

GROWING RESIDENCY

Towards a multi-species design practice in architecture based on affordances

P5 Presentation

Delft University of Technology

Graduation – Explorelab 35

Main Mentor – Mieke Vink

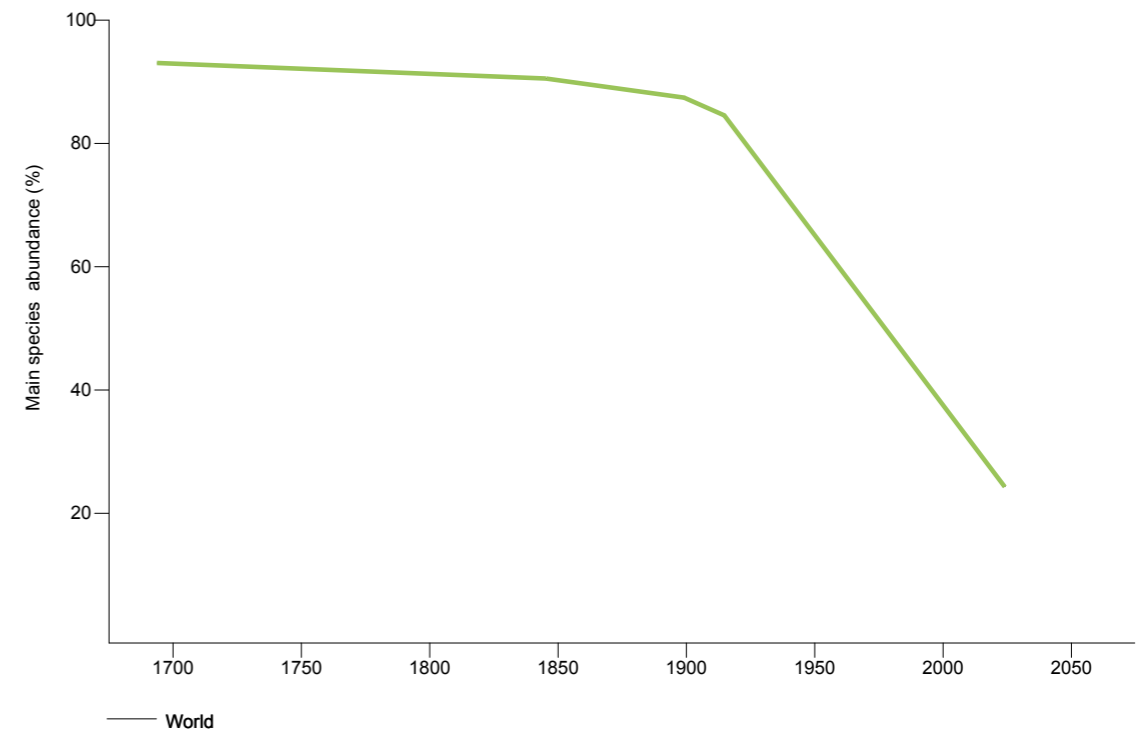
2nd Mentor – Georgios Kavelas

3rd – Dr. Birgitte Louise Hansen

Author: Philipp Gruber



“AirBees`n`Birds”, Hotel for biodiversity @dakdorpen, Rotterdam (own work)



Global main species abundance

Source: Stiphout van, M. (2019) First Guide To Nature Inclusive Design, p.20



Ruin: Palacio Ford, Porto, Portugal



Ruin: Palacio Ford, Porto, Portugal



Cohabitation:

“Humans, animals, plants share space!” (Prof. Baldenius)

-> Requires us humans to rethink our relation towards other species

Architect:

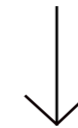
Reconsider position & role and think in a multi-species design practice!

Working upon a new **system:**

-> Considering needs related to space, time, socio-cultural behaviour

-> Mitigating conflicts between different species

-> Finding new ways of reading an environment and spatial negotiation



Affordances?

Research question:

How can a multi-species design practice in architecture based on affordances informed by the act of human and non-human space-making in abandoned ruins help to achieve a symbiotic relation between architecture and biodiversity?

Knowledge:

Research

Action:

Design, Crafting



Observation:

Observing, Sensing

Retroactive sense-making:

Interpreting, Reflecting

Theoretical Framework:

Literature analysis

Cohabitation



Ruins



+

Affordances



+

Multi-species design

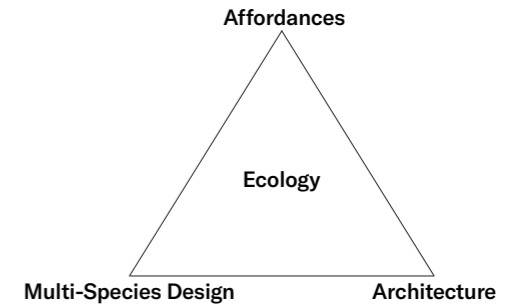


+

Architecture



=



Discussion

Position

↓ Limitations, interpretation

Artistic research:

Reflection, New narrative



JACK SPARROW
House Sparrow, *Passer domesticus*



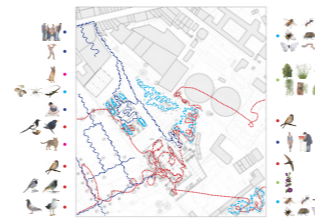
Creative writing: Poems

Improvisation: Installation

↗ Design position & experiment

Design research:

Ruin: Site + context analysis



Zoöp-Methods: Demarcating, observing & sensing, mapping, images

Interviews, workshops

↓ Design goals

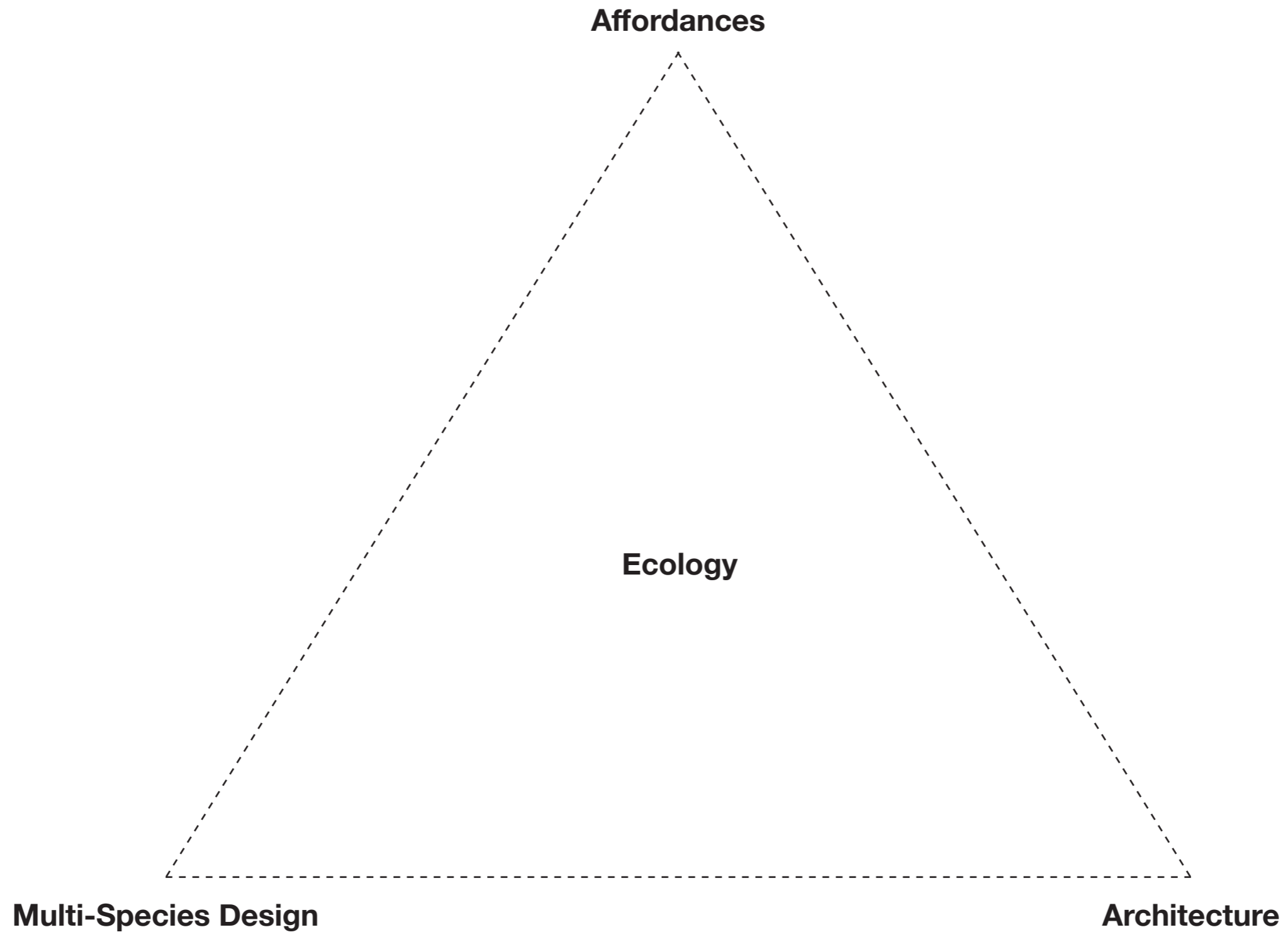
Design:

Concept, objects, configuration, composition

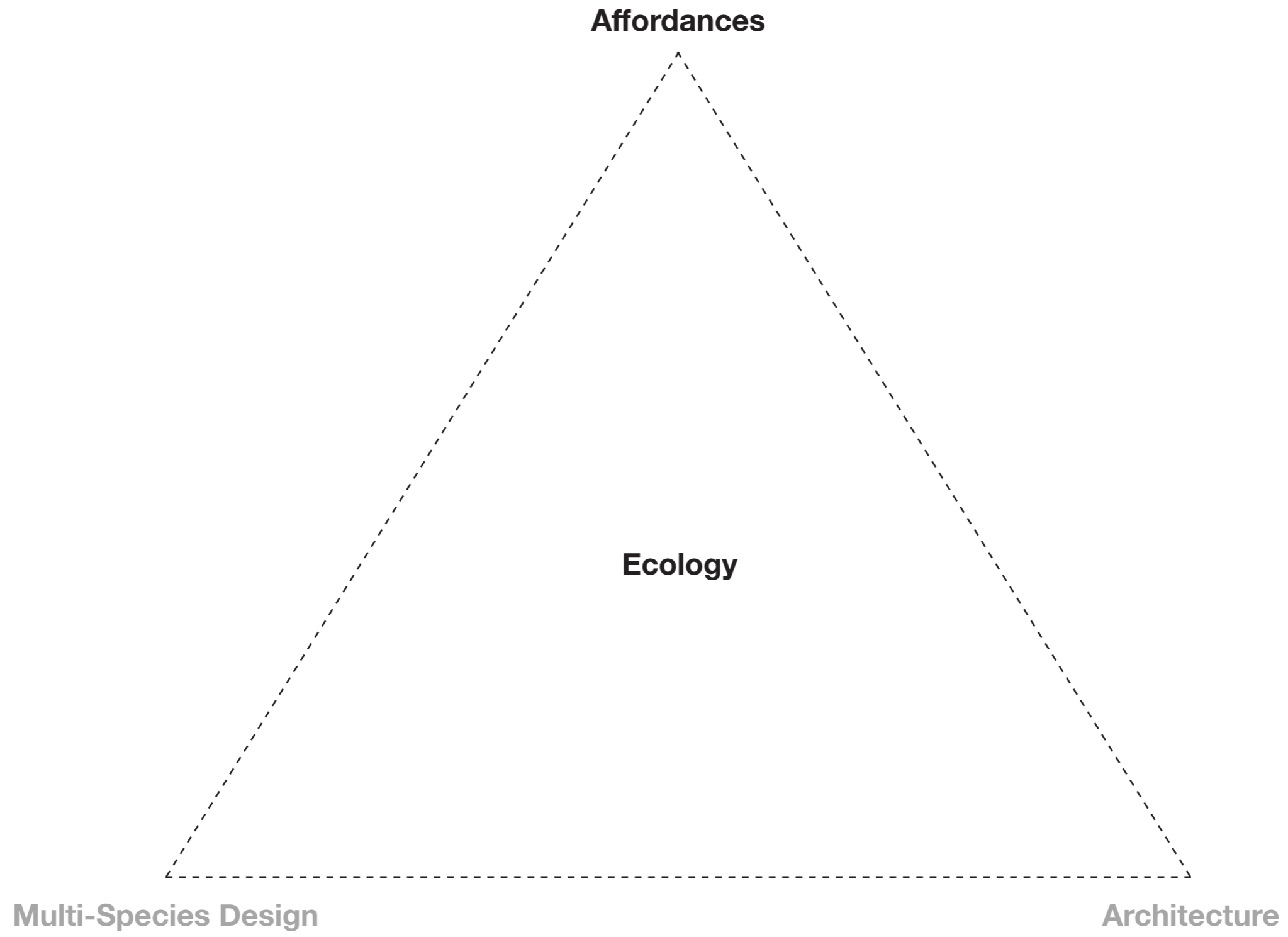


Multi-species residency

Growing Residency



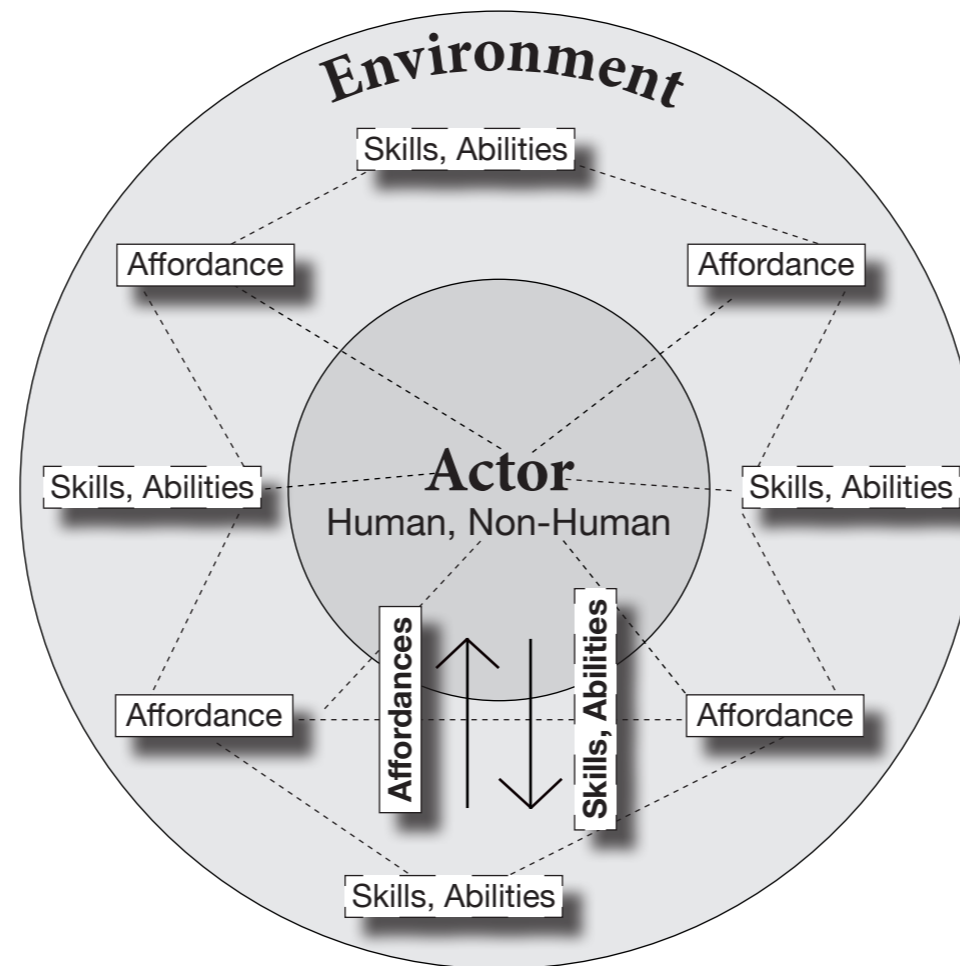
Growing Residency



Affordances:

“Affordances (Gibson, 1979/1986) are possibilities for action provided to an animal by the environment— by the substances, surfaces, objects, and other living creatures that surround it. [...] the affordances an environment offers to an animal are dependent on the skills the animal possesses.”

Rietveld, Erik & Kiverstein, Julian. A Rich Landscape of Affordances, Ecological Psychology, London: Taylor and Francis, 2014. p.325



Network of affordances:

“ [...] the environment [is] a network of interrelated affordances available in a particular form of life on the basis of the abilities manifested in its practices - its stable ways of doing things.”

Rietveld, Erik & Kiverstein, Julian. A Rich Landscape of Affordances, Ecological Psychology, London: Taylor and Francis, 2014. p.330

Growing Residency



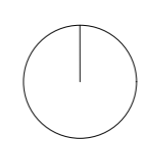
1) Ruin - Palácio Ford (since 1970)



2) Cemetery - Prado do Repouso (since 1839)



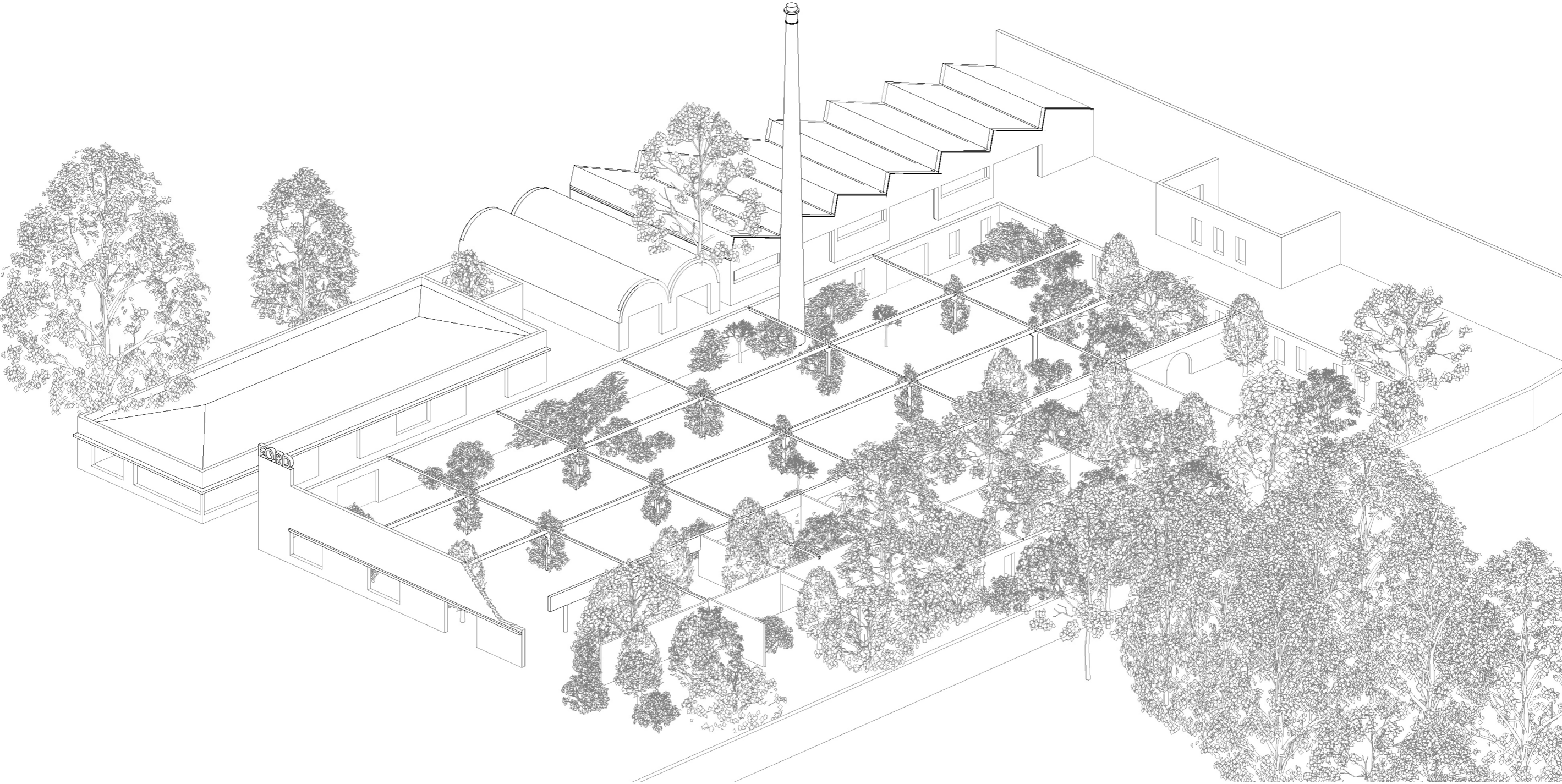
3) Forest Park - Parque das Agúas (older)



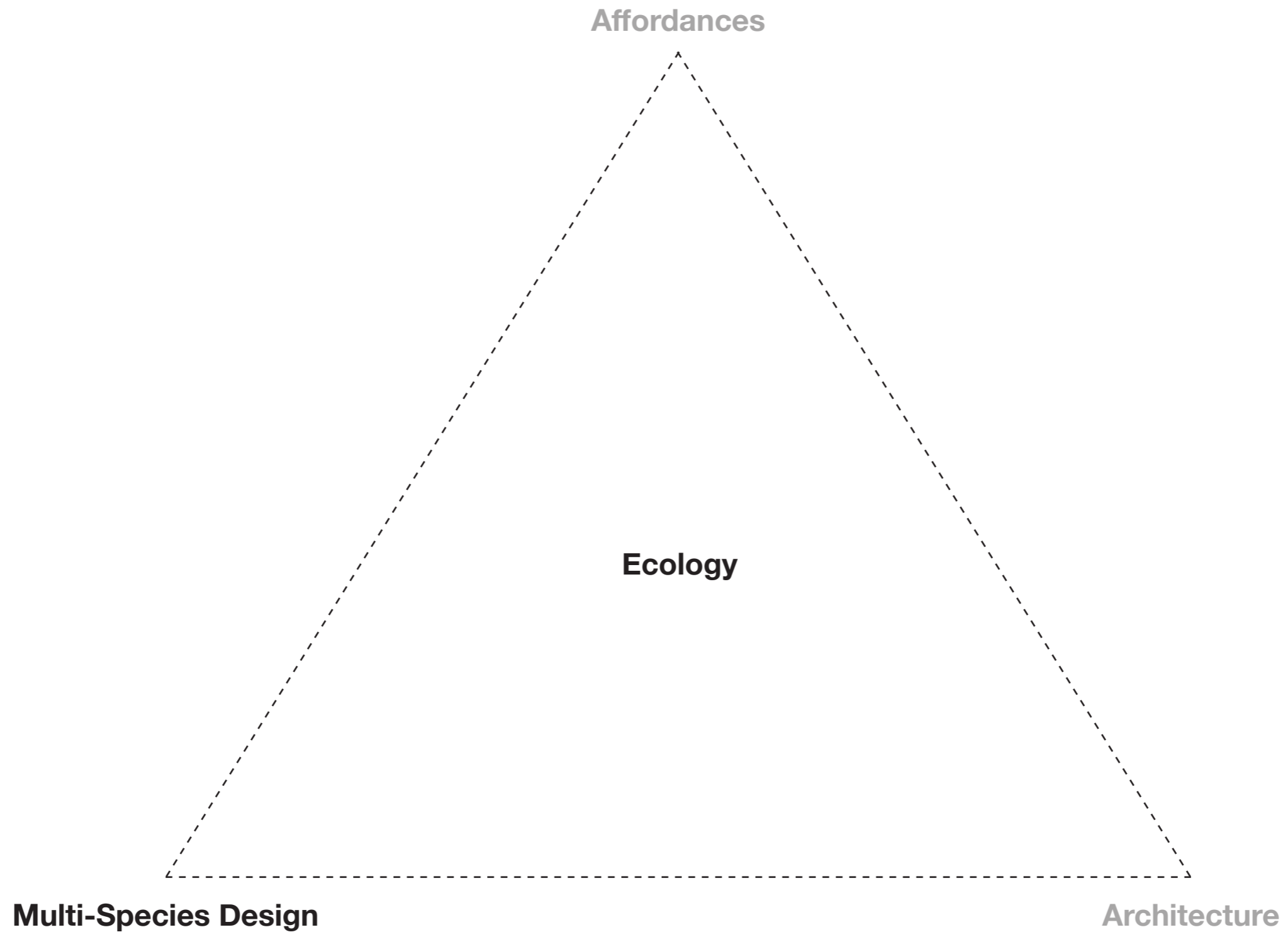
Growing Residency



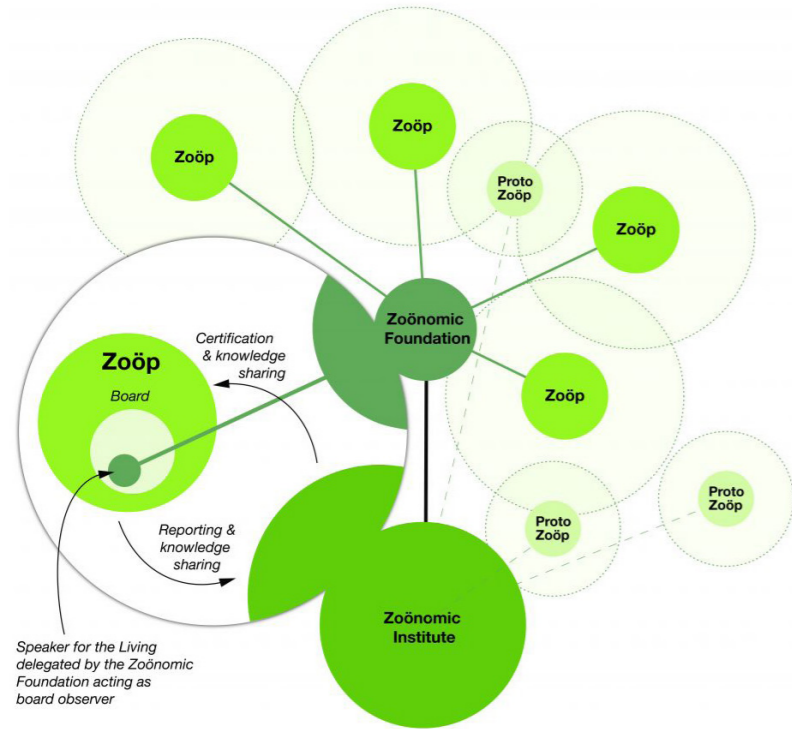
Growing Residency



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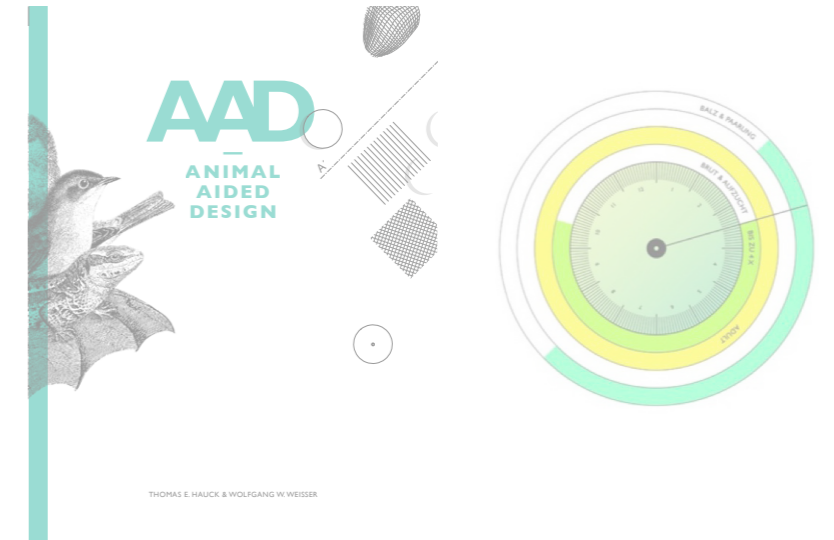
Zoöp Framework:



Nature-Inclusive-Design-Guides:



Animal-Aided-Design:



Regional multi-species group

Habitat requirements

Socio-cultural behaviour

Analysing existing affordances

Designing affordances

Considering life-cycles, activity, skills

Reflective multi-species design practice based on affordances





Madeira ivy
Hedera canariensis Willd.



Forest elder
Nuxia floribunda Benth



Herb mercury
Mercurialis annua L



Plantain
Plantago monosperma Pourr.



Scented oakfern
Gymnocarpium robertianum



Lauraceae
Persea indica (L.) Spreng.



Egyptian mallow
Malva parviflora L



Grasses
xxx



Grasses
xxx



Grasses
xxx



Bermuda-buttercup
Oxalis pes-caprae_



Bramble
Rubus ferocior



Bramble
Rubus ferocior



Grasses
xxx



Wild tobacco
Solanum mauritianum Scop.



Australian cheesewood
Pittosporum undulatum Vent



Red nightshade
Solanum villosum Mill



Purple milk thistle
Galactites tomentosus Moench



Spreading pellitory
Parietaria judaicaL



Hazelnut
Corylus avellana L.



Cocupa plant
Erodium cheilanthifolium Boiss



Water convolvulus
Ipomea indica



Moss
Bryophyta



Plane tree
Platanus



Seagull
Larinae



Pigeon
Columbidae



House Sparrow
Passer Domesticus



Blackbird
Turdus merula



Wagtail
Motacilla alba



Swift
Apus apus



Black redstart
Phoenicurus ochruros



Magpie
Pica pica



Magpie
Hirundinidae



White-throated dipper
Waterspreeuw



Bat
Microchiroptera



Lizzard
Lacertilia



Beetle
Coleoptera



Bumblebee
Bombus



Wild bee
Apidae



Honey bee
Apis mellifera



White butterfly
Pieris rapae



Ant
Formicidae



Spider
Araneae



Fungi
Fungus



Earthworm
Lumbricidae



Hedgehog
Erinaceus europaeus



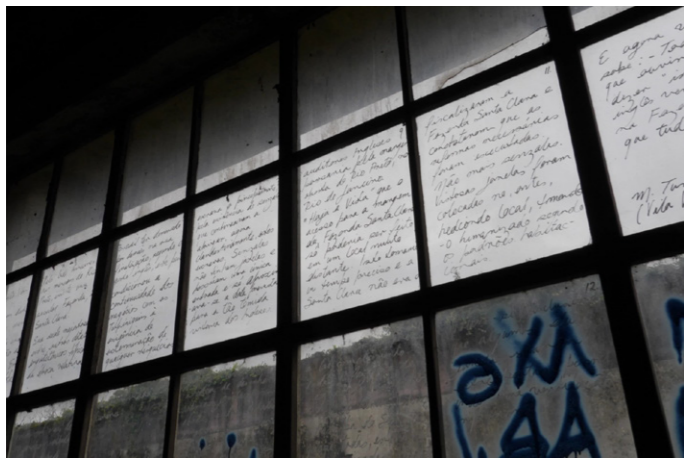
Cat
Felis catus



Dog - German shepherd
Canis lupus familiaris

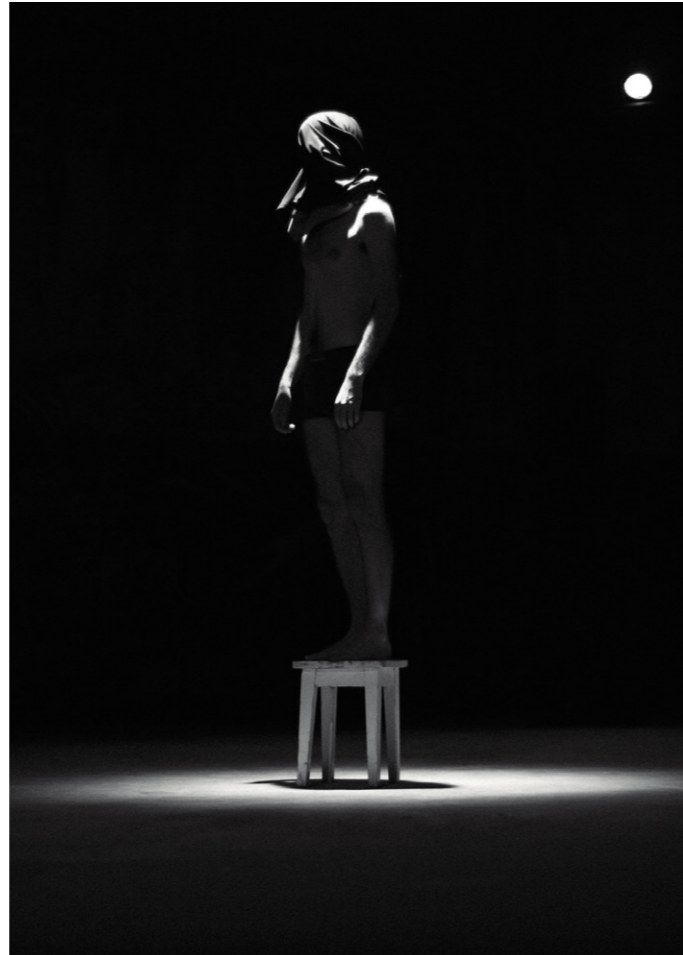
Art exhibition:

“para inglês ver”, 14.11.2018



Theatre:

“V” performance, 27. - 30.06.2022



Architecture Biennale:

“Archisummit”, 13. - 15.07.2022



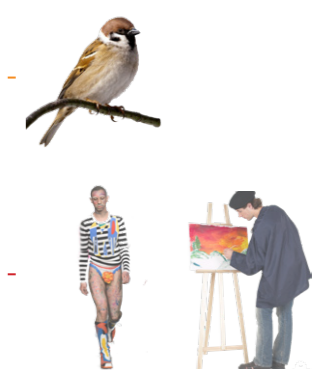
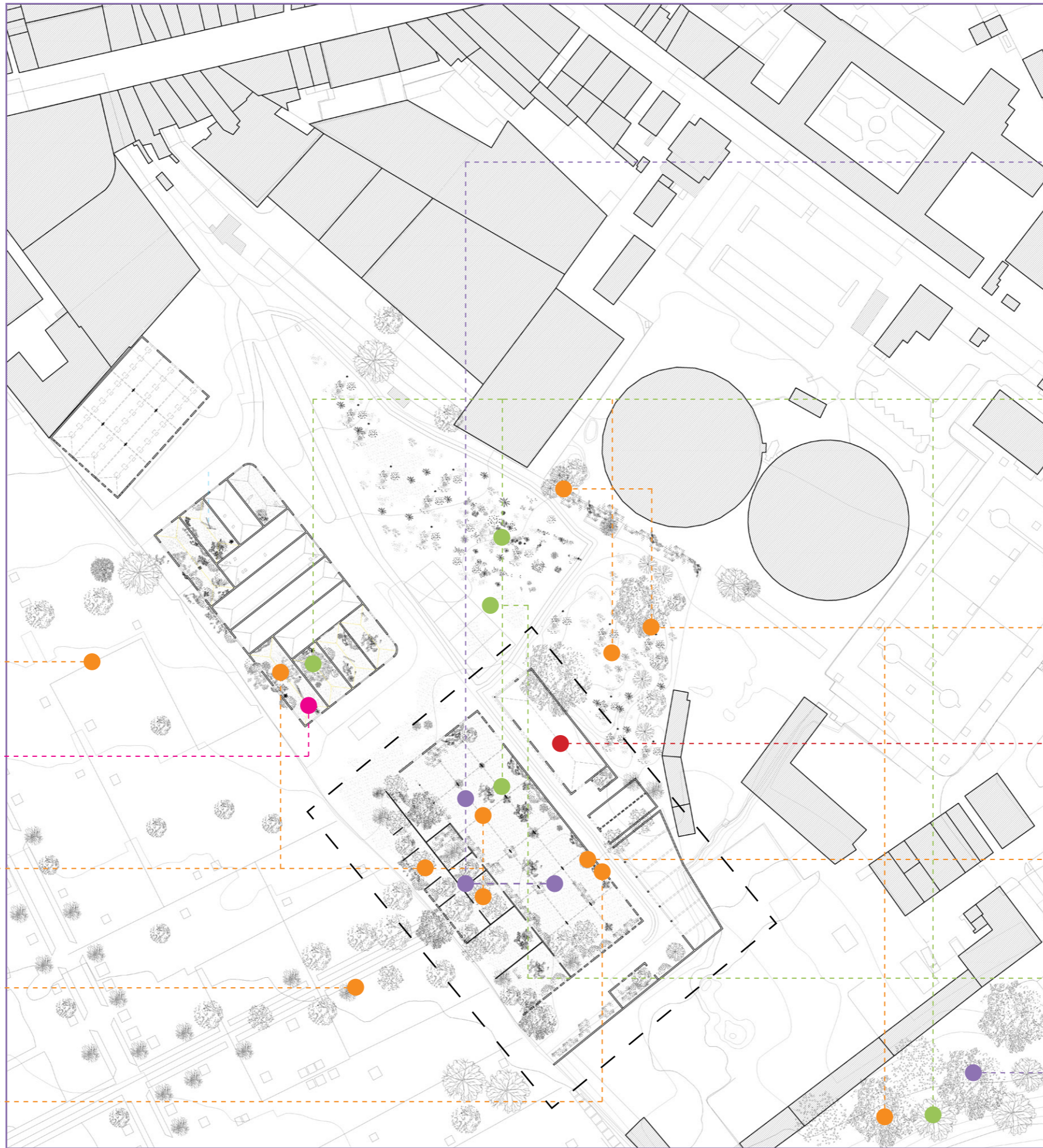
Fashion Event:

pedro pedro studio, 15.10.2022

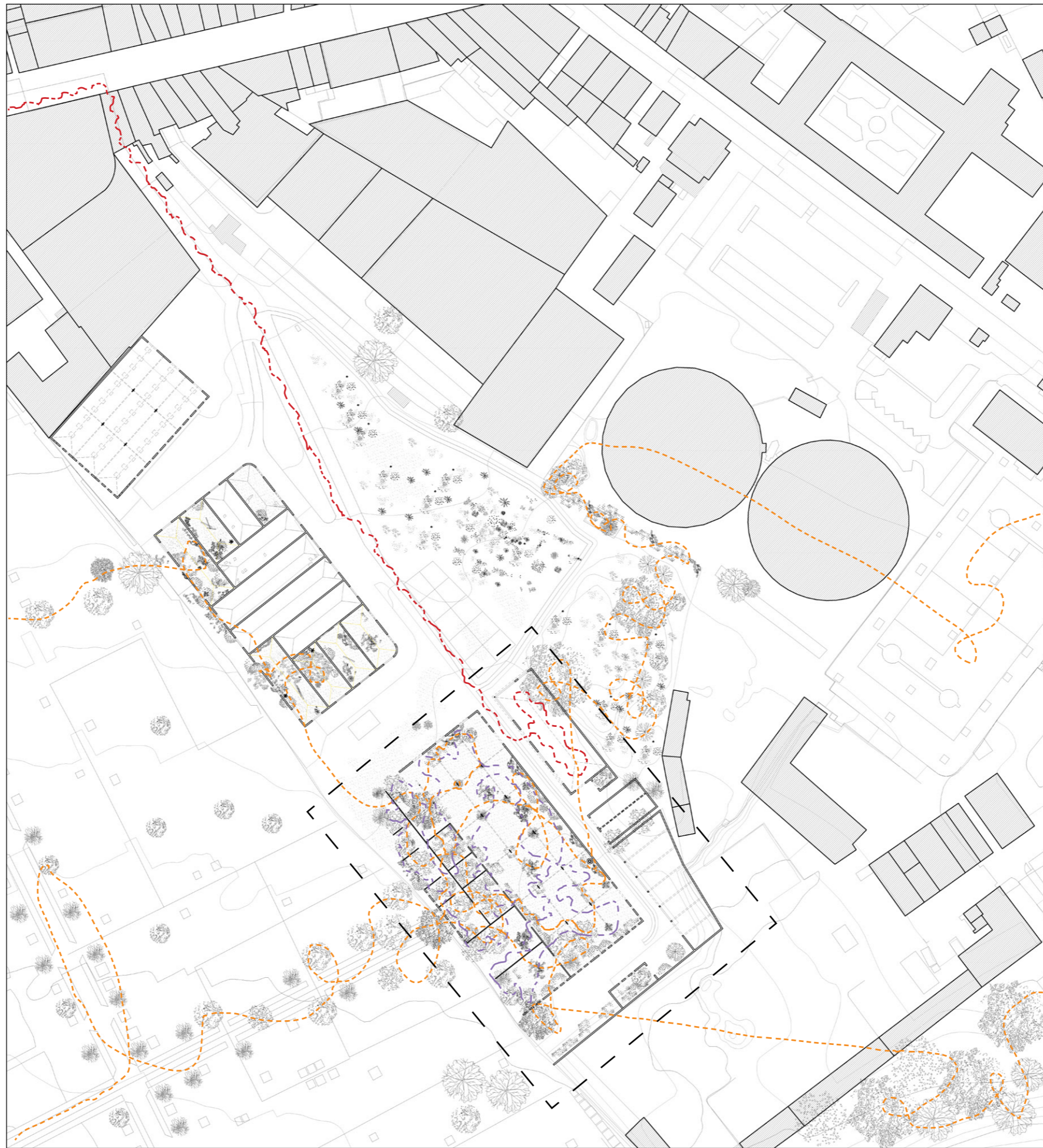


Growing Residency

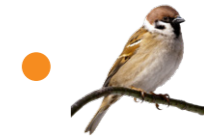
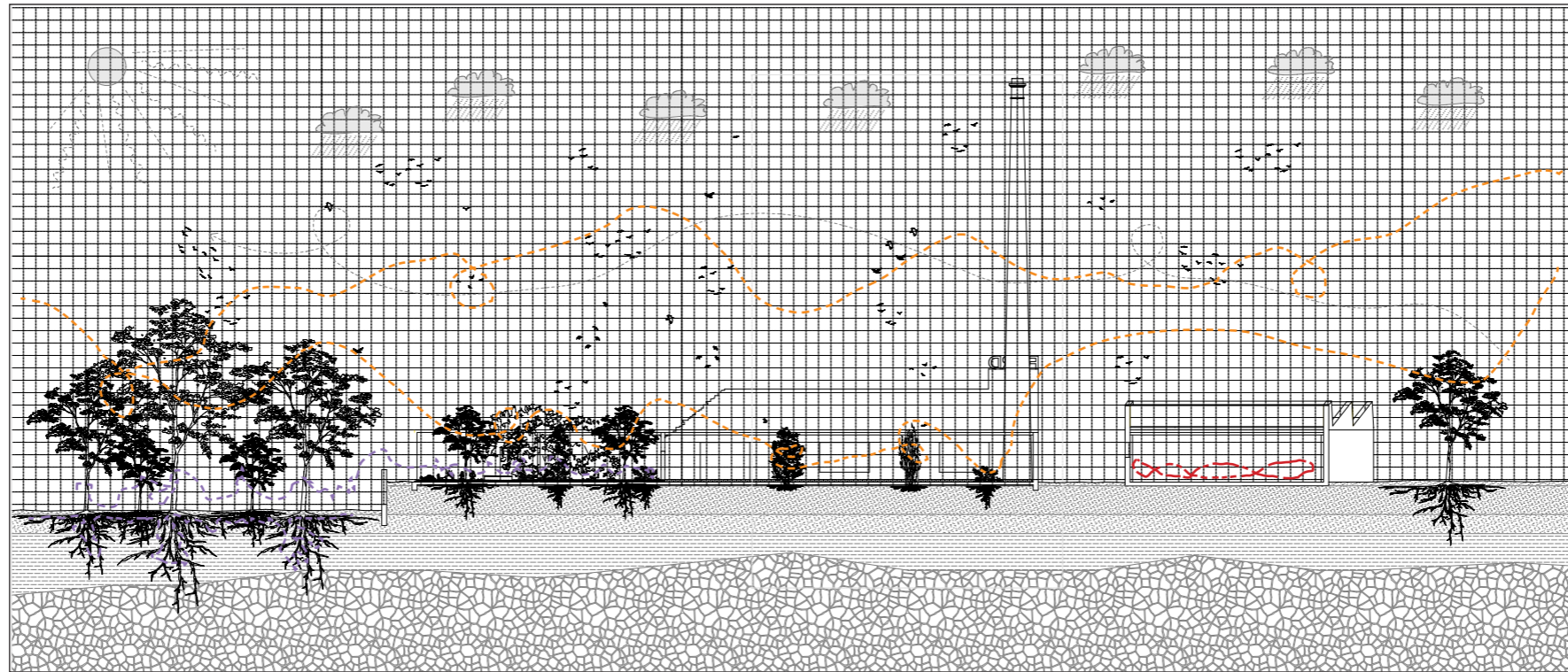
Growing Residency



Growing Residency



Growing Residency



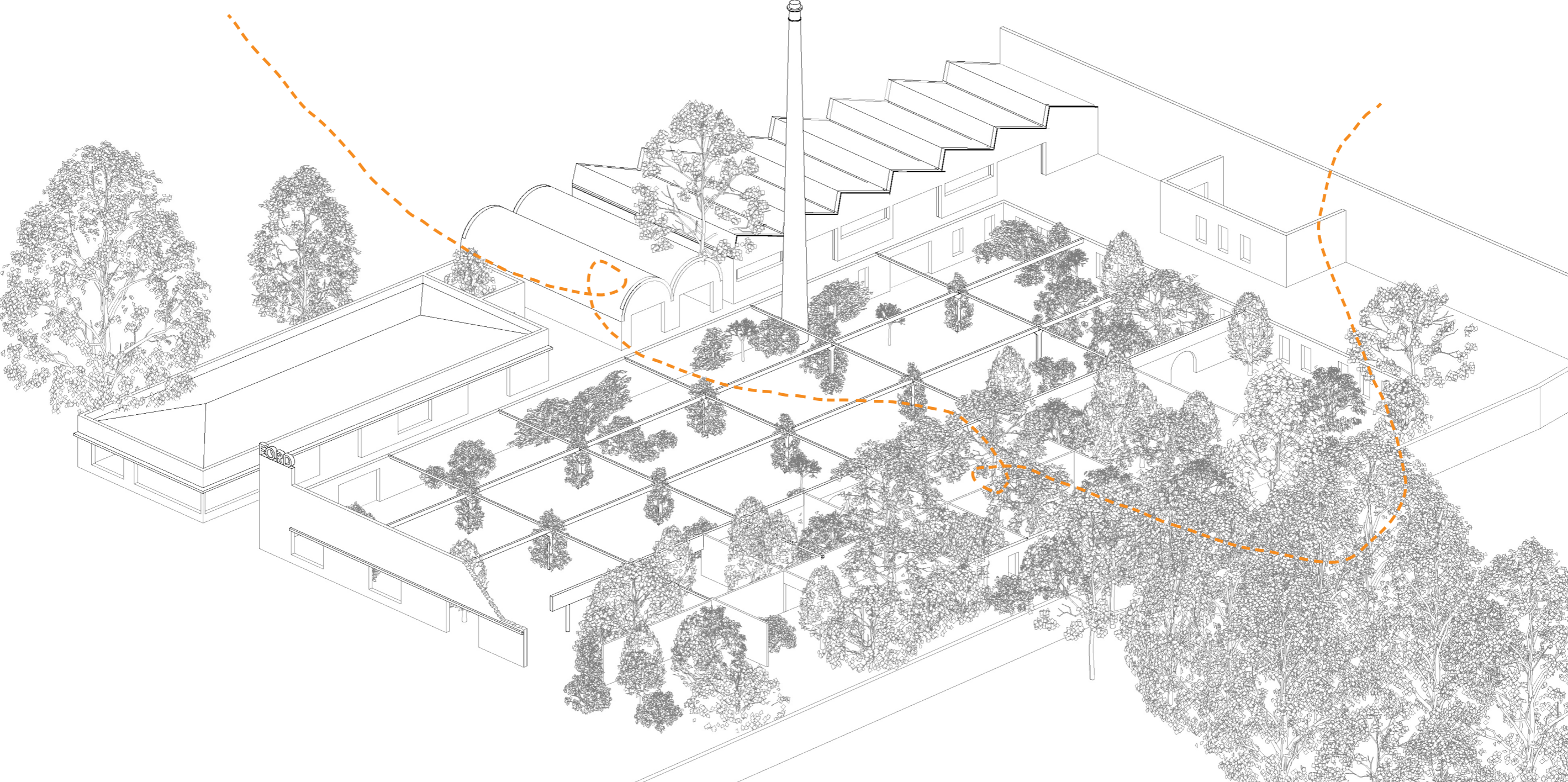




JACK SPARROW

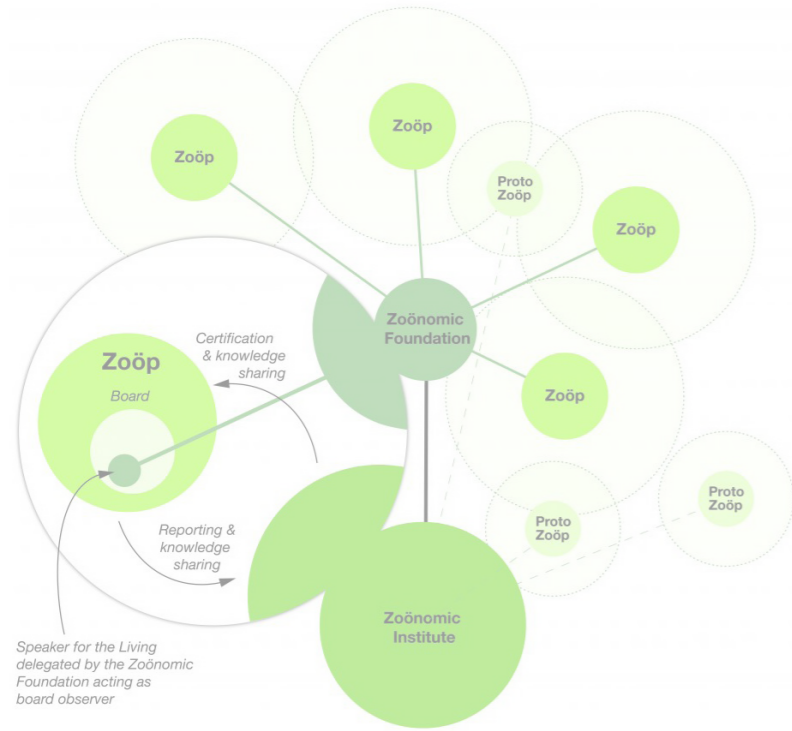
House Sparrow, *Passer domesticus*

Growing Residency



VIDEO

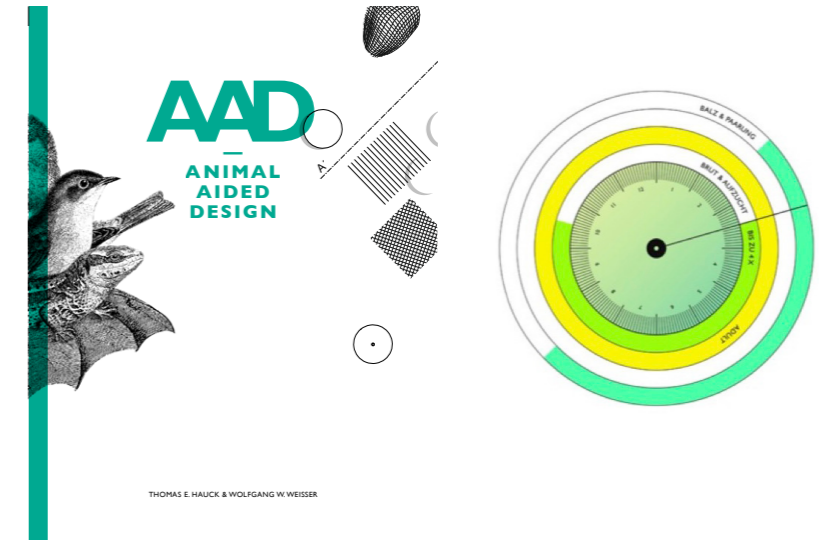
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Habitat requirements

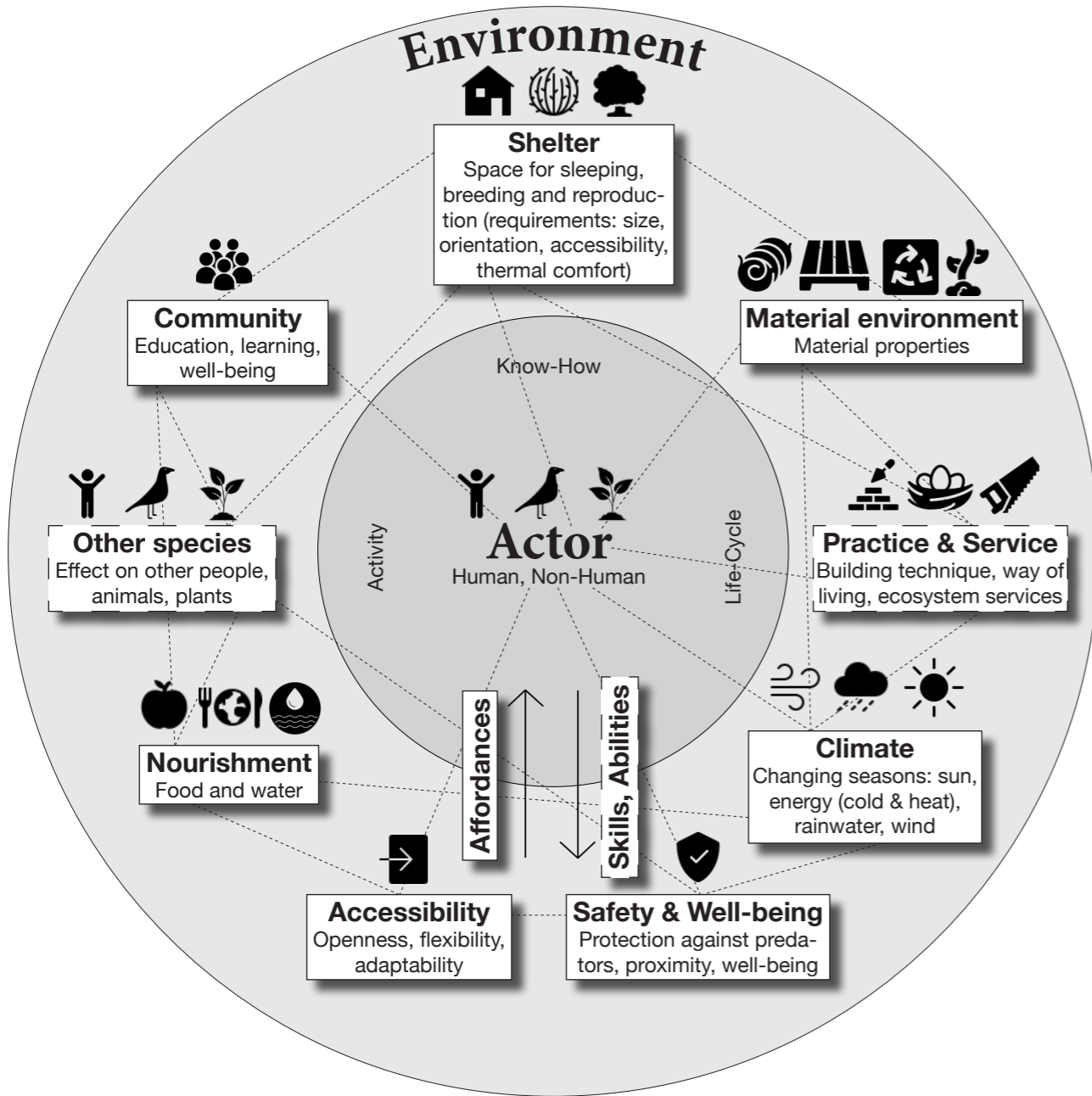
Socio-cultural behaviour

Analysing existing affordances

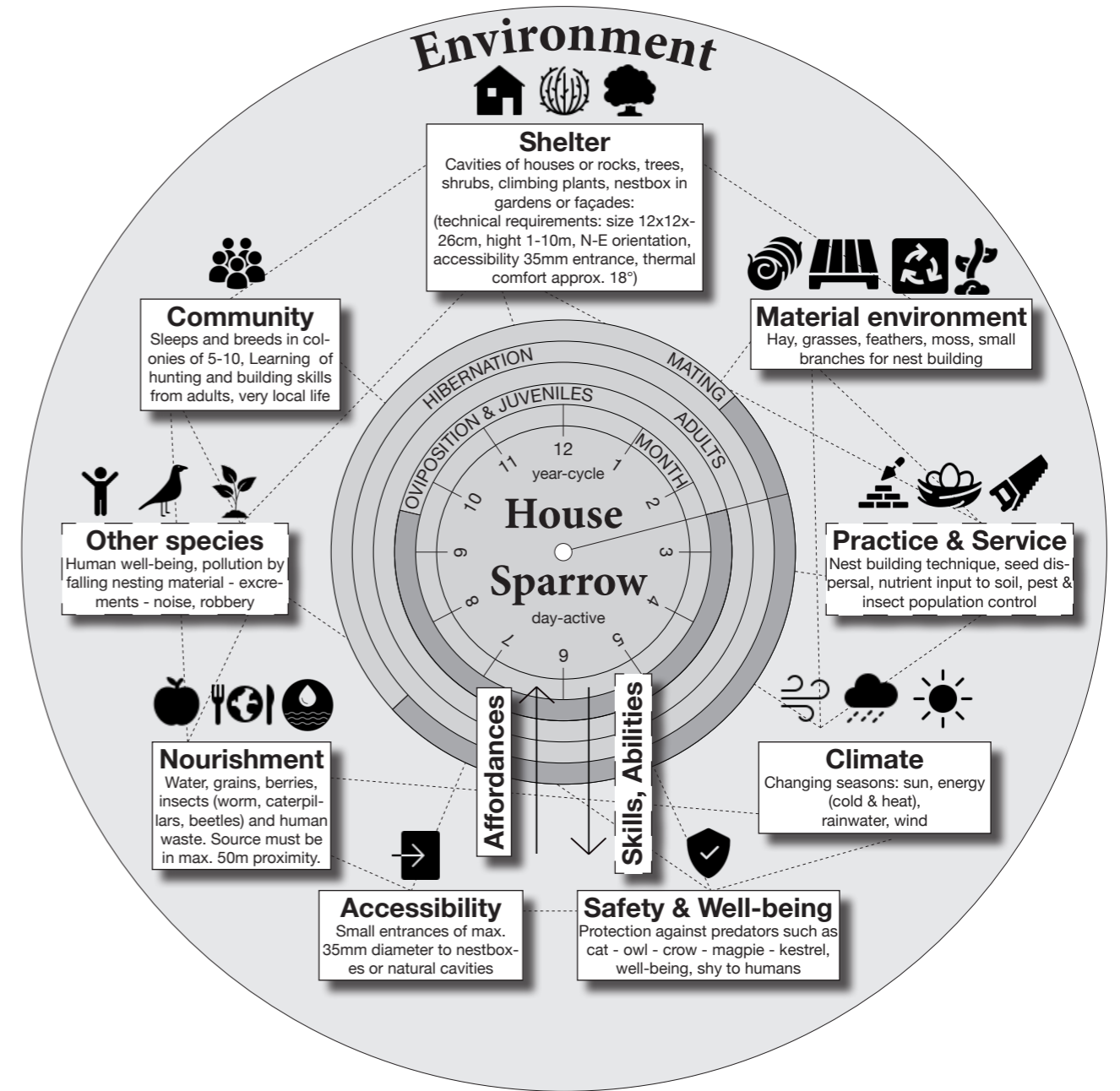
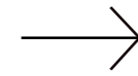
Designing affordances

Considering life-cycles, activity, skills

Reflective multi-species design practice based on affordances



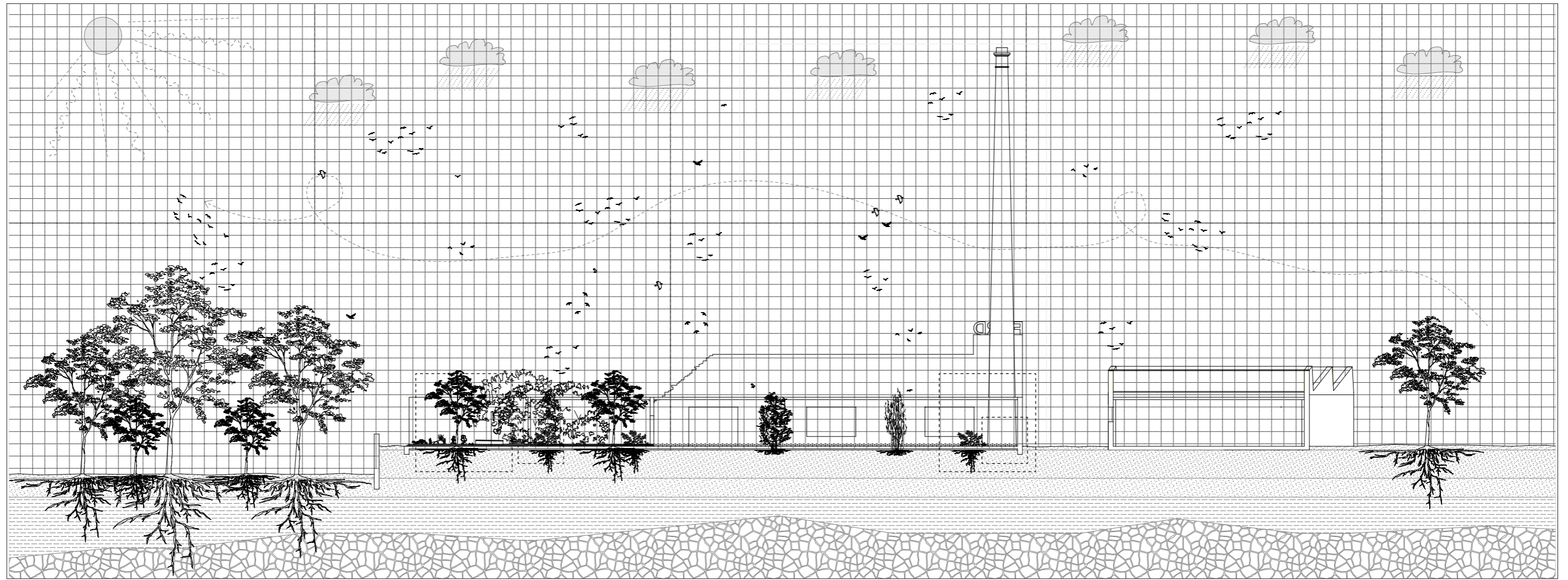
Affordances - Diagram:
Environment, Affordances, Actor



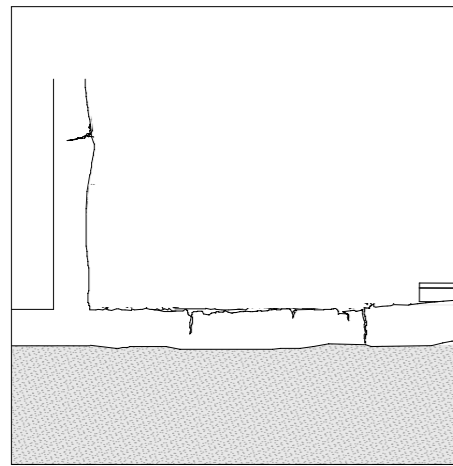
Affordances - Diagram:
Environment, Affordances, House Sparrow

Growing Residency

Landscape = Ruin Palácio Ford

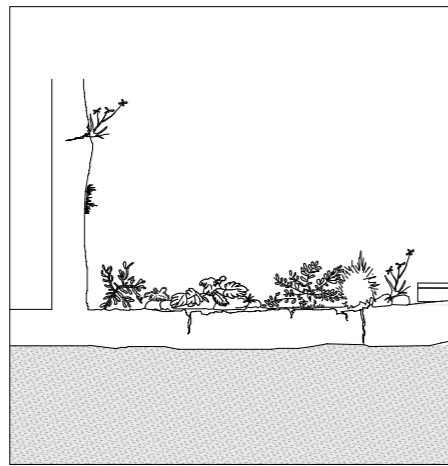


Affordances = Offer for action



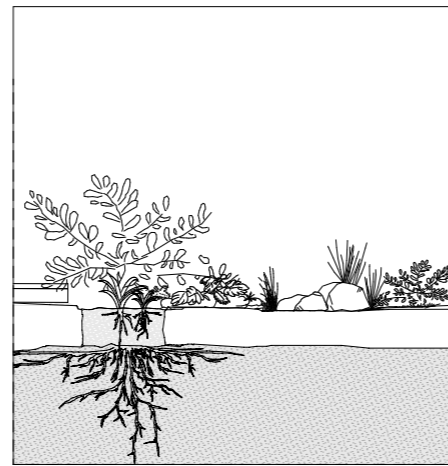
1. Abandonment

Substances, walls, slabs, soil, water, materials & objects (roof tiles, wood, rubble)



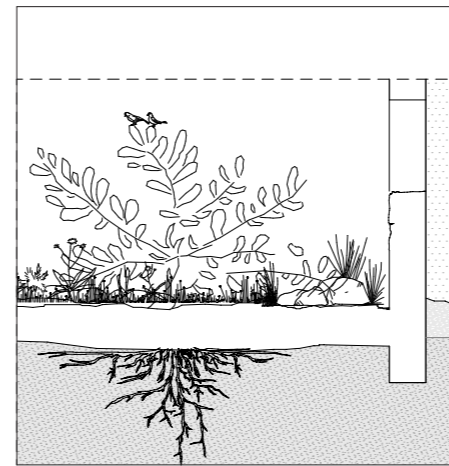
2. Oxford ragwort stage

Micro-organisms, fungi, grasses, mosses, insects, decomposed matter



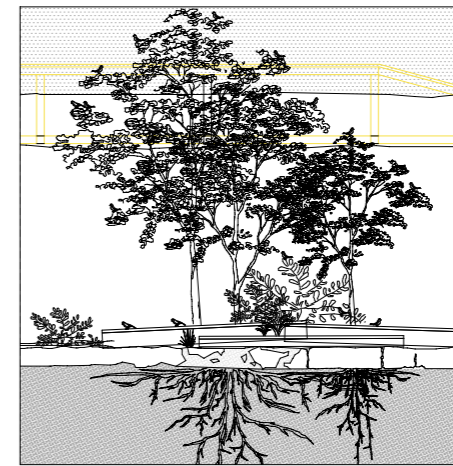
3. Tall-herb stage

Perennial plants, climbing plants, herbs, small bush, flowers, pollinators, bees



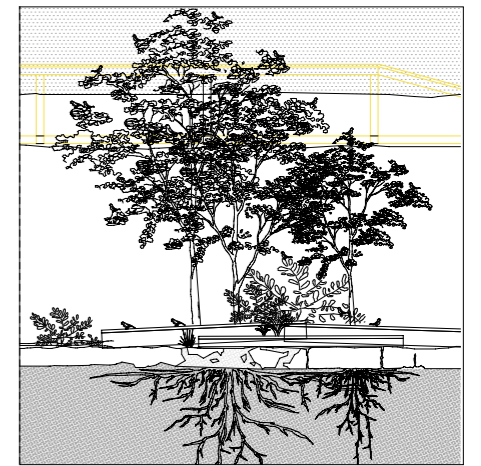
4. Grassland-stage

Shrubs, small trees, marshland with taller perennial plants & bushes



5. Shrub-woodland stage

Pioneer trees & big shrubs, elder, willow, silver birch trees, hawthorn bushes hog-weed, bramble



6. Animal stage

Birds (house sparrow, black red-tard, swift, blackbird, grey & blue tit) + mammals (mice, hedgehog)

time

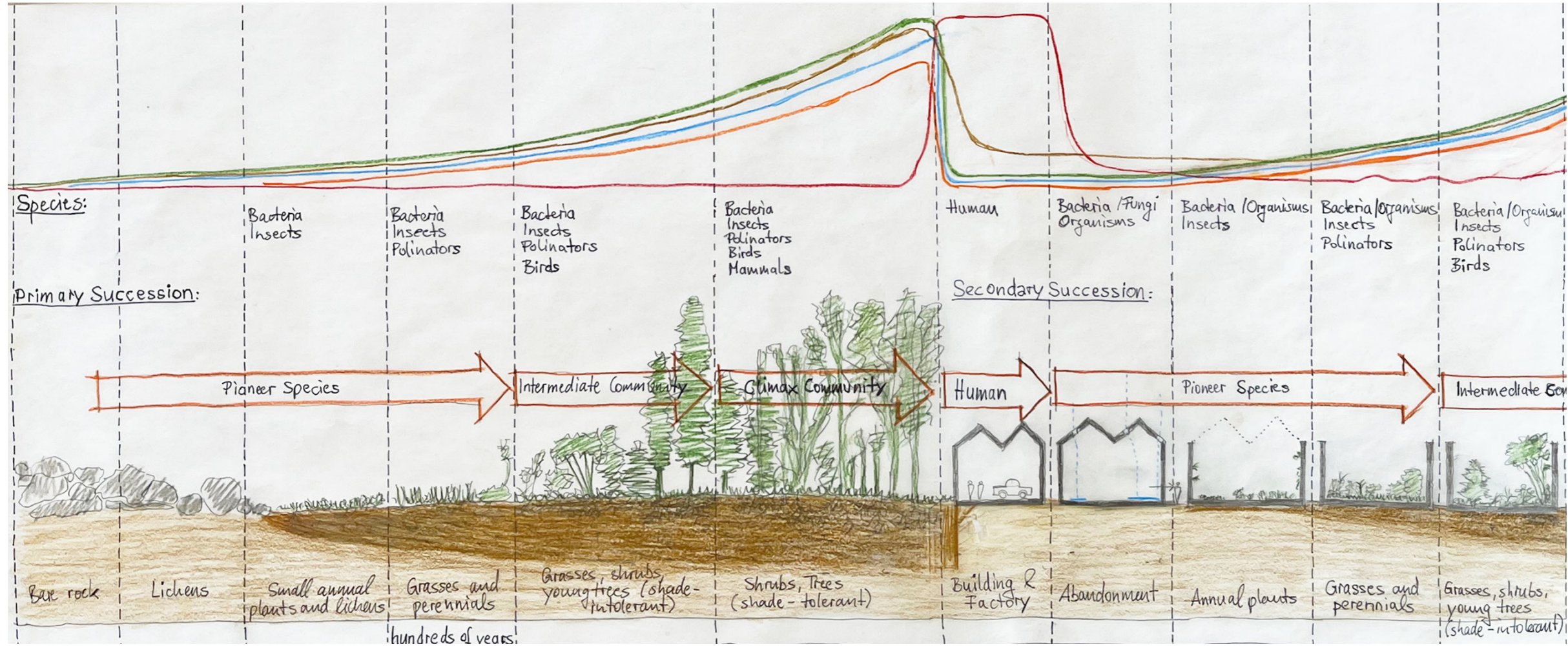
Decay = Successive development of affordances



**Disruptive moment:
Construction of Ford-Factory**



Growing Residency



time →

Hundreds of years

1892
Farmland

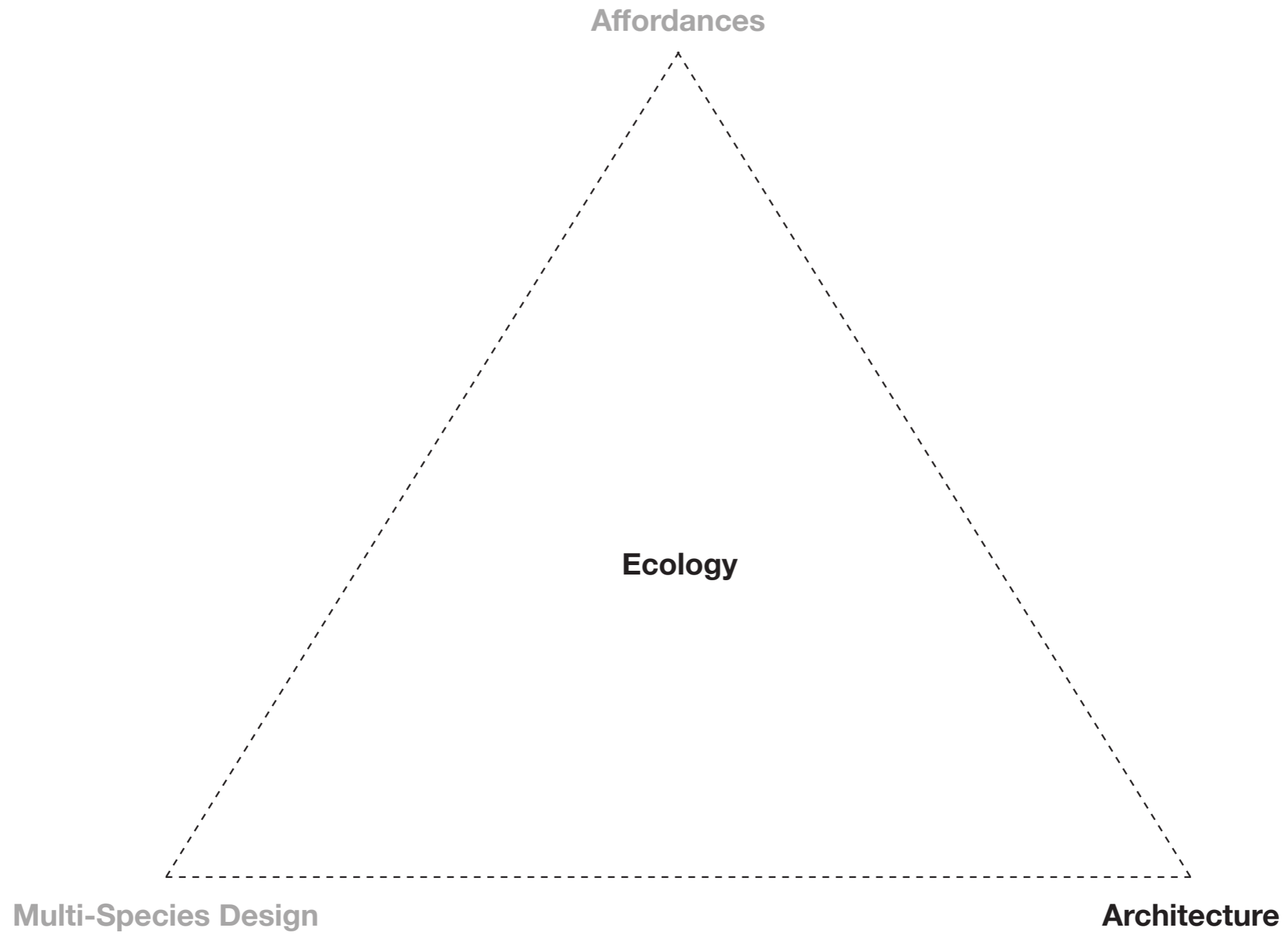
1934
Building
1940
Renovation

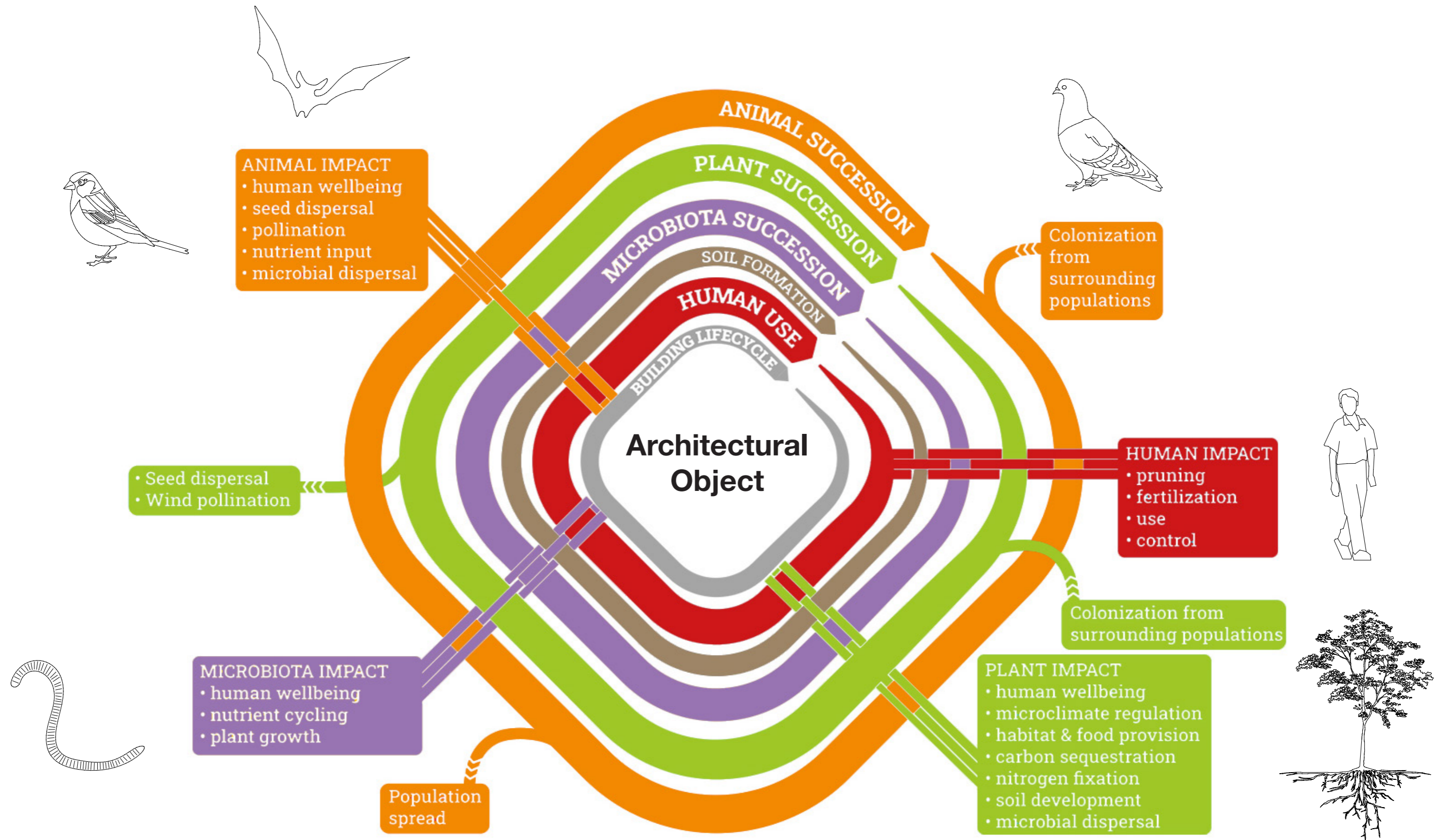
1960
Abandonment

NOW
Reclaimed
by Nature

Design position:
Design process in symbiotic
relation with ongoing ecological
succession of the ruin

Growing Residency

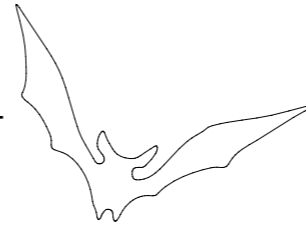
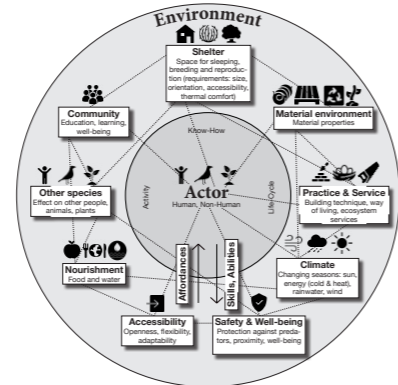
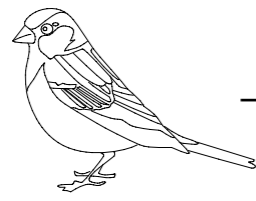




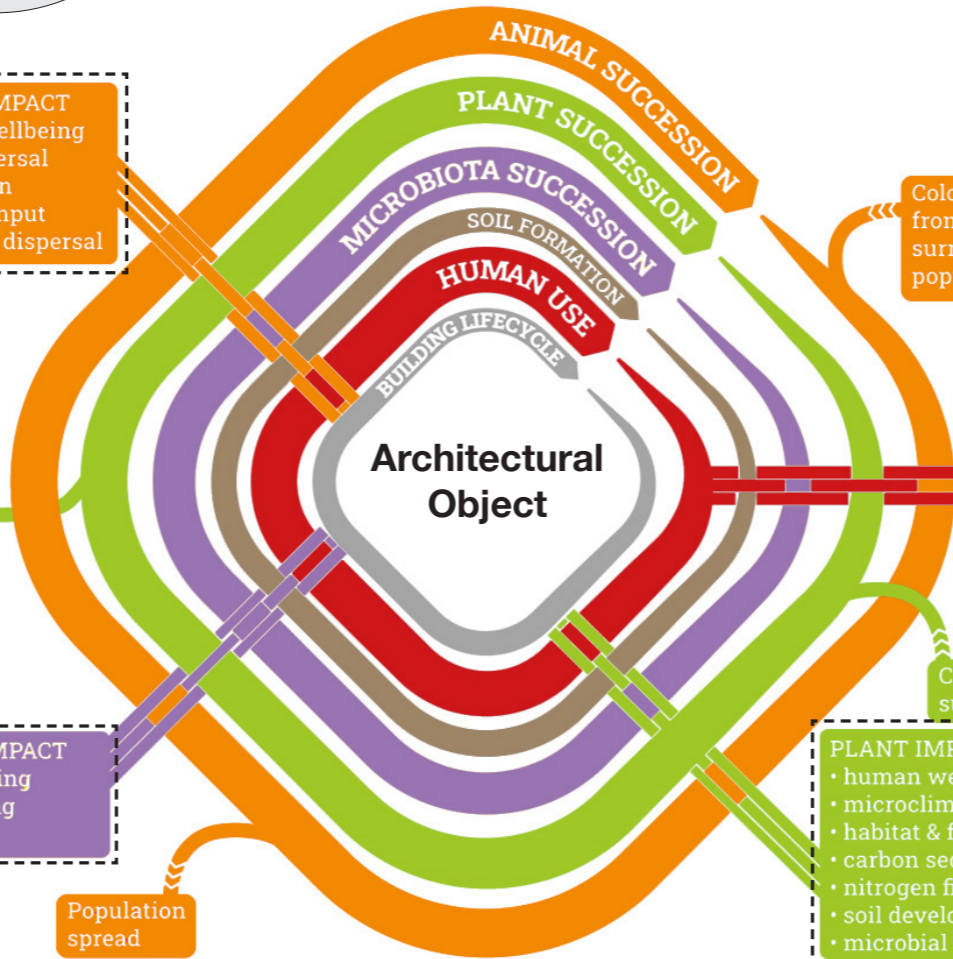
Source: "Ecolopes", Creating ecologically sound buildings by integrating ecology, architecture and computational design. 2023.

Symbiotic relations:
Environment - Architectural object - Actors

Affordances: Animals

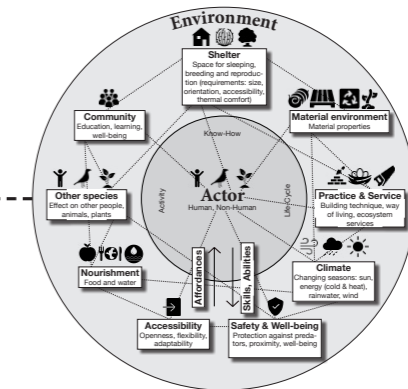


ANIMAL IMPACT
 • human wellbeing
 • seed dispersal
 • pollination
 • nutrient input
 • microbial dispersal



Colonization from surrounding populations

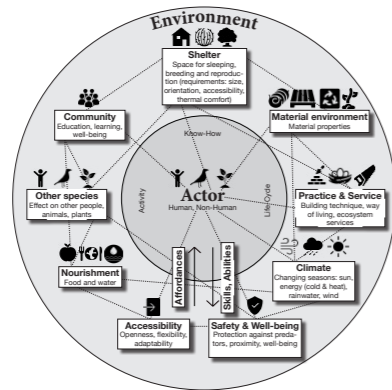
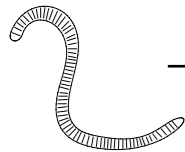
Affordances: Human



HUMAN IMPACT
 • pruning
 • fertilization
 • use
 • control

Colonization from surrounding populations

Affordances: Insects, Microbiota

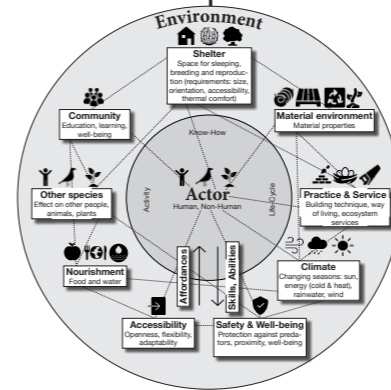
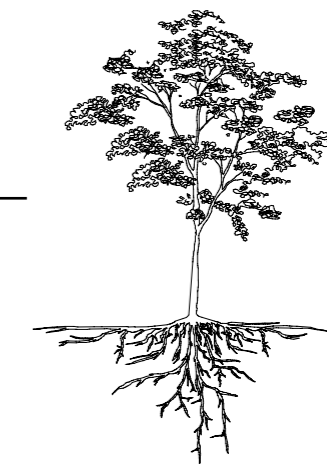


• Seed dispersal
 • Wind pollination

MICROBIOTA IMPACT
 • human wellbeing
 • nutrient cycling
 • plant growth

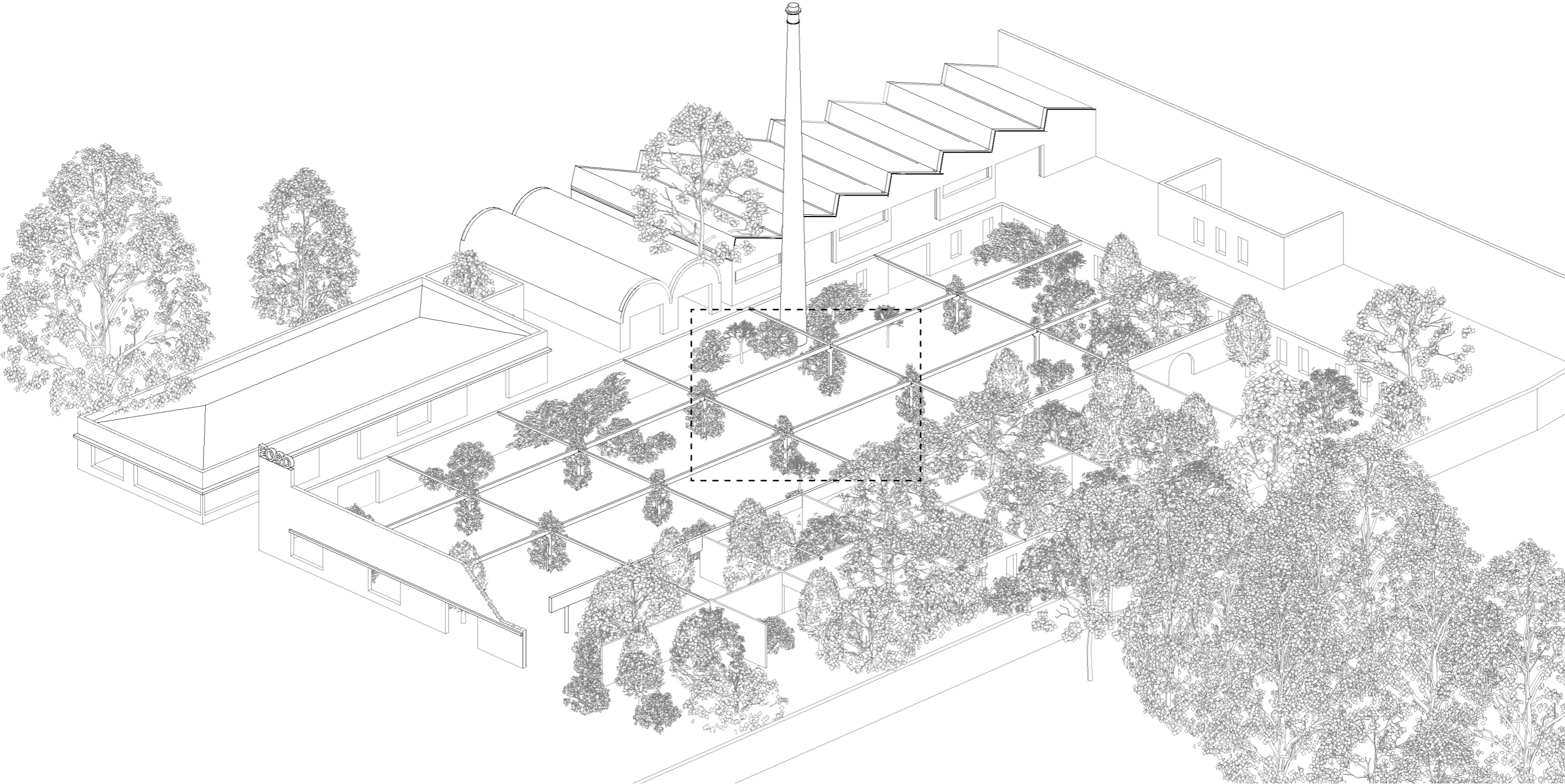
Population spread

PLANT IMPACT
 • human wellbeing
 • microclimate regulation
 • habitat & food provision
 • carbon sequestration
 • nitrogen fixation
 • soil development
 • microbial dispersal

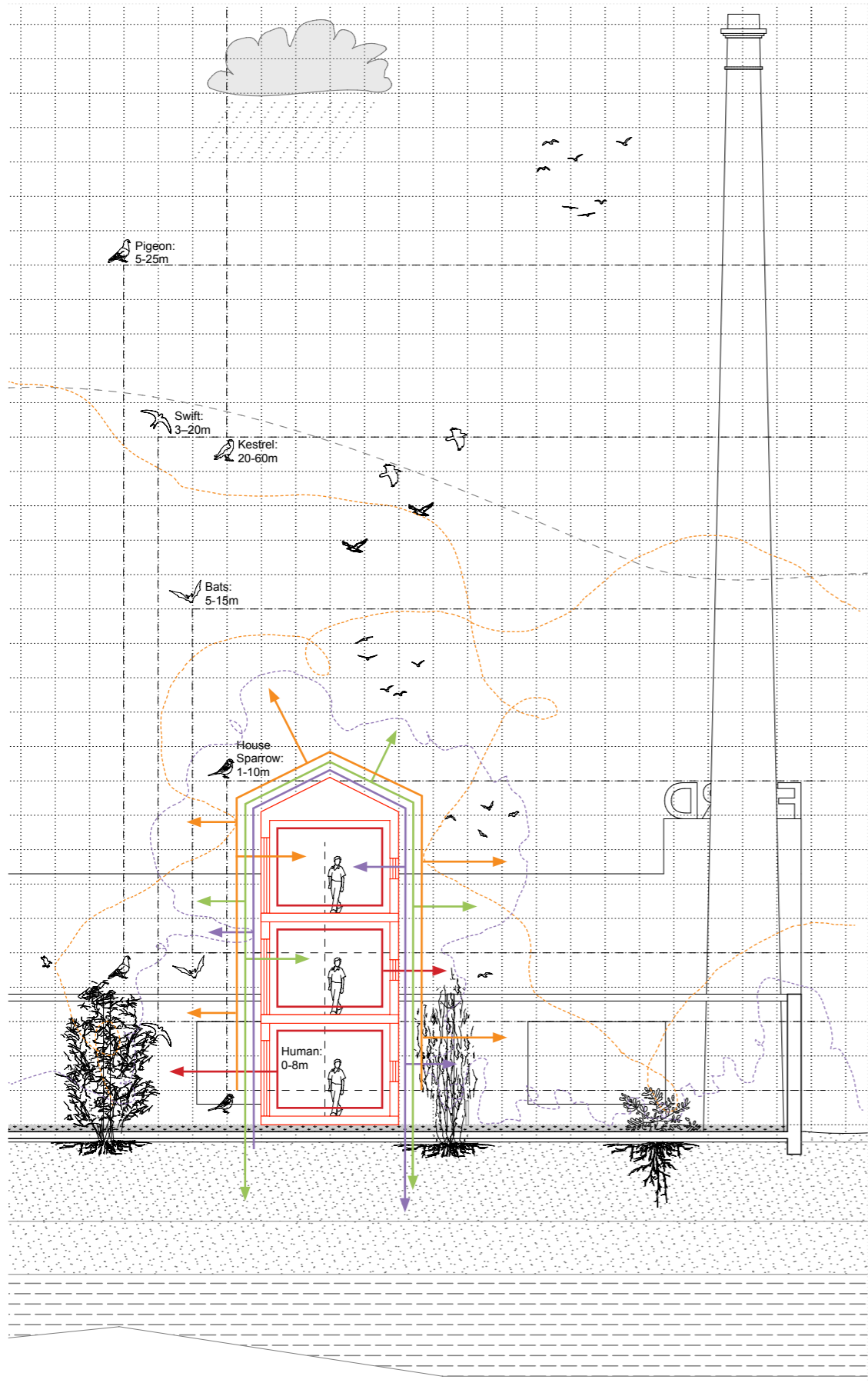


Affordances: Plants

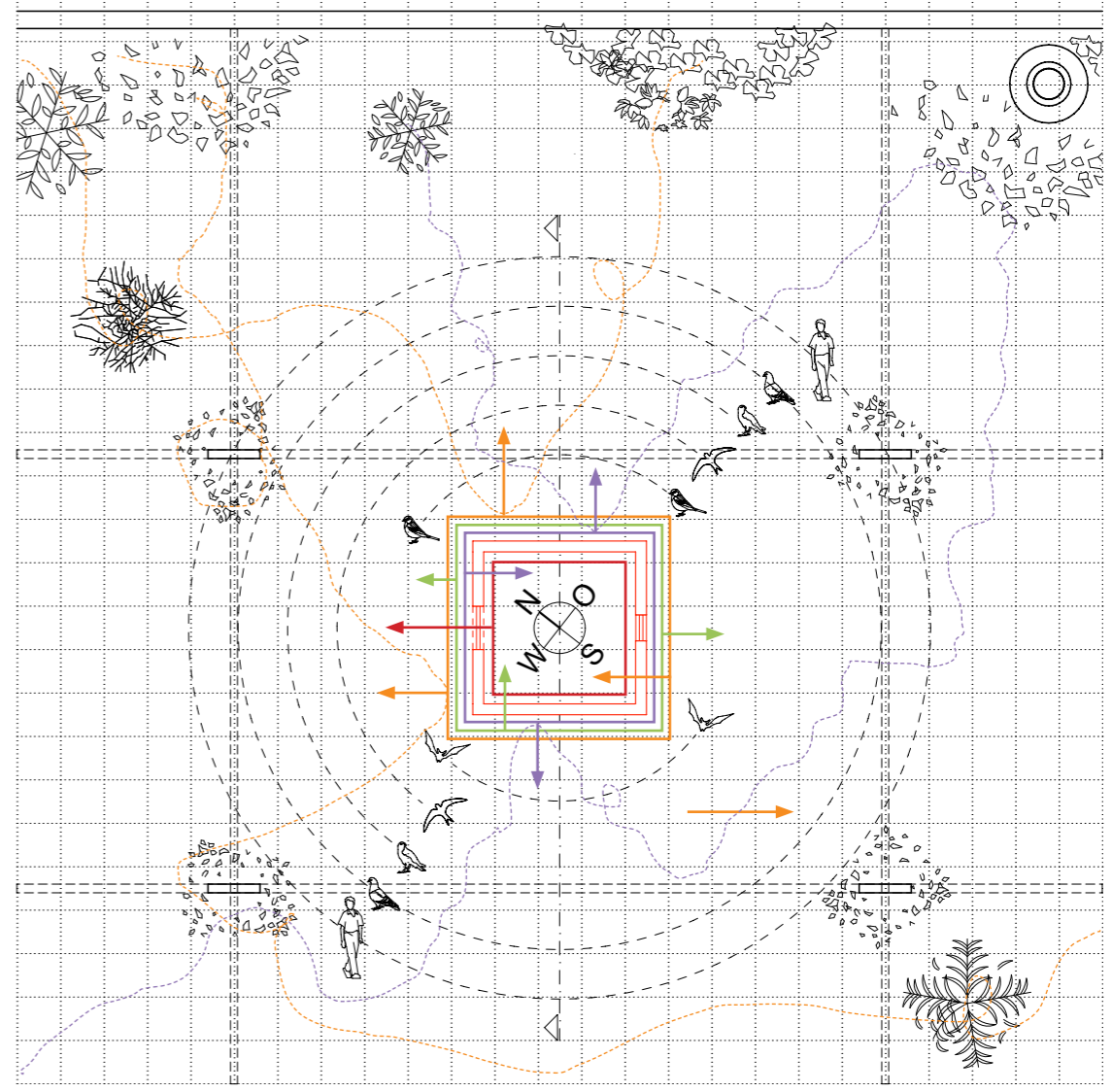
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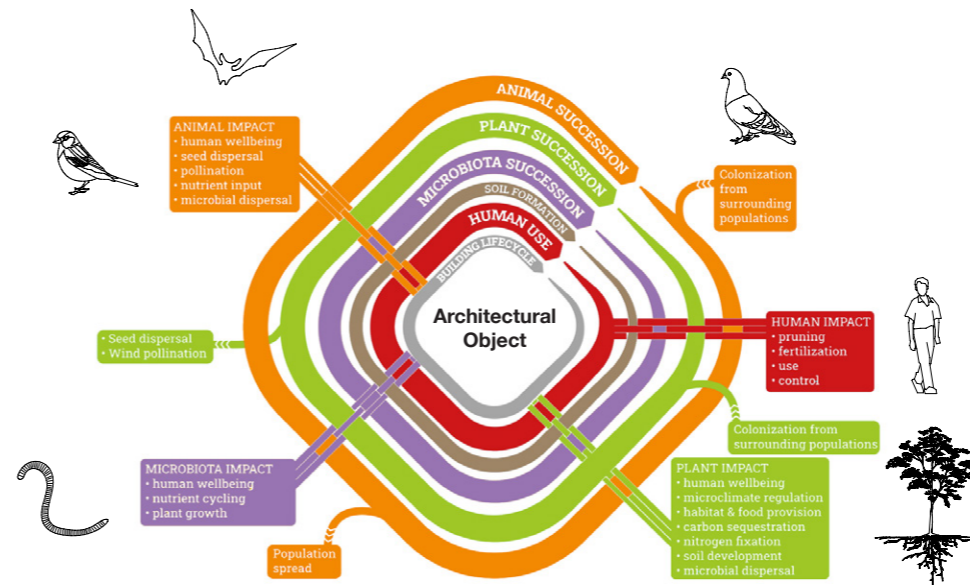
Growing Residency



Architectural object: Section (Ruin)

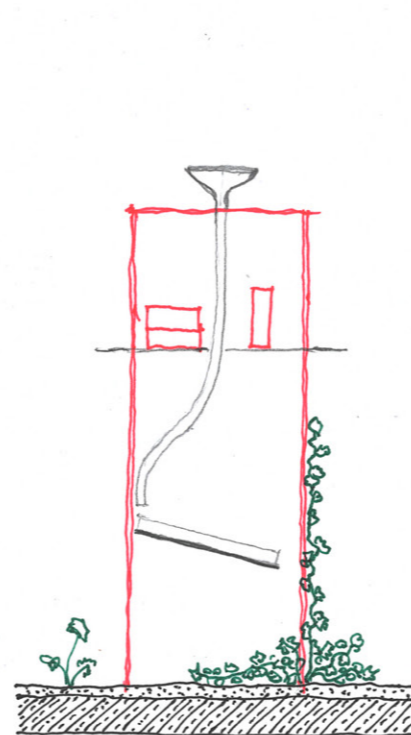


Architectural object: Plan (Ruin)

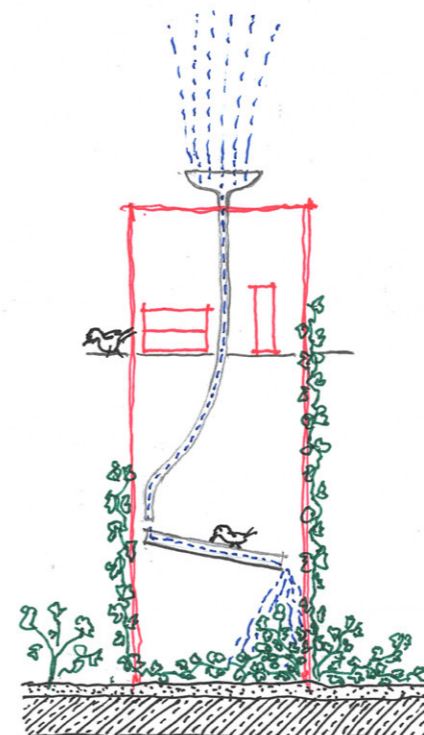




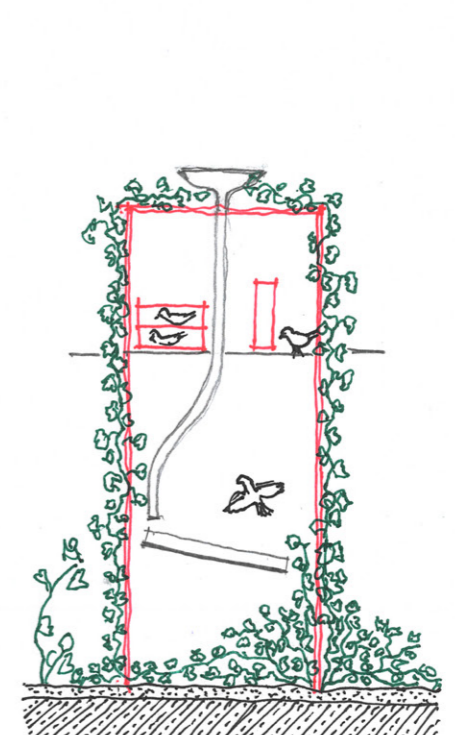
Existing



February 2023



Summer 2023

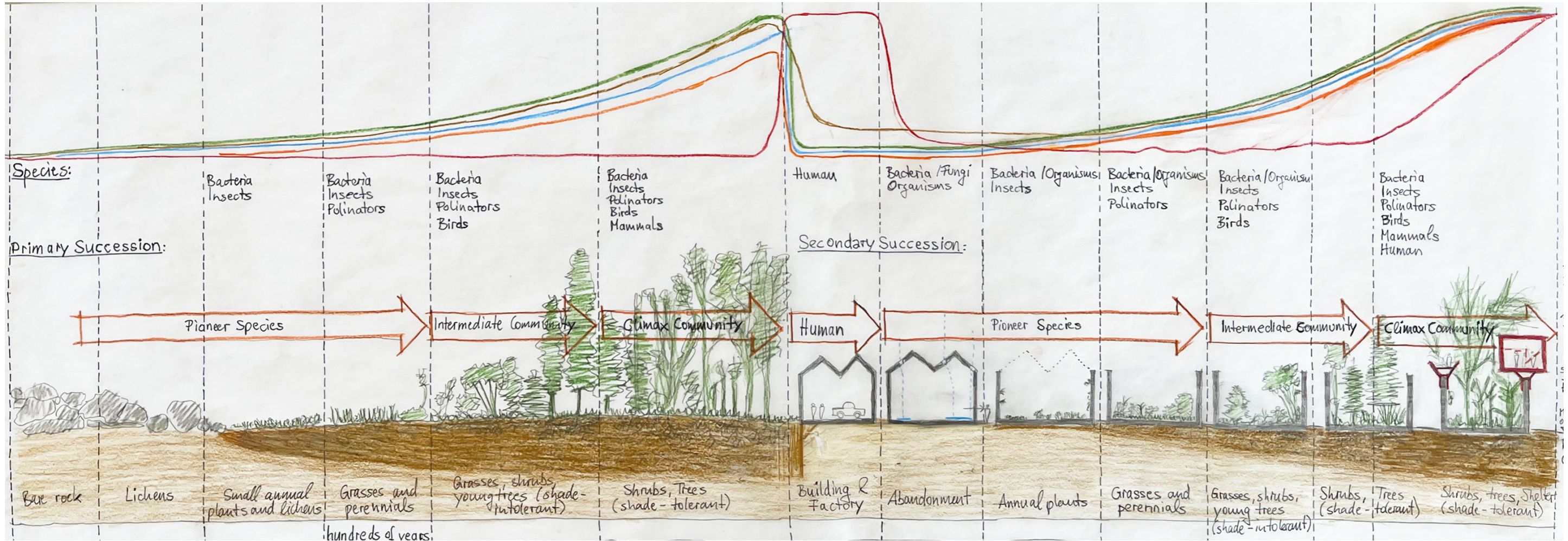


February 2023

**Disruptive moment:
Construction of Ford-Factory**



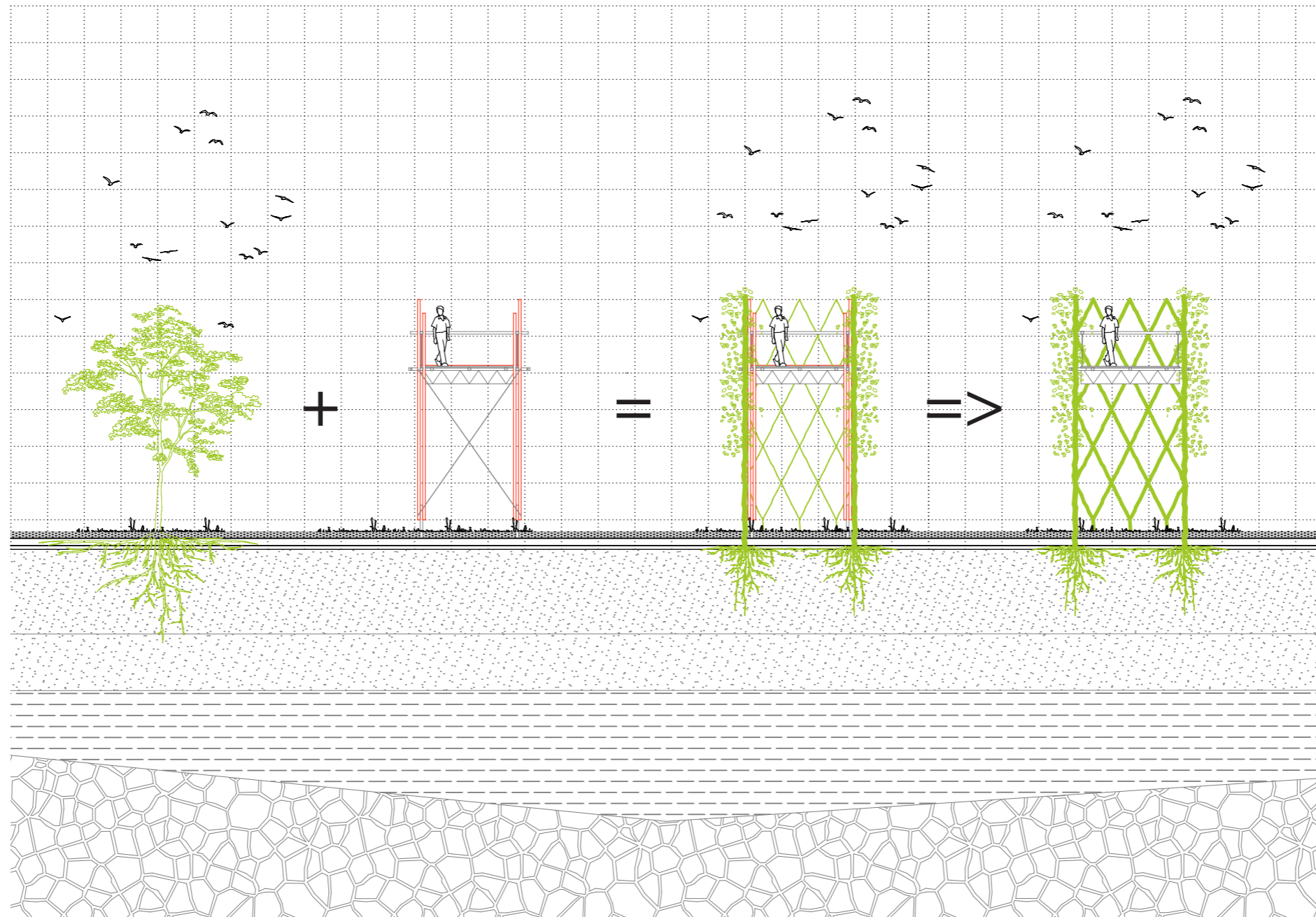
Growing Residency



Socio-ecological succession of the ruin (own work)

Socio-ecological design goal:
Living in a growing urban forest

Needs: Water, Air, Light, Nutrients, Multi-Species-Community



Tree:
Natural
Plant Growth

+

Scaffolding
Technical
Guidance, Care

=

Baubotanik
One entity

⇒

Baubotanik
Tree structure

Time: 35 years

Growing Residency

Pedro Marques de Figueiredo:
Architect, Illustrator, Worst Tour Guide



Urban challenges of Porto & history of ruins:

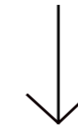


- More urban green
- Protection of privatized green (ruins)
- Support of local communities
- Cultural offer (Theatre, arts spaces)

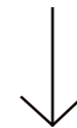
Prof. Nuno Brandão Costa:
Professor at FAUP, Architect



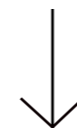
Urban challenges at Palácio Ford:



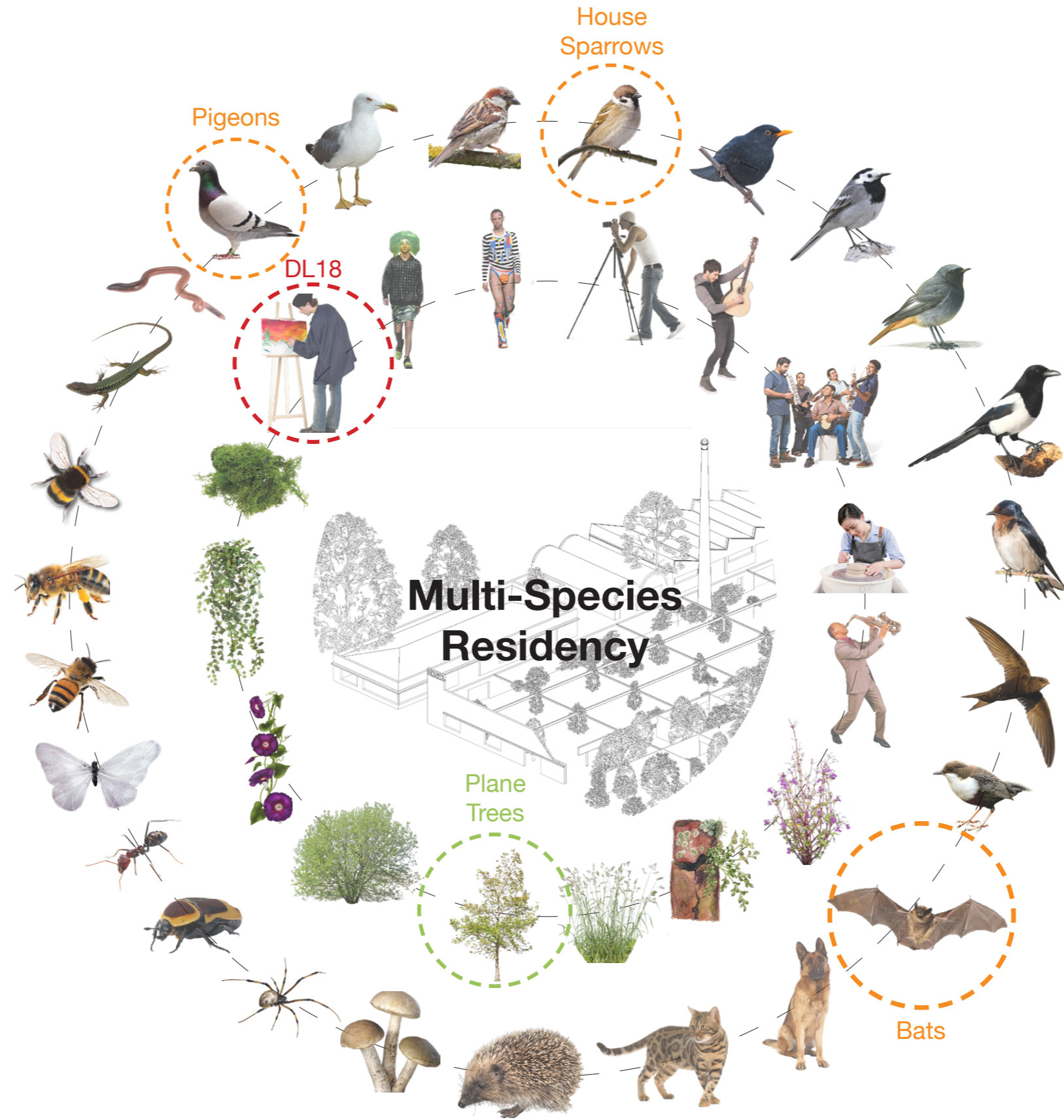
- Local park (leisure & sports activities)
- Residential housing (T0-T3)
- Workspaces for local musicians and arts school "Belas Artes"
- Space for small-scale companies, production, commercial use



Experimenting new ways
of living in an urban forest

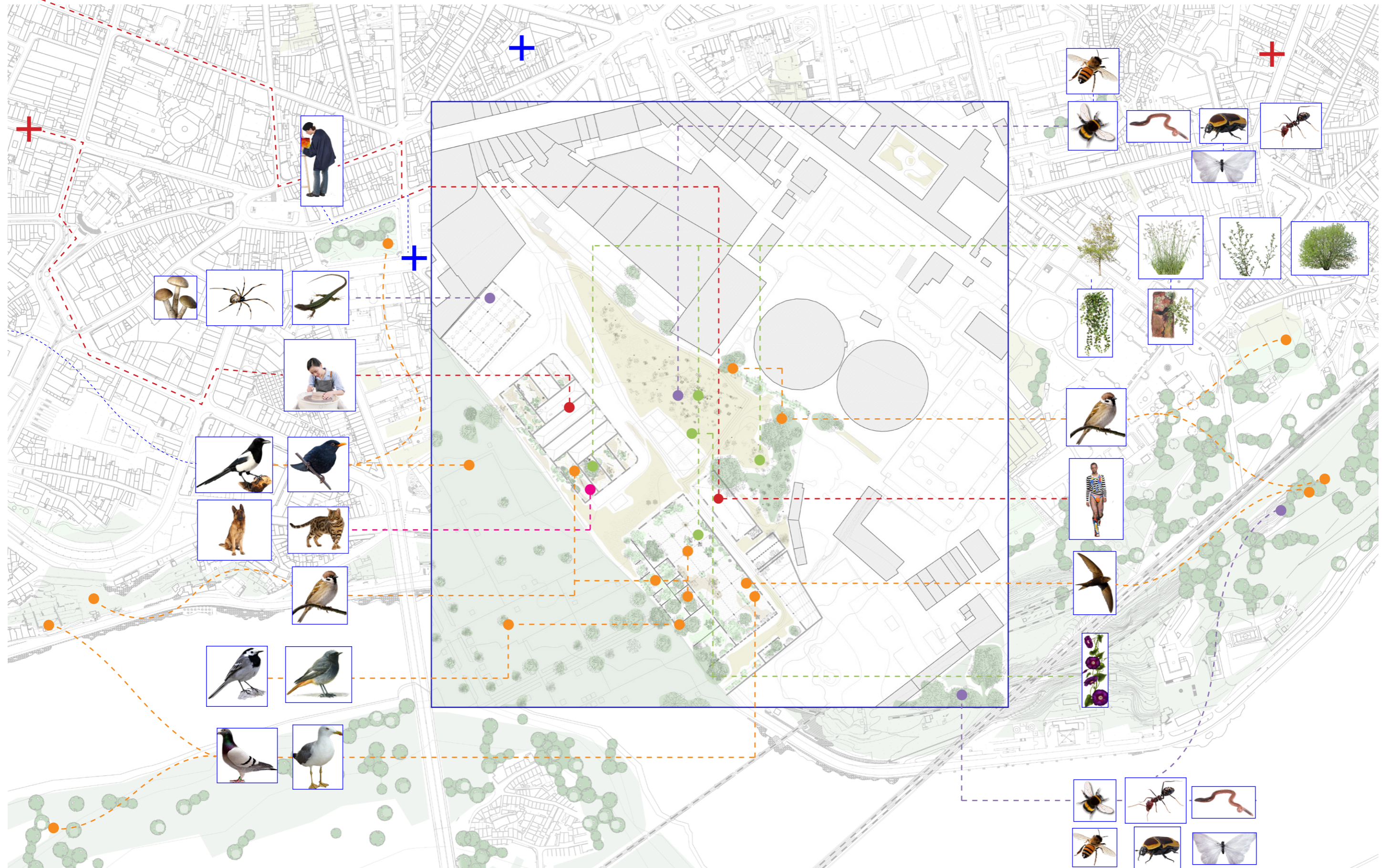


Multi-Species-Residency:
Temporal living & working



+ D'Eliceiras 18

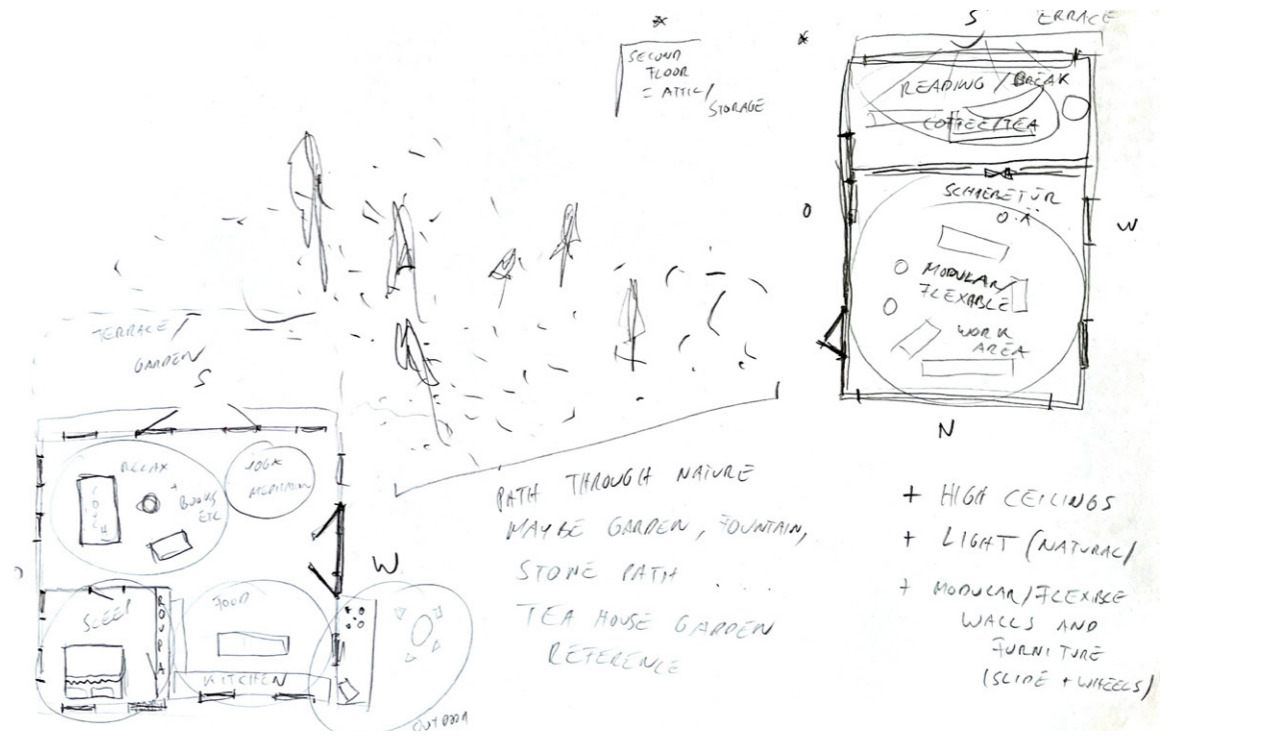
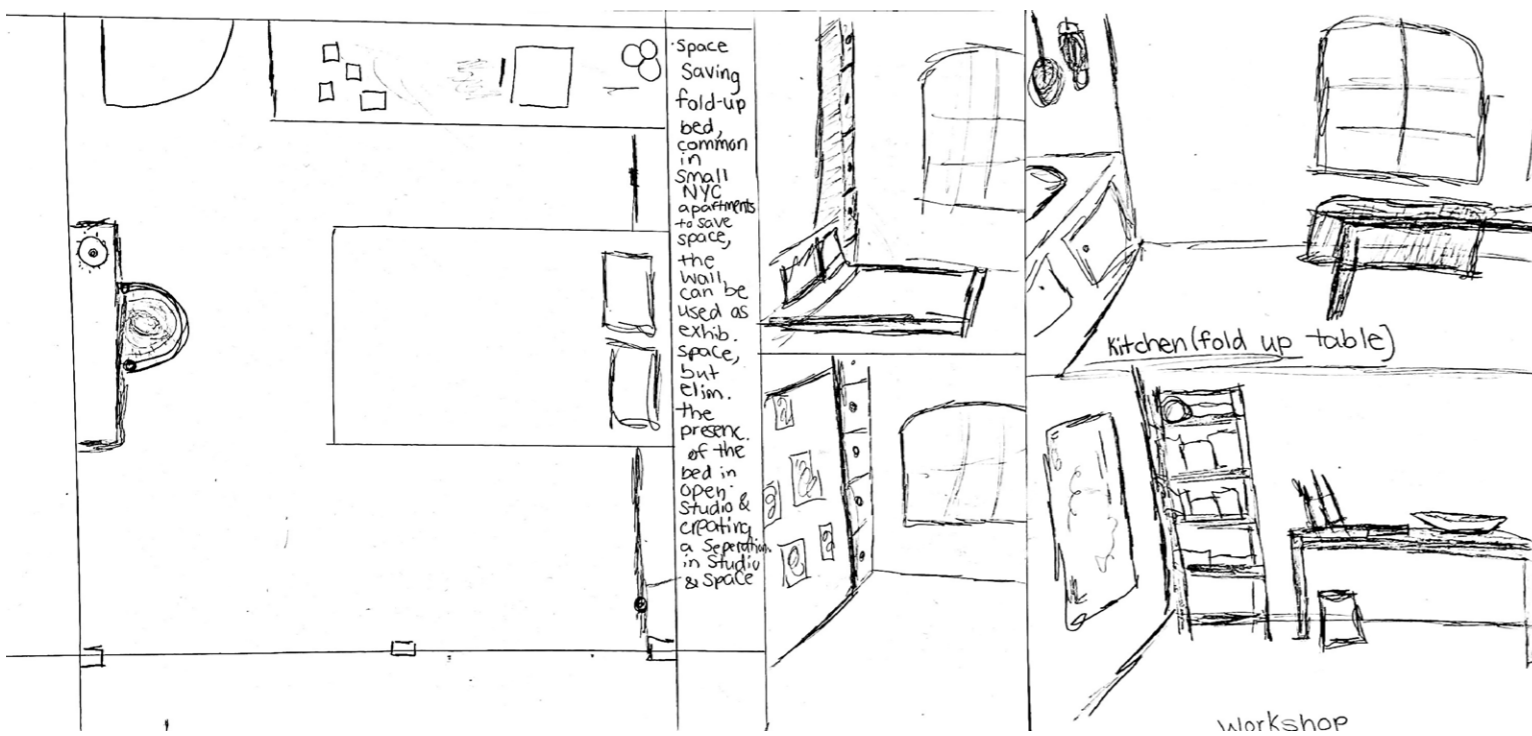
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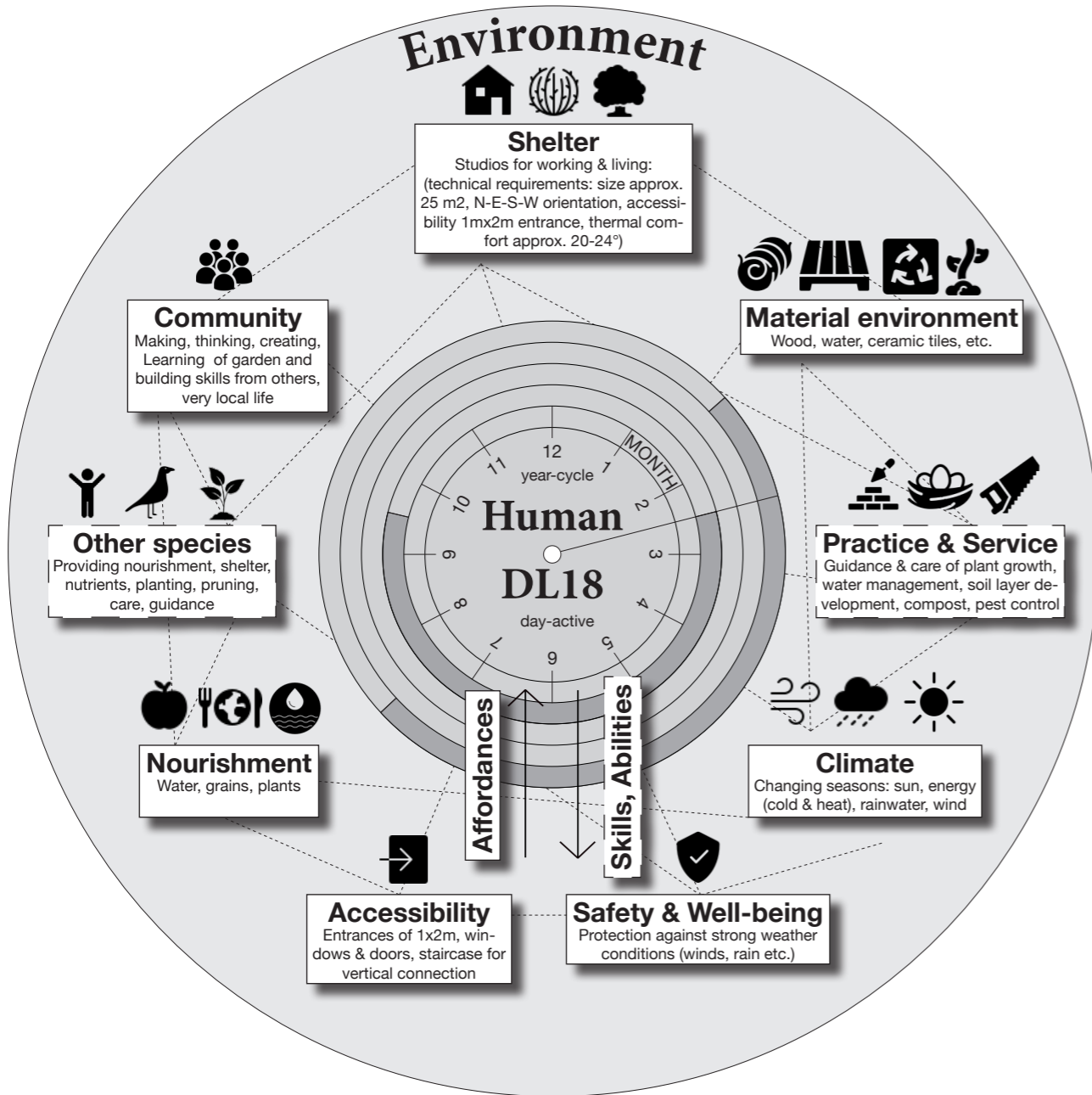


+ Organisations

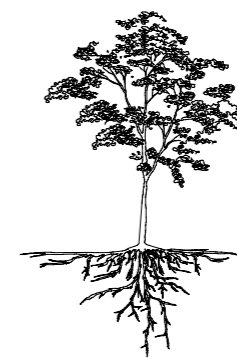
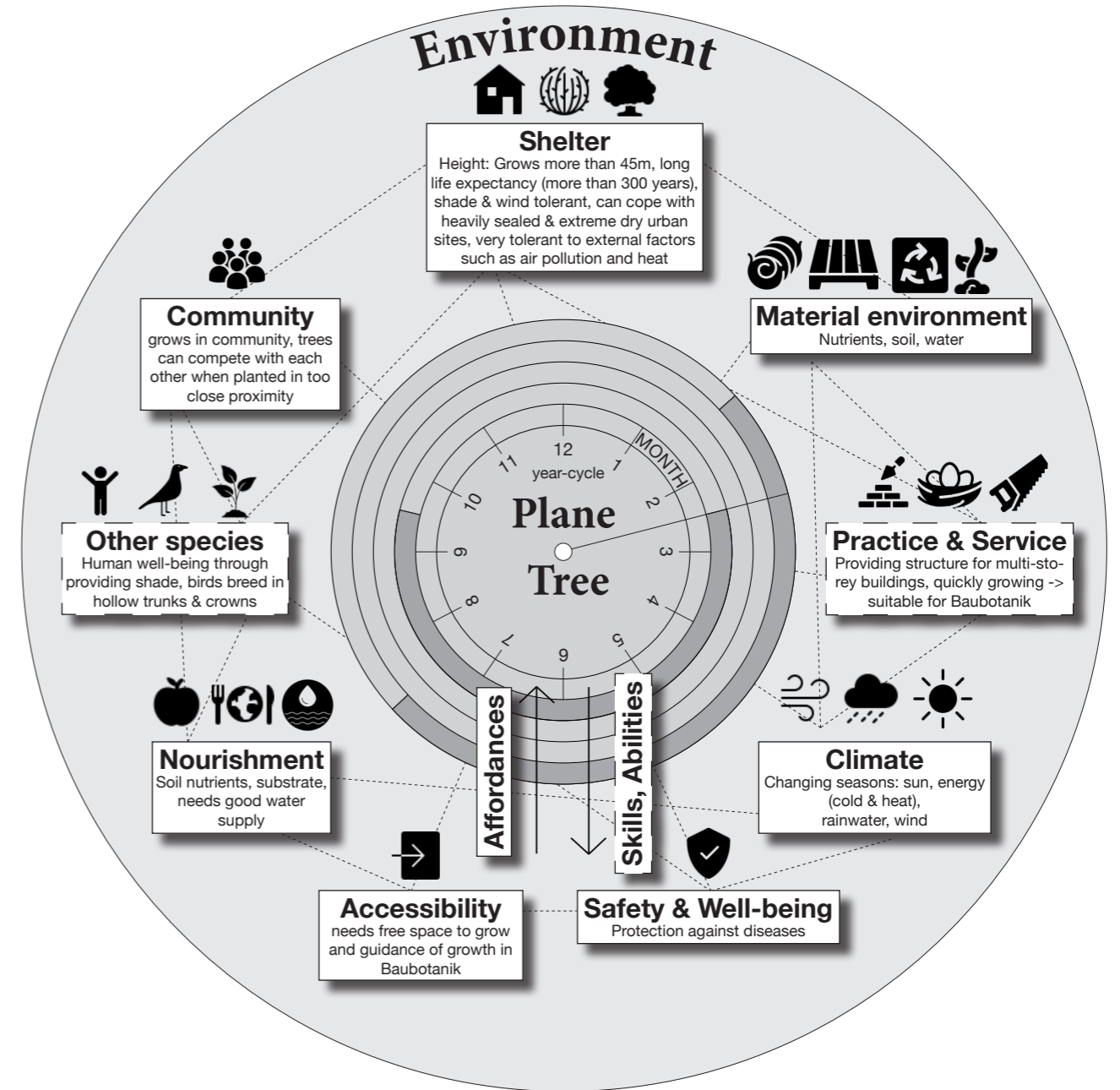


How to live in a residency in harmony with nature?

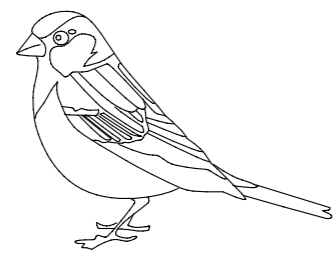
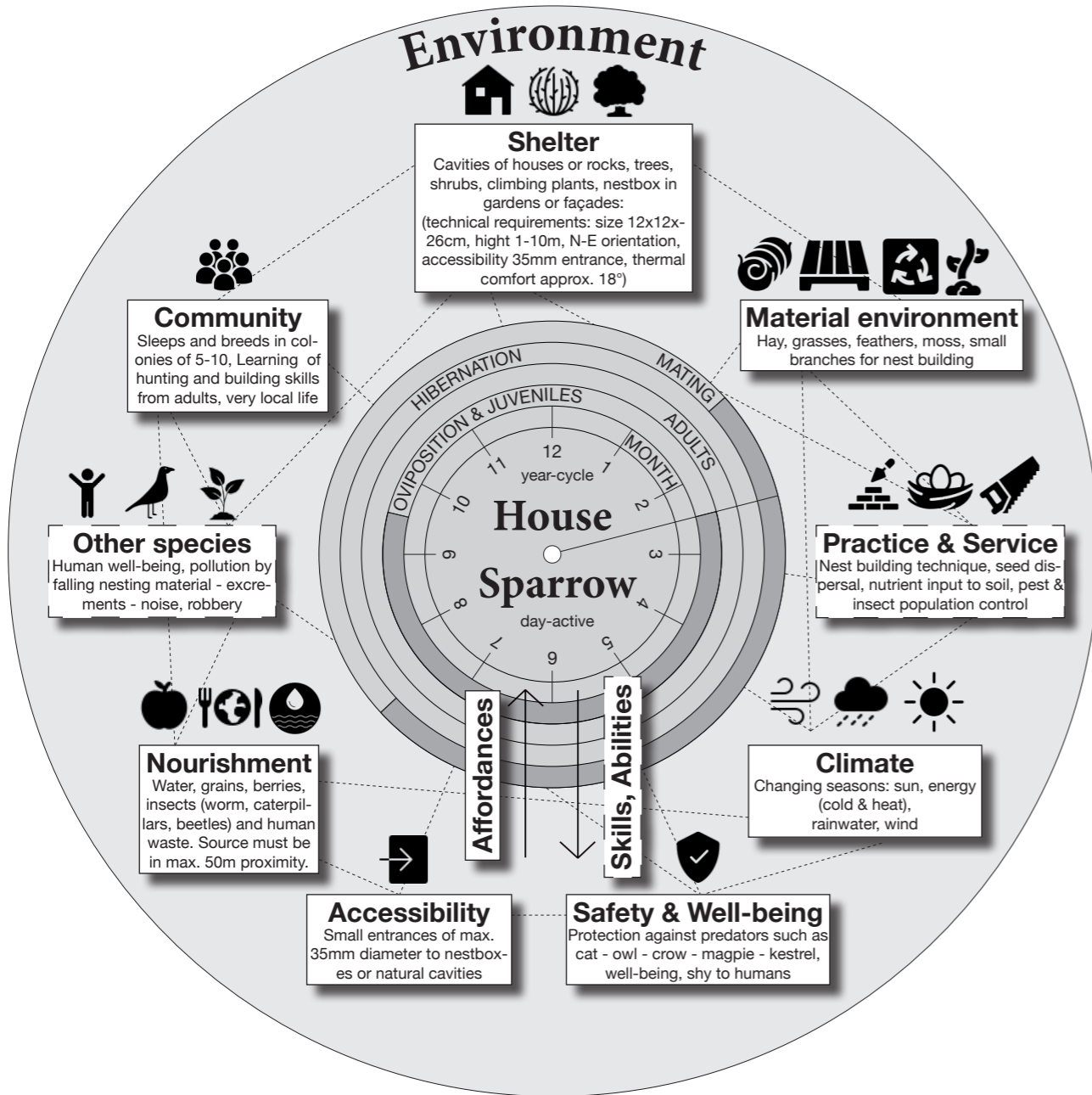




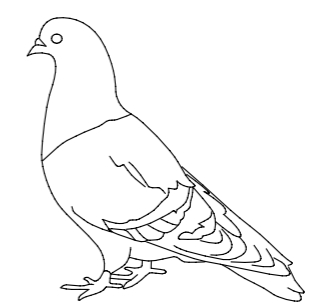
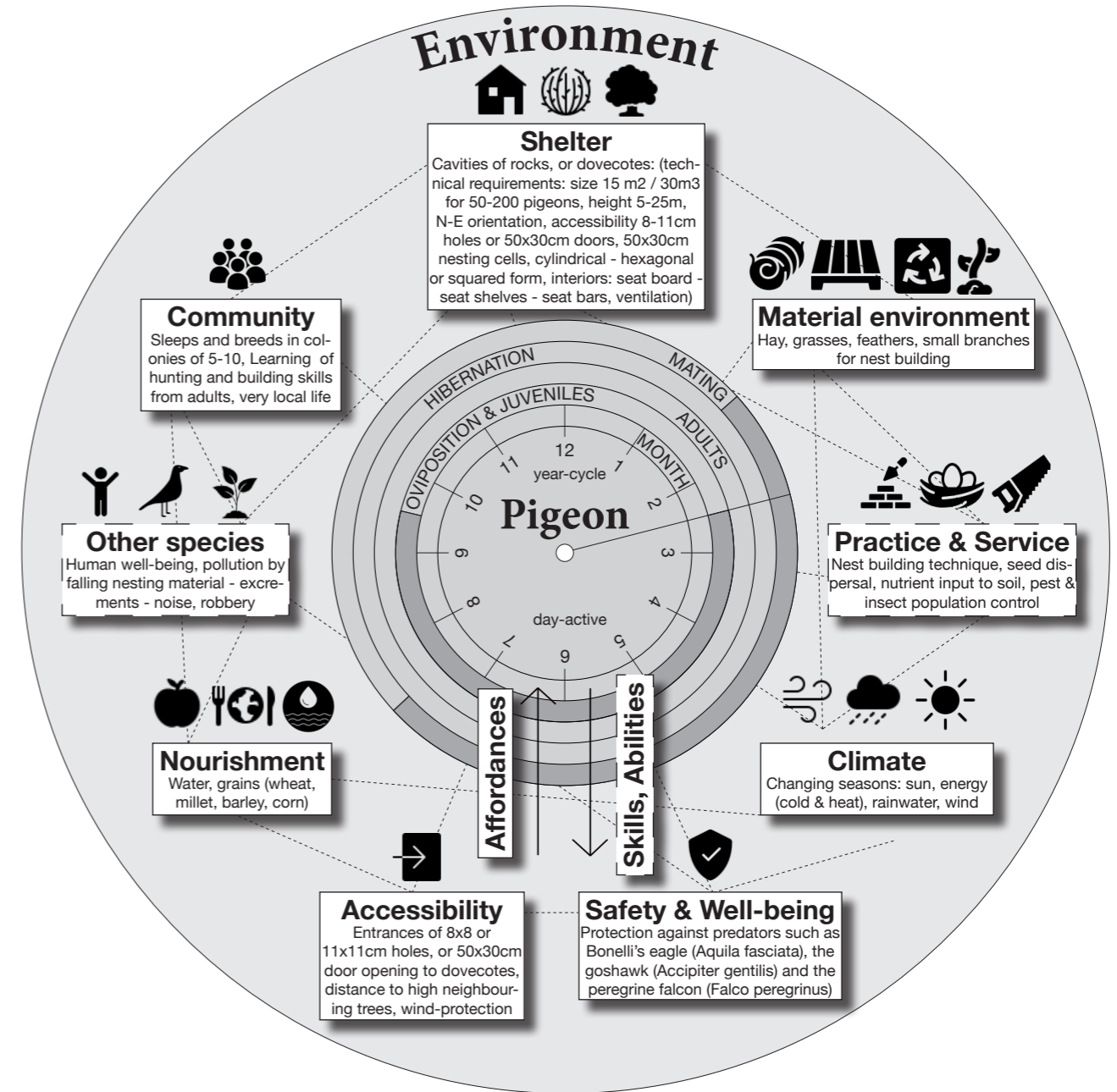
Human (DL18): Affordances
Environment - Affordances - Actor



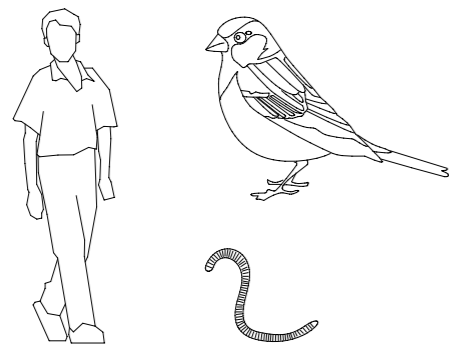
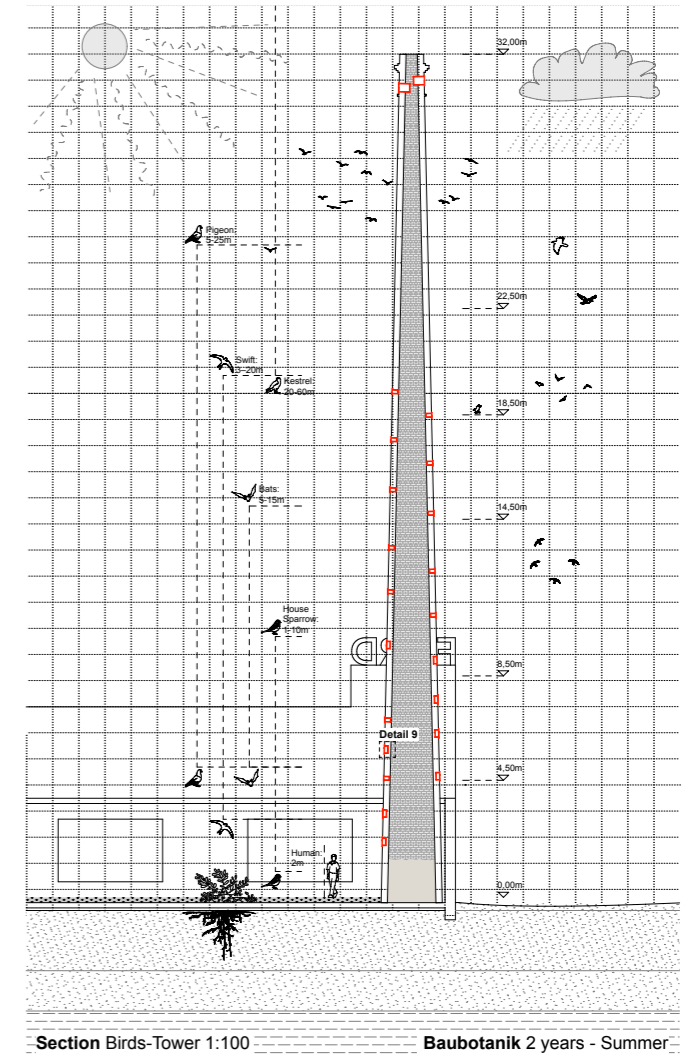
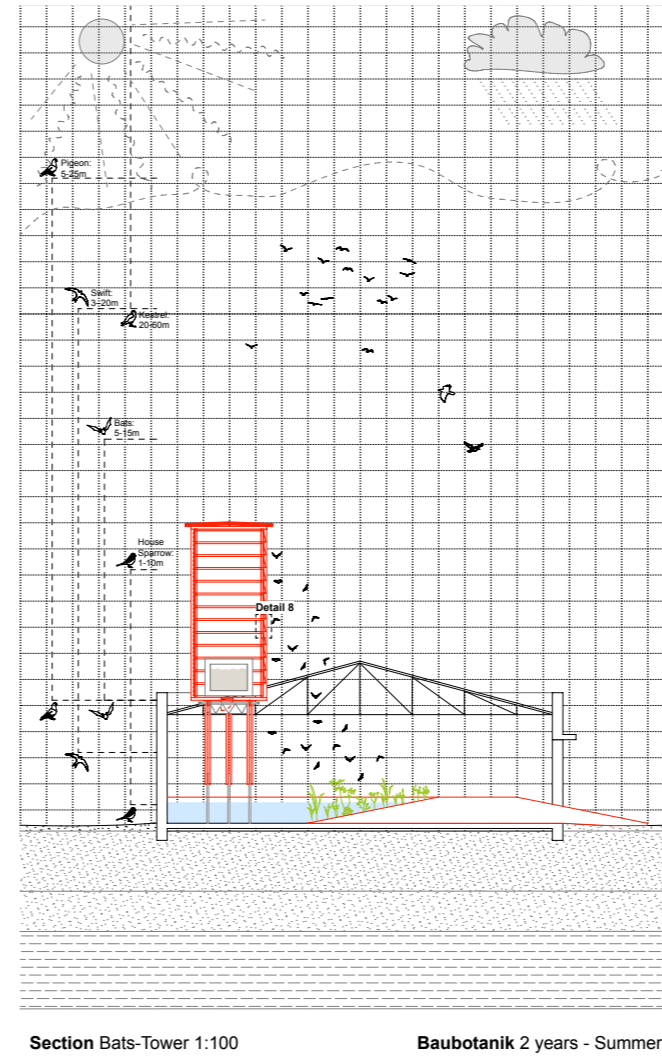
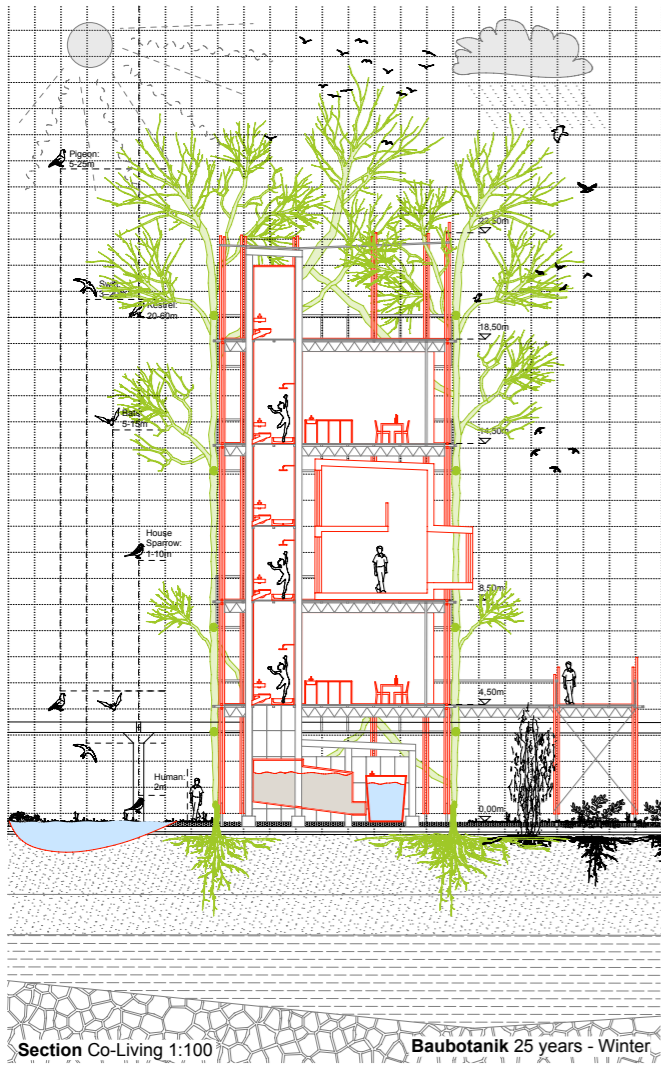
House Sparrow: Affordances
Environment - Affordances - Actor



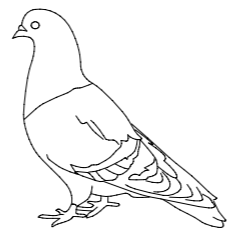
House Sparrow: Affordances
Environment - Affordances - Actor



Pigeon: Affordances
Environment - Affordances - Actor



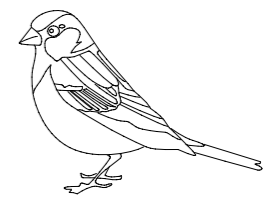
Multi-Species-Residency
Humans, Birds, Insects,
Microbiota



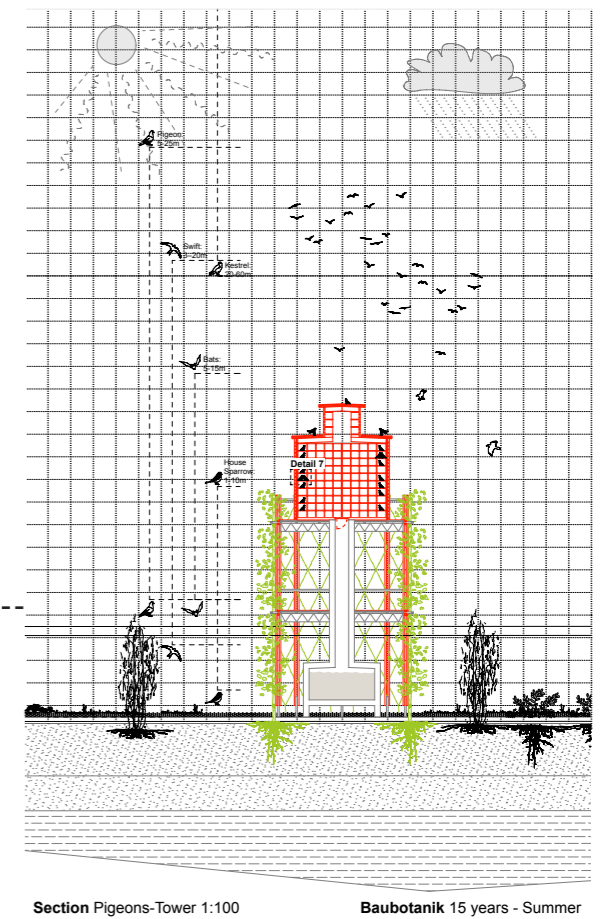
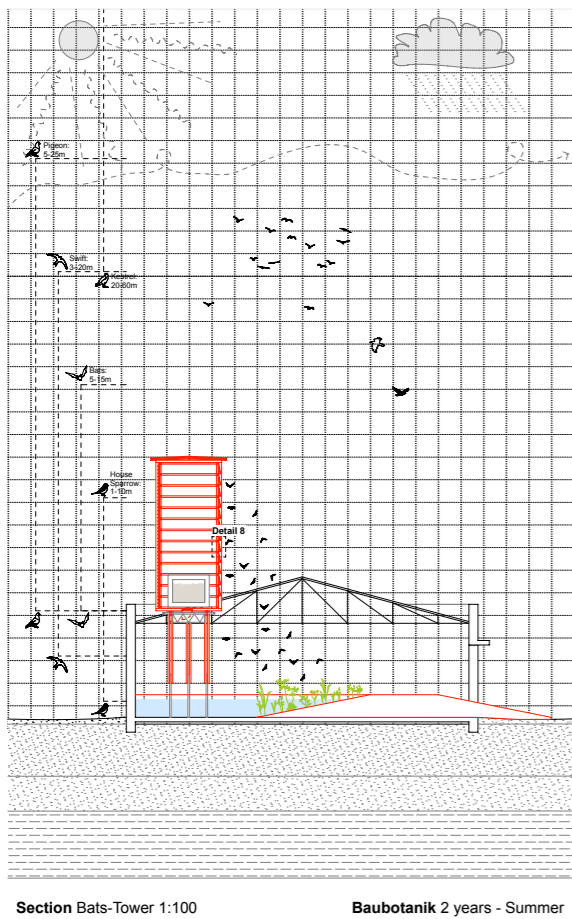
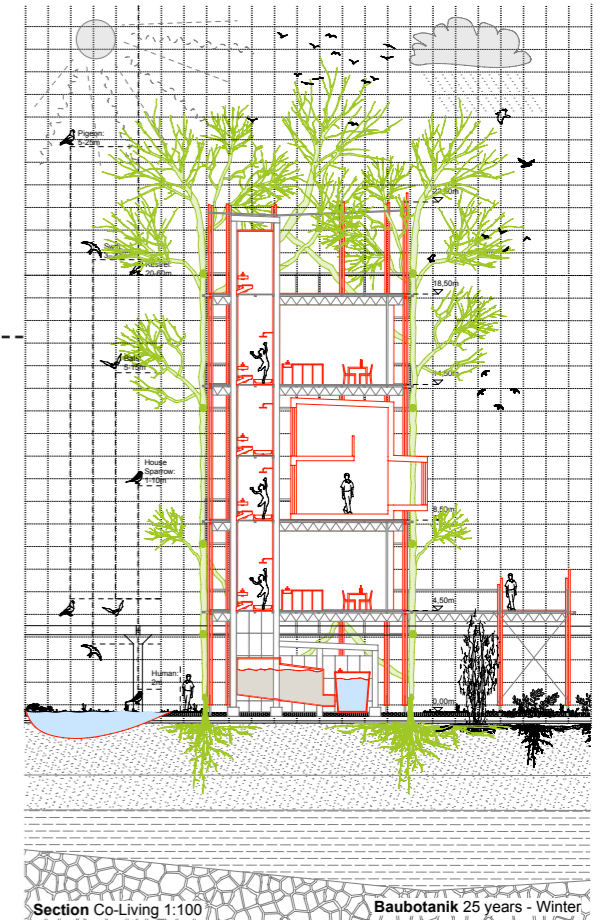
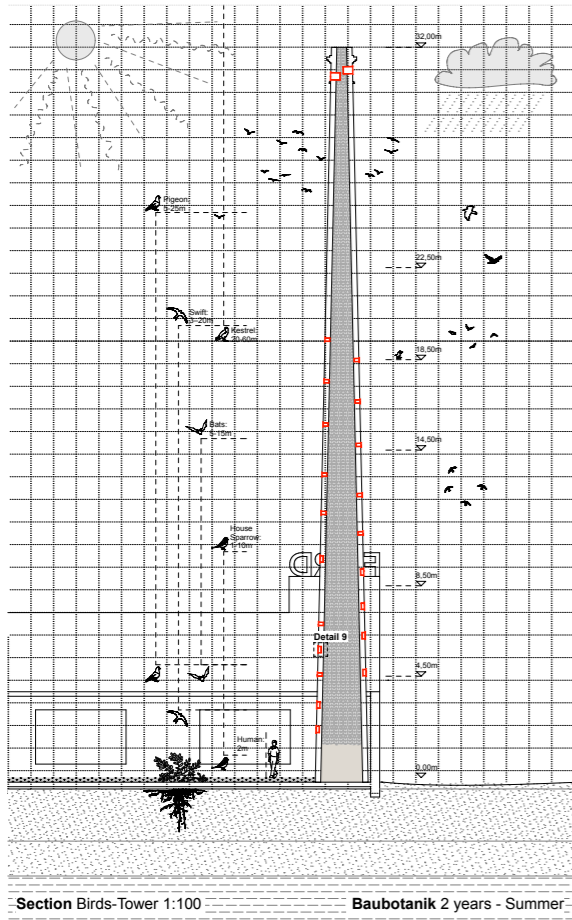
Pigeons-Tower
Pigeons

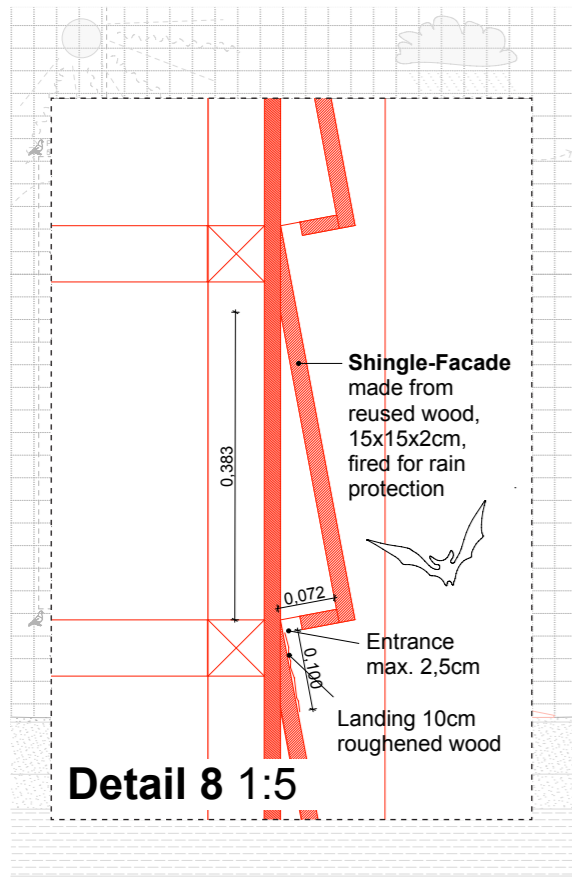


Bats-Tower
Bat

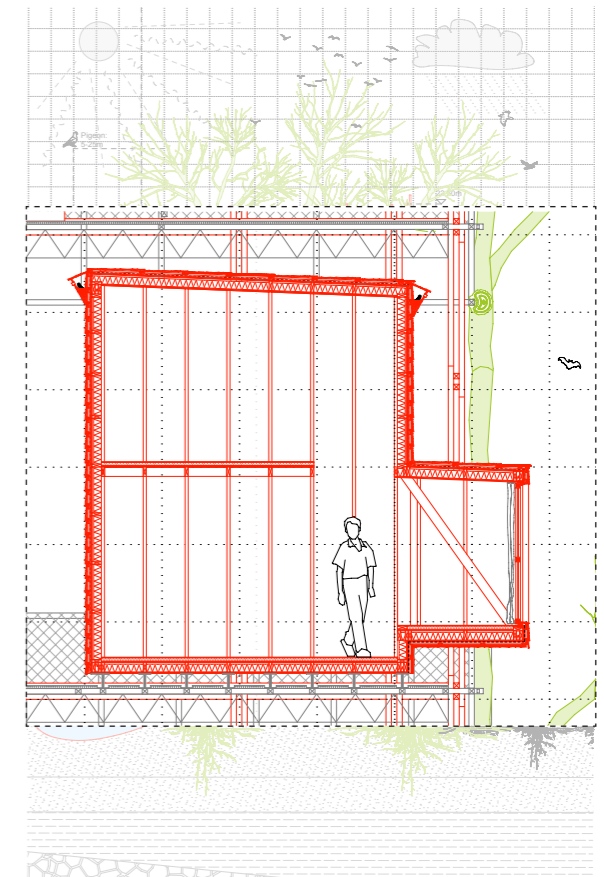


Birds-Tower
House Sparrow, Black
Redstart, Swift, Kestrel

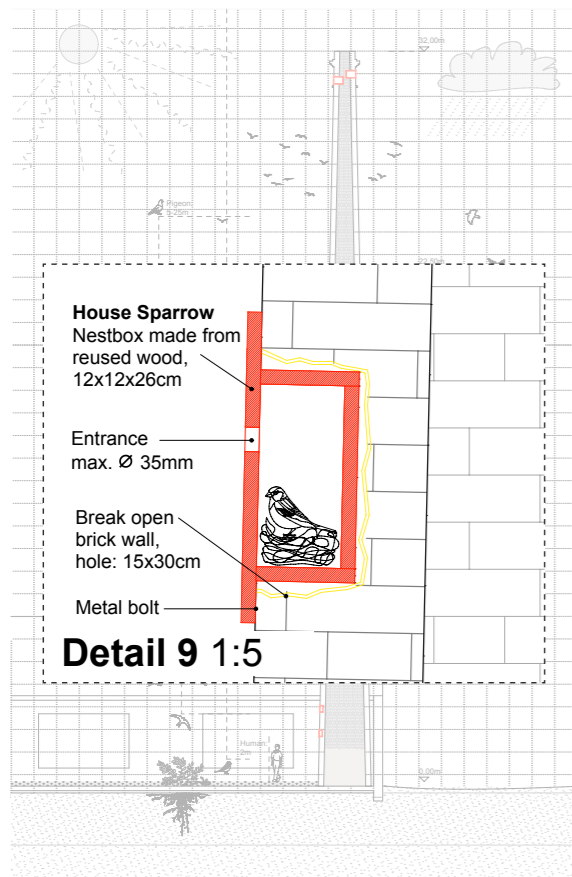




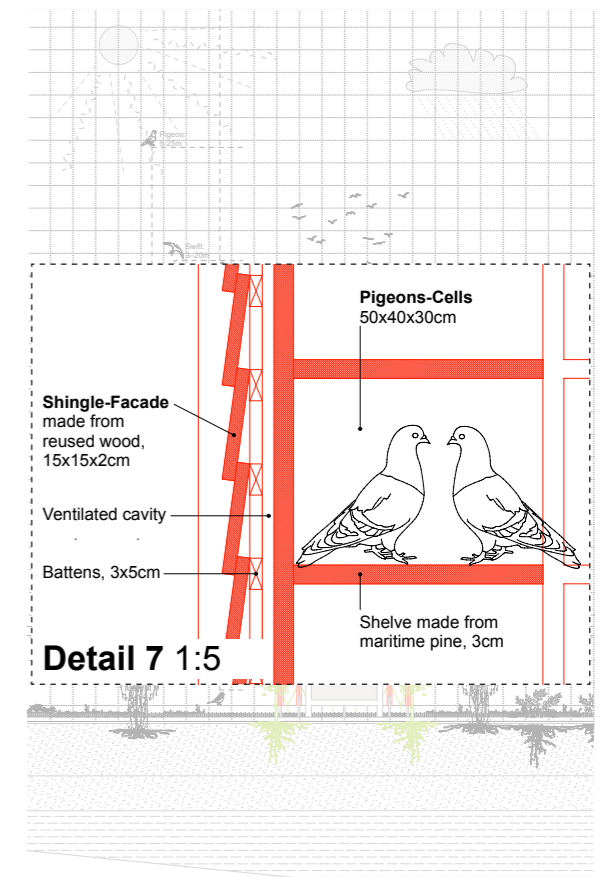
Section Bats-Tower 1:100 Baubotanik 2 years - Summer



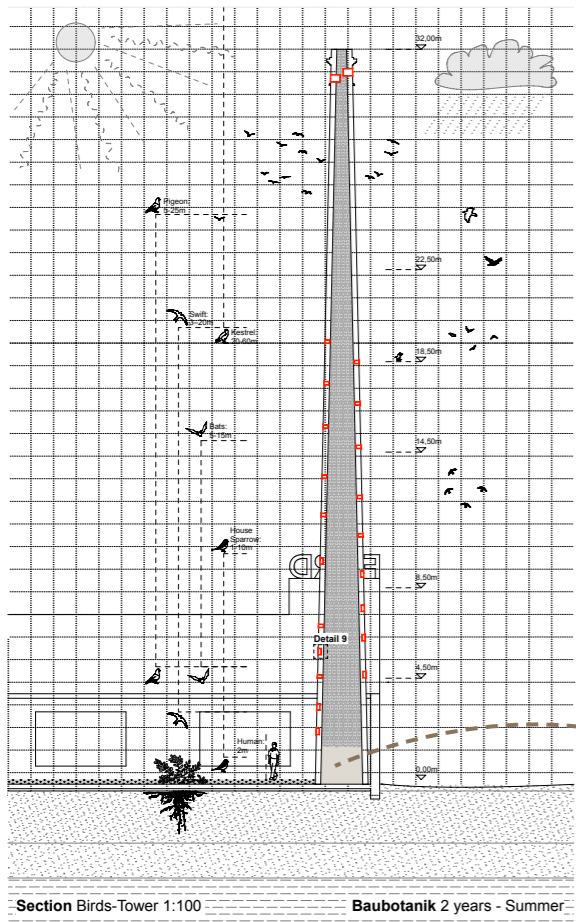
Baubotanik 25 years - Winter



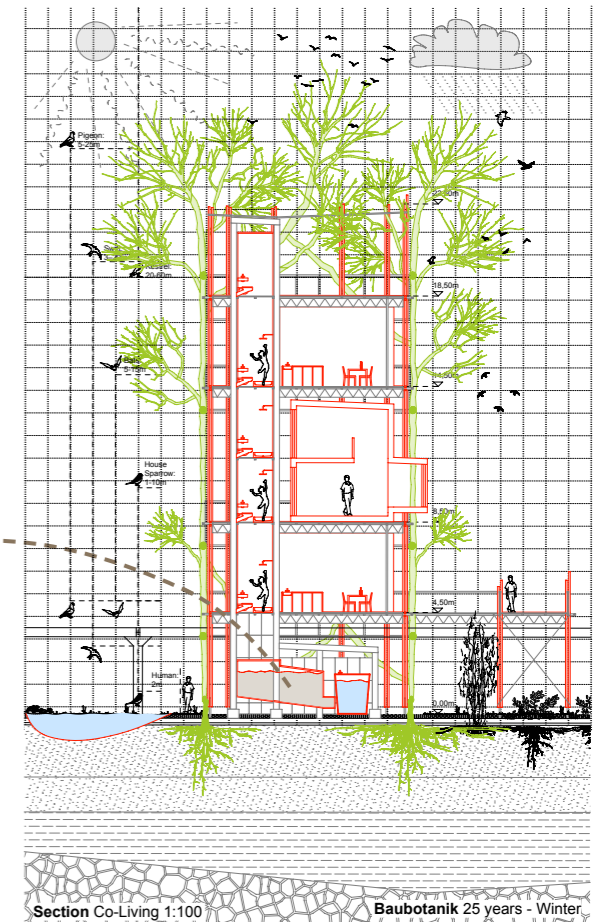
Section Birds-Tower 1:100 Baubotanik 2 years - Summer



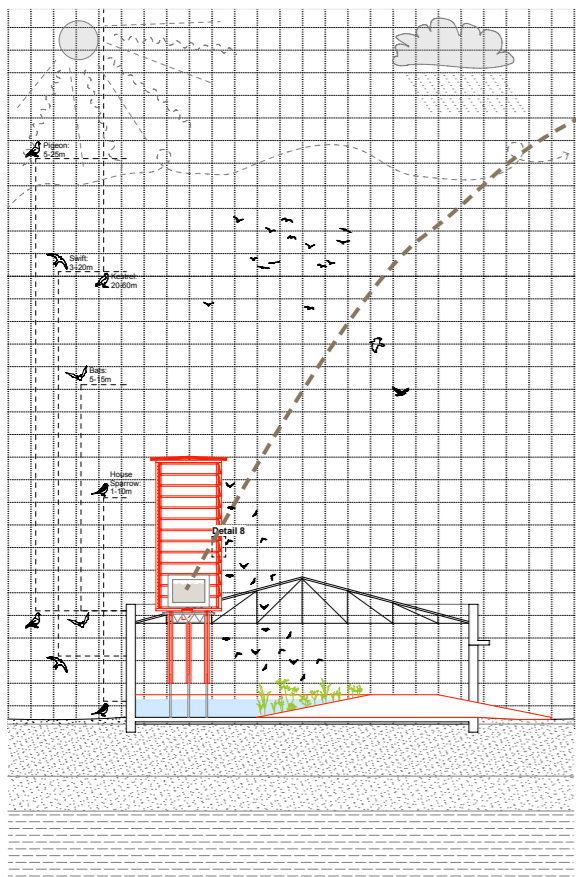
Section Pigeons-Tower 1:100 Baubotanik 15 years - Summer



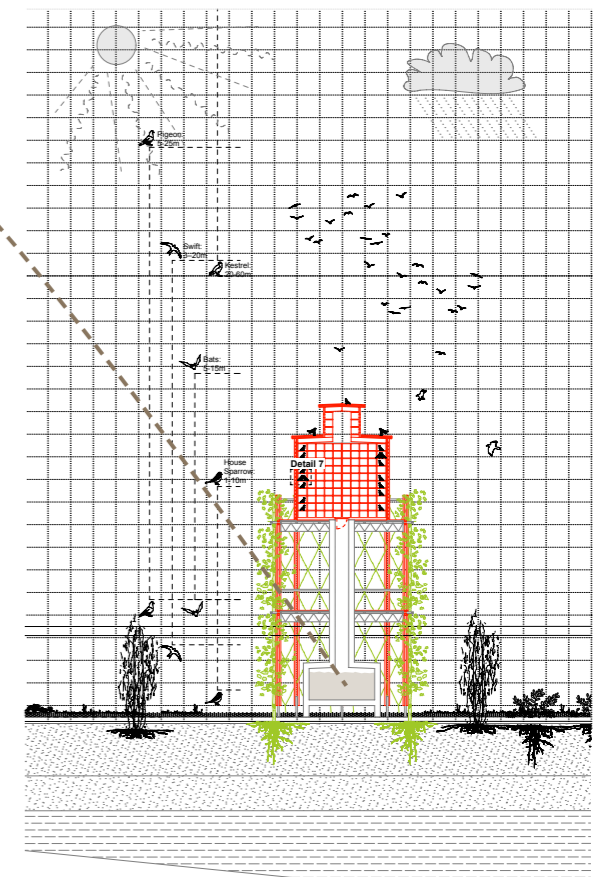
Section Birds-Tower 1:100 Baubotanik 2 years - Summer



Section Co-Living 1:100 Baubotanik 25 years - Winter

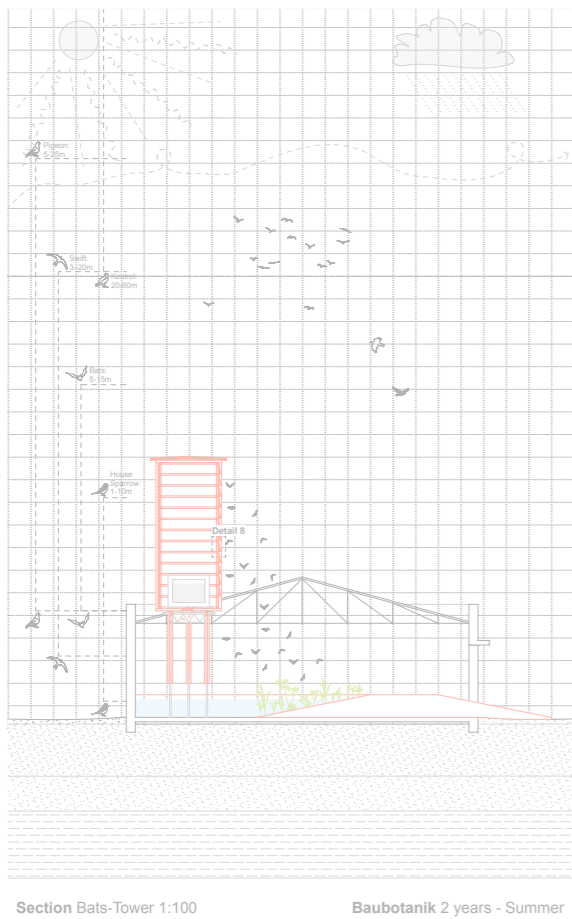
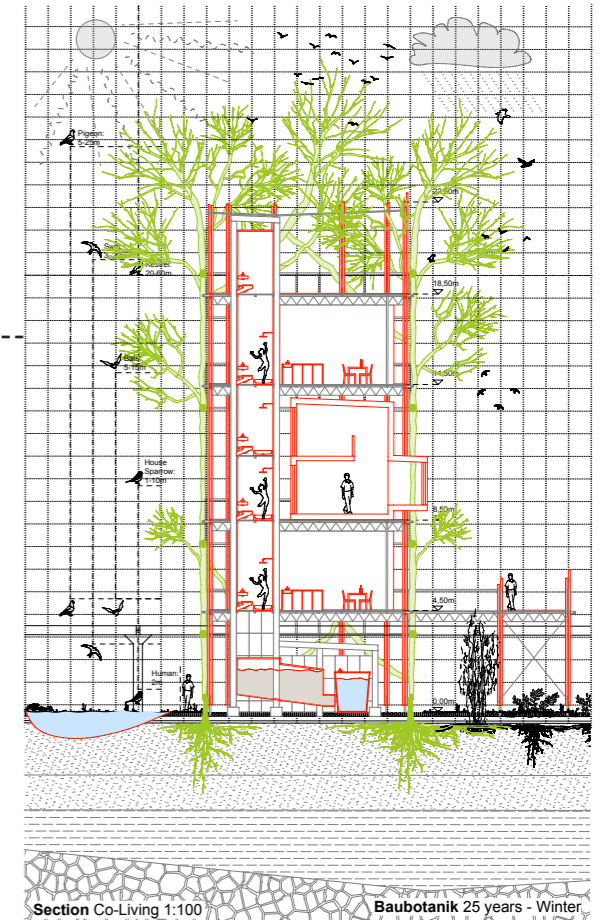
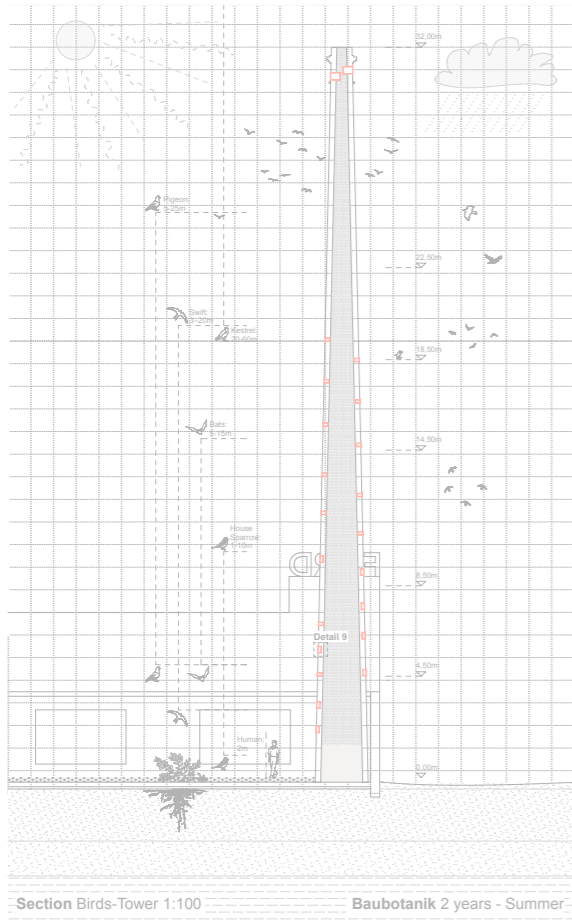


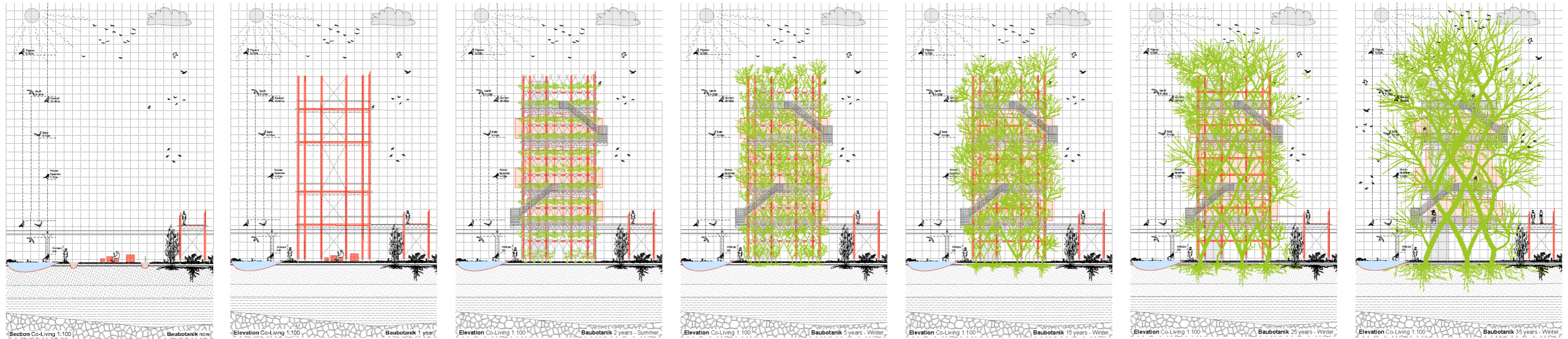
Section Bats-Tower 1:100 Baubotanik 2 years - Summer



Section Pigeons-Tower 1:100 Baubotanik 15 years - Summer

Growing Residency





time

2023
Now

2024
1 year

2025
2 years

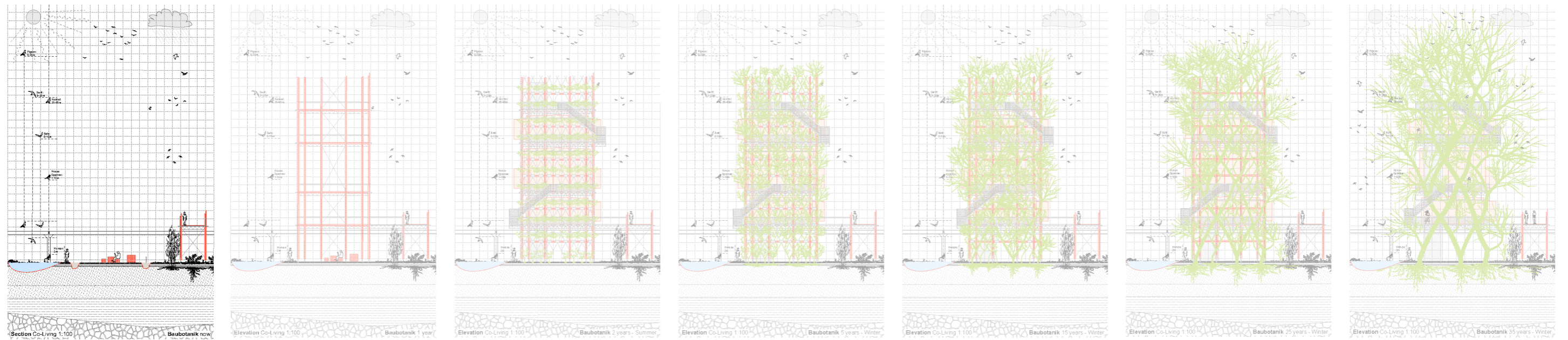
2028
5 years

2038
15 years

2048
25 years

2058
35 years





time

2023
Now

2024
1 year

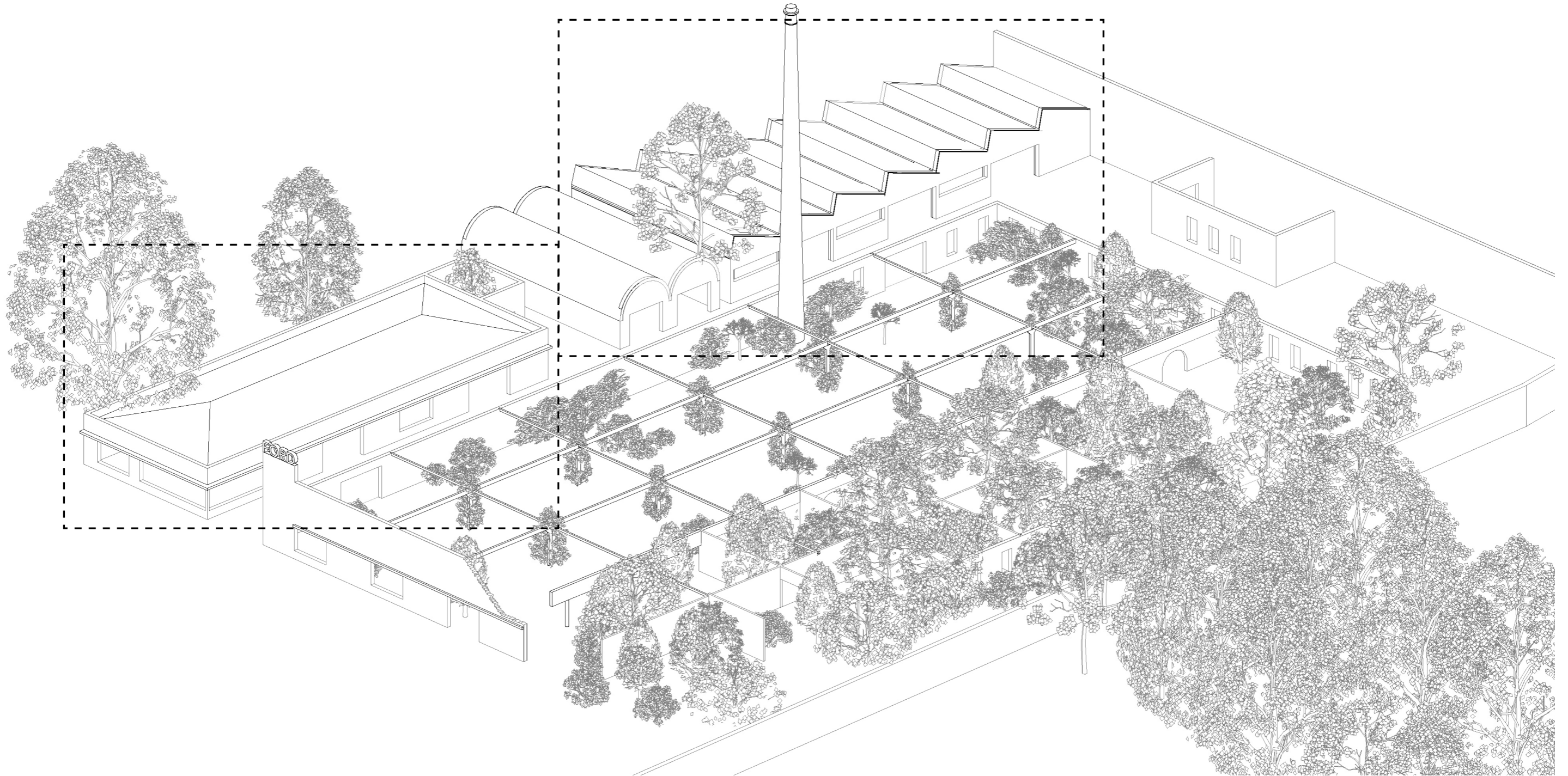
2025
2 years

2028
5 years

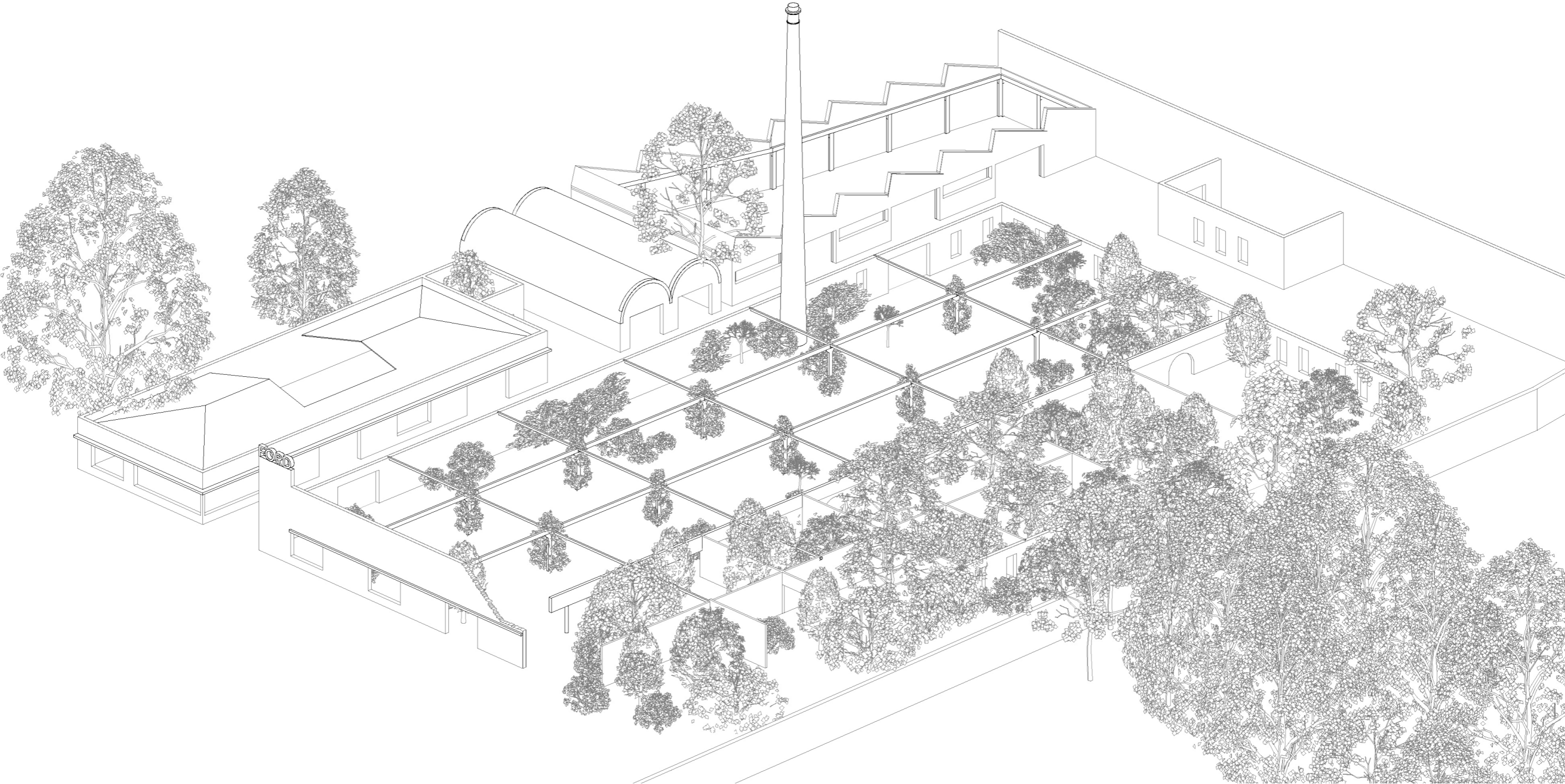
2038
15 years

2048
25 years

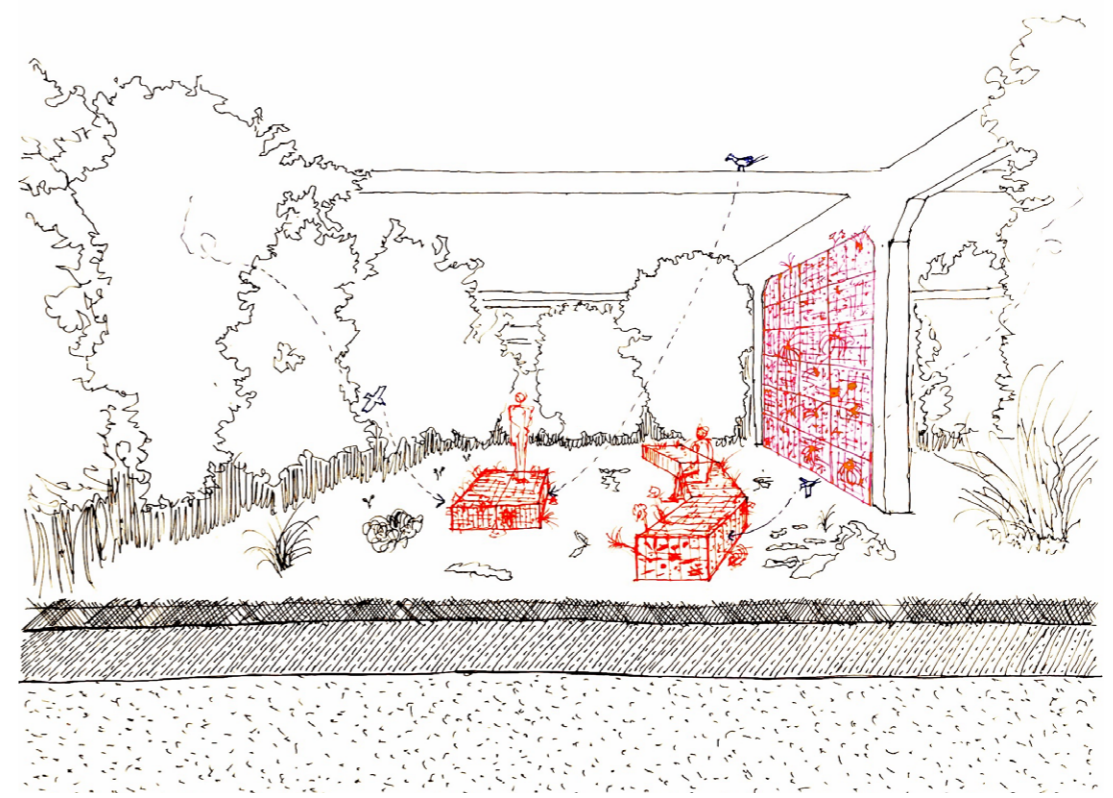
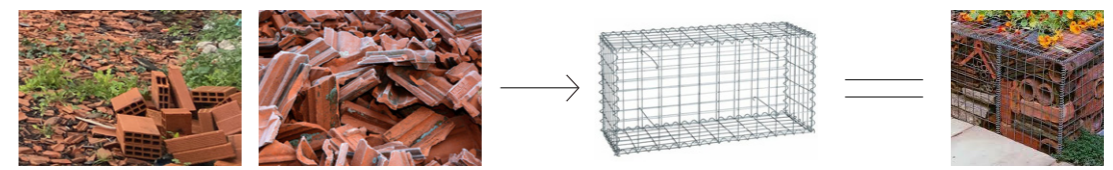
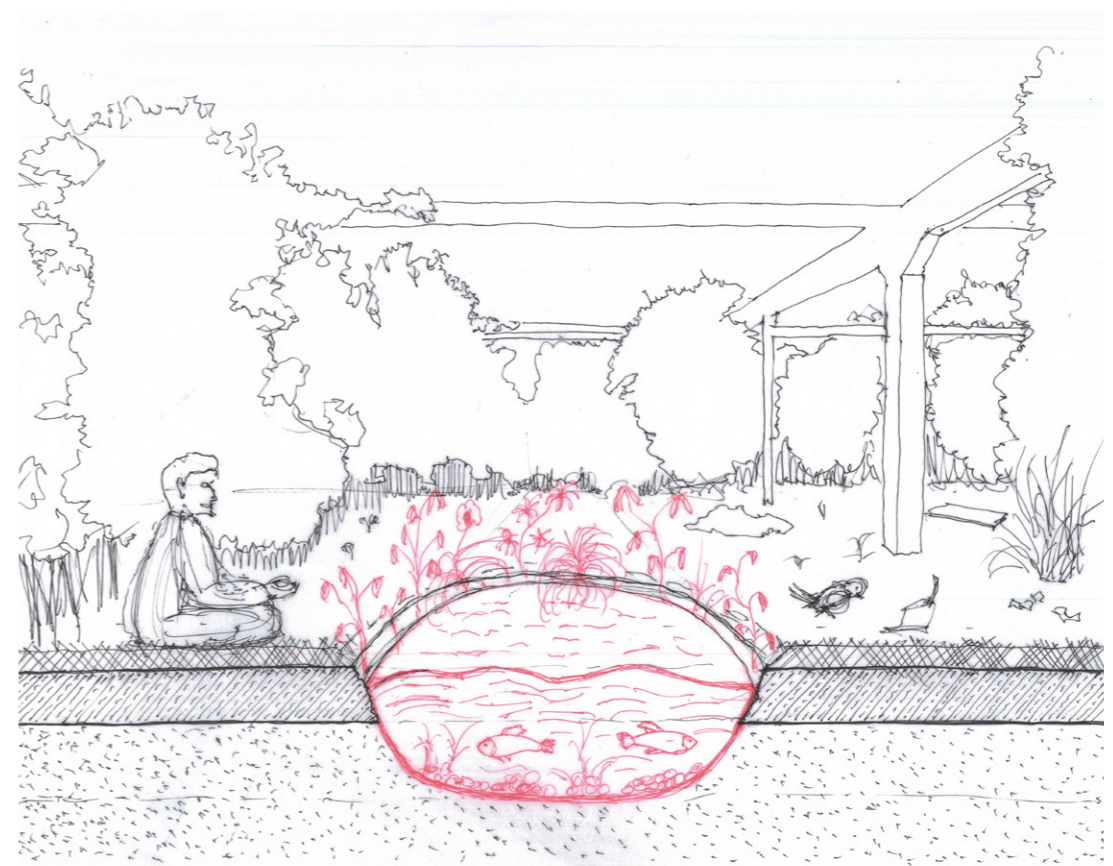
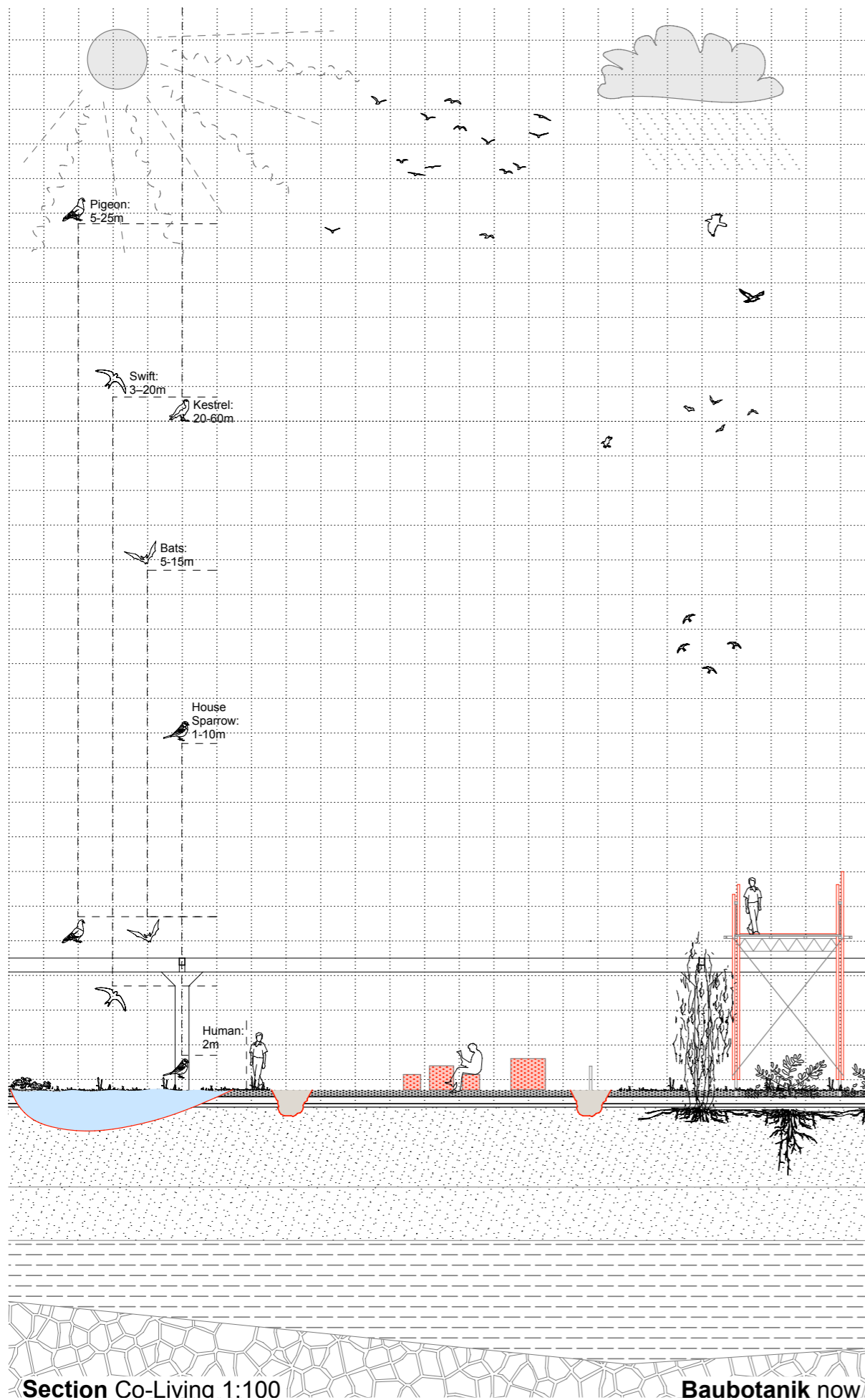
2058
35 years

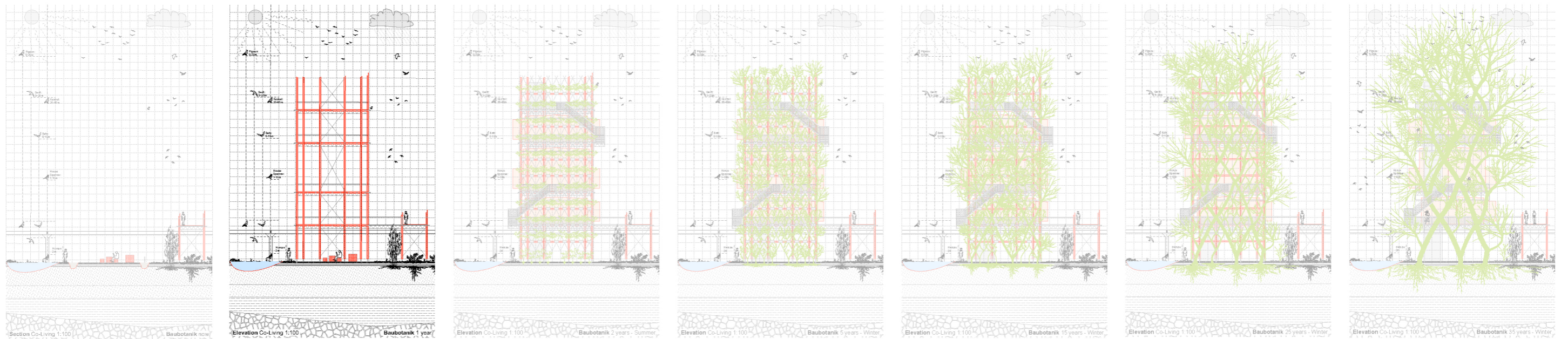


Growing Residency



Growing Residency





time

2023
Now

2024
1 year

2025
2 years

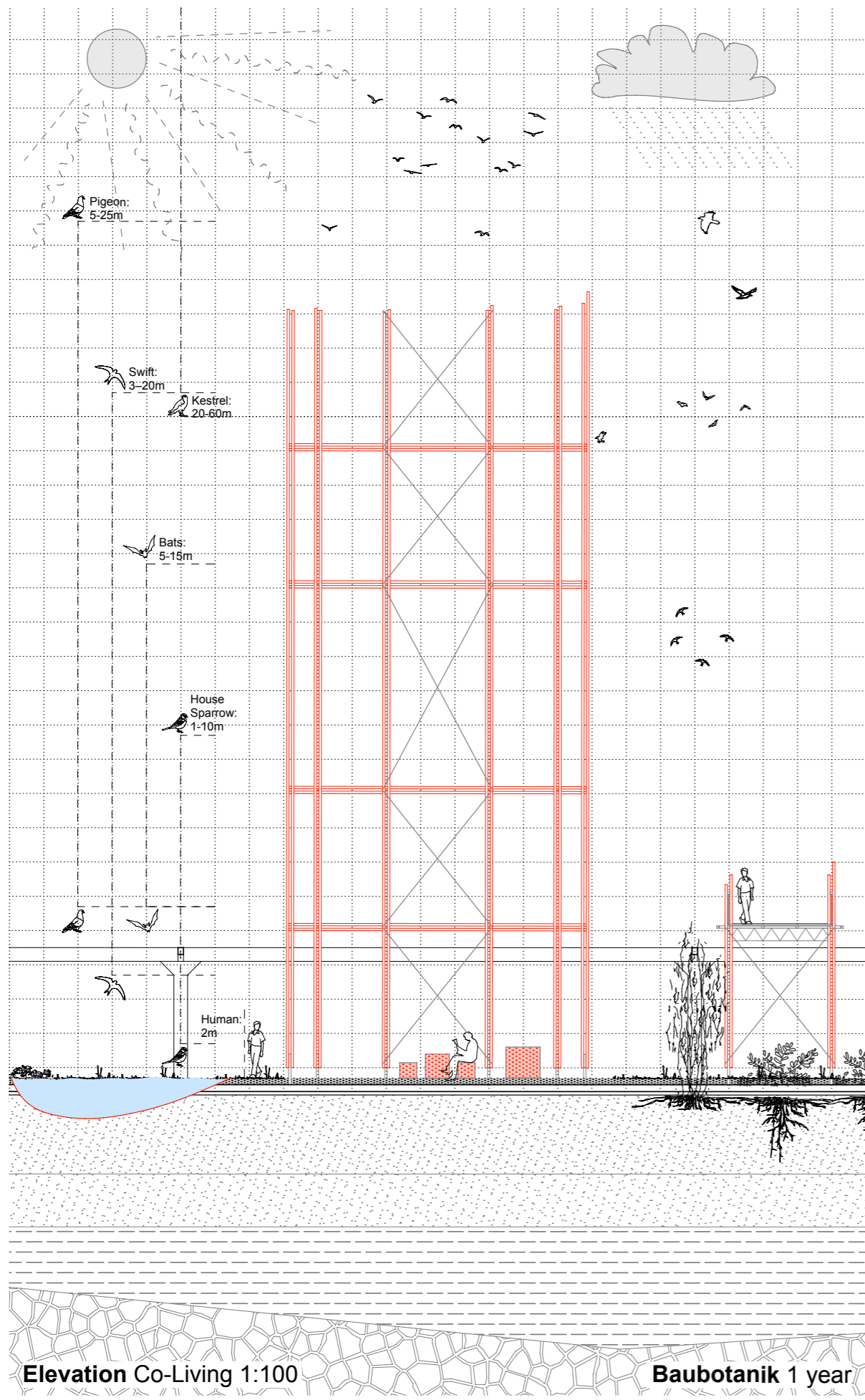
2028
5 years

2038
15 years

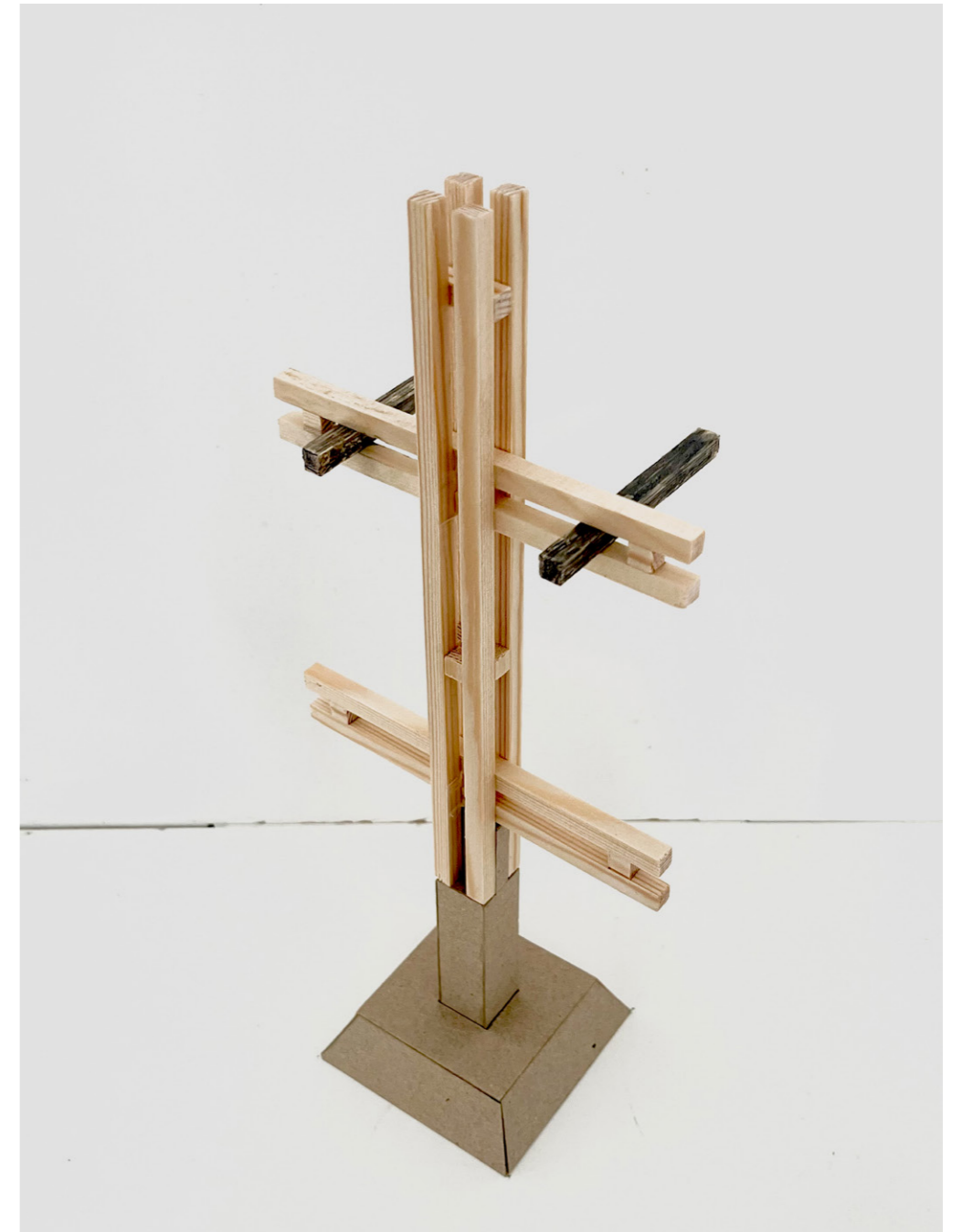
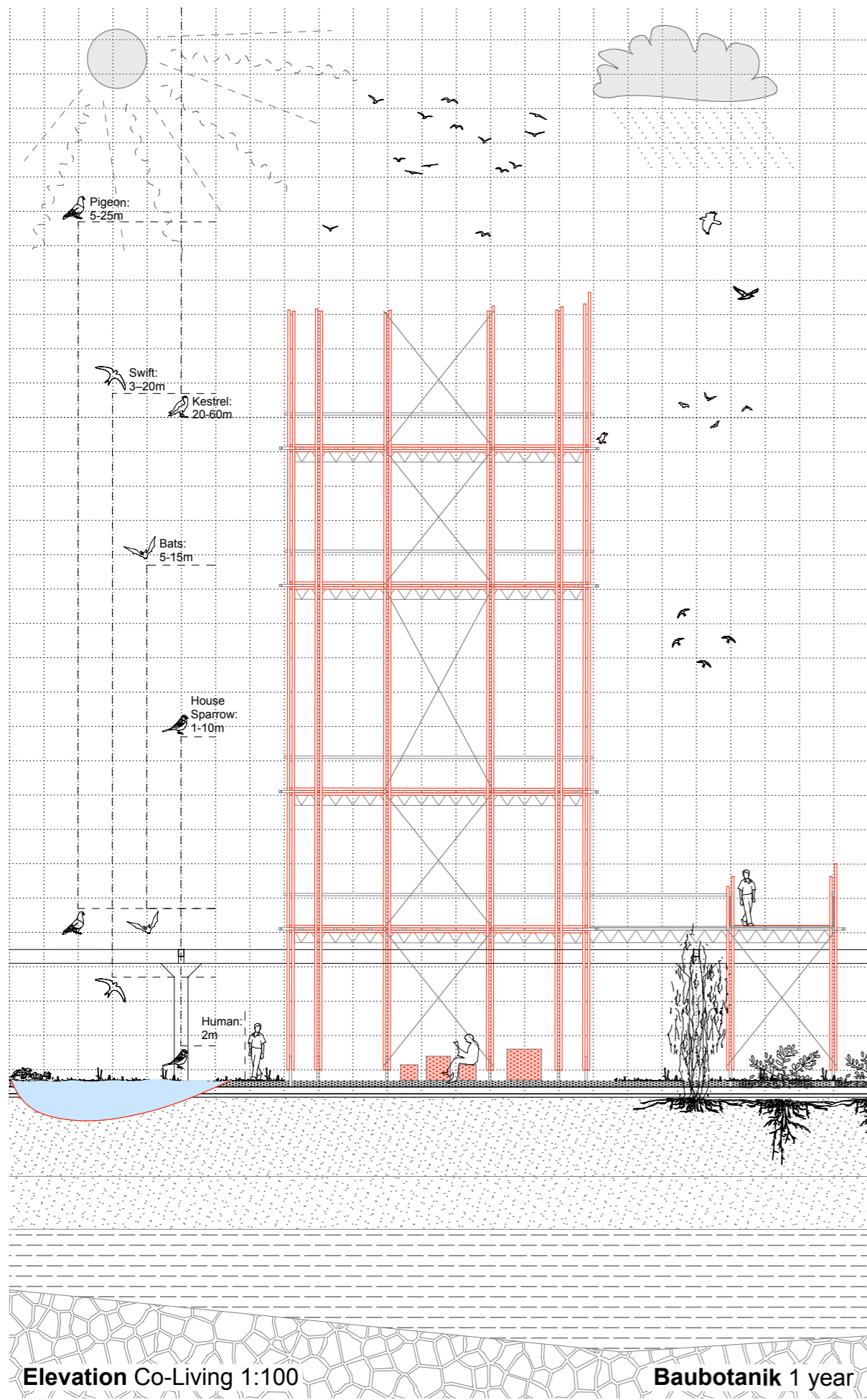
2048
25 years

2058
35 years

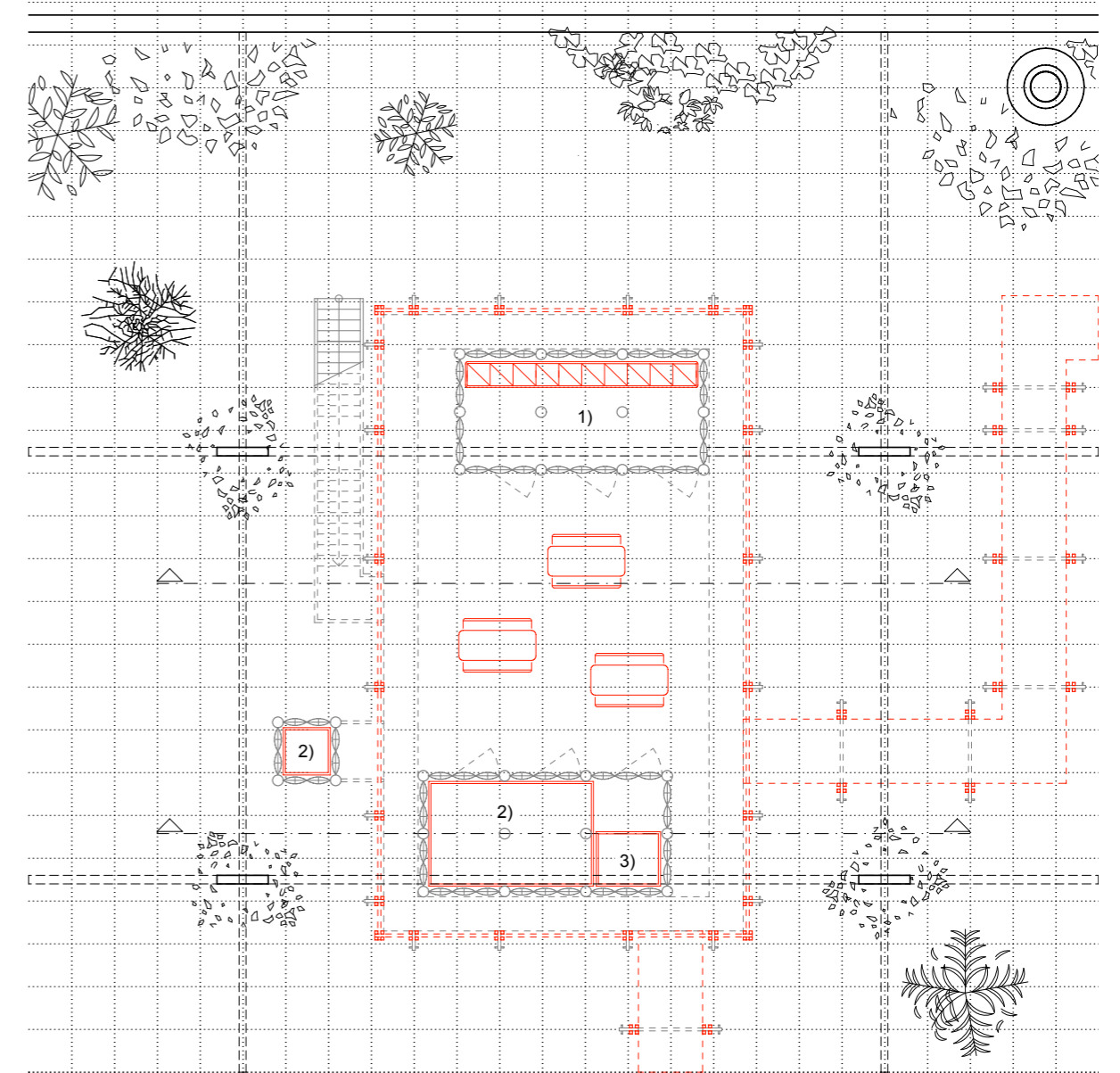
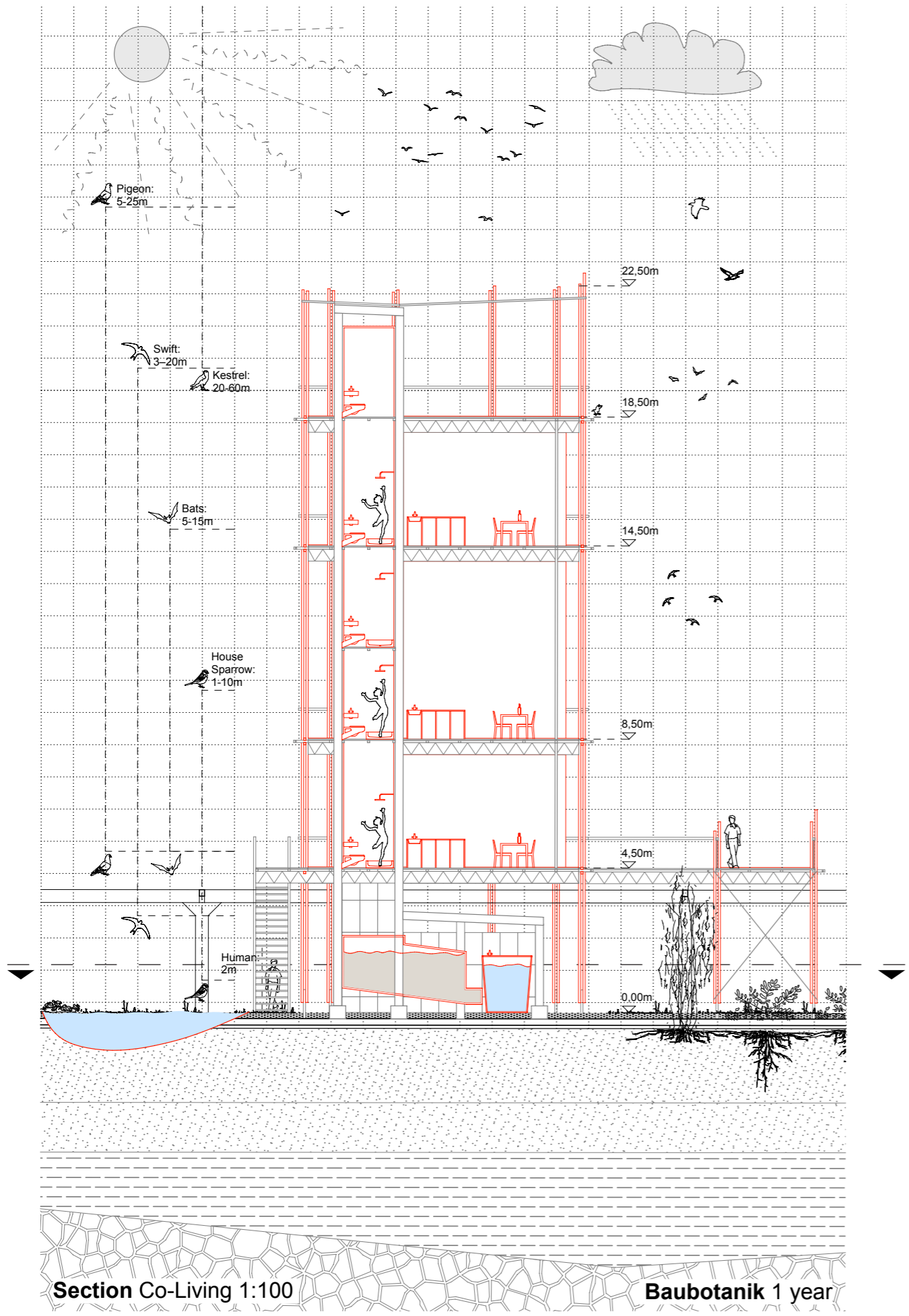
Growing Residency



Growing Residency



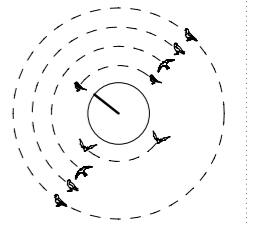
Growing Residency



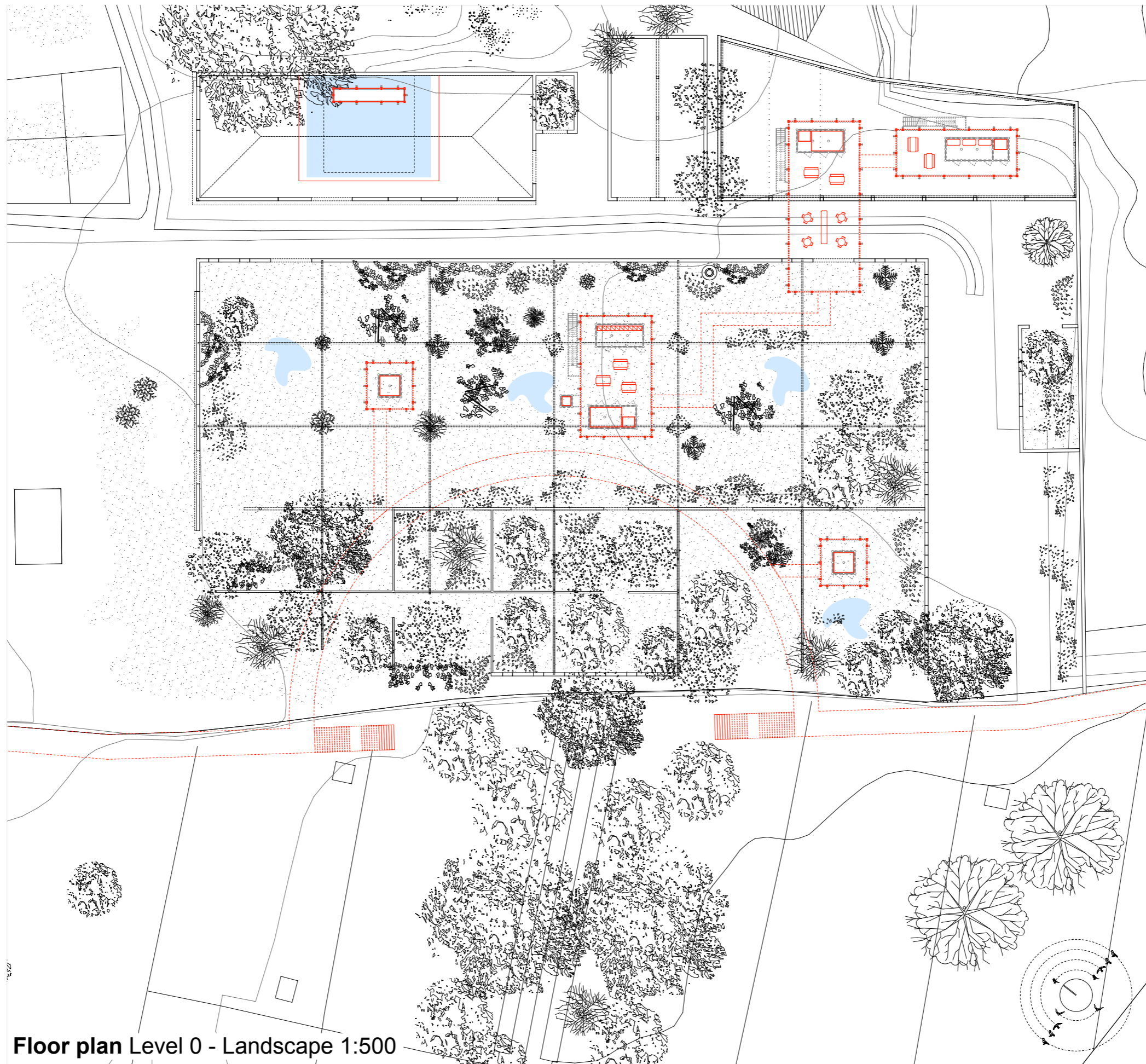
Floor plan Co-Living L.0 - Landscape 1:100

Baubotanik 2 years - Winter

- 1) Storage / compost processing
- 2) Compost tank / heating system
- 3) Water tank
- 4) Elevator

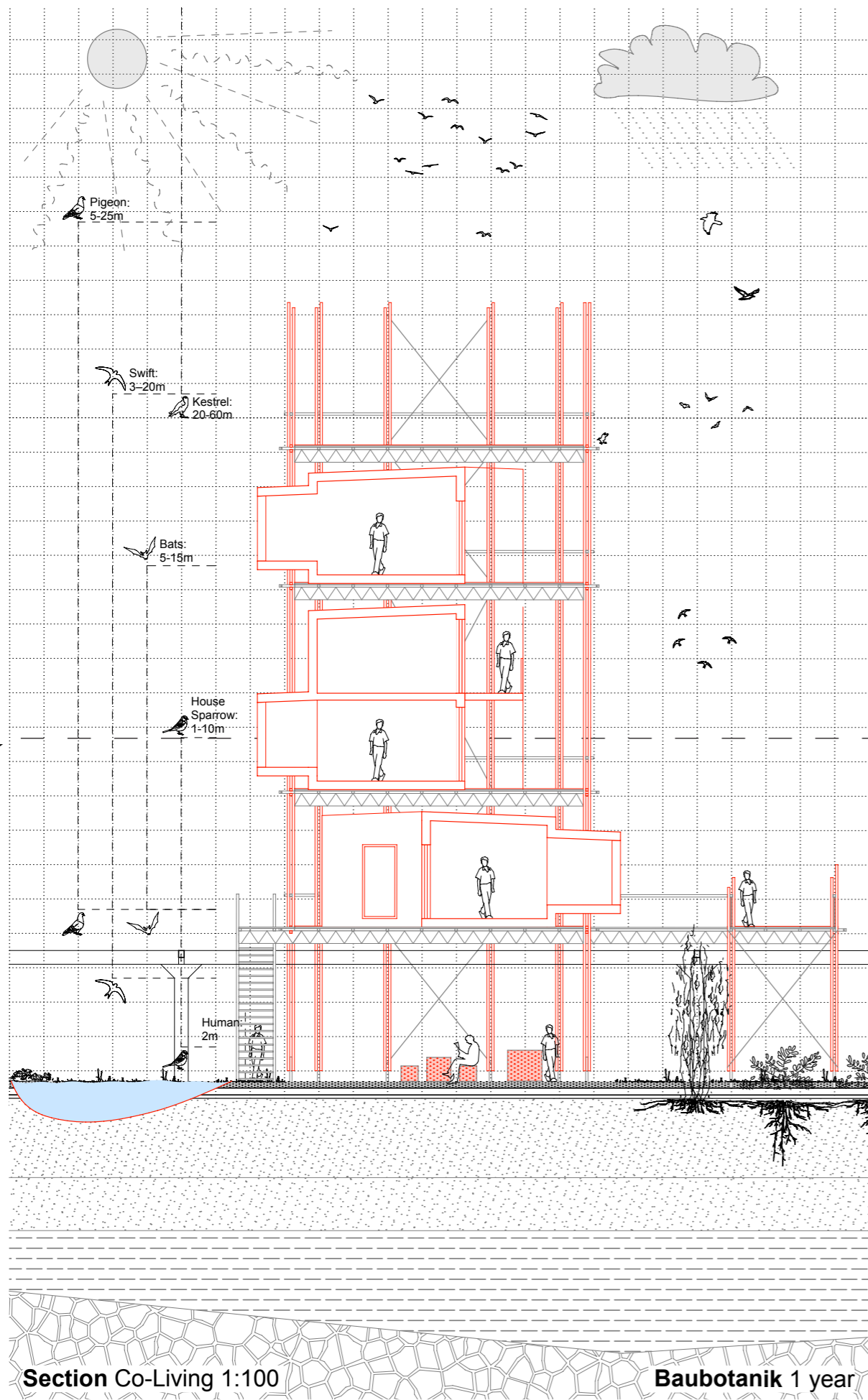






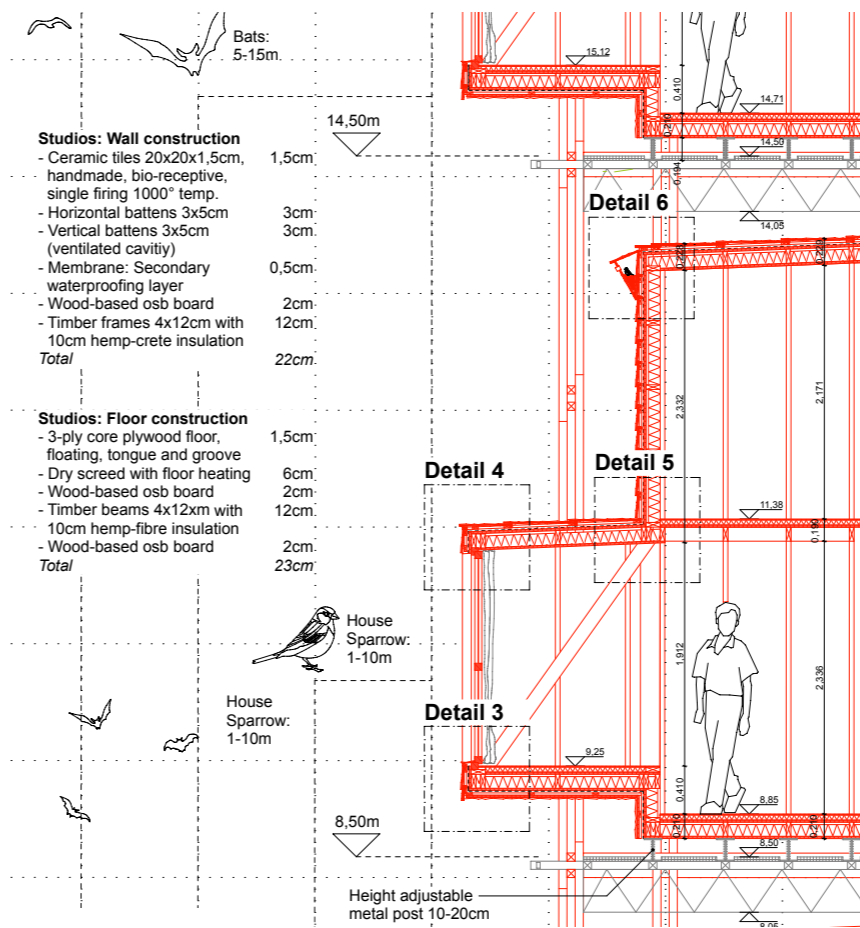
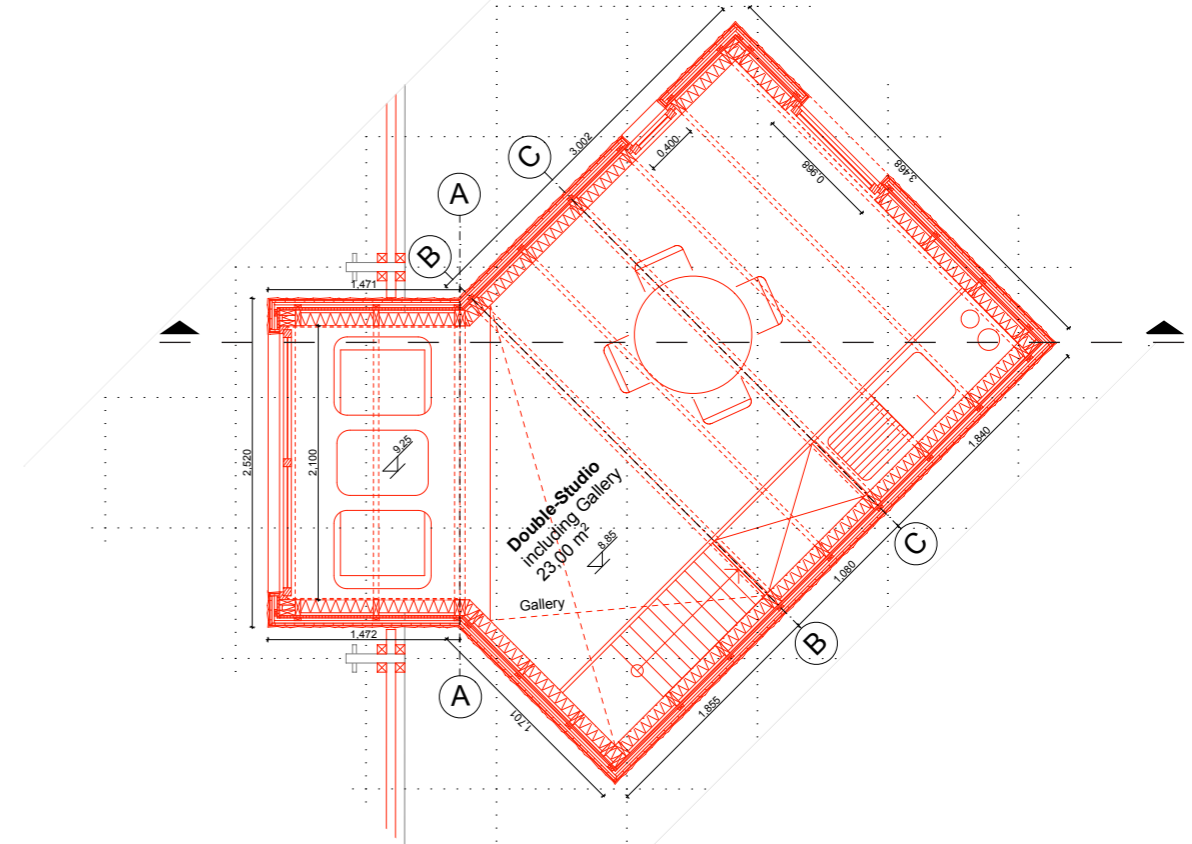
Floor plan Level 0 - Landscape 1:500

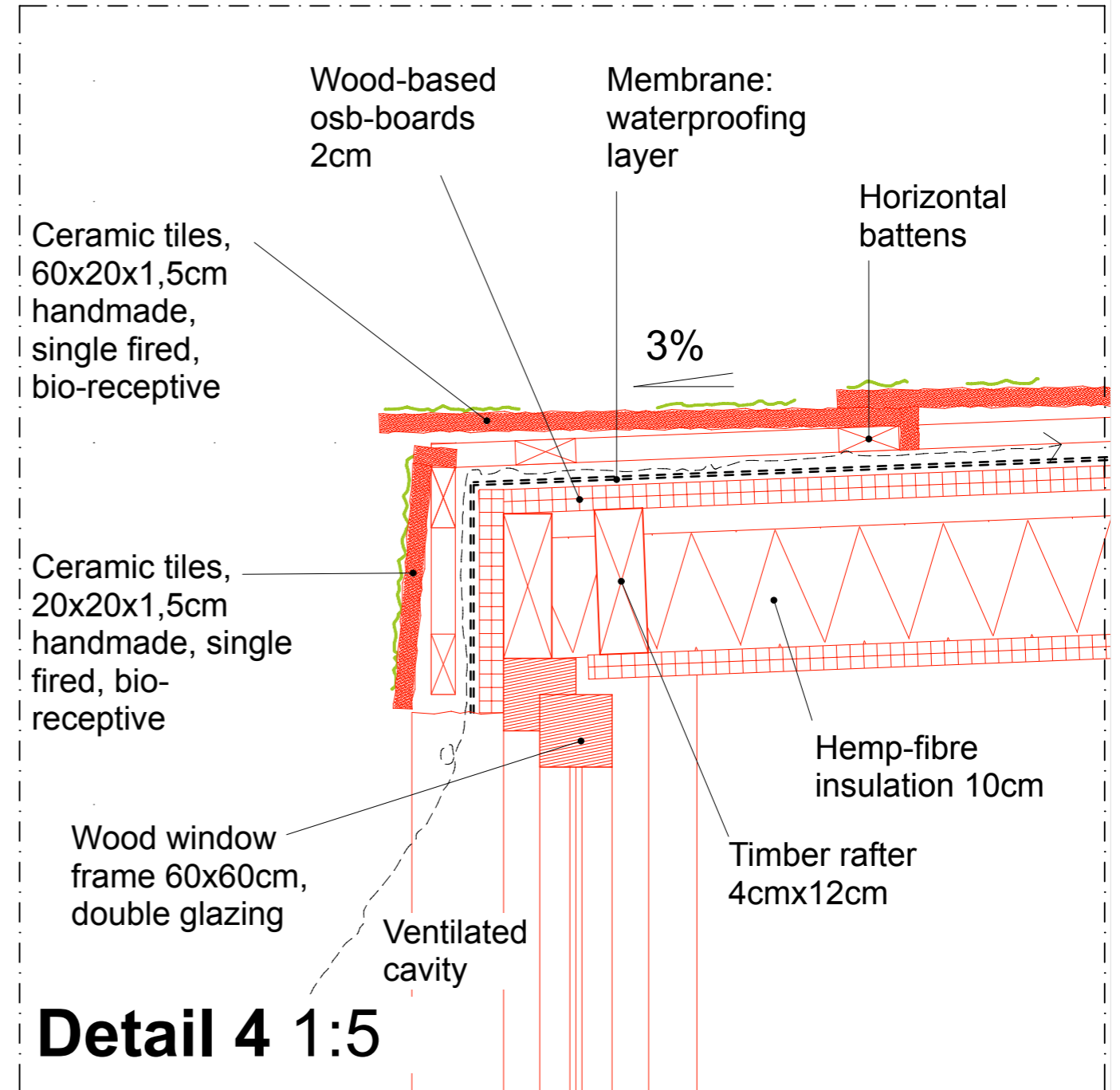
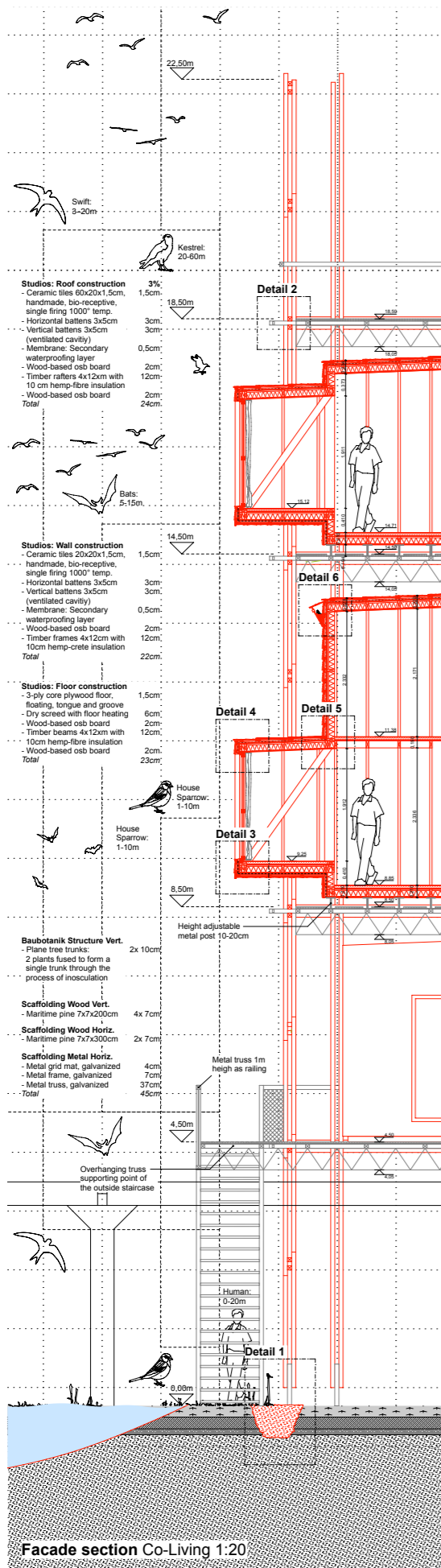
Growing Residency

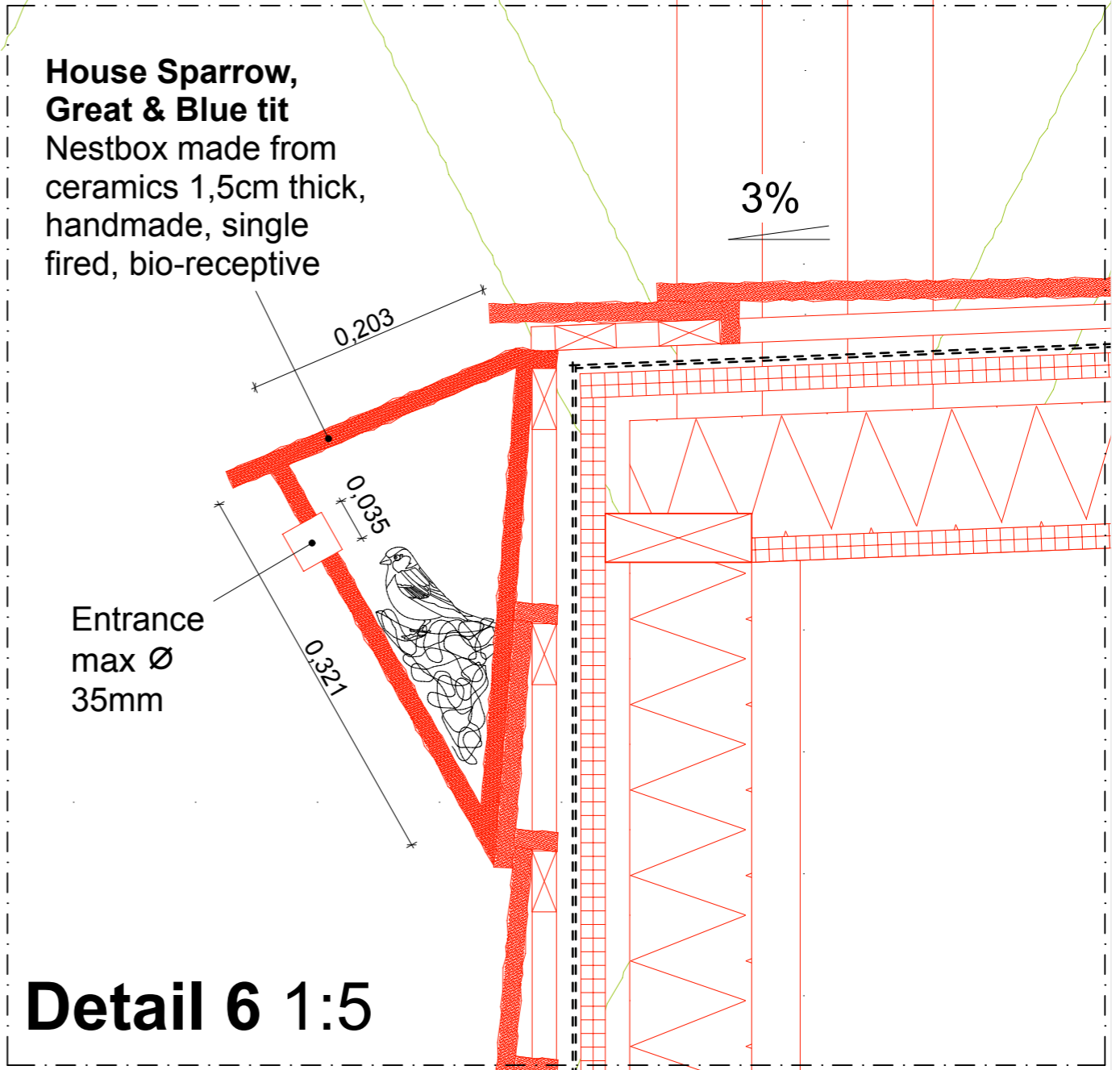
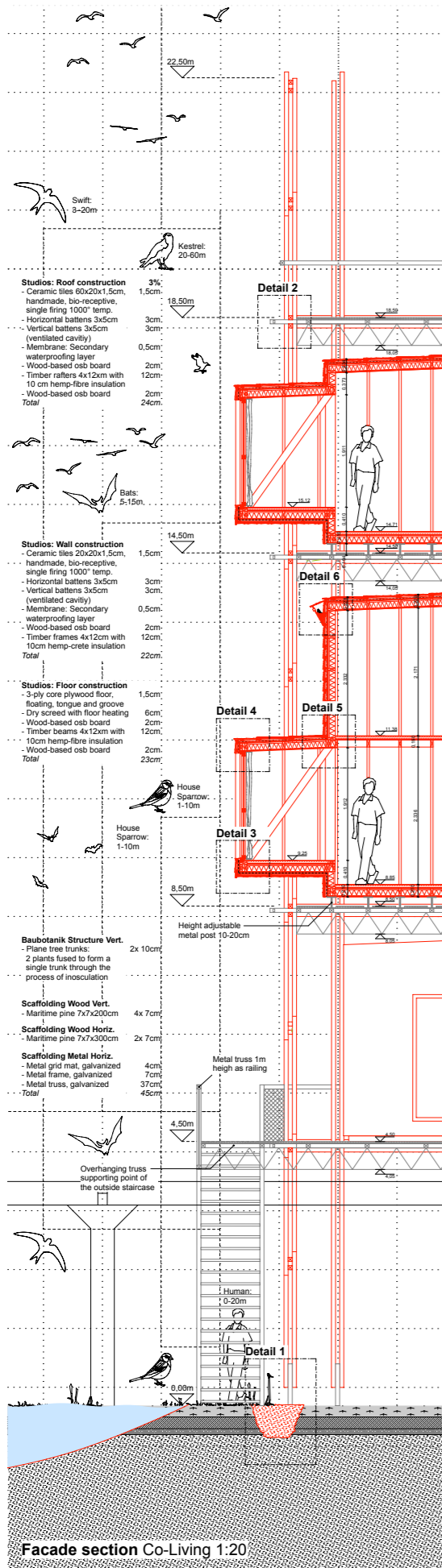


Section Co-Living 1:100

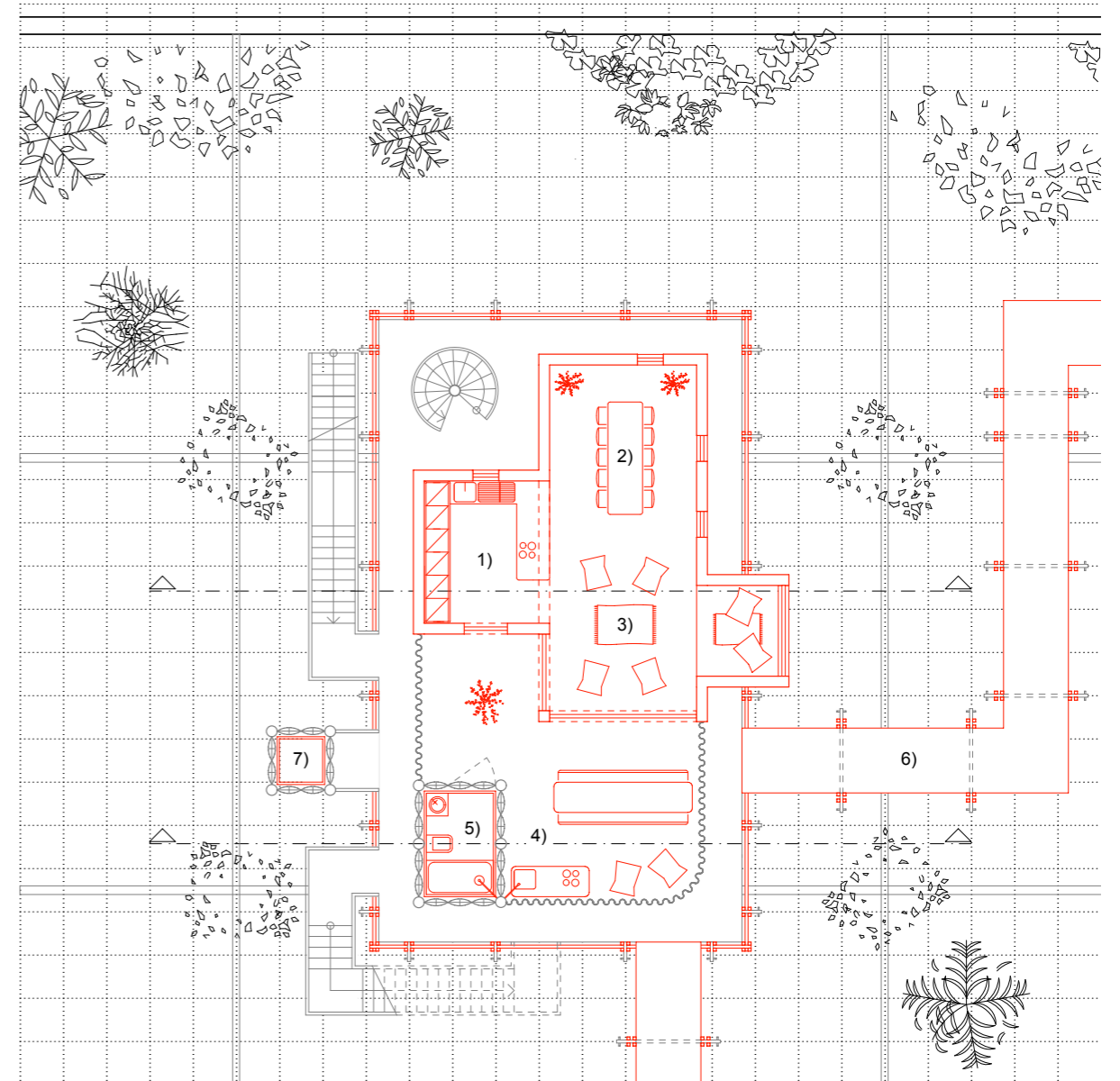
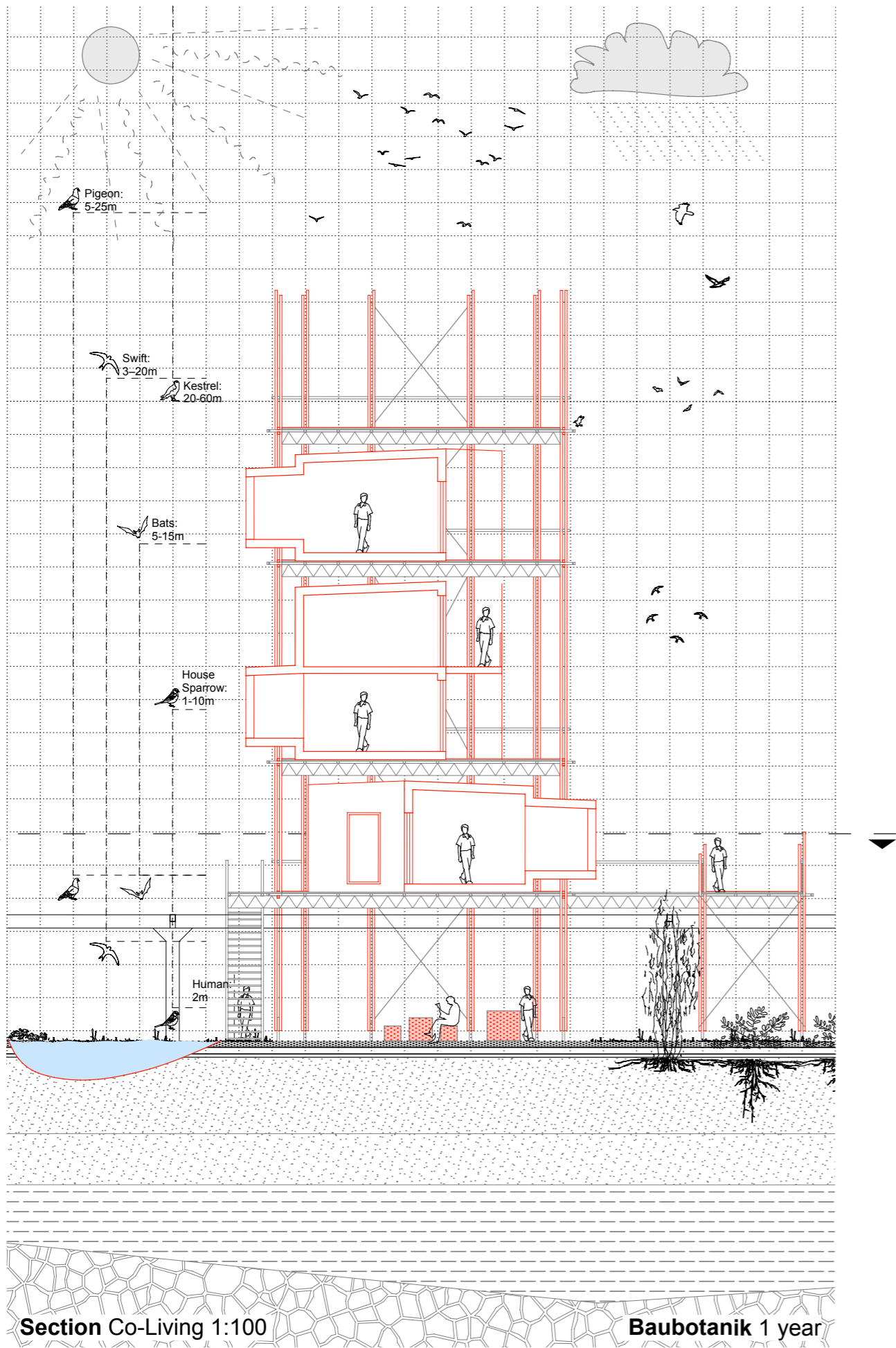
Baubotantik 1 year





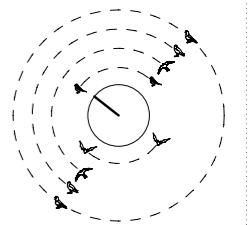


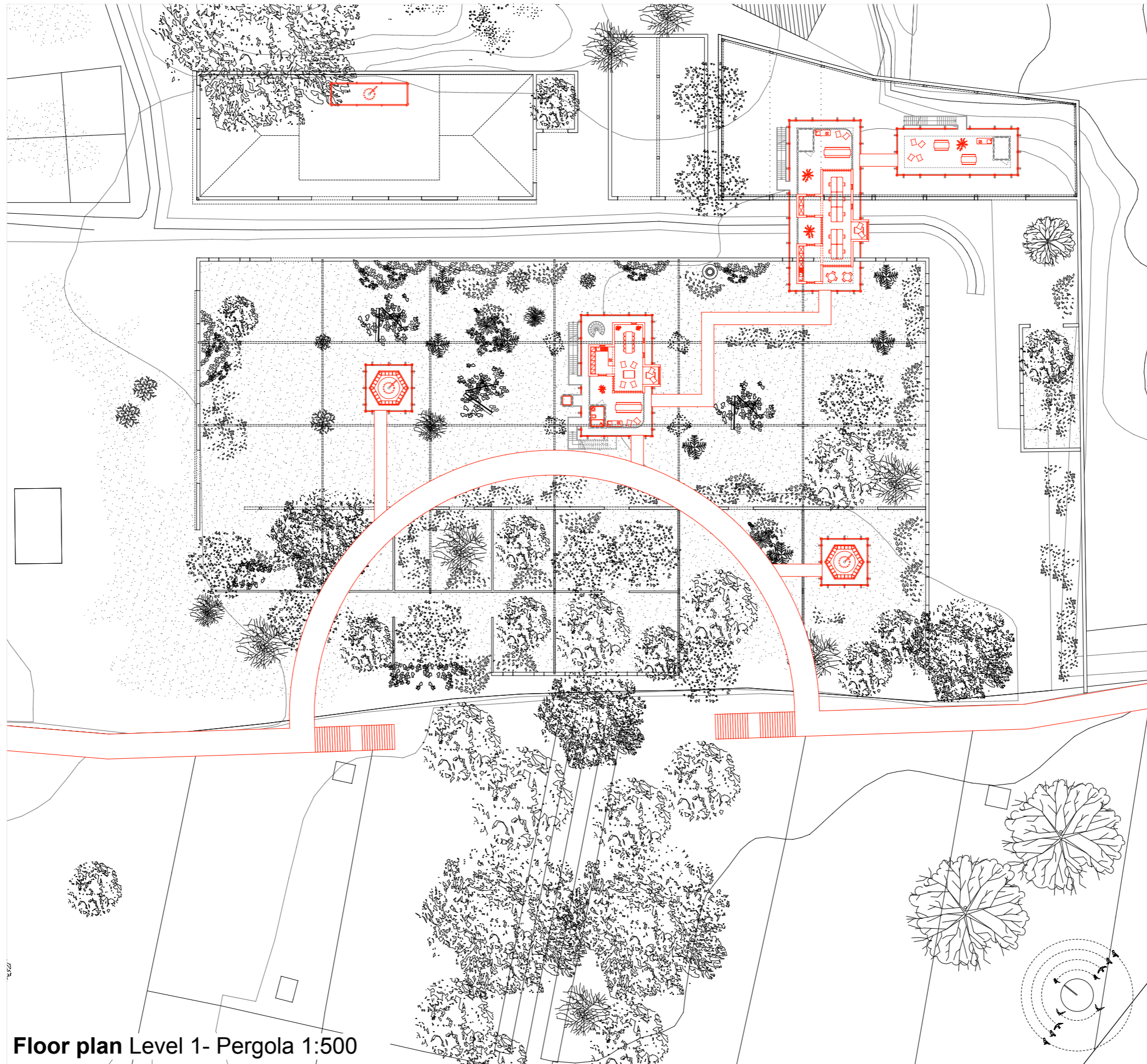
Growing Residency



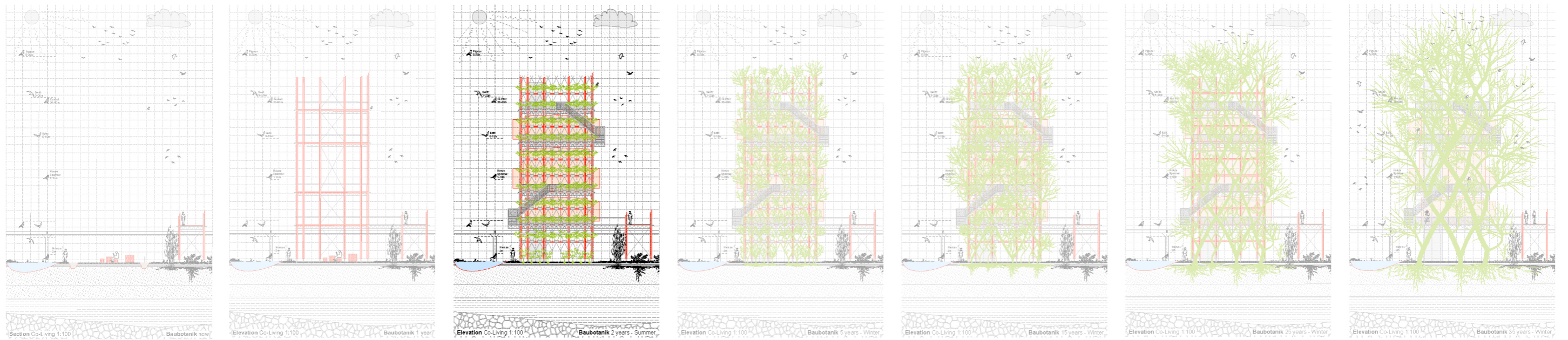
Floor plan Co-Living Level 1 - Pergola 1:100 Baubotanik 2 years - Winter

- 1) Communal kitchen
- 2) Communal eating
- 3) Communal living
- 4) 4-seasons outside kitchen
- 5) Bathroom
- 6) Pergola
- 7) Elevator





Floor plan Level 1- Pergola 1:500



time

2023
Now

2025
1 year

2025
2 years

2028
5 years

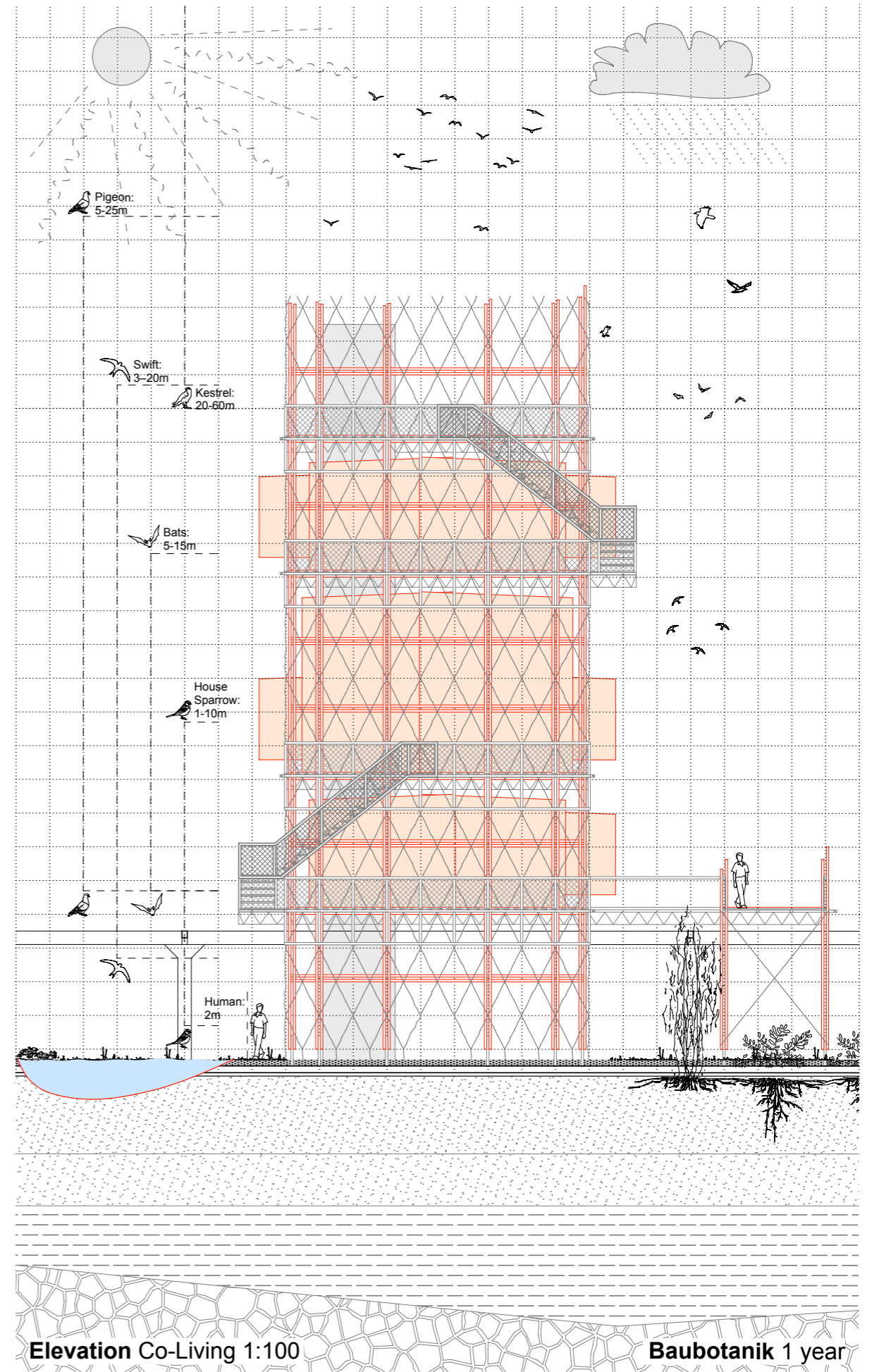
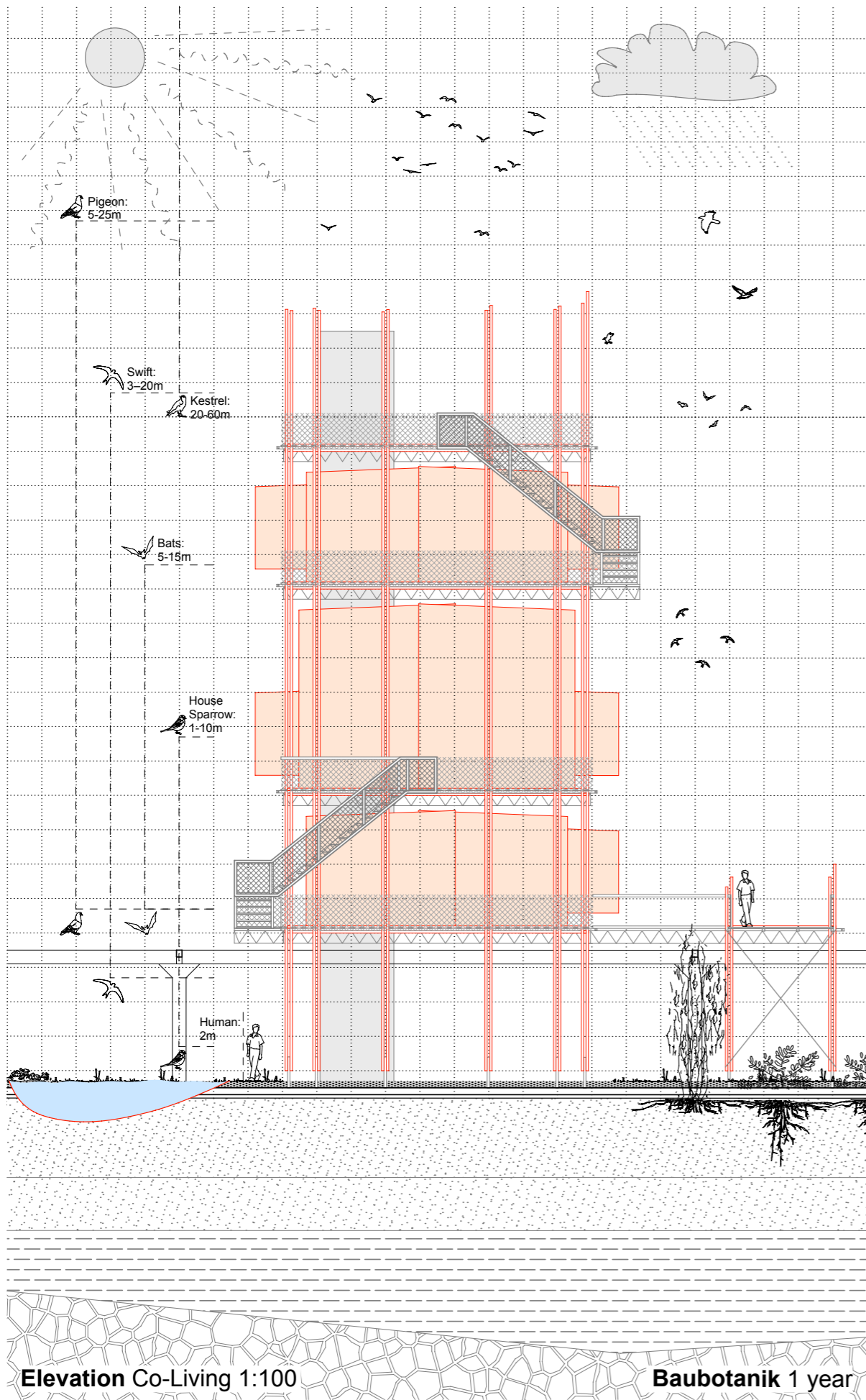
2038
15 years

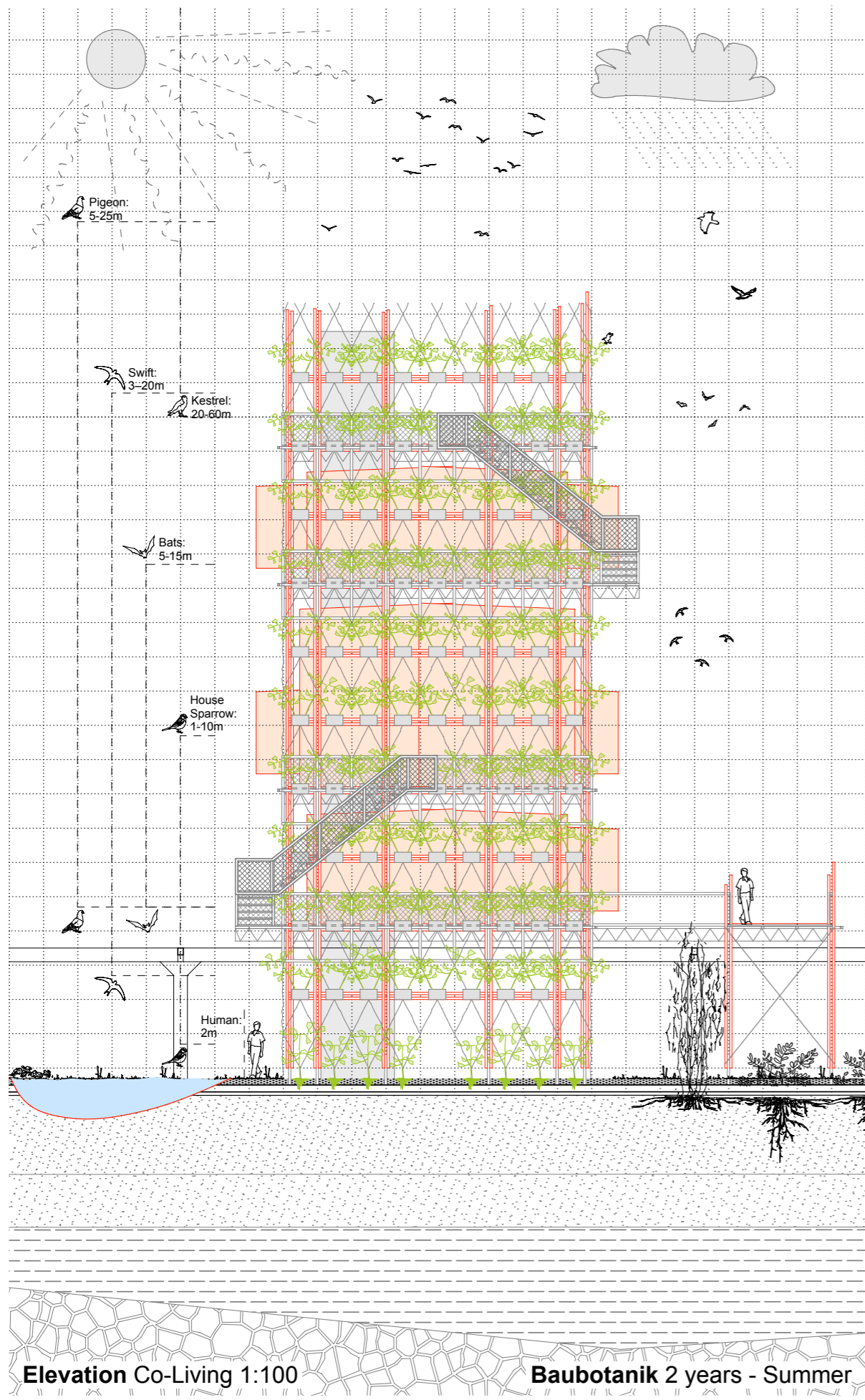
2048
25 years

2058
35 years

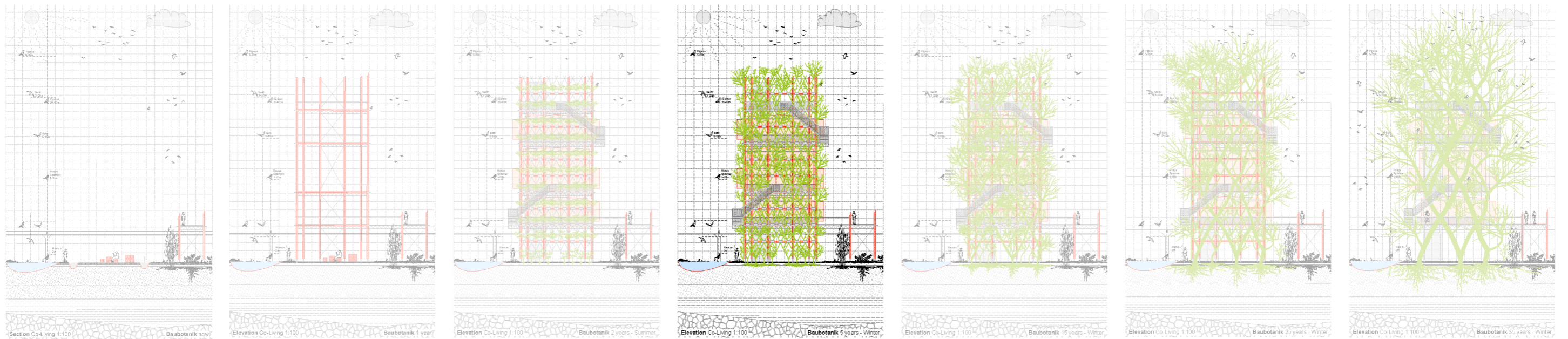


Growing Residency





Source: Ludwig, F. & Schönle, D. Growing Architecture - How to Design and Build with trees, Basel: Birkhauser, 2023.



time

2023
Now

2024
1 year

2025
2 years

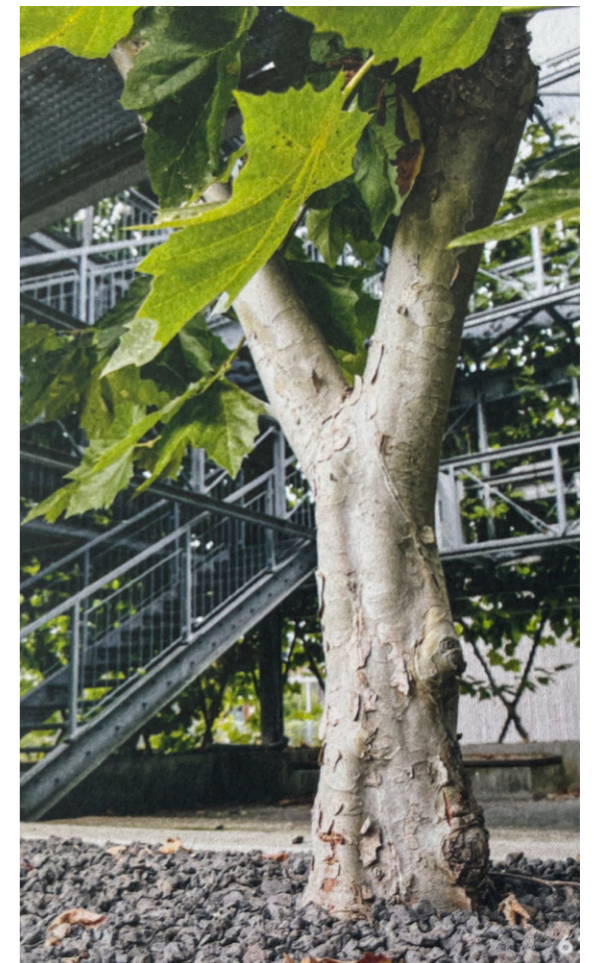
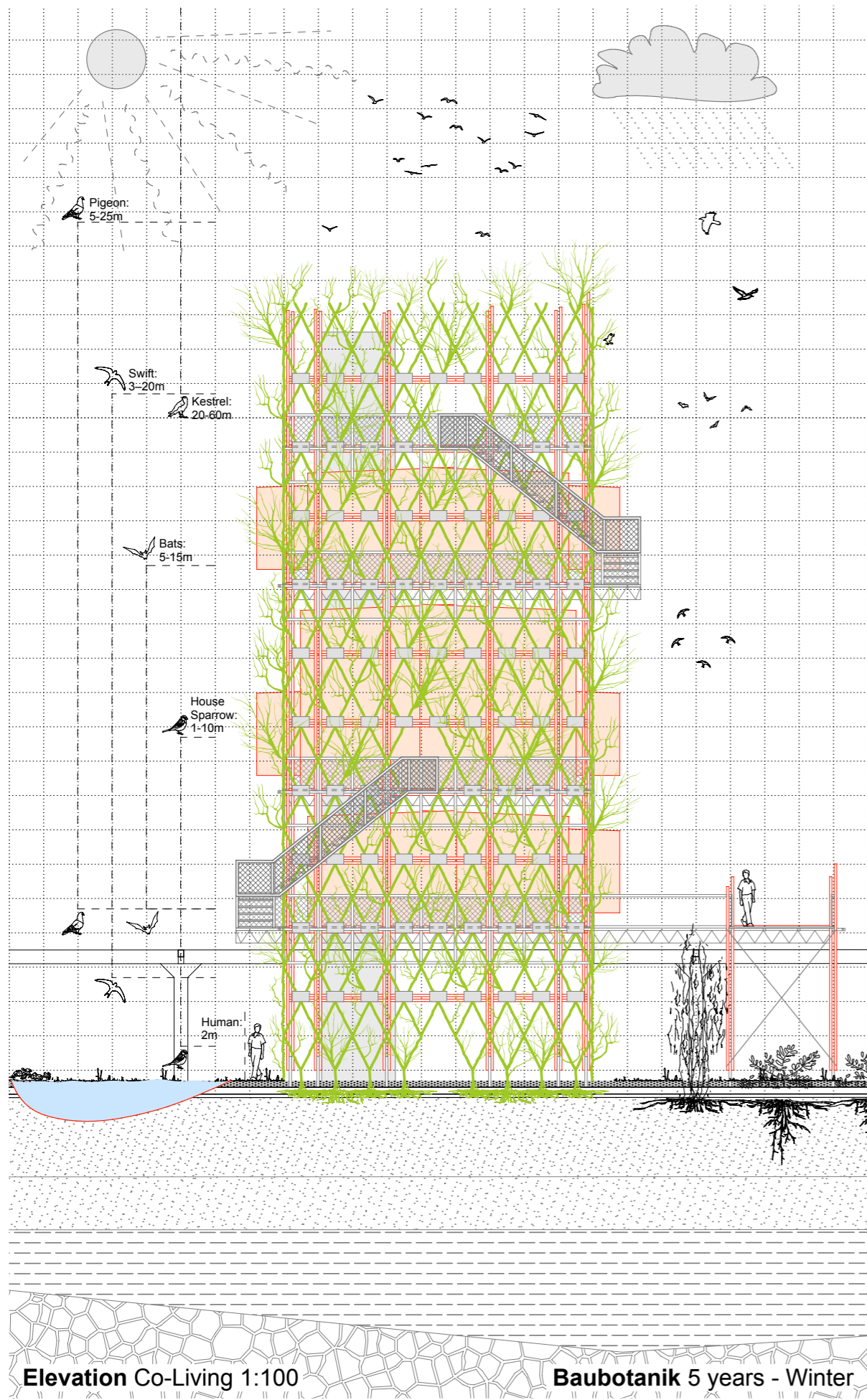
2028
5 years

2038
15 years

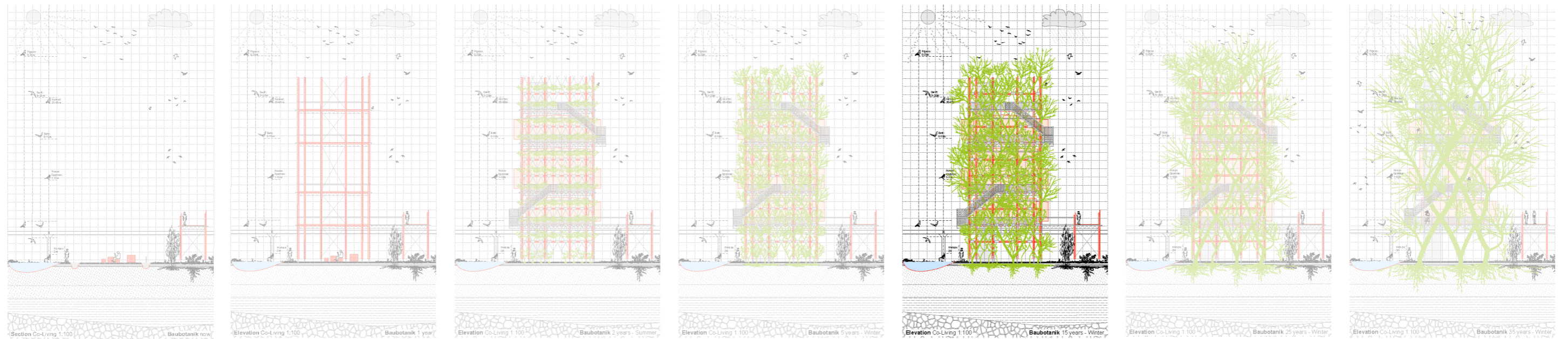
2048
25 years

2058
35 years





Source: Ludwig, F. & Schönle, D. Growing Architecture - How to Design and Build with trees, Basel: Birkhauser, 2023.



time

2023
Now

2024
1 year

2025
2 years

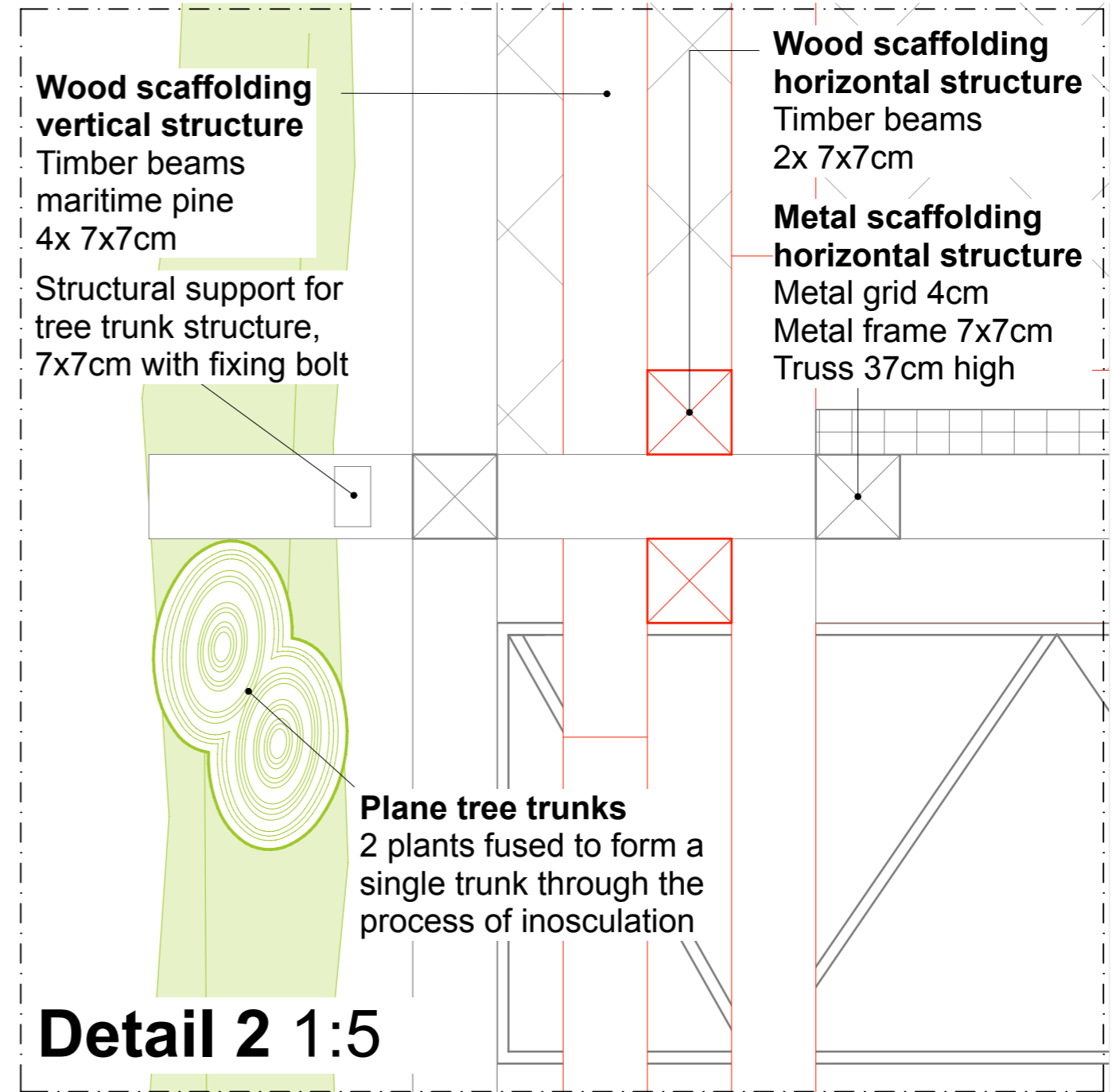
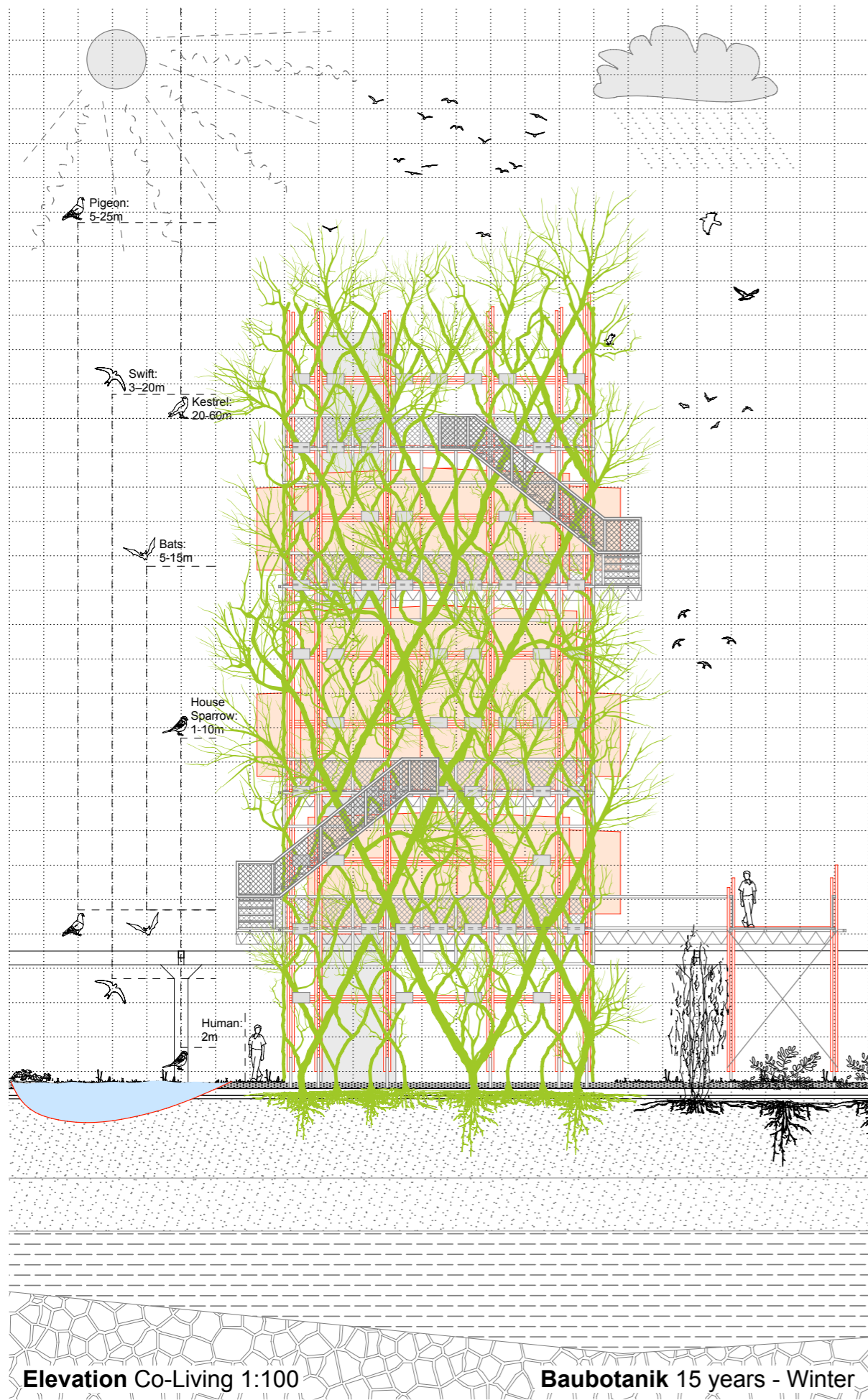
2028
5 years

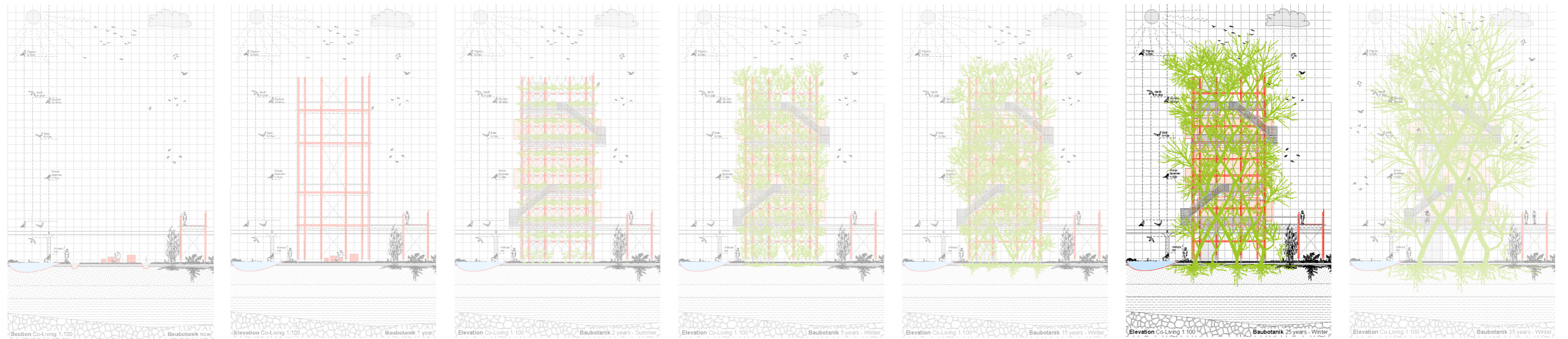
2038
15 years

2048
25 years

2058
35 years







time

2023
Now

2024
1 year

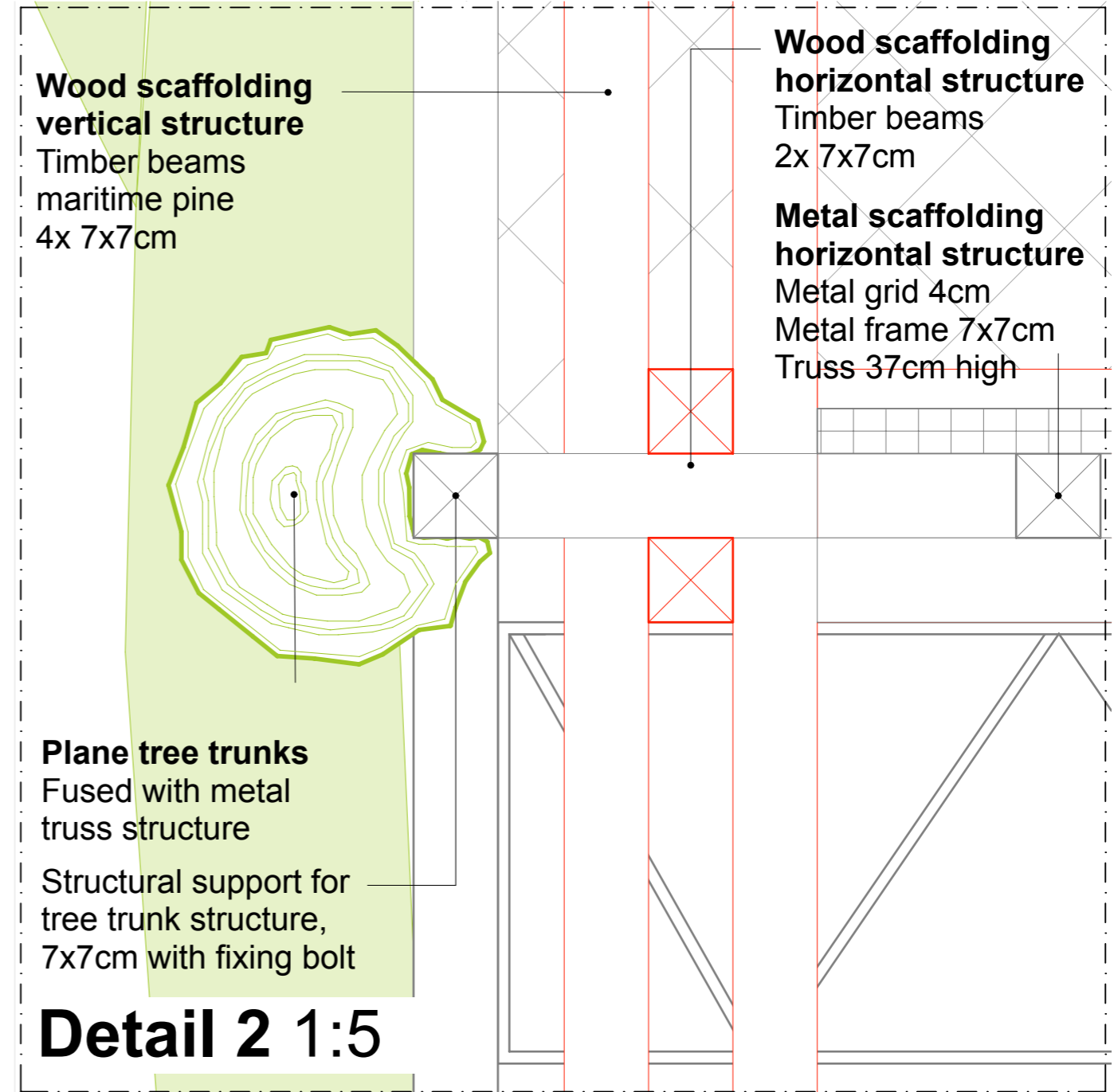
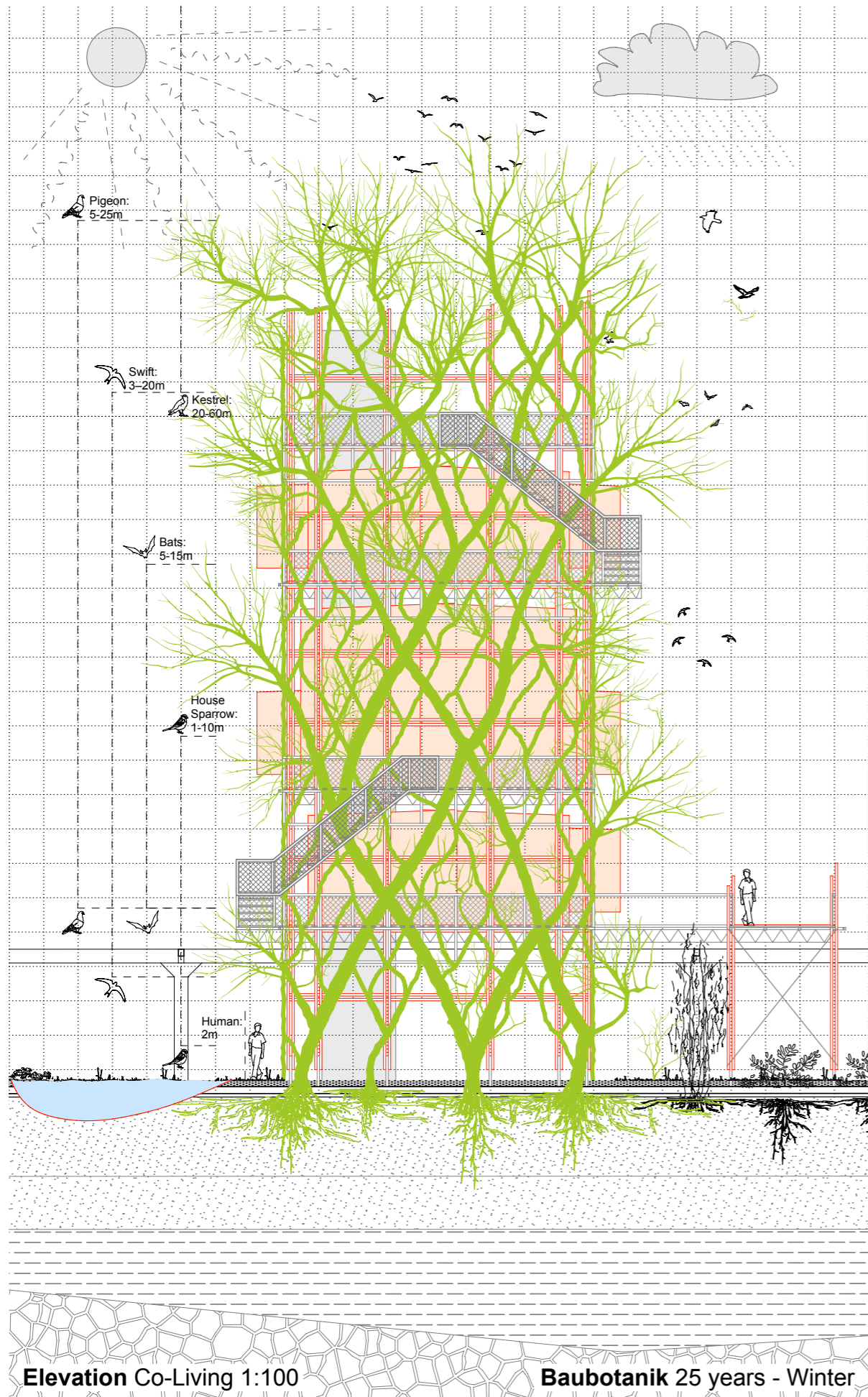
2025
2 years

2028
5 years

2038
15 years

2048
25 years

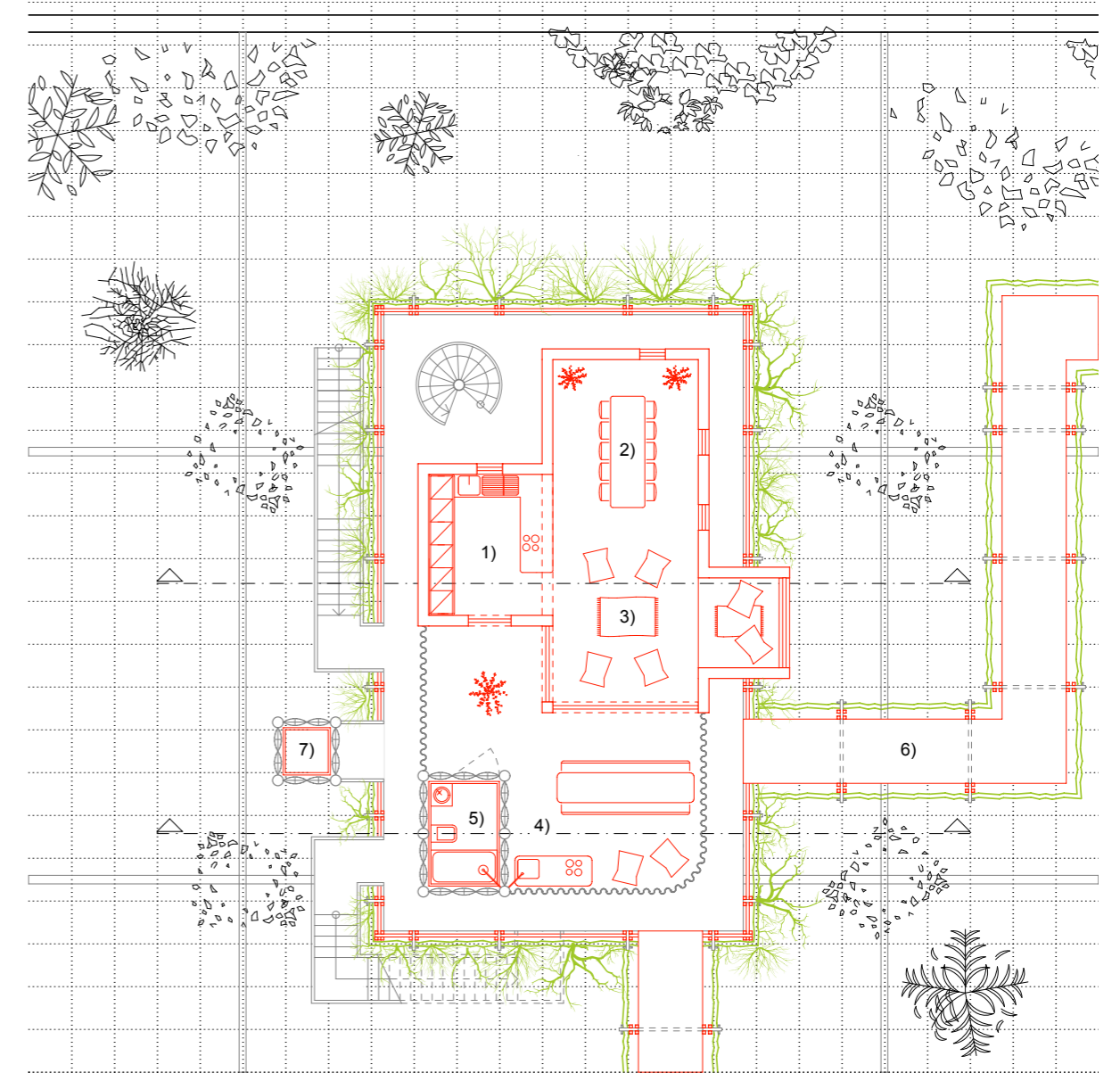
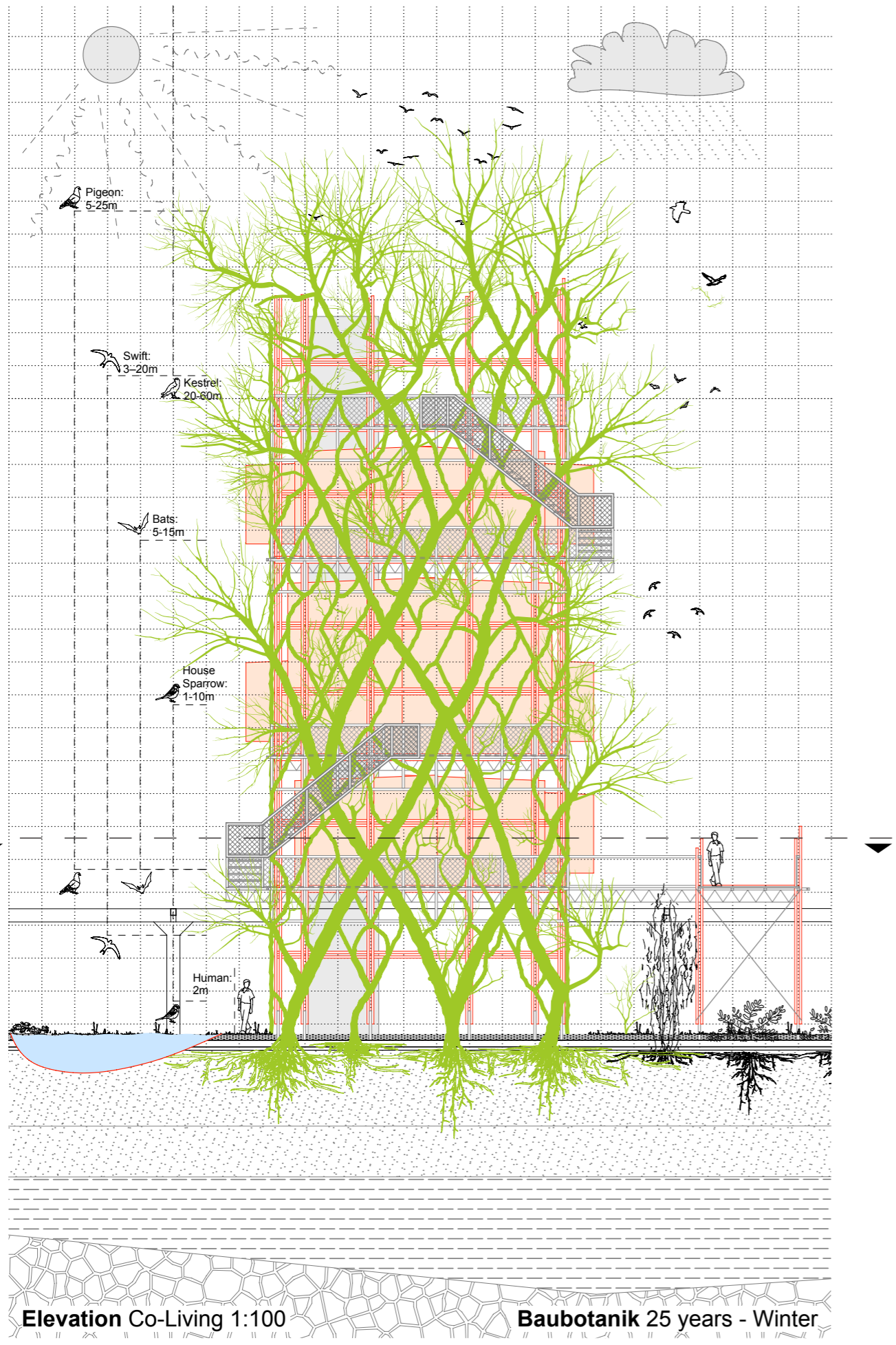
2058
35 years



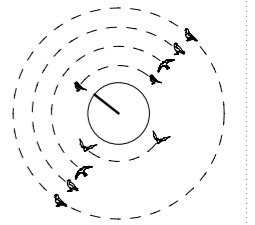
Elevation Co-Living 1:100

Baubotantik 25 years - Winter





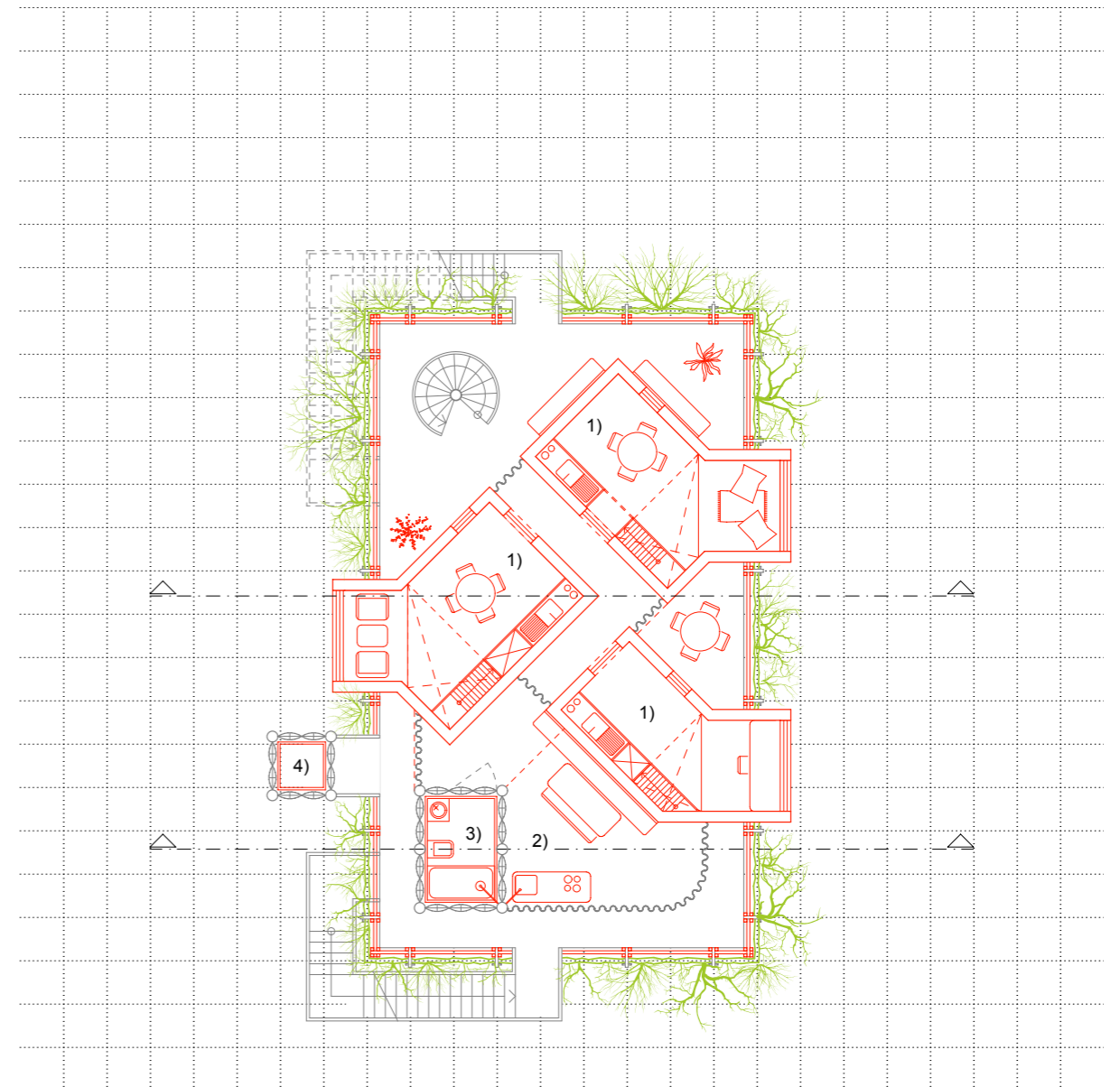
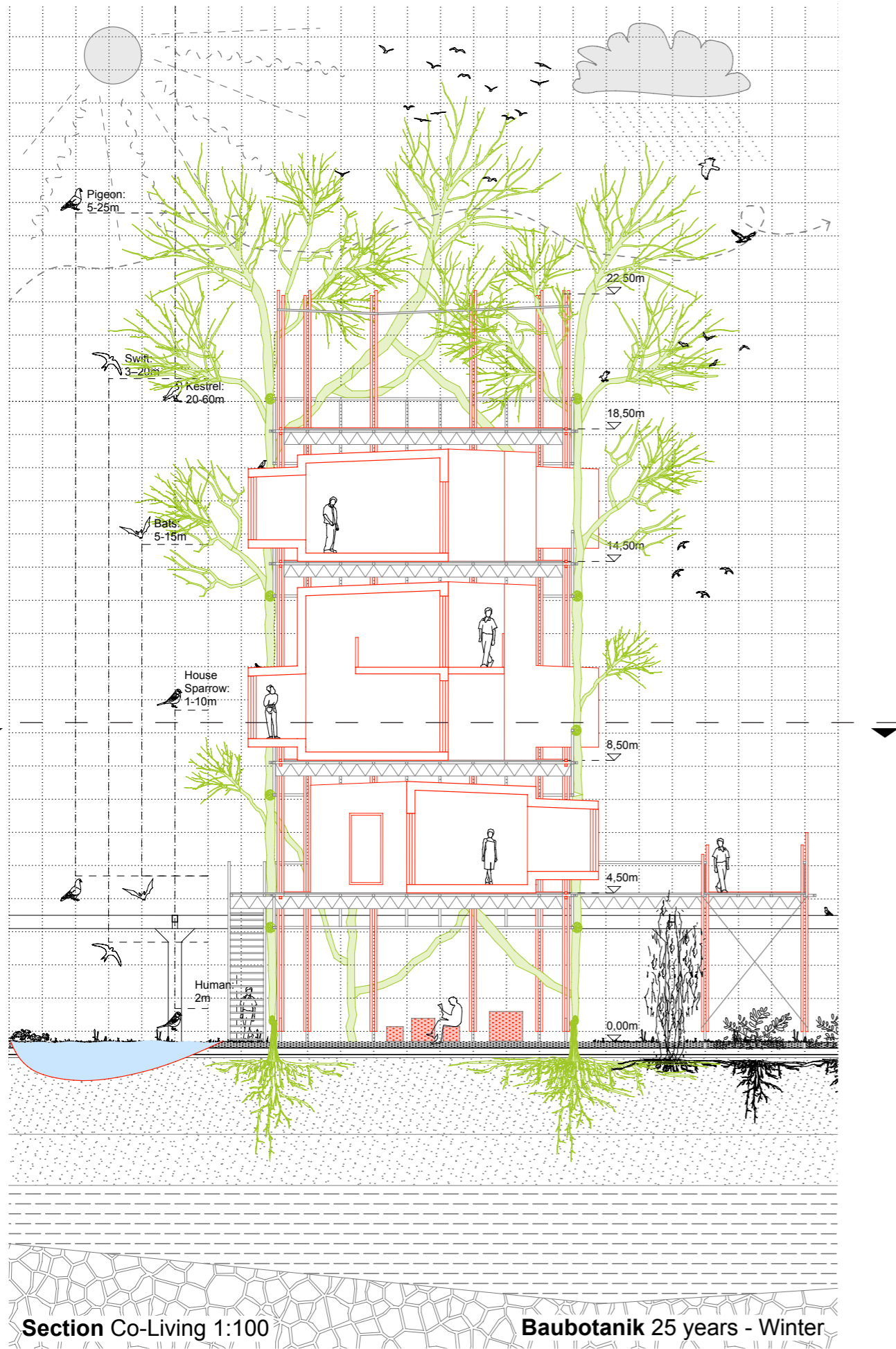
- 1) Communal kitchen
- 2) Communal eating
- 3) Communal living
- 4) 4-seasons outside kitchen
- 5) Bathroom
- 6) Pergola
- 7) Elevator





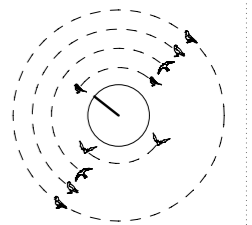


Growing Residency



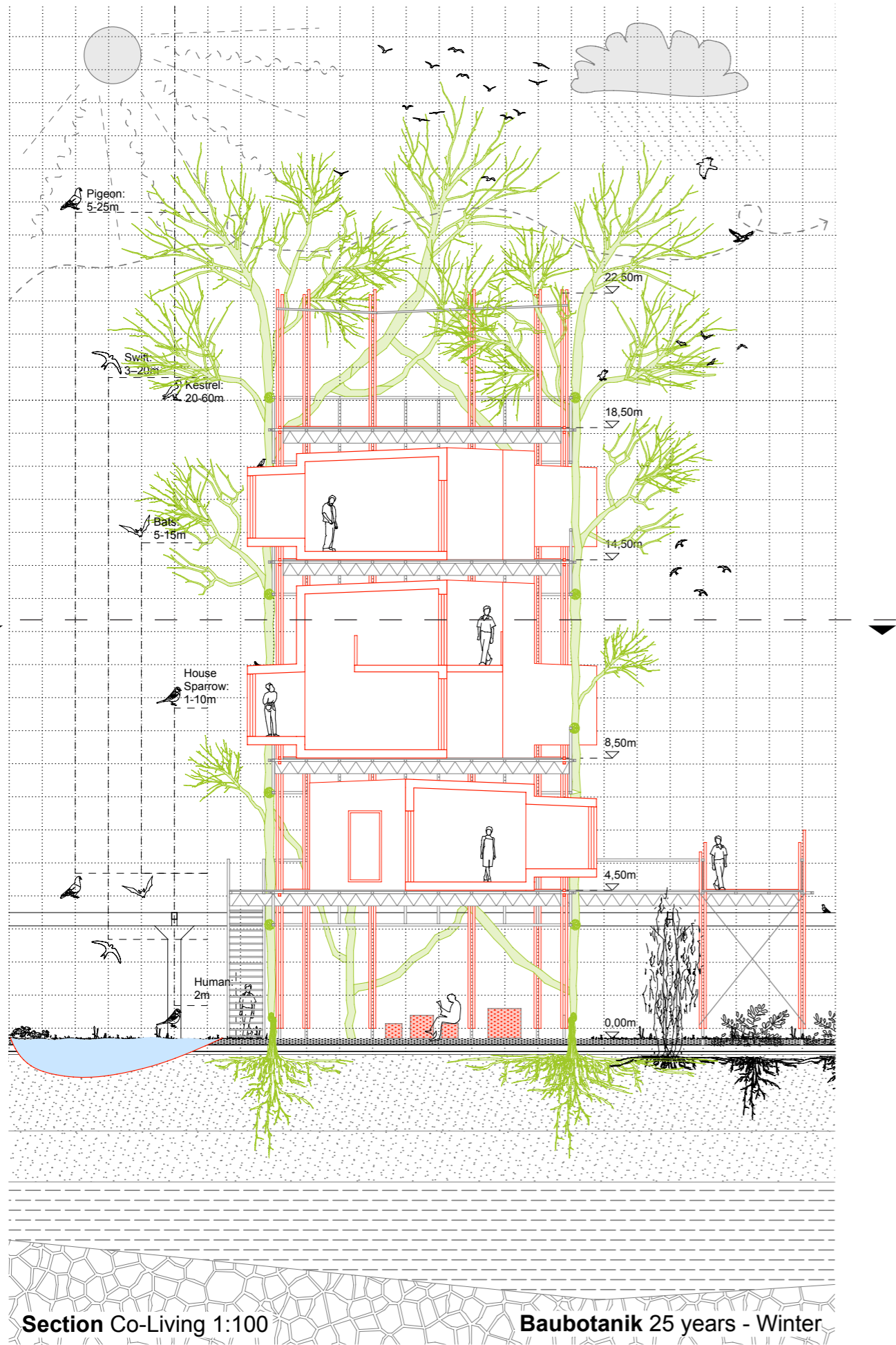
Floor plan Co-Living Level 2 - Studios 1:100 Baubotanik 25 years - Winter

- 1) Studios
- 2) 4-Seasons outside kitchen
- 3) Bathroom
- 4) Elevator



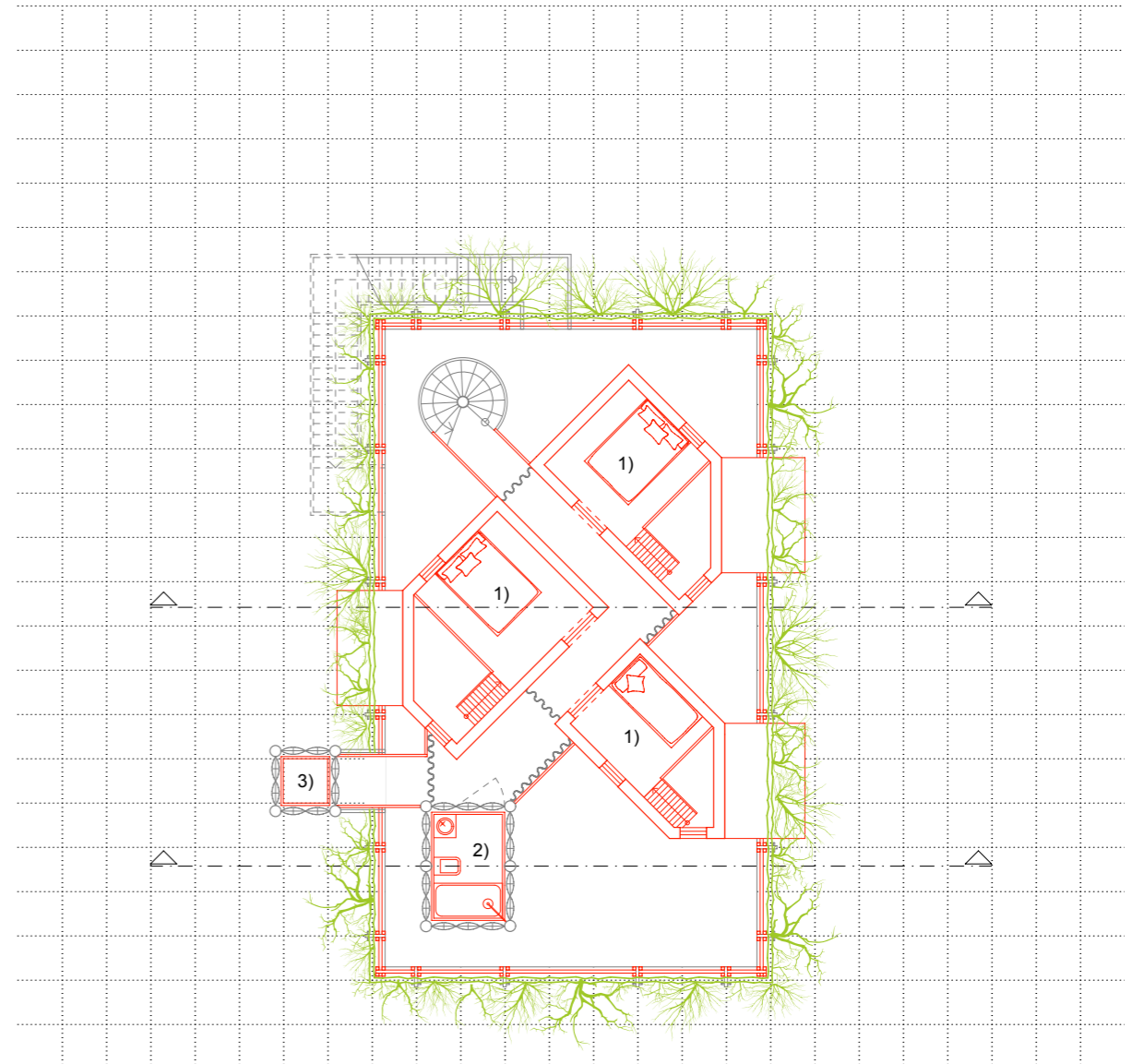


Growing Residency



Section Co-Living 1:100

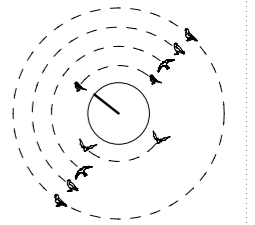
Baubotanik 25 years - Winter



Floor plan Co-Living Level 2 - Gallery 1:100

Baubotanik 25 years - Winter

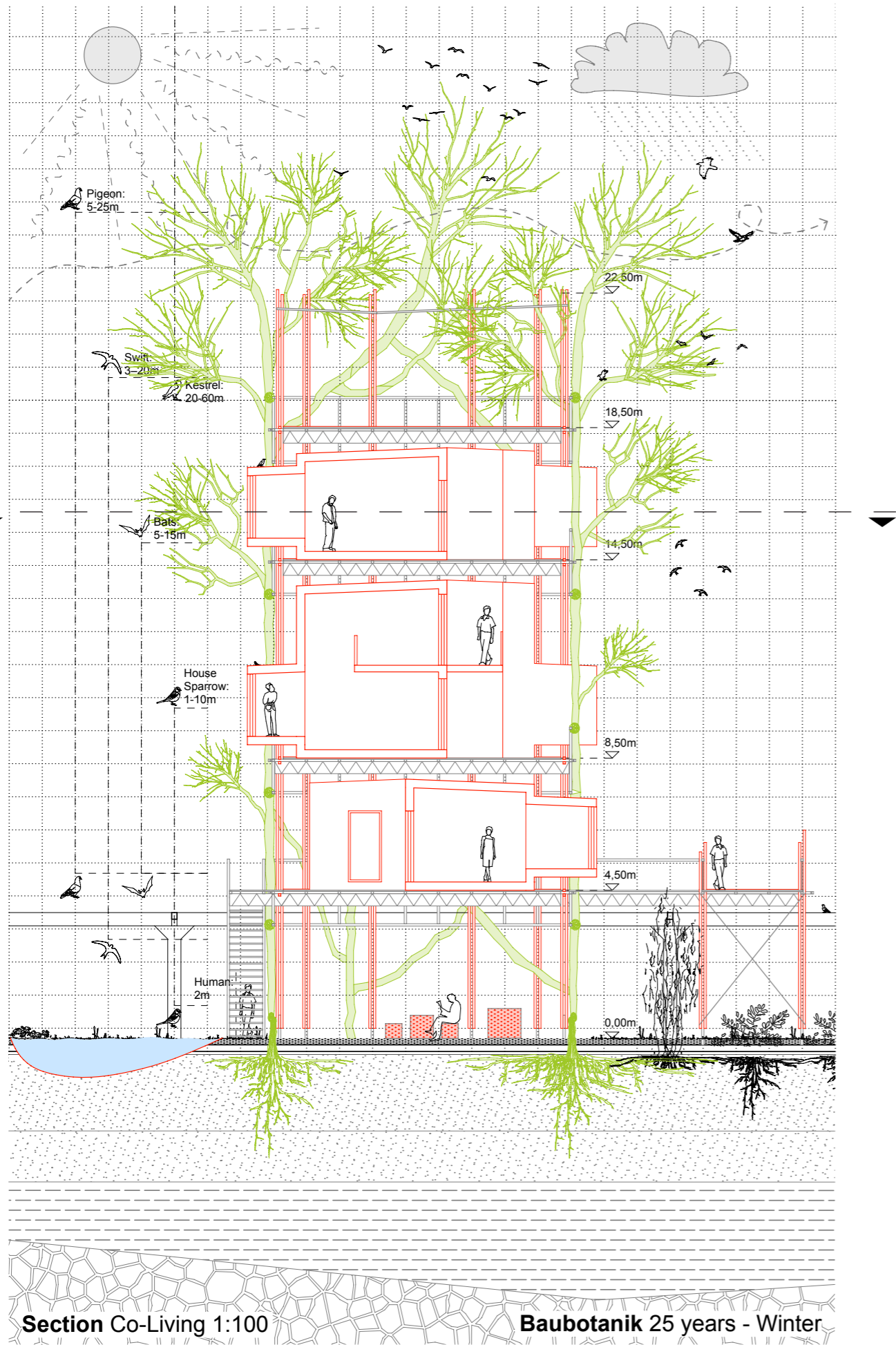
- 1) Studios - Sleeping galleries
- 2) Bathroom
- 3) Elevator





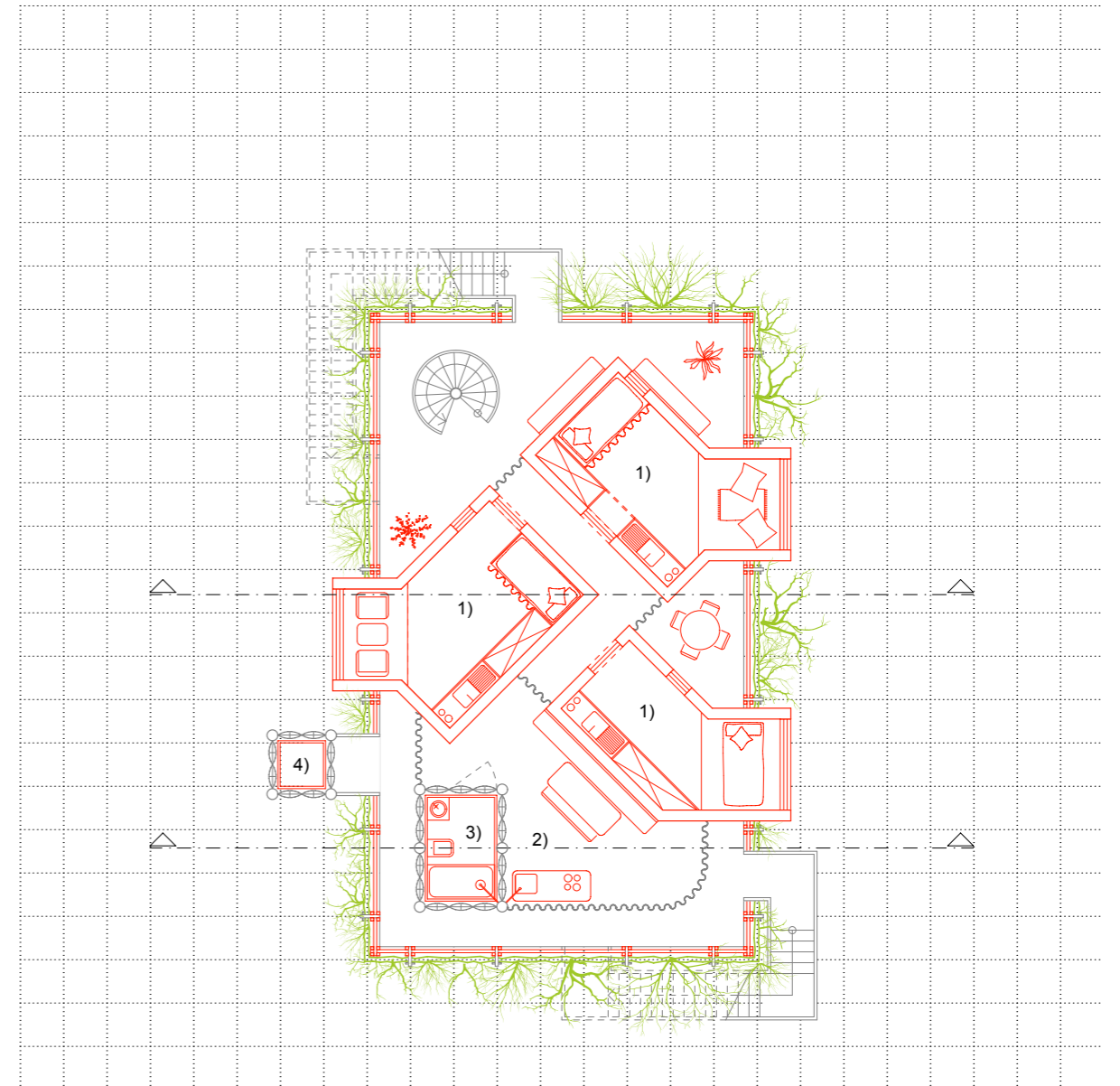


Growing Residency



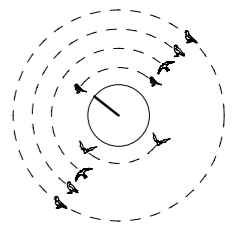
Section Co-Living 1:100

Baubotanik 25 years - Winter



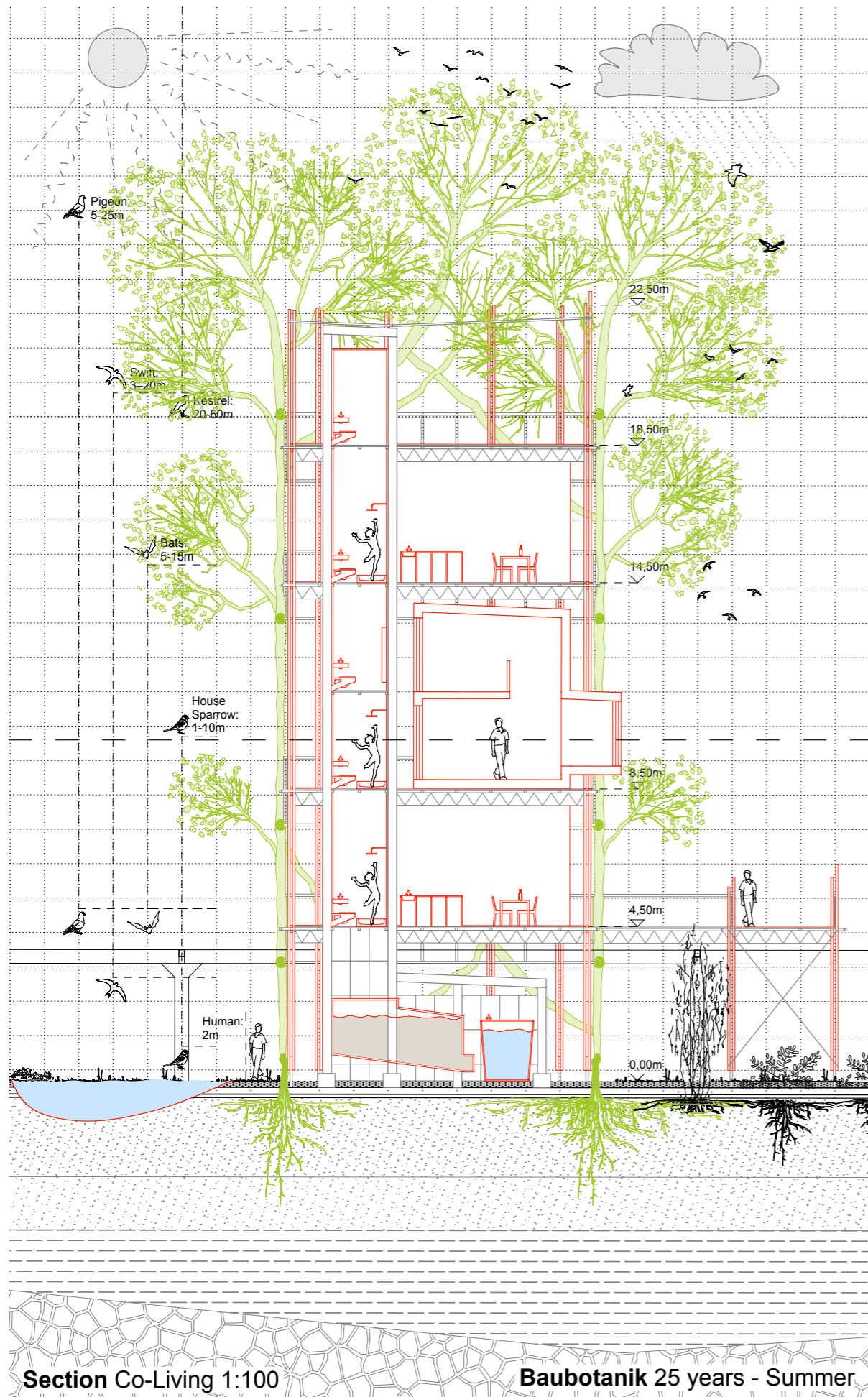
Floor plan Co-Living Level 3 - Studios 1:100 Baubotanik 25 years - Winter

- 1) Studios
- 2) 4-Seasons outside kitchen
- 3) Bathroom
- 4) Elevator



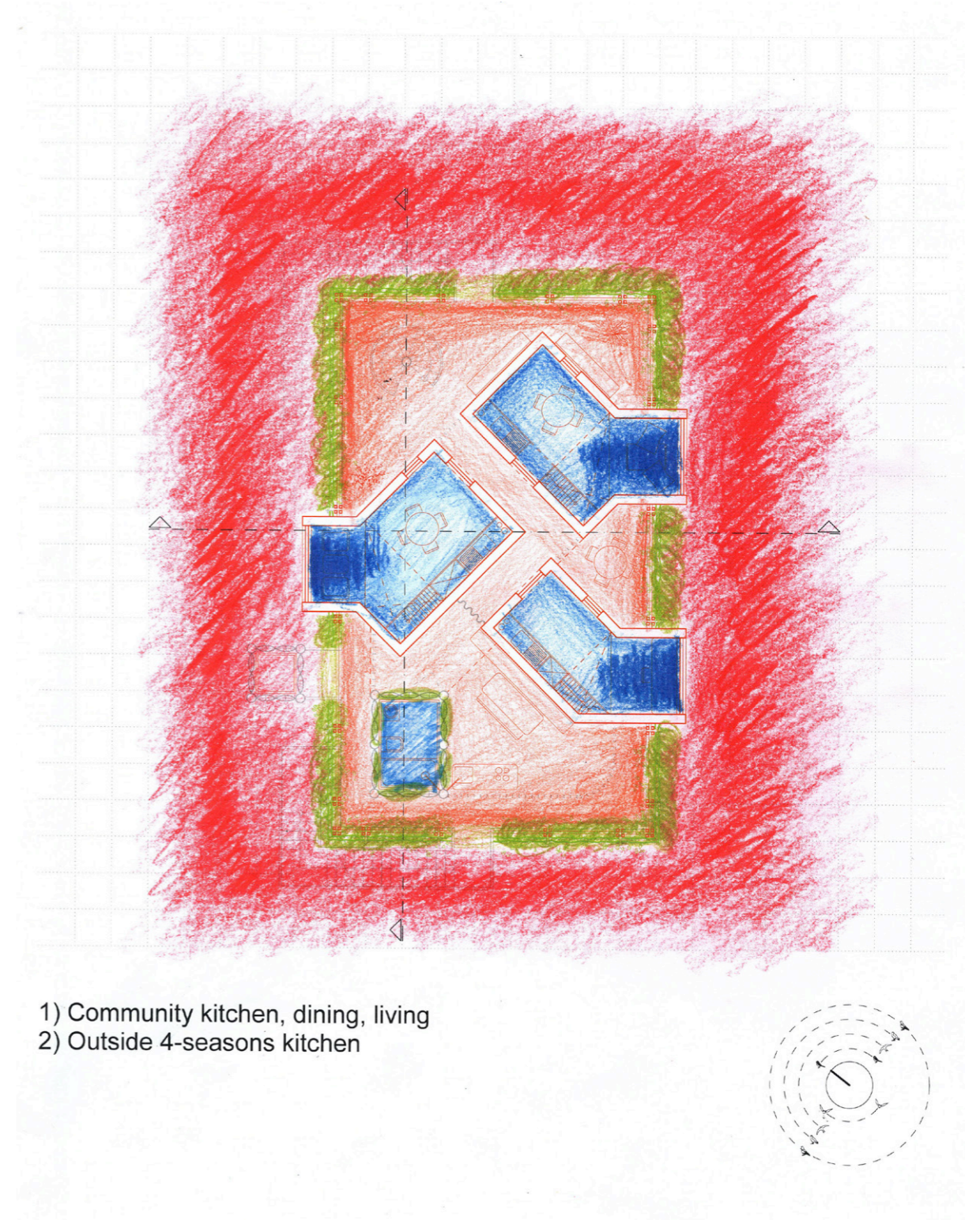


Growing Residency



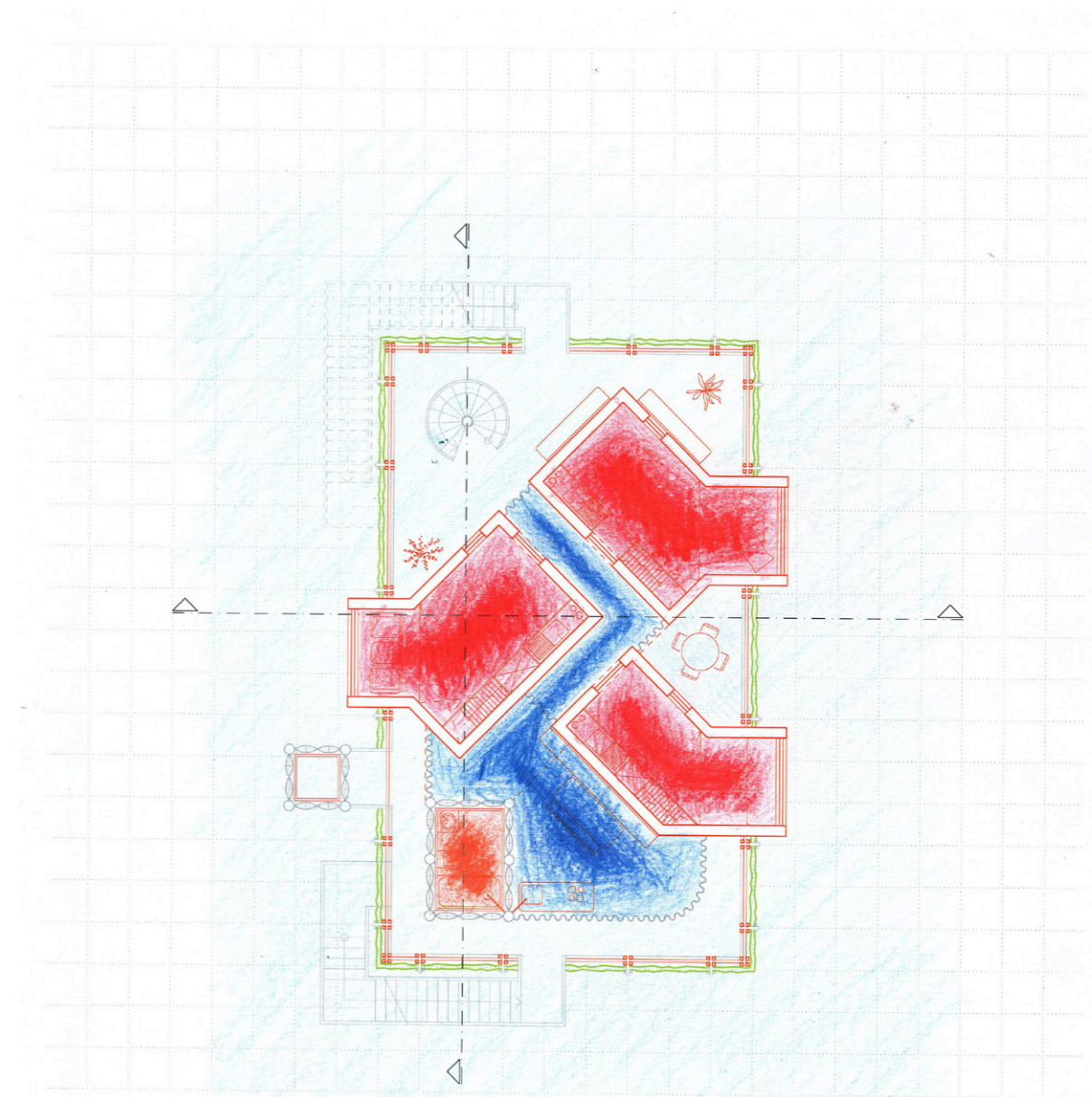
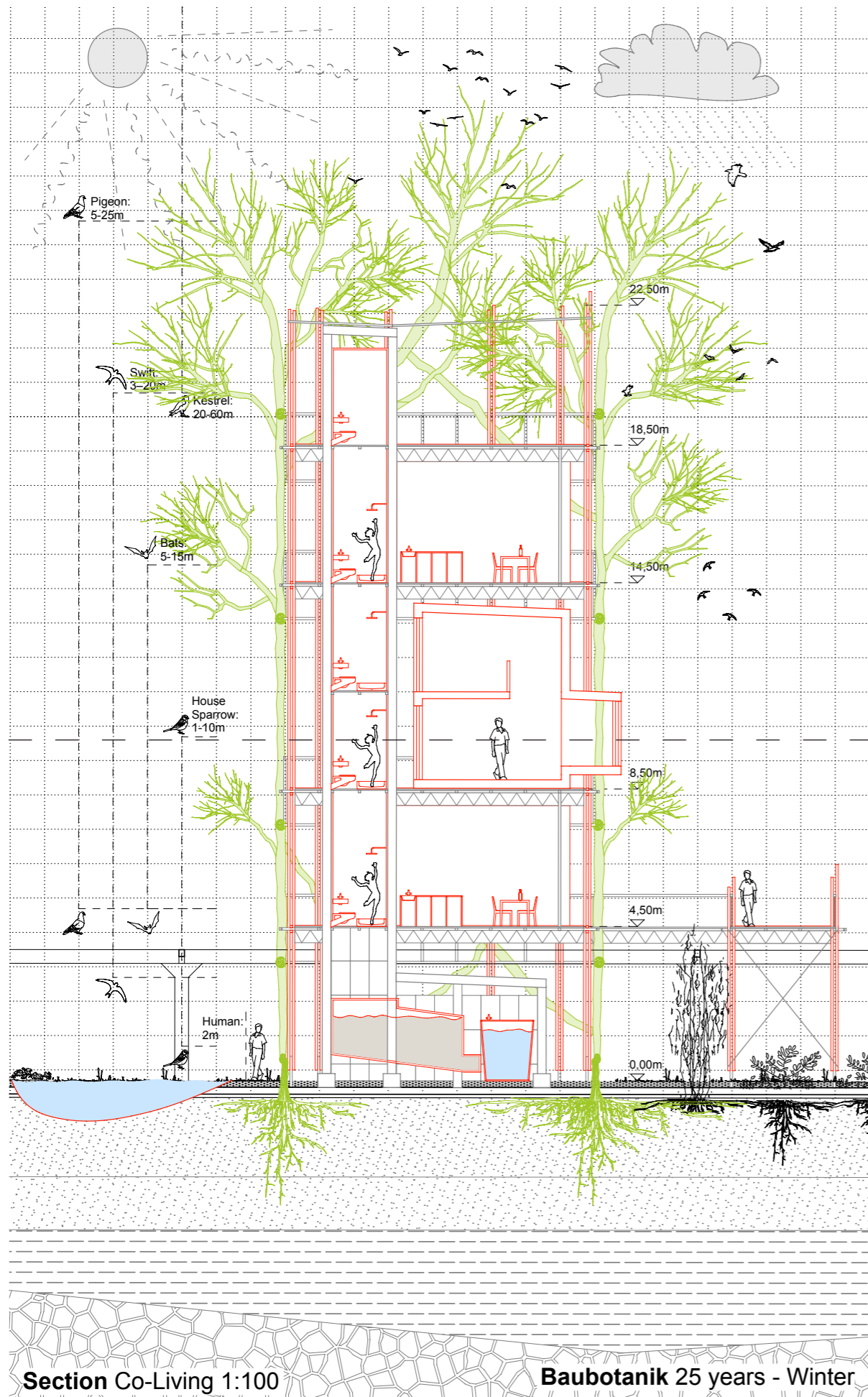
Section Co-Living 1:100

Baubotanik 25 years - Summer

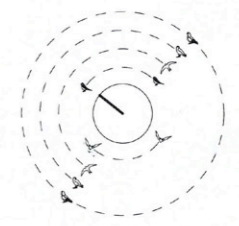


- 1) Community kitchen, dining, living
- 2) Outside 4-seasons kitchen

Growing Residency



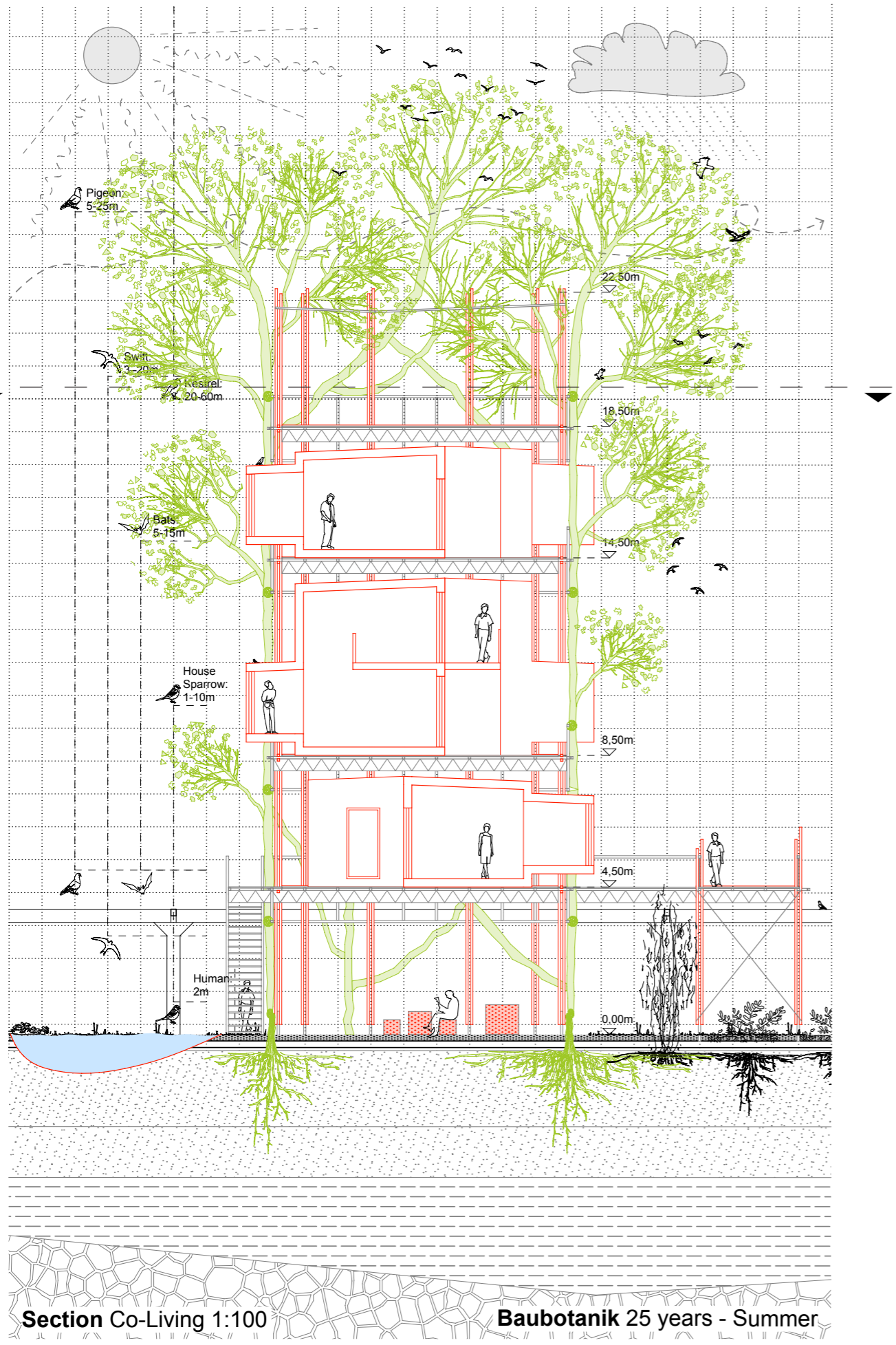
- 1) Community kitchen, dining, living
- 2) Outside 4-seasons kitchen



Section Co-Living 1:100

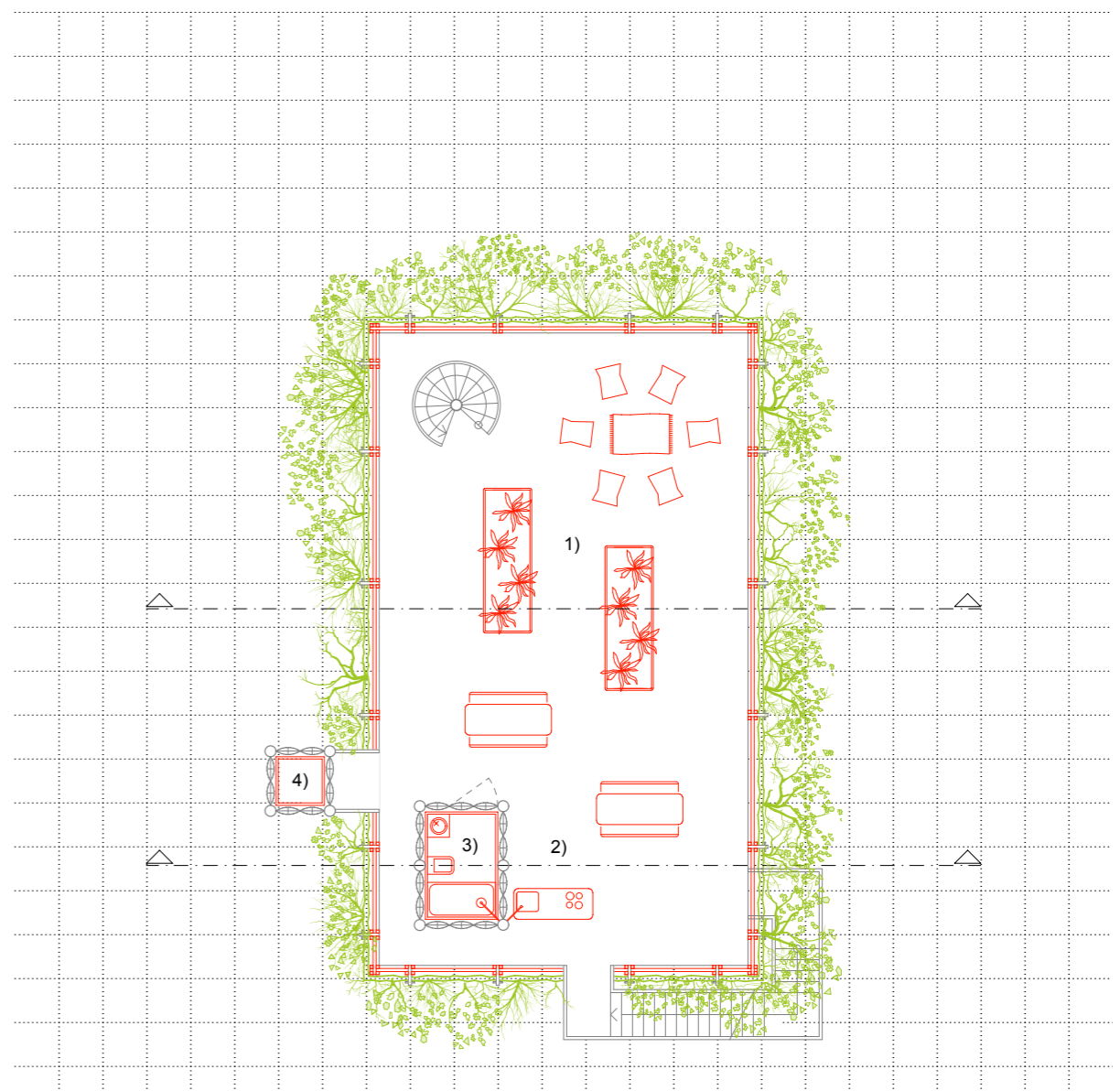
Baubotnik 25 years - Winter

Growing Residency



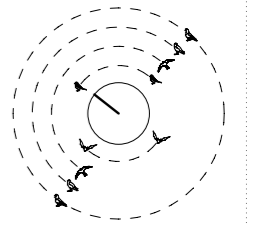
Section Co-Living 1:100

Baubotanik 25 years - Summer

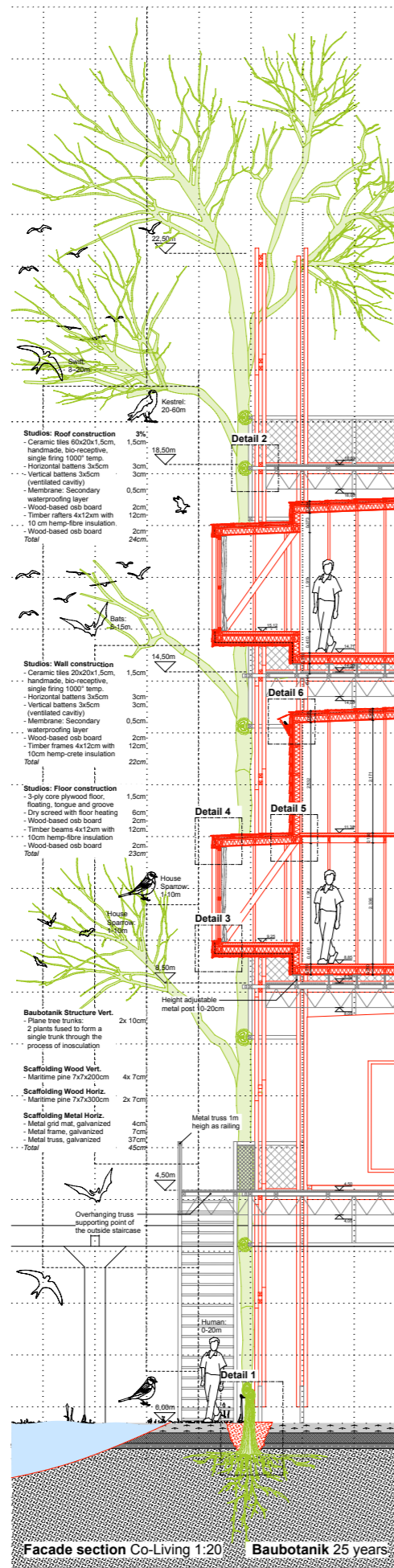


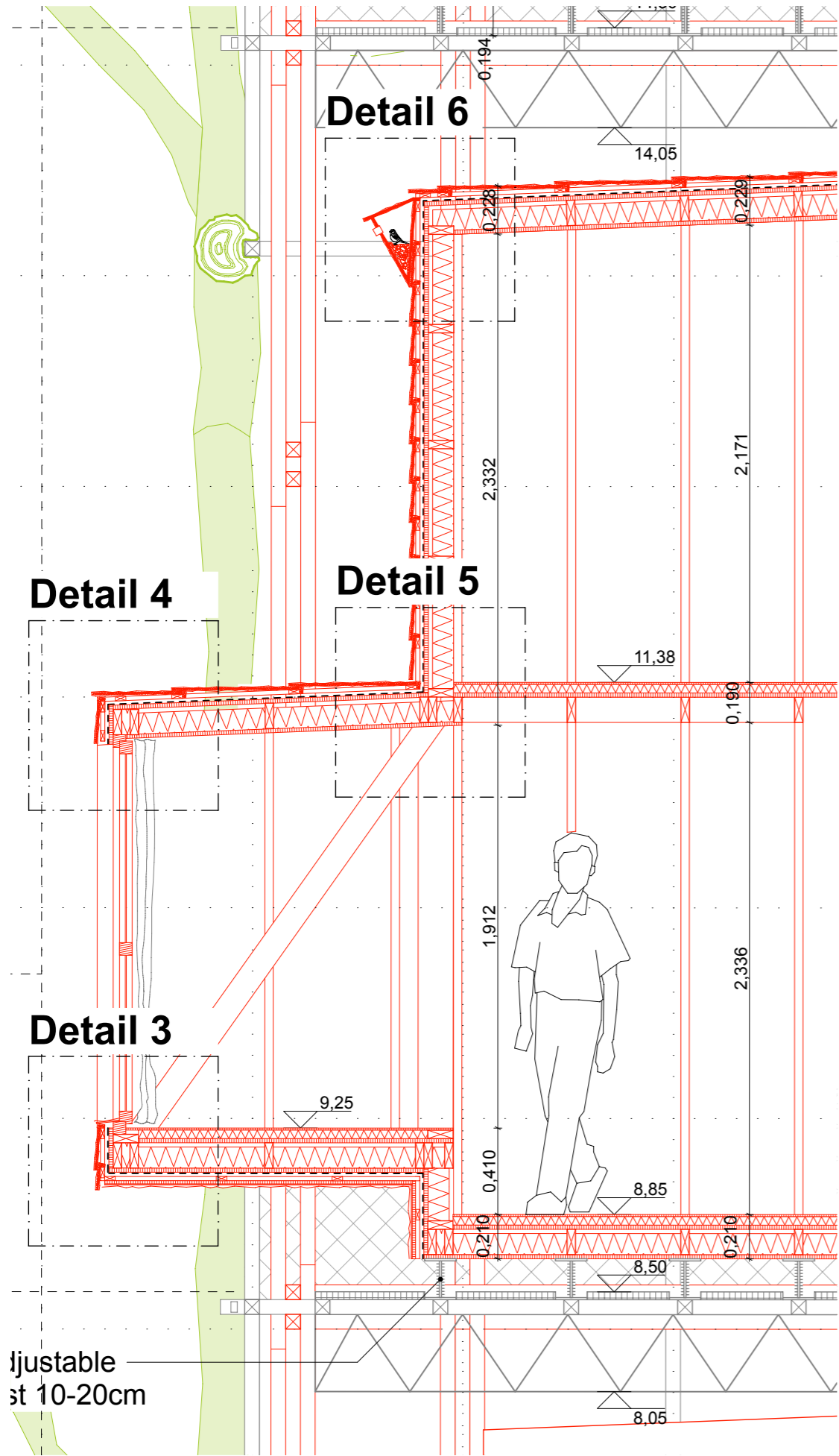
Floor plan Co-Living Level 4 - Rooftop 1:100 Baubotanik 25 years - Winter

- 1) Rooftop garden
- 2) 4-Seasons outside kitchen
- 3) Bathroom
- 4) Elevator

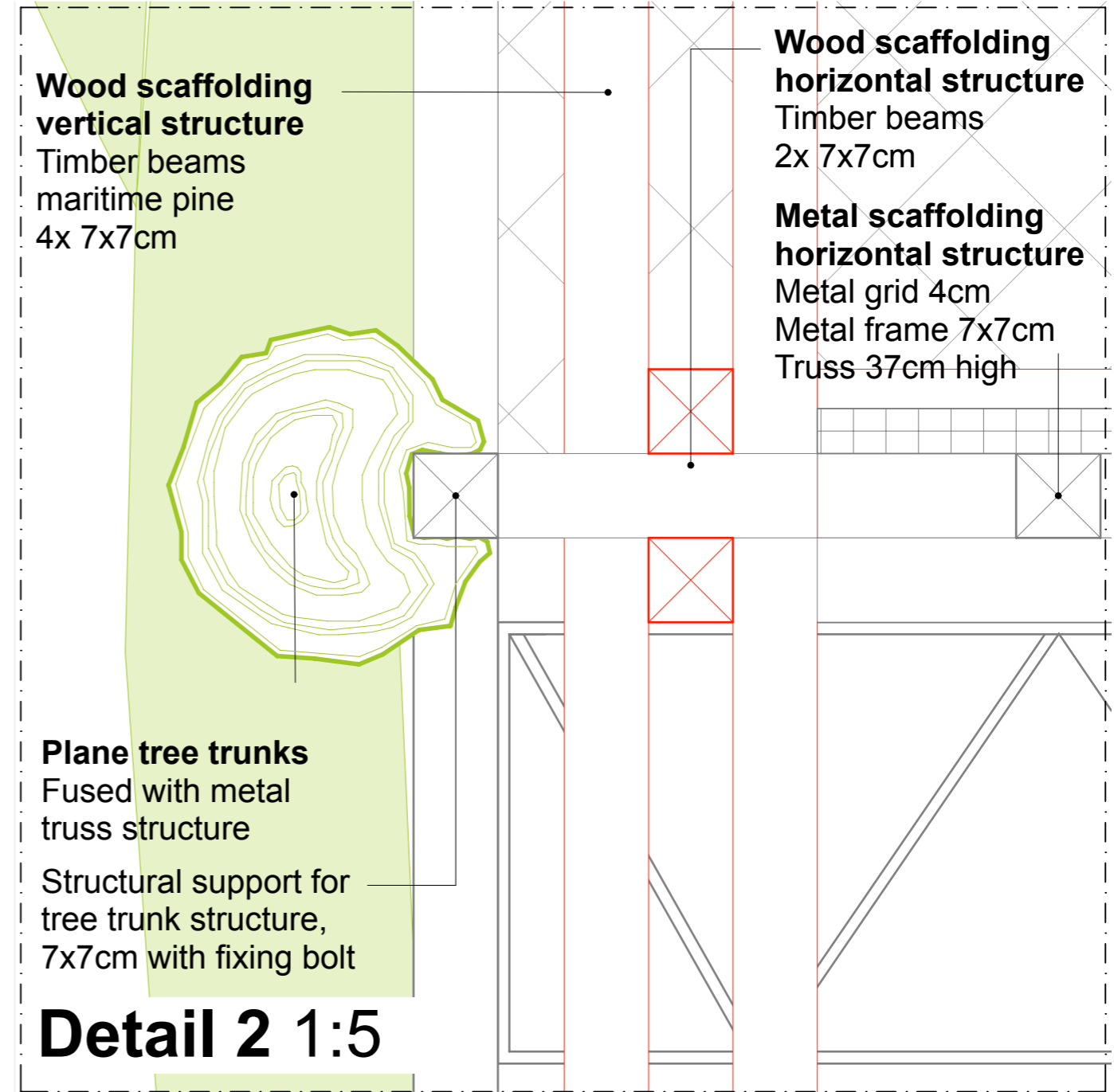
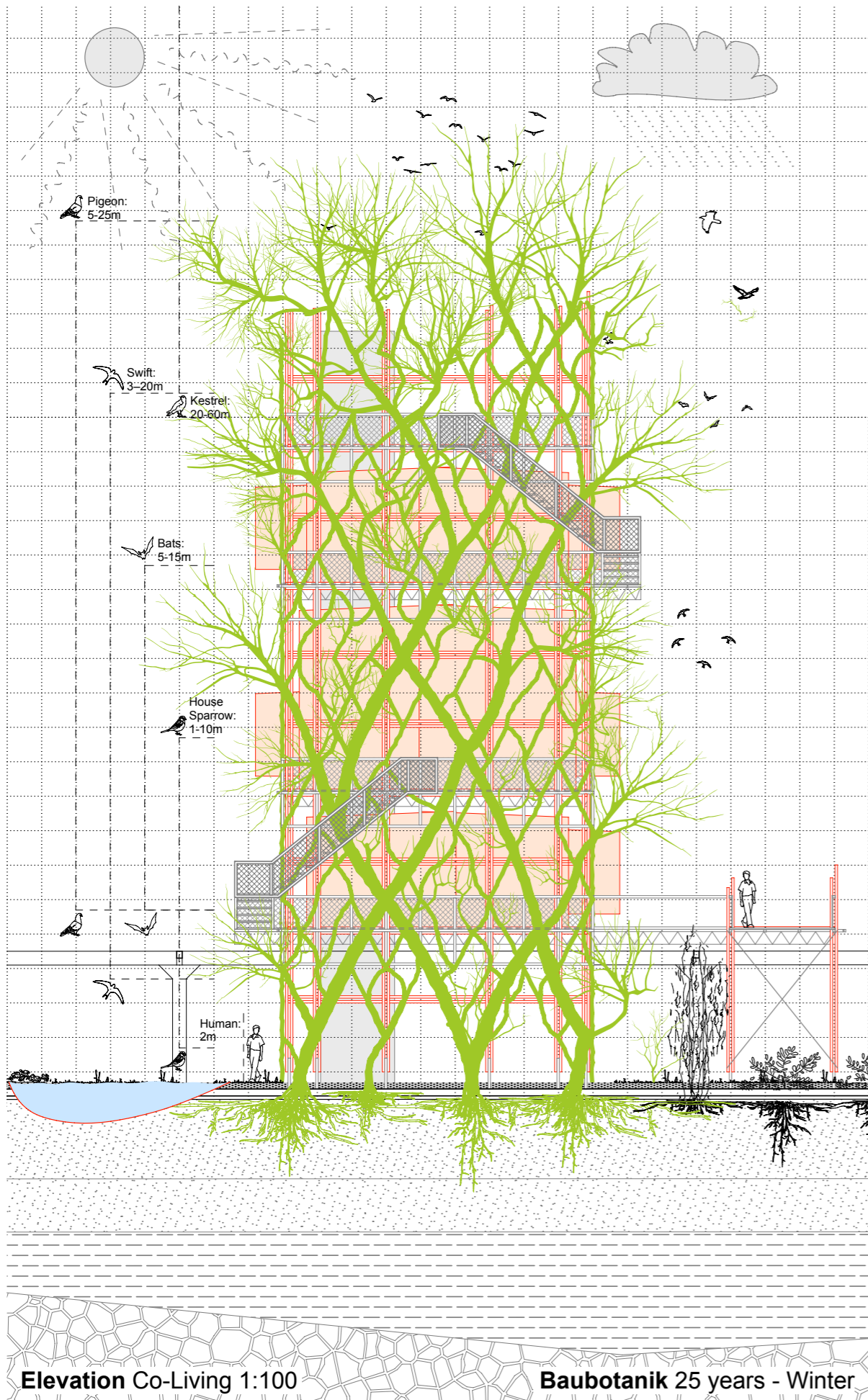


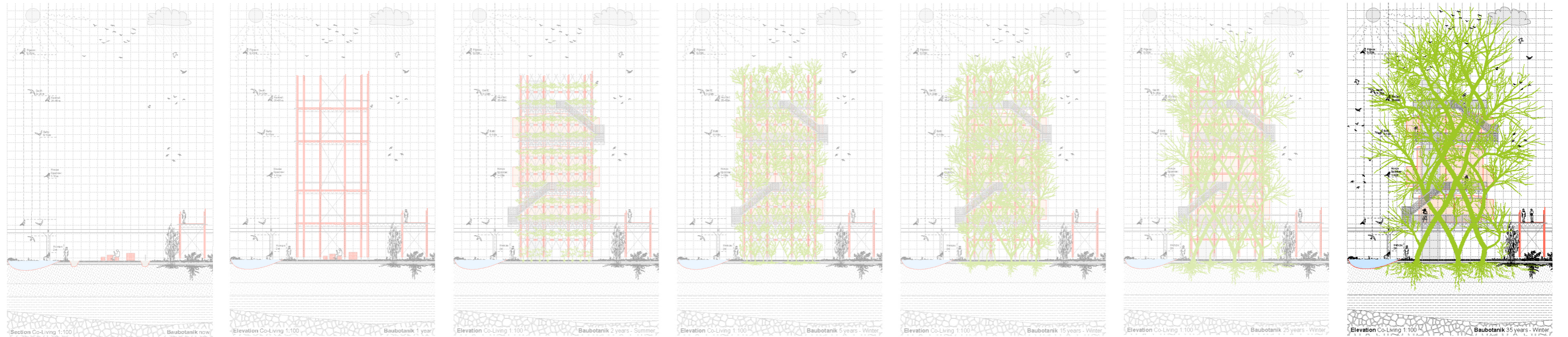












time

2023
Now

2024
1 year

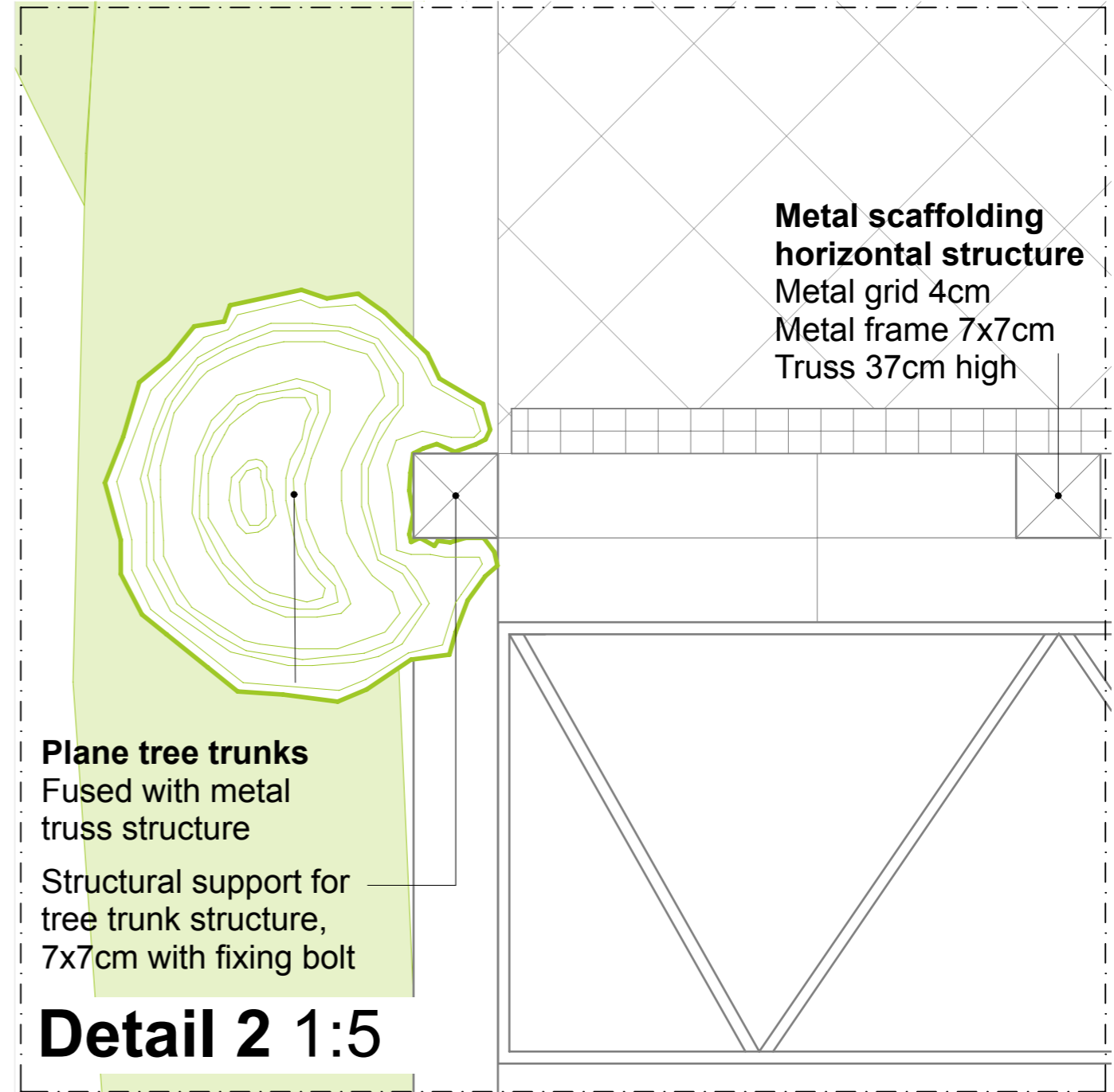
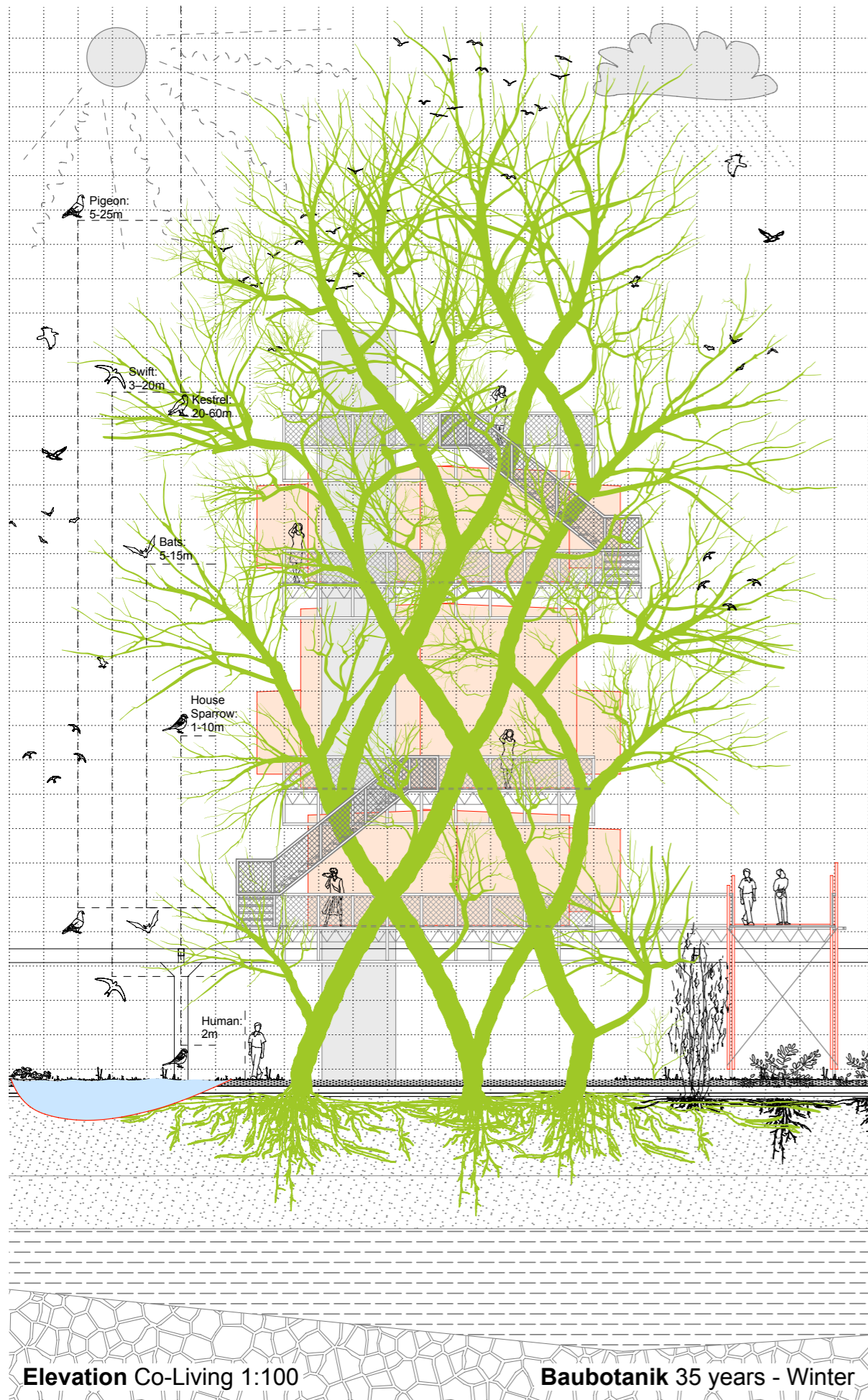
2025
2 years

2028
5 years

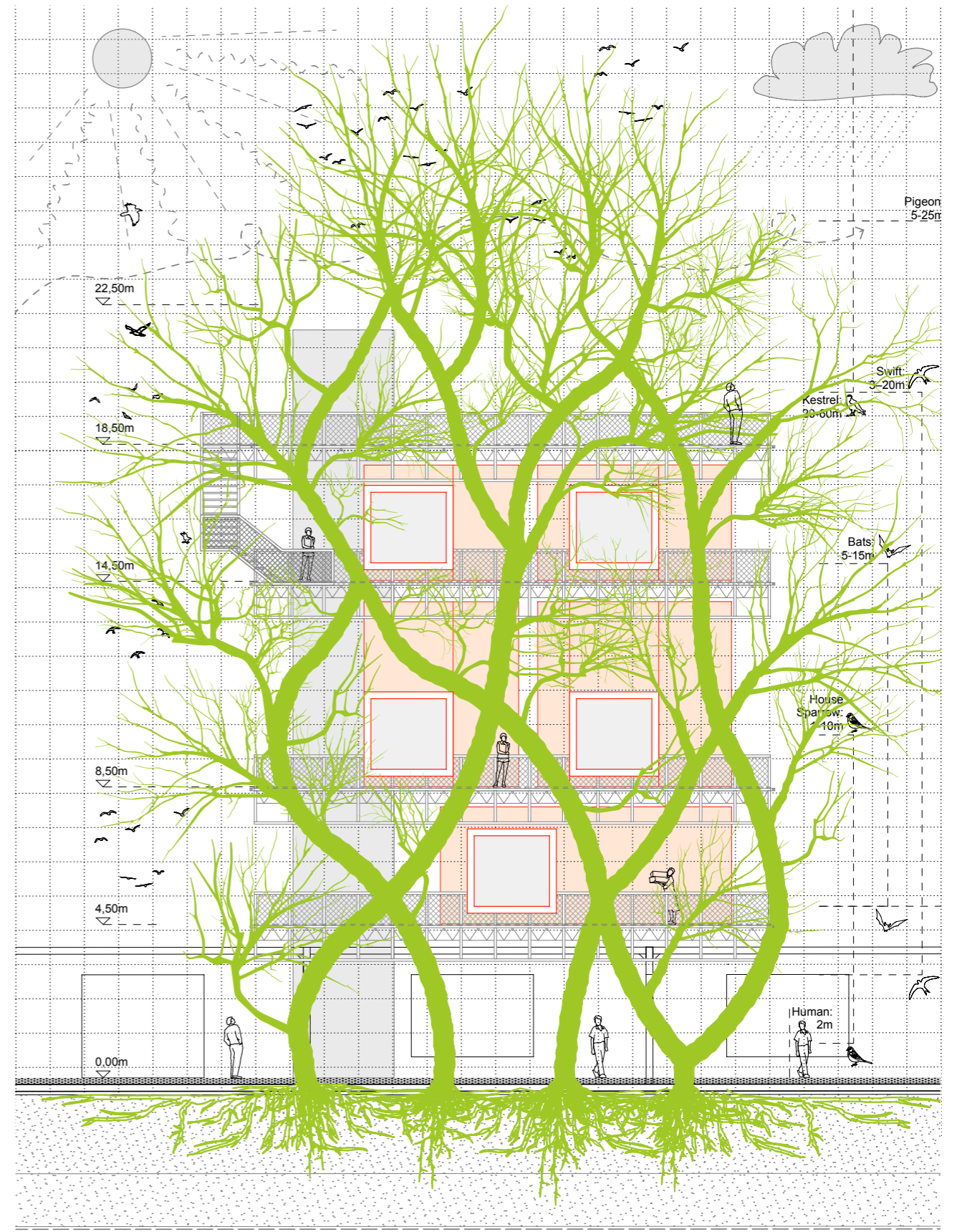
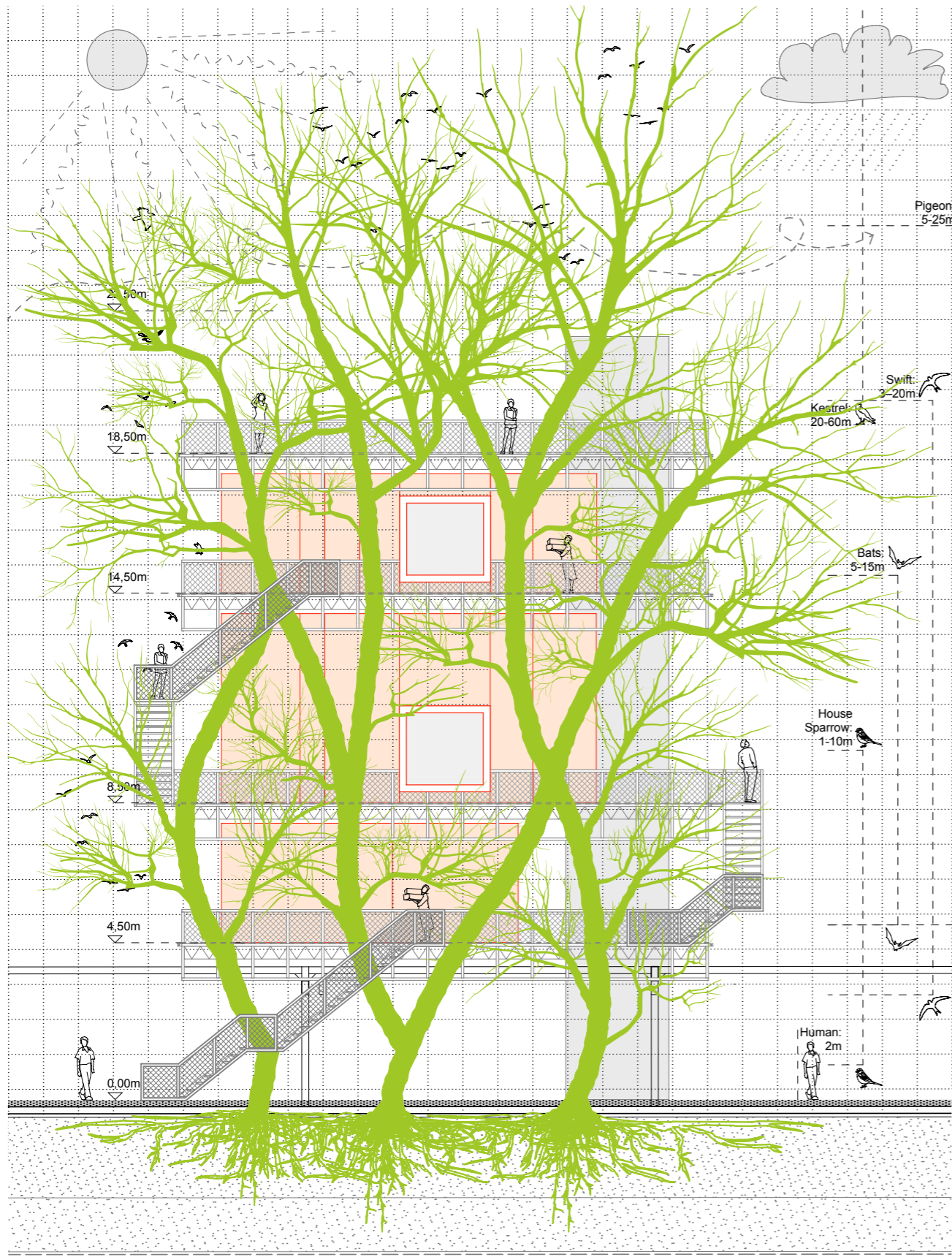
2038
15 years

2048
25 years

2058
35 years



Growing Residency

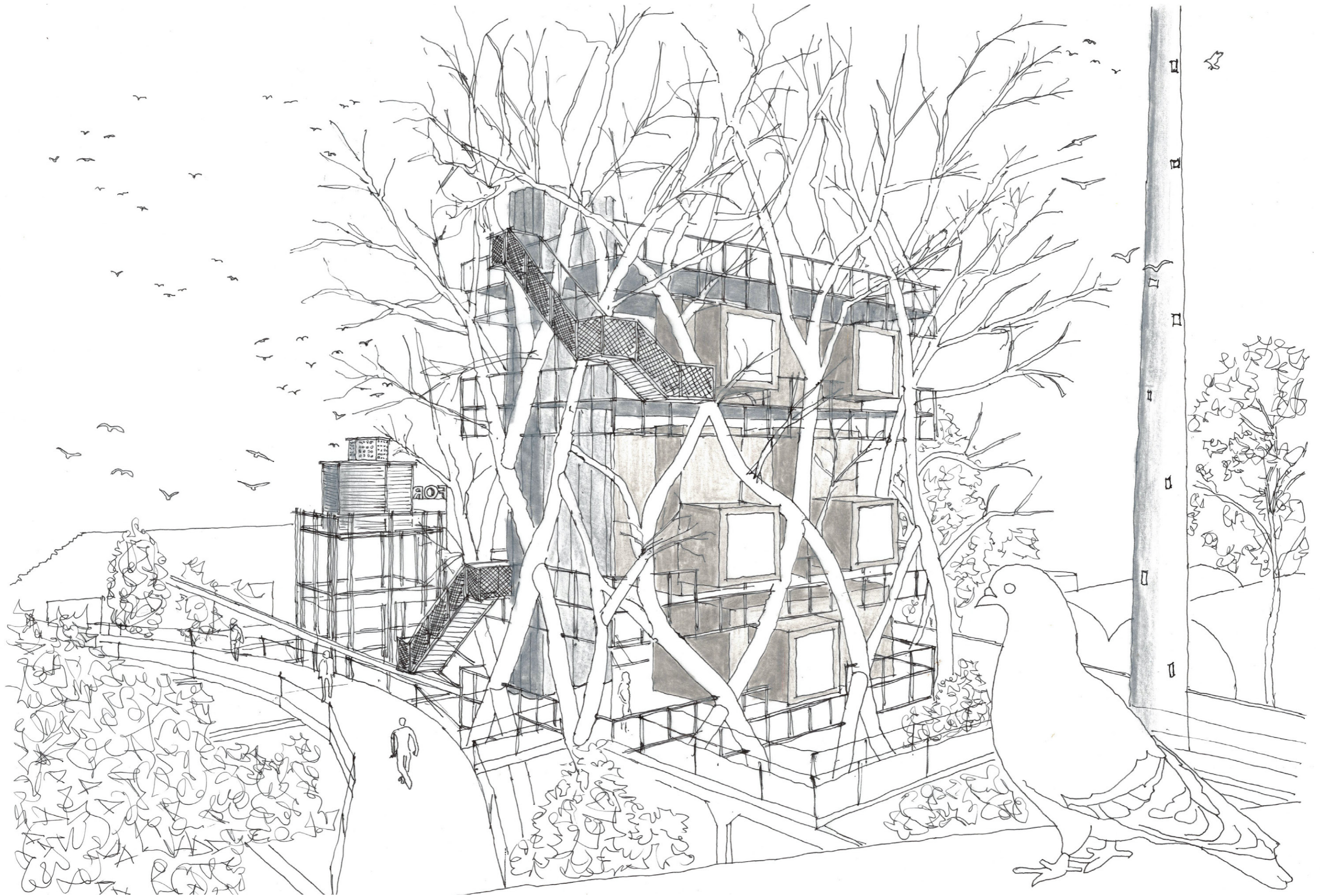


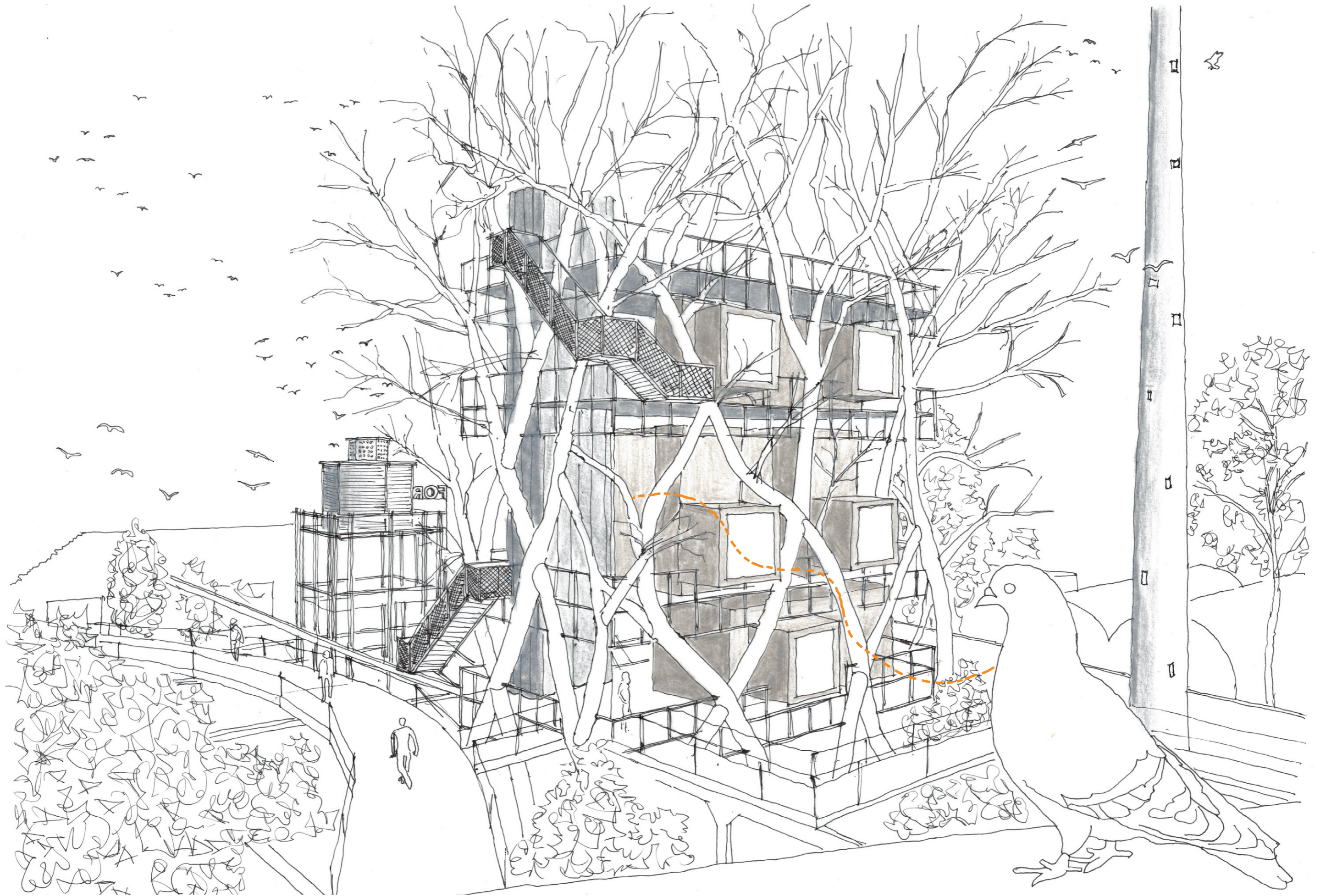
Elevation Co-Living 1:100

Baubotantik 35 years - Winter

Elevation Co-Living 1:100

Baubotantik 35 years - Winter





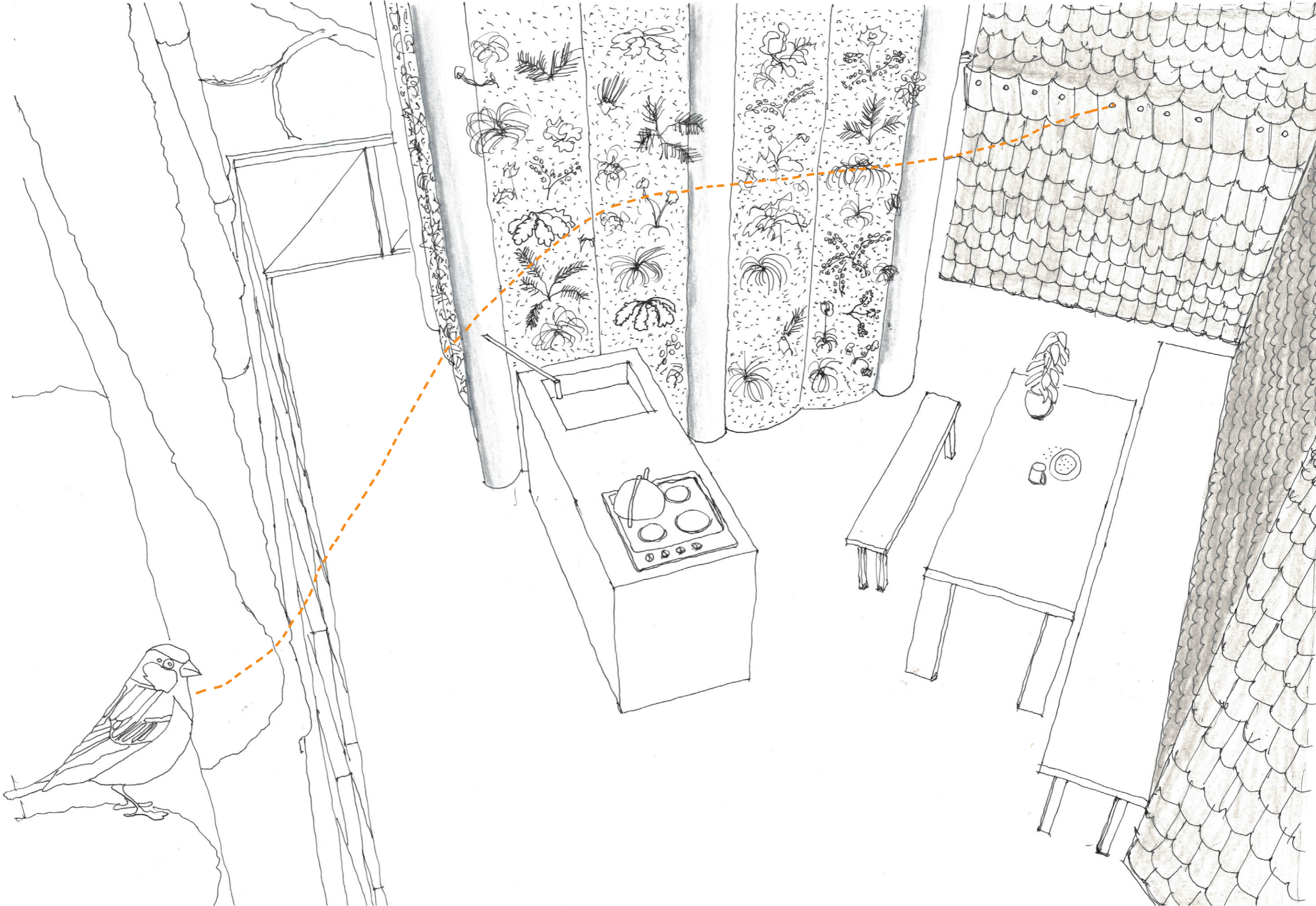
Growing Residency

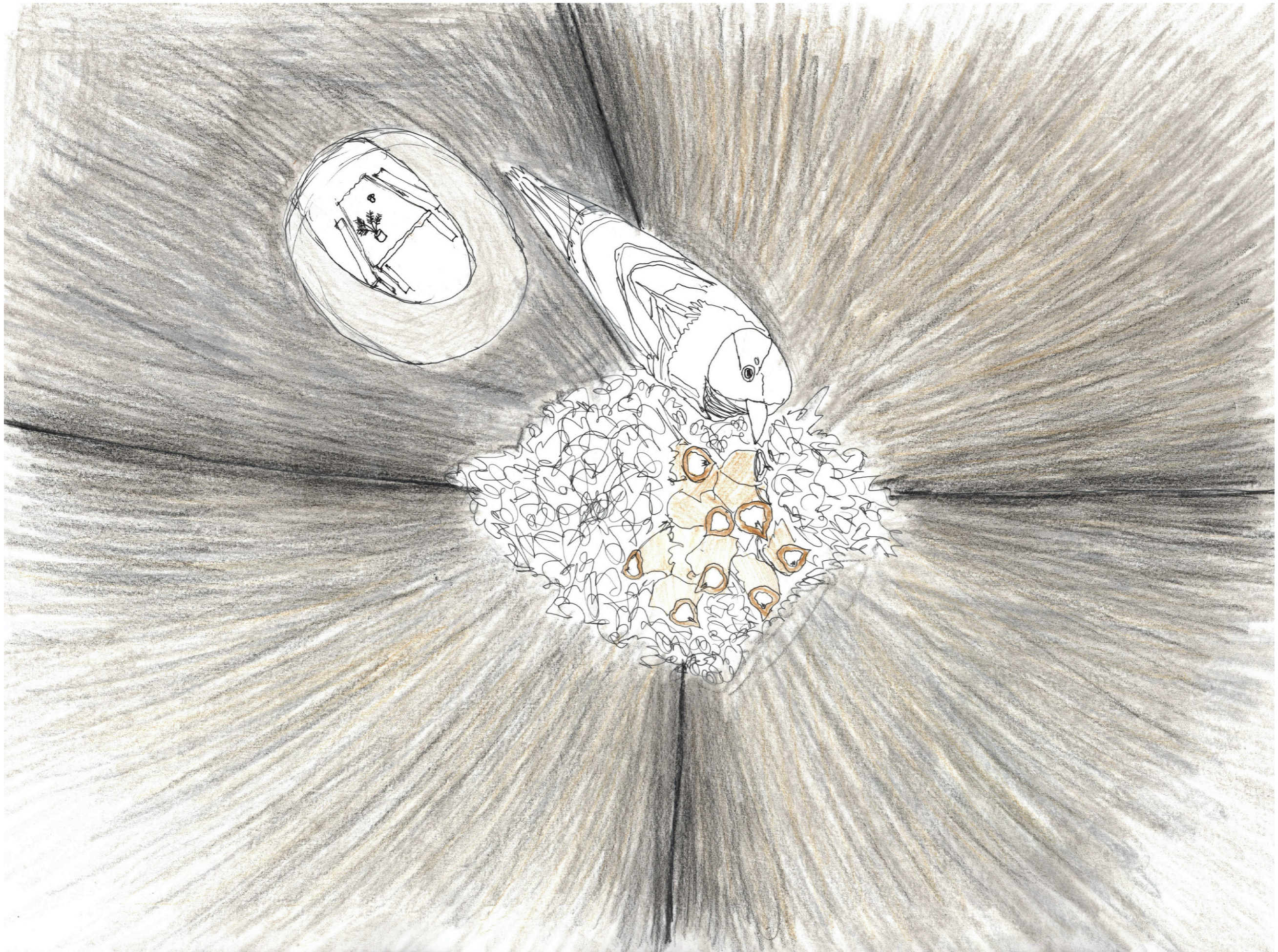


Growing Residency

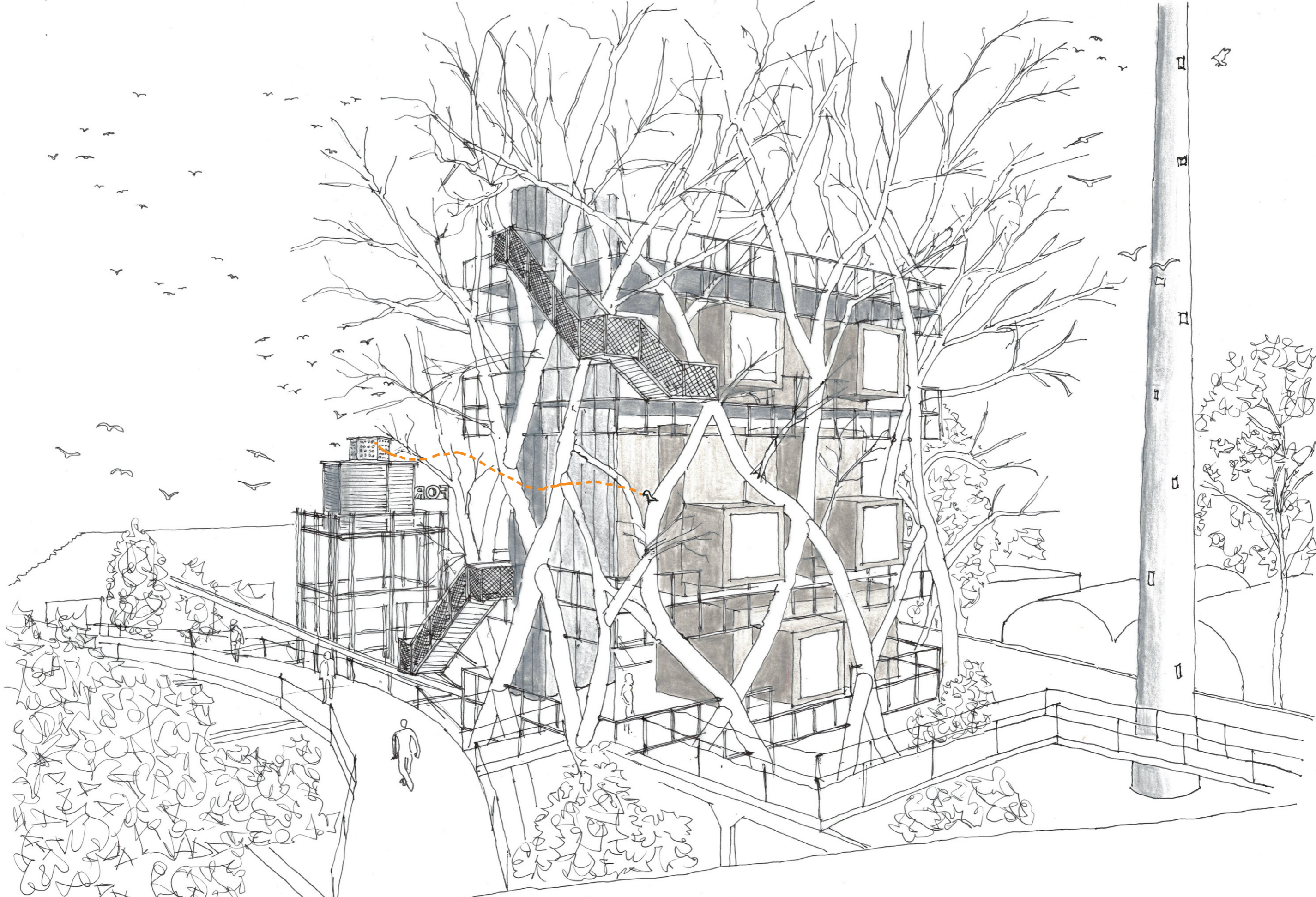


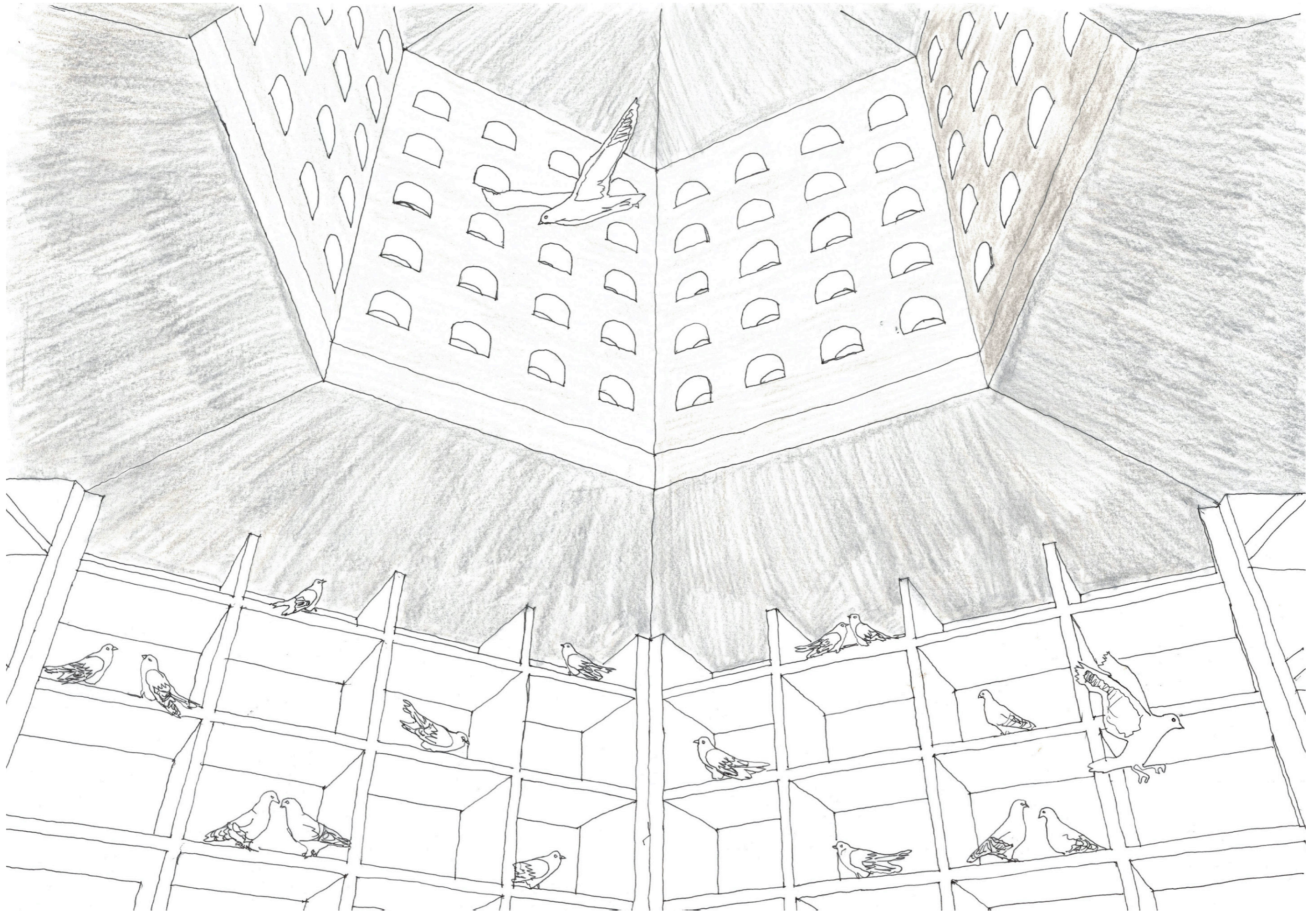
Growing Residency





Growing Residency





Thank you!
Obrigado!

