Adaptive reuse of Cold War heritage: where history meets nature

Soesterberg, The Netherlands

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AR4AH120 Adaptive reuse of heritage graduation studio
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Abstract

This graduation report investigates the adaptive reuse case of the former Soesterberg airbase through the transformation of abandoned aircraft shelters into a center for research for nature and biodiversity, and museum. Following the decommissioning of the military site, the area gradually evolved into a protected natural landscape with ecosystems developing throughout the entire airbase. Specific shelters are strategically maintained: some are currently occupied, some are intentionally left to decay. This raises concerns regarding a long-term vision for the preservation of such military heritage.

This project proposal explores how architectural interventions can act as mediators between biodiversity, heritage preservation, and public accessibility whilst respecting the core values of the site. Through context analysis, case studies and transformation research a strategy for intervention is elaborated.

The proposal introduces a program that develops across three unused shelters and combines them with outdoor ecological study fields and public walking routes. The main intervention case focuses on one of the shelters with function of museum and educational center, in which the shelter is preserved through an arch structure. This newly introduced climatic layer protects the deteriorating World War II building whilst allowing it to be the main exhibit element.

GRADUATION PLANNING

Planning

The graduation studio begins in the second week of November where group work is conducted for the analysis of the project site, together with a site visit.

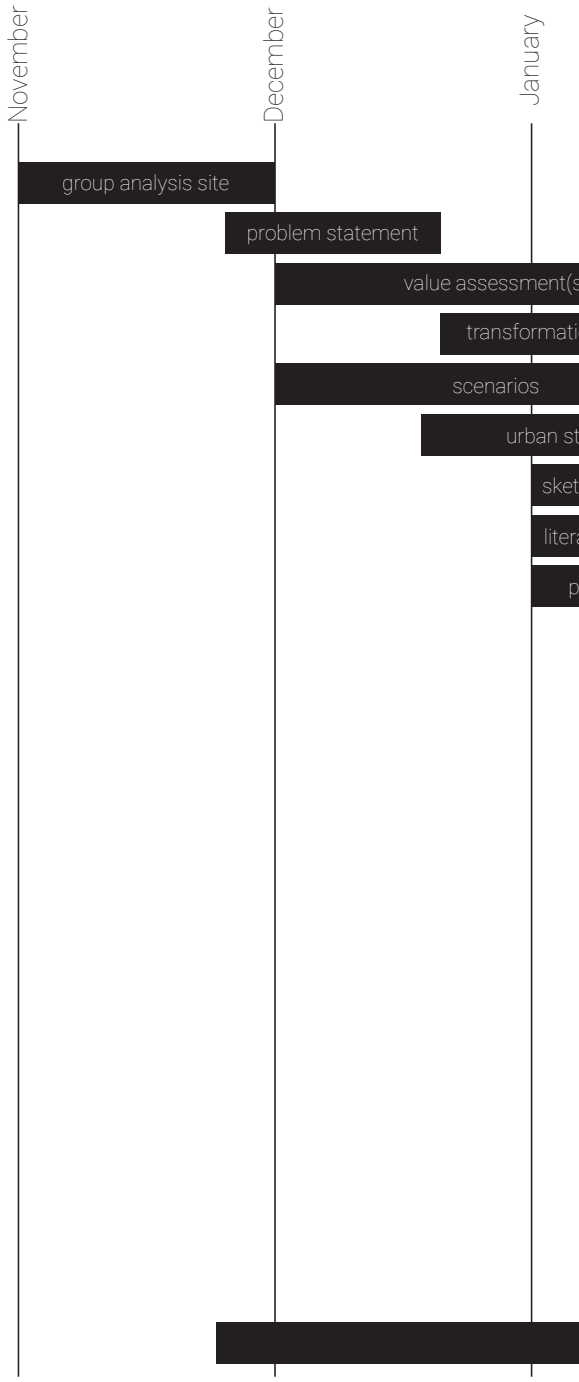
Findings from the analysis contribute to identifying possible opportunities for the improvement of the site, leading to the problem statement. This is complemented with the main research question and subquestions.

A value assessment is made in the following step, together with the development of scenarios that fit with the problem statement. The urban strategy and transformation framework are made shortly after from the conclusions of the scenarios.

Literature review on selected themes relating to the research question and subquestions is conducted and certain aspects are deepened.

In the moments following the A1 presentation, more realistic and true-to-scale design choices are made, resulting in preliminary drawings like floorplans, elevations, and sections. A concrete masterplan is made from the conceptual schemes made for the A1 presentation. For the second assessment, material analysis and structural changes are also evaluated, and initial research on climate design is done.

For the final presentation moments of A3 and A4, the design brief is finalized, resulting in a specified and realistic program. Representative models are also made and the presentation is adjusted to fit an architectural (and non) audience. The report is finally completed.



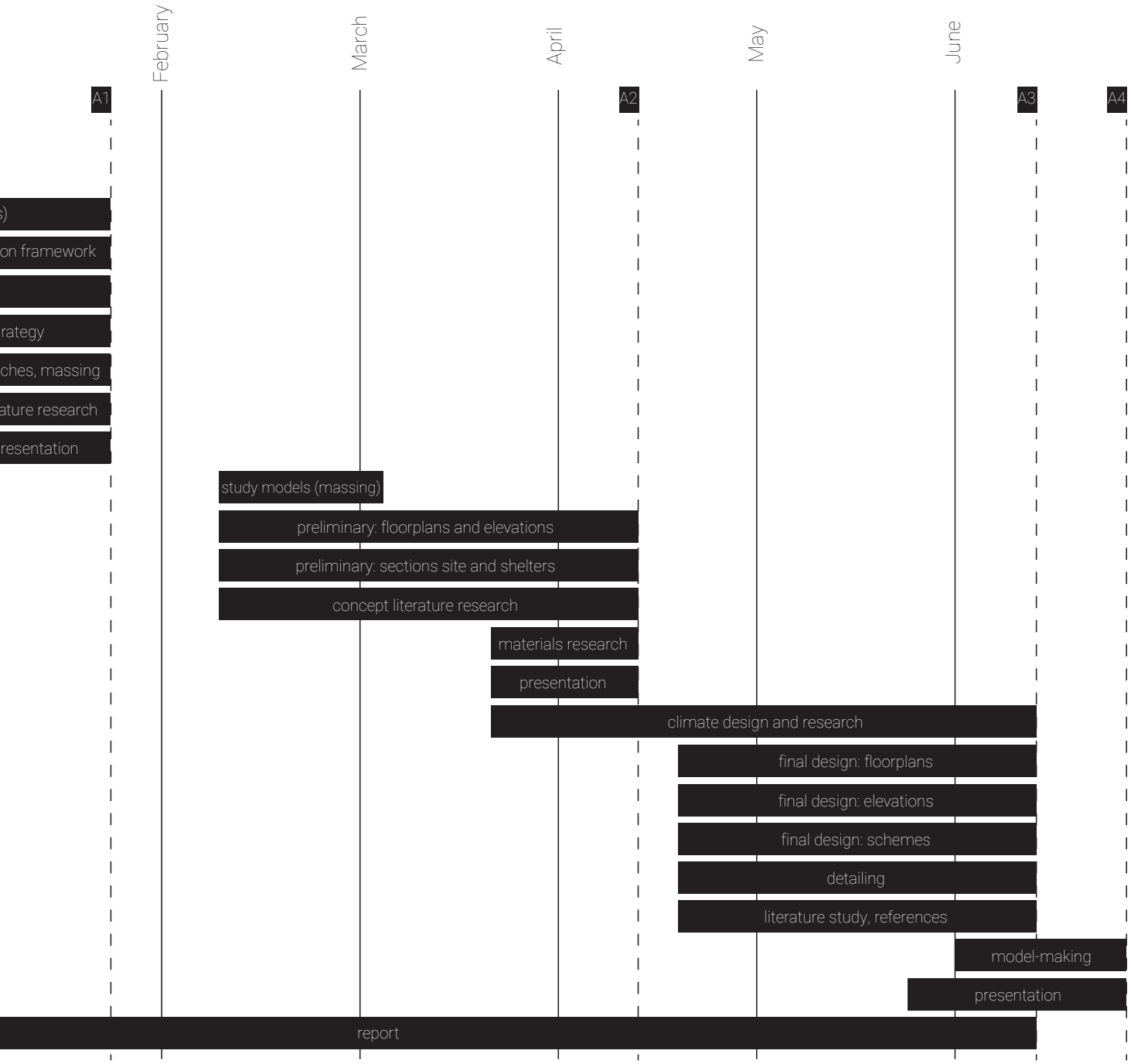


Figure 1: Planning

1. INTRODUCTION

Introduction

This report is part of the course Heritage Graduation Studio at Delft University of Technology, whose focus is on the adaptive reuse of military heritage in The Netherlands. For this project, the site of the former military airbase in Soesterberg was chosen, with the parcels of land of UtrechtsLandschap as main focus. The aircraft shelters and bunker are at the center of this adaptive reuse case, in which a new program and functions will be given. This project approaches the existing structures not only as built heritage, but as structures for which a long-term vision is developed.

The context

Soesterberg is a village located in the central province of Utrecht, The Netherlands. Part of the municipality of Soest, and with a population of around 8'000 inhabitants, the village is surrounded by heathlands, forests and natural reserves and parks, whilst still being in close proximity to major roads and highways.

Initially a small village populated by farmers and with major facilities located in the near town of Soest, the village grew starting from the 1800's when Napoleon paved the first military road connecting Amsterdam to Arnhem. Around the 1900's Soesterberg was discovered as a location with potential for large-sized homes, and in 1913 the Dutch Army established its Aviation Department (LVA). Consequently, its population saw an increase starting in 1940 with roughly 2'000 inhabitants, tripling 25 years later.[1]

The airbase

The history of aviation for Soesterberg began in the early 1900's when the Soesterberg Aviation Company was founded with the intention of hosting competitions, trainings, demonstrations, and aircraft manufacturing. Its history in military aviation, however, began in 1913 with the establishment of the Dutch Army's Aviation Department. With the outbreak of the First World War, aircraft production moved from France and took place at the airbase, leading to an exponential growth of the village.

During World War II, Soesterberg was first bombed and later taken over by the German forces. The area was expanded into a modern military airbase and some of the current facilities were upgraded and extended.

In 1945, after the end of the war, the airbase was taken over by KLM, the Dutch Airline Company, which offered training lessons to its future pilots. Eight years later, in 1953, the Royal Netherlands Air Force was established, leading to the presence of NATO and the Americans with their Wolfhounds in The Netherlands.[2] Many new facilities were introduced for the 3'500 Americans that were stationed in the area until 1994, year during which operations were shut down and the premises were vacated as a result of the end of the Cold War.[3]

[1] Soesterberg Air Base - Historic Landscapes blog. (z.d.). https://historiclandscapes.net/blog/soesterberg-air-base.html. Accessed on 07-04-2026

[2] Vliegbasis Soesterberg - geheugen van Zeist. (2018, 24 januari). Geheugen van Zeist. https://www.geheugenvanzeist.nl/articles/vliegbasis-soesterberg/. Accessed on 30-11-2025

[3] Soesterberg: the forgotten Dutch airfield where American planes stood guard against Soviet MIGs. (2022, 21 December). Soldier Of Fortune Magazine. https://sofmag.com/soesterberg-air-base/. Accessed on 30-11-2025

Figure 2. Luchtfoto van Flieghorst Soesterberg, from *https://beeldbank.nimh.nl/foto-s/?q=soesterberg&fq%5B%5D=search_s_mediatype:%22Foto%27s%22&mode=gallery&view=horizontal. N/A (1945)*
Figure 3. Luchtfoto van vliegbasis Soesterberg, from *https://beeldbank.nimh.nl/foto-s/?q=soesterberg&fq%5B%5D=search_s_mediatype:%22Foto%27s%22&mode=gallery&view=horizontal.* N/A (1954)
Figure 4. Luchtfoto van de vliegbasis Soesterberg, from *https://beeldbank.nimh.nl/foto-s/?q=soesterberg&fq%5B%5D=search_s_mediatype:%22Foto%27s%22&mode=gallery&view=horizontal*. N/A. (1954)

Problem statement and relevance

The entire airbase today has a fragmented ownership with each area having a different function: from a natural park, to military, to cultural, to future residential developments. For the graduation studio the focus is on the 17 aircraft shelters, all under UtrechtsLanschap ownership since 2008.

Currently, a total of 9 shelters are permanently closed as these are found in an area of the airbase that is home to several animal and vegetation habitats. These will receive no further maintenance and are destined to a complete nature takeover and, consequently, a curated decay. The remaining 8 have different functions namely arts and craftsmanship studios, event-hall spaces and office spaces. However, a long-term vision on the owned hangars is unclear: the existing structures appear to be underutilized, if not used at all, the existing military heritage is at risk of decay and loss over time, and the site's ecology has potential to be further developed.

In order to reactivate this military heritage area and ensure that its identity does not disappear, conscious design-interventions will occur. These will consider the historical background of the site, its extremely biodiverse context, and possible structural preservations. By doing so, this could serve as a guide for future reuse projects within the military field whose aim is to preserve and upscale unused military buildings rather than choosing a decay and demolishment strategy.

The main architectural challenge lies in intervening in an area that was originally designed for secrecy, isolation, protection, whilst working towards openness and building on the established ecological situation. Furthermore, the interventions should be clearly readable and ensure that the site's original identity is preserved as much as possible.

Objective and research questions

Throughout the course of my studies I have been attracted to the issue on how existing buildings, especially those with a historical value, can be reused and repurposed rather than seeking for total demolition. In the case of military bases, each with their unique historical background and spatial features, this fascinates me further in terms of what opportunities for reuse are available, to what extent the existing structures can be adapted to future uses, and in what way can the reputation of the site be transformed.

The aim of this design-by-research project is to investigate the existing site conditions, historical value, and research in biodiversity and to focus on reutilizing the former aircraft shelters for a research center for nature and biodiversity. This will involve the themes of existing structural conservations, area reactivation, short-stay, research center, exhibition spaces, gardens.

Considering the current semi-private character of the former airfield, creating a research institute focused on nature appears to be aligned with the current situation: a semi-private program centered on nature and in a biodiverse context.

The aim of this adaptive reuse project is to transform the aircraft shelters and their original introverted character by spatially reconfiguring them into recognizable interventions that will enable new forms of use.

This leads to the following research question:

How can architectural interventions at the former Soesterberg military airbase harmonise military heritage, existing ecological systems, and new research-related uses through the transformation of the site into a biodiversity research center?

And the following sub-questions:

What historical and spatial values and attributes define the site's military identity and how can these be preserved?

and

What transformation types are appropriate for the existing buildings and infrastructure on site?

and

How can spatial sequences and access hierarchies be designed to accommodate different user groups while protecting sensitive ecological areas?

2. APPROACH

Methods

This section of the report discusses the design and research strategy in which the different research techniques and methods are explained. Expected outputs are stated and a graduation planning is presented. This is followed by a theoretical framework in which literature review and precedents are discussed and conclusions are made.

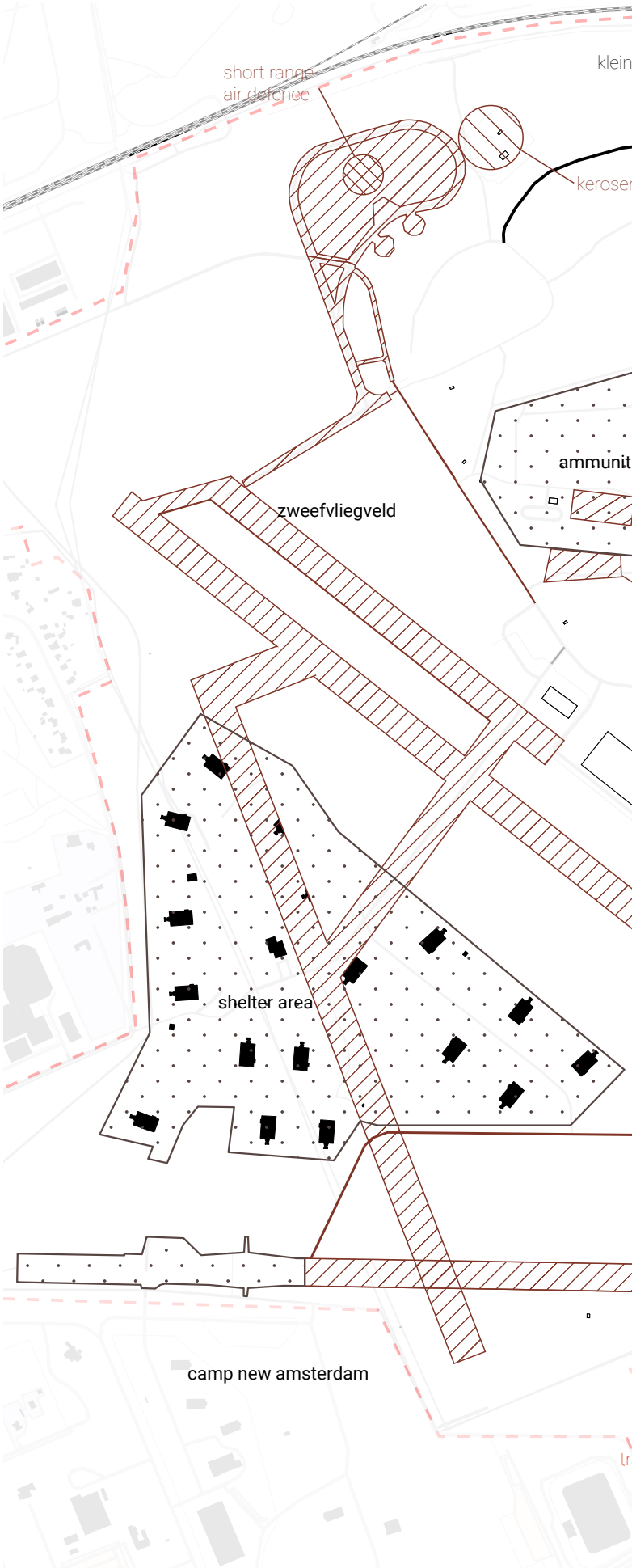
Research methods

To provide an answer to the main research question, three sub questions are formulated, each with a different theme and method.

What historical and spatial values and attributes define the site's military identity and how can these be preserved?	Theme: heritage Method: historical layering analysis, site characteristics
How can spatial sequences and access hierarchies be designed to accommodate different user groups while protecting sensitive ecological areas?	Theme: ecology and users Method: ecological mapping
What transformation types are appropriate for the existing buildings and infrastructure on site?	Theme: transformations Method: massing, light studies

Site analysis

This method is used to address the first sub question and its theme of heritage and nature. Historical site analysis is used and its layers are mapped.



Historical layers

This diagram reveals the different historical layers and (re) construction periods of the former airbase.

The plan is organized in three main periods: the pre-airfield landscape, the World War II period, and the Cold War time. In the earliest pre-airfield landscape no major infrastructure was present: the site was an open airfield with no airstrip.

The World War II area, instead, including the German occupation period, brought many major developments in terms of infrastructure. During this time the two still existing runways were built, together with a third, shorter, runway of which only the footprint is still visible today. Other support facilities namely shooting ranges and fuel storage were also added at this time.

Lastly, during the Cold War phase, the ammunition park at the North of the shelter area is added and the 17 shelters and central commando bunker are built. During this period Camp New Amsterdam was also developed and this accommodated the thousands of American soldiers deployed in Soesterberg.

Figure 5.Historical layers 1:10 000

Site values and attributes

Wonder building

This building typology originated from the United States of America and is from the mid-1950's. It was originally intended for civilian use only and was later on used for military applications with the addition of a concrete layer. This makes the building column-free from the interior and extremely robust.

The shape and industrial look in the interior and exterior create an out of the ordinary atmosphere which is highly valuable.

Figure 6. Wonder building

Unique ensemble

Many airbases across Europe have the same building typology as the former airbase in Soesterberg. What makes this unique is the scattering of the aircraft shelters.

Variations in the orientation of the shelters creates an unique way of approaching them from different paths within the site.

Figure 7. Unique ensemble

Existing layers

Different layers belonging to different time periods shape the infrastructure and the airbase's system as a whole. Some layers are still present today. Some have disappeared, but their footprint is still visible.

This allows for the existing layers to be used, whereas the footprint of the old is used as a reference for new connections and circulation within the site.

Figure 8. Existing layers

Ecology

The site is highly valuable in ecology as over the years flora and fauna have established an important network of their own. There are several ecological corridors of high importance along which many plants and vegetation have grown and which animals also use to move around the airbase.

This gives an opportunity to study nature's takeover in the same environment in which it occurs and generating knowledge, therefore giving back to the site.

Figure 9. Ecology from *https://www.planviewer.nl/imro/files/NL.IMRO.0342.BPLG0005-0401/tb_NL.IMRO.0342.BPLG0005-0401_7.pdf.* N/A (n.d.)

Time

Time as a site value relates to how the site has been left untouched ever since NATO ceased its operations in the early 1990's.

Signs of weathering and aging of the structures demonstrates their resilience towards the climate after almost a century. This adds an additional layer to the story of each shelter.

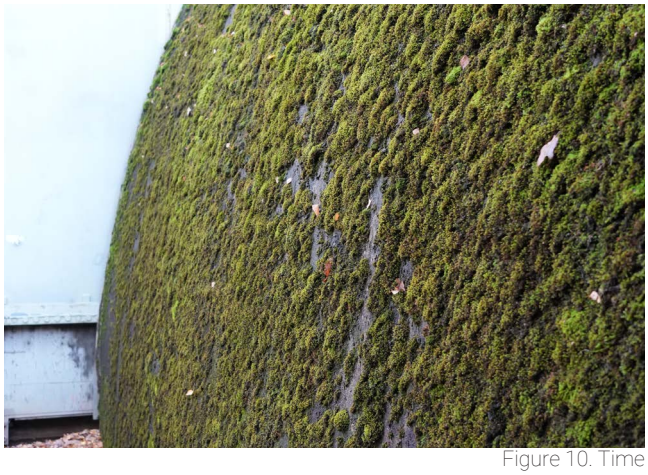


Figure 10. Time

Embedded knowledge

The site is a means for research itself. The area has firstly been shaped through its military use and it allowed for nature and animals to slowly start creating their own habitats in and around unused military facilities. New micro climates were born.

Research can be conducted on the response of nature to military presence and construction.

Figure 11. Munitiepark Soesterberg from *https://www.baarnschecourant.nl/lokaal/natuur-en-milieu/346308/wandeltocht-munitiepark-soesterberg. Wijchers, O. (2020)*

Biodiversity mapping

Existing biodiversity data is gathered and visualized through means of maps and diagrams. Possible trends are determined and used as a design tool to make informed decisions on which possible interventions are most suitable for the context.

Flora and fauna on site

This map visualizes the presence of different animal and plant species on site. By overlaying biological data points obtained from the management plan from Utrechts Landschap, such as the presence of bees, ground-nesting birds, and plants like viola canina, the map highlights high-density biodiversity areas. The spatial strategy emphasizes a diagonal green corridor that connects the site to the broader Utrechtse Heuvelrug landscape, while the grey zones highlight areas where habitats currently exist. The grey areas are study sites belonging to the research program in which researchers will use there areas to study the development of the species at the site. Movement through the site is carefully planned and the public is kept away from such sensitive areas.

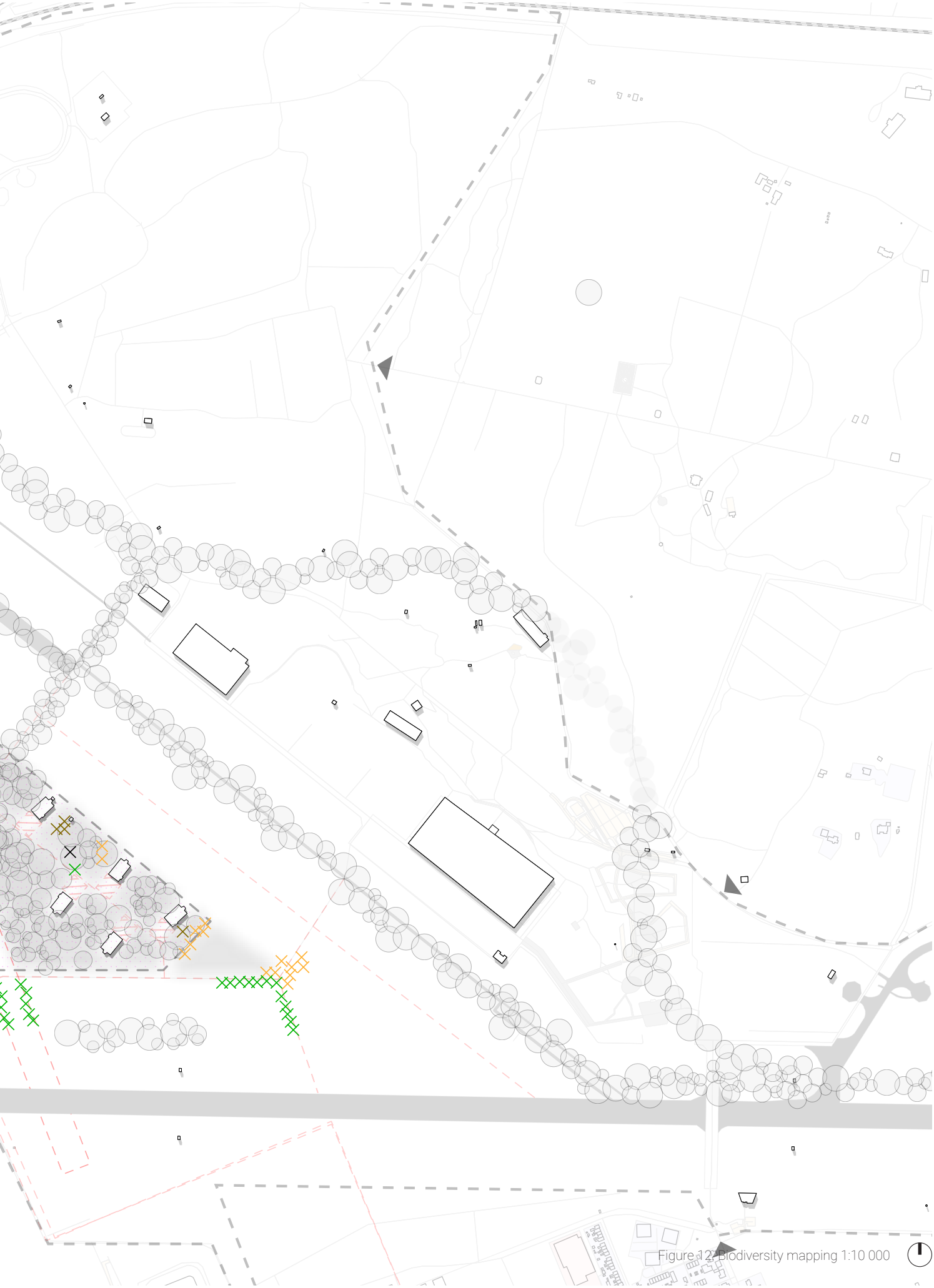


Figure 12 Biodiversity mapping 1:10 000

Literature

Several scientific papers are used to provide background knowledge for the interventions at the airbase. A first reading discussed the definition of adaptive reuse, this being a broad term including the changes in circulation, orientation, relationship between spaces, addition or removal of building parts. Plevoets et al. (2010) also discusses three approaches: typological, technical, and architectural. The architectural approach, also known as strategic approach, is the one relevant to this transformation project and focuses on processes and strategies applied for converting buildings. There are seven concepts of conversion: building within, building over, building around, building alongside, recycling materials, adapting to new function, building in style of.[4]

Several conservation principles should also be considered in adaptive reuse cases like the understanding the significance of places is vital, significant places should be managed to sustain their values, decisions about change must be reasonable, transparent and consistent, and documenting and learning from decisions is essential as Thurley (2020)[5] mentions in his paper. He further discusses heritage values like historical value being a demonstration of how the past used to be, and aesthetic value being the sensory stimulation from a place.

In the case of transforming existing structures, three terms, like Shin (2024) define the relationship between the old and the new: translatio, imitatio, aemulatio. The first aims at perfect imitation (restoration), the second aims at equality, the third aims at surpassing the original aesthetics and functionality by making the new better and improve. The integration of old and new is subjective to the designer.[6]

Peter Zumthor discusses atmosphere as a form of perception that helps us survive. He discusses several elements like the body of architecture, materiality acoustics, temperature of a space, surrounding objects, tension between interior and exterior, and light of a space as all elements that contribute to creating an atmosphere. The relationship between materials and light partly create the indoor character

[4] Plevoets, B., Petermans, A., & Van Cleempoel, K. (2010). Developing a Theoretical Framework for Understanding (Staged) Authentic Retail Settings in Relation to the Current Experience Economy. Proceedings Of DRS. https://doi.org/10.21606/drs.2008.97

[5] Thurley, S. (2020). Conservation principles. European Heritage Heads Forum.

together with acoustics (Zumthor, 2007).[7] In Soesterberg's case, quietness, enclosure of spaces and material heaviness represent core values of the site. Therefore, the preservation of the site's shelters and materials for as much as possible directly contributes to their atmospheric quality, as well as being heritage carriers. New materials should be legible and thus provide a contrast with the existing.

Brighenti (2007)[8], in his book On territory as relationship and law as territory discusses that a territory is not only a space, but a set of social relationships too. In the case of Soesterberg, this means multiple ownerships and functions within the whole site area. Applying Brighenti's principles in Soesterberg's airbase means designing using a layered system, corresponding to what the current conditions are, preservation of the military heritage as a way to maintain territorial history and logic and not as freezing time, and biodiversity research as a new site program requiring new boundaries and conditions.

[6] Shin, Y. (2024). The adaptive reuse design strategies– focused on the case of the Tate Modern architectural competition. Journal Of Asian Architecture And Building Engineering, 24(2), 554–569. https://doi.org/10.1080/13467581.2023.2300387

[7] Zumthor, P. (2006). Atmospheres: architectural environments. surrounding objects. In Medical Entomology and Zoology. http://ci.nii.ac.jp/ncid/BA77504088

[8] Brighenti, A. (2007). On territory as relationship and law as territory. N/A.

Precedents

Naturalis biodiversity center and museum by Neutelings Riedijk architects is located in Leiden, NL. It hosts one of the largest natural history collections in the world is organized through a clear spatial program, with public functions on the ground floor and exhibition halls above, whilst the existing buildings accommodate offices, depots, and labs.

The building guides visitors on a journey of discovery from entrance to increasingly larger exhibition spaces. A central atrium connects old and new, and the exhibition hall is marked by a glass crown that filters daylight and gives the building a distinct identity.

The concept of the Naturalis can be translated in this project by having the collections of nature become a part of the narrative and by having parts of the research process, conducted in the study fields, be visible to visitors. Rather than having a museum separate from science, the two concepts work simultaneously.

In Naturalis circulation plays an important role. Routes, transitions and controlled circulation create a specific user experience. This concept can be translated in the shelter in which the (hi)story of the space is being revealed through movement; by ramps, stairs, platforms, which all allow to observe the shelter from multiple points.

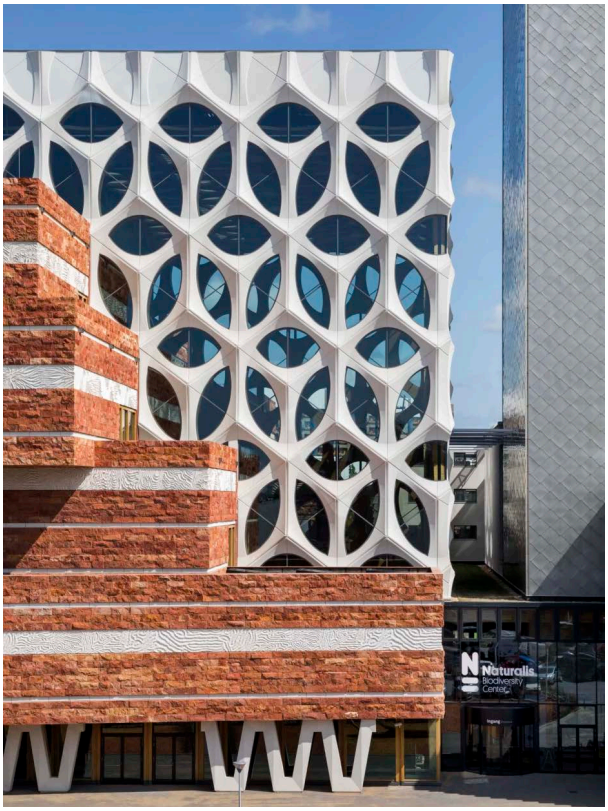


Figure 13. Naturalis biodiversity center in Leiden from *https://www.museum.nl/nl/naturalis.* N/A. (2019)

Pintos, P. (2025, May 14). Naturalis Biodiversity Center Leiden / Neutelings Riedijk Architects. ArchDaily. https://www.archdaily.com/924031/naturalis-biodiversity-center-leiden-neutelings-riedijk-architecten

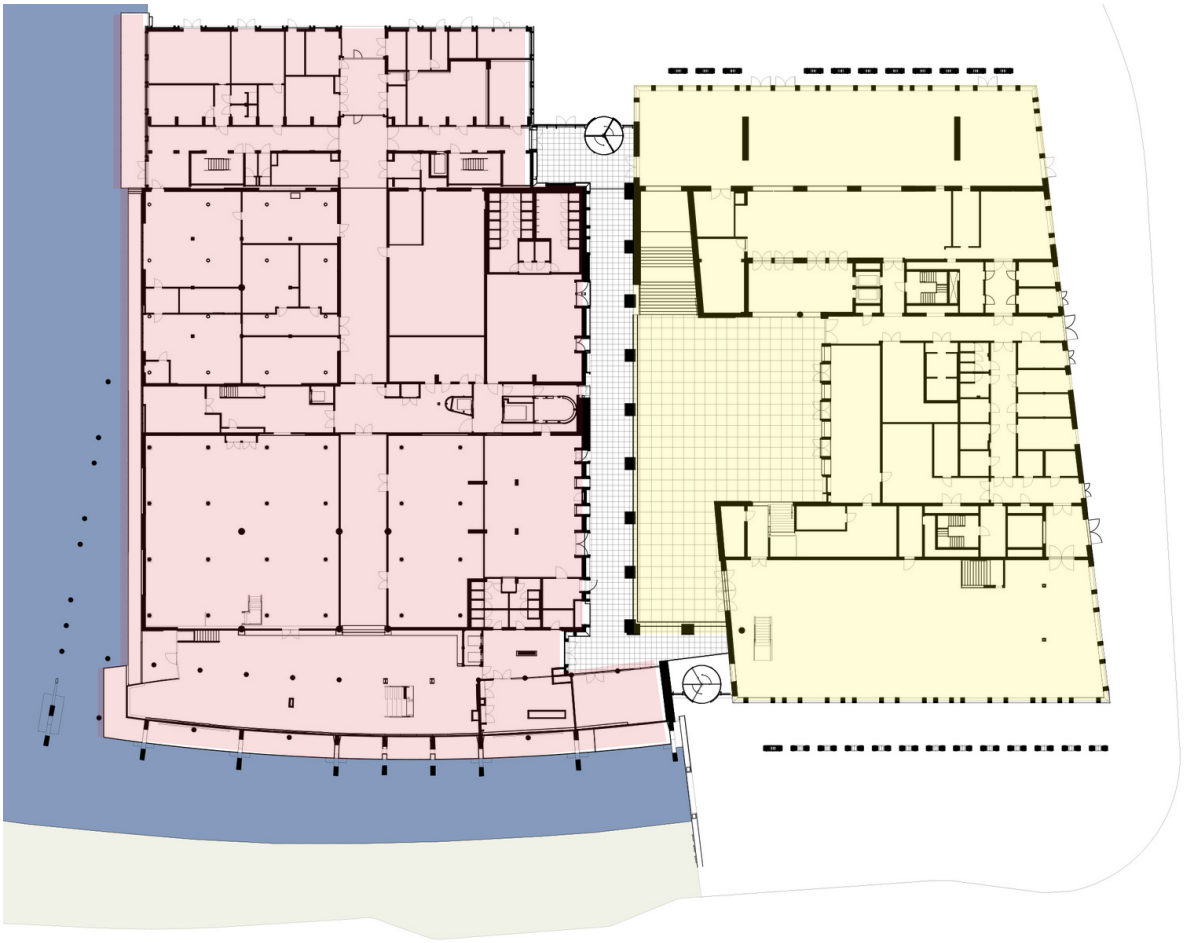


Figure 14. Plan ground level
from *https://www.museum.nl/nl/naturalis.* N/A, (2019)

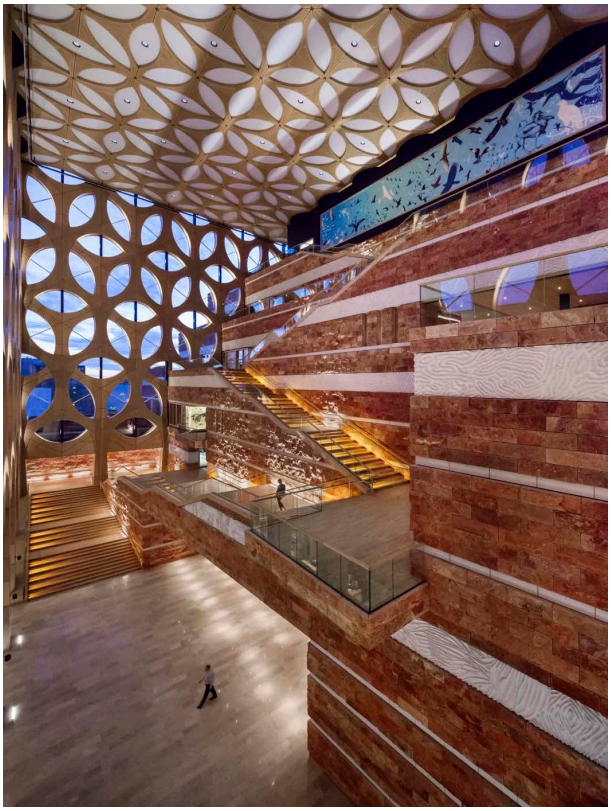


Figure 15. Naturalis biodiversity center in Leiden
from *https://www.museum.nl/nl/naturalis.* N/A. (2019)

Precedents

The Zeitz Museum of Contemporary Art Africa (MOCAA) was designed by London-based Heatherwick Studio and is one of the largest museums of contemporary art in the world.

With a total of 9 floors covering 9 500m^2, the building reuses the Grain Silo Complex of Cape Town to host its exhibition spaces. These have been carved out of concrete tubes, creating a whole new set of rooms within the historic masses.

This project has at its core the transformation of a massive infrastructural object into a spatial museum experience. This is where the structure of the silo becomes an exhibit itself by having volumes carved out and visible to the human eye.

These elements are used in Soesterberg by aiming to create a user experience in which the shelter becomes the main focus of the exhibition space, from which mass is carved out to reveal the massiveness of the structure and by inserting a new programme whilst simultaneously preserving the authenticity of the military heritage.

Figure 16. Complex view from *https://www.archdaily.com/879763/zeitz-museum-of-contemporary-art-africa-heatherwick-studio.* N/A (2017)

Zeitz Museum of Contemporary Art Africa. (2026, May 8). Zeitz MOCAA - Museum of Contemporary Art - Zeitz MOCAA. Zeitz MOCAA. https://zeitz-mocaa.museum/

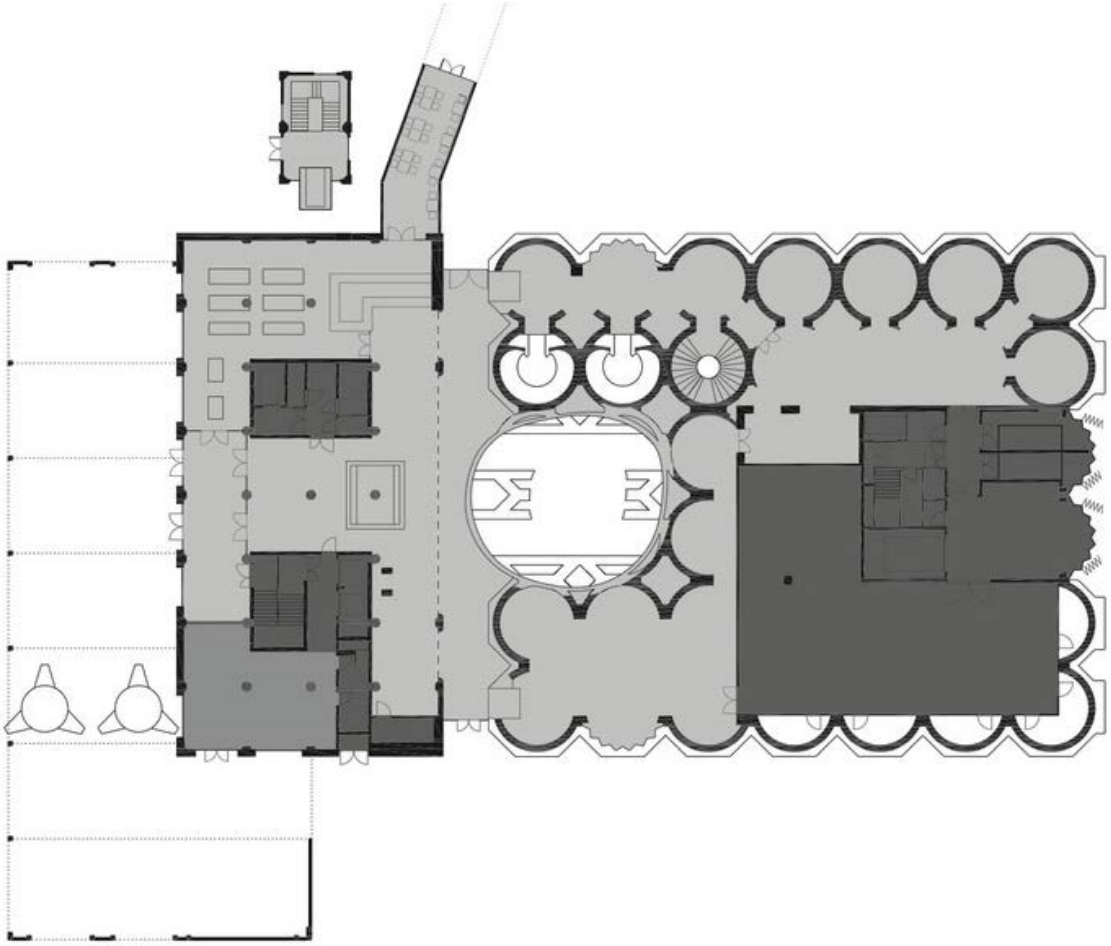


Figure 17. Ground plan from *https://www.archdaily.com/879763/zeitz-museum-of-contemporary-art-africa-heatherwick-studio.* N/A (2017)

Figure 18. Exhibition hall from *https://www.archdaily.com/879763/zeitz-museum-of-contemporary-art-africa-heatherwick-studio.* N/A (2017)

Precedents

The Great Court at the British Museum was designed by Foster and Partners in the late 1990's. Originally, the museum hosted the British Library with an open courtyard and a circular reading room with bookstacks in the center. However, with the loss of its program due to the library's relocation, the inner courtyard was reimagined and was given a new focus: it became the connection between all exhibition galleries of the museum. This was acheived by placing a large canopy to bridge the connection between the existing buildings and creating a new interior space that surrounded the existent. The existing reading room at the center was preserved.

The glazed canopy, therefore, can be seen as a complementing element with the aim of preserving the historic and creating new spaces that focus on the existing.

This concept can be applied in the case of the Hardened Aircraft Shelter by creating a structure that completely covers the existing building. By doing so, the original shelter is protected from the outdoor environment, a new climate is created and new public spaces introduce a user experience in which the former military building becomes an item of display. This can also be considered as a museum-within-a-museum.

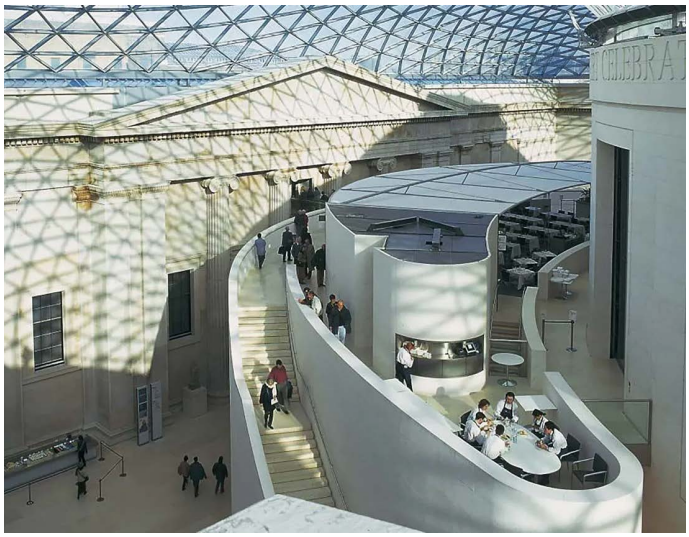


Figure 19. Interior impression from *https://www.fosterandpartners.com/projects/great-court-at-the-british-museum.* N/A (n.d.)

Great Court at the British Museum | Foster + Partners. (n.d.). *https://www.fosterandpartners.com/projects/great-court-at-the-british-museum*

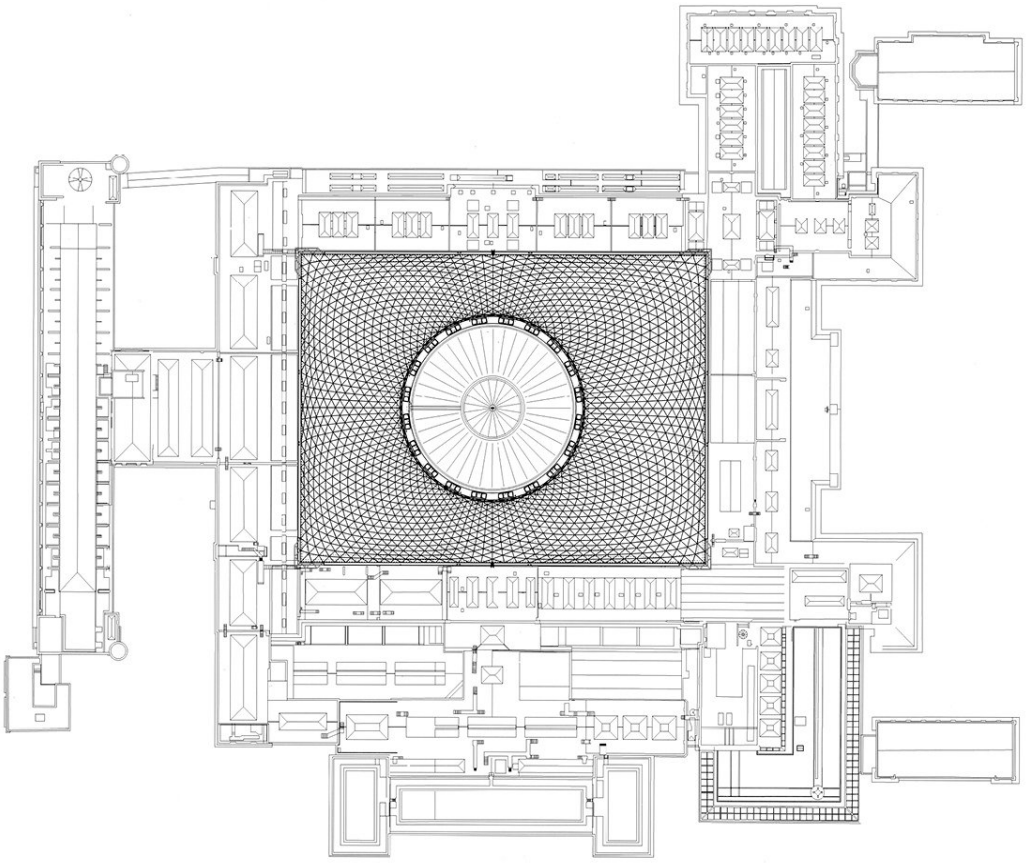


Figure 20. Roof plan from *https://www.fosterandpartners.com/projects/great-court-at-the-british-museum.* N/A (n.d.)

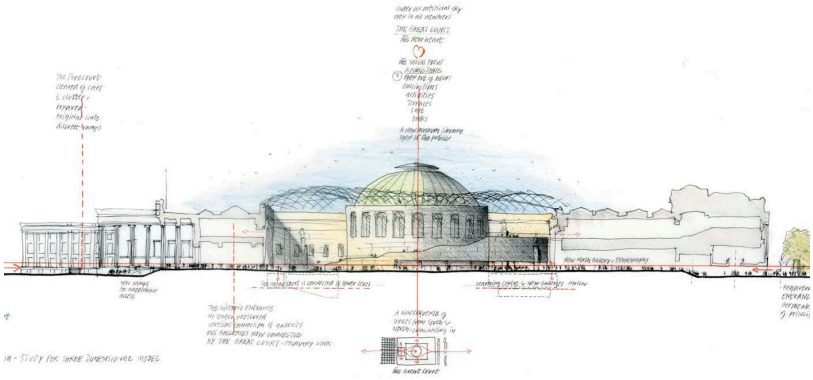


Figure 21. Sketch from *https://www.fosterandpartners.com/projects/great-court-at-the-british-museum.* N/A (n.d.)

Initial design approach

The initial design for the museum and exhibition center began with the concept of building-within-building. This was conceived as a way to reimagine the role of the shelter as protective element, but as an element being protected from the outdoor environment. By doing so, the HAS becomes the central element of the design. By creating a new structure, multiple public spaces are added around the existing shell, spaces from which visitors observe at different points.

Originally, the addition resembled a geodesic dome. Once also used in military applications to protect aircrafts, this lighter weight construction is self-supporting and creates large spaces without the need of supports. This was chosen because of its structural properties, as well as to make the intervention noticeable from distance: from the National Military Museum. This would attract visitors' curiosity and lead them to the shelter area. In the case of the shelter, the dome was ideated as two intersecting asymmetyric circles with resepct to the existing shelter. By doing so, diverse spaces are created, each with a different user experience.

In the interior, a ramp with connects the ground, first and observation deck. Several ramp platforms would allow visitors to observe the shelter from different points, thus getting a different perspective on the shelter.

This concept, however, resulted in a large-scaled structure that would not align with Soesterberg's site characteristics given its scale.

The concept is maintained, but with a different outcome: a larger structure that mimics the half-piped shape of the shell. This improves the relationship between the old and the new.

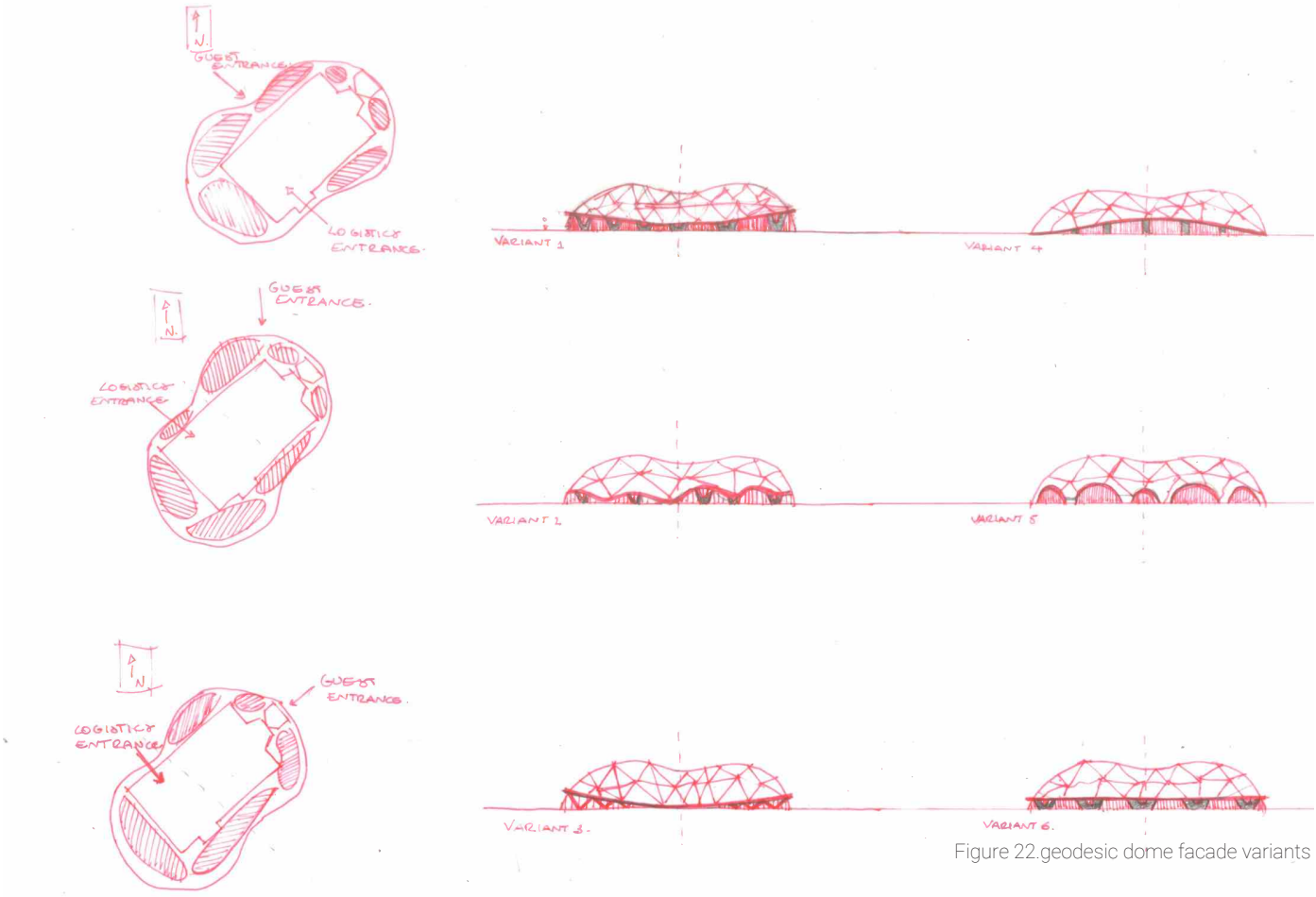


Figure 22.geodesic dome facade variants

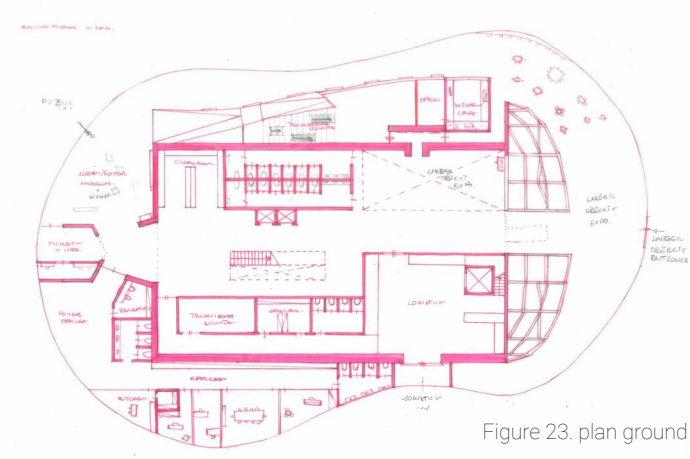


Figure 23. plan ground

Figure 24. section

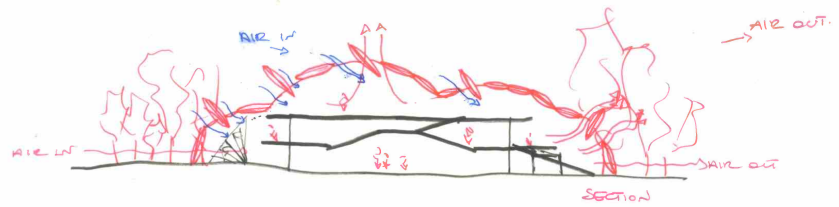


Figure 25.section

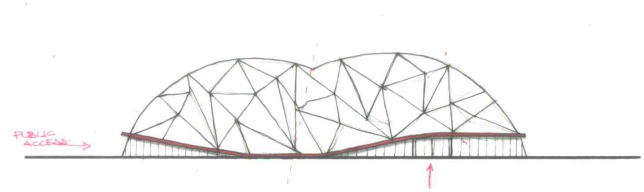


Figure 26. facade variant

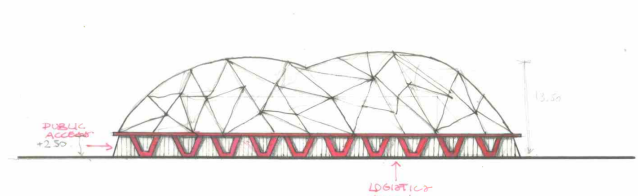


Figure 27. facade variant

3. RESULTS

Value assessment

The current value assessment of the former airbase categorizes the site as a landscape in which the layers of ecology, history and spatial values are seen as high value elements. Based on Utrechts Landschap's vision, the site is highly valued for its existing ecological systems, quietness, and traces of military past.

The scattered aircraft shelters create a highly valuable network of heritage. They are part of a larger landscape of which the runways are valued positively as these serve as green corridors through which animals transit. The existing infrastructure strengthens the heritage and identity of the airbase.

According to this study, adaptive reuse becomes a strategy of high preservation through limited occupation and ecological preservation.

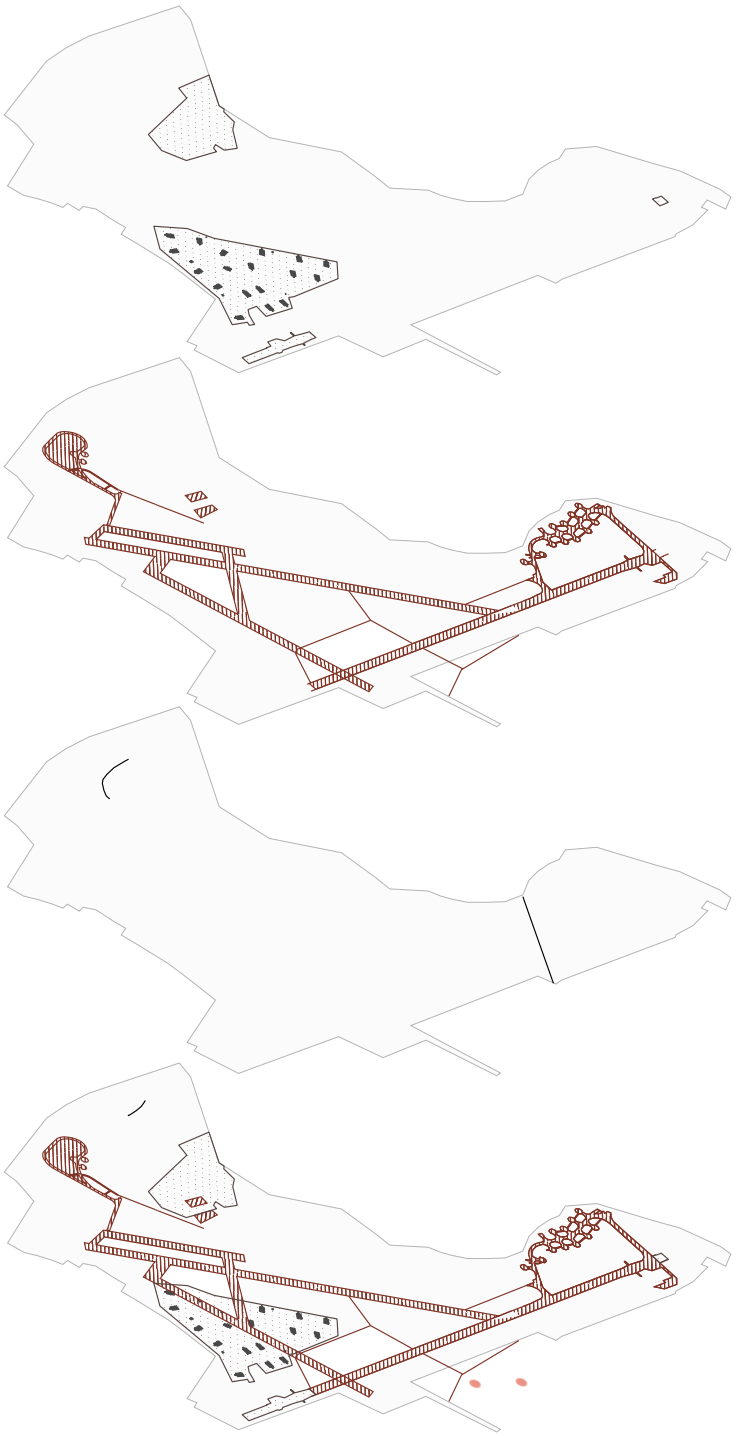


Figure 28. Existing layers

Value assessment

1. Unique ensemble

The HAS structures themselves have a positive value, but taken as a whole system the value increases. In its entirety, these structures represent historical functions of the airbase and how the cluster worked.

2. Infrastructural layers

Many layers within the former airbase are still recognizable. This is either where paved surfaces still exist, or the footprint of some infrastructural elements are still visible. Throughout the shelter area we observe a split: at the West of the former German runway the surfaces are still paved, whereas everything at the East is visible through footprint. The former runway represents one of the main arteries of traffic and, together with the traces of the former taxiways, this demonstrates the inner functioning of the airbase as a whole.

3. Ecology

Limited human movement was possible in the airfield due to its secretive nature; access was limited to non-authorized personnel. Consequently, this created favorable conditions for several species of living organisms and animals to develop their habitat at the airbase. Over time, and especially after the site's decommissioning, the existing ecology became a vital and integral part of the area. A dualism between preservation of heritage and preservation of nature is encountered.

4. Wonder building

The whole ensemble of the seventeen hardened aircraft shelters are a demonstration of a large-scale military war system. Originally designed for civilians as easy-to-build structures, these were later discovered and applied in the military field with the addition of a thick concrete layer. This is an example of the versatility of these simple and standardized structures and how these can be replicated with ease.

5. Dome structure

The dome shape of the shelters is a key value in maintaining the recognizability of military heritage. The hangars are extremely recognizable and their preservation is key in order to protect its heritage status.

6. Camouflage

The richness in ecological ecosystems and its dominance at the site contributes to the camouflaging of the whole shelter system. This creates a variation in the visibility of the shelters: some are fairly visible, whereas others are almost entirely surrounded by nature. This highlights the dominance of nature and how it has taken over a site.

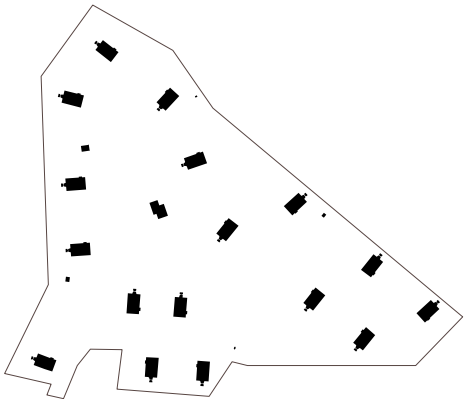


Figure 29. Unique ensemble

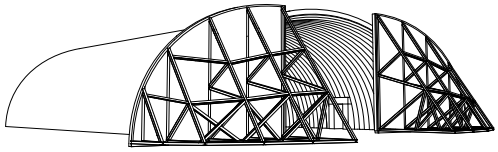


Figure 32. Wonder building

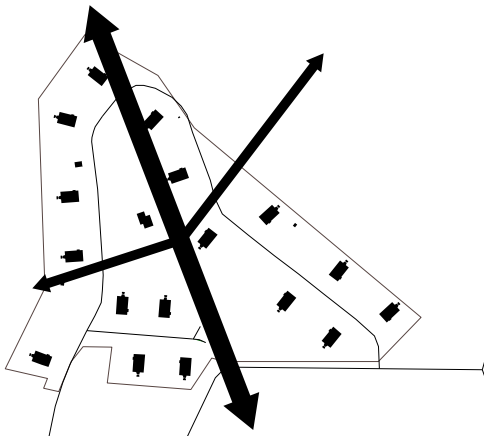


Figure 30. Infrastructural layers

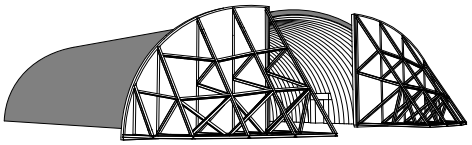


Figure 33. Dome structure

Figure 31. Ecology

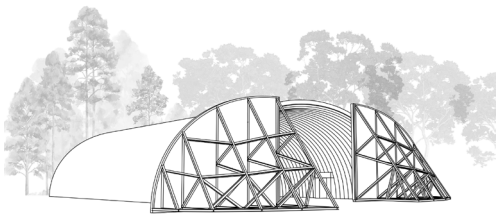


Figure 34. Camouflage

Value assessment

This drawing identifies which elements contribute positively to the building's character and which have limited or neutral significance based on a subjective analysis.

The scheme highlights the concrete and steel dome as the most valuable component, both structurally and spatially. Its distinctive form and construction define the identity of the shelter and are therefore to be preserved. Similarly, key structural elements such as the steel framework and the main volume of the building are considered to have strong architectural and experiential value.

Other elements like the existing entrance, are also marked as positive, as they contribute to the authenticity and legibility of the structure.

Rear doors and the existing ventilation system are classified as indifferent in value. While these elements may still function, they do not significantly contribute to the spatial or historical quality of the building. These elements only have a historical value when considering the whole HAS system as one.

With relation to the value assessment from Utrechts Landschap, the proposed masterplan reflects the original value assessment. The runways will retain their ecological corridor function and the shelters will maintain their high value status. This will also extend to the interior, in which the atmosphere created by the dome is also classified as highly valuable.

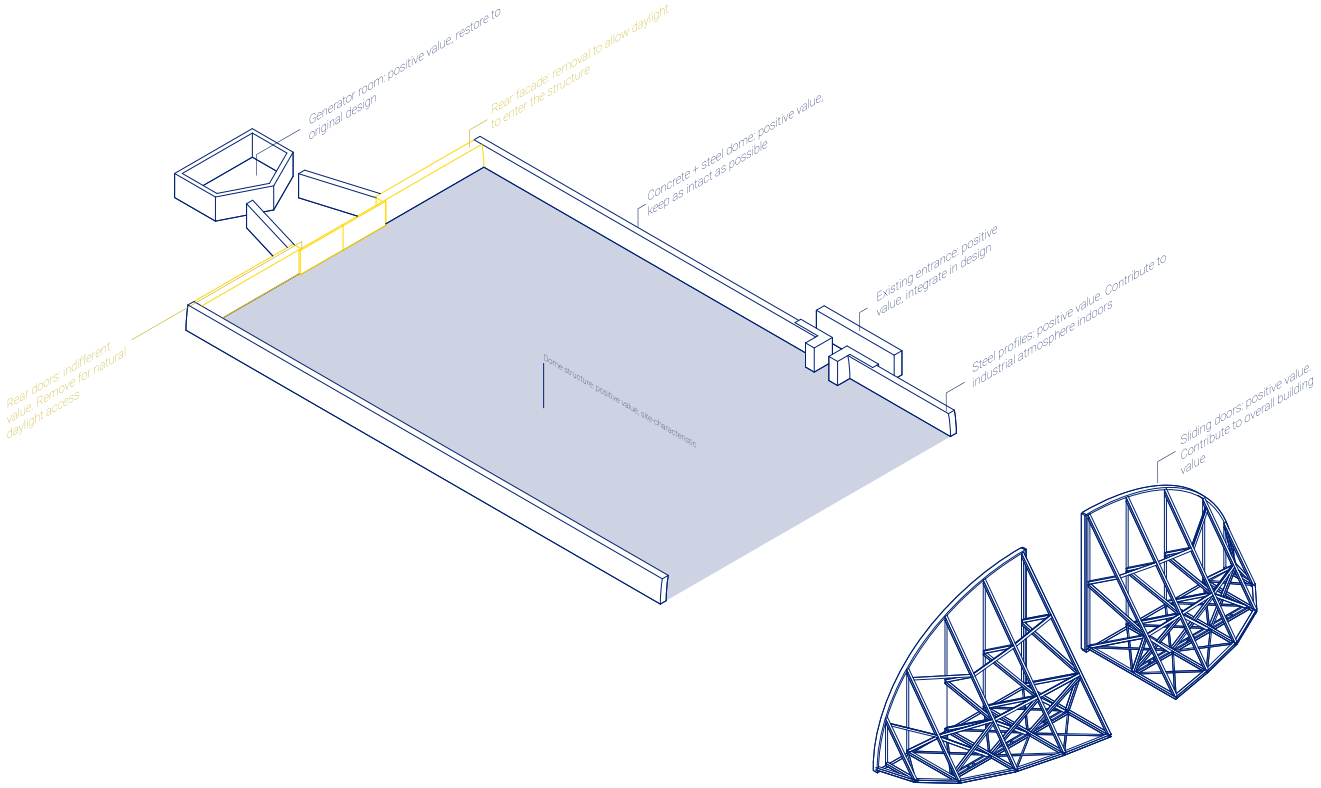


Figure 35. Shelter value assessment

Program and ownership values

The re-purposing of the site into a research center and museum for nature and biodiversity aligns with the vision of transforming the former airbase into a natural environment.

The proposal aligns with the vision of Utrechts Landschap, which focuses on strengthening healthy and sustainable ecosystems, protecting biodiversity, preserving traces of the past, and reinforcing the relationship between heritage and landscape.

Their vision also values nature as a place for regeneration and relaxation, while aiming to connect larger ecological areas and support healthy animal populations. These principles are reflected in the proposal through the integration of research, education, and public accessibility within the existing landscape.

New spatial connections between the shelter area and the *Nationaal Militair Museum* are introduced while responding sensitively to the existing flora and fauna on site.

Areas with higher ecological value are preserved and used as monitored research fields, allowing the project to contribute to both biodiversity development and public awareness of the site's natural and historical layers.

Compared to other programs like residential, hospitality, or commercial, a biodiversity research center's success depends on preserving the site's existing ecological conditions. Its purpose is to study ecosystems and monitor their activity and development, whilst simultaneously generating additional scientific knowledge.

This new strategy, therefore, does not transform the site's identity, but builds upon ongoing processes. By doing so, this provides a long-term preservation strategy with the aim of protecting heritage and ecology.

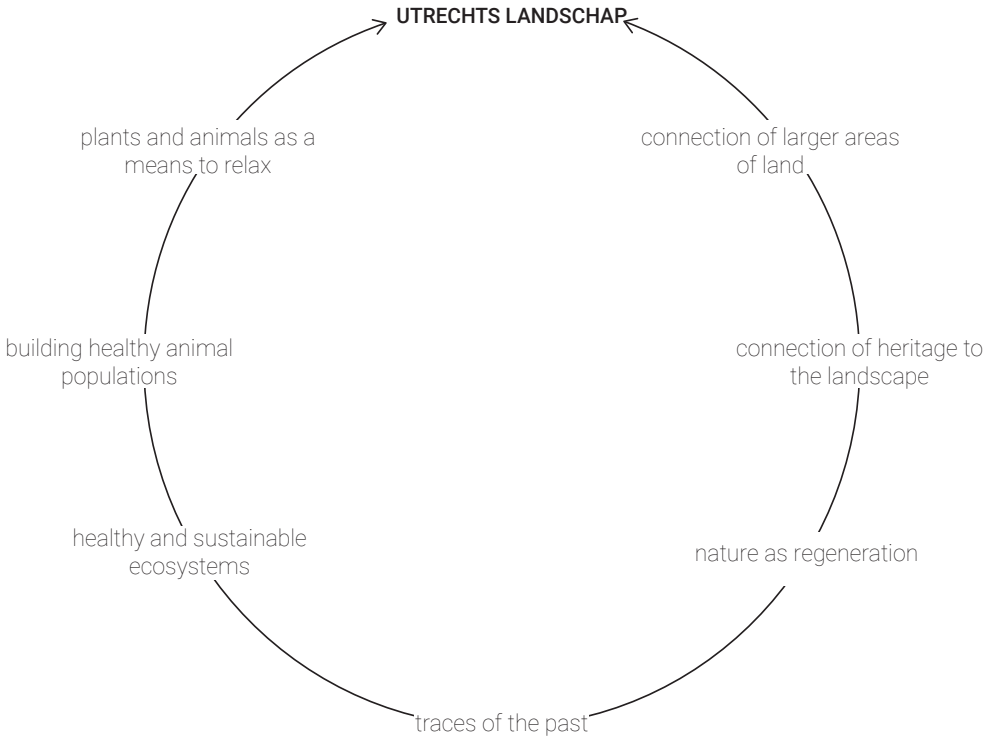


Figure 36. Utrechts Landschap values

Shelter choice

This conceptual diagram illustrates the choice of the shelters which are included in the program. As described in the introduction, approximately half of the shelters are occupied. These are highlighted in black.

At the airbase two museums are found: the National Military Museum and a smaller military museum in the commando bunker in the shelter area. The two facilities are currently connected through a series of walking and cycling routes, yet these are very far apart. A gradient is missing, as well as visibility; the bunker is hidden within the landscape.

The proposed situation (red) focuses on selecting a cluster of shelters adjacent to the commando bunker. This would create a new focus and improve visibility from the National Military Museum when the biodiversity museum shelter is chosen as the structure closest to the border. Furthermore, this would cluster all museum facilities into one area, improving the relationship between existing military bunker museum and the new nature museum.

By selecting the other highlighted shelters (red) as part of the new program, this becomes more concentrated into one main area rather than having several disconnected facilities. This also creates a main area in which visitors are contained, reducing the risk of disruptions to the neighboring habitats.

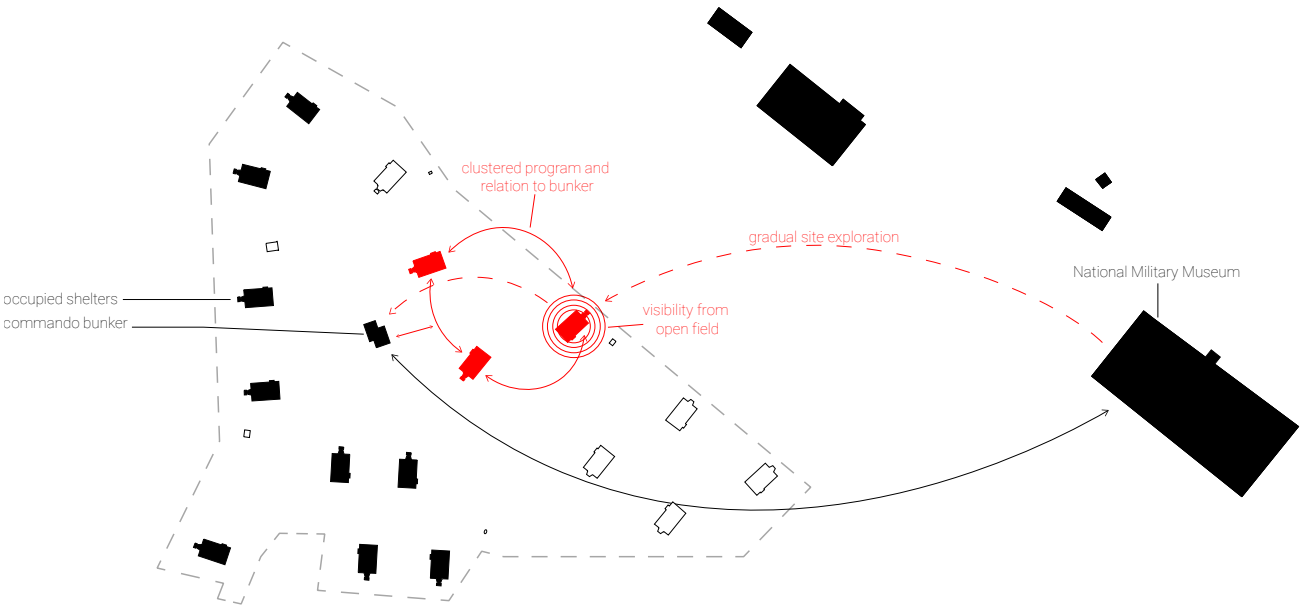


Figure 37. Shelter choice diagram

Program

The program of the nature and biodiversity museum and adjacent research center develop in 3 unused aircraft shelters.

Labs and research, storage

wet labs	200
dry labs	250
sample preparation rooms	300
analysis	220
archive & documentation	150
shared technical support	100
ecological sample storage	200
climate-controlled storage	250
equipment storage	200
circulation & services	100
logistics	150
Total	2120m^2

20-25 permanent users:
- lab manager
- 2-4 senior researchers
- 3 researchers
- 2 technicians
- support staff
- lab space= 38m^2/researcher

2 research groups:
- landscape, heritage, ecological transformation
- species monitoring and biodiversity systems

Offices, workspaces, meeting areas

shared workspaces	150
offices	250
meeting rooms	120
horeca	200
circulation & services	120
Total	840m^2

5 permanent users
20-25 researchers

Exhibition & education

long-term exhibition	300
short-term exhibition	180
horeca + guest services	150
workshop rooms	180
classrooms	180
labs	150
circulation & services	160
logistics	200
Total	1500m^2

open 300 days/year
estimated 300 visitors/day

Total: 4460m^2

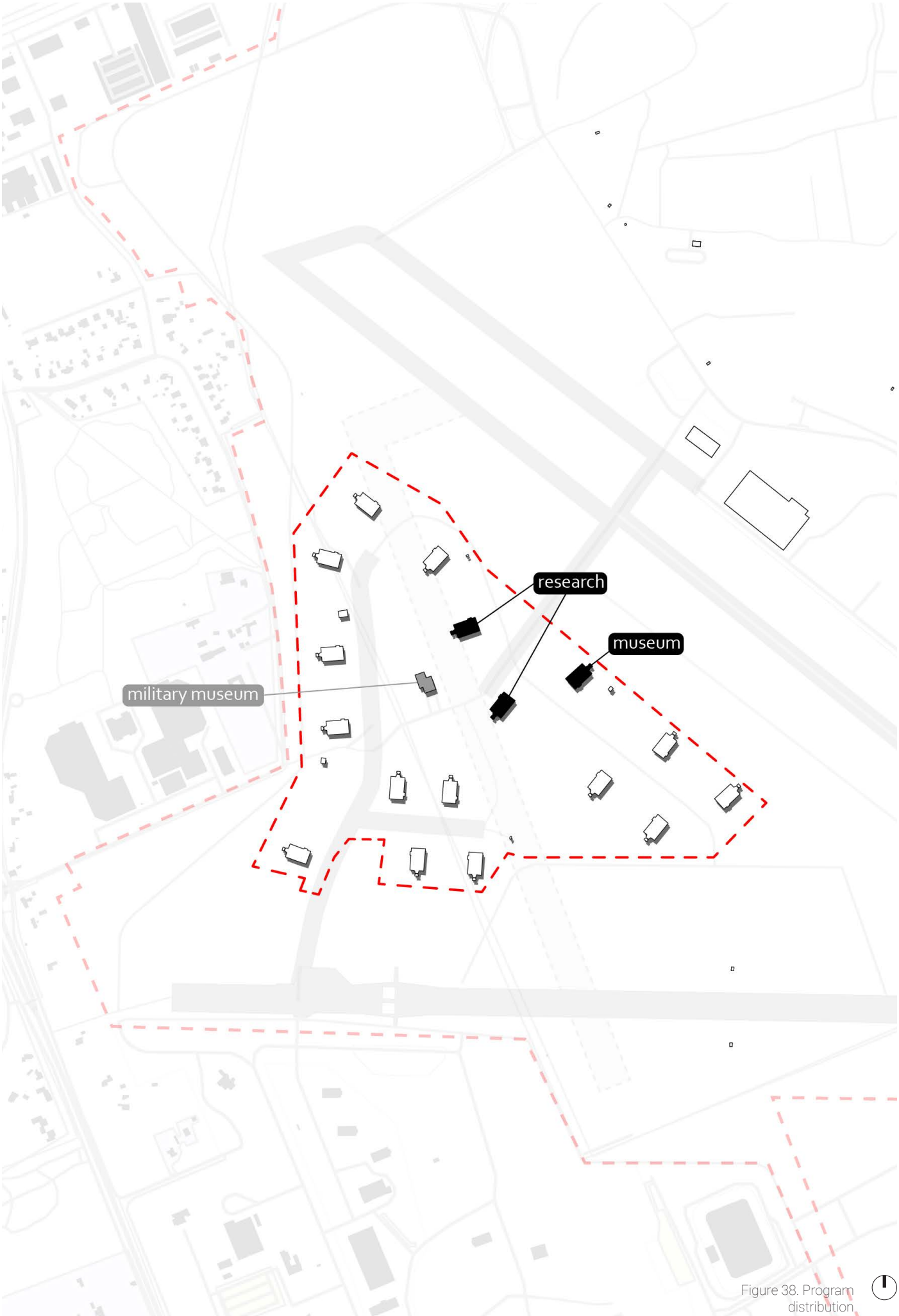


Figure 38. Program distribution

Masterplan

This masterplan reimagines the site and the coexistence between ecology, heritage, and public accessibility. The plan preserves the established greenery on-site whilst accommodating a new use. The existing ecological corridor present on one of the former airstrips is preserved and is linked to the shelter area through a North-East-oriented former taxiway footprint.

The existing mobility situation is not altered, but several walking routes are added to strengthen the overall site's accessibility and allow visitors to move around the site freely. This is done in accordance to the safety-zone from the *zweefvlieg terrein*, a flight school located on the site, in which the area must be kept free at all times due to flying gliders. Consequently, the added walking routes to connect the shelter area to the National Military Museum extend from within the site and towards the East-West airstrip. Two employee-only paths are present in correspondence of the research shelter and the access to the logistics area of the museum shelter. This is aimed at partially separating movement in the site, as well as preserving the nature by limiting visitor access in the sensitive research zones.

Out of the 8 unused aircraft shelters, the program develops in 3 (black), these being located around the core of the site.

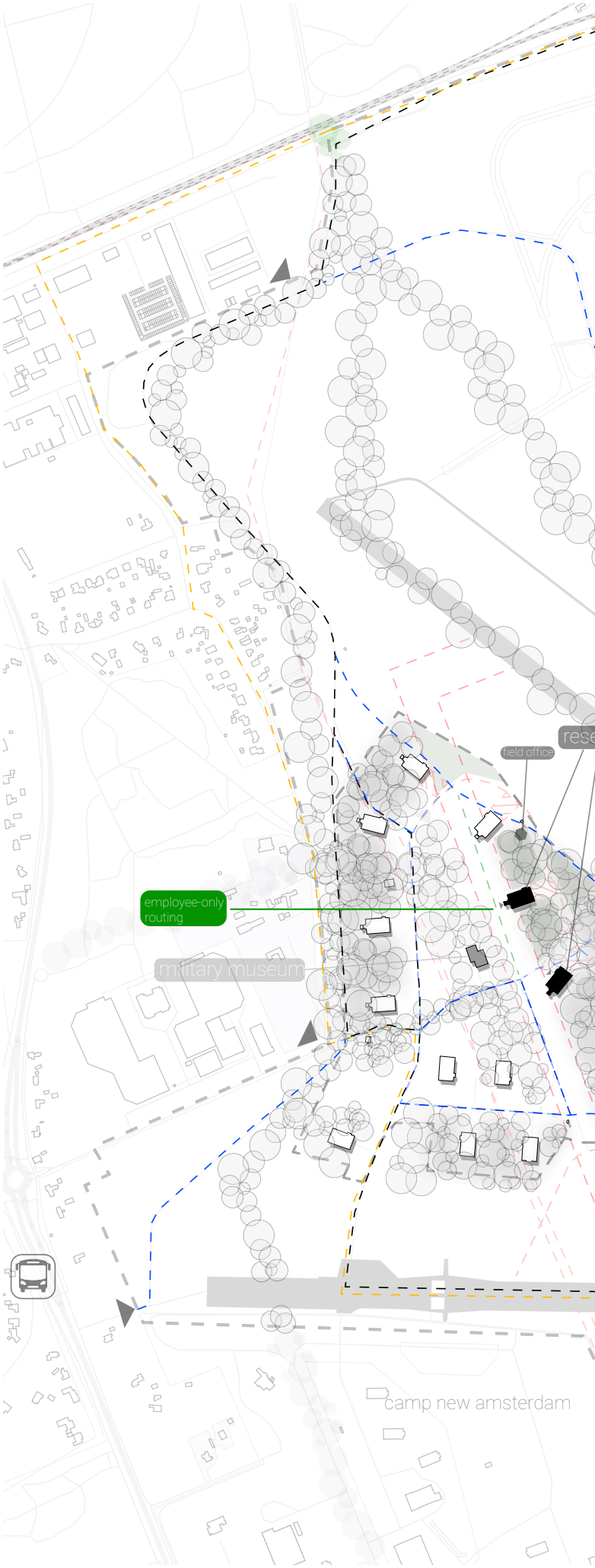


Figure 39.Masterplan
1:10 000

Masterplan

This zoomed-in site plan focuses on the integration of research, ecology, and public accesses within the dense forest setting.

The new program is organized around four study fields, with areas dedicated to birds and bees, and flora and fauna, supported by small-scale field offices in addition to the main research facilities in the shelters.

The main research conducted relates to habitat succession, species monitoring, and to climate resilience. The first observes how Soesterberg's ecosystems developed as a result of low human activity at the site. Species monitoring, instead, monitors the protected species in the area and studies changes in future patterns. Climate resilience, lastly, observes the changes of the biodiversity related to climate.

A network of paths develops through the site, providing clear pathways for visitors. These routes are designed as narrow gravel trails with slightly raised edges, allowing them to blend almost invisibly into the natural setting and to pose a minimal barrier to the moving animals.

Along these paths, wooden platforms are placed at key locations. These act as quiet observation points where visitors can pause—either to watch researchers at work in the study fields or simply to experience the surrounding forest. In this way, the plan enables a coexistence between public visitors and scientific research, reinforcing the site's role as both a living laboratory and a natural landscape.

Figure 40. Masterplan
1:2000

Figure 41. Impression study fields in nature

Transformation strategies

These diagrams show different possible strategies for the transformation of the shelters.

The diagrams on the left show the lighting in the current situation: light reaches the shelter only when the front doors are open as there are no other openings. The bottom figure shows how the demolition of the rear part of the structure and the displacement of the front doors change the behavior of the sunlight within the dome.

The 12 different variants on the right are an initial approach towards the mass studies where light behavior is studied. This is done for the museum shelter, in which a major amount of natural daylight is required with respect to the other shelters dedicated for research. Different variants are explored in which part of the shelter is removed or displaced, with the addition of transparent volumes (glass).

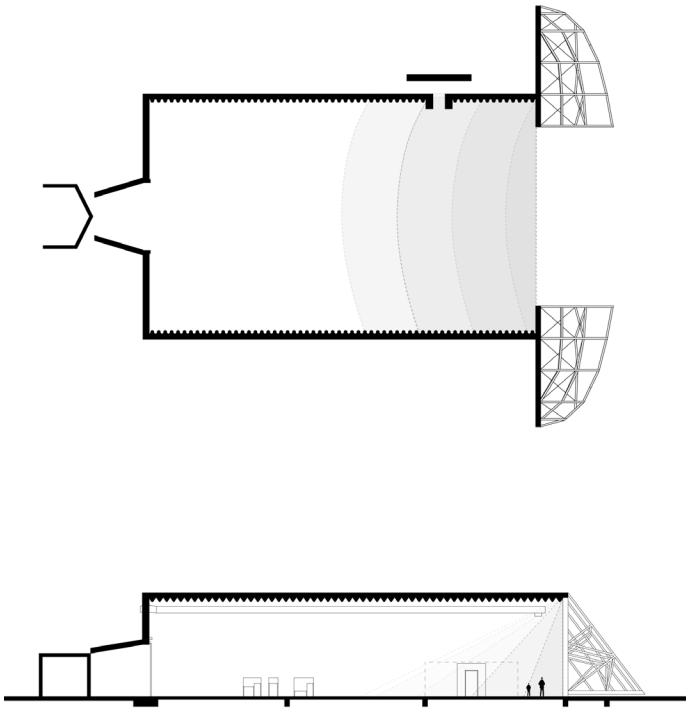


Figure 42. Current

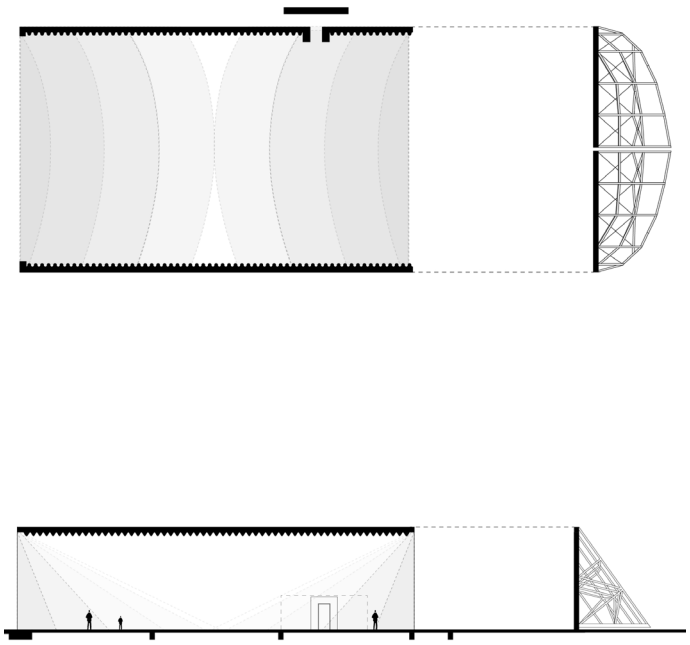


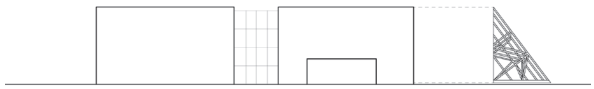
Figure 43.Variation

Variant 1
untouched

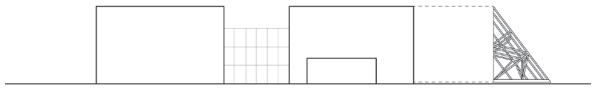
Variant 2
untouched + displaced front doors

Variant 3
displaced front doors + demolished rear structures

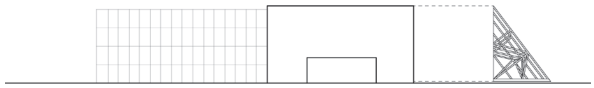
Variant 4
displaced front doors + cut through center



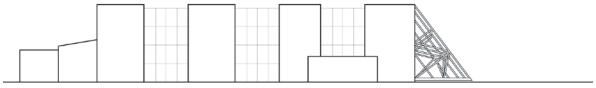
Variant 5
displaced front doors + cut through center



Variant 6
displaced front doors + material replacement rear



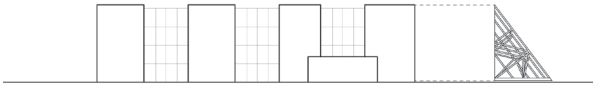
Variant 7
cut throughs



Variant 8
displacement front doors + front + rear extensions

Variant 9
displacement front doors + front exension

Variant 10
displacement front door + cut throughs



Variant 11
displacement front doors + front + rear material replacement

Variant 12
displacement front door + material replacement upper shell

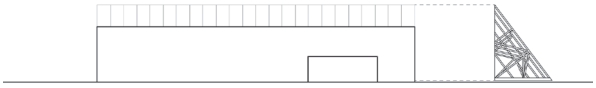


Figure 44. Shelter designs

Museum shelter transformation

The chosen transformation strategy for the museum shelter is that of a building-in-building concept. This larger structure is chosen for several reasons.

1. Weather resistance

The shelter is almost a century old and is no longer weather proof. During its construction no waterproofing layer was added and during a site visit water damage to the interior was visible. Adding insulation and water-resistant layers to the inside and outside would thicken the whole structure and change its appearance. Its authenticity would be lost.

2. Busy surroundings

Guest and visitor activities at the museum create medium to high levels of noise, especially in proximity of the building itself. High disturbance negatively impacts living species of plants and animals.

3. Containment of activity

This is connected to the point above. By creating a larger structure covering the existing hangar, all museum activity is contained and disturbance to the surroundings is reduced by containment.

4. Shelter as artifact

By adopting the building-in-building principle, the shelter becomes the main element of display. Military heritage is protected from the outside world and from further decay caused by weathering.

5. Observation at different points

Adding new building masses next to the shelter create a play of volumes which can be used as observation points. Different levels create different angles.

6. Connection inside-outside

The outer building, having larger dimensions than that of the shelter, is closer to nature. By using contrasts like transparent elements, nature and animal activity are directly and clearly observable from a safe distance. This ensures that wildlife is not disturbed.

7. Dispersion of visitors

Transforming the shelter into a museum attracts guests. This is the only shelter fully open to the public and is reachable through defined paths. Visitors are tempted to observe the entire shelter from up-close, even if this means accessing unauthorized nature areas. This causes disturbance and disruptions to the existing habitat and ecosystem.

8. Containment of visitors

Containing all types of visitor activity inside one structure creates a separation between indoor and outdoor activities. Visitors of the museum are contained within one area and the outside environment is left undisturbed.

The principles used transform the shelter from an abandoned military structure into a protected historical element in which heritage, biodiversity, and user experience coexist.

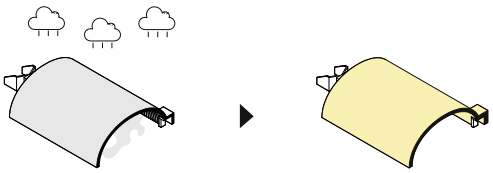


Figure 45. Weather resistance

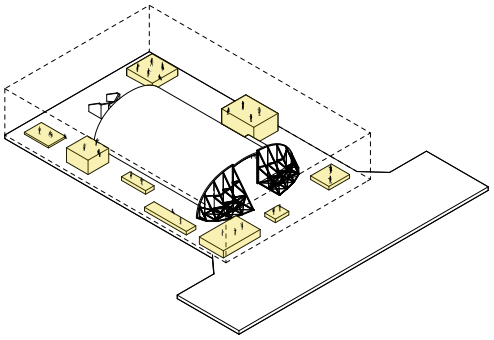


Figure 49. Observation at different points

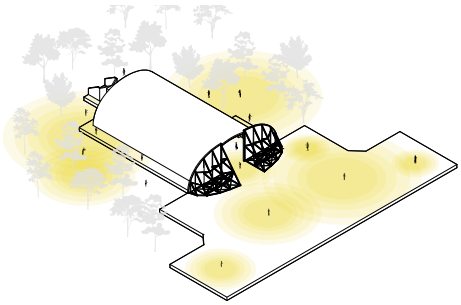


Figure 46. Busy surroundings

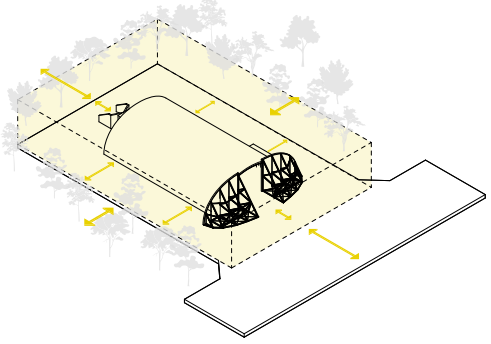


Figure 50. Connection inside-outside

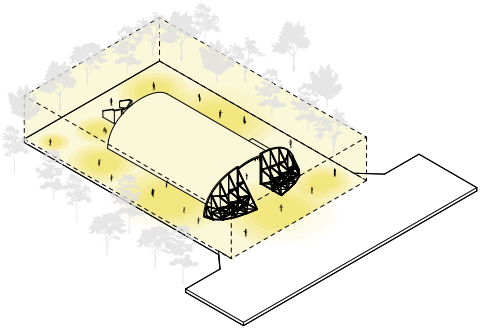


Figure 47. Containment of activity

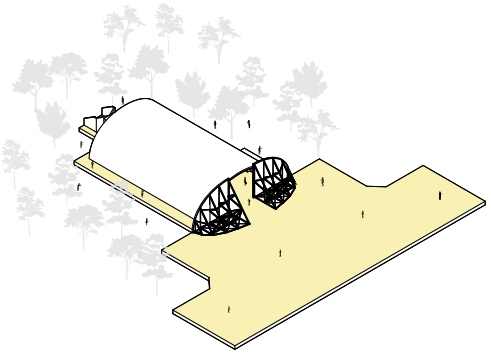


Figure 51. Dispersion of visitors

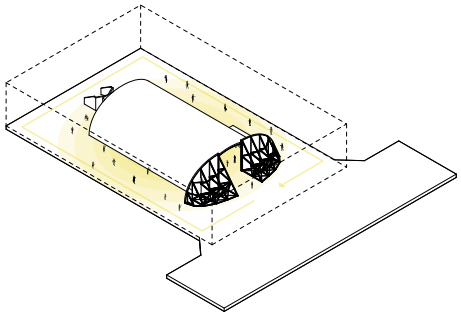


Figure 48. Shelter as artifact

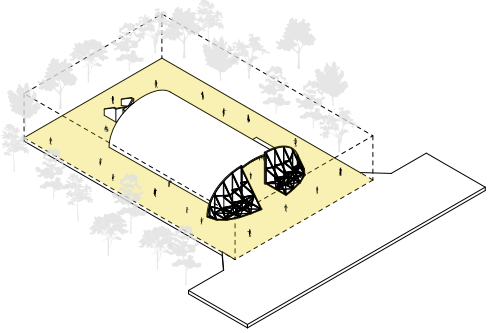


Figure 52. Containment of visitors

Museum shelter transformation

The design concept for the museum in one of the former aircraft shelters begins with the original mass. The rear part of the shelter is restored to its original design. The shelter, in its current state, has a box-like rear volume as seen in figure 1. This was an adaptation made by the military to make use of the additional mass as an electric generator room.

New masses on each side of the shelter are added to provide additional room for functions related to the museum. One of the shelter's doors is opened halfway to allow for natural daylight to enter the shell, but to also reveal part of the existing structure.

To connect the shelter to the added volumes, openings to the shell are made. Together with sloping elements, these create a flow for guests visiting the museum. The openings expose the structure further by allowing visitors to observe the massiveness of the structure from a closer distance.

Finally, routing through the masses and shell create a visitor flow in which the shelter is gradually explored.

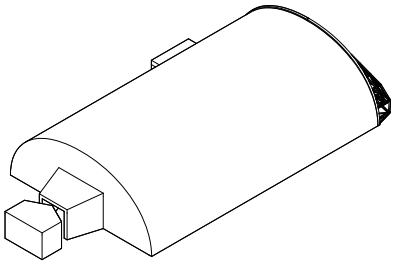


Figure 53. Original shelter mass

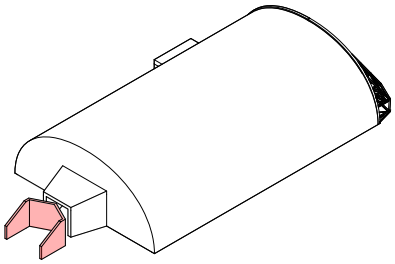


Figure 54. Restoring of parts to original state

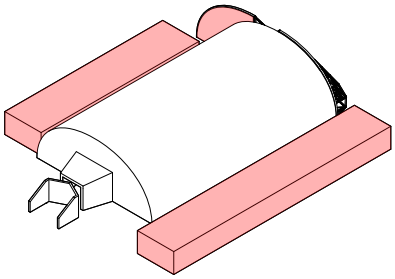


Figure 55. New volumes and modifications

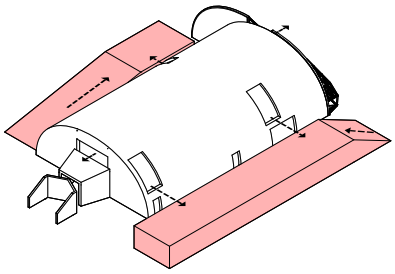


Figure 56. Relation old and new masses

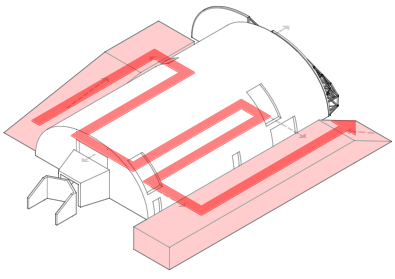


Figure 57. Routing

Museum shelter transformation

The layout of the functions of the museum are divided over two levels. On the ground floor, all guest-related functions like cafeteria, bathrooms and cloakroom are placed. On the first level, all exhibition spaces are found. These are placed within the shelter's mass to create a relation between exhibits and heritage.

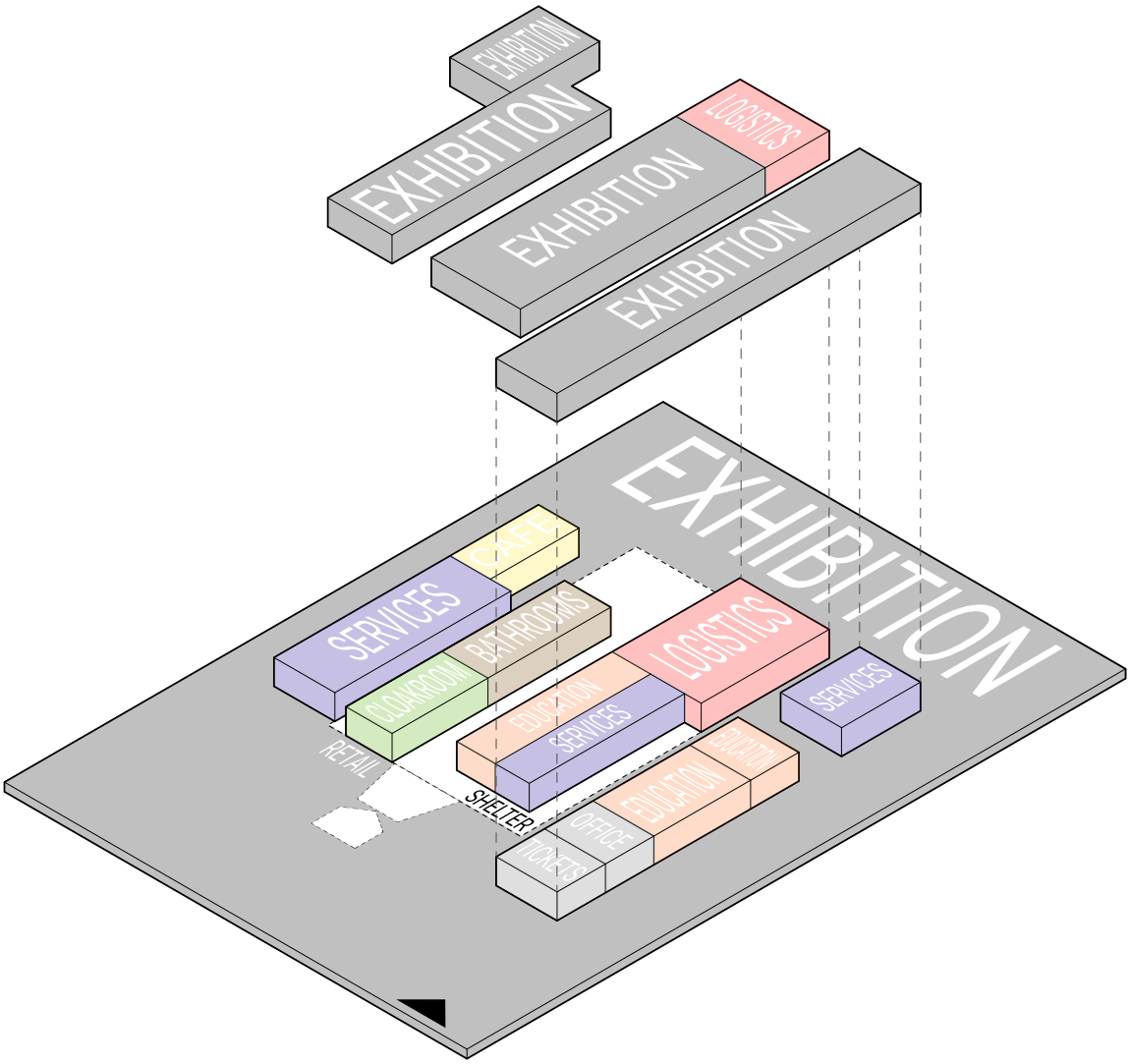


Figure 58. Museum shelter program

Museum shelter transformation

Figure 59 shows the routing within the building. From the main entrance, visitors make a first stop at the ticket office. After that, they can visit the cloakroom and other guest-related facilties at the ground level inside the shelter, or proceed to the upper level. Following the visit of the exhibition halls, visitors make their way to the exit by passing by the café and museum retail store.

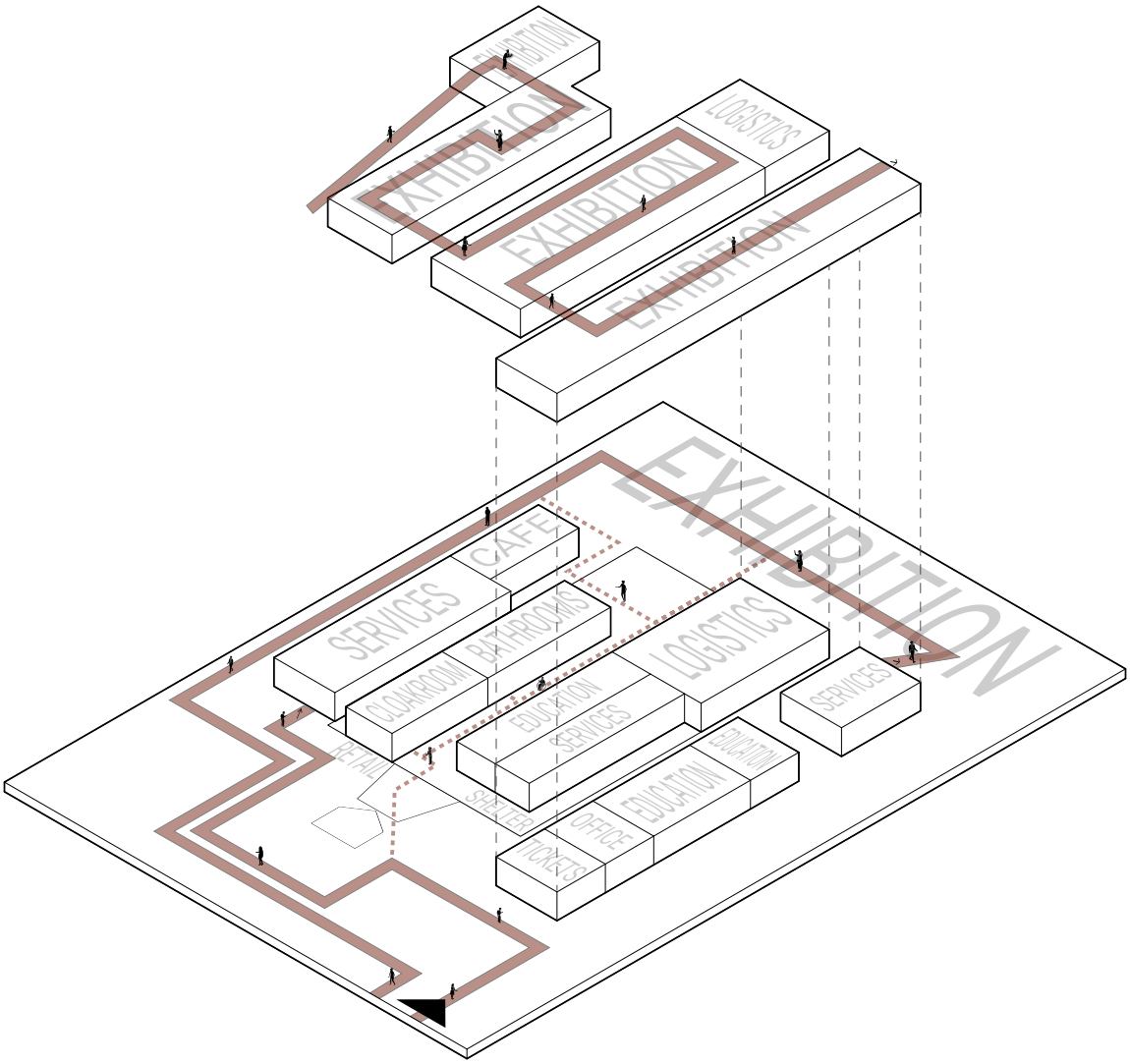


Figure 59. Museum shelter routing

Museum shelter transformation

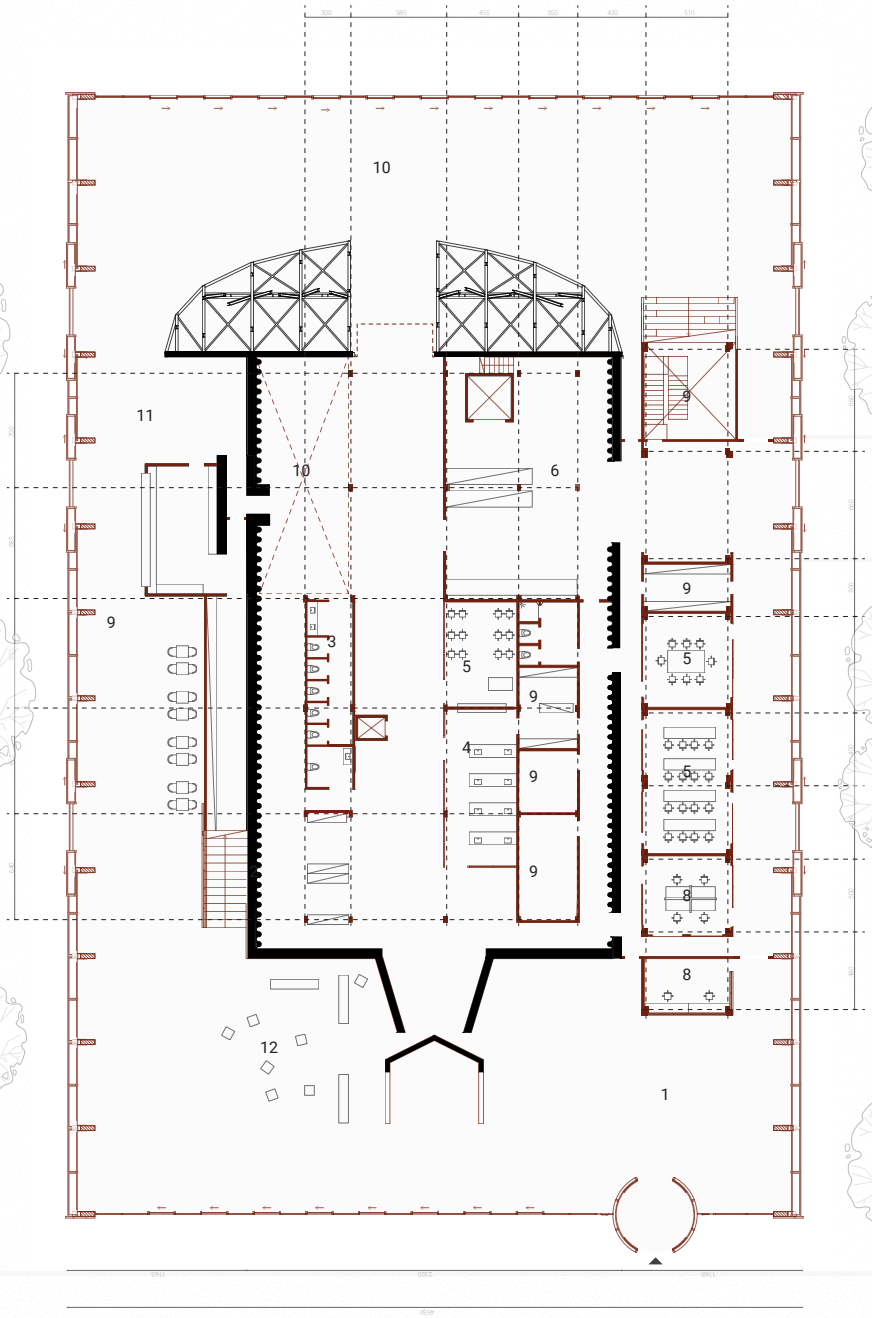
The shelter has been preserved almost entirely with the exception of openings made to connect new and old. The visitor at the foyer meets the rear of the shelter. An opening on the first level creates a connection between the inner shelter and the surrounding visitor's space.

One of the aircraft doors is opened for daylight in the shell and the original door engine is kept as display element. A void at the first level enhances the shelter's structure: visitors from above can observe below and the construction of the shelter. A café is located at the North side and is adjacent to a staircase from which visitors reach the upper level.

At the South side, offices and logistics spaces are found. The block is offset from the shelter to make the new intervention readable and at the upper level a balcony allows visitors to observe the dome and the level below.

Figure 60.Ground level plan 1:300

1 foyer
2 lockers (guest)
3 WC (guest)
4 laboratories
5 lecture room
6 logistics
7 logistics access
8 offices
9 utility rooms
10 exhibition space
11 cafe
12 gift shop


10
11
10
6
9
3
5
9
4
9
9
9
5
5
8
8
12
1
7

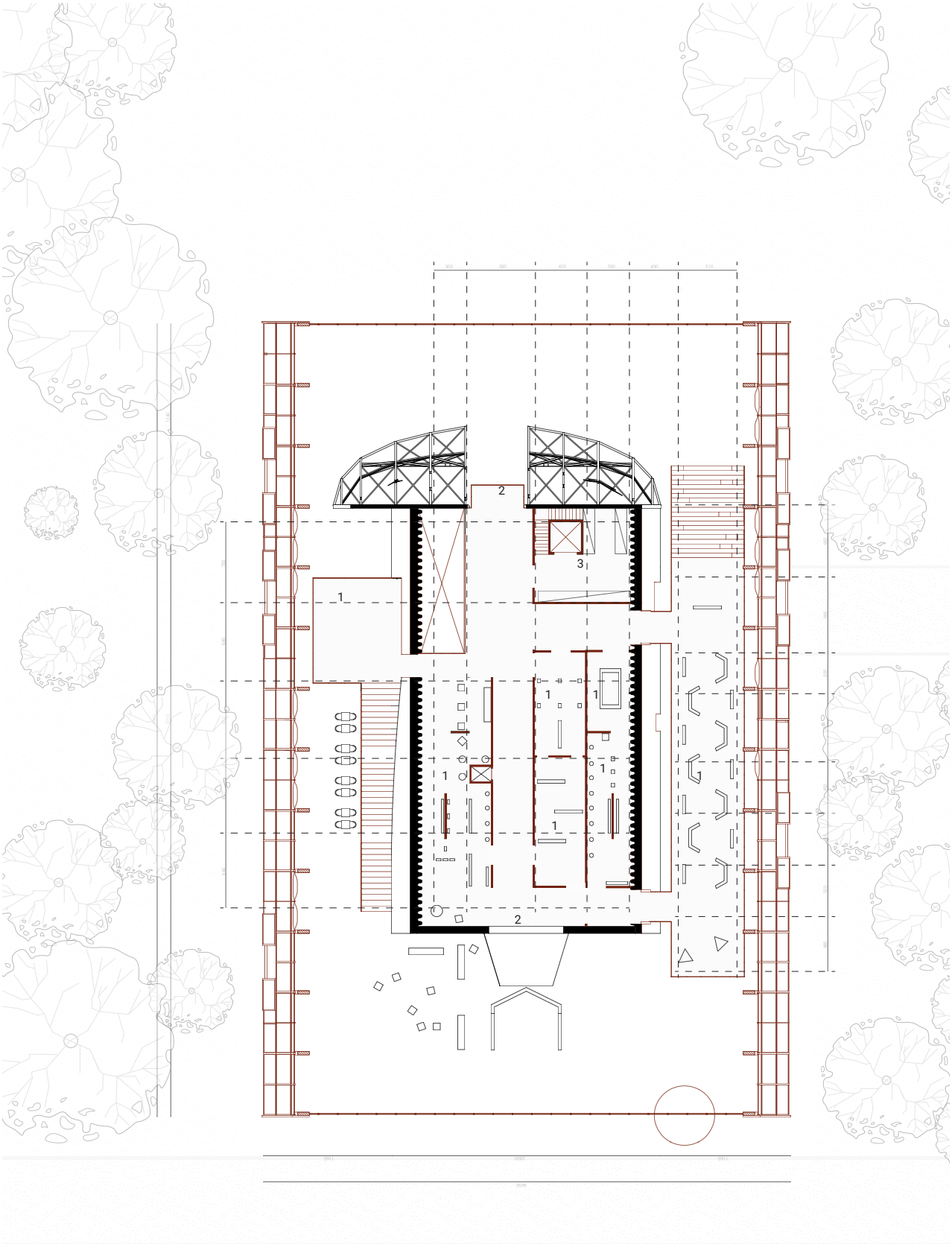
Museum shelter transformation

The first level is reached through a gentle staircase. This lands on a large multifunctional platform. This is used as an exhibition area, or simply as an observation zone.

Three exhibition halls are found inside the shelter and these display biodiversity in different modes: from digital projections, to transparent cases showcasing seed banks, and to interactive touch-tables where visitors can design an ecosystem and test its development over time in Soesterberg. The exhibition extends outside (right) of the shelter through this large platform and ends at a staircase. This last element also has a gathering function as it can be used for educational purposes.

Figure 61. First level plan
1:300

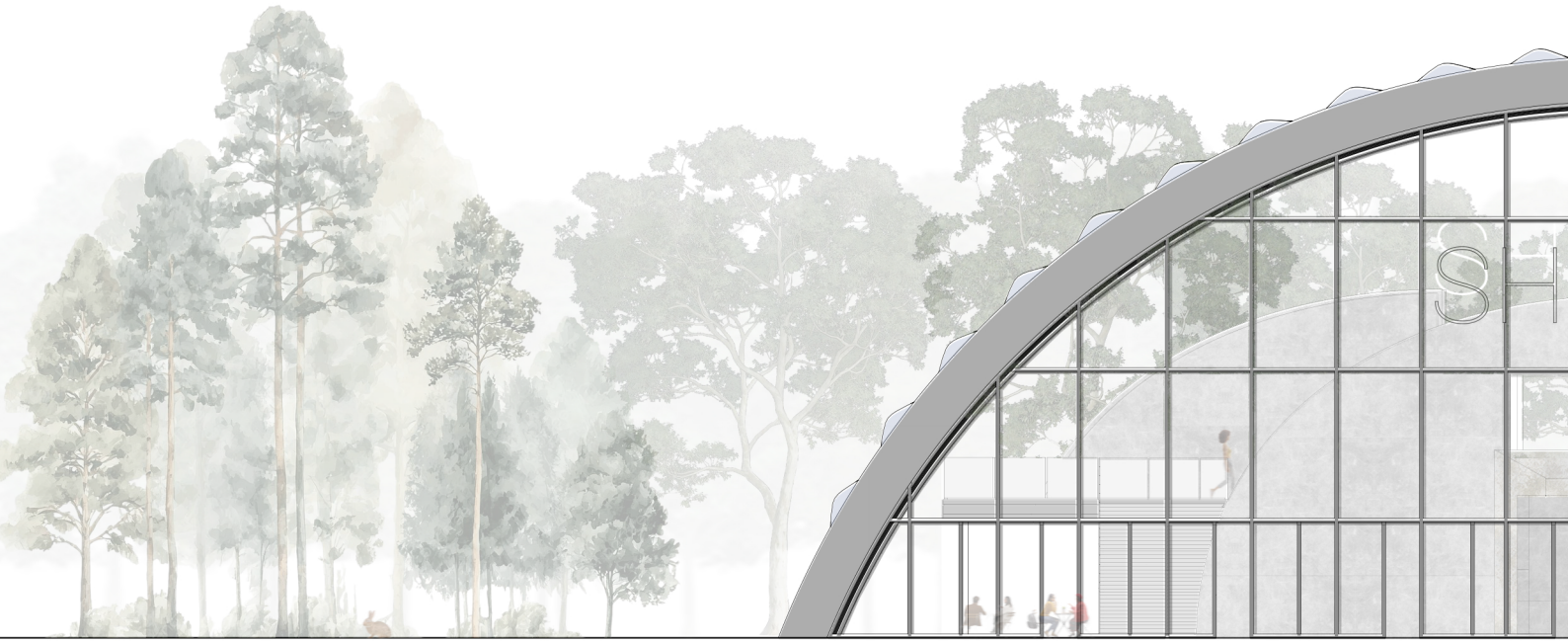
1 exhibition
2 look-out point
3 logistics

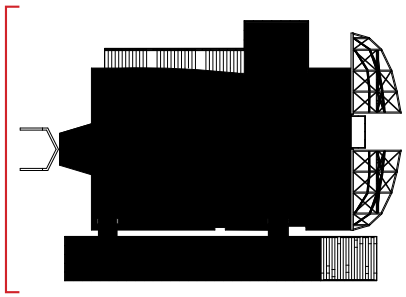

1
2
3
1
1
1
1
1
2

Museum shelter transformation

The main entrance to the building is found at the South facade. Visitors gain access through a revolving door. This controls the indoor-outdoor climate exchange and simultaneously regulates visitor flow.

The grid structure of the facade creates openings of different height: at the ground level these are in line with the revolving door's standards. Furthermore, sliding doors are added to the ground level as part of design strategy. This also extends to the curvature of the facade: a ventilating profile is added to regulate fresh air into the structure.





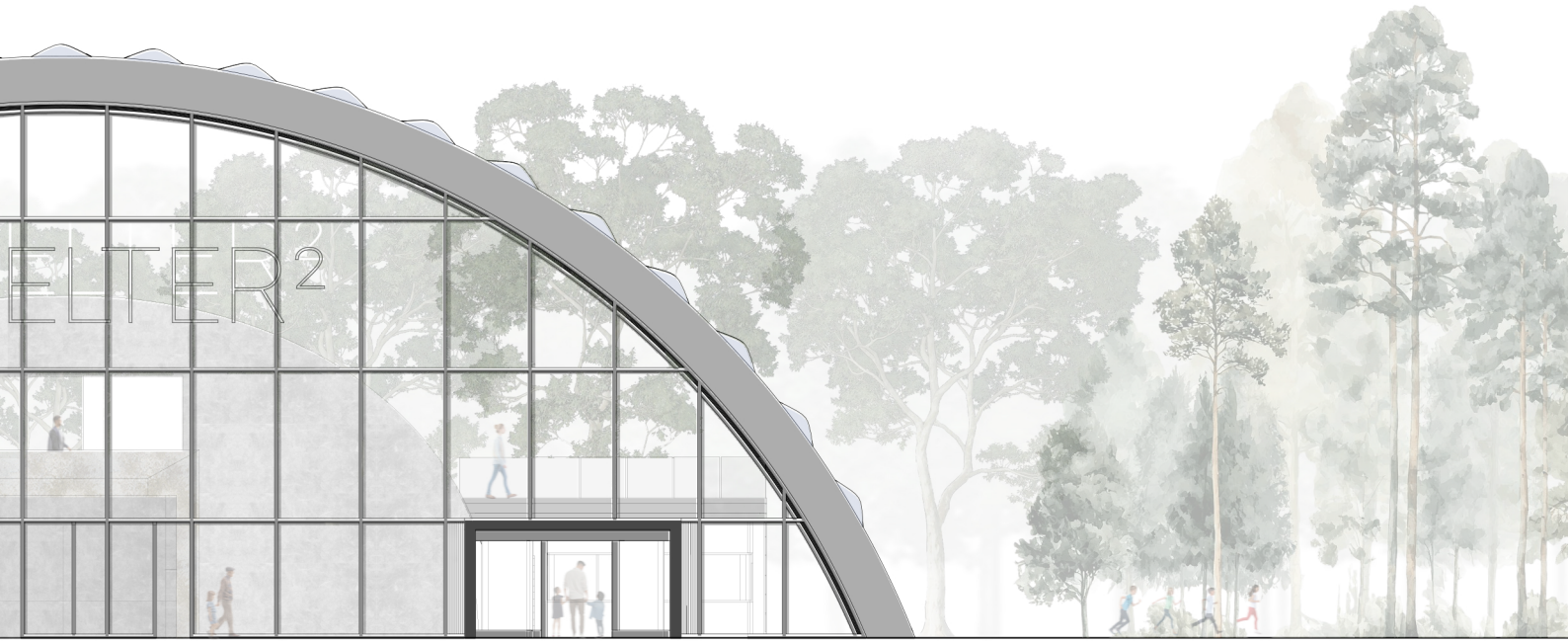
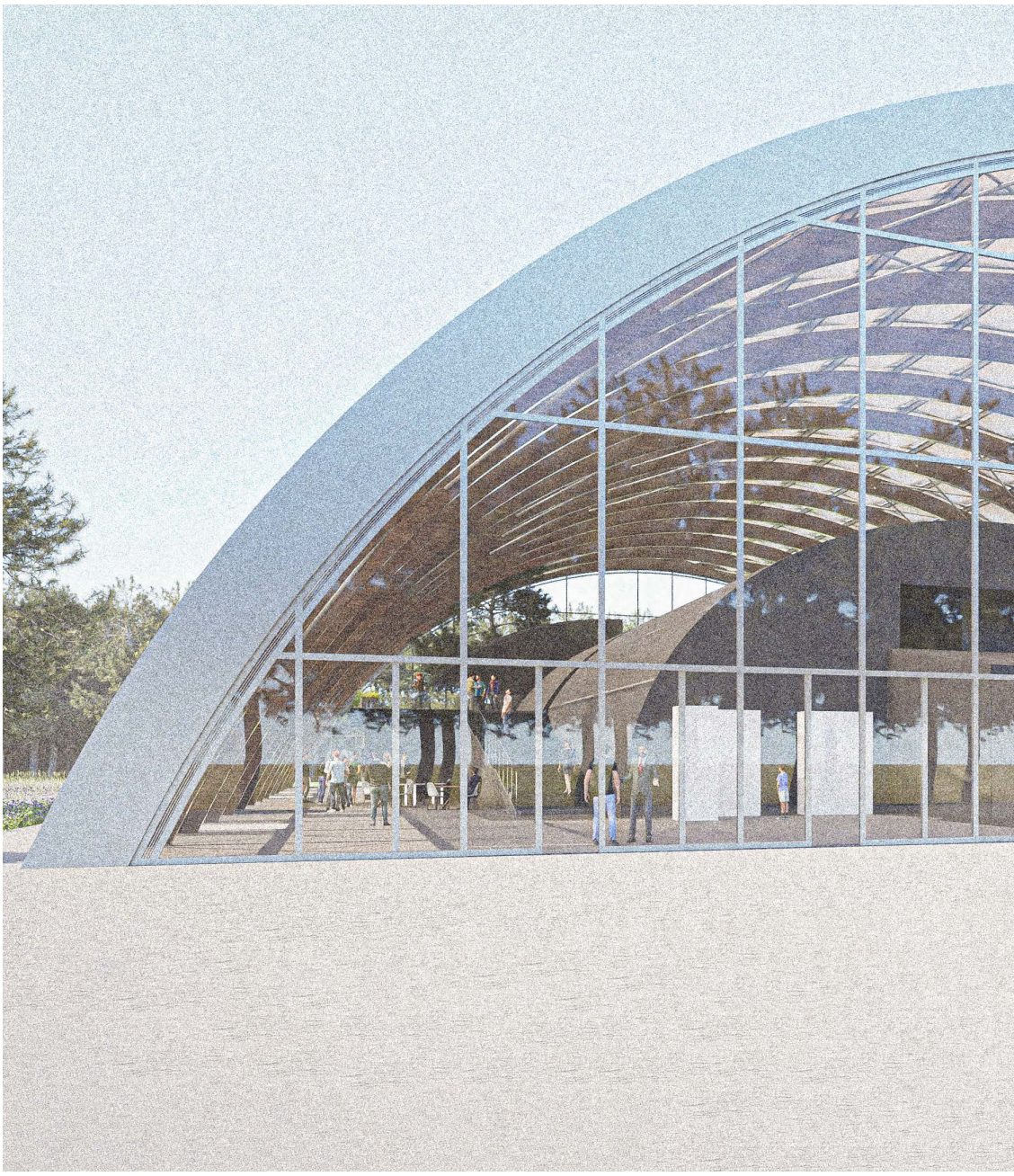


Figure 62.North elevation, 1:200



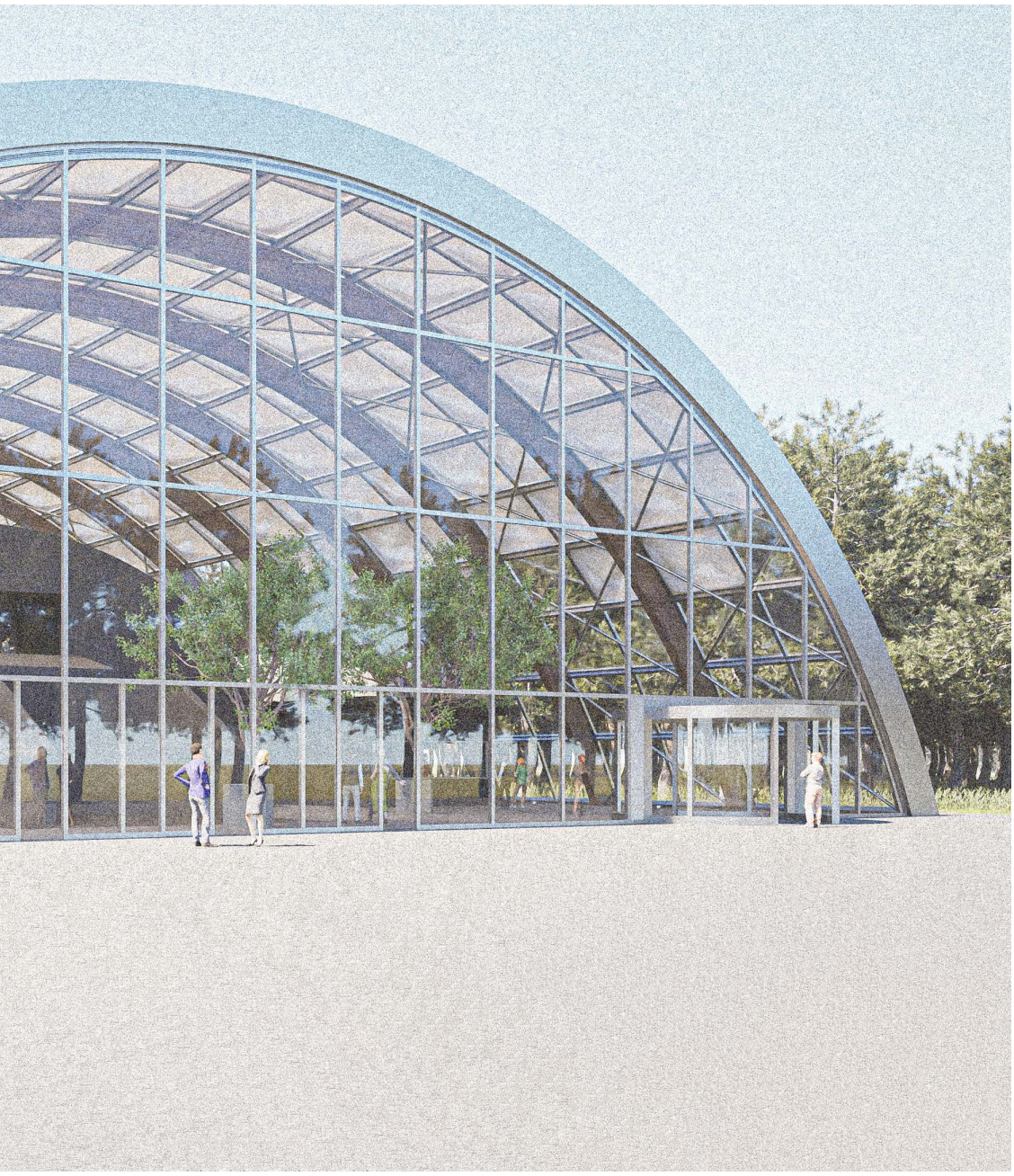


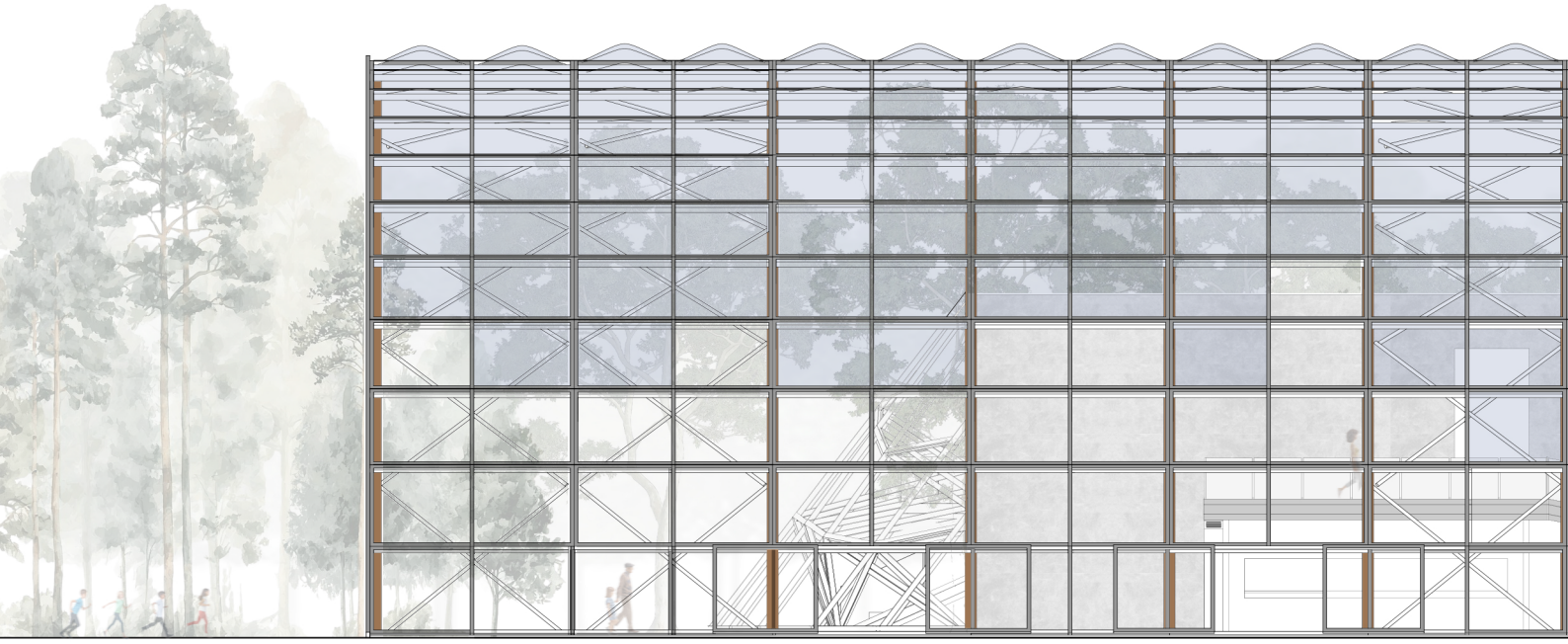
Figure 63. Entrance of museum impression

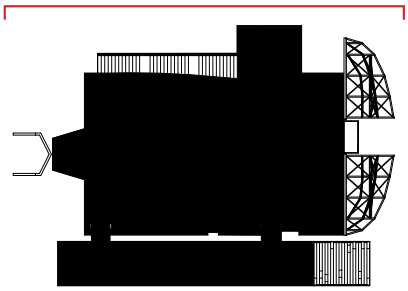
Museum shelter transformation

The West elevation shows a variation in facade openings. At the ground level several sliding doors are added and these create a connection between indoor and outdoor spaces, as well as for ventilation. As the height of the structure increases, the glazed panels are replaced with ETFE panels. The combination of these two elements create a dynamic facade.

The positioning of the ETFE panels is in relation with its surroundings: glass allows for a more transparent view on the outside environment whereas ETFE filters daylight. This allows visitors to observe outdoor activities without filters.

The ETFE panels are equipped with a 4-layered system. The outer films are fully transparent. The two inner films have a pattern that, with differences in air pressure, contribute to climate and daylight regulations.





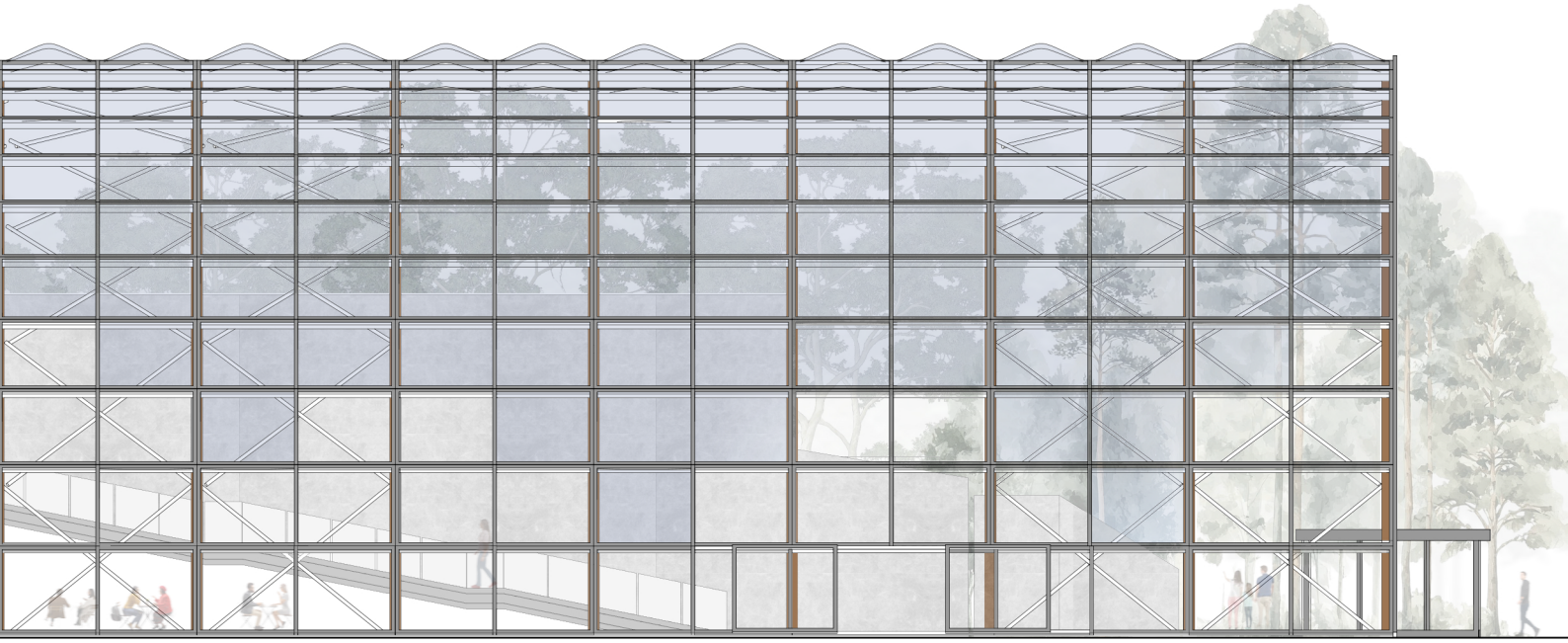
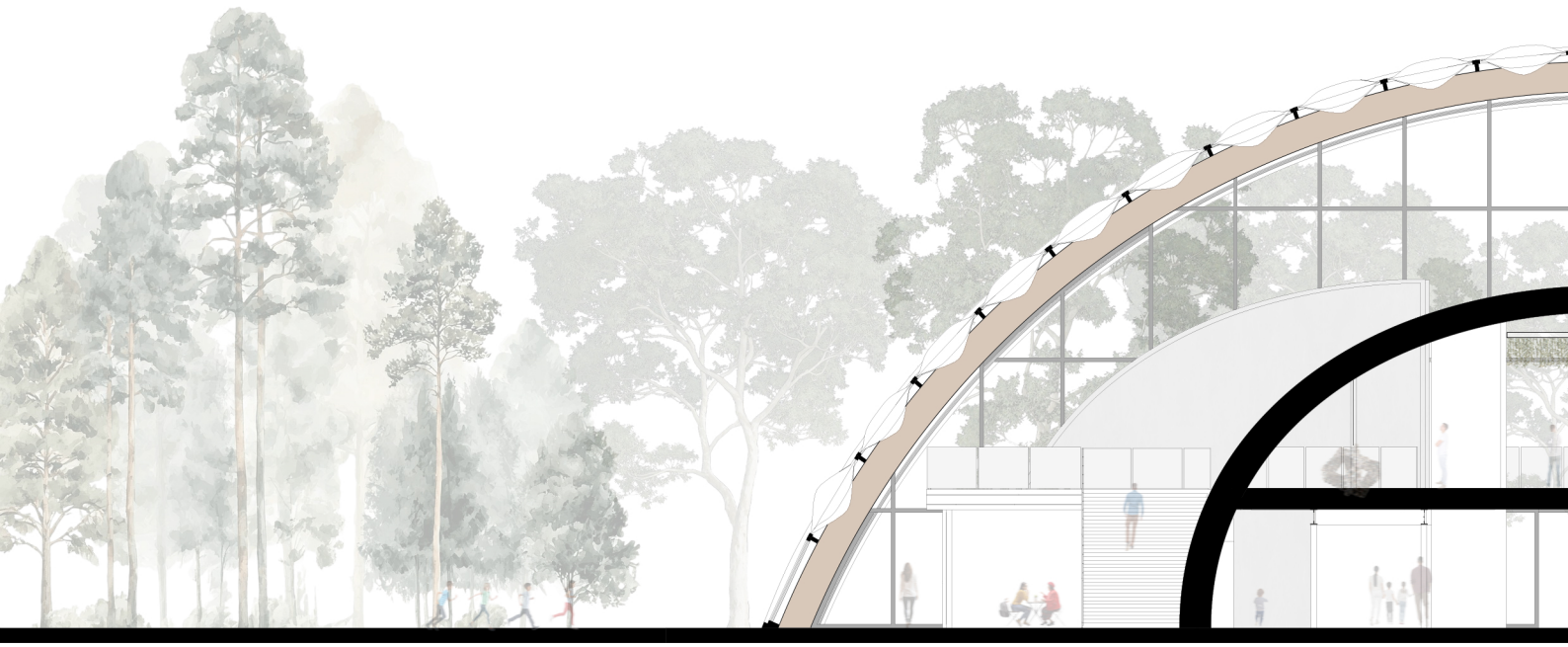
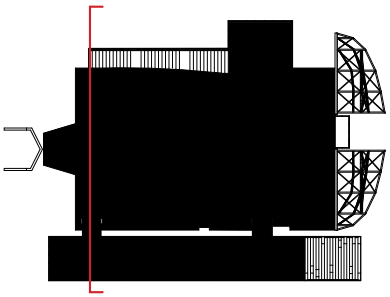


Figure 64. West elevation, 1:200

Figure 65. Lobby of museum impression

Museum shelter transformation





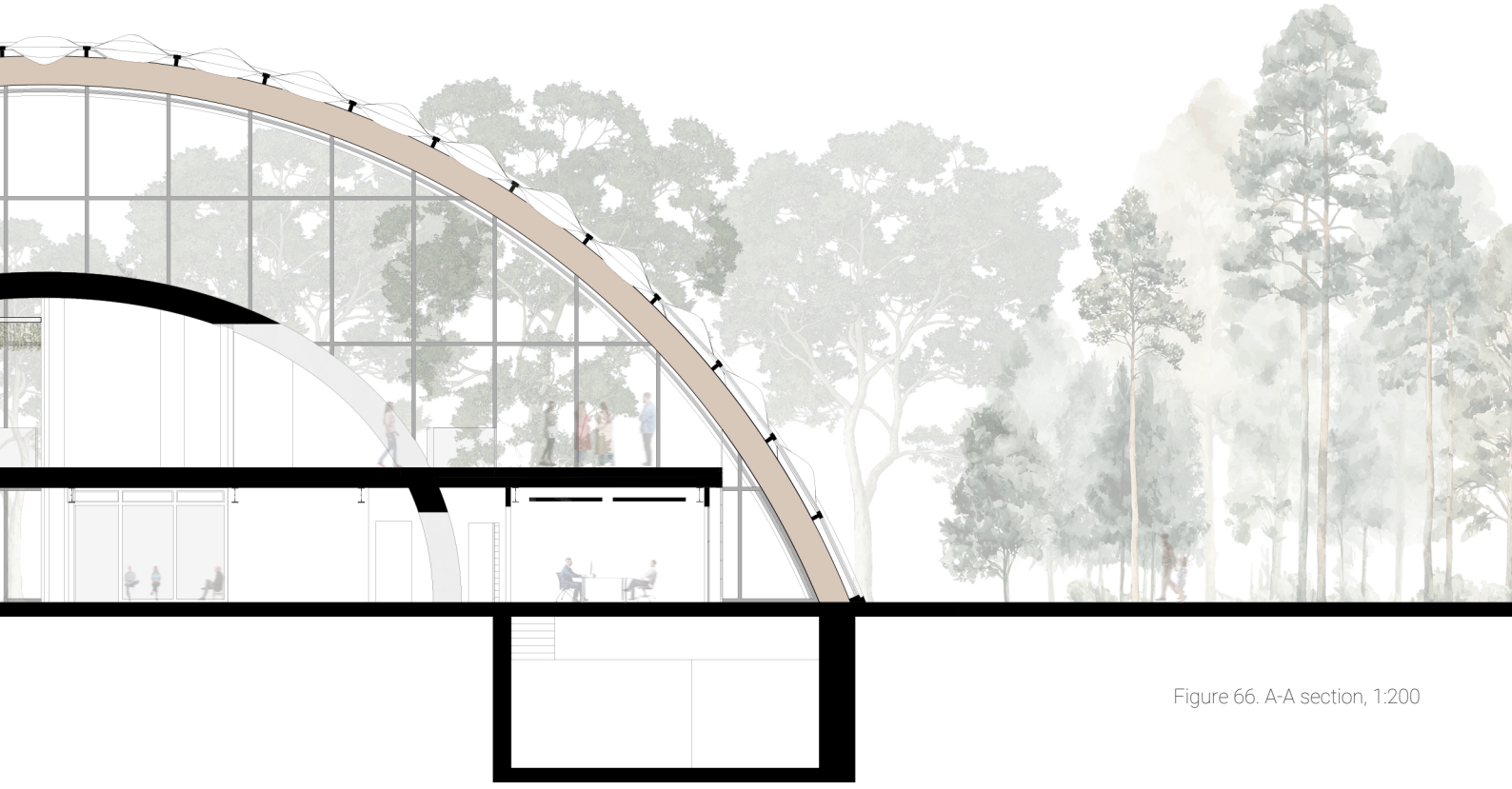
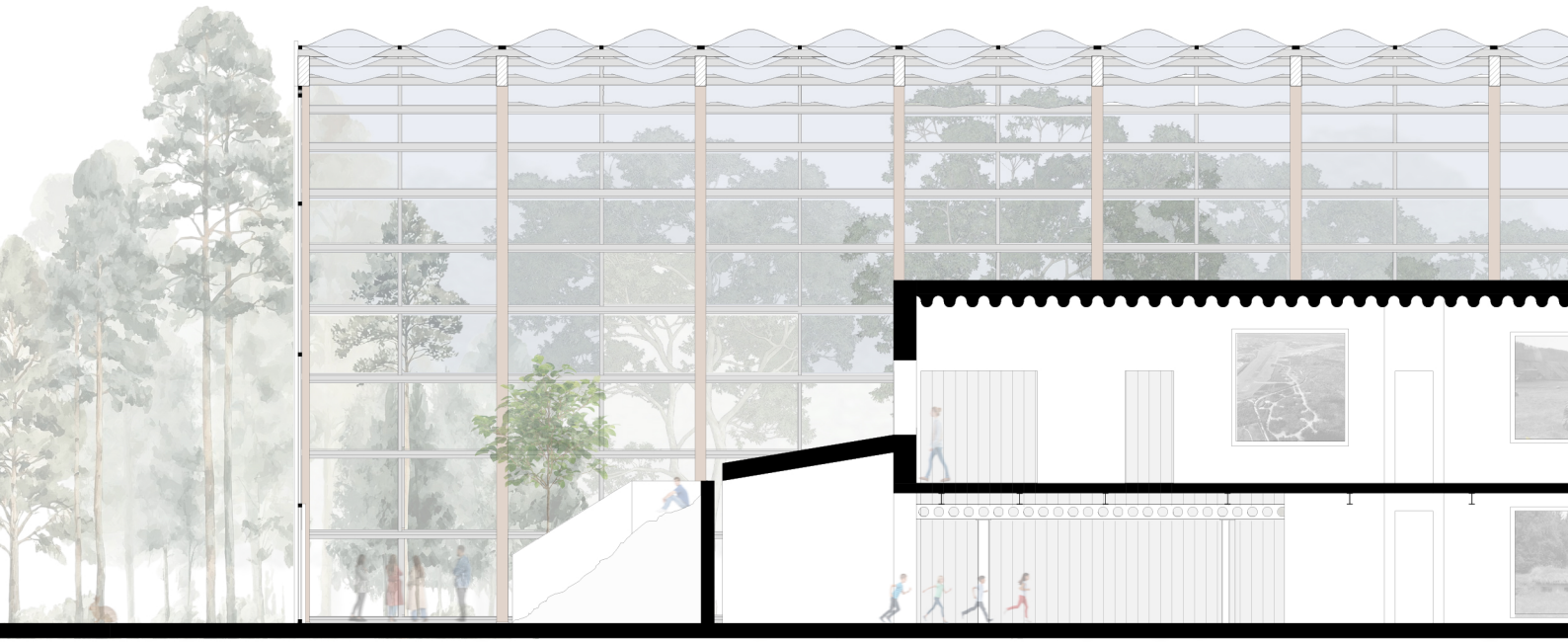
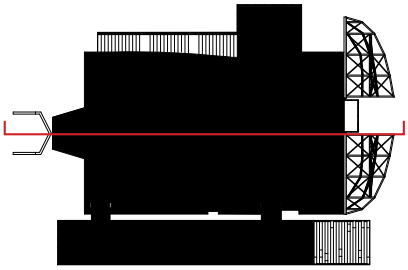


Figure 66. A-A section, 1:200

Figure 67. Ground floor impression

Museum shelter transformation





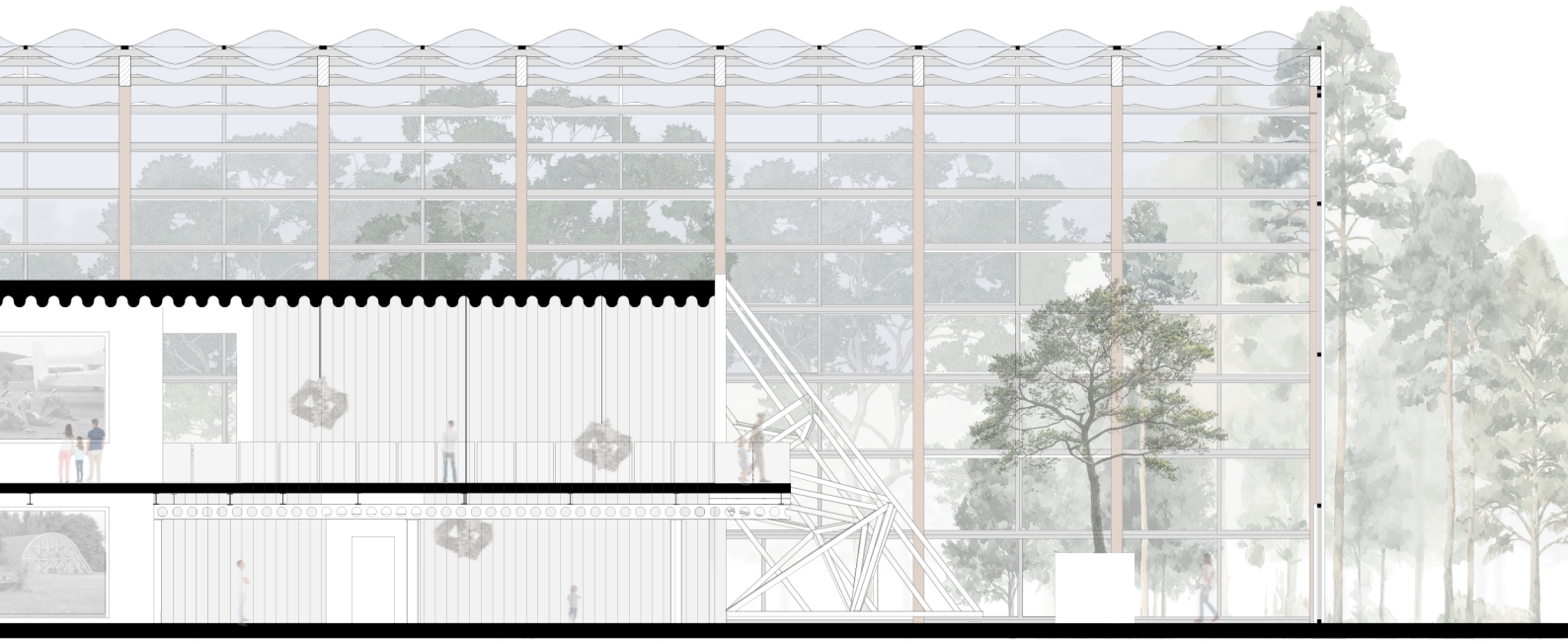


Figure 68. B-B section, 1:200

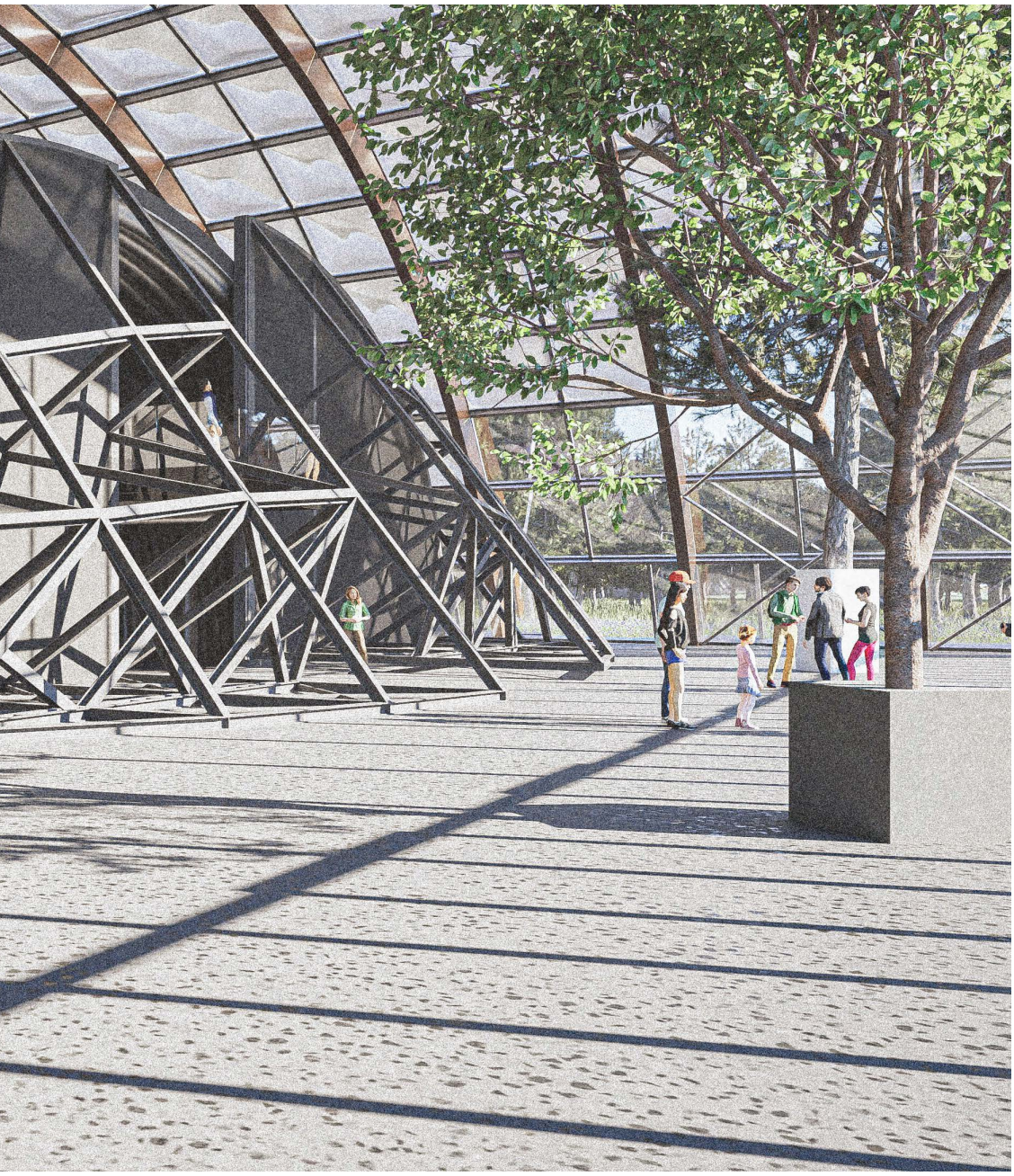
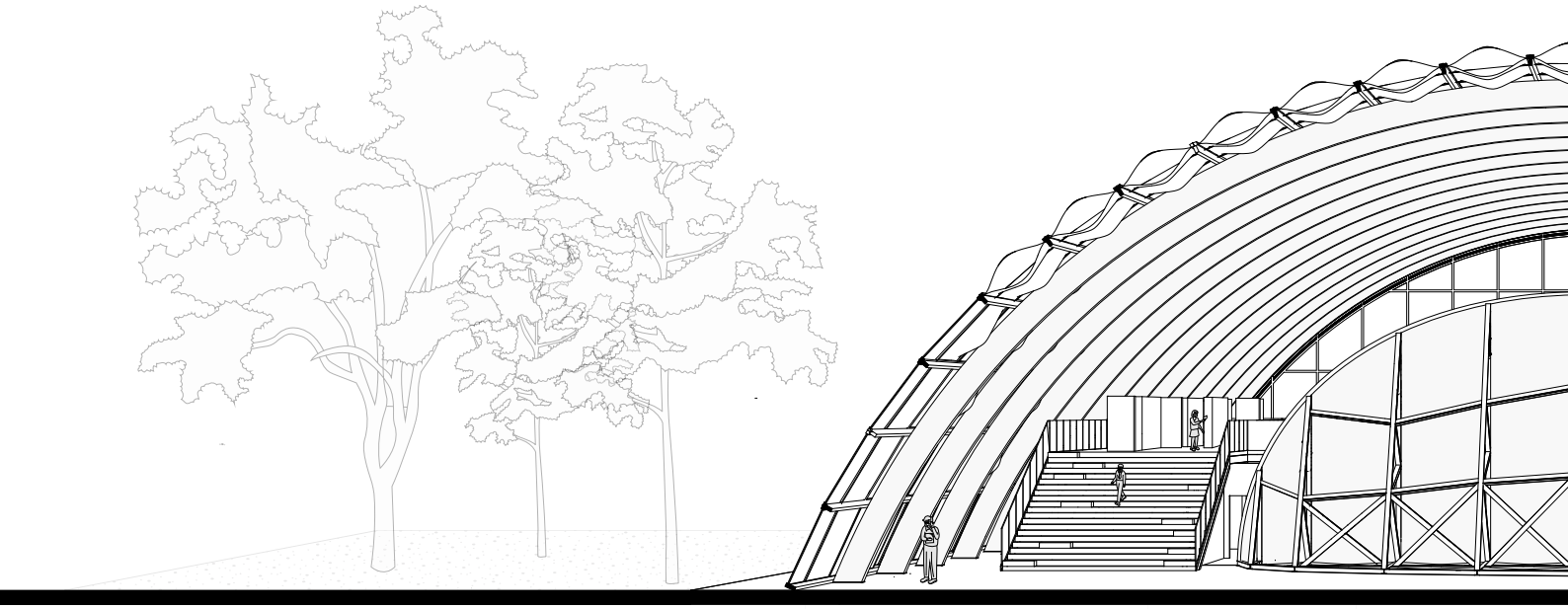


Figure 69. Rear of museum impression

Museum shelter transformation



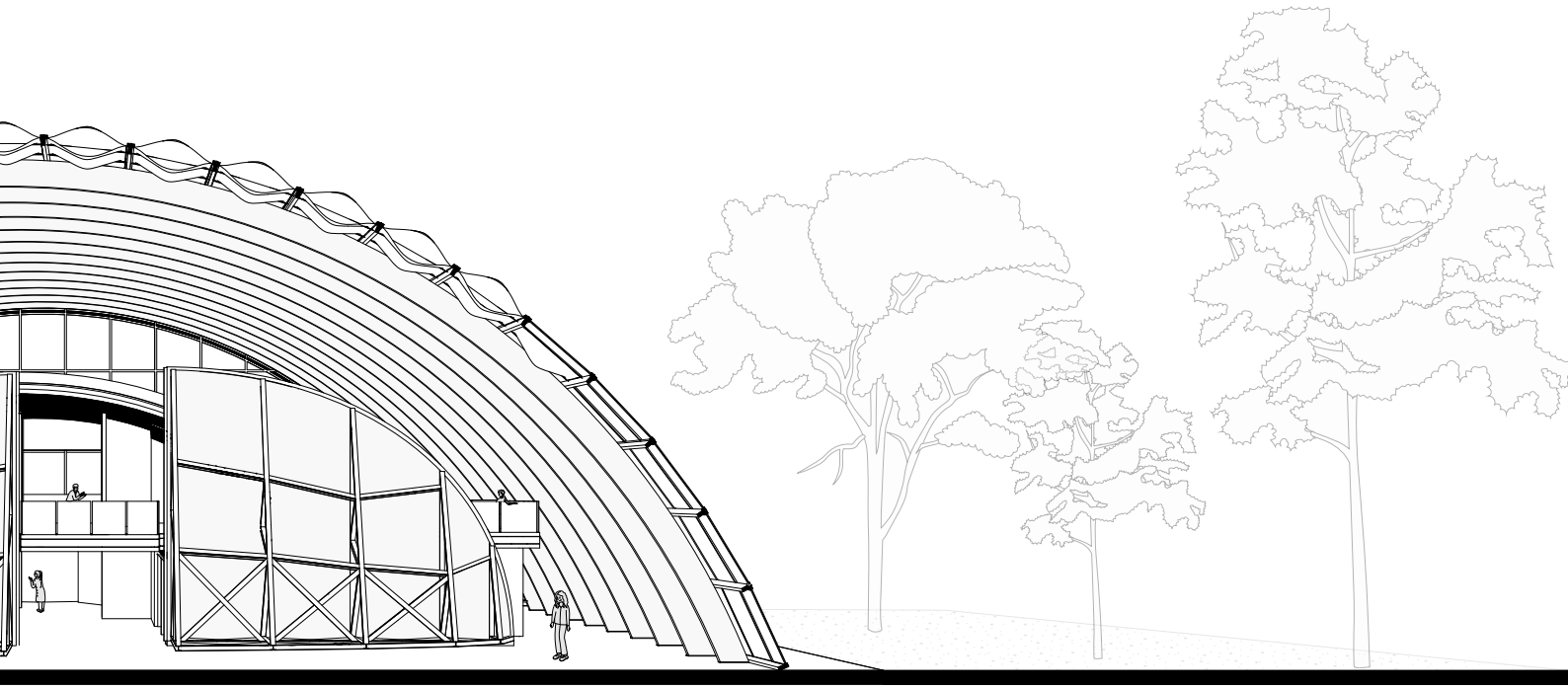


Figure 70. Perspective section

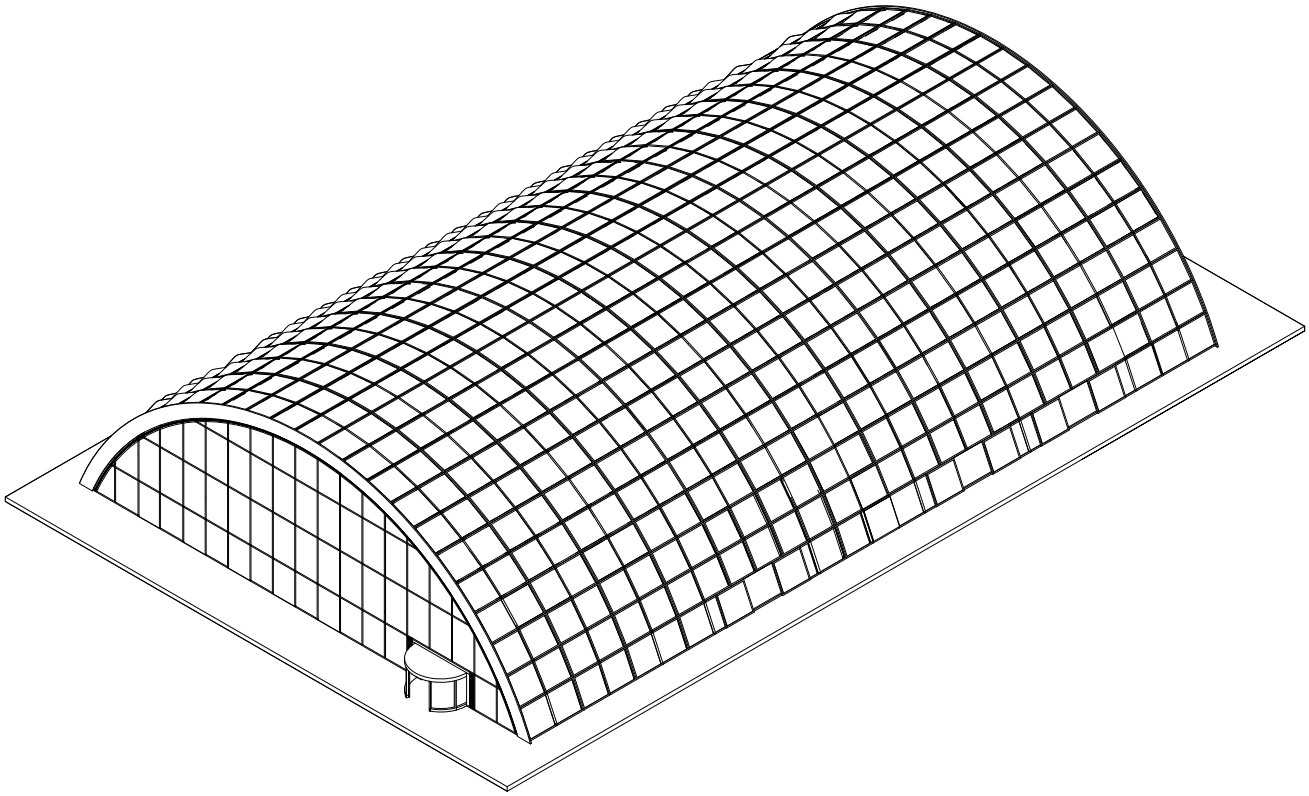


Figure 71. Isometric

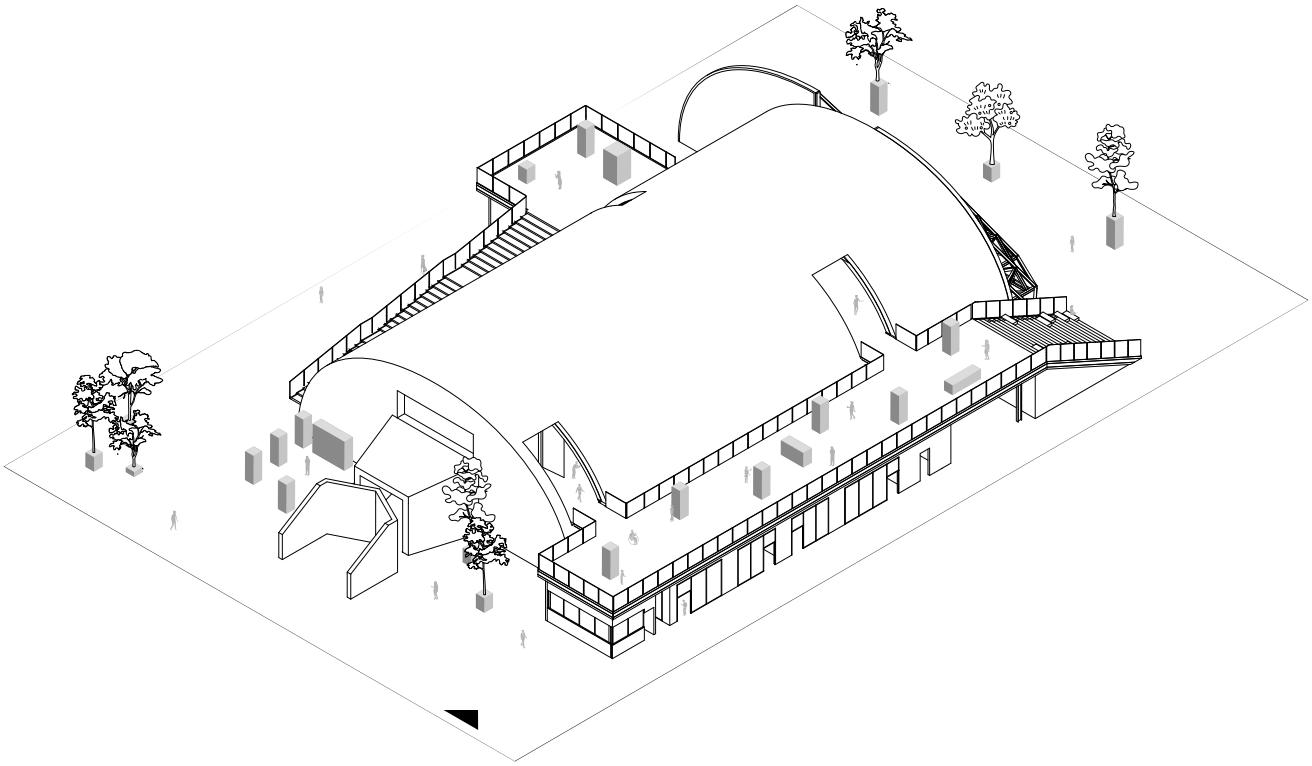


Figure 72.Isometric

Museum shelter transformation

The indoor climate is regulated via two Heat Recovery Ventilators (HRV) and is located in the building's basement. Each machine distributes fresh air to different areas of the building.

One unit handles the entrance facade and half of the ground floor through floor outlets placed in between the glulam arches. The offices and educational spaces are also connected to this system.

The second unit handles the remainder of the floor outlets between the glulam arches and the facade opposite the entrance. Furthermore, additional air ducts are connected to this system and provide fresh air to the cafeteria and its adjacent spaces.

Fresh air to the upper level is supplied via floor outlets. The same air ducts as the ground level are used; the rooms at the ground level are equipped with ceiling outlets whilst the upper level exhibition spaces are equipped with floor outlets. The air ducts are, therefore, shared.

A separate extraction line (red) removes the exhaust air from the cafeteria, bathrooms, logistics, and upper level hallway. The heat exchanger located in the basement will use the heat from the extracted air to warm up the incoming fresh air without mixing it.

Offices and lecture rooms are equipped with an additional system of floor heating for increased comfort.

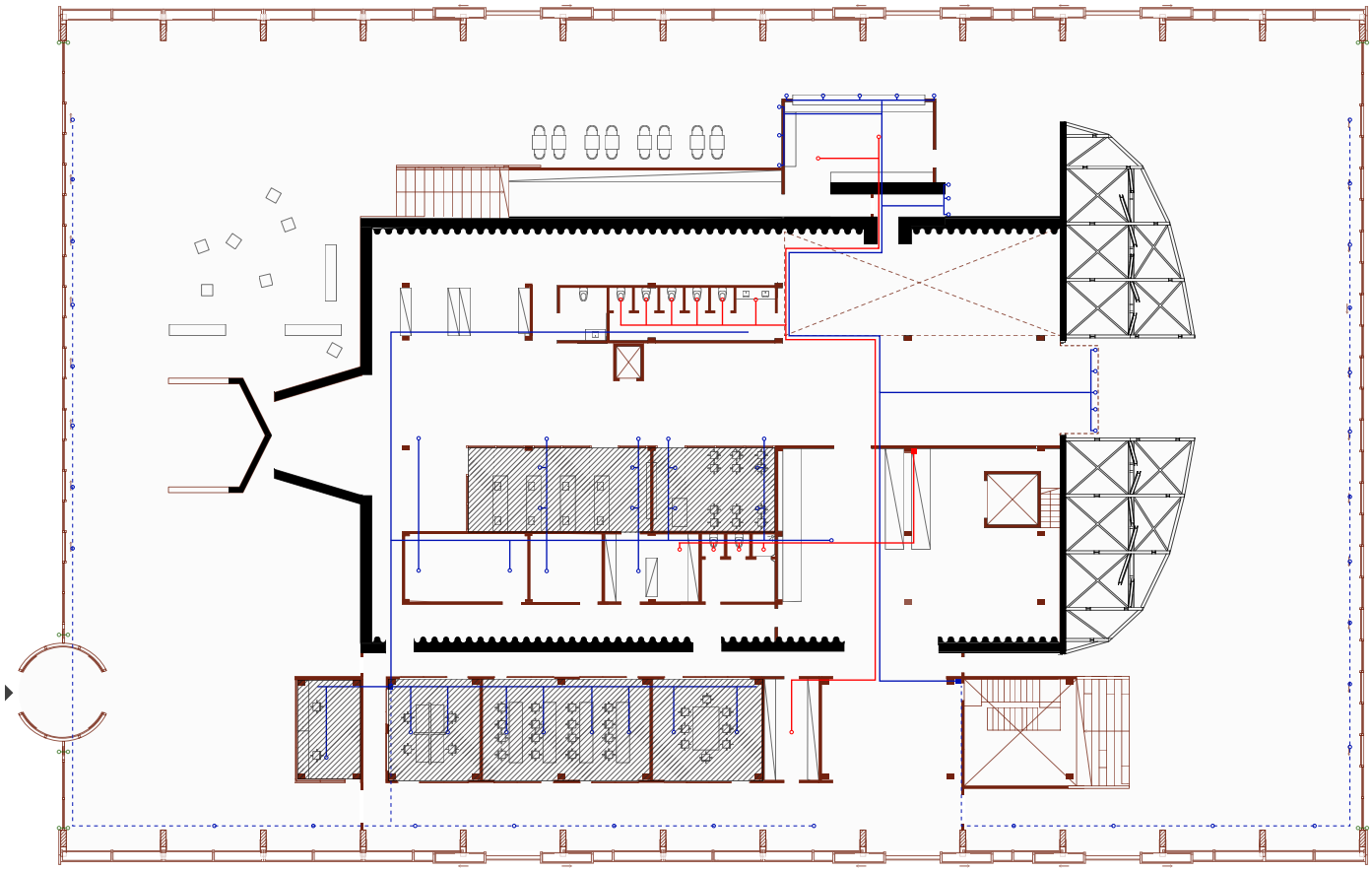


Figure 73. Ground level ventilation

fresh air duct

exhaust air duct

outside air inlet

floor heating

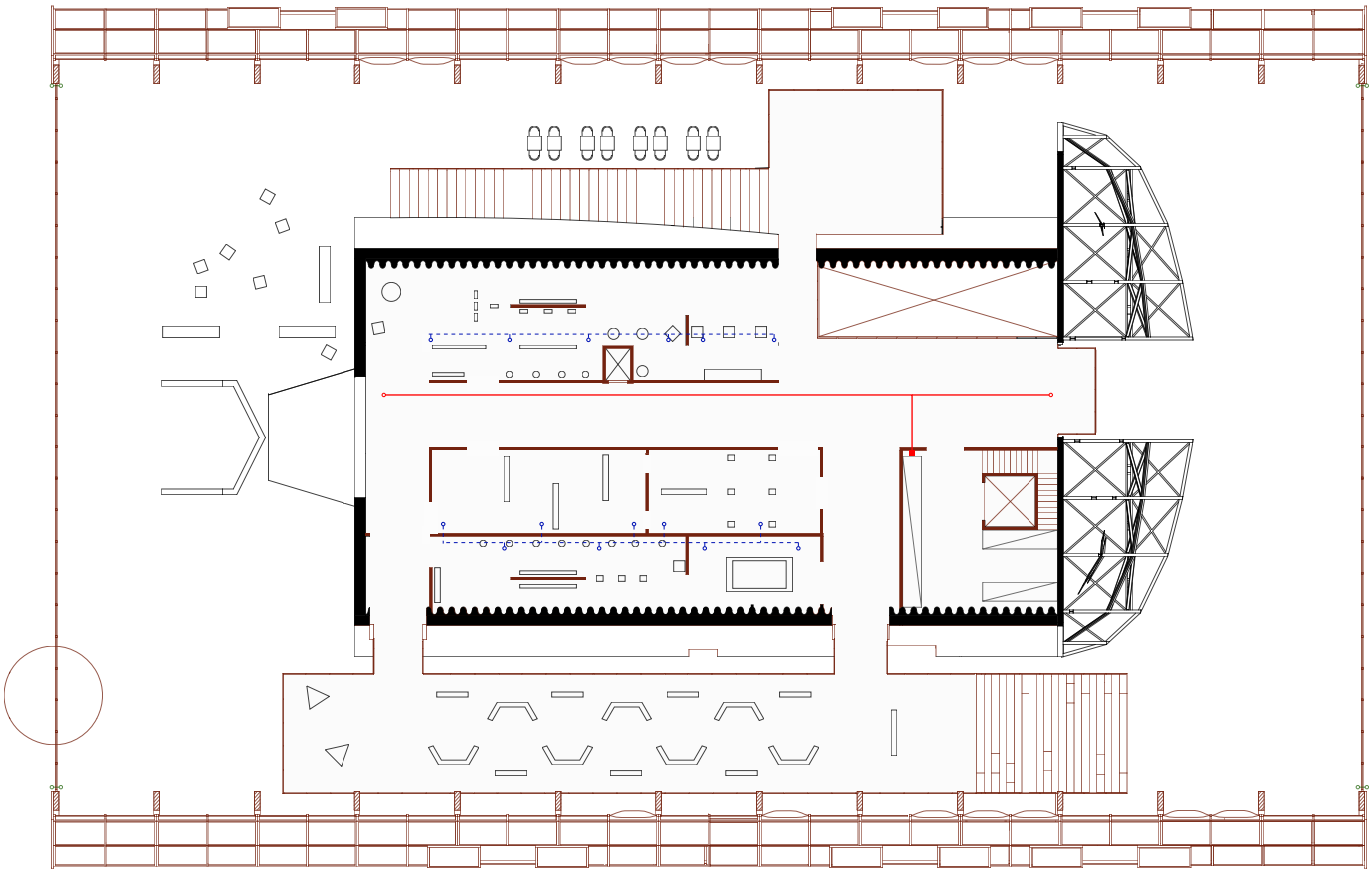
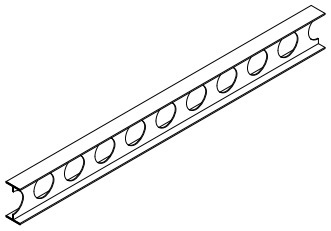


Figure 74. First level ventilation

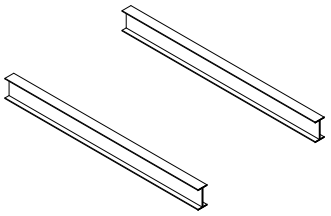
Museum shelter transformation

The added upper level in and around the shelter is supported by several steel elements. The IPE 300 columns are connected to the IPE 400 (main) cellular beams via an end plate. IPE 300 sub-beams support the composite concrete decking and the black epoxy floor finishing. Cellular beams are used and allow for ventilation ducts and other services to run on the same level, without the need to reduce the floor height.

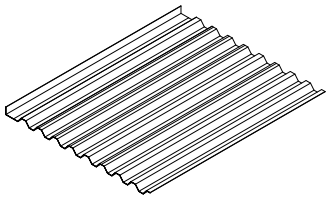
IPE 300 column



IPE 400 cellular beam



IPE 300 sub-beams



composite concrete deck

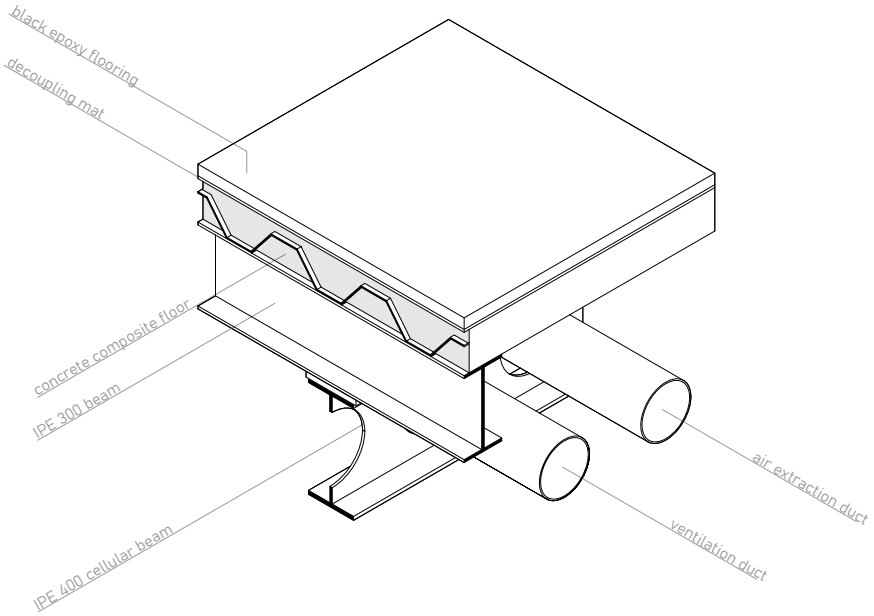


Figure 75. Floor layering

Museum shelter transformation

Figure 76 shows the structure of the added intermediate floor. The structural grid differs in each part of the building and its maximum span reaches 6.5 meters.

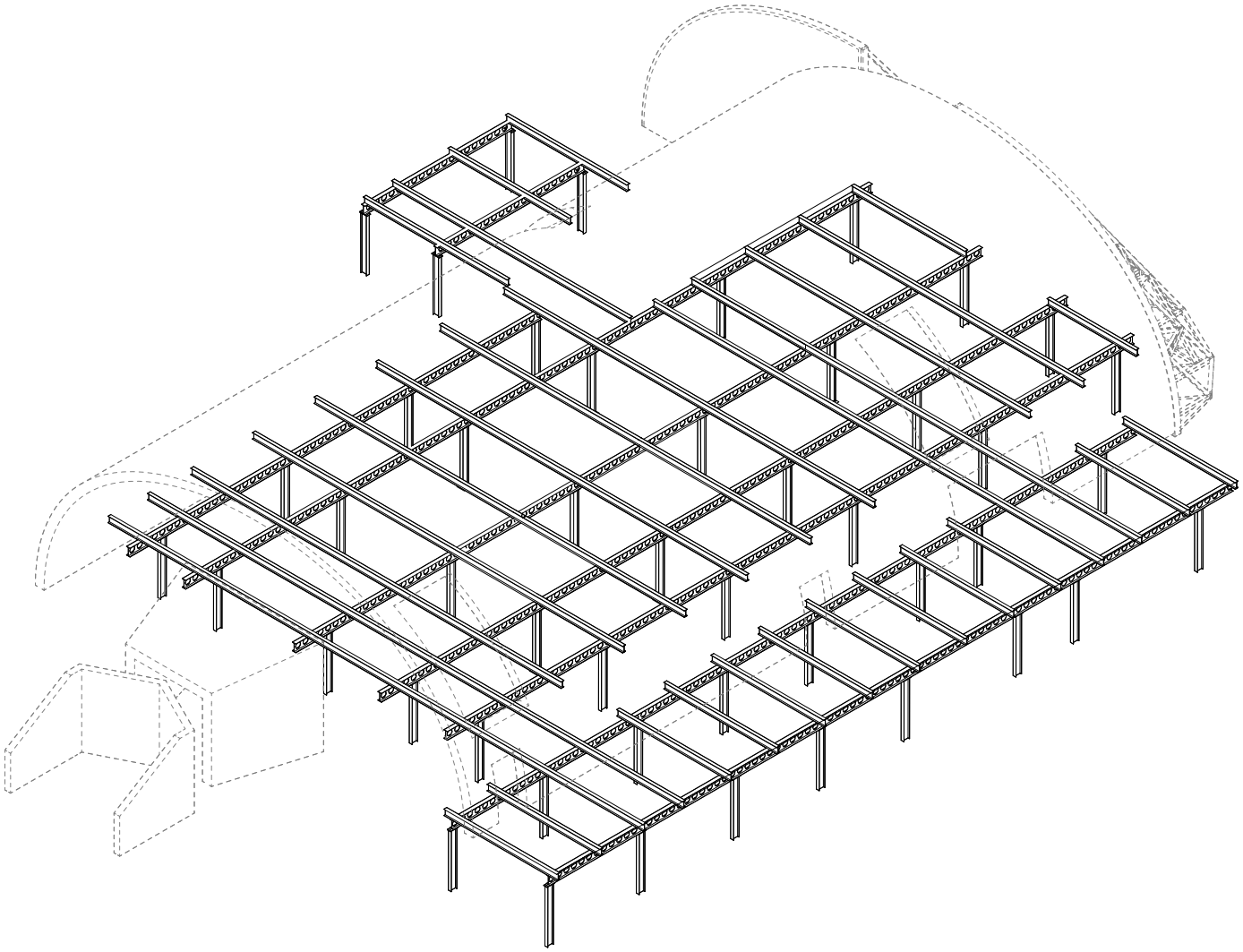


Figure 76. Structure intermediate floor 1:300

The structural scheme below shows the 3-hinge glulam arches and steel bracing. Each arch has a 15.5 meter height and has a 21.55 meter radius. The center-to-center distance between arches is 5.3 meters.
The profile is 300mm x 850mm and cross bracing is added to increase structural stiffness.

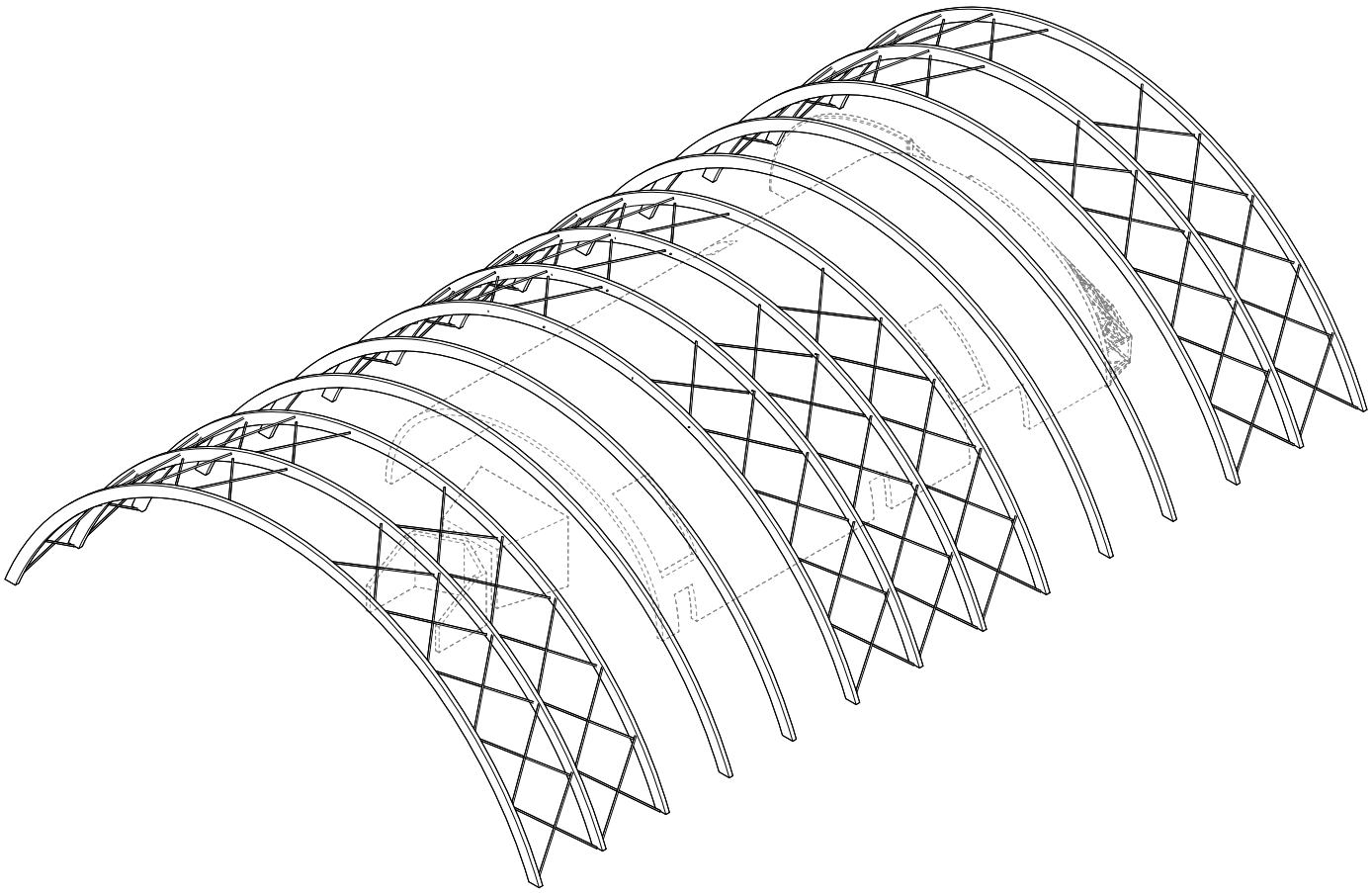
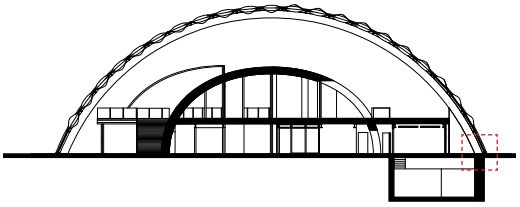


Figure 77. Structure arches 1:300

Museum shelter transformation

The 3-hinge glulam arch is fixed to the ground with a steel shoe. The curtain wall with openings sits in front of the arch, protecting it from the outdoor environment. A water drainage system is placed in front of the facade and the rainwater is collected in the basement. This is later used for the sanitary blocks.



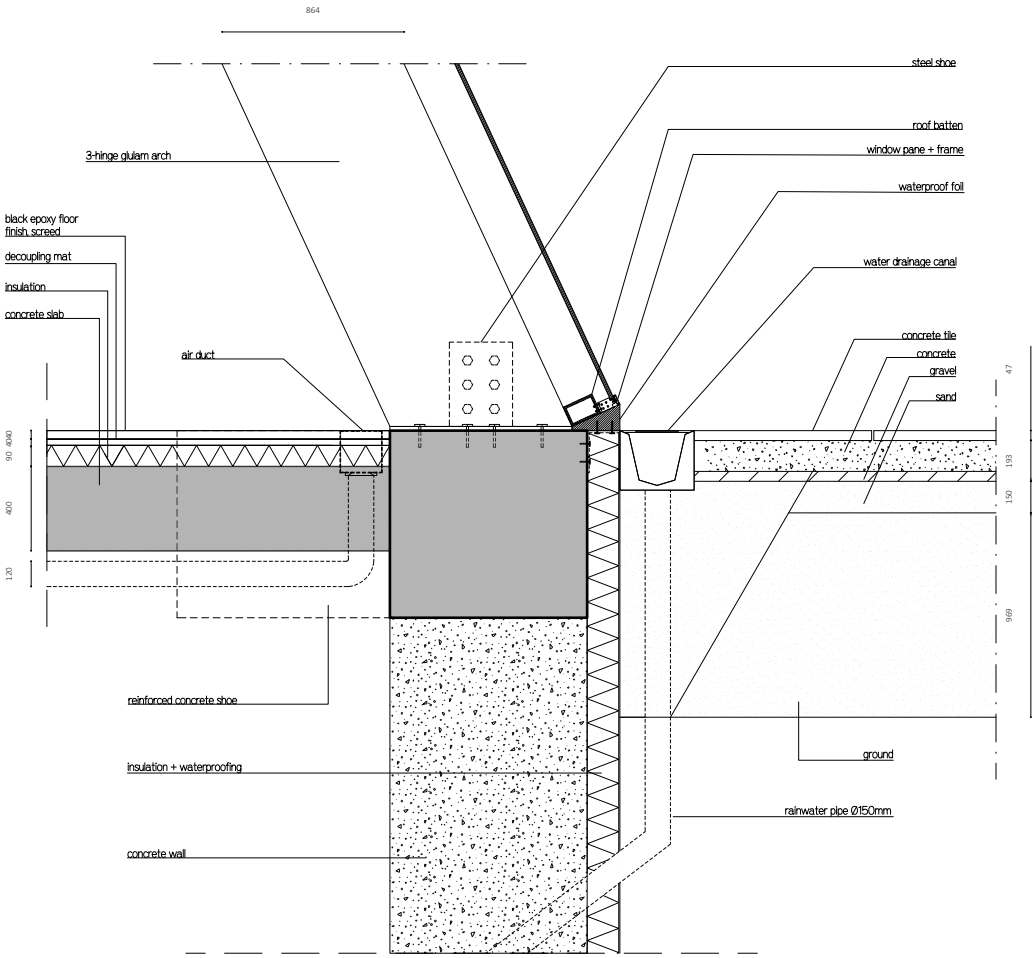
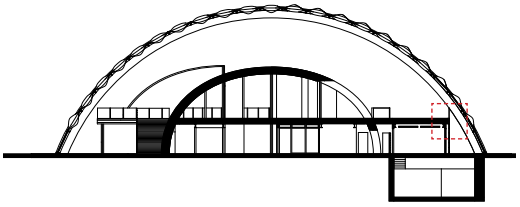


Figure 78. Foundation detail 1:10

The glass railing is fixed to the concrete at the composite deck layer. This is clad with an anthracite aluminum panel and fixed to a wooden substructure and UNP profile to the structural sub-beams.



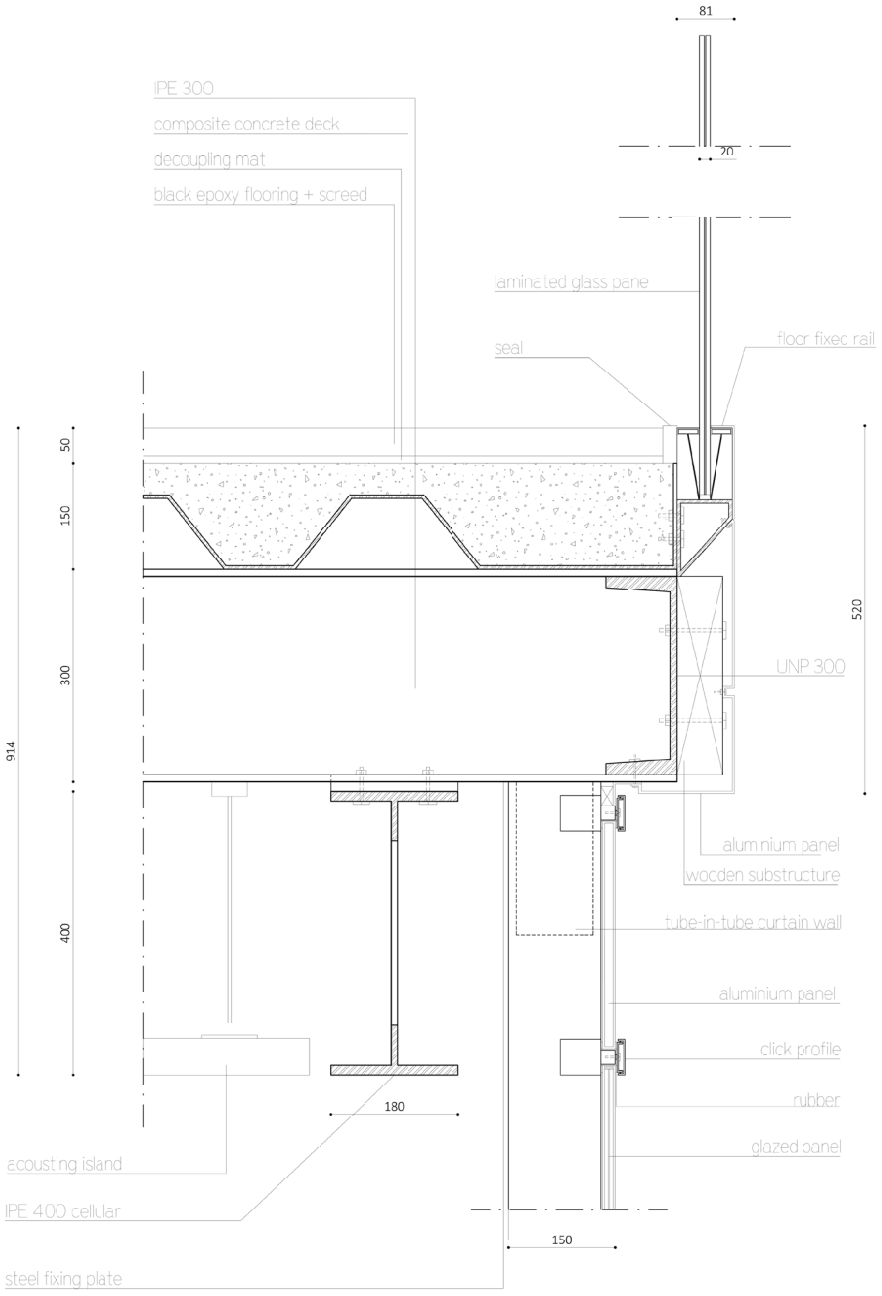
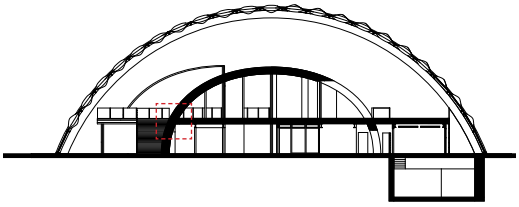
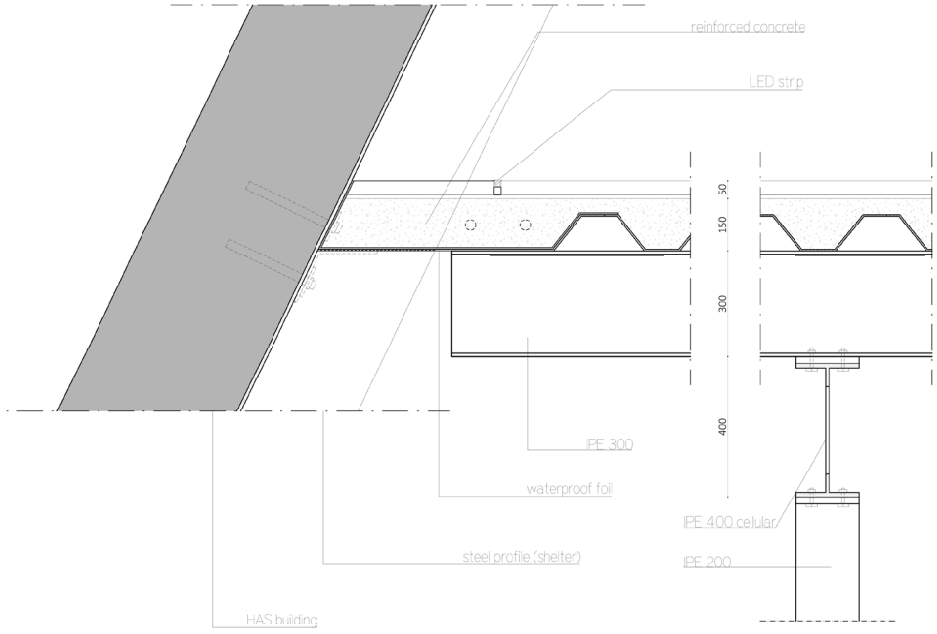


Figure 79. Floor-rail detail 1:10

Museum shelter transformation

The connection between the added floor and the shelter is achieved by extending the composite deck to the existing structure's steel profiles. This is supported at each curvature with an L-profile and a liner is added to reduce concrete leaking during its pouring in-situ.





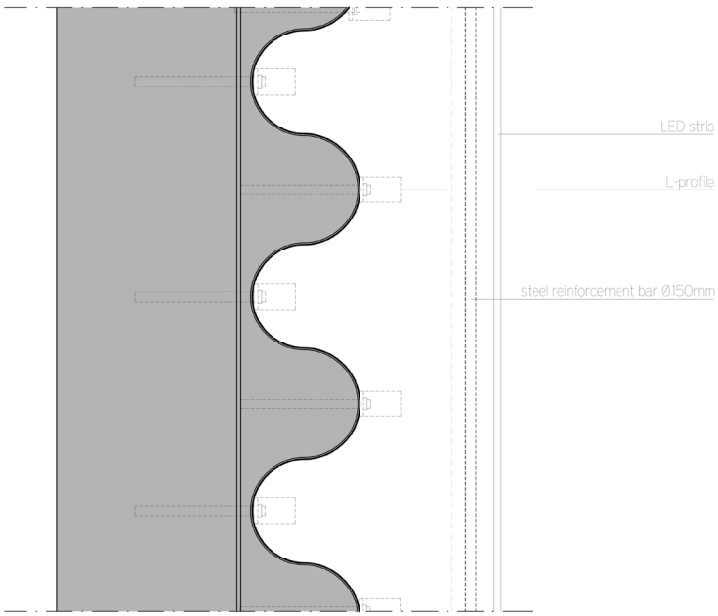
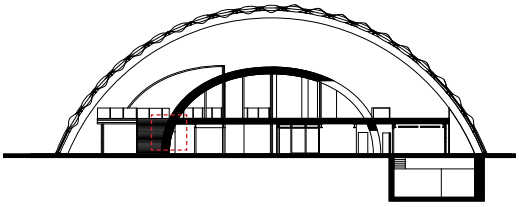
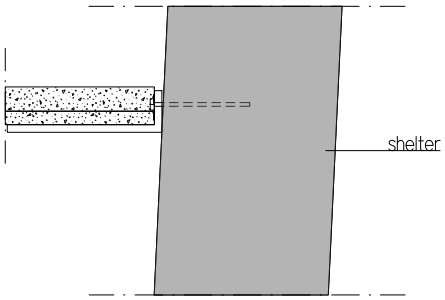


Figure 80. Floor-shell detail 1:10

The main staircase to access the first level is composed of black prefabricated concrete steps. These are supported on one side by a structural beam, and on the shelter's side by mounting L-profiles to the shell.





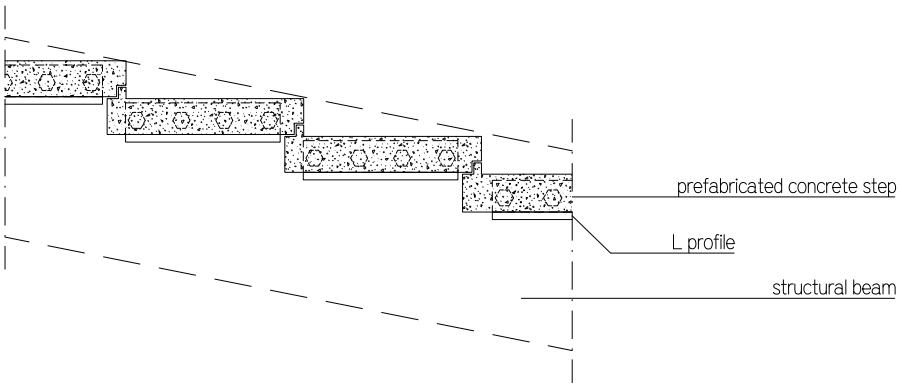
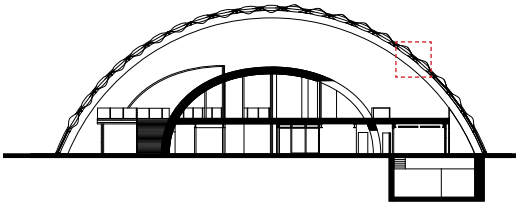


Figure 81. Stair-shell detail 1:10

Museum shelter transformation

This detail represents the meeting point of the two facade elements: the glass and the ETFE curtain wall panels.

The ETFE panels are individually framed and mounted onto a curtain wall connected to the main roof rafters. The main air inlet is fixed to the glulam arch and not visible. An air pressure system regulates the chambers' pressure, from which different shading conditions are achieved.



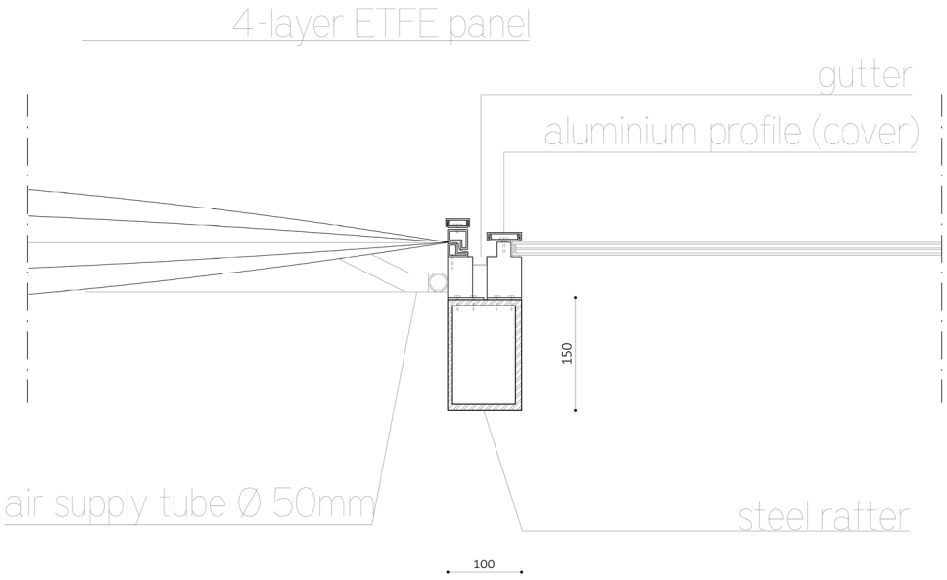
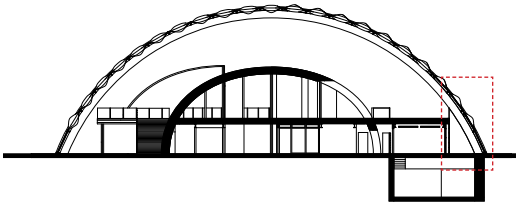
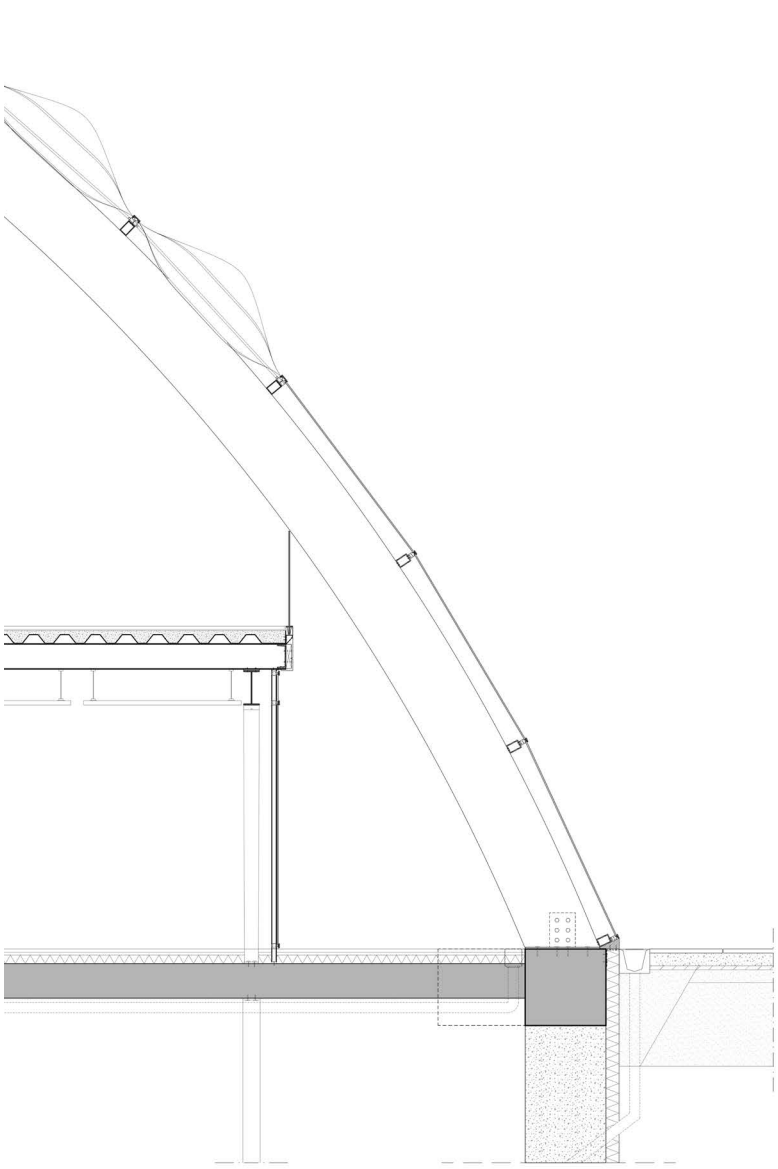
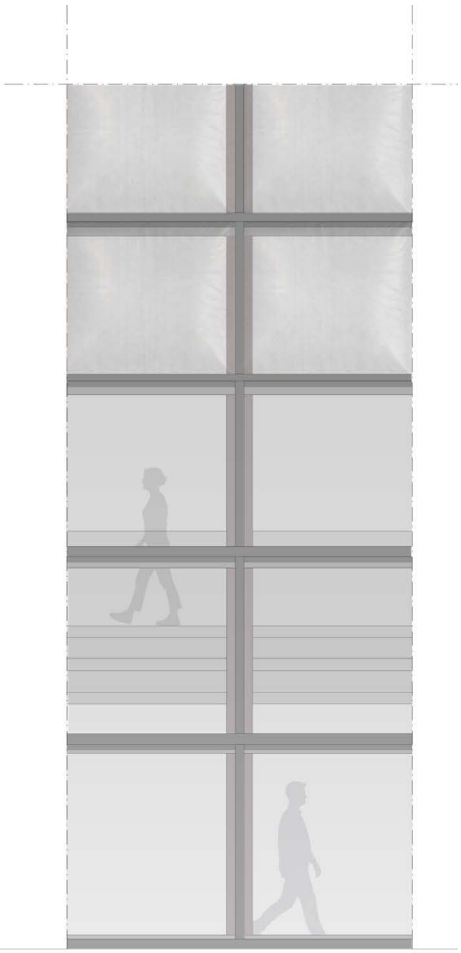


Figure 82. ETFE panel detail 1:10







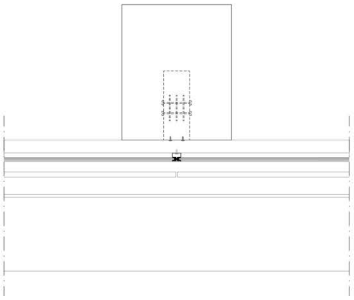


Figure 83.Combination drawing

Museum shelter transformation

The infill and transparent element of the arch structure are Ethylene Tetra Fluoro Ethylene (ETFE) panels.

This is a Teflon material originally used within the aeronautics industry and for green house poly-tunnels, but has later been used in architectural applications. Being approximately 1% of the weight of glass, it has high light transmission, with 95% translucency. It is also highly tear-resistant and has a lifespan of roughly 50 years.

The panel is composed of two or more ETFE layers. Between the inner and outer layer is an air chamber: this acts as a thermal insulator. Whereas the outer layers are fully transparent, any internal additional layer(s) are imprinted with different patterns. With changes in air pressure achieved through an air system, the patterned foils are displaced towards the outer layers and allow to filter daylight. Their purpose is, therefore, to act as shading devices.[1]

Real life applications of this system include the Allianz Arena in Munich by Herzog & De Meuron (CH), the canopy in Utrecht Centraal Station (NL) by Ector Hoogstad Architecten, and the Hortus Botanicus Amsterdam in Amsterdam (NL) by ZJA.

[1] Architen Landrell. (2014, 7 maart). ETFE: Why this Building Material is Gaining Popularity | Architen Landrell. https://www.architen.com/articles/etfe-the-new-fabric-roof/. Accessed on 09-04-2026

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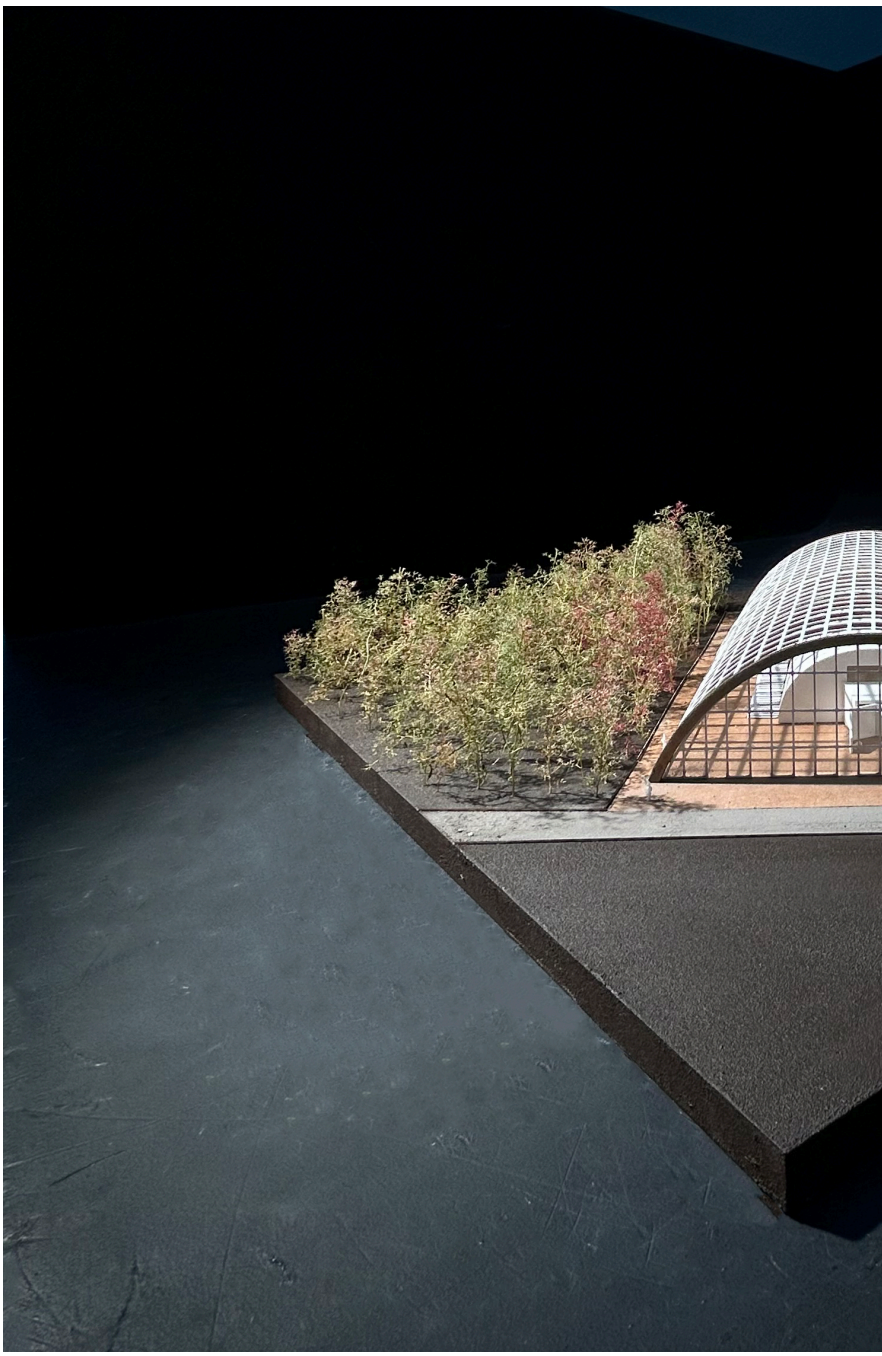
Figure 87. Model

Figure 88. Model

Figure 89. Model



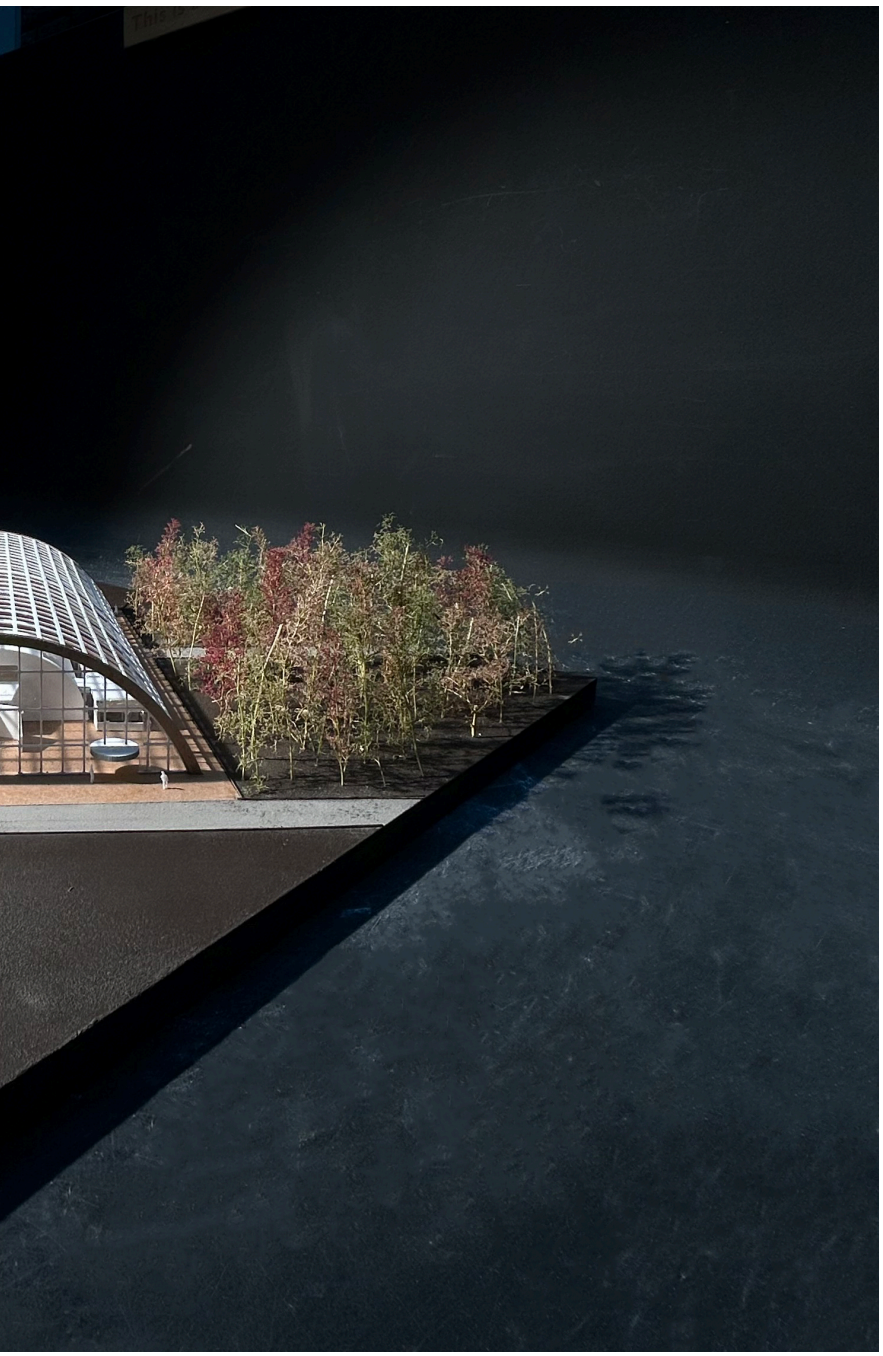


Figure 90. Model

Research shelter transformation

In addition to the museum shelter, a research center is part of the program. This involves two other hangars.

Several functions are placed here, namely wet and dry laboratories, sample preparation rooms, analysis laboratories, and utility rooms. Offices for researchers and all supporting facilities are also part of the program.

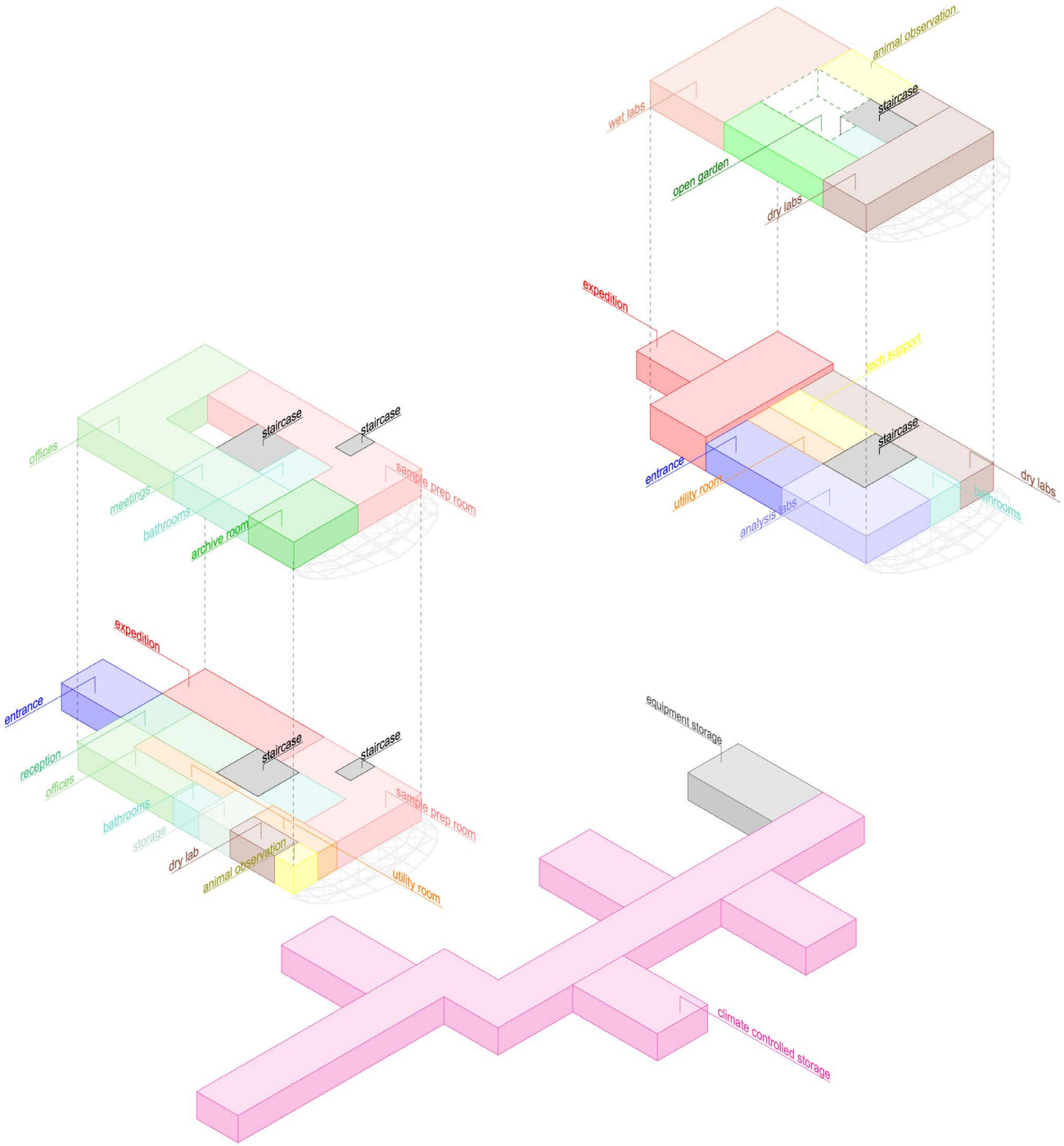


Figure 91. Research shelters program

4. CONCLUSION

Discussion and impact

This project investigated how architectural interventions at the former airbase in Soesterberg can coexist with a high presence of biodiversity and military heritage. This research demonstrated that the relationship between ecology and the site should be approached as two interconnected systems that have strongly developed over time. Both military heritage and biodiversity, therefore, should be treated with equal value.

The project highlighted several historical and spatial qualities essential to the preservation of the military character of the airbase. These are namely the uniqueness of the ensemble, the visible layers of infrastructure, the Wonder building, and the quietness of the atmosphere. Rather than discarding or changing these site values and attributes, the proposal aims at reinforcing them through carefully studied interventions.

Through the analysis and elaboration of different transformation strategies, it was concluded that the adaptive reuse of the shelter should be selective. Rather than intervening in all of the unused structures, a choice of three was made. Most of the original building mass is preserved and the interventions are, to some extent, reversible.

This approach still allows legibility in the interventions and the shelters preserve their military and historical identity. A long-term vision, also expressed in the masterplan, introduces new connections to the National Military Museum and allows visitors to discover a site which once was secretive and hidden from the outside world. The addition of a secondary arch structure that introduces a building-within-building concept demonstrates how a new climatic layer can protect history without erasing its military character. By adopting this method, architecture becomes a tool of preservation rather than a full replacement.

In addition, this research highlighted the importance of spatial thresholds and variation in accessibility within a sensitive ecological landscape. Public routing, staff access, and research zones are planned according to biodiversity presence and through minimal and reversible interventions. This allows for visitor and worker flows to coexist within a complex set of ecosystems and positions the site's landscape as grounds for active research and education. The routing for employees and visitors is separated at times. This allows to differentiate flows and ensure that ecology is preserved and disturbed the least.

To conclude, the transformation of the former airbase is approached as a landscape with multiple layers. Through this case of adaptive reuse, this design brief demonstrates how architecture can be used for long-term preservation strategies, preserve the site's current values and attributes, and introduce new forms of social engagement with scientific research.

Implications and recommendations

This project reflects on the role that architecture can play within environments that are ecologically and historically sensitive. Rather than creating a large-scaled intervention scheme, this proposal focuses on certain areas of the former airfield in which new architecture coexists with biodiversity and heritage. In such way, this proposal avoids more conventional approaches in which full and intensive restoration dominate the historic landscape.

An important implication of this design brief is the concept of preservation through controlled occupation rather than full restoration or full abandonment. By introducing a medium-intensity program focused on research and education, the project aims at proposing a long-term maintenance framework for the shelters whilst still preserving the site's quietness. The integration of the biodiversity research within the former military site demonstrates how architecture can support public engagement with ecology and history.

For further development, several recommendations are made. These concern site studies and the impact of their relative interventions. To begin with, a more accurate biodiversity analysis should be executed. This allows to determine with more precision which zones of the shelter area are the least sensitive, enabling safe visitor flows. This data was mapped using Utrechts Landschap's management document, although the sources used provided an estimate on the location of species rather than an accurate location. This can also be applied to the masterplan.
For the case of the shelter transformation, instead, studies relating to the impact that the new arch structure has on its current environment should be carried out. This helps gain insight relating to the consequences that the new structure has on the current landscape.

Reflection

This graduation project explores the adaptive reuse of several aircraft shelters located at the former Soesterberg airbase in The Netherlands into a center for research for nature and biodiversity.

The project started by observing that all of the shelters located at the East of the former German runway are currently left to decay under a strategy of selective maintenance defined by Utrechts Landschap. Although this process allows for nature to reclaim the site and is in line with the values of the owners, this raised questions regarding the long-term preservation of the heritage present at the site and a future vision for the area. This project, therefore, investigated how different architectural interventions can create a relationship between new uses and protection of ecology and heritage.

One of the main challenges throughout the design phases was understanding how to alter the current landscape without creating imbalances and disruptions to its current conditions. Rather than creating a larger-scaled intervention, the project aimed at creating a series of smaller changes that work within the logic of the former airfield. This resulted in a design also based on preservation of existing traces.

Throughout the design process, another challenge was faced. Earlier design iterations explored a lightweight tensile roof structure that spanned over one of the shelters with the aim of creating protection to the building and creating a new environment around the existing structure. This raised several challenges relating to its scale, feasibility both financial and architectural, permanence, and relationship with the military landscape. The structure felt too disconnected from the current site conditions and the idea was not pursued further. This struggle determined a turning point for the design process during which other options were considered. This led to the creation of a new structure, arch-shaped, which mimics the dome-like shape of the aircraft shelter.

This intervention became more integrated with the current landscape, improved the relationship to the existing structure, and created a new climate in which the shelter was preserved from further decay whilst still allowing its visibility. Consequently, the shelter became the central element of the exhibition experience.

Another aspect relevant to the design iteration was the vision of Utrechts Landschap, the owner of the site. Their focus on nature, healthy ecosystems and connection of nature to heritage raised critical questions on how to handle the site's redevelopment whilst still remaining within their values. Further research on biodiversity on-site and its mapping contributed to understanding the site's dynamics.

The planning provided at the beginning of this report has mostly been followed. A few deviations with the writing of the report and research occurred. These tasks were not carried out simultaneously with the design part: it was intermittent and, at certain moments, was left for a later stage.

Ultimately, this project demonstrates how architecture can act as a mediator between conflicting interests. This graduation studio strengthened my understanding of adaptive reuse as a process in which working with existing conditions is essential and highlighted the importance of specific site values to define and guide architectural decisions. Through a continuous dialogue between research, design, and reflection, this proposal developed from searching for a new function into a long-term preservation strategy for nature and heritage.

Reflecting upon the entire journey, this graduation project reinforced the idea that architecture is not exclusively about creating new buildings, but also about using it as a tool to reveal, protect, and highlight what is already existing.

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