3. WATER & BIODIVERSITY

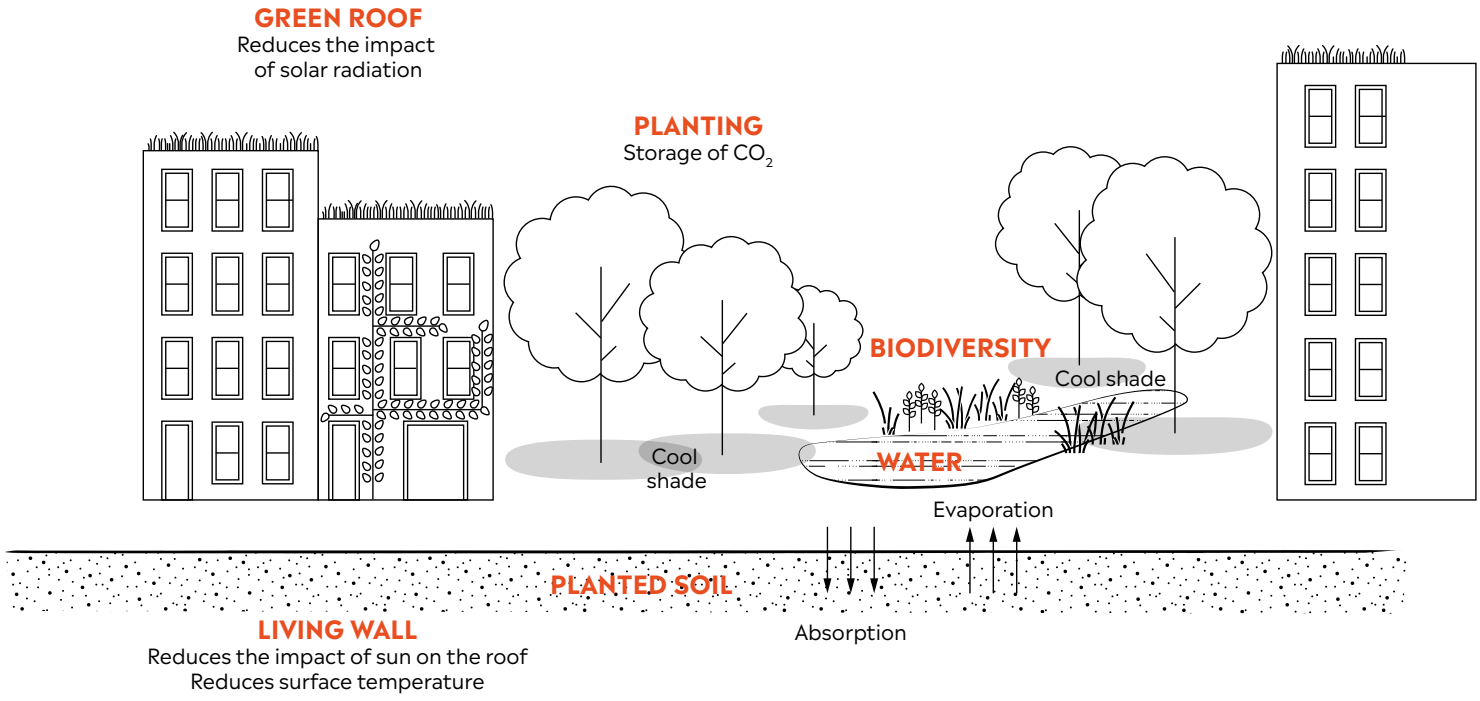
Restoring fertile soil

For a long time, managing rainwater in the city has been limited to strategies to collect and store water and drain it into underground networks. In Paris, this approach has been combined with a **requirement to limit discharges into the Seine.** Rainwater collected by downpipes and gutters in the streets joins the main drain, which also takes wastewater from homes (from washing and toilets). If the flow into the pipes and at wastewater treatment plants is too high, especially during storms, surplus dirty water can pour directly into the river, creating risks of pollution.

Paris has come up with a rainwater management plan, *ParisPluie*, to prevent this. All public and private-sector stakeholders involved in the city's development and management must now comply with the requirements of the plan. The 3.4 ha Saint-Vincent-de-Paul site, with its 4,000 m^2 of green spaces, is one of the first major projects to implement the plan.

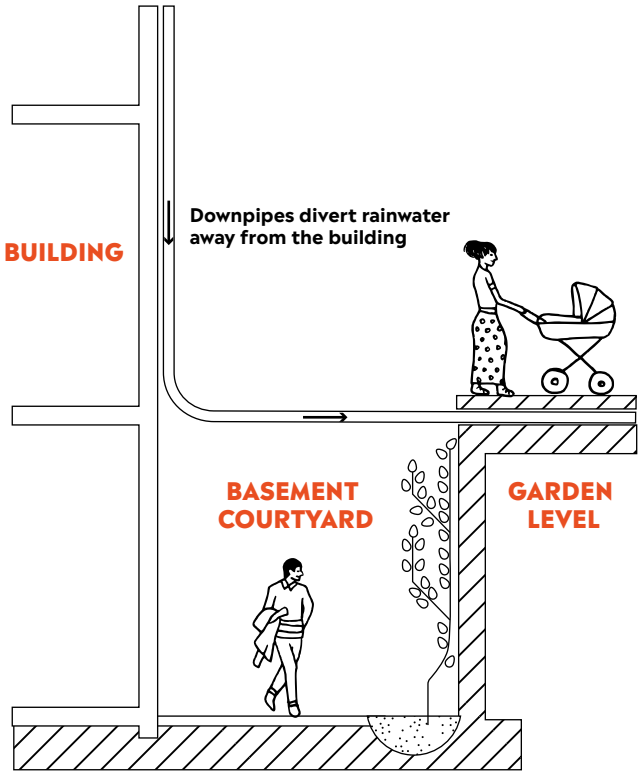
Fundamentally, this innovative approach relies on the interaction between water and biodiversity. One of its primary concerns is looking after the city's actual soil, which has long been neglected. Over the centuries, it has largely been made impermeable, covered up by paving slabs and tarmac. And even where it has been left bare, compacted soil no longer absorbs water, so it streams over the surface and into the drains. Earthworms, insects and the root systems of plants that could otherwise aerate the soil have abandoned it!

The challenge is to **re-establish biodiversity, and de-compact and restore the quality of the soil so that it can absorb more water.** Experts _ the Thierry Maytraud agency and the Empreinte group of project managers _ are developing a method to restore its original porosity.



Special precautions will be taken to avoid the ground being compacted by site machinery or storing heavy materials, as well as accidental spills of pollutants. The soil will be enriched with soil improvers and natural materials, with the aim of improving its physical and chemical properties. It will be planted with plant species whose roots develop at different depths, so that the substrate is aerated and nourished at every level. Finally, animal species that populate and work the soil will be reintroduced.

The benefits of these interventions have a "cascade" effect: **water is absorbed by the ground rather than entering** the drainage network; newly fertilised soil needs less watering and planting becomes denser and more robust, creating "islands of freshness" in the city that are much appreciated during hot weather.



Rainwater seeps directly into the soil in the basement courtyard

Rainwater collected from roofs and elsewhere can be recovered and channelled into gardens to water plants. If this is not enough, further supplies can be sourced from city's the non-drinking raw water network, which surrounds the Saint-Vincent-de-Paul site. This pumps water from the Seine and is used by Paris's street-cleaning services and gardens for various purposes.

Contrary to the approach used for underground networks, which has made water circulation a mystery, **the philosophy adopted by the neighbourhood's developer is to make the process transparent** from an educational and aesthetic perspective. The public areas and planted spaces will be punctuated by pools, channels and rivulets.

According to the *Paris Pluie* plan, **the ground must be capable of absorbing a minimum of 12mm of rainfall in a 24-hour period.** Planted areas in the "bare earth" sections will allow for this easily. In built areas, a number of different systems will be used:

- On roofs, 15 cm of substrate consisting of real, living soil is sufficient to absorb this amount of water. In Saint-Vincent-de-Paul, the thickness will be increased to ensure the development of biodiversity.

- The aim for external spaces below street level, such as basement courtyard areas, is for them to be autonomous through seepage.

- Finally, recovery strategies for specific uses, such as toilets or cleaning, will be developed on a case-by-case basis.

The developer and the City of Paris will now be working on a **Rainwater Management System (SGEP) for the whole site**, which will be compulsory for the various operators and users.