# Technology

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

Technology Report

# The Naked Island

Unveiling the Dichotomy
of Productive and Romantic Territories

Daniele Ceragno

Under the supervision of:

*Design mentor:* ir. Jacques A. Vink
*Building Technology mentor:* ir. Sjap Holst
*Research mentor:* dr. ir. Taneha K. Bacchin

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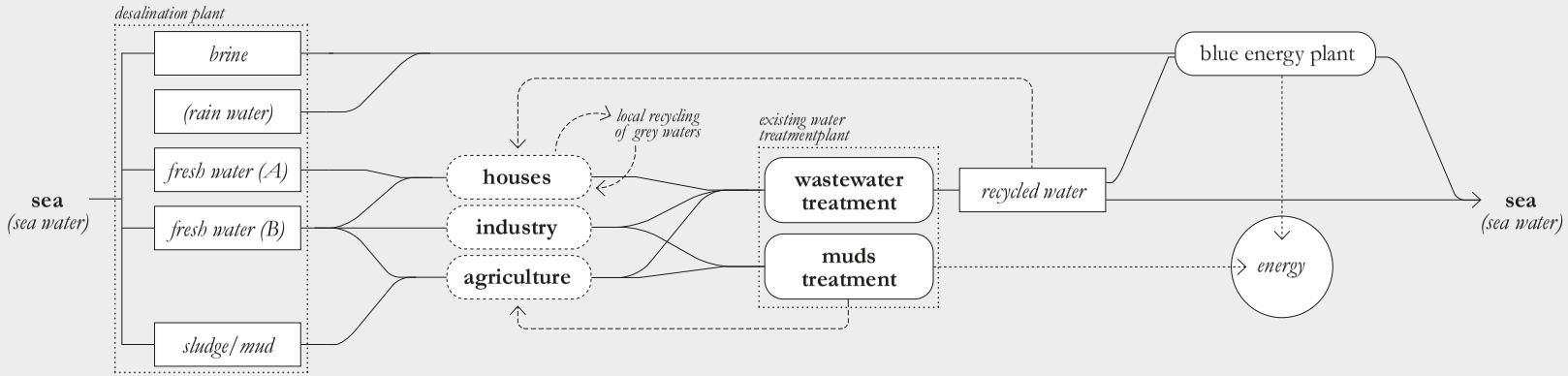

desalination plant
brine
(rain water)
fresh water (A)
fresh water (B)
sludge/mud
sea
(sea water)
houses
industry
agriculture
local recycling
of grey waters
existing water
treatmentplant
wastewater
treatment
muds
treatment
recycled water
blue energy plant
energy
sea
(sea water)

## Abstract

The European (and later global) approach to the claming and inhabiting of a territory has always been one of violent and harsh exploitation. A univocal linear path, from resources extraction and transformation, to users consumption and finally to discharge - or waste, until the total depletion of the same resources. Defining this process of territorialization as the very representation of the anthropic need of perpetual growth and accumulation of power, the project wants to question the possibility of a different approach to satisfy these same needs. The Naked Island reacts to this suggestion, offering the vision for a mitigated territorialization.

Two main concepts regulates this new process of mitigated territorialization. First, the possibility of an integrated water management, organizing the production, consumption and recycling of any kind of water around the principle of circularity: what is extracted from the sea needs to come to the sea, in an equal or similar state. This same principle of integration does not apply only to the regional water management, but also to the smaller context of the Naked Island: here, the rituals of the baths are deeply embedded in the processes of the desalination plant. The former works indeed only thanks to the waste products of the former - which are eventually not to be considered waste. The sand-engine itself functions through the constant flux of waste sand, mud and sludge from the desalination plant.

The second principle is one of clarity of structure. Being the Naked Island a place of unveiling, also its structural concept must reflect the same conditions which exist on the island. Therefore, the massive concrete structure of the desalination plant - which also works as the foundation of the island and as the storm-waves barrier - is in constant confrontation with the ephemeral parasitic structure of the baths - the human colonizing element. Also, projected in a different time scale, the former is designed as a to-be-ruin, perhaps to even survive to the civilization which built it; the latter, on the contrary, is the physical icon of this same ephemeral condition of territorialization.

Regional water management scheme: all the pimary and secondary products of the desalination plant - coming from sea water - are engaged in wider systems, and will eventually be brought back to their sea water condition.

Studio Tom Emerson (ETH),
J. Dehlin (Ph), *Pavilion of Reflections,* Zurich (CH), 2016.

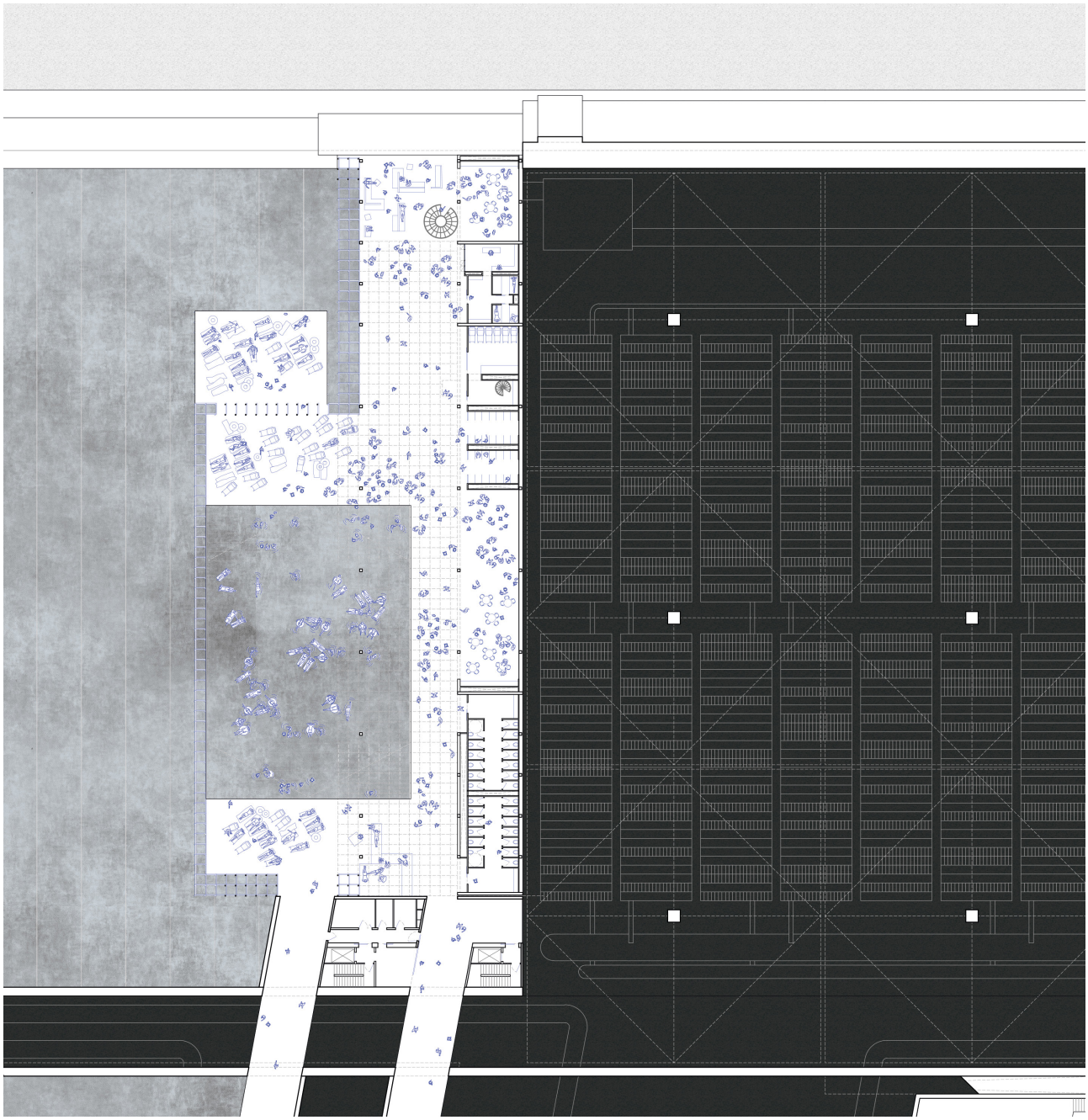
P.L. Nervi, P. Monti (Ph),
*Palazzo del Lavoro*, Torino (IT),
1961.

CASE STUDY:
**CALDARIUM**

## The Caldarium - or The Brine Storage Pools

The first of the three "collective" pools is chosen as a case study: it shows indeed one of the most radical oppositions between the massive concrete structure of the desalination plant and the ephemeral wooden elements of the baths. As a recurrent background, the wall frames both the baths and the plant.

*in the previous page:* M. Vitali, *Architecture of Leisure*, Catania (IT), 2016.



*glulam structure -*
*subservices area*

*solarium II*

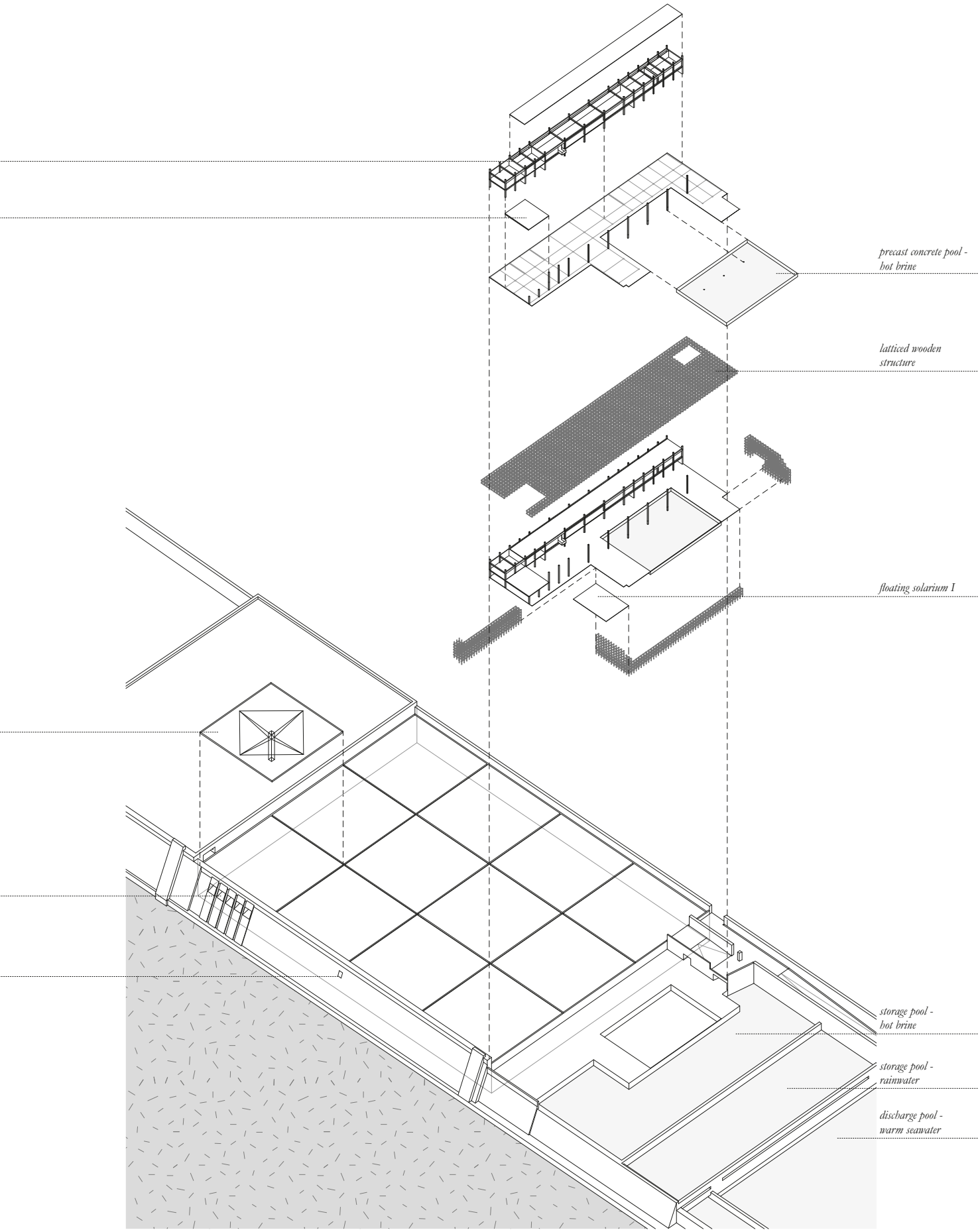
*concrete*
*"mushroom" pillar*

*concrete structure*
*for air intake*
*- basalt protection wall*
*- caisson foundations*

*viewpoint*

## The Baths as Parasitic Architecture

The structure of the baths exists as a secondary addition to the plant: a parasitic element, which clings to the rough surface of the hot brine storage pool. The Caldarium itself hosts different functions, each of them is expressed by different structural typologies. The services spine is built in strong glulam elements, while being wrapped by a lighter latticed structure, which act as activator of potential situations - perhaps through the possibility to hang textile elements in order to further fragment the space.


precast concrete pool -
hot brine
latticed wooden
structure
floating solarium I
storage pool -
hot brine
storage pool -
rainwater
discharge pool -
warm seawater

*primary GLT beams*

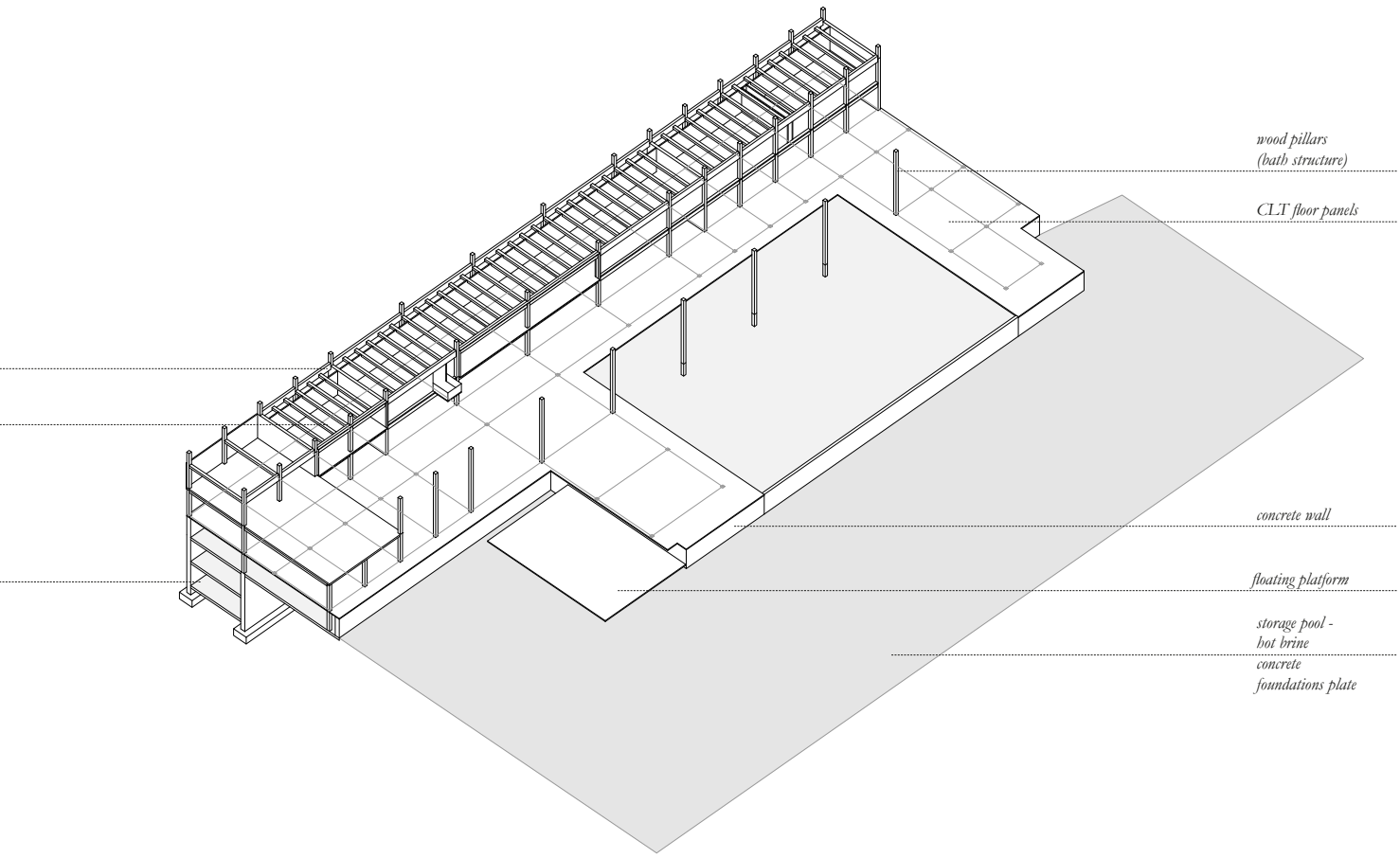
*secondary GLT beams*

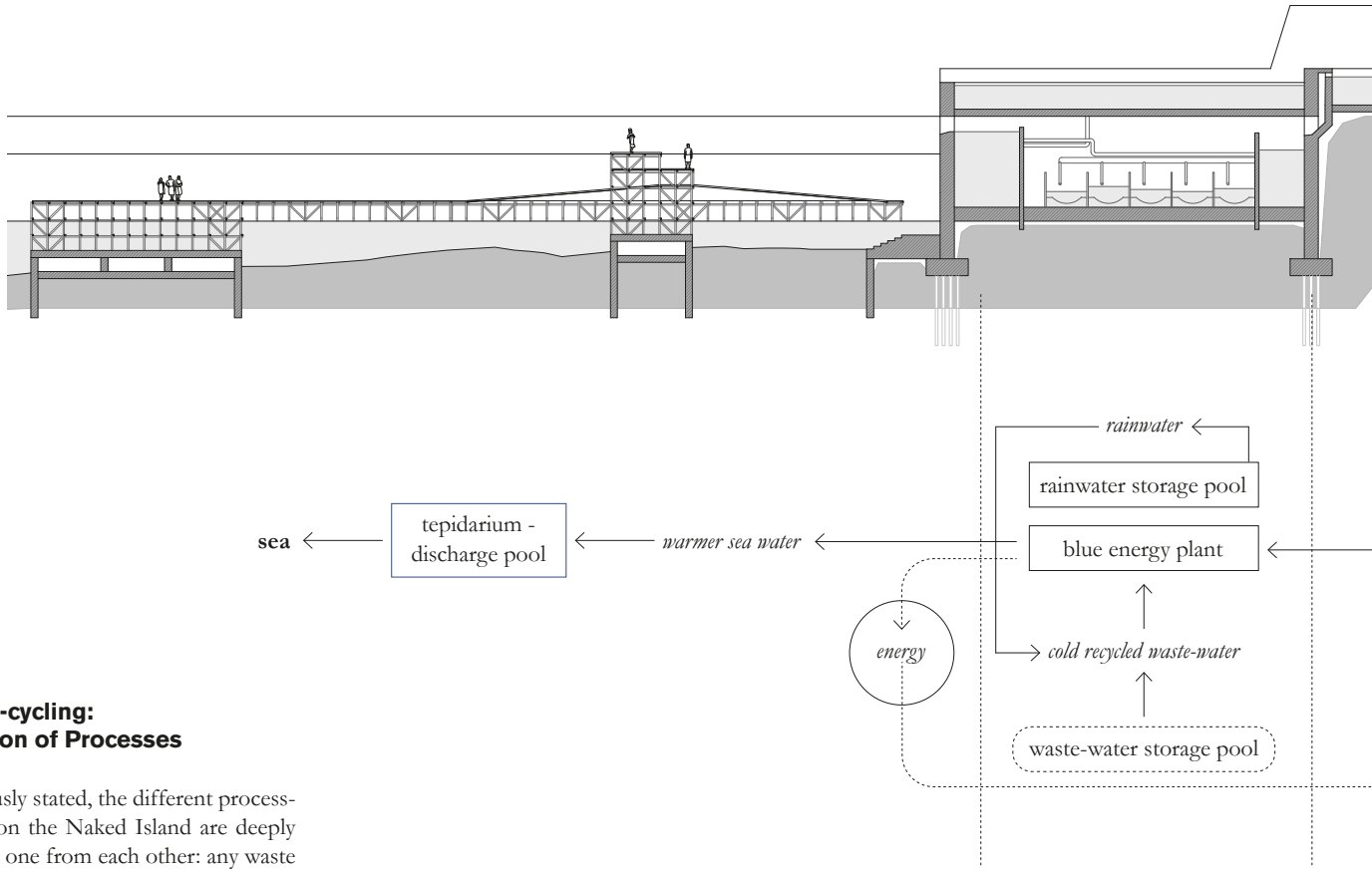
*concrete wall (plant structure)*

*technical rooms*
*(biorotor, filters)*

## The Baths as Parasitic Architecture

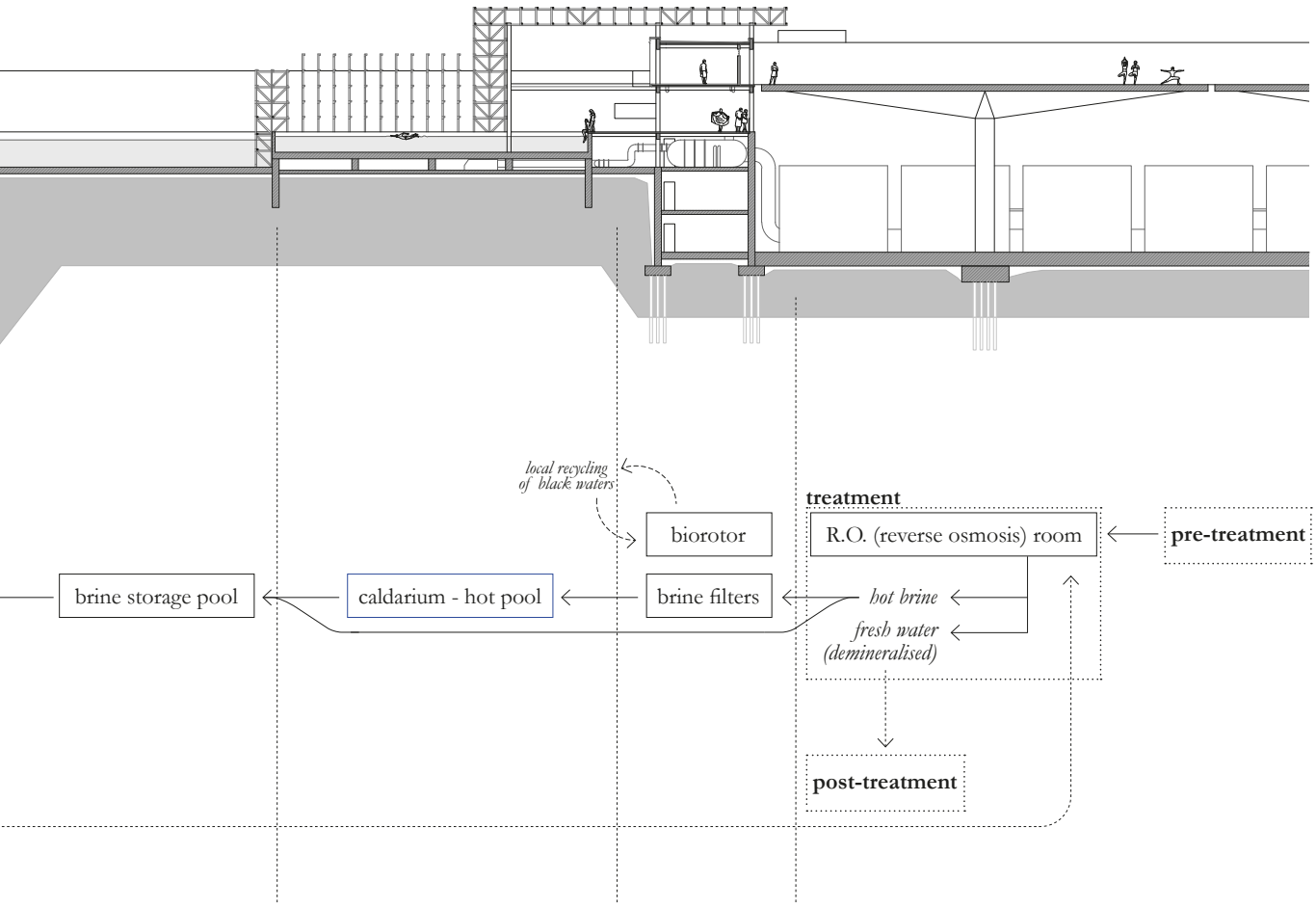
The glulam structure of the baths rests on the thick walls of the desalination plant. The service spine is located above a few rooms which filter and disinfect the hot brine before pumping it in the bath pool; the spine acts then as a wooden footprint of the concrete sturcture below. The caldarium is separated from the brine storage pool by a concrete wall: the two bodies of water are therefore tangent, yet deeply separated.

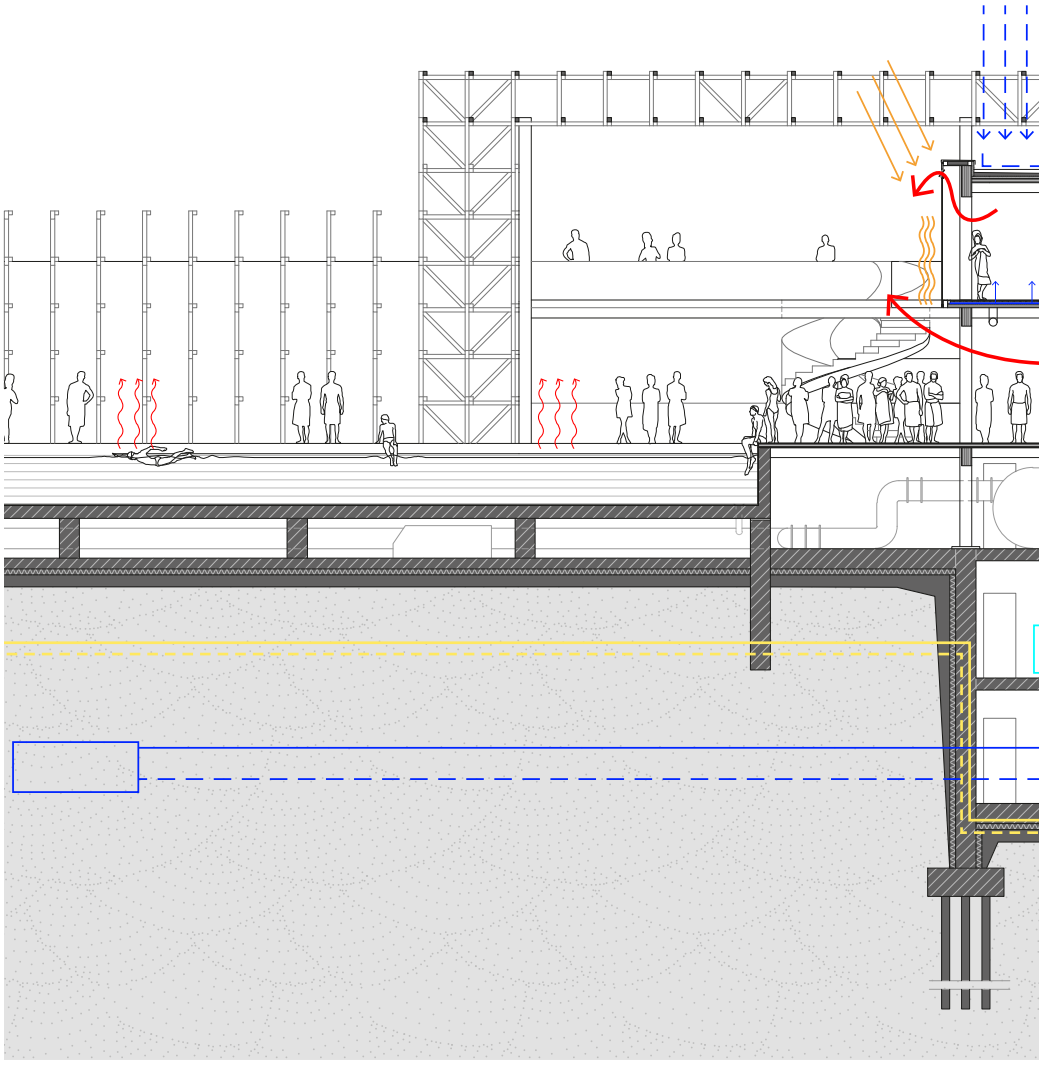

wood pillars
(bath structure)
CLT floor panels
concrete wall
floating platform
storage pool -
hot brine
concrete
foundations plate




## Water re-cycling: Integration of Processes

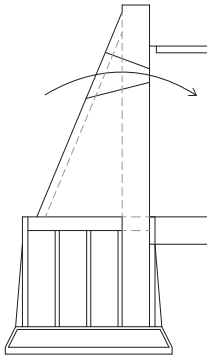
As previously stated, the different processes staged on the Naked Island are deeply dependent one from each other: any waste product becomes the primary resource of other cycles. In the area surrounding the chosen case study, this condition is quite radical: from the waste product of the desalination process - hot brine - to the main feature of the caldarium, then to the production of energy - being merged with other waste or recycled products - and finally to the sea, where the opportunity to organize another bath pool is embraced. The water released in the sea is of a similar chemical composition of the one originally harvested; the otherwise violent process of sea exploitation is thus mitigated.

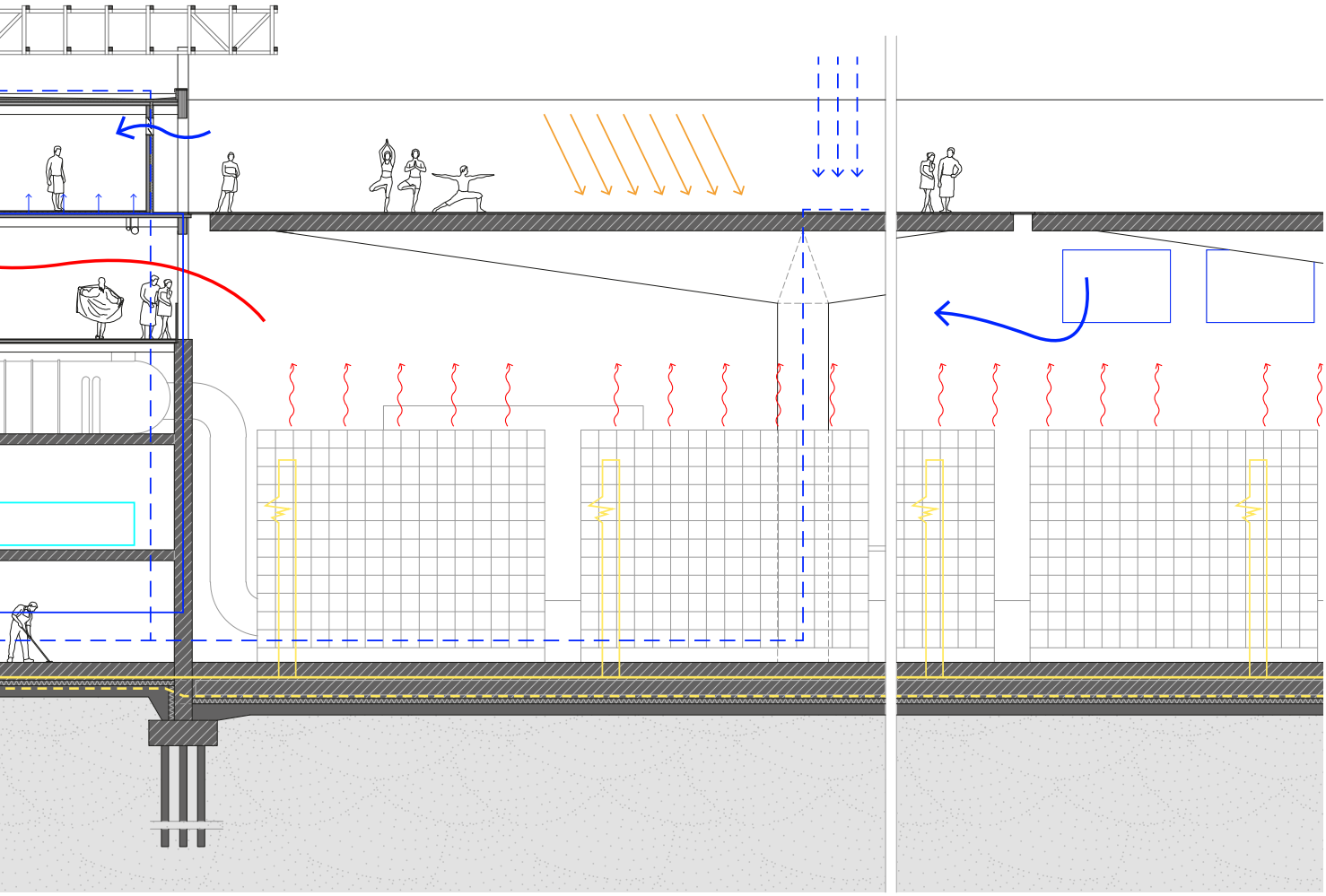

local recycling
of black waters
biorotor
treatment
R.O. (reverse osmosis) room
pre-treatment
brine storage pool
caldarium - hot pool
brine filters
hot brine
fresh water
(demineralised)
post-treatment

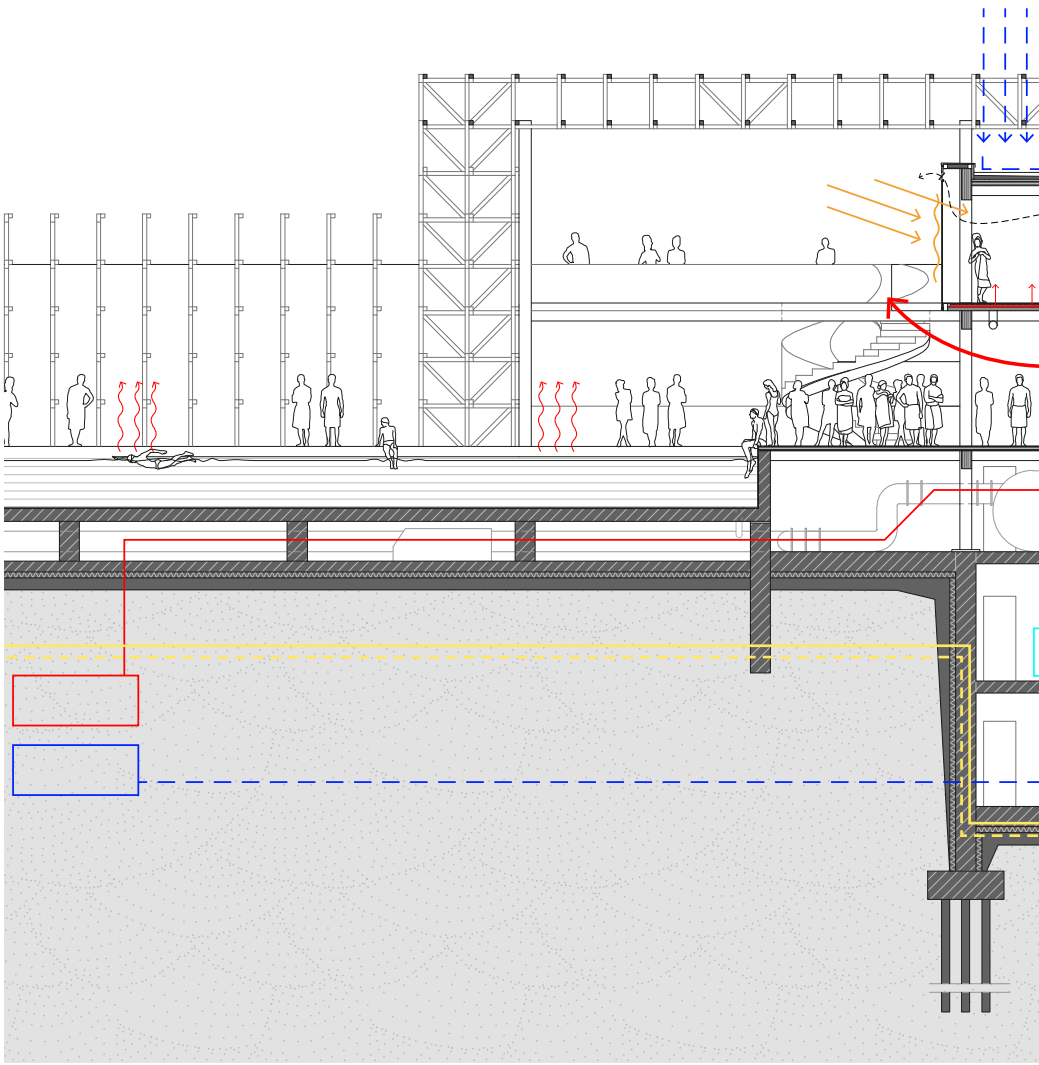


## Climatic Section: Summer

The main climatic principle of the services spine, here developed as case study, is natural ventilation. The strong maritime winds (perpendicular to the protection wall for most of the yeat) are captured and canalized inside the plant rooms, cooling down the machineries; moreover, thanks to the chimney effect, the air is brough out through the services spine. Thanks to the phenomenon of radiation - both from sun and hot water - heat is captured by the mass of concrete, and released in winter. Cooling of interior spaces happens thanks to pipes in the floor, directly connected to the cold water storage pools of the plant - and to the rainwater collection pools.

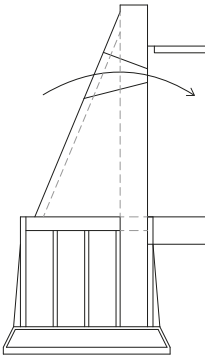


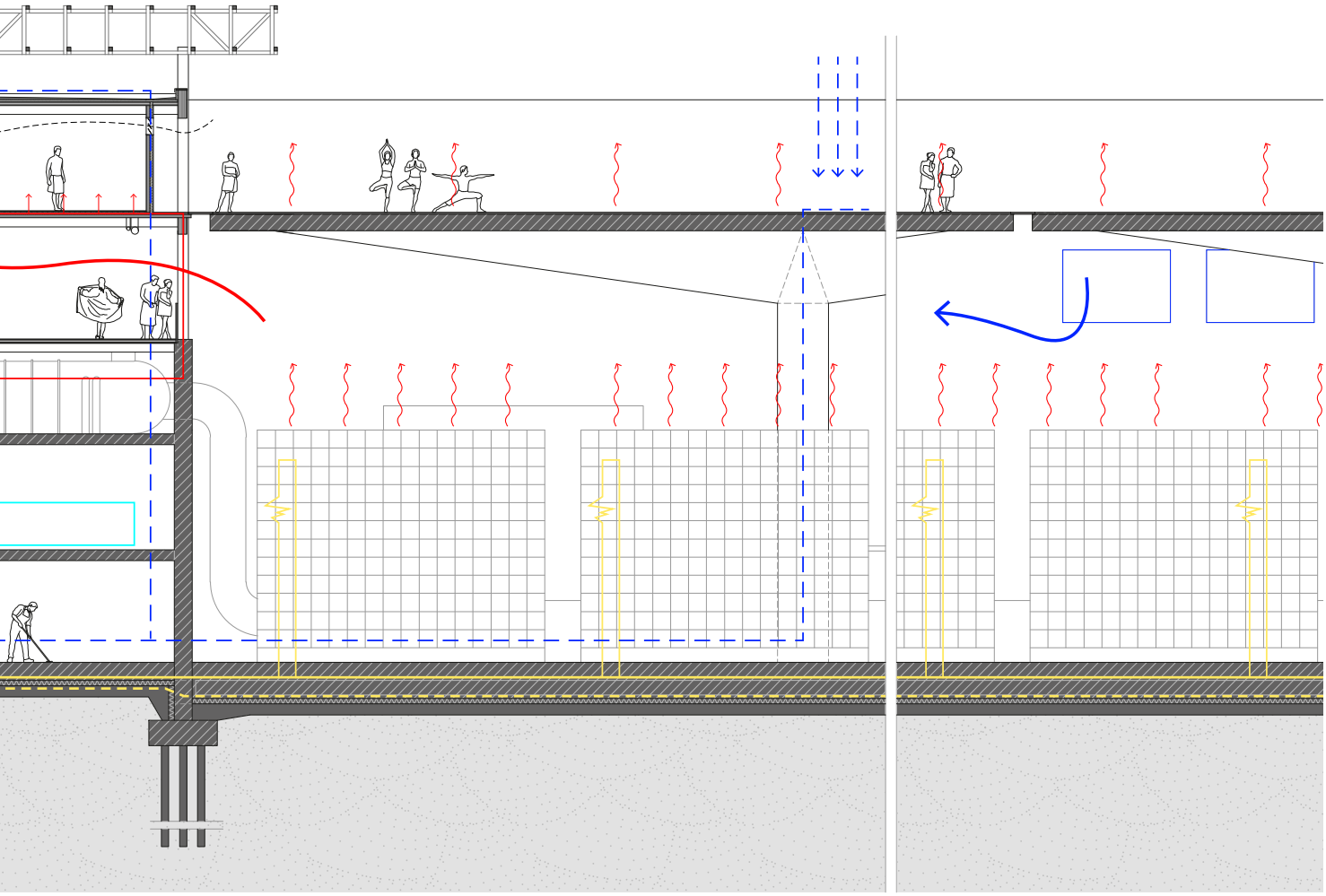


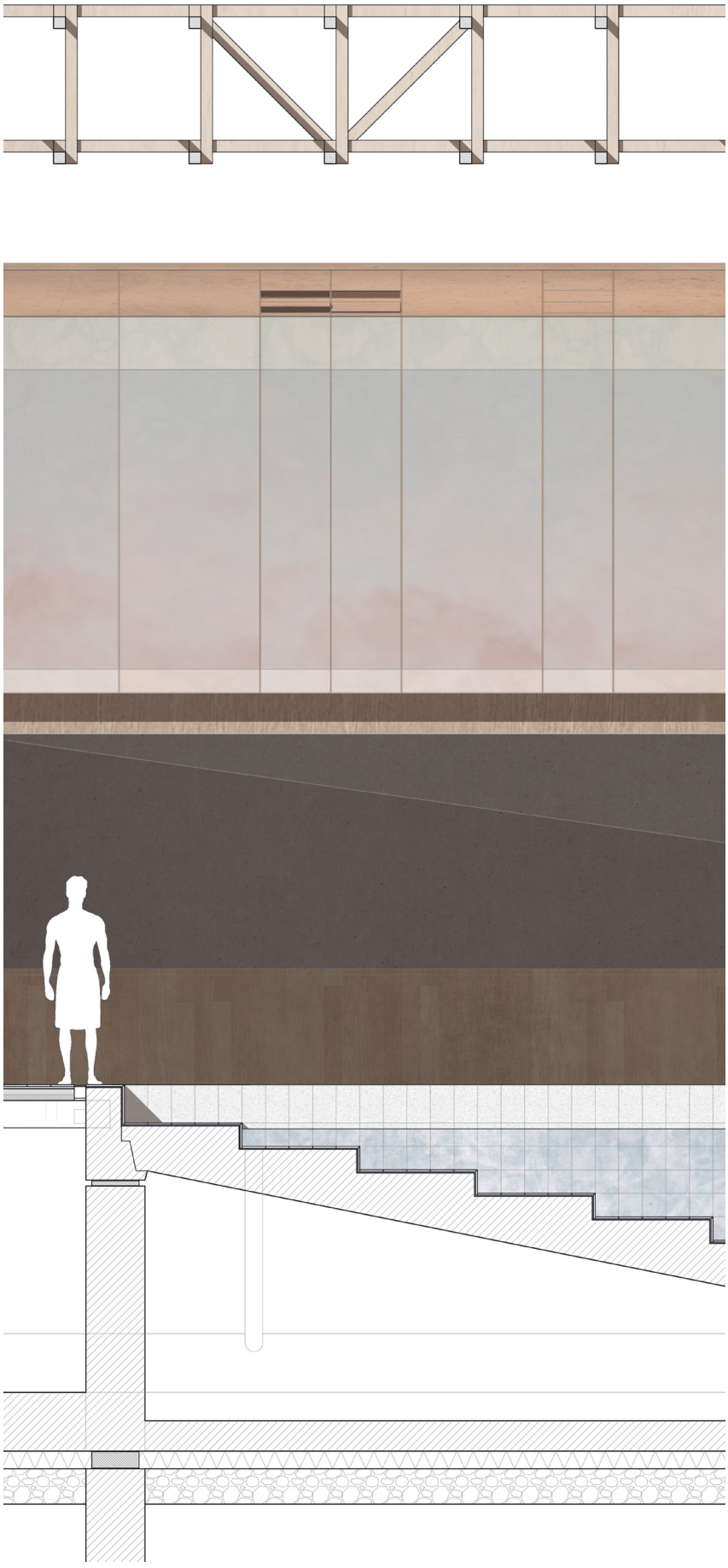


**Climatic Section: Winter**

In winter, natural ventilation is still used to cool down the machineries of the plant. Insted of cold water, the floor pipes system is used to heat the interior spaces - directly connected to the hot water storage pools.

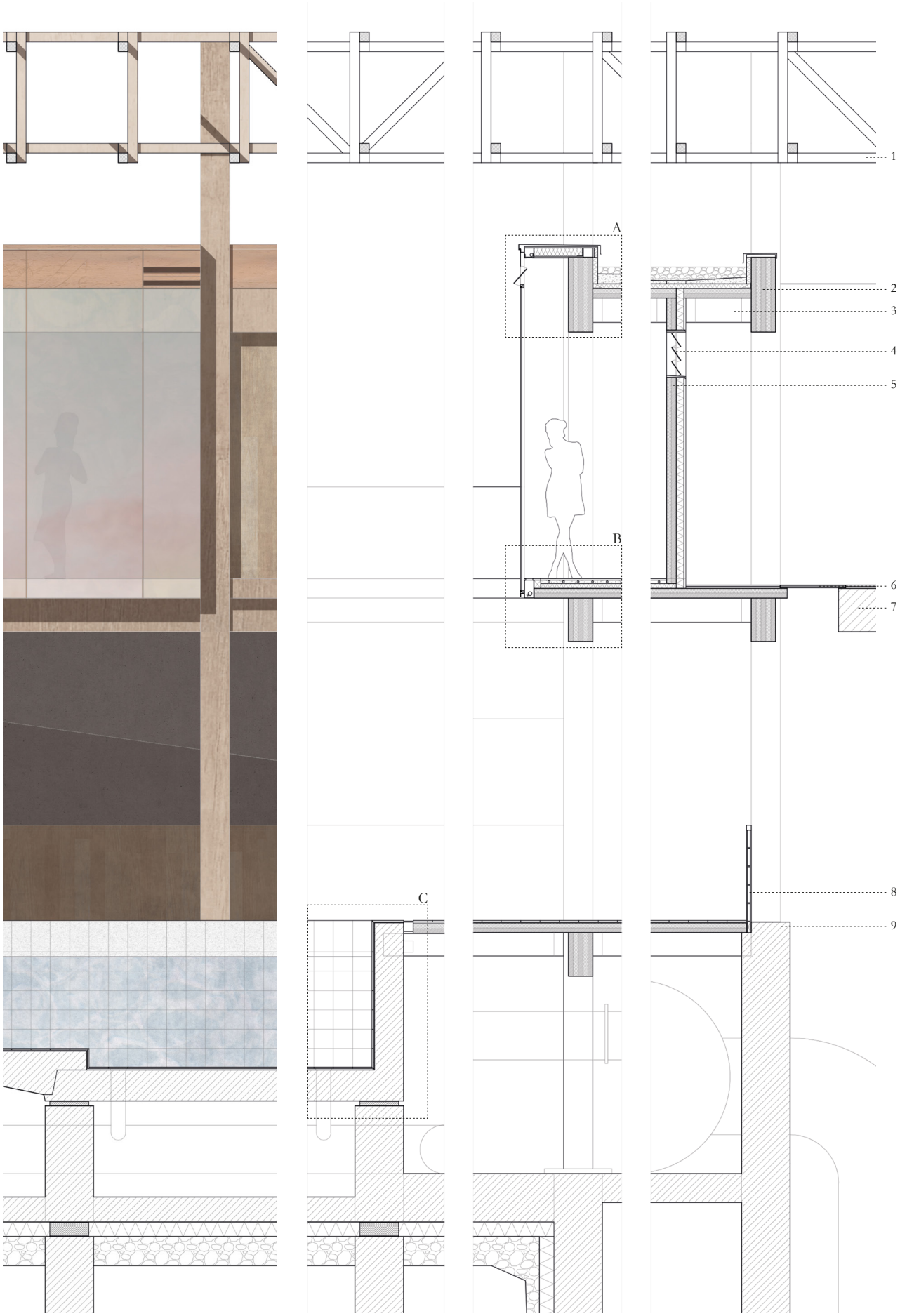






## SW facade - 1:20

1. timber latticed roof - spruce: modules: 115x10x10.
2. HESS glued laminated timber (GLT) main beam 250x760 - spruce.
3. HESS glued laminated timber (GLT) secondary beam 250x300 - hybrid (core: spruce - outer layer: cedar).
4. openable ventilation frame - oak
5. NE wall: HESS cross laminated timber (CLT) panel; wood fiber thermal insulation board; external cedar cladding.
6. structural glass panel 680x680.
7. concrete “mushroom” pillar.
8. cedar railing.
9. concrete structural wall.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A
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B
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C
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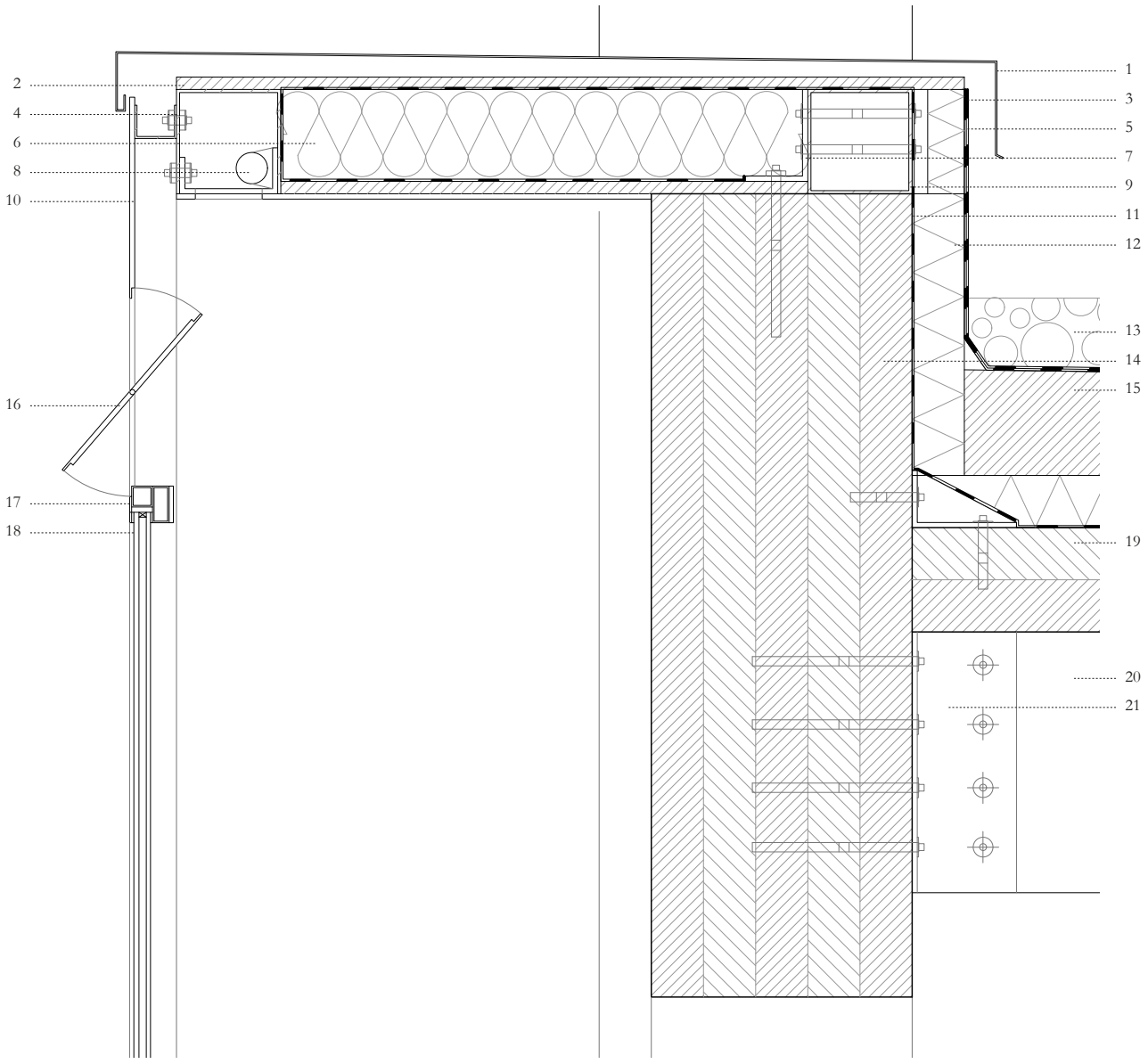
## Detail A - 1:5

1. copper flashing.
2. WPB ply - 12mm.
3. aluminium membrane - 5mm.
4. 100x100 SHS U frame + steel angle section to support metal and glass.
5. waterproof bituminous steath with glass fiber reinforcement - 5mm.
6. 500x100x50 steel joists + thermal wood fiber insulation panel - 100mm.
7. steel angle section to connect the steel frame to the GLT structure.
8. neon lightning system.
9. 100x100 SHS O frame.
10. copper flashing extension.
11. multilayer vapour barrier - 3mm.
12. rigid insulation panel - 50mm.
13. gravel protection layer.
14. HESS glued laminated timber (GLT) main beam 250x760 - spruce.
15. wooden roof mat - 100mm (rainwater collection ends in non-sectioned pluvials).
16. openable copper frame.
17. aluminium window frame + copper painting.
18. double glazing structural tinted glass.
19. HESS CLT floor panel - 100mm - hybrid (core: spruce; outer layer: cedar).
20. HESS glued laminated timber (GLT) secondary beam 250x300 - hybrid (core: spruce - outer layer: cedar).
21. steel angle plate.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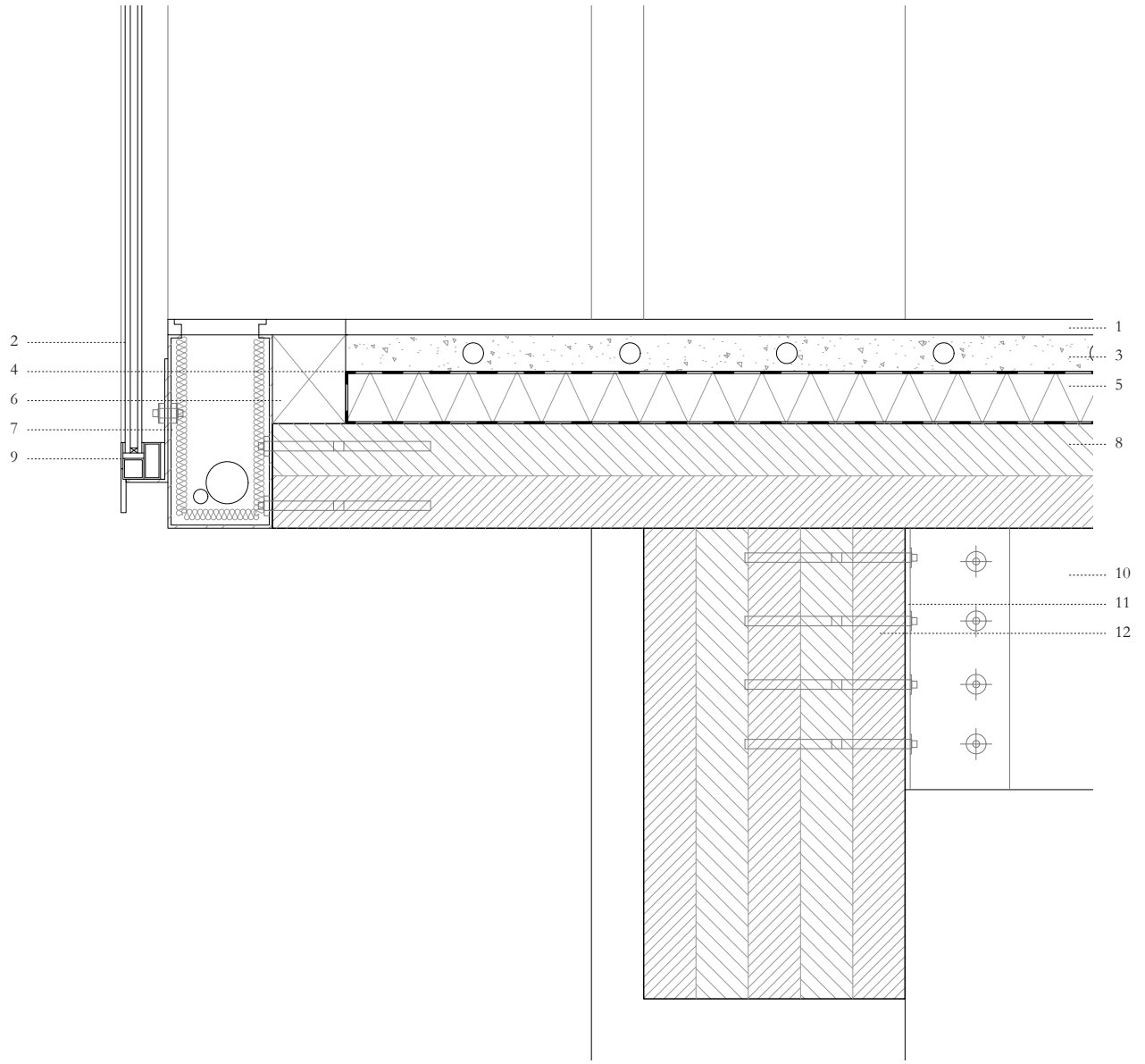
## Detail B - 1:5

1. cedar flooring - 15mm.
2. double glazing structural tinted glass.
3. floor heating/cooling system (connected to the hot/cold water pools) in a concrete mat - 35mm.
4. multilayer vapour barrier - 3mm.
5. rigid insulation panel - 50mm.
6. timber jamb
7. 180x100 SHS U frame
8. HESS CLT floor panel - 100mm - hybrid (core: spruce; outer layer: cedar).
9. aluminium window frame + copper painting.
10. HESS glued laminated timber (GLT) secondary beam 250x300 - hybrid (core: spruce - outer layer: cedar).
11. steel angle plate.
12. HESS glued laminated timber (GLT) main beam 250x440 - spruce.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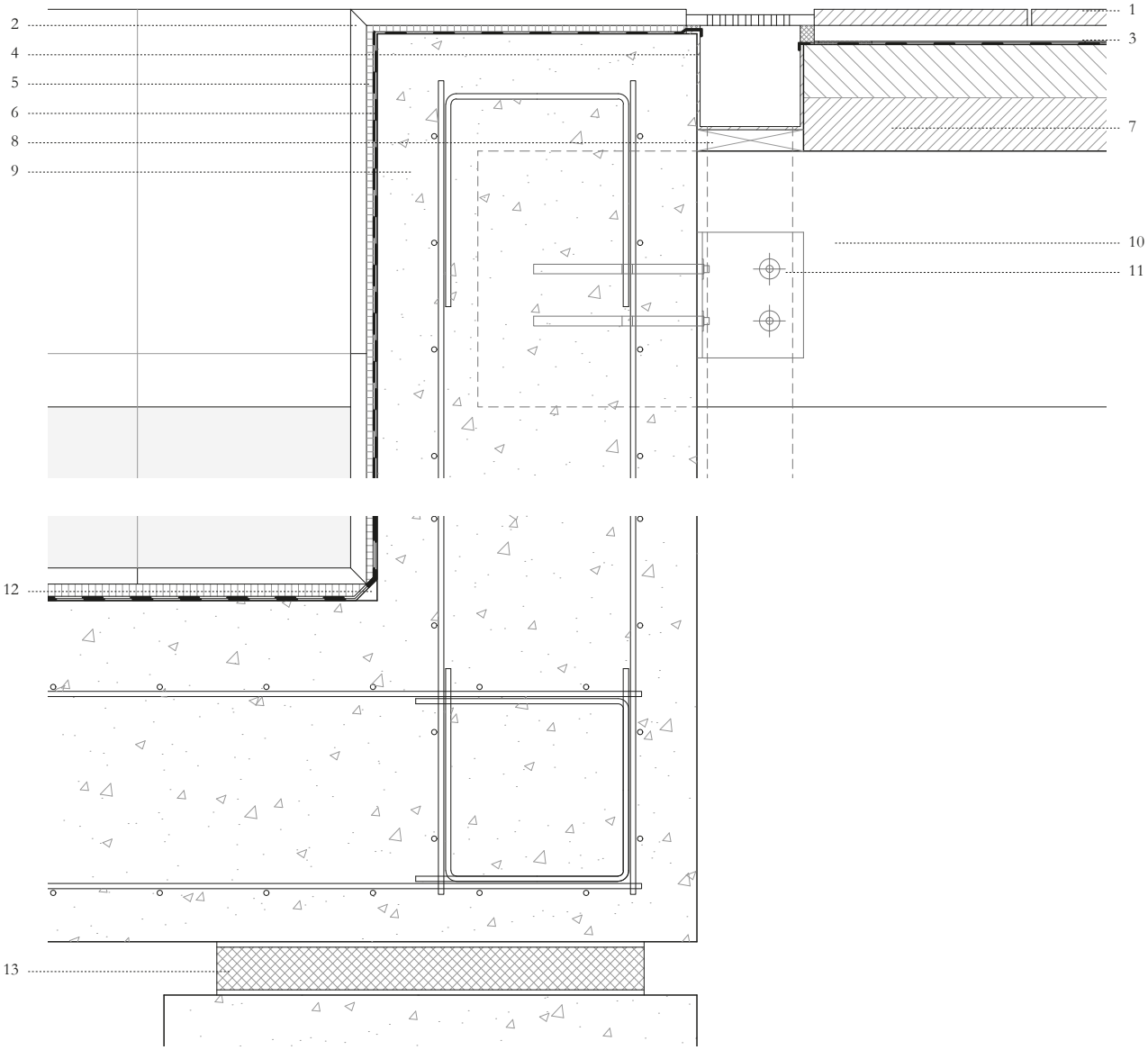
## Detail C - 1:5

1. cedar hardwood flooring - rough surface - 15mm (4mm gap between planks); life cycle: about 20 years.
2. osmotic resin tiles - sand colour - 15mm.
3. floor structure: wooden frame - 15mm (to ensure proper water drainage) + natural rubber cushion - 3mm.
4. drainage duct: metal duct + rubber cushions + metal (copper) grid - 10mm
5. tile adhesive layer - 8mm
6. double EPDM waterproofing membrane - 4mm
7. HESS cross laminated timber (CLT) floor panel - 100mm - spruce.
8. wooden mat - 20mm.
9. precast concrete U pool basin - 300mm
10. HESS glued laminated timber (GLT) beam 200x150 - spruce.
11. L-shaped metal plate
12. beveled concrete edge
13. neoprene (teflon) panel - 50mm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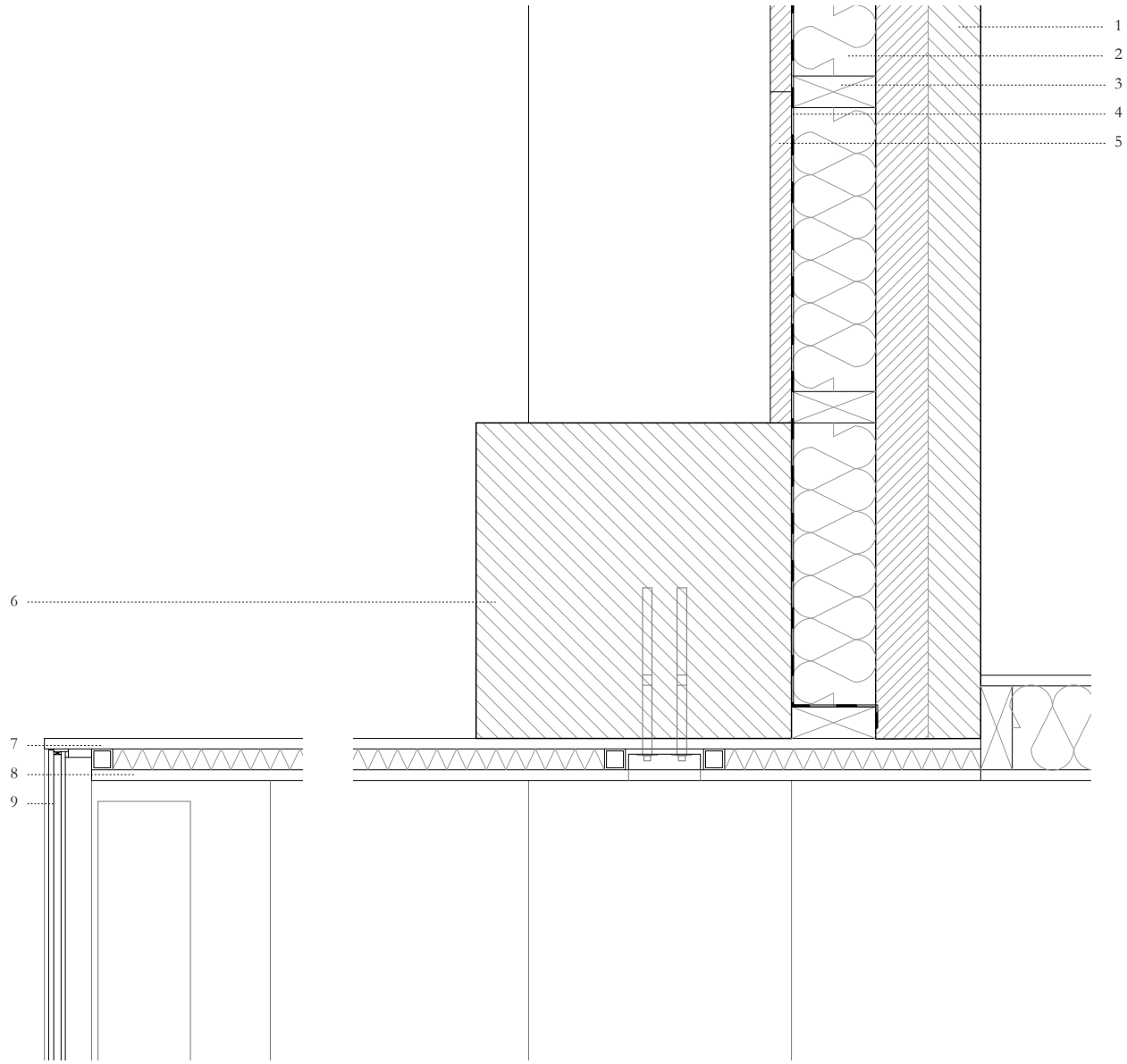
## Detail H - 1:5

1. HESS CLT wall panel - 100mm - hybrid (core: spruce; outer layer: cedar).
2. thermal wood fiber insulation panel - 80mm.
3. timber frame to support facade cladding - 80x30.
4. multilayer vapour barrier - 3mm.
5. facade cladding - 20mm - cedar.
6. main solid wood pillar - 300x300.
7. external copper plate - 1mm; connected to the main structure through a SHS frame structure.
8. internal cedar cladding - 1mm.
9. double glazing structural tinted glass.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