

The inclusive community hub

- A feminist approach towards architecture -

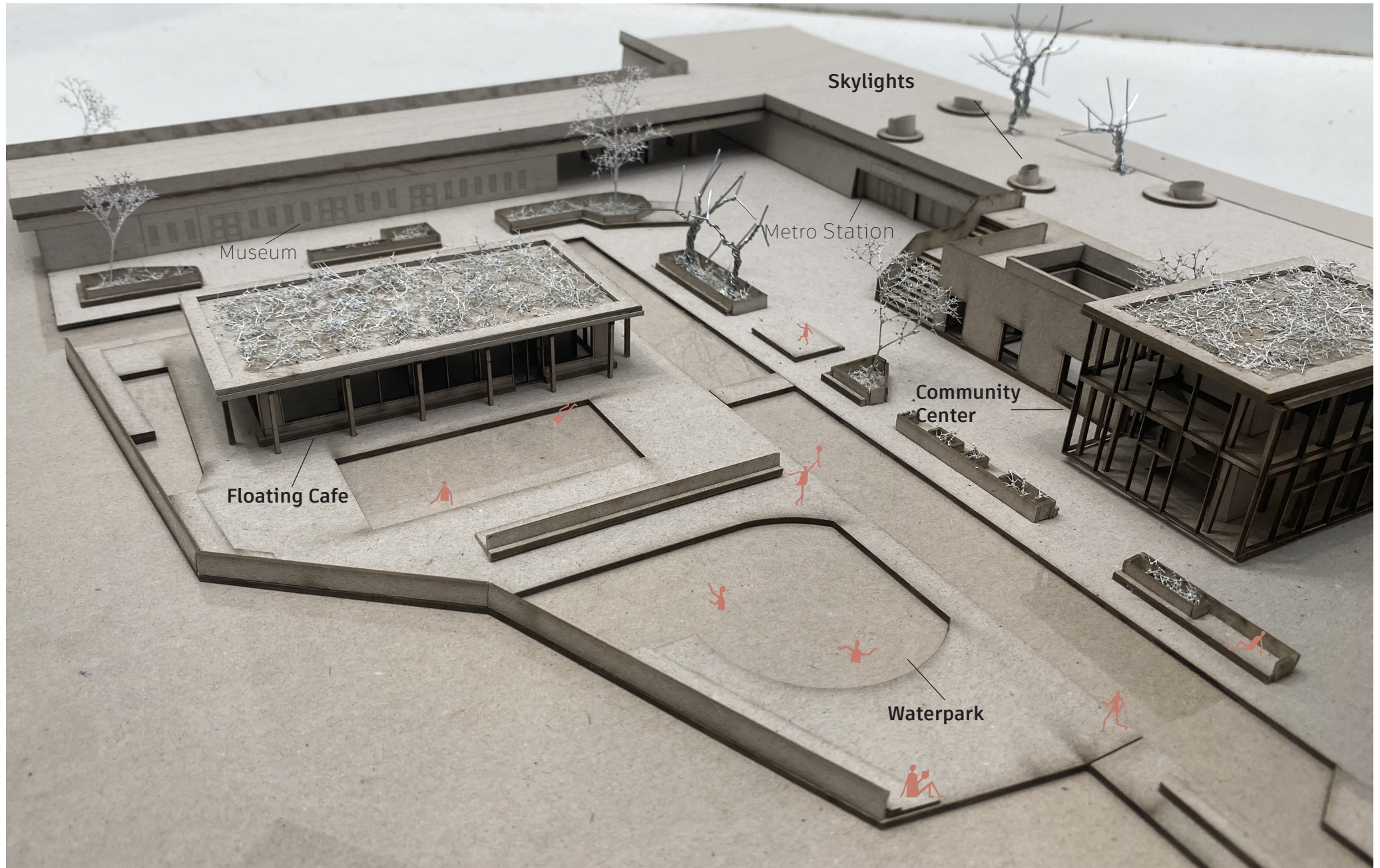


Table of contents

Community hub	1
The proposal	2
Key design concepts	3
Design – Facilities	5
Area plan	6
Public space design	8
Waterpark	12
Roof lights by subway	15
Generating energy	18
Building 1 - Floating Café	19
Floor plan	20
Images	22
Section	26
Structural plan & Calculation	27
Ventilation plan & Calculation	33
Climate section	37
Detailing	39
Building 2 - Community center	42
Floor plan	43
Images	45
Section	51
Structural plan & Calculation	52
Ventilation plan & Calculation	58
Climate section	62
Detailing	64

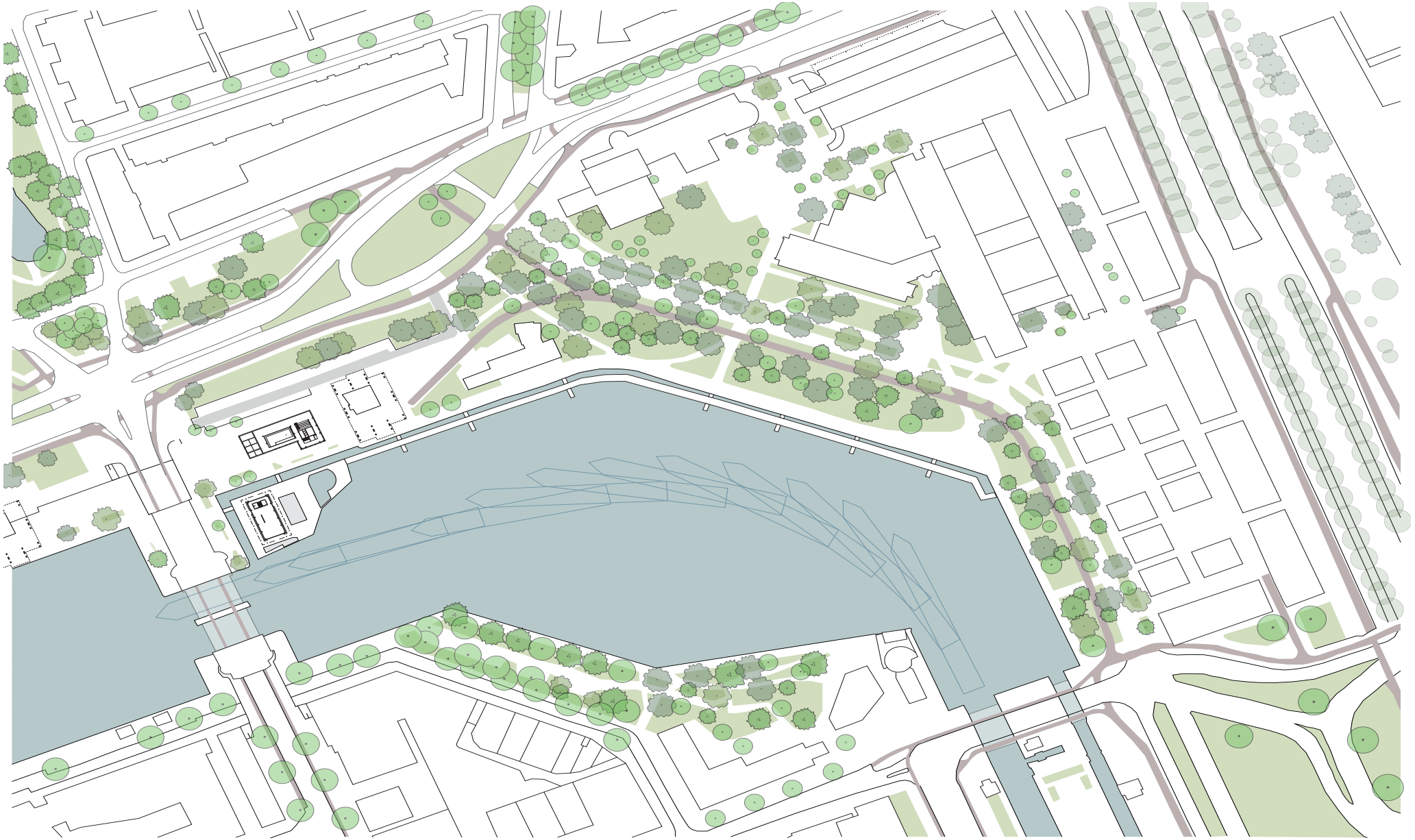


Community hub



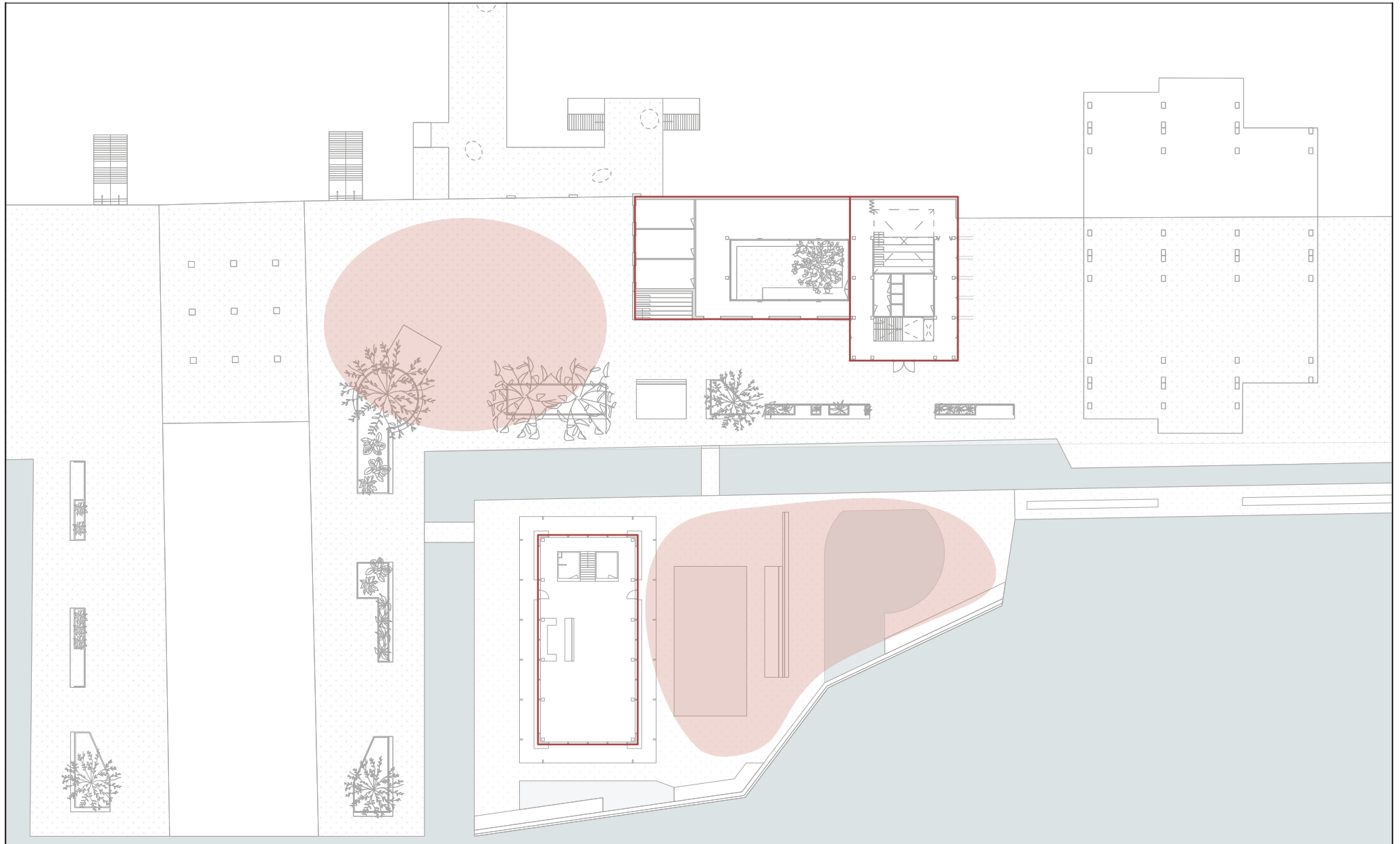
The proposal

My proposal is to activate and enliven the site where currently not much is happening by erecting two new buildings, continuing a green route and adding a water park. This will both attract people in itself and provide a gateway to the waterfront.



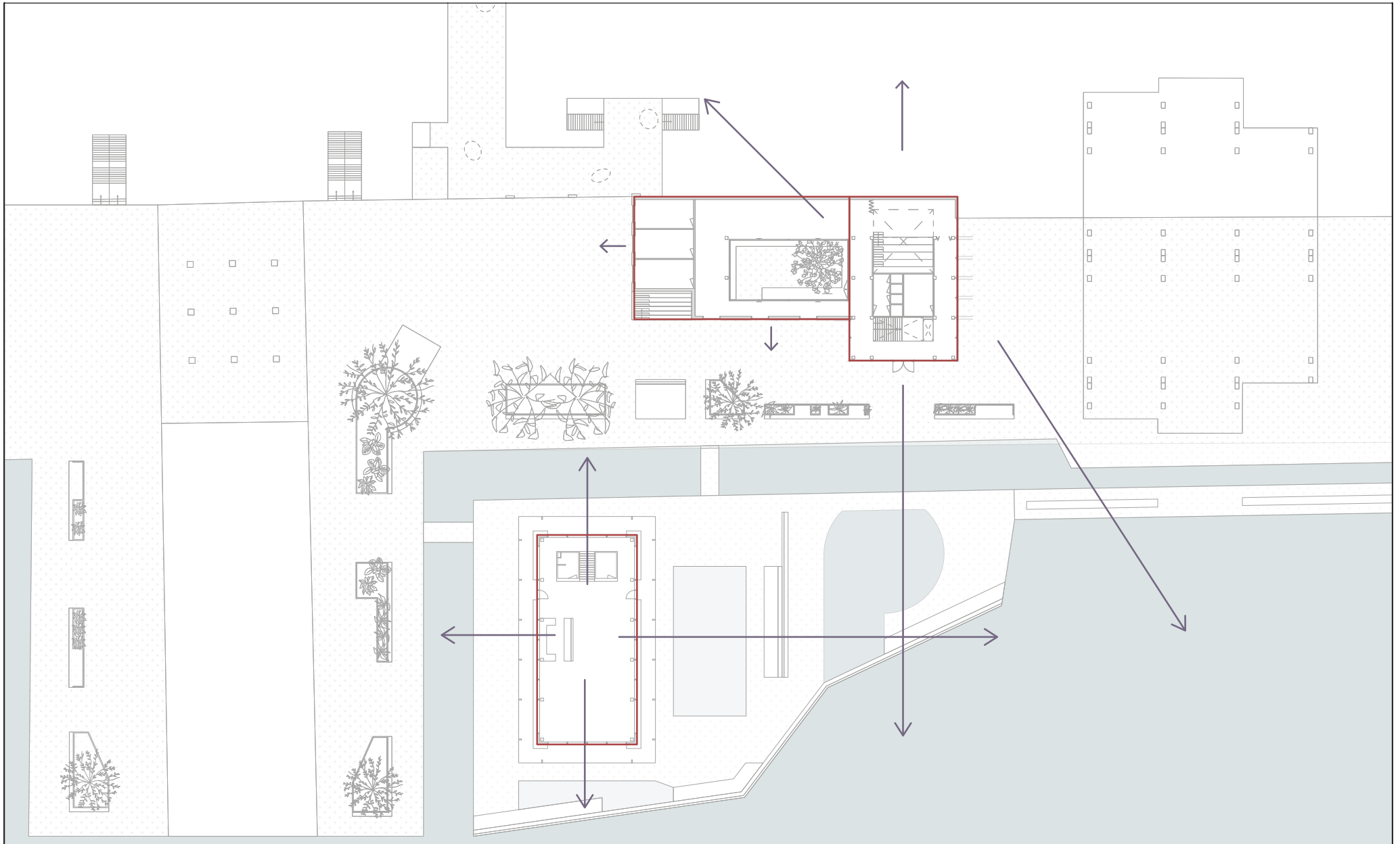
Key design concepts - Areas

By placing two buildings I ensure that multiple and different types of areas are created that provide more liveliness at multiple times of the day



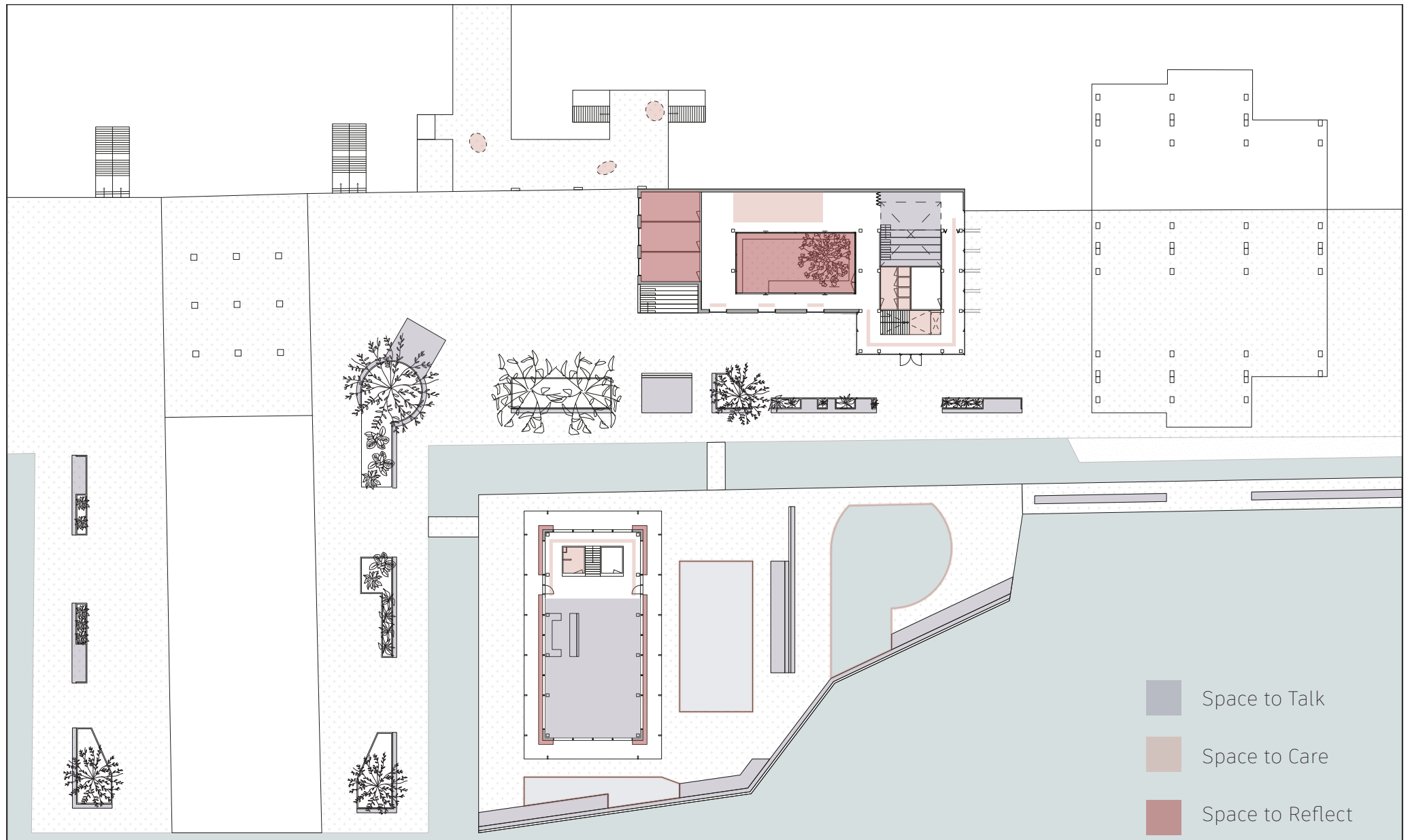
Key design concepts - Sightlines

The placement of the buildings was chosen so that more sight lines are created across the entire site plan area providing more social safety.

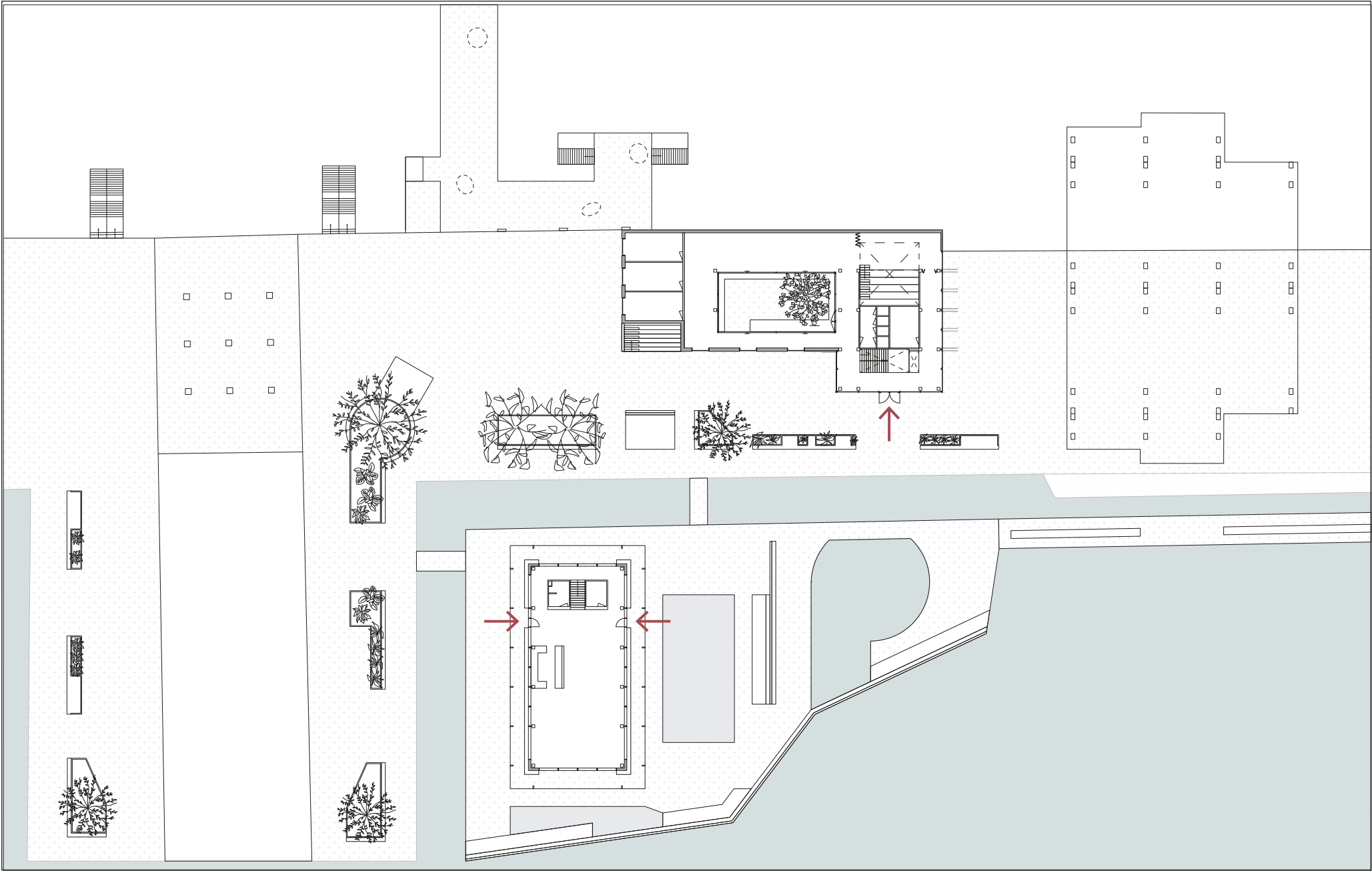


Design - Facilities

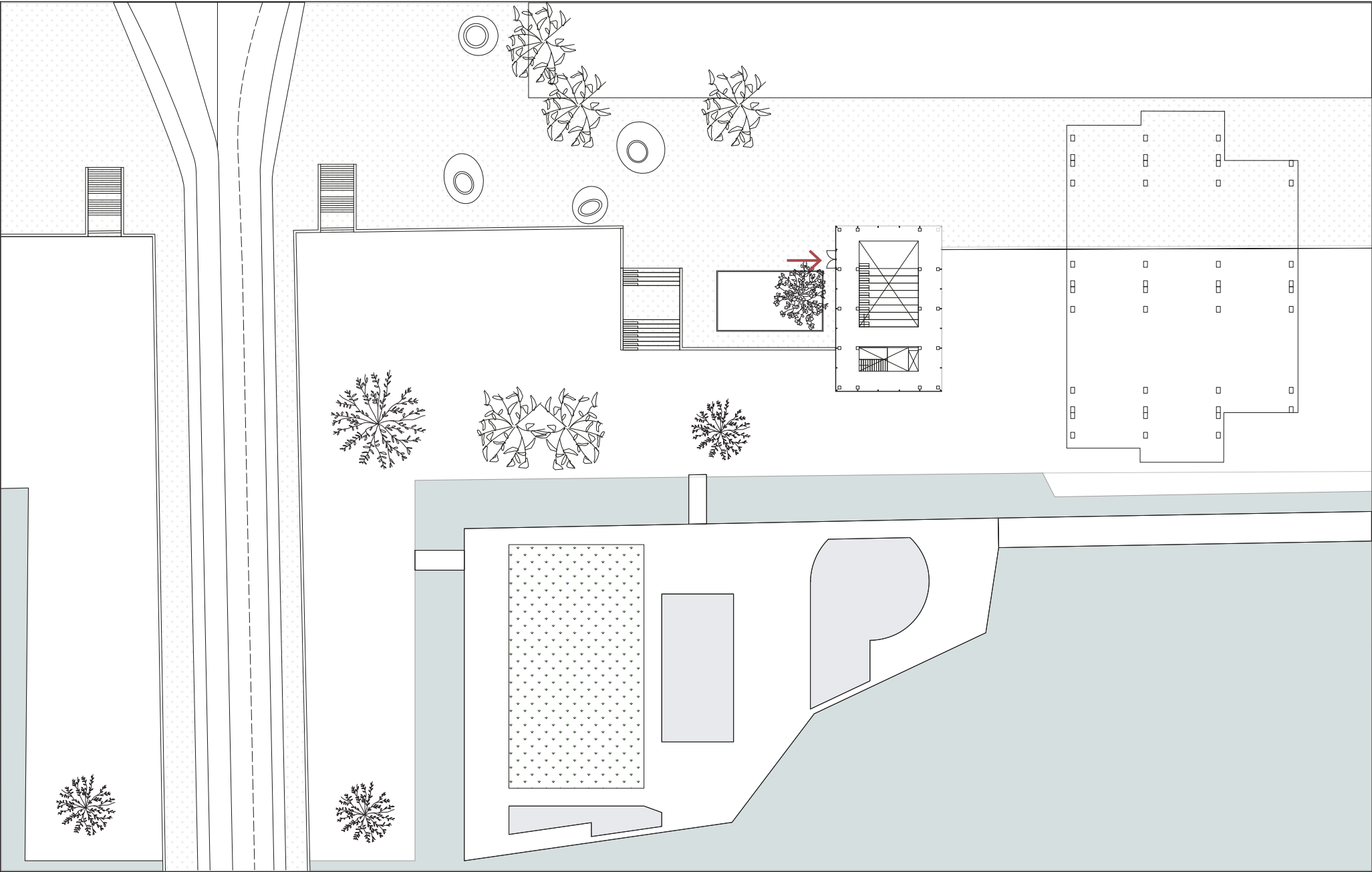
The design reflects this translation of the research. Allow me to take you through the design and point out how all three spaces have been created.



Area plan - First floor

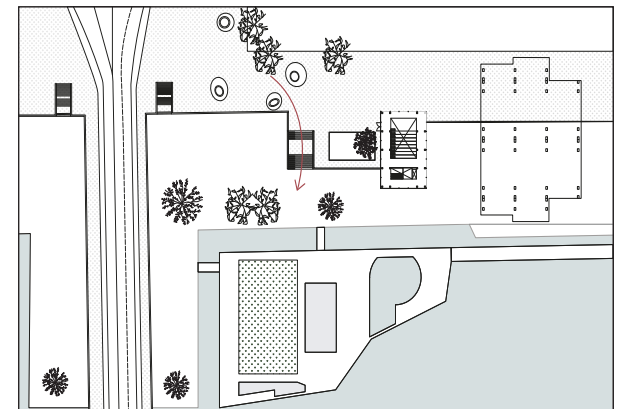
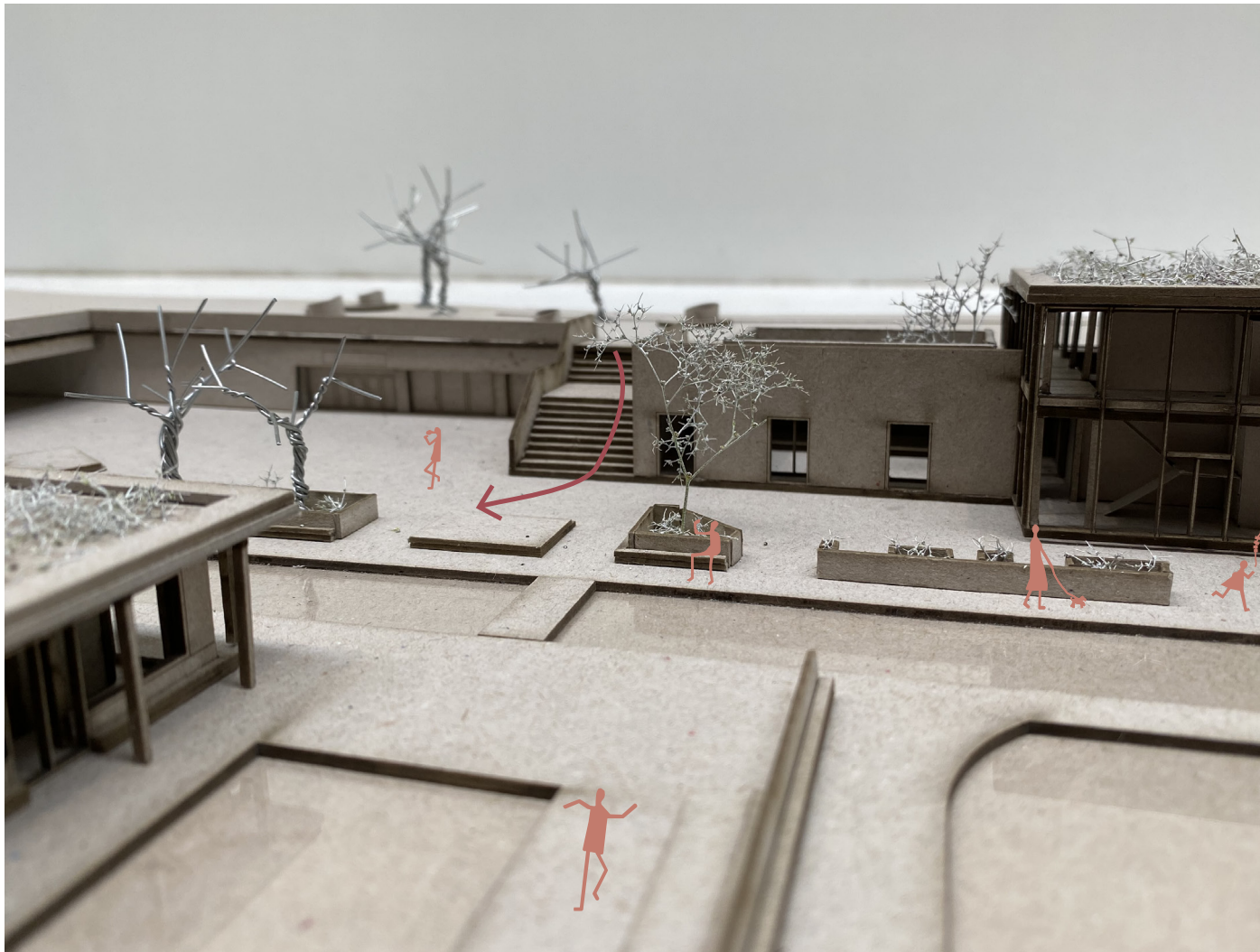


Area plan - Second floor



Public space design - Entry of the site

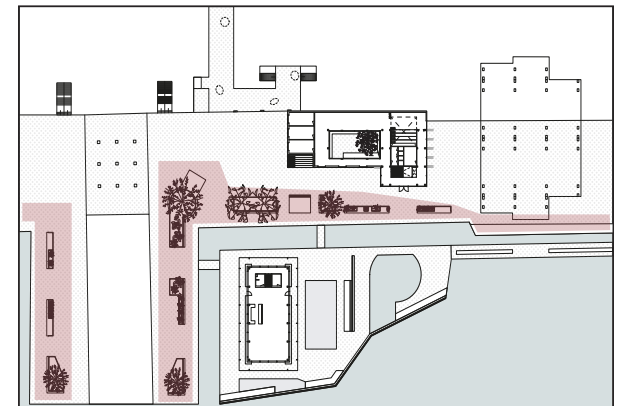
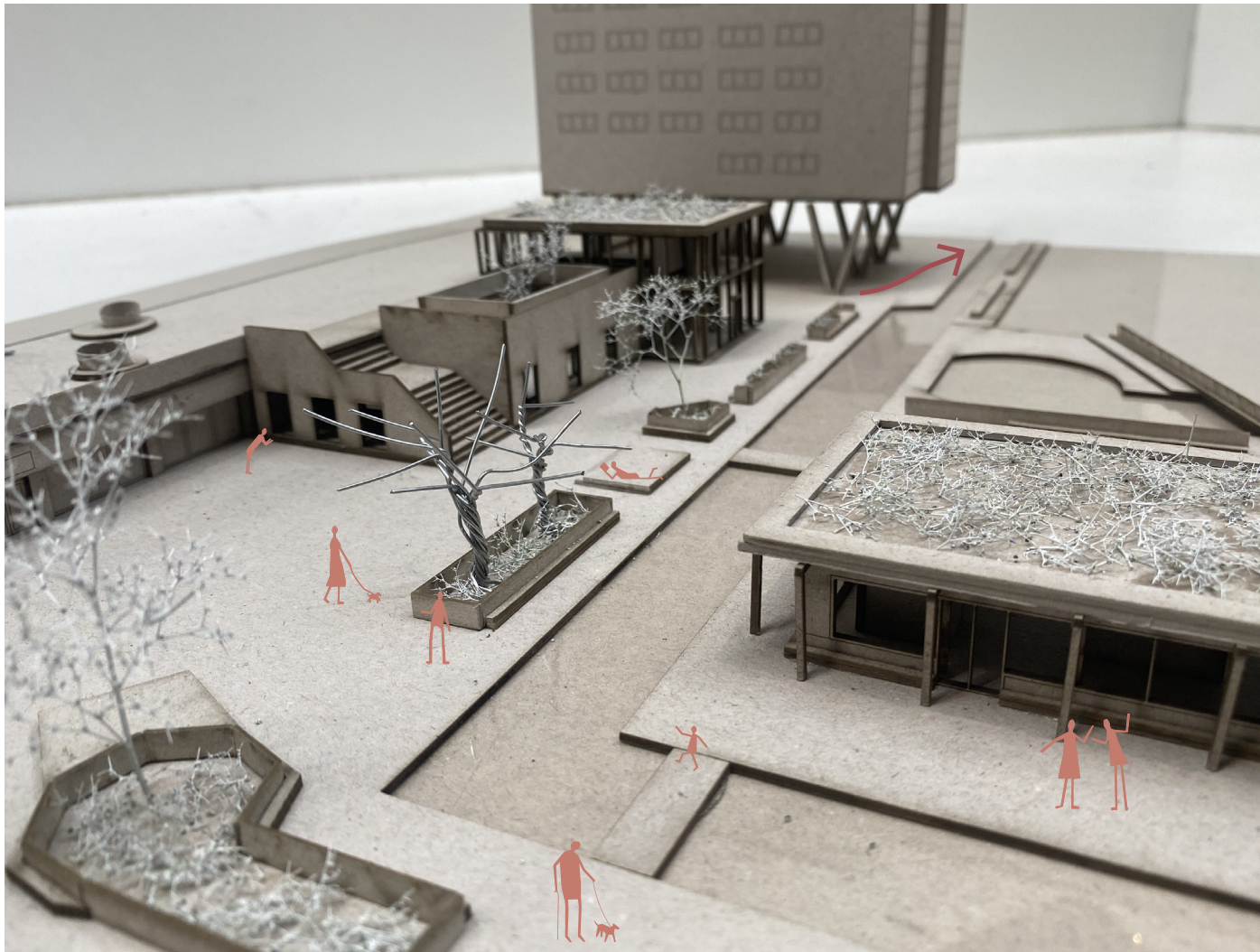
Adding a large, wide staircase will increase accessibility to the area for the residents, which creates more liveliness. In addition, it will also start to provide more visibility which automatically results in a safer place.



Public space design - Park route extension

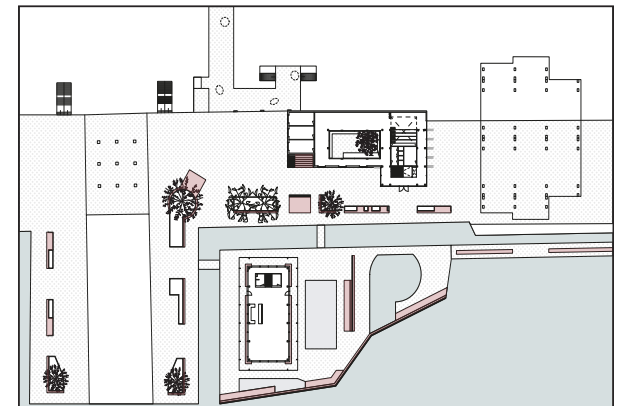
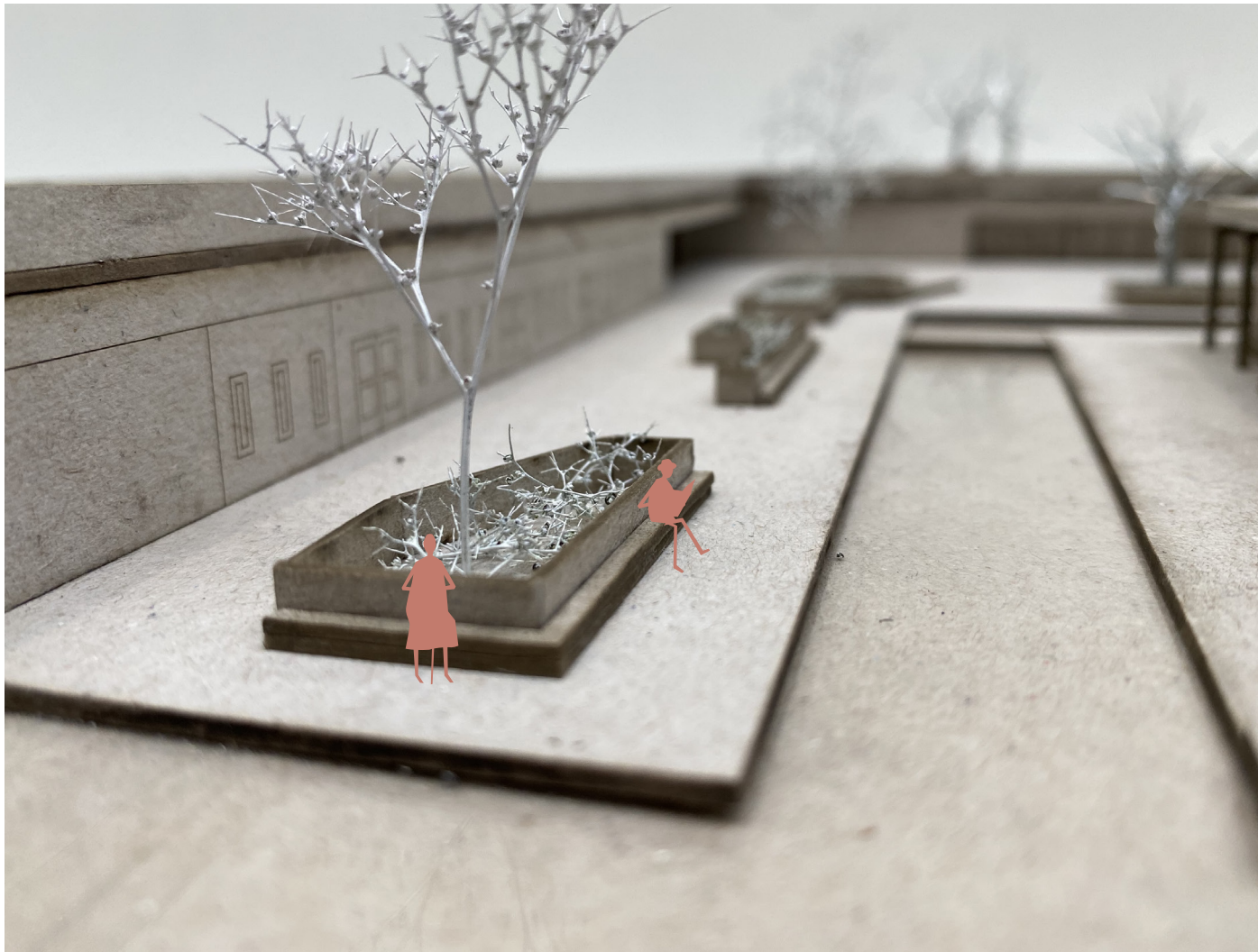
Recently, a new park has been built in the extension of my site, this park is already making an effort to create a green route through the city and to attract people to the area along the water.

The recently constructed waterfront park will be extended to the site of the community center. It will be designed in strips where seating, lounging areas, a stage and plants and trees will be placed.



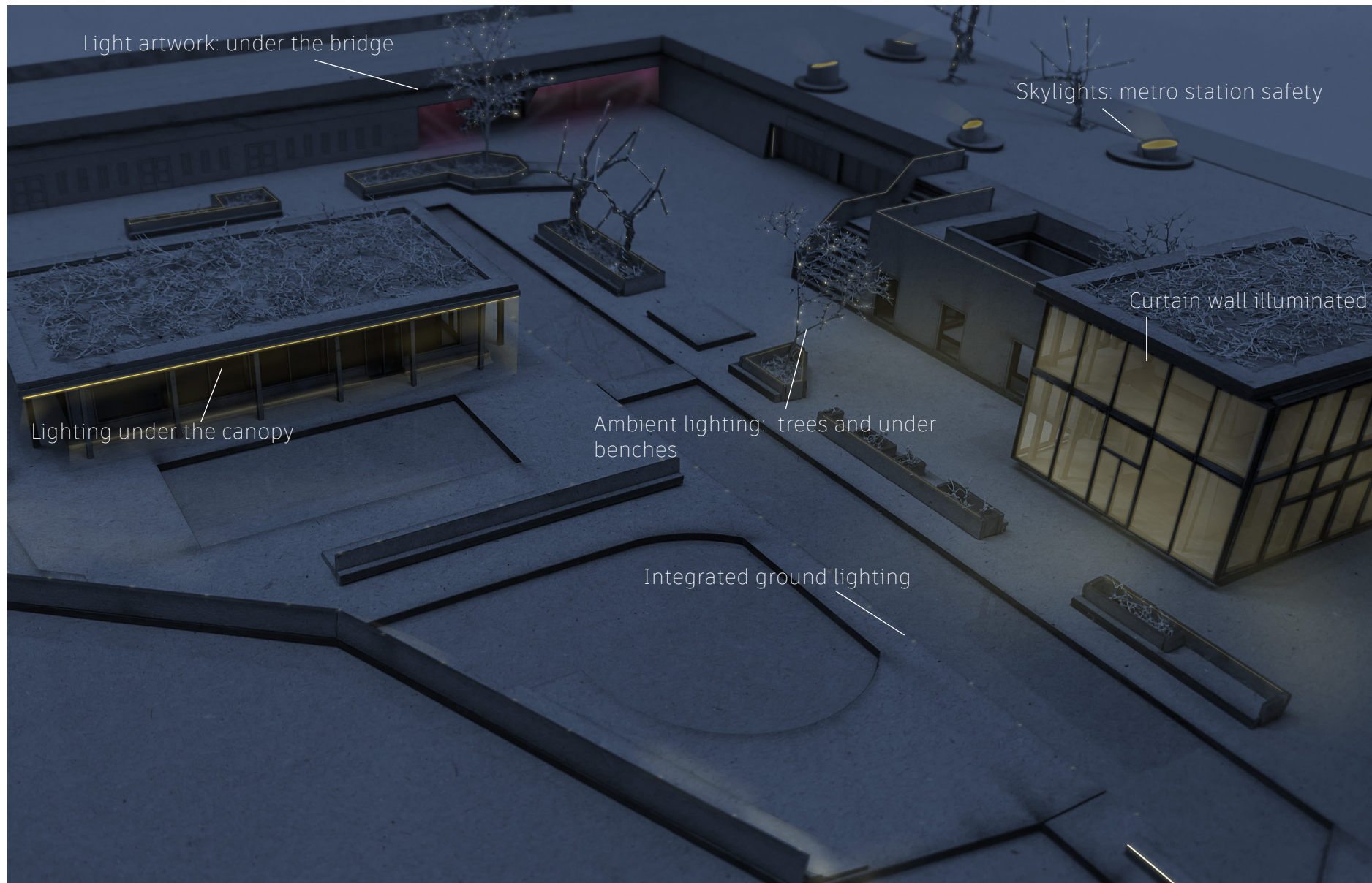
Public space design - Seating

During my interviews, people expressed a desire to see seating areas added along the waterfront. The opportunity is given to them, whether it is on benches, stairs, at the quay and it is even integrated into the façade of the buildings.



Public space design - Lighting plan in the area

In the evening, the whole area will be illuminated in different ways. This has been taken into account in the design of the buildings, but there will also be an artwork of light under the bridge and there will be ambient lighting in the trees, benches and decking.

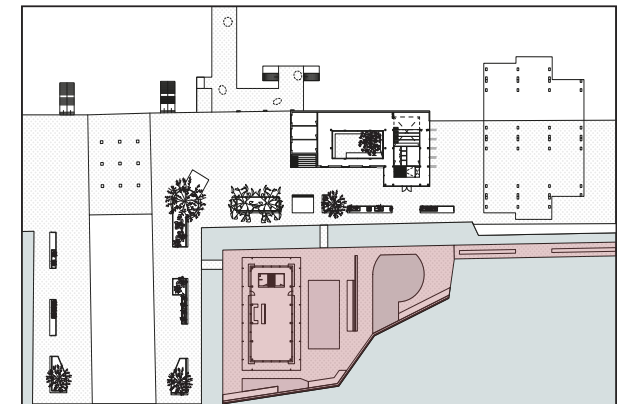
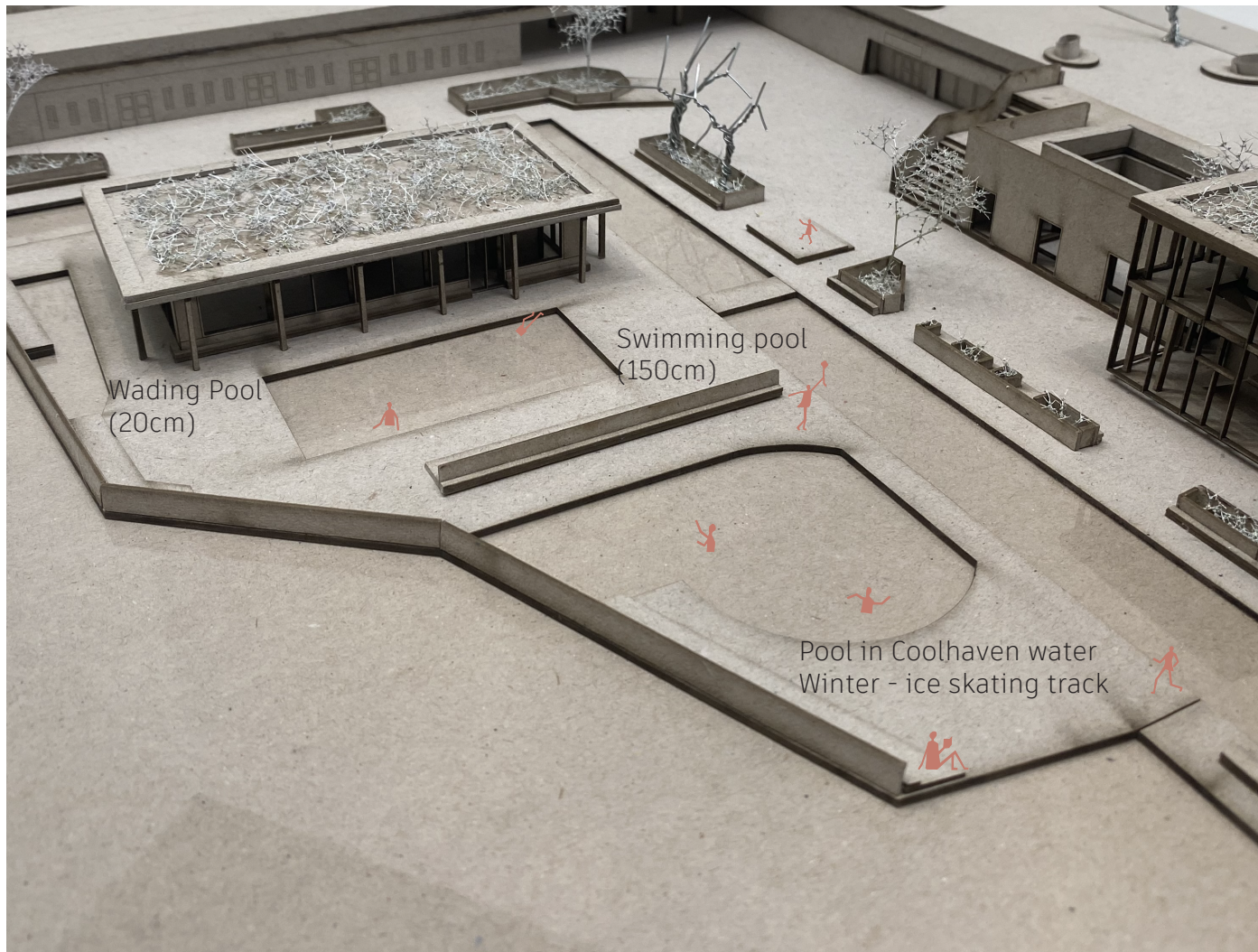


Waterpark

Adding a water park can provide space for fun and cooling off on sunny days, also it will automatically start to bring more vibrancy to the area. Three different pools have been added, space will be given to different age groups this way.

On less sunny days, it can be a place to walk through and have a cup of coffee, fish or reflect under the cafe's canopy.

In winter, a pool can be converted into an Ice-skating rink.



Waterpark - Swimming pool (150cm)



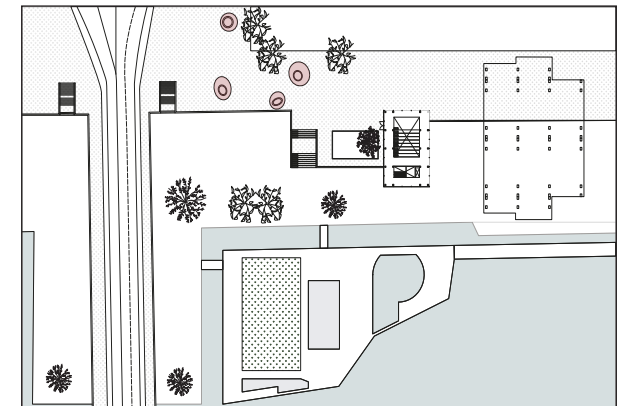
Waterpark - Wading Pool (20cm) with fountains



Roof lights by subway

The neighborhood experiences more nuisance and vandalism than on average in Rotterdam. Similarly, more women and men are harassed on the street than on average. It is therefore very important to address this during the design process.

Residents indicated that the subway station located below feels closed off, dark and unsafe. Adding large, playful skylights will create a better connection between upstairs and downstairs.

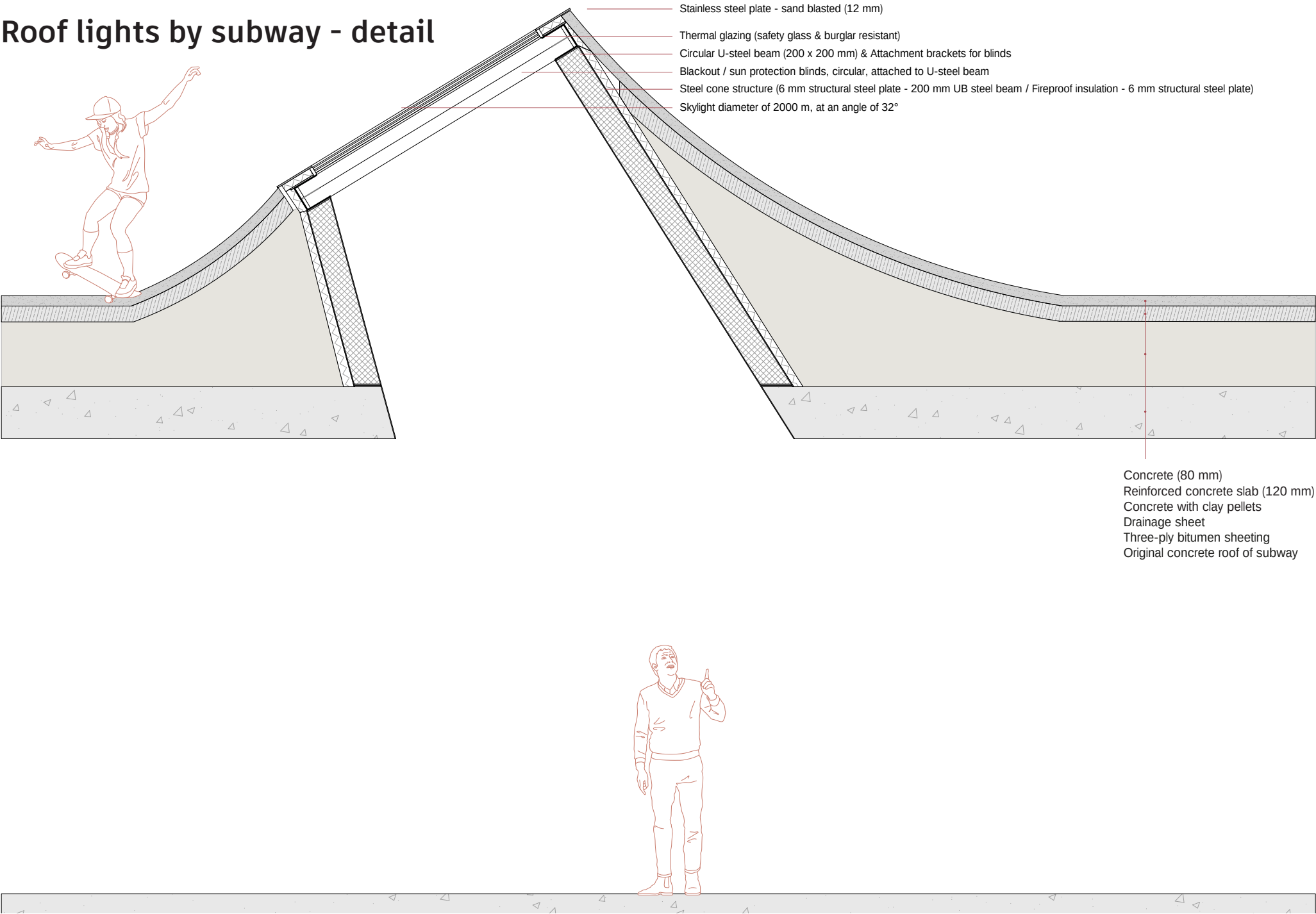


Roof lights by subway - Model

"I think it is very important, in spaces like subway stations that there is a lot of visibility. So that social control is stimulated, I think a very open space helps tremendously with that and light is also very important. Because in the dark you often feel more unsafe"

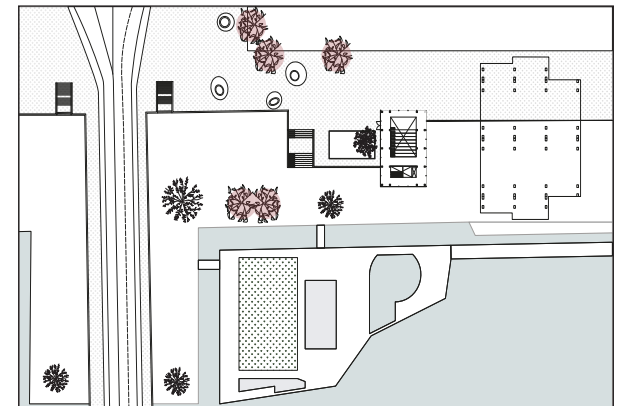
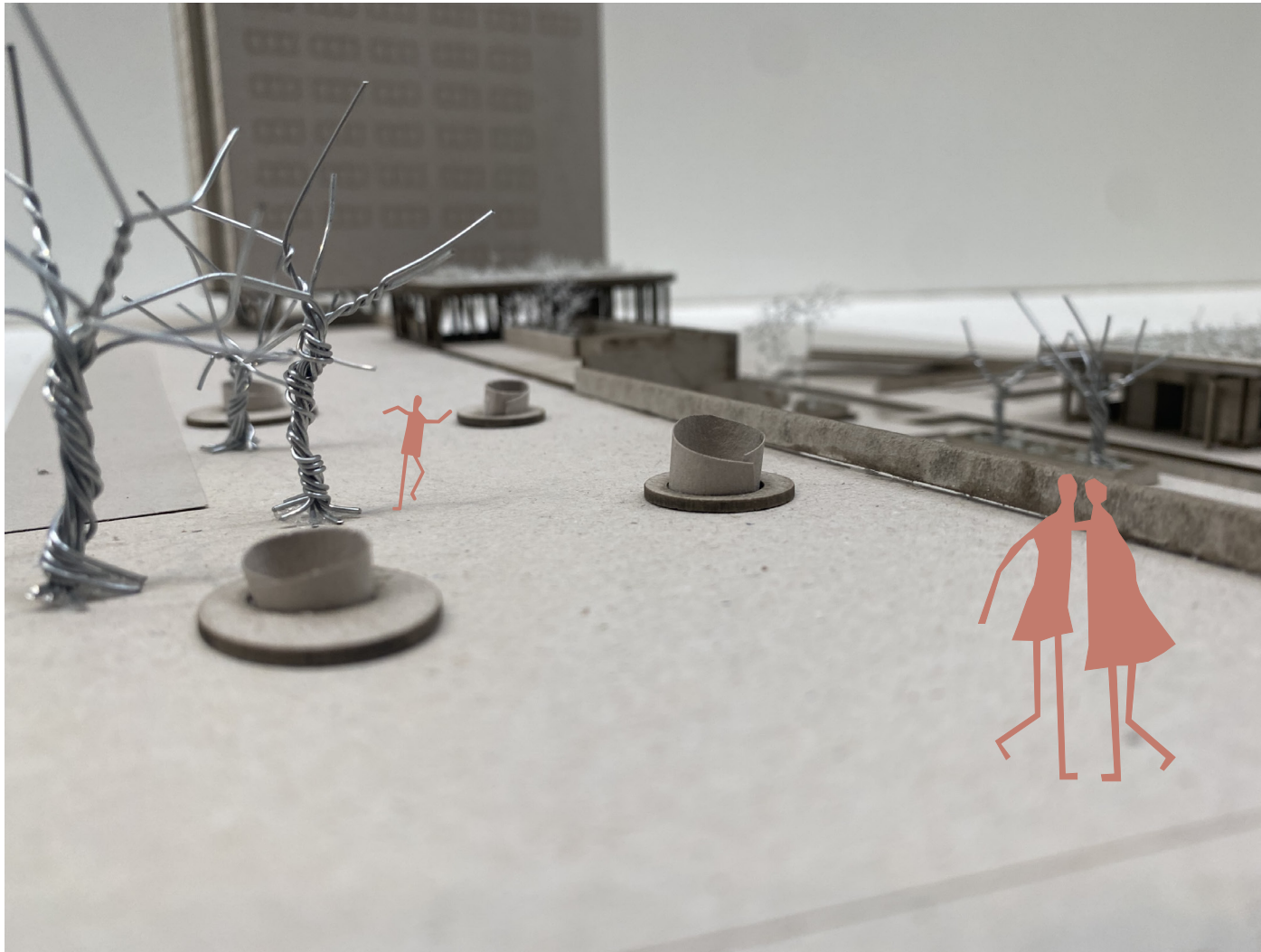


Roof lights by subway - detail

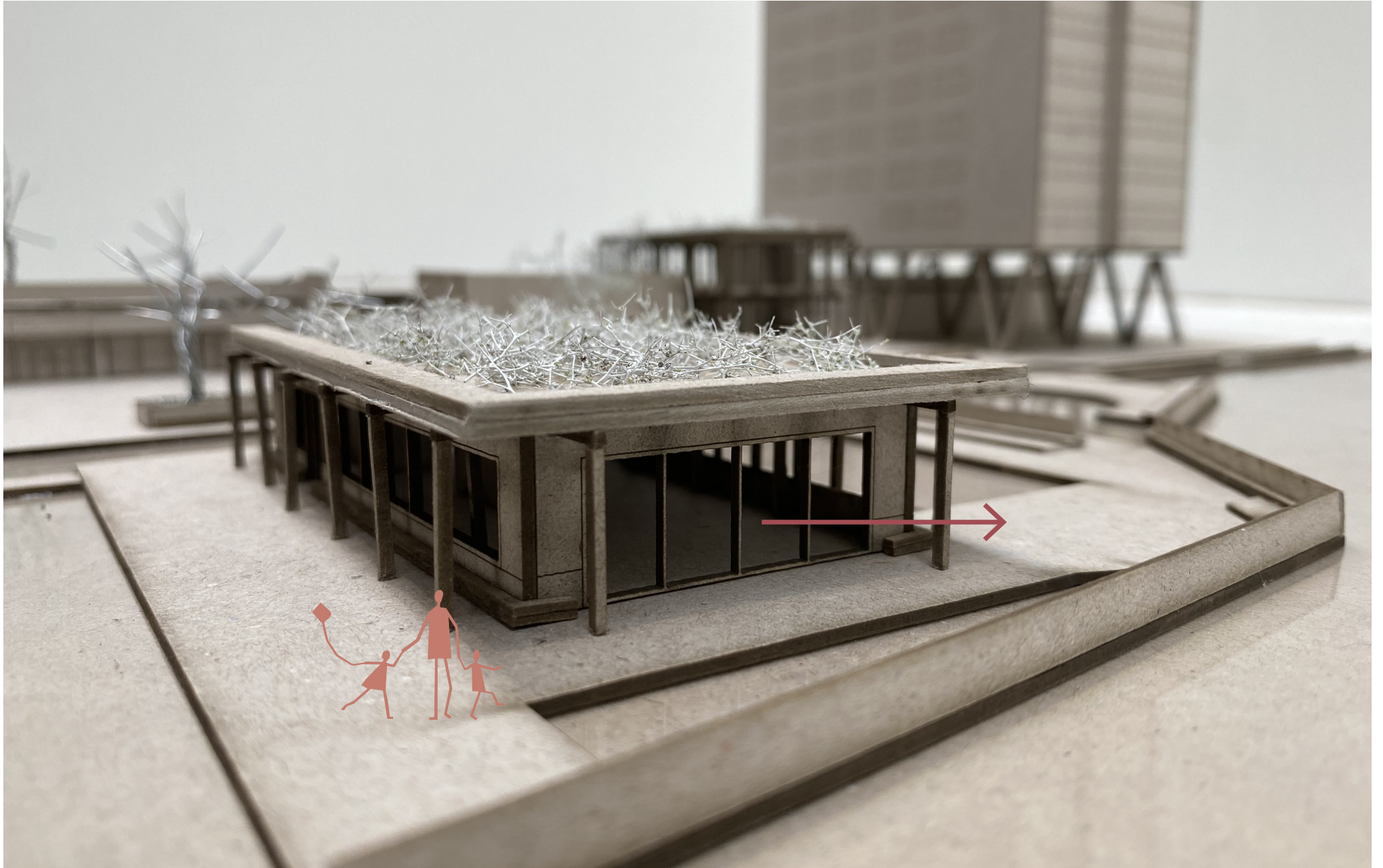


Generating energy - Solar tree

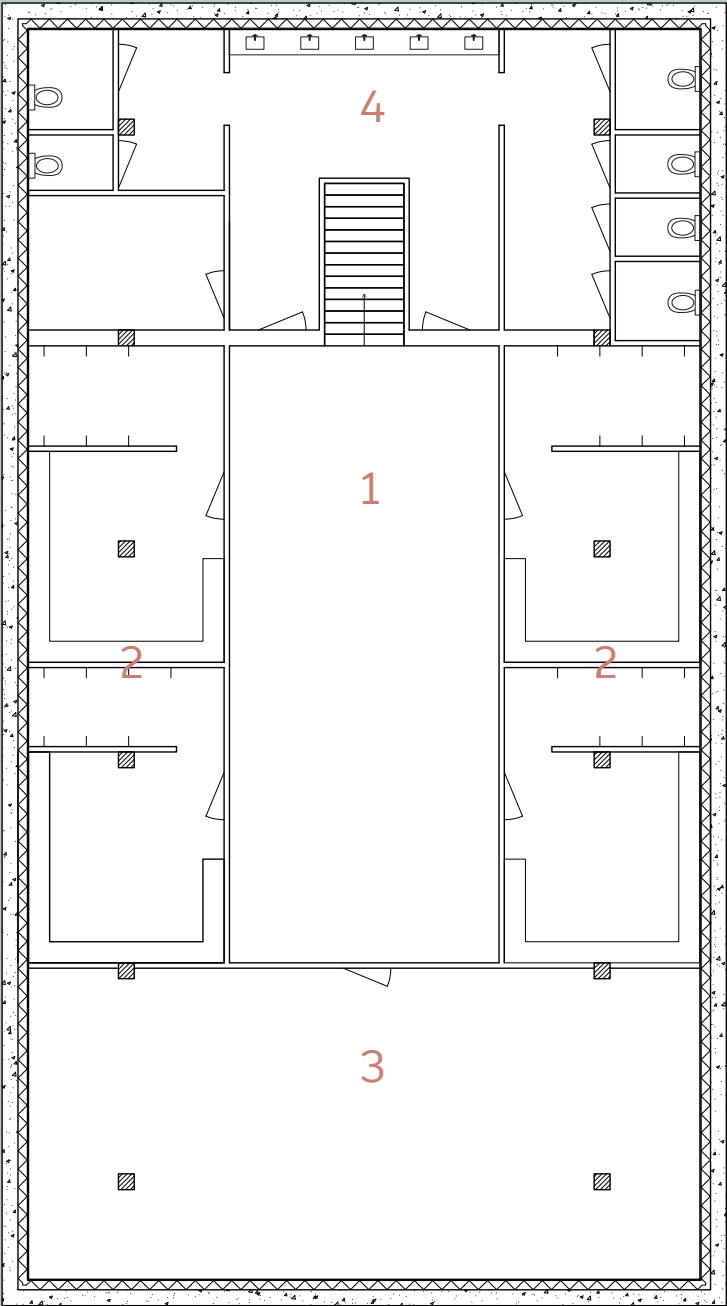
At various places in the area, not only will normal trees be placed but also solar trees will be added. By generating solar energy in the public environment, awareness is created among the residents.



Building 1 - Floating Cafe

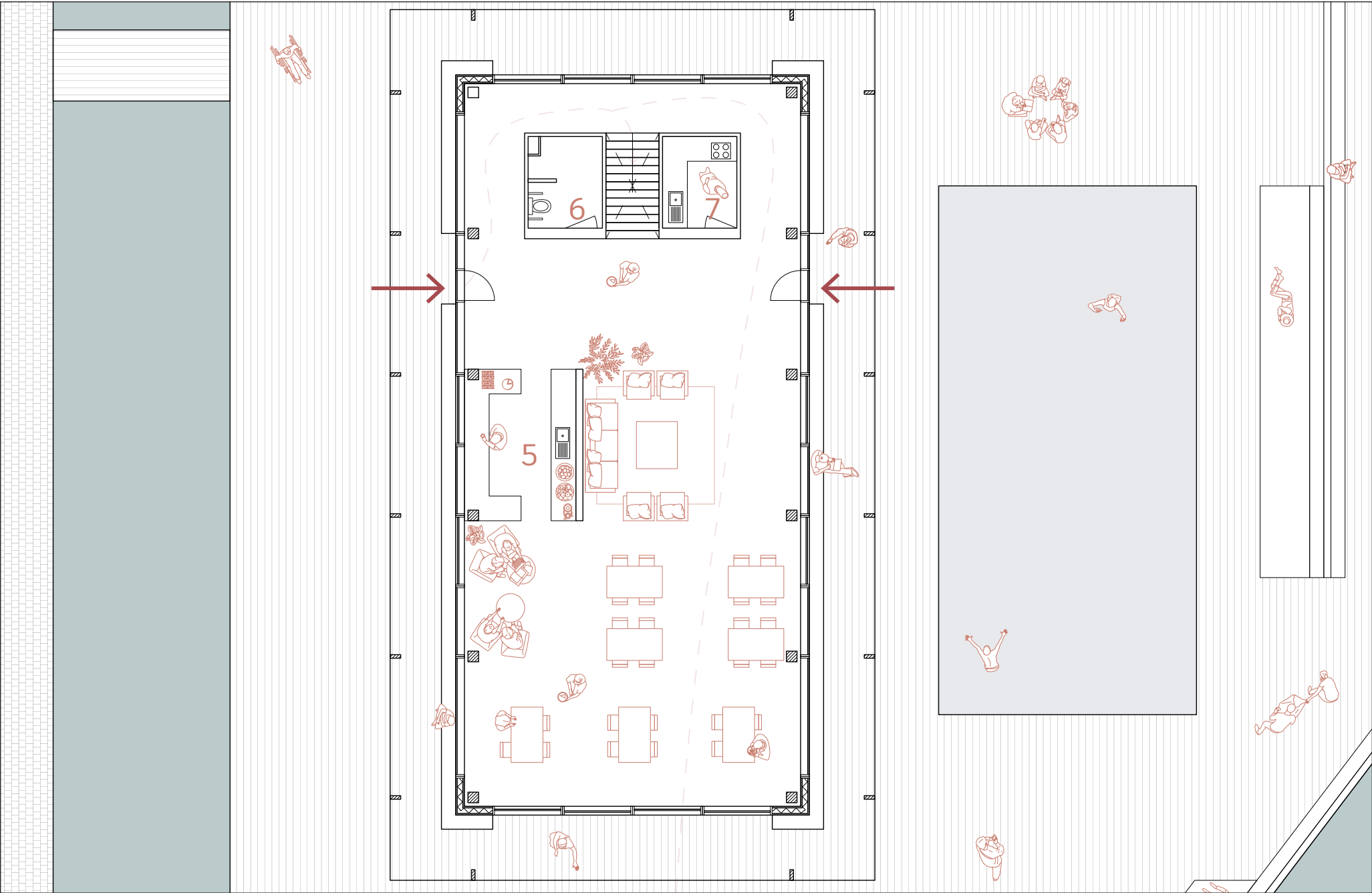


Floating Cafe - Floor plan basement



- 1. Corridor
- 2. Dressing rooms
- 3. Technical room
- 4. Toilets
- 5. Coffee corner
- 6. Accessible toilet
- 7. Kitchen

Floating Cafe - Floor plan first floor



Floating Cafe interior - Coffee corner



A cafe has been added in the building on the water. Workshops can also be hosted here. A nice additional feature is that, because of this special location on the water, the cafe will also attract many people.

A coffee corner has also been added to the façade of the cafe, for hot chocolate in the winter or ice cream in the summer that can be enjoyed on the bench under the canopy. These seating areas under the canopy also provide some initial space for reflection.

Floating Cafe - View



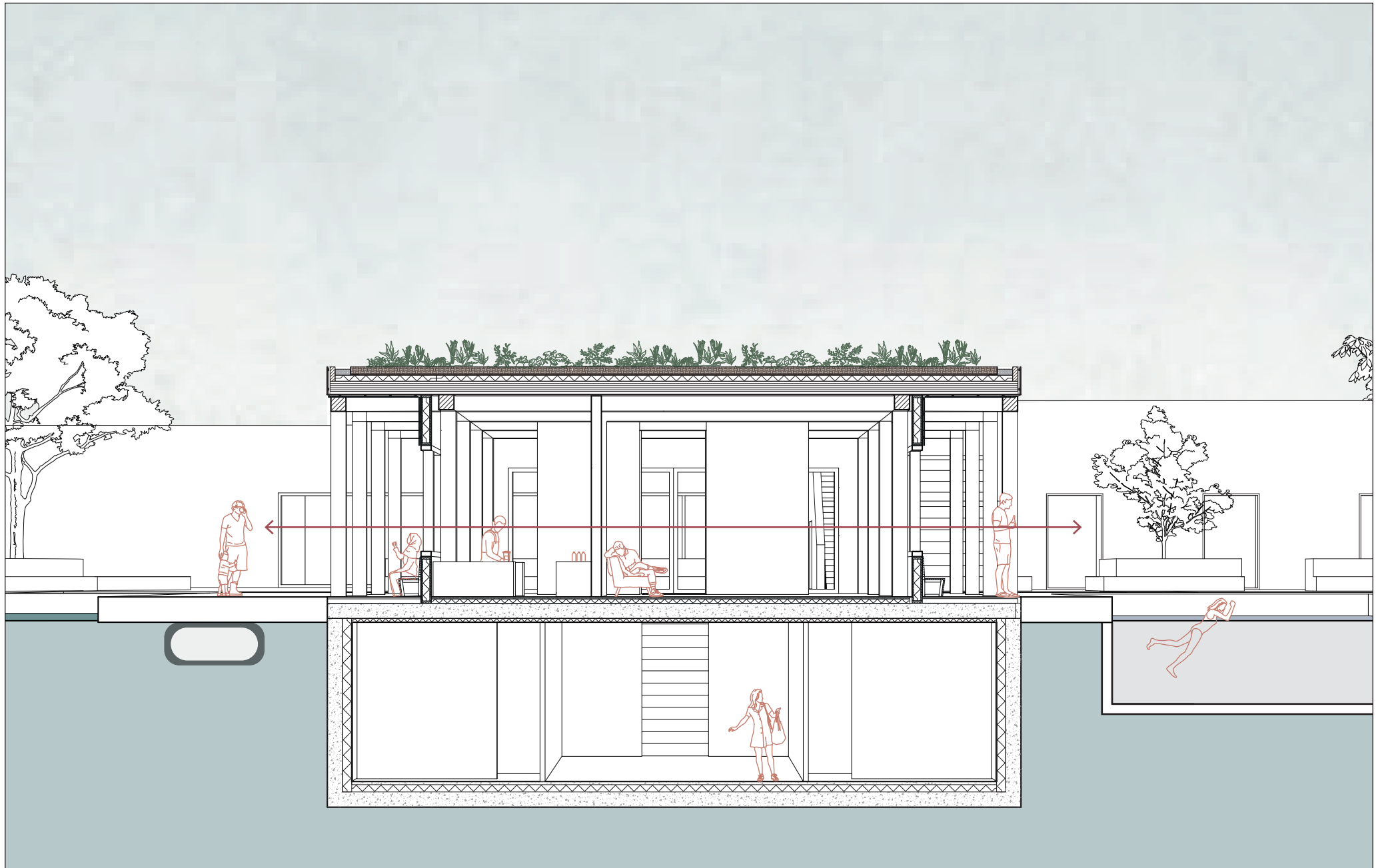
Floating Cafe interior - View



Floating Cafe - Bench under canopy



Floating Cafe - Section



Floating Cafe - Structural plan - Basement

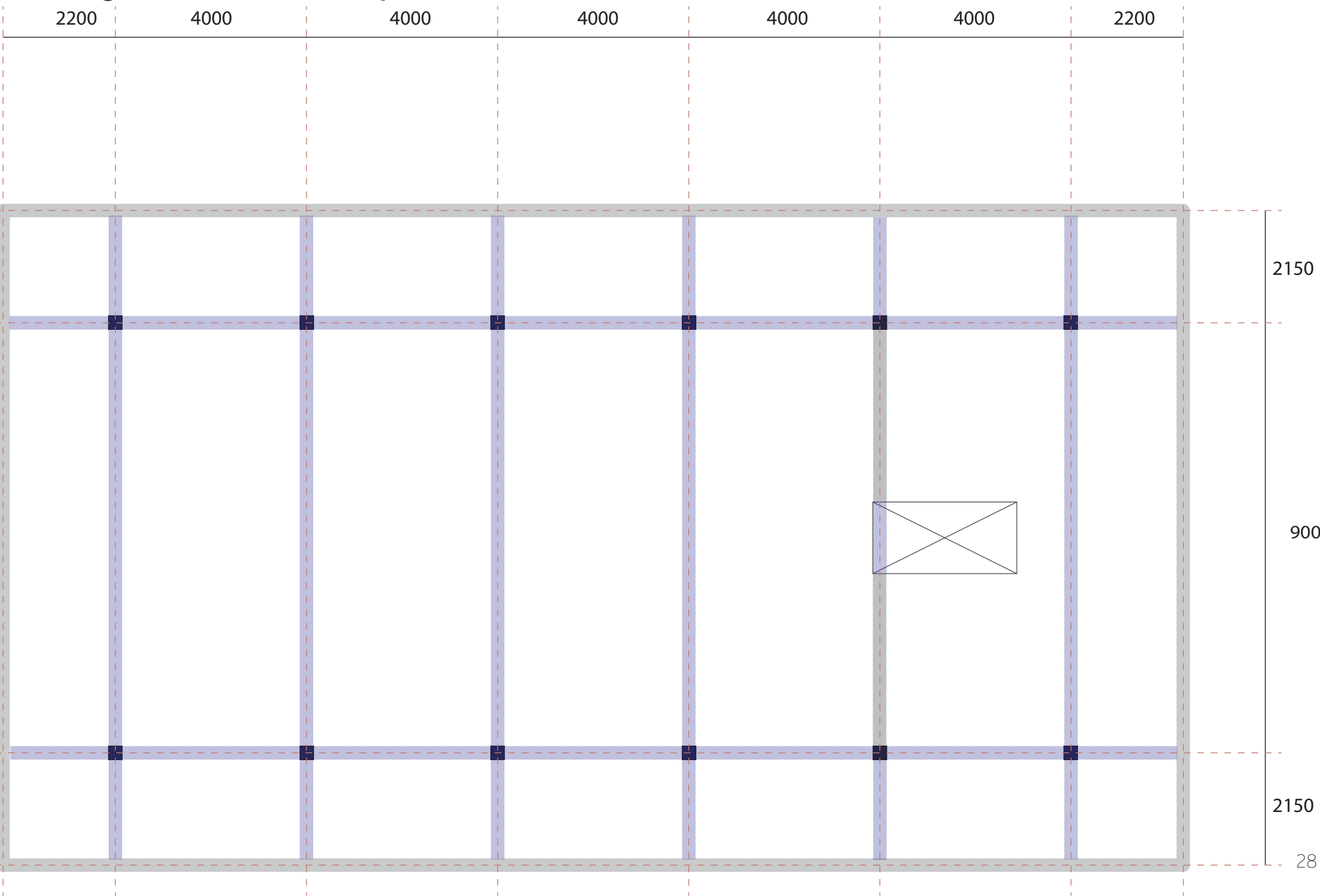
24400

13300

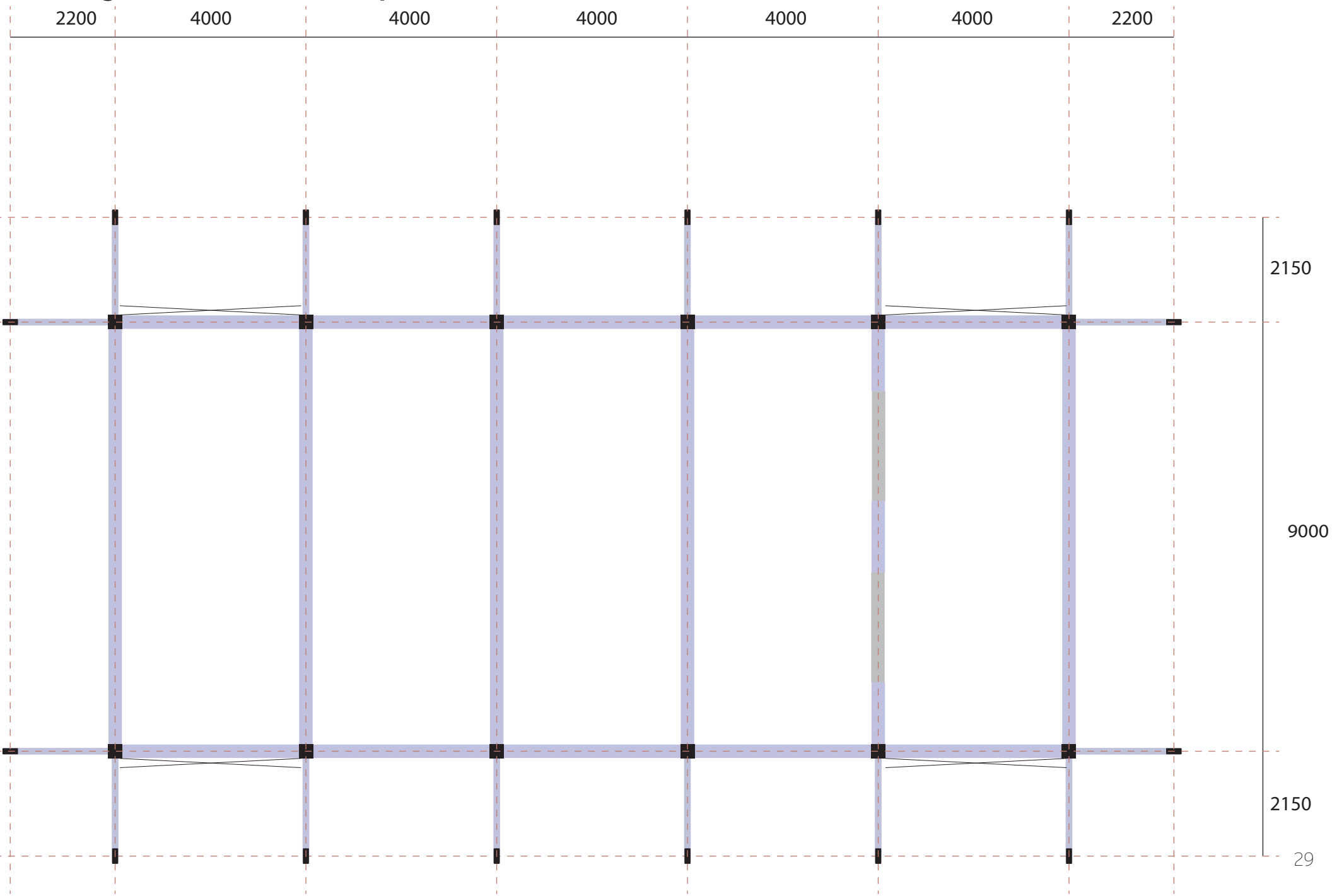
27



Floating Cafe - Structural plan - First floor



Floating Cafe - Structural plan - Roof



Floating Cafe - Calculation beam

Bepaling dimensies houten ligger volgens globale belasting uit leidraad.						
gelamineerd	$l_{hoh} =$	4	[m]	$b =$	225	[mm]
	$q_{tot \text{ rekenw}} =$	8	[kN/m ²]	$h =$	450	[mm]
	$q_{UGT} =$	32	[kN/m]	$W =$	7593750	[mm ³]
	$q_{Q;kar.w} =$	4	[kN/m ²]	$I =$	1708593750	[mm ⁴]
	$q_{BGT \text{ vb}} =$	16	[kN/m]	$f_{cd} =$	14	[N/mm ²]
	$l_{oversp} =$	9000	[mm]	$E =$	11000	[N/mm ²]
sterkte						
veld mom =	324000000	[Nmm]	$\sigma_m =$	42,7	[N/mm ²]	
	UC =	3,05	$W_{benodigd} =$	23142857	[mm ³]	
stijfheid						
	$q_{BGT \text{ kruip}} =$	13	[kN/m]	$U_{bij \text{ norm vloer}} =$	27,00	[mm]
	$U_{bij} =$	130,91	[mm]	$U_{bij \text{ norm vl-wand}} =$	18,00	[mm]
	UC vloer =	4,85	$I_{benodigd} =$	8284090909	[mm ⁴]	
	UC vl.wand =	7,27	$I_{benodigd} =$	12426136364	[mm ⁴]	

Bepaling dimensies houten ligger volgens globale belasting uit leidraad.						
gelamineerd	$l_{hoh} =$	4	[m]	$b =$	500	[mm]
	$q_{tot \text{ rekenw}} =$	8	[kN/m ²]	$h =$	530	[mm]
	$q_{UGT} =$	32	[kN/m]	$W =$	23408333,33	[mm ³]
	$q_{Q;kar.w} =$	4	[kN/m ²]	$I =$	6203208333	[mm ⁴]
	$q_{BGTvb} =$	16	[kN/m]	$f_{cd} =$	14	[N/mm ²]
	$l_{oversp} =$	9000	[mm]	$E =$	11000	[N/mm ²]
sterkte						
veld mom =	324000000	[Nmm]		$\sigma_m =$	13,8	[N/mm ²]
	UC =	0,99		$W_{benodigd} =$	23142857	[mm ³]
stijfheid						
	$q_{BGT \text{ kruip}} =$	13	[kN/m]	$U_{bij \text{ norm vloer}} =$	27,00	[mm]
	$U_{bij} =$	36,06	[mm]	$U_{bij \text{ norm vl-wand}} =$	18,00	[mm]
	UC vloer =	1,34		$I_{benodigd} =$	8284090909	[mm ⁴]
	UC vl.wand =	2,00		$I_{benodigd} =$	12426136364	[mm ⁴]

Ligger van Restaurant

ligger restaurant in de helder

$l_{hoh} = 4000 \text{ mm} = 4,0 \text{ m}$

$q_{tot. \text{ rekenw}} = 8 \text{ kN/m}^2$? (waar kan ik dit vinden)

$q_{a. \text{ kar. w}} = 4 \Rightarrow$ zie bijlage 1

$l_{oversp} = 9000$

b en h bepalen...

minstregel ligger (hout gezwaagd) $= \frac{1}{20} l = h$

- $h = \frac{1}{20} \cdot 9000 = 450$

- Voor de bijbehorende lengte $\frac{1}{2} h = b$ (minstregel)

$\frac{450}{2} = 225$

- gewicht per strekande meter $= g = b \times h \times \rho \times \frac{10}{1000}$

$\rho = 350 \text{ kg/m}^3$ (naaldhout)

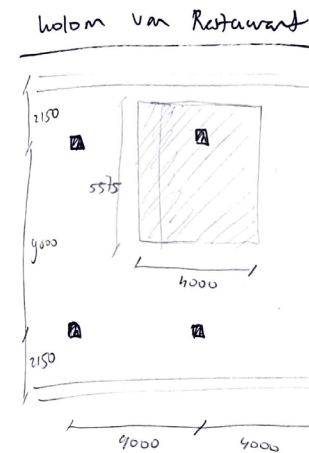
$0,225 \times 0,45 \times 350 \times \frac{10}{1000} = 0,354 \text{ kN/m}$

$\Rightarrow$ de hc is te hoog dus dingen aanpassen

Floating Cafe - Calculation column

globale bepaling doorsnede kolom onder 1 ^{ste} verdieping				
materiaal:	Hout			
	lengte [m]	breedte [m]	belasting [kN/m ²]	tot.bel. per verd. [kN]
Dak				
tot. bel. dakconstr. =	4	x 5,575	x 2	= 44,6
5^{de} verdieping				
tot. bel. vloerconstr. =		x	x	= 0
4^{de} verdieping				
tot. bel. vloerconstr. =		x	x	= 0
3^{de} verdieping				
tot. bel. vloerconstr. =		x	x	= 0
2^{de} verdieping				
tot. bel. vloerconstr. =		x	x	= 0
1^{ste} verdieping				
tot. bel. vloerconstr. =	4	x 5,575	x 16	= 356,8
totale belasting belasting $F_{G,d}$:				401,4 kN
gereduceerde druksterkte:				7 N/mm ²
benodigde oppervlak doorsnede A =				57342,86 mm ²

Bepaling dimensies houten of betonnen kolom volgens globale belasting uit leidraad.				
	lengte		breedte	rekenwaarde
opp.vl dak =	4 [m]	x	5,575 [m]	2 [kN/m ²] = 44,6 [kN]
opp.vl bg	4 [m]	x	5,575 [m]	16 [kN/m ²] = 356,8 [kN]
				$F_{G,d} = 401,4$ [kN]
$A = F_{G,d}/f_{c,d}$	$= 28671,4286 \rightarrow d = 169,3264$ mm			
$f_{c,d}$	14			
l_{cr}	2500 [mm]			
E	11000 [N/mm ²]			
I_z	1,33E+08 [mm ⁴]			
F_{cr}	2,32E+06 [N]			
UC	0,87			
$I_{z,ben}$	1,16E+08 [mm ⁴]			



globale bepaling

	lengte (m)	breedte (m)	bel
Dak	4	5,575	2
1 st verd	4	5,575	16

bel. dak en vloer kijken naar bijlage 1
Op het dak wordt niet zomaar een sekum dak gelegd maar een dak ~~over~~ waar zwaardere en grotere planken op kunnen. Is 2 dan wel genoeg?
gereduceerde druksterkte = 7 (bijlage 2)

Bepaling dim. houten kolom volgens belasting uit leidraad

$F_{c,d} = 14$ en $E = 11000$ (bijlage 3) $\rightarrow$ klopt dit?

$l_{cr} = 2500$ (kolom die onder de begane grond ligt)

vuistregel kolommen kant $= \frac{1}{20}$ $l_c = \frac{1}{20} \cdot 2500 = 125$

l_c te hoog dus breedte aanpassen naar $b = 200$ mm

Floating Cafe - Structure axonometry

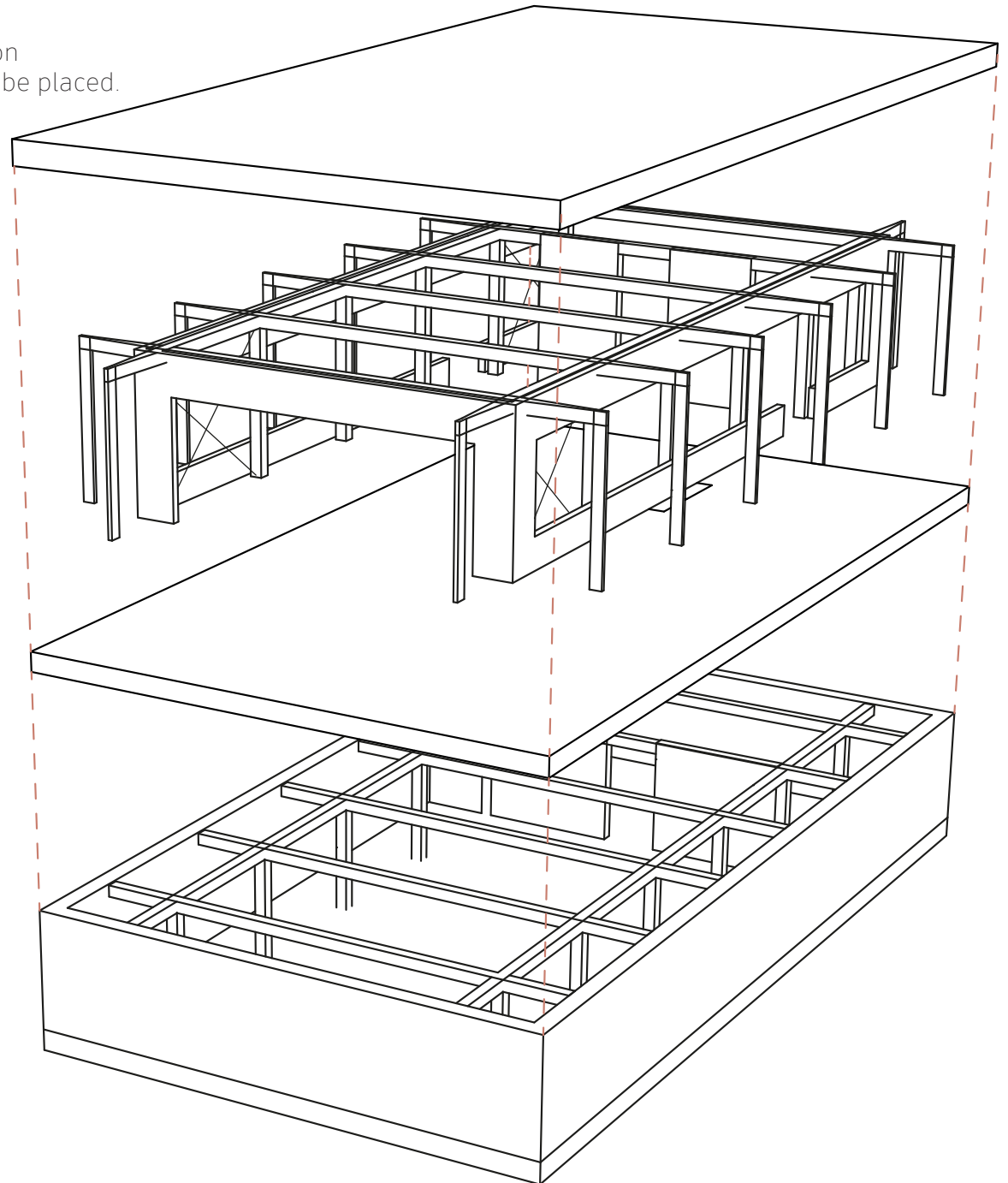
For the structure of the cafe, a concrete base will be placed upon which a wooden structure can be built, on which a CLT roof will be placed.

CLT roof

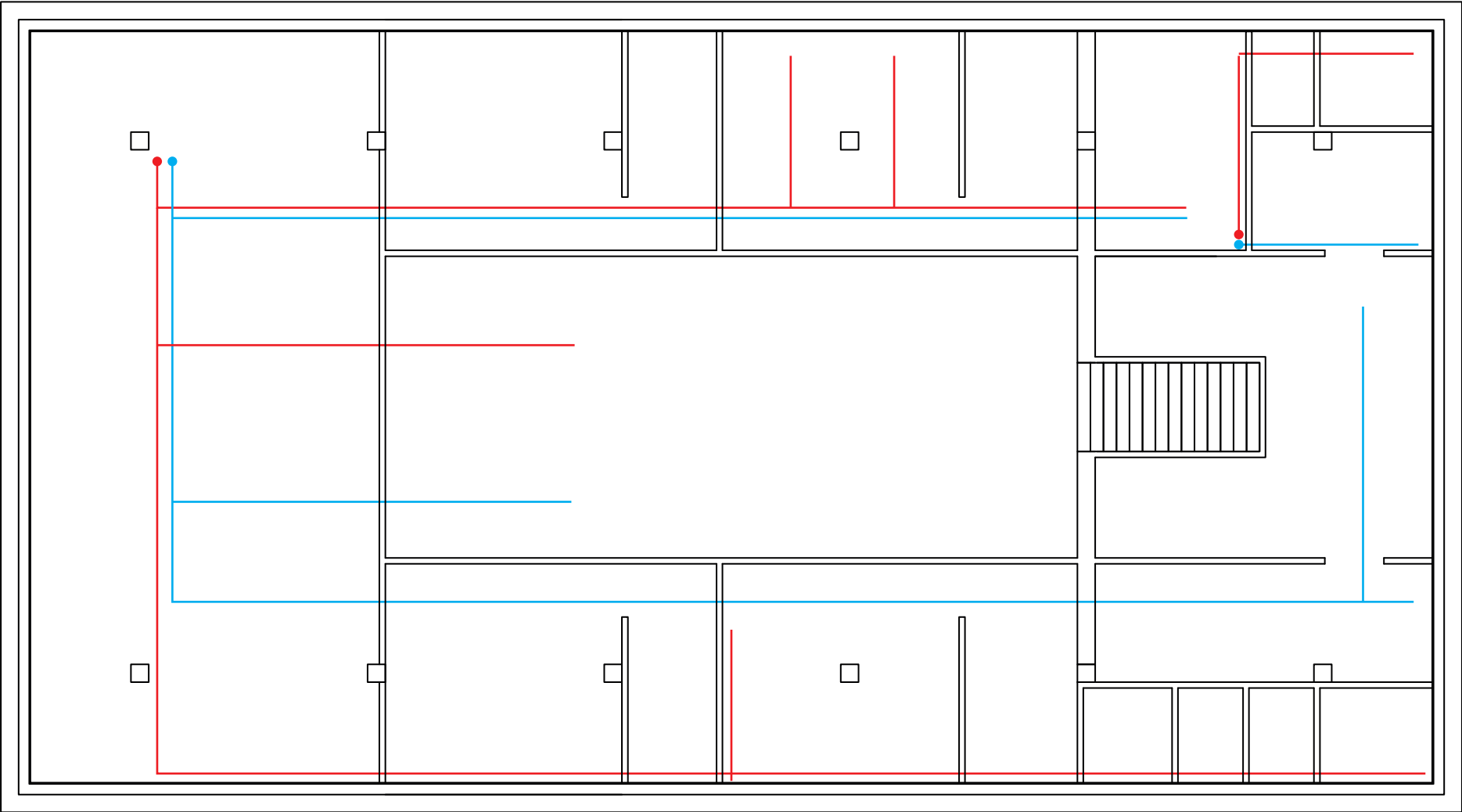
Wooden beams and columns and a self-supporting detached facade

Concrete intermediate floor seals

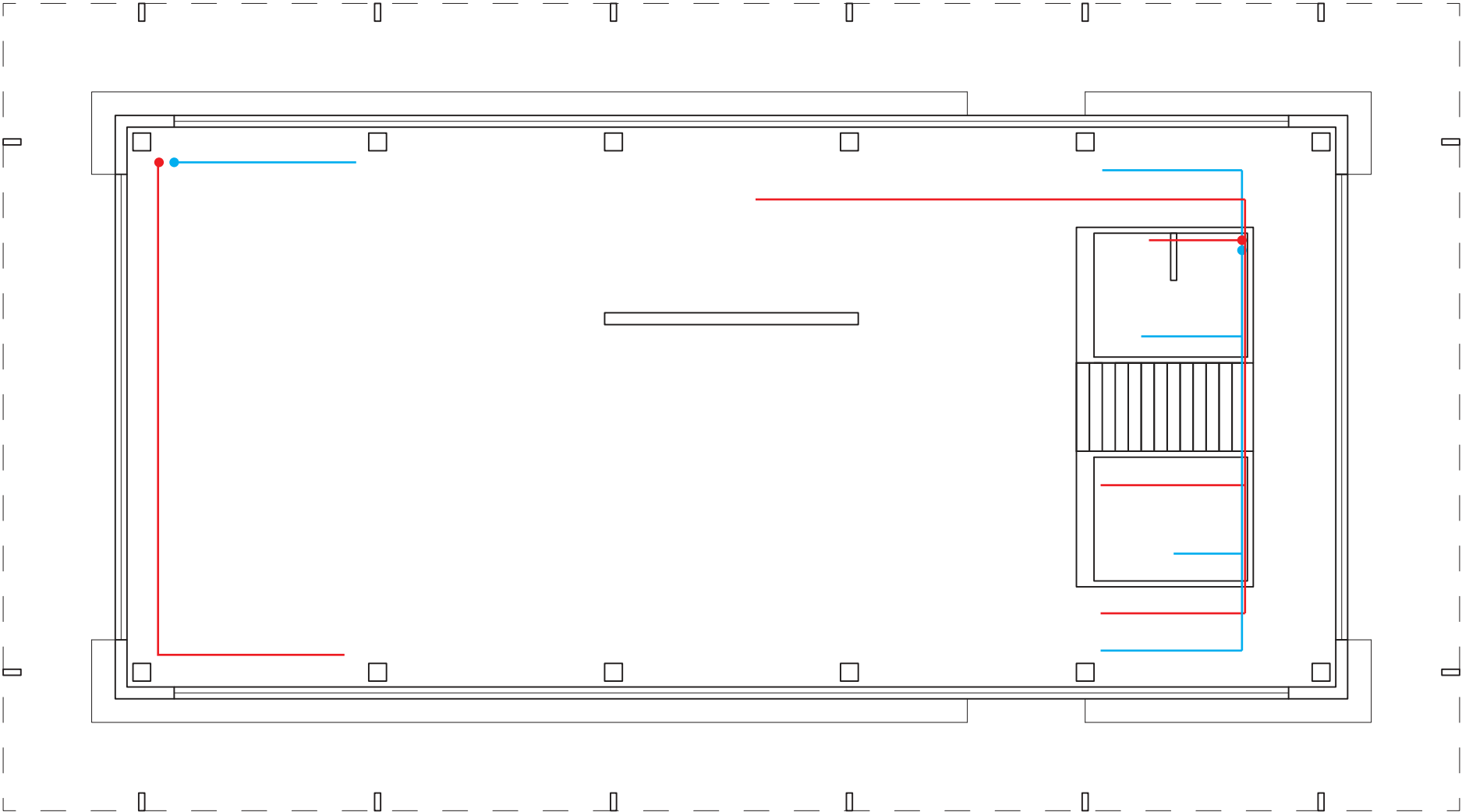
Concrete base - can float in water



Floating Cafe - Ventilation plan - Basement



Floating Cafe - Ventilation plan - First floor



Ventilation - air ducts

Er wordt gebruik gemaakt van een hybride ventilatiesysteem. Waarbij in de zomer overgegaan kan worden op ventilatie type c door de ramen te openen. In allebei de gebouwen zijn in alle ruimtes te openen ruimte, behalve in de kelder van het restaurant.

In het restaurant (gebouw op het water) op de begane grond zijn in de gehele gevel ramen te vinden die geopend kunnen worden. In de kelder van het restaurant wordt altijd mechanische geventileerd. In de kelder zijn twee technische ruimtes te vinden waar luchtbehandelingskasten staan. In de grootste technische ruimte staat de LBK die alles van de kelder ventileert. De kleine technische ruimte met een LBK wordt niet gebruikt voor de kelder maar gaat naar de begane grond van het restaurant om daar te ventileren.

Om een kleine inschatting te maken hoe groot bepaalde kanalen zullen worden is er een berekening gedaan van de grootste capaciteitsruimtes.

Berekening van de luchtkanalen in het restaurant:

Ventilatievoud= 25 m³/u per persoon

Personen = 150

$V = 150 \times 25 = 3750 \text{ m}^3/\text{u}$

V per seconde = $3750 / 3600 = 1,042 \text{ m}^3/\text{s}$

Maximale snelheid = 3 m/s

$A = 1,042 / 3 = 0,347 \text{ m}^2$

Er zijn 3 luchtkanalen: $0,347 / 3 = 0,116 \text{ m}^2$

$A = \pi r^2 \text{ } r = \sqrt{(A/\pi)}$

$r^2 = A/\pi \text{ } r = \sqrt{(0,116/\pi)} = 0,235 \text{ m}$

Diameter van de luchtkanaal is dus 0,38 m

Ventilation - air treatment cabinet

Om de afmetingen van de LBK te achterhalen wordt gekeken naar Ned Air OmniLine PL.

In het community center komen twee luchtbehandelingskasten en in het restaurant komen er ook twee.

In de tabel hiernaast staat aangegeven wat het rendement is van elke LBK.

Berekening:

LBK1 (restaurant – berging en deel boven) en LBK2 (restaurant – alleen boven):

Doordat er twee LBK verantwoordelijk zijn voor mede het restaurant maakt dat de berekening iets lastiger.

Daarom heb ik ervoor gekozen dat dit te zien is in de berekening bij de hoeveelheid mensen.

LBK1:

Restaurant en berging 90 personen met ventilatievoud van 25 m³/u per persoon

100 * 25 = 2500 m³/u > PL 3500

Afmetingen van de kast zijn: 2200 x 1415 x 1470 mm

(L, B en V in mm)

LBK2:

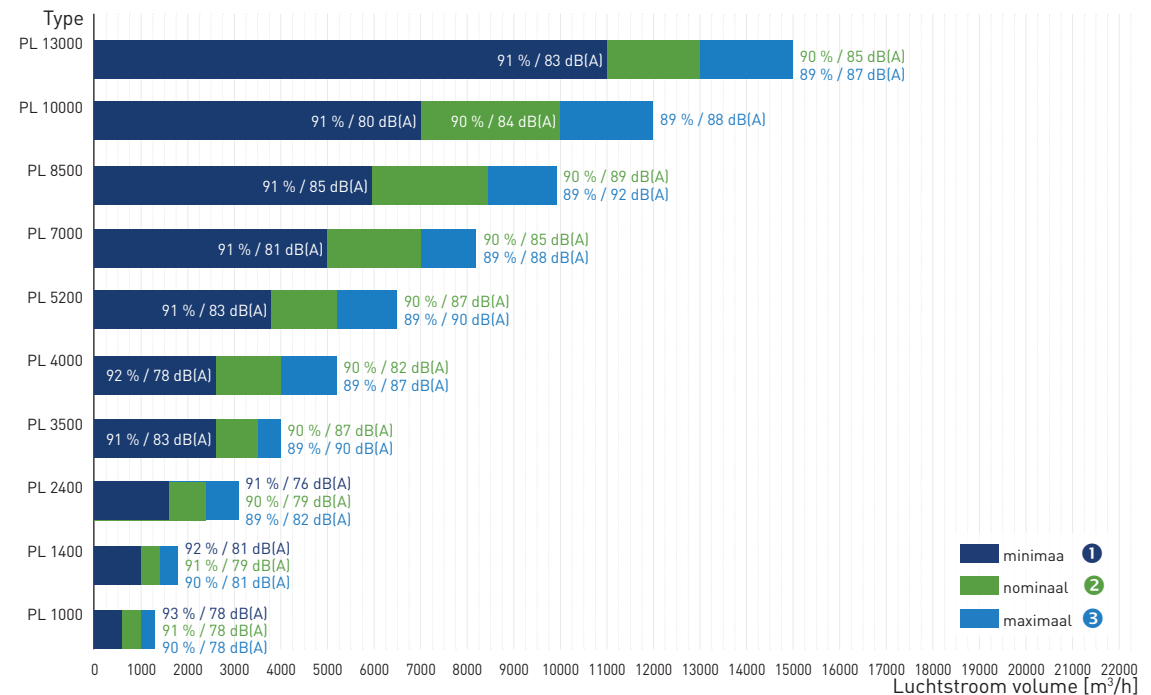
Restaurant en overige ruimtes 60 personen met

ventilatievoud van 25 m³/u per persoon

50 * 25 = 1250 m³/u > PL 1400

Afmetingen van de kast zijn:

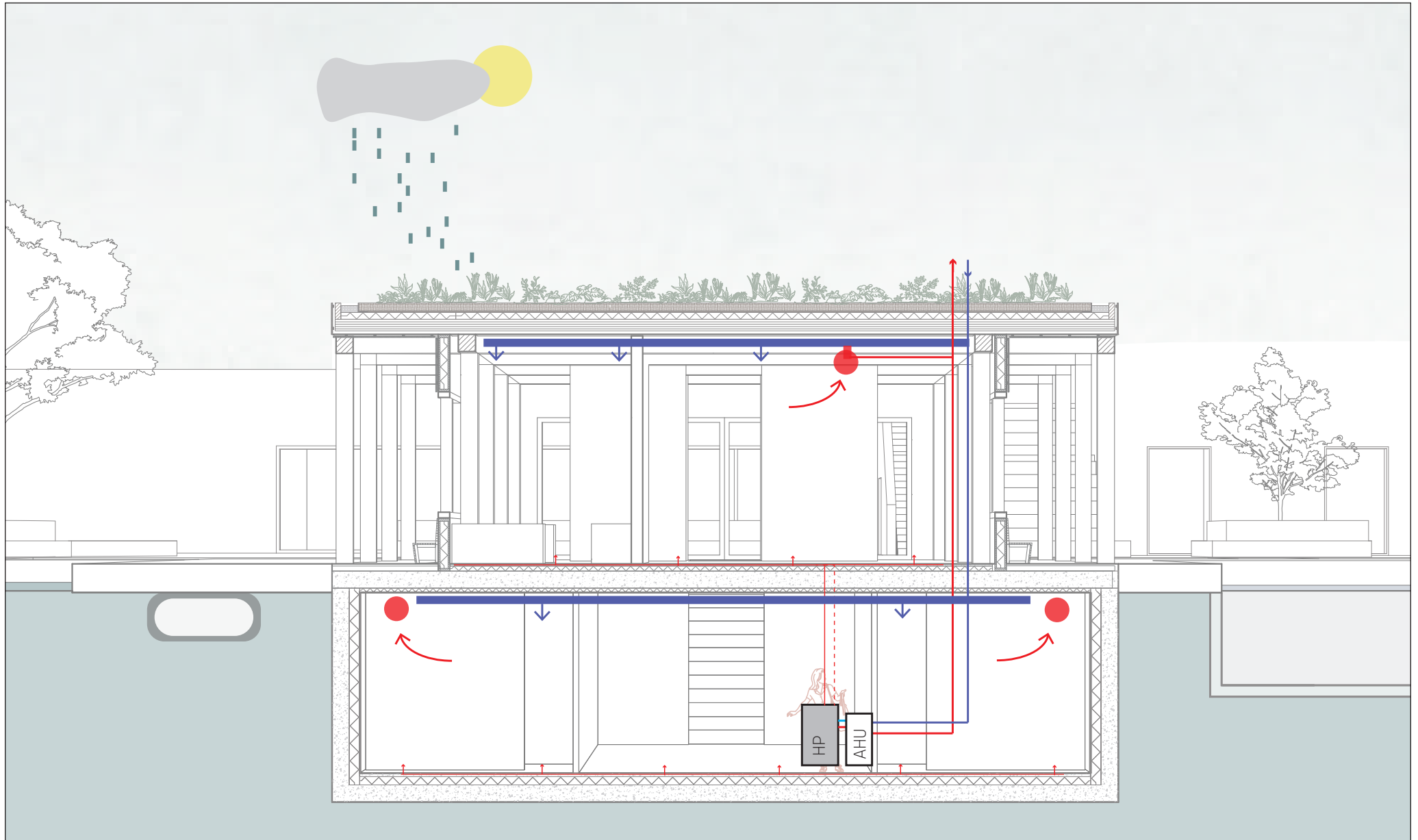
1900 x 1110 x 1200 mm (L, B en V in mm)



- Rendementsbepaling in de winter, volgens NEN 5138.
- Temperatuur condities toevoer -7 °C / 50% R.V., retour 20 °C / 50% R.V.
- Geluidvermogen niveau dB(A) in toevoerlucht.

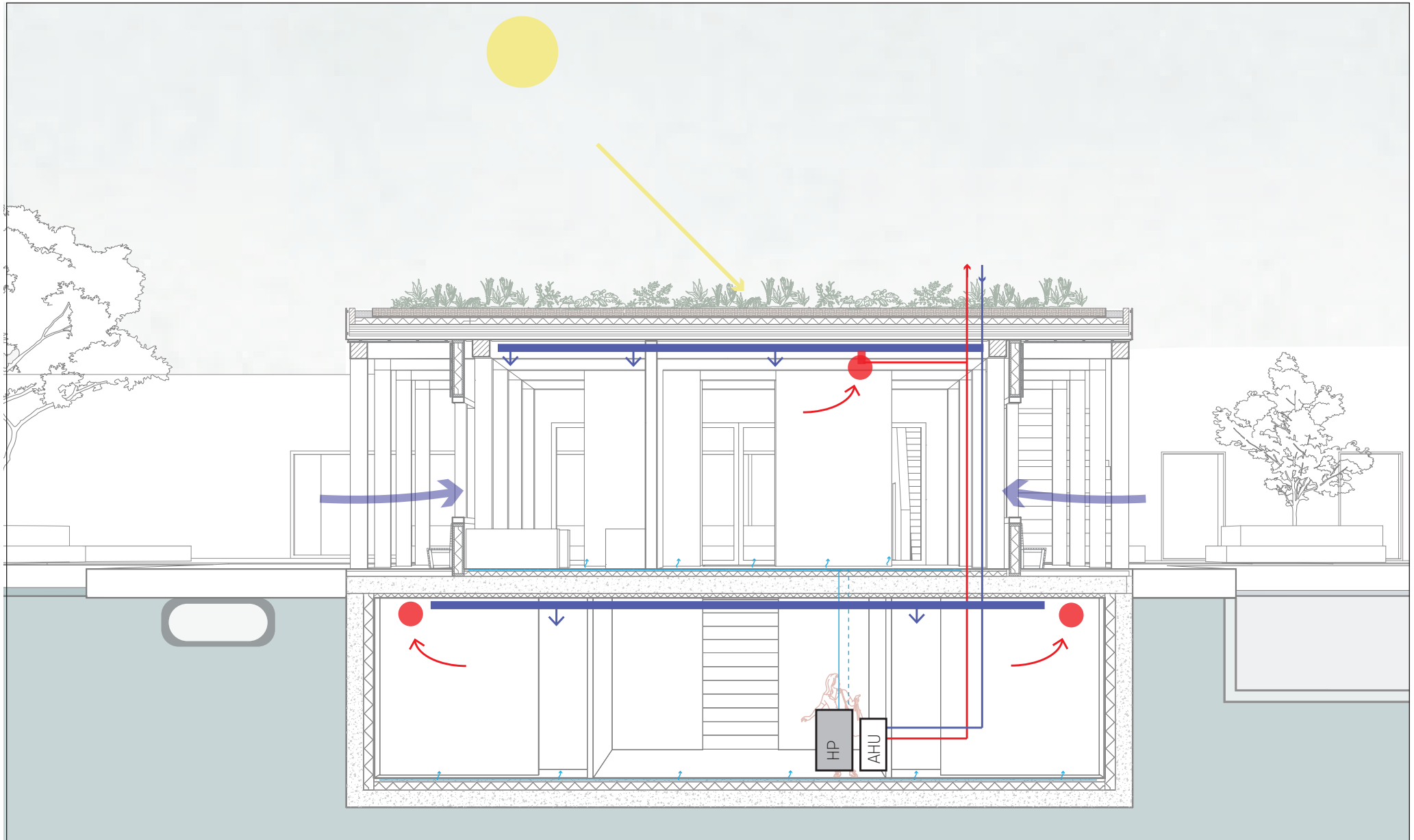
Floating Cafe - Climate section - Winter

It could be seen before but a green roof will be placed on both buildings. This will ensure that there will be more space for more biodiversity for the city. Allowing animals to have a place, as well.



Floating Cafe - Climate section - Summer

In summer, the overhang provides shade. Additionally, across the entire facade openable windows and sliding doors will be placed, so in the summer the space can be naturally ventilated.



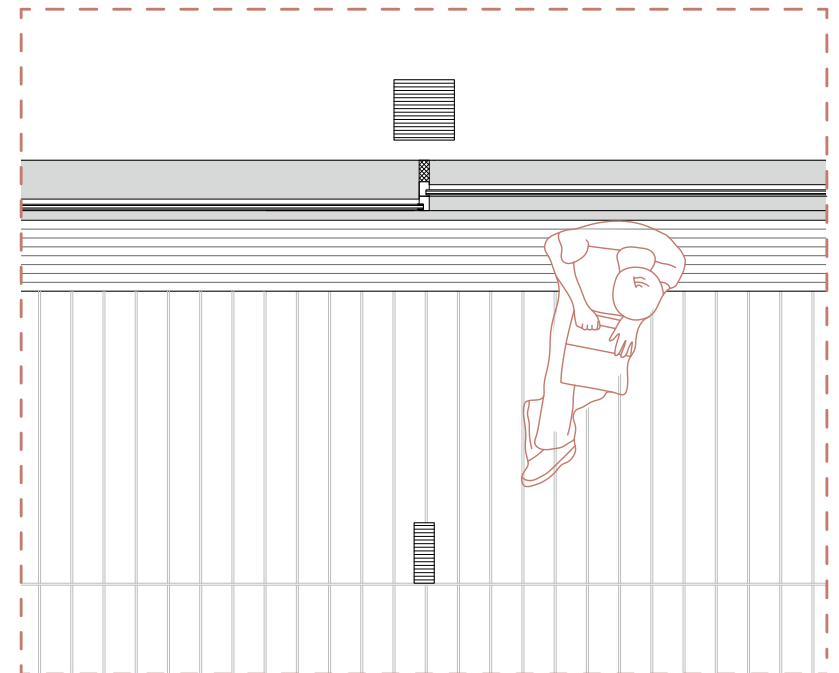
Floating Cafe - Material view



Floating Cafe - Facade view & Horizontal section

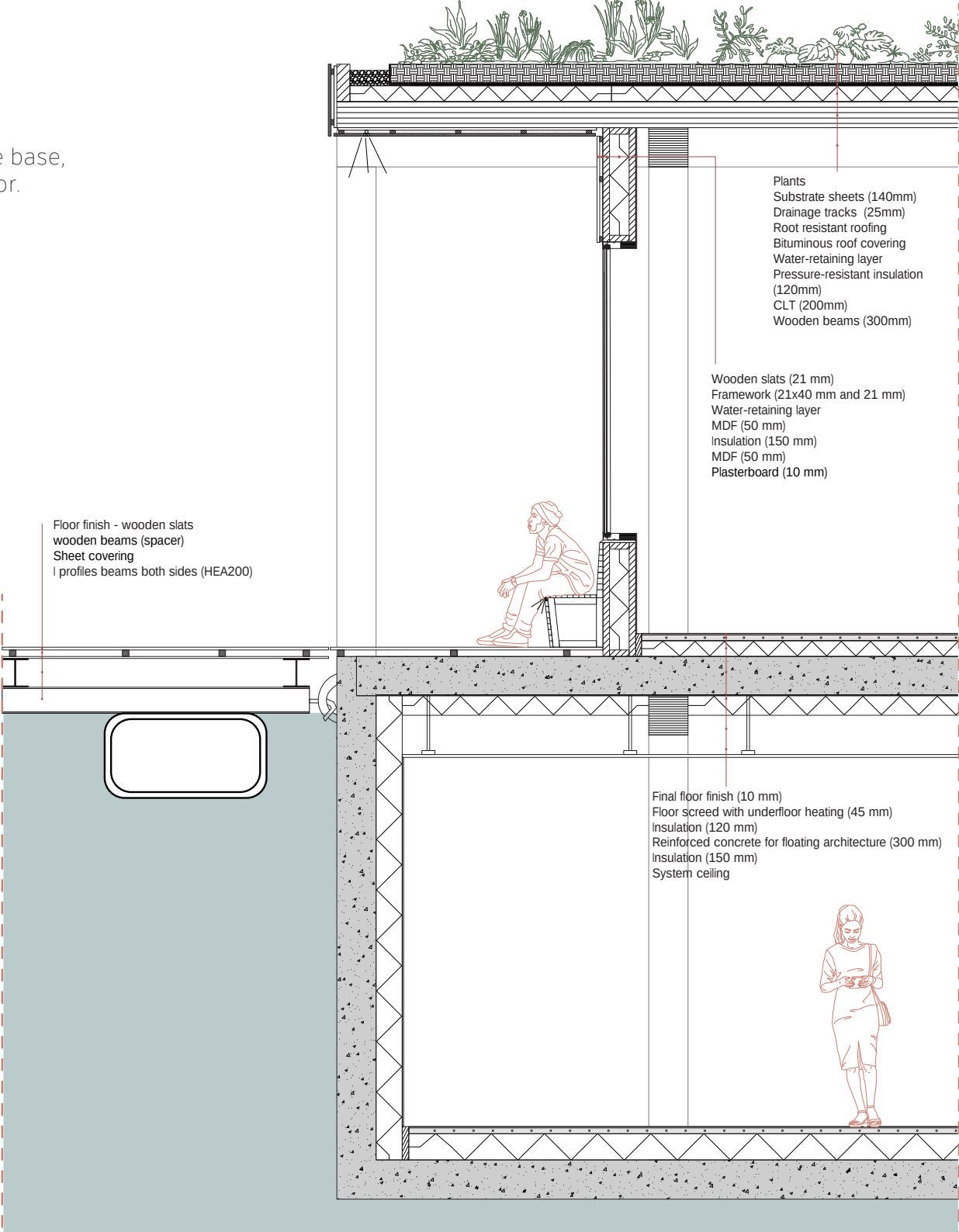
Wooden vertical cladding was chosen for the floating café in which the bench is incorporated into the facade. Because the building is floating and can be moved to other places, this also has a sustainable aspect.

In the horizontal detail you can also see that in the facade are sliding windows that can be opened.



Floating Cafe - Vertical section

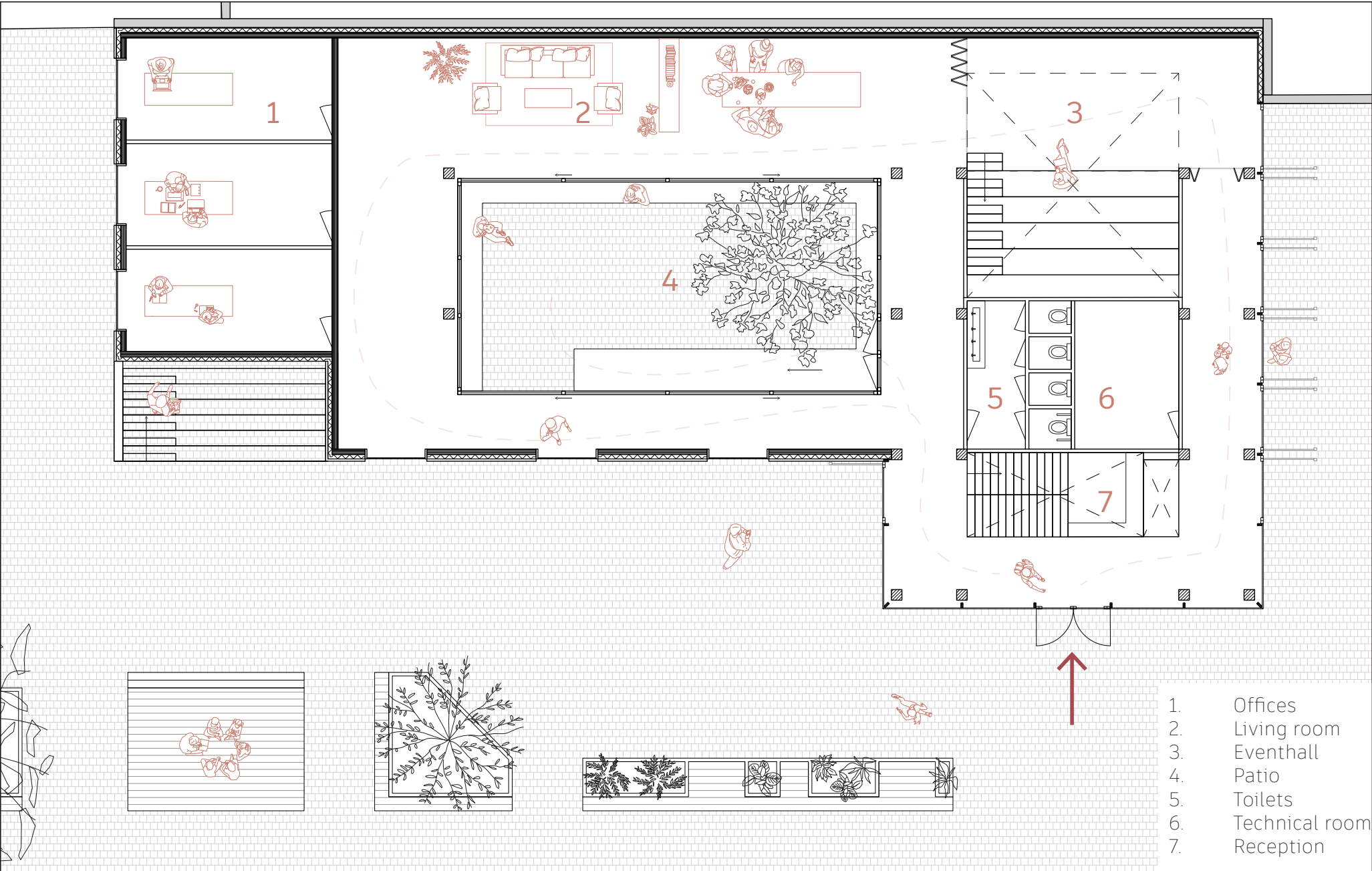
And in the 1.20 vertical detail you can see how the concrete base, so the basement, supports the wooden top, the ground floor. And how the building connects to the attached platforms.



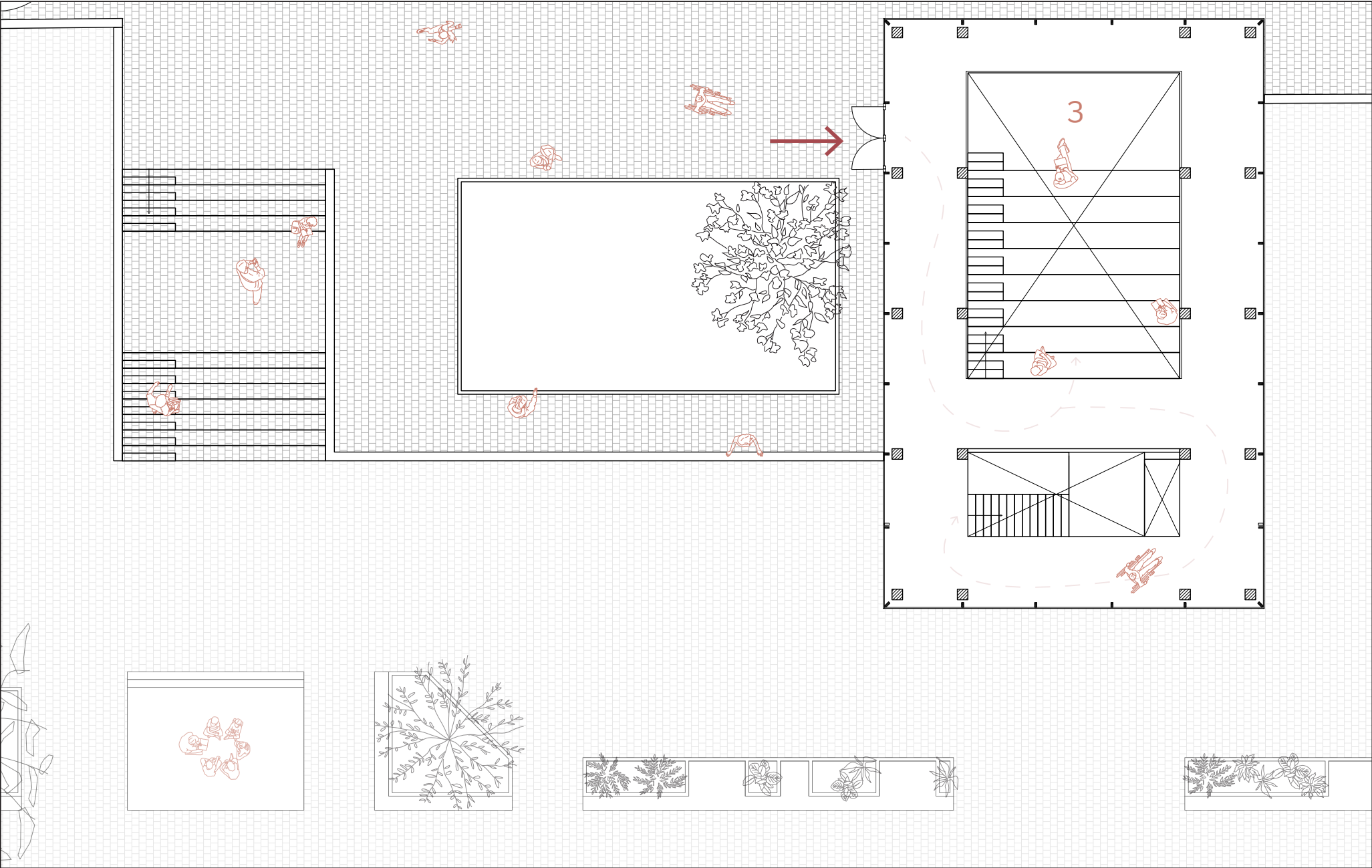
Building 2 - Community center



Community center - Floor plan first floor

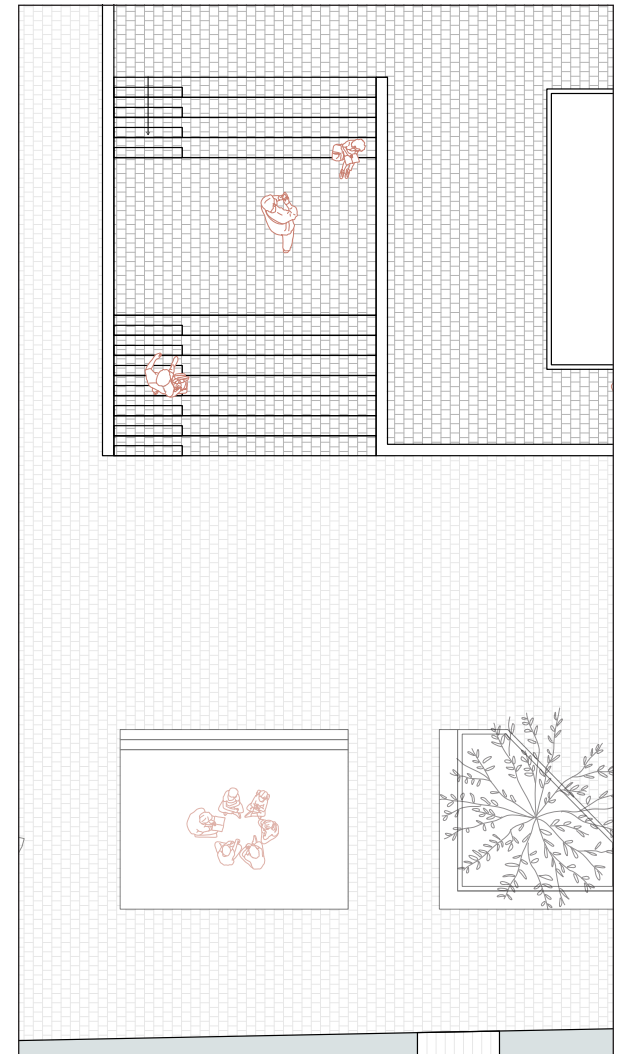


Community center - Floor plan second floor



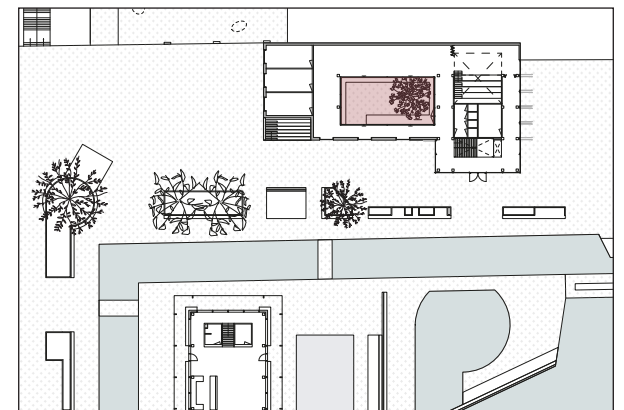
Community center - Outdoor stage

Outdoors, a stage was created by adding a staircase with seating areas, between the levels of the center.



Community center - Patio

The patio is a place where residents can relax and find some peace of mind amidst the hectic and bustling city. During my interviews, it appeared that there was a desire for this type of outdoor space. A place to read or draw peacefully.



Community center - Patio



Community center - Workplace



Many residents, mostly students, asked for a space to study or work with several people as well. Space for this was given in three rooms underneath the outdoor stairs.

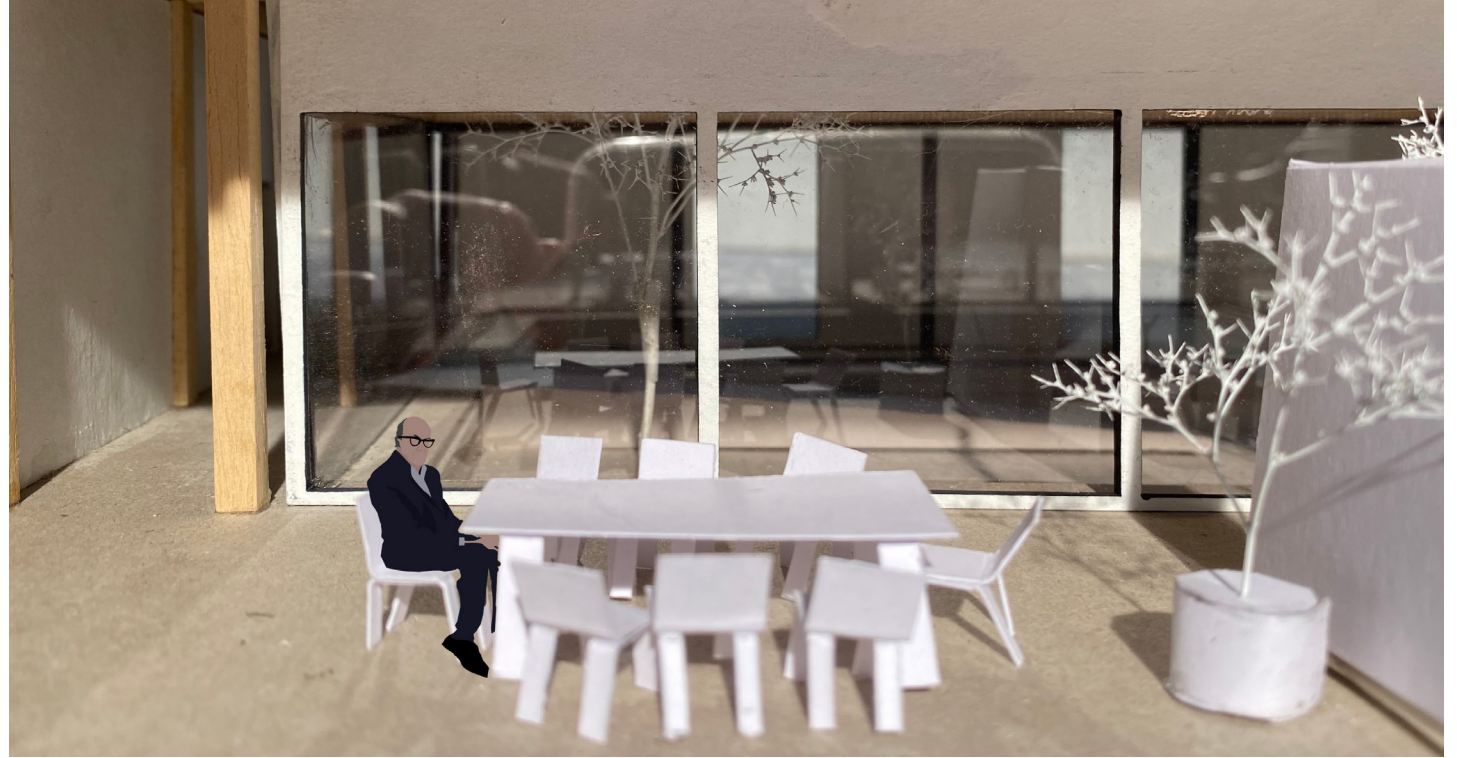
Community center - Event hall



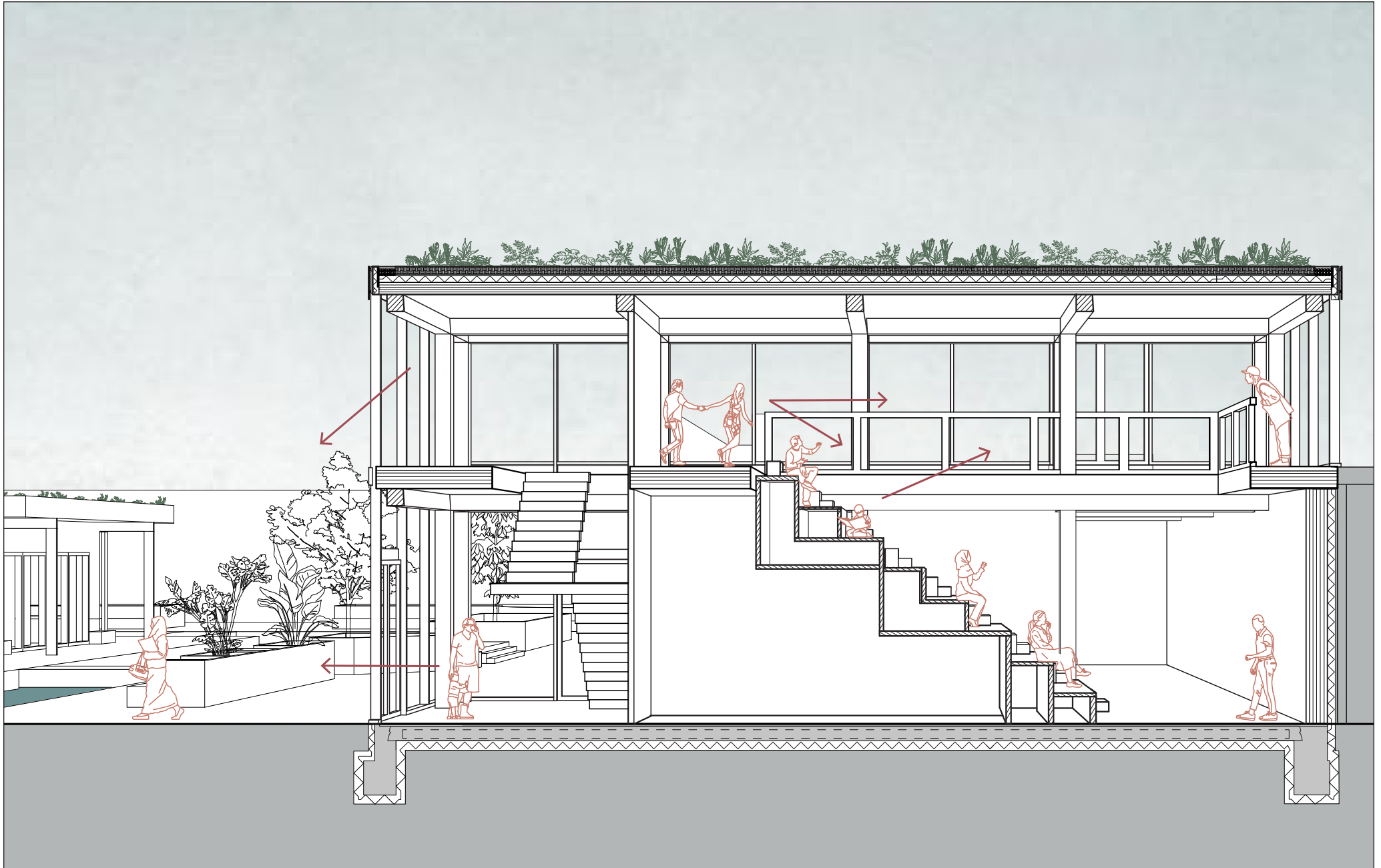
Indoors, the event hall answers the need for a space where events can be organized for the neighborhood. The event hall is a general space, where all kinds of events can be organized. Think of school performances, lectures, and neighborhood meetings, but also offer a space for weddings and act as a shelter for feminist associations in Rotterdam.

Community center - Living room

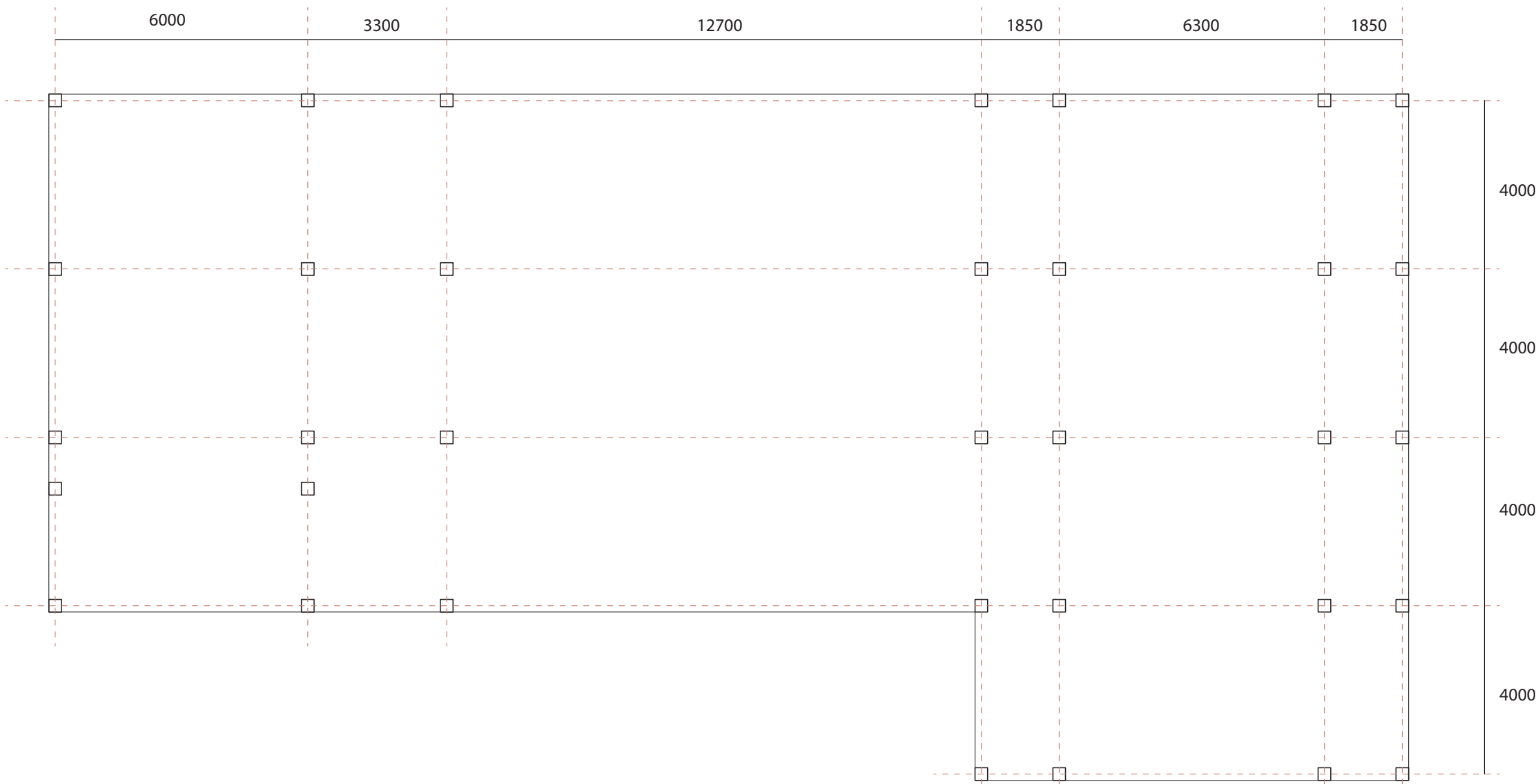
Adding a living room for the neighborhood will provide space for the elderly and youth who need it, where people can interact.



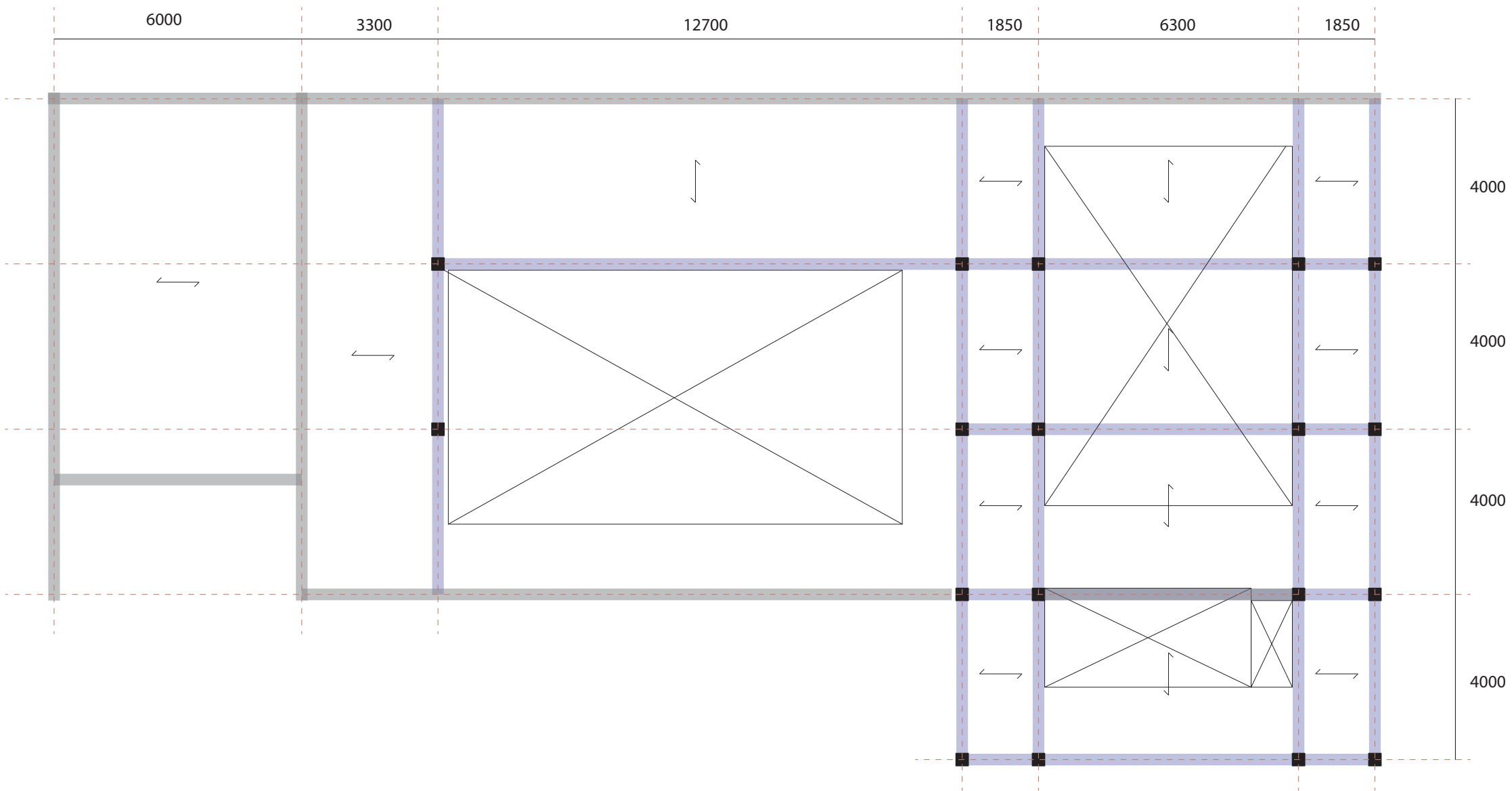
Community center - Section



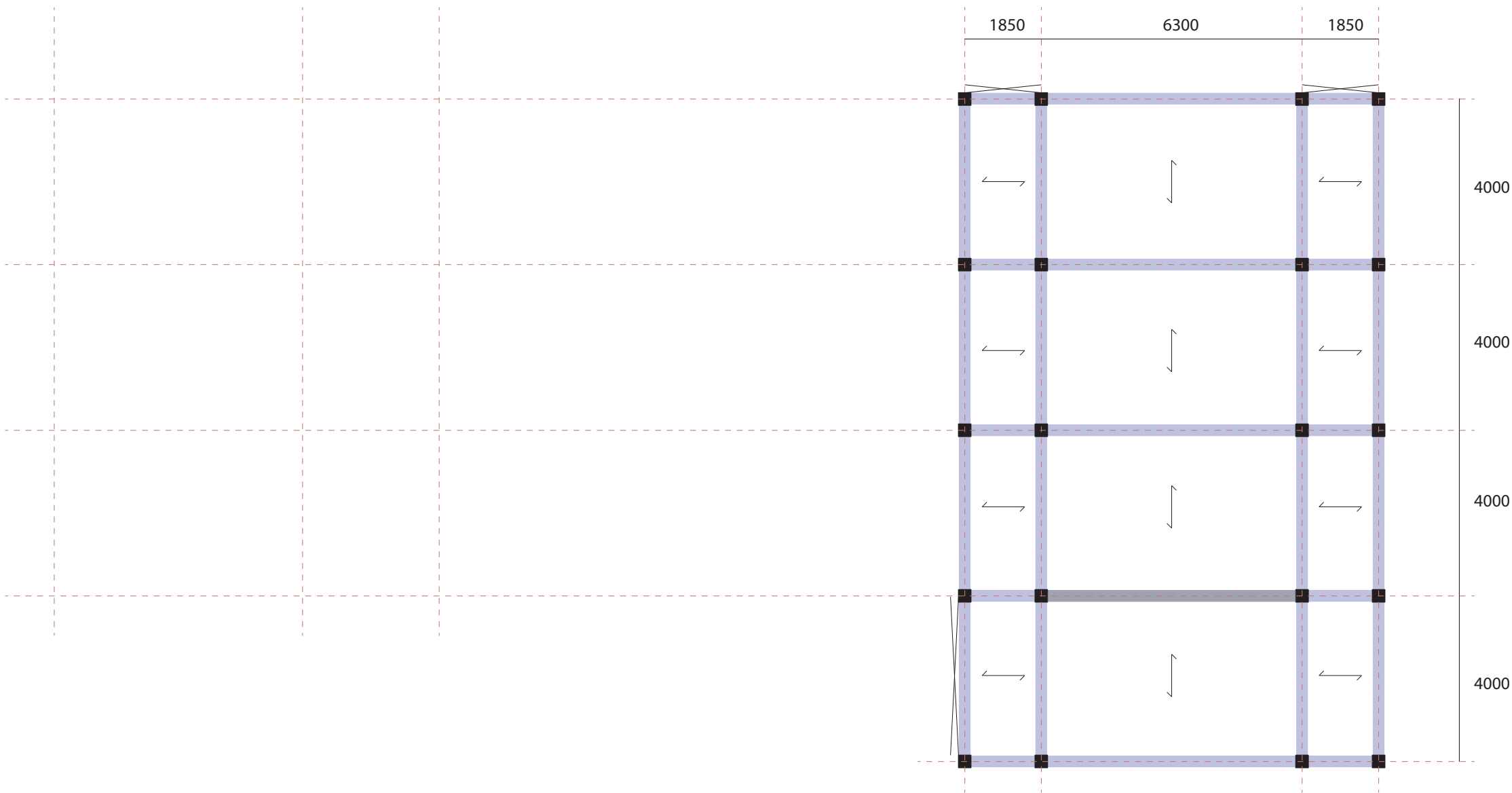
Community center - Structural plan - Foundation (First floor)



Community center - Structural plan - Second floor



Community center - Structural plan - Roof



Community center - Calculation beam

1	Bepaling dimensies houten ligger volgens globale belasting uit leidraad.				
2					
3	gelamineerd	$\ell_{hoh} = 4,075$ [m]	$b = 100$ [mm]		
4		$q_{tot \text{ rekenw}} = 8$ [kN/m ²]	$h = 200$ [mm]		
5		$q_{UGT} = 32,6$ [kN/m]	$W = 666666,6667$ [mm ³]		
6		$q_{Q;kar.w} = 5$ [kN/m ²]	$I = 66666667$ [mm ⁴]		
7		$q_{BGT vb} = 20,375$ [kN/m]	$f_{cd} = 14$ [N/mm ²]		
8		$\ell_{oversp} = 4000$ [mm]	$E = 11000$ [N/mm ²]		
9					
10	sterkte				
11	veld mom =	65200000 [Nmm]	$\sigma_m = 97,8$ [N/mm ²]		
12		UC = 6,99	$W_{benodigd} = 4657143$ [mm ³]		
13					
14	stijfheid				
15		$q_{BGT kruip} = 10$ [kN/m]	$U_{bij \text{ norm vloer}} = 12,00$ [mm]		
16		$U_{bij} = 137,07$ [mm]	$U_{bij \text{ norm vl-wand}} = 8,00$ [mm]		
17		UC vloer = 11,42	$I_{benodigd} = 761489899$ [mm ⁴]		
18		UC vl.wand = 17,13	$I_{benodigd} = 1142234848$ [mm ⁴]		
19					
20					

Bepaling dimensies houten ligger volgens globale belasting uit leidraad.				
gelamineerd	$\ell_{hoh} = 4,075$ [m]	$b = 300$ [mm]		
	$q_{tot \text{ rekenw}} = 8$ [kN/m ²]	$h = 305$ [mm]		
	$q_{UGT} = 32,6$ [kN/m]	$W = 4651250$ [mm ³]		
	$q_{Q;kar.w} = 5$ [kN/m ²]	$I = 709315625$ [mm ⁴]		
	$q_{BGT vb} = 20,375$ [kN/m]	$f_{cd} = 14$ [N/mm ²]		
	$\ell_{oversp} = 4000$ [mm]	$E = 11000$ [N/mm ²]		
sterkte				
veld mom =	65200000 [Nmm]	$\sigma_m = 14,0$ [N/mm ²]		
	UC = 1,00	$W_{benodigd} = 4657143$ [mm ³]		
stijfheid				
	$q_{BGT kruip} = 10$ [kN/m]	$U_{bij \text{ norm vloer}} = 12,00$ [mm]		
	$U_{bij} = 12,88$ [mm]	$U_{bij \text{ norm vl-wand}} = 8,00$ [mm]		
	UC vloer = 1,07	$I_{benodigd} = 761489899$ [mm ⁴]		
	UC vl.wand = 1,61	$I_{benodigd} = 1142234848$ [mm ⁴]		

Constructie

liggers : houten ligger
1^{ste} verd. evenementen zaal

$\ell_{hoh} = \left(\frac{1850}{2} + \frac{6300}{2} \right) = 4,075 \text{ m}$

$q_{tot \text{ rekenw}} = 8 \text{ [kN/m}^2\text{]}$? (waar kan ik dit vinden)

$q_{Q;kar.w} \rightarrow$ kijken naar handleiding blz 37 of 45? $\rightarrow$ zie bijlage ①

$\ell_{oversp} = 4000 \text{ [mm]}$

b en h bepalen W en I uitrekenen

- vuistregels liggers (hout geraagd) $= \frac{1}{20} \ell = h$
- $h = \frac{1}{20} \cdot 4000 = 200 \text{ mm}$
- Voor de bijbehorende breedte kies je de halve hoogte (vuistregel):
 $200 / 2 = 100 \text{ mm} = b$
- gewicht per strekkende meter $= g = b \times h \times \rho \times \frac{10}{1000}$
 $\rightarrow \rho \rightarrow$ naaldbout $350 \text{ kg/m}^3 \rightarrow (0,1 \text{ m} \times 0,2 \text{ m} \times 350 \text{ kg/m}^3 \times 10 \text{ m}^3) / 1000 = 0,07 \text{ kN/m}$
- $I_y = \frac{1}{12} b \times h^3 = \frac{1}{12} \cdot 100 \cdot (200)^3 = 66.666.666,67 \text{ [mm}^4\text{]}$
- $W = I / \frac{1}{6} h = \frac{1}{6} \cdot b \cdot h^2 = \frac{1}{6} \cdot 100 \cdot 200^2 = 666.666,67 \text{ [mm}^3\text{]}$

$\rightarrow f_{cd}$ en $E \rightarrow$ bekijken in handleiding blz 40 $\rightarrow$ zie bijlage ②

b $f_{cd} = ?$ = buigsterkte vezel richting = 14 N/mm^2

$E = ?$ = elasticiteitsmodulus in de buigsterktegrens toestand $= 11000$

$\rightarrow$ de W is veel te hoog. Waar ligt dit aan?

$\rightarrow$ voor de b en h heb ik geleken naar de vuistregels maar ik denk dat dit veel te kleine groottes zijn ...

Community center - Calculation column

globale bepaling doorsnede kolom onder 1 ^{ste} verdieping								
materiaal:		Hout						
	lengte [m]		breedte [m]		belasting [kN/m ²]		tot.bel. per verd. [kN]	
Dak								
tot. bel. dakconstr. =	4,075	x	4	x	2	=	32,6	
5 ^{de} verdieping								
tot. bel. vloerconstr. =		x		x		=	0	
4 ^{de} verdieping								
tot. bel. vloerconstr. =		x		x		=	0	
3 ^{de} verdieping								
tot. bel. vloerconstr. =		x		x		=	0	
2 ^{de} verdieping								
tot. bel. vloerconstr. =		x		x		=	0	
1 ^{ste} verdieping								
tot. bel. vloerconstr. =	4,075	x	4	x	10	=	163	
							+	
totale belasting belasting F_G :							195,6	kN
gereduceerde druksterkte:							7	N/mm ²
benodigde oppervlak doorsnede A =							27942,86	mm ²

Bepaling dimensies houten of betonnen kolom volgens globale belasting uit leidraad.							
	lengte		breedte		rekenwaarde		
opp.vl dak =	4,075	[m] x	4	[m] x	2	[kN/m ²]	= 32,6 [kN]
opp.vl verd.1	4,075	[m] x	4	[m] x	10	[kN/m ²]	= 163 [kN]
						$F_{G,d}$	= 195,6 [kN]
$A = F_{G,d}/f_c;d$	13971,4286	-->	$d =$	118,208	mm	$b =$	211 mm
$f_{c;d}$	14					$h =$	211 mm
l_{cr}	4215	[mm]	$E =$	11000	[N/mm ²]	$I_z =$	1,65E+08 [mm ⁴]
F_{cr}	1,01E+06	[N]					
UC	0,97		$I_{z\ ben} =$	1,60E+08	[mm ⁴]	-->	

Berekening kolom

Globale bepaling

	lengte (m)	breedte (m)	bel.
Dak	4,075	4	2
1 ^{ste} verd.	4,075	4	10

belasting dak → kijken naar bijlage ①
 ik wil een elt dak maar dat dak wordt wel zwaarder belast groen dak en zonnepanelen. Is het dan wel 2 kN/m² ?
 - gereduceerde druksterkte = 7 voor geraagd hout.

bepaling dim. houten kolom volgens belasting uit leidraad

	lengte (m)	breedte (m)	rekenw (kN/m ²)	
opp. vl dak	4,075	4	2	= 32,6 kN
opp. vl verd. 1	4,075	4	10	= 163 kN
				<u>195,6 kN</u>

$F_{G,d} \approx 14$ $E = 11000$ (bijlage 3) klopt dit?

$l_{cr} = \frac{4520}{\sqrt{14}} - 305 = 4215$ mm

vuist regel b kolommen hout = $\frac{1}{20} l_{cr} = \frac{1}{20} \cdot 4215 = 210,75 \Rightarrow 211$

Community center - Structure axonometry

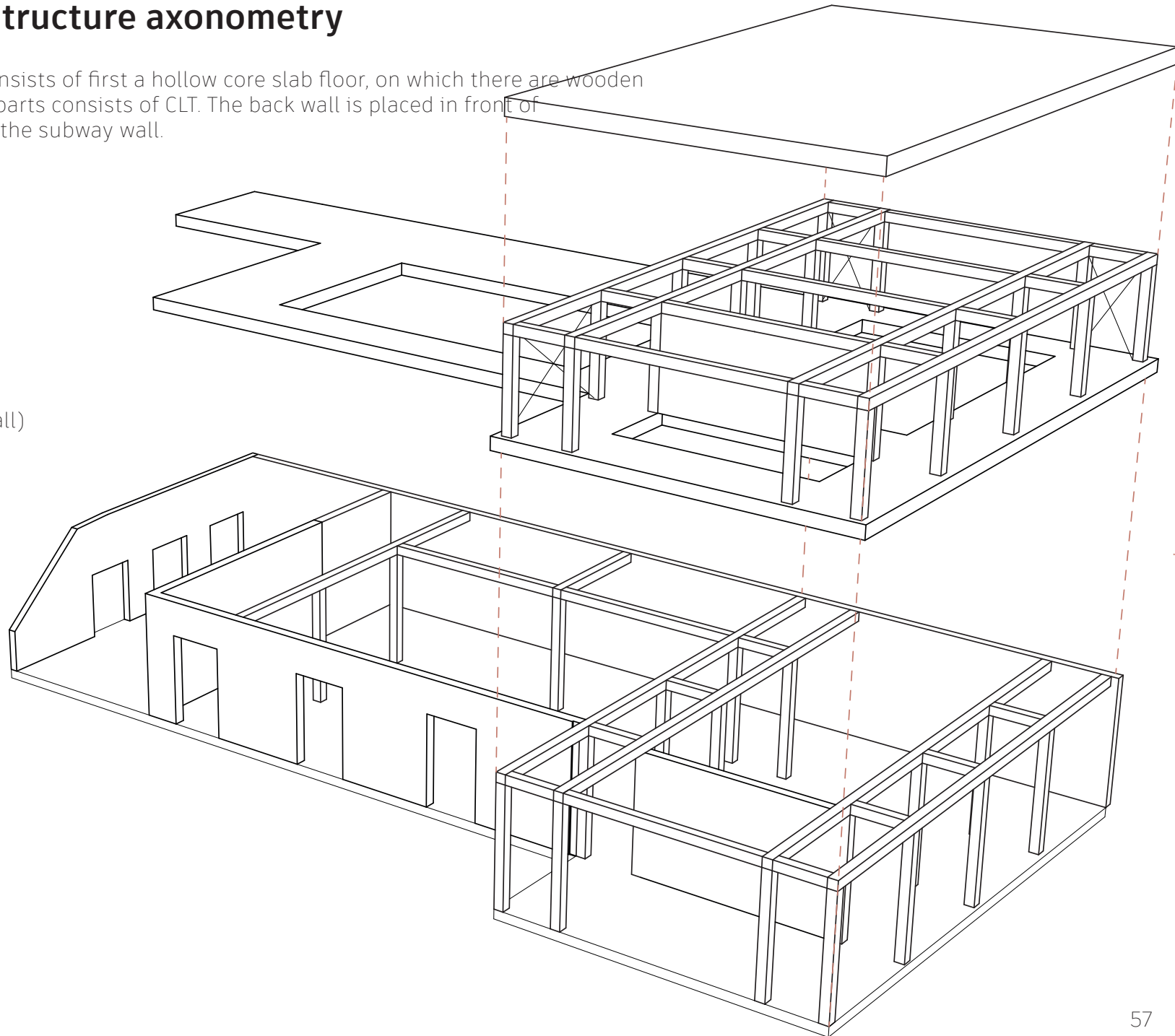
The construction of the building consists of first a hollow core slab floor, on which there are wooden beams and columns, and the solid parts consists of CLT. The back wall is placed in front of the subway wall and is attached to the subway wall.

CLT walls and upper floors

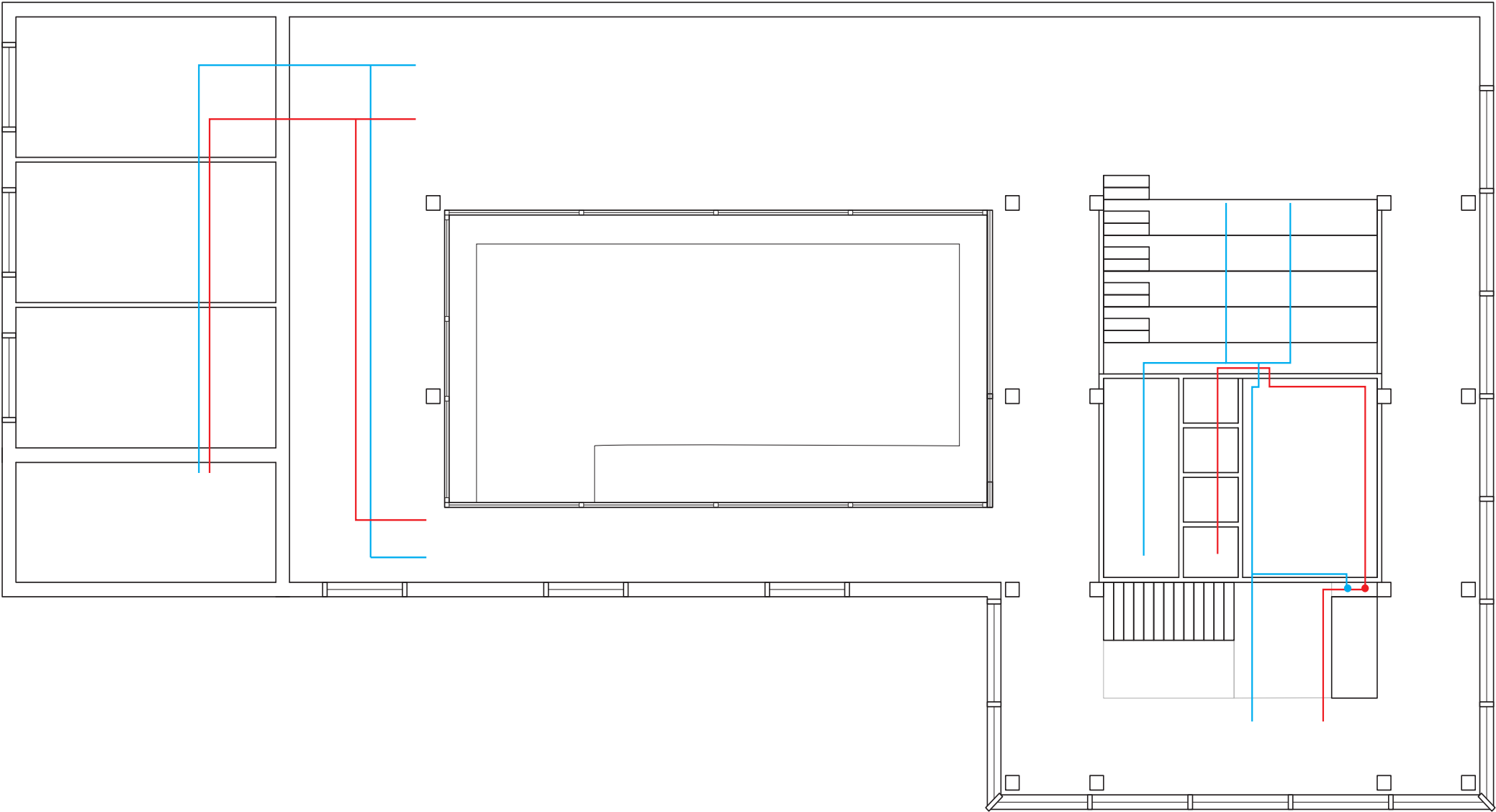
Wooden beams and columns
(self-supporting wooden curtain wall)

Back wall is placed in front of the
subway wall and is attached
to the subway wall

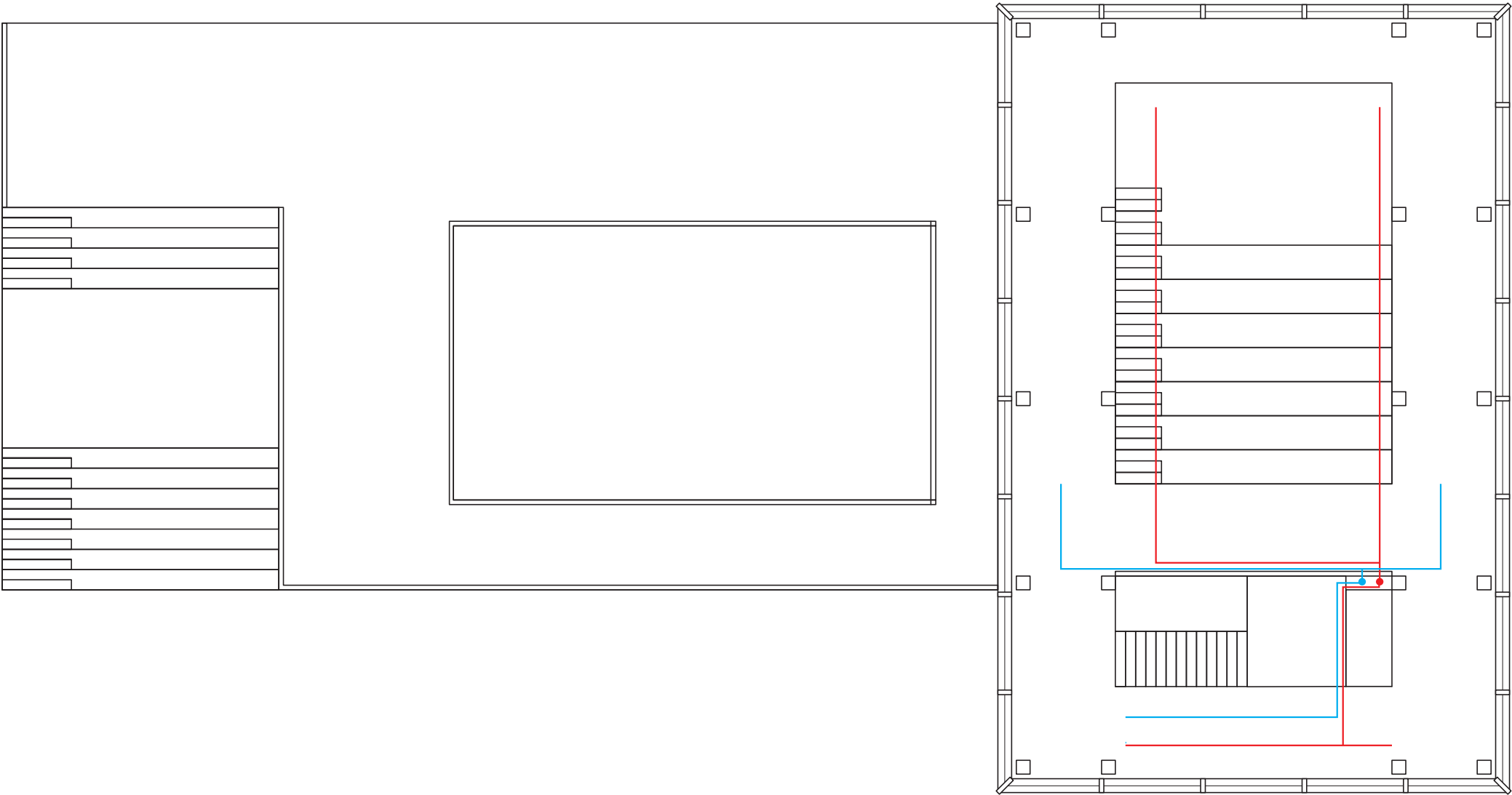
Hollow core slab floor



Community center - Ventilation plan - First floor



Community center - Ventilation plan - Second floor



Ventilation - air ducts

Er wordt gebruik gemaakt van een hybride ventilatiesysteem. Waarbij in de zomer overgegaan kan worden op ventilatie type c door de ramen te openen. In allebei de gebouwen zijn in alle ruimtes te openen ruimte, behalve in de kelder van het restaurant.

In het community center is ook voor twee technische ruimtes gekozen. Dit zodat de tweedeling, waarin ook de functies verschillen, van het gebouw los van elkaar kan draaien. Daarnaast is er rekening gehouden met zo min mogelijk kanalen door het gebouw heen, omdat gekozen is voor een zichtbare houten constructie. Bij de evenementenruimte wordt de mechanische toevoer door de tribune naar buiten geblazen, de mechanische afvoer wordt op de eerste verdieping op het plafond afgevoerd.

Om een kleine inschatting te maken hoe groot bepaalde kanalen zullen worden is er een berekening gedaan van de grootste capaciteitsruimtes.

Berekening van de luchtkanalen in de eventhal van het community center:

Ventilatievoud= 25 m³/u per persoon

Personen = 150

$V = 150 \times 25 = 3750 \text{ m}^3/\text{u}$

V per seconde = $3750 / 3600 = 1,042 \text{ m}^3/\text{s}$

Maximale snelheid = 3 m/s

$A = 1,042 / 3 = 0,347 \text{ m}^2$

Er zijn 2 luchtkanalen: $0,347 / 2 = 0,174 \text{ m}^2$

$A = \pi r^2 \text{ } r = \sqrt{(A/\pi)}$

$r^2 = A/\pi \text{ } r = \sqrt{(0,174/\pi)} = 0,235 \text{ m}$

Diameter van de luchtkanaal is dus 0,47 m

Ventilation - air treatment cabinet

Om de afmetingen van de LBK te achterhalen wordt gekeken naar Ned Air OmniLine PL.

In het community center komen twee luchtbehandelingskasten en in het restaurant komen er ook twee.

In de tabel hiernaast staat aangegeven wat het rendement is van elke LBK.

Berekening:

LBK3 (Community center – evenementenhal enz):

Evenementenhal 150 personen met ventilatievoud van 25 m³/u per persoon +

50 personen in overige ruimtes (toiletten/gang) met ventilatievoud van 25 m³/u per persoon

200 * 25 = 5000 m³/u > PL 5200

Afmetingen van de kast zijn: 2600 x 1670 x 1470 mm (L, B en V in mm)

LBK4 (Community center – kantoren en gang):

30 personen in kantoren met en een ventilatievoud van

30 m³/u per persoon.

30 personen in gangen met een ventilatievoud van

25 m³/u per persoon.

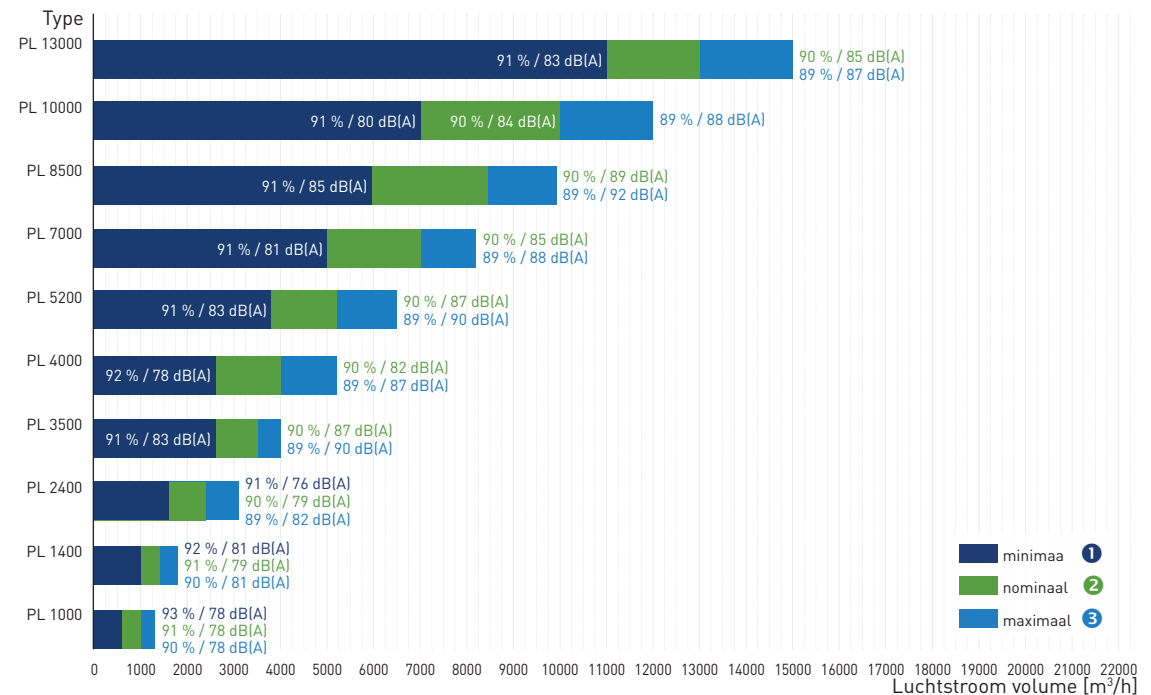
30 * 30 = 900 m³/u

30 * 25 = 750 m³/u

900 + 750 = 1650 m³/u > PL 2400

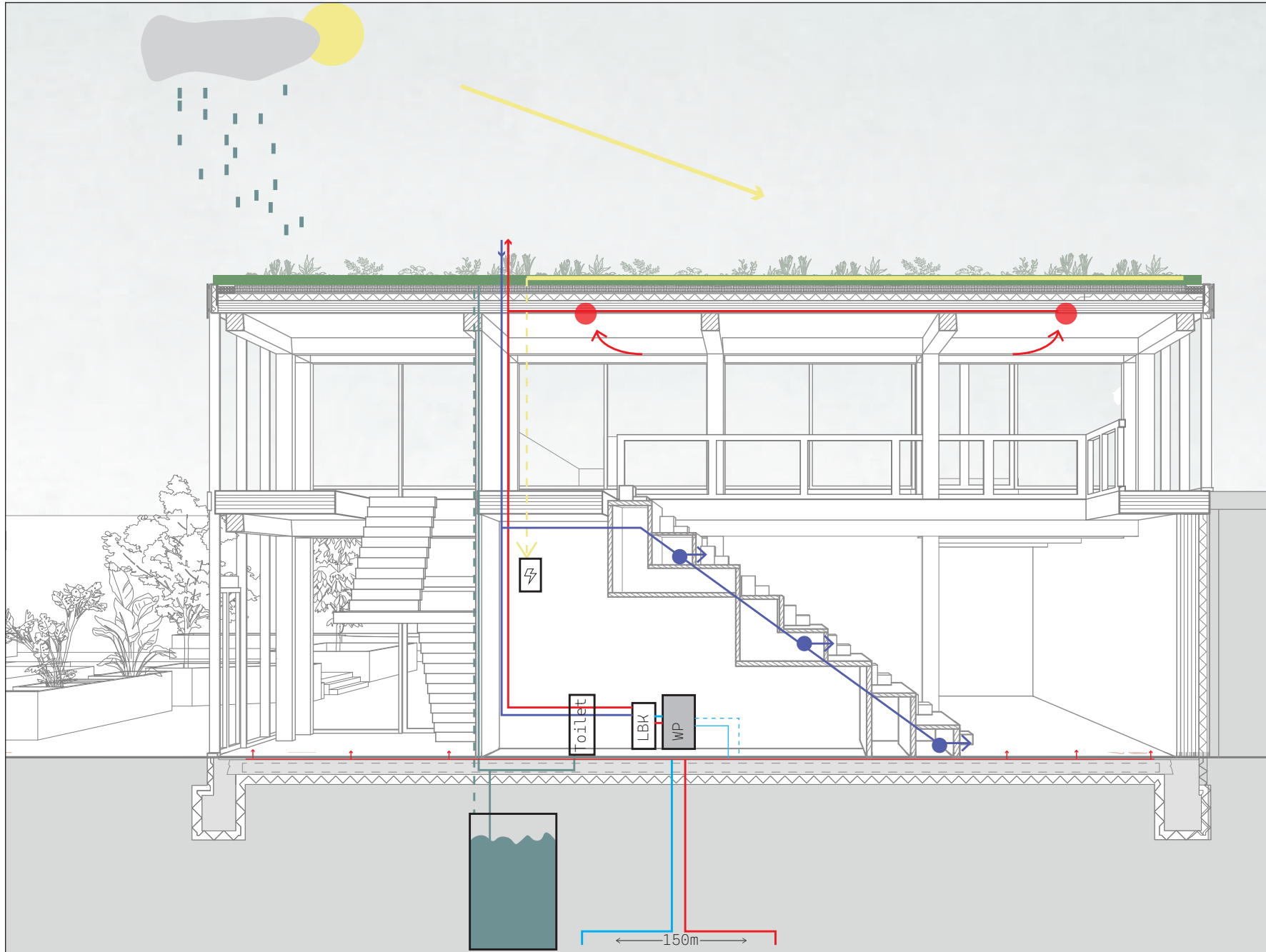
Afmetingen van de kast zijn: 2200 x 1110 x 1470 mm

(L, B en V in mm)



- Rendementsbepaling in de winter, volgens NEN 5138.
- Temperatuur condities toevoer -7 °C / 50% R.V., retour 20 °C / 50% R.V.
- Geluidvermogen niveau dB(A) in toevoerlucht.

Community center - Climate section - Winter



In winter, the building will be mechanically ventilated, the air supply will come from under the stairs of the tribune. Rainwater will also be collected and used for flushing toilets and watering plants if needed.

In summer, windows and doors that can be opened will open, so that in summer the space can be naturally ventilated. There will be sunshades behind the curtain wall, both to keep out unwanted heat and provide comfort. And lastly, solar energy is collected for a small part on the roof, in addition a part comes from the solar trees placed in the area.

Community center - Material view - Curtain wall

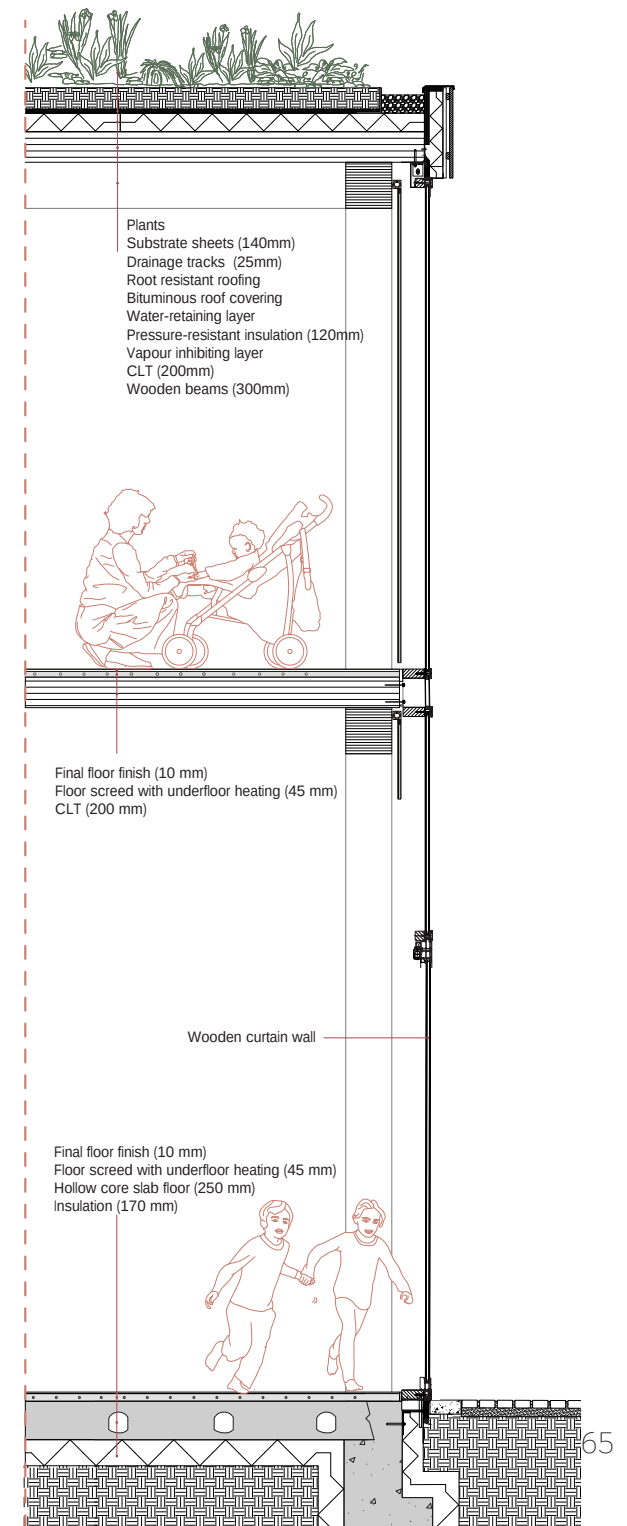


Community center - Facade view & Vertical section

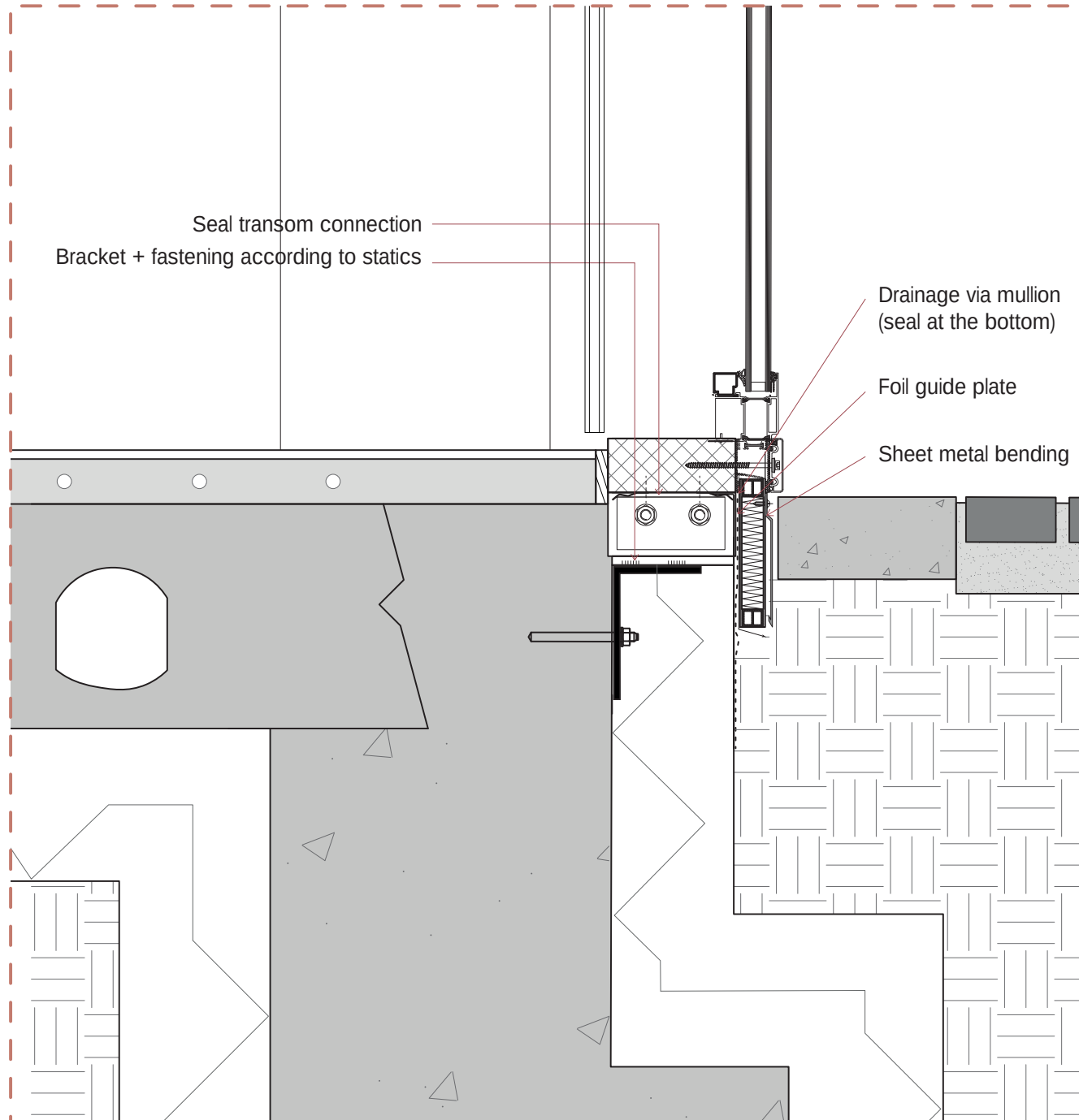
Safety was also considered in the choice of facade and materials. By choosing a wooden curtain wall, it ensures that there is full visibility on the street.

In the evening, this facade will be illuminated. Therefore, the female students who indicated in the interviews that they felt unsafe here at night will hopefully feel much safer.

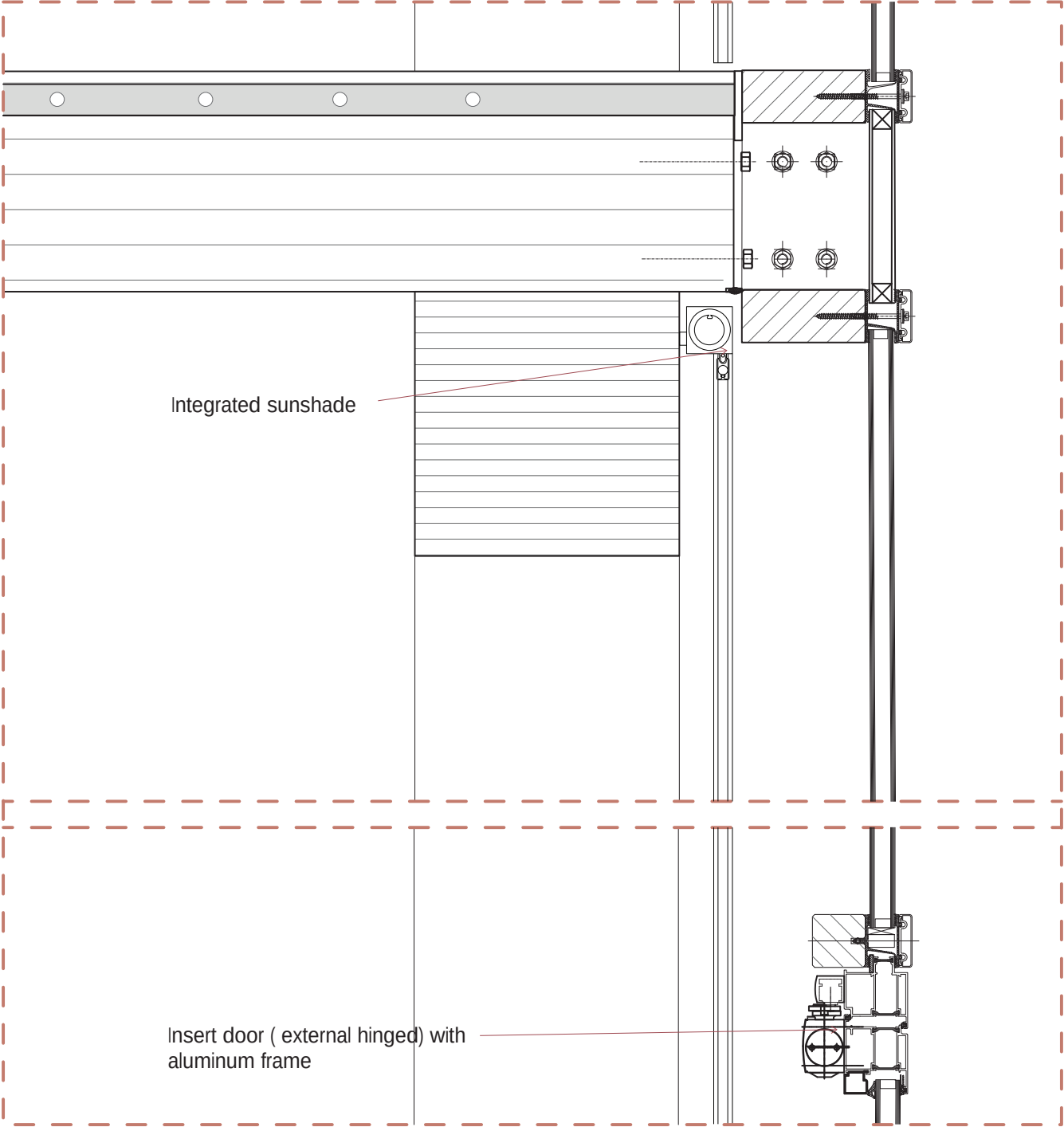
In the 1.20 detail, you can see that some parts of the façade include sections that can be opened. Then when an event is organized, the street could be connected to the building for example.



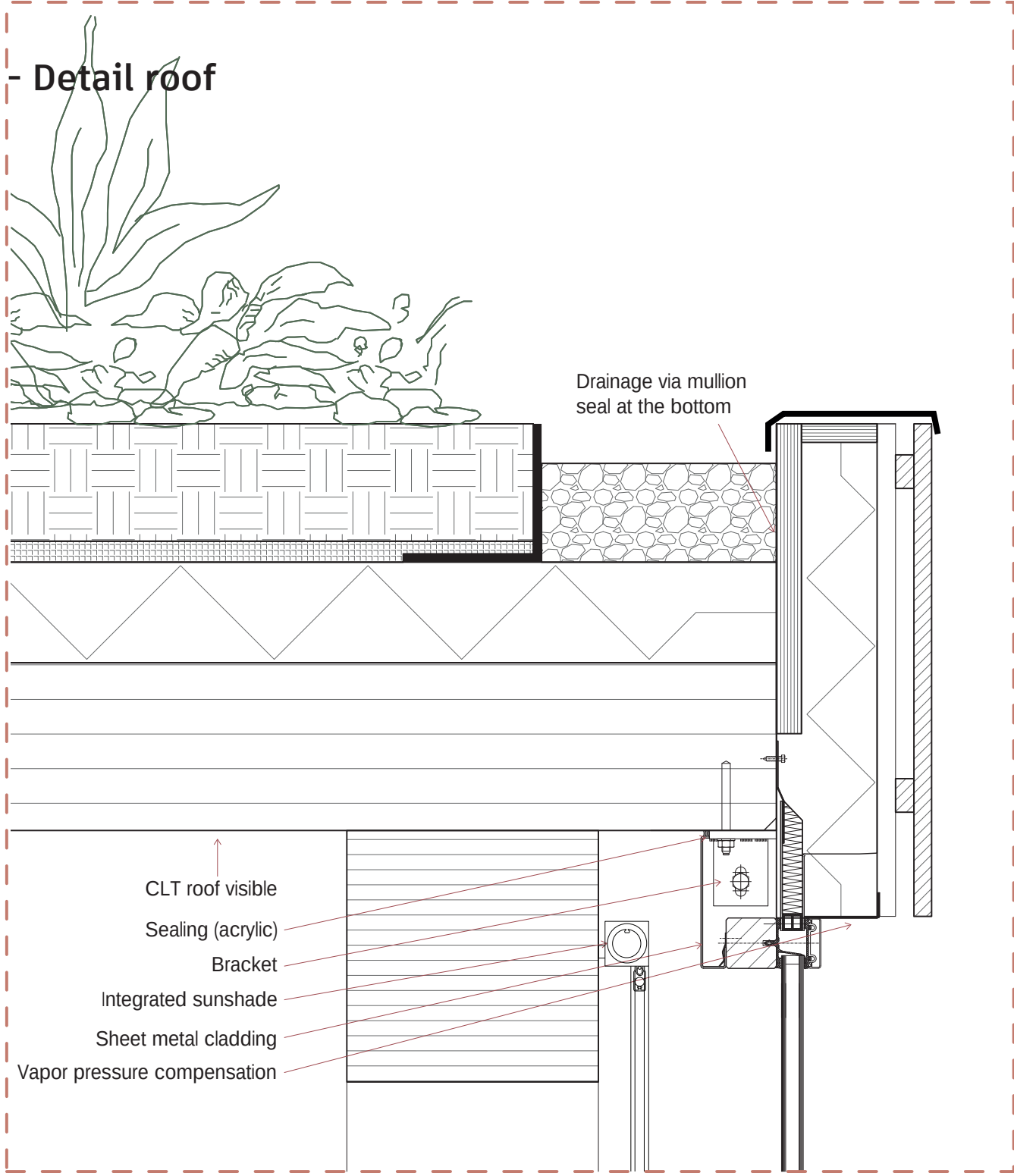
Community center - Detail foundation



Community center - Detail intermediate floor



Community center - Detail roof



Community center - Material view - Wooden cladding



Community center - Facade view & Vertical section

A wooden vertical cladding was chosen for the material choice of the community center.

Where for the closed parts of the facade, a CLT facade with a CLT roof was chosen.

