

## Appendix 1

### **Further information relating to green roofs 9 Villiers Road Southsea**

A green roof is a layer of vegetation planted over a waterproofing system that is installed on top of a flat or slightly-sloped roof. Green roofs are also known as vegetative or eco-roofs.

There are many benefits of having a green roof and the applicants see an opportunity here to utilise and enhance this otherwise wasted space of the modern extension which is currently dominated by a vast expanse of grey membrane roof.

Benefits of a green roof include:

\* Improved Stormwater Management - A green roof helps control storm water runoff and retention. The increased urbanisation of towns and cities has resulted in less green space and more impervious surfaces. Precipitation generally runs off the roof of a building into gutters and flows into a storm sewer. From the storm sewer it either enters a municipal water treatment facility, or it is directly deposited into the ecosystem via lakes, streams and rivers. Any dirt or contaminants on the roof are picked up by the water and flushed into the storm sewer as well. In cities such as Portsmouth with a combined sewage overflow system in which rain water runoff, domestic sewage and industrial wastewater are collected in the same pipe for treatment, too much storm water can cause a city's sewage system to overflow, discharging sewage into streams and rivers.

A green roof can help prevent this by retaining water in the plants and growing medium, thus slowing and reducing the amount of storm water entering the ecosystem and, consequently, reducing flooding and erosion. Data collected from a study by researchers at the Pennsylvania State University, Center for Green Roof Research show **that green roofs captured up to 80% of rainfall during rainstorms, compared to 24% typical for standard roofs**. The growing medium and plant material of the roof also act as a filter, neutralising acid rain, trapping dust and airborne particles.

\* Eco-insulation for the Building – The thermal insulation of the building is improved providing a more balanced temperature within. This reduces heating costs in the winter and air conditioning expenses during the summer. Green roofs have excellent acoustic qualities too for both external sound (up to 3dB) and internal noise (8Db).

\* Reduces Greenhouse Gas Emissions - In addition to providing greater natural insulation thereby helping reduce greenhouse gas emissions from fossil fuel combustion associated with the use of traditional heating and air conditioning equipment, adding plants and trees to the urban landscape in turn increases photosynthesis which filters airborne pollution particles and reduces carbon dioxide levels produced by vehicles, industrial facilities, and mechanical systems. It purifies the air and also increases oxygen production.

\* Extends Roof Life - By shielding the roofing materials from direct ultra-violet radiation and extreme temperatures, a well-maintained green roof can more than double the number of years before a roof needs to be replaced compared to a standard roof.

\* Wildlife Sanctuary - A green roof can also provide a refuge for insects, bees, butterflies and birds that have lost their natural habitat due to urban development and the loss of green space.

\* People Sanctuary (Improves Amenity) - An accessible green roof increases urban green space and improves the comfort and enjoyment of the building's occupants by providing an aesthetically-pleasing view and an environment for recreation or leisure. It provides a unique potential for replacing the land lost by the footprint of the building. In addition to growing local wildflowers, sea and meadow plants to attract local wildlife. The applicants would like to incorporate urban agriculture in their green roof, including the growing of herbs and vegetables, that can be harvested for use.

"The University of Michigan performed a valuation study comparing a 2,000 square foot conventional roof and a green roof. The study looked at a range of benefits of green roofs including stormwater management, improved health benefits due to reduced pollution, and energy savings. Over its estimated lifespan of 40 years a green roof would save about \$200,000, of which, nearly two-thirds would come from reduced energy costs."

Such are the advantages economically, environmentally and even emotionally (a natural environment has proven to boost people's sense of well-being, reduce stress and increase immunity), that many Council's around the world have provided grants to encourage and create more green roofs. Green roofs are used extensively throughout Europe, Australia and America. In London grants were given to the private sector to encourage the implementation of green roofs and walls in new buildings in the capital. Many councils realise that green roofs & walls are an "integral part of any sustainable city" and the "continued growth and densification [of urban cities], along with the impacts of climate change, mean collaboration with the private sector [to include green roofs and walls in their designs] is needed to ensure long-term liveability."

Portsmouth City Council (PCC) have been looking to implement policies to enhance its "Green Infrastructure" and specifically in respect of private development encourage the use of green roofs and green walls. In the PCC's Green Infrastructure Paper (2019) it states:

"Green roofs and green walls involve the planting of various species of flora across the exterior surfaces of buildings. These living surfaces, as with other types of green infrastructure, are multi-functional and allow for the making use of otherwise wasted space extending well above street level. Amongst their various benefits, green roofs and facades can help slow down the flow of water, reducing the likelihood of flash flooding; they can also reduce urban heat islands effects; and improve air quality. Of particular relevance to the context of Portsmouth's built environment is that this type of green infrastructure is particularly beneficial in more densely developed urban areas, where space for conventional planting of green infrastructure like trees and hedges, parks and other green spaces, is limited. Unfortunately, there is little quantitative data relating to the implementation of green roofs and walls across the city at present."

The applicants would like to start changing that with this project.

References:

<https://www.nps.gov/tps/sustainability/new-technology/green-roofs/benefits.htm>

<https://www.cityofsydney.nsw.gov.au/environmental-support-funding/green-roofs-and-walls>

<https://www.cityofsydney.nsw.gov.au/environmental-support-funding/environmental-performance-ratings-and-assessment-grants>

<https://www.melbourne.vic.gov.au/community/greening-the-city/green-infrastructure/Pages/green-our-rooftop-project.aspx>

<https://livingroofs.org/new-report-reveals-londons-green-roof-success-2019/>

<https://efb-greenroof.eu>

[https://www.london.gov.uk/sites/default/files/green\\_capital\\_grants\\_guide\\_nov\\_2017.pdf](https://www.london.gov.uk/sites/default/files/green_capital_grants_guide_nov_2017.pdf)

<https://www.london.gov.uk/press-releases/mayoral/mayor-offers-1-million-green-grants>

<https://www.portsmouth.gov.uk/wp-content/uploads/2020/05/development-and-planning-green-infrastructure-background-paper.pdf>