Greengage

65 & 67 Maygrove Road REP Maygrove Road LLP
Biodiversity Assessment & Code for Sustainable Homes Ecology Report, November 2012

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65 & 67 Maygrove Road: Biodiversity Assessment & Code for Sustainable Homes Ecology Report

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Prepared by:	Paul Roebuck	Paul Roebuck/Morgan Taylor
Signature:		
Authorised by:	Mitch Cooke	Mitch Cooke
Signature:		
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1.0 INTRODUCTION

1.1 Greengage Environmental LLP were commissioned by REP Maygrove Road LLP to undertake a Biodiversity Assessment at a site known as 65-67 Maygrove Road, London in order to establish the ecological value of the site and its potential to support notable and/or legally protected species; to identify the impact on the biodiversity value of the site and the surrounding area, and bring forward mitigation and enhancement measures to result in a net benefit for biodiversity.

1.2 This report will also relate the findings from this survey to the available credits under the Code for Sustainable Homes 2010: Ecology category (credits ECO1-ECO4). To this end, the report uses findings from the site walkover and desk based study and presents specific enhancement recommendations required for the site in light of these findings to maximise the awarded credits for the proposed development (see section 6.0 onwards).

1.3 The overall assessment consisted of:

- Site specific biological information gained from statutory and non-statutory consultation; and
- A site walkover and ecological survey.

1.4 The site-specific consultation provided the ecological context for the survey and assessment. The survey boundary and existing site is shown at Figure 1.0.

1.5 Greengage undertook the site walkover survey on 15th July 2011 during warm, bright weather conditions. Features within the site boundary and accessible features immediately bordering it were evaluated and the extent and distribution of habitats and plant communities were recorded. Fauna using the area were recorded and areas of habitat suitable for statutorily protected species were identified where present, with an active search carried out for evidence of such use. All building exteriors and interiors were examined as part of this survey. The site survey was undertaken prior to any site preparation or clearance works. This report has been updated from a previous report and the site conditions have been reviewed to determine if the ecological baseline would have changed since the original survey in July 2011. We can confirm that the baseline conditions have not changed in the interim and remain as the situation identified in July 2011.

1.6 It has been assumed that all areas of the site and associated habitats will be affected by any future plans, and as such this report identifies potential ecological constraints relating to the entire site.

1.7 The recommendations and opinions expressed in this report are based on the combination of information stated, site observations and feedback from the desk based data study. Overall the biodiversity enhancement measures will result in a major positive impact upon the biodiversity value of the site and immediate area.

SITE DESCRIPTION

1.8 The assessment site covers an area of approximately 0.35 hectares (ha) and is located in LB Camden, centred on grid reference TQ249845, OS co-ordinates 524964, 184581.

1.9 The site is in an area of dense urban development surrounded by residential housing. There is a small area of amenity grassland (Maygrove Peace Park) to the north and east of the site with some areas of scattered trees containing mature sycamore (*Acer pseudoplatanus*) and cherry (*Prunus avium*) trees along the eastern and north eastern site borders.

1.10 The assessment site is dominated by buildings, with a three storey office building and hardstanding. There are ornamental shrub planters along the south of the site containing *Miscanthus* grass species and Privet hedge species (*Lingustrum sp.*), and an area of laurel (*Prunus laurocerasus*) with a ground covering of mulch at the north of the site. Figure 1.0 shows the existing site plan.

1.11 The site is Nos. 65 and 67 Maygrove Road, West Hampstead, London NW6.

1.12 65 Maygrove Road is a mid-20th Century building comprising three storeys (ground plus two upper storeys) located on the north side of the road. Pedestrian access is provided from Maygrove Road with disabled access provided by a recently built access ramp. The existing building comprises 2,543sqm of office accommodation accessed principally from a central entrance from Maygrove Road. The building was recently refurbished by the previous owner in an attempt to improve marketability of the space. This attempt failed and the building is now vacant.

1.13 No.67 Maygrove Road is a late 20th Century four storey building which is in office use at ground to second floor and has three residential flats at third floor. The office use in this building will shortly cease when the occupiers move to new premises elsewhere. The three flats are rented on short leases.

1.14 To the rear of the site is a large open car park accessed from Brassey Road. Assessing the space using normal parking standards the car park has space for 37 cars.

1.15 The site slopes down from north to south by approximately six metres with the floor level of rear car park, accessed from Brassey Road, corresponding with first floor level of the building. The site comprises an area of 0.32ha in total. It is a moderately accessible site, located mid way between West Hampstead and Kilburn stations with a PTAL rating of 4/5.

1.16 The proposed plans call for the demolition of Nos. 65 and 67 Maygrove Road and the erection of a building comprising basement, ground and four upper storeys to provide 91 residential (Class C3) units, with the provision of 10 car spaces for disabled

persons, 2 car club spaces, 120 cycle spaces and ancillary refuse storage at basement level and hard and soft landscaping to the rear.

2.0 METHODOLOGY

DESK TOP REVIEW

2.1 A review of readily available ecological information and other relevant environmental databases was undertaken for the assessment area and its vicinity. This provided the overall ecological context for the sites informing the site visits and ecological survey.

CONSULTATION

2.2 Site specific information has been sourced through direct consultation with Greenspace information for Greater London (GiGL) that act as the Local Biological Records Centre for London and coordinates the data from a range of nature conservation groups and provides data and information on nature conservation designations, records of protected species, notable species and other ecological information.

ON SITE SURVEYS

Flora

2.3 The extent and distribution of different habitats on site were identified, supplemented with target notes describing the dominant botanical species and any valuable or interesting features.

2.4 As stated above, the survey was carried out in July 2012 and it should be noted that this is inside the optimal time period for botanical identification which is generally considered to be from April – October.

Fauna - Protected Species

2.5 This assessment specifically includes surveys to identify the potential for protected species to be present, and to ascertain the likelihood of species protected by statute inhabiting the site. This involved identifying potential habitats in terms of refugia, breeding sites and foraging areas.

2.6 The likelihood of occurrence is ranked as follows and relies on the current survey and evaluation of existing data through the desk top study.

- Negligible - While presence cannot be absolutely discounted, the site includes very limited or poor quality habitat for a particular species. The site may also be outside the known national range for a species;
- Low - On-site habitat is poor to moderate quality for a given species, with few or no information about their presence from desk top study. However, presence

cannot be discounted due to the national distribution of the species or the nature of on-site and surrounding habitats;

- Moderate - The on-site habitats are of moderate quality, providing most or all of the key requirements for a species. Several factors may limit the likelihood of occurrence, habitat severance, habitat disturbance and small habitat area;
- High - On-site habitat of high quality for given species. Site is within a regional or national stronghold for that particular species with good quality surroundings and good connectivity; and
- Present - Presence confirmed for the survey itself or recent, confirmed records from information gathered through desk top study.

2.7 The species surveyed for included:

Badgers (Meles meles)

2.8 The potential for badgers to inhabit or forage within the study area was established during the site walkover. Evidence of badger activity includes the identification of setts (a system of underground tunnels and nesting chambers), grubbed up grassland (caused by the animals digging for earthworms, slugs, beetles etc.), badger hairs, paths, latrines and paw prints.

Great Crested Newts (Triturus cristatus)

2.9 During the site walkover, an assessment was carried out to identify any potential habitats that may support great crested newts (GCN) and other native amphibians. The aquatic and terrestrial habitats required generally include small, still ponds or water bodies suitable for breeding; and woodland or grassland areas where there is optimal invertebrate prey potential.

Bat species (Chiroptera)

2.10 The site visit was undertaken in daylight and the evaluation of bat potential comprised an assessment of natural features on site that aimed to identify characteristics suitable for bat roosts, foraging and commuting. In accordance with the guidelines and methods given in English Nature's (now Natural England) *Bat Mitigation Guidelines*[1] consideration was given to:

- The availability of access to roosts for bats;
- The presence and suitability of crevices and other places as roosts; and
- Signs of bat activity or presence.
- Definite signs of bat activity were taken to be:
- The bats themselves;

- Droppings;
- Grease marks;
- Scratch marks; and
- Urine spatter.

2.11 Signs of possible bat presence were taken to be:

- Stains; and
- Moth and butterfly wings.

2.12 Features with potential as roost sites include mature trees with holes, crevices or splits (the most utilised trees being oak, ash, beech, willow and Scots pine), caves, bridges, tunnels and buildings with cracks or crevices serving as entrance or exit holes.

2.13 Additionally, linear natural features such as tree lines, hedgerows and river corridors are often considered valuable for foraging and commuting. Consideration was given to the presence of these features both immediately within and adjacent to the assessment area.

2.14 The availability of access to roosts was assessed based upon the presence of holes large enough to allow entry of bats.

Reptiles

2.15 The potential for reptile species on site was assessed during the walkover survey. Possible species include the grass snake (*Natrix natrix*), smooth snake (*Coronella austriaca*), adder (*Vipera berus*), common and sand lizards (*Lacerta vivipara* and L. *agilis*) and the slow worm (*Anguis fragilis).* These native reptile species generally require open areas with low, mixed-height vegetation, such as heathland, rough grassland, and open scrub or, in the case of grass snake, waterbody margins. Suitable well drained and frost free areas are needed so they can survive the winter.

Dormice (Muscardinus avellanarius)

2.16 During the walkover survey the potential for dormice to be present on site was assessed. This included observations for suitable habitat such as well-layered woodland, scrub and linking hedgerows, particularly those species offering suitable food sources such as honeysuckle and hazel, in addition to direct evidence such as characteristically gnawed hazelnuts, chewed ash keys and honeysuckle flowers, or nests.

Water voles (Arvicola terrestris)

2.17 Water vole potential was assessed during the walkover survey. The potential is identified by the presence of ditches, rivers, dykes and lakes with holes and runs along the banks. Latrines, footprints or piles of food can also be noted.

Otters (Lutra lutra)

2.18 Where desk-top review or consultation indicates the presence of otters in a river catchment, the presence of water bodies with good cover and potential holt (den) sites would be noted.

Birds

2.19 During the walkover survey, the potential for breeding birds was assessed. In particular, this includes areas of trees, scrub, heathland and wetlands that could support nests for common or notable birds.

Notable Invertebrates

2.20 As part of the walkover survey the quality of invertebrate habitat and the potential for notable invertebrate species was considered. There is a wide variety of habitats suitable for invertebrates including wetland areas, heathland, areas of bare sandy soil, ephemeral brownfield vegetation and meadows.

Other Fauna

Biodiversity Action Plan priority species

2.21 Where consultation and desk-study indicates the presence of BAP priority species not protected by statute, effort was made to establish the potential for the site to support these species.

3.0 BASELINE CONDITIONS

DESK TOP REVIEW

Designations

3.1 The Multi-Agency Geographic Information for the Countryside (*MAGIC*) dataset[2] was referenced in a desktop search, and has confirmed that there are no statutory or non-statutory designations of local, national or international importance within the boundary of the assessment site.

3.2 There is however, one statutory Local Nature Reserve (LNR) and 21 Sites of Importance to Nature Conservation (SINCs) within a 2km radius as show in table 3.1 below.

3.3 The Local Nature Reserve is Westbere Copse and is located ~0.8km north west of the site, is designated for its value for wildlife. It is described as *containing varied habitats including spring and summer meadows, a pond, woodland and scrub areas.*

3.4 The SINCs have been designated because of their protected status in the land-use planning system on account of the potential presence of notable or protected flora and fauna. These SINCs are of either (in increasing importance) Local, Borough (Grade II and I) or Metropolitan importance.

3.5 Six of the closest of these sites within ~1km radius, are detailed below:

- Hampstead Cemetery – a SINC (Borough) ~2km north of the site. This cemetery contains areas of planted shrubs, scattered trees, mature secondary woodland, tall herbs and semi-improved neutral grassland. It contains a wildlife area that supports a number of butterfly and bird species.
- West Hampstead Railsides – a SINC (Borough Grade I) ~0.2km south of the assessment site. This site is composed of a number of sections of railside, an old orchard at Medley Gardens and Westbere Copse. The railsides are mostly covered by secondary woodland, bramble and tall herb communities.
- Broadhurst Gardens Meadow – a SINC (Borough Grade II) ~1km south east of the site. This site is a communal garden meadow and contains scattered trees, scrub and semi-improved neutral grassland. The site supports a rich invertebrate population.
- Gondar Gardens covered reservoir – a SINC (Borough Grade II) ~0.7km north of the site. This site, an undisturbed covered reservoir, contains an area of secondary woodland and semi-improved neutral grassland. This site is the only known location of slow worms in Camden and supports populations of invertebrates.

- 160 Mill Lane Community Garden - a SINC (Borough Grade II) ~0.4km north northwest of the assessment site. This site, a small community garden contains a pond and areas of scattered trees, scrub and semi-improved neutral grassland.
- Kilburn Grange Park – a SINC (Local) ~0.7km south of the south of the site. This site, a typical local park, contains areas of amenity grassland, flower beds, planted shrubs, ruderal planting and scattered trees. This park contains two species that are scarce in London, small flowered crane's bill (*Geranium rotundifolium*) and round-leaved cranes bill (*G. pusilium*).

Table 3.1 Statutory and Non – Statutory Designated Sites within a 2km Radius of the Application Site

Site Name	Designation Status
Westbere Copse	LNR
Hampstead Heath	SINC (Metropolitan)
Silverlink Metro between Brondesbury and Willesden Junction	SINC (Borough Grade I)
Metropolitan line between Kilburn and Neasden	SINC (Borough Grade I)
Hampstead Cemetery	SINC (Borough Grade I)
Branch Hill	SINC (Borough Grade I)
West Hampstead Railsides, Medley Orchard and Westbere Copse	SINC (Borough Grade I)
Hampstead Parish Courtyard	SINC (Borough Grade I)
Paddington Old Cemetery	SINC (Borough Grade II)
Queens park	SINC (Borough Grade II)
Broadhurst Gardens meadow	SINC (Borough Grade II)
Frognal Court wood	SINC (Borough Grade II)
Green Triangle	SINC (Borough Grade II)
King's College Hampstead campus	SINC (Borough Grade II)
Gindar gardens covered reservoir	SINC (Borough Grade II)
Malorees School orchard	SINC (Local)

Site Name	Designation Status
The Dell Doorsteo Green	SINC (Local)
Greville Place Nature reserve	SINC (Local)
160 Mill Lane Community garden	SINC (Local)
Frognal Lane gardens	SINC (Local)
Kilburn Grange park	SINC (Local)
Paddington recreation ground	SINC (Local)

Biodiversity Action Plans

3.6 UK Biodiversity Action Plans (BAPs) have been developed to set priorities for nationally important habitats and species. To support the BAPs, Species Statements have been produced that provide an overview of the status of the species and set out the broad policies that can be developed to conserve them.

3.7 Local Biodiversity Action Plans (LBAPs) ensure that national action plans are translated into effective action at the local level, and establish targets and actions for locally characteristic species and habitats.

3.8 The London Biodiversity Partnership delivers the London BAP for important habitats and species within the Greater London area. This identifies priority habitats and species that are of particular importance for biodiversity in London. Some of the species have been identified as needing targeted action to secure their future in London, and these have their own Species Action Plans (SAPs). Relevant SAPs for the surrounding area around Maygrove Road include the following:

- Bats;
- Black redstart (*Phoenicurus ochruros*);
- Stag beetle (*Lucanus cervus*); and
- House sparrow (*Passer domesticus*).

3.9 The site in Maygrove Road is subject to the Camden Biodiversity Action Plan. Key details surrounding relevant BAPs to the proposed development at the site can be found at Appendix 4.0.

Species Records

3.10 The information provided from the consultation exercise with GiGL identified a number of protected species records within 2km search radius of the site.

DESCRIPTION OF SITE ECOLOGY

Detailed Description of Site: Habitats

3.11 The habitats presented across the assessment site consist of the following JNCC Phase 1 Habitat categories:

- Introduced shrub (J1.4); and
- Building & hard-standing (J3.6).

Target Note 1

3.12 The building and hardstanding that takes up much of the area within the red line boundary. Photographs of the building and hardstanding within the curtilage of the site can be found at Appendix 1.0.

Target Note 2

3.13 This target note covers an area of introduced shrub planting in raised bed planters bordering the southern face of the building and a mulch bed containing laurel to the north of the buildings. Shrubs are sparsely planted in these areas and provide low ecological value. Photograph 4 in Appendix 1.0 refers to the planters.

DETAILED DESCRIPTION OF SITE: PROTECTED SPECIES POTENTIAL

Badger

3.14 No direct evidence of badgers was identified during the site visit. The site itself and much of the surrounding area has negligible potential for foraging badgers. The overall potential for badgers is considered to be negligible.

Great Crested Newt

3.15 There are no watercourses or waterbodies directly present on the application site and terrestrial habitats on site were considered largely unsuitable, with the site covered almost exclusively by urban hard-standing. Therefore it is concluded that the land does not support habitat suitable for GCN and the potential is negligible.

Bats

Roosting

3.16 There are no suitable roost sites for bats on site; buildings are well maintained and there are no ingress or egress points. Given the site's isolated urban nature, the level of disturbance (it is subject to use as a work yard) and its position next to a busy high

street, it is considered the potential for bats roosting on site is negligible-low. In addition, an assessment of the trees in the neighbouring park did not identify any that were of value for roosting bats.

Foraging

3.17 The habitats on site provide very few opportunities for bat foraging, with limited vegetation. Whilst the adjacent park area and railway line could arguably act as a corridor to and from the site, the potential for bat foraging can be considered as negligible because of the poor quality of habitat present.

Reptiles

3.18 No reptiles were identified during the site visit. General habitats across the site were not suitable as there were no open areas with low height vegetation, such as heathland, rough grassland and open scrub or refuge sites. Overall, potential is therefore considered negligible.

Dormice

3.19 No direct evidence of dormouse activity or suitable habitat was identified during the site visit. As such, the potential for the site to support dormice is considered negligible.

Water Voles

3.20 No direct evidence of water vole activity or suitable habitat was identified during the site visit. No latrines, footprints or piles of food were noted. Therefore we can consider the potential for water voles on site to be negligible.

Otters

3.21 There are no water bodies on site to provide habitat for otters. Overall the potential is considered to be negligible.

Invertebrates

3.22 There are no areas on site that provide good habitat opportunities for invertebrates. The potential can be considered as negligible.

Birds

3.23 The tree and underlying vegetated areas will be removed in the area adjacent to the park and some bird nesting potential, although most of the overall site consists of hard standing and buildings that do not present opportunities for birds to nest. Overall the

potential can be considered as low for most of the site and moderate in the area adjacent to the park.

Other BAP Species

3.24 None were observed during the site walkover.

Baseline Summary

3.25 The assessment site and its surroundings have potential to support the following ecological receptors of note, which could therefore, be impacted upon by any future prospective development proposals, as indicated in Table 3.2 below:

Table 3.2 Baseline Summary

Receptor	Presence/Potential Presence	Comments
Badgers	Negligible	Local habitat is limited. No direct evidence of badgers on site.
Great Crested Newts	Negligible	Local habitat is limited. No direct evidence of great crested newts on site.
Foraging bats	Negligible - low	Local habitat is limited. No direct evidence of the potential for foraging bats on site.
Roosting bats	Negligible - low	Local habitat is limited. There are no buildings or trees on site suitable of supporting bats. No direct evidence of the potential for roosting bats on site.
Reptiles	Negligible	No open areas with low height vegetation, such as heathland, rough grassland and open scrub.
Water Voles	Negligible	Local habitat is limited. No direct evidence of water voles on site.
Dormice	Negligible	Local habitat is limited. No direct evidence of dormice on site.
Otters	Negligible	Local habitat is limited. No direct evidence of otters on site.

Receptor	Presence/Potential Presence	Comments
Invertebrates	Negligible	Lack of habitat mosaic, no suitable areas of vegetation.
Birds	Low- moderate	Limited habitat nesting onsite, however some potential immediately adjacent to the site. No direct evidence.

CONSERVATION VALUE – RATCLIFFE CRITERIA

3.26 The nature conservation value of the site was assessed using the Ratcliffe Criteria[3], currently accepted as being the most effective method for assessing the nature conservation value of sites.

3.27 The results of the use of Ratcliffe Criteria are indicated below:

Size – A habitat's importance for nature conservation generally increases with its size.
The site is approximately 0.35ha of which approximately 95% is covered by building or hardstanding.
VALUE: Negligible - Low

Naturalness – Sites which have remained relatively unaltered by man tend to be the most valuable. Further, the sites which are considered most natural are generally those which are hardest to recreate. NB throughout the UK there is probably no site that can be considered completely natural and therefore an assessment must be made related to degrees of naturalness
All areas of the site show that they have been altered by previous development and usage on site.
VALUE: Negligible - Low

Diversity – Variety is better than uniformity, species or habitat richness is generally better than a poor species or habitat complement. It should be noted that certain habitats are intrinsically poor in species diversity and that

this should be borne in mind when making any assessment.
Most of the site consists of building or hardstanding with some small areas of introduced shrub planting. This does not represent a diverse habitat.
VALUE: Negligible – Low

Fragility – A habitat that is fragile is one that is sensitive to changing influences. Habitats that are liable to such influences are likely to be of higher value than those that are not.
Habitats associated with the site are generally common across the UK and therefore, not considered fragile and are less sensitive to potential future redevelopment or changes in land use.
VALUE: Negligible

Typicalness – Those habitats, which are representative or typical of good examples of their type, are considered of higher value than those which are not.
The site is typical of the area, with this area of Hampstead dominated by urban development.
VALUE: Low

Rarity – A site where rare or protected species or habitats exist is considered of higher value.
All protected species potential is considered to be negligible or low (other than nesting bird potential).
VALUE: Low

Position in an ecological or geographical unit – Sites, and their associated habitats, which are contiguous with other similar sites, tend to be more valuable than those sites which are situated in isolation.

The site is situated in Camden, London within an area dominated by urban development; mostly residential properties with associated gardens. The site is similar to contiguous areas but these areas are of very low ecological importance.
VALUE: Low

Intrinsic Value – This criterion is based upon the value humans place on a feature of ecology as opposed to its actual nature conservation value.
The site shows limited intrinsic value from an ecological perspective.
VALUE: Low

Potential Value – Habitats that, through an adjustment of current influences, have the potential to be of higher nature conservation value than they are currently.
There are opportunities to increase the ecological value of the site. Green space can be created through enhancement in design. The inclusion of a biodiverse roof at the site will dramatically enhance the ecological value of the site.
VALUE: Moderate

Re-creatibility – A site that is difficult to recreate, generally because of its more natural development, is deemed to be of higher nature conservation value than one which can be recreated reasonably simply (additional assessment criterion from Ratcliffe).
The site is lacking in mature habitats, with the entire site easily reproducible.
VALUE: Negligible

Evaluation Summary

3.28 Using the Ratcliffe Criteria it is determined that overall the site has a **Negligible - Low** conservation interest.

4.0 POLICY & LEGISLATIVE CONTEXT

4.1 This section includes the legislative context of those protected species or other notable species that are recorded on site, or have the potential to be present on site. Details on specific legislation for other protected or notable species that have not been identified as being present, or having the potential to be present, are not included below. A more thorough overview of relevant legislation to the CSH assessment can be found at Appendix 3.0.

NATIONAL POLICY

4.2 The introduction of the National Planning Policy Framework (NPPF) in March 2012 sets out the Government's planning policies for England and how these are expected to be applied in the presumption in favour of sustainable development. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so and is a material consideration for local planning authorities in determining applications.

4.3 The NPPF has replaced much existing planning policy guidance, including Planning Policy Statement 9: Biological and Geological Conservation. However, the government circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact within the Planning System, which accompanied, PPS9 remains valid. Therefore features of ecological value should be considered in the context of:

- NPPF sections on biodiversity;
- Circular 06/05: Biodiversity and Geological Conservation; and
- The UK Biodiversity Action Plan (UK BAP).

WILDLIFE & COUNTRYSIDE ACT (1981)[4]

4.4 This policy strengthened the protection for SSSIs, providing additional safeguards for particular types of area and restricting the killing, taking from the wild and disturbance of various species. All of the UK's wild bird species are protected under the 1981 Act. Extra protection is given to birds listed in Schedule 1 of the 1981 Act.

NESTING BIRDS

4.5 All birds, their nests and eggs are protected by law (Wildlife & Countryside Act 1981) and it is thus an offence, with certain exceptions intentionally to:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while it is in use or being built; and

- Take or destroy the egg of any wild bird.

5.0 CODE FOR SUSTAINABLE HOMES: ECOLOGY CREDITS

5.1 The credits under the Ecology category of the CSH carry a high percentage score and therefore, it is highly recommended to maximise credits under this section. A site visit and an ecological survey by a 'suitably qualified ecologist' are necessary to optimise credits under this category with regards the following credit headings:

- Eco 1: Ecological Value of Site – 1 credit available;
- Eco 2: Ecological Enhancement – 1 credit available;
- Eco 3: Protection of Ecological Features – 1 credit available; and
- Eco 4: Change in Ecological Value of the Site – 4 credits available.

ECO 1: ECOLOGICAL VALUE OF SITE

5.2 Greengage contains a number of 'suitably qualified ecologists' (SQE). Paul Roebuck, who undertook the survey on the 15th July 2011, has a degree in Geography (Hons), an MSc in Freshwater and Coastal Sciences and is a graduate member of IEEM. Paul has 5 years experience in ecological survey and assessment of development sites.

5.3 Mitch Cooke has a degree in Ecology (Hons), an MSc in Environmental Assessment and Management, and is a full member of IEEM with over 20 years experience in ecological survey and assessment. Mitch has set up and developed ecological and environmental teams for over 10 years and has undertaken and managed numerous ecological surveys and assessments. He is the Partner at Greengage and manages the team.

5.4 Helen Newman has a degree in Biology (Hons), an MSc in Environmental Technology and a Landscape Design diploma and is an associate member of IEEM with over 5 years experience in ecological survey and assessment.

5.5 Morgan Taylor, who undertook the site visit and wrote this report, has a masters degree in Marine Biology (MSci Hons) and is a member of IEEM. Morgan has 3 years' experience in ecological surveying and has undertaken assessments of numerous development sites.

5.6 The application site survey was undertaken by Paul Roebuck and this report was written by Paul Roebuck and Morgan Taylor, reviewed by Helen Newman and verified by Mitch Cooke who confirms in writing (refer to the QA page of this report) that the report is in line with the following:

- Represents sound industry practice;
- Reports and recommends correctly, truthfully and objectively;
- Is appropriate given the local site conditions and scope of works proposed; and
- Avoids invalid, biased and exaggerated statements.

5.7 The site walkover survey determined that when assessed as an overall ecological unit, taking into account all areas within the development footprint, the application site can be determined as having 'low ecological value'. Some scattered trees immediately adjacent to the application site have a low – moderate value for nesting birds however, this does not affect the overall assessment for the site to have an overall low value.

5.8 As such, 1 credit can awarded for ECO1: Ecological Value of Site.

ECO 2: ECOLOGICAL ENHANCEMENT

Key Recommendations

5.9 1 credit is available for enhancing the ecological value of the application site. The client has appointed Greengage to advise on the ecological value of the application site, and we recommend that the ECO 2 credit should be awarded on receipt of written confirmation that the following enhancement advice has been adhered to. Figure 2.0 shows the key recommendations and the suggested location of these features.

5.10 Details on the relevant Biodiversity Action Plans (BAPs) to the enhancement features at the site are included at Appendix 4.0. The enhancement features have sought to compliment local and national BAP targets by encouraging the creation of priority habitats detailed in Habitat Action Plans (HAPs). Additionally, the recommendations will consider specific Species Actions Plans (SAPs) of relevance, and seek to encourage said species.

Enhancement: Bird Boxes

5.11 The inclusion of bird boxes that are installed into the fabric of the building follows best practice dictated in the CPG.

Swift Boxes

5.12 Numbers of swifts (*Apus apus*) in the UK has declined as a result modern construction practices leading to decreased nesting sites.

5.13 The installation of swift nesting boxes in existing high-rise buildings and new builds is seen as one way to counter-act this problem, providing suitable nesting sites for this declining population.

5.14 The swift and its nest are fully protected under the Wildlife and Countryside Act 1981 (as amended). It is included in Appendix II of the Bern Convention, which requires signatory nations to give strict protection to the species listed.

5.15 The swift is listed as a Priority Species and Species of Conservation Concern in the London BAP[5]. Whilst swifts are not priority species under LB Camden BAPs they are

listed as priority species in nearby boroughs (including the Olympic site BAP[6]), and their conservation and enhancement does add to the targets of the Camden BAP.

5.16 4-10 swift nest boxes will be included within the development and will be located on a northern facing wall facing out over the communal space. The boxes will be placed anywhere high, shaded and free from disturbance and obstructions to their flight paths. They will be located preferably under eaves out of sunlight.

5.17 Figure 5.1 shows the Schwegler Swift Box 16[7]. This nest box can be installed within an external wall to a maximum depth of 17 cm in order to prevent the underneath entrance hole being blocked. It can also be attached to the surface of an external wall (or within render or an external insulation layer) using the optional fixing bracket. The box can be painted, if desired, using standard air-permeable external wall paint.

5.18 The box is specifically designed to attract swifts and should ideally be sited 6 to 7 m above the ground. It can be placed on any external wall but ensure unobstructed access for birds entering and leaving by having a clear distance (drop) below the box (preferably 5 m or more). Whilst cleaning and inspection is not necessary, the box can be easily accessed by removing the front panel.

Figure 5.1 Swift box

Sparrow Terrace

5.19 The house sparrow (*Passer domesticus*) population in the UK has halved since 1980 (it now sits at 2.1-3.7 million breeding pairs[8]). The reason for this decline remains undetermined.

5.20 They are a priority UK, London and LB Camden BAP species, red data book species and are subject to a London BAP Species Action Plan (SAP).

5.21 The inclusion of a sparrow terrace in the Maygrove Road development will help redress this decline in house sparrow numbers.

5.22 Sparrows are social birds and like to nest in company. Terraces, such as the Schwegler 1SP Sparrow Terrace[9] or RSPB nest box terrace[10] shown at Figure 5.2 allow for a number of families to nest together at once.

Figure 5.2 Sparrow Terraces

5.23 The entrance holes for both of the above nest boxes are 32mm diameter. Typically, the terrace can be fixed on to the surface of a suitable wall or incorporated into the wall in the case of the Schwegler model. Ideally place the terrace 2 metres or more above the ground. Nest boxes can typically be installed on the surface of the wall using the plugs and screws provided, or installed directly into the wall; specific instructions come with specific next boxes. Nest boxes typically have a removable front panel for cleaning and inspection.

5.24 The terrace will be included on the north facing wall of the building facing out over the communal area; see Site Layout plan at Figure 1.0. The next box will be kept out of reach of inquisitive humans or animals and placed at >5m height from the ground. To further encourage House sparrows to the site, bird feeders will be included in the courtyard area containing sunflower seeds. Dense shrub planting will also be included to provide shelter for birds.

Enhancement: Bat bricks

5.25 In addition to the in- built bird boxes, 2 bat bricks are recommended for inclusion at the site on the eastern frontage of the building overlooking the park.

5.26 These bat bricks will therefore provide roosting opportunities for bats that may use the park and adjacent railway line as a foraging/commuting corridor.

5.27 An example bat brick is shown at Figure 5.3 although the exact brick choice will accord with the brick finish on the accompanying walls.

Figure 5.3 Schwegler Brick Box Type 27

5.28 This brick can be cemented into a wall, and contains a single internal wooden panel to simulate a crevice where bats can roost.

Enhancement: Soft landscaping

5.29 Planted areas will be incorporated into the scheme with wildlife friendly herbaceous borders that will benefit bees, butterflies and birds. We recommend the below species are included to be used in the 450 sqm (consisting of at least 437sqm of ground floor soft landscaping and a predicted area of raised bed planting on the 4th floor terrace of 13 sqm) area of the site allowed for wildlife friendly soft landscaping.

- Teasel (*Dipsacus fullonum*);
- Purple loosestrife (*Lythrum salicaria*);
- Musk mallow (*Malva moschata*);
- Wild marjoram (*Origanum vulgare*);
- Tormentil (*Potentilla tormentilla*);
- Golden rod (*Solidago virgaurea*);
- Betony (*Stachys officinalis*);
- Common valerian (*Valeriana officinalis*);
- Michealmas daisy (*Aster novi– belgii*);
- Agrimony (*Agrimonia eupatoria*);
- Cow parsley (*Anthriscus sylvestris*);
- Hedge bedstraw (*Galium mollugo*);

- Hedge garlic (*Alliaria petiolata*);
- Lesser knapweed (*Centaurea nigra*);
- Oxeye daisy (*Leucanthemum vulgare*);
- Nettle leaved bellflower (*Campanula trachelium*);
- Red campion (*Silene dioica*); and
- St. Johns Wort (*Hypericum perforatum*).

5.30 A native/ornamental shrub spine will be included as wildlife planting in the two aforementioned areas that will encourage invertebrates and birds to use the site. Species in this area will include the following:

- Japanese Blood Grass (*Imperata cylindrical*)
- Dogwood (*Cornus sanguinea*);
- Lavender (*Lavandula stoechas*);
- Christmas Berry *Photinia;*
- *Stipa gigantean*;
- *Crocosmia*;
- *Pennisetum alopercuroides;*
- Mexican Feather Grass (*Stipa tenuissima*);
- *Salvia nemorosa*;
- *Sedum spectabile*;
- *Pinus mugo*; and
- Sweet Box *Sarcococca humilis*

Enhancement: Biodiverse (brown) Roof

5.31 885sqm of bio-diverse roof area including 25 species included in table 5.1 will be included in the development, the positioning of which is shown at Appendix 3.0.

5.32 This will compliment action All13 of the Camden BAP: The Built Environment, that aims to increase the number of green roofs in Camden, targeting council buildings. Additionally, all recommendations fulfil Camden's requirements as outlined in CPG – Chapter 3 Sustainability (Section 10: Living Roofs and Section 13: Biodiversity).

5.33 As an overview, the biodiverse roof will comprise mounded substrate/growing medium between 80mm-150mm and will be supplemented with a wildflower seed mix to aid natural colonization. Biodiversity features such as deadwood logs will be included to enhance the biodiversity value.

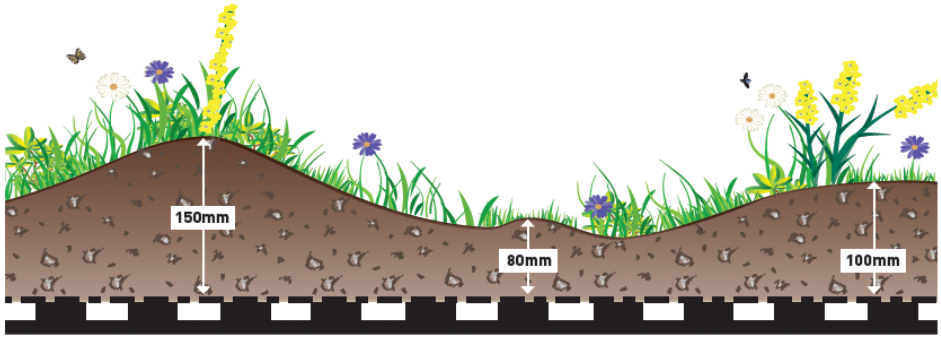
5.34 Appendix 5.0 contains a specification document on roof build up details from the architect.

5.35 A monitoring plan is included at Appendix 6.0, with notes on management included.

Substrate Specification

5.36 To maximise diversity in micro-climate across the roof, the substrate depth will be varied, between at least 80mm and 150mm (see Figure 5.4). This variation will result in differences in exposure, shading, diurnal temperatures, humidity and water content giving rise to localised diversity in species composition[11]. This will also particularly benefit invertebrate species.

Figure 5.4 Example cross section of bio-diverse roof showing change in substrate depth



5.37 This substrate will be formed of a mineral component of recycled crushed brick and expanded clay shale and an organic component composted of pine bark. This mix provides a low nutrient substrate that will be suitable for the proposed seed mix. The low nutrient composition will prevent undesired weed species growing and dominating the sward.

5.38 Substrates evolve as part of their normal function, with generally a steady increase in organic content over the lifespan of the roof.

Biodiverse Roof floral Specification

5.39 Brown or bio-diverse roofs can be left to colonise naturally although this can be a slow and unpredictable process that relies on a source of propagules in the local vicinity; the nearest species rich habitats are those of Hampstead Heath, ~2.5km north east of the site. To facilitate rapid establishment and promote a more predictable mix of species of biodiversity benefit the decision has been taken to supplement the biodiverse roofs for the with specially chosen wildflower species. The species mix has been carefully chosen to optimise biodiversity across the roof spaces, to suit the

substrate utilised, and importantly, to tolerate the drought and wind exposed conditions prevalent at the different roof levels.

5.40 The choice of plant has therefore, been based on the following criteria:

- Ability to grow in drought conditions and be wind tolerant;
- Relatively low growth height (around 80cm maximum) to be able to survive the harsh conditions at proposed roof heights;
- Range of vegetation heights (up to 80cm) for structural diversity;
- They are of wildlife benefit, providing valuable nectar sources and attracting invertebrates;
- Local to Camden and London, commonly found growing in this area and typical of brownfield habitat;
- Wide ranging corolla (shape/size of flower petals) that is vital to attract a number of different invertebrate species, and in particular BAP or Red Data book species;
- Will benefit local BAP species or have been referenced in the Camden BAP or London BAP; and
- Wide ranging flowering periods to enable a long and variable flowering season throughout the year.

5.41 The Table 5.1 below summarises the species mix that has been selected for the biodiverse roof at Maygrove road, and includes further details on the species overall height, wildlife benefit and growth conditions. It is recommended that at least 25 of these species are included in the roof.

5.42 It should be noted that the maximum heights of the taller plants specified in Table 5.1 may not be achieved on the living roof as the conditions may not be optimal, thus heights will be restricted to what the conditions allow.

Table 5.1 Wildflower Species Mix with Characteristics

Species Name	Latin Name	Height	Wildlife Benefit	Growth Conditions
Agrimony	*Agrimonia eupatoria*	Up to 65cm	The food plants by the larvae of some Lepidoptera species including Grizzled Skipper and Large Grizzled Skipper	A hardy plant that prefers partial shade
Autumn Hawkbit	*Leontodon autumnalis*	15-30cm	Late flowering, attracts beetles and butterflies	Drought tolerant, low nutrients, wind tolerant, open conditions
Birds Foot Trefoil	*Lotus corniculatus* (do not confuse with introduced sown variety *L. Corniculatus* var *sativus)*	20-40cm	Mid flowering, good nectar source for many insects and a larval source for many species of Lepidoptera - beneficial for black redstarts	Drought and wind tolerant, low growing, sprawling habit. Common on grasslands and along roadsides. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time
Biting Stonecrop	*Sedum acre*	10-15cm	Branched clusters of bright yellow flowers, which have long protruding stamens and are attractive to bees for pollen and nectar.	This is a spreading plant that thrives on virtually soil-less conditions. Favours full sunlight.
Black Medick	*Medicago lupulina*	Up to 50cm	Early flowering, attracts butterflies, hoverflies and bees. Beneficial for black redstarts	Low growing, ground hugging plants. Very common on roads and roadsides and is drought and wind tolerant, and can survive relatively cold conditions. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time
Bladder Campion	*Silene vulgaris*	40-80cm	The Bladder Campion is an important nectar source for butterflies and a favourite food plant of frog hoppers, the insects which create cuckoo spittle	It prefers neutral, dry soils and is generally found alongside paths and in open grassy or rough ground.
Breckland Thyme	*Thymus serpyllum*	5-20cm	Flowers are attractive to bees	Easily grown in average, dry to medium, well-drained soils in full sun. Tolerates drought and poor soils of low fertility. Loose, sandy or rocky soils with excellent drainage are best habitat

Species Name	Latin Name	Height	Wildlife Benefit	Growth Conditions
Bugle	*Ajuga reptans*	10-25cm	The flower is an important early source of nectar for butterflies, especially the Duke of Burgundy, Marsh Fritillary and the Pearl-Bordered Fritillary.	A small, spreading plant that produces a ring of blue flowers on top of each set of leaves. Prefers sunny of semi-shaded conditions
Bulbous Buttercup	*Ranunculus bulbosus*	20-50cm	The food plant of the larvae of some Lepidoptera species including Hebrew Character and Small Angle Shades	Favours nutrient-poor, well-drained soils
Common Corncockle	*Agrostemma githago*	Up to 80cm	Attracts lady-beetles and parasitic wasps	Hardy plant found in many conditions. Likes disturbed, nutrient poor soils
Common Field Speedwell	*Veronica persica*	10-30cm	Flowers most of the year, attracts butterflies.	Low growing, hardy plant, nutrient rich
Common Forget-Me-Not	*Myosotis arvensis*	10-35cm	Food plant of the larvae of some Lepidoptera species including *Setaceous Hebrew Character*	Shows a preference for soils with low pH
Common Mouse Ear	*Cerastium fontanum*	Up to 50cm	Early to late flowering, flowers are self or insect pollinating	Low growing, likes dry grassland and wasteland conditions, prefers richer nutrient levels
Common Poppy	*Papaver rhoeas*	Up to 60cm	Has no nectar but the flowers provide pollen for bees. Beetles feed in the seed capsules and some species may overwinter here when the capsules are empty	Hardy plant grows on disturbed soils
Common Vetch	*Vicia sativa*	15-40cm	Mid flowering, attracts bees, wasps, butterflies and aphids – aphids are beneficial for house sparrows	Particularly attractive to aphids, an essential food source for house sparrow chicks. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time
Corn Camomile	*Anthemis arvensis*	Up to 30cm	Attract a range of pollinating insects	Preference for light chalky or sandy soils
Cornflower	*Centaurea cyanus*	30-80cm	Attract many beneficial insects that come to nectar and feed on the pollen	A hardy plant which grows of many soil types and prefers full sun

Species Name	Latin Name	Height	Wildlife Benefit	Growth Conditions
Cowslip	*Primula veris*	Up to 25cm	Food plant of the Duke of Burgundy Fritillary butterfly, Plain Clary and Northern Rustic moths	A hardy plant preferring well drained soils and full sun
Cut Leaved Crane's-Bill	*Geranium dissectum*	10-40cm	Mid to late flowering, attracts beetles and butterflies.	Likes stony ground, wasteland, and thin soils. Low growing sprawling plant
Dove's-Foot Crane's-Bill	*Geranium molle*	Up to 20cm	Early flowering, attracts range of insects and beneficial for black redstarts	Low growing, sprawling habit. Drought tolerant and common on roadsides, wastelands and brownfield sites
Fox And Cubs	*Hieracium aurantiacum*	15-35cm	Mid flowering, attracts flies, good nectar source	Drought tolerant, hardy plant, low growing
Hares Foot Clover	*Trifolium arvense*	10-40cm	Late flowering, attracts flies, good nectar source	Drought and wind tolerant. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time
Hoary Plantain	*Plantago media*	30-55cm	Mid flowering, large flowerhead, attracts bees and wasps	Drought tolerant, low growing
Kidney Vetch	*Anthyllis vulneraria*	Up to 60cm	Late flowering, attracts bees and wasps and butterflies. Beneficial for black redstarts.	Low growing, ground covering plant, found on wastelands, railway embankments etc. Drought tolerant. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time
Knapweed	*Centaurea scabiosa*	Up to 50cm	Very attractive to butterflies and bees.	Tolerant of a wide range of soils. It's common throughout the British Isles.
Lemon-scented Thyme	*Thymus x citriodorus*	10cm	Very attractive to numerous species of butterflies and bees	Hardy low growing plant. Frost tolerant.
Musk Mallow	*Malva moschata*	Up to 80cm	Particularly attractive to several species of bees.	Prefers dry and fertile soils and full sun.
Ox Eye Daisy	*Leucanthemum vulgare*	Up to 60cm	Late flowering, attracts beetles and hoverflies.	Grows on disturbed soils and wastelands as well as wildflower meadows, tolerant of a wide range of environmental conditions including drought

Species Name	Latin Name	Height	Wildlife Benefit	Growth Conditions
Pale Toadflax	*Linaria repens*	Up to 80cm	Has pollen for bees and pollen beetles, *Brachtypterus spp*., in the flowers.	Grows on dry banks and stony ground over much of England and Wales.
Perforate St Johns Wort	*Hypericum perforatum*	20-50cm	Mid flowering, attracts bees, wasps and beetles. Beneficial for black redstarts.	Found on wastelands, dry stony ground, drought tolerant, robust plant
Red Campion	*Silene dioica*	30-80cm	The nectar of the flowers is utilised by bumblebees and butterflies, and several species of moth feed on the foliage	Grows in a variety of conditions but prefers to grow on damp, non-acid soils.
Red Clover	*Trifolium pratense*	20-60cm	Late flowering, attracts bumble bees, common carder bee, butterflies and weevils.	Low growing drought tolerant, hardy plant, low nutrient growth. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time
Reflexed Stonecrop	*Sedum reflexum*	10cm	An excellent source of nectar for bees and butterflies	Low growing plant which grows in small bushes, spreading on the ground
Ribwort Plantain	*Plantago lanceolata*	10-40cm	Beneficial for black redstarts	Drought tolerant and very common on wasteland, brownfield sites and roadsides
Rough Hawkbit	*Leontodon hispidus*	20-50cm	Yellow flower attracts butterflies and bees	A slow-growing, rosette-forming perennial of dry, neutral or calcareous soils. Dislikes nutrient-rich soils.
Scented Mayweed	*Matricaria recutita*	15-50cm	This plant is a very good source of nectar for bees and flies. One small weevil, *Omphalapion hookeri* lives on the seedheads. Scented mayweed is highly attractive to ladybirds that feed on aphids	It thrives best on lighter soils but can grow on loams and heavy clays. Prefers full sun.
Self Heal	*Prunella vulgaris*	30-60cm	Mid flowering, good for bees. Beneficial for black redstarts	Prefers sun or semi-shade and some moisture but drought tolerant, low growing creeping plant.
Tunic Flower	*Petroraghia saxifraga*	10-15cm	Flowers attracts numerous butterfly and bee species.	Grows in sunny location in poor to moderately fertile soil, low water. Tolerates drought and neglect.

Species Name	Latin Name	Height	Wildlife Benefit	Growth Conditions
Viper's Bugloss	*Echium vulgare*	30-60cm	An important food source for species of bumblebee and butterflies.	Grows in dry, sunny position in well-drained or sandy soils.
White Clover	*Trifolium repens*	20cm	Late flowering, attracts, honey bee, bumble bees, weevils	Low growing, relatively drought tolerant, will not grow well in shade, low nutrient growth. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time.
White Stonecrop	*Sedum album*	20cm	It provides nectar and pollen for bees including the buff-tailed bumble bee. Used as food plants by the larvae of some Lepidoptera species.	Grows well in a city environment. Is drought tolerant and prefers sunny positions.
Wild Basil	*Clinopodium vulgare*	30-70cm	Pollinated by bees and attractive to butterflies.	Very hardy plant and drought resistant.
Wild Marjoram	*Origanum vulgare*	30-60cm	Late flowering, attracts butterflies and bees	Drought resistant, low growing
Wild Mignonette	*Reseda lutea*	30-50cm	The green-yellow flowers are very attractive to bees.	Grows in waste, scrubby, disturbed soils that are well drained and in full sunlight.
Wild Pansy	*Viola tricolor*	Up to 40cm	Attractive to, and pollinated by, a variety of species of bee.	Prefers sandy substrates and partial shade.
Wild Thyme	*Thymus serpyllum*	2-10cm	It is an important nectar source plant for honeybees as well as the large blue butterfly which feeds exclusively on wild thyme	A hardy plant that thrives in full sun and often grows in pavement cracks. A low growing, creeping plant
Yarrow	*Achillea millefolium*	Up to 80cm	Attracts beneficial Syrphid flies.	Drought tolerant plant that prefers full sun and shallow, disturbed and nutrient poor soils.
Zigzag Clover	*Trifolium medium*	20-60cm	Attracts bumblebees and butterfly species.	Low growing drought tolerant, hardy plant, low nutrient growth. A member of the legume family therefore nitrogen fixing and will increase the nutrient value of the substrate over time
Mosses				

Species Name	Latin Name	Height	Wildlife Benefit	Growth Conditions
Springy Turf Moss	*Rhytidiadelphus squarrosus*	Up to 15cm		It tolerates a wide range of soils and colonises on man-made habitats.
Wall Screw Moss	*Tortula muralis*	5-10cm		Commonly found on stone and concrete areas.
Grey Cushion Moss	*Grimmia pulvinata*	2cm		Grows on rocks and concreted areas.

5.43 The seed mix list in Table 5.1 has been specified due to the wildflower's local provenance to the Camden and London area. The species are also commonly found on industrial, wasteland and brownfield sites in this region. We recommend if possible that the seed supplier has collected the seed from the London area from the wild and grown these on in their nursery to ensure a successful, viable seed that is capable of germination – many commercial seed suppliers do this routinely. It is important that this method of sourcing is used to lessen the risk of virus, low health and poor germination in flowers that may occur if the seed had been taken directly from the wild and planted straight onto the roof. The seed is carefully nurtured at the nursery to ensure a stable seed mix that is able to grow successfully without disease. The wildflower species will carry the same characteristics as those found growing wild in London, as the seed will have been originally sourced in this area and carefully grown to provide a healthy flower mixture.

5.44 To support the growth of the seed mix specified above, plug plants will be hand planted on each roof space. These will be established prior to the seed mix application and will be carefully chosen from the list above to provide balanced growth across the roof. Less vigorous plants such as the clovers and vetches will be plug planted so they are well established before stronger growing plants develop from the seed mix.

5.45 The plug plants will provide an immediate 'greening' of some parts of the roof but will not be planted all the way across as blanket coverage. If covering the entire roof area with plug plants these would need to be planted at a density of >16 plug plants per square metre (sqm).

5.46 The hand planting of plug plants can be done all year round although it is best undertaken in autumn/winter, and planting is advised to be initiated before the seed mix is applied. Due to time constraints both the plug plants and seed mix are likely to be applied before this coming autumn. This will not significantly affect the rate of growth but there may be a greater number of plants that fail to establish and seeds that don't germinate successfully.

5.47 Another limitation to establishment may be loss of plug plants from seagulls eating them but the application advice of 16 plugs per sqm takes into account some loss of species and will be sufficient for the roof spaces.

5.48 The final number of plug plants will be determined when the seed mix is purchased - upon provision of sqm biodiverse roof space the seed supplier will determine the number of plug plants required according to the desired percentage of each species type.

Seed Application

5.49 As discussed above the plug plants will be manually installed into the prepared roof substrate to establish a mature plant layer in advance of the seed mix germinating. This can be done any time of the year although autumn/winter is preferable and the seed mix will be sown shortly after, as some of the seeds may require cold periods to germinate. Due to time constraints however, the mix will likely be sown before this time of year but some seeds that do not germinate as successfully due to the need for a cold snap – this can be overcome if the seeds are refrigerated for approximately two weeks before sowing (further advice will be sought from the seed supplier).

5.50 The seed mix will be sown by hand and will be applied with an appropriate, lightweight and dry seed carrier that will be low in nutrients. The use of a 'carrier' will not affect the overall nutrient level enough to dramatically change the overall growing conditions.

5.51 The seed carrier will be a different colour to the roof substrate and will act as a visual aid for seed application, highlighting areas that have been sown and areas that are still to complete, ensuring the application is level across all of the roof space. The seed carrier will consist of sand or perlite, and will encourage quicker germination with improved seedling growth. When the seed mix is purchased the amount of seed carrier suitable to the overall roof size and species will be specified and is usually provided as a percentage.

5.52 The seed mix will be applied by hand, and it is advised to aim for 1-2 grams of seed per sqm to provide good coverage across the roof for successful growth rates and good yields. When applying by hand the mix will be casted on to the roof over the prepared substrate in a measured and even fashion. Whilst this method is labour intensive it is successful to use, although practice may be required to sow evenly at a suitable rate.

5.53 All three mosses specified in Table 4.1 will be hand planted into shady crevices of the dead wood features such as the vertical log piles and the log and woodchip mounds.

Enhancement: Biodiverse Roof Enhancement Features

5.54 Maintaining the theme of diversity and variation, a range of additional ecological features have been specified for incorporation onto the living roof at the site to provide habitats suitable for invertebrates and further increase the range of micro niches and

biodiversity. It is anticipated that these structural features will create micro climates around them that will also influence the floral establishment in the immediate proximity, leading to changes in floral composition and further increasing the diversity and mosaic of habitats across the roof areas.

5.55 There are no specific locations across the biodiverse roof for the placement of these enhancement features. Their placement will be informed by the description of where they are best placed assessed in terms of the final substrate topography. A suitably qualified ecologist will oversee the placement of these features and decide upon their location once the roof is finalised.

Invertebrate Sandy Piles

5.56 Bare ground is important for a range of insects which use open areas for nesting, chasing after prey and basking. Sandy piles provide warm, dry conditions that favour warmth-loving invertebrates and facilitate burrowing. Sandy piles should have open south-facing bare slopes to provide valuable nesting sites for colonies of burrowing solitary bees and wasps. It is essential that the sandy piles are regularly cleared to prevent any vegetation colonisation and ensure they remain clear.

5.57 Substrates such as gravel and sand will be taken from layers under the soil of the construction site or from a nearby area. The piles will be compacted to form a sand castle effect, with sides angled to 30 degrees and cover an area of approximately $1m^2$; position in a sunny area with the broadest area facing south, preferably sheltered from the wind. Some of the sandy piles may change shape or decrease in size over time due to prolonged expose to the wind, so to reduce this happening to all the piles and to increase diversity of the hibernacula, some of the piles will be covered with stones of approximately 10-15 cm in size loosely placed over the mound ensuring gaps are available for burrowing invertebrates[16] – the south facing slope will still remain relatively bare.

5.58 Three of these sandy piles will be included on the biodiverse roof at the site.

Rope Coils

5.59 Rope coils are to be incorporated to create diverse hibernacula across the roof, encouraging a range of invertebrate species to burrow within the crevices produced. Rope made from natural fibres will be used such as Manila rope which is suitable for general outdoor use. Manila rope is made from the leaves of the plant *Musa Textilis* and will last up to 10 years, reducing maintenance requirements. The rope will be coiled in a spiral shape to cover an area of $1m^2$; the rope will be coiled loosely to ensure suitable gaps are created for invertebrates. Pegs will need to be used to harness the rope to the roof and ensure that it cannot blow away. Five rope coils will be incorporated in the design spread across the roof at the site.

Rocks & Stones

5.60 Several species of invertebrates favour warmth and shelter from wind and rain, therefore, shelter and sunny nooks are important to create across the roof. This can easily be done by using large rocks and stones positioned in circles or spirals to create a range of micro climates. Rocks and stones of varying size from 10cm to 40cm in diameter will be placed in circles and spirals ranging from 1m wide upwards; these will be widespread across the biodiverse roof and also provide beneficial visual effect, an example is shown in Figure 5.5.

Figure 5.5 Stone swirl/circle

Bird Perches

5.61 Two bird perches comprising at least 2m high metal poles (approx. 30mm diameter – see 0) are to be attached to each wall; these are intended to be of particular benefit to black redstarts who like to sing from prominent and exposed perches see below.

Enhancement: Vertical Greening

5.62 Climbing plants are recommended to be attached to a supporting framework to create a vertical greening to the bike sheds and a section of the northern perimeter. The supporting structure should be approximately 2 inches away from the wall. The green wall will be approximately 84sqm in elevation.

5.63 As well as ivy (*Hedera helix*) recommended climbers include flowering species that will provide nectar for invertebrates, such as Evergreen Clematis *Clematis armandii*, Honeysuckle *Lonicera henryi* and Virginia Creeper *Parthenocissus quinquefolia*. These plant species increase biodiversity on site, providing mixed height vegetation with foliage providing an effective nesting habitat for a variety of birds, and the flowers attracting a range of invertebrates. If the species in the table are not available at the time of implementation the SQE should be contacted for guidance on species of wildlife value. An appropriate number of plants for each species, given the space required to cover, should be planted and it is worth noting it may not supply immediate green coverage but will grow over time. The strongest stems of each plant should be supported and tied to the lowest level of the framework in a secure manner.

Additional Recommendations

5.64 All of the aforementioned are key recommendations and are compulsory to gain the ECO 2 credit. Additional recommendations which are required as part of the CSH assessment include the following:

- Bee house;
- Lacewing box;
- Butterfly habitat feeder;
- Hedgehog house;
- Bird feeders;
- The use of pesticides (herbicides, insecticides, fungicides and slug pellets) should be discouraged to prevent changes to the food chain;
- Peat free composts;
- Peat free soil conditioners;
- Use of bark mulch in planted borders: breaks down and feeds soil;
- Deadwood piles for invertebrate habitat at ground level in communal planting beds; and

- Where possible well drained sandy soils should be incorporated at ground level that will provide burrowing opportunities for hymenoptera. Small sandy piles can be created for invertebrates to use as it is a preferable habitat especially if south facing, therefore receiving sunlight throughout the day. The sandy piles will have increased sun exposure compared with the loggery as a sunlit aspect is required to provide good habitat for hymenoptera.

5.65 If the advice in the 'key recommendations' section is adhered to along with at least 30% of the 'additional recommendations' listed above, the proposed development should be awarded the maximum one credit for ECO 2.

ECO 3: PROTECTION OF ECOLOGICAL FEATURES

5.66 Where there is a commitment to maintain and adequately protect existing ecological features from substantial damage during the cleaning of the site and the completion of construction works a credit can be awarded. The only value that the site adds to local ecology comes from the nesting bird potential in the trees adjacent to the site boundary. This is a seasonal value, and, should site clearance be undertaken outside of breeding bird season (March-October), the site will be considered to be of negligible-low ecological value. Given that any trees to be removed are to be replaced or translocated, and that these trees in the first will singularly add insignificant value to local ecology as a whole, Greengage as the SQE are satisfied that the ecological features of the site are suitably protected.

Site Protection: Birds

5.67 All of the UK's wild bird species are protected under the 1981 Wildlife & Countryside Act[12]. Extra protection is given to birds listed in Schedule 1 of the 1981 Act.

5.68 All birds on the nest, their nests and eggs are protected by law and it is thus an offence, with certain exceptions intentionally to:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while it is in use or being built; and
- Take or destroy the egg of any wild bird.

5.69 There is low - moderate potential for bird nesting within the bordering scattered woodland to the north and east of the site; where trees in this area of trees are to be removed or affected as part of redevelopment works, disturbance should be minimised by undertaking vegetation removal/development work outside the bird nesting/breeding season (March – September inclusive, although birds can and do nest earlier and later than this).

Site Protection: Trees

5.70 In accordance with good practice guidance, all trees that may be retained within the site and overhanging boundary trees must be protected in accordance with British Standard (BS) 5837:2005 '*Trees in relation to construction – recommendations*'[13] for the duration of the works on the application site. The guidance gives recommendations and information on the principles to be applied to avoid impacts from construction on trees within and immediately adjacent to the application site. A tree report has been produced that confirms the required actions to suitably protect the trees on site. This can report can be found as a standalone planning application report and should be referred to, to confirm the necessary procedures to ensure all trees on site and adjacent to the site, marked for retention that stand to be impacted, are suitably protected.

ECO 4: CHANGE IN ECOLOGICAL VALUE OF THE SITE

5.71 The ecological value before and after development has been measured based on the species per hectare values for the current site obtained from data collected during the site walkover, and for the proposed development based on species per hectare values for habitat types recommended by the SQE.

5.72 The overall change in species per hectare is calculated as at least 9.27, which is considered a major enhancement greater than +9. Therefore, the proposed development is likely to be awarded 4 credits out of an available 4 credits for ECO 4 upon receipt of written confirmation that the key enhancement recommendations have been adhered to, accompanied by a full planting plan for the soft landscaping. The calculations for ECO 4 are shown at Appendix 2.0. This shows finalised areas of green roof (885 sqm with 25 native species of wildlife benefit chosen from Table 5.1)) and indicative areas of soft landscaping (450 sqm with 28 native species of specific wildlife benefit chosen from the list included in the report – this area includes areas of raised bed planting on the 4th floor terrace and ground floor bed planting in the communal garden). Should these areas decrease then the achievable credits will decrease, however any increase in these areas for the final design and in the final delivery of the planting scheme will not change the credits achieved.

6.0 SUMMARY & CONCLUSIONS

6.1 A site survey was carried out on the 15th July 2011 in order to establish the ecological value of the site and its potential to support notable and/or legally protected species. Information from the survey was used to identify credits that are likely to be awarded, where possible, for the Code for Sustainable Homes Ecology Category. Along with a review of readily available ecological information and other relevant environmental databases an assessment of the sites ecological value was made.

6.2 Within the assessment site there are areas of building, hardstanding and introduced shrub; as such ecological habitat variety is limited. There is a low potential for nesting birds in areas of scattered scrub and scattered trees bordering the site. Due to the potential any clearance/demolition works of vegetation should be undertaken outside of the breeding season for birds (generally the months of March – September inclusive, although birds can and do nest earlier and later than this).

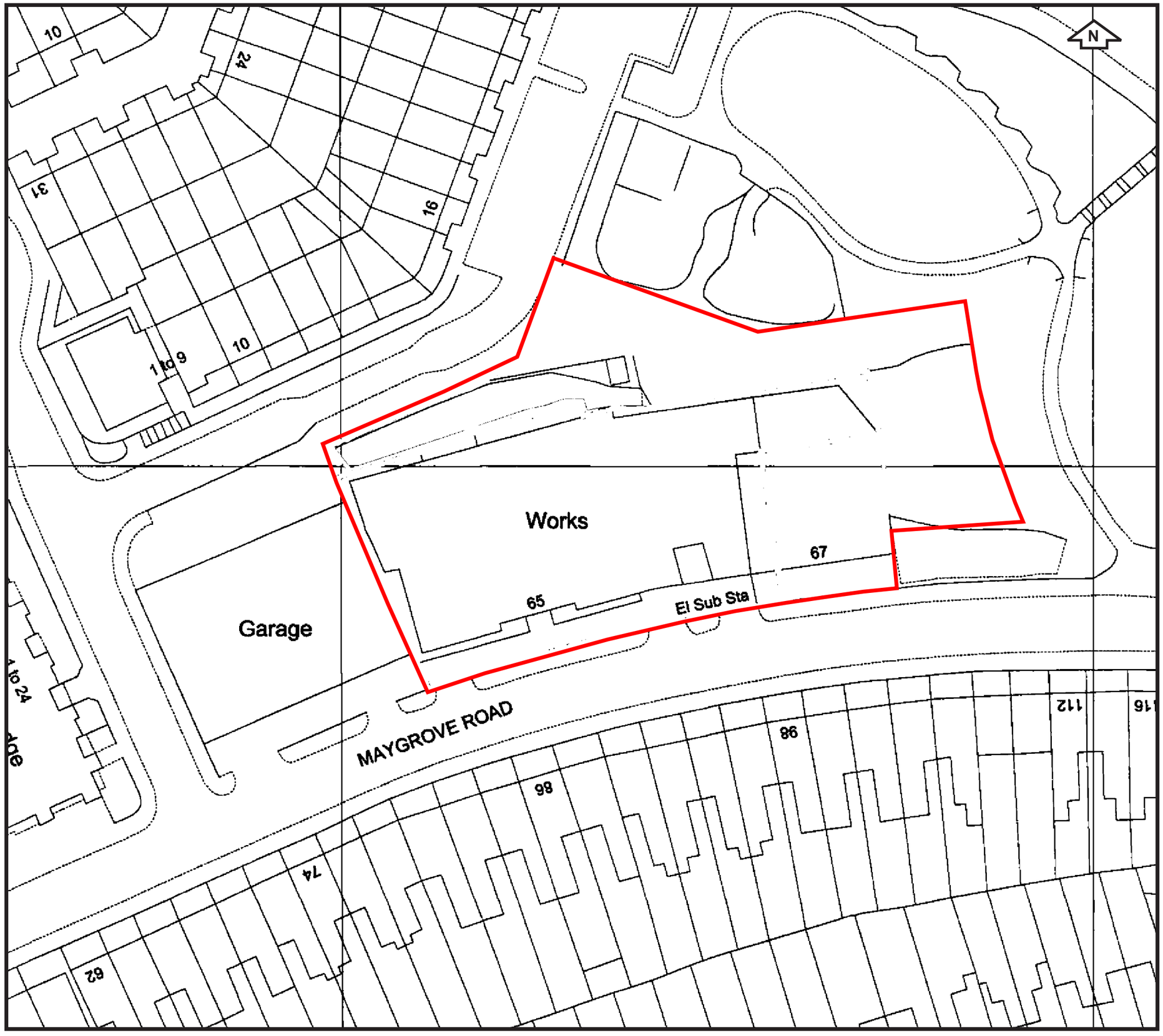
6.3 Details received from a desk top study and the site walkover have confirmed the site:

- Has negligible potential to provide habitat for badgers;
- Has negligible potential to provide habitat for great crested newts;
- Has low potential to provide habitat for roosting bats;
- Has low potential to provide habitat for foraging bats;
- Has negligible potential to provide habitat for reptiles;
- Has negligible potential to provide habitat for dormice;
- Has negligible potential to provide habitat for water voles;
- Has negligible potential to provide habitat for otters;
- Has low potential to provide habitat for invertebrates; and
- Has low - moderate potential for nesting birds.

6.4 When considered as a single ecological unit, the site cannot be determined as having ecological value as it supports no habitats of significant value, other than low potential to support birds and invertebrates. It is therefore possible to award the ECO 1 and ECO 3 credits. Dependant on commitment to the recommendations for enhancement for credit ECO 2 and ECO 4, it is likely that up to 7 credits with regard to the Code for Sustainable Homes Ecology Category will be achieved, subject to written confirmation that the recommendations will be incorporated.

6.5 The biodiversity enhancement measures designed into the scheme will result in a net gain in biodiversity value on the site and provide additional habitat types and variation for the site and wider area. The impact of the scheme will be a '**major positive'** for a range of species including bats, birds and invertebrates.

FIGURE 1.0: SITE LOCATION PLAN



65 MAYGROVE ROAD

Application Site

Greengage Environmental
64 Great Suffolk Street, London, SE1 0BL
T: 0203 544 4000

www.greengage-env.com

FIGURE 1.0

Site Location Plan

Job No. 2186 - Not to scale - October 2012

APPENDIX 1.0: SITE PHOTOGRAPHS

PHOTOGRAPH 1 – Front exterior of the building facing south.

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PHOTOGRAPH 2 – Rear exterior of the building facing north.

PHOTOGRAPH 3 –Interior of the building.

PHOTOGRAPH 4 – Planters along the south of the site.

PHOTOGRAPH 5 – Hard standing to the rear (north) of the site. Note bordering residential housing and scattered trees.

PHOTORAPH 6 –Hard standing to the rear (north) of the site. Note bordering scattered trees.

PHOTOGRAPH 7 – Bordering scattered trees to the north.

APPENDIX 2.0: CSH CREDIT CALCULATOR

Greengage Environmental LLP

Code for Sustainable Homes Ecology

Job Name: 65 Maygrove Road

Job Number: 550275

Date: Nov-12

BEFORE DEVELOPMENT

Plot type	Area of plot (m^2)	Species No	Area * species
Building/hardstanding	3240	0	0
existing vegetation	224	11.6	2598.4
			0
			0
			0
			0
			0
Total	3464	11.6	2598.4

Species per plot type before development **0.750115473**

AFTER DEVELOPMENT

Plot type	Area of plot (m2)	Species No	Area * species
Building/hardstanding	2129	0	0
soft landscaping	450	28	12600
green roof	885	25	22125
			0
			0
			0
			0
			0
			0
			0
Total	3464		34725

Species per plot before development **10.02453811**

Species change **9.27442263** 1=OK

0=ERROR

ECO 4 4 1

APPENDIX 3.0: LANDSCAPING PLANS SHOWING LOCATION OF BIODIVERSE ROOF AREA AND COMMUNAL GARDEN

Landscape Plan - DRAFT

Communal Garden

The Communal Garden provides a series of tranquil seating spaces set within a landscape garden.

The main routeway extends into the first garden, and a series of spaces are arranged off this; these spaces are either natural stone or timber, and both fixed and moveable seating is provided. A second Garden Space is located further East, connected by footpath.

The end of the key access route into the garden terminates at a vertical water element, acting as a backdrop and providing noise and interest.

The planting is structured, with formal hedges parallel to the building facade providing a level of privacy to the Private Terraces and providing a framework for garden planting areas; the planting will have seasonal interest. A range of Japanese plant species are also proposed.

The tree and shrub layers provide height and help screen the rear retaining wall.



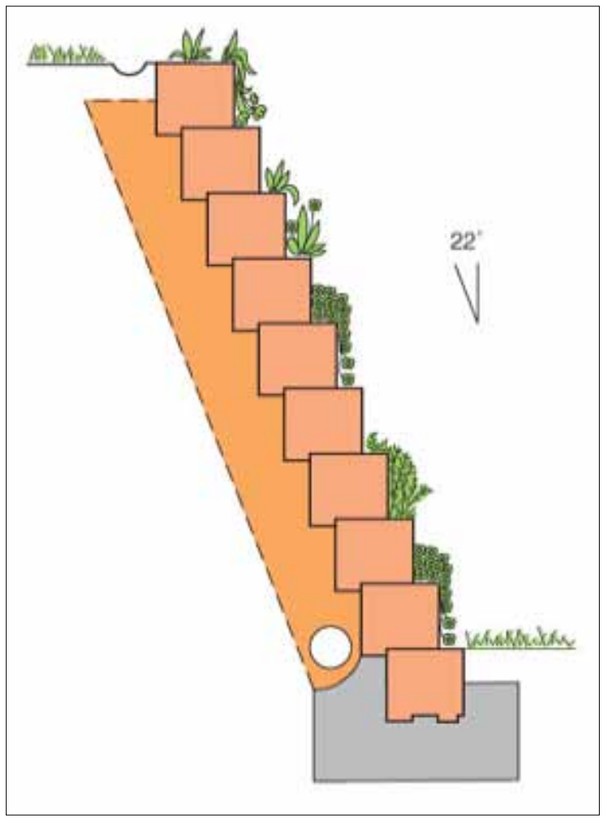

Precedent images

Communal Garden - **Retaining Wall**

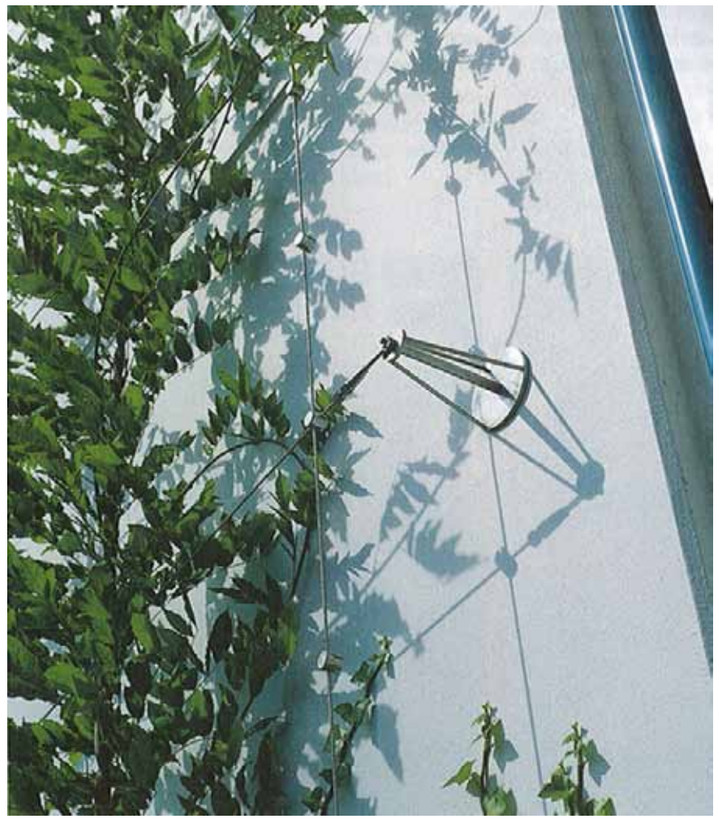
To soften the mass and height of the retaining wall to the rear of the site, we are proposing to create a series of **terraces** and **raised planters** - providing pockets at intervals up the retaining wall for planting with trees and shrubs. The terraces and raised planters will help break the retaining wall into a series of separate vertical sections with lower heights. The tree and shrub planting will also reduce any visual impacts of the wall.

Stainless steel wire systems will be added to the vertical retaining walls to 'green' the surface, using a combination of evergreen and deciduous climbers to cover the wall.

Consideration will also be given to incorporating a criblock retaining system where appropriate

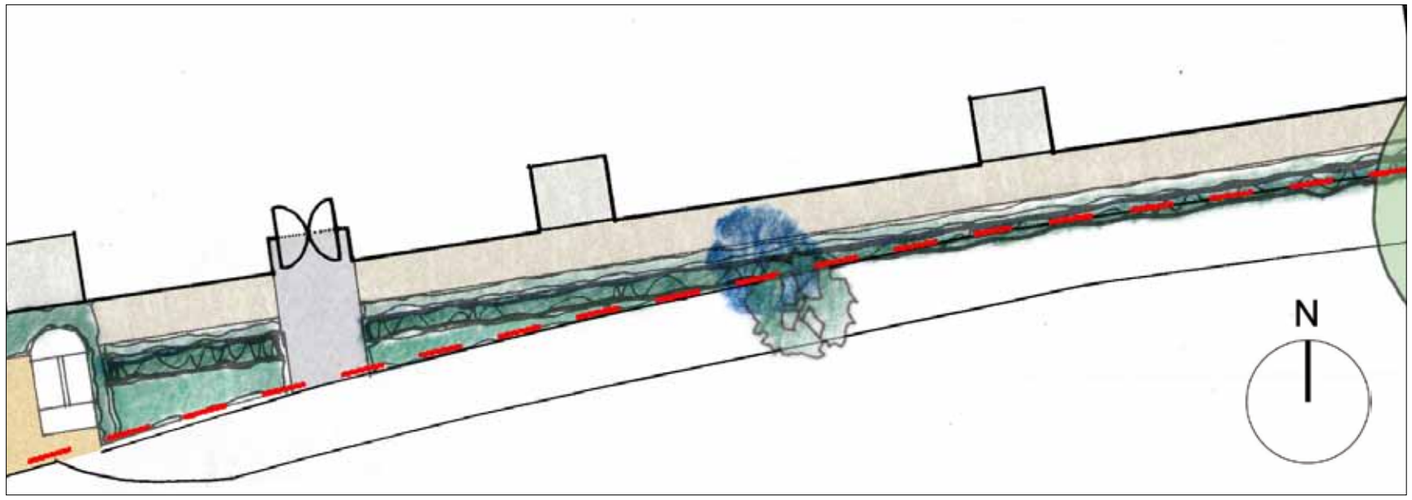


Criblock retaining Wall



Climbing wire system to retaining wall

Front Gardens



The Front Gardens are at basement level, and as such are sunken spaces with access directly from bedrooms.

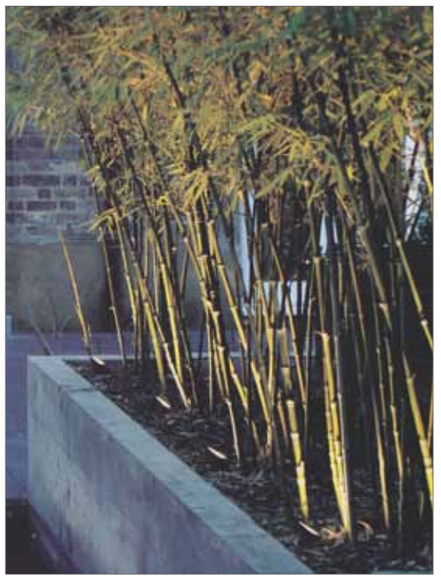
The approach is to provide a formal evergreen hedge and 1.1 metre high railing to the back of the footpath along Maygrove Road, to provide a level of privacy and buffer for the lower gardens. Where the planting area widens towards the West, additional formal planting is provided.

To soften and screen the boundary retaining wall, we are proposing a raised planter containing Black Bamboo, a shade-tolerant species with dense evergreen foliage. Consideration to be given to uplighting the bamboo (refer to image below).

The remainder of the gardens are hard surfacing, providing an area for sitting out and space for individual residents to have their own planting in pots/sculptural elements.

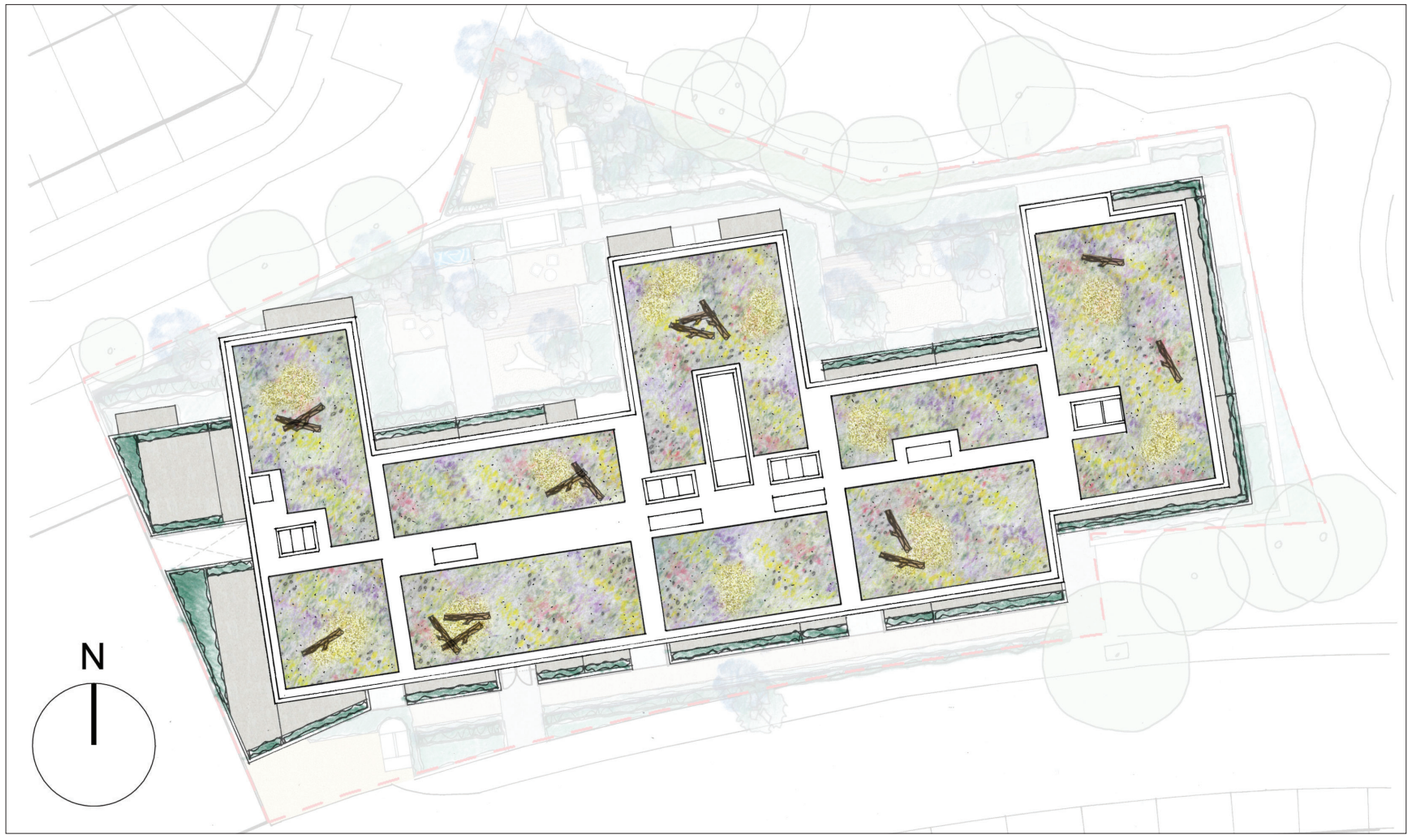
Formal hedge and planting

Black Bamboo - *Phyllostachys nigra*



Raised planter with bamboo

Roofscapes



Given the extensive areas of roofscape potentially available for greening, we are proposing to develop a Biodiverse (or ‘Brown’) Roof.

The Biodiverse Roof will comprise mounded substrate/growing medium between 80mm-150mm depth and will be supplemented with a wildflower seed mix to aid natural colonization. Biodiversity features such as deadwood logs will be included to enhance the biodiversity value (Refer to Greengage report for further details).

To facilitate rapid establishment and promote a more predictable mix of species of biodiversity benefit the decision has been taken to supplement the biodiverse roofs for the with specially chosen wildflower species. The species mix has been carefully chosen to optimise biodiversity across the roof spaces, to suit the substrate utilised, and importantly, to tolerate the drought and wind exposed conditions prevalent at the different roof levels.

A full list of species are included in the Greengage ecology report. The proposed species are commonly found on industrial, wasteland and brownfield sites in this region.

Biodiverse Roof

Agrimony

Cornflower

Common Poppy

Bladder Campion

APPENDIX 4.0: RELEVANT BIODIVERSITY ACTION PLAN OVERVIEW

BIODIVERSITY ACTION PLANS

London Biodiversity Action Plan

The London Biodiversity Action Plan (BAP)[14] lists 26 priority habitats and species to protect and enhance, which are of importance to London's nature conservation. As noted above, the two priority action plans that are of relevance to this report (in the biodiverse roof) are the wasteland HAP and the black redstart SAP. The biodiverse roof will complement the targets of both of these HAPs.

There are two priority London BAP species of specific relevance to the bird box recommendations within this report; the house sparrow and swift. Both of these species will also benefit from the biodiverse roof and the landscaping for food and shelter.

Wasteland Habitat Action Plan

Much 'wasteland' or post-industrial brownfield land, as a consequence of being left underused and allowed to re-colonise naturally, develops a diverse assemblage of flora and fauna. The wide range of substrates that can be present on such sites including bare patches, disturbed soils, and rubble mounds, often result in a unique and characteristic 'mosaic' of habitat types and may be associated with particularly specialised or rare species including black redstarts, reptiles, and a range of invertebrates. Rail linesides that are often in close proximity to brownfield sites also provide crucial green corridors that link between habitats. As such, certain areas of wasteland or post-industrial land that has been left undeveloped for some years is now acknowledged as being of high biodiversity and conservation value. With increased pressures on urban land, however, many urban wasteland and post-industrial brownfield sites are being redeveloped and the biodiversity associated with this land is lost. In response, the London BAP includes a HAP for wasteland to promote the conservation and enhancement of these valuable sites.

Brown roofs otherwise known as 'biodiverse' or 'ecoroofs', in particular, are considered in conservation circles as an appropriate mitigation model for the loss of brownfield land. This roof type uses a low nutrient substrate material, laid down on a flat roof that is allowed to colonise naturally with local ruderal and herbaceous plant species that in turn attract invertebrates that are popular with birds.

The biodiverse roof at London Zoo has been instigated as a study into biodiversity conservation potential, especially as a mitigation measure for the loss of species-rich 'brownfield' sites through increasing urban development. This research is focusing on

important invertebrate groups highlighted in the UK BAP and English Nature's Species Recovery Programme. These include beetles, spiders, wasps and bees such as the brown-banded carder bee *Bombus humilis* and the ground nesting mining bees *Andrena florea* and *Lasioglossum pauperatum*. The aim of the research is intended to determine what species of invertebrate colonise the biodiverse roof and to develop a set of design criteria for biodiverse living roofs. Smaller research studies[15] have concluded that biodiverse roofs are better biodiversity compared to green roofs, although green roofs are beneficial habitats. It is understood from current research that substrate depth and structural diversity of vegetation are important for species richness and biodiversity[15].

The biodiverse roof at Maygrove Road will aim to recreate wasteland habitat and offer habitat for UK BAP invertebrate species, as well as encouraging other key BAP species, discussed below in more detail.

Black Redstart Species Action Plan

One of the London BAP priority species is the black redstart, a small robin-sized bird that is a relative newcomer to Britain. Originally from Europe, the black redstart naturally colonises a range of habitats from maritime to montane but importantly characterised by sparse vegetation and rocky, craggy terrain[16]. The black redstart first appeared in Britain colonising the coastal cliffs of southern England in 1923[17] and was then commonly spotted inhabiting London's wastelands during the Second World War resulting in its nickname as the 'bomb-site bird'[14]. There are now less than 100 breeding pairs[17] of black redstarts located in central and southern England, generally found in association with brownfield sites concentrated around London and Birmingham. The black redstart is therefore, rarer in Britain than either the golden eagle or osprey and consequently, affords protection under Schedule 1 on the Wildlife and Countryside Act, 1981 and appears in Appendix 11 of the Bonn Convention on the Conservation of Migratory Species of Wild Animals[17]. The black redstart favours territories with low tree coverage (less than 26%[18]) making the urban landscape an ideal habitat. Brownfield sites provide the sparse rocky 'wasteland' habitats they require in combination with vertical features such as buildings gantries, flood defence structures, or gasometers that mimic the cliff faces of their natural terrain and provide holes and ledges to nest in[19] and high, exposed perches to sing from. Black redstarts are also known to use TV aerials on which to perch and sing[18].

Black redstart on perch

Source: http://www.blackredstarts.org.uk/

Black restarts require sparsely vegetated rubble that is nutrient poor and subject to drought stress, which can sustain the types of plants that will support the invertebrates on which black redstart feed, particularly during the breeding season. Invertebrates favoured by black redstarts include midges (*Diptera*), aphids (*Hemiptera*), ants (*Hymenoptera*), moths and butterflies (*Lepidoptera*), and fruit and seeds[20]. With a preference for midges, black redstarts seek nesting sites in close proximity to still or slow flowing open water.

The effect of biodiverse roofs is to mimic post industrial habitat that is beneficial to this species that use brownfield land for foraging, perching, nesting. Biodiverse roofs provide valuable foraging habitat for the black redstart and other wildlife including invertebrates. Accordingly, one of the objectives of this study is to specify the appropriate plants that will endure the drought conditions associated with biodiverse roofs and are of benefit to black redstarts – meeting the aims of the black redstart SAP, the London BAP and the Ecology and Nature Conservation SWS.

The London population is concentrated along the Thames east of Tower Bridge and in the Lea Valley, with the London Boroughs of Enfield, Tower Hamlets, Newham and Greenwich having the greatest number of breeding pairs[19]. Black redstarts have not been recorded on the Maygrove Road site, however, the site is a key target area for the black redstart action plan[21]. With less than 100 pairs nesting in the UK there is an opportunity to assist in the conservation of this bird.

LB Camden BAP

The London Borough of Camden BAP includes a Partnership Plan surrounding biodiversity and the built environment. This seeks to:

- Enhance the built environment for biodiversity and improve ecological connectivity within the urban landscape;
- Encourage planners, developers and building owners to design for biodiversity and install features beneficial to wildlife; and
- Raise awareness of the contribution the elements of the built environment e.g. buildings, bridges, cemeteries, railsides, previously developed land (vacant, derelict, brownfield and wasteland), provide for biodiversity.

The inclusion of a living roof at the site compliments the aims of a number of specific action plans within the Camden BAP.

Priority Species

London is nationally significant for the UK stag beetle population; as such, LB Camden aims to promote the creation of suitable habitats for this species. The aim of the BAP is to increase the provision of habitat within the Borough to maintain and increase breeding populations by ensuring a continued supply of suitable dead wood throughout the urban, suburban and rural range of the beetle. Specifically, the Camden BAP Parks, Open Spaces and Private Gardens action plan calls for the creation of new loggeries at key sites across the borough[22]. As such, the specific enhancements for stag beetles found in chapter 3 of this report compliment the aims of the BAP.

Similarly, the creation of the swift and house sparrow nest boxes will help combat the decline in nesting sites for both species and mirror the aims of numerous action plans in the Camden BAP and other BAP in Greater London. Specifically, 43 and 167 action plans in greater London exist for swifts and house sparrows respectively.

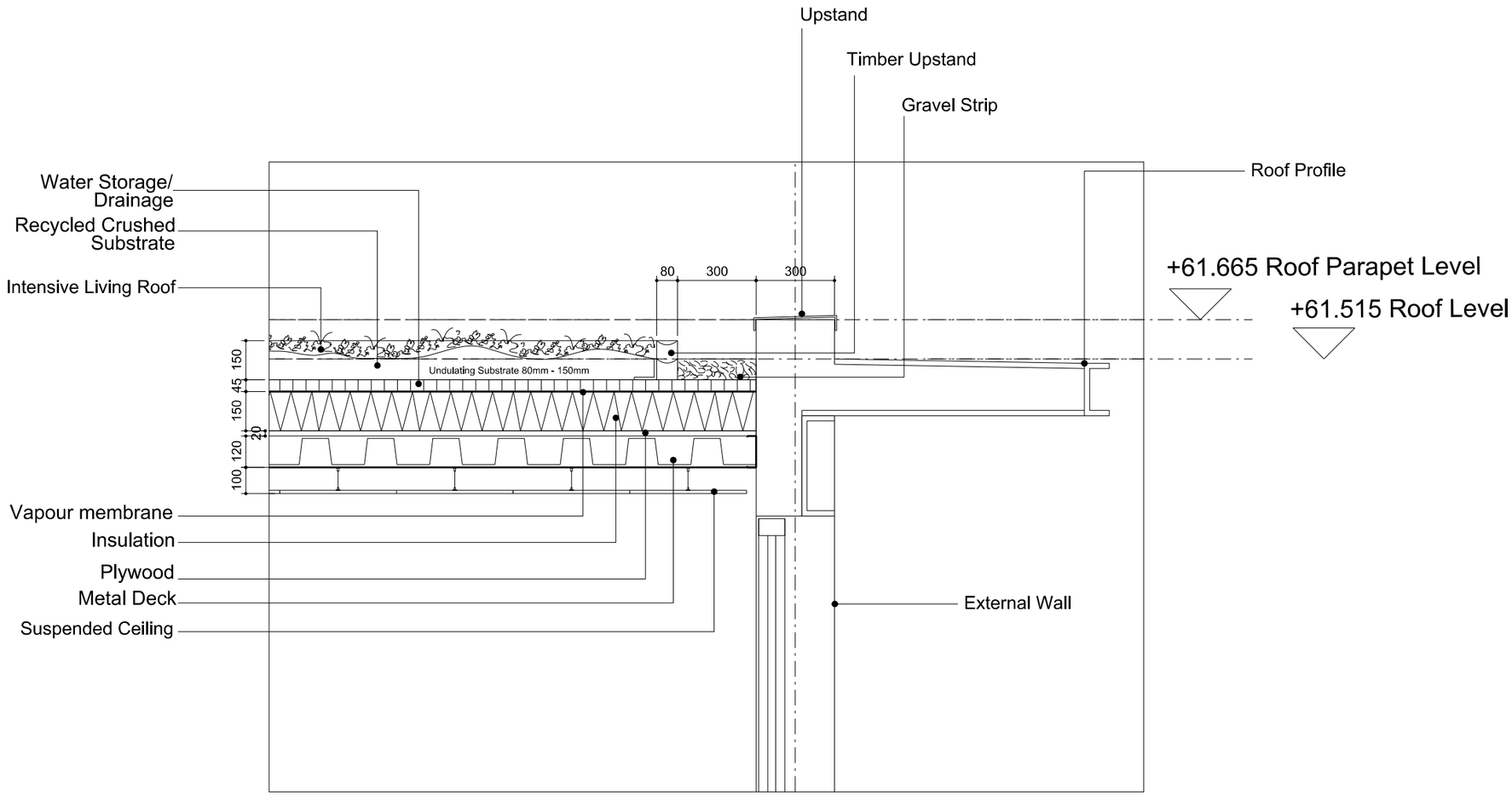
RED DATA BOOK SPECIES

House Sparrow

House sparrows are a resident in the UK and found from the centre of cities to the farmland of the countryside feeding on a diet of insects, berries, scraps and grains. Similarly to black redstarts, the house sparrow is afforded full protection under both the Wildlife and Countryside Act (1981, as amended) and the Countryside and Rights of Way Act (2000). Recent declines have been caused by a combination of reduced plant food in winter, reduced insect availability for chicks, and reduction in available nest sites, leading to a population crash in the 1990s[23]. Because of this decline in numbers, the house sparrow is now red listed[24] as a species of high conservation concern. Invertebrates associated with the proposed biodiverse roof at Maygrove Road should provide a valuable food source for local house sparrow fledgling chicks.

Additionally, the boxes, that feature as part of the enhancement features, will provide nesting sites for house sparrows and will help combat the decline in available nest sites.

APPENDIX 5.0 – BIODIVERSE ROOF BUILD UP DETAIL



A6001 / 01 Extensive Living Roof Build Up 1:20

General Notes:

- **G1** For Site and Grid setting out refer to A/UCLH4A/3000
- **G2** All dimensions to be checked on site
- **G3** Any discrepancies between drawings to be reported to the Architect Immediately.
- **G4** All Levels are above ordnance datum (AOD)
  New Levels are shown thus: +20.345
  Existing Levels are shown thus: EX+20.345
  Retained Existing Levels: EX+20.345
- **G5** Use figured dimensions only; Do not scale from drawings. IF IN DOUBT, ASK.
- **G6** Refer to Structural Engineers drawings for all structural and services information.
- **G7** For tolerances see the Design Drawings and Specifications
- **G8** For elements of work subject to Contractor's Design, this drawing is indicative of the visual & performance requirements only. The Contractor is responsible for the detailed design and co-ordination of the Installation within the parameters defined in the specification, design drawings, contract terms and contract documents.
- **G9** Room numbers are shown thus: 115
- **G10** Door(D) & Window (W) References are shown thus: D1 / W1
- **G11** Clear height is shown thus (finished floor to finished soffit): 2750
- **G12** T Sheet Reference shown thus: IWS-01
- **G13** Finishes are shown thus:

- **G14** Setting Out Points shown thus: SOP
- **G15** Refer to A/UCLH4A/9100 for T Sheet references, and to A/UCLH4A/9102 for Architectural Specifications.

Work Package	Cost Check	Info/Briefing	Tender	Contract	Construction
-					

Date	Revision	Description
27.11.2012	A	Issued under Memo036: for Ecology / Planning Issue

Date	Ref.	Revision

Project: Maygrove Road Housing
Subject: Extensive Living Roof Build Up Detail Section
Architects: Hopkins Architects Partnership LLP, 27 Broadley Terrace, London, NW1 6LG, T: 020 7724 1751 E: mail@hopkins.co.uk

Sort Code	Drawing Number	Rev.
A/MRH	6001	A

Date 28.11.2012 Scale 1:20 at A3

APPENDIX 6.0 – NOTES ON MAINTENANCE OF BIODIVERSE ROOF & MONITORING PROGRAMME

MAINTENANCE

A maintenance scheme will likely be provided by the installation contractors; however this section gives a basic overview of maintenance required for biodiverse roofs. Should the installation contractor not offer maintenance then a specialist contractor will be sought to do so.

There will be a maintenance scheme that is adhered to for the living roof at the site despite extensive biodiverse roofs of the like being considered relatively 'low maintenance'. This maintenance scheme will be in addition to the management and monitoring actions detailed in section 4.0. The primary factors considered as part of maintenance of the living roof will be the following:

Undesirable Plants

Vegetation found across the roof and in drains that damages the biodiversity aims, planting regime and building fabric (e.g. Buddleja) will be removed whilst immature.

Fire Breaks

Vegetation breaks/barriers have an important safety function and prevent the spread of fire. All vegetation barriers at up-stands, roof penetrations and fire breaks will be maintained at their original width and cleared of any encroaching plants.

Drain Heads and Outlets

All drainage points will be checked every year and cleared out if necessary to ensure optimum performance. Excess water must be able to leave the roof, to avoid ponding and overloading.

Health and Safety During Maintenance

Where maintenance will be undertaken within 2m of the edge of a green roof, fall protection will be provided. The fall protection systems will themselves maintained once a year.

MANAGEMENT, MONITORING & FUNDING

This section provides an overview of the relevant management, monitoring and funding features of the ecological enhancements at the site. As an overview, Greengage will monitor the ecological aspects of the enhancement features (e.g. checking species mixes are appropriate for the locality) with general maintenance and 'day to day' management being undertaken by an external company appointed by the owners/developers. Funding will be from an annual residents surcharge for grounds and property maintenance. The maintenance of the living roof will be undertaken by the installation contractors. However, as discussed in the section 2.0, should this maintenance not be offered then the services of a specialist living roof maintenance company will be sought.

This Ecological Management Plan will maintain and enhance the living roof habitats and species that are included in the London and Camden BAP. It will help achieve initiatives and targets set out within these BAP's providing habitat for priority species. In particular the living roof will contribute to targets for the London BAP Wasteland HAP, London and UK BAP Stag Beetle, Bat Species and Black Redstart SAPs, and Camden BAP the Built Environment.

The Ecological Management Plan will follow a clearly defined 5 year timetable in the first instance that will be used as a reference point for site maintenance, monitoring and any future planting and enhancement works that may be necessary for the biodiverse roof.

Living roof are dynamic, and the species composition is anticipated to change over time, due to plant selection resulting from the prevailing climatic conditions, natural colonisation, and succession. As a result, some of the actions within the first 5 years will be dependent upon rate of growth or success of initial planting/sowing and enhancements. In general, where measures have not been stated it is due to a non-intervention policy once the features have been established.

This Plan will also be iterative in the medium to long-term, adapting in a staged process to the changing roof composition and in response to the feedback from monitoring exercises. Suggestions can be made to alter the enhancement measures or supplement the planting regime as necessary. Primarily, the Ecological Management Plan will include actions to maintain the ecological objectives for the Living Roof, which are:

- Optimise biodiversity measured by the range of wildlife benefiting plant species, lichens, mosses and fungi, and invertebrate and bird species using the living roof;
- Encourage invertebrates through diverse range of floral species and suitable invertebrate niche habitats;
- Encourage species highlighted in the UK BAP, Red Data Book and English Nature's Species Recovery Programme such as the black redstart, the house sparrow, the brown-banded carder bee and ground nesting mining bees.

Greengage will undertake the monitoring programme that will measure the success of the living roof for their overall biodiversity value, observing any natural colonisation, the success of the seed mix and plug planting and use of the roof by birds and invertebrates as key biodiversity indicators. The monitoring for birds and invertebrates in particular will occur annually for the first 3 years and is recommended biennially thereafter. Monitoring will focus on the diversity and abundance of these species.

At or just after Practical Completion of the living roof, we will inspect the ecological enhancements implemented as a result of the recommendations in this Living Roof Specification. We propose to undertake three further site surveys over the following 3 years after practical completion to monitor the effectiveness for increasing biodiversity.

After the initial 3 years of establishment and annual surveys, we highly recommend that biennial site surveys over the following 10 years are undertaken to monitor the effectiveness of the ecological enhancement and amend the Ecological Management Plan accordingly.

Indicators of success will include the successful establishment of a wide variety of plant species, natural colonisation of floral species in the bare areas on the roof, evidence of invertebrates inhabiting the ecological features incorporated on the roof, evidence of bird activity on the roof such as birds using the nest boxes or signs that the black redstart is using the living roof.

The table below summarises management actions for the first 5 years. Assuming that practical completion of the living roof is undertaken by autumn 2013, Year 1 Spring will be Spring 2014. Following the initial 5 year period, the actions should be repeated, with any changes to the actions informed through the reactive process that should be used as a basis of this iterative management/monitoring plan.

In addition to checking the living roof, Greengage will check the status of the other ecological enhancement features during each visit, however specific maintenance and management of these features (if required) was included.

Table Showing Key Stages of the 5 Year Management Plan

Year and Season	Action	Comments
Year 1 – Spring	-	-
Year 1 – Summer	• Annual monitoring programme (survey to be undertaken between May and August) • Survey for signs of invertebrates and bird species using the roof areas • Check enhancement measures are intact	• An annual monitoring programme by Greengage will measure the success of the roof for their biodiversity value, including surveying for dominant plant species - this will inform the need for any improvements/alterations • Survey for signs that invertebrates are inhabiting enhancement features and other fauna are using the site for foraging, nesting or perching • During the monitoring programme it will be necessary to check the enhancement measures are intact, such as the wire netting not been blown away and the rope coils nailed down
Year 1 - Autumn	• Re – plant or supplement planting if necessary • Weed out competitive species if necessary	• Feedback from the monitoring programme will inform the need for any further planting or weeding if required
Year 1 – Winter	• Check if any litter needs removing and dispose where necessary	-
Year 2 – Spring	• Annual monitoring programme (survey to be undertaken between May and August) • Survey for signs of invertebrates and bird species using the roof areas • Check enhancement measures are intact	• An annual monitoring programme by Greengage will measure the success of the roof for their biodiversity value, including surveying for dominant plant species - this will inform the need for any improvements/alterations • Survey for signs that invertebrates are inhabiting enhancement features and other fauna are using the site for foraging, nesting or perching • During the monitoring programme it will be necessary to check the enhancement measures are intact, such as the wire netting not been blown away and the rope coils nailed down

Year and Season	Action	Comments
Year 2 – Summer	-	-
Year 2 – Autumn	• Re – plant or supplement planting if necessary • Weed out competitive species if necessary	• Feedback from the monitoring programme will inform the need for any further planting or weeding if required
Year 2 – Winter	• Check if any litter needs removing and dispose where necessary	-
Year 3 – Spring	-	-
Year 3 – Summer	• Annual monitoring programme (survey to be undertaken between May and August) • Survey for signs of invertebrates and bird species using the roof areas • Check enhancement measures are intact	• An annual monitoring programme by Greengage will measure the success of the roof for their biodiversity value, including surveying for dominant plant species - this will inform the need for any improvements/alterations • Survey for signs that invertebrates are inhabiting enhancement features and other fauna are using the site for foraging, nesting or perching • During the monitoring programme it will be necessary to check the enhancement measures are intact, such as the wire netting not been blown away and the rope coils nailed down
Year 3 – Autumn	• Re – plant or supplement planting if necessary • Weed out competitive species if necessary	• Feedback from the monitoring programme will inform the need for any further planting or weeding if required
Year 3 – Winter	• Check if any litter needs removing and dispose where necessary	-
Year 4 – Spring	-	-
Year 4 – Summer	-	-
Year 4 – Autumn	• Check enhancement measures are intact • Check if any litter needs removing and dispose where necessary	• Check the enhancement measures are intact, such as the wire netting not been blown away and the rope coils nailed down

Year and Season	Action	Comments
Year 4 – Winter	-	-
Year 5 – Spring	• Biennial monitoring programme of dominant plant species, invertebrates and birds diversity & abundance (survey to be undertaken between May and August)	• A biennial monitoring programme is recommended to continue to measure the success of the roof for their biodiversity value, including surveying for dominant plant species - this will inform the need for any improvements/alterations to the long term Ecological Management Plan (covering a period up to 25 years) • Survey for signs that invertebrates are inhabiting enhancement features and other fauna are using the site for foraging, nesting or perching • During the monitoring programme it will be necessary to check the enhancement measures are intact, such as the wire netting not been blown away and the rope coils nailed down
Year 5 - Summer	-	-
Year 5 – Autumn	• Re – plant or supplement planting if necessary • Weed out competitive species if necessary	• Feedback from the monitoring programme will inform the need for any further planting or weeding if required
Year 5 – Winter	• Check if any litter needs removing and dispose where necessary	-

The table outlines the necessary responsibilities and key objectives for the next 5 years. The actions should be repeated and edited as appropriate following the initial 5 years. This is the basis of the iterative plan, with edited/added actions decided upon by the ecologist as a function of any un-foreseen potential changes that may need to be addressed in the future). Should the Ecological Management Plan need to be extended beyond 10 years, it will be done so in appropriate stages, considered to be 5 – 10 years, 10 – 15 and up to 25 years.

Hence, the Ecological Management Plan is iterative and feedback from the monitoring exercises will inform and develop the Plan, which will be amended and updated accordingly to maintain the objectives.

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