

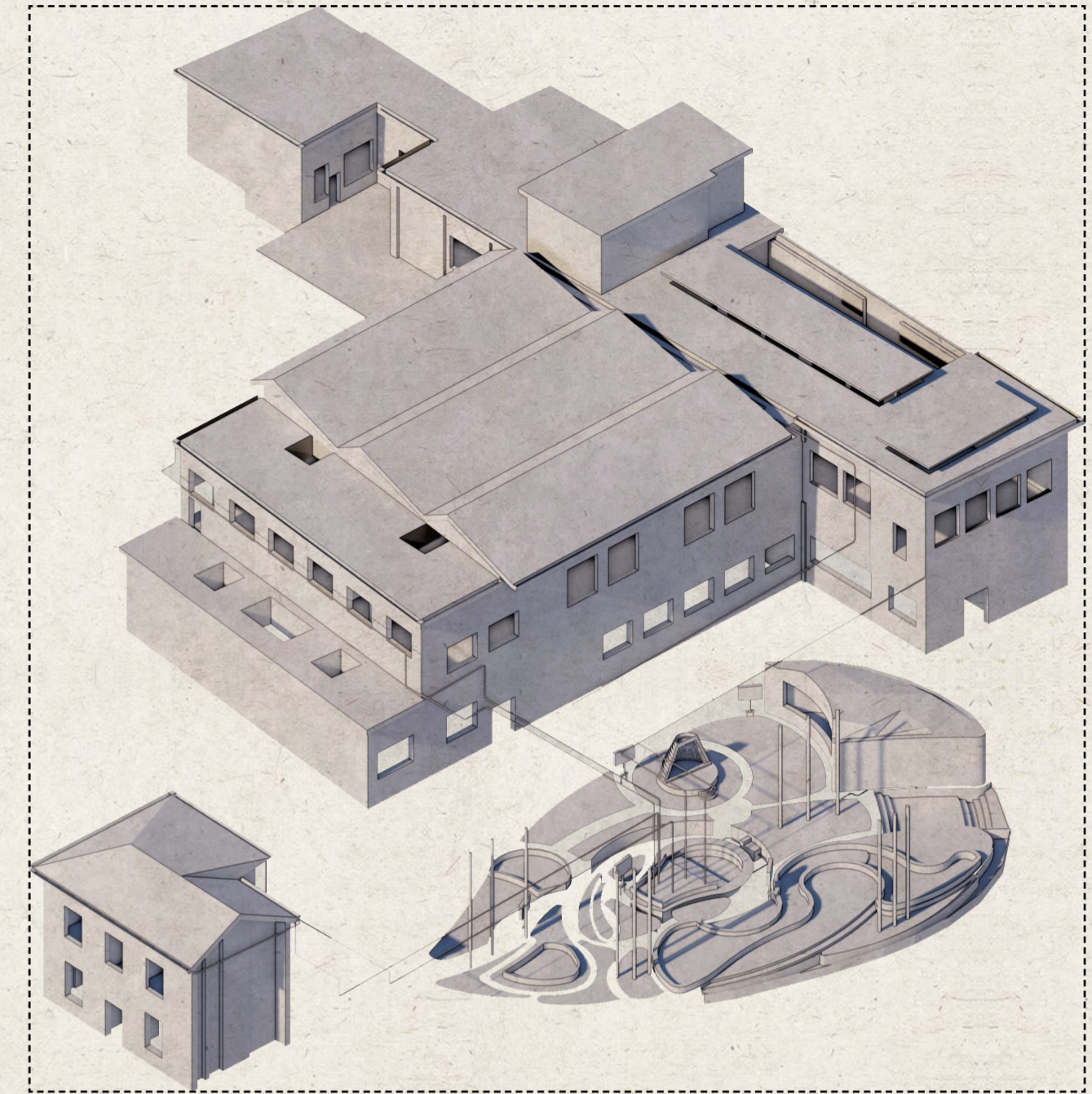
A GARDEN FOR WATER&HUMAN

How can we improve the utilization of water and integrate the flow of water in the space with the people in the natural environment?

The Brief

This is a design project on water sources and water treatment. The project site is located in the Peckham area of London, the main area of the Kennedy sausage factory. My design goal is to create an open outdoor space that collects water and uses plant filters to purify the water, while also having an educational purpose. On the one hand, I hope to collect rainwater on the roof for recycling to improve water efficiency in the region. On the other hand, I hope to introduce the influence and function of rain in nature and urban life from the perspective of children and guide children to establish correct values of water resources and strengthen their cognition and protection of water resources. Based on this, I designed a rain garden in the garden of the region. The main contents include a network of pipes for transporting rainwater and a plant filter for water purification. The rainwater will be collected through the tank structure on the eaves, and then transported to the plant filter for two stages of purification. At the same time, I built a cafe in the garden, connecting the purified rainwater with the sink in the cafe, so that the purified rainwater can be used again, forming a complete cycle. As a sustainable outdoor open space, I also added natural elements such as flowers and plants, hoping to improve the natural environment of the site. I hope this project will help the water cycle and cause people to think about water conservation and reflection.

The project draws on sustainable drainage systems (suds), a new type of drainage solution. The project aims to design a rain garden to assist in the collection and utilization of rainwater. This is a green infrastructure that manages and filters stormwater runoff through the use of plants, soil and natural processes. As rainwater passes through the rain garden, it is filtered through the plant roots and soil layer, effectively removing pollutants. It also helps the public understand the importance of stormwater management and environmental protection and promotes the participation of community members.



SUSTAINABILITY

- Plants and sustainable development

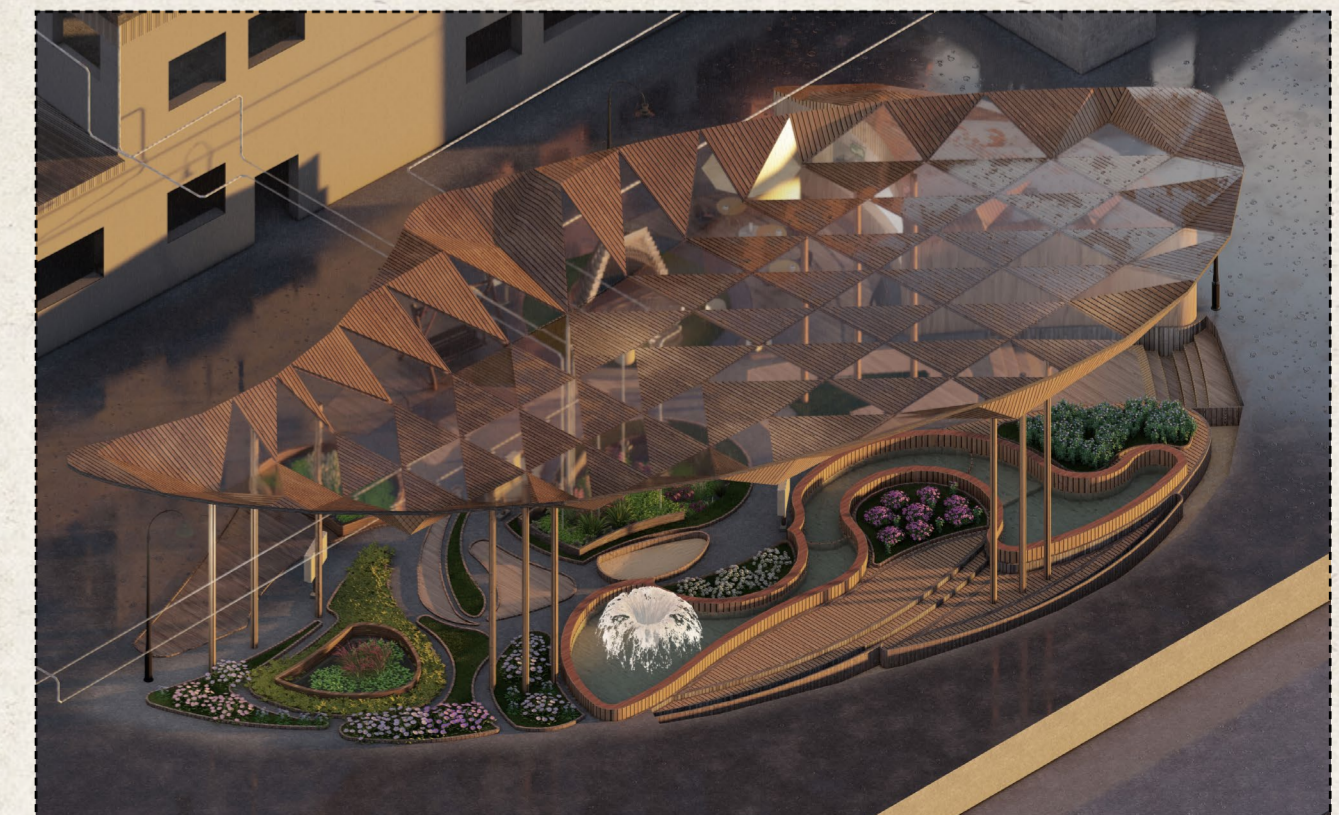
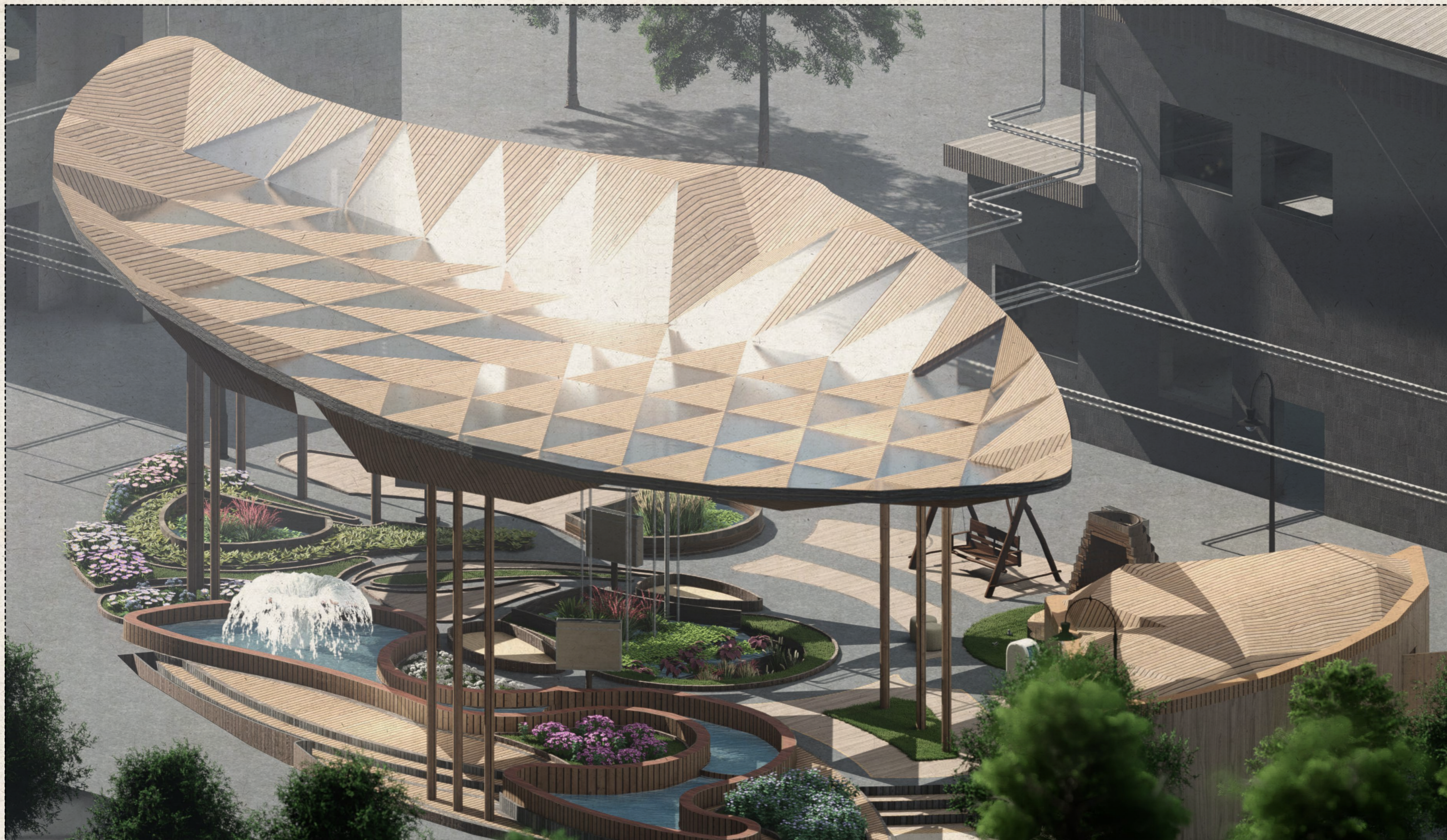
Plants are one of the most important components of the project, with green and natural properties, which can naturally purify sewage and improve the environment in the area.

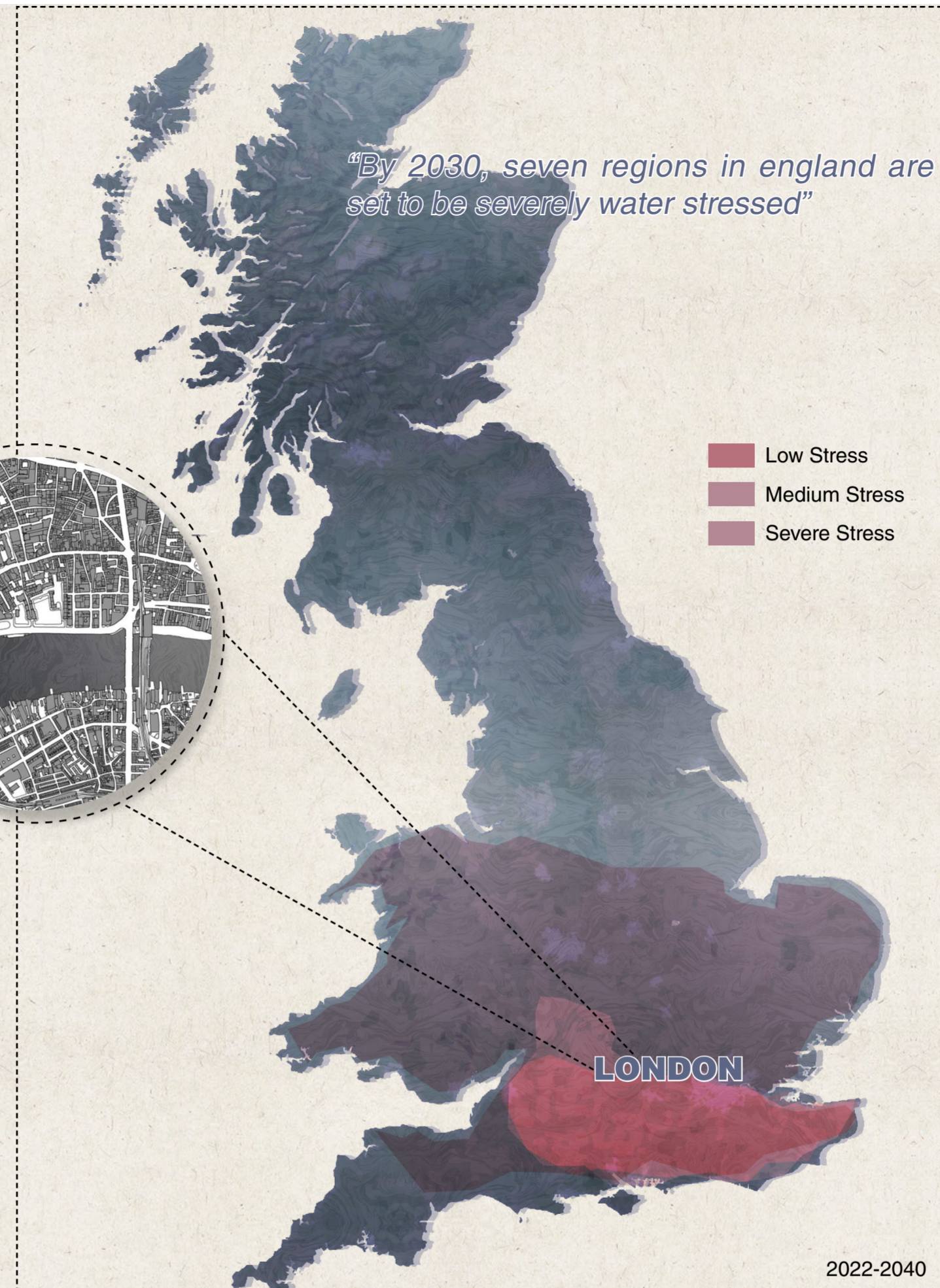
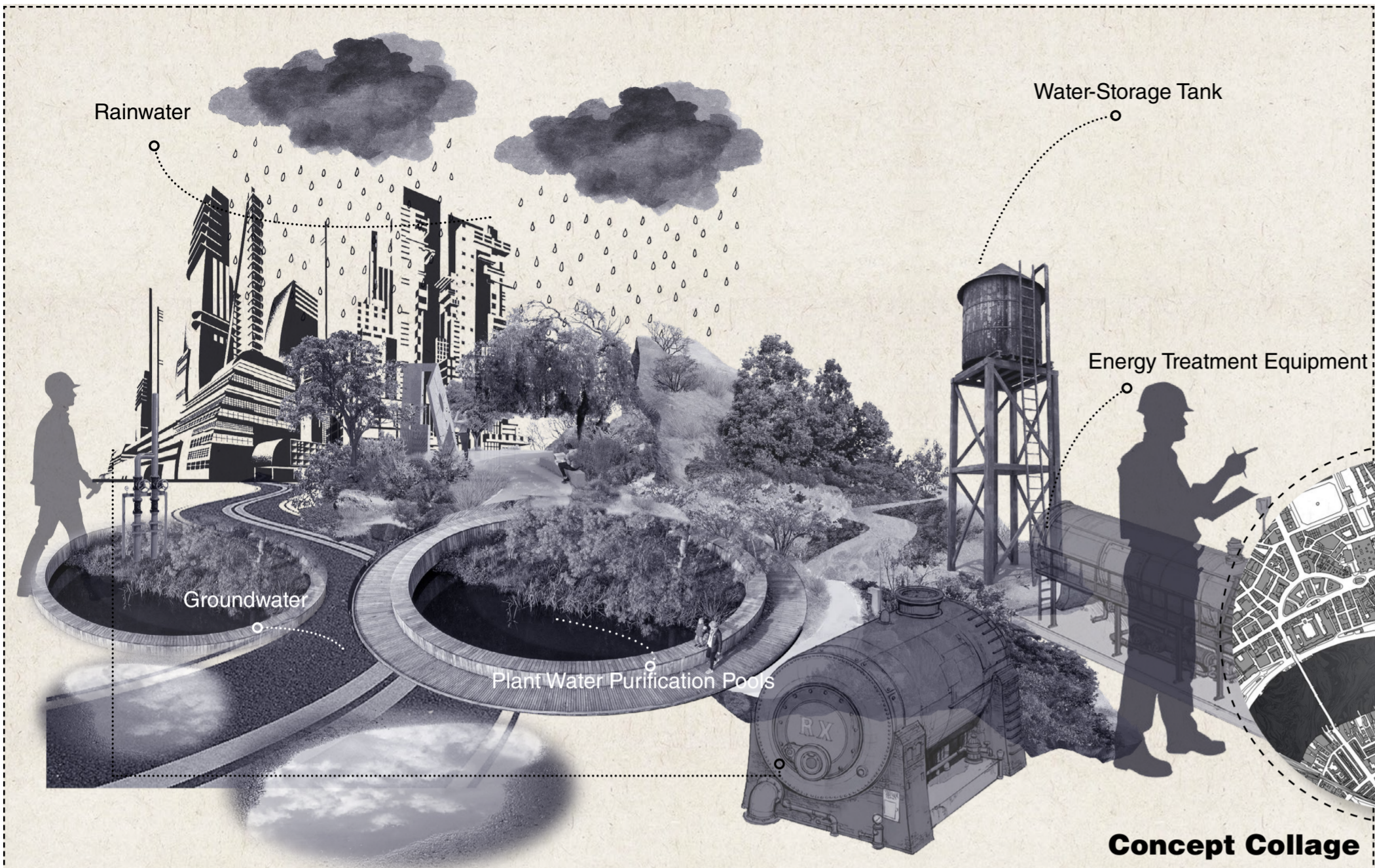
Plants can absorb carbon dioxide and release oxygen through photosynthesis, which helps mitigate climate warming and improve air quality, and they play an important role in the water cycle, helping water enter the atmosphere through transpiration and regulating water resources.

COMMUNITY

- Promotes community cohesion with additional entertainment space

Community ecological gardens can be used as outdoor education places to convey environmental protection and sustainable development knowledge to residents, especially young people.

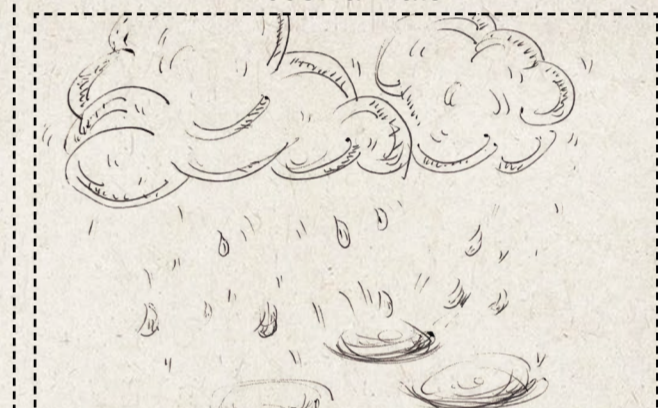




Domestic water



Industrial water



Natural precipitation



River and groundwater



Regional Precipitation

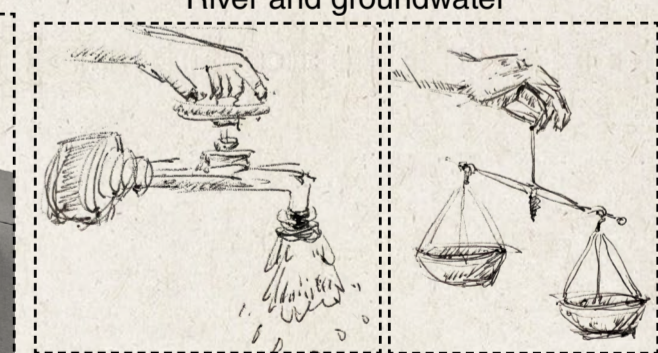
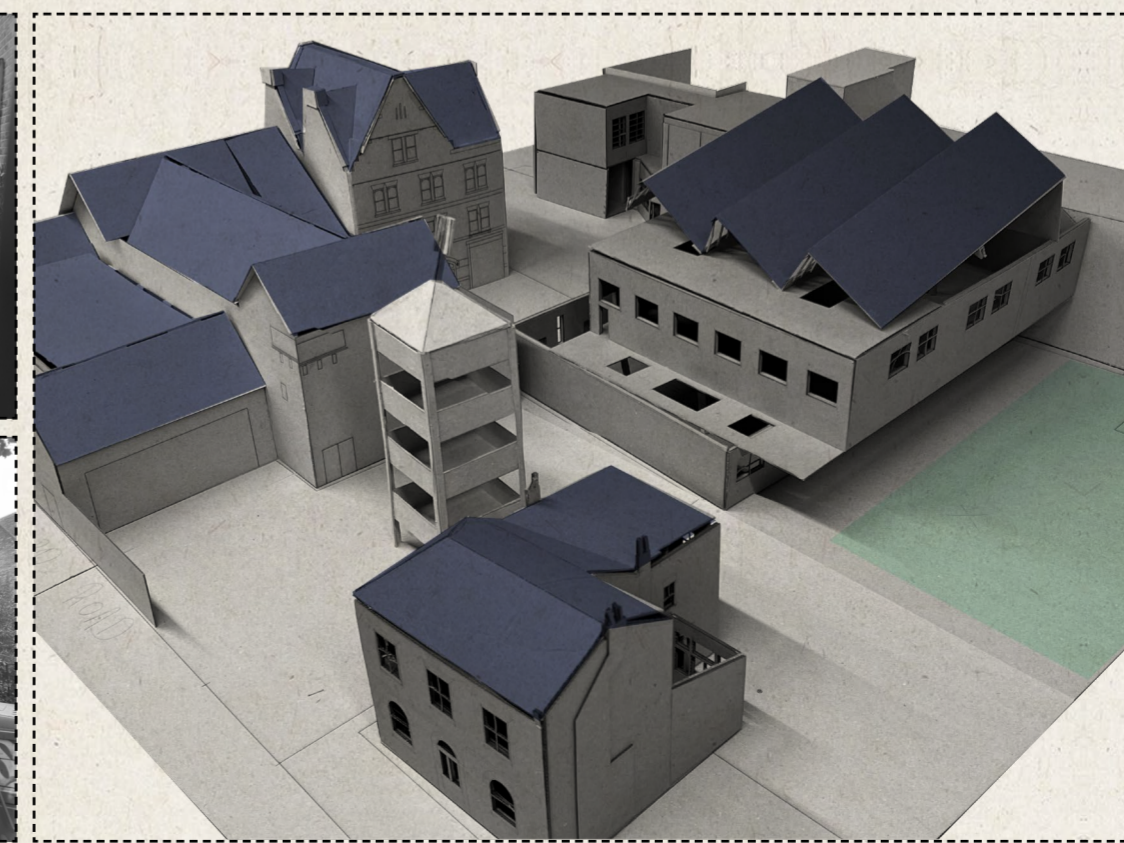
Average Precipitation Mm (Inches)

0-10 10-15 15-20 20-25

The district's yearly temperature is 13.7°C (56.66°F) and 2.95% Higher than the United Kingdom's averages. Peckham typically receives about 18.63 Millimetres (0.73 Inches) of precipitation and has 36.28 Rainy days (9.94% Of the time) annually.

With nearly a billion tons of rain falling in London every year, people should see rainwater as a valuable resource, not something to be mixed with sewage and thrown away. In London, we use more than 2.6 billion litres of water daily.

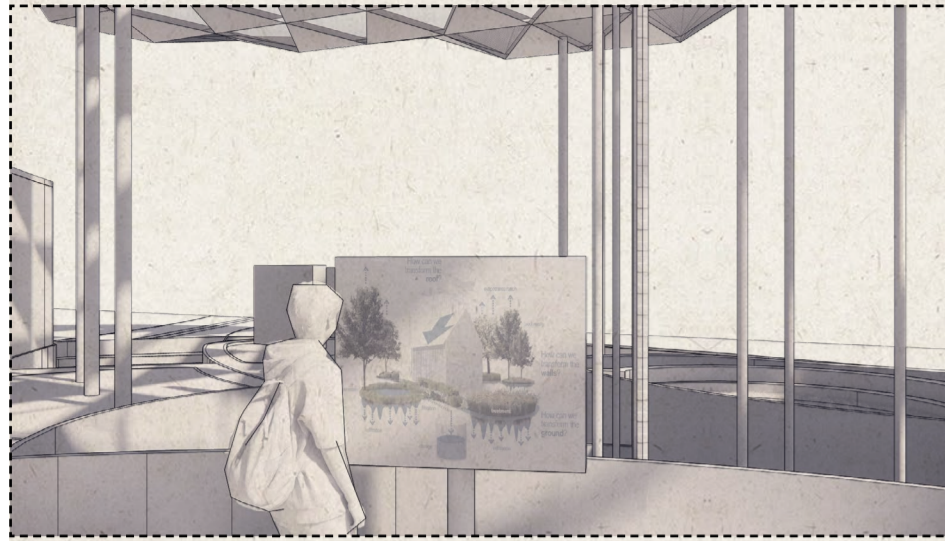
We get most of London's water from the rivers Thames and Lee. The remainder comes from groundwater that lies underneath London. Using rainwater can improve water efficiency and relieve pressure on urban drainage.



Site Location

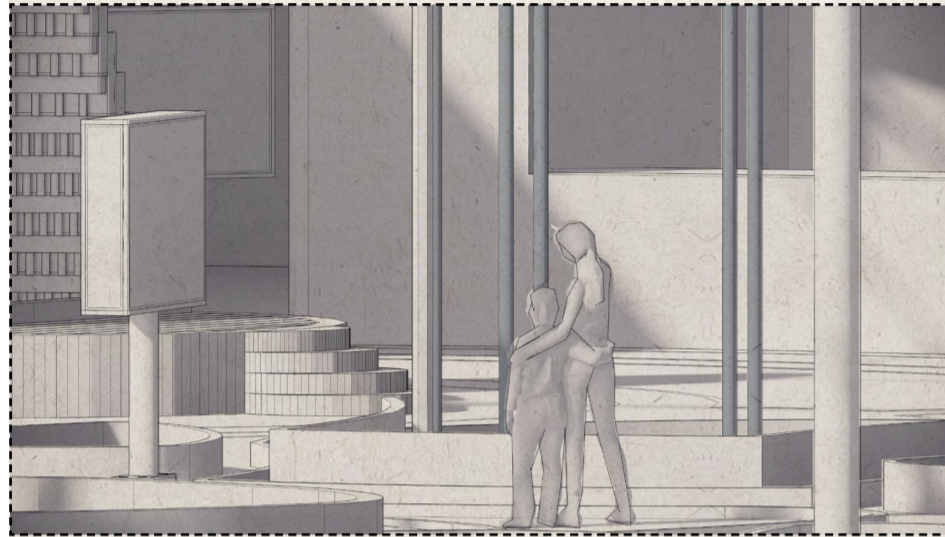
The design site I chose is located in the garden area, which has an open outdoor space, so the site is suitable for the design of a rain garden. The garden is surrounded by green vegetation so that the design content can better integrate into the surrounding environment.

Story Board



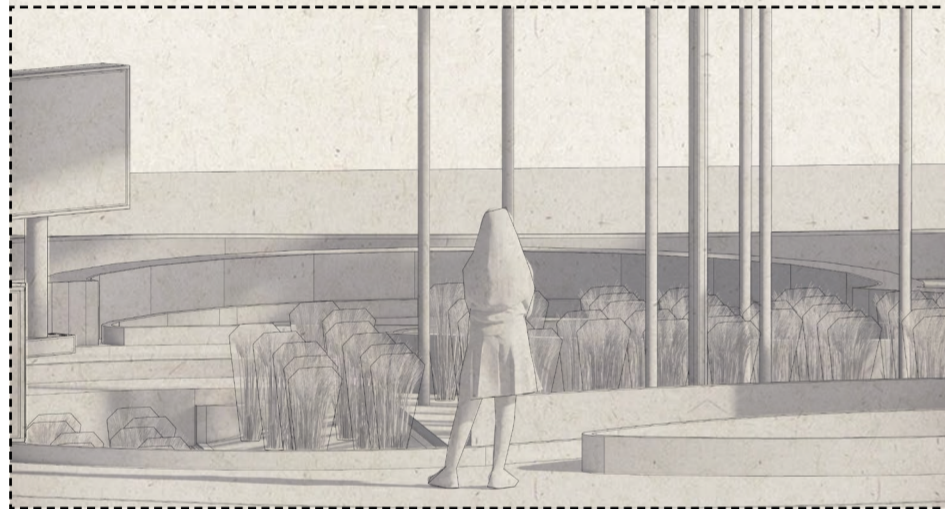
Billboard

Browse the content of the billboard to understand the recycling process and water source knowledge of the plant filter.



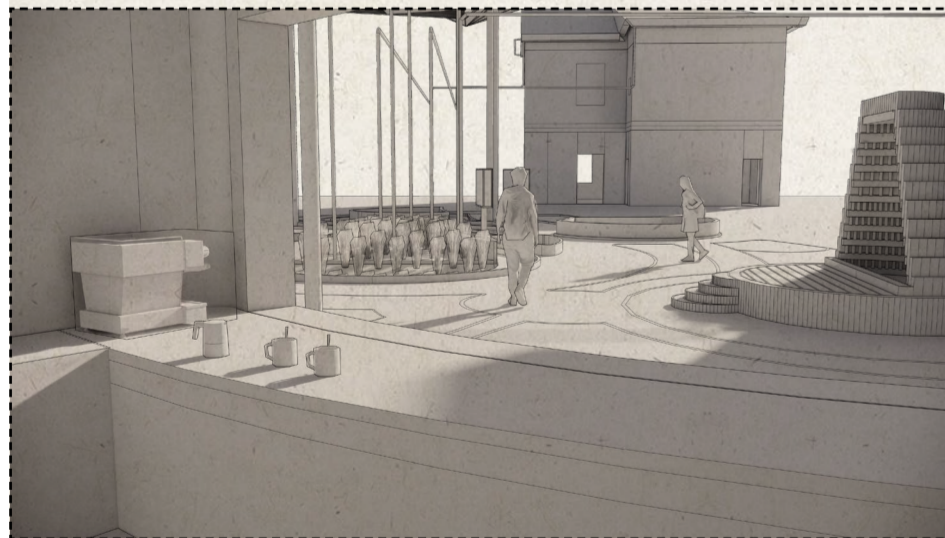
Pipe

It is responsible for transporting rainwater throughout the cycle and connecting the eaves/plant filters and the gutters in the cafe.



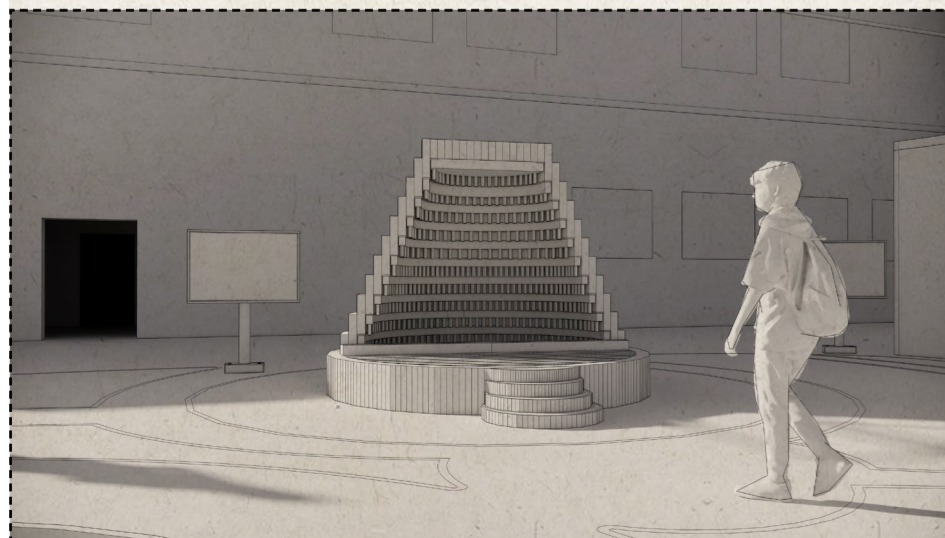
Plant Filter

Use the natural properties of plants and root tissue to purify rainwater and remove pollutants and heavy metals from it.



Coffee Shop

The purified rainwater is supplied here for daily use, forming a complete cycle process.



Rain Clock

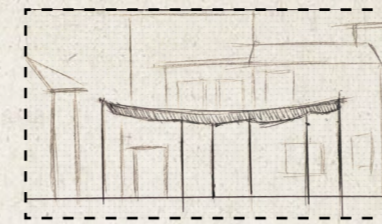
It can store rainwater and is also a platform for visitors to rest or perform.

Human&Water

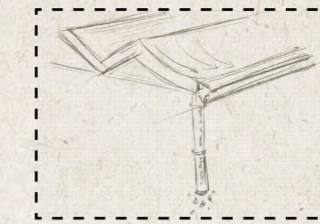
This section shows the overall development of the design and the functional analysis of the site, distinguishing between the functions facing the water and the people. For visitors, the space covers the nature of education, leisure, communication, and interaction. From the point of view of the water cycle, the space is practical and sustainable and has a network of pipes and a demonstration of the water cycle process. I hope to achieve the interaction between people and water in space and adjust the balance between them to form a good regional ecological environment.

Functional Analysis

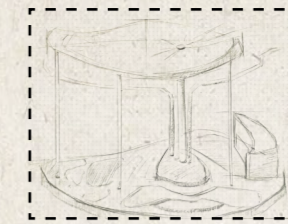
Through the analysis of the outdoor site, I divided the functions into five parts: water pipe/green space/plant filter/coffee shop/water clock device to strengthen the interaction between water and people.



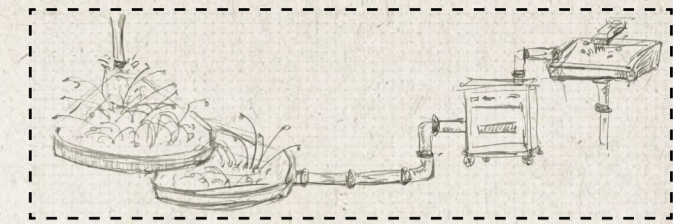
Purification process Rain water on the cover



Rainwater on the roof

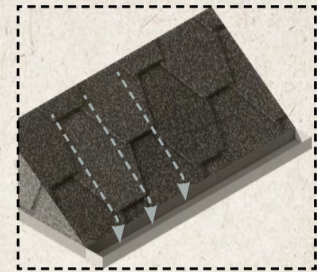
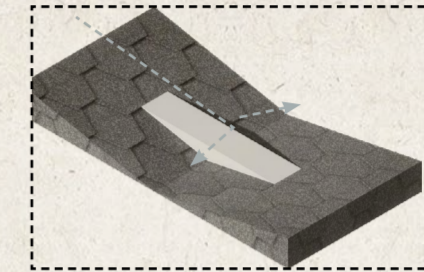
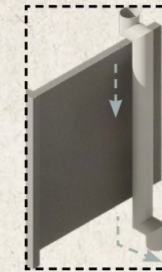
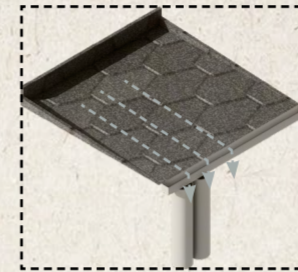
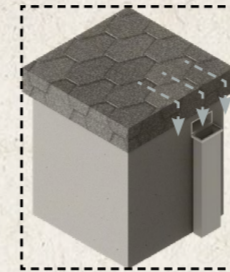


Collect rainwater through pipes

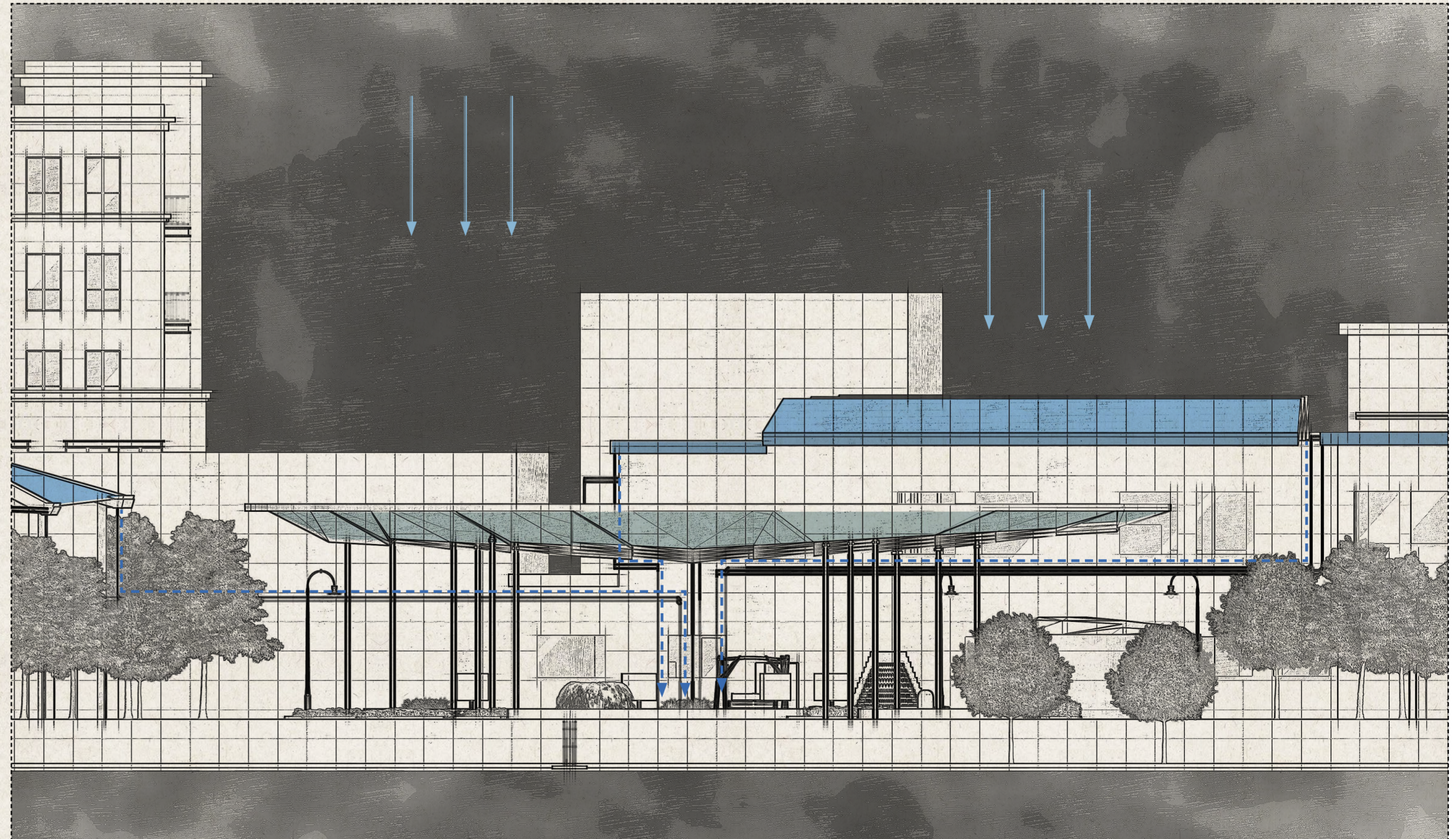
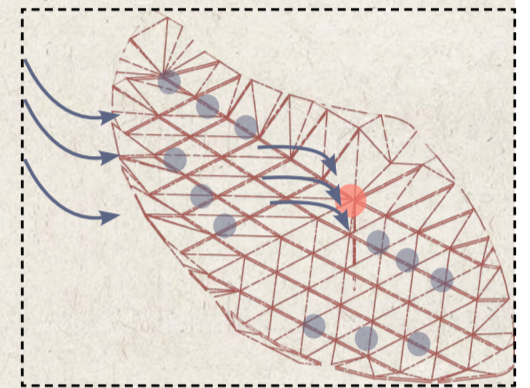
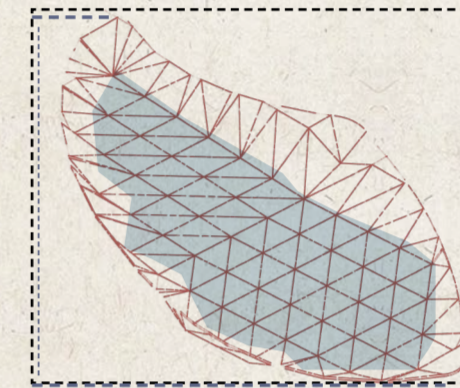
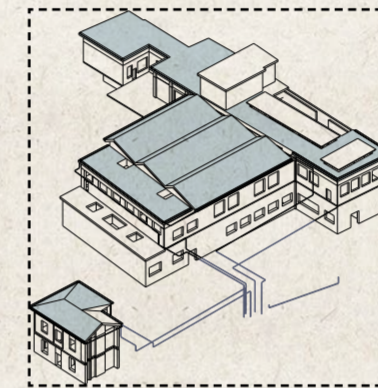
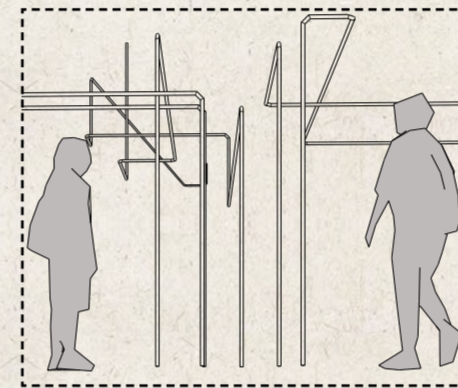


After purification through the plant filter, it goes into the underground pipeline connected to the disinfection equipment and is disinfected again before being put into use

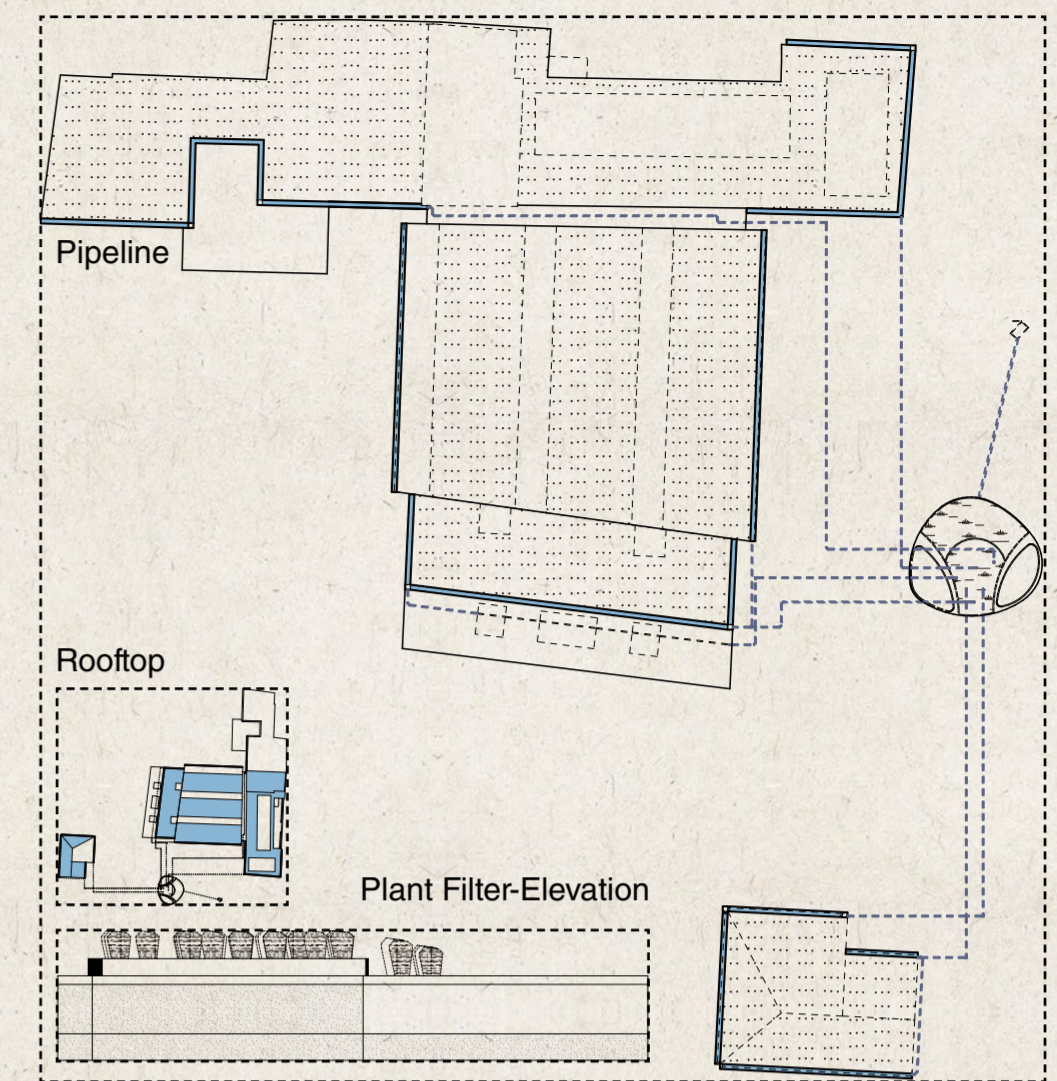
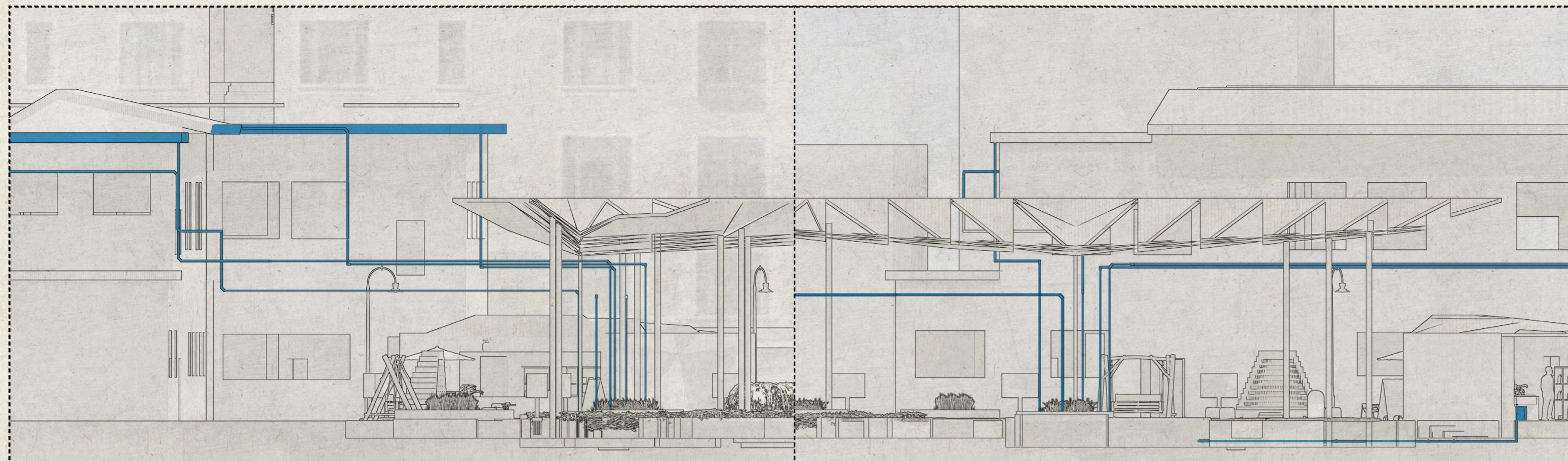
Different kinds of eaves drainage



The movement of rain

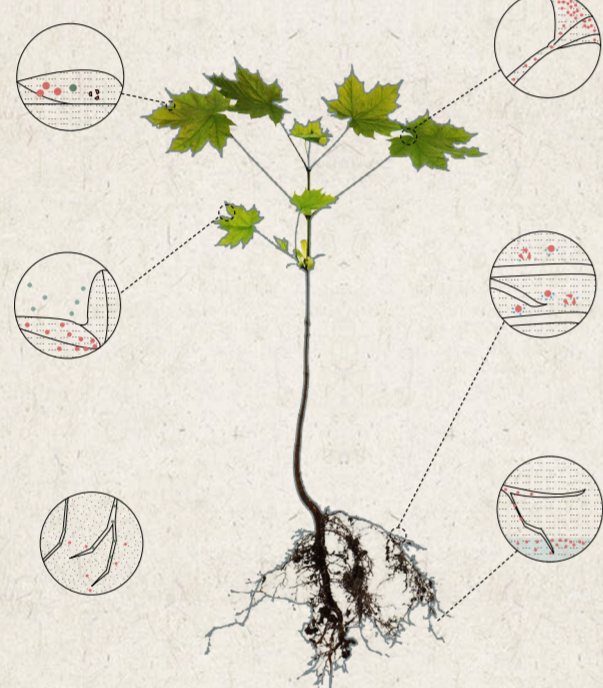


Purification Process Of Plant Filter



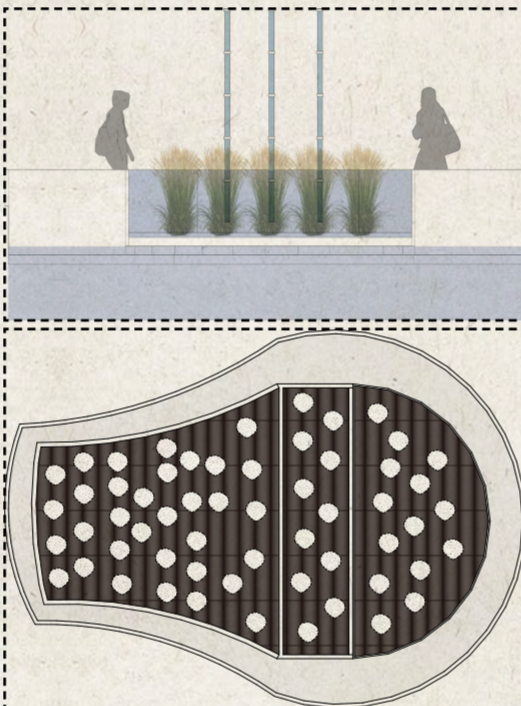
1. Phytodegradation

Enzymes fragment contaminants and produce new plant fibre



4. Phytoextraction

Contaminants are stored in leaves and stems



2. Phytovolatilization

Contaminants are modified along the way evaporated

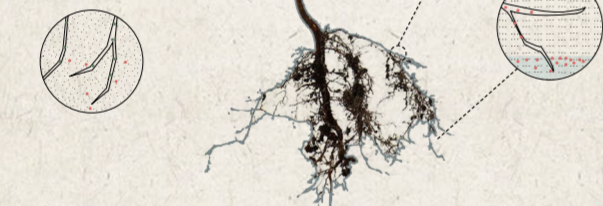


5. Rhizodegradation

Microbes hidden in the roots break down contaminants

3. Phytostabilization

The root zone of plants immobilizes contaminants



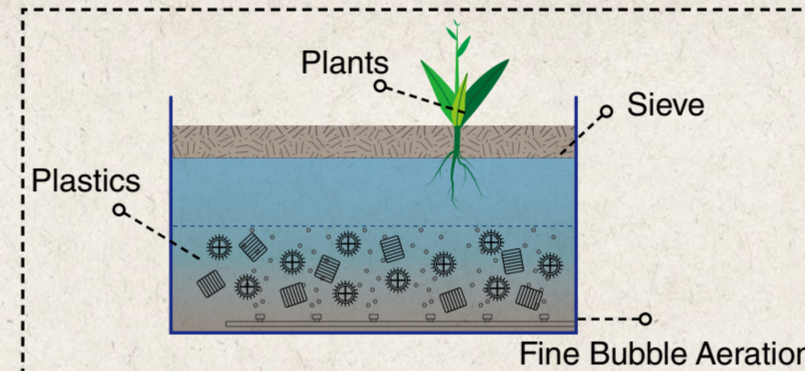
6. Rhizofiltration

Roots adsorb contaminants in groundwater



Scan the QR code to see the animation of water movement.

AEROBIC TANK: MBBR TECHNOLOGY

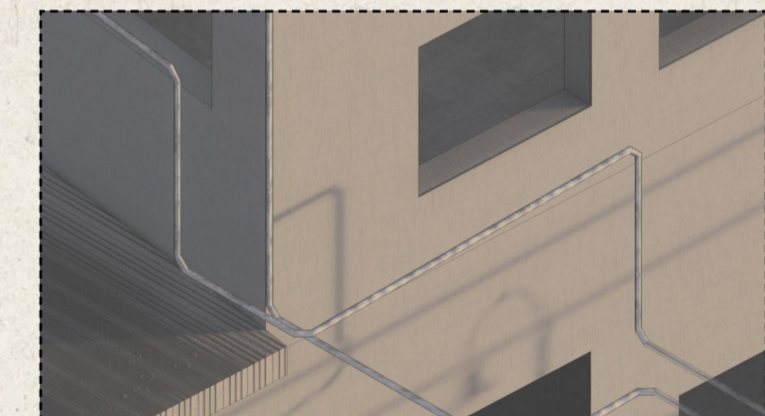


A moving bed biofilm reactor is a biological wastewater treatment process, meaning it is a natural process that uses biofilm to remove waste from wastewater. Microorganisms attached to media in the water consume unwanted waste, leaving the water cleaner.



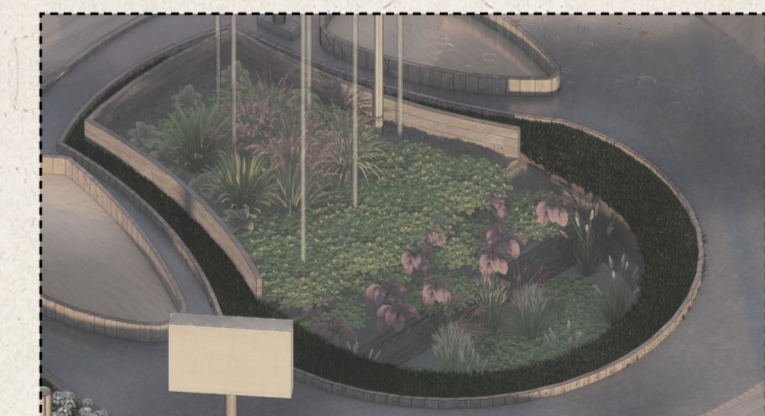
Step 1

First, gutters in the eaves will collect rainwater that drips onto the roof, pooling together from the sloping surfaces to the pipes.



Step 2

After entering the pipe, the collected rainwater will be transported through the pipe to the plant filter.



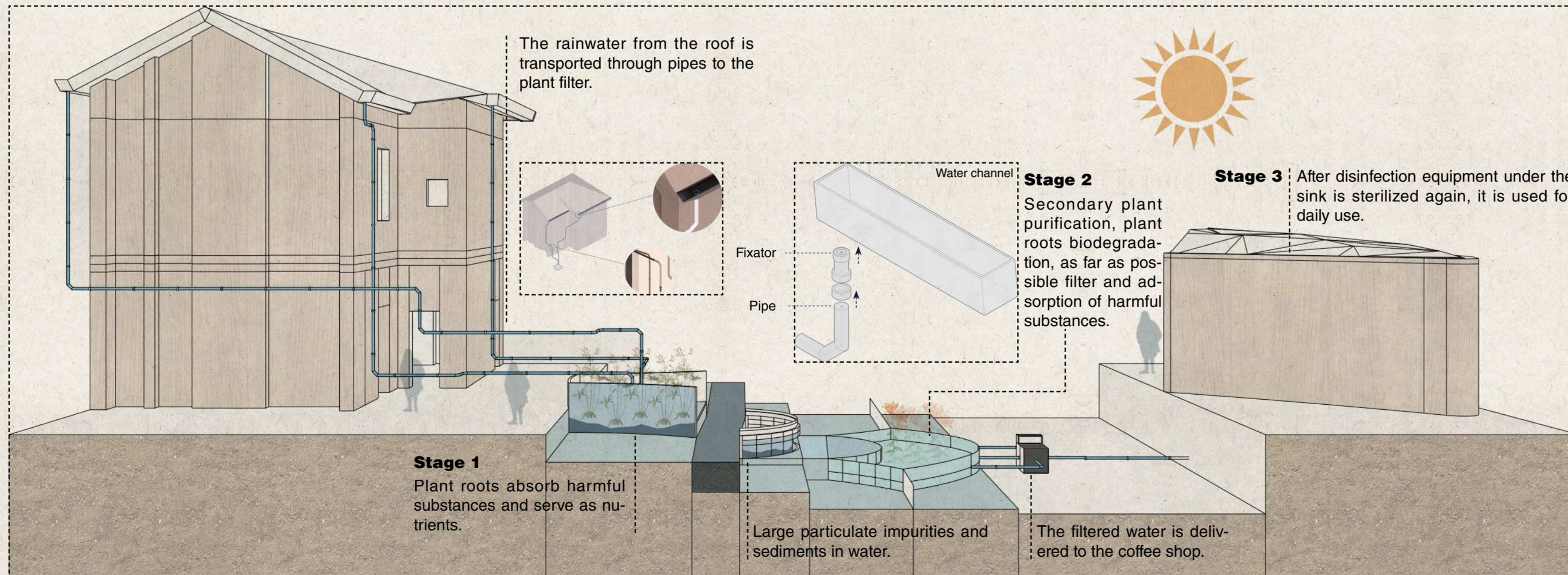
Step 3

The rainwater enters the plant filter, which houses a variety of plants with the ability to purify water, where it goes through two stages of purification.



Step 4

The rainwater filtered by the plants is sent to the sterilizer under the kitchen sink through the underground pump and pipe for the third stage of sterilization and finally connected to the faucet for daily use.



Character Flow



Oh, it's a park with lots of beautiful flowers!



It says this is a rain garden that recycles rainwater from the roof for reuse!



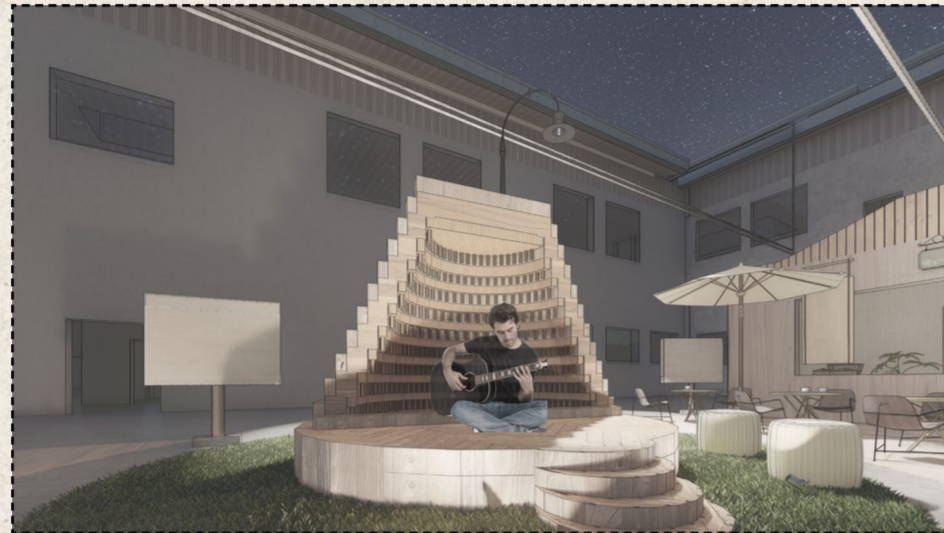
"This is the pipe that collects rainwater!"



Oh, so many kinds of plants. Rainwater is purified in this filter.



There is also a pool for children's play!



The purified rainwater was supplied to the coffee shop for daily use!



Listen to this! The sound of rain falling on the water was like the ticking of a clock.

Material Analysis

Pipe

I hope that part of the water pipeline will be made of transparent materials so that visitors can see the movement of the water when they stay here, and enhance the sense of interaction between people and water.

Brick

Brick is not a sustainable material, but it is still one of the most popular building materials. Bricks of different colours and materials can better integrate the local architectural style, and the bricks are easy to use, their dimensions can be changed so that they can be used to cope with simple or complex building structures.

Wood

The reason for my choice is that wood is a sustainable and environmentally friendly material, which is widely used in environmentally friendly architecture and design due to its low carbon and versatility. The cost is low, and the environmental impact is small, with sufficient strength and durability.

Bioplastic

I hope to use transparent materials on some of the pipes so that visitors can see the movement of water in the pipes. However, glass, acrylic and other materials are not environmentally friendly and sustainable. Fiberglass and bioplastic are better alternatives, and I think it is the most appropriate choice to show the transparent effect on biological materials.

