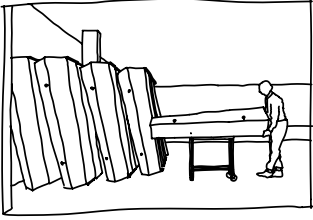


PHASE 2 - FS 2023 - DESIGN

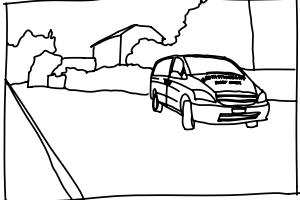
**6. PROJECT DESIGN
- ECOLOGICAL GARDENS AND FORESTS OF REMEMBRANCE**

⁸⁸ St Mary Magdalene Church, Milk Street London, Inscription

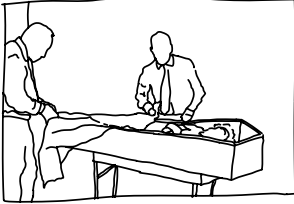
**“ Grass of levity,
Span in brevity,
Flowers’ felicity,
Fire of misery,
Winds’ stability,
Is mortality.”⁸⁸**



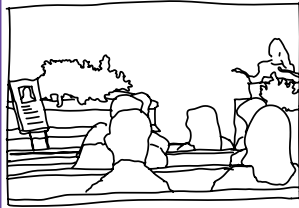
1. THE COFFIN STORAGE



2. RETRIEVING THE BODY



3. EMBALMING



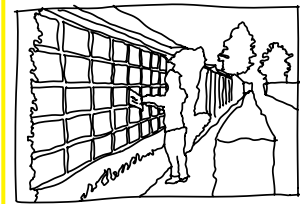
6. FUNERAL/
CEREMONY



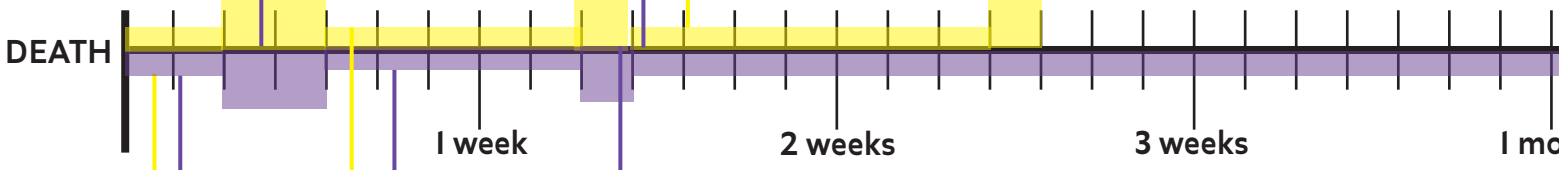
7.1 EARTHEN BURIAL



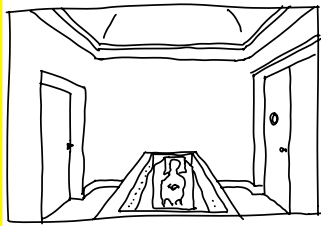
7.2 CREMATION



8. DISPOSAL OF
ASHES



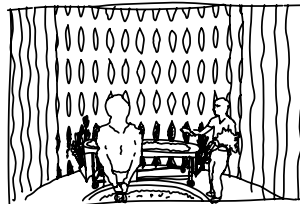
OFFICIAL
DEATH
CERTIFICATE



4. THE WAKE



5. ARRIVAL
PROCESSION



7.3 FLOWERING



9. LAYING IN



8.1 PROCESSION TO
LAYING IN

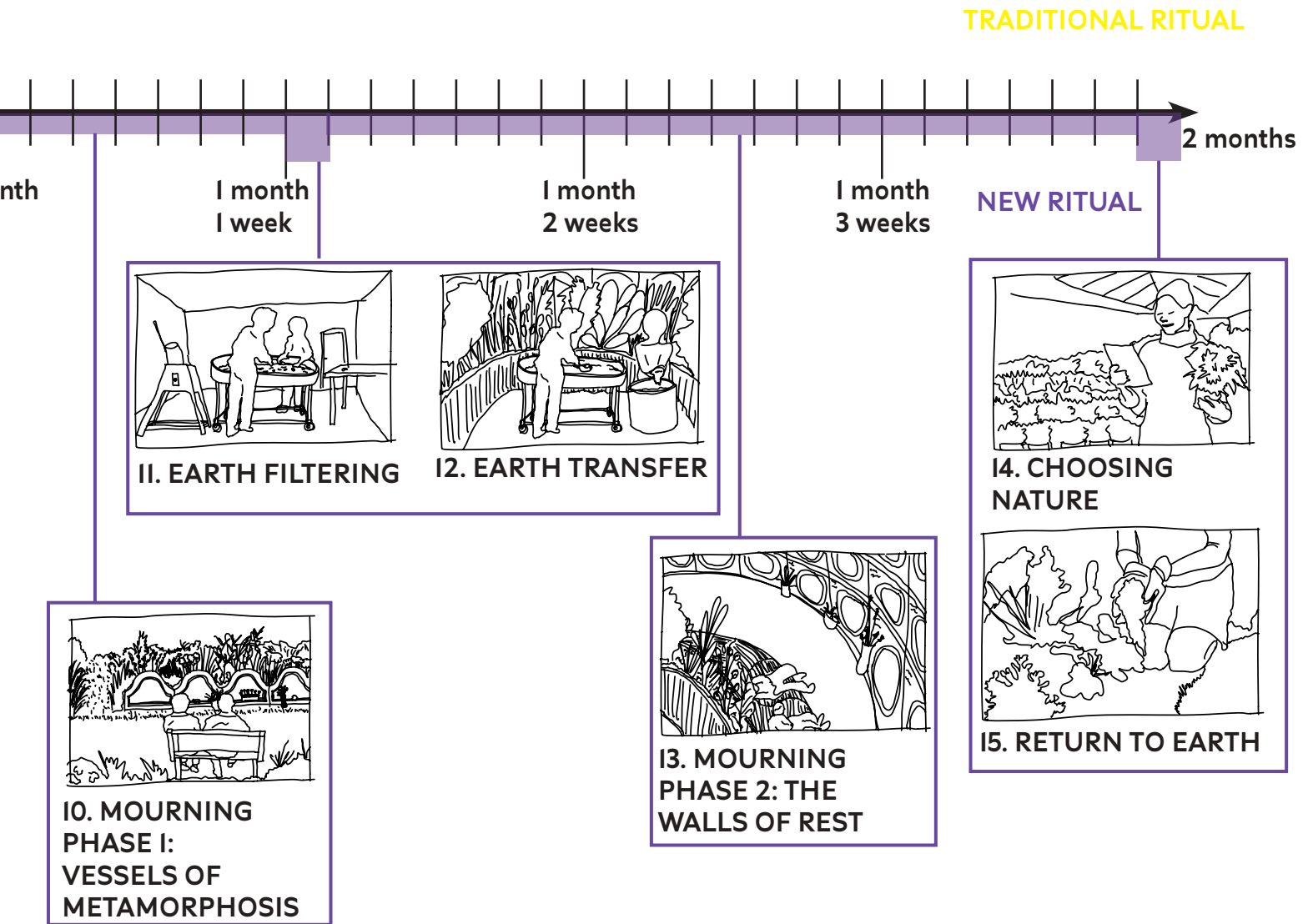
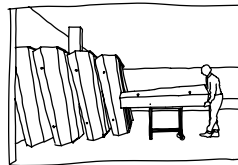
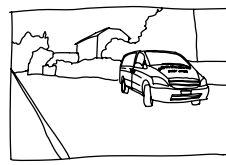


Figure I02: New Ritual timeline comparison: a longer ritual. by Author. (2022). [sketch]

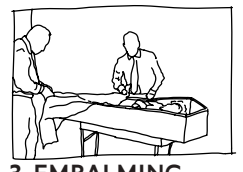
6.1 MASTERPLAN DESIGN -BACK TO NATURE



I. THE COFFIN STORAGE



2. RECOVERING THE DECEASED



3. EMBALMING

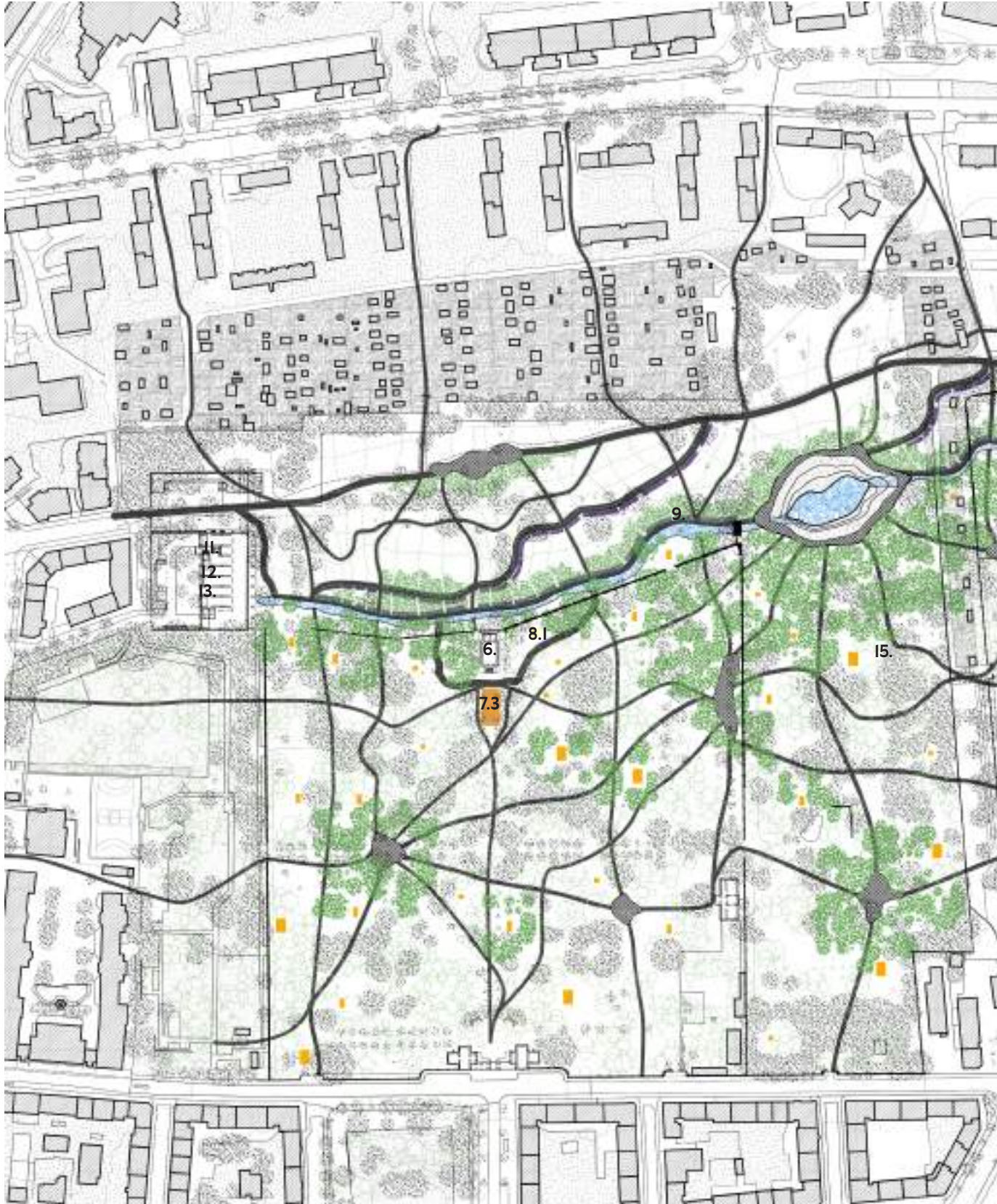
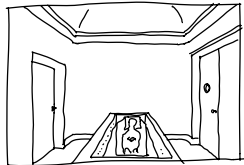


Figure I03: Masterplan 2050: integrating NOR and its ritual. by Author. (2022). [plan]



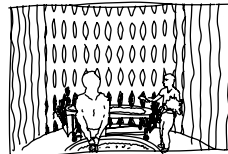
4. THE WAKE



5. ARRIVAL PROCESSION



6. FUNERAL/ CEREMONY



7.3 FLOWERING



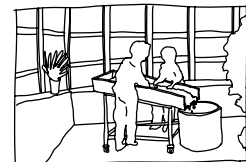
8.1 PROCESSION TO LAYING IN



9. LAYING IN: VESSELS OF METAMORPHOSIS



10. MOURNING PHASE I: PAVILIONS OF REMEMBRANCE



11. EARTH FILTERING



12. EARTH TRANSFER



13. MOURNING PHASE 2: THE WALLS OF REST



14. CHOOSING NATURE



15. RETURN TO EARTH



- Vessels of Metamorphosis
- Pavilions of Remembrance
- Flowering Pavilions

MASTERPLAN DESIGN

The current cemetery is defined by a linear grid. The parts of the process corresponding to the traditional ritual create 2 boulevards that follow this grid.

The design of the masterplan aims to decompose this grid with the goal of returning to a certain form of natural state (figure I04). The first move to do so is the restoration of the historical creek that used to cross the site (figure I05). In a second phase, the observation of surface runoff water led to the creation of squares through the site (figure I06). Connecting paths join the squares to one another and also connect Sihlfeld to the exterior urban context. These new paths define plots that are gradually transformed in 4 phases. The final aim is to generate gardens of remembrance by planting perennial gardens north of the river and by planting trees south of the river (figure I07 - I08). The planting of the trees is based on a simulation of the historical forest that used to be in Sihlfeld in 3000 BC (figure I09).

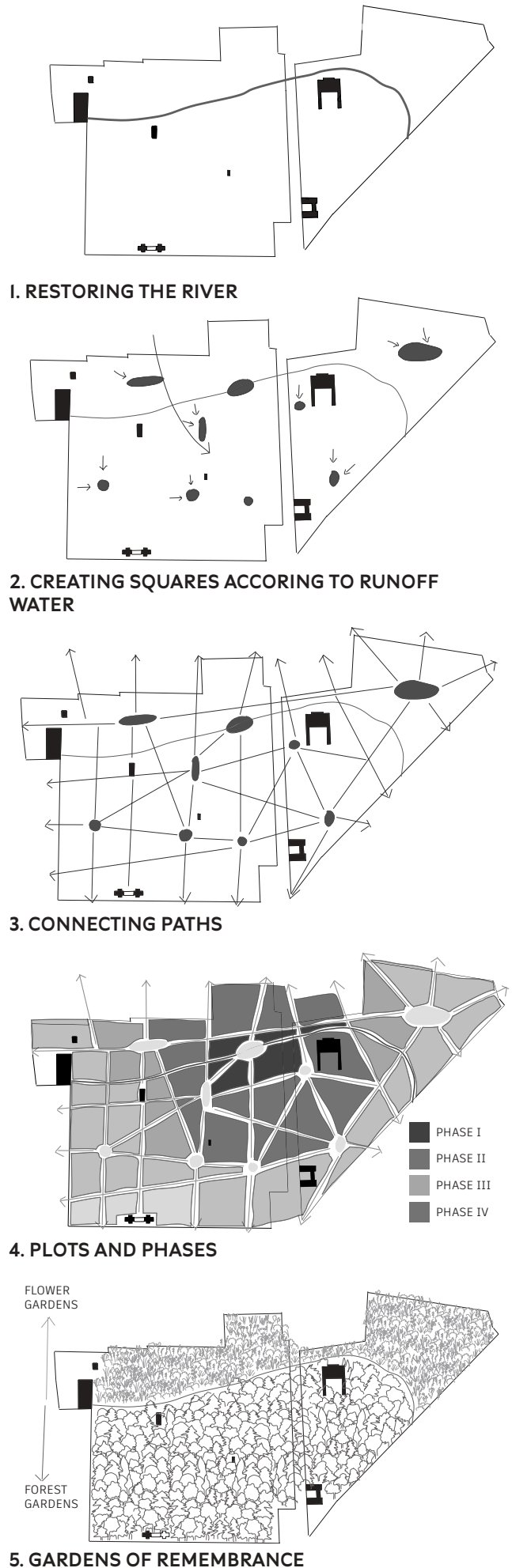


Figure I04: Masterplan design concept. by Author. (2023). [sketch]



Figure I05: Historical map with river overlaid on orthophoto. Source:maps.geodamin.ch. [map]



Figure I06: Surface water runoff depth. Source:maps.zh.ch. [map]



Figure I07: Forests of Remembrance, axonometric drawing extract. by Author (2023). [drawing]

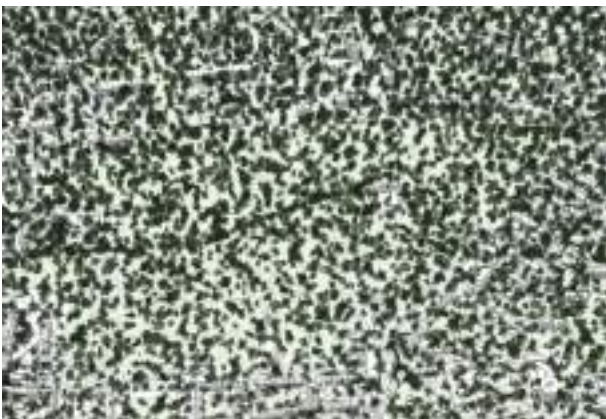


Figure I09: Simulation of historical forest Sihlfeld, Zürich 3000 BC. Source: https://3d.stzh.ch/appl/3d/zuerich_4d_extern. [map]



Figure I08: Gardens of Remembrance, axonometric drawing extract. by Author (2023). [drawing]

ARCHITECTURE & LANDSCAPE DESIGN

The design of the landscape and architecture follows the process of natural organic reduction: a process of decomposition.

As nature is created, it is also used. It becomes source of construction material but also plays a role in the decomposition of the bodies. Parallel to the decomposition of the bodies, there is a progressive decomposition of the architecture and ultimately a decomposition of the perception of death in our society (figure I10).

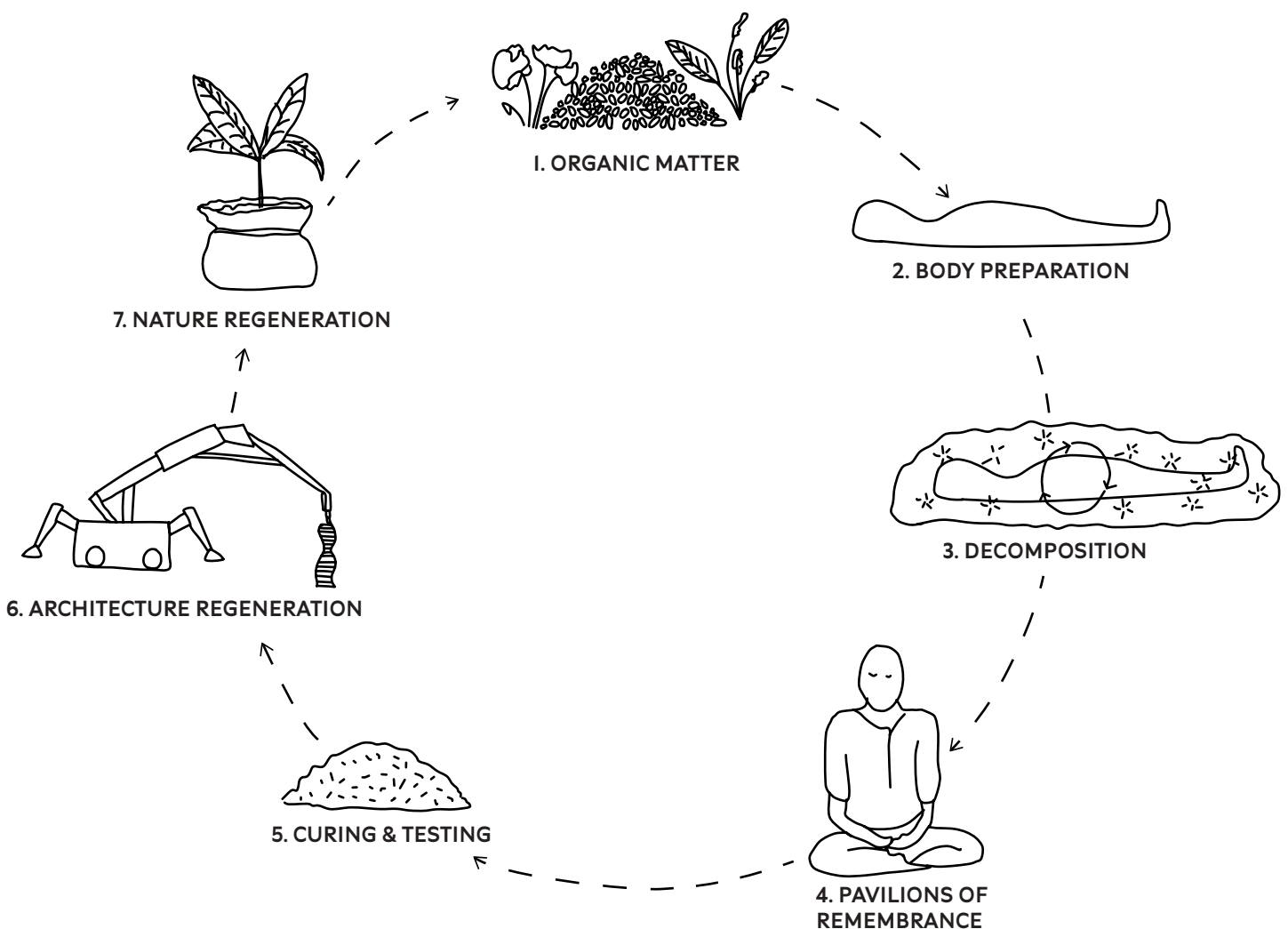


Figure I10: Project cycle: natural organic reduction and the gardens of remembrance. by Author. (2022). [sketch]

6.2 ORGANIC MATTER -CONSTRUCTIVE SYSTEM

The constructive system is based on an approach of minimal intervention with materials found on site. Therefore, there are three main materials used: clay, fungi and trees (figure III).

Historically, the site of Sihlfeld and its surroundings were used for agriculture and mines. The clay quality of the earth made it adequate for quarries and thus, brick fabrics emerged in the region (figure II2).

A quarry north of Sihlfeld C, in line with the river, acts as the main source of clay. A clay that is then mixed with fibres and directly 3d printed to build pavilion shells, vessels and structures for the curing containers.

A basic wooden structure covers the pavilions and fungi found on site is used to create mycelium bricks (figure II3).

The pavilions, exposed to weather conditions, go through their own cycles of decomposition. The mycelium bricks first start to grow and then entirely decompose, gradually opening the structure to the exterior. These are replaced every 4 years. The 3d printed shells start to break and crumble and are partially or entirely reprinted every 16 years. Finally, the wooden structure exposed to humidity slowly loses its strength and is replaced every 32 years in average.

The architectural language of the pavilions mimic nature. The pavilions are like trees whose leaves change, grow, fall and adapt.

CLAY EARTH - 3D PRINTING

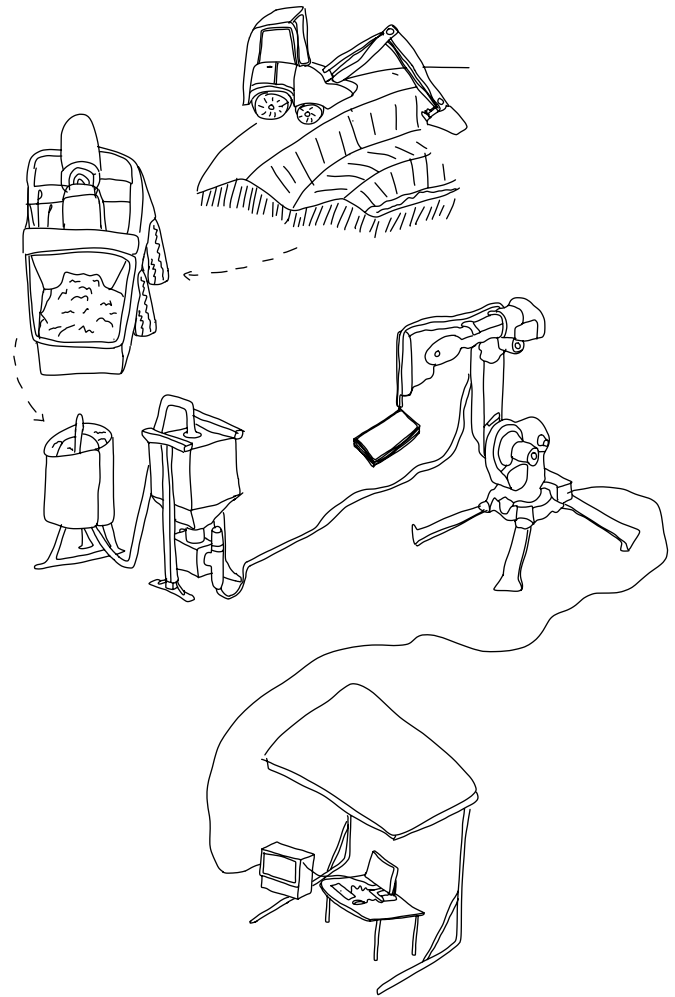


Figure III: Different materials and their constructive use. by Author. (2023). [sketch]

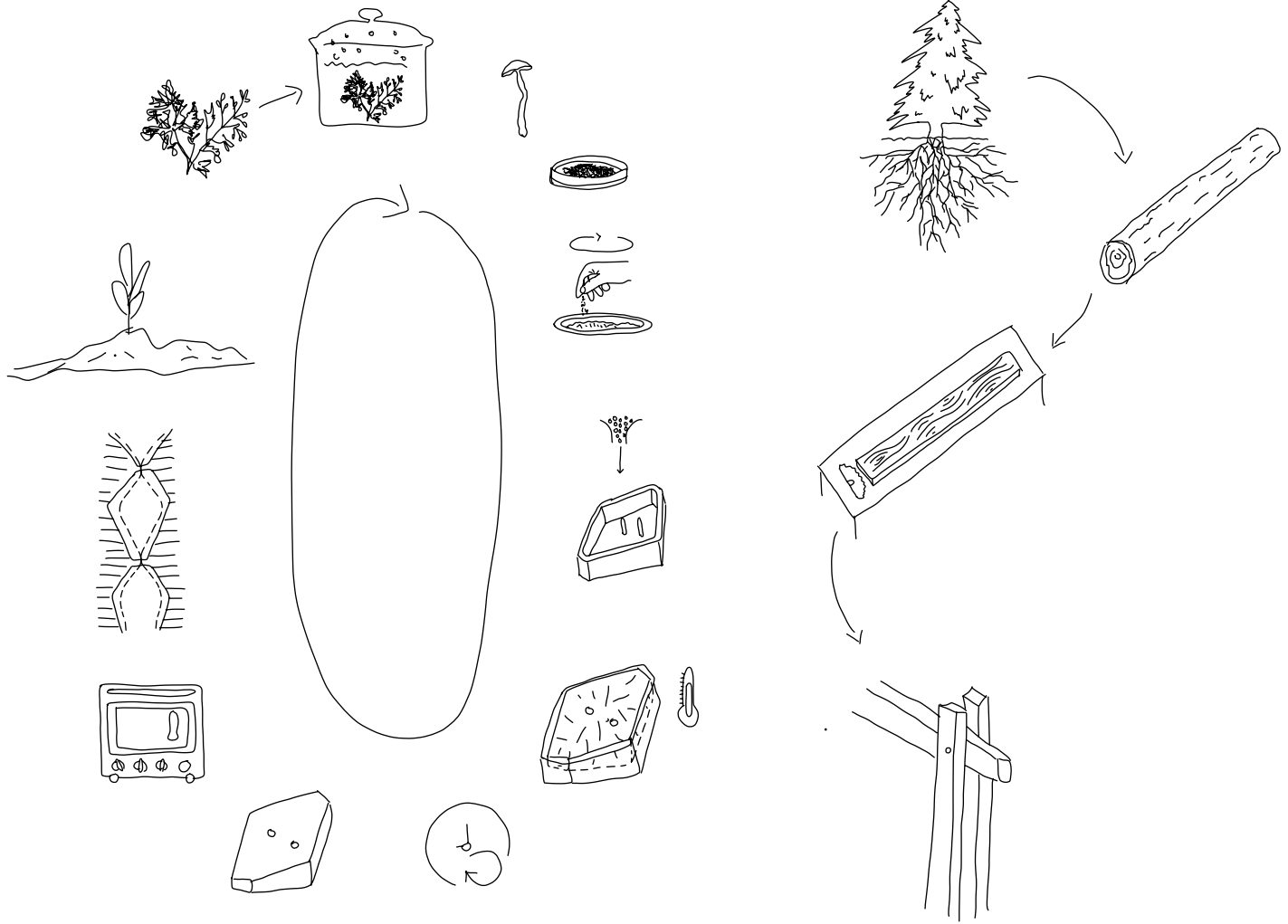
Sihlfeld Cemetery



Figure II2: 1945 abandoned quarry Wiedikon. Source: <https://ba.e-pics.ethz.ch/main/gallery view>. [image]

FUNGI - MYCELIUM BRICKS

TREES- WOODEN STRUCTURE



CLAY 3D PRINTED SHELL

WOODEN STRUCTURE

MYCELIUM BRICKS

RAMMED EARTH

RICE HUSK INSULATION

GRAVEL

COMPACTED EARTH

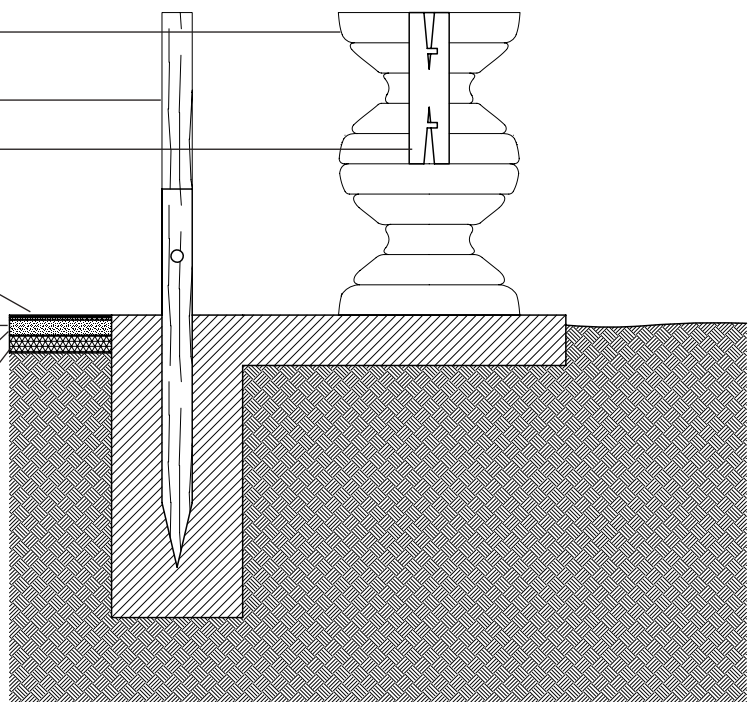


Figure I13: Foundation construction system detail 1:20.
by Author. (2023). [drawing]

TYOLOGY & MATERIALITY

The 3d printed clay shells are like the branches of a tree: frail yet robust, they support themselves and their leaves (mycelium bricks). They organically follow the offset of the void drawn by the existing and planted trees. The Construction-3D maxi printer (figure II4-II5) is used to print these delicate shells. If the length of the shells surpasses the printable area, several printers can be combined. The rough organic layering of clay earth envelops the users with the warmth of its natural colour (figure II6).

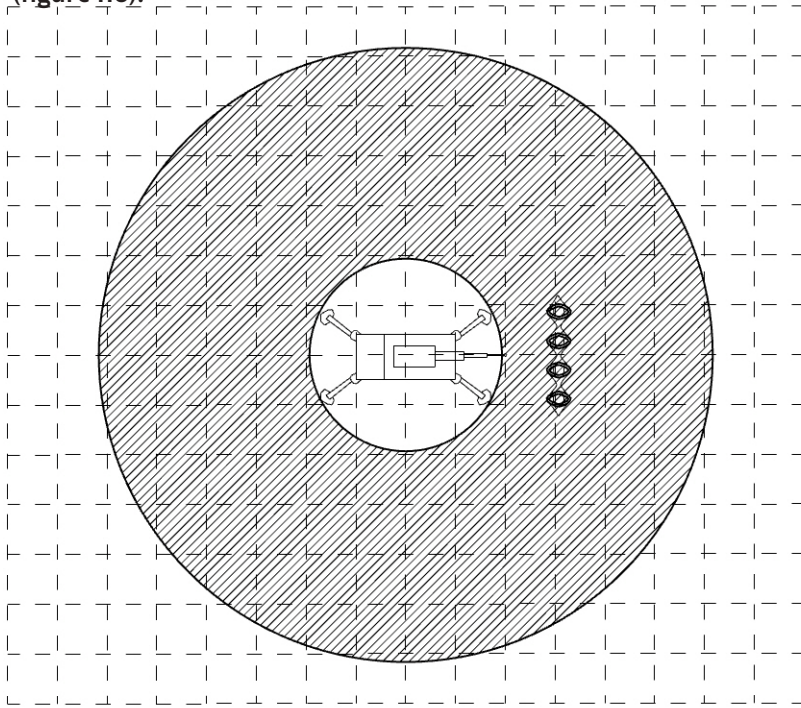


Figure II5: Construction 3d Maxi Printer. Source: <https://en.constructions-3d.com/la-maxi-printer> . [image]

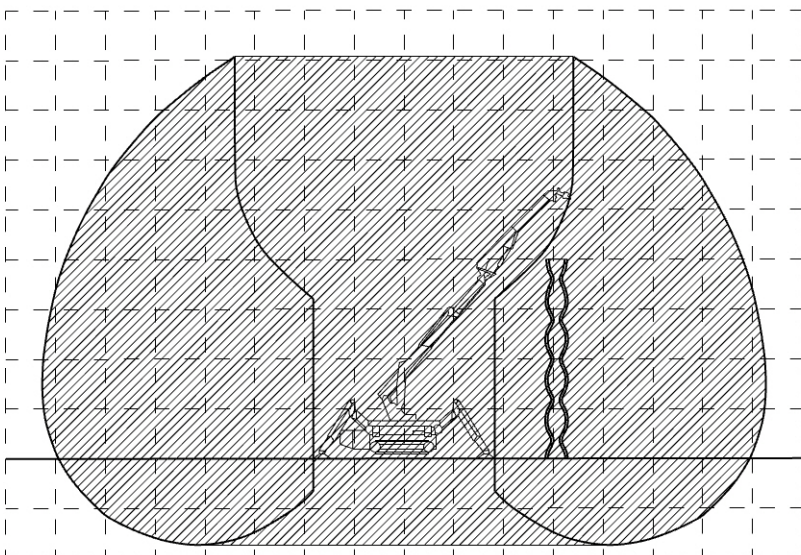


Figure II4: Construction 3d Maxi Printer, printable area, 1:150. Source: <https://en.constructions-3d.com/la-maxi-printer> . by Author. (2023). [drawing]



Figure II6: 3d Printed clay house, Tecla, by architect Mario Cucinella. Source: <https://www.archdaily.com/960714/tecla-technology-and-clay-3d-printed-house-mario-cucinella-architects>. Image by: Iago Corazza. [image]

On the other hand the wooden structure that covers the pavilions are built in a standard traditional lightweight wooden structure with simple wooden joints inspired by traditional wood building techniques (figure I17). The veins of the wood and its structure contrast and anchor the shells (figure I16). Whereas the bricks bring life to the shell as they gradually decompose and create different environments (figure I18-I20).

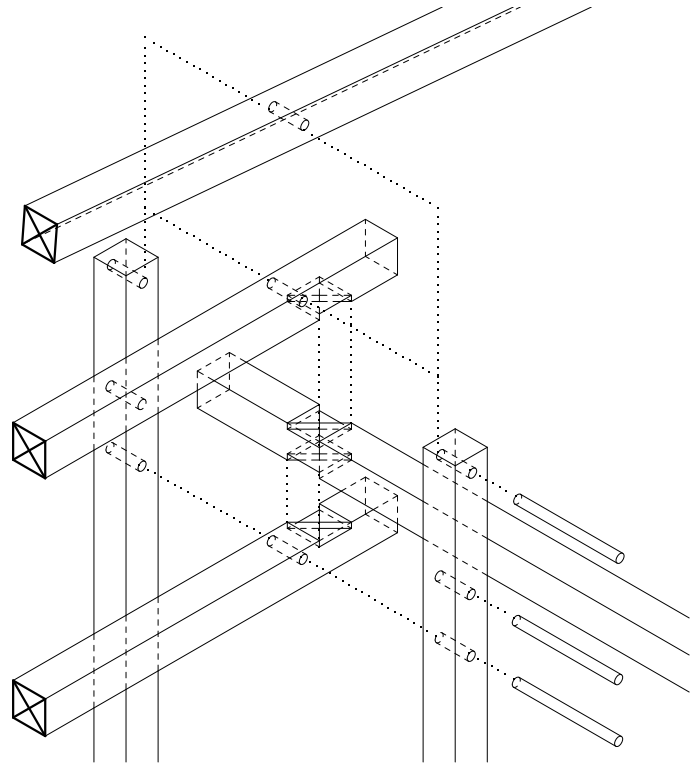


Figure I17: Wooden roof joint detail 1:20. by Author (2023). [image]



Figure I18: ALICE, 1st Year architecture student projects 2015-2016 Source: https://www.domusweb.it/en/news/2016/07/18/alice_house_1.html. Image by: Dylan Perrenoud [image]



Figure I19: James Emery BA, Year 3, student project AA. Source: <https://pr2020.aaschool.ac.uk/James-Emery> [Accessed 28 Jan. 2023] [image]



Figure I20: BIOHM, Mycelium bricks for construction. Source: <https://www.greentracearchitect.co.uk/post/mycelium-construction-materials> [Accessed 28 Jan. 2023] [image]

6.3 BODY PREPARATION -FLOWERING PAVILIONS

For the decomposition to take place, the body must be layed on a bed of organic matter (mainly wood chips, straw and alfalfa) and covered with it as well.

On the first day of ceremony, people enter the cemetery from the north of the river and cross the gardens to either one of the old crematory buildings. As they cross the gardens, they are invited to pick flowers and plants that are then layed out next to the transporter(“coffin”) for the ceremony.

After the main ceremony, the closest family memebers bring the body down (figure I21-I22) into the flowering pavilion mirroring the historical crematory (figure I23). They are first led to an intimate space where they uncover the transporter to expose the body wrapped in its shroud. They then proceed further to the end of the pavilion where they cover the body with organic matter as well as the flowers collected upon arrival. After this, they push the body back up the ramp and along the patch of garden leading out of the pavilion (figure I24).

The body is then taken to a Vessel of Metamorphosis.

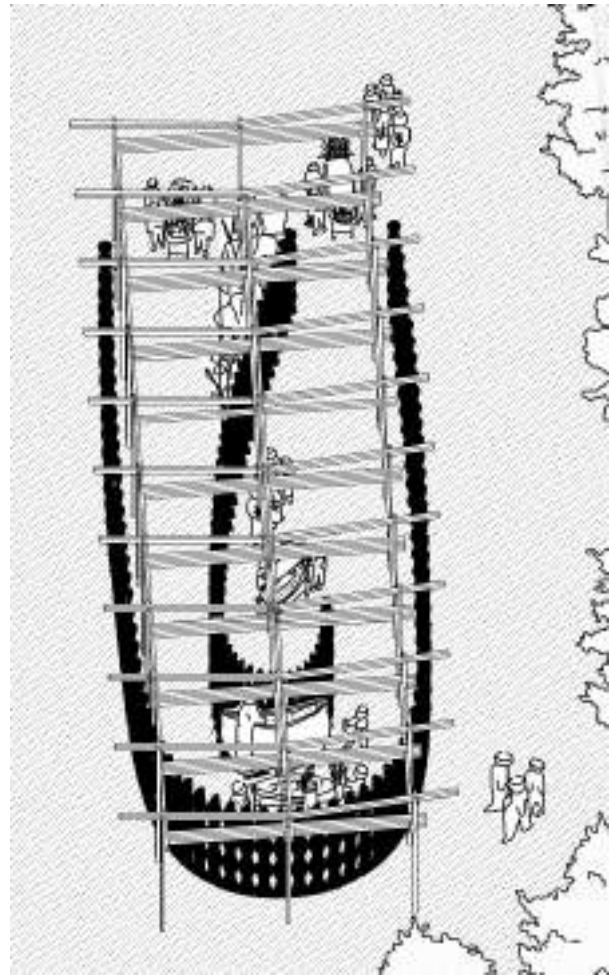


Figure I21: Flowering Pavilion, axonometric drawing extract. by Author (2023). [drawing]

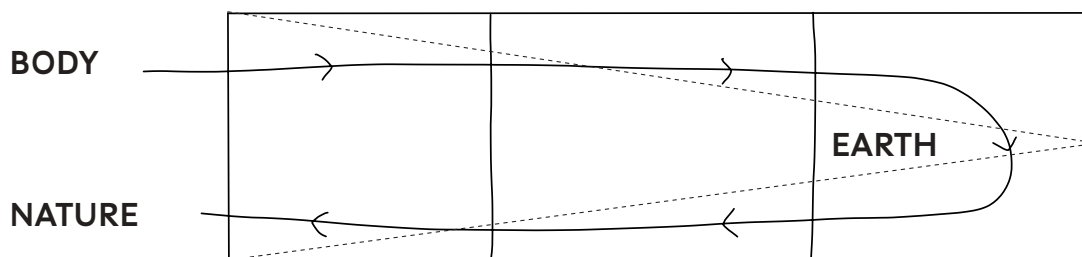
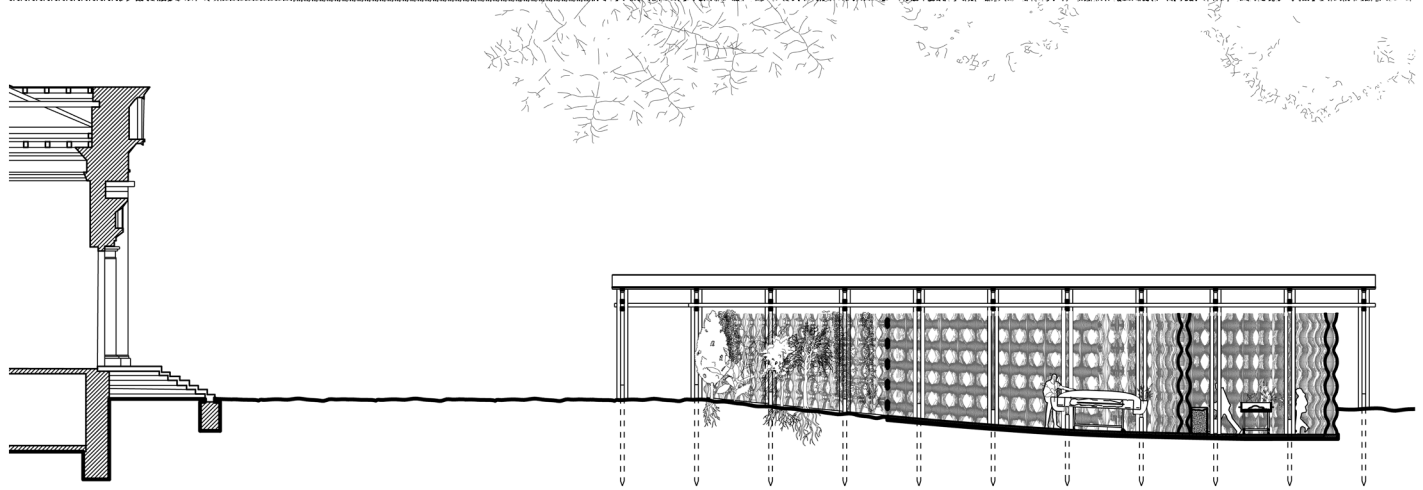
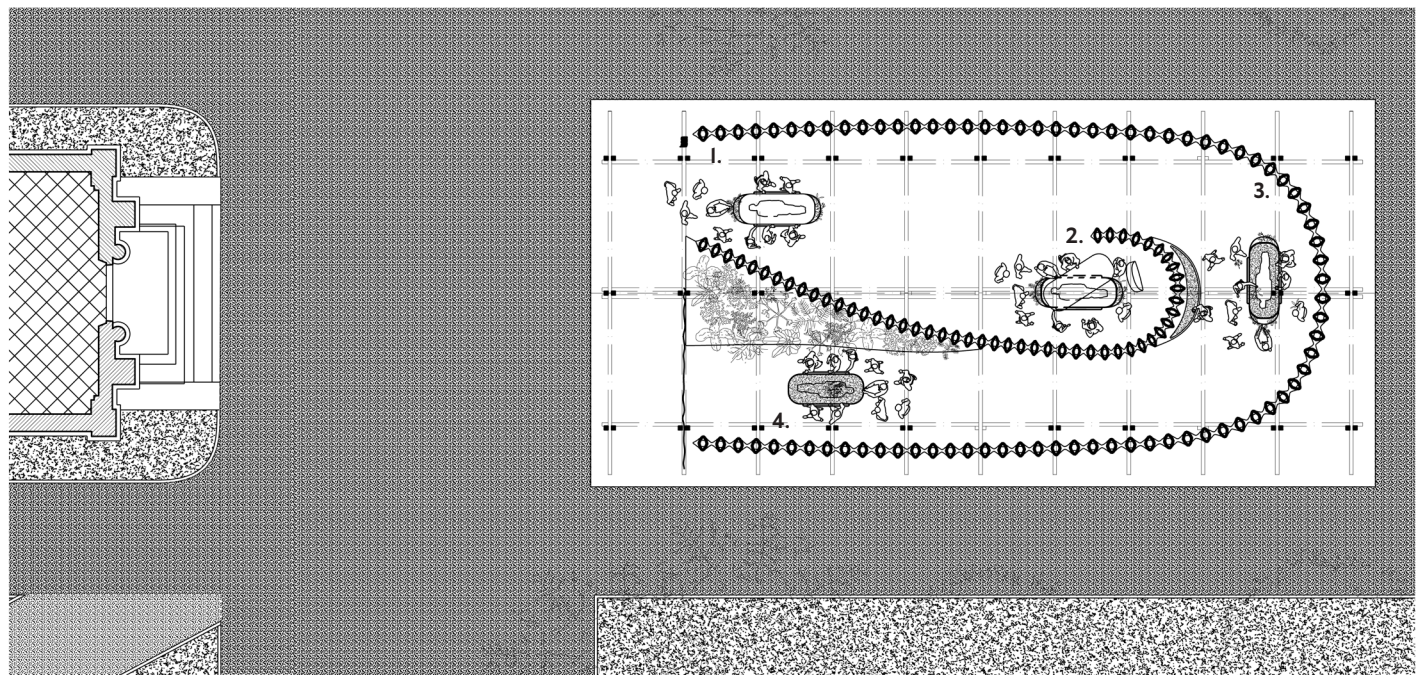


Figure I22: Design concept: movement in plan of flowering pavilion ceremony. by Author. (2023). [sketch]



Figure I23: Flowering pavilion facing Crematory D. by Author. (2023). [collage]



1. Entrance
2. Body exposing
3. Flowering ceremony
4. Exit

Figure I24: Flowering pavilion facing Crematory A, plan and section 1:250. by Author. (2023). [drawing]

PATHS & BRIDGES & WALLS

The decomposition of the grid of the existing cemetery not only translates in a physical and visual level (from straight paths to natural curved paths) but also aims to reduce hierarchy. Hierarchy in the existing paths of the cemetery create vertical and horizontal axis that highlight this grid. Therefore in the masterplan there are two types of paths: the natural and spiritual paths.

The natural paths are narrow paths made of wood chips reminding us of forest paths. These paths constitute the main typology of paths (figure I25).

The spiritual paths are slightly wider than the natural paths and these are made of smooth rammed earth. The purpose of these paths are to make the journey from the flowering pavilion to the vessels a smooth journey. They allow the body to be pushed along them delicately (figure I26).

The bridges that connect the gardens of remembrance to the forests of remembrance are made from the material of the existing walls. The existing walls are torn down to accommodate the new plots and open the cemetery to the city context. These walls go from separating elements to connecting (figure I27).

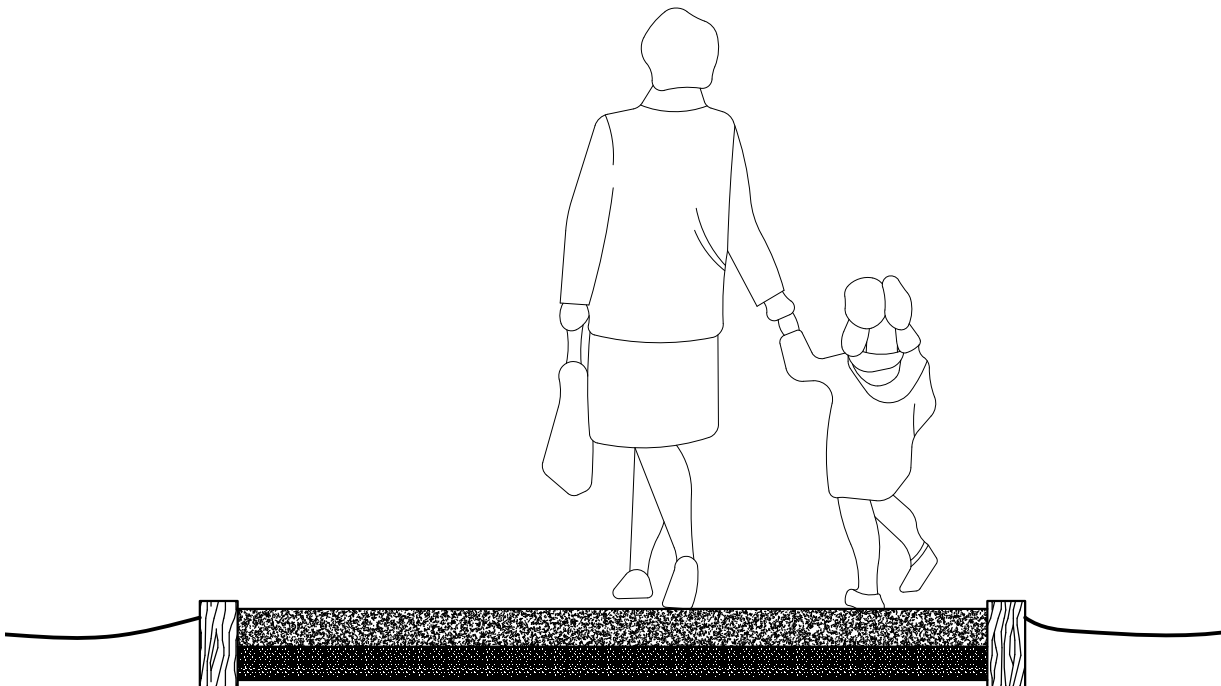
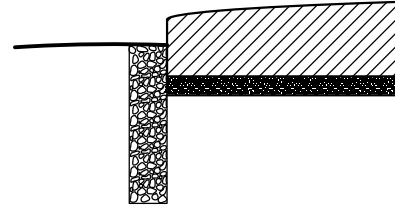


Figure I25: Natural Paths, I:20 by Author. (2023). [drawing]

Figure I26: Spiritual Paths, I:20 by Author. (2023). [drawing]

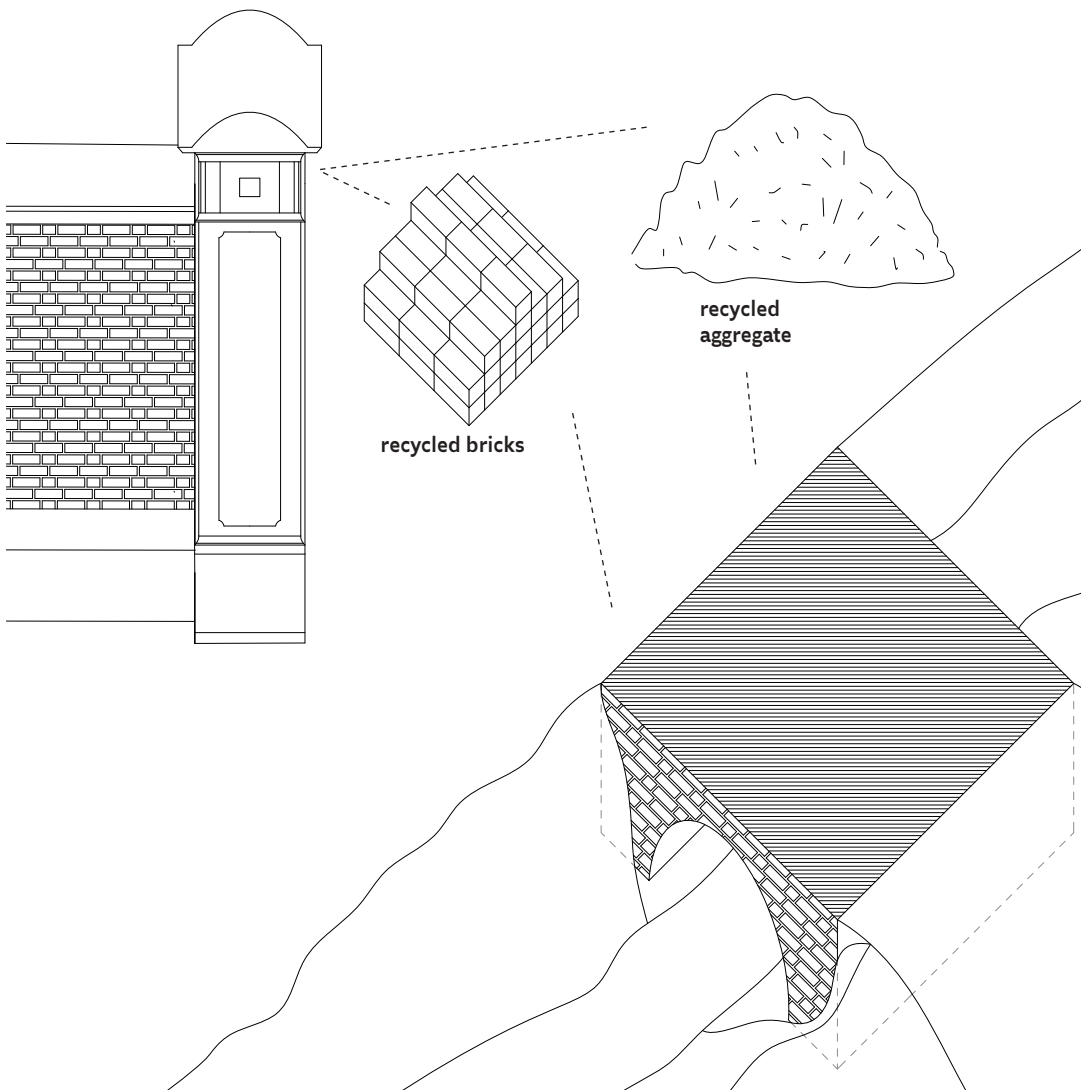
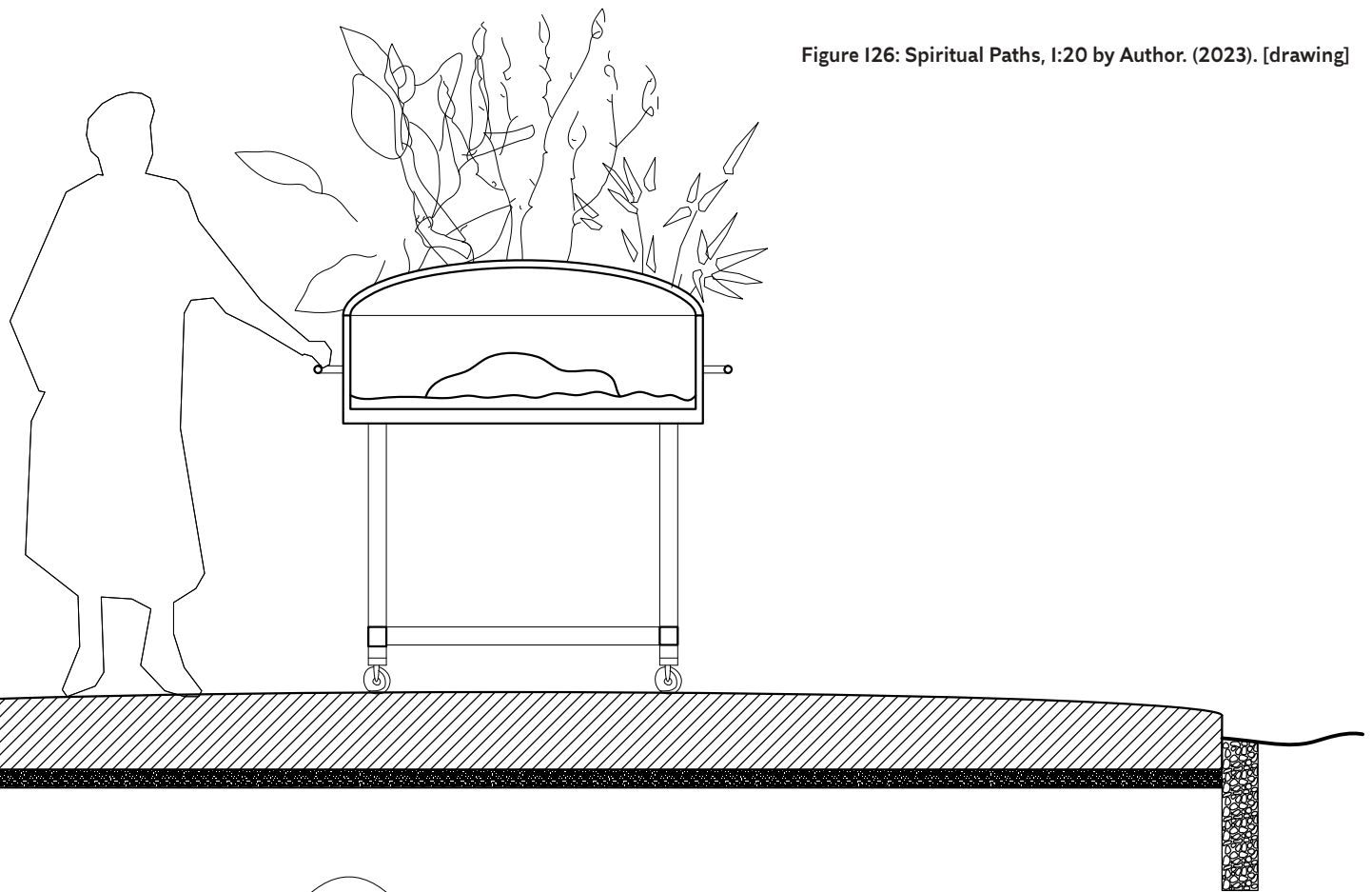


Figure I27: From separating walls to connecting bridges, I:200. by Author. (2023). [drawing]

6.4 DECOMPOSITION -VESSELS OF METAMORPHOSIS

After the flowering ceremony, there is the laying in (figure I28). The body is carried to one of the Vessels where it is left for a month to decompose (figure I29).

Throughout this period of time, there is a constant control of the air flow and temperature to ensure an efficient decomposition process (figure I30). The heat generated by the decomposition is transformed into energy that is used to light up the Vessel.

The vessels are 3d printed as well. Their envelope forms a skin useful for insulation but also for the planting of perennials (figure I31).

The vessels are aligned in groups and form a natural landscape adequate for planting gardens. They therefore physically integrate and become part of the gardens. When it rains, their topography creates natural water gardens. (figure I32).

The groups formed by these vessels are called clusters and are organised according to regions (figure I33-I35).

NUMBER OF VESSELS NEEDED IN SIHLFELD
FOR 2050: 653

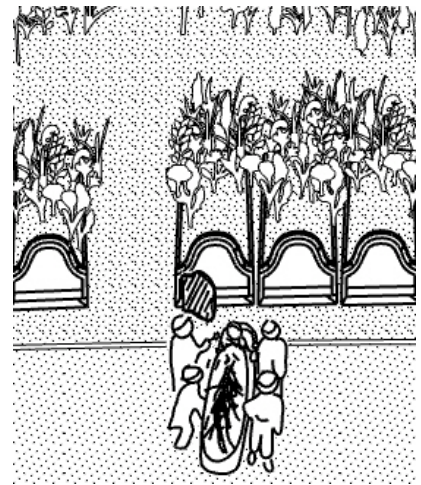


Figure I28: Laying in, axonometric drawing extract. by Author (2023). [drawing]

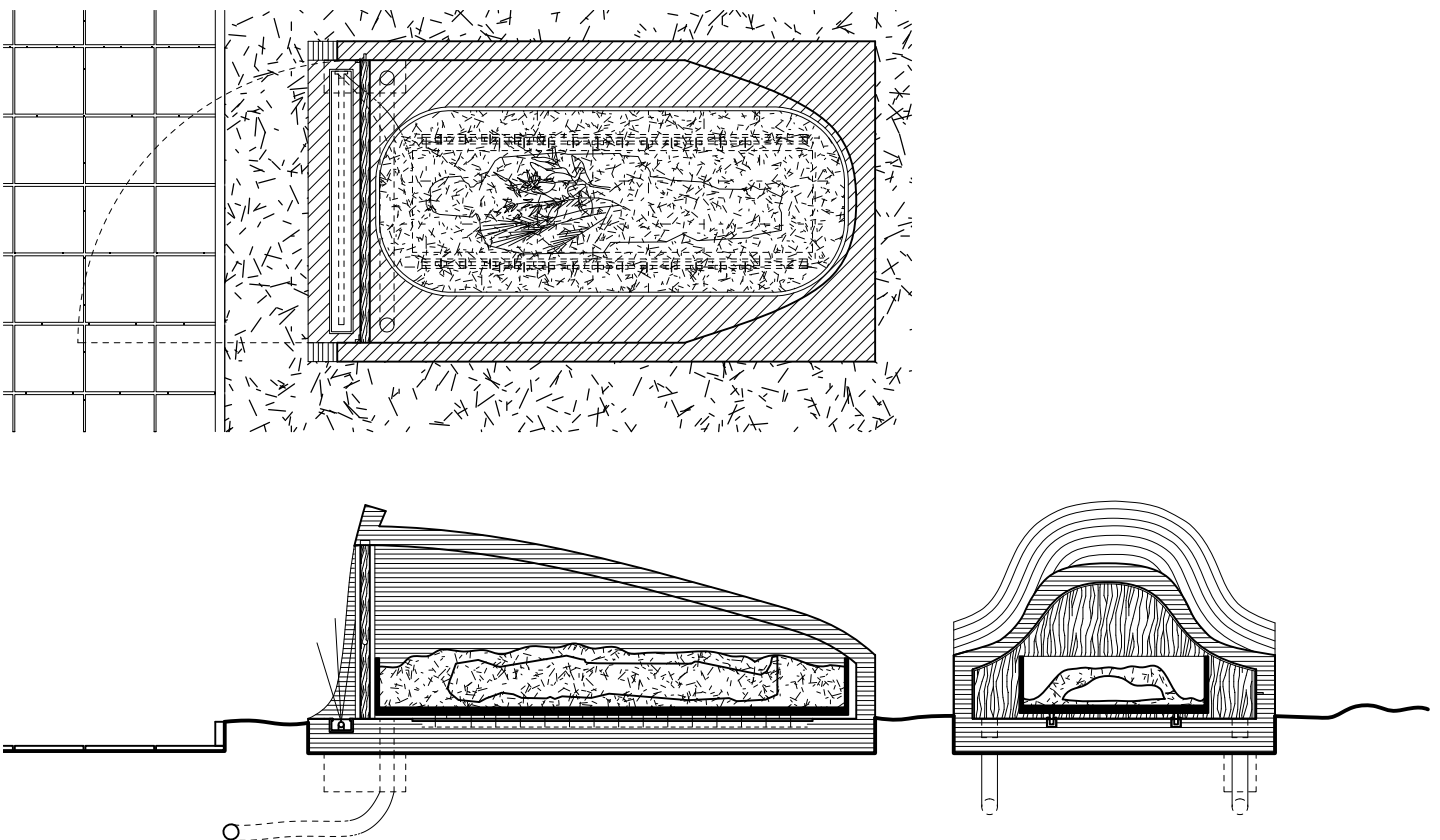


Figure I29: Vessels of Metamorphosis plan and sections I:40. by Author. (2023). [drawing]

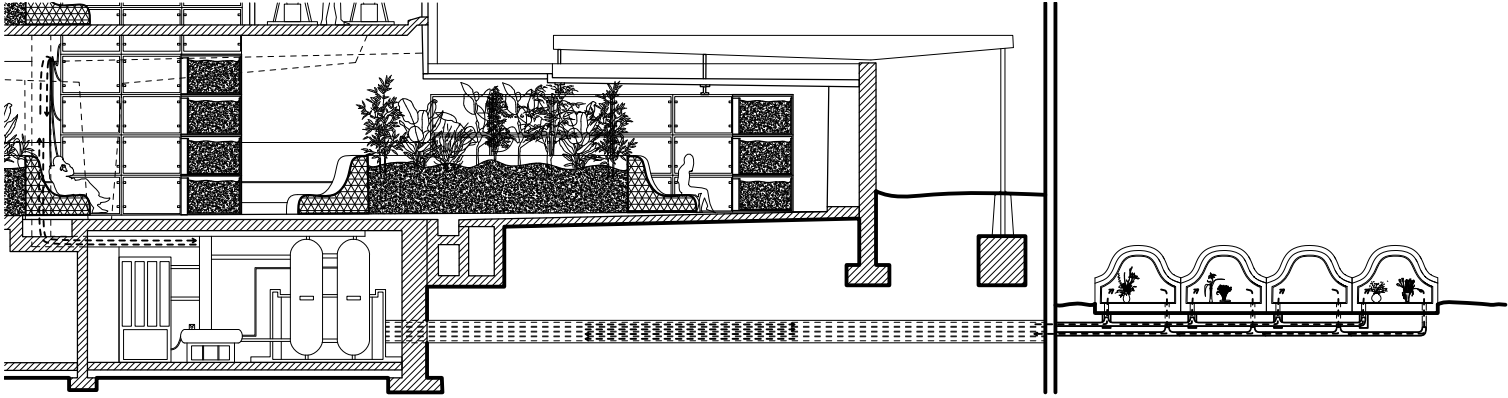


Figure I30: Air flow control system, I:150. by Author. (2023). [drawing]

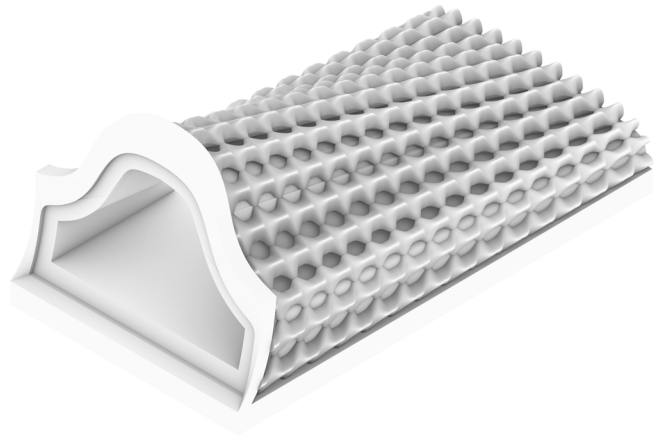


Figure I31: Vessel envelope structure, I:40. by Author. (2023). [image]

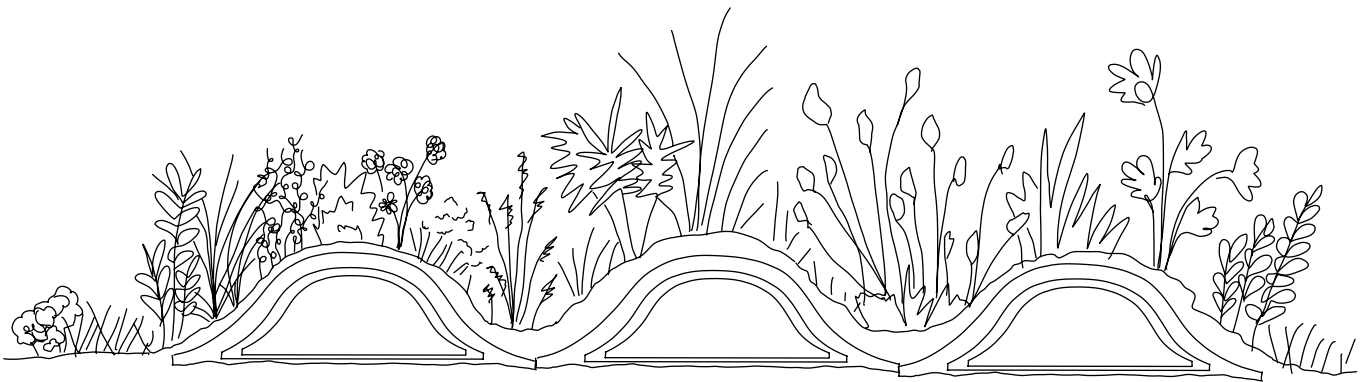


Figure I32: Vessels of Metamorphosis, integration in the Gardens of Remembrance. by Author. (2023). [sketch]

HOW ARE CLUSTERS AND VESSELS ORGANISED?

-Regions are allocated a number of Vessels according to their population size

DECOMPOSITIONS PER CEMETERY ACCORDING TO CEMETERY SIZE

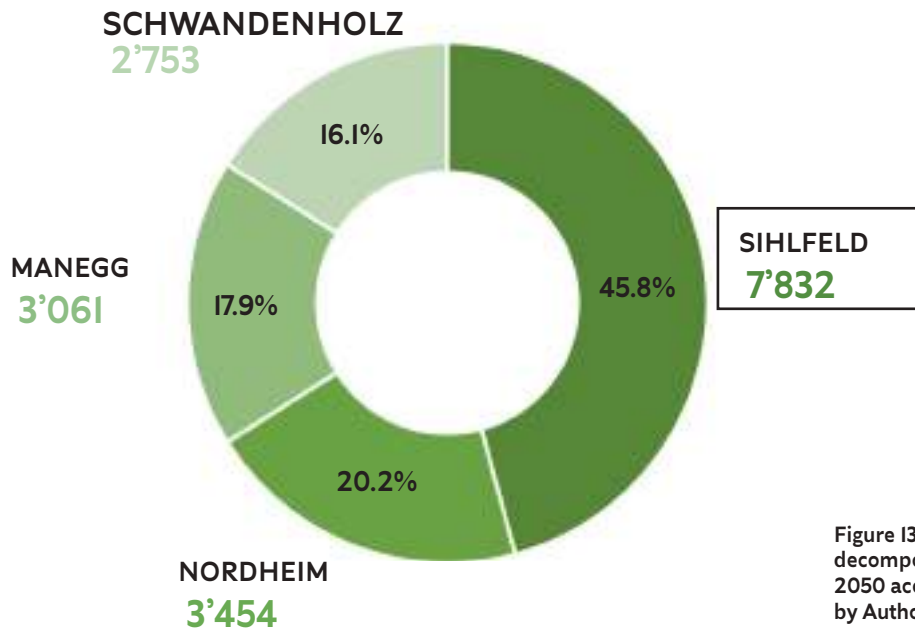


Figure I33: Distribution of bodies to decompose yearly in each cemetery in 2050 according to the size of the cemetery. by Author (2022) [sketch]

CEMETERY ATTRIBUTION ACCORDING TO POPULATION OF REGIONS

SIHLFELD CEMETERY

DISTRICT/REGION	POPULATION
ZÜRICH, Kreis I	5'817
ZÜRICH, Kreis 3	50'104
ZÜRICH, Kreis 4	29'023
ZÜRICH, Kreis 5	15'804
ZÜRICH, Kreis 7	38'663
ZÜRICH, Kreis 8	17'818
ZÜRICH, Kreis 9	57'077
ZÜRICH, Kreis 12	32'654
BÜLACH	158'566
DIELSDORF	92'479
DIETIKON	95'438
MEILEN	107'006
TOTAL	700'449

NORDHEIM CEMETERY

DISTRICT/REGION	POPULATION
ZÜRICH, Kreis 6	35'355
ZÜRICH, Kreis 10	41'017
ZÜRICH, Kreis 11	76'975
USTER	136'806
HINWIL	98'201
TOTAL	388'354

MANEGG CEMETERY

DISTRICT/REGION	POPULATION
ZÜRICH, Kreis 2	36'025
AFFOLTERN	56'370
HORGEN	128'224
TOTAL	220'619

SCHWANDENHOLZ CEMETERY

DISTRICT/REGION	POPULATION
WINTERTHUR	174'646
PFÄFFIKON	61'597
ANDELFINGEN	32'136
TOTAL	268'379

Figure I34: Population Distribution per Kreis and District. Source for districts: <http://www.citypopulation.de/en/switzerland/zurich/>. Source for Kreis: https://de.wikipedia.org/wiki/Stadtteile_der_Stadt_Z%C3%BCrich (Accessed 31 Jan. 2023) [table]

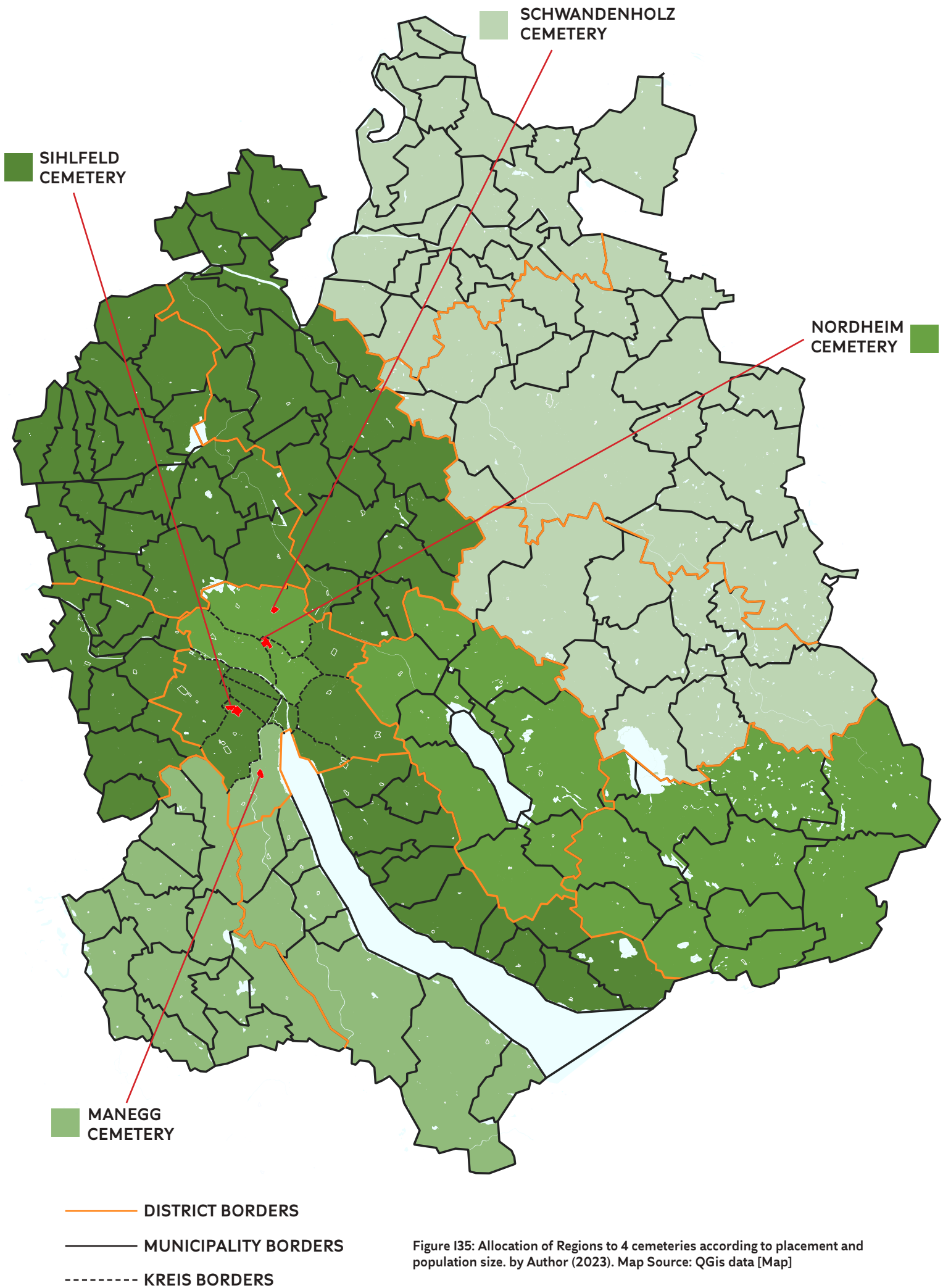


Figure I35: Allocation of Regions to 4 cemeteries according to placement and population size. by Author (2023). Map Source: QGis data [Map]

6.5 MOURNING

-PAVILIONS OF REMEMBRANCE

As mentioned in chapter 6.2, the constructive system of the pavilions is based on a concept of decomposition (figure I36). Therefore, not only do the flowering pavilions evolve, change and decompose but so do the pavilions of remembrance (figure I37).

These pavilions are placed in each plot south of the river (forest side) and follow 3 typologies. The smallest modules are the spiritual pavilions, the medium are the technological pavilions and the largest are the natural.

Theses allow the park to engage in workshops, and other public activities to add some dynamic movement to the forests of remembrance.

The pavilions change function according to their state of decomposition. Here are the activities proposed (figure I38):

Flowering pavilion:

- Full mycelium: meeting space

- Expanding mycelium:

meditation room

- Decomposed mycelium: exhibition space

Technological pavilion:

- Full mycelium bricks: tech lab

- Expanding mycelium : pottery workshop

- Decomposed mycelium: pop-up store

Natural pavilion:

- Full mycelium: seeding house

- Expanding mycelium : flowering atelier, flower drying

- Decomposed mycelium: plant store

Life cycle:

- Every 4 years: new mycelium bricks

- Every 16 years: reprint shells

- Every 33 Years : replace wooden structure



Figure I36: 3 pavilion typologies at different stages of decomposition, axonometric drawing extract. by Author (2023). [drawing]

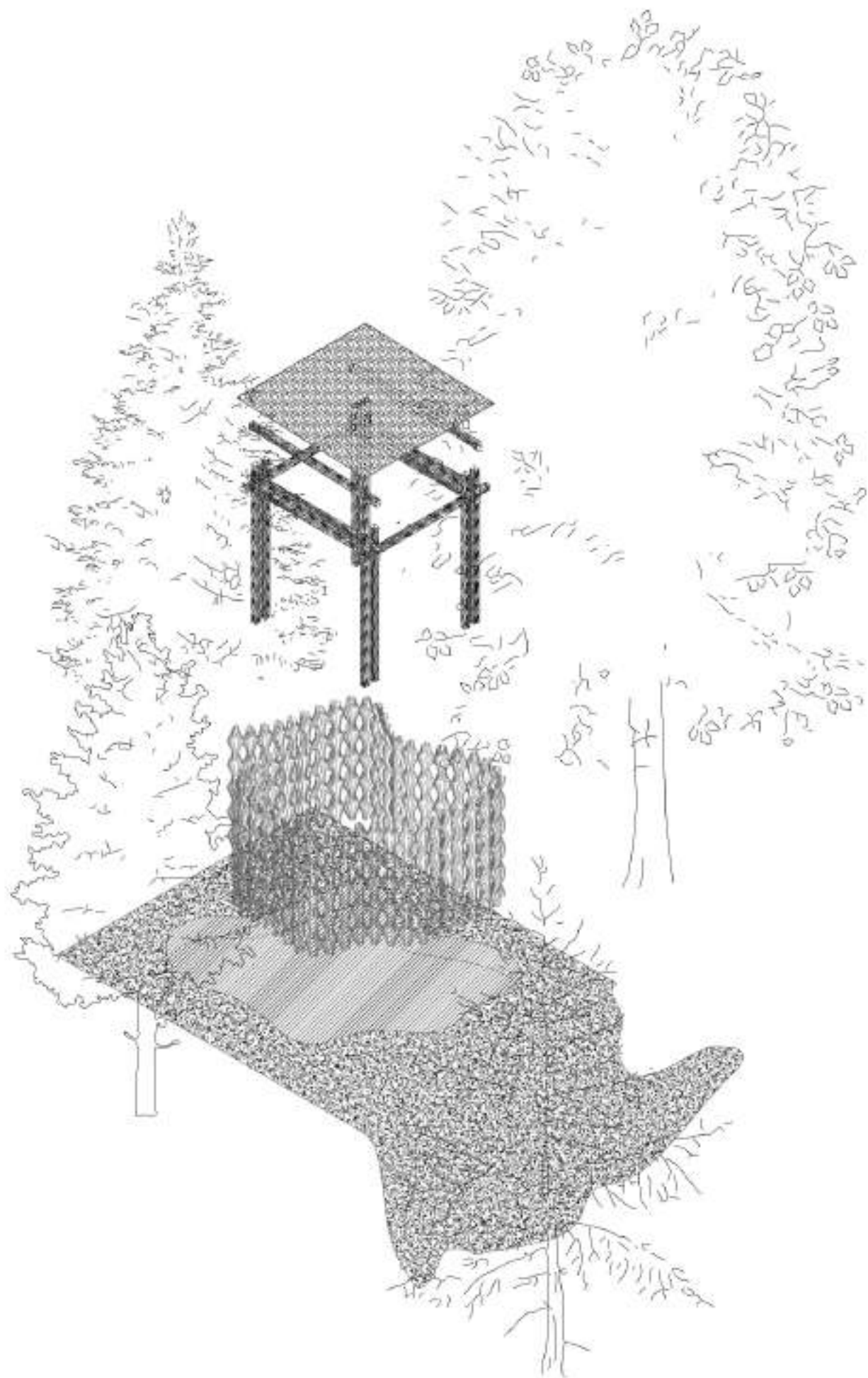
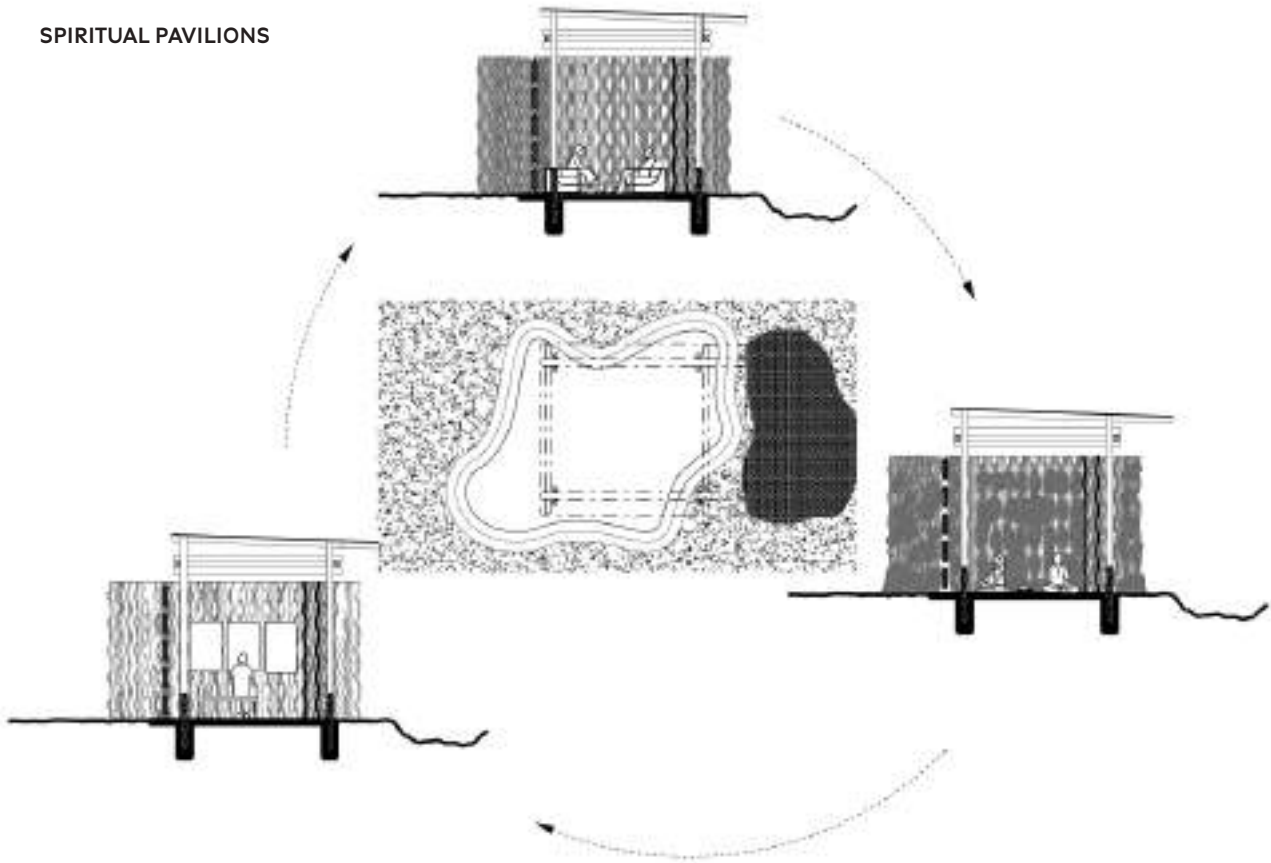
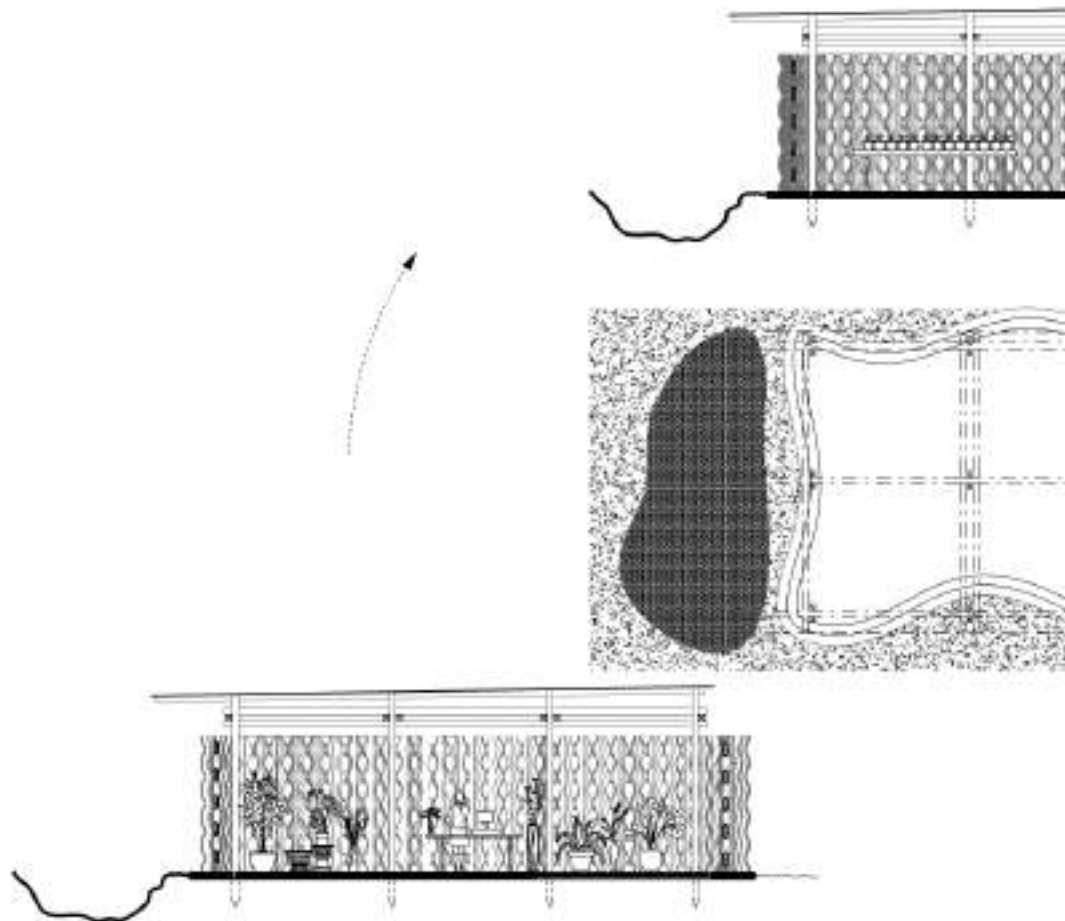


Figure 137: Exploded axonometric spiritual pavilion I: I50. by Author. (2023). [drawing]

SPIRITUAL PAVILIONS



NATURAL PAVILIONS



TECHNOLOGICAL PAVILIONS

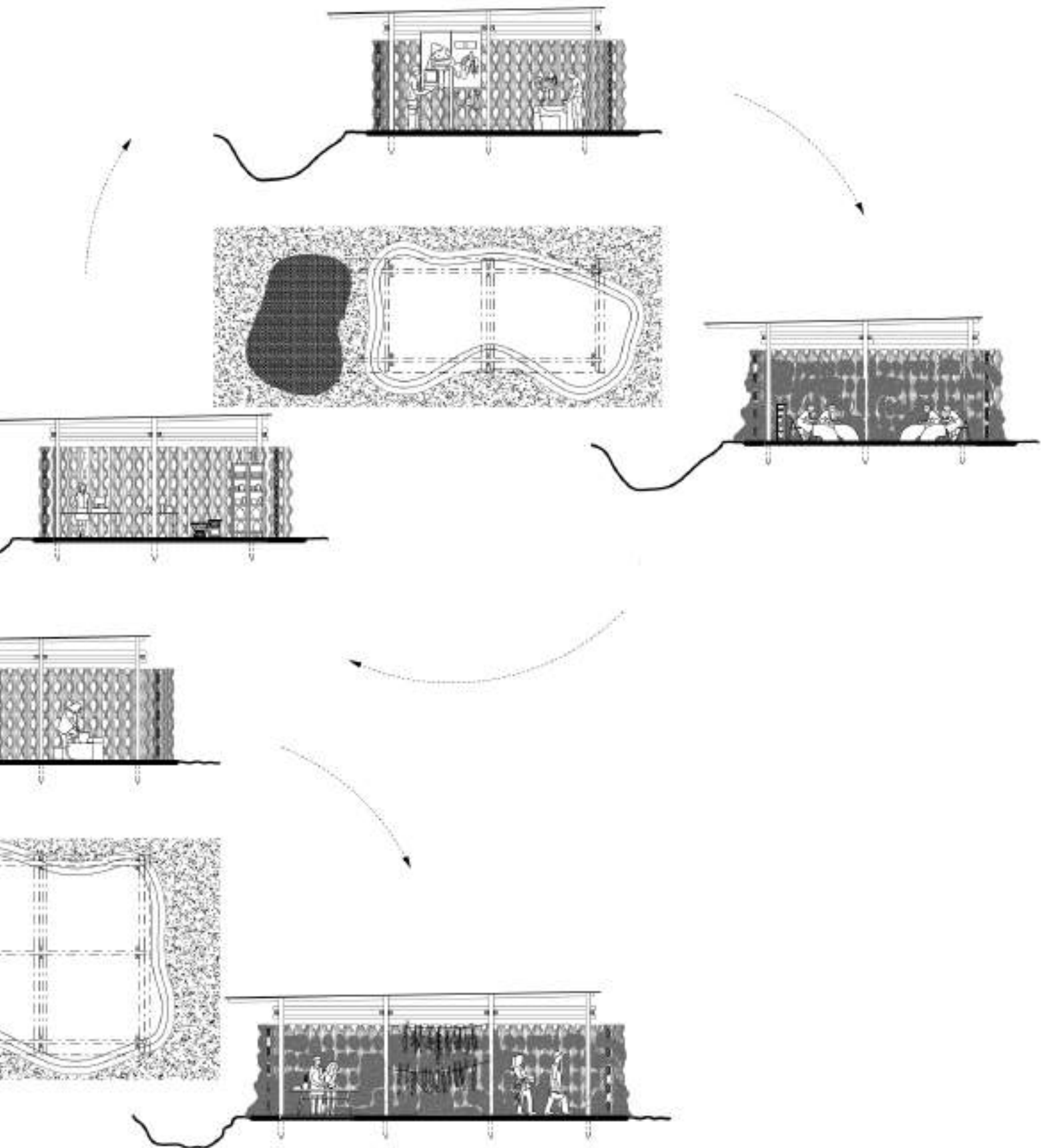


Figure I38: Spiritual pavilion, technological pavilion, natural pavilion: I50. by Author. (2023).
[drawing]

6.6 CURING & TESTING -HOUSE OF REST

Once the body has decomposed the compost is brought to the house of rest where it is filtered and the bones over 1 cm are turned into a fine powder. Then a transfer ceremony takes place and the earth is laid in a resting block (figure I38) where the microbial activity gradually stops.

The building is organised so that the technical units for control are in the basement along with the ceremony room. In the other floors the curing containers are stacked in towers. The benches are places for visiting and relaxing during this mourning phase. The benches form organic shapes, in their interior a small offset of earth acts as the rooting system for climbing plants that connect the floors to one another and to the open roof (figure I39-I41).

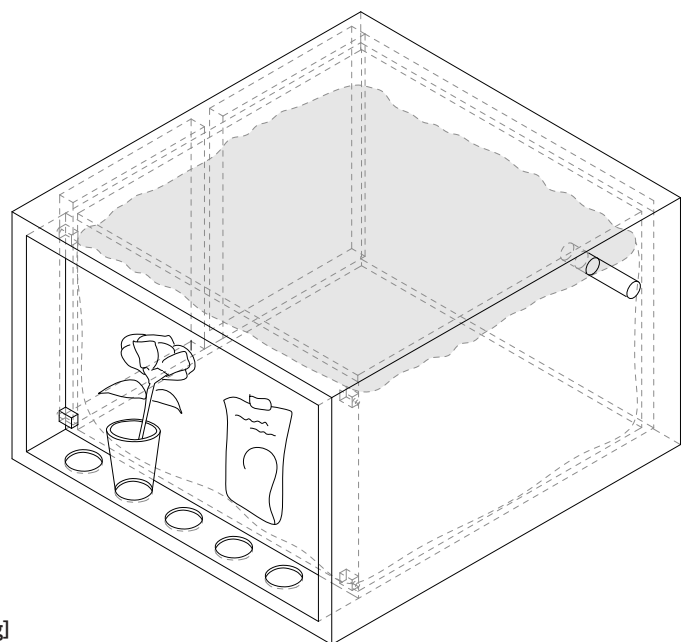
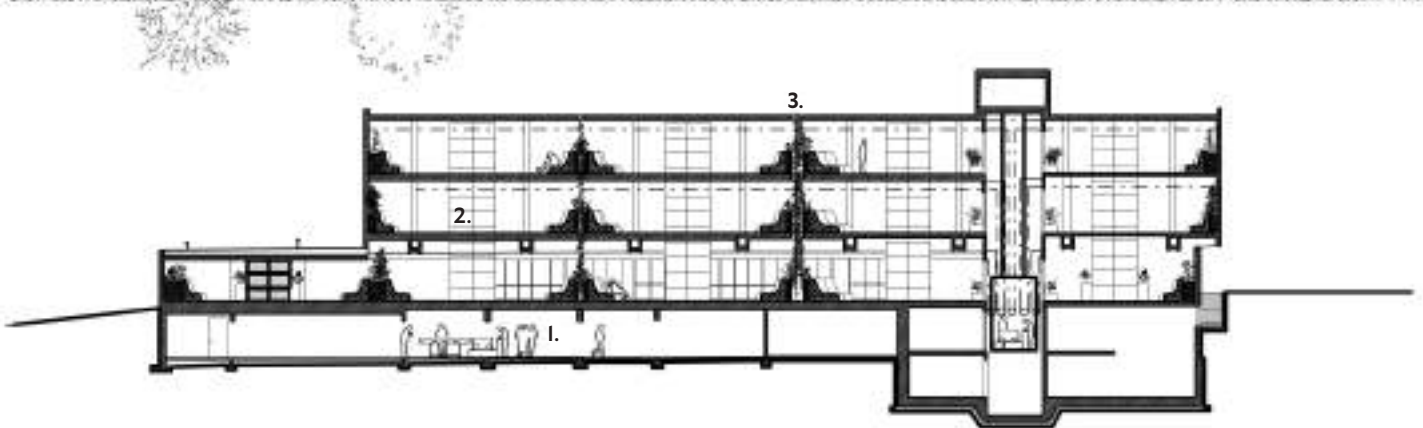
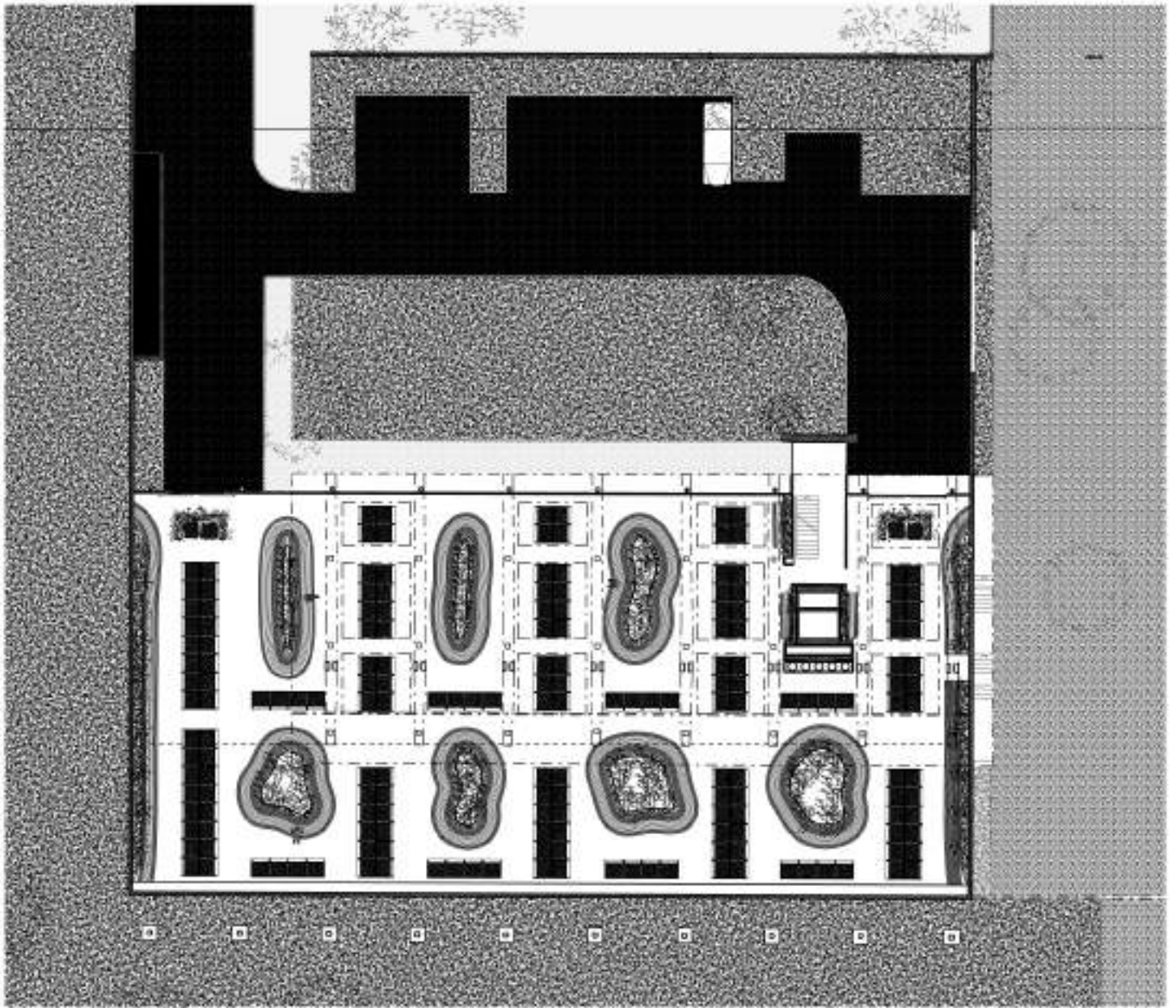


Figure I39: Earth resting block, I: 20. by Author. (2023). [drawing]



- 1. Earth transferring ceremony
- 2. Resting Blocks
- 3. Open roof skylight

Figure I40: House of rest, 1:400. by Author. (2023). [drawing]

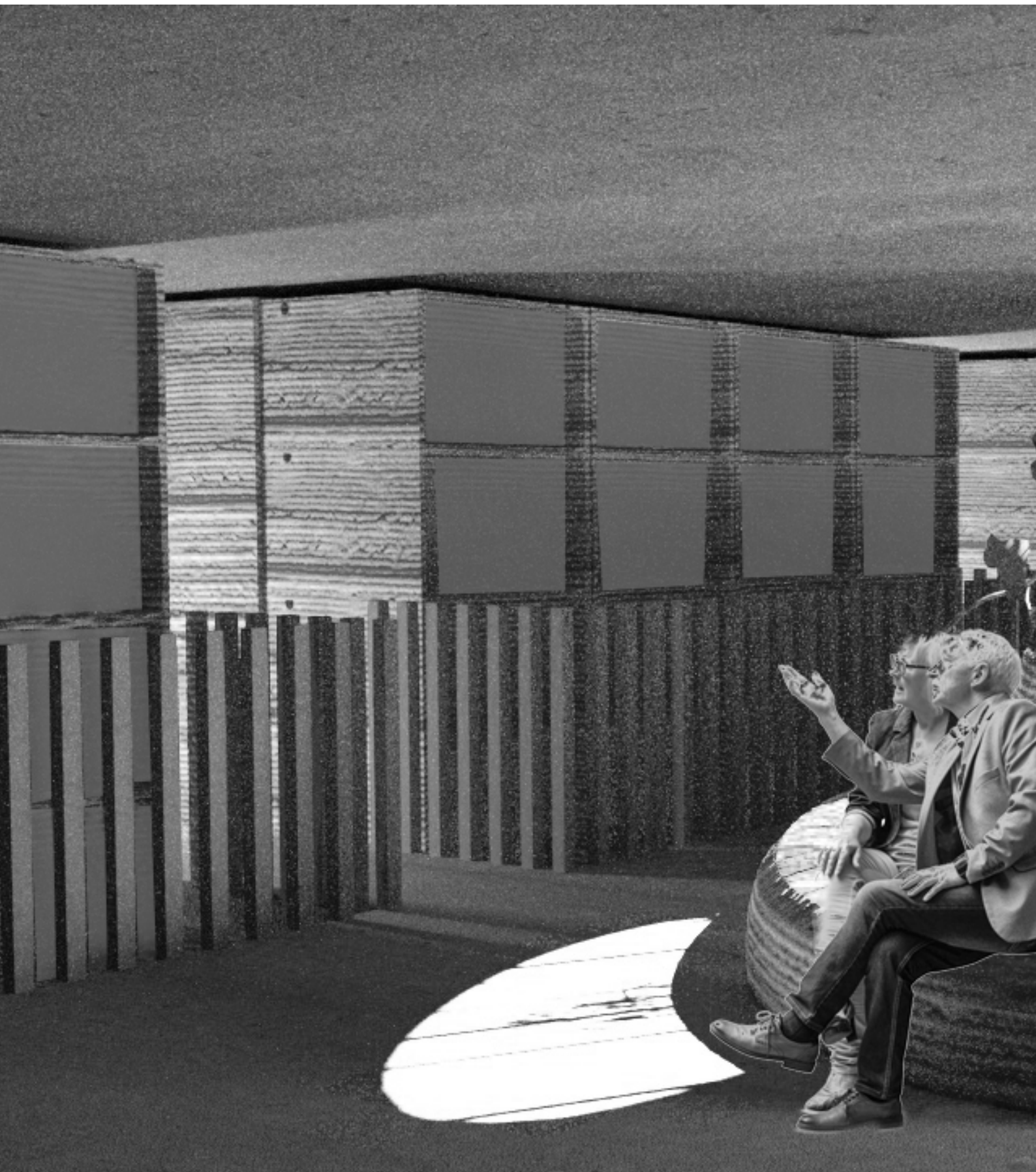
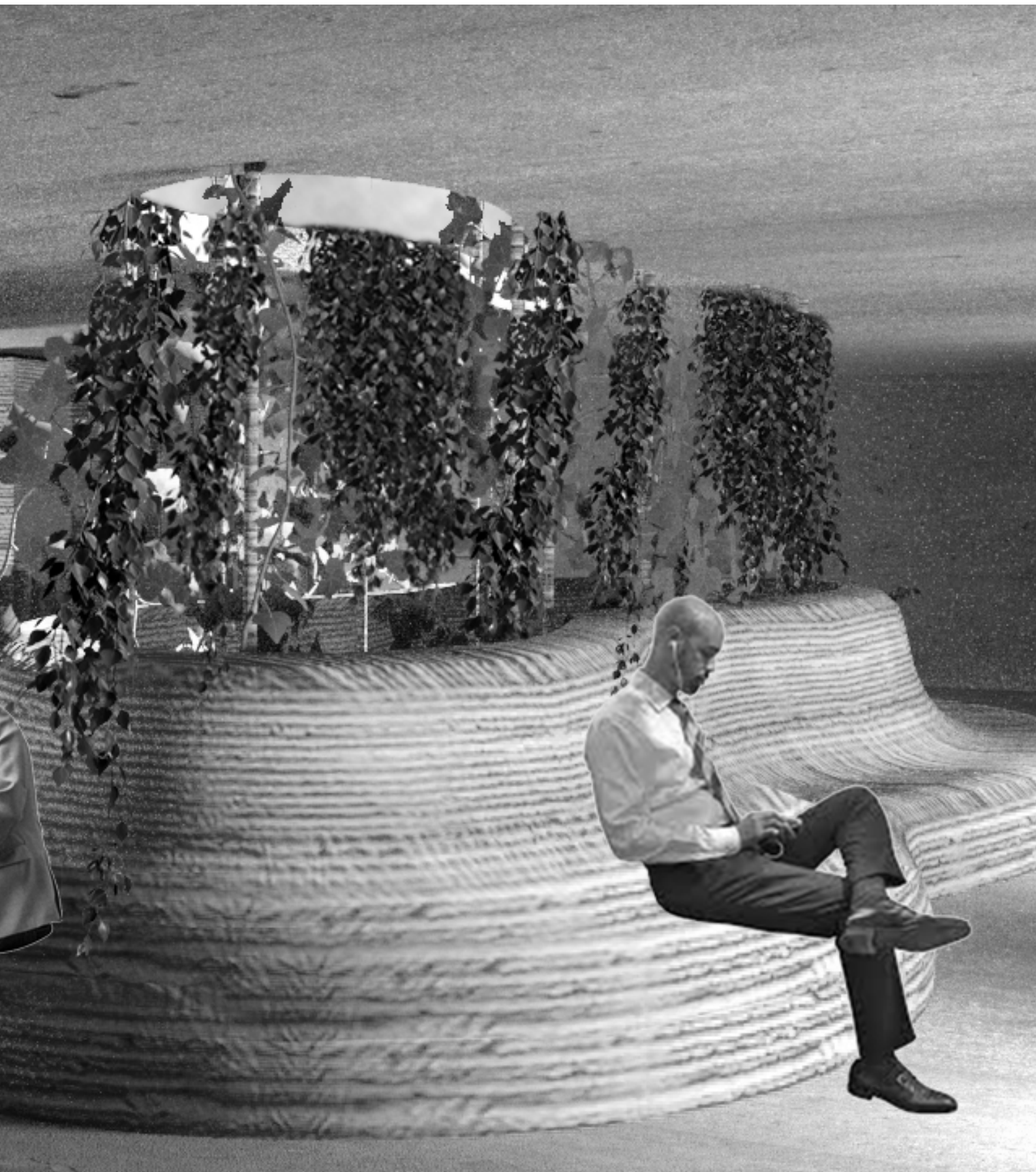


Figure 141: House of Rest, imaginary. by Author. (2023). [rendering/collage]



6.7 ARCHITECTURE REGENERATION -HOUSE OF CONSTRUCTION

The house of construction (figure I42) is the main place for construction and material storing. A main building is set along the river and thus separated in two parts. On the garden part, the clay is stored and on the forest part, the wood is kept. This alley along the river generates an entrance gate gradually inviting people to enter the cemetery from the street. It also marks the start of the river. On each side of these main building arms, two smaller pavilions are set. Within the forest, the wood and mycelium construction pavilion and on the garden side, the 3d printing lab. The shape of their shells mirror the construction system defined by the techniques and tools (figure I43).

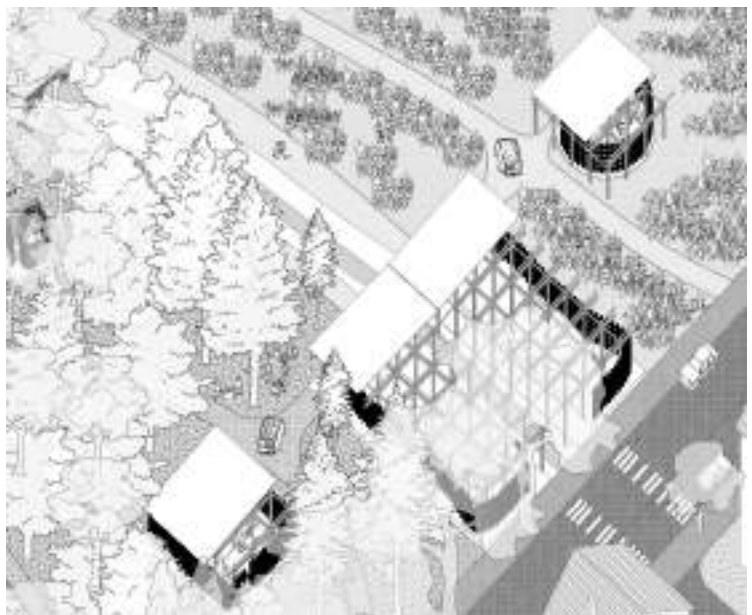
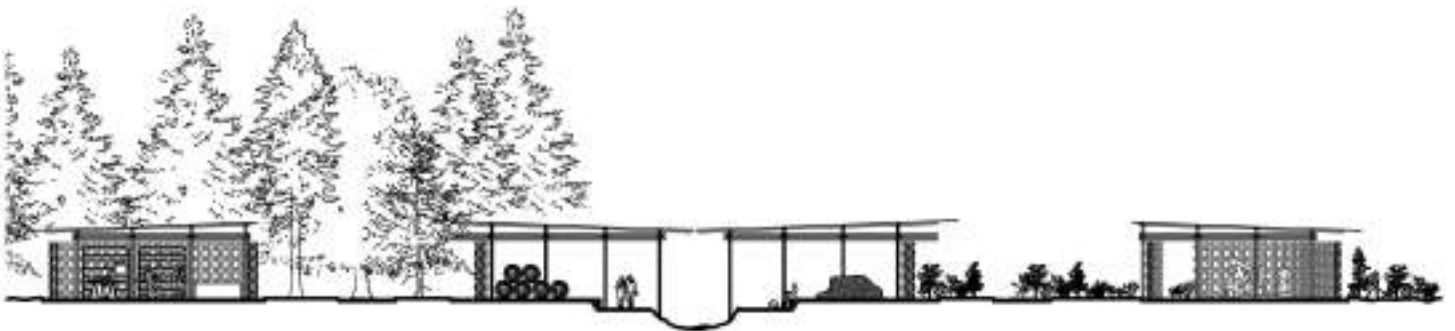
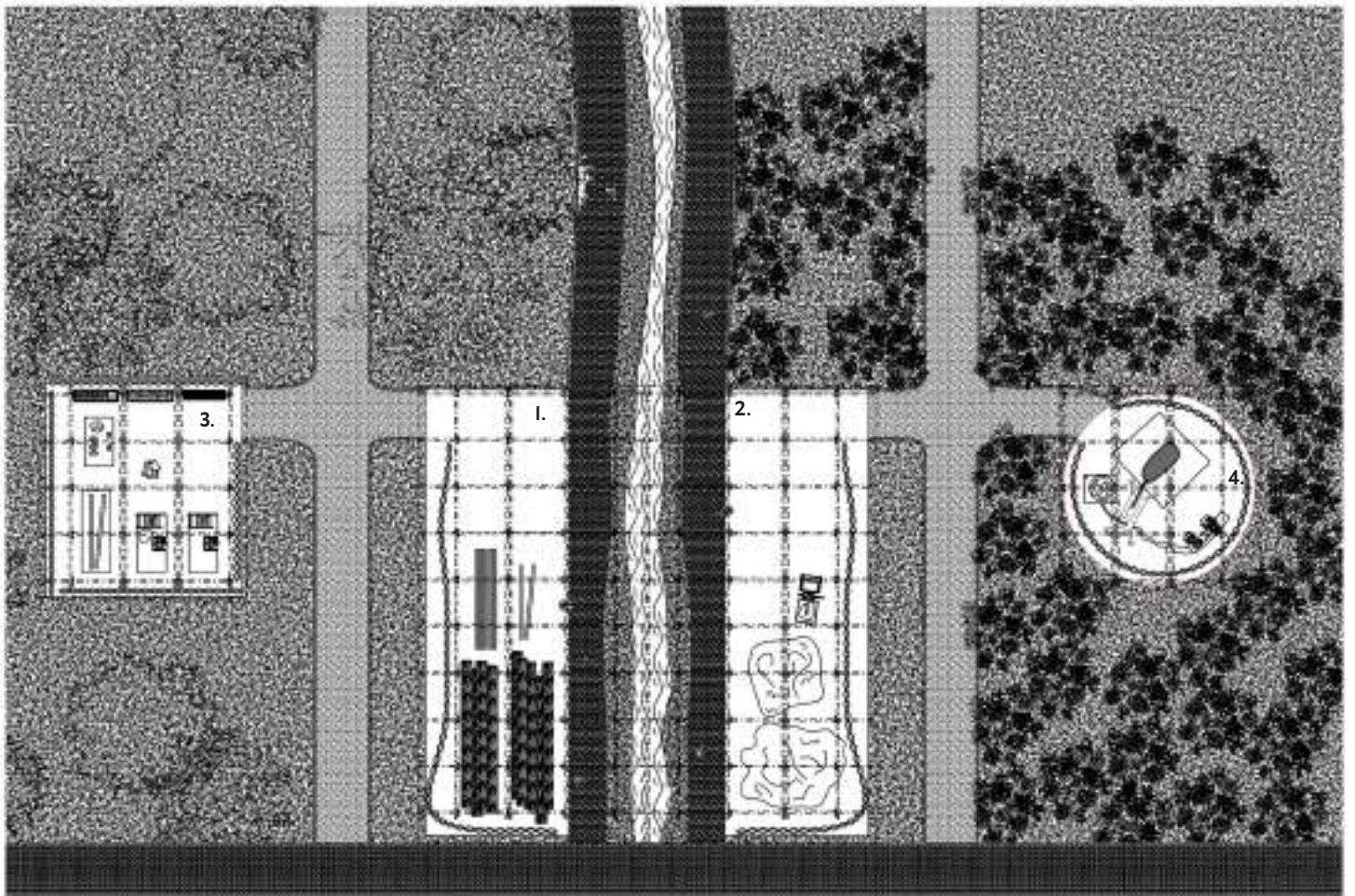


Figure I42: House of Construction, axonometric drawing extract. by Author (2023). [drawing]



- 1. Wood storing
- 2. Earth storing
- 3. Wood and Mycelium Workshop
- 4. 3d printing lab

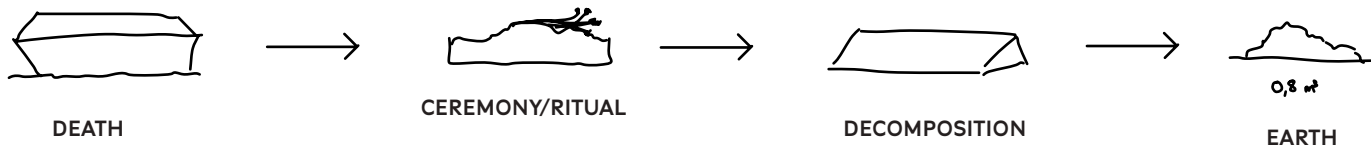
Figure I43: House of construction, 1:400. by Author. (2023). [drawing]

6.8 NATURE REGENERATION -GARDENS OF REMEMBRANCE

The process of natural organic reduction generates approximately 0.8 square meters of earth per person. The question then becomes, what happens with the earth generated (figure 144)?

If you choose to dispose of the earth in Sihlfeld, you have the choice between perennials in the gardens of remembrance or trees in the forest of remembrance (figure 145).

EARTH DISPOSAL OPTIONS



HYPOTHETICAL ANALYSIS:

NUMBER OF DEATHS FROM 2050-2150: 1'850'000

VOLUMES OF EARTH GENERATED FROM 2050 TO 2150: 1'480'000 M3

HYPOTHESIS OF EARTH DISTRIBUTION:

- 35% -EARTH THAT IS USED OUTSIDE OF CEMETERY: 518'000 M3
 - Construction Bricks
 - Forest soil regeneration
 - Private garden planting
- 39% -TOPSOIL REGENERATION IN THE CEMETERY, CREATION OF NEW PLOTS: 576'000 M3
 - 2cm of soil to cover the ground and regenerate the soil throughout the cemetery
- 12% -EARTH USED FOR PLANTING TREES : 177'600 M3
 - Trees planted around green cords for coppicing and forest like environment
- 14% -EARTH USED FOR PLANTING GARDENS: 207'200 M3
 - Gardens at the boundary with the exterior of the cemetery

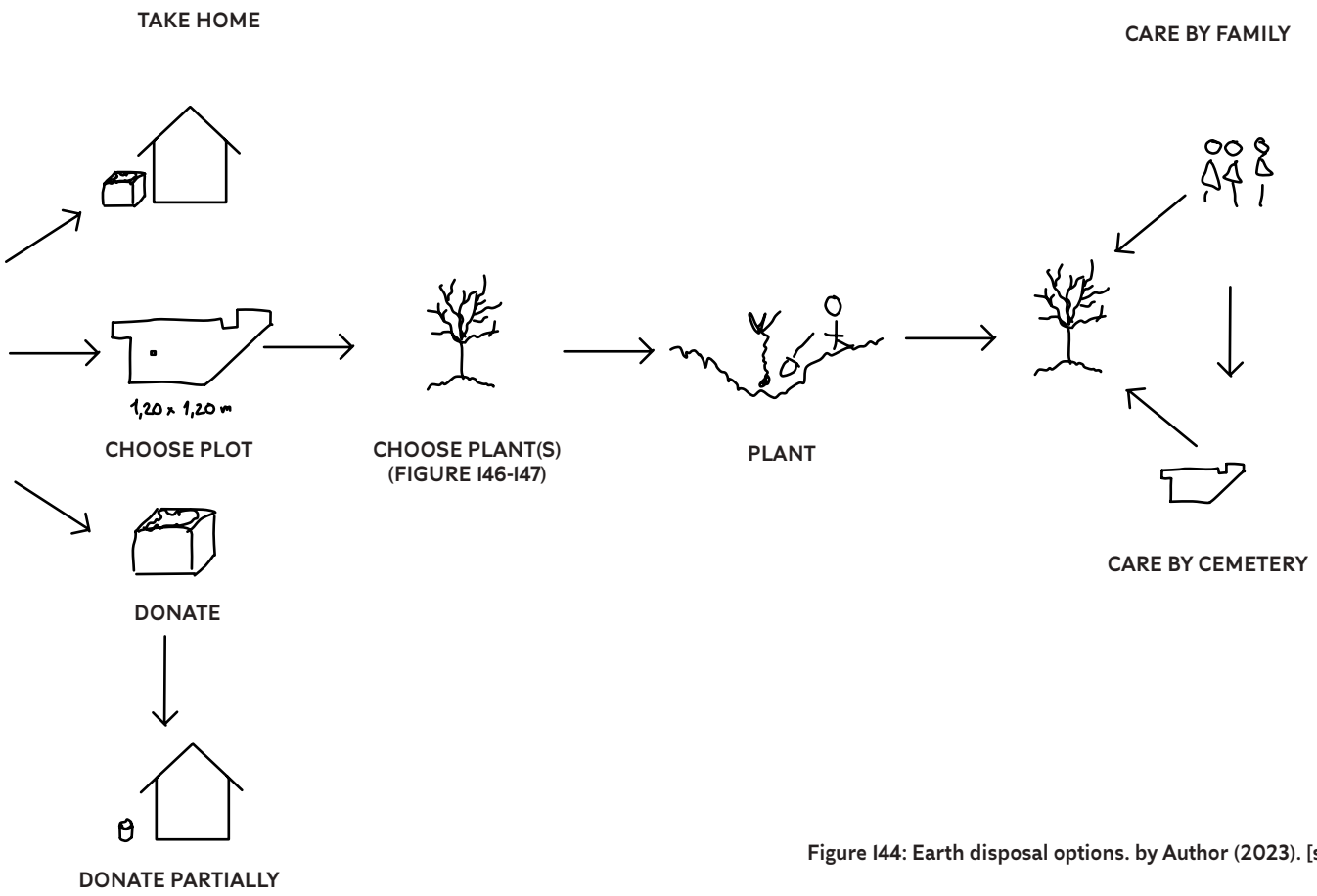


Figure I44: Earth disposal options. by Author (2023). [sketch]

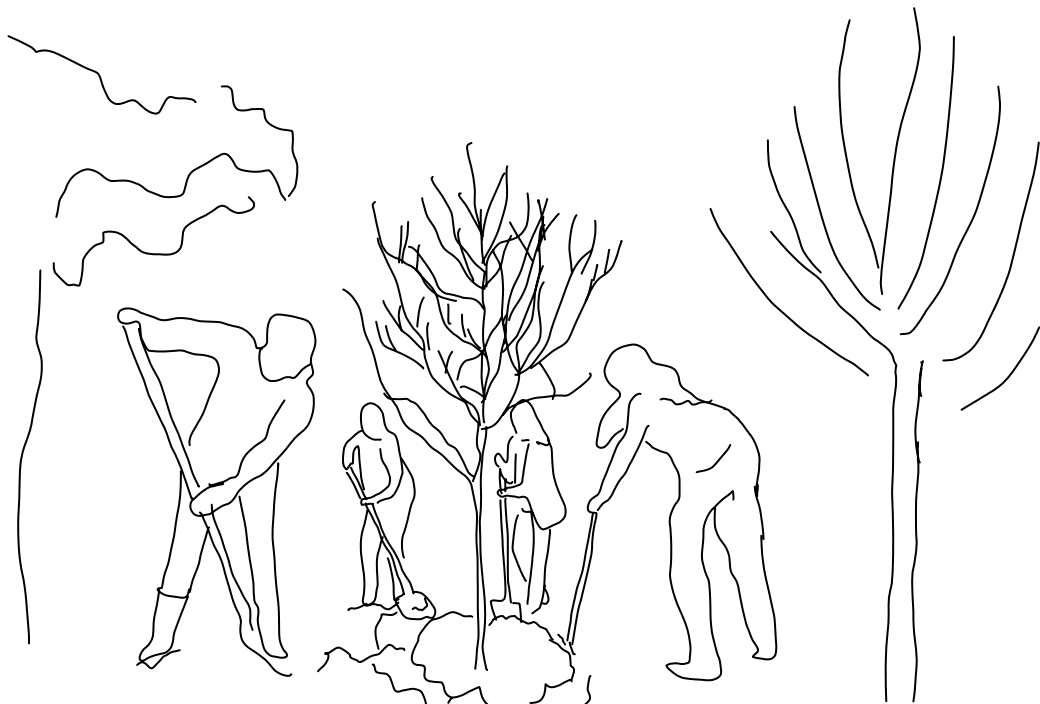


Figure I45: Tree planting in the forests of Remembrance. by Author (2023). [sketch]

Inventory of existing trees on site and proposal of trees that can be planted:

Hypothesis of the amount of Trees planted from 2050-2150: 259'000

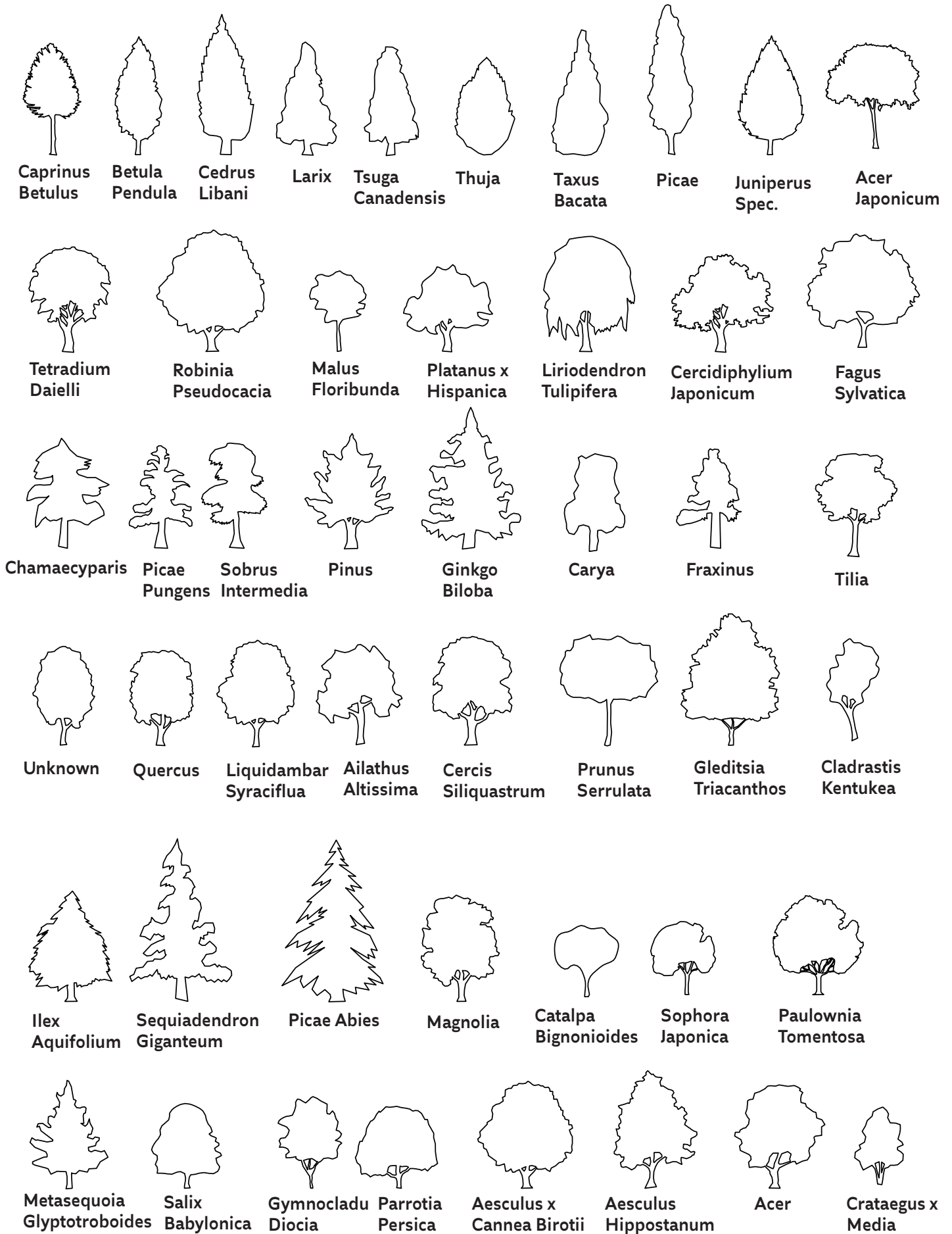


Figure 146: Tree inventory, forests of remembrance. by Author (2023). [sketch]

Inventory proposal of perennials that can be planted:

Hypothesis of the amount of perennials planted from 2050-2150: 222'000

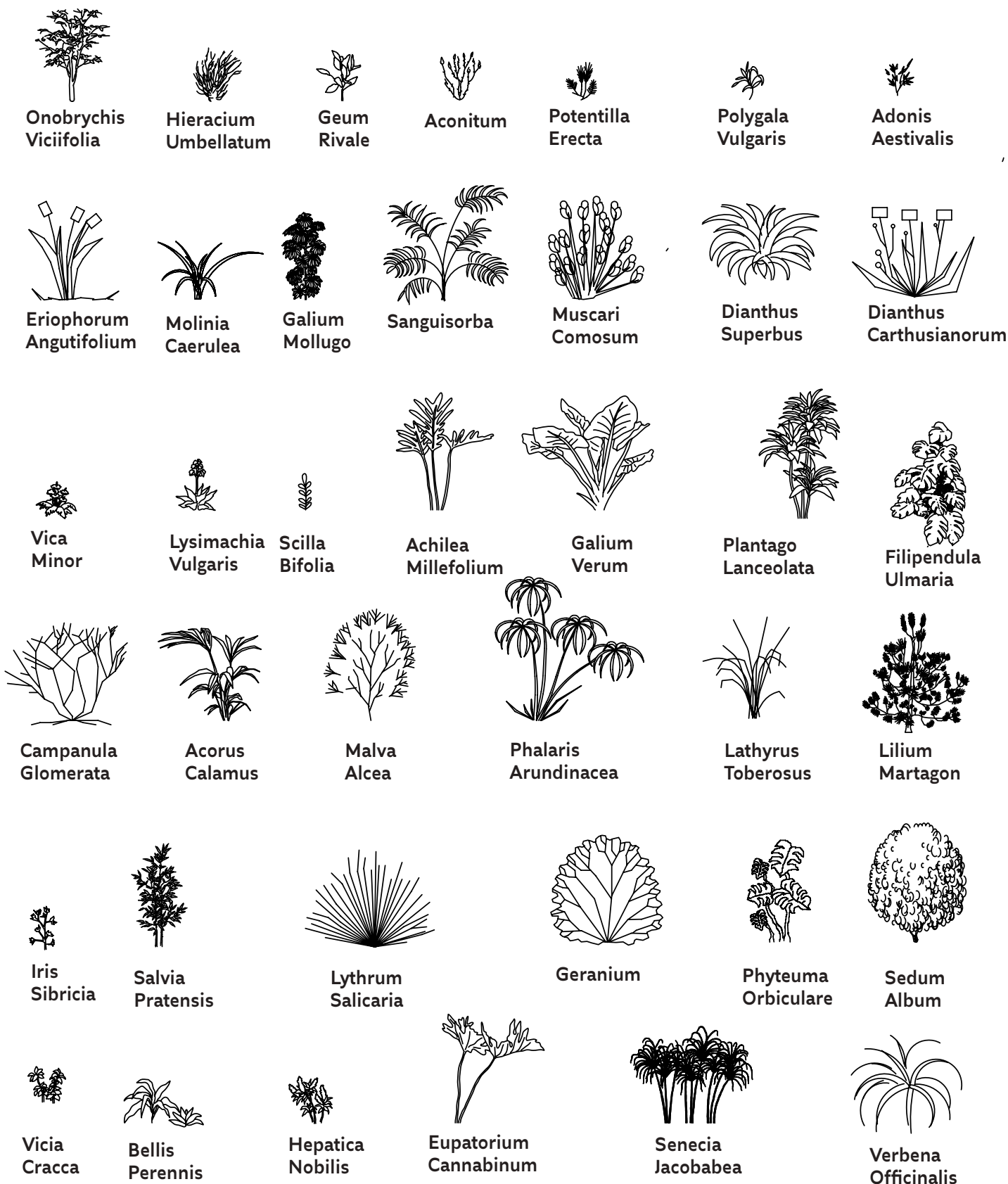


Figure 147: Perennial inventory, forests of remembrance. by Author (2023). [sketch]





Figure I48: Gardens of Remembrance, Vessels and River imaginary. by Author (2022). [collage]

9. CONCLUSION

The project developed is a master plan based on an extreme scenario. The design engages fully in a circular process. The ideology of the project is to imagine a place that becomes fully functional on its own. An isolated machine creating a balance between, man, nature and spirituality.

It is a project that fully encompasses the process of decomposition, from human to architectural. A process that takes time. Therefore time becomes a key aspect of the design process and phasing. This mirrors the notion of time that is often associated to the act of mourning. Through this island of ecological spirituality, the aim is to imagine that the new process will change the way we deal with death. Perhaps the association of death with life (of nature), on a human and natural level will change the way we deal with our own mortality and the ones of others.

The cemetery loses its definition of a cemetery and also its terminology to become “gardens and forests of remembrance”. Thus the project goes further than simply proposing a new typology of cemetery but actually aims towards a decomposition of all our prior notions and terminologies regarding death and death-care.

The breaking of these boundaries are important to re-think death. However they are very radical. In my research on the evolution of the perception of death, it is clear that notions regarding death take time. They take time to build, to change and to evolve therefore it is optimistic and utopic to imagine that such a situation may occur in 2150.

The shift in the way we conceive death is highlighted throughout the new process and ritual. Nevertheless, conceiving such a project where nature plays a fundamental role leads us to also re-imagine our relationship to nature. Perhaps natural organic reduction and the planting of gardens of remembrance would completely change our perception of nature. Each plant and tree takes on a certain individuality and spirituality therefore rendering nature sacred.

As a conclusion, the “extreme scenario” approach to the subject is necessary to start de-constructing the foundations that are so strongly anchored in our culture regarding death care and nature. The next step that would be interesting to pursue is a realistic approach to the system on a different scale. Perhaps an intimate and local scale could help us analyse the technical difficulties of such a process and truly start to analyse its environmental as well as emotional impact.

Figure I49: Axonometric drawing extract. by Author (2023).
[drawing]

