North Sea: Landscapes of Coexistence
Transitional Territories Studio 2019-2020

Technology Report

Zuzanna Rosinska

Archive Fever
Neighbourhood of data

Index

Abstract

1. General Arrangement

2. Climate Concept

3. Structural Concept

4. Facades

5. Details

6. Conclusion

Abstract

The project emerges from the acknowledgement of the growing phenomena of archive fever (Derrida, 1995). Driven by the need, obligation, desire or simply possibility to store a growing amount of both - physical objects and digital data, and encouraged with a constantly increasing capacity of digital media storage - we keep on gathering more. Often unconsciously or with little curation of the collected content, we keep on creating a limitless cloud archive, that has an overwhelming physical presence that takes over hectare after hectare of land. Huge, anonymous, dark and hot space, placed in a remote location – that is a typical data centre. Blending into the neighbouring storage halls is easily omitted and stays hidden from the public sight.

Data storage came a long way from the representative architecture of banks, archives and city halls to a unit defined storage facility. Therefore, one may say that data centre is a continuation of the typology of storing and archiving. And a storage type that emerges is an opaque container defined by the size of a stored unit - server. These content defined buildings, technical as they are, allow for almost no human presence, but do potentially manage through their sheer size to organize and control the context they inhabit, the territory. One cannot underestimate their urban impact.

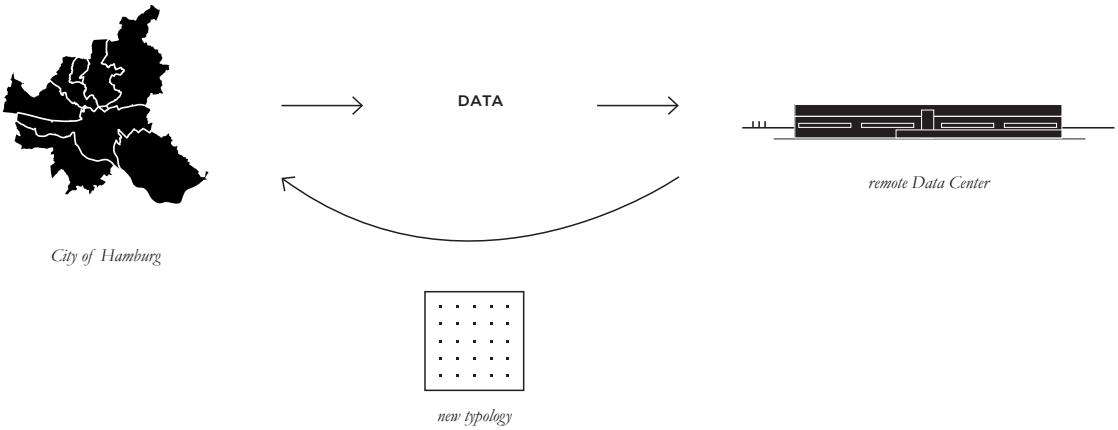
Current trends in technology, among others, the Internet of Things and a growing amount of latency dependent applications will generate a need to introduce data into the cities. That gives a unique opportunity to redefine existing data centre typology. Even though data is already fully integrated and present in our lives, we rarely acknowledge it. What is more, due to a lack of understanding of data flows we are often excluded from the discussion on the degree of its presence in our lives or surveillance.

The proposed project, is a gesture that brings data, technology, citizens and urban context together, emphasizing interconnections and interdependence of all aforementioned. This way introducing one of the most significant elements of our infrastructure physically into the culture, giving digital data a physical weight and interface. Creating friction between public and private, human and machine – that are completely dependent on each other and cannot function without the other.

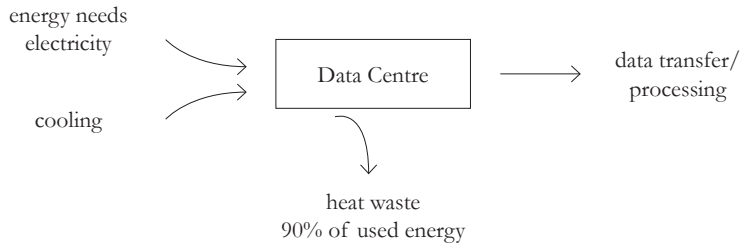
Keywords: data, archive fever, storage, unit defined

General Arrangement

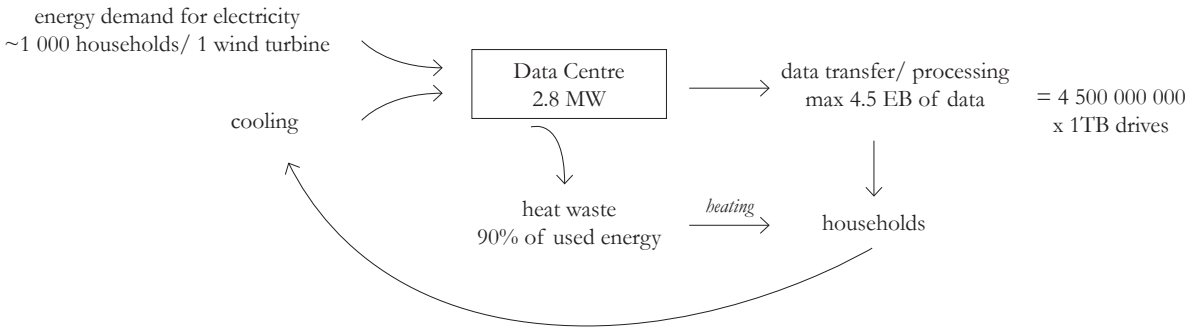
General describtion - specificity of DC

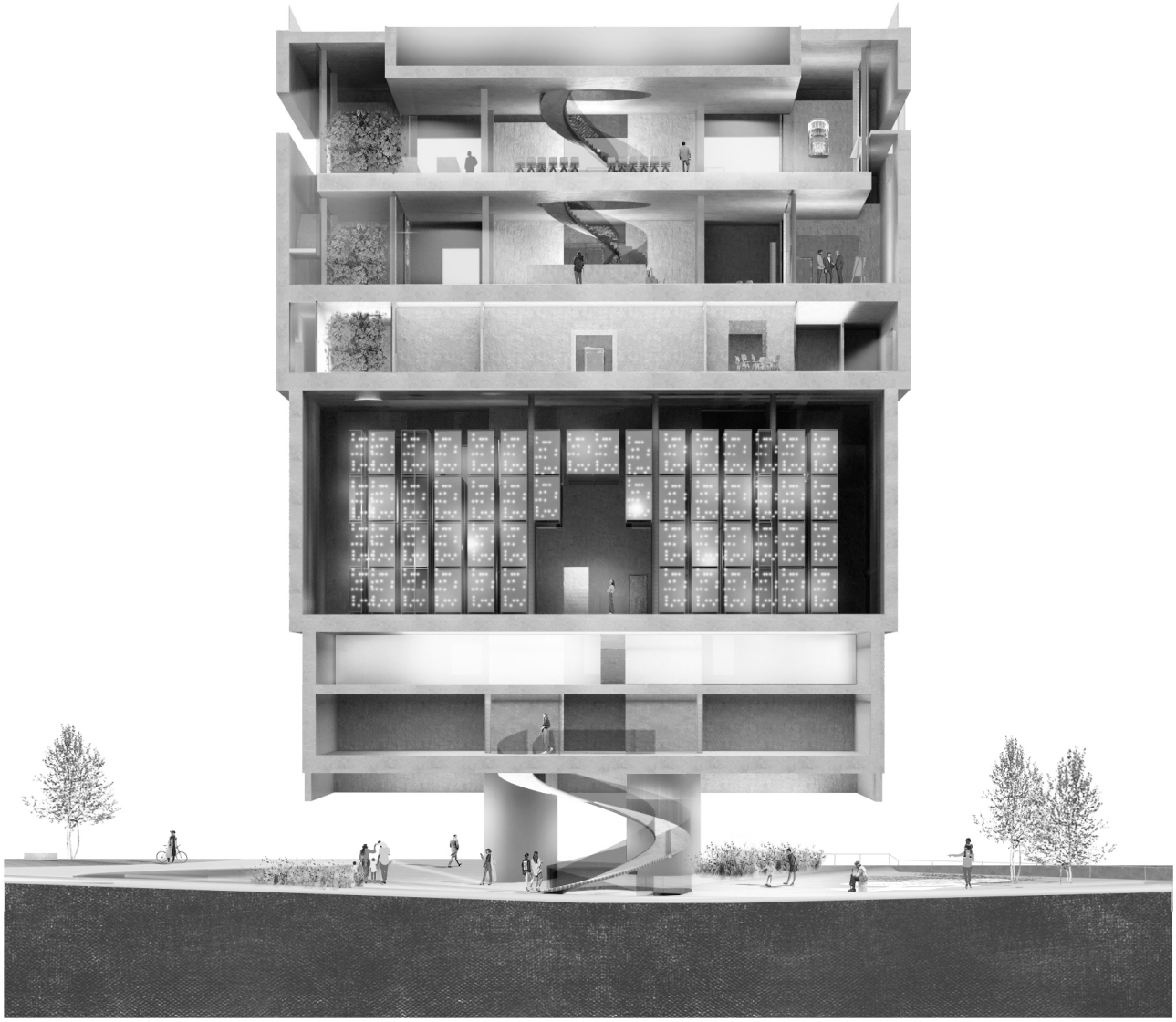


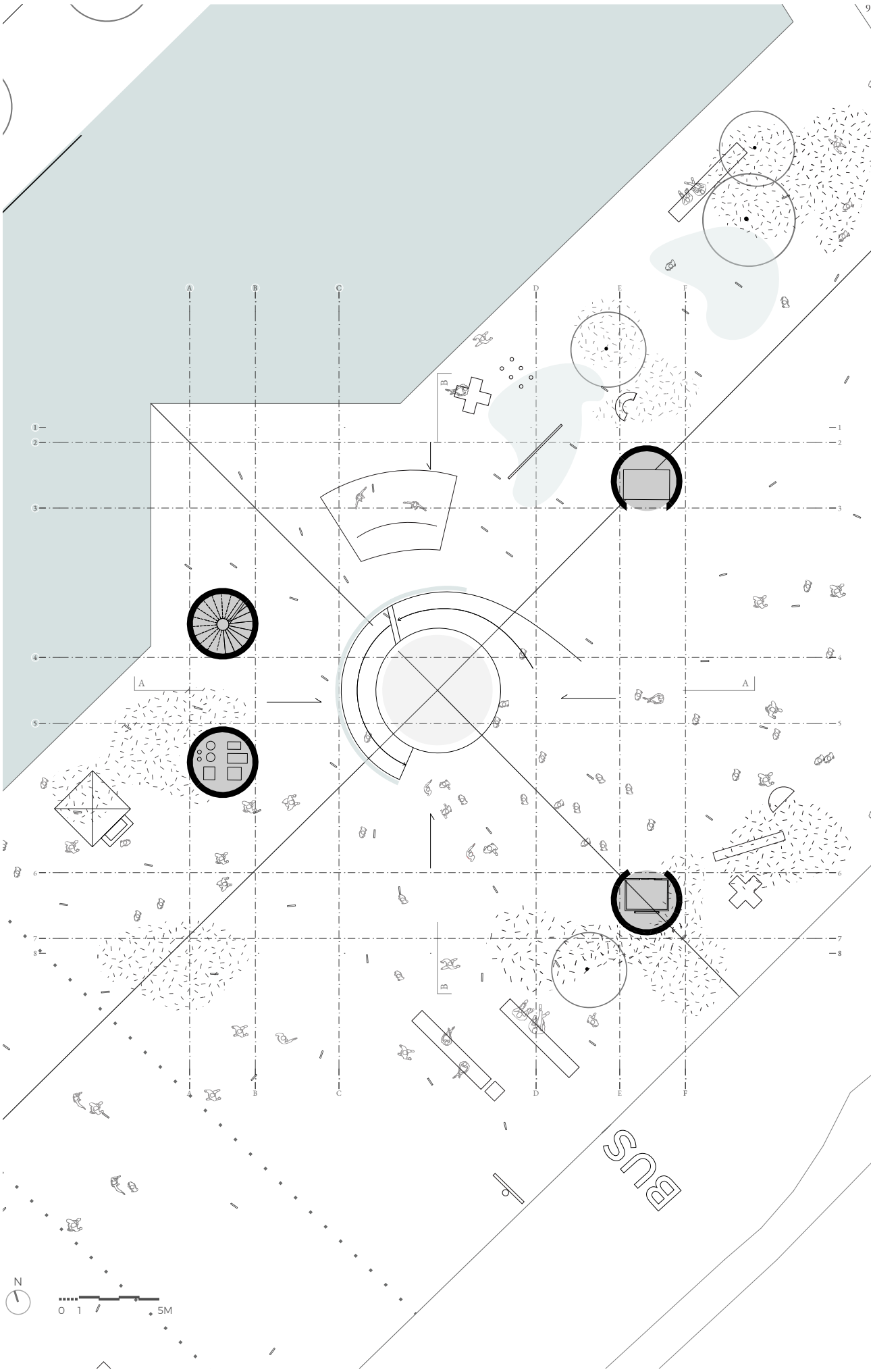
TYPICAL LINERAL SYSTEM



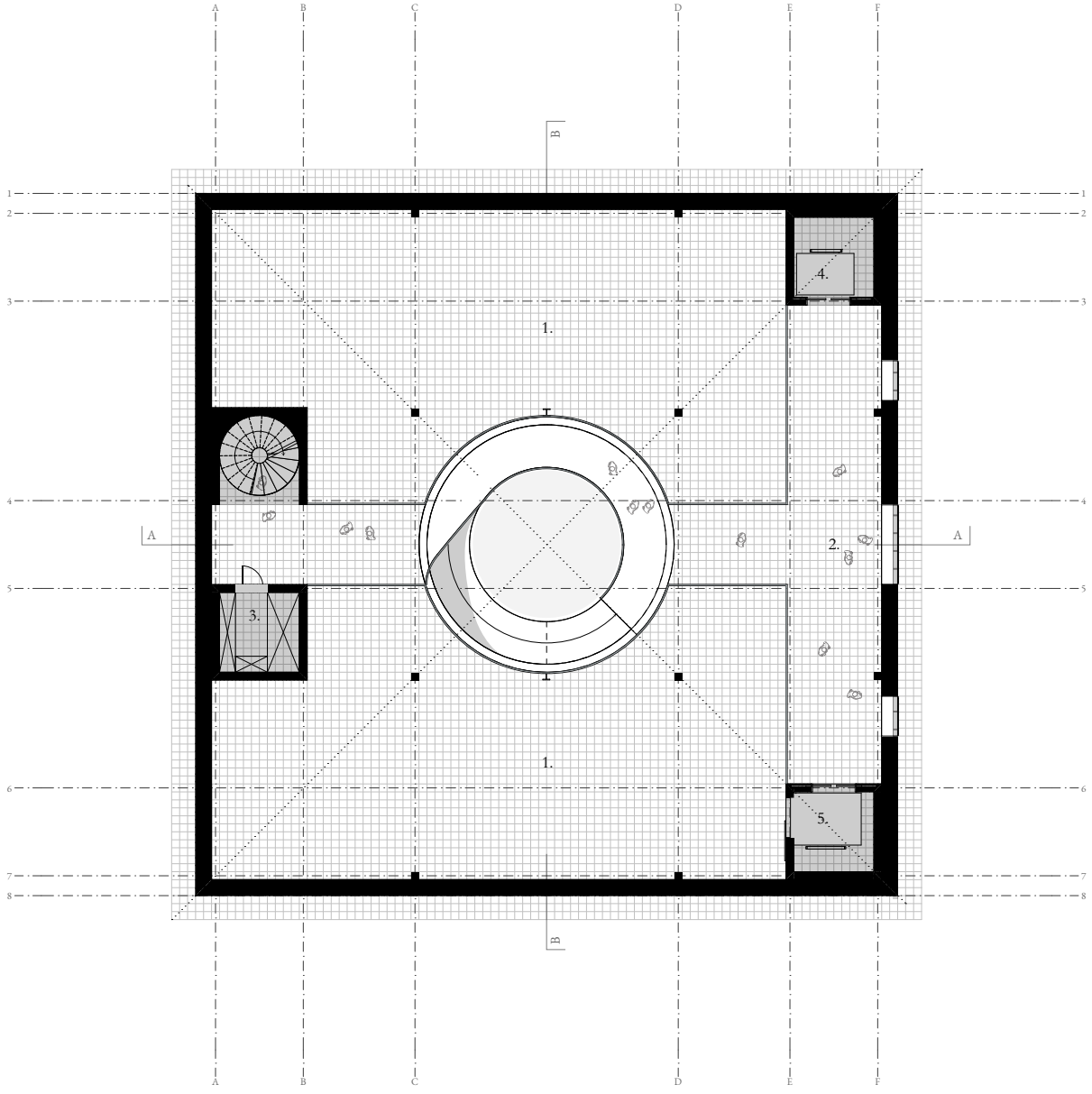
PROPOSED CIRCULAR SYSTEM



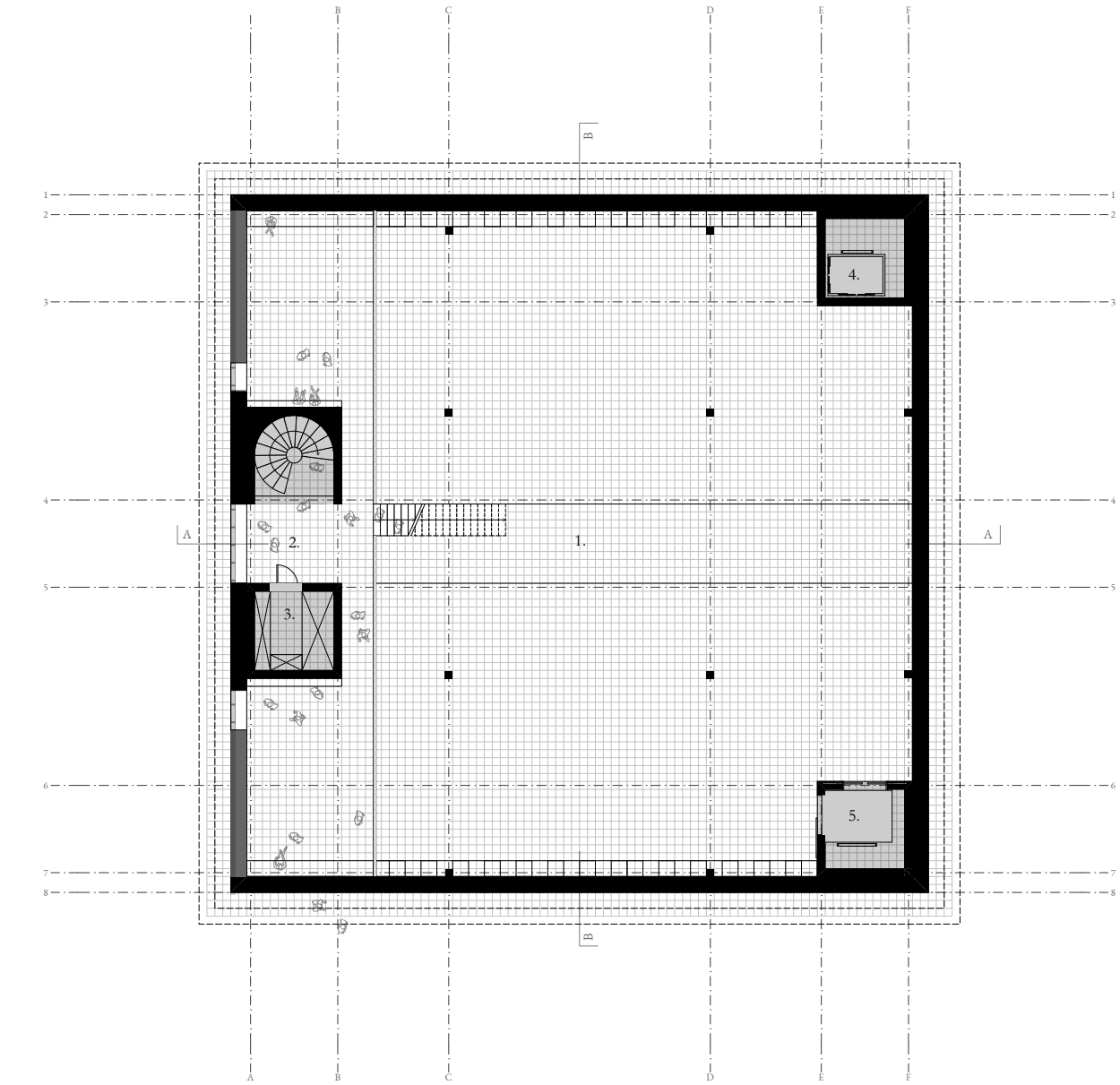



A
B
C
D
E
F
1
2
3
4
5
6
7
8
A
A
B
B
bus
N
0 1 5M

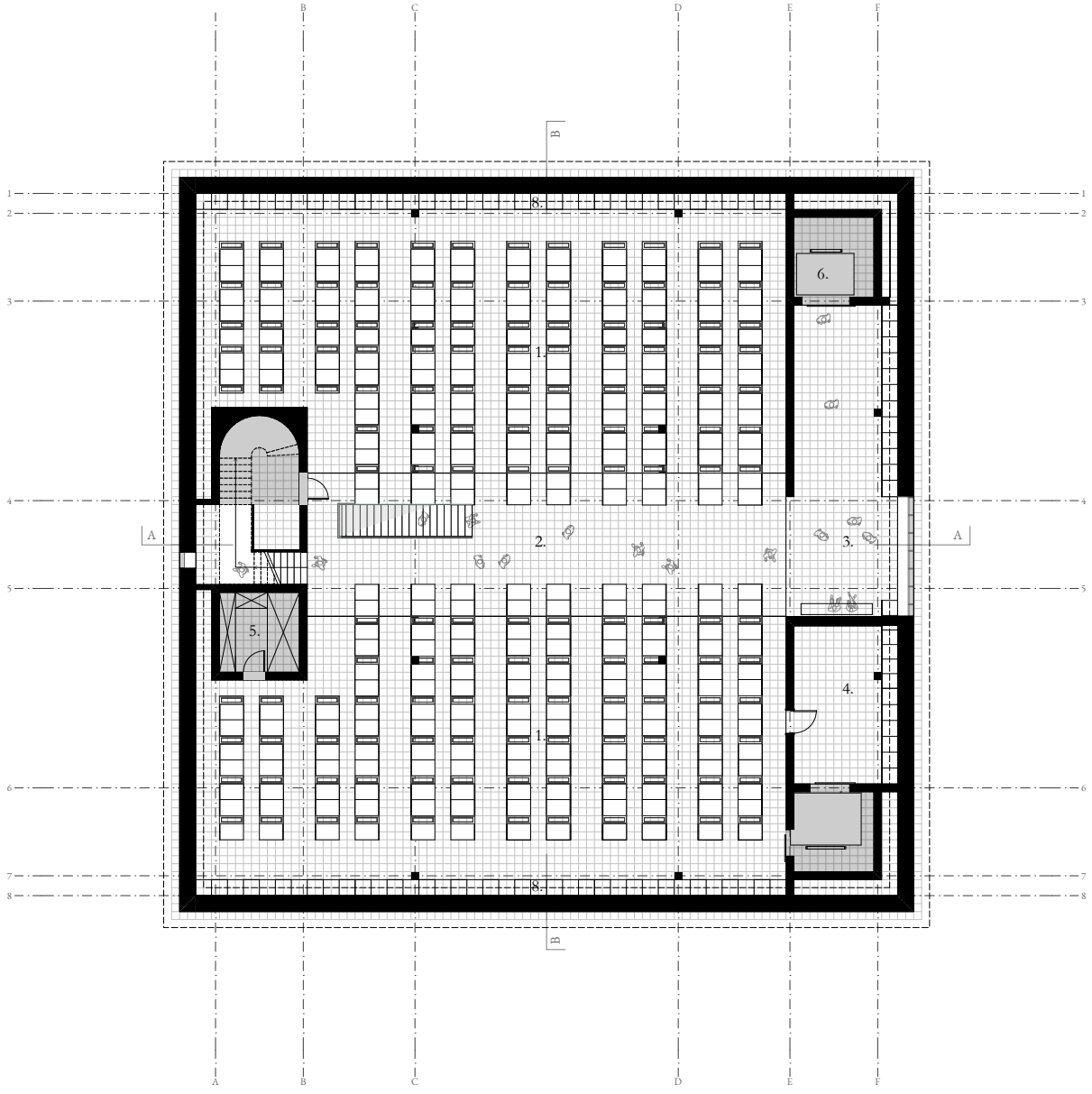
1. Technical floor| HEP & Electrical room
2. Viewpoint - vies towards:
    Port Canteen
    International maritime museum
    Überseeboulevard
3. Technical core - installation shafts access
4. Lift (employees and visitors)
5. Technical lift



1. Conditioned storage
2. Viewpoint - vies towards:
    HTH Hamburger tea trade
    Coffee trade - stock exchange
    St. Annen canal
3. Technical core - installation shafts access
4. Lift (employees and visitors)
5. Technical lift



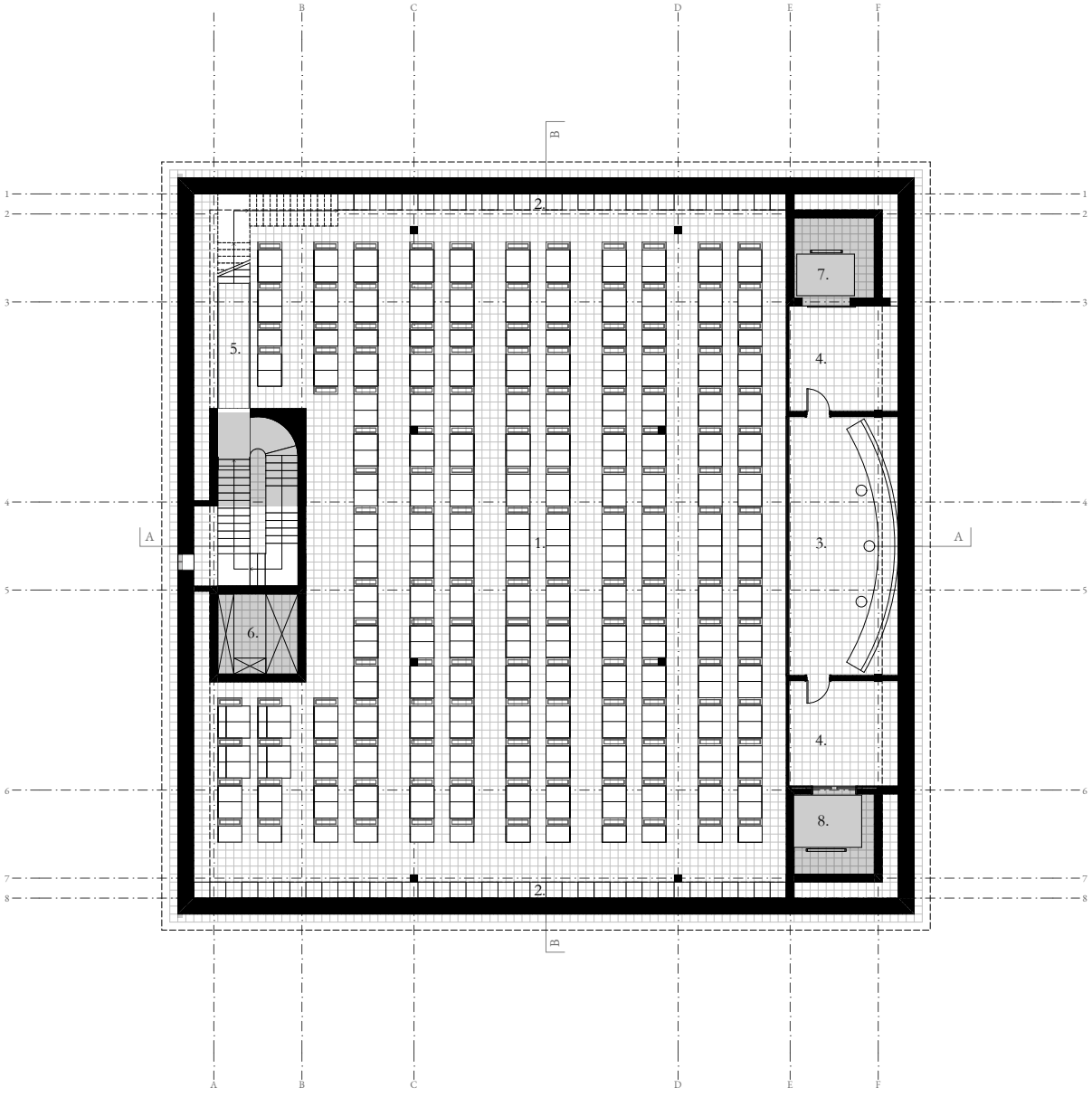
1. Data Centre white space
2. Visitor path - DC overview
3. Viewpoint - towards new HafenCity district
where data is produced and stored in the DC
4. Staging room
5. Technical core
Computer Room Air Handling CRAH
6. Lift (employees and visitors)
7. Technical lift
8. Main ditribution Frame MDF



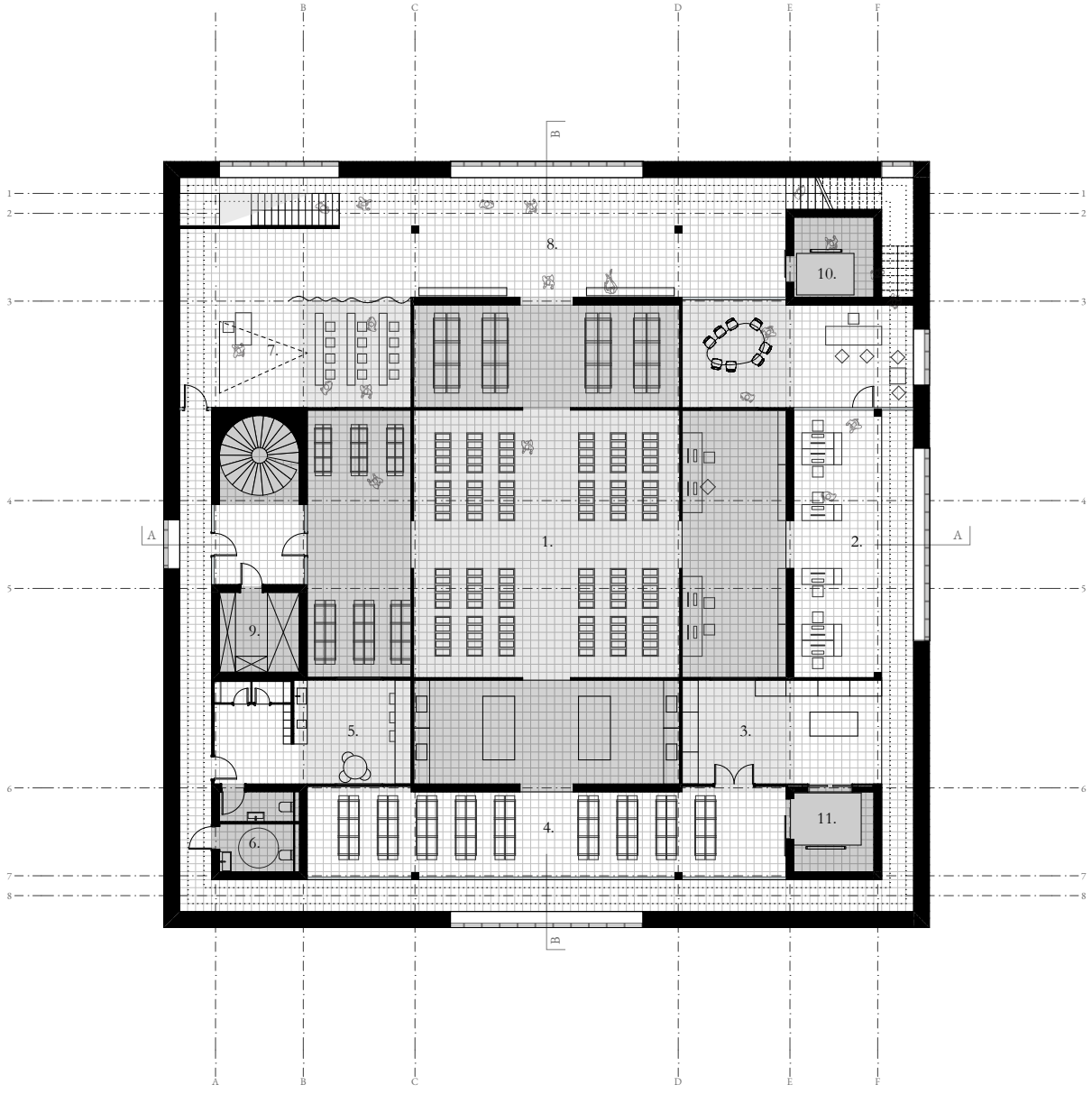
N

0 1 5M

1. Data Centre white space
2. Main ditribution Frame MDF
3. Network Operation Centre NOC
monitoring performance of DC
4. Access control
5. Bridge - overview of DC and technical connections to racks *(cables, pipes etc.)*
6. Technical core
7. Lift (employees and visitors)
8. Technical lift



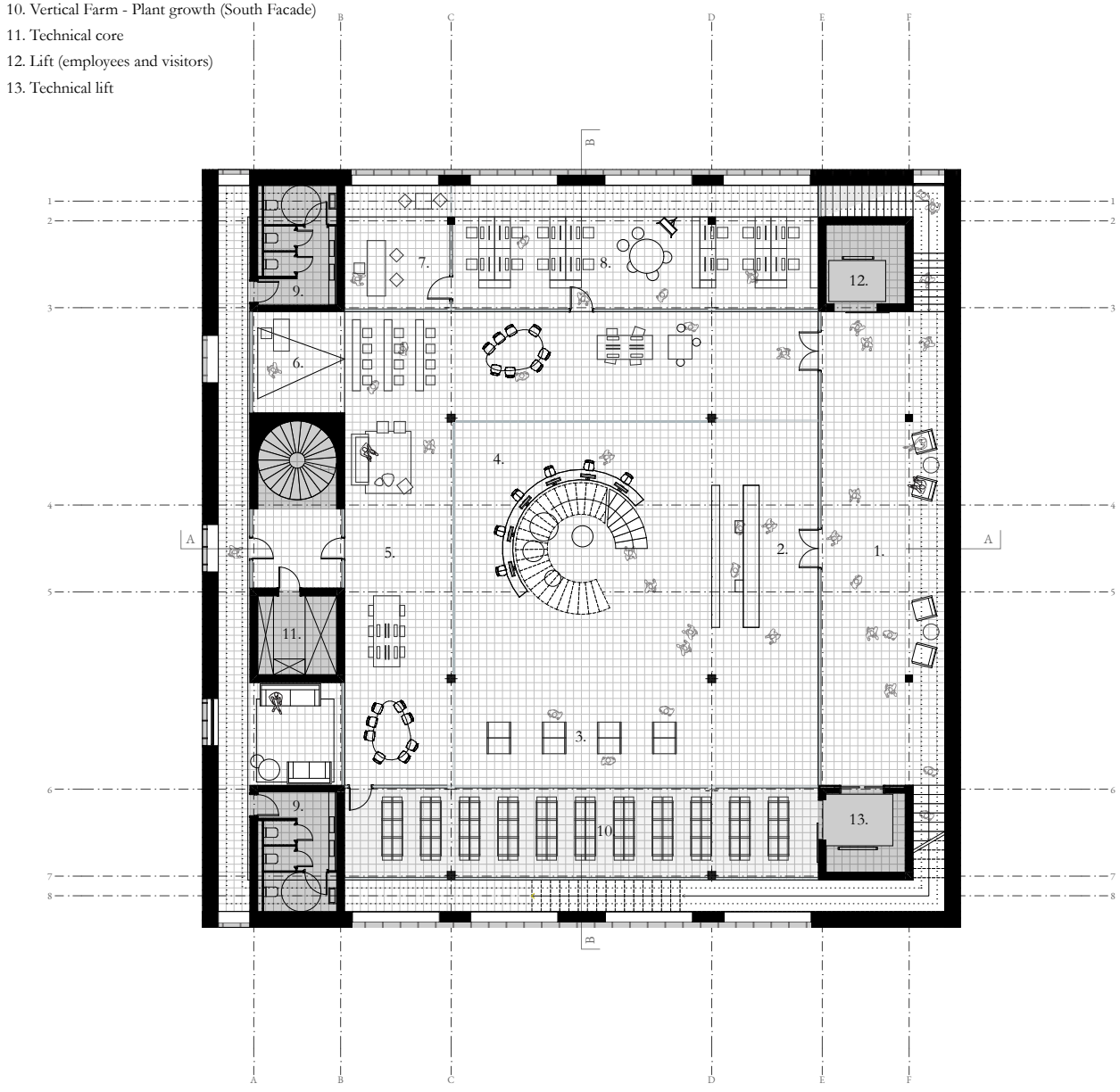
1. Vertical Farm Laboratory
2. Vert. Farm Offices
3. Food Storage
4. Vertical Farm - Plant growth (South Facade)
5. Employee changing room and kitchen
6. WC
7. Training space
8. Visitor Path
9. Technical core - Waste Heat distribution
10. Lift (employees and visitors)
11. Technical lift



N

0 1 5M

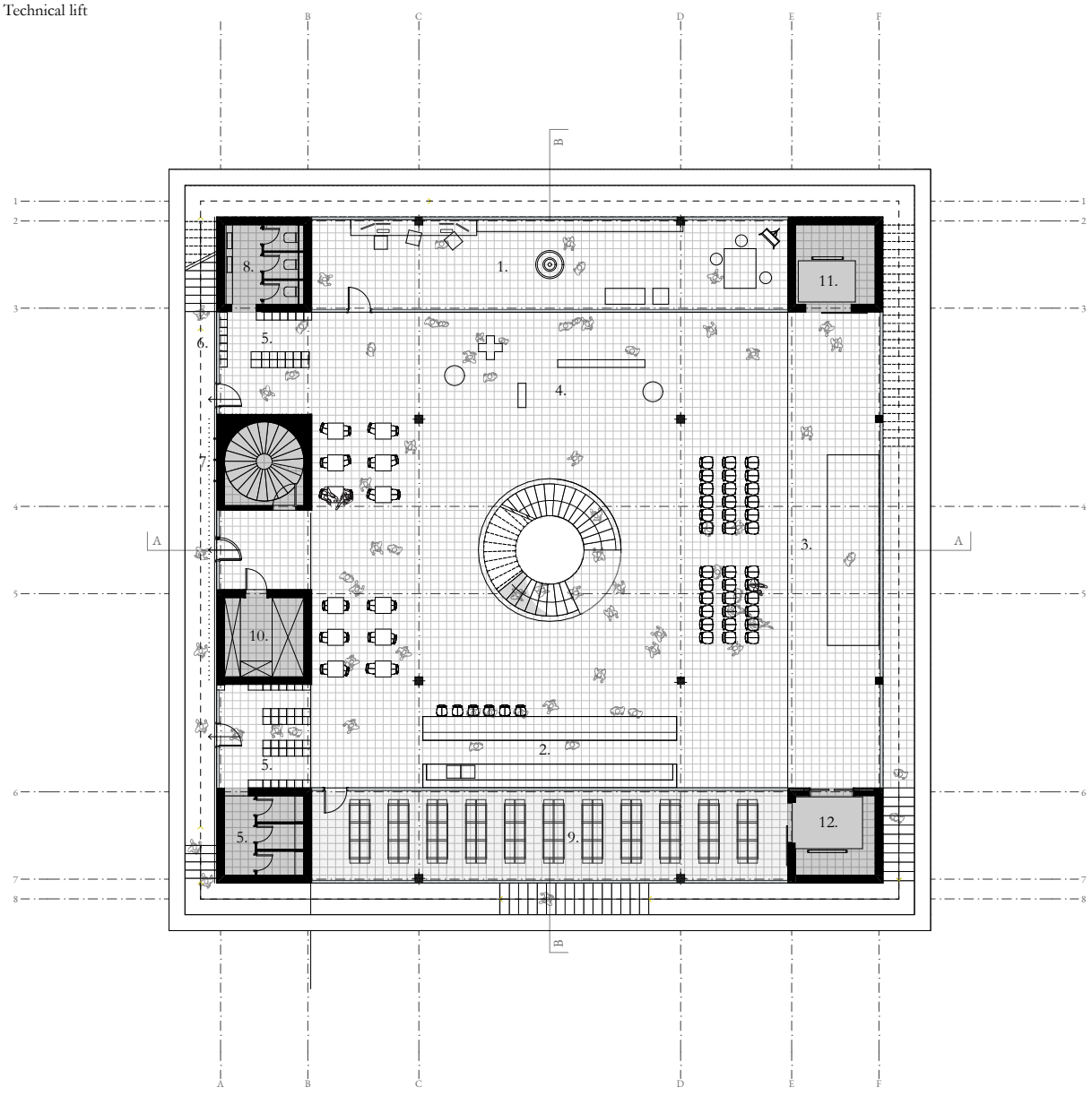
1. Visitor Path
2. DC & Data Bank Reception
3. Data Bank self-service
4. Coworking - latency critical workspace
5. Office Open Space
6. Quantum Lab Training space
7. Executive Office
8. IT office
   DC optimalisation
   Big Data processing
9. WC
10. Vertical Farm - Plant growth (South Facade)
11. Technical core
12. Lift (employees and visitors)
13. Technical lift



N

0 1 5M

1. Quantum Lab
2. Café
3. Event Space with city view
4. Multifunctional space
5. Changing rooms
6. Swimming Pool Access
7. Outdoor showers
8. WC
9. Vertical Farm - Plant growth (South Facade)
10. Technical core
11. Lift (employees and visitors)
12. Technical lift

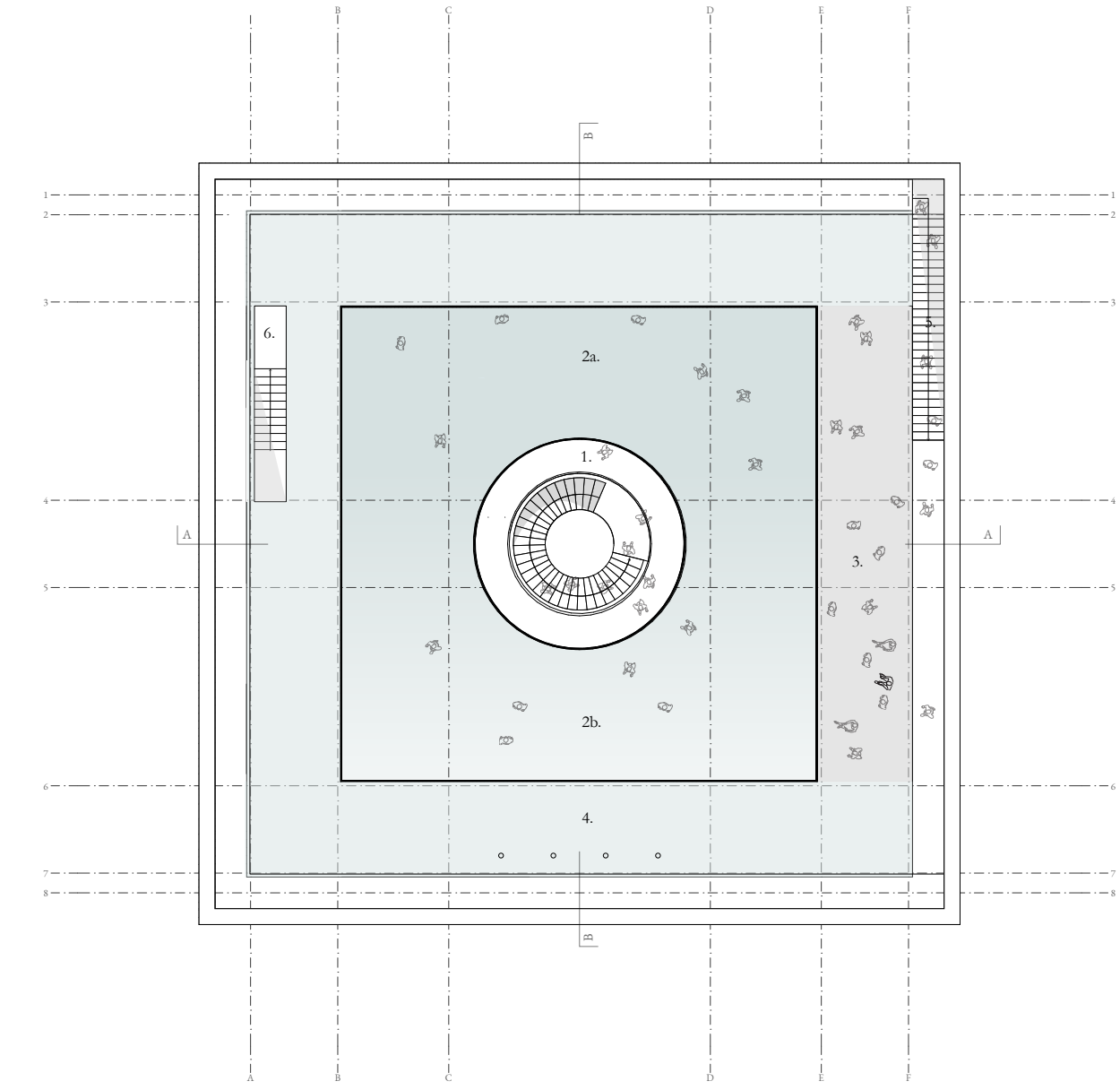


N

0 1 5M

1. Observation Deck
2. Swimming Pool
    a. deep water 1.5 m
    b. shallow water
3. Terrace - rest zone - sunbathing
4. Outdoor showers
5. Swimming pool access
6. Evacuation Staircase

N1



Climate Concept

Climate concept

Describtion - specificity of DC
Heat waste

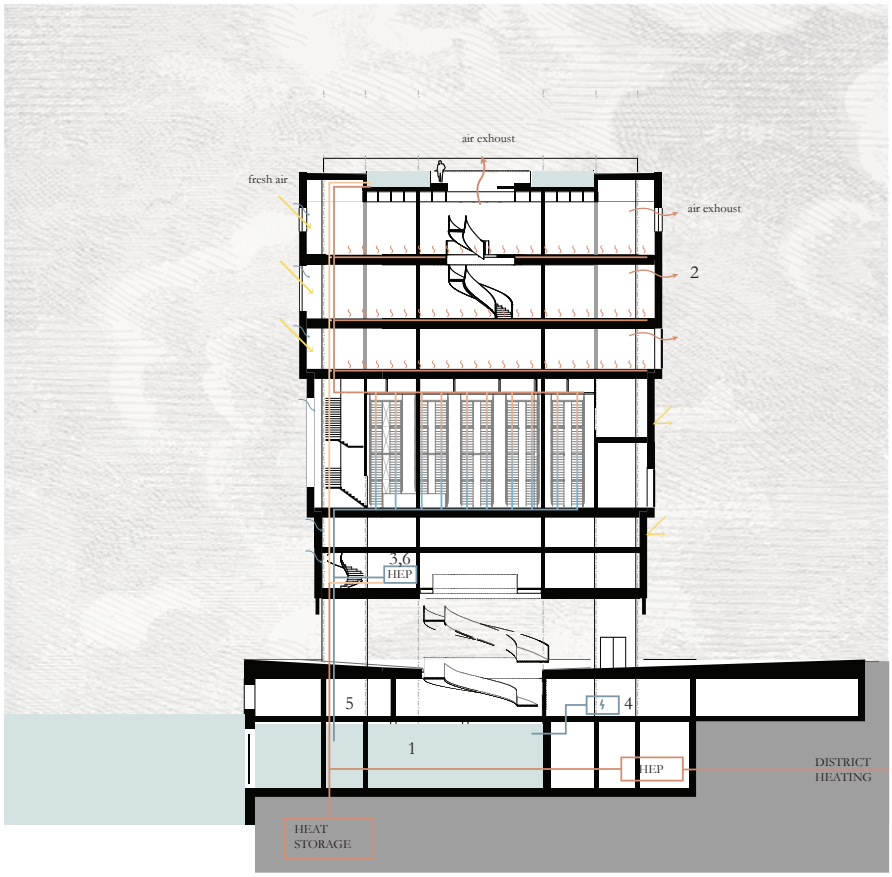
Summer

Winter

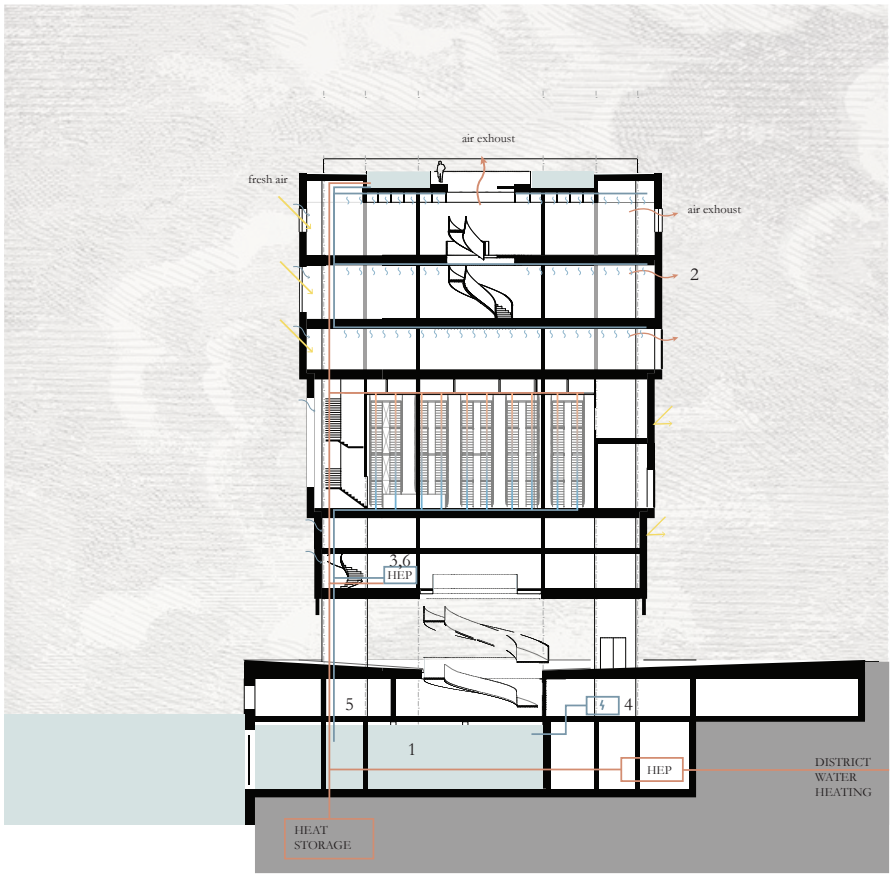
Climate schemes

Tidal energy - electricity source
Liquid cooling system
Liquid low temperature heating system
Cooled water - used for room & pool heating
Mechanical ventilation with heat recovery
Ventilation - fresh air

1 Tidal pools
2 Mechanical ventilation with heat recovery
3 Transformer / Inverter
4 Water-source heat exchanger (for server cooling)
5 Water pomp (from canal for cooling)
6 Heat exchanger for ventilation



Winter

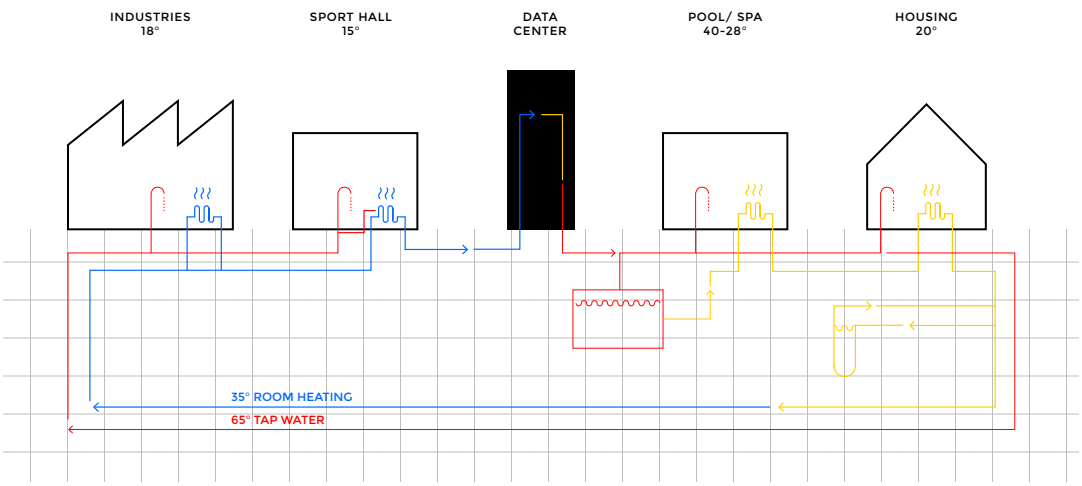


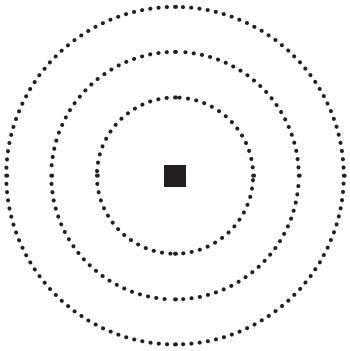
Summer

Heat waste as a district heating

The Spark Model
by Snøhetta

drawing by author



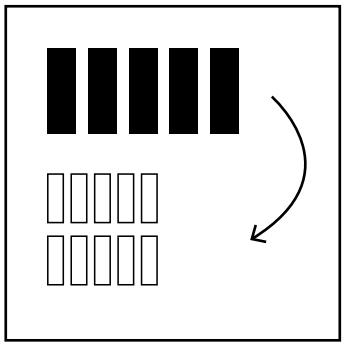


	Telia DC, Finland, 2015-18	*Yandex DC, Finland, 2018*	***estimation for the Hamburg site***
DATA CENTER CAPACITY	24 MW	10 MW	~2.8 MW
RACKS	5 000	2 100	~580
SQ M	8 400 M²	6 500 M²	~1 800 M²
HEATED FLATS	20 000	8 400	~2 000
THERMAL ENERGY	200 000 MWh/ year	84 000 MWh/ year	~23 300 MWh/ year

Structural Concept

Structural Concept

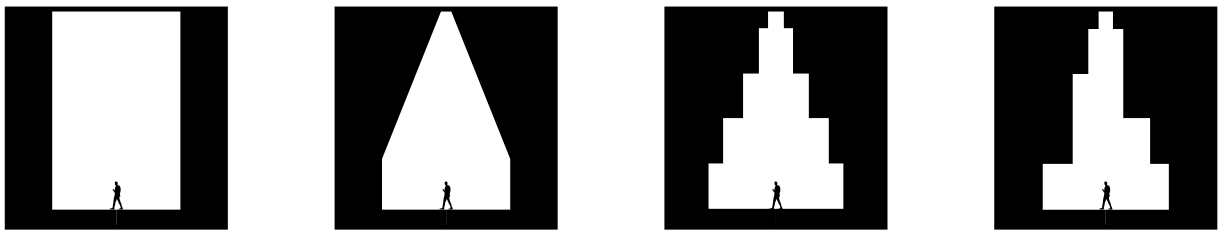
Truss
flexibility
dimensions



Technological flexibility

GROWING & SHRINKING DATA VISIBLE INSIDE

direct spatial impact of data amount



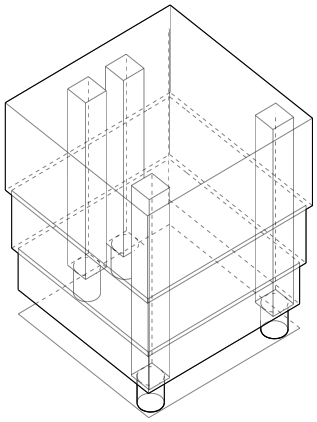
overview of the collected data

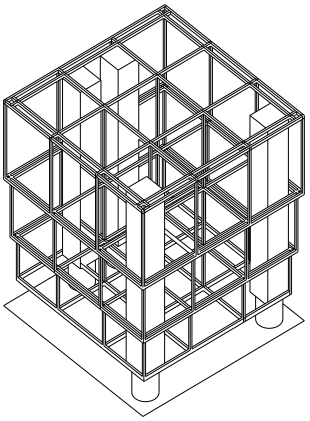
base state (recurring due to server update ~every 3-5 years)

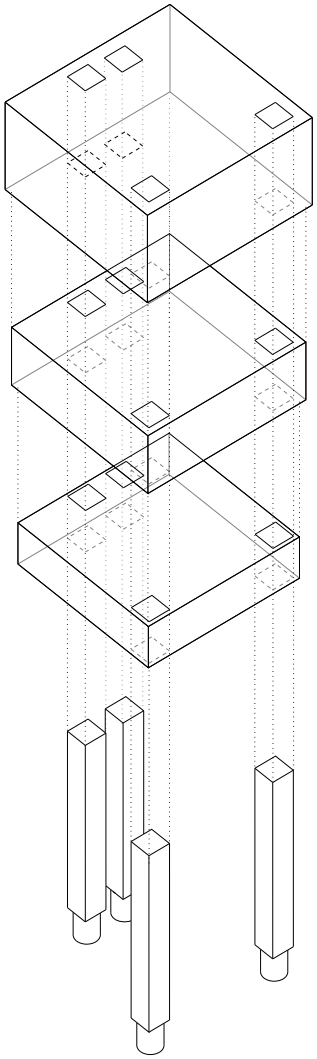
principal of growth

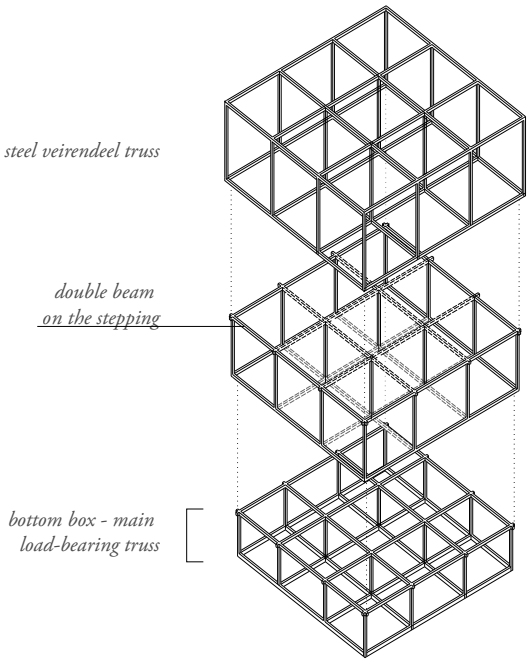
growing data

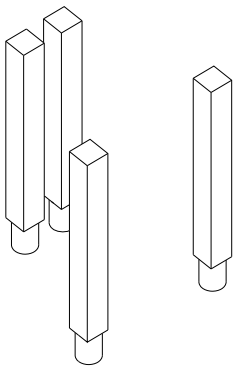
Structural concept axonometric view



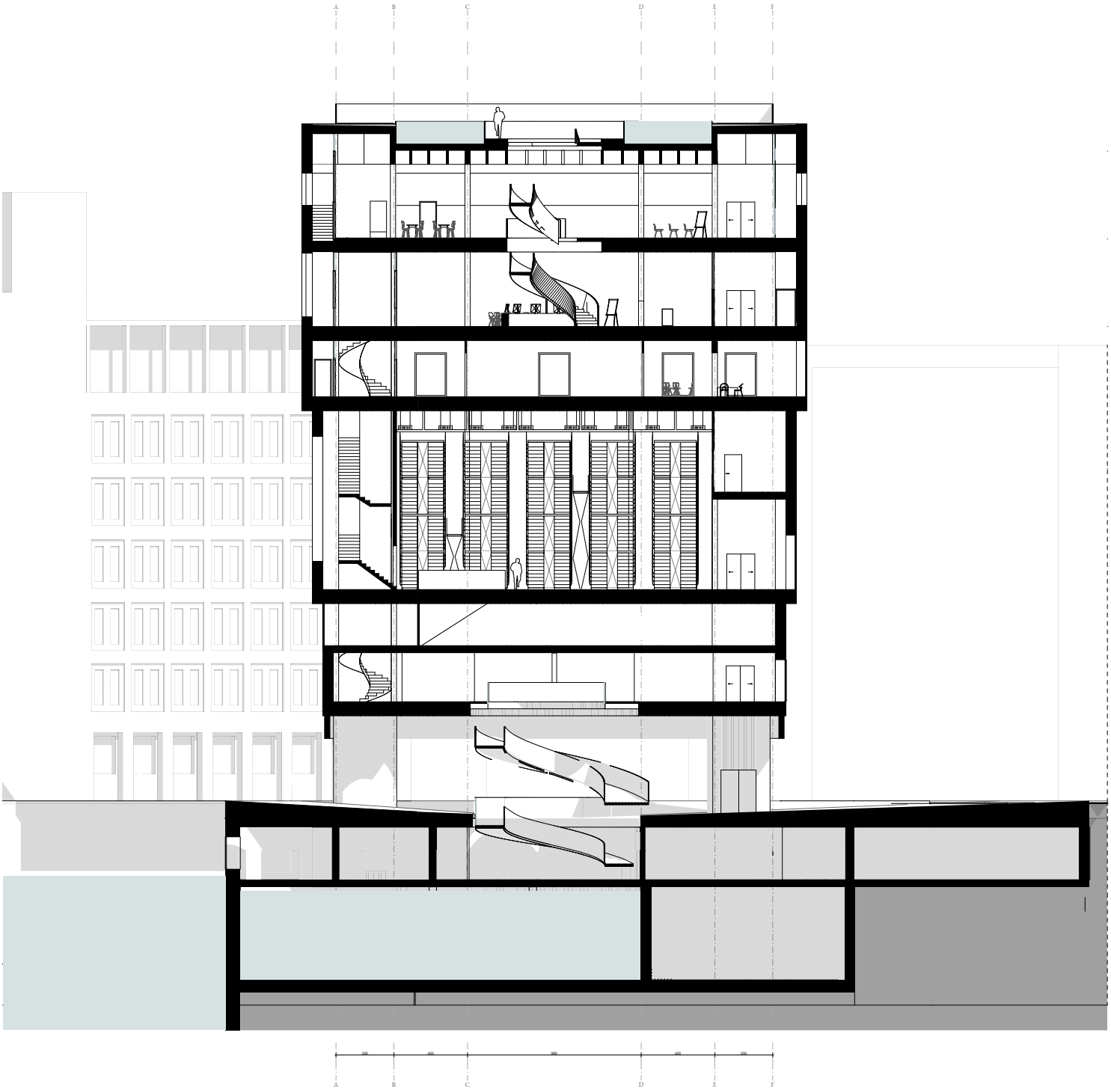


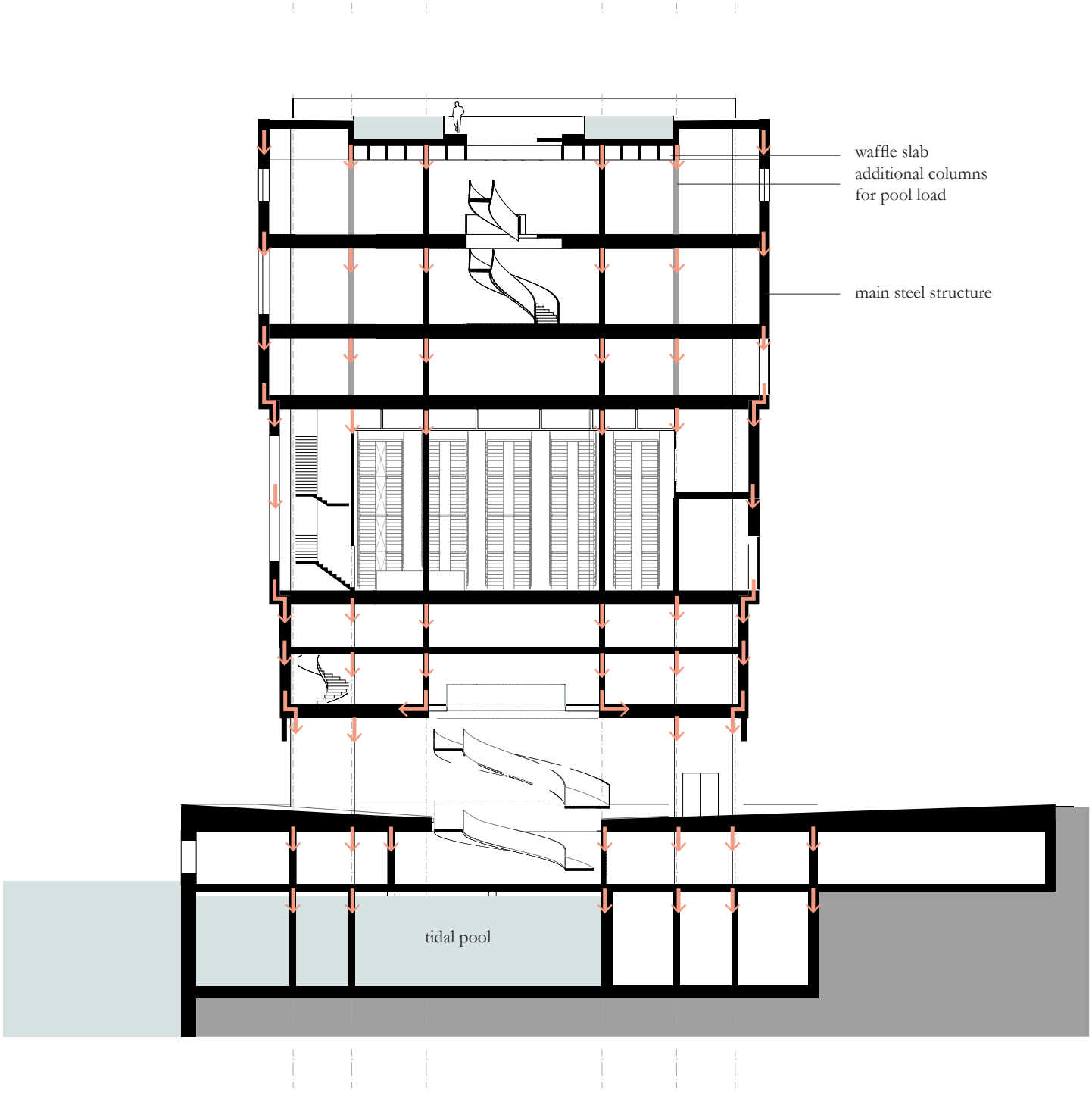



steel veirendeel truss
double beam
on the stepping
bottom box - main
load-bearing truss

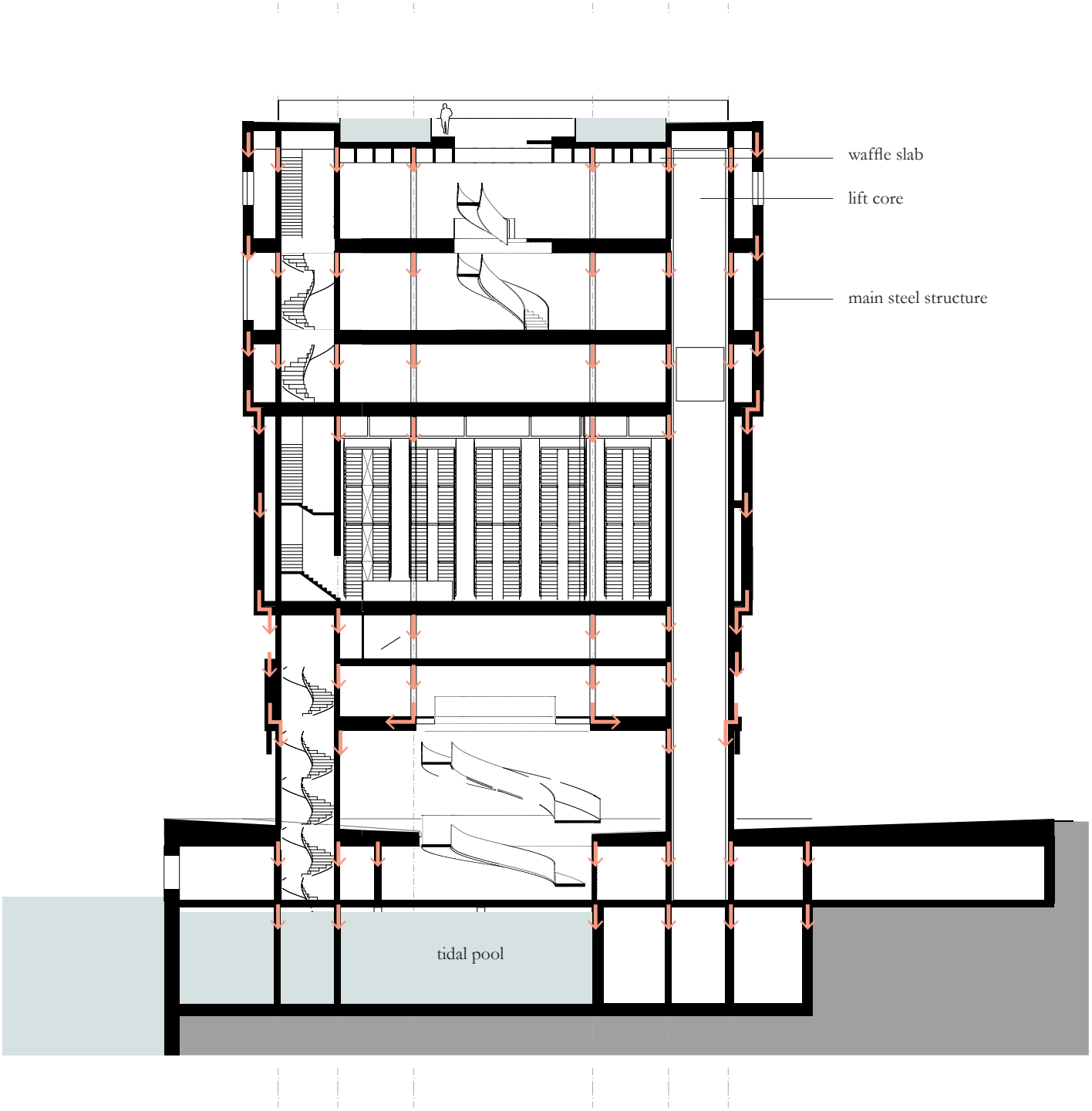

concrete cores

Section BB 1-200 @A3


A
B
C
D
E
F
330
420
990
420
330



Structural concept main structure and pool load bearing structure
1-200 @A3



Structural concept main structure
section through cores *1-200 @A3*

Façades

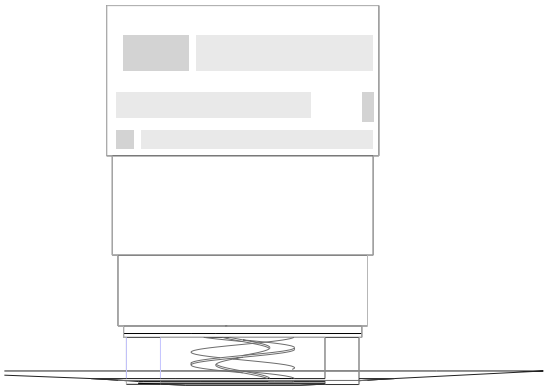
Façades

Aluminium modules
Windows

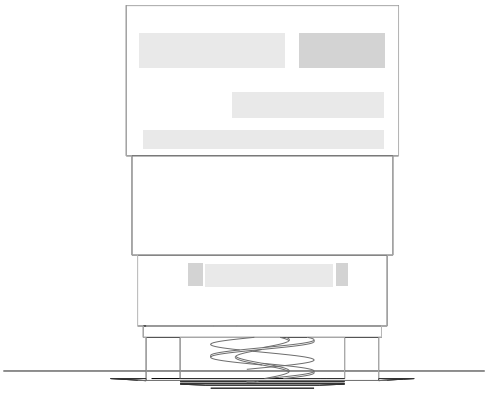
Facade diagrams

opening - city view

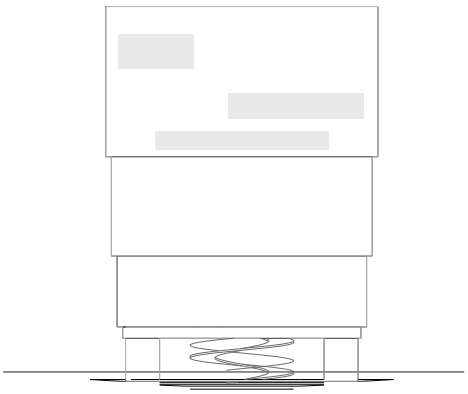
perforation



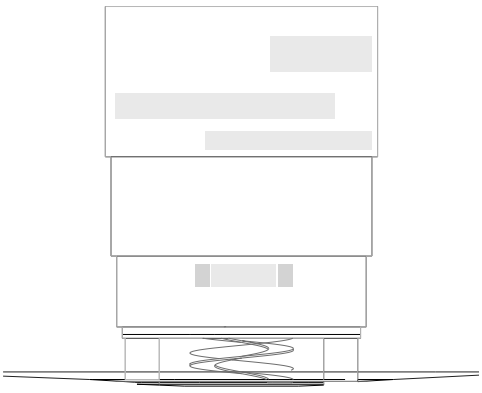
North facade



East facade



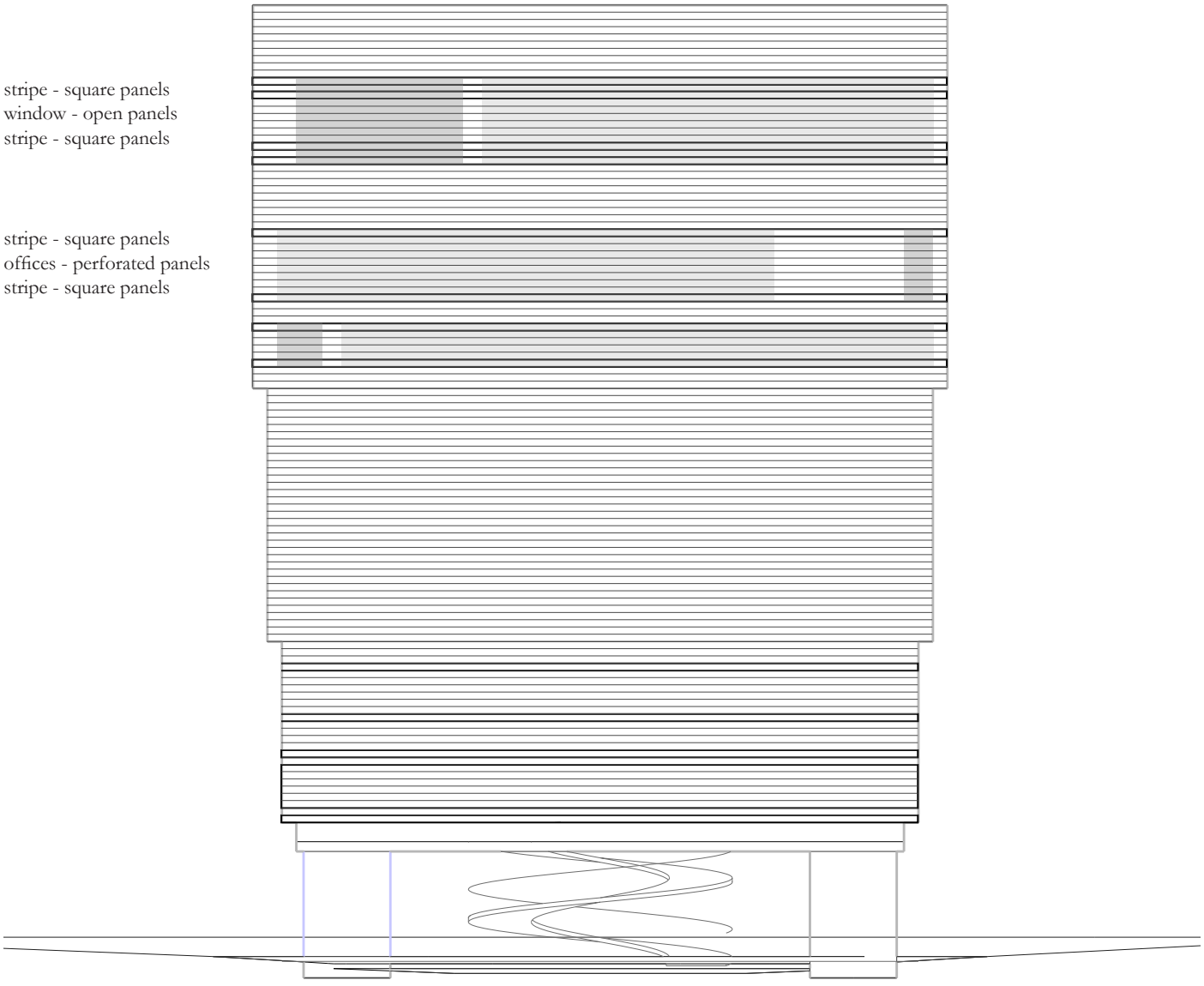
South facade



West facade

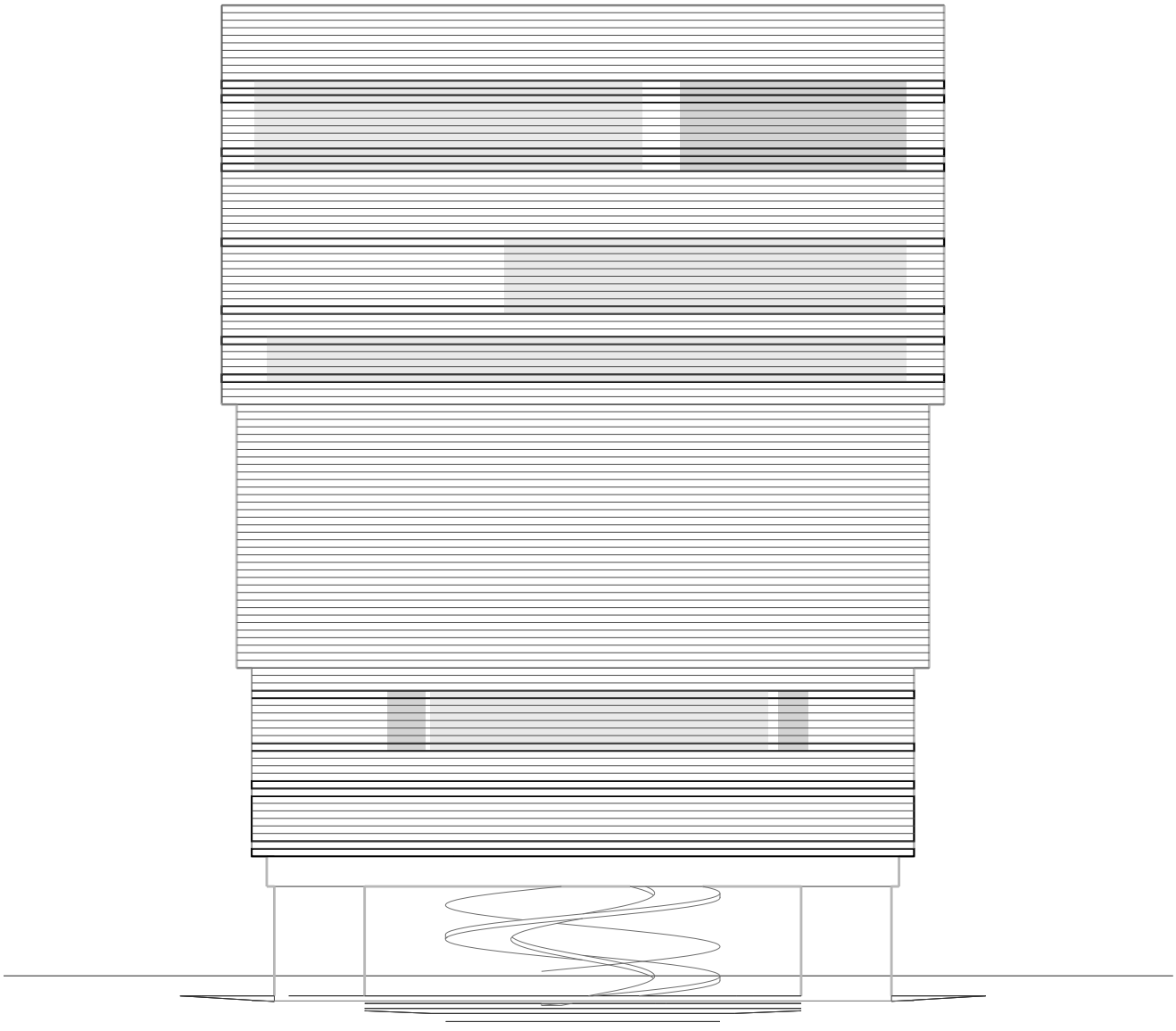
stripe - square panels
window - open panels
stripe - square panels

stripe - square panels
offices - perforated panels
stripe - square panels



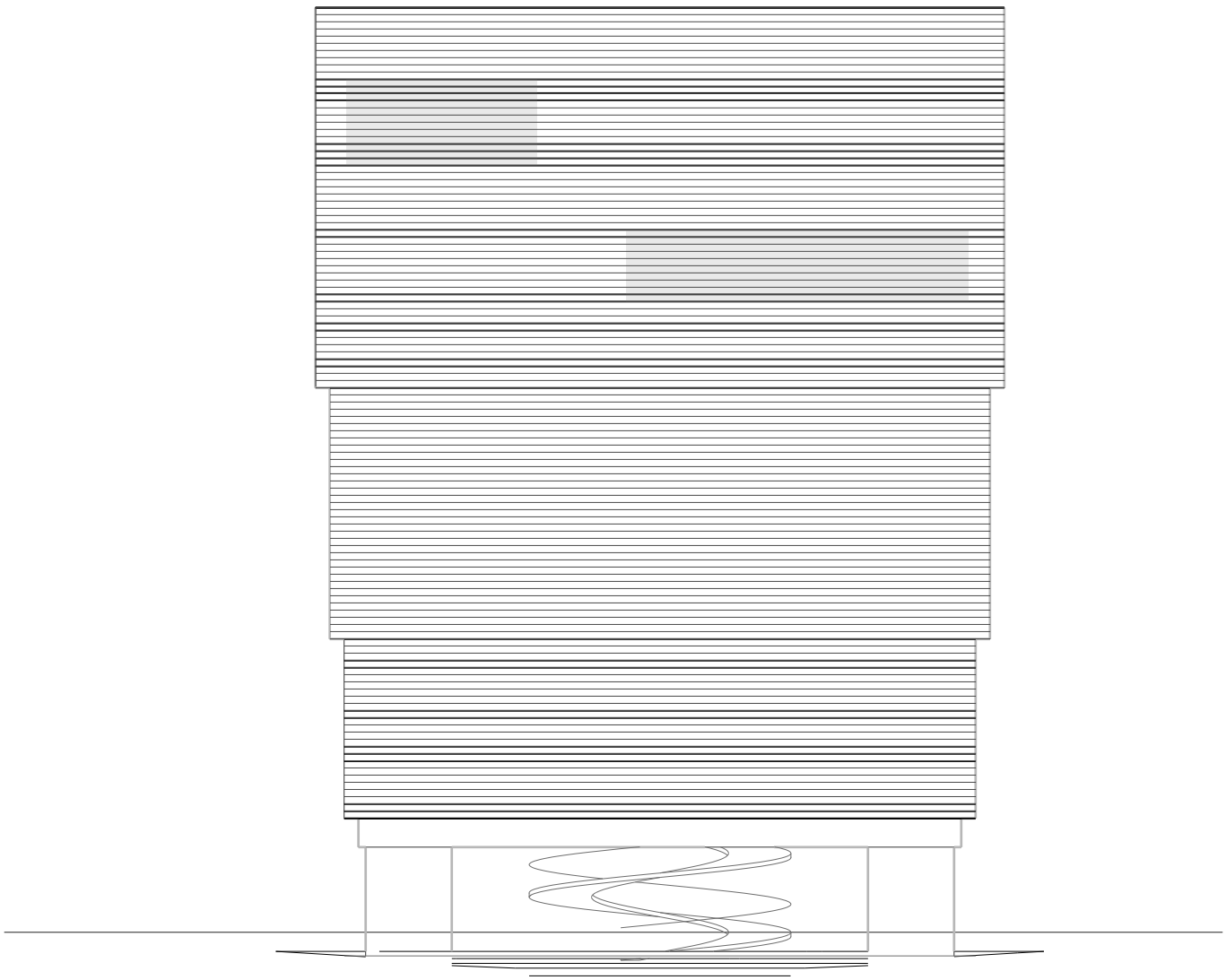
North facade

Facades | 1:200



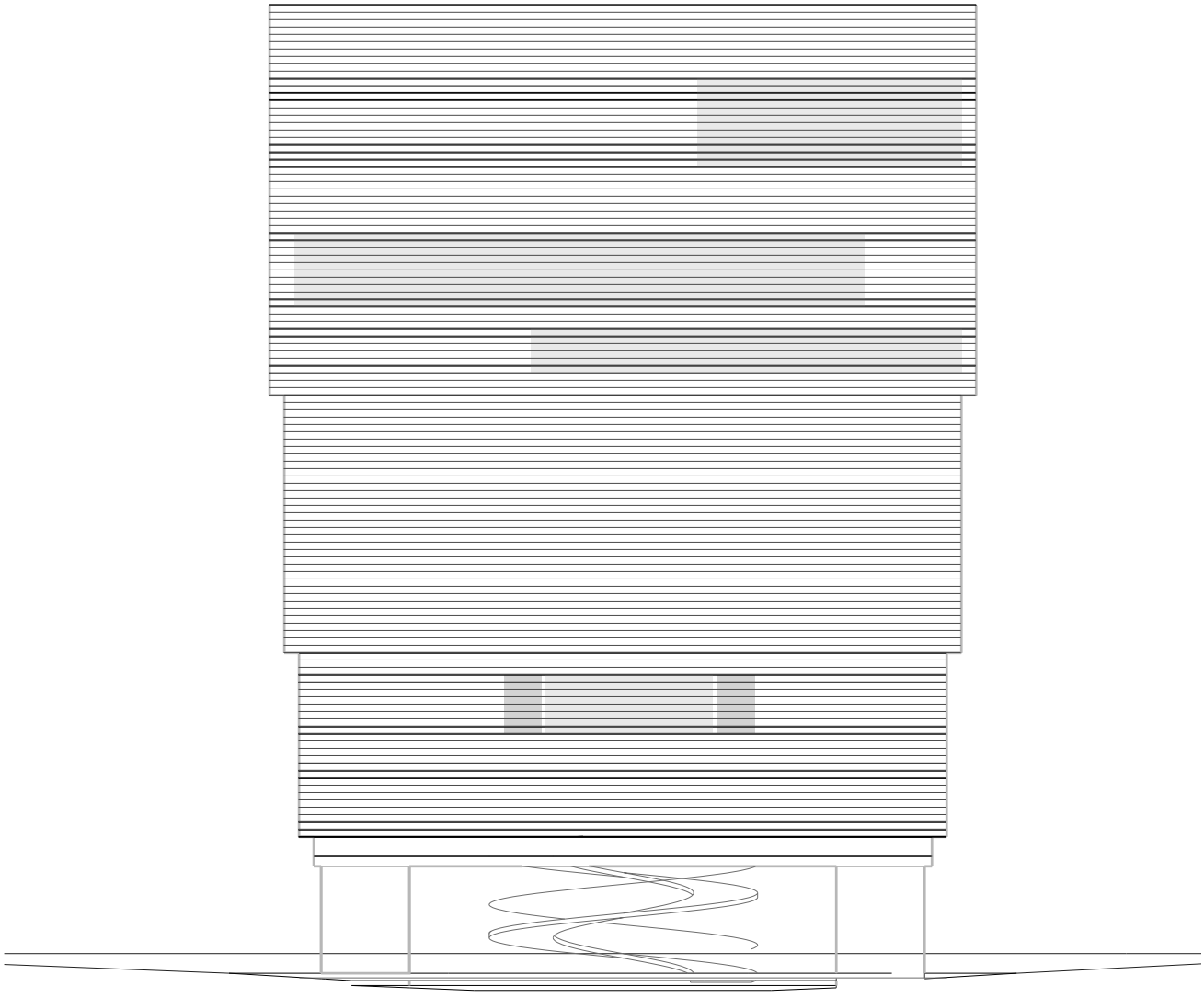
East facade

0 1 5M



South facade

Facades | 1:200



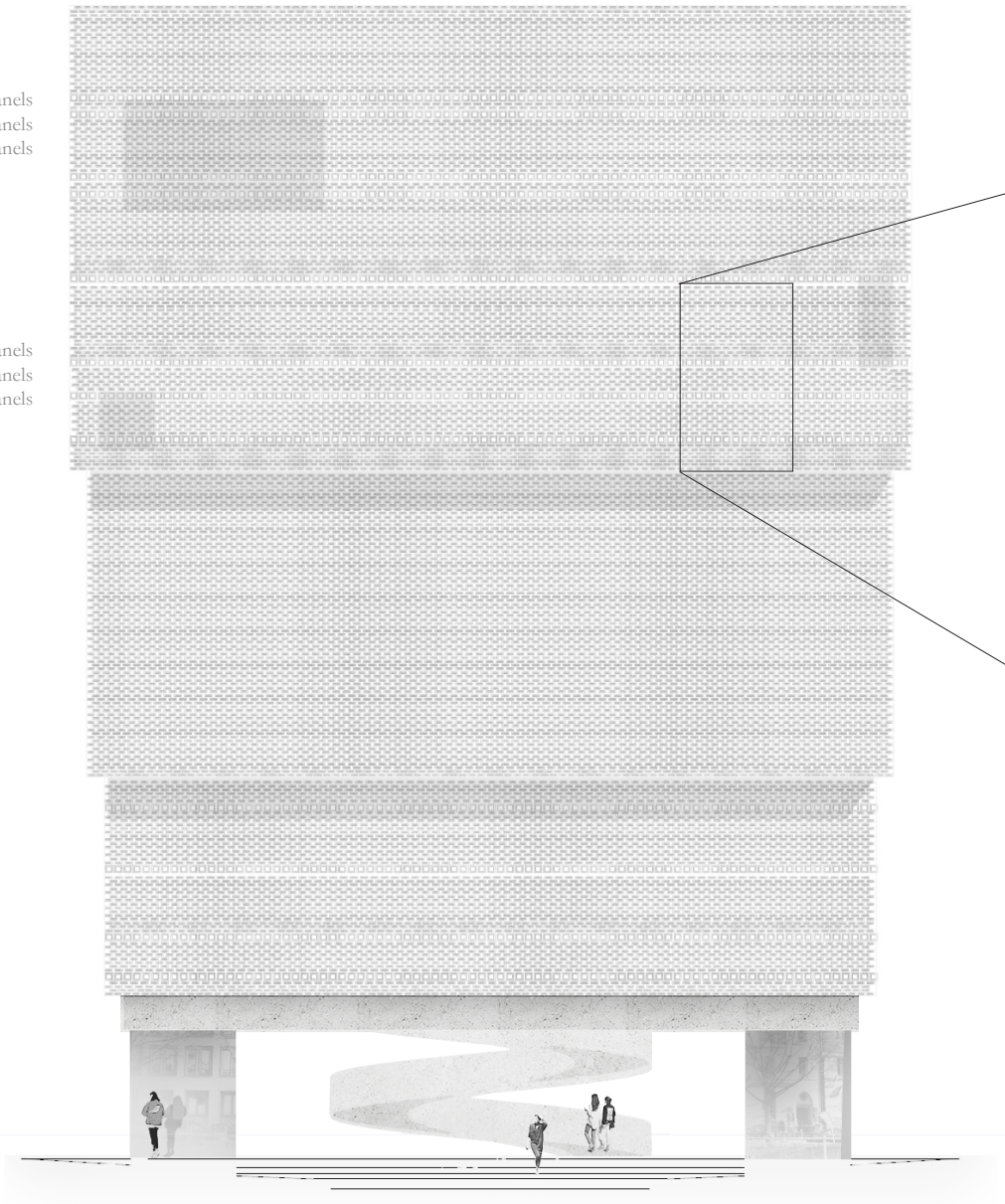
West facade

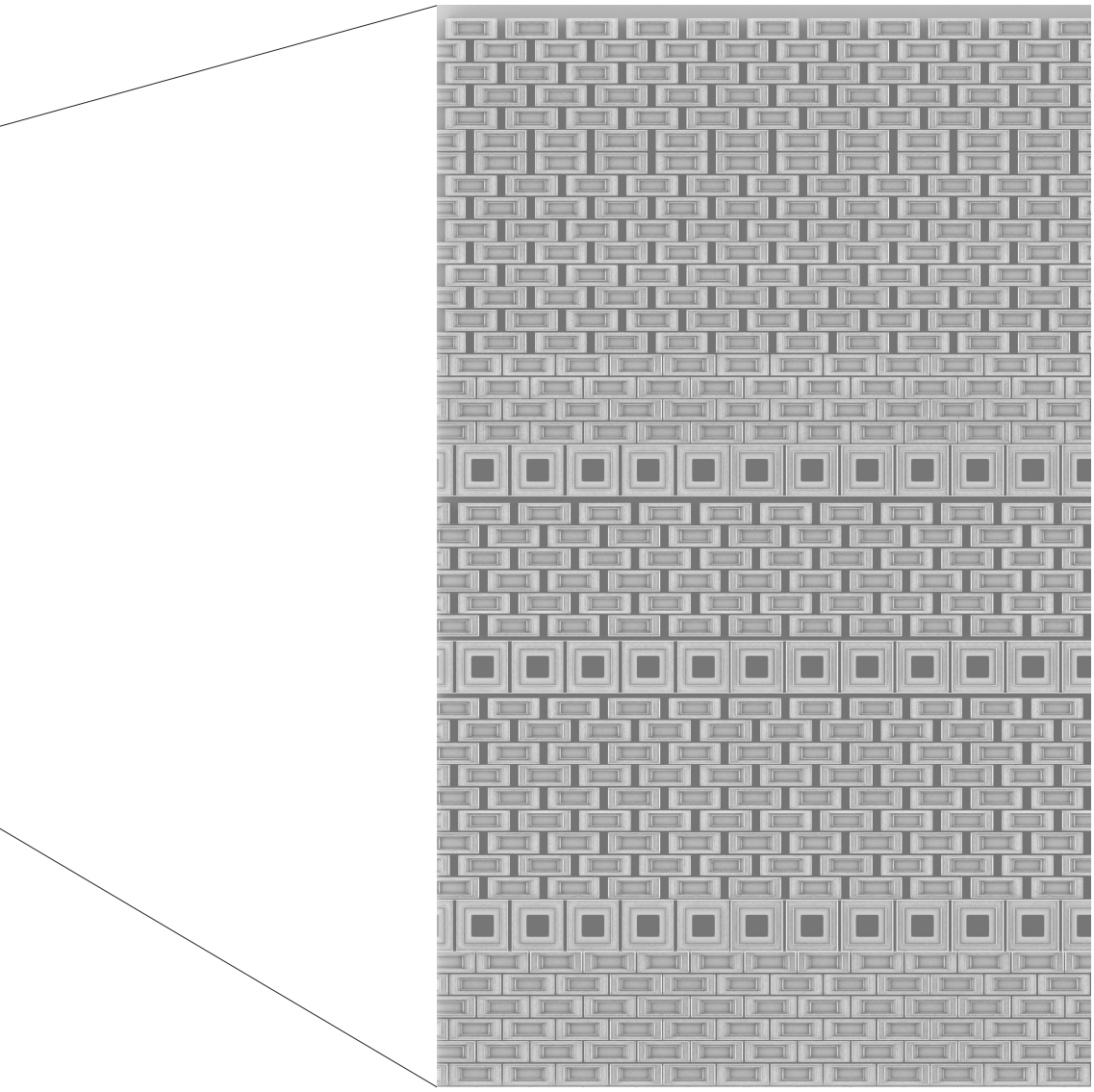
0 1 5M

Details

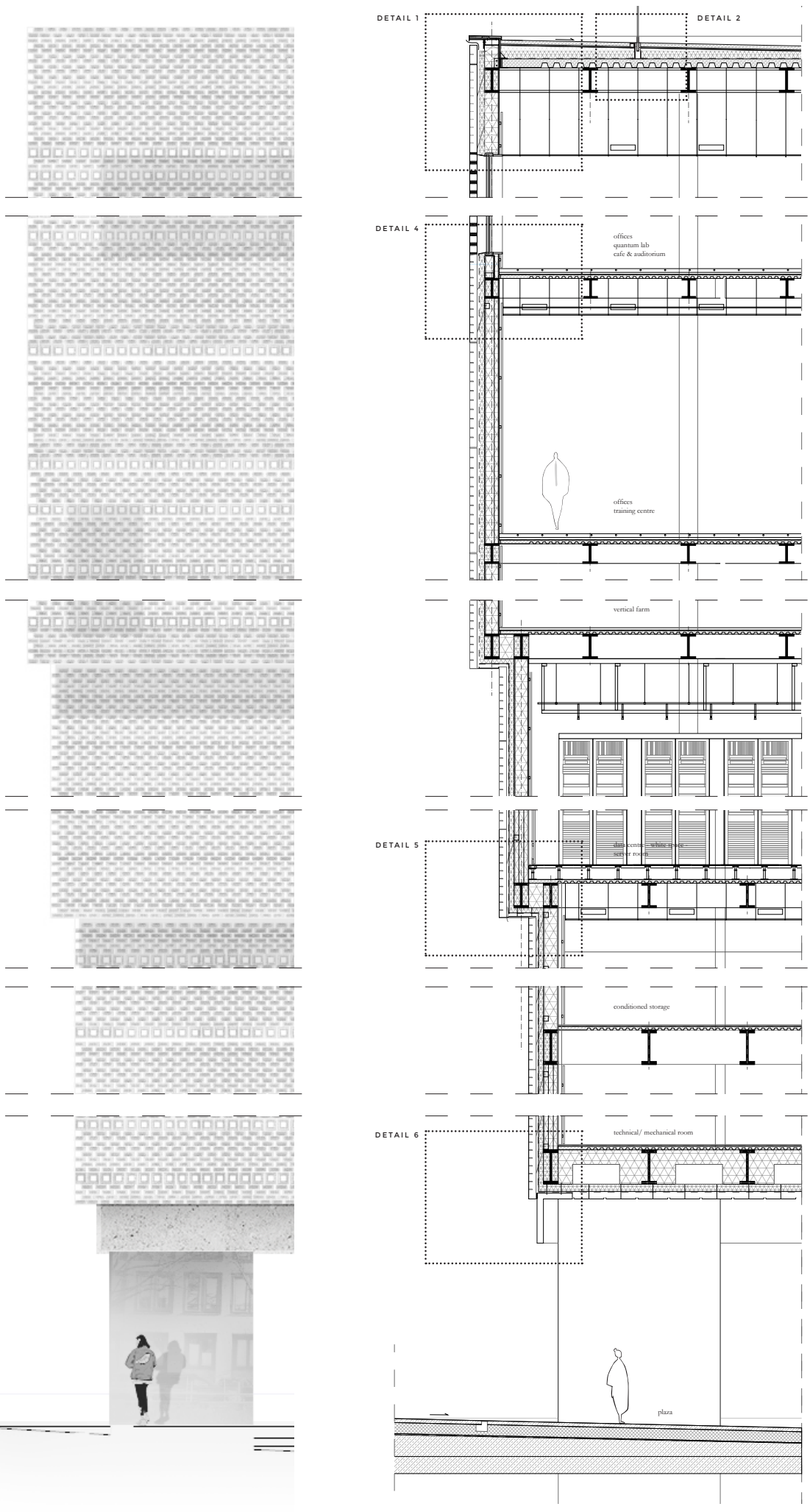
stripe - square panels
window - open panels
stripe - square panels

stripe - square panels
offices - perforated panels
stripe - square panels

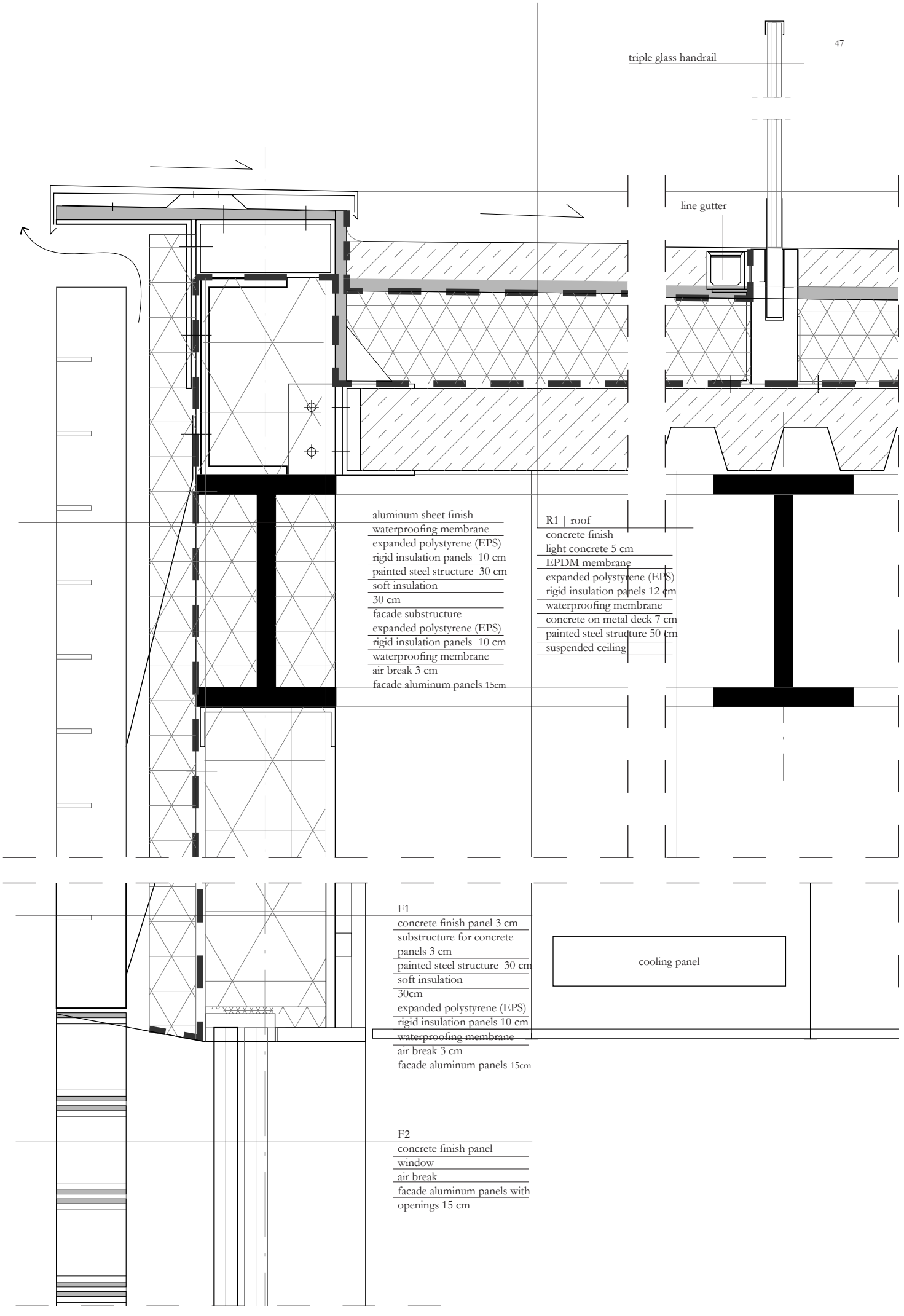




Facade Fragment original 1:20

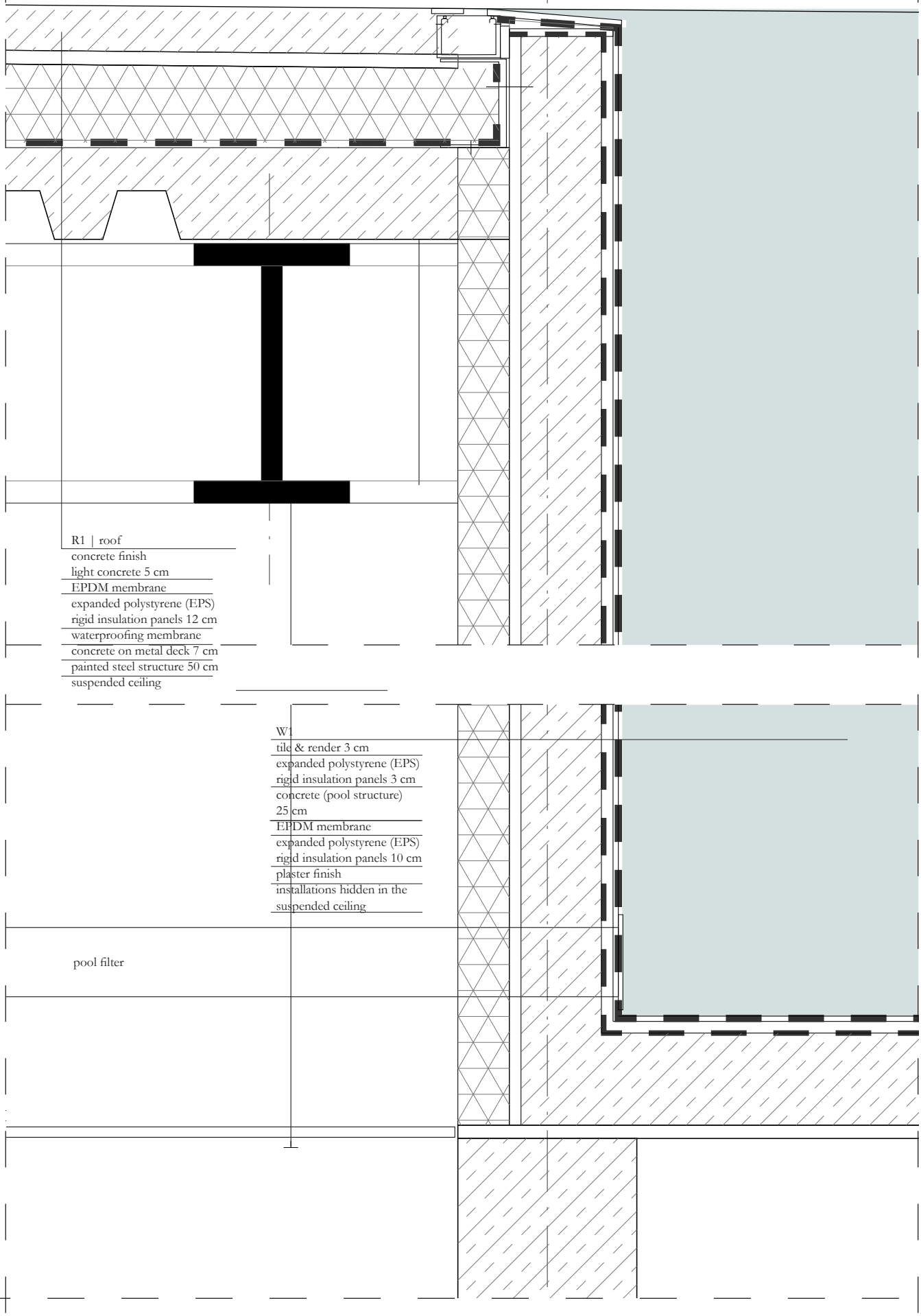

DETAIL 1
DETAIL 2
DETAIL 4
offices
quantum lab
cafe & auditorium
offices
training centre
vertical farm
DETAIL 5
data centre - white space
server room
conditioned storage
DETAIL 6
technical/ mechanical room
plaza

Detail 1. & 2. 1:10
(original scale 1:5)

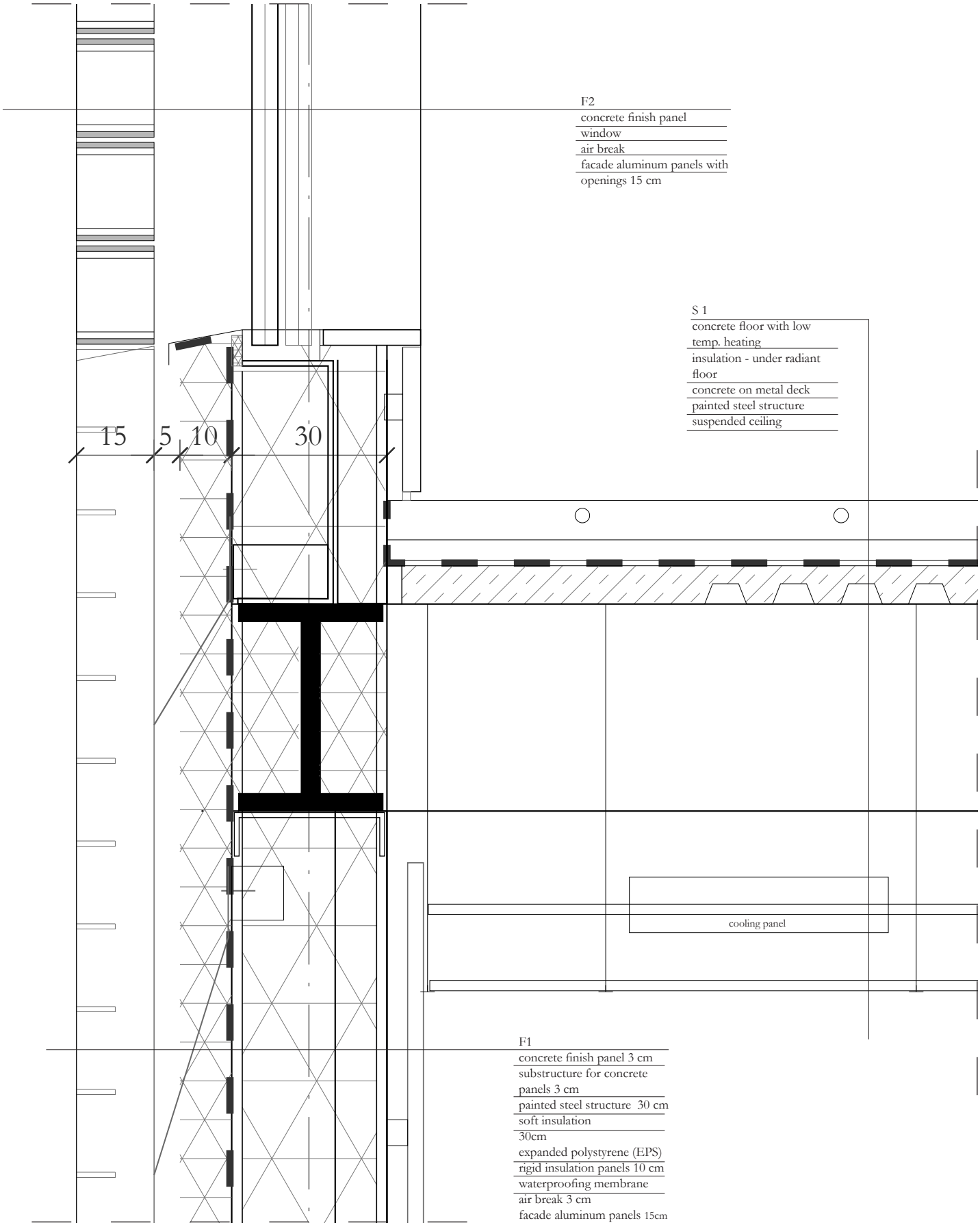

triple glass handrail
line gutter
aluminum sheet finish
waterproofing membrane
expanded polystyrene (EPS)
rigid insulation panels 10 cm
painted steel structure 30 cm
soft insulation
30 cm
facade substructure
expanded polystyrene (EPS)
rigid insulation panels 10 cm
waterproofing membrane
air break 3 cm
facade aluminum panels 15cm
R1 | roof
concrete finish
light concrete 5 cm
EPDM membrane
expanded polystyrene (EPS)
rigid insulation panels 12 cm
waterproofing membrane
concrete on metal deck 7 cm
painted steel structure 50 cm
suspended ceiling
F1
concrete finish panel 3 cm
substructure for concrete
panels 3 cm
painted steel structure 30 cm
soft insulation
30cm
expanded polystyrene (EPS)
rigid insulation panels 10 cm
waterproofing membrane
air break 3 cm
facade aluminum panels 15cm
cooling panel
F2
concrete finish panel
window
air break
facade aluminum panels with
openings 15 cm

Detail 3 1:10
(original scale 1:5)

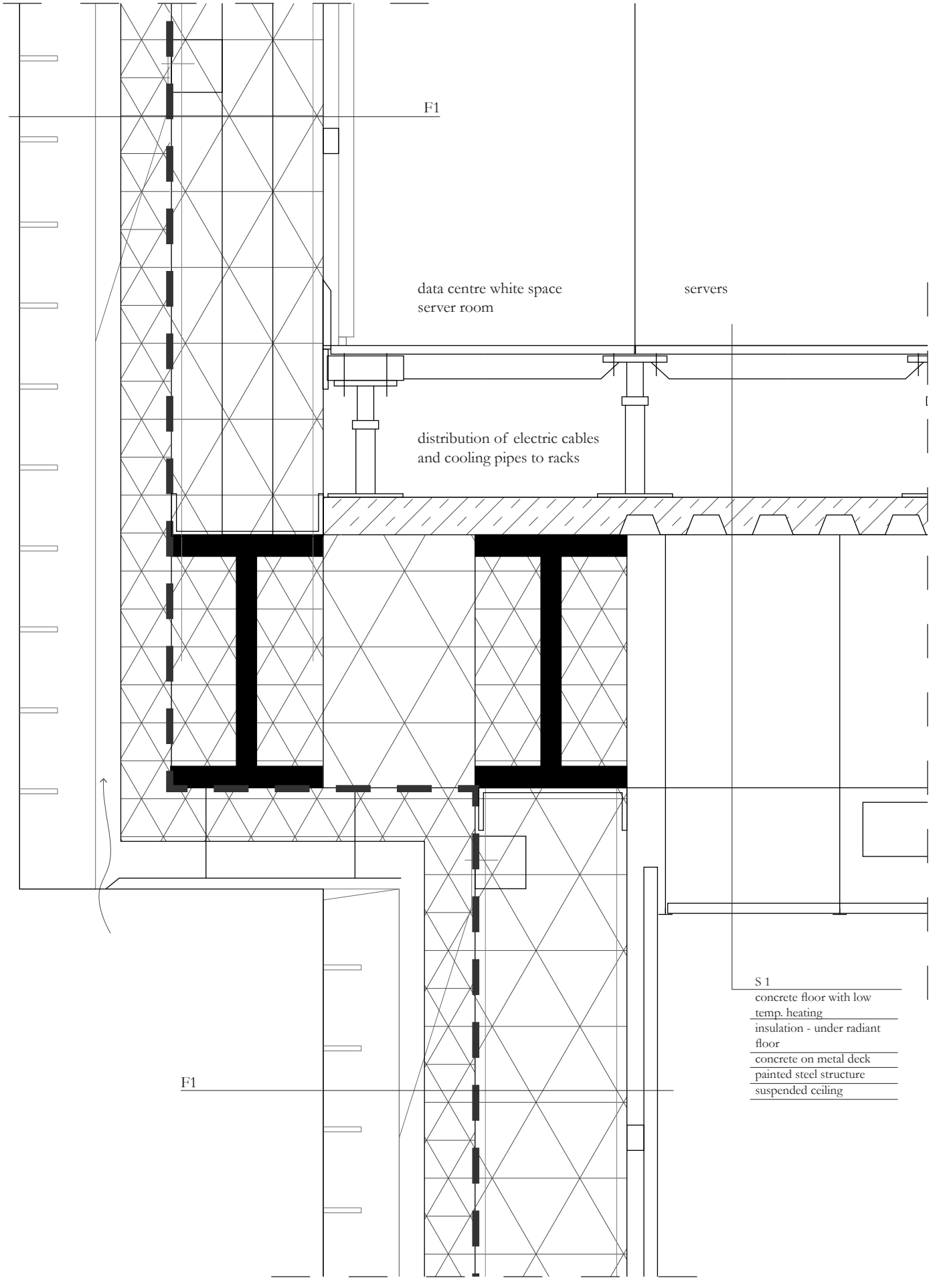
Connection of the roof with the swimming pool.


R1 | roof
concrete finish
light concrete 5 cm
EPDM membrane
expanded polystyrene (EPS)
rigid insulation panels 12 cm
waterproofing membrane
concrete on metal deck 7 cm
painted steel structure 50 cm
suspended ceiling
W1
tile & render 3 cm
expanded polystyrene (EPS)
rigid insulation panels 3 cm
concrete (pool structure)
25 cm
EPDM membrane
expanded polystyrene (EPS)
rigid insulation panels 10 cm
plaster finish
installations hidden in the
suspended ceiling
pool filter

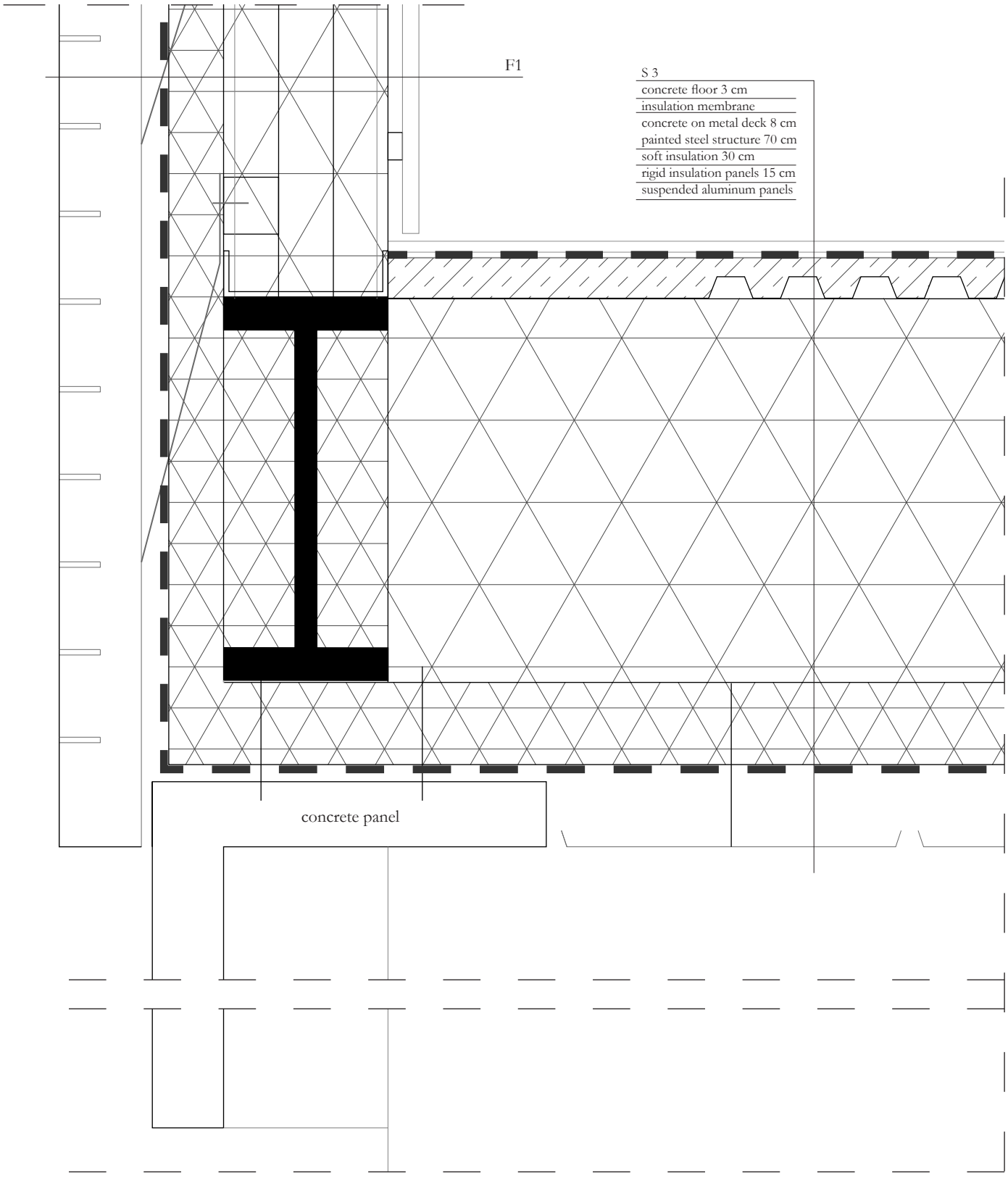
Detail 4. 1:10
(original scale 1:5)


F2
concrete finish panel
window
air break
facade aluminum panels with openings 15 cm
S 1
concrete floor with low temp. heating
insulation - under radiant floor
concrete on metal deck
painted steel structure
suspended ceiling
15
5
10
30
cooling panel
F1
concrete finish panel 3 cm
substructure for concrete panels 3 cm
painted steel structure 30 cm
soft insulation
30cm
expanded polystyrene (EPS)
rigid insulation panels 10 cm
waterproofing membrane
air break 3 cm
facade aluminum panels 15cm

Detail 5. 1:10
(original scale 1:5)


F1
data centre white space
server room
servers
distribution of electric cables
and cooling pipes to racks
F1
S 1
concrete floor with low temp. heating
insulation - under radiant floor
concrete on metal deck
painted steel structure
suspended ceiling

Detail 6. 1:10
(original scale 1:5)


F1
S 3
concrete floor 3 cm
insulation membrane
concrete on metal deck 8 cm
painted steel structure 70 cm
soft insulation 30 cm
rigid insulation panels 15 cm
suspended aluminum panels
concrete panel