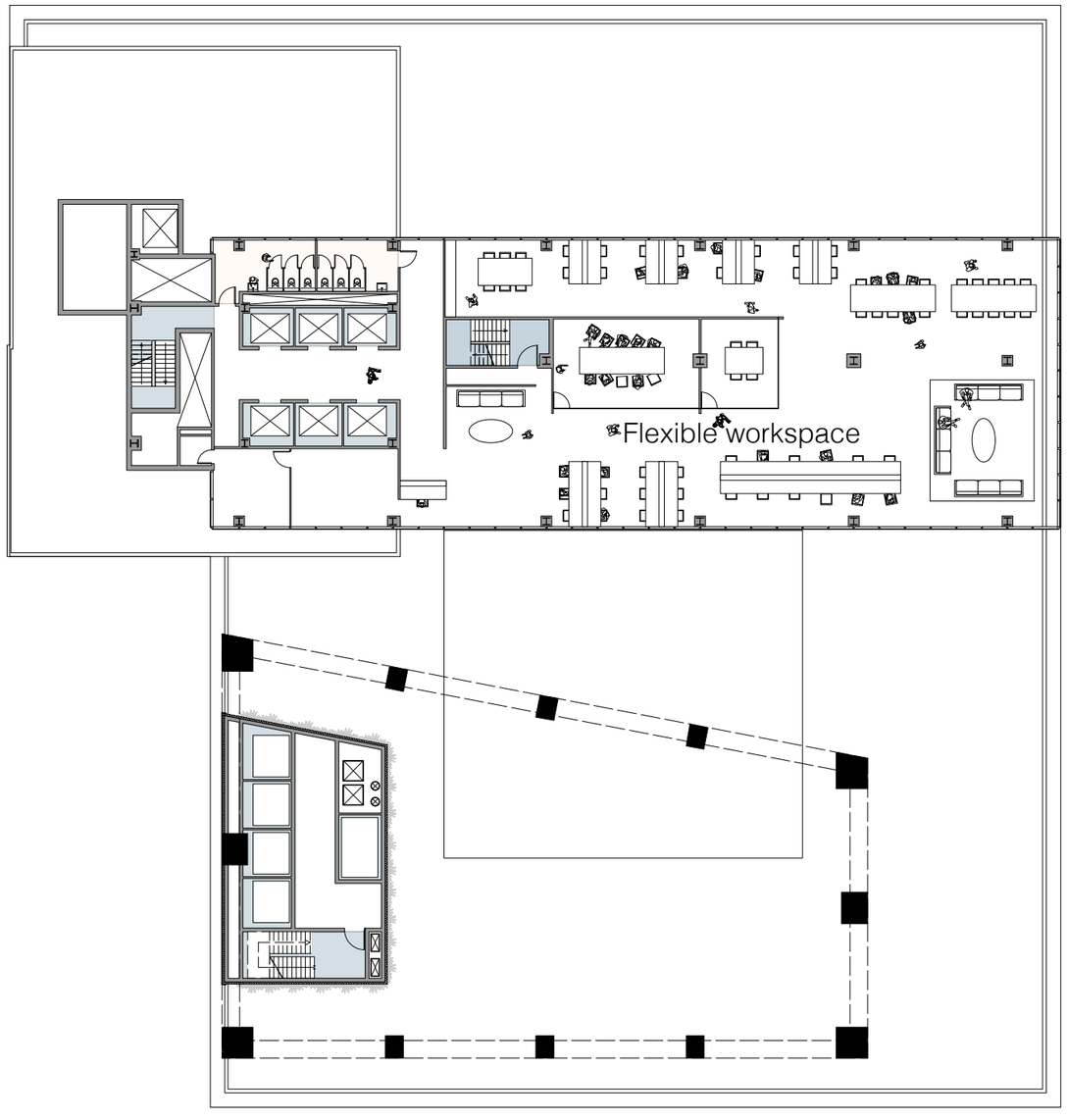

Garage
Installation space


Freight space
elevator shaft
Lobby/ café
Public space

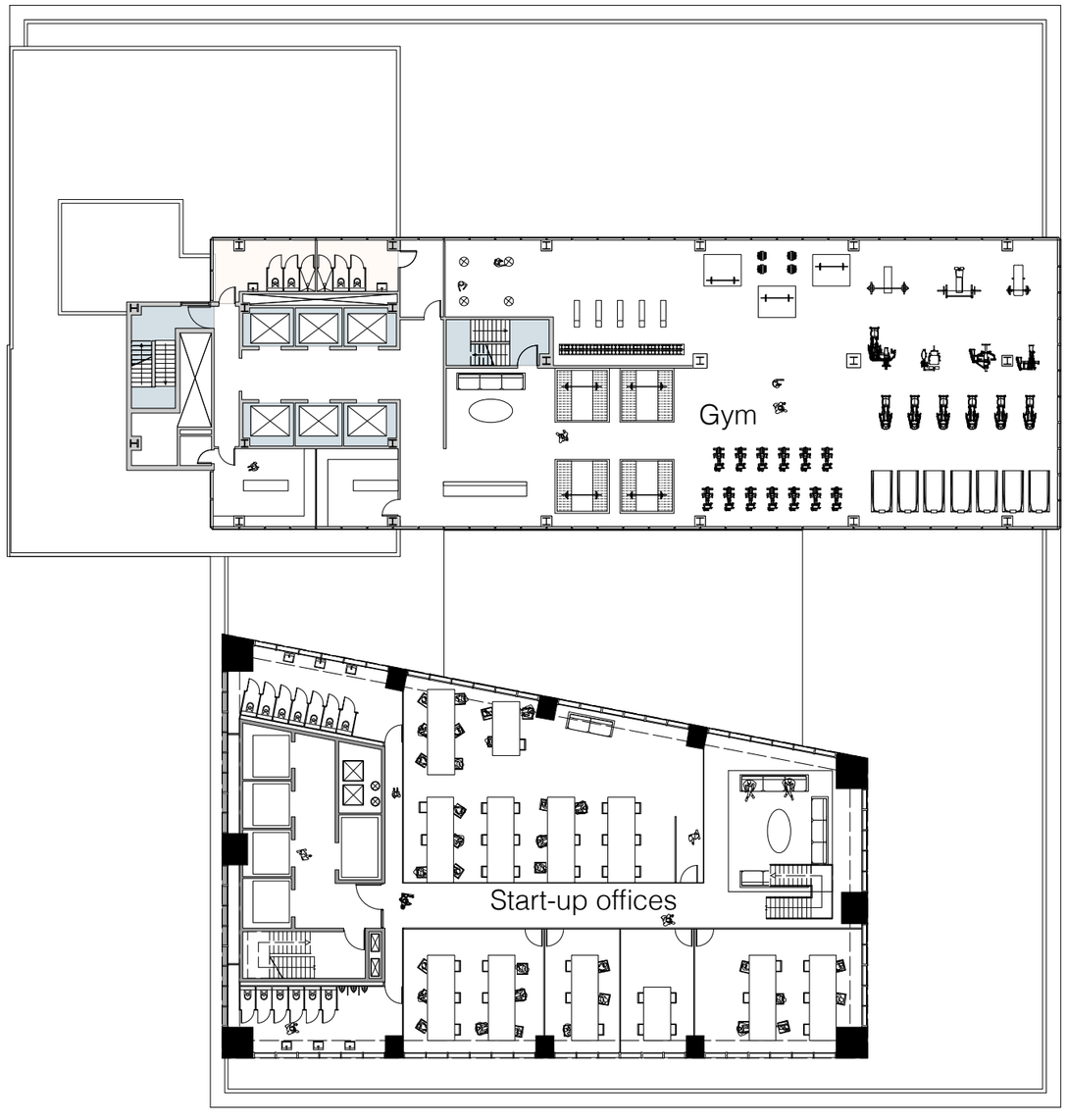
-01 & 00

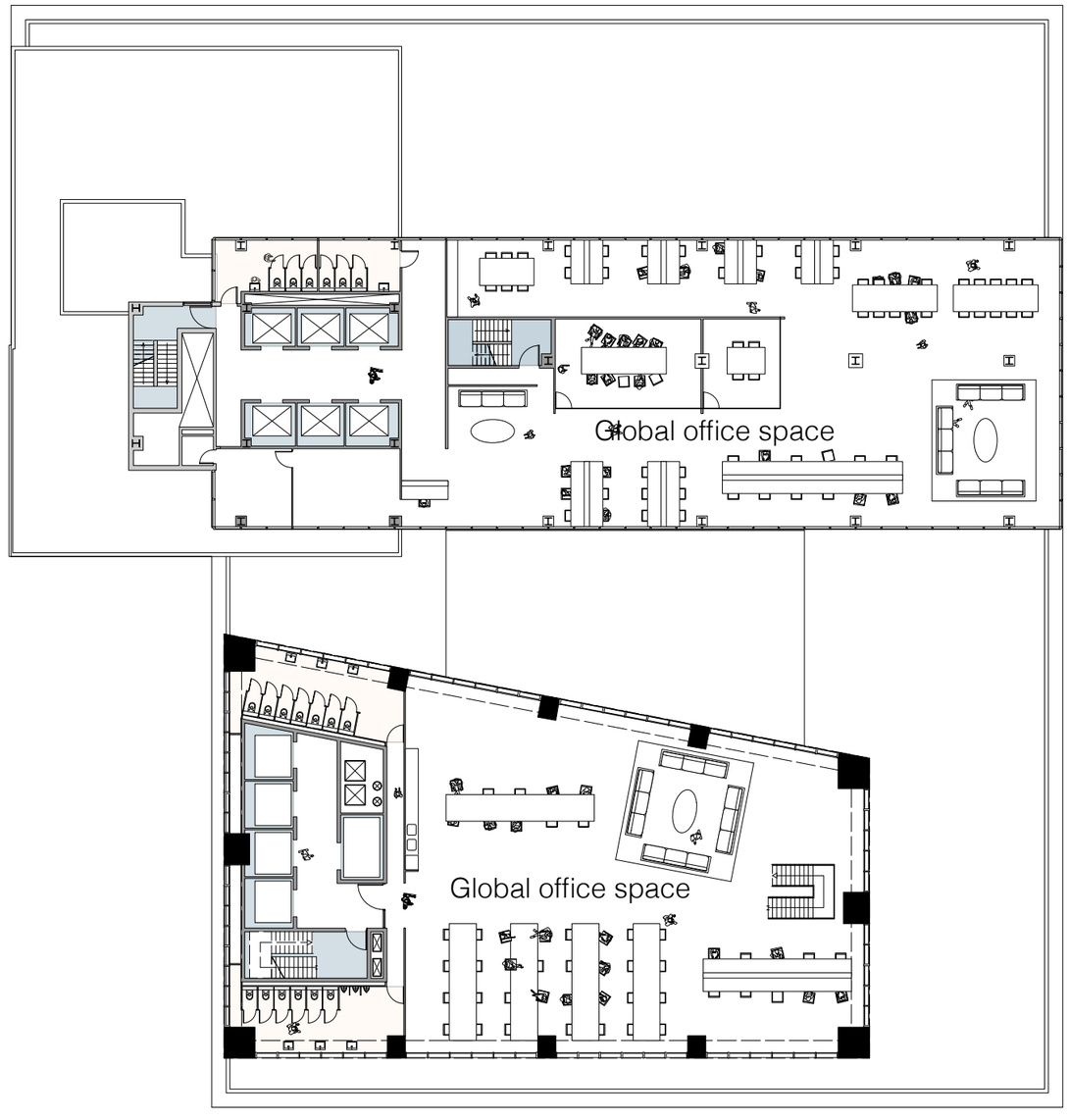

Installation space
Gallery
Lobby desk
Gallery

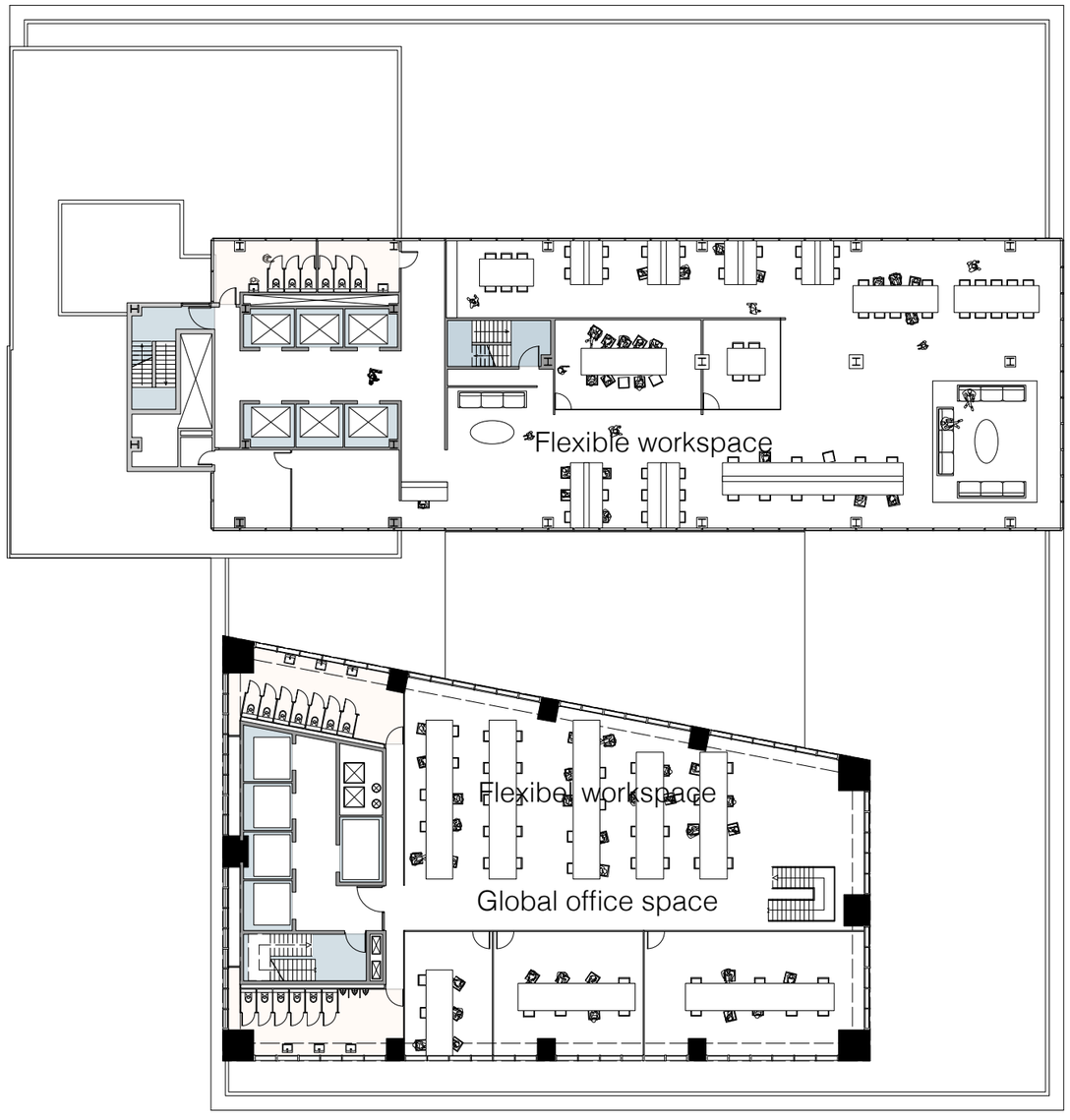

Kitchen
Buffet
Roof terrace
Public restaurant
Roof terrace

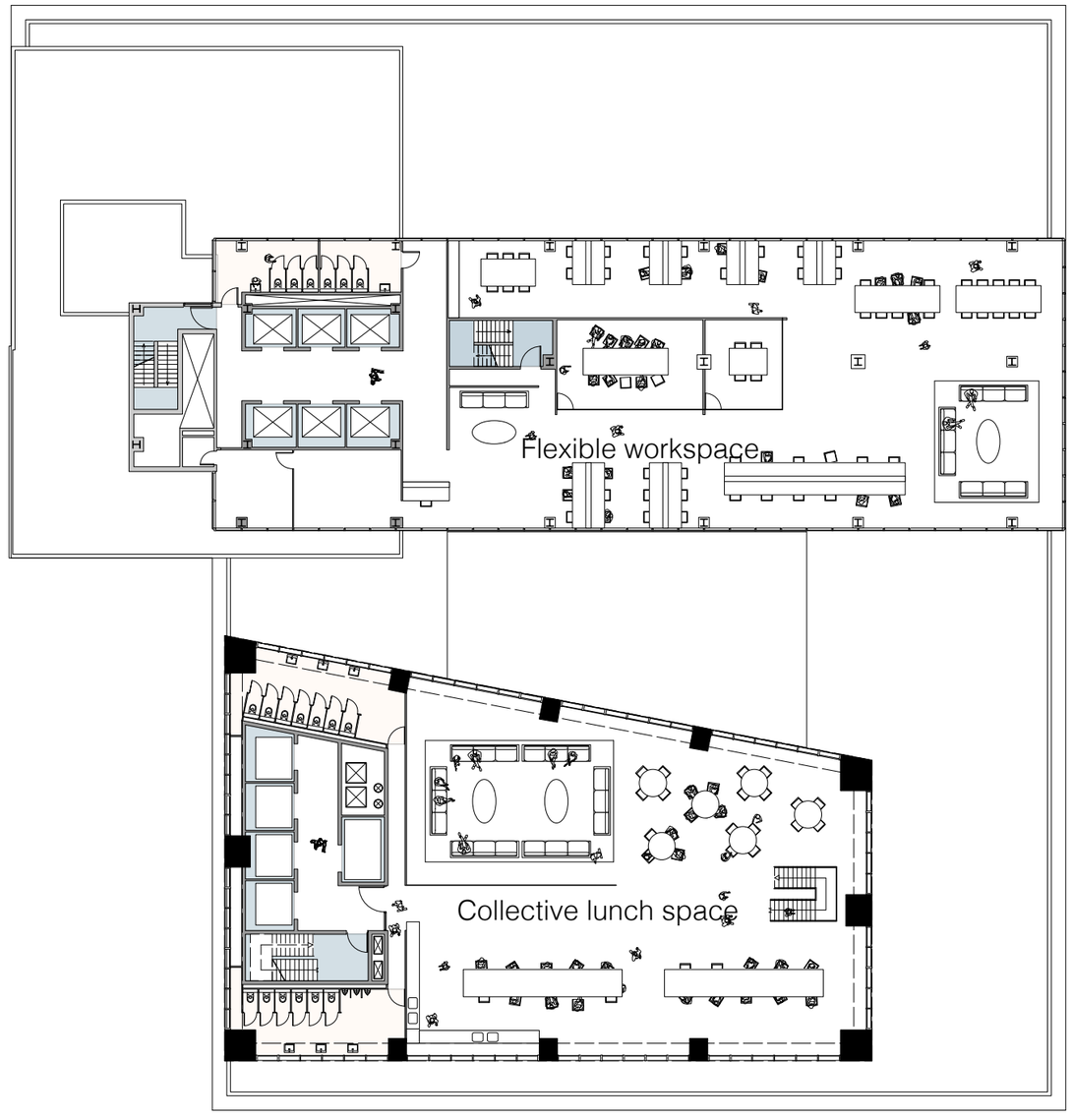

Flexible workspace

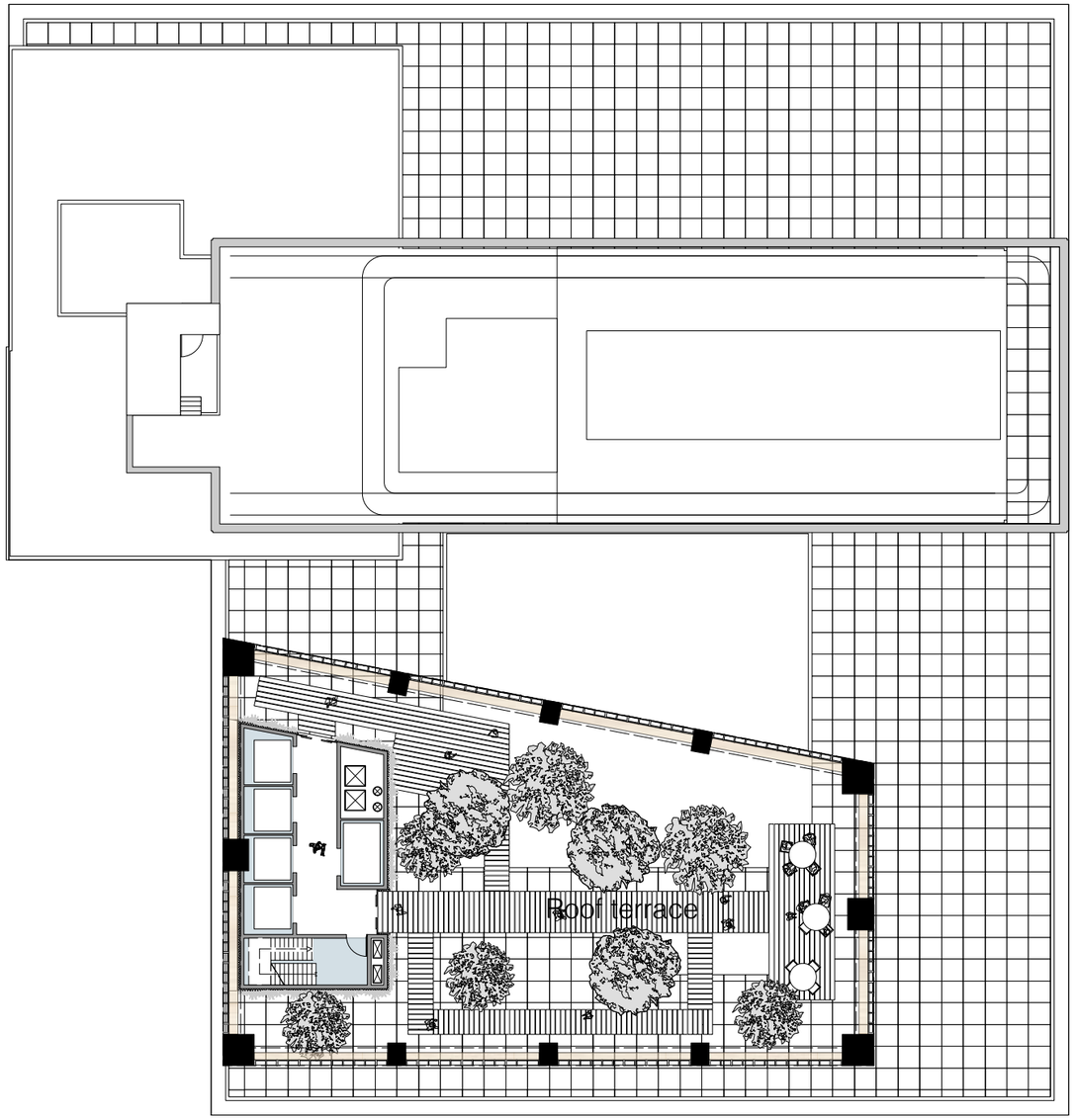

Global office space
Global office space

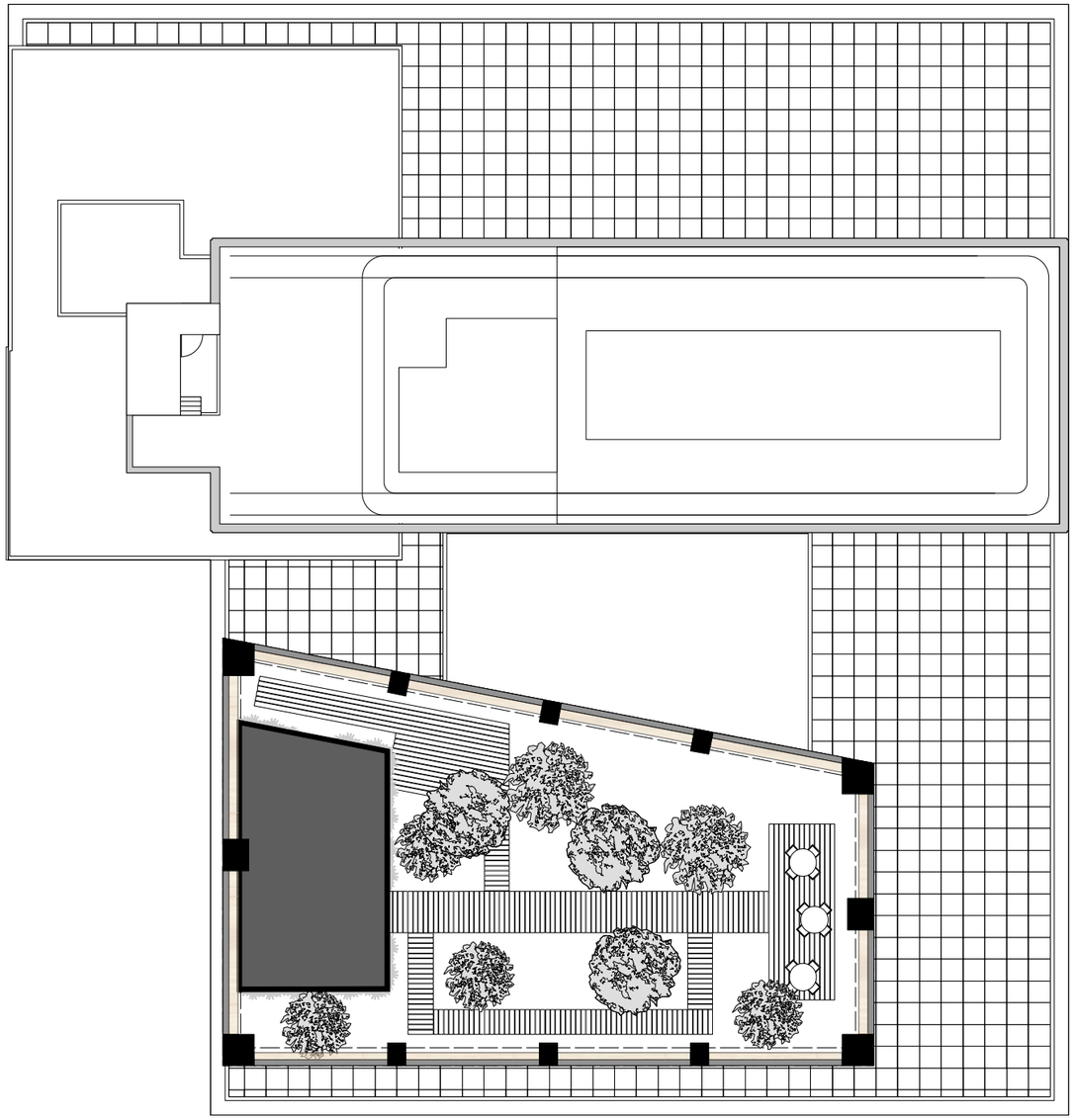

Gym
Start-up offices


Global office space
Global office space

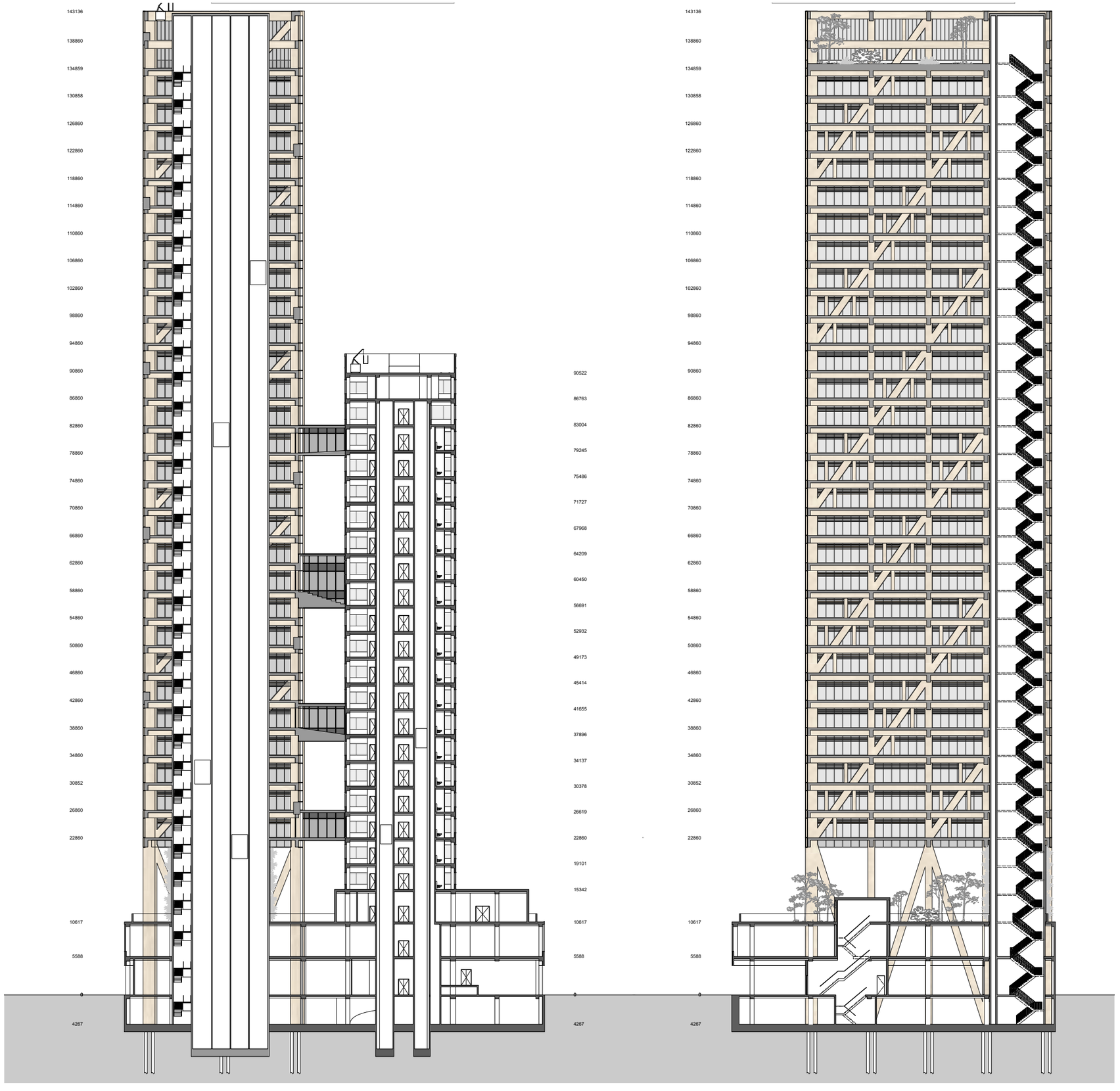

Flexible workspace
Flexible workspace
Global office space


Flexible workspace
Collective lunch space



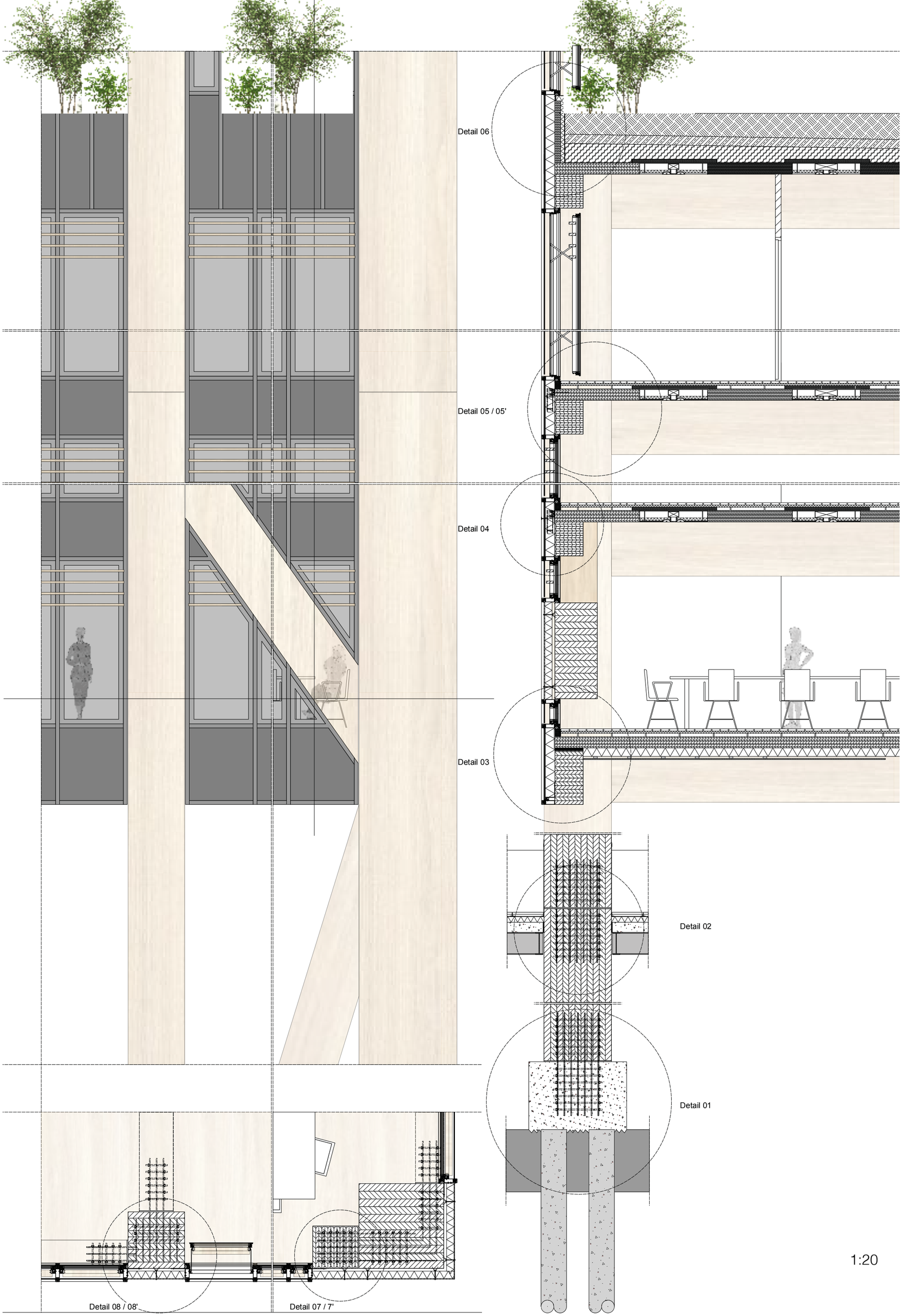
Rooftop



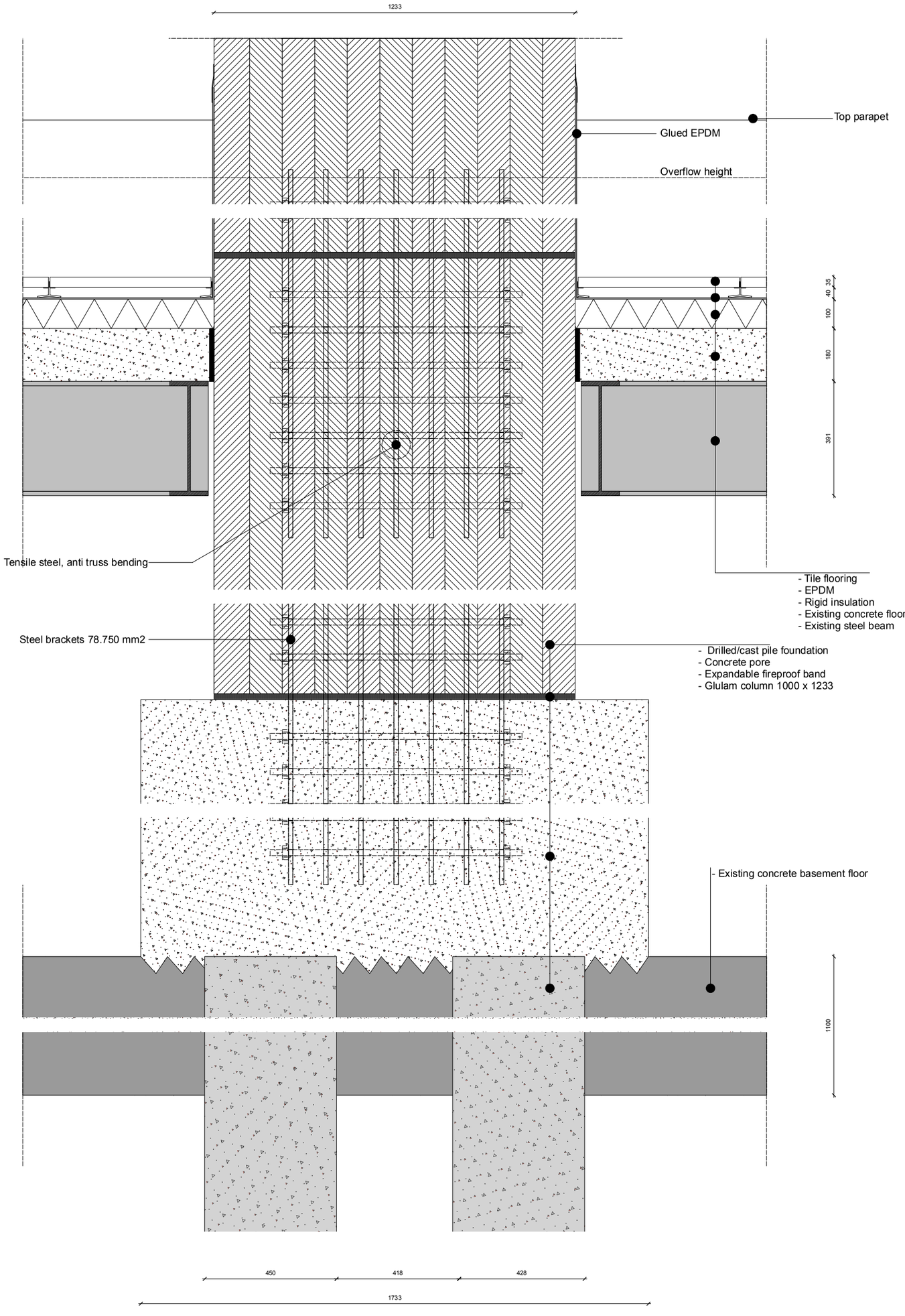

Section A-A

Section B-B

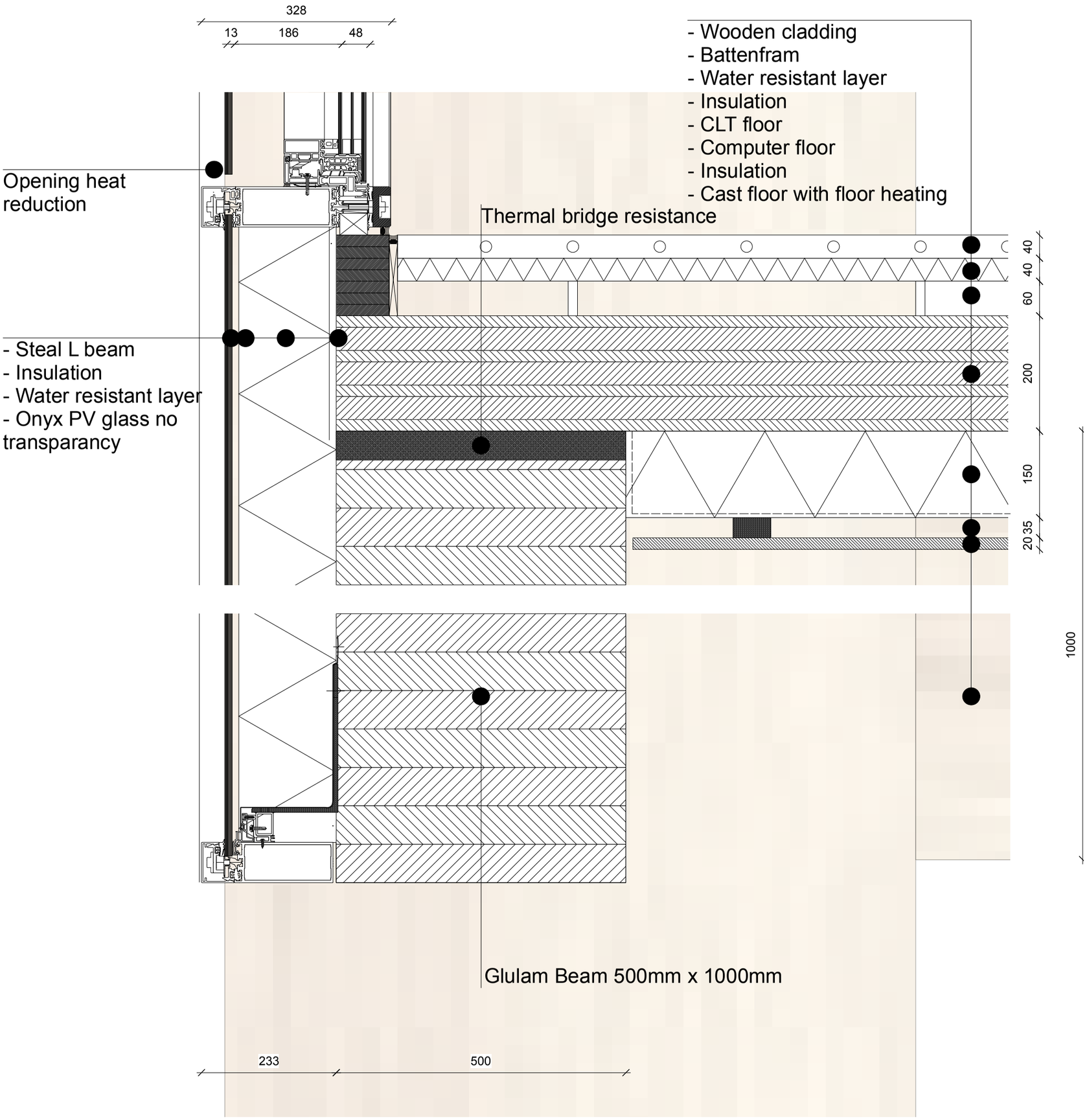
1:50 Section


Detail 06
Detail 05 / 05'
Detail 04
Detail 03
Detail 02
Detail 01
Detail 08 / 08'
Detail 07 / 7'

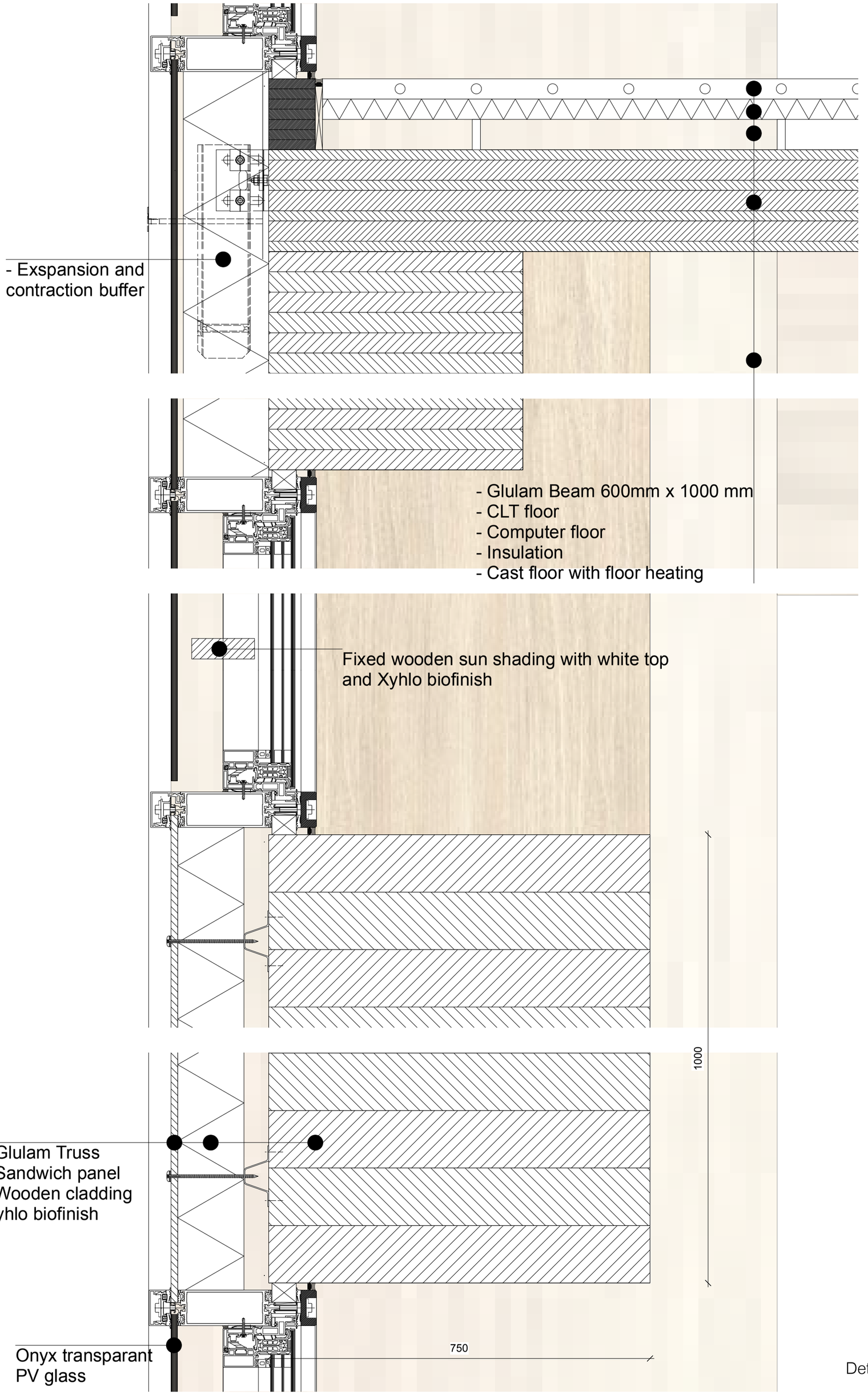
1:20


1233
Top parapet
Glued EPDM
Overflow height
40
35
100
180
391
Tensile steel, anti truss bending
- Tile flooring
- EPDM
- Rigid insulation
- Existing concrete floor
- Existing steel beam
Steel brackets 78.750 mm2
- Drilled/cast pile foundation
- Concrete pore
- Expandable fireproof band
- Glulam column 1000 x 1233
- Existing concrete basement floor
1100
450
418
428
1733

Detail 01 & 02

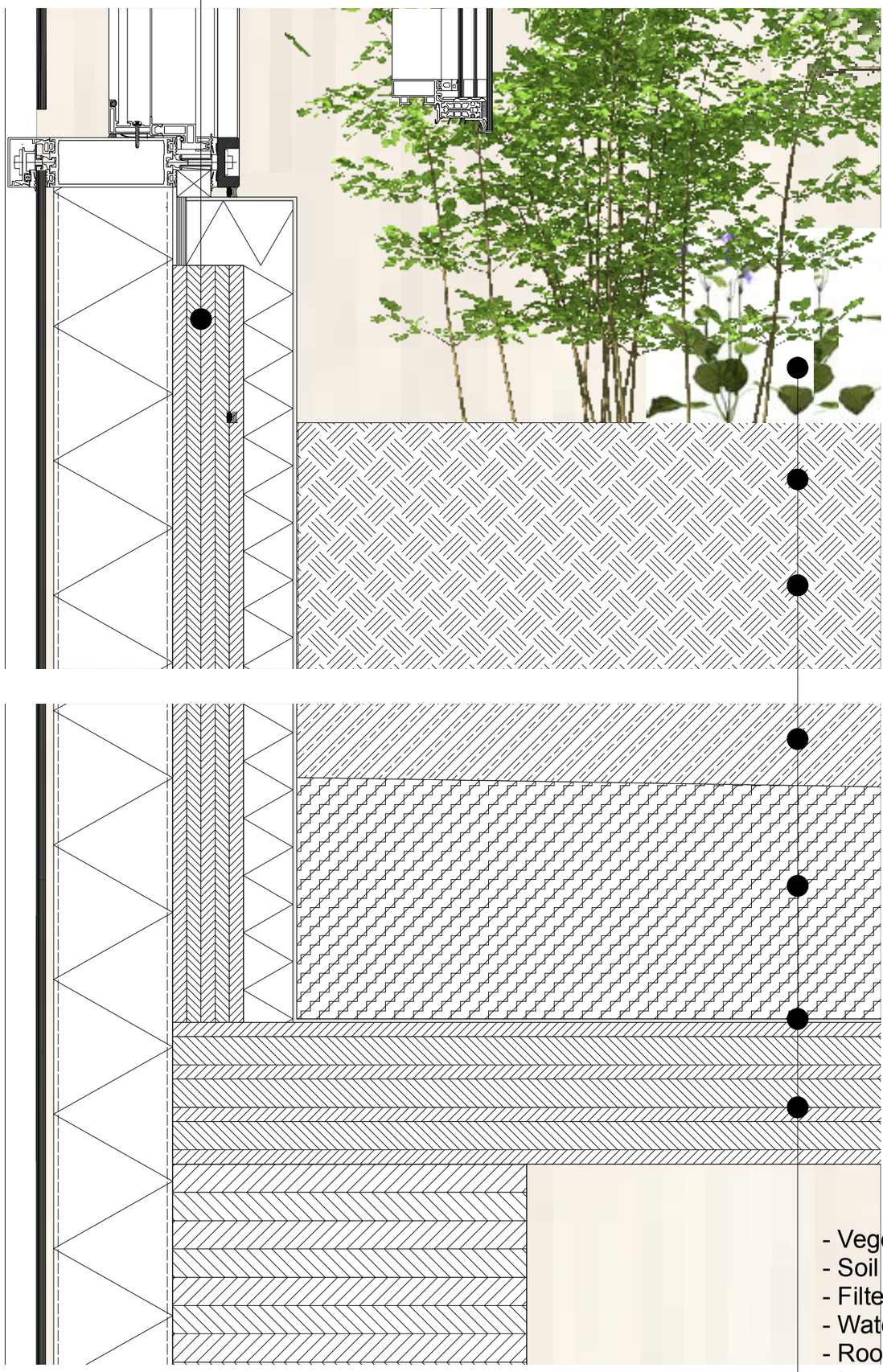

328
13
186
48
- Wooden cladding
- Battenfram
- Water resistant layer
- Insulation
- CLT floor
- Computer floor
- Insulation
- Cast floor with floor heating
Opening heat reduction
Thermal bridge resistance
- Steal L beam
- Insulation
- Water resistant layer
- Onyx PV glass no transparancy
40
40
60
200
150
20
35
1000
Glulam Beam 500mm x 1000mm
233
500

Detail 03


- Exspansion and contraction buffer
- Glulam Beam 600mm x 1000 mm
- CLT floor
- Computer floor
- Insulation
- Cast floor with floor heating
Fixed wooden sun shading with white top and Xyhlo biofinish
1000
- Glulam Truss
- Sandwich panel
- Wooden cladding
Xyhlo biofinish
Onyx transparant PV glass
750

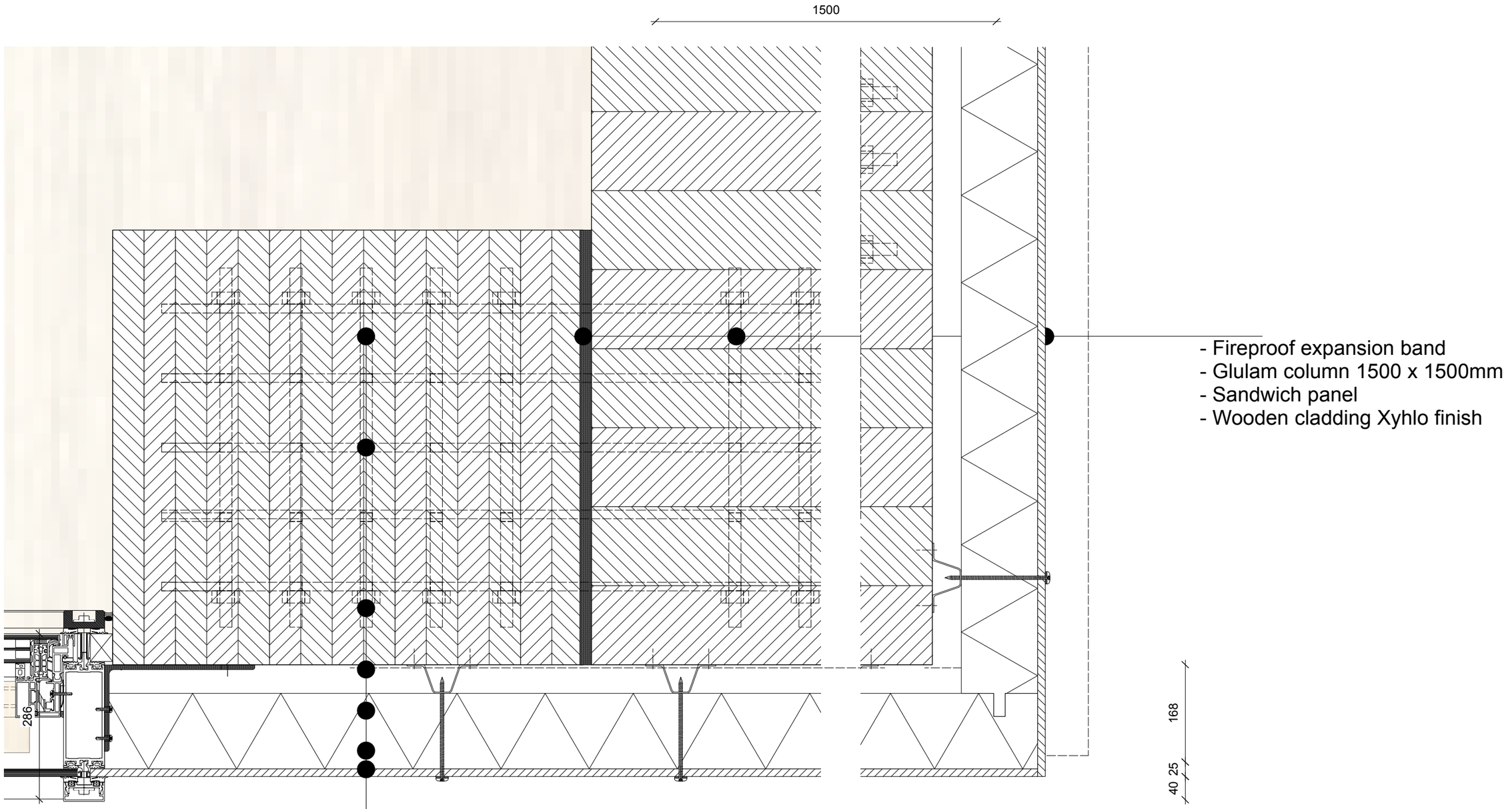
Detail 04

- CLT parapet

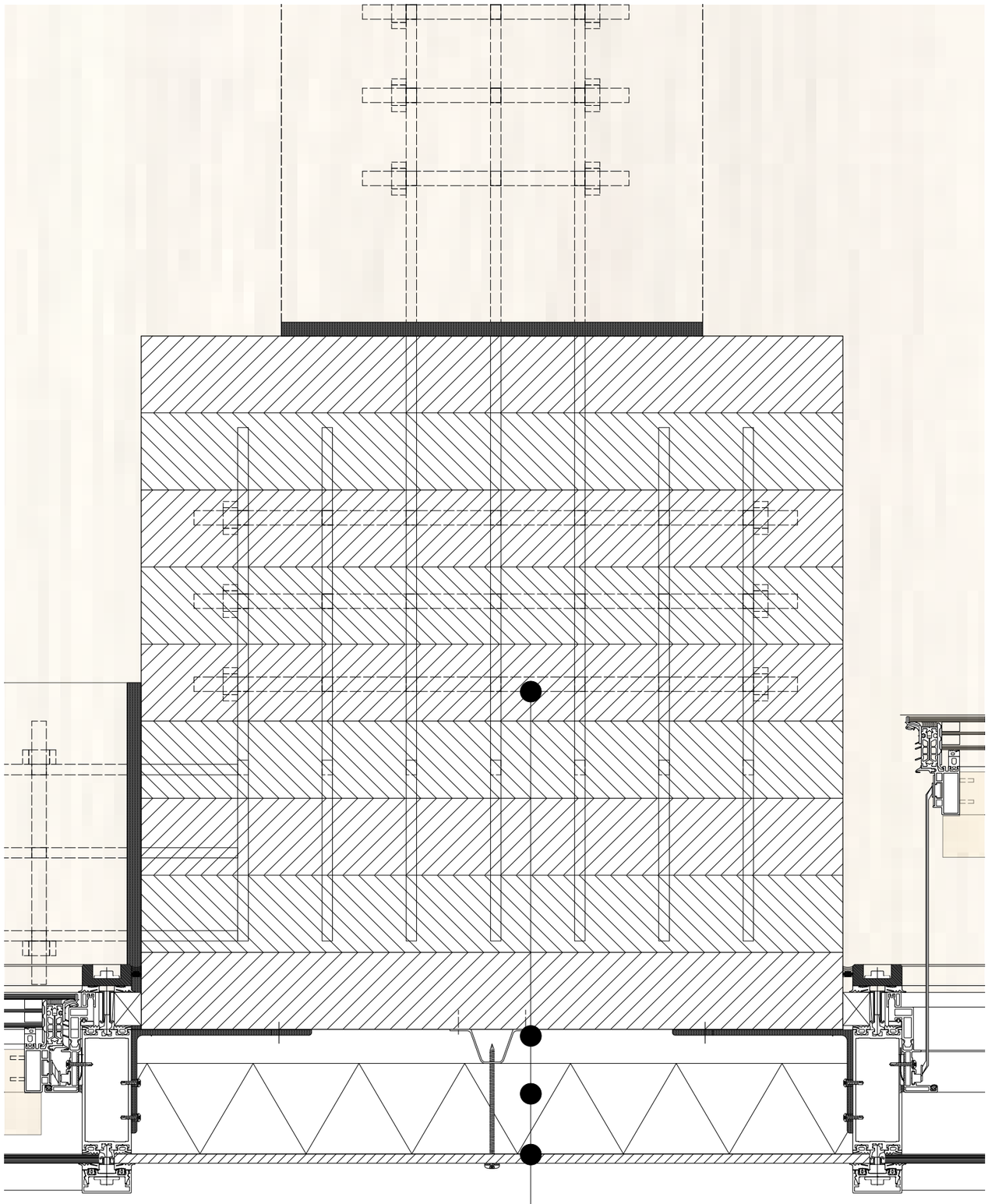



- Vegetation
- Soil
- Filterlayer
- Water reservoir and drainage layer
- Root- resistant waterproofing
- Insulation
- EPDM
- Clt Flooring

Detail 05


1500
- Fireproof expansion band
- Glulam column 1500 x 1500mm
- Sandwich panel
- Wooden cladding Xyhlo finish
286
168
40 25
- Glulam Truss 750 x 1000mm
- Steel plate 5 x 15 x 750 mm
- Water resistant layer
- Sandwich panel
- Wooden cladding Xyhlo finish

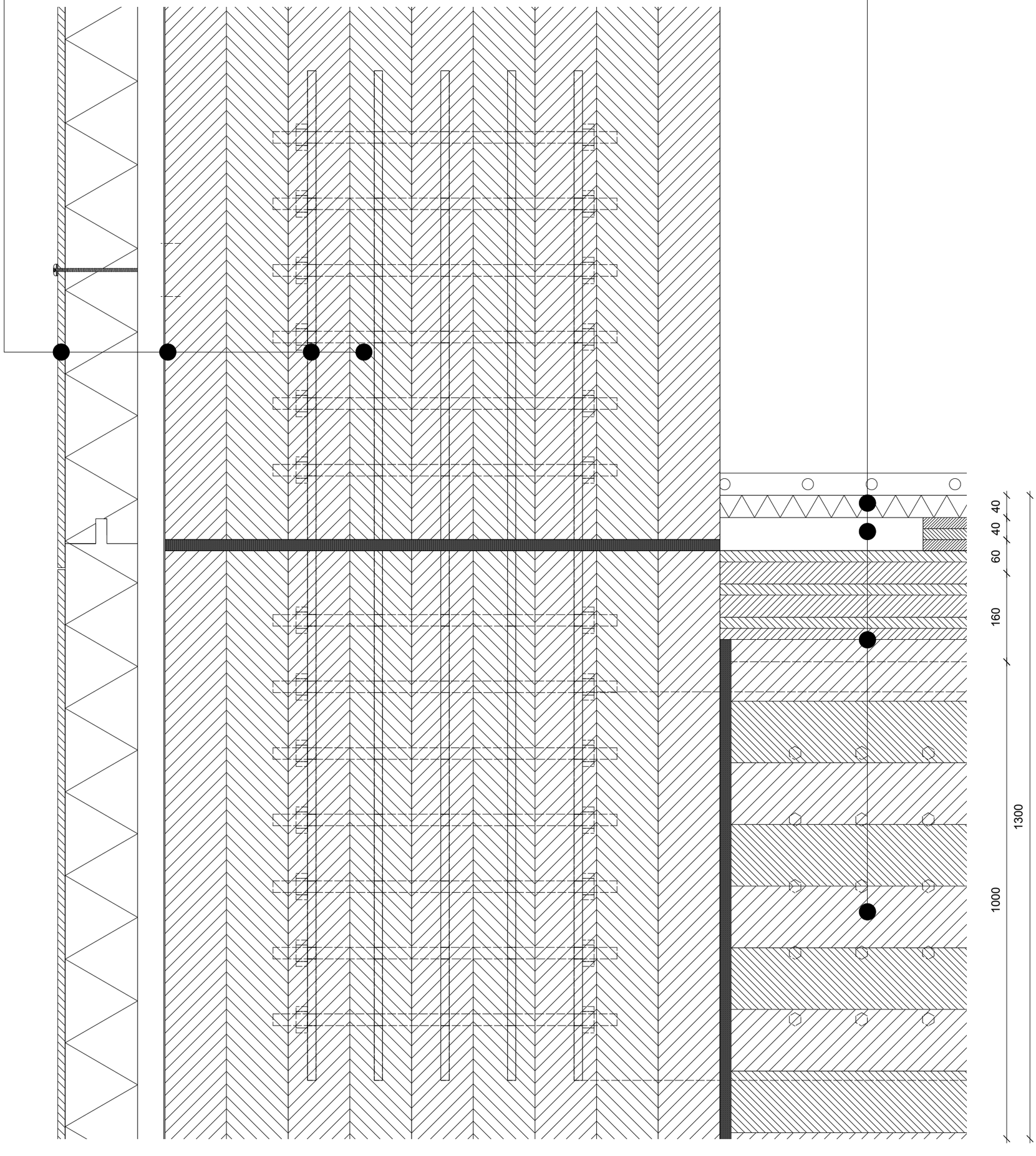
Detail 06


- Glulam column 1000x 1000
- Sandwich panel
- Wooden cladding Xyhlio finish

Detail 07

- Glulam column 1000x1000-
- Steel plates 5mm
- Sandwich panel
- Wooden cladding Xyhlo finish

- Glulam Beam
- Clt floor
- Computer floor
- Insulation
- Cast floor with floor heating/cooling




Detail 05’

500

175

17

- Glulam beam
- Steel plates 5mm
- insulation
- Onyx PV glass

- Glulam Truss 750 x 1000mm
- Steel plate 5 x 15 x 750 mm
- Sandwich panel
- Wooden cladding Xyhlo finish

750

330

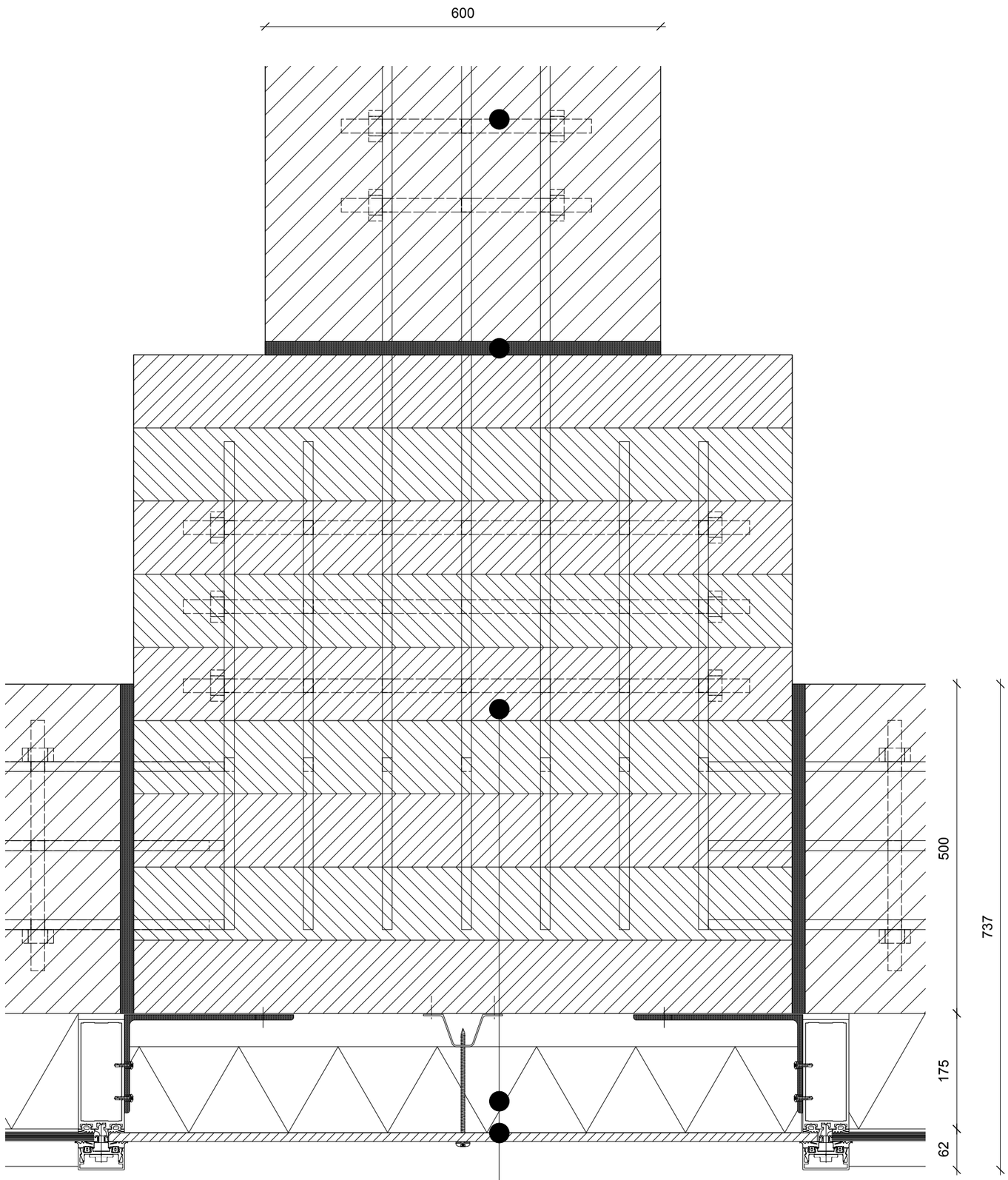
50

131

13

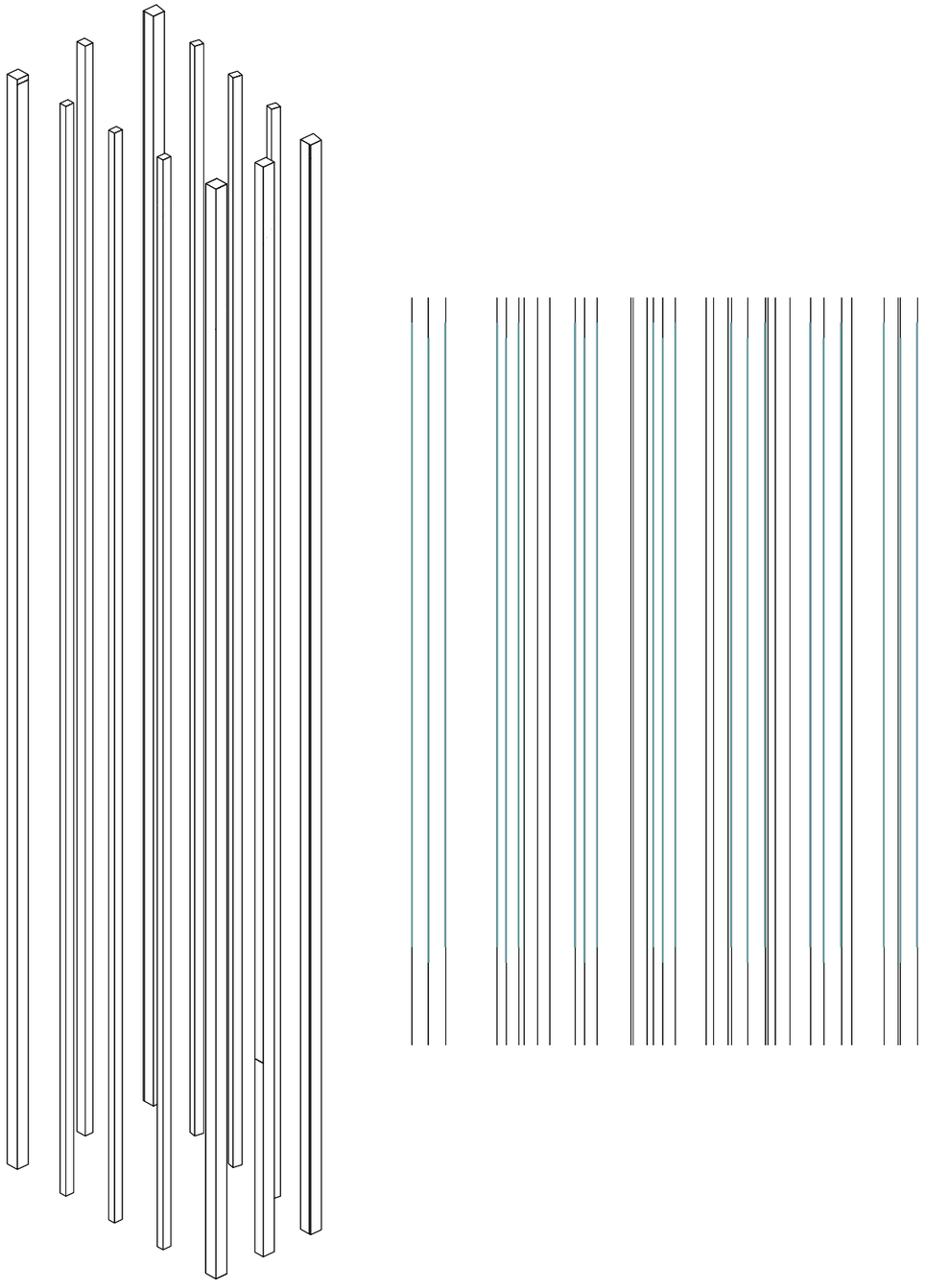
- Fireproof expansion band
- Glulam column 1500 x 1500mm
- Sandwich panel
- Wooden cladding Xyhlo finish

Detail 06’

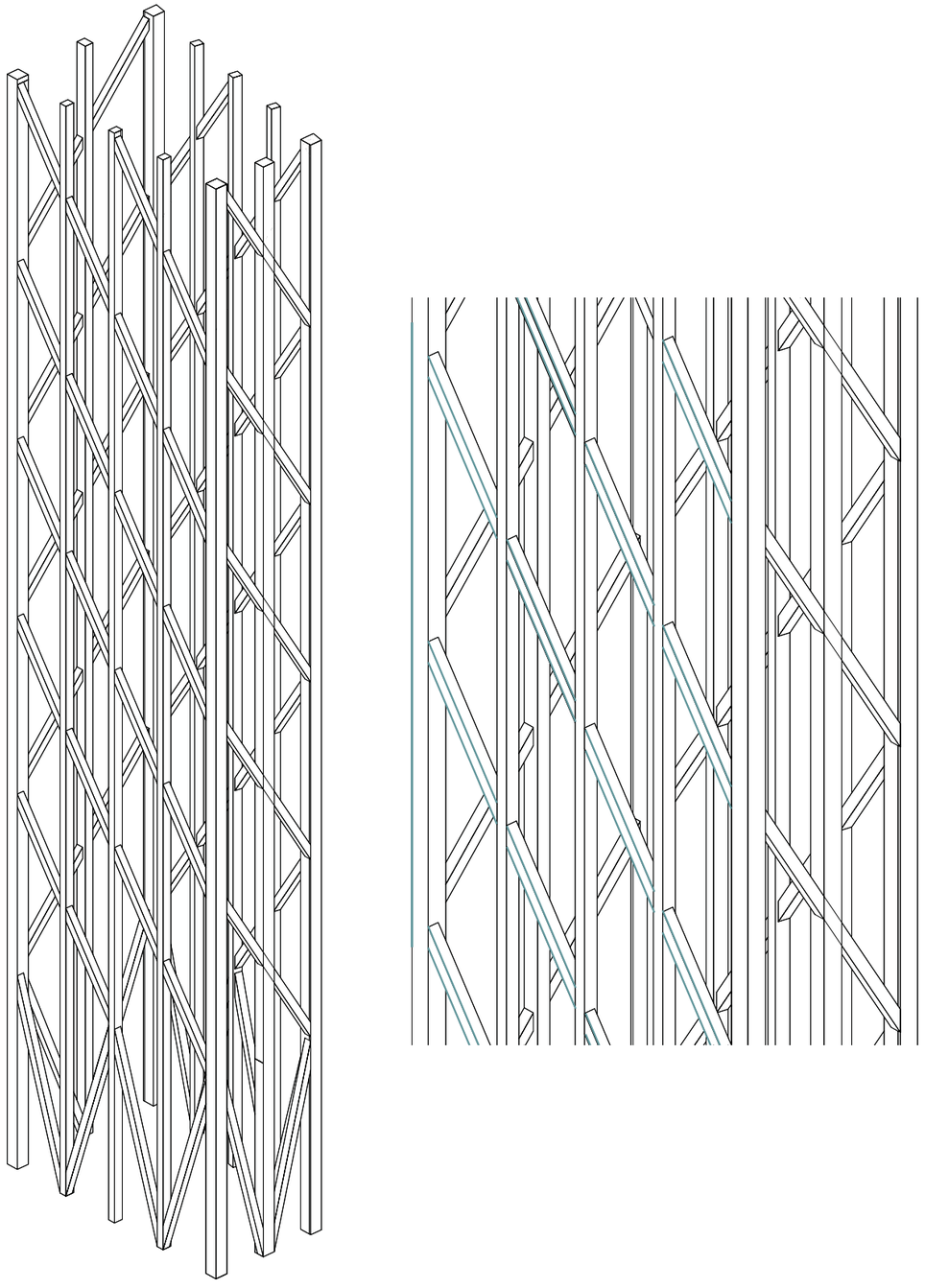



- Glulam beam
- Steel planels 5 x 15 x 750
- Glulam column 1000 x 1000
- Steel panels 7 x 15 x 750
- Sandwich panel
- Wooden cladding Xyhlio finish

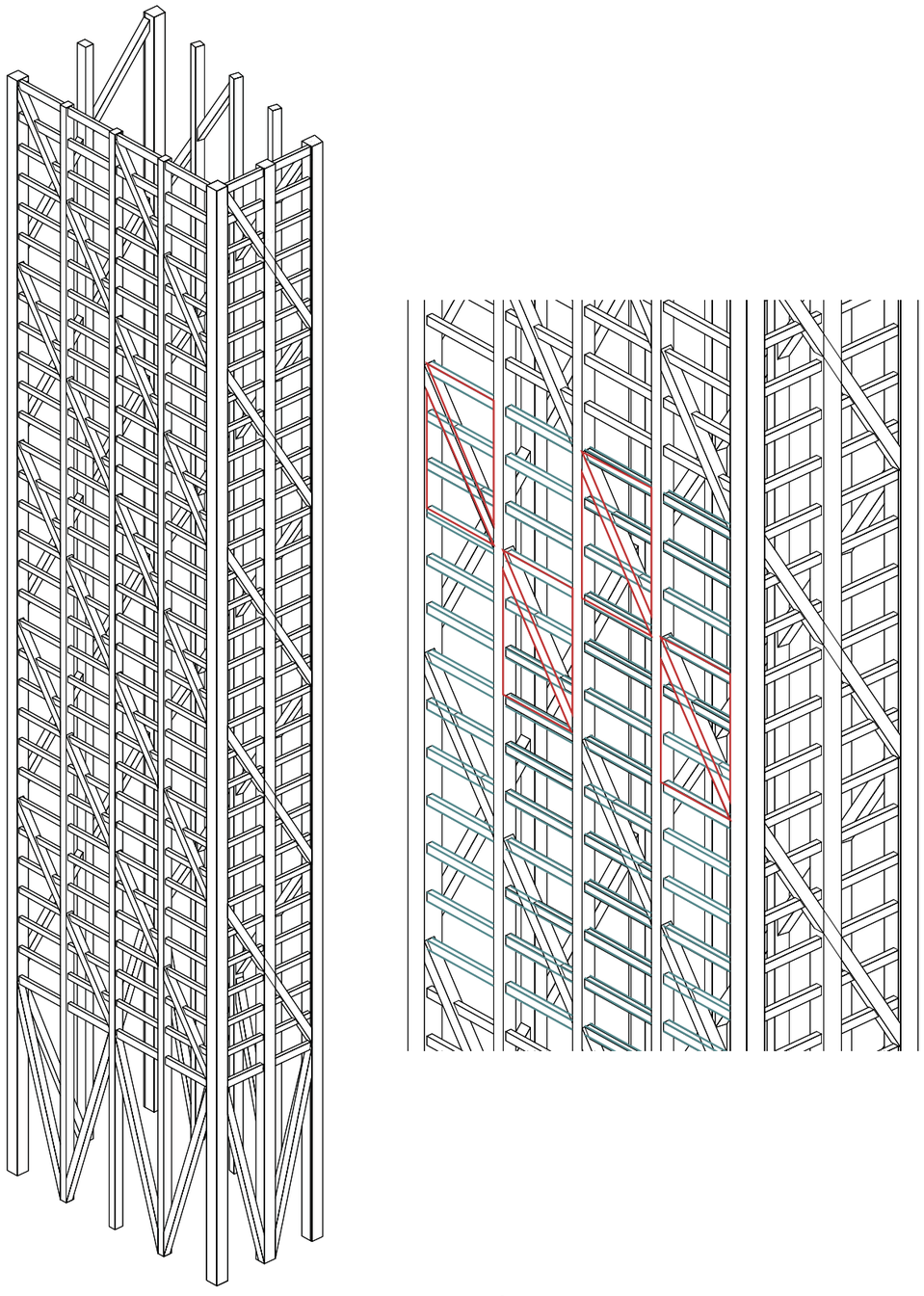
Detail 07’



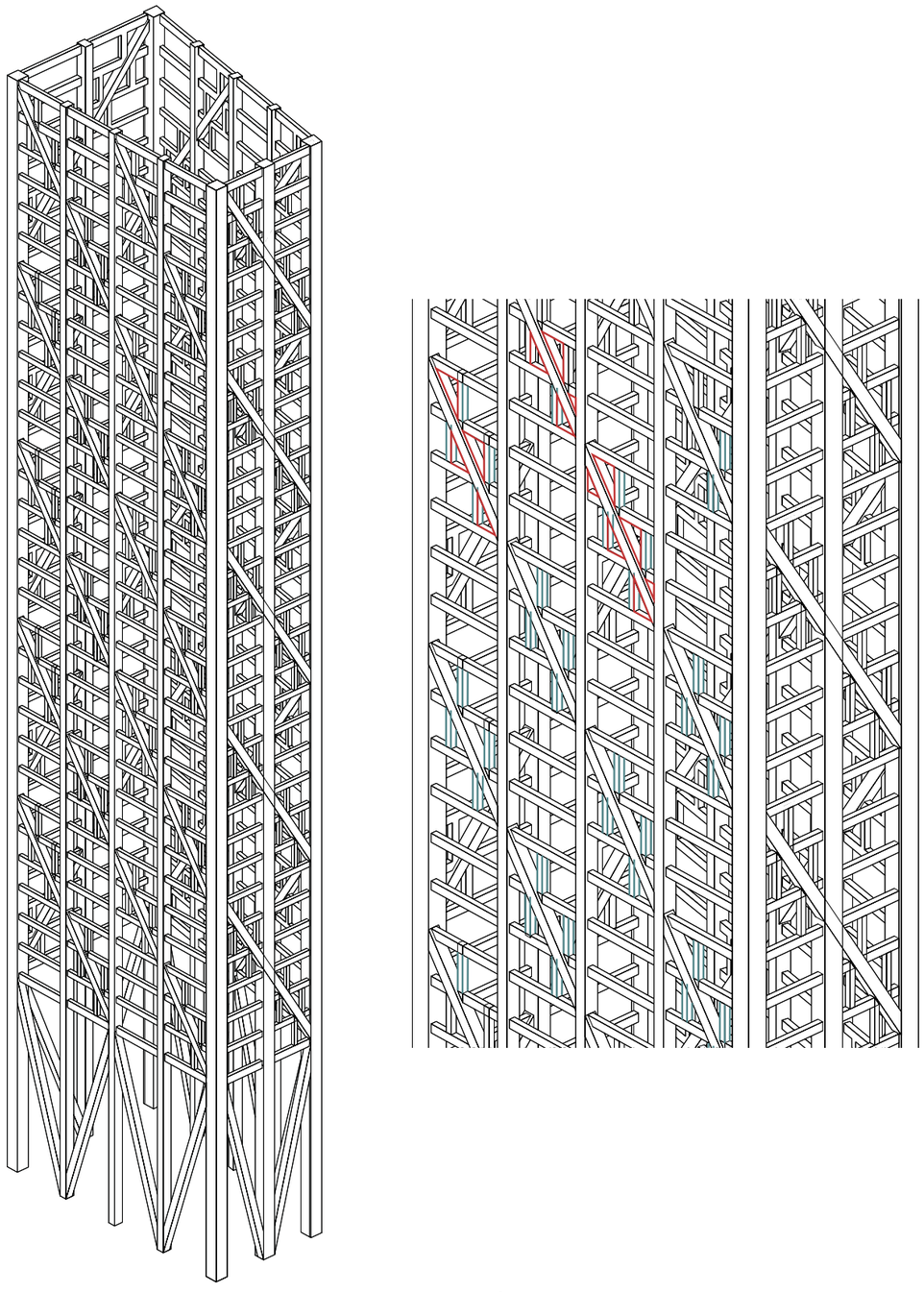
Gravitational load



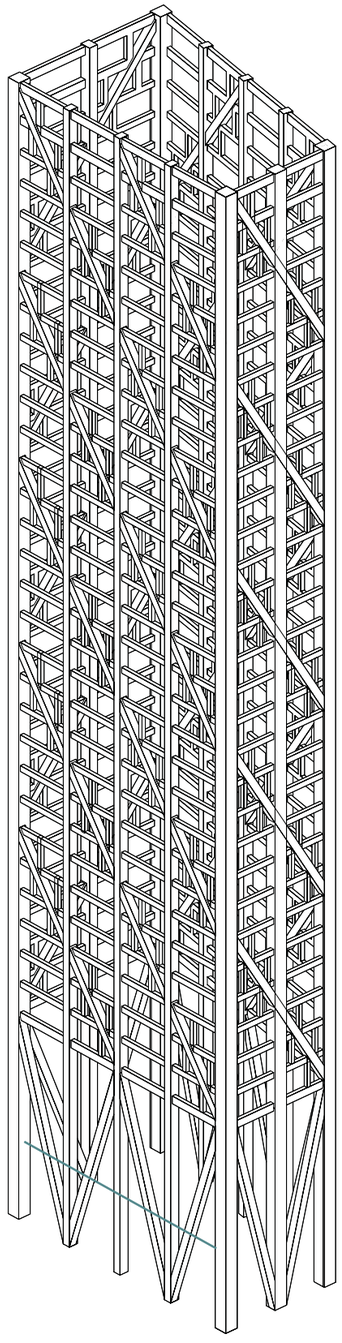
Lateral load

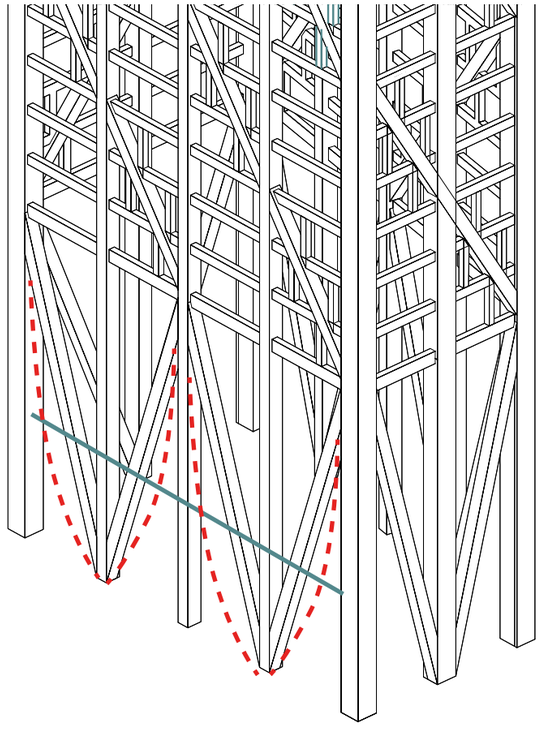


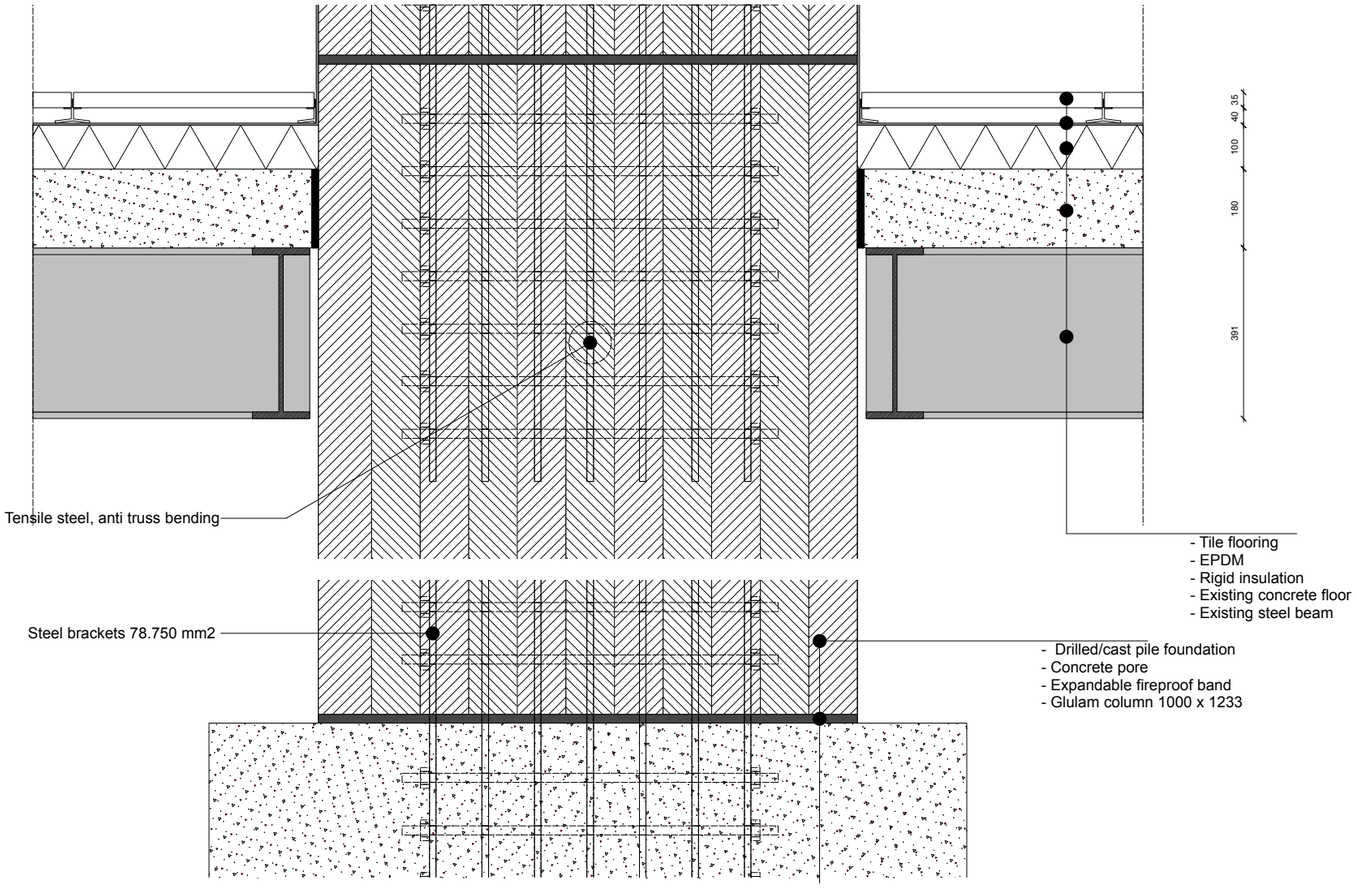
Triangle for Lateral load



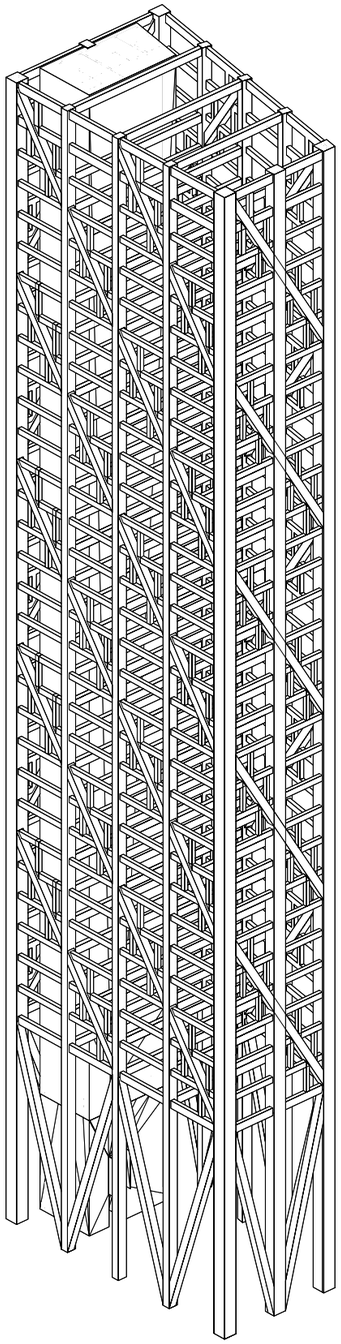
Triangle for Lateral load



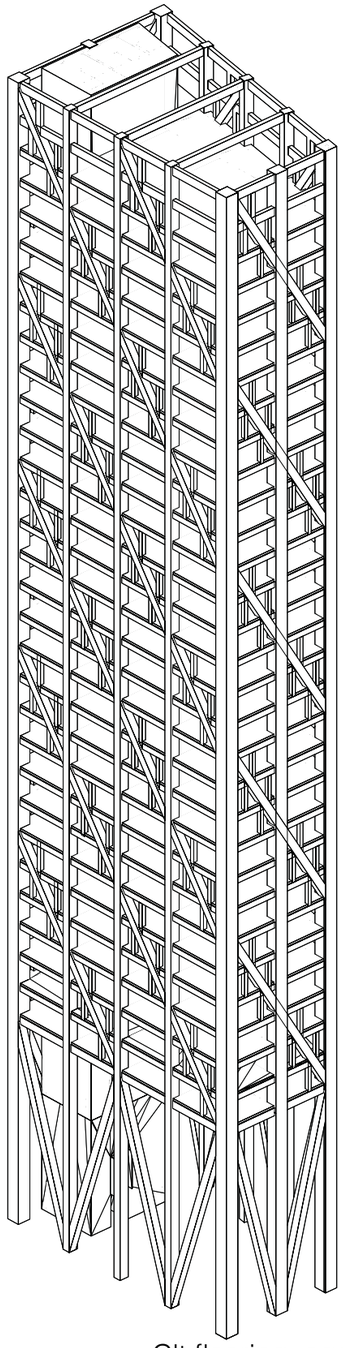




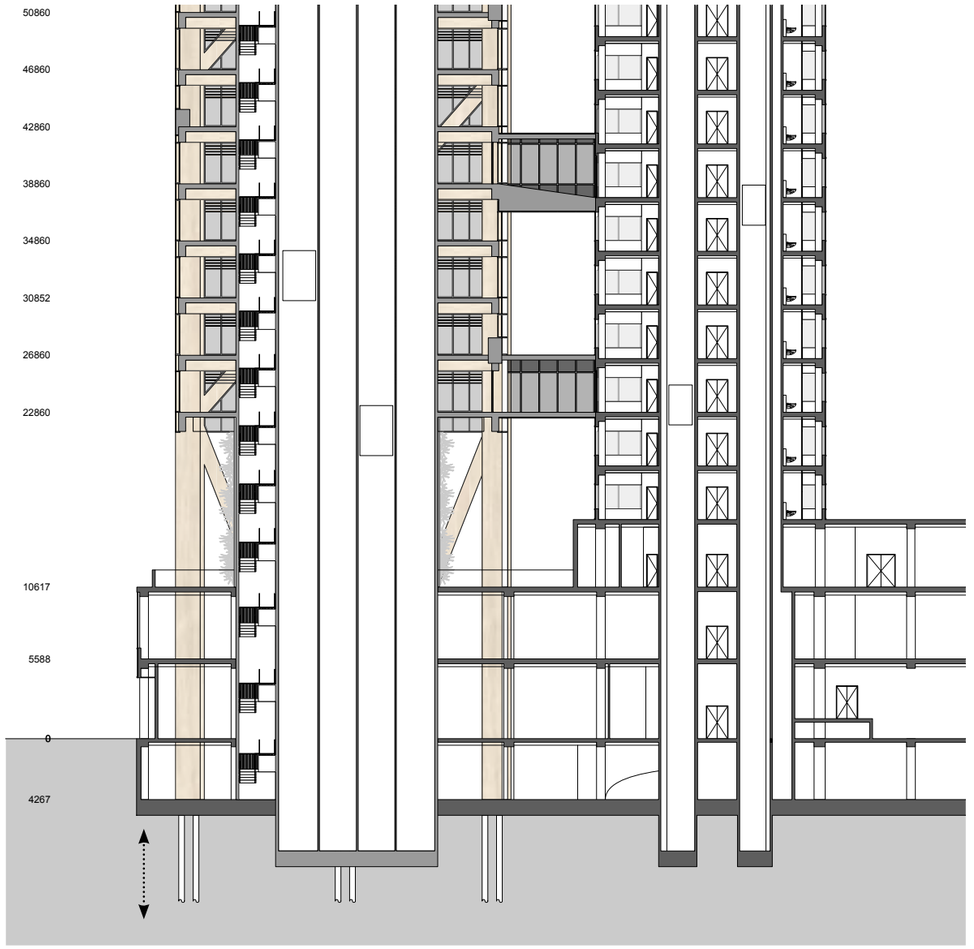

Bending support



CLT  core

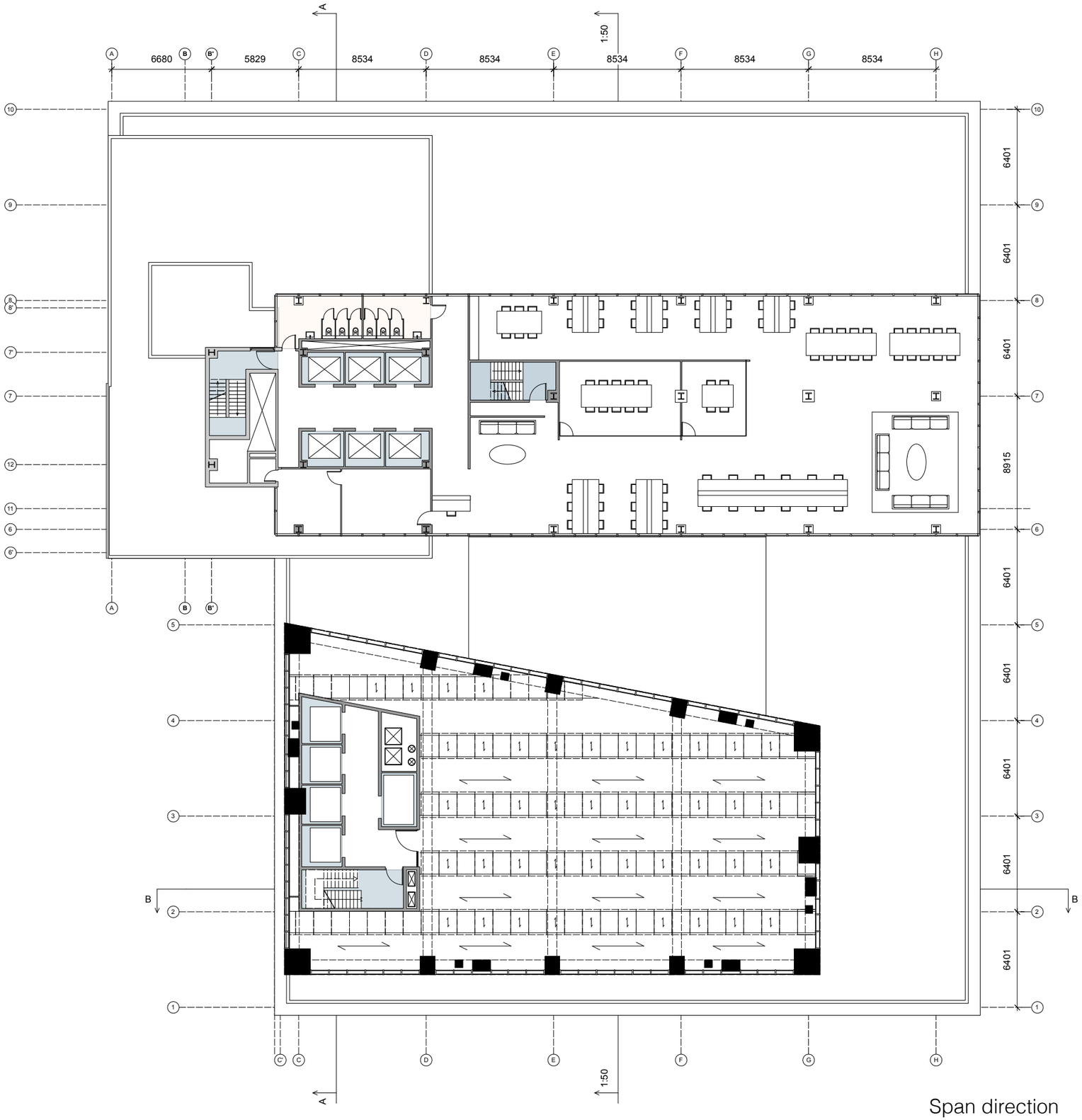


Clt flooring  against twisting




Poured foundation piles under-
neath new tower.

Gravitational and tensile stress




Span direction

Construction calculation

Largest span: 19284mm
Glulam beam height= 1/20 * length = 964,2mm = 1000mm

F office: 10kN/$m^2$
F construction: 125kg/$m^3$ = 1,22kN/$m^3$
F glulam(N/$mm^2$): 35,6n/$mm^2$
F Steel(N/$mm^2$): 550n/$mm^2$

Office Surface: 720$m^2$
Amount of floors: 28
Total surface of office sapce: 20160$m^2$
Heightbuilding: 121,2m
Office volume= 720*121,2= 87264

F office = 10kN/$m^2$ * 20160 = 201600 kN = 201600.000 N
F construction = 1,22N/$m^3$ = 106462,08 kN = 106462080 N
F combined = 308062080 N

A glulam = 30806208 N / 35,6N/$mm^2$ = 8653434,83 $mm^2$

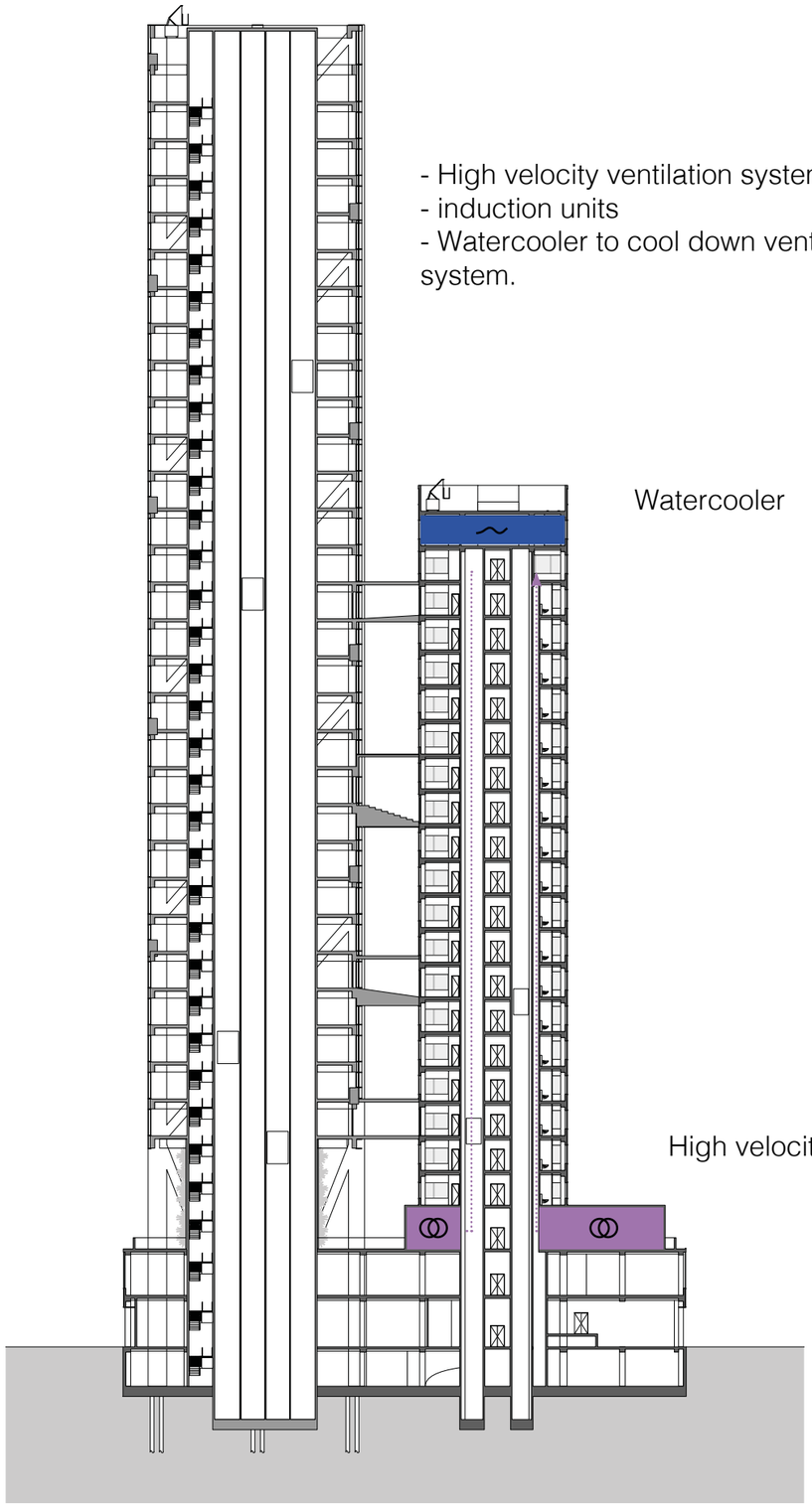
A column (12) = 60 % = 6192060,89 $mm^2$
A truss (12) = 40 % = 3461373,93 $mm^2$

A column = 6192060,89 / 12 = 516005,07 $mm^2$ = 718 mm x 718 mm

A truss = 3461373,93 / 12 = 288447 $mm^2$ = 537 mm x537 mm

A steel = 308062080 N / 550N/$mm^2$ = 560112,87 $mm^2$
A steel (12) = 560112,87 $mm^2$ / 12 = 46646 $mm^2$

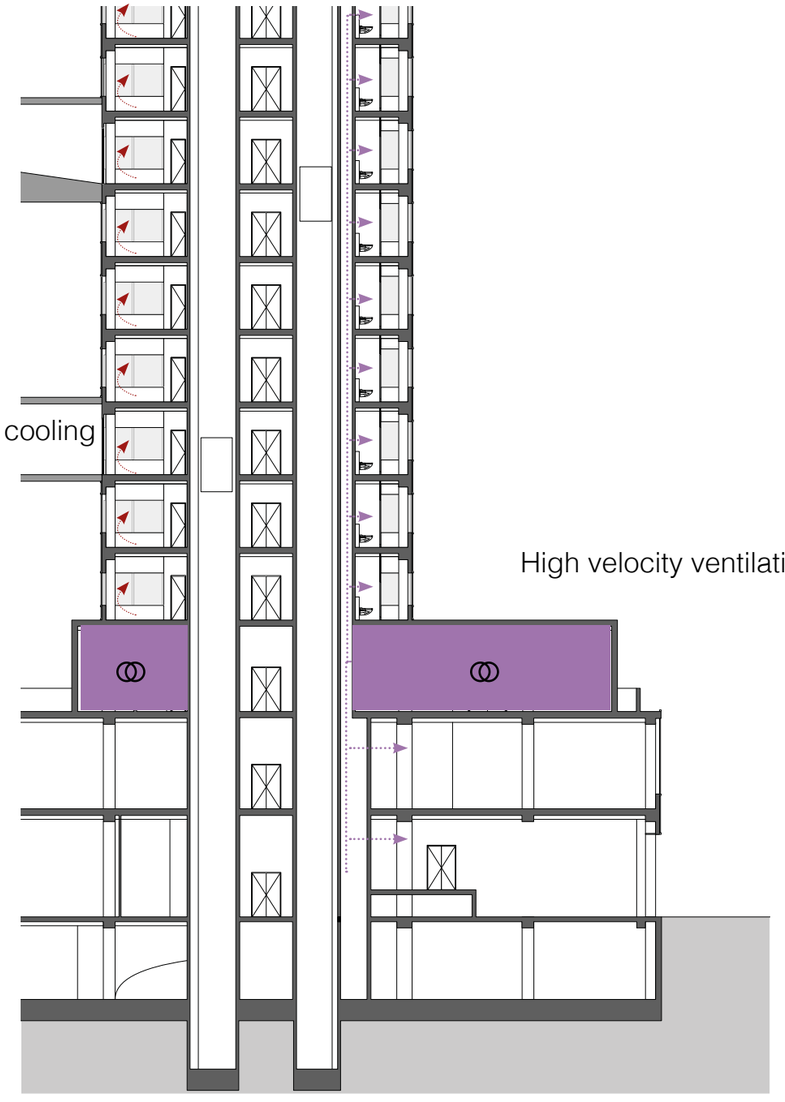
Used square $mm^2$ = 78.750 $mm^2$



- High velocity ventilation system
- induction units
- Watercooler to cool down ventilation system.

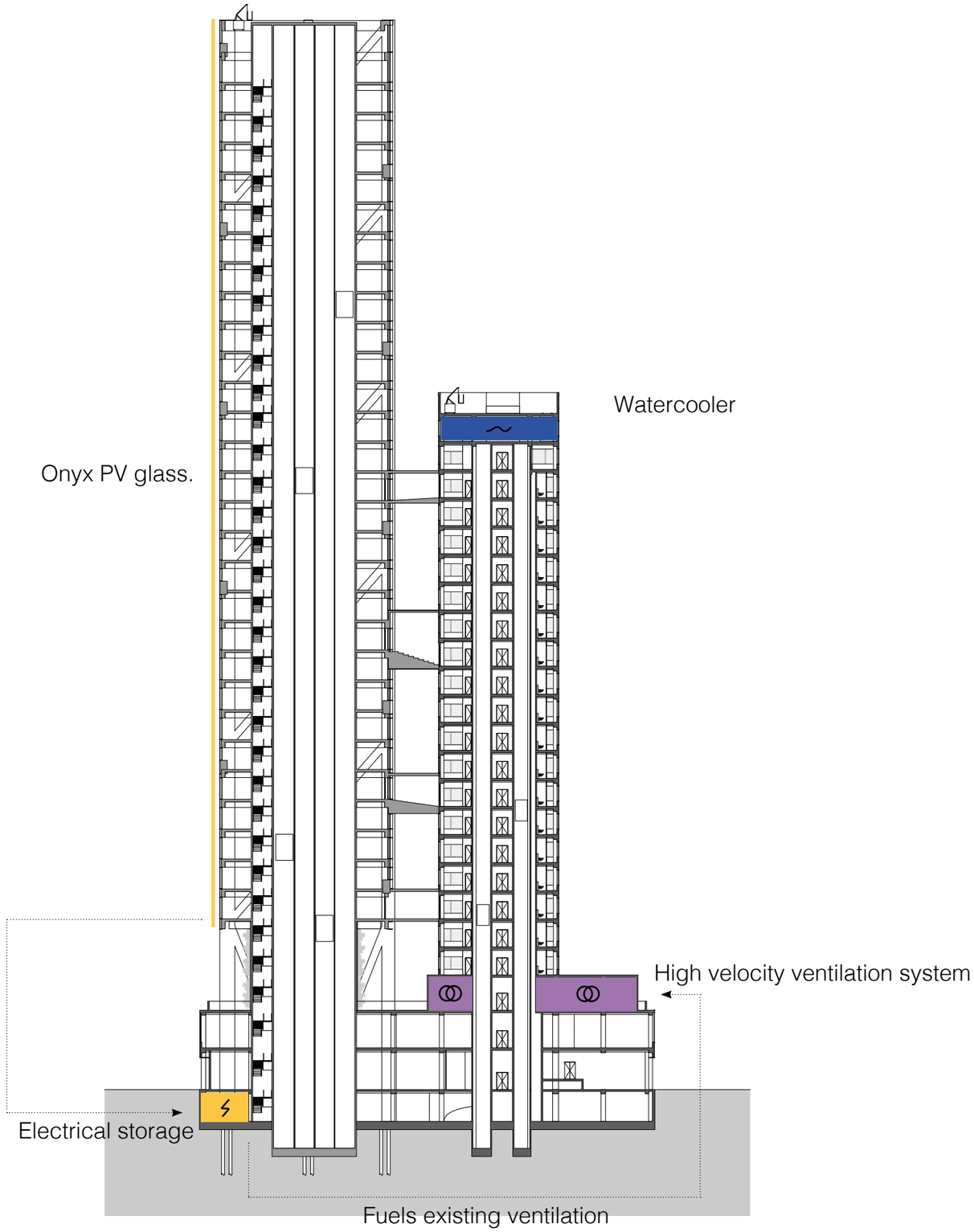
Watercooler

High velocity ventilation system

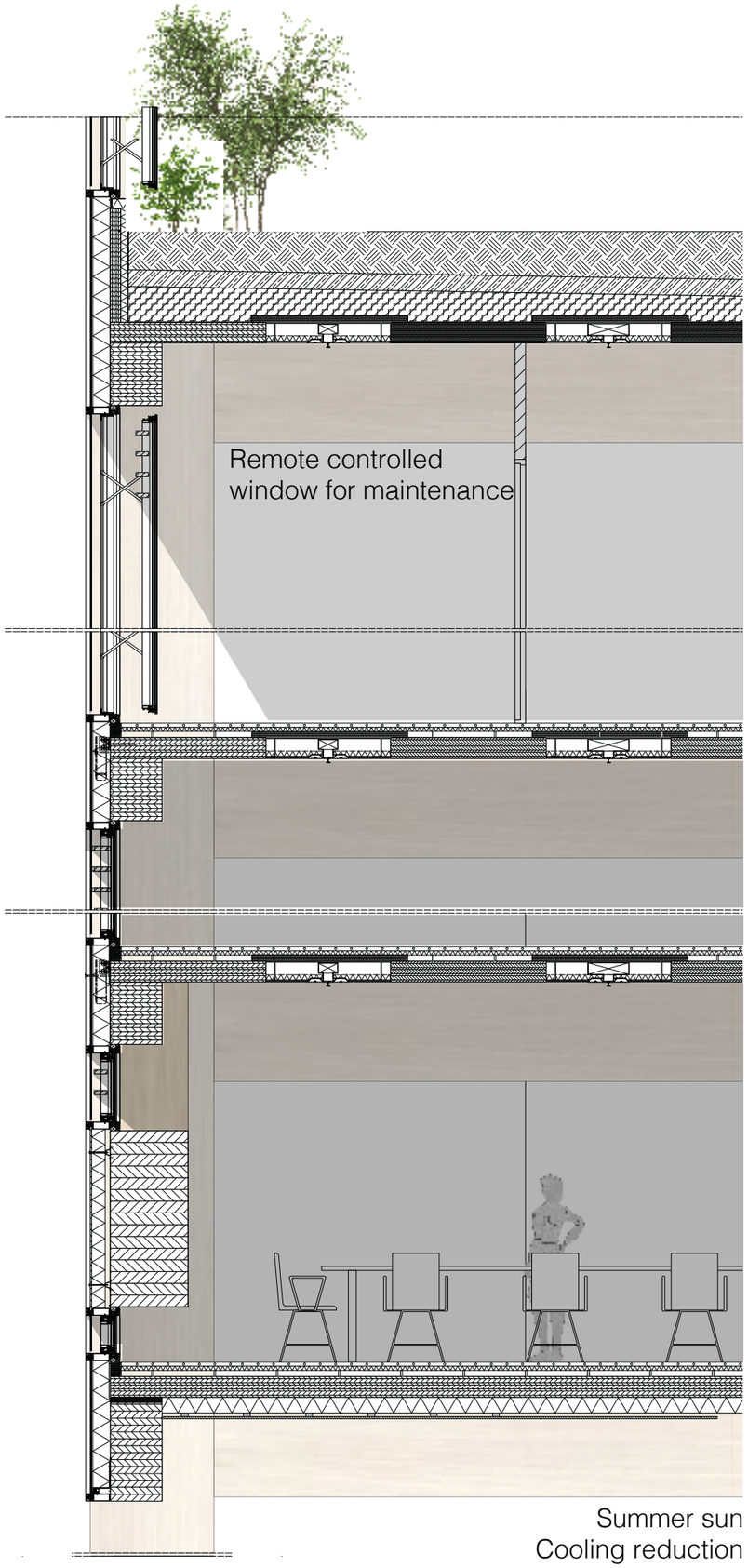


Induction units heating and cooling

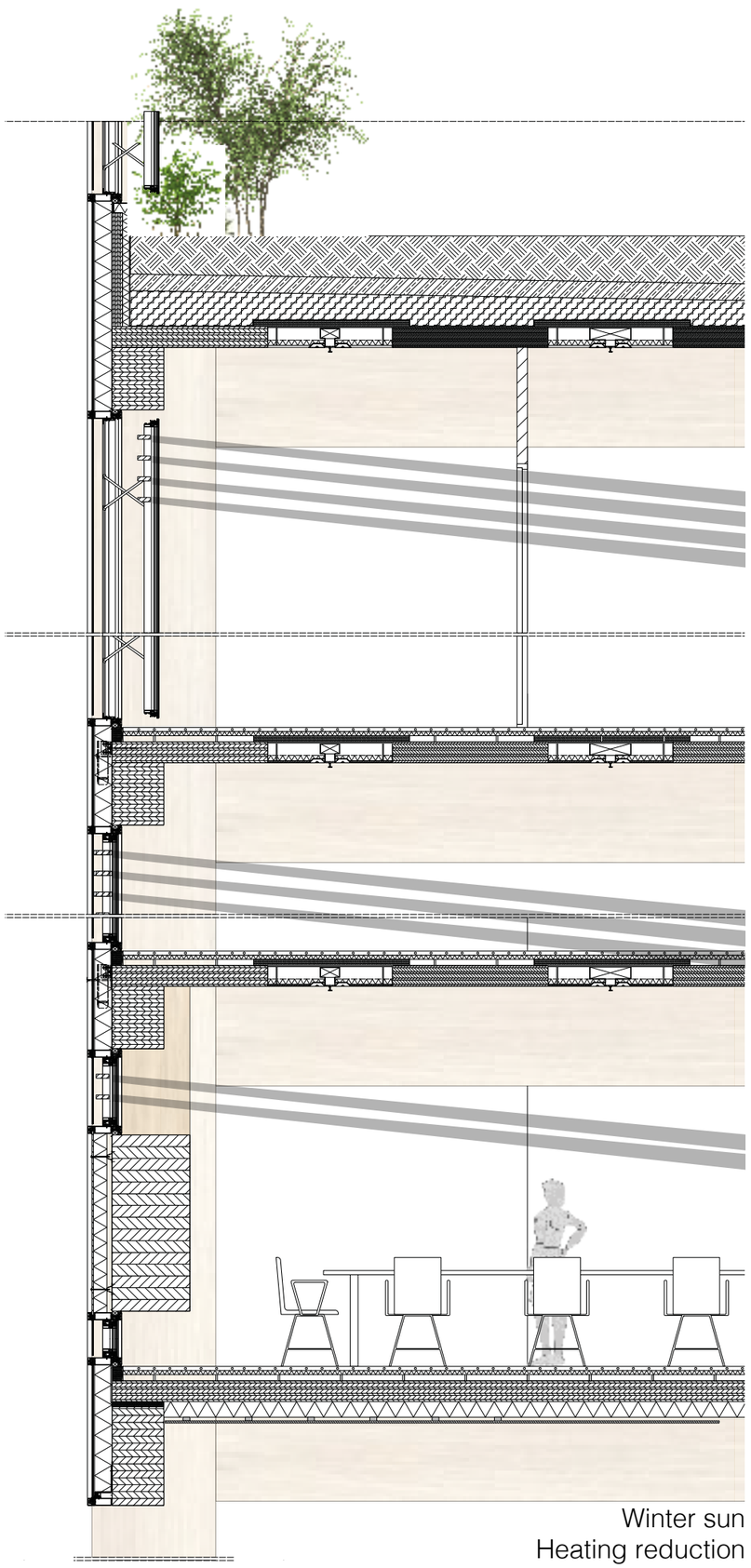
High velocity ventilation system


Onyx PV glass.
Watercooler
High velocity ventilation system
Electrical storage
Fuels existing ventilation

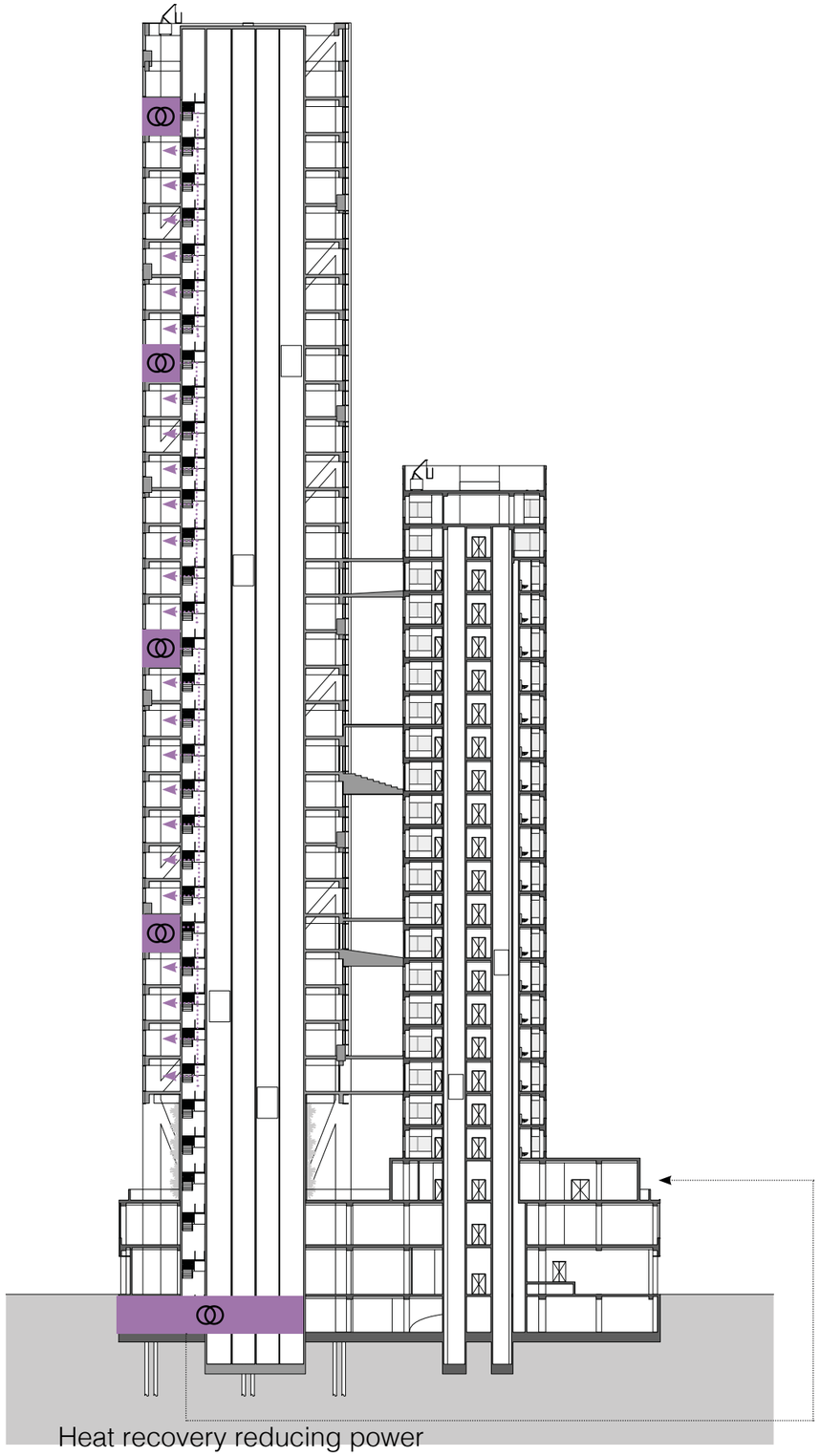
Onyx PV glass blocks
17% light transmittance
0.3% UV transmittance



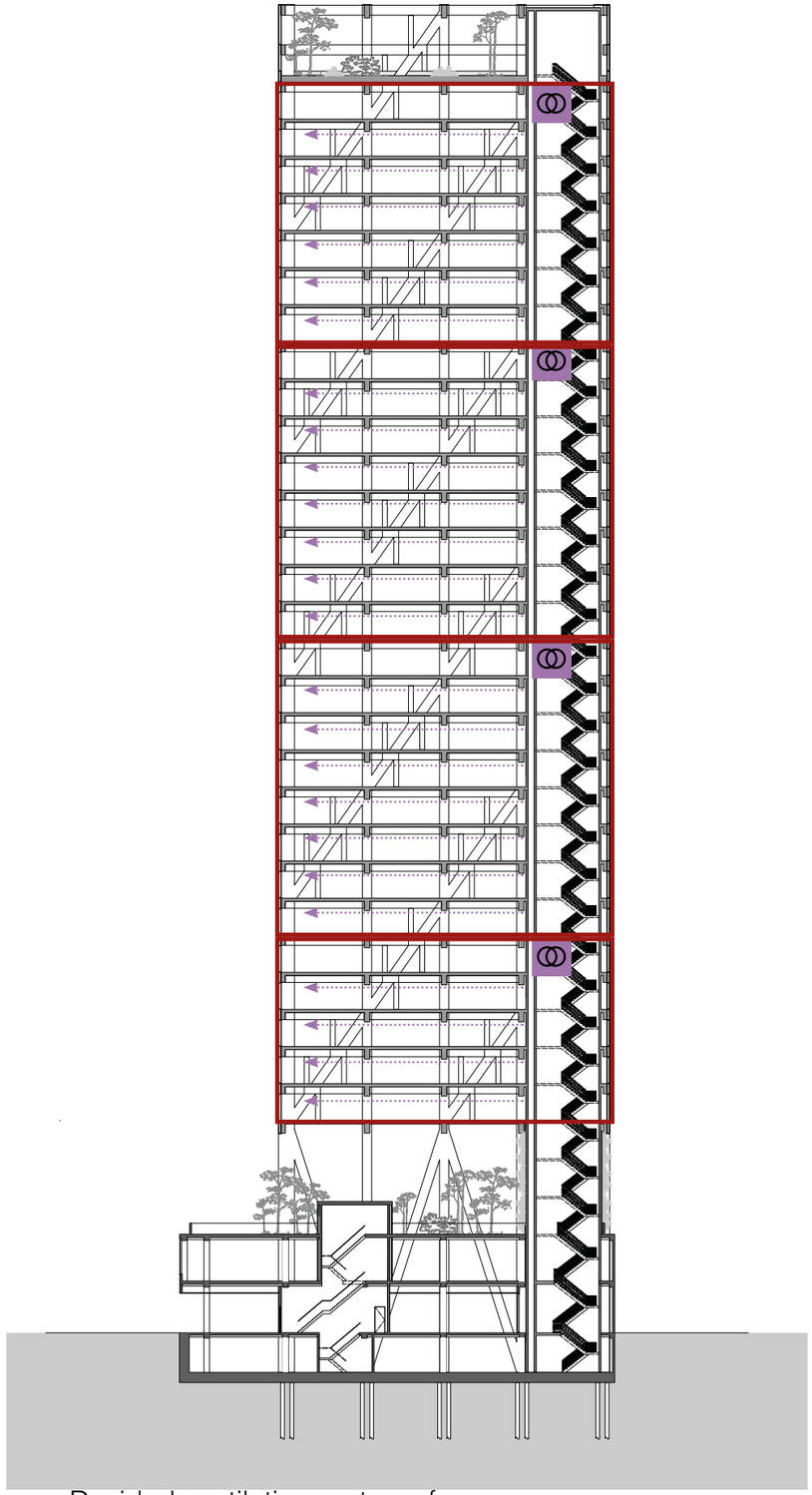

Summer sun
Cooling reduction



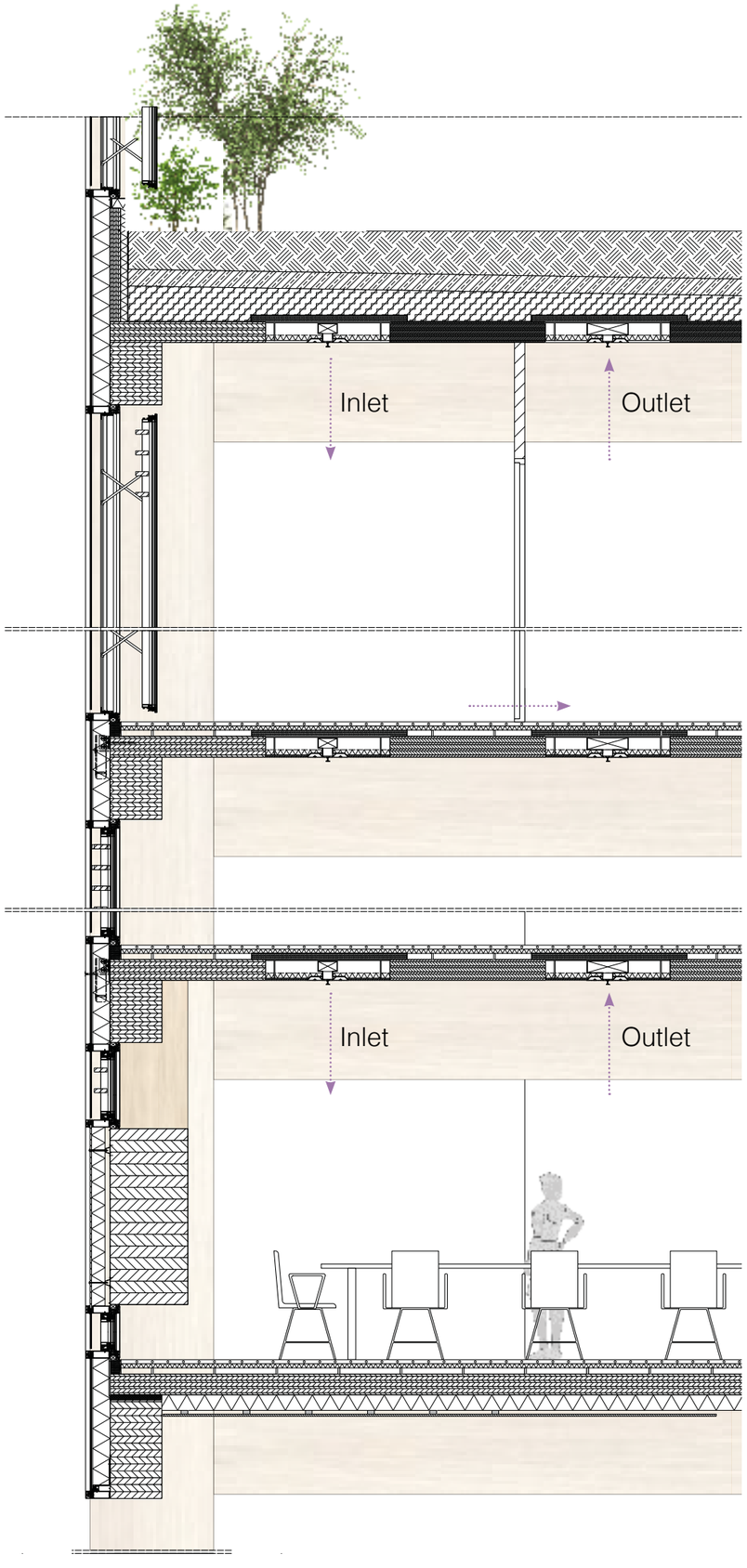
Winter sun
Heating reduction

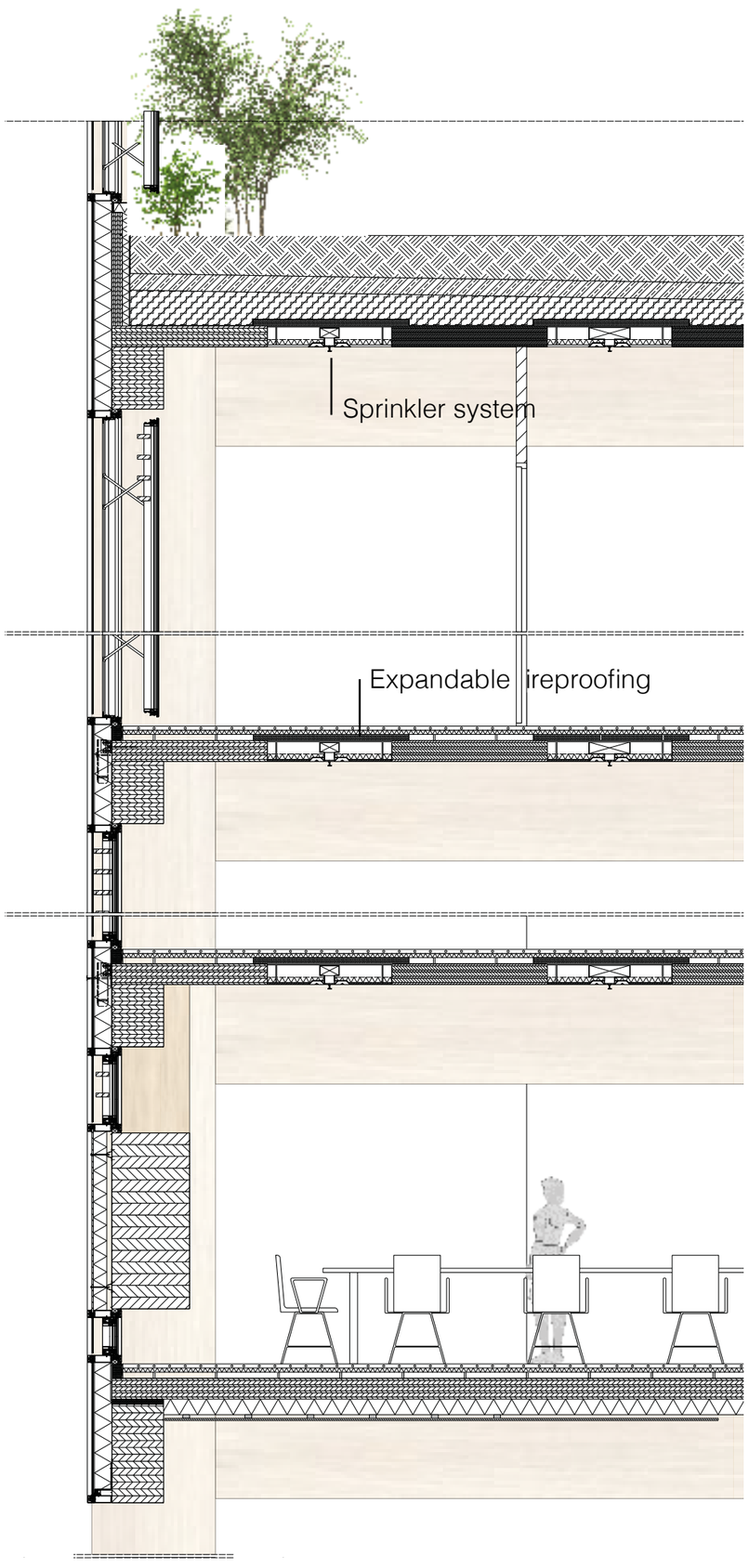


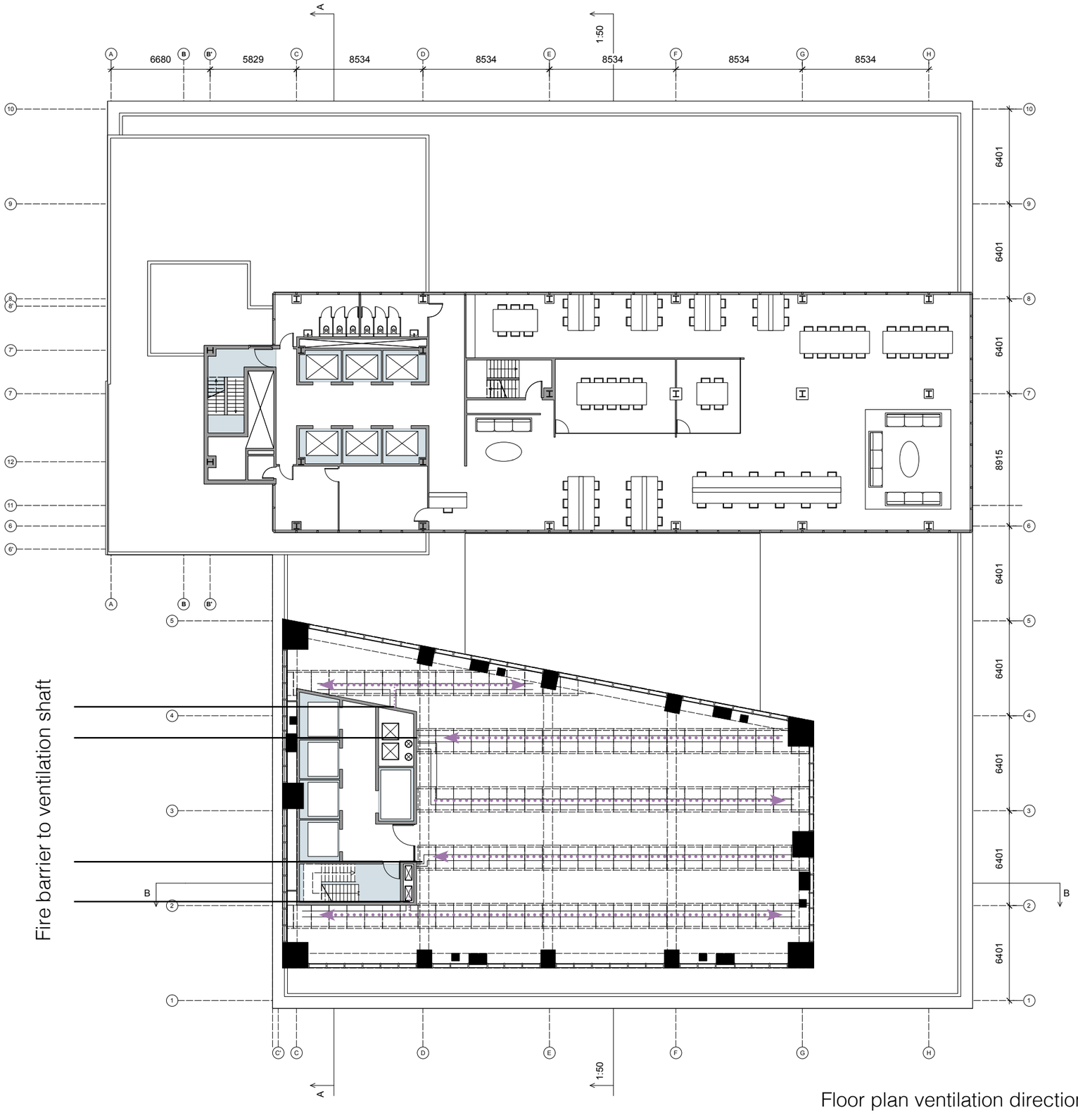
Heat recovery reducing power
of high velocity ventilation



Devided ventilation systems for
fire compartments


Inlet
Outlet
Inlet
Outlet


Sprinkler system
Expandable ireproofing




Floor plan ventilation direction

*Ventilation shaft: 1.37 m²*
*Ventilation Kanal: 0,0194 m²*

Main ventilation: 25 m³/p/h
Main ventilation speed: 10 m/s
Secundary ventilation speed: 5m/s
Tertiary ventilation speed: 3m/s
Interior surface = 556,5 m² * 28 = 15582
People: 8 m²/p = 15582/ 8 = 1947,75
A ventilation = ventilation amount / venitalation speed.

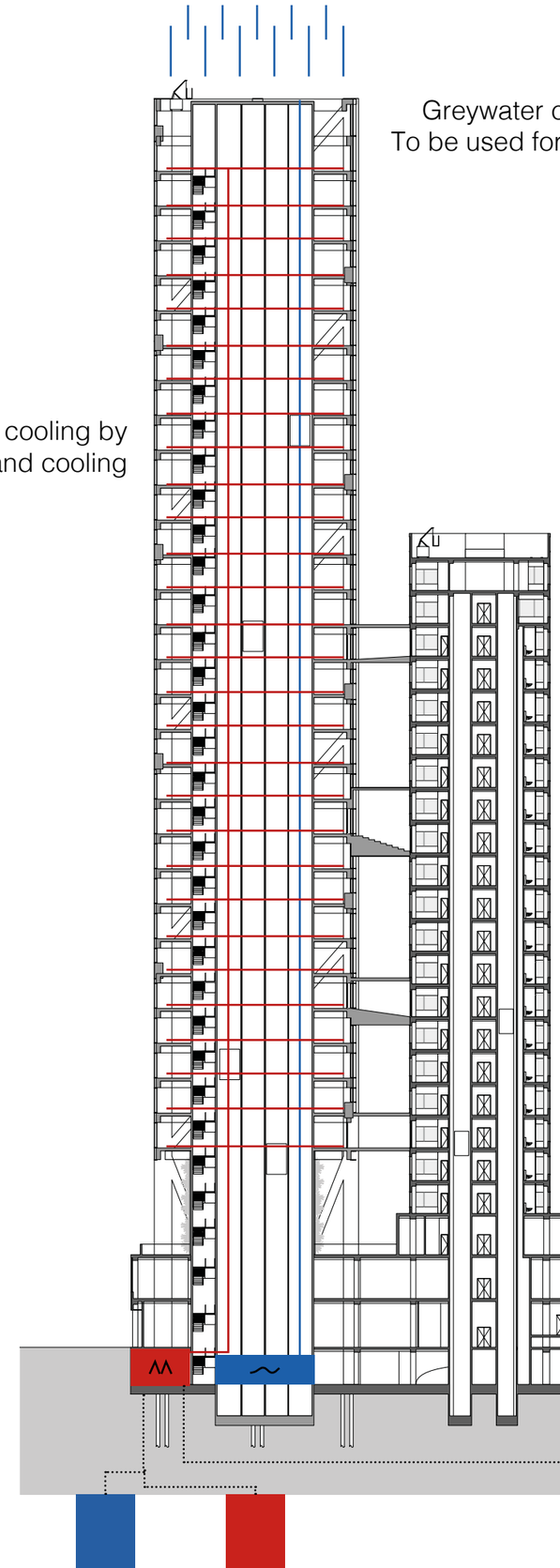
A Main shaft = 1947,75 * 25 = 48693,75 m³/h = 13,52 m³/s
A Main shaft = 13,5 m³/s / 10 m/s = 1,35m²

Secundary ventilation = 70 x 25 = 1750 m³/h = 0,486 m³/s
A secundary ventilation = 0,486 m³/s / 5 m/s = 0,097 m²
Dimension secundary ventilation supply = 0,097 m² / 5 = 0,0194 m²
Dimension secundary ventilation supply = 140mm x 140mm

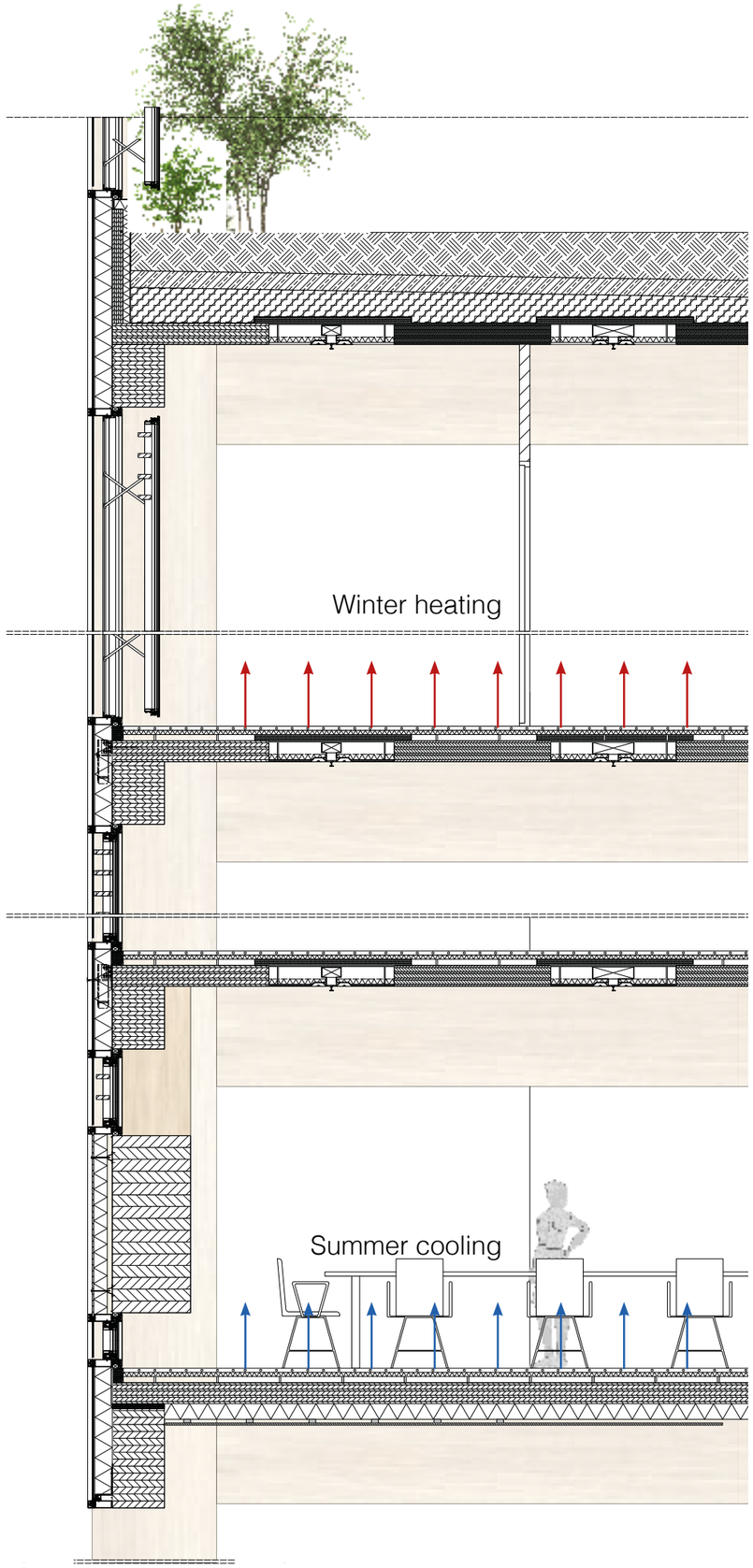
Dimension secundary ventilation discharge: 0,097 m² / 2 = 0,0485 m²
Dimension secundary ventilation discharge = 220 x 220

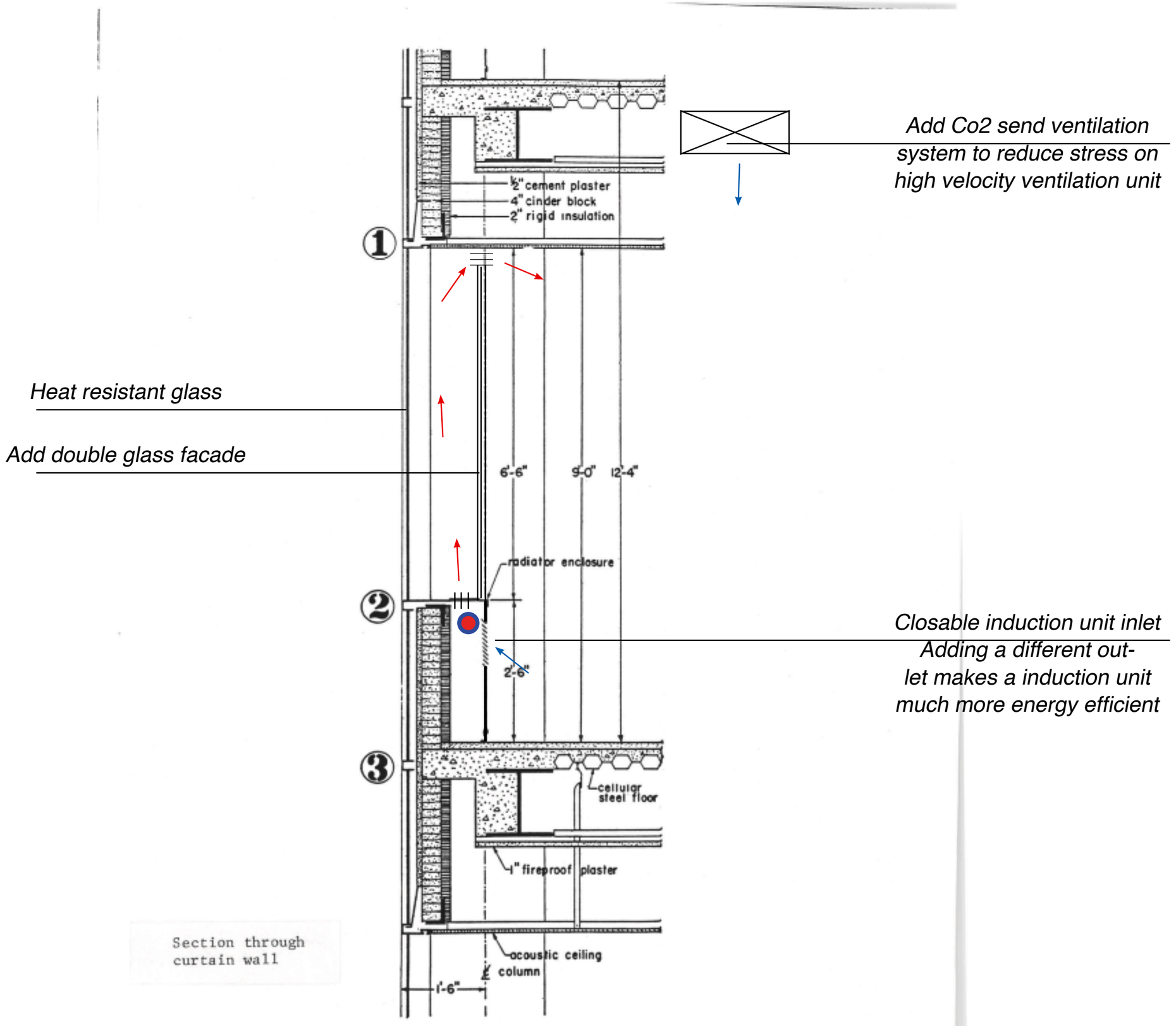
Greywater collection in basement.
To be used for cleaning and sanitary

Heating and cooling by
floorheating- and cooling



Cold and heat storage
fuels high velocity ventilation and
induction units leverhouse






*Add Co2 send ventilation system to reduce stress on high velocity ventilation unit*

*Heat resistant glass*

*Add double glass facade*

*Closable induction unit inlet*

*Adding a different out-let makes a induction unit much more energy efficient*

Section through curtain wall