TECHNO-VERNACULAR:
LEARNING ABOUT COHABITATION AND *THE MATERIAL* IN THE ANTHROPOCENE

„You have to be attached to some things, not everything. The only possible way is that again and again and again we engage each other in doing something.“

Donna Haraway

INTRODUCTION

The current edition of Tallinn Architecture Biennale presents a vital platform to confront pressing issues like the great climate crisis and the detrimental impact of human activities on natural ecosystems. Within this context, the Estonian Pavilion takes center stage, offering an opportunity to deeply contemplate on waste materials, natural resources, and their intricate entanglements with other ecosystems. It serves as a tangible representation of a renewed approach towards future architectural practices, emphasizing the significance of reuse and understanding the life cycles of materials.

Around the Estonian Pavilion, we aspire to state a **neo-materialist** approach on regenerative architecture. Such statement will tackle three essential themes: fostering an *ethos* of **inclusivity and collaboration**, embracing a **post-extractive** mindset concerning building materials, and finally recognizing the pivotal role of materials within natural ecosystems and therefore *becoming-world* in **coexistence** with other species.

The urgency to distill these themes within the pavilion's realization arises from the many crises of our era: among other increasing social disparities, the widespread turmoil of ecosystems both locally and globally, and the mass extinction of animal species caused by extractivist and non-regenerative practices.

METHODOLOGY AND APPROACH

To transport such themes of central importance into the Biennale and to create a collective imaginary within Tallinn' society, we drew inspiration from *pre-modern Estonian imagery* with its forms and symbols. The design of the Pavilion should serve as a testament to the vibrant tapestry of Estonian identity, intertwined with myth, folklore, and traditional forms. The attempt is to embodies Estonia's profound connection to its land, nature, and heritage, showcasing resilience and a renewed dedication to sustainable construction practices and the reuse of building resources. The rich heritage of Estonia and the groundbreaking work of avant-garde painter **Kaju Pollu** from the late 1960s in this context have been instrumental. Our vision for the pavilion it represents a journey through time, *paying homage to our ancestors' mythical worldview and the ancient culture of the Finno-Ugric people*. Similar to Pollu's departure from Western Neo-avant-garde art, our exploration of Estonian traditions and deep connection to nature diverges from technocratic solutions. In this proposal we promote a collective and creative approach to architectural design and on the conscious use of natural and waste materials.

The design and construction process of the future canopy is conceived as a **collaborative Living-Lab**, characterized by *expeditions, city-scale mappings, the creation of catalogs and descriptive sheets, material experiments, co-design, and co-execution*. All of this will be documented and afterwards disseminated throughout the city of Tallinn.

The involvement of stakeholders and participants in the Living-Lab and the promotional campaign is built upon the narrative of Estonian mythology, particularly the tales of giants protecting the land and its resources. Through collaborative design processes, material sourcing, and stakeholder engagement, we bring these stories to life, integrating them deeply into the fabric of the pavilion. The mythological tales of giants serve not only as a communication campaign but also as metaphors for a deeper narrative — the reconciliation between humanity and nature, celebrating the continuity and interconnectedness between the organic and inorganic. Performances centered around these tales become **convivial** *moments of material sourcing, forging bonds, and nurturing a neo-materialist pedagogy*.

DESIGN AND TECTONICS

The pavilion and the future canopy in the spaces outside Tallinn's central station will not be assembled solely to provide shelter for commuters. The canopy will be envisioned as a **more-than-human** shelter able to foster the formation of other ecosystems. Its structural elements will be assembled to enhance **cohabitation** between humans and non-humans. Gaps and fissures in the load-bearing walls will function as nest for insects and small animals. Through the employment of minerals and large erratic boulders, sourced around the city of Tallinn, the development of additional natural ecosystems will be fostered.

The pavilion for the Tallinn Biennale and **the future canopy will be a place at the intersection between a public garden and a canopy for commuters**. A space where to immerse in a lush green environment, fostering close interaction between humans and non-humans. The future canopy is conceived as a rhythmic alternation of spaces, including some exclusively designed for commuters to stop and wait, while others will feature green spaces thought for multispecies cohabitation. The tectonic of the pavilion and subsequently of the future roof is conceived at its foundation by the repetition of a square modular grid where heavy elements will form load-bearing partitions. Similarly, the substructure of the canopy, which lies on the load-bearing partitions, is assembled and punctuated by the repetition of metallic tubes thus allowing the loads and stresses in the substructure elements to be distributed equally over the entire length of the canopy. Finally, the last covering layer of the canopy is made from a mantle of recycled plastic material recovered from the wetlands in and around the city of Tallinn, and subsequently treated to be "reshaped" in panels.

THE AFTERLIFE

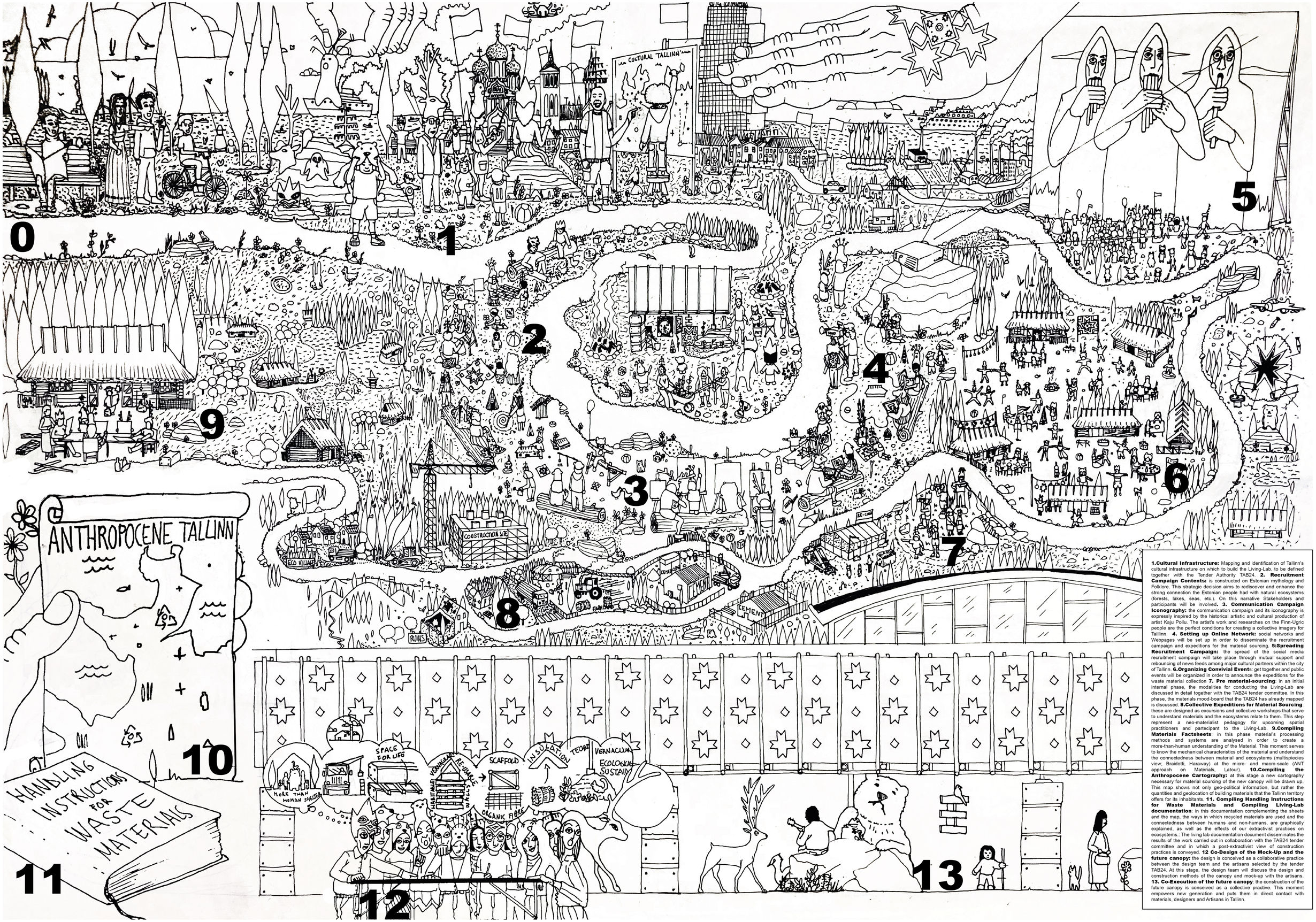
Upon completion, both the pavilion and the canopy are **designed to be disassembled**. This is ensured transorming as less as possible the source materials, and when not possible, the repurposing of the waste material will be engineered and conducted according to the principles of environmental sustainability. This approach ensures that the materials used for the canopy's construction, already coming from an upcycling process, can be reintegrated into other material cycles and repurposed many times. The metallic components of the roof's substructure will be repurposed or returned to the market. Meanwhile, the canopy's base, composed of rock and mineral materials, will either be repurposed or left to cultivate new animal ecosystems and transform into a garden.

TRANSFORMATIVE DESIGN

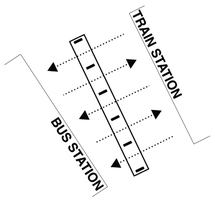
Our approach to *"Regenerative Design"* redefines ecological consciousness and collective building. It enhances our transformative design methodologies and contributes at the same time to a broader architectural discourse, generating knowledge without depleting resources, while simultaneously repairing ecosystems in crisis.

AESTHETIC OF THE ANTHROPOCENE

Our approach represents the attempt to transport Estonian identity imagery with its forms and proportions into the Anthropocene. In this way we intend to impart a renewed contemporary techno-vernacular aesthetic to the new pavillion and future canopy, blending reused materials with aesthetics of vernacular architecture to forge a new visual language, one that embodies sustainability and celebrates Estonia's rich cultural heritage.

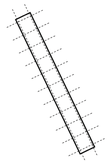


1.Cultural Infrastructure: Mapping and identification of Tallinn's cultural infrastructure on which to build the Living-Lab, to be defined together with the Tender Authority TAB24. **2. Recruitment Campaign Contents:** is constructed on Estonian mythology and Folklore. This strategic decision aims to rediscover and enhance the strong connection the Estonian people had with natural ecosystems (forests, lakes, seas, etc.). On this narrative Stakeholders and participants will be involved**. 3. Communication Campaign Iconography:** the communication campaign and its iconography is expressly inspired by the historical artistic and cultural production of artist Kaju Pollu. The artist's work and researches on the Finn-Ugric people are the perfect conditions for creating a collective imagery for Talllinn. **4. Setting up Online Network:** social networks and Webpages will be set up in order to disseminate the recruitment campaign and expeditions for the material sourcing. **5:Spreading Recruitment Campaign:** the spread of the social media recruitment campaign will take place through mutual support and rebouncing of news feeds among major cultural partners within the city of Tallinn. **6.Organizing Convivial Events**: get together and public events will be organized in order to announce the expeditions for the waste material collection **7. Pre material-sourcing**: in an initial internal phase, the modalities for conducting the Living-Lab are discussed in detail together with the TAB24 tender committee. In this phase, the materials mood-board that the TAB24 has already mapped is discussed. **8.Collective Expeditions for Material Sourcing**: these are designed as excursions and collective workshops that serve to understand materials and the ecosystems relate to them. This step represent a neo-materialist pedagogy for upcoming spatial practitioners and partecipant to the Living-Lab. **9.Compiling Materials Factsheets**: in this phase material's processing methods and systems are analysed in order to create a more-than-human understanding of the Material. This moment serves to know the mechanical characteristics of the material and understand the connectedness between material and ecosystems (multispecies view; Braidotti, Haraway) at the micro- and macro-scale (ANT approach on Materials, Latour). **10.Compiling the Anthropocene Cartography:** at this stage a new cartography necessary for material sourcing of the new canopy will be drawn up. This map shows not only geo-political information, but rather the quantities and geolocation of building materials that the Tallinn territory offers for its inhabitants. **11. Compiling Handling Instructions for Waste Materials and Compiling Living-Lab documentation**: in this documentation complementing the sheets and the map, the ways in which recycled materials are used and the connectedness between humans and non-humans, are graphically explained, as well as the effects of our extractivist practices on ecosystems.: The living lab documentation document disseminates the results of the work carried out in collaboration with the TAB24 tender committee and in which a post-extractivist view of construction practices is conveyed. **12 Co-Design of the Mock-Up and the future canopy:** the design is conceived as a collaborative practice between the design team and the artisans selected by the tender TAB24. At this stage, the design team will discuss the design and construction methods of the canopy and mock-up with the artisans. **13. Co-Execution of the future canopy**: the construction of the future canopy is conceived as a collective practive. This moment empowers new generation and puts them in direct contact with materials, designers and Artisans in Tallinn.



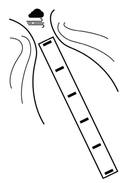
Permeability of the bearing structure. The new pavilion is located between the bus station and the train station. The partition walls emphasize the permeability and guide the traveler towards the desired station.

A succession of thematic rooms. The wall partitions delineate a sequence of: services for travelers, circular seatings, public restroom and spaces for social interaction.



A structural module on a square grid. The supporting system of the new pavilion is designed and assembled using a modular square grid framework, to allow replicability additions and subtractions.

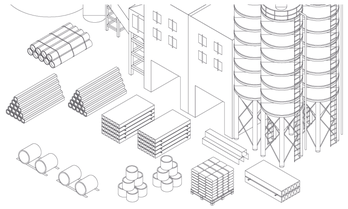
Erratic boulders alternate with wall partitions. The supporting structural system is composed of a rhythmic alternation of wall partitions and erratic boulders that support the new roof.



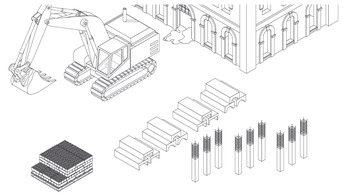
The wall partitions protect from the wind. The orientation of the wall partitions provides protection under the roof from the strongest winds in the city.

The public space lighting system. A series of spotlights are strategically placed around the erratic boulders to uniformly illuminate the public area.

1. Defining mapping criteria



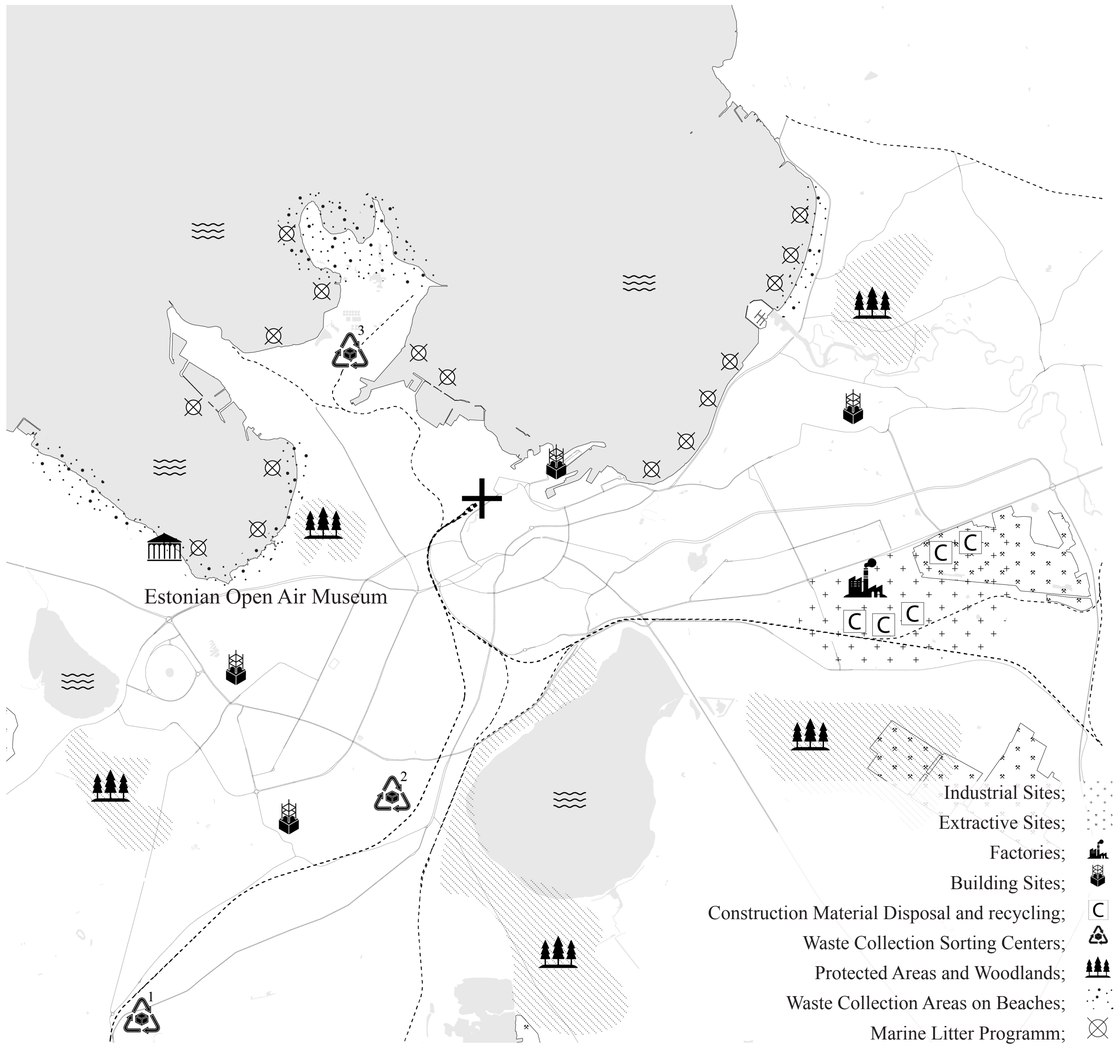
Materials surplus from industrial production and worn-out materials emploied for temporary structures on building sites.



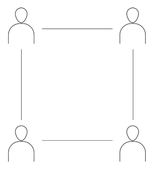
Waste material resulting from demolitions, temporary events, or exhibitions. Locations include construction sites, theaters, fairs, and museums.

Materials sourced from the landscape, such as wood, rocks, and vegetation commonly found in forests, wetlands, and beaches.

2. Making the Anthropocene Cartography

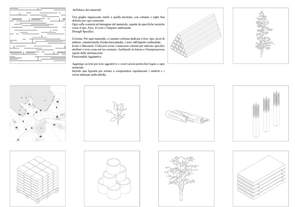


3. Drafting Material Sheets



Interdisciplinary Team composed of Biologists, Landscape Architects, Urban Designers and Architects.

Creation of descriptive material sheets reflecting physical properties and their relationship to ecosystems.



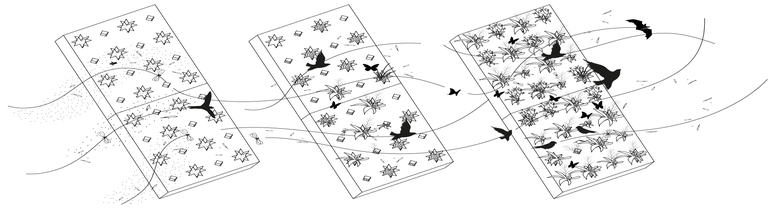
Drafting arrays that reflect assembly possibilities and the tectonics of materials.

1. Erratic pillars

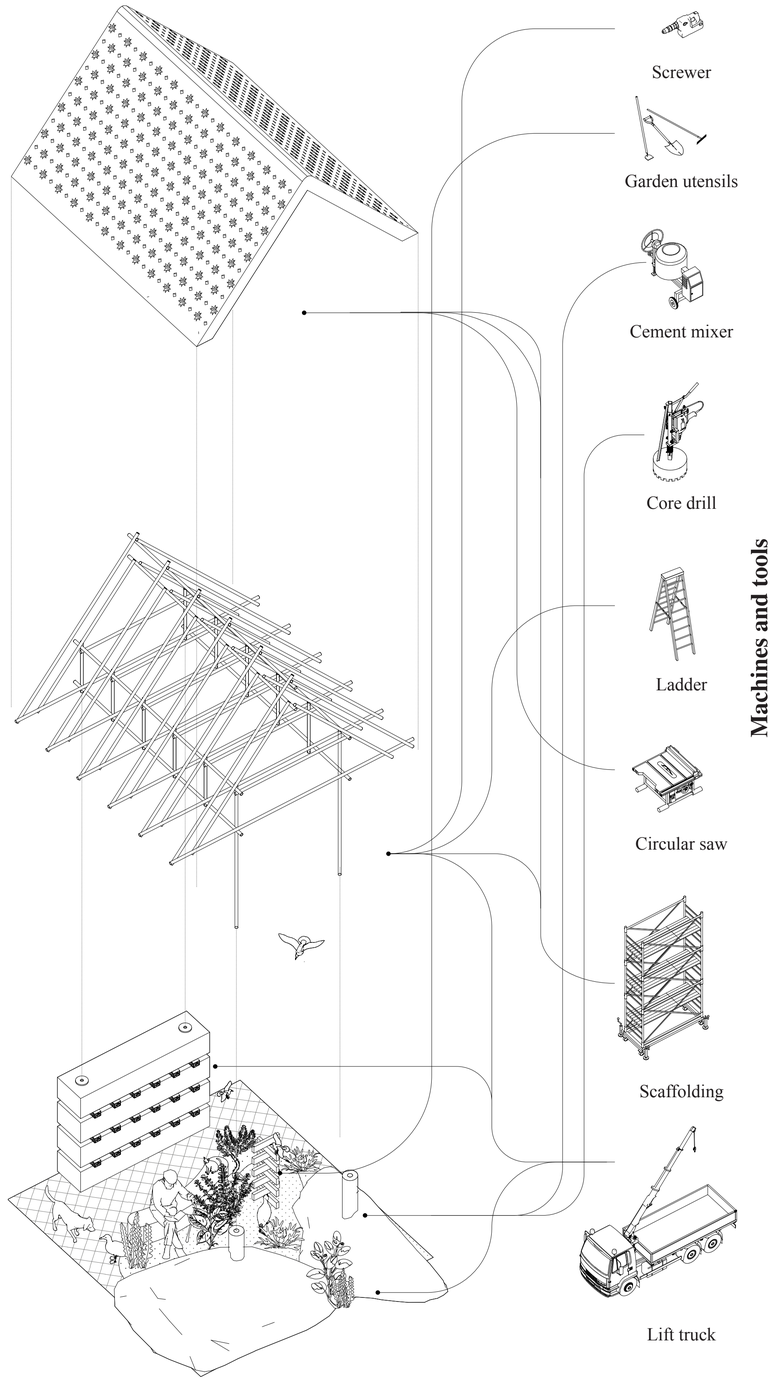
2. Concrete beans walls

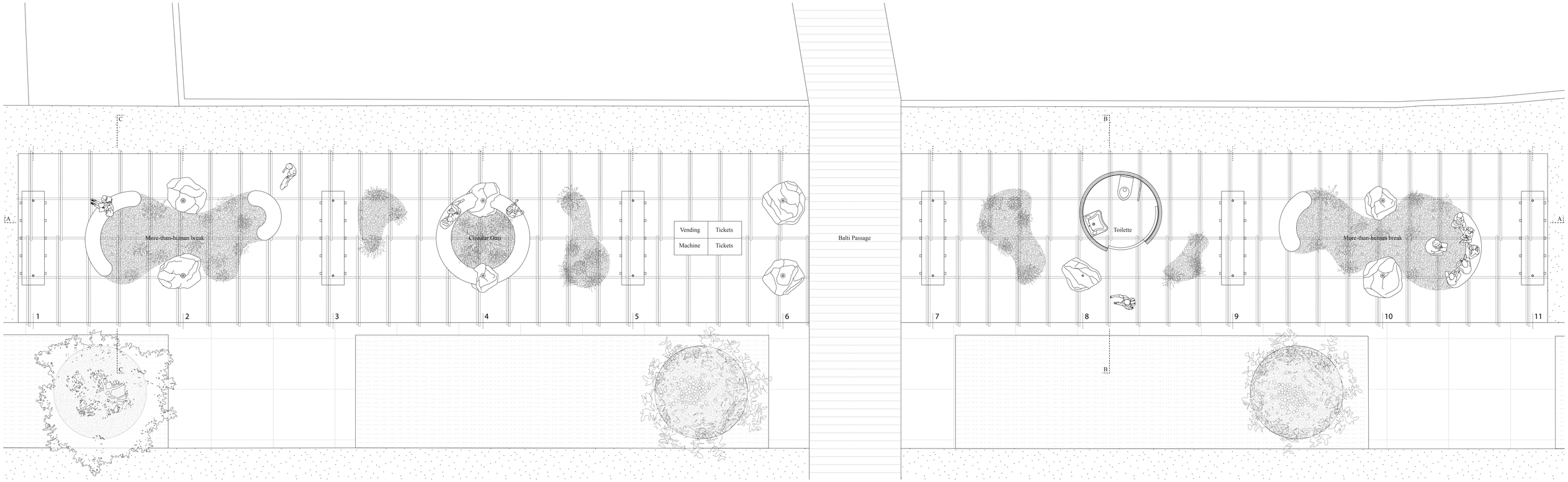
3. Scaffolding tubes bearing structure

4. Green Living roof's plastic panels

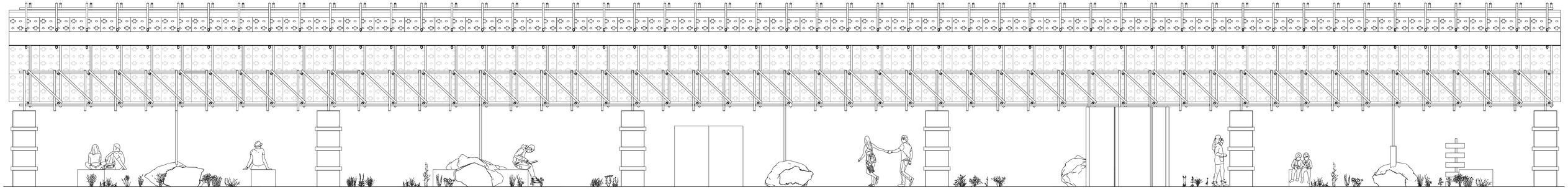


The roofing panel is designed with a series of interstice inspired by Estonian traditions and symbolism. These cavities not only hold soil and capture windborne pollen, creating an ideal environment for plant growth, but also pay homage to the cultural heritage of Estonia. Each cavity acts as a small natural planter, retaining moisture and providing a fertile substrate for the seeds that settle in them. Over time, the seeds germinate and plants begin to grow, gradually transforming the panel into a living green surface. This design not only promotes biodiversity but also help filter the air, improving the environmental quality of the public space below. The use of traditional Estonian symbols and geometries in the cavities adds an element of cultural identity, making the panel a true tribute to local history and traditions.

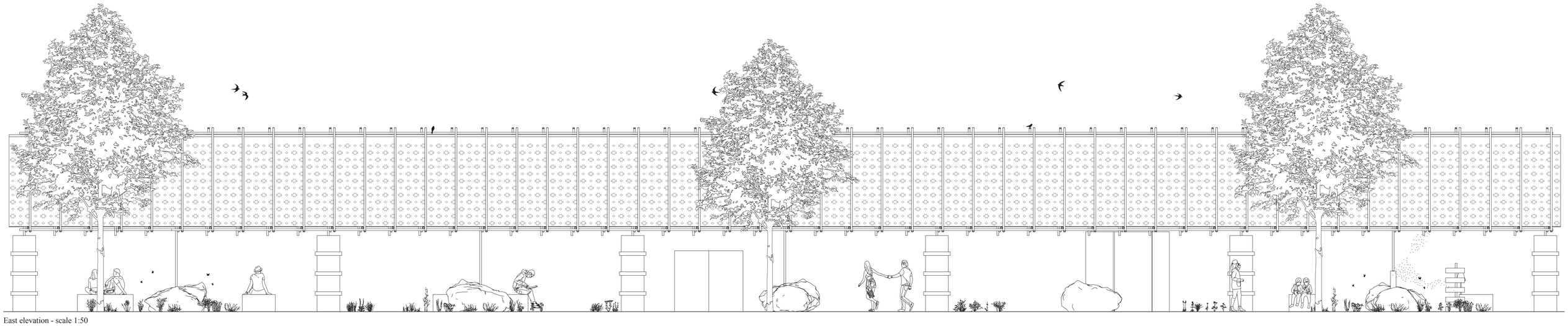




Floorplan - scale 1:50



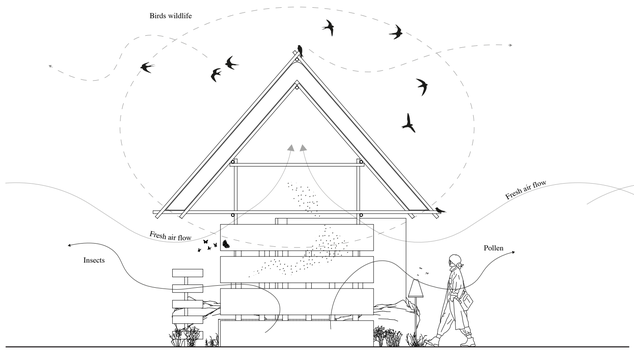
Section AA - scale 1:50



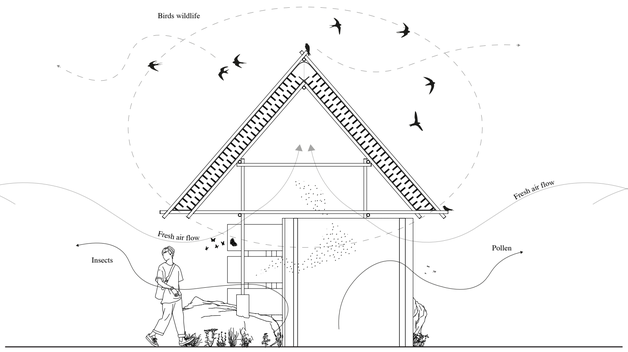
East elevation - scale 1:50

Future perfect: View of the new Canopy from the train Station

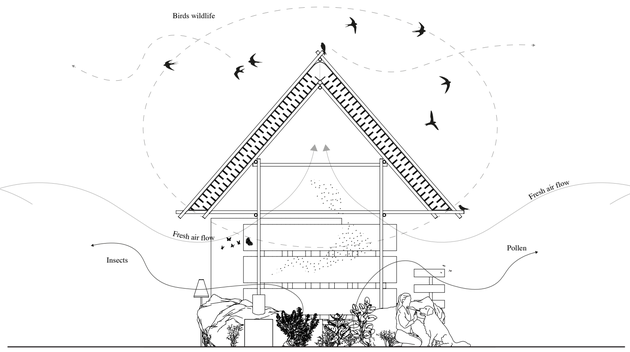
Future: The mock-up installation during the 2024 TAB



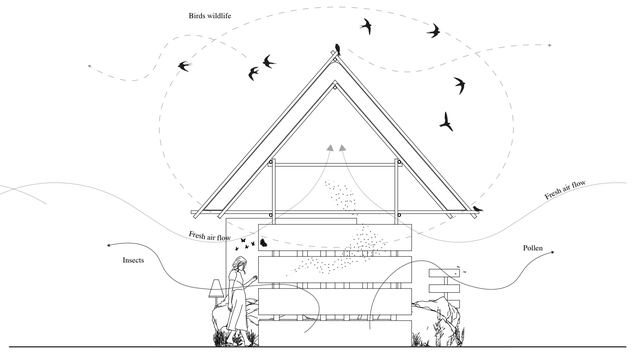
South elevation - scale 1:50



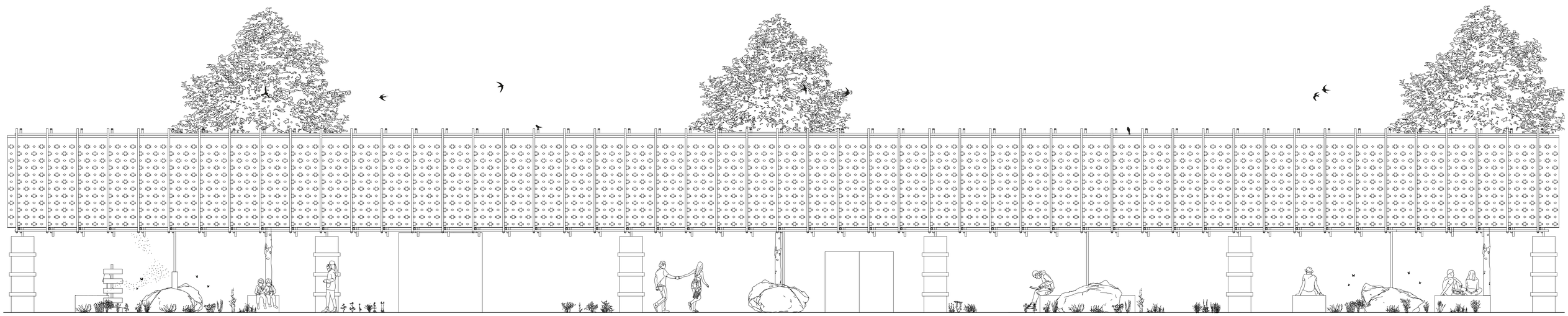
Section BB - scale 1:50



Section CC - scale 1:50



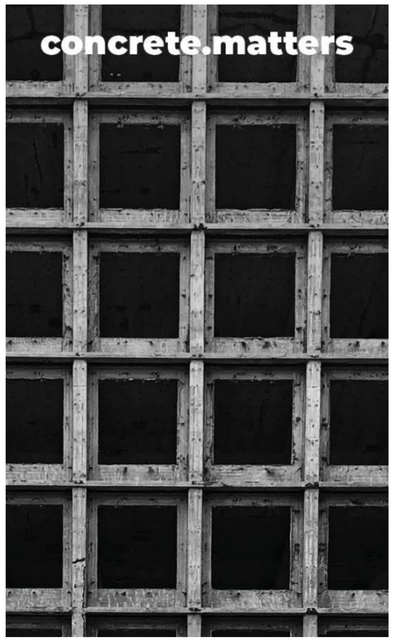
North elevation - scale 1:50



East elevation - scale 1:50

Material Sourcing as Collective Action: The collective Botanica Urbana organizes expeditions to rescue buildings threatened by demolition, based on convivial events involving participants in planning the deconstruction of the building and transportation of materials. In this case a 350-square-meter greenhouse is saved from demolition thanks to the involvement of approximately seventy people.

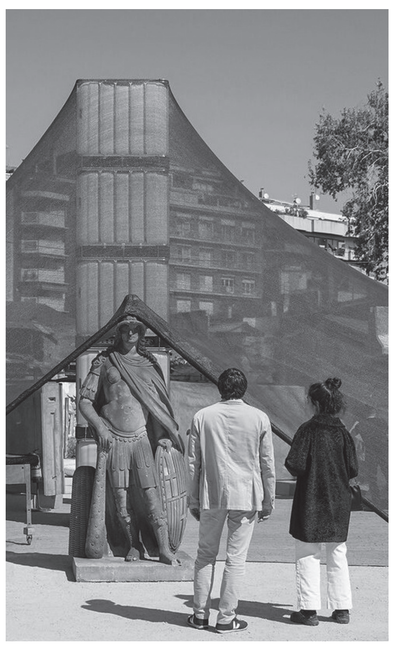
Investigation on Material Tectonics: The same collective, Botanica Urbana, through the format of the Summer School, conducts collective experiments on the tectonics of reuse. During the Summer Festival at Kampnagel (Hamburg), a pavilion is designed and assembled within fifteen days using the same materials as the greenhouse. The pavilion is designed to be disassembled and subsequently stored back without any waste production.



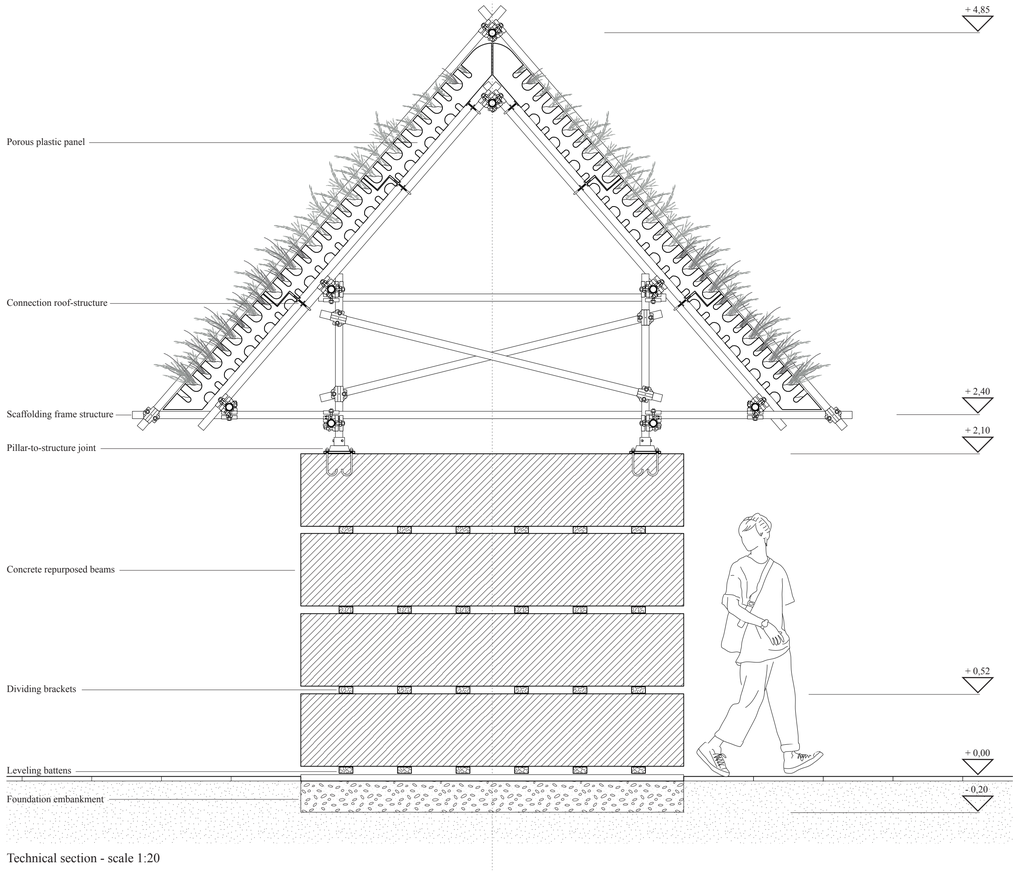
Living Lab for Reflecting on Material Reuse: we are inspired from the documentation conducted by the collective Baukreisel. They are promoting the reuse of materials in construction, conducting research on new possibilities for reuse, and implementing these findings in various projects, focusing on design, research, consulting, and activism for a more socially, ecologically, and circularly oriented building industry.

Understanding Natural Ecosystems Through Material Harvesting: Waste materials and natural materials can be extracted and reintroduced into the landscape provided that their effects on ecosystems are understood. The Summer School “Seaweed Monsters” and expeditions for collecting organic material on the coasts of Germany suggest that it is essential to also reflect on the available natural materials typical of vernacular architecture.

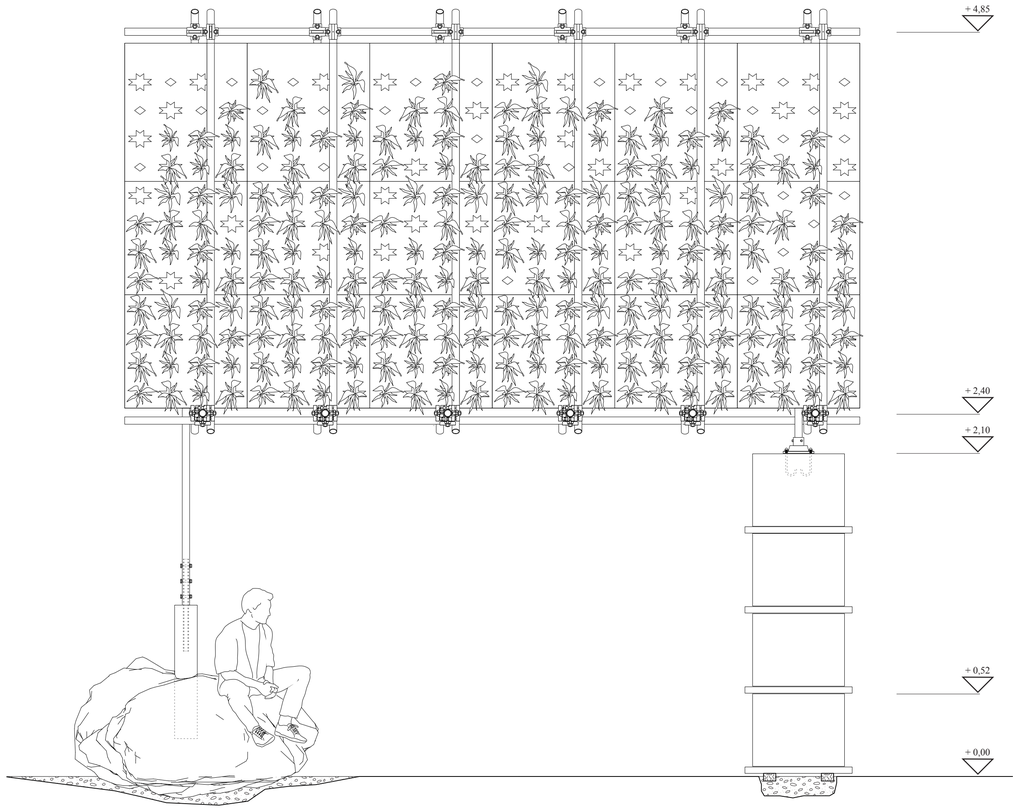
More-Than-Human Design: In the Anthropocene, we can no longer afford to consider humans as the sole dominant species. Interconnectedness, for us, also means understanding how through design, we can promote the development of multiple ecosystems. The pavilion is conceived as a place of multispecies intersection. In the design of the new canopy, we draw inspiration from the Garden of Intersections.



Implementing Unexpected Material: In our project, we assign new meanings to materials that are not typically used as construction materials. Our effort is to reflect on the possibilities of employing the material just as it was done in the Permanently Temporary Pavilion in Barcelona.



Technical section - scale 1:20

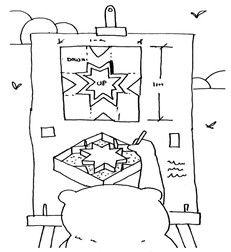


Technical elevation - scale 1:20

Fabrication and installation of the roofing panel

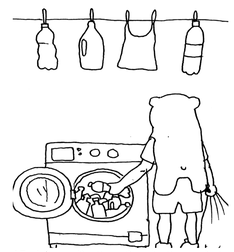
21. Once the molded plastic panels have cooled and solidified, they are installed onto the supporting structure. It is important to securely and stably fasten the panels to the tubes, following the project specifications to ensure the structural integrity of the roof.

20. Melt the recovered plastic and mold the roofing panel. Using a specialized furnace, the shredded plastic is melted and then poured into the metal mold.

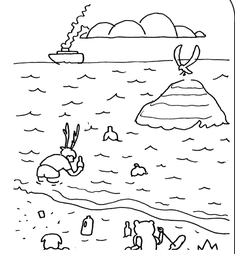


19. Create a metal mold for casting the shredded plastic. The mold must be precisely designed to produce roofing panels that meet the specified dimensions and shapes of the project.

18. Once washed and dried, the plastic must be shredded using a mechanical shredder. This machine reduces the plastic into small pieces, facilitating the melting and molding process that follows.

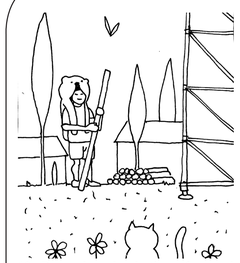


17. After collection, the plastic needs to be thoroughly washed to remove any dirt, sand, or other contaminants. This process ensures that the plastic is clean and ready for the subsequent processing stages, improving the quality of the final product.

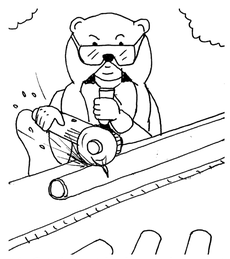


16. Collect plastic waste from beaches and urban recycling programs. The collection should be carried out systematically, ensuring that as much plastic material as possible is recovered to be reused in the project.

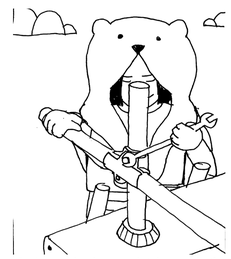
Assembly of the metal roof tubesstructure



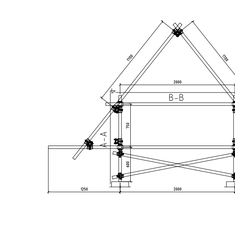
13. Research and selection of unused metal tubes from scaffoldings for construction sites. This step involves identifying and selecting decommissioned metal tubes to be used in the construction of the roof.



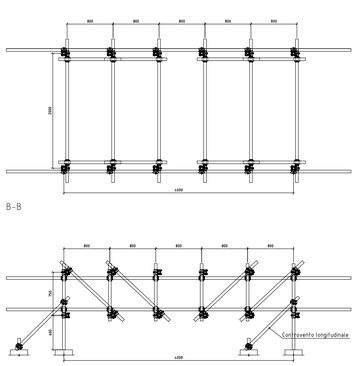
14. Cut the metal tubes to the correct length and prepare them for assembly in the roof structure. Once selected, the tubes need to be precisely cut to the required length to fit exactly according to the roof design.



15. Assemble the metal tubes with the designated joints and bolts. Using the specified joints and bolts, the metal tubes are assembled to form the roof structure. It is essential to carefully follow the assembly instructions and use the appropriate tools to ensure that all connections are firm and secure.

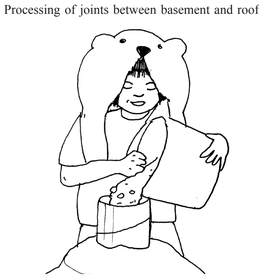


MARCEGAGLIA BUILDTECH PRELIMINARY PROJECT: Marcegaglia buildtech provided a proof of the resistance of the frame structure in tube and joint scaffolding. The test was conducted on both types of roofing, thatched roofing and roofing made of recycled plastic panels. In terms of costs, the manufacturer confirms that it can provide the structure on loan for use at a price of no more than 17 euros per square metre per month.



Processing of joints between basement and roof

12. Position the metal pin in the concrete, which will designate the housing for the tubular structure of the roof. It must be correctly aligned and securely fixed in the concrete to ensure the stability and safety of the connection between the various components of the structure.

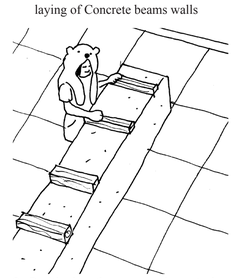


11. Prepare the formwork and pour the concrete into the housing created in the erratic boulder. The formwork must be carefully constructed to maintain the intended shape and dimensions. Once ready, pour the concrete into the housing, ensuring that the material is compacted and leveled to achieve a solid and uniform base.

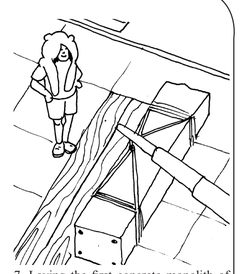
10. Drill the erratic boulder to create the housing for the concrete element that will form the joint between the foundation and the metal substructure of the roof. In this step, it is necessary to precisely drill the erratic boulder to create an appropriate opening to accommodate the concrete element.

laying of Concrete beams walls

9. Creating the concrete housing necessary for the installation of the metal plate that will support the roof substructure. This step involves preparing an adequate recess in the concrete for the installation of the metal plate.

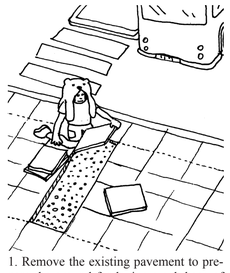


8. Positioning the spacer elements between the individual elements of the wall partition. Spacer elements are inserted between the concrete blocks to maintain uniform gaps and ensure the structure's stability.

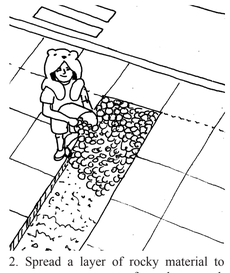


7. Laying the first concrete monolith of the wall partition on the ground foundation. In this step, the first concrete block is precisely positioned on the prepared foundation. It is crucial to ensure that the monolith is correctly aligned and stabilized.

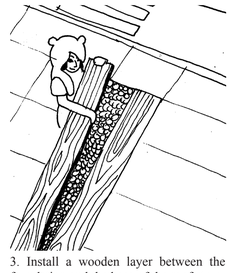
Foundations



1. Remove the existing pavement to prepare the ground for laying a sub-base of inert gravel material. This step is essential to ensure a stable and even foundation for the pavilion structure.

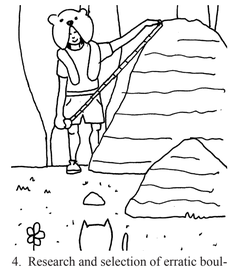


2. Spread a layer of rocky material to prevent water seepage from the ground. Rocky materials, such as gravel or pebbles, create an effective barrier against moisture, thus protecting the pavilion structure.



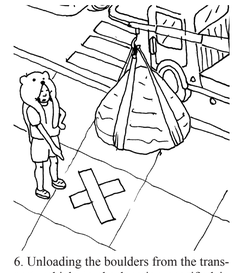
3. Install a wooden layer between the foundation and the base of the roof structure. This wooden layer acts as a cushion that absorbs potential load variations and protects the structure from deformation.

laying of erratic boulders



4. Research and selection of erratic boulders that will serve as the foundation walls on which the roof will be placed. This step involves identifying and collecting boulders of appropriate sizes and shapes to ensure a solid and stable base.

5. Loading the boulders using straps and chains and transporting them from the location where they were found to the site where th e new roof will be constructed. Using sturdy straps and chains, the boulders must be carefully lifted to avoid damage.



6. Unloading the boulders from the transport vehicle to the location specified in the project. Upon arrival at the construction site, the boulders must be carefully unloaded and positioned precisely according to the project plan.