The Mongstad Experience
Facilitating a transition in time, function and space

Elise van Herwaarden

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Building Technology Report

Elise van Herwaarden

Delta Interventions 2017/2018
North Sea: Landscapes of Coexistence

25-01-2019

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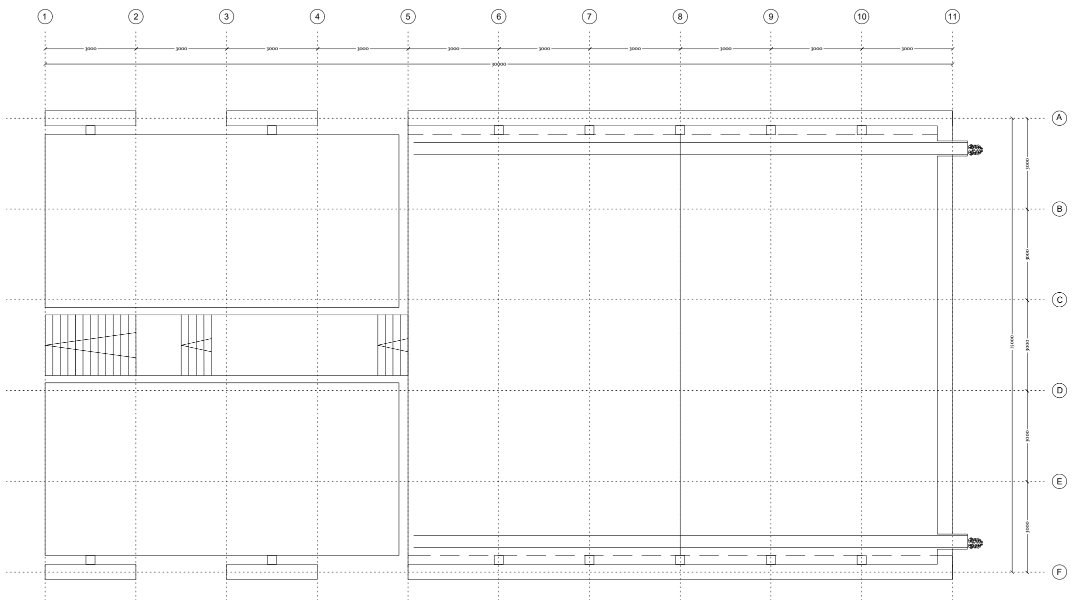
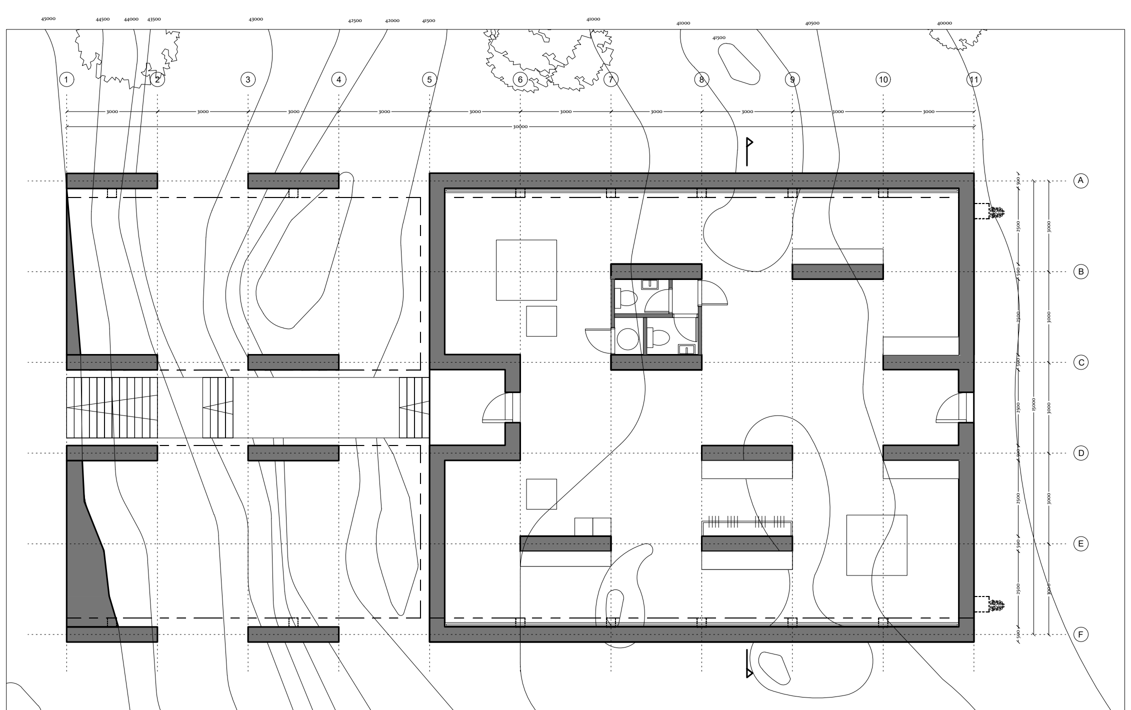
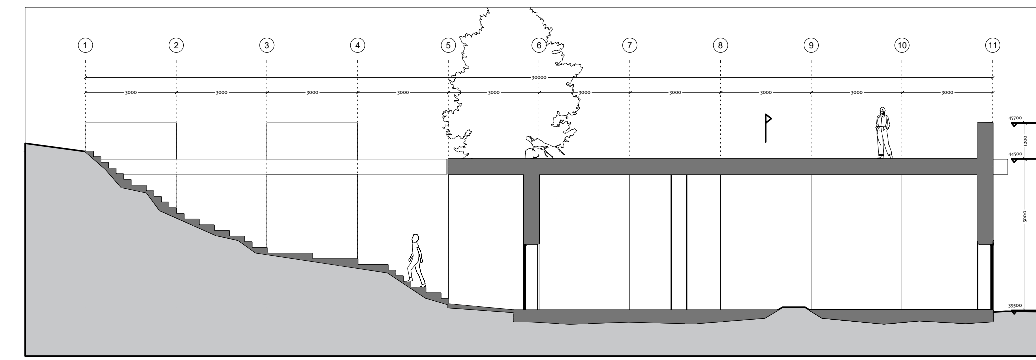
CONTENT

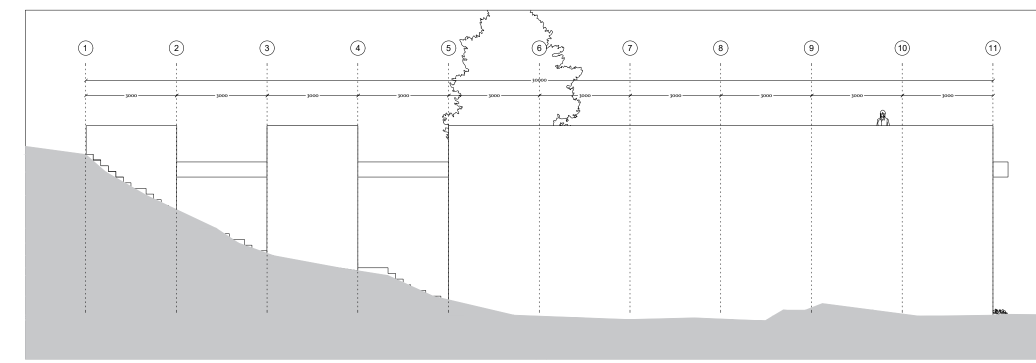
I VISITOR CENTRE

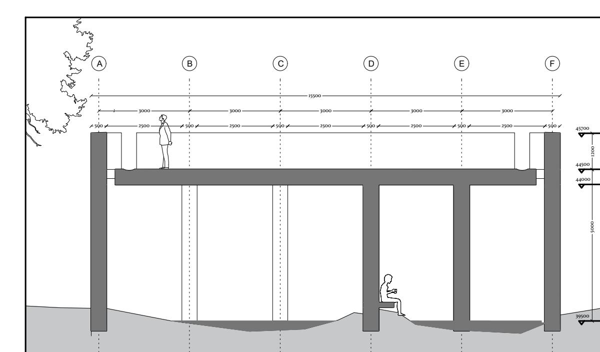
GENERAL DOCUMENTATION

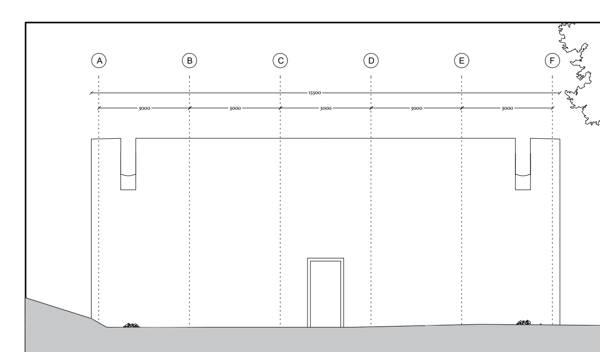






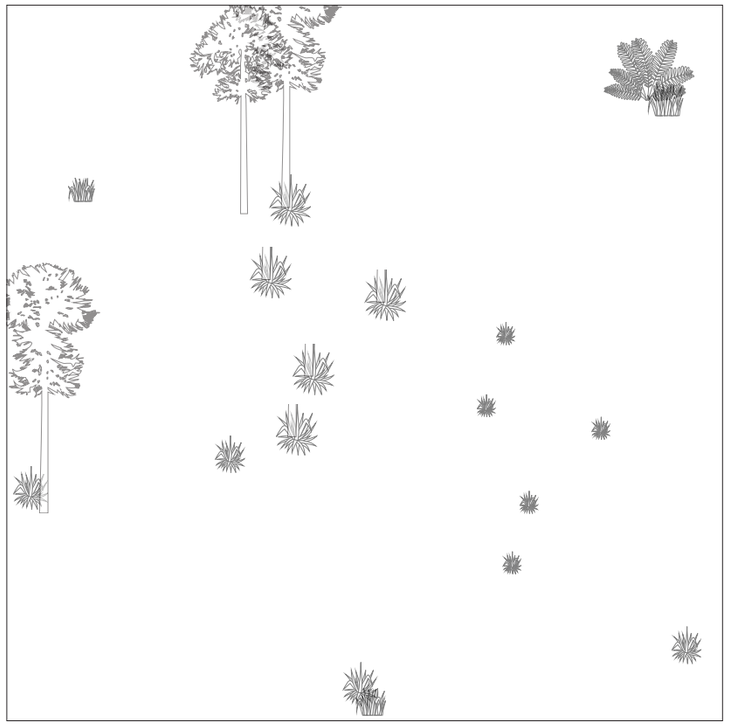






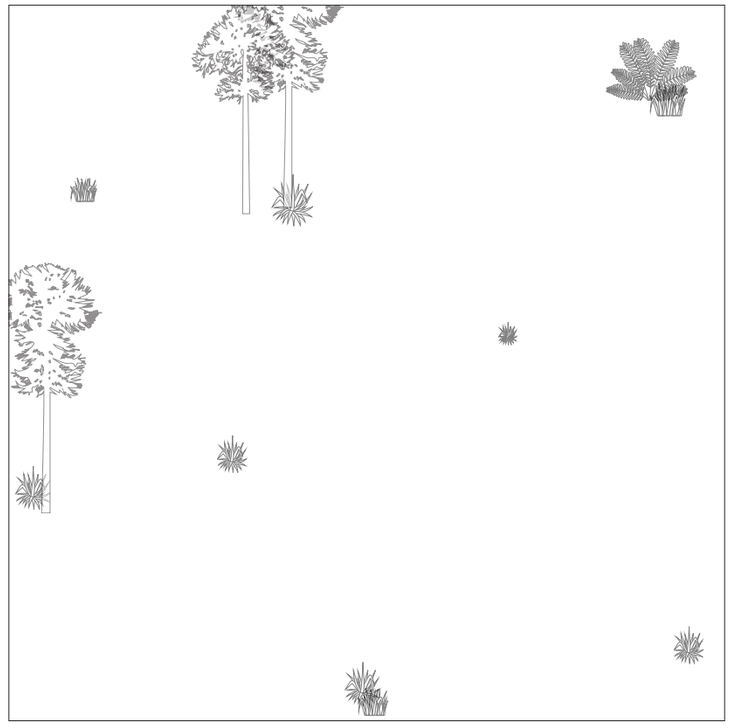
BUILDING ORDER

1 - soil



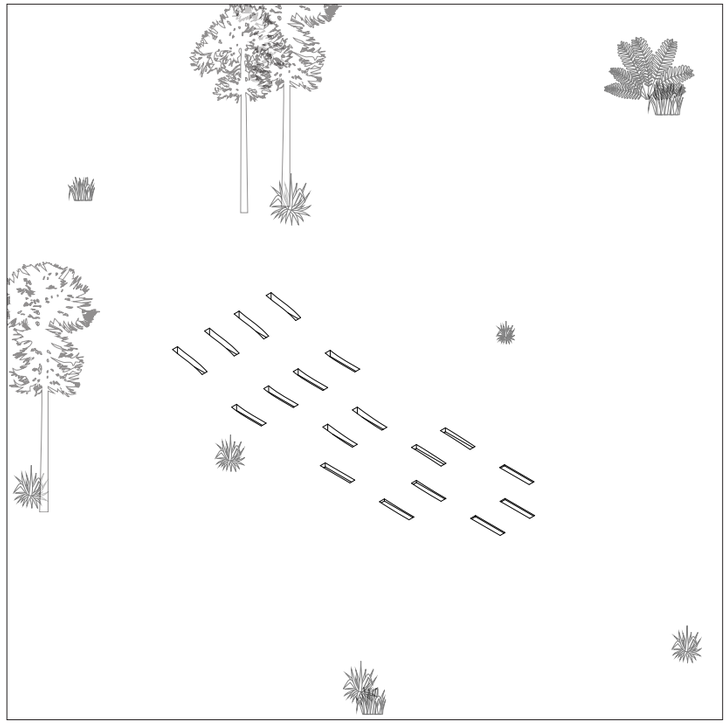
The site as it is found: bare rocky soil with some vegetation.

2 - cleaned soil



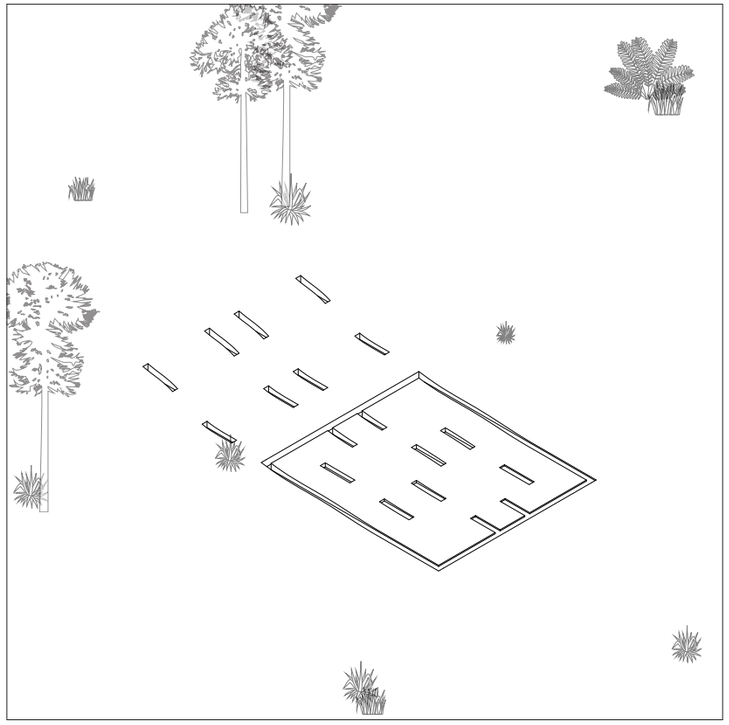
Where the building will be located. the soil will be cleaned from any plants or vegetation.

3 - flattening



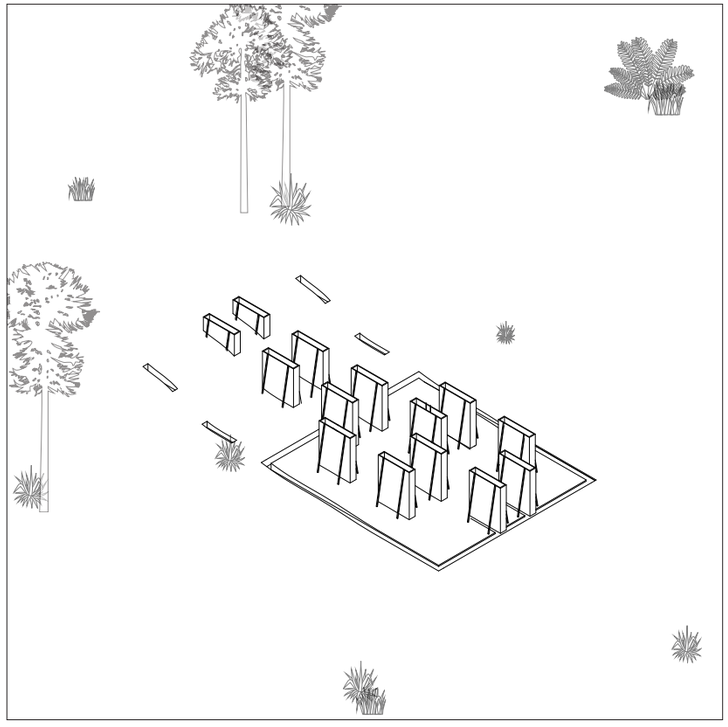
The soil will partially be prepared to host a building. At the location where later on loadbearing walls will be constructed, holes with a flat bottom are excavated out of the rocks.

4 - flattening II



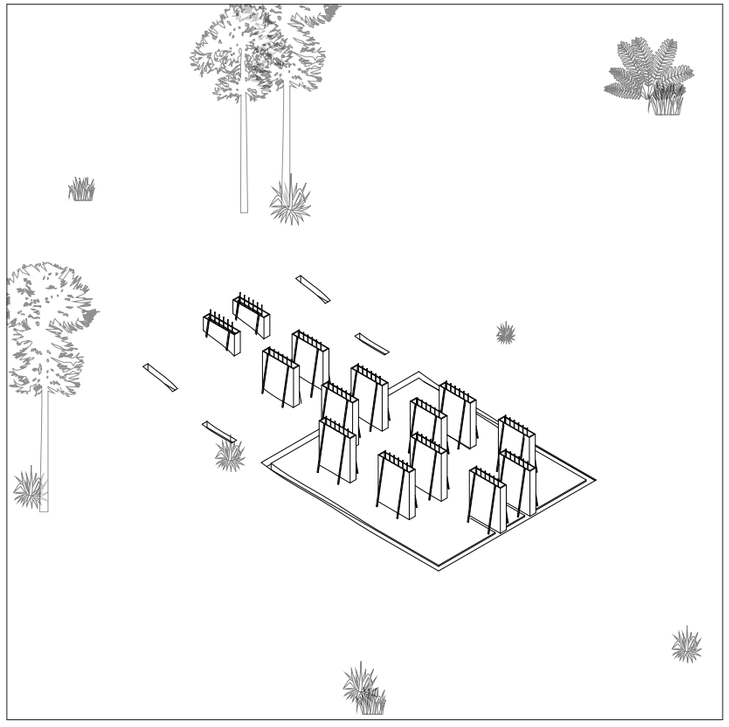
Not only the loadbearing walls will be poured onto the flattened soil: same goes for the other walls, closing off the pavilion.

5 - formworks



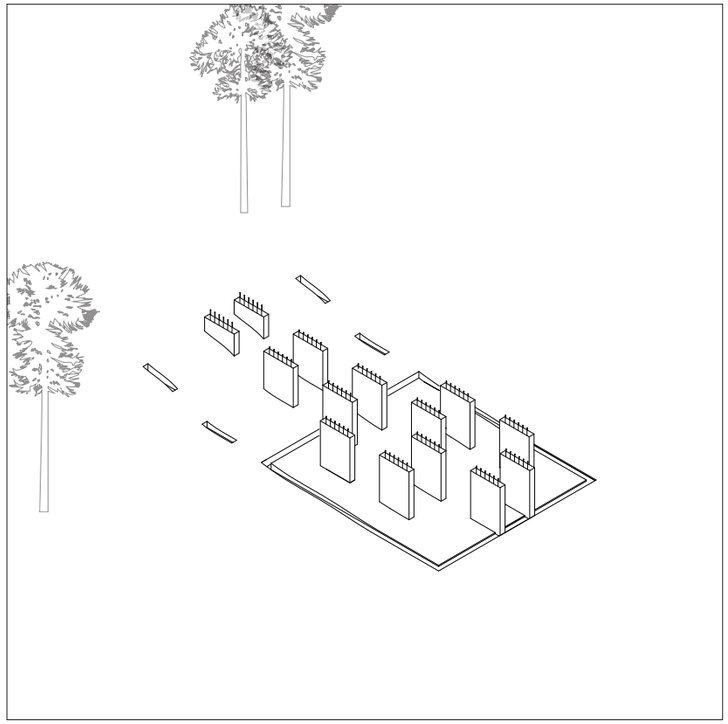
Formworks for the concrete loadbearing walls are placed.

6 - reinforcement + conduits



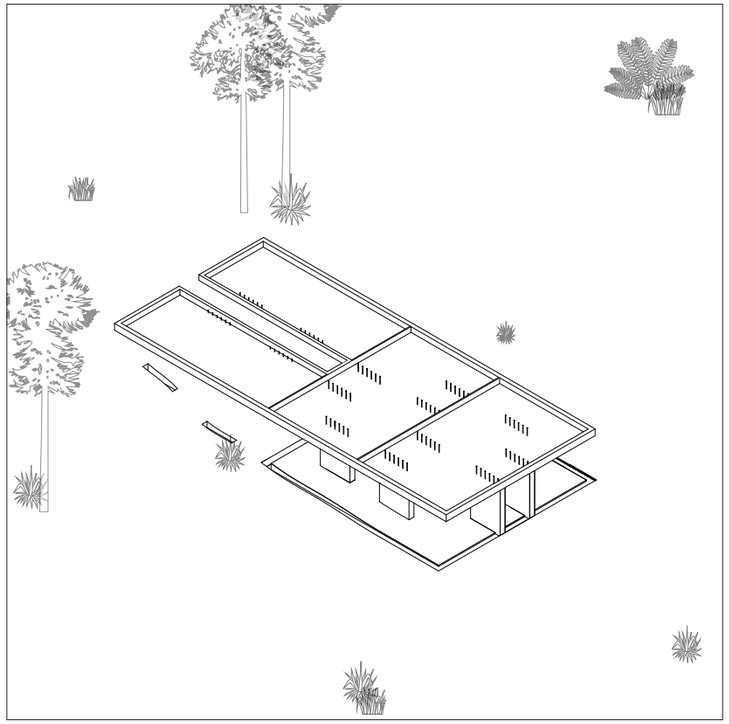
In the formworks, the reinforcement mesh and heating and electricity conduits are installed.

7 - loadbearing wall



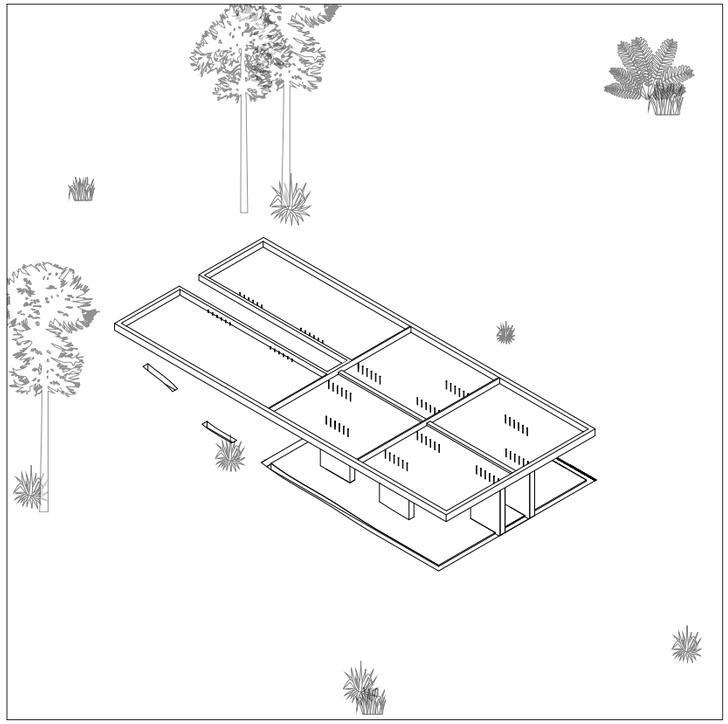
On site, concrete is poured into the formworks. By doing so, the conduits and reinforcement mesh are integrated and will together make these elements loadbearing walls.

8 - formwork roof



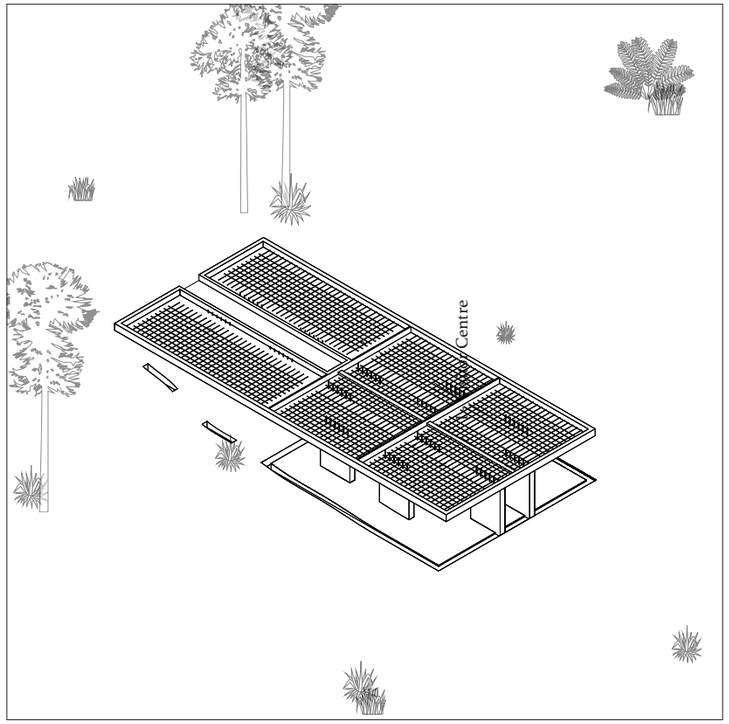
The same method as for the walls is used to make a roof out of reinforced concrete. Because the surface is rather large, the roof is constructed out of several pieces. To connect it structurally to the walls, the reinforcement wires of the walls will be integrated in the roof too.

9 - conduits



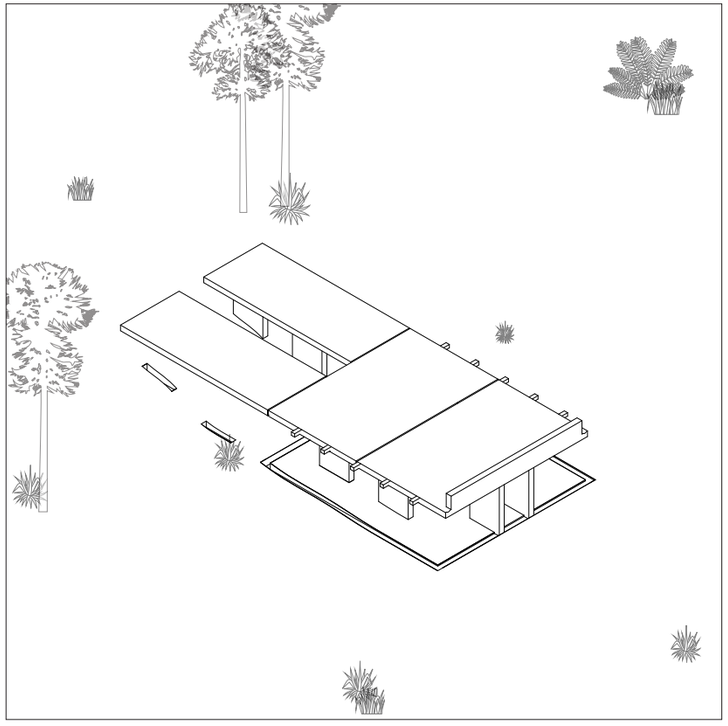
Conduits for electricity and heating are placed on the bottom of the formwork, to be incluided in the ceiling of the pavilion.

10 - reinforcement roof



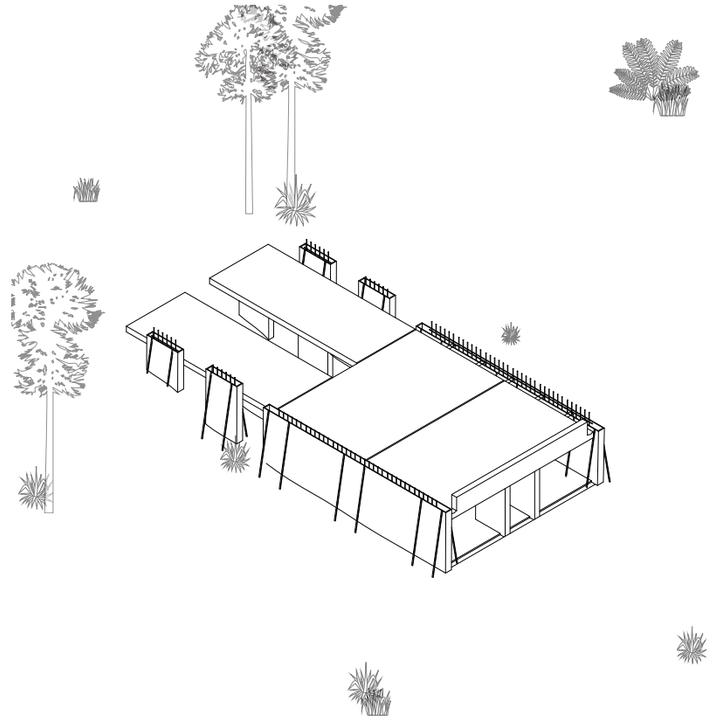
The conduits will be connected to the reinforcement mesh of the roof. the mesh stretches to all ends of the formwork to make the roof as strong as possible.

11 - roof slabs + steel



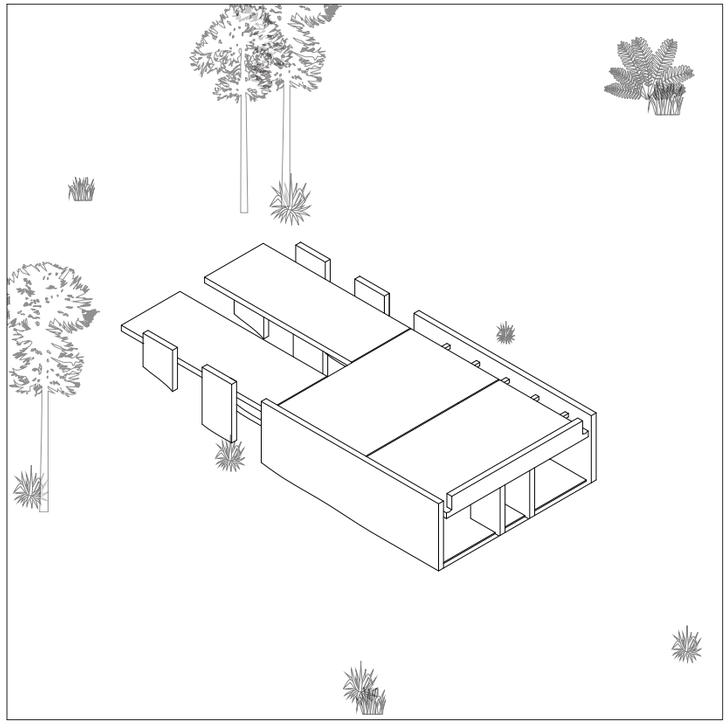
After integrating steel U-profiles at the sides of the formwork, concrete is poured. The steel profiles stick out of the roof slab and will connect the roof to the outer walls.
A gutter for water drainage and the parapet are included.

12 - formworks outer walls



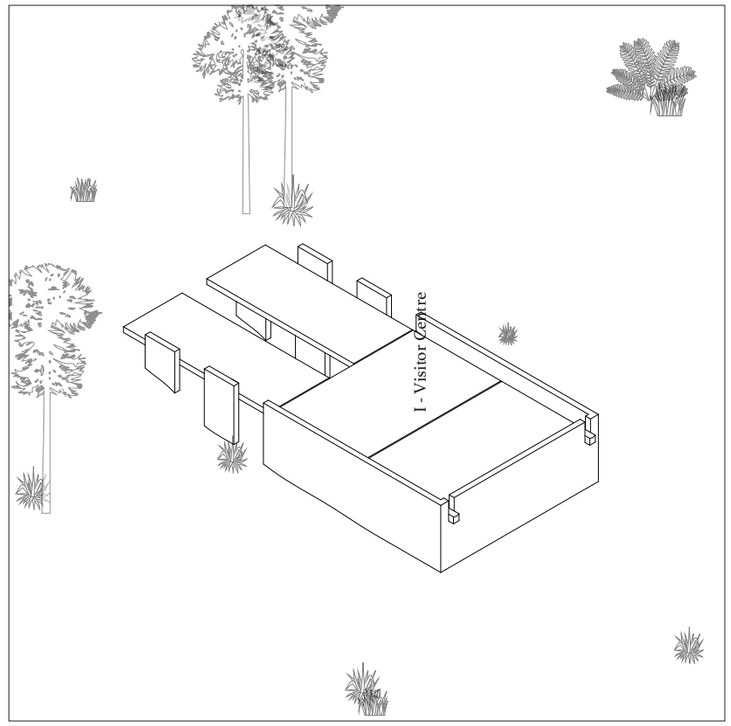
By using the same method as for the loadbearing walls, the outer walls of the pavilion will be casted on site, connecting them to the pavilion.

13 - outer walls



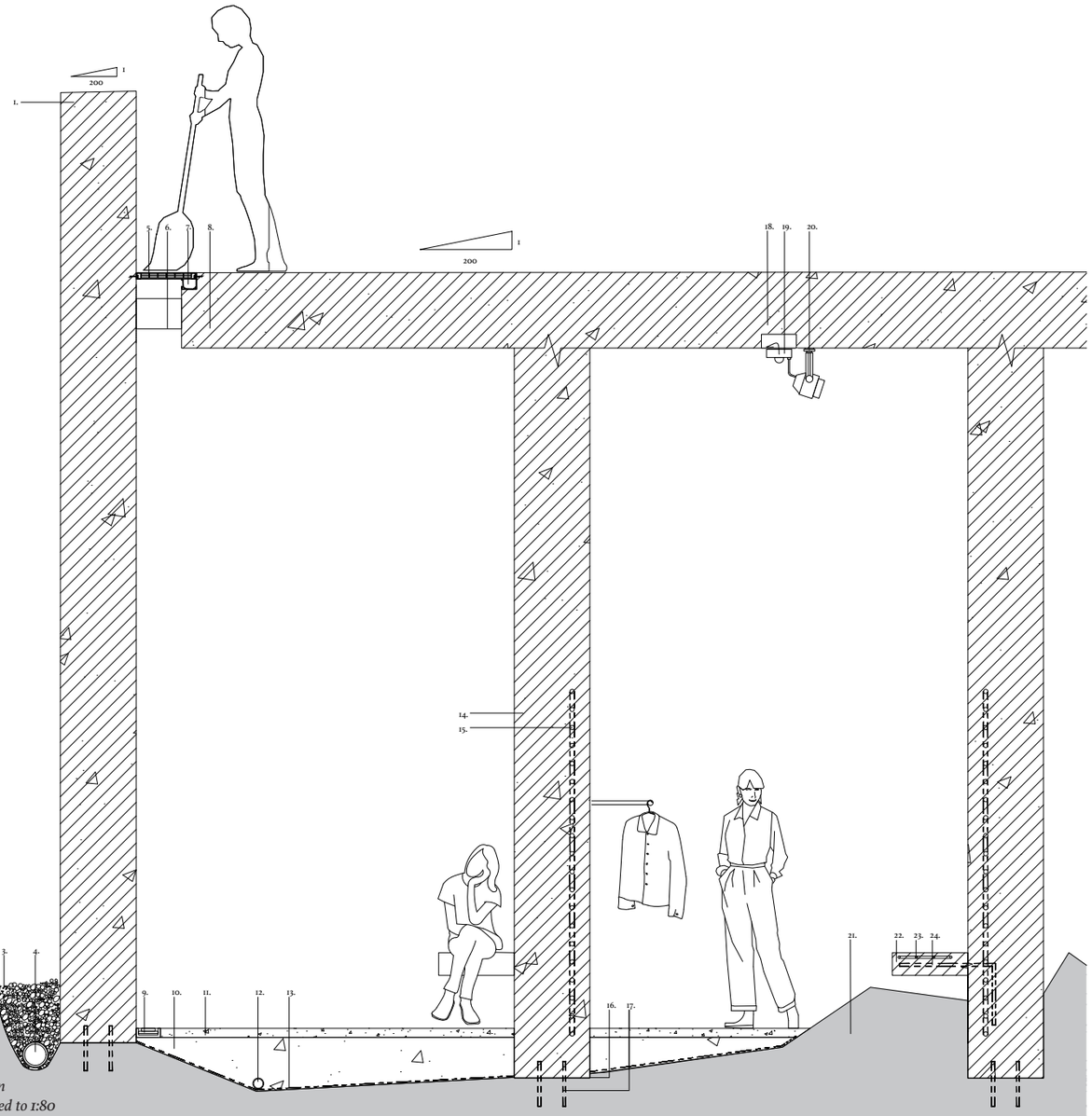
The outer walls will not only serve as a shelter, but go up 1200 mm above the roof level to serve as parapet too.

14 - outer walls + flooring



The last step in constructing the shell of the building are the perpendicular walls. These don't contribute in bearing the load of the roof, but do close the building. Now all the walls are in place, the flooring can be poured on top of the soil. The soil and walls serve as a formwork.

DETAILS - 1:20

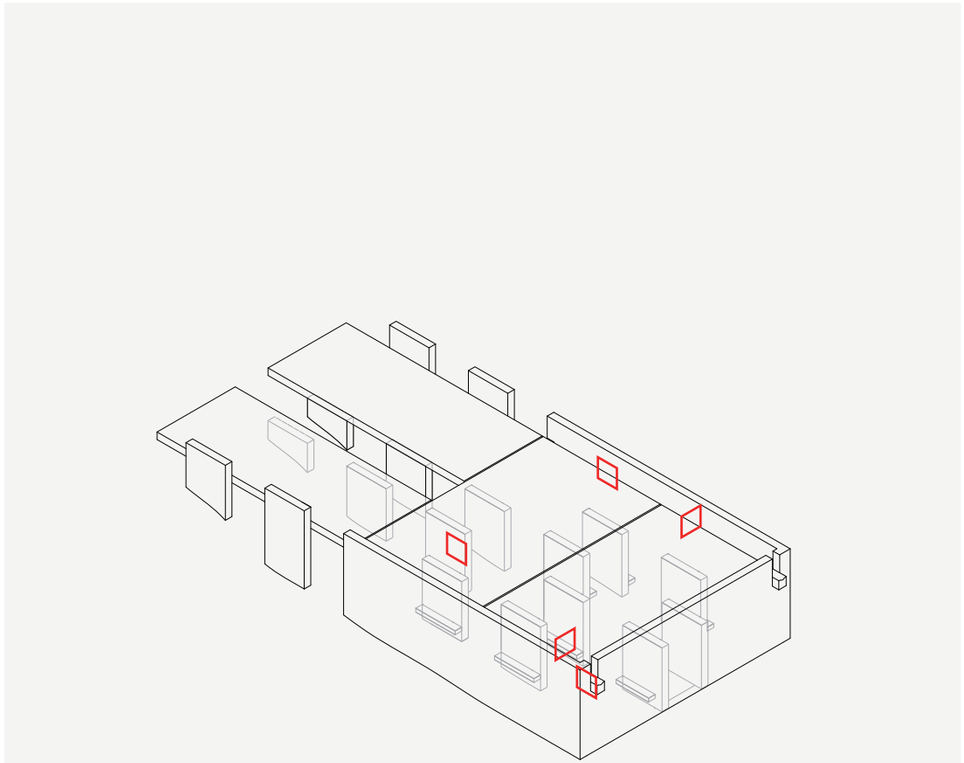


Vertical section
1:20 downscaled to 1:80

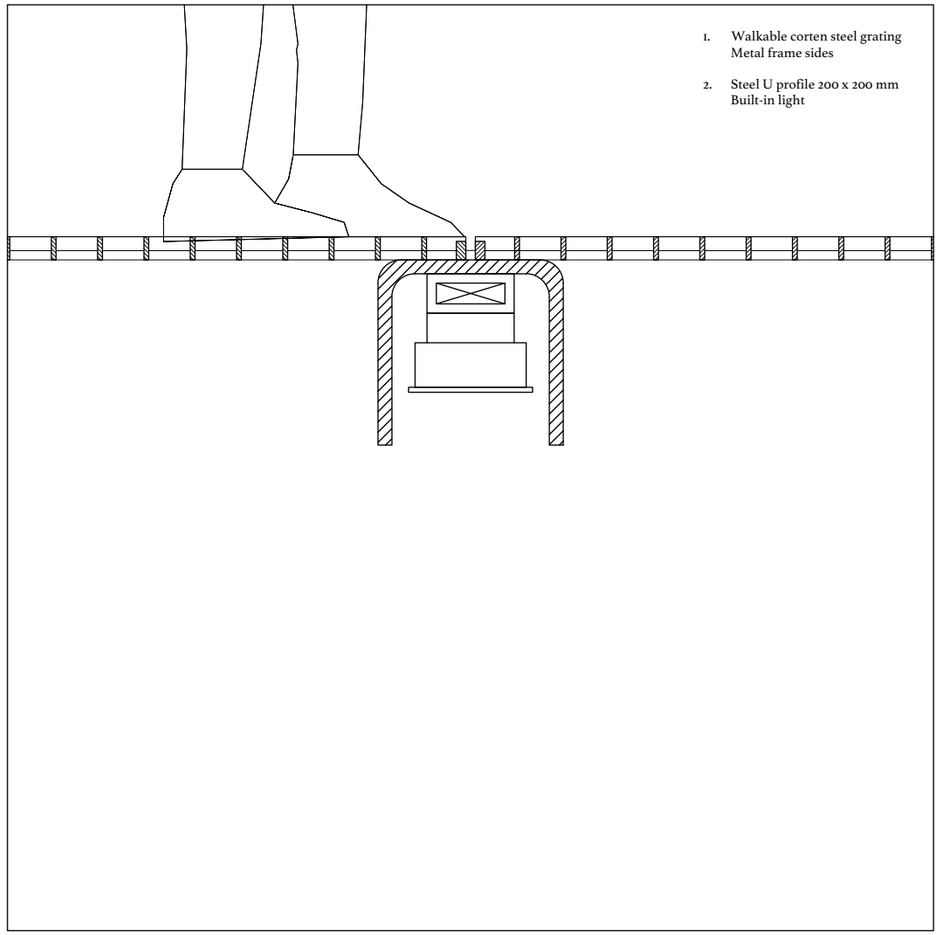
1. Exposed reinforced concrete wall
   recycled aggregates
   casted in-situ
2. Rocky soil
3. Gravel band
4. Drainage piping
5. CorTen steel walkable grating
6. Steel U profile
   built-in light
   poured in construction
7. Box gutter
8. Reinforced concrete roofing
   casted in-situ
   descending - 500 mm min
9. CorTen steel drainage gutter
10. Concrete leveling flooring
    recycled aggregates
    poured in-situ
11. Sand cement screed
    trowel finish
    descending - 60 mm min
12. Drainage piping
13. Water tight layer
14. Reinforced concrete loadbearing wall
    recycled aggregates
    casted in-situ
15. Wall heating
16. Rocky soil
    cleaned
    flattened
17. Steel toggle
18. Electricity conduit
19. Movement sensor
20. Spotlight
21. Exposed soil
22. Concrete wall seat
    casted in-situ
23. Electric heating mat
    poured in construction
24. Steel toggle
    poured in construction

Facade impression
1:20 downscaled to 1:80

DETAILS - 1:5

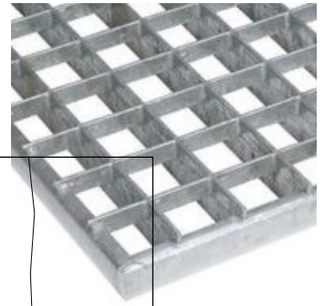


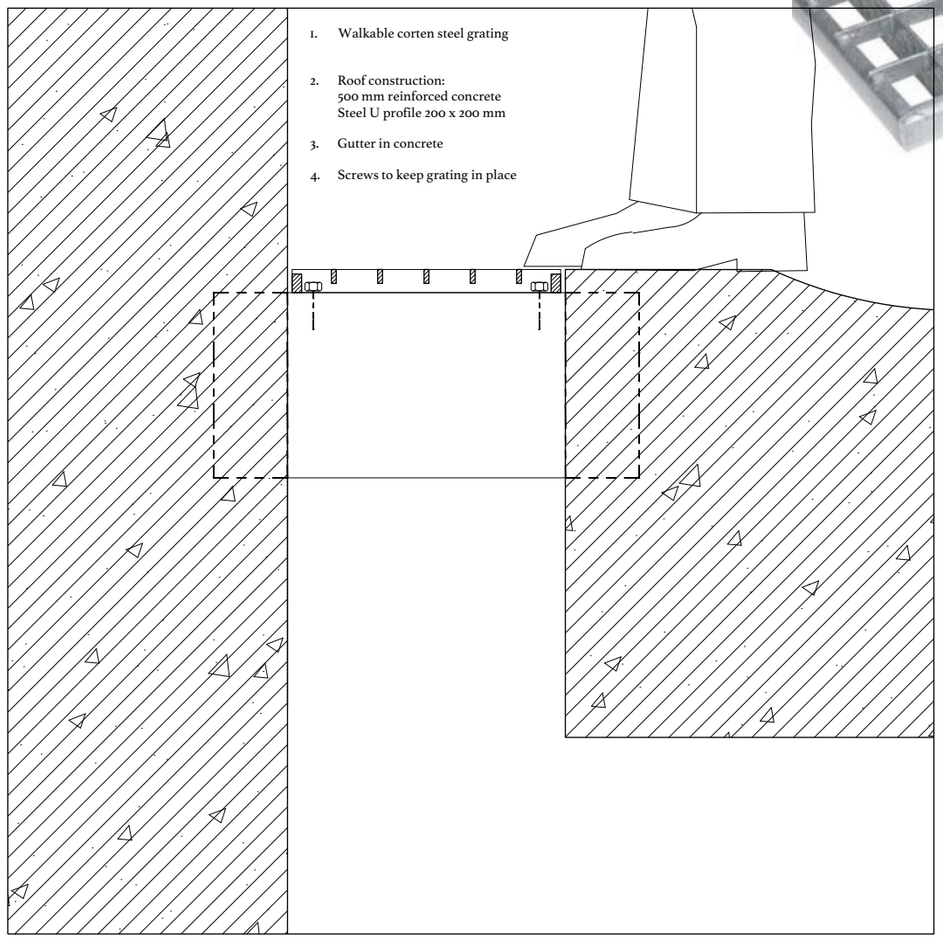
Location 1:5 details



Detail A
Outer wall + u profile with light
1:5 downscaled to 1:10

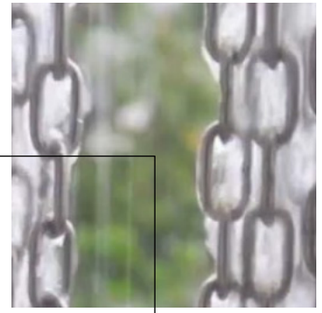
The roof of the building is accesible. To enhance the accessibilty as well as maintaining a 30 mm opening in the roof, a CorTen steel grating is installed between the concrete roof and extended wall slab.

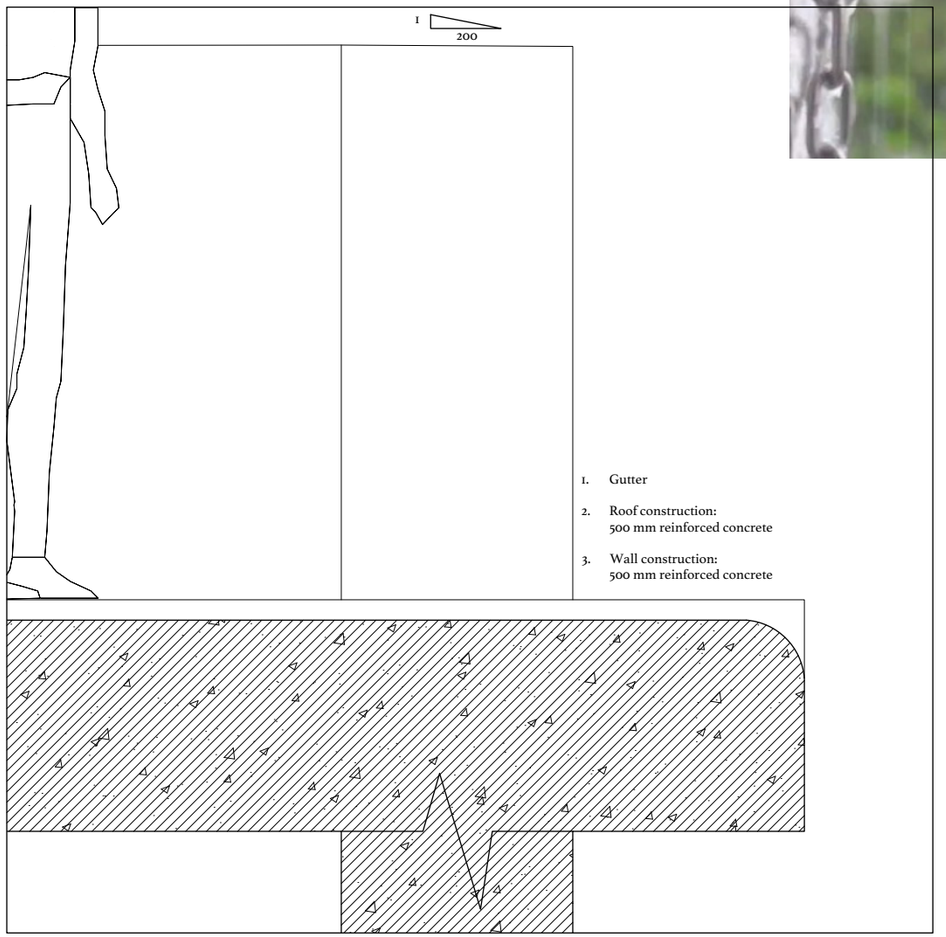




Detail B
Outer wall + walkable grating + concrete roof detail
1:5 downscaled to 1:10

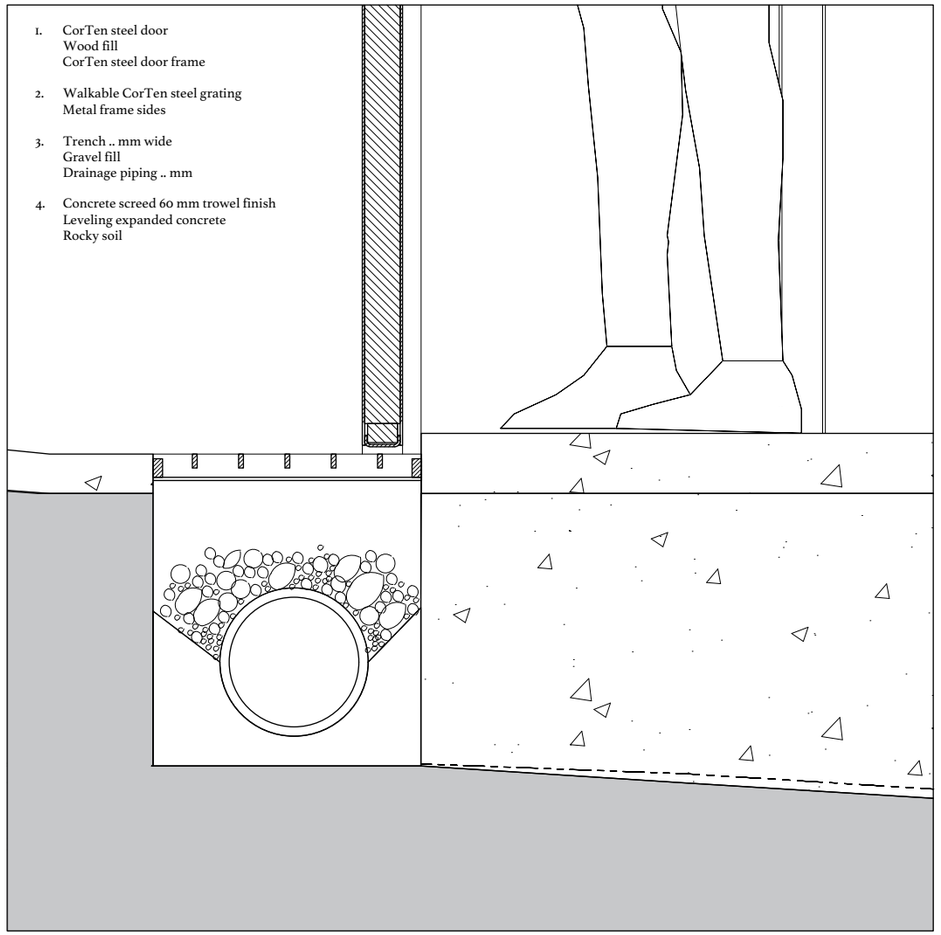
The roof of the building is accesable. To enhance the accessibilty as well as maintaining a 30 mm opening in the roof, a CorTen steel grating is installed between the concrete roof and extended wall slab.





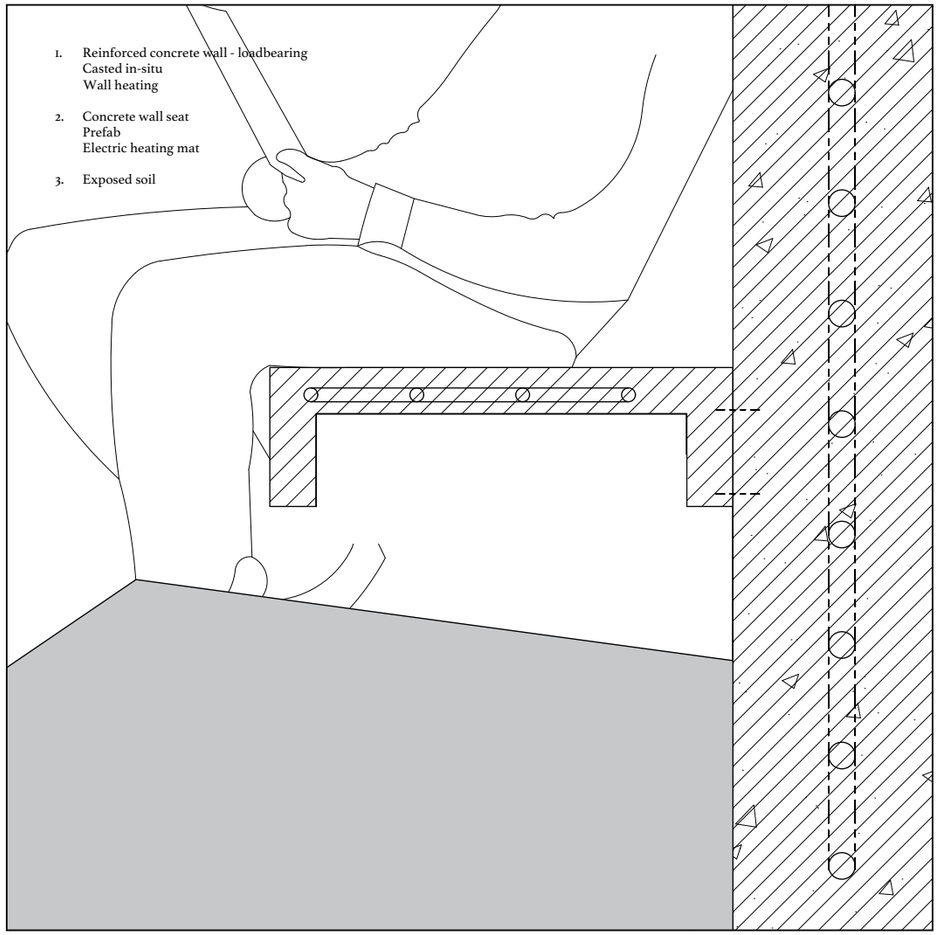
Detail C
Rain gutter + downsprout
1:10 downscaled to 1:20

Because the big surface of the roof catches much rainwater, an appropriate method of disposing this had to be found. A gutter is placed on the in-situ casted concrete and protrudes 500 mm. The chain connected to this gutter guides rainwater down to the ground.



Detail D
Entrance door + drainage detail
1:5 downscaled to 1:10

The entrance of the pavilion is marked by a heavy CorTen steel door. Under this door, the CorTen steel grating ensures rainwater or snow can seep through - to be abduced through drainage piping. Besides this, the gravel-filled trench leaves enough space for fresh air to enter the building.

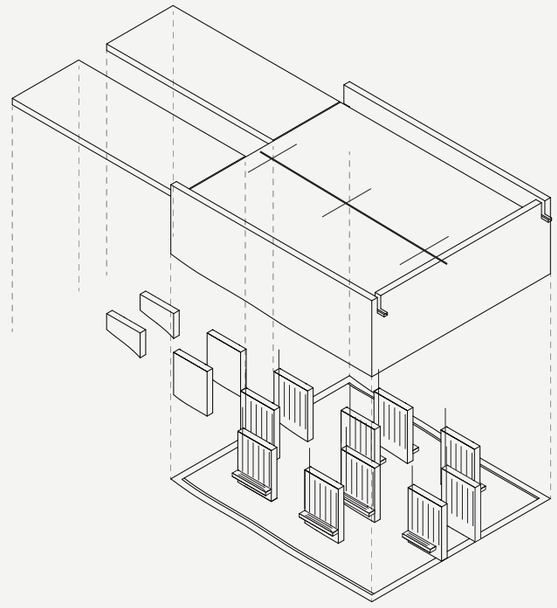


Detail E
Concrete bench + loadbearing wall detail
1:5 downscaled to 1:10

Inside the pavilion, concrete benches are installed to comfort the visitor. Within the in-situ casted concrete, heating pipes are installed.

CLIMATE DESIGN

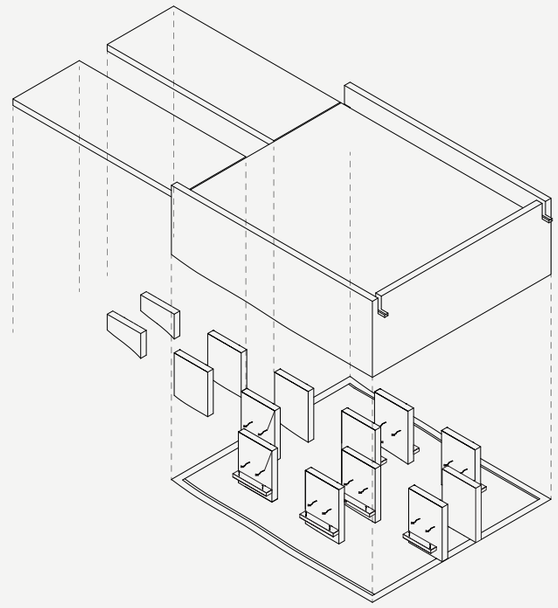
electricity



Climate scheme I
Electricity

Conduits are casted in the conrete shell. Electricity supplies are connected to wall heating and bench heating systems.

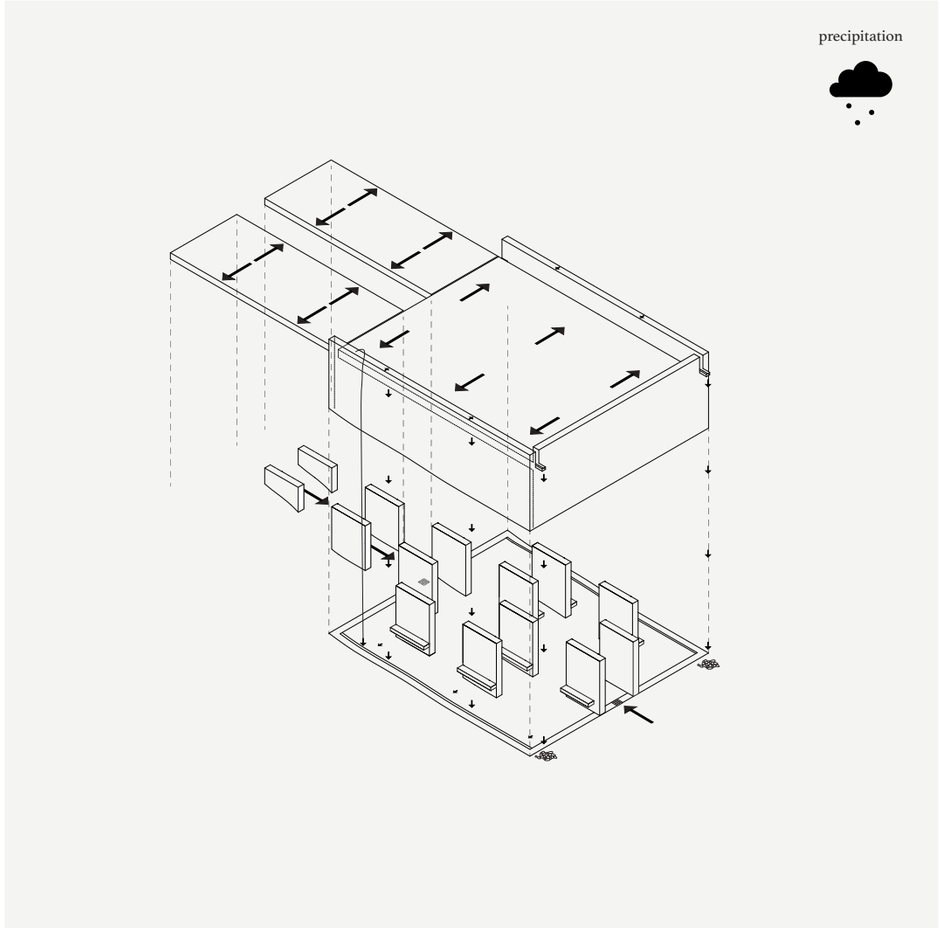
heating



Climate scheme II
Heating

The pavilion is permeable to everything from outside, however, because of local slab heating visitors can have a somewhat comfortable experience.

Besides this, the toilet flushing systems are prevented from freezing.



Climate scheme III
Rain

The building is open to rain. Gutters on the side ensure drainage. On the roof water is drained as well. It can leave via open gutters that extend beyond the pavilion.

II
MODULE

Beams
HE360 - CorTen

Beams
HE360 - CorTen

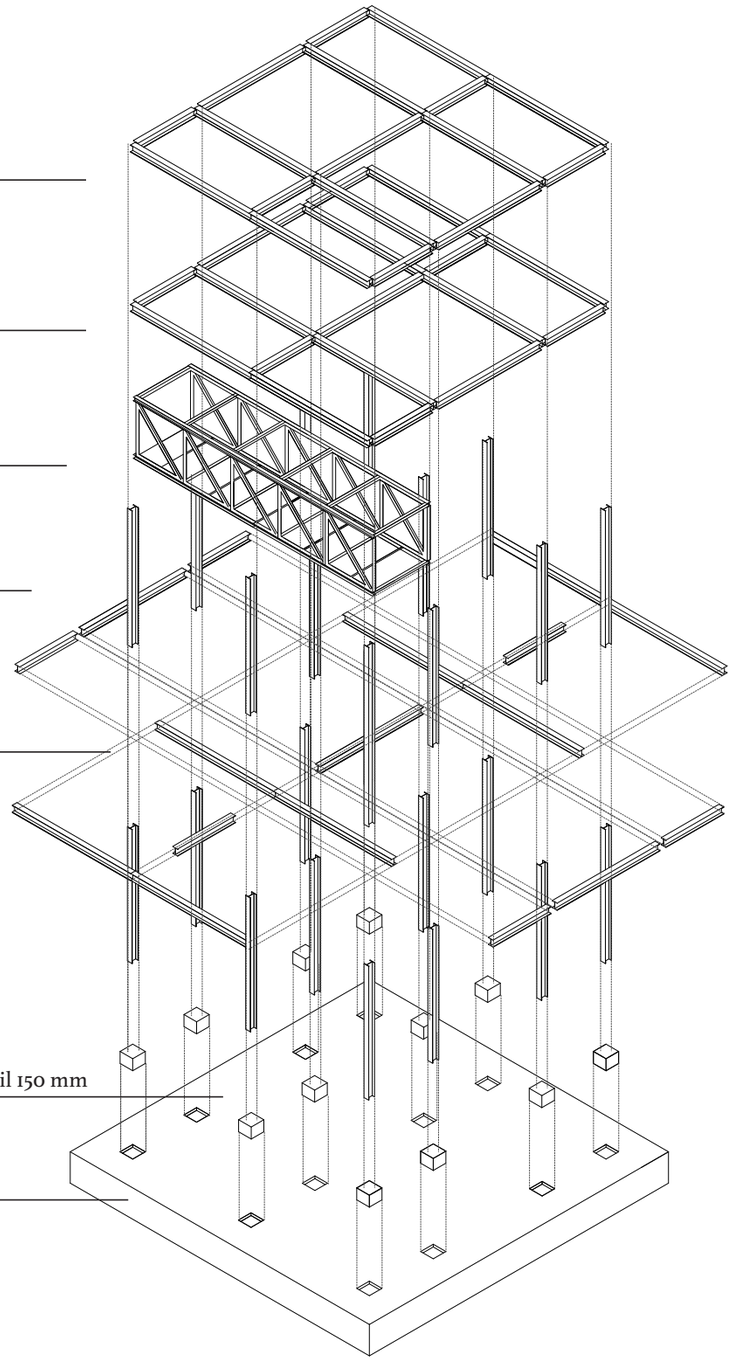
Walking path
See closeup

Columns
HE360 - CorTen

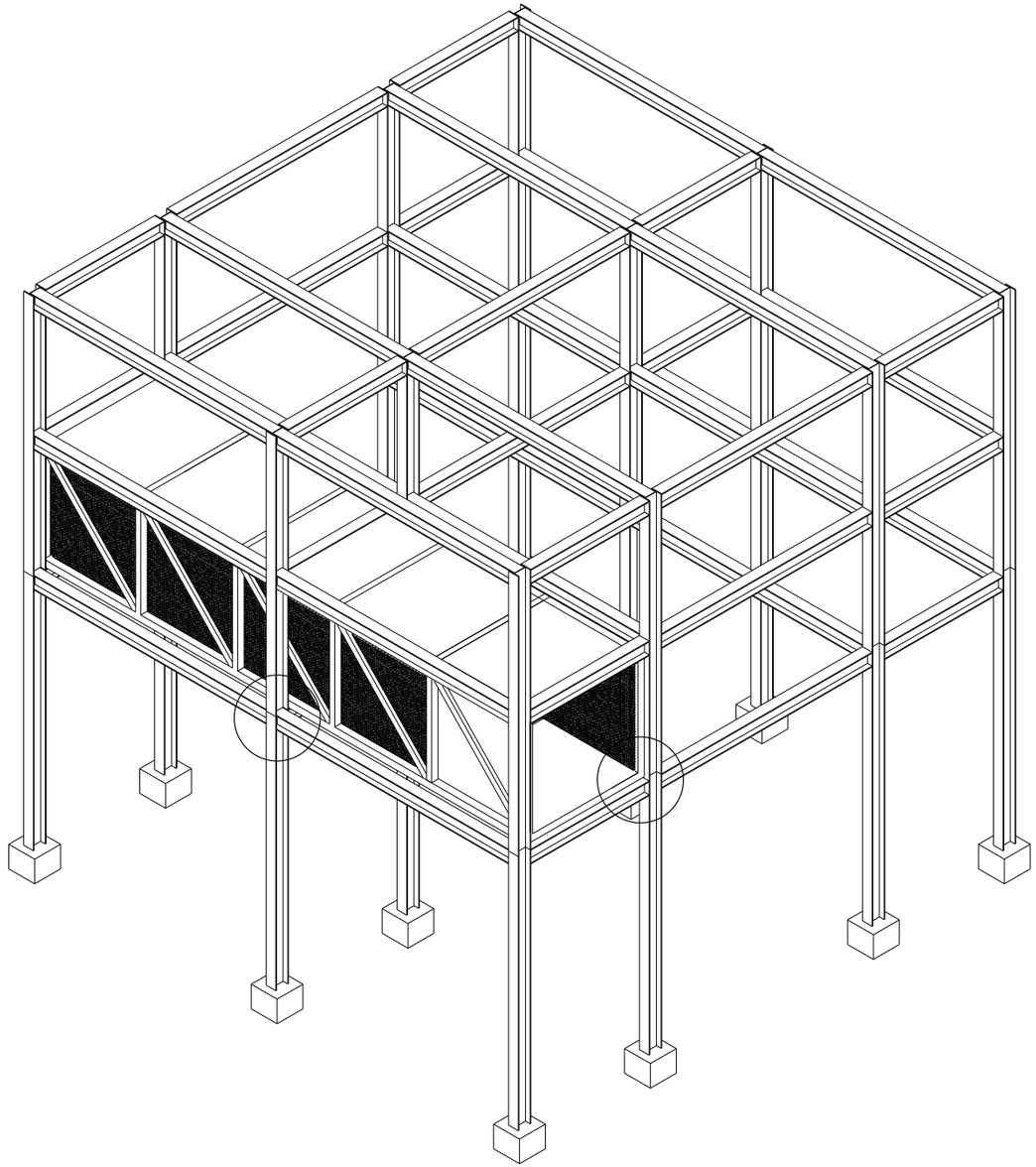
Beams
HE360 - CorTen

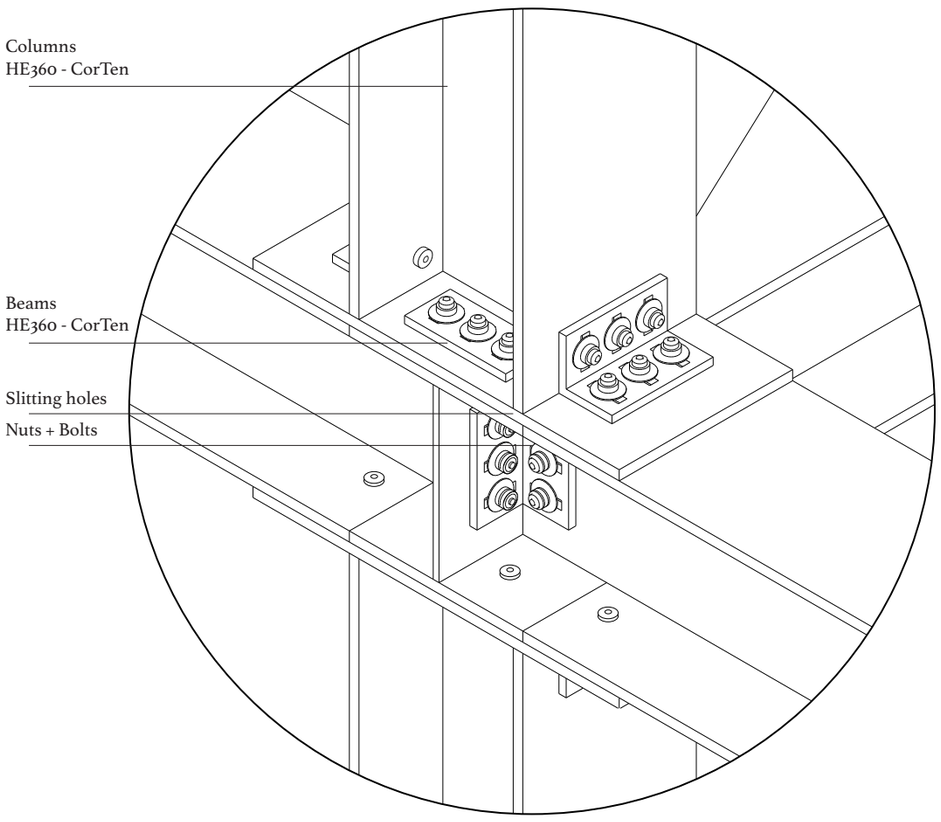
Foundation
Concrete sticking above soil 150 mm

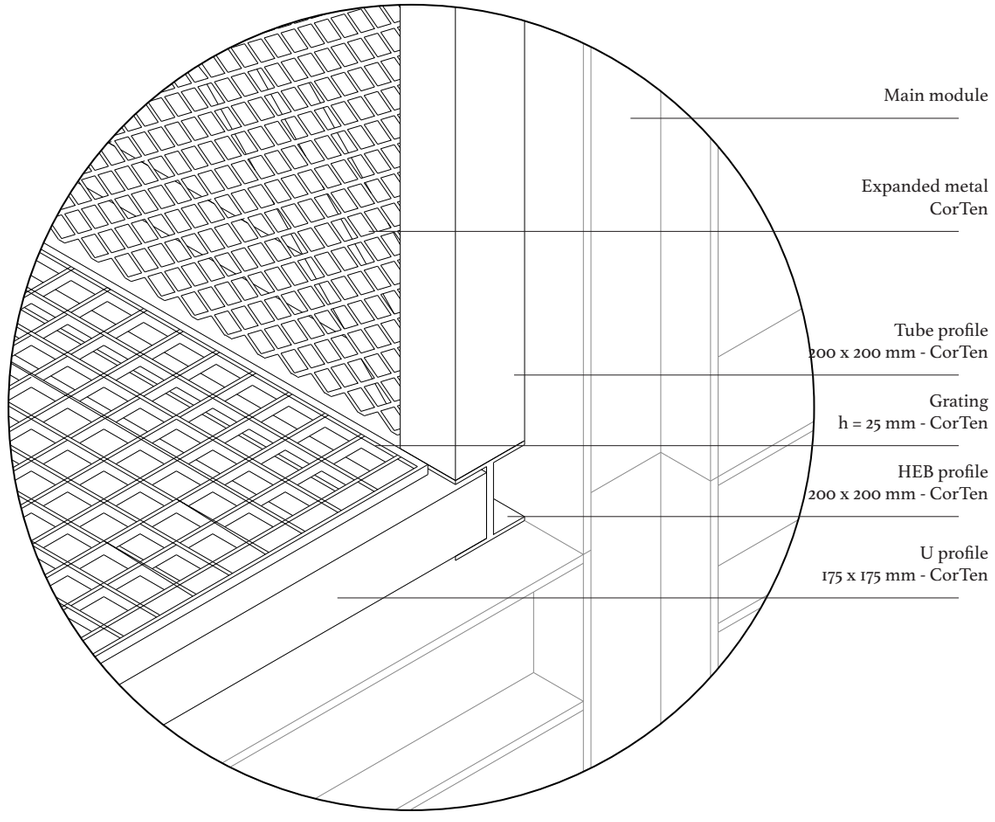
Soil
Flattened where needed

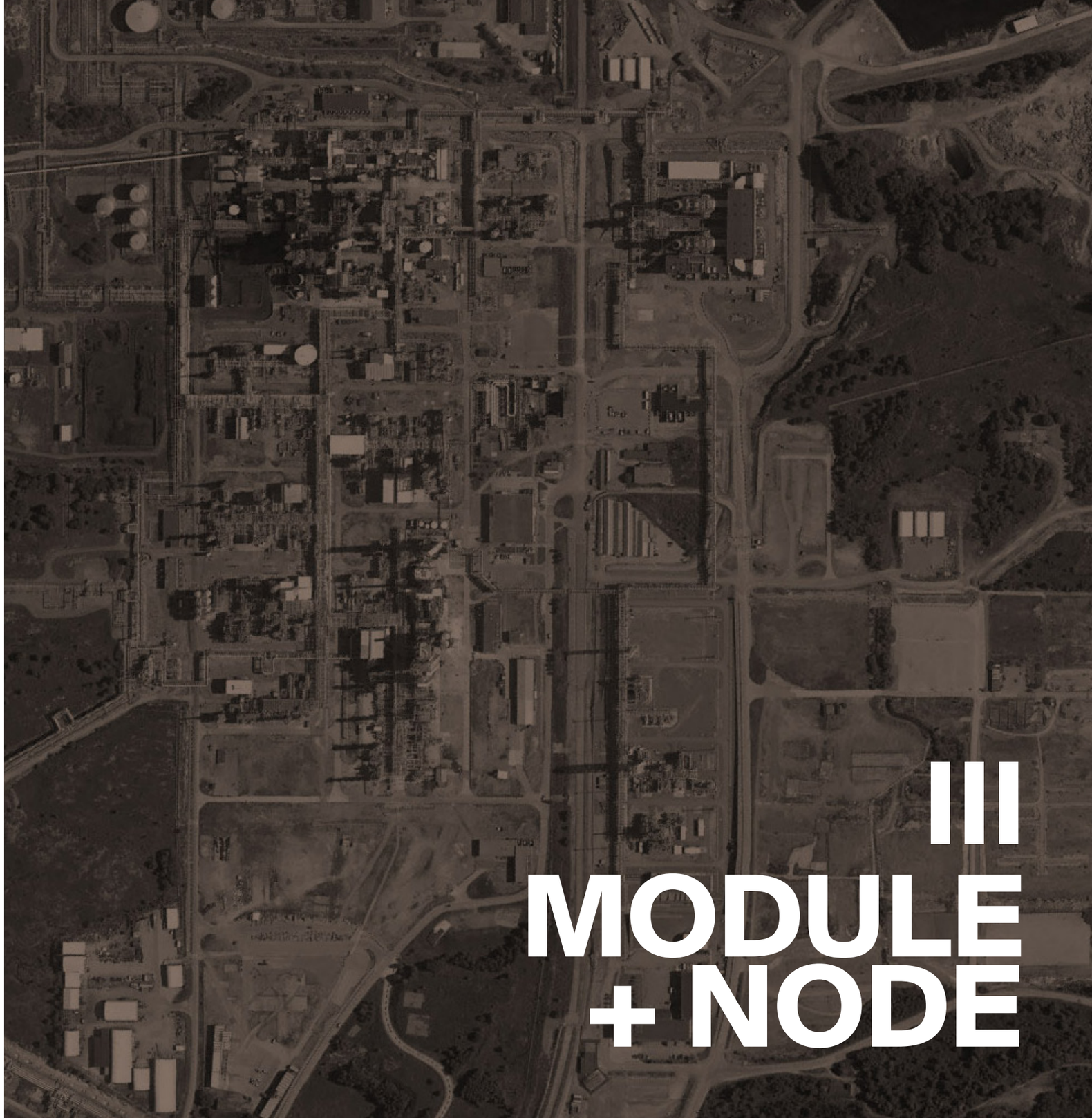


CONSTRUCTION OF THE MODULE



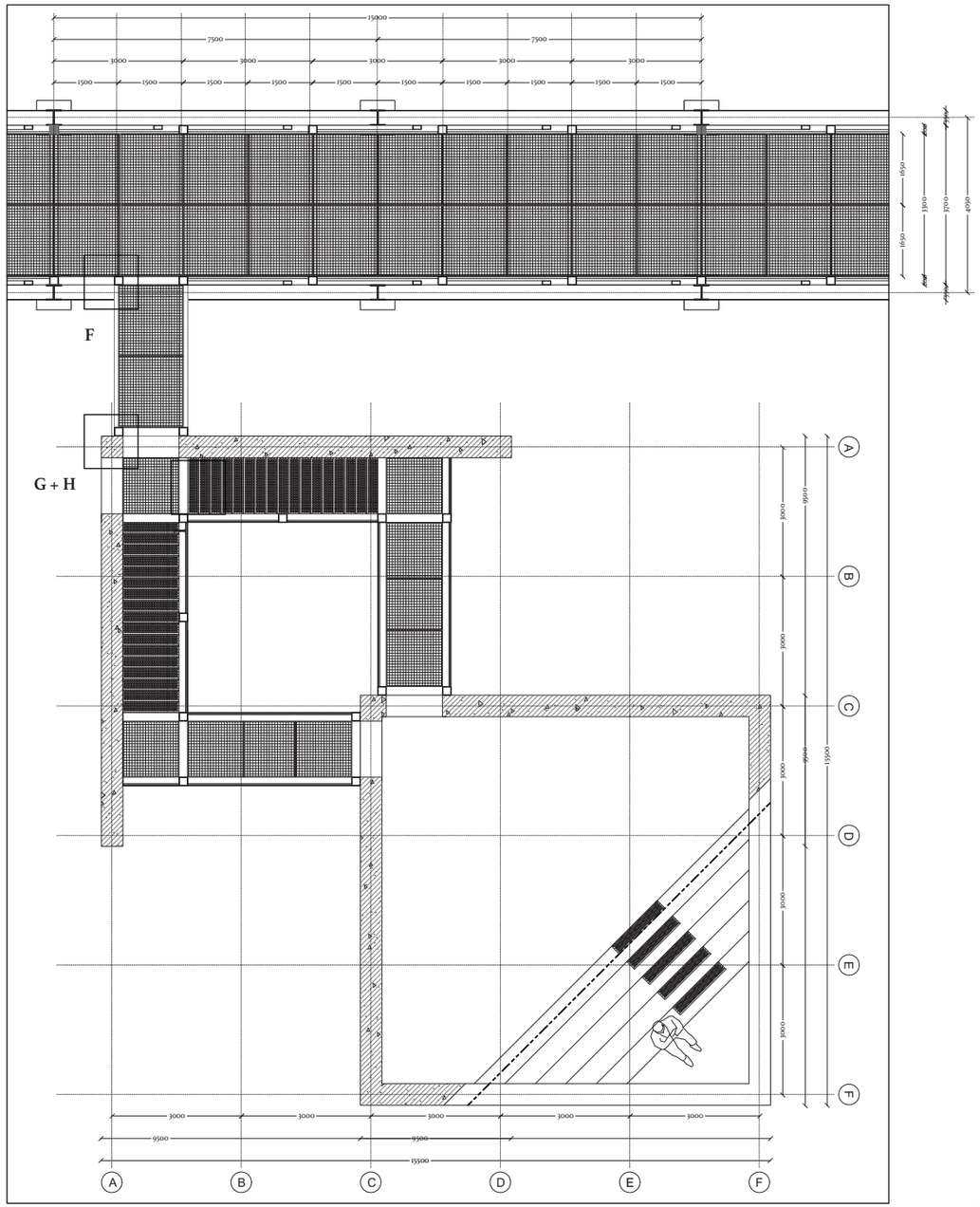

Columns
HE360 - CorTen
Beams
HE360 - CorTen
Slitting holes
Nuts + Bolts


Main module
Expanded metal
CorTen
Tube profile
200 x 200 mm - CorTen
Grating
h = 25 mm - CorTen
HEB profile
200 x 200 mm - CorTen
U profile
175 x 175 mm - CorTen

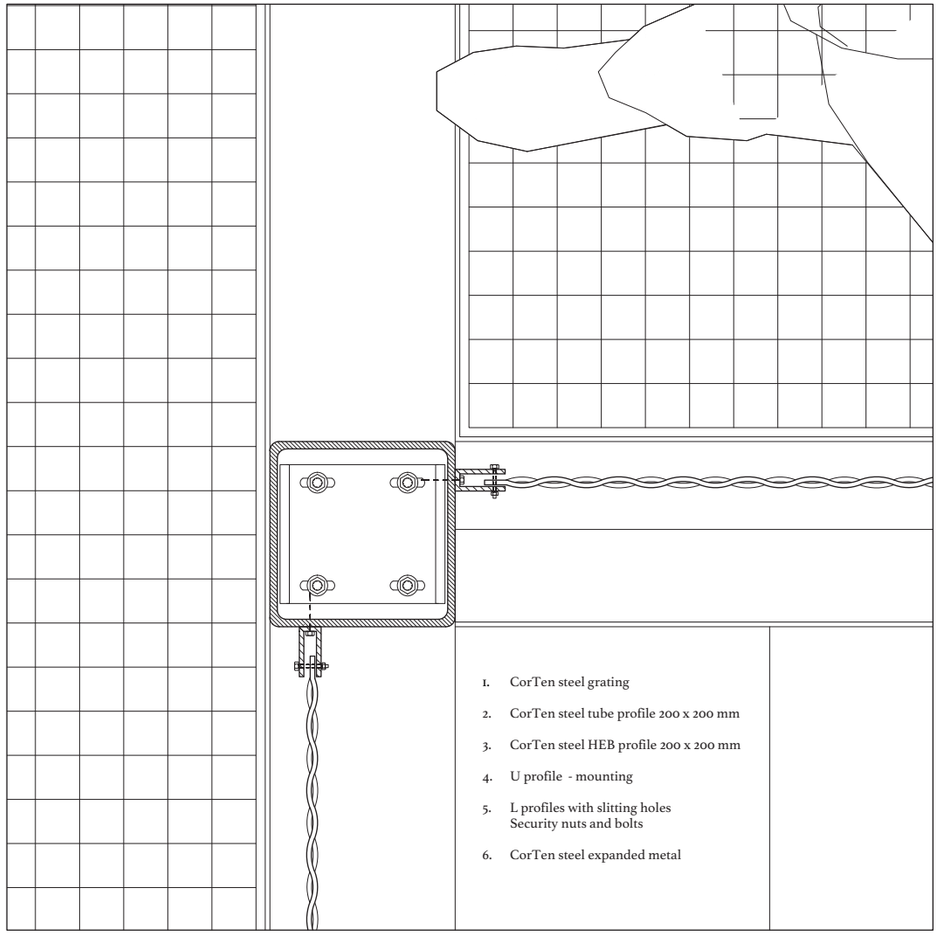


III
MODULE + NODE

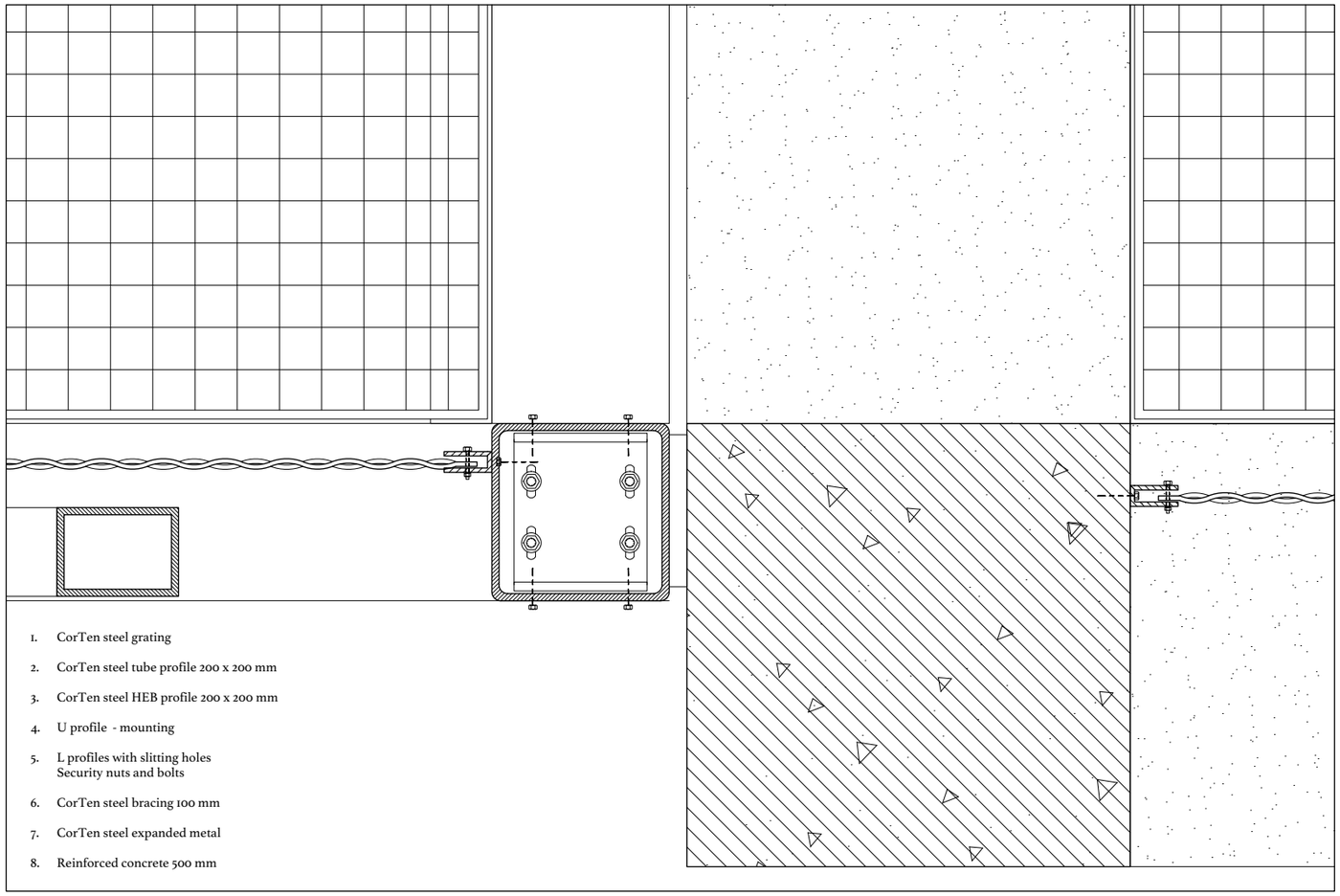
GENERAL DOCUMENTATION



DETAILS

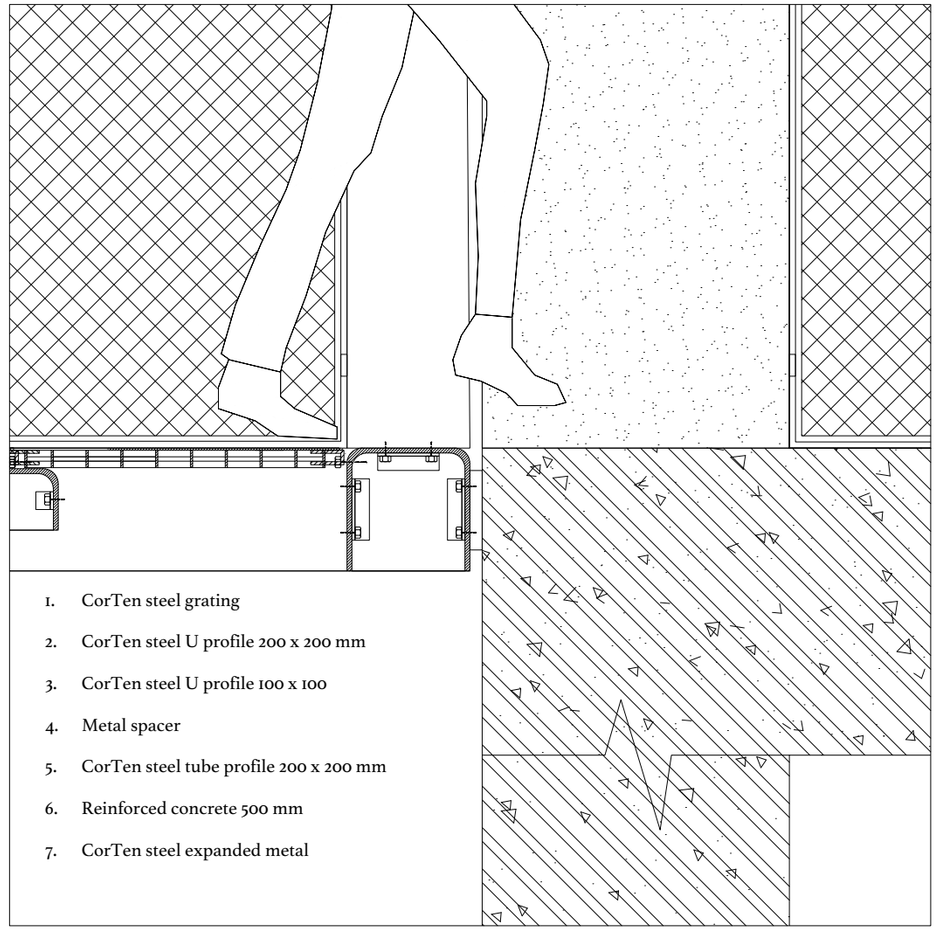


Detail F
Connection steel module - steel bridge
1 to 5 downscaled to 1 to 10 HORIZONTAL



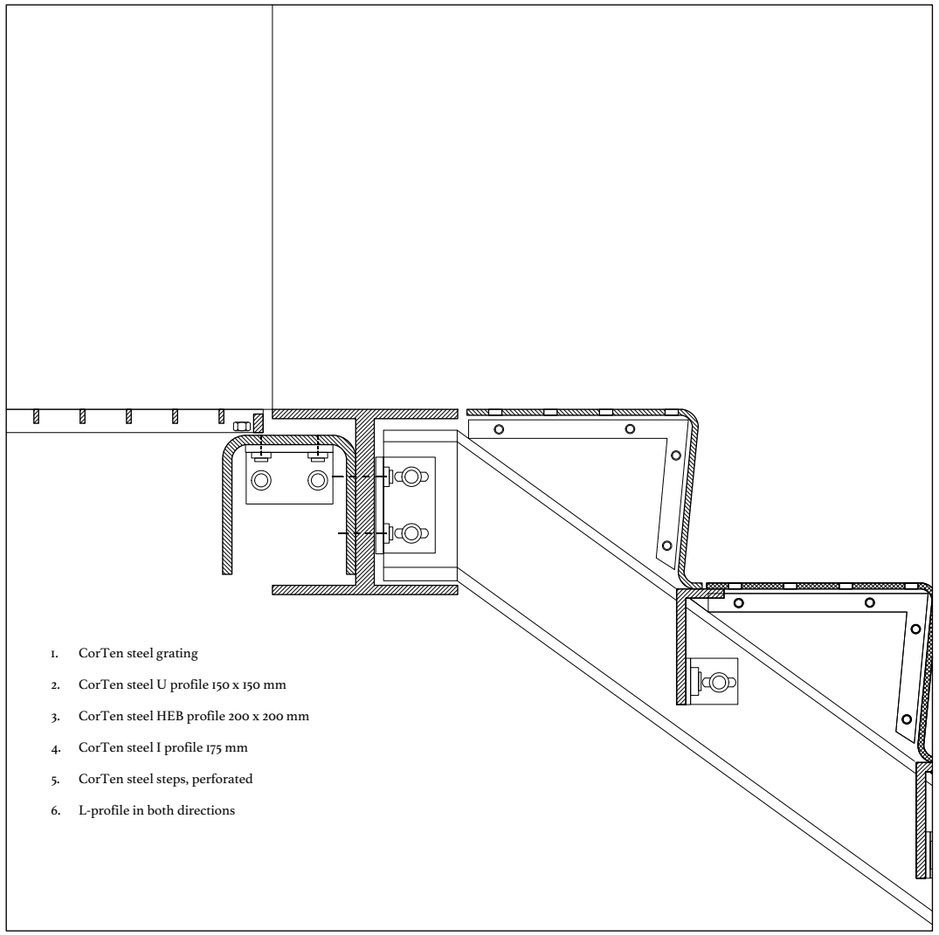
1. CorTen steel grating
2. CorTen steel tube profile 200 x 200 mm
3. CorTen steel HEB profile 200 x 200 mm
4. U profile - mounting
5. L profiles with slitting holes
   Security nuts and bolts
6. CorTen steel bracing 100 mm
7. CorTen steel expanded metal
8. Reinforced concrete 500 mm

Detail G
Connection steel bridge - concrete node
1 to 5 downscaled to 1 to 10 HORIZONTAL



1. CorTen steel grating
2. CorTen steel U profile 200 x 200 mm
3. CorTen steel U profile 100 x 100
4. Metal spacer
5. CorTen steel tube profile 200 x 200 mm
6. Reinforced concrete 500 mm
7. CorTen steel expanded metal

Detail H
Connection steel module - steel bridge
1 to 5 downscaled to 1 to 20 VERTICAL



1. CorTen steel grating
2. CorTen steel U profile 150 x 150 mm
3. CorTen steel HEB profile 200 x 200 mm
4. CorTen steel I profile 175 mm
5. CorTen steel steps, perforated
6. L-profile in both directions

Detail I
Connection steel stairs
1 to 5 downscaled to 1 to 10