I n t e r v a m

P5

Reducing the energy demand and creating quality for the users with observance of (historical) values in the renovation of the Intervamflats at the Camera Obscuradreef in Utrecht Overvecht

Camera Obscuradreef
Utrecht Overvecht

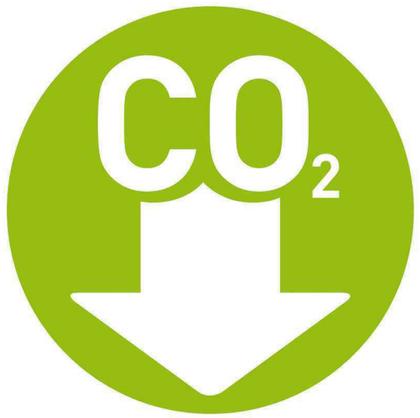
VAM system by Intervam

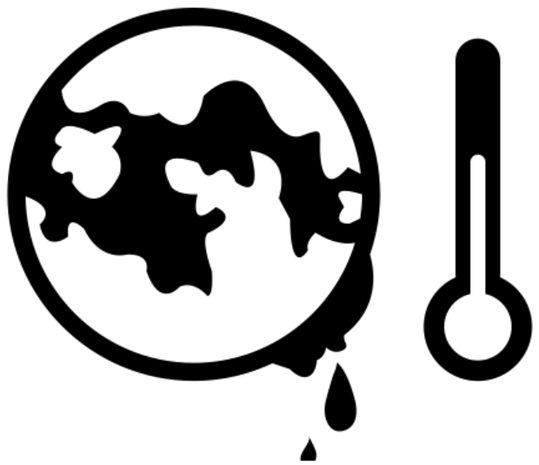
Rick Hoofd | 4415272
TU Delft | Heritage & Architecture | ReHousing
27-06-2017

1st mentor: Lidwine Spoormans (Architectural Design)
2nd mentor Bas Gremmen (Building Technology Design)
3th mentor: Nicholas Clarke (Cultural Value)
External examiner: Drs.ing. G.A. van Bortel

PARIS2015
CONFÉRENCE DES NATIONS UNIES
SUR LES CHANGEMENTS CLIMATIQUES
COP21·CMP11

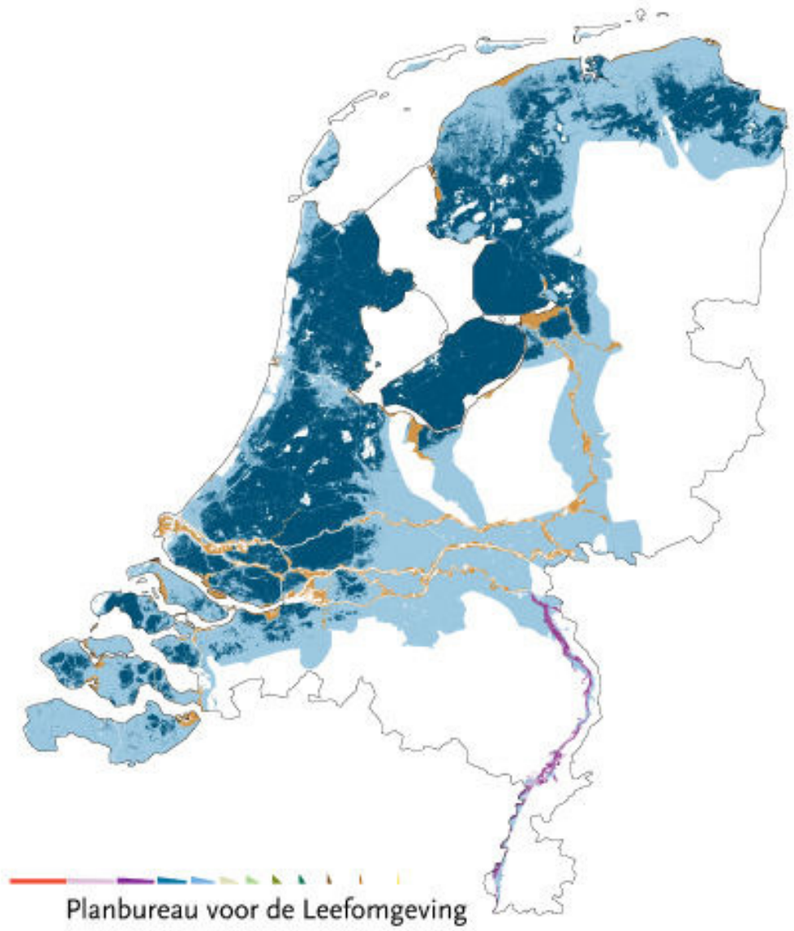
Source: FluxEnergie



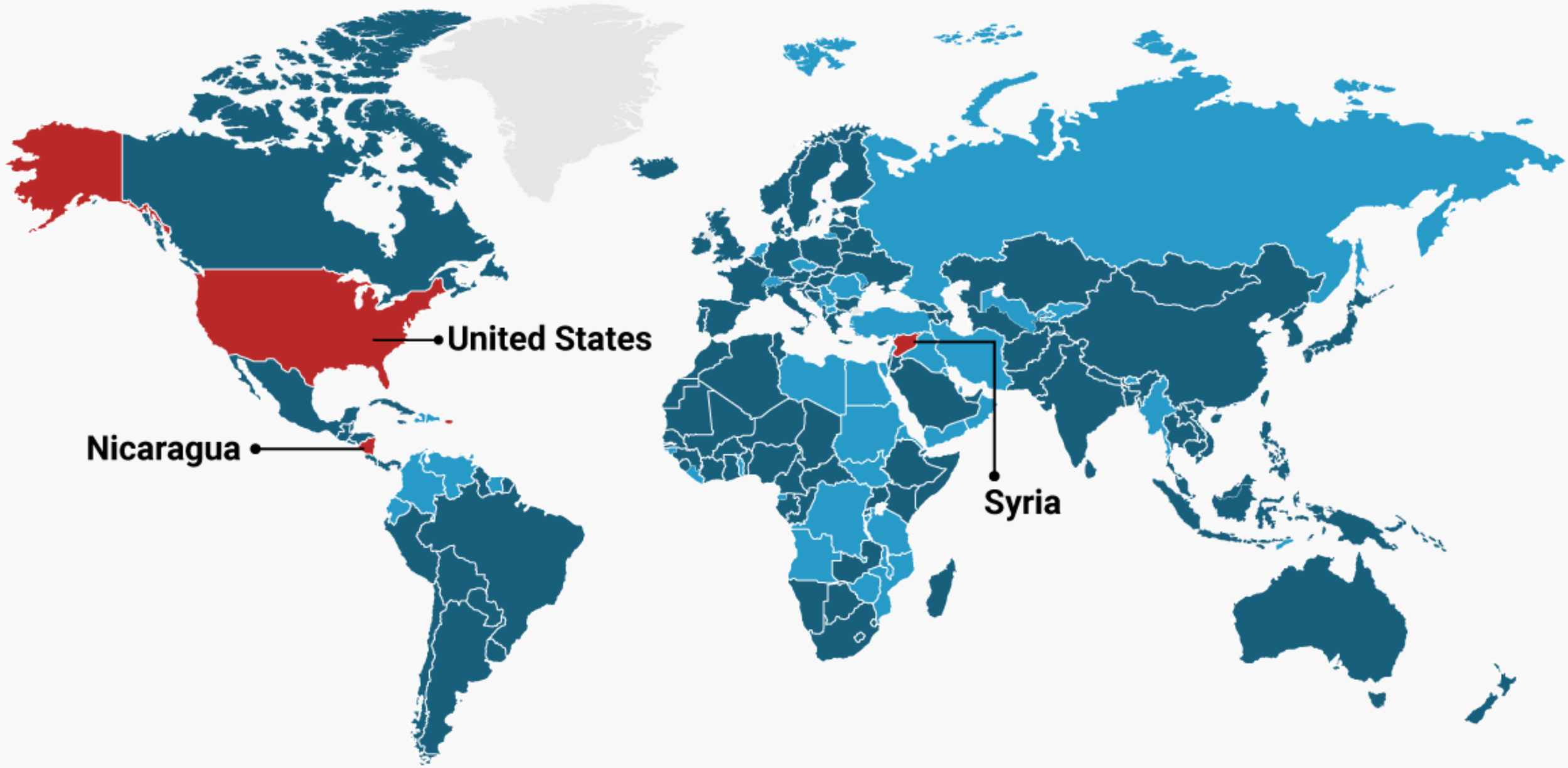


Source: Live ECO

Overstromingsgevoelig gebied



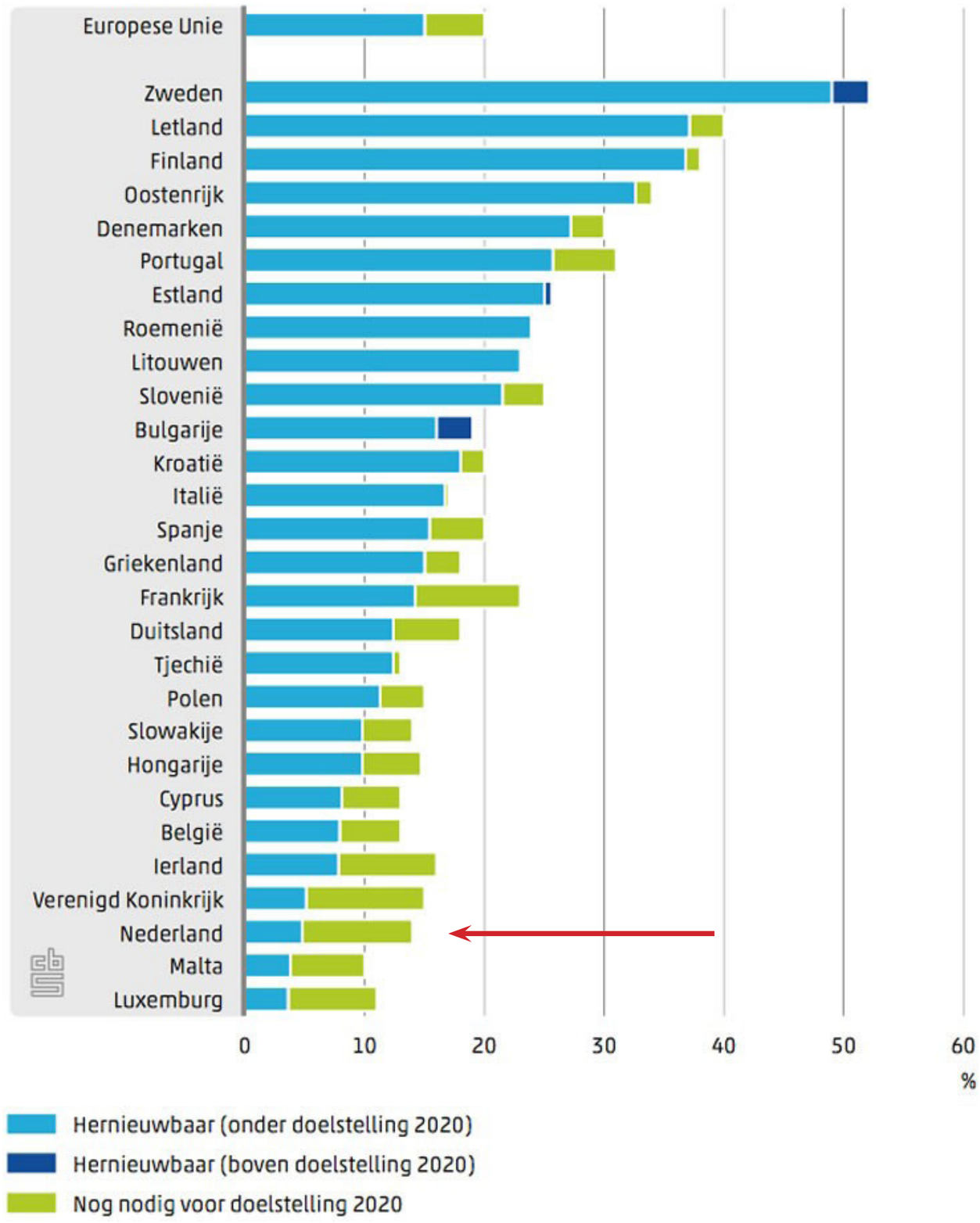
COUNTRIES THAT JOINED THE PARIS CLIMATE AGREEMENT



SOURCE: UNFCCC **NOTE:** Denmark's agreement excludes Greenland. Map is updated as of May 31, 2017.

BUSINESS INSIDER

Aandeel hernieuwbare energie in eindverbruik, 2013



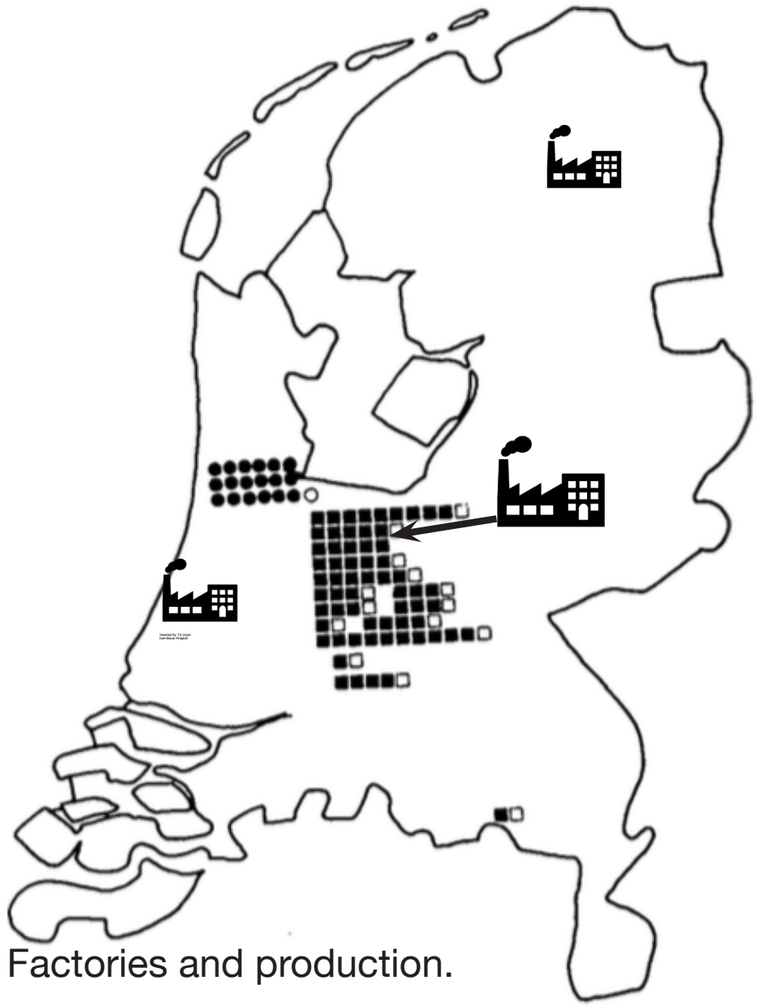
Source: De Volkskrant

CONTENT

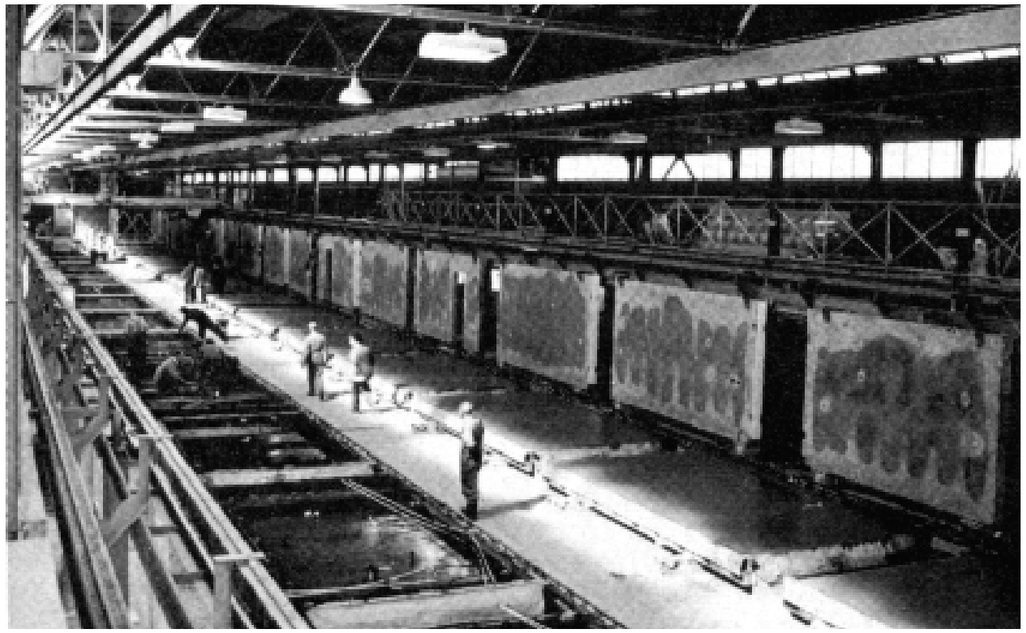
CONTENT

InterVAM

- Prefab system
- Built 1962-’70s
- Portiekflat, 5 or 10 floors high
- Total built 14.000 (Utrecht 6.500)
- Characterized by repetition (minimum of 250)



Factories and production.



Factory production.

Construction site.

Assembly on site

LOCATION

Utrecht

LOCATION

Utrecht OVERVECHT ZUID

LOCATION

CAMERA OBSCURADREEF


POTAIN

mitros

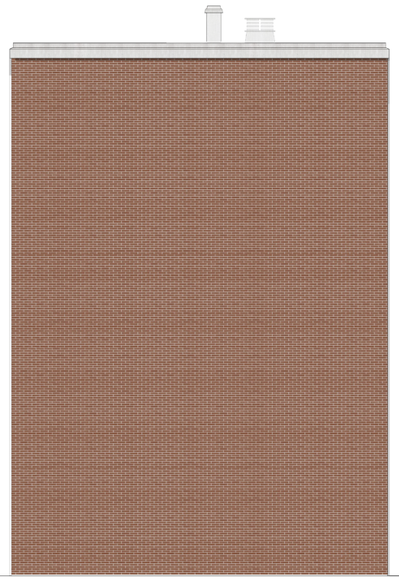
AMBITION MITROS

CURRENT SITUATION

ACCORDING TO LEGISLATION

WITHOUT FOSSIL FUELS

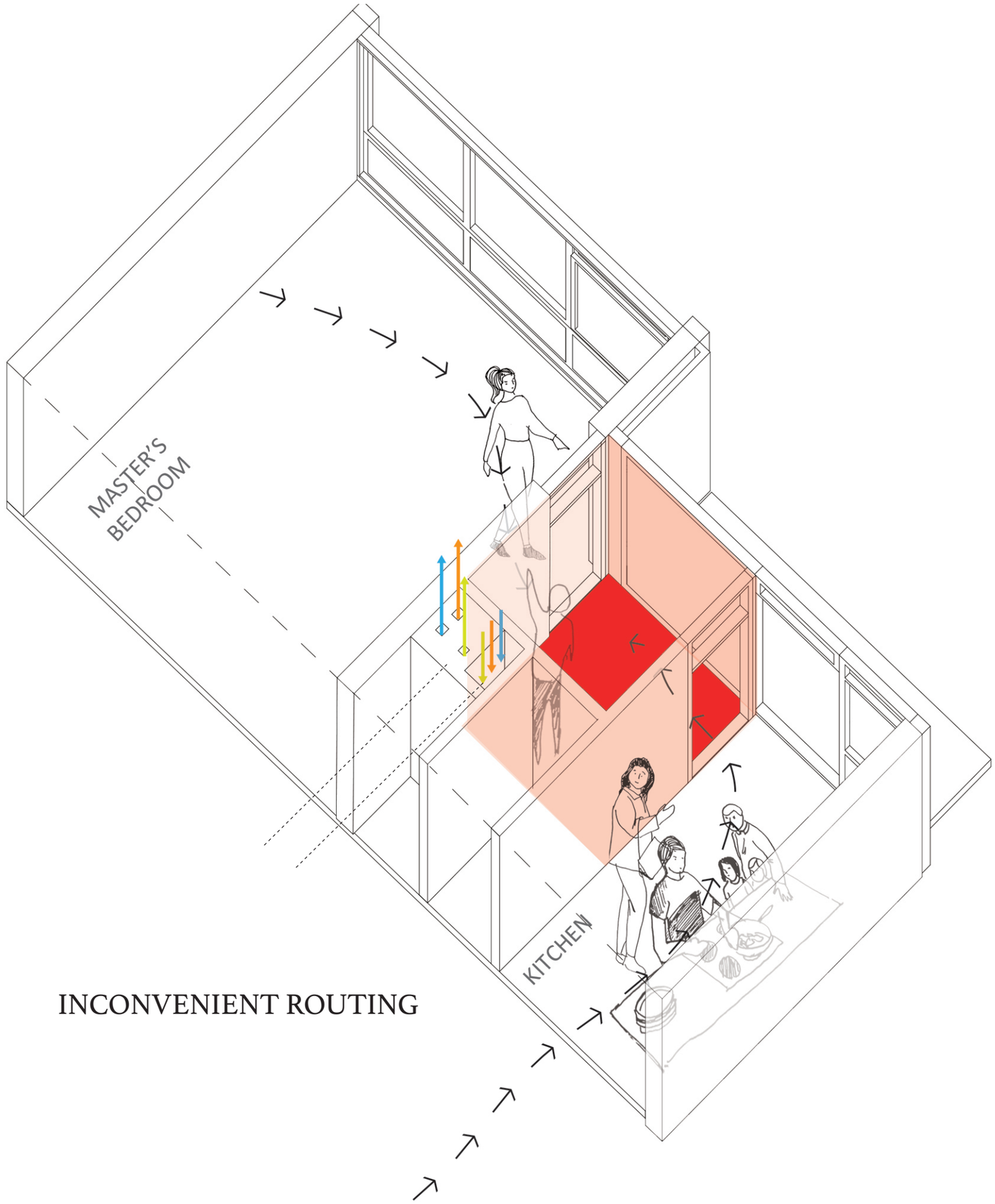
BACK FACADE
EXISTING



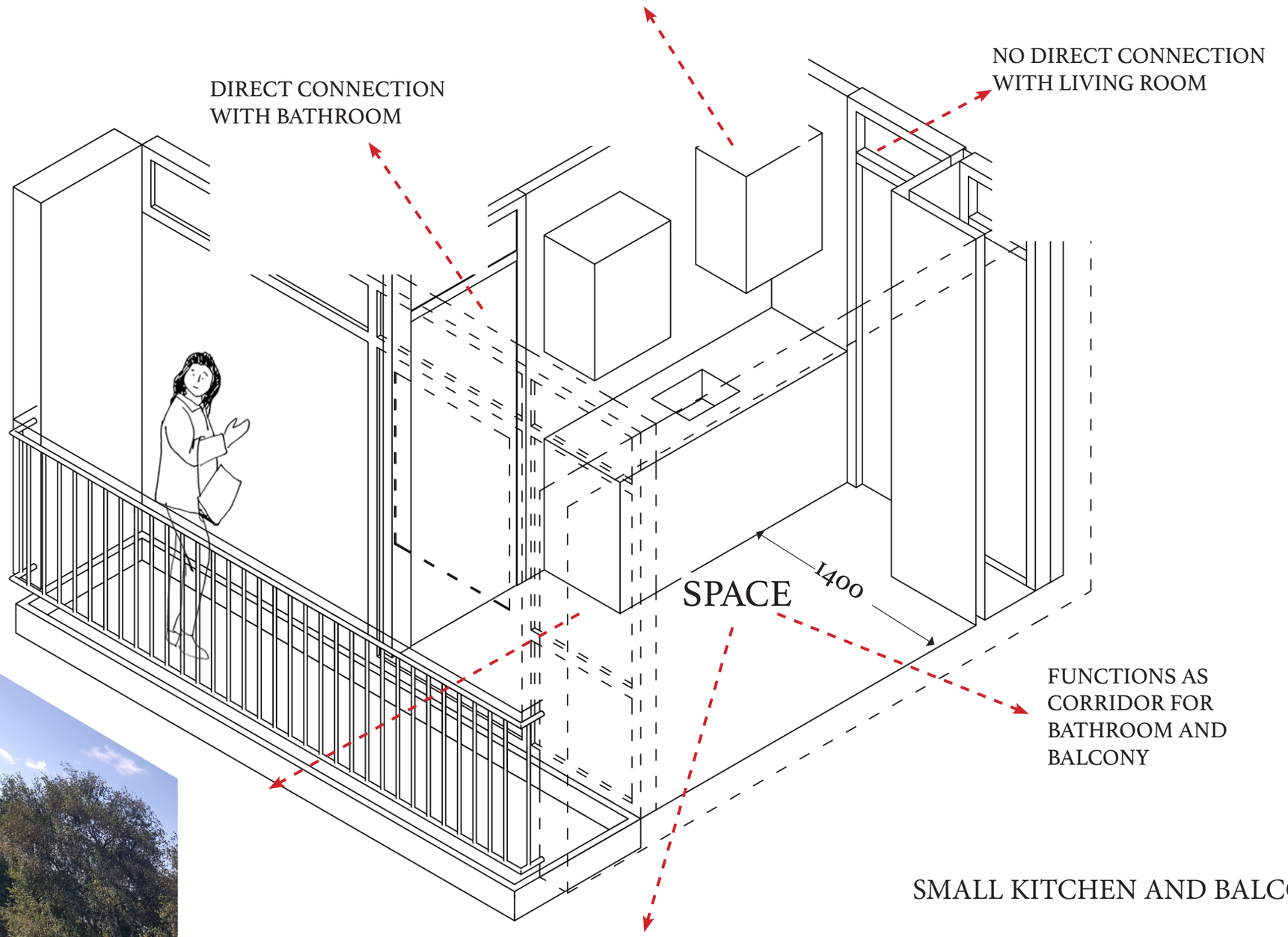
END WALL
EXISTING

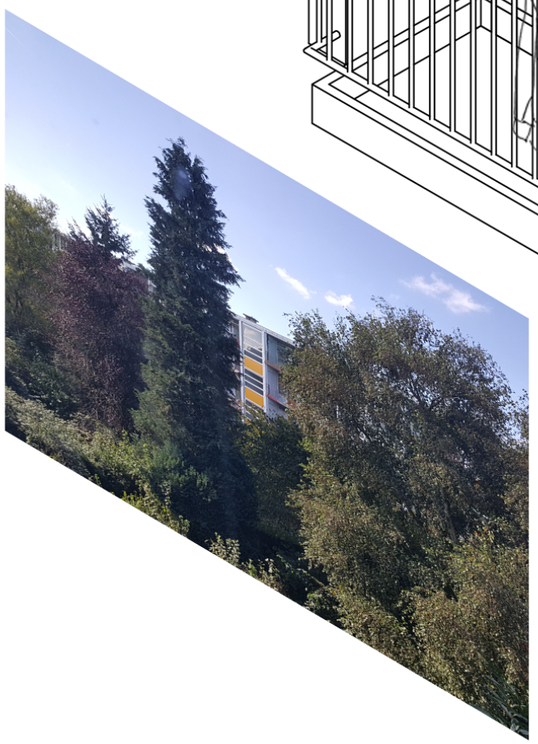
FRONT FACADE
EXISTING

CONTENT



INCONVENIENT ROUTING

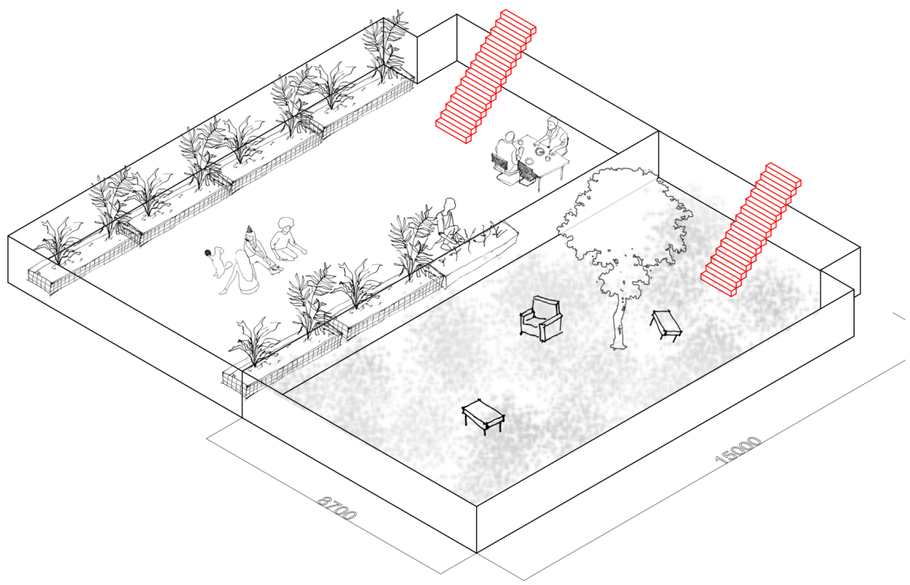




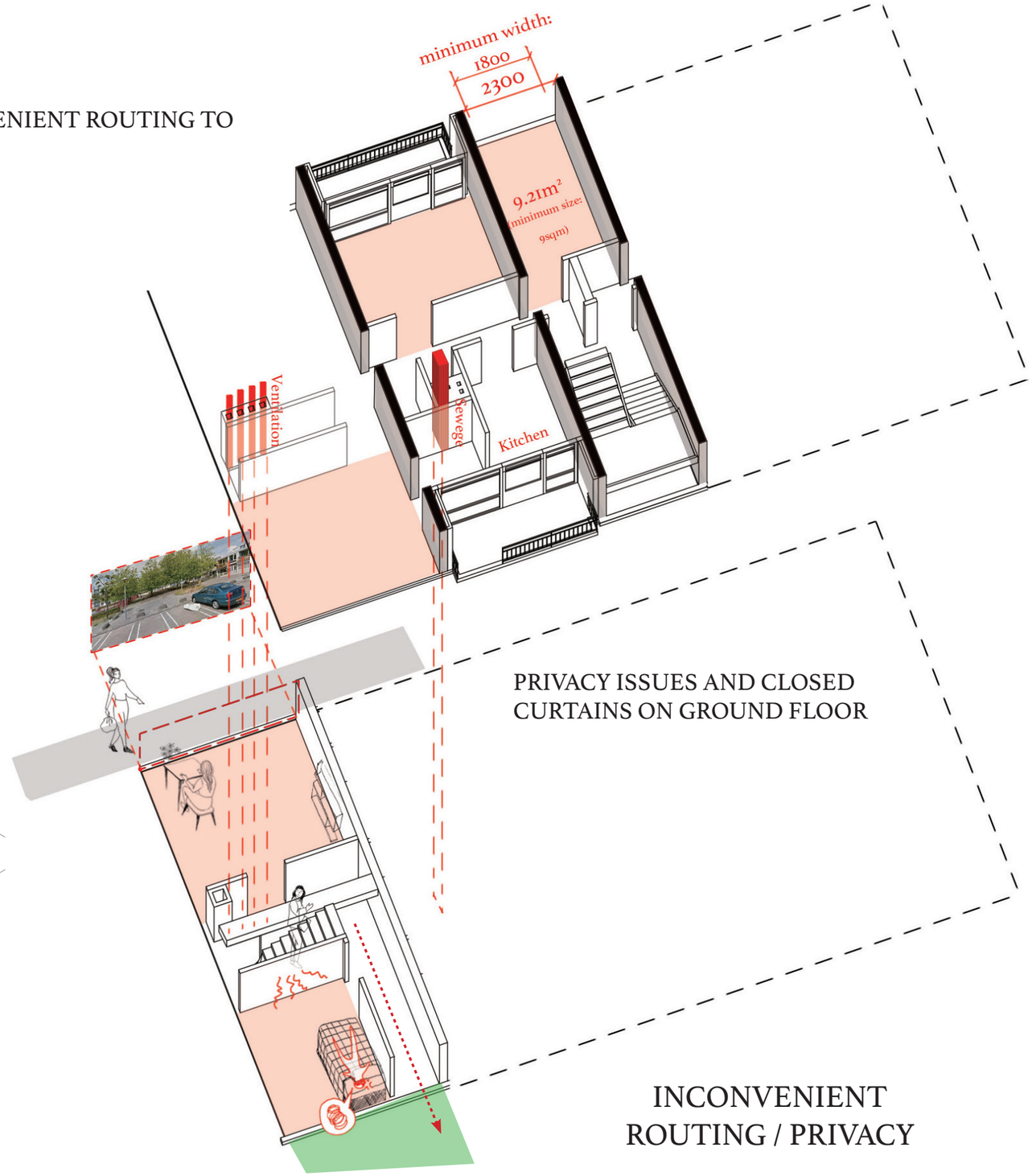
VIEW

SMALL KITCHEN AND BALCONIES

INCONVENIENT ROUTING TO GARDEN



LARGE GARDEN LOT OF MAINTENANCE



PRIVACY ISSUES AND CLOSED CURTAINS ON GROUND FLOOR

INCONVENIENT ROUTING / PRIVACY

Afbeelding 9. Criminaliteit (totaal misdrijven) per 1.000 inwoners+arbeidsplaatsen in Overvecht en Utrecht, in 2015

	Wijk Overvecht	Utrecht
criminaliteit per 1000 inw+arb	74,9	52,0
woninginbraken per 1000 woningen	14,1	11,2
autokraak per 1000 inw+arb	14,7	10,0
geweld: totaal per 1000 inw+arb	6,5	4,0
Totaal	110,3	77,2

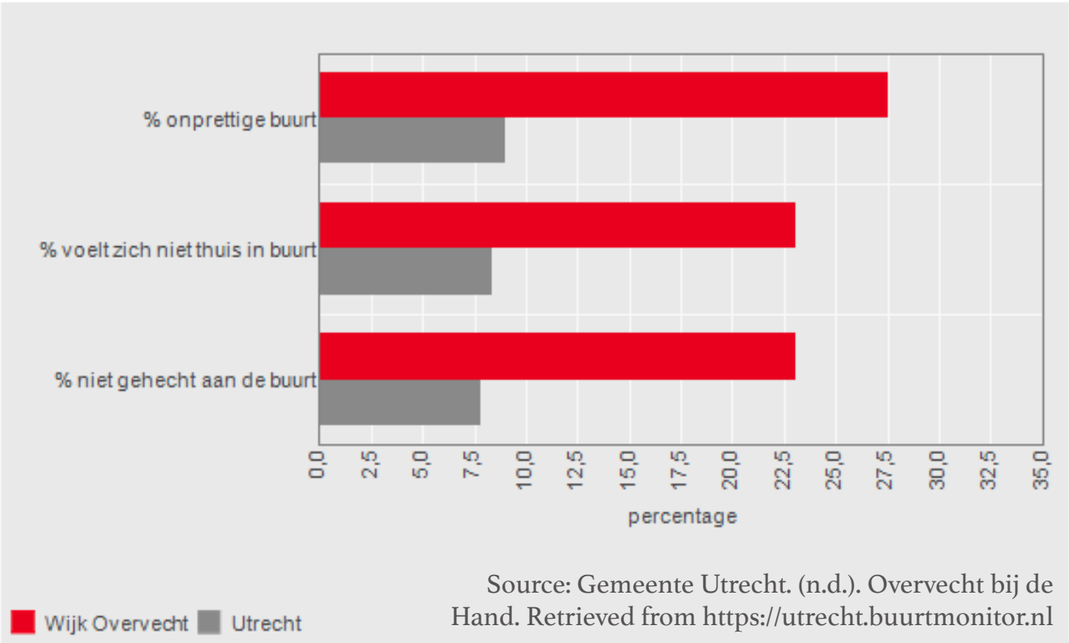
Afbeelding 12. Werkzoekenden, WW en bijstand

	Wijk Overvecht	Utrecht
% werkzoekenden (nww) [2014]	15,3	7,4
% werkzoekenden 15-26 jaar (nww) [2014]	6,4	3,0
% werkloosheidsuitkeringen [2011]	2,5	1,9

Afbeelding 10. Door bewoners ervaren overlast van jongeren en het gevoel van onveiligheid (in eigen buurt) in 2015

	Wijk Overvecht	Utrecht
% vaak last van jongeren op straat in de buurt	41	20
% voelt zich wel eens onveilig in eigen buurt	50	32
% voelt zich vaak onveilig in eigen buurt	10	3
% voelt zich wel eens onveilig algemeen	54	39
% voelt zich vaak onveilig algemeen	8	3

Afbeelding 17. Bewonersoordeel woonomgeving in aandelen, 2015

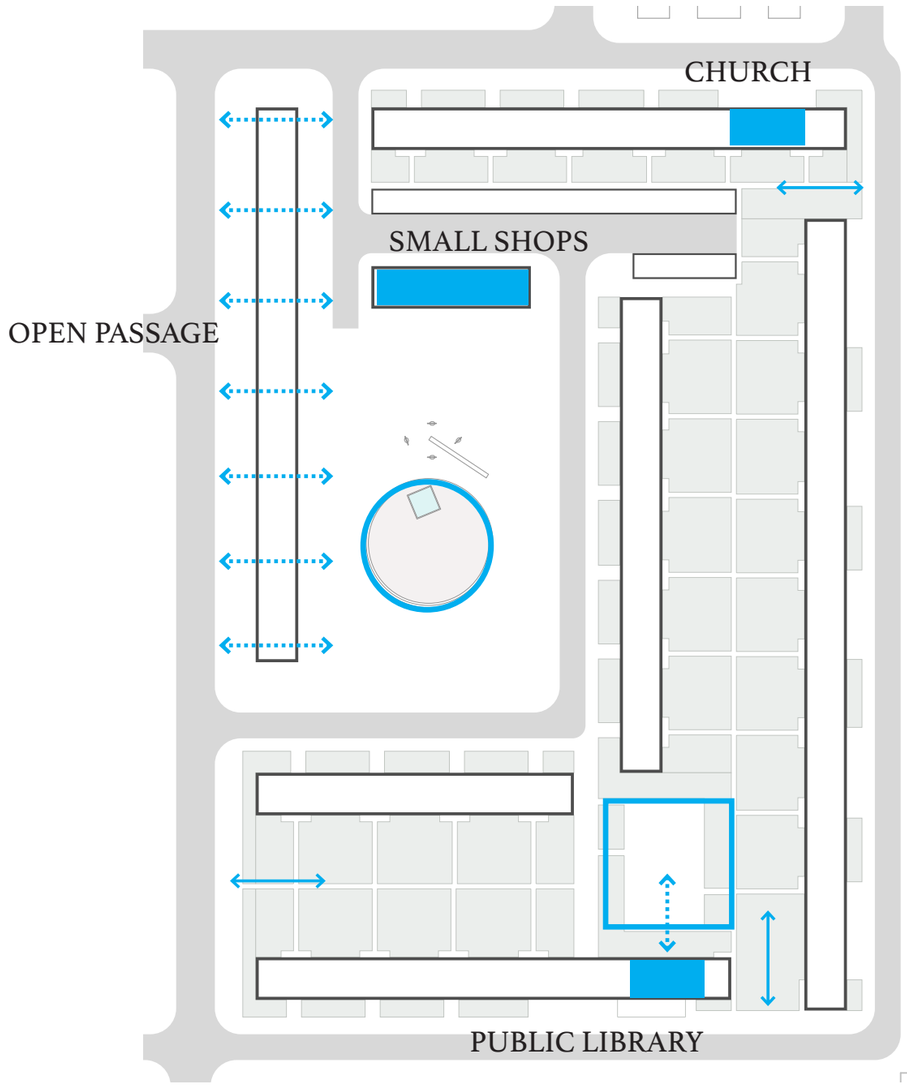


Source: Gemeente Utrecht. (n.d.). Overvecht bij de Hand. Retrieved from https://utrecht.buurtmonitor.nl

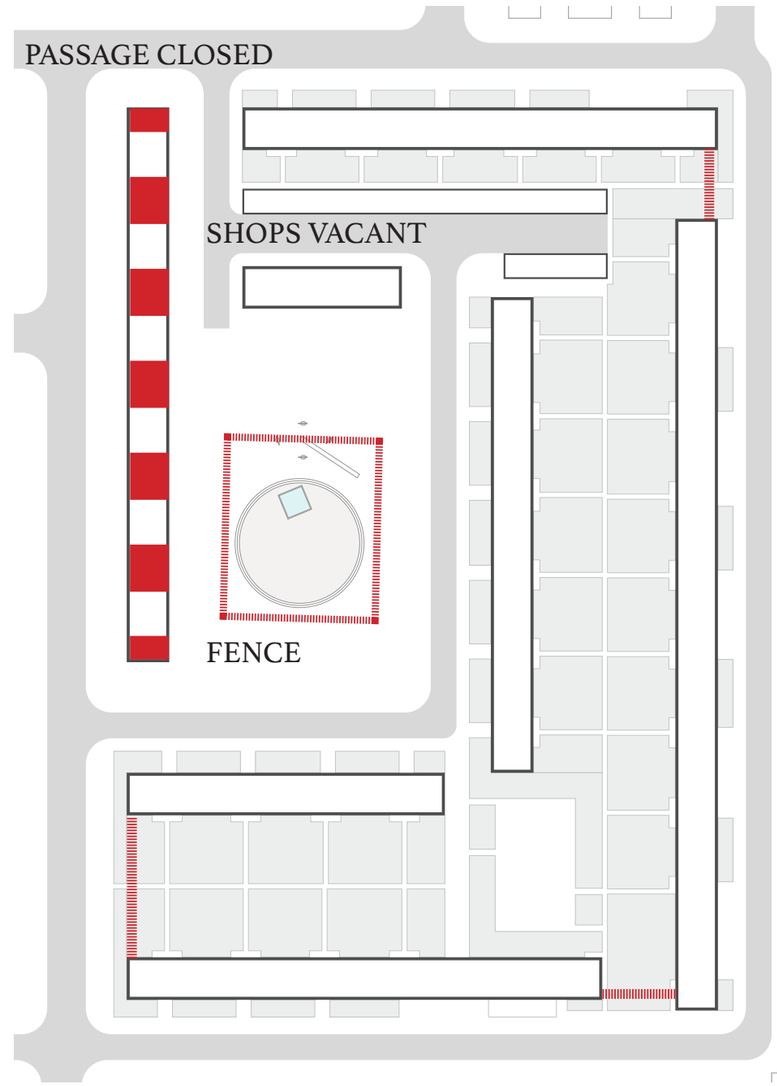
- BAD REPUTATION
- HIGH CRIME RATES
- HIGH UNEMPLOYMENT
-YOUNG PEOPLE HANGING AROUND
- 50% OF THE RESIDENTS FEELS SOMETIMES UNSAFE
- INTEGRATION PROBLEMS

SOCIAL PROBLEMS

Source: Gemeente Utrecht. (n.d.). Overvecht bij de Hand. Retrieved from https://utrecht.buurtmonitor.nl



PAST



PRESENT

VACANT STORES

LESS ATTRACTIVE LIVING ENVIRONMENT BECAUSE CHANGE OF SOCIETY

mitros

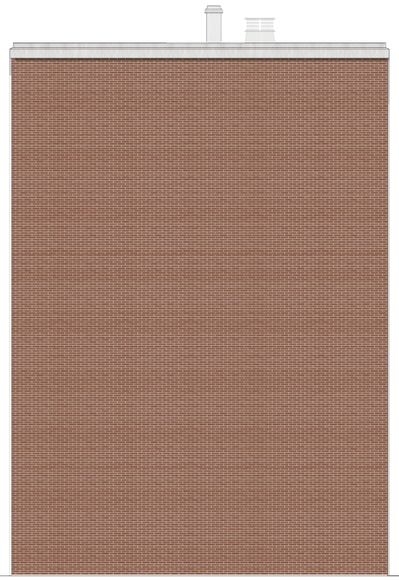
AMBITION MITROS

CURRENT SITUATION

ACCORDING TO LEGISLATION

WITHOUT FOSSIL FUELS

BACK FACADE
EXISTING



END WALL
EXISTING

FRONT FACADE
EXISTING

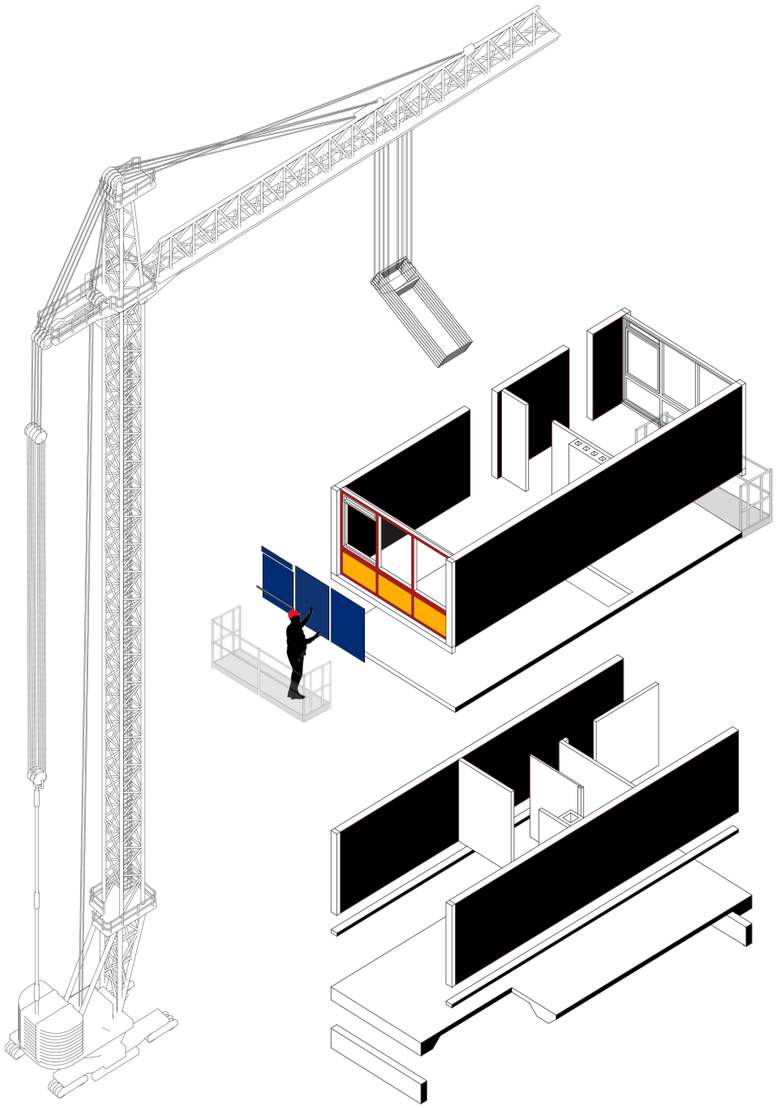
CONTENT

AMBITION:
REDUCING THE ENERGY DEMAND AND
CREATING QUALITY FOR THE USERS
WITH OBSERVANCE OF (HISTORICAL
VALUES IN THE RENOVATION OF THE
INTERVAMFLATS AT THE CAMERA
OBSCURADREEF IN UTRECHT
OVERVECHT

ENERGY COMFORT

CLIMATE
USER QUALITY
SOCIAL COHESION
LIVELY AREA
EASY ACCESSIBLE
PRIVACY
COMFORTABLE LIVING ENVIRONMENT

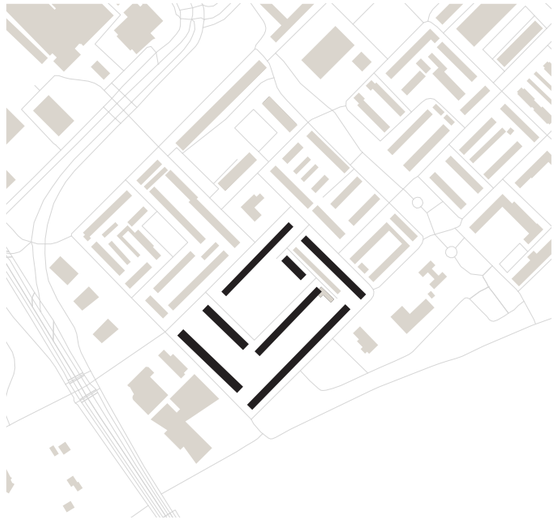
CONTENT



Building system VAM
(photo google streetview)

Intervam flat Camera obscuradreef
(photo google streetview)

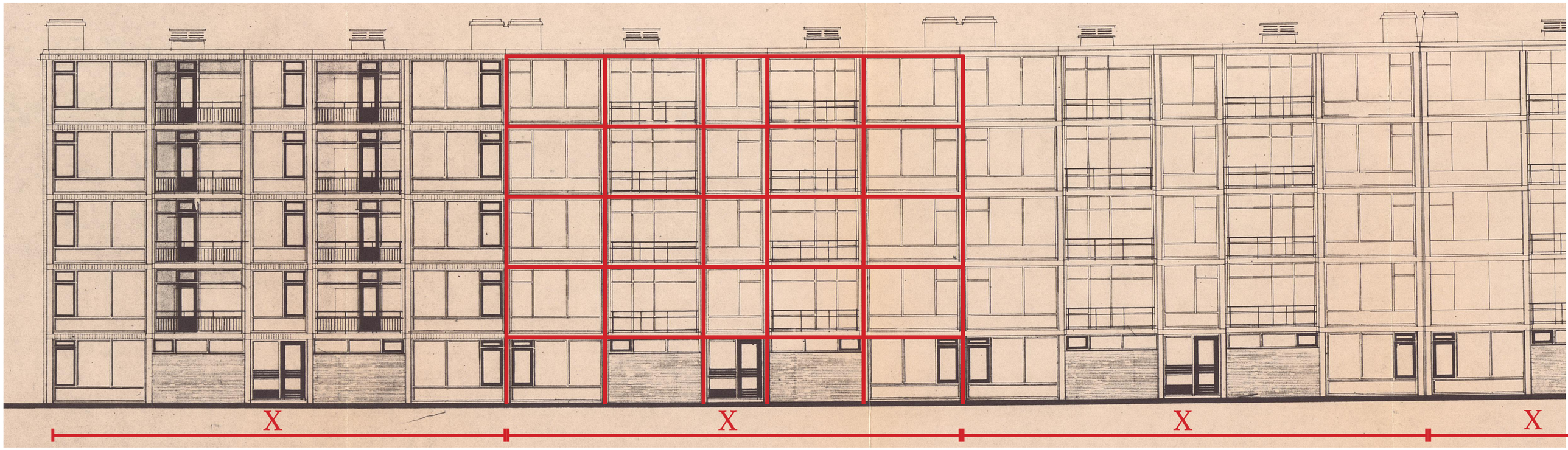
Intervam flat Kanaleneiland
(photo google streetview)



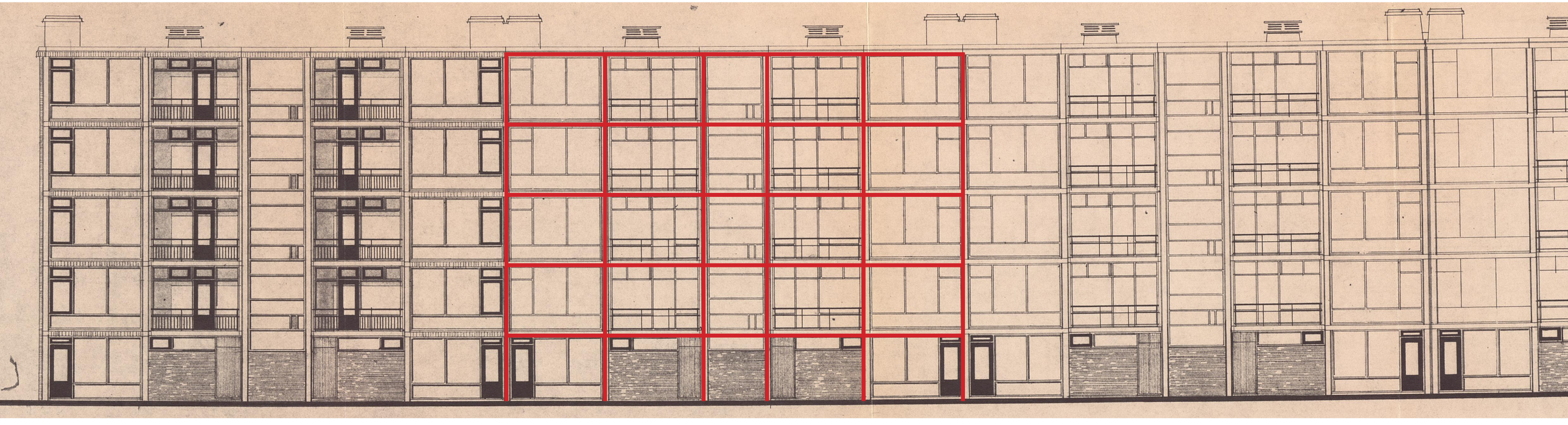
Structure of the neighborhood

“Wijkgedachte”
(image: http://www.bestaandewoningbouw.nl/begrip-van-het-verleden-biedt-kansen-voor-de-toekomst/)

Intervam flats in Overvecht-Zuid



Front elevation (before renovation)

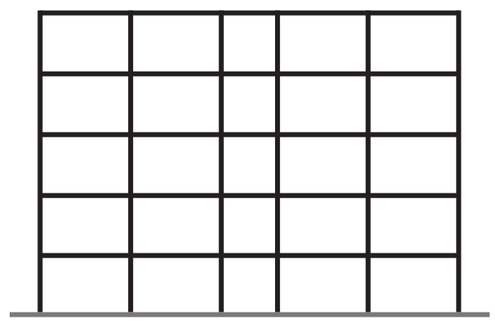


Rear elevation (before renovation)

(Image: Utrecht Archive)

URBAN
- SPACIAL PLACEMENT
BUILDINGS

Cultural value



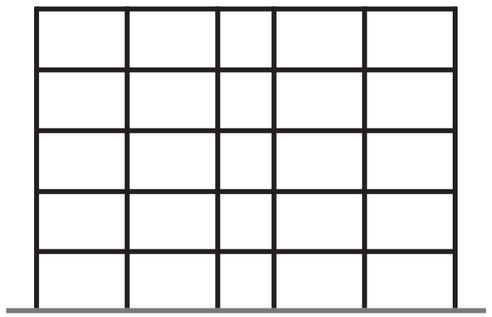
GRID
- CHARACTERISTIC FOR
INTERVAM 1964

AMBITION

ENERGY
- ENERGY EFFICIENT

COMFORT
- COMFORTABLE LIVING ENVIRONMENT

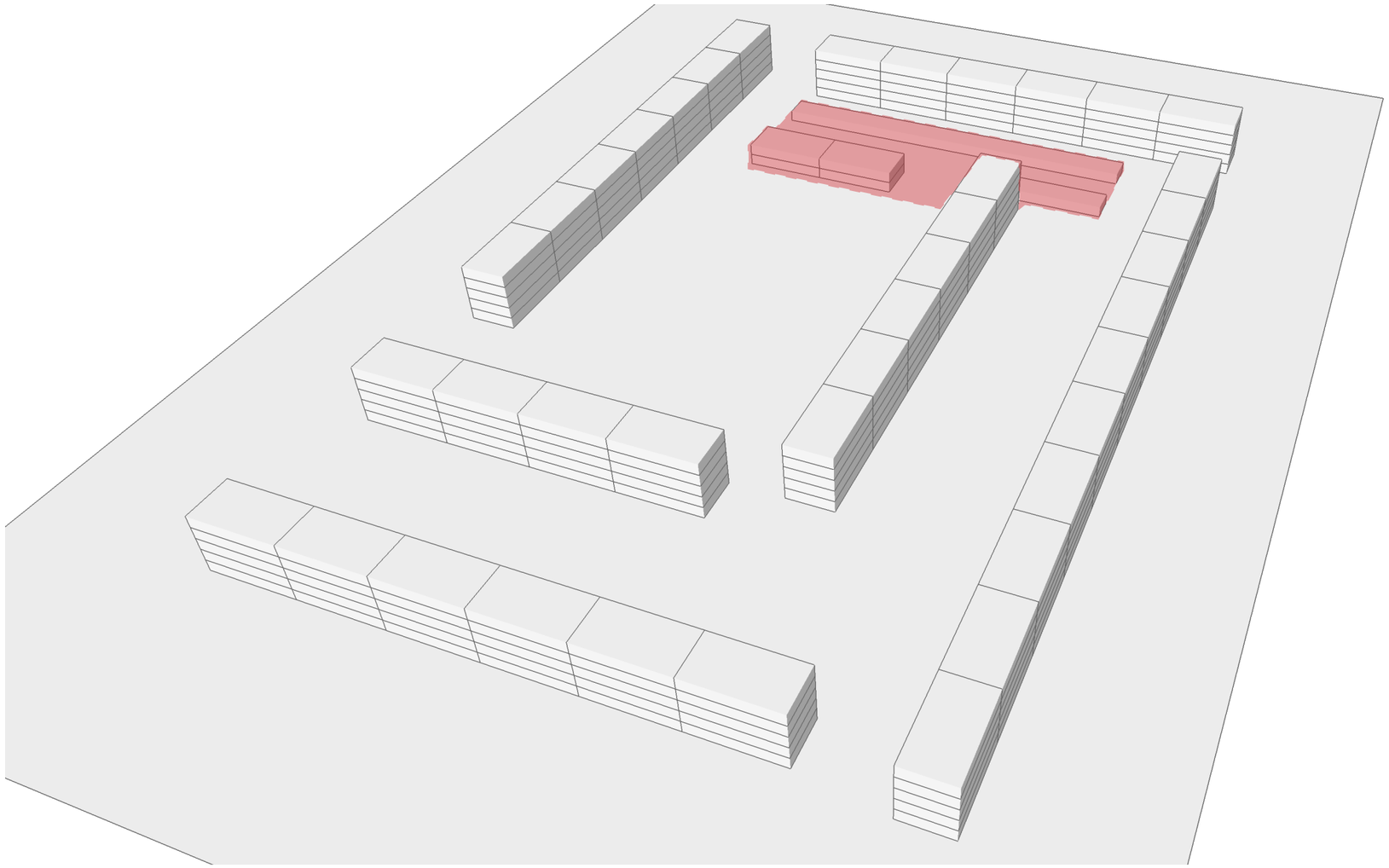
URBAN
- SPACIAL PLACEMENT BUILDINGS



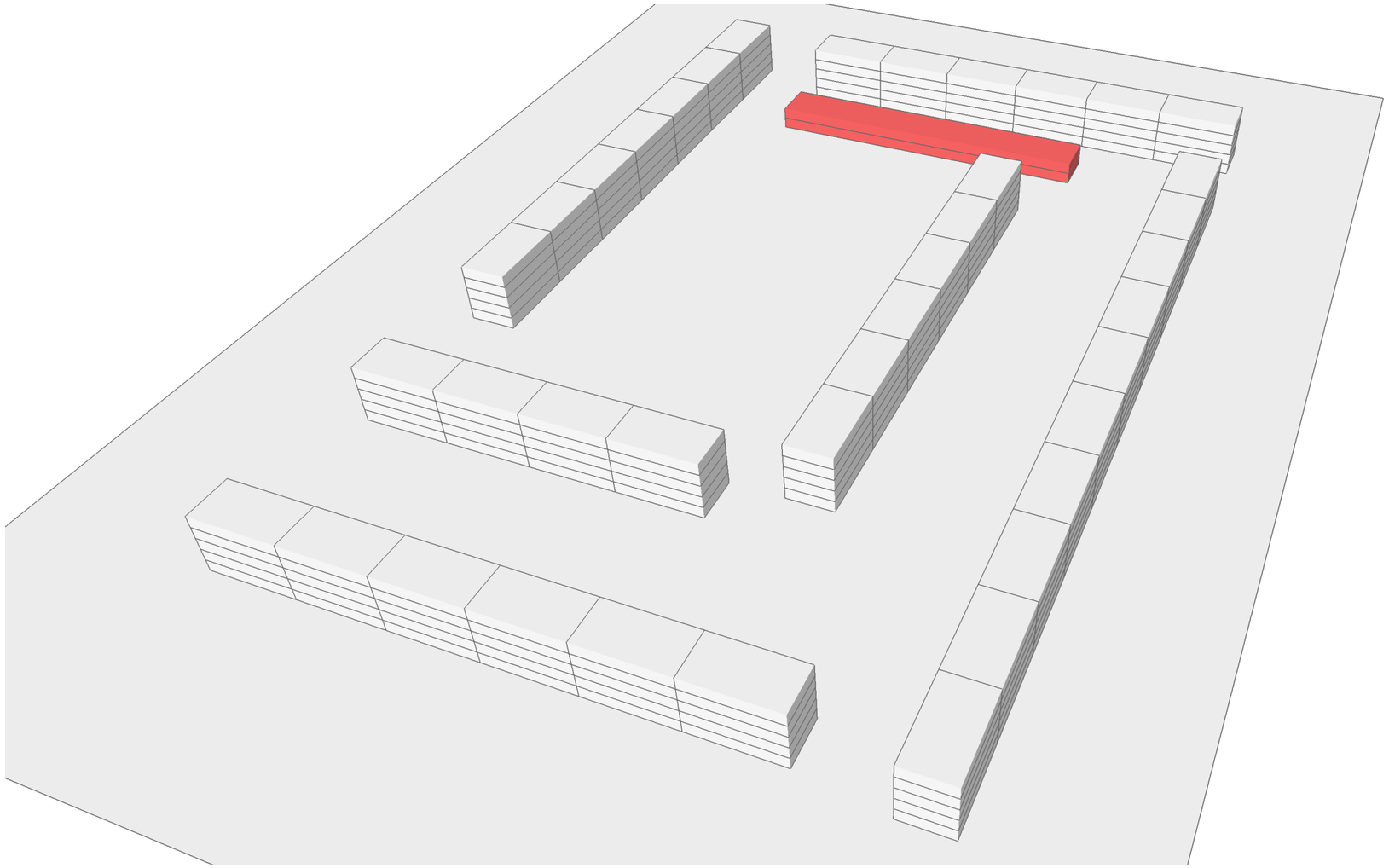
GRID
- CHARACTERISTIC FOR INTERVAM 1964

CONTENT

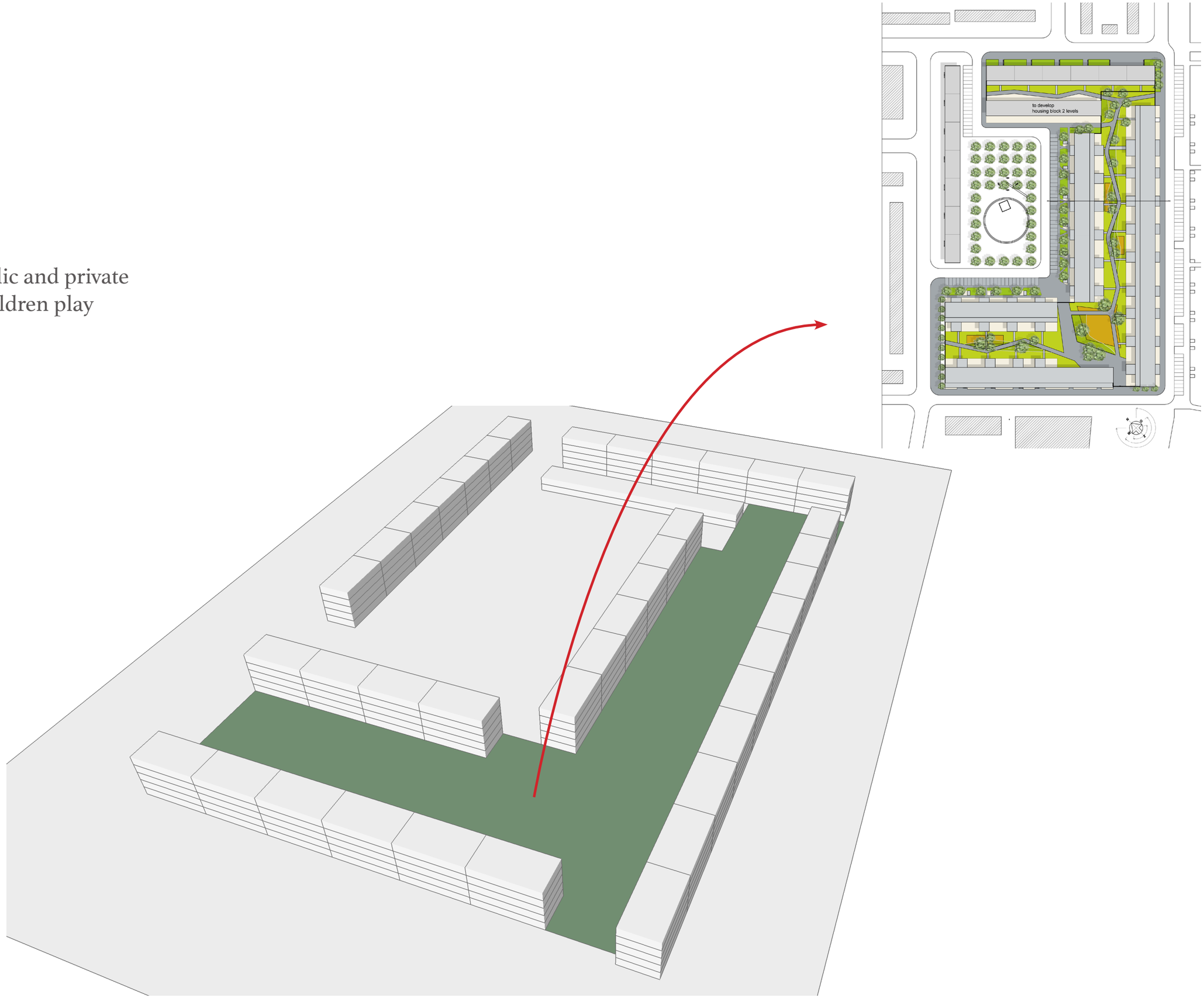
Demolish garages and store
- Remove uncomfortable or non-functioning spaces

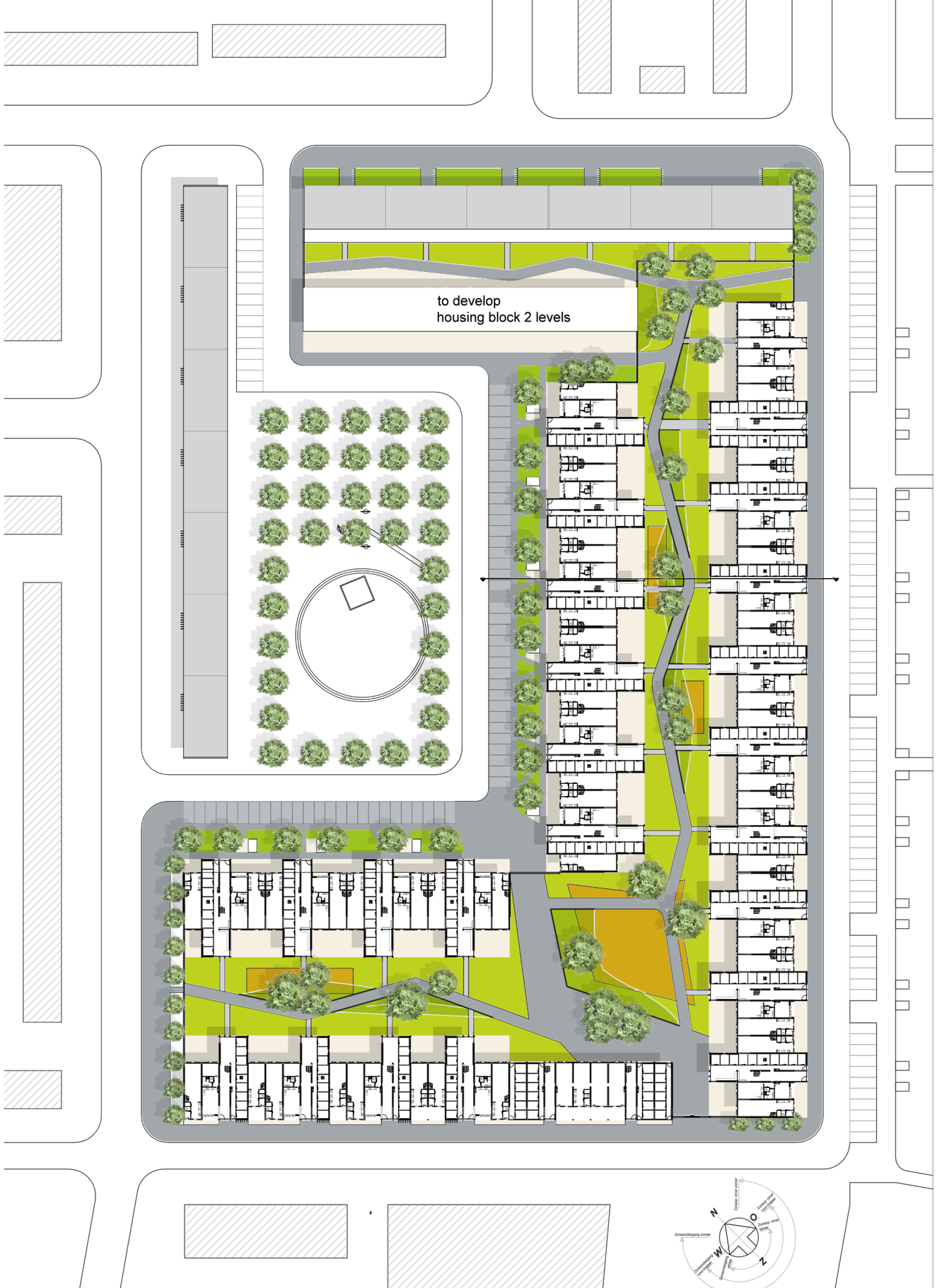


Densify
- Introducing new homes

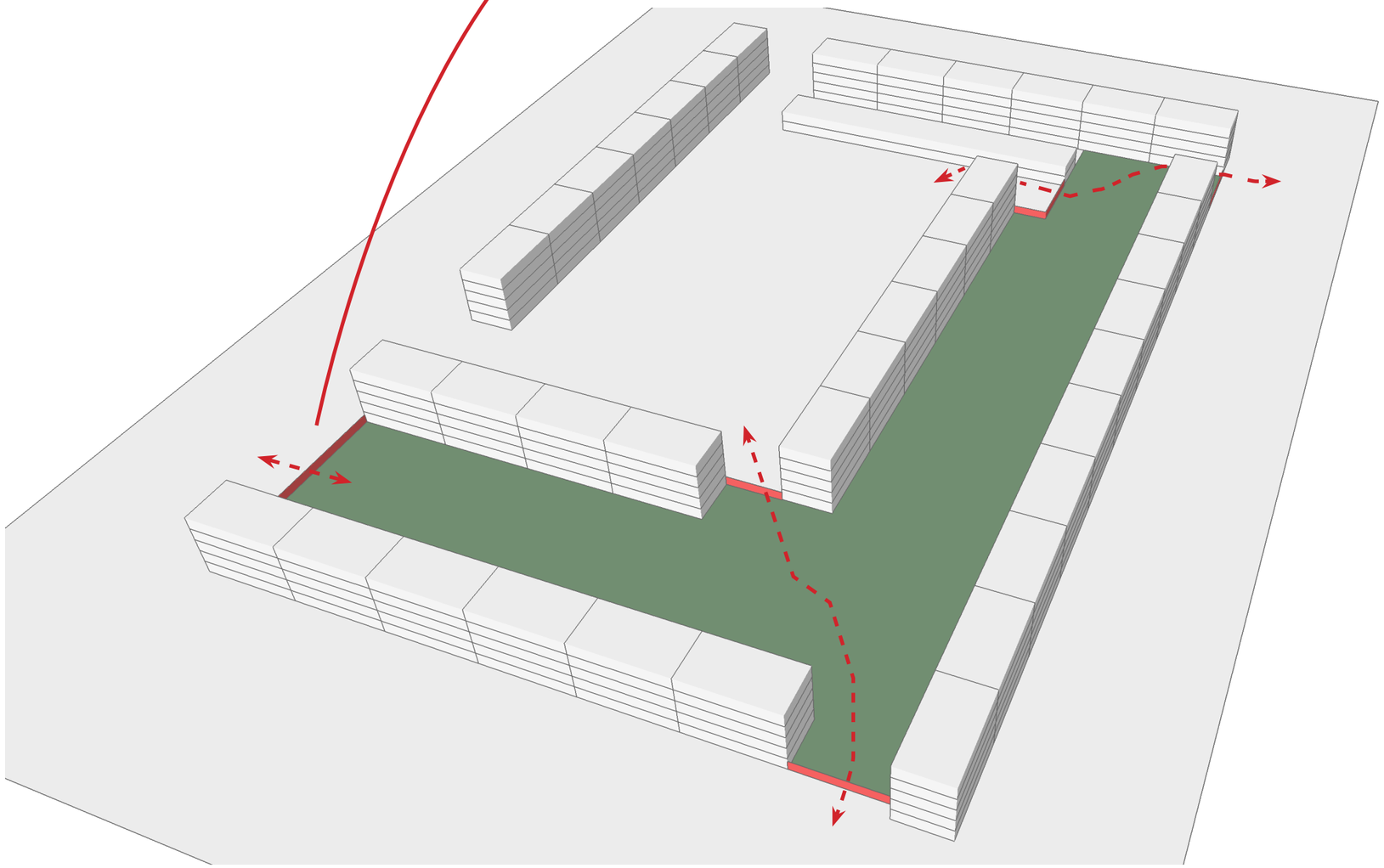


Community garden
- Zone between public and private
- People interact, children play
- Social cohesion
- Integration

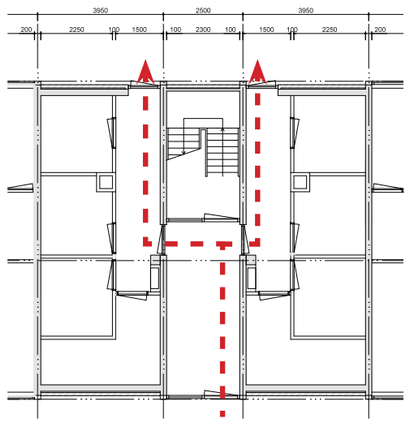



to develop
housing block 2 levels
N
O
Z
W
Zonsopgang zomer
Zonsondergang zomer
Zonsopgang winter
Zonsondergang winter

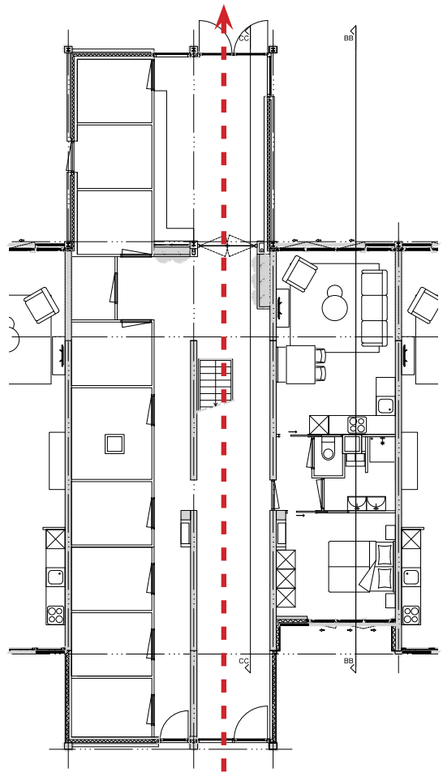
Community garden
- Limited access at night



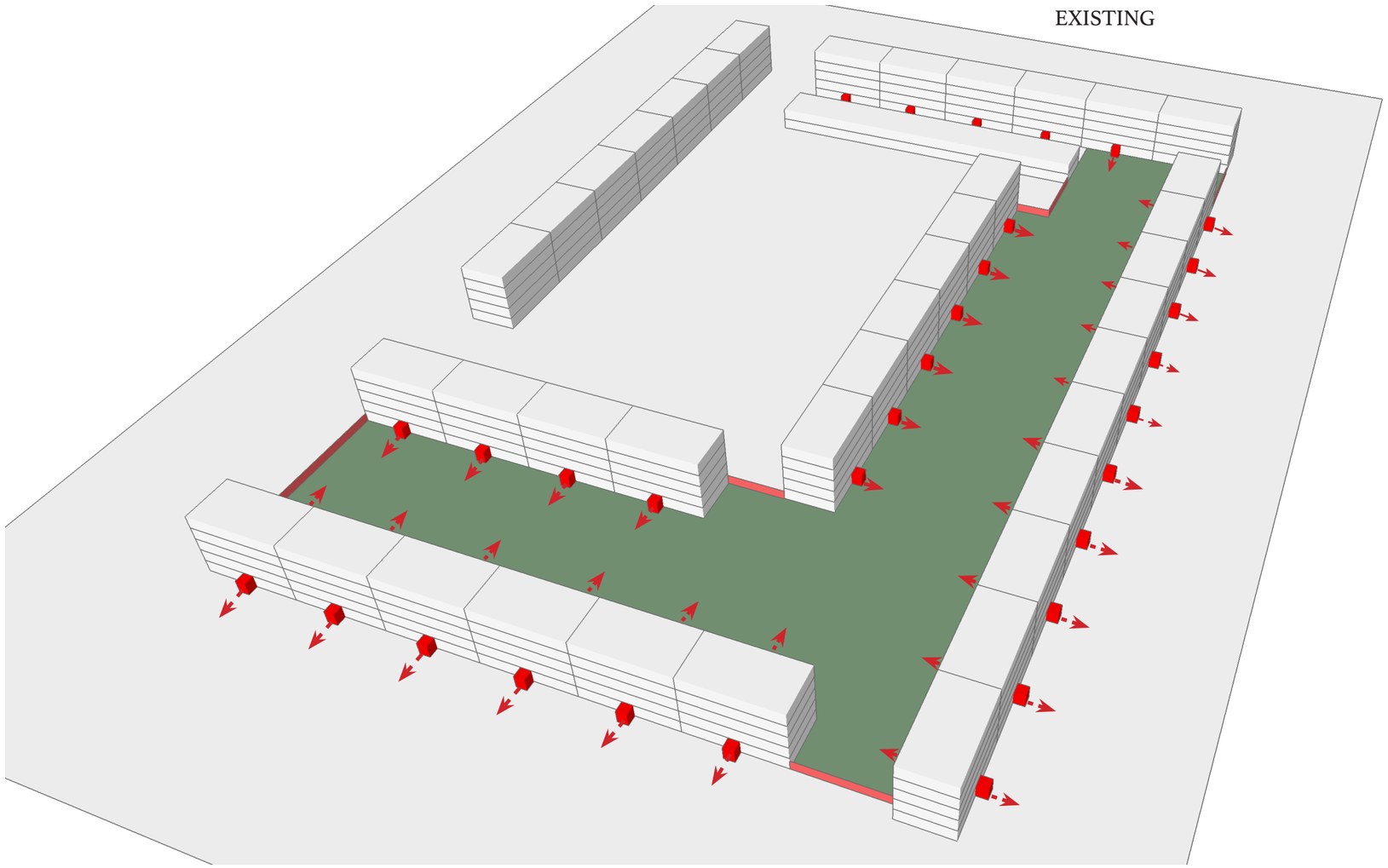
Community garden
- Access through portiek
- Inviting entrance garden



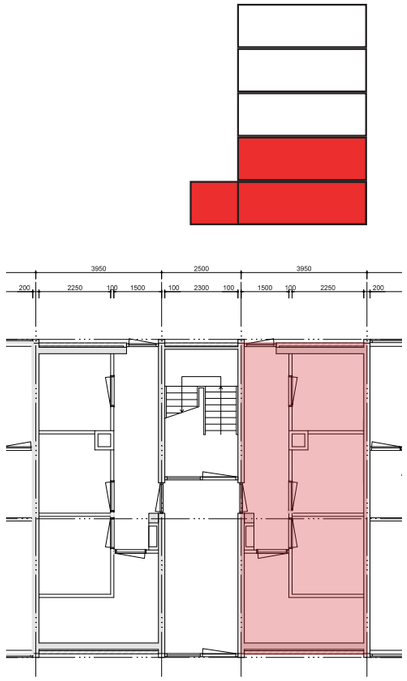
EXISTING



DESIGN



Densify for social control
- Social control
- Dwelling instead of storage
- Lively plinth
- Easy access dwelling
- Extension 3 m for 43 m2 apartment



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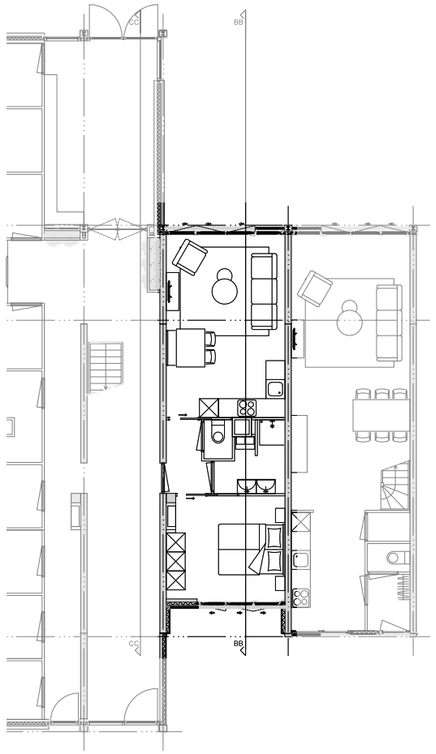
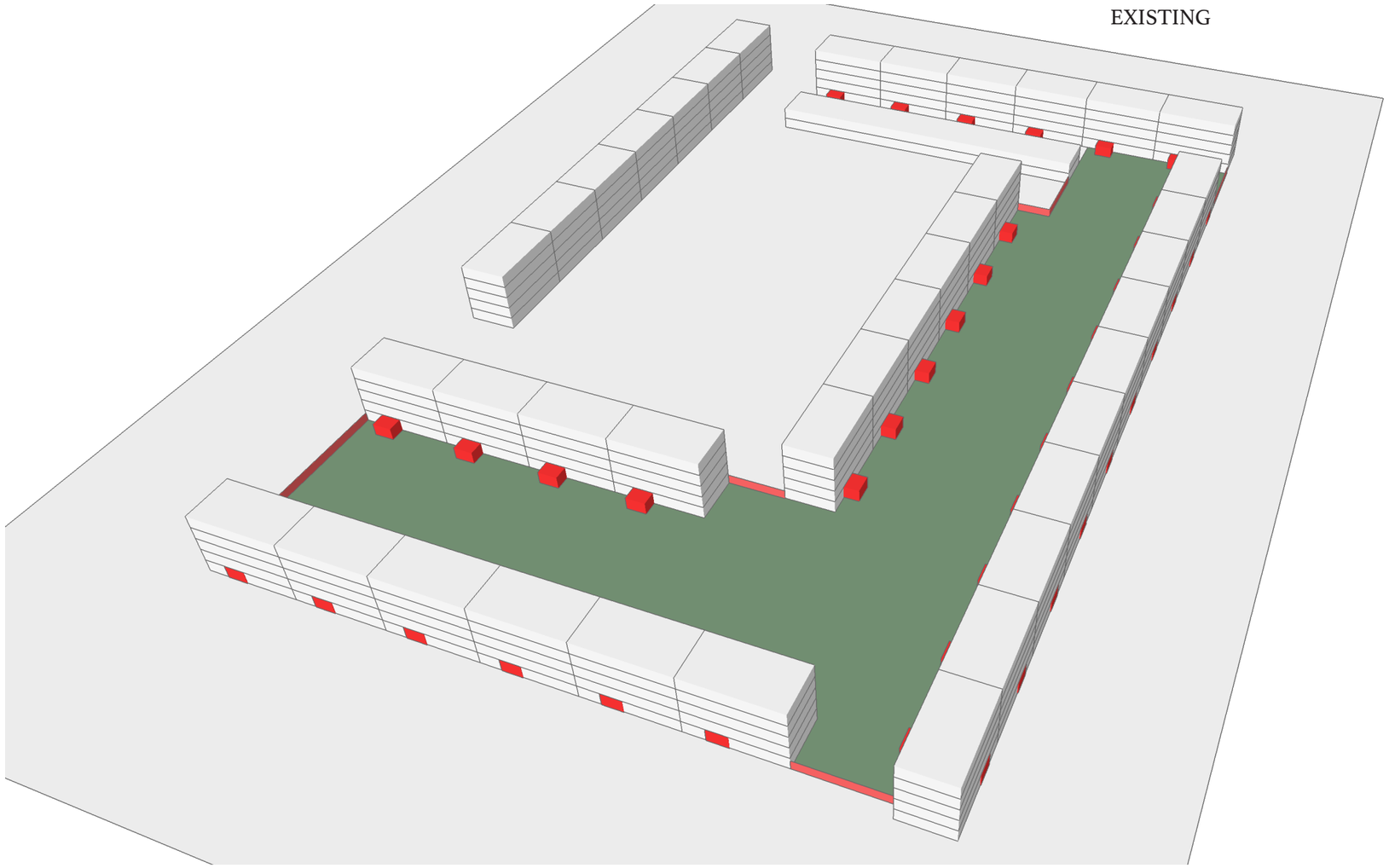
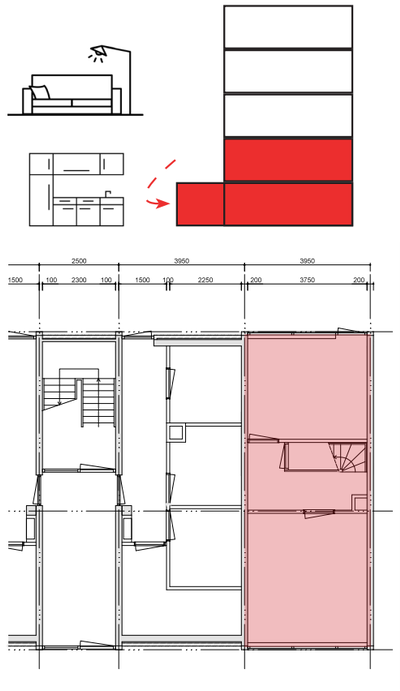


DESIGN



Change floor plan
- Living room and kitchen to the ground floor
- Better access garden
- Lively plinth
- Social control



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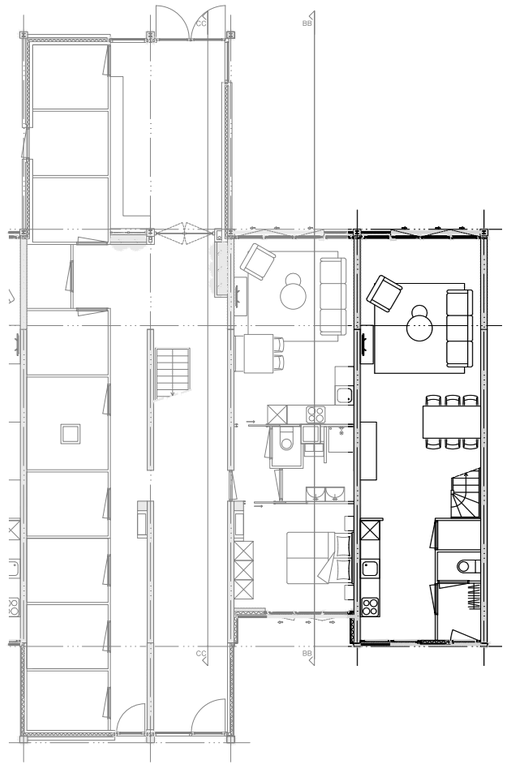
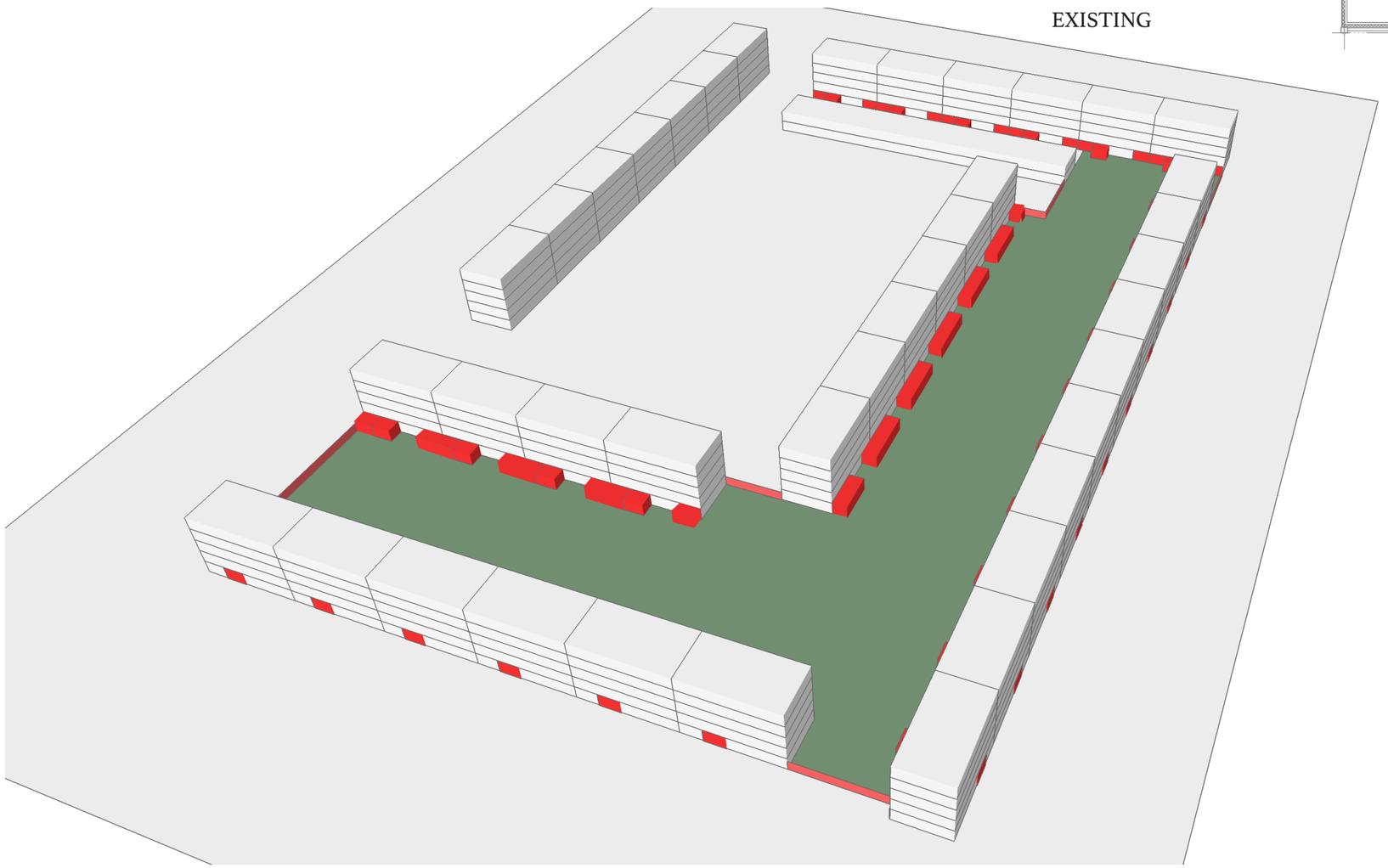
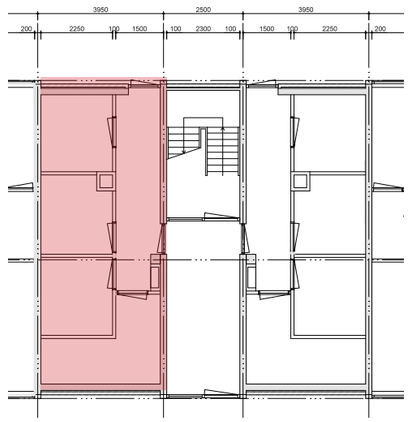


DESIGN



Replacing storage
- Better access storages
- Creating privacy for ground floor apartments



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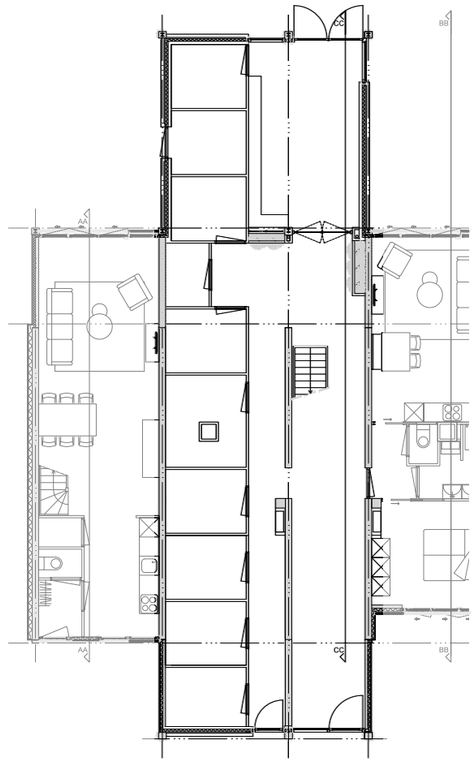
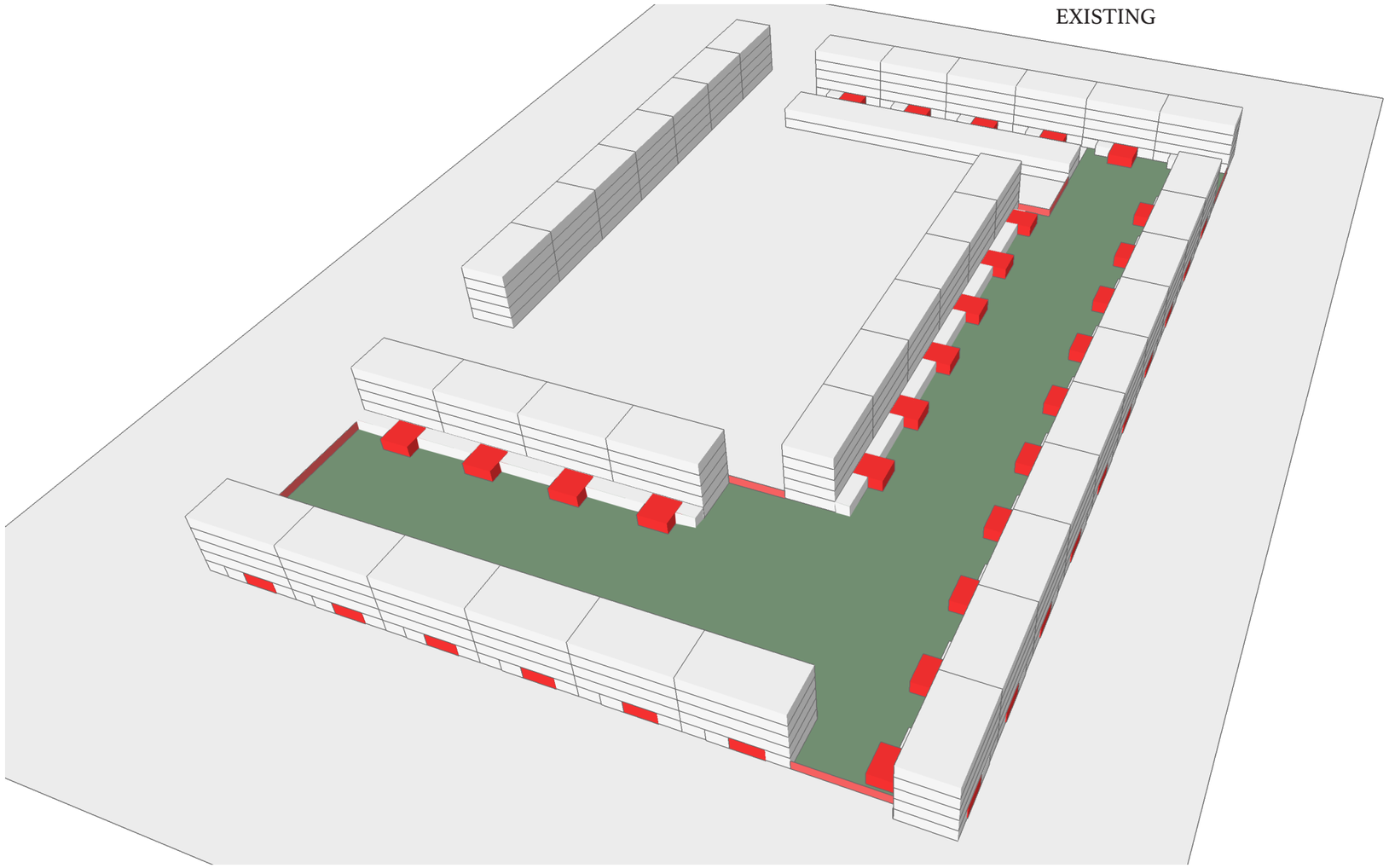
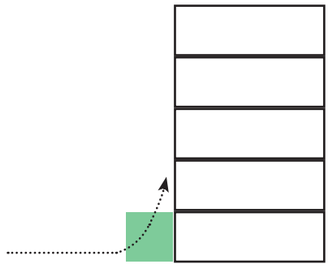
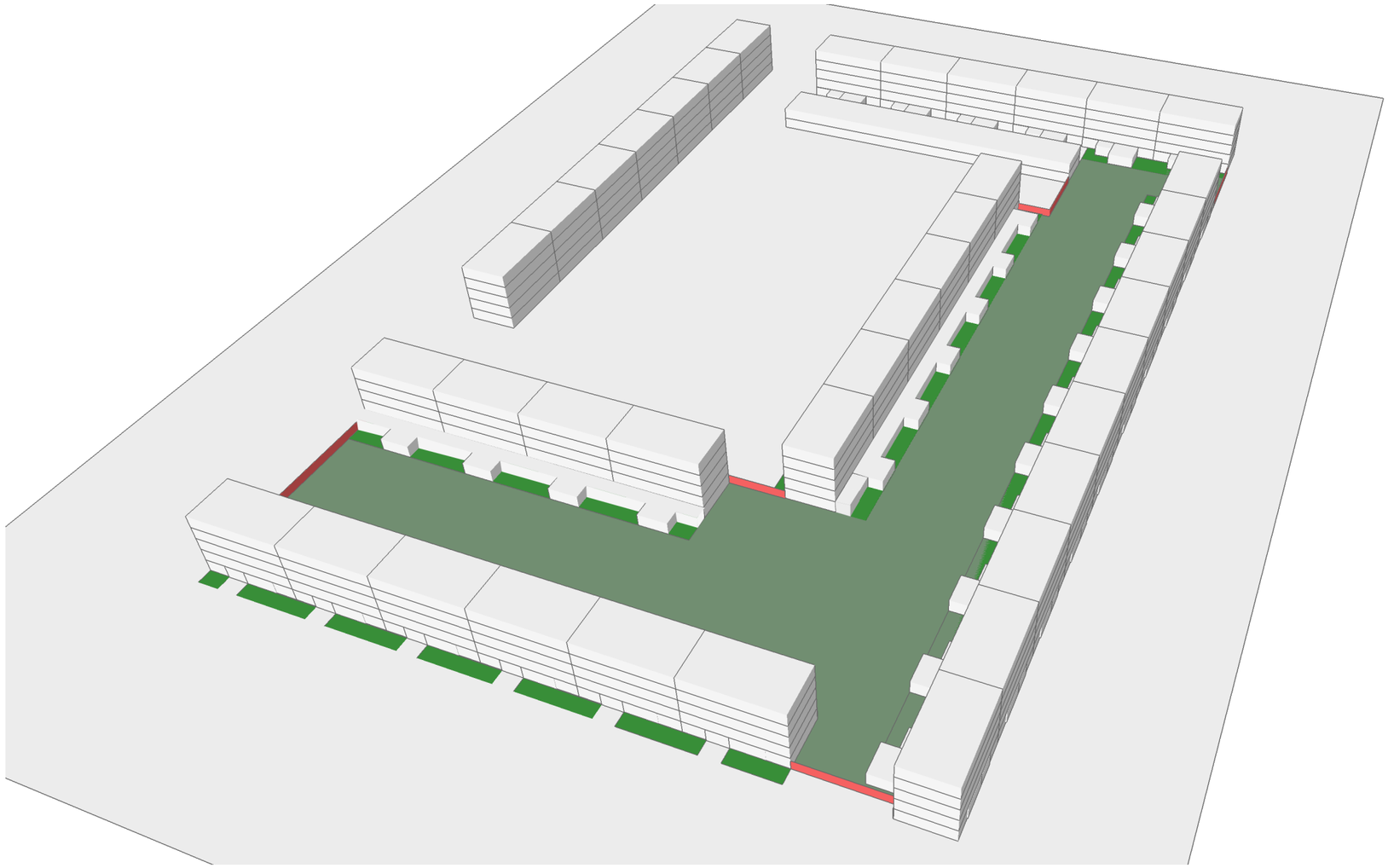


DESIGN

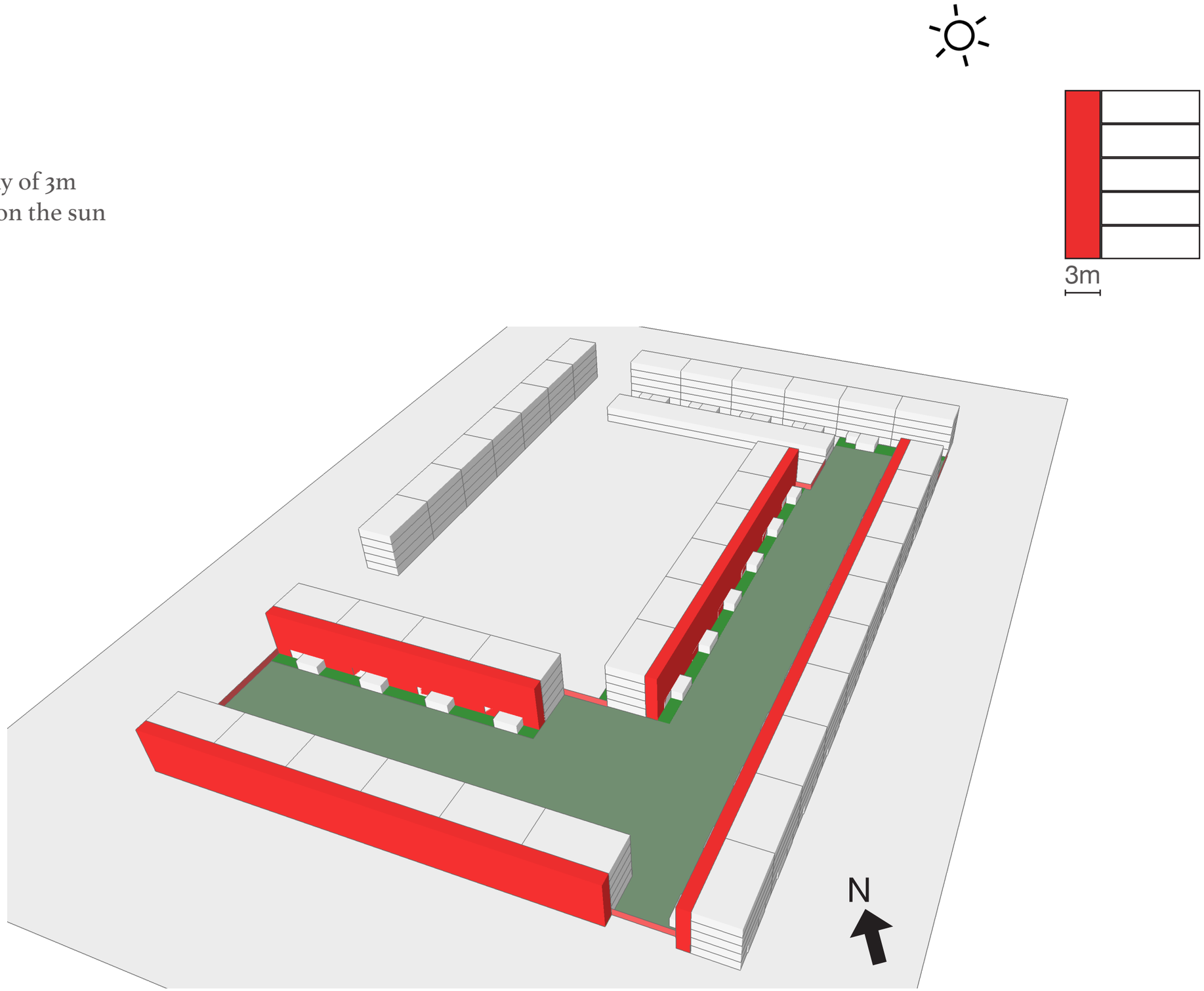


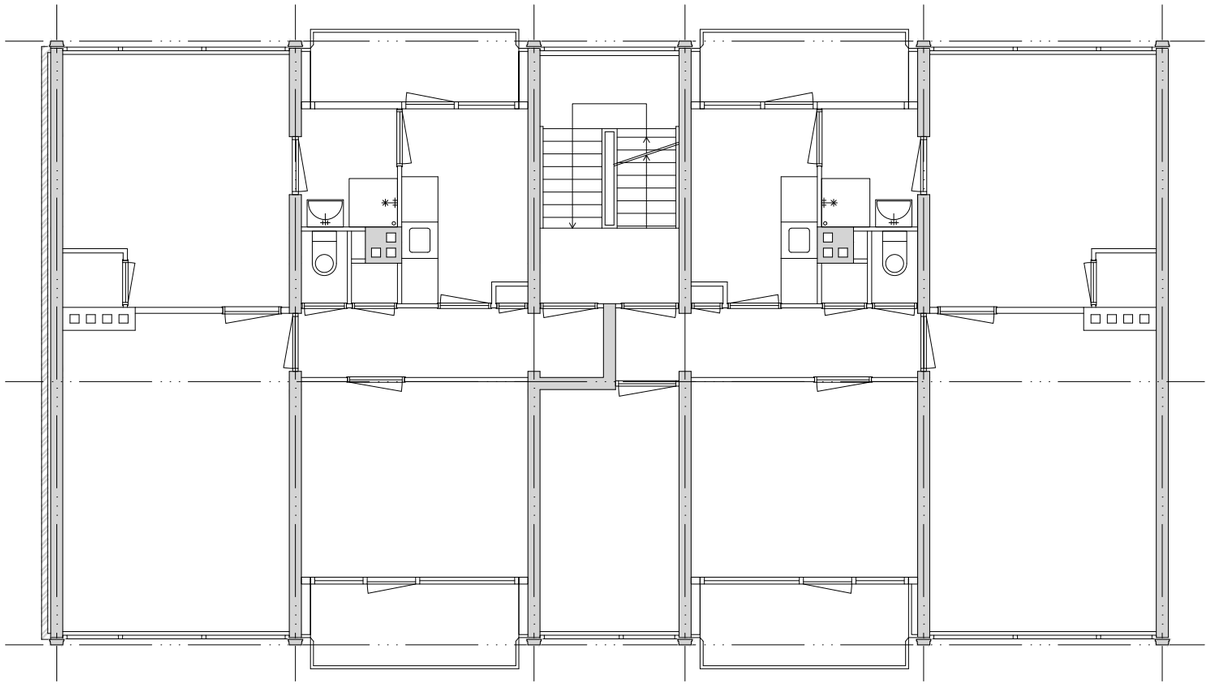
Front and back garden
- Transition between public and private



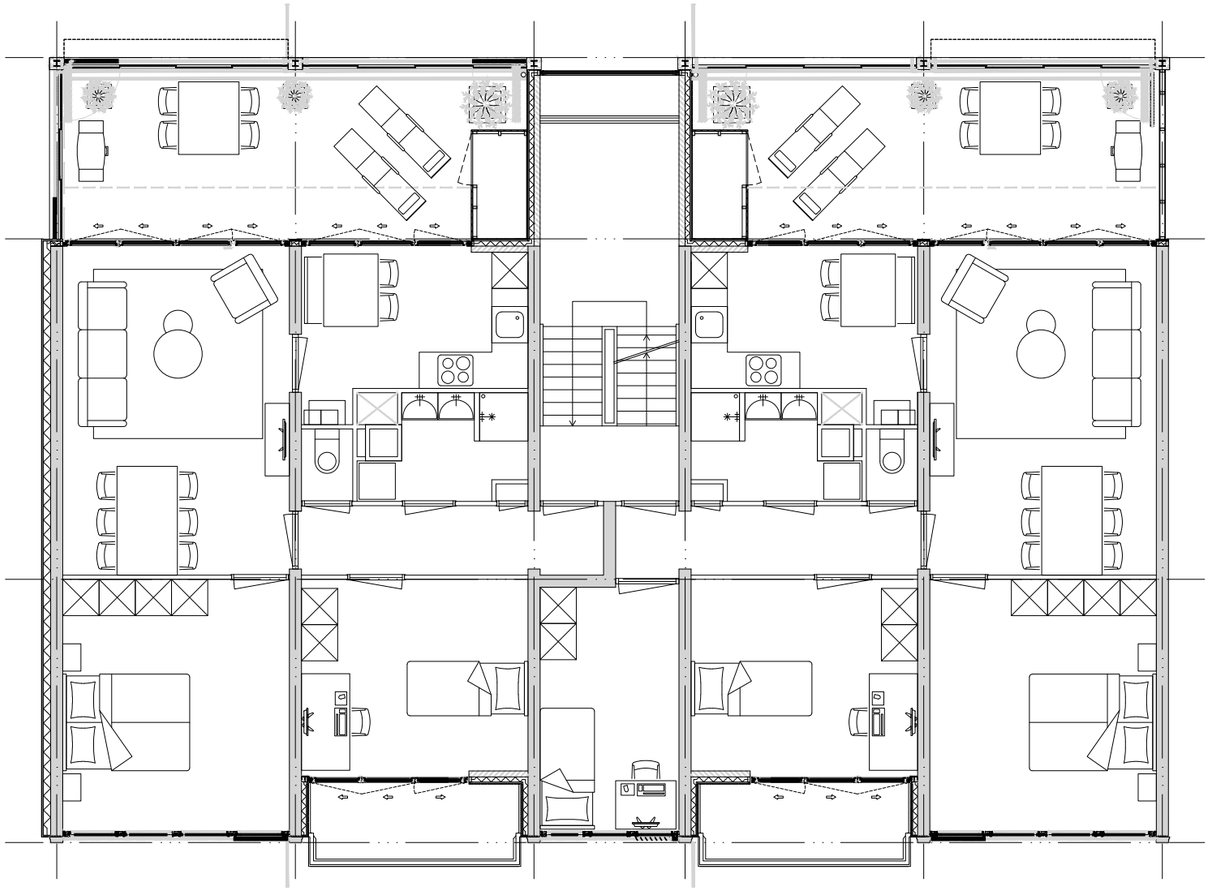


Create user quality
- Introducing balcony of 3m
- Orientation based on the sun



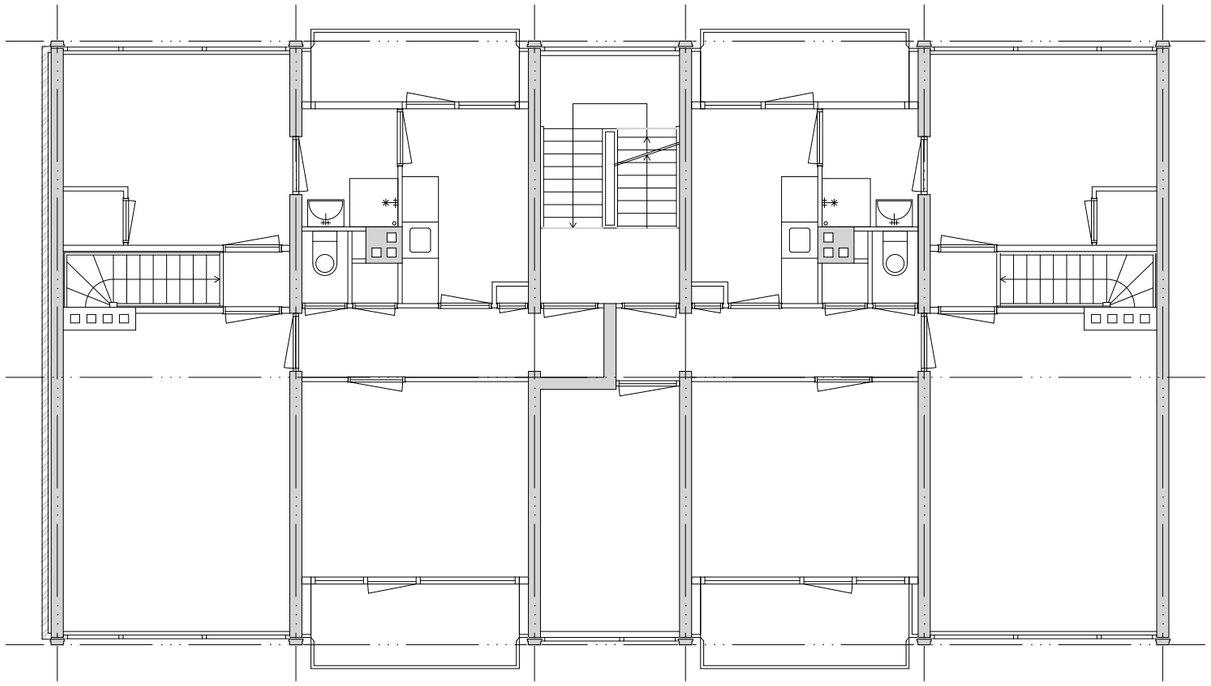


FLOOR PLAN 2ND - 4TH
EXISTING

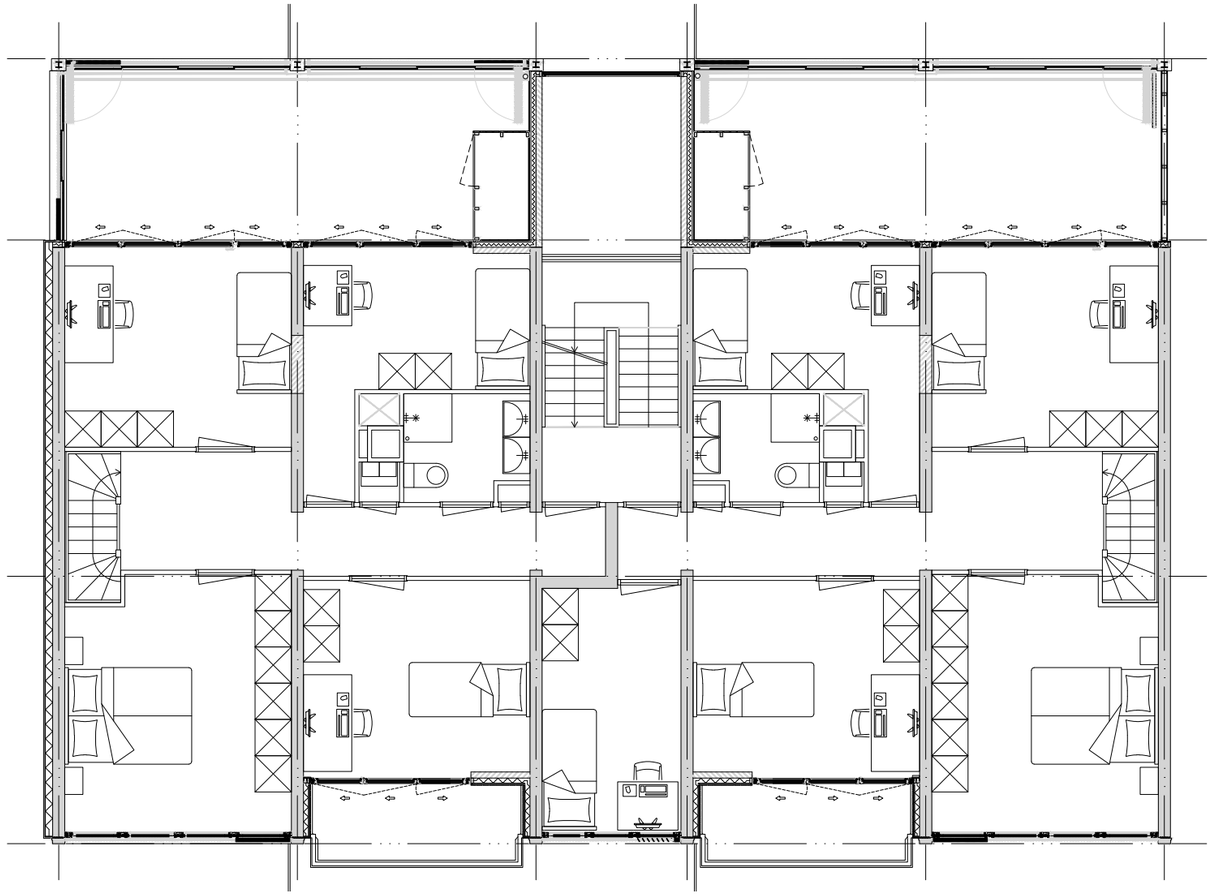


DESIGN

2ND- 4TH	EXISTING	DESIGN
BEDROOM	16,1 -12,1	15,7 - 12,1
LIVING ROOM	19,9	20,4
KITCHEN	6,5	9,3
BATHROOM	3,1	4,0

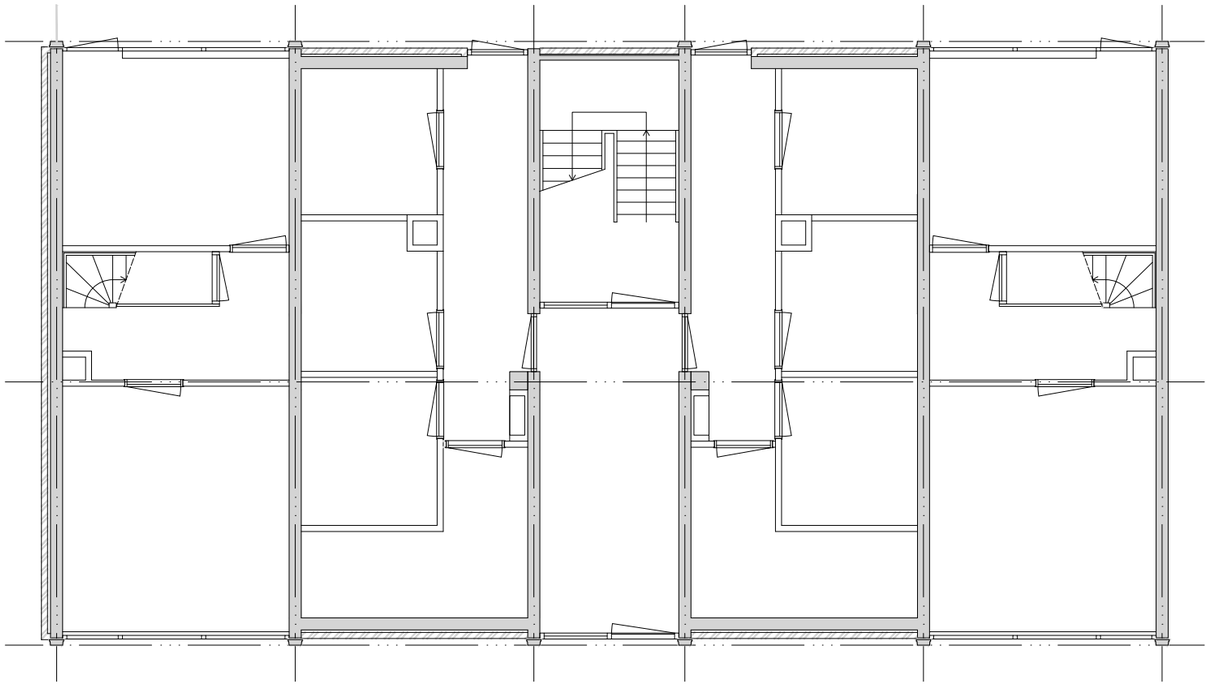


1ST FLOOR
EXISTING

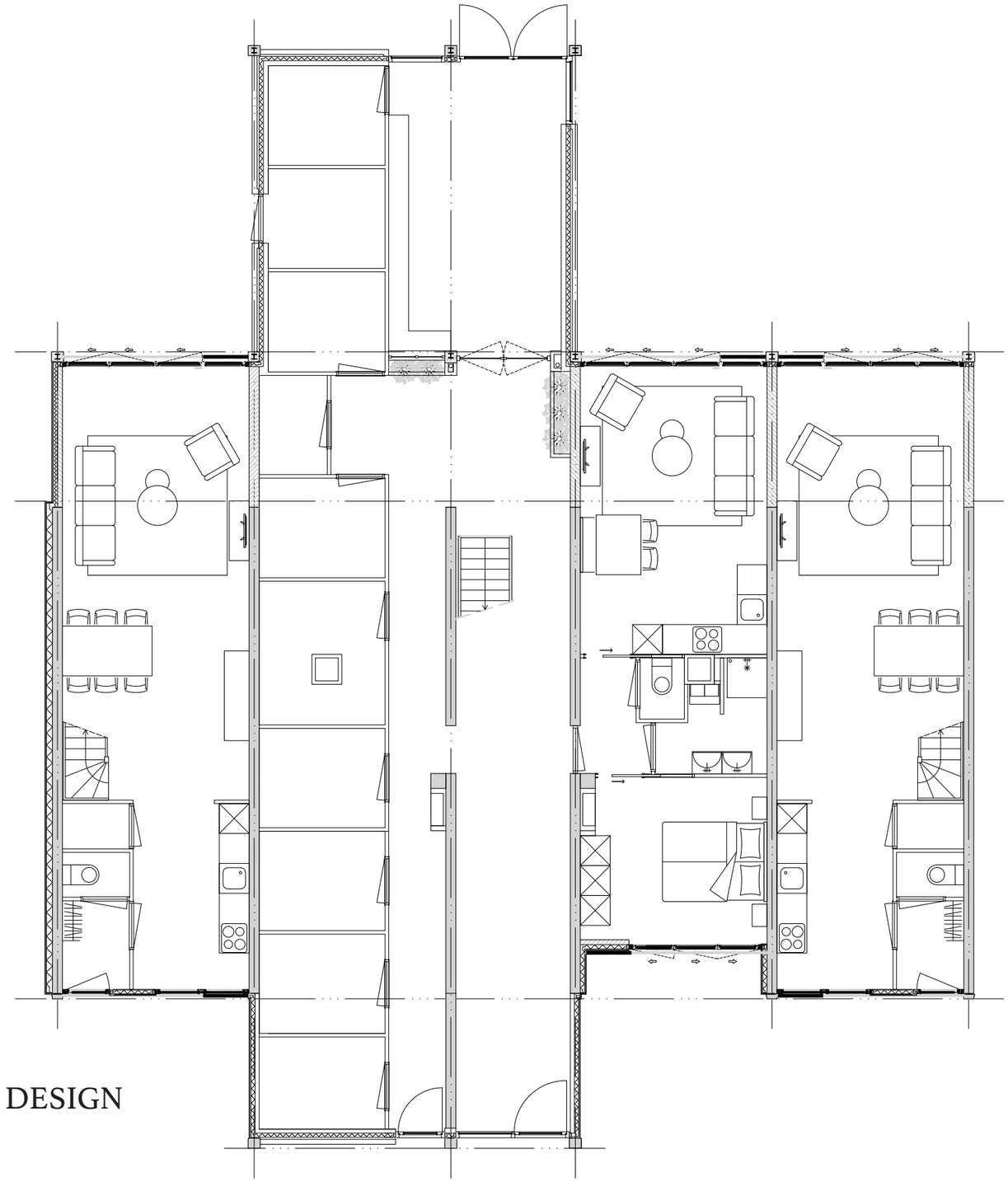


DESIGN

GROUND FLOOR	EXISTING	DESIGN
BEDROOM 1	12,4	12,4
2	12,1	12,1
3	11,8	10,4
4	15,2	15,3
LIVING ROOM	19,9	34,3
KITCHEN	6,5	9,9
BATHROOM	3,1	3,5



GROUND FLOOR
EXISTING 1:100



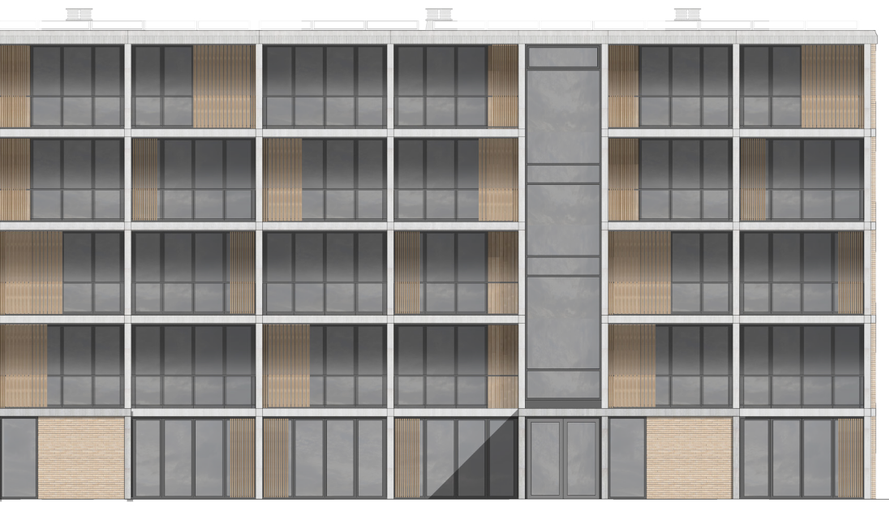
DESIGN

GROUND FLOOR NEW APARTMENT	
BEDROOM 1	12,1
LIVING ROOM	15,0
KITCHEN	6,8
BATHROOM	4,1

EXISTING LIVING ROOM

LIVING ROOM 2th - 4th FLOOR DESIGN

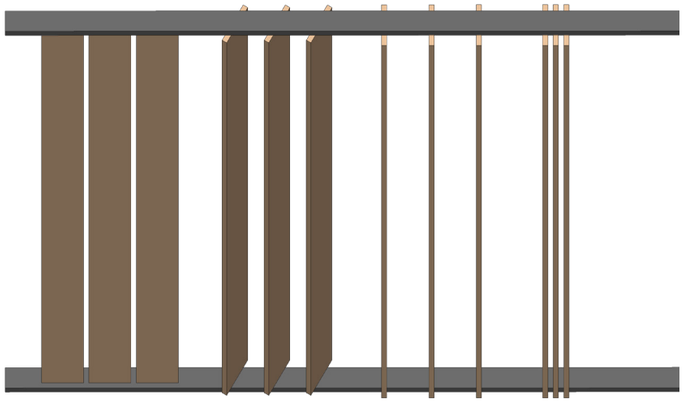
LIVING ROOM GROUND FLOOR DESIGN



BACK FACADE

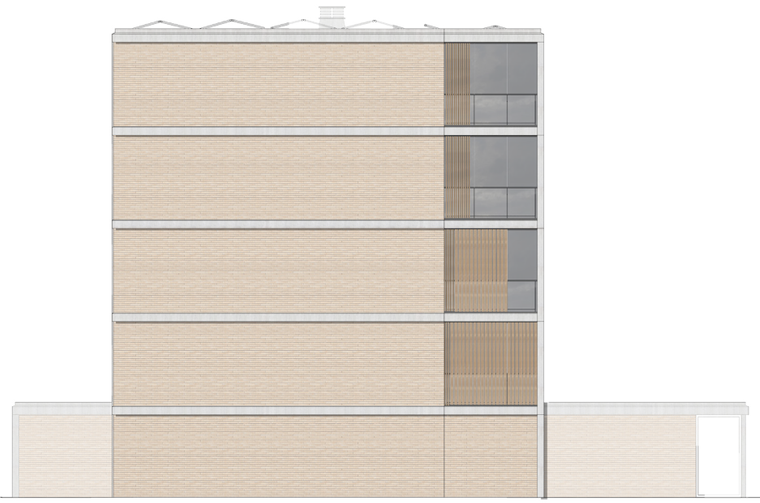
END WALL

FRONT FACADE

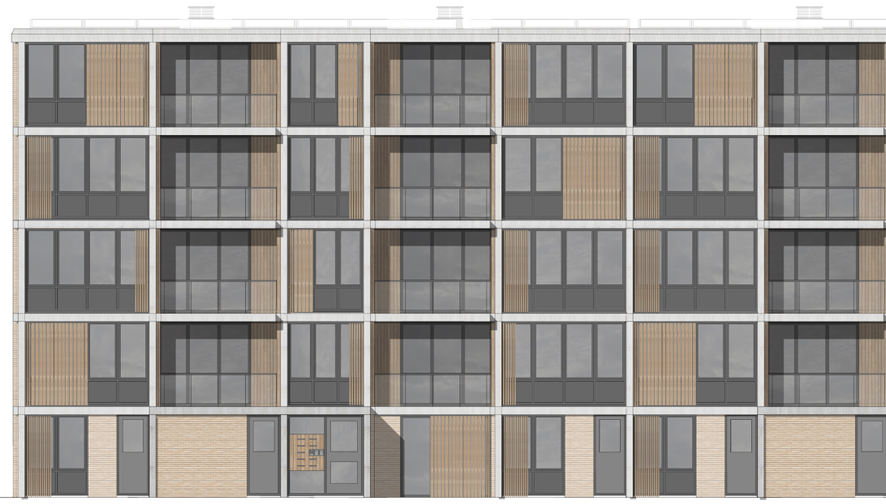


1.CLOSED BLINDS 2.TURNED 3.OPEN 4.FULL OPEN

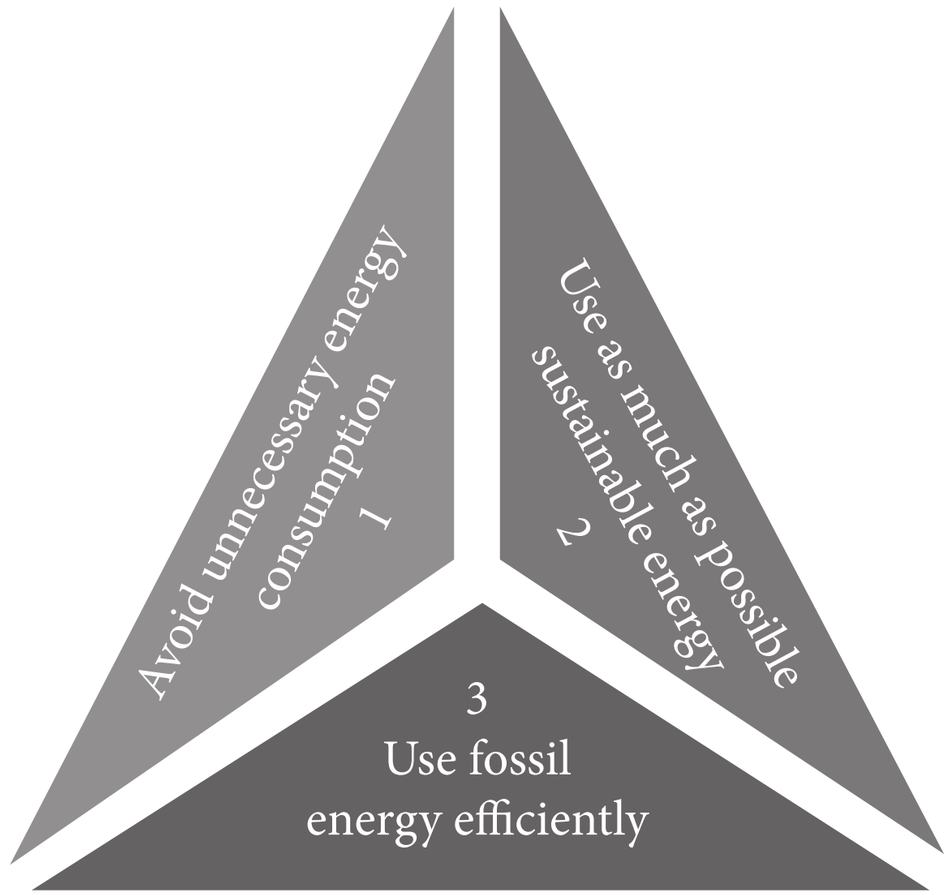
BACK FACADE



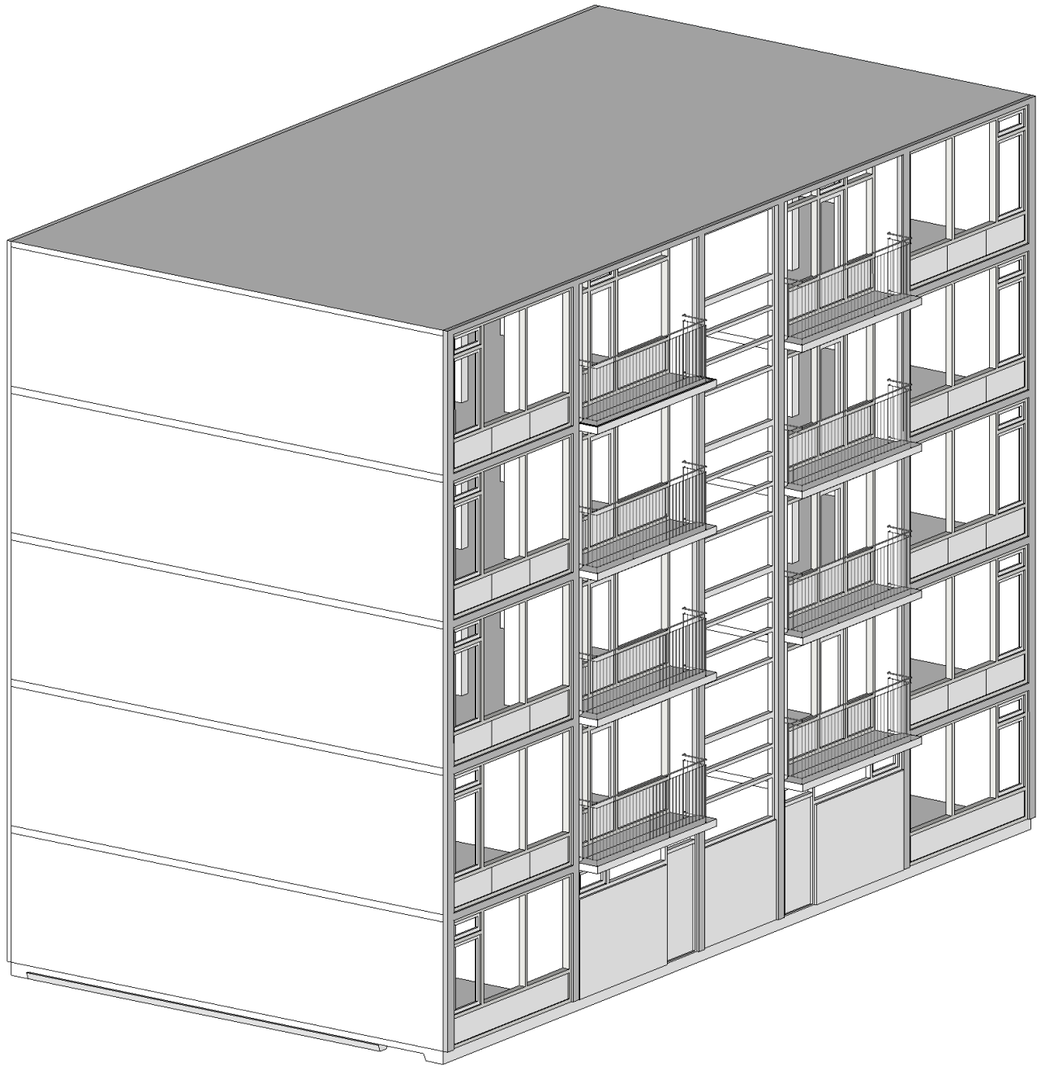
END WALL



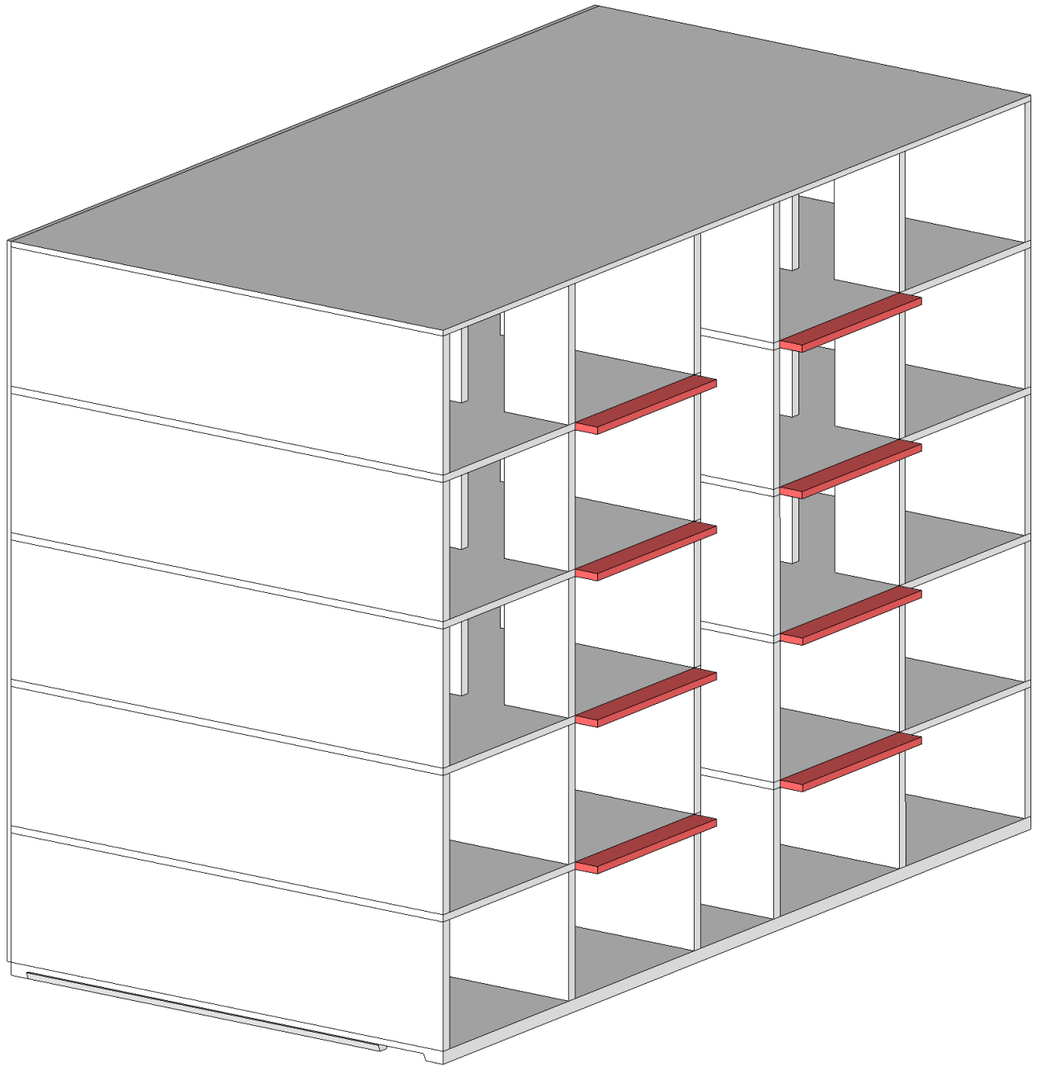
FRONT FACADE



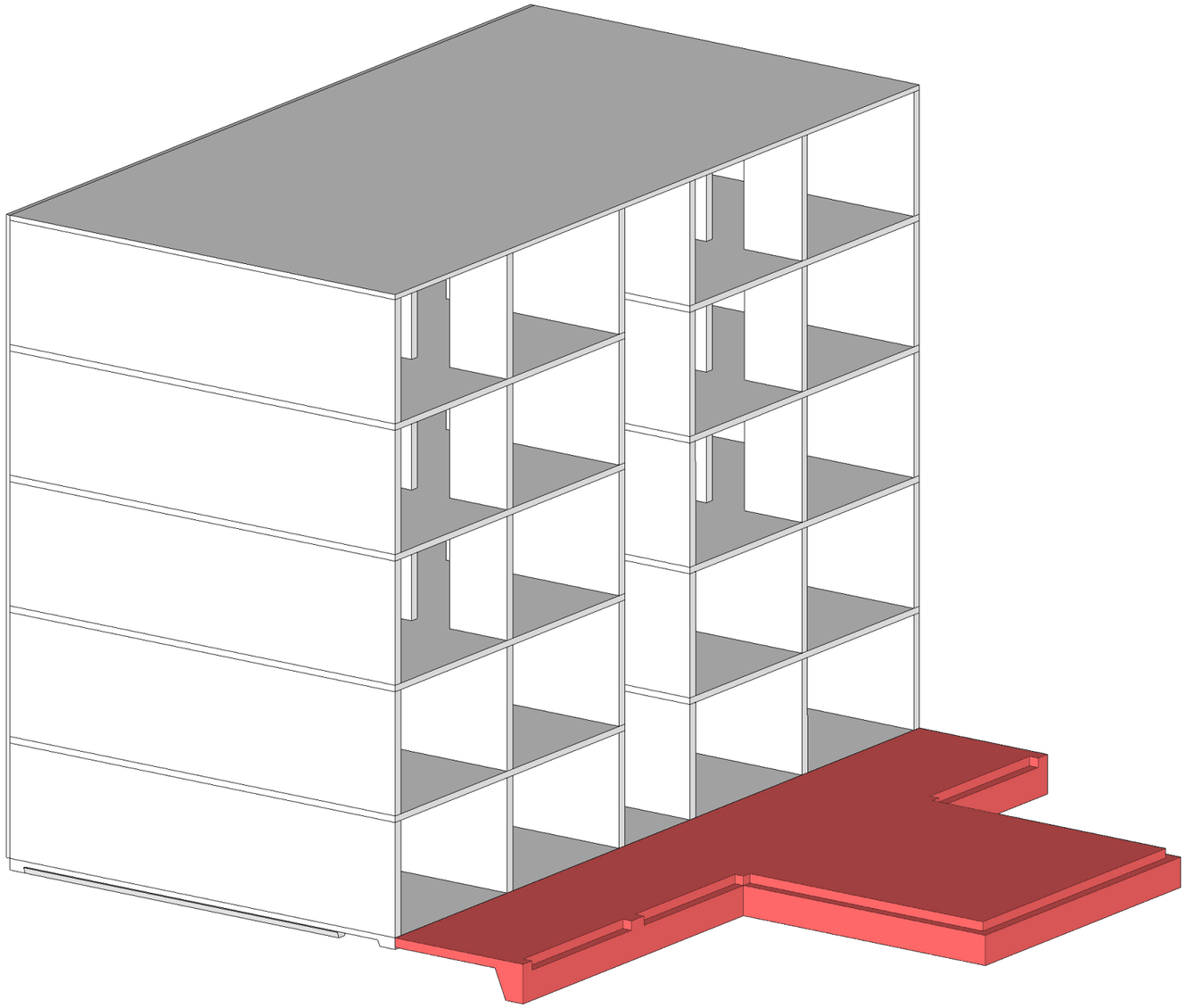
TRIAS ENERGETICA



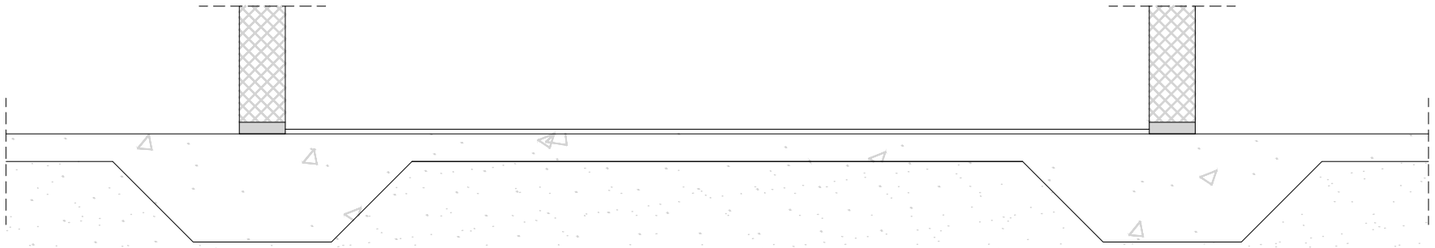
1. DEMOLISH THE FACADE



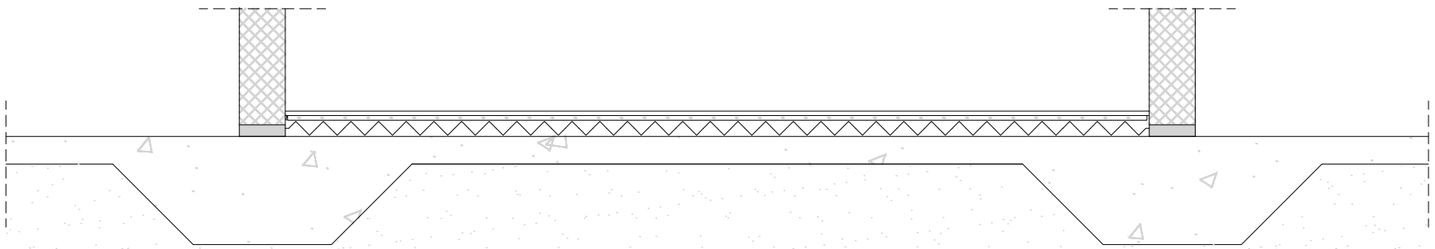
2. DEMOLISH PART OF THE BALCONY



3. POURING THE FOUNDATION AND FLOOR

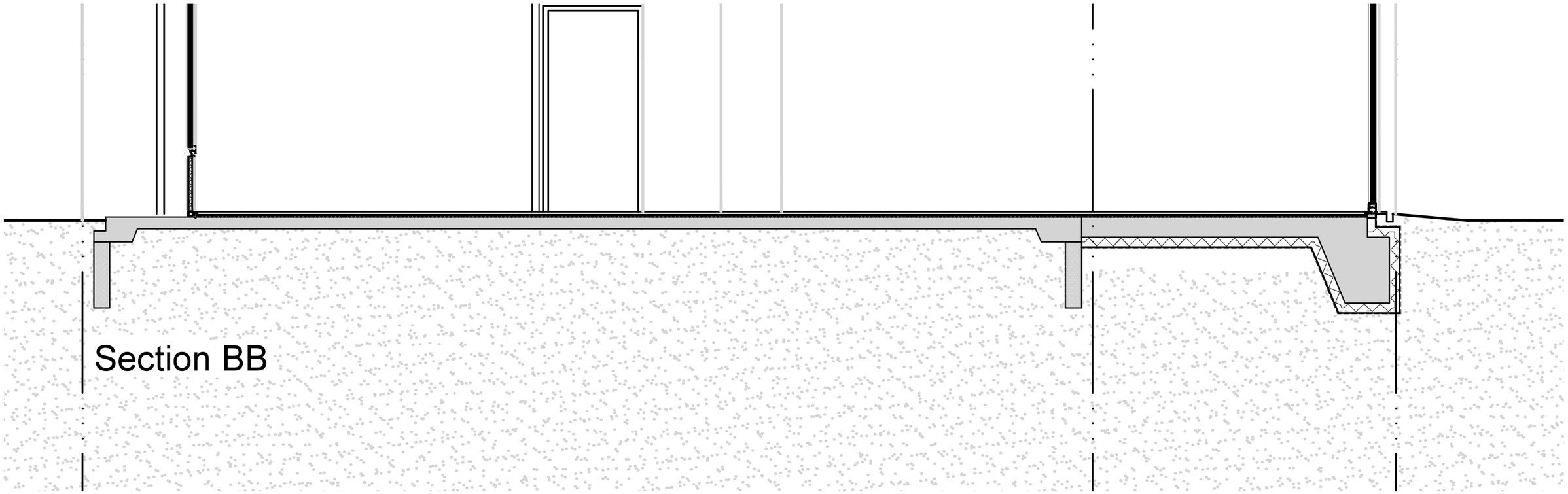


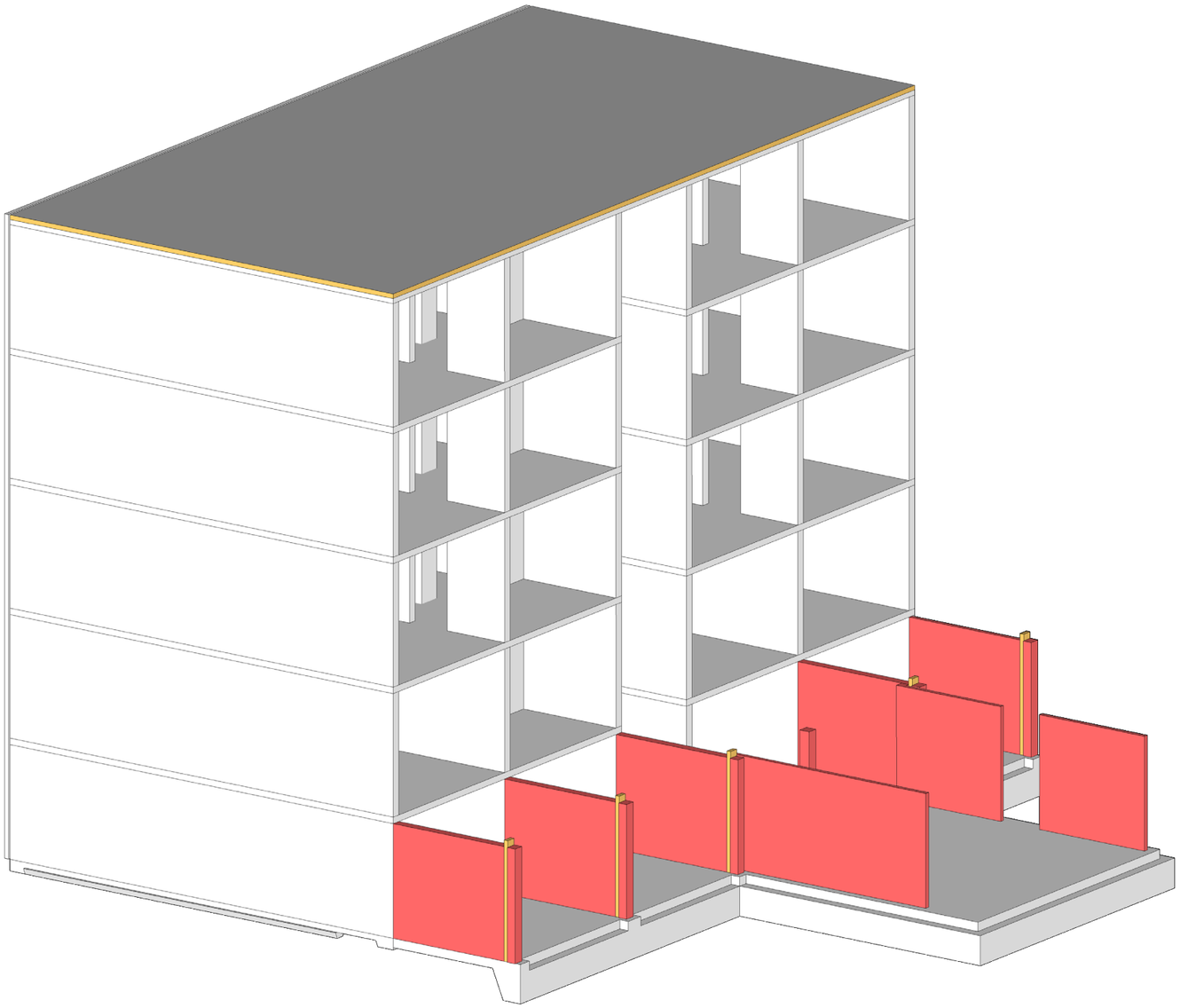
Existing Rc 0.2



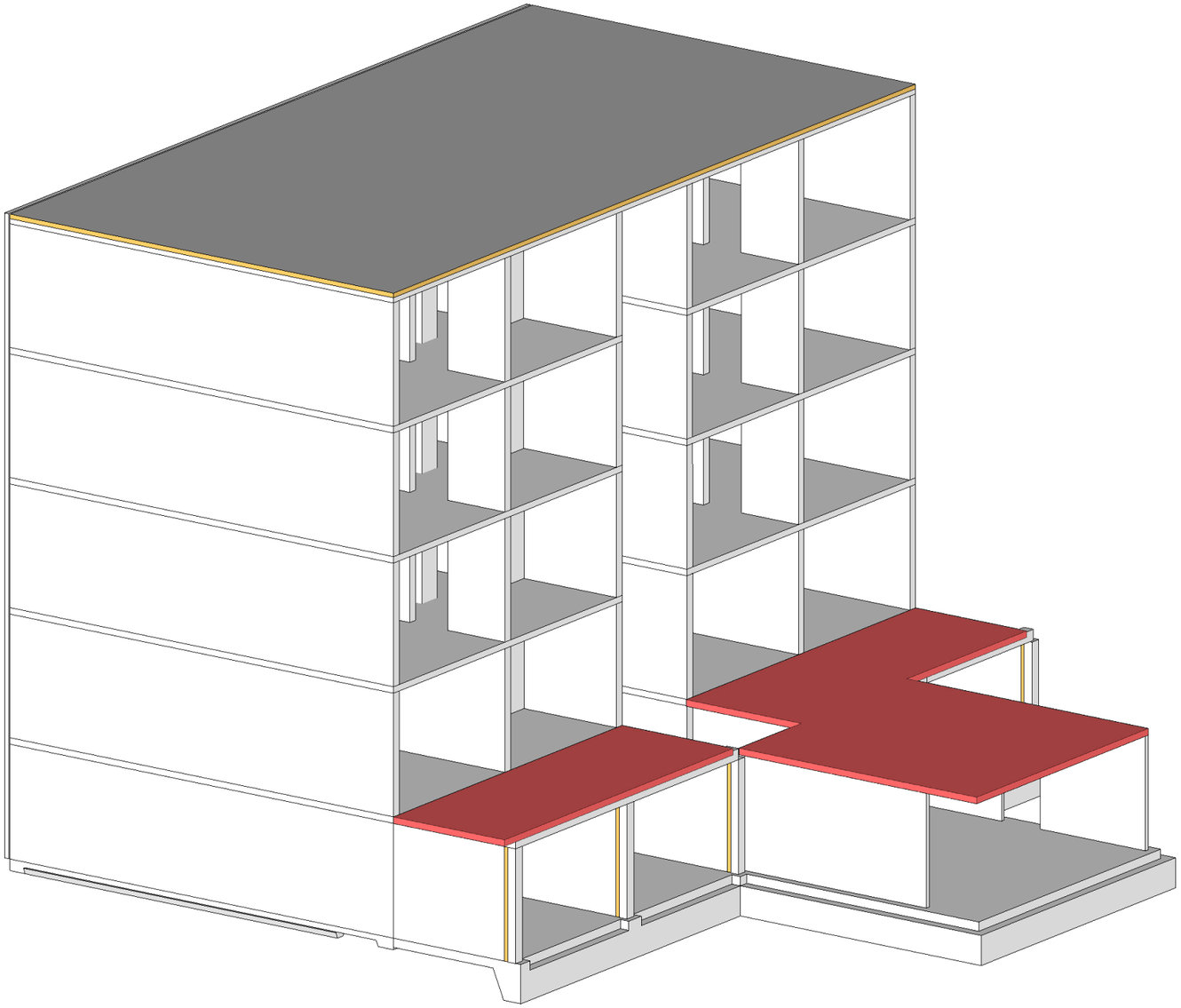
Design Rc 2.5

Floor heating:
existing hight 2480mm
insulation Rc 2,5 hight 2400mm
Rc↑0,5 = hight↓10mm

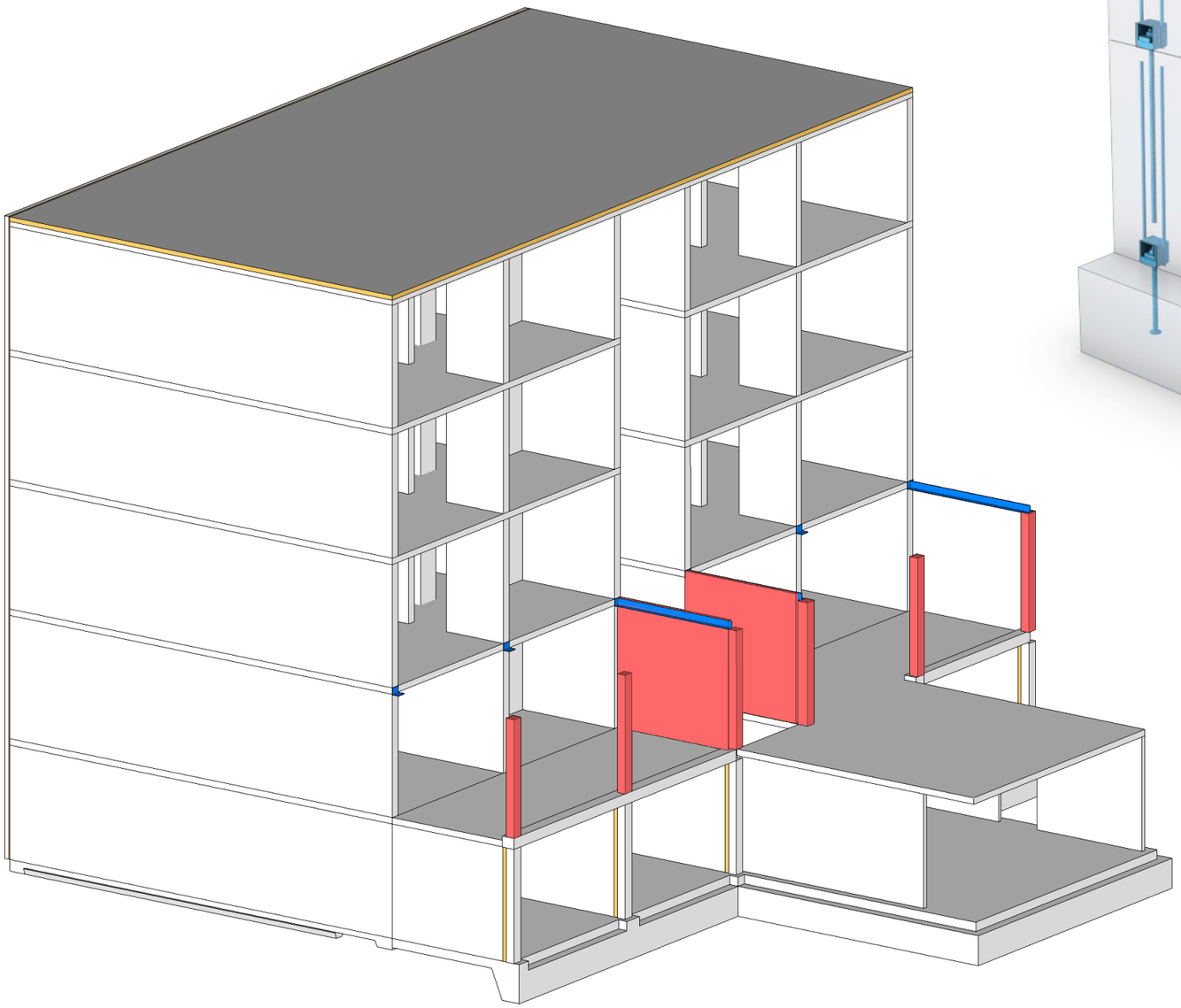




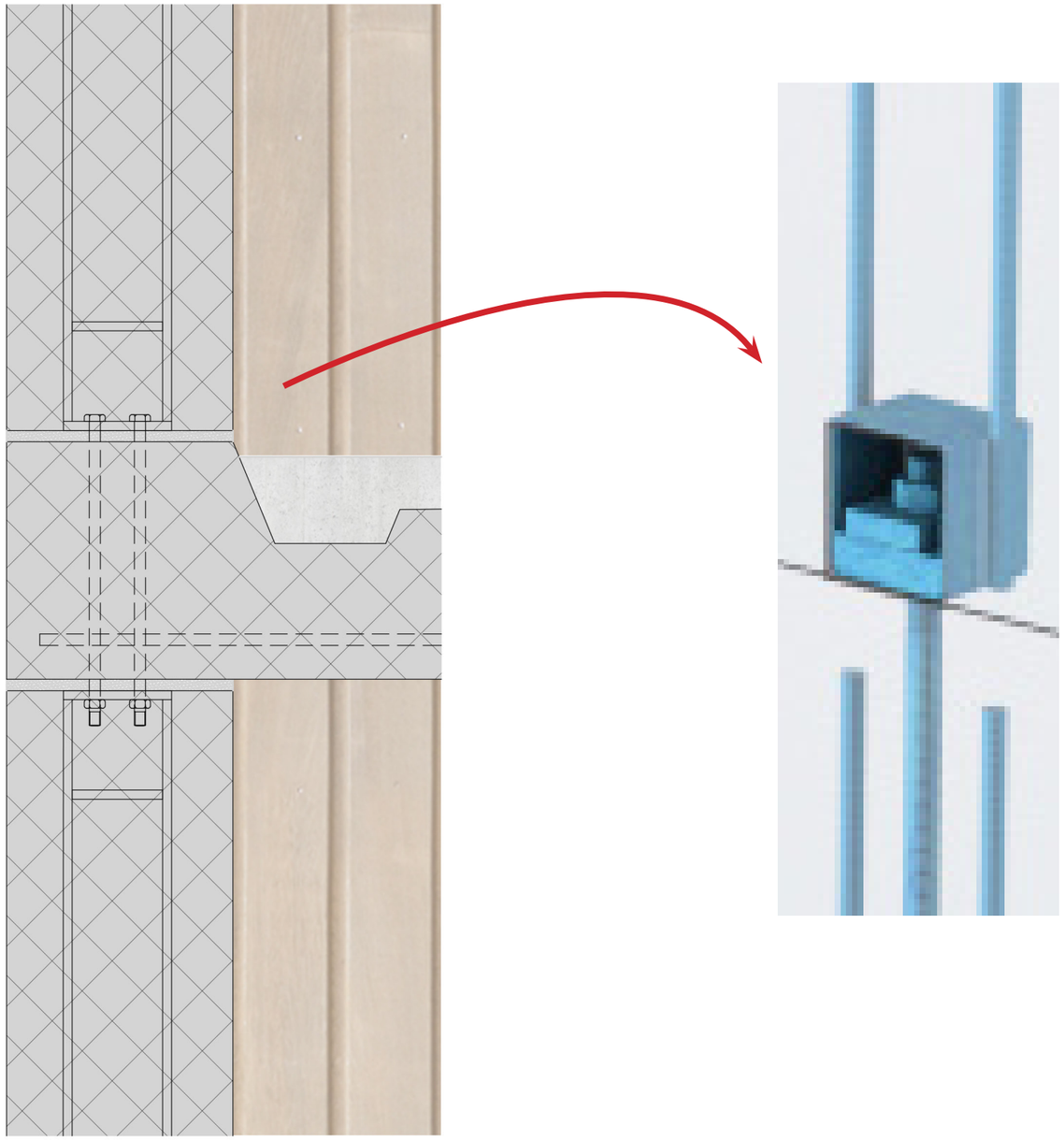
4. PLACING LOAD BEARING WALLS AND COLUMNS

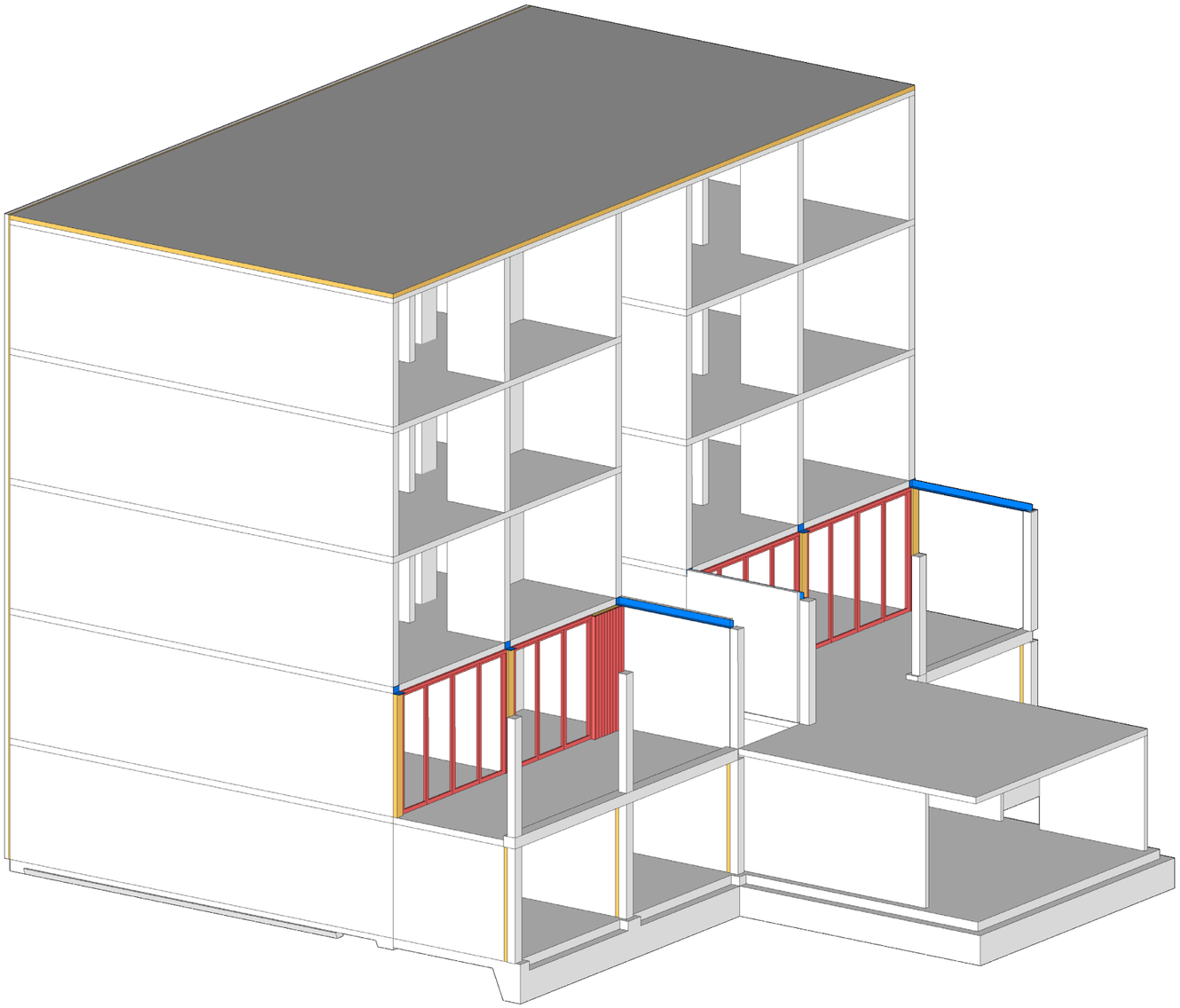


5. PLACING THE FLOOR

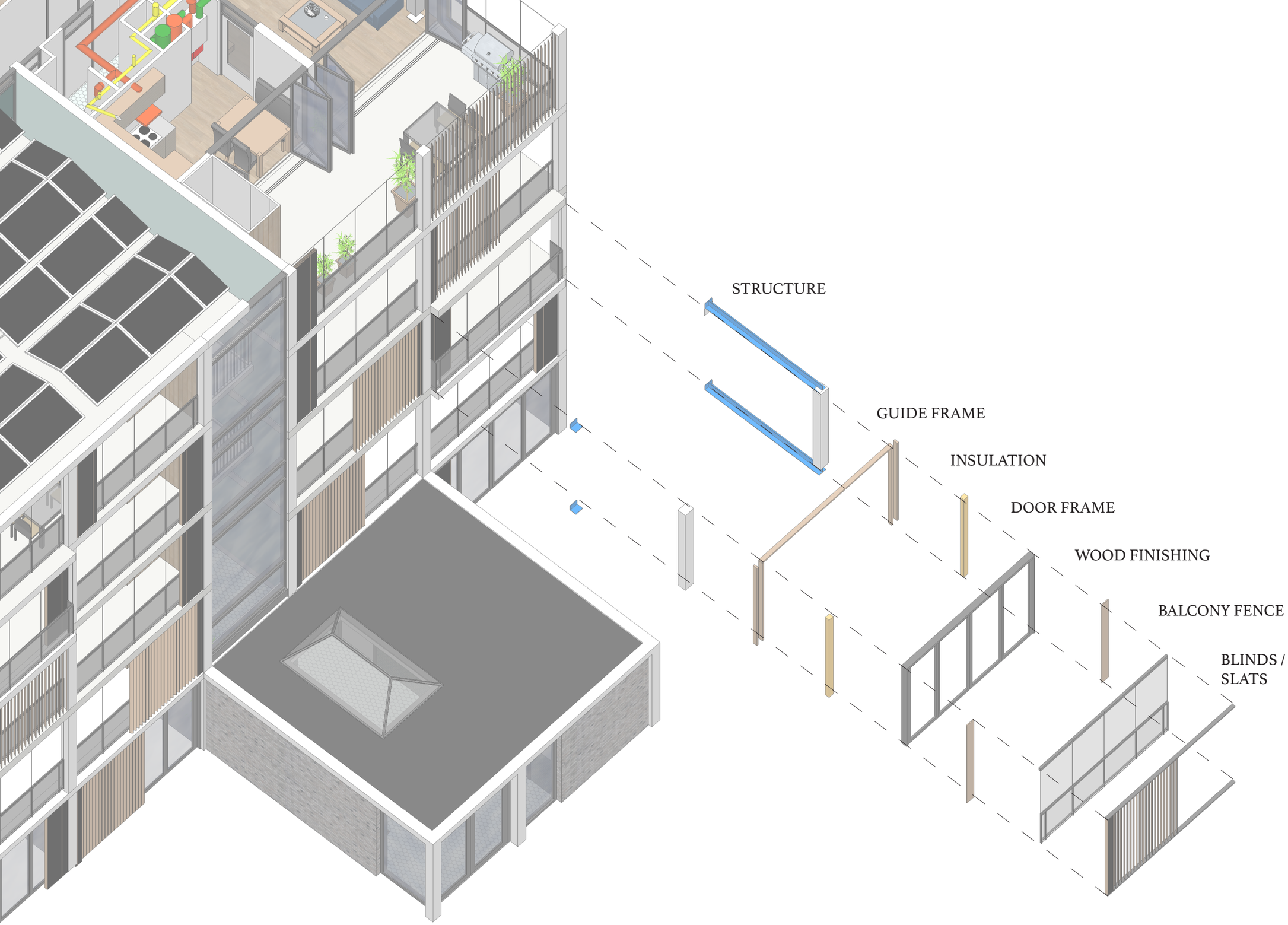


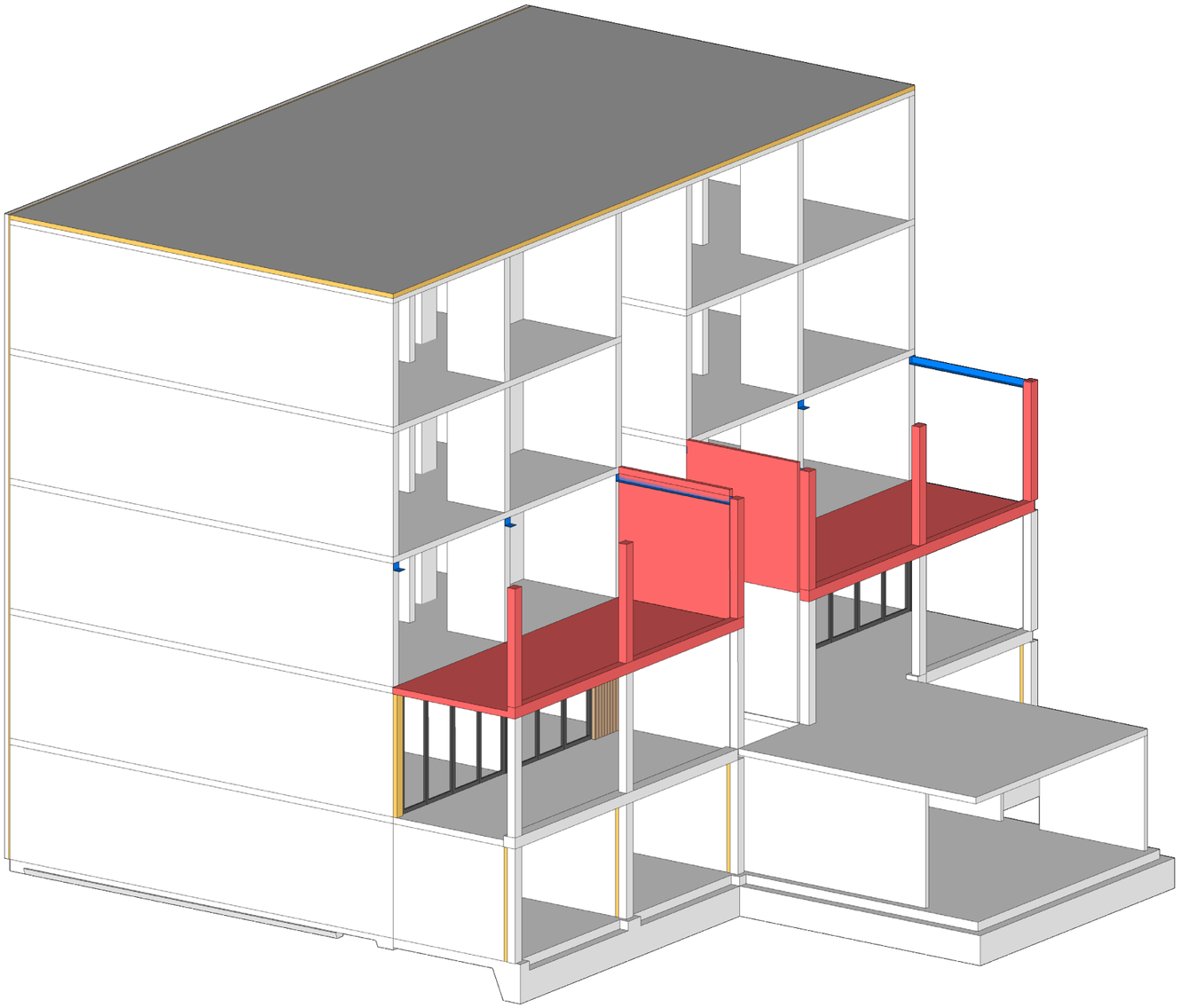
6. PLACING COLUMNS AND STEEL BEAMS



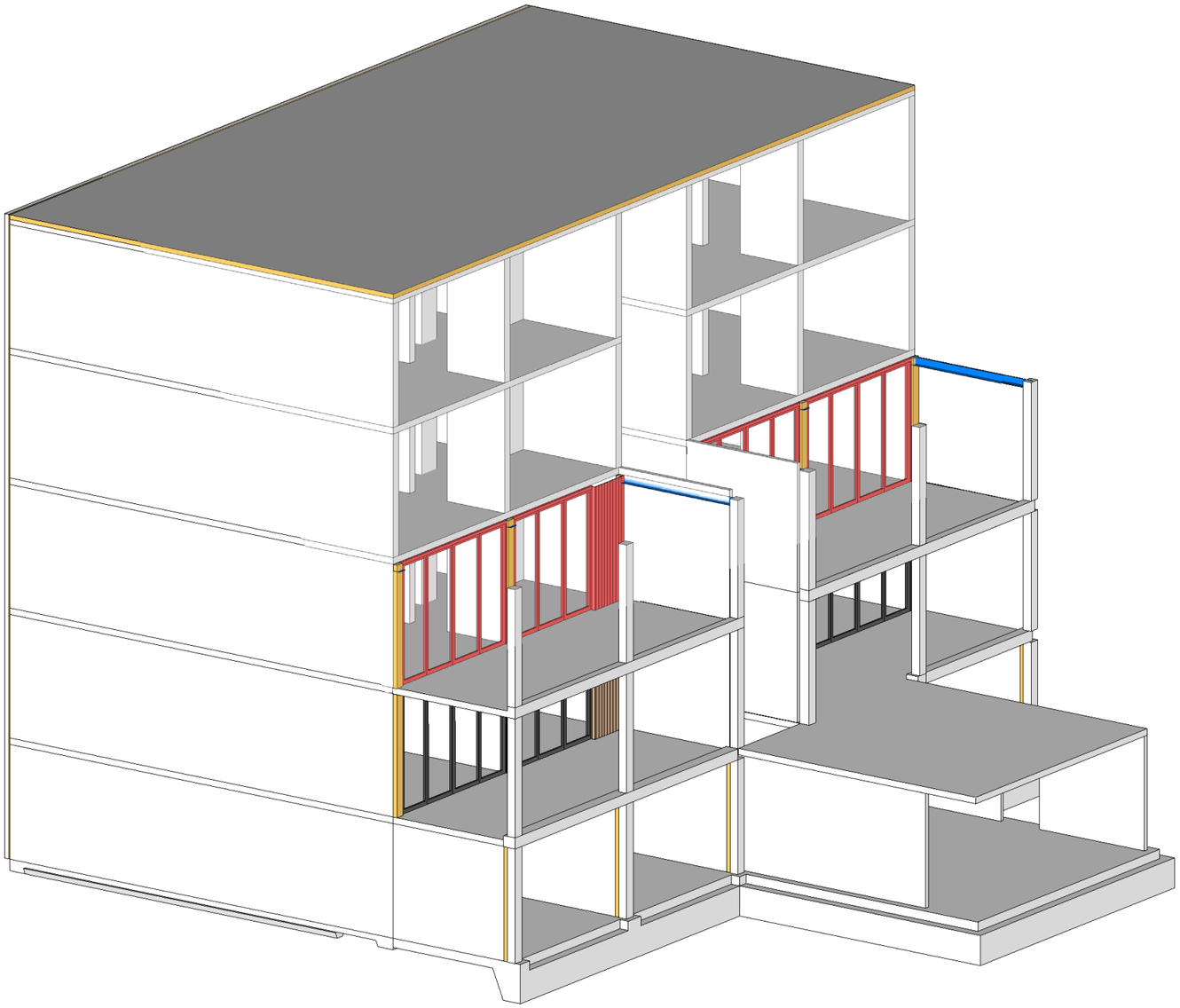


7. PLACING INSULATION AND WINDOW FRAMES

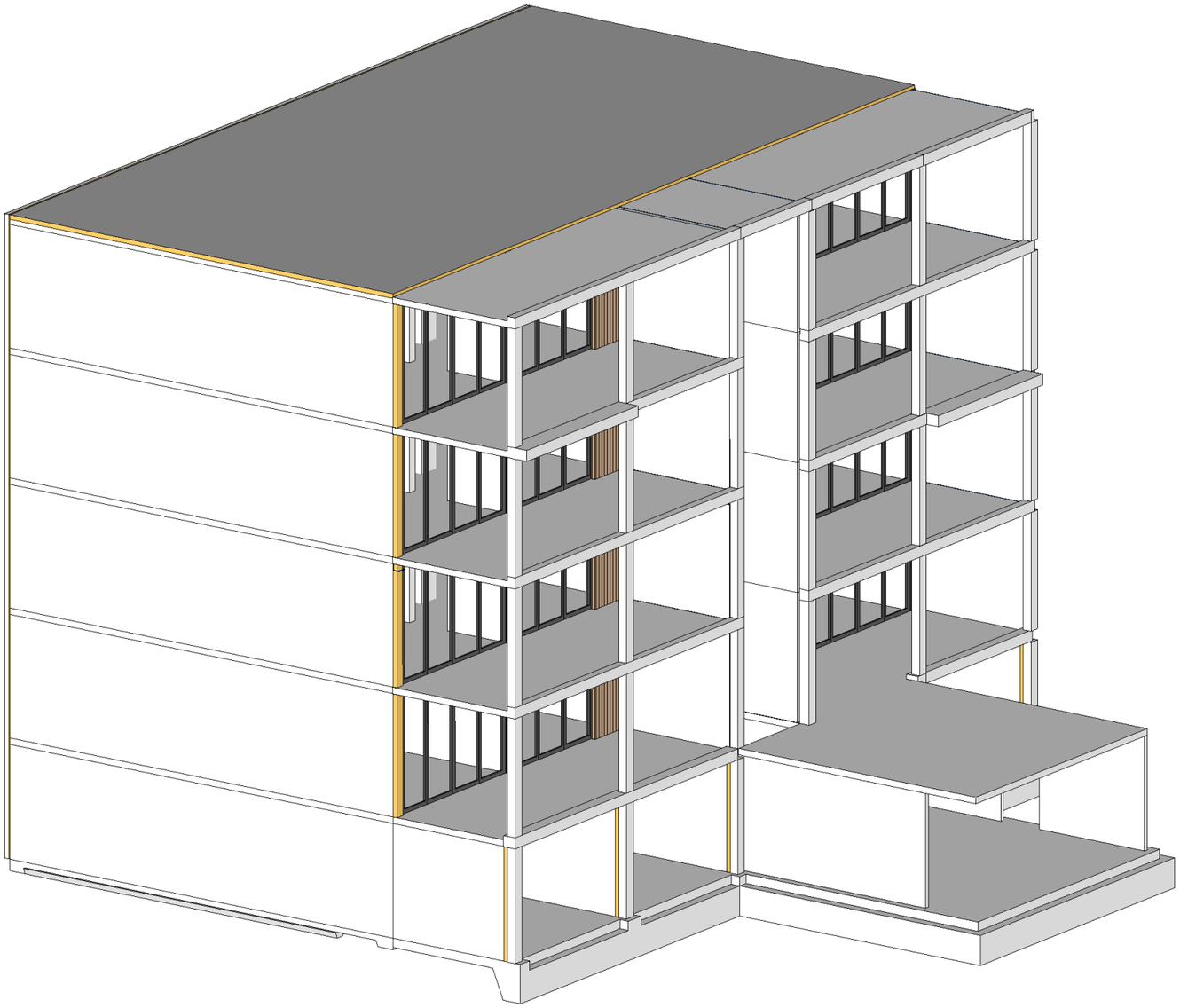

STRUCTURE
GUIDE FRAME
INSULATION
DOOR FRAME
WOOD FINISHING
BALCONY FENCE
BLINDS /
SLATS



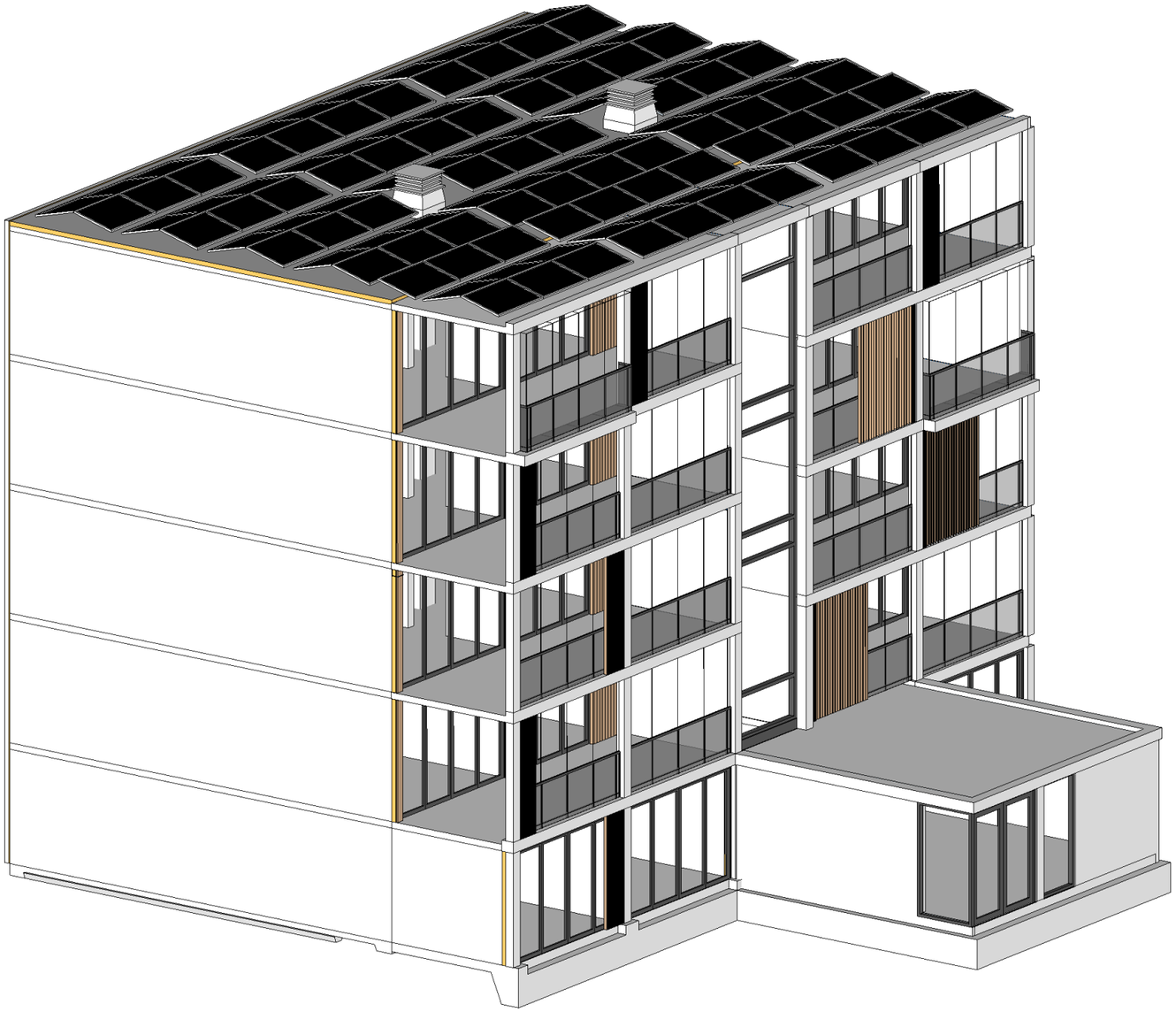
8. PLACING BALCONY, COLUMNS AND
STEEL BEAMS



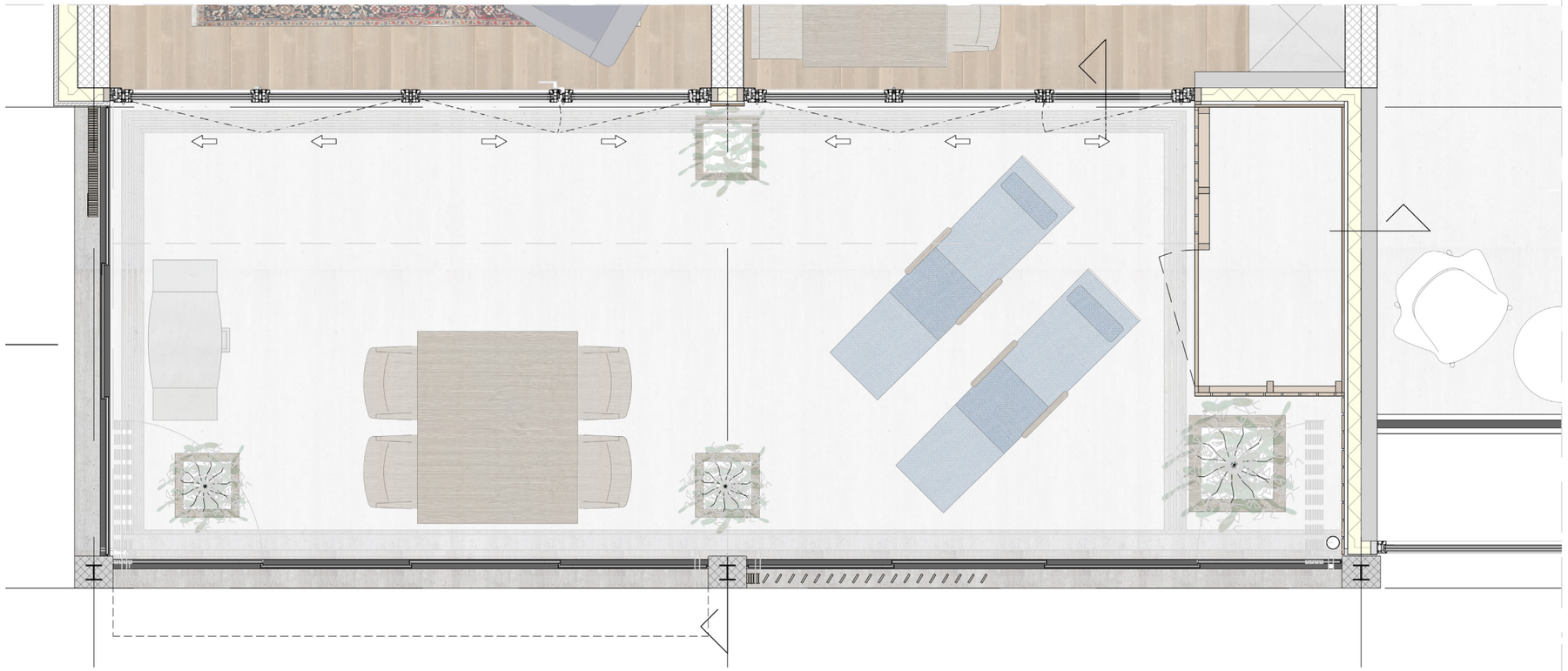
9. PLACING WINDOW FRAMES AND INSULATION

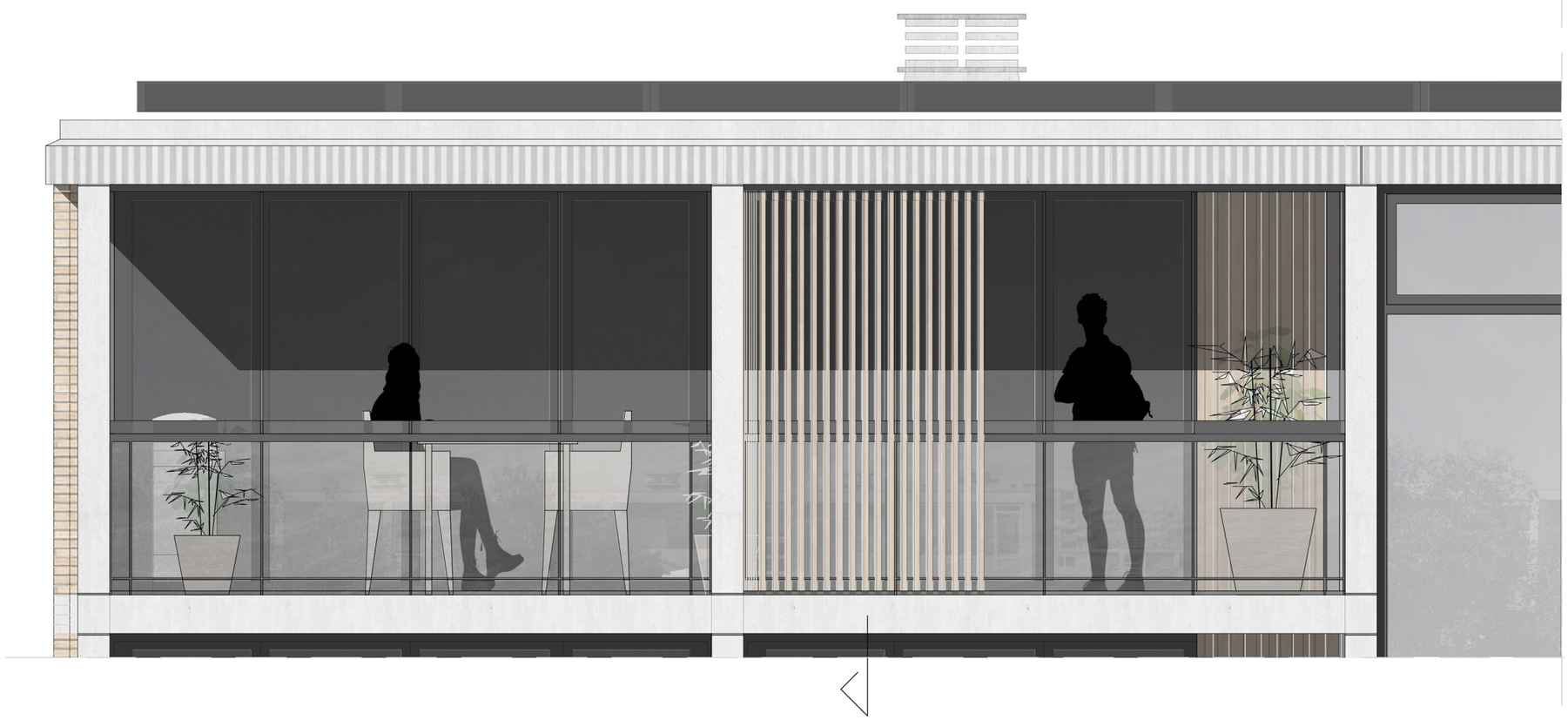


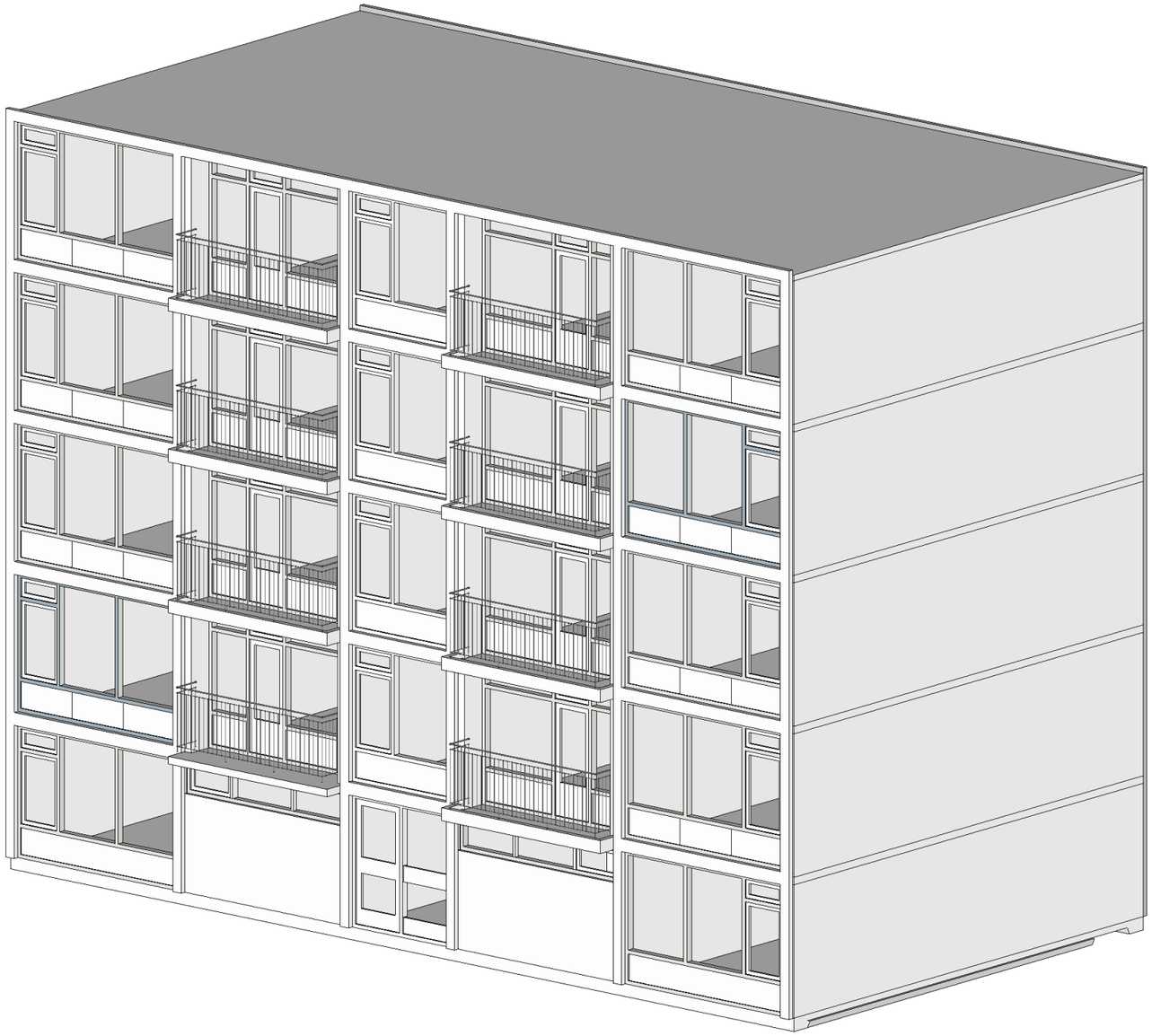
10. FINISHING BALCONY STRUCTURE

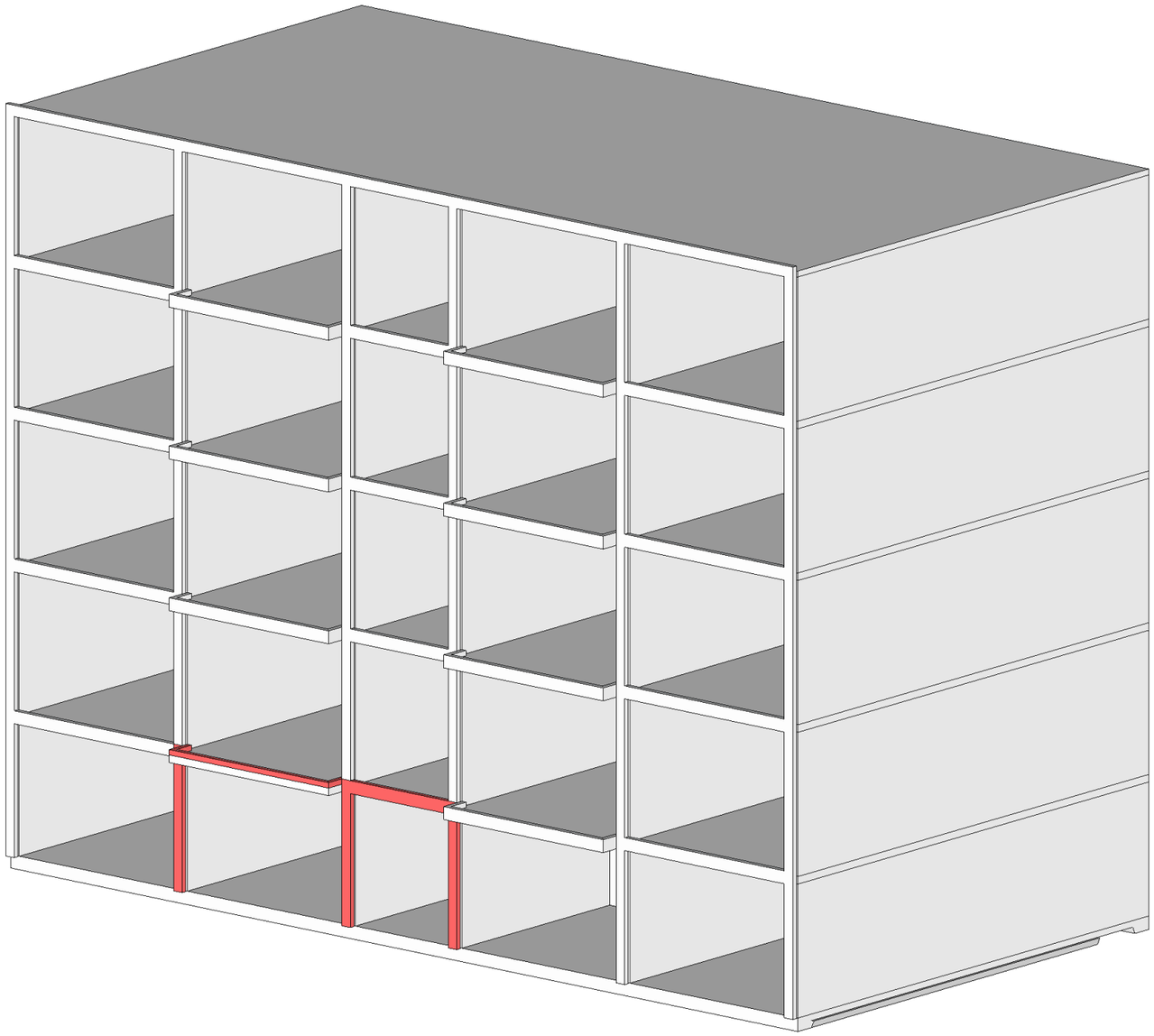


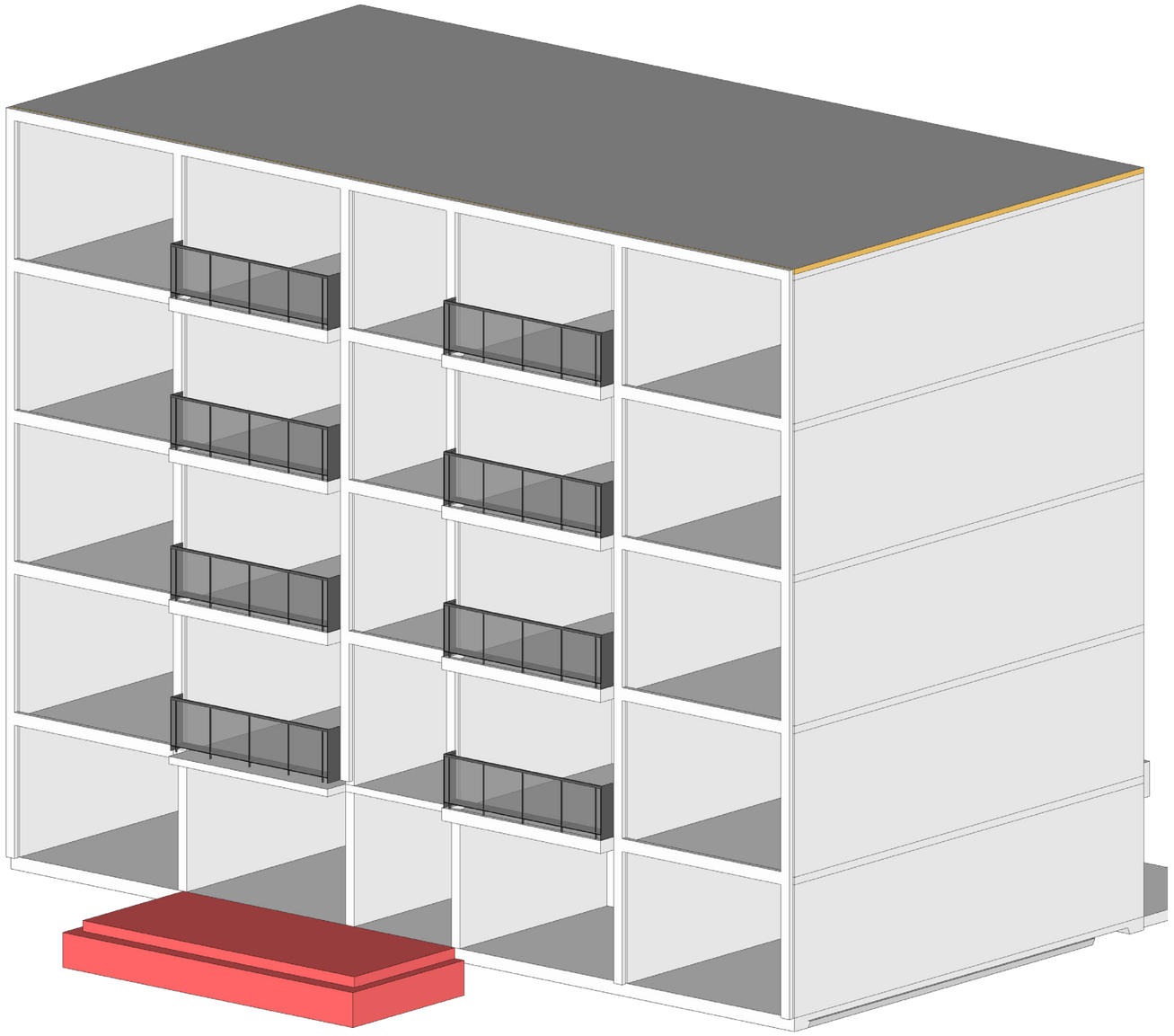
ii. PLACING GLASS, RAILS, FACADE CLADDING ETC.

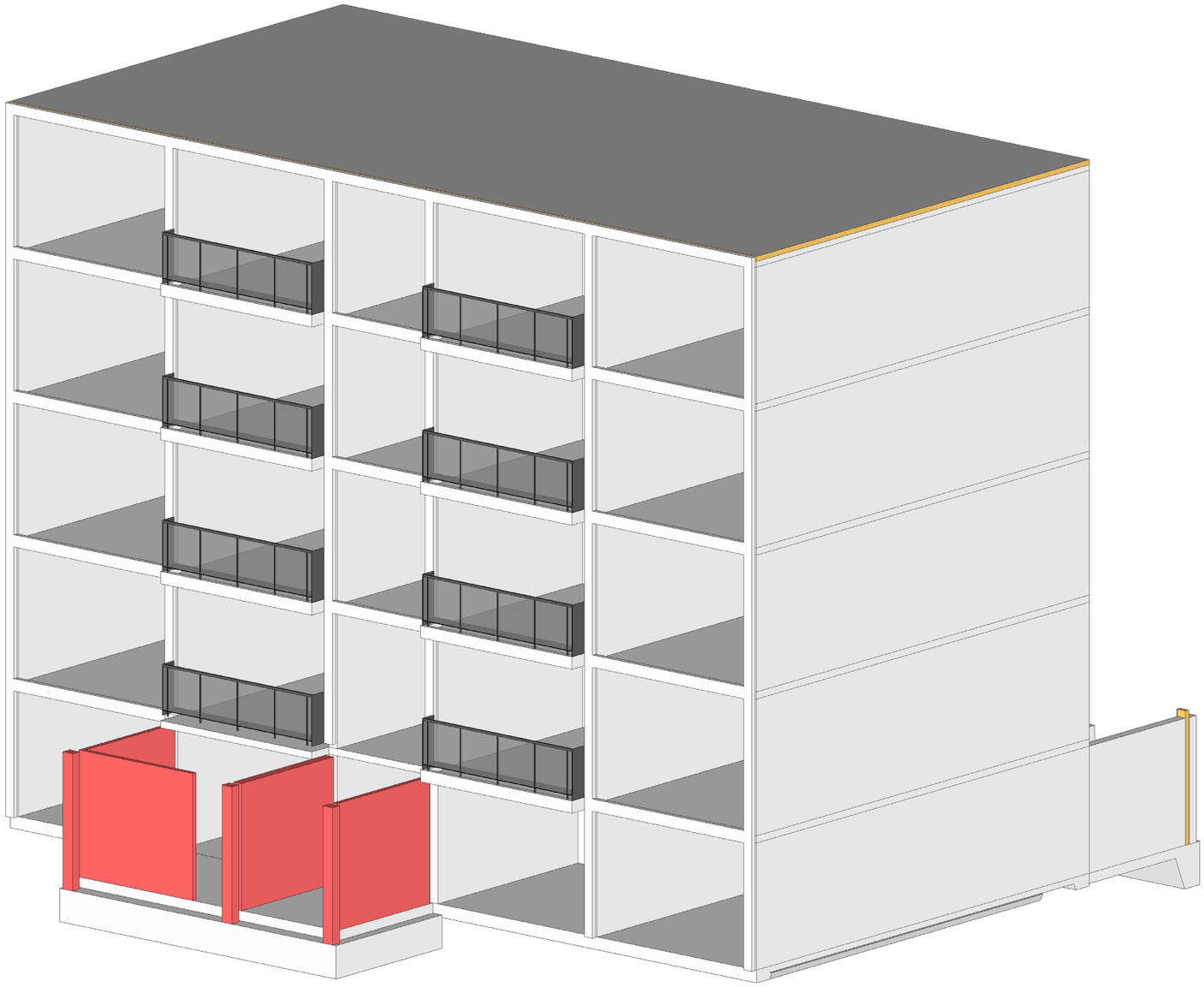


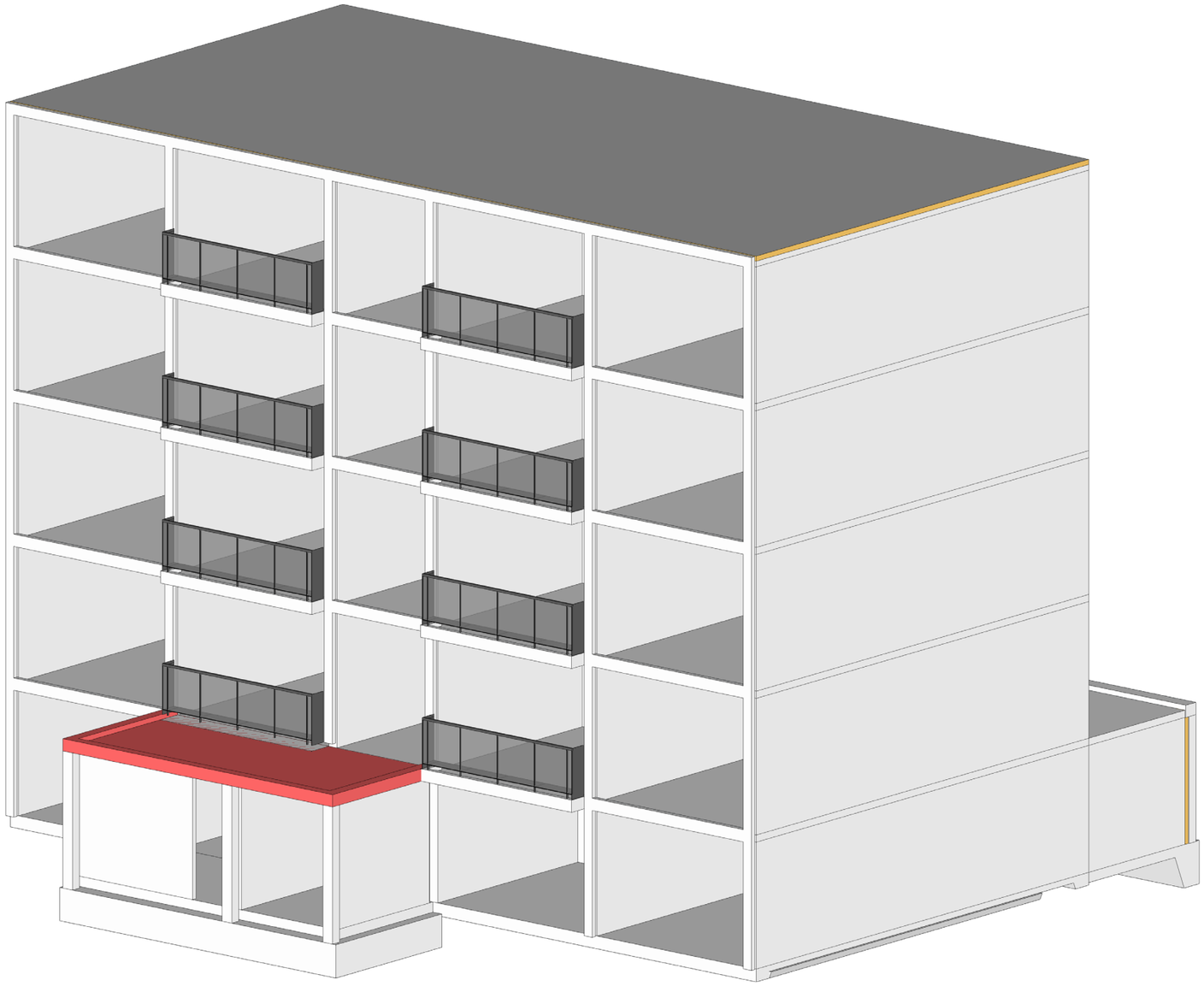


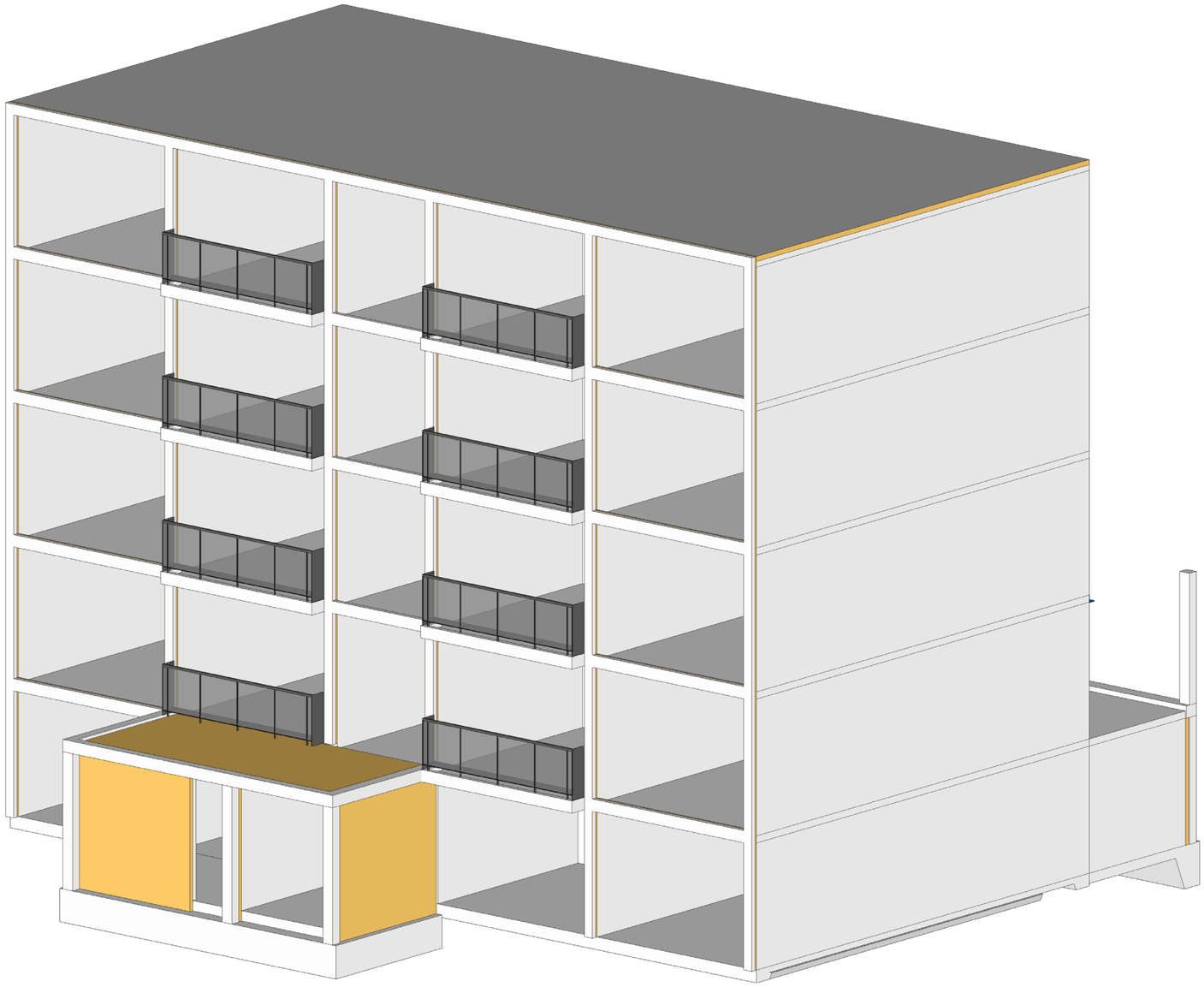


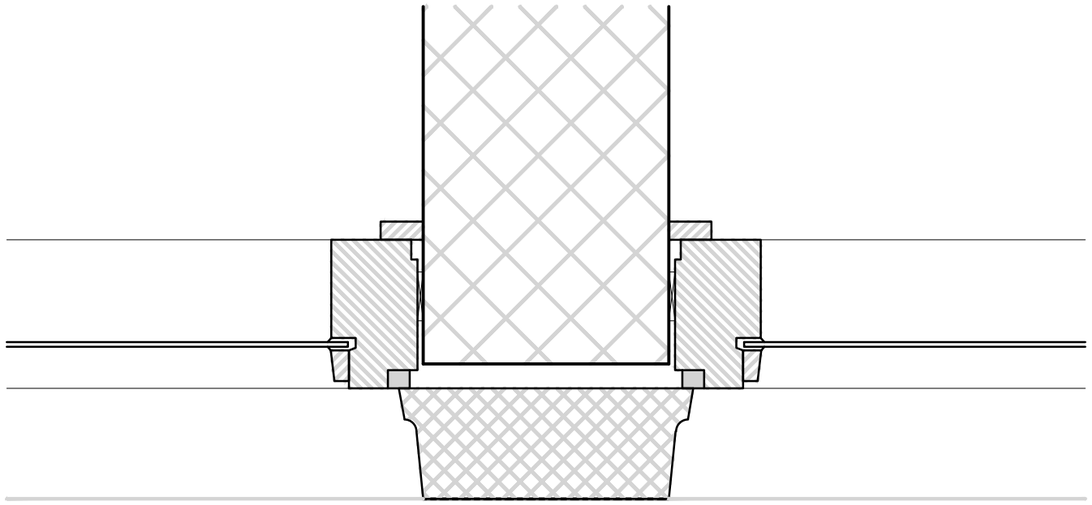


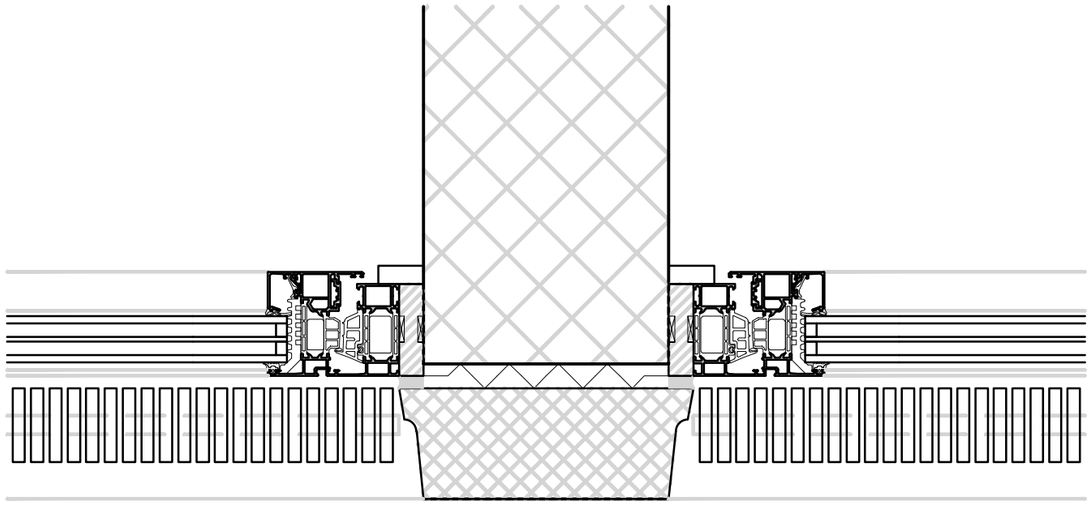


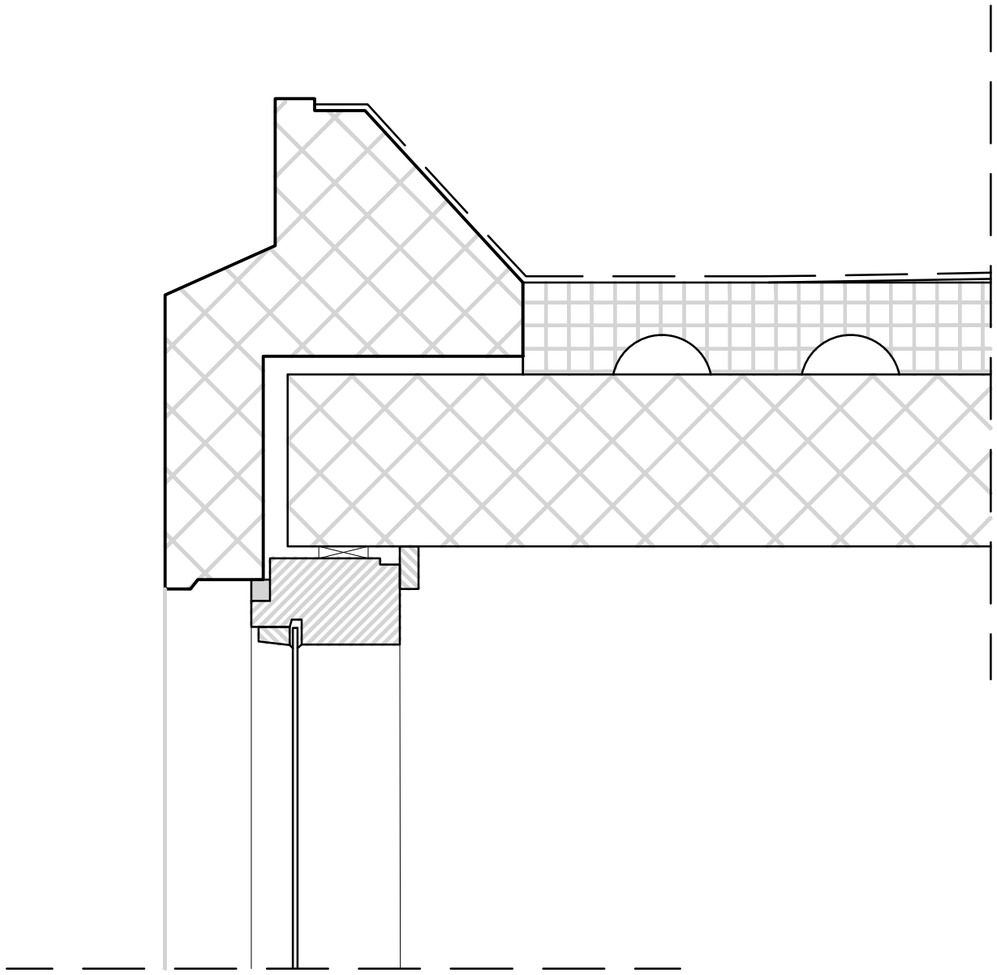


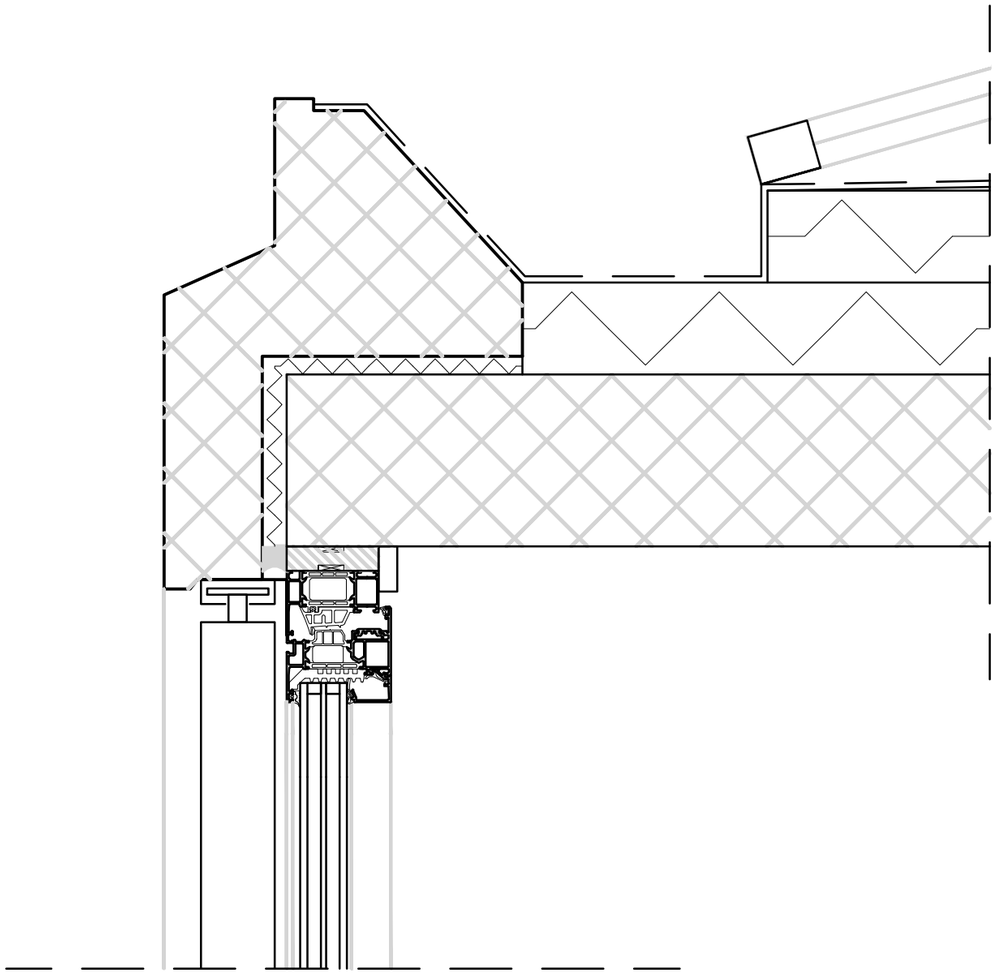




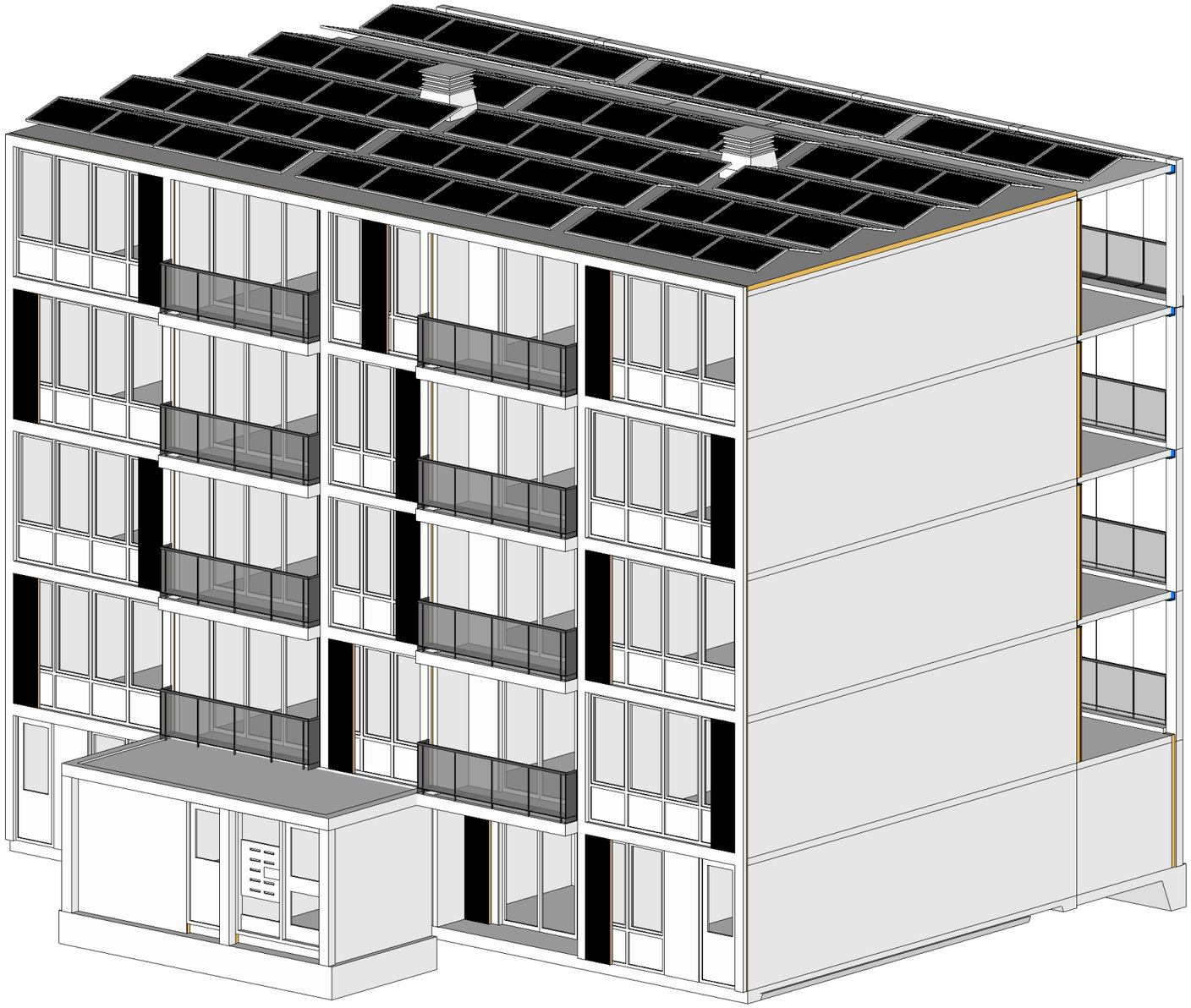


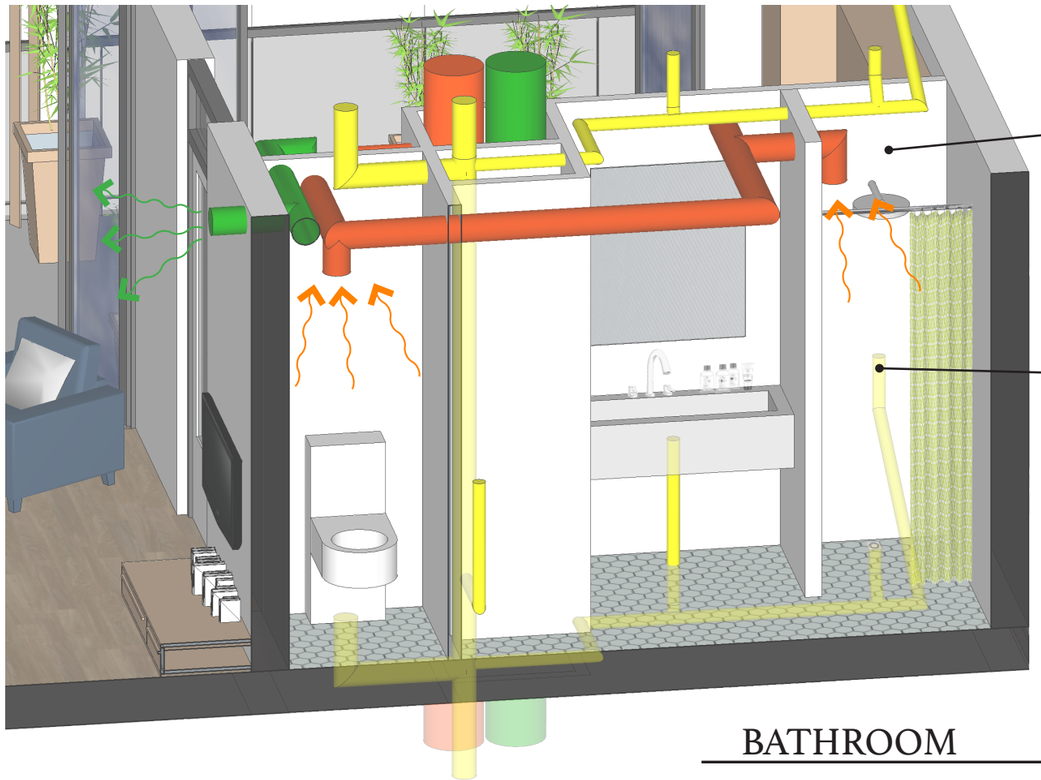






SOLAR PANELS 350 Wp
- 121 PER PORTIEK
- 13,5 PER APARTMENT
- 4235 kWh PER YEAR
- 3.300 kWh AVERAGE USE IN NL





PIPES ABOVE
SUSPENDED
CEILING
IN BATHROOM,
TOILET AND HALL

DRAIN PIPE
KITCHEN SINK

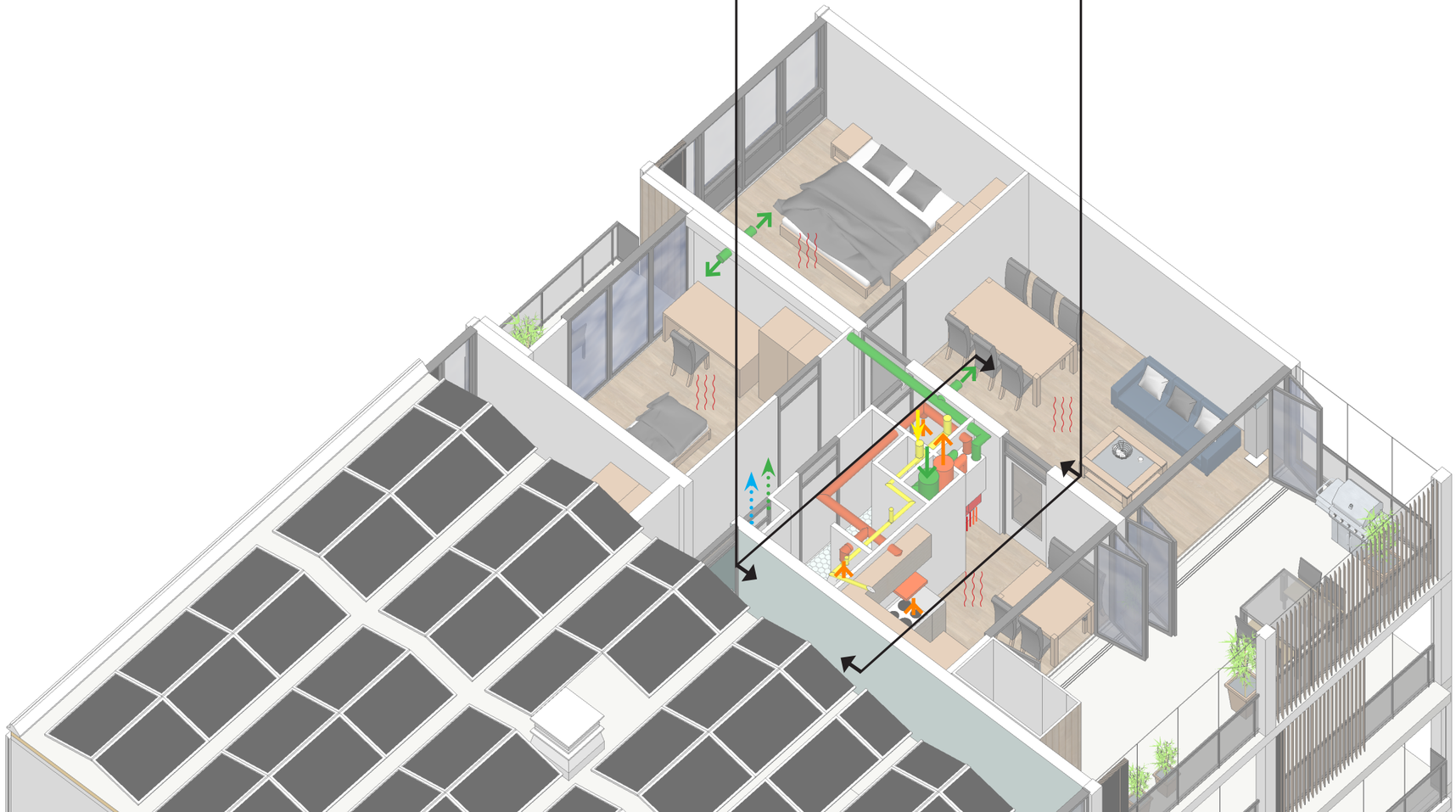
BATHROOM

KITCHEN

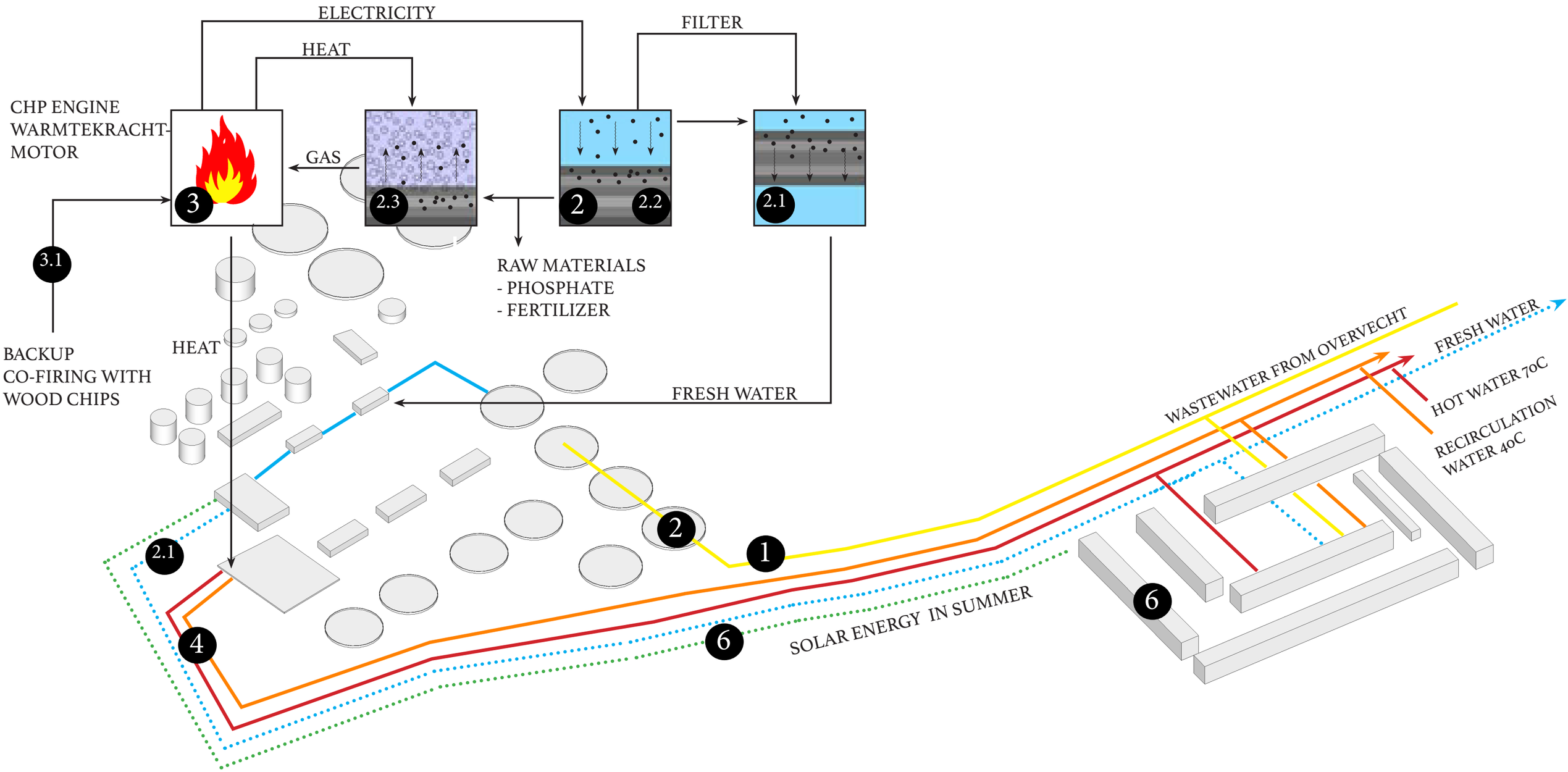
- FLOOR HEATING
  DISTRIBUTION STATION

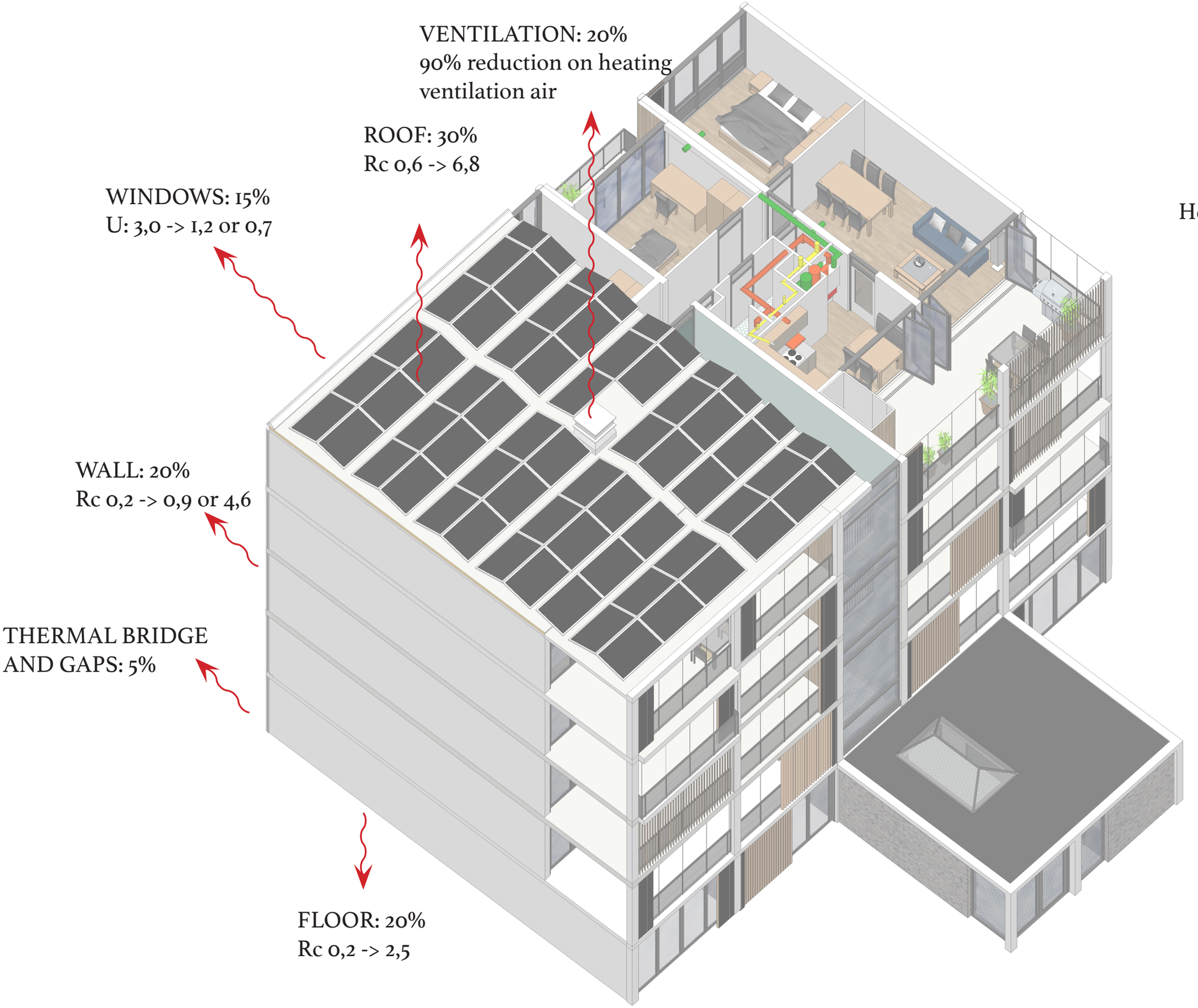
- HEAT EXCHANGER
- HOT TAP WATER &
HEATING

- BALANCE VENTILATION
- CO_2 CONTROLLED
- BYPASS

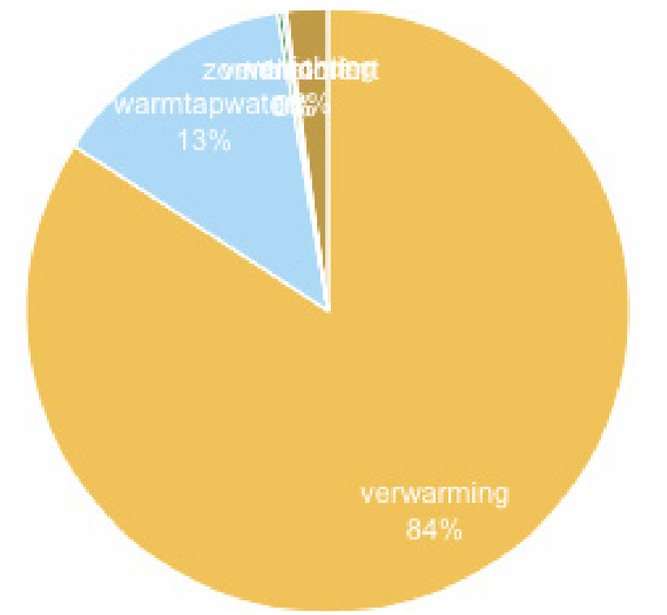


SIMILAR PROJECT: APELDOORN ZUIDBROEK
- HEAT 1.800 DWELLINGS AND
- ELECTRICITY FOR 3900 DWELLINGS
- 5.5 MILLION M3 BIOGAS
- 900.000 KG FERTILIZER
- RECOVERY OF PHOSPHATE
SOURCE: KONINKLIJK NEDERLANDS WATERNETWERK



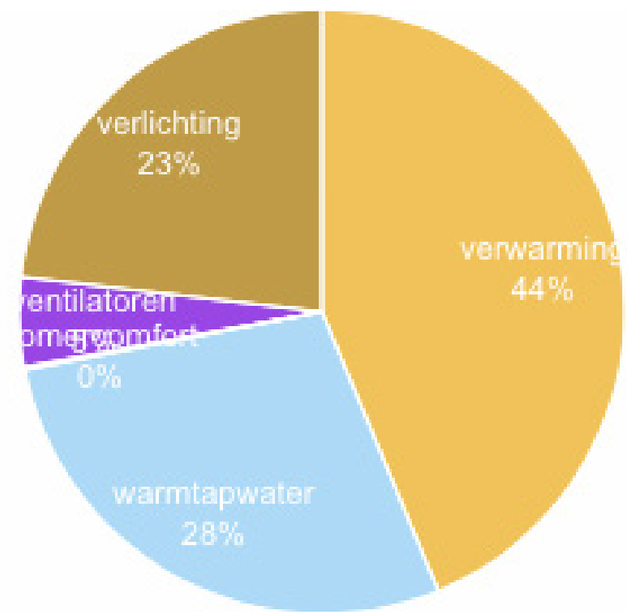


District heating
Heating building without
fossil fuels



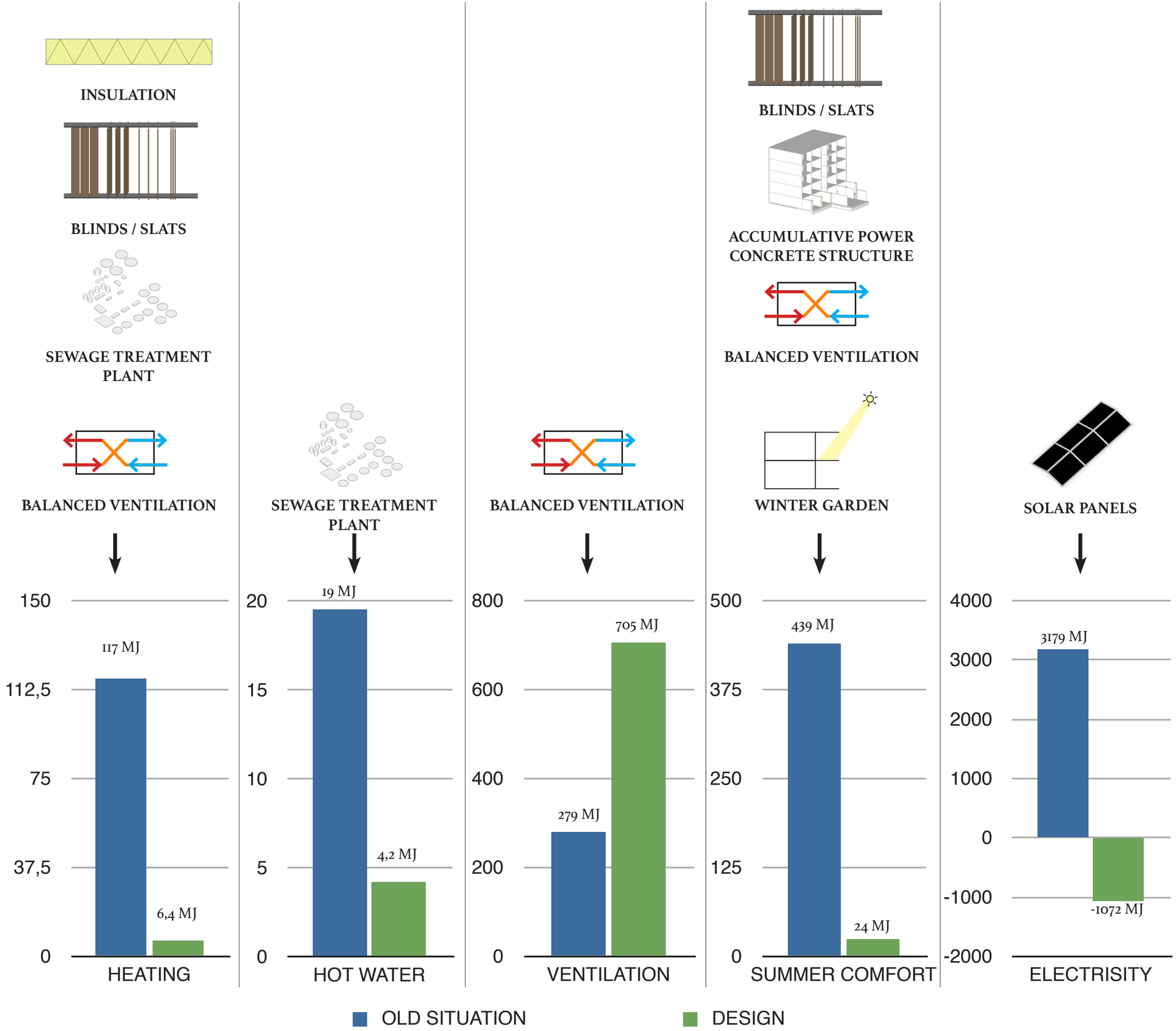
Camera obscuradreef Utrecht - Camera obscuradreef Utrecht
Existing situation, block 3, upper corner apartment

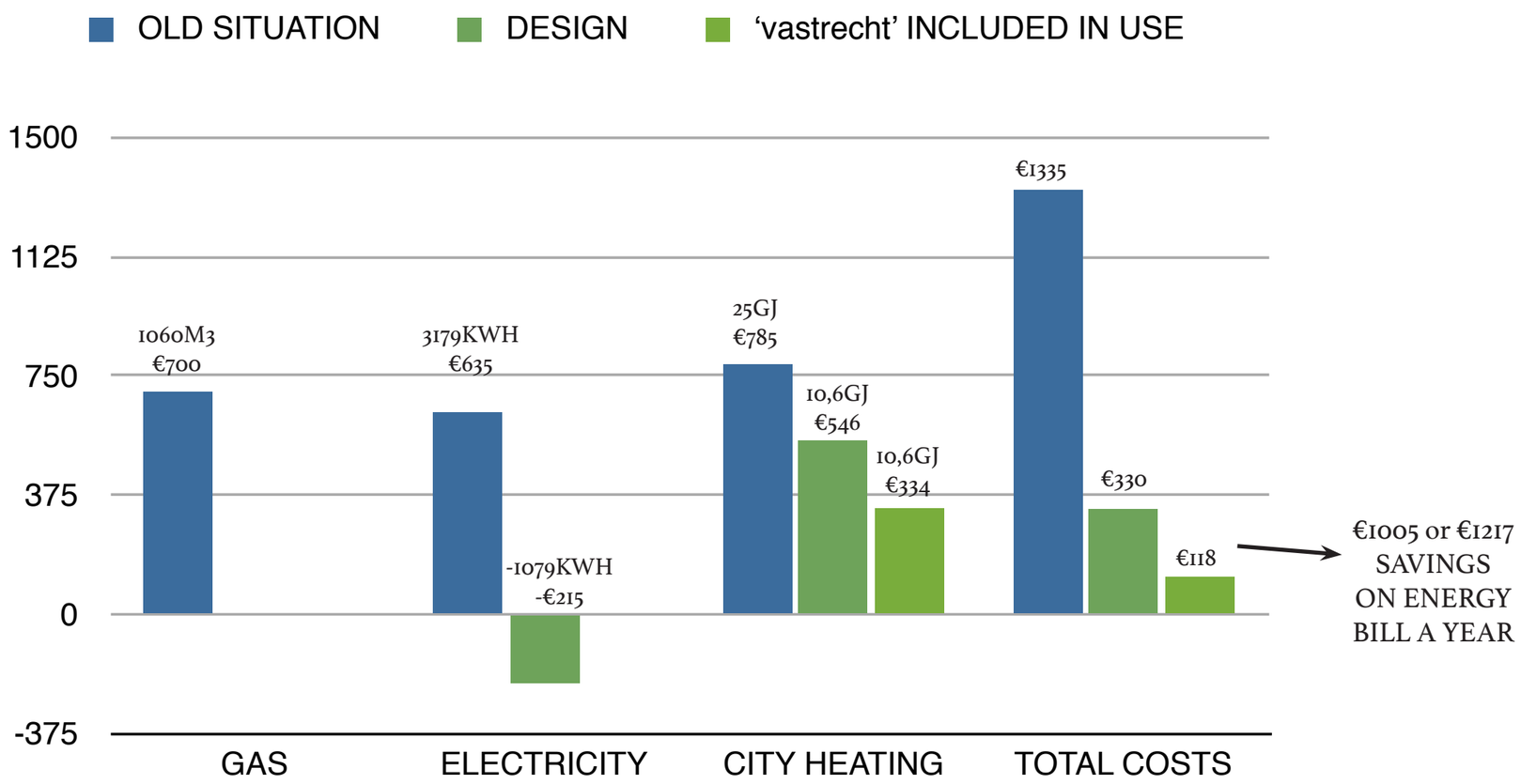
3,00



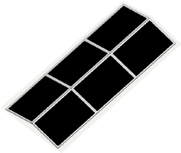
Camera obscuradreef Utrecht - Camera obscuradreef Utrecht - New - nauwkeurige methode
New situation, block 3, upper corner apartment

-0,33


INSULATION
BLINDS / SLATS
SEWAGE TREATMENT PLANT
BALANCED VENTILATION
150
112,5
75
37,5
0
117 MJ
6,4 MJ
HEATING
SEWAGE TREATMENT PLANT
20
15
10
5
0
19 MJ
4,2 MJ
HOT WATER
BALANCED VENTILATION
800
600
400
200
0
279 MJ
705 MJ
VENTILATION
BLINDS / SLATS
ACCUMULATIVE POWER CONCRETE STRUCTURE
BALANCED VENTILATION
WINTER GARDEN
500
375
250
125
0
439 MJ
24 MJ
SUMMER COMFORT
SOLAR PANELS
4000
3000
2000
1000
0
-1000
-2000
3179 MJ
-1072 MJ
ELECTRISITY
OLD SITUATION
DESIGN

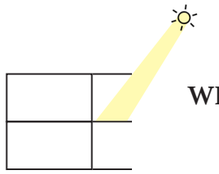


SOURCE OF KEY FIGURES:
MILIEU CENTRAAL



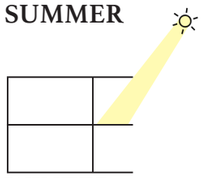
SOLAR PANELS

SEWAGE TREATMENT PLANT



WINTER GARDEN

SUMMER

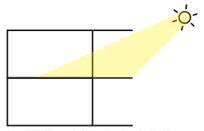


ELECTRICITY CONVERTED TO BIOGAS
SOLAR PANELS PRODUCE MORE ENERGY THAN CONSUMED PER APARTMENT. ELECTRICITY IS TRANSPORTED TO SEWAGE TREATMENT PLANT THAT USE ELECTRICITY TO PRODUCE BIOGAS

HOT TAP WATER
SEWAGE TREATMENT PLANT IS PROVIDED WITH ELECTRICITY FROM SOLAR PANELS
BIOGAS IS BURNED FOR PRODUCTION HOT TAP WATER

PROTECTION OVERHEATING
WINDOWS ARE OPEN AND CANTILEVER PROTECT AGAINST OVERHEATING

WINTER

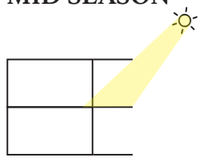


GENERATES ENERGY
PANELS PRODUCE ENERGY FOR APARTMENT

HEATING AND HOT TAP WATER
SEWAGE TREATMENT PLANT USES STORED BIOGAS FROM THE SUMMER. POSSIBILITY TO CO-FIRE WITH WOOD CHIPS IN COLD WEATHER

OUTDOOR SPACE IN THE WINTER
THE WINTER GARDEN PROVIDE OUTDOOR SPACE IN THE WINTER AND SERVES AS BUFFER ZONE BETWEEN INSIDE AND OUTSIDE

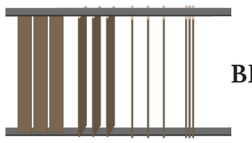
MID SEASON



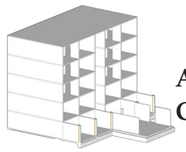
GENERATES ENERGY
PANELS PRODUCE ENERGY FOR APARTMENT

HEATING AND HOT TAP WATER
SEWAGE TREATMENT PLANT PROVIDE BIOGAS WHICH IS USED TO GENERATE ENERGY (HEATING, HOT TAP WATER AND ELECTRICITY)

EXTRA SPACE
THE WINTER GARDEN PROVIDE OUTDOOR SPACE IN THE MID SEASON AND SERVES AS BUFFER ZONE BETWEEN INSIDE AND OUTSIDE



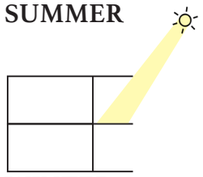
BLINDS / SLATS



ACCUMULATIVE POWER CONCRETE STRUCTURE

BALANCED VENTILATION

SUMMER

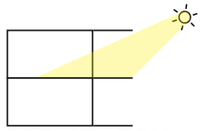


PROTECTION OVERHEATING
SLATS ARE SEMI CLOSED OR CLOSED TO PROTECT AGAINST OVERHEATING. PERFORM AS SHUTTERS ONLY SLATS CAN BE TURNED TO ADJUST LIGHT INTENSITY

STABLE TEMPERATURE
IN THE SUMMER THE STORED COLD OF THE WINTER CAN KEEP THE TEMPERATURE STABLE

NIGHT VENTILATION
EXCHANGE TEMPERATURE VENTILATION AIR WITH FRESH AIR. AT NIGHT, THE BYPASS ALLOWS NIGHT VENTILATION TO COOL THE APARTMENT

WINTER

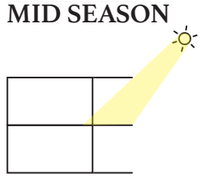


ADDITIONAL INSULATION / PRIVACY
THE SLATS CAN BE USED AS ADDITIONAL INSULATION LAYER DURING THE NIGHT. THEY CAN BE USED TO GREAT PRIVACY AS WELL

STABLE TEMPERATURE
IN THE WINTER THE STORED COLD OF THE SUMMER CAN KEEP THE TEMPERATURE STABLE

PREHEATED AIR
BY EXCHANGE TEMPERATURE OF THE VENTILATION AIR WITH FRESH AIR FLUCTUATIONS IN TEMPERATURE CAN BE PREVENTED, RESULTING IN A MORE COMFORTABLE INDOOR CLIMATE

MID SEASON



ADJUSTABLE COMFORT
THE SLATS CAN BE USED FOR SUN/PRIVACY AND PROVIDE ADJUSTABLE COMFORT

STABLE TEMPERATURE
THE MASS OF THE CONCRETE HAS ACCUMULATING CAPACITY WHEREBY THE TEMPERATURE SLOWLY CHANGES.

CO_2 CONTROLLED
THE VENTILATION IS CO_2 CONTROLLED PREVENTING UNNECESSARY VENTILATION

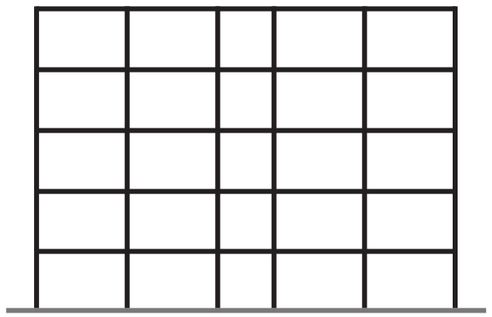
CONTENT

AMBITION

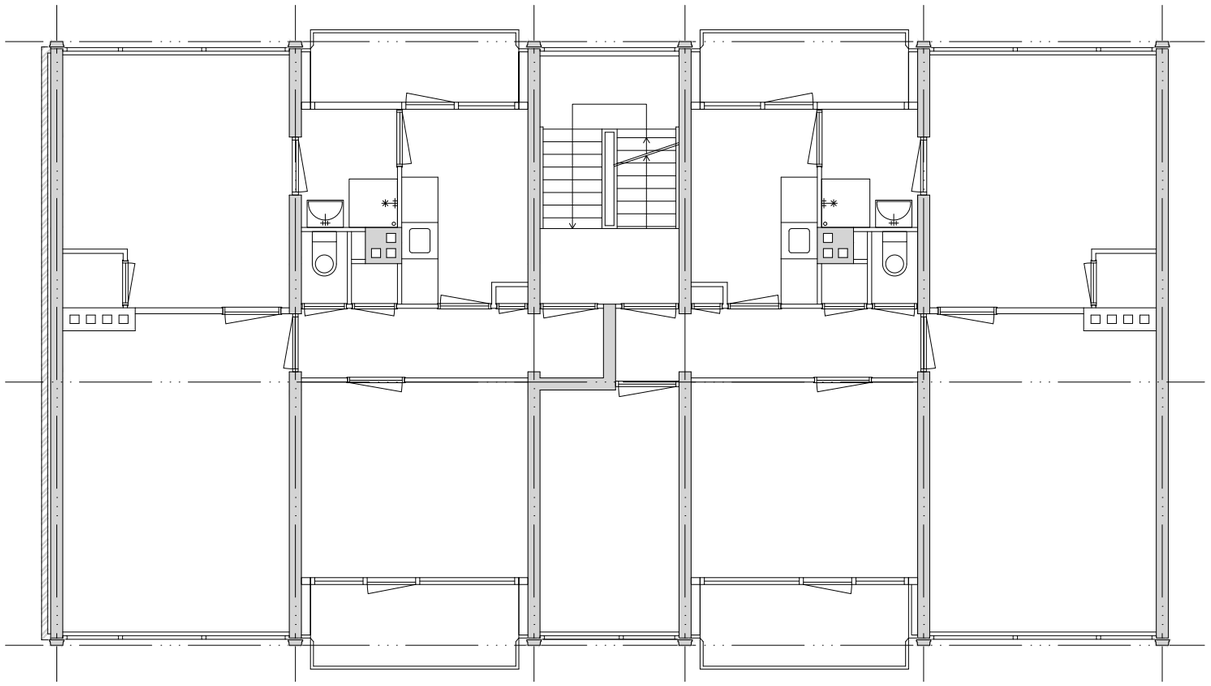
ENERGY
- ENERGY EFFICIENT

COMFORT
- COMFORTABLE LIVING ENVIRONMENT

URBAN
- SPACIAL PLACEMENT BUILDINGS



GRID
- CHARACTERISTIC FOR INTERVAM 1964



FLOOR PLAN 2ND - 4TH
EXISTING

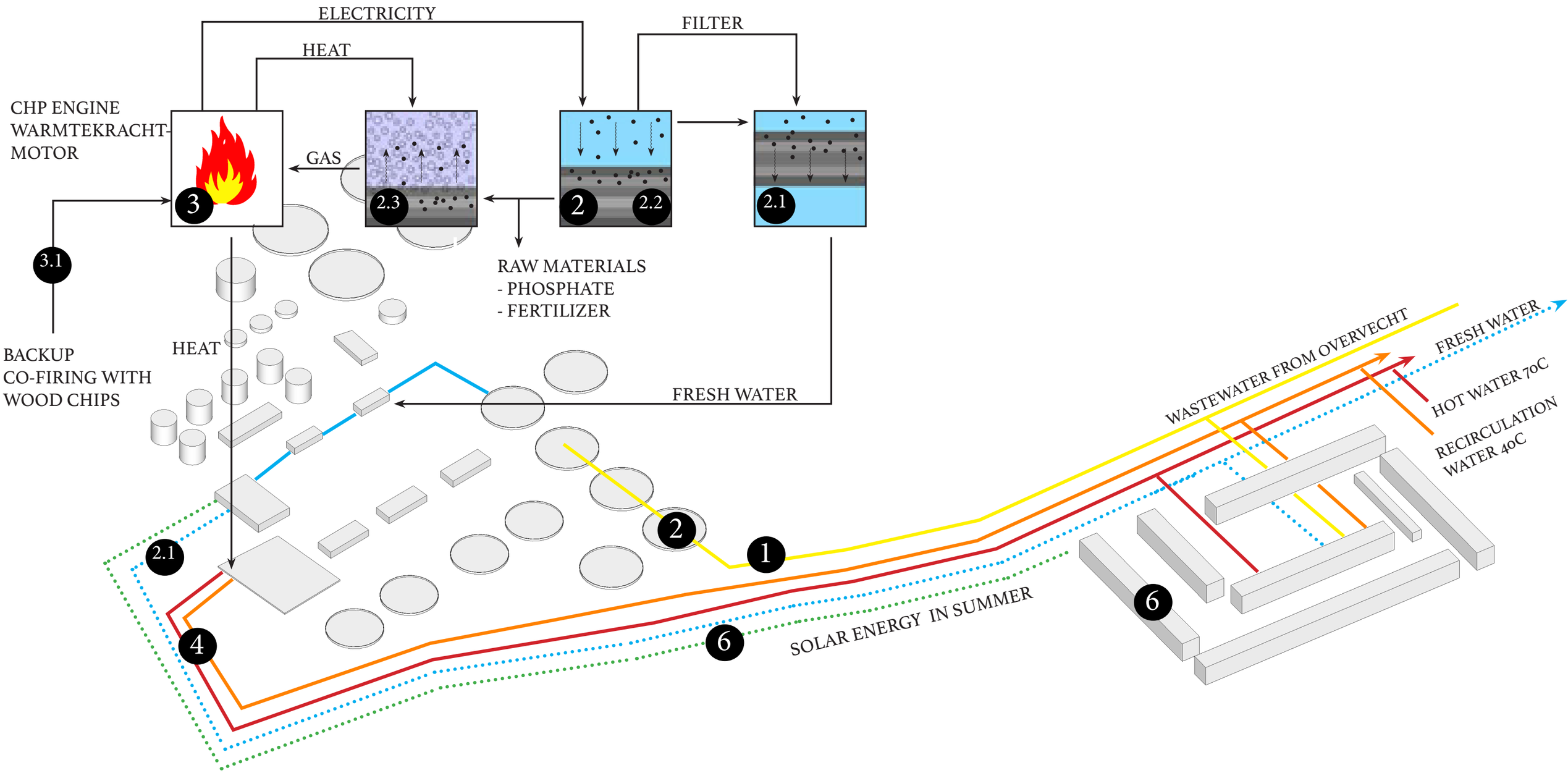
DESIGN

2ND- 4TH	EXISTING	DESIGN
BEDROOM	16,1 -12,1	15,7 - 12,1
LIVING ROOM	19,9	20,4
KITCHEN	6,5	9,3
BATHROOM	3,1	4,0

Camera obscuradreef Utrecht - Camera obscuradreef Utrecht Existing situation, block 3, upper corner apartment	3,00
Camera obscuradreef Utrecht - Camera obscuradreef Utrecht - New - nauwkeurige methode New situation, block 3, upper corner apartment	-0,33

SIMILAR PROJECT: APELDOORN ZUIDBROEK
- HEAT 1.800 DWELLINGS AND
- ELECTRICITY FOR 3900 DWELLINGS
- 5.5 MILLION M3 BIOGAS
- 900.000 KG FERTILIZER
- RECOVERY OF PHOSPHATE

SOURCE: KONINKLIJK NEDERLANDS WATERNETWERK




Thank you!
Questions?