EMANUEL CHRIST & CHRISTOPH GANTENBEIN
MAARTEN DELBEKE | BENJAMIN DILLENBURGER

REVIVING UNDERGROUND

MASTER THESIS
HS22

NOSTALGIA
ECOLOGY

NIKOLAI GÖLDI

STARTING POINT

In this Master's thesis, we would like to examine the townhouse in the Zurich area. The foundation of our research is the comprehensive work "Das Bürgerhaus in der Schweiz" (The Townhouse in Switzerland) published by the townhouse commission of the Swiss Association of Engineers and Architects in the 1920s, which documents representative residential buildings from various eras, most of which still exist today. The collection shows an impressive variety of formally and stylistically self-conscious buildings, which are depicted in detail with wonderful care. The reproduced plans include meticulously drawn elevations and interiors, from ceiling to floor, from tiled stove to door handle.

"Das Bürgerhaus in der Schweiz" was created in the interwar period and bears witness to a specific view of the history of architecture, one that is determined by the place and time in which it was built. Thus, the concept of the townhouse itself is to be understood in a specific historical context. On the one hand, the publication can be read as a documentation of an architectural heritage; on the other hand, it is an expression of a return to traditional ideas of a building and craft culture that is understood as the antipole to a modernity that is perceived as threatening. The work of the Bürgerhaus Commission will serve us as a case study on which we can examine questions of reception and appropriation. Derived from this, we are interested in the question of how we can take an inspired and critical look at architectural history today. By looking at historical architecture, we want to generate knowledge that helps us to produce architecture in our own time. In doing so, we do not look back because we are nostalgic, but because we want to be radically contemporary and relevant.

Considering their great age and durability, the por- tained buildings seem to be particularly sustainable. They testify to a high level of economic, functional and energetic intelligence and contain implicit knowledge on these topics. We want to learn from this and apply our findings to current issues of sustainability, resource and energy consumption and the durability of buildings in their various meanings. We will re-examine the buildings in our own way a hundred years after they were documented by the community centre commission. In doing so, today's digital aids allow us a high-quality, direct and fast recording of the building fabric and an up-to-date view of the community centre. At the same time, through precise observations, we are looking for answers to the urgent questions of our time.

Based on the results of our investigation, we will identify thematic fields that are characteristic for the phenomenon of the community centre and still seem relevant today. Based on this, we will develop design scenarios for contemporary urban buildings and ask ourselves the question: could the community centre once again function as the starting point for a radically ecological architecture today?

CONTENTS

TYPOLOGIE

S. 05 – 15 Phase 1

STARTING POINT

The basement is a recurring element in the town houses of the city of Zurich. The hidden room underground is therefore far more than just a simple storage room.

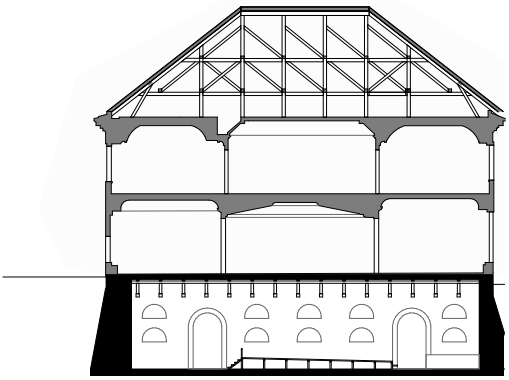
Basement vaults were already used in ancient Rome, but they later disappeared over the centuries. It brought back cellar vaults only with the rise of the brewing industry and the associated need for large-scale storage space. The idea is simple, but highly effective. The earth walls not only protect the space from environmental influences, but also buffer the temperature and ensure a stable, fresh climate.

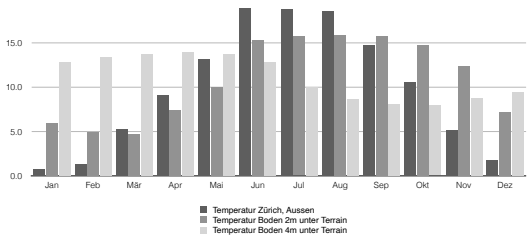
At a time when town houses were often associated with a vineyard, the cellar was an object of investment. Certain town houses, such as the Haus zum Bocken in Meilen, were significantly influenced by them. With the prestige of these buildings, the cellar became a representative space in Zurich.

Today, the cellar is generally only used as a storage room or avoided altogether. At a time when sustainable building is a high priority, the cellar brings many advantages due to its low-tech concept.

The questions arise: How can the cellar be translated into today's architecture? How can its climatic and spatial qualities be used profitably?

Nikolai Göldi: Muraltengut (2022)





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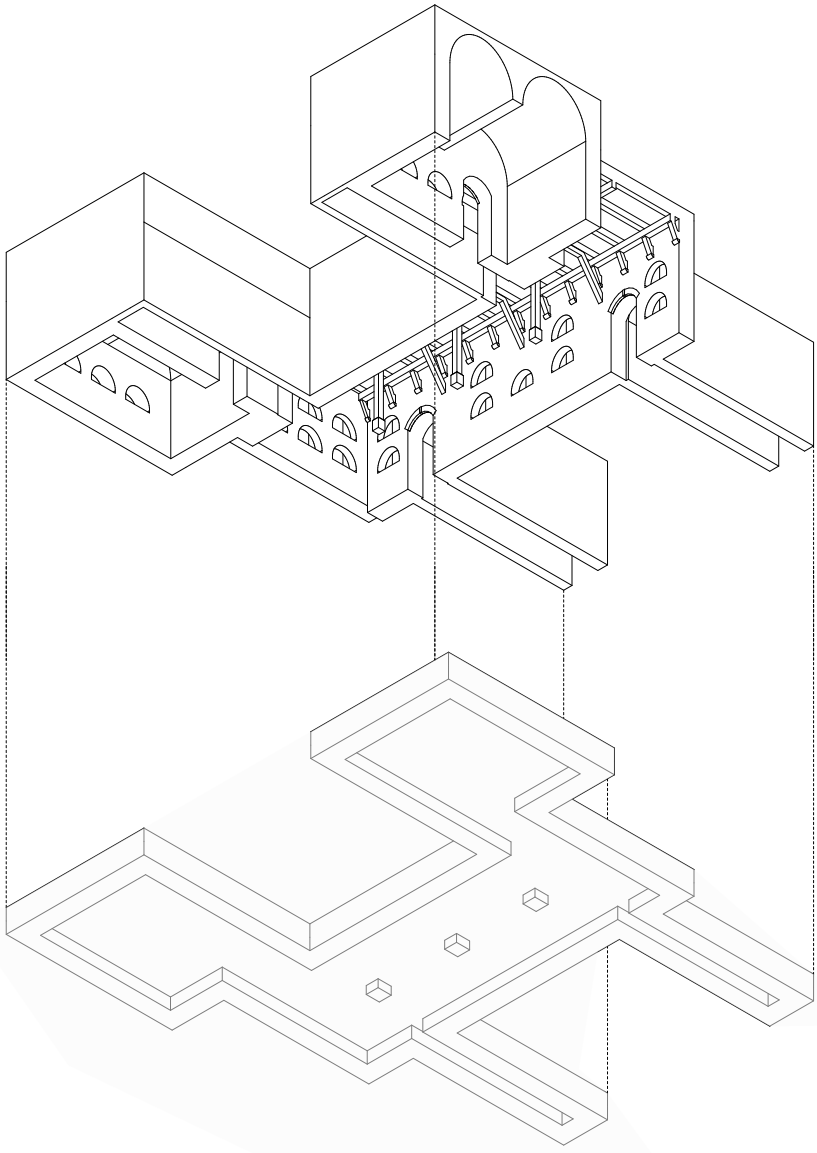
Feb	1.3	5.0	8.8
Mär	5.3	4.8	7.9
Apr	9.1	7.5	8.1
Mai	13.2	10.0	8.7
Jun	18.9	15.3	10.0
Jul	18.8	15.7	12.8
Aug	18.6	15.9	13.7
Sep	14.7	15.8	14.0
Okt	10.6	14.7	13.7
Nov	5.2	12.3	13.4
Dez	1.8	7.2	12.8

Section Muraltengut

Nikolai Göldi: Muraltengut (2022)

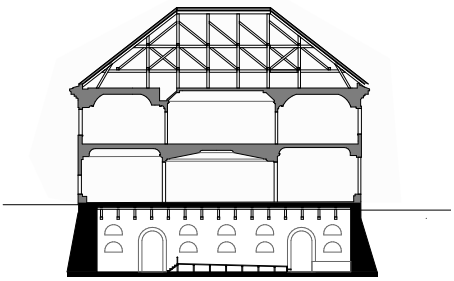


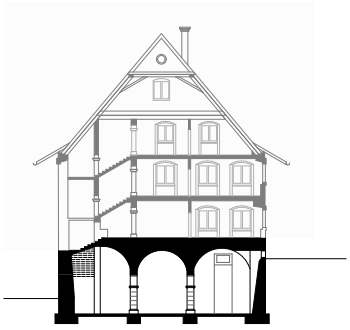
Wärmespeicherfähigkeit Keller Agentenhaus

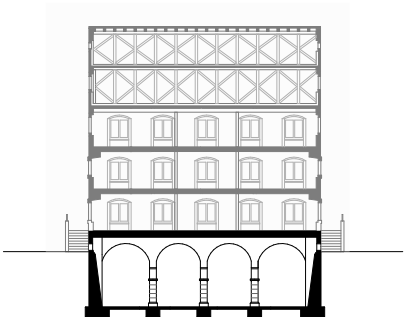
Volumen: 1310m^3
Wärmekapazität c = 1000 J/kgK
Rohdichte ρ = 2150 kg/m^3

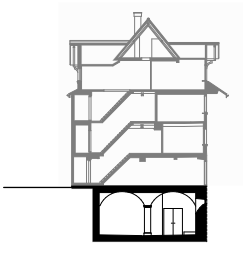
Wärmespeicherungszahl s: 1310m^3 * 1000J/kgK * 2150kg/m^3
s= 2'816'500'000 KJ/m^3K

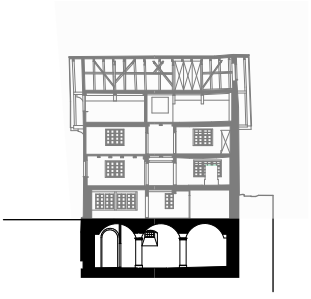
Axonometry Muraltengut



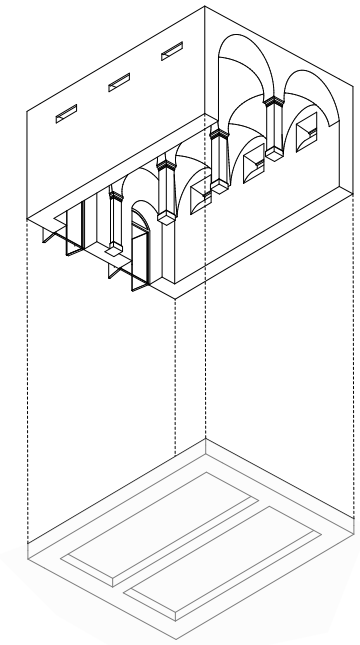


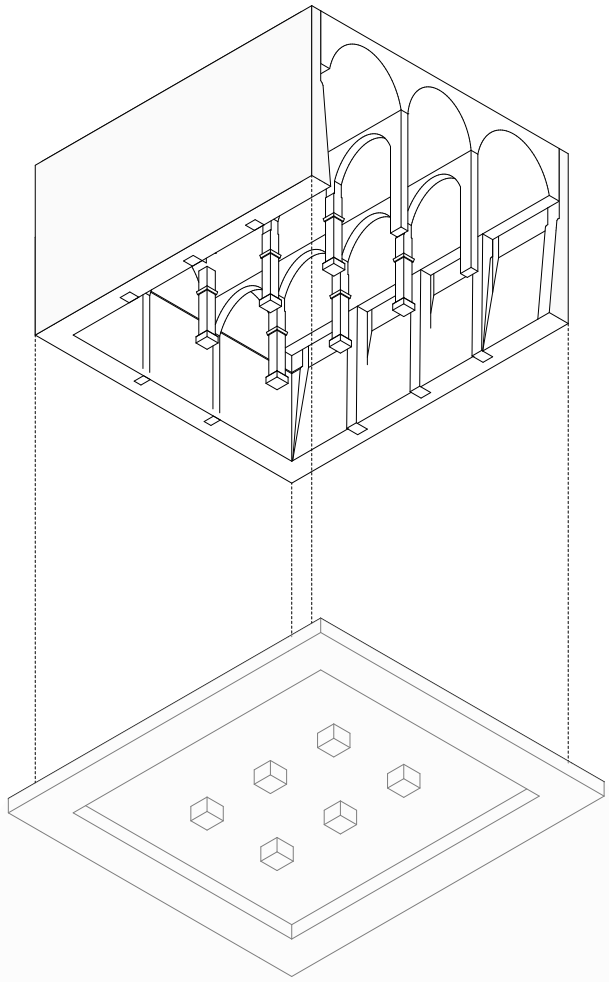






Analysis Basement Bürgerhäuser





Wärmespeicherfähigkeit Keller Agentenhaus

Volumen: 284m^3
Wärmekapazität c = 1000 J/kgK
Rohdichte ρ = 2150 kg/m^3

Wärmespeicherungszahl s: 284m^3 * 1000J/kgK * 2150kg/m^3
s= 610'600'000 KJ/m^{3}K

Wärmespeicherfähigkeit Keller Haus zum Bocken
Volumen: 964m^3
Wärmekapazität c = 1000 J/kgK
Rohdichte ρ = 2150 kg/m^3

Wärmespeicherungszahl s: 964m^3 * 1000J/kgK * 2150kg/m^3
s= 2'072'600'000 KJ/m^{3}K

SCENARIO

S. 15 – 23

Phase 2

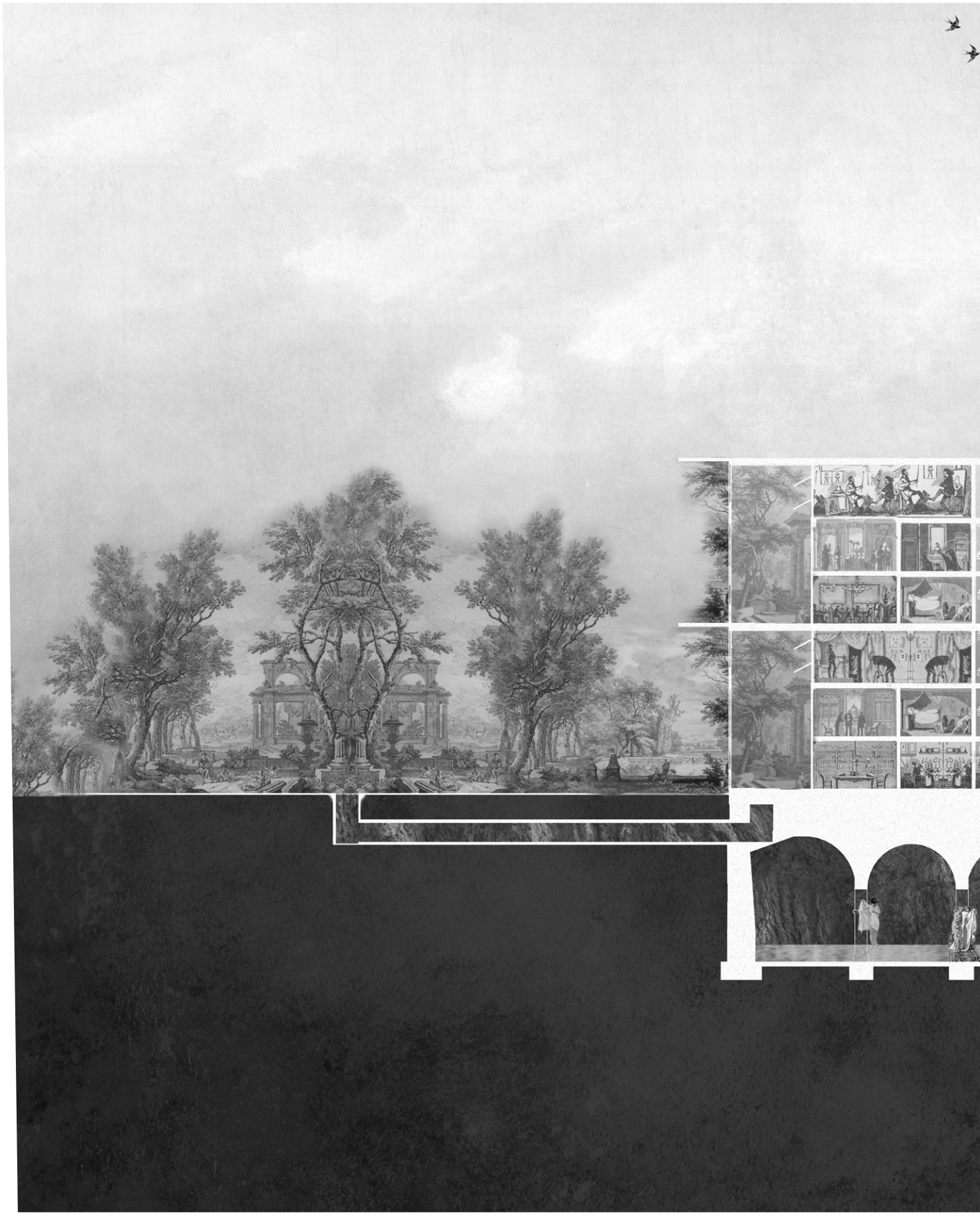
Section Collage

UNTERSUCHUNG
THERMISCHE ZONEN BÜRGERHÄUSER

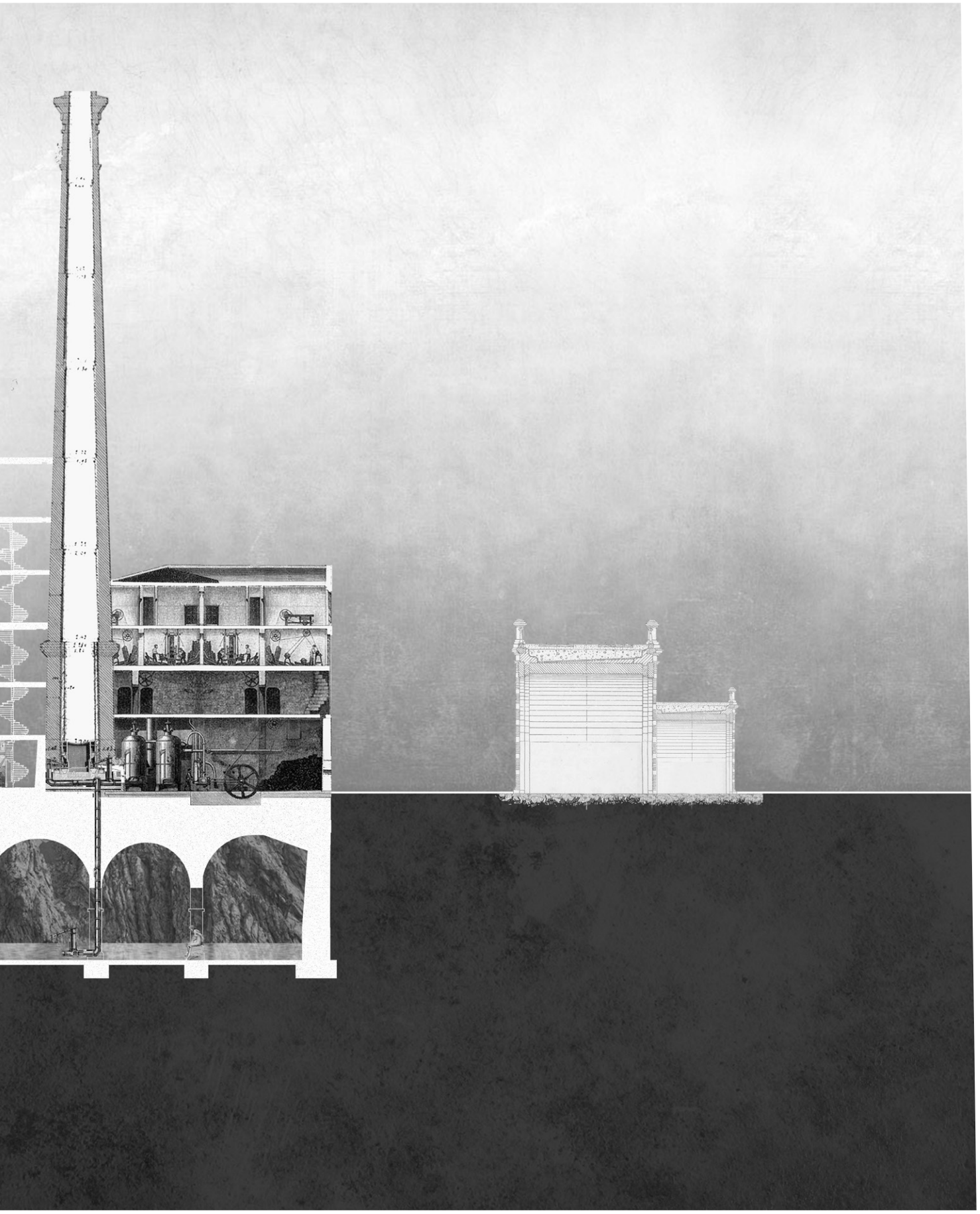
Anders als heute mussten sich die Bürgerhäuser des 18./ 19. Jahrhunderts mit einem Minimum an Haustechnik begnügen. Aufgrund des fehlenden technischen Fortschritts wurden einfachere Lösungen angestrebt, die sich in gewissen Punkten grundlegend von unserem Verständnis von Komfort von heute unterscheiden. In der heutigen Zeit wird eine durchgehend konstante Raumtemperatur für alle Räume angestrebt, die nach Finger mindestens 19 Grad beträgt. Im Gegensatz dazu wurde bei den Bürgerhäusern die Erzeugung von Wärme mittels Öfen punktuell auf wichtige Räume beschränkt. Weniger wichtige Nebenräume, wie etwa die Toilette, blieben komplett kalt.

Die Rekonstruktion der damals vorherrschenden Zustände und der damit verbundenen Entwicklung sind nicht einfach, da entsprechende Quellen oft fehlen oder keine empirischen Aufzeichnungen zum Thema Komfort getätigt wurden. Nichtsdestotrotz finden sich einige wenige Quellen, wie etwa beim Zunfthaus zur Meise, welche ein Bild der damaligen Verhältnisse zeichnen können.
Demnach scheint die Heizung mittels der Öfen vor allem ein wiederkehrendes Ausprobieren gewesen zu sein. Die Eisenöfen, die in der Mitte des 19. Jahrhunderts eingebaut wurden lieferten nicht genug Wärme, während der darauffolgende Kachelofen eine zu lange dauernde Aufheizzeit benötigte. Schliesslich entschied man sich für mehrere kleine Öfen für den grossen Saal, die war weniger Wärme lieferten dafür aber schneller aufgeheizt werden konnten. Zu Beginn des 20. Jahrhunderts wurden die Öfen durch eine Warmwasserzentralheizung mit Kohlenfeuerung ersetzt; die alten Kachelöfen wurden herausgerissen. Die neue Heizung erhöhte den Wohnkomfort erheblich, die angenehme Strahlungswärme des Kachelofens wurde jedoch von den Zünftler schmerzlich vermisst. Interessant ist an dieser Stelle zu erwähnen, dass dieses Bürgerhaus bereits 1877 eine mechanische Lüftung besass: vier in die Fenster eingelassene Ventilatoren lieferten Frischluft für den grossen Saal. Allerdings wurde die Effizienz und vor allem die Lautstärke stark bemängelt, sodass diese 1912 ersetzt wurden.

Mit den technischen Entwicklungen im 20. / 21. Jahrhundert stieg zwar der Komfort und dessen Verfügbarkeit, allerdings auch der Energieverbrauch signifikant an. Die Räume können unabhängig von den Umgebungseinflüssen gekühlt oder geheizt werden, das Raumprogramm ist sehr statisch. Eine thermische Zonierung in der Form der Bürgerhäuser gibt es so nicht. Mit dem Hintergrund des Energieverbrauchs stellt sich die Frage, ob unser Verständnis von Komfort noch aktuell ist oder ob dieses zwingend hinterfragt werden muss. Kann ein sich veränderndes Raumprogramm mit wechselnden thermischen Zonen zu einem neuen Komfortstandard werden?
Ausgehend von einem solchen Standard werden Themen wie Adaptierbarkeit, der Bezug zur direkten Umgebung, mögliche Synergien und passive Nutzung wichtig. Ein Szenario, das im städtischen Kontext nicht als Solitär existiert, sondern sich in die Umgebung einfügt und bereits vorhandenes nutzt.



Section Collage



Section Collage Basement

PROJECT

S. 24-57

SZENARIO

On one hand, basements are very durableand long lasting constructions; on the other hand, their construction requires excavating the earth. For this very reason, basements are nowadays often avoided or minimised. In the context of a circular approach to construction, an existing basement is intended to be reused.

The former incineration plant Josefwiese has extensive underground structures, including a waste bunker nearly 14 m deep that is no longer needed. These facilities are so deeply embedded in the ground that the City is looking for an alternative use for them instead of extensively dismantling them. Part of the power plant will be converted into a heating plant, the remaining space will be vacant. Instead of demolishing the whole building, the huge underground structures are to be transformed into a new use. Furthermore, an excavation must be carried out to remove contaminated subsoil nearby.

The arrangement of the floor plan results from the existing structure. The deep waste bunker is transformed into a jumping pool, while the less deep spaces are used for the remaining swimming areas. The industrial expression of the former plant is still noticeable. Existing silos are trimmed and used as skylights. The foundation of the old power plant is left visible on the surface and appears as a kind of ruin in the urban context.

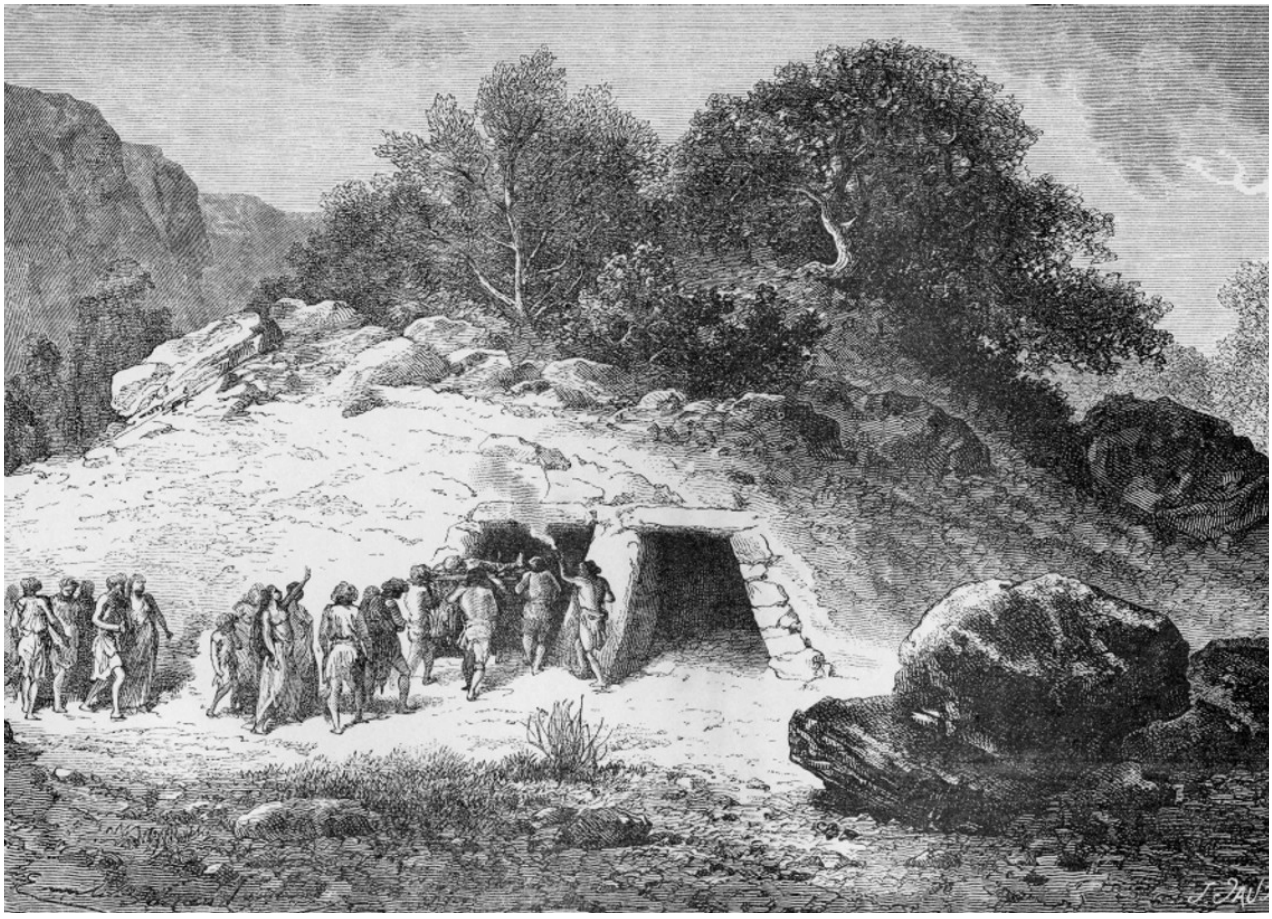
The new building uses the space created by the contaminated soil that has now been removed. The drilled piles used remain visible in the interior and show the manifestation of the process. Large skylights bring natural light into the interior and give a sense of the hidden structure underneath on the surface.

Since the City demands for, the function in winter is an indoor swimming hall. The earth's insulation can be used and synergies are created with the neighbouring thermal power plant. In summer, the cooler underground becomes a space for dance and theatre performances, parties or even exhibitions. The ground absorbs the coolness in summer and allows for low temperatures on hot summer days. At the same time, heat islands are avoided as a result of the park above.

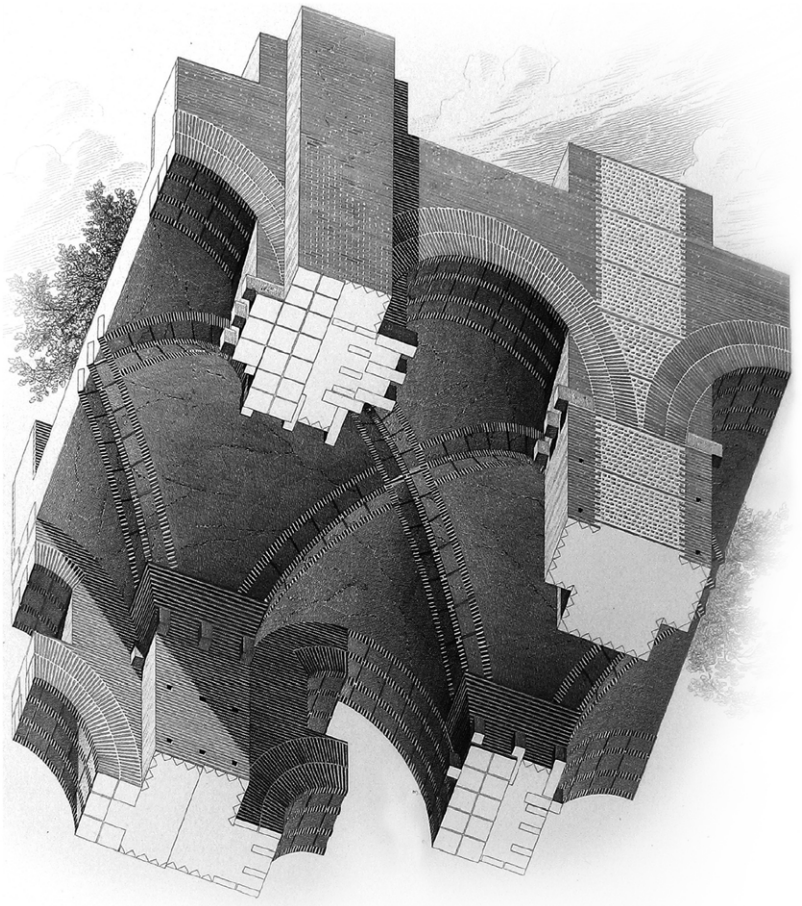
The use of the existing basement and the adaptive function can be a scenario of what the basement of the future will look like.

Building on the existing

Adaptable function



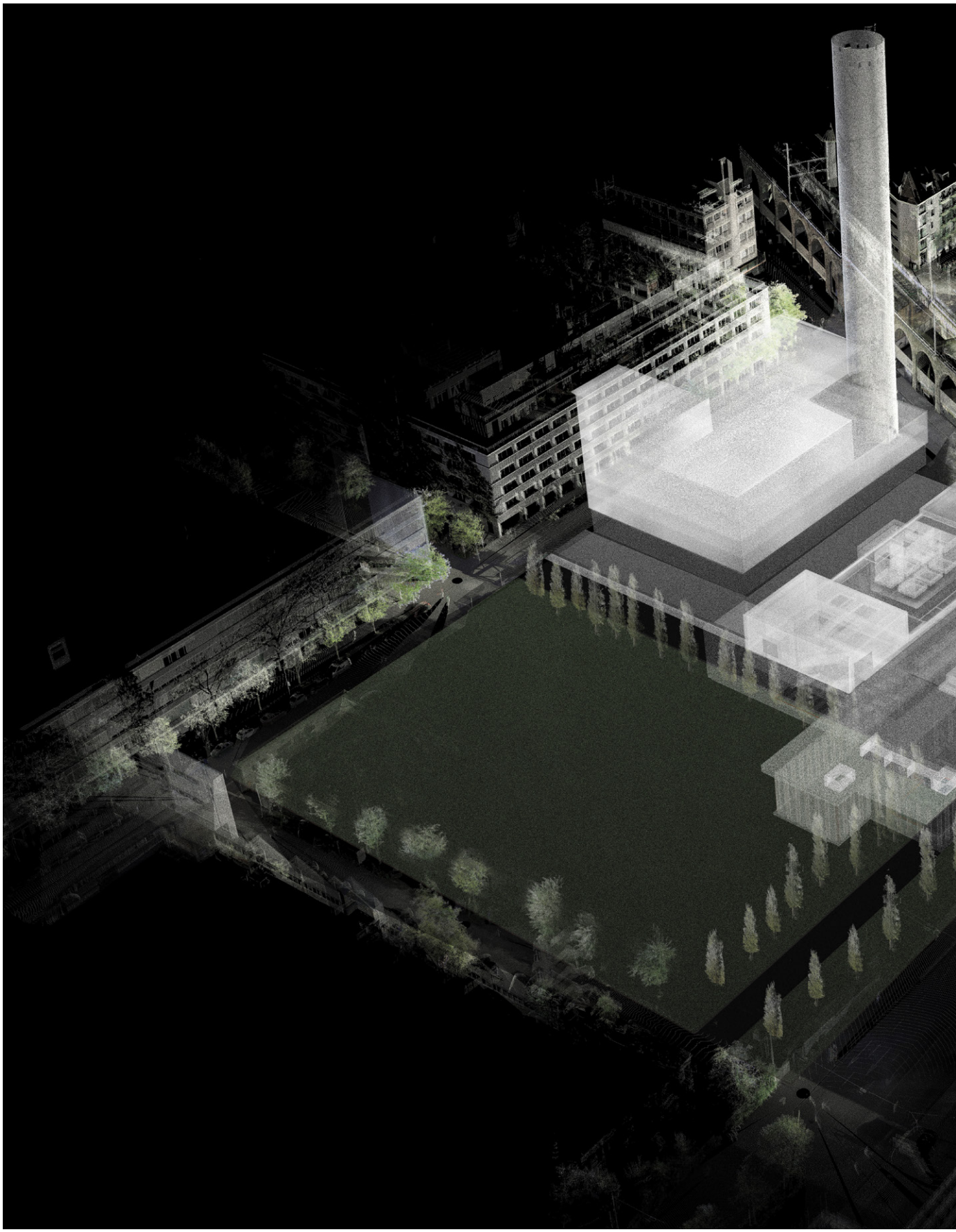
Hidden vs Visible Space



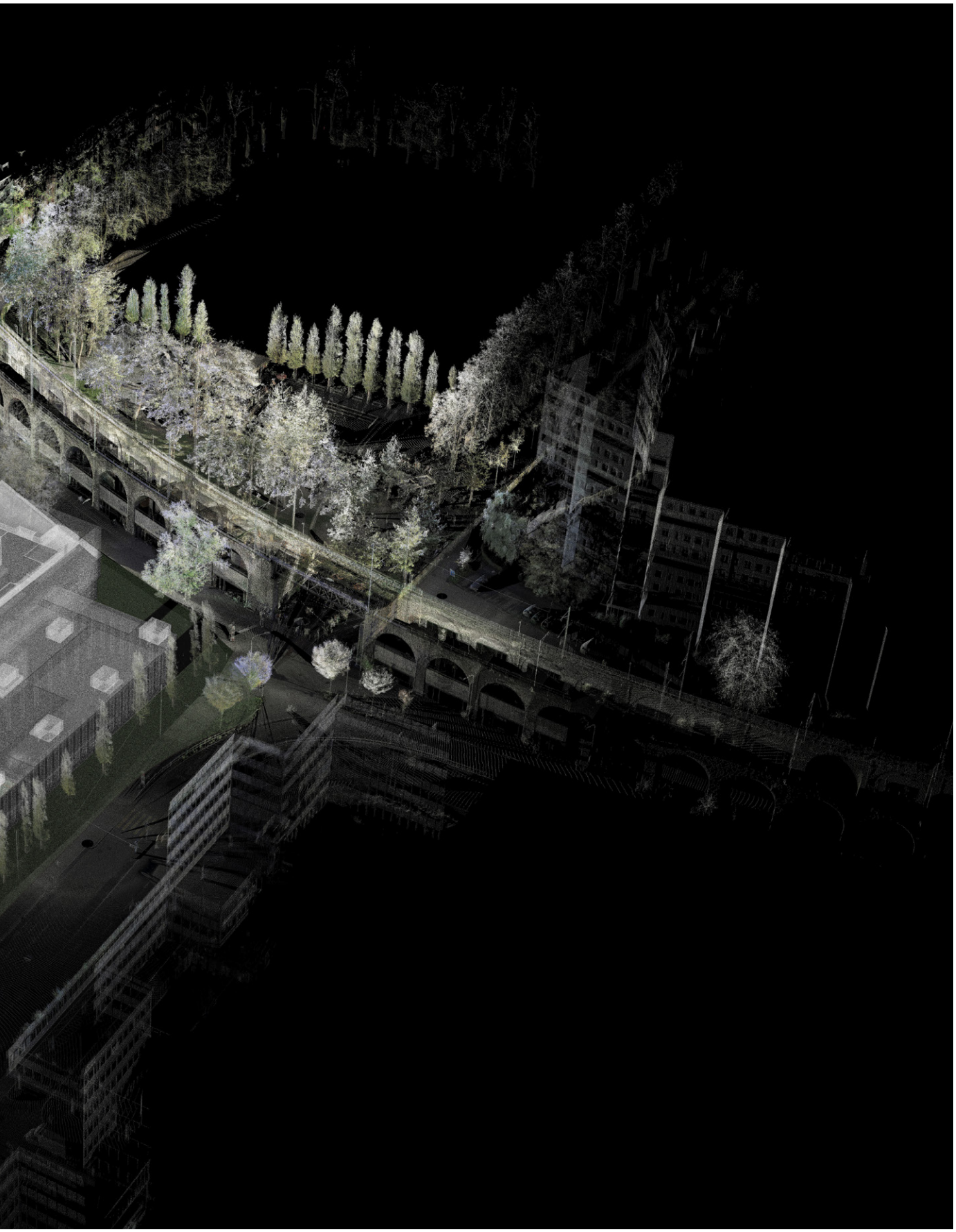
Surface vs Underground

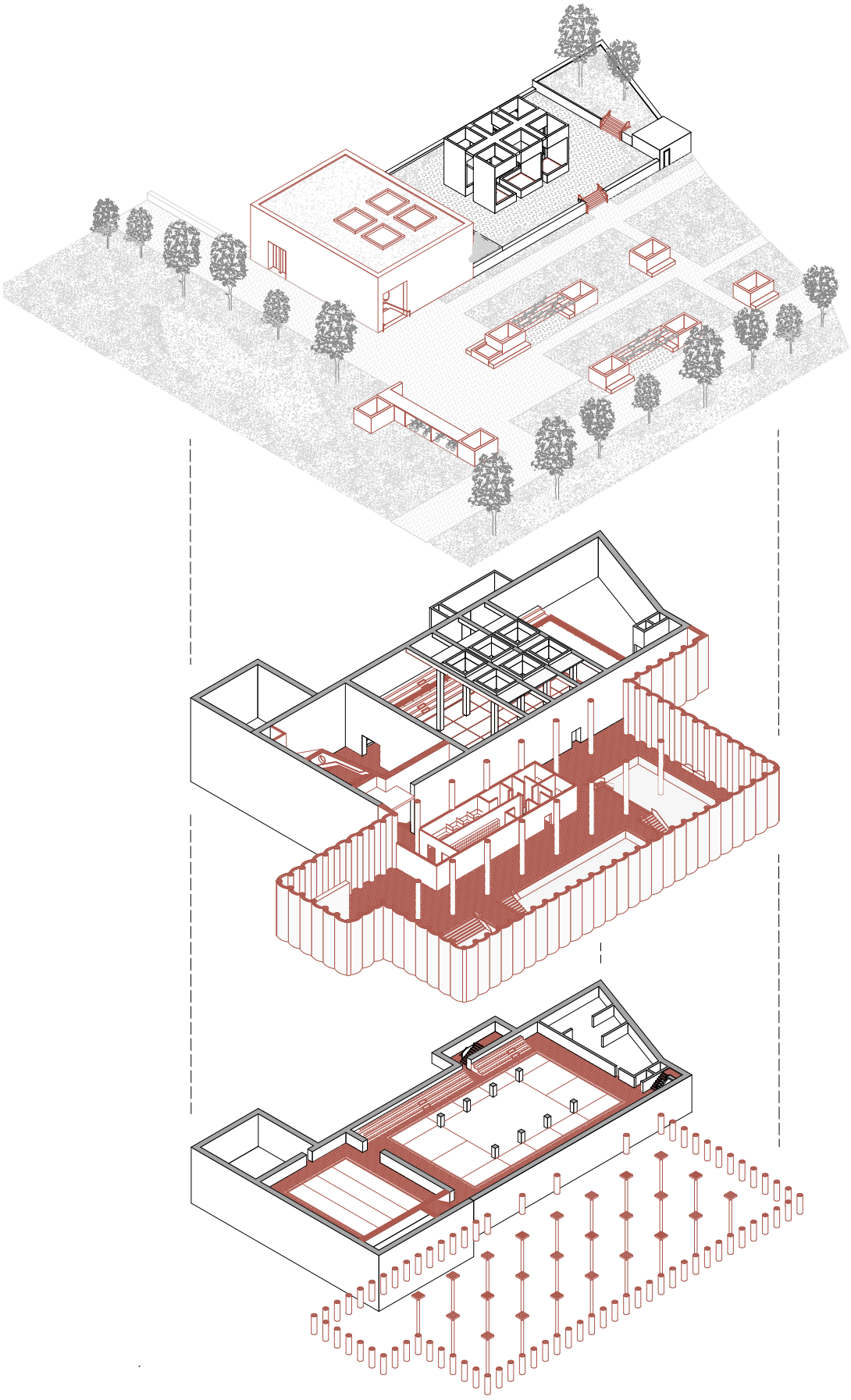
Site surface

Site underground



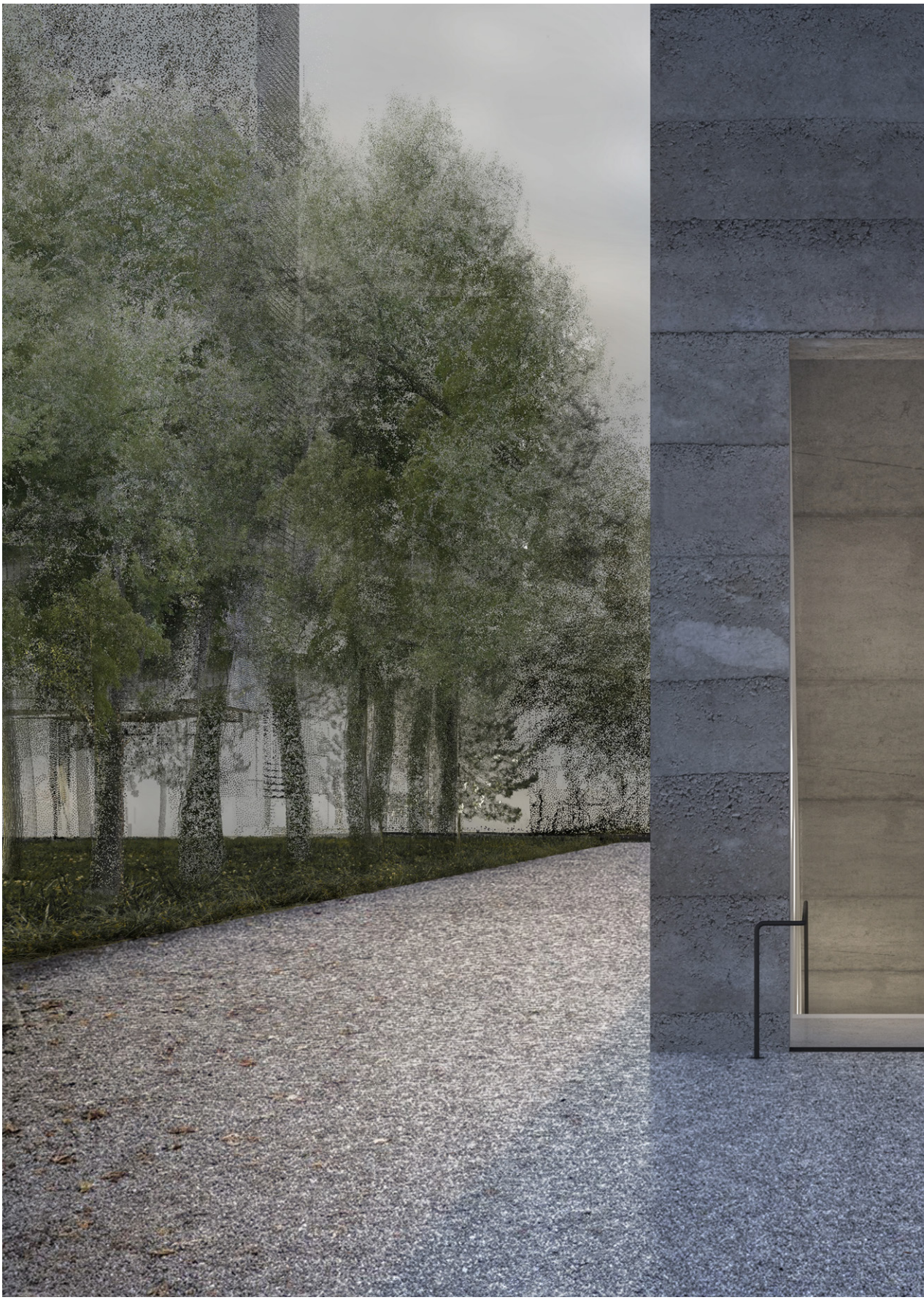
Axonometric Overview Site, Pointcloud



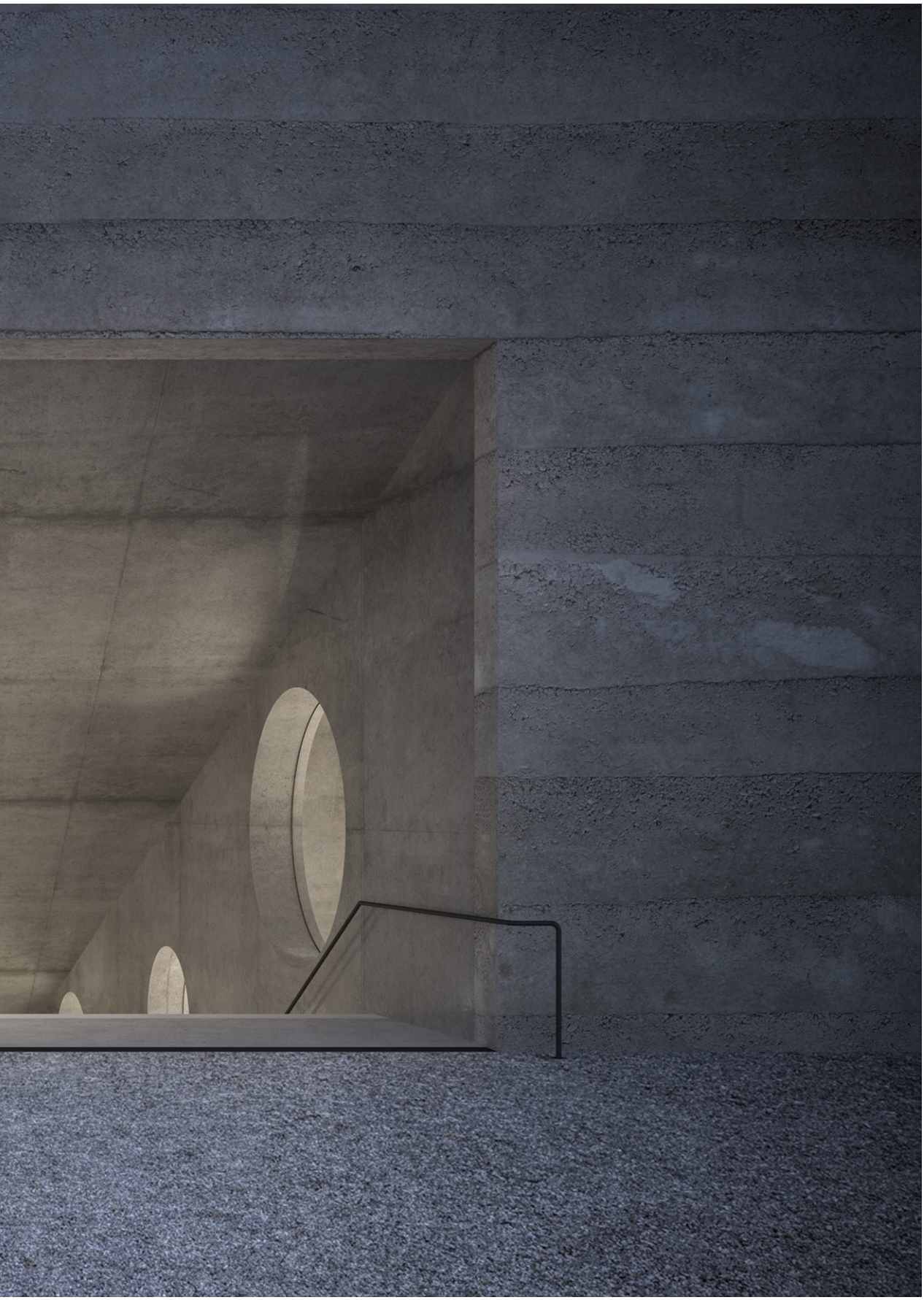


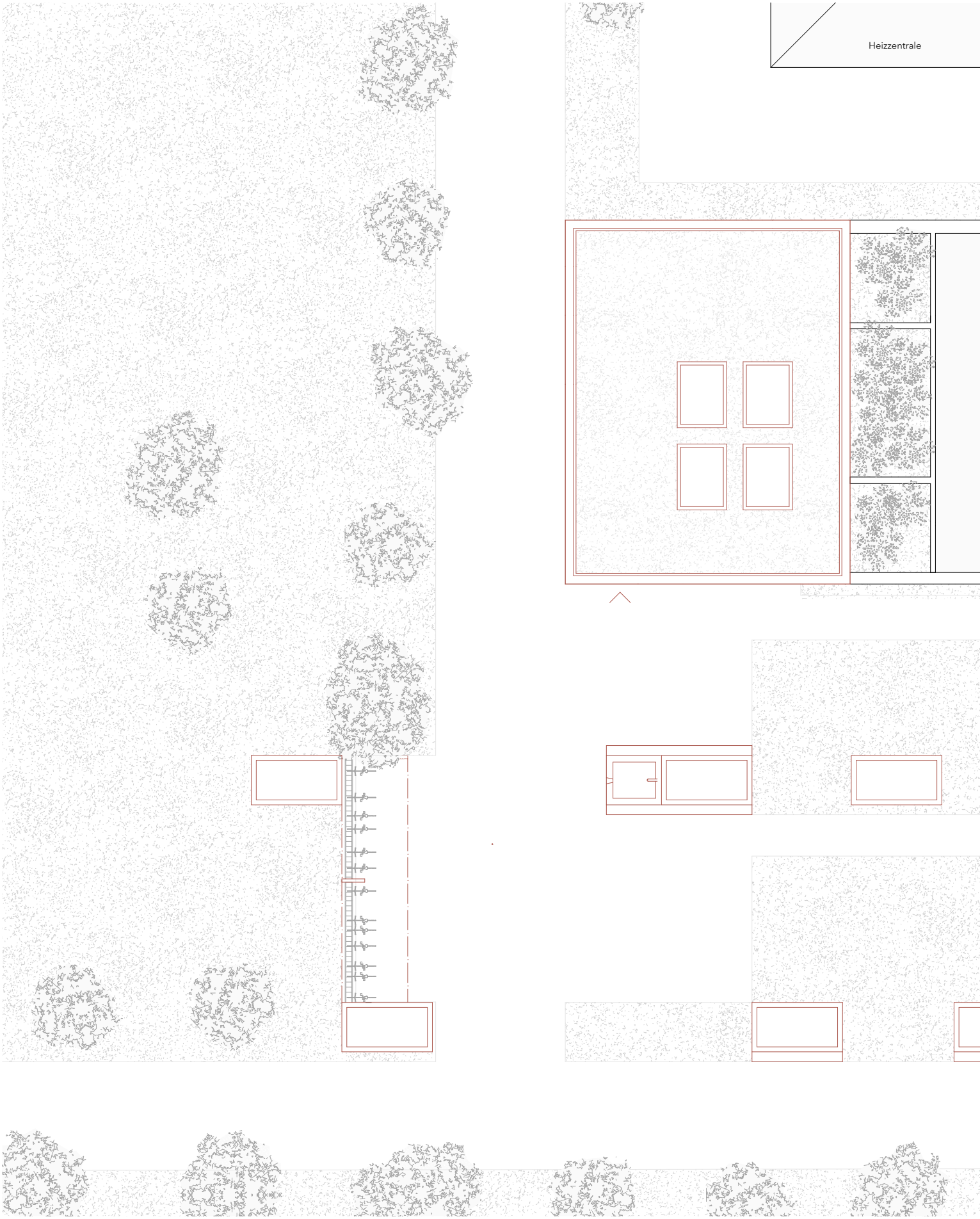
Axonometrie

Visualisation Exterior

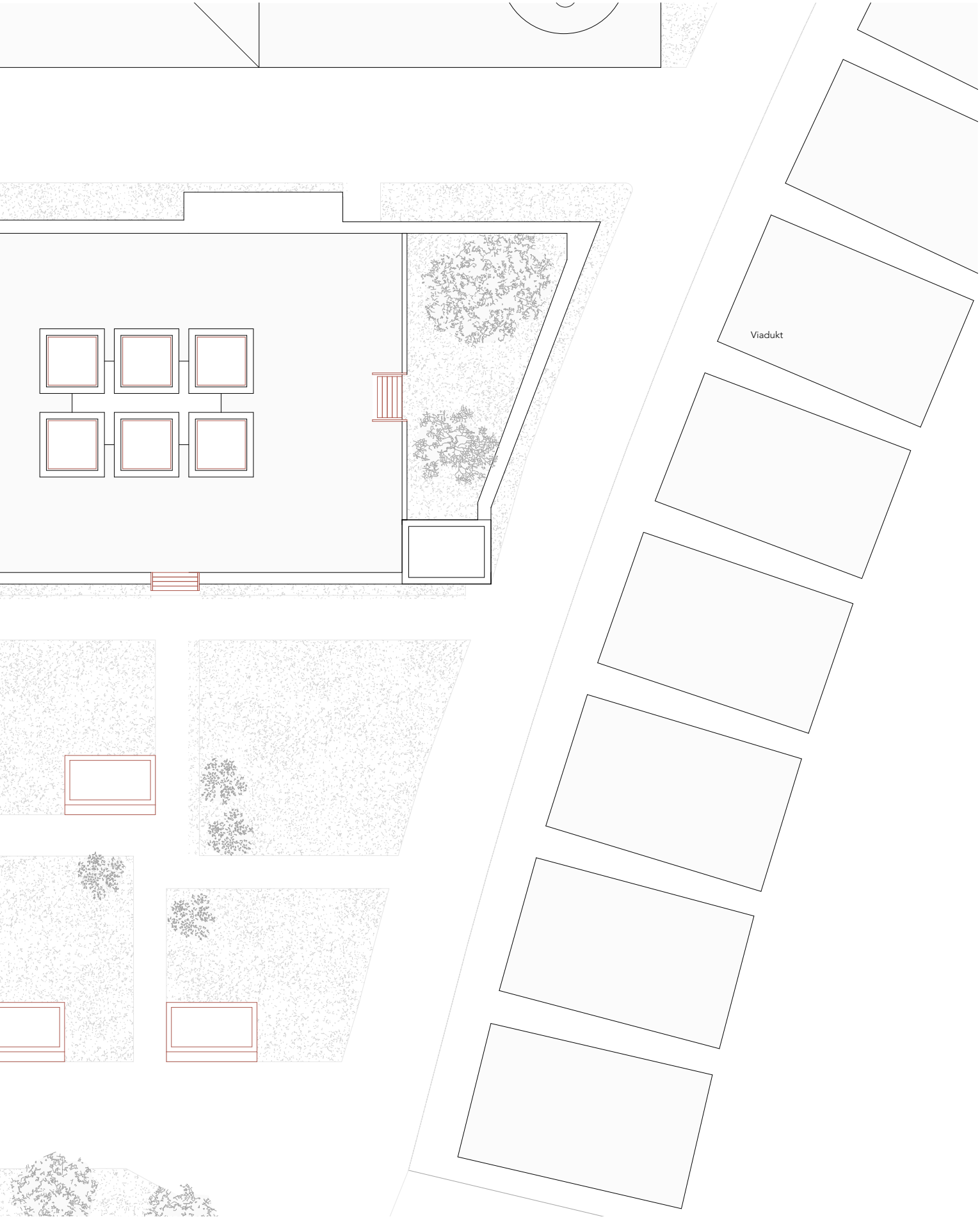


Visualisation Exterior





Floorplan Groundfloor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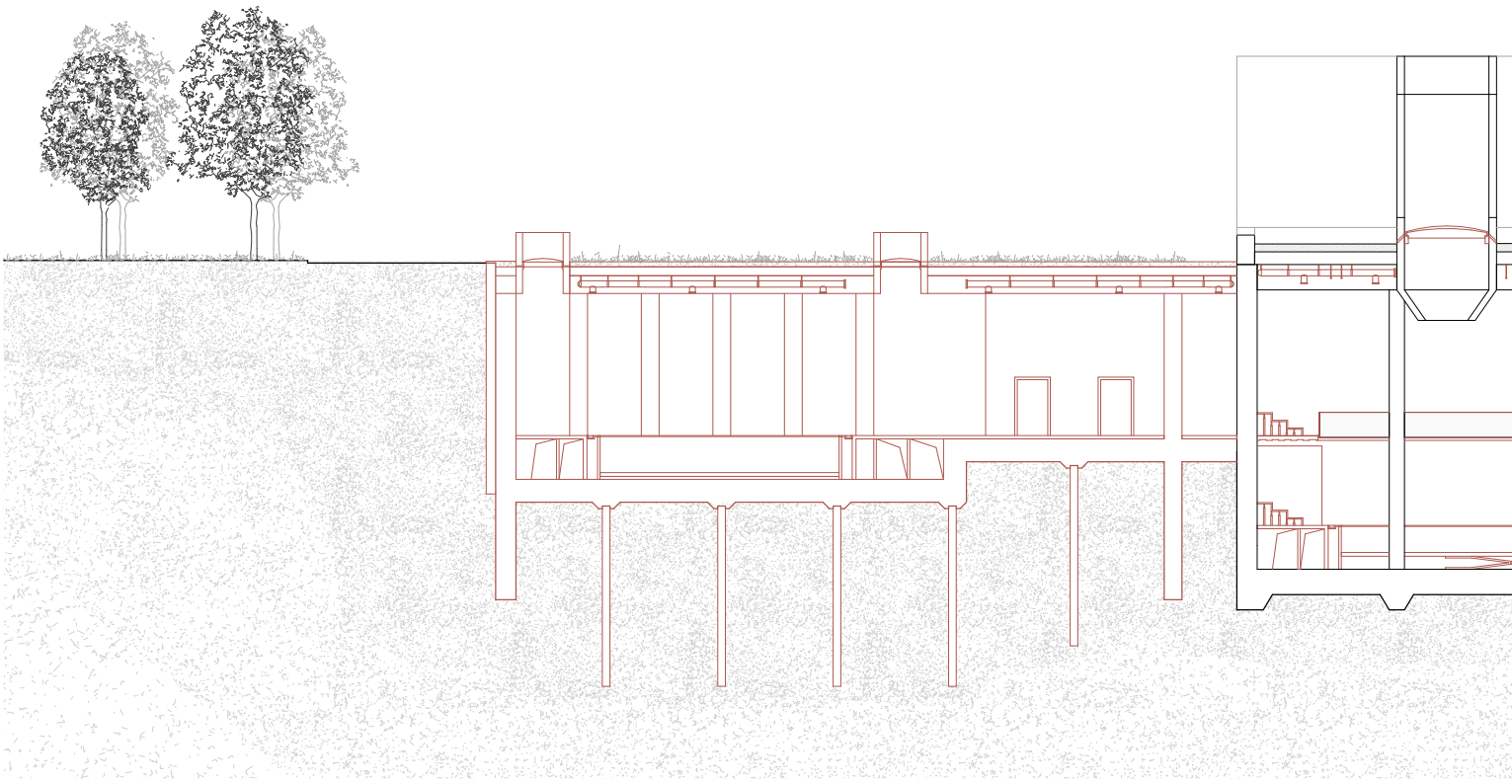
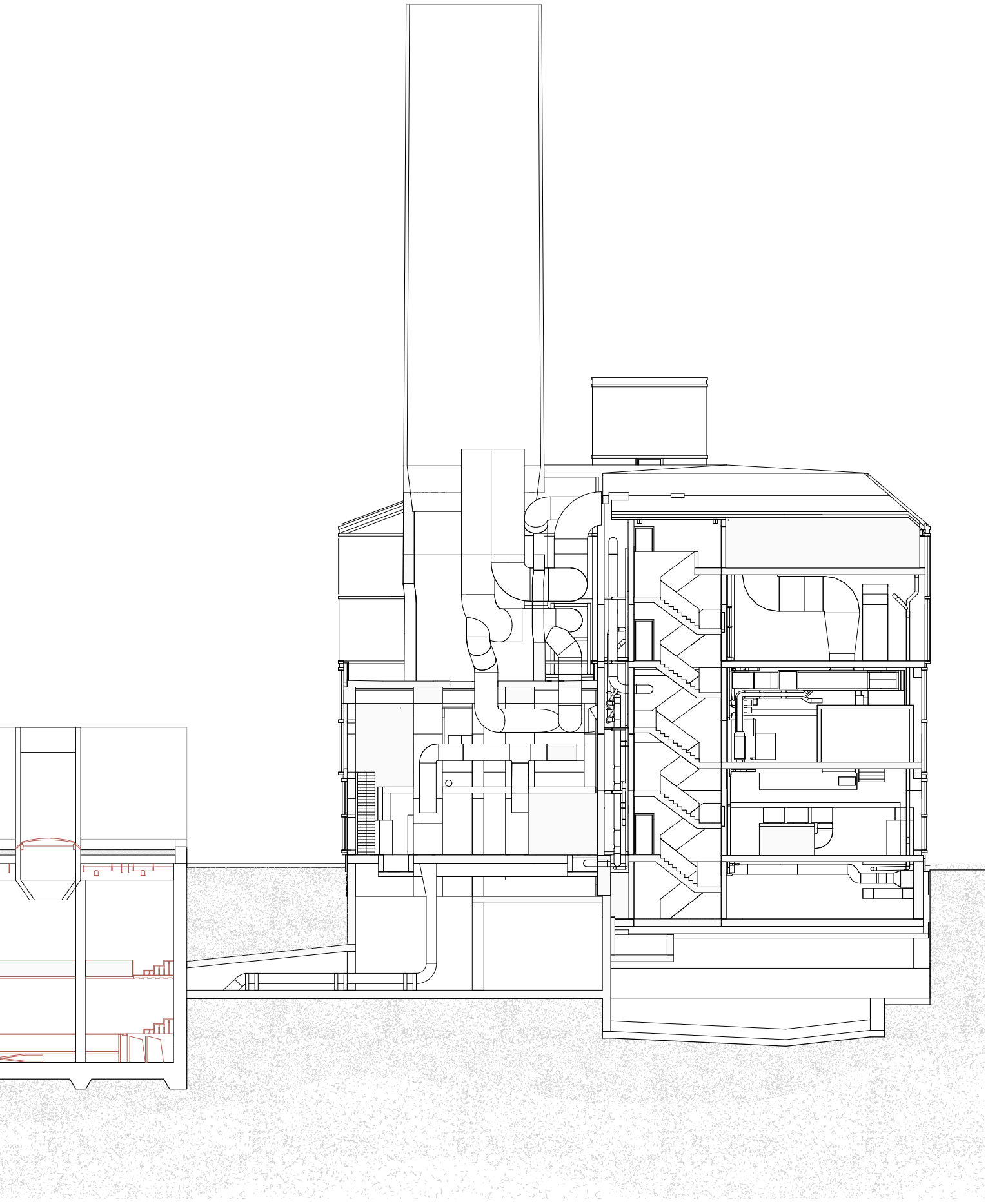
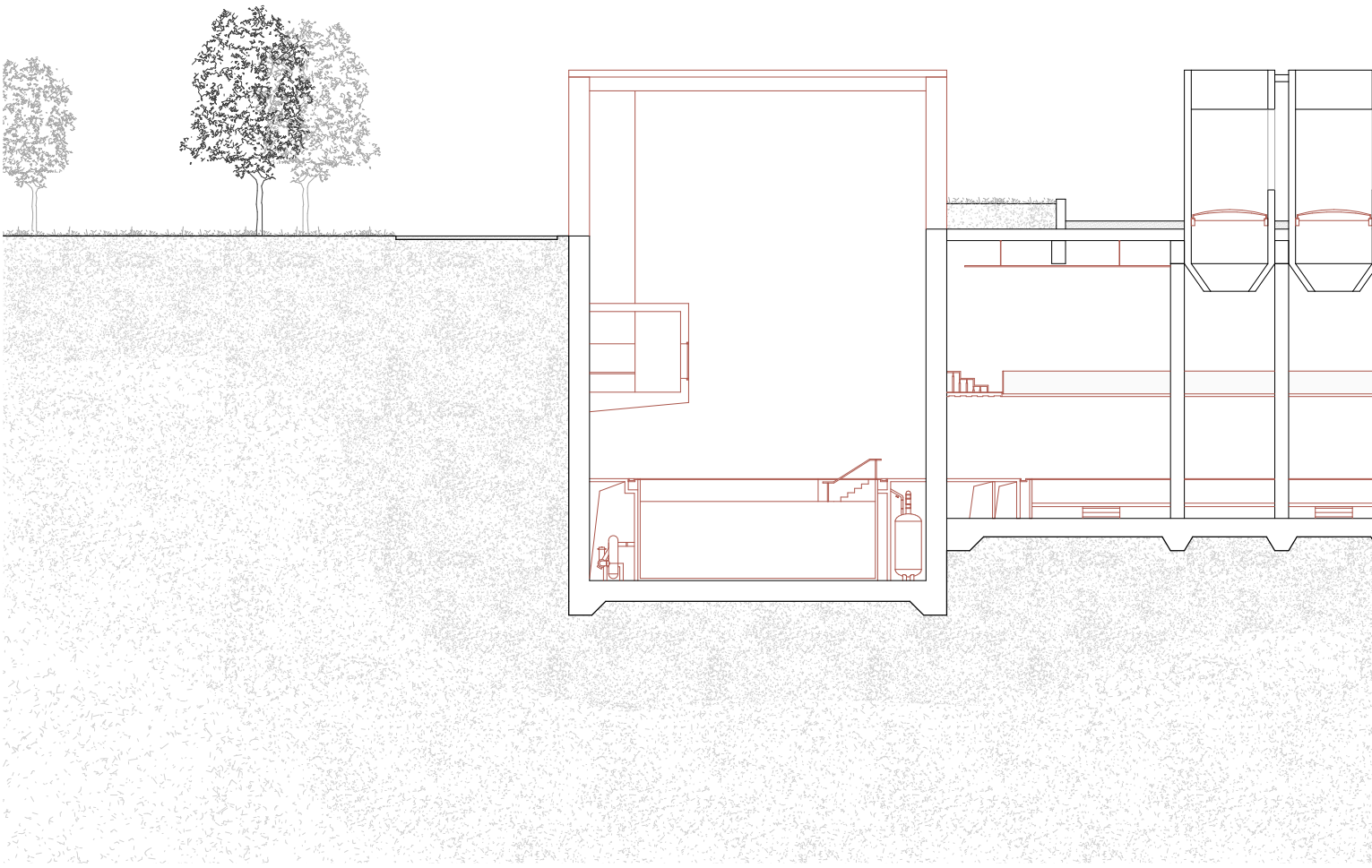


Section

BASEMENT





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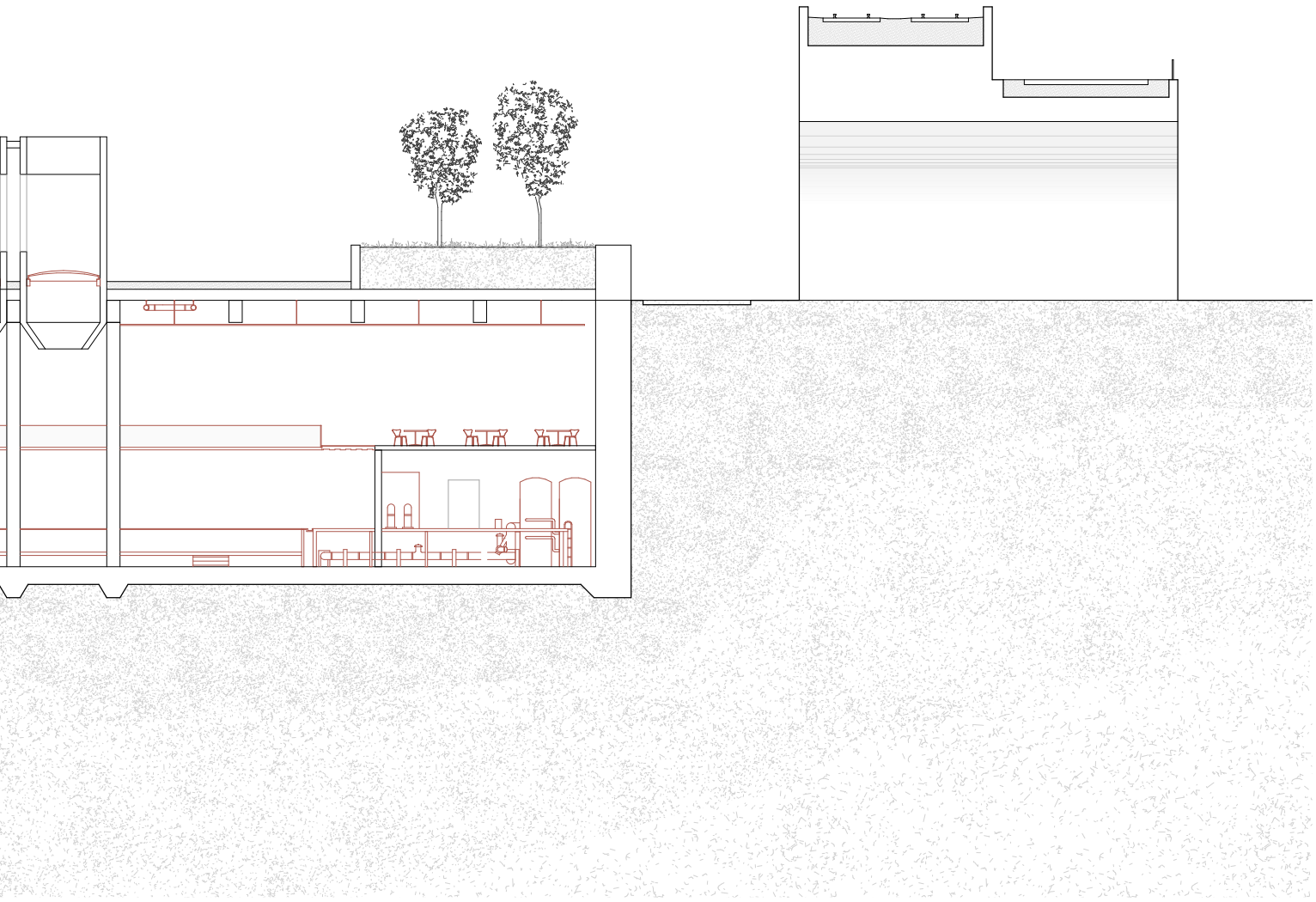
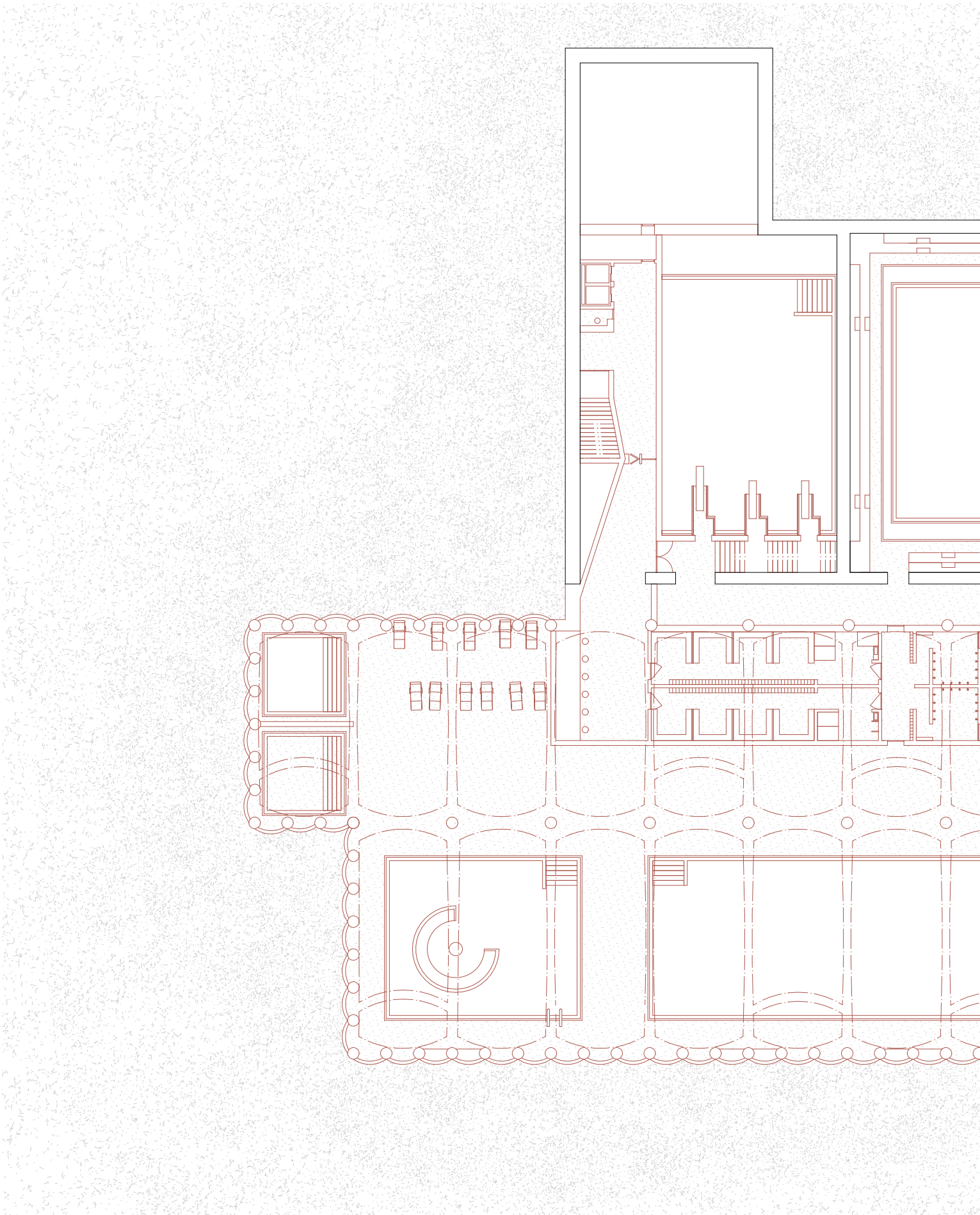
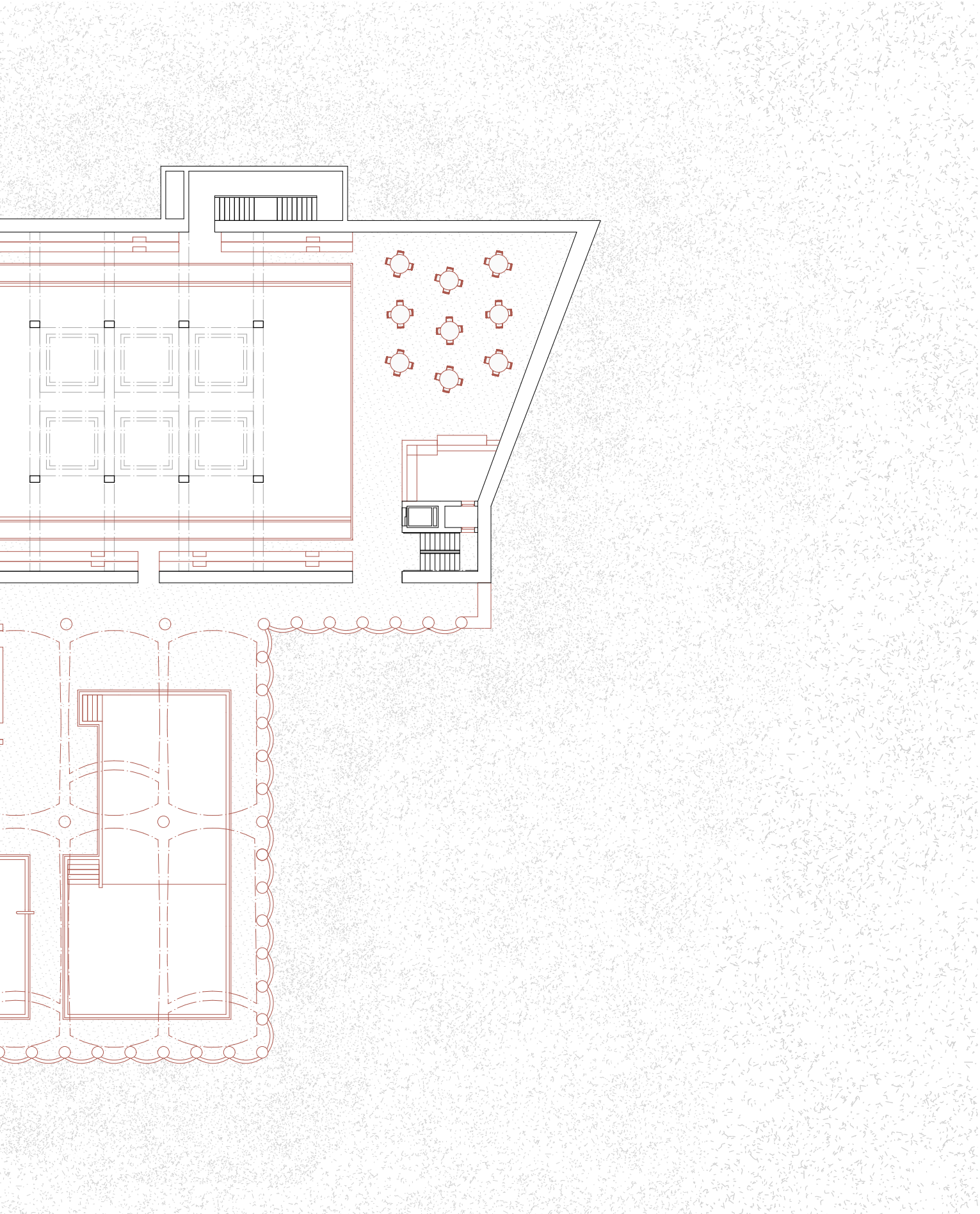
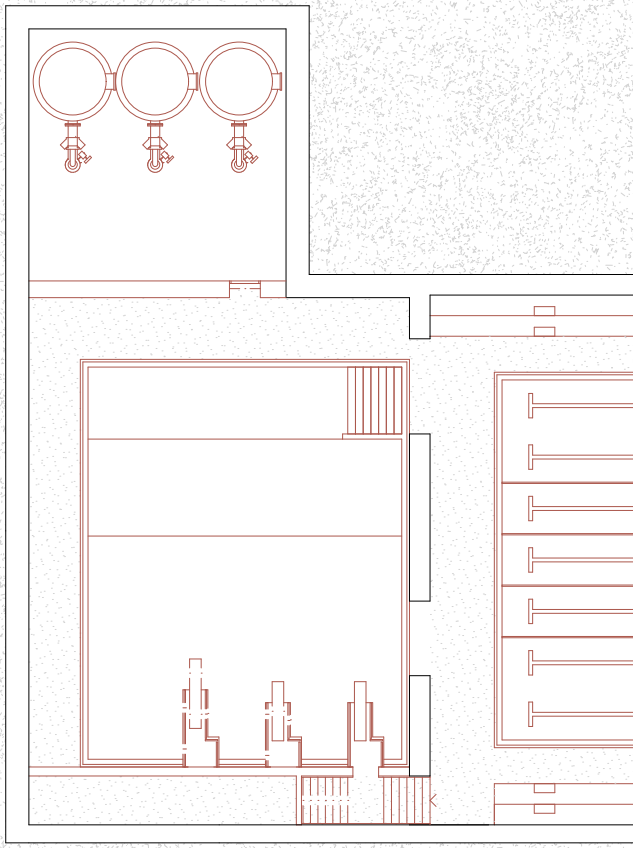




Floorplan First Basement





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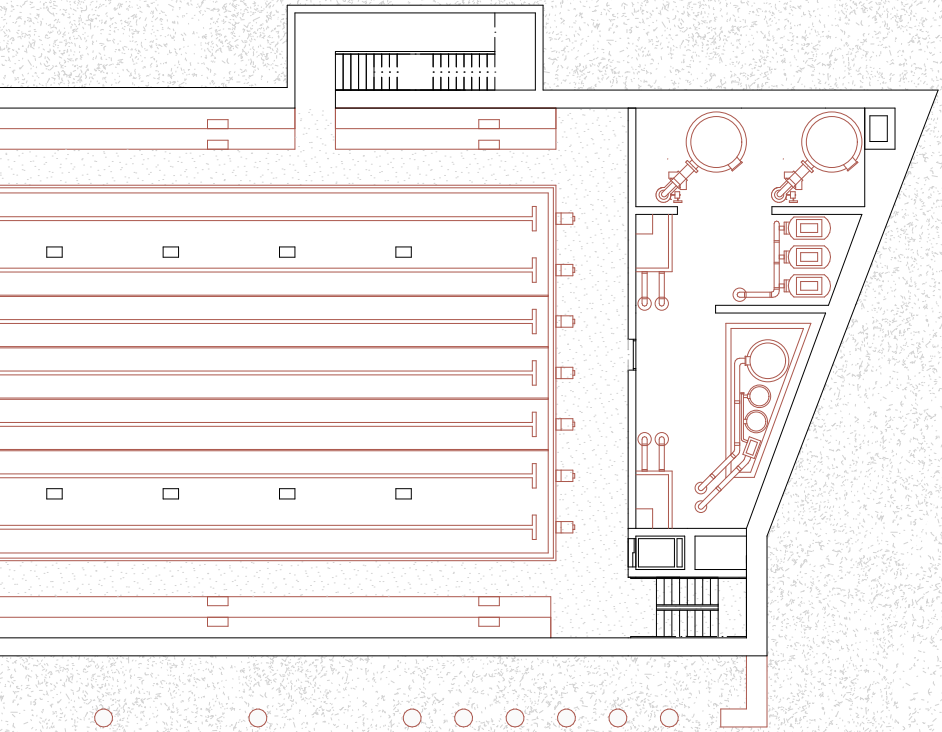
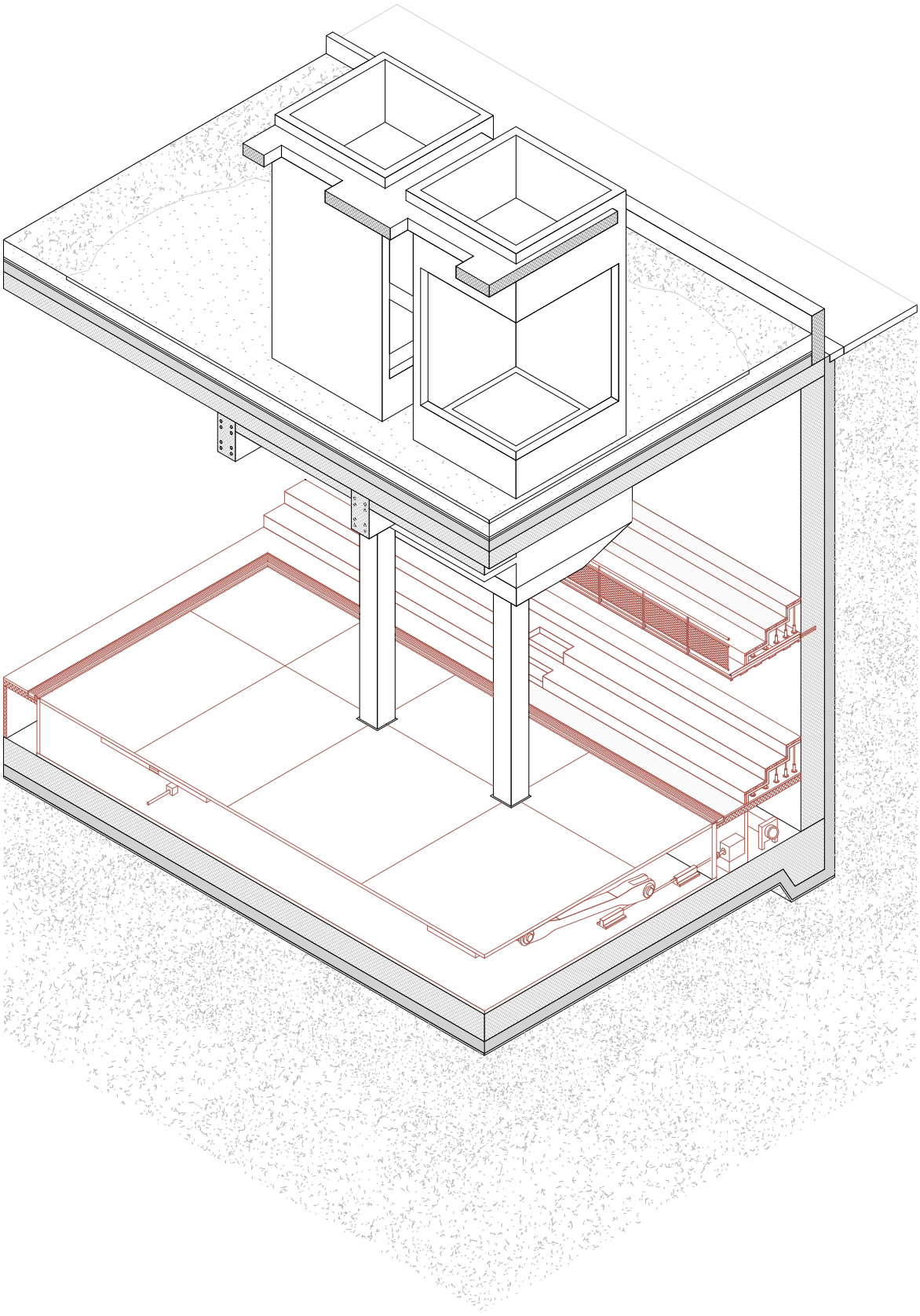
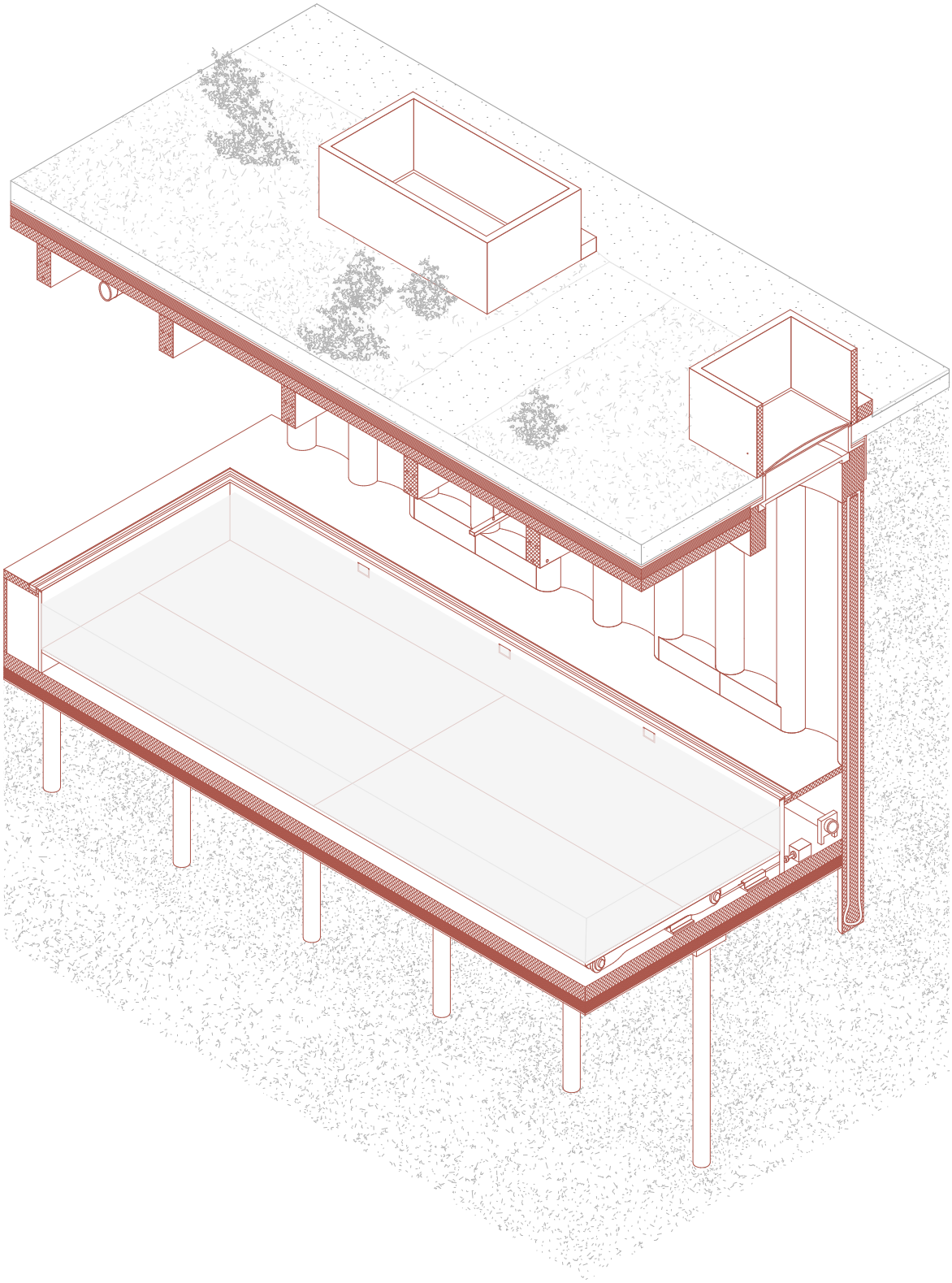




Axonometrie Existing



Axonometrie New Build

Visualisation Exterior

Visualisation Exterior

ACKNOWLEDGE

I would like to thank the supervisors Cara Rachele and Angela Yoo and the professors Marten Delbeke, Christoph Gantenbein and Benjamin Dillenburger.

In particular, I would like to thank Julien Bellot. He has accompanied me over the last few weeks with much enriching, encouraging and supportive input and great commitment.

16.12.2022

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NIKOLAI GÖLDI