

CHAPTER 7

Planting design guidelines

Rooftops are generally exposed to climatic extremes and may experience direct and reflected sun in summer, heavy rain or snow in winter, and turbulent winds all year round. Plants need to be selected so that they match the relatively harsh environmental conditions of the built environment. They also need to be selected to best suit the intended purpose or function of the green roof or living wall, or to maximise the main drivers of the project. For instance, if the project driver is to retain and slow down the release of rainfall into the stormwater system, the plant selection might focus on species with a capacity to take up and cleanse large quantities of water. In the case of biodiversity roofs or bushtops, a habitat template approach can be used to analyse the natural habitats of target fauna species, and to then select appropriate plants to create a new urban habitat template to mimic these habitats on the rooftop.

Plant root systems occupy a relatively shallow depth of soil strata, being the top 150–250 mm for small plants and shrubs and up to 400–800 mm for large bushes and trees. These depths are ideal for rooftops because most intensive or elevated landscape roof types are rarely deeper than 800 mm. For instance, the elevated landscape of Millennium Park in Chicago has a maximum depth of 1200 mm and is successfully growing a forest of mature trees.

The growing medium or soil needs particular characteristics such as the presence of oxygen, which is of prime importance, together with moisture, minerals and nutrients. The smaller fibrous feeder roots need the growing medium to be well drained, but with an ample supply of water and nutrients. The larger structural roots provide anchorage and balance to leafy structures above the growing medium surface. This anchoring function may require artificial mechanisms for some shallow green roofs to compensate for the lack of soil depth and structure.

As we have seen, wind is a major factor for green roofs and living walls: the higher you go, the windier and more extreme the growing conditions become. Increased wind or air movement over the leaves decreases the plant's ability to absorb moisture from the air, both via the leaves and the root systems. When the evaporation rate is extremely high, the loss of water via the plant leaves cannot be matched by the water uptake of the root system.