65 Kingsway

Green roof biodiversity management Plan

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1.0 INTRODUCTION

THE BRIEF

The Green Infrastructure Consultancy Ltd (GIC) has been commissioned by Clearbell Captial LLP to provide a Biodiversity Management Plan for 65 Kingsway development, London, WC2B. This is to discharge London Borough of Camden's planning condition 12 requirements which state:

Prior to commencement of development, full details in respect of the living roof in the area indicated on the approved roof plan shall be submitted to and approved by the local planning authority. The details shall include
i. a detailed scheme of maintenance
ii. sections at a scale of 1:20 with manufacturers details demonstrating the construction and materials used
iii. full details of planting species and density The living roofs shall be fully provided in accordance with the approved details prior to first occupation and thereafter retained and maintained in accordance with the approved scheme. Reason: In order to ensure the development undertakes reasonable measures to take account of biodiversity and the water environment in accordance with policies CC1, CC2, CC3, D1, D2 and A3 of the London Borough of Camden Local Plan 2017.

This report provides details in regard sub-sections (i) and (iii)

The main species of conservation concern, the black redstart (see also below) is attracted to derelict industrial sites with equipment and gantries similar to rooftop landscapes. The species-rich vegetation created on green roofs will support invertebrates and provide feeding sites for this species.

SCOPE OF THE REPORT

This report provides the following;

- Ecological rationale for the design of biodiverse green roofs

- Role of the project in meeting Biodiversity Action Plans (BAPs);
- Specification for the planting of the green roof
- Details of maintenance for the green roof.

SITE CONTEXT AND STATUS

- Kingsway is located within London Borough of Camden. The site is urban with little or no green space in the immediate area. It is, however, in a known area for breeding black redstarts.

THE CONCEPT

- The green roof will be designed for biodiversity, installed following the specification in this document, and will be vegetated by seeding a diverse range of wildflowers through the use of the London Living roofs mix (Appendix 1).

- The London Borough of Camden is known to support breeding black redstart with records from within 1km of Kingsway in every year since 2000. The black redstart is a nationally rare bird species (with London being one its strongholds), which is given additional legal protection under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). It is also a Bird of Conservation Concern (BoCC) Amber List[1] species and a London BAP species (see Table 3 below).

[1] Birds of Conservation Concern status is prioritised into high concern (Red), medium concern (Amber) and low concern (Green) (Eaton *et al*, 2009). Red-list species are those that are globally threatened according to the IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and have not shown a substantial recent recovery. Amber-list species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations. Green-list species are those that fulfil none of the criteria.

BIODIVERSITY ACTION PLANS

- The United Kingdom published its first BAP in 1994 in response to The Convention on Biological Diversity[2]. The aims and objectives of the document were to preserve and enhance the biological diversity of the UK through implementation of Habitat Action Plans (HAPs) and Species Action Plans (SAPs). The design of the biodiverse extensive green roof and installation of bird boxes addresses objectives of the following plans from the most recently updated version (JNCC, 2010) of the UKBAP:

Table 1: Summary of UK BAPs relevant to the site.

Plan	Summary
Open mosaic habitats on previously developed land HAP	Synonymous with wasteland habitat. Disturbed ground more than 2500m^2 comprising a mosaic of early successional plant communities with open areas and mixed substrate types. Can support important plant and invertebrate assemblages and birds such as black redstart.
House sparrow *Passer domesticus* SAP	68% decline in UK populations between 1979 and 2004. Key actions from the plan are to ensure homeowners; LPAs, developers and others consider this bird in building design and maintenance, garden and green space management.

- In addition to the UKBAP, local partnerships including LPAs also produce BAPs for action at the local level (LBAPs). These publications include specific plans concerning local habitats and the associated 'Key Species' that they support. The design of the living roofs addresses objectives of the following plans from the London BAP (London Biodiversity Partnership, 2008).

[2] The Biodiversity Treaty' (1992). The Convention on Biological Diversity (CBD). Article 6: General Measures for Conservation and Sustainable Use. http://www.cbd.int/convention/articles.shtml?a=cbd-06

Table 4: Summary of London BAPs relevant to the site.

Plan	Summary
Black redstart SAP	The black redstart is a rare bird species whose distribution is concentrated in urban areas, with London being one of its UK strongholds. The UK population is presently thought to fluctuate between 80 and 120 pairs (Gibbons *et al.*, 1993). On average there are approximately 10-20 pairs breeding in Greater London each year (Gedge, 2010). One pair breeding in a London Borough could therefore amount to 1.25% of the national population. The London BAP includes aims to protect, conserve and enhance the existing population. This SAP links with the UK and London HAPs relating to wasteland.
House sparrow SAP	This bird species is found in close proximity to human activity in urban and rural areas. It has declined nationally by over 60% between 1977 and 2002. This decline has been particularly marked in London, with research suggesting an 85% decline from 1975 to 1995. The London BAP includes aims to undertake measures to reverse the decline of house sparrow populations. This SAP links with the London Built Structures HAP below.
Wasteland HAP	Wasteland or 'brownfield' sites include a variety of vegetation developing on declining and/or derelict land that is typically high in biodiversity. The total area of London's wasteland habitat is continuing to decline due to development pressures. The London BAP includes aims to promote the appropriate retention, incorporation, and management of wasteland habitats within new developments in London and to maintain a diverse network of wasteland sites. Wasteland habitat can be created at roof level through the creation of biodiverse living roofs (originally termed 'brown roofs').
Built Structures HAP	The artificial fabric of the city: buildings, bridges, car parks, wharfs, jetties and chimneys provide valuable habitat for wildlife, some species depend almost entirely on built structures e.g. the black redstart. This plan encourages developers and building owners to design for biodiversity and install features beneficial to wildlife e.g. living roofs.

- The London Borough of Camden's Biodiversity Action Plan includes a HAP '*Built Environment*' which encompasses green roofs, bird nesting sites, street trees and the urban realm.

PLANNING POLICY

- A technical report on living roofs and walls was published to support the London Plan (2011) and London Built Structures HAP, and includes the following key policy:

"Major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible, to deliver as many of the following objectives as possible:

- *adaptation to climate change (i.e. aiding cooling)*
- *sustainable drainage*
- *mitigation of climate change (i.e. aiding energy efficiency)*
- *enhancement of biodiversity*
- *accessible roof space*
- *improvements to appearance and resilience of the building*
- *growing food.*

Within LDFs [Local Development Frameworks] *boroughs may wish to develop more detailed policies and proposals to support the development of green roofs and the greening of development sites. Boroughs should also promote the use of green roofs in smaller developments, renovations and extensions where feasible".*

ECOLOGICAL RATIONALE

- Due to issues of accessibility to the roofs a full biodiverse green roof approach has not been taken. The green roof finish will be a vegetation blanket (sedum) with additional wildflower planting and seeding and other features to enhance the green roof for biodiversity.

- Additional planting and habitat features will provide a broader range of ecological habitats at roof level, increasing the roofs potential to support rare species, particularly the black redstart. Furthermore the provision of these habitat features will ensure that the roof is attractive to both common and rare

Hymenoptera and other invertebrate species associated with brownfield and open habitat.

- The seed mixes listed in the Appendix contain native species associated with brownfield sites in London, a number of which are important food plants for rare bees. It is recommended that these mixes be sourced from a recognised native supplier to ensure ecological integrity of the seeds.
- Stones and logs are also to be placed on the roof. Such structural elements provide an important niche environment for a number of important invertebrate species.

2. SPECIFICATION FOR EXTENSIVE GREEN ROOF

Photo of biodiverse extensive green roof on TfL HQ in St James by GRC, which uses similar build up and seeding/planting to this scheme

ROOF BUILD UP

2.1 The roof build-up will be comprised of deck, waterproof layer, root barrier/protection layer, protective fleece, water storage and drainage layer (optional – not required on sloping perimeter) and filter sheet. The substrate and vegetation will be installed on top of this build up (see Appendix).

QUALITY ASSURANCE

2.2 A recognised green roofing manufacturer should provide materials and a suitably qualified and experienced contractor should install the green

roof. Green roofs can fail because of poor installation and/or the use of sub-standard materials. Those companies listed on www.livingroofs.org work to FLL standards (the de facto international green roof standards body that is based in Germany).

ROOT PROTECTION

2.3 It is imperative that a root protection element be included either within the waterproofing layer [in the form of a biocide] or as a separate element above the waterproofing (but often fused together). The root barrier will ensure that the waterproofing is not penetrated and damaged by roots.

PROTECTIVE FLEECE

2.4 It is standard practice for a protective fleece to be installed above the waterproofing

DRAINAGE

2.5 It is standard practice for a 25mm drainage layer to be used to allow lateral drainage. Drainage board will not be required on the sloping perimeter sections.

FILTER SHEET

2.6 Most suppliers provide a filter fleece (geotextile membrane) as part of and above the drainage layer. However, where this is not supplied it is imperative that a filter sheet be rolled out loose over the drainage layer. The drainage layer must be dressed up to all up stands, to substrate level. The filter sheet ensures that fines (sediments) do not escape from the substrate and enter the drains.

SUBSTRATE

2.7 A green roof substrate suitable for wildflowers will be installed onto drainage layer/filter sheet at an average depth of 100mm (varied from 50mm to 200mm.

VEGETATION

2.8 The vegetation will be established a wildflower seed mix comprising species suitable for biodiverse green roofs in London including the species listed in Appendix 1

DEADWOOD

2.9 Small log piles will be added in 3 selected areas along the perimeter. The logs will be a mix of untreated dried and rotting hardwood logs (softwood/coniferous wood should not be used) and should be approximately 800-1000mm in length with a minimum diameter of 100mm. There should be at least 3 logs in each pile and three piles. South facing logs will be drilled with several holes between 2-8mm in diameter and 100mm deep to provide nesting sites for solitary bees.

4. MAINTENANCE

4.1 The extensive green roof will consist of seeded and plug planted drought tolerant vegetation established on extensive green roof substrate. It will not be irrigated. See Appendix 1 for further information.

4.2 The extensive green roof will be visited by a suitably qualified and experienced technician (a person who is able to identify the weed species listed and is trained to work on an extensive green roofs) twice each year, once in autumn and again in early spring to undertake the following:

- Make a visual inspection
- To remove the weed species by hand (weed species include couch grass *Elytrigia repens*, butterfly bush *Buddleja davidii*, fleabane species *Conyza* spp, creeping thistle *Cirsium arvense*.
- Note: Vegetation cutting, dead heading and pruning are **not** required (dead vegetation has ecological importance for overwintering invertebrates)
- To replenish any areas of substrate that have been eroded by settlement, wind or other disturbance (in order to maintain a minimum depth of 80mm)
- To check and unblock if required all drainage outlets
- To clean up and keep tidy any access routes

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Appendix 1 – Wildflower seed mix

Wildflower seed list for main substrate	
Scientific name	**Common name**
Agrimonia eupatoria	Agrimony
Anthyllis vulneraria	Kidney Vetch
Centaurea nigra	Common Knapweed
Clinopodium vulgare	Wild basil
Echium vulgare	Viper's-bugloss
Galium verum	Lady's Bedstraw
Hypericum perforatum	Perforate St John's-wort
Knautia arvensis	Field Scabious
Leontodon hispidus	Rough Hawkbit
Leucanthemum vulgare	Oxeye Daisy
Linaria vulgaris	Common Toadflax
Lotus corniculatus	Bird's-foot-trefoil
Malva moschata	Musk-mallow
Origanum vulgare	Wild Marjoram
Plantago media	Hoary Plantain
Primula veris	Cowslip
Prunella vulgaris	Selfheal
Ranunculus acris	Meadow Buttercup
Ranunculus bulbosus	Bulbous Buttercup
Reseda lutea	Wild Mignonette
Poterium sanguisorba	Salad Burnet
Silene vulgaris	Bladder Campion