



eight
associates

The power of green space

Adding human, environmental and financial value to buildings

Eight Associates 2018 Based on a breakfast seminar delivered in association with

ubu
design



The power of green space

Green space in urban environments provides social, economic and sustainability benefits. There are now many studies that quantify these benefits to health and wellbeing, biodiversity, carbon sequestration, cost reduction and in added financial value terms.

The economic factors range from increased private investment levels due to the quality of area and ability to lever funding, through to higher business productivity and improved staff attraction and retention.

The social benefits of access to green space are also wide ranging; physical health and wellbeing from exercise and relaxation, improved mental health and happiness through connection with nature, with a community benefit of visual and physical amenity for local people and visitors.

The provision of habitat, short to medium term carbon sequestration, flood alleviation and water management, reduction of the urban heat island effect, pollution amelioration and cleaning of air are just some of the sustainability benefits.

With so many possible benefits on offer, it seems intuitive that every project would include an early stage assessment of how to maximise green space potential. These considerations range from 'human factors' such as recreation, access to nature and leisure areas for all age ranges, to building performance and ecological considerations. However, this is not always the case. Eight Associates is sharing its expertise and highlighting a few of the biodiversity elements to consider, to create a well considered design which will ensure wide-ranging benefits with long lasting impact.




Economic benefits

We spend over 90% of our lives in and around buildings, where the concepts of sustainability and environmental impact are widely understood and measured. Following recent studies, there is an increased consideration of a building's impact on occupant wellbeing, namely productivity and absenteeism levels. It's not surprising given 90% of typical business operating costs relate to staff costs (salaries and benefits) and 90% of people say their attitude to work is adversely affected by the quality of their workplace environment. The cost of ill-health is clear; for example, poor mental health specifically costs UK employers £30 billion a year through lost production, recruitment and absence.

Daylight, air quality, noise, thermal comfort, design layout and access to nature have a huge impact on how people feel in the workplace and at home. Green space can be incorporated in a variety of ways on a building in line with biophilic design principles – this is the integration of nature inside and outside of a building, through the inclusion of environmental elements and space layout. Interaction with nature, both in and outside of the building, should also be considered.

Investment in green space can lead to a rise in demand for homes and higher returns for the property sector. A 2008 study by Natural Economy Northwest (NENW) 'The economic value of green infrastructure' found that green space in key locations within urban areas has significant benefits which are reflected in increasing property and land values.

Greener areas have a better image and attract more visitors, bringing with them retail and leisure spending and providing job and rental opportunities – which in turn increases land and property values.



A well-managed green space nearby results in average property premiums from 2.6% to 11.3%

1% increase in green space in the vicinity equates to approximately a 0.5% increase in average house price



Health and wellbeing benefits

Green space can improve air quality (due to pollution absorption by vegetation), help reduce stress levels with a positive effect on mental health and provide opportunities for physical activity with a positive effect on physical health.

Visual amenity of green space can enhance the views from people's homes and on journeys to and from work, contributing to a higher quality of life.

Being immersed in nature for just 20 minutes has been shown to reduce blood pressure, muscle tension and pulse rate and lower cortisol levels. Known as 'eco-psychiatry', people exhibit less mental distress and higher life satisfaction when they are living in greener areas.

Access to green space promotes physical activity and the economic benefit of increased activity includes cost savings to the National Health Service (NHS) and increased economic output due to a reduction in ill health and absence from work.

Workers in offices with natural environment, such as greenery and sunlight

report 15%
higher wellbeing

are 6%
more productive

are 15%
more creative

London case study: A commitment to improving the quality of green space

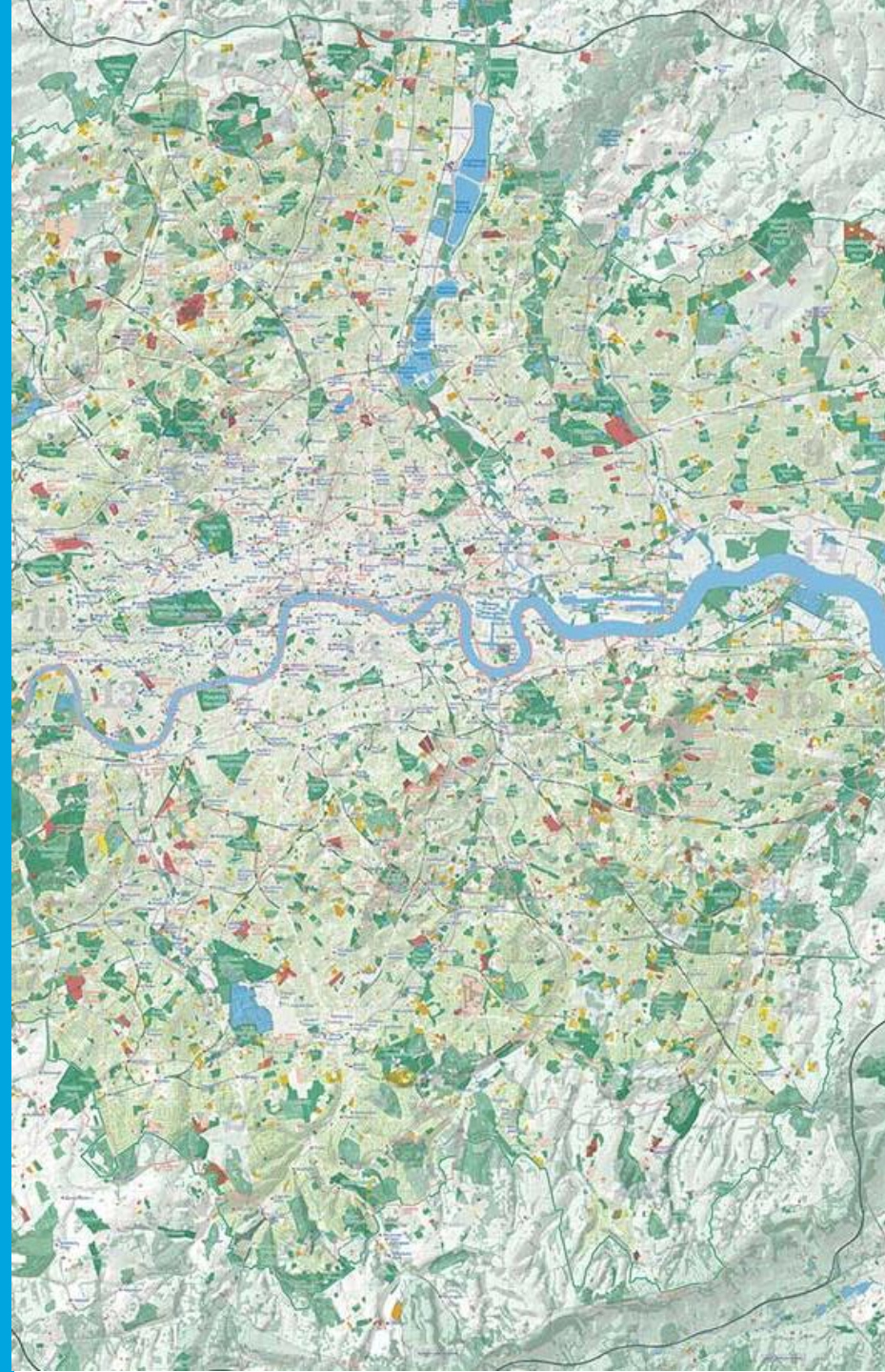
The Mayor of London's Greener City Fund is a £9 million fund to create and improve green spaces and encourage more tree planting in London, and to make London the first National Park City by 2019, with the aim of making the city a greener and healthier place to live.

Surprisingly, 47% of London is green space, consisting of approximately 24% domestic gardens, 22% greenbelt, 18% park and open spaces and 19% conservation sites. Whilst UKGBC reports that there are 22,000 hectares of green space that were converted into artificial surfaces between 2006 and 2014 (a landscape twice the size of Liverpool), there has also been a 17% increase in green roofs in London from 2014 to 2015.

This quality green space is crucial for local wildlife populations – species such as birds and bats use parks, gardens and green infrastructure to forage and travel safely across an urban landscape. Connectivity across habitats means populations can move freely around and access a range of resources in the local area.

Trees also act as features that increase connectivity across an urban landscape. There are 8.4 million trees in London, providing 2.4 Mt of CO₂ storage, removing 2200 tonnes of pollution, absorbing 3.4 million tonnes of storm water and £260,000 in energy savings from shading buildings each year. These benefits are worth about £132.7m a year.

The benefits of trees in cities is also well-known. Trees and woodlands make the city a healthier, more attractive place to live, and help combat climate change and air pollution. Trees improve air quality, minimise urban heat island effects and support water quality. They create nesting and foraging habitat for birds, foraging for invertebrates and tree lines are important for habitat connectivity.



Urban case study: “Contemporary London living at its best”

Adding value through the use of green space has been a recurring theme for Eight Associates over last 10 years. We were appointed the Code for Sustainable Homes Assessor and Ecologist for a 474 dwelling project, consisting of seven high rise blocks organised around a central communal garden with living roofs on each block. The existing site was a car park, dominated by hardstanding, with no ecological features.

The Grounds

- 1607m² of shrub and perennial garden planting with a diversity of 22 plant species native or species of known wildlife value
- 1020m² of lawn with a diversity of at least three native plant species
- 306m² hedge planting with two different native species
- Water body with aquatic planting, including a range of depths
- Benches throughout and exercise area

Benefits

The development’s marketing strategy heavily featured the access to central green space and landscaping features, with views from apartment balconies of green space.

The development contributes to local and national conservation aims, the hedges and living roofs provide connectivity and habitat for foraging birds and bats. The grounds minimise the Urban Heat Island effect and act as effective SuDS.

The communal grounds give occupants health and wellbeing benefits including access to community, improved air quality and stress alleviation.



“Emerald Gardens known for its contemporary living at its finest. Six buildings that make up this stunning development surround just under an acre of beautifully landscaped gardens”

“North West Village at Wembley Park is contemporary London living at its best: super connected with secluded gardens, fantastic shopping and leisure on the door step”

“Stylish and luxurious new homes set around a private landscaped water garden”



Incorporating biodiversity in the built environment

Adding ecologically valuable habitat make a critical difference to the environmental sustainability of our cities and towns. An enormously wide range of species can be encouraged in urban settings. Following ecological site assessments, we make recommendations to include fruiting and flowering species and those that are native or of value to wildlife.

Invertebrates

Creating a good habitat for invertebrates is an important starting point, as this in turn provides a food source for birds and bats. Invertebrate 'hotels' encourage solitary bees to nest on the site and log piles create breeding habitat for beetles. Planting should be native include flowering species to encourage solitary bees, ladybirds, butterflies and other pollinators. Design options can be tailored for any size space, for example into walls, and include a wide range of colours.

Bats

In addition to considering food sources, bat boxes can be fitted on trees or walls in a range of designs. Bat bricks can also be incorporated, which have barely visible gaps of 15-20mm x 20-50mm, and can be placed next to eaves of the house on a south facing wall. Similarly, bat tiles can be placed on tiled roofs. External lighting should be designed with bats in mind, following Bat Conservation Trust guidelines.

Birds

Food, shelter and nesting sites are the key criteria when creating habitats for birds, particularly in urban settings where there nesting opportunities are limited. Bird boxes should be installed at least 3m off the ground and be sheltered from prevailing wind and rain.

Local authorities expect developers to aim to protect and enhance biodiversity in its widest sense, even where there are no significant habitats or protected species present on an existing site. Ecology is an important consideration from the very outset of a project and links to SuDS and flood alleviation and air quality strategies.

Please contact us to discuss your project biodiversity options or if we can help with habitat surveys or protected species assessments.



Biodiversity design – Green roofs

A green roof is defined as one covered in part by vegetation, planted over a waterproof membrane. They fall into two broad categories - intensive and extensive - depending on the depth of planting, species incorporated and the required amount of maintenance.

All living roofs consist of a waterproof layer, root barrier, protection mat, drainage reservoir, filter sheet, substrate and the plant level. Intensive gardens, with enough soil depth to grow plants or lawns, are often used as amenity spaces, and require more intensive maintenance, feeding and irrigation systems, and hence need to be easily accessible. Extensive living roofs are almost self-sustaining, needing only a minimum level of maintenance, while still establishing wildlife habitats.

Biodiverse green roofs are often specified with variable substrate depths, habitat patches (sand, gravel, log piles) and wildflower and grass species for foraging.

Green roofs act as effective SuDS. When a green roof is exposed to rain, most of it captured by the substrate, the drainage layer and also on the surface of the plants and vegetation.

A large amount of the rainfall which is held on the green roof is removed through the process of evapotranspiration. The rainwater that is absorbed and passes through the vegetation and substrate layer and then runs off has reduced pollutants - it has been found that 95% of heavy metals are removed from run-off by green roofs and nitrogen levels can also be reduced.



The best green roofs are designed with the location in mind, in terms of species choice, aesthetics and microclimate considerations.



Biodiversity design – Green walls

Green walls have increased in popularity over the last five years, not least as they can be crafted with a wide variety of species to create visually stunning designs in almost any setting.

There are broadly two types of green walls;

- Hydroponic walls, where there is a mechanical support system and no soil is used. Plants are grown on pre-constructed panels.
- Substrate/soil based walls, where troughs are attached to existing walls

The benefits of green walls are multifold. The leaves of plants attenuate sound by reflecting, refracting and absorbing acoustic energy in small amounts, helping with noise levels. The local absorption of pollutants means air quality is improved. As the surface of an exterior green wall is up to 10°C cooler than an exposed wall, it also helps with insulation, solar gain and energy consumption. The aesthetics of a green wall can increase property value by attracting higher numbers of patrons and also have an impact on staff retention levels.

As the plants remove common indoor chemicals and improve air quality, as well as providing a connection to nature, internal green walls are also increasingly being specified. Internal green walls are used in both retail and office settings, not least to create dramatic backdrops and improve building users sense of wellbeing and connectivity to nature. Plant species that are known to have beneficial effects on improving air quality, including 'Peace Lily' *Spatyphillum*, which is the number one for air quality improvement according to NASA, and 'Spider Plant' *Chlorophytum* are often featured.



Biodiversity design - Rain gardens and bio-retention areas

Rain gardens consist of a landscaped area of depression to capture and filter polluted run-offs. Studies have shown that rain gardens have the ability to cut down river pollution by 30% through their filtration of water. The plant species need to be hardy, being able to survive periods of sudden inundation as well periods of drought when the free draining soil is quickly removing water in normal weather conditions. Native UK species that match this criteria include guelder rose, dogwood, stinking hellebore, bellflower and royal fern - some additionally provide a nectar source for invertebrates in the area.

Bio-retention areas are in effect rain gardens on a larger scale. They are usually used alongside car parks, schools, industrial areas and roadsides, stopping such areas from flooding and allowing the rainwater that otherwise would have been drained away to sewage systems to return to the soil. The filtered run-off can be stored over a period of three or four days before being slowly released as groundwater. An open throat catch basin is usually installed in case the system starts to overflow. Similar sorts of plants are used for bio-retention areas as in rain gardens, and because of the larger scale, trees can also be planted to absorb water and release it through evapotranspiration.

For big sites, wetlands and retention basins (temporary pools, wet grassland, wet woodland and reedbeds) become a consideration. They provide the capacity to store large amounts of storm run-off, releasing it at a controlled rate, and make a significant ecological contribution by creating a whole new ecosystem for amphibians, birds, mammals.



The power of green space: Realising the potential

There are many inter-related considerations to be made in maximising the potential for green space. Collaborating with a Landscape Architect, Ecologist and Arboriculturalist at an early stage ensures that a well considered design will deliver benefits with long-lasting impact in the most cost-effective way.

Incorporating biodiversity design elements can actually reduce the project budget. On a recent project, we found that the installation cost of a 450m² green roof was approximately £70,000, which could be accommodated into the proposed concrete structure with a relatively minor thickening of the concrete roof slab. The alternative proposal to achieve the same sustainability rating was the installation of a CHP plant, at a cost of over £140,000.

A green roof contributes to maximum BREEAM credits for land use and ecology because a site can provide a large area and a high number of species, increasing the change in ecological value and enhancement of a site.

This guide provides a brief overview of the considerations needed when creating green space to provide environmental, social and financial benefits to buildings. Eight Associates is always happy to talk through projects, answer any questions, discuss enhancements and recommendations or deliver further CPDs at your office.

Talk to us.

info@eightassociates.co.uk
+44 0207 043 0418
eightassociates.co.uk



References

- Benefits of green infrastructure - Report by Forest Research, 2010
- Health, Wellbeing & Productivity in Offices - The next chapter for green building – World Green Building Council, 2014
- The economic value of green infrastructure - Natural Economy Northwest, 2008
- UK National Ecosystem Assessment – Synthesis of Key Findings, 2011
- The Global Impact of Biophilic Design in the Workplace, Human Spaces, 2015
- The Effects of Green Space on Stress: how urban natural and built environments affect stress measures – Natural Medicine Journal 2014
- Interior Landscape Plants for Indoor Air Pollution Abatement – NASA, 1989
- Valuing London's urban forest: Results of the London i-Tree Eco Project – iTree, 2015
- Key London Figures - Greenspace Information for Greater London CIC, 2015
- Sustainable Drainage Systems: maximising the potential for people and wildlife – RSPB, 2012

