1

A tlas

F I G . 1

MAP SHOWING SOME OF THE IMPORTANT MOMENTS THROUGH THE HISTORY OF THE WOLFBACH.

FIG.1

Historical maps and documents are invaluable tools that allow us to trace the original course of the stream that begins at Adlisberg before eventually merging into the Limmat. The stream's origin likely remains unchanged over the years, maintaining its natural state. However, as it journeyed towards the city, its path transformed significantly compared to its present course. Historically, the stream was ingeniously rerouted beneath the city's imposing walls, resurfacing later to feed into a large basin. This basin, a hub of communal activity, would freeze over in winter, becoming a popular spot for ice skating. This specific area, rich in social history, now lies beneath the quaint garden above the Kunstmuseum extension, marking a stark contrast between past and present urban landscapes.

In 1895, the Wolfbach, a once freely flowing stream, underwent a significant transformation as it was channeled and confined to an underground tunnel, with its waters re-emerging only when meeting the Limmat by the Rudolf Brun Bridge.

This change was emblematic of broader shifts during the Industrial Revolution, which brought into sharp relief the severe hygiene and sanitation issues of the era. Previously, many streams traversed cities openly, serving the unenviable role of carrying away all forms of urban waste. This practice, however, led to the realization of significant health risks as these contaminated waters became vectors for disease.

In response to this public health crisis, cities, including Zurich, began to reroute these streams underground, transforming them into conduits for waste towards treatment facilities. This shift marked a crucial step in urban development, prioritizing the health and safety of the populace over the natural flow of waterways.

FIG.1
REMAINS OF THE WOLFBACH-CANAL, VIEW FROM THE DITCH, KUNSTHAUS, ZURICH, 2021

FIG.2
REMAINS OF THE WOLFBACH-CANAL, VIEW FROM THE DITCH, KUNSTHAUS, ZURICH, 2021

FIG.3
REMAINS OF THE WOLFBACH-CANAL, VIEW FROM THE DITCH, KUNSTHAUS, ZURICH, 2021

FIG.2

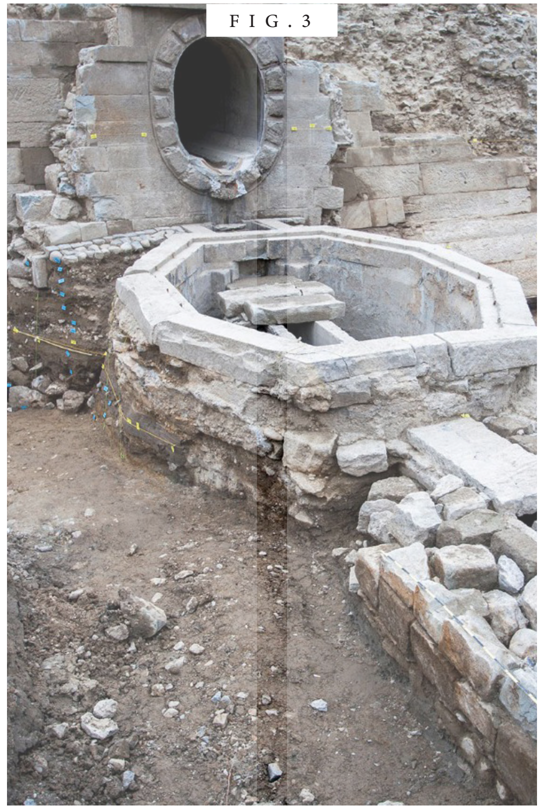


FIG.3

F I G . 1

Fast forward to 2012, and the city of Zurich embarked on a project to repair the deteriorating Wolfbach canal. This endeavor unexpectedly unearthed a portion of the historic structure during the excavation for an extension by the architect Chipperfield. Today, the rehabilitated tunnel resumes its critical role, channeling wastewater to treatment facilities, albeit with a nod to its historical past.

F I G . 2

F I G . 3

F I G . 1
WOLFBACHKANAL, NEUMARKT, ZURICH , 1992

F I G . 2
WOLFBACHKANAL, ZURICH , 1943

F I G . 3
WOLFBACHKANAL, SPITALGASSE, ZURICH , 1943

F I G . 1
MAP SHOWING THE OPEN WOLFBACH FLOWING DOWN THE ADLISBERG, UNDERNEATH THE CITY WALLS AND THROUGH THE OLD TOWN.
„KELLER PLAN", 1864.

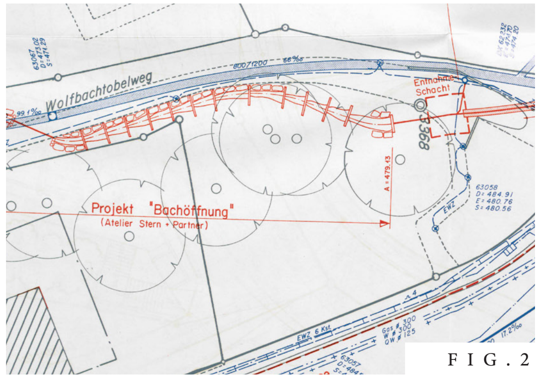
Even with advancements in predicting environmental changes, it‘s often challenging to anticipate the full impact of rising water levels and the increase in natural disasters. This unpredictability is starkly illustrated by the situation depicted in the image to the right, where the waters of the Wolfbach have breached their confines, leading to significant flooding in the historic city center of Zurich. This event underscores the formidable power of nature and the limits of human foresight and preparation in the face of such forces.

F I G . 1
WOLFBACH FLOODING, „MÜHLEGASSE", ZURICH, 1988

F I G . 2
PROJECT TO RE-SURFACE THE STREAM IN 1990

F I G . 3
FOUNTAIN MARKING THE INITIAL CHANNELING OF THE WOLFBACH, „KNABE MIT GANS", FRANZ FSICHER, 1933

F I G . 1



F I G . 2 F I G . 3

In 1895, efforts to manage the Wolfbach stream led to its burial beneath the ground, a common practice intended to control its flow and mitigate urban flooding. However, in a remarkable shift in urban planning and environmental policy, the stream was unearthed once again in 1980. This resurgence was driven by the desire to harness its clean, fresh water and reintegrate natural elements into the urban fabric.

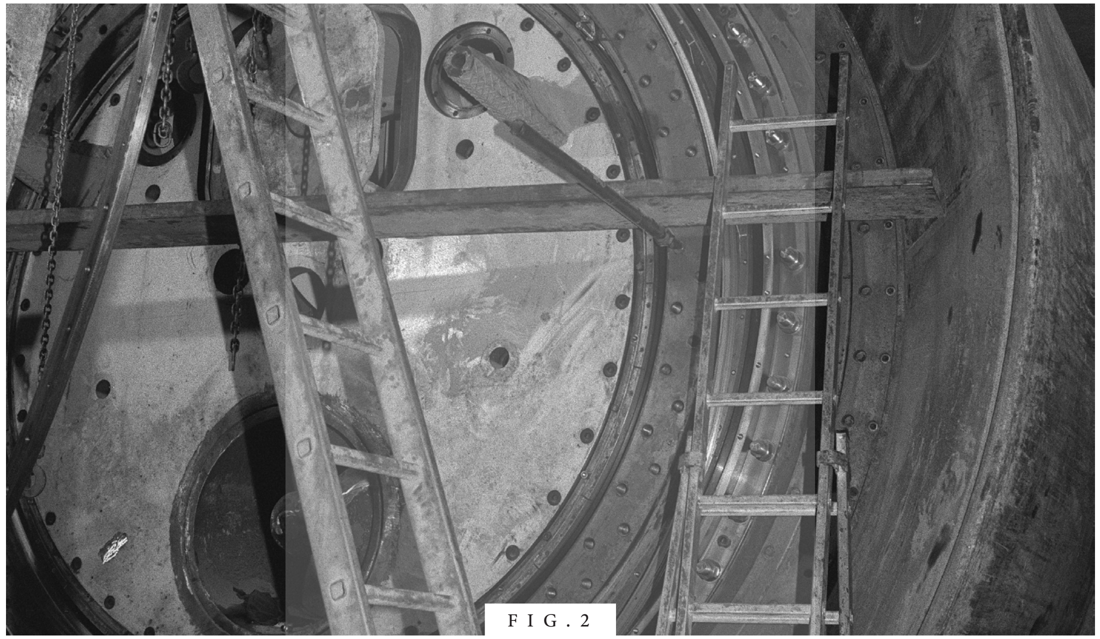
This approach isn‘t unique to the Wolfbach; it reflects a growing trend in many cities to reopen buried streams. By bringing these waterways back to the surface, cities aim to enhance local recreation areas and provide residents with peaceful retreats amidst urban settings. Moreover, these reopened streams contribute significantly to the urban climate, helping to reduce the heat island effect prevalent in many cities. This cooling influence, combined with the added green spaces, offers a habitat for a variety of species, fostering biodiversity. The reintroduction of streams into urban environments, therefore, serves multiple purposes: improving the quality of life for city dwellers, enhancing local ecosystems, and contributing to the overall sustainability of urban areas.

The Glattstollen, the largest single construction project in Zurich, is an impressive example of modern engineering in wastewater management. Spanning 5.3 kilometers and with a diameter of 4.5 meters, this tunnel runs 40 meters underground. It starts at the Glatt sewage treatment plant near Leutschenbach, crosses under the Käferberg, and passes beneath the Limmat River to safely transport wastewater from North Zurich to the Werdhölzli sewage treatment facility.

The importance of this project is reflected not only in its size and technical complexity but also in its environmental impact. By redirecting the wastewater to the more modern Werdhölzli facility, the Glatt River is relieved, significantly improving water quality. This measure makes wastewater treatment more efficient and less expensive, leading to a reduction in sewage fees. From a previous rate of CHF 2.20 per cubic meter of water, the fee was reduced to CHF 2.05, with a similar reduction for stormwater fees.

The construction, which cost a total of CHF 198 million—well below the projected CHF 253 million—was also financed through revenues from telecommunications. The tunnel serves not only for wastewater transport but also houses telecommunications lines. The public had the opportunity to explore this underground giant on an open day, allowing citizens to gain insights into this crucial urban infrastructure. Such a structure highlights Zurich‘s advanced technological and environmental efforts in urban planning and development.

F I G . 1



F I G . 2

F I G . 1
„GLATTSTOLLEN", FIRST OFFICIAL RIDE THROUGH THE MAINTENANCE TUNNEL, ZURICH, 1996

F I G . 2
„GLATTSTOLLEN", TUNNEL BORING MACHINE, ZURICH, 1996

F I G . 3
„GLATTSTOLLEN", TUNNEL INSPECTION BY ARGE, ZURICH, 1996

F I G . 3

Contrary to initial expectations, the journey to understand the stream's origins started in a place as unassuming as a small ditch beside a field. This modest beginning, where water merely trickles or gathers in shallow depressions, marks the nascent stage of the stream. As you continue your walk, the increasing presence of water, enough to begin its downhill journey, becomes evident. The surrounding ground, moist underfoot, signals the lifeblood of the stream beginning to pulse, with varying types of vegetation marking its path, flourishing where water seeps and nourishes.

The transition from one watershed to another is particularly telling. Here, water accumulates into a puddle, hesitating as if contemplating its rightful path down the landscape. This natural boundary, marked by water's indecision, provides a unique lens through which to understand the land's topography. The presence of water and the type of vegetation become natural guides, delineating the contours and slopes of the terrain without the need for maps or tools.


F I G . 1

F I G . 1
FOREST, DREIWIESEN, FEBRUARY 2024

F I G . 2
HUMID SPOTS THROUGH DIP IN TOPOGRAPHY, DREIWIESEN, FEBRUARY 2024

F I G . 3
FIRST SIGN OF RUNOFF, WOLFBACH, DREIWIESEN, FEBRUARY 2024

F I G . 4
FOREST BORDERING AGRICULTURAL FIELD, DREIWIESEN, FEBRUARY 2024


F I G . 2


F I G . 3


F I G . 4

F I G . 1
615 MASL.
UNASSUMING BEGINNINGS

F I G . 1

Beneath the expanse of a public swimming pool area, the waters from a large segment of Adlisberg find their exit through a wall that can only be described as eclectic. This wall, constructed from an assortment of stones and repurposed building materials reminiscent of roads and pathways, serves as a vivid testament to the area‘s historical approach to stream management.

Before the mid-20th century, the responsibility for the upkeep of these watercourses fell to the department of road and infrastructure. This led to a unique situation where the teams tasked with building and repairing roads and sidewalks also took on the maintenance of the area‘s wild streams and small rivers. The result was a distinctly pragmatic approach: the repurposing of old concrete and steel remnants, materials originally intended for urban development, now integral parts of a water management system.

F I G . 1
RE-USE OF CONCRETE AND STONES IN WOLFBACH, UNDERNEATH ICE RINK, ADLISBERG, FEBRUARY 2024

F I G . 2
RE-USE OF CONCRETE AND STONES IN WOLFBACH, UNDERNEATH ICE RINK, ADLISBERG, FEBRUARY 2024

F I G . 3
CONCRETE BASIN TO REDUCE EROSION THROUGH OUTFLOW, UNDERNEATH ICE RINK, ADLISBERG, FEBRUARY 2024

F I G . 2

F I G . 3

Another location where the use of reused materials is evident lies next to Bergstrasse, where the stream must be channeled to pass beneath a busy road. Here, the water is collected in a large basin designed to slow down the stream and mitigate some of its force. The walls of this basin are constructed from old boardwalk stones, giving these perfectly rectangular stones a s

econd life in water control infrastructure. Adjacent to these roadside stones, a few pieces of metal protrude from the water's surface. These form a large filter designed to prevent large trunks or stones from entering the delicate tunnel system. The metals, old reused train tracks, are highly effective in this role, having been originally designed to withstand all types of weathering.

F I G . 1
RE-USED BOARD WALK STONES, BERGSTRASSE, WOLFBACH, MARCH 2024

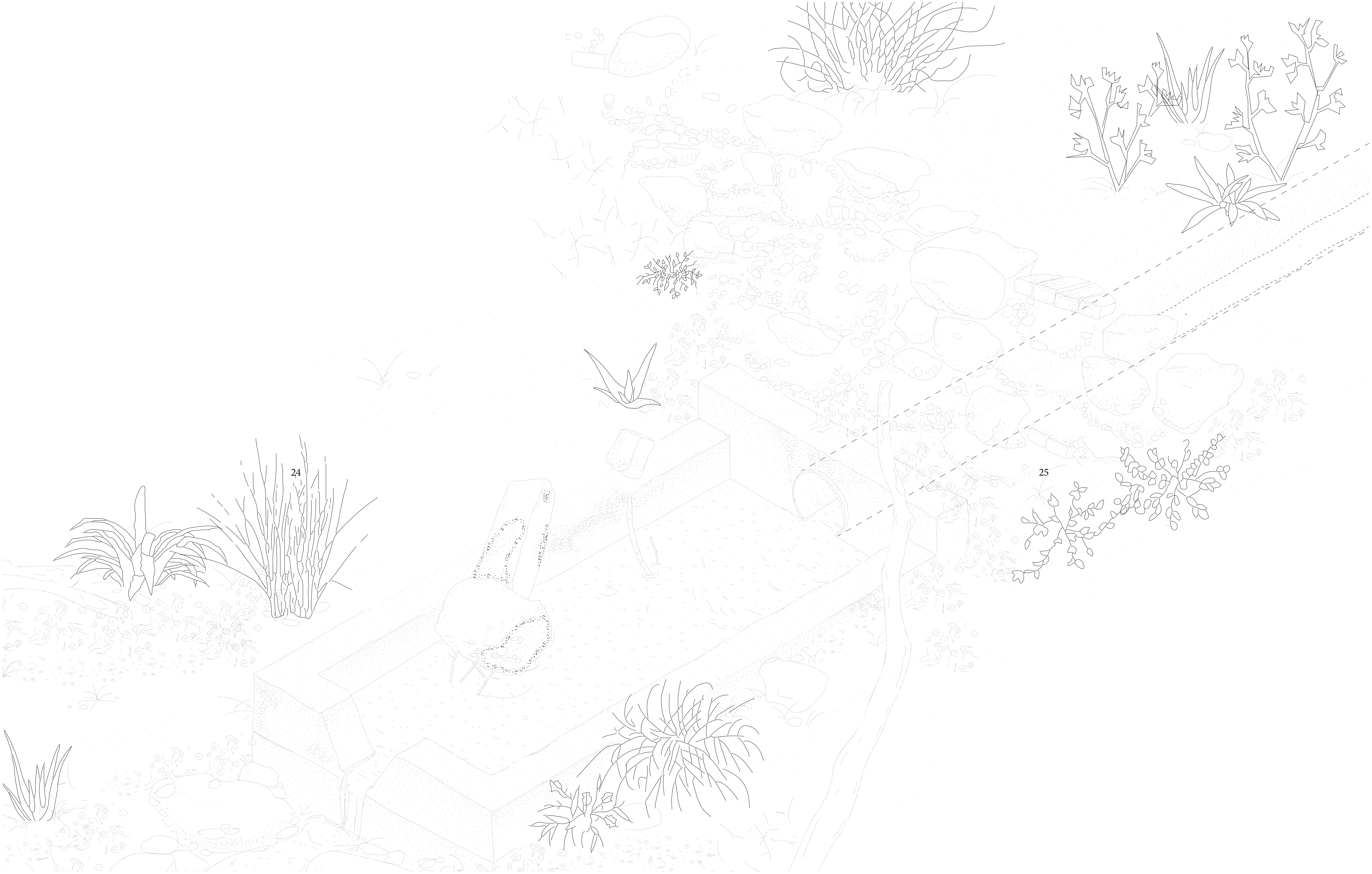
F I G . 2
RE-USED RAILWAY RAILS AS A DEBRIS COLLECTOR, BERGSTRASSE, WOLFBACH, MARCH 2024

F I G . 3
RE-USED BOARD WALK STONES, BERGSTRASSE, WOLFBACH, MARCH 2024

F I G . 1

F I G . 2

F I G . 3



F I G . 1
595 MASL.
PRAGMATIC GUIDANCE

In the heart of the forest, the stream collects water from various smaller tributaries. This increased volume of water not only requires more space but also finds a brief pause when a natural retention basin in the forest floor allows the gathered water to permeate the ground and evaporate into the air. This represents a crucial and regrettably rare instance where the stream processes water naturally. The water not only benefits the nearby flora and fauna, but it also cools the air through evaporation and reduces hazards that animals might encounter in conventional drainage systems.

F I G . 1

F I G . 1
DRAINAGE PIPE, SURFACE WATER FROM NEARBY ROADS FLOWING INTO FOREST RETENTION BASIN, ADLISBERG, FEBRUARY 2024

F I G . 2
HUMUS MOUND CREATING RETENTION BASIN, ADLISBERG, FEBRUARY 2024

F I G . 3
FOREST RETENTION BASIN, MUTLIPLE LEVELS FOR DIFFERNT VOLUMES OF RAIN, ADLISBERG, FEBRUARY 2024

F I G . 2

F I G . 3

F I G . 1
597 MASL.
TIME TO DRAIN

FIG.1

FIG.1
DESIGNED MEANDRING OF WOLFBACH STREAM IN UPPER PART, ADLISBERG, FEBRUARY 2024

FIG.2
MEANDRING OF STREAM AND PATHWAY, ADLISBERG, FEBRUARY 2024

FIG.3
STONE STEPS TO CONTROL AMOUNT OF SVELOCITY AND EROSION, IMPORTED STONES GROM GLARNER ALPS, ADLISBERG, FEBRUARY 2024

FIG.2

The practical reuse of materials, as seen in the structural wall under the Dolder Ice Skating Park, stands in stark contrast to the adjacent steps made from stones imported from the Glarus Alps—a deliberate choice aligned with the canton's plan for renaturation. The use of imported stones, which seems outdated and bizarre, underscores the need for close monitoring of elements that erode over time in the stream. However, sourcing materials from the nearby vicinity could also offer significant benefits. The area marked by these theatrical stones further emphasizes a stylized portrayal of natural streams as we perceive them, even though this might be far removed from their original state.

FIG.3

F I G . 1
505 MASL.
IMPORTED ECOLOGY

F I G . 1

Just before the Wolfbach disappears underground, the stream was reopened in the 1980s, allowing the water to follow a carefully designed path. Its disappearance is closely linked to its proximity to urban areas, posing a more imminent threat; the stream is controlled by being directed into a large drainage system. This system is engineered to channel the water southward, merging it with water flowing down from the Klusbach. In the event of heavy rain and potential flooding, the water carried by the Wolfbach can be automatically redirected into a normally dry, large-dimensioned drainage pipe to protect the surrounding houses.

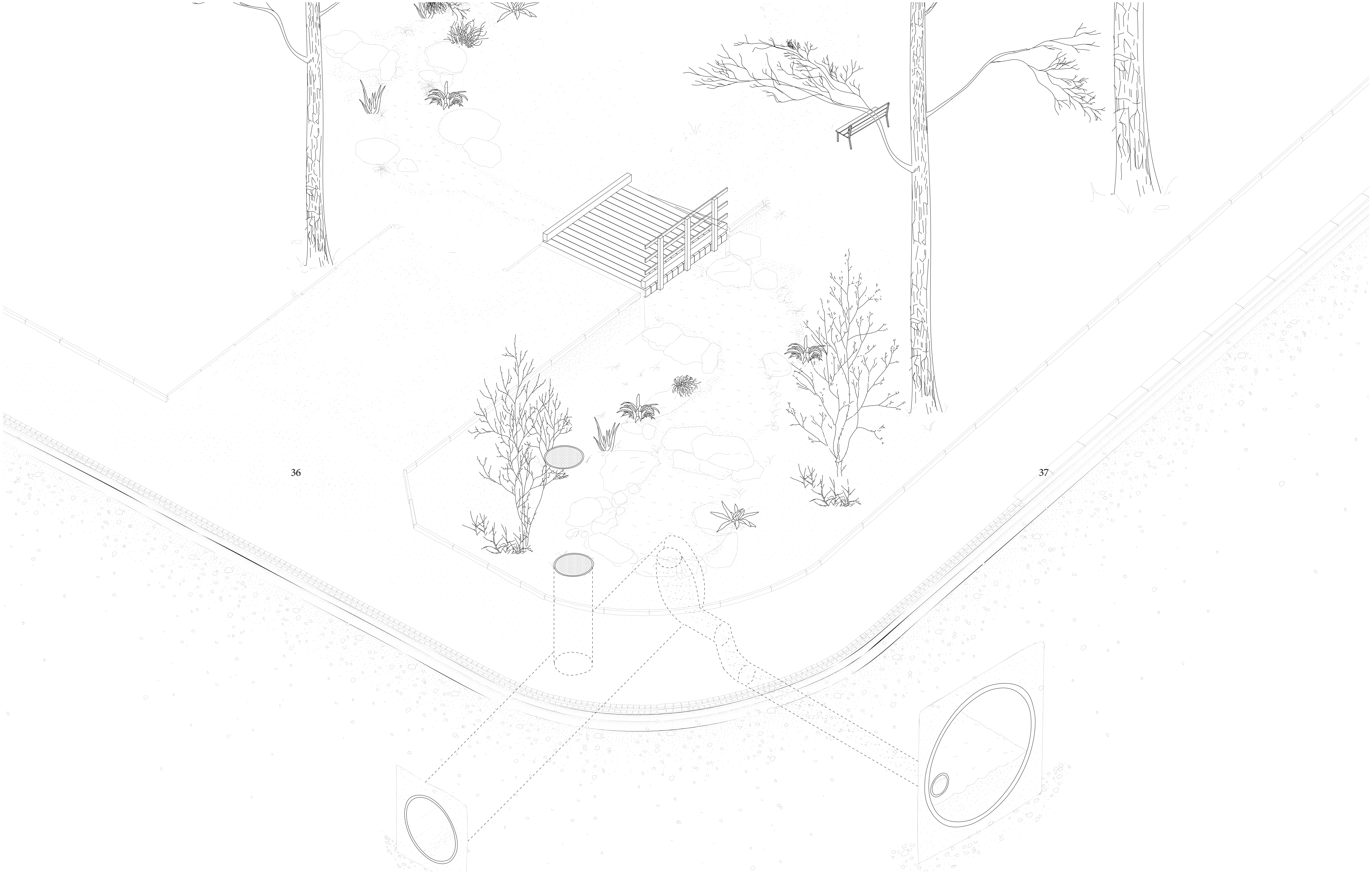
F I G . 2

F I G . 1
RE-SURFACED STREAM NEAR BUNGERTWIES, FEBRUARY 2024

F I G . 2
ARCHIVE PLAN OF LANDSCAPE PROJECT WOLFBACH, 1912

F I G . 3
DEBRIS COLLECTOR AND STREAM DETAIL, BUNGERTWIES, FEBRUARY 2024

F I G . 3



F I G . 1
460 MASL.
PROTECTED DESIGN

F I G . 1

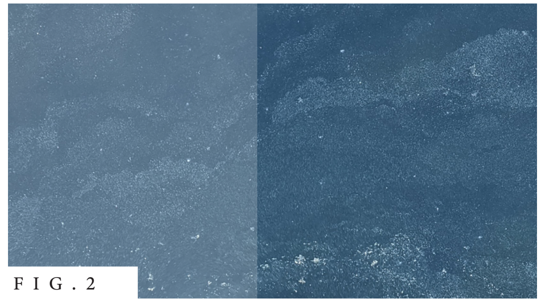
The end of the stream is as unassuming as its beginnings; the pipe simply terminates at the lake near Utoquia without any drama. Only when you step over the ledge and look down do you see a large hole gaping in the wall, hinting at more turbulent times. The water joins the lake, which serves as a catchment area for a multitude of rivers and streams around the canton of Zurich, forming the backbone of almost all our drinking water system.

F I G . 1
WATER OF LAKE ZURICH, FEBRUARY 2024

F I G . 2
WATER OF LAKE ZURICH, APRIL 2024

F I G . 3
WATER OF LAKE ZURICH, APRIL 2024

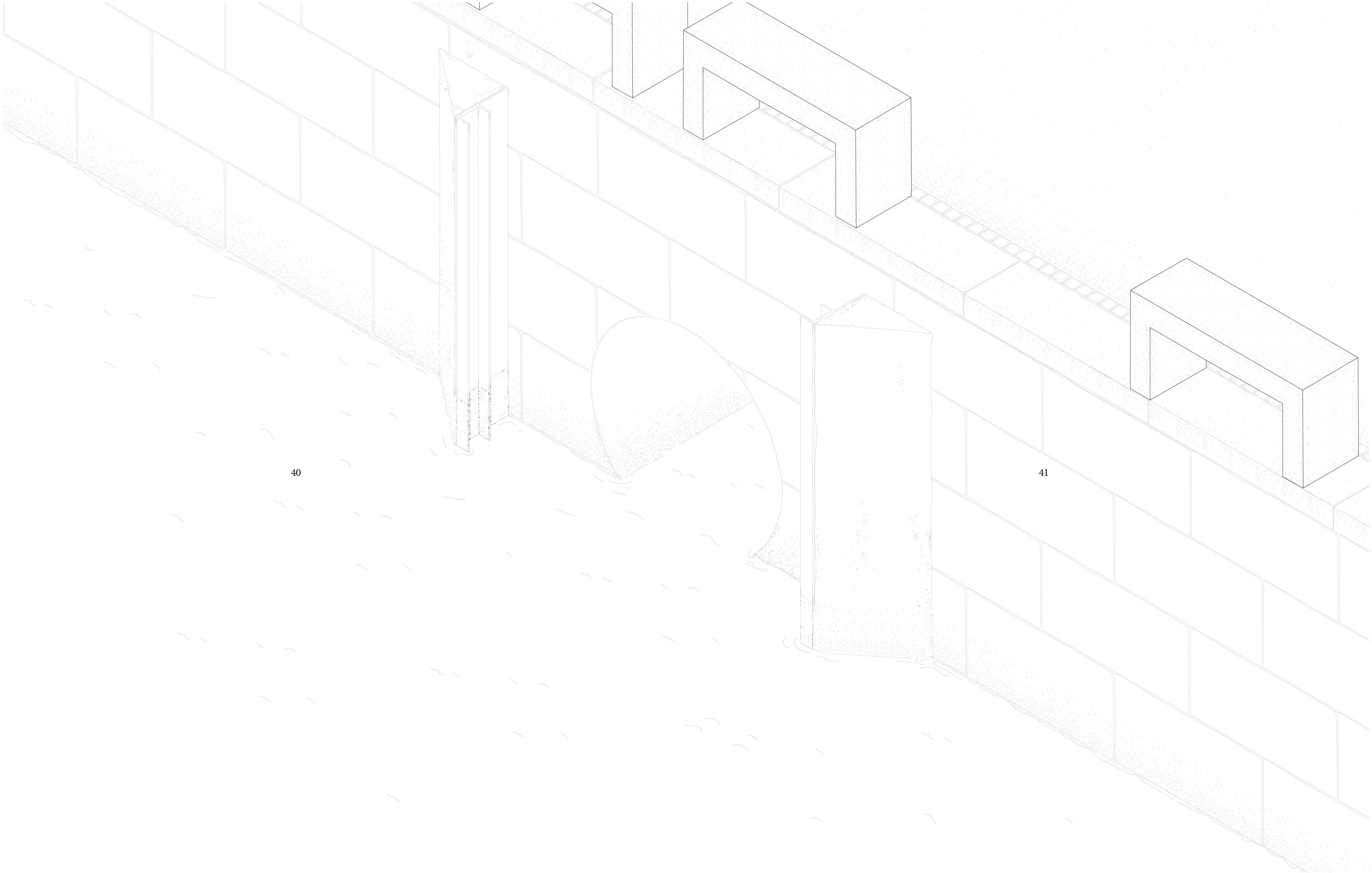
F I G . 4
„KREUZSTRASSE“ UNDER WHICH THE WOLFBACH IS BEING DRAINED THROUGH THE CANALISATION PIPES OF ZURICH, FEBRUARY 2024



F I G . 2

F I G . 3

F I G . 4



F I G . 1
405 MASL.
MERGING WATERS

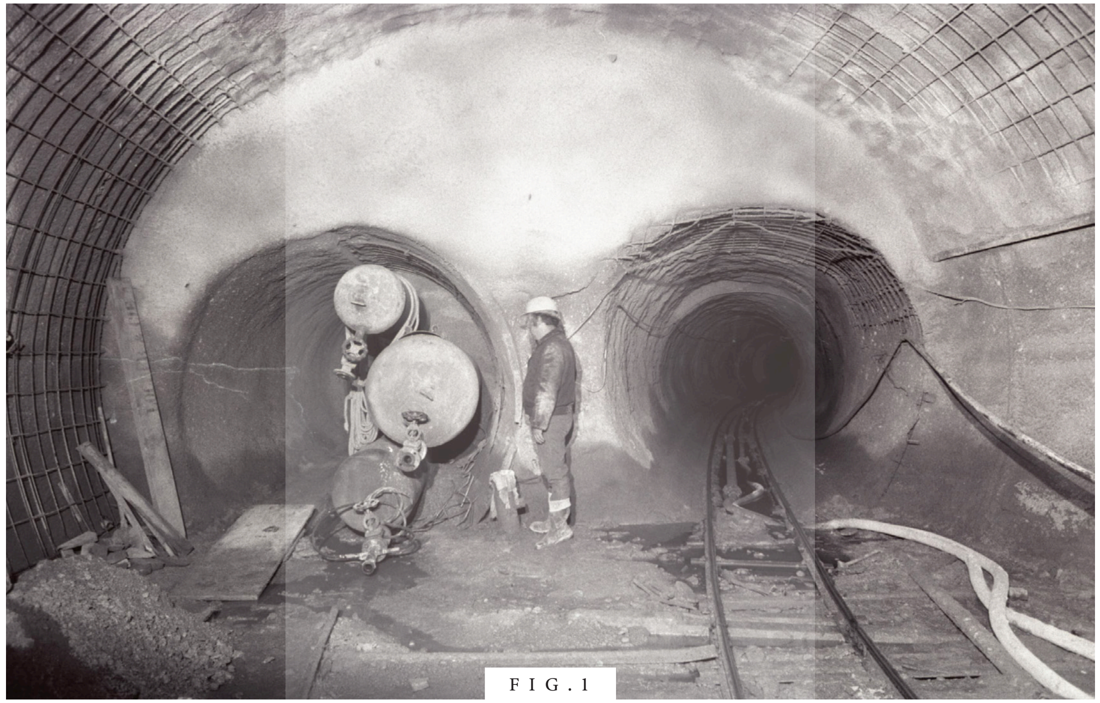
B

rief

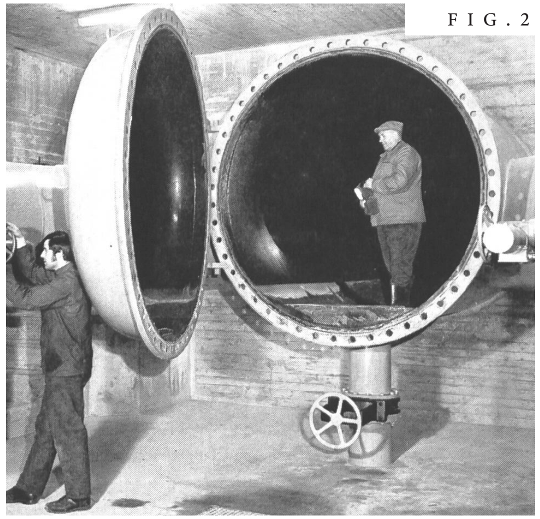
In 1973, an article was published in a scientific magazine for engineering that discussed the impending implementation of an extensive freshwater pipeline system called the „Ringleitung". This project was considered state-of-the-art, involving substantial costs and expertise. For sizing the system, projections were based on the expected water usage of the people living in Zurich, anticipating consumption to increase in line with trends from previous decades. This resulted in estimates of up to 1,000 liters of fresh water per person. However, in reality, the city's actual usage is only 285 liters per day per person, a difference attributable to several factors. Water-using appliances have become significantly more efficient, certain freshwater cooling methods have become obsolete, and there has been a shift in industry away from the city—an important factor in water usage. The last major industry was ‚Toni', known for milk and other dairy products. Ultimately, a change in mentality has also contributed to reduced consumption; people are now far more conscious of this vital resource than they were 50 years ago.

F I G . 1
DRINKING WATER TUNNNEL, „HARDHOF-STRICKHOF", ZURICH 1974

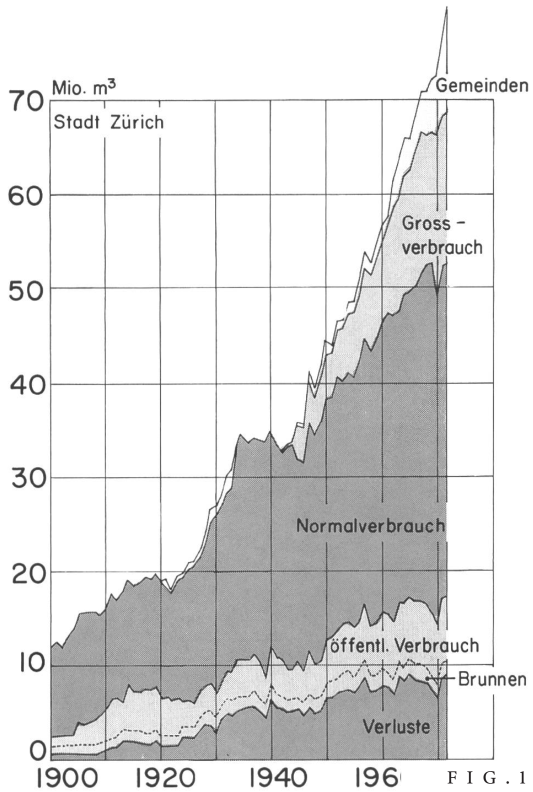
F I G . 2
ENTRANCE TO THE „ZURICHBERGSTOLLEN", ZURICH, 1973



F I G . 1



F I G . 2



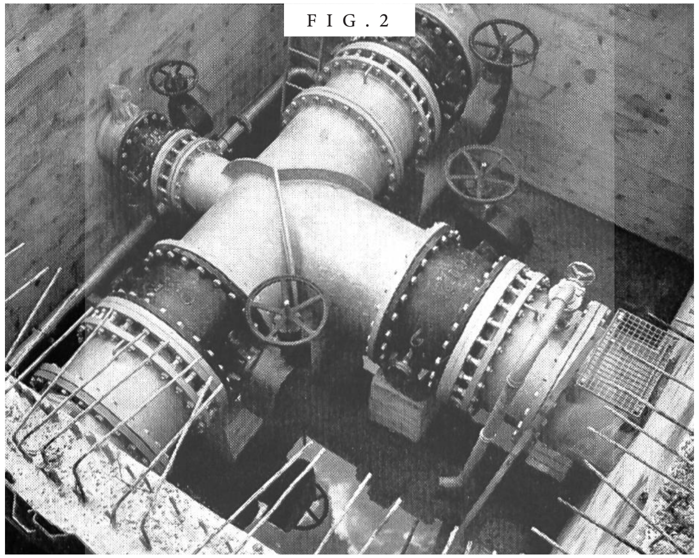
F I G . 1

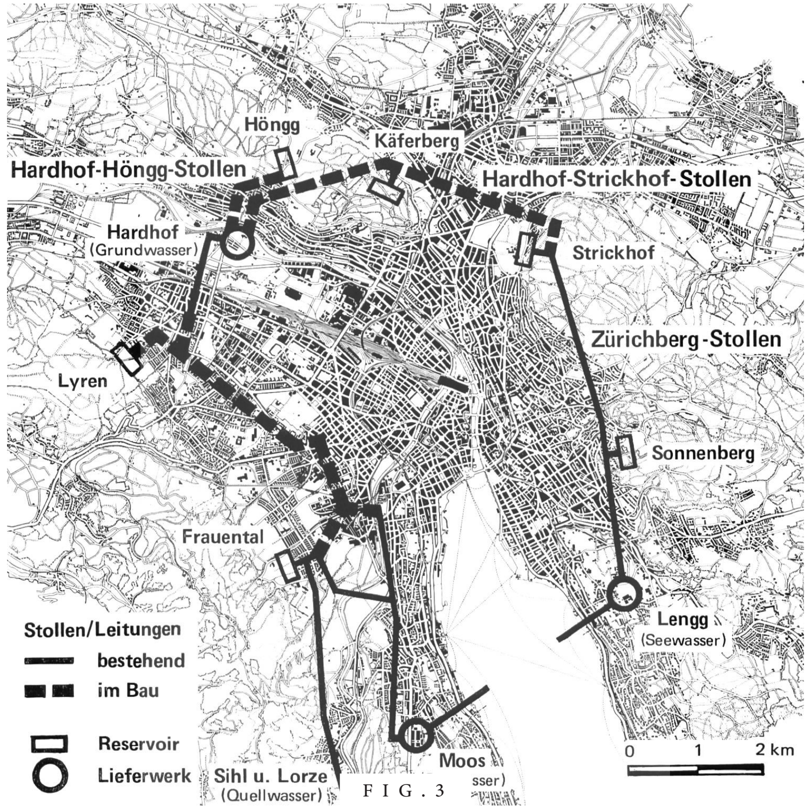
Daily water usage of a person living in Zurich in 1970.
650 liters

Daily water usage of a person living in Zurich in 2020. [expected amount in 1970]
1000 litres

Daily water usage of a person living in Zurich in 2023. [actual amount]
265 litres

F I G . 2





F I G . 3

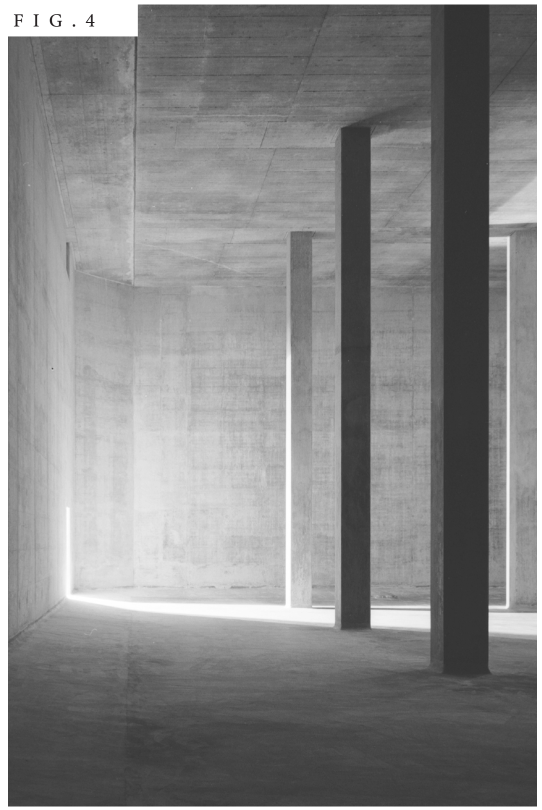
F I G . 1
ANNUAL WATER USAGE, ZURICH, 1973

F I G . 2
WATER PIPE INTERSECTION, RESERVOIR LYREN, ZURICH, 1973

F I G . 3
OVERVIEW OF THE MOST IMPORTANT WATER TREATMENT FACILITIES AND INFRASTRUCTURE NETWORKS, ZURICH, 1973

F I G . 4
RESERVOIR LYREN, BY TALOS DOMINIC, ZURICH, 2021

F I G . 4



The meteoric water from the high-rise buildings flows via facade gutters onto the base buildings, where it is retained and irrigates the roof gardens. The overflows spew the water into the garden area, where it runs into the water basin via concrete and steel gutters. Thanks to evaporation and infiltration, the sewage system can be relieved to the maximum. The differentiated formulation of the banks of the water basin (generous steps, inclined plane and planting) create a high utility and ecological value.

F I G . 3

F I G . 1
PRIMARY IRRIGATION/DRAINAGE WAY. AFTER THE ROOFS COLLECTED THE RAINWATER, THE ARTIFITIAL DRAINAGE PIPES GUIDE THE WATER TO THE CENTRAL POND, CREATING AN EVER CHANGING WATER LANDSCAPE.

F I G . 2
CENTRAL WATER BASIN, FILLED WITH WATER AFTER HEAVY RAINS, TRANSFORMING THE LANDSCAPE.

F I G . 3
SECONDARY IRRIGATION/DRAINAGE WAY.

F I G . 2

F I G . 1

F I G . 1

F I G . 2

F I G . 3

F I G . 4

F I G . 1
MOORLAND LANDSCAPE, UNTERSEE, PFÄFFIKON, ZH, MARCH 2024

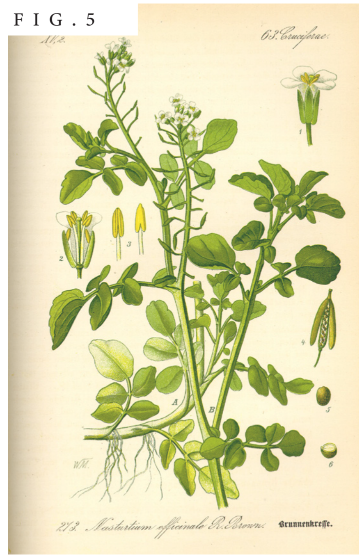
F I G . 2
NATURAL DRAINAGE AND IRRIGATION SYSTEM OF MOORLAND LANDSCAPE, UNTERSEE, PFÄFFIKON, ZH, MARCH 2024

F I G . 3
MOORLAND LANDSCAPE, UNTERSEE, PFÄFFIKON, ZH, MARCH 2024

F I G . 4
RETENTION BASIN ALONG THE MILLIONENBACH, USTER, ZH, MARCH 2024

F I G . 5
WATERCRESS, NASTURTIUM OFFICINALEV
GFDL BY KURT STUEBER

F I G . 5



F I G . 1

F I G . 1

F I G . 3

F I G . 4

F I G . 1
WATER RETENTION BASIN, CHÄMPTERNBACH, ZH, MARCH 2024

F I G . 2
WATER RETENTION BASIN, CHÄMPTERNBACH, ZH, MARCH 2024

F I G . 3
MARSH-MARIGOLD, CALTHA PALUSTRIS
GFDL BY KURT STUEBER

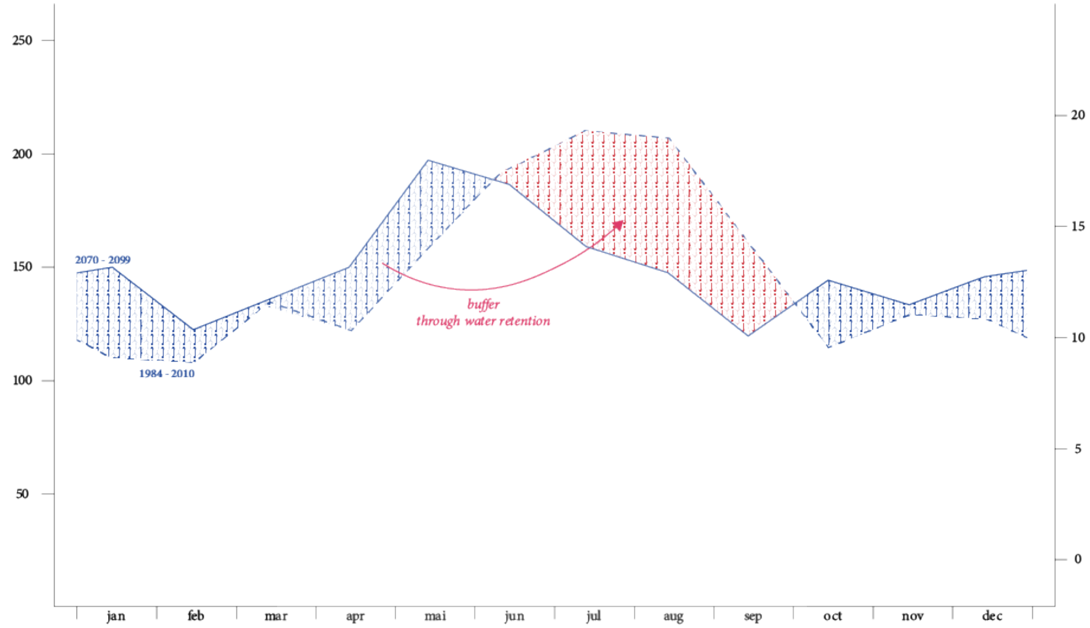
F I G . 4
FARHENBÜHLWEIHER, BÄRETSWIL, ZH, MARCH 2024
PREVIOUSLYPART OF WATER BASED ENERGY SYSTEM IN THE AREA, TODAY PROTECTED BECAUSE OF ITS INFRASTRCUTURAL HISTORY AND ITS CURRENT IMPORTANCE AS A NATRUAL PROTECTION ZONE AND BREEDING GORUND FOR SMALL REPTILES.

F I G . 5
FARHENBÜHLWEIHER, BÄRETSWIL, ZH, MARCH 2024

F I G . 5

F I G . 1 F I G . 2

F I G . 3



F I G . 4

F I G . 1
SMALL SCALE WATER DRAINAGE SOLUTION, DOLDER WALDHAUS, MARCH 2024

F I G . 2
DRAINAGE PIPES AT THEIR MAXIMUM CAPACITY, PARKING, WALDHAUS, MARCH 2024

F I G . 3
KLOSBACH ALONG THE DOLDERBAHN TRACKS, MARCH 2024

F I G . 4
GRPAHIC, MEDIAN RAINFALL SWITZERLAND, REFERENCE AND PROGNOSED AMOUNT, METEO SCHWEIZ, C HADES

Under the 2011 Water Protection Act (‚Gewässerschutzgesetz 2011'), Swiss cantons are mandated to renaturize their public waters. This effort aims to enhance urban cooling effects and improve the quality of life for residents by creating more sustainable and natural water environments in urban settings.
It's important to note that almost 50% of all water-related damages in these areas can be attributed to surface water floods. These flooding events underscore the need for improved management of water systems to mitigate risks and enhance resilience against such occurrences.
Furthermore, as the climate warms, the atmosphere's capacity to hold water increases by approximately 7% for every degree Celsius in temperature rise. This phenomenon is expected to lead to more frequent and intense rainfall events in the future, exacerbating the potential for flooding and other water-induced challenges.
Additionally, the ongoing melting of snow and ice due to rising global temperatures means that precipitation that once fell as snow will increasingly occur as rain. It is projected that over the next fifty years, the proportion of precipitation falling as rain could increase significantly, from 54% to 74%. This shift has significant implications for water management strategies, particularly in terms of flood risk and water storage capabilities.

Spring water in Switzerland varies greatly in quality. There is spring water of very high quality that can be used directly as drinking water without any treatment, and there are also springs whose water must be treated to achieve drinking water quality. If the raw water needs to be treated due to its characteristics, slow sand filters can be used. Similar to natural processes, the spring water flows slowly through the sand layer. The slow filters essentially represent an additional passage through the ground.

In the ‚Quellwasserfilter Dolder‘ 130‘000 litres of water can be held, therfoe makeing it also valuable in case of emergencies where water can be stored inside of the volume. The water is being filtered through 200 cubic meters of sand before it flows into the fountain network of Zurich.

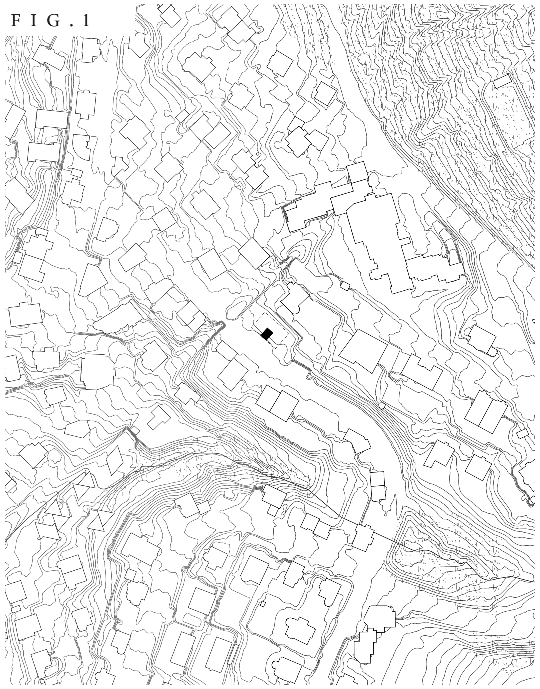
F I G . 1
MAP OF ‚QUELLWASSERFILTER DOLDER'
BUILT IN 1907 THE FILTER IS STILL PART OF THE WATER INFRASTRUCTURE OF ZURICH, CLEANING WATER COLLECTED FROM MULTIPLE SOURCES ACROSS THE ADLISBERG.

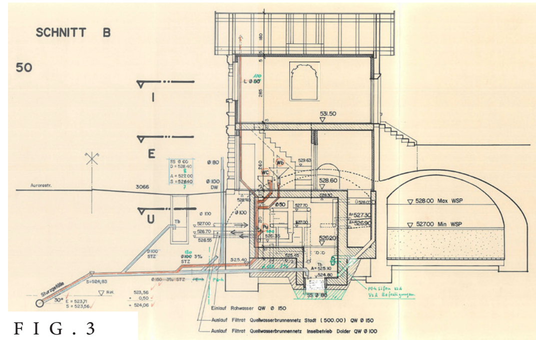
F I G . 2
INTERIOR IMAGE, QUELLWASSERFILTER

F I G . 3
SECTION B. QUELLWASSERFILTER UMBAU, PLAN OF A REFURBISHMENT IN 1986, DONE BY THE TIEFBAUAMT ZURICH.

F I G . 4
SECTION A. QUELLWASSERFILTER UMBAU, PLAN OF A REFURBISHMENT IN 1986, DONE BY THE TIEFBAUAMT ZURICH.

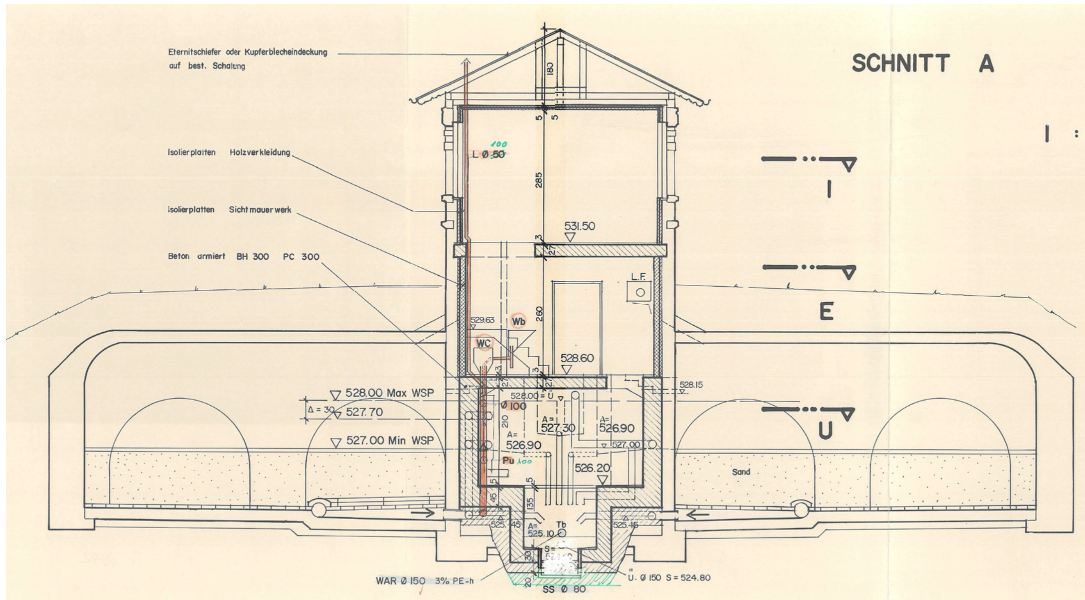
F I G . 1



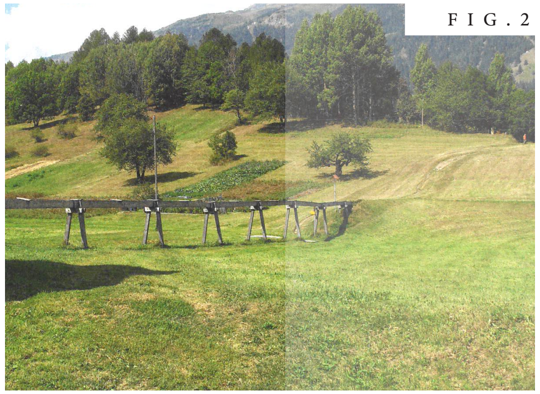


F I G . 2 F I G . 3

F I G . 4

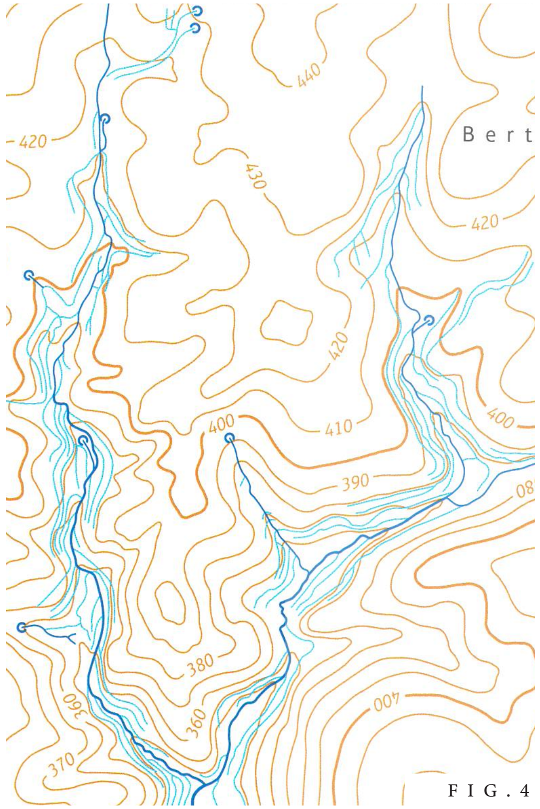


F I G . 1



F I G . 2

F I G . 3



F I G . 4

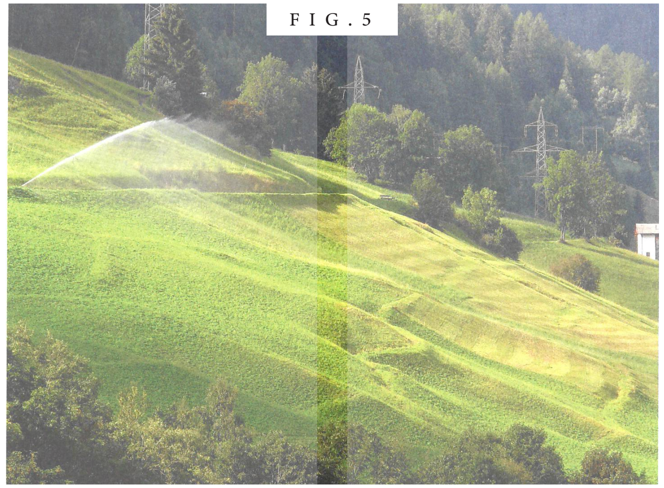
F I G . 1
MARCITA-WÄSSERWIESEN, SWITZERLAND, 2009

F I G . 2
WOODEN AQUEDUCT, ERNEN, 2011

F I G . 3
CANAL-BED, RU DE GATTINÉRIE

F I G . 4
DRAINAGE SYSTEM IN BOTH DIRECTIONS, BETRIX, ARDENNE

F I G . 5
RELICTS OF OLD DRAINAGE SYSTEM, ERNEN, 2001



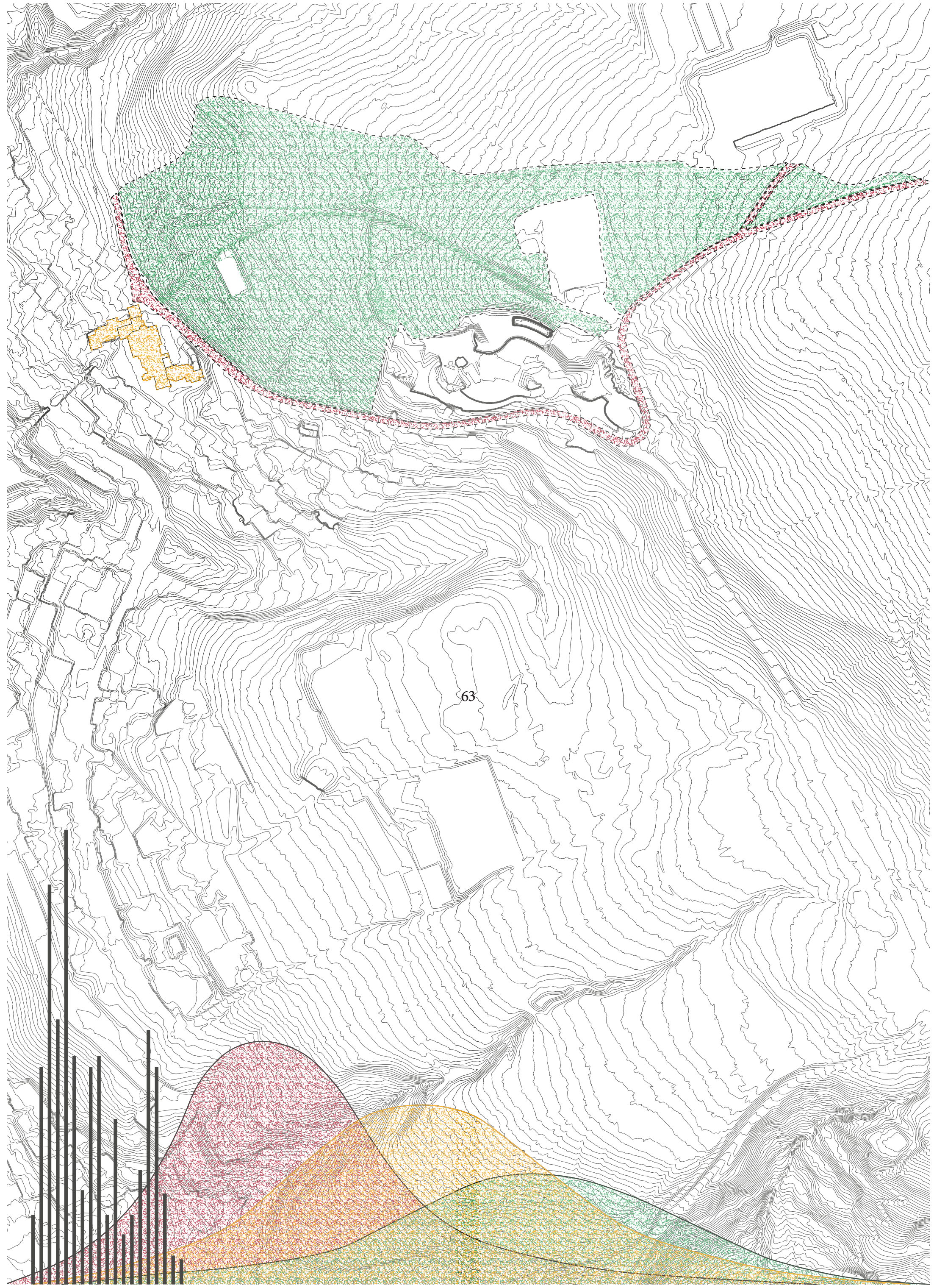
F I G . 5

C onclusion

After heavy rainfall, the way water is discharged from different surfaces varies significantly, reflecting the distinct characteristics of each surface. For example, water runoff from roads and other paved surfaces is typically much faster and more direct. This is because these surfaces are impervious and designed to channel water away quickly to prevent pooling and potential hazards.

In contrast, water from forest floors, grasslands, or other permeable surfaces with a greater capacity to absorb water is discharged more slowly. These natural surfaces act like sponges, absorbing and retaining water, which is then gradually released into the environment. This slow release helps to stabilize stream flows and reduce the peak flow of water during storm events, which can mitigate the impact of floods.

The difference in discharge rates can have significant implications for urban planning and flood management. By integrating more permeable surfaces and green infrastructure into city landscapes, municipalities can enhance their capacity to manage stormwater more effectively, reducing the risk of flooding and supporting healthier urban water cycles.



F I G . 1
HEAVY RAIN EVENT - LATENED DISCHARGE OF ROAD, FOLLOWED BY ROOF, FOLLOWED BY FOREST

F I G . 1

F I G . 2

F I G . 1
ASPHALT BREAKING UP IN FRONT OF THE WALDHAUS, APRIL 2024

F I G . 2
SLIP RESISTANT METAL ON ROOF OF WALDHAUS, APRIL 2024

F I G . 3
METAL FINISH, ROOF LEDGE, WALDHAUS, APRIL 2024.

F I G . 4
BROKEN DRAINAGE, WALDHAUS, APRIL 2024

F I G . 5
ASPHALT BREAKING UP IN FRONT OF THE WALDHAUS, APRIL 2024

F I G . 4 F I G . 5

F I G . 6

F I G . 1

F I G . 2

F I G . 3

F I G . 4

F I G . 1
ROOF DRAINAGE, WALDHAUS, APRIL 2024

F I G . 2
GARDEN, WALDHAUS, APRIL 2024

F I G . 3
PATHWAYS OUT OF STONES IN GARDEN, WALDHAUS, APRIL 2024

F I G . 4
GARDEN, WALDHAUS, APRIL 2024

F I G . 5
GARDEN, WALDHAUS, APRIL 2024

F I G . 5

FIG.1

FIG.2

FIG.1
PEBBLES AND HUMMUS ON ROOF, WALDHAUS, APRIL 2024

FIG.2
VERANDE DRAINAGE, WALDHAUS, APRIL 2024

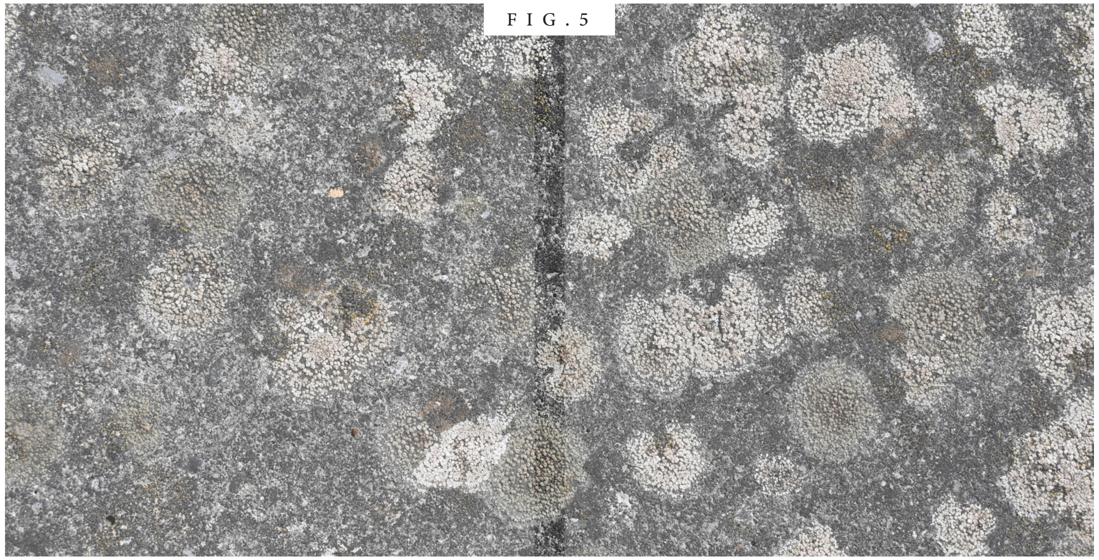
FIG.3
VERANDA DRAINAGE, WALDHAUS, APRIL 2024

FIG.4
ROOF DRAINAGE, WALDHAUS, APRIL 2024

FIG.5
MOSS GROWTH ON STONE SLAB, WALDHAUS, APRIL 2024

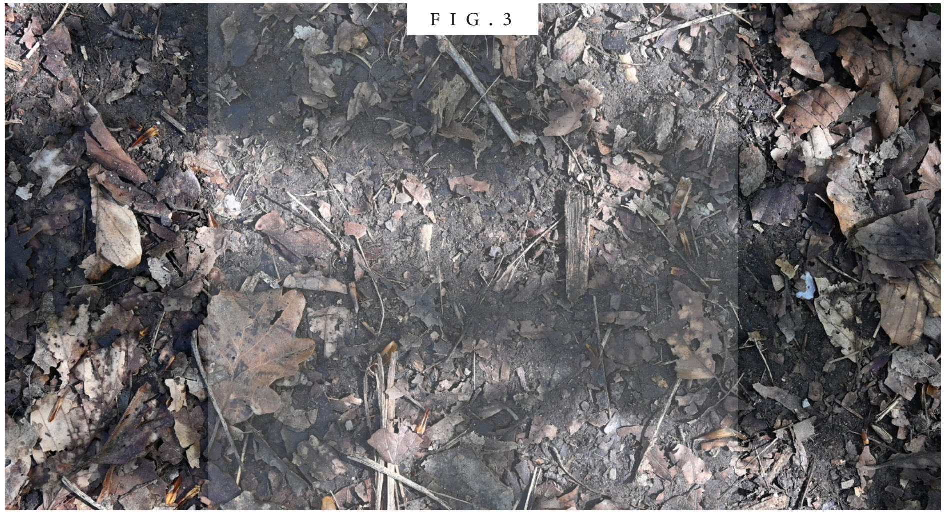
FIG.3 FIG.4

FIG.5



F I G . 1   F I G . 2

F I G . 3



F I G . 4

F I G . 1
GRASS, FOREST GROUND TEXTURE, ADLISBERG, APRIL 2024

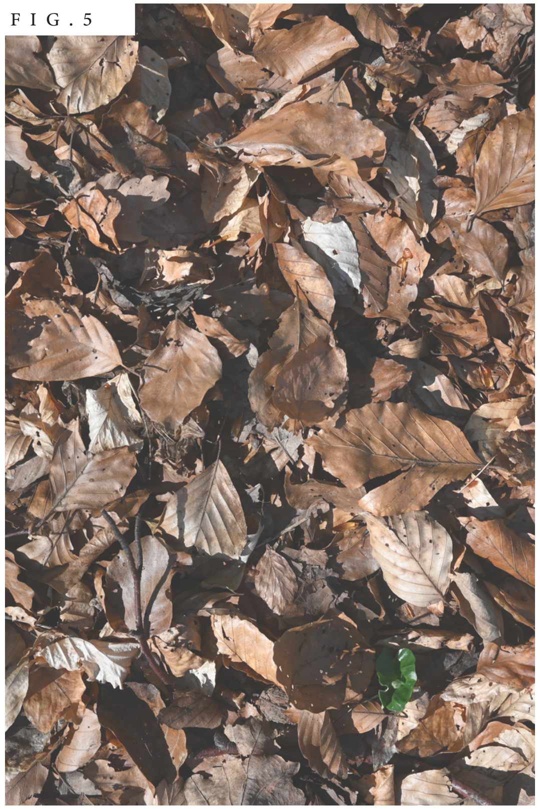
F I G . 2
MOSS, FOREST GROUND TEXTURE, ADLISBERG, APRIL 2024

F I G . 3
DIRT, FOREST GROUND TEXTURE, ADLISBERG, APRIL 2024

F I G . 4
DOLDERBAHN TRACKS, ADLISBERG, APRIL 2024

F I G . 5
DRY LEAFS, FOREST GROUND TEXTURE, ADLISBERG, APRIL 2024

F I G . 5



F I G . 1

F I G . 2

F I G . 1
PLANTS BREAKING THROUGH, ROAD TEXTURE, ADLISBERG, APRIL 2024

F I G . 2
COBBLESTONES AND ASPHALT, ROAD TEXTURE, ADLISBERG, APRIL 2024

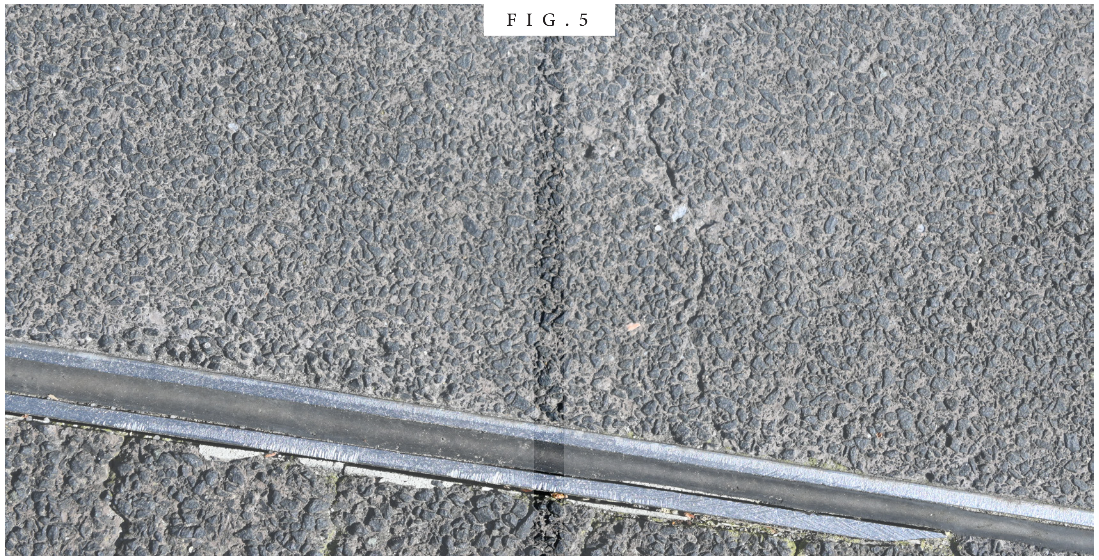
F I G . 3
ASPHALT, ROAD TEXTURE, ADLISBERG, APRIL 2024

F I G . 4
COBBLESTONES AND ASPHALT, ROAD TEXTURE, ADLISBERG, APRIL 2024

F I G . 5
DENSE ASPHALT, ROAD TEXTURE, DOLDER GRANDE, APRIL 2024

F I G . 3 F I G . 4

F I G . 5



During the ongoing construction of the new „Areal Depot Hard“ and the extensive refurbishment of the adjacent tram station, a slender strip of asphalt is meticulously protected by robust construction site barriers. These barriers are crucial for ensuring that pedestrians do not accidentally fall into the nearby Limmat River. Additionally, the barriers create a protected enclave that is isolated from routine maintenance activities. This isolation provides a favorable environment for moss to thrive along the edges, which in turn supports the growth of larger plants, contributing to a mini ecosystem within the urban landscape.

Furthermore, the boundary established by the construction site serves a dual purpose. It not only safeguards people by preventing direct access to the hazardous edges of the Limmat but also shields the emerging greenery from our conventional expectations of cleanliness and the often intrusive nature of urban maintenance practices. This unique setup allows for a natural progression of plant life, which adds a touch of unexpected nature to the construction site, enhancing the ecological diversity of the area.

FIG. 1
PLANTS GROWING THROUGH HOLE IN ASPHALT, CONSTRUCTION SITE, HARDSTRASSE, ZURICH, APRIL 2024

FIG. 2
PLANTS GROWING THROUGH CRACK IN ASPHALT, CONSTRUCTION SITE, HARDSTRASSE, ZURICH, APRIL 2024

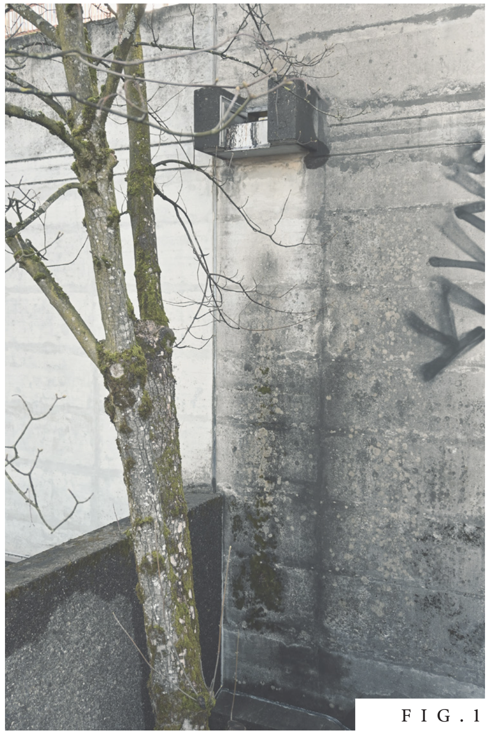
FIG. 3
PLANTS GROWING THROUGH CRACK IN ASPHALT, CONSTRUCTION SITE, HARDSTRASSE, ZURICH, APRIL 2024

FIG. 4
MOSS PROVIDING WITH THE NECESSARY GROUND AND NUTRIANTS FOR PLANT GROWTH, PLANTS GROWTH PROTECTED BY CONSTRUCTION SITE, HARDSTRASSE, ZURICH, APRIL 2024

FIG. 1

FIG. 2 FIG. 3

FIG. 4



F I G . 1

F I G . 2

F I G . 3

F I G . 4

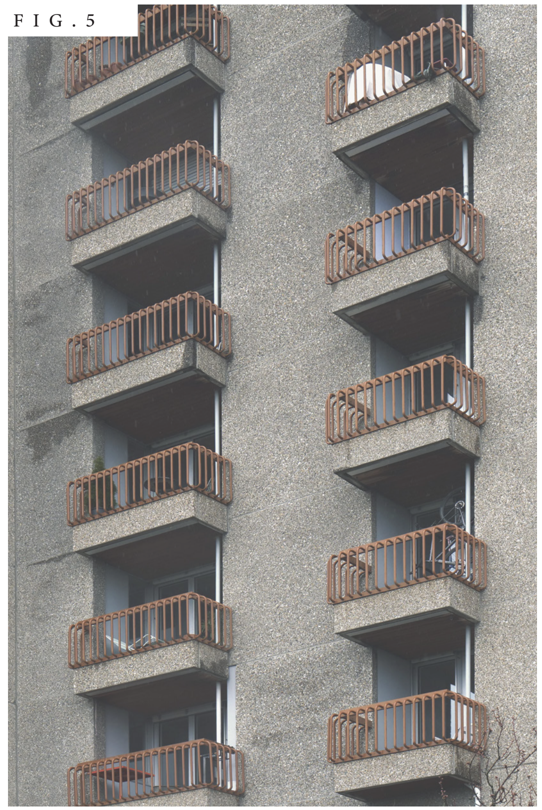
F I G . 1
DRAINAGE DETAILS, DOLDERBAHN, WALDHAUS, MARCH 2024

F I G . 2
MAINTENANCE AREA DRAINAGE DETAILS, DOLDERBAHN, WALDHAUS, MARCH 2024

F I G . 3
ROOF DRAINAGE DETAILS, DOLDERBAHN, WALDHAUS, MARCH 2024

F I G . 4
NORTH STAIRCASE, WALDHAUS, MARCH 2024

F I G . 5
FACADE BY RAIN, WALDHAUS, MARCH 2024



F I G . 5

FIG.1

78

FIG.2

FIG.1 - 3

DRAINAGE DETAILS, SOUTH WEST VERANDA, WALDHAUS, MARCH 2024

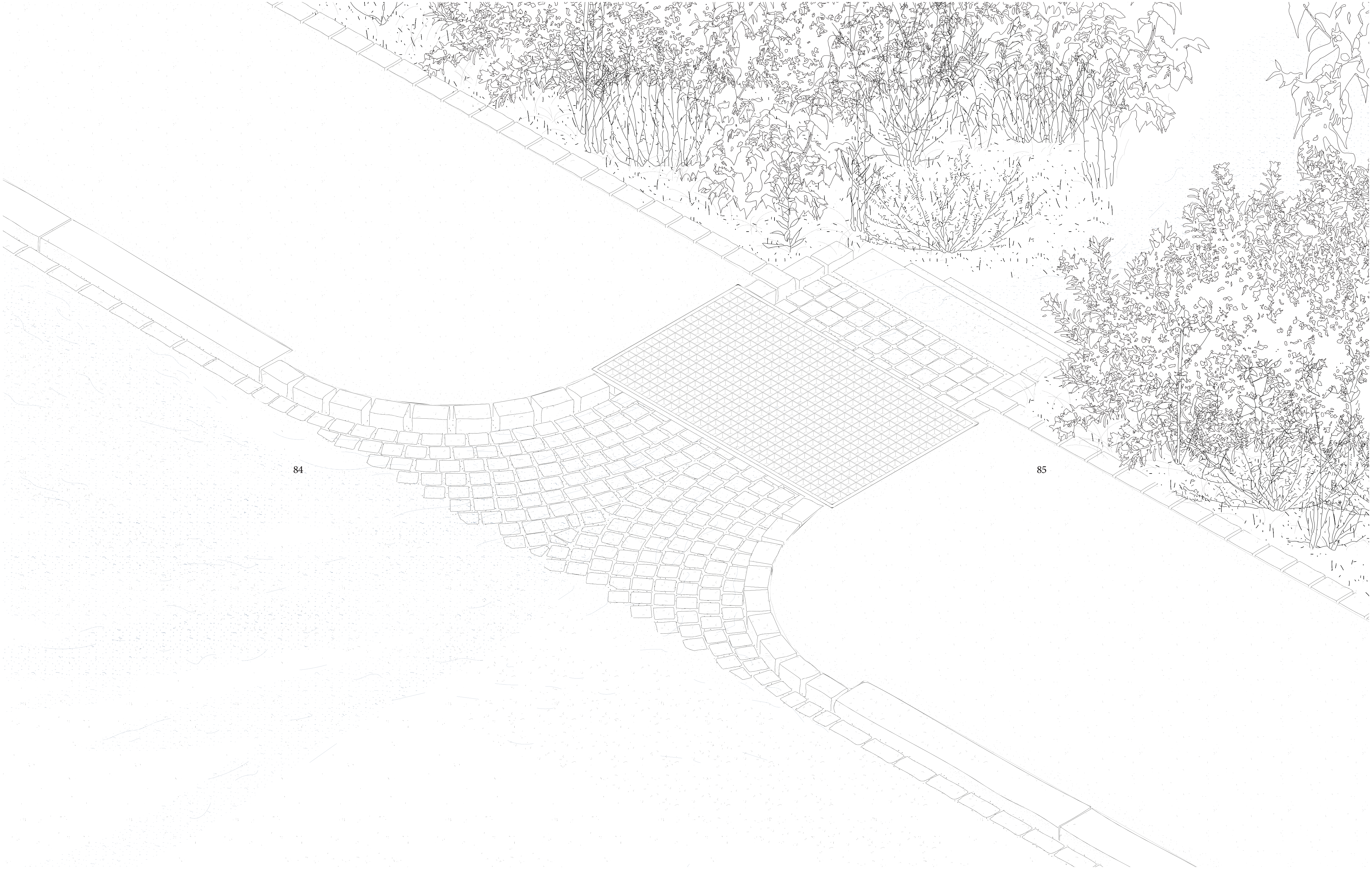
FIG.2

FIG.1 - 3

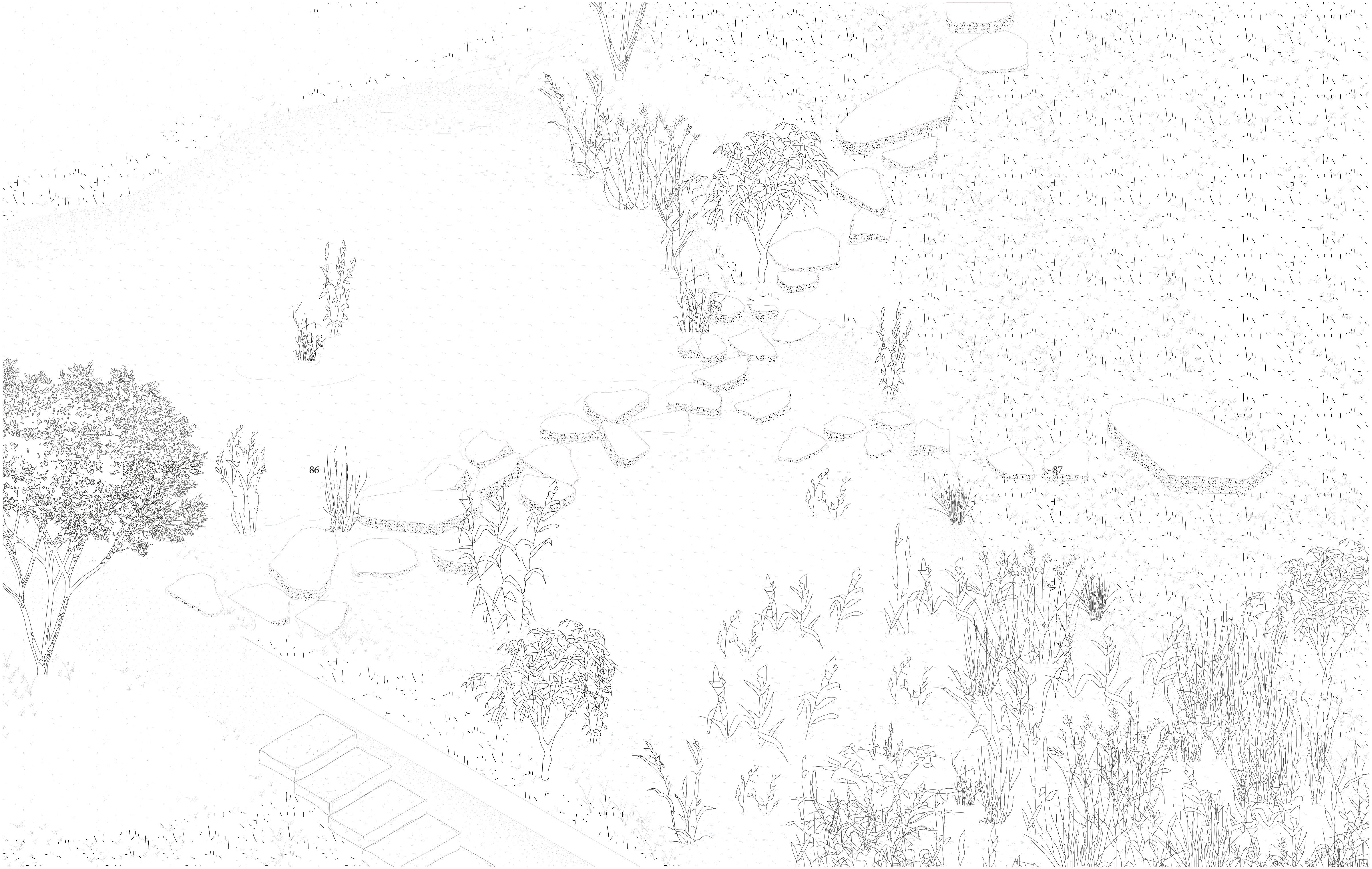
DEMONSTRATING THE PERMEABILITY AND THE ACT OF PLANTS TAKING BACK SPACE, PLANTING A SMALL LOCAL PLANT IN A ERODING CONRETE, BY C. TRUEB, APRIL 2024

FIG.3

F I G . 1
PLANTING
PERMEBALE CONCRETE IN THE NORTH SIDE OF THE WALDHAUS SITE



F I G . 1
ENTRANCE
WHERE WATER ENTERS THE SITE



F I G . 1
WATER RETENTION BASIN

VEGETATION

Populus alba L. - Silber Pappel
moisture conditions F4+
light condititions L4
not endangered but mostly planted
up to 35m

Salix alba L. - Silber Weide
moisture conditions F4+
light condititions L3
not endangered
up to 20m

Drypteris carthusiana - D. Wurmfang
moisture conditions F3+
light condititions L2
not endangered but mostly planted
.1-1m

Festuca gigantea - Riesen-Schwingel
moisture conditions F4+
light condititions L2
not endangered
.6-1.5m

Hunulus Lupulus L. - Hopfen
moisture conditions F4+
light condititions L3
not endangered
2.5-6m





Riperian Forest
always wet

Thalctrum l. L. - hohe Wiesenraute
moisture conditions F4
light condititions L3
endangered in Switezrland
2m

Hypercium - Johanniskraut
moisture conditions F3+
light condititions L3
not endangered
.5-1m

Galium Rubioides - Krap. Labkraut
moisture conditions F3+
light condititions L3
not endangered
.5-1m

Geranium p. L. - Sumpfstorchschnabel
moisture conditions F4+
light condititions L3
potentially endangered
0.3-0.8m

Agrostis gigantea Roth - Riesenstrauss
moisture conditions F3+
light condititions L3
not endangered
0.4-1.5m



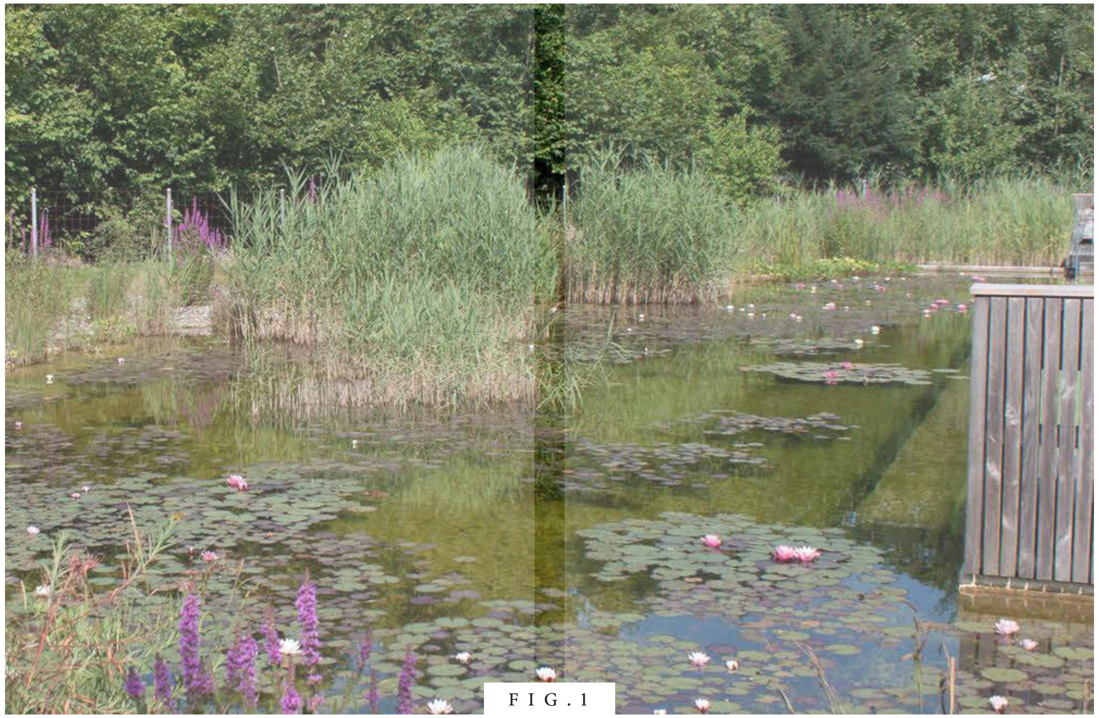


tall herbaceous vegetation
always humid

Orchis Morio L. - kl. Knabenkraut
moisture conditions F2
light condititions L4
endangered
.1-.3m

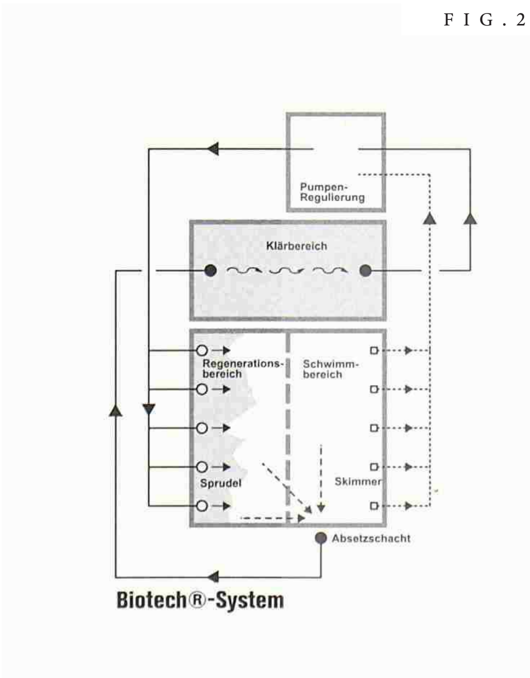
Centaurea jacea Gremli
moisture conditions -
light condititions -
not endangered
1m


wet meadow
sequentially wet and dry



F I G . 1

F I G . 2



F I G . 1
IMAGE OF BIO SWIMMINGPOOL, BIBERSTEIN, SWITZERLAND

F I G . 2
SCEMATIC DRAWING OF FILTERING SYSTEM, BIO SWIMMINGPOOL

F I G . 3
IMAGE, OUTDOOR BIO POOL CONNECTING TO INDOOR GREYWATER POOL, COLD AND HOT WATER INTERACTING, OUTSIDE SAUNA LANDSCAPE

The Maladrerie district, a garden city in Aubervilliers, features an old car park that was dismantled in 2015 to prevent vehicle access. Wagon-landscaping transformed this 1600m2 area into a rock garden inspired by 19th-century Alpine gardens, housing over 150 plant species. This hybrid garden, blending wasteland and botanical elements, employs minimal but strategic gardening, emphasizing plant selection over weeding. The project innovatively revitalizes the area by enriching typically sterile soil. Wagon-landscaping handled the entire project, reducing timelines and costs. Key features include no watering, extensive maintenance, no material export, and creating a dynamic, living space on an artificial, impermeable surface.

F I G . 1

F I G . 2

F I G . 3

F I G . 1 - 4
JARDIN JOYEUX- LA MALADRERIE - AUBERVILLIERS, WAGON LANDSCAPING

F I G . 4

To demonstrate the flow of water through the topography, the plan involved creating a terrain model using clay, scaled at 1:400. The next step was to pour glaze over the model and fire it at approximately 2000 degrees to achieve the characteristic shiny effect of the glaze, creating a strong contrast between the water surface and the still rough clay surface. Unfortunately, the model exploded in the kiln into thousands of pieces because there wasn‘t enough time for the model to dry properly.

F I G . 1

F I G . 1
WET CLAY WITH LOST NEGATIV OUT OF WHITE CARDBOARD

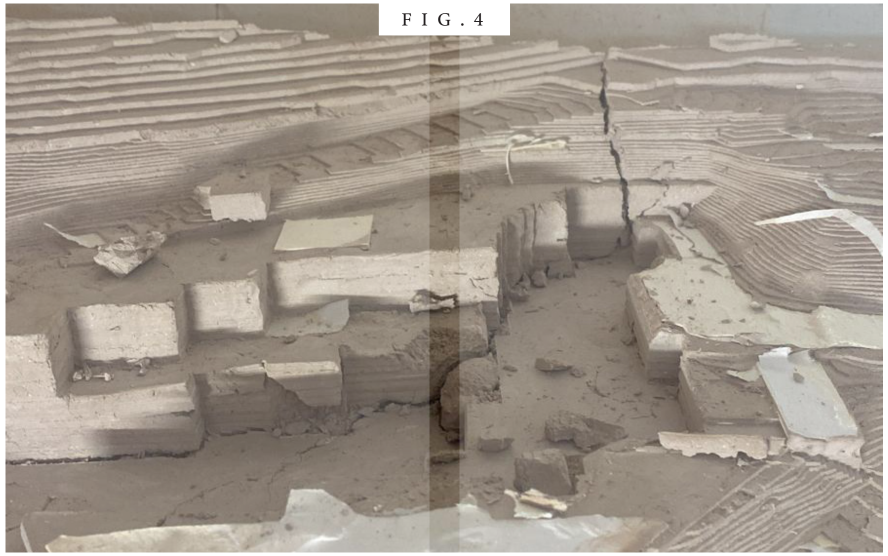
F I G . 2
PROOF OF CONCEPT SUING CLAY AND SOME CARDBOARD

F I G . 3
COMPLICATED NEGATIVE TOPOGRAOHY OF THE SITE

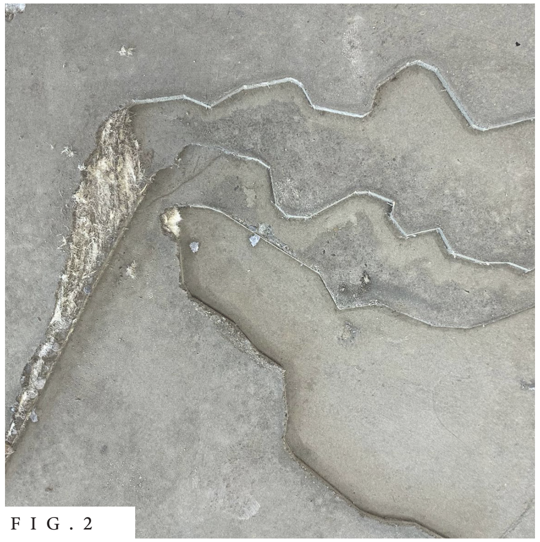
F I G . 4
BROKEN CLAY MODEL THROUGH SHRINKAGE AND HETEROGENOUS DRYING

F I G . 2

F I G . 3



F I G . 4



F I G . 1 F I G . 2

F I G . 3

F I G . 4

F I G . 1 - 3

MATERIAL TESTS WITH CONCRETE, USING DIFFERENT FIBRES FOR REINFORCEMENT

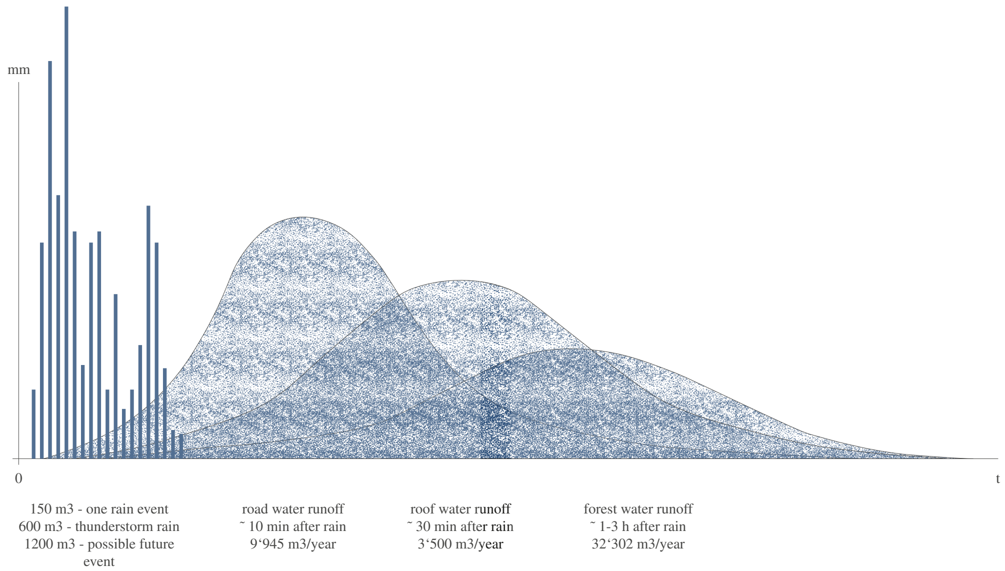
F I G . 4

TERRAIN MODEL, CONCRETE COLOURIZED WITH IRON OXIDE

F I G . 5

REPRESENTING WTAER FLOW USING TRANSPARENT SOAP

F I G . 5



F I G . 1

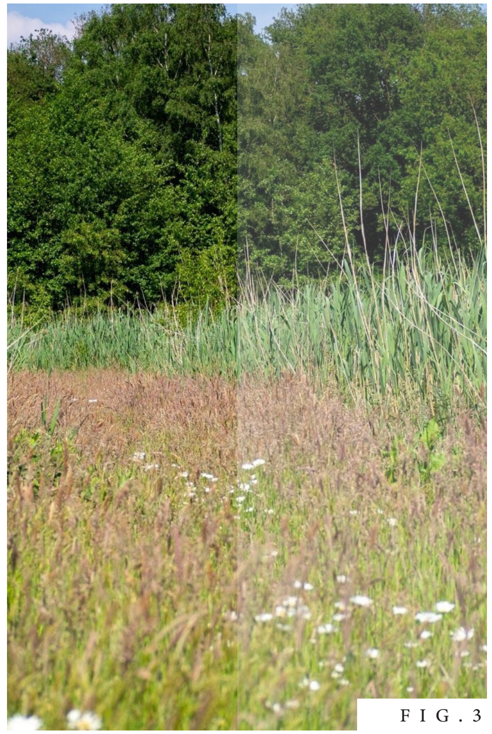
F I G . 2

F I G . 1
RAIN DISCHARGE GRAPHIC, QUALITATIVE, SHOWING THE SEQUENTIAL RUNOFF OF RAINWTAER DEPENDING ON DIFFERETN SURFACES

F I G . 2
IMAGE OF WATER DRAINAGE ABOVE WALDHAUS, APRIL 2024

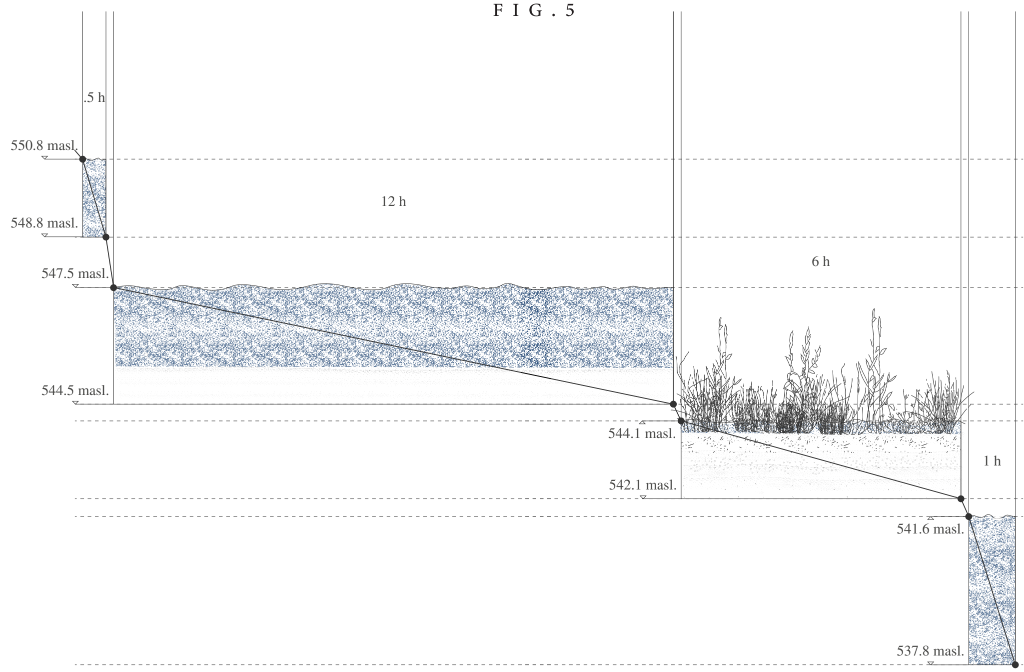
F I G . 3 - 4
WATER PURIFICATION PARK, STROOTMAN LANDSCAPE ARCHITECTS

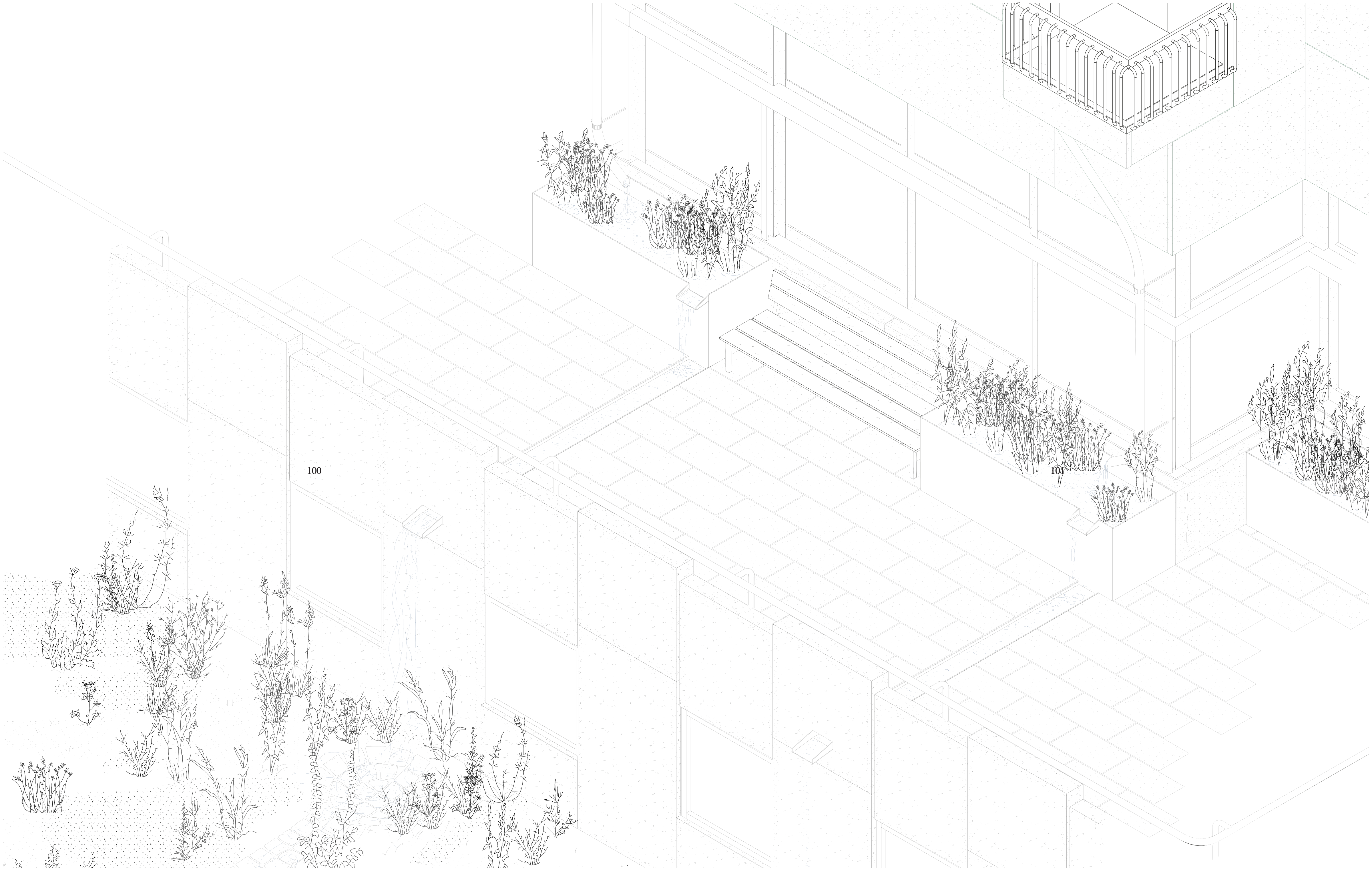
F I G . 5
WATER MOVING THROUGH ALL FILTERING STAGES, DIAGRAM SHOWING ELEVATION RELATED TO THE TIME SPENT IN EACH AREA



F I G . 3 F I G . 4

F I G . 5





F I G . 1
ROOF GARDEN
TRANSITION OF WATER FROM THE ROOF DRAINAGE INTO THE GARDEN AREA

The project opens up complex relationships between the real and the experienced space. The simultaneity of spatially concrete nature development and the dynamic, process-oriented experience of landscapes in one place is one of the most exciting observations to be made at the Old Airfield. The city of Frankfurt continues to support numerous events and festivals at the Old Airfield. „Landscape guides“ answer questions about nature development and usage, and a comprehensive website about the park is available online. Various workshops, the Tower Café, and Green Classrooms utilize the preserved airport buildings, promoting active park use. Kindergartens and schools use the areas as a nature lab.

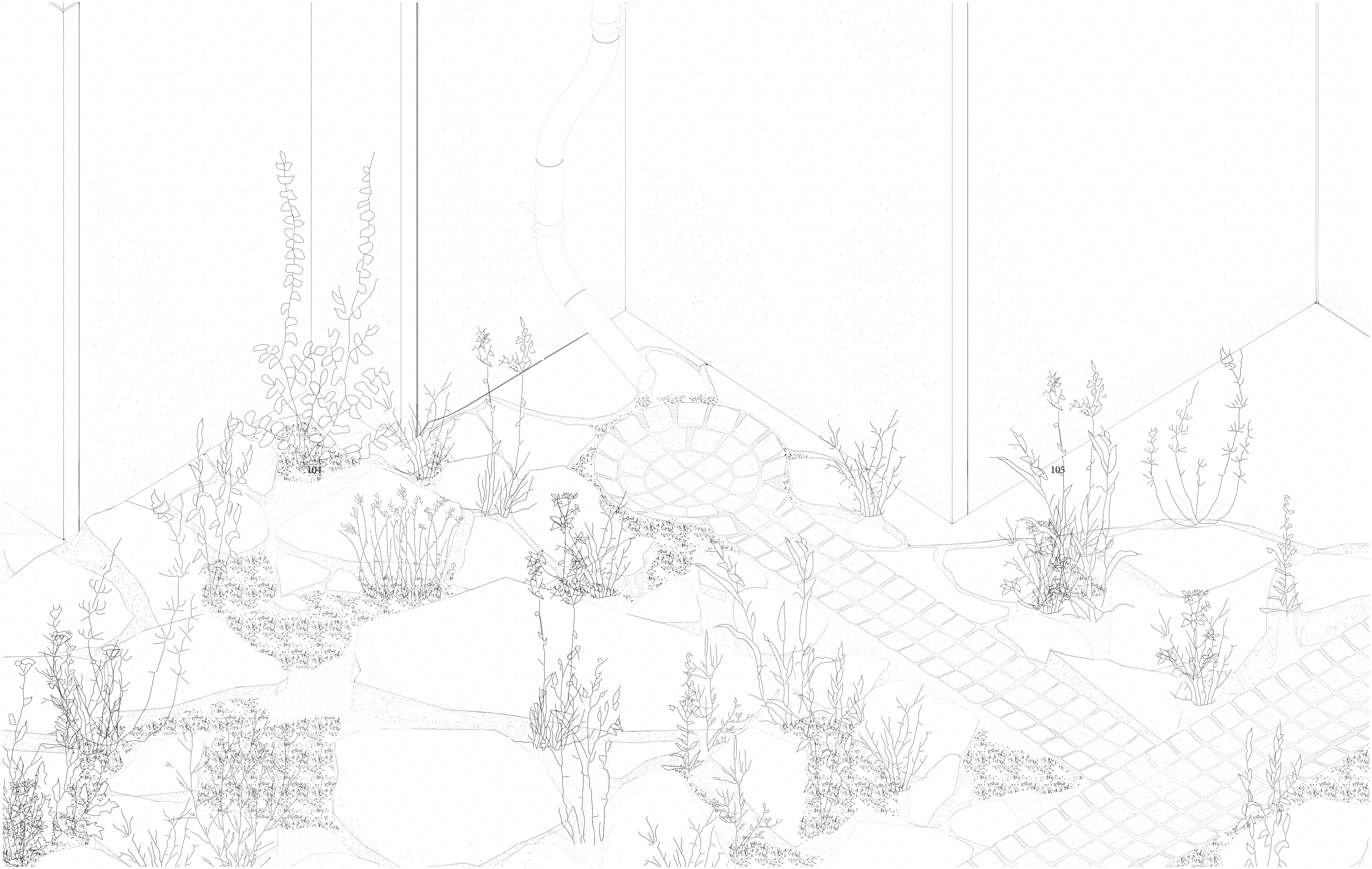
F I G . 1

F I G . 2

F I G . 3

F I G . 1 - 4
OLD AIRPORT BONAMES - GTL LANDSCHAFTSARCHITEKTUR

F I G . 4



F I G . 1
PERMEABLE CONCRETE
BROKEN UP CONCRETE WITH COBBLESTONE WATER STREAM THROUGH THE LANDSCAPE

hydrophob
In chemistry, hydrophobicity is the physical property of a molecule that is seemingly repelled from a mass of water (known as a hydrophobe)

hydrophil
In chemistry, hydrophilicity is the physical property of a molecule that is attracted to and can interact well with water (known as a hydrophile).

grey water
Greywater is wastewater generated from household activities such as bathing and washing dishes, which can be recycled for uses like irrigation and flushing toilets.

rainwater
Rainwater is the natural precipitation that falls from the atmosphere to the Earth‘s surface, which can be collected and used for various purposes such as drinking, irrigation, and replenishing groundwater.

black water
Blackwater is wastewater from toilets that contains feces, urine, and flush water, often requiring treatment before safe disposal or reuse.

surface water
Surface water refers to water that is found on the Earth‘s surface in streams, rivers, lakes, ponds, and reservoirs, as opposed to groundwater which is found beneath the Earth‘s surface.

flood
Water covering normally dry land.

drought
Extended period of low precipitation resulting in water scarcity.

rain intensity
Rain intensity refers to the rate at which rain falls over a given area, typically measured in millimeters per hour or inches per hour.

artesic groundwater
Artesian groundwater refers to water that is trapped in an underground aquifer under pressure, allowing it to rise to the surface without the need for pumping.

resilience
Resilience refers to the ability of a system to withstand and recover from disturbances or shocks, adapting and maintaining its functionality over time.

soft and hard water
Soft water contains low concentrations of dissolved minerals, typically calcium and magnesium, while hard water contains higher concentrations of these minerals.

topography
Topography encompasses the surface characteristics of an area, such as its elevation, terrain, and landscape features.

topology
In landscape architecture, topology refers to the study and design of the spatial arrangement and configuration of landforms, including the manipulation of terrain, grading, and contouring to create desired landscapes and outdoor spaces.

drainage
Drainage is the natural or artificial removal of surface or subsurface water from an area, preventing water accumulation and minimizing the risk of flooding or waterlogging.

irrigation
Irrigation is the artificial application of water to land or soil to assist in the growth of crops, plants, or landscaping, typically to supplement rainfall or provide water during periods of drought

GLOSSARY

water retention
In architecture, water retention refers to the design or engineering strategies employed to manage or control the accumulation and drainage of water on or around a building, preventing issues like leaks, flooding, or damage.

entropy
Entropy is a measure of the disorder or randomness present in a system.

chaos theory
Chaos theory is a branch of mathematics and physics that studies complex systems and their behavior, often characterized by sensitivity to initial conditions, non-linear dynamics, and unpredictability, leading to seemingly random or chaotic outcomes.

ecology
Ecology is the scientific study of the relationships between organisms and their environment, including interactions between living organisms and their physical surroundings.

surface water
Surface water refers to water that is found on the Earth‘s surface in streams, rivers, lakes, ponds, and reservoirs, as opposed to groundwater which is found beneath the Earth‘s surface.

runoff
Runoff refers to the flow of water over the land surface, typically as a result of precipitation, which does not infiltrate into the soil but instead moves over the ground and eventually enters streams, rivers, lakes, or oceans.

evaporation adn transpiration
Evaporation is the process by which water changes from a liquid to a gas and enters the atmosphere, typically from bodies of water, soil, or plants. Transpiration is the release of water vapor from plants through their leaves into the atmosphere as part of their natural physiological processes.

infiltration
Infiltration is the process by which water penetrates into the soil surface and moves downward through soil pores, entering the soil profile and potentially replenishing groundwater reserves.

rain discharge
Rain discharge refers to the volume or rate at which rainwater flows or is discharged from a particular area, typically measured in volume per unit of time, such as liters per second or cubic meters per hour.