ARCHITECTURE STUDENT CONTEST

17th INTERNATIONAL EDITION, WARSAW 2022

N° 30

Germany

FRANKFURT UNIVERSITY OF APPLIED SCIENCES

Hans Friedrich Kracht

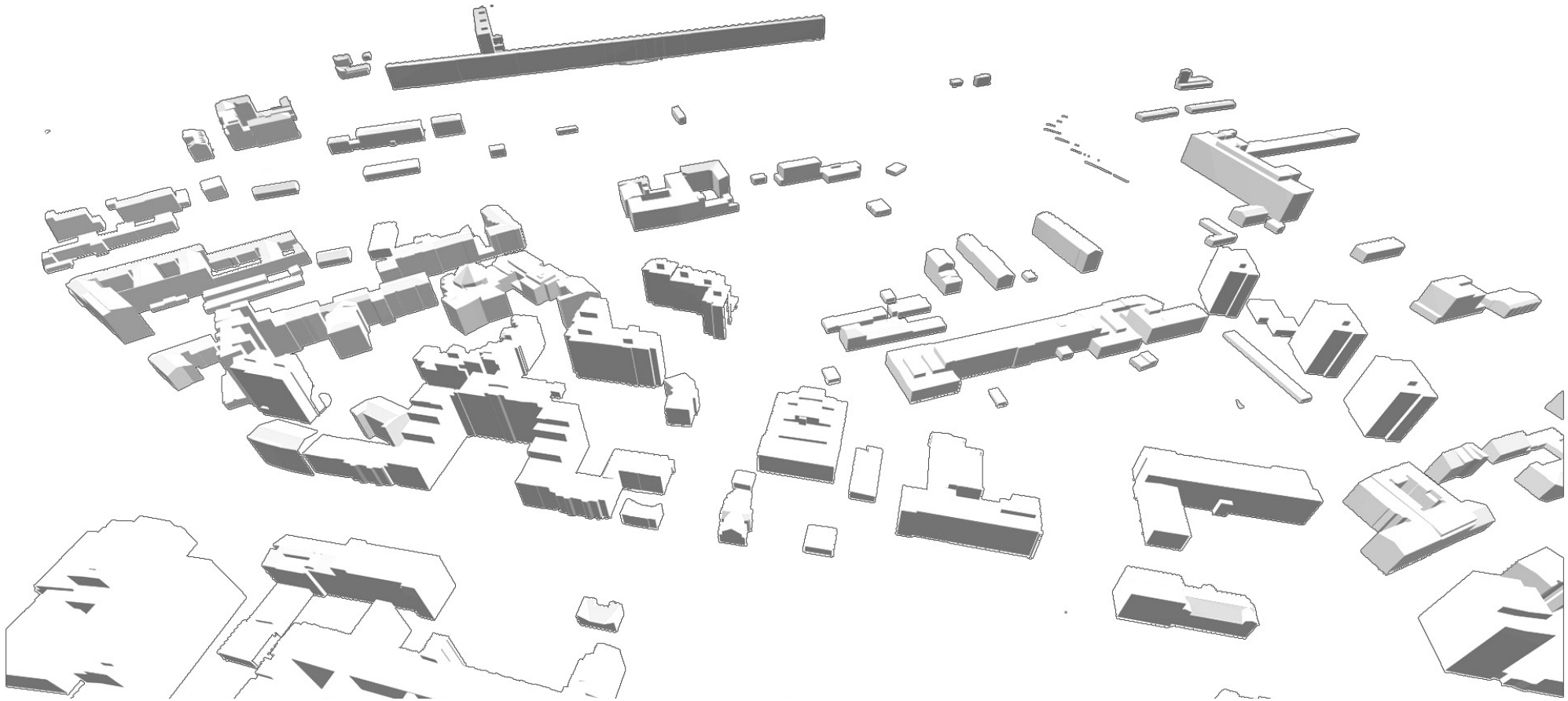
Anouschka Ivana Pohlenz

teached by Niall Fitzgerald | Prof. Erik Röthele

the vision

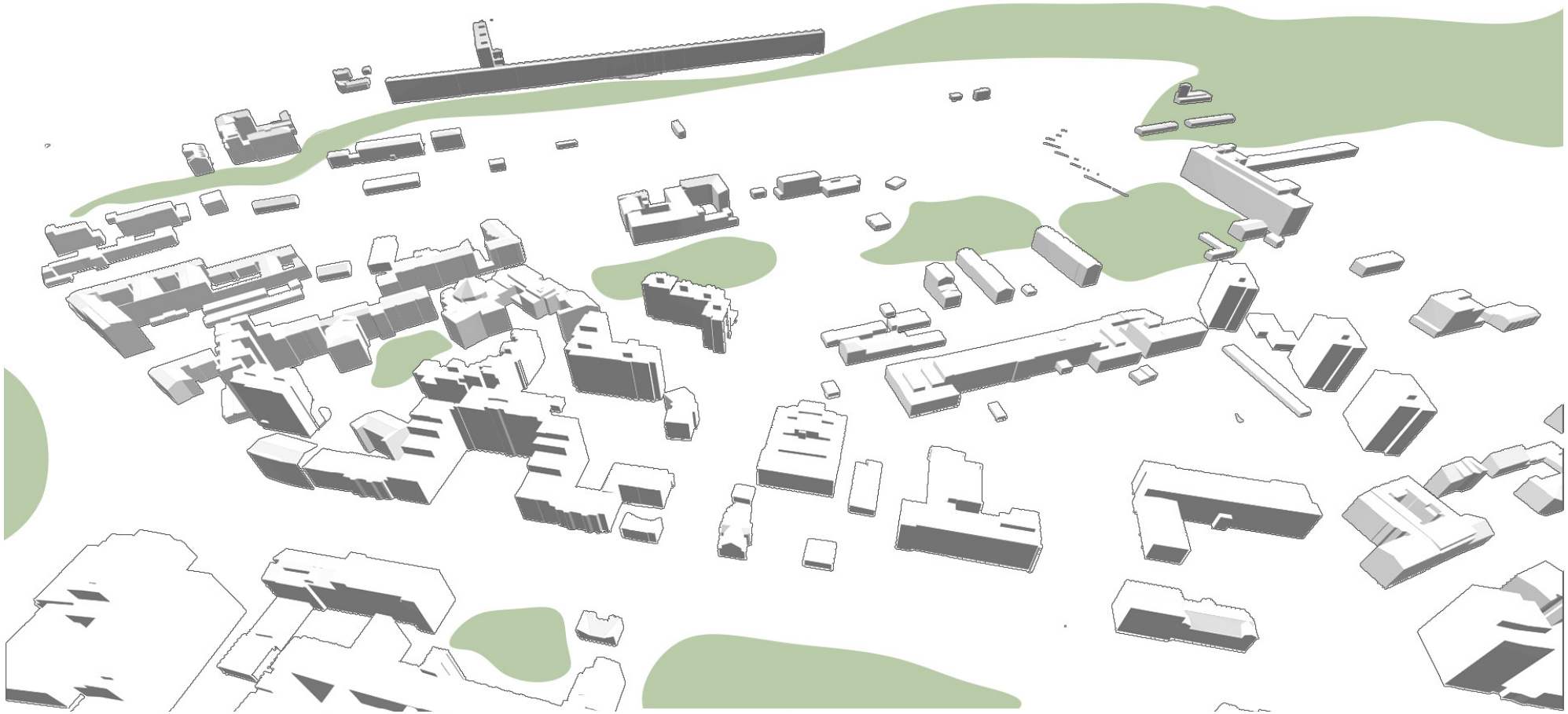
urban green zones

structure plan | 1:25000| warschau



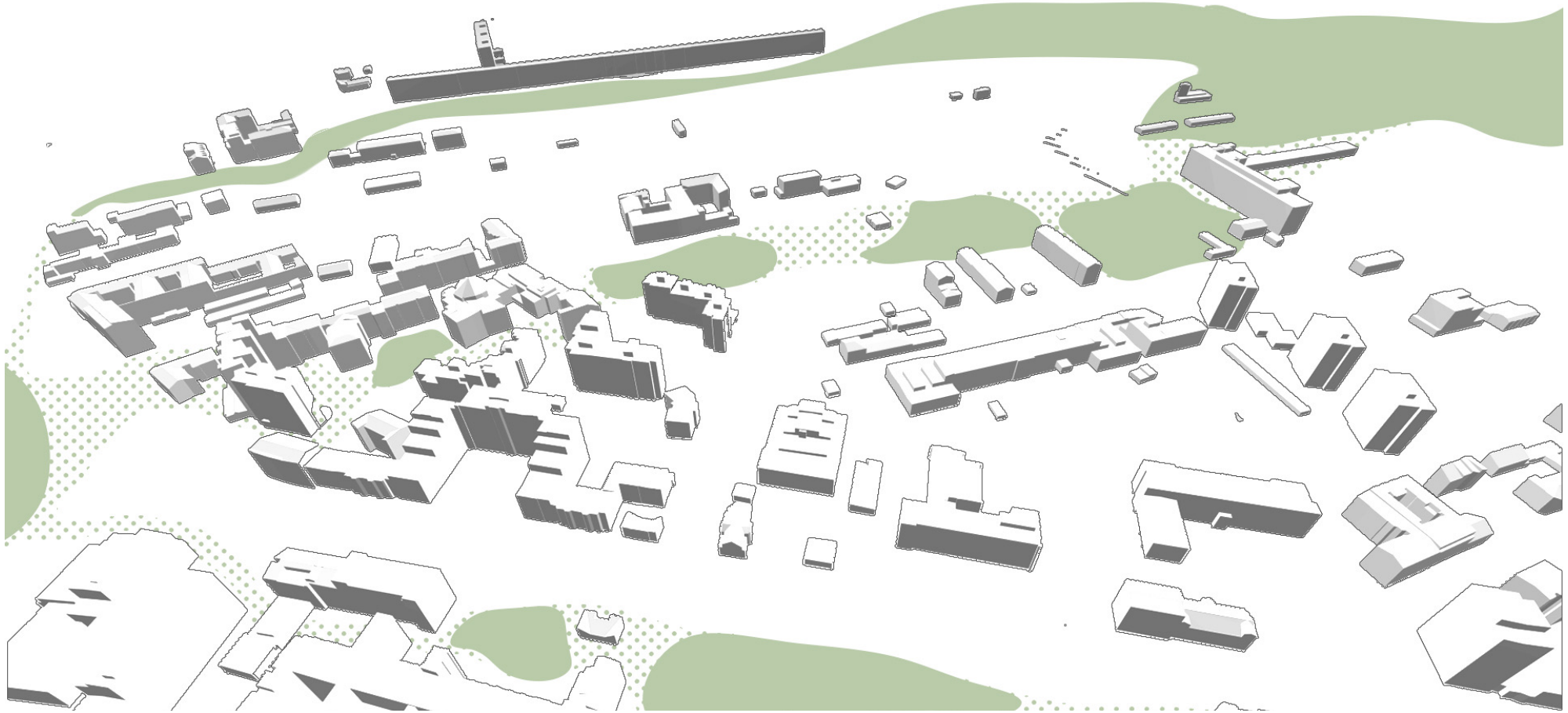
connecting green zones

perspective | Warschau



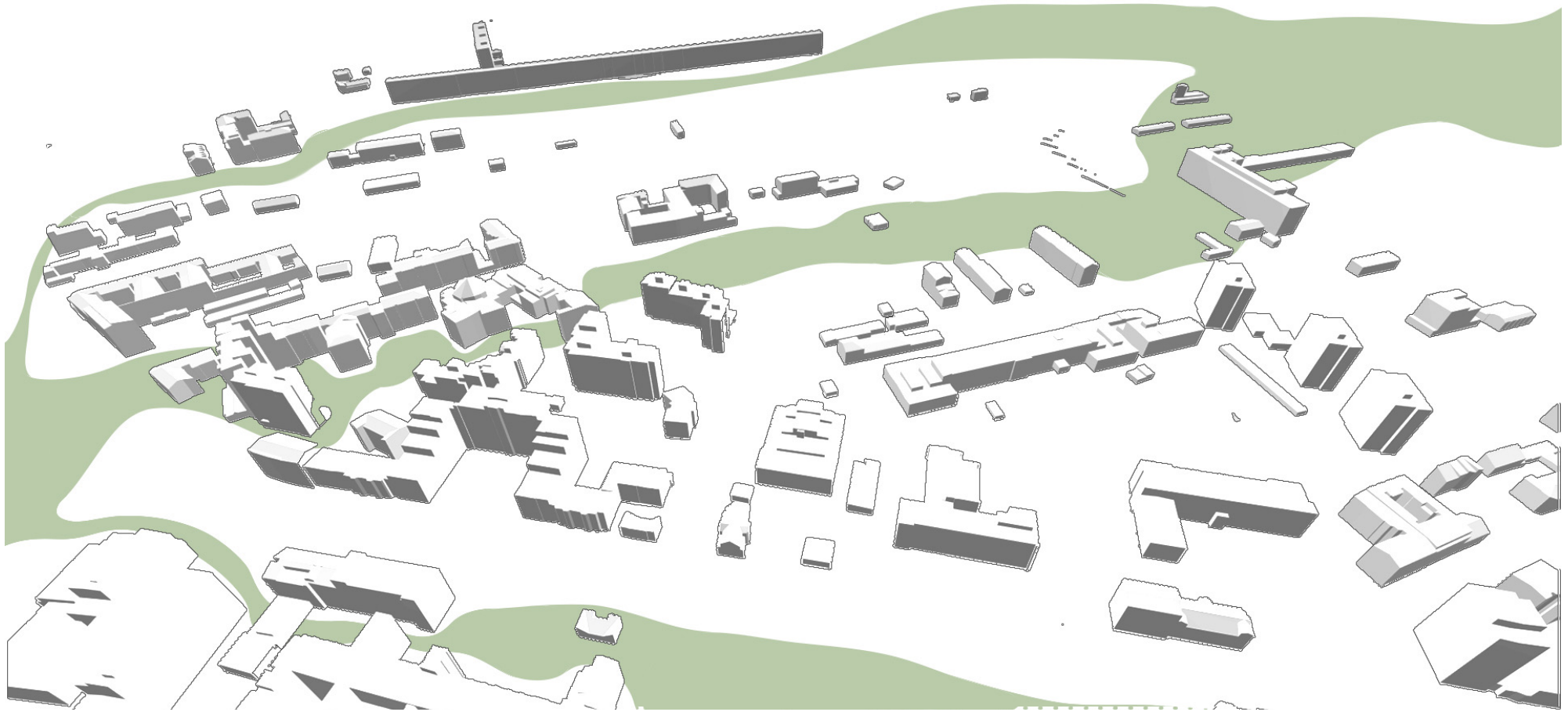
connecting green zones

perspective | Warschau



connecting green zones

perspective | Warschau

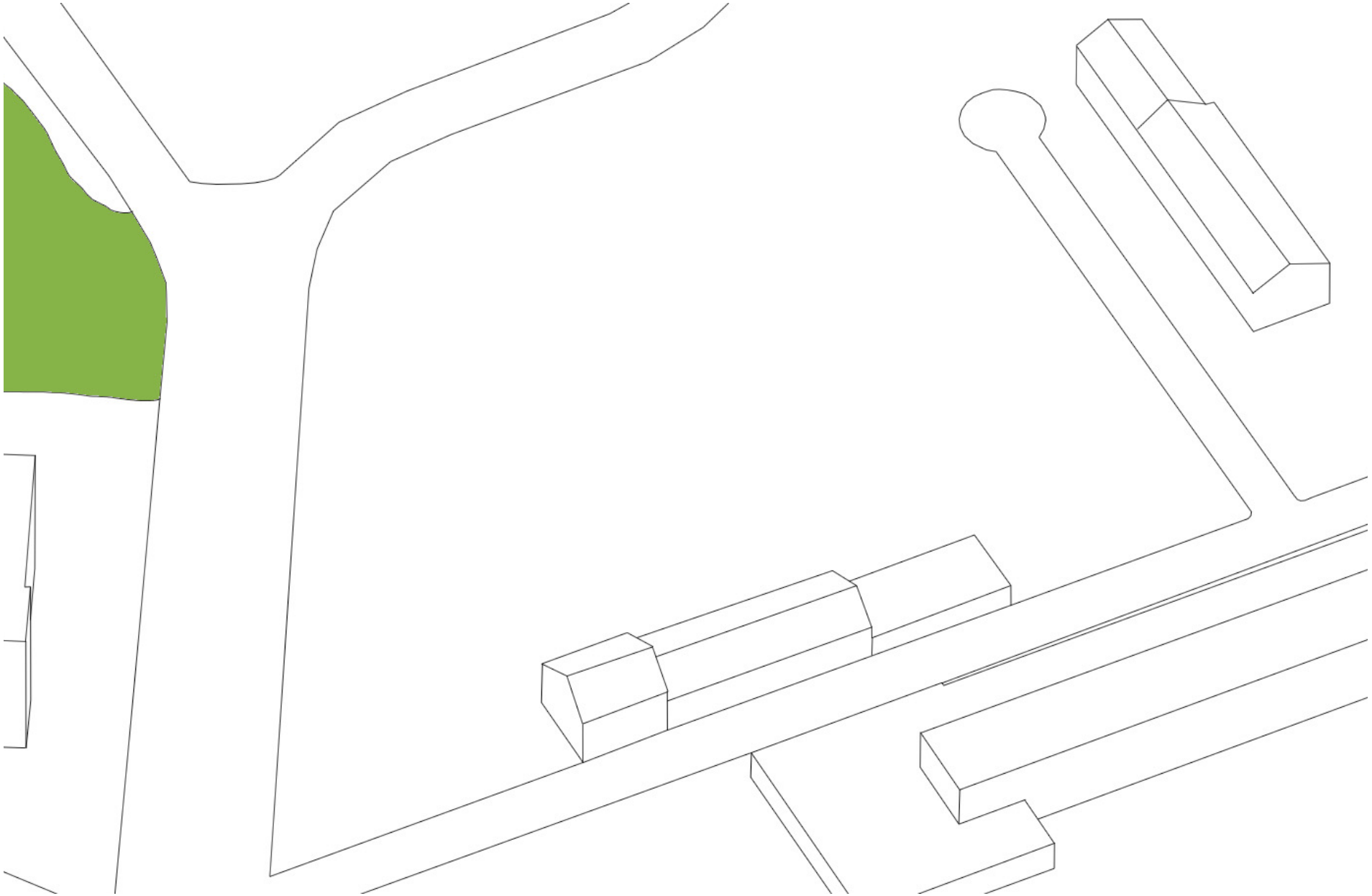


connecting green zones

perspective | Warschau

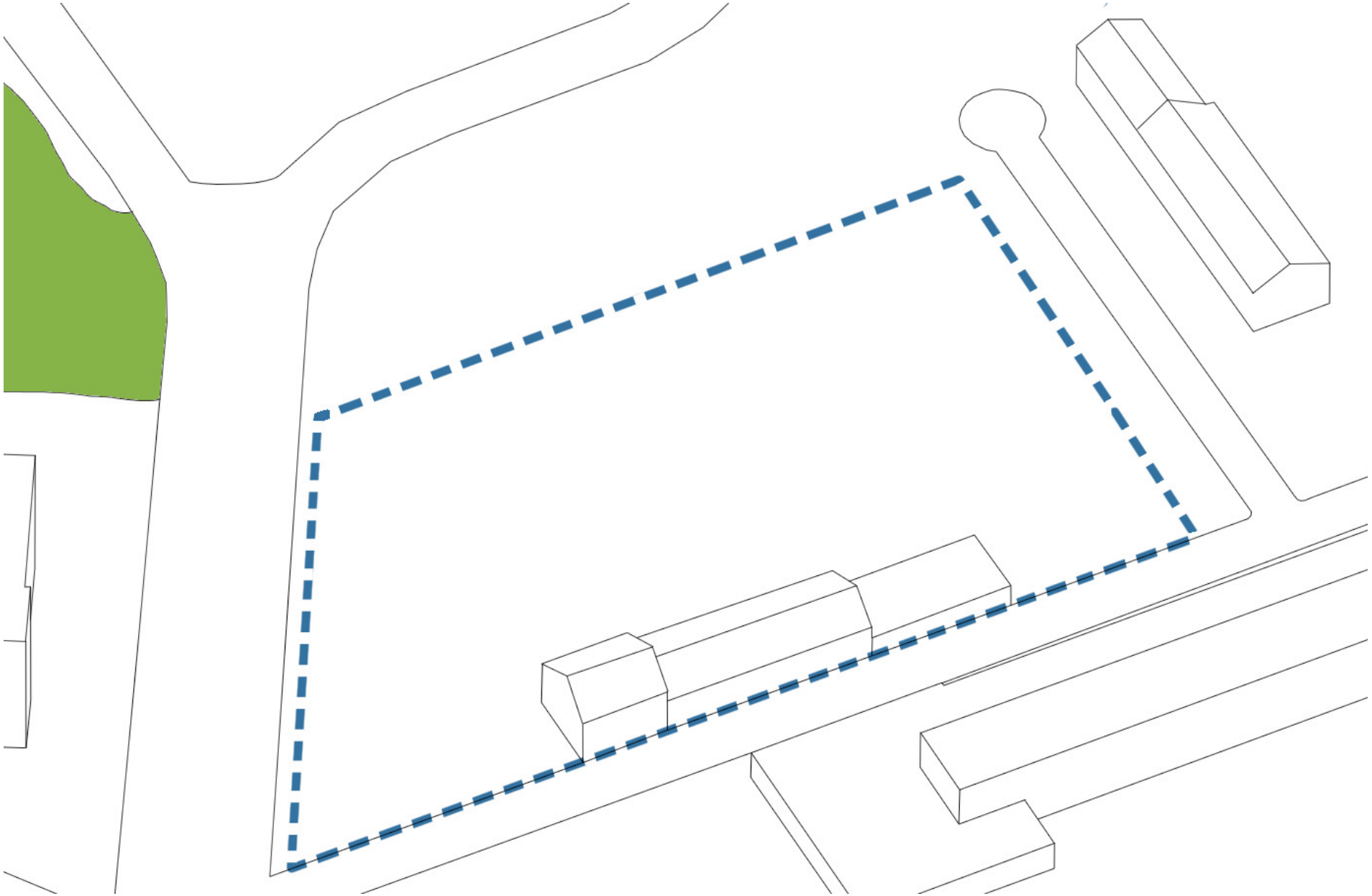
connecting green zones

perspective | Warschau



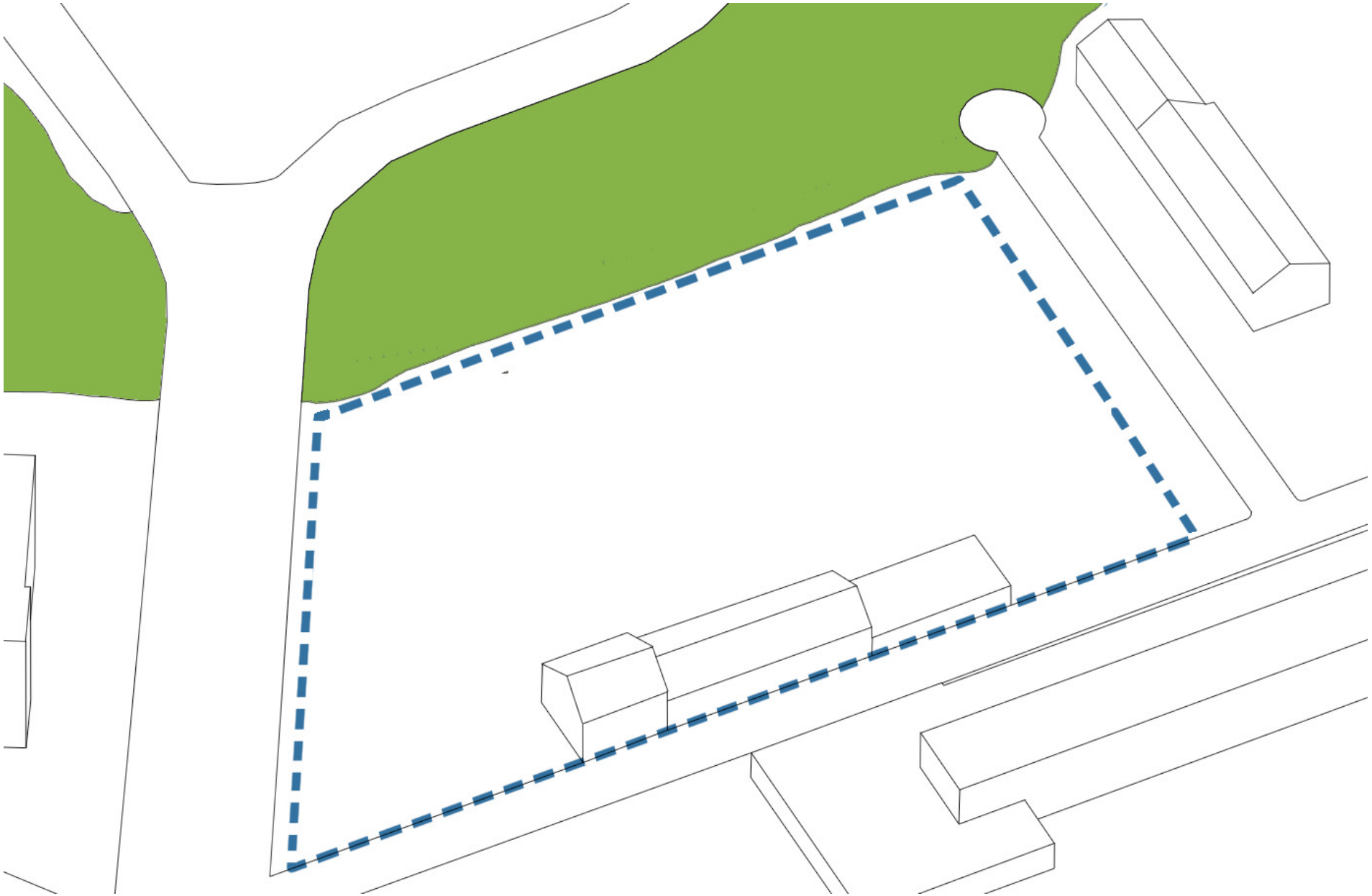
cubature design

isometric | 1:1000| warschau



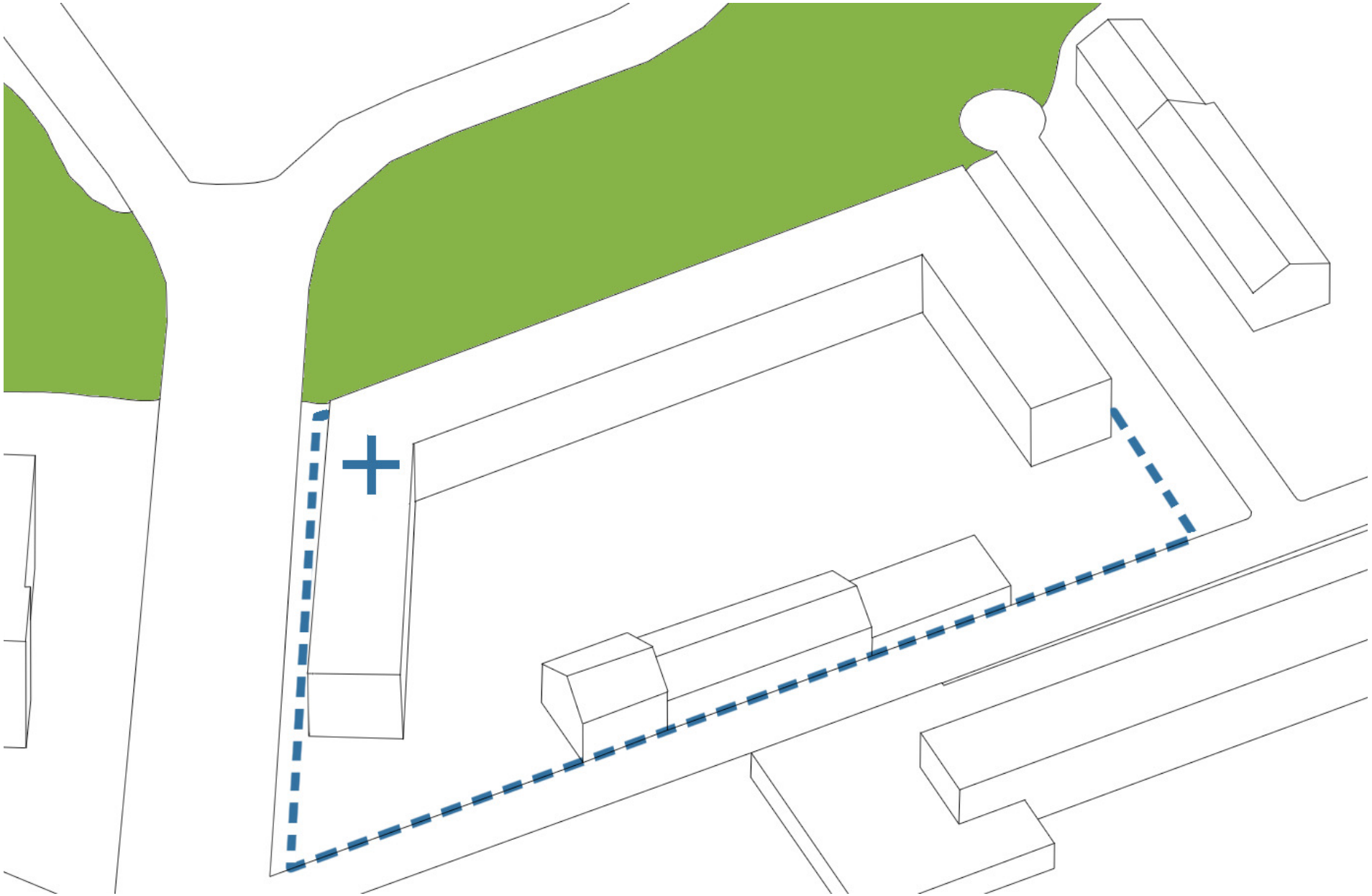
cubature design

isometric | 1:1000| warschau



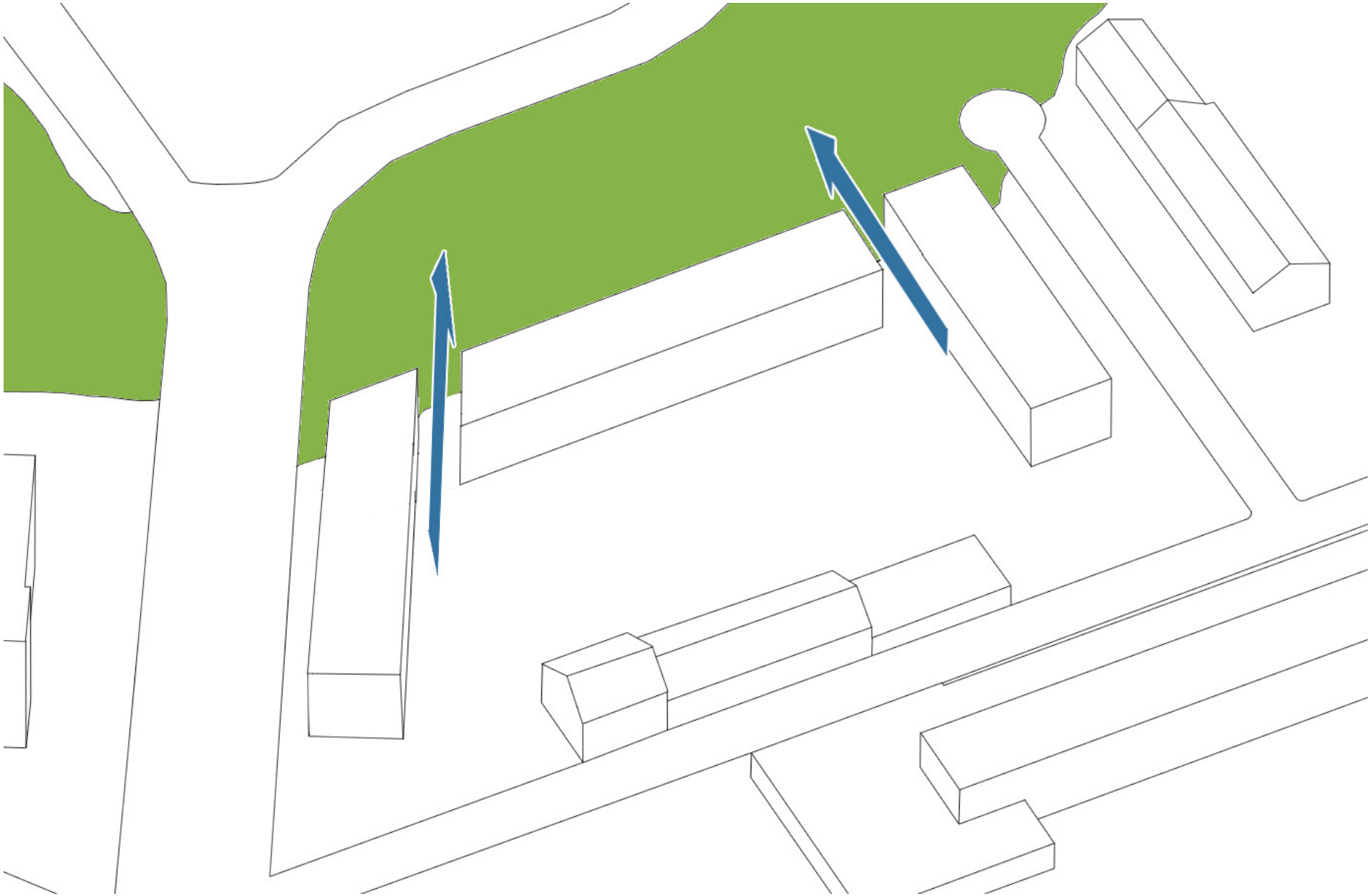
cubature design

isometric | 1:1000| warschau



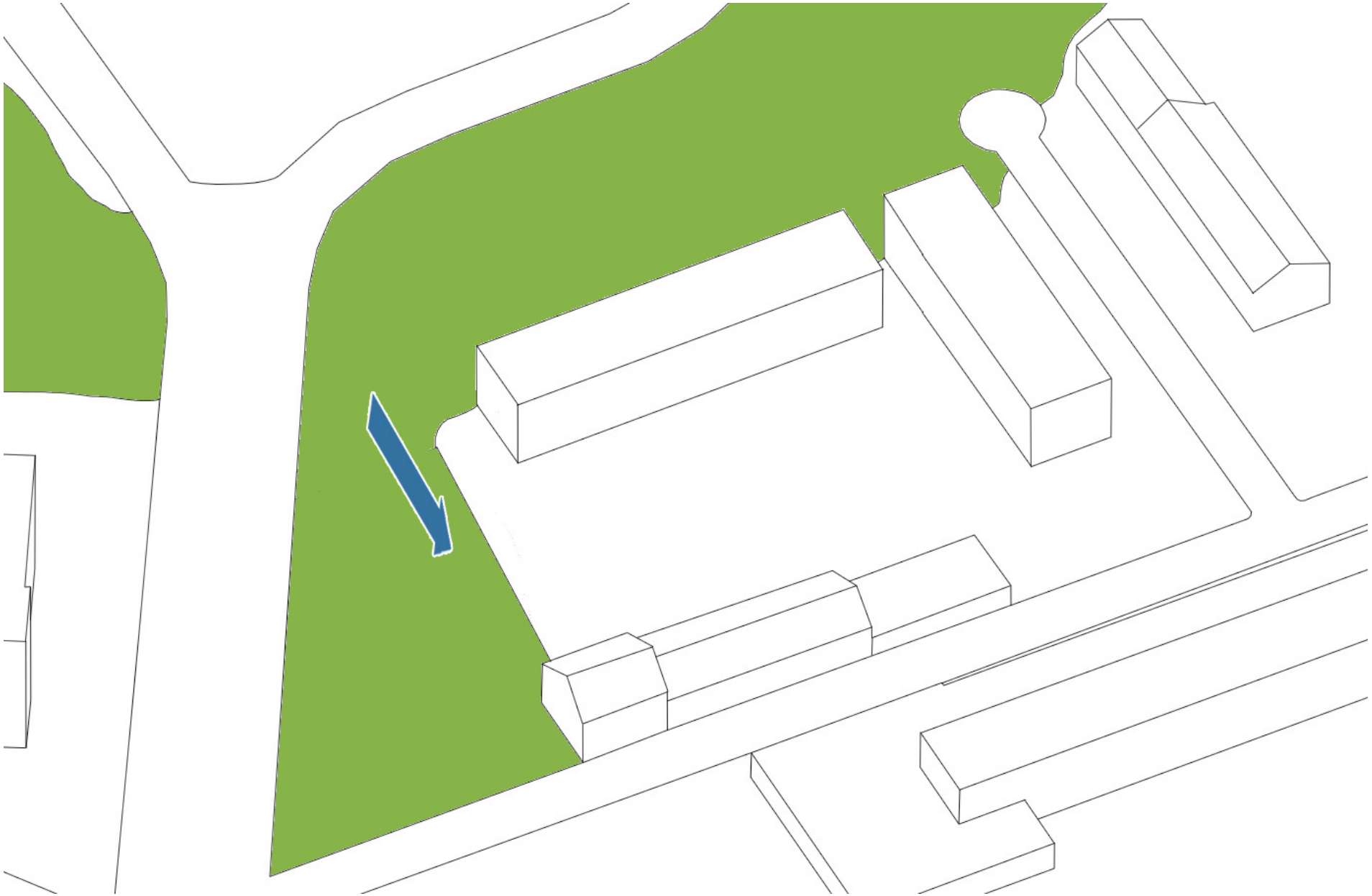
cubature design

isometric | 1:1000| warschau



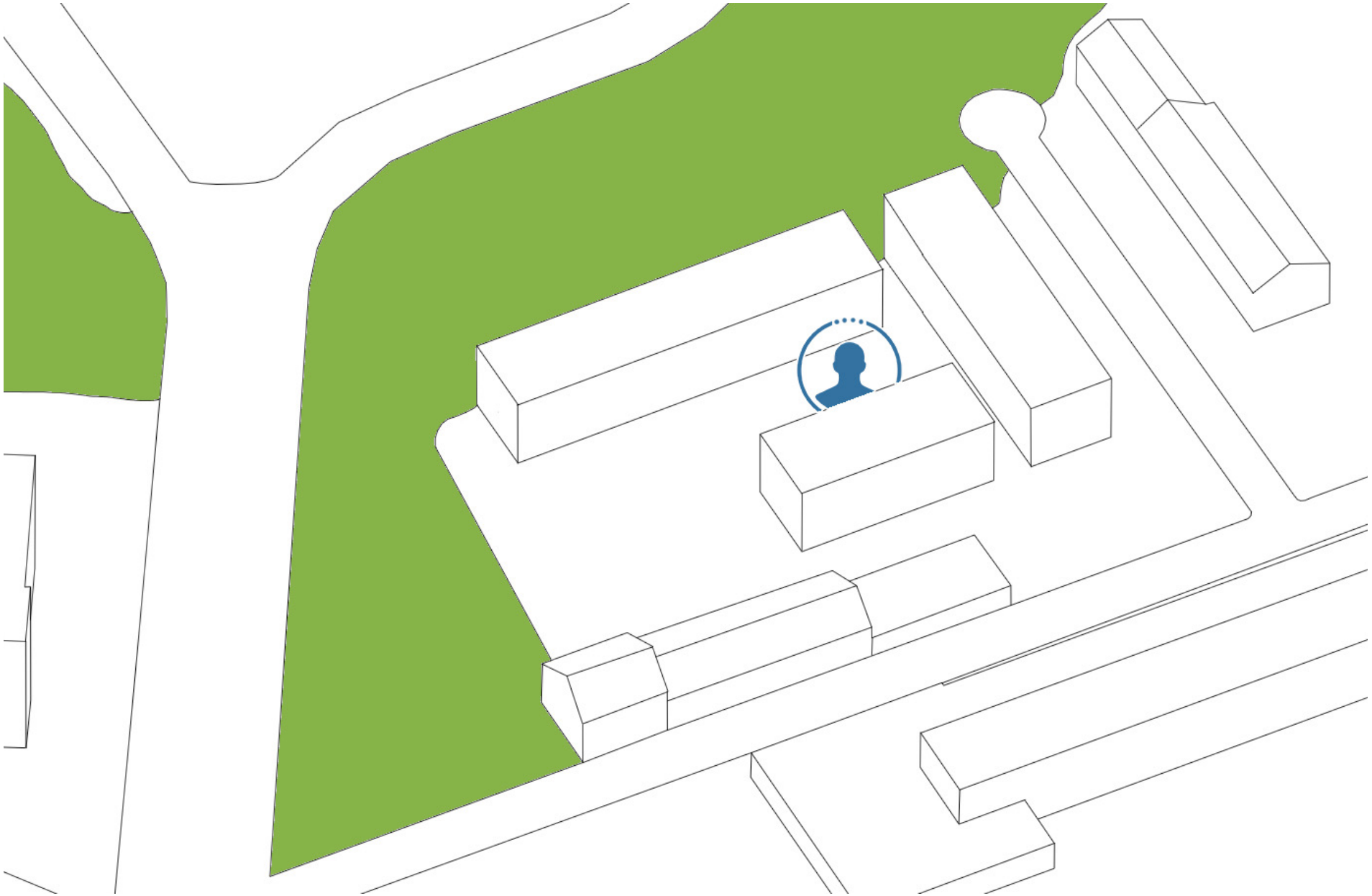
cubature design

isometric | 1:1000| warschau



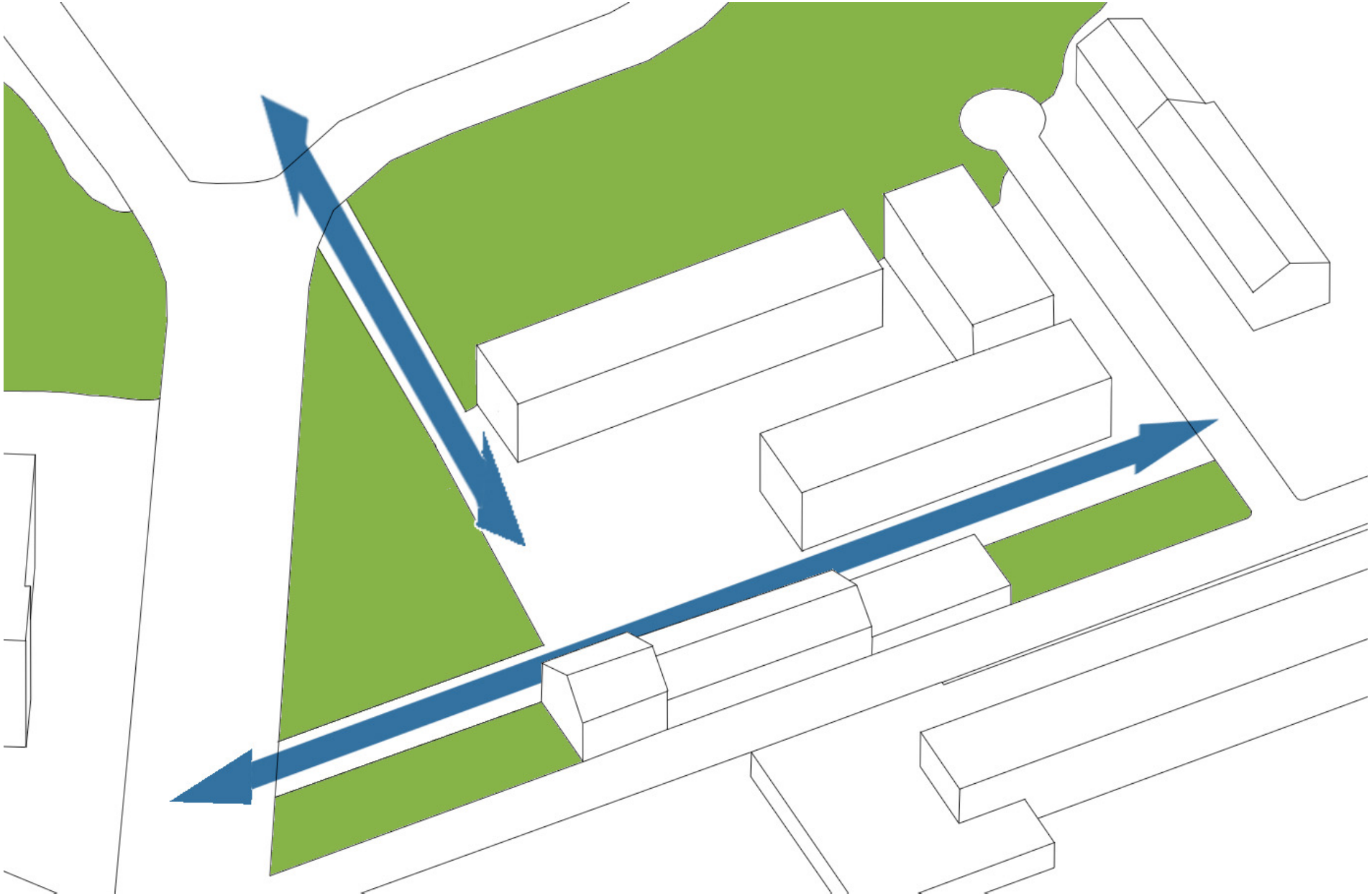
cubature design

isometric | 1:1000| warschau



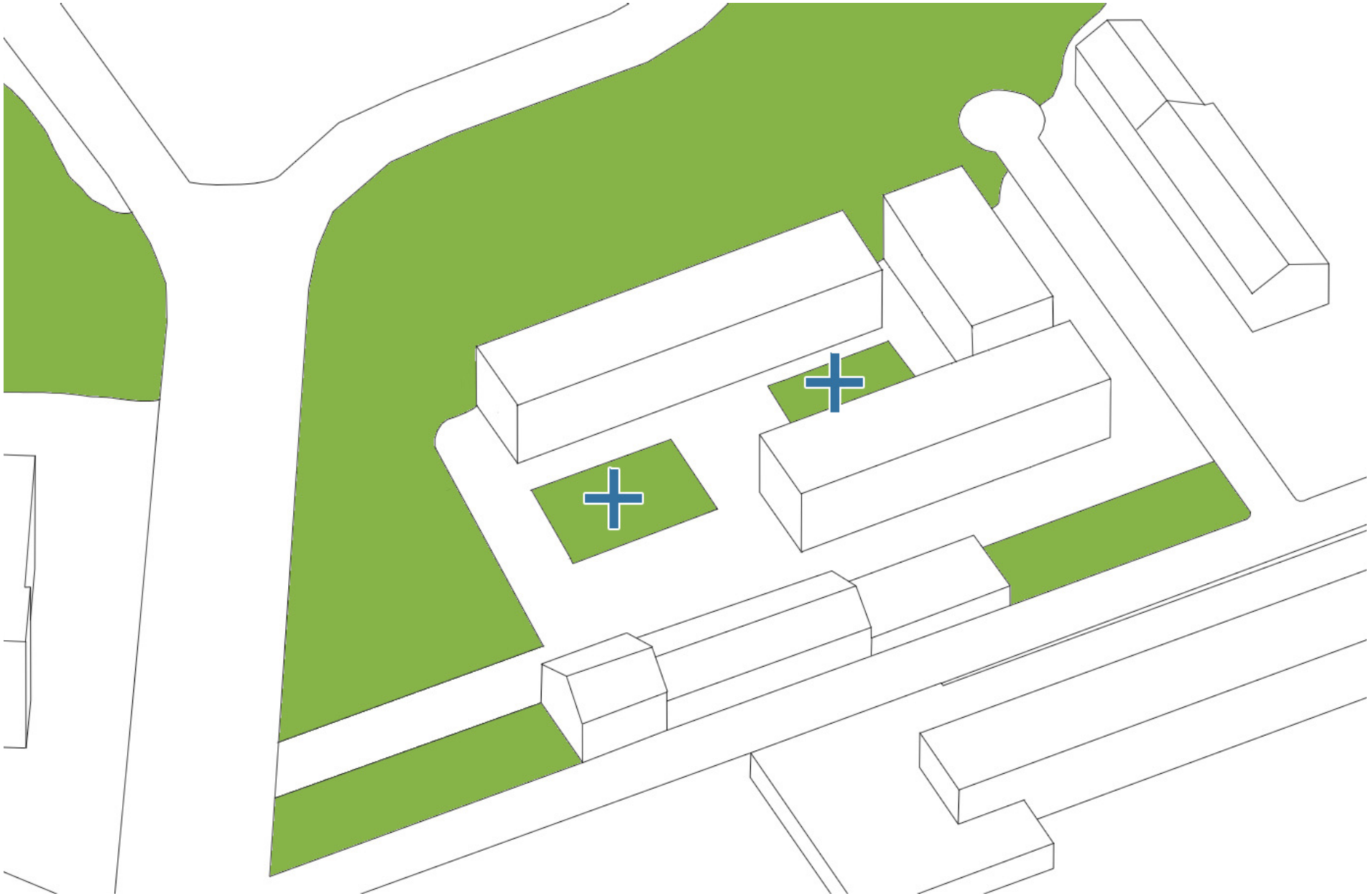
cubature design

isometric | 1:1000| warschau



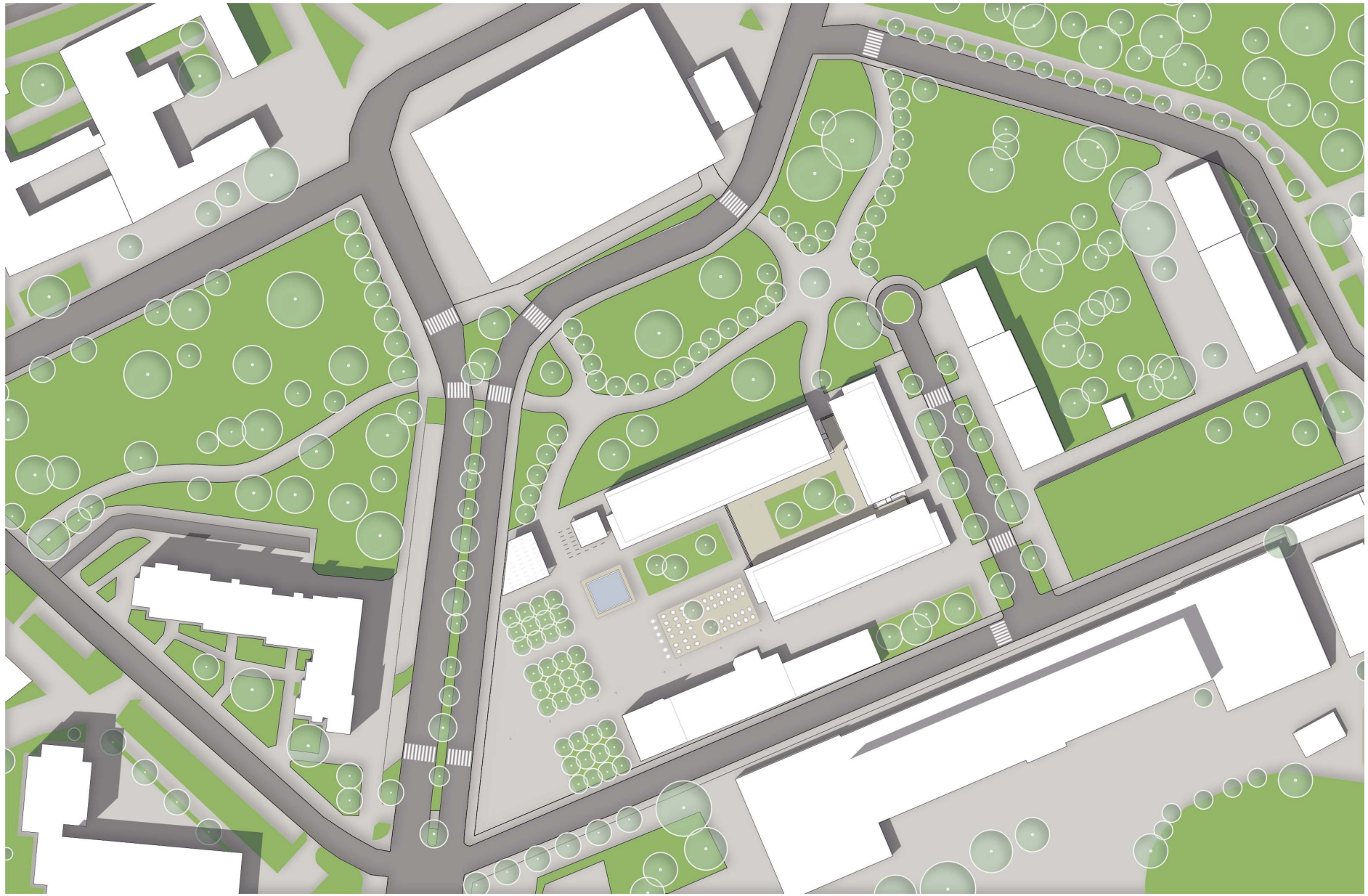
cubature design

isometric | 1:1000| warschau



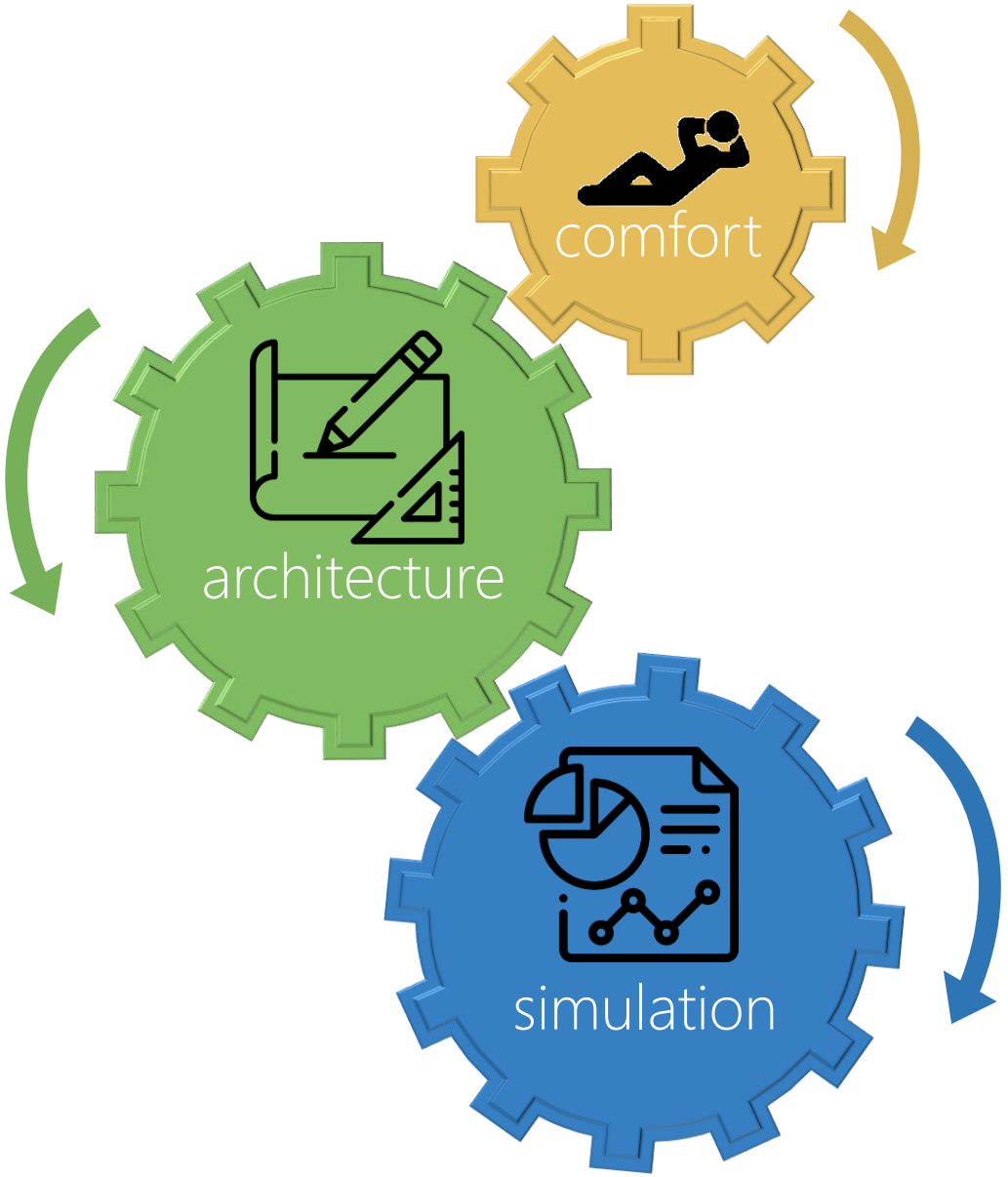
cubature design

isometric | 1:1000| warschau

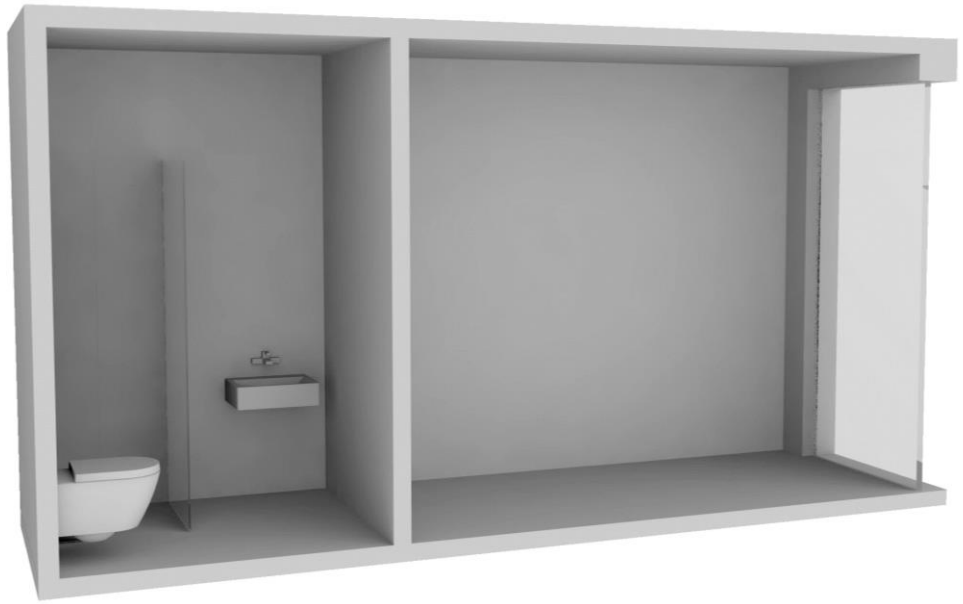


master plan

1:500


comfort
architecture
simulation

construction | weight

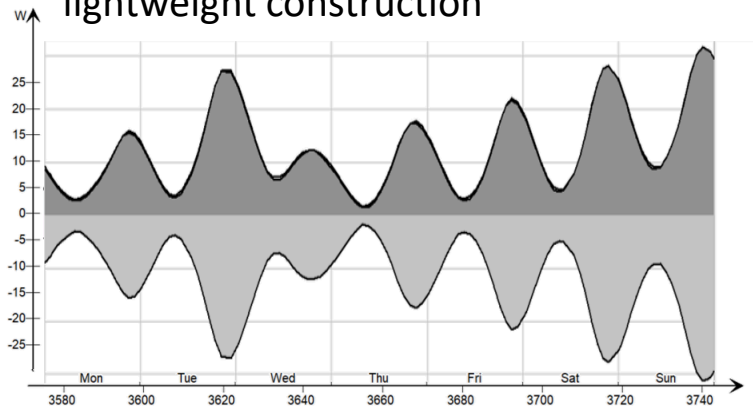


raw single room

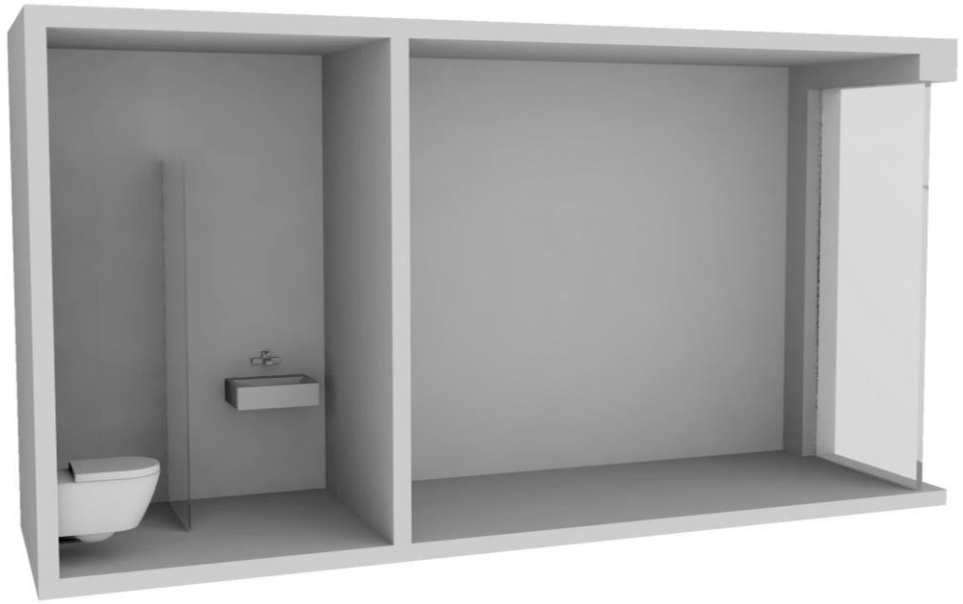
slight fluctuations

energy balance

lightweight construction



construction | weight



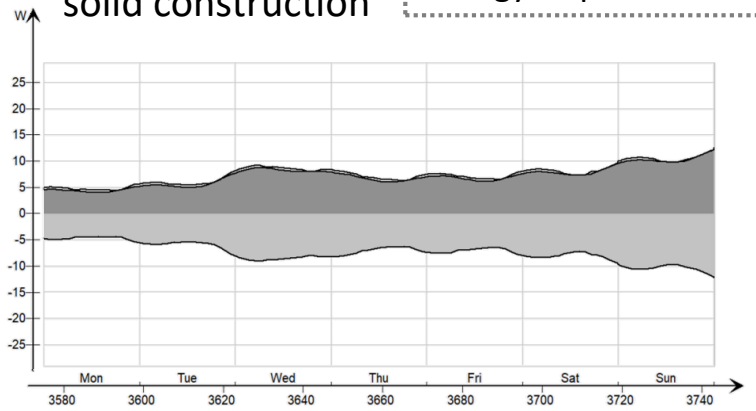
raw single room

slight fluctuations

energy balance

solid construction

up to 30% lower heating energy requirement



construction | weight

comfort

architecture

simulation

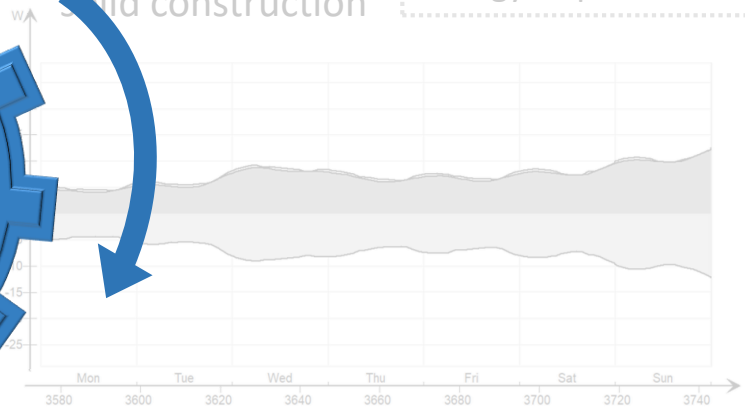
slight fluctuations

energy balance

solid construction

up to 30% lower heating energy requirement

raw single room



construction | weight

construction in single room

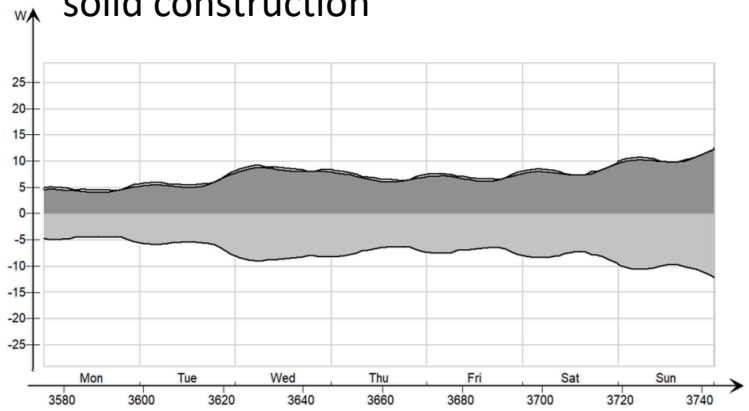
solid

lightweight

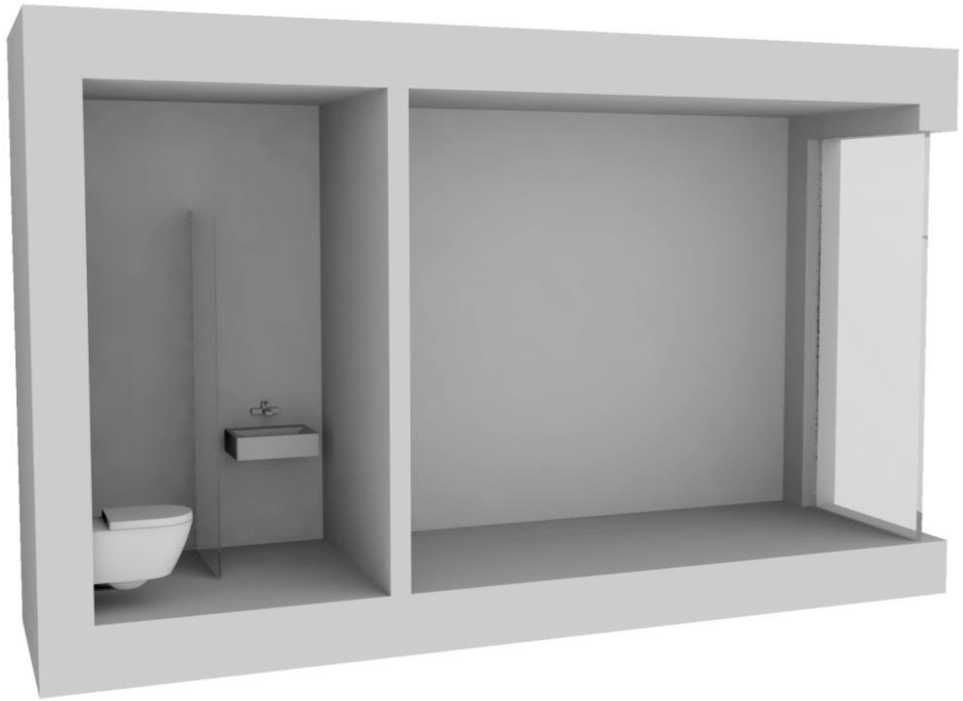
slight fluctuations

energy balance

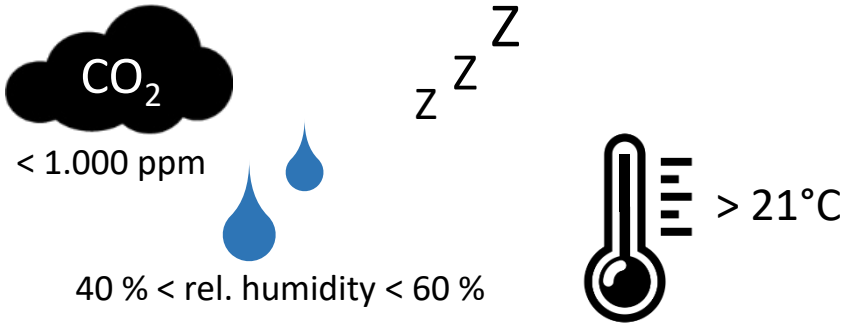
solid construction

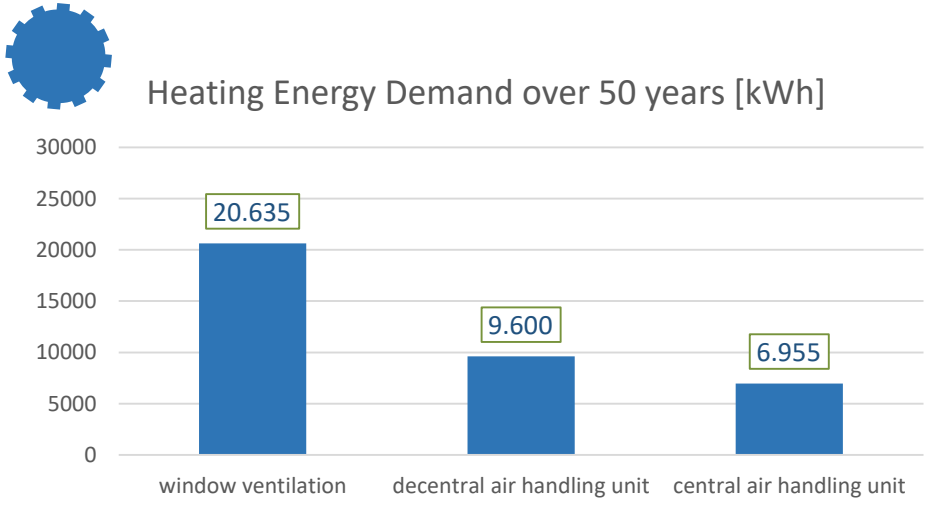


ventilation | heating



construction in single room





ventilation | heating

construction in single room

comfort

architecture

simulation

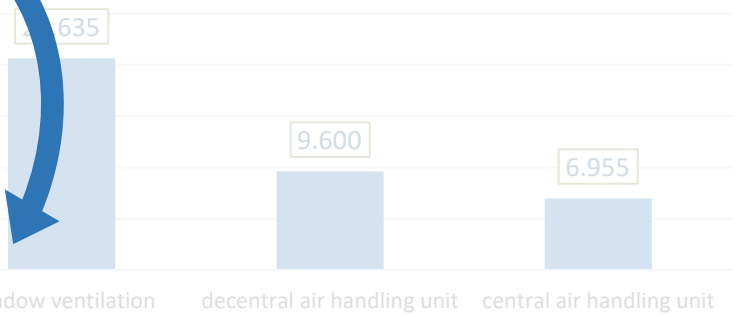
CO_2

< 1.000 ppm

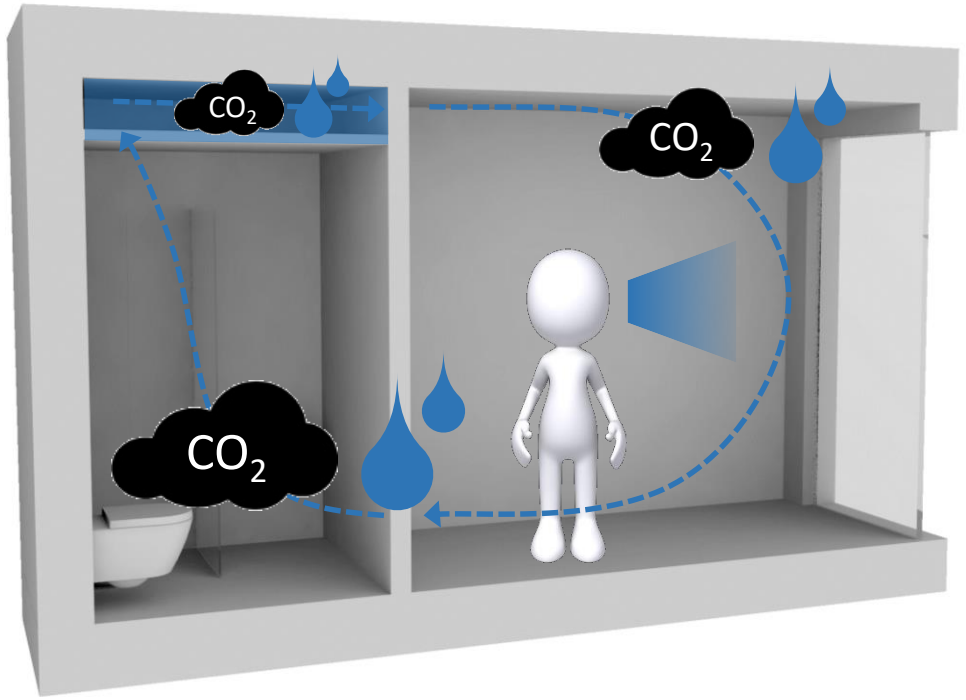
40 % < rel. humidity < 60 %

> 21°C

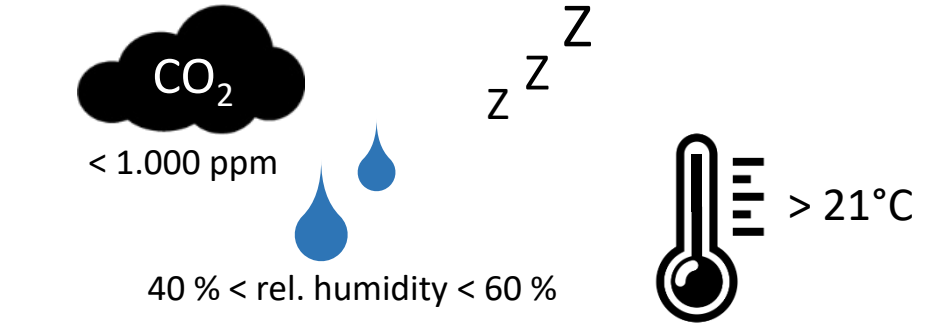
Heating Energy Demand over 50 years [kWh]

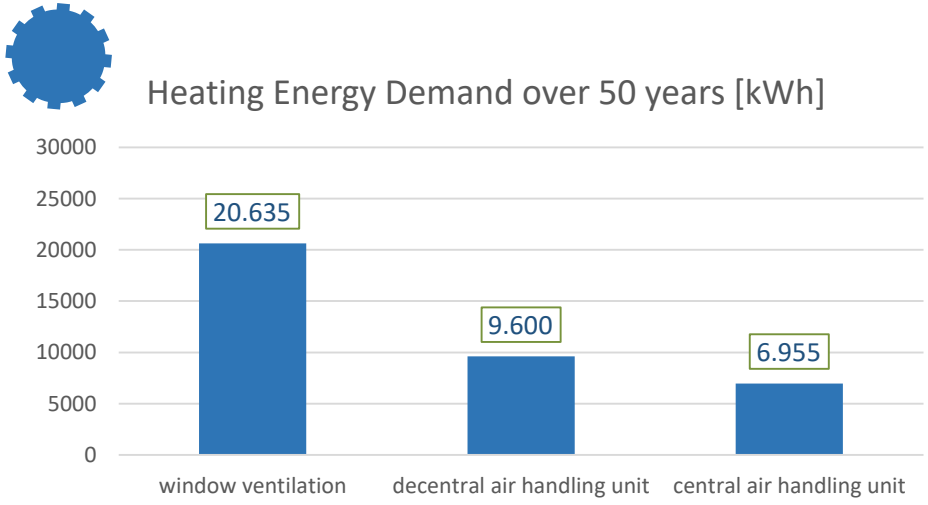


ventilation | heating

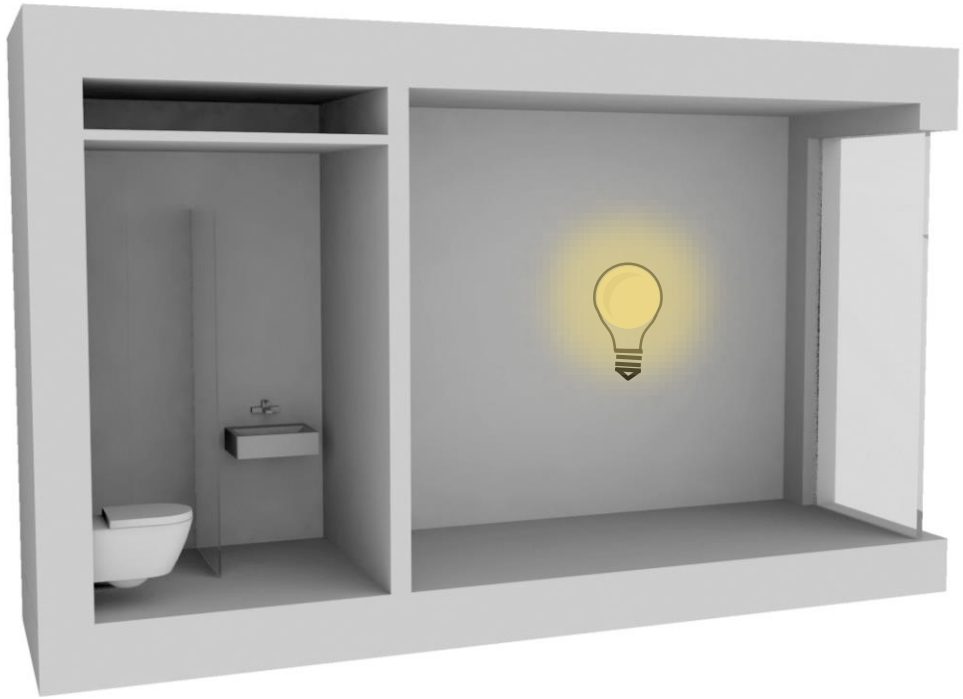


ventilation in single room

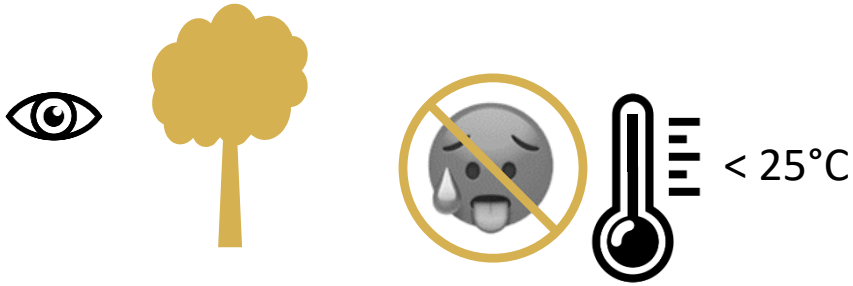




daylight | overheating



little daylight in single room

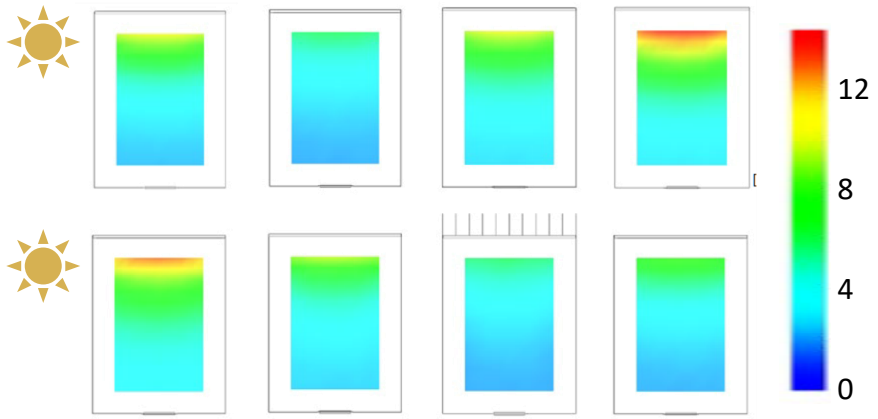


daylight | overheating

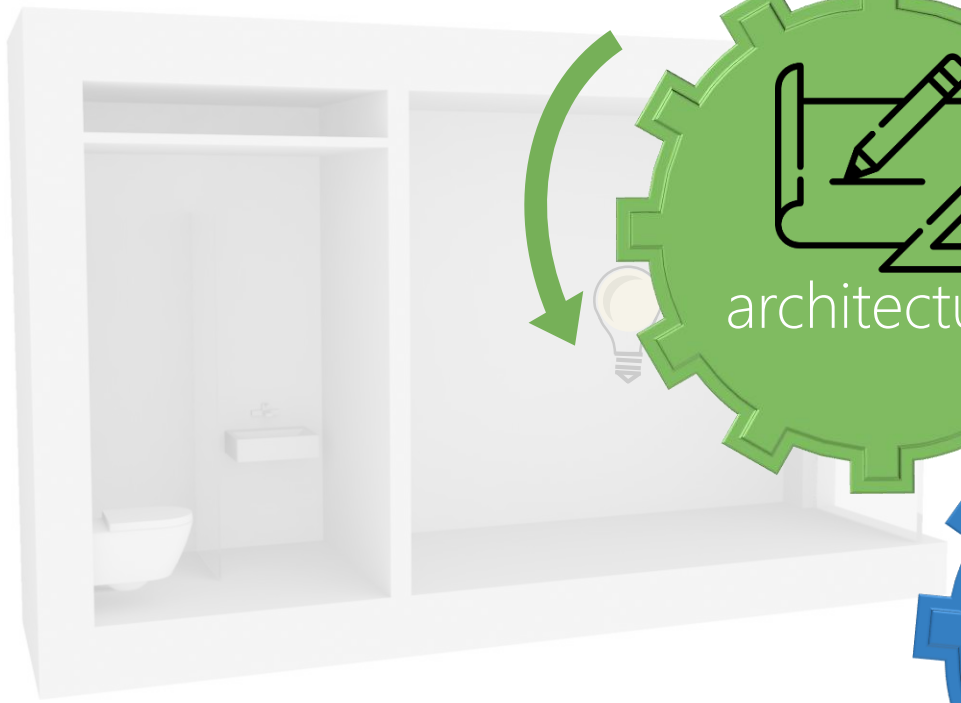
much daylight in single room

< 25°C

daylight factor with different shadings (%)



daylight | overheating



much daylight in single room

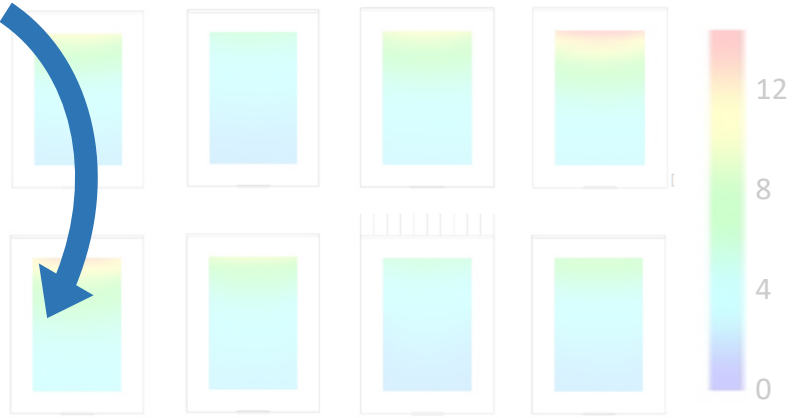
comfort

architecture

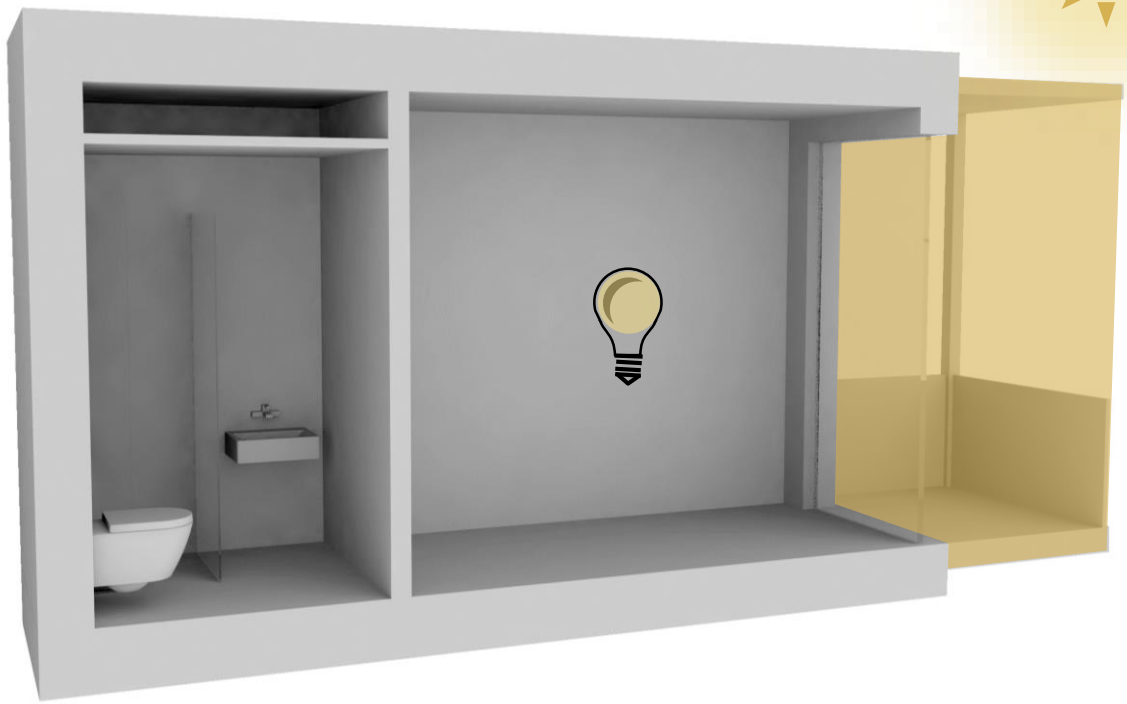
simulation

< 25°C

daylight factor with different shadings (%)



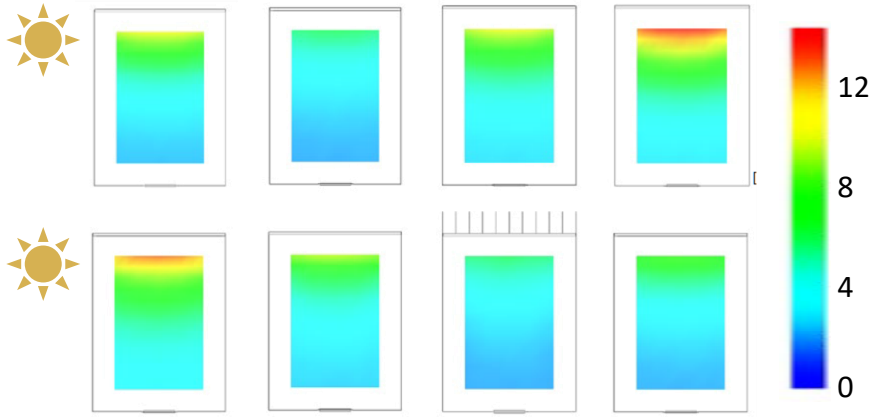
daylight | overheating



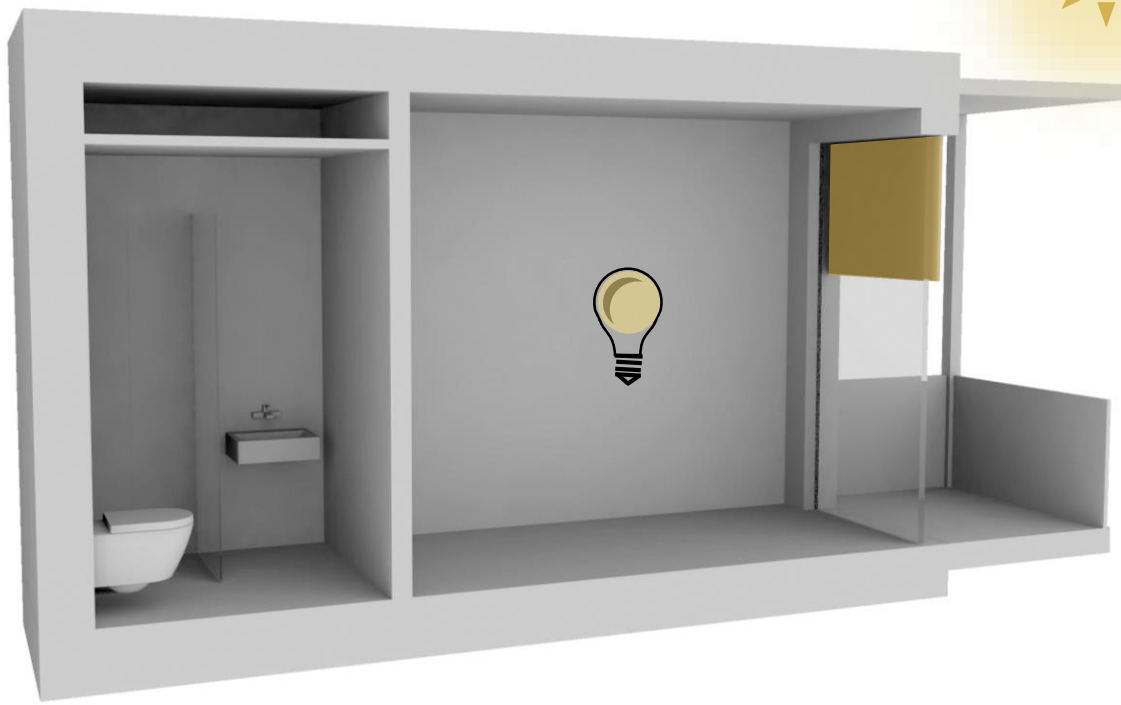
shading in single room

< 25°C

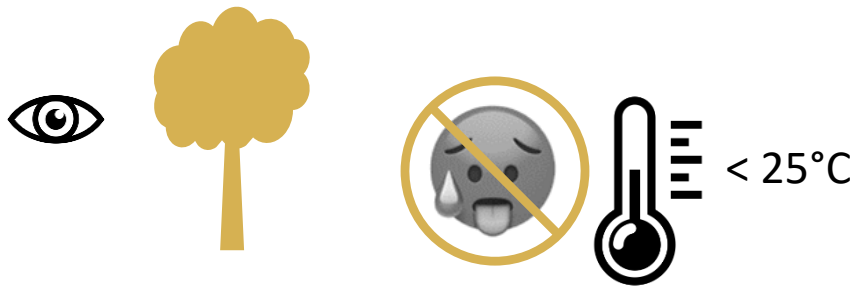
daylight factor with different shadings (%)



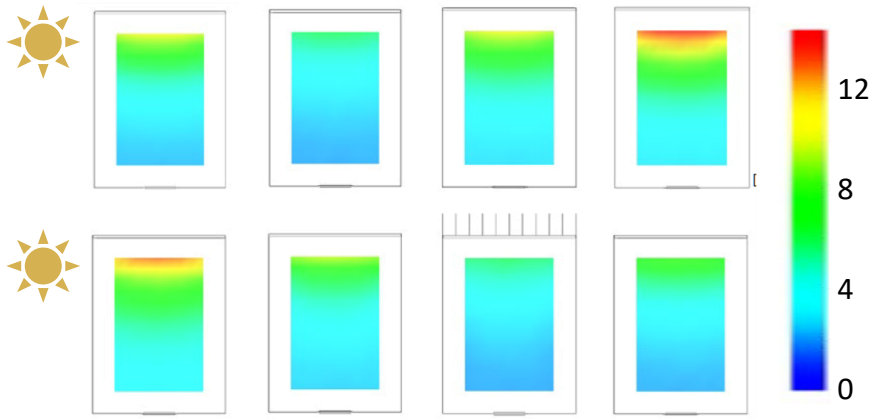
daylight | overheating



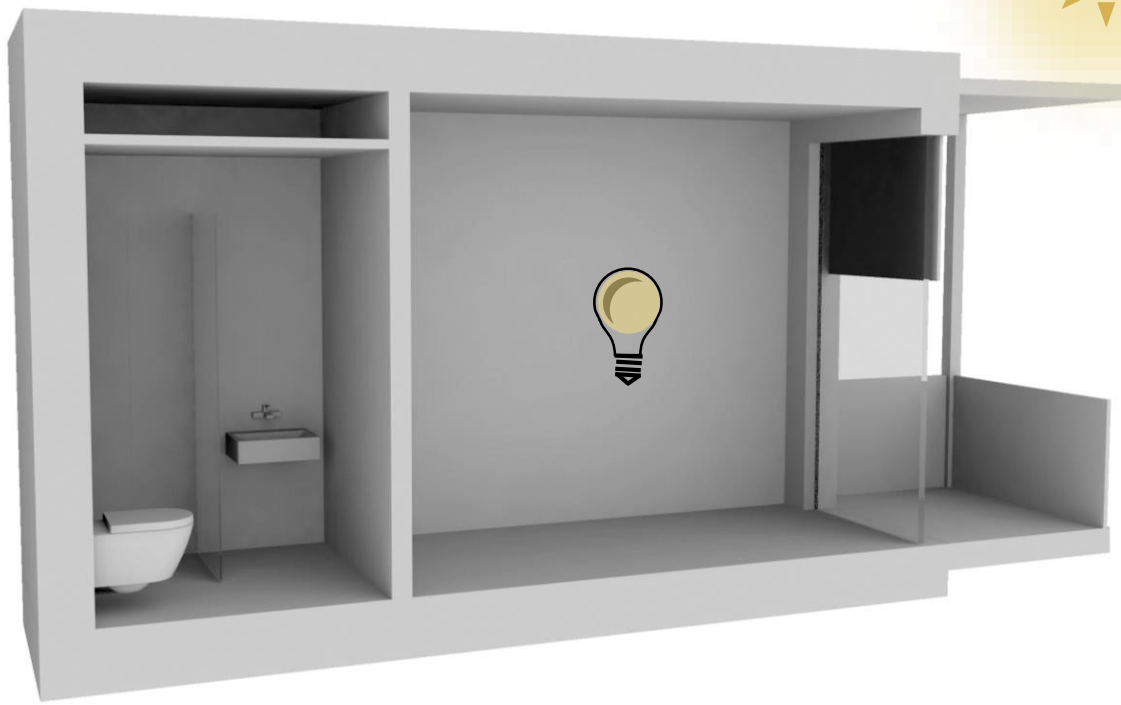
shading in single room



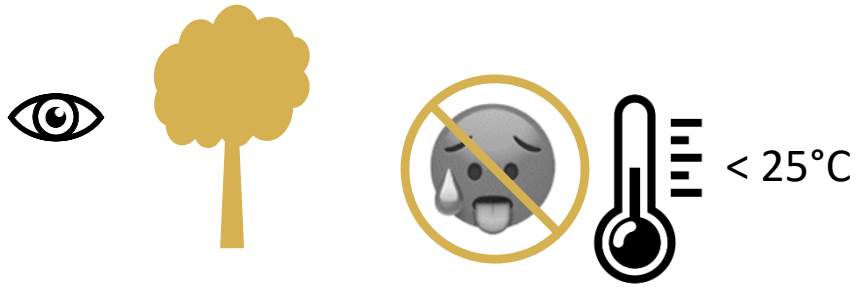
daylight factor with different shadings (%)



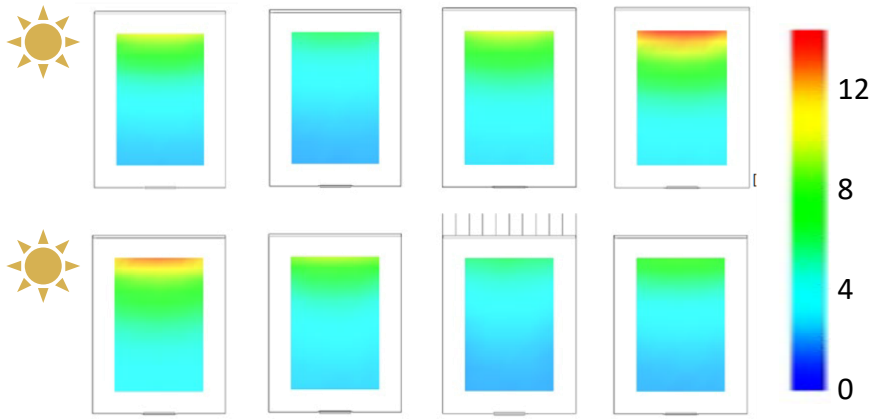
daylight | overheating

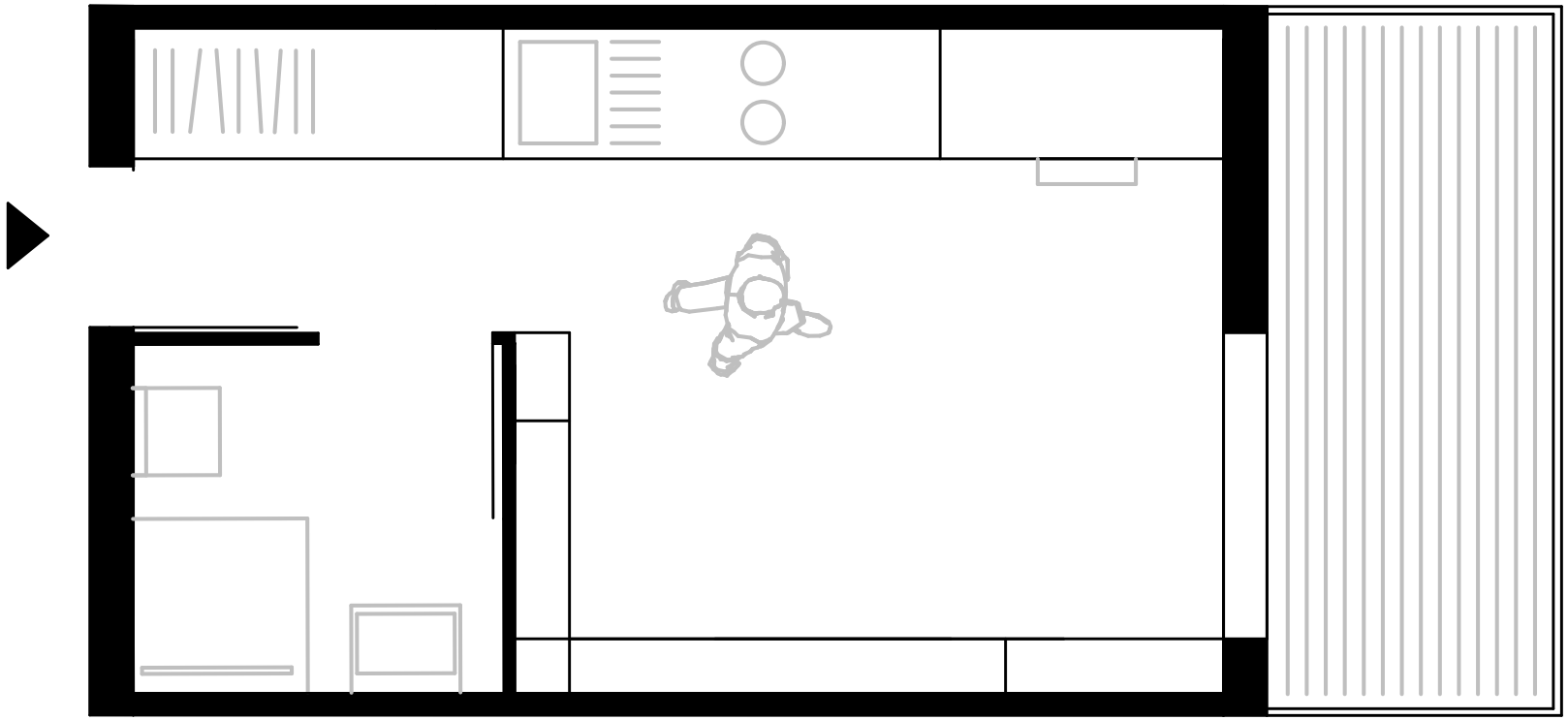


equipped single room



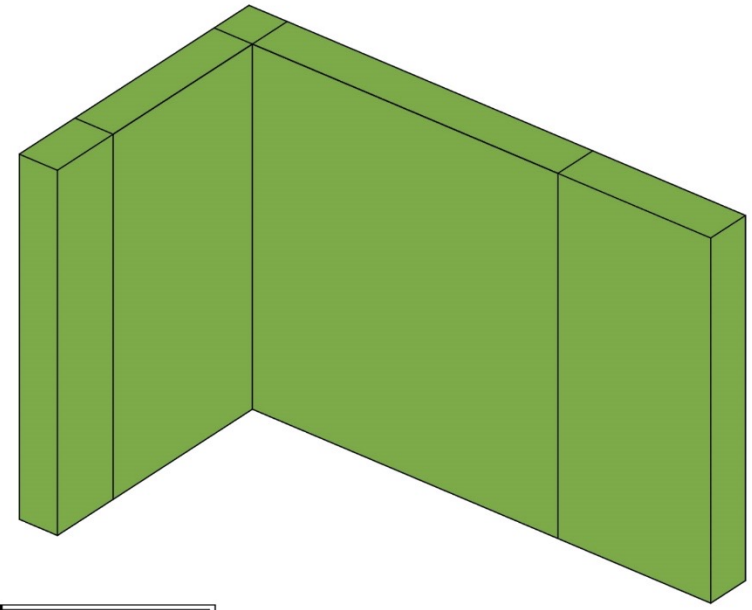
daylight factor with different shadings (%)





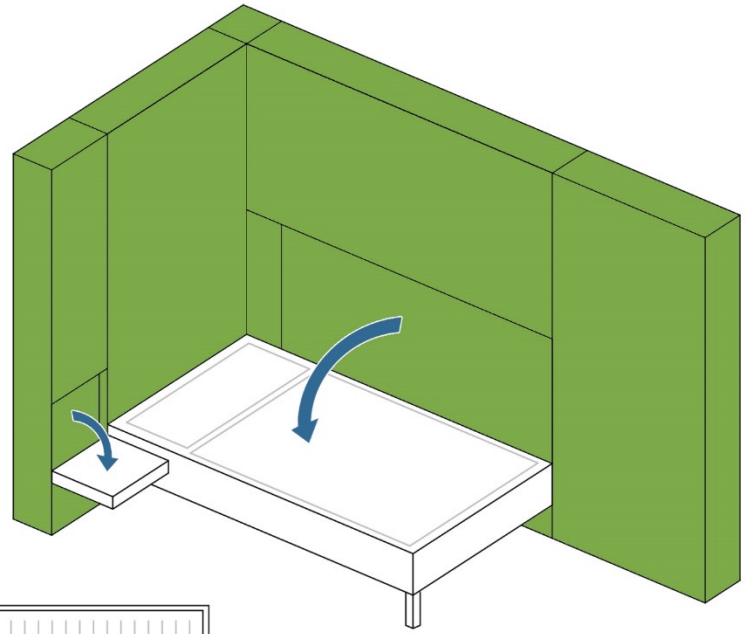
1 room apartment

floor plan | 1:50



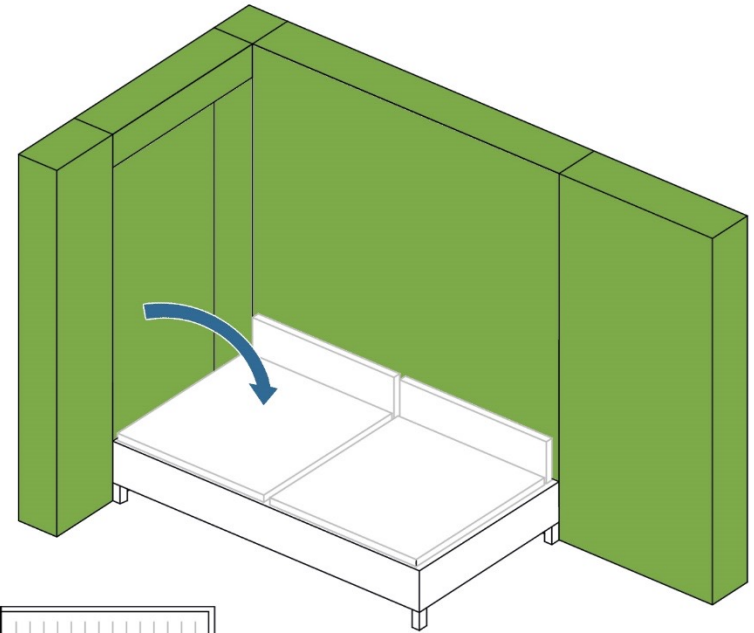
built-in furniture

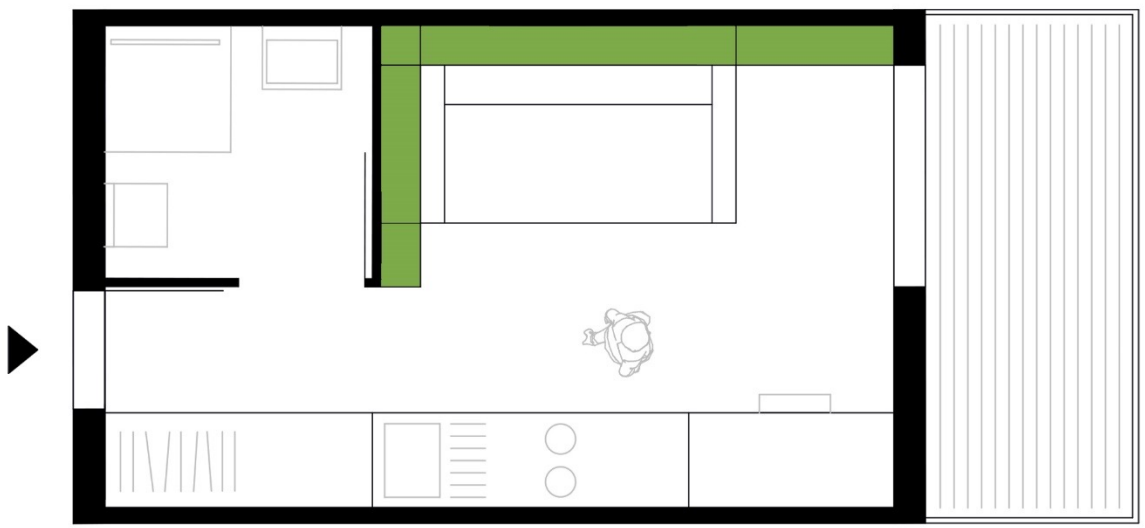
isometric | floor plan | 1:50



bed

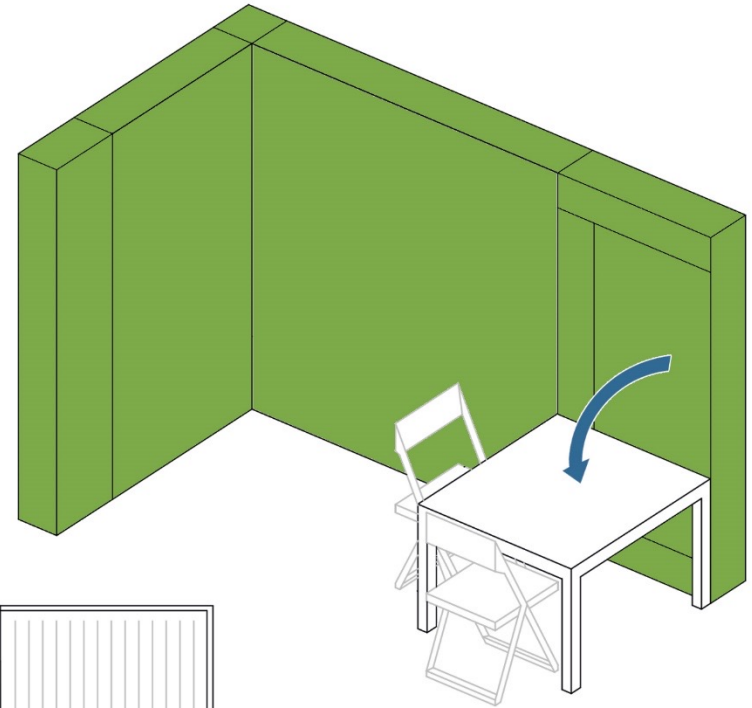
isometric | floor plan | 1:50





couch

isometric | floor plan | 1:50



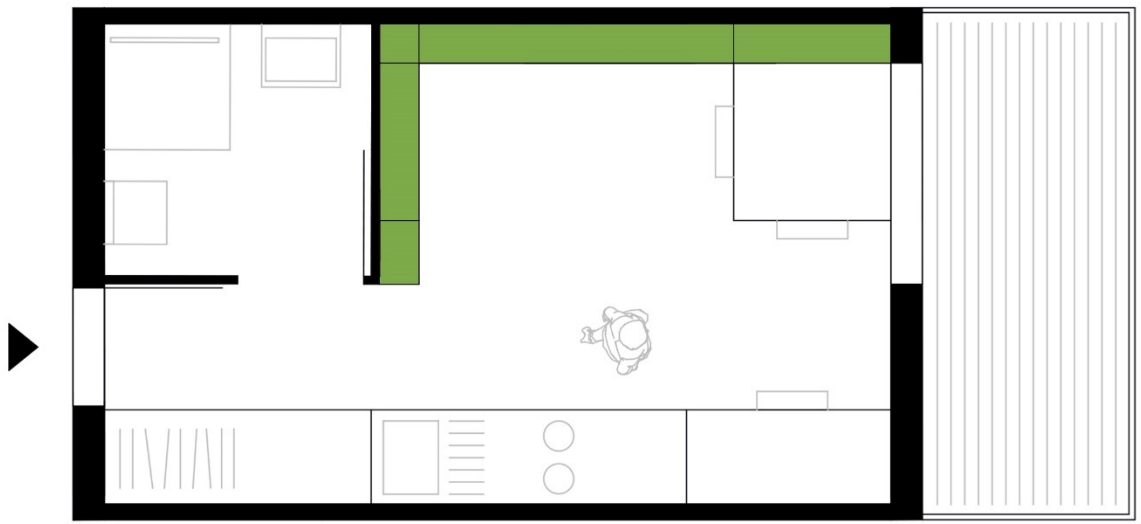
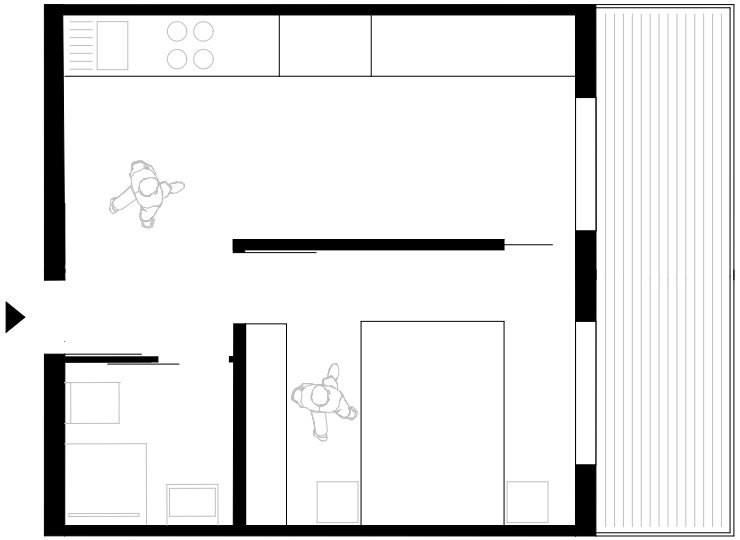


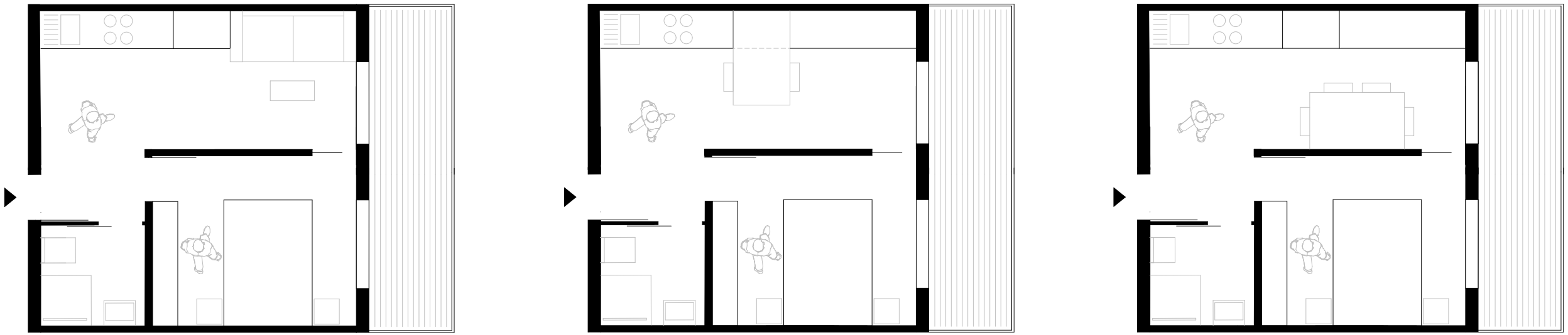
table + chairs

isometric | floor plan | 1:50



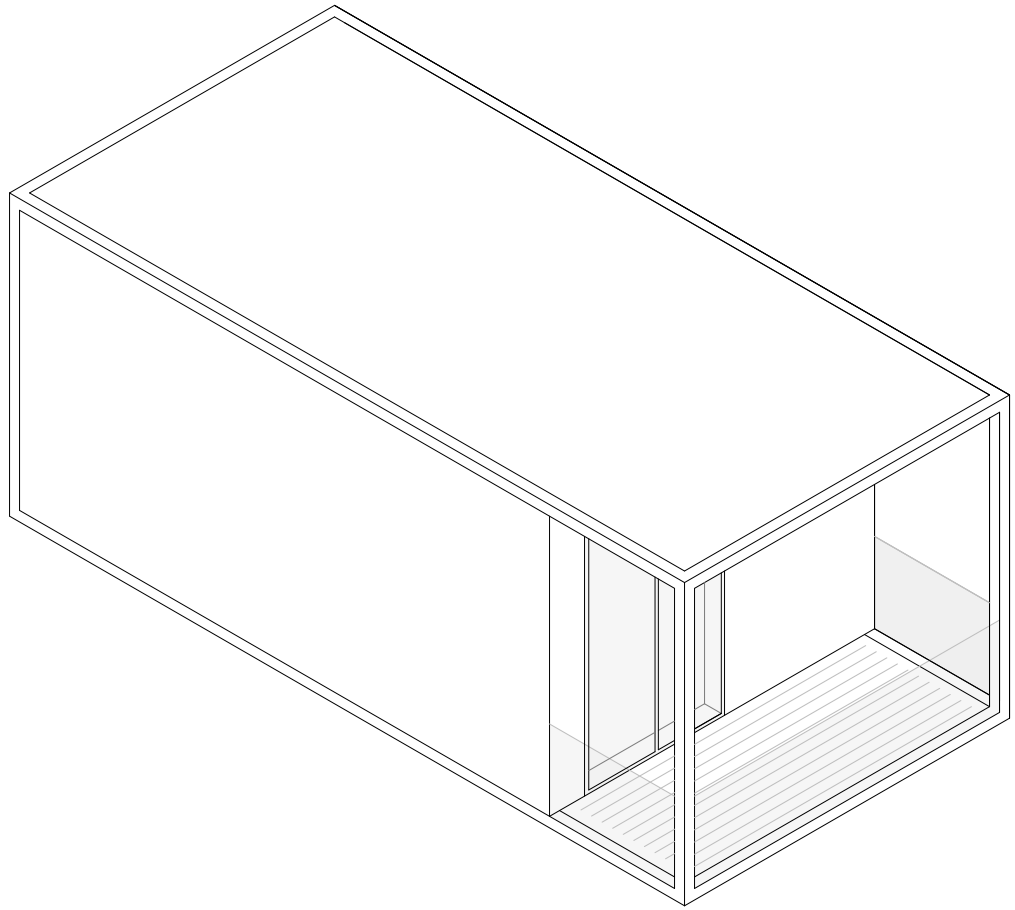
2 room apartments

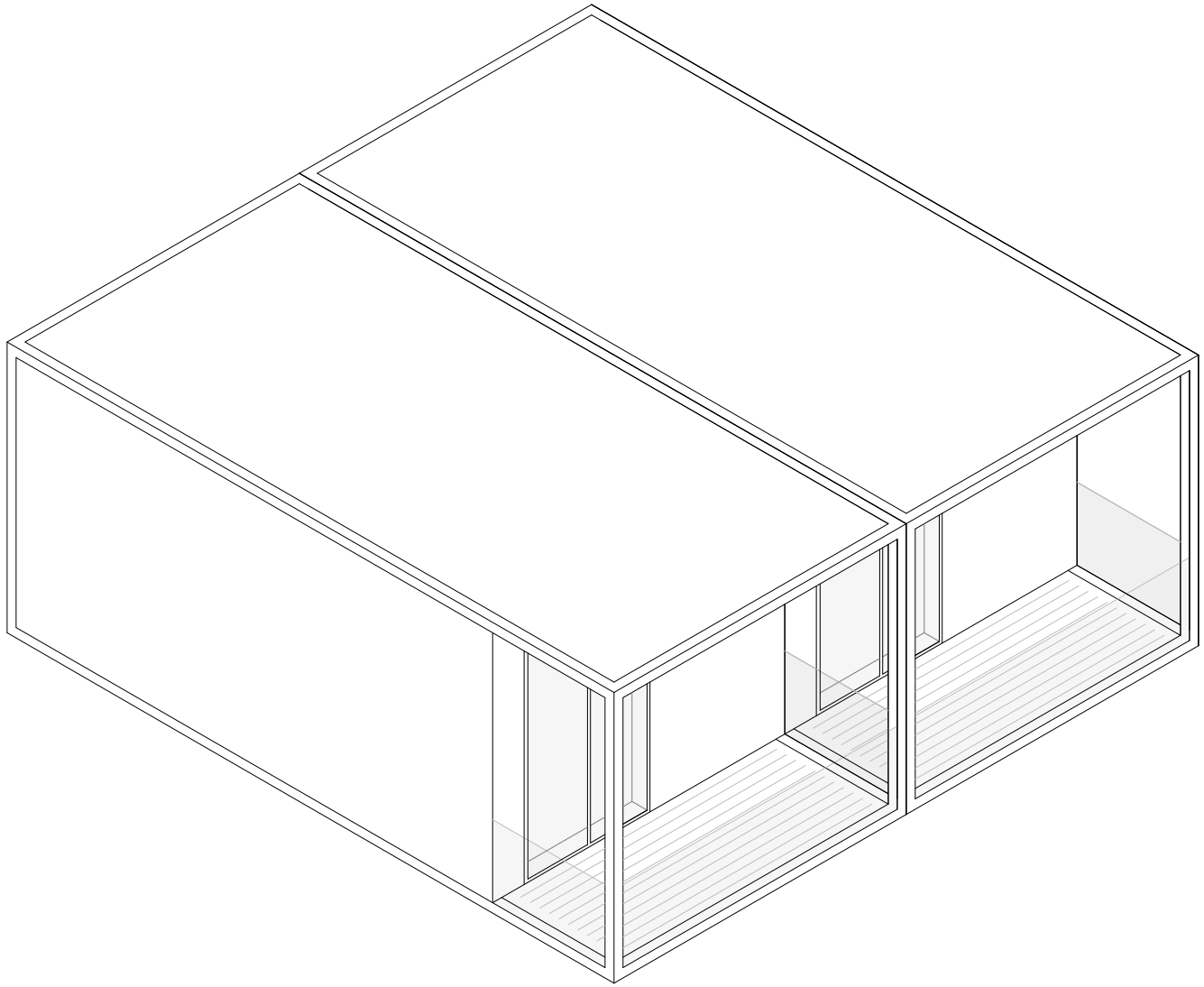
floor plan | 1:50

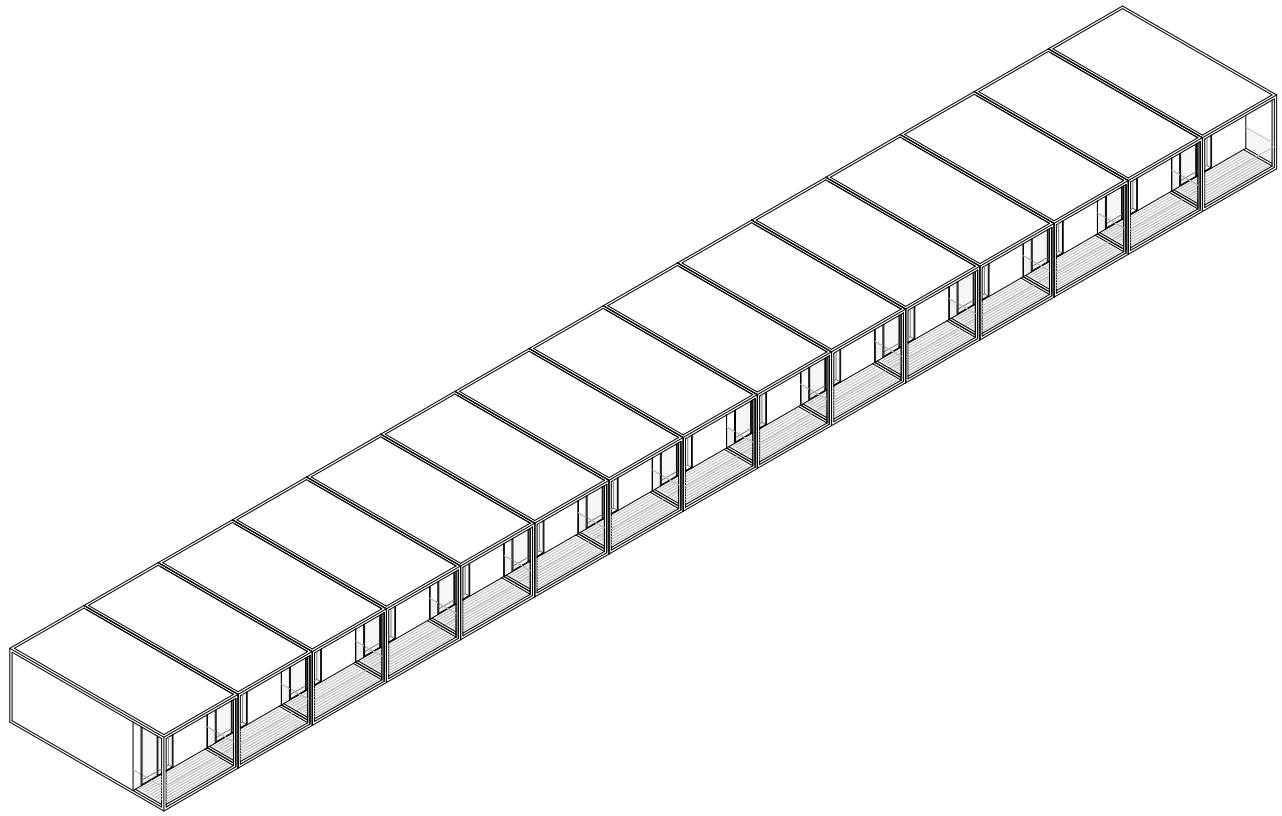


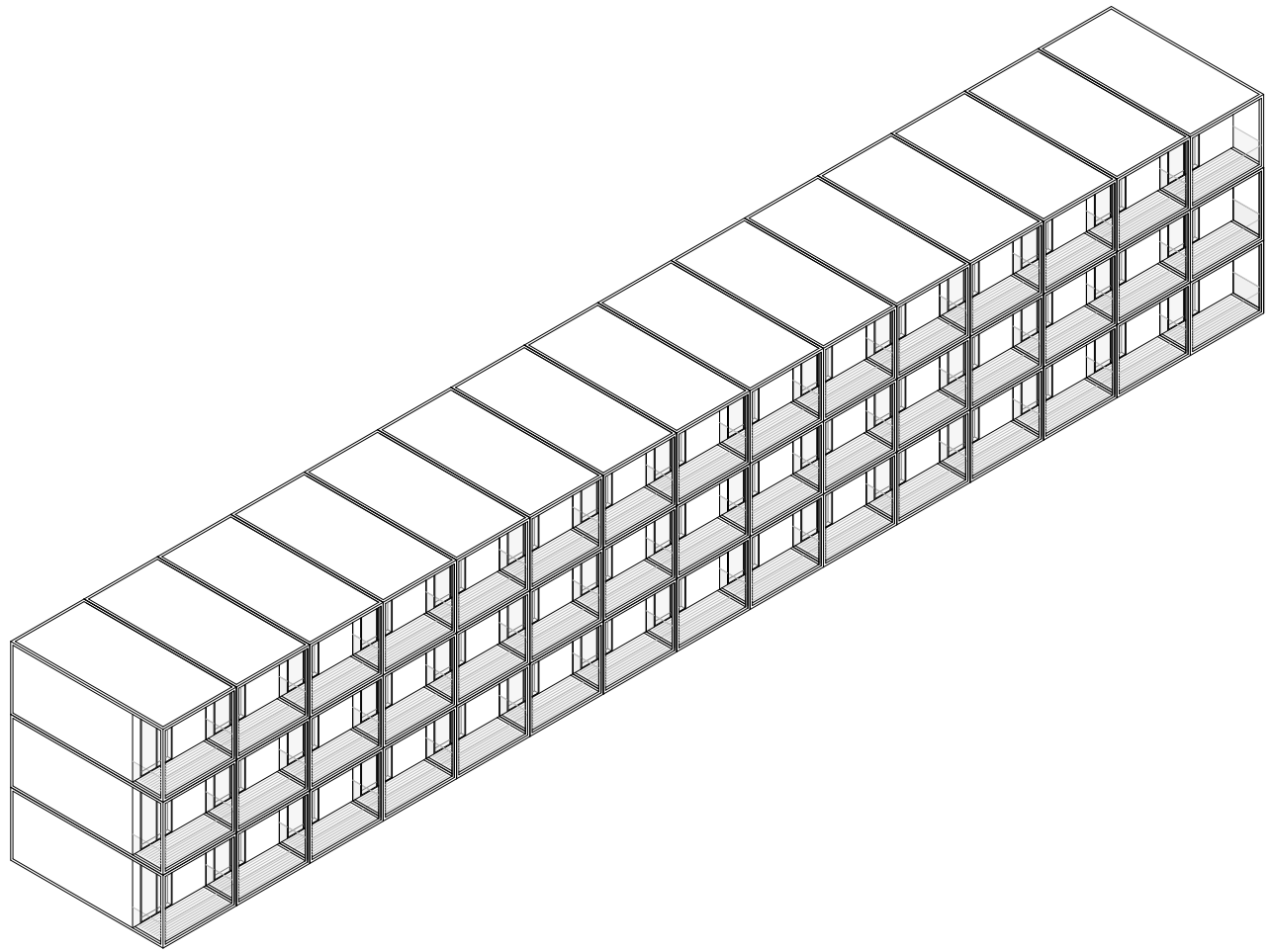
floor plan variations

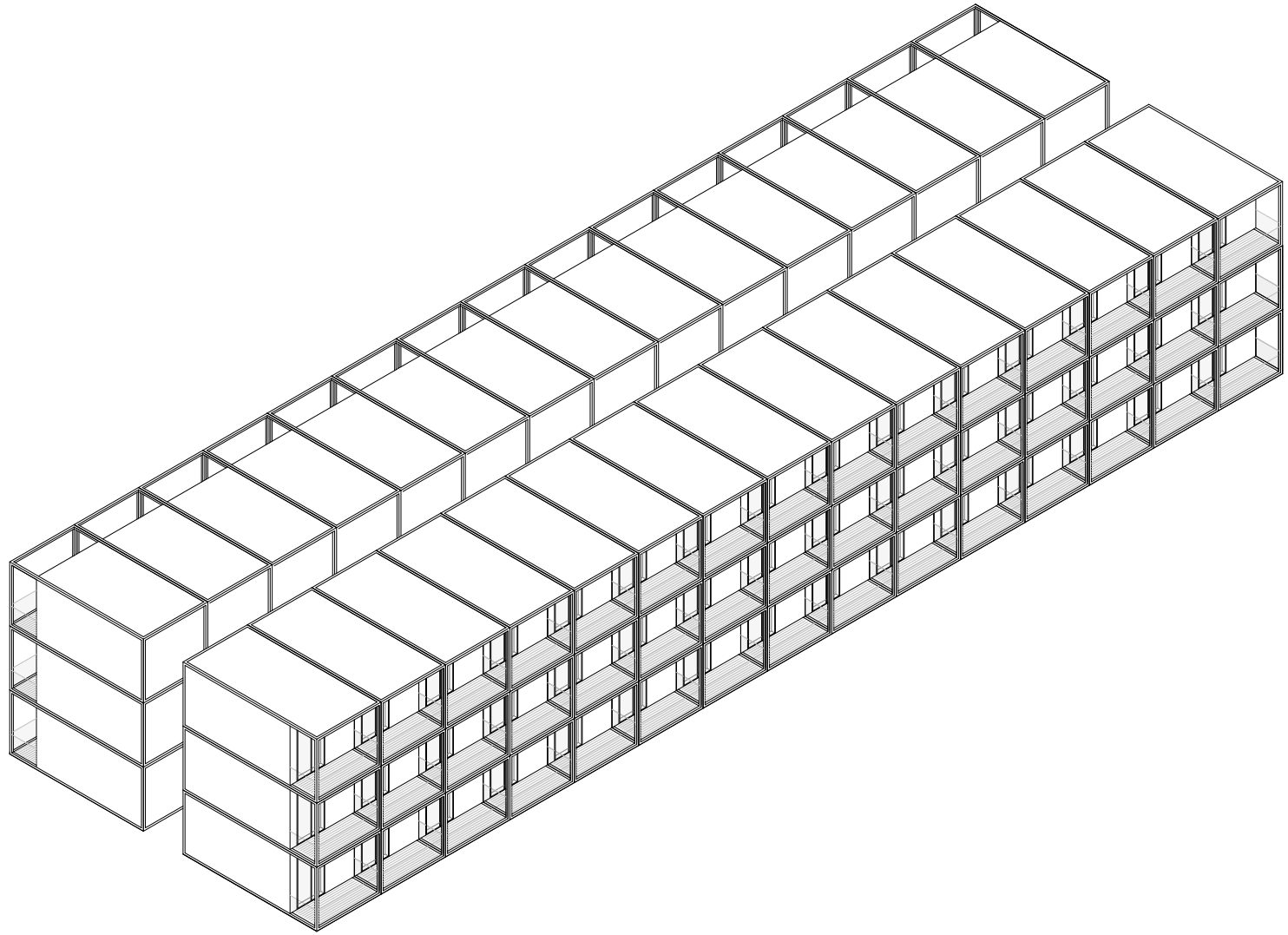
floor plan | 1:50

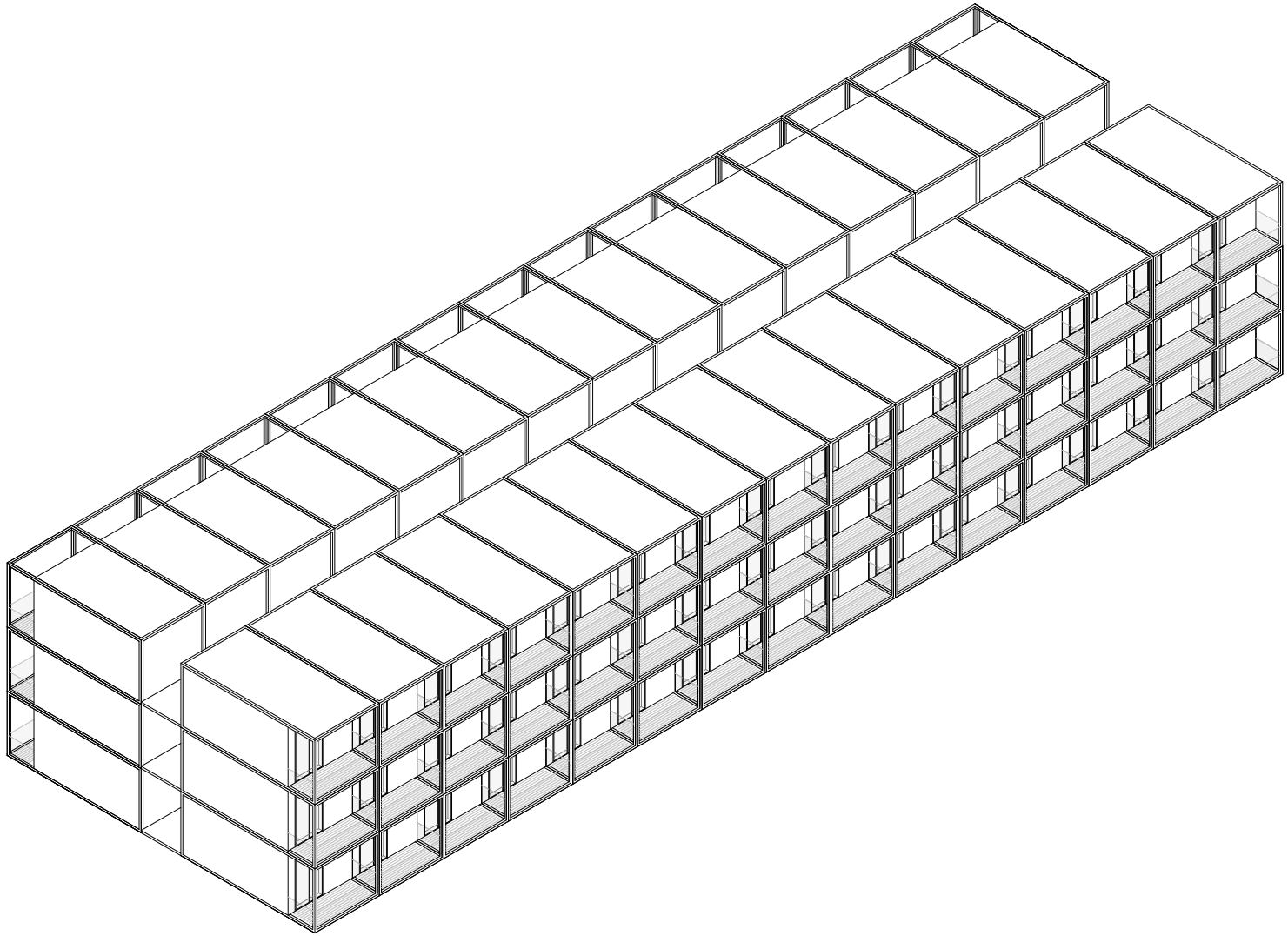


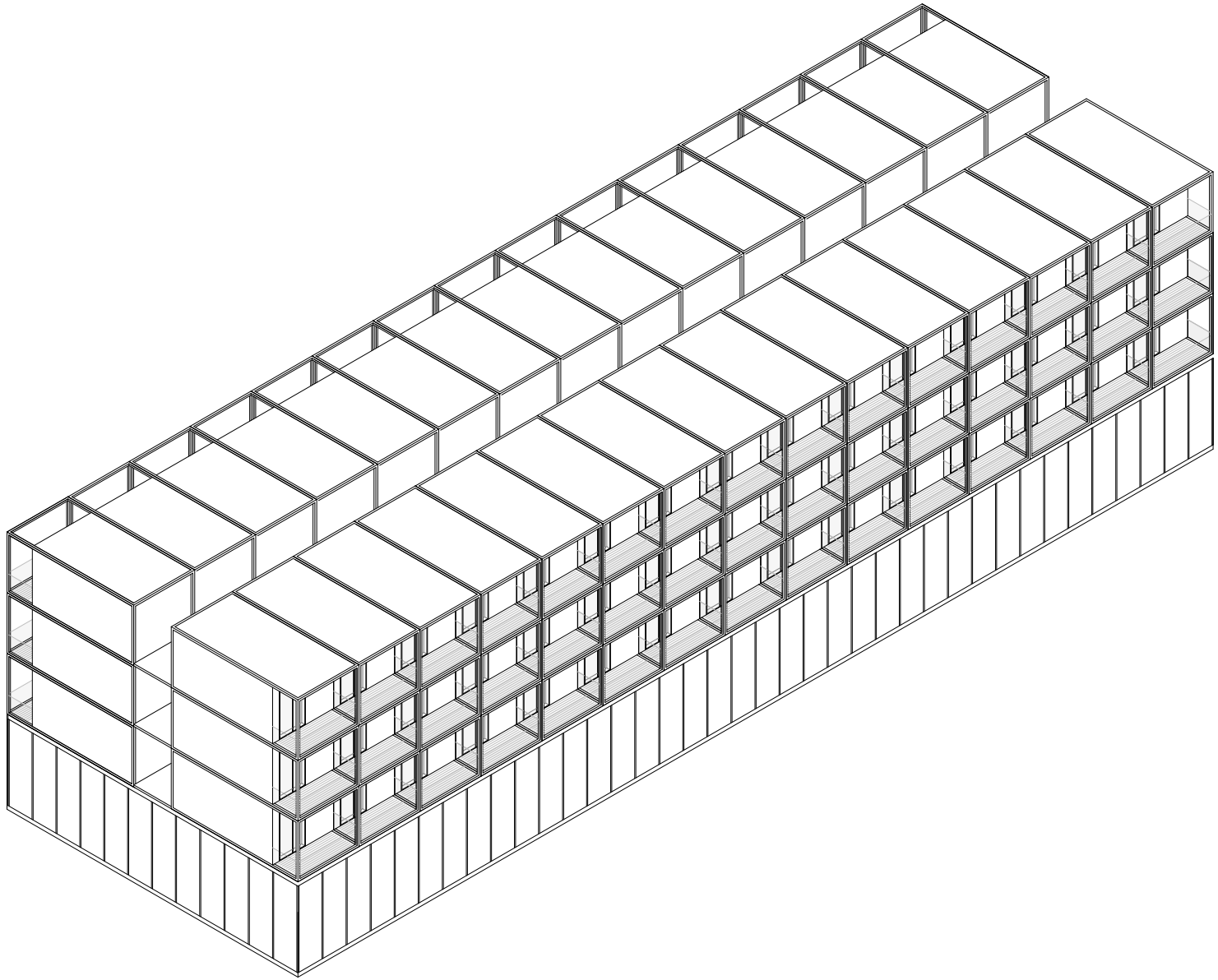


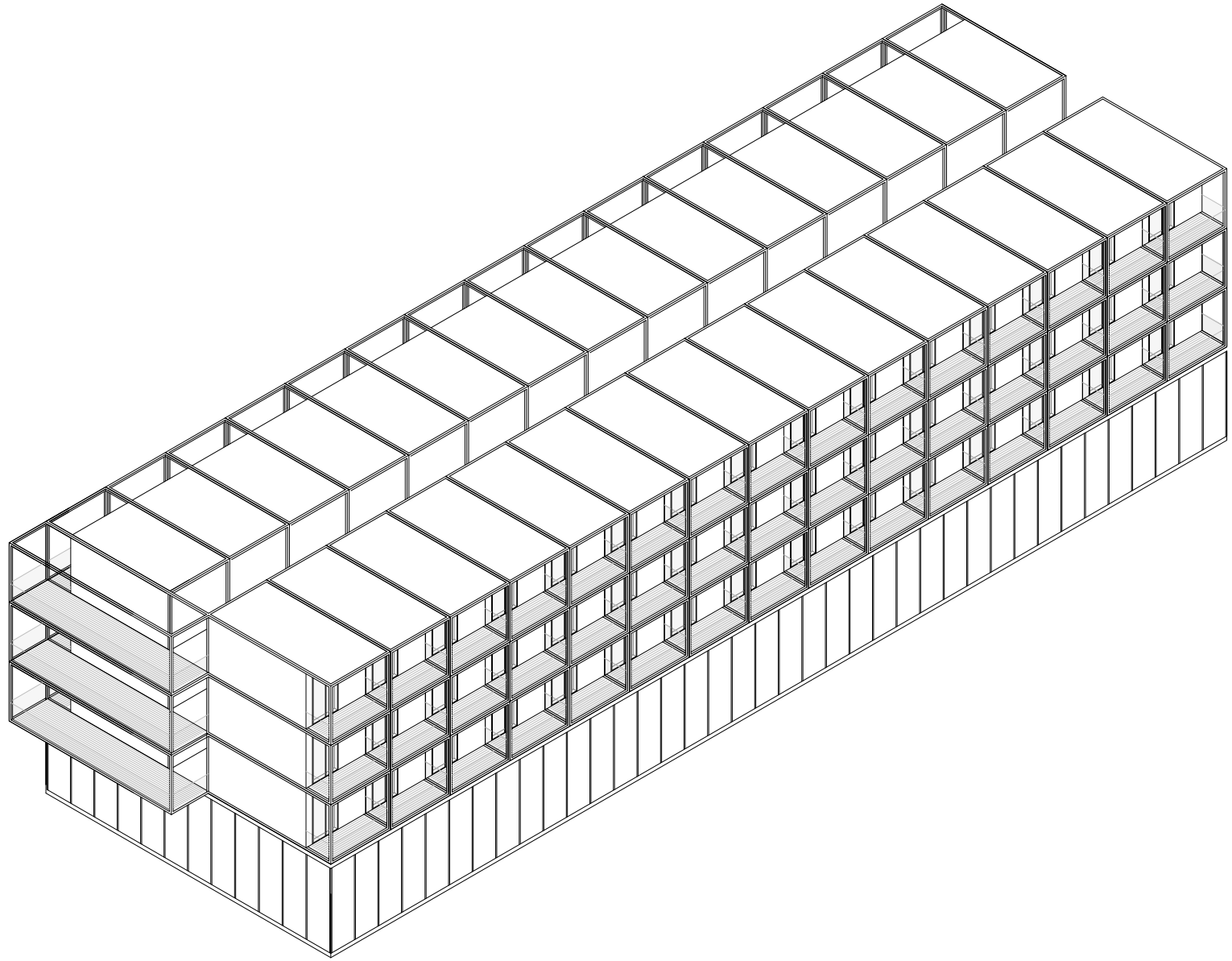






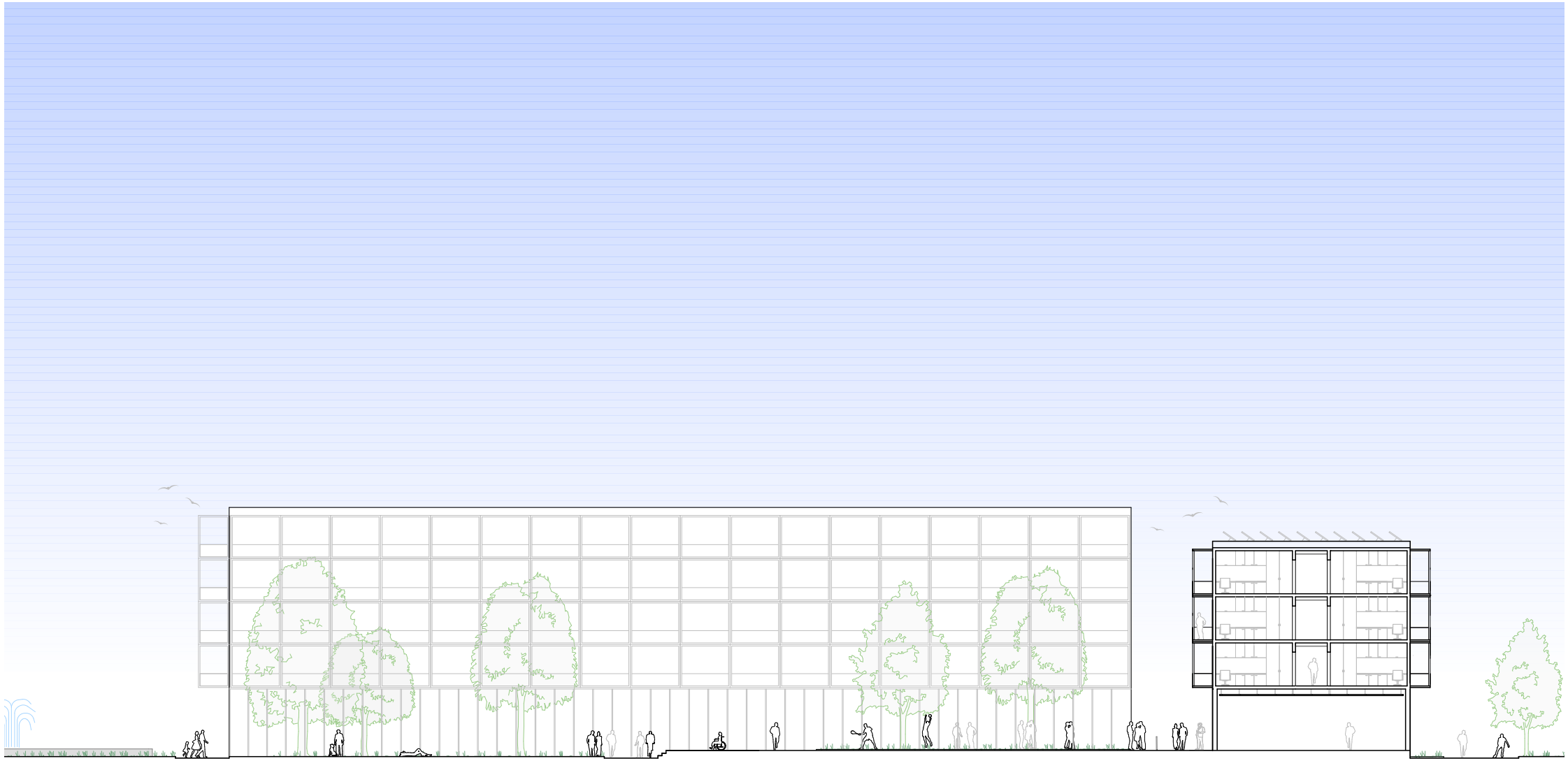






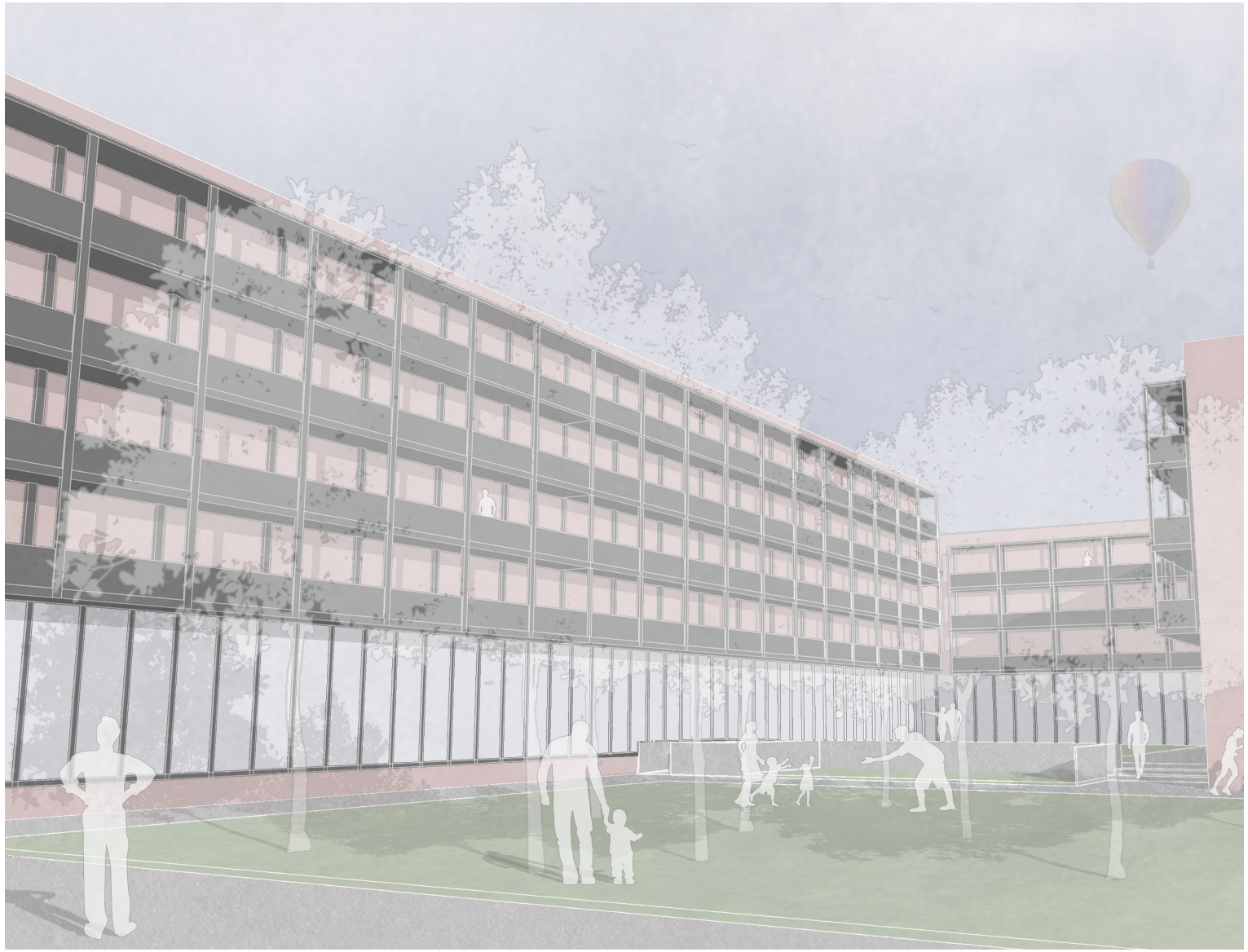
cross section

north-south | 1:200



longitudinal section

west - east | 1:200



student residence

perspective

ground floor

floor plan | 1:200

ground floor

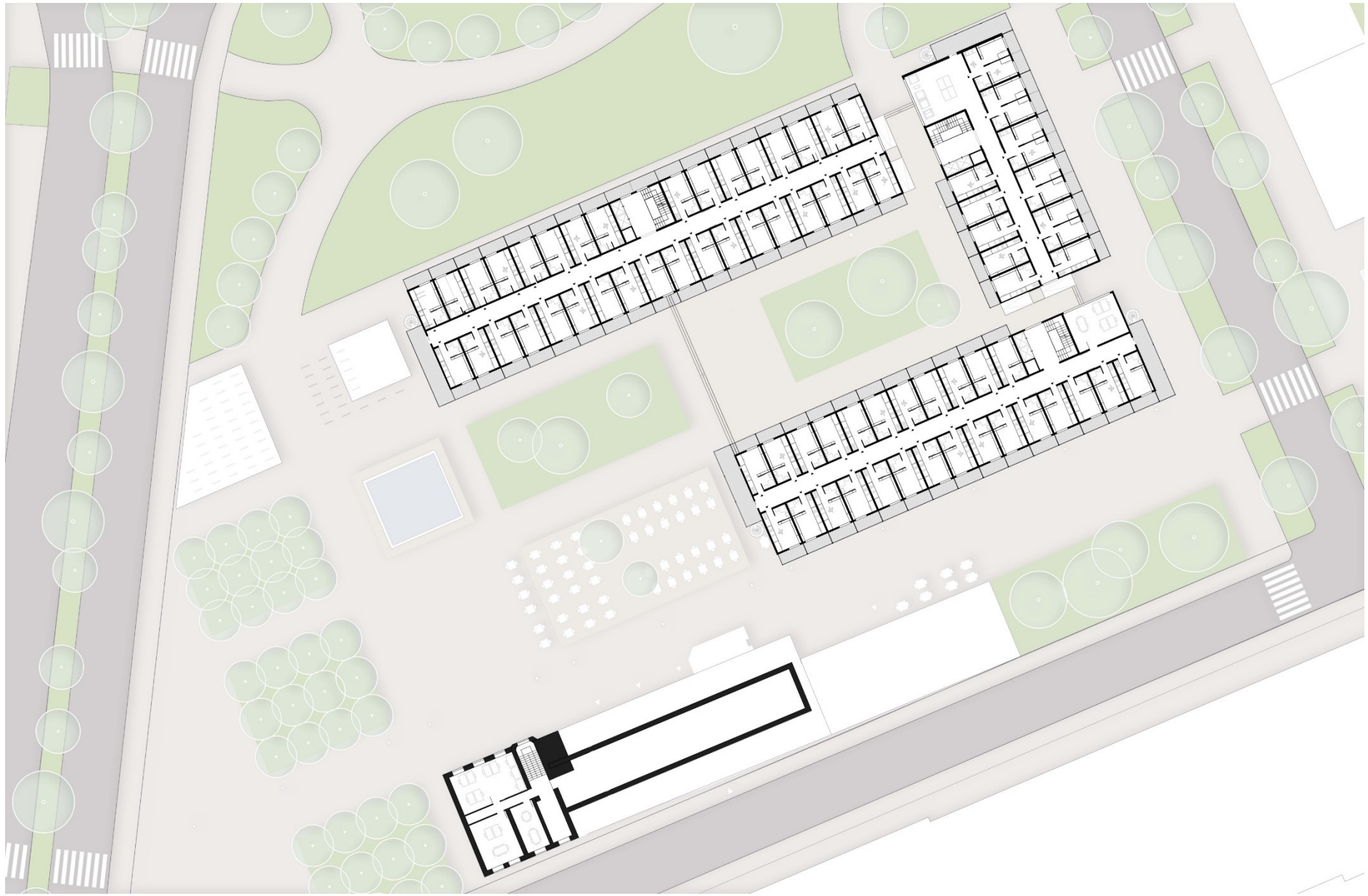
floor plan | 1:200

ground floor

floor plan | 1:200

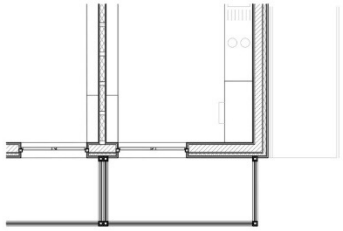
ground floor

floor plan | 1:200



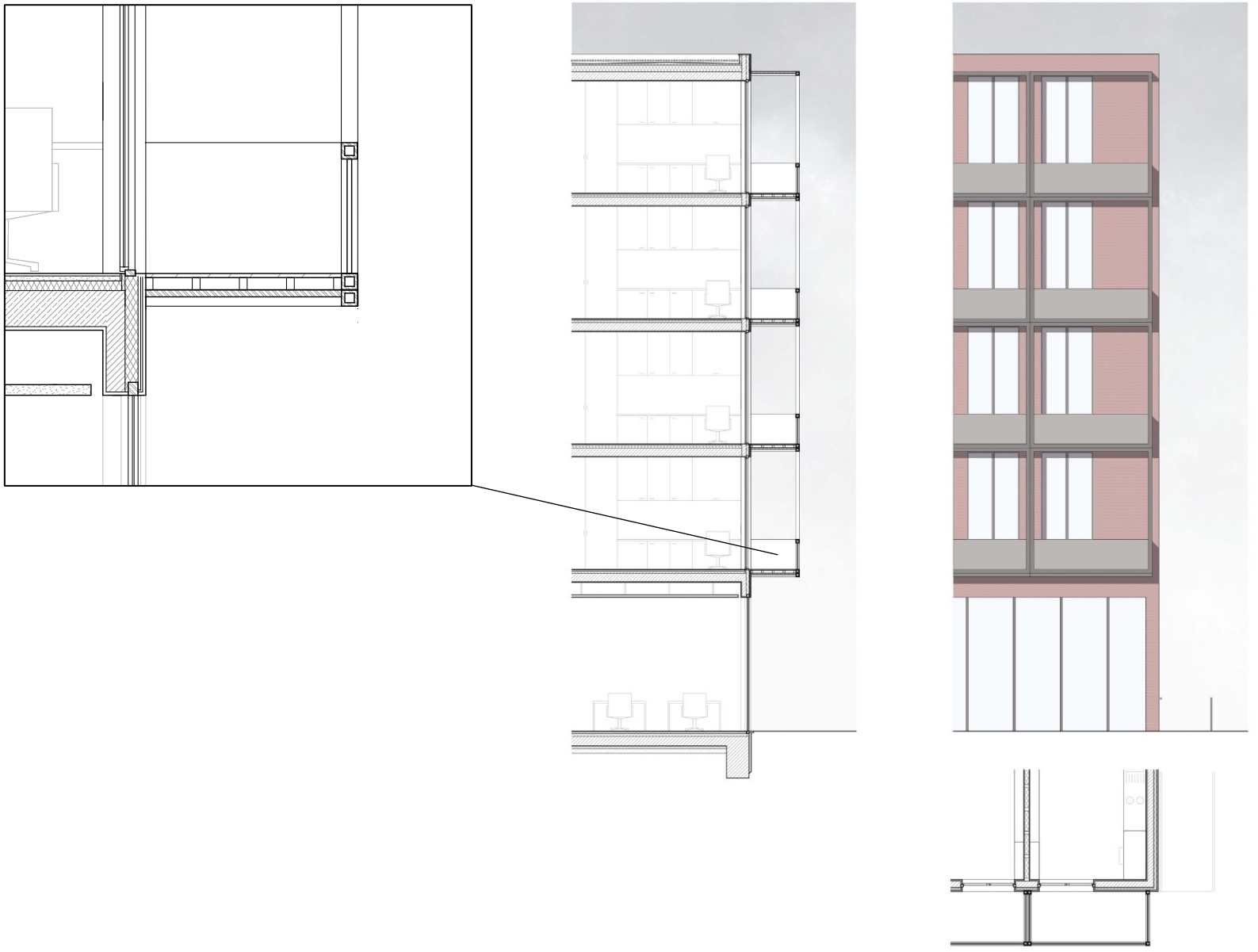
upper floor

floor plan | 1:200



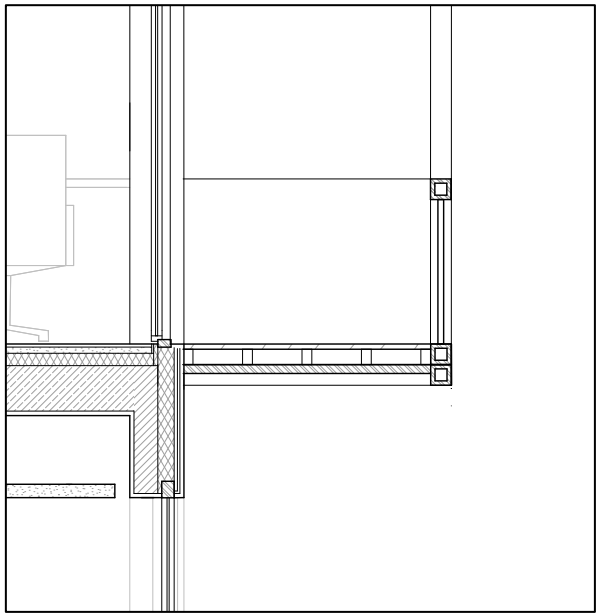
facade details

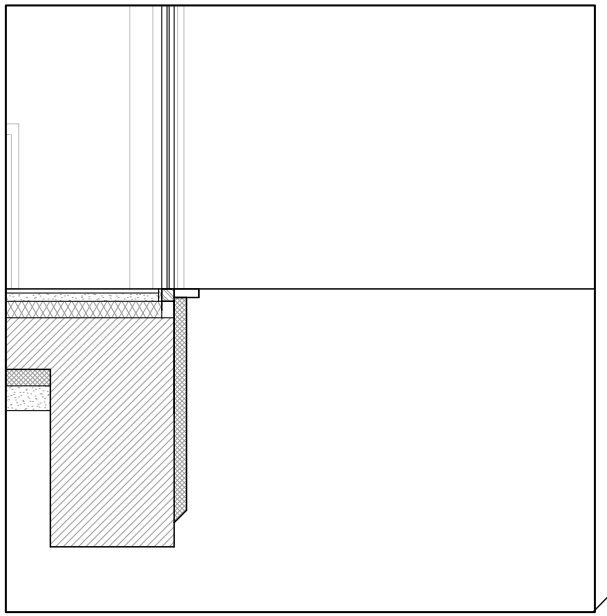
section | view | floor plan | 1:50

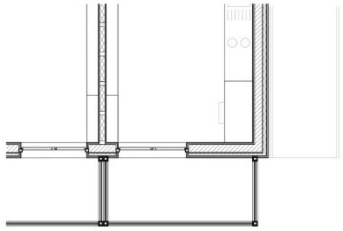


balcony detail

section | view | floor plan | 1:50

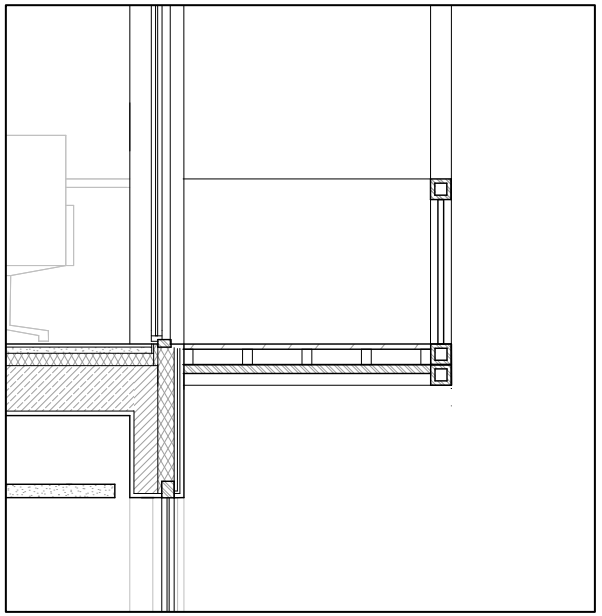


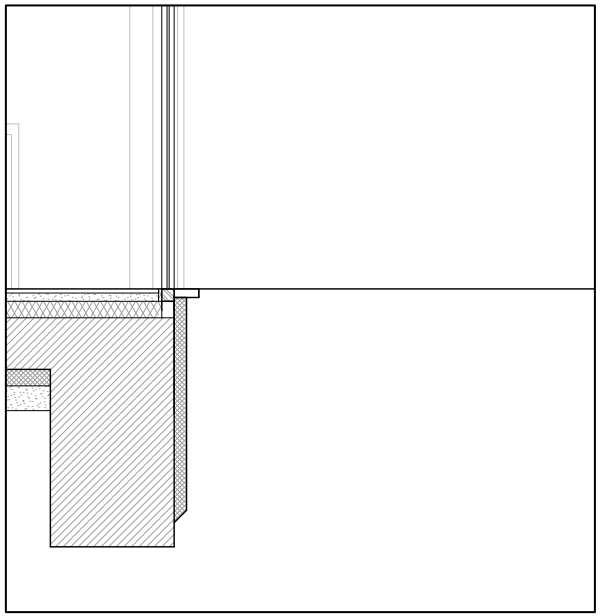


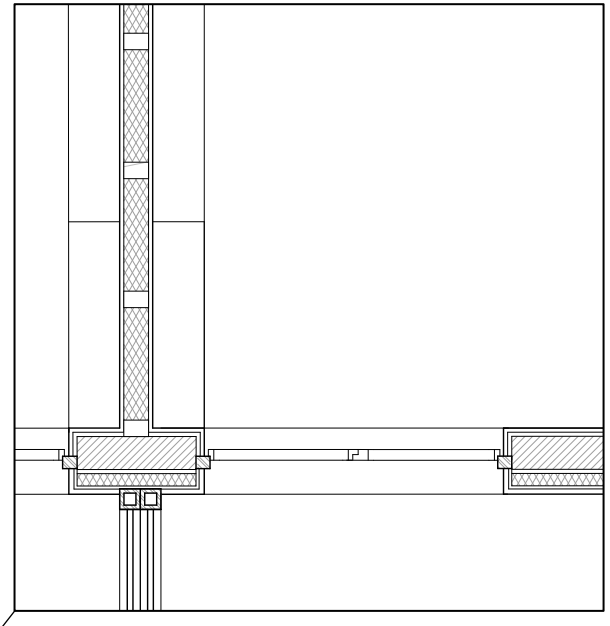


founding detail

section | view | floor plan | 1:50

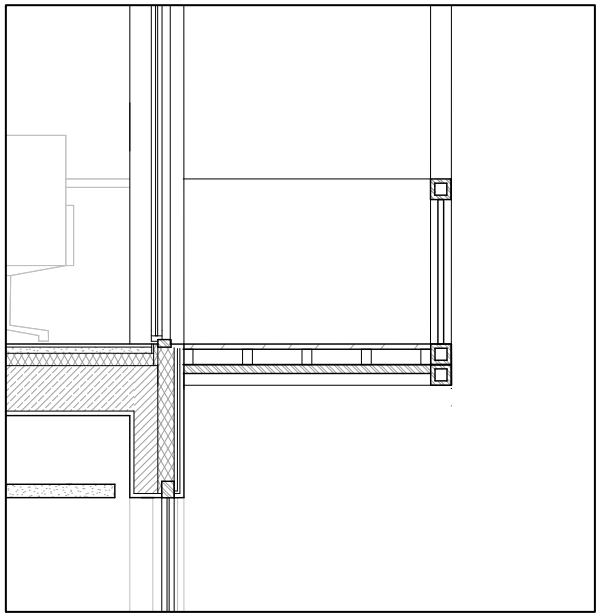


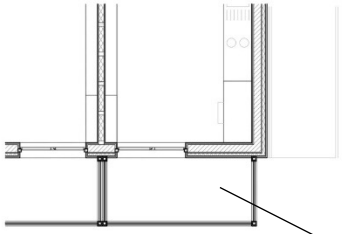


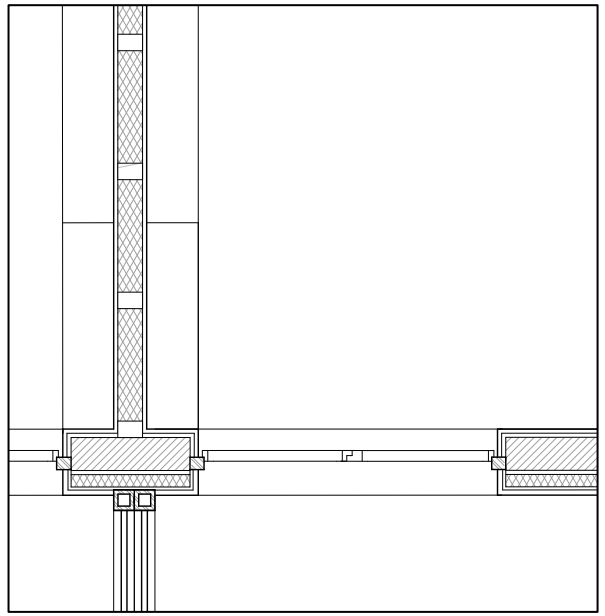


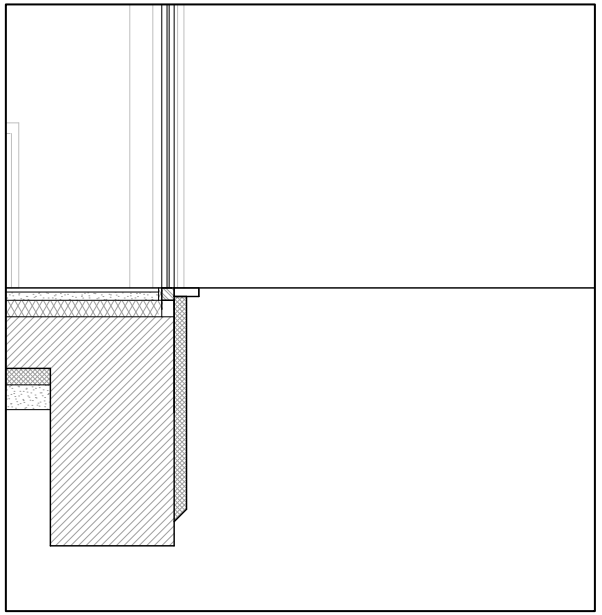
apartment partitions details

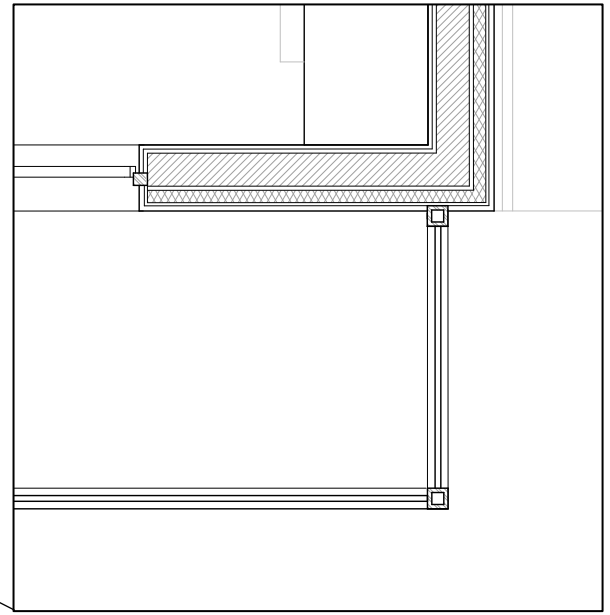
section | view | floor plan | 1:50







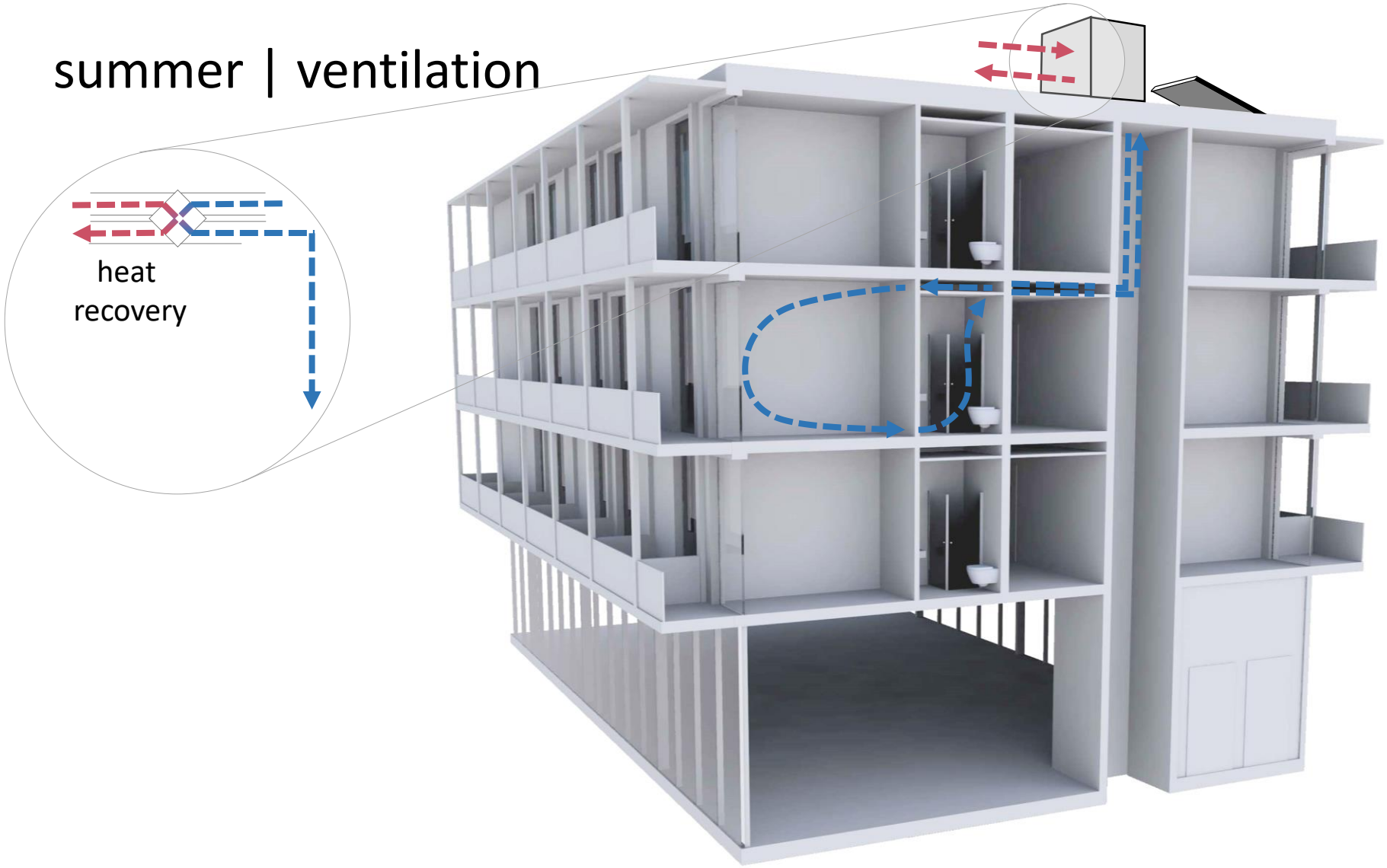




building closure detail

section | view | floor plan | 1:50

summer | ventilation



compliance

annual energy demand for heating

$9{,}12\ \frac{kWh}{m^2 \cdot a}$

temperature above 25°C

< 3,8 % p.a.

CO_2 concentration

< 740 ppm

ventilation rate per person

> 30 m³

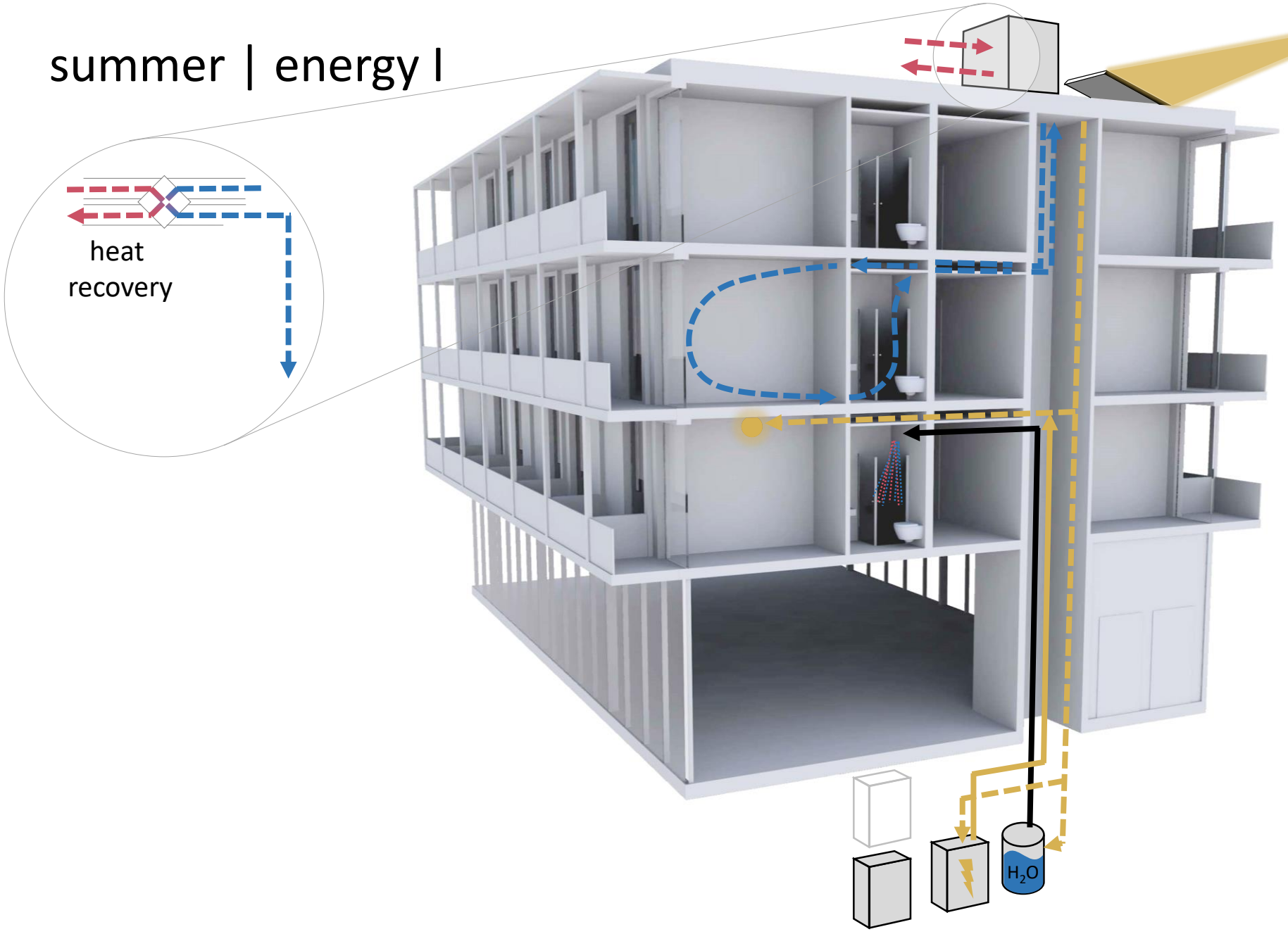
windows/floor ratio

1/5

air tightness

n_{50} = 0,6/h

summer | energy I



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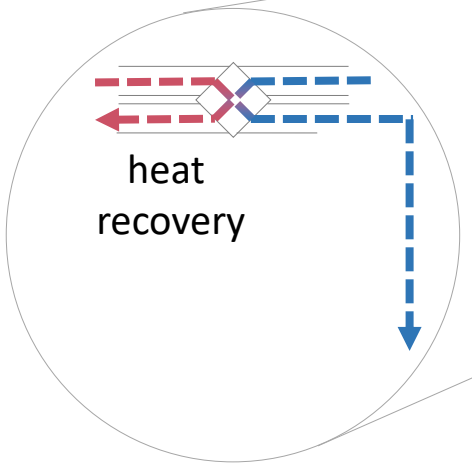

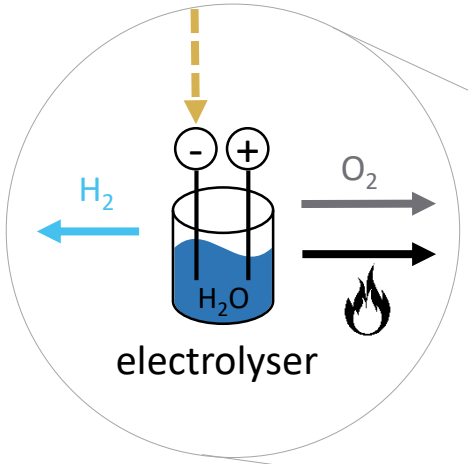

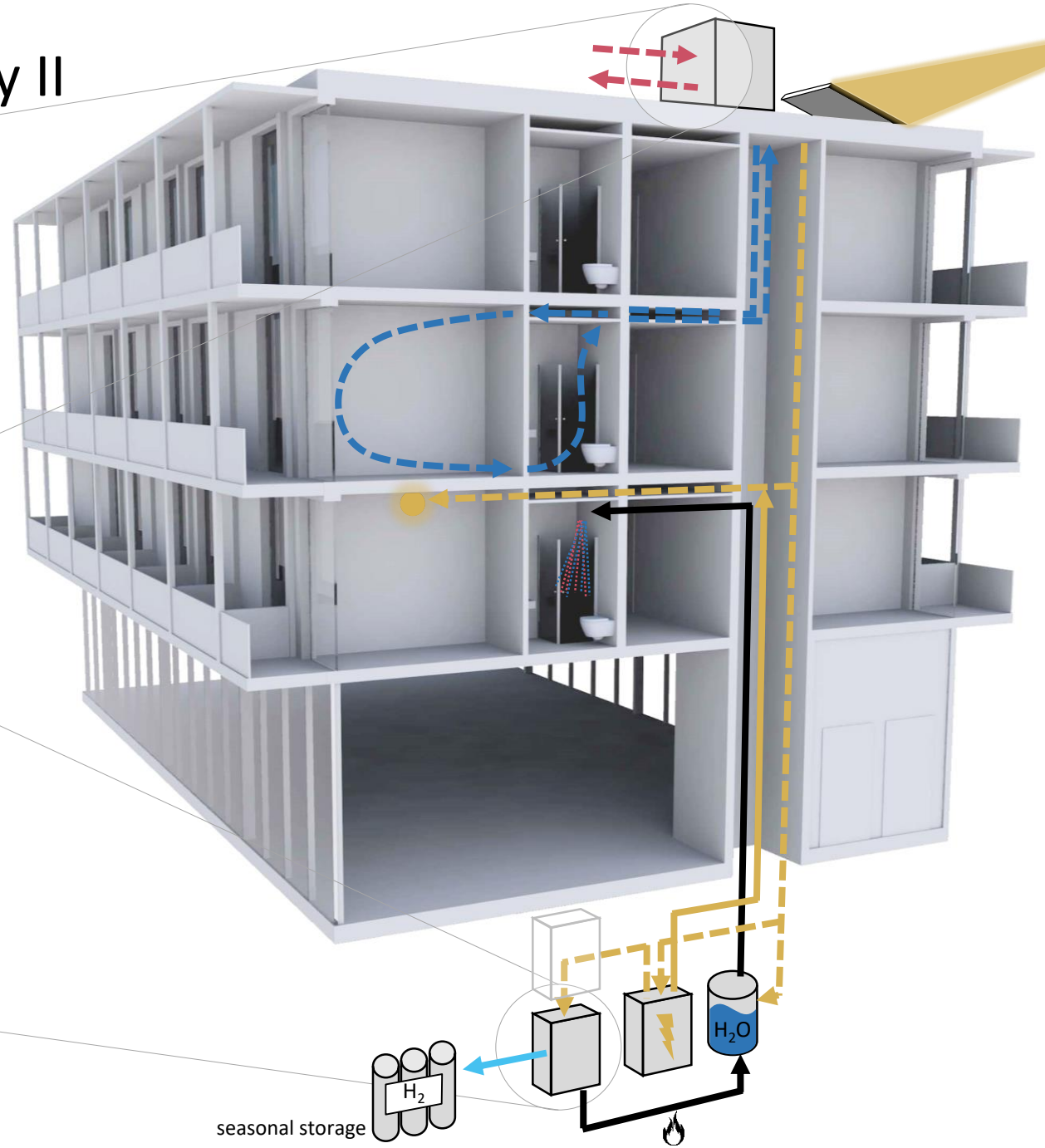

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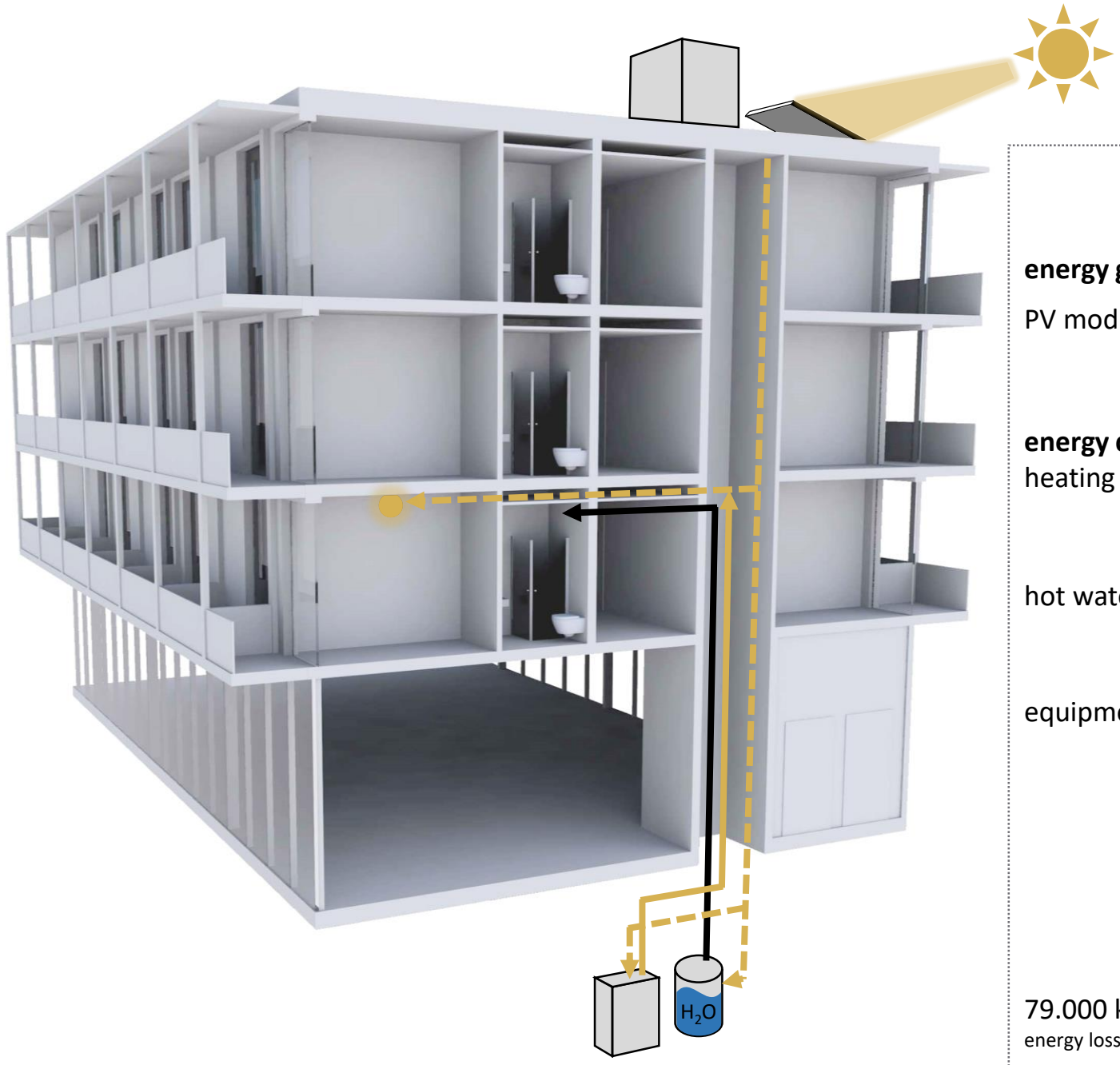
winter | energy I



autarky

energy generation

PV modules $1.680\ m^2 \cdot 270\ \frac{kWh}{m^2 \cdot a}$

453.600 kWh/a

energy demand

heating 62.016 kWh/a

$9{,}12\ \frac{kWh}{m^2 \cdot a} \cdot 6.800\ m^2$

hot water 168.000 kWh/a

$600\ \frac{kWh}{p \cdot a} \cdot 280\ p$

equipment | lightning in rooms

144.400 kWh/a

$535\ \frac{kWh}{room \cdot a} \cdot 220\ rooms$

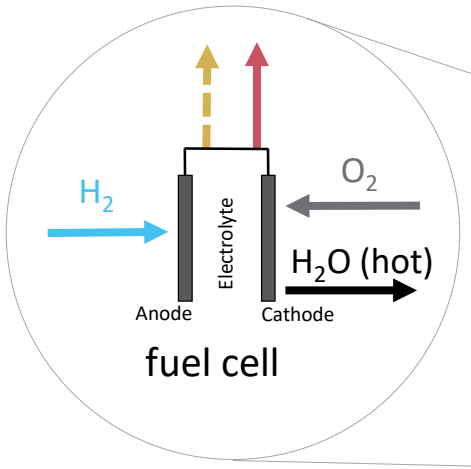
$890\ \frac{kWh}{room \cdot a} \cdot 30\ rooms$

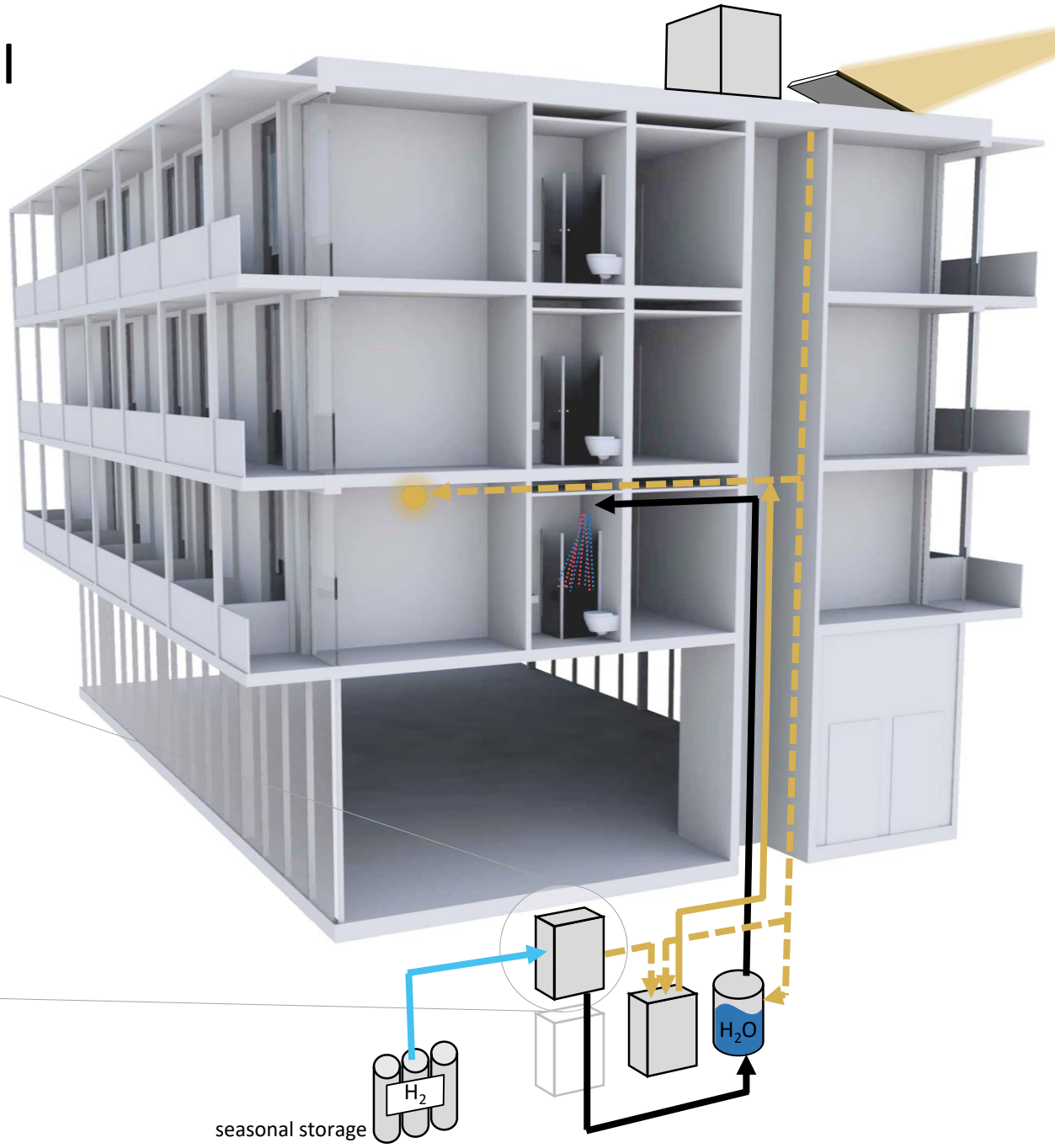
374.500 kWh/a

79.000 kWh/a left

energy losses and reserve

winter | energy II





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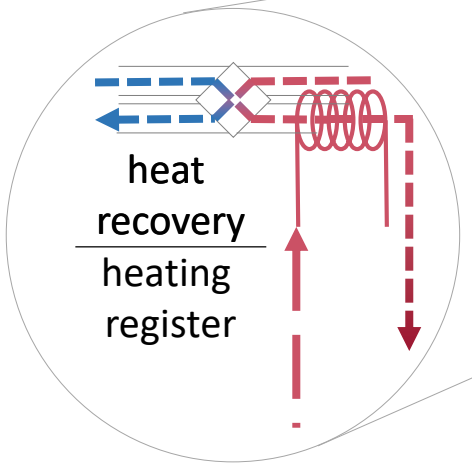

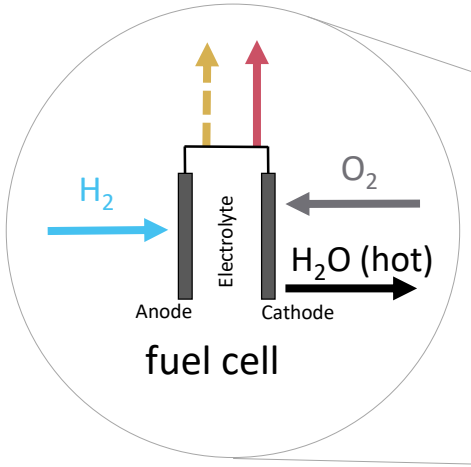

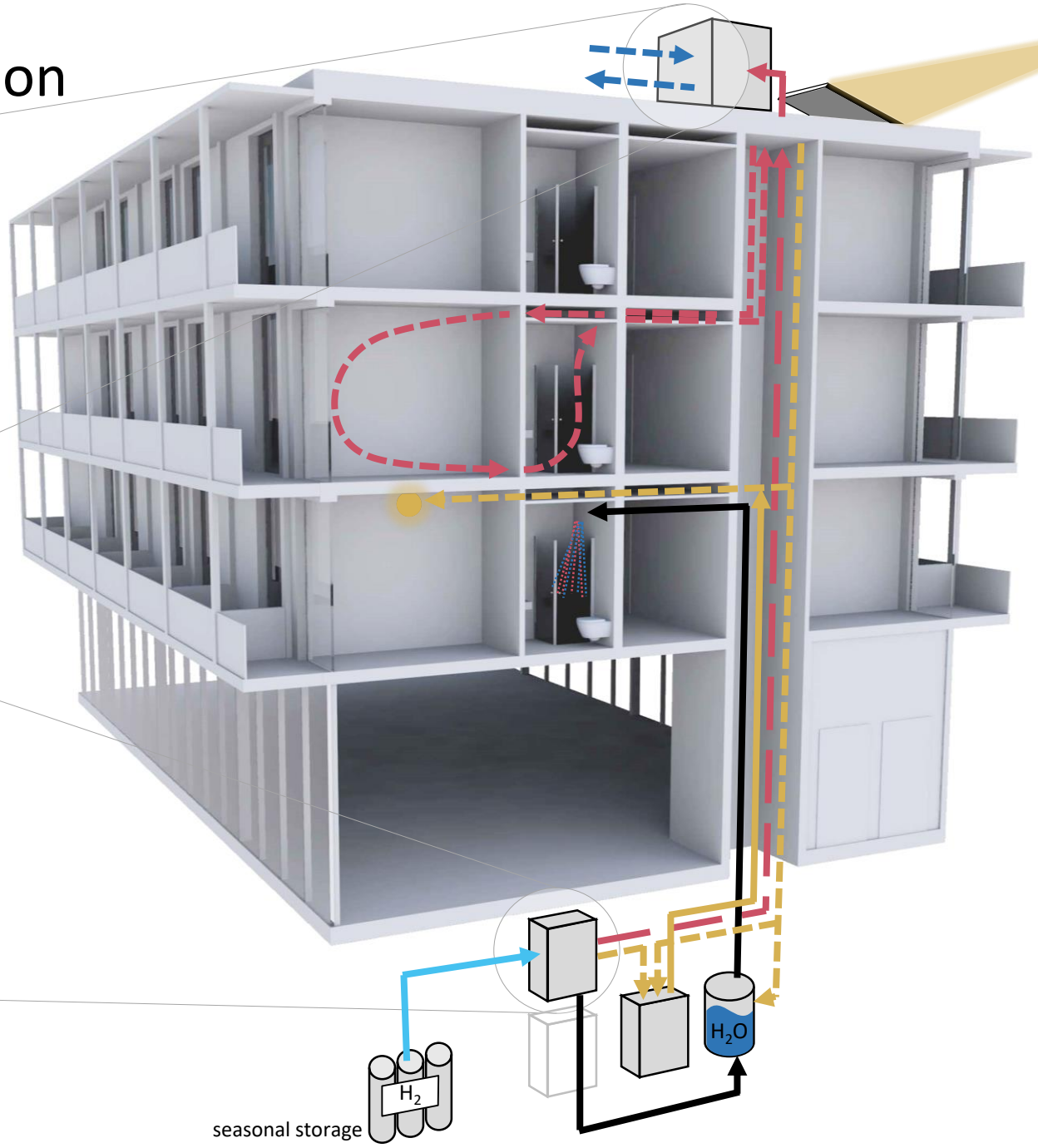

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energy losses and reserve

we have a vision…

and we are working on it.