



Hydro-Heritage: A Visual Guide to Water Points in Villaviciosa de Odón and El Bosque



Historical Landmark - Bien de Interés Cultural (BIC)  
 Zona de Máxima Protección - Parque Regional del Curso Medio del Río Guadarrama (PORN and PRUG)

Water Usage Matrix - Villaviciosa de Odón			
Sector	Estimate Consumption (m <sup>3</sup> /year) 2025	Projected Consumption (m <sup>3</sup> /year) 2050	Estimated Share (%)
Domestic	1,650,000	1,800,000	65%
Municipal	400,000	450,000	15%
Industrial	300,000	350,000	12%
Agricultural	200,000	250,000	8%
<b>TOTAL (Estimated)</b>	<b>2,550,000</b>	<b>2,850,000</b>	<b>100%</b>

**Assumptions and Sources Used**

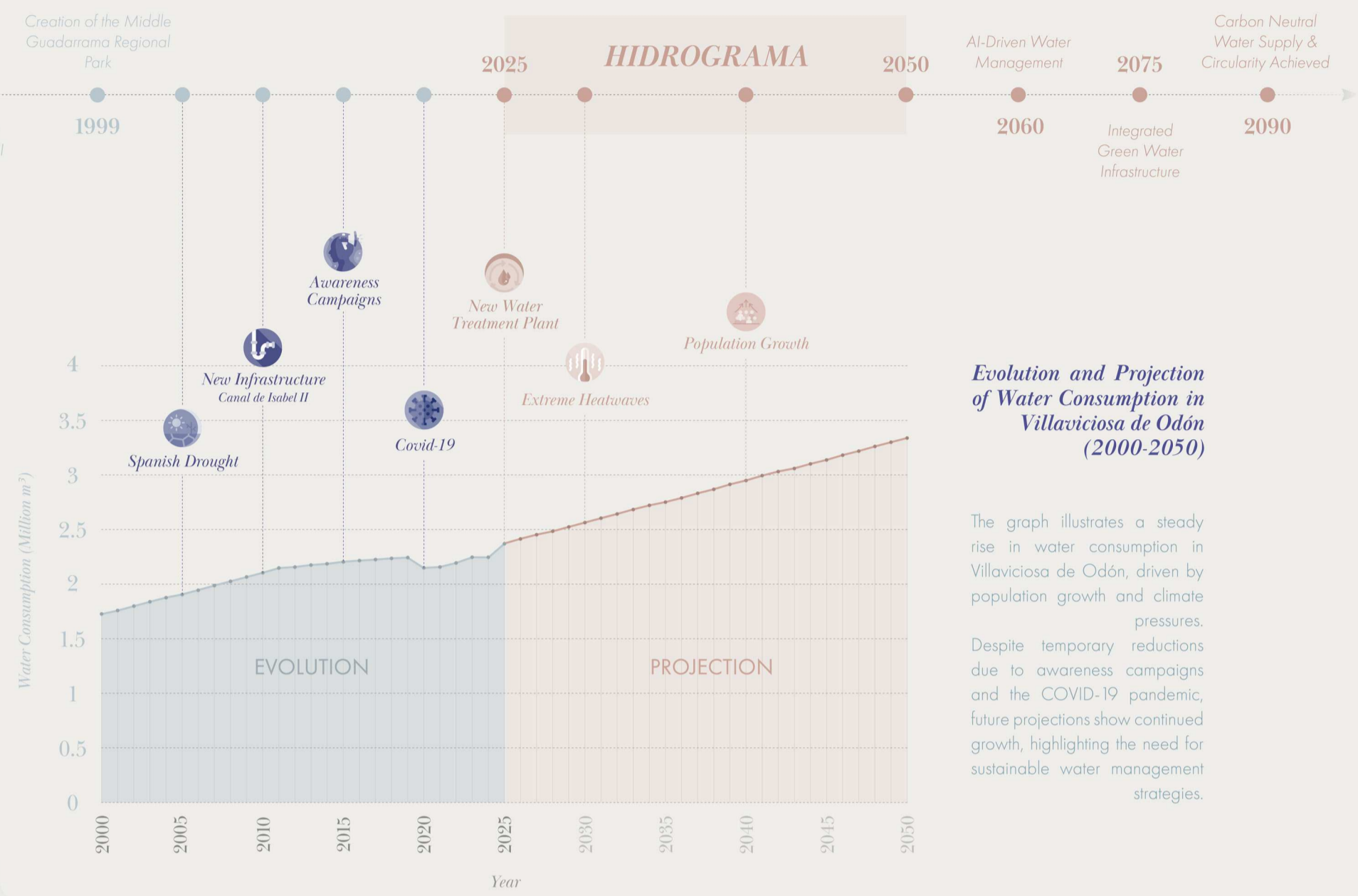
- Estimated Population: Approximately 38,000 inhabitants.
- Average Domestic Consumption: 129 liters/person/day, based on INE data for the Community of Madrid in 2020 (ine.es).
- Municipal Consumption: Around 15% of the total, including green spaces and public buildings, following national data (ine.es).
- Industrial Consumption: Estimated at 12%, reflecting moderate industrial activity in the area.
- Agricultural Consumption: Estimated at 8%, considering water use for irrigation of local agricultural areas.

**Key Information**

- Length: 131.8 km
- Source: Siete Picos, Sierra de Guadarrama (1,900m elevation)
- Mouth: Tago River
- Basin Size: 1,708 km<sup>2</sup>
- Main Tributary: Aulencia River

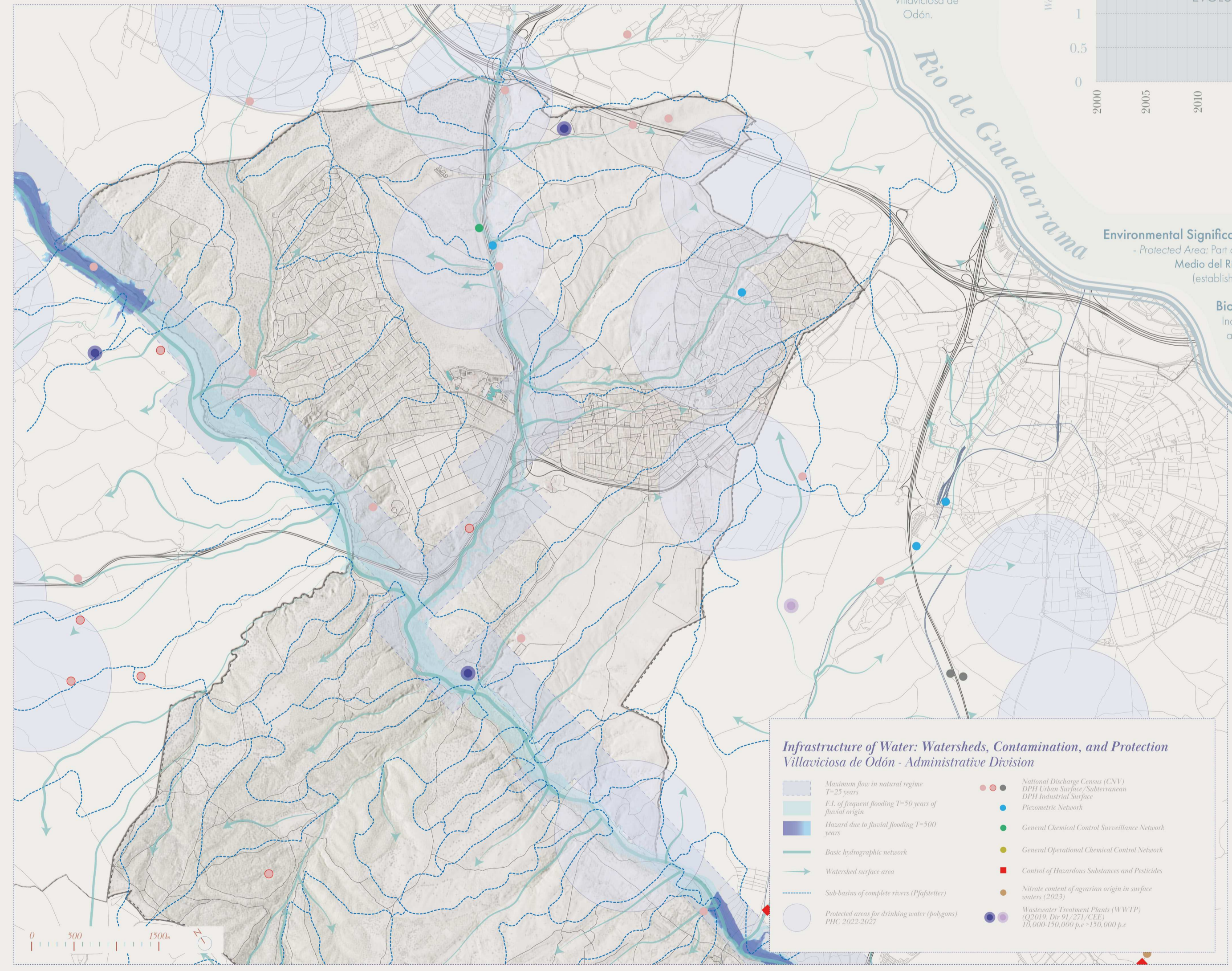
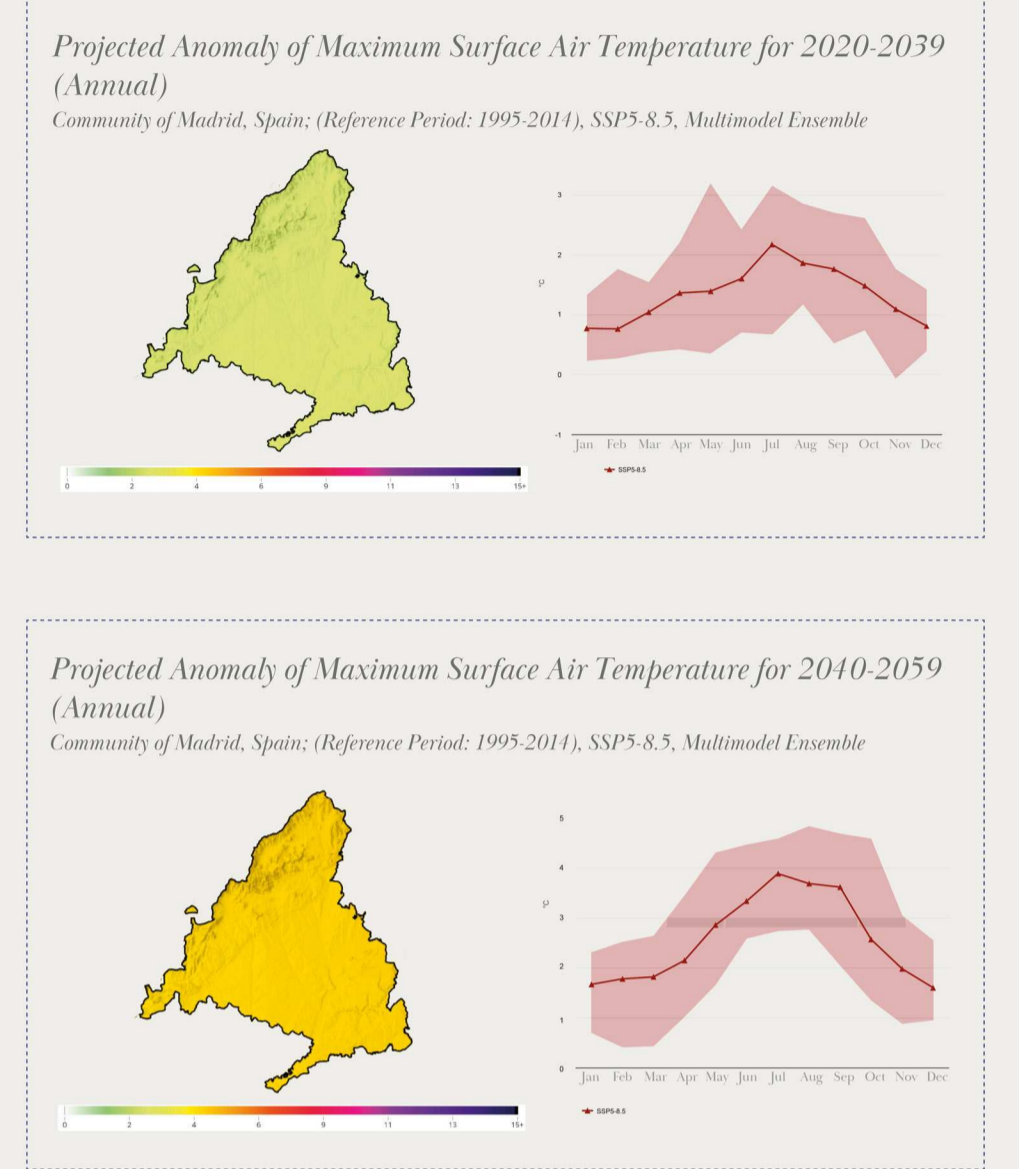
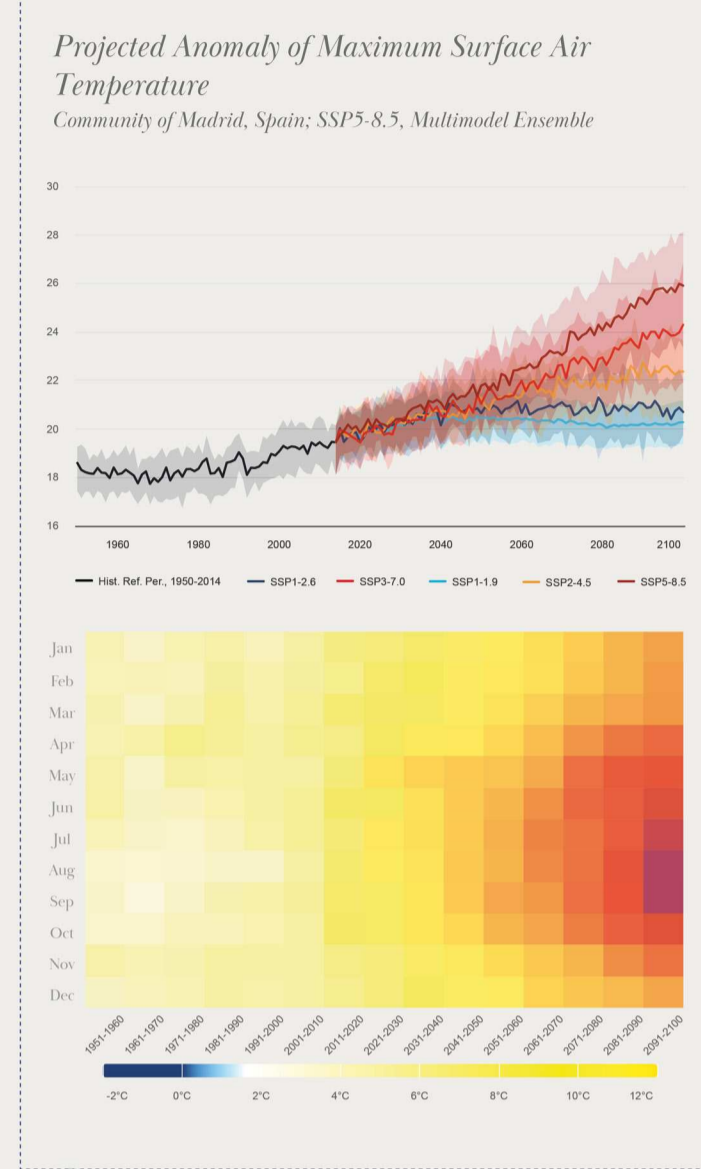
**Historical Use**

The Rio Guadarrama provided water for agriculture, powered local mills, and served as a natural boundary for settlements, including Villaviciosa de Odón.



Evolution and Projection of Water Consumption in Villaviciosa de Odón (2000-2050)

The graph illustrates a steady rise in water consumption in Villaviciosa de Odón, driven by population growth and climate pressures. Despite temporary reductions due to awareness campaigns and the COVID-19 pandemic, future projections show continued growth, highlighting the need for sustainable water management strategies.



**Environmental Significance**

- Protected Area: Part of the Parque Regional del Curso Medio del Río Guadarrama y su Entorno (established in 1999).

**Biodiversity**

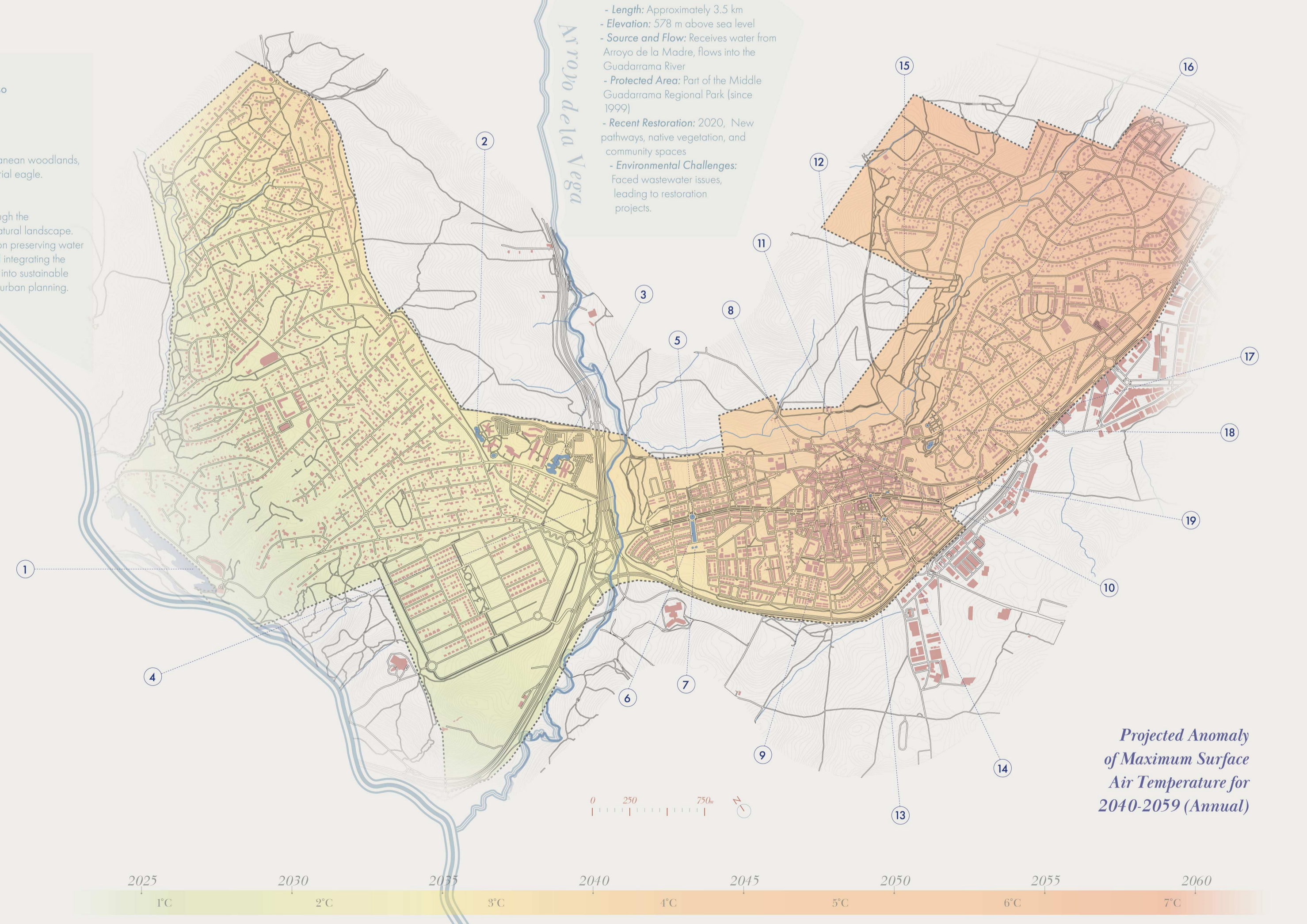
- Includes riparian forests, Mediterranean woodlands, and species like the Iberian imperial eagle.

**Connection to VDO**

- The river flows directly through the municipality, shaping its natural landscape.
- Local efforts focus on preserving water quality and integrating the river into sustainable urban planning.

**Infrastructure of Water: Watersheds, Contamination, and Protection Villaviciosa de Odón - Administrative Division**

- Maximum flow in natural regime (T=25 years)
- F.A. of frequent flooding (1-50 years of return cycle)
- Hazard due to flood flooding (1-500 years)
- Basic hydrographic network
- Watershed surface area
- Subbasins of complete rivers (Pigüeter)
- Protected areas for drinking water (subgrupos) PORN 2002-2052
- National Discharge Census (CNY)
- DWH Urban Surface, Subterranean DWH Suburban Surface
- Pressure Network
- General Chemical Control Surveillance Network
- General Operational Chemical Control Network
- Control of Hazardous Substances and Pesticides
- Nitrate content of aquifer origin in surface waters (2023)
- Wastewater Treatment Plants (WWTP) (Q2009: 136.91, 271, 433) (Q2000: 196,000 p.e. - 176,000 p.e.)



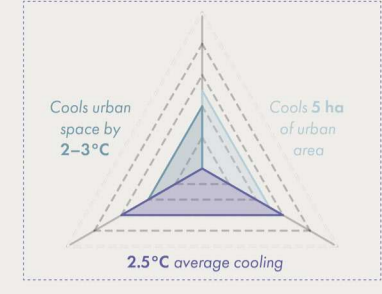
Projected Anomaly of Maximum Surface Air Temperature for 2010-2059 (Annual)

Hidrograma HYPOTHESIS 'Making Water visible transforms the city'

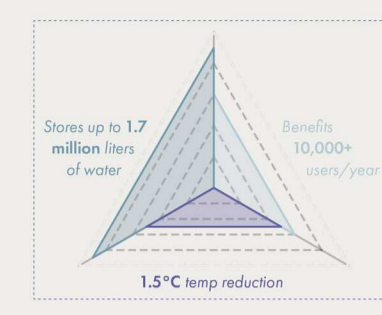
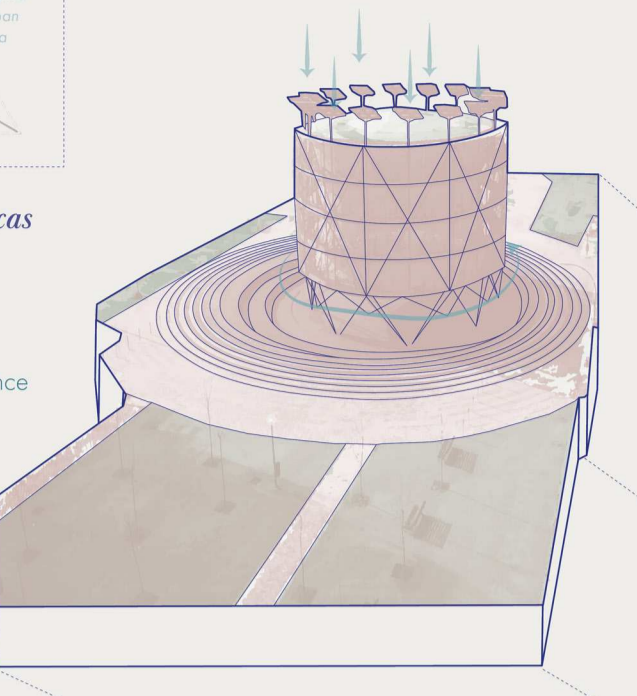
This Hypothesis explores the complex relationship between water infrastructure, climate, and urban development in Villaviciosa de Odón. Through a combination of historical analysis, current water usage data, and future projections, it visualizes the intricate hydrological network of the region. The map highlights natural watercourses, urban catchments, and key infrastructure points, providing a clear understanding of how water flows through the landscape. The accompanying timeline and consumption graph illustrate the evolution of water management strategies, from traditional sources to advanced projections for 2050. By making water visible—both as a resource and a challenge—this study emphasizes the need for resilient and sustainable water management strategies to ensure a balanced future for Villaviciosa de Odón.



Joanna Berzina Morell

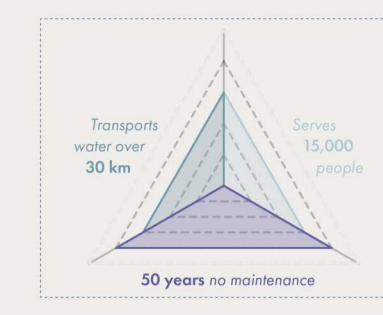
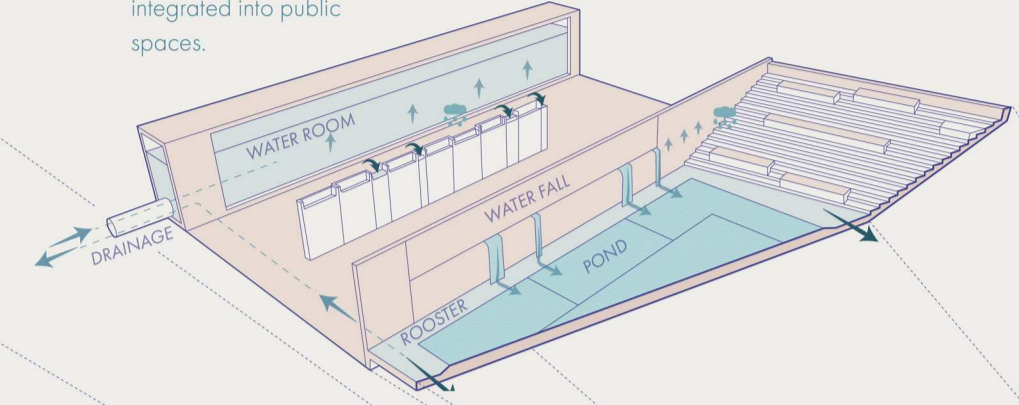


**Eco-Boulevard of Vallecas**  
Madrid, Spain  
2007  
Public spaces equipped with bioclimatic devices that enhance urban comfort. It combines climate adaptation strategies with social uses, integrating water and ventilation as active elements of urban design.



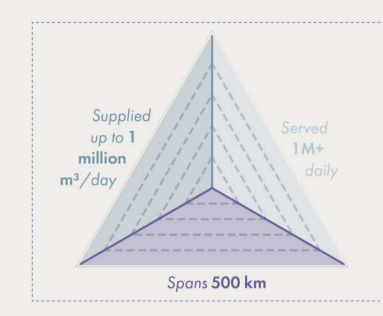
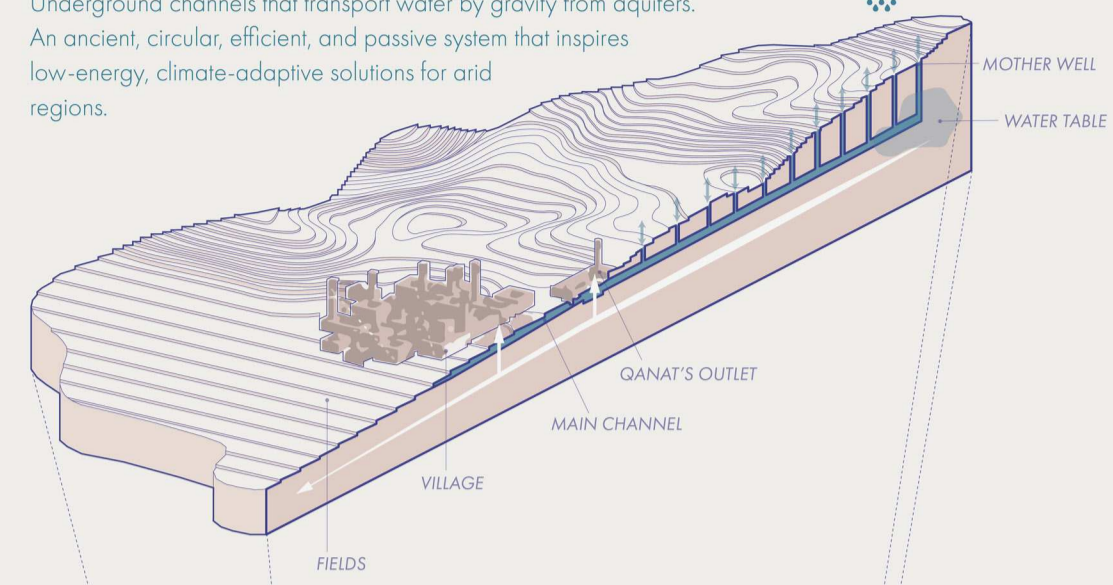
**Water Squares - De Urbanisten**  
Netherlands  
2013

Public squares that function as water reservoirs during heavy rainfall. They propose a dual infrastructure: playful and functional. They make water management visible and demonstrate how technical systems can be creatively and educationally integrated into public spaces.



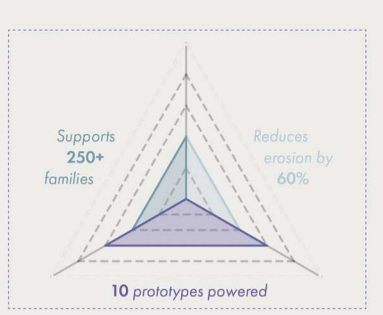
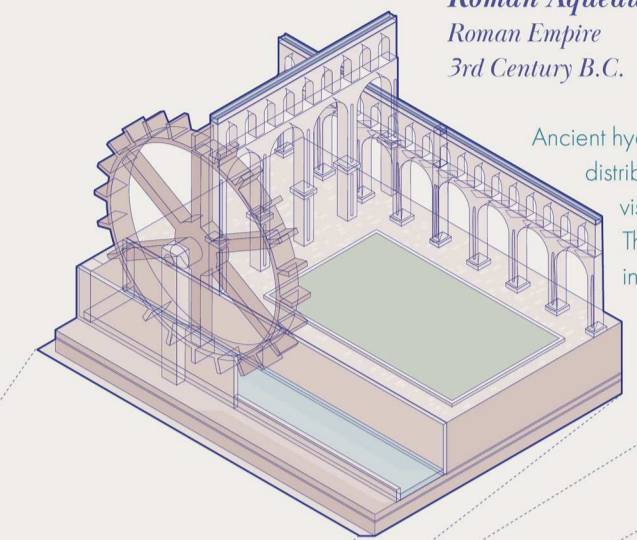
**Qanats/Khettaras**  
Middle East / North Africa  
1000 B.C.

Underground channels that transport water by gravity from aquifers. An ancient, circular, efficient, and passive system that inspires low-energy, climate-adaptive solutions for arid regions.



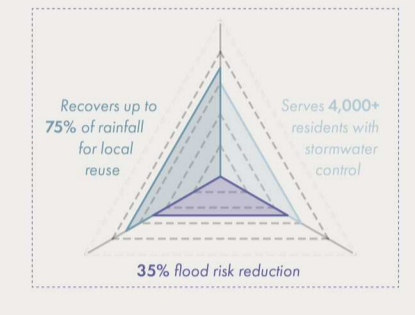
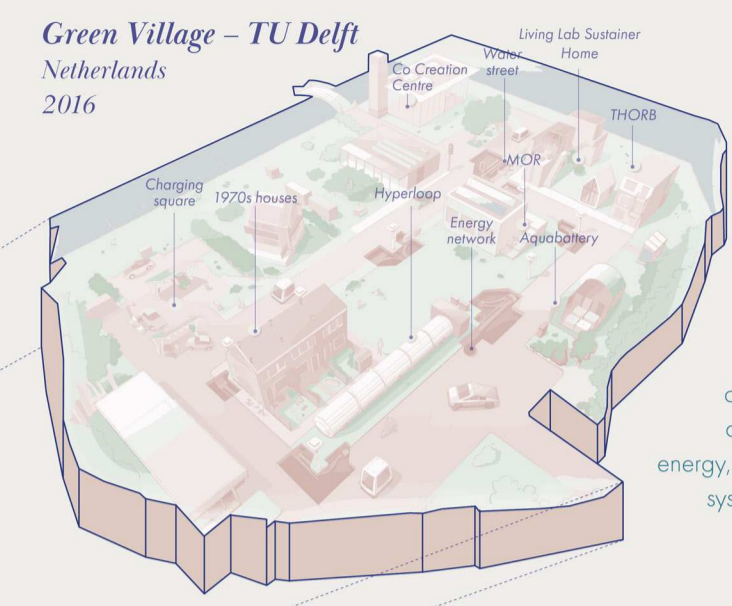
**Roman Aqueducts and Fountains**  
Roman Empire  
3rd Century B.C.

Ancient hydraulic systems that distributed water in cities through visible structures. They demonstrate how infrastructure can be monumental, public, and a bearer of civic and cultural identity.



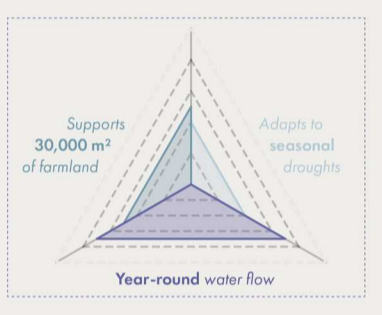
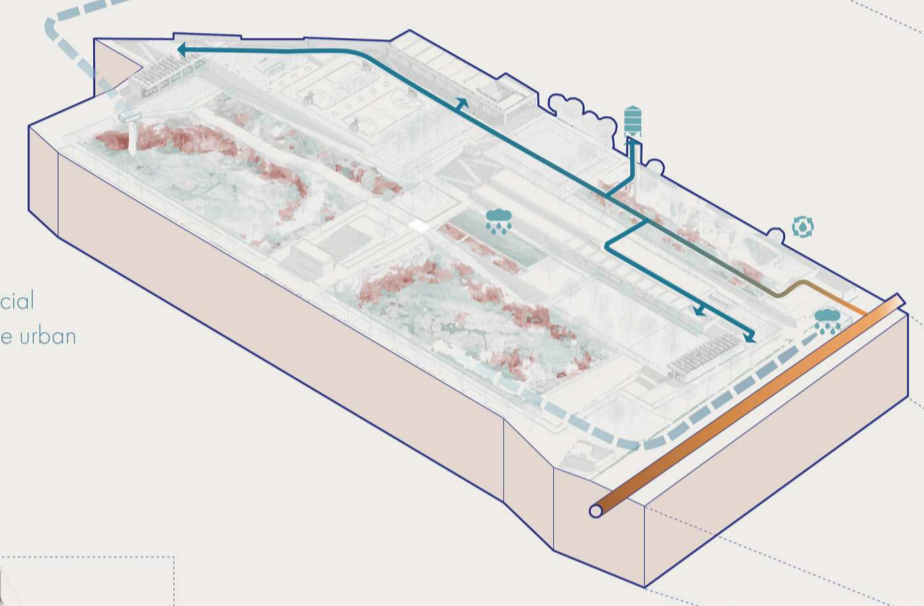
**Green Village - TU Delft**  
Netherlands  
2016

A full-scale urban laboratory for testing sustainable technologies. It demonstrates how buildings can operate with closed cycles of water and energy, integrating circular systems into the urban environment.

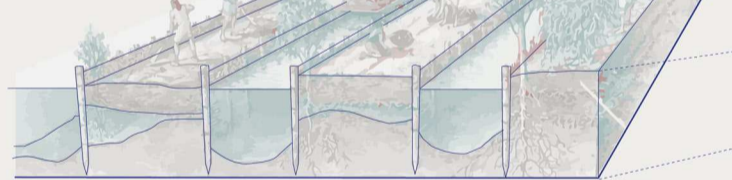


**La Quebradora Hydraulic Park**  
Mexico City, Mexico  
2019

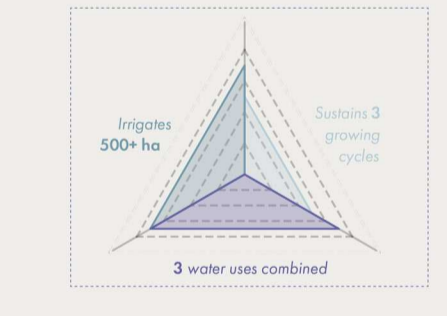
A park that manages rainwater and provides public space. It combines hydraulic infrastructure and social space, making water visible and part of the urban landscape.



**Chinampas (Aztecs)**  
Xochimilco, Mexico  
XIV Century

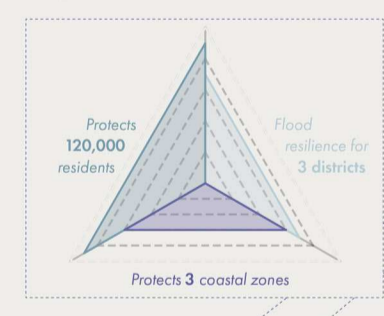
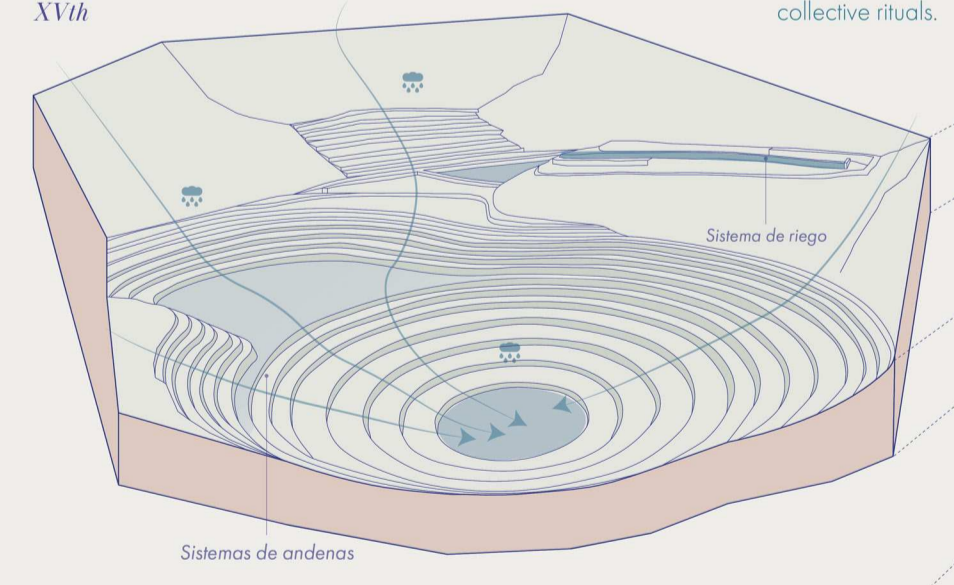


Parcelas agrícolas construidas sobre lagos poco profundos. Demuestran paisajes productivos que gestionan el agua y se adaptan tanto a las inundaciones como a la sequía.

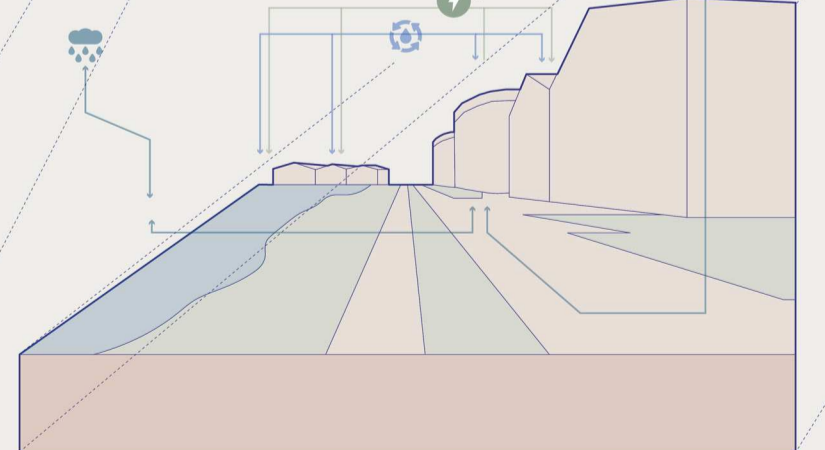


**Qochas and Inca Canals**  
Andes, Peru/Bolivia  
Inca Empire  
XVII

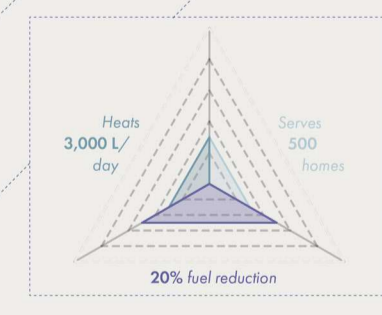
Agricultural systems that store and distribute water in high Andean landscapes. They integrate water infrastructure with the territory, local culture, and collective rituals.



**One Urbanism - Semarang**  
Indonesia  
2019



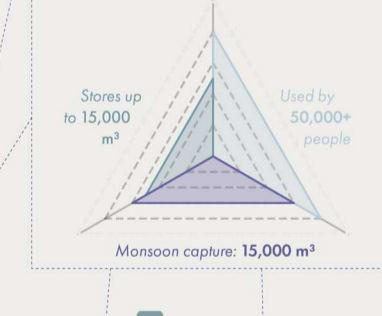
Urban planning and design focused on climate resilience and coastal infrastructure. It provides strategies for climate change adaptation and water management in vulnerable urban environments.



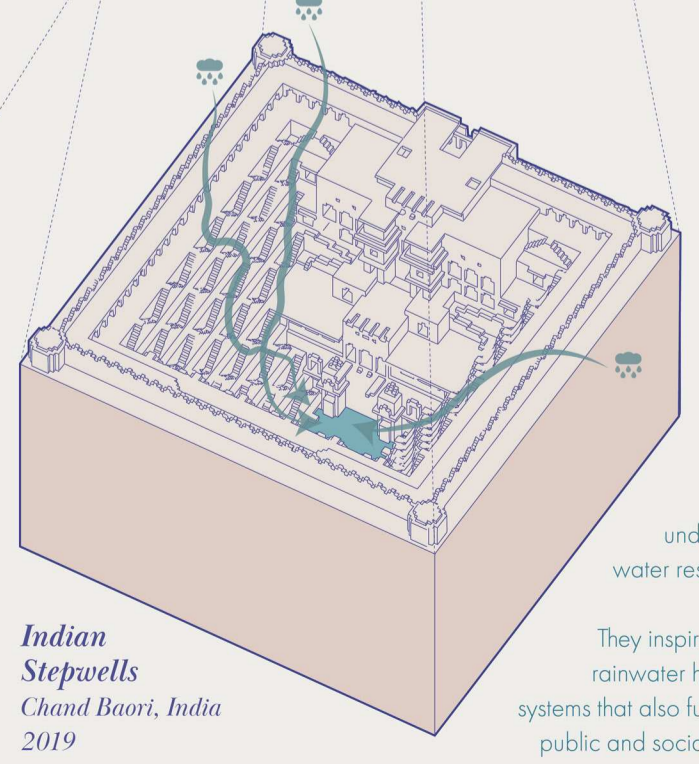
**Traditional Hammams**  
Middle East  
Mediterranean  
VII and XIX



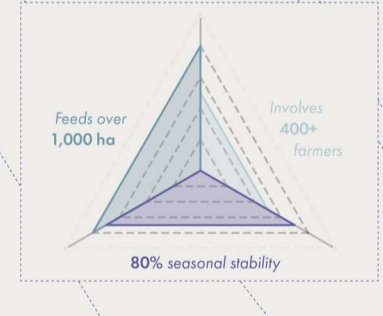
Communal public baths with hygienic, social, and ritual functions. They treat water as a collective and cultural experience, not just a technical service. They inspire habitable, sensory, and symbolic infrastructure.



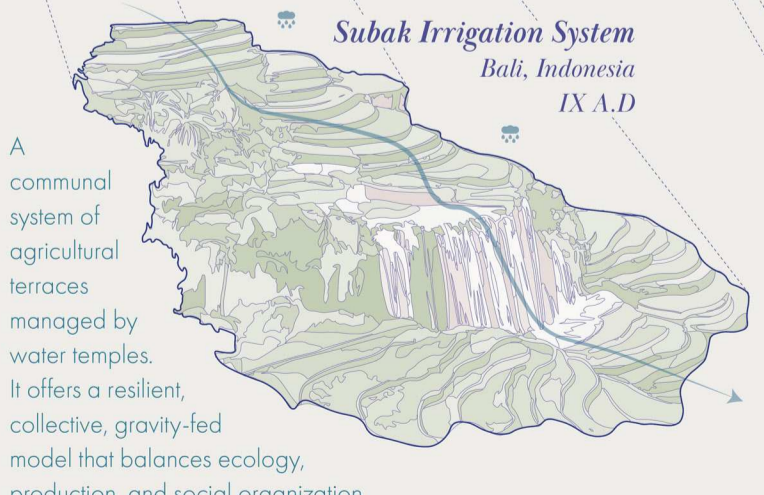
**Indian Stepwells**  
Chand Baori, India  
2019



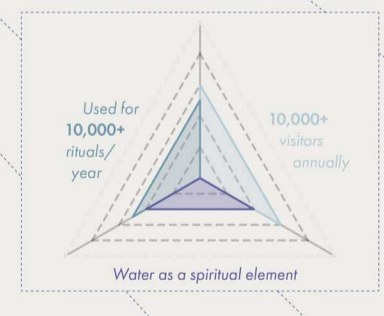
Ancient underground water reservoirs in India. They inspire passive rainwater harvesting systems that also function as public and social spaces.



**Subak Irrigation System**  
Bali, Indonesia  
IX A.D.

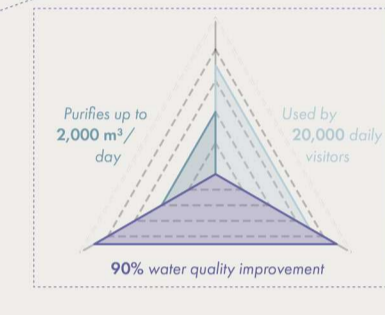
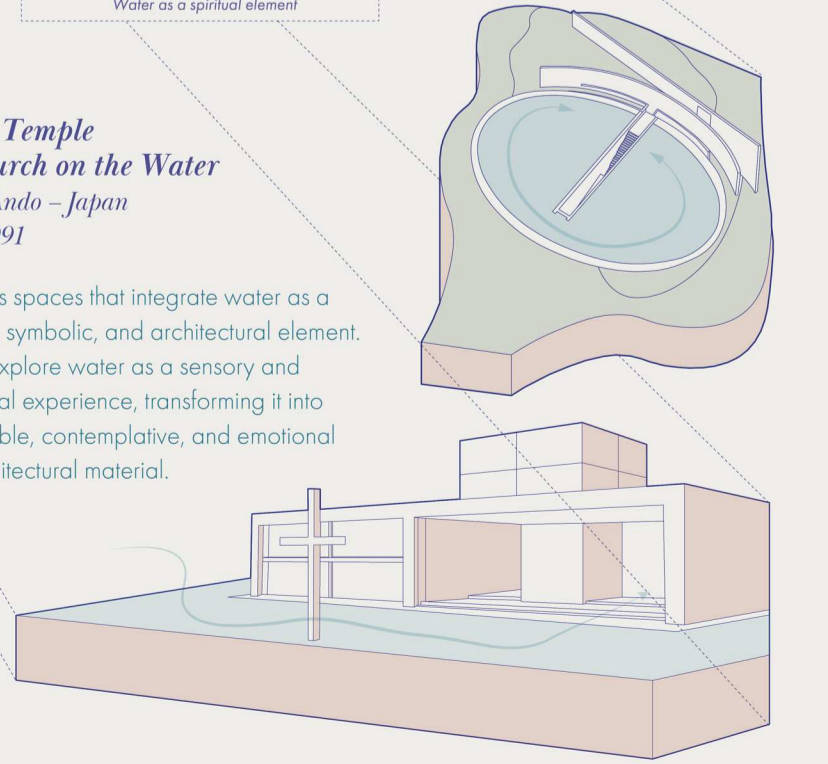


A communal system of agricultural terraces managed by water temples. It offers a resilient, collective, gravity-fed model that balances ecology, production, and social organization.



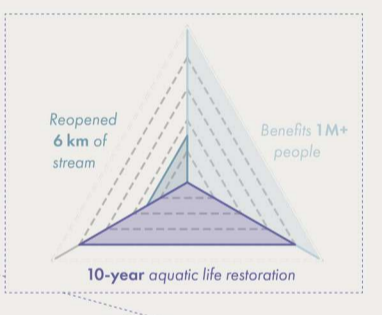
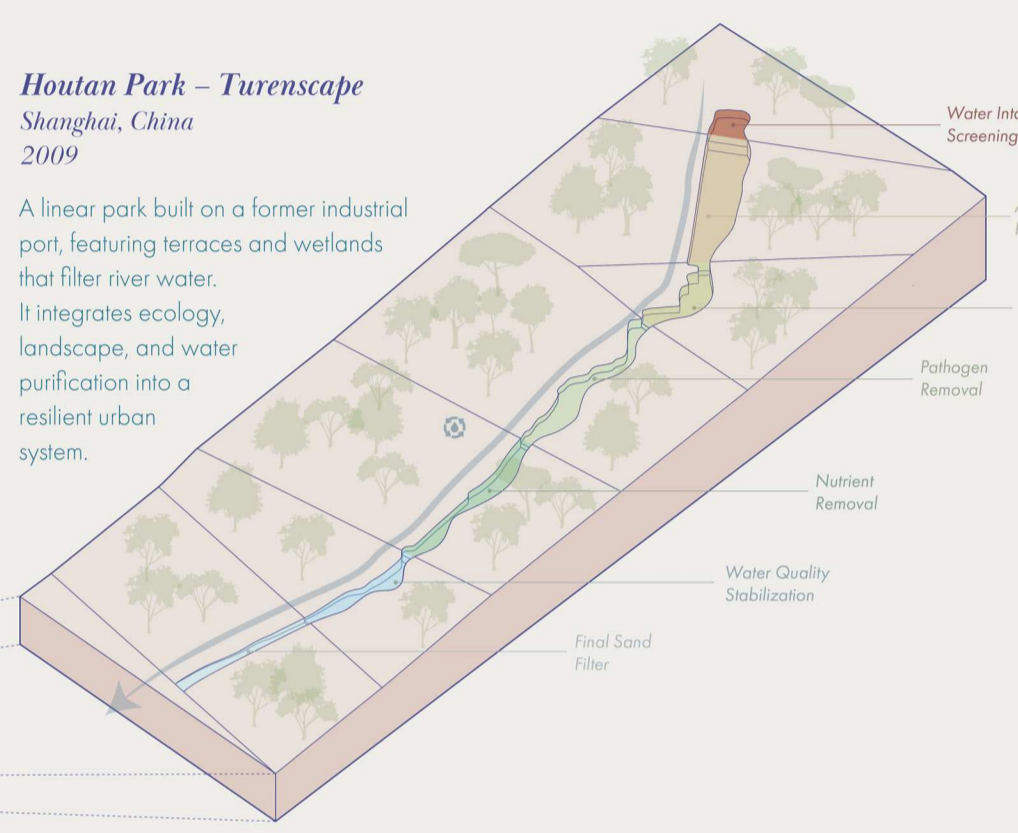
**Water Temple & Church on the Water**  
Todao Ando - Japan  
1988-1991

Religious spaces that integrate water as a central, symbolic, and architectural element. They explore water as a sensory and spiritual experience, transforming it into a visible, contemplative, and emotional architectural material.

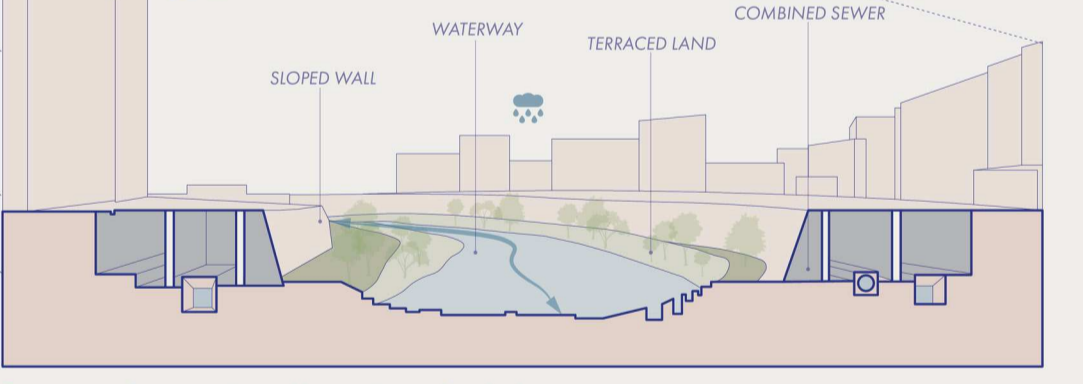


**Houtan Park - Turescape**  
Shanghai, China  
2009

A linear park built on a former industrial port, featuring terraces and wetlands that filter river water. It integrates ecology, landscape, and water purification into a resilient urban system.



**Cheonggyecheon Restoration**  
Seoul, South Korea  
2005



Restoration of a stream buried beneath an urban highway. It reconnects the city with its natural water flow, transforming gray infrastructure into an accessible, ecological public space.

90% of natural disasters are water-related, including floods, droughts, and storms (UN-Water, 2022)

70% of global freshwater is used for agriculture, making it the largest consumer of water (FAO, 2022)

By 2050, nearly half of the world's population is expected to live in areas facing severe water stress due to climate change (IPCC, 2023)

EUROPE

AFRICA

MIDDLE EAST

INDIA

EAST ASIA

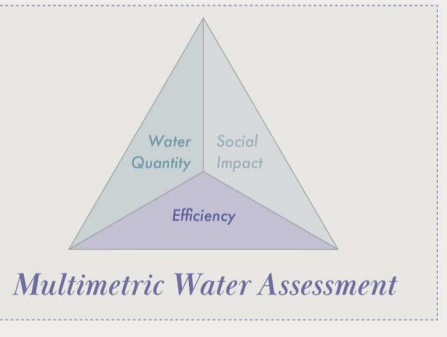
SOUTH EAST ASIA

CENTRAL AMERICA

SOUTH AMERICA

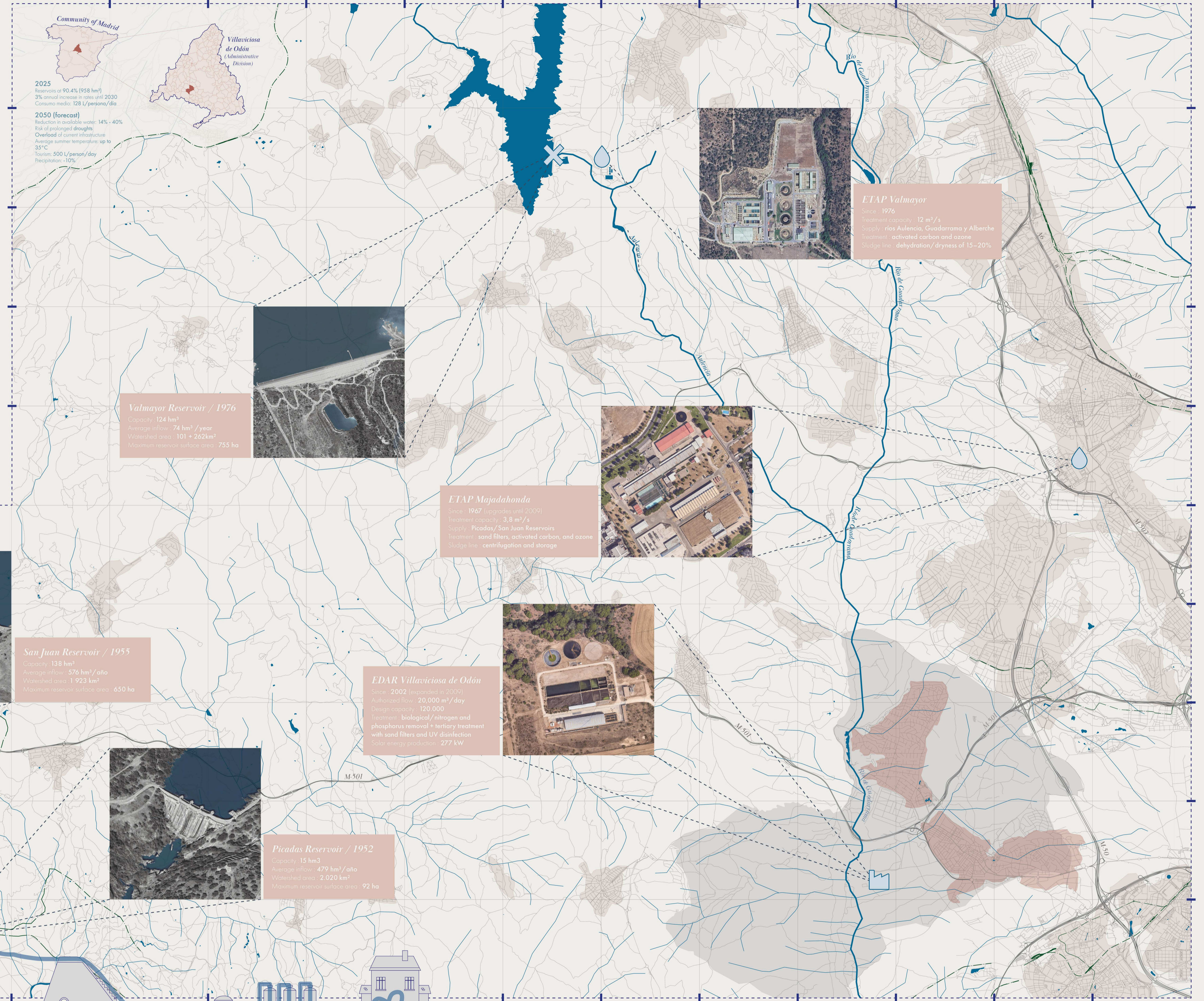
# Hidrograma REFERENCES

'From Ancestral Past to Resilient Future'



Axis	Current Urban Challenge	2050 Vision
Hydro - Urbanism	Linear, invisible and disconnected water cycles; runoff and scarcity coexist	A visible, circular water system embedded in public space and landscape, reconnecting natural and civic flows
Ecological-Porous Infrastructure	Fragmented systems and rigid surfaces block natural processes	A hybrid infrastructure network that absorbs, filters, and connects — combining ecology, mobility, and resilience
Civic Mobility & Street Activation	Car-dominated infrastructure breaks continuity and limits social use	A walkable, active city organized around inclusive streets, canalized flows, and slow mobility layers
Urban Climate Adaptation	Vulnerability to heatwaves, droughts and flash floods	Infrastructure designed as climate buffers: shaded, water-retaining, breathable and responsive systems
Self-Sufficient Productive Infrastructure	Resource-intensive urban metabolism and external dependencies	Circular systems that produce, reuse and store water, energy, and food — embedded in the everyday urban fabric

Theme	Current Problem	2050 Vision
Climate Variability & Scarcity	Increasing droughts, irregular rainfall, overreliance on centralized supply	A diversified, resilient water cycle with decentralized harvesting, storage, and reuse
Stormwater & Flood Management	Impermeable surfaces cause runoff, erosion, and urban flash floods	A porous city with sponge infrastructures: bioswales, wetlands, green roofs, retention plazas
Hydrological Disconnection	Local streams and aquifers are buried, polluted, or invisible	Surface water is revitalized through daylighting streams, naturalizing channels, and integrating hydrology into public space
Linear Water Use	Single-use system (clean-use-dispose), no greywater reuse or rain capture	Circular systems: greywater recycling, rainwater harvesting, treatment wetlands within the urban fabric
Invisible & Outdated Infrastructure	Water systems are underground and hidden, from public awareness	Water becomes a visible, educative, and participatory infrastructure embedded in urban life
Lack of Social Integration	Water seen as a utility, not a cultural or social asset	Civic water spaces: community fountains, water gardens, and cultural landmarks celebrating water stewardship



**2025**  
Reservoirs of 90.4% (1958 hm<sup>3</sup>)  
3% annual increase in rates until 2030  
Consumo medio: 128 l/persona/día

**2050 (forecast)**  
Reduction in available water: 14% - 40%  
Risk of prolonged droughts  
Overload of current infrastructure  
Average summer temperature: up to 35°C  
Irrigation: 500 l/person/day  
Precipitation: -10%

**Valmayor Reservoir / 1976**  
Capacity: 124 hm<sup>3</sup>  
Average inflow: 74 hm<sup>3</sup>/year  
Watershed area: 101 + 262 km<sup>2</sup>  
Maximum reservoir surface area: 755 ha

**ETAP Majadahonda**  
Since: 1967 (upgrades until 2009)  
Treatment capacity: 3,8 m<sup>3</sup>/s  
Supply: Picadas/San Juan Reservoirs  
Treatment: sand filters, activated carbon, and ozone  
Sludge line: centrifugation and storage

**San Juan Reservoir / 1955**  
Capacity: 138 hm<sup>3</sup>  
Average inflow: 576 hm<sup>3</sup>/año  
Watershed area: 1 923 km<sup>2</sup>  
Maximum reservoir surface area: 650 ha

**EDAR Villaviciosa de Odón**  
Since: 2002 (expansion in 2009)  
Authorized flow: 20 000 m<sup>3</sup>/day  
Design capacity: 120 000  
Treatment: biological/nitrogen and phosphorus removal + tertiary treatment with sand filters and UV disinfection  
Solar energy production: 277 kW

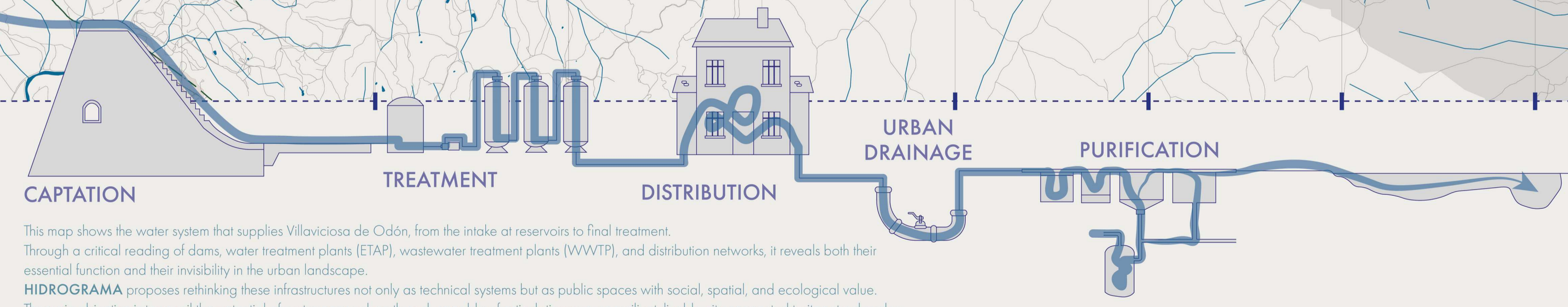
**Picadas Reservoir / 1952**  
Capacity: 15 hm<sup>3</sup>  
Average inflow: 479 hm<sup>3</sup>/año  
Watershed area: 2 020 km<sup>2</sup>  
Maximum reservoir surface area: 92 ha



# Hidrograma

## OBJECTIVES

'Redesign Water as Public Infrastructure'



**The Journey of Water: From Captation to Purification**

Main Rivers	Water Points	RESERVOIRS AND DAMS
Flood Network	Municipalities	Water capture and hydroelectric production
Railway	Villaviciosa de Odón	ETAP Drinking Water Treatment Station
	Villaviciosa de Odón Administrative Domain	EDAR Wastewater Treatment Station

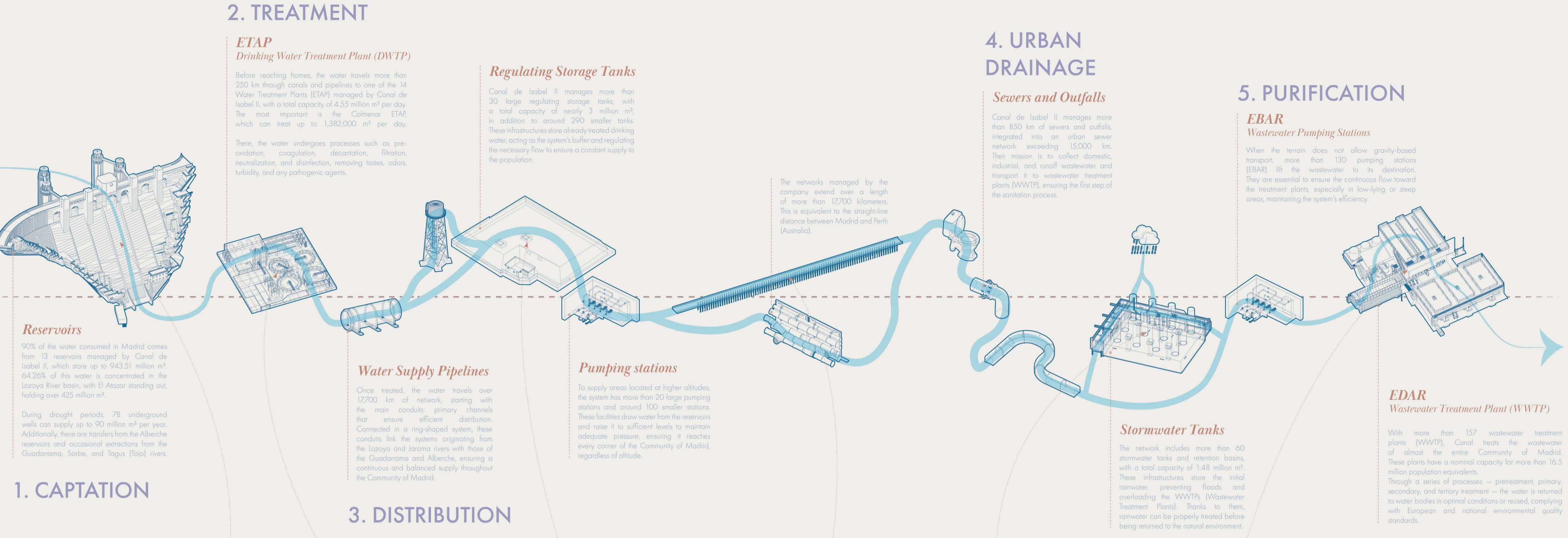
This map shows the water system that supplies Villaviciosa de Odón, from the intake at reservoirs to final treatment. Through a critical reading of dams, water treatment plants (ETAP), wastewater treatment plants (WWTP), and distribution networks, it reveals both their essential function and their invisibility in the urban landscape. **HIDROGRAMA** proposes rethinking these infrastructures not only as technical systems but as public spaces with social, spatial, and ecological value. The main objective is to unveil the potential of water as an urban thread, capable of articulating a more resilient, livable city connected to its natural cycles.

### Hidrograma - 2050 Water, Infrastructure, and Urban Porosity

Through a progressive intervention, Villaviciosa de Odón could become, by 2050, a model of a porous city, where water is no longer managed as a fragmented resource but is integrated as an essential, resilient, and adaptive infrastructure. Architecture and urban planning will act as mediating agents, articulating systems of retention, filtration, and redistribution that enable a holistic management of the water cycle.

This transformation will not only respond to the climate crisis and water scarcity but will also redefine the relationship between the built environment and the natural world, promoting a more permeable, habitable, and resilient city. An urbanism based on porosity will help restore ecological balance, enhance biodiversity, and ensure equitable access to water as a fundamental right.

By 2050, Villaviciosa de Odón will be a benchmark in the symbiosis between infrastructure and nature, where water management will drive new ways of living, producing, and coexisting, ensuring water sustainability and urban adaptation to an uncertain future.



**2025** *Disconnected from the Stream*  
Without formal infrastructure, people seek contact with natural water to cope with rising heat.

**2030** *A River Forgotten*  
Waterways lose their presence in the landscape, fading from collective memory and urban space.

**2035** *In Search of Water*  
Amid growing shortages, everyday life reveals the urgent need to reuse and recycle water.

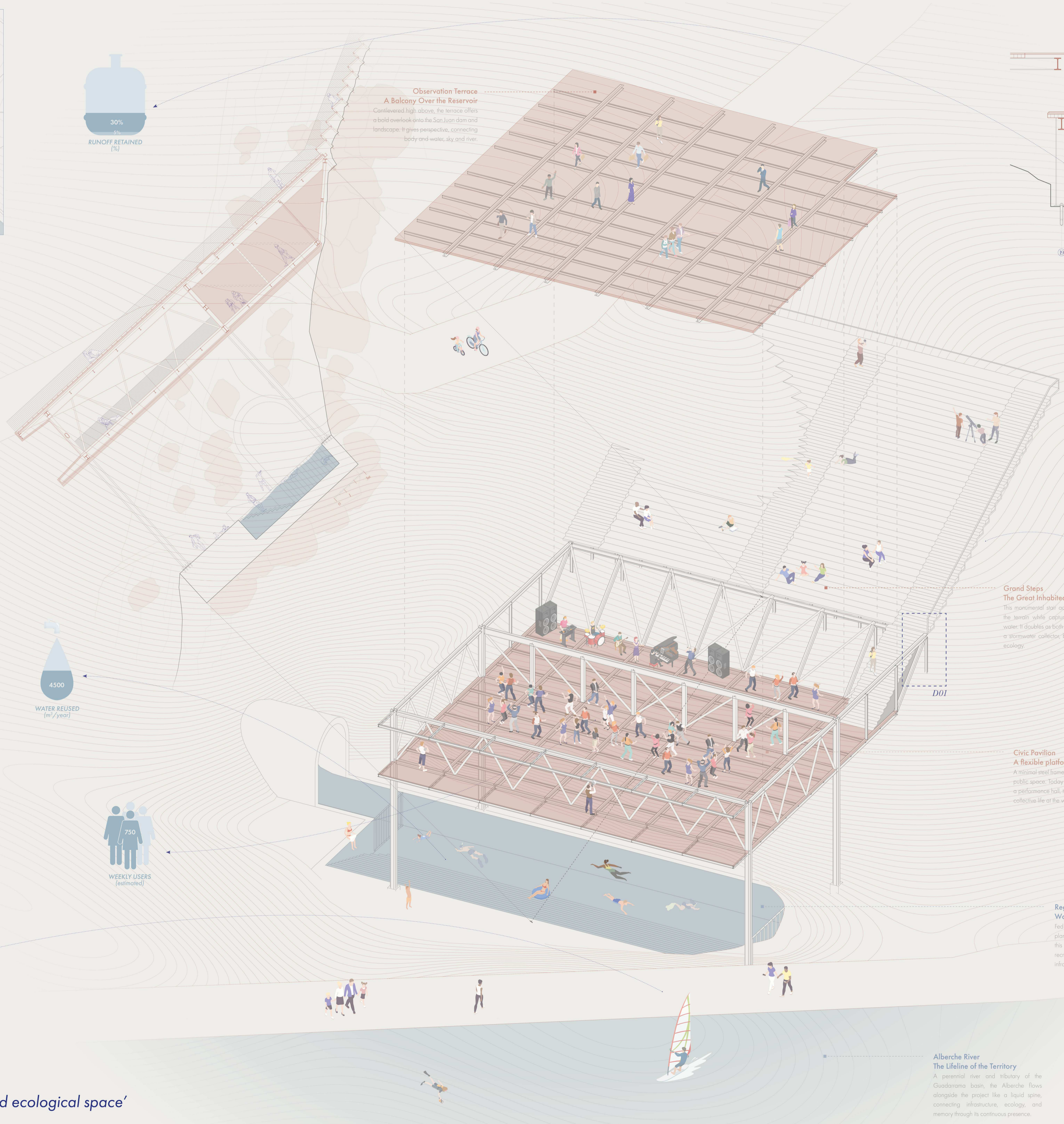
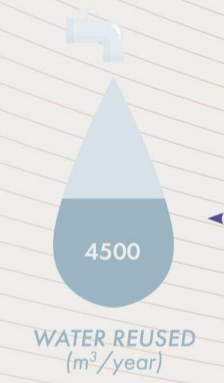
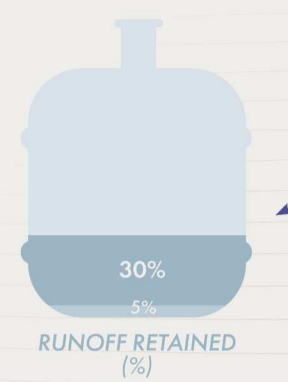
**2040** *Heat in the Concrete*  
Urban streets trap heat, exposing residents to rising temperatures and environmental stress.

**2045** *Overflow Below*  
Extreme rains overwhelm stormwater systems, flooding the underground network.

**2050** *Fields under Pressure*  
A growing city demands more food and water, while the land cracks under the weight of climate.



## Hidrograma PROPOSAL 'A Porous City Where Water Takes Its Place'



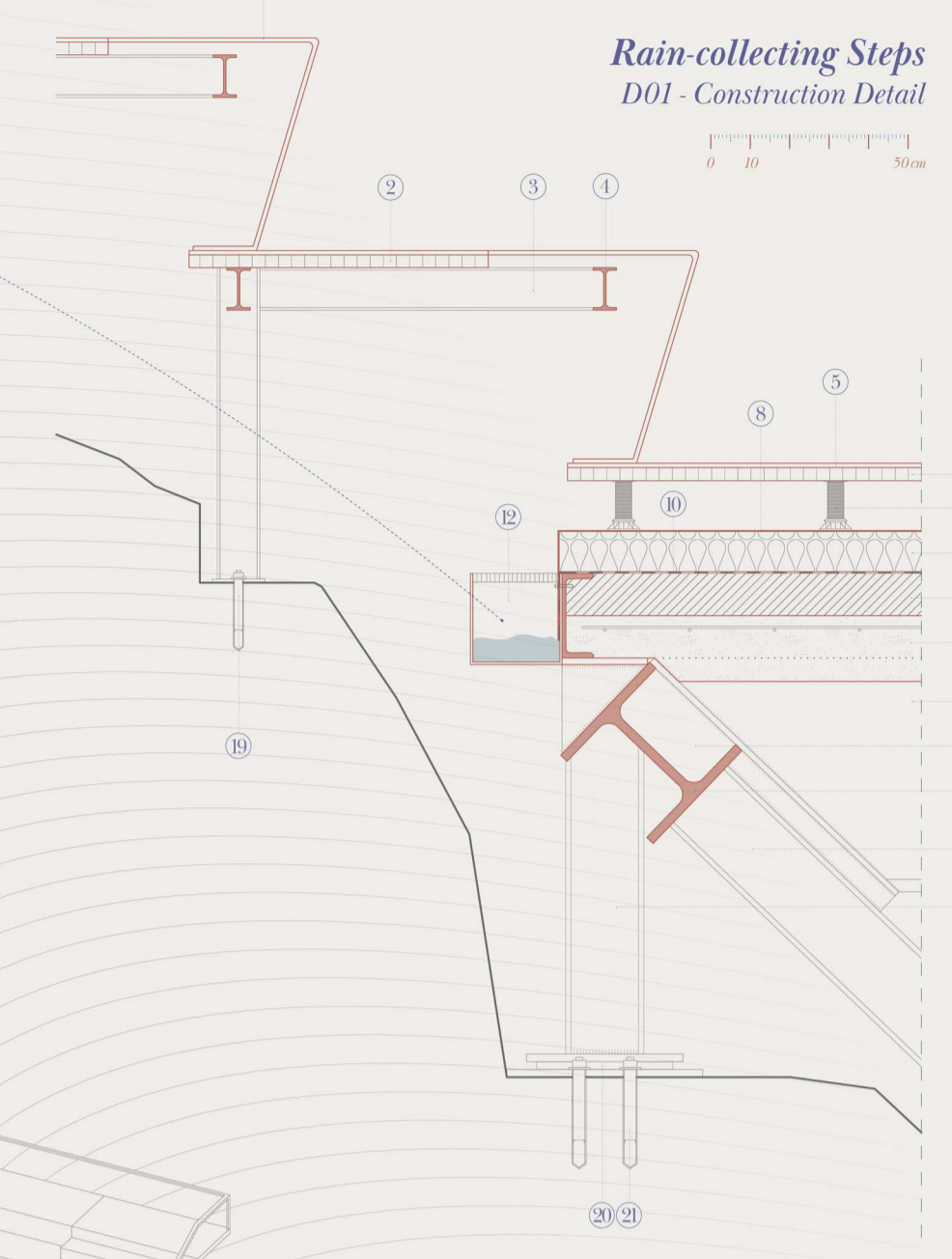
**Observation Terrace**  
**A Balcony Over the Reservoir**  
Canistered high above, the terrace offers a bold overlook onto the San Juan dam and landscape. It gives perspective, connecting body and water, sky and river.

**Grand Steps**  
**The Great Inhabited Slope**  
This monumental stair adapts to the slope of the terrain, while capturing rain and spring water. It doubles as both an amphitheater and a stormwater collector, blending access and ecology.

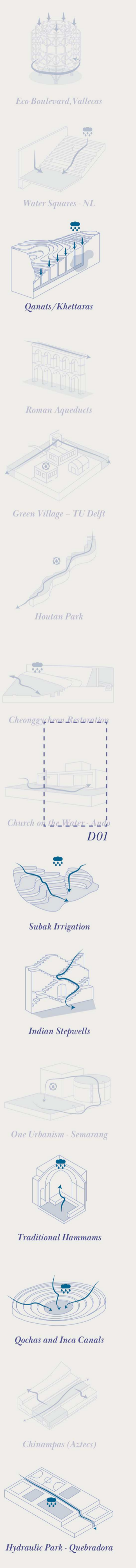
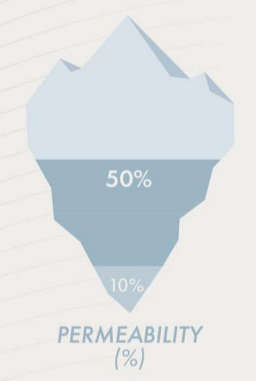
**Civic Pavilion**  
**A flexible platform for social use**  
A minimal steel framework defines a flexible public space. Today a nightclub, tomorrow a performance hall, this open box amplifies collective life at the water's edge.

**Regenerative Pool**  
**Water returned and reused**  
Fed by the outflow of the hydroelectric plant and runoff filtered from the platform, this water body is both ecological and recreational, a regenerative basin where infrastructure returns water to the people.

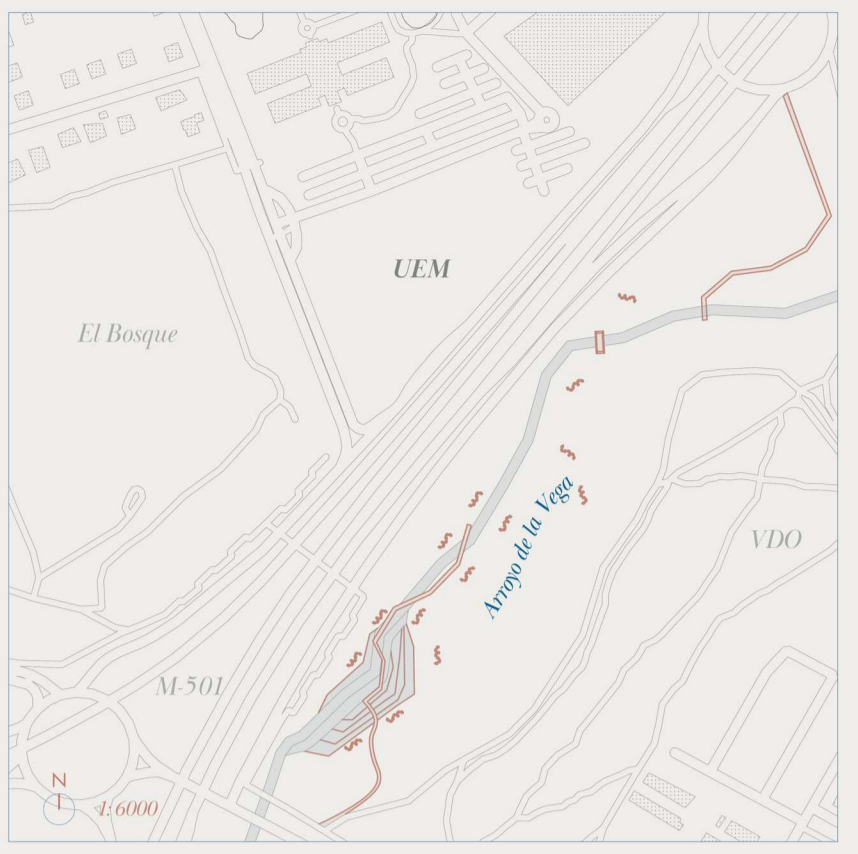
**Alberche River**  
**The Lifeline of the Territory**  
A perennial river and tributary of the Guadarrama basin, the Alberche flows alongside the project like a liquid spine, connecting infrastructure, ecology, and memory through its continuous presence.



- Corten steel sheet stair: 1
- Steel grid panel: 2
- PE 100 beam: 3
- PE 100 beam: 4
- Welded corner steel plates: 5
- Steel grid panel: 6
- Adjustable piler: 7
- Protection layer: 8
- XPS rigid panel insulation: 9
- PVC waterproofing membrane: 10
- Lightweight sloped concrete: 11
- Stainless steel gutter & water stops: 12
- Composite slab with steel decking: 13
- HEB550 beam: 14
- HEB300 beam: 15
- HEB550 beam: 16
- HEB240 beam (diagonal): 17
- HEB300 column: 18
- Anchor bolt and plate: 19
- Anchor plate/stoprene layer: 20
- Anchor bolt: 21



**Hidrograma**  
**EMBÁLSÉATE**  
**'Activate the reservoir as a civic and ecological space'**



**Shading Nest – Cooling, Gathering, Restoring**  
D02 - Axonometric Scheme



- 1 Provides generous shade throughout the day
- 2 Collects atmospheric moisture through the steel canopy into pillar tanks
- 3 Cools the air by diffusing collected water as a fine mist
- 4 Incorporates integrated seating for rest, pause, and gathering
- 5 Supports urban biodiversity by attracting birds and pollinators

**The Circulation**  
A new student crossing  
This elevated path softens a traffic-heavy node, creating a safe, visible, and direct route for students between town and campus. By calming vehicles and prioritizing people, the passerelle reclaims the roundabout as a civic space. It turns a point of disconnection into an everyday urban ritual.

**The Footbridge**  
Water as experience  
A suspended walkway traces the reactivated stream, inviting visitors to walk, pause, and observe the water cycle in real time. Biofiltration zones and wetlands become part of a public, sensory path. Here, infrastructure is not hidden; it is experienced, learned, and appreciated.

Along the forgotten Arroyo de la Vega, a former branch of the Guadarrama River, nestled between the M-501 highway and the outskirts of Villaviciosa de Odón : Camino al TratArte. It proposes a new path: ecological, educational, and vital. It transforms a marginal void into a regenerative urban experience.

The project is born from a dual intention: to recover a neglected fringe space, long overshadowed by infrastructure, and to reconnect the town center with the Universidad Europea through a greener, slower, and safer pedestrian route.

The existing footbridge remains, but the proposed intervention invites a different rhythm, one that is immersive and attuned to the landscape.

Drawing inspiration from projects like Houtan Park in Shanghai, the stream becomes a living infrastructure: a visible system of terraces, wetlands, and vegetated banks that purify runoff water naturally and in real time.

Visitors witness this transformation as they walk. Water filters through sand, gravel, and aquatic plants; microturbines under footbridges harvest energy; mist diffuses from shaded canopies suspended above. These architectural "nests" collect humidity, offer seating, and attract birds and pollinators, turning the linear path into a biodiverse corridor of rest and awareness.

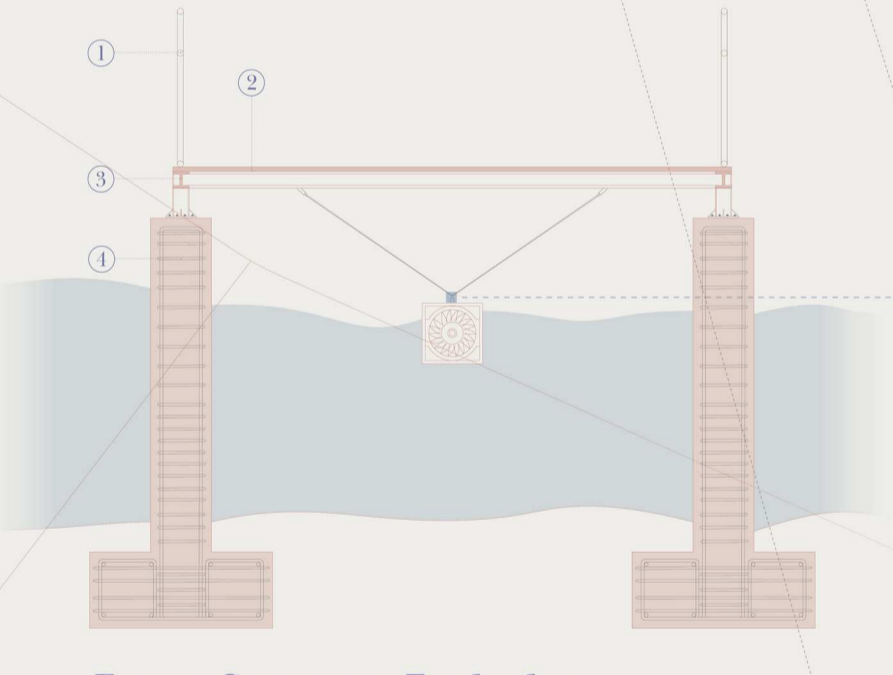
At certain points, the route opens into contemplative thresholds: benches, decks, or shallow crossings where water, people, and terrain meet. The design invites observation, pause, and connection, without compromising hydrological function.

The channel's primary role is to clean runoff water before it enters the municipal potable system.

This segment of the Hidrograma reveals a phase usually hidden; a choreography of ecological treatment between water's collection and its reprocessing.

More than a path, Camino al TratArte becomes a restorative gesture: blending land, infrastructure, and urban life into one resilient and poetic system. A green spine that redefines the way we move, relate, and care.

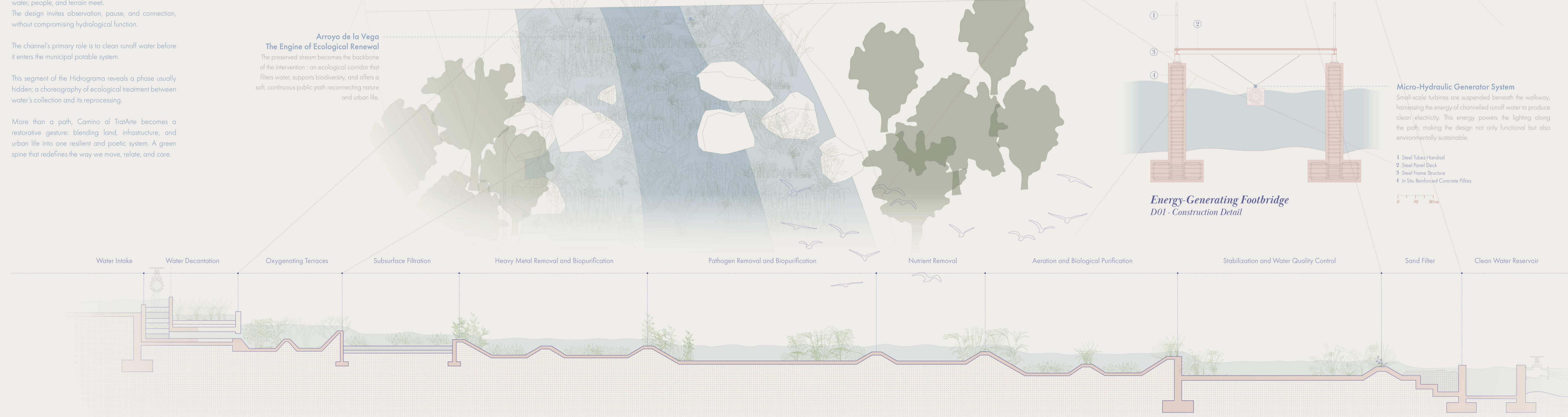
**Arroyo de la Vega**  
The Engine of Ecological Renewal  
The preserved stream becomes the backbone of the intervention: an ecological corridor that filters water, supports biodiversity, and offers a soft, continuous public path reconnecting nature and urban life.



**Energy-Generating Footbridge**  
D01 - Construction Detail

**Micro-Hydraulic Generator System**  
Small-scale turbines are suspended beneath the walkway, harnessing the energy of channelled runoff water to produce clean electricity. This energy powers the lighting along the path, making the design not only functional but also environmentally sustainable.

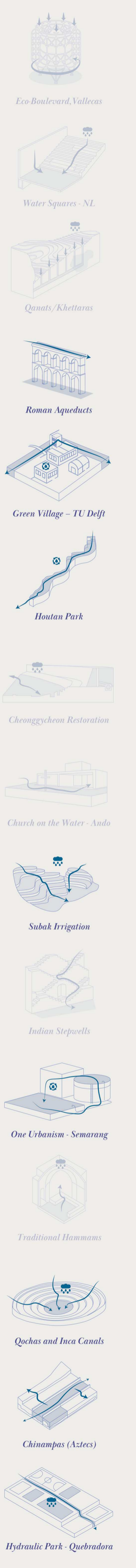
- 1 Steel Tubed Handrail
- 2 Steel Panel Deck
- 3 Steel Frame Structure
- 4 In Situ Reinforced Concrete Pillars

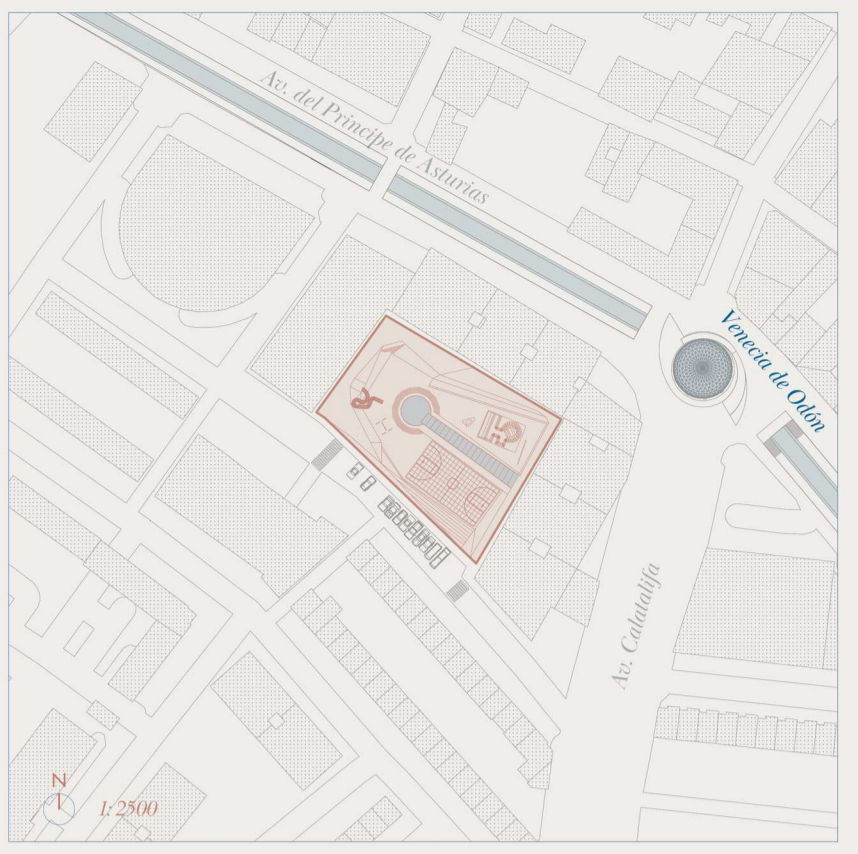


**Natural Purification Channel**  
Engineered Wetland System with Phytoremediation and Sand Filtration Modules  
Schematic Section

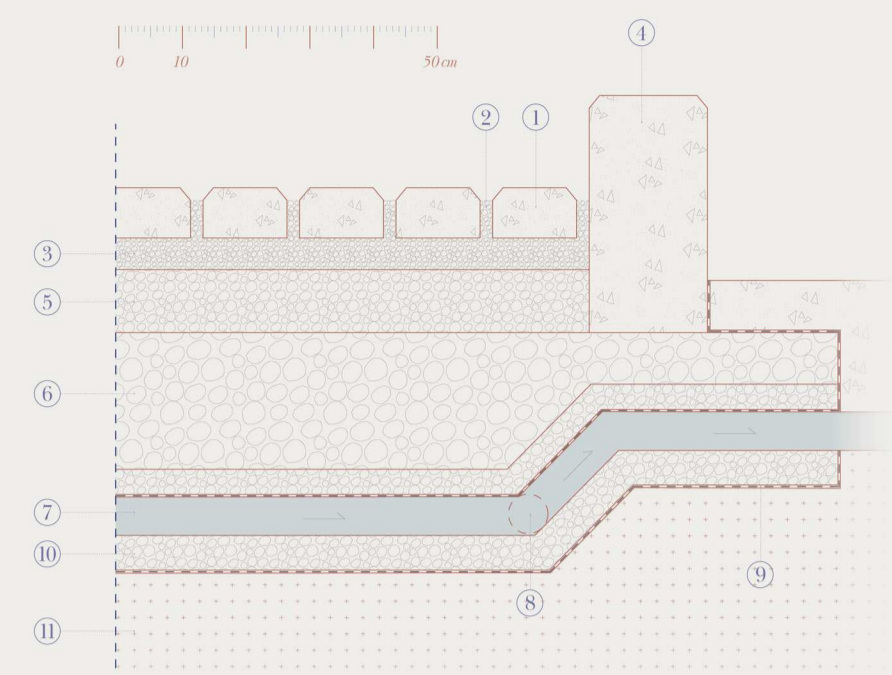


**Hidrograma**  
**CAMINO AL TRAT-ARTE**  
'Revived stream: water that heals and connects'





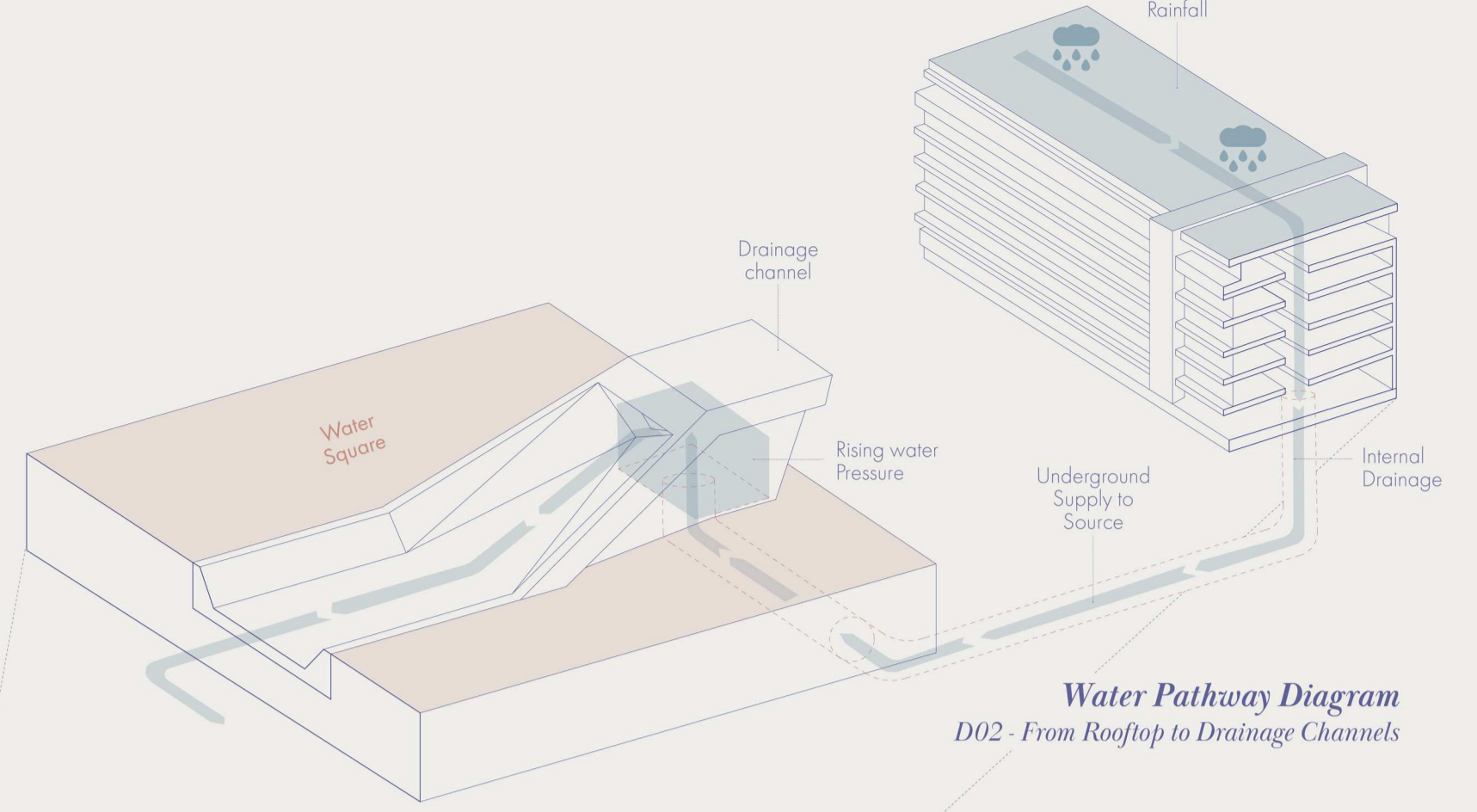
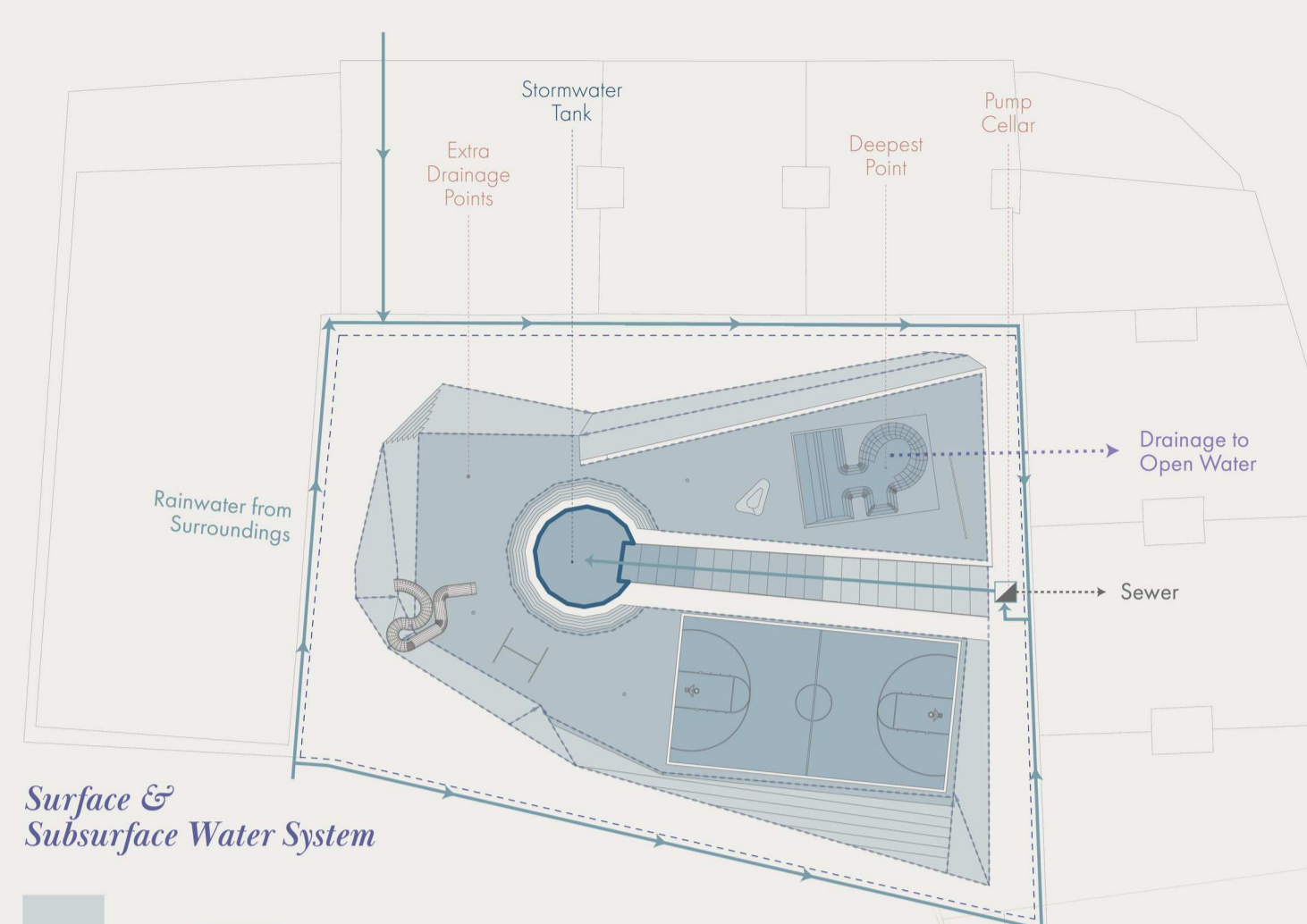
**Permeable Pavement  
D01 - Construction Detail**



- 1 Concrete pavers (80mm)
- 2 Washed angular stones in joints
- 3 Bedding course (4-10mm coated stones)
- 4 Concrete Edge and Slab
- 5 Stone Open Graded Base (ATSM #57)
- 6 Stone Subbase/Reservoir layer
- 7 Outlet Pipes to catch basin
- 8 Reinforced sloped underdrains
- 9 Drainage Grates/stele
- 10 Bedding for drainage pipe
- 11 Soil Subgrade Sloped to drain

**Surface & Subsurface Water System**

Storm Type	Frequency	Intensity	Volume
Extreme Storm	~1/3-5 years	100-300 mm	~326-979 m <sup>3</sup>
Heavy Storms	10-15/year	20-30 mm	650-1,470 m <sup>3</sup>
Regular Rain	~150/year	~5 mm	~2,146 m <sup>3</sup>



**Water Pathway Diagram  
D02 - From Rooftop to Drainage Channels**

In the heart of Plaza de las Margaritas, Las Antipiscinas emerges as a bold reinterpretation of the urban square, not as an inert, paved surface, but as a dynamic, porous system that actively participates in the water cycle. In an era marked by climate extremes, the project responds to the need for public spaces that are not only social but also resilient, ecological, and didactic.

Where water was once evacuated as quickly as possible, it is now welcomed, retained, and made visible. The plaza is no longer a backdrop for circulation but a hydrological landscape, designed to collect, slow, and filter rainwater through a network of permeable surfaces, slopes, and drainage corridors.

The project draws inspiration from Dutch urban water strategies, where plazas, parks, and playgrounds double as stormwater infrastructure. Following this logic, Las Antipiscinas reclaims the hidden potential of urban voids, creating a hybrid civic-hydraulic space where every square meter contributes to climate adaptation.

The intervention is structured around three main components. First, a basketball court with permeable paving doubles as a recreational platform and infiltration surface. Second, a sunken skatepark serves as a leisure space and secondary basin, capable of retaining excess water during intense rain. Its geometry is calibrated for temporary storage and controlled release.

Third, and most critically, the plaza's hydrological structure is anchored by a stormwater tank (tanque de tormentas) at its lowest point. Water flows into it through a system of sloped surfaces, subsurface pipes, and open channels, following the natural topography and aligning with the new Venecia de Odón canal street.

Every surface participates in this logic. Pavements alternate between hard, porous, and planted zones. Subtle level changes and grates guide runoff toward collection points. Native vegetation enhances infiltration, biodiversity, and cooling.

The transformation is both functional and symbolic. It positions water not as a threat to be hidden, but as a civic protagonist; present, visible, and celebrated. Las Antipiscinas reclaims the social and environmental potential of plazas as multi-layered infrastructures: spaces that gather people while responding to drought, storms, and heat.

Beyond its ecological mission, the project revitalizes the plaza's social life. Sports, leisure, and shaded areas activate the space daily, encouraging intergenerational use and supporting local commerce. A once-underused square becomes a vibrant and meaningful place.

Las Antipiscinas is not an isolated gesture but part of a broader urban vision: a prototype for Villavicosa de Odón 2050. It proposes a new kind of public space: one shaped by rain, open to uncertainty, and guided by the intelligence of the ground.

**Sloped Surfaces & Drainage  
Shaping space through water**

The entire plaza is sculpted by water logic: gentle slopes guide rainfall across the surface, revealing subtle topographies. Drainage channels trace these flows, framing paths, seating zones, and play areas. Infrastructure becomes design, readable, walkable, and shared.

**Permeable Court  
Play on a porous ground**

This sports surface merges recreation and resilience: a basketball court made of permeable paving that filters rainwater as it falls. Along its edge, the stepped bleachers not only provide seating, but also direct and collect surface runoff, integrating spectatorship into the hydrological choreography beneath their feet.

**Roof Gutters  
Redirected flows from above**

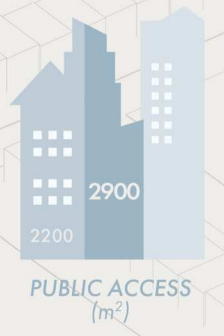
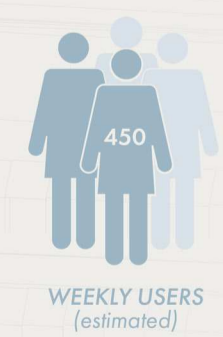
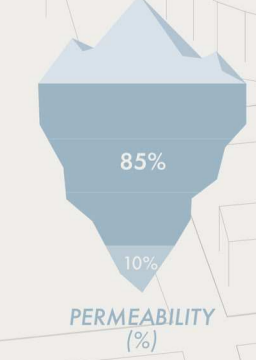
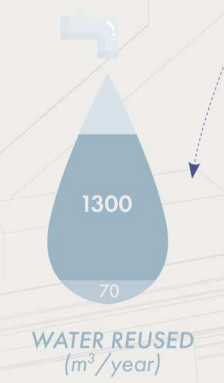
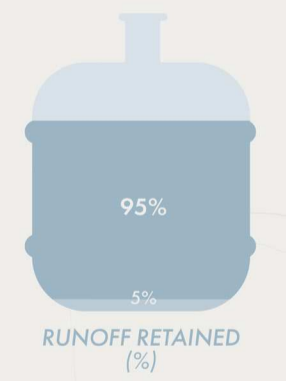
New gutters installed on the rooftops guide rainwater into the plaza's drainage system. Linked to an articulated network of surface and subsurface channels, they contribute to a unified logic of collection, where built form and water cycles become interdependent.

**Storm Skatepark  
A bowl ready to catch the rain**

When not in use by skaters, this sculpted concrete park becomes a reserve basin, capturing excess runoff during heavy rainfall. Its dual function adds both character and capacity to the plaza, allowing stormwater to be held temporarily before filtration.

**Central Catch Basin & Waterfall  
Where all waters meet**

At the heart of the intervention, this basin collects runoff from both the plaza and surrounding rooftops. Water flows visibly toward a cascading fall, before being directed underground into a new tanque de tormentas, making infrastructure part of the public landscape.



**Hidrograma  
LAS ANTIPISCINAS**

'Transform the plazas into porous and climate-active surfaces'

- Eco Boulevard, Valletta
- Water Squares - NL
- Quants/Khettaras
- Roman Aqueducts
- Green Village - TU Delft
- Houtan Park
- Cheonggyecheon Restoration
- Church on the Water - Ando
- Sabak Irrigation
- Indian Stepwells
- One Urbanism - Semarang
- Traditional Hammams
- Qochas and Inca Canals
- Chinampas (Aztec)
- Hydraulic Park - Quebradon





Along Avenida Príncipe de Asturias, the main axis of Villavicosa de Odón, stormwater and treated wastewater flow just beneath the surface, hidden in pipes, out of sight and out of mind. What was once a vital hydrological line has been paved over, compressed into infrastructure without presence, disconnected from both the city's natural processes and its public life.

Venecia de Odón proposes to resurface this flow, not metaphorically, but literally. It introduces a narrow, continuous urban canal into the existing street, reclaiming the buried logics of water management and transforming them into spatial, social, and environmental value.

The canal collects, filters, and transports a mix of rainwater and treated effluents, acting simultaneously as a visible drainage line, a cooling ribbon, and a passive reservoir in times of excess.

Rather than erasing the street's existing function, the intervention operates within it, not against it. The canal weaves through the center and edges of the avenue, adapting to available space, leaving room for vehicles but shifting the balance.

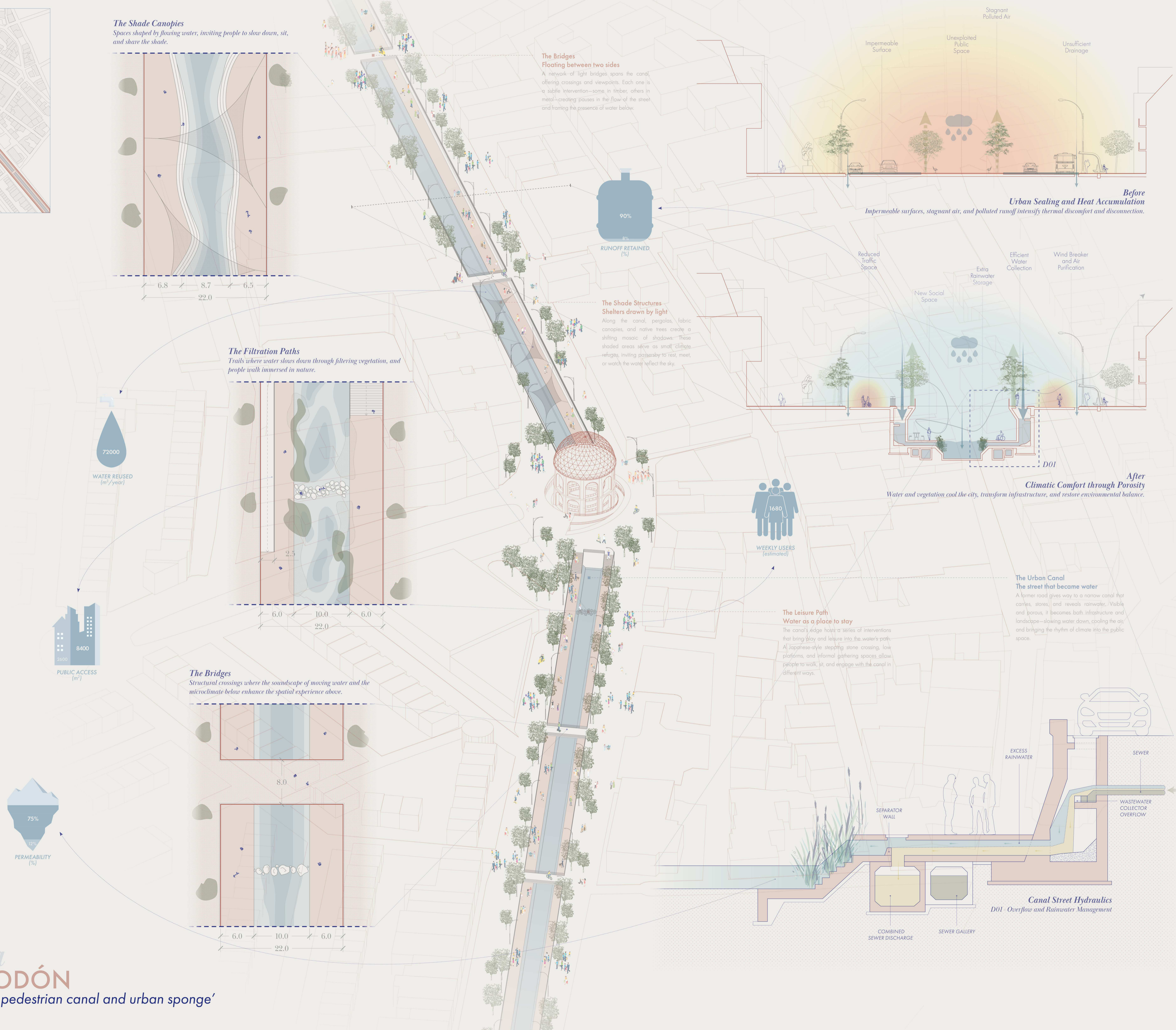
Car circulation is reduced, not eliminated, making way for broader sidewalks, shaded areas, and vegetated strips that restore porosity and reduce heat. Asphalt becomes permeable. Water becomes present. The street begins to breathe.

As the canal flows, it interacts with the public realm. Bioswales, filtration gardens, and gravel beds line its course, enabling water to slow down, infiltrate, and be partially purified through natural processes. These visible systems not only perform hydrologically, but reshape how the street feels: the air becomes more humid, temperatures lower, the soundscape changes. The once-hardened avenue becomes a softer place, a place to walk, to cross, to linger.

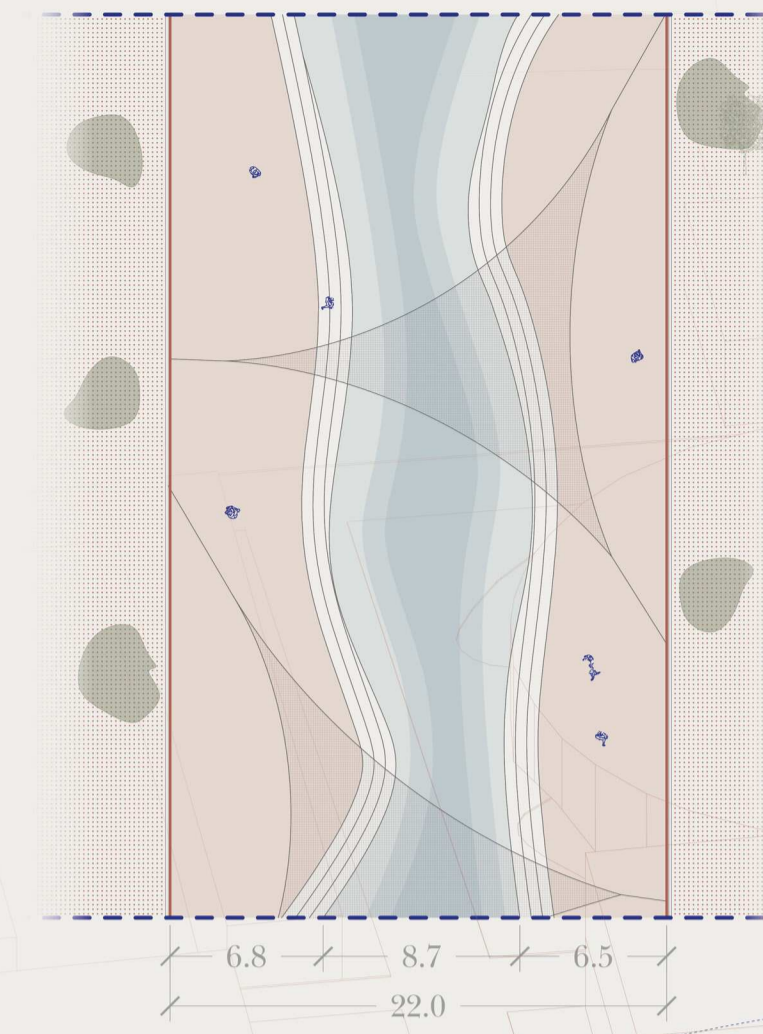
Shading structures, bridges, and stone crossings create a rhythm of movement and pause. The canal does not cut through the city, it threads it together. Nearby shops and services benefit not only from foot traffic, but from the improved comfort and identity of the street. This is not a spectacle of water, but an infrastructure made legible, subtle, calm, and part of everyday routines.

Venecia de Odón is both practical and poetic. It restores ecological function to a paved corridor while upgrading its public character. It captures runoff, stores and channels water, and reveals what was once buried, offering a new civic geography where environmental and social systems align.

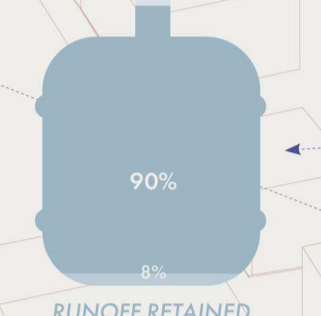
Far from being a rupture, this intervention is a reconciliation: between water and pavement, climate and city, flow and structure. It is a street that no longer hides its systems, but lets them shape the experience of urban life.



**The Shade Canopies**  
Spaces shaped by flowing water, inviting people to slow down, sit, and share the shade.

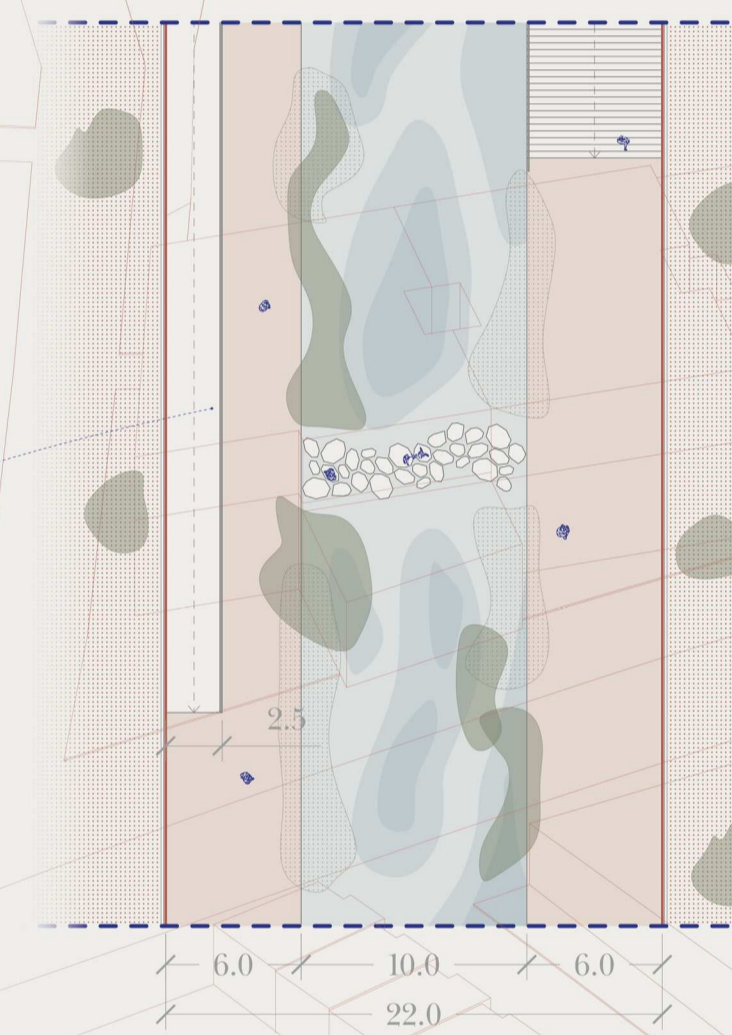


**The Bridges**  
Floating between two sides  
A network of light bridges spans the canal, offering crossings and viewpoints. Each one is a subtle intervention—some in timber, others in metal—creating pauses in the flow of the street and framing the presence of water below.

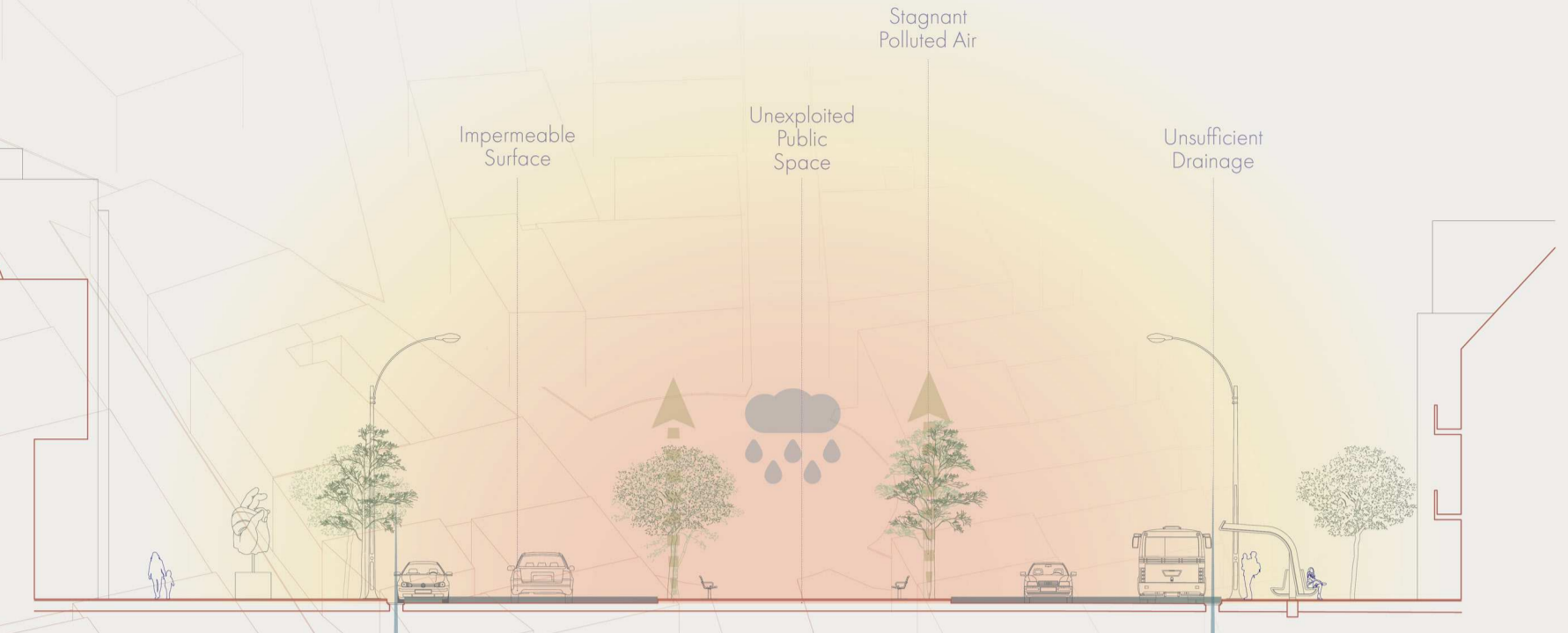
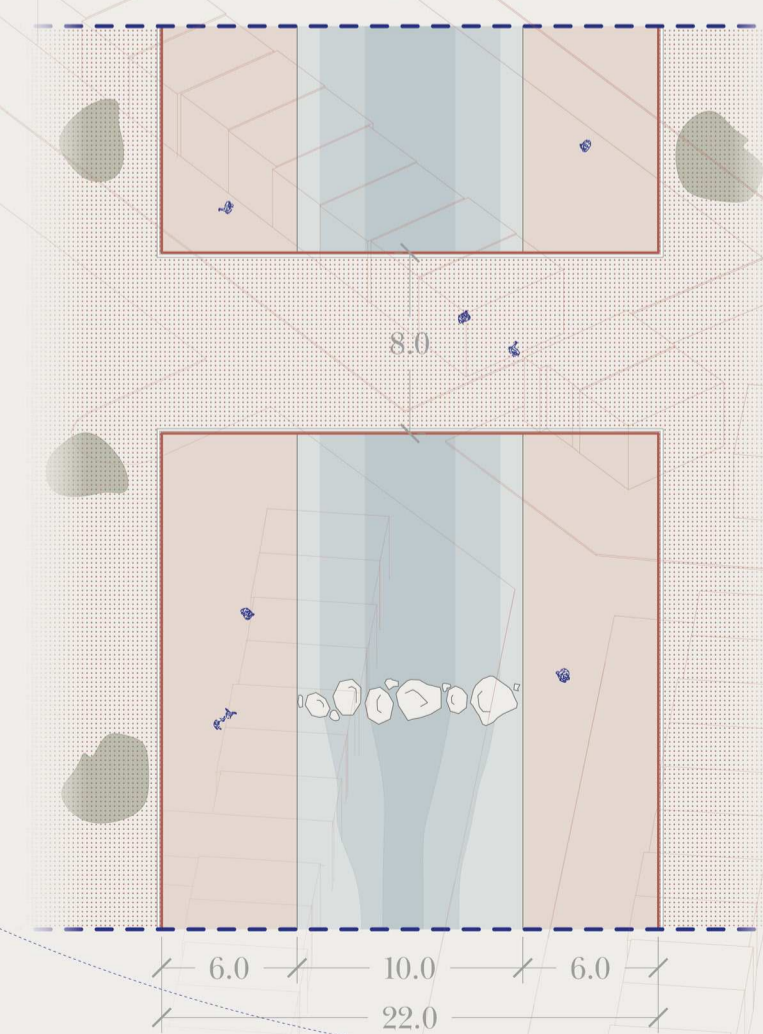


**The Shade Structures**  
Shelters drawn by light  
Along the canal, pergolas, fabric canopies, and native trees create a shifting mosaic of shadows. These shaded areas serve as small climate refuges, inviting passersby to rest, meet, or watch the water reflect the sky.

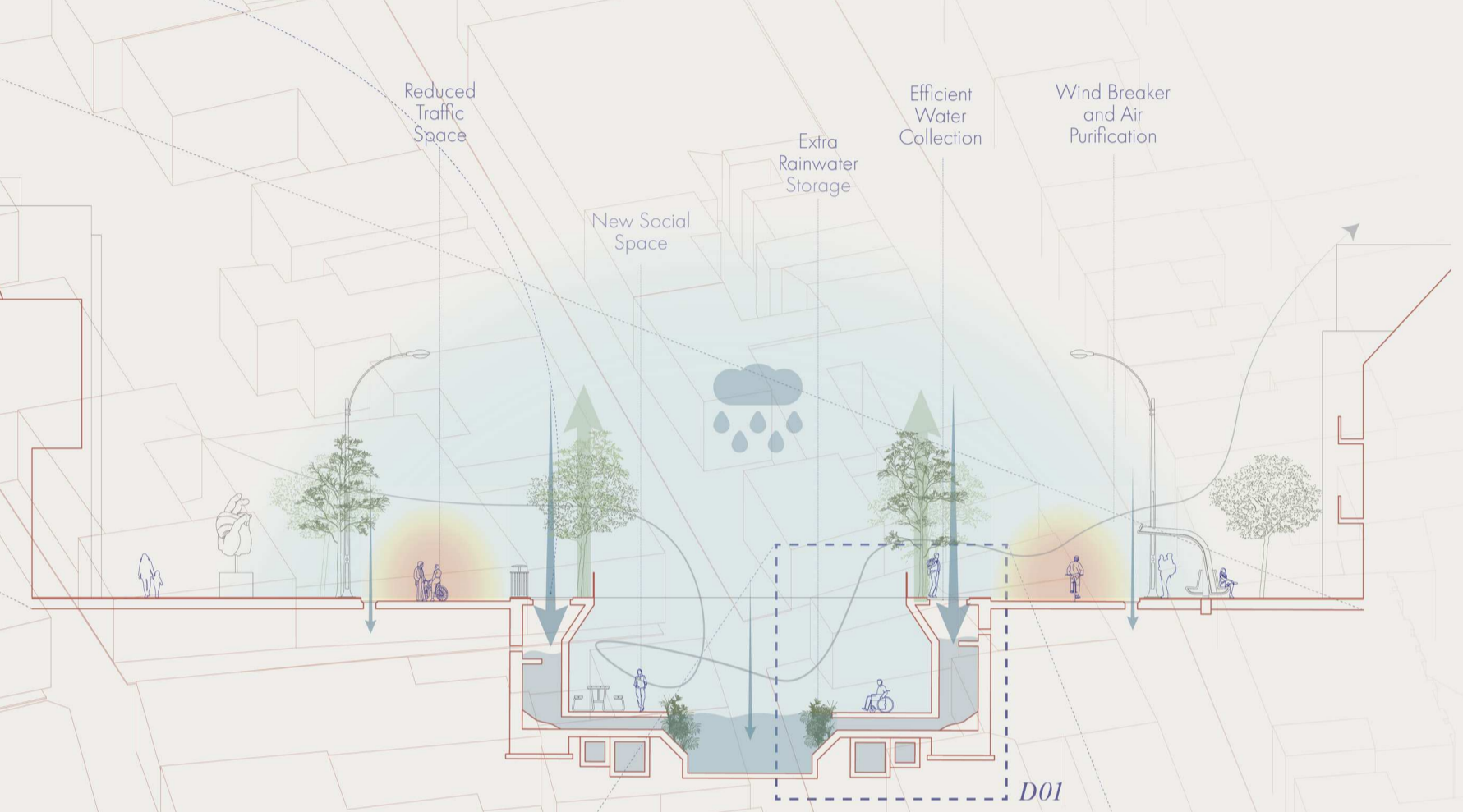
**The Filtration Paths**  
Trails where water slows down through filtering vegetation, and people walk immersed in nature.



**The Bridges**  
Structural crossings where the soundscape of moving water and the microclimate below enhance the spatial experience above.



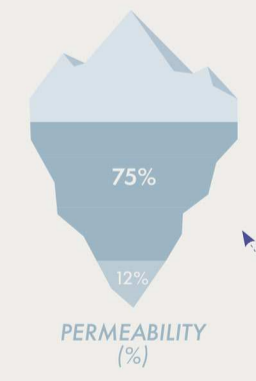
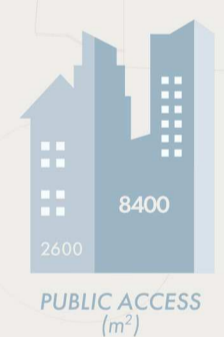
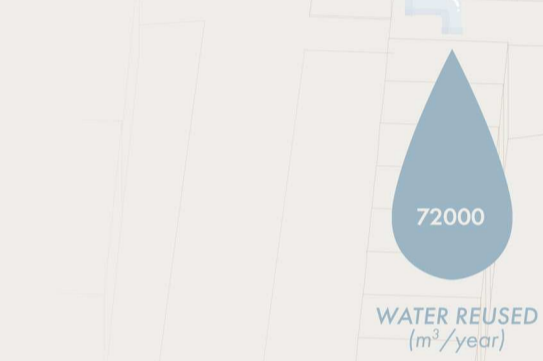
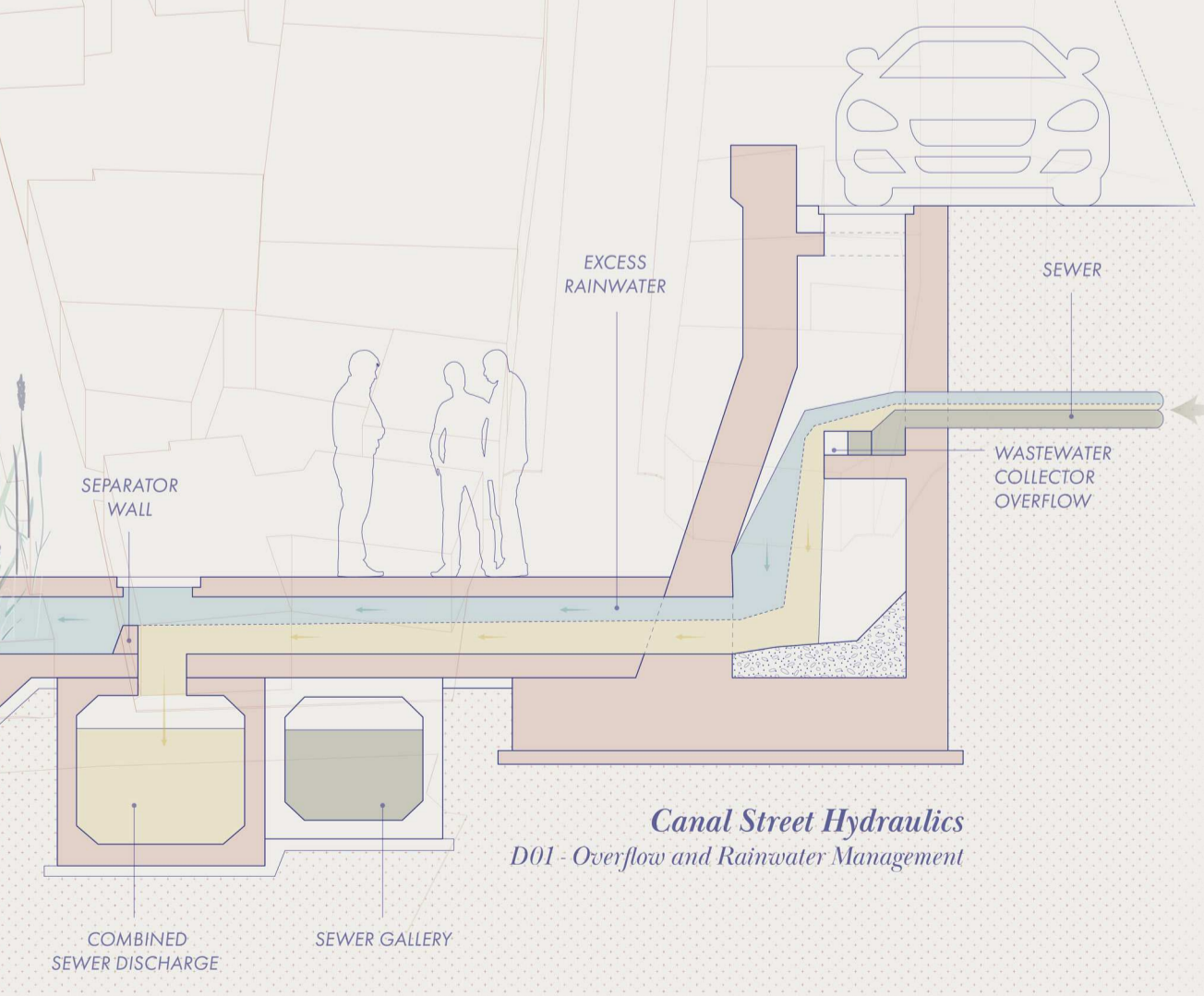
**Before**  
Impermeable surfaces, stagnant air, and polluted runoff intensify thermal discomfort and disconnection.



**After**  
Water and vegetation cool the city, transform infrastructure, and restore environmental balance.

**The Leisure Path**  
Water as a place to stay  
The canal's edge hosts a series of interventions that bring play and leisure into the water's path. A Japanese-style stepping stone crossing, low platforms, and informal gathering spaces allow people to walk, sit, and engage with the canal in different ways.

**The Urban Canal**  
The street that became water  
A former road gives way to a narrow canal that carries, stores, and reveals rainwater. Visible and porous, it becomes both infrastructure and landscape—slowing water down, cooling the air, and bringing the rhythm of climate into the public space.

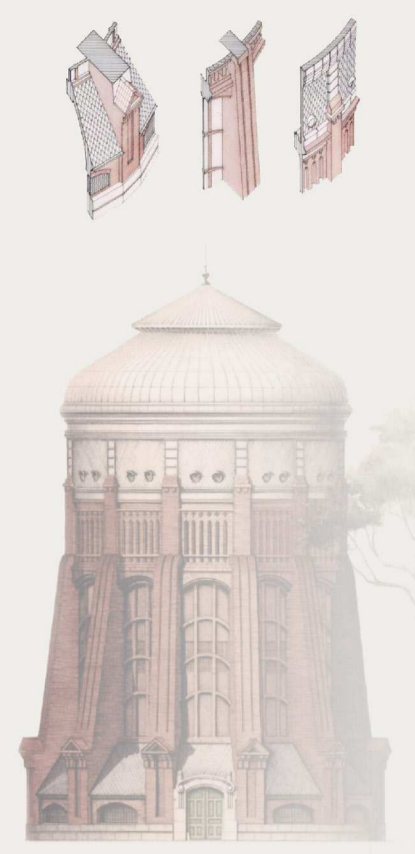
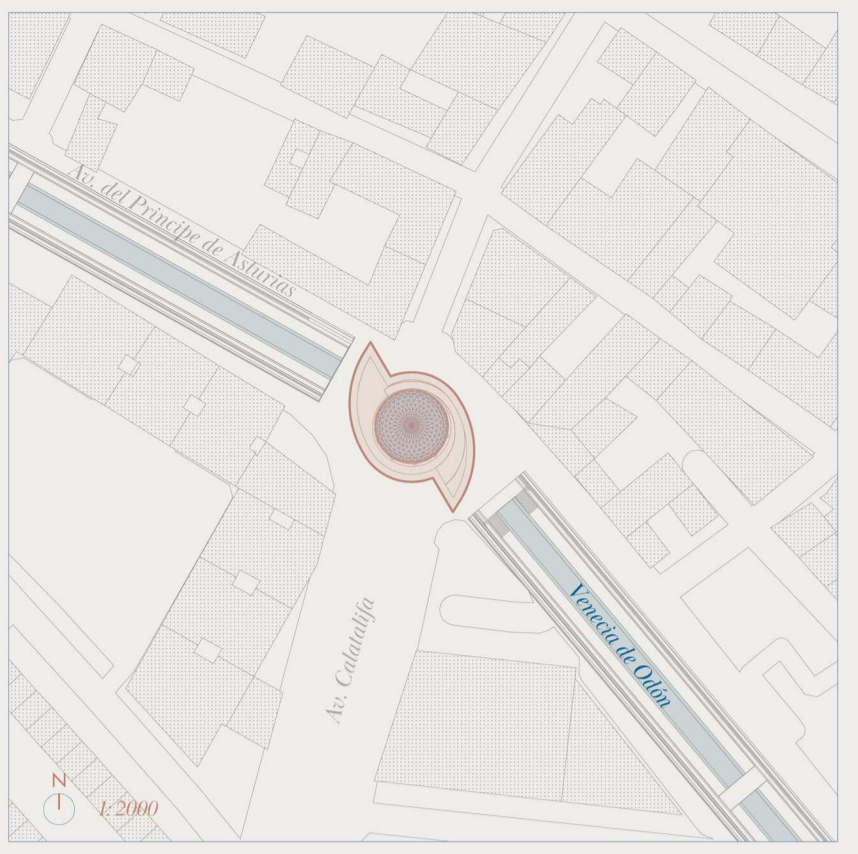


- Eco Boulevard, Vallecas
- Water Squares - NL
- Quants / Khetaras
- Roman Aqueducts
- Green Village - TU Delft
- Houtan Park
- Cheonggyecheon Restoration
- Church on the Water - Ando
- Sabak Irrigation
- Indian Stepwells
- One Urbanism - Semarang
- Traditional Hammams
- Qochas y Canales Incas
- Chinampas (Aztec)
- Hydraulic Park - Querabrada

# Hidrograma

## VENECIA DE ODÓN

'Transform the street into a pedestrian canal and urban sponge'



### Inspiration Depósito de Santa Engracia

The historic Depósito de Santa Engracia in Madrid inspired Baño de Poseidón as a model of civic water architecture, monumental yet functional. Its brick vaults, rhythmic structure, and quiet dignity informed the spatial language of the new water pavilion. Baño de Poseidón reinterprets this legacy through a contemporary lens: light materials, open structure, and public accessibility transform the reservoir into a new urban ritual.

Beneath the surface of Villaviciosa de Odón, massive stormwater tanks quietly hold the rain that falls over the city, protecting it from floods and regulating its hydrological cycle. Normally hidden, these technical infrastructures take center stage in Baño de Poseidón: a transformative intervention that reveals one of these reservoirs as a civic and symbolic monument to water.

The project is part of the Venecia de Odón sequence, continuing its logic of purifying mixed rainwater and wastewater through visible, architectural means. Where the canal-street makes flows legible on the surface, Baño de Poseidón invites the public into the depths of the system, uncovering the hidden core of urban water management.

From the main axis, a discreet entry appears as a fracture in the ground, a modern grato carved into the city. This subtle gesture invites visitors to descend into the unseen: a vast cylindrical space where water gathers, suspended between sky and earth.

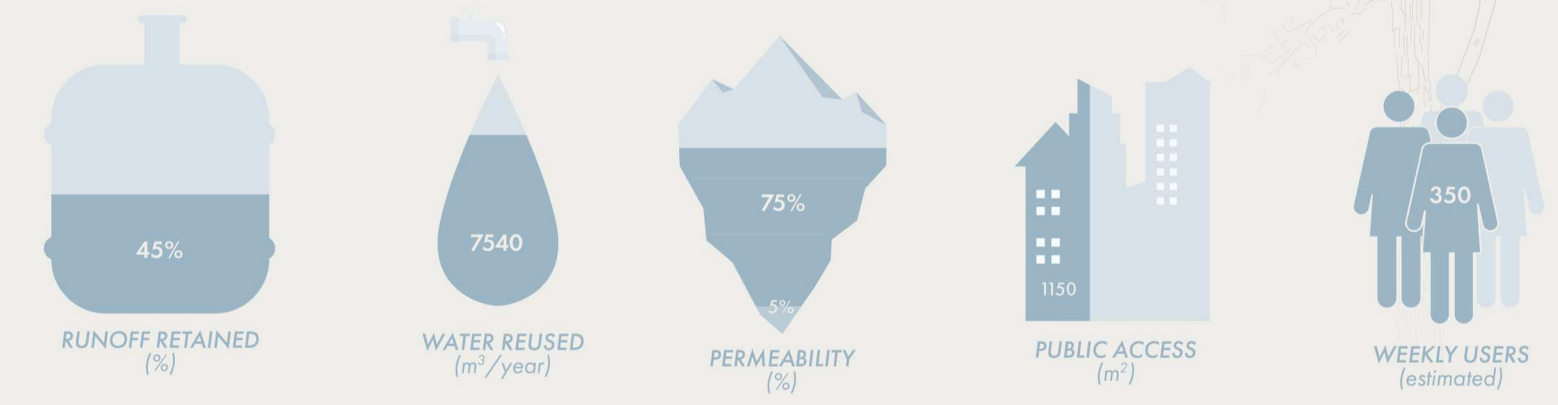
The intervention preserves the tank's function but transforms its meaning. An elevated circular balcony allows visitors to observe the reservoir in real time. As storms pass, the water level fluctuates, echoing through the chamber. Sound, atmosphere, and light shift, turning this once-invisible infrastructure into a living, responsive space.

At the top, a transparent ETFE dome crowns the structure, a symbolic device that makes the volume of stored water visible from above. The dome acts as a hydrological barometer for the city, reminding citizens of the precarious balance between scarcity and abundance.

The architectural language is quiet, monumental, and emotional. It is inspired by historical water deposits like Santa Engracia in Chamberí, Madrid. Light enters softly, reflecting on the water surface like in a sacred space. The experience is designed to be introspective, almost ritualistic; a place not just to look at water, but to feel its presence and meaning.

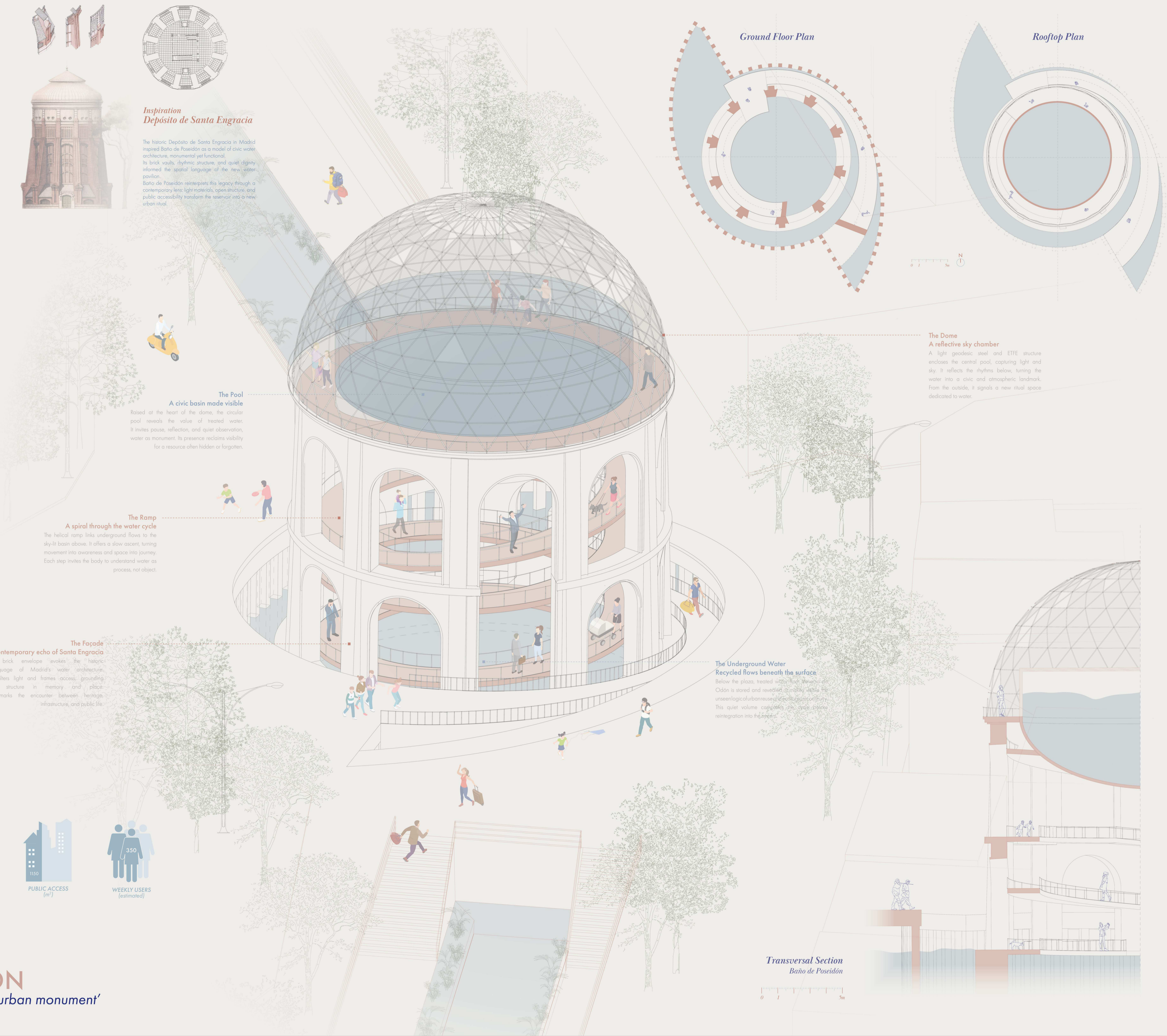
This descent is not only a spatial journey but a civic one. By opening access to the hidden system beneath their feet, Baño de Poseidón gives citizens the opportunity to recognize water as a collective heritage, not a threat or residue, but a living element that sustains and unites.

Within the Hidrograma project, this intervention marks a moment of transition: where technical resilience becomes public culture, and utility becomes memory. It is a pause in the journey of Venecia de Odón, a monumental threshold that celebrates the new relationship between the city and its water: reflective, infrastructural, and deeply human.



# Hidrograma BAÑO DE POSEIDÓN

'Reveal the depths of the cycle as an urban monument'



#### The Pool A civic basin made visible

Raised at the heart of the dome, the circular pool reveals the value of treated water. It invites pause, reflection, and quiet observation, water as monument. Its presence reclaims visibility for a resource often hidden or forgotten.

#### The Ramp A spiral through the water cycle

The helical ramp links underground flows to the sky-lit basin above. It offers a slow ascent, turning movement into awareness and space into journey. Each step invites the body to understand water as process, not object.

#### The Façade Contemporary echo of Santa Engracia

A brick envelope evokes the historic language of Madrid's water architecture. It filters light and frames access, grounding the structure in memory and place. It marks the encounter between heritage, infrastructure, and public life.

#### The Underground Water Recycled flows beneath the surface

Below the plaza, treated water from Venecia de Odón is stored and recycled, visible in the unseen logic of urban reuse. This quiet volume completes the cycle: from reintegration into the system.

#### The Dome A reflective sky chamber

A light geodesic steel and ETFE structure encloses the central pool, capturing light and sky. It reflects the rhythms below, turning the water into a civic and atmospheric landmark. From the outside, it signals a new ritual space dedicated to water.

#### Transversal Section Baño de Poseidón



- Eco Boulevard, Valencia
- Water Squares - NL
- Quants/Khetaras
- Roman Aqueducts
- Green Village - TU Delft
- Houtan Park
- Cheonggyecheon Restoration
- Church on the Water - Ando
- Sabak Irrigation
- Indian Stepwells
- One Urbanism - Sennarung
- Traditional Hammams
- Qochas and Inca Canals
- Chimnapas (Aztecs)
- Hydraulic Park - Quebradora

Joanne Benizama Morali



At the final curve of the water's path, where the cycle should end but instead begins again, stands Agua de Ida y Huerta: an inhabitable ring that embraces the EDAR of Villaviecosa de Odón and transforms water's afterlife into opportunity.

Located around the municipal wastewater treatment plant, the intervention marks the closure of the Hidrograma, both symbolically and functionally. Here, treated water, once considered residual, is reused in aquaponic systems that feed productive landscapes and educational programs. It is a place where the city's waste becomes the land's wealth.

The architecture takes the form of a circular elevated structure, supported by a forest of slender steel pillars. Suspended lightly above the terrain, it creates a threshold between the technical and the territorial. Within this inhabited ring, a hybrid program unfolds: library, workshops, exhibition rooms, and restaurants, all oriented around cycles of learning, growing, and regenerating.

Above, a planted green roof becomes a new public path, inviting visitors to walk above the infrastructure, gaining fresh perspectives on the surrounding cultivated fields, the Barranco de la Virgen, and the expansive rural context. It is a place to learn, to stroll, to gather, all while witnessing the quiet power of reuse.

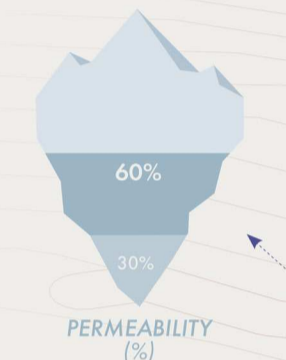
The outer façade is fully glazed, opening views toward the land that receives the returned water. In contrast, the inner skin is shaded with vertical rotating louvers that regulate light and temperature, and crucially, help reduce odor from the treatment plant. Together, these dual envelopes form a comfortable interior environment that mediates between function, climate, and landscape.

Inside, productive systems are embedded directly into the architecture: aquaponic basins, hydroponic gardens, and nutrient recovery installations form an open pedagogical loop. The flows of waste, air, water, and food are made visible; not as technical background, but as shared civic knowledge.

Inspired by the civic integration of La Quebradora Hydraulic Park in Mexico City and the circular productivity of One Urbanism's Semarang project in Indonesia, Agua de Ida y Huerta fuses infrastructure and culture. It frames the wastewater plant not as a hidden utility, but as a site of encounter, resilience, and territorial generosity.

Paths along the outer ring connect nearby farms, orchards, and community gardens, activating a larger productive landscape. As people walk, eat, study, or rest, they engage directly with the transformation of water from residue to resource, from invisible flow to tangible good.

Agua de Ida y Huerta is the final act of the Hidrograma, and the beginning of a new relationship between water, territory, and society. In closing the loop, it opens a renewed sense of urban ecology, where no drop is wasted and every cycle is celebrated.



**The Exhibition Spaces**  
Learning through infrastructure  
Along the inner ring, exhibition rooms open onto the treatment landscape. Through models, diagrams, and immersive media, visitors discover the invisible urban systems that sustain everyday life.

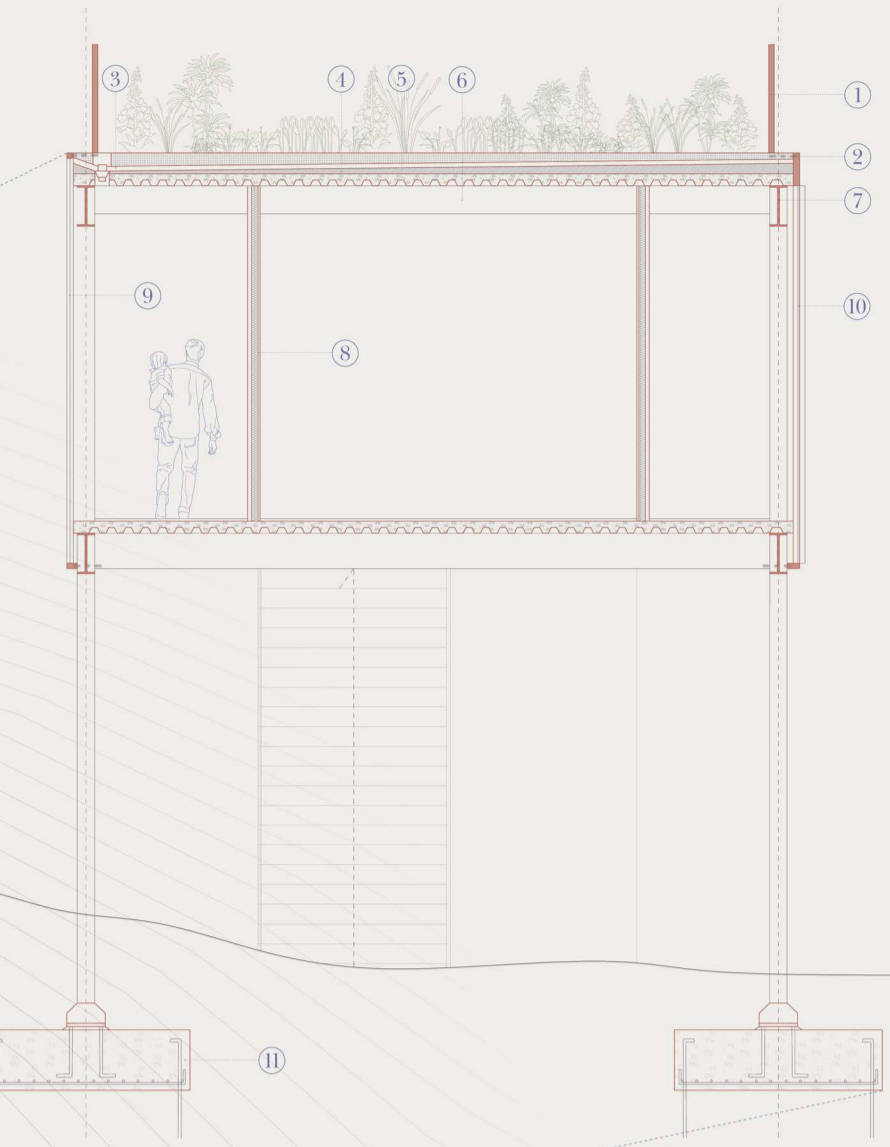
**The Restaurant Spaces**  
Eating from the cycle  
The restaurants serve produce grown on-site, linking taste and territory. With views to the aquaponics and surrounding fields, they offer a sensory experience rooted in sustainability and reuse.

**The Aquaponics Loop**  
Closing the nutrient cycle  
Treated water from the EDAR nourishes a system of aquaponic tanks and hydroponic gardens, where fish and plants collaborate in a cycle: visible food that transforms residual water into food, learning, and ecological awareness.

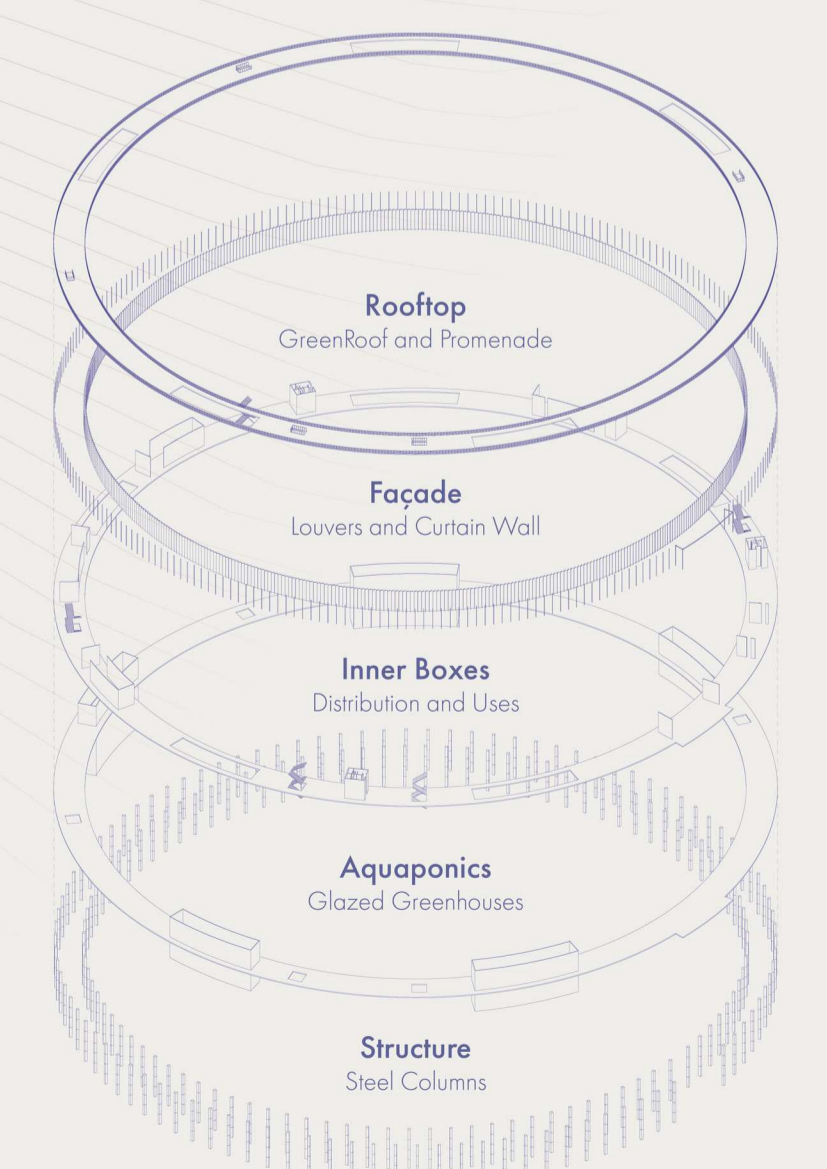
**The EDAR Core**  
Revealing water's afterlife  
At the center lies the existing wastewater treatment plant. Once hidden, it is now embraced by public architecture, reframing the EDAR as a productive heart where water is purified and returned to the land.

**Typical Section**  
D01 - Construction Detail

- Steel Handrail 1
- Engineered Soil with Planting 2
- Drainage Channel 3
- Sloped Cellular Concrete 4
- Composite Slab 5
- IFE 400 6
- IFE 270 7
- Partition Wall 8
- Double Fixed Glazing 9
- Rotating Vertical Steel Louvers 10
- Reinforced Concrete Footing 11



- Eco Boulevard, Vallecas
- Water Squares - NL
- Qanats/Khetaras
- Roman Aqueducts
- Green Village - TU Delft
- Houtan Park
- Cheonggyecheon Restoration
- Church on the Water - Ando
- Subak Irrigation
- Indian Stepwells
- One Urbanism - Semarang
- Traditional Hammams
- Qochas and Inca Canals
- Chinampas (Aztecs)
- Hydraulic Park - Quebradora



Main Floor Plan  
Agua de Ida y Huerta



# Hidrograma

## AGUA DE IDA Y HUERTA

'Closing the water cycle by connecting the city to the productive territory'

Camino al TratArte converts a forgotten fringe into a green corridor where water care becomes a shared and visible act. As pedestrians walk along terraces and wetlands that naturally clean runoff, they witness environmental processes in real time. This path slows movement and opens awareness, offering spaces of pause and reflection. It reconnects the town and university not only physically but emotionally, fostering a new kind of belonging where nature, infrastructure, and community learning are intertwined.

Las Antipiscinas turns a dry, underused square into a lively and porous urban stage. Here, people gather not only to play or rest, but to coexist with water and climate processes. Every surface performs a function—soaking, retaining, inviting. Sports courts, skate bowls, and shaded paths double as flood infrastructure, allowing children and elders alike to inhabit the plaza through different rhythms. The project strengthens community resilience by creating shared ground where life and weather meet meaningfully.



Embalséate redefines the San Juan Reservoir as more than a water source: it becomes a civic space where the public reconnects with the origins of their water. By transforming hydraulic infrastructure into a lived and accessible landscape, it invites people to contemplate and engage with water as a cultural and sensory experience. The architecture, inspired by hammams and stepwells, evokes a slow and ritual descent toward awareness, strengthening the emotional and ecological bond between humans and their resources.



**Camino al TratArte**  
Revived Stream : water that heals and connects



**Las Antipiscinas**  
Transform the plazas into porous and climate-active surfaces

Venecia de Odón restores water's presence in the city by embedding a canal into the main avenue, creating a space where people walk alongside ecological processes. This integration of mobility, climate adaptation, and social life makes the street more than a route—it becomes a place of gathering, learning, and comfort. By moderating car traffic and encouraging lingering, it gives the public a sense of agency in how their city adapts to change. The intervention transforms a functional corridor into a space of civic identity.



**Venecia de Odón**  
Transform the street into a pedestrian canal and urban sponge



Agua de Ida y Huerta celebrates the potential of water's afterlife by transforming the wastewater treatment plant into a productive civic loop. Visitors interact with aquaponic systems, green roofs, and educational spaces that demonstrate circularity in action. It is a place where infrastructure becomes a catalyst for knowledge, food, and community. People gather not only to learn but to participate in a landscape of regeneration, turning waste into resource and closing the cycle with purpose and visibility.

**Agua de Ida y Huerta**  
Closing the water cycle by connecting the city to the productive territory

**Baño de Poseidón**  
Reveal the depths of the cycle as an urban monument



Baño de Poseidón makes the invisible visible, giving citizens access to the vast stormwater tanks beneath them. As they descend into the reservoir, they encounter water not as an abstract concept, but as a tangible and ever-changing presence. Light, sound, and humidity engage the senses, transforming this infrastructure into a public space of introspection and shared stewardship. It deepens the connection between people and their hydrological systems, reminding them of their role in the city's climate resilience.

**HIDROGRAMA**  
'Beyond Infrastructure, Into Waterscapes'

Hidrograma Summary					
Intervention	Runoff Retained (%)	Water Retained (m <sup>3</sup> /year)	Permeability (%)	Public Access (m <sup>2</sup> )	Weekly Users (estimated)
EMBALSÉATE	5% → 30%	0 → 4500	10% → 50%	0 → 2000	~750
CAMINO AL TRAT-ARTE	10% → 50%	0 → 220752	25% → 65%	0 → 5760	~1200
LAS ANTIPISCINAS	5% → 95%	70 → 1300	10% → 85%	2200 → 2900	~450
VENECIA DE ODÓN	8% → 90%	0 → 72000	12% → 75%	2600 → 8400	~1680
BAÑO DE POSEIDÓN	0% → 45%	0 → 7540	5% → 75%	0 → 1150	~350
AGUA DE IDA Y HUERTA	15% → 60%	300 → 1800	30% → 60%	0 → 7500	~400

(New permeable area / Total catchment area) \* Estimated retention efficiency  
(Catchment area \* Annual rainfall \* water factor)  
Before: Existing asphalt/ concrete / After: Grass, permeable pavers, soil, vegetation  
Total surface area of new publicly accessible water-linked spaces (canals, wetlands, plazas)  
Cross-sectioned with benchmarks (e.g. #/person in urban leisure spaces)