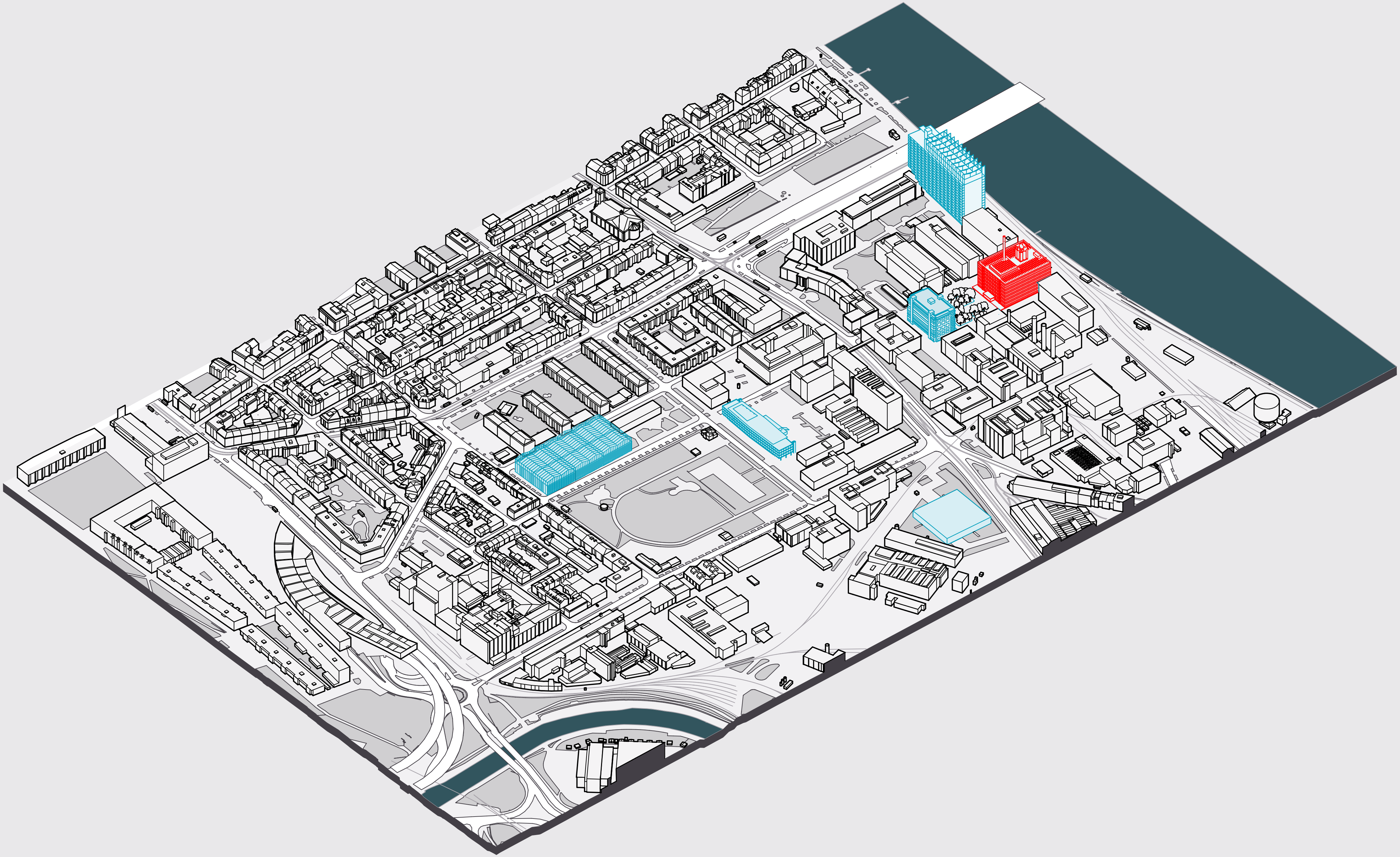
Hospital for the Earth - Re-use Ciba (C)

Studio Anne Lacaton - Jurek Brüggen



Hospital* for the Earth

Summary concept

We moderns divided the world into two separate entities; nature and society

We try to protect the Earth from our harmful human impact

But if we no longer separate but consider ourselves and our buildings as part of a common shared Earth

We would live together with many different inhabitants

All capacities needed for separation from the environment could be re-used to contribute to it - with minimal interventions

*In colloquial terms the hospital describes a place where ill people are cured. It comes from the Latin hospitalis ‚hospitable' (hospes, hospit) and means to host a guest, the reception of a stranger. In the early past, it was a place for the poor because the rich were treated at home.
Can we imagine these meanings together?

Maybe it´s too late to protect -
maybe we have to heal the Earth

A

What has happened so far*

*in the climate crisis

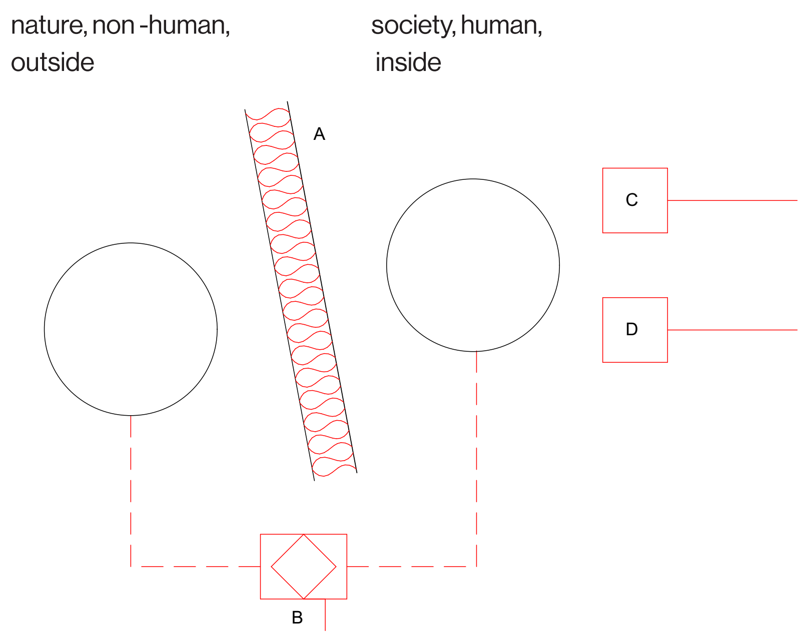
We (modern humans) have built uncountable houses all over the (modern) world. These (modern) houses form inside spaces which are detached from their surroundings. In the beginning, this separation was a modern dream. We have made an enormous technical effort to create tight envelopes, mechanical ventilations and technical heating or cooling systems. Nature has only been a reliable background of human actions in this story.

Having settled in controlled inside spaces we believed our human world to be independent from what we called the natural world.

For a while we have taken the basis of our existence for granted. But in the climate crisis we realise that its very basic components are affected by us and affect us. It has become clear that our way of living is only possible at the expense of the Earth.

So this separation became a necessity. The Earth had to be protected from the harmful human impact - from ourselves. By improving the efficiency of insulation, mechanical ventilation, heating and cooling we tried to minimise the traces of our life, to make ourselves invisible in an ecological sense, to live as ghosts in this world - from a dematerialised distance.

A insulation
B mechanical ventilation
C heating
D cooling



*based on the “Two House Collective” diagram by Bruno Latour

What may become

What if architects asked whom to design for?

If we consider ourselves and our buildings to be part of a common Earth this would mean to live together with many different inhabitants. Our protagonist shows that life in a building that separates the inside from its surroundings to provide homogenous comfort fur humans is not even as generous and pleasureful as we thought. Instead we could make the Earth a common concern for everyone. Then our protagonist could become a hospital for the Earth, which does not try to minimise its harmful causes but instead maximises its positive impact on the Earth.

All the capacities which were needed to separate from the environment can be re-used to contribute to it in a positive way. A hospital for the Earth is a place that cleans the water, filters the air, fertilises the soil, captures CO_2, hosts plants, accommodates animals - and ultimately enables generous and pleasureful human life.

When freed from its constraints to separate, our protagonist offers large extra spaces in deep rooms, high ceilings due to its open, large span structure. It functions with very little interventions. Instead its existing capabilities are reused to become passive systems which rely on interaction with all inhabitants as a common ecosystem.

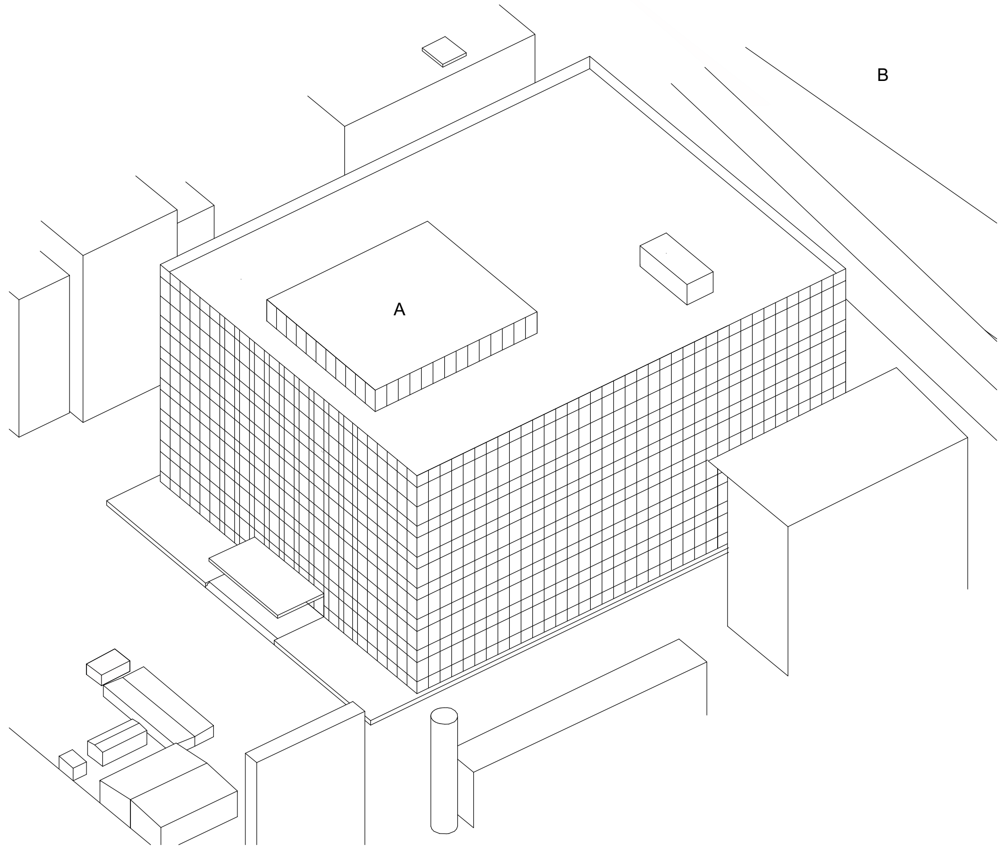
The Hospital for the Earth may become a building which is part of the outside, enabling a new inside with no more outside. In this new inside many different actors co-inhabit the same common space.

The protagonist

The main character of this story was built in the time of modern dreams. It is called B127. Since 1973 it was used as a laboratory and office building. Before moving out, up to 600 people worked in 154 laboratories and additional offices. The building's structure is based on a strict office grid of 1,70 m with a column every 3rd unit (span of 5.10m).

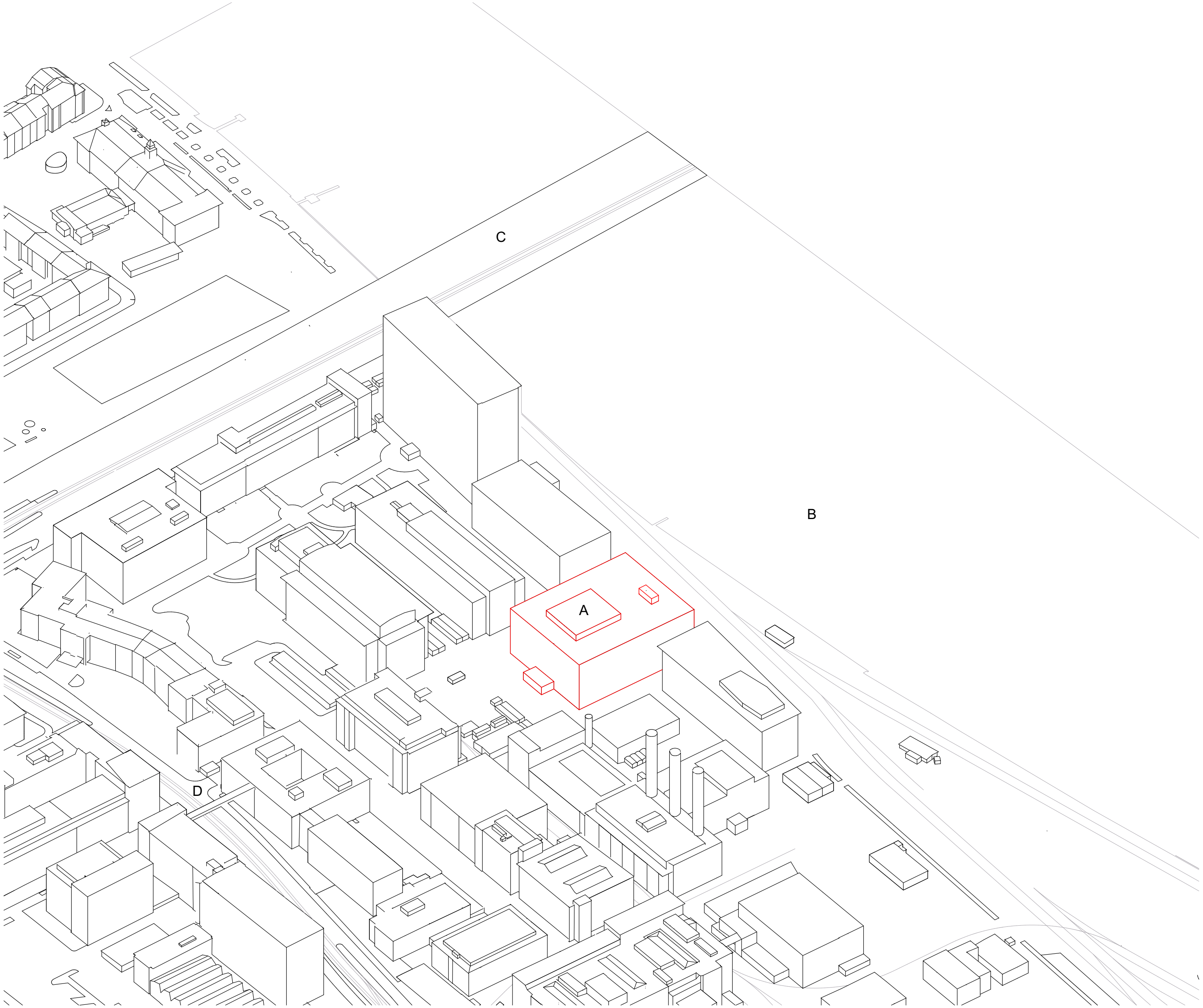
It is situated in the north of Basel in a former industrial area in the district of Klybeck. Its west facade faces the Rhine river.

A the protagonist
B river Rhine

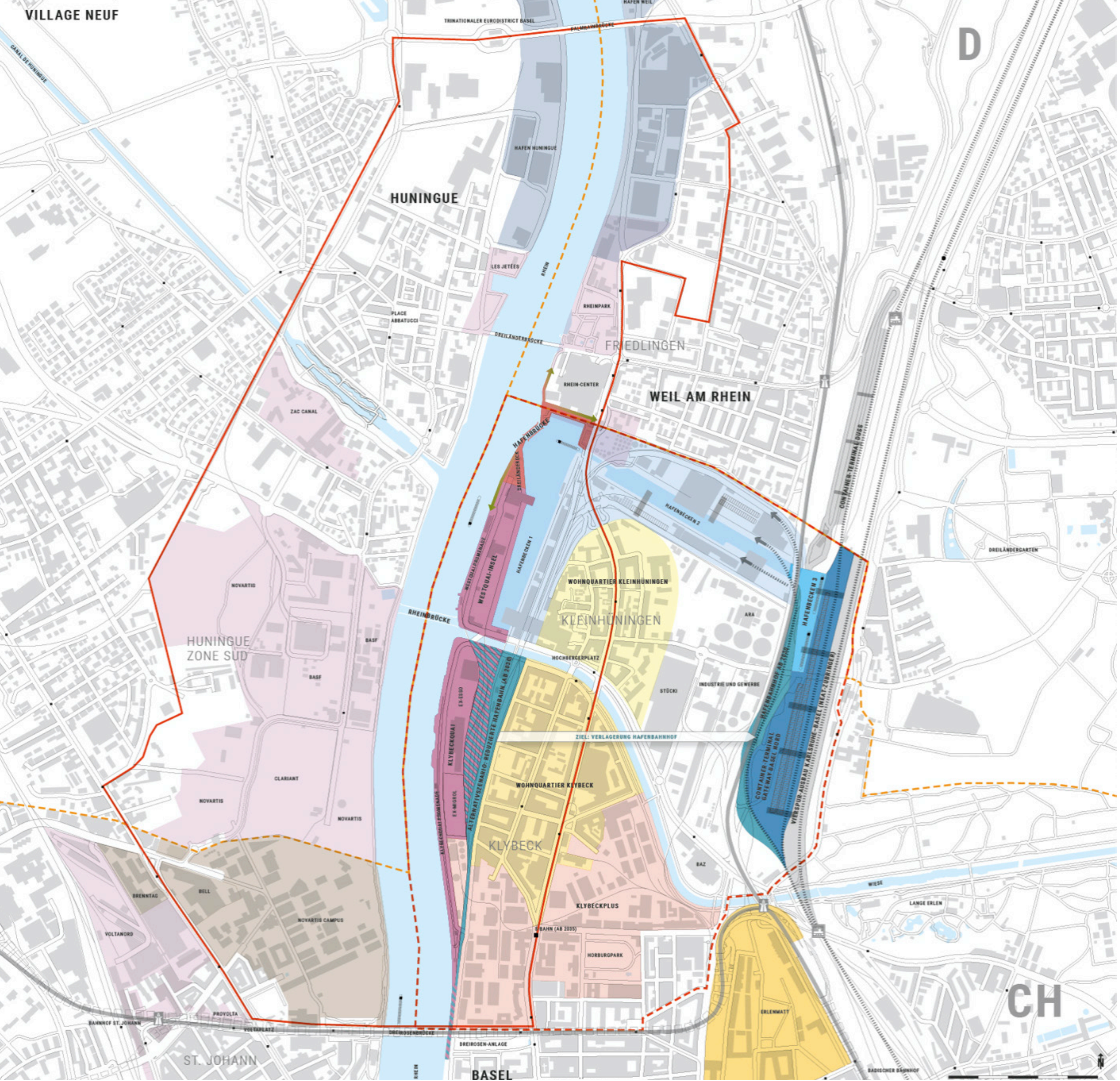


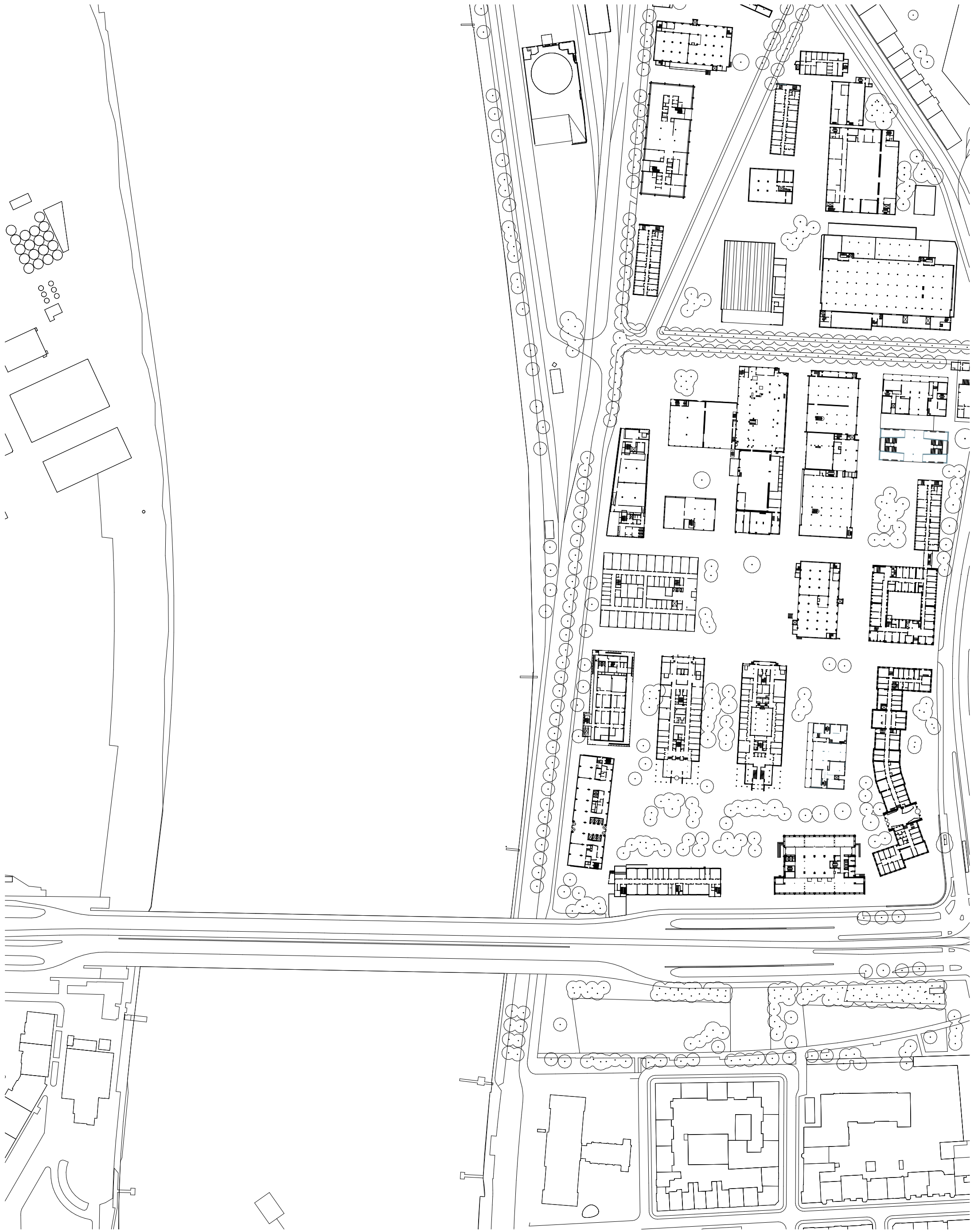
Axonometry existing

A the protagonist
B river Rhine
C Dreirosenbrücke
D Klybeckstrasse

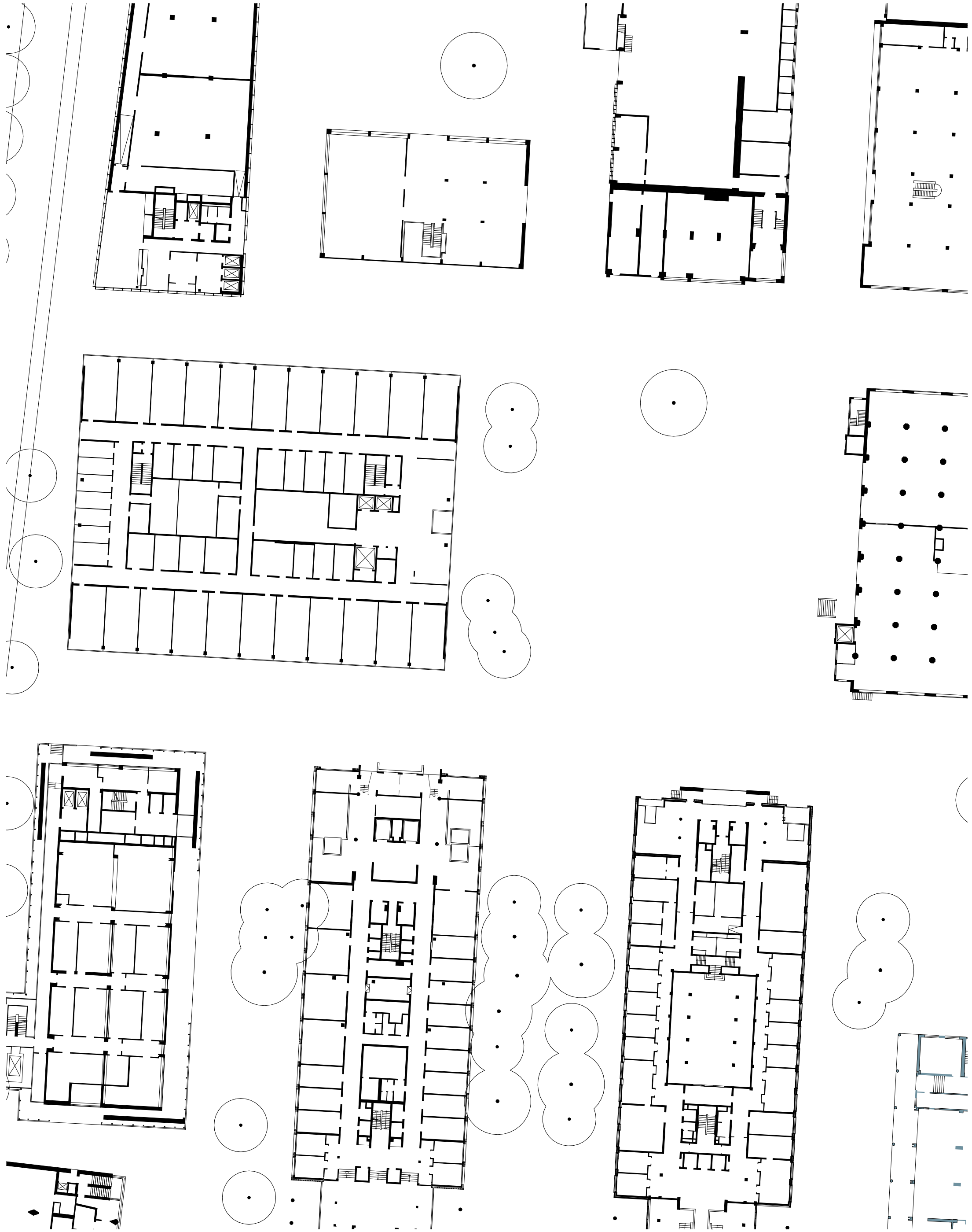


Site plan


VILLAGE NEUF
D
HUNINGUE
HAFEN HUNINGUE
LES JETÉES
RHEIN
PLACE ABBATUCCI
DREILÄNDERBRÜCKE
RHEINPARK
FRIEDLINGEN
RHEIN-CENTER
WEIL AM RHEIN
ZAC CANAL
HAFENBRÜCKE
HAFENBECKEN 1
HAFENBECKEN 2
HAFENBECKEN 3
WESTQUAI-INSEL
CONTAINER-TERMINAL DUSS
DREILÄNDERGARTEN
WOHNQUARTIER KLEINHÜNINGEN
KLEINHÜNINGEN
RHEINBRÜCKE
NOVARTIS
HUNINGUE ZONE SUD
BASF
HOCHBERGERPLATZ
STÜCKI
INDUSTRIE UND GEWERBE
ARA
KLYBECKQUAI
ZIEL: VERLAGERUNG HAFENBAHNHOF
CONTAINER TERMINAL GATEWAY BASEL NORD
WOHNQUARTIER KLYBECK
CLARIANT
KLYBECK
BAZ
WIESE
LANGE ERLEN
BRENNTAG
BELL
NOVARTIS CAMPUS
KLYBECKPLUS
VOLTANORD
S-BAHN (AB 2035)
HORBURGPARK
ERLENMATT
CH
PROVOLTA
BAHNHOF ST. JOHANN
VOLTAPLATZ
DREIROSENBRÜCKE
DREIROSEN-ANLAGE
ST. JOHANN
BASEL
BADISCHER BAHNHOF

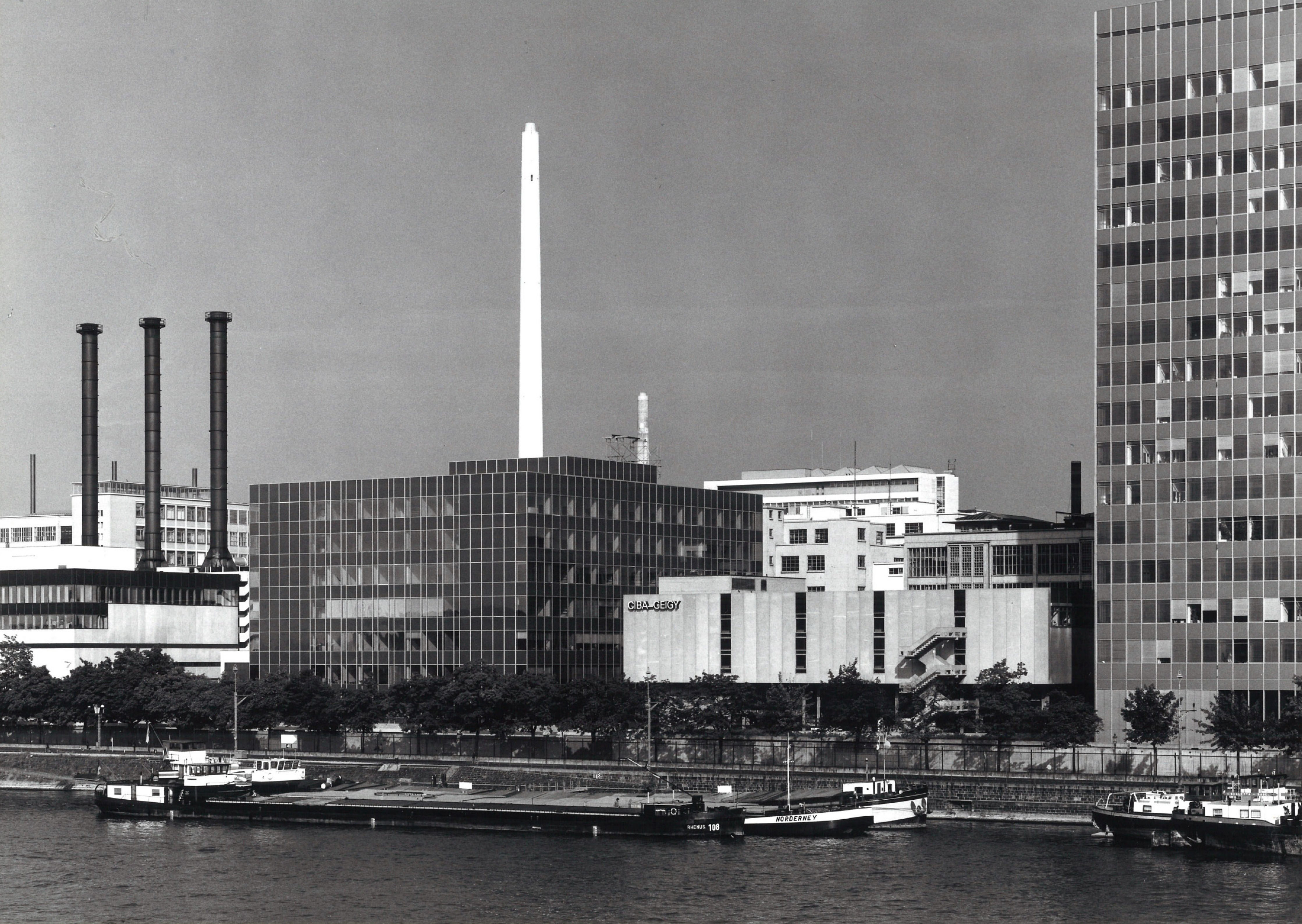


URBAN CONTEXT | 1:2000



IMMEDIATE SURROUNDINGS | 1:500


127

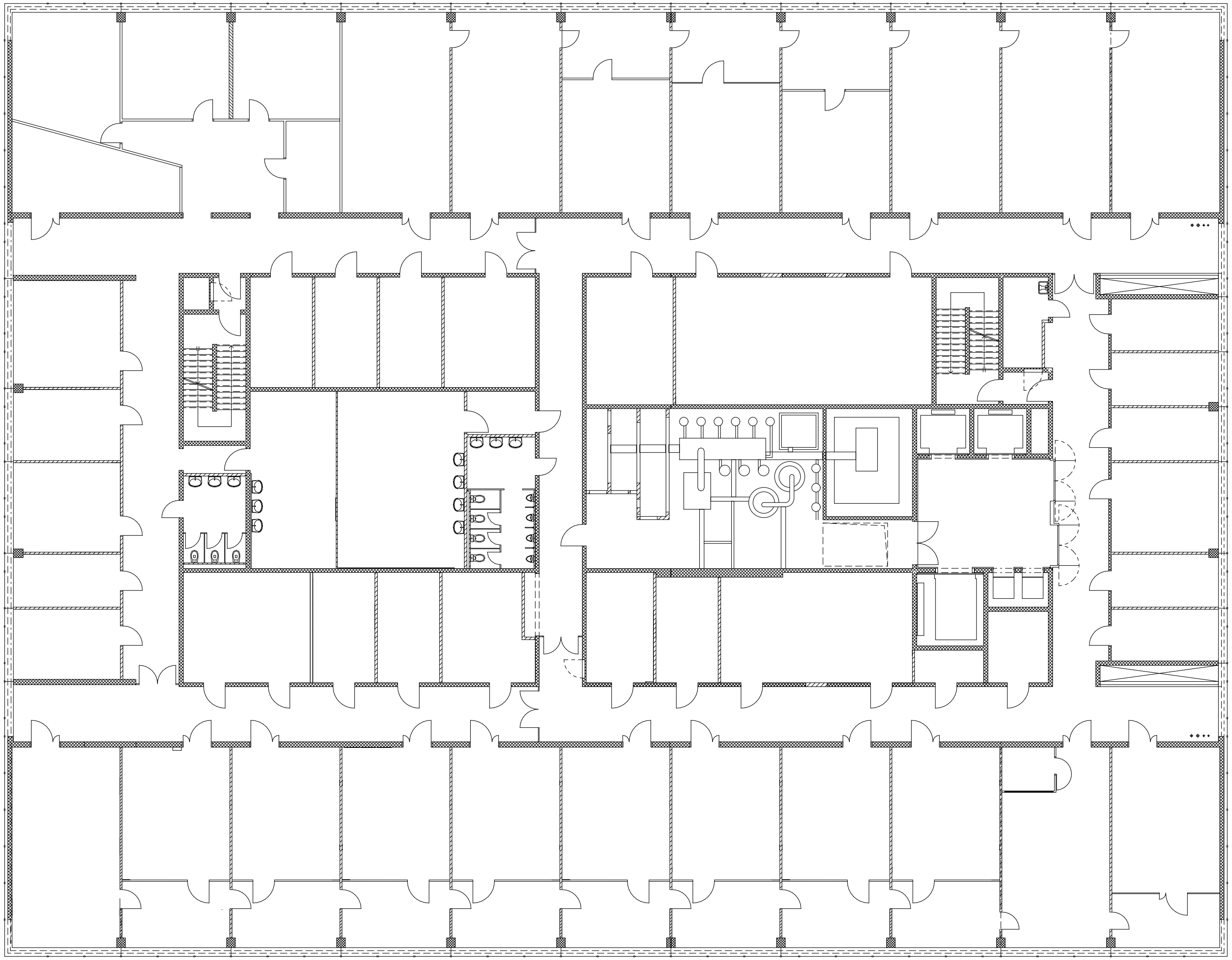

CIBA-GEIGY
RHENUS 108
NORDERNEY


127

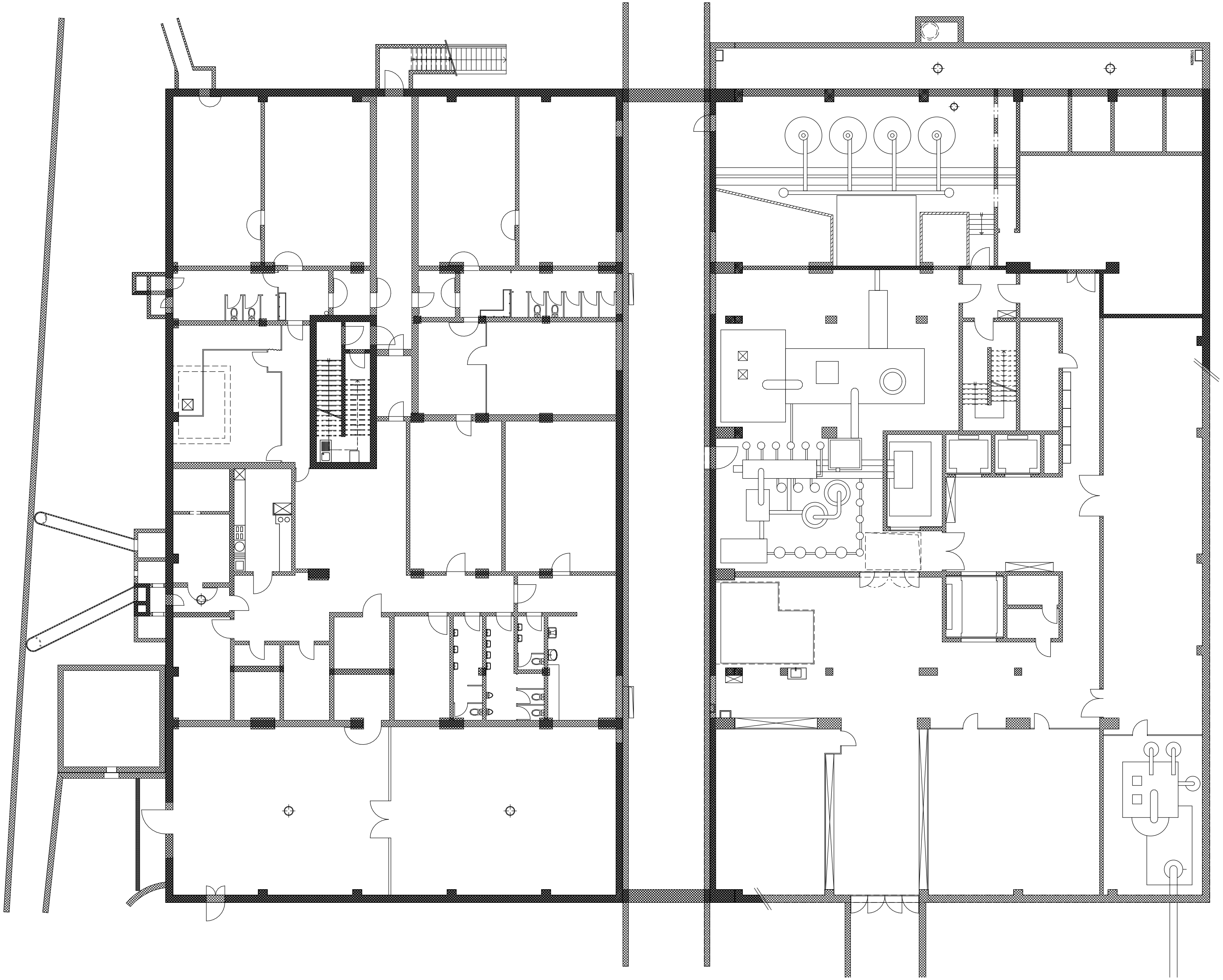

127


Gastarbeiter

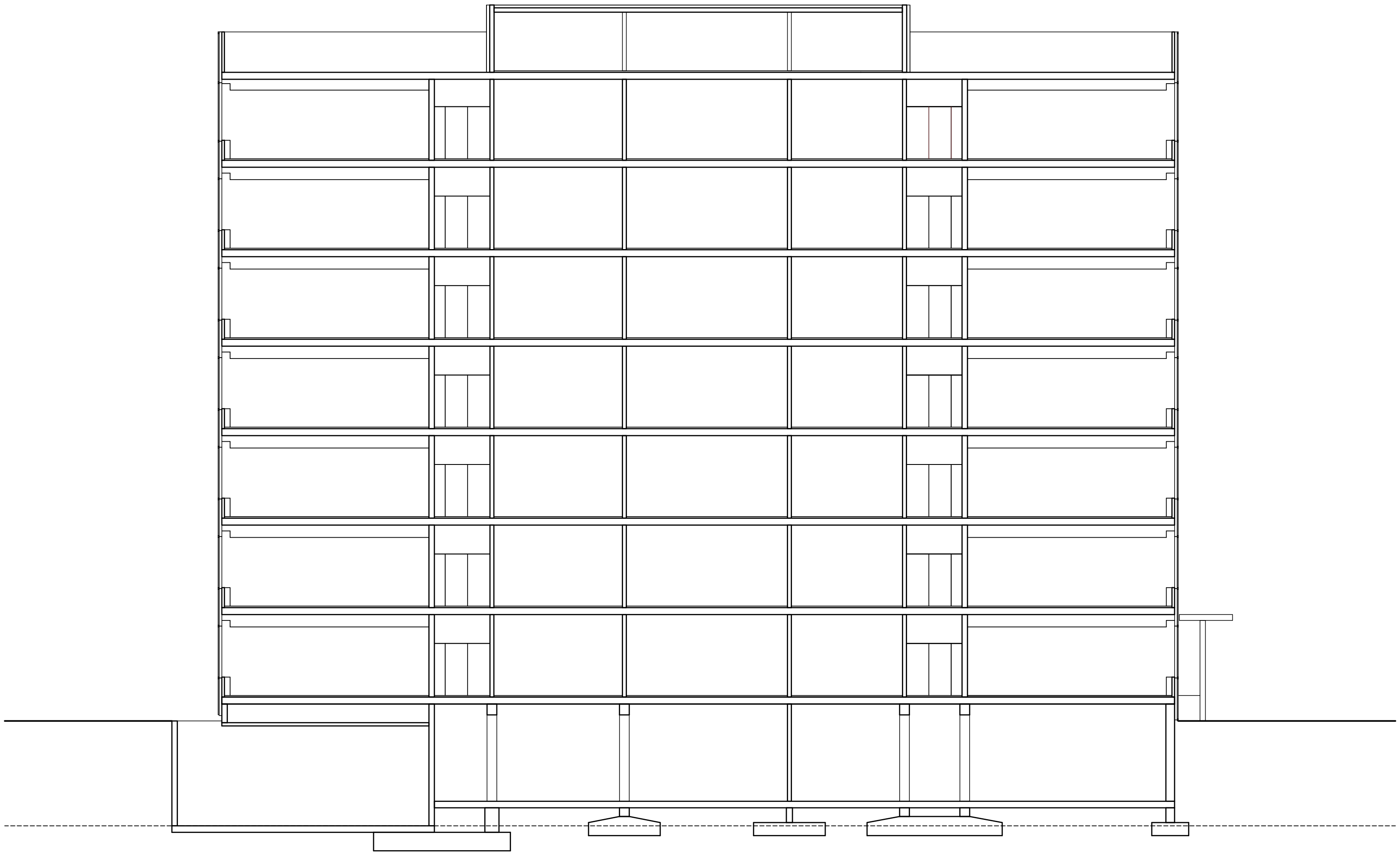

10 20 50 1.-



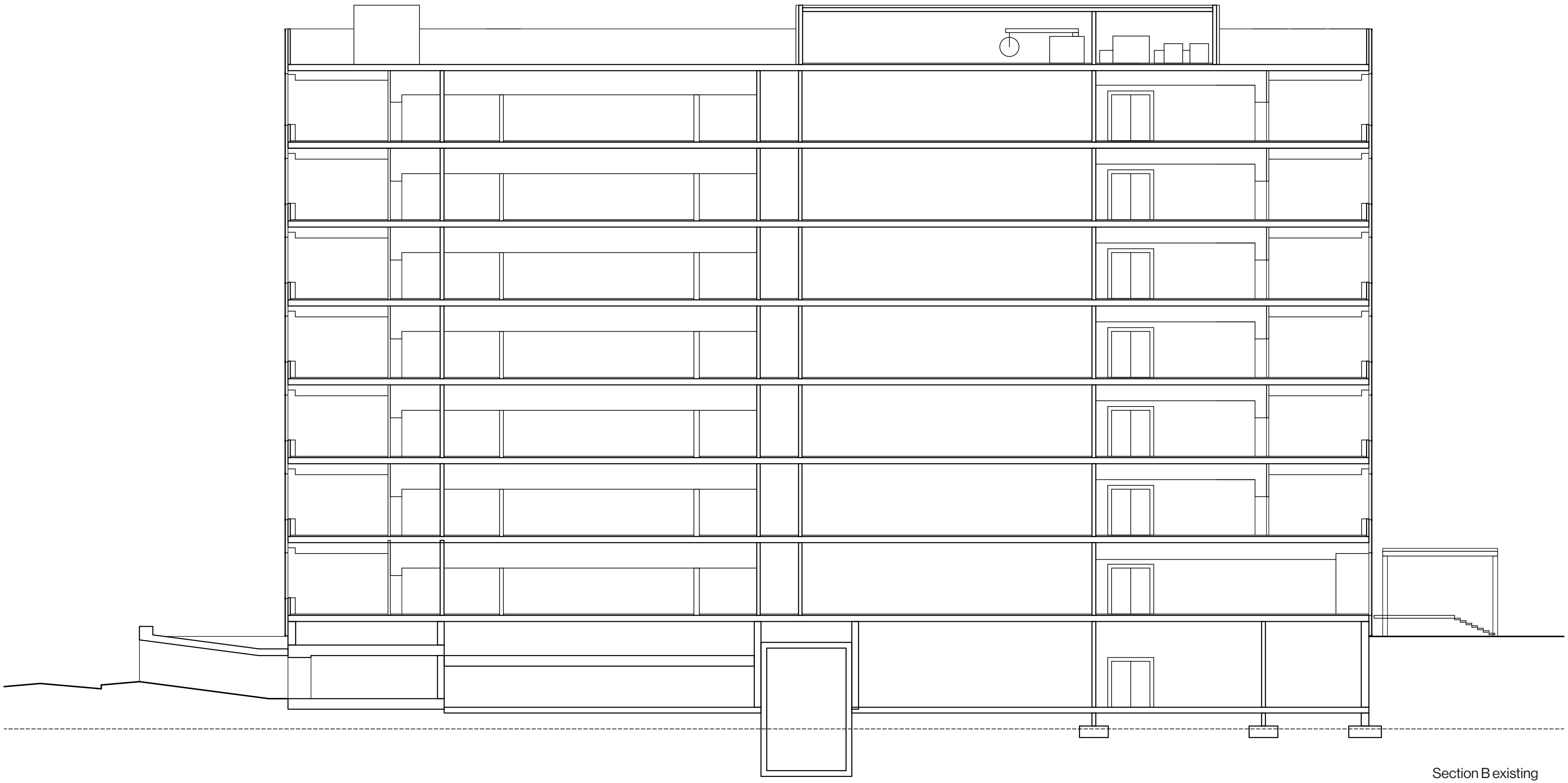
Standard floor plan existing



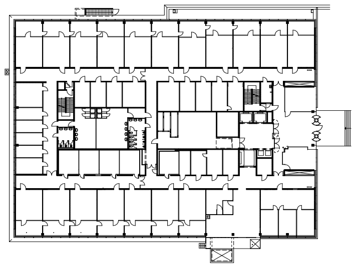
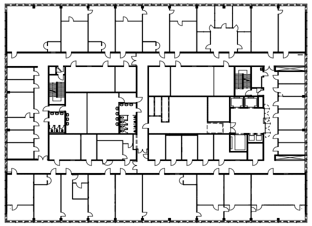
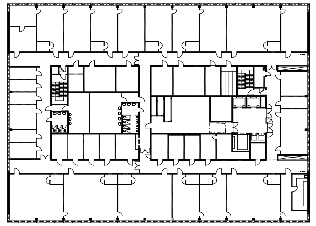
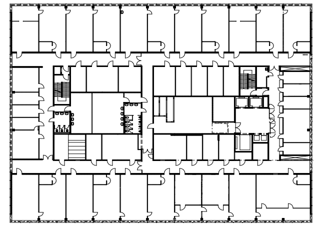
Basement floor plan existing



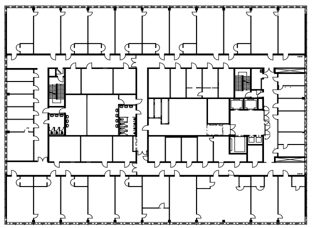
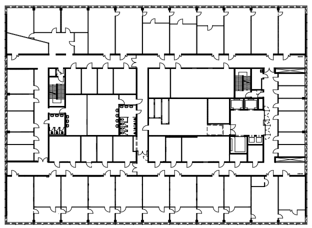
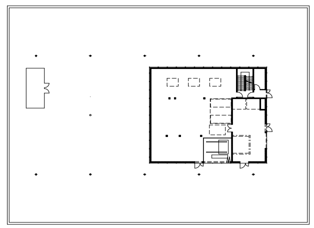
Section A existing



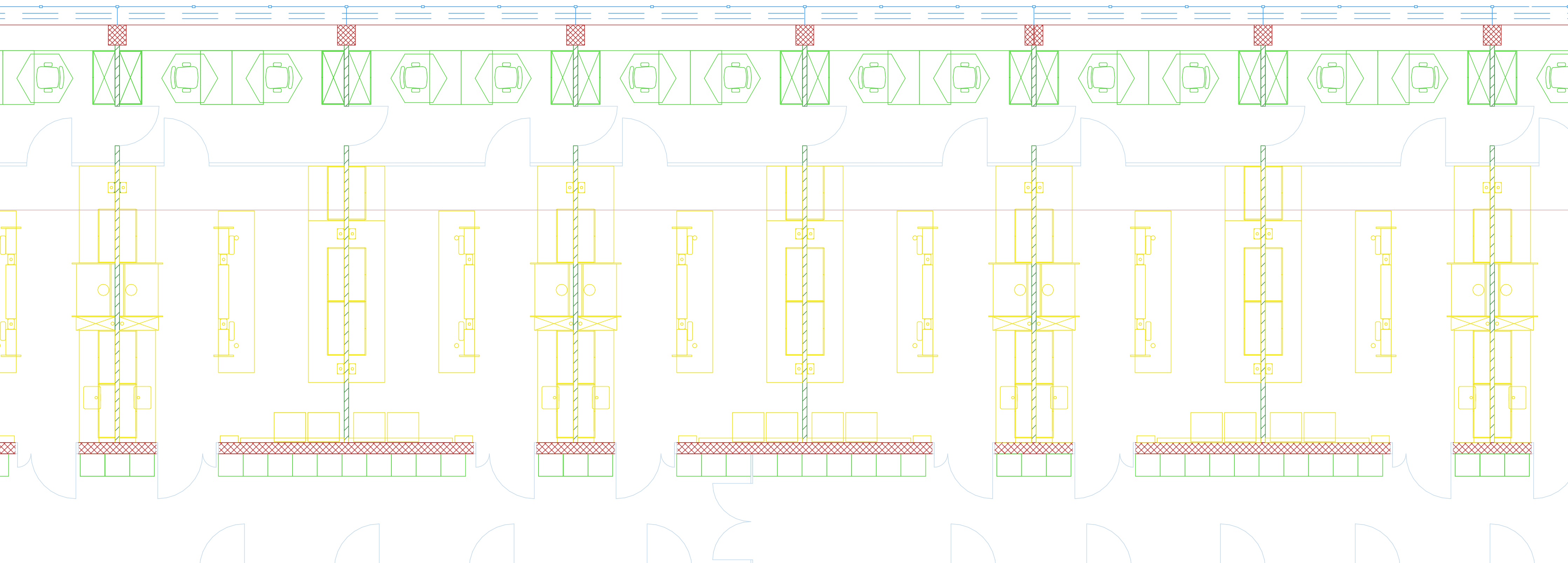
Section B existing

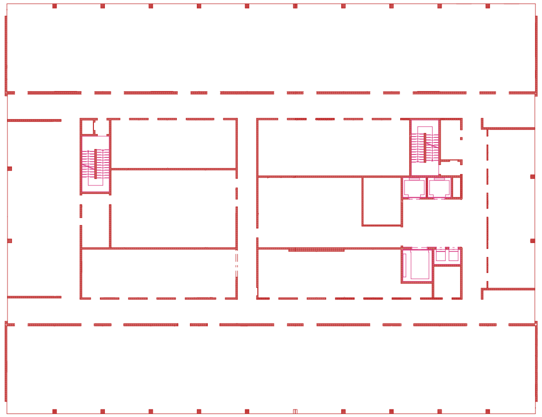





equal floors

equal rooms



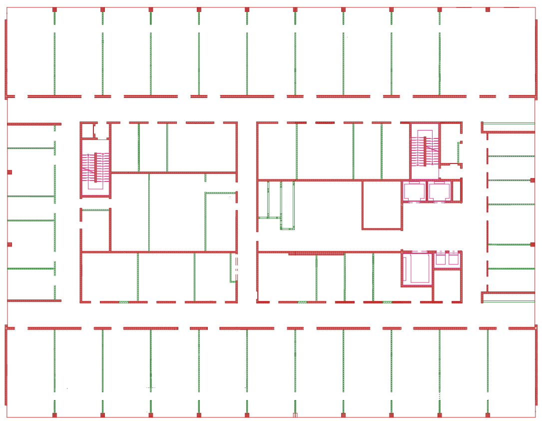


2 staircases, one lift area, 3 different sizes of lifts

ELEMENTS | CIRCULATION

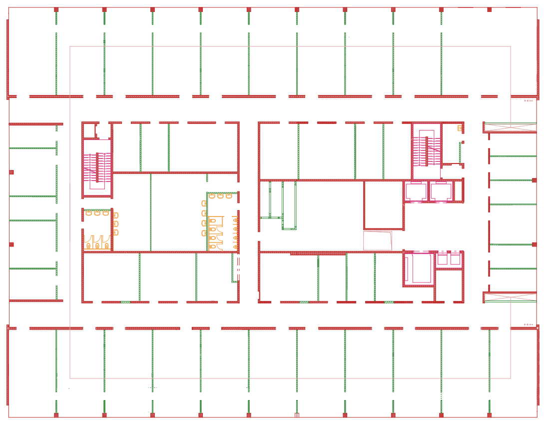
3 sanitary access points, designed for 600 persons

ELEMENTS | SANITARY INSTALLATIONS



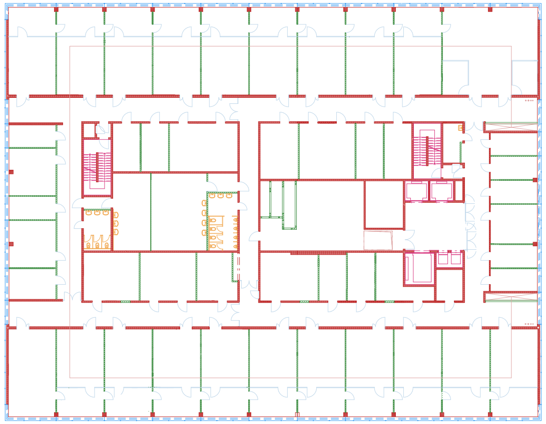
5,10 m grid, more spacious corner rooms , 10 cm prefabricated concrete wall in laboratories, brick walls in the inner areas

ELEMENTS | WALL SEPARATIONS



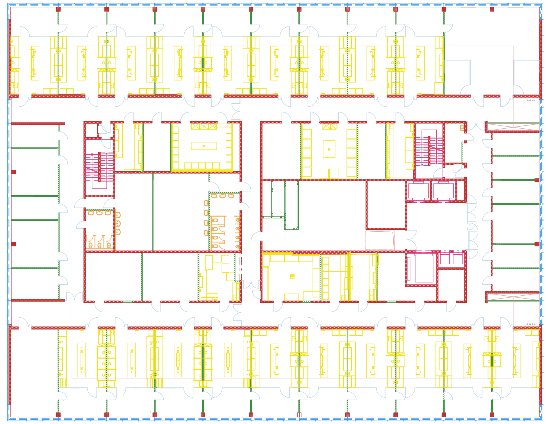
2 cores for installations, and a media ring line, supply with nitrogen, factory water from the Rhine, desalinated water, natural gas, vacuum, helium, hydrogen, carbon dioxide

ELEMENTS | LOAD BEARING



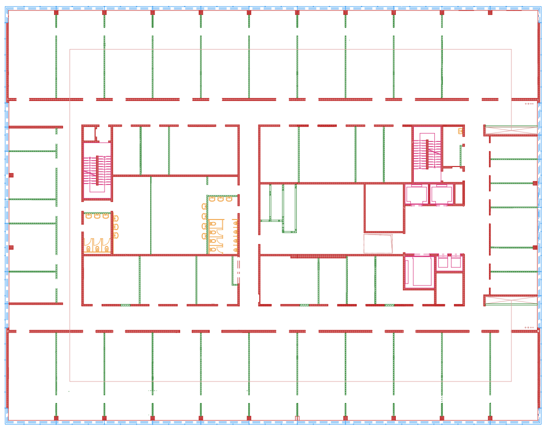
standard glas doors in the outside layer, air tight heavier doors in the inside layer

ELEMENTS | MINOR LIGHT WEIGHT COMPONENTS



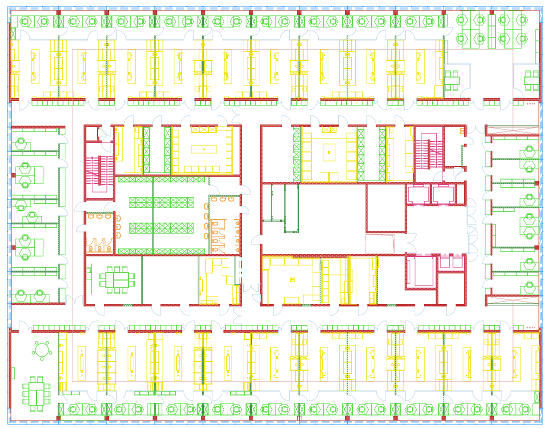
up to 23 similar laboratories on one floor, total 154 units, 47 m^2 (5,10 m x 9,10 m), for 600 persons, 7238 m^2, 12,1 m^2/person

ELEMENTS | LABORATORIES



mullion transom facade, not openable, walls and floors covered by glas panels, contaminated with asbestos, 2,55m grid

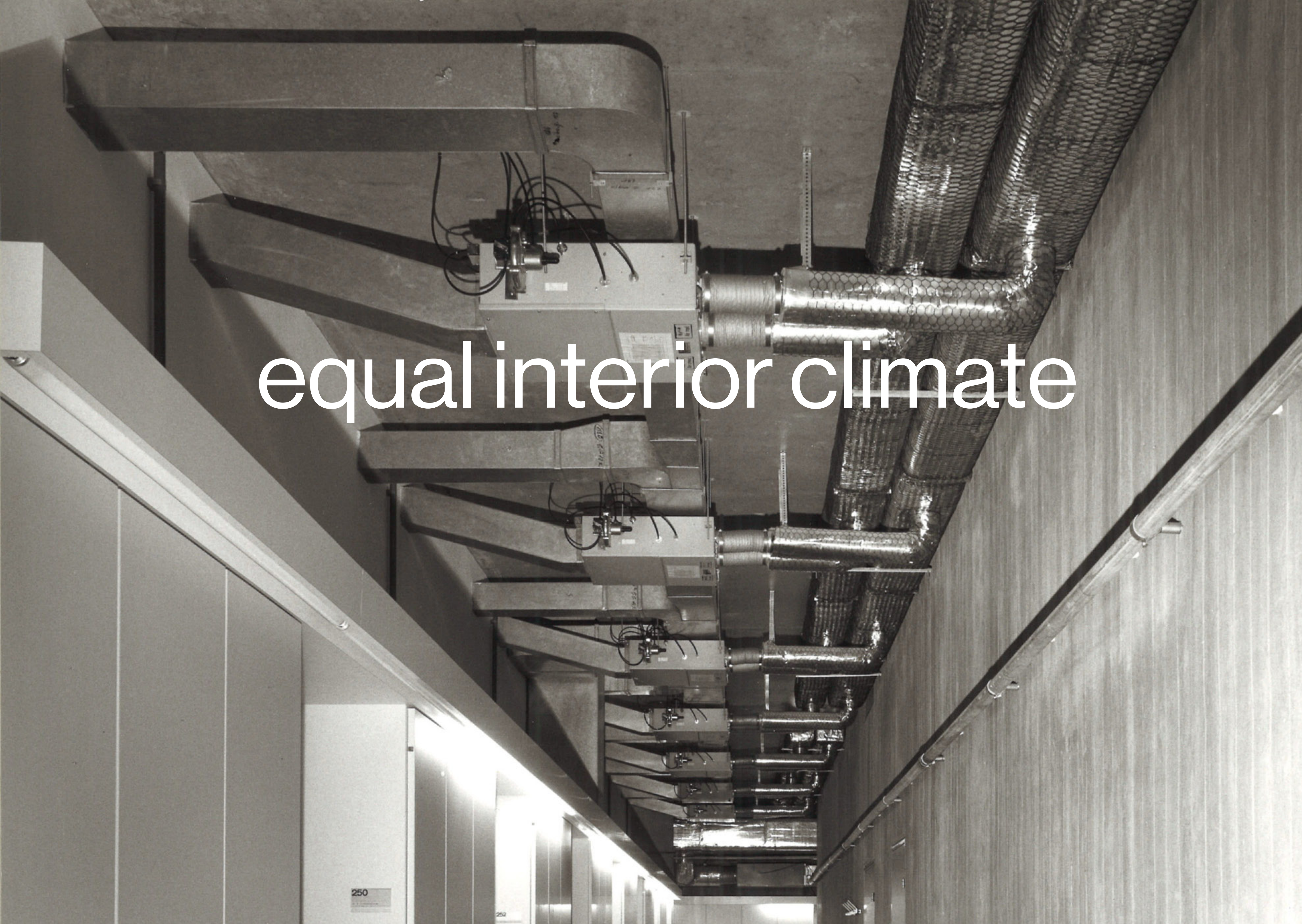
ELEMENTS | FACADE



ELEMENTS | ALL

equal facades

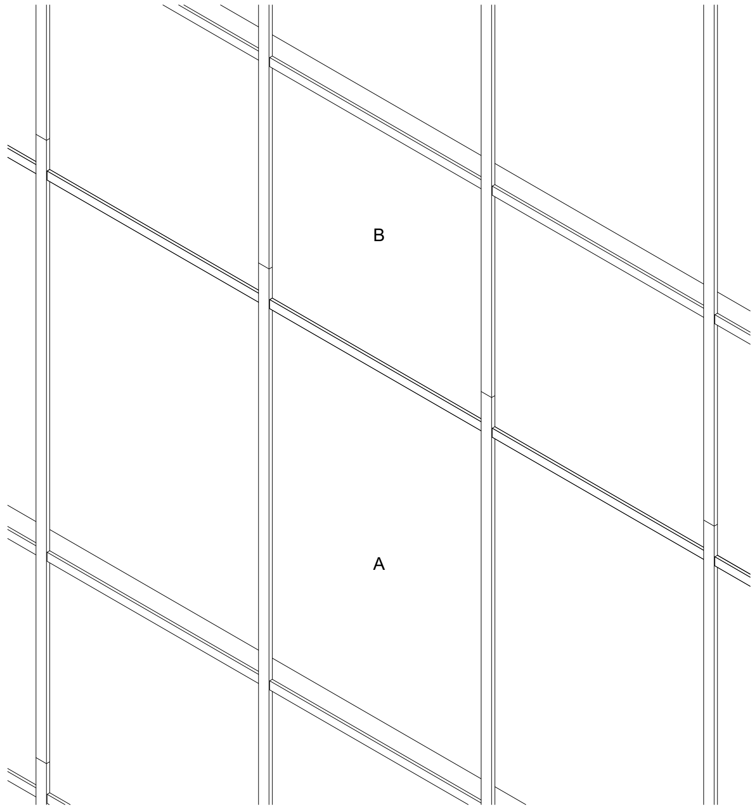
equal interior climate



Like many other office buildings B127 has a mullion transom glass facade which cannot be opened. Although it looks very homogenous, it is divided into reflecting glass and opaque sandwich elements with an outer glass layer.

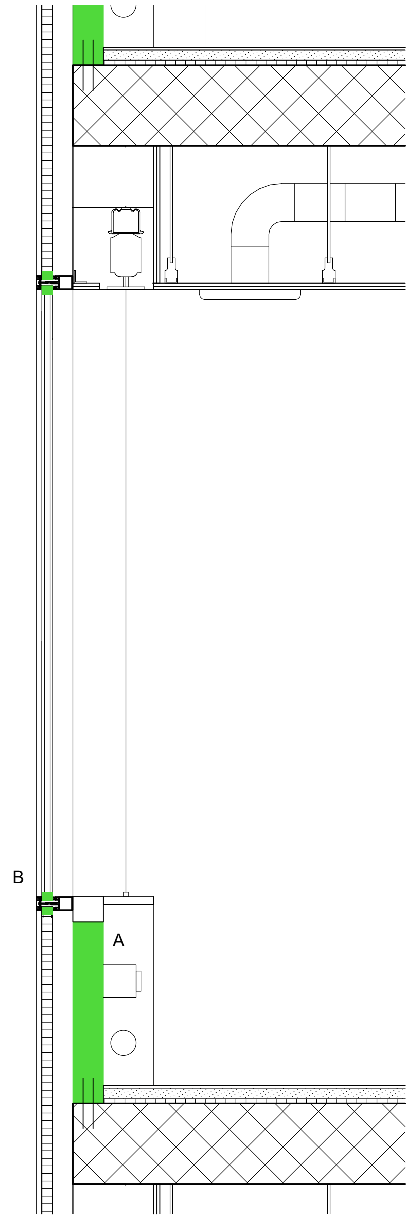
The protagonist

A insulating glass element
B insulating sandwich element



Axonometry facade

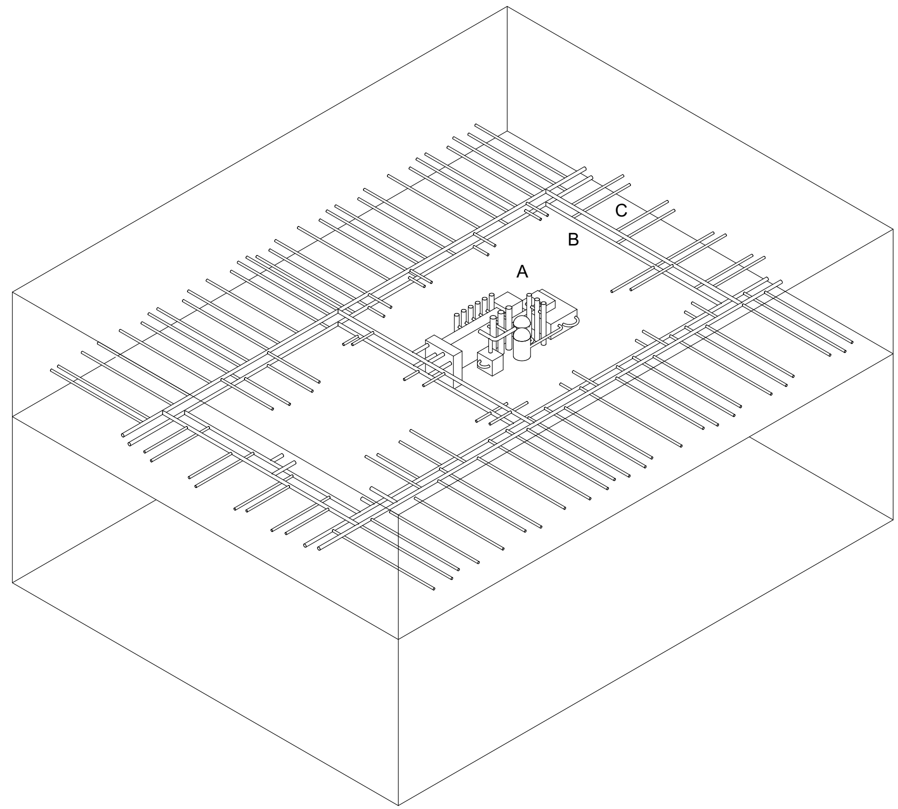
Parts of the facade are contaminated by asbestos. Our protagonist contains asbestos in the seals of the facade and in the concrete railing to prevent fire flashover from floor to floor. If released, this causes severe health problems, so that both elements need to be removed.



Section facade existing

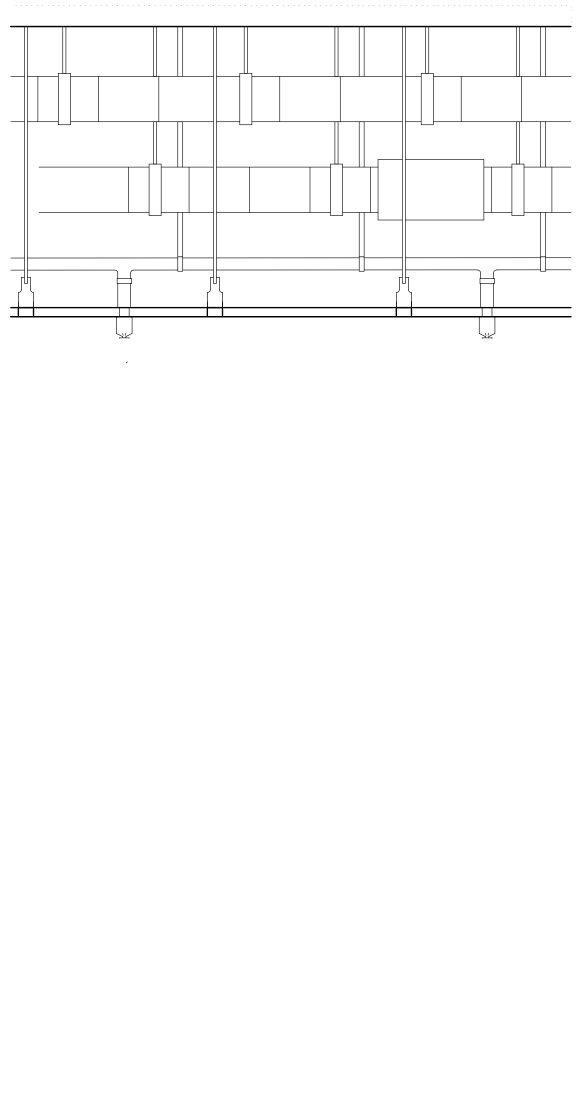
To provide a closed inside with fresh and clean air, our protagonist B127 has a sophisticated mechanical ventilation system. It enables a fully controlled, constant inside. For chemical storage and experiments the system achieves air exchange rates of up 30 times/h in special storage rooms and 15 times/h in all laboratories. Additionally, it is equipped with an elaborate air filter to clean the air from contamination.

A central ventilation unit
B supply air
C exhaust air



Axonometry ventilation system existing

All the technical appliances are hidden above a suspended ceiling which lowers the room height by up to 1 m. The suspended ceiling consists of a grid structure to which lightweight boards are attached.



Section existing

B

The inhabitants

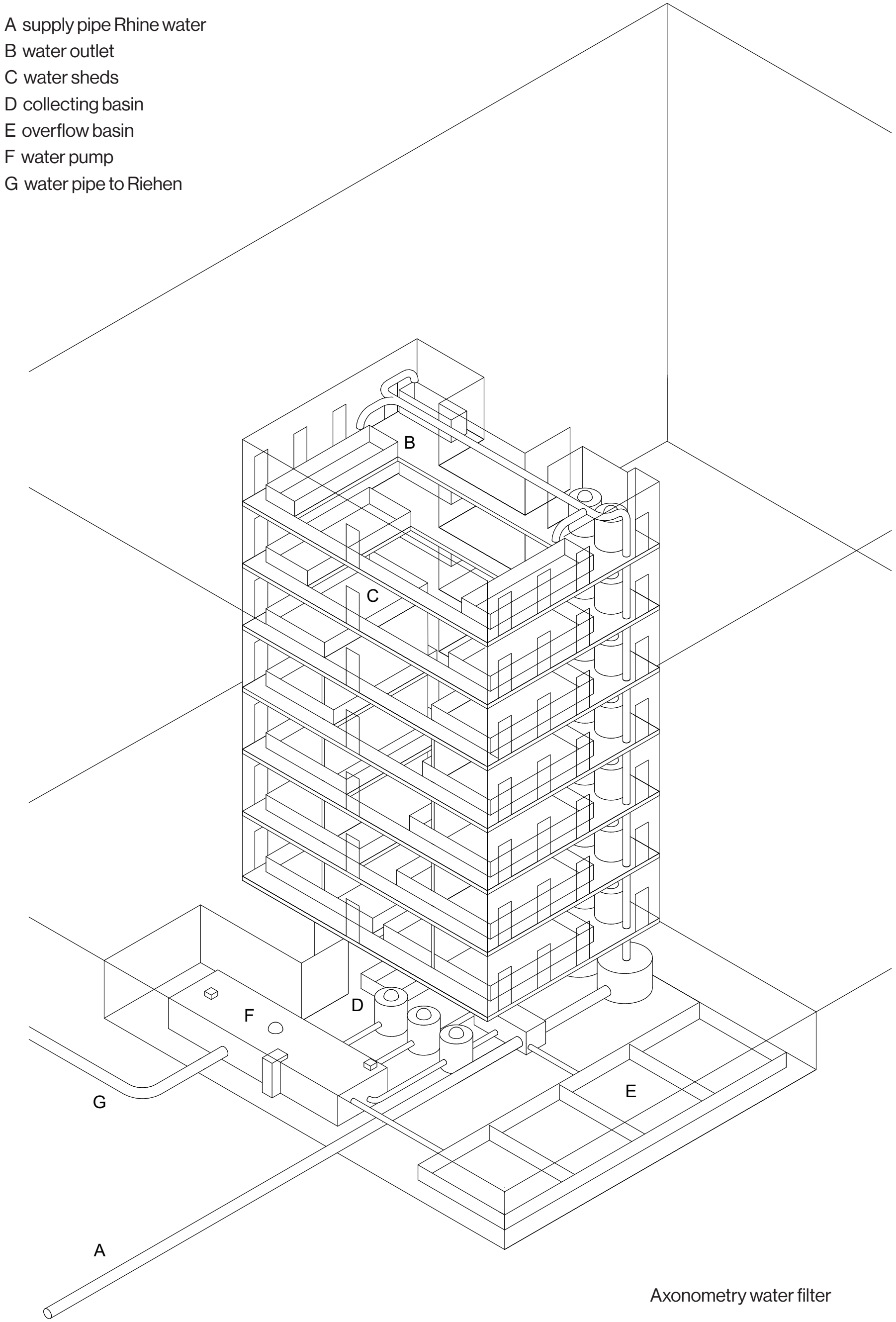
1.1 Water

Our protagonist was built next to the river Rhine. It is in the centre of an emerging city district to be built in the upcoming years. The area will require additional amounts of fresh and cleaned water. Even today, the groundwater in the city of Basel is not sufficient to supply everyone. It is therefore enriched with water from the Rhine. However, this must be removed and filtered.

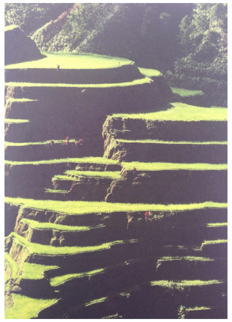
In the past, the laboratories in our protagonist were cooled with Rhine water. For this purpose, it has a water pump and supply line from the river. The building is also located in the immediate vicinity of the Lange Erlen nature reserve, where the filtered Rhine water is already fed into the groundwater.

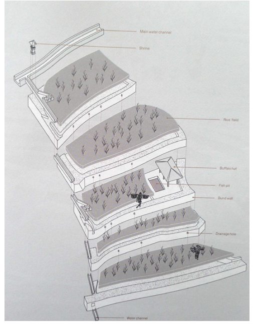
By converting the existing system, our protagonist becomes part of this water supply for the city of Basel. In the former changing room and sanitary core, which is no longer used after the laboratories have been abandoned, our protagonist receives a natural water filter system. The water is filtered via cascade-shaped water terraces filled with aquatic plants, microorganisms and quartz sand. A large pump in the basement transports the purified water to the Lange Erlen nature reserve.

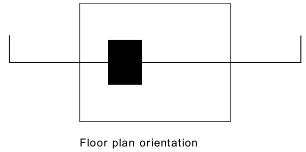
A supply pipe Rhine water
B water outlet
C water sheds
D collecting basin
E overflow basin
F water pump
G water pipe to Riehen

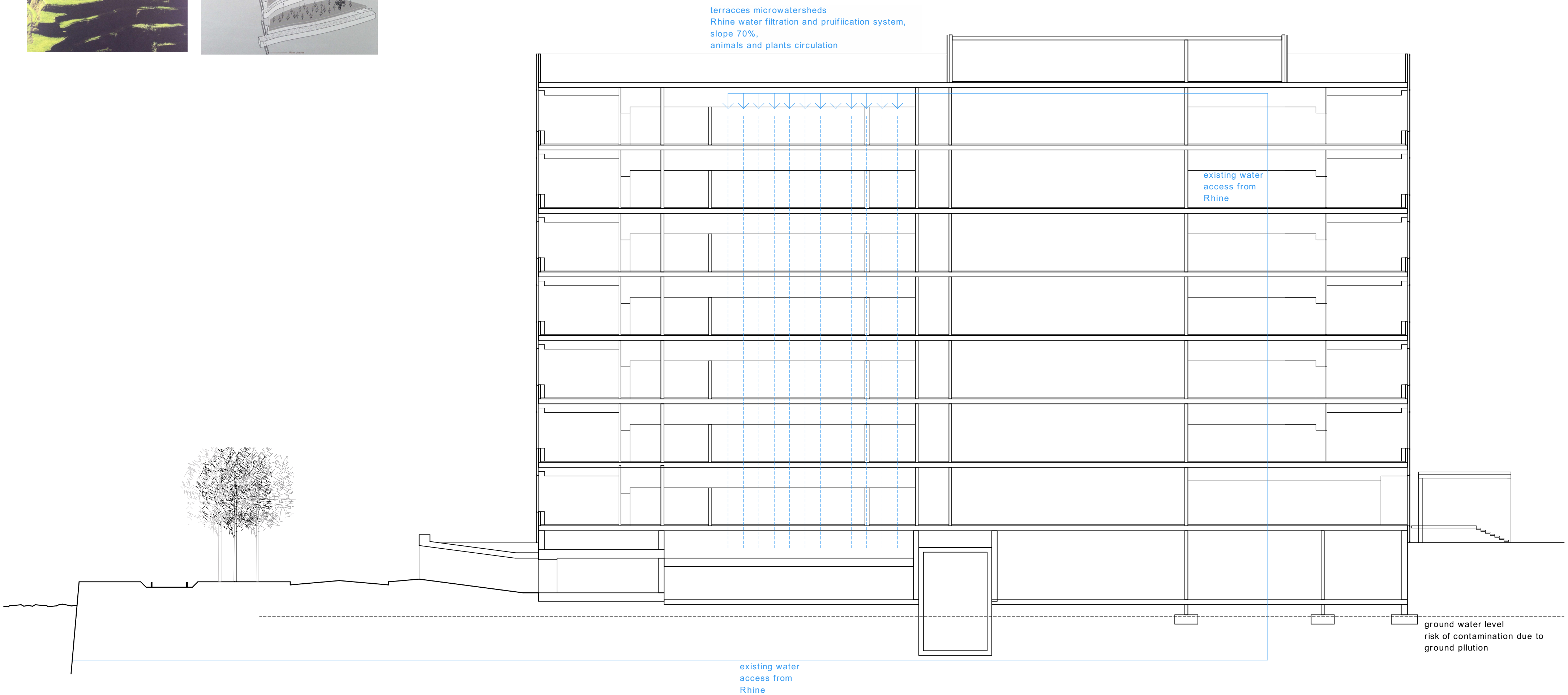


Axonometry water filter



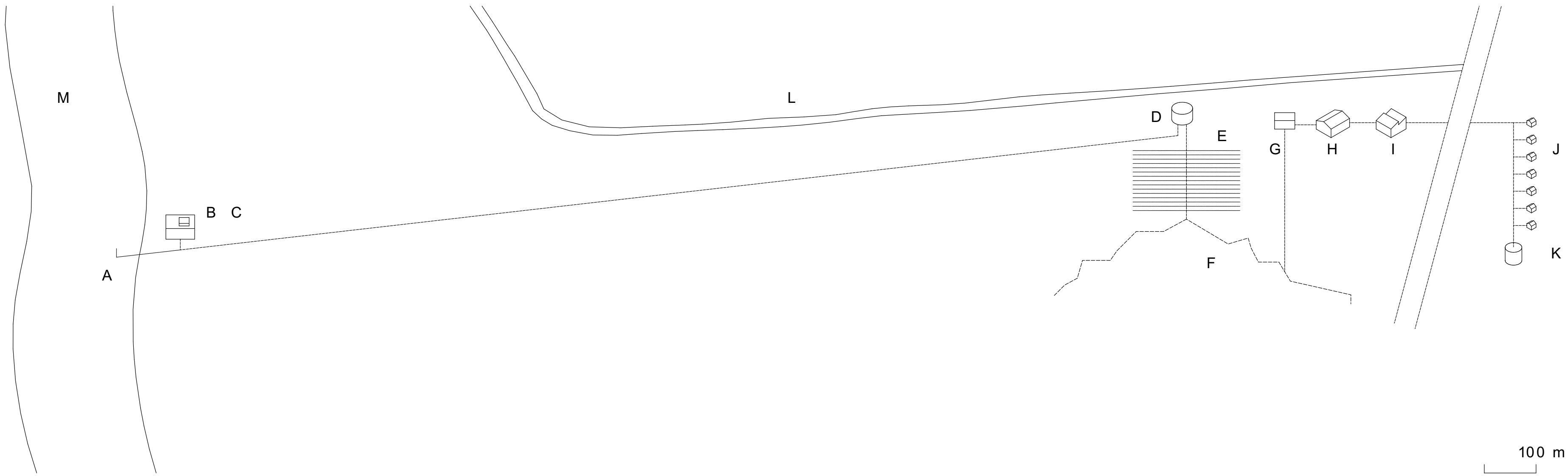






Terraces as watersheds for Rhine water filtration

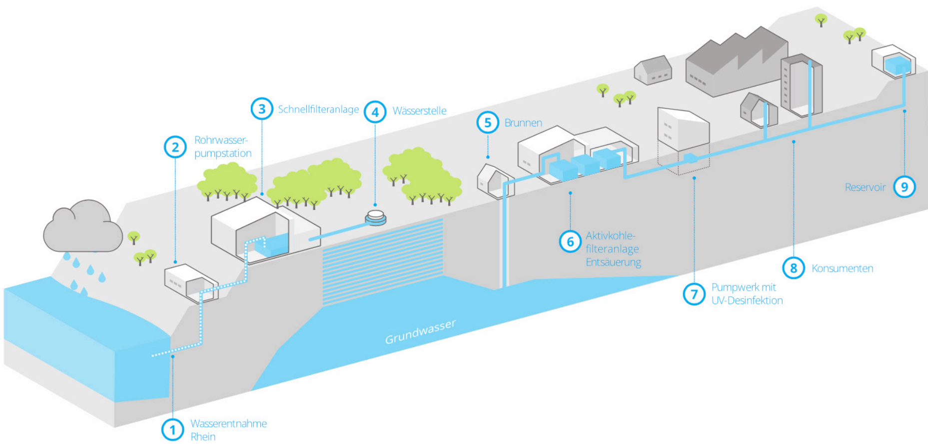
A water abstraction rhine
B rapid filter system
C pipe water pumping station
D watering place
E forest soil
F ground water
G well
H carbon filter plant, deacidification
I pump station, UV disinfection
J households
K reservoir
L river Wiese
M river Rhine

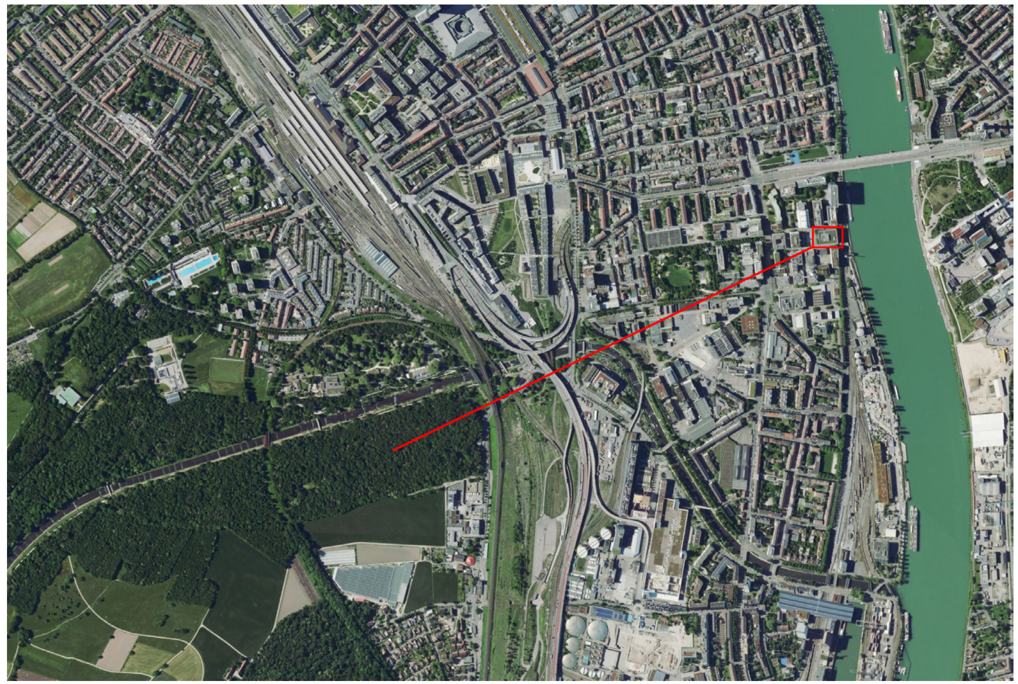


Axonometry water filter system Basel

3 Vorfiltrierung durch Quarzsand

Die Schnellfilteranlage in den Langen Erlen hat zwanzig Filterbecken. Eine jeweils 85 Zentimeter dicke Quarzsandschicht fängt die Schwebestoffe auf und das Rheinwasser gelangt in das Filtratreservoir. Zurück bleibt eine Schlammschicht, die regelmässig mit Luft und filtriertem Wasser weggespült wird. Die Sandfilter filtrieren bis zu 100 Millionen Liter Wasser pro Tag.



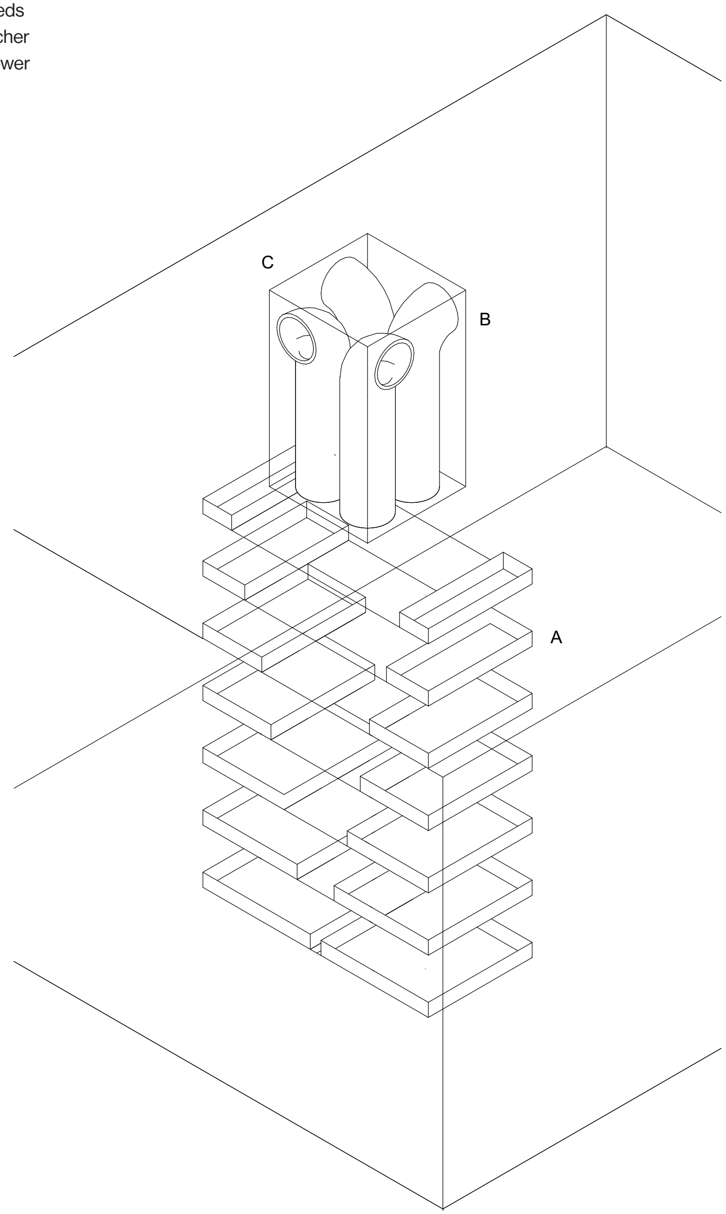


Water filter

1.2 Cold

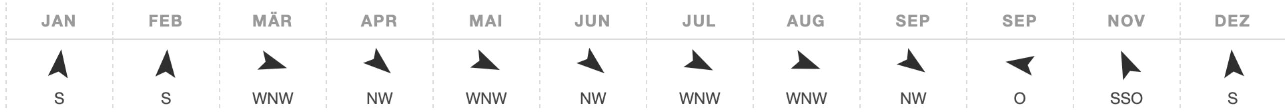
In the natural Rhine water filter system water evaporates continuously. This is used to cool the building naturally. Our protagonist receives a wind tower above its water terraces. The trapped air cools down through evaporation and sinks towards the ground. Through the existing door openings, the cool air flows through the apartments to the outside. The air flow can be regulated by opening and closing the doors. Turbines in the wind towers generate electricity for the building.

A water sheds
B wind catcher
C glazed tower



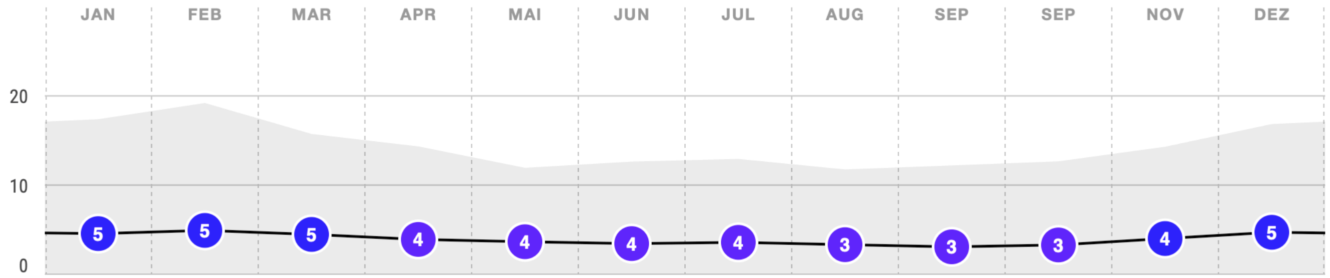
Axonometry natural cooling

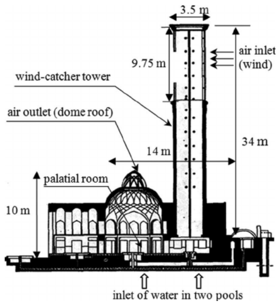
VORHERRSCHENDE WINDRICHTUNG

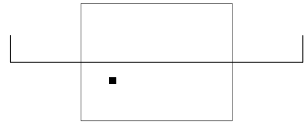


DURCHSCHN. WINDGESCHWINDIGKEIT (KTS)

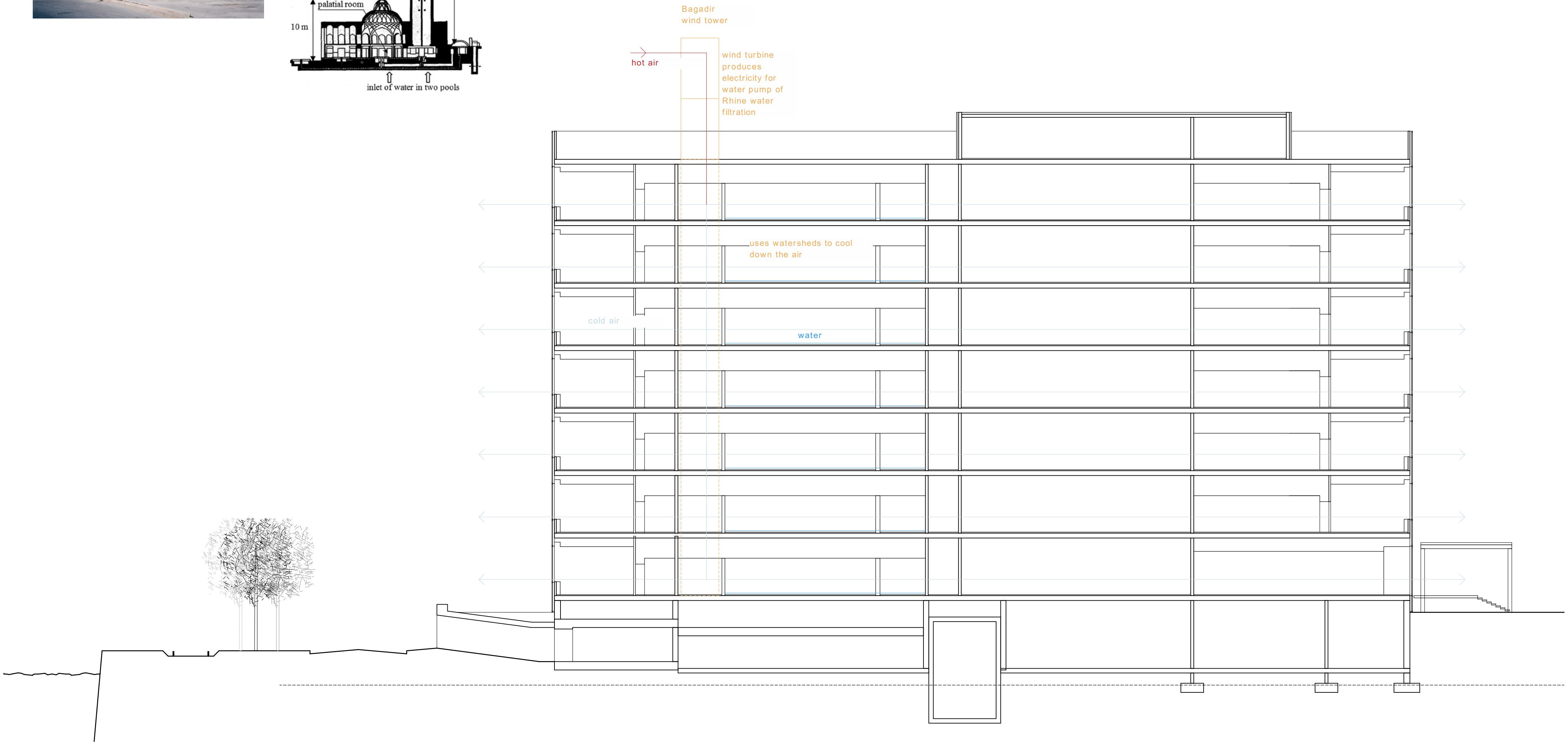
Anzeigen: Durchschnitt, Min, Max Windböen







Floor plan orientation



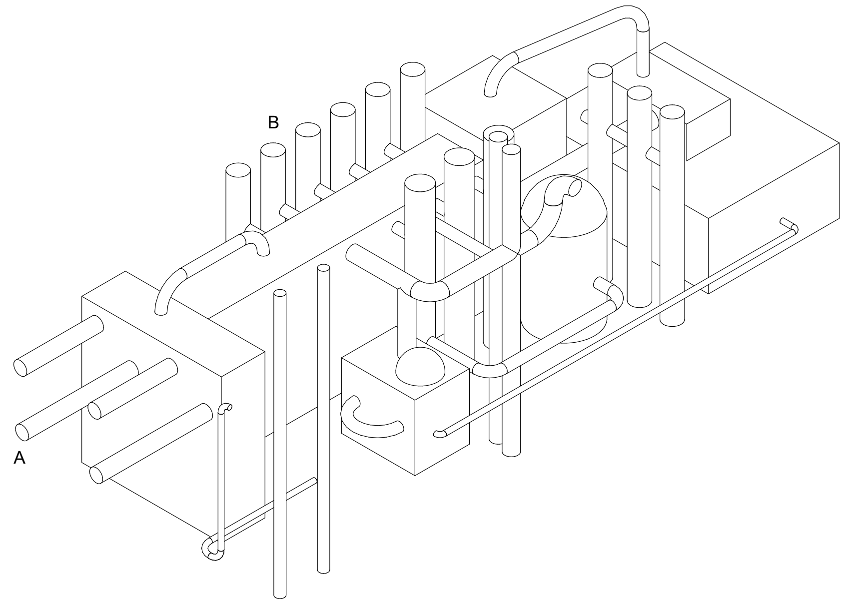
Wind catcher for cooling and ventilation using the water terraces

1.3 Air

Due to the closed glass façade without external sun protection, our protagonist has a sophisticated ventilation system to cool the interior and supply it with fresh air. The laboratories and storage rooms for chemicals required a particularly high air exchange rate with a very powerful air filter.

Since the facade is replaced by opening sliding windows and the rooms can be cooled by a passive system, the existing ventilation system is highly oversized.

However, the building is located in an area of the city of Basel that has regularly exceeded contamination limits for fine air particles and ozone in recent years. The free capacity of the ventilation system is sufficient to completely filter the air of the planned quarter once every 3 hours.



A air supply for floor
B vertical air supply

Axonometry mechanical ventilation

Jahresstatistik für Ozon (O_3)

Anzahl Stunden > 120 µg/m³ im Zeitraum Apr 2019 – Mär 2020

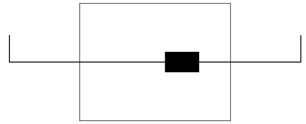
Station	Kanton	Apr 2019	Mai 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Okt 2019	Nov 2019	Dez 2019	Jan 2020	Feb 2020	Mär 2020	Total 2019	bisher 2020
Basel St. Johannplatz	BS	8	3	58	68	14	1	0	0	0	0	0	0	153	0

Jahresstatistik für Feinstaub (PM10)

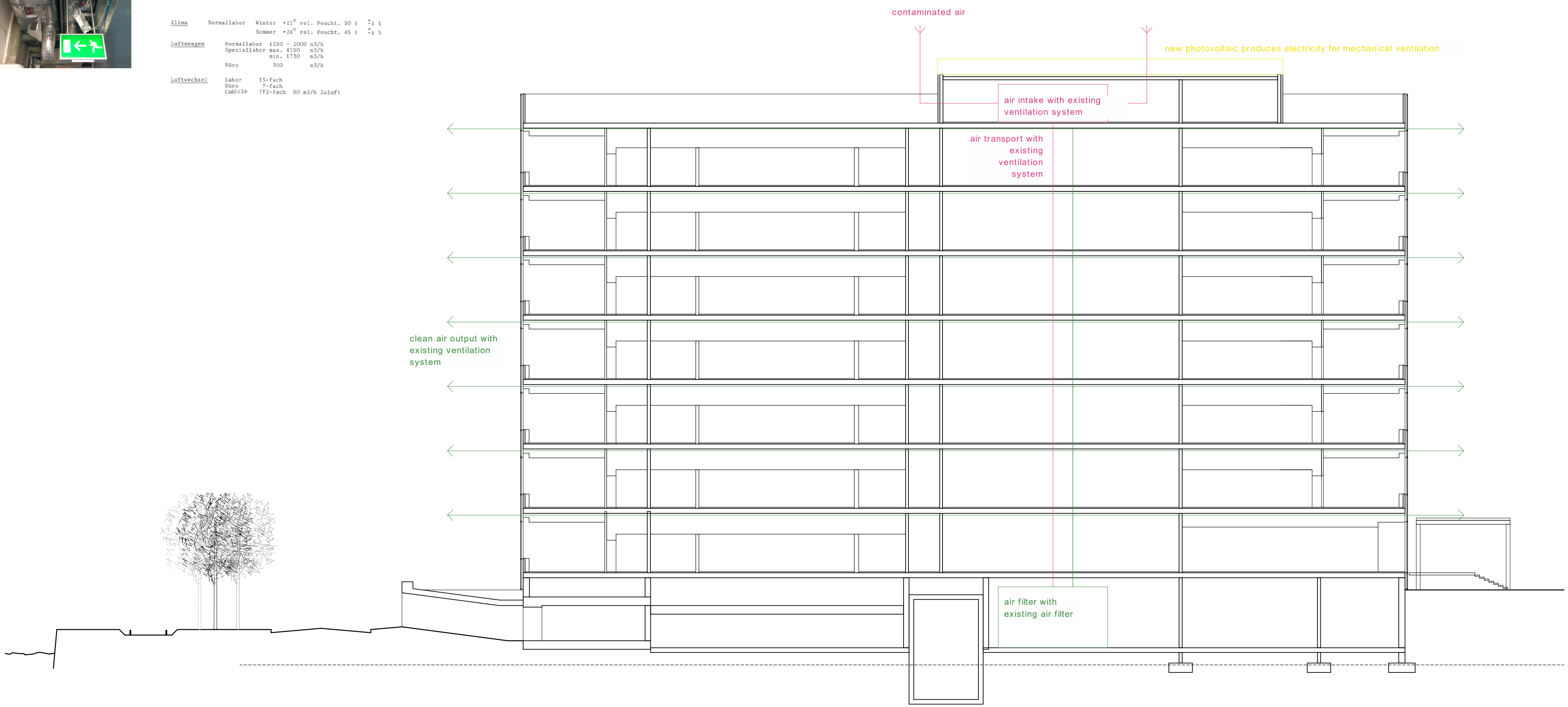
Anzahl Tagesmittelwerte > 50 µg/m³ im Zeitraum Apr 2019 – Mär 2020

Station	Kanton	Apr 2019	Mai 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Okt 2019	Nov 2019	Dez 2019	Jan 2020	Feb 2020	Mär 2020	Total 2019	bisher 2020
Basel Feldbergstrasse	BS	2	0	2	0	1	0	0	0	0	1	0	0	10	1

Klima	Normallabor	Winter	+21° rel. Feucht. 50 %	± 5 %
		Sommer	+26° rel. Feucht. 45 %	± 5 %
Luftmengen	Normallabor	1290 - 2000 m3/h		
	Speziallabor	max. 4190 m3/h		
		min. 1730 m3/h		
	Büro	300 m3/h		
Luftwechsel	Labor	15-fach		
	Büro	7-fach		
	Cubicle	7½-fach	90 m3/h Zuluft	

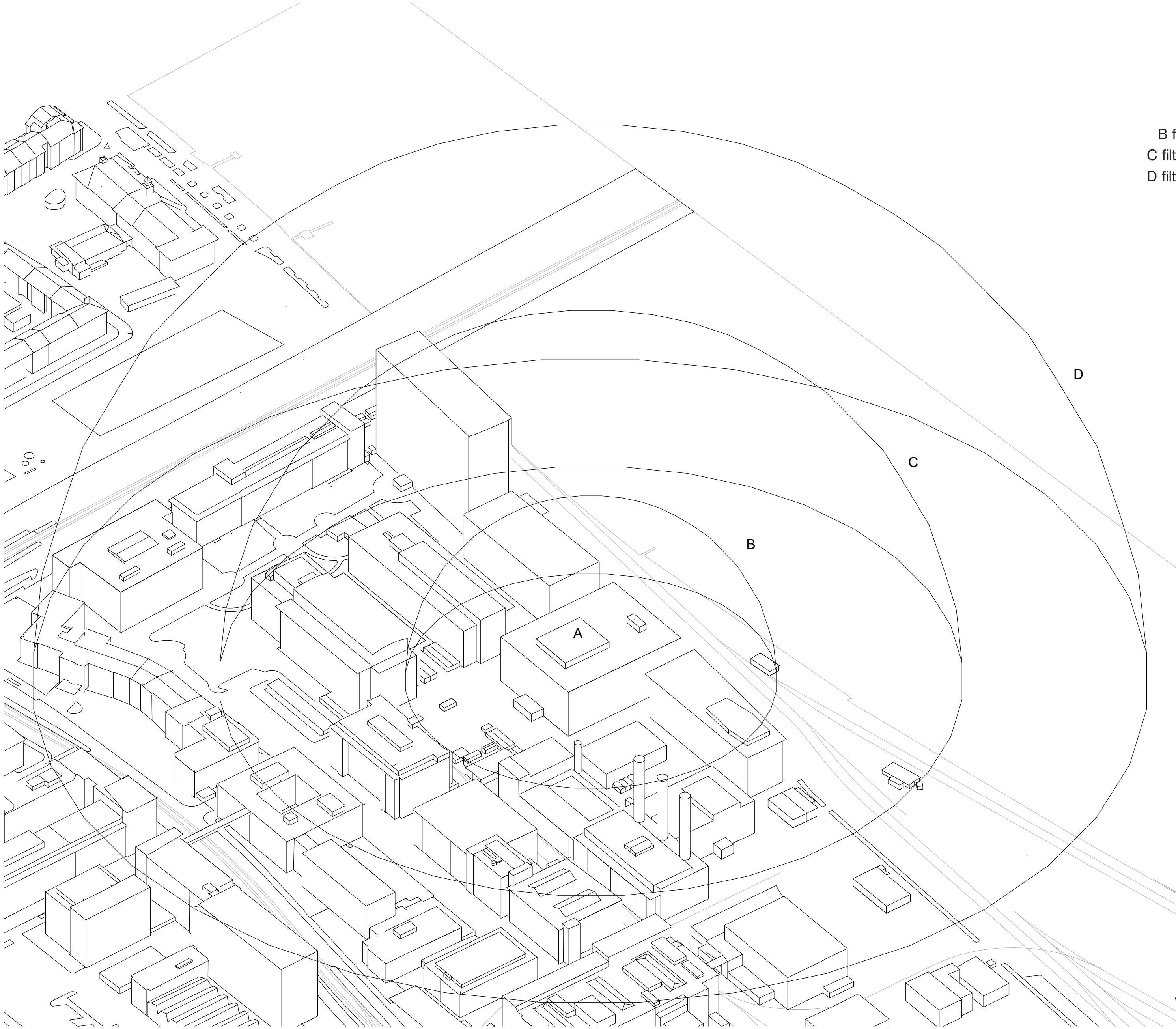


Floor plan orientation



Over-capacity of mechanical ventilation used to clean the outside air

A the protagonist
B filtered air volume / 1 hour
C filtered air volume / 2 hours
D filtered air volume / 3 hours



Axonometry filtered air volume

Capacity mechanical ventilation and air filter system

	space m2	volume m3	air exchange rate / h	/floor	/building
offices	215	806,25	7	5643,75	39506,25
laboratories	1180	4425	15	66375	464625
special laboratorties	380	1425	30	42750	299250
sanitary rooms	160	600	7	4200	29400
circulation spaces	500	1875	7	13125	91875
staircases	75	281,25	7	1968,75	13781,25
				134062,5	938437,5
				air exchange rate / h	air exchange rate / h
TOTAL				3217500	22522500
				air exchange rate / d	air exchange rate / d

Jahresstatistik für Ozon (O_3)

Anzahl Stunden > 120 µg/m³ im Zeitraum Apr 2019 – Mär 2020

Station	Kanton	Apr 2019	Mai 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Okt 2019	Nov 2019	Dez 2019	Jan 2020	Feb 2020	Mär 2020	Total 2019	bisher 2020
Aarau-Buchenhof	AG	18	12	71	94	15	0	0	0	0	0	0	0	214	0
Baden Schönaustrasse	AG	26	16	82	118	22	3	0	0	0	0	0	0	274	0
Schupfart-Blind	AG	32	20	93	153	34	4	0	0	0	0	0	0	353	0
Bern-Bollwerk (NABEL)	BE	4	1	26	61	0	0	0	0	0	0	0	0	93	0
Bern-Morgartenstrasse	BE	23	12	63	111	23	0	0	0	0	0	0	0	237	0
Biel-Bienne	BE	15	7	71	51	5	0	0	0	0	0	0	3	151	3
Etzelkofen	BE	11	14	65	101	22	2	0	0	0	0	0	0	216	0
Gstaad	BE	8	0	1	46	0	0	-	-	-	-	-	-	55	0
Ittigen	BE	26	17	48	86	3	0	0	0	0	0	0	0	184	0
Jungfraujoch (NABEL)	BE	0	1	2	0	0	0	0	0	0	0	0	0	3	0
Langenthal	BE	18	17	57	85	4	0	0	0	0	0	0	0	186	0
Moutier	BE	7	4	50	81	6	0	-	-	-	-	-	-	152	0
Thun-Pestalozzi	BE	24	9	63	111	10	0	0	0	0	0	0	0	224	0
Zimmerwald	BE	7	1	68	128	9	0	0	0	0	0	1	0	213	1
Binningen (NABEL)	BL	24	24	93	118	38	2	0	0	0	0	0	0	306	0
Sissach-Bützenen	BL	36	16	67	118	16	2	0	0	0	0	0	0	264	0
Basel St. Johannplatz	BS	8	3	58	68	14	1	0	0	0	0	0	0	153	0

Jahresstatistik für Feinstaub (PM10)

Anzahl Tagesmittelwerte > 50 µg/m³ im Zeitraum Apr 2019 – Mär 2020

Station	Kanton	Apr 2019	Mai 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Okt 2019	Nov 2019	Dez 2019	Jan 2020	Feb 2020	Mär 2020	Total 2019	bisher 2020
Baden Schönaustrasse	AG	0	0	1	0	0	0	0	0	0	0	0	0	2	0
Bern-Bollwerk (NABEL)	BE	0	0	1	0	0	0	0	0	0	0	0	0	3	0
Jungfraujoch (NABEL)	BE	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Basel Feldbergstrasse	BS	2	0	2	0	1	0	0	0	0	1	0	0	10	1
Biberist	SO	0	0	0	0	0	1	0	0	0	1	0	0	2	1
Dornach	SO	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Härkingen (NABEL)	SO	0	0	1	0	0	0	0	0	0	0	0	0	1	0

Die letzten beiden Spalten zeigen die Werte im gesamten Vorjahr sowie im aktuellen Jahr bis heute. Die Messdaten werden jährlich, jeweils ca. im Juni, bereinigt. Es werden nur Stationen mit Überschreitungen in den letzten 12 Monaten aufgeführt.

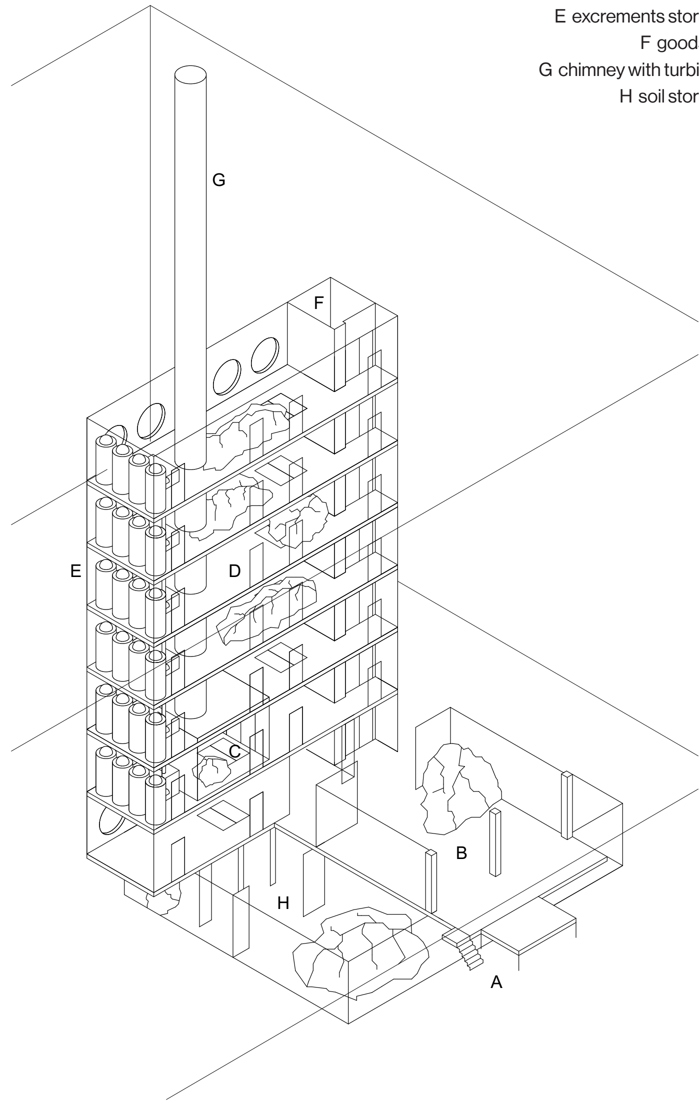
1.4 Earth

Our protagonist stands on the site of a former industrial zone for chemicals and medicines. The ground is strongly contaminated. It is planned to create a riverside park along the Rhine, in front of the building. Inside our protagonist, a few particularly special rooms have been built for the storage of chemicals and certain experiments.

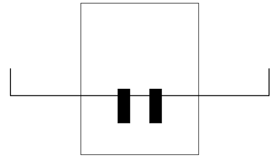
In these rooms, our protagonist could produce fertile soil from the green waste of the park and the collected excrements of the residents by means of carbonisation. For this purpose, green waste and excrements are carbonised in the absence of air. The indigenous people of the Amazon have already used this technique to produce what is called Terra Preta.

By removing oxygen, carbon dioxide is hardly released during the carbonisation process, but is instead bound in the earth. In this way, our protagonist can produce fertile soil in its interior. It can be distributed to the contaminated areas of the former industrial quarter to allow for the re-introduction of plants and animals. And with the help of this technology, carbon dioxide can be stored in fertile soil for thousands of years.

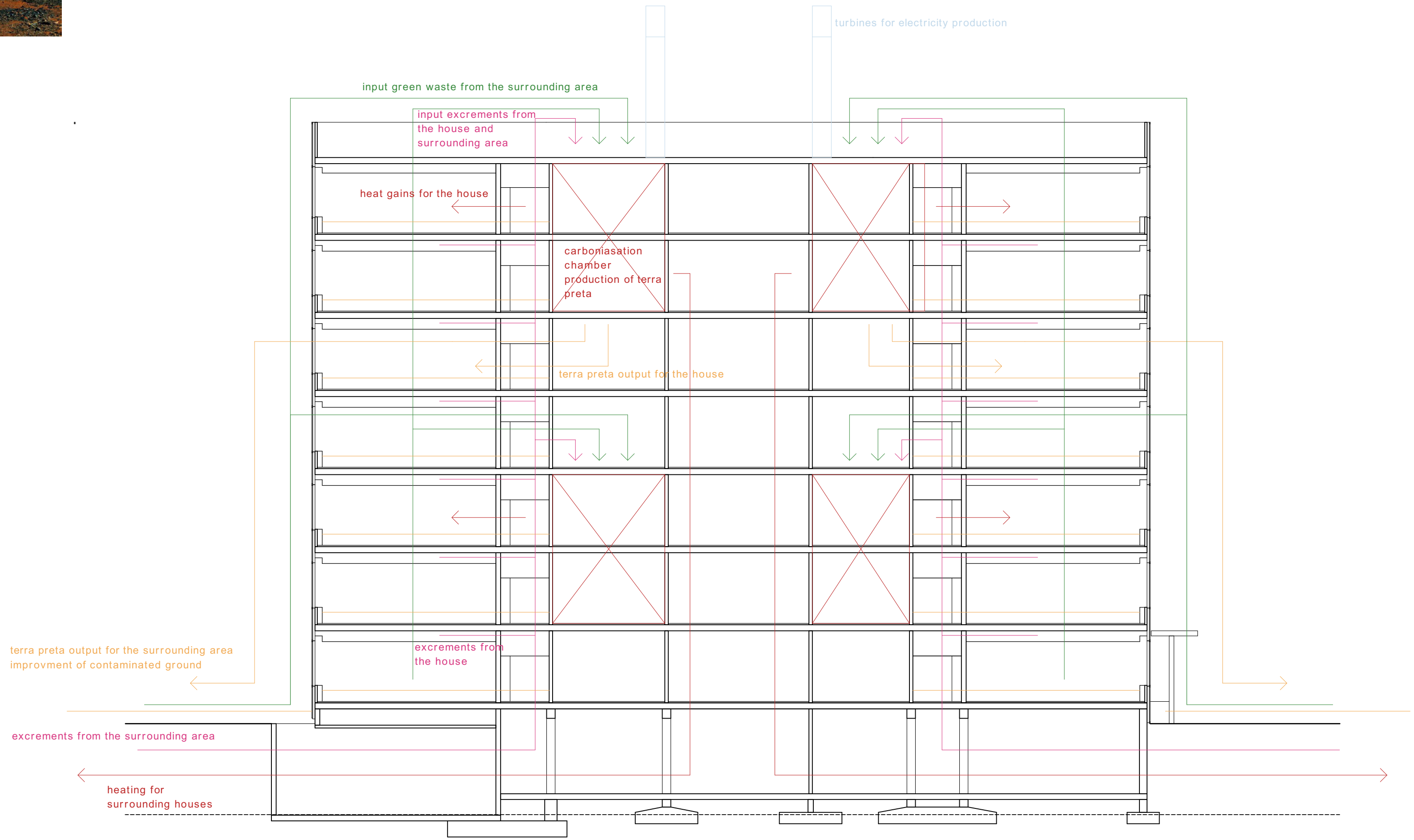
A lifting platform
B removal and delivery
C carbonisation chamber
D green waster storage
E excrements storage
F goods lift
G chimney with turbines
H soil storage



Axonometry carbonisation



Floor plan orientation



Carbonisation of green waste and excrements produces fertile Earth and heat

← vorheriger Beitrag   nächster Beitrag →

Neuer Beitrag in der Fachzeitschrift Müll und Abfall erschienen.

Veröffentlicht am 4. April 2018 von Dr. Wagner — 2 Kommentare ↓

In der Märzausgabe ist ein Beitrag zur „Klimabilanz der Wertschöpfung pflanzlicher Reststoffe zu Biokohle und Biokohlesubstraten– Ergebnisse des TerraBoGa Projektes zur Schließung von Stoffkreisläufen im Botanischen Garten Berlin-Dahlem“ in der Fachzeitschrift Müll und Abfall erschienen. Unter www.muellundabfall.de ist der Beitrag erhältlich.

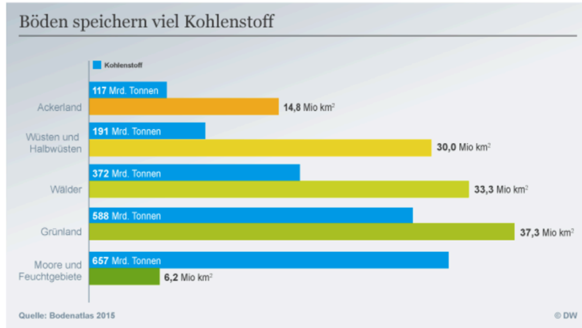
Zusammenfassung: Die Karbonisierung von pflanzlichen Reststoffen zu Biokohle und deren Anwendung in der Kompostierung stellt eine vielversprechende Technologie zur Verbesserung der Klimabilanz dar. Im Botanischen Garten Berlin-Dahlem lassen sich pro Jahr durch die Karbonisierung von Ast- und Strauchschnitt 74 Mg CO_2 *nachhaltig aus der Atmosphäre entfernen und weitere 40 Mg* CO_2 *durch die Substitution von fossilen Brennstoffen einsparen. Die Kompostierung wurde hinsichtlich der Betriebsführung erheblich verbessert. Während der Kompostierung werden jetzt weniger Treibhausgase (Methan, Lachgas und Ammoniak) freigesetzt. Zusätzlich wirkt sich der Einsatz von Biokohle minimierend auf die Treibhausgasfreisetzung aus (24 bis 43 % Reduktion). Durch die Neustrukturierung der Kompostierung konnten Biokohlekomposte hergestellt werden, die die Vorgaben der Bundesgütegemeinschaft Kompost e. V. vollständig erfüllen. Dies führte zu der im Projekt angestrebten Schließung von Stoffkreisläufen. Der Einkauf von externen Kompost wurde gänzlich eingestellt und die Entsorgung von Grünschnitt weitestgehend minimiert. Insgesamt konnten durch die durchgeführten Maßnahmen 200 Mg* CO_{2eq} *eingespart werden. Ein Vergleich der Klimabilanz vor und nach erfolgter Kreislaufschließung zeigt, dass die Emission von ursprünglich 130 Mg* CO_{2eq} *auf minus 69 Mg* CO_{2eq} *gesenkt wurde. Die Umstellung des Abfall- und Substratmanagement im Botanischen Garten Berlin-Dahlem erzielte damit einen* CO_2*-negative Bilanz.*

Dieser Beitrag wurde veröffentlicht in **TerraBoGa in den Medien** von **Dr. Wagner**. **Permalink**

Böden sind für unser Leben elementar. Sie geben Pflanzen wichtige Nährstoffe und diese wachsen mit Hilfe von Wasser, Sonnenenergie und Kohlendioxid (CO2). Pflanzen geben uns Nahrung und entziehen durch den natürlichen Prozess der Photsynthese CO2 aus der Luft und sind deshalb auch für das ökologische Gleichgewicht und das Klima äußerst wichtig.

Bei dem Prozess der Photosynthese wird aus CO2 Biomasse in Form von Bäumen, Pflanzen und Wurzeln. Ein Teil der Biomasse ist unsere Nahrung, verrottet oder wird verbrannt, ein anderer Teil wie Wurzeln, Blätter und Pflanzenreste werden durch natürliche Prozesse mit Hilfe von Bakterien, Pilzen, Wasser und Luft im Boden zu Humus und damit lange gebunden.

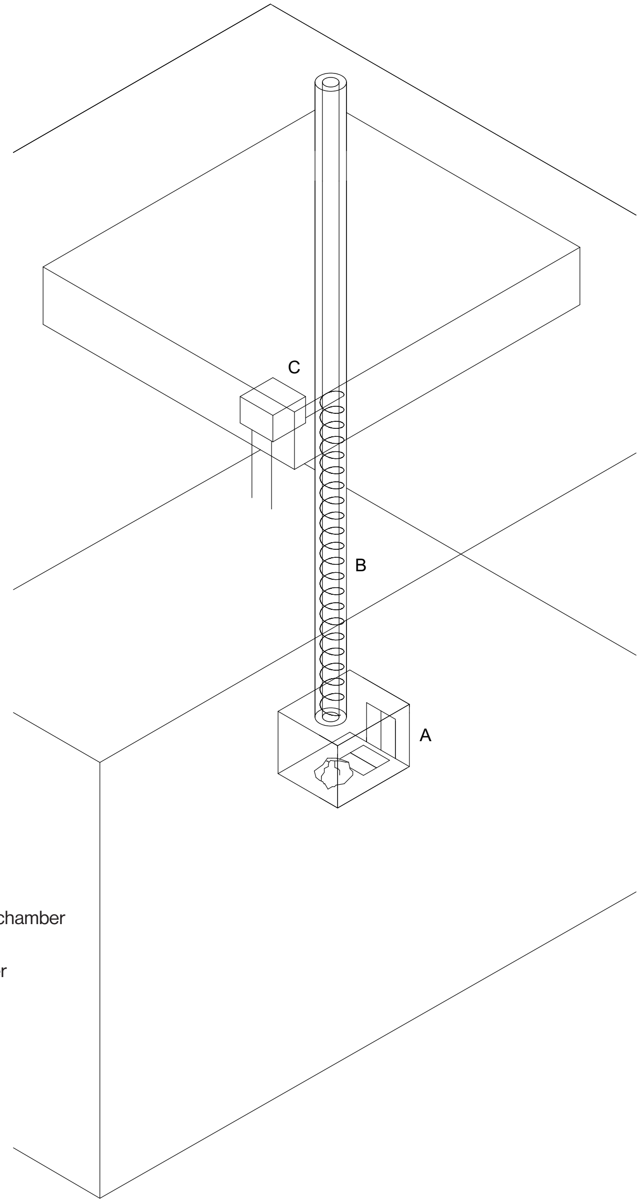
In den obersten Bodenschichten der Welt sind somit mehrere tausend Milliarden Tonnen Kohlenstoff gebunden, mehr als in der Erdatmosphäre und der gesamten Erdvegetation zusammen.



1.5 Heat

The heat generated by the carbonisation process provides the inhabitants of the house and surrounding buildings with hot water and heating in winter.

A generator in the chimney produces electricity from the nevertheless produced exhaust gases, creating a small combined heat and power plant with a high degree of efficiency. The intensity of the carbonisation can be controlled according to need, thus compensating for the natural irregularities of electricity production with photovoltaic collectors. Both systems complement each other well, as the solar collectors generate a lot of electricity, especially in summer when little heat is needed, while in winter it is the other way round but sun radiation is low.



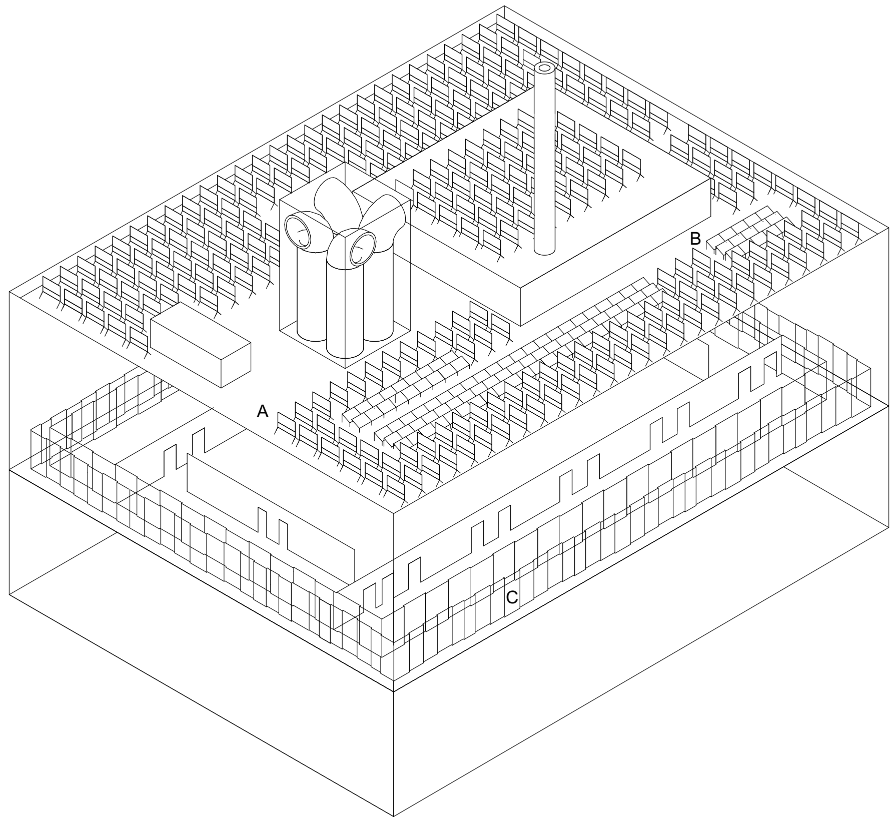
A carbonisation chamber
B water pipe
C heat exchanger

Axonometry heat recovery

1.6 Sun

Our protagonist receives non-heated wintergardens along the façade to be able to use solar radiation for passive heat gains. The depth of the conservatories varies according to their orientation.

Its existing horizontal photovoltaic panels on the roof are supplemented by additional vertical panels, which provide more space for plants and animals on the roof.



A vertical photovoltaic panels
B horizontal photovoltaic panels
C wintergardens

Axonometry solar gains

Photovoltaik-Dachanlagen im Vergleich

Typ	Flächen-nutzungsgrad*	Spezifischer Energieertrag**
90° Solarmodule inkl. Dachbegrünung Ost/West, bifazial, vertikal bzw. 90°-Neigungswinkel, Prototyp	36.7%	~940 kWh/kWp
~30° Solarmodule Süd, monofazial, ~30°-Neigungswinkel	ca. 50%	~1050 kWh/kWp
~10° Solarmodule Ost/West, monofazial, ~10°-Neigungswinkel	90–100%	~960 kWh/kWp

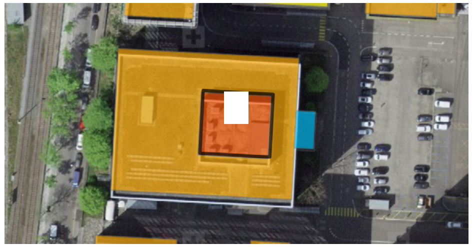
* Flächennutzungsgrad: Anzahl mögliche Solarmodule pro Fläche
** Spezifischer Energieertrag: Stromproduktion in Kilowattstunden pro installiertem Kilowattpeak (kWh/kWp)

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE
Federal Office of Meteorology and Climatology MeteoSwiss
Federal Office of Topography swisstopo

How much **electricity** or **heat** can my **roof** produce?

Address	**null 4057 Basel**
Suitability	**Very high**
Solar electricity worth up to	**6'900 Swiss francs per annum**
Please note The solar potential analysis is carried out automatically and does not substitute professional consulting. This figure concerns an estimate of the yield when the entire roof surface is used. The actual yield may vary from the automatically calculated figure. No indications can be deduced from sonnendach.ch regarding the requirement of, or the suitability for, a building permit.	



Solar electricity

Please note Maximum yield calculations are based on the use of the entire roof surface (i.e. maximum surface area of the modules). Installations such as skylights, dormers, chimneys and balconies have not been taken into account in the calculations. The effective utilisable roof surface area may therefore be significantly smaller. For the calculation of the solar electricity yield, the figure of 10 cents per kilowatt hour is applied. This factor is derived from the following assumptions: a portion of the produced electricity is used by the producer, and costs of up to 20 cents per kilowatt hour can be saved. Most of the produced electricity is fed into the grid at less than 10 cents per kilowatt hour. Please note that feed-in tariffs, as well as electricity prices, vary considerably in Switzerland.	
Suitability *	**Very high**
Electricity yield of up to **	**69'500 kWh of solar electricity a year worth**

Module efficiency: 17 % Performance Ratio: 80 %	The typical level of consumption in a four-person household is 3'500 kWh.
Solar electricity worth up to	**6'900 Swiss francs per annum**
Roof surface fully covered – optimum use	**69'500 kWh**
Three quarters of roof surface covered – typical use	**52'125 kWh**
Half of roof surface covered – low use	**34'750 kWh**
Please note * Low < 800 kWh/m^2/year | Medium ≥ 800 und < 1000 kWh/m^2/year | High ≥ 1000 und < 1200 kWh/m^2/year | Very high ≥ 1200 und <1400 kWh/m^2/year | Excellent ≥ 1400 kWh/m^2/year ** The electricity yield from a photovoltaic system depends on the surface area, solar radiation, efficiency of the installed modules and performance ratio.	

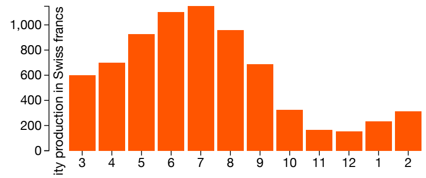
Solar heat

Please note Heating and hot water requirement are calculated on the basis of the data from the register of buildings and dwellings. The results may vary considerably from the effective figures, depending on the degree of renovation of the building or its heating system. The calculation of the heat yield is based on a collector surface area that may be smaller than the available roof surface. The reason for this is that the system has to be optimally dimensioned in relation to the building's heating and hot water requirements. For this purpose, the optimal volume of the heat storage is also calculated.	
Wärmeertrag Calculated heat yield for a representative system configuration with the size adapted to the heat requirement.	**46'100 kWh of solar heat per annum**
Solar heat to the value of	**3 % of annual heating costs** This is equivalent to 109 hot showers a day.
Heating requirement * Estimated heating requirement	**1'633'449 kWh per annum**
Hot water requirement * Estimated hot water requirement	**70'644 kWh per annum**
Storage volume ** For calculating the utilised storage volume, adjusted to the requirement of the solar thermal system.	**7'200 Litre(s)**
Collector surface ** For calculating the utilised collector surface, adjusted to the requirement of the solar thermal system.	**110 m^2**
Please note * Heating and hot water requirement are calculated on the basis of the data from the register of buildings and dwellings. ** Generally speaking, storage volume and collector surface area should be used solely for clarifying the calculation of heat yield, and not as a recommendation for dimensioning.	

Your roof surface area

Roof pitch	**0°**
Orientation	**0° North**
Surface area	**426 m^2**

December 2019	**1'516**	**152**	**536**
January 2020	**2'349**	**235**	**546**
February 2020	**3'145**	**315**	**490**
Please note * Heating degree days are used as the basis for distributing the annual heating requirement over the calendar months. The number of heating degree days per month is calculated from the difference between room temperature (20°C) and the average daily temperature on days with a mean daily temperature that is lower than the heating level (< 12°C).			



Solar radiation

Average solar radiation Mean annual solar radiation (global radiation) per square metre, taking account of shading/cloud cover	**1'200 kWh/m^2 per annum**
Total solar radiation Annual solar radiation, taking account of shading/cloud cover. This corresponds to the average level multiplied by the roof surface.	**510'989 kWh per annum**
Please note Reference years 2004 to 2014 are used for calculating solar radiation data.	

Feed-in remuneration tariffs

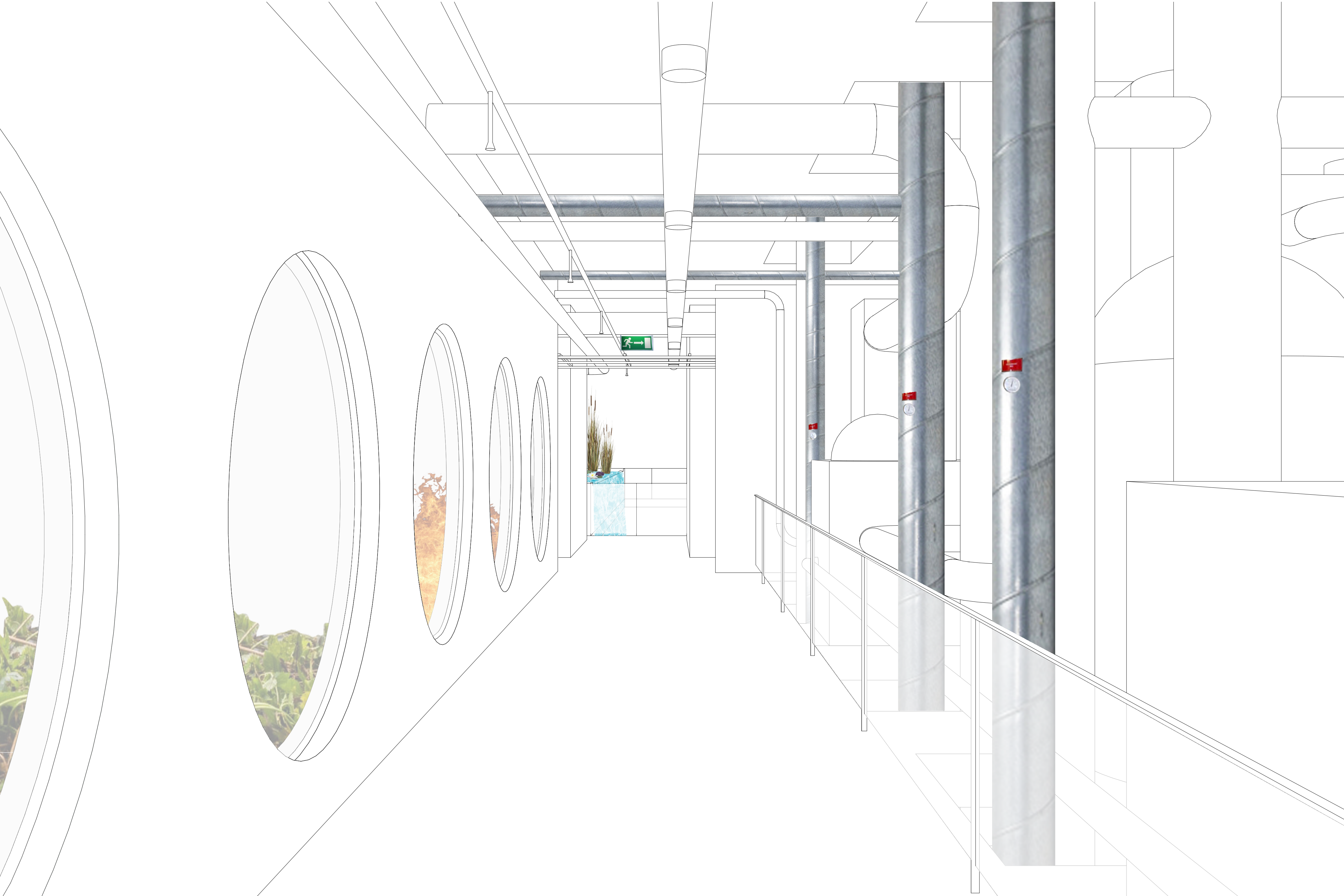
Industrielle Werke Basel IWB	**13 Cents/kWh**
Please note The remuneration tariff displayed applies to the energy fed into the grid from a PV installation with 10 kVA connected load. This includes remuneration for the certificate of origin, provided this is accepted without limitation. Data source: pvtarif.ch / Verband unabhängiger Energieerzeuger (VESE)	

Solar potential of

Basel	**Fact sheet**
Roofs and facades: Solar electricity only	**562.46 GWh**
Roofs and facades: Combination of solar electricity and solar heat	**426.85 GWh solar electricity**
	170.56 GWh solar heat

Electricity production in the past twelve months

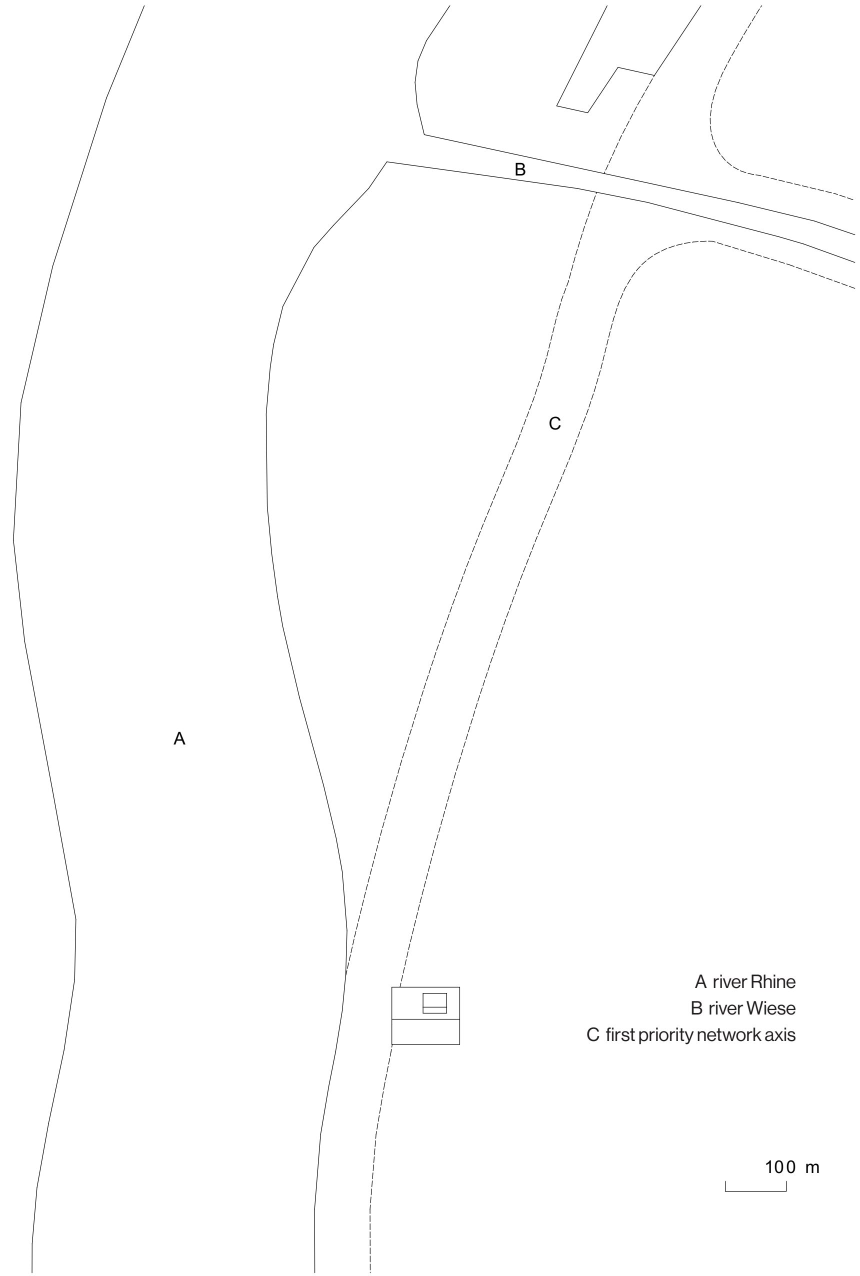
Month	**Electricity yield [kWh/month]**	**Financial yield [in Swiss francs]**	**Heating degree days [no. of days] ***
March 2019	**6'017**	**602**	**394**
April 2019	**7'005**	**701**	**188**
May 2019	**9'258**	**926**	**72**
June 2019	**11'022**	**1'102**	**5**
July 2019	**11'478**	**1'148**	**0**
August 2019	**9'577**	**958**	**1**
September 2019	**6'882**	**688**	**36**
October 2019	**3'263**	**326**	**167**
November 2019	**1'650**	**165**	**396**



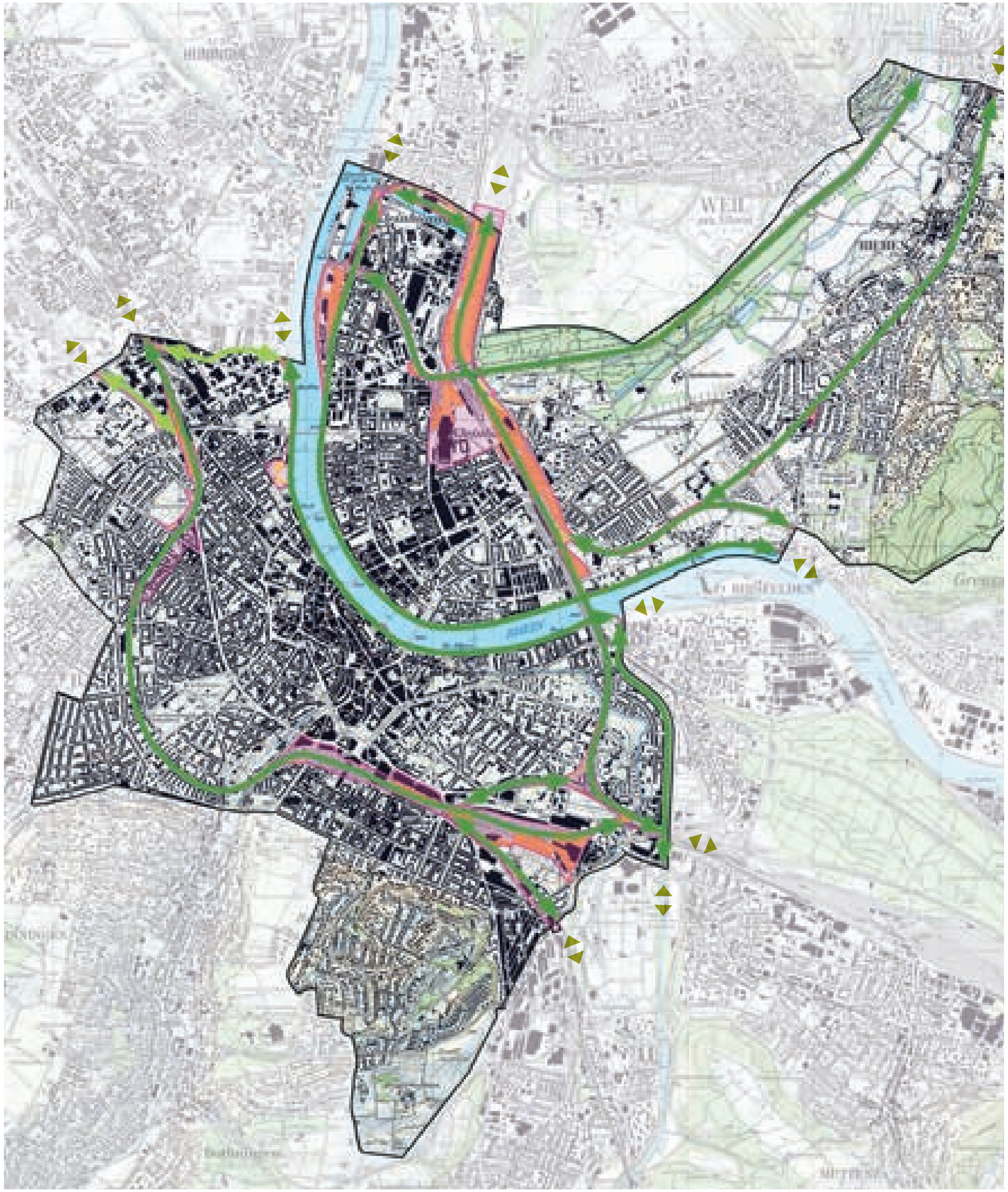
2 Biotope networks

A biotope network concept was developed for the city of Basel to link the habitats of animals and plants. This concept identifies natural corridors in graded priorities. As a result of road and settlement construction and the more intensive use of open spaces, biotopes are increasingly being fragmented into isolated „islands“. Functioning axes without barriers that support exchange between intact habitats are necessary to promote biodiversity.

Our protagonist lies directly on such an axis for dry warm habitats. In front of the building this area is very narrow and partially sealed. So far it offers little space and protection for flora and fauna.



Axonometry natural corridor first priority


WEIL


Verbascum pulveru-lentum


Herniaria spp.


Cymbalaria muralis


Sisymbrium officinale


Arctium spp.

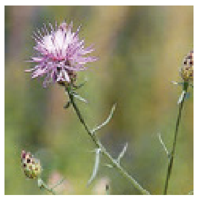

Berteroa incana


Chaerophyllum temu-lum


Corydalis lutea Gelber

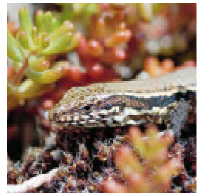

Ballota nigra spp. foetida


Hordeum murinum


Centaurea stoebe


Galeopsis angustifolia


Plebejus argyrognomon


Podarcis muralis


Calliptamus italicus

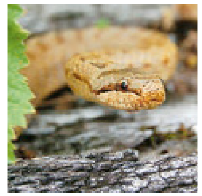

Amara sp.


Broscus cephalotes


Oedipoda caerulescens


Papilio machaon


Mantis religiosa

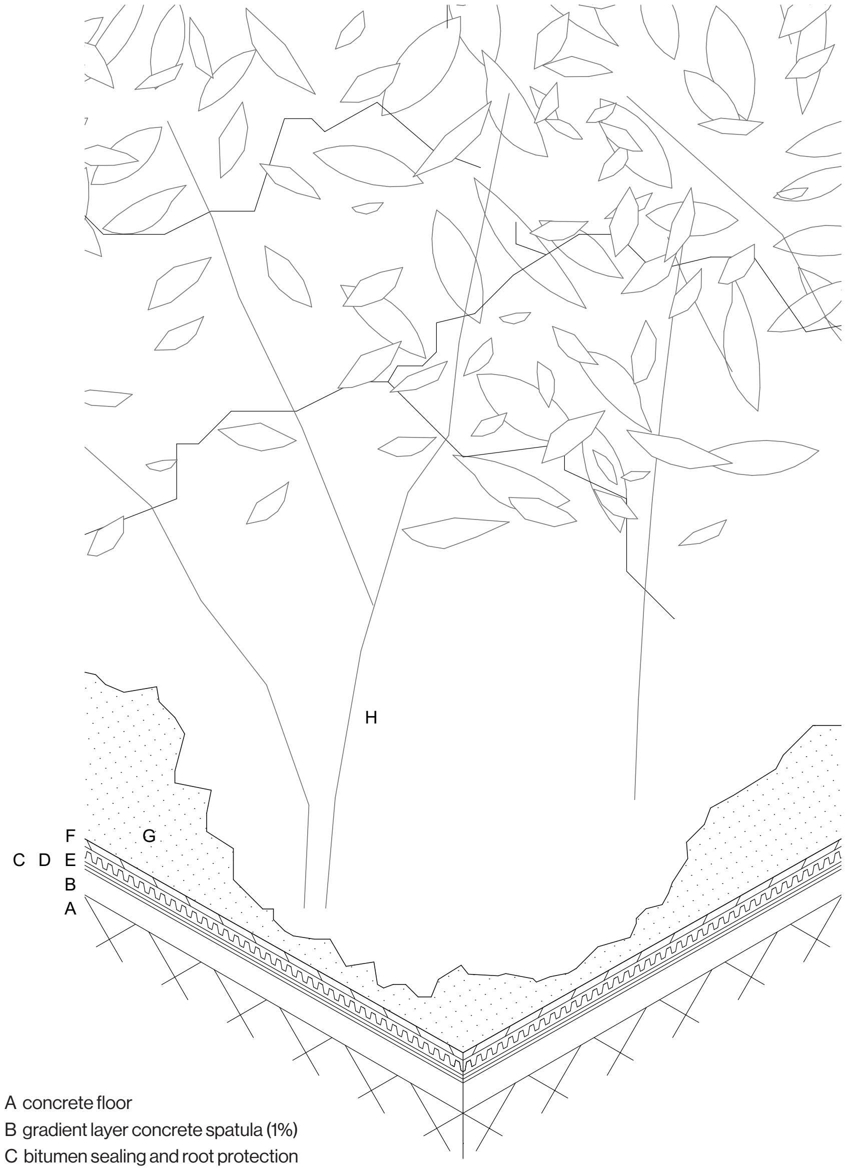

Coronella austriaca


Oecanthus pellucens

Target species for dry warm habitats

2.1 Plants

In the areas of terraces and wintergardens, the existing floor structure must be removed, as it is not suitable for outdoor use. The resulting difference in height to the living space is replaced with a floor structure similar to a green roof. The thin layer of substrate can be piled up to form hills to allow lush plant growth, or paved with stones in sand to use the area as a terrace. Different layer thicknesses create different habitats, which increases biodiversity. In the conservatories, the areas are watered by the existing fire sprinkler system.



A concrete floor
B gradient layer concrete spatula (1%)
C bitumen sealing and root protection
D storage protection mat
E drainage layer
F filter layer
G vegetation substrate
H vegetation

Axonometry floor detail

Biodiversitäts-Gründach

Dort, wo die Natur durch Baumassnahmen zerstört und der Boden versiegelt wurde, können Dachbegrünungen verloren gegangene Grünflächen zum Teil kompensieren und Ersatzlebensräume für Flora und Fauna schaffen. Vor allem naturbelassene, pflegearme Extensivbegrünungen sind wichtige Rückzugsräume für Tier- und Pflanzenarten. Wildbienen, Schmetterlinge und Laufkäfer finden hier Nahrung und Unterschlupf. Die Entwicklung der Artenvielfalt hängt dabei aber sehr stark davon ab, wie die Lebensräume aufgebaut sind, die den Pflanzen und Tieren auf dem Dach angeboten werden. Reine Sedumbegrünungen, die häufig in Kombination mit sehr niedrigen Substratstärken installiert werden, können dieses Potenzial nur unzureichend ausschöpfen. Dabei lässt sich durch verschiedene Gestaltungsmassnahmen und die Berücksichtigung grundlegender Biodiversitätsprinzipien bei der Planung und Ausführung die Biotop-Funktion begrünter Dachflächen mit vergleichsweise geringem Aufwand gezielt gefördern.

Biodiversitäts-Module

Modulation Substrat-oberfläche
Durch Variationen in der Substrathöhe entstehen unterschiedliche Lebensräume, die das Artenspektrum der Bepflanzung erweitern.

Einbringung von Totholz
Abgestorbene Äste und Stämme stellen ein besonders wertvolles Strukturelement dar. Es wird unter anderem von Moosen, Flechten, Pilzen, Käfern, Fliegen, Mücken, Ameisen und Wildbienen als Lebensraum genutzt.

Temporäre Wasserflächen
Durch Einfassungen und Folien entstehen Flächen, in denen das Regenwasser über einen längeren Zeitraum auf dem Dach zurückzuhalten wird. Dies verbessert das Wasserangebot z.B. für Insekten und Vögel.

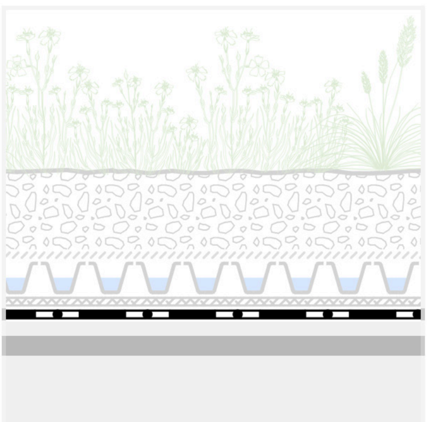
Sandlinsen und Grobkiesbeete
Vegetationsfreie Bereiche stellen wichtige Biotopbereicherungen dar und werden von Insekten und anderen Dachbewohnern als Versteck, Brut- und Sonnenplätze benutzt.

Pflanzenauswahl z.B. Futterpflanzen
Sofern (z.B. durch Anhügelungen) Bereiche mit höherem Substrat zur Verfügung stehen, können Futterpflanzen für Insekten und Vögel eingesetzt werden oder auch ein breiteres Spektrum an heimischen Pflanzen.

Nisthilfen
Durch den Einsatz von Nisthilfen lässt sich die Ansiedlung von Insekten gezielt unterstützen

Die Anzahl der zum Einsatz kommenden Biodiversitäts-Module ist frei wählbar. Dies kann, wie am Beispiel des IGA-Besucherzentrum unten gezeigt, bereits bei der Planung berücksichtigt werden, die einzelnen Module können aber auch nachträglich errichtet werden.

Grafik



Produkte

Flachballenpflanzen gemäss Pflanzenliste „Steinrosenflur"

Zincoterre® „Steinrosenflur"

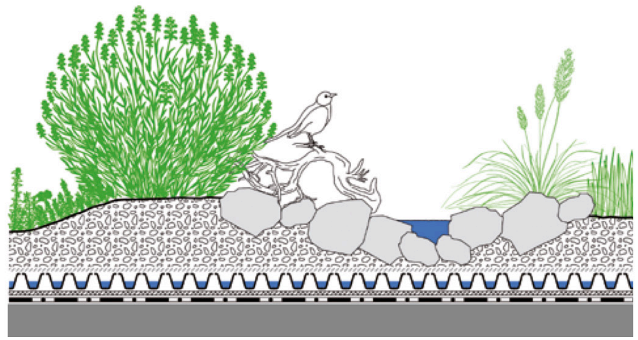
Systemfilter SF

Floradrain® FD 25-E

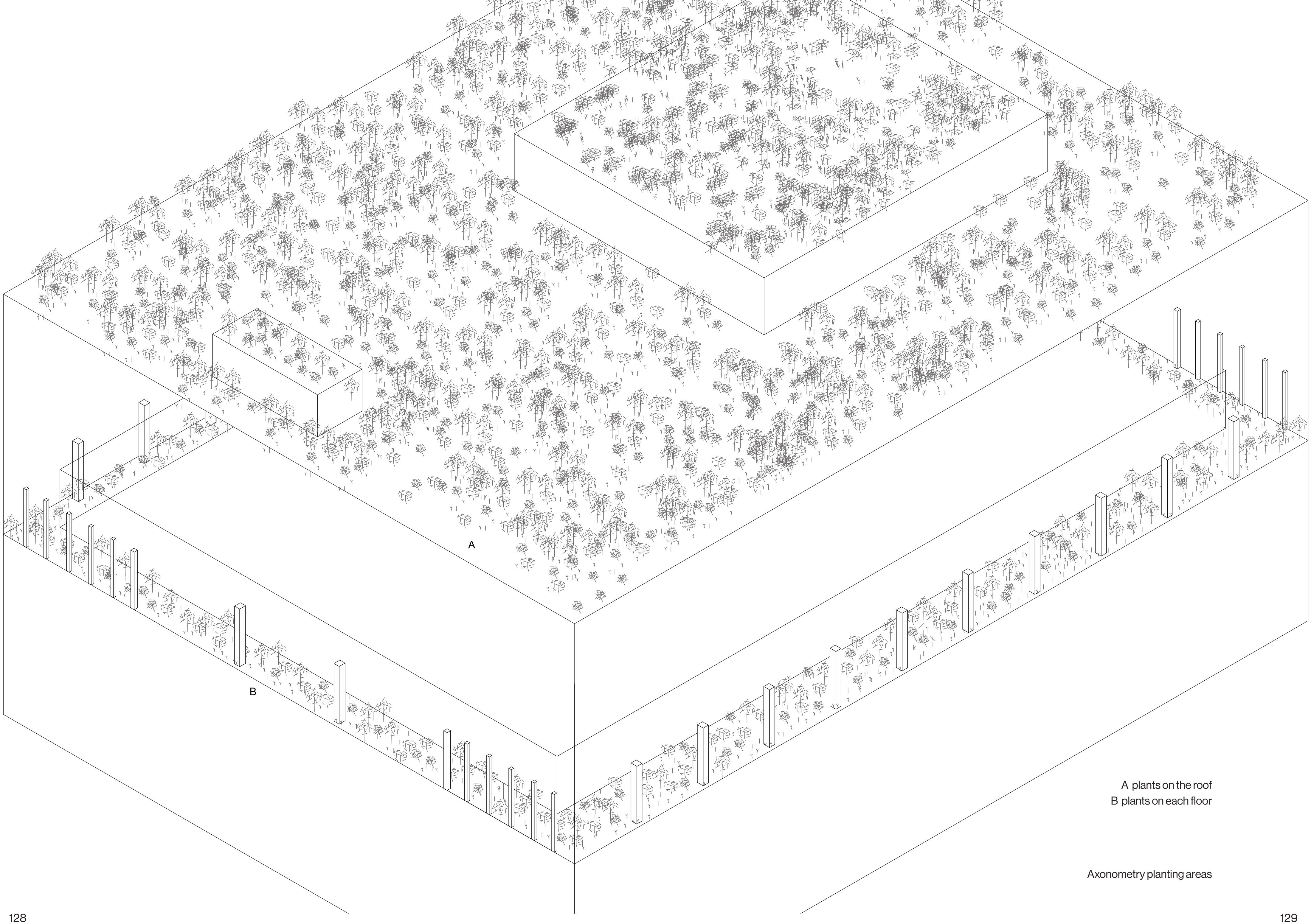
Speicherschutzmatte SSM 45

ggf. zusätzlicher Wurzelschutz

Dachaufbau mit Dachabdichtung



Grundlage für das Biodiversitäts-Gründach ist z.B. ein Systemaufbau „Steinrosenflur"mit dem Dränage-Element Floradrain® FD 25



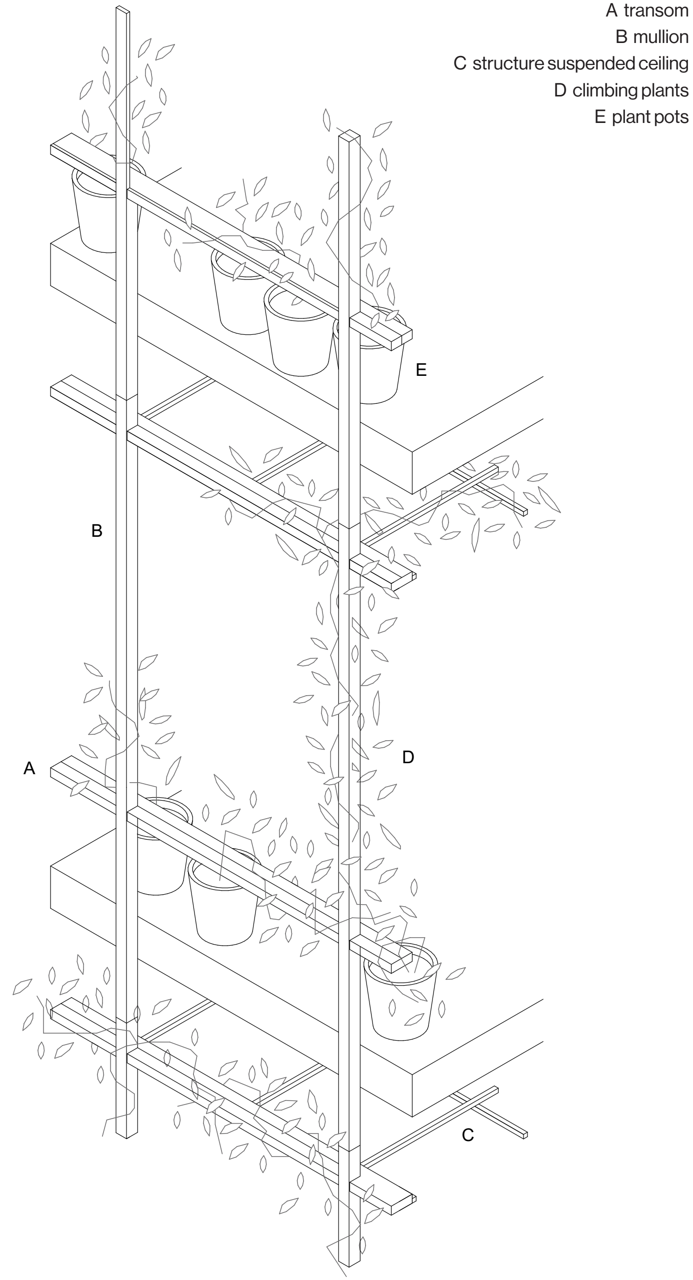
A plants on the roof
B plants on each floor

Axonometry planting areas

2.2 Climbing plants

From the existing façade, only the asbestos-contaminated seals and fillings are disposed of. The mullions and transoms will be retained. They serve as a climbing frame for climbing plants along the façade.

The covering of the suspended ceiling will be removed to benefit from the ceiling height.The supporting structure of the suspended ceiling is retained and serves as a further climbing aid.



Axonometry facade

Waldkauz in Birnenspalier
Efeu an der Klostermauer

Berg-Waldrebe

wilden Weins o

Die Dreispitzige Jungfernrebe (oft auch Dreiblättriger Wilder Wein genannt) ist nicht immergrün, belebt die Fassade jedoch mit einem imposanten Farbenspiel: glänzendes Rot im Herbst, blattlos im Winter, zartes Hellgrün im Frühling. Sie klettert mit

Rose.

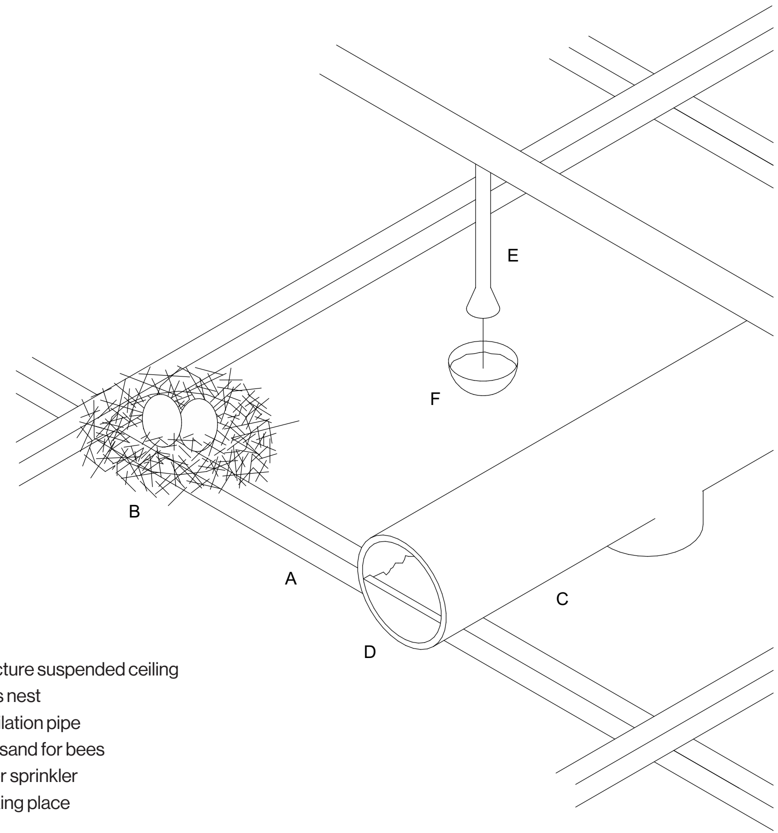
3 Wald-Geissblatt

Grosse Kapuzinerkresse

Waldrebe an Spanndraht emporwachsend

2.3 Birds and bees

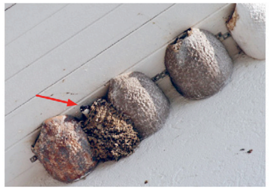
Birds and wild bees do not find nesting or breeding opportunities in the smooth facades of heavily insulated facades. The open structure of the suspended ceiling provides the best conditions for the animals to build nests at a protected height. The no longer needed ventilation pipes of our Protagonist can be used to accommodate wild bees with the help of lean sand.



A structure suspended ceiling
B bird's nest
C ventilation pipe
D lean sand for bees
E water sprinkler
F drinking place

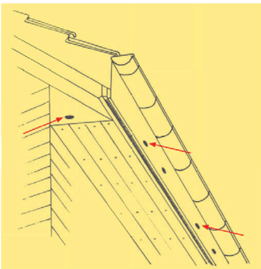
Axonometry structure suspended ceiling

Die Kreise zeigen, welche Stellen von Seglern auf der Suche nach Nistplätzen häufig angeflogen werden.



Natürliches Mehlschwalbennest aus Lehmklümpchen zwischen Kunstnestern. (Bild: M. Werder)

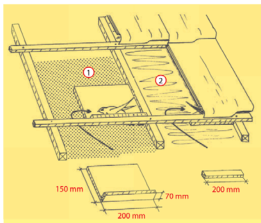
Freigelegtes Seglernest auf dem Unterdach. Der Nestkranz ist mit Speichel gut verleimt. Das Nistmaterial stammt zum Teil von Spatzen.



Nistplätze im Traufkasten. Die Abbildung zeigt Einflugöffnungen für Mauersegler unter der Regenrinne (im Stirnbrett) sowie eine Öffnung auf der Giebelseite.

Nistplätze auf dem Unterdach

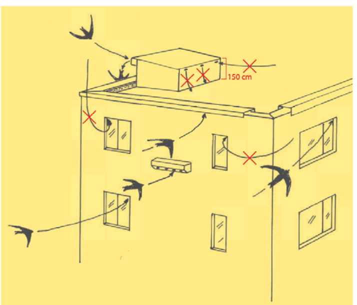
Sehr häufig liegen die Nistplätze der Mauersegler auf dem Unterdach. Beträgt der Abstand zwischen dem Unterdach und den Dachlatten 30 mm oder mehr, können die Mauersegler dazwischen hinaufklettern und ihr Nest an einer günstige Stellen anlegen. Allerdings



Nisthilfe für Mauersegler auf dem Unterdach.
1 Verputzgitter
2 Dachpappe

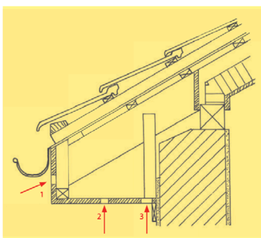
Freier Anflug

Segler fliegen ihre Nistplätze direkt an, ohne Zwischenlandung auf einem Ast oder Fenstersims. Flughindernissen wie Ästen, Telefondrähten, Fahrleitungen oder Taubenabwehren können sie beim Landen und Starten mit ihren langen Flügeln nur schlecht ausweichen und verletzen sich leicht. Der Anflug zum Nistplatz muss deshalb frei sein.



Nistplätze im Traufbereich

Ein beliebter Nistort der Segler ist der Traufkasten. Mauersegler nisten auf dem Boden des Traufkastens, Alpensegler kleben ihre Nester oft an dessen Rückwand. Solche Brutplatzangebote sind einfach einzurichten. Einflugöffnungen können zum Beispiel unterhalb der Regenrinne im Stirnbrett, in der Traufuntersicht oder hinten, zwischen Untersicht und Fassade, eingerichtet werden.



Mögliche Einflugöffnungen in den Traufkasten.
(Pro Nistplatz ist nur eine Einflugöffnung zu machen.)
1 Stirnbrett
2 Untersicht
3 Anschluss Untersicht - Fassade

Wasservögel

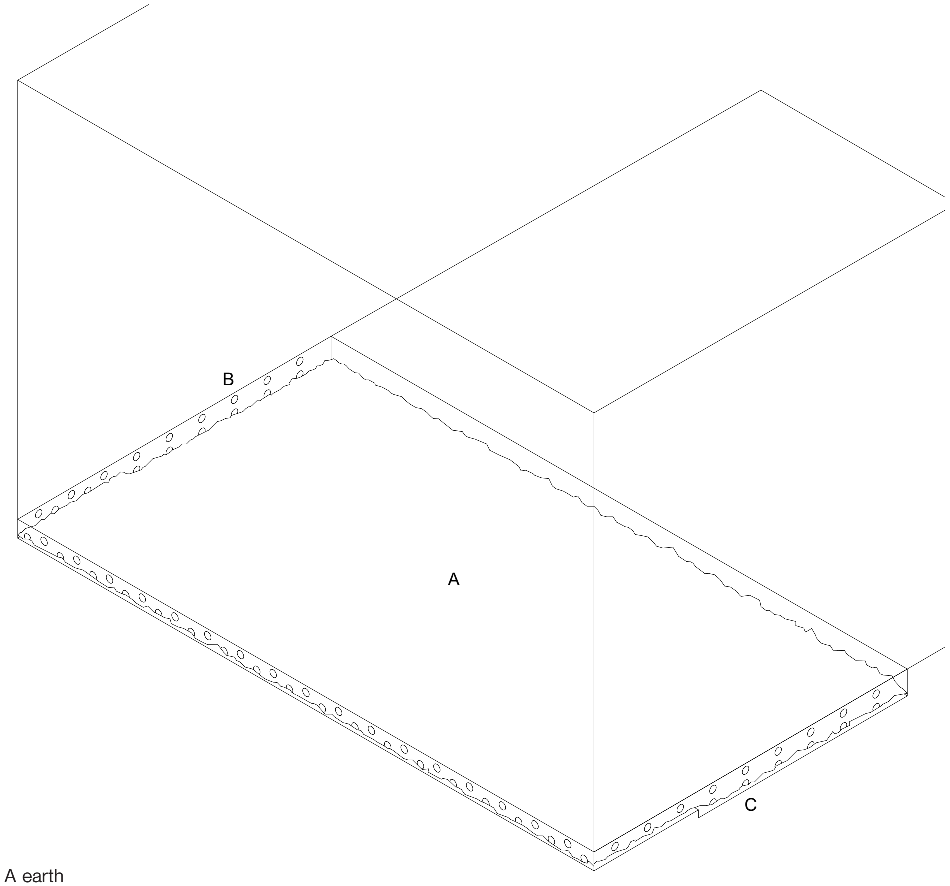
Der Rhein bietet zahlreichen Wasservögeln einen ganzjährigen Lebensraum. Vom Bodensee bis zum Delta ist der Rhein für Wasservögel aber auch ein wichtiges Rast- und Überwinterungsgebiet.

Letztmalig wurde im Jahr 2000 das Vorkommen der Wasservögel im gesamten Rheinverlauf erfasst. Bei den Zählungen im November 1999 sowie im Januar und März 2000 wurden insgesamt 2.1 Millionen Wasservögel gezählt, verteilt auf insgesamt 42 Arten. (1995: 1 Million, verteilt auf 38 Arten). Für 21 Arten wurde ein Vorkommen von internationaler Bedeutung festgestellt. Mehr als die Hälfte der Vögel wurde im Niederrhein unterhalb Bonns gezählt. Große Anzahlen traten zudem im November im Bodenseegebiet auf. Hoch-, Ober – und Mittelrhein werden vor allem in der Mittwinterperiode im Januar von vielen Wasservogelarten besucht.

Zu den generell am zahlreichsten vorkommenden Arten gehörten Blässgans, Stockente, Reiherente und Blässhuhn. Am häufigsten waren pflanzenfressende Arten und Arten, die sich von Kleintieren im Wasser ernähren (Benthivoren). Grasfresser wie Blässgans und Pfeifente waren vor allem auf den Wiesen am Niederrhein und in den Deichvorländern des Deltas zu finden. In den Flachwasserbereichen am Bodensee, in den Randmeeren und im IJsselmeer/Markermeer waren Wasserpflanzen bevorzugende Wasservögel wie Höckerschwan und Kolbenente zahlreich, aber auch Benthivore wie Reiher-, Tafel- und Bergente wegen der hier zahlreich vorkommenden Wandermuscheln (Dreissena polymorpha) als Futter. Fischfresser bildeten eine wesentlich kleinere Gruppe und wurden nur durch zwei wichtige Arten - Haubentaucher und Kormoran - vertreten.

2.4 Bats and reptiles

To provide a home for bats and reptiles, the unused mezzanine level of the cellar can be converted. Especially in winter reptiles and bats need frost-free but permanently damp protected rooms. The room is located directly below the water terraces, which provide sufficient humidity, and partially above the ground surface, so that it can be approached through simple openings.



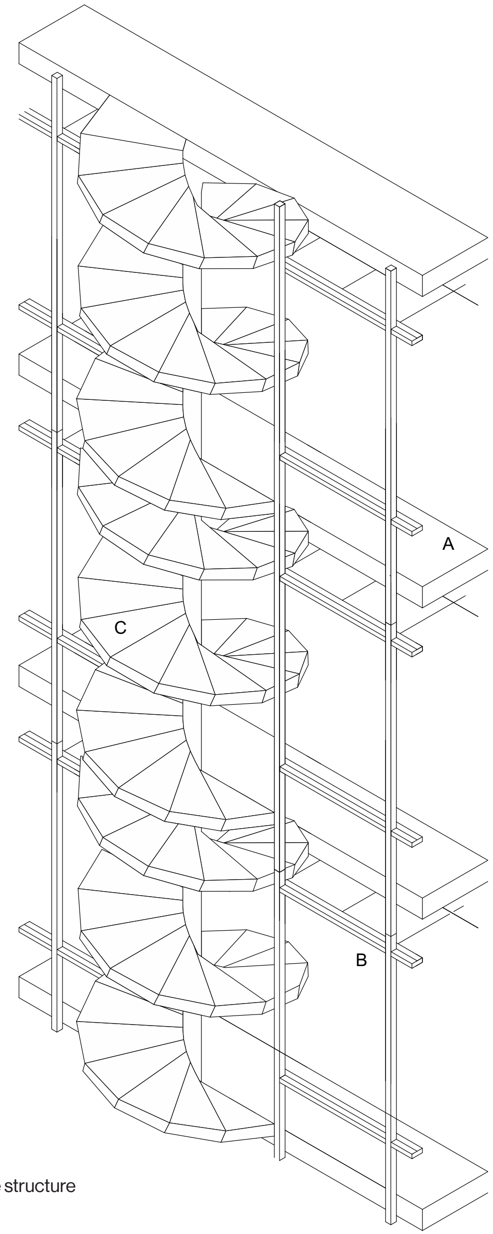
A earth
B openings for bats
C openings for reptiles

Axonometry natural cellar

- Lässt sich ein Naturkeller einrichten? Dieser hat das ganze Jahr über ein gleichmässiges Klima mit konstant hoher Luftfeuchtigkeit, was insbesondere den Feuersalamandern und den Erdkröten gefällt. In den Keller gelangen sie entweder durch ein Loch in oder neben der Kellertüre oder durch eine Licht- oder Lüftungsöffnung. Auch Fledermäuse sind manchmal Gäste in einem Naturkeller. Ein etwa vier Zentimeter breiter Spalt beim Fenster oder eine entsprechende Öffnung in der Kellertüre genügt ihnen, um hineinzugelangen.

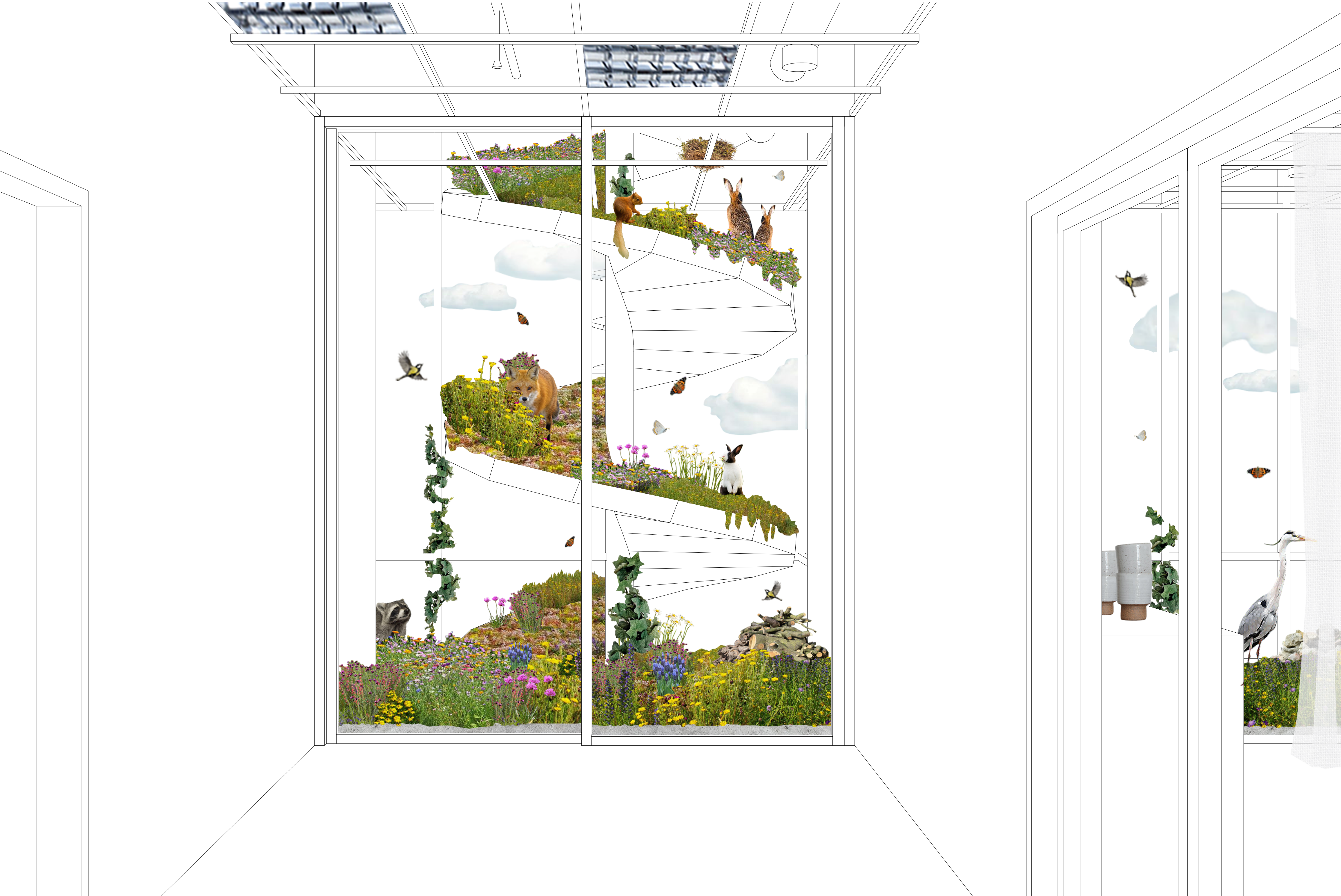
2.5 Insects and mammals

These residents would love to settle or rest in the green areas along the house and on the roof. In order to reach them, our protagonist receives four spiral green ramps, which serve as access for animals.



A ceiling
B mullions transom facade structure
C animal spiral

Axonometry animal circulation

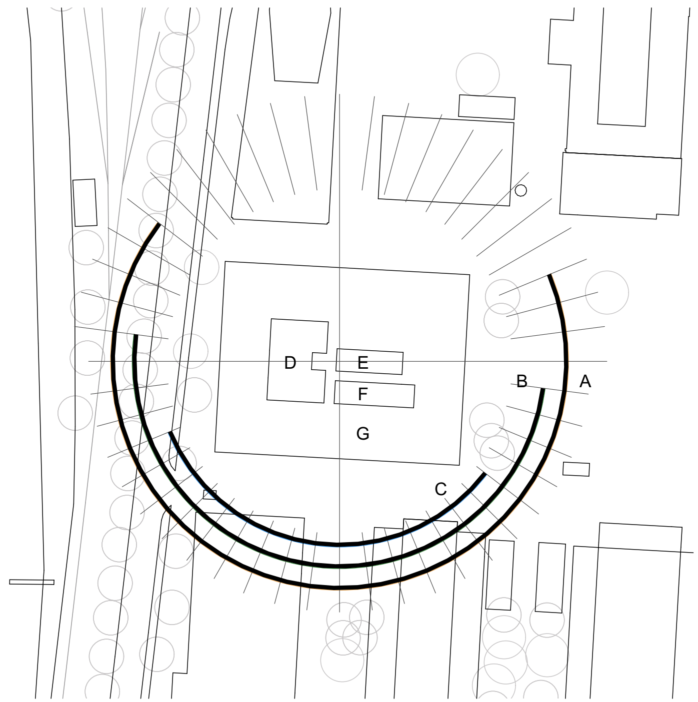


3 Cluster living

Due to the great depth of the building, the rooms in our protagonist, with the exception of the corners of the building, are always oriented on one side only. To be able to benefit from direct sunlight all day long, the human inhabitants live in cluster apartments. Each floor forms a common apartment. On the west and east side are the common rooms, on the north side the bedrooms and work rooms, on the south side the bedrooms and private living rooms. All residents can also benefit from the special view of the Rhine.

North
working,
sleeping

West
eating,
dining,
seating



East
eating,
dining,
seating

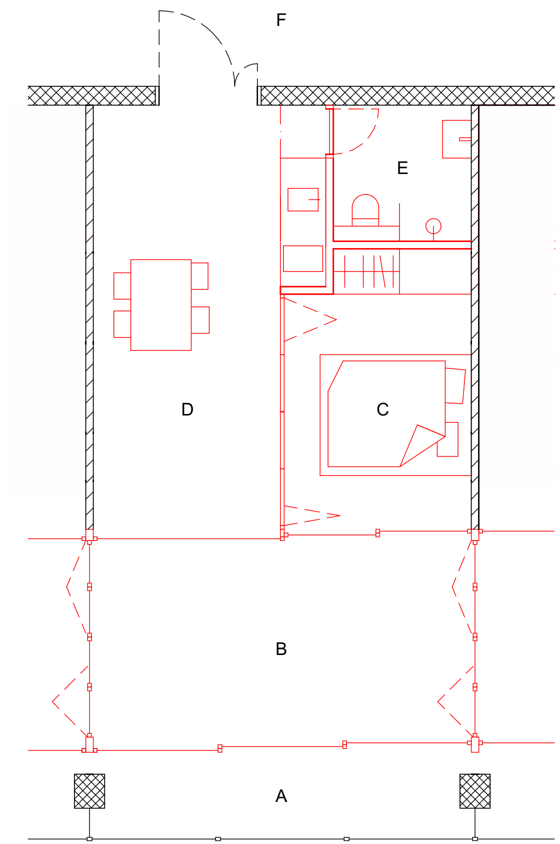
South
living,
sleeping

A sun course summer
B sun course spring and summer
C sun coourse winter
D water filter area
E air filter area
F carbonisation area
G living area

Course of the sun

3.1 Singles and couples

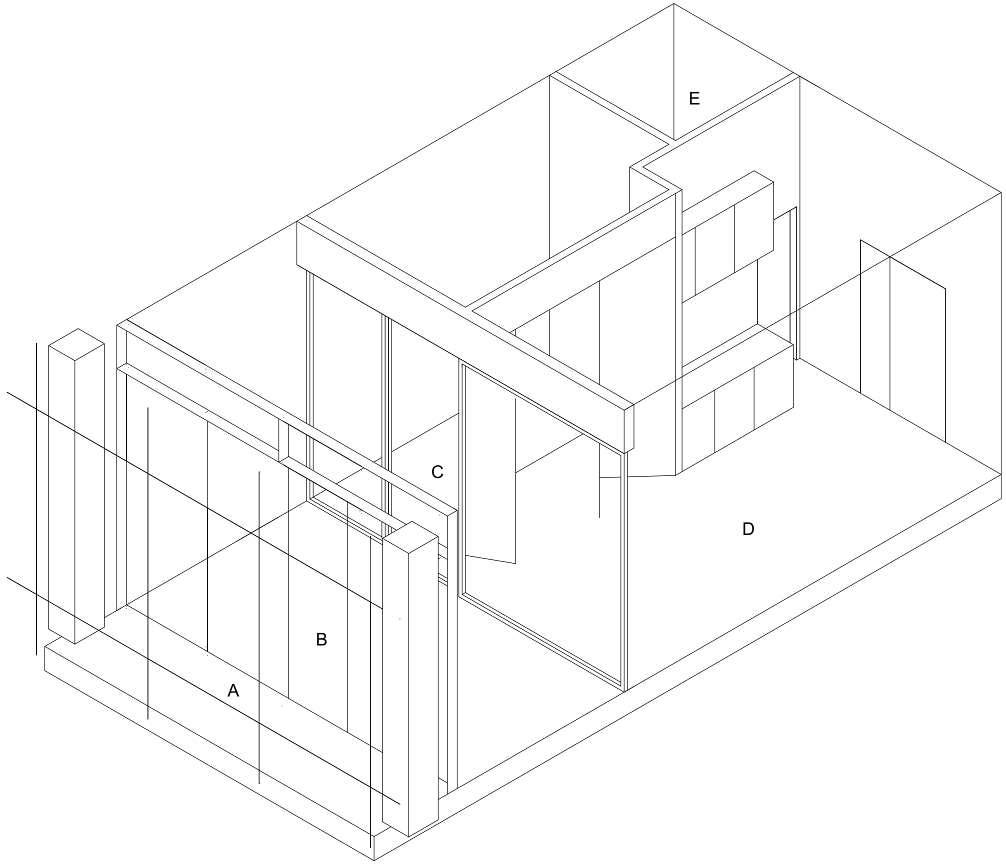
There are seven single clusters on each floor. Each cluster apartment is a small apartment of its own to give each resident the privacy they desire. The common rooms function as extra spaces. The clusters consist of 5 climate zones. Only the living area is heated. All clusters can be connected in the wintergardens - for temporary events or to combine several clusters.



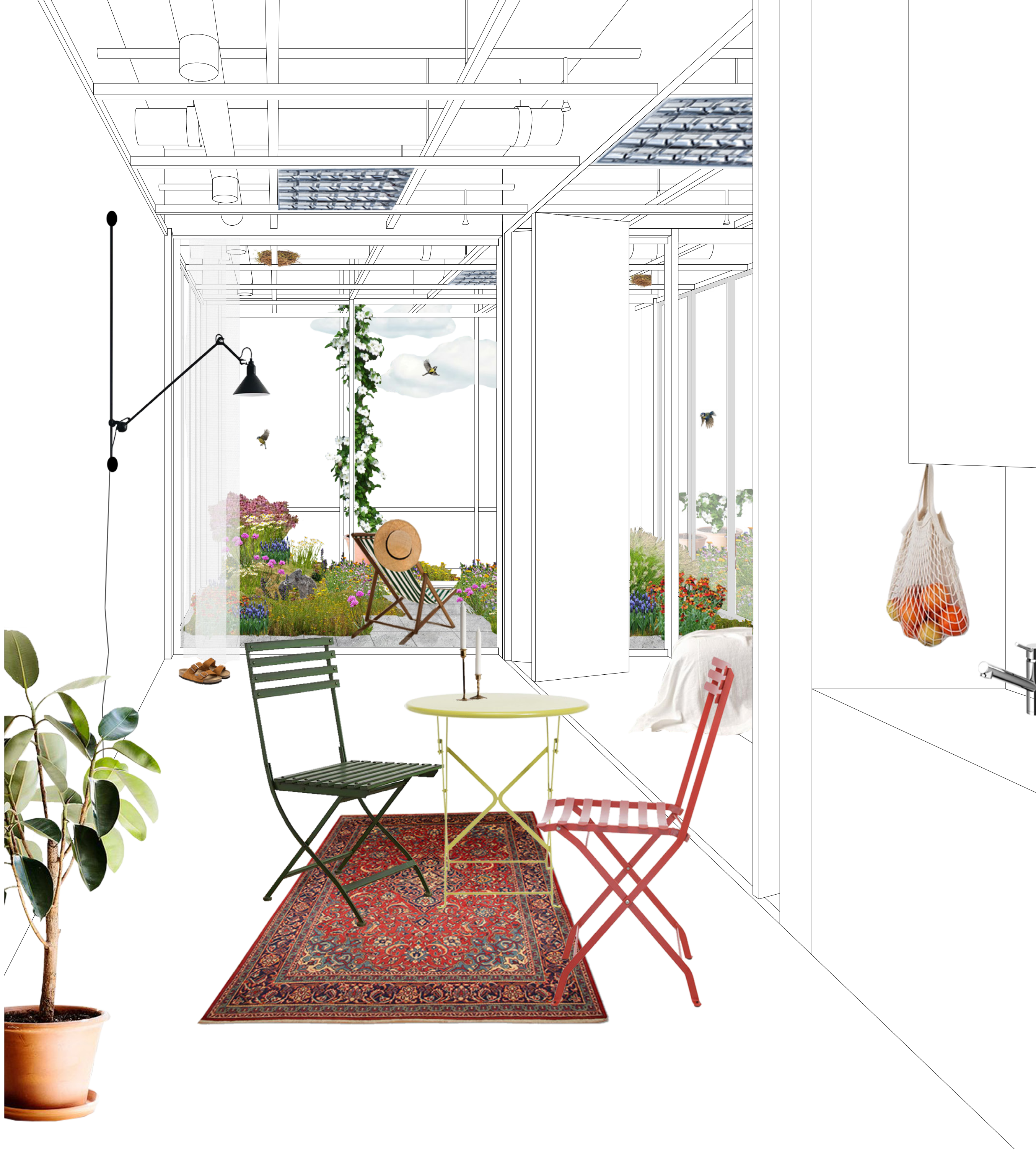
A outside space, climate zone 1
B wintergarden, climate zone 2
C sleeping, climate zone 3
D living, climate zone 4
E bath, climate zonne 5
F corridor

Floor plan single cluster

A outside space, climate zone 1
B wintergarden, climate zone 2
C sleeping, climate zone 3
D living, climate zone 4
E bath, climate zonne 5
F corridor

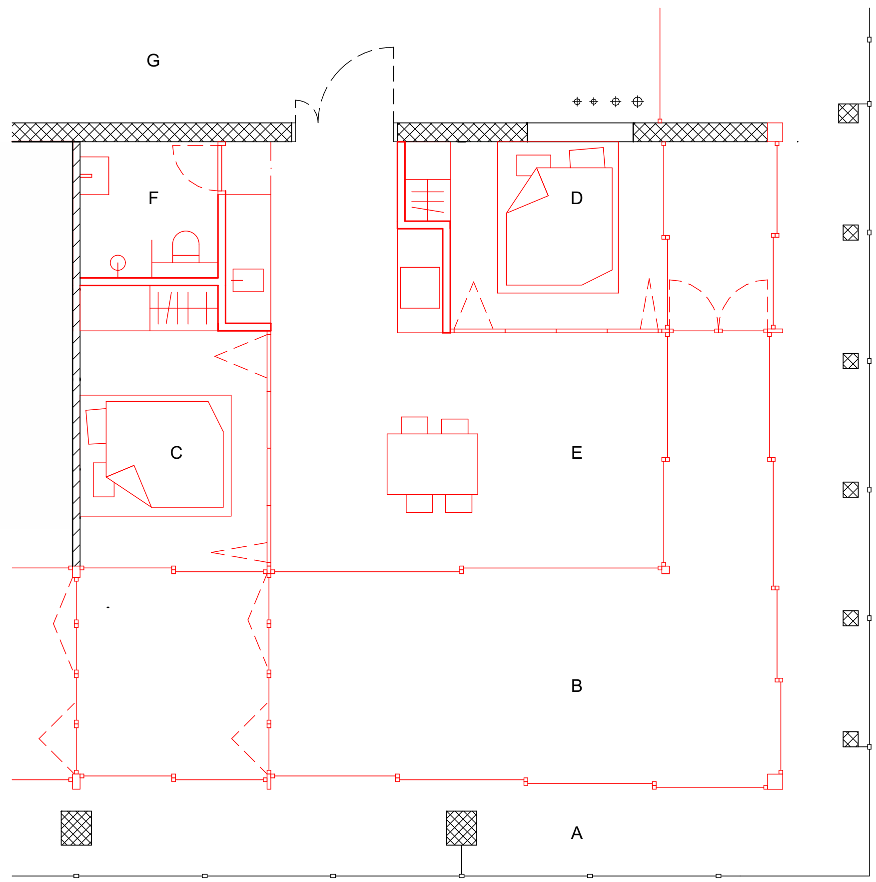


Axonometry single cluster



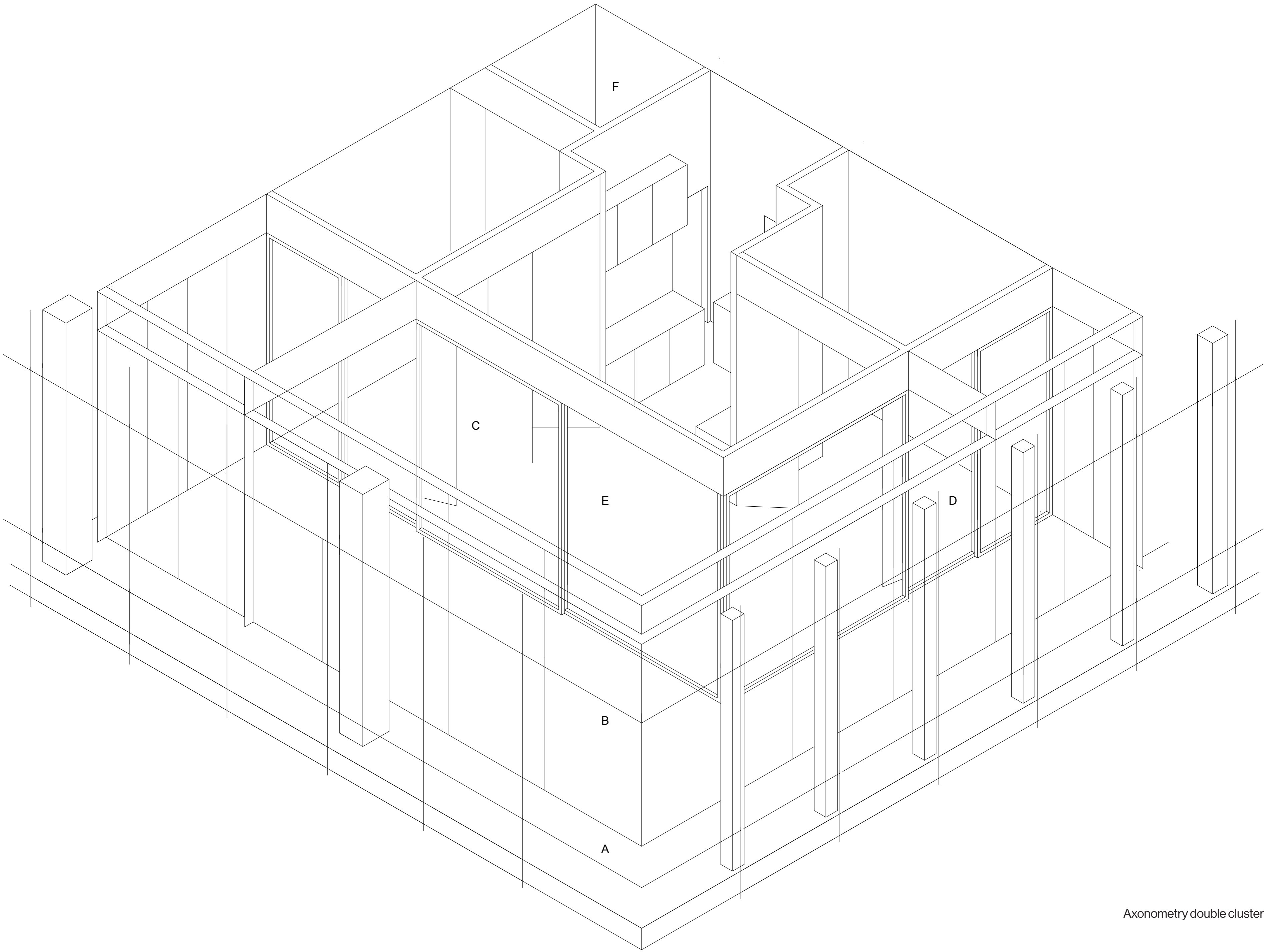
3.2 Families

There are four double clusters on each floor. Just like the single cluster they consist of 5 climate zones

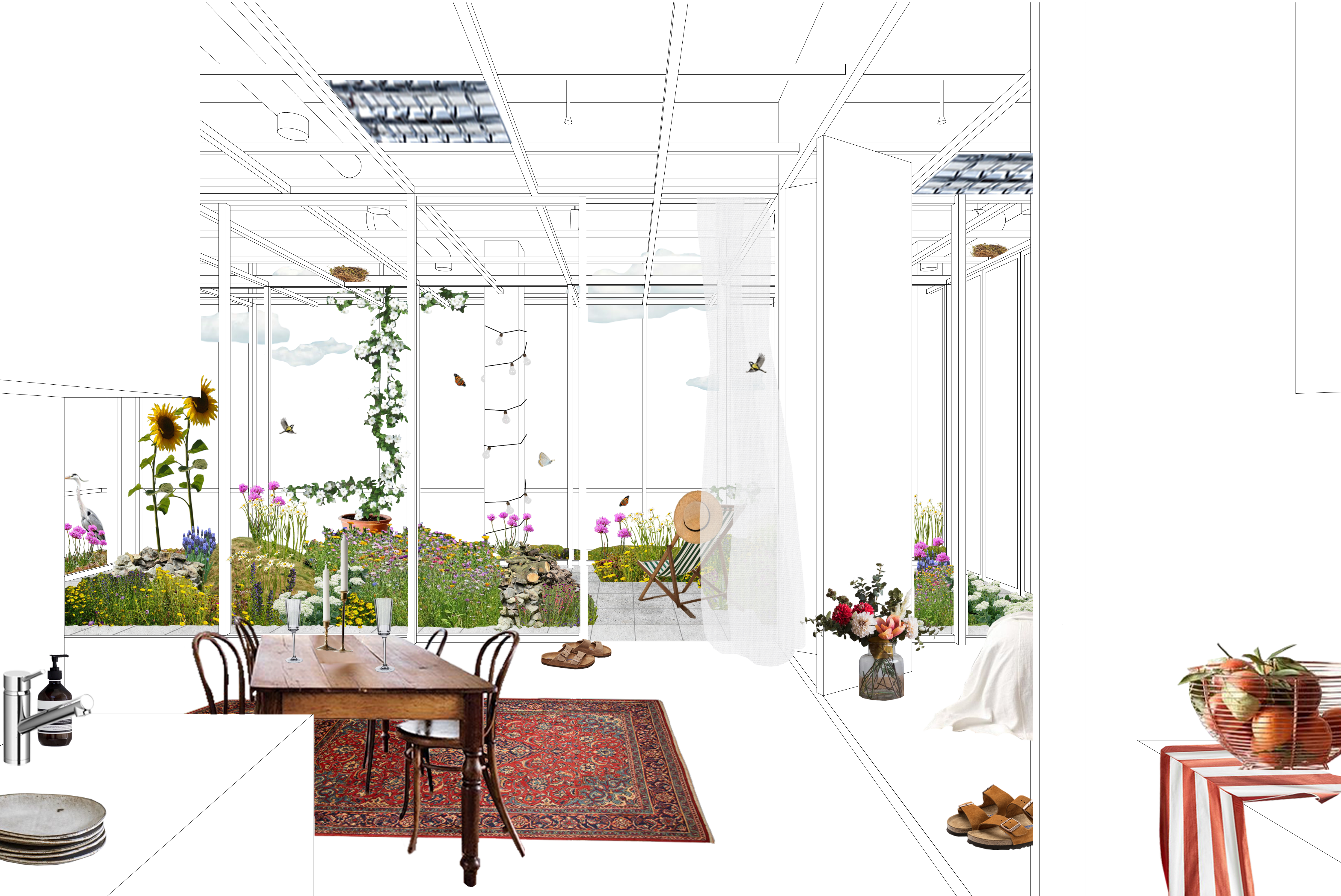


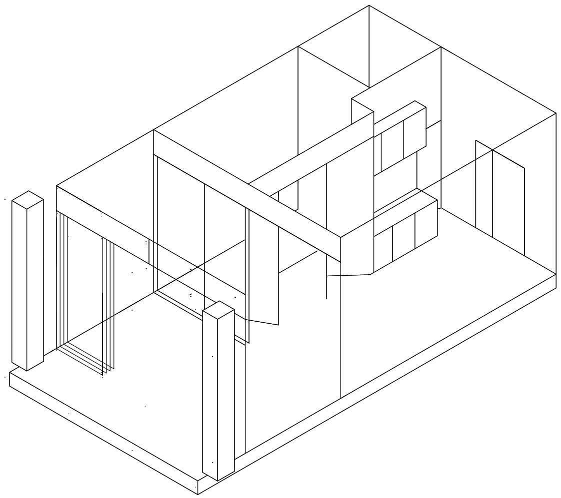
A outside space, climate zone 1
B wintergarden, climate zone 2
C sleeping, climate zone 3
D sleeping, climate zone 3
E living, climate zone 4
F bath, climate zonne 5
G corridor

Floor plan double cluster

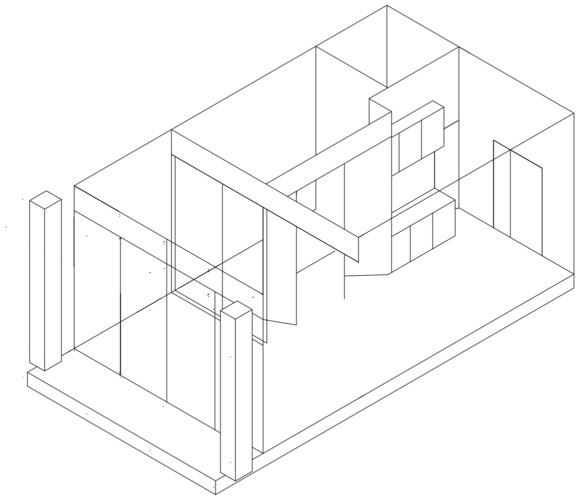


Axonometry double cluster

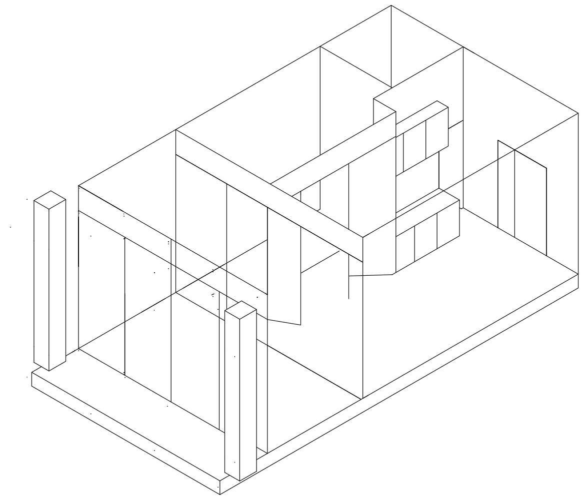




Summer
facade wintergarden: open
facade living space: open
living space: 49 m²



Spring, Autumn
facade wintergarden: closed
facade living space: open
living space: 42 m²

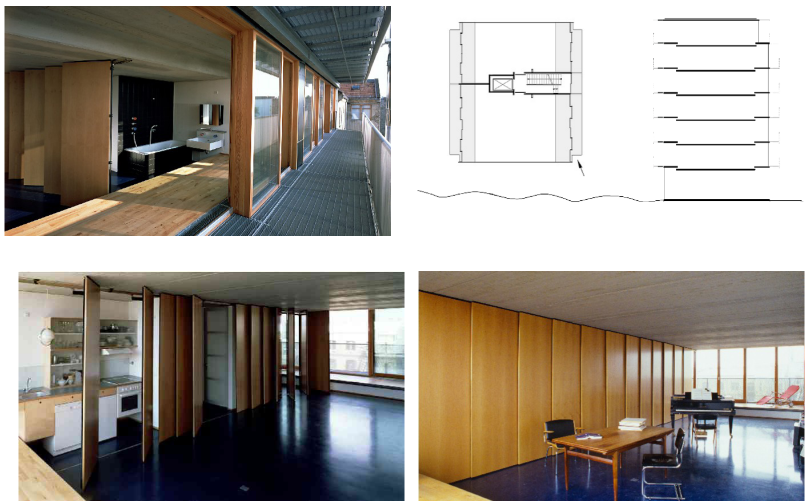


Winter
facade wintergarden: closed
facade living space: closed
living space: 29 m²

Axonometry seasonal living

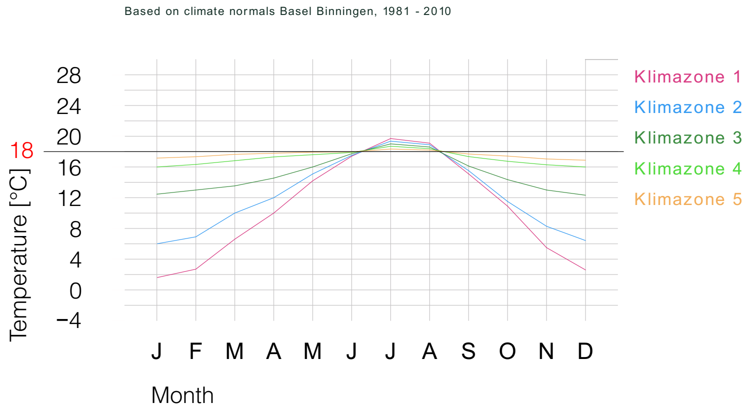
House for a young couple
Junya Ishigami

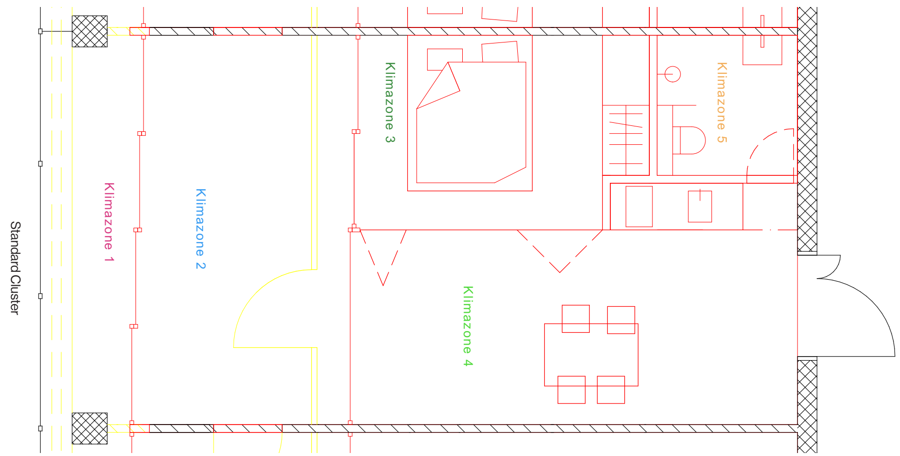
Garden (Serpentine Pavillon)
Peter Zumthor



Affordable Housing, Choriner Straße, Berlin
Planpopp Architektur und Land

3.3 energy calculations

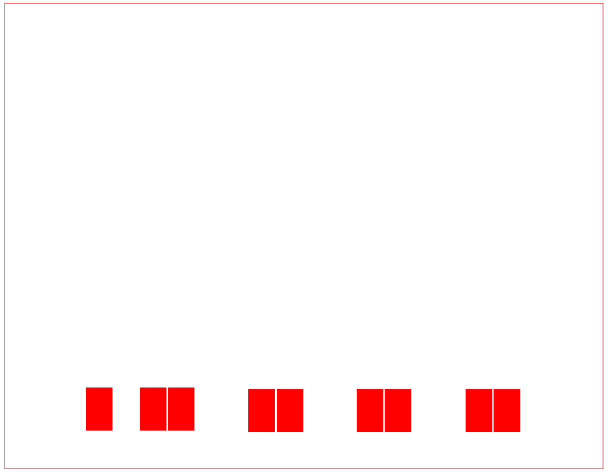


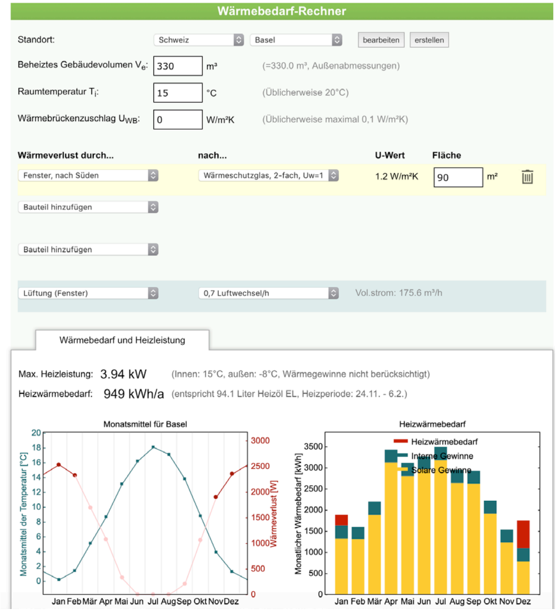


Berechnung Heizwärmebedarf

Zone 3, Süden,
90 m²,
330 m³,
90 m² Fensterfläche,
U=1,2 W/m²K

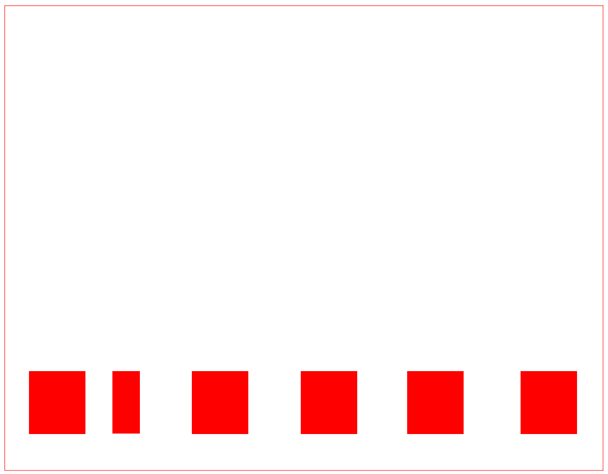
Heizwärmebedarf: 950 kWh/a





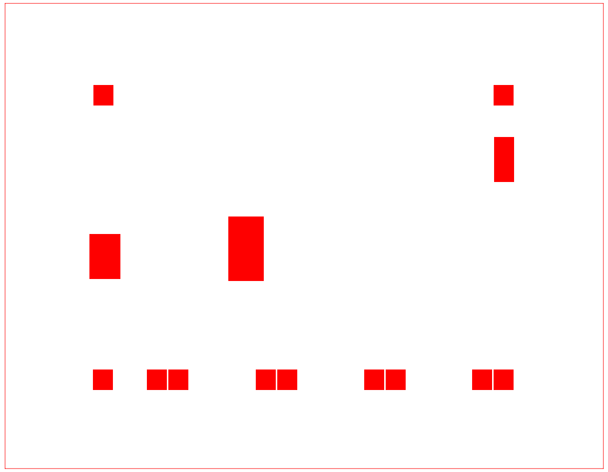
Zone 4, Süden,
170 m²,
630 m³,
100 m² Fensterfläche,
U=0,65 W/m²K

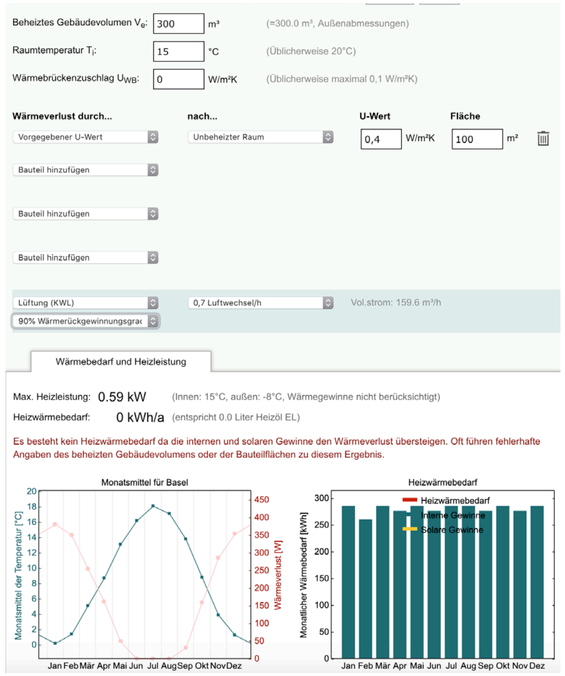
Heizwärmebedarf: 3500 kWh/a



Zone 5, innenliegend
80 m²,
300 m³,
0 m² Fensterfläche,
U=0,4 W/m²K
(machenische Lüftung
mit Wärmerückgewinnung,
90 % Wirkungsgrad)

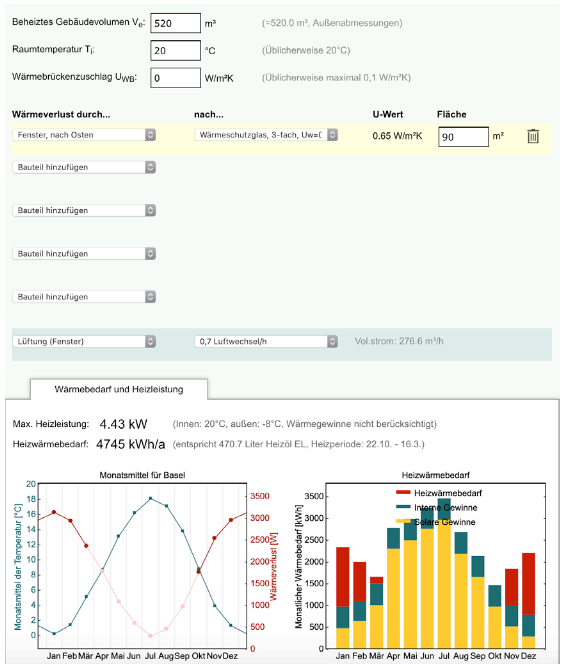
Heizwärmebedarf: 0 kWh/a





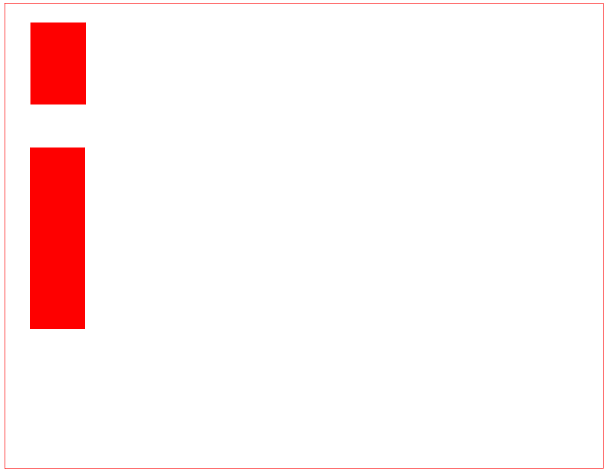
Zone 4, Osten
140 m²,
520 m³,
90 m² Fensterfläche,
U=0,65 W/m²K

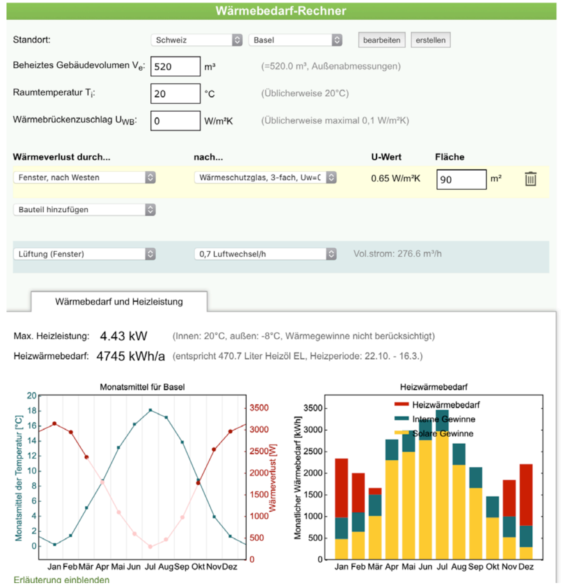
Heizwärmebedarf: 4750 kWh/a



Zone 4, Westen
140 m²,
520 m³,
90 m² Fensterfläche,
U=0,65 W/m²K

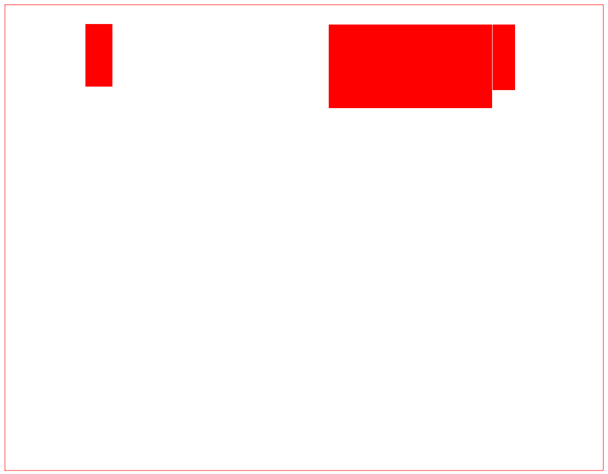
Heizwärmebedarf: 4750 kWh/a





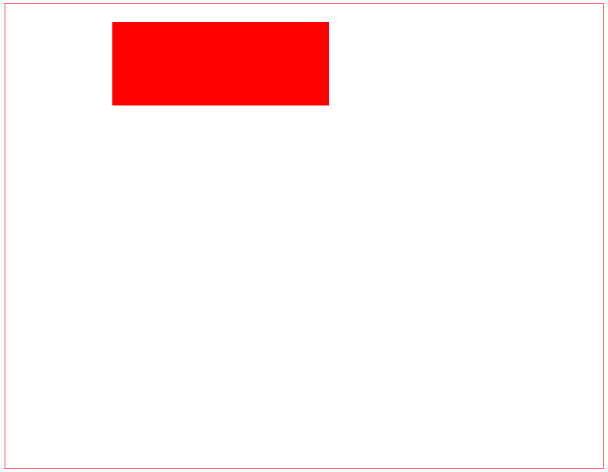
Zone 3, Norden
150 m²,
555 m³,
75 m² Fensterfläche,
U=0,65 W/m²K

Heizwärmebedarf: 3030 kWh/a



Zone 4, Norden
160 m²,
590 m³,
75 m² Fensterfläche,
U=0,65 W/m²K

Heizwärmebedarf: 6400 kWh/a



Heizwärmebedarf gesamt: 23 380 kWh/a (Geschoss)
Heizwärmebedarf gesamt: 14 280 kWh/a (Gebäude)

Jährlicher Wärmebedarf für Warmwasser: 20 kWh/m²
Geschoss: 1200 m² (Wohnen)

Jährlicher Wärmebedarf für Warmwasser: 24 000 kWh/a (Geschoss)
Jährlicher Wärmebedarf für Warmwasser: 144 000 kWh/a (Gebäude)

Jährlicher Elektrizitätsbedarf der Geräte: 18 kWh/m²
Jährlicher Elektrizitätsbedarf Beleuchtung: 4 kWh/m²
Geschoss: 1500 m² (Wohnen, Arbeiten)

Jährlicher Elektrizitätsbedarf der Geräte und Beleuchtung: 33 000 kWh/a (Geschoss)
Jährlicher Elektrizitätsbedarf der Geräte und Beleuchtung: 198 000 kWh/a (Geschoss)

Berechnung Energieprooduktion

Elektrizität:

- Photovoltaik Dach

Orientierung: Süden
Neigung der Module: 35°
belegte Fläche: 2500 m²

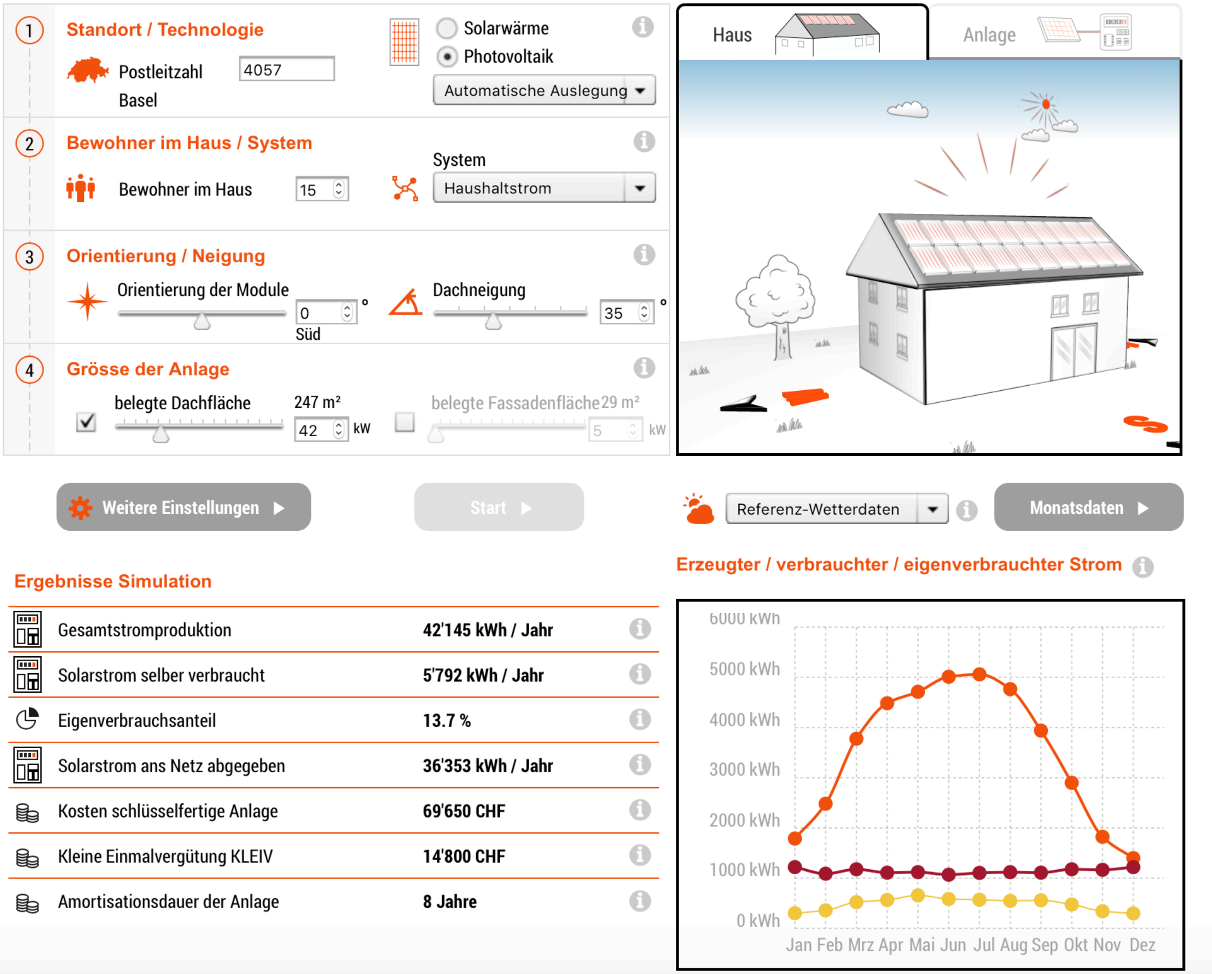
Gesamtstromproduktion: 426 500 kWh/a
nach energieschweiz.ch

Berechnung Eigenverbrauch
schlechtester Monat: Dezember
Ertrag Dezember: 14 000 kWh/m²
durschnittlicher monatlicher Bedarf (Gesamtbedarf/12): 16 500
kleiner Speiicher für Eigennutzung notwendig

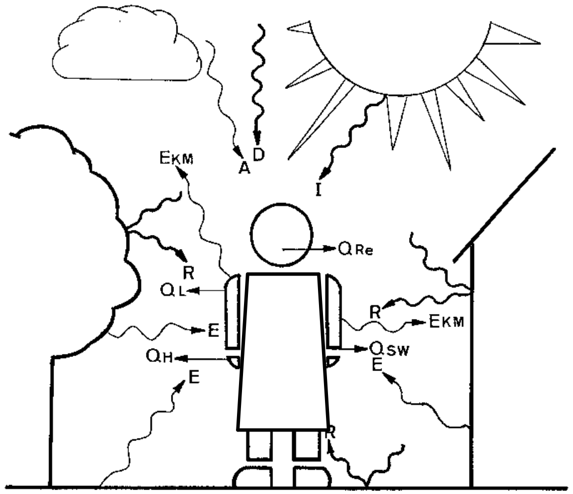
Einspeisung: 228 500 kWh/a

Solarrechner

Mit dem Solarrechner können Sie die ungefähre Energieproduktion, die Gesamtkosten und die Amortisationsdauer einer auf Ihre Bedürfnisse zugeschnittenen Solaranlage berechnen.

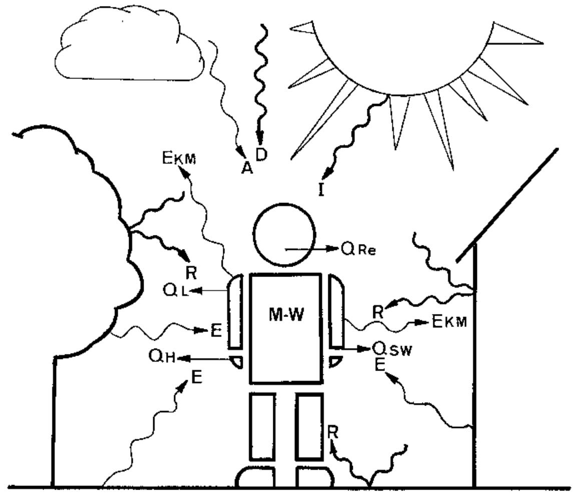


Live like climate Heidi and climate Michel !



Heidi

female, ? m, ? kg, ? m² body surface,
activity, metabolic rate, clothing



Michel

male, 1,75 m, 75 kg, 1,9 m² body surface,
activity, metabolic rate, clothing

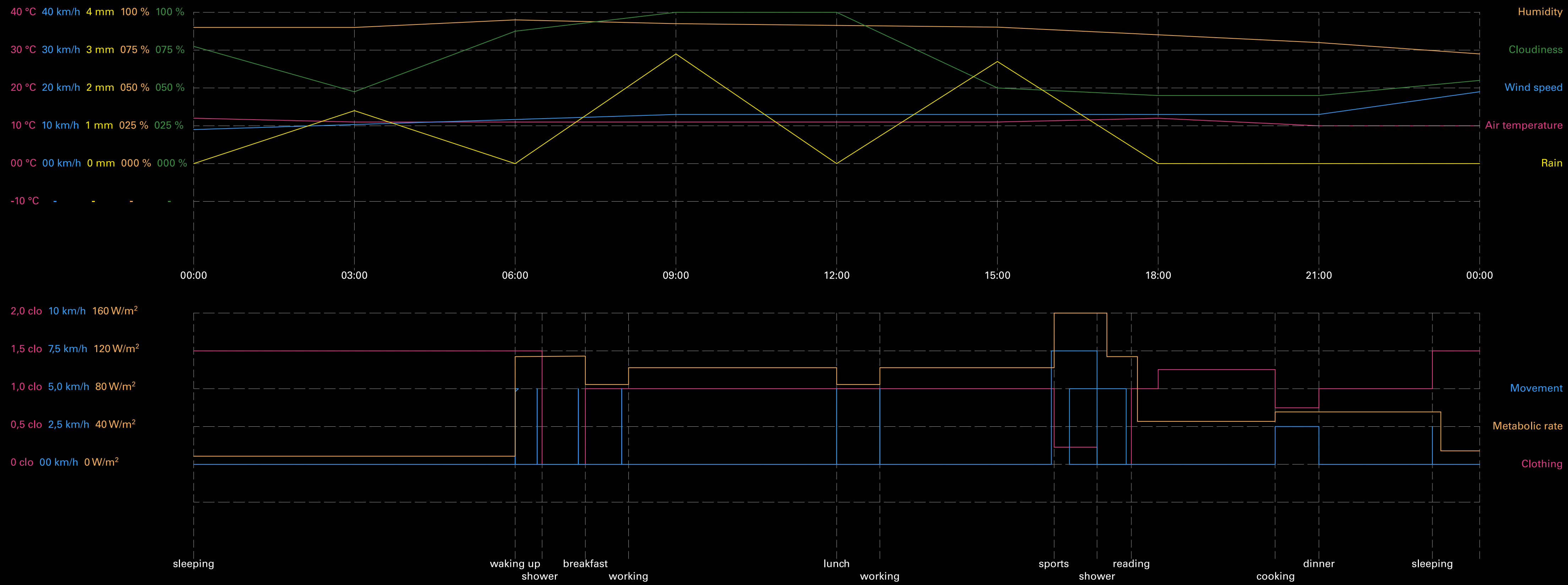
Climate

- air humidity
- air temperatuer
- air velocity
- (solar) radiation

= perceived temperature

*Climate Michel is a model developed by the German weather agency to calculate the perceived temperature. It takes into account all relevant parameters from the natural and human environment.

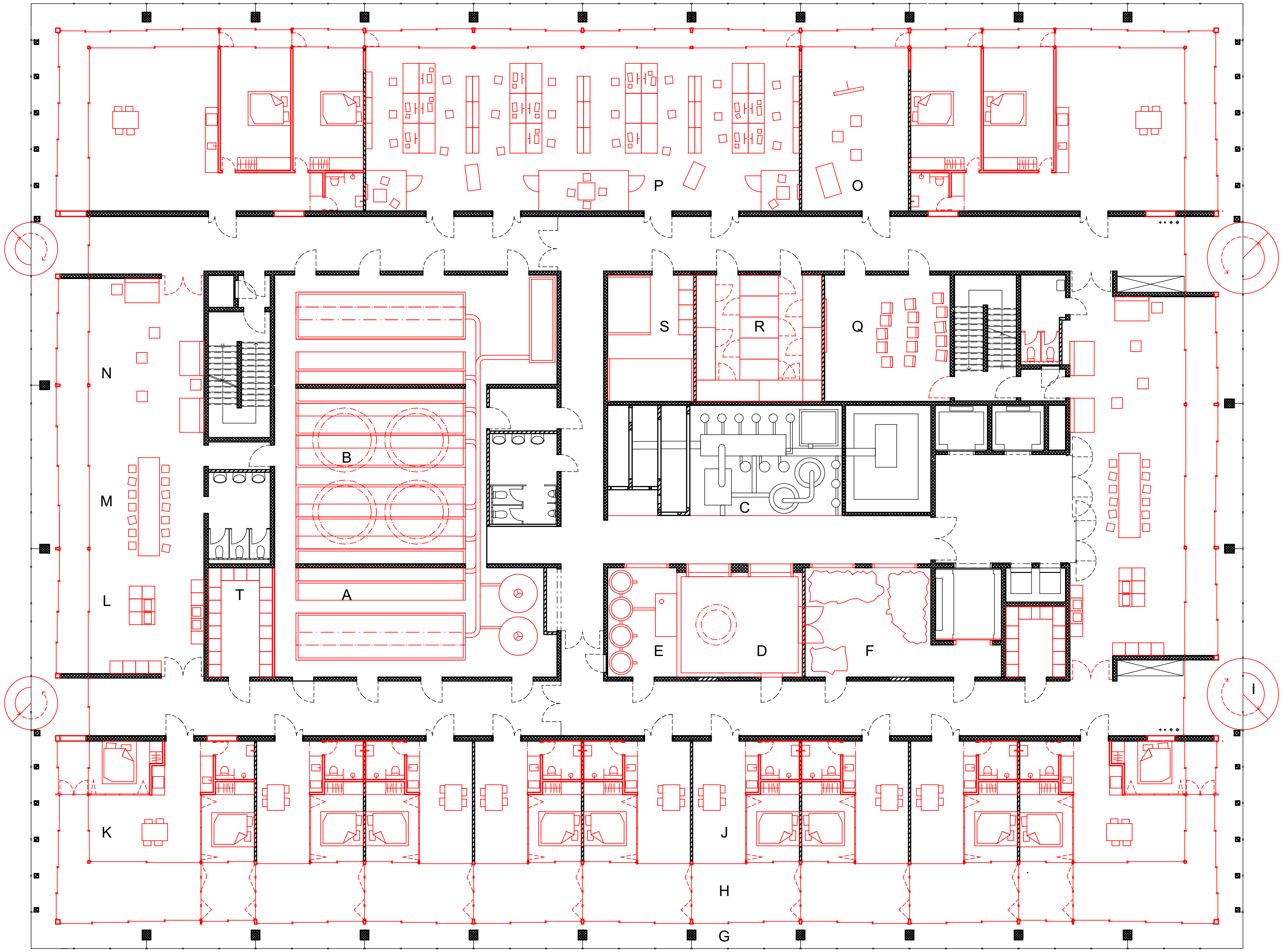
A day in a Klybeck flat
06.11.2018
0-24



Climate Michel
1,75 m
75 kg
Felt temperature = 19 °C

C

How we will live together

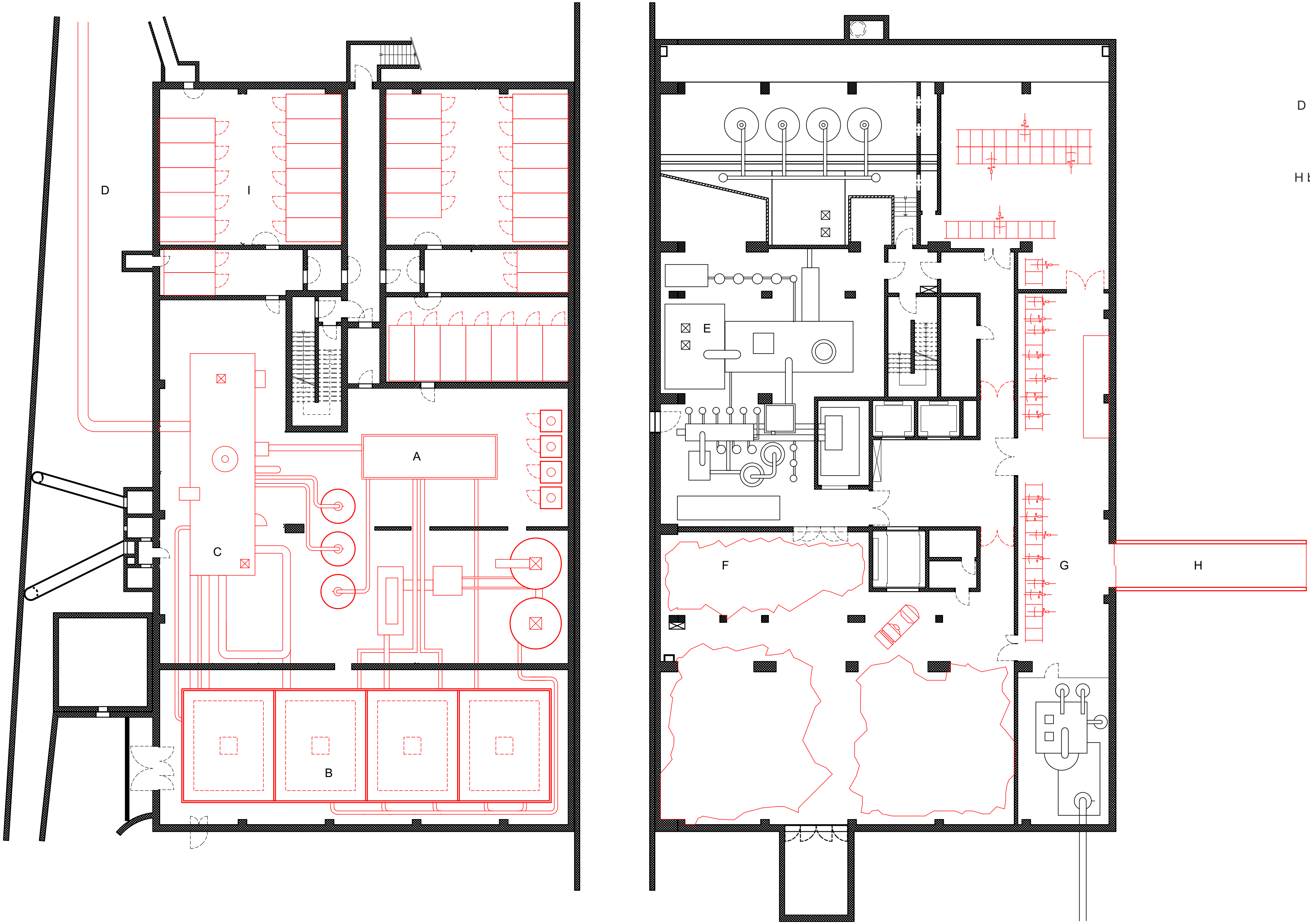


A water filter
B wind catcher
C mechanical ventilation
D carbonisation chamber
E excrements storage
F green waster storage
G outside space
H wintergarden
I animal spiral
J single cluster
K double cluster
L common kitchen
M common dining room
N common living room
O studio
P working spaces
Q common extra space
R storage
S laundry
T kitchen storage

Standard floor plan

A water filter
B wind towers
C mechanical ventilation
D output soil
E removal and delivery
F packaging soil
G outside space
H wintergarden
I animal spiral
J single cluster
K double cluster
L common kitchen
M common dining room
N common living room
O studio
P working spaces
Q common extra space
R storage
S laundry
T kitchen storage

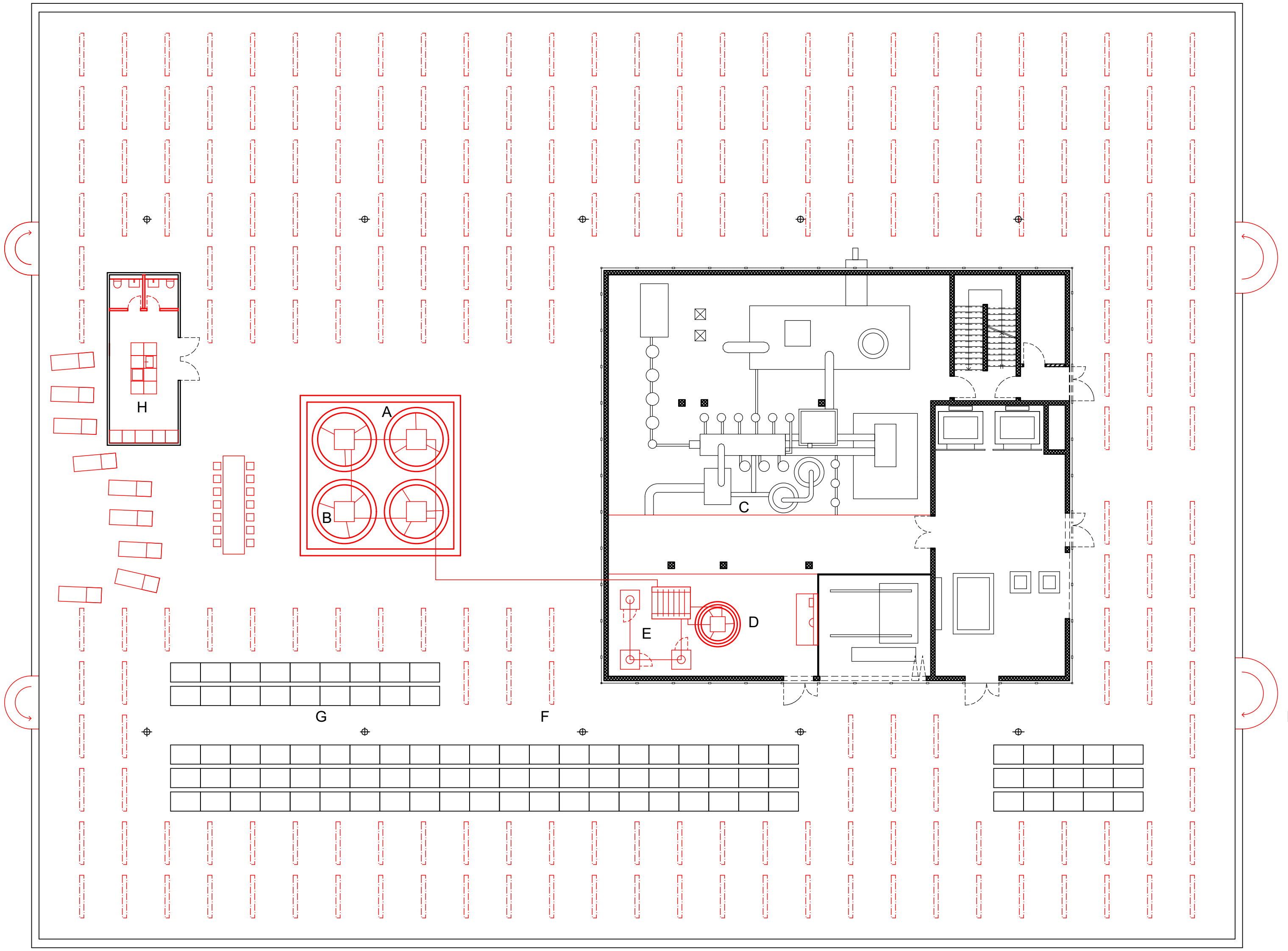
Ground floor plan



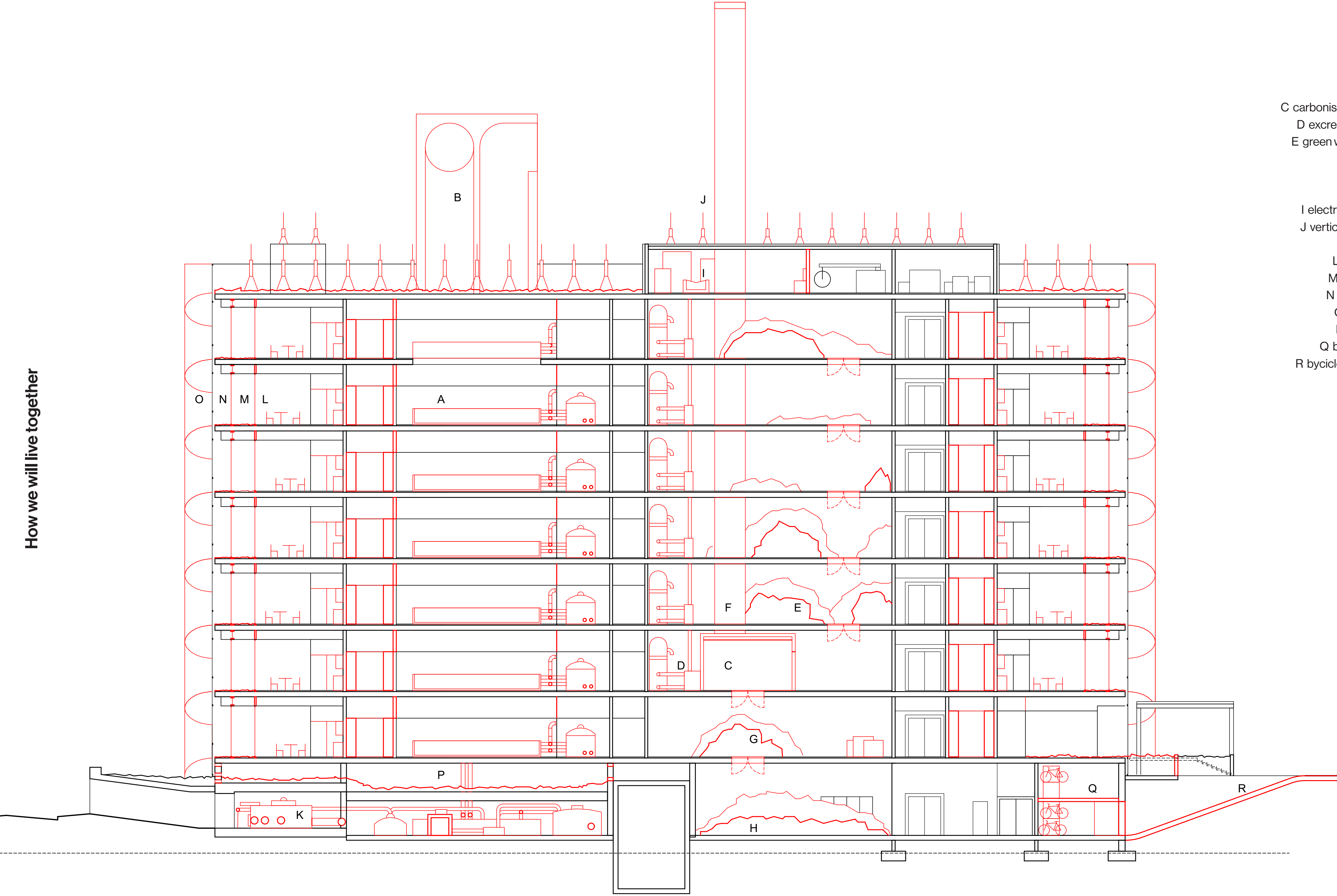
A collection basin
B overflow basins
C water pump
D pipe to watering site
E air filter
F soil storage
G bicycle storage
H bicycle access ramp
I storage

Basement floor plan

A wind tower
B wind turbine
C mechanical ventilation
D exhaust gas turbine
E electricity generators
F vertical solar panels
G horizontal solar panels
H common kitchen
I animal spiral

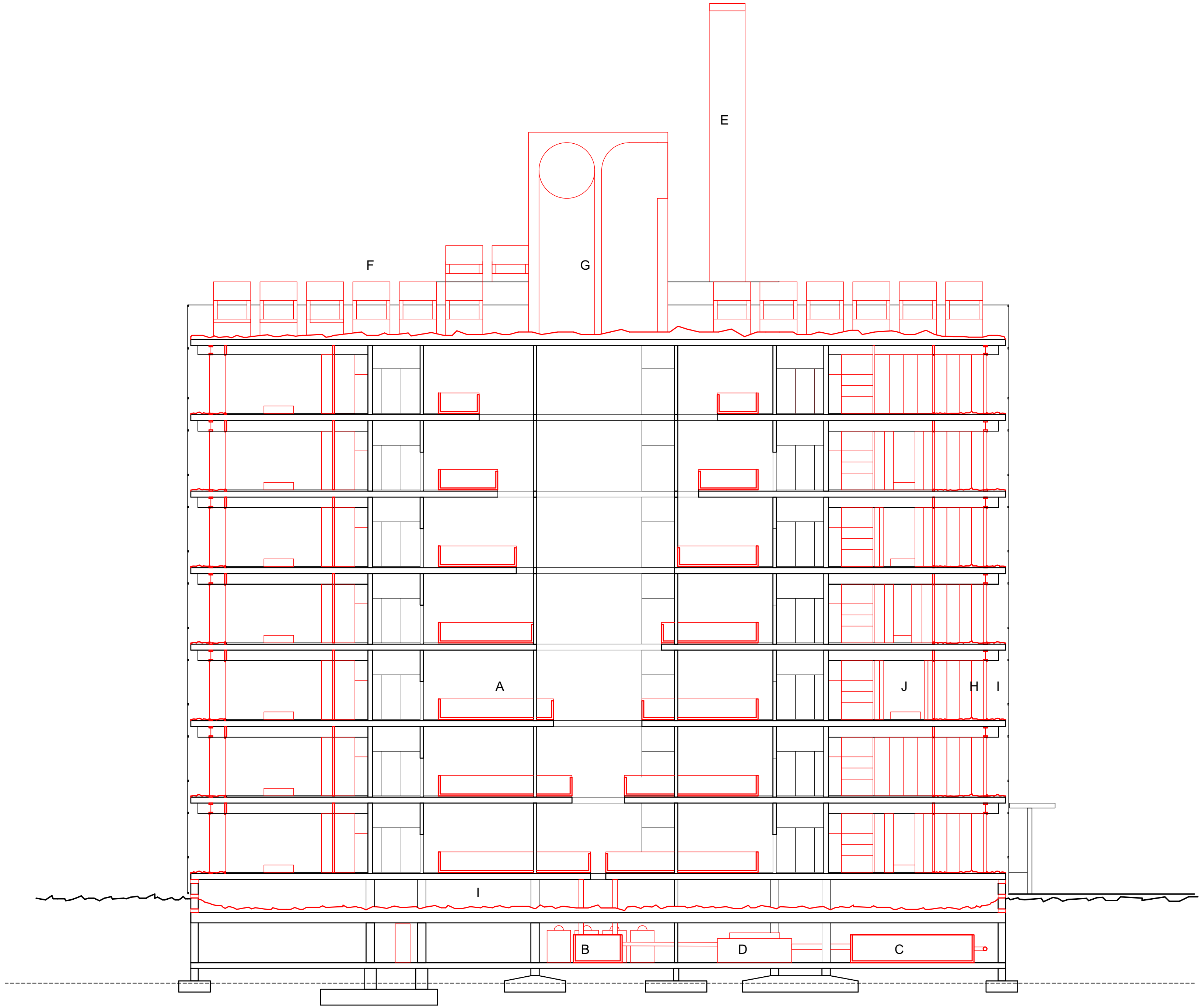


roof floor plan



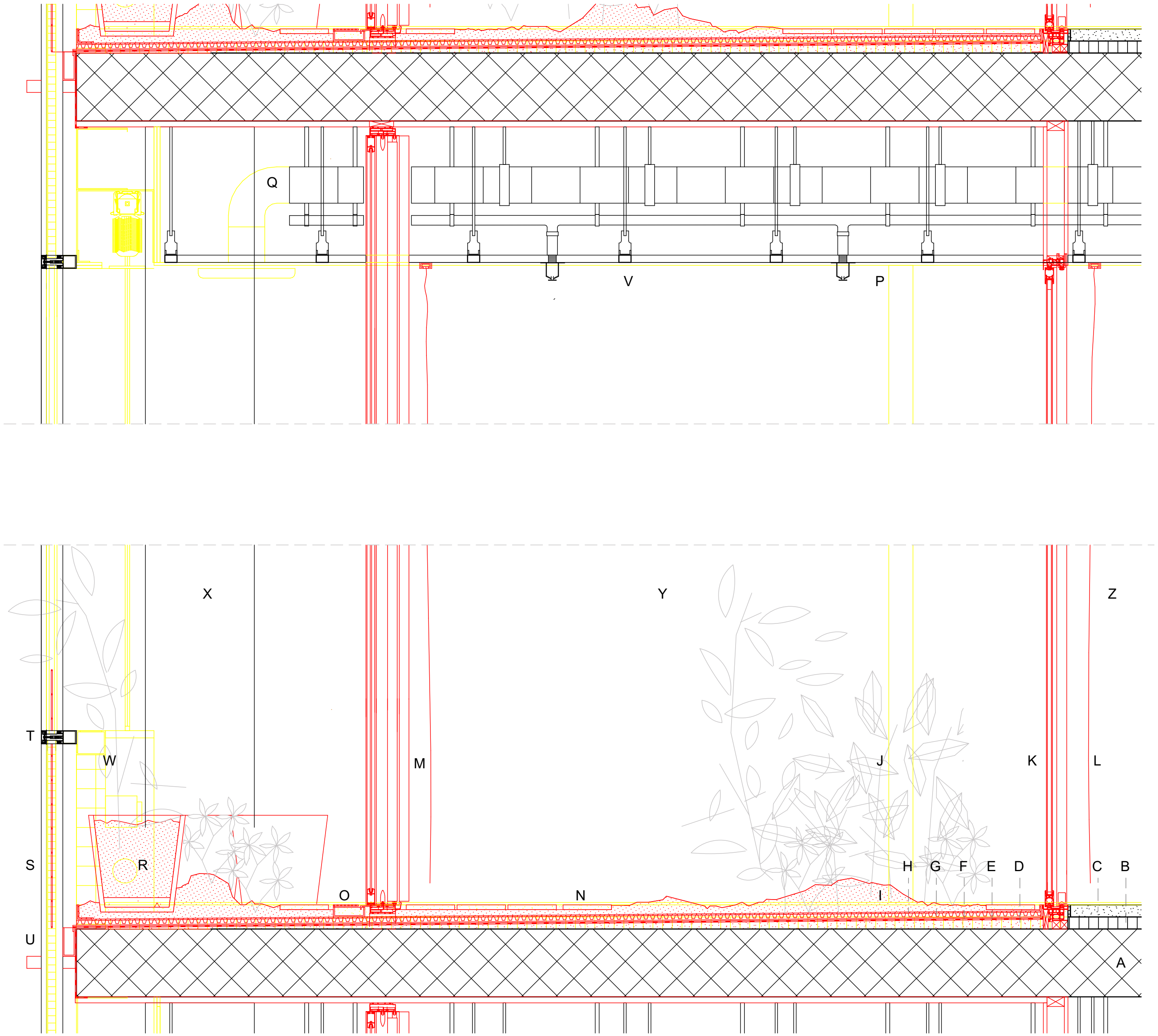
A water filter
B wind towers
C carbonisation chamber
D excrements storage
E green waster storage
F chimney
G output soil
H soil storage
I electricity generator
J vertical solar panels
K water pump
L single cluster
M wintergarden
N outisde space
O animal spiral
P animal cellar
Q bycicle storage
R bycicle access ramp

Section A



A water filter
B collection basin
C overflow basins
D water pump
E chimney
F vertical solar panels
G wind towers
H wintergarden
I outside space
J single cluster

Section B



A concrete floor
B footfall sound insulation
C cement screed
D gradient layer concrete spatula (1%)
E bitumen sealing and root protection
F storage protection mat
G drainage layer
H filter layer
I vegetation substrate
J vegetation
K double glazed sliding door
L thermal curtain
M single glazed sliding door
N concrete plates
O rain gutter
P water sprinkler for vegetation watering
Q open tubes for birds nests
R plant pots for climbing plants
S railing
T facade profiles for climbing plants
U water spout
V suspended ceiling profiles
W climbing plants
X outisde space
Y wintergarden
Z cluster living space

Detail

The project will provide affordable housing for all inhabitants,
if we succeed in integrating the ecological costs into our economic system.