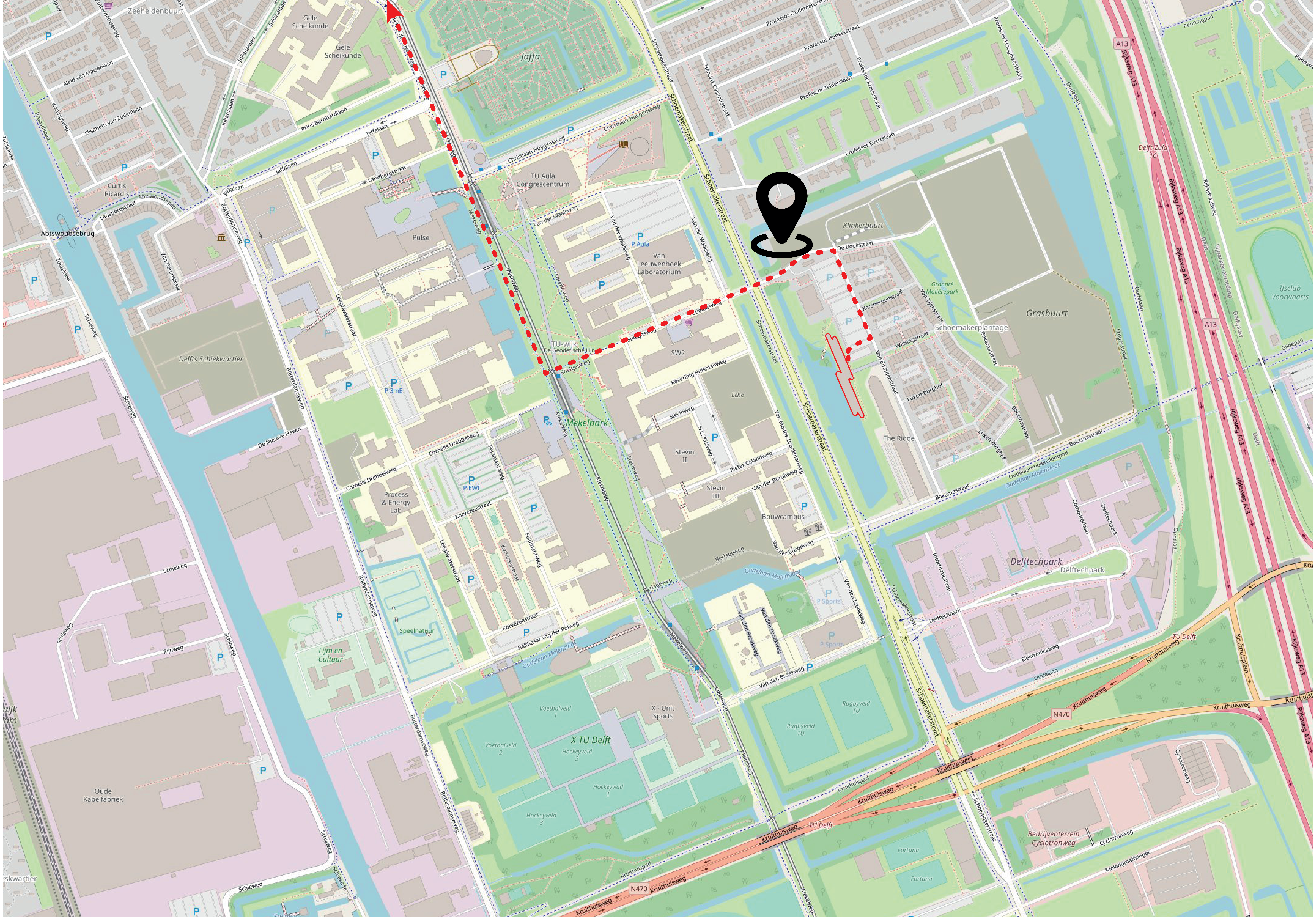
P5 PRESENTATION

THE HANGING GARDENS OF DELFT

A.C. VAN ROSMALEN
4361350

DESIGN MENTOR: MONIQUE SMIT
BUILDING TECHNOLOGY: MARCEL BILOW
RESEARCH MENTOR: JOS DE KRIEGER
DELIGATE EXAMINER: ANDRÉ MULDER



Zeeheldenbuurt
Gele Scheikunde
Gele Scheikunde
Jaffa
Julianalaan
Prins Bernhardlaan
Jaffalaan
Christiaan Huygensweg
TU Aula Congrescentrum
Schoemakerstraat
Klinkerburt
De Booijstraat
Grasbuurt
Schoemakerplantage
Kersbergenstraat
Wissingstraat
Luxemburghof
The Ridge
Bakemastraat
Oudelaan
IJsclub Voorwaarts
Rijksweg A13
A13
Delft Zuid
Abtswoudsebrug
Curtis Ricardis
Pulse
Van der Waalsweg
Van Leeuwenhoek Laboratorium
P Aula
Stieltjesweg
TU-wijk
SW2
Keverling Buismanweg
Echo
Mekelpark
Mekelweg
Delfts Schiekwartier
Rotterdamseweg
Leeghwaterstraat
P 3mE
De Nieuwe Haven
Cornelis Drebbelweg
Process & Energy Lab
P EWI
Korvezeestraat
Feldmannweg
Stevinweg
Stevin II
Stevin III
Pieter Calandweg
Van der Burghweg
Bouwcampus
Berlageweg
Oudelaan Molensloot
Delftechpark
Informaticalaan
Computerlaan
Elektronicaweg
P Sports
Van den Broekweg
Balthasar van der Polweg
Speelnatuur
Lijm en Cultuur
Schieweg
Rijnweg
Oude Kabelfabriek
Voetbalveld 1
Voetbalveld 2
X TU Delft
Hockeyveld 2
Hockeyveld 1
Hockeyveld 3
X - Unit Sports
Rugbyveld TU
Kruithuisweg
N470
TU Delft
Fortuna
Bedrijventerrein Cyclotronweg
Cyclotronweg
Molengraaffsingel


Wonen
op de
duurzaamste
plek van
Delft!
Schoemakerplantage.nl

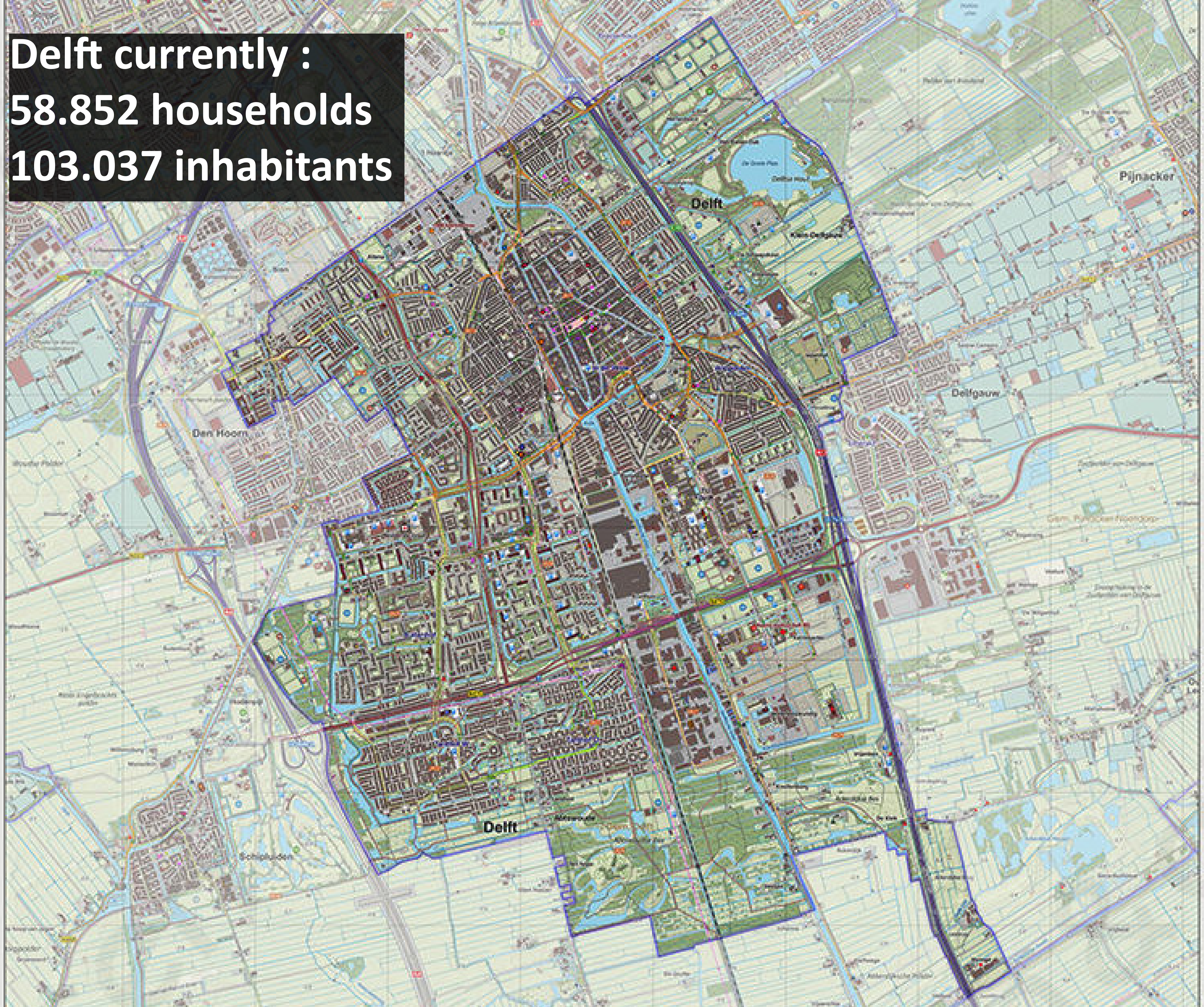

Wonen op de duurzaamste plek van Delft!
Schoemakerplantage.nl
MOST SUSTAINABLE? WHY? BUT IS IT THOUGH?


INTEGRATED
PV PANELS
ZERO ENERGY //
NUL-OP-DE-METER

Installations define sustainable architecture?

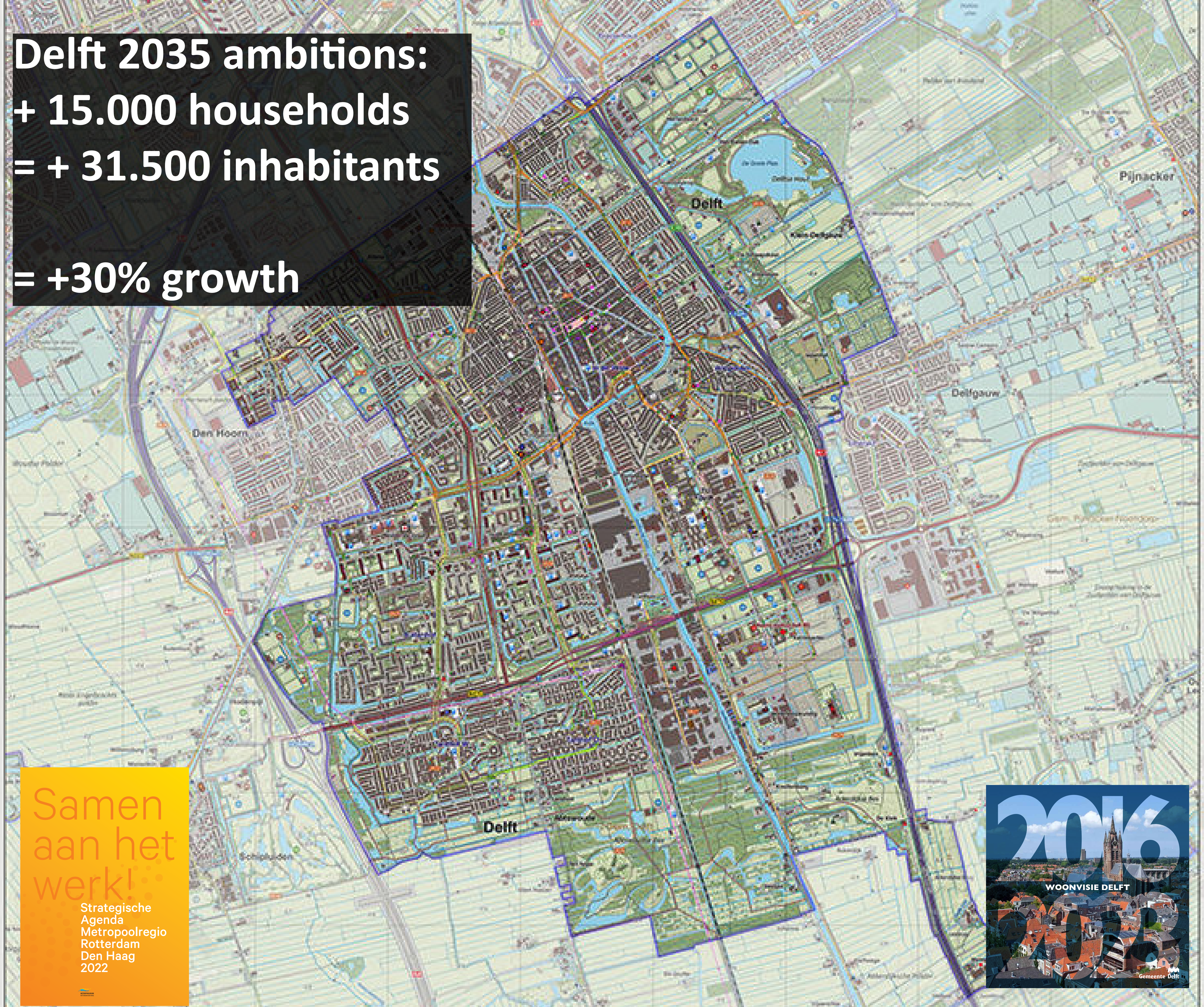
DENSITY

Delft currently :
58.852 households
103.037 inhabitants



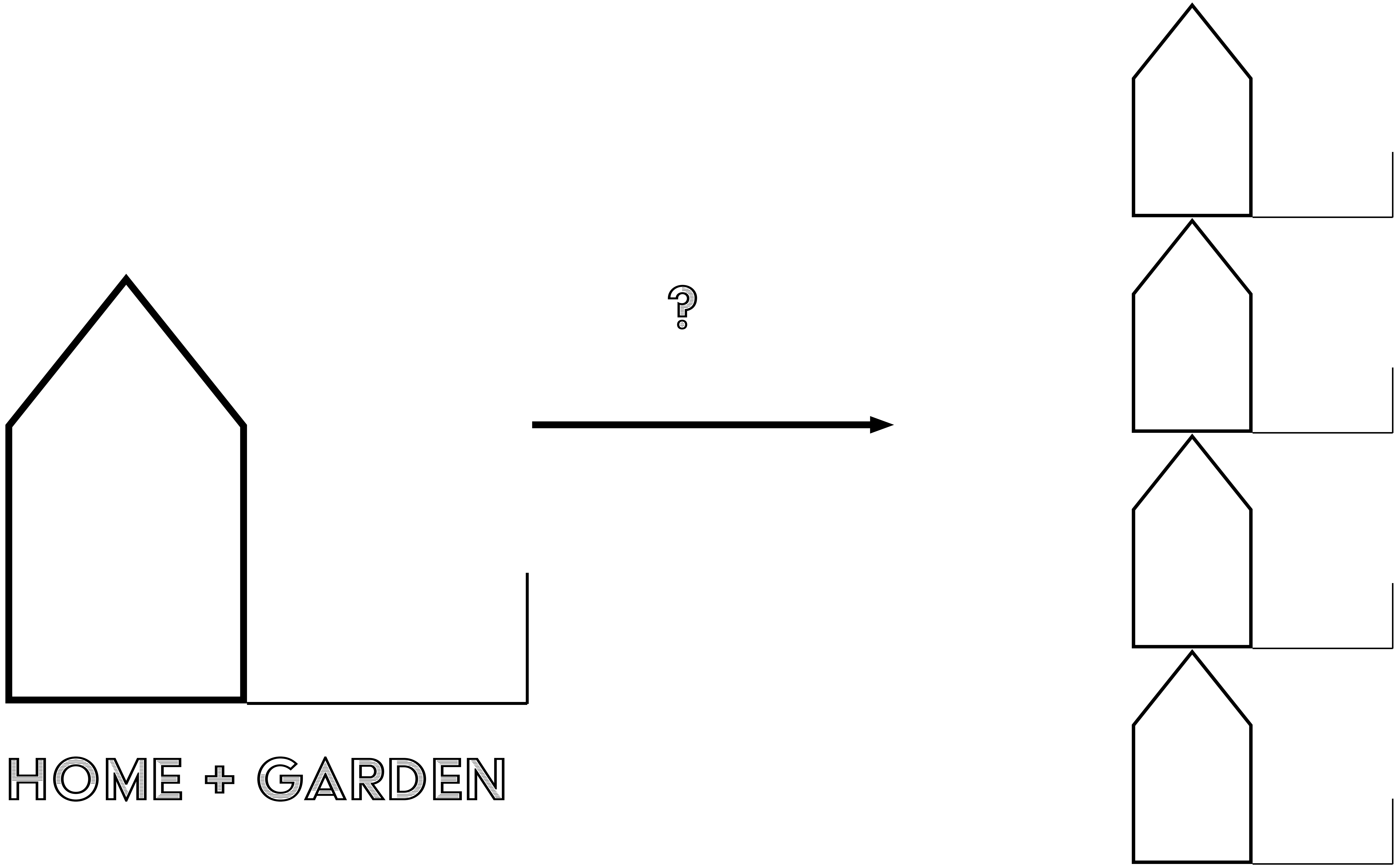
Delft 2035 ambitions:
+ 15.000 households
= + 31.500 inhabitants

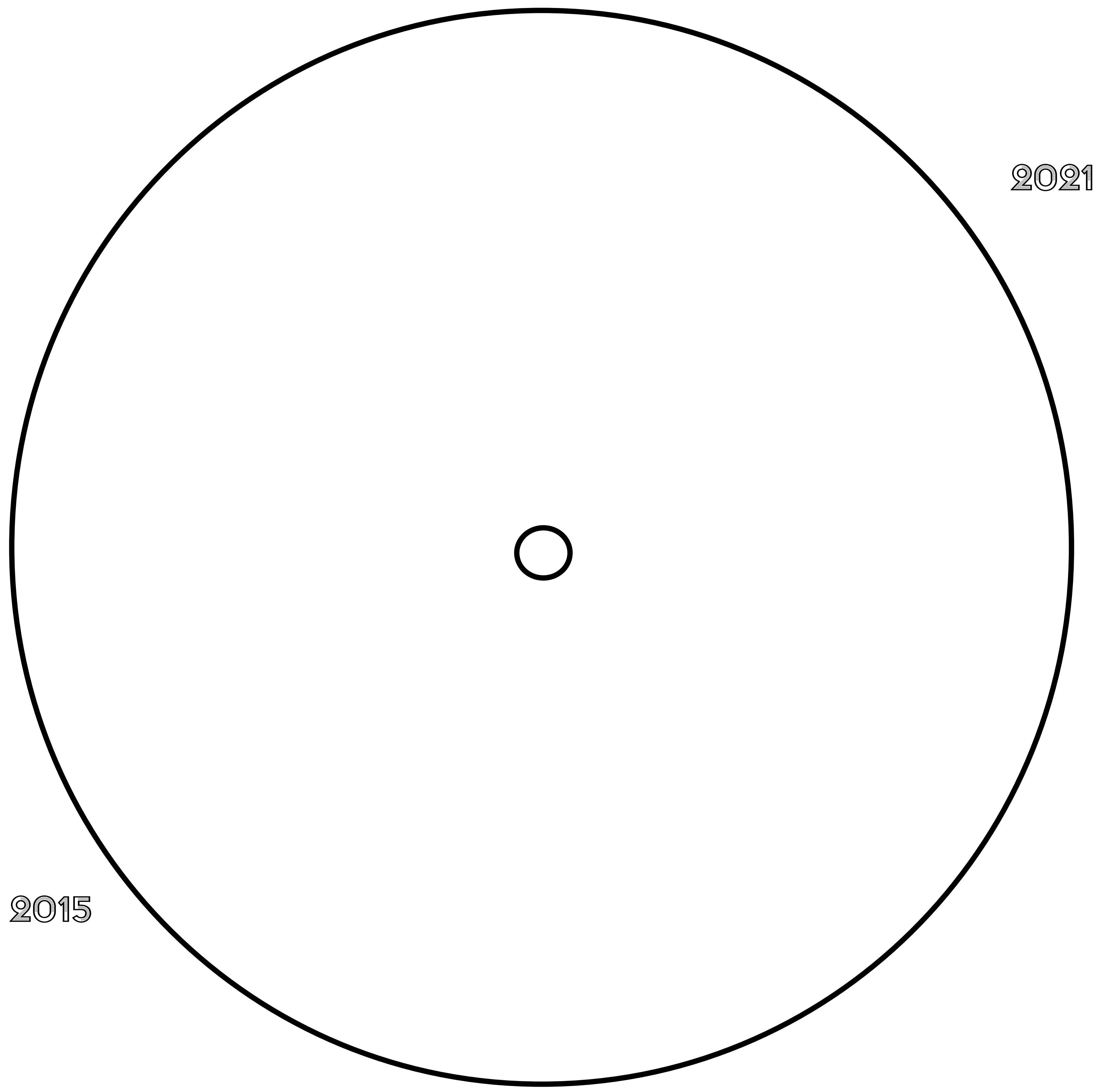
= +30% growth



One milion homes?

HOME + GARDEN


?
HOME + GARDEN


2021
2015

GOALS

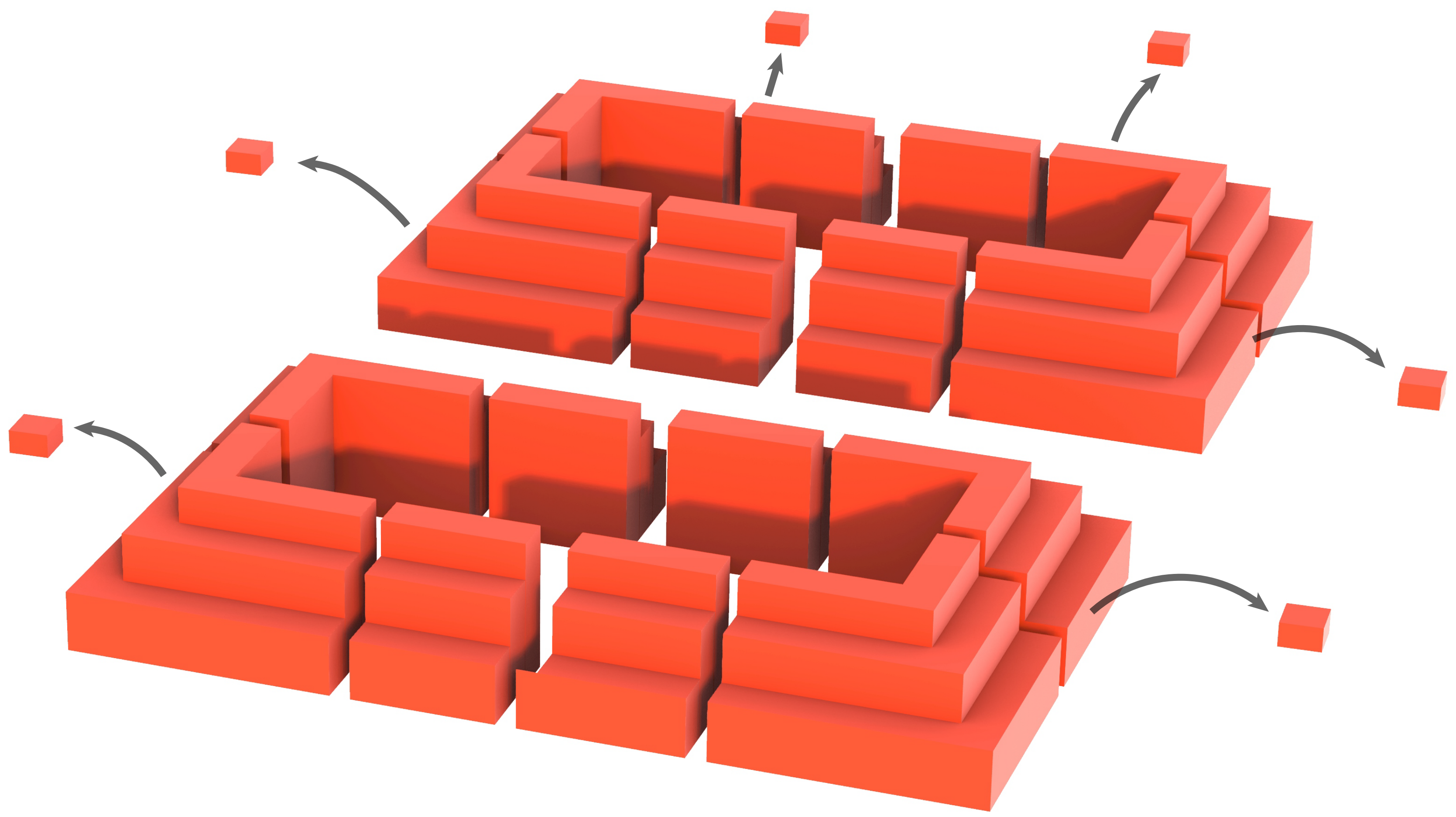
HIGH DENSITY &
HIGH QUALITY LIVING

Design fits demand to reach one milion homes

600 → **3000**

SUSTAINABILITY &
STRIVE FOR SELFSUFFICIENCY

Combining clever installatations with clever organisation of food, water and energy flows



GOALS BUILDING BLOCK

High density & high quality of living

LIGHT CAN EASILY ENTER BUILDING

STRONG VISIBLE CONNECTION GREEN

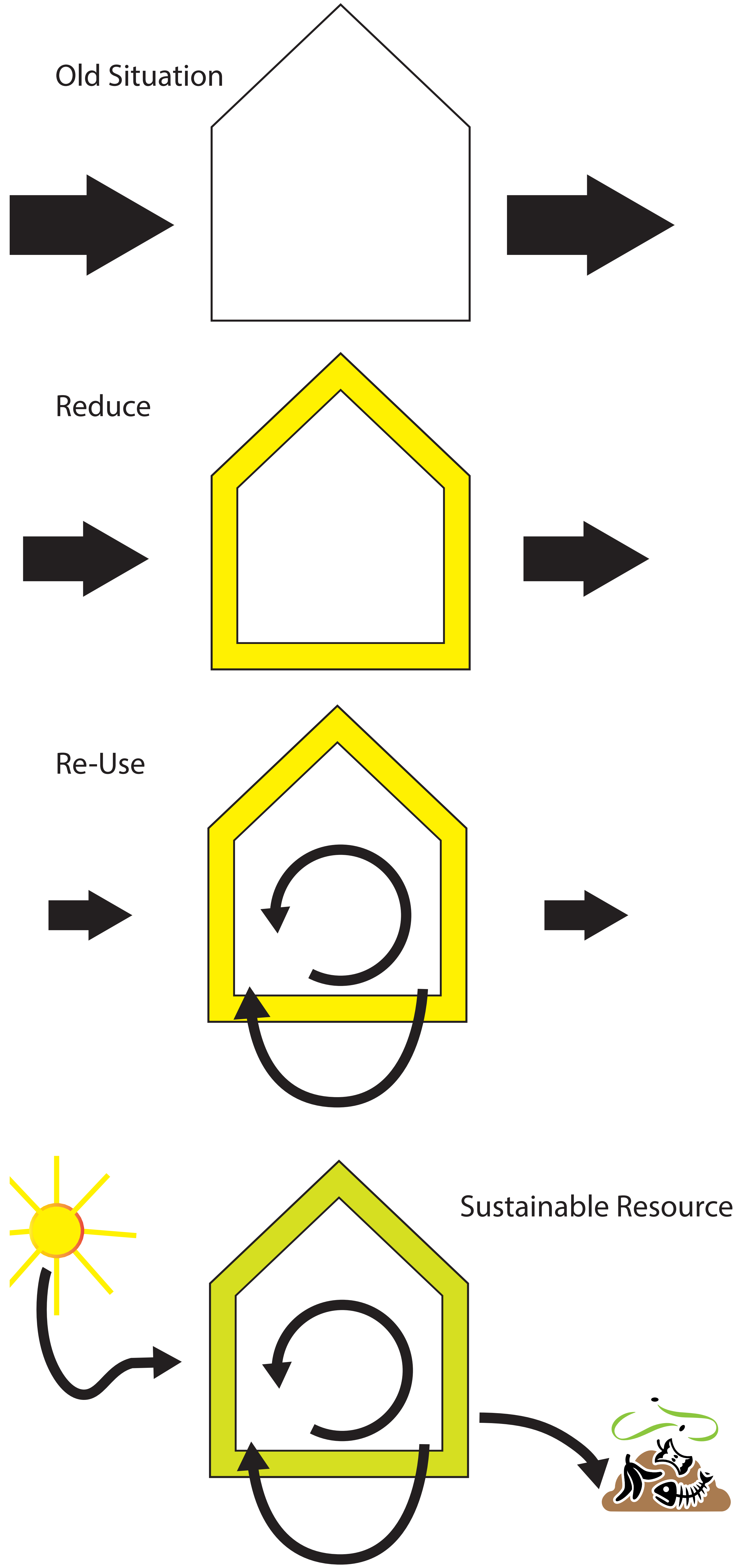
SOCIAL INTERACTION IN COLLECTIVE GREEN SPACE

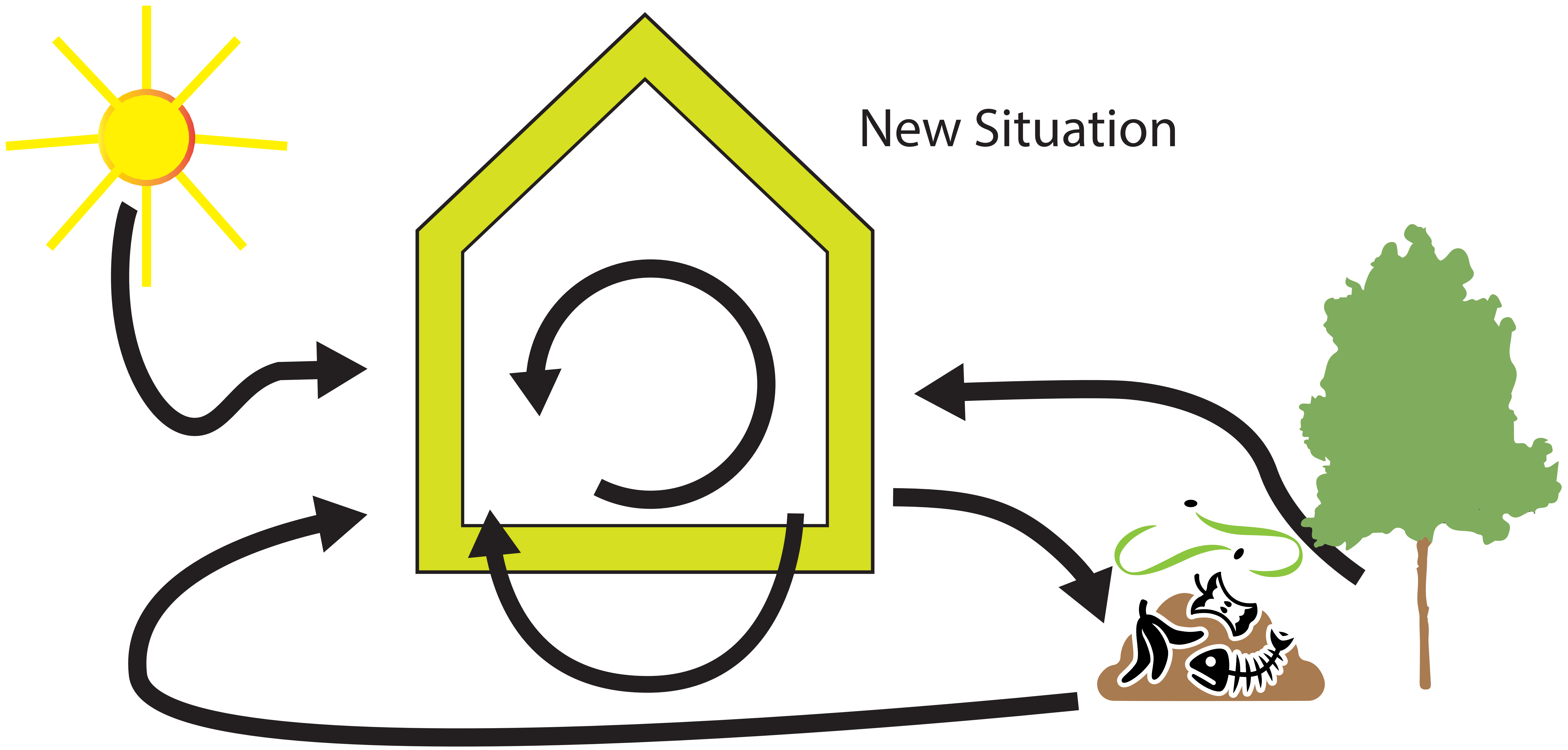
GOAL: MAX OUT SUSTAINABILITY

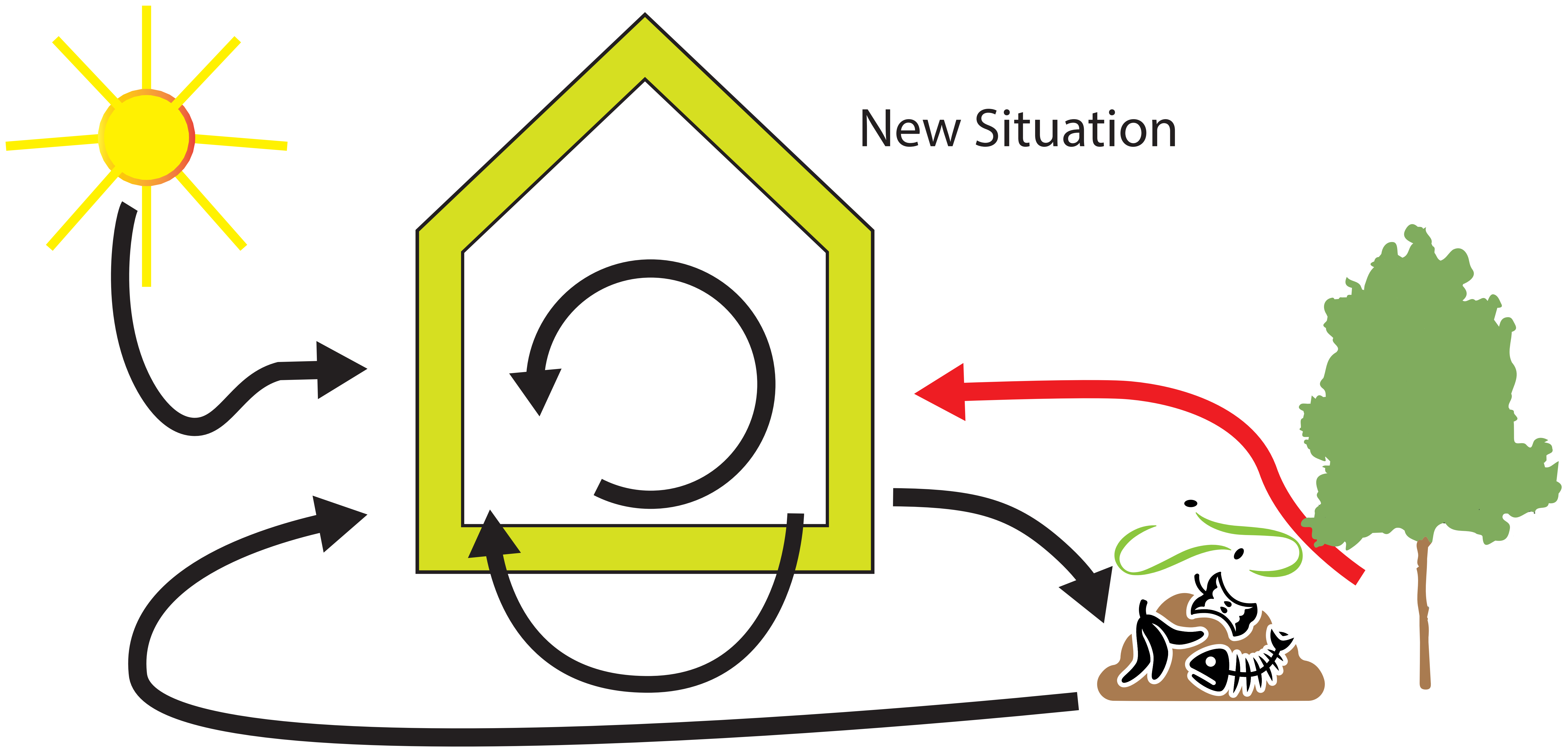
LOW EMBODIED ENERGY MATERIALS

LOCAL MATERIALS

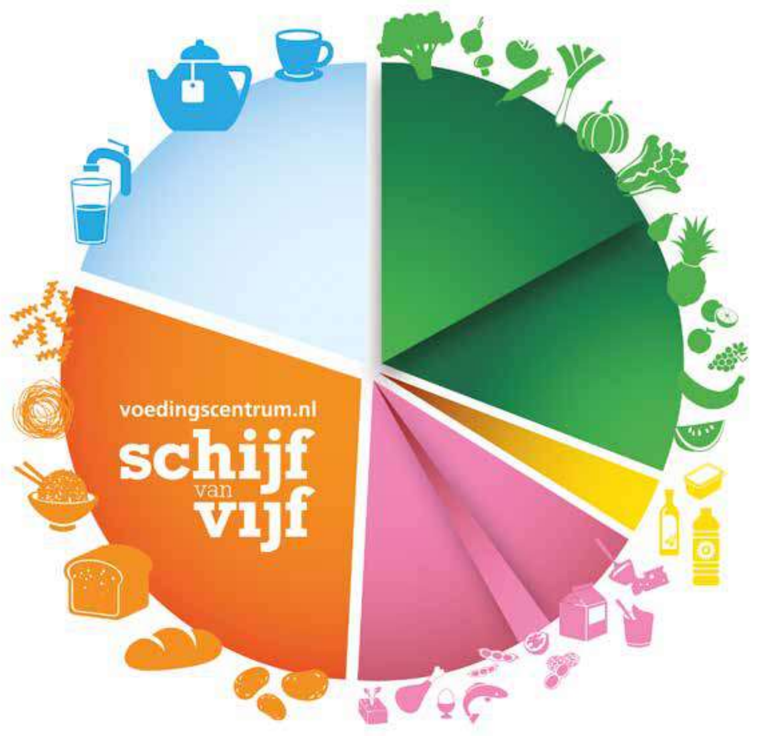
FOOD PRODUCTION

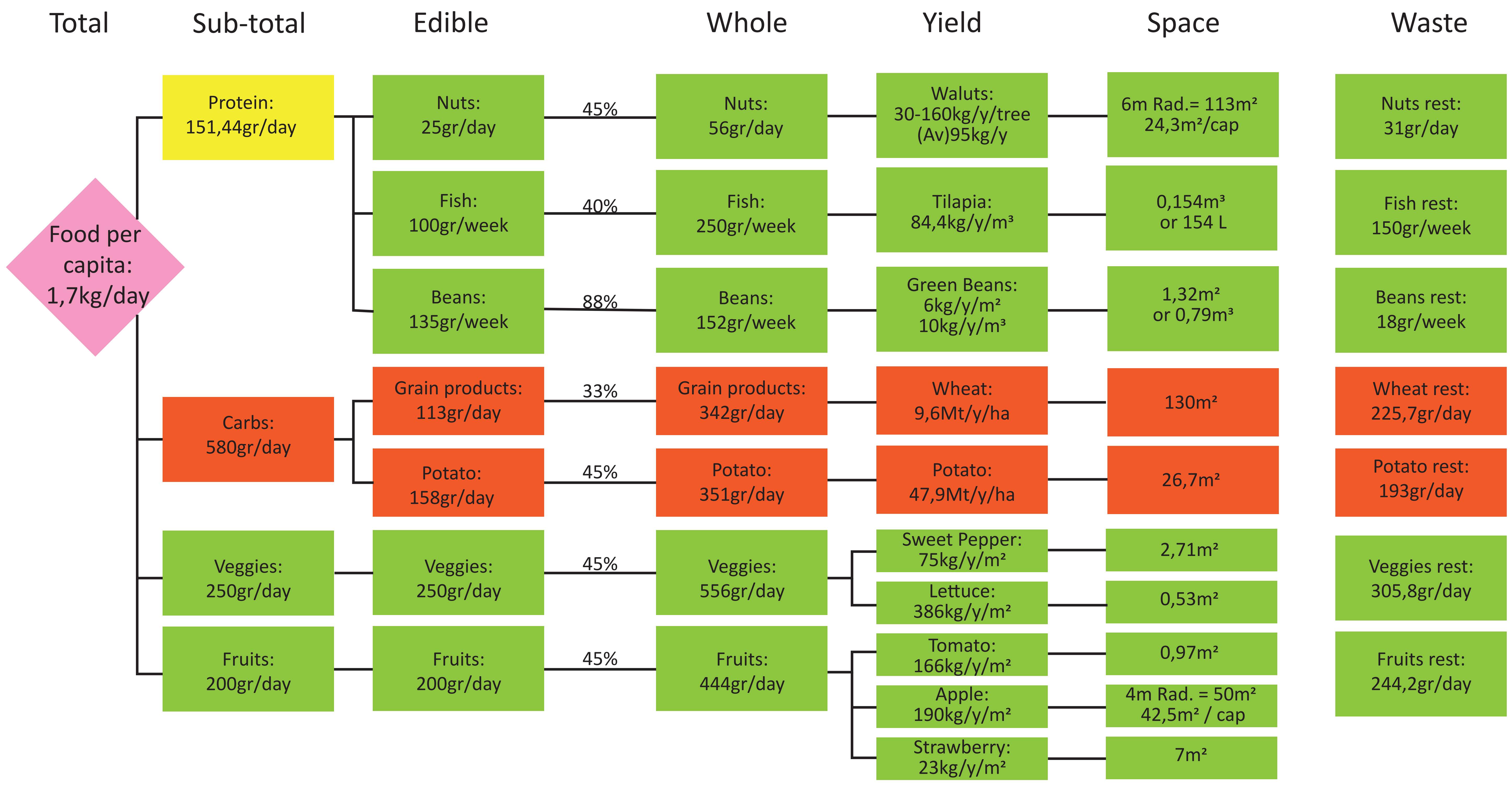

Old Situation
Reduce
Re-Use
Sustainable Resource


New Situation

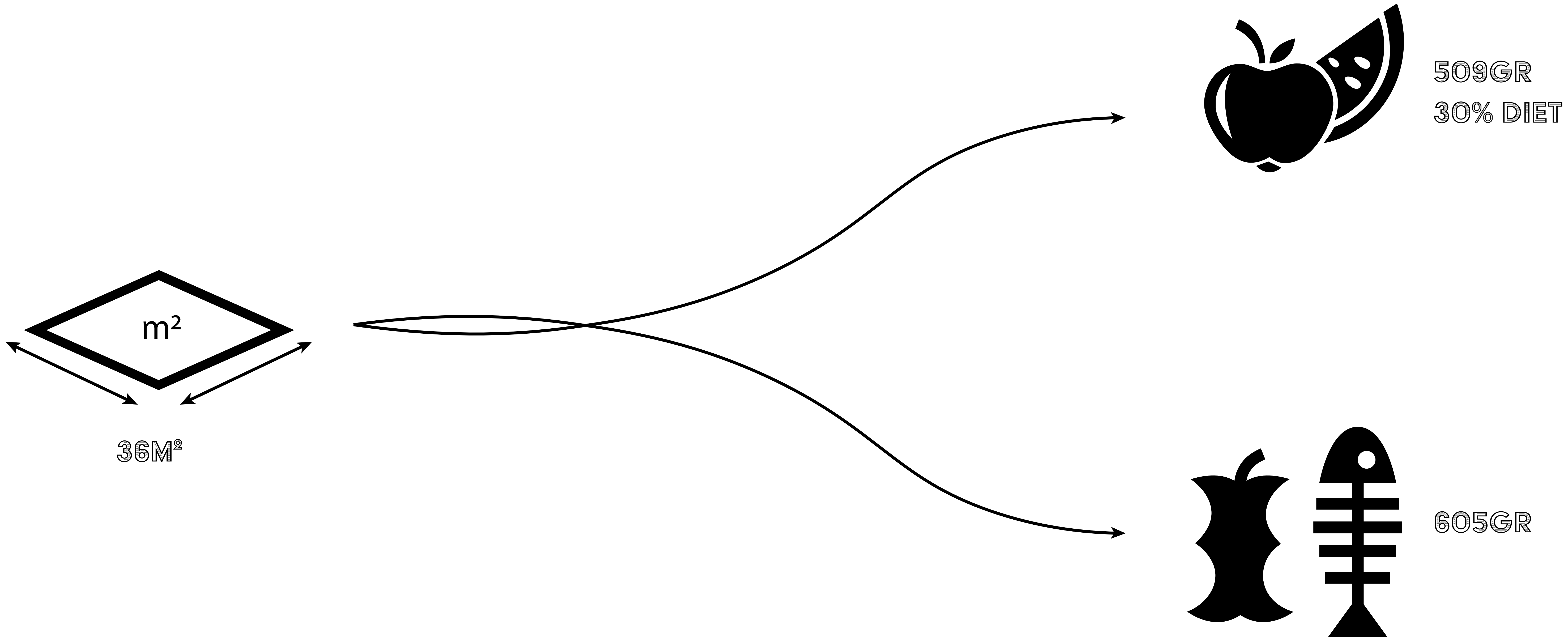

New Situation

Richtlijnen Schijf van Vijf

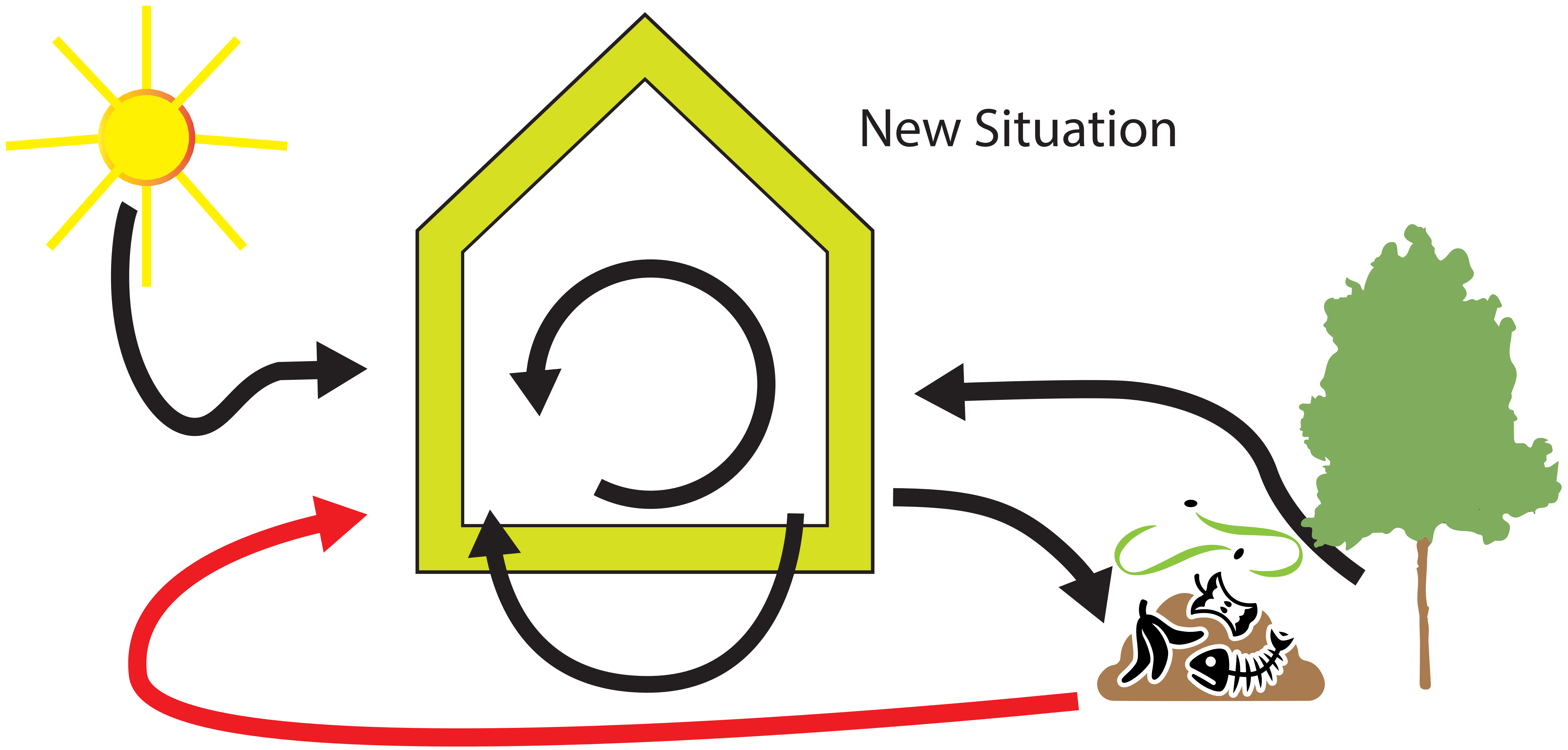


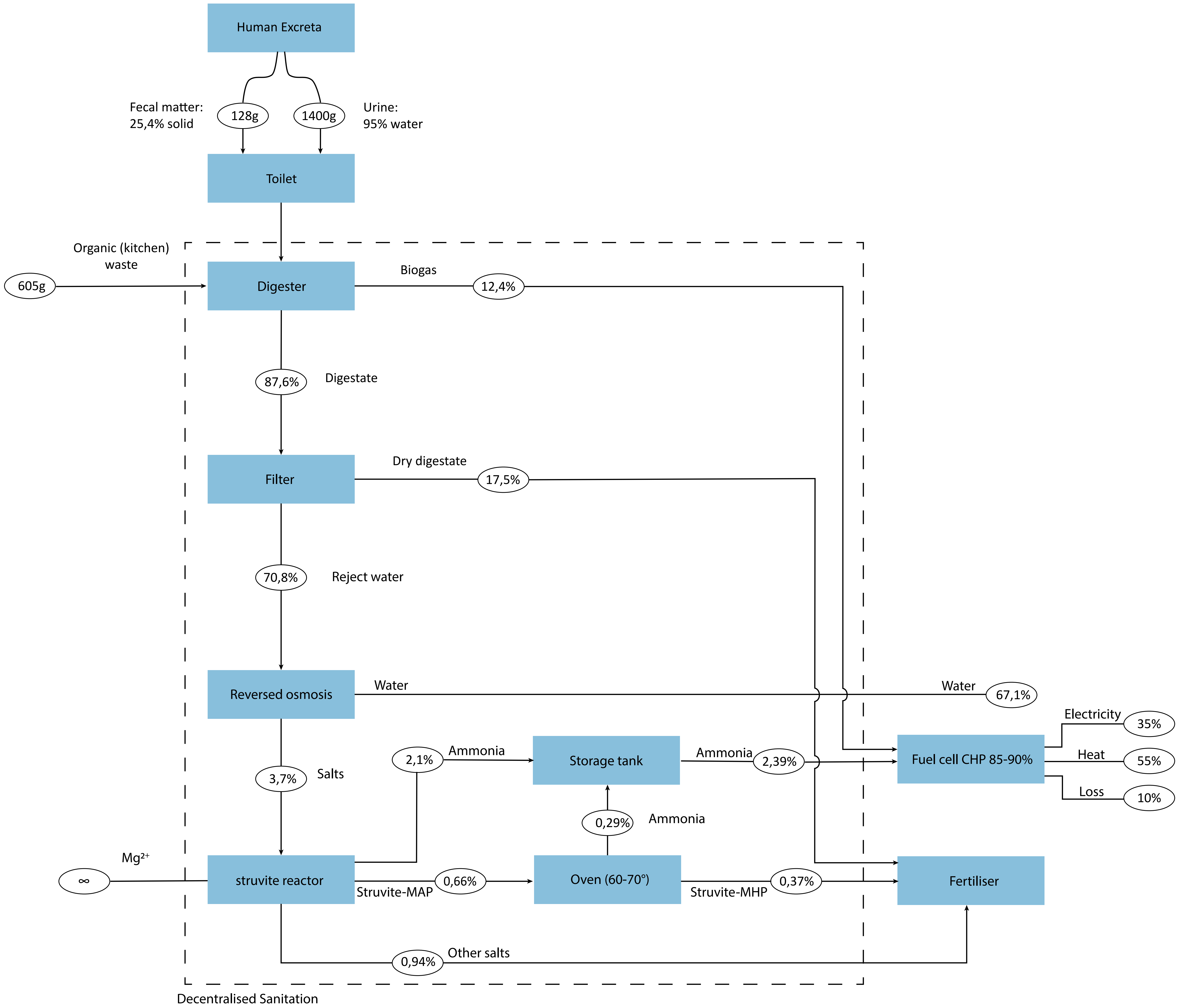


Total
Sub-total
Edible
Whole
Yield
Space
Waste
Food per capita: 1,7kg/day
Protein: 151,44gr/day
Nuts: 25gr/day
45%
Nuts: 56gr/day
Waluts: 30-160kg/y/tree (Av)95kg/y
6m Rad.= 113m^2 24,3m^2/cap
Nuts rest: 31gr/day
Fish: 100gr/week
40%
Fish: 250gr/week
Tilapia: 84,4kg/y/m^3
0,154m^3 or 154 L
Fish rest: 150gr/week
Beans: 135gr/week
88%
Beans: 152gr/week
Green Beans: 6kg/y/m^2 10kg/y/m^3
1,32m^2 or 0,79m^3
Beans rest: 18gr/week
Carbs: 580gr/day
Grain products: 113gr/day
33%
Grain products: 342gr/day
Wheat: 9,6Mt/y/ha
130m^2
Wheat rest: 225,7gr/day
Potato: 158gr/day
45%
Potato: 351gr/day
Potato: 47,9Mt/y/ha
26,7m^2
Potato rest: 193gr/day
Veggies: 250gr/day
Veggies: 250gr/day
45%
Veggies: 556gr/day
Sweet Pepper: 75kg/y/m^2
2,71m^2
Lettuce: 386kg/y/m^2
0,53m^2
Veggies rest: 305,8gr/day
Fruits: 200gr/day
Fruits: 200gr/day
45%
Fruits: 444gr/day
Tomato: 166kg/y/m^2
0,97m^2
Apple: 190kg/y/m^2
4m Rad. = 50m^2 42,5m^2 / cap
Strawberry: 23kg/y/m^2
7m^2
Fruits rest: 244,2gr/day

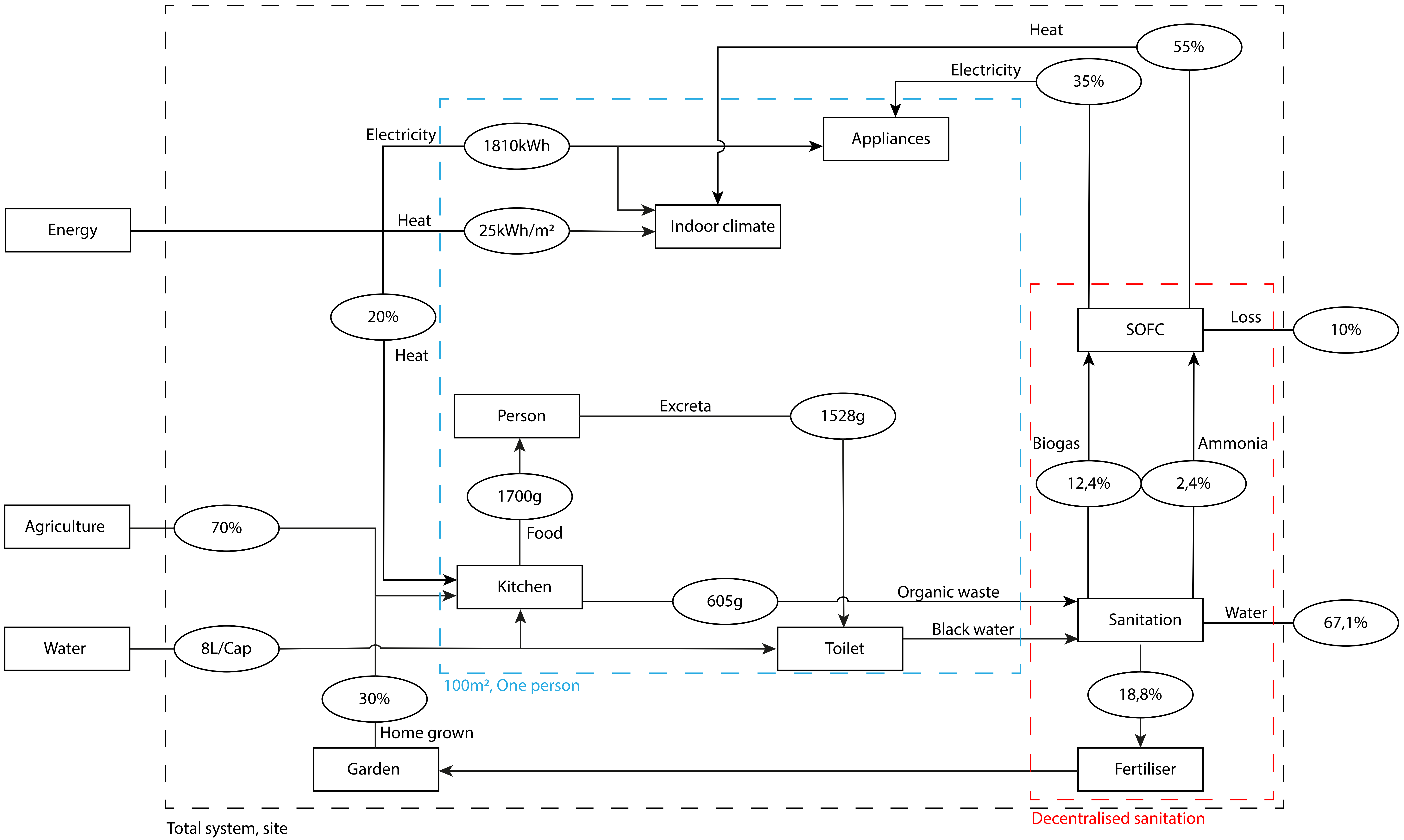


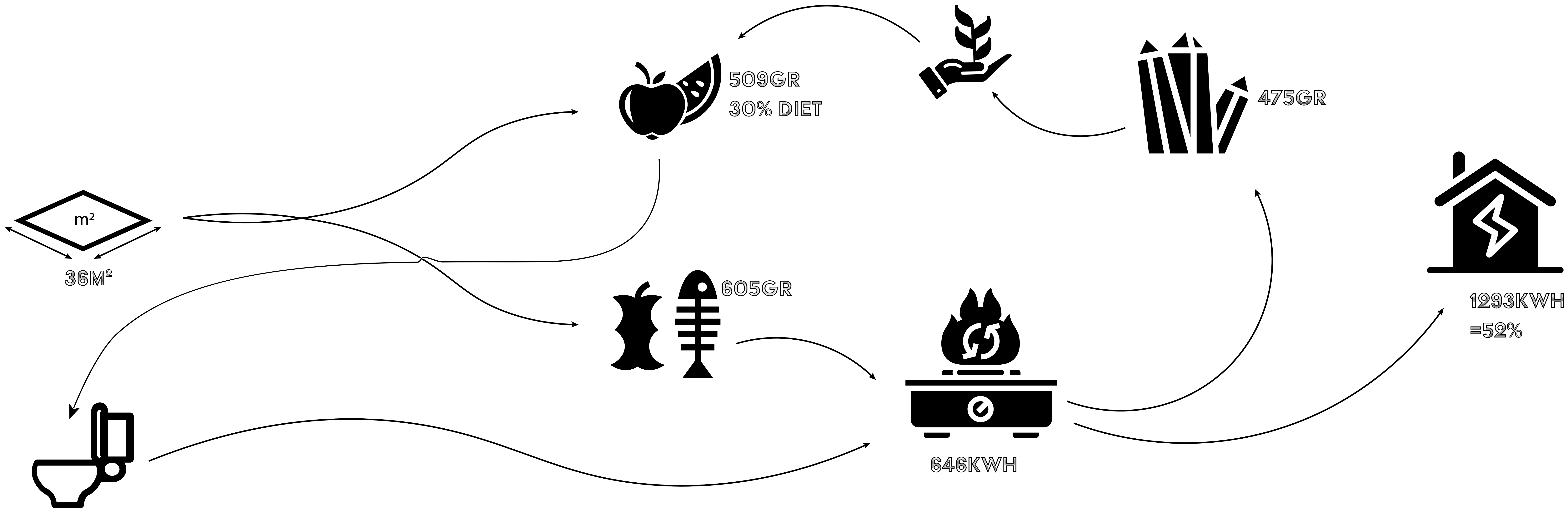
m²
36M²
509GR
30% DIET
605GR


New Situation



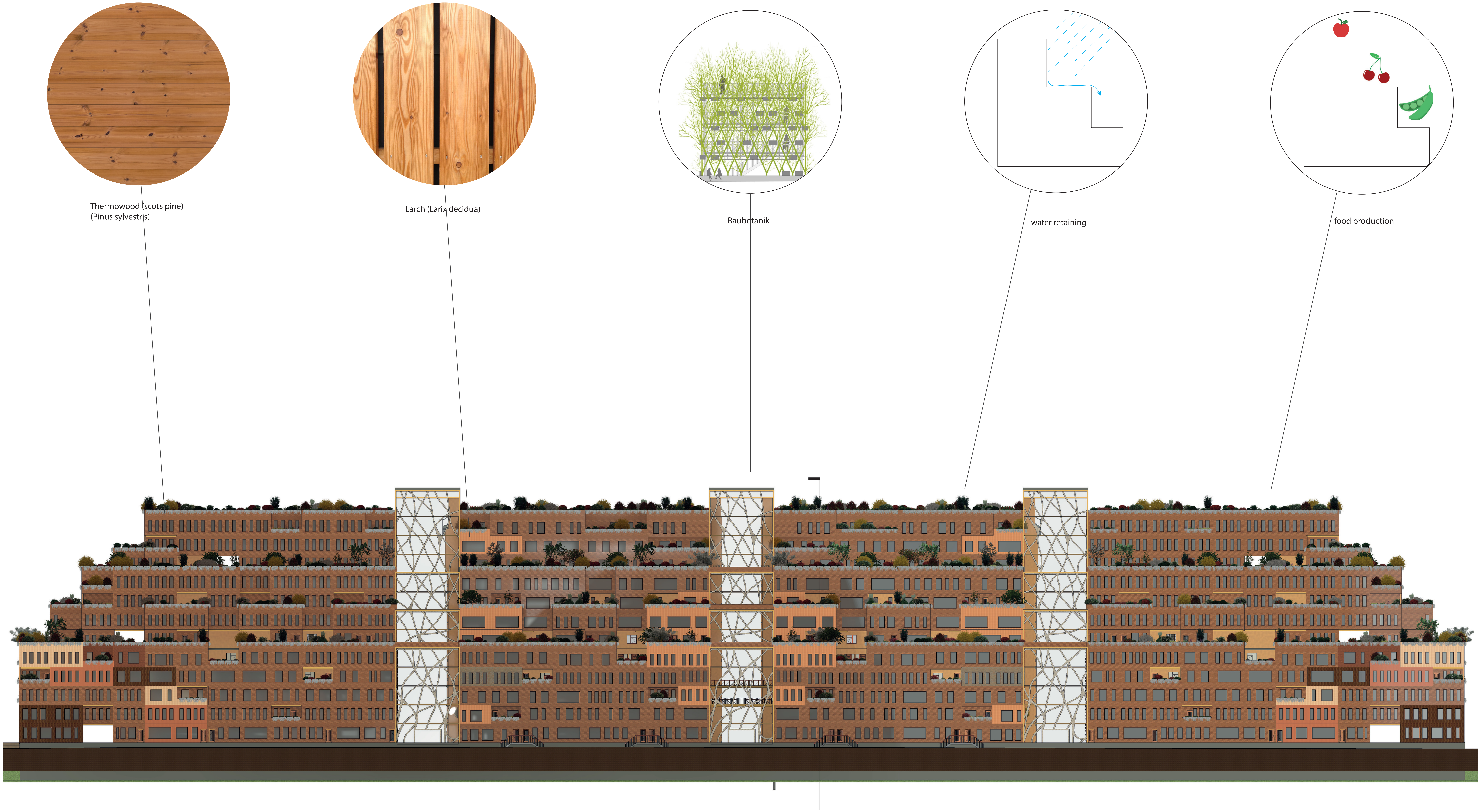
Human Excreta
Fecal matter: 25,4% solid
128g
1400g
Urine: 95% water
Toilet
Organic (kitchen) waste
605g
Digester
Biogas
12,4%
87,6%
Digestate
Filter
Dry digestate
17,5%
70,8%
Reject water
Reversed osmosis
Water
Water
67,1%
Electricity
35%
Fuel cell CHP 85-90%
Heat
55%
Loss
10%
3,7%
Salts
2,1%
Ammonia
Storage tank
Ammonia
2,39%
0,29%
Ammonia
Mg²⁺
∞
struvite reactor
Struvite-MAP
0,66%
Oven (60-70°)
Struvite-MHP
0,37%
Fertiliser
0,94%
Other salts
Decentralised Sanitation

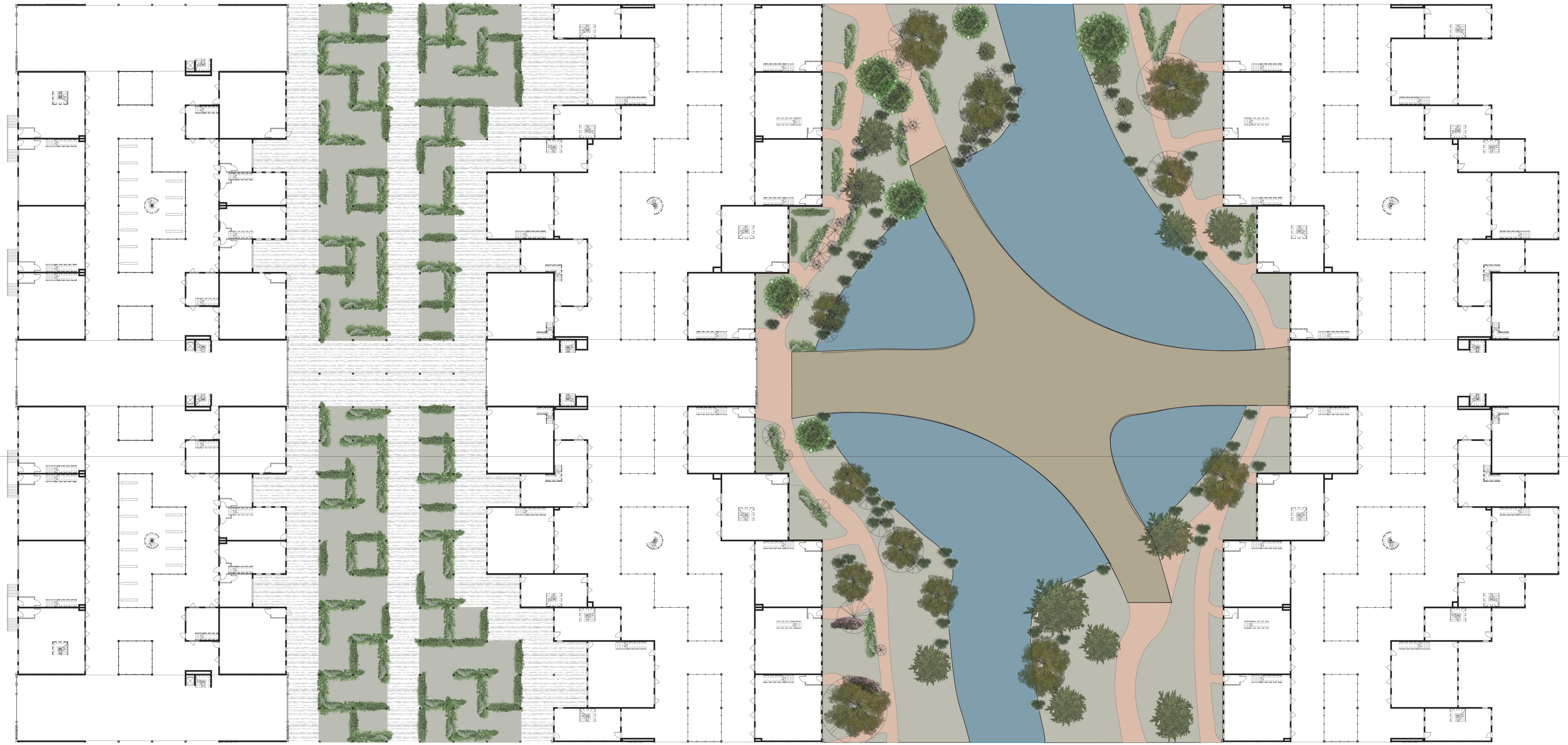

Heat
55%
Electricity
35%
Electricity
1810kWh
Appliances
Indoor climate
Energy
Heat
25kWh/m²
20%
Heat
SOFC
Loss
10%
Person
Excreta
1528g
Biogas
Ammonia
1700g
12,4%
2,4%
Agriculture
70%
Food
Kitchen
605g
Organic waste
Sanitation
Water
67,1%
Water
8L/Cap
Toilet
Black water
100m², One person
30%
18,8%
Home grown
Garden
Fertiliser
Total system, site
Decentralised sanitation

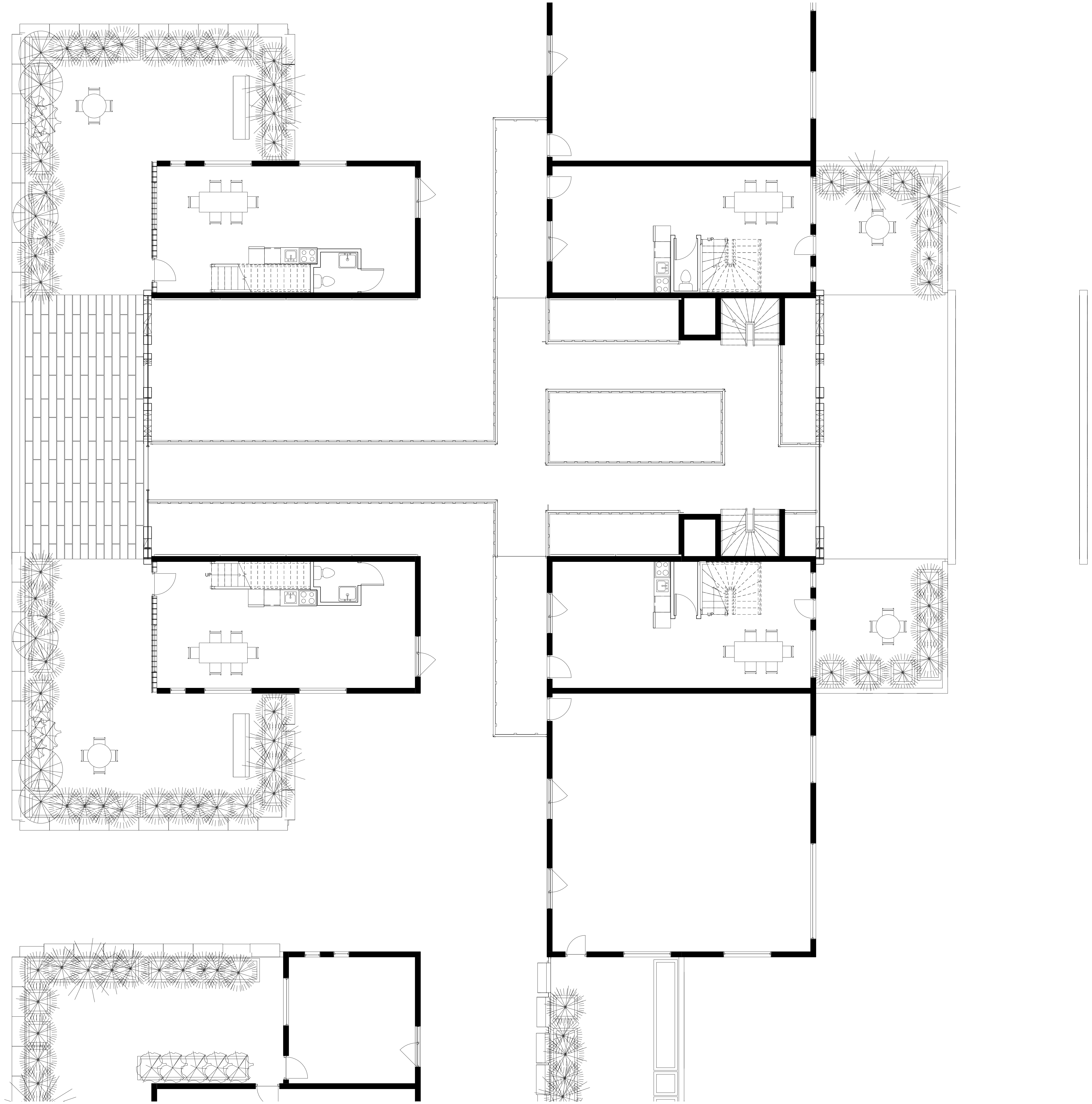


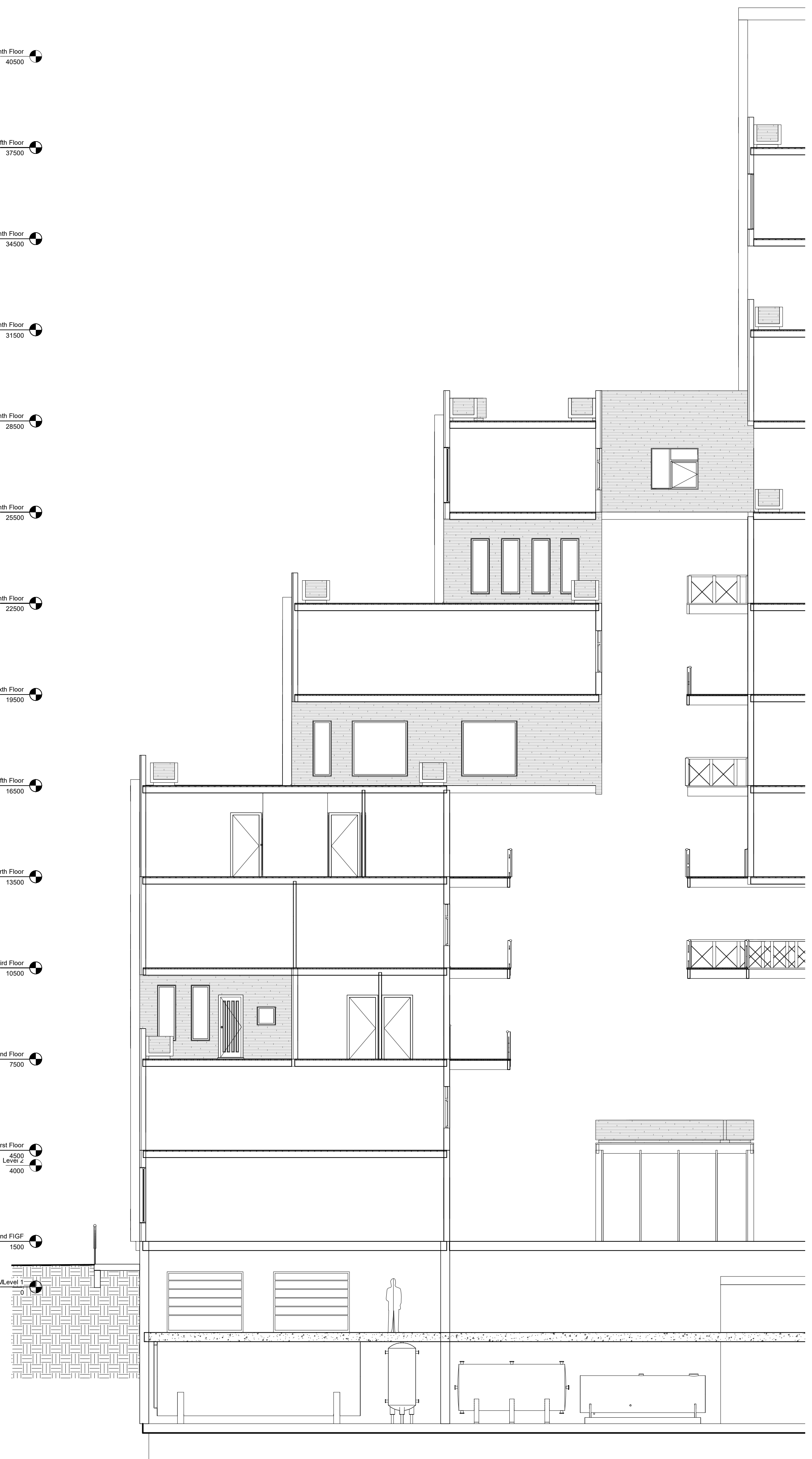
509GR
30% DIET
475GR
m²
36M²
605GR
1293KWH
=52%
646KWH

1029 kWh/m²
El
Q
wtw
NH_3
septic
meta
thermo
storage
SOFC:
solid oxide
fuel cell
septic
25
18
Aquifer
8

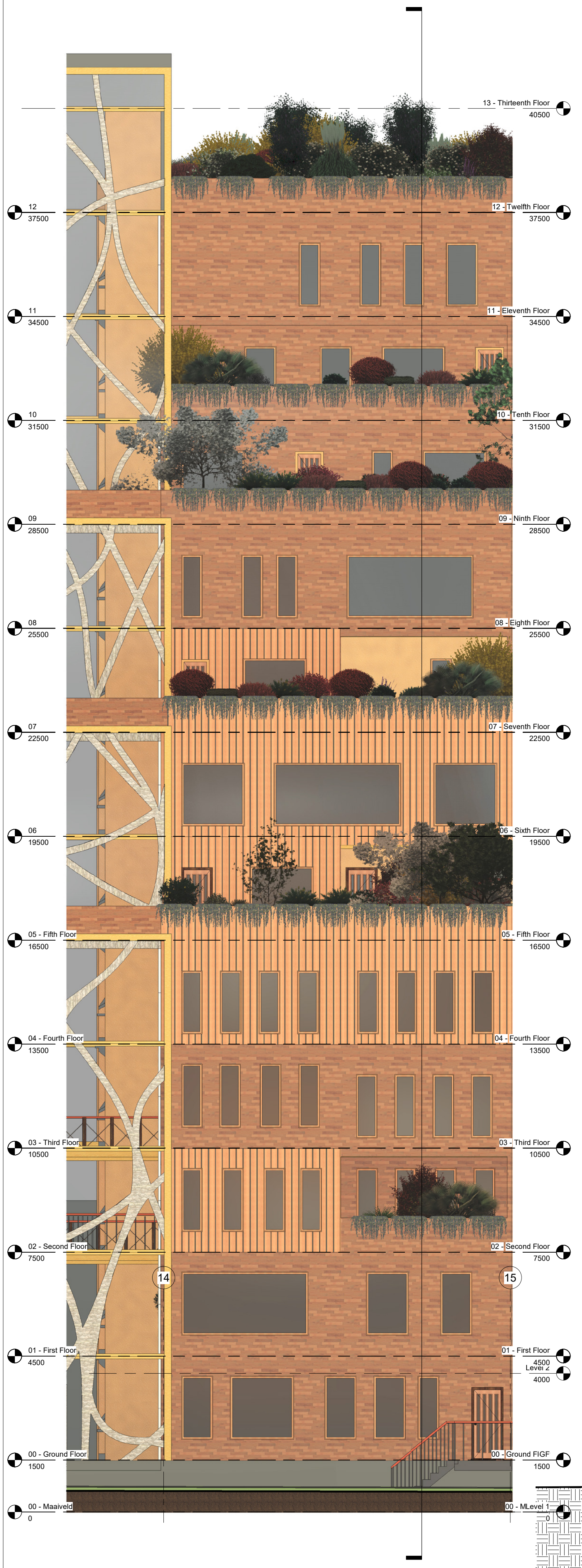

Thermowood (scots pine)
(Pinus sylvestris)
Larch (Larix decidua)
Baubotanik
water retaining
food production



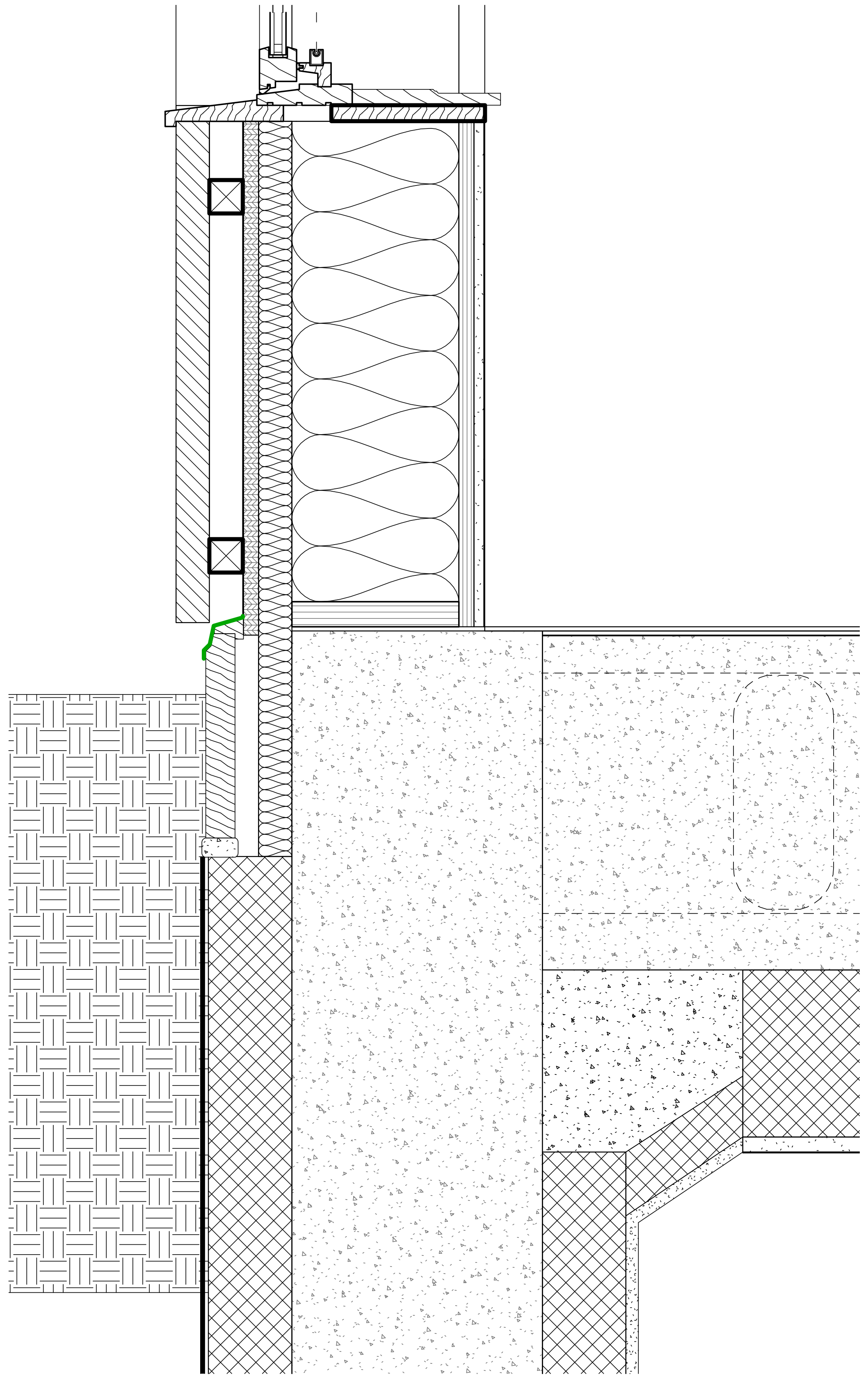

UP
UP
UP
UP

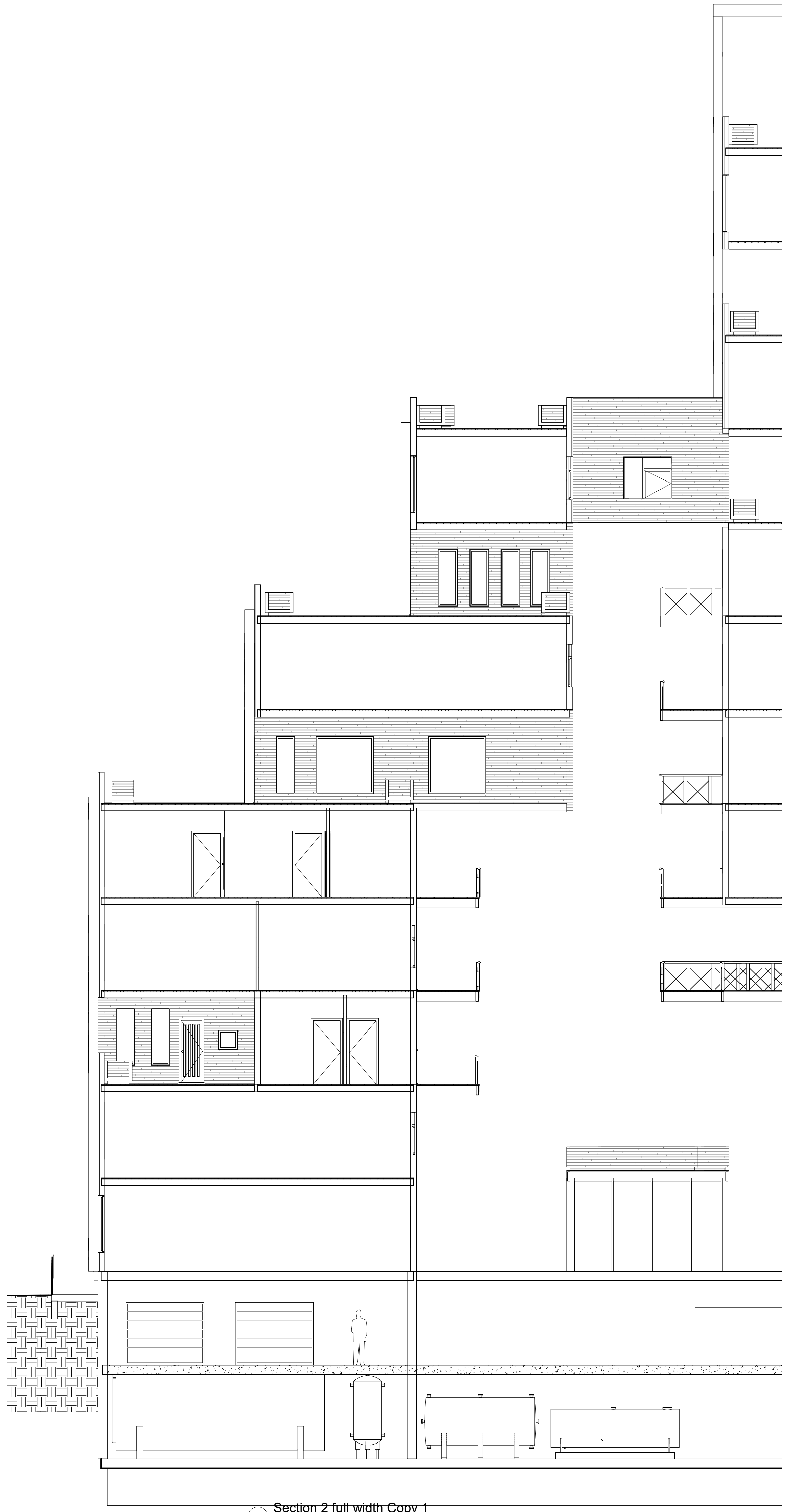


1 Section 2 full width Copy 1
1 : 50

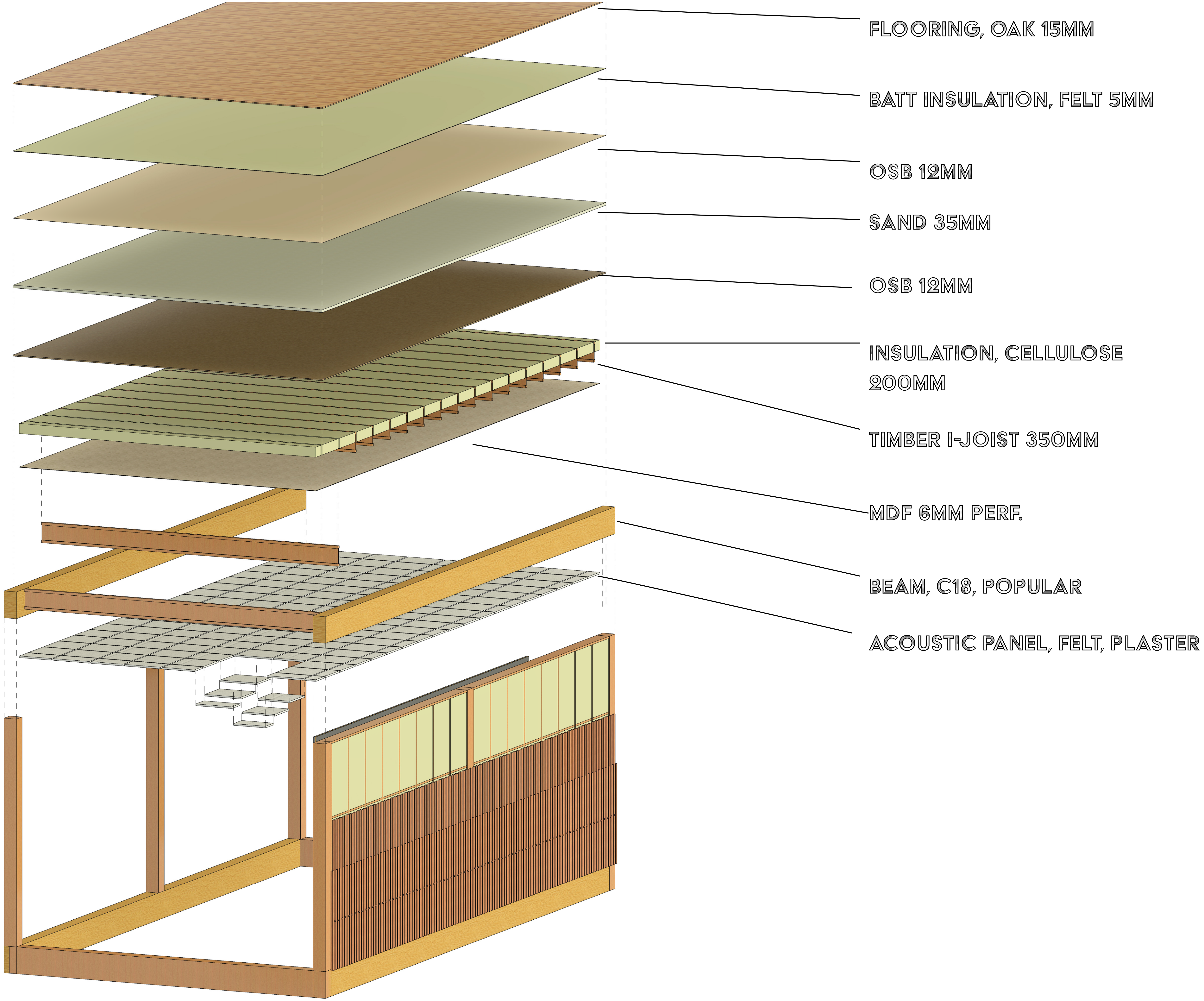


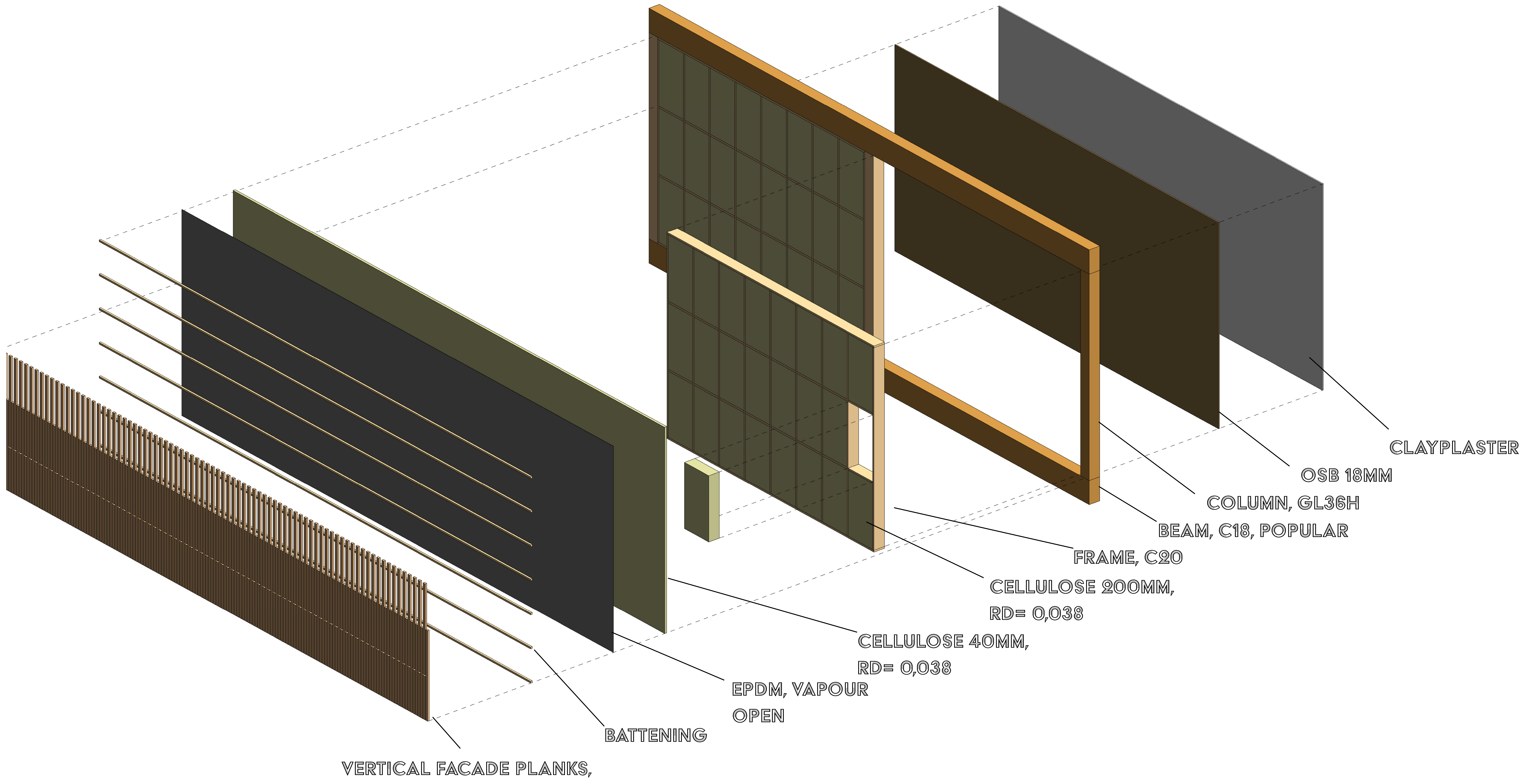
2 West
1 : 50

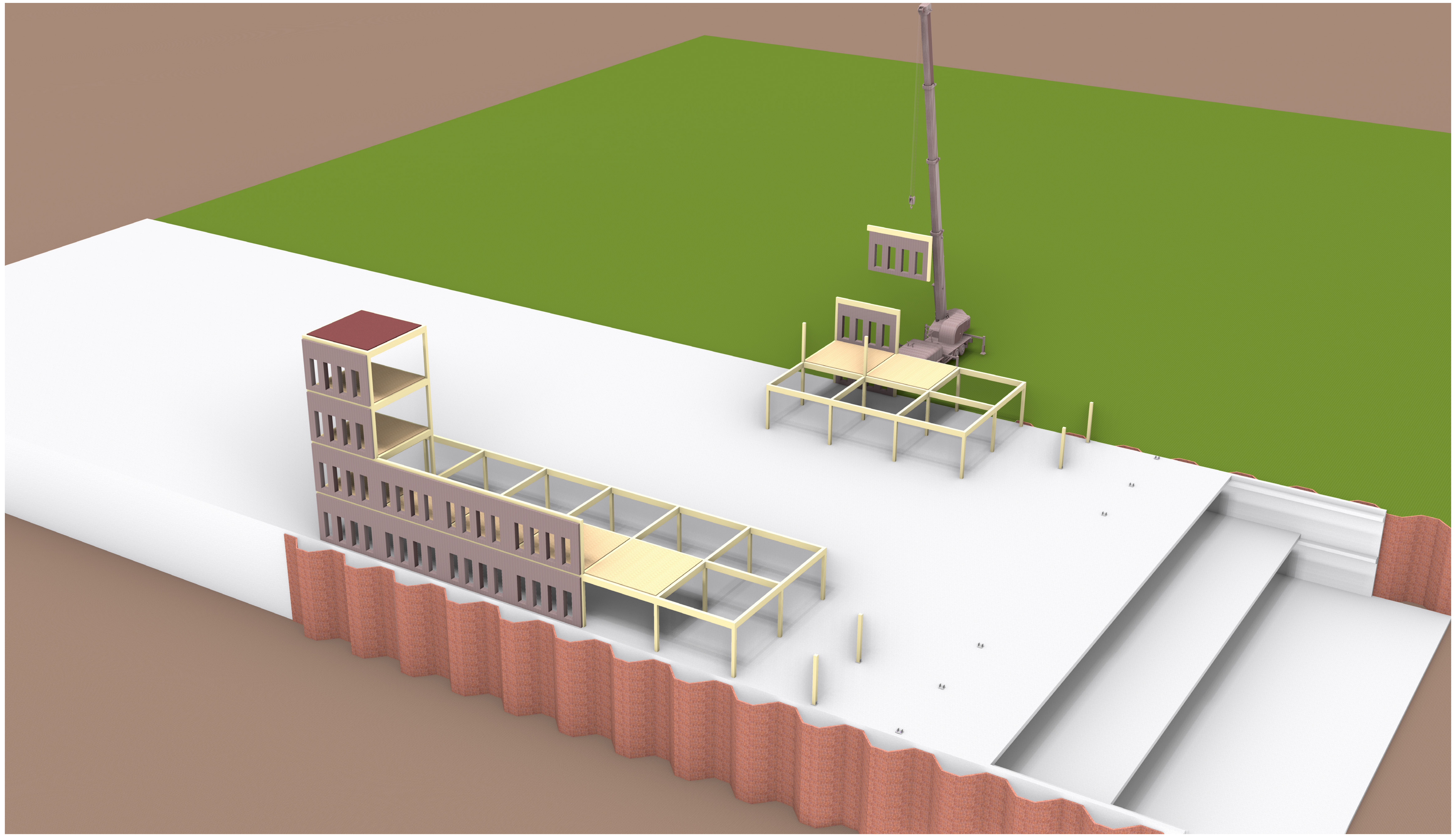




1 Section 2 full width Copy 1
1 : 50


FLOORING, OAK 15MM
BATT INSULATION, FELT 5MM
OSB 12MM
SAND 35MM
OSB 12MM
INSULATION, CELLULOSE 200MM
TIMBER I-JOIST 350MM
MDF 6MM PERF.
BEAM, C18, POPULAR
ACOUSTIC PANEL, FELT, PLASTER


CLAYPLASTER
OSB 18MM
COLUMN, GL36H
BEAM, C18, POPULAR
FRAME, C20
CELLULOSE 200MM,
RD= 0,038
CELLULOSE 40MM,
RD= 0,038
EPDM, VAPOUR
OPEN
BATTENING
VERTICAL FACADE PLANKS,
THERMOWOOD, SCOTS-PINE



THANK YOU FOR YOUR ATTENTION

QUESTIONS